DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2014	Pass: NA	Trucks: NA	Total: 45	NA
Forecast 2034	Pass: NA	Trucks: NA	Total: 45	NA
Clear Zone Distance: 18'		Design Speed: 55 M.P.H		
Minimum Sight Dist. for Stopping: 495'		Bridges: HL-93		
Minimum Sight Dist. for Safe Passing: NA				
Sight Dist. for No Passing Zone: NA				
Pavement Design Life NA (years)				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	18714	1	1

JOB# 12

STUTSMAN COUNTY, NORTH DAKOTA

PLANS FOR

Federal Aid Project No. CNOC-BRC-4741(051)
Structure No. 143-39.0

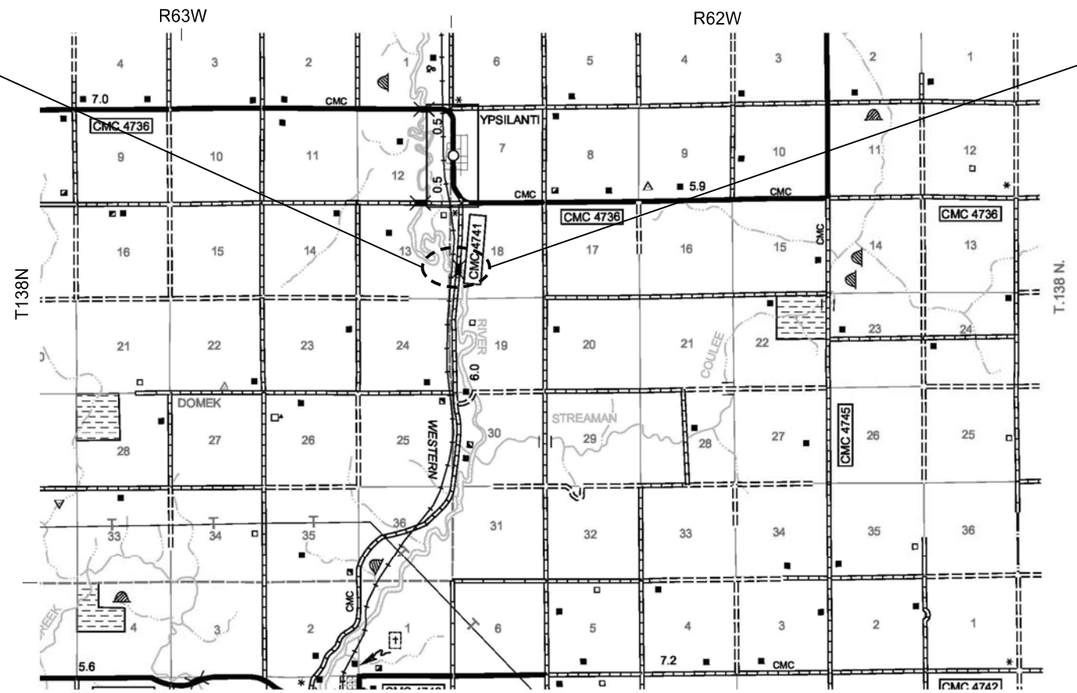
Project Consists of the Replacement of Bridge 143-39.0
with a 162 Ft, Multi Span Bridge, Road Grading and Incidentals
Project is Located 1 Mile South of Ypsilanti, North Dakota

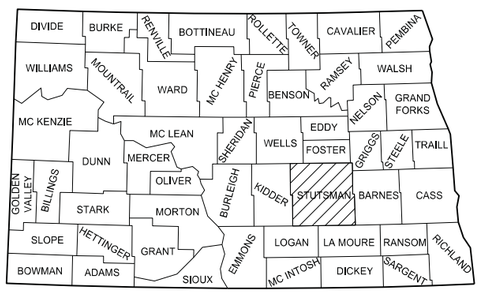
GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
CNOC-BRC-4741(051)	0.170	0.170

BEGIN PROJECT BRC-4741(051)
STA 6+50
N=406787.6152
E=2453805.3309
3774.6' South and 253'
East of the NW Corner
of Section 18
T136N R62W

END PROJECT BRC-4741(051)
STA 15+50
N=407684.3748
E=24538822.2053
2877.5' South and 321'
East of the NW Corner
of Section 18
T136N R62W





STATE COUNTY MAP

PS&E CORRECTIONS MADE DATE _____
SURVEYED DATE 11-10
DESIGNED DATE 2-16

DESIGNERS

Mike Bassingthwaite, PE

Alex Schwarzhoff, PE

Tim Pearson

Tyler Birchem

Aaron Medenwaldt

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 03/22/2016

Michael L. Bassingthwaite /s/

INTERSTATE ENGINEERING INC.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	2	1

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LIST OF STANDARD DRAWINGS

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D-260-1	Erosion and Siltation Controls-Silt Fence
D-261-1	Fiber Roll Placement Details
D-622-1	Pile Splice Details
D-704-7	Breakaway Systems for Construction Zone Signs – Perforated Tube
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D-704-9	Construction Sign Details Terminal and Guide Signs
D-704-10	Construction Sign Details Regulatory Signs
D-704-11	Construction Sign Details Warning Signs
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D-704-14	Construction Sign Punching and Mounting Details
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D-704-22	Construction Truck & Temporary Detour Layouts
D-764-1	W-Beam Guardrail General Details
D-764-6	Flared Energy Absorbing Terminal
D-764-22	Typical Grading at Bridge Ends with W-Beam Guardrail

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SP #	Description
SP 0003(14)	Temporary Erosion & Sediment Best Management Practices
SP 0004(14)	Federal Migratory Bird Treaty Act
SP 5107(14)	Permits and Environmental Considerations

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	6	1

NOTES

100-P01 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 location and elevations are unknown. The Contractor will be liable for any costs resulting from damage to utilities or pipelines.

Utility companies will move or adjust conflicting facilities that are not designated for relocation in the plan documents. Coordinate work with the utility companies affected by the project.

107-114 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the Red River Valley and Western Railroad Company at RP 14.10. The type of work that will be performed within the railroad right of way is bridge replacement, road grading, and incidentals. Direct inquiries regarding protective liability insurance to:

Mr. Dan Zink, Director of Administration
Red River Valley and Western Railroad Company
P.O. Box 608
Wahpeton, ND 58074
701-642-8257

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".

203-P01 COMMON EXCAVATION: Benching of the existing roadway in-slopes shall be required. Each bench shall be thoroughly compacted before additional embankment is placed. All scarifying, re-compacting, and benching shall be included in bid price for “Common Excavation–Type B”. “Common Excavation–Type B” shall be paid at plan quantity.

203-P02 TOPSOIL: Arrangements for topsoil storage area shall be made if room isn’t available within the right-of-way. Topsoil shall be spread evenly over the entire disturbed area, except 28-foot roadbed, approaches, and riprap. No payment will be made for additional handling of topsoil that is moved to provide additional excavation area between proposed grading limits and the right-of-way. The bid item “Topsoil” includes all labor, materials, and equipment associated with stripping, stockpiling, and re-spreading the topsoil. Topsoil will not be measured separately and will be paid at plan quantity.

203-P03 BORROW-EXCAVATION: The Contractor shall be responsible for obtaining areas to provide suitable “Borrow” material. Compaction of Embankment material shall be in accordance with Section 203.04 E.3 of the Standard Specifications.

253-P01 MULCHING: All disturbed areas are to be straw mulched after seeding is complete.

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	6	2

ENVIRONMENTAL COMMITMENTS

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

EC-1: Unavoidable permanent impacts will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank in accordance with the mitigation guidance[2, 3].

ACTION REQUIRED /TAKEN: Permanent Impacts of 0.10 acres will be mitigated at the Stutsman County wetland mitigation bank.

Wetland Impact Table

Wetland Number	Test Hole (in wetland)	Location	LONG West (Dec. Deg.)	LAT North (Dec. Deg.)	Field Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	Wetland Impacts (acres)		Wetland Mitigation				
											Mitigation Required			Location; Acreage; Wetland#; Ratio	Onsite Mitigation Acres
									Temp. Ac.	Perm. Ac.	EO 11990	USACE	USFWS		
1	Ypsi-1-w	Sec. 18, T138N, R62W	-98.5644	46.7652	PEMA	Fringe Riverine Wetland	0.60	Natural	0.00	0.00	Y	Y	N		
2a	Ypsi-2-w	Sec. 18, T138N, R62W	-98.5642	46.7657	PEMA	Fringe Riverine Wetland	0.10	Natural	0.00	0.02	Y	Y	N		
2c	-----	Sec. 18, T138N, R62W	-98.5646	46.7670	PEMA	Fringe Riverine Wetland	0.02	Natural	0.00	0.04	Y	Y	N		
2b	Ypsi-3-w	Sec. 18, T138N, R62W	-98.5643	46.7669	PEMA	Fringe Riverine Wetland	0.06	Natural	0.00	0.04	Y	Y	N		
2e	-----	Sec. 18, T138N, R62W	-98.5640	46.7667	PEMA	Fringe Riverine Wetland	0.01	Natural	0.00	0.00	Y	Y	N		
3	-----	Sec. 18, T138N, R62W	-98.5640	46.7669	PEMA	Linear Slope Wetland	0.11	Natural	0.00	0.00	Y	Y	N		
4	Ypsi-4-w	Sec. 18, T138N, R63W	-98.564	46.7674	PEMA	Floodplain Basin	0.19	Natural	0.00	0.00	Y	Y	N		
5	-----	Sec. 18, T138N, R63W	-98.5649	46.7651	PEMA	Linear Slope Wetland	0.02	Artificial	0.00	0.00	N	N	N		
6	-----	Sec. 18, T138N, R63W	-98.5647	46.7661	PEMA	Linear Slope Wetland	0.07	Artificial	0.03	0.03	N	N	N		artificial / not required
					Total	Total	1.18		**0.03**	**0.13**					**0**

Other Waters Impact Table

Other Waters															Other Water Mitigation				
Number	Location	LONG West (Dec. Deg.)	LAT North (Dec. Deg.)	Local Waterway Name	Tributary To	Field Cowardin Classification	OW Size (acres)	OW Length (feet)	Feature	Impacts to Other Waters				Mitigation Required			Mitigation Location; ratio	Method
										Acres		Linear Feet						
										Temp	Perm	Temp	Perm	EO 11990	USACE	USFWS		
#OW 2b	Sec. 26, T132 N, R53 W	-98.5644	46.7668	James River	James River	R2UB3	0.8	87	Perennial Stream	0.15	0.05	87	87	N	Y	N	on site	riprap in the river channel lowered 1'
						Total	0.8	87		0.15	0.05	87	87					

Summary Impact Table

Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	**Total (Acres)**	**Wetland Type**	**Total (Acres/LF)**
Natural/JD	0.1	**Temporary JD**	0.03
Natural/Non-JD	0.0	**Non-JD Temporary**	0.0
Artificial/JD	0.03	**Permanent JD > 0.10**	0.0
Artificial /Non-JD	0.0	**Permanent OW**	0.05 ac/87 ft.
Total	**0.13**	**Temporary OW**	0.15 ac/87 ft

EC- 2: No construction or demolition activities will take place during the spawning season in the James River from April 15 to June 1.

EC-3: The Contractor shall prevent the introduction of 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 (NDGFD) Administrative Rules 30-3-06 for compliance with ND Century Code Chapter 20.1-17 on Aquatic Nuisance Species (ANS). Contractor shall notify the NDGFD 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 Department sufficient time to inspect any and all such equipment for ANS. The NDGFD ANS Coordinator, Fred Ryckman, shall be contacted by phone (701.770.0920) or e-mail fryckman@nd.gov for equipment inspections, or any additional information regarding ANS prevention protocol.

PERMITS REQUIRED: NDPDES (North Dakota Pollutants Discharge Elimination System) – to be obtained by the contractor. **The owner of the permit shall be listed as Stutsman County.**

[1] A wetland Jurisdictional Determination was issued by the USACE on 2/11/16; NWO-2010-0265-BIS.

[2] 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.

[3] 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), and temporary impacts do not require mitigation.

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ND	CNOC-BRC-4741(051)	8	1

Estimated Quantities

SPEC	CODE	DESCRIPTION	UNIT	UNITS
103	0100	CONTRACT BOND	L SUM	1
107	0100	RAILROAD PROTECTION INSURANCE	LSUM	1
202	0105	REMOVAL OF STRUCTURE	LSUM	1
203	0102	COMMON EXCAVATION-TYPE B	CY	1,033
203	0109	TOPSOIL	CY	798
203	0140	BORROW-EXCAVATION	CY	1,113
210	0101	CLASS 1 EXCAVATION	L SUM	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0209	FOUNDATION FILL	TON	350
210	0411	FOUNDATION PREPARATION	LSUM	1
216	0100	WATER	MGAL	30
251	0200	SEEDING CLASS II	ACRE	2
251	2001	TEMPORARY COVER CROP	Mile	0.17
253	0101	STRAW MULCH	ACRE	2
255	0102	ECB TYPE II	SY	200
256	0201	RIPRAP GRADE II	TON	1,160
260	0100	SILT FENCE UNSUPPORTED	LF	800
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	800
261	0112	FIBER ROLLS 12IN	LF	1,270
261	0113	REMOVE FIBER ROLLS 12IN	LF	260
262	0100	FLOATATION SILT CURTAIN	LF	400
262	0101	REMOVE FLOATATION SILT CURTAIN	LF	400
302	0356	AGGREGATE SURFACE COURSE CL 13	TON	600
602	0130	CLASS AAE-3 CONCRETE	CY	146.2
602	1130	CLASS AE-3 CONCRETE	CY	173.2
604	9610	PRESTRESSED BOX BEAM-27IN	LF	626
612	115	REINFORCING STEEL - GRADE 60	LBS	16,347
612	116	REINFORCING STEEL - GRADE 60 - EPOXY COATED	LBS	28,266
616	364	STRUCTURAL STEEL M270-GRADE 36	LBS	1,546
622	0040	STEEL PILING HP 12X53	LF	820
624	0151	RAILING	LF	318.8
626	0120	PIER COFFERDAM	EA	2
702	0100	MOBILIZATION	L SUM	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,153
704	1052	TYPE III BARRICADES	EA	9
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	LF	60
714	9770	UNDERDRAIN PIPE PVC NON-PERFORATED 4IN	LF	80
764	131	W-BEAM GUARDRAIL	LF	275
764	145	W-BEAM GUARDRAIL END TERMINAL	EA	4

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	10	1

BASIS OF ESTIMATE

203 BORROW-EXCAVATION
Plan dimension less structural fill plus 40% for shrinkage

210 FOUNDATION FILL
Plan dimension plus 25% for shrinkage x 1.5 Tons/CY

216 WATER

Common Excavation	4 gal/CY
Borrow	4 gal/CY
Dust Palliative	25 Mgal/mile
Aggregate Surface Course	30 gal/Ton

256 RIPRAP GRADE II

1.5 Tons/CY

302 AGGREGATE SURFACE COURSE CLASS 13

4” Depth, 24’ top width, 2’ sloughs @ 1.875 Tons/CY	3178 Tons/mile
Transition to existing roadway (2)	20 Tons each
Guardrail Widening	20 Tons (Total)

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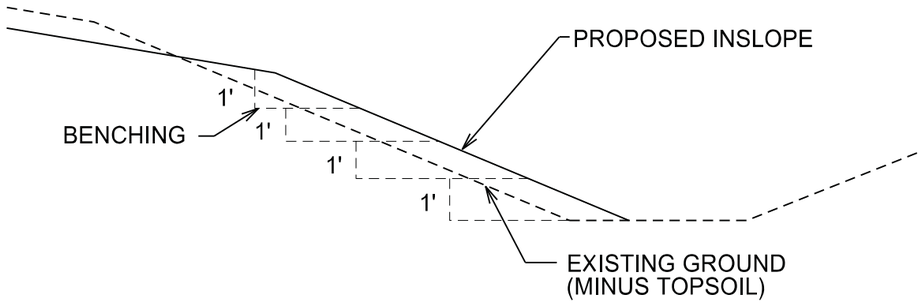
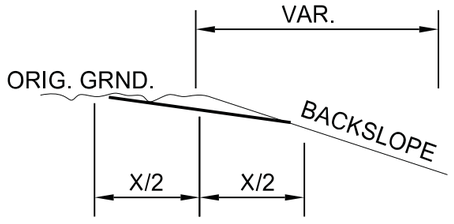


BENCHING TYPICAL SECTION

N.T.S.



BACKSLOPE ROUNDING WHERE X = 10'
UNLESS RESTRICTED BY HEIGHT OF BACKSLOPE

BACKSLOPE ROUNDING

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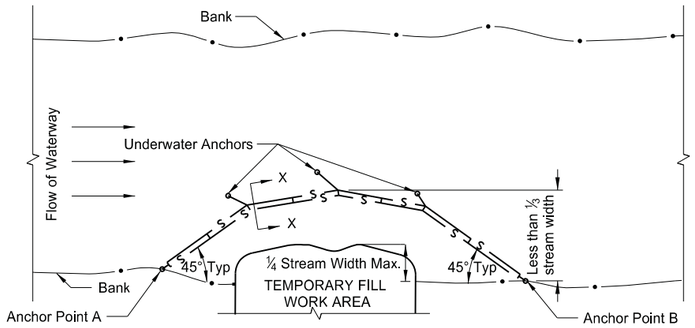
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Details

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	20	2

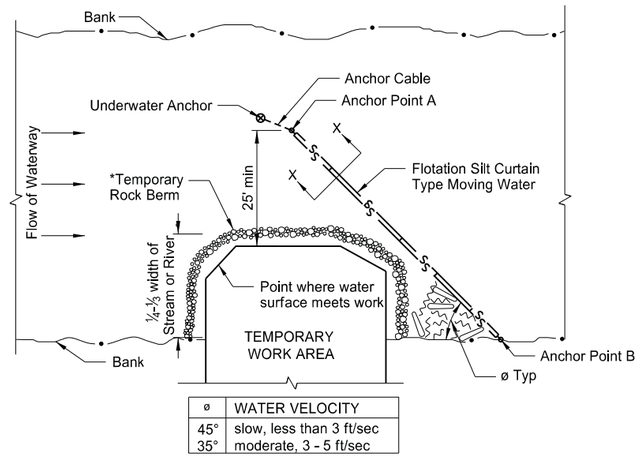
TYPICAL INSTALLATIONS
May vary with conditions



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE WORK AREA

DESIGN GUIDELINES:
When temporary work encroaches less than ¼ of the width of stream.



ø	WATER VELOCITY
45°	slow, less than 3 ft/sec
35°	moderate, 3 - 5 ft/sec

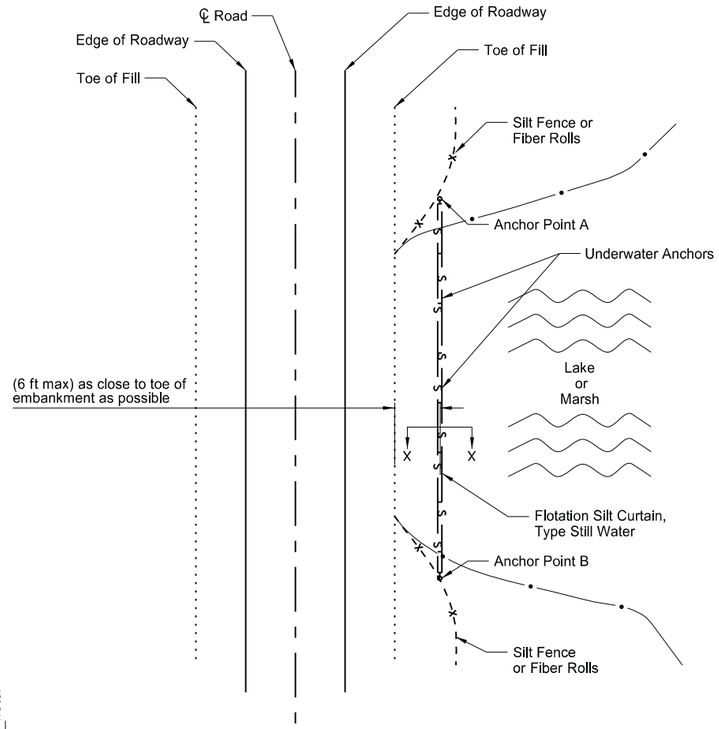
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE MOVING WATER

DESIGN GUIDELINES:
When temporary work encroaches more than ¼ but less than ⅓ width of the stream.

For narrow waterways, the curtain may be placed 1 foot above the bottom of waterway to allow water flow.

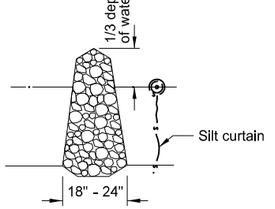
*In areas where the plans call for riprap at the bridge, provide a temporary rock berm. Include all costs for the temporary rock berm in price bid for the "Riprap".



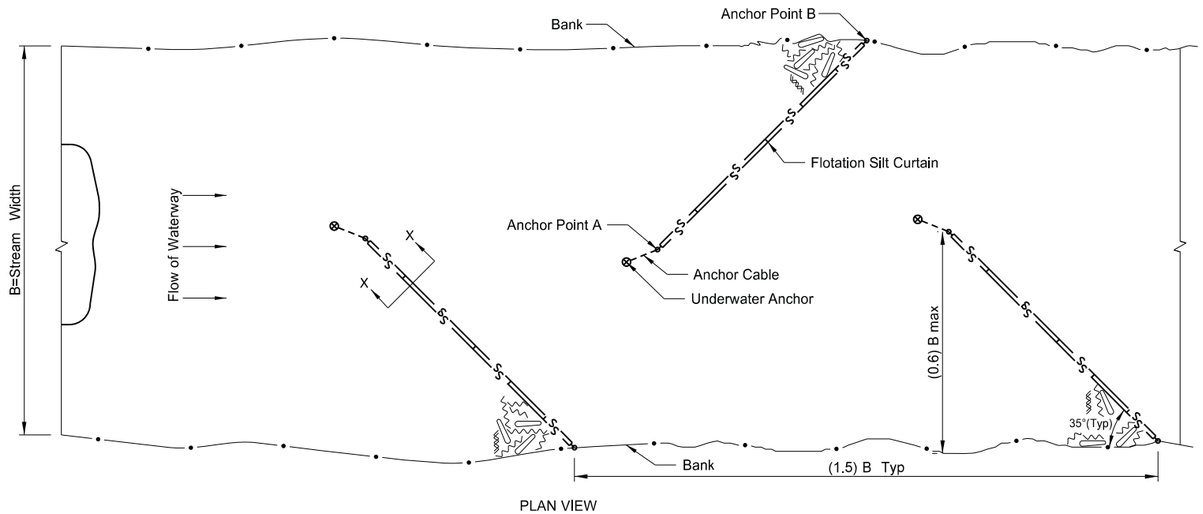
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE STILL WATER

The silt curtain shall extend onto shore and shall also be anchored there.



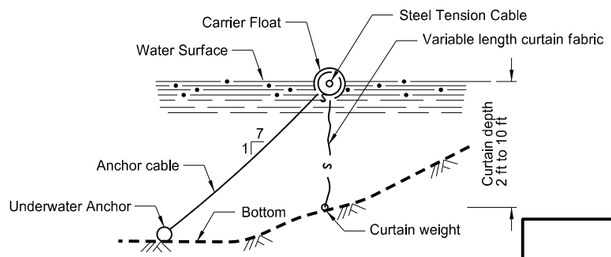
TEMPORARY ROCK BERM



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
When temporary work encroaches more than ⅓ width of the stream
Or where stream width doesn't allow use of Type Moving Water



SECTION X-X
FLOTATION SILT CURTAINS

Note:
Maximum water velocity for moving water = 5 ft/sec

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Temporary Erosion Control - Flotation Silt Curtain

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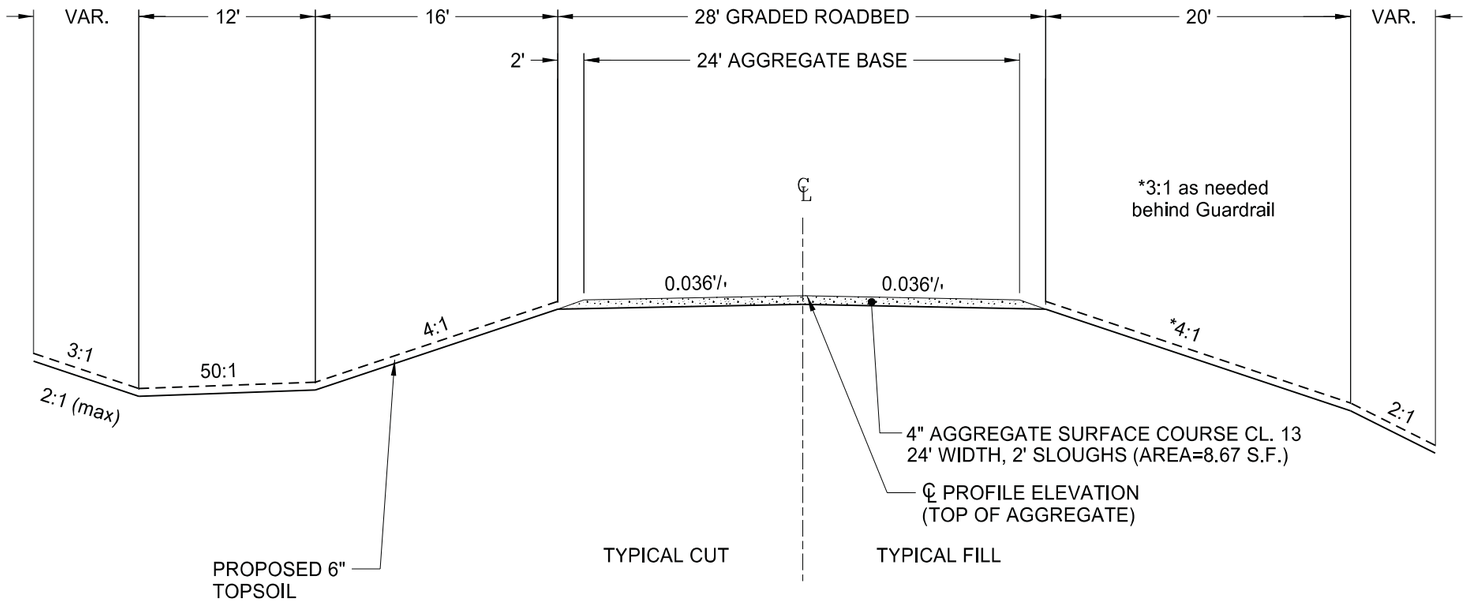

ROADWAY SYMMETRICAL ABOUT CENTERLINE

Proposed Typical Section

STA 6+50 TO STA 15+50 N.T.S.

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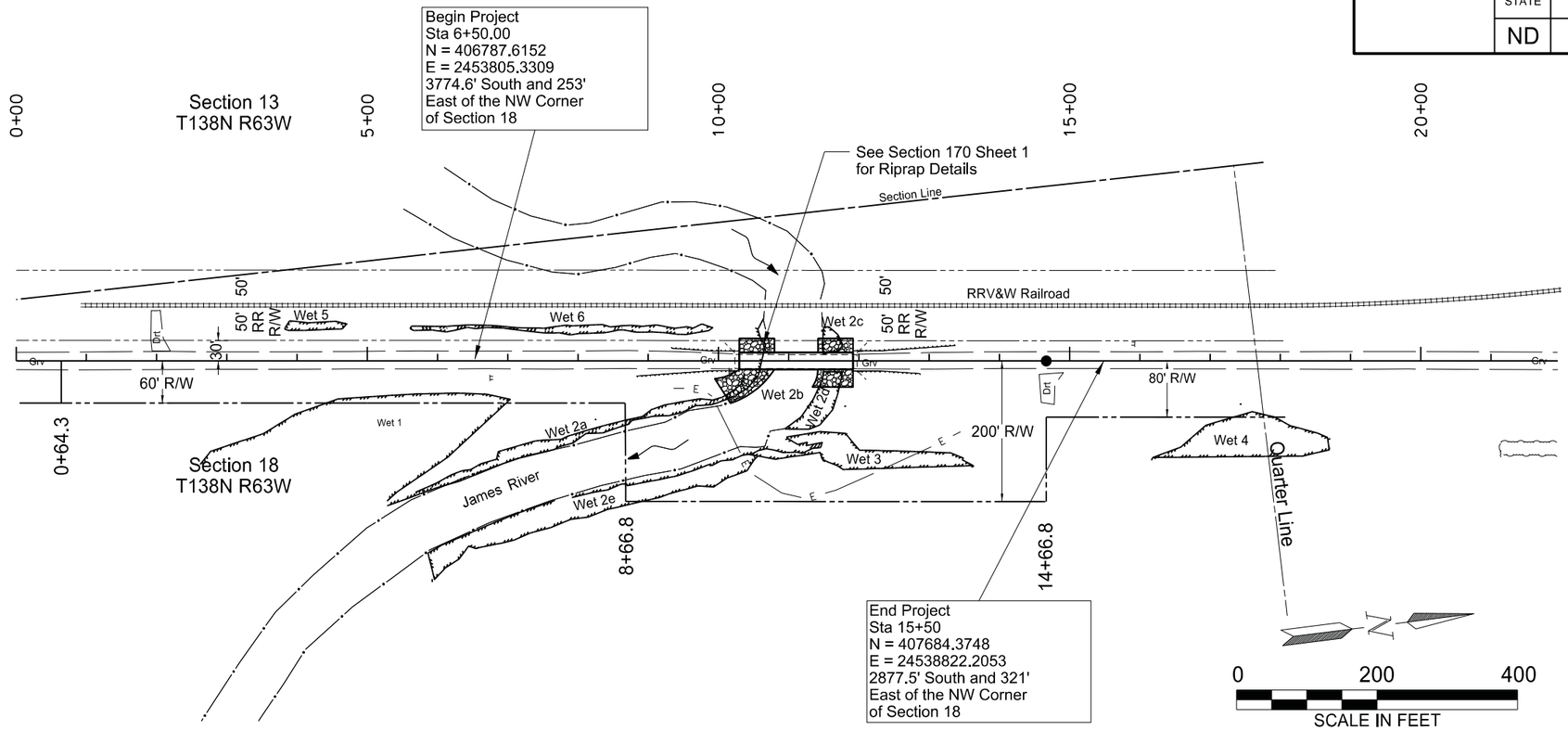
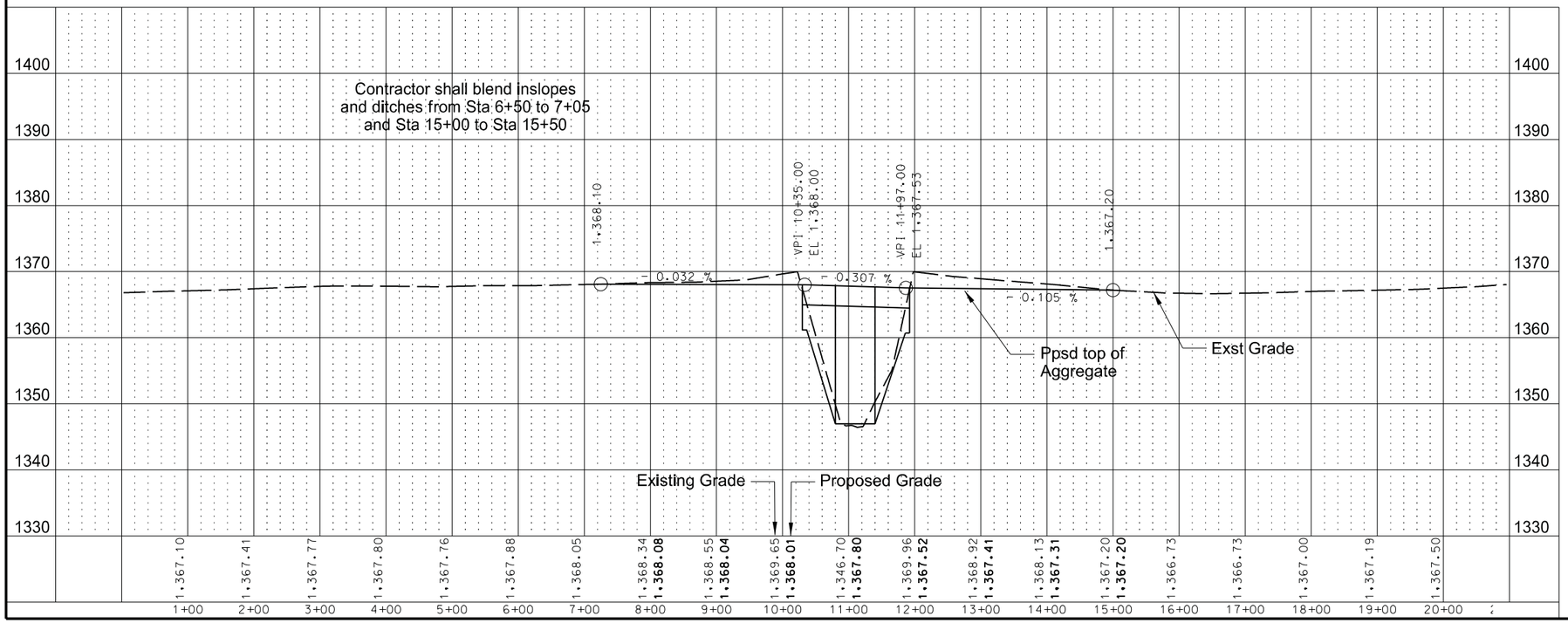
STUTSMAN COUNTY, NORTH DAKOTA

Typical Section

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	60	1





REMOVAL OF STRUCTURE
STA 11+20 1 EA

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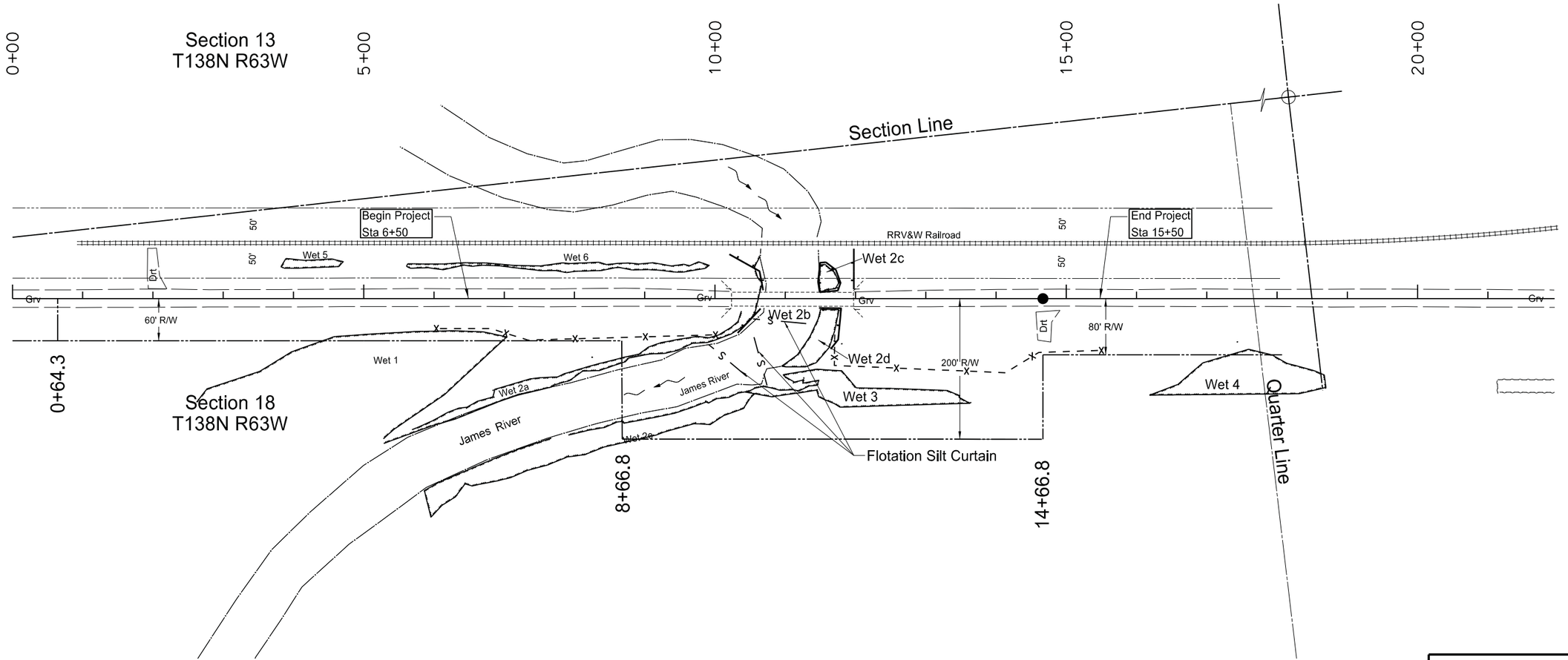
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Plan and Profile Sheet
Sta 6+50 to Sta 15+50

3/14/2016 11:31:08 AM Shelley.Terfehr Q:\2010\J10s\J1000025 Ypsilanti bridge\CADD\Design\Sheets\Section 60 PP\Alt 2 PP1.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	76	1



Fiber Rolls 12IN		
Sta. 10+40	LT	50 LF
Sta. 10+40	RT	70 LF
Sta. 11+70	LT	80 LF
Sta. 11+80	RT	60 LF
Silt Fence Unsupported		
Sta. 6+00 to 10+00	RT	400 LF
Sta. 11+70 to 15+50	RT	400 LF
Floatation Silt Curtain		
Sta 10+00	RT	400 LF

Erosion Control Legend

- Fiber Rolls 12 IN
- Silt Fence Unsupported
- Flotation Silt Curtain
- Riprap
- ECB

Notes:

All features shown shall be adjusted to comply with NDPES permit. Installations are anticipated to be staged as construction advances. Additional fiber rolls shall be installed at critical locations.

All features on this sheet are expected to be removed prior to permanent feature installation.

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JAMES RIVER
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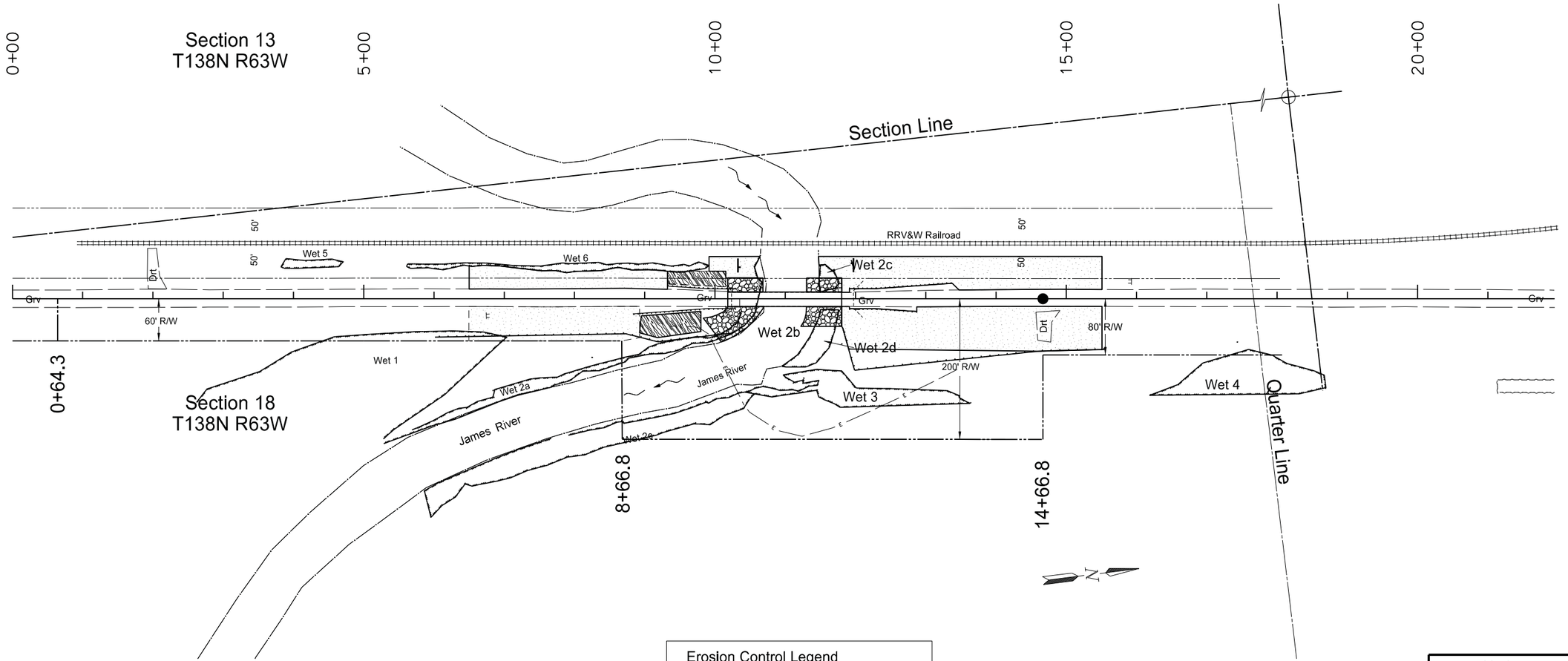
STUTSMAN COUNTY, NORTH DAKOTA

Temporary Erosion Control

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	77	1



Erosion Control Legend

- Fiber Rolls 12 IN
- Silt Fence Unsupported
- Flotation Silt Fence
- Riprap
- ECB
- Seeding and Mulch

Fiber Rolls 12IN		
Sta. 10+30	LT	30 LF
Sta. 12+00	LT	30 LF
Sta. 6+00 to 10+30	RT	450 LF
Sta. 11+90 to 15+50	RT	500 LF
ECB Type II		
Sta. 10+00	RT	100 SY
Sta. 10+00	LT	100 SY
Seeding Class II		
Sta. 6+50 to 15+50		2 Acres
Straw Mulch		
Sta. 6+50 to 15+50		2 Acres

Note: Silt fence installed for temporary control shall be removed prior to seeding and installation of permanent devices.

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JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Permanent Erosion Control

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Ypsilanti, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
5000	0+00.00	406139.9905	2453749.8235
5001	21+94.95	408326.9165	2453937.2870

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
NWSEC	18-138-63	410562.0960	2453556.8540
EQCOR	18-138-63	408061.0960	2458780.7550
NQCOR	18-138-63	410638.6940	2456055.4150
NQCOR	13-138-63	410503.6610	2450912.8140
NWSEC	13-138-63	410459.9850	2448324.8540

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	CONTROL POINT DESCRIPTION
CP7	410588.6360	2453583.0650	1382.9000			Off Chain
CP8	407621.5030	2453904.2100	1365.4300			Sta. 14+89.29 27' RT
CP9	406350.9060	2453706.7970	1365.8700			Sta. 2+06.47 61' LT

NOTES:

Date Survey Completed 03/01/10

☐ Assumed Coordinates

☒ All coordinates on this sheet are Stutsman County ground coordinates. They are derived from the "North Dakota Coordinate System of 1983", NAD83(2011).South Zone Combination Factor (cf) = 0.99987415

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK OPUS

☒ NAVD-88
☐ NGVD-29

☐ GEOID 09 ☒ GEOID 12B
☐ GEOID 12A

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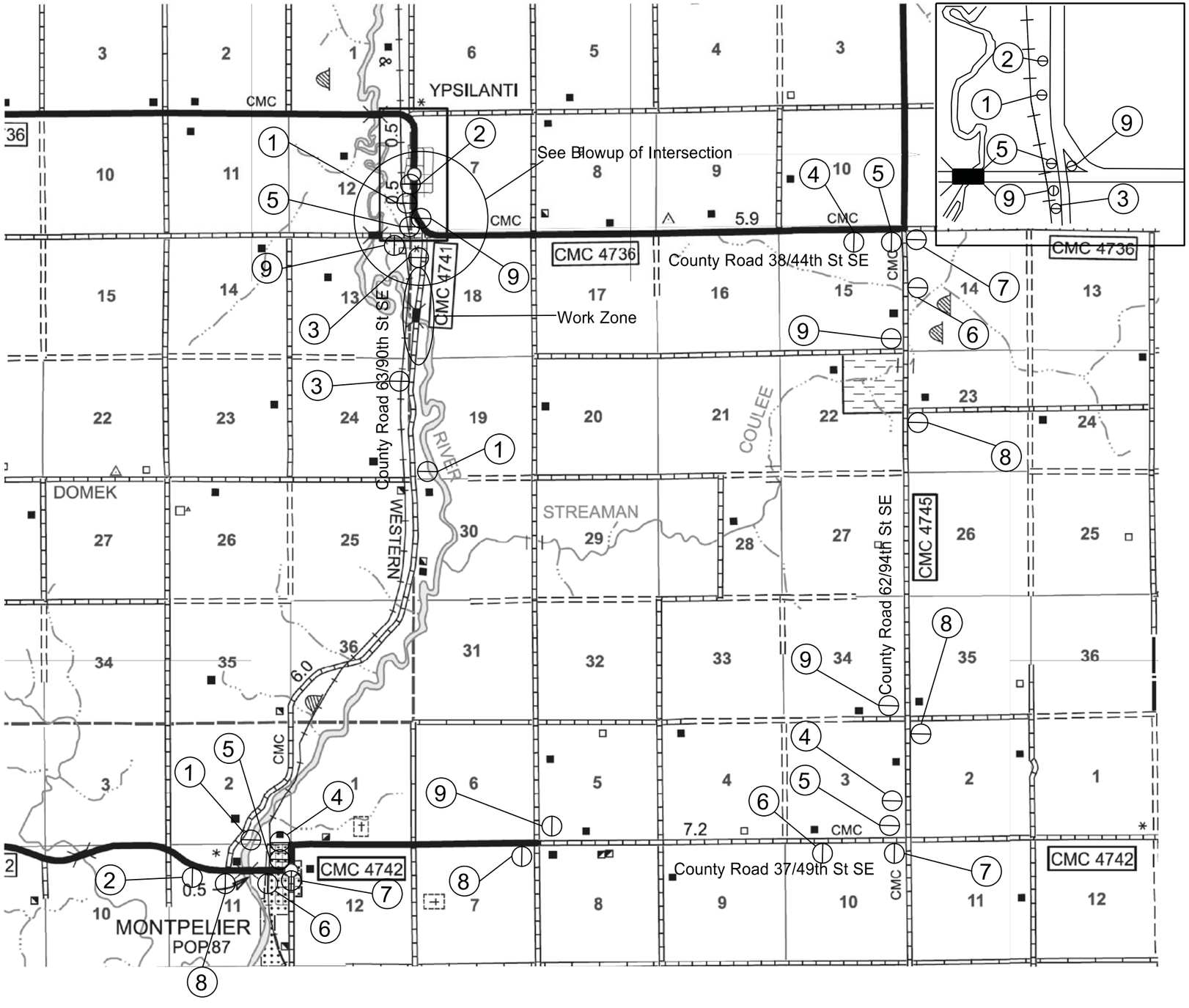
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	100	1



① R11-3a-60 "Road Closed Ahead" - "Local Traffic Only" with Type III Barricade Mounted (1 Barricade Post Mounted)

② W20-2-48 "Detour 2000 Feet" Post Mounted

③ R11-2-48 "Road Closed" with Type III Barricade Mounted (3 Barricades)

④ M4-8-24 "Detour"
M3-3-24 "South"
M1-6-24 County Route Marker
M5-1-21 " ⮡ " or " ⮧ "
Post Mounted

⑤ M4-8-24 "Detour"
M3-3-24 "South"
M1-6-24 County Route Marker
M6-1-21 " ← " or " — "

⑥ M4-8-24 "Detour"
M3-3-24 "North"
M1-6-24 County Route Marker
M5-1-21 " ⮡ " or " ⮧ "
Post Mounted

⑦ M4-8-24 "Detour"
M3-1-24 "North"
M1-6-24 County Route Marker
M6-1-21 " ← " or " — "

⑧ M4-8-24 "Detour"
M3-1-24 "North"
M1-6-24 County Route Marker
M6-3-21 " ↑ "

⑨ M4-8-24 "Detour"
M3-3-24 "South"
M1-6-24 County Route Marker
M6-3-21 " ↑ "

The construction signing layout is for informational purposes only. Traffic control signing shall be installed as per MUTCD manual and/or standard drawings.

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JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Detour Signing Layout

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	**36"x6"**	**STREET NAME SIGN (Sign and installation only)**	**28**	**6**	**168**
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)**	**13**	**7**	**91**
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	**24"x12"**	**SOUTH (Mounted on route marker post)**	**15**	**7**	**105**
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	**24"x12"**	**DETOUR (Mounted on route marker post)**	**22**	**7**	**154**
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)**	**8**	**7**	**56**
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)**	**9**	**7**	**63**
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)**	**11**	**7**	**77**
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**	**3**	**31**	**93**
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**	**2**	**35**	**70**
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
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	
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	
M1-6-24		**County Route Marker (Post and Installation Only)**	**22**	**10**	**220**

SPECIAL SIGNS

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	1153

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**	**9**
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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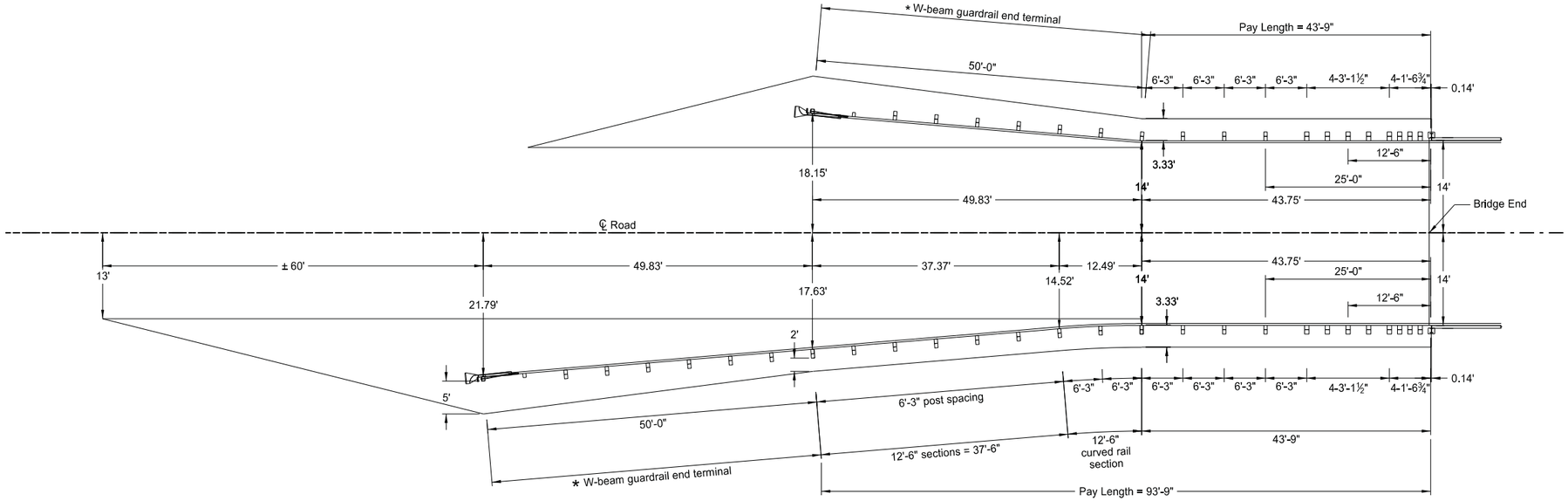
Traffic Control Devices List

JAMES RIVER

COUNTY ROAD 63

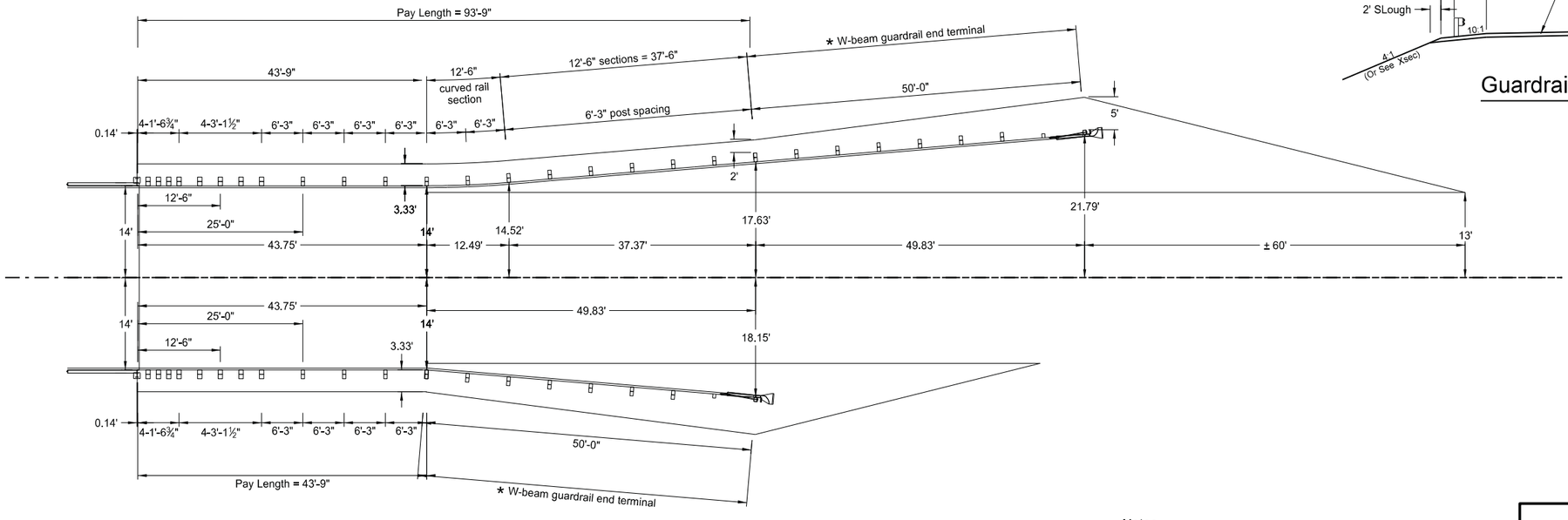
STUTSMAN COUNTY, NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	130	1



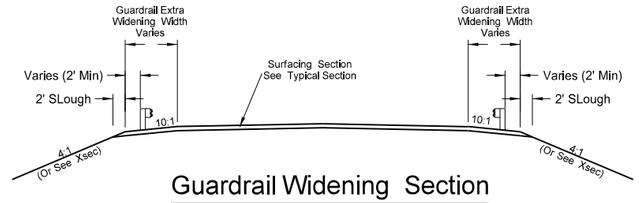
Guardrail Layout

South End of Bridge
NTS



Guardrail Layout

North End of Bridge
NTS



Guardrail Widening Section

NTS

Notes:
1. See Standard Drawing D764-1, D-764-6, and D-764-22.
2. * FLEAT terminal required
3. All ℄ offsets and dimensions are from face of rail.

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JAMES RIVER
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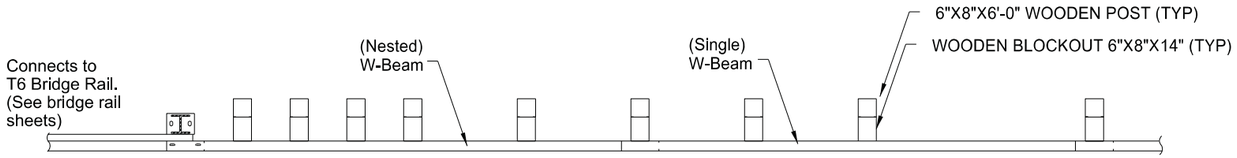
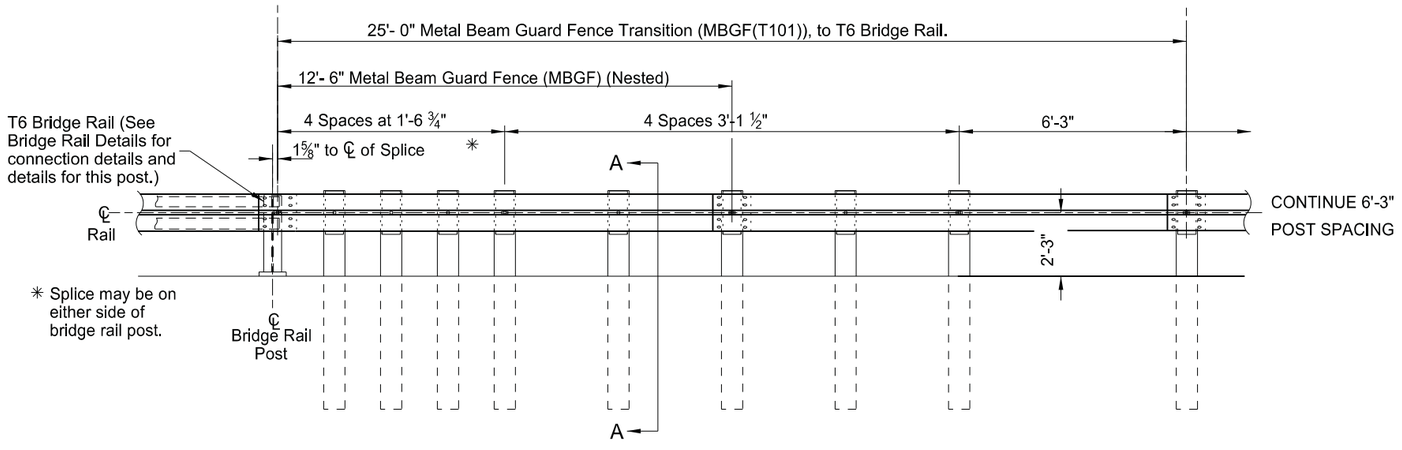
STUTSMAN COUNTY, NORTH DAKOTA

Guardrail at Bridge Ends

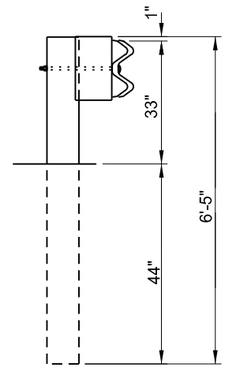
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	130	2



TYPICAL PLAN VIEW



TYPICAL ELEVATION VIEW



SECTION A-A

GENERAL NOTES

1. Rail element shall meet all requirements of AASHTO M-180 except as modified on the plans.
2. See standard drawing D-764-1 for blockout attachment & typical post attachment details.

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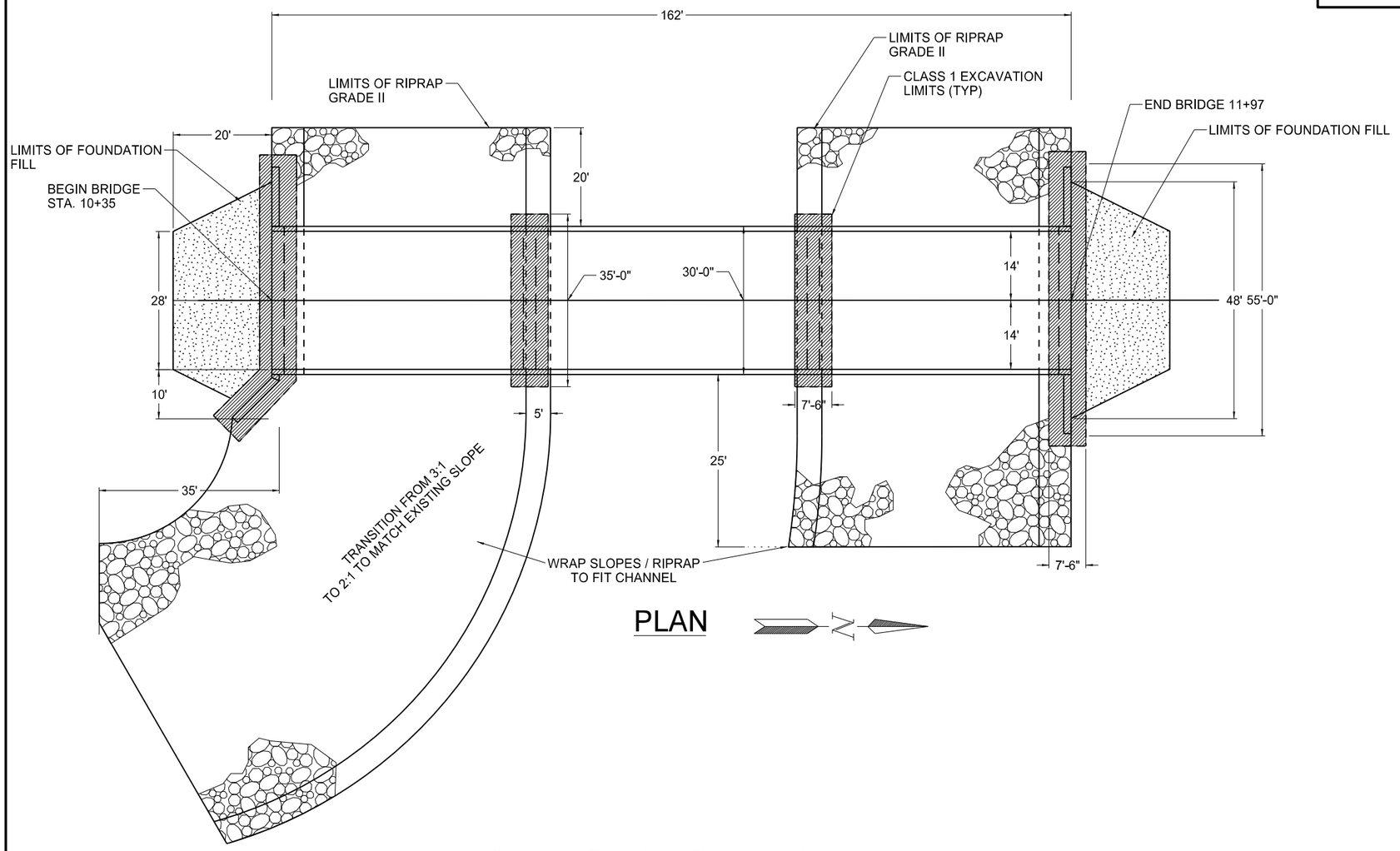
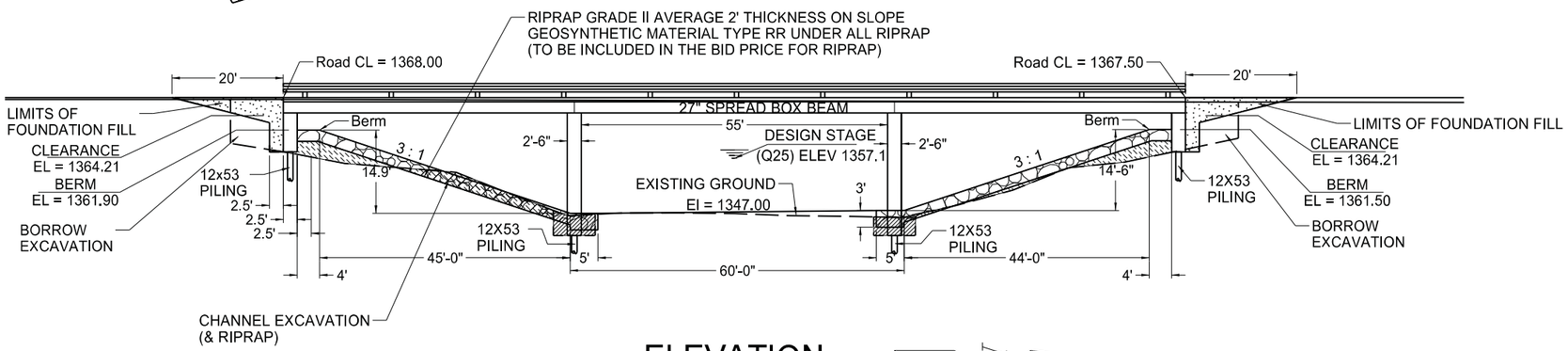
STUTSMAN COUNTY, NORTH DAKOTA

Guard Rail Detail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	1



PLAN



ELEVATION

LEGEND

- CLASS 1 EXCAVATION
- FOUNDATION FILL
- RIP RAP
- CHANNEL EXCAVATION
- EMBANKMENT

EVENT	FLOW (CFS)	HEADWATER ELEVATION
Q2	496	1351.24
Q5	1877	1355.34
Q10	2365	1356.15
Q25	3005	1357.10
Q50	4036	1358.44
Q100	5251	1359.77
Q500	8864	1362.72
WA = 1919 SF		

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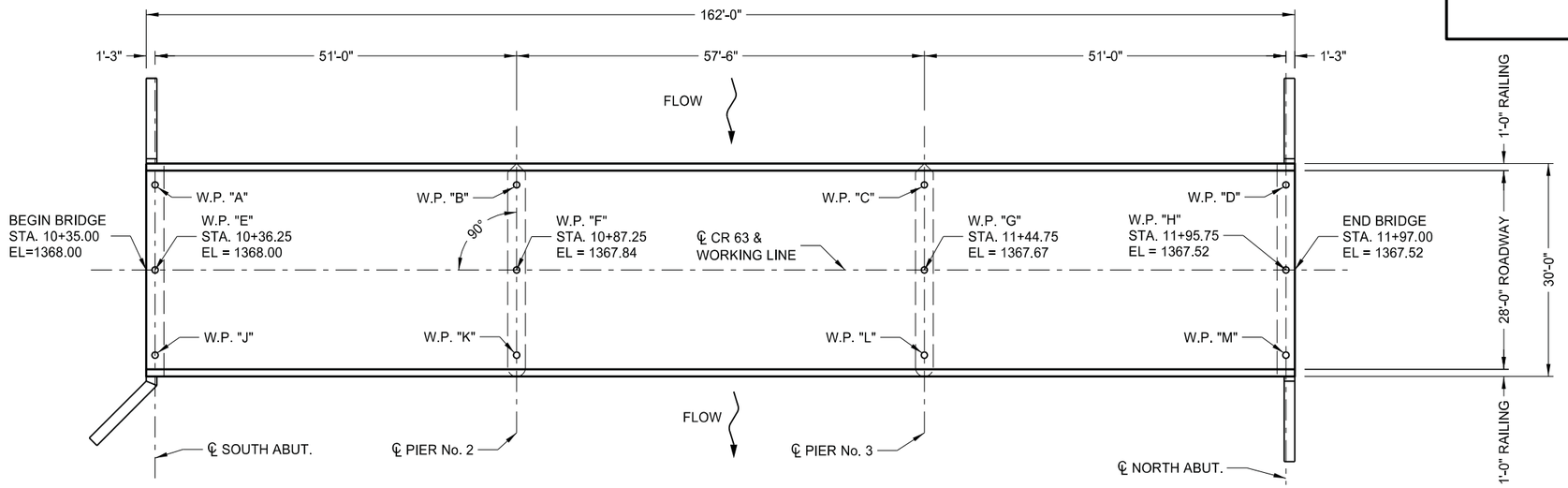
STUTSMAN COUNTY, NORTH DAKOTA

Bridge Excavation Limits/
Hydraulic Design Data

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	2



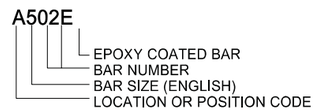
PLAN

DESIGN STRENGTHS:
f'c = 3,000 PSI ~ CLASS AE-3 CONCRETE
f'c = 4,000 PSI ~ CLASS AAE-3 CONCRETE
f'ci = 4,500 PSI ~ PRESTR. GIRDER CONCRETE
fc = 6,000 PSI ~ PRESTR. GIRDER CONCRETE
Fy = 60,000 PSI ~ REINFORCING STEEL
f's = 270 KSI ~ LOW RELAXATION PRESTRESSING STRANDS

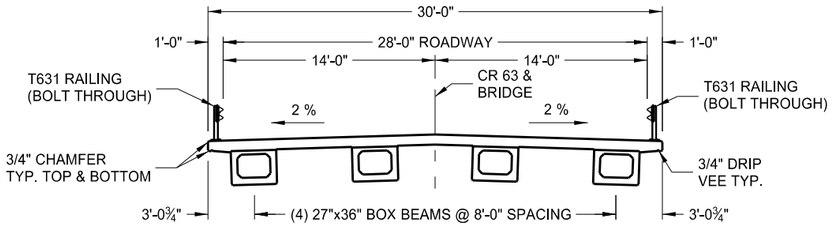
LRFD DESIGN [HL 93 DESIGN LOADING]
F.W.S. 15 PSF

PLAN NOTES

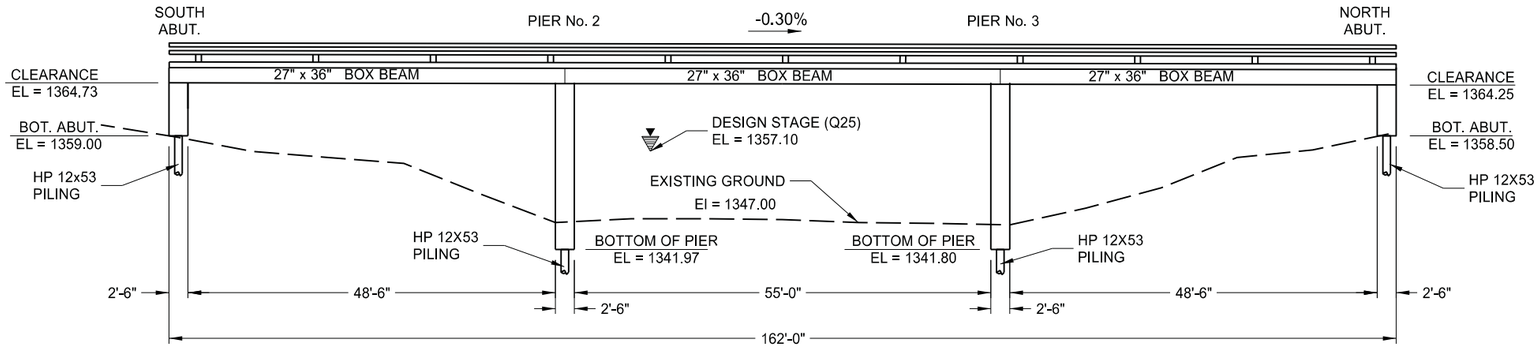
1. REINFORCING BAR MARKS SHALL BE DEFINED AS SHOWN BELOW



2. THE ABUTMENT SHALL NOT BE BACKFILLED UNTIL THE DECK IS CAST AND CURED.



TYPICAL DECK SECTION



ELEVATION

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0101	CLASS 1 EXCAVATION	L SUM	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0209	FOUNDATION FILL	TON	350
210	0411	FOUNDATION PREPARATION	L SUM	1
256	0201	RIP RAP GRADE II	TON	1060
602	0130	CLASS AAE-3 CONCRETE	CY	146.2
602	1130	CLASS AE-3 CONCRETE	CY	173.5
604	9610	PRESTRESSED BOX BEAM-27 IN	LF	626
612	0115	REINFORCING STEEL-GRADE 60	LBS	16347
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	28266
616	0364	STRUCTURAL STEEL M270-GRADE 36	LBS	1546
622	0040	STEEL PILING HP12 X 53	LF	820
624	0151	RAILING	LF	318.8
626	0120	PIER COFFER DAM	EA	2
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4 IN	LF	60
714	9770	UNDERDRAIN PIPE PVC NON PERFORATED 4 IN	LF	80

SURVEY CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION
CP8	407,621.5030	2,453,904.2100	1365.4300
CP9	406,350.9060	2,453,706.7970	1365.8700

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JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY. NORTH DAKOTA

Bridge Layout

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	170	3

BRIDGE NOTES

100-P01 GENERAL: The cost of furnishing and placing performed expansion joint filler, concrete inserts, finishes and other miscellaneous items shall be included in the price bid for Class AE-3 and Class AAE-3 concrete.

107-P01 HAZARDOUS MATERIAL: The existing structural steel may be painted with lead-based paint. Certain Contractor operations could expose employees to hazardous levels of lead. The Contractor shall plan accordingly and shall inform employees of the hazards of lead-based paint.

202-P01 REMOVAL OF STRUCTURE: The existing structure to be removed consists of a three-span steel girder bridge with an overall length of 175 feet. All salvaged materials except the bridge rail will become property of the Contractor. The Contractor shall remove and salvage the bridge rail and stockpile on site for the County to pick up. The Contractor shall arrange for and secure a suitable disposal site off of the right-of-way for the remainder of the structure.

Any existing substructures shall be removed in accordance with Section 202.04B of the Standard Specifications. All costs associated with removal and disposal of the structure shall be included in the price bid for “Removal of Structure”.

210-P01 CLASS 1 EXCAVATION: Shall be to the limits shown on the bridge excavation limits drawing. All material not considered suitable for the roadbed shall be used to fill the road in-slopes unless the material is deemed waste excavation by the engineer. It is assumed that this material will be suitable for use in embankment areas. The quantity for Class I Excavation within the excavation limits is estimated at 65 cubic yards. Payment for all Class 1 Excavation to the limits shown on the plans will be Lump Sum. The price bid for Class 1 Excavation shall include the costs for placement of this material in embankment areas. The embankment shall meet the requirements of Section 203.04 E3 Compaction Control Type B.

210-P02 CHANNEL EXCAVATION: shall be excavated to the limits shown on bridge excavation limits drawing. It is assumed that excavated material will be suitable for use in embankment areas. All material not considered suitable for the roadbed shall be used to fill the road in-slopes unless the material is deemed waste excavation by the engineer. The quantity of Channel Excavation within the limits is estimated at 120 cubic yards excavation and 150 cubic yards of fill compacted volume. Payment for all Channel Excavation to the limits shown on the plans will be Lump Sum. The price bid for Channel Excavation shall include the costs for placement of this suitable material in embankment areas. The embankment shall meet the requirements of section 203.04 E3 Compaction Control Type B.

“Waste Excavation” material from the structural and channel excavation not useable as embankment material shall be removed and disposed of at a site obtained by the Contractor. The Contractor is responsible for obtaining any and all permits needed for waste disposal and shall full responsibility for complying with the requirements of said permits and with all applicable laws. The Contractor shall be responsible for restoring the waste disposal areas to satisfactory condition and any seeding required. This shall be included in the price bid for excavation with no direct compensation therefor. The Contractor shall be required to obtain a site release for the disposal site and deliver a copy of said release to the Engineer.

602-P01 CONCRETE STRUCTURES: DECK CONCRETE: Beams and girders have slight variations in the anticipated camber. To build the deck to the designated thickness will require slight adjustments in deck elevation and/or riser dimensions. These adjustments result in minor concrete quantity discrepancies. The Contractor shall consider this quantity discrepancy when he bids the unit price for Class AAE-3 concrete.

602-P02 INTERMEDIATE DIAPHRAGMS: If the intermediate diaphragm concrete is placed before the deck concrete, the concrete shall cure for at least 72 hours before deck placement.

602-P03 PIER DIAPHRAGMS: The pier diaphragm concrete shall not be placed before the deck concrete. Concrete for the piers and abutments shall be Class AE-3 Concrete.

602-P04 ABUTMENT ENDWALL: The abutment endwall concrete shall not be placed before the deck concrete

604-P01 PRESTRESSED CONCRETE BOX BEAMS: The Contractor shall submit five (5) sets of shop drawings for review to the project engineer before fabrication of the prestressed concrete beams. The beams may not be incorporated into the structure until the shop drawings are reviewed and accepted. The design of the precast, prestressed concrete box beams shall satisfy the requirements of LRFD Bridge Design Specifications, Seventh Edition, 2014 and interim specification thereto. The design truck load shall be the HL-93 loading. Prestressed girders shall not be cast any earlier than 90 days before the deck is placed.

612-P01 REINFORCING STEEL: All reinforcing Steel shall be Grade 60 in accordance with the Standard Specifications unless noted otherwise on the drawings. Dimensions for bent bars are given out to out and to tangent intersections unless noted otherwise. Bars shall be bent according to ACI Specifications around ACI Standard Pins.

622-P01 PILING: PILE HAMMERS: The pile hammer supplied for this project shall have a minimum ram weight of 3,000 pounds and produce a minimum energy of 30,000 foot pounds. The following formula shall be used for pile driving:

$$R_n = \frac{4E}{S + .02} X \frac{W + 0.2M}{W + M}$$

The weight of the driving cap shall be included with the pile weight when it received the hammer blow, but it should not be included when the ram delivers the blow directly to the pile.

Design loads are those shown in the Drawings. Piles shall be driven to achieve the Required Bearing Rn shown on the plans.

The Contractor shall furnish the Engineer with the information concerning the performance of the pile hammer to be used a minimum of five (5) working days or seven (7) calendar days prior to use.

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BRIDGE NOTES

The Contractor shall furnish Written Certification that the pile hammer is developing the energy stated in the pile hammer data sheets or Certification of the reduction in performance due to wear or other factors which will affect the pile hammer performance.

622-P03 PILE RE-STRIKE: Driving shall be suspended on any pile that does not achieve the required bearing capacity within the estimated length. The Contractor shall perform a re-strike on each pile that did not previously achieve the required bearing capacity, at least 24 hours after completing the initial drive. A re-strike is considered 10 hammer blows for which an accurate energy and penetration can be observed. If the required bearing is not achieved during the re-strike, the pile shall be driven until the required bearing is achieved. No additional re-strikes will be required. All costs associated with performing the re-strike and subsequent pile driving shall be included in the unit price bid for Steel Piling HP 12X53.

624-P01 RAILINGS: Railings shall be furnished and installed as shown in the details for Type T631 railing. The unit price bid shall be considered full compensation for furnishing all equipment, labor and materials necessary. The pay limits shall be as shown on the drawings. All railing and connection hardware for the W-Beam Guard Rail shall be considered in the price bid for “W-Beam Guard Rail”. It shall be the Contractor’s responsibility to verify that the plate/bolt assemblies are installed at the proper location and elevation to assure that the bolts are of proper length and projection.

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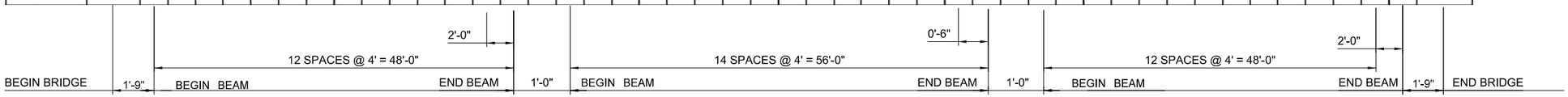
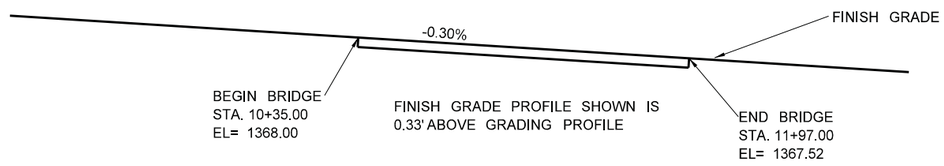
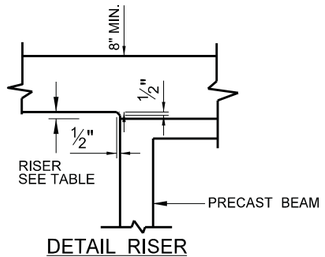
	BEGIN BRIDGE	DISTANCE FROM BEGINNING OF BEAM, (FT)														C.L. PIER	DISTANCE FROM BEGINNING OF BEAM, (FT)																	C.L. PIER	DISTANCE FROM BEGINNING OF BEAM, (FT)															END BRIDGE
		0	4	8	12	16	20	24	28	32	36	40	44	48	50.00		0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	56.5		0	4	8	12	16	20	24	28	32	36	40	44	48	50	
C.L. GIRDER 1	1367.76	1367.75	.75	.75	.75	.74	.74	.73	.71	.70	.68	.66	.64	.62	.60	1367.60	1367.60	.61	.61	.61	.61	.60	.60	.59	.57	.56	.54	.52	.49	.46	.44	.43	1367.43	1367.43	.43	.43	.42	.42	.41	.40	.39	.37	.35	.33	.31	.29	.28	1367.28
C.L. GIRDER 2	1367.92	1367.91	.91	.91	.91	.90	.90	.89	.87	.86	.84	.82	.80	.78	.76	1367.76	1367.76	.77	.77	.77	.77	.76	.76	.75	.73	.72	.70	.68	.65	.62	.60	.59	1367.59	1367.59	.59	.59	.58	.58	.57	.56	.55	.53	.51	.49	.47	.45	.44	1367.44
C.L. GIRDER 3	1367.92	1367.91	.91	.91	.91	.90	.90	.89	.87	.86	.84	.82	.80	.78	.76	1367.76	1367.76	.77	.77	.77	.77	.76	.76	.75	.73	.72	.70	.68	.65	.62	.60	.59	1367.59	1367.59	.59	.59	.58	.58	.57	.56	.55	.53	.51	.49	.47	.45	.44	1367.44
C.L. GIRDER 4	1367.76	1367.75	.75	.75	.75	.74	.74	.73	.71	.70	.68	.66	.64	.62	.60	1367.60	1367.60	.61	.61	.61	.61	.60	.60	.59	.57	.56	.54	.52	.49	.46	.44	.43	1367.43	1367.43	.43	.43	.42	.42	.41	.40	.39	.37	.35	.33	.31	.29	.28	1367.28



SCREED ELEVATIONS



FINISH PROFILE DATA



DETAIL RISER

① THEORETICAL RISERS (INCHES) (AT ℄ BEAM)		
LOCATION	APPROACH SPAN	MAIN SPAN
ENDS	1 ¾"	1 ¾"
MIDSPAN	⅞"	⅞"

① RISERS SHOWN ARE BASED ON THEORETICAL RESIDUAL BEAM CAMBER. ACTUAL RISER DIMENSIONS SHALL BE DETERMINED IN THE FIELD.

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Screed Elevations

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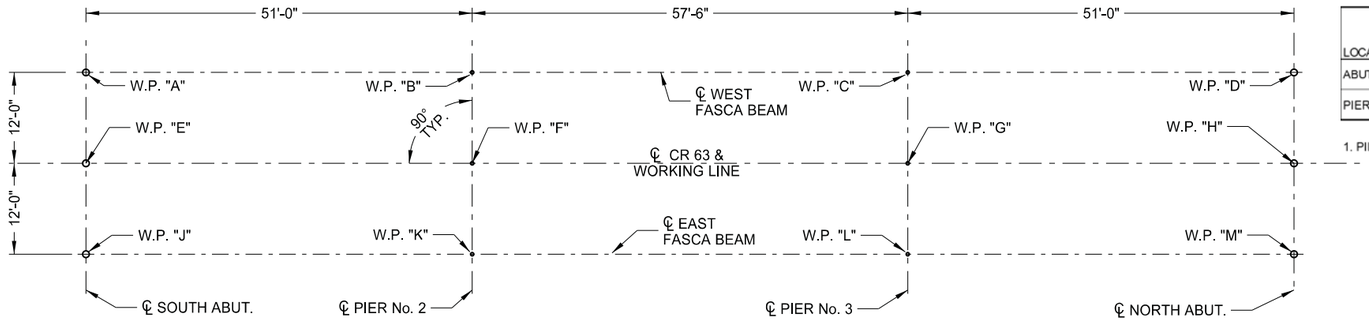
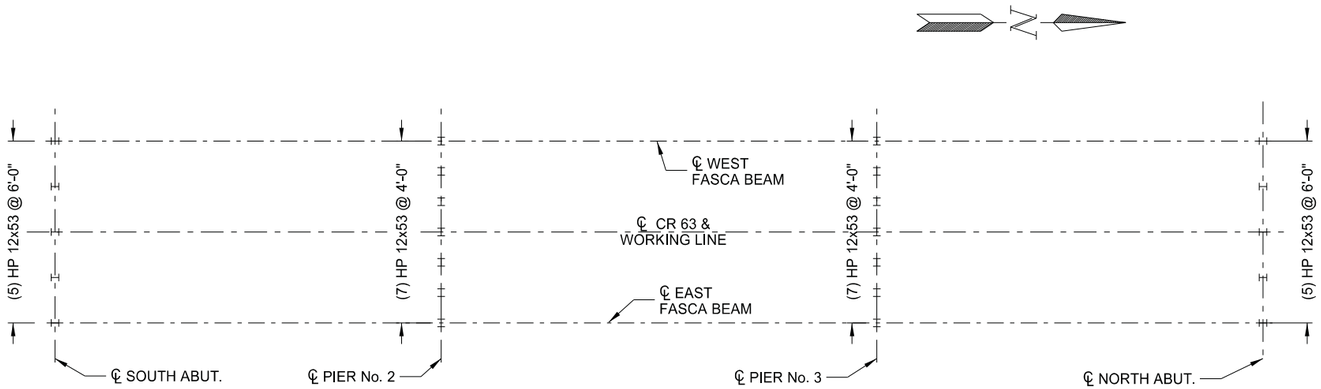


PILE NOTES

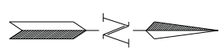
LOCATION	TYPE	FACTORED LOADS (TONS) DEAD LOADS DC	DW	LIVE LOAD	SCOUR	FACTORED DESIGN LOAD	REQUIRED BEARING R_r WAVE EQ $\varphi_{dyn} = 0.40$	ESTIMATED LENGTH (FT)
ABUTMENTS	STEEL PILING HP12X53	57.7	2.5	62.5		122.7	**306.8**	**40**
PIERS	STEEL PILING HP12X53	69.8	3.3	50.3	10.0	133.4	**318.5**	**30**

1. PILING SHALL BE DRIVEN TO THE REQUIRED BEARING R_r USING THE EQUATION SHOWN ON SHEET 3.

WORKING POINT LAYOUT



PILING LAYOUT



WORKING POINT	STATION	DIMENSIONS BETWEEN WORKING POINTS A	B	C	D	E	F	G	H	J	K	L	M	TOP OF SLAB	SLAB TO BRIDGE SEAT	BRIDGE SEAT	POINT
A	10 + 36.25		51.00			12.00	52.39				56.36	111.12		1367.76	3.07	1364.69	A
B	10 + 87.25			57.50			12.00	58.74		56.36		62.31	111.12	1367.60	3.07	1364.53	B
C	11 + 44.75				51.00			12.00	52.39	111.12	62.31		56.36	1367.43	3.07	1364.36	C
D	11 + 95.75								12.00		111.12	56.36		1367.28	3.07	1364.21	D
E	10 + 36.25						51.00			12.00	52.39			1368.00	3.07	1364.93	E
F	10 + 87.25							57.50			12.00	58.74		1367.84	3.07	1364.77	F
G	11 + 44.75								51.00			12.00	52.39	1367.67	3.07	1364.60	G
H	11 + 95.75												12.00	1367.52	3.07	1364.45	H
J	10 + 36.25										51.00			1367.76	3.07	1364.69	J
K	10 + 87.25											57.50		1367.60	3.07	1364.53	K
L	11 + 44.75												51.00	1367.43	3.07	1364.36	L
M	11 + 95.75													1367.28	3.07	1364.21	M

TOP OF SLAB TO BRIDGE SEAT	
SLAB	8 (IN)
STOOL (MIN)	1/2 (IN)
RESIDUAL CAMBER	7/8 (IN)
BEAM	27 (IN)
BEARING DEVICE	1/2 (IN)
TOTAL	3.07 (FT)

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Working Point and Piling Layout

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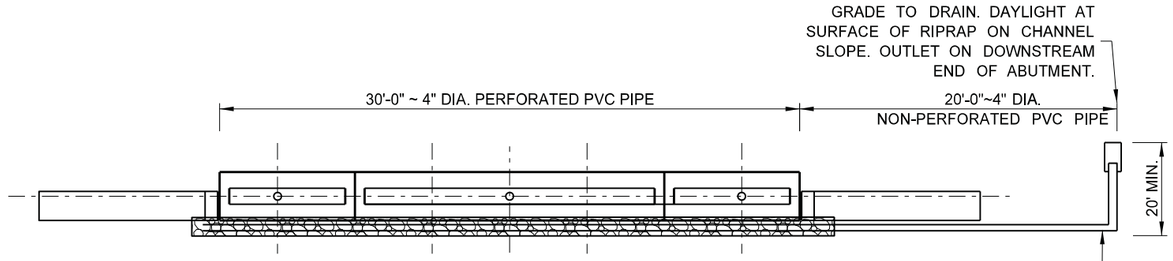
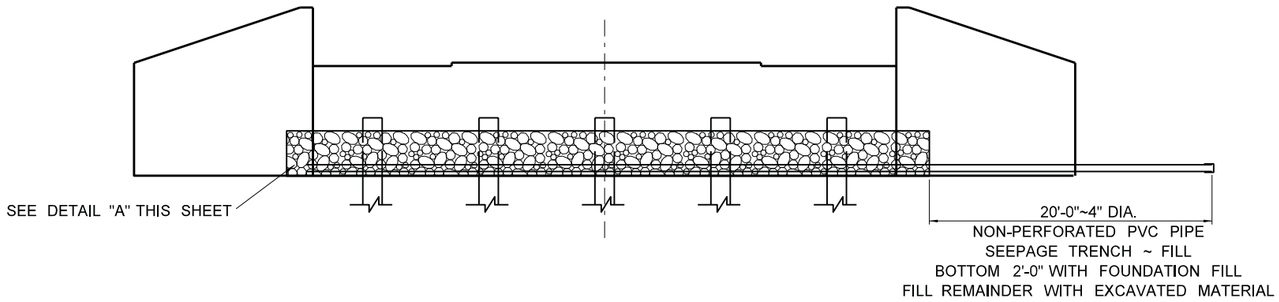
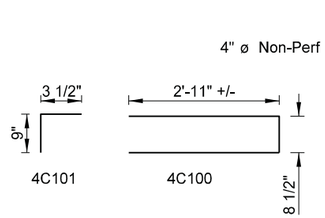


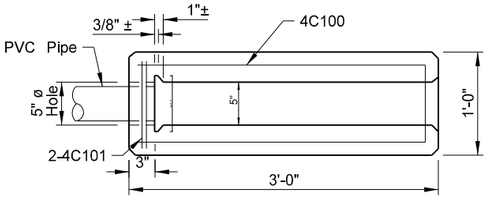
BACK FACE OF ABUTMENT UNDER DRAIN



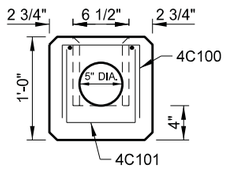
ABUTMENT BACK ELEVATION



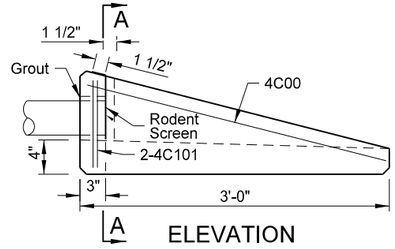
BENT BAR DETAILS



PLAN



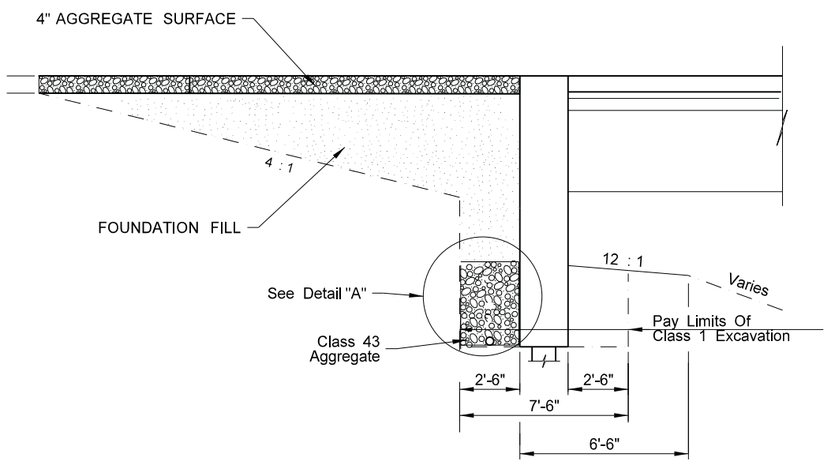
A-A



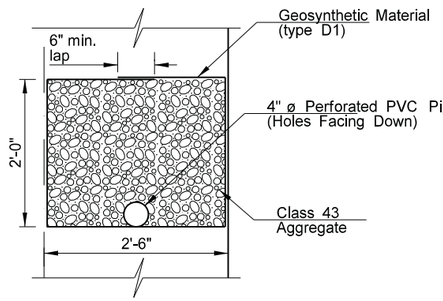
ELEVATION

PRECAST CONCRETE HEADWALL DETAILS

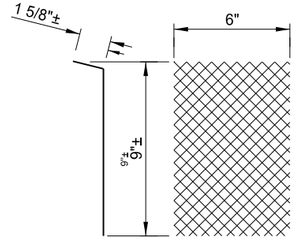
NOTE:
The cost to furnish and place the Class 43 Aggregate, Geosynthetic Material Type D, shall be included in price bid for perforated pvc pipe. Headwalls and Rodent Screens shall be included in the price bid for non- perforated pvc pipe.



DETAIL AT ABUTMENT ON BRIDGE ℄



DETAIL "A"



SIDE VIEW FRONT VIEW

RODENT SCREEN DETAILS

NOTES:

The dimensions for the rodent screen are approximate to allow for bending and a snug fit into the slot in the headwall.

The rodent screen shall be fabricated from flattened, expanded metal with screen openings of approximately 0.25 square inches. The screen shall be 16 Ga. metal and be hot dip galvanized after fabrication.

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Abutment Underdrain Detail

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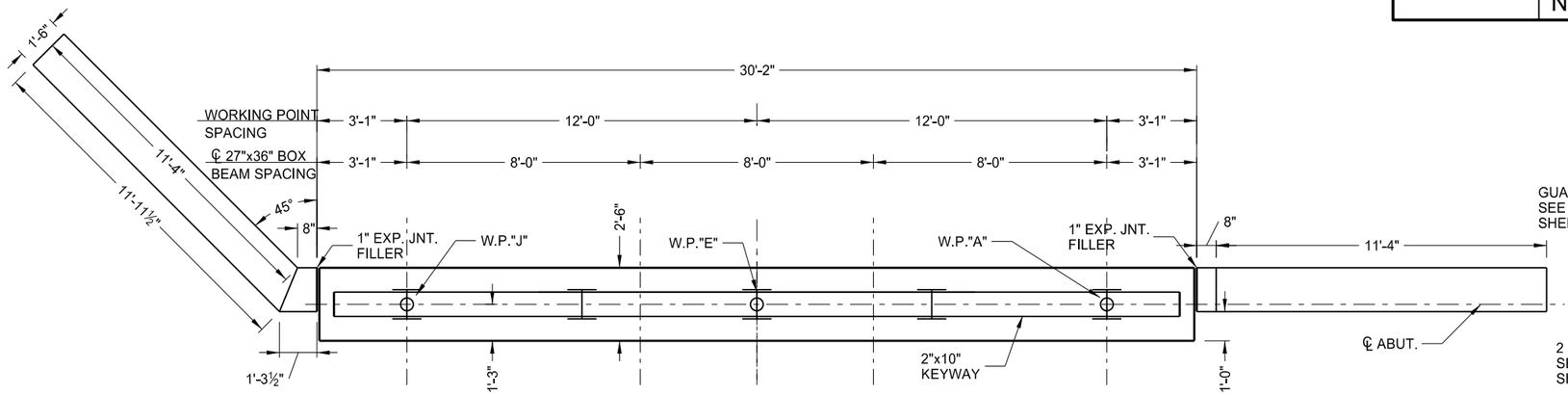
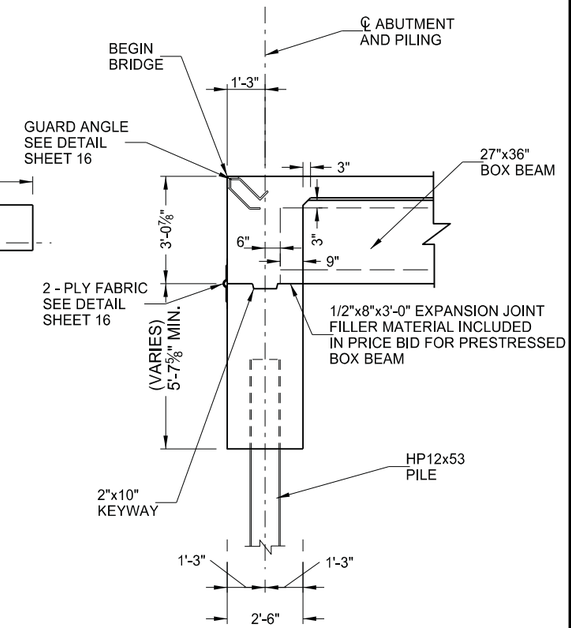
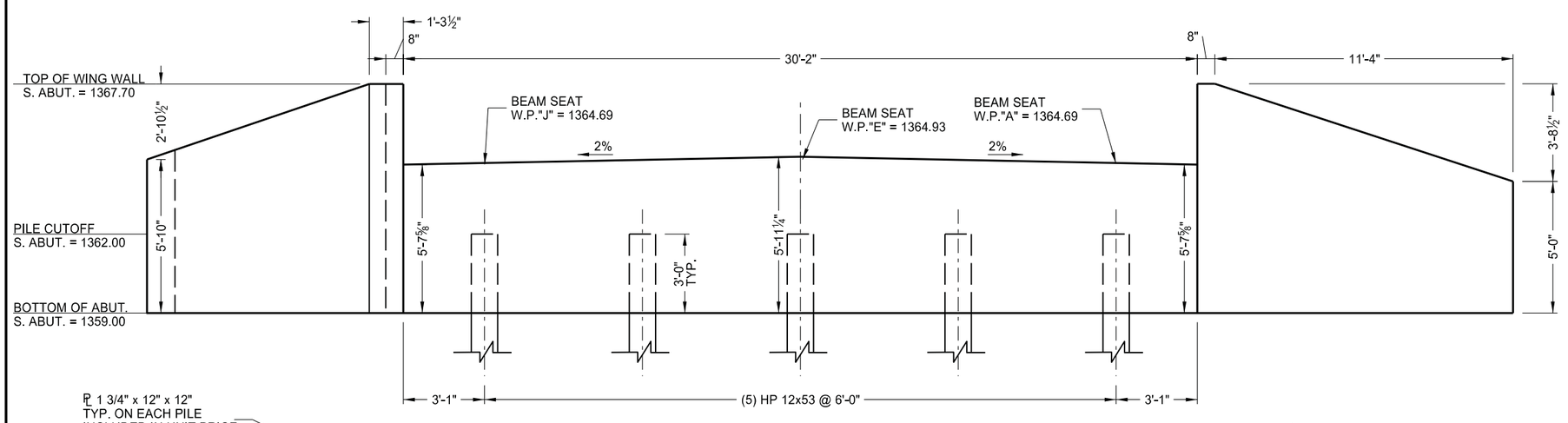


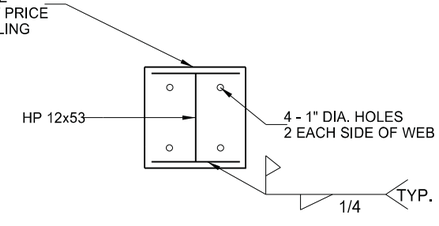
PLAN - SOUTH ABUTMENT



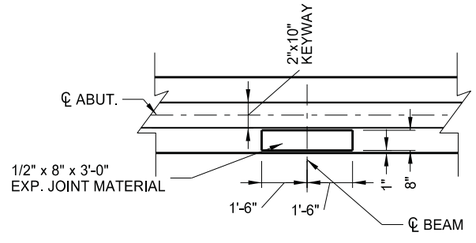
SECTION - ABUTMENT



ELEVATION - SOUTH ABUTMENT



PILE BEARING PLATE



ABUTMENT - BEAM SEAT

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South Abutment Details
South Abutment Dimensions

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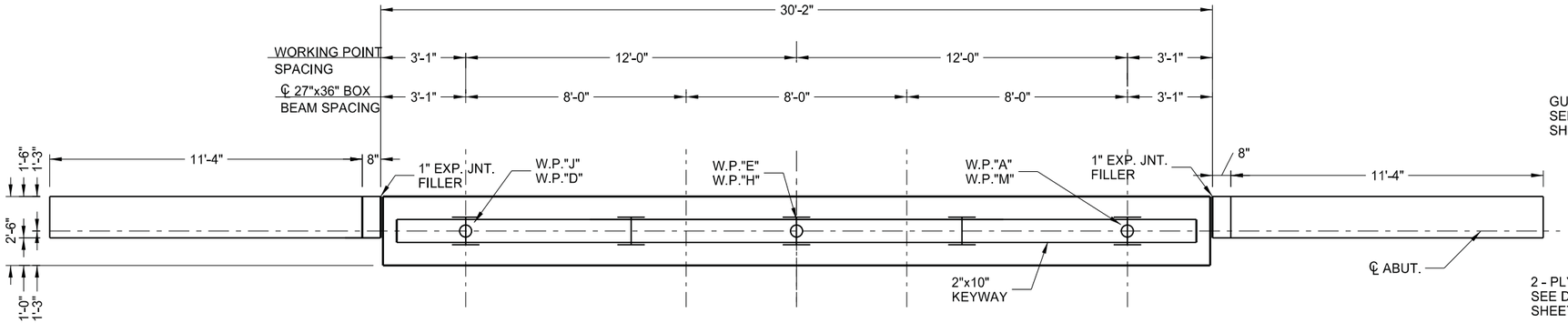
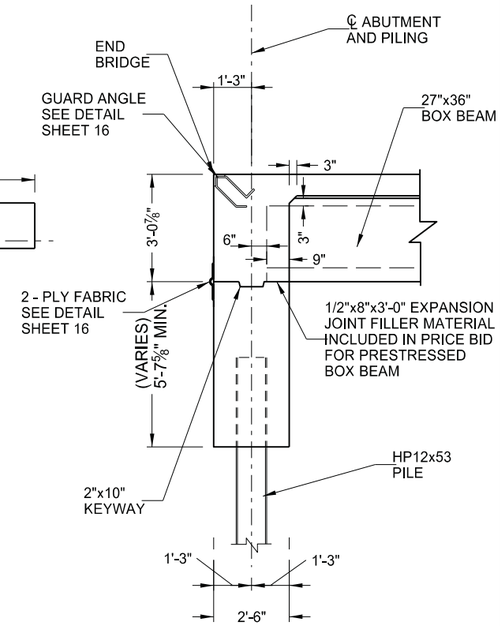
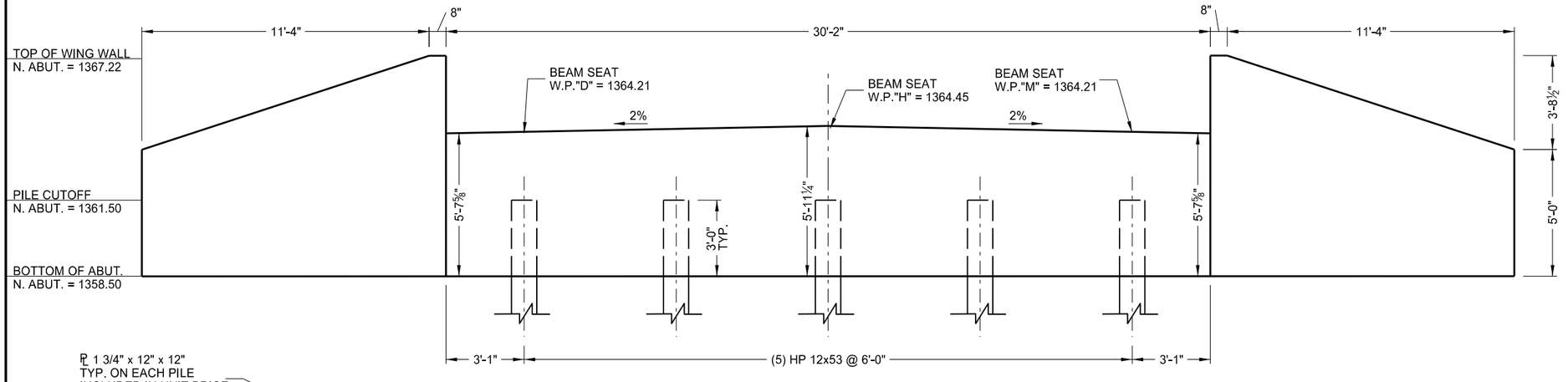


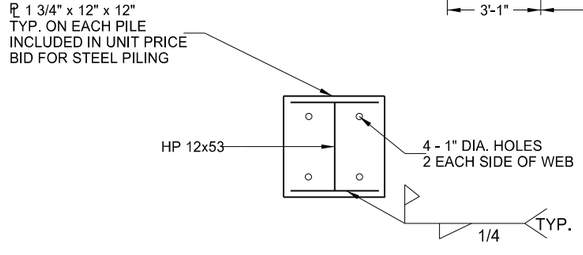
PLAN - NORTH ABUTMENT



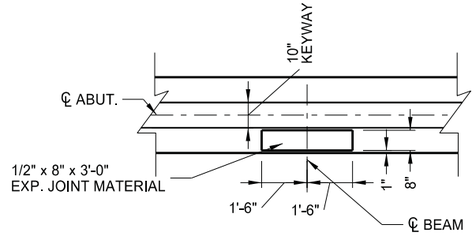
SECTION - ABUTMENT



ELEVATION - NORTH ABUTMENT



PILE BEARING PLATE



ABUTMENT - BEAM SEAT

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North Abutment Details
North Abutment Dimensions

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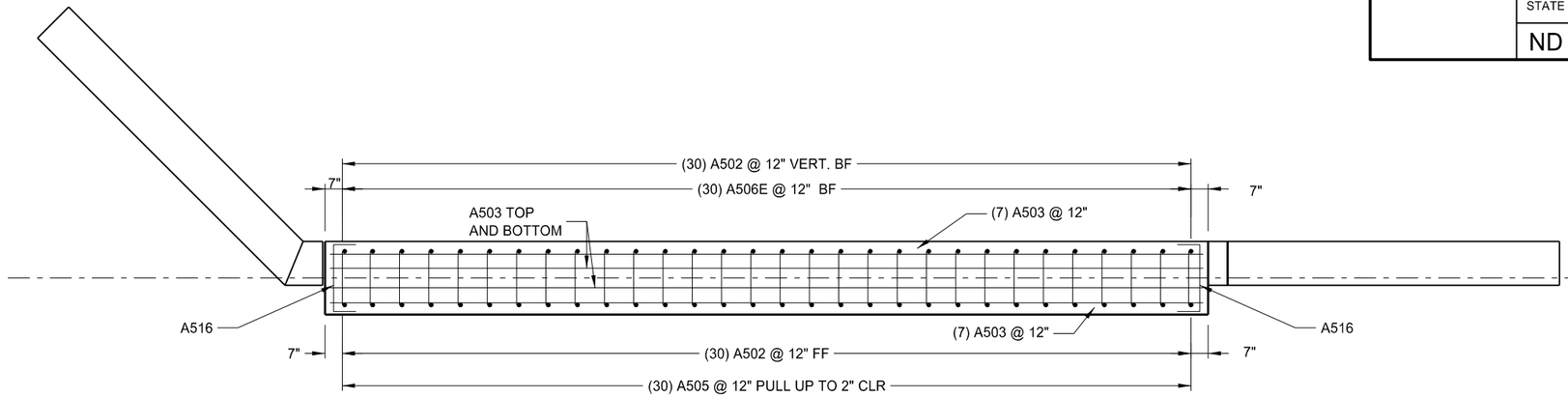
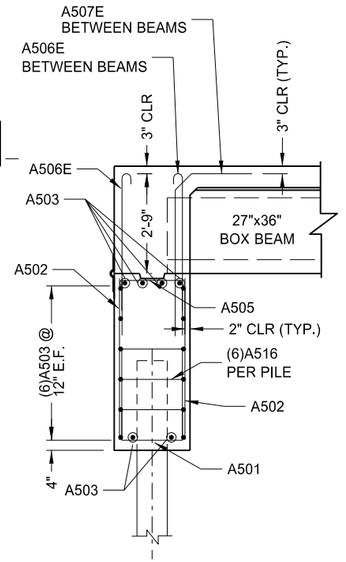
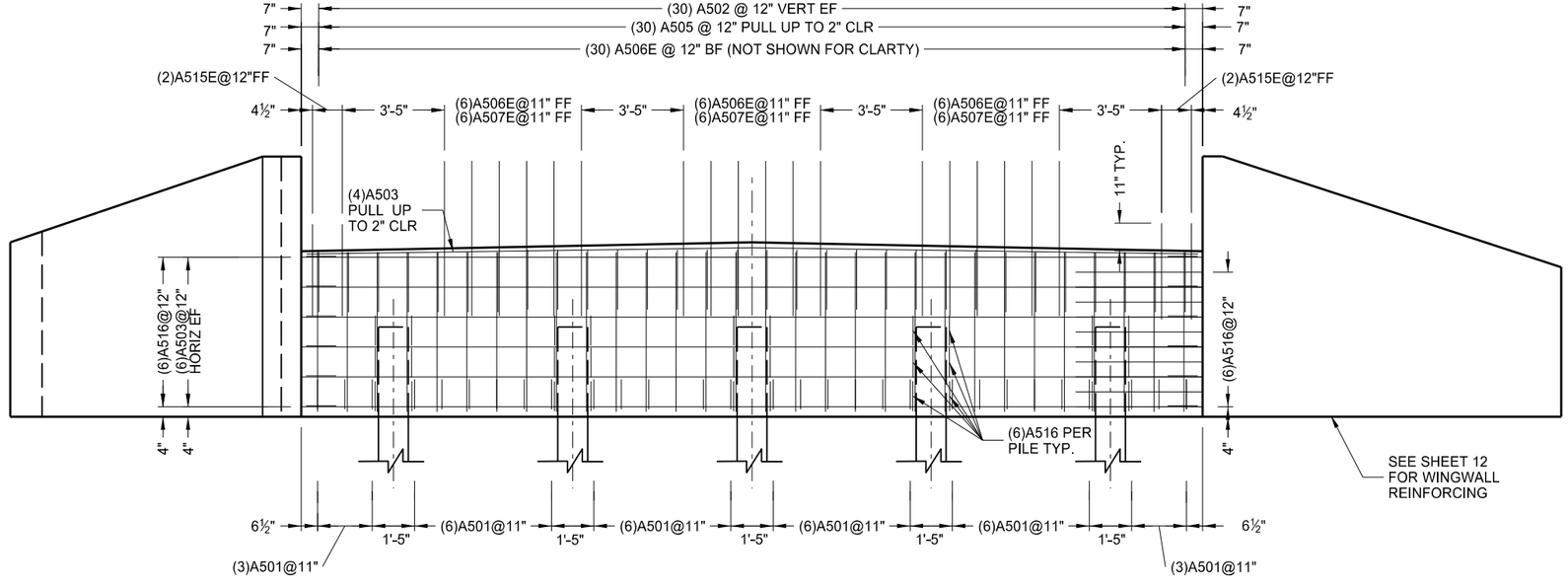


PLAN - SOUTH ABUTMENT



SECTION - ABUTMENT



ELEVATION - SOUTH ABUTMENT

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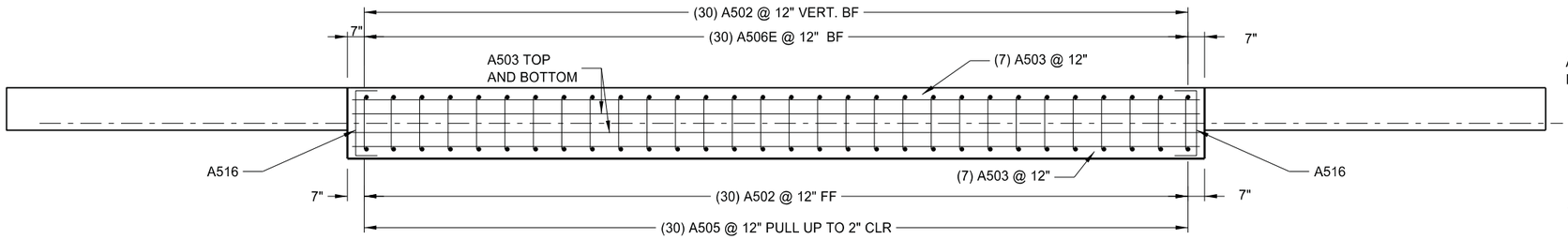
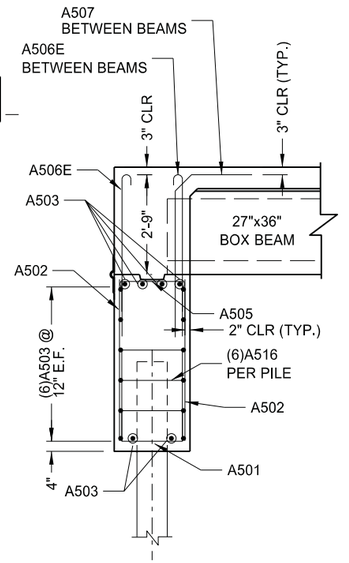
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

South Abutment Details
South Abutment Reinforcing

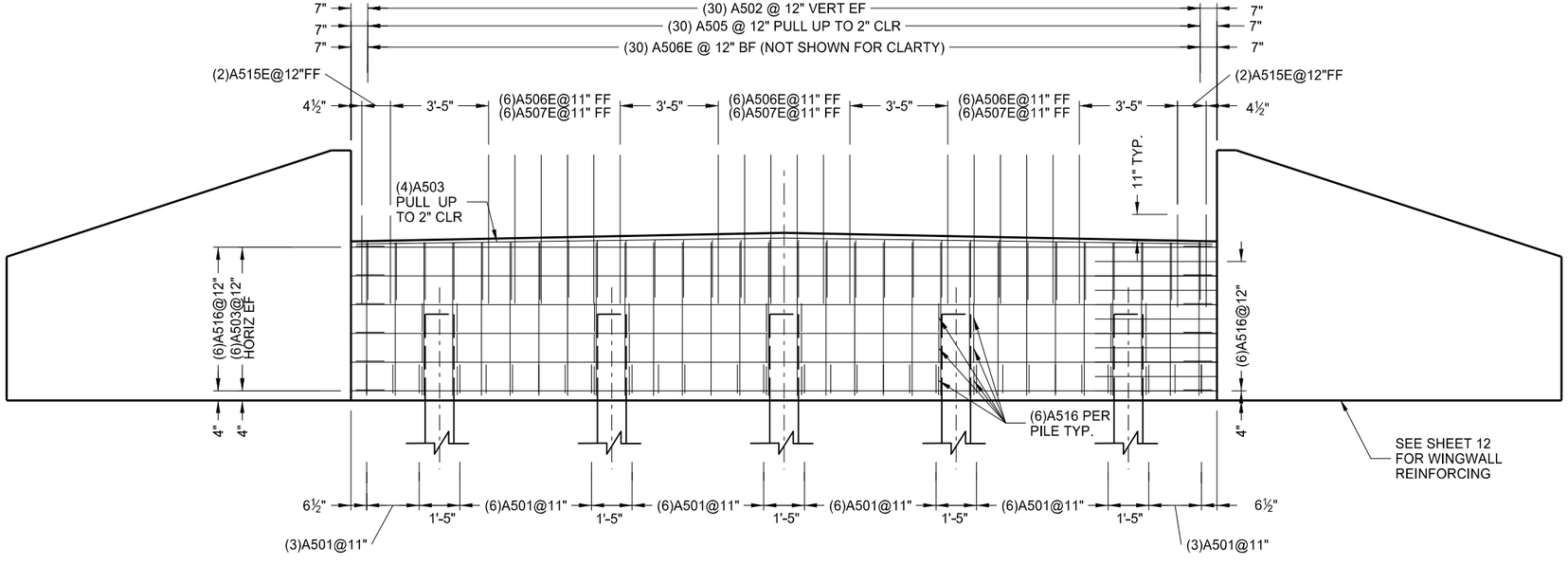
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	11



PLAN - NORTH ABUTMENT



SECTION - ABUTMENT



ELEVATION - NORTH ABUTMENT

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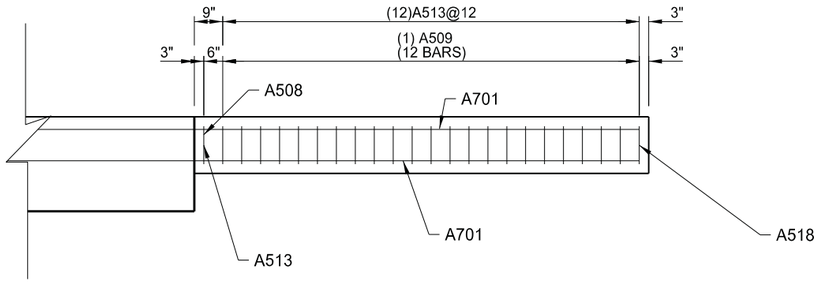
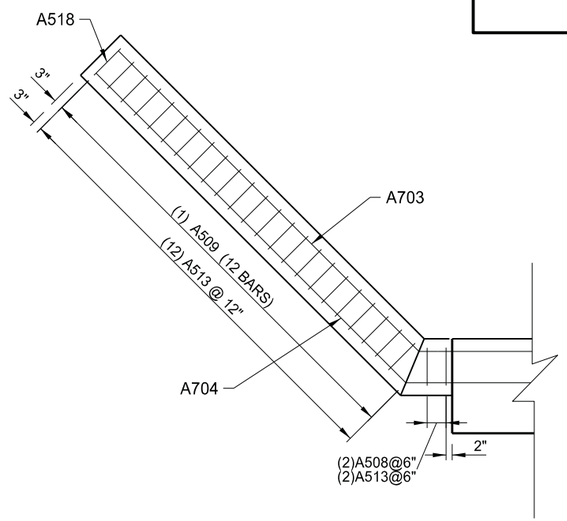
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

North Abutment Details
North Abutment Reinforcing

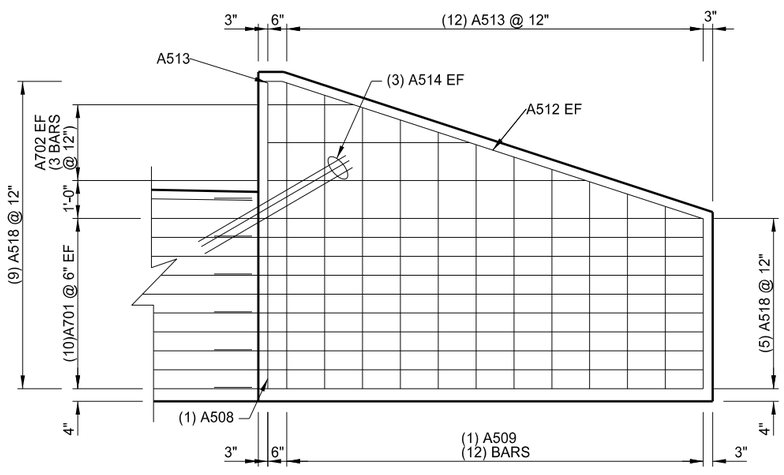
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	12



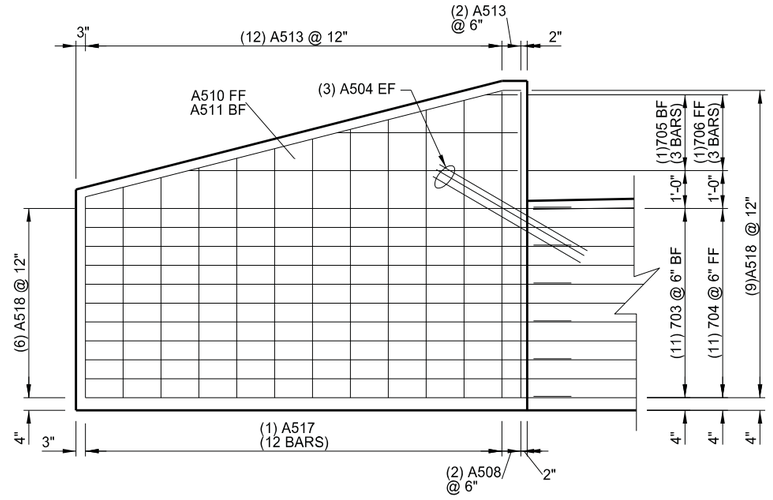
PLAN - NW/NE/SW WINGWALL REINFORCING



PLAN - SE WINGWALL REINFORCING



ELEVATION NW/NE/SW WING WALL REINFORCING



ELEVATION SE WING WALL REINFORCING
(FRONT FACE SHOWN)

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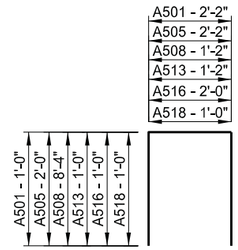
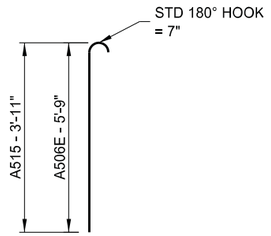
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Wing Wall Details
Reinforcing Details

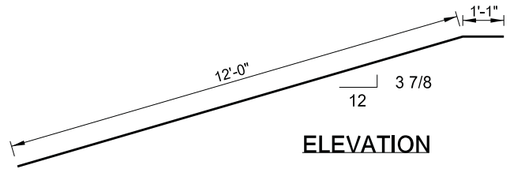
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	170	13



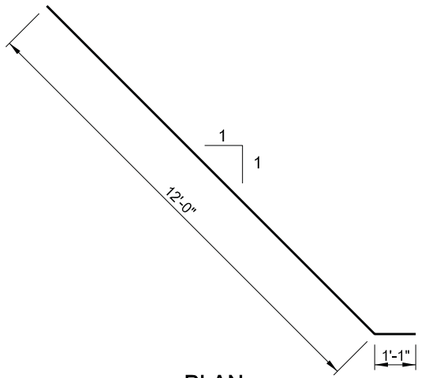
A501, A505, A508, A513, A516, A518



A506E, A515

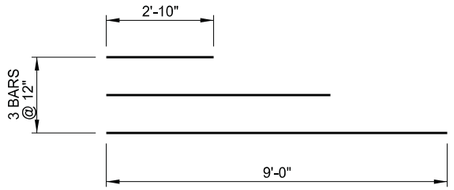


ELEVATION

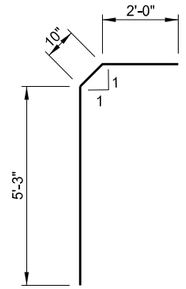


PLAN

A510



A702



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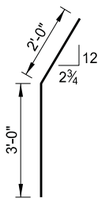
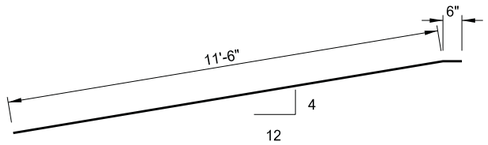
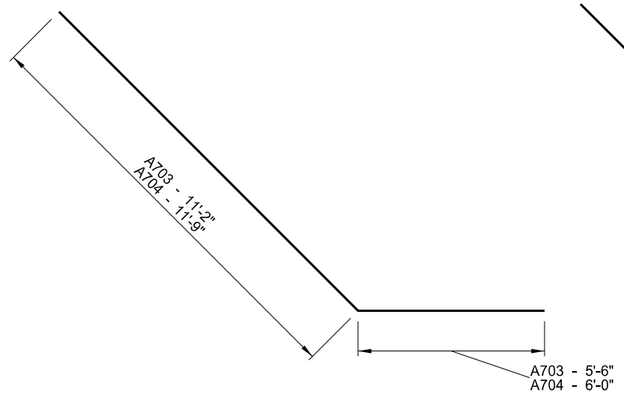


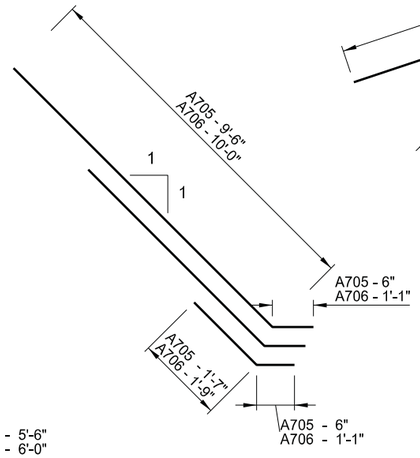
A504E



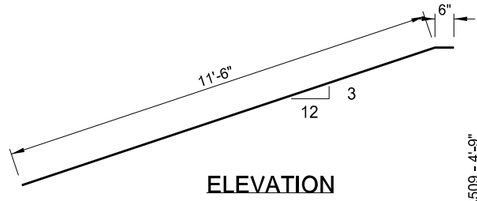
A512



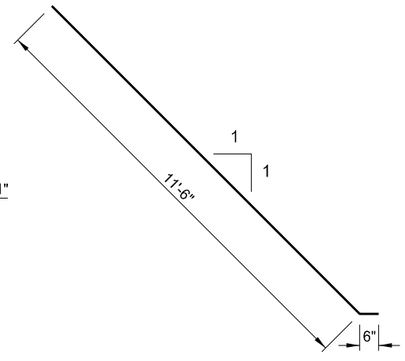
A703, A704



A705, A706

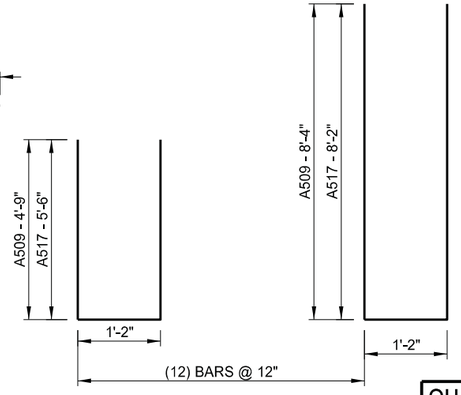


ELEVATION



PLAN

A511



A509, A517

BILL OF REINFORCEMENT - (2) ABUTMENTS

MARK	QUANTITY	LENGTH (FT-IN)	SHAPE	REMARKS
A501	60	4 - 2	BENT	ABUTMENT BOTTOM TIES
A502	120	5 - 4	STRT	ABUTMENT VERTICAL EACH FACE
A503	36	29 - 10	STRT	ABUTMENT HORIZONTAL EACH FACE
A504	6	5 - 0	STRT	ABUTMENT/SE WINGWALL TIES EACH FACE
A505	60	6 - 2	BENT	ABUTMENT TOP TIES
A506E	96	6 - 4	BENT	ABUTMENT/DIAPHRAGM TIES
A507E	36	8 - 1	BENT	ABUTMENT/DIAPHRAGM DIAGONAL TIES
A508	5	17 - 10	BENT	WINGWALL VERTICAL
A509	3 - SERIES	171 - 0	BENT	WINGWALL VERTICAL
A510	1	13 - 1	BENT	SE WINGWALL TOP DIAGONAL FF
A511	1	12 - 0	BENT	SE WINGWALL DIAGONAL BF
A512	6	12 - 0	BENT	WINGWALL TOP DIAGONAL EF
A513	53	3 - 2	BENT	WINGWALL TOP TIES
A514	18	5 - 0	STRT	ABUTMENT/WINGWALL DIAGONAL EACH FACE
A515	8	4 - 6	BENT	ABUTMENT/DIAPHRAGM TIES
A516	84	4 - 0	BENT	ABUTMENT SIDE AND PILE TIES
A517	1-SERIES	178 - 0	BENT	SE WINGWALL VERTICAL
A518	57	3 - 0	BENT	WINGWALL SIDE TIES
A701	60	16 - 6	STRT	WINGWALL HORIZONTAL
A702	6-SERIES	17 - 9	STRT	WINGWALL HORIZONTAL
A703	11	16 - 8	BENT	SE WINGWALL HORIZONTAL
A704	11	17 - 9	BENT	SE WINGWALL HORIZONTAL
A705	1	18 - 2	BENT	SE WINGWALL HORIZONTAL
A706	1	20 - 10	BENT	SE WINGWALL HORIZONTAL

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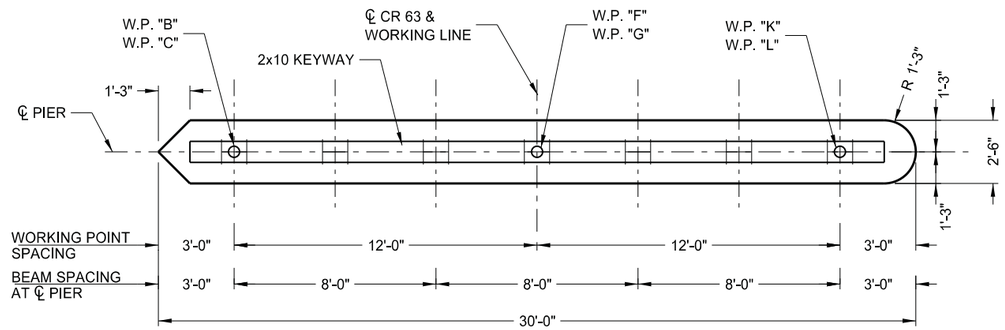
QUANTITIES	(2 ABUTMENTS)
CLASS AE-3 CONCRETE	51.5 CY
REINFORCING STEEL - GRADE 60	7311 LBS
REINFORCING STEEL - GRADE 60 - EPOXY COATED	938 LBS
STEEL PILING HP 12X53	400 LF

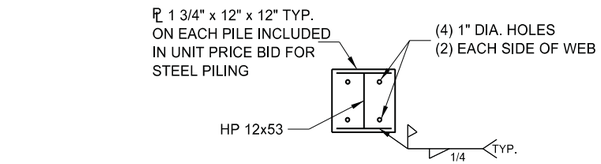
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Abutment Details
Reinforcing Details

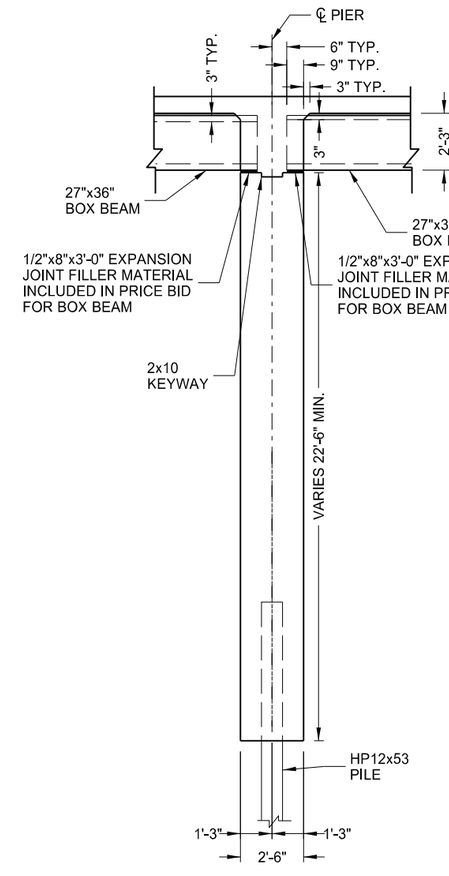
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	14



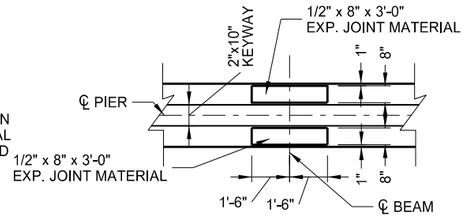
PLAN - PIER



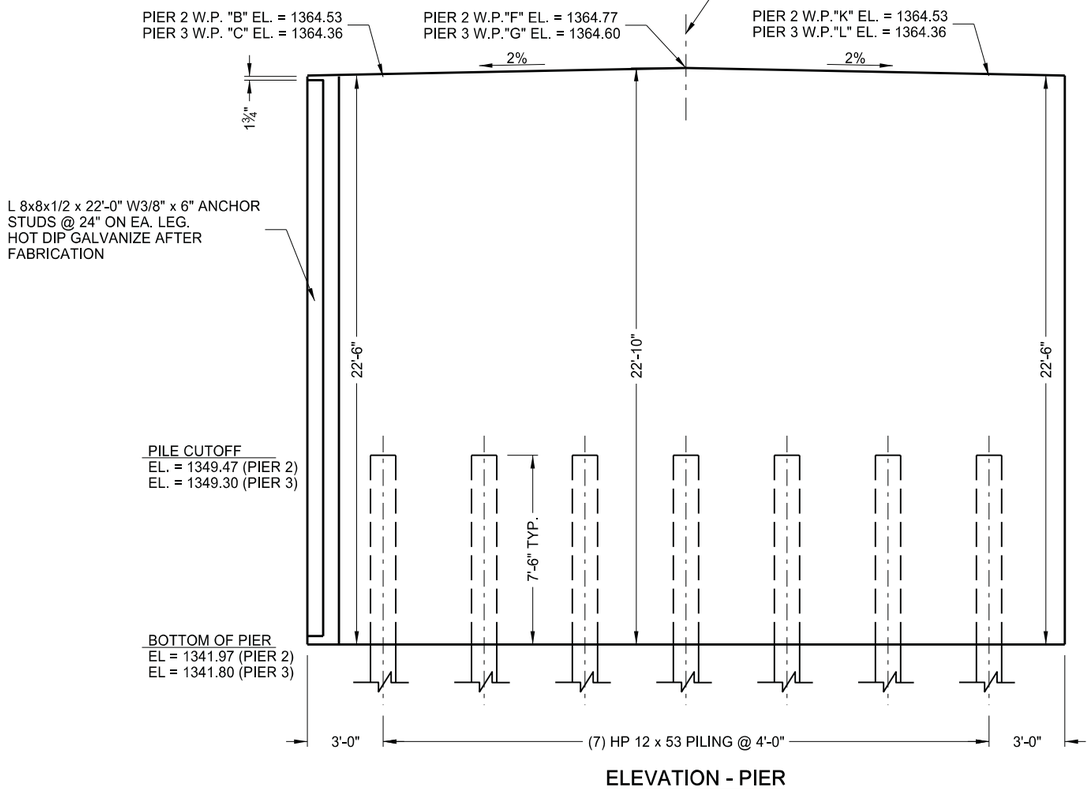
DETAIL - PILE BEARING PLATE PLAN VIEW



SECTION - PIER



PIER - BEAM SEAT



ELEVATION - PIER

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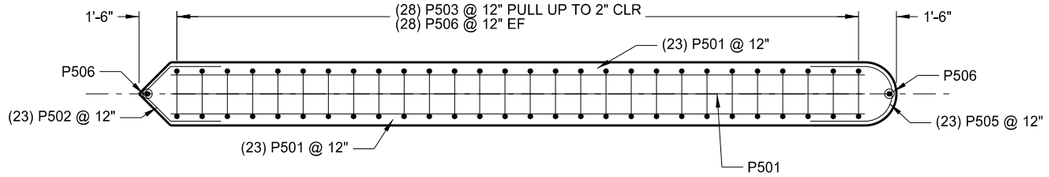
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Piers Details
Pier Dimensions

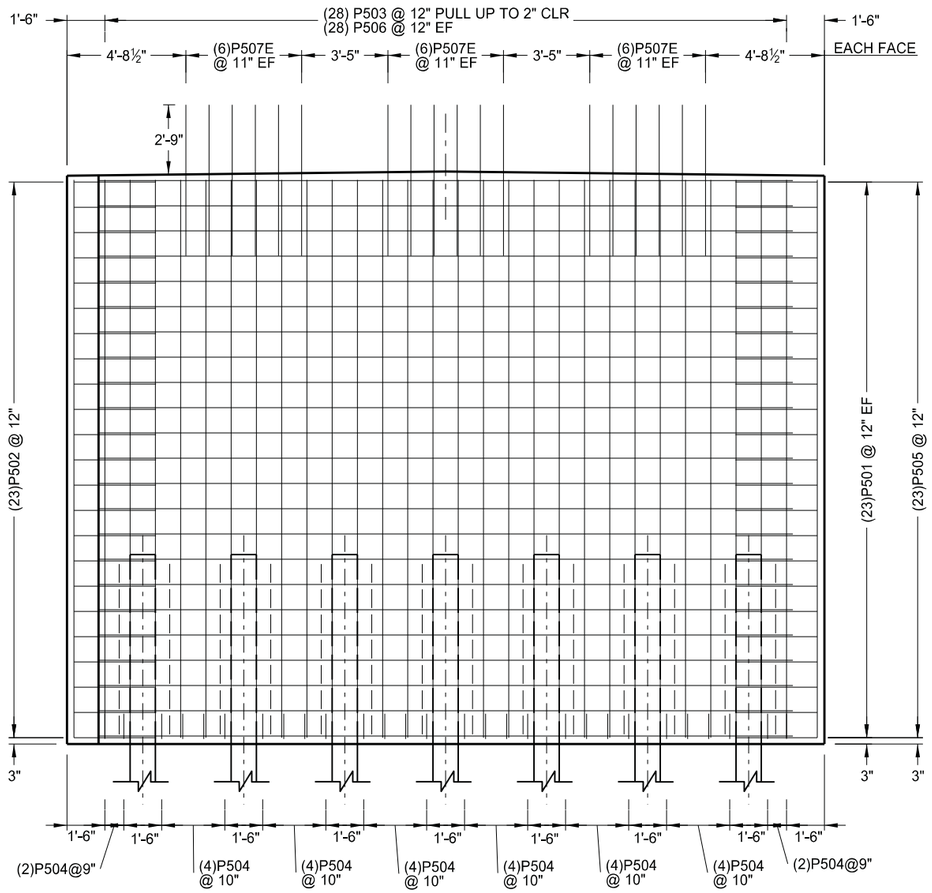
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	15

BILL OF REINFORCEMENT - (2) PIERS

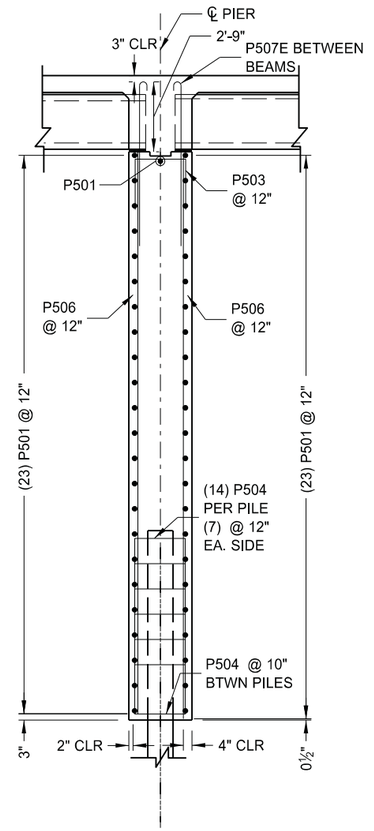
MARK	QUANTITY	LENGTH (FT-IN)	SHAPE	REMARKS
P501	94	27 - 6	STRT	PIER HORIZONTAL EACH FACE
P502	46	7 - 0	BENT	PIER WEST END TIES
P503	56	6 - 0	BENT	PIER TOP TIES
P504	252	4 - 0	BENT	PIER BOTTOM/PILE TIES
P505	46	7 - 9	BENT	PIER EAST END TIES
P506	116	22 - 0	STRT	PIER VERTICAL FACE
P507E	72	7 - 1	BENT	PIER/DIAPHRAGM TIES



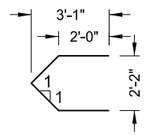
PLAN - PIER



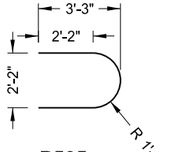
ELEVATION - PIER



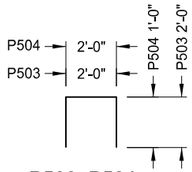
SECTION - PIER



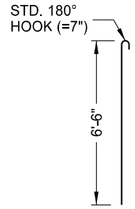
P502



P505



P503, P504



P507E

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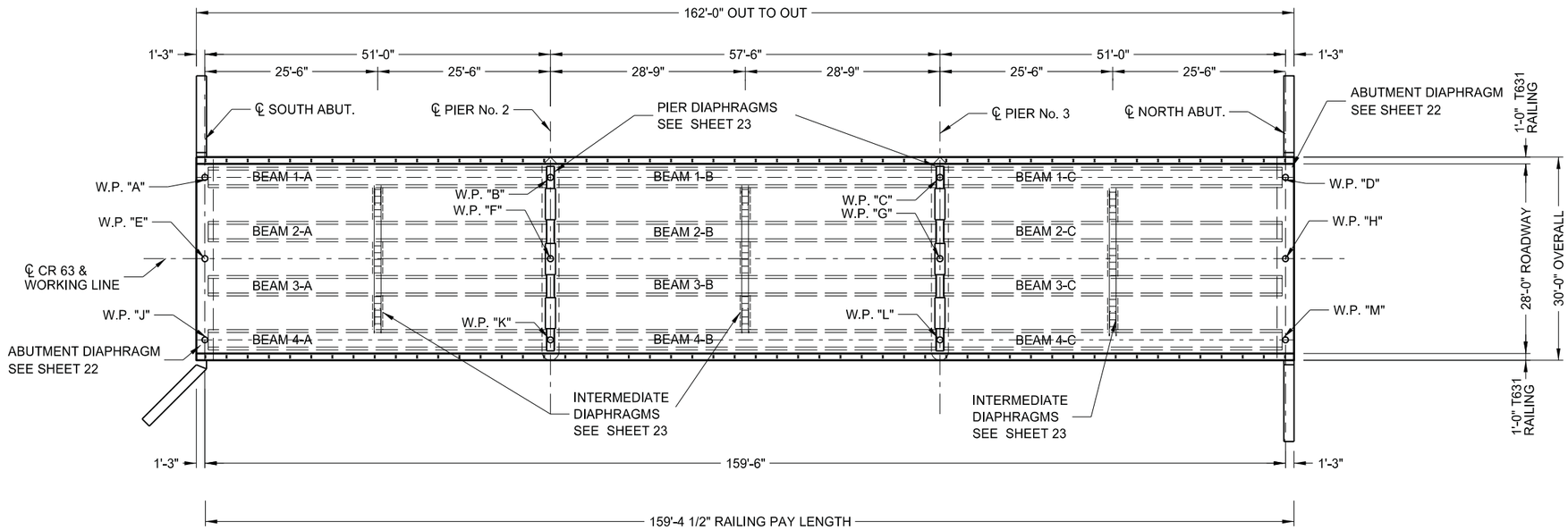
QUANTITIES	(2 PIERS)
CLASS AE-3 CONCRETE	122 CY
REINFORCING STEEL - GRADE 60	7467 LBS
REINFORCING STEEL - GRADE 60 - EPOXY COATED	532 LBS
STRUCTURAL STEEL	1169 LBS
STEEL PILING HP 12X53	420 LF

JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Pier Details
Pier Reinforcing

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	16



FRAMING PLAN

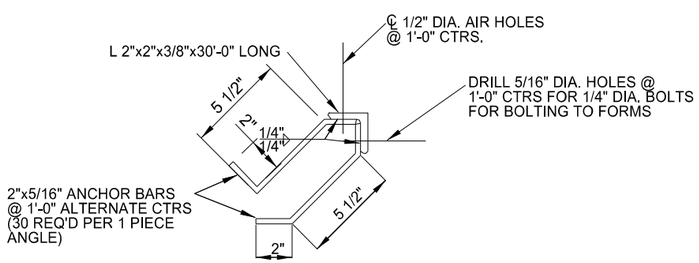
NOTES:

1. GUARD ANGLES MAY BE FURNISHED IN TWO PIECES WITH END ANCHOR BARS 6" MAXIMUM FROM EACH END. IN WHICH CASE THE ANGLES SHALL BE FIELD WELDED TOGETHER.

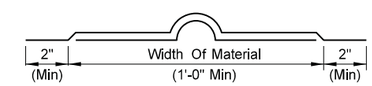
2. RECESS ANGLE 1/8" BELOW FINISHED GRADE AND HOLD IN ACCURATE POSITION WHILE CONCRETE IS BEING PLACED.

3. GUARD ANGLE TO BE CONSTRUCTED TO MATCH CROWN OF ROADWAY.

4. GUARD ANGLE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.



GUARD ANGLE



Fabric waterproofing shall be applied in accordance with Section 602 of the NDDOT Specifications.

All material and work shall be included in the pay item "Class AAE-3 Concrete."

TWO-PLY FABRIC WATERPROOFING MEMBRANE

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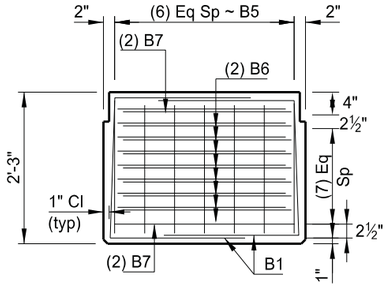
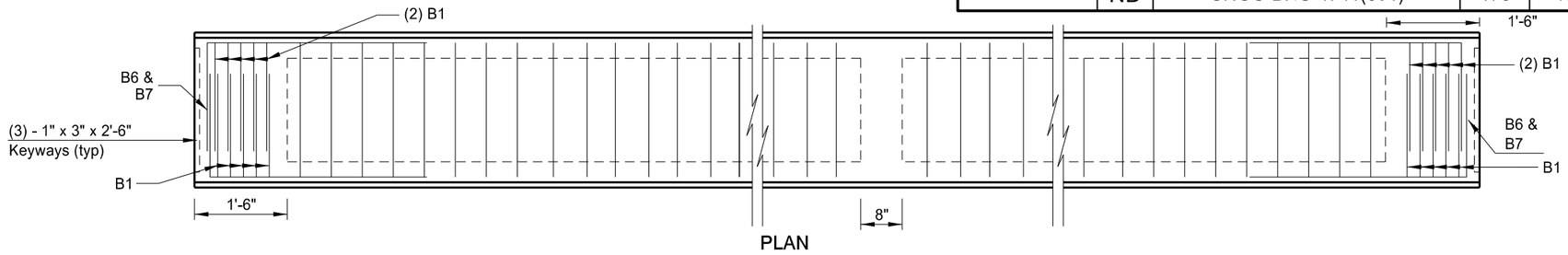
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKPTA

Superstructure Details
Framing Plan

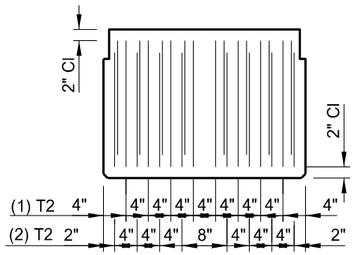
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	170	17



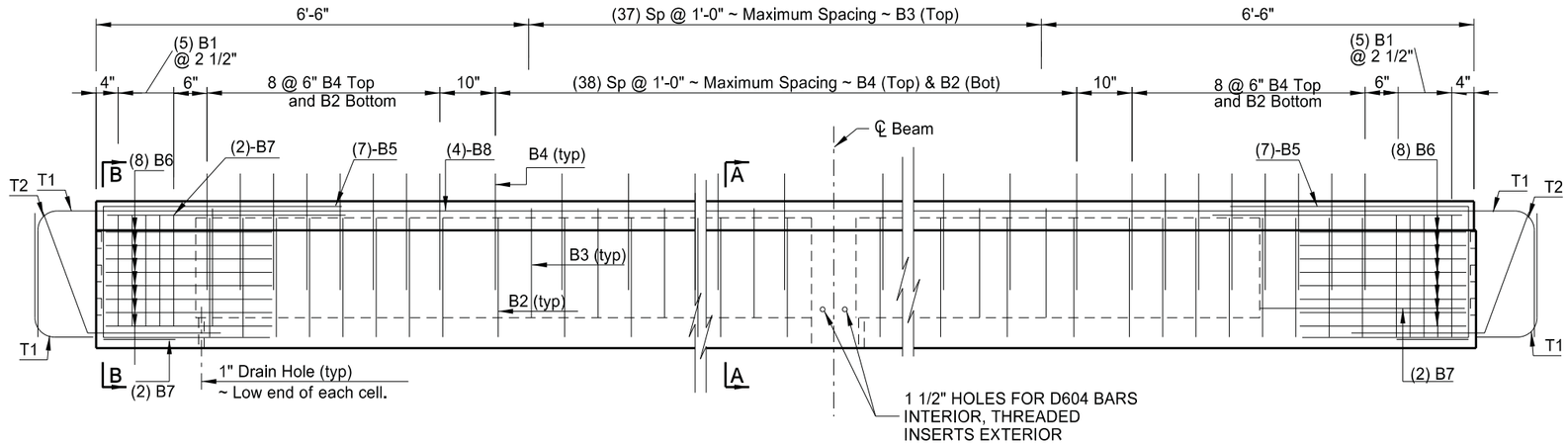
B-B



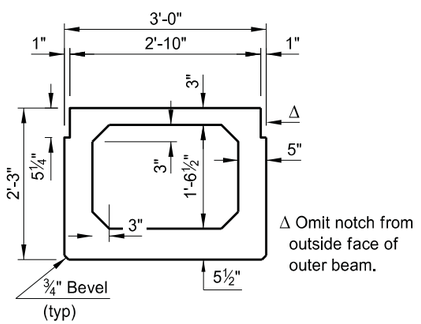
PLAN



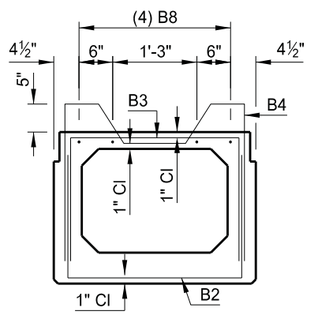
END VIEW



ELEVATION



(SHOWING DIMENSIONS)
A-A



(SHOWING REINFORCING)
A-A

BAR LIST ~ ONE BEAM					
MARK	SIZE	NO.	LENGTH	SHAPE	
B1	4	20	6'-6"	BENT	
B2	4	57	6'-6"	BENT	*
B3	4	38	6'-0"	BENT	*
B4	4	55	6'-7"	BENT	
B5	5	14	8'-1"	BENT	
B6	4	32	5'-1"	BENT	
B7	4	8	3'-1"	BENT	
B8	4	4	49'-6"	STR	
T1	4	32	4'-9"	STR	**
T2	4	16	4'-0"	STR	**

* Welded Wire Fabric with minimum circumferential steel area of 0.15 sq in per ft may be substituted for B2 and B3 bars.

** Field bend as shown (Grade 40).

BEAM SECTION DATA
WT = 517.0 LBS/FT
CROSS SECTIONAL AREA = 496.0 IN^2
C.G. (FROM BOTTOM) = 12.16 IN
I = 44242 IN^4
S_B = 3638.3 IN^3

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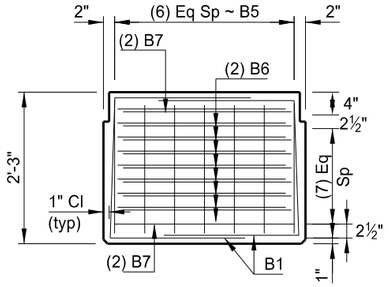
QUANTITIES	(ONE BEAM)
BEAM LENGTH	50.0 LF

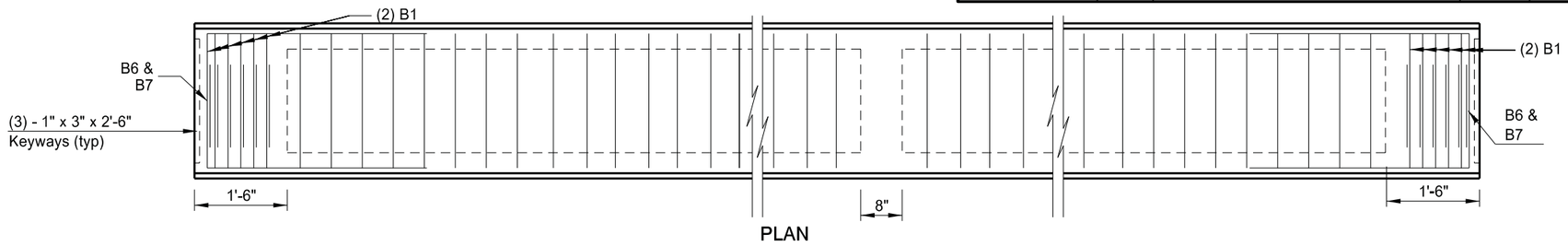
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Pre-Tensioned 27" X 36"
50'-0" Prestressed Spread Box Beam

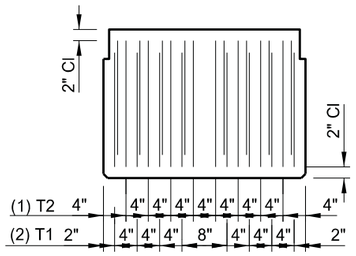
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CNOC-BRC-4741(051)	170	18



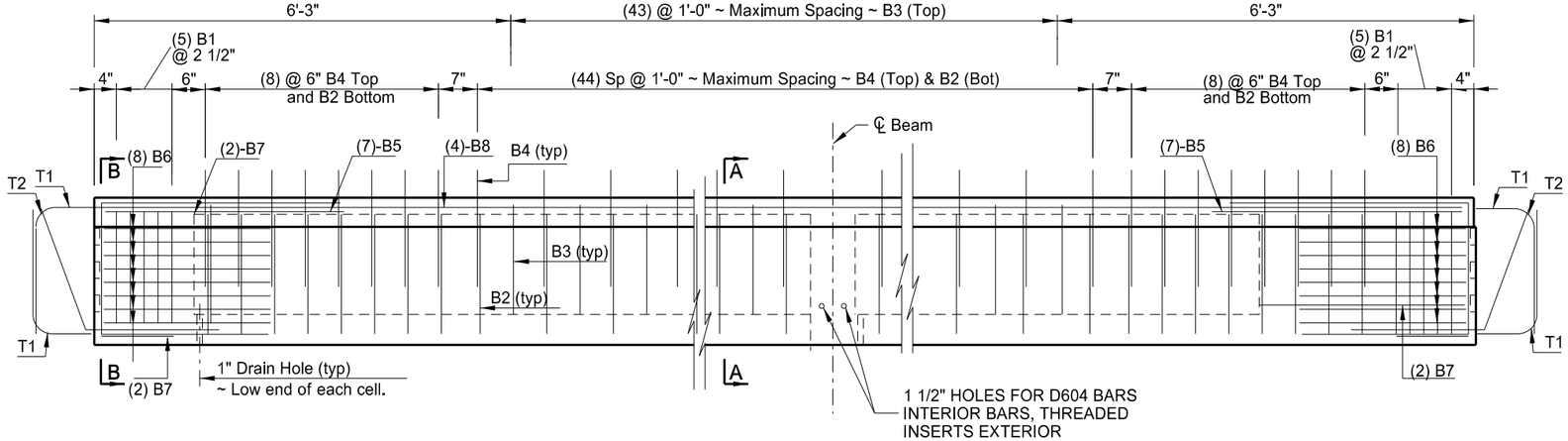
B-B



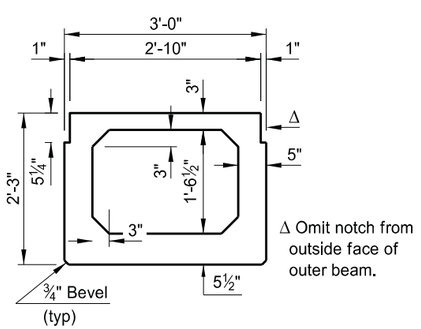
PLAN



END VIEW

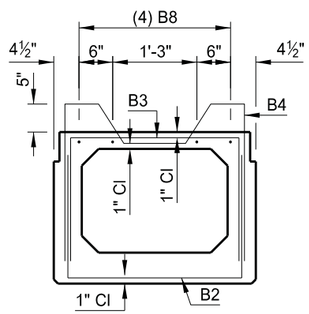


ELEVATION



(SHOWING DIMENSIONS)

A-A



(SHOWING REINFORCING)

A-A

BAR LIST ~ ONE BEAM					
	MARK	SIZE	NO.	LENGTH	SHAPE
*	B1	4	20	6'-6"	BENT
*	B2	4	61	6'-6"	BENT
*	B3	4	44	6'-0"	BENT
	B4	4	61	6'-7"	BENT
	B5	5	14	8'-1"	BENT
	B6	4	32	5'-1"	BENT
	B7	4	8	3'-1"	BENT
	B8	4	4	55'-0"	STR
**	T1	4	32	4'-9"	STR
**	T2	4	16	4'-0"	STR

* Welded Wire Fabric with minimum circumferential steel area of 0.15 sq in per ft may be substituted for B2 and B3 bars.

** Field bend as shown (Grade 40).

BEAM SECTION DATA
WT = 517.0 LBS/FT
CROSS SECTIONAL AREA = 496.0 IN^2
C.G. (FROM BOTTOM) = 12.16 IN
I = 44242 IN^4
S_B = 3638.3 IN^3

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QUANTITIES	(ONE BEAM)
BEAM LENGTH	56.5 LF

JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Pre-Tensioned 27" X 36"
Prestressed Spread Box Beam

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	19

NOTES:

At least 14 days prior to the forming and pouring of any beams, the Contractor shall submit shop drawings to the Engineer for review. The shop drawings shall include design calculations showing the total initial prestress force taken from the contract drawings and the losses in the prestress due to elastic shortening, shrinking or creeping of concrete and the relaxation of steel stress as determined by the Contractor for his method of stressing.

Shop drawings shall show strand layout, pull down locations, tensioning forces, elongation and any proposed changes in reinforcing steel.

The final prestress force (remaining after all losses have been accounted for) and its corresponding center of gravity, shall be selected from those on a curve determined by the three values shown.

The beams shall be poured in all steel forms.

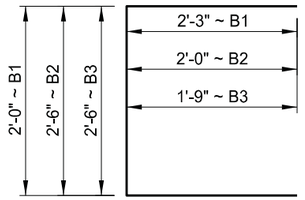
Beams shall not be cast any earlier than 90 days before deck is placed.

Holes and inserts to accommodate the diaphragm bars shall be provided in the beams at locations as shown.

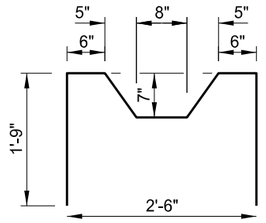
Minor changes to the shape of the beam and to reinforcing steel may be made to accommodate the forms of various contractors and their construction methods with the approval of the Engineer.

The tops of the beams shall be rough floated and broomed transversely for bond.

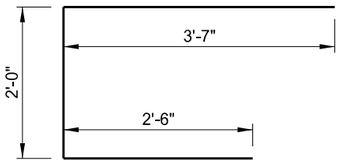
Provide handling hooks or devices as required by the Contractor. Hooks or devices provided will be subject to approval by the Engineer and shall be installed within 4'-0" of the end of beam.



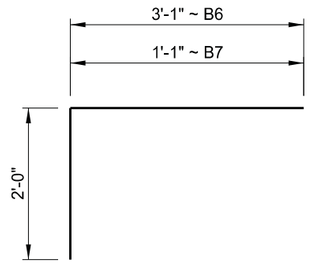
B1, B2 & B3



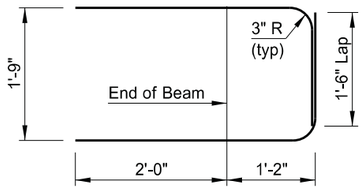
B4



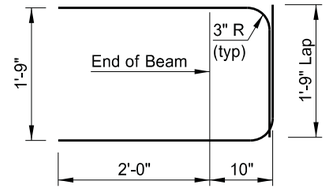
B5



B6 & B7



(AT ABUTMENTS)

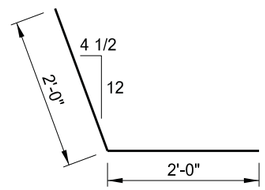


(AT PIERS)

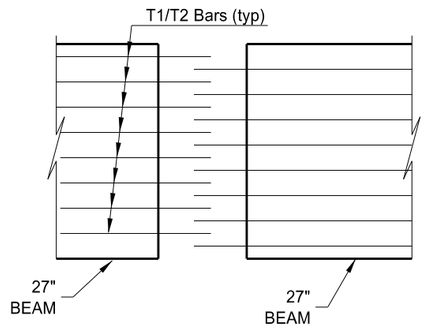
(2) T1

(DIMENSIONS SHOWN ARE OUT TO OUT)

BENT BAR DETAILS



(1) T2



BEAM END PLAN AT PIER

PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
5.1 in	615 k	4500 psi (Min)	6000 psi (Min)	12.9/50 foot 14.6/56.5 foot	50'-0"
5.3 in	703 k				
6.9 in	791 k				

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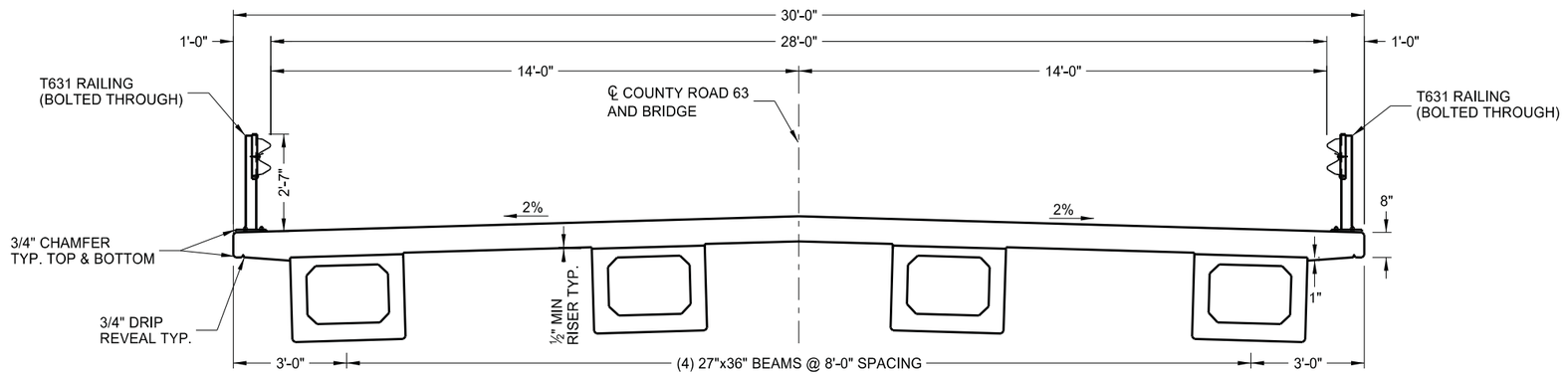
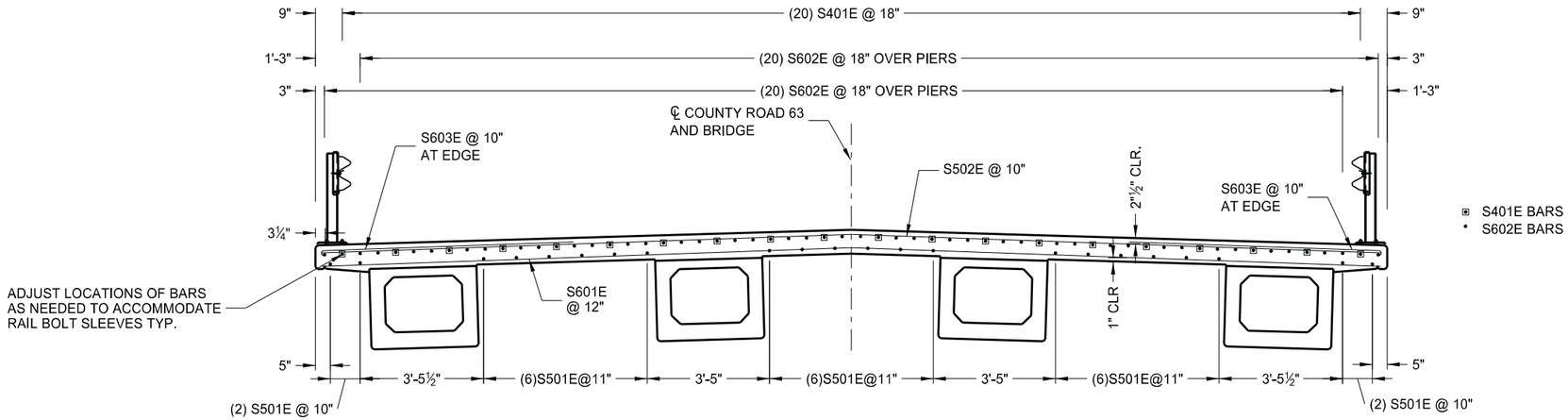
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY. NORTH DAKOTA

Pre-Tensioned 27" X 36"
Prestressed Spread Box Beam

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	20



SECTION - SHOWING DIMENSIONS



SECTION - SHOWING REINFORCING

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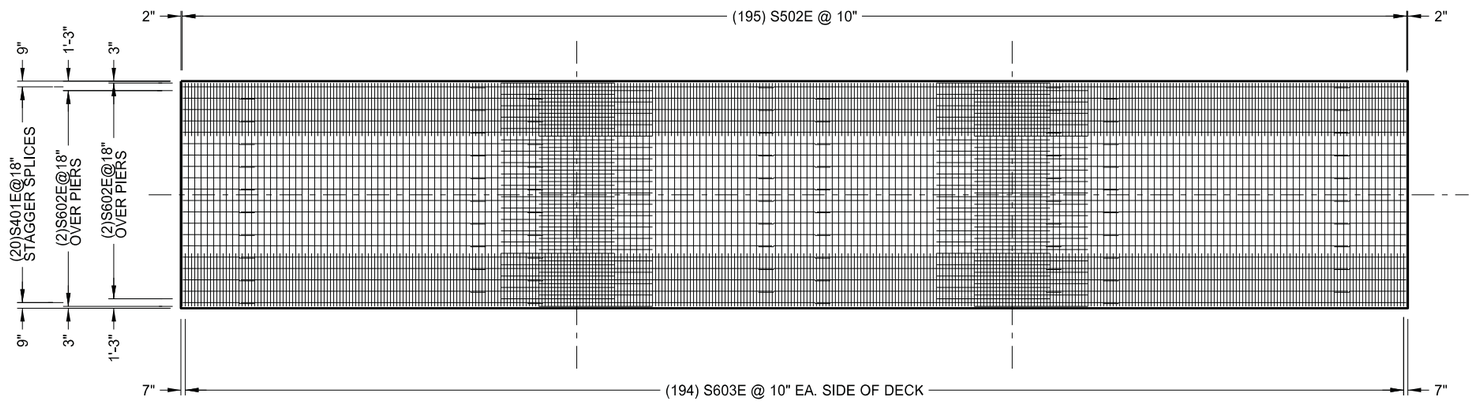
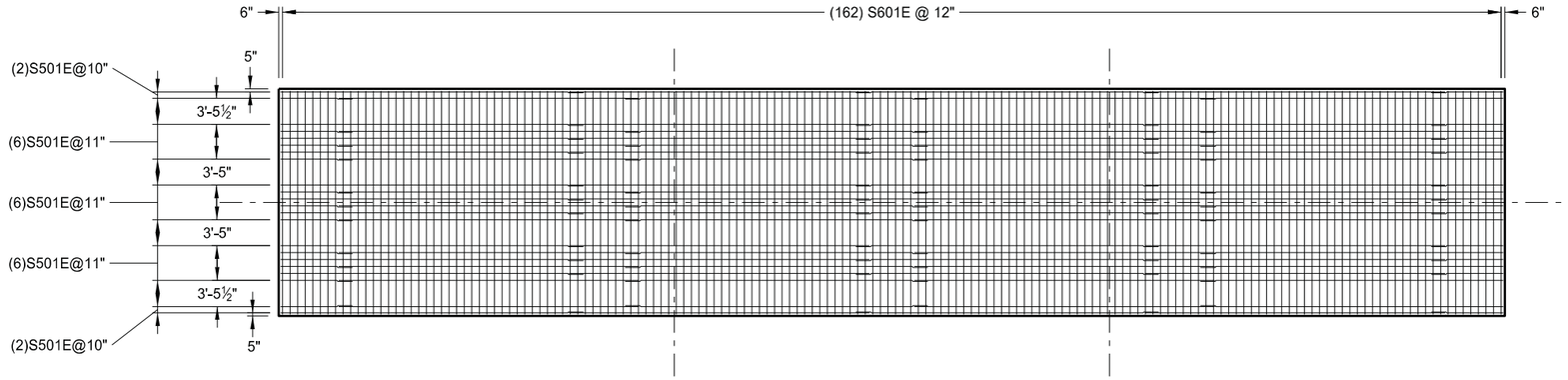
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY. NORTH DAKOTA

Superstructure Details
Deck Sections

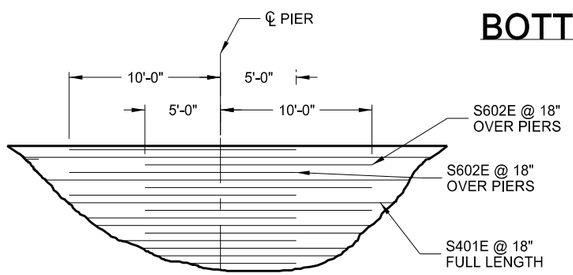
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	21



TOP REINFORCING



BOTTOM REINFORCING



DETAIL - TOP REINFORCING OVER PIERS

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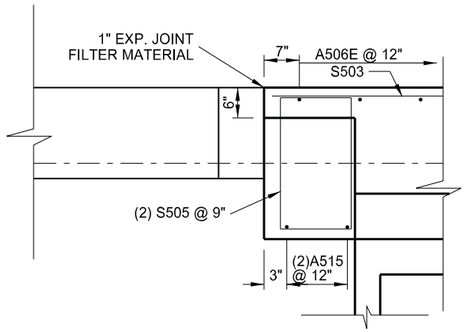
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Superstructure Details
Deck Reinforcing

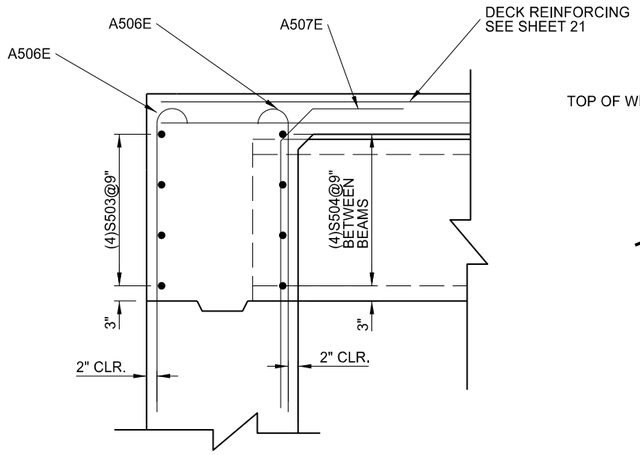
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	22



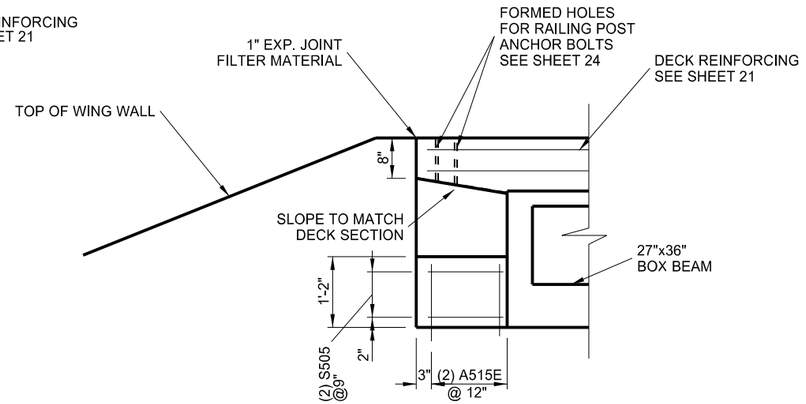
PARTIAL PLAN - RAIL POST BOLT POCKET

BILL OF REINFORCEMENT - SUPERSTRUCTURE

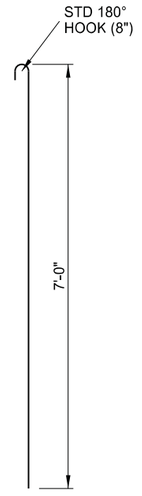
MARK	QUANTITY	LENGTH (FT-IN)	SHAPE	REMARKS
S401E	20	169 - 6	STRT	DECK TOP LONGITUDINAL
S501E	22	169 - 6	STRT	DECK BOTTOM LONGITUDINAL
S502E	195	29 - 6	STRT	DECK TOP TRANSVERSE
S503	8	29 - 8	STRT	ABUTMENT ENDWALL HORIZONTAL
S504	24	4 - 6	STRT	ABUTMENT ENDWALL HORIZONTAL BETWEEN BEAMS
S505	8	7 - 7	BENT	ABUTMENT ENDWALL HORIZONTAL TIES
S601E	162	29 - 6	STRT	DECK BOTTOM TRANSVERSE
S602E	80	15 - 0	STRT	DECK TOP LONGITUDINAL OVER PIERS
S603E	388	7 - 8	BENT	DECK TOP EDGES TRANSVERSE



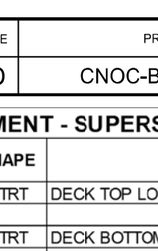
SECTION - ABUTMENT ENDWALL



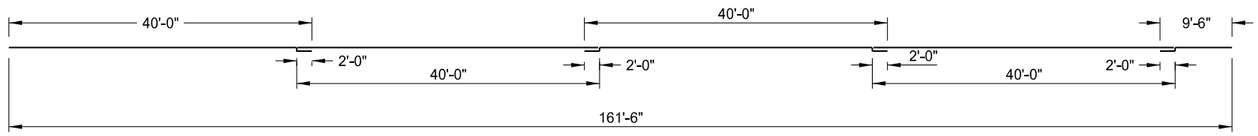
PARTIAL SECTION - RAIL POST BOLT POCKET



S603



S505



S401, S501 (STAGGER SPLICES)

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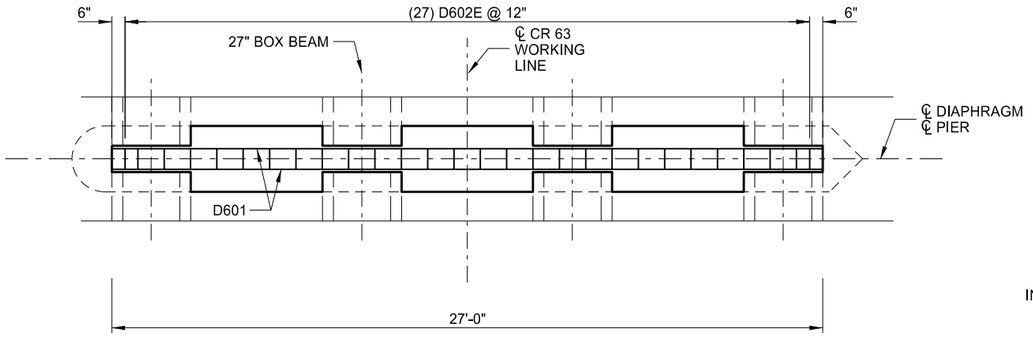
QUANTITIES	SUPERSTRUCTURE/ DIAPHRAGMS
CLASS AAE-3 CONCRETE	146.2 CY
REINFORCING STEEL - GRADE 60	1569 LBS
REINFORCING STEEL - GRADE 60 - EPOXY COATED	26,796 LBS
STRUCTURAL STEEL	377 LBS
RAILING	318.8 LF

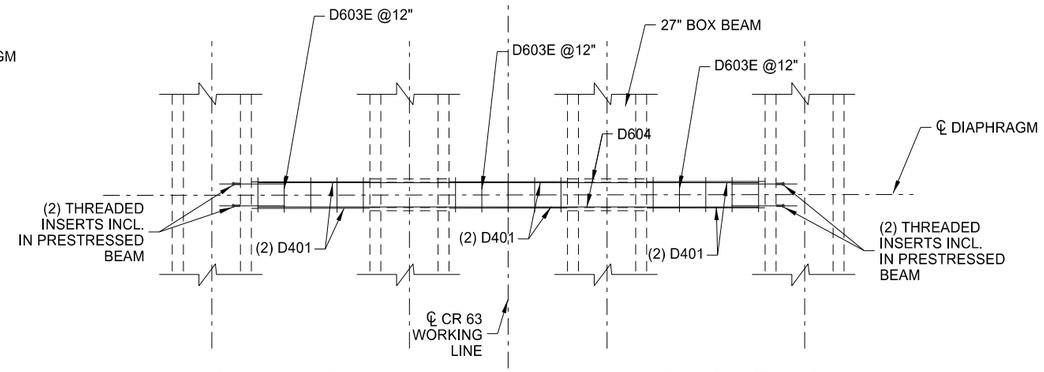
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Superstructure Details
Reinforcing Details

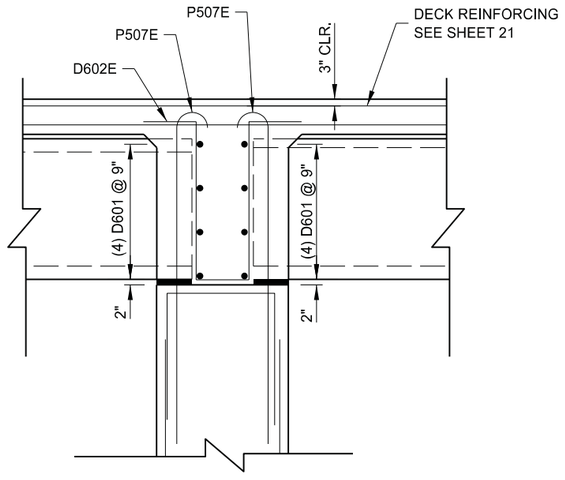
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	23



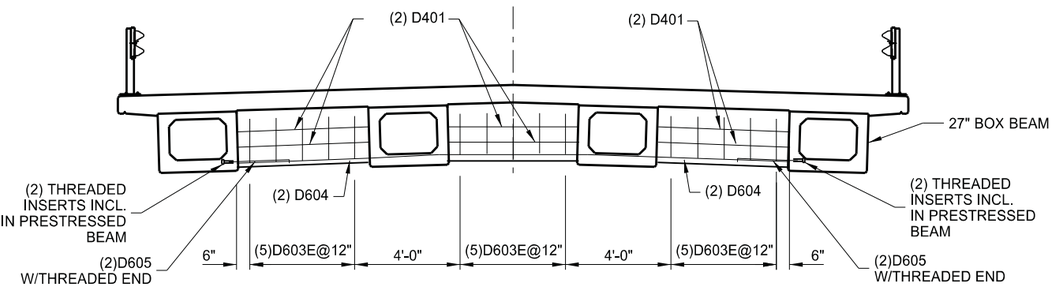
PLAN- 27" BEAM PIER DIAPHRAGMS



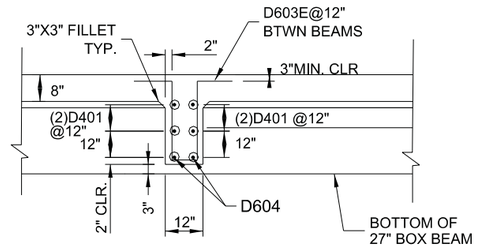
PLAN- INTERMEDIATE DIAPHRAGMS



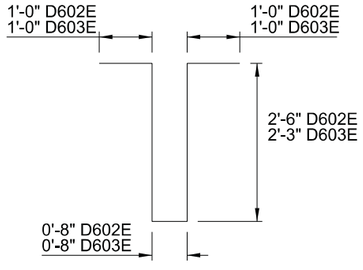
SECTION- PIER DIAPHRAGMS



ELEVATION - 27" BEAM INTERMEDIATE DIAPHRAGMS



SECTION- INTERMEDIATE DIAPHRAGMS



D602E, D603E

BILL OF REINFORCEMENT - (2) PIER AND (3) INTERMEDIATE DIAPHRAGMS				
MARK	QUANTITY	LENGTH (FT-IN)	SHAPE	REMARKS
D401	36	4 - 6	STRT	INTERMEDIATE DIAPHRAGM HORIZONTAL BETWEEN BEAMS
D601	16	26 - 6	STRT	PIER DIAPHRAGM HORIZONTAL
D602E	54	7 - 8	BENT	PIER DIAPHRAGM TIES
D603E	45	7 - 2	BENT	INTERMEDIATE DIAPHRAGM VERTICAL
D604	6	20 - 8	STRT	INTERMEDIATE DIAPHRAGM HORIZONTAL THROUGH BEAMS
D605	12	3 - 6	STRT	INTERMEDIATE DIAPHRAGM HORIZONTAL W/THREADED END

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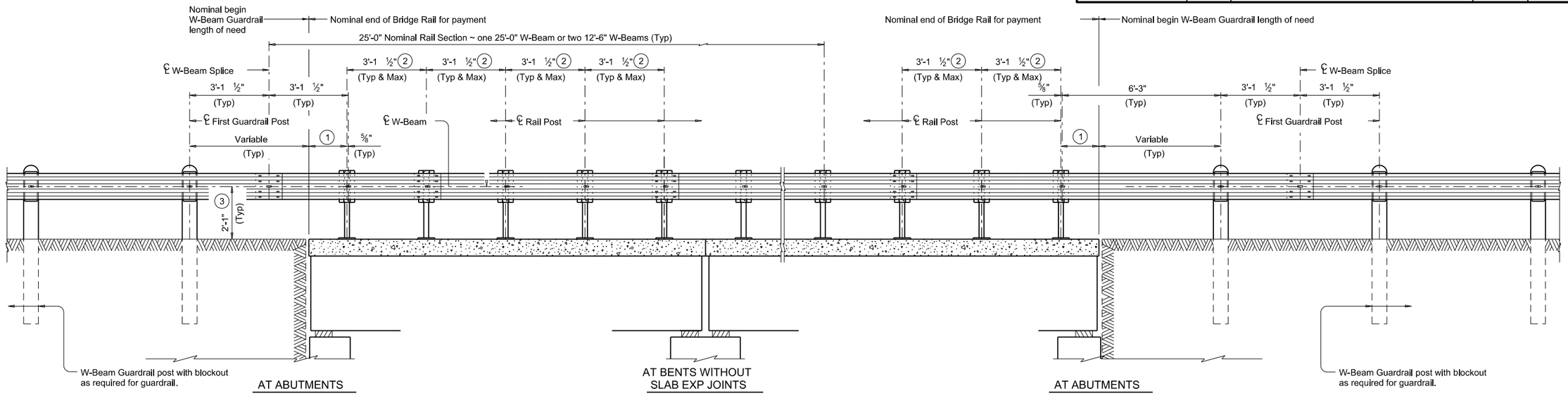
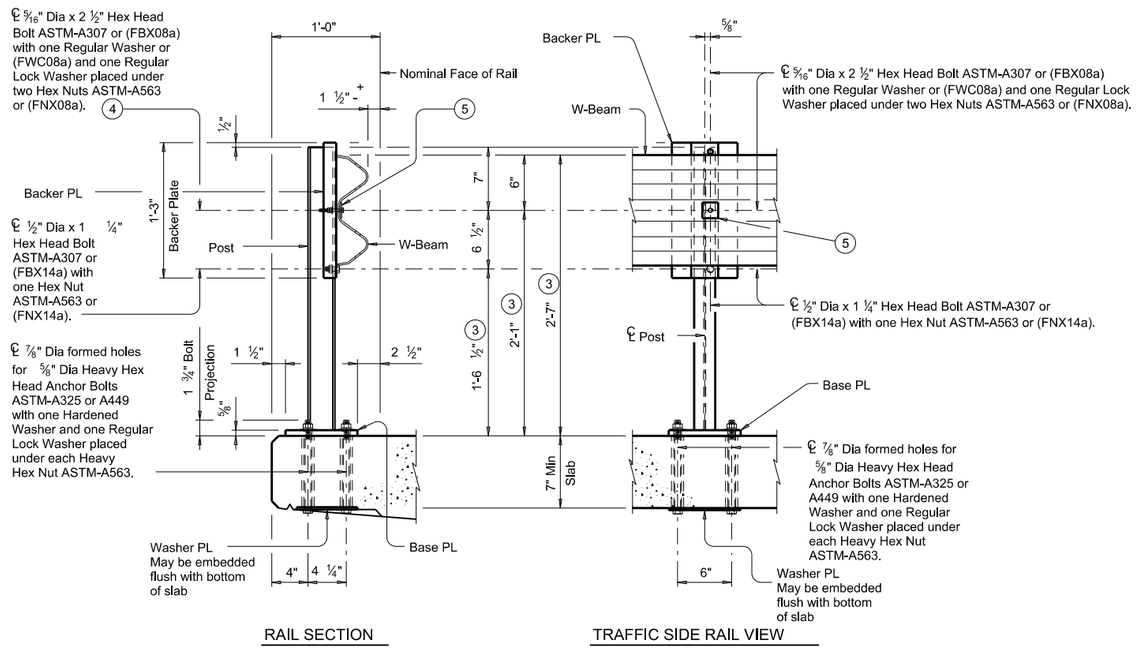
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOYA

Superstructure Details
Pier / Intermediate Diaphragm

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	24



ROADWAY ELEVATION OF RAIL



RAIL DETAILS ON BRIDGE SLAB

(1) 9" Min, 5'-9" Max

(2) Maintain 3'-1 ½" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.

(3) Increase 2" for structures with overlay.

(4) Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.

(5) PL ⅛ x 1 ¾ x 1¾ with ⅜ Dia Hole centered in PL, ASTM-A36. Square Guardrail Washer (FWR01).

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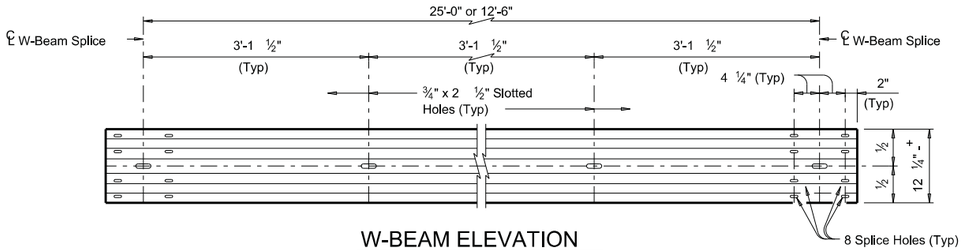
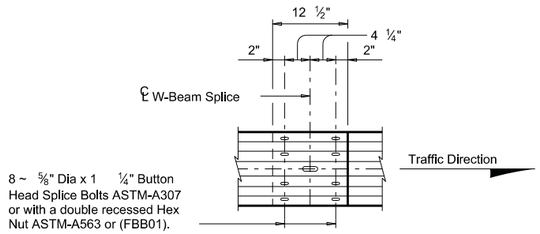
JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Railing Details

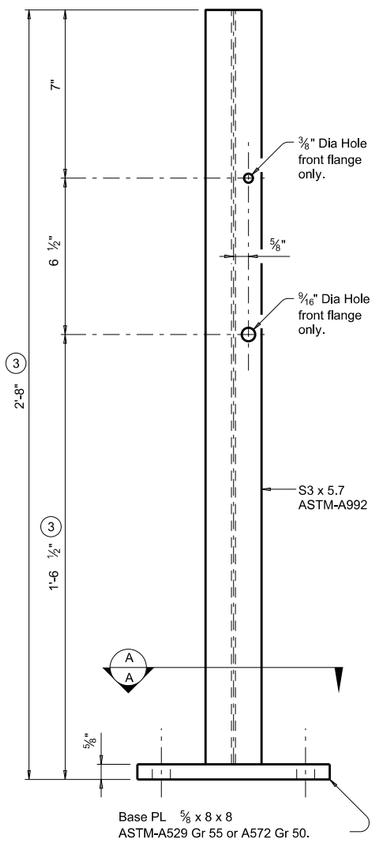
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	CNOC-BRC-4741(051)	170	25



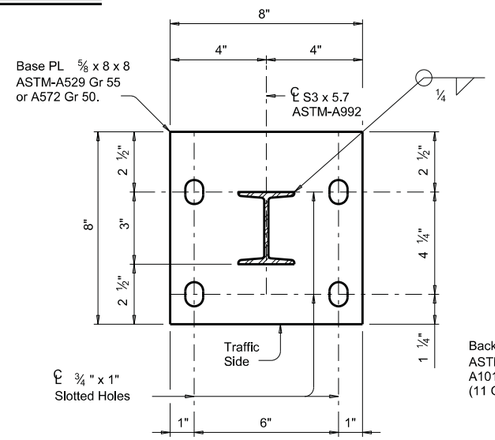
W-BEAM ELEVATION



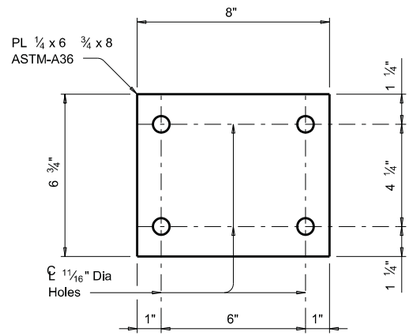
W-BEAM SPLICE ELEVATION



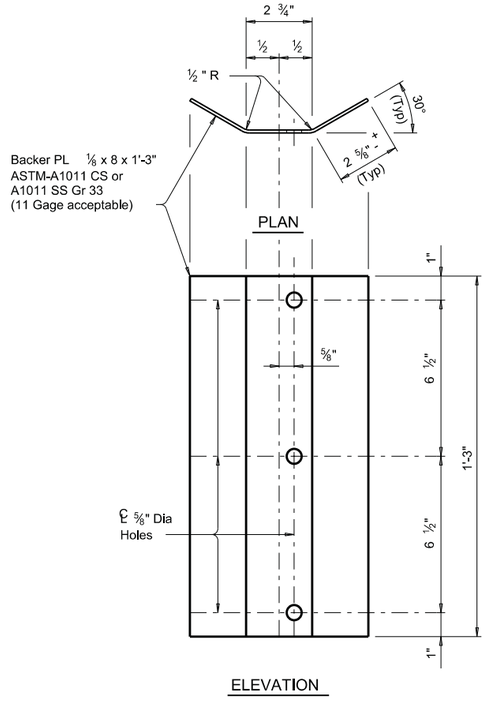
POST ELEVATION



SECTION A



WASHER PLATE DETAIL



BACKER PLATE

③ Increase 2" for structures with overlay.

CONSTRUCTION NOTES:

1. Face of rail post must be plumb unless otherwise approved by the Engineer.
2. Post must be perpendicular to adjacent roadway grade.
3. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.
4. Fully anchored guardrail must be attached to each end of rail.
5. A metal beam guard fence transition is not used with this rail.
6. Fabricator must submit erection drawings to the Engineer for approval.
7. Round or chamfer exposed edges of rail post and backer plate to approximately 1/16" by grinding.
8. Shop drawings are required for this rail.

MATERIAL NOTES:

1. Galvanize all steel components after fabrication.
2. Anchor bolts for base plate must be ⅝" Dia ASTM-A325 or A449 bolts with one hardened washer and one regular lock washer placed under each heavy hex nut. Nuts must conform to A563 requirements.
3. W-beam must meet the requirements of Spec 764, Code 131, "W-Beam Guardrail" except as modified in the plans. The Contractor may furnish rail elements of 25'-0", or 12'-6" (Nominal) lengths. W-Beam must have slotted holes at 3'-1 ½".
5. Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

GENERAL NOTES:

1. This railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria.
2. This railing can be used for speeds of 50 mph and greater.
3. This rail is designed to deflect approximately 4' to 4'-6"as it contains and redirects the errant vehicle.
4. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.
5. Repairs to impact-damaged post and base plate unit are not permitted.
6. Replace all impact-damaged posts with a new post and base plate unit.
7. Average weight of railing with no overlay: 19 plf total.

This document was originally issued and sealed by Alexander Schwarzhoff, Registration Number PE- 9435, on 03/21/16 and the original document is stored at the Stutsman County Highway Department

JAMES RIVER
COUNTY ROAD 63
STUTSMAN COUNTY, NORTH DAKOTA

Railing Details

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	
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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	
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DATE	CHANGE
08-03-15	General Revisions

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Line Styles

D-101-20

- 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

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

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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 (T)
- 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

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

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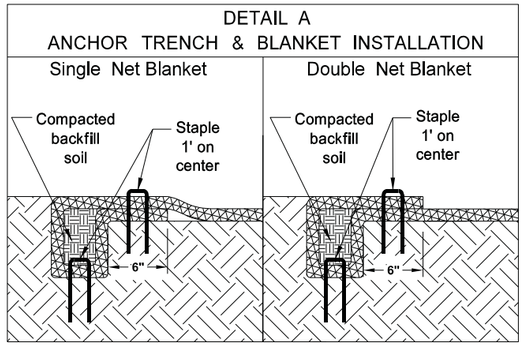
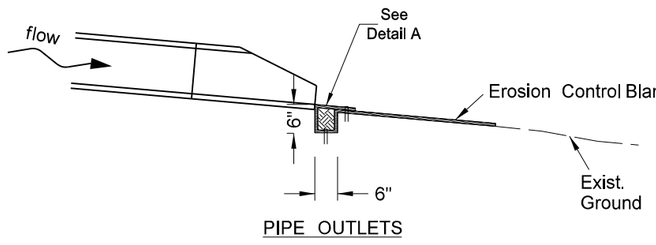
D-255-2

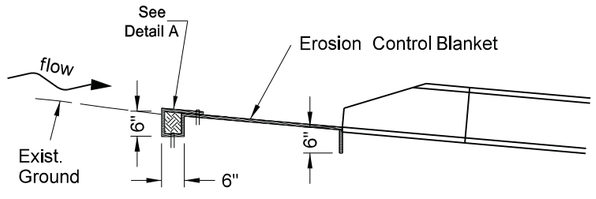
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



NOTE:
If a Single Net Blanket is used the side with the netting should be on the top once the blanket is installed.

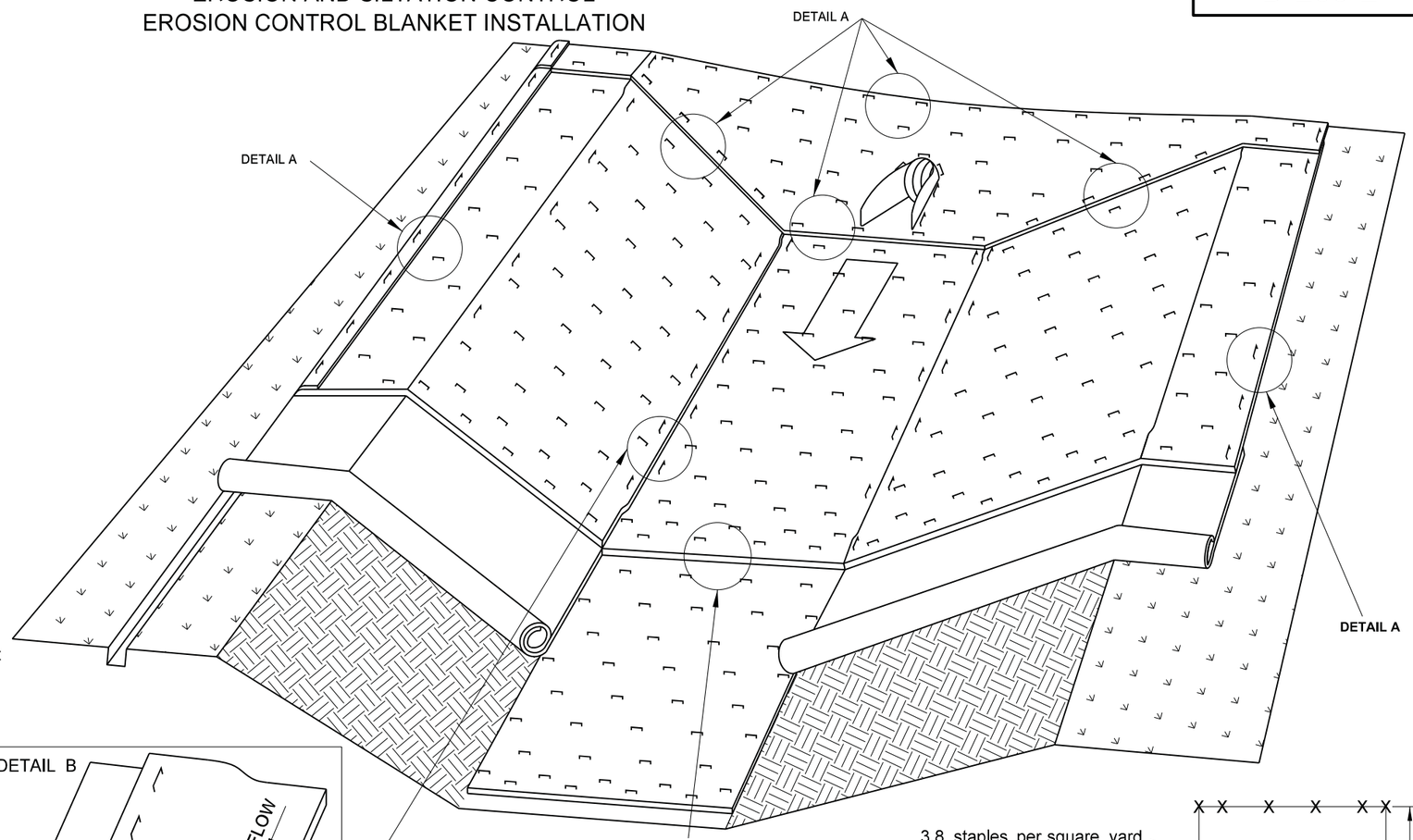


PIPE OUTLETS

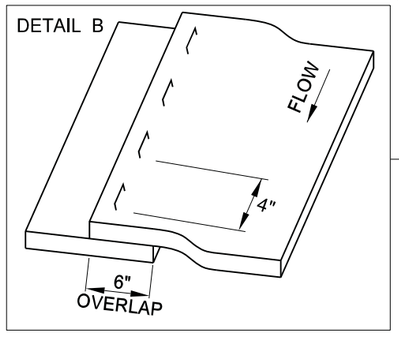


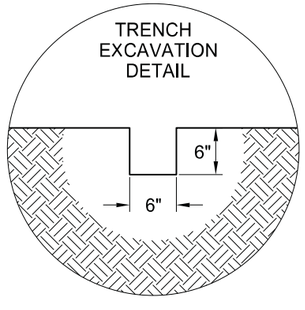
PIPE INLETS

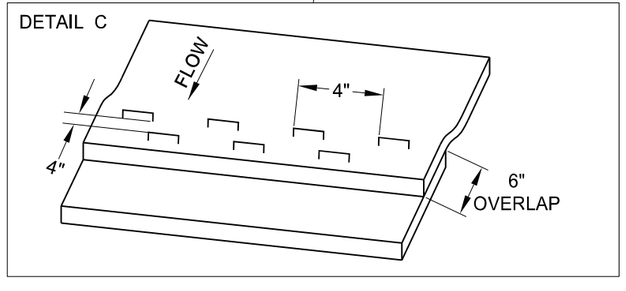
INSTALLATION AT PIPE ENDS



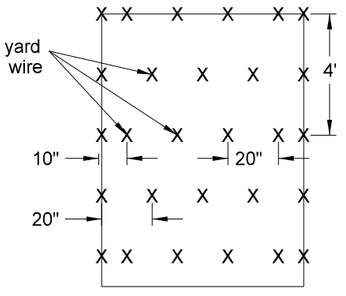
BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION







3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



STAPLE PATTERN

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-709-5 to D-255-2.
07-27-15	Changed installation details such as trench depth and overlap dimensions.

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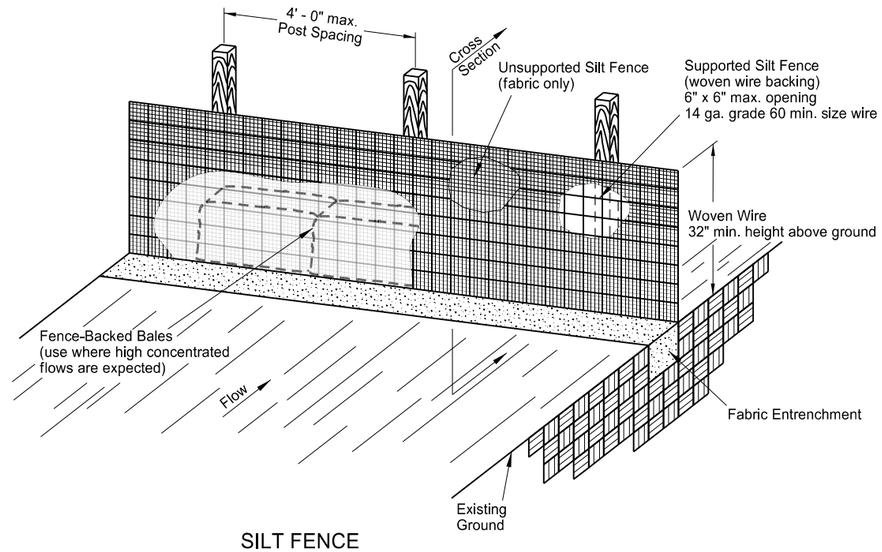
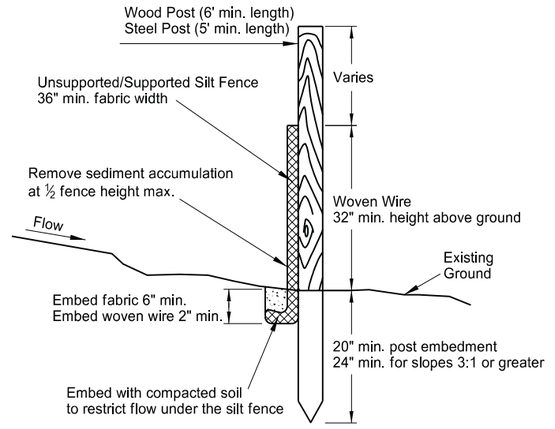
EROSION AND SILTATION CONTROLS - SILT FENCE

D-260-1



SILT FENCE
SUPPORTED AND UNSUPPORTED



SILT FENCE
CROSS SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.

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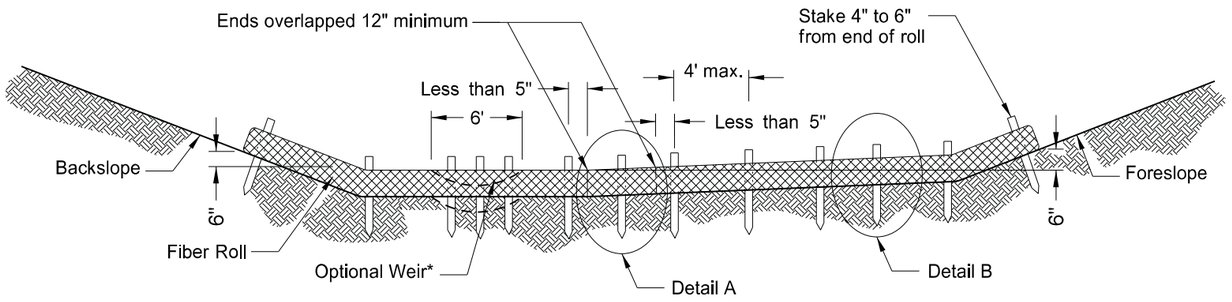
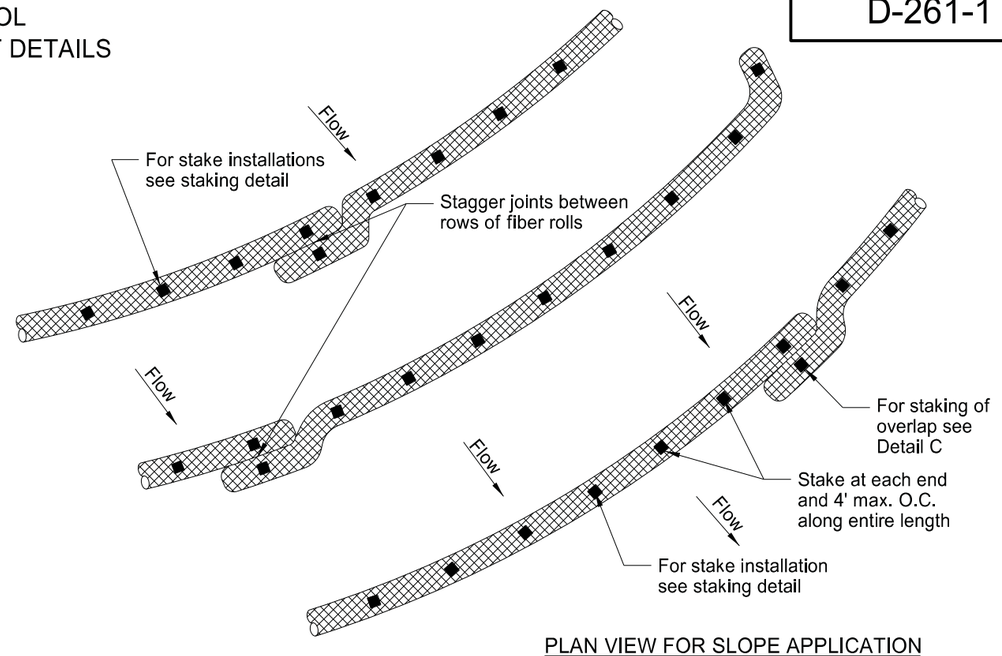
D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

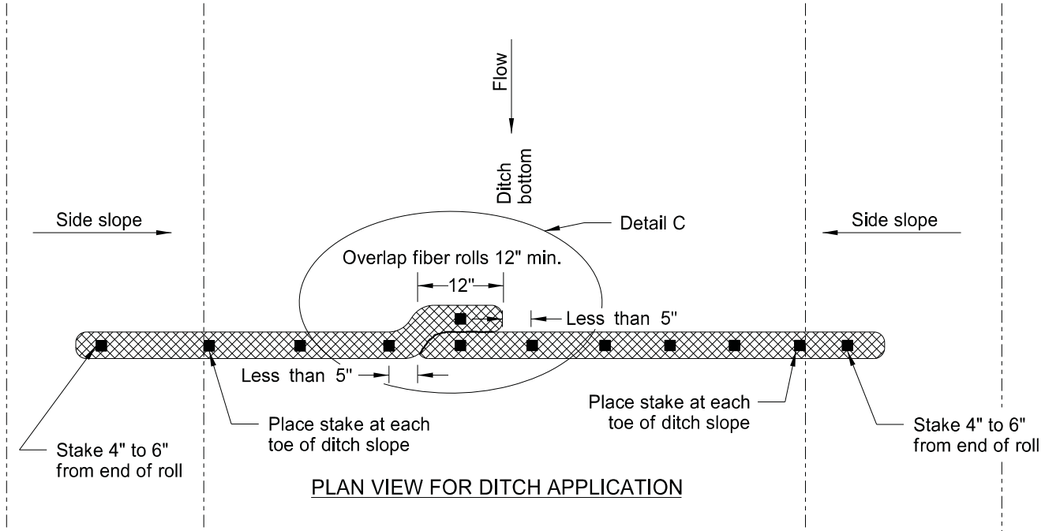


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

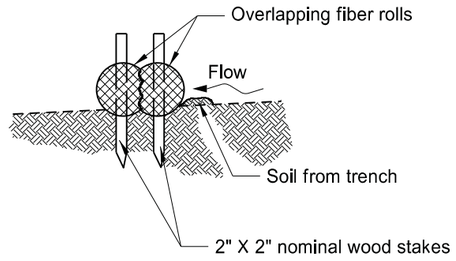
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

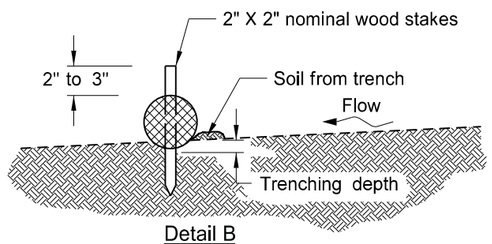


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

REVISIONS

DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1

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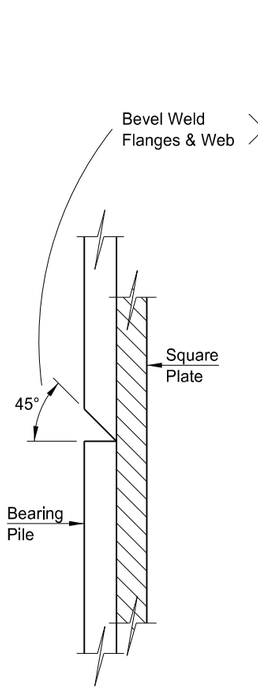
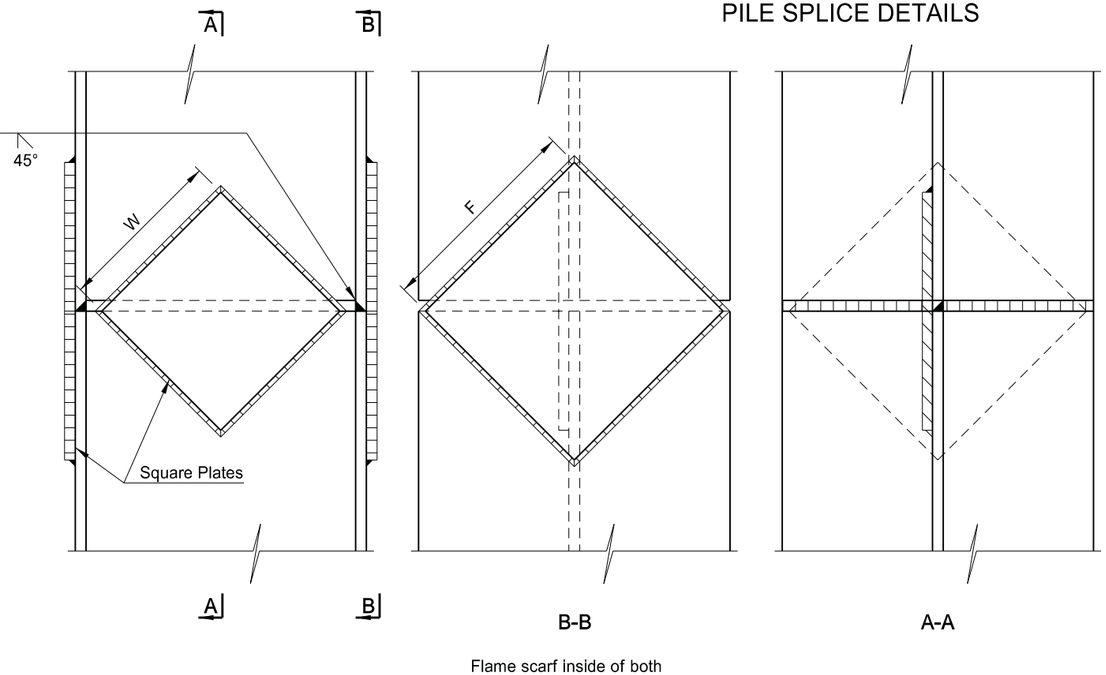
PILE SPLICE DETAILS

D-622-1



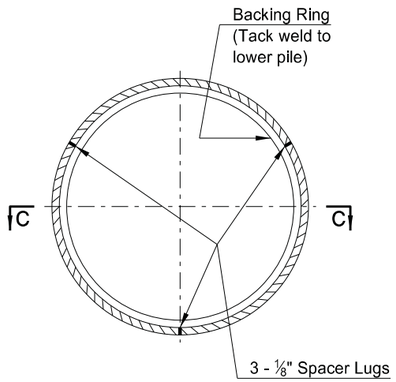
ENLARGED VIEW



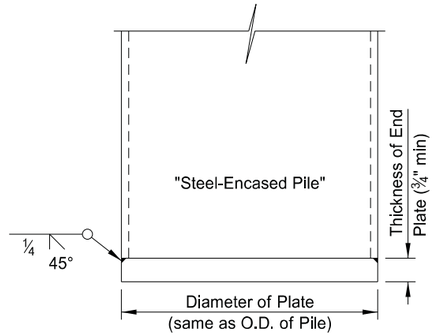
B-B

A-A

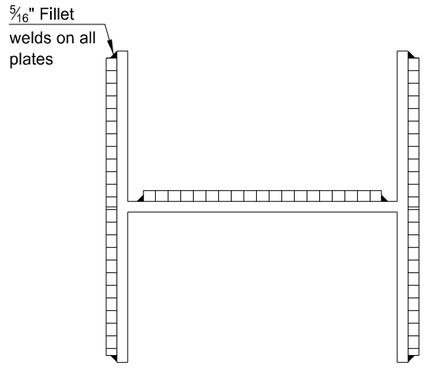
Flame scarf inside of both flanges and one side of web of upper section.



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

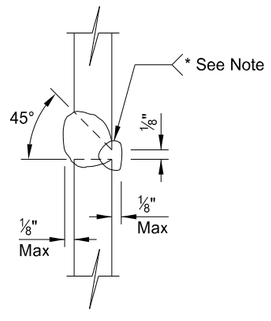


END PLATE DETAIL

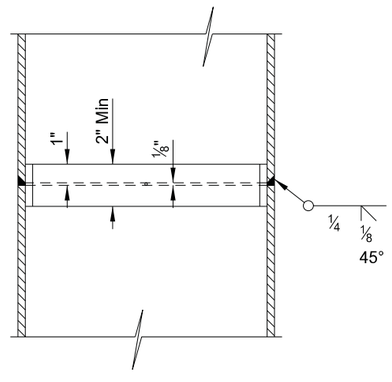


PILE	8"	10"	12"	14"
"F" FLANGE	5"	6½"	8"	10"
"W" WEB	4"	5½"	6½"	8"

H-PILE SPLICE DETAIL

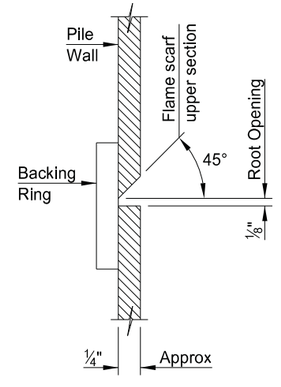


ALTERNATE H-PILE SPLICE DETAIL



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.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09/14/11	
REVISIONS	
DATE	CHANGE

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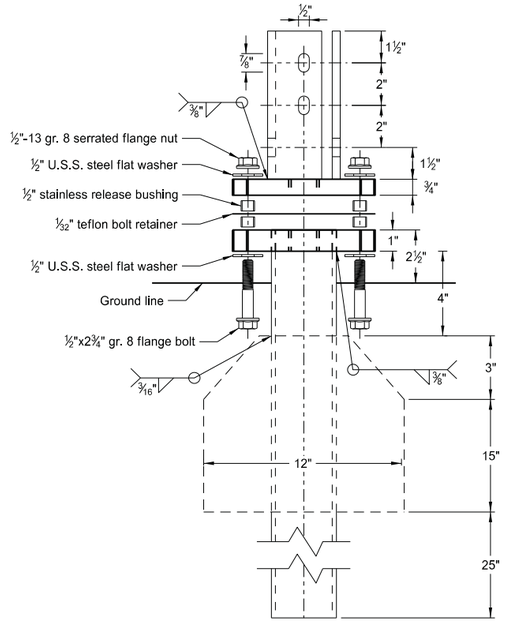
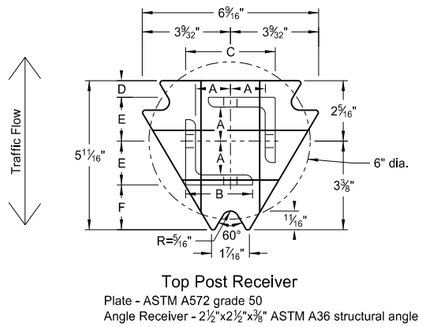
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

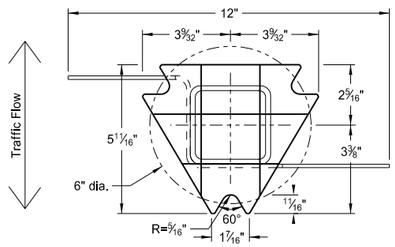


Multi-Directional
Slip Base Assembly

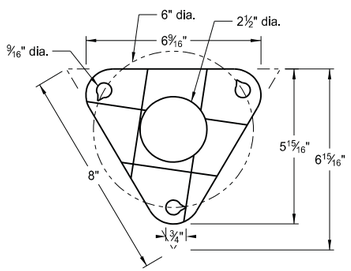
Perforated Tube



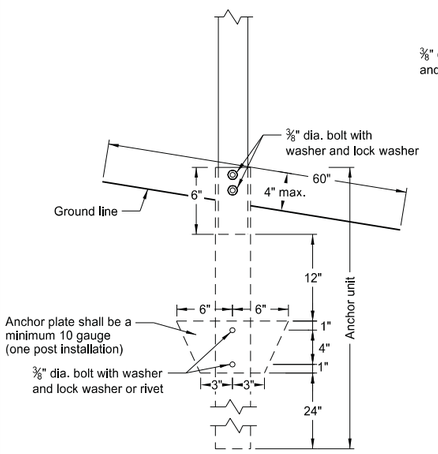
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



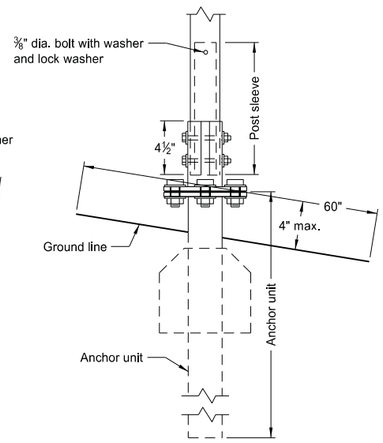
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50



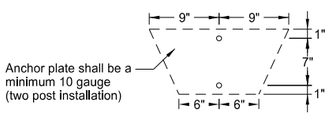
Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



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	2 3/16	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
2 3/16 x 2 3/16	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
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1⅞"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	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 2 3/16"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

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

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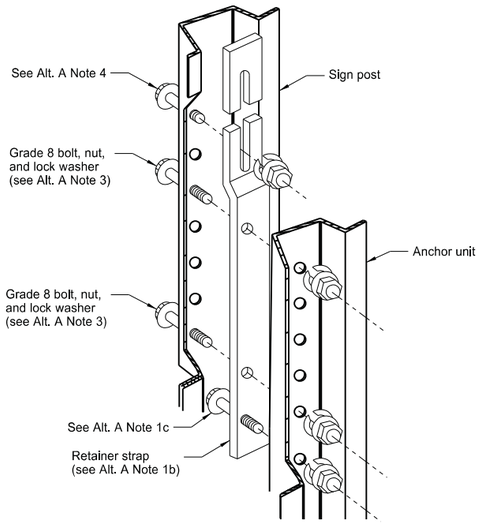
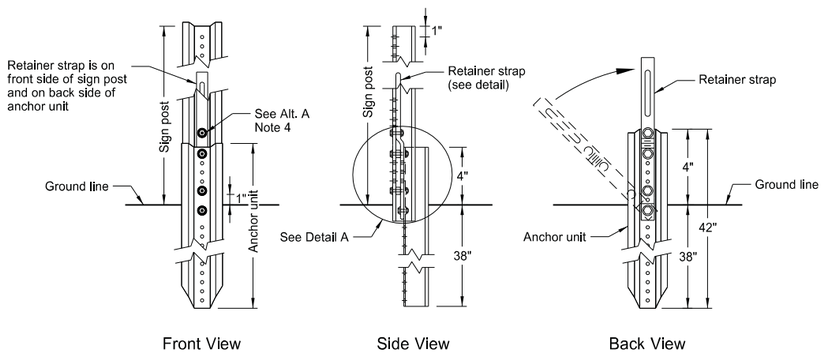
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



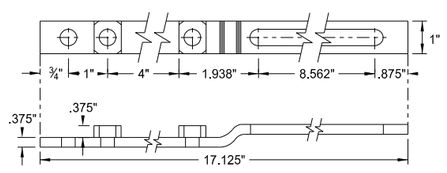
Detail A



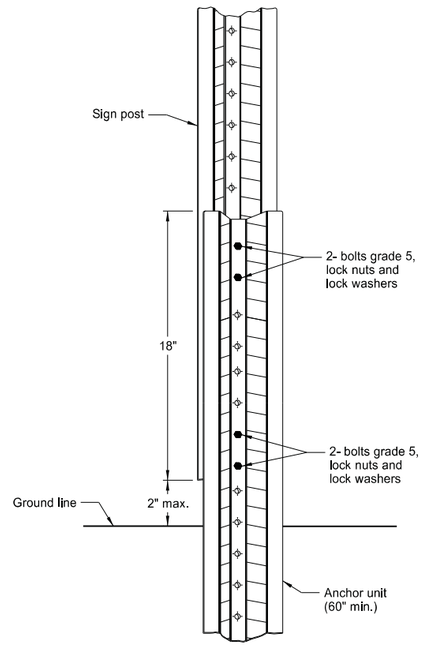
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

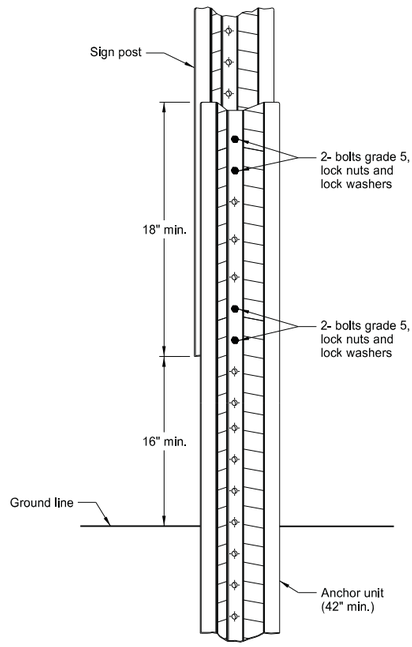


Retainer Strap Detail



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.

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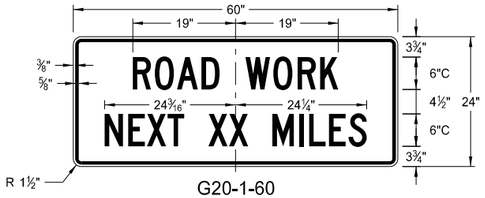
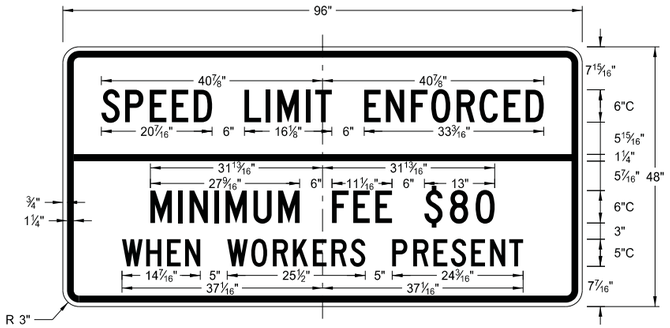
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
Legend: black (non-refl)
Background: orange

G20-4b-36
Legend: black (non-refl)
Background; orange



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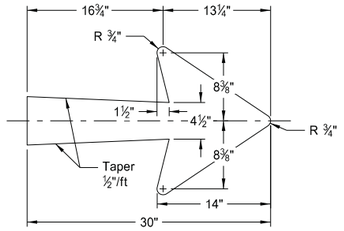
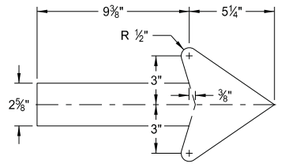
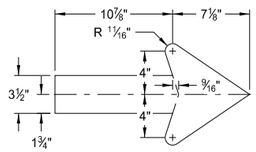


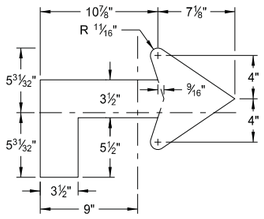
E5-1-48



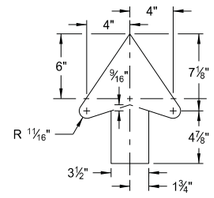
G20-50a-72
G20-52a-72



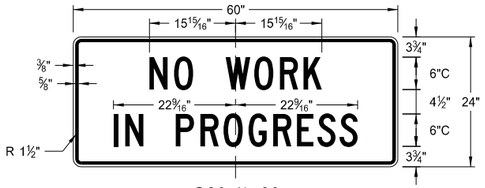
M4-9(L or R)-30
Right or Left



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight



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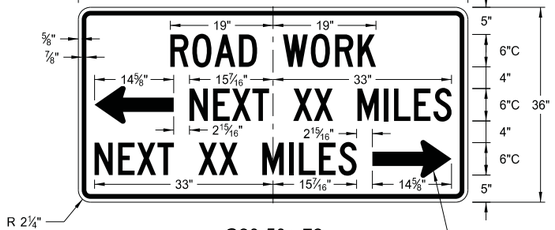
Background: orange



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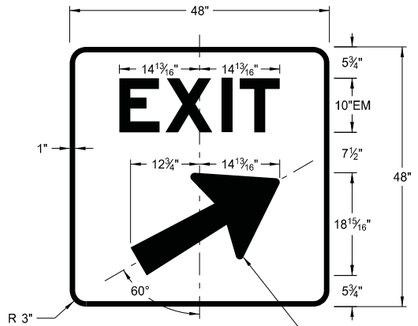

E5-1(L or R)-48
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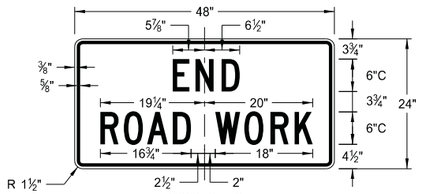
Background: green



G20-2-48
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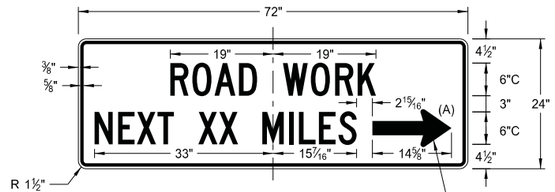
Background: orange



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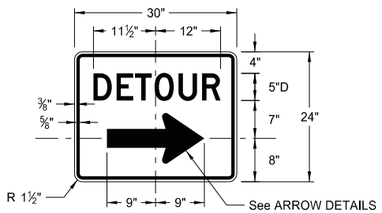

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

ARROW DETAILS

NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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8-13-13	
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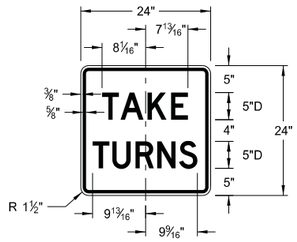
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
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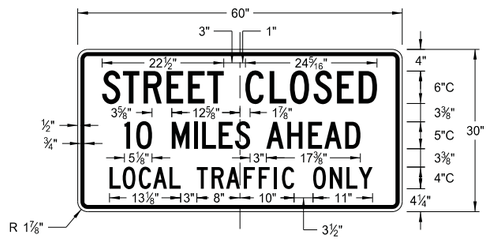
Background: white



R11-3c-60
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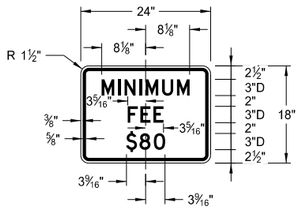

R2-1a-24
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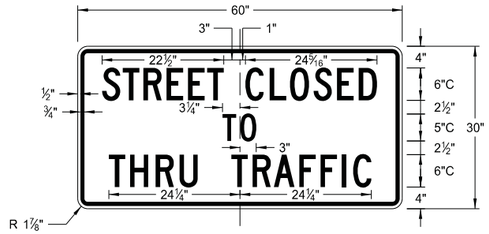

R11-4a-60
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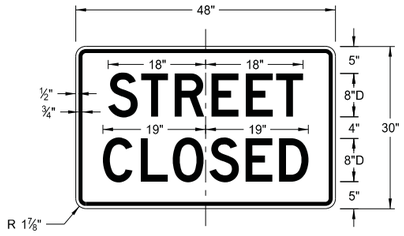

R11-2a-48
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Background: white

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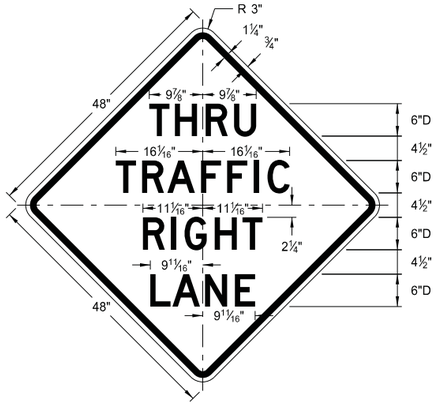
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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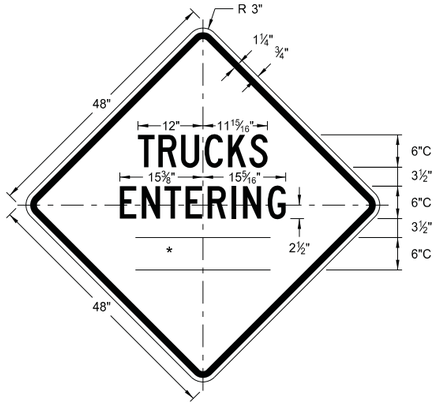
Background: orange



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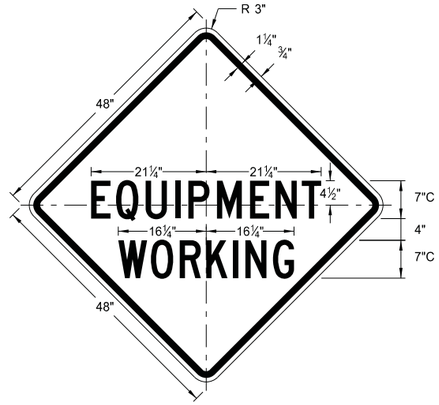

W20-51-48
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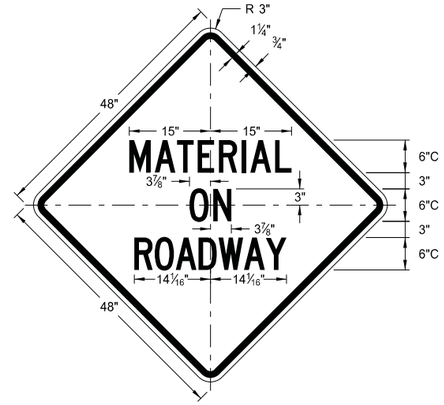
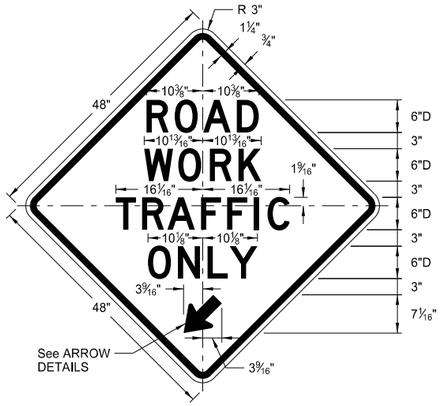
Background: orange



W21-51-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48
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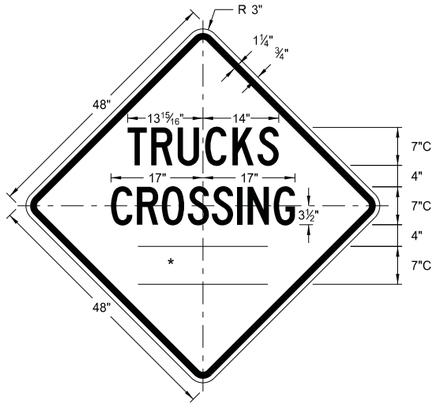
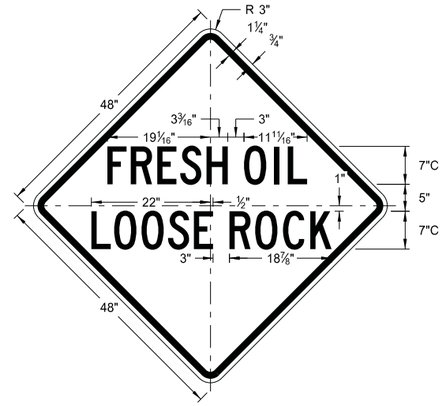
Background: orange



W8-55-48
Legend: black (non-refl)
Background: orange

W20-52-54
Legend: black (non-refl)
Background: orange



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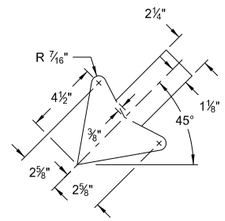
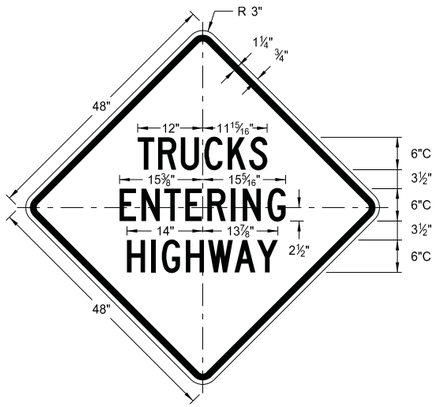


W5-9-48

ARROW DETAILS



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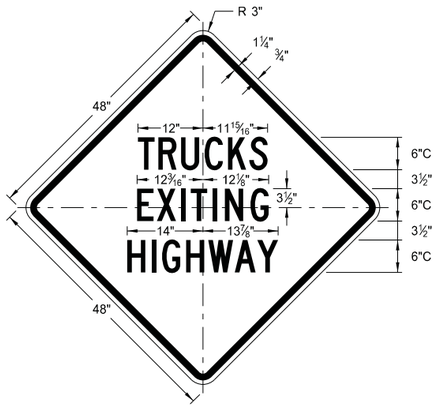

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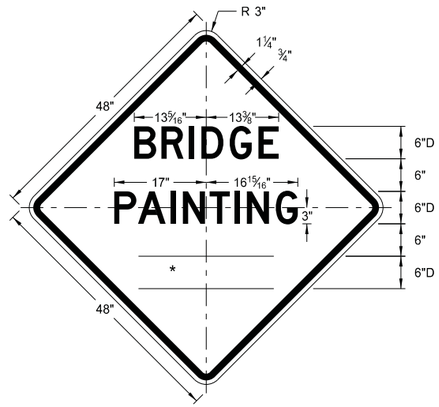

W21-50-48
Legend: black (non-refl)
Background: orange

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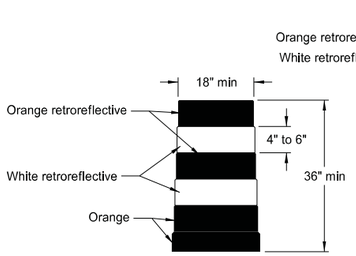
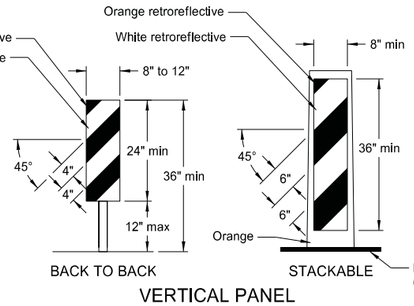
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



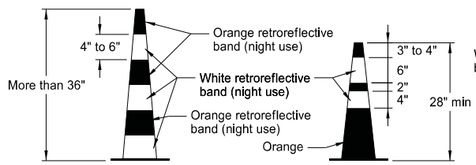
DELINEATOR DRUM

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.



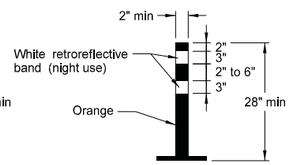
VERTICAL PANEL

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.



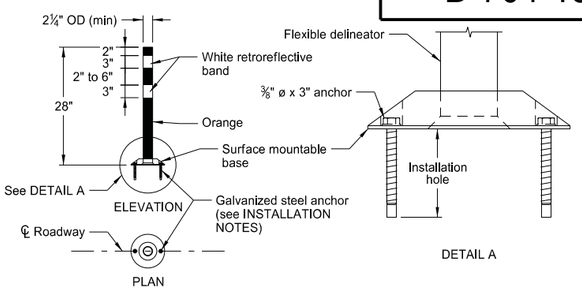
TRAFFIC CONE

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

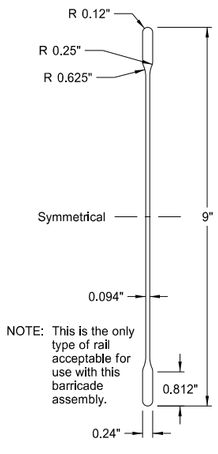
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



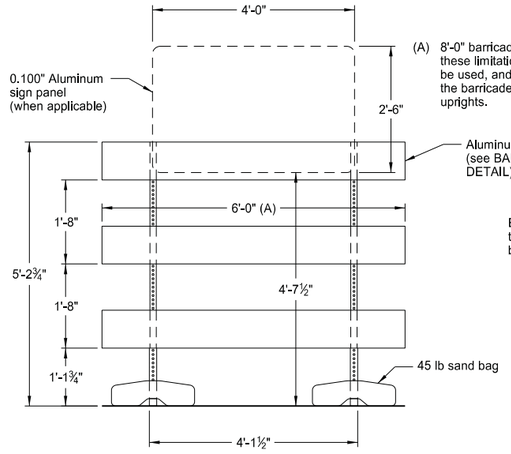
FLEXIBLE DELINEATOR

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.

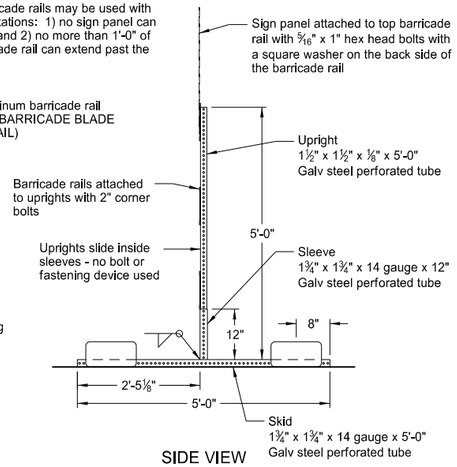


BARRICADE BLADE DETAIL



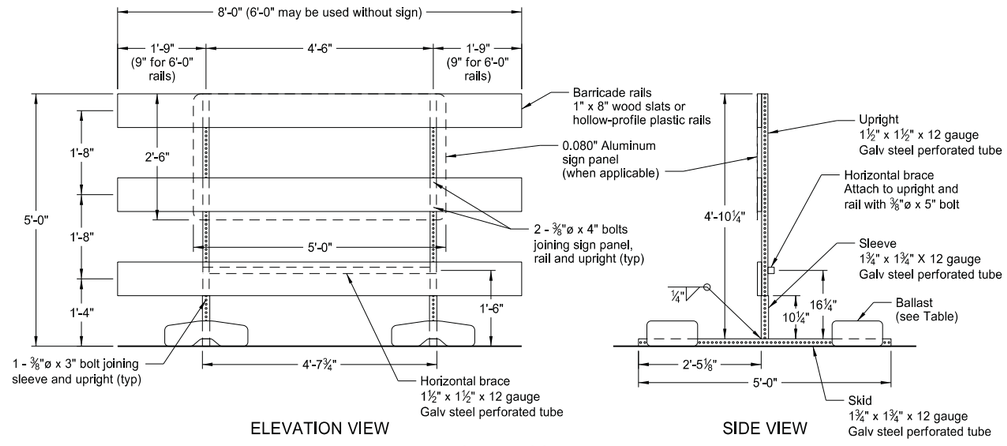
ELEVATION VIEW

(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.



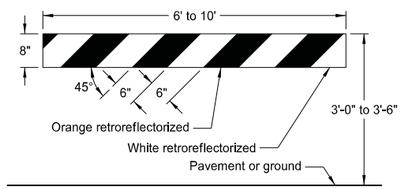
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

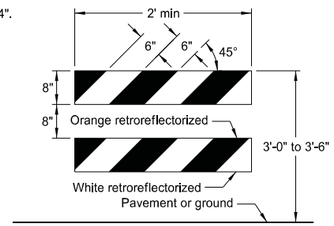


BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

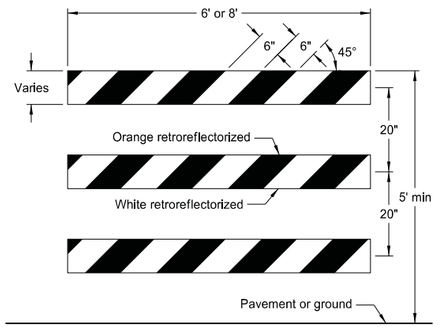
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

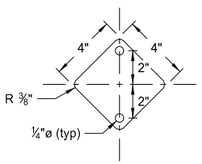


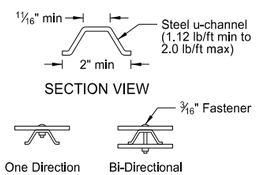
TYPE II BARRICADE

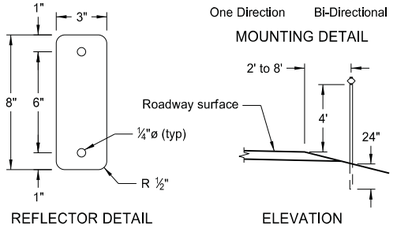


TYPE III BARRICADE

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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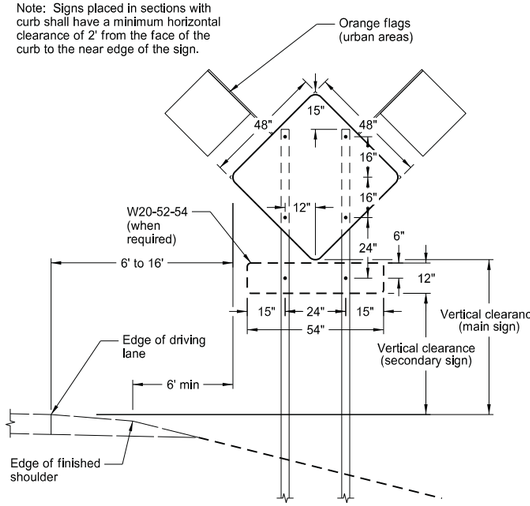
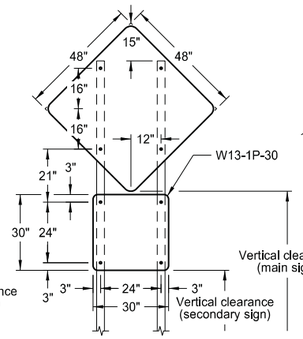
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

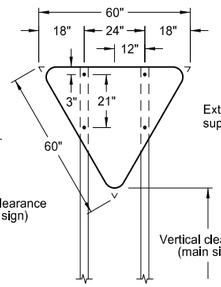
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



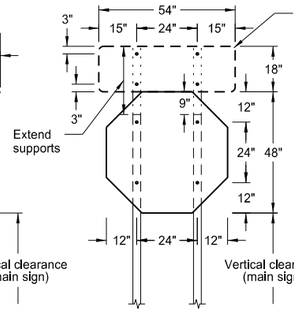
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



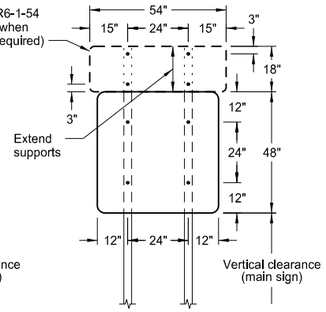
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



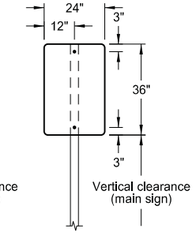
R1-2-60 - YIELD SIGN



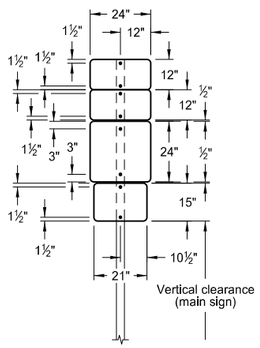
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



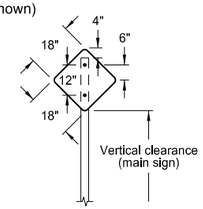
48" x 48" SIGN
(with R6-1-54 sign as required)



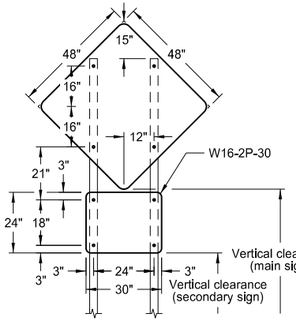
24" x 36" SIGN



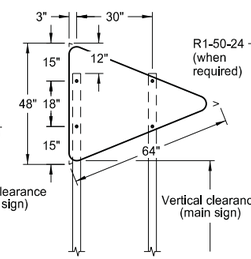
24" x 24"
ROUTE MARKER
ASSEMBLY



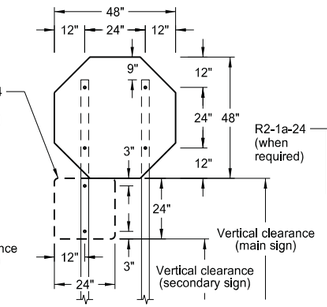
18" x 18"
DIAMOND SIGN



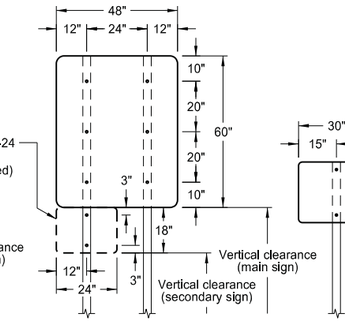
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



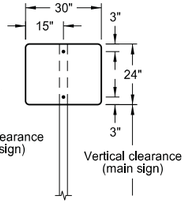
W14-3-64 - PENNANT SIGN



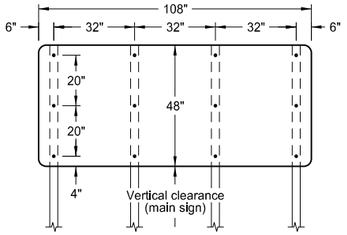
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



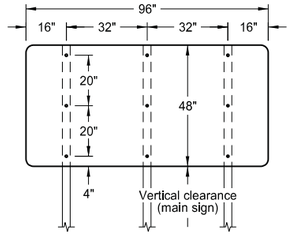
48" x 48" SIGN
(with R2-1a-24 sign as required)



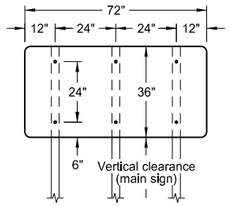
30" x 24" SIGN



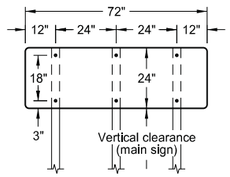
108" x 48" SIGN



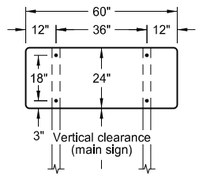
96" x 48" SIGN



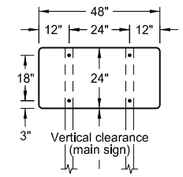
72" x 36" SIGN



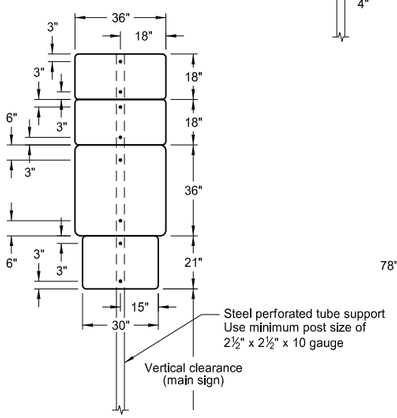
72" x 24" SIGN



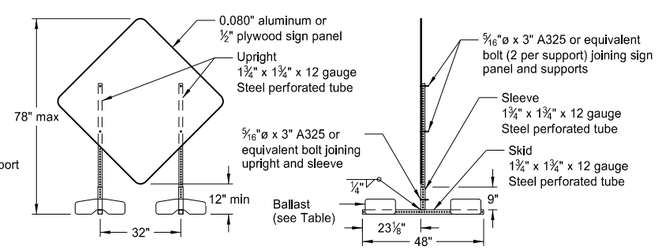
60" x 24" SIGN



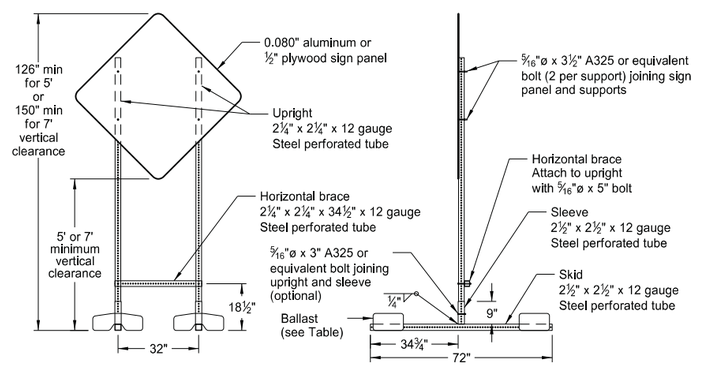
48" x 24" SIGN



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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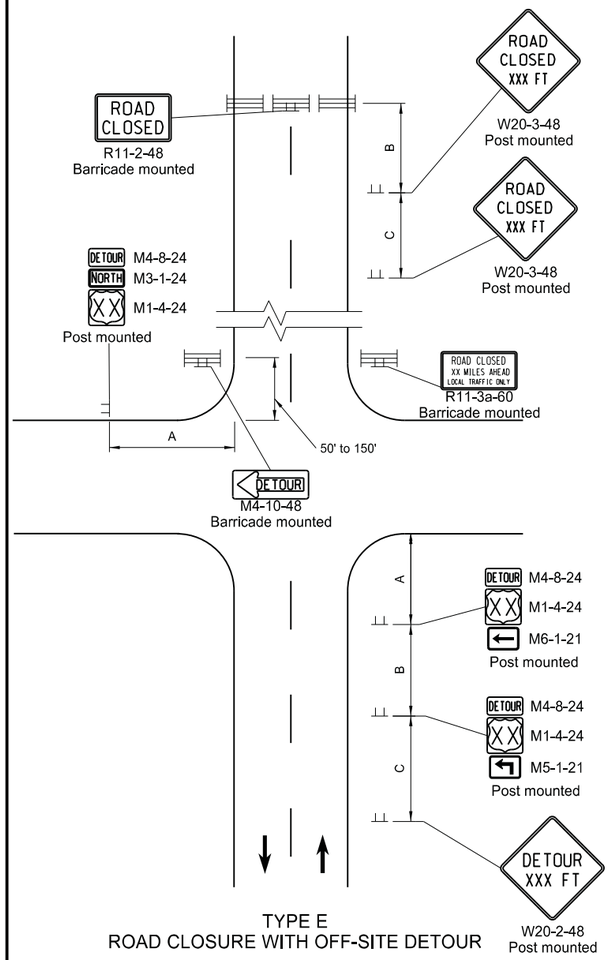
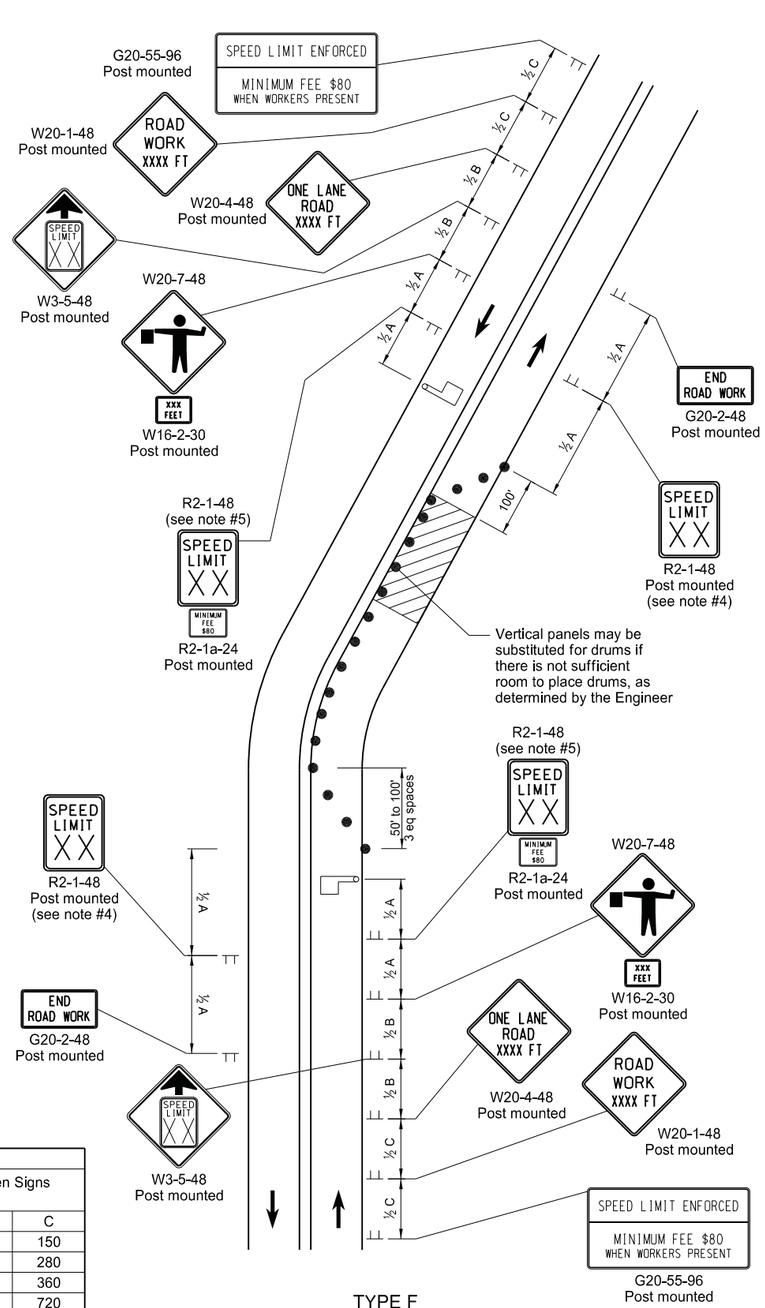
ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Used where a road is closed beyond a detour point. Signing shown for one direction only. Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

Two lane highway with one lane closed. Flagger is at a point where it is visible to approaching traffic.

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 40mph)	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

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 the roadway shall be placed on skid mounted assemblies.
3. Delineator drums used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at 2 times dimension "S".
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. 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 1/2 B.
6. 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.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. Where necessary, safe speed to be determined by the Engineer.
9. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
10. G20-55-96 or R2-1a-24 sign are not required when a pilot car operation is used, if this standard is part of other traffic control layouts, or the work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
    a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
    b. A "Do Not Stop on Tracks" sign (R8-8-24) should be placed near the cross buck in each direction while the lane closure is in the vicinity of the tracks.
    c. A buffer space between the work zone and the lane closure transition should be extended upstream of the highway-rail grade crossing so a queue created by the flagging operation will not extend across the highway-rail grade crossing.
    d. If the queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.

KEY

- Delineator Drum
- Type III Barricade
- Flagger
- Sign
- Work/Hazard Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT"

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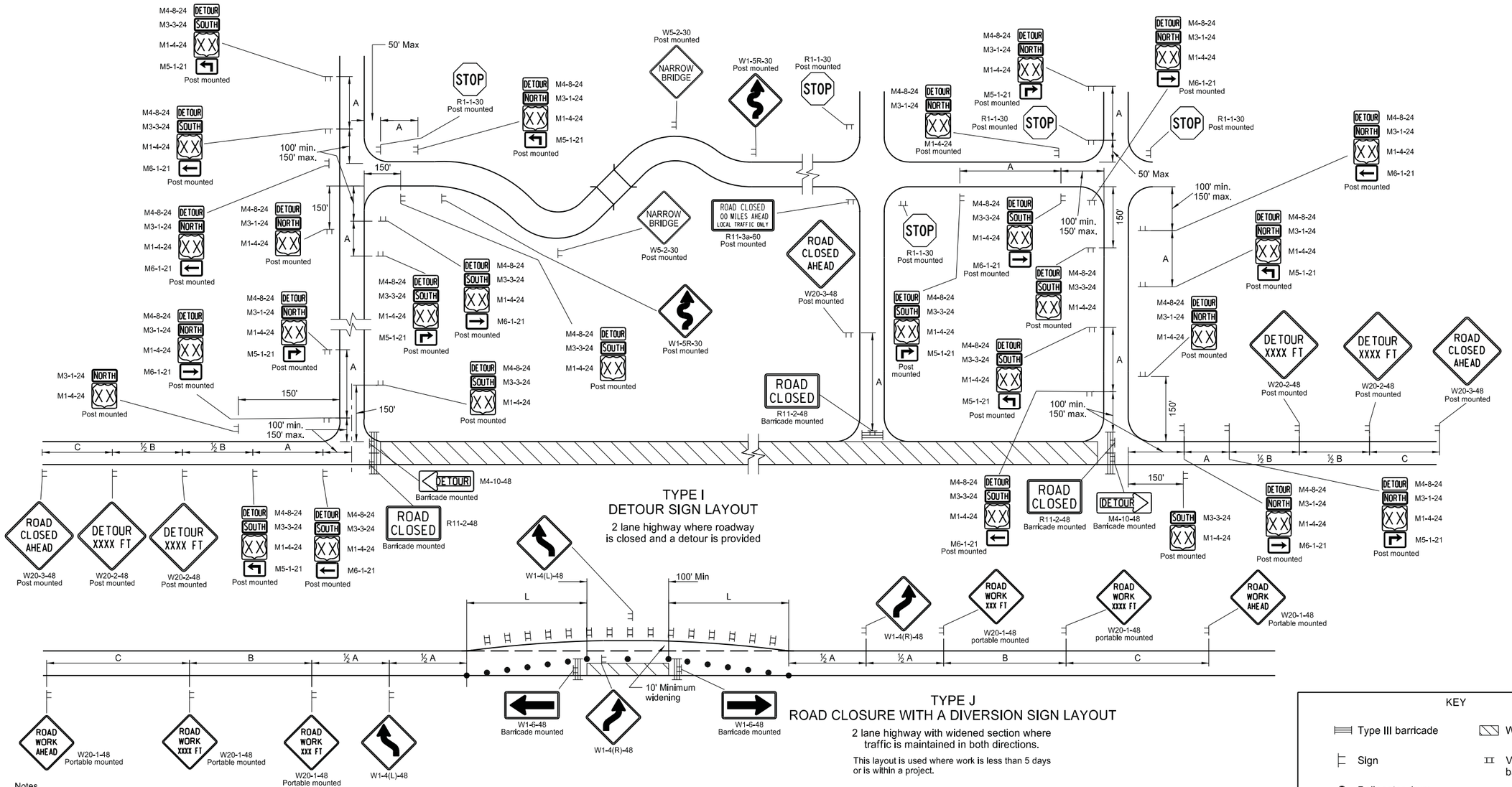
DETOUR AND ROADWAY DIVERSION SIGN LAYOUTS

D-704-21



TYPE I
DETOUR SIGN LAYOUT

2 lane highway where roadway is closed and a detour is provided

TYPE J
ROAD CLOSURE WITH A DIVERSION SIGN LAYOUT

2 lane highway with widened section where traffic is maintained in both directions.

This layout is used where work is less than 5 days or is within a project.

KEY

- Type III barricade
- Work area
- Sign
- Vertical panels back to back
- Delineator drum

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 and vertical panels used for tapering traffic shall be spaced at dimension "S". Delineator drums, tubular markers and vertical panels used for tangents shall be spaced at 2 times "S".
4. 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 shall be placed at ½ B.
5. 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.
6. Existing speed limit signs within a reduced speed zone shall be covered.
7. Obliterated or covered payment marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
9. A W24-1-48 sign may be used in place of the double reverse curve signs if the tangent between tapers is less than 600'.

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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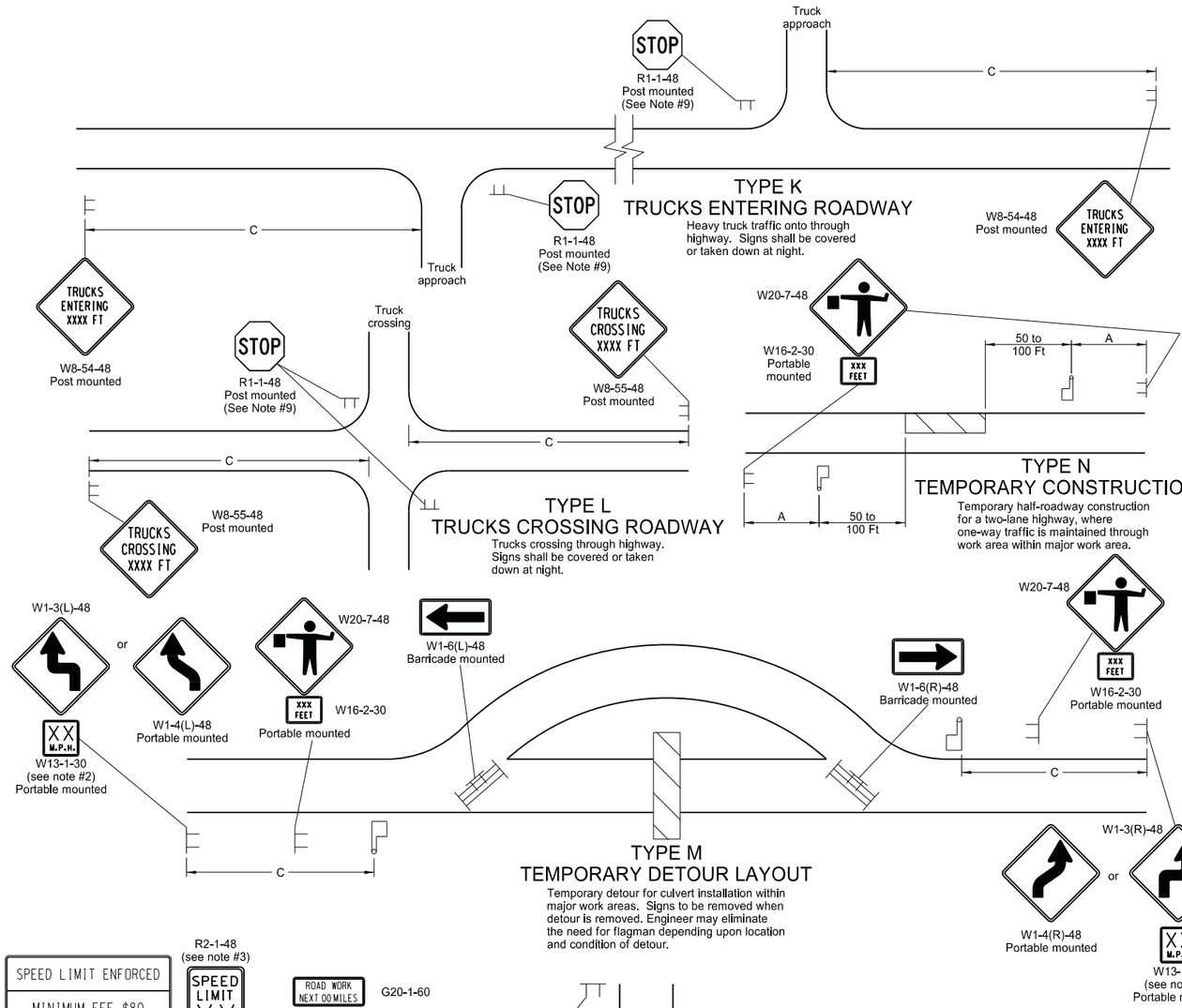
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. 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.
4. 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.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

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 40mph)	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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

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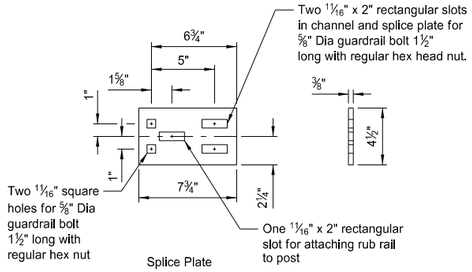
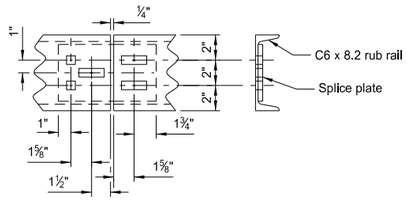
W-BEAM GUARDRAIL GENERAL DETAILS

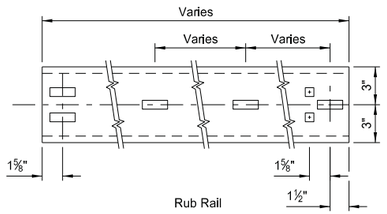
D-764-1



Splice Plate

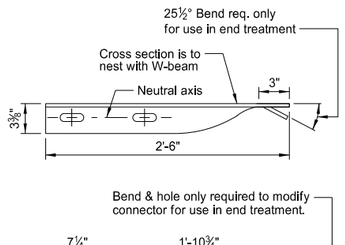


Splice Detail

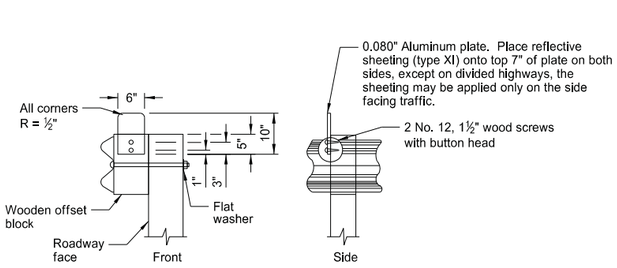


Rub Rail

C6x8 RUB RAIL AND SPLICE PLATE

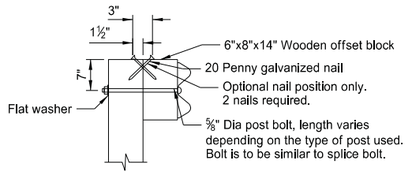


W BEAM TERMINAL CONNECTOR

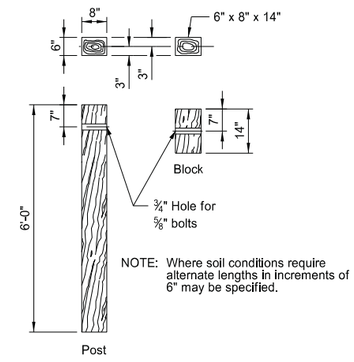


REFLECTORIZED PLATE DETAIL

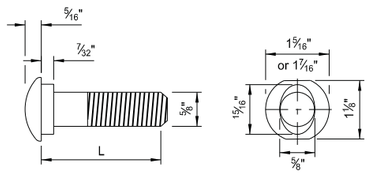
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



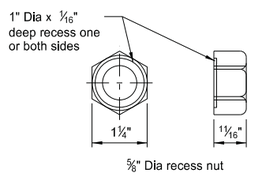
TYPICAL POST ATTACHMENT DETAIL



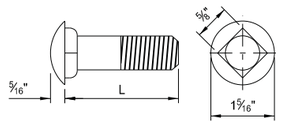
6"x8" TIMBER POST & BLOCK



5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length

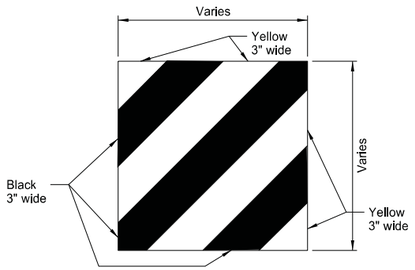


5/8" GUARDRAIL BOLT & RECESS NUT

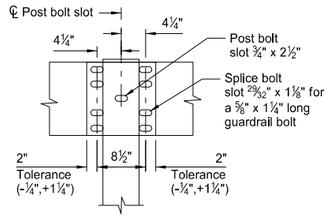


5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

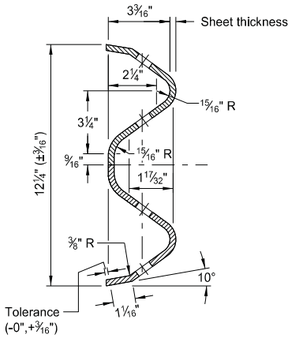
5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



SPLICE DETAIL



W-BEAM CROSS SECTION

NOTES:

1. Reflectorized plates: Reflector plates shall begin at the first post and be spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. The reflector shall be the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Manner of replacing bituminous material at guardrail post: All excess earth from excavations for guard posts shall be disposed of as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. The Object Marker shall fit within the vertical edges of the Impact Plate. The retroreflective sheeting shall be type XI sheeting meeting the requirements of Section 894.02.B of the standard specifications. The sheeting shall be applied to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. The Object Marker shall attach to the Impact Head Plate with rivets or some other attachment device. The rivets or attachment device shall be non-rust. The stripes shall slope downward toward the roadway side.
4. Guardrail installation height tolerance = - 1/4" , + 1".

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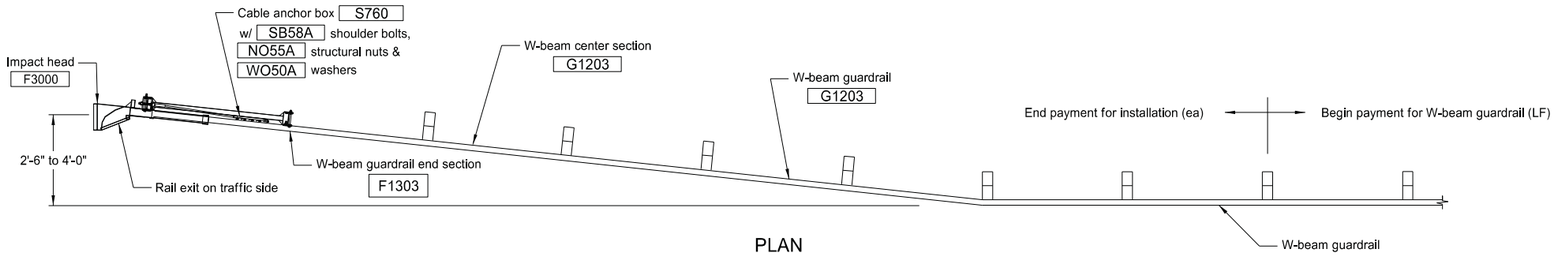
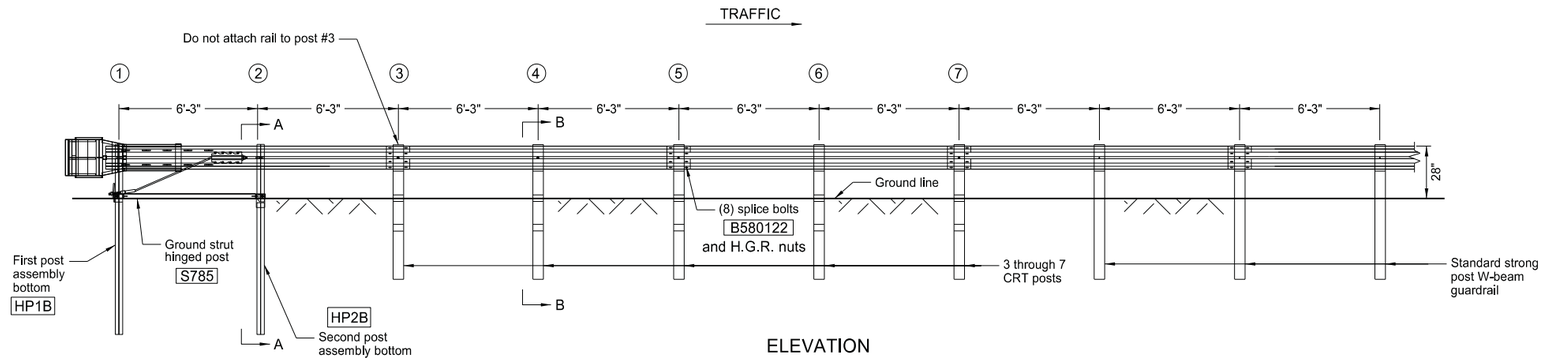
FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

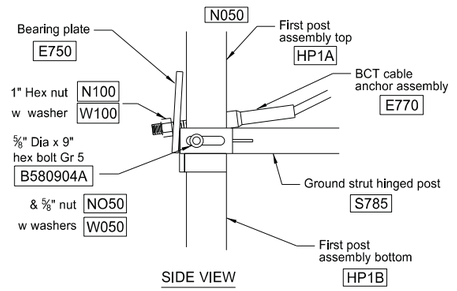


ELEVATION

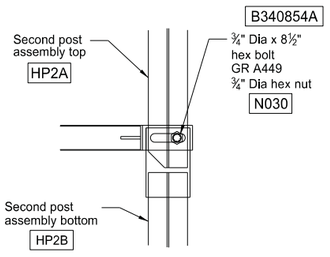
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT OR RECYCLED EQUIVALENT
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
		HARDWARE (ALL DIMENSIONS IN INCHES)
B140404	2	¼ Dia x 4 HEX BOLT
WO14	4	¼ WASHER
N014	2	¼ HEX NUT
B580122	17	⅝ Dia x 1¼ SPLICE BOLT
B581802	4	⅝ Dia x 10 H.G.R. BOLT (POSTS 3 THRU 6)
B580904A	1	⅝ Dia x 9 HEX BOLT GR 5
W050	5	⅝ WASHER
N050	22	⅝ Dia H.G.R. NUT
B340854A	1	¾ Dia x 8½ HEX BOLT GR A449
NO30	1	¾ Dia HEX NUT
N100	2	1 ANCHOR CABLE HEX NUT
W100	2	1 ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	½ A325 STRUCTURAL NUT
W050A	16	1 1/16 OD x 9/16 ID A325 STR. WASHER

GENERAL NOTES

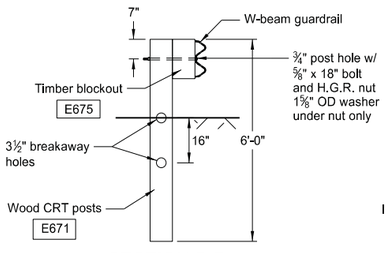
1. Wood posts are required with the Flared Energy Absorbing Terminal except posts #1 and #2.
2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
3. The lower sections of the posts shall not protrude more than 4 inches above the ground (measured along a 60 inch cord). Site grading may be necessary to meet this requirement.
4. Lower post sections shall not be driven with the upper post attached. If the the post is placed in a drilled hole, the backfill material must be satisfactory compacted to prevent settlement.
5. When rock is encountered during excavation, a 12" diameter post hole 20" deep may be used if approved by the Engineer. Granular material will be placed in the bottom of the hole approximately 2½" deep to provide drainage. The soil tubes shall be field cut to length, placed in the hole and back filled with adequately compacted material excavated from the hole.
6. The breakaway cable assembly shall be taut. A locking device (vice grips or channel lock pliers) should be used to prevent cable from twisting when tightening nuts.
7. The wood blockouts shall be "toe nailed" to the rectangular wood posts to prevent them from turning when wood shrinks. The nail shall be 20 penny and galvanized.
8. The Flared Energy Absorbing Terminal shall be flared only when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, the Flared Energy Absorbing Terminal shall have only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, the Flared Energy Absorbing Terminal shall be turned parallel to the roadway.



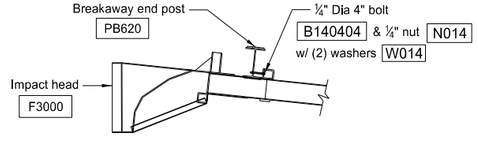
SIDE VIEW



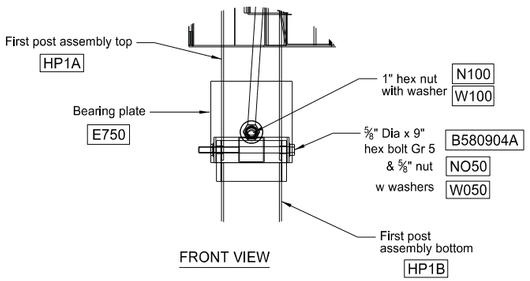
SIDE VIEW DETAIL OF POST #2



SECTION B-B
POST 3 THRU 7

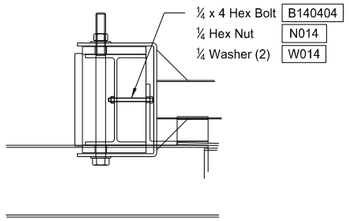


IMPACT HEAD CONNECTING DETAIL

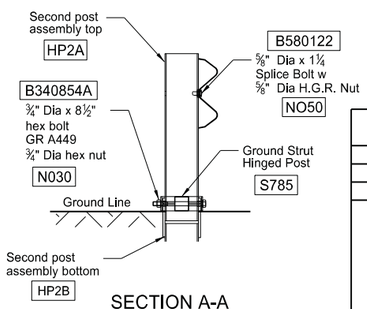


FRONT VIEW

POST #1 CONNECTION DETAILS



IMPACT HEAD CONNECTION DETAIL



SECTION A-A
at Post #2

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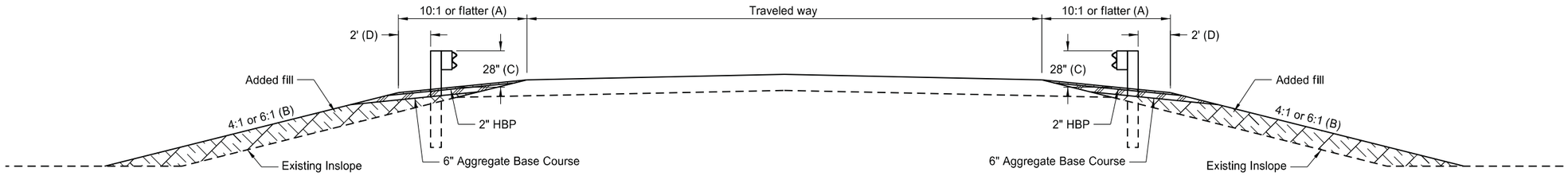
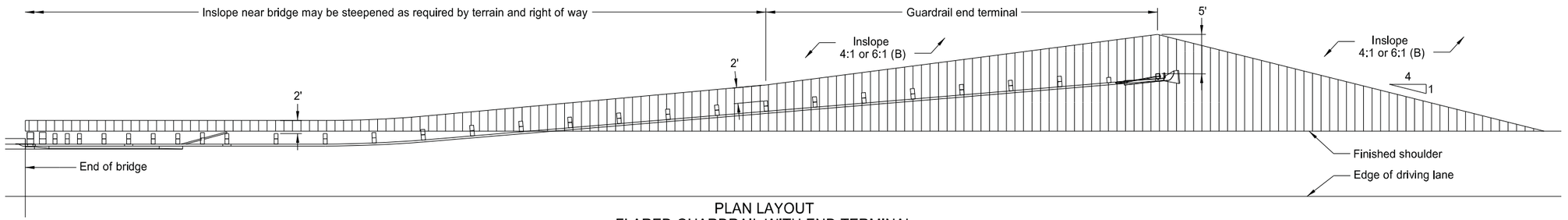
D-764-22

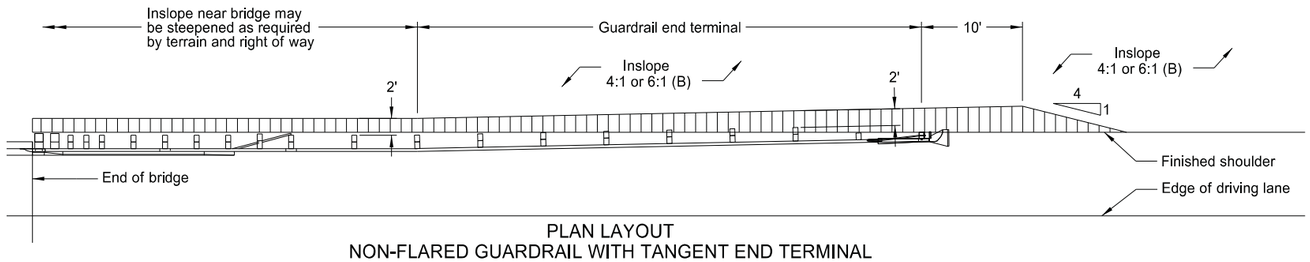
TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL



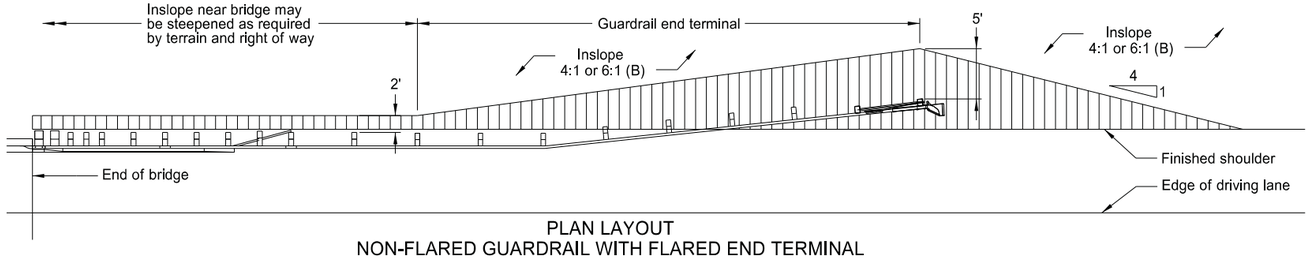
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Slope flatter than 10:1 may be required to provide proper guardrail height.

(B) Where normal inslope is 4:1 the added fill shall be 4:1. Where normal inslope is 6:1 the added fill shall be 6:1.

(C) Measured from top of guardrail to top of surfacing at front face of guardrail.

(D) Dimension at end terminals may vary per Plan Layouts shown on this sheet.

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