DESIGN DATA		
Traffic	Average Daily	
Current 2016	LESS THAN 100 V.P.D	
Forecast 2036		
Clear Zone Distance:		
Minimum Sight Dist. for Stopping: 80 ft	Bridges: HS-3	
Sight Dist. for No Passing Zone: NA		
Pavement Design Life: NA		
Design Accumulated One-way ESALs: N/A		

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	21155	1	1

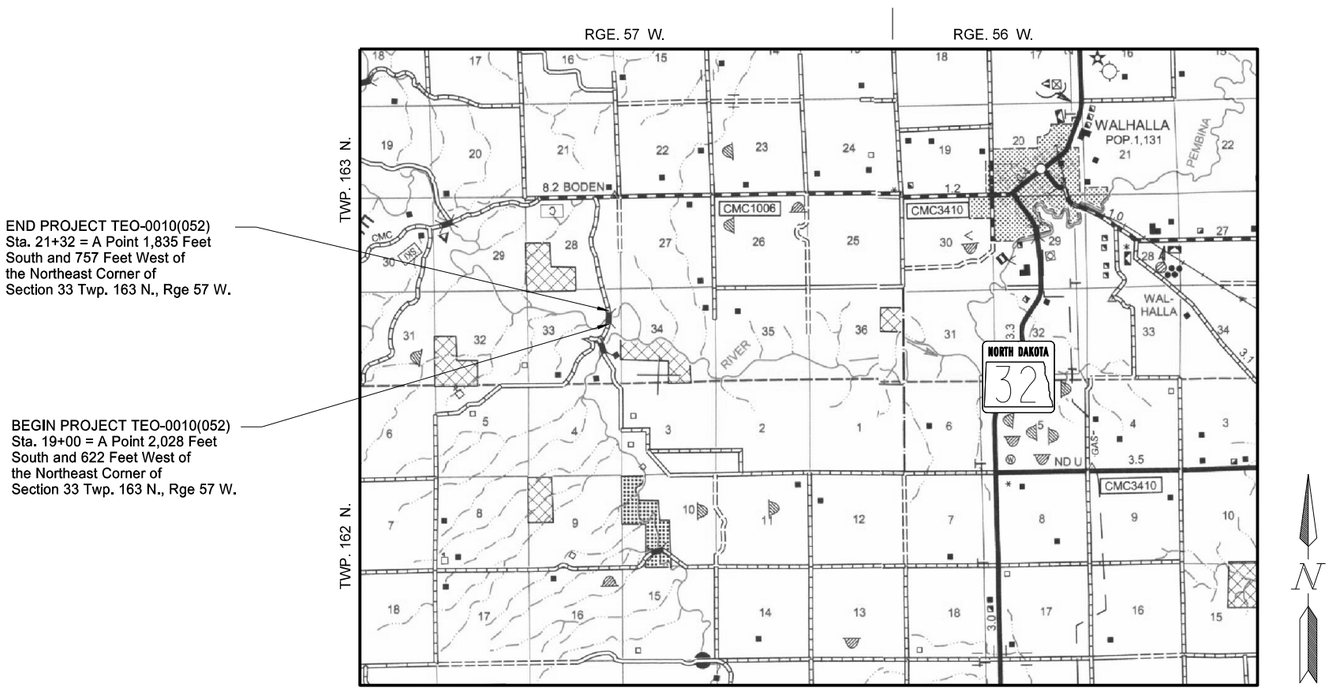
JOB #1
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

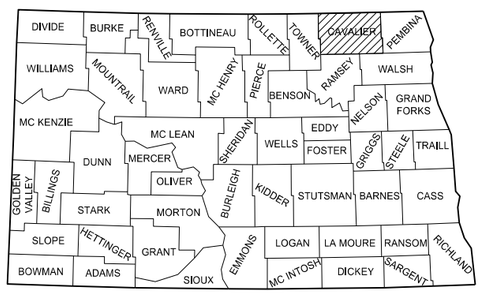
TEO-0010(052)

Cavalier County
4 Miles West and 1.5 Miles South of Walhalla, ND
Bridge #10-145-08.1
Structure Rehabilitation & Incidentals

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
TEO-0010(052)	0.044	0.044





STATE COUNTY MAP

DESIGNERS

Wade Thompson

Paige Mortenson

APPROVED DATE 05/12/16

/S/ Robert Fode
OFFICE OF PROJECT DEVELOPMENT
ND 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 05/06/16

/S/ Dustin Kinnischtzke
NDDOT DIV-DIST OR CONSULTANT FIRM

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	2	1

TABLE OF CONTENTS

PLAN SECTIONS

Section	Page(s)	Description
1	1	Title Sheet
2	1	Table of Contents
6	1	Notes/ Basis of Estimate
6	2 - 3	Environmental Commitments
8	1	Quantities
20	1	Flotation Silt Curtain Detail
30	1	Typical Sections
60	1	Plan & Profile
75	1	Wetland Impacts
76	1	Erosion Control
77	1	Permanent Erosion Control
100	1 - 2	Work Zone Traffic Control
110	1 - 2	Signing
170	1 - 15	Bridges and Box Culverts
175	1	Soil Boring Logs

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1	NDDOT Abbreviations
D-101-2	NDDOT Abbreviations
D-101-3	NDDOT Abbreviations
D-101-20	Line Styles
D-101-21	Line Styles
D-101-30	Symbols
D-101-31	Symbols
D-101-32	Symbols
D-622-1	Pile Splice Details
D-704-7	Breakaway Systems for Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems for Construction Zone Signs - U-Channel Post
D-704-10	Construction Sign Details - Regulatory Signs
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-704-15	Road Closure Layouts
D-754-23	Perforated Tube Assembly Details
D-754-24	Mounting Details Perforated Tube
D-754-27	Sign Punching, Stringer and Support Location Details Regulatory, Warning, and Guide Signs
D-754-29	Sign Punching, Stringer and Support Location Details Regulatory, Warning, and Guide Signs
D-754-37	Sign Punching, Stringer and Support Location Details Regulatory, Warning, and Guide Signs
D-754-82	Object Markers

SPECIAL PROVISIONS

Number	Description
SP 0003(14)	Temporary Erosion and Sediment Best Management Practices
SP 0004(14)	Federal Migratory Bird Treaty Act
SP 313(14)	Bridge Paint: Lead Paint Removal, Containment, and New Paint
SP 5114(14)	Permits and Environmental Considerations

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	6	1

PLAN NOTES

100-P01 **DIMENSIONS:** The dimensions shown for the various fabricated parts are computed from general measurements of the existing structure. The actual dimensions required for a proper fit or alignment may vary from the shown dimensions. Verify all dimensions to assure proper fit and alignment of the various components, both new and existing prior to installation.

INCIDENTALS: Include the cost of incidental items shown in the plans but not listed in the estimate of quantities in the unit price bid for various pay items.

100-P02 **EROSION CONTROL:** Bid Items Fiber Rolls and Flotation Silt Curtain are included for use in conjunction with the Contractor's SWPPP. These quantities may be reduced depending on the Contractor's operation. An estimated quantity has been set up for each item.

100-P03 **UTILITIES:** Utilities that the Engineer has been made aware of are shown on the plans. Other utilities may exist that are not shown. Underground utility locations are approximate and not all utilities are shown on the plans. The actual locations and elevations are unknown. The Contractor will be liable for any costs resulting from damage to utilities or pipelines.

107-710 **HAUL ROADS:** Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

201-P01 **CLEARING AND GRUBBING:** Remove all trees as necessary to construct the proposed abutments. There is approximately 4 trees to be removed. Some of the trees have multiple trunks that originate from the same root system. Removal of trees in temporary easements is not allowed. It is the Contractor's responsibility to assess the work required for removal. Include all costs for labor, equipment, removal and disposal of trees in the unit bid price for "CLEARING AND GRUBBING".

203-P01 **COMPACTION CONTROL:** Construct the embankment with Compaction Control, Type B in accordance with Section 203.04 E.3 of the Standard Specifications.

216-P01 **WATER:** Water for compaction and dust control is included in other bid items.

261-P01 **PERMANENT FIBER ROLLS:** If fiber rolls are to remain on the project, use fiber rolls that are composed of plastic or natural fiber photodegradable netting that has a life expectancy between 12 to 24 months. If the photodegradable netting is plastic, the netting color must be either clear or green. Black plastic netting will not be allowed.

704-P01 **CONSTRUCTION SIGNING:** Use the construction signing layout on Sheet 2 Section 100 for the duration of the project. Coordinate schedule with Engineer and the County to ensure the least amount of downtime and disruption to traffic.

754-P01 **SIGNING:** Stockpile signs designated for removal on site for Cavalier County. Replace any signs damaged by contractor operations at no expense to owner.

970-P01 **TREES**: Provide trees with a minimum of 1½" diameter above the bole, and a minimum of eight feet in height. Potential species for use on this project are Eastern Cottonwood, American Linden, and Northern Oak. Final tree species shall be determined at time of planting by Cavalier County. Final locations for tree planting will be determined by the project engineer and Cavalier County.

BASIS OF ESTIMATE

Foundation Fill	CY Measured in Place
Seeding	Entire disturbed area within the right of way and project limits minus hard surfaces
Mulching	Provided for permanent seeding
Topsoil	Quantity based on 6" of removal and replacement. Waste excess topsoil onsite in locations approved by the Engineer.

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TEO-0010(052)
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

PLAN NOTES

DRWN. BY	CHKD. BY	PROJECT NO.
JM	WT	18215103

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	6	2

ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS (EC): Cavalier County, the North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable impacts to wetlands will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank.

ACTION REQUIRED /TAKEN: 0.03 acres of permanent impacts to USACE jurisdictional and to EO 11990 wetlands will require mitigation. These impacts will be mitigated at the Vollrath 16/17 wetland mitigation bank.

Wetland Impact Table

Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size Ac.	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		Wetland Mitigation				
											Mitigation Required**/***			Location; Acreage; Wetland#; Ratio	Onsite Mitigation Acres
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	EO 11990	USACE	USFWS		
1	Sec 33 T163N, R57W	PEMC	Stream bank	0.18	Natural	Yes	0.00	0.03	--	--	Y	N	N/A	TBD	N/A
			Totals	**0.18**			**0.00**	**0.03**	**0.00**	**0.00**					**N/A**

* A wetland Jurisdictional Determination is pending. Assuming jurisdiction.
**All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.
***All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), Preamble Wetlands, and temporary impacts do not require mitigation.

Other Waters Impact Table

Other Waters											Other Water Mitigation				
Number	Location	Type	Size		Feature	USACE Jurisdictional*	Impacts to Other Waters				Mitigation Required			Location	Method
			Acres	Linear Feet			Acres Temp	Acres Perm	Linear Feet Temp	Linear Feet Perm	EO 11990	USACE	USFWS		
OW1	Sec 33 T163N, R57W	Pembina River	0.53	459	Natural	Yes	0.00	0.01	0.00	47	N	N	N	N/A	N/A
		Totals	**0.53**	**459**			**0.00**	**0.01**	**0.00**	**47**					

*A wetland Jurisdictional Determination is pending. Assuming jurisdiction.

Summary Impact Table

Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	**Total (Acres)**	**Wetland Type**	**Total (Acres/Lf)**
Natural/JD	0.03	**Temporary JD**	0.00
Natural/Non-JD	0.00	**Non-JD Temporary**	0.00
Artificial/JD	0.00	**Permanent JD > 0.10**	0.00
Artificial /Non-JD	0.00	**Permanent OW**	0.01 ac/46.5ft.
Total	**0.03**	**Temporary OW**	0.00

Compensation Requirements by Agency and Water Type

Water Type	USACE Mitigation	EO 11990 Mitigation
Natural/JD Wetland	> 0.1 acre	All
Natural/Non-JD Wetland	No mitigation required	All
Artificial/JD Wetland	> 0.1 acre	No mitigation required
Artificial/Non-JD Wetland	No mitigation required	No mitigation required
Deep Water (> than 6.6 feet)	No mitigation required	No mitigation required
Other Water	> 300 linear feet	No mitigation required
Preamble	No mitigation required	No mitigation required

Revised 7/13/16	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL COMMITMENTS

EC-2: All impacted riparian trees within the project right-of-way and easements must be mitigated for as directed by resource agencies.

ACTION REQUIRED /TAKEN: There are riparian trees within the project right-of-way and easements. Approximately 4 trees will be impacted during construction. Four trees will be mitigated at a (2:1) ratio in the impacted riparian corridor(s), as shown in these plans.

EC- 3: No construction or demolition activities will take place during the spawning season in the Pembina River from April 15 to June 1.

EC-4: The Contractor shall take steps to prevent construction debris from falling into the waterway.

ACTION REQUIRED /TAKEN: The Contractor will minimize debris falling into the waterway to the maximum extent practicable. Any debris that falls into the waterway will be retrieved.

EC-5: The Contractor shall prevent the introduction of aquatic nuisance species (ANS) into North Dakota waters, or transport of aquatic vegetation to or from any waters of the state, or transport of any aquatic vegetation into the state.

ACTION TAKEN/REQUIRED: The Contractor shall follow the North Dakota Game and Fish Department's (NDGF) Administrative Rules 30-3-06 for compliance with ND Century Code Chapter 20.1-17 on ANS. The Contractor shall notify NDGF at least 72 hours prior to the placement IN or ON the waters of the State of North Dakota of any and all vehicles, vessels, pumps and equipment that will be used in the project, to allow the NDGF sufficient time to inspect any and all such equipment for ANS. The NDGF ANS Coordinator shall be contacted by phone at (701) 770-0920 for equipment inspections, or any additional information regarding ANS prevention protocol.

EC-6: Active migratory bird nests with eggs or chicks are protected by the Federal Bird Treaty Act.

ACTION REQUIRED /TAKEN: NDDOT's special provision, SP0004(14) for compliance with the Federal Regulation shall be followed.

NOTIFICATIONS TO BE FILED BY CONTRACTOR:

- North Dakota Department of Health SFN 17987 Asbestos Notification of Demolition and Renovation for bridges and boxes. Tom Naas (ND License #5302) of KLJ (4585 Coleman St, Bismarck, ND 58503; 701 355 8400) completed an asbestos inspection of Bridge No. 10-145-08.1 on January 9, 2016. Based on visual inspection of the sites, no building or structure materials were determined to contain asbestos. No other inaccessible and/or assumed ACMs were identified.

Permits Required:

NDPDES (North Dakota Pollutants Discharge Elimination System)
Status: To be obtained by the Contractor.

United States Army Corps of Engineers - Section 404 Permit
Status: Obtained.

ND State Water Commission – Sovereign Lands Permit
Status: Obtained.

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ESTIMATE OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANITIY
103	0100	CONTRACT BOND	L SUM	1
201	0330	CLEARING & GRUBBING	L SUM	1
202	0105	REMOVAL OF STRUCTURE	L SUM	1
203	0109	TOPSOIL	CY	20
210	0101	CLASS I EXCAVATION	L SUM	1
210	0111	CLASS 2 EXCAVATION	L SUM	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0201	FOUNDATION PREPARATION	EA	1
210	0210	FOUNDATION FILL	CY	255
251	0200	SEEDING CLASS II	ACRE	.500
253	0101	STRAW MULCH	ACRE	.500
256	0200	RIPRAP GRADE II	CY	267
261	0112	FIBER ROLLS 12IN	LF	760
261	0113	REMOVE FIBER ROLLS 12IN	LF	380
262	0100	FLOTATION SILT CURTAIN	LF	105
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	105
602	1130	CLASS AE-3 CONCRETE	CY	114.0
612	0115	REINFORCING STEEL-GRADE 60	LBS	10,892
616	0360	STRUCTURAL STEEL	LBS	22,716
618	0110	TREATED TIMBER	MBM	12.0
622	0020	STEEL PILING HP 10 X 42	LF	1,440
622	0060	STEEL PILING HP 14 X 73	LF	240
630	0100	SAND BLASTING & PAINTING	L SUM	1
630	9000	CONTAINMENT SYSTEM	L SUM	1
702	0100	MOBILIZATION	L SUM	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	320
704	1052	TYPE III BARRICADE	EA	14
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	401
714	8516	CASING PIPE 36IN	LF	68
754	0117	FLAT SHEET FOR SIGNS-TYPE 3A REFL SHEETING	SF	57
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	131
754	0803	OBJECT MARKERS - TYPE III	EA	4
930	3040	BEARINGS (EXPANSION)	EA	2
930	9642	REHABILITATE HISTORIC STRUCTURE	L SUM	1
970	1000	TREES	EA	8

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

ESTIMATE OF QUANTITIES

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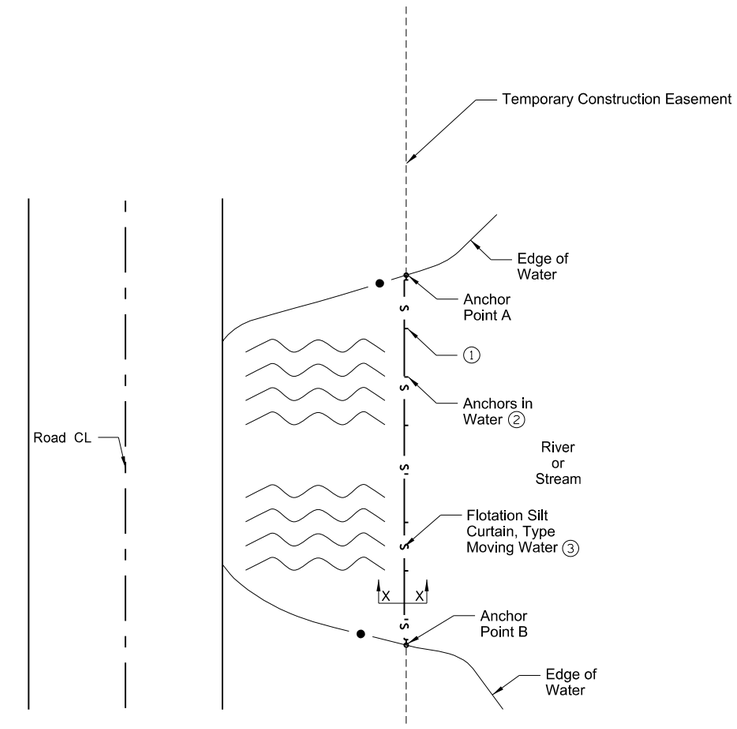
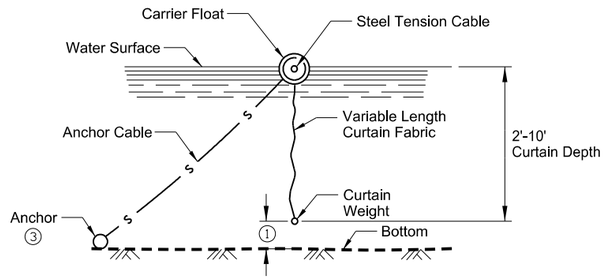
	ND	TEO-0010(052)	20	1



PLAN VIEW
FLOTATION SILT CURTAIN-TYPE MOVING WATER③



SECTION X-X

NOTES:

① Curtain 1 foot from bottom.

② Contractor to supply and install sufficient quantity of anchors to hold the silt curtain in place.

③ Materials meeting Type Moving Water will be required.

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NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

FLOTATION SILT CURTAIN DETAIL

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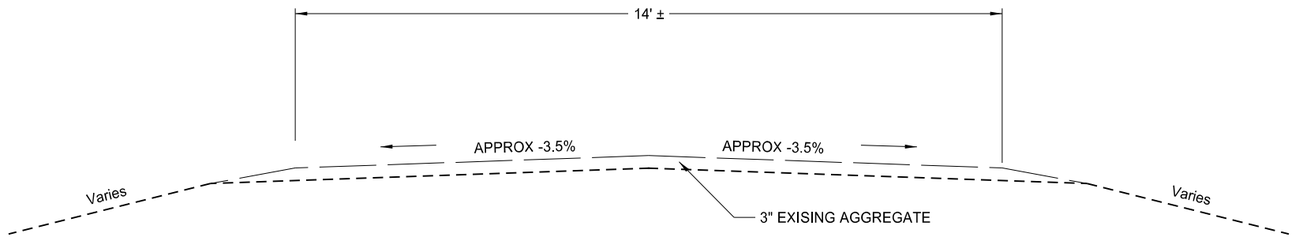
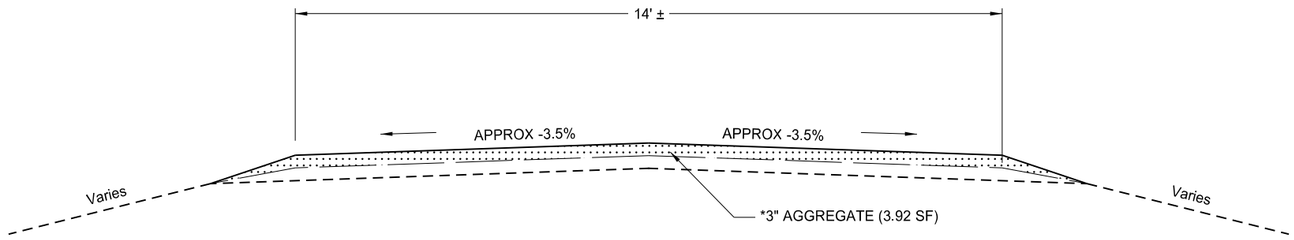
	ND	TEO-0010(052)	30	1



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

*Paid for as Foundation Fill, measured & paid for by CY in place

GRAPHIC SCALE (in feet)
1.5 0 1.5 3
1" = 3'

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NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

TYPICAL SECTIONS

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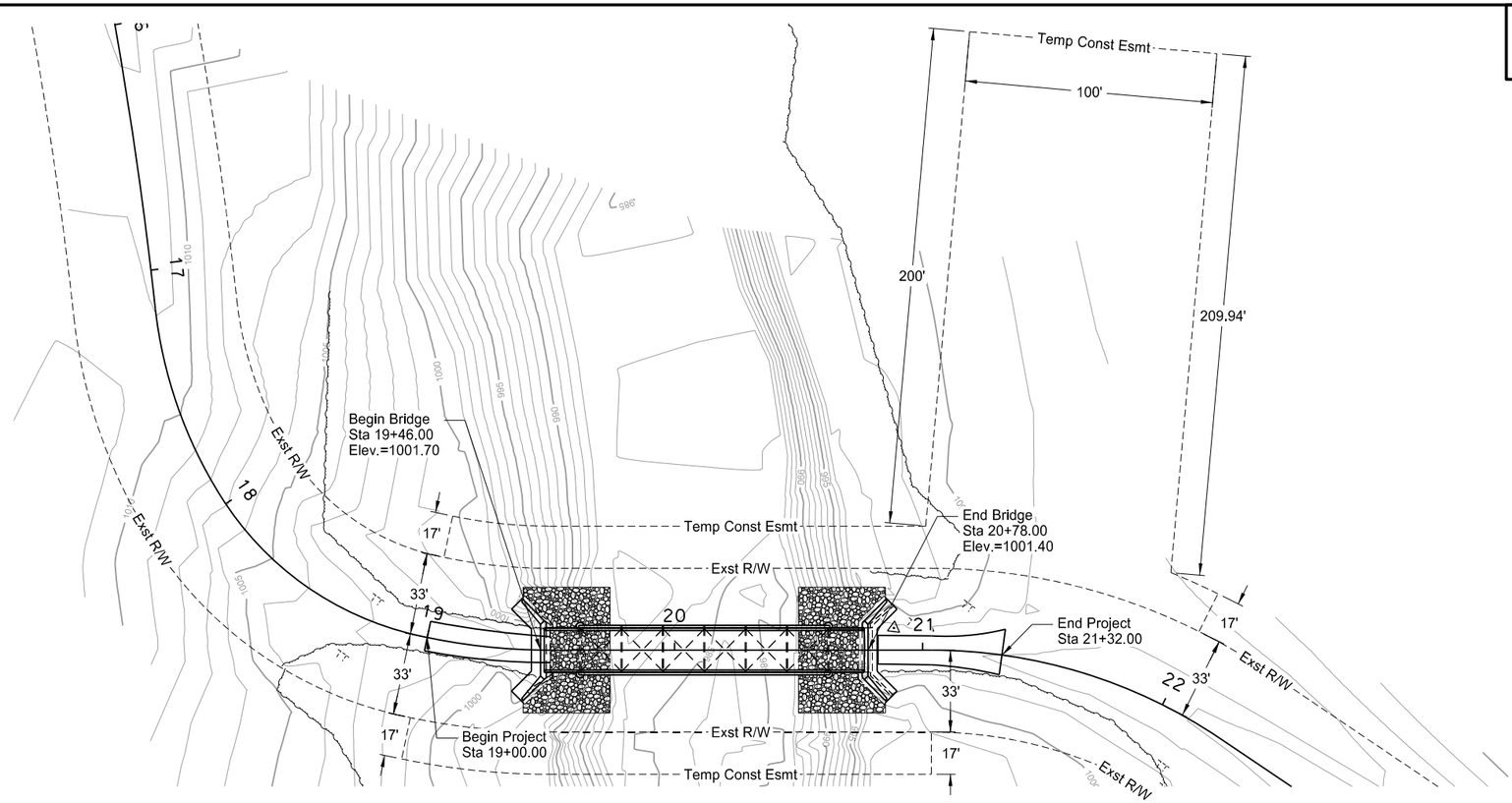
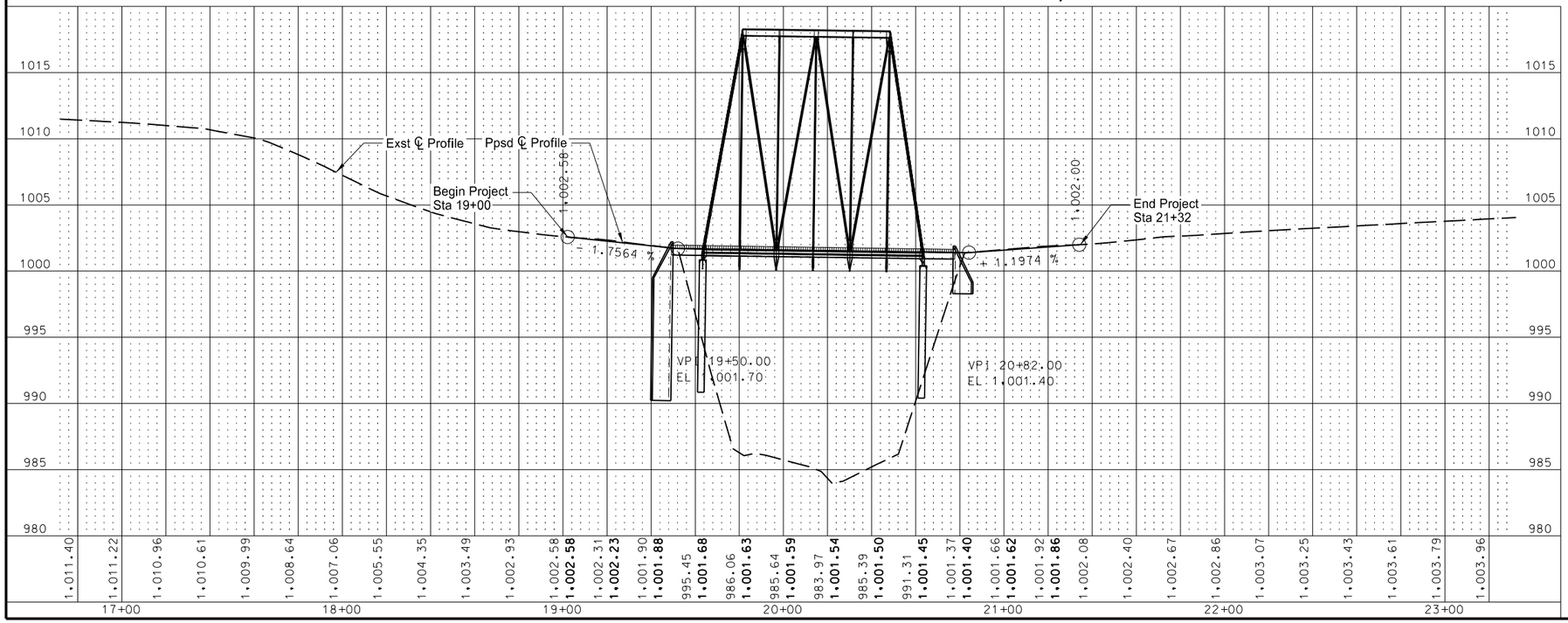
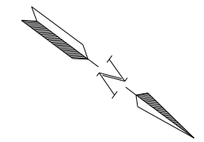
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	60	1

210 0210 FOUNDATION FILL
Roadway 12 CY







GRAPHIC SCALE (in feet)
30 0 30 60
1" = 60'

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CAVALIER COUNTY, NORTH DAKOTA

PLAN AND PROFILE
STA. 19+00 TO STA. 21+32

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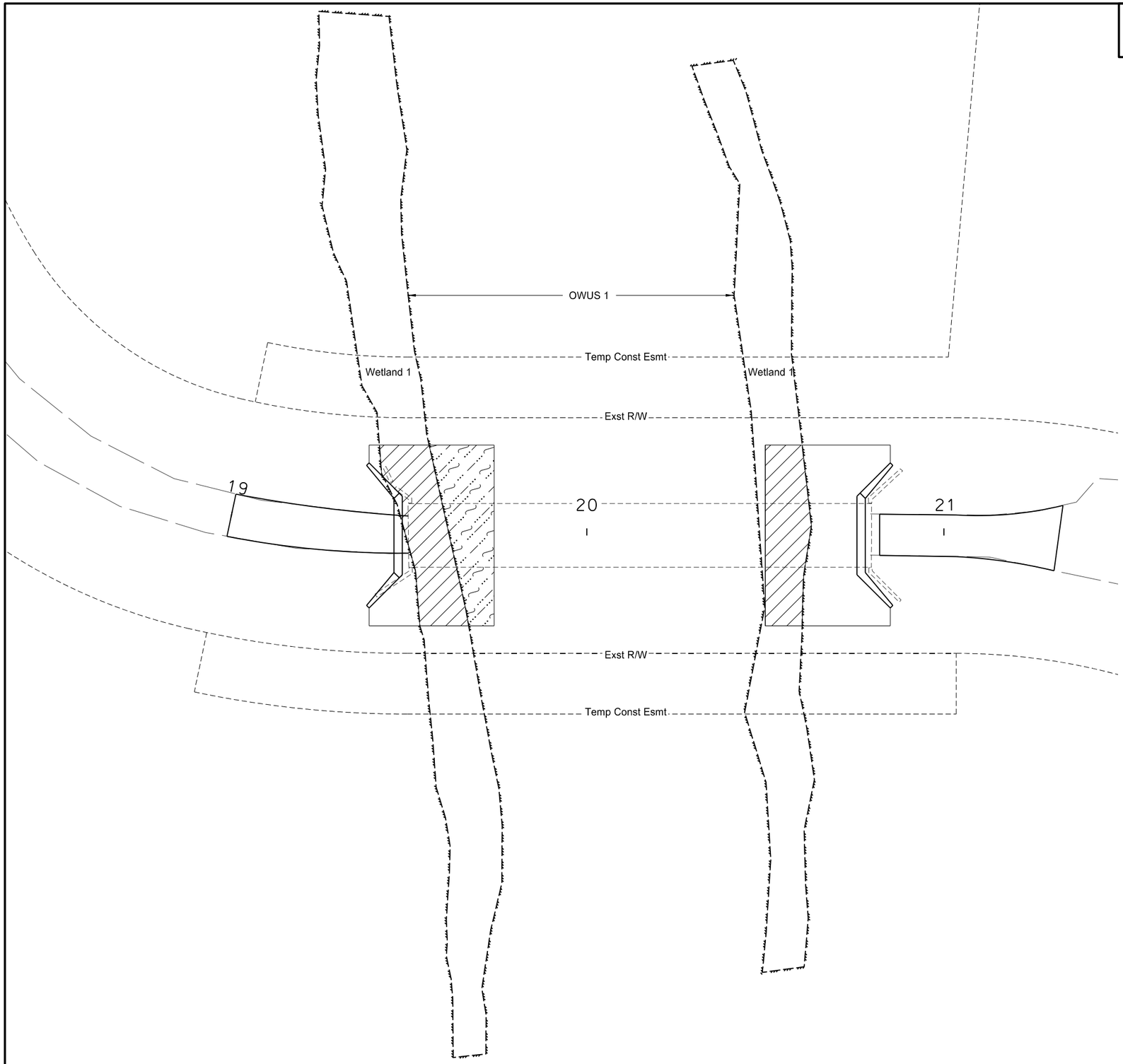
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	75	1



Delineated Wetland

Permanent Wetland Impacts (0.03 ACRES)

Permanent OWUS Impacts (0.01 ACRES)

GRAPHIC SCALE (in feet)
15 0 15 30
1" = 30'

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CAVALIER COUNTY, NORTH DAKOTA

WETLAND IMPACTS

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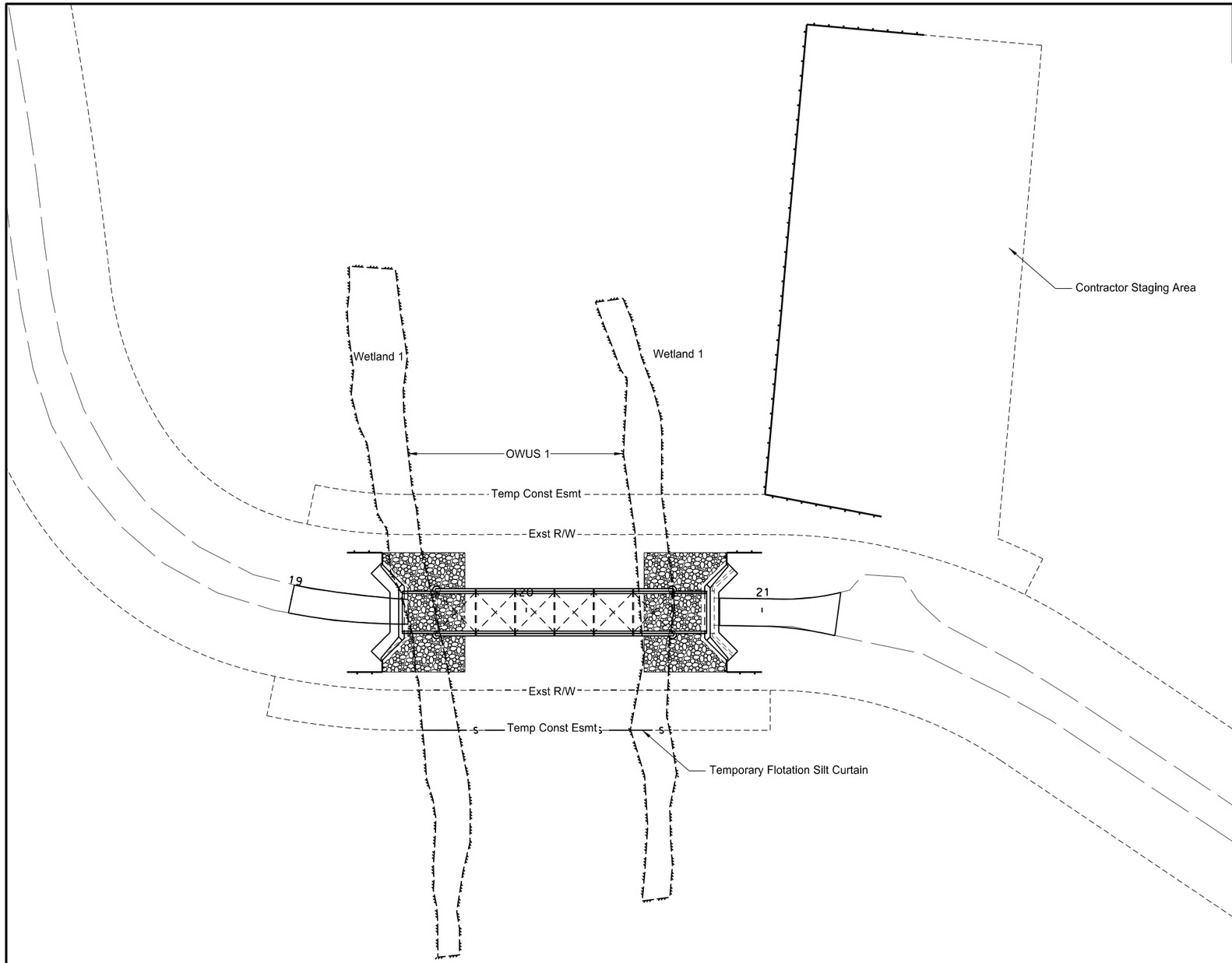

261 0112 FIBER ROLLS 12IN

Abutments		80	LF
Temporary Construction Easement		300	LF
	Total	380	LF

261 0113 REMOVE FIBER ROLLS 12IN

Abutments		80	LF
Temporary Construction Easement		300	LF
	Total	380	LF

262 0100 FLOTATION SILT CURTAIN

Abutments		105	LF

262 0101 REMOVE FLOTATION SILT CURTAIN

Abutments		105	LF

S — Flotation Silt Curtain

12IN Fiber Rolls

Seeding/Mulching

Riprap Grade II
(See Section 170 Sheet 1)

N

GRAPHIC SCALE (in feet)
25 0 25 50
1" = 50'

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NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

TEMPORARY EROSION CONTROL

DRWN. BY	CHK'D. BY	PROJECT NO.
PM		18215103

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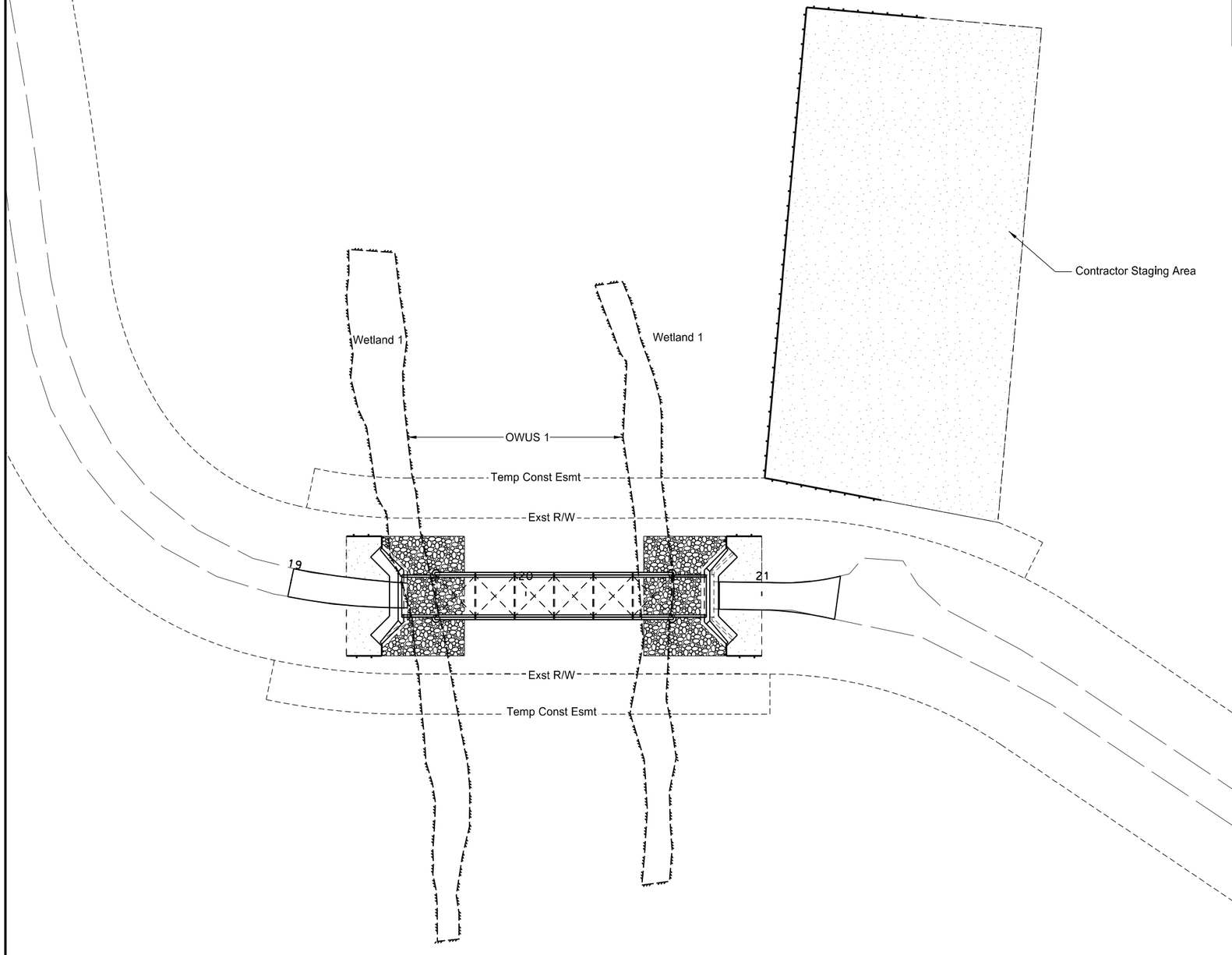
	ND	TEO-0010(052)	77	1



251 0200 SEEDING CLASS II

Abutments	0.030	ACRE
Temporary Construction Easement	0.470	ACRE
Total	0.500	ACRE

253 0101 STRAW MULCH

Abutments	0.030	ACRE
Temporary Construction Easement	0.470	ACRE
Total	0.500	ACRE

261 0112 FIBER ROLLS 12IN

Abutments	80	LF
Temporary Construction Easement	300	LF
Total	380	LF

12IN Fiber Rolls

Seeding/Mulching

Riprap Grade II
(See Section 170 Sheet 1)

GRAPHIC SCALE (in feet)
25 0 25 50
1" = 50'

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

PERMANENT EROSION CONTROL

DRWN. BY	CHK'D. BY	PROJECT NO.
PM		18215103

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	48"x24"	END ROAD WORK		19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back		5	
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	**48"x30"**	**ROAD CLOSED**	**2**	**28**	**56**
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	**60"x30"**	**ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY**	**4**	**31**	**124**
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE		35	
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	**48"x48"**	**ROAD or STREET CLOSED AHEAD or __ FT.**	**4**	**35**	**140**
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	48"x48"	FLAGGING SYMBOL		35	
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE			
704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**320**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**14**
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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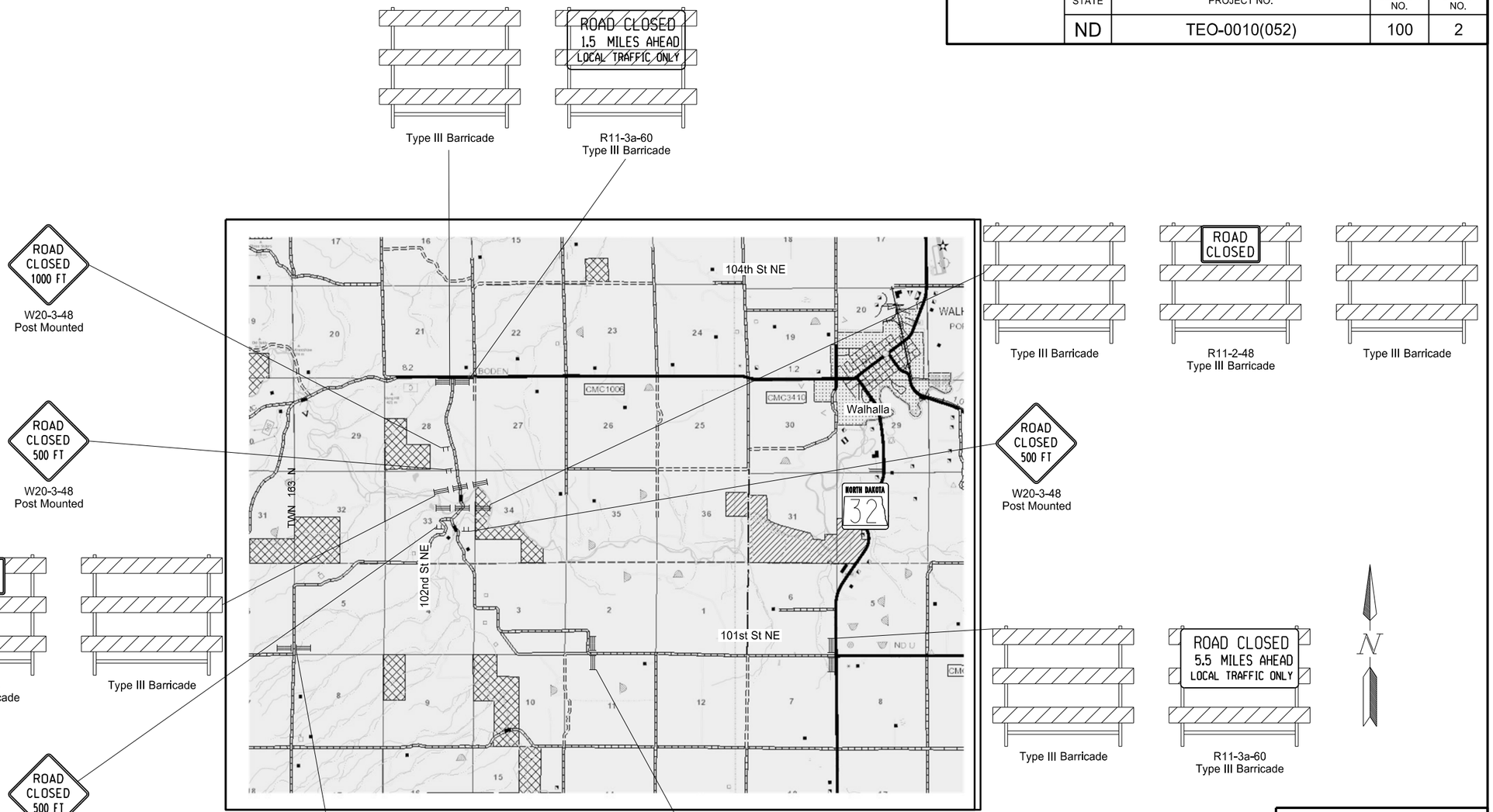
Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	100	2



Type III Barricade

ROAD CLOSED
1.5 MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
Type III Barricade

ROAD CLOSED
1000 FT
W20-3-48
Post Mounted

ROAD CLOSED
500 FT
W20-3-48
Post Mounted

Type III Barricade

ROAD CLOSED
R11-2-48
Type III Barricade

Type III Barricade

ROAD CLOSED
500 FT
W20-3-48
Post Mounted

Type III Barricade

ROAD CLOSED
R11-2-48
Type III Barricade

Type III Barricade

ROAD CLOSED
5.5 MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
Type III Barricade

ROAD CLOSED
500 FT
W20-3-48
Post Mounted

Type III Barricade

ROAD CLOSED
2.5 MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
Type III Barricade

Type III Barricade

ROAD CLOSED
2.5 MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
Type III Barricade

The sign layout is for general informational purposes only.
The contractor will be required to conform to MUTCD and the standard drawings when installing the traffic control signing.

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

CONSTRUCTION SIGNING LAYOUT

DRWN. BY	CHK'D. BY	PROJECT NO.
PM	ENGINEER	18215103

5/6/2016 11:13:35 AM dustinkinnischtzke P:\State\NDDOT\18215103\CADD\bignumber\Design\Plans\100WZ_002_CSL.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	TEO-0010(052)	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
EX																						
16+15 Rt	W1-2L	54		11.3	13.8				2.5 x 2.5 12 ga	15.8	4.0				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	W13-1P
16+75 Rt	W5-3	20		9.0	12.7				2.25 x 2.25 12 ga	14.1	4.0				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
17+75 Rt	W1-8	8		3.0	11.1				2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
18+50 Rt	R12-1	9		5.0	11.7				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
21+25 Lt	R12-1	9		5.0	11.7				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
22+00 Lt	W1-8	8		3.0	11.1				2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
22+50 Lt	W5-3	20		9.0	12.7				2.25 x 2.25 12 ga	14.1	4.0				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
23+25 Lt	W1-2L	54		11.3	13.8				2.5 x 2.5 12 ga	15.8	4.0				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	W13-1P
Sub Total			0.0	56.6		**Total**	98.7									**Total**	32		0	0	4	
Grand Total			0.0	56.6		**Total**	98.7									**Total**	32		0	0	4	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Rural Roadway - 60"

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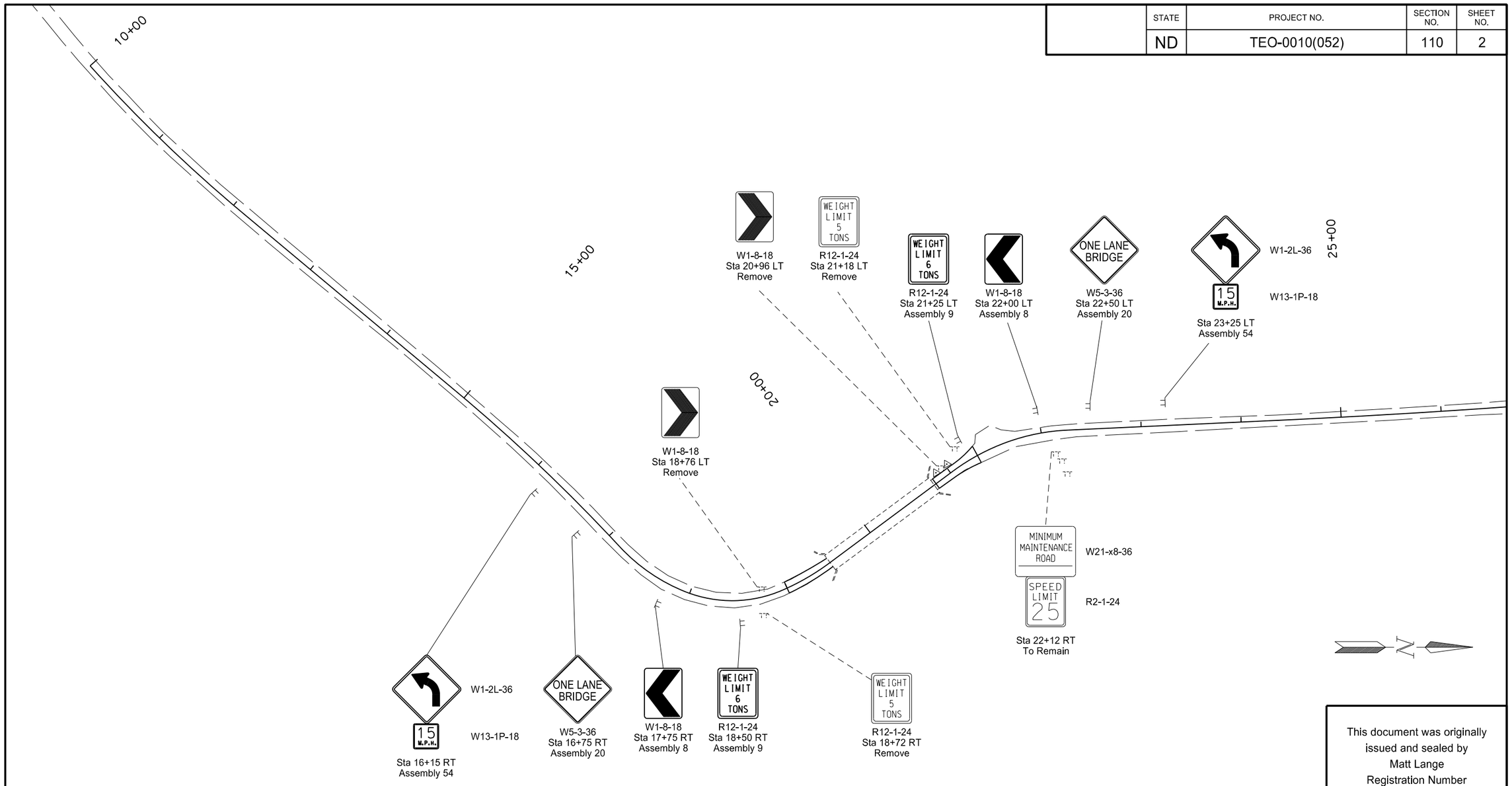
Sign Summary
Perforated Tube

Brickmine Bridge

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	110	2



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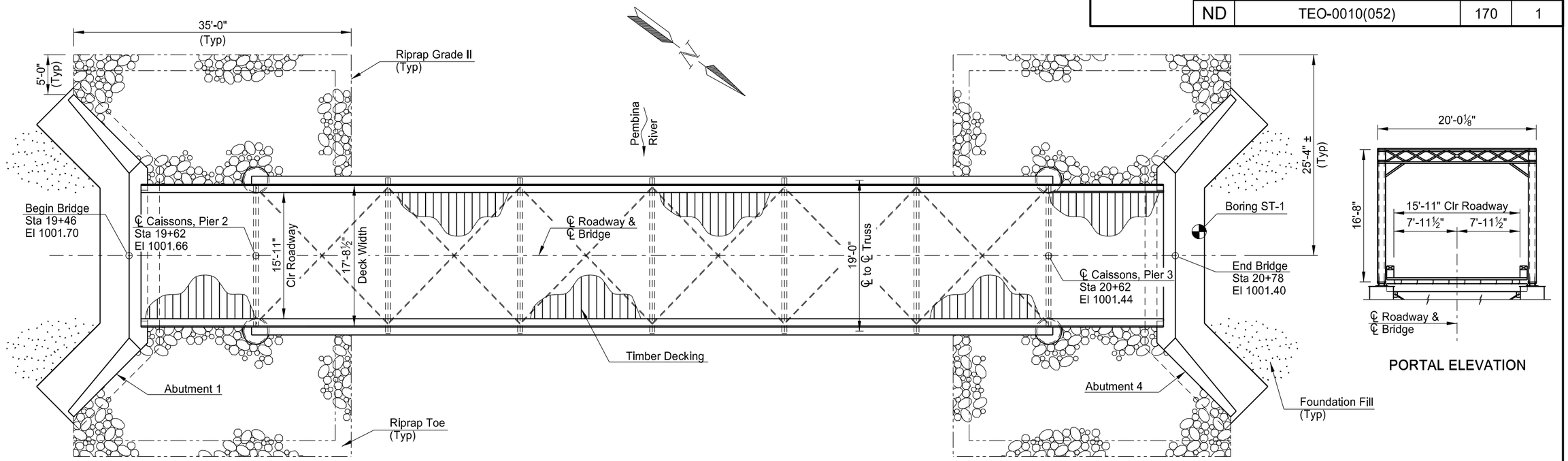
BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

PERMANENT SIGNING LAYOUT

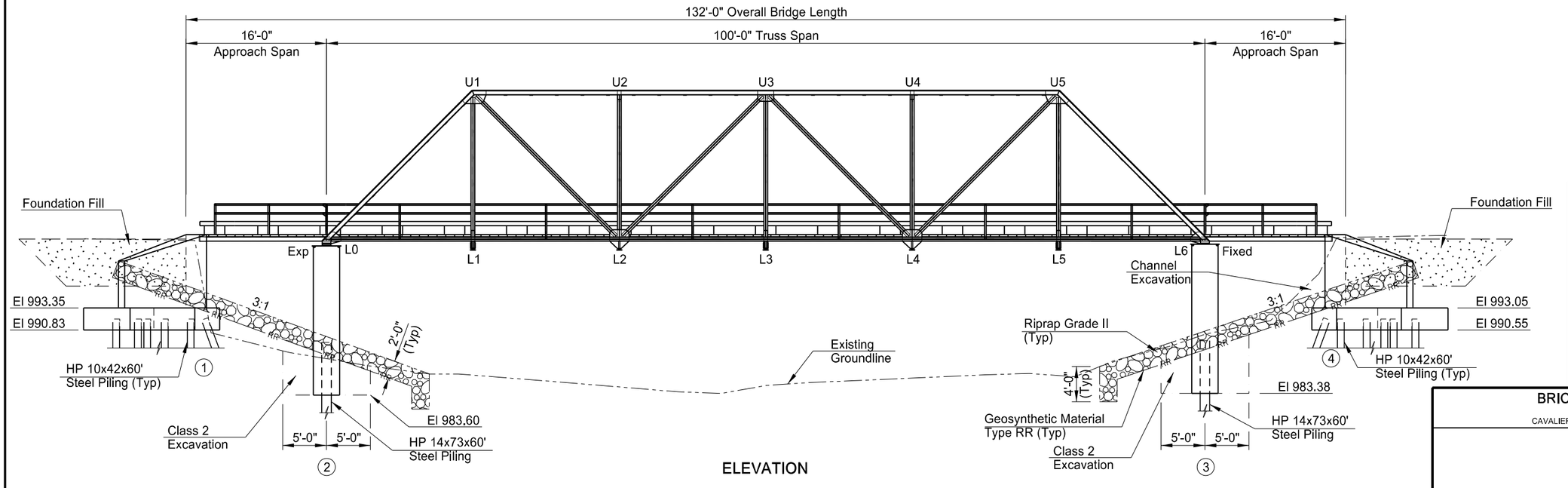
DRWN. BY	CHK'D. BY	PROJECT NO.
PM	ENGINEER	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	1



PLAN

PORTAL ELEVATION



ELEVATION

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

BRIDGE LAYOUT

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	2

STRUCTURAL NOTES

100 SCOPE OF WORK: This project consists of rehabilitating an existing 100' through-truss bridge over the Pembina River located near the city of Walhalla. The bridge will have new concrete abutments, pier caissons, stringers, railings, and timber decking. One truss chord member will be replaced as well.

100 GENERAL: Include the cost of furnishing and placing anchor bolts, neoprene bearing pads, and other miscellaneous items in the unit bid price for "CLASS AE-3 CONCRETE".

107 HAZARDOUS MATERIAL: The existing structural steel is likely painted with lead-based paint. Certain Contractor operations could expose employees to hazardous levels of lead. Plan accordingly and inform employees of the hazards of lead-based paint.

202 REMOVAL OF STRUCTURE: Remove the existing timber deck planks and stringers prior to lifting the truss from its supports. Salvage timber planks for Cavalier County and coordinate with Terry Johnston (701-256-2161) to arrange pickup. Dispose of the stringers in accordance with the Standard Specifications.

Remove the existing posts and railing at bolted connections and dispose of in accordance with the Standard Specifications.

Include all labor, equipment, materials, and miscellaneous items required to perform this work and to remove and dispose of the existing abutments and pier caissons in the price bid for "REMOVAL OF STRUCTURE".

210 CLASS 1 EXCAVATION: Construct any fill that is needed within the limits of Class 1 Excavation up to the bottom of the footing with Foundation Fill following Compaction Control, Type A in accordance with Section 203.04 E.2.b of the Standard Specifications.

210 FOUNDATION FILL: Use Class 5 as specified in Section 816 "Aggregates". Place Foundation Fill in layers of not more than six inches, moisten or dry as required, and thoroughly compact with mechanical tamping equipment.

Foundation Fill quantity is to be paid by the in-place volume within the plan dimensions.

602 SURFACE FINISH: Complete Surface Finish "C" on all concrete surfaces above the finished ground line. On no part of the structure will Surface Finish "D" be allowed to replace Surface Finish "C".

616 STRUCTURAL STEEL: The condition of some of the existing truss steel in unknown. Notify the engineer after completion of sandblasting so they can visually inspect all steel surfaces. Cut out and replace existing steel which is determined to be unsuitable for re-use with new steel of the same shape and size except as noted in the plans. If required, the Engineer will approve reinforcement prior to being installed. Payment for new material will be by the weight of steel installed in accordance with Section 616 of the Standard Specifications. All materials and labor required to remove existing and install new steel sections not shown in plans will be paid for at the unit price bid for "STRUCTURAL STEEL".

Paint all new structural steel with the color number 10076 (Brown) from the Federal Standard 595B Colors.

618 TREATED TIMBER: Produce timber for deck planks, curb rail, and curb blocks from Douglas Fir Larch No. 1 grade or better. Meet AASHTO M 133 for all timber materials.

622 STEEL PILING: Drive piling with a steam, air, or diesel hammer with a rated energy and ram weight not less than 59,246 foot-pounds-tons, as computed by the formula W(E-18,572)+0.638E, where W is the weight of the ram in tons and E is the rated hammer energy. The ram weight is not to be less than 4,500 pounds. It is the contractor's responsibility to determine the type and size of pile hammer that will provide the specified bearing under the actual conditions encountered in the field.

One pile at each substructure is designated for restrike. Once all of the piles at a substructure have been driven to bearing, the designated pile is to be restruck after a 48 hour period. The restrike will consist of a minimum of 10 blows where the hammer is at full stroke and will determine if bearing has been lost on pile due to shale relaxation.

If the specified bearing is still met upon restrike, no further action is required. If the specified bearing is no longer met upon restrike, the Engineer will determine if any corrective action is necessary. The type of corrective action will be determined within 24 hours after restrike, if needed.

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

STRUCTURAL NOTES

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	3

STRUCTURAL NOTES

630 SAND BLASTING & PAINTING AND CONTAINMENT SYSTEM: This work consists of the removal of paint and rust from the structure, containment, storage, and disposal of the material obtained from the paint removal process and the painting of the cleaned structural components as required by SP 313(14). Paint all steel components with color number 10076 (Brown) from the Federal Standard 595B Colors.

714 CASING PIPE 36IN: Meet the requirements of Section 840.01B of the Standard Specifications for the Casing Pipe. Remove a portion of the casing pipe as necessary to embed the existing pier floorbeam into the caisson as shown in the plans. Painting of the casing pipe components is to meet requirements in SP 313(14) and is to be color number 10076 (Brown) from the Federal Standard 595B Colors. Include the costs of this work in the price bid for "CASING PIPE 36IN".

930 BEARING (EXPANSION): Upon removal of truss, the Engineer will examine the existing expansion bearings. If the bearings are determined to be in satisfactory condition, sand blast, paint and reuse the existing bearings. If the existing expansion bearings are used, the bid item "BEARING (EXPANSION)" will be eliminated. If the bearings are in unsatisfactory condition, replace with the new elastomeric expansion bearings as shown in plans.

930 REHABILITATE HISTORIC STRUCTURE: All steel truss components are to be sandblasted, painted, and reused on this project except as noted. The contractor has the option to complete the sandblasting and painting on site or at another location. If the bridge components are transported to another location, brace and support the truss as necessary to prevent bending or twisting. Disassemble the truss components at bolted connections only. The use of a cutting torch to remove bolts or rivets is prohibited. Take precautions to prevent paint chips or other debris from falling in the river or on the ground during the removal process. Submit proposed removal and transporting techniques to the Engineer for approval prior to removal.

Include all materials and labor required to remove the existing steel truss from existing foundations, place it on temporary supports for rehabilitation or transporting it off-site, remove and reset floorbeams, and reset the truss after completion of the rehabilitation process in the lump sum bid price for "REHABILITATE HISTORIC STRUCTURE".

DESIGN STRENGTHS:

F'c 3,000 PSI Class AE-3 Concrete (Min. 28-day compressive strength)
Fy 60,000 PSI Grade 60 Reinforcing Steel
Fy 50,000 PSI Structural Steel (All W & C sections)
Fy 36,000 PSI Structural Steel (All other steel)

ALLOWABLE STRESS DESIGN

WORK DRAWINGS: Submit the following work drawings to the Engineer of Record:

1. Structural Steel
2. Treated Timber
3. Casing Pipe 36IN

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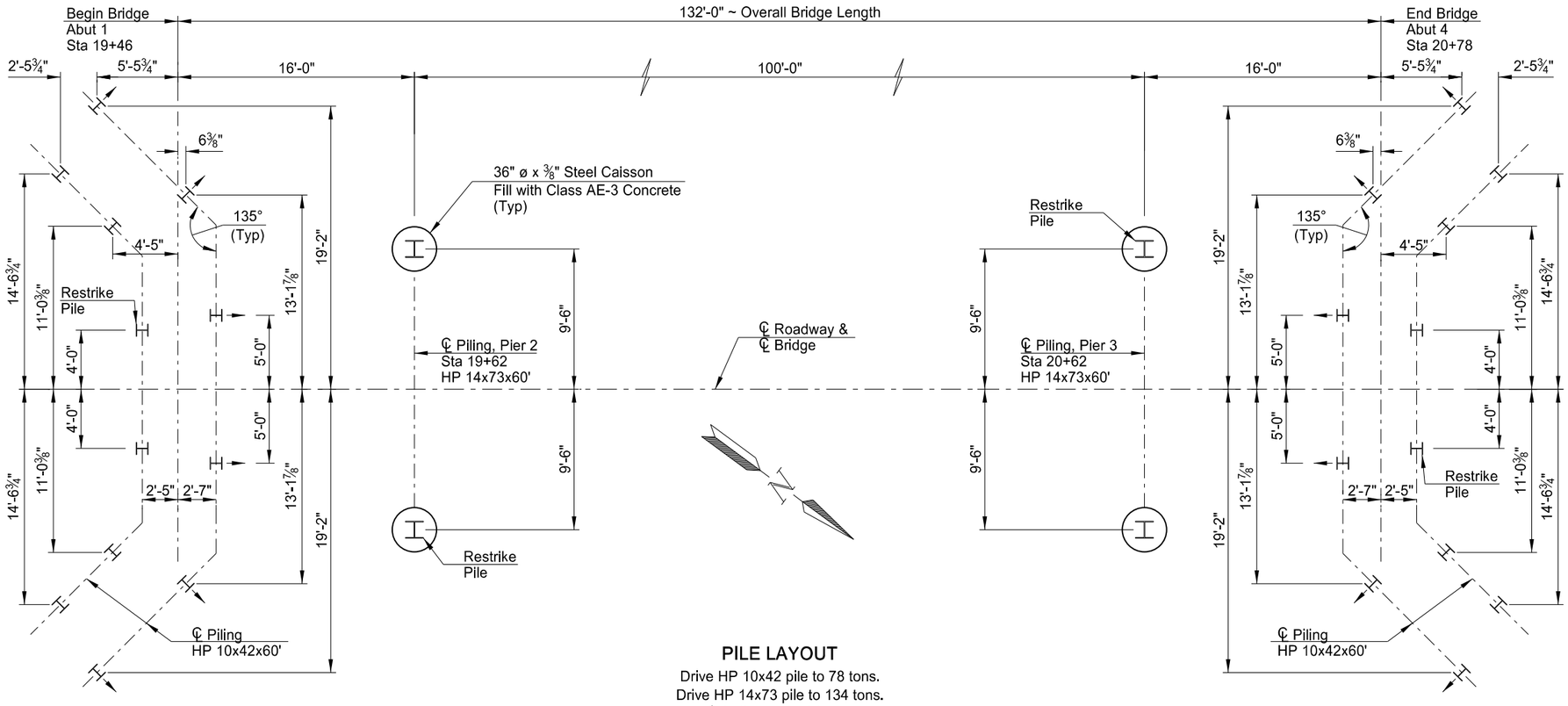
BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

STRUCTURAL NOTES

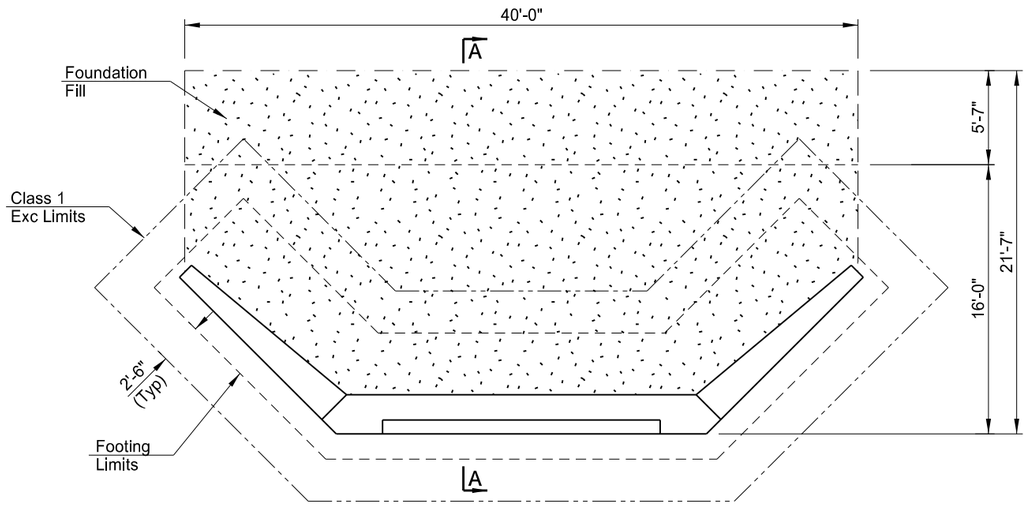
DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	4

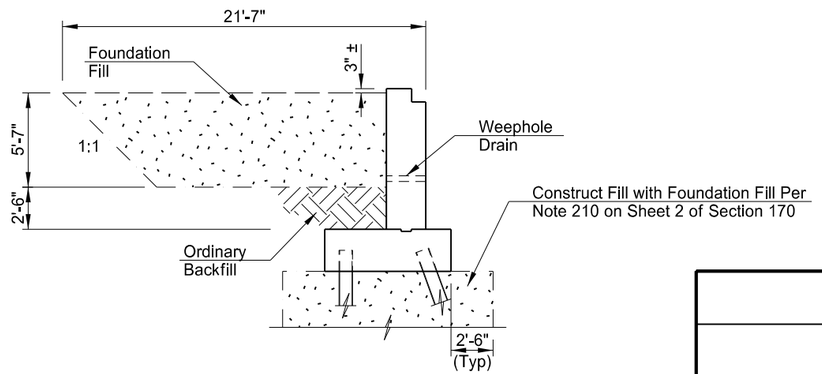


PILE LAYOUT

Drive HP 10x42 pile to 78 tons.
Drive HP 14x73 pile to 134 tons.
Indicates 3:12 batter.



PLAN



A-A

BACKFILL DETAILS

NOTE:

For double acting or single acting diesel hammers, the safe bearing value of piles will be determined by the following formula:

$$P = \frac{3.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

Where:

P = Safe bearing value, in pounds.
W = Weight of striking parts (ram), in pounds.
M = Weight of parts being driven, in pounds. Includes pile weight, anvil (if any), driving cap, etc.
E = Energy per blow, in foot-pounds.
S = Average penetration of pile in inches per blow for last ten blows.

For single acting hammers, E will be calculated by multiplying observed stroke and W.

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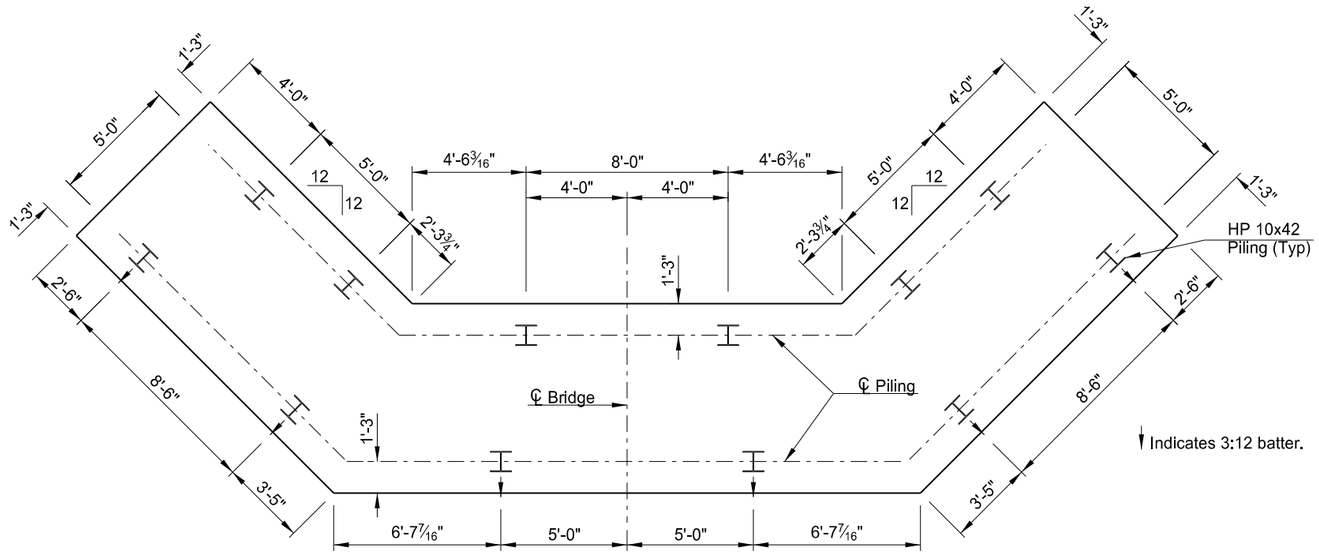
BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

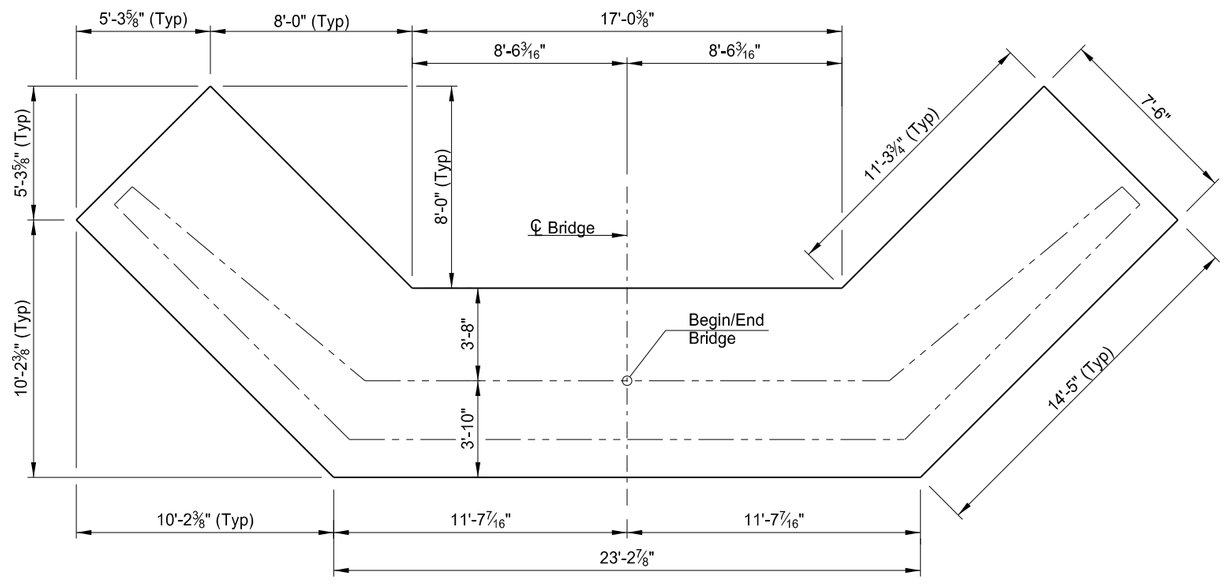
PILE LAYOUT & BACKFILL DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	5



FOOTING PLAN
(Showing Piles)



FOOTING PLAN
(Showing Dimensions)

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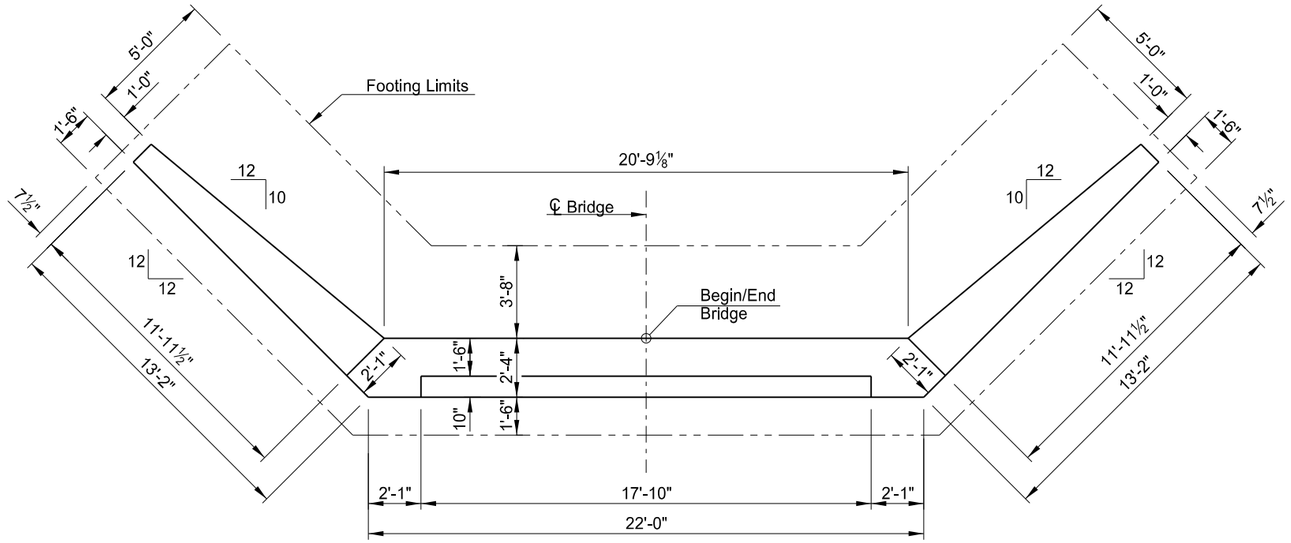
BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

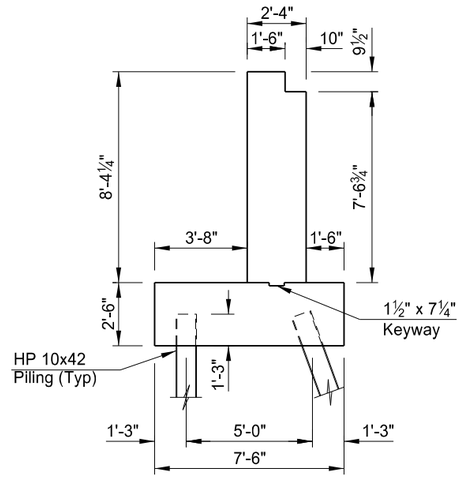
FOOTING DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	6



PLAN



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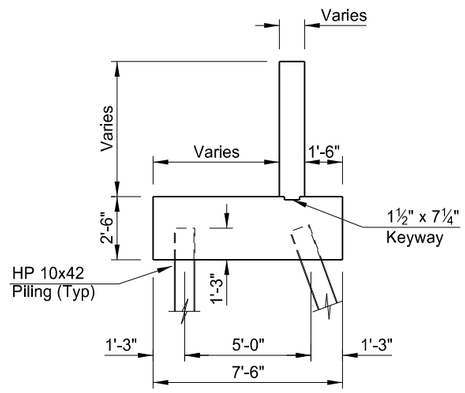
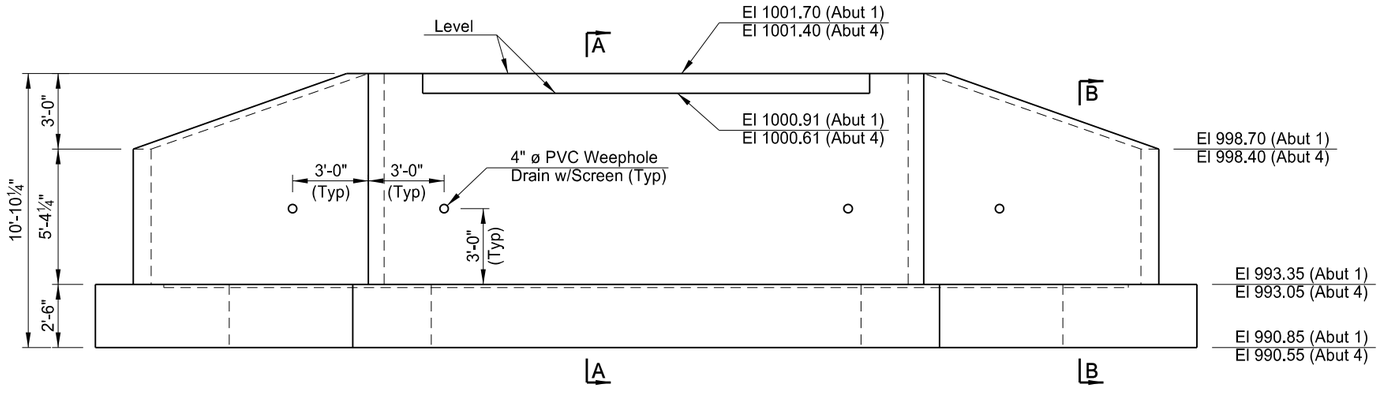


B-B



ELEVATION

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

ABUTMENT DETAILS (SHOWING DIMENSIONS)

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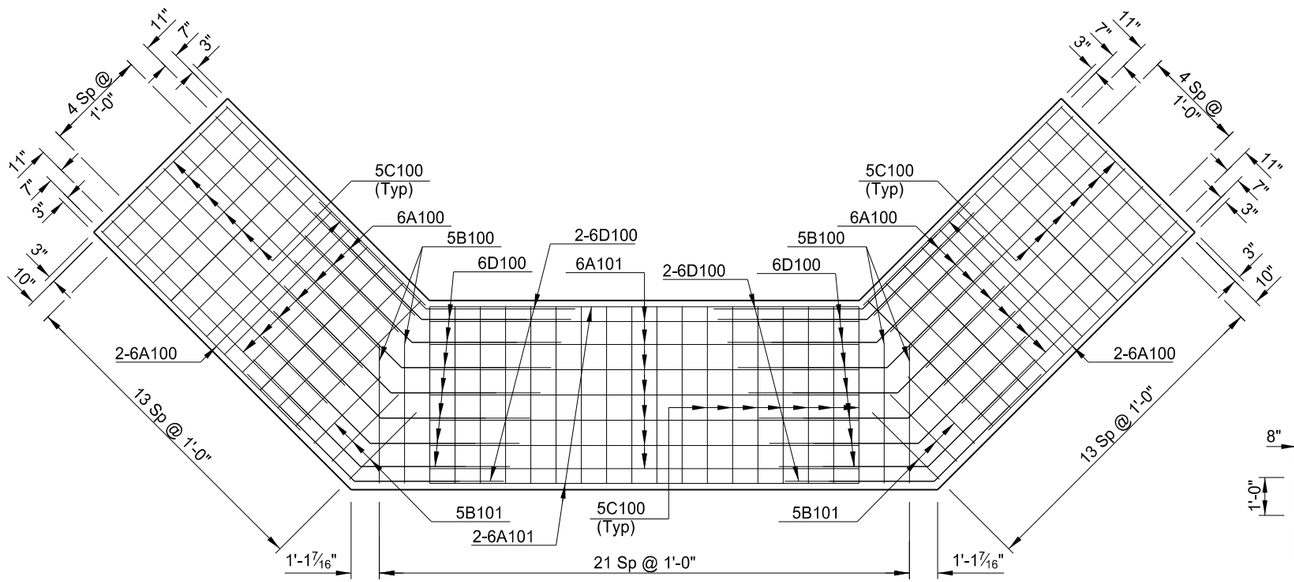
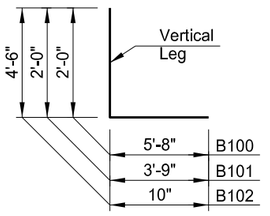
BJJ	WMT	18215103

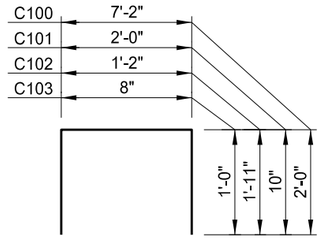
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	7



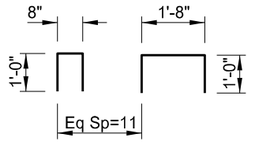
FOOTING PLAN
(Showing Top Reinforcing)



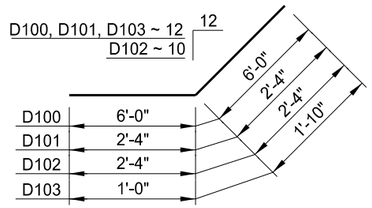
B100 - B102



C100 - C103



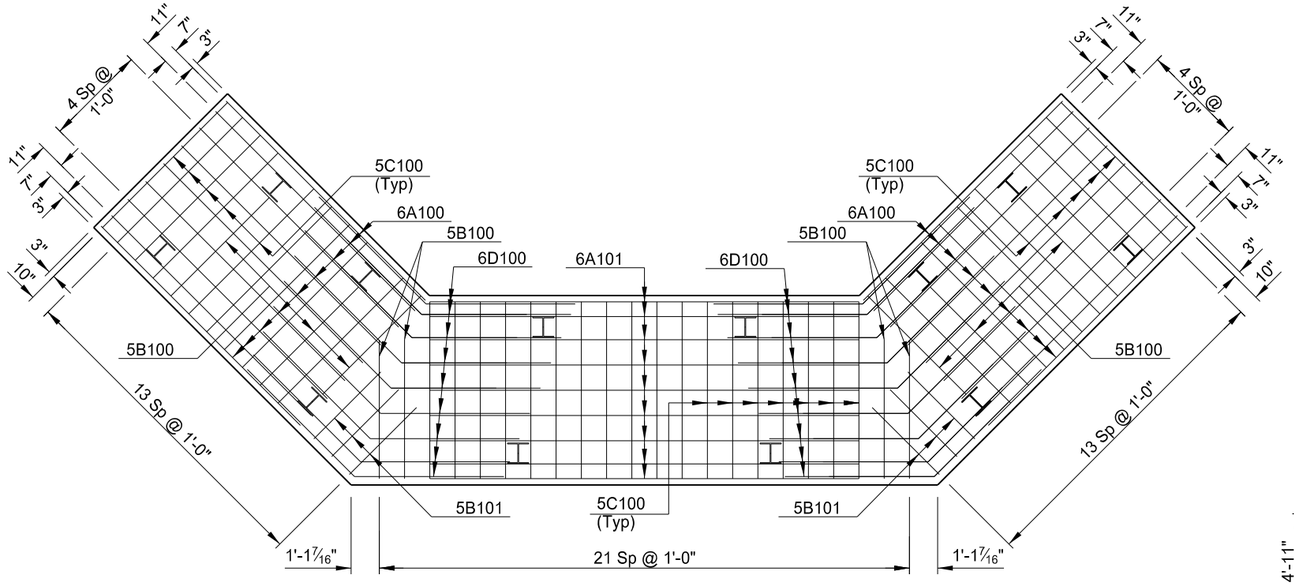
SC100



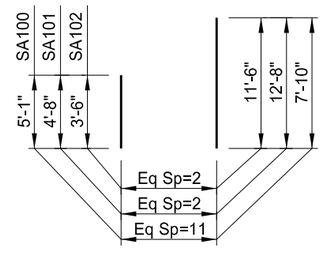
D100 - D103

BILL OF REINFORCEMENT (ONE ABUTMENT)

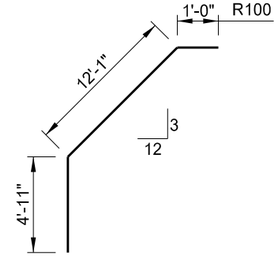
SIZE	MARK	NO.	LENGTH
6	A100	40	11'-2"
6	A101	20	17'-0"
5	A102	18	7'-2"
5	A103	26	8'-0"
5	A104	8	21'-8"
5	A105	10	20'-5"
5	A106	10	11'-8"
5	A107	10	12'-10"
5	B100	14	7'-8"
5	B101	12	5'-9"
5	B102	92	5'-4"
5	C100	78	11'-2"
5	C101	20	3'-8"
5	C102	18	5'-0"
5	C103	10	2'-8"
6	D100	40	12'-0"
5	D101	16	4'-8"
5	D102	16	4'-8"
5	D103	2	2'-10"
5	R100	4	18'-0"
5	SA100	4	77'-6"
5	SA101	2	26'-0"
5	SA102	2	22'-6"
5	SC100	2	38'-0"



FOOTING PLAN
(Showing Bottom Reinforcing)



SA100 - SA102



R100

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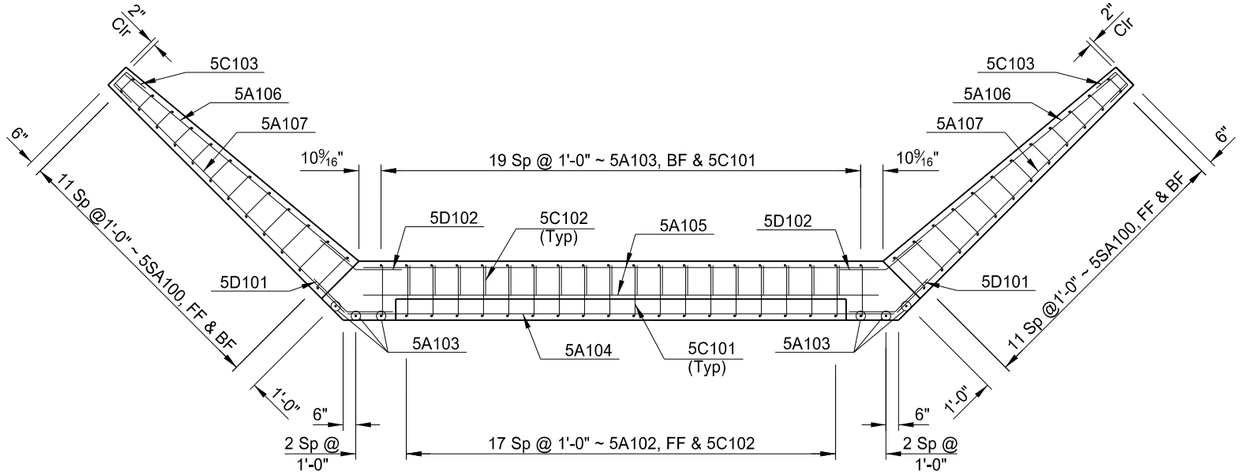
QUANTITIES	(ONE ABUTMENT)
CLASS AE-3 CONCRETE	57.0 CY
REINFORCING STEEL-GRADE 60	5,446 LB

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

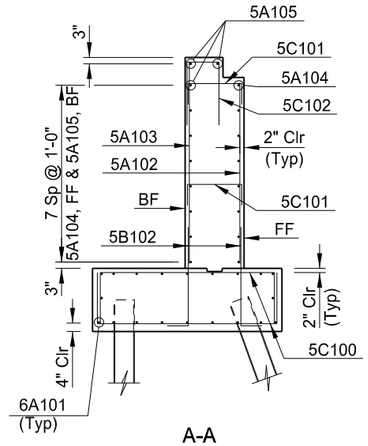
ABUTMENT FOOTING DETAILS (SHOWING REINFORCING)

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

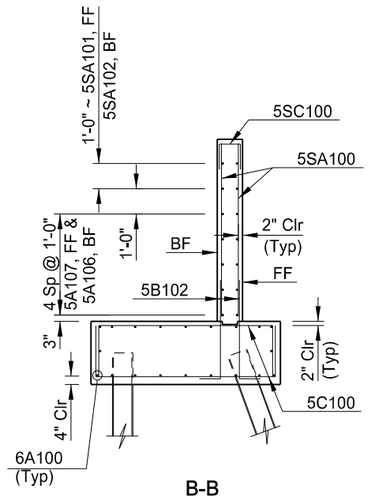
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	8



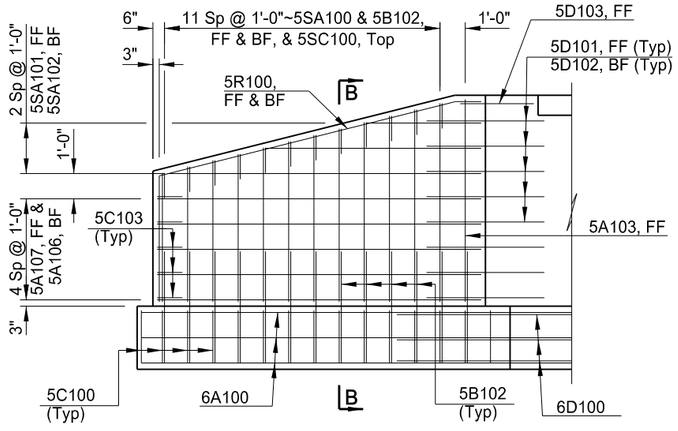
PLAN



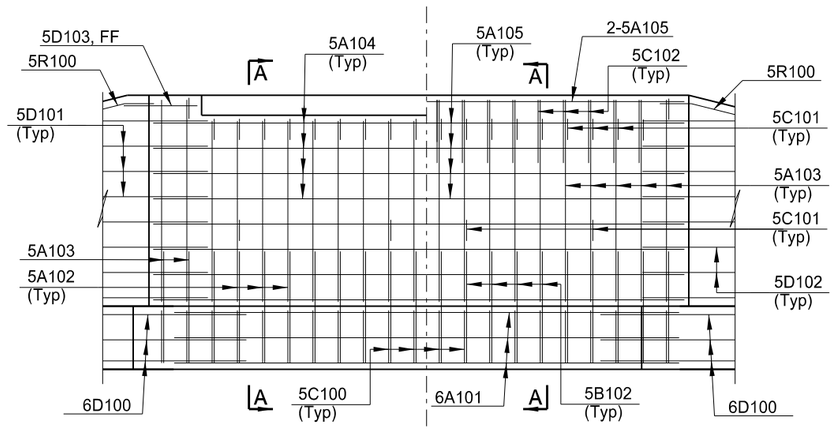
A-A



B-B



WINGWALL ELEVATION



Half Showing Front Face Reinforcing

Half Showing Back Face Reinforcing

ENDWALL ELEVATION

NOTES:

1. FF = Front Face
2. BF = Back Face
3. See Sheet 7 of Section 170 for concrete and reinforcing quantities.

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

ABUTMENT DETAILS (SHOWING REINFORCING)

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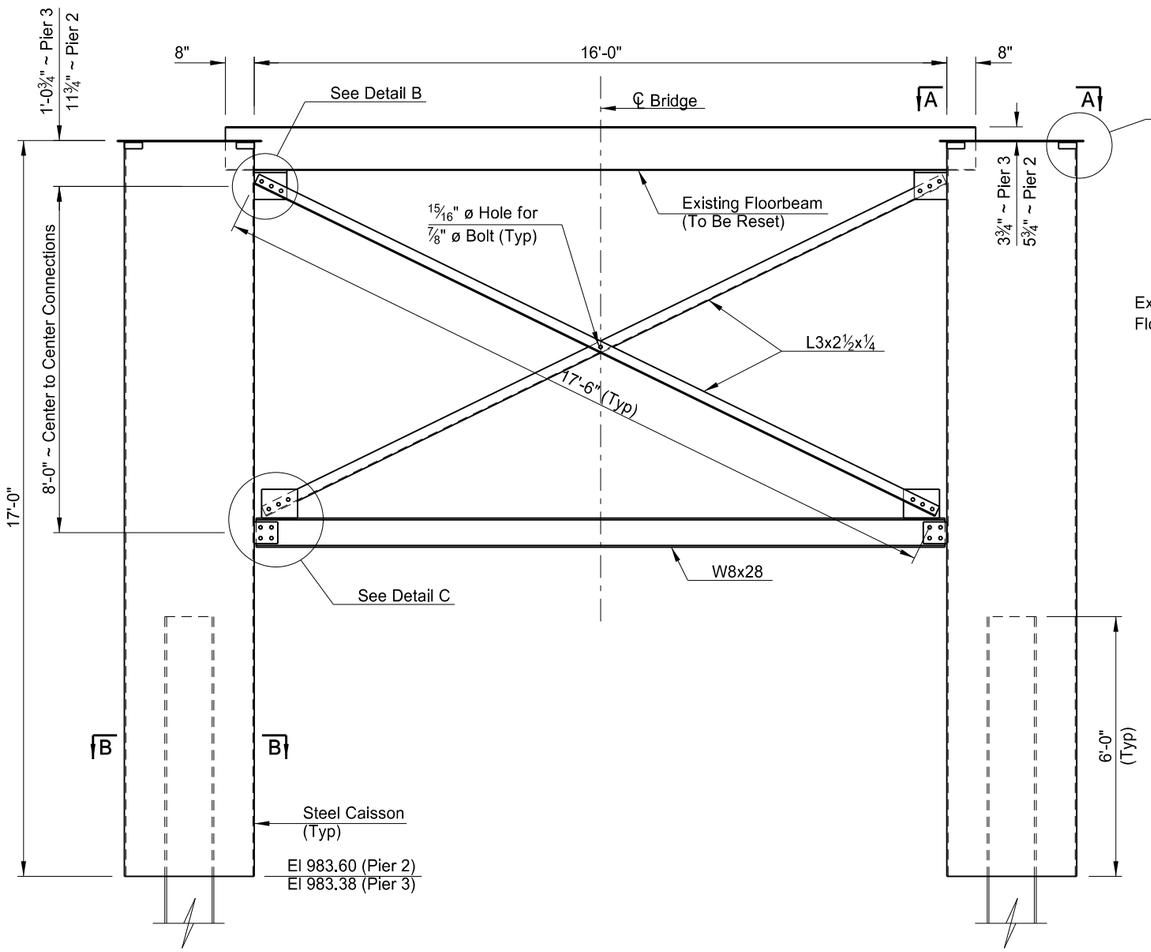
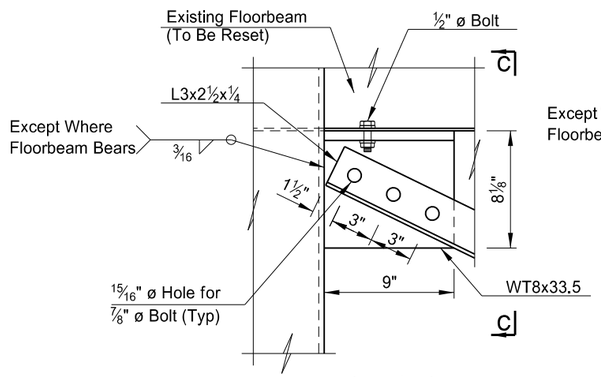
BJJ	WMT	18215103

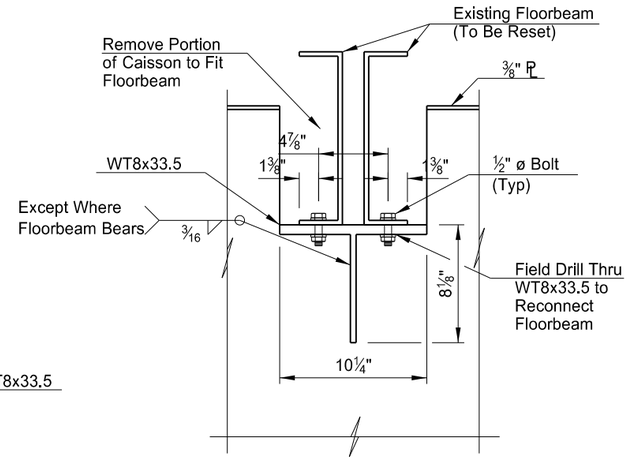
	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	9



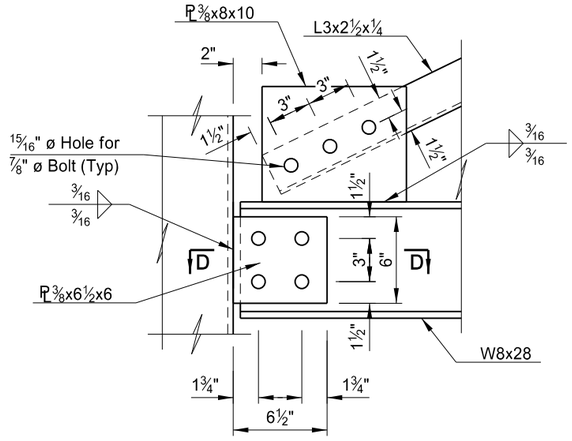
PIER ASSEMBLY ELEVATION



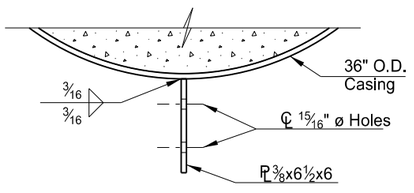
DETAIL B



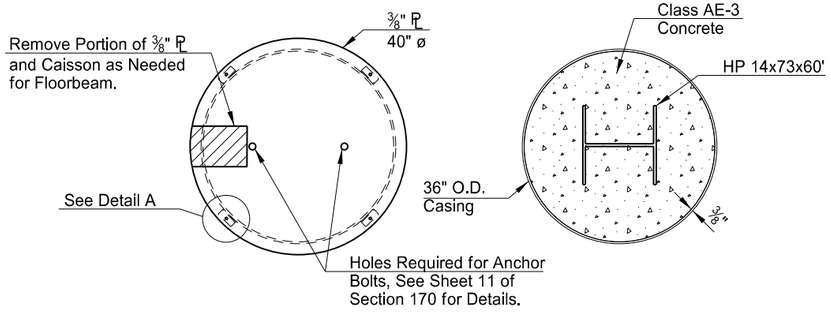
C-C



DETAIL C

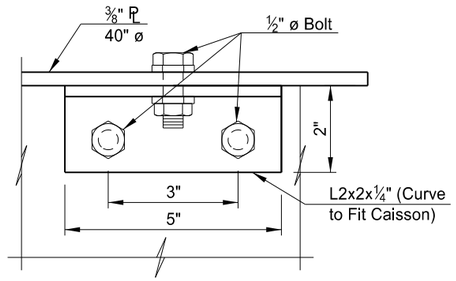


D-D



A-A

B-B



DETAIL A

NOTES:

1. Include Steel Casing, Steel Lid, and Class AE-3 Concrete fill in the price bid for "Casing Pipe 36IN".
2. Steel Casing must meet the requirements of Section 840.01B of the Standard Specifications.
3. Approximately 4.5 CY of Class AE-3 Concrete per Caisson.
4. Field verify existing floorbeams to ensure fit with new connections on caissons.

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QUANTITIES	(ONE PIER)
STRUCTURAL STEEL	692 LBS
CASING PIPE 36 IN	34 LF

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

PIER DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
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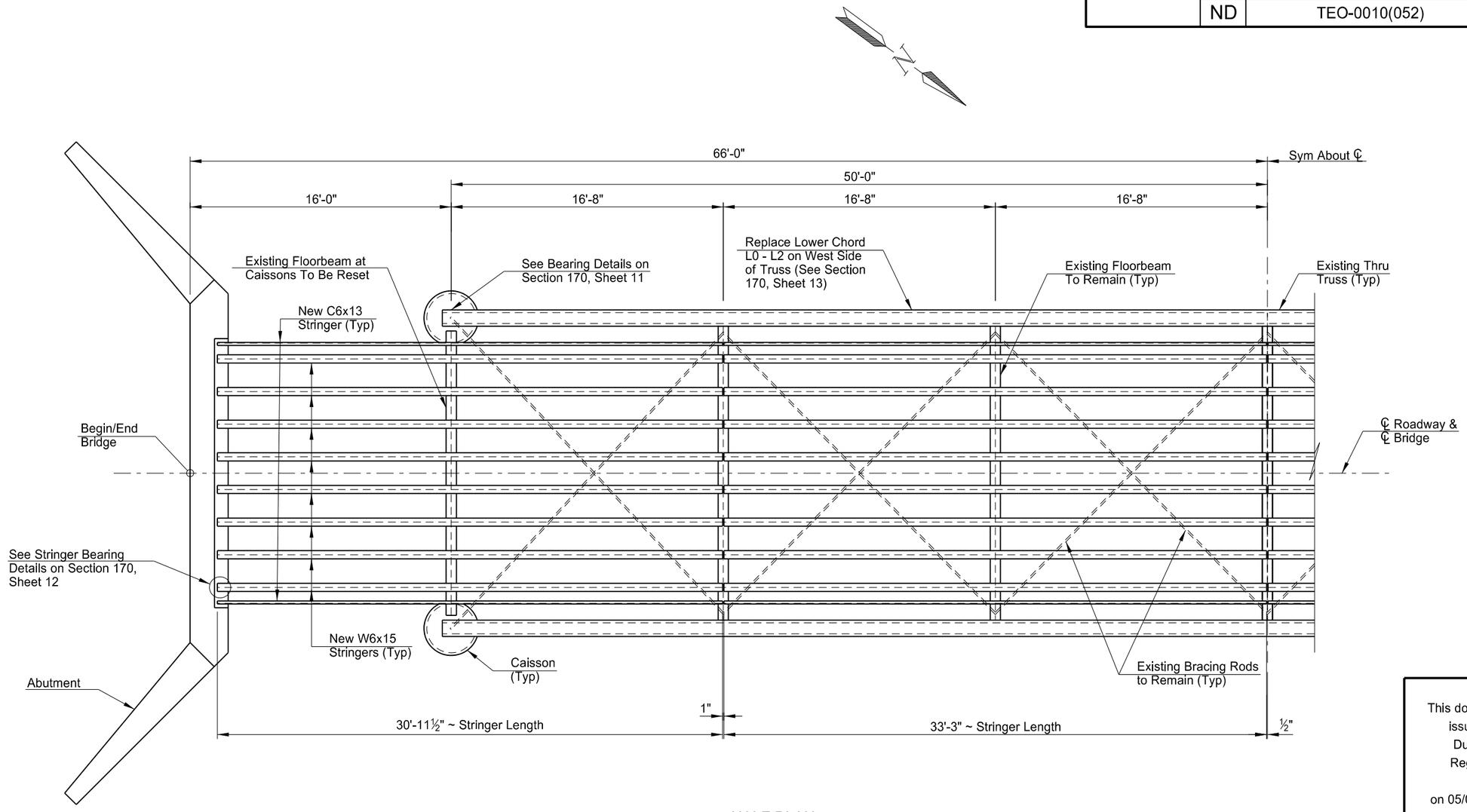
	ND	TEO-0010(052)	170	10



HALF PLAN

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QUANTITIES	
STRUCTURAL STEEL	18,749 LBS
TREATED TIMBER	9.7 MBM

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

SUPERSTRUCTURE DETAILS

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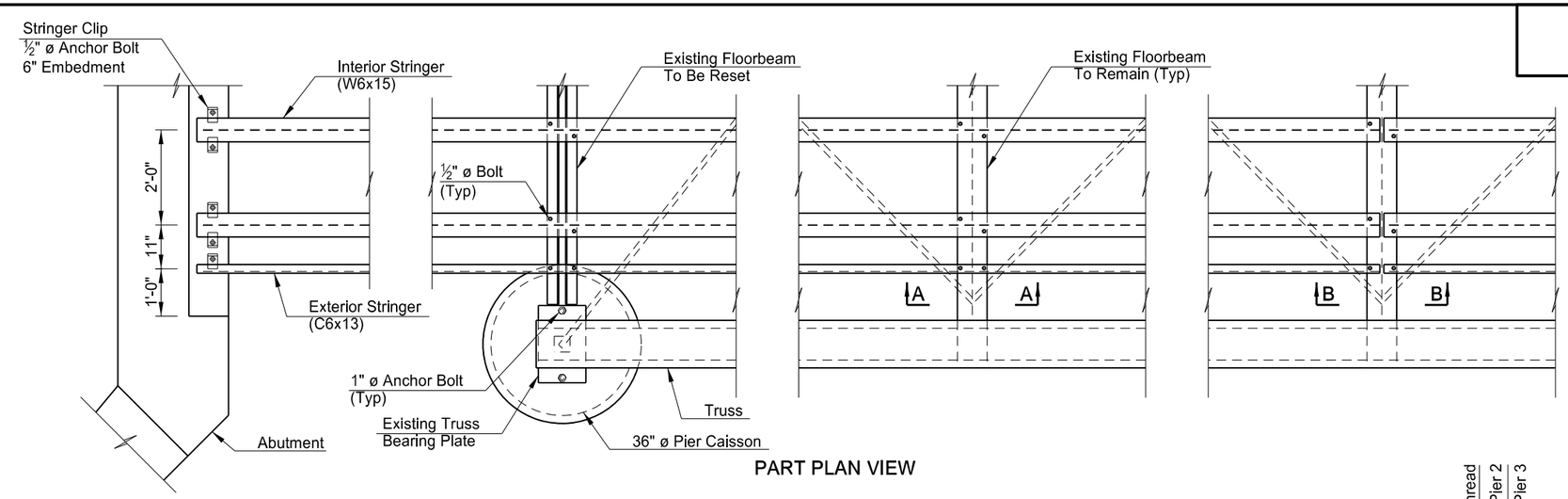
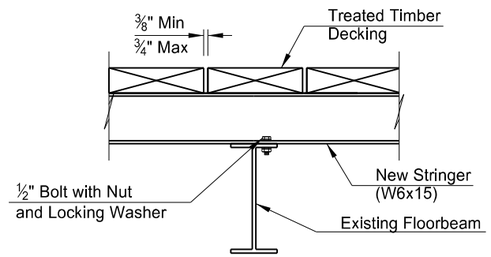
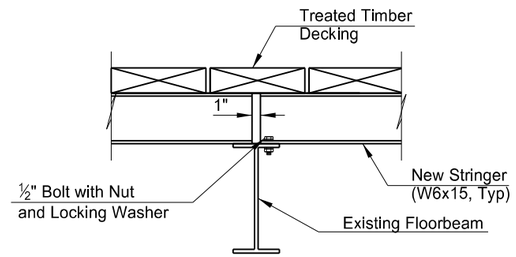
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	170	11



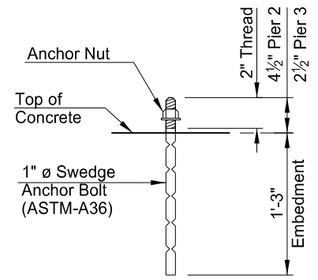
PART PLAN VIEW



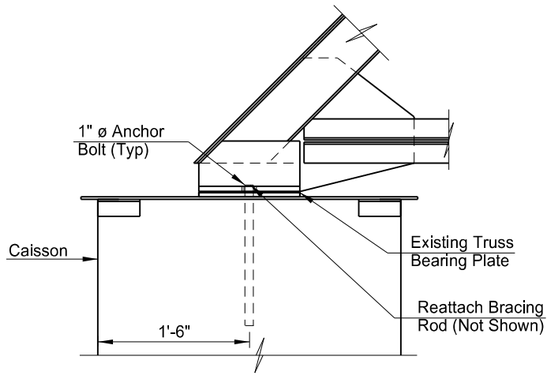
A-A
(L0, L2, L4 & L6 Shown)



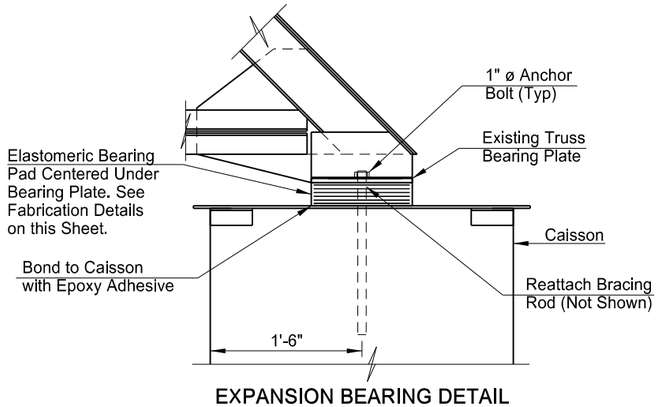
B-B
(L1, L3 & L5 Shown)



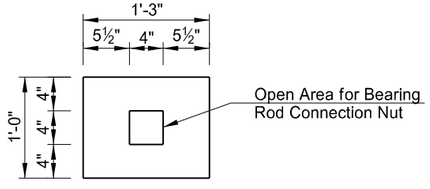
ANCHOR BOLT DETAIL
AT PIERS



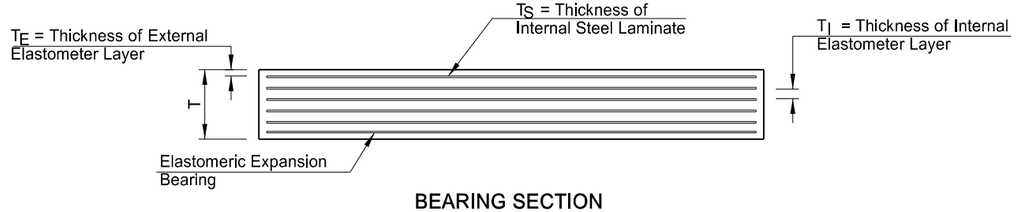
FIXED BEARING DETAIL
(Pier 3)



EXPANSION BEARING DETAIL
(Pier 2)



BEARING PLAN



BEARING SECTION

ELASTOMERIC BEARING PAD DATA										
OVERALL DIMENSIONS			LAMINATE DIMENSIONS AND NUMBER						NO. REQ'D	DURO-METER
LENGTH	WIDTH	THICKNESS-T	NO.	T_E	NO.	T_I	NO.	T_S		
12"	15"	2.75"	2	0.25"	5	0.375"	6	0.0625"	2	50

NOTES:

1. Field verify locations of anchor bolts to ensure fit with existing bearing plates to be reset.
2. Anchor bolts may be placed in wet concrete or secured to the abutment with an approved epoxy anchorage system. If an epoxy system is used, submit a copy of the specifications to the Engineer for approval prior to installation.
3. Install Elastomeric Bearing Pads per manufacturer's recomendations.
4. Bond the neoprene bearing pad to the top of the pier caisson with an epoxy adhesive as approved by the bearing manufacturer.

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

SUPERSTRUCTURE DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
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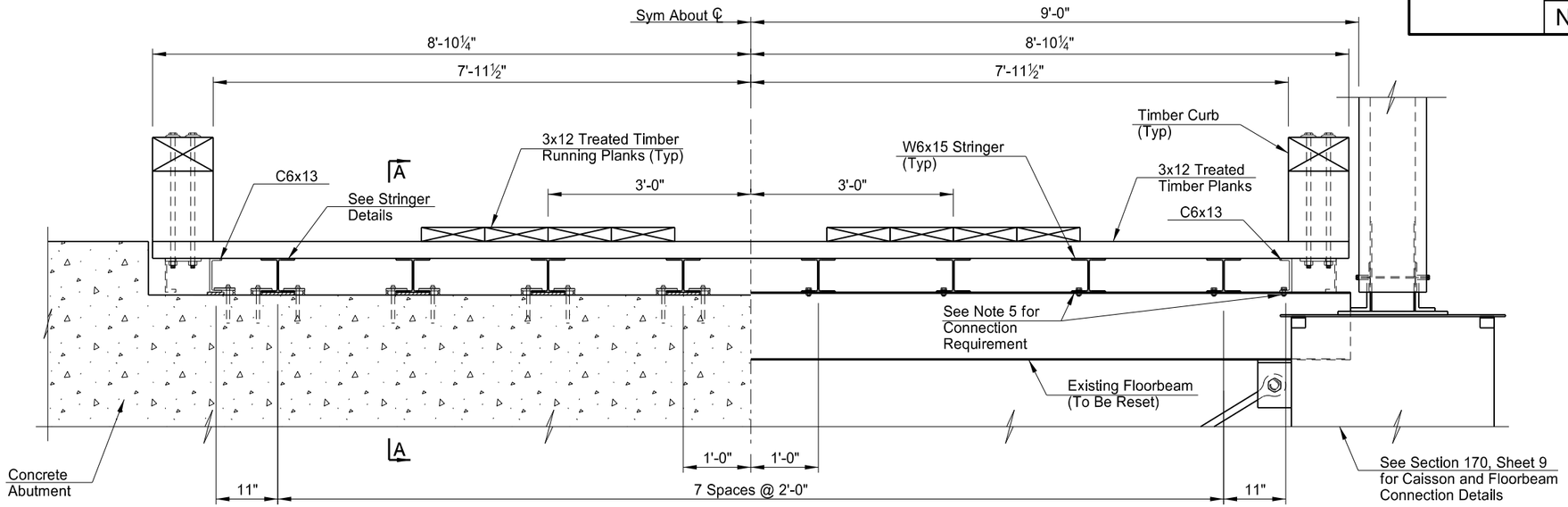
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	170	12

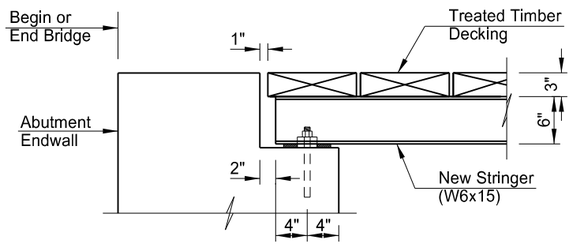


HALF SECTION AT ABUTMENT

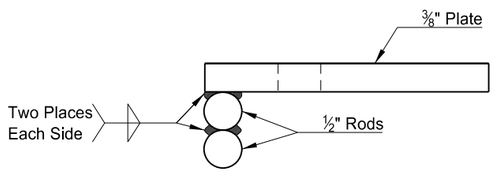
HALF SECTION AT PIER

NOTES:

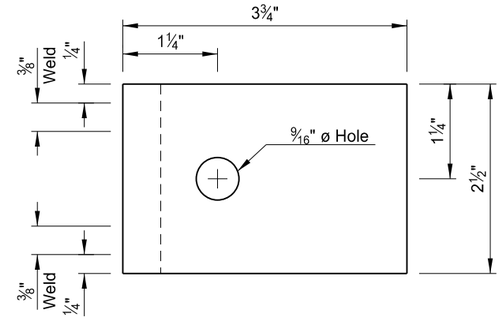
1. Fasten timber deck planks to stringers with one galv. "C"-Clip. Submit detail of "C"-Clip to the Engineer for review prior to fabrication. Include materials and labor required for clip installation in the unit price bid for "TREATED TIMBER".
2. Galvanize the "C"-Clips, stringer clips, and ringshank nails in accordance with the Standard Specifications.
3. Include all materials and labor required to install stringer clips and ½" ø bolts in the unit price bid for "STRUCTURAL STEEL".
4. Fasten running planks to timber deck with two rows of 4½" ringshank nails per plank at 24" oc. Alternate centers with nails at each end of plank.
5. Include work drawings detailing connection of new stringers to existing floor beams in the "Structural Steel" submittal. Interior stringers will be replaced in the same location, fascia stringers will be relocated inwards as shown. Connections are to consist of at least 2 bolts at each intersection and are to be staggered on interior stringers.



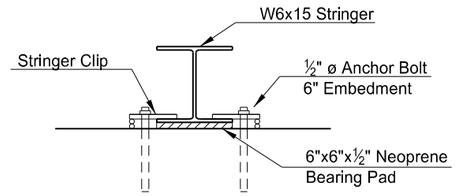
A-A



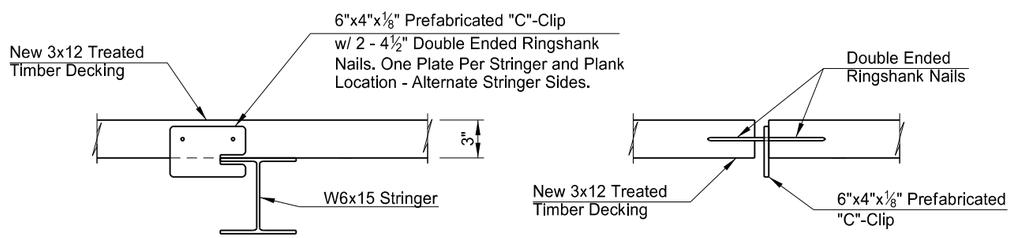
STRINGER CLIP
(Section)



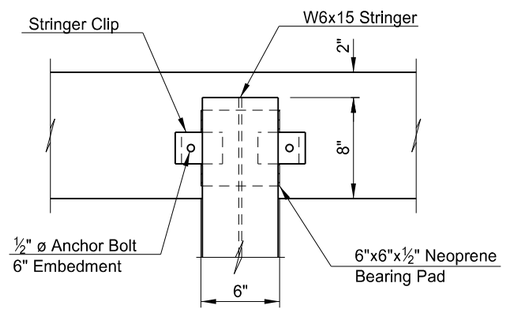
STRINGER CLIP
(Plan)



STRINGER BEARING ELEVATION
(At Abutments)



TYPICAL DECK TO STRINGER CONNECTION DETAIL



STRINGER BEARING PLAN
(At Abutments)

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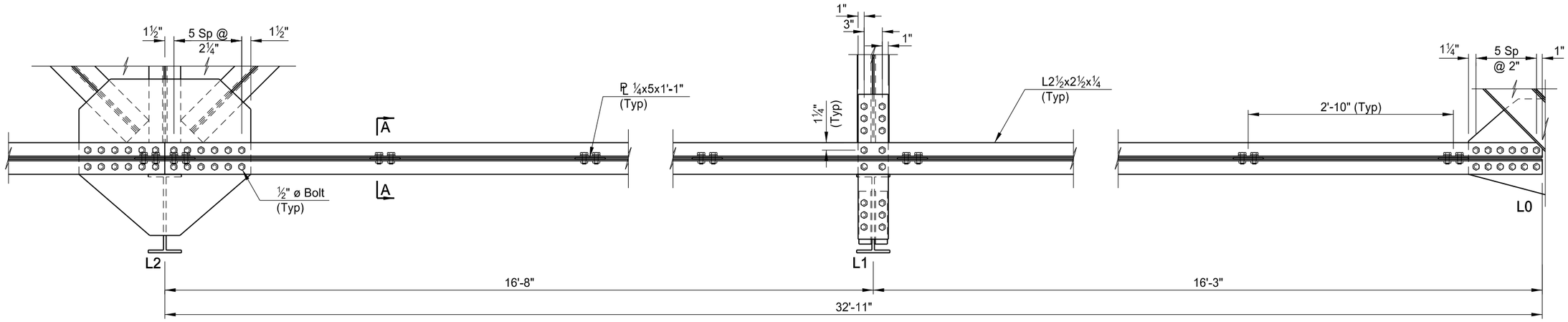
BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

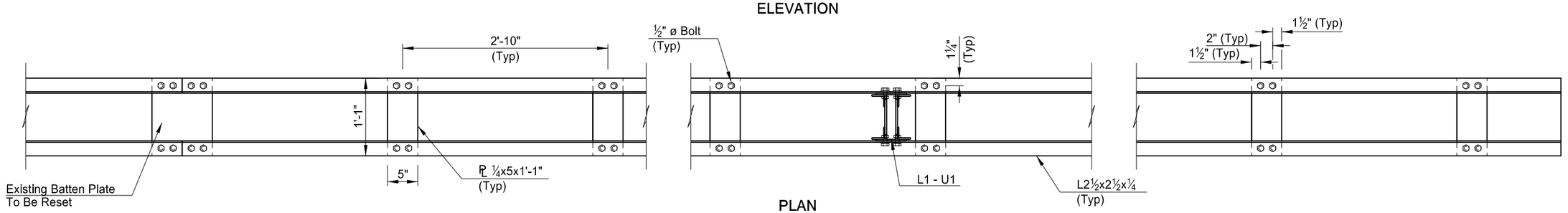
SUPERSTRUCTURE SECTION

DRAWN BY	CHK'D BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	13



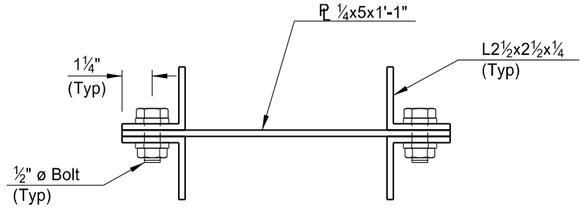
ELEVATION



PLAN

CHORD L0 - L2 REPLACEMENT DETAILS

(WEST SIDE ONLY)



A-A

NOTE:

Contractor has the option to either verify bolt holes for gusset plate & bottom plate connection prior to fabrication or to field drill holes.

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QUANTITIES

STRUCTURAL STEEL	591 LBS

BRICKMINE BRIDGE

NORTH DAKOTA

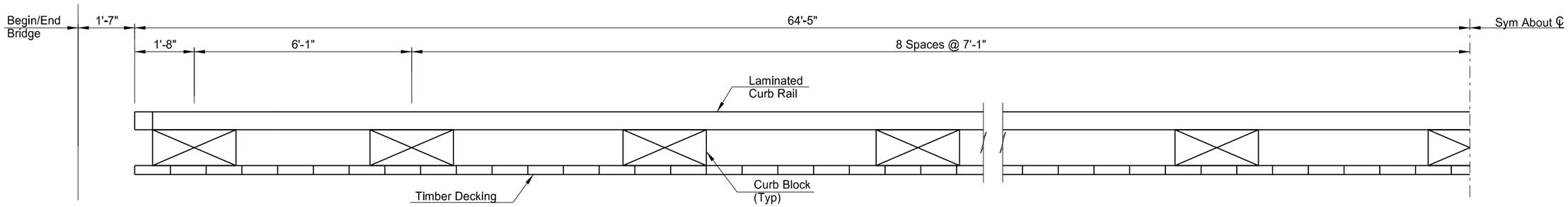
CAVALIER COUNTY, NORTH DAKOTA

LOWER CHORD REPLACEMENT DETAILS

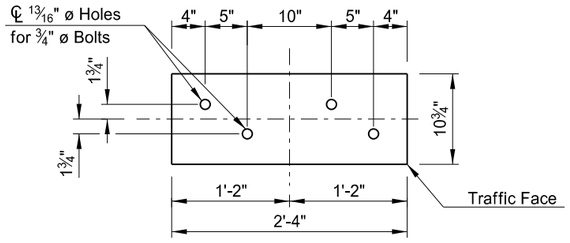
DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	170	14

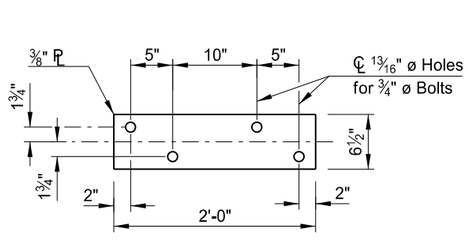
NOTE:
Include all costs associated with supplying and installing the timber curb assemblies and hardware in the unit price bid for "TREATED TIMBER".



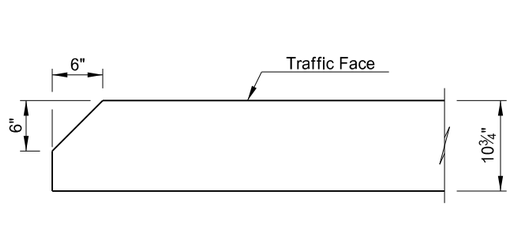
CURB ELEVATION



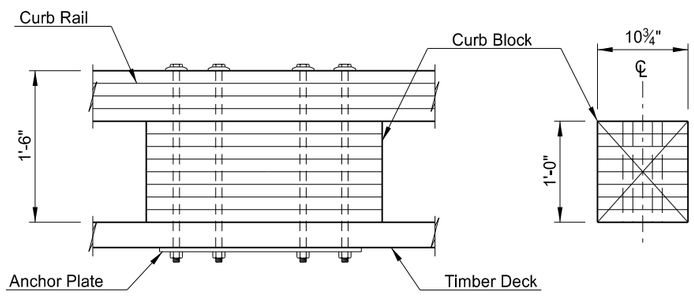
PLAN - CURB BLOCK
Fabricated From 10¾"x12" Glued-Laminated Material.



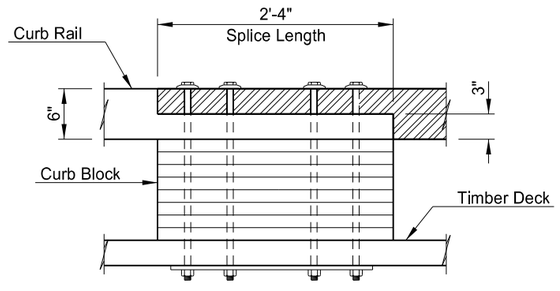
PLAN - ANCHOR PLATE
(Plan View)



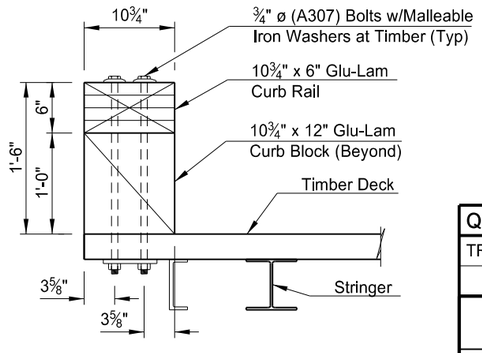
CURB END BEVEL
(Plan View)



ELEVATION - CURB BLOCK



ELEVATION - CURB RAIL SPLICE



CURB CONNECTION DETAIL

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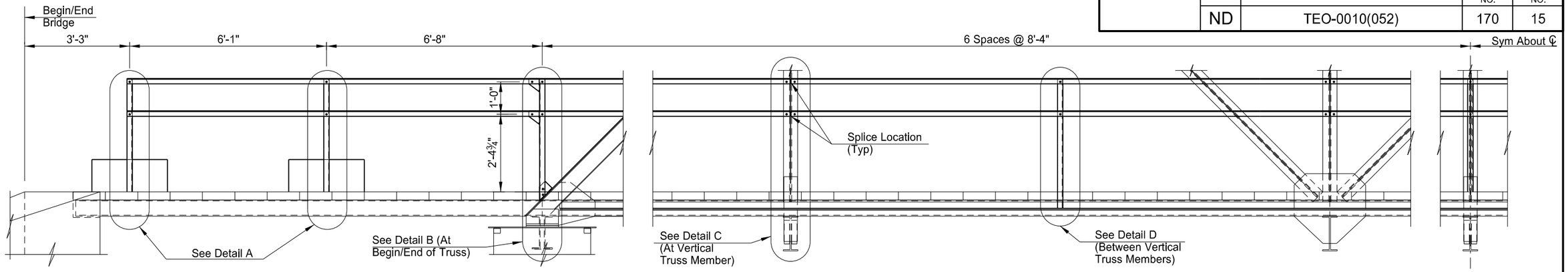
QUANTITIES	(CURB & RAIL ONLY)
TREATED TIMBER	2.3 MBM

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

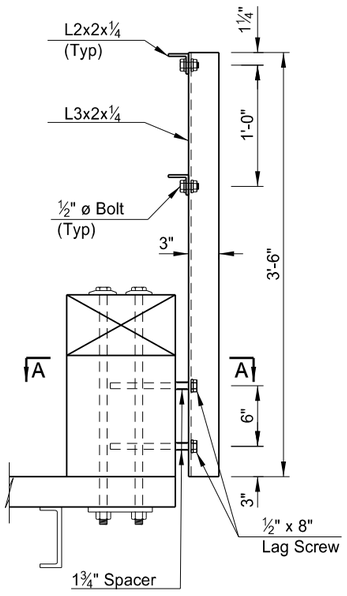
CURB DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

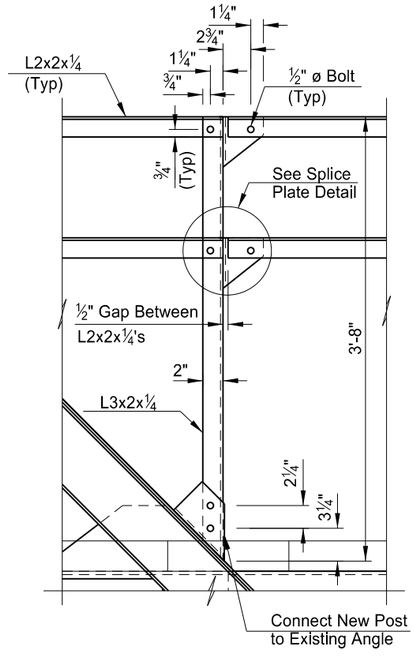
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	TEO-0010(052)	170	15



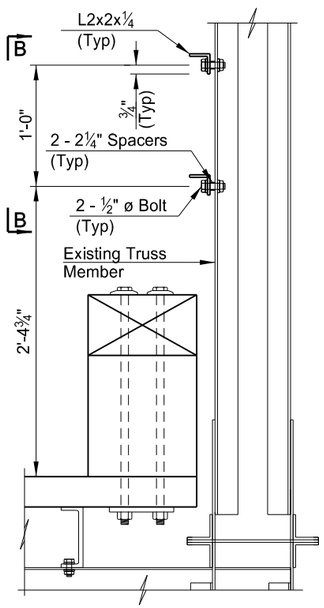
RAILING ELEVATION
(Timber Curb Not Shown for Clarity)



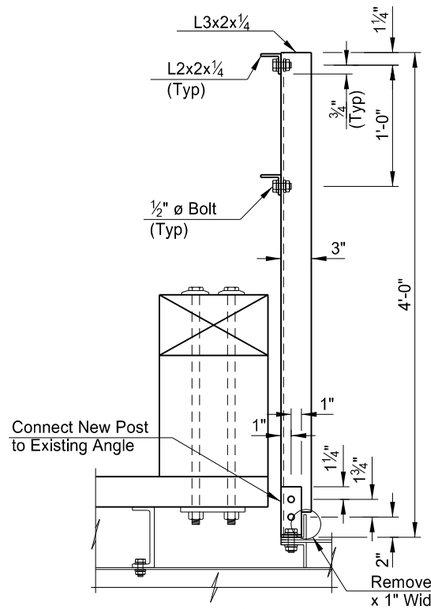
DETAIL A
(8 Total Locations)



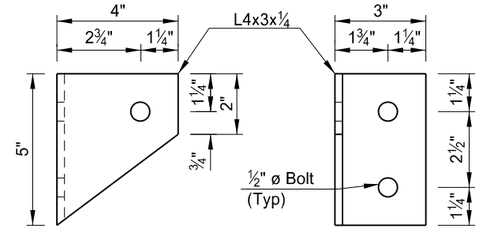
DETAIL B
(4 Total Locations)



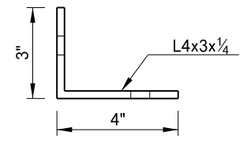
DETAIL C
(10 Total Locations)



DETAIL D
(12 Total Locations)

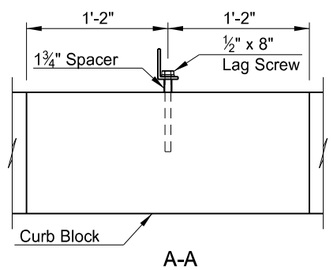


ELEVATION

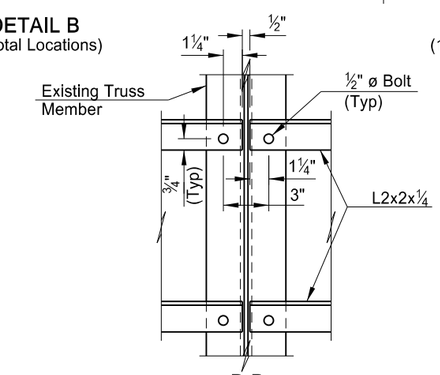


PLAN

SPLICE PLATE DETAIL



A-A



B-B

NOTE:
Include all costs associated with supplying and installing the miscellaneous hardware for the railing in the unit price bid for "STRUCTURAL STEEL".

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QUANTITIES

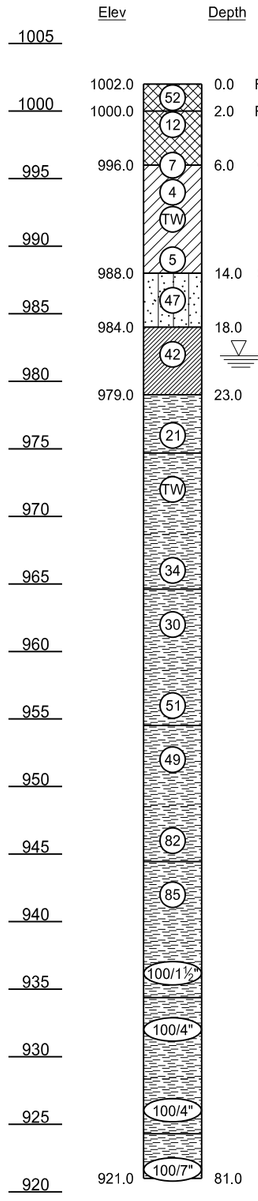
STRUCTURAL STEEL	1,992 LBS

BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

RAILING DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	TEO-0010(052)	175	1



ST-1
Appr. Sta 20+81
3.0' LT
Drilled on: 1/27/16

NOTES:

1. The encircled numbers indicate the number of blows delivered by a 140 lb. automatic hammer from a height of 30" to drive a 2" o.d. split-barrel sampler 1'-0".

2. The boring data shown is for owner's design and estimating purposes only. The boring logs are only representative of the exact location from which the samples were taken and interpretation between sample locations is discouraged. The owner assumes no responsibility if the soil conditions encountered during construction differ from those shown.

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BRICKMINE BRIDGE
NORTH DAKOTA
CAVALIER COUNTY, NORTH DAKOTA

BORING LOG

DRWN. BY	CHK'D. BY	PROJECT NO.
BJJ	WMT	18215103

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument
I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl	plate
Pt	point
PCC	point of compound curve
PC	point of curve
PI	point of intersection
PRC	point of reverse curvature
PT	point of tangent
POC	point on curve
POT	point on tangent
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RTP	random traverse point
Rge or R	range
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
Reinf	reinforcement
Res	reservation
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route
Salv	salvage(d)
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
San	sanitary sewer line
Sc	scoria
Sec	seconds
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sh	shale
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw	sidewalk
S	siemens
SD	sight distance
SN	sign number
Sig	signal
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam
Sgl	single
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SC	spiral to curve
ST	spiral to tangent
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
SF	square feet
Km2	square kilometer
M2	square meter
SY	square yard
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Sta	station
Sta Yd	station yards
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SE	superelevation
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical
SI	systems international
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	tesla
T	thinwall tube sample
T/mi	tons per mile
Ts	topsoil
Twp or T	township
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
TB	transit book
Trans	transition
TT	transmission tower
Trans	transverse
Trav	traverse
TP	traverse point
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
TP	turning point
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VC	vertical curve
VCP	vitrified clay pipe
V	volt
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
W	watt
Wrng	wearing
Wb	weber
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner
WGS	world geodetic system
Z	zenith

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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D-101-20

Line Styles

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Sight Distance Triangle Line
- Small Hidden Object
- Dimension Leader
- Existing Ground
- Existing Topsoil (Cross Section View)
- Large Hidden Object
- Edge Drain
- Geotextile Fabric Type D
- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Geogrid
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Geotextile Fabric Type R
- Geotextile Fabric Type R1
- Remove Line
- Geotextile Fabric Type RR
- Geotextile Fabric Type S
- Floating Silt Curtain
- Existing Telephone Line
- Existing TV Line
- Existing Assumed Ground (Not Surveyed)
- Tentative Ground Line
- Existing Water or Steam Line
- Existing Under Drain
- Under Drain
- Wall
- Existing Slotted Drain
- Existing Cemetary Boundary
- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Stripe 4 IN Dotted Extension White
- Stripe 8 IN Dotted Extension White
- Stripe 8 IN Lane Drop
- Wetland Mitigation
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Easement
- Existing Concrete
- Existing Easement
- Existing Gravel Surface
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Riprap
- Existing Underground Vault or Lift Station
- Tangent Line
- Hidden Object
- Existing Dirt Surface
- Existing Conduit
- Topsoil Profile
- Existing Conductor
- Conductor
- Fiber Optic
- Existing Loop Detector
- Subgrade, Subcut or Ditch Grade
- Existing Asphalt Surface
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Existing Tie Point Line
- Existing State or International Line
- Existing Quarter Section Line
- Existing County
- Existing Section Line
- Existing Township
- Existing Railroad Centerline
- Centerline
- Existing Centerline
- Supplemental Contour
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Failure Line
- Existing Conditions
- Existing Ground (Details)
- Existing Sixteenth Section Line
- Existing Right of Way Not State Owned
- Phantom Object
- Centerline Main
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Excavation Limits
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines

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D-101-21

Line Styles

- Subgrade Reinforcement
- Existing Down Guy Wire Down Guy
- Existing Fence
- Existing Railroad
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Fence
- Silt Fence
- Existing Field Line
- Exst Flow
- Flow
- Existing Culvert
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Overhead Sign Structure
- Existing Micro Loop Detector
- Micro Loop Detector
- Existing Overhead Sign Structure Cantilever
- Existing Railroad Switch
- Overhead Sign Structure Cantilever
- 24 Inch Pipe
- Reinforced Concrete Pipe
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm
- Tie Bar at Random Spacing
- 3-Cable w Posts
- Existing 3-Cable w Posts
- Site Boundary
- Fiber Rolls
- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Depression Contours
- Existing City Corporate Limits or Reservation Boundary
- Gravel Pit - Borrow Area
- Existing Tree Boundary
- Tree Row
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Retaining Wall (Plan View)
- Sheet Piling
- W-Beam w Posts
- Existing W-Beam Guardrail with Posts
- Exst Wet Area-Vegetation Break
- Existing Wetland Delineated

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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Symbols

D-101-31

- Existing Light Standard
- Existing High Mast Light Standard 10 Luminaire
- Existing High Mast Light Standard 3 Luminaire
- Existing High Mast Light Standard 4 Luminaire
- Existing High Mast Light Standard 5 Luminaire
- Existing High Mast Light Standard 6 Luminaire
- Existing High Mast Light Standard 7 Luminaire
- Existing High Mast Light Standard 8 Luminaire
- Existing High Mast Light Standard 9 Luminaire
- Existing Overhead Sign Structure Load Center
- Existing Luminaire
- Existing Light Standard Luminaire
- Existing Federal Mailbox
- Existing Private Mailbox
- Existing Meander Section Corner
- Existing Meter
- Existing Electrical Manhole
- Existing Gas Manhole
- Existing Sanitary Manhole
- Existing Sanitary Force Main Manhole
- Existing Sanitary Manhole with Valve
- Existing Storm Drain Manhole
- Existing Force Main Storm Drain Manhole
- Existing Force Main Storm Drain Manhole with Valve
- Existing Telephone Manhole
- Existing Manhole with Valve Water
- Existing Water Manhole
- Existing Mile Post Type A
- Existing Mile Post Type B
- Existing Mile Post Type C
- Existing Reference Marker
- Existing RW Marker
- Existing Utility Marker
- Iron Monument Found
- Iron Pin R/W Monument
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

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Symbols

D-101-32

- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type 2
- Junction Box
- High Mast Light Standard 10 Luminaire
- High Mast Light Standard 3 Luminaire
- High Mast Light Standard 4 Luminaire
- High Mast Light Standard 5 Luminaire
- High Mast Light Standard 6 Luminaire
- High Mast Light Standard 7 Luminaire
- High Mast Light Standard 8 Luminaire
- High Mast Light Standard 9 Luminaire
- Relocate Light Standard
- Overhead Sign Structure Load Center
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 175 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Manhole
- Manhole 48 Inch
- Sanitary Force Main Manhole
- Sanitary Sewer Manhole
- Storm Drain Manhole
- Storm Drain Manhole with Inlet
- Reset Mile Post
- Mile Post Type A
- Mile Post Type B
- Mile Post Type C
- Right of Way Marker
- Tubular Marker
- Alignment Monument
- Iron Pin Reference Monument
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

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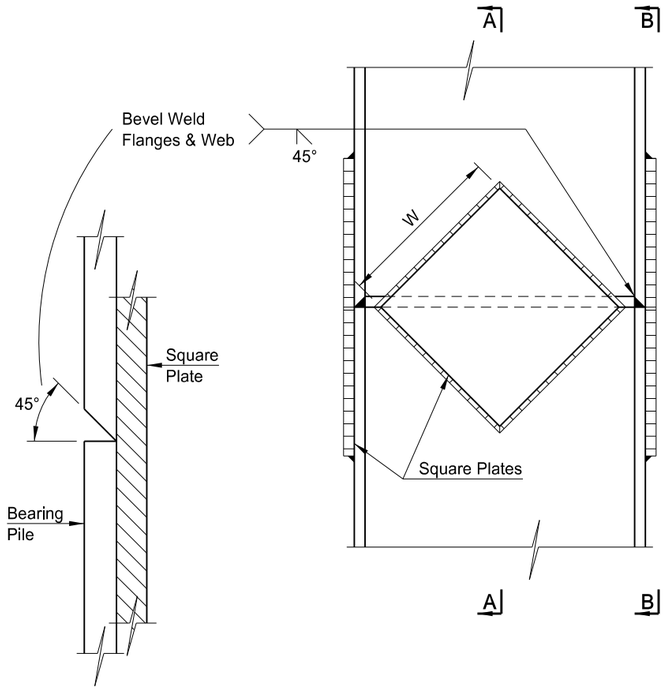
PILE SPLICE DETAILS

D-622-1

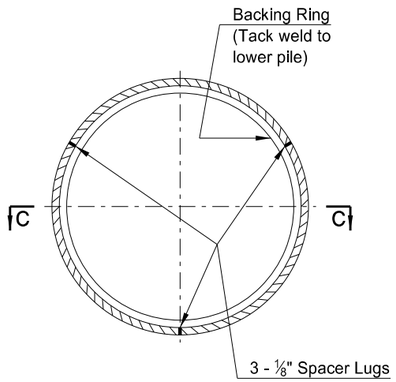


ENLARGED VIEW

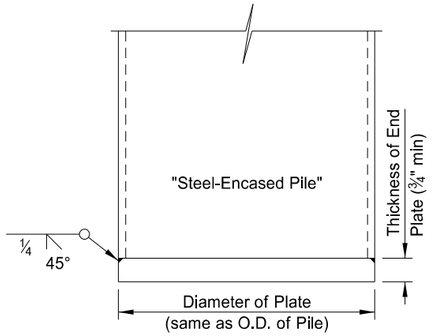
B-B

A-A

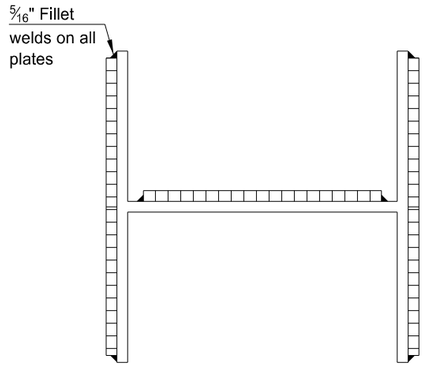
Flame scarf inside of both flanges and one side of web of upper section.



Backing Ring may be made from pile cut-offs or other material of a like quality.

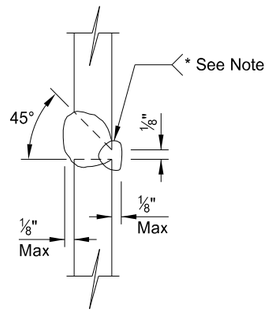


END PLATE DETAIL

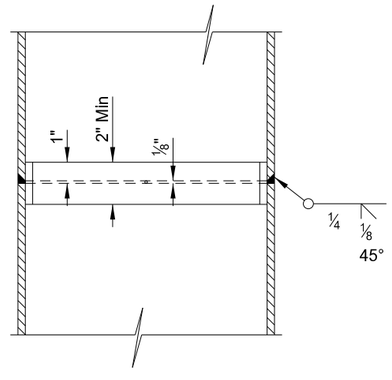


PILE	8"	10"	12"	14"
"F" FLANGE	5"	6½"	8"	10"
"W" WEB	4"	5½"	6½"	8"

H-PILE SPLICE DETAIL

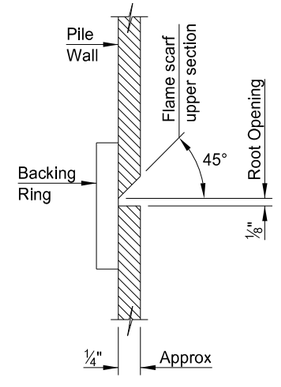


ALTERNATE H-PILE SPLICE DETAIL



C-C

STEEL-ENCASED CONCRETE PILE SPLICE DETAIL



ENLARGED VIEW

NOTES:

Steel H-Pile may be spliced with complete penetration groove welds in both flanges and web in lieu of using the reinforcing plates.

AWS classification E7OXX Low Hydrogen Electrodes shall be used.

* Welds made without the use of backing material shall have the root gouged to sound metal and welded from the second side.

All welding shall conform to the current AASHTO/AWS D1.5 Bridge Welding Code.

The thickness of the steel square plates shall at a minimum be as thick as the flanges and web of the pile being spliced.

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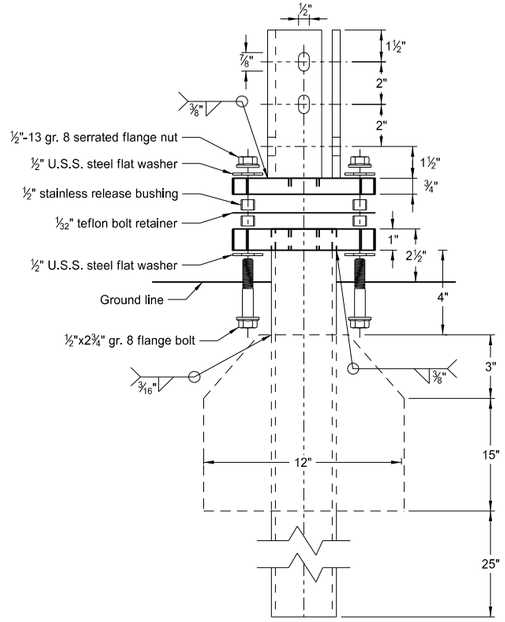
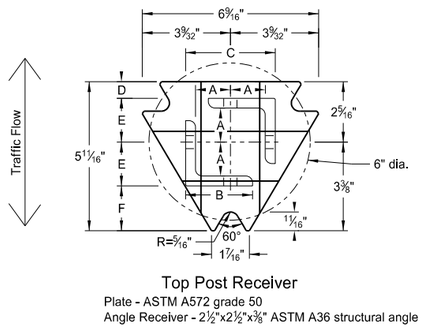
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

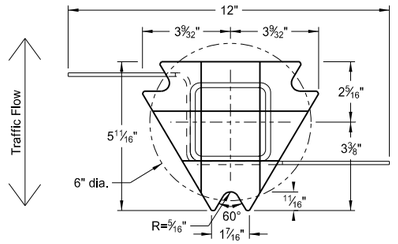


Multi-Directional
Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

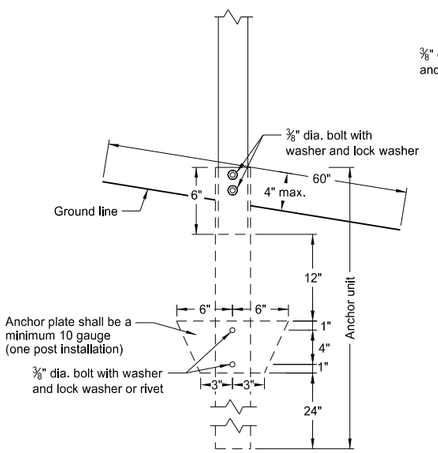
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2³⁄₁₆	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia $in.^4$	Cross Sec. Area $in.^2$	Section Modulus $in.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2³⁄₁₆ x 2³⁄₁₆	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

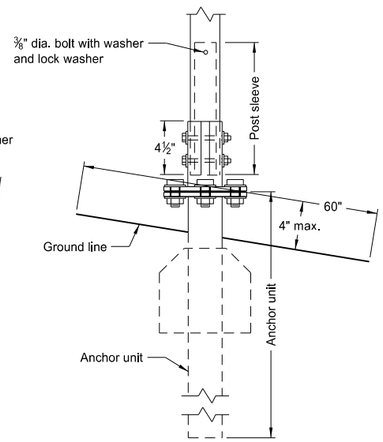
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

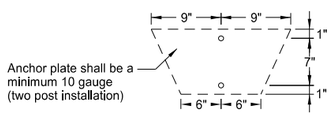
(B) The 2³⁄₁₆"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

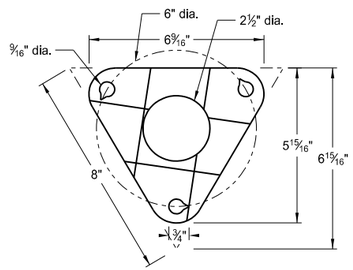


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





Bolt Retainer for Base Connection
Bolt Retainer- ¹⁄₃₂" Reprocessed Teflon

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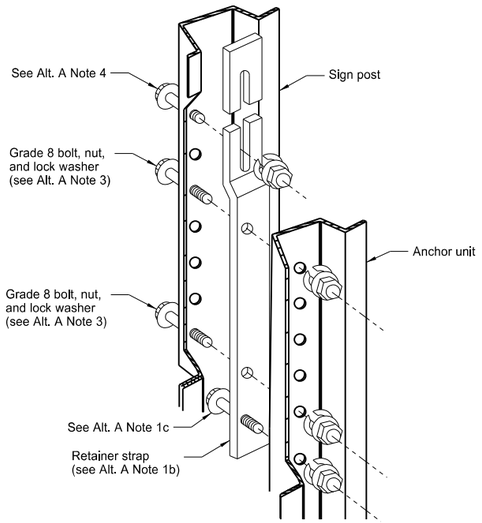
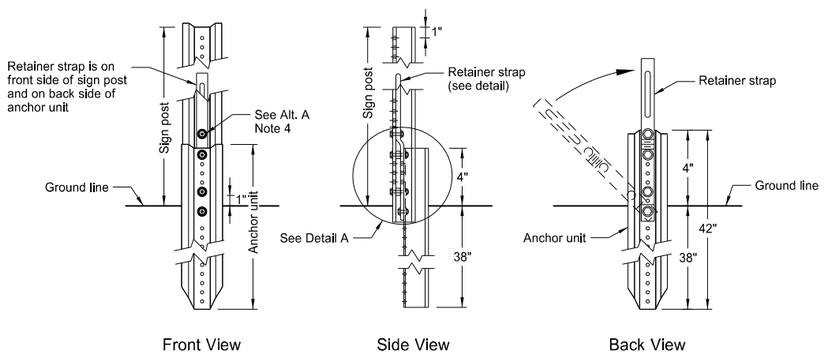
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



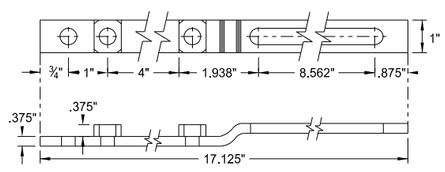
Detail A



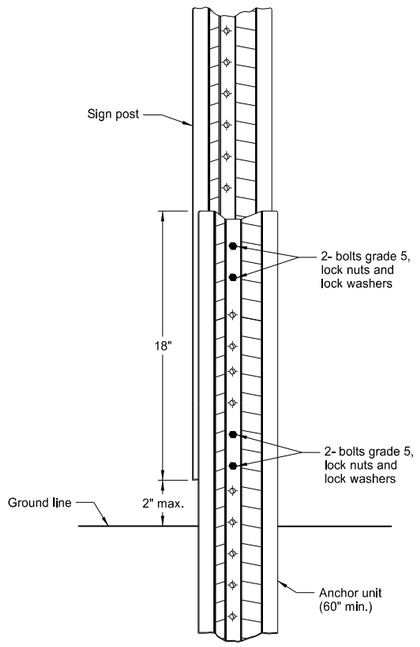
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

A maximum of 2 posts shall be installed within 7'.

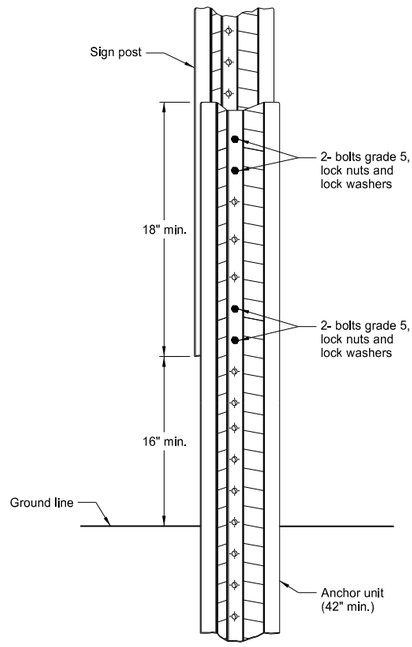


Retainer Strap Detail



Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

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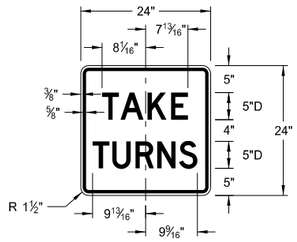
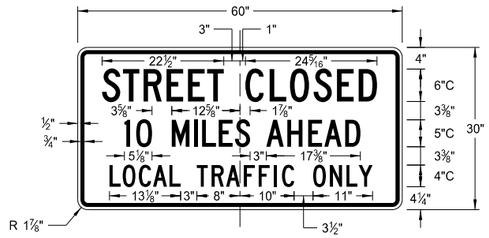
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
Legend: black (non-refl)
Background: white



R11-3c-60
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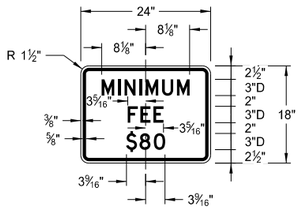
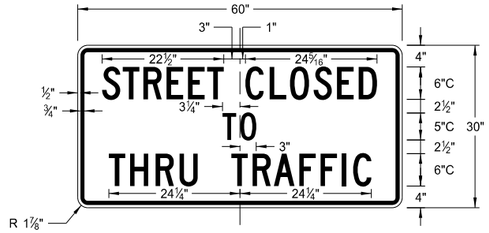
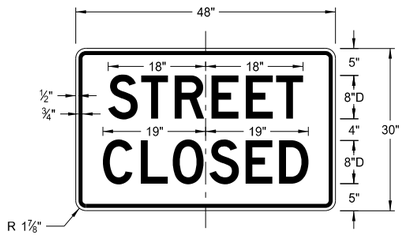
Background: white



R2-1a-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white



R11-2a-48
Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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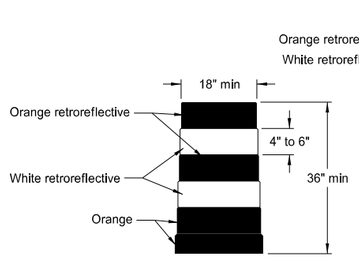
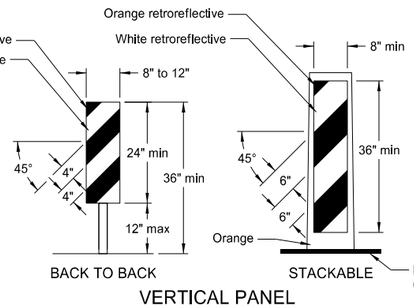
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



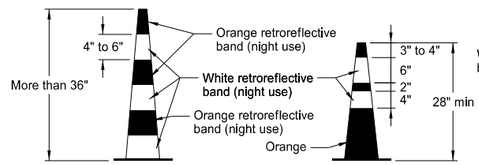
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



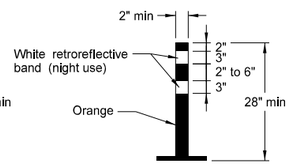
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



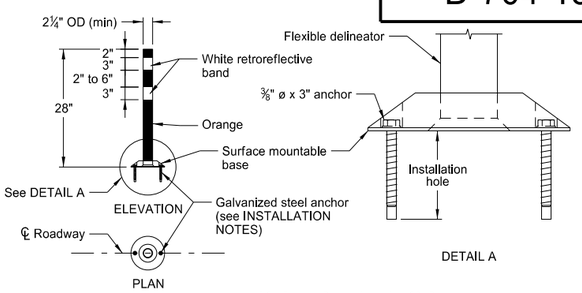
TRAFFIC CONE

Retroreflectorization of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

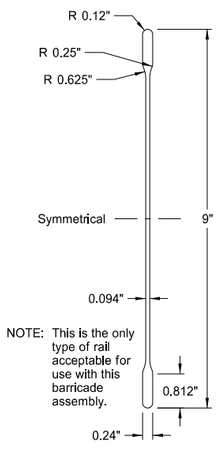
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



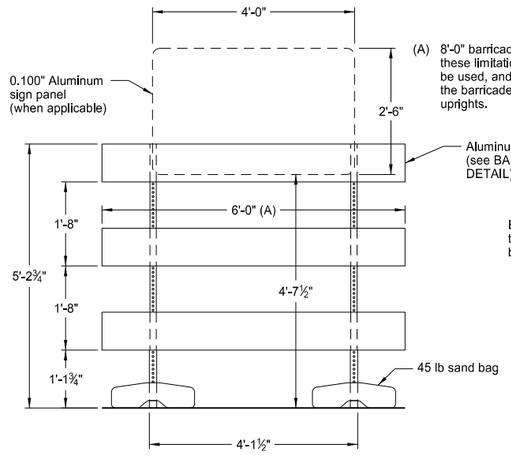
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

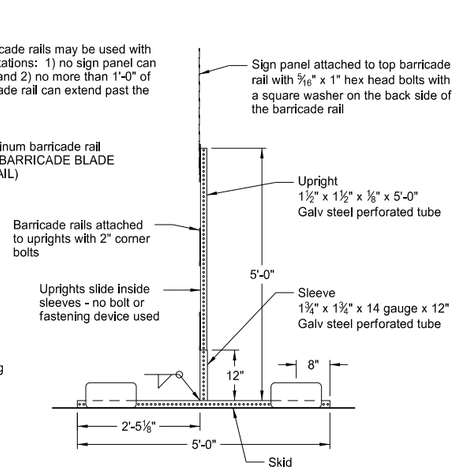


BARRICADE BLADE DETAIL



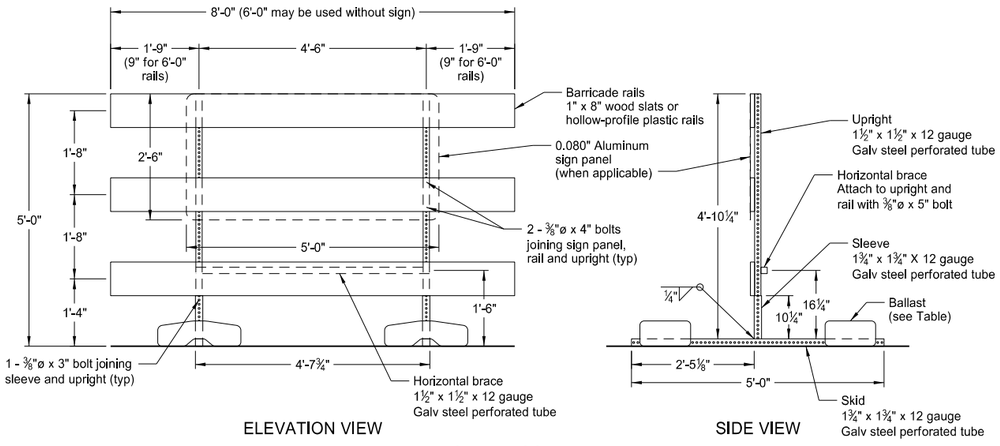
ELEVATION VIEW

(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

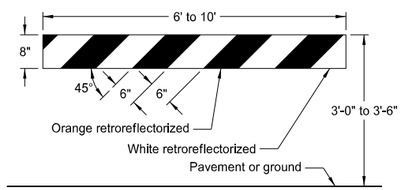


ELEVATION VIEW

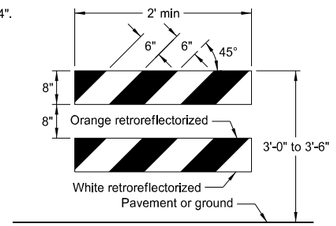
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

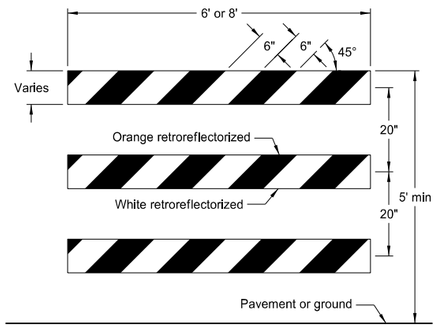
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



TYPE I BARRICADE

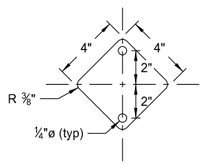


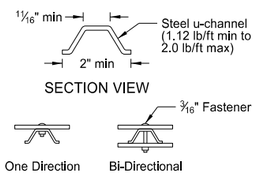
TYPE II BARRICADE

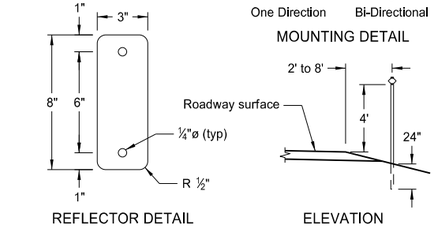


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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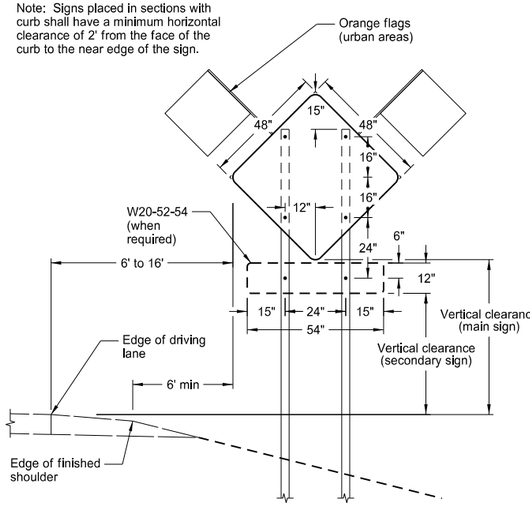
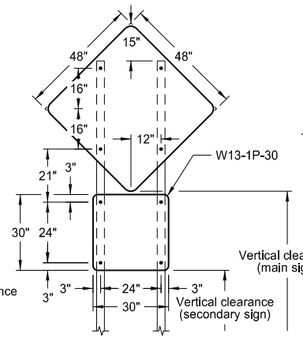
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

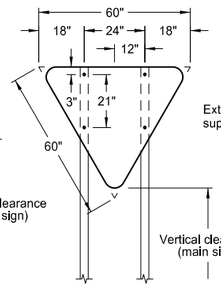
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



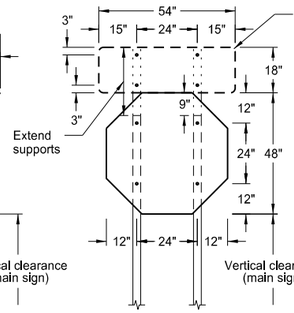
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



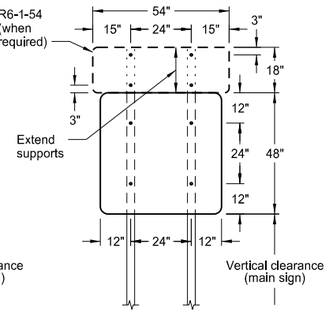
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



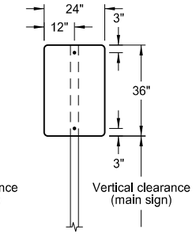
R1-2-60 - YIELD SIGN



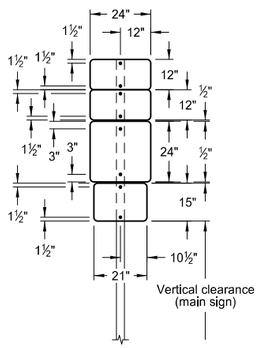
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



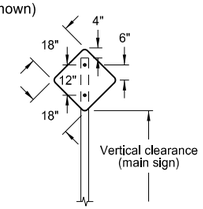
48" x 48" SIGN
(with R6-1-54 sign as required)



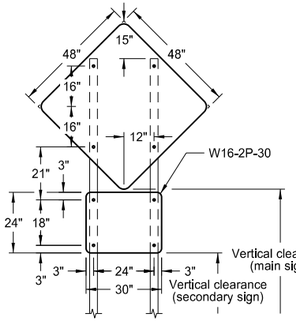
24" x 36" SIGN



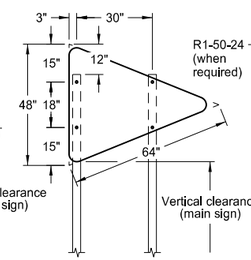
24" x 24"
ROUTE MARKER
ASSEMBLY



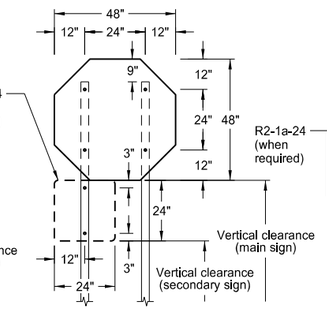
18" x 18"
DIAMOND SIGN



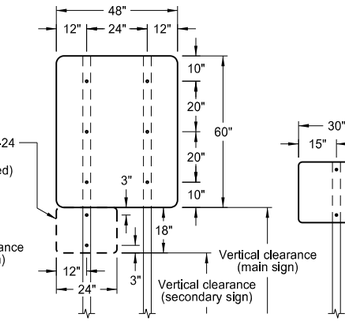
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



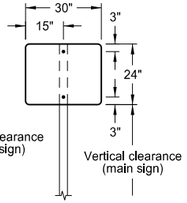
W14-3-64 - PENNANT SIGN



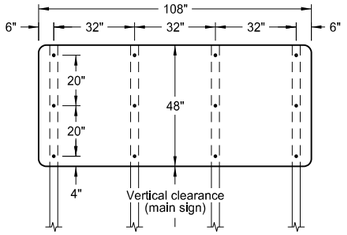
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



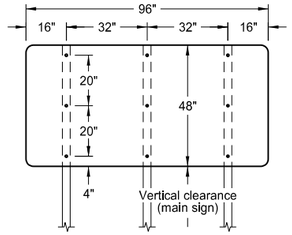
48" x 48" SIGN
(with R2-1a-24 sign as required)



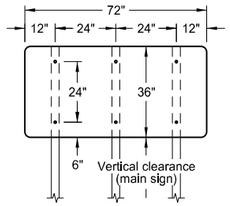
30" x 24" SIGN



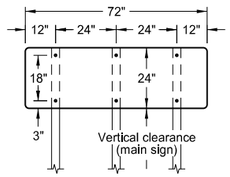
108" x 48" SIGN



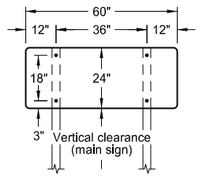
96" x 48" SIGN



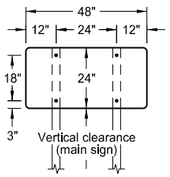
72" x 36" SIGN



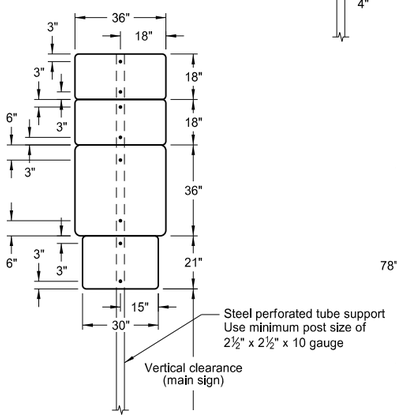
72" x 24" SIGN



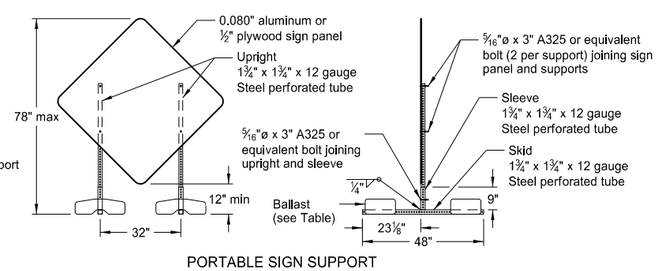
60" x 24" SIGN



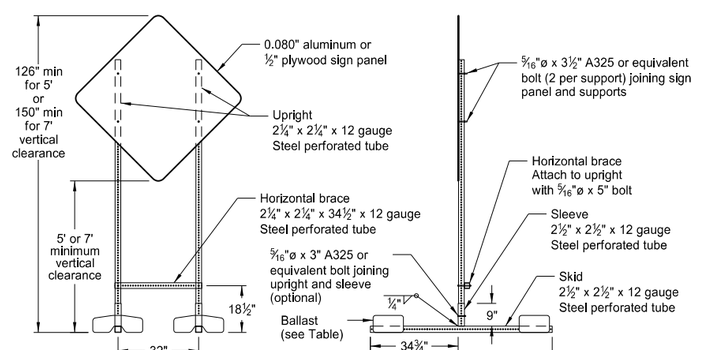
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

   Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

   Interstate - white legend on blue background
   Interstate Business Loop - white legend on green background
   US and State - black legend on white background
   County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

   The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

   Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

   When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

   Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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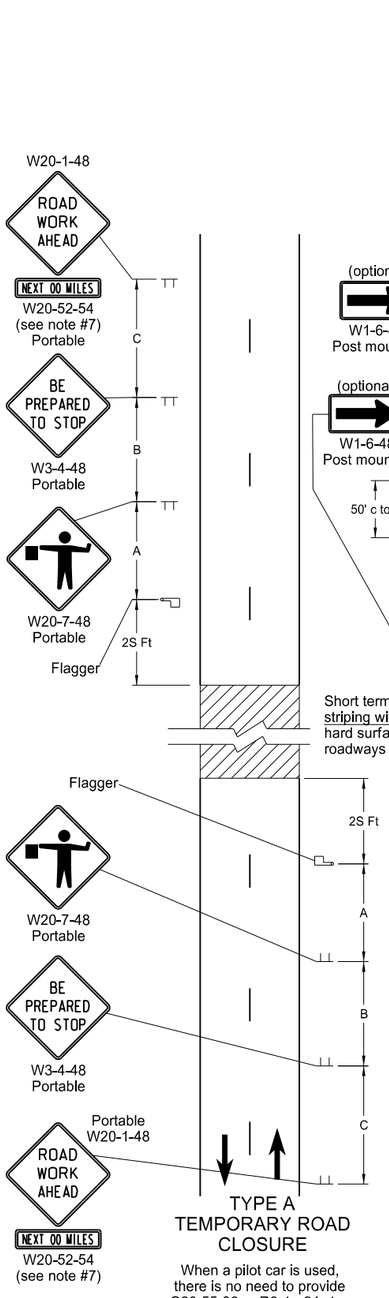
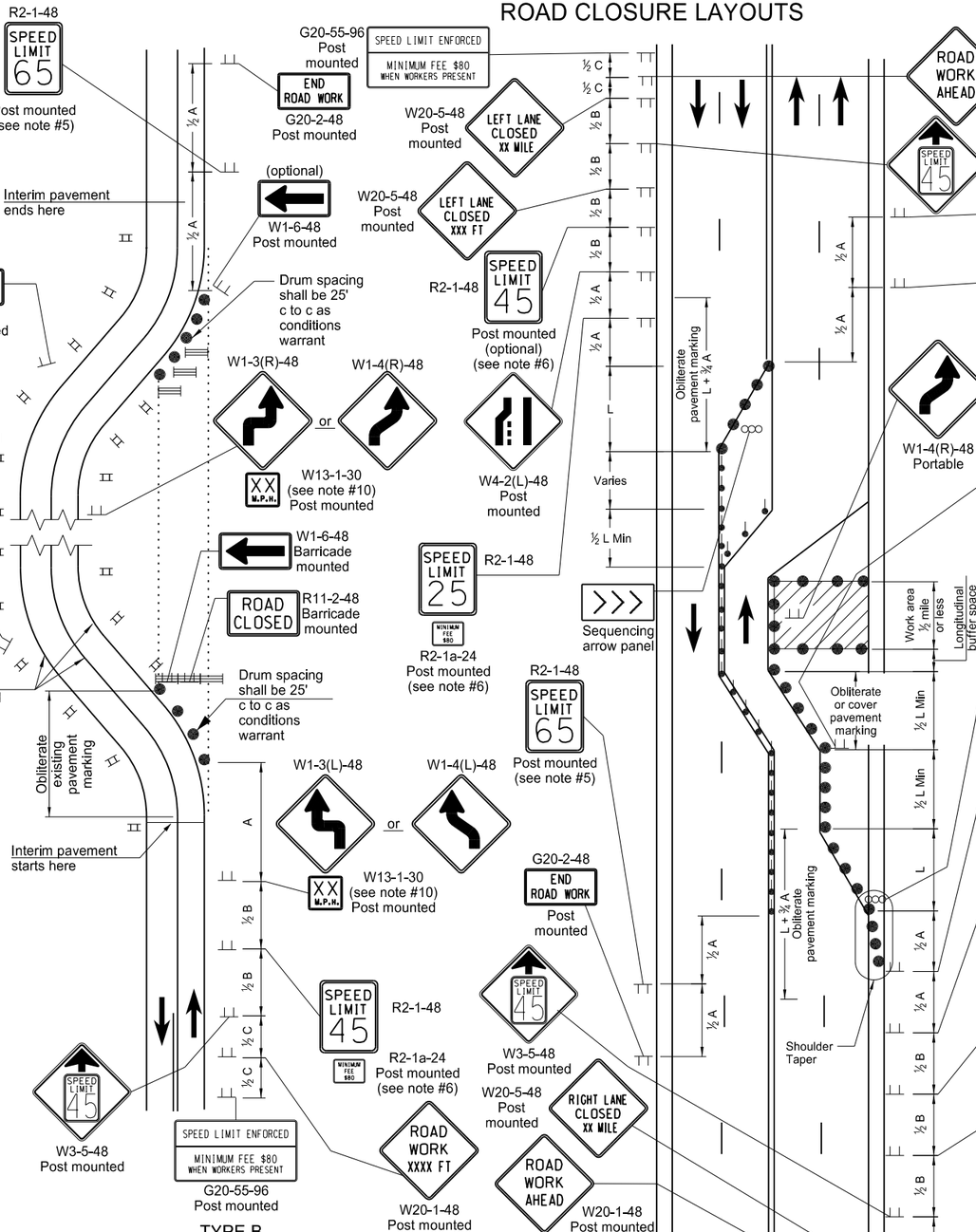
ROAD CLOSURE LAYOUTS

D-704-15



TYPE A
TEMPORARY ROAD CLOSURE

When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.



TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour is provided (signing shown for one direction of travel only). Use on bridge and culvert installation where closure is ½ mile or less.

TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY

4 lane undivided highway with half the roadway closed.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. Use when work area is 1 mile or longer.
8. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Type III barricade
- Sign
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.

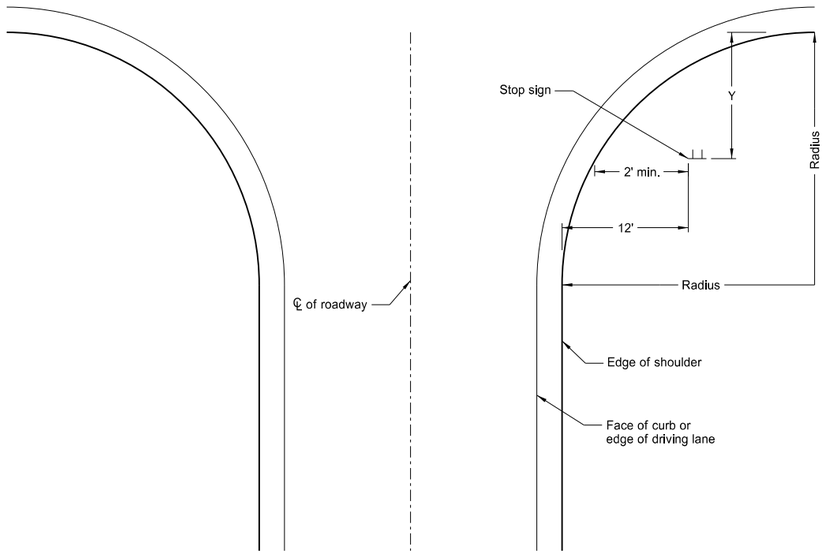
   Signs on expressways shall be installed with a minimum height of 7'.

   Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.

   The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.

3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.

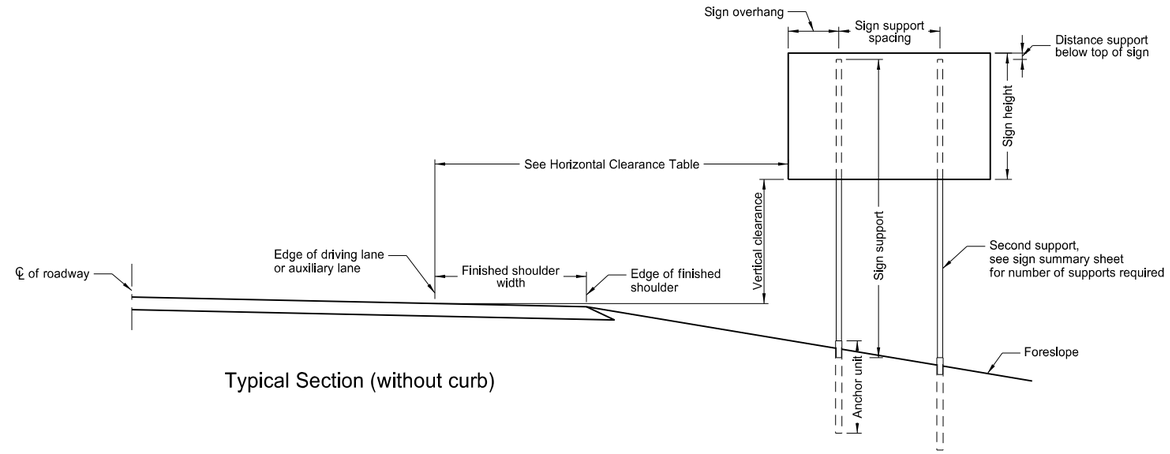
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.



Stop Sign Location
Wide Throat Intersection

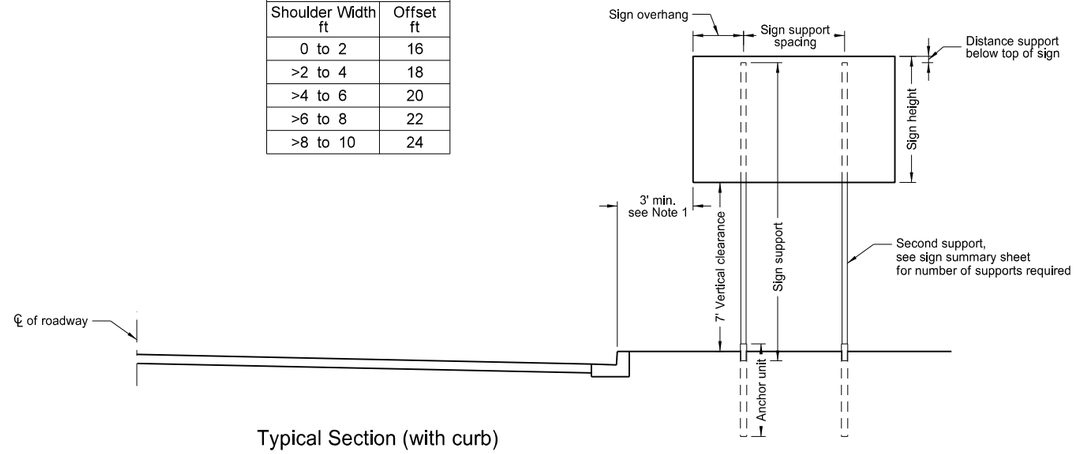
This layout is to be used for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



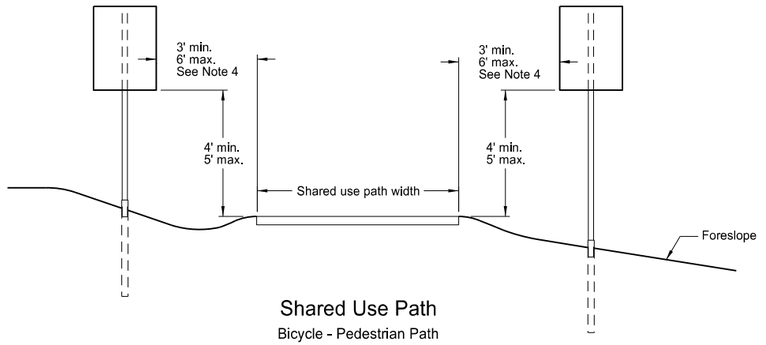
Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

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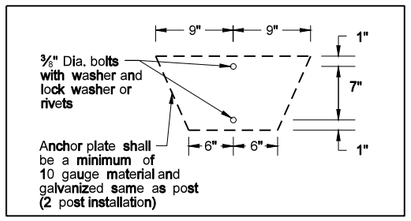
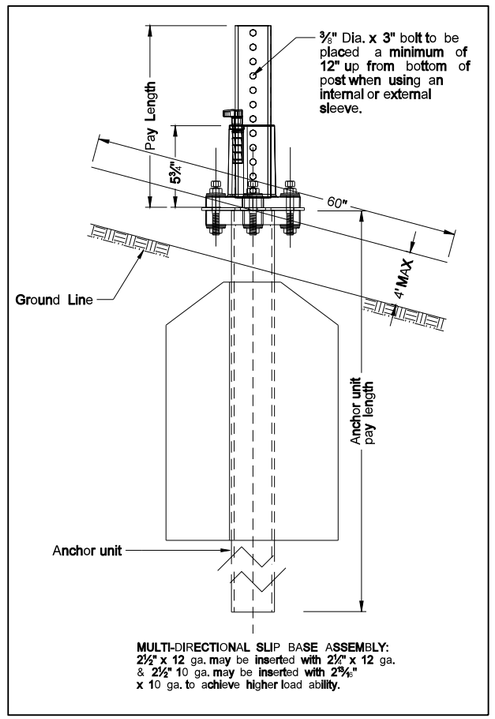
Mounting Details Perforated Tube

D-754-24

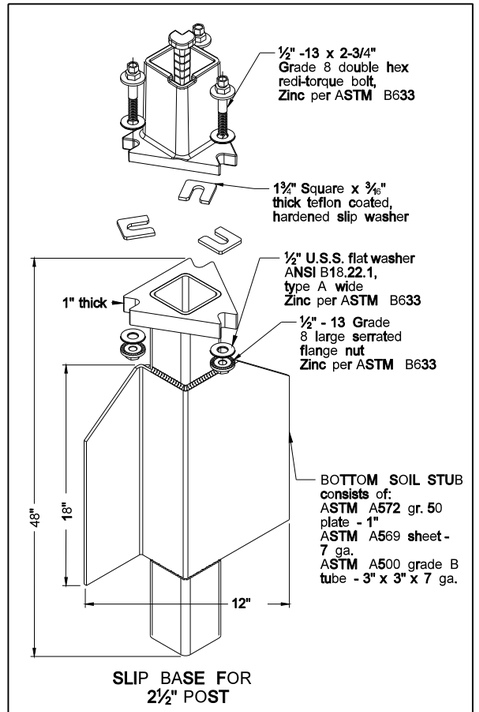
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2½	12
1	2½	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2½	12	2⅛(D)	12	Yes		7
1	2½	12	2½	12	Yes		7
2	2½	10			Yes		7
2	2½	12	2⅛(D)	12	Yes		7
2	2½	12	2½	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2½	12	Yes		7
3 & 4	2½	12	2⅛(D)	12	Yes		7
3 & 4	2½	10	2⅜	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

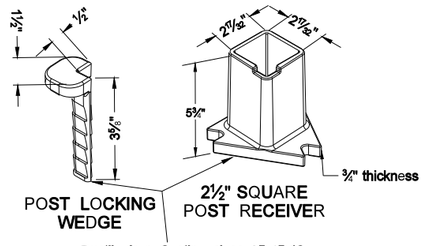




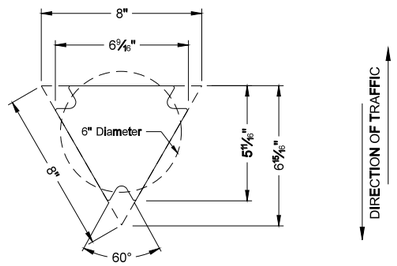
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY: 2½" x 12 ga. may be inserted with 2½" x 12 ga. & 2½" 10 ga. may be inserted with 2⅜" x 10 ga. to achieve higher load ability.



SLIP BASE FOR 2½" POST



Ductile Iron Casting class 65-45-12. Hot Dip Galvanize ASTM A153



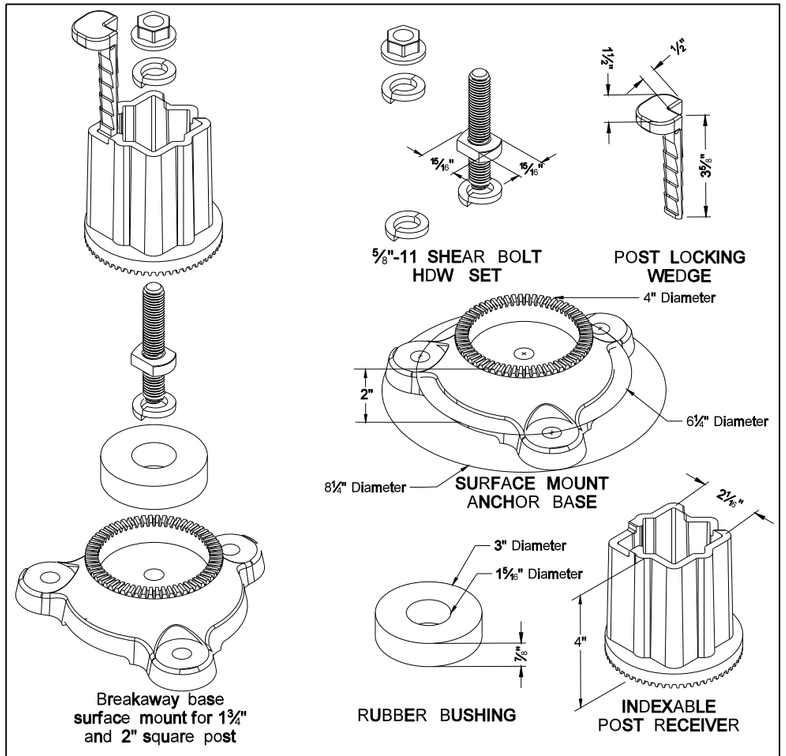
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia in.⁴	Cross Sect. Area in.²	Section Modulus in.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2⅜ x 2⅜	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 ⅜" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

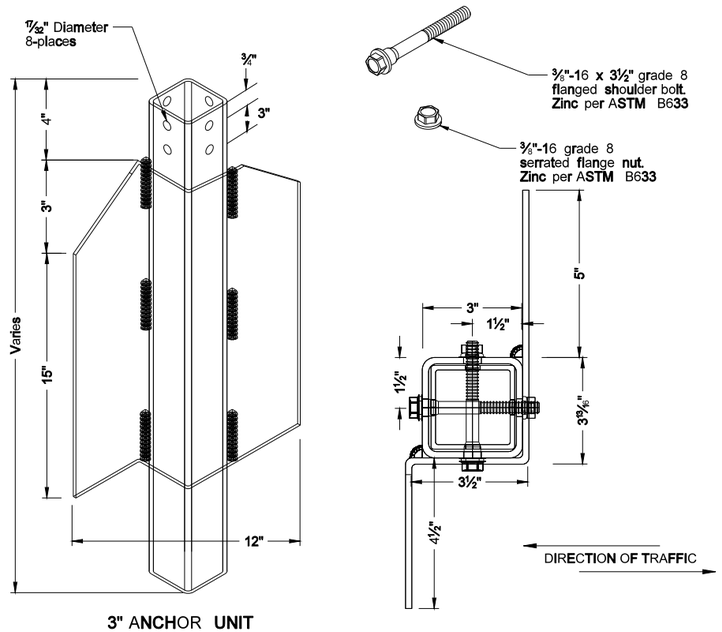
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor material shall be 7 guage H.R.P.O. Commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. When used in concrete sidewalk, anchor shall be the same concept without the wings
4. Four post signs shall have over 8' between the first and fourth posts.
5. Installation procedures as per manufacturers recommendation.
6. Concrete fasteners for surface mount breakaway base shall be a minimum ½" diameter x 4" grade 8.



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post. (standard ⅜" diameter grade 8 bolt may be used with proper shim)



3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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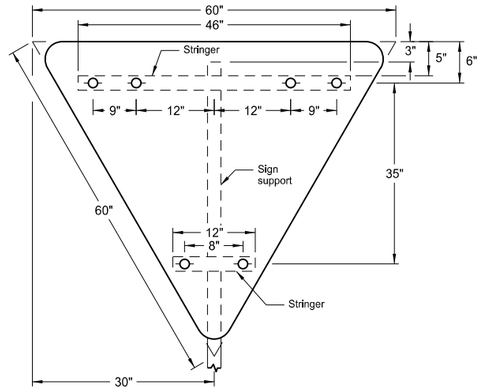
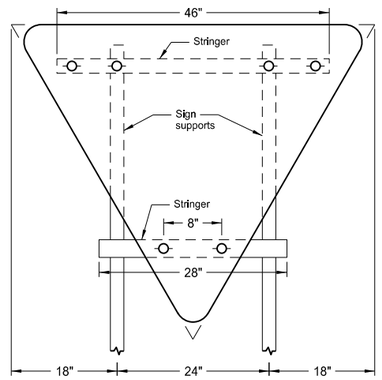
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

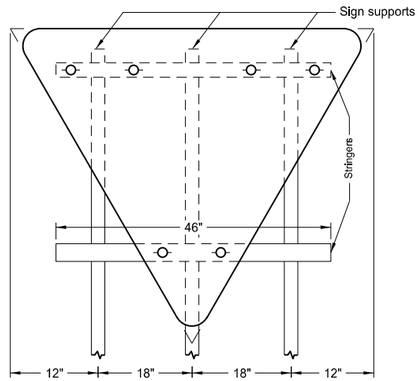
D-754-27



1 Post



2 Posts



3 Posts

Assembly No. 6

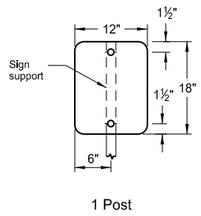
Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

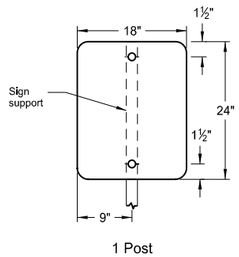
3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.



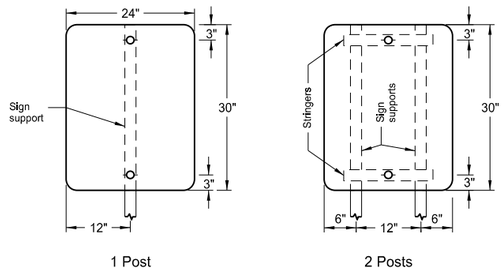
1 Post

Assembly No. 7



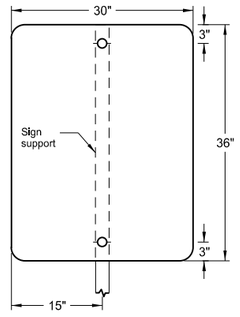
1 Post

Assembly No. 8

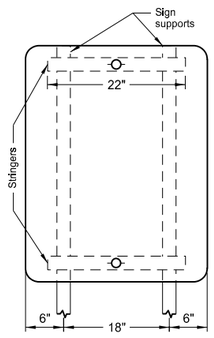


1 Post 2 Posts

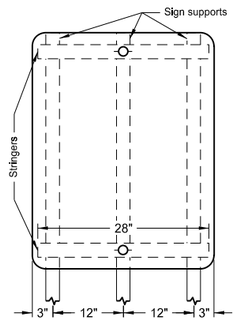
Assembly No. 9



1 Post

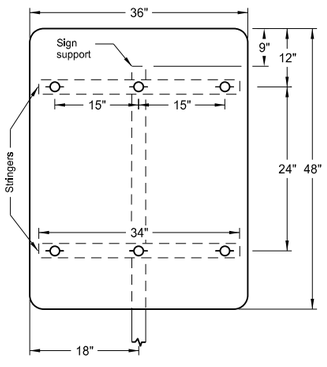


2 Posts



3 Posts

Assembly No. 10



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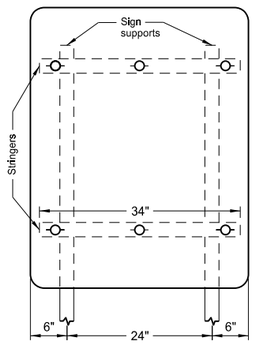
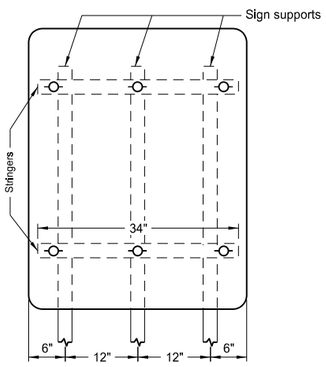


2 Posts



3 Posts

Assembly No. 11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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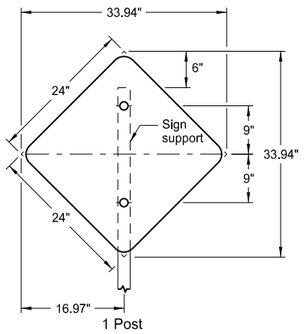
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



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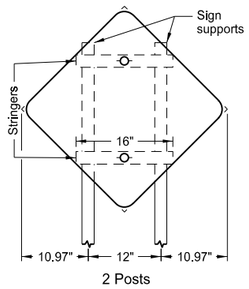
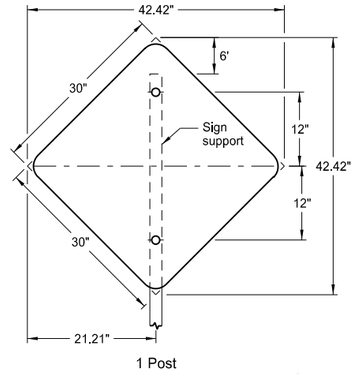


2 Posts

Assembly No. 18



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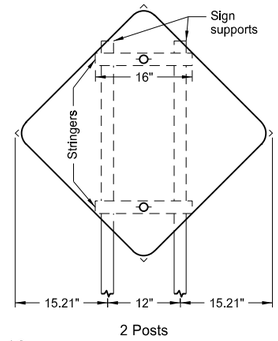
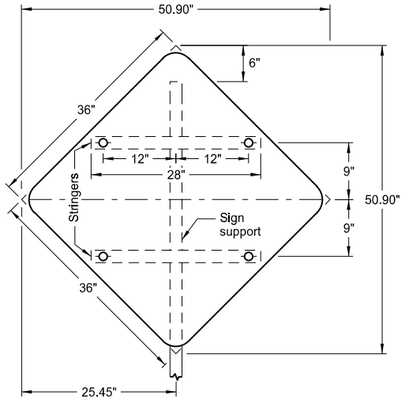


2 Posts

Assembly No. 19



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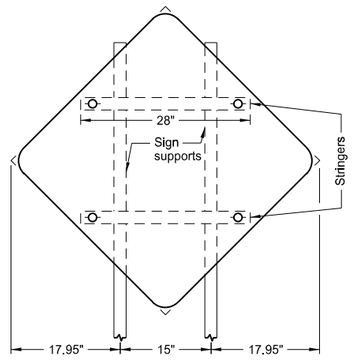
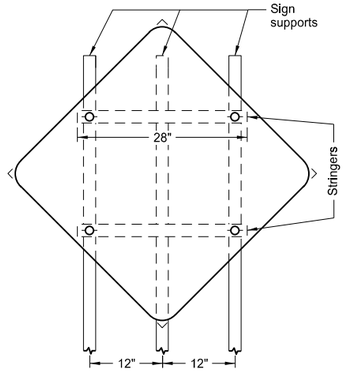
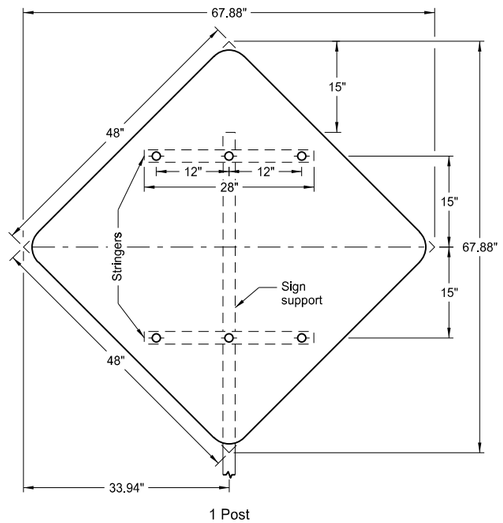


2 Posts

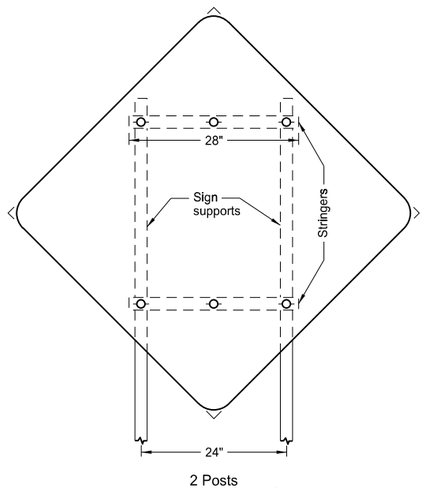


3 Posts

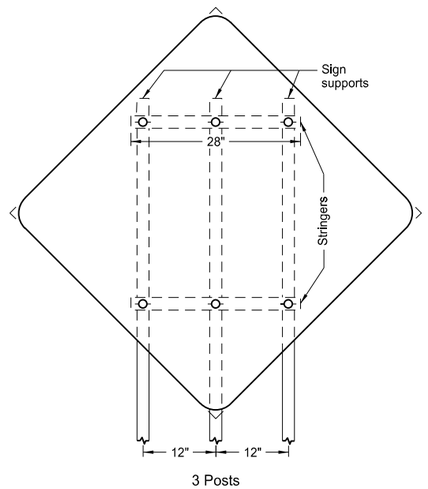
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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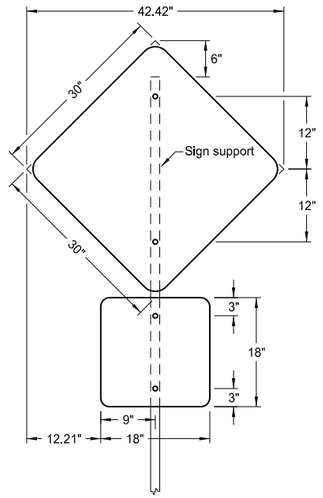
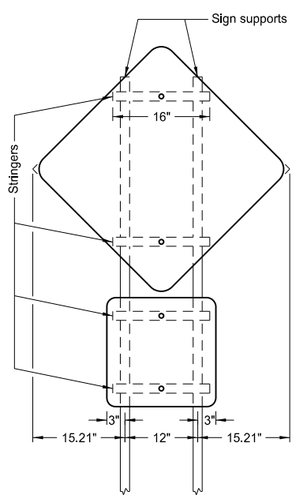
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING AND GUIDE SIGNS

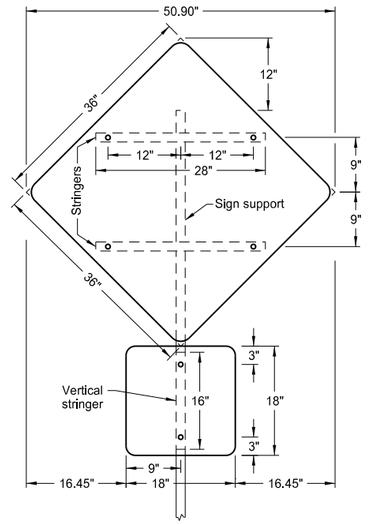


1 Post

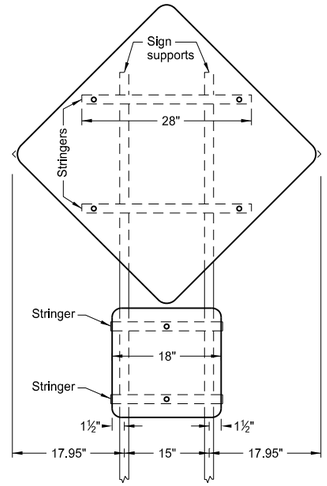


2 Posts

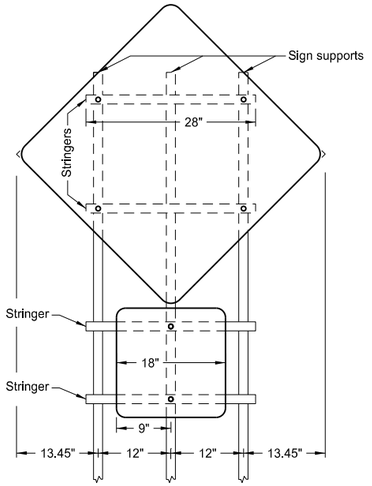
ASSEMBLY NO. 53



1 Post

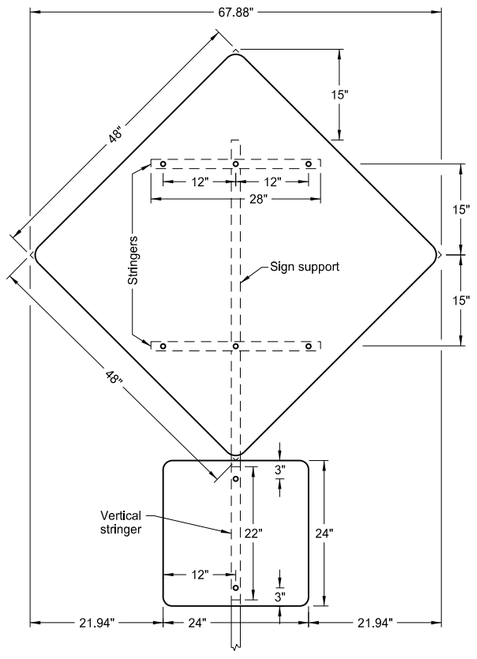


2 Posts

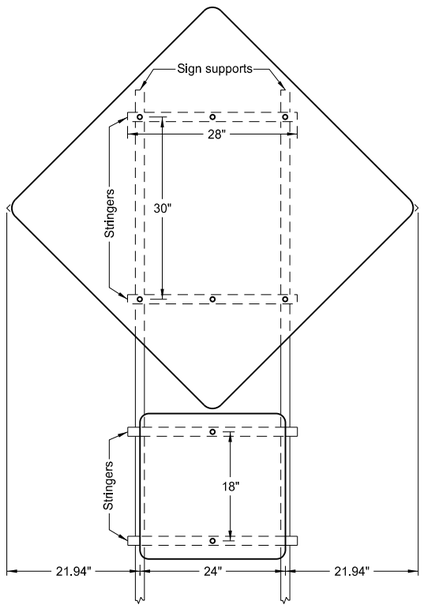


3 Posts

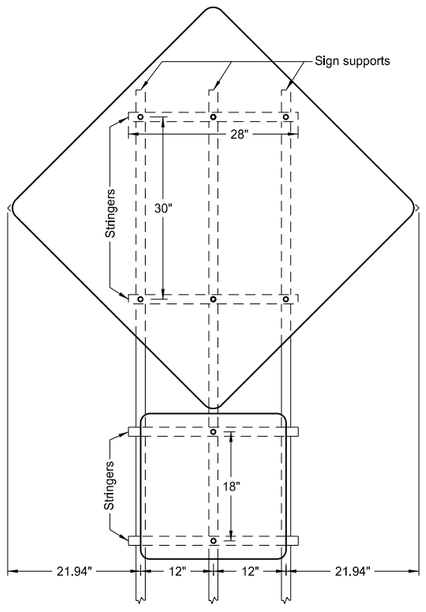
ASSEMBLY NO. 54



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 55

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½"x1½".
3. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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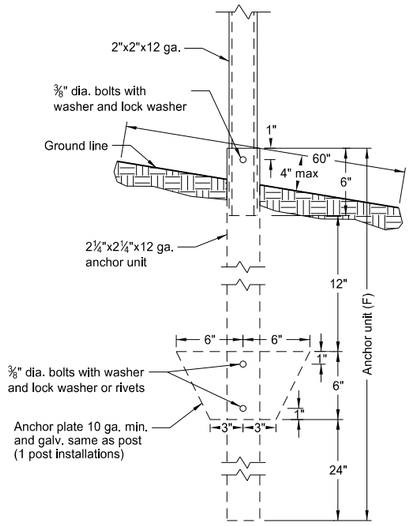
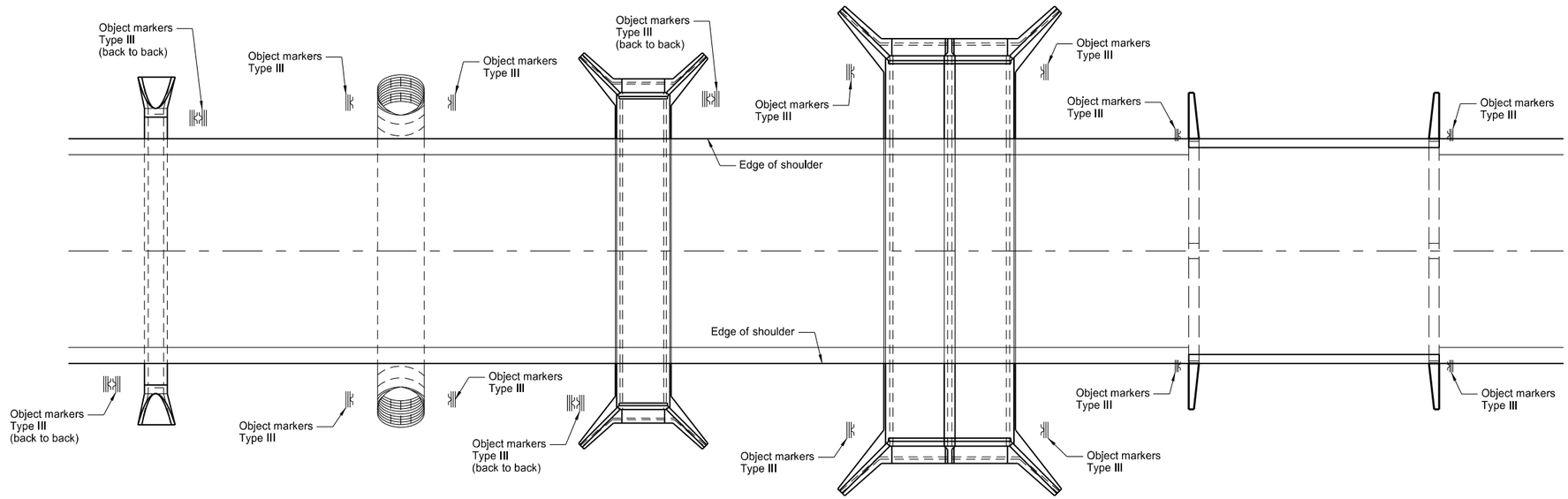
OBJECT MARKERS

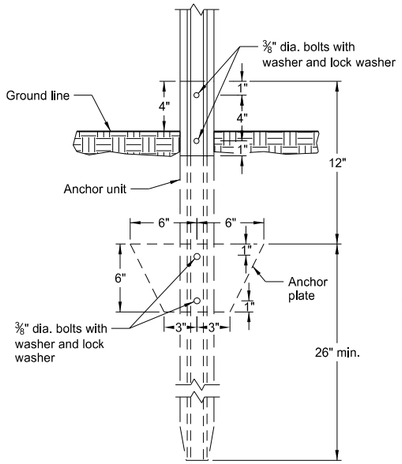
D-754-82



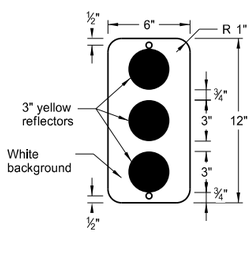
Perforated Tube Anchor Unit Assembly



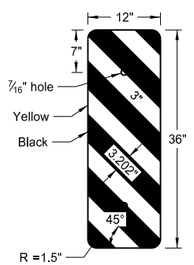
Pipe Culverts 10' max | Pipe Culverts greater than 10' | Box Culverts 10' max | Box Culverts greater than 10' | Bridges (B)



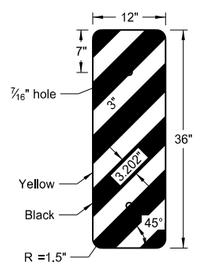
U-Channel Anchor Unit Assembly



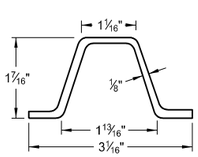
Object Marker
OM2-1V (C)
Type II



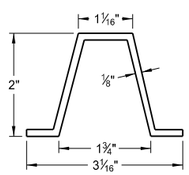
Object Marker Left
OM-3L (C)
Type III



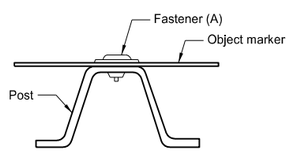
Object Marker Right
OM-3R (C)
Type III



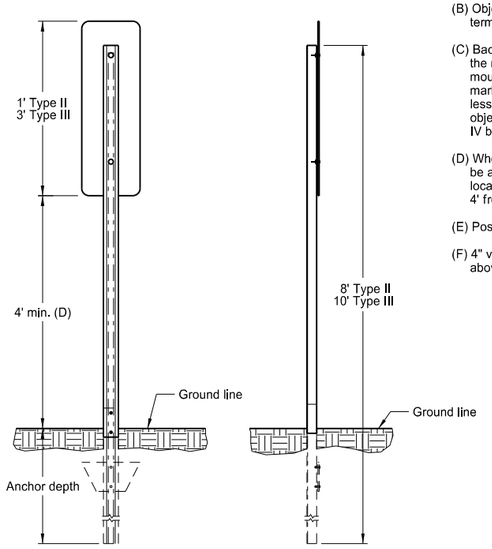
Steel Post Detail (E)
Approx. 2 lb/ft



Aluminum Post Detail (E)
Approx. 0.88 lb/ft



Fastener Detail



Object Marker
Installation Detail

Notes:

(A) The fastener shall be ⅜" dia. with flat washer having a min. outside dia. of 1 3/16". Fasteners shall be tension pin type or other non-rust vandal resistant fastener.

(B) Object markers are not required if approach guardrail is installed with reflectors and end terminal with impact head object markers.

(C) Back to back mountings require two object markers. The 3" yellow reflector shall conform to the requirements of Section 894.06 B.2 of the Standard Specifications. Object markers to be mounted vertically on steel posts in front of the bridge railing on each side of highway to mark the horizontal clearance on all bridges where the distance between wheel guards is less than approach width. All sign backing material shall be .100" sheet aluminum. Type III object markers shall be ASTM Type XI sheeting. Type II object markers shall be ASTM Type IV background sheeting with ASTM Type XI reflectors.

(D) When an object marker is located 8' or less from shoulder or curb, vertical clearance shall be a minimum of 4' from the near edge of the traveled way to the bottom of the sign. If located more than 8' from the shoulder or curb the vertical clearance shall be a minimum of 4' from the ground to the bottom of the sign.

(E) Posts shall conform to Section 894.03 B of the Standard Specifications.

(F) 4" vertical clearance of anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and back and ahead of post.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-18-14	Revised Note C

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