

DESIGN DATA				
Traffic	Average Daily			
Current 2020	Pass: 6,065	Trucks: 550	Total: 6,615	
Forecast 2040	Pass: 7,830	Trucks: 740	Total: 8,575	
Clear Zone Distance: 32 ft		Design Speed: 70 MPH		
Minimum Sight Dist. for Stopping: 730 ft		Bridges: N/A		
Sight Dist. for No Passing Zone: 1,200 ft				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 532,112				

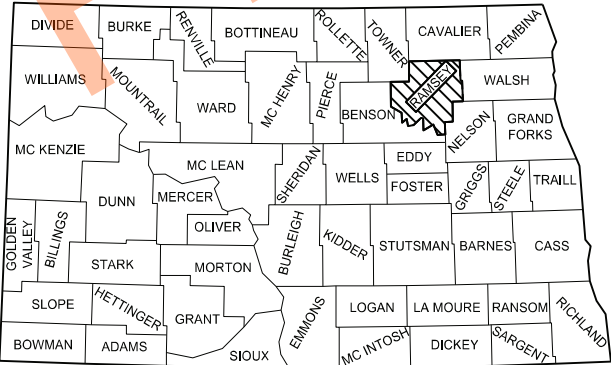
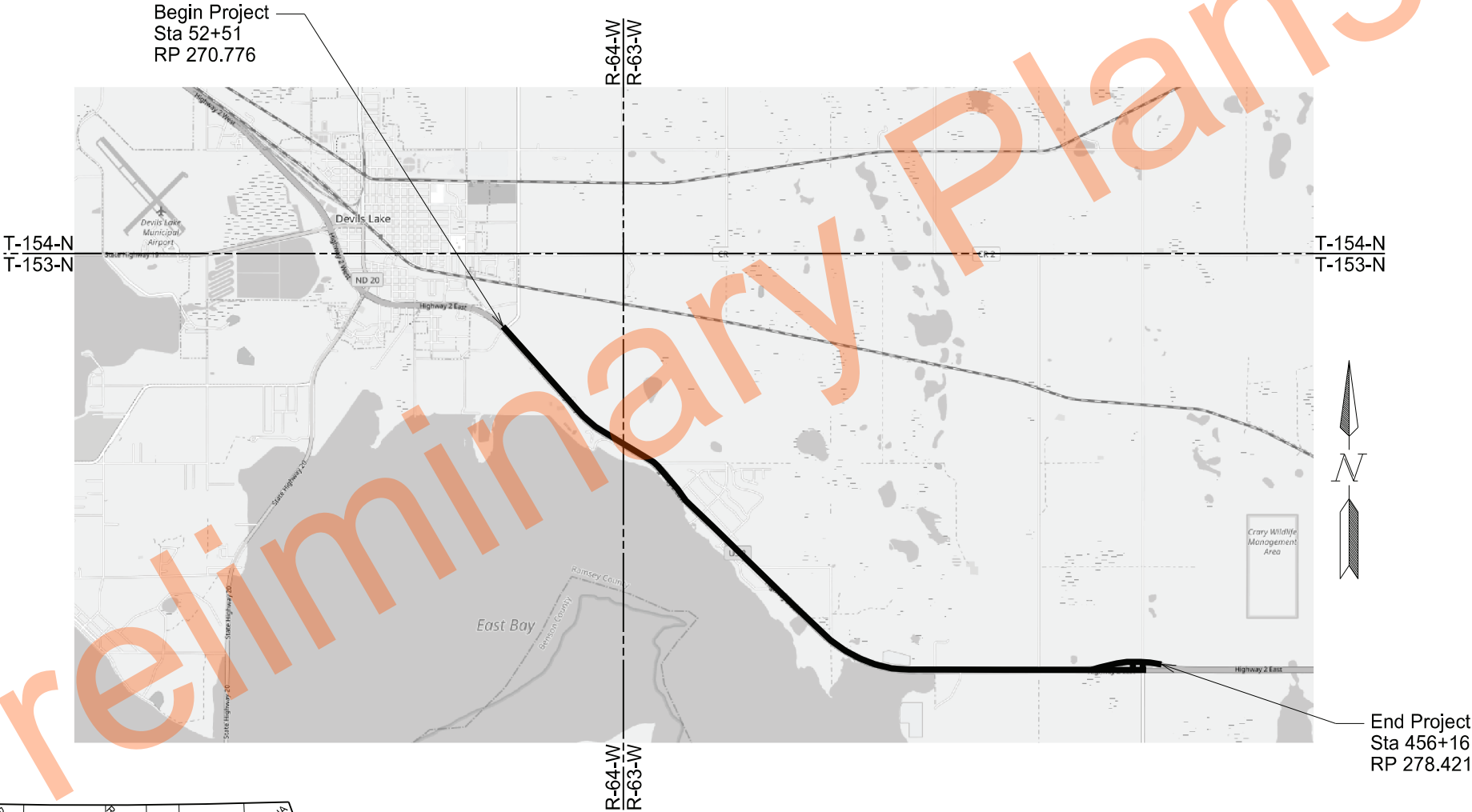
JOB # 23110
NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

NH-3-002(173)270
Ramsey County
Devils Lake 4 Lane to Heftl Rest Area - EB & WB
City of Devils Lake
Mill and Overlay 2" Max
Destination Lighting

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-002(173)270	7.66	7.66



STATE COUNTY MAP

DESIGNER Kyle Wieler
DESIGNER Luis Blanco
DESIGNER Julian Yap

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Kirk Hoff
12/28/23

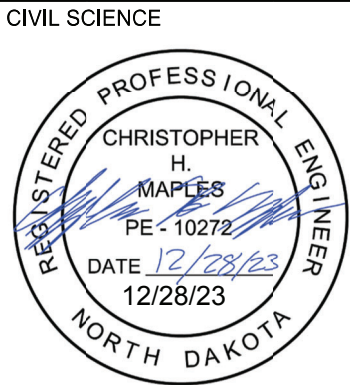
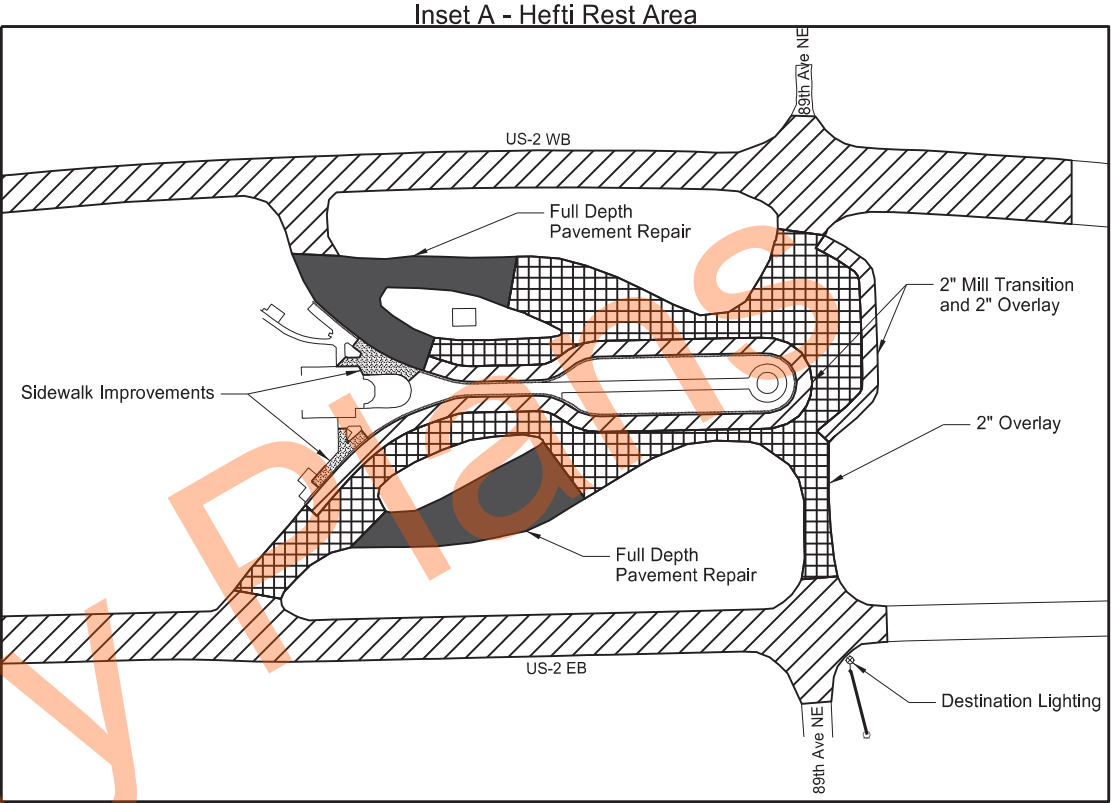
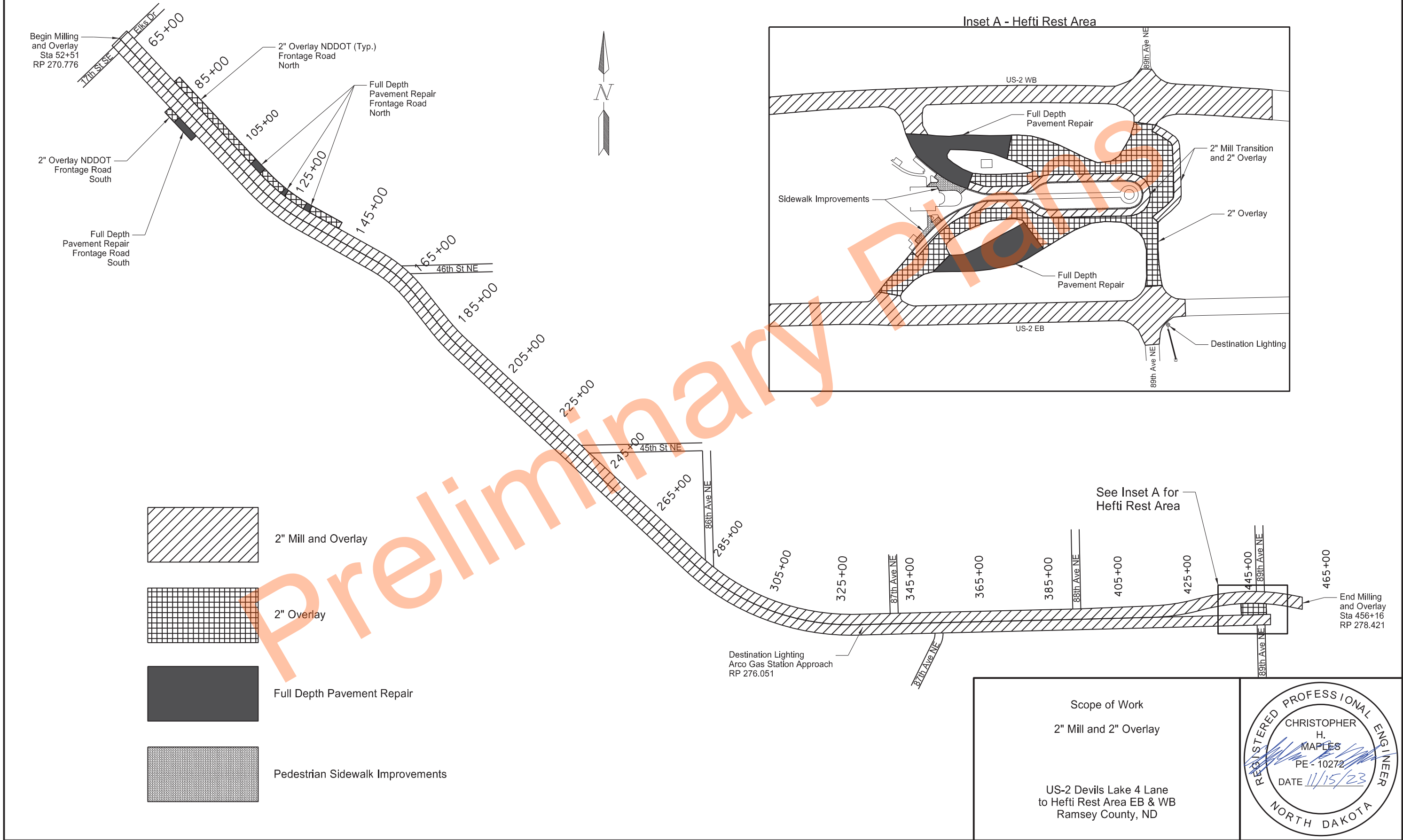


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20	1 - 5	General Details	D-704-9	Construction Sign Details - Terminal And Guide Signs					
30	1 - 8	Typical Sections	D-704-10	Construction Sign Details - Regulatory Signs					
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			D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips					
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			D-750-3	Curb Ramp Retrofit Details					
			D-750-4	Curb Ramp Retrofit Transitional Area Details					
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			D-762-1	Pavement Marking Message Details					
			D-762-4	Pavement Marking					
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Number	Description								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
SSP 4	Longitudinal Joint Density								
SP 252(23)	Flexible Pavement Surface Tolerance								
SP 253(23)	E-Ticketing Mandatory								
SP 309(23)	Utility Coordination								

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Scope of Work

2" Mill and 2" Overlay

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

REGISTERED PROFESSIONAL ENGINEER

CHRISTOPHER H. MAPLES

PE - 10272

DATE 11/15/23

NORTH DAKOTA

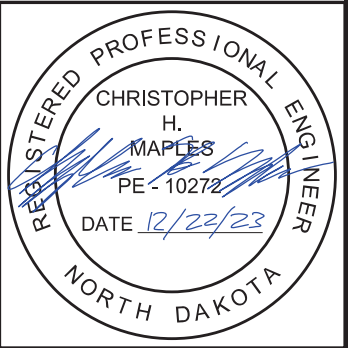
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NOTES

GENERAL NOTES

- 105-P01 UTILITIES: No utility relocations or adjustments are planned. Protect all utilities on the project in existing location.
- 107-P01 EQUIPMENT HEIGHT: Limit height of equipment to 16 feet if notification is not filed to the Federal Aviation Administration.
- 411-P01 TEMPORARY ASPHALT WEDGES: Place temporary asphalt or milled material wedges at the milled taper locations to allow for a smooth passage of vehicles. Include the cost for labor, materials, and equipment to install, maintain and remove the wedges shall be included in the contract unit price for "MILLING PAVEMENT SURFACE – 2 INCH."
- 430-P01 LEVELING COURSE: In the Hefti Rest Area parking lot place a leveling course in advance of the pavement overlay. The leveling course should be used to correct rutting in the parking lot. Apply a tack coat to the surface prior to placing the leveling course. Use the same type of mix that is required for the subsequent lift. Use a pneumatic roller as specified in Section 151.01 C. "Self-Propelled Pneumatic-Tired Roller" to compact the mix. The material and tonnage will be obtained from the Hefti Rest Area tonnage. All equipment, materials, and labor required for the leveling course will be included in the contract unit price for "RAP - SUPERPAVE FAA 45", "PG 58H-34 ASPHALT CEMENT" and "TACK COAT."
- 430-P02 RAP – SUPERPAVE FAA 45: Recycled asphalt pavement mix to include between 10 and 15 percent of the mix, by weight.
- 430-P03 FULL DEPTH PAVEMENT REPAIR: Remove existing material 12" below existing base and replace with HMA Surfacing and Aggregate Base Course CL 5 over Geosynthetic Material Type R1. Include all costs for removals in the contract unit price for "REMOVE AGGREGATE BASE & SURFACING."
- When performing full depth pavement repair adjacent to valley gutter, surface will be 2" below the valley gutter to accommodate the 2" overlay.
- Include all costs for surfacing in the contract unit price for "AGGREGATE BASE COURSE CL 5", "GEOSYNTHETIC MATERIAL TYPE R1, "TACK COAT" and "RAP – SUPERPAVE FAA 45."

- 704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.
- 704-P01 TRAFFIC CONTROL PHASING: Temporary traffic control details were developed on the basis that this project will be constructed in phases.
- For each phase, maintain full length one lane closure on both eastbound and westbound US-2 simultaneously.
- Maintain full closure of frontage roads during full depth pavement repair while keeping at least one access to all businesses and residences.
- For the Hefti Rest Area keep at least one half of the parking lot open at all times. Maintain at least one access from both eastbound and westbound US-2. Maintain at least one ADA compatible access to the rest area building at all times.
- 704-P02 TRAFFIC CONTROL DEVICES: Traffic control devices quantities are based on a full-length single lane closure and the following layouts on the Standard Drawings. Traffic control devices are also included to close two frontage road accesses simultaneously. The Department will pay for all necessary deployed devices, regardless of the number and length of the lane closures.
- STANDARD DRAWING LIST:
- D-704-31: For pavement overlay on frontage roads.
 - D-704-34: For full length one lane closure on US-2 EB and WB.
- 750-P01 SIDEWALK CONCRETE 4IN: Includes all costs for labor, equipment, and materials required to construct pedestrian curb ramps as shown in Section 80. Includes all cost for materials, equipment and labor for removal of concrete sidewalk and aggregate base, incidental excavation, embankment and landscape restoration to match existing landscaping adjacent to pedestrian curb ramps. Include costs in the contract unit price for "SIDEWALK CONCRETE 4IN."
- Care should be taken while removing existing handicap accessible signs and supports. If a support is damaged, the Contractor must replace it. Include costs to remove and reset handicap accessible signs in the contract unit price for "SIDEWALK CONCRETE 4IN."
- 762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.



NOTES

770-P01 DESTINATION LIGHT LUMINAIRE: Provide the luminaires that meet the following:

Light Source	LED
Light Color (correlated color temperature)	4000K CCT
Color Accuracy (color rendering index)	70 CRI (minimum)
Optical Distribution	Type III
Light Output (minimum permitted)	7500 Lumens
Wattage (maximum permitted)	80
BUG rating (maximum permitted)	B2-U2-G2
Operating Temperature Range	-40°C to +40°C
Luminaire Housing	Die Cast Iron
Vibration Testing	ANSI/NEMA C136.31 Level 2, 3G
Surge Suppression Rating	ANSI/IEEE C62.41 Category C
Outdoor rating for housing, wiring, and drivers	IP66 and listed by a NRTL
Input Driver Voltage	Multi-volt, 120-277V, operating at 240V
Lumen Maintenance TM-21 (50,000 hours, 25°C)	>90%
Photo Control on each luminaire	No
Tool-less Access	Yes
Bubble Level	Yes
Finish	Standard Gray, Powder-Coated
House Side Shield	No
Drop Refractor for Traffic Indication of Intersection	Yes

Provide one of the luminaires listed or an approved equal:

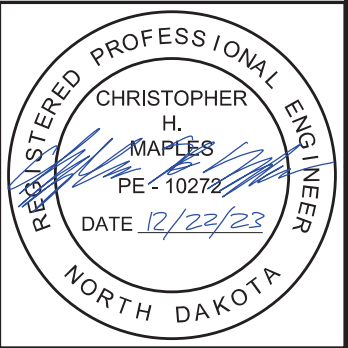
Company	Catalog Number
American Electric	ATBS-P10-MVOLT-D2
General Electric	Evolve E2SB-0-B1-B3-1-40

Provide photo control at the feed point.

Ensure the Effective Projected Area of the luminaire does not exceed the capacity of the light standard.

Include all cost associated with the destination light LED luminaire in the bid price for “Destination Lighting” and “Destination Lighting (Two or More Poles).”

770-P02 LIGHTING CONDUIT: Conduit between Feed Point FP 1 and Light Standard L1 – B must be bored. Include all costs associated with this work in the bid price for “Destination Lighting (Two or More Poles).”



ENVIRONMENTAL NOTES

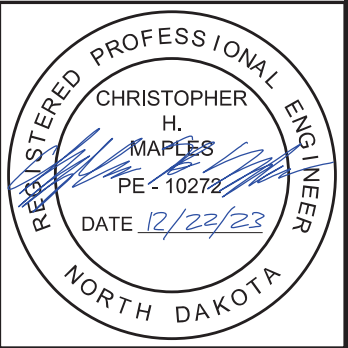
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ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-2 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

Preliminary Plans



Estimated Quantities

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SPEC	CODE	ITEM DESCRIPTION	UNIT	NH-3-002(173)270	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
109	1000	E-TICKETING	L SUM	1	1
202	0021	REMOVE AGGREGATE BASE & SURFACING	TON	5749	5749
302	0120	AGGREGATE BASE COURSE CL 5	TON	4010	4010
401	0050	TACK COAT	GAL	19535	19535
401	0060	PRIME COAT	GAL	1592	1592
411	0114	MILLING PAVEMENT SURFACE - 2 INCH	SY	332054	332054
430	0145	RAP - SUPERPAVE FAA 45	TON	43043	43043
430	1000	CORED SAMPLE	EA	328	328
430	5818	PG 58H-34 ASPHALT CEMENT	TON	2537	2537
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	750	750
704	1000	TRAFFIC CONTROL SIGNS	UNIT	6619	6619
704	1052	TYPE III BARRICADE	EA	129	129
704	1060	DELINEATOR DRUMS	EA	477	477
704	1067	TUBULAR MARKERS	EA	584	584
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
706	0500	AGGREGATE LABORATORY	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	6370	6370
748	0140	CURB & GUTTER-TYPE I	LF	126	126
748	0520	CURB-TYPE I	LF	99	99
750	0115	SIDEWALK CONCRETE 4IN	SY	175	175
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	29.8	29.8
762	0103	PVMT MK PAINTED-MESSAGE	SF	1744	1744
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	3608	3608
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	346162	346162
762	0436	SHORT TERM 24IN LINE-TYPE NR	LF	162	162
762	0438	SHORT TERM 10IN LINE-TYPE NR	LF	12128	12128
762	0442	SHORT TERM MESSAGE-TYPE NR	SF	1744	1744
762	1104	PVMT MK PAINTED 4IN LINE	LF	1804	1804
762	1106	PVMT MK PAINTED 6IN LINE	LF	173081	173081
762	1110	PVMT MK PAINTED 10IN LINE	LF	12128	12128
762	1124	PVMT MK PAINTED 24IN LINE	LF	162	162
770	0007	DESTINATION LIGHTING	EA	1	1
770	0008	DESTINATION LIGHTING (TWO OR MORE POLES)	EA	1	1

BASIS OF ESTIMATE

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Surfacing												
US-2												
EB			WB			North Frontage Road		South Frontage Road		Hefti Rest Area*	Median Crossovers and Approaches**	Totals
Material	Unit	Width (ft)	Quantity Per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Quantity per Station	Quantity per Location	
Tack Coat @ 0.05 Gal/SY (1 st Lift)	Gal	32-36	21	32-36	20	22	15	28	16	110	9	18,899
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton	32-36	45	32-36	45	22	32	28	35	241	20	41,273
PG 58H-34 Asphalt Cement @ 5.8%	Ton	32-36	3	32-36	3	22	2	28	2	14	1	2,434

*25% additional is included in Tack Coat, Superpave, and Asphalt Cement estimates to account for Leveling Course in Hefti rest area.

**See Section 20 Sheet 1 for additional details.

Full Depth Pavement Repair*														
		South Frontage Road		North Frontage Road						Hefti Rest Area				Totals
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	
Material	Unit	80+99	88+21	104+83	108+73	117+46	118+78	125+71	127+64	441+44	443+48	441+90	444+03	
Remove Aggregate Base & Surfacing	Ton	1,949		954		489		457		982		918		5,749
Geosynthetic Material Type R1	SY	2,159		1,057		542		507		1,088		1,017		6,370
Aggregate Base Course CL 5	Ton	1,349		660		339		317		680		635		3,980
Prime Coat @ 0.25 Gal/SY (1 st Lift)	Gal	540		264		135		127		272		254		1,592
Tack Coat @ 0.05 Gal/SY (1 st Lift)	Gal	108		53		27		25		54		51		318
Tack Coat @ 0.05 Gal/SY (2 nd Lift)	Gal	108		53		27		25		54		51		318
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton	600		294		151		141		302		282		1,770
PG 58H-34 Asphalt Cement @ 5.8%	Ton	35		17		9		8		18		16		103

*Quantities account for reconstruction to the existing pavement elevation.
Overlay quantities are included in the surfacing table above.

Milling Pavement Surface					
Location	Start	End	(A)	(B)	(C)=(A x B)/9
			Milling Length (ft)	Milling Width (ft)	Total (SY)
US-2 (EB)	52+51	446+73	39,422	Varies 32-36	157,596
US-2 (WB)	52+51	456+12	40,361	Varies 32-36	159,739
Hefti Rest Area	441+51	446+70	Varies	14	1,691
Median Crossovers and Approaches*	52+51	456+12	Varies	Varies	13,028
Total					332,054

*See Section 20 Sheet 1 for additional details.

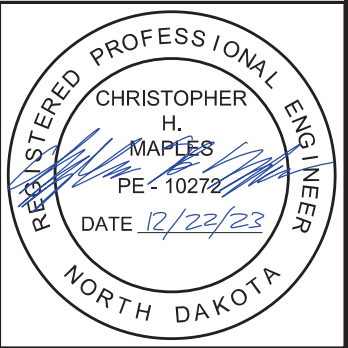
Rumble Strips - Asphalt Shoulder			
	From Station	To Station	Length (Mi)
US-2 EB Inside	58+54	446+73	7.4
US-2 EB Outside	58+54	446+73	7.4
US-2 WB Inside	59+65	456+09	7.5
US-2 WB Outside	60+19	456+15	7.5
Total			29.8

Removals

Bituminous Surfacing @ 2.00 Ton/CY
Concrete Surfacing @ 2.00 Ton/CY
Aggregate Base Course @ 1.875 Ton/CY

Temporary Pavement Marking		
Location – Type	# Applications	Quantity
Centerline – Short Term 6IN Line-Type NR	2	39,912 LF
Edge Lines – Short Term 6IN Line-Type NR	2	305,260 LF
Short Term 10IN Line-Type NR	1	12,128 LF
Short Term 24IN Line-Type NR	1	162 LF
Left and Right Turn Arrows	1	1,680 SF
Hefti Rest Area		
Parking – Short Term 4IN Line-Type NR	2	3,608 LF
Edge Lines – Short Term 6IN Line-Type NR	2	990 LF
Accessibility Parking Symbol	1	64 SF

Permanent Pavement Marking	
Location – Type	Quantity
Centerline – Pvmt Mk Painted 6IN Line	19,956 LF
Edge Lines – Pvmt Mk Painted 6IN Line	152,630 LF
Pvmt Mk Painted 10IN Line	12,128 LF
Pvmt Mk Painted 24IN Line	162 LF
Left and Right Turn Arrows	1,680 SF
Hefti Rest Area	
Parking – Pvmt Mk Painted 4IN Line	1,804 LF
Edge Lines – Pvmt Mk Painted 6IN Line	495 LF
Accessibility Parking Symbol	64 SF



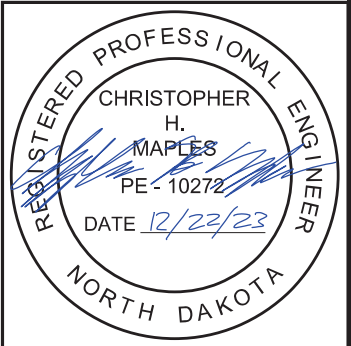
BASIS OF ESTIMATE

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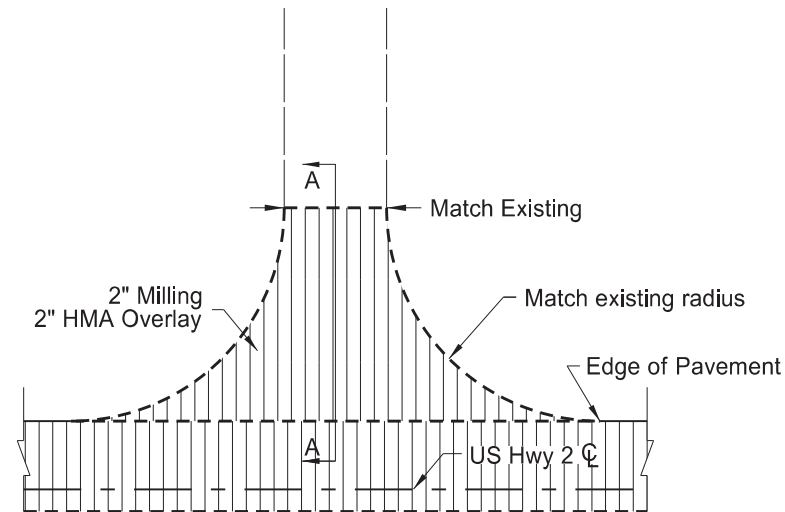
HMA Cored Samples							
Specification Section	A	B		C			
	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity	Quantity	Unit
					(A x B x C)	(1 per mile)	
Eastbound US-2							
430.04 I.2.b(1), "General"	39	2	N/A	1	78	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	39	N/A	1	1	39	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	7	EA
Subtotal					117	7	EA
Westbound US-2							
430.04 I.2.b(1), "General"	40	2	N/A	1	80	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	40	N/A	1	1	40	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	8	EA
Subtotal					120	8	EA
North Frontage Road							
430.04 I.2.b(1), "General"	7	2	N/A	1	14	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	7	N/A	1	1	7	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	1	EA
Subtotal					21	1	EA
South Frontage Road							
430.04 I.2.b(1), "General"	1	2	N/A	1	2	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	1	N/A	1	1	1	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	1	EA
Subtotal					3	1	EA
Hefti Rest Area							
430.04 I.2.b(1), "General"	N/A	N/A	N/A	N/A	7	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	N/A	N/A	N/A	N/A	6	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	0	EA
Subtotal					13	0	EA
Full Depth Pavement Repair (6 Locations)*							
430.04 I.2.b(1), "General"	6	2	N/A	2	24	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	6	N/A	1	2	12	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	1	EA
Subtotal					36	1	EA
Totals					310	18	EA
Total					328		EA

*Cored samples are to be taken for each lift at every location.

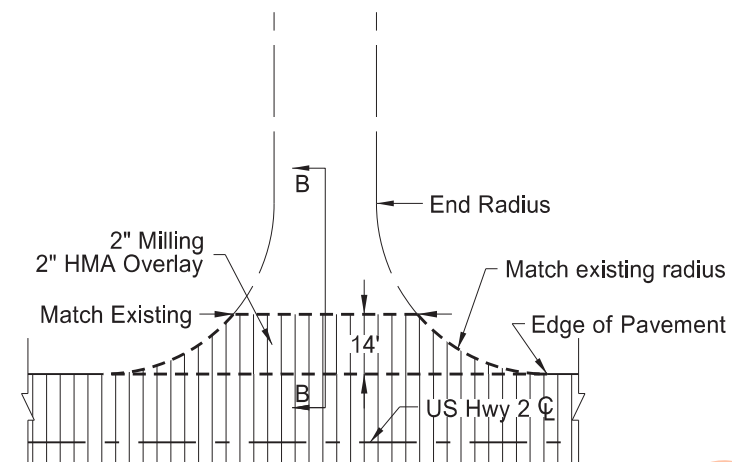
*Cored samples are to be taken for each lift at every location.



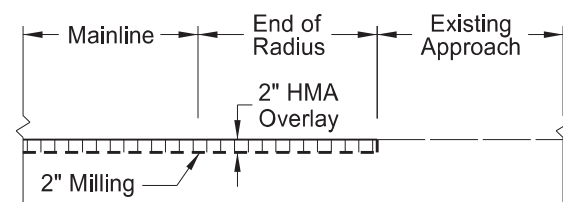
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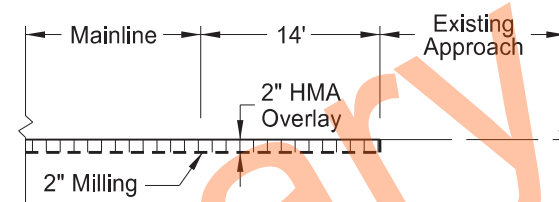
Section Line, County Road, Private Drive



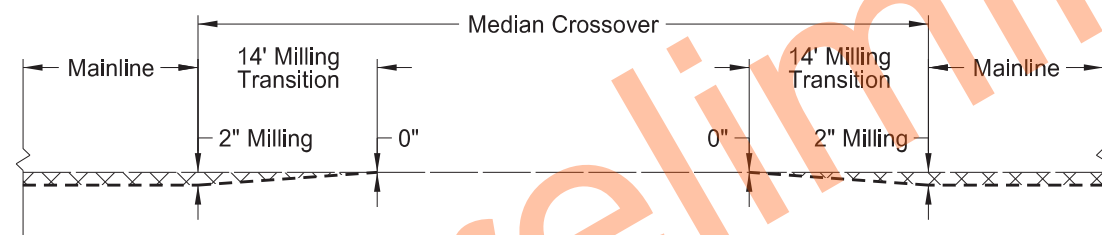
Field Drive Approach



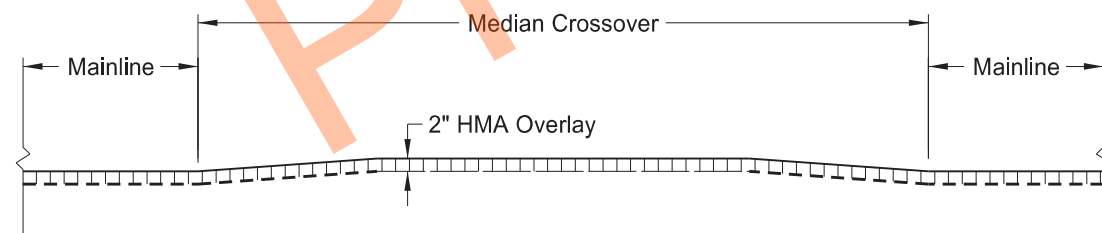
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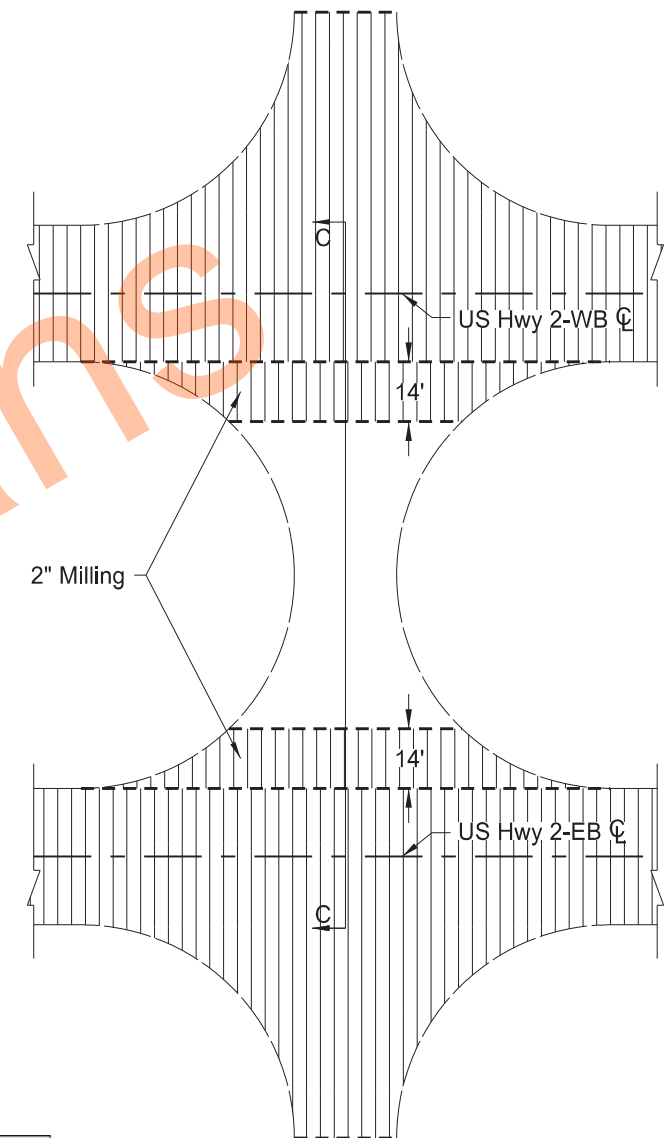
Section B-B
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Section C-C (Milling)
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Section C-C (Paving)
(not to scale)



Median Crossover Milling
(not to scale)

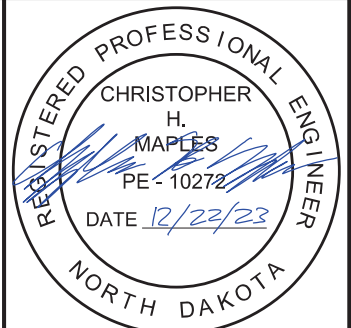
BASIS OF ESTIMATE		(1)	(2)	(3)	
ITEM	UNIT	Section Line, County Road, or Private Drive	Field Drive Approach	Median Crossover	TOTALS
Number of Locations	#	46	10	30	86
Milling Pavement Surface	SY	158	52	174	13028
Tack Coat @ 0.05 Gal/SY (1 st Lift)	Gal	8	3	12	779
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton	18	6	27	1700
PG 58H-34 Asphalt Cement @ 5.8%	Ton	1.0	0.3	1.6	99

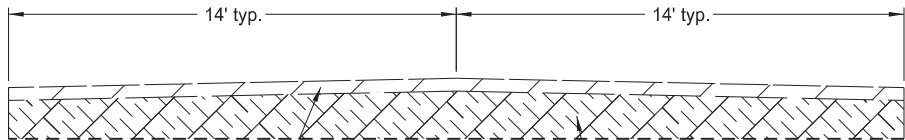
Notes:

- Quantity totals are included in the bid items shown in the "Basis of Estimate" section of the plans.

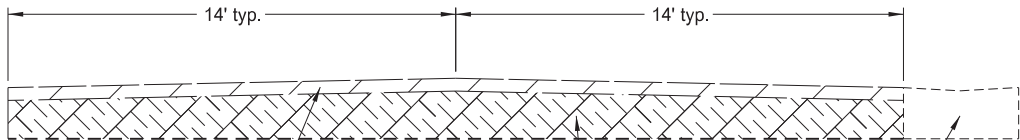
Milling Transitions
Rural Approaches

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

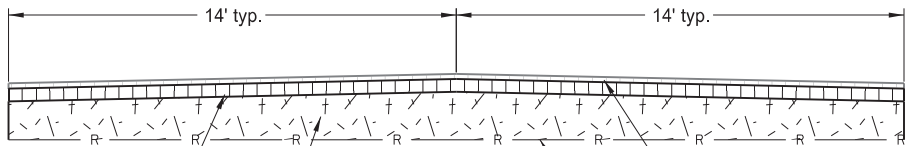




Removal Typical
Sta 80+99 to 82+69

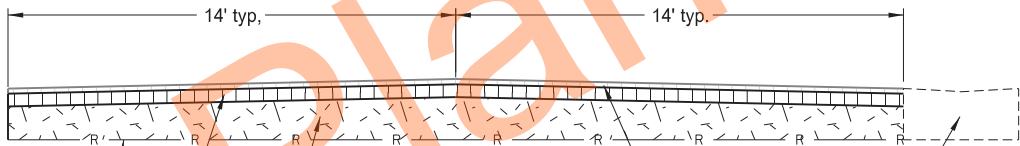


Removal Typical
Sta 82+69 to 88+21



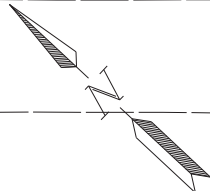
5" RAP - Superpave FAA 45
12" Aggregate Base Course CL 5
Type R-1 Fabric
2" RAP - Superpave FAA 45
(Included in Section 10 Overlay Quantities)

Proposed Typical
Sta 80+99 to 82+69



Type R-1 Fabric
5" RAP - Superpave FAA 45
12" Aggregate Base Course CL 5
Existing Valley Gutter
2" RAP - Superpave FAA 45
(Included in Section 10 Overlay Quantities)

Proposed Typical
Sta 82+69 to 88+21



US 2-EB

Frontage Road

Sta 80+99

Sta 82+69

Sta 88+21



Remove Existing Aggregate Base and Surfacing,
Install Type R-1 Fabric, Aggregate Base, and HMA.

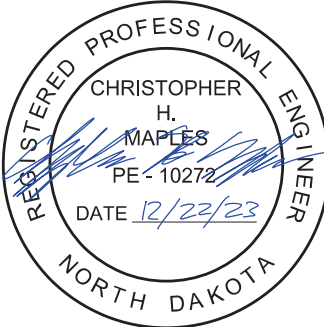
South Frontage Road				
Sta 80+99 to 88+21				
Material	Unit	Area (SF)	Depth (in)	Quantity
Remove Aggregate Base & Surfacing	Ton	19429	17	1949
Geosynthetic Material Type R1	SY		--	2159
Aggregate Base Course CL 5 @ 1.875 Ton/CY	Ton		12	1349
Prime Coat @ 0.25 Gal/SY (1 st Lift)	Gal		--	540
Tack Coat @ 0.05 Gal/SY (2 nd Lift)	Gal		--	108
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton	5	5	600
PG 58H-34 Asphalt Cement @ 5.8%	Ton			35

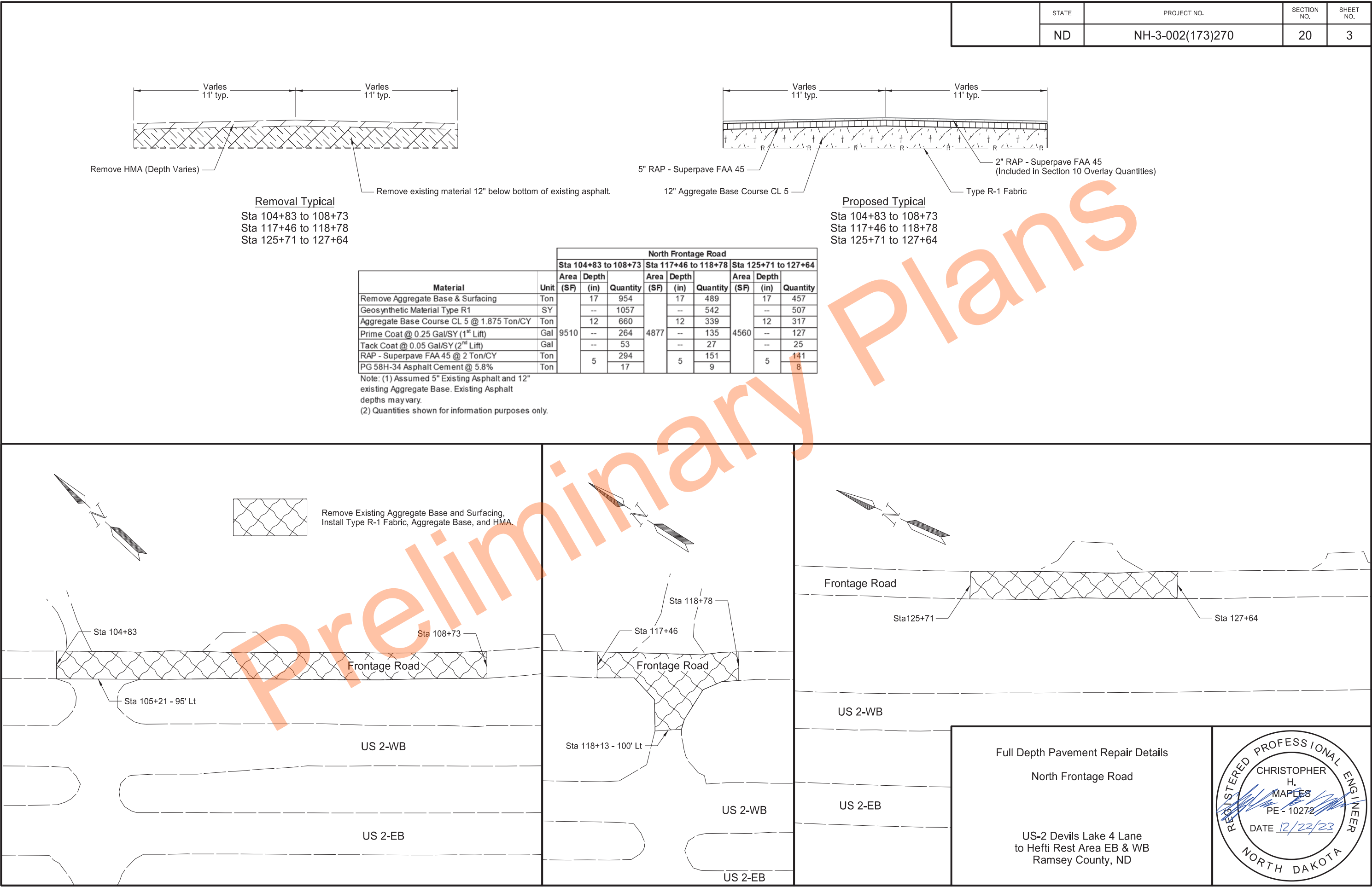
Note: (1) Assumed 5" Existing Asphalt and 12" existing Aggregate Base. Existing Asphalt depths may vary.
(2) Quantities shown for information purposes only.

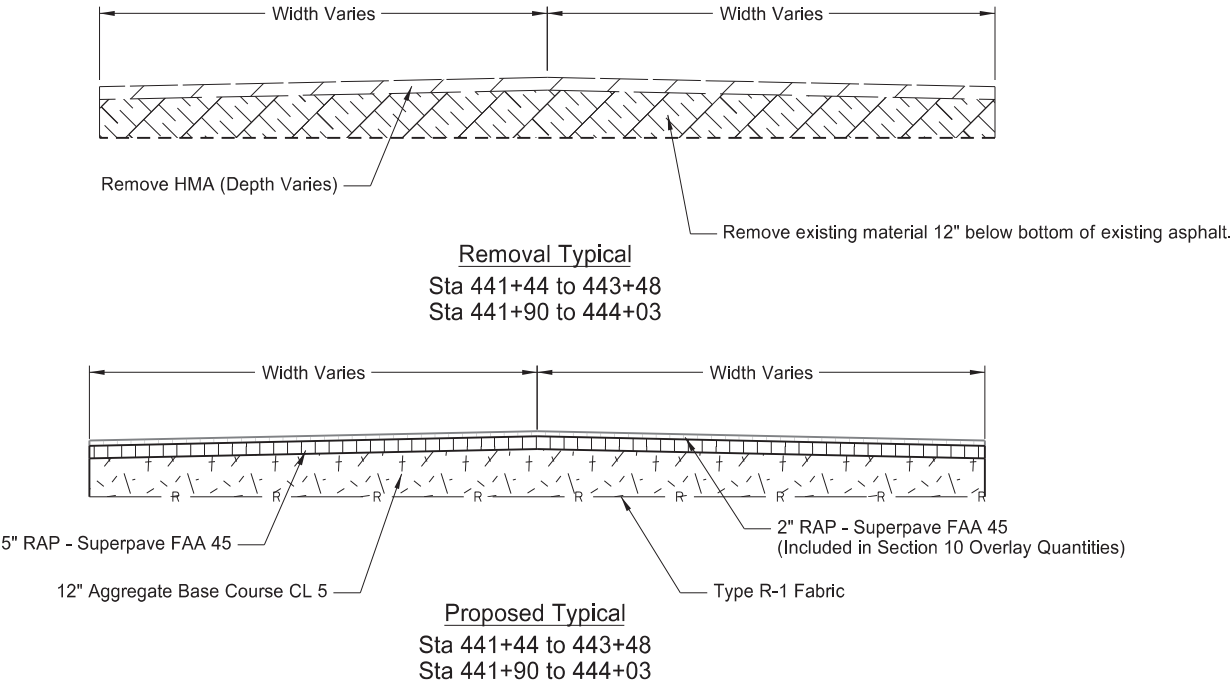
Full Depth Pavement Repair Details

South Frontage Road

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

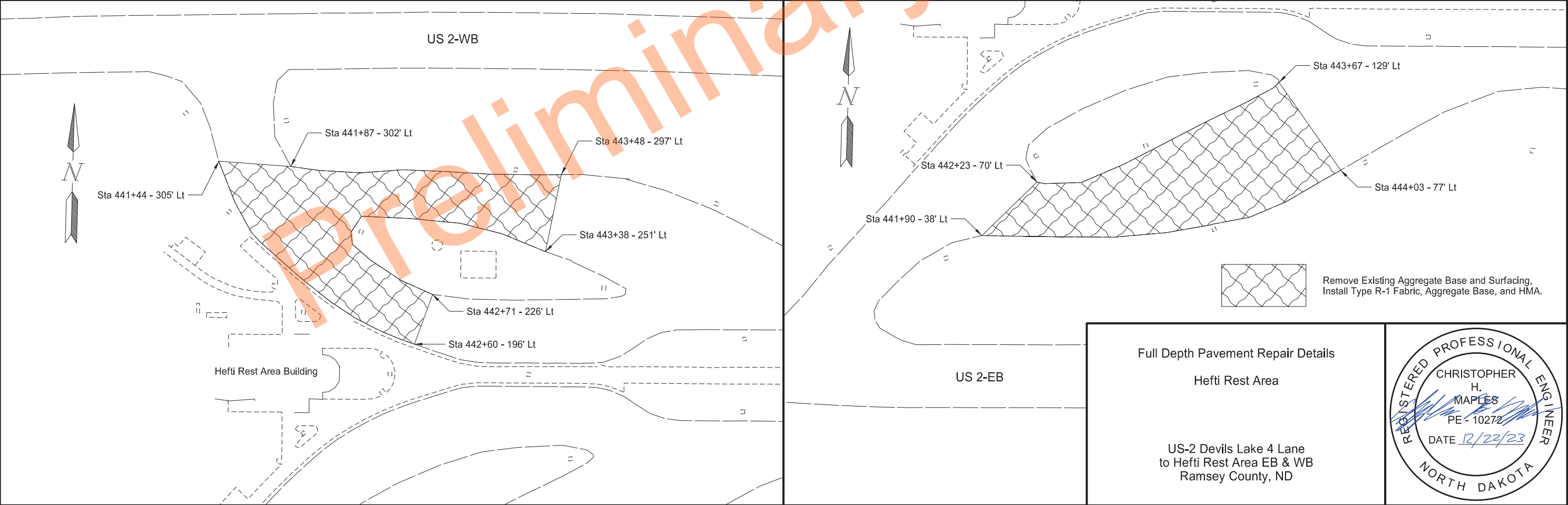




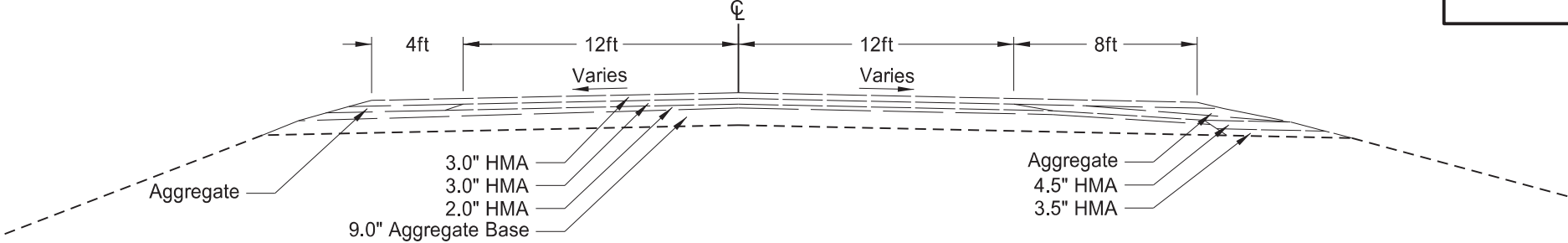


Hefti Rest Area						
Sta 441+44 to 443+48			Sta 441+90 to 444+03			
Material	Unit	Area (SF)	Depth (in)	Quantity	Area (SF)	Depth (in)
Remove Aggregate Base & Surfacing	Ton		17	982	17	918
Geosynthetic Material Type R1	SY	--	--	1088	--	1017
Aggregate Base Course CL 5 @ 1.875 Ton/CY	Ton		12	680	12	635
Prime Coat @ 0.25 Gal/SY (1 st Lift)	Gal	9788	--	272	9149	--
Tack Coat @ 0.05 Gal/SY (2 nd Lift)	Gal		--	54	--	51
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton		5	302	5	282
PG 58H-34 Asphalt Cement @ 5.8%	Ton		5	18	5	16

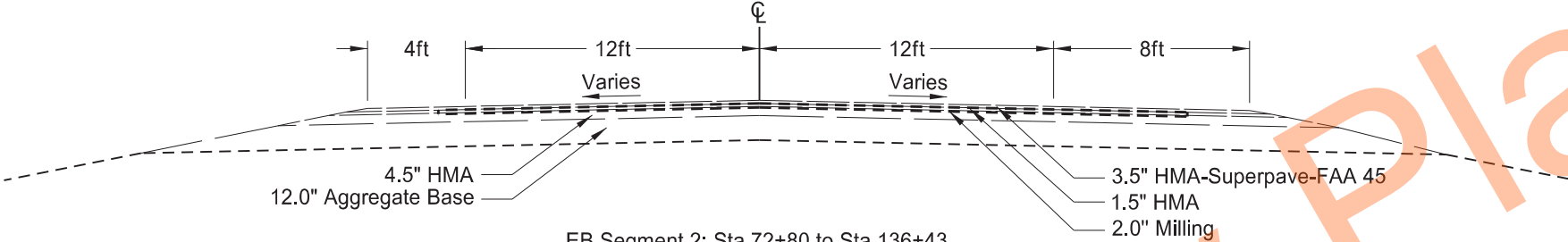
Note: (1) Assumed 5" Existing Asphalt and 12" existing Aggregate Base. Existing Asphalt depths may vary.
(2) Quantities shown for information purposes only.



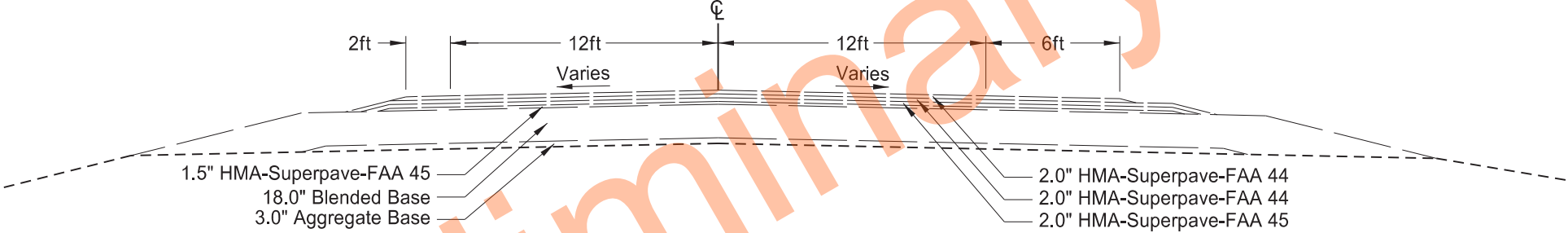
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	1



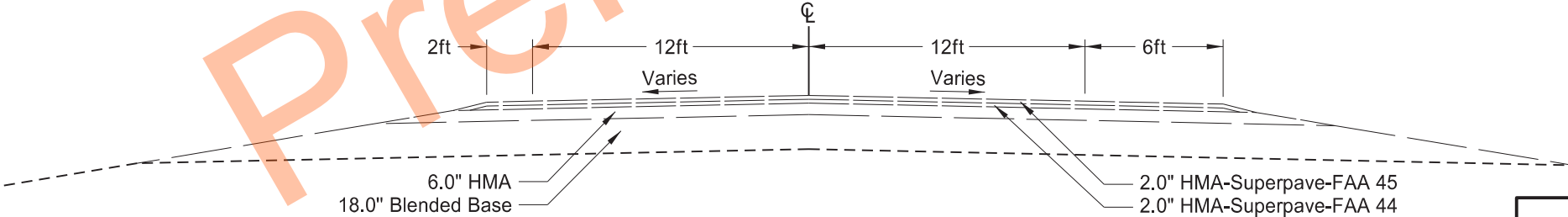
EB Segment 1: Sta 52+51 to Sta 72+80



EB Segment 2: Sta 72+80 to Sta 136+43



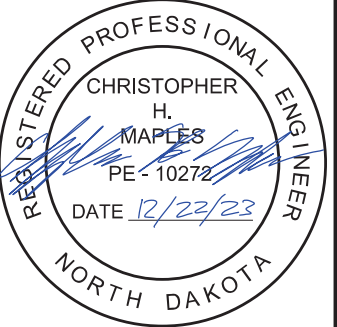
EB Segment 3: Sta 136+43 to Sta 250+79
EB Segment 5: Sta 338+81 to Sta 446+73



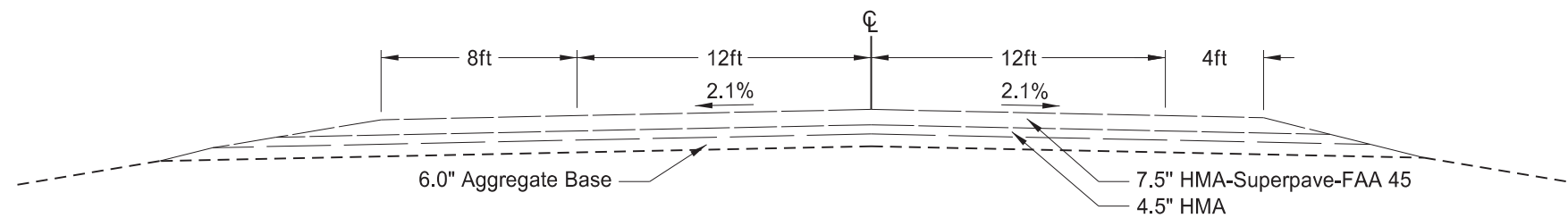
EB Segment 4: Sta 250+79 to Sta 338+81

Existing Typical Sections
Eastbound US-2

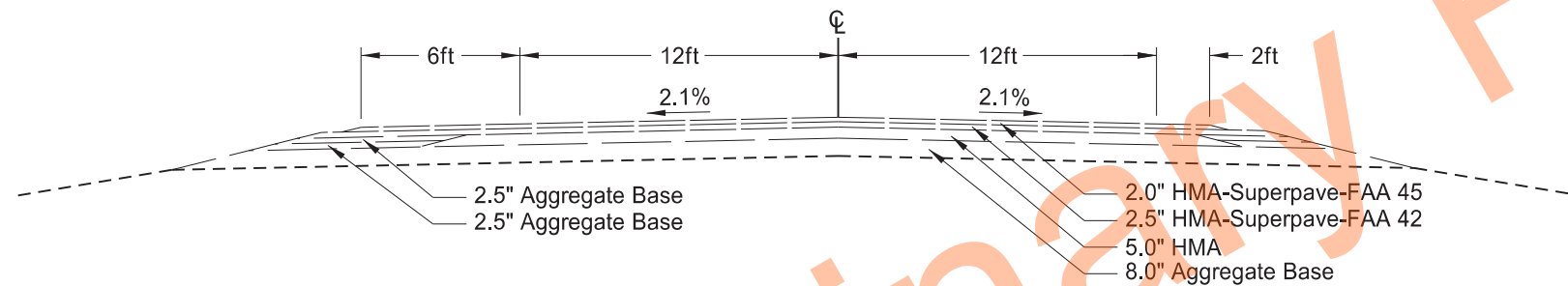
US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



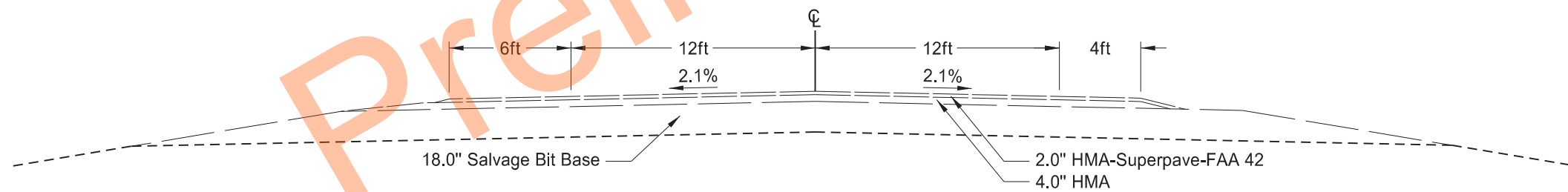
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	2



WB Segment 1: Sta 52+51 to Sta 119+02



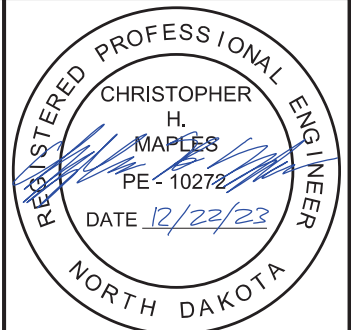
WB Segment 2: Sta 119+02 to Sta 277+39
WB Segment 4: Sta 342+12 to Sta 456+16



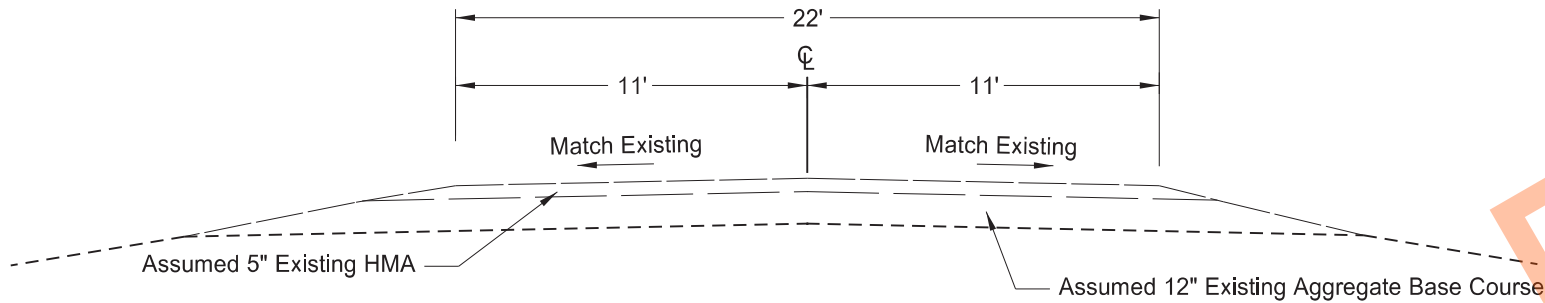
WB Segment 3: Sta 277+39 to Sta 342+12

Existing Typical Sections
Westbound US-2

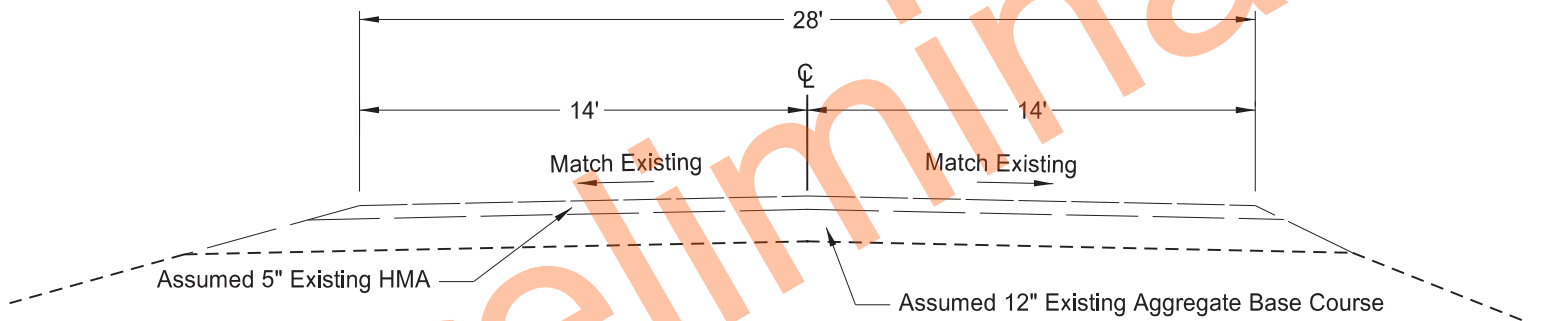
US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	3



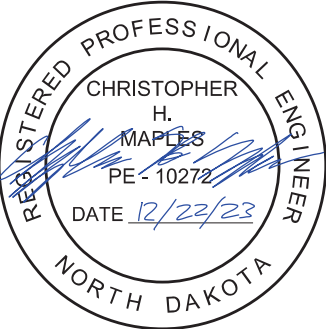
North Frontage Road
Segment 1: Sta 73+03 to Sta 136+84



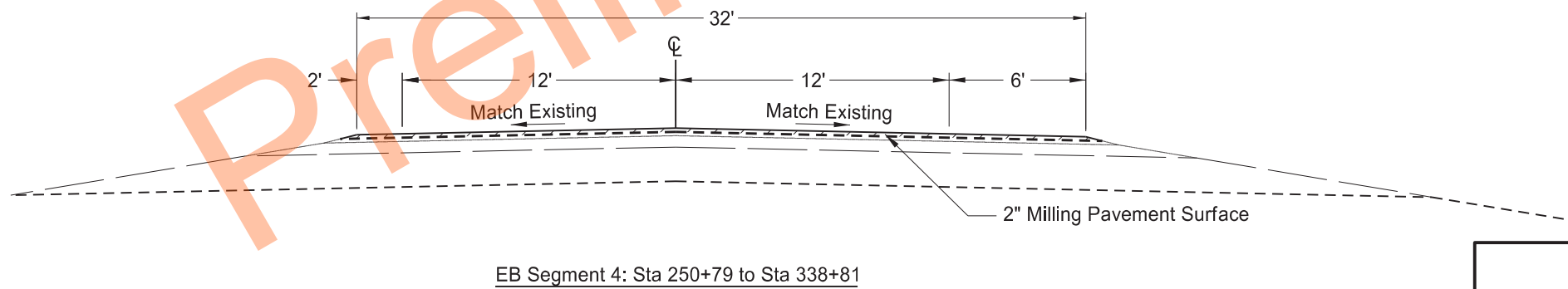
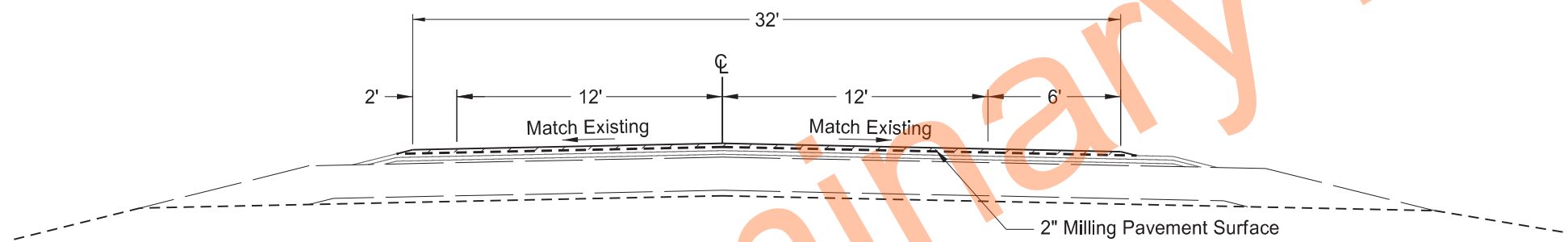
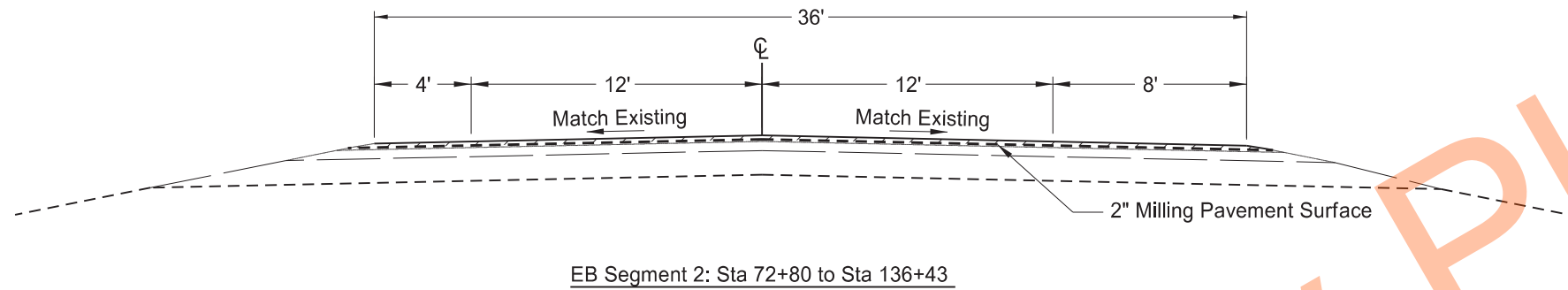
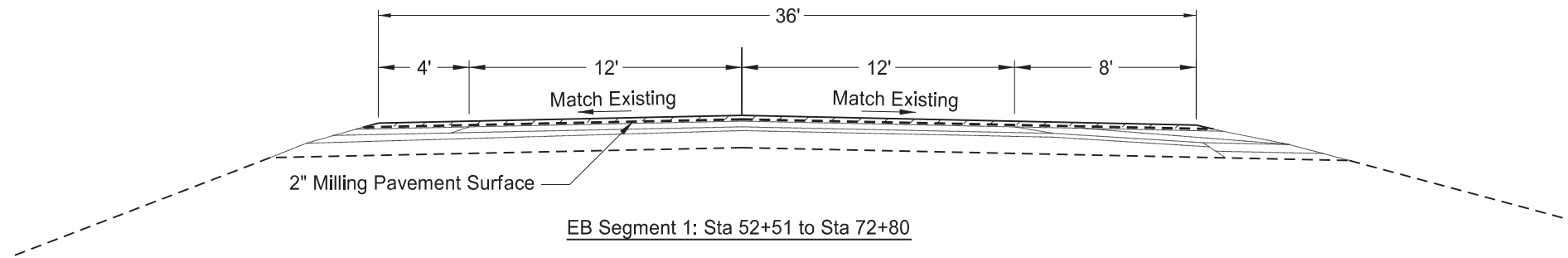
South Frontage Road
Segment 1: Sta 77+45 to Sta 80+99

Existing Typical Sections
Frontage Roads

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

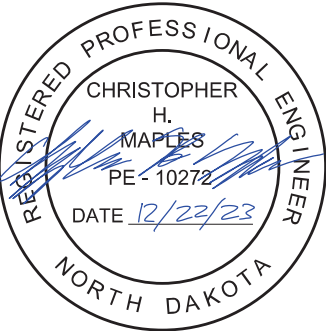


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	4

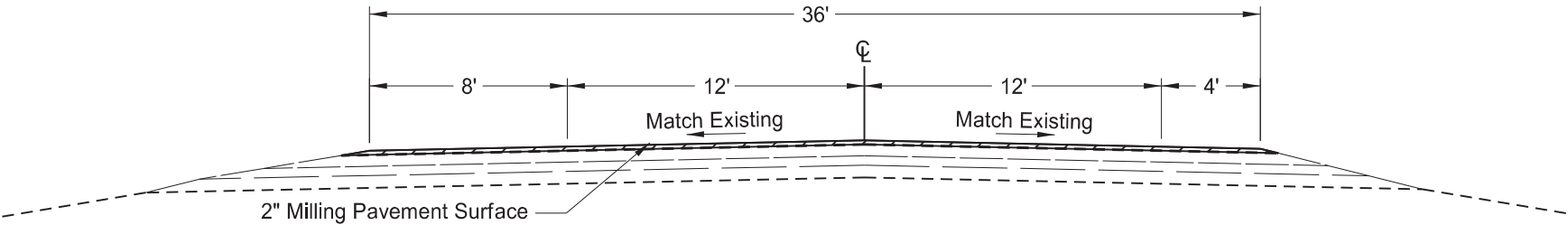


Removal Typical Sections
Eastbound US-2

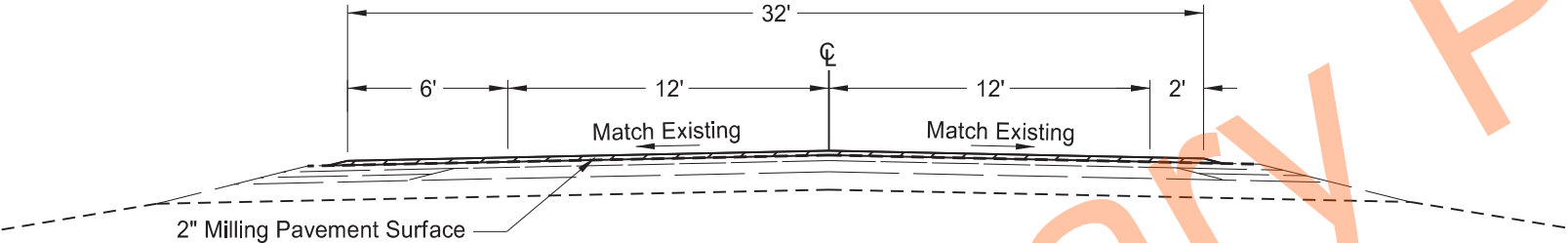
US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



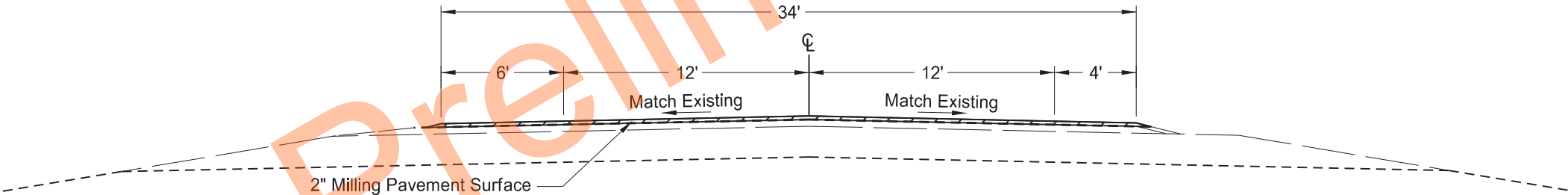
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	ND	NH-3-002(173)270	30	5



WB Segment 1: Sta 52+51 to Sta 119+02



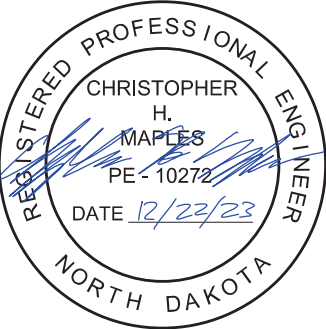
WB Segment 2: Sta 119+02 to Sta 277+39
WB Segment 4: Sta 342+12 to Sta 456+16



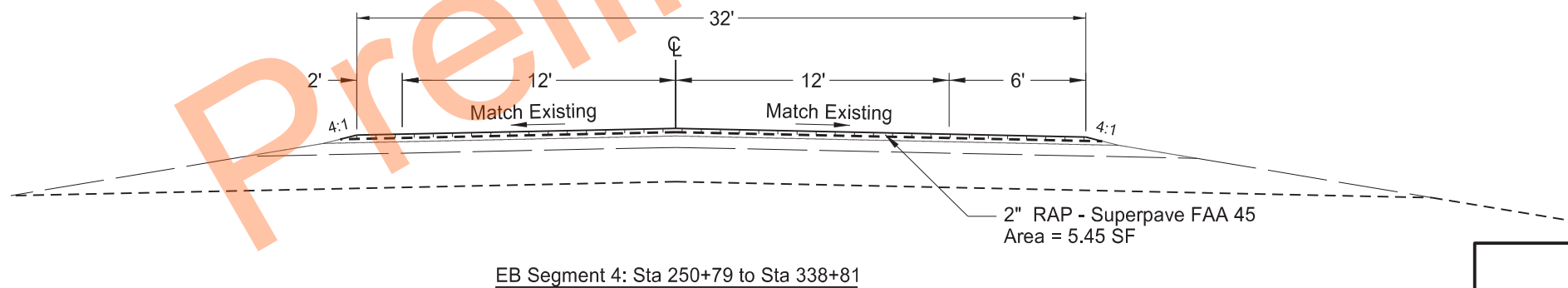
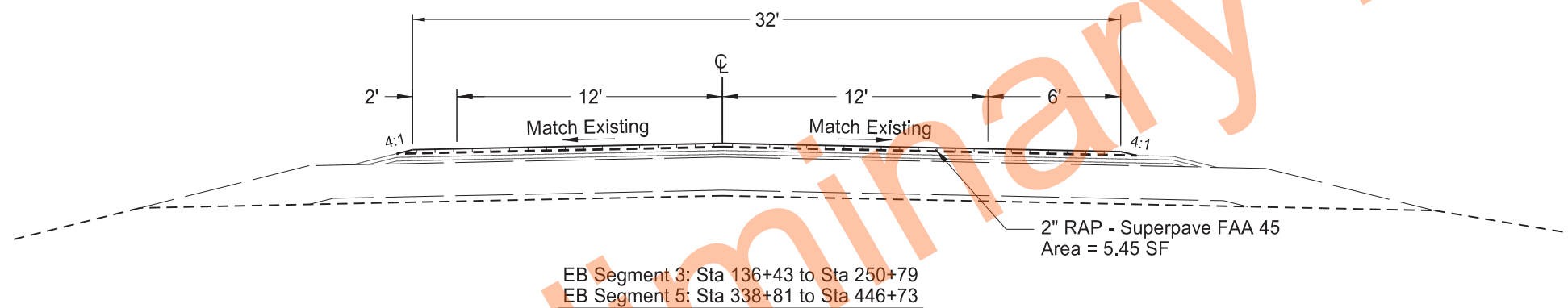
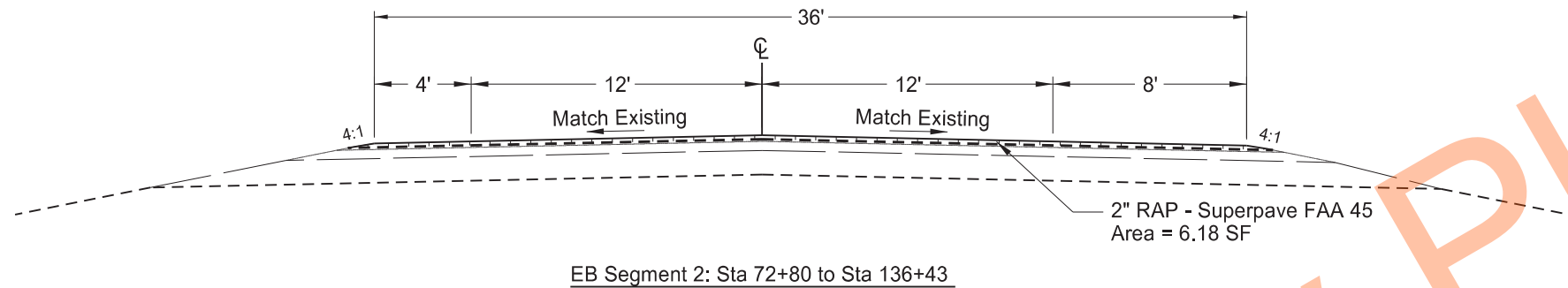
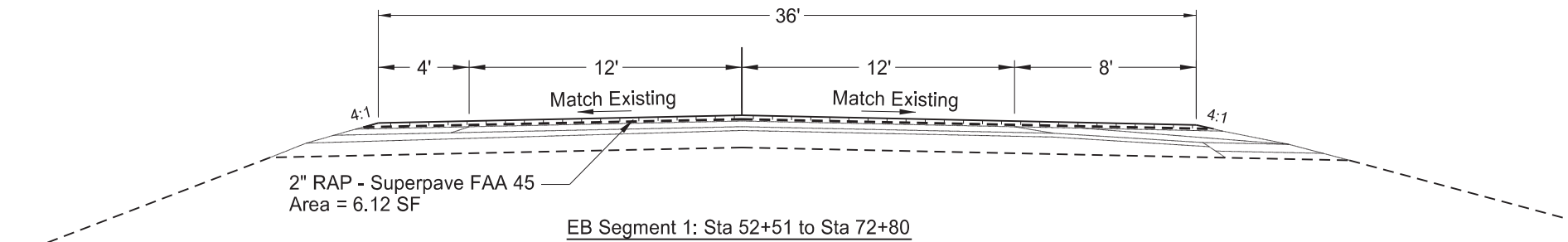
WB Segment 3: Sta 277+39 to Sta 342+12

Removal Typical Sections
Westbound US-2

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

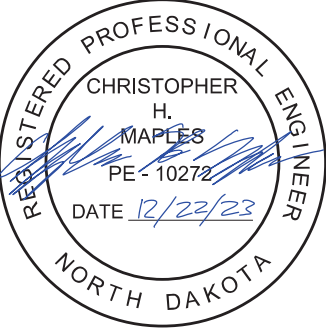


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	6

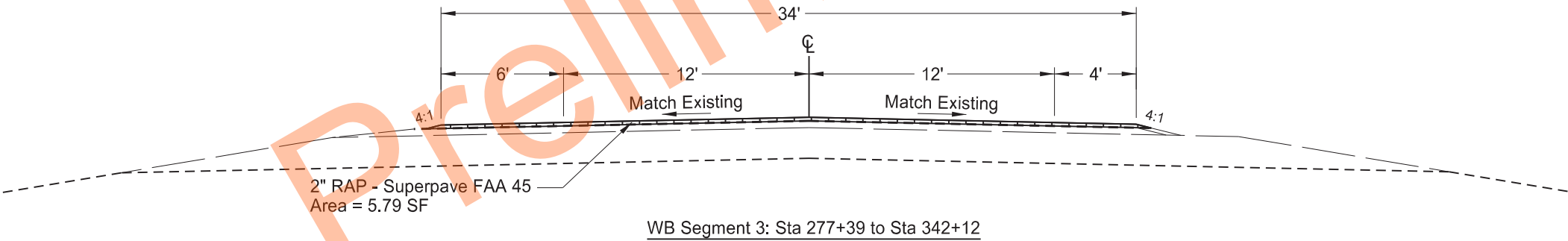
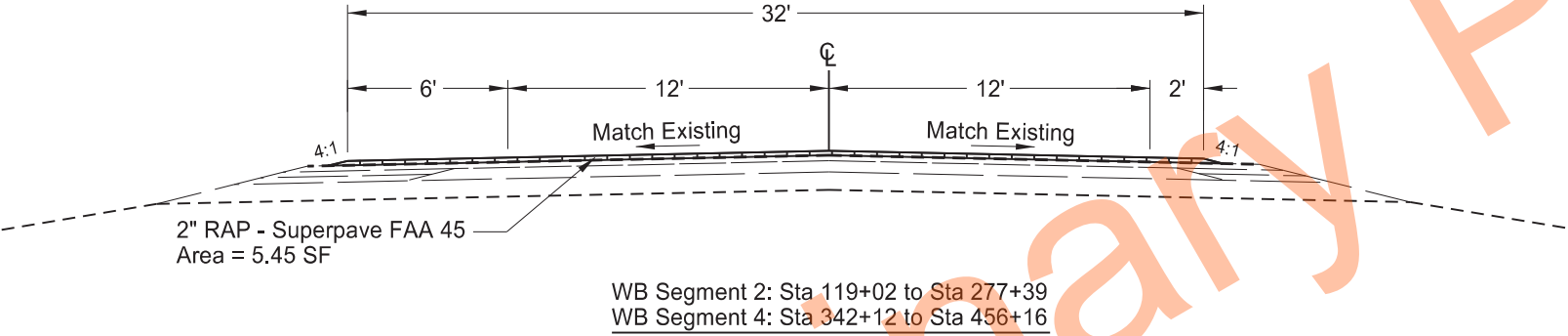
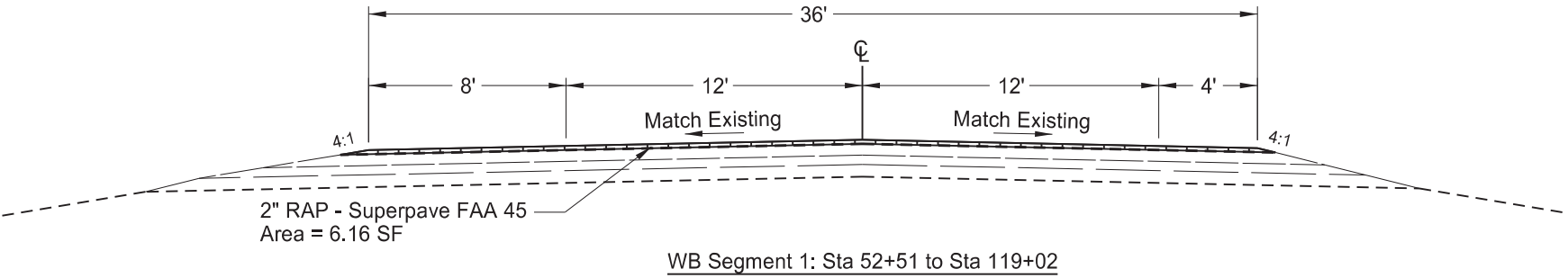


Proposed Typical Sections
Eastbound US-2

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

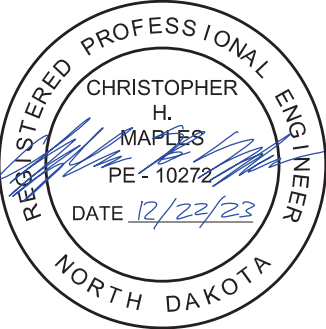


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	ND	NH-3-002(173)270	30	7

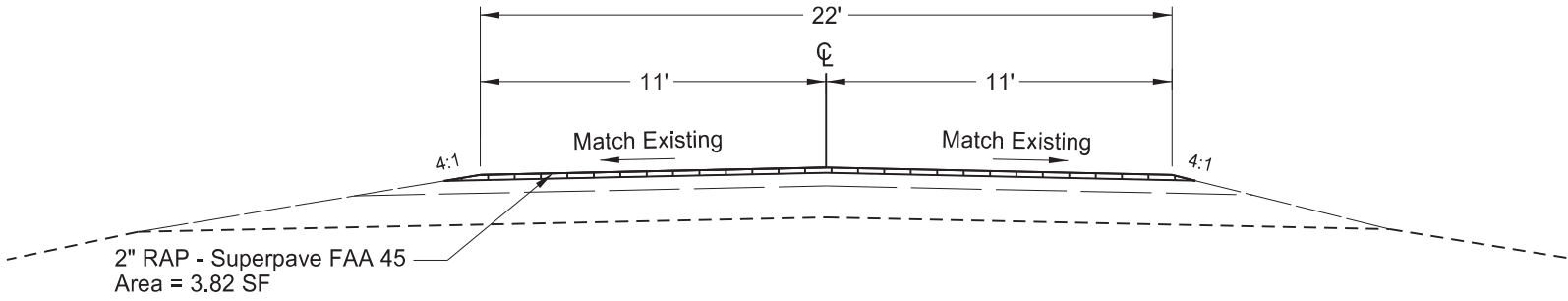


Proposed Typical Sections
Westbound US-2

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

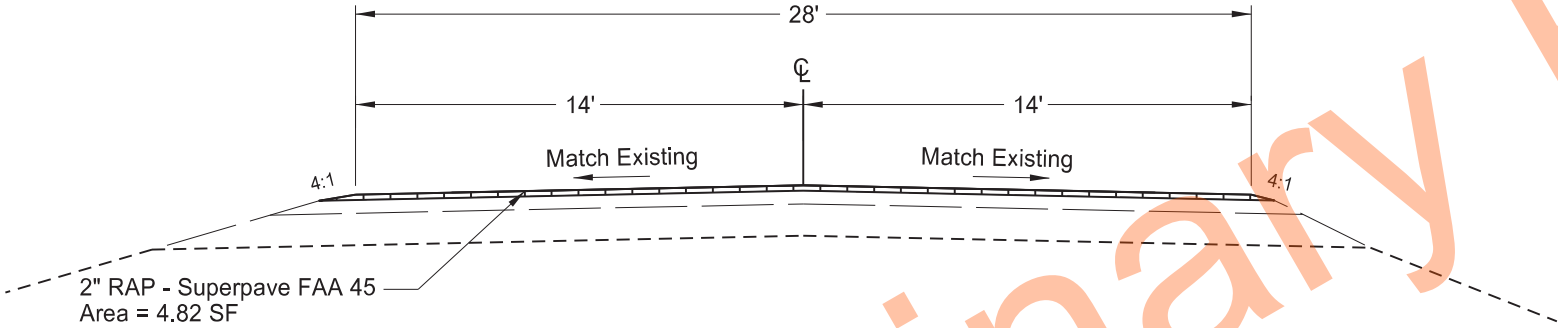


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	30	8



North Frontage Road*
Segment 1: Sta 73+03 to Sta 104+83
Segment 2: Sta 108+73 to Sta 117+46
Segment 3: Sta 118+78 to Sta 125+71
Segment 4: Sta 127+64 to Sta 136+84

*See Section 20 Sheet 3 for
Full Depth Pavement Repair details
Sta 104+83 to Sta 108+73
Sta 117+46 to Sta 118+78
Sta 125+71 to Sta 127+64

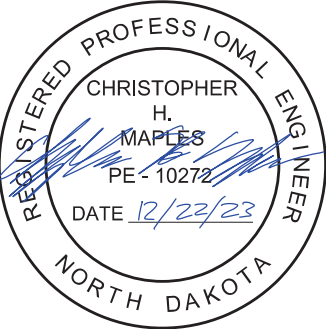


South Frontage Road*
Segment 1: Sta 77+45 to Sta 80+99

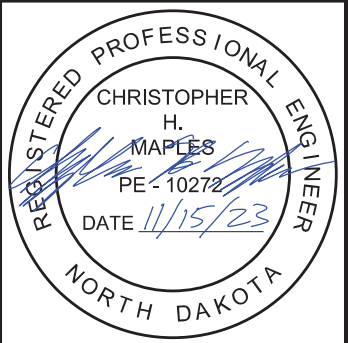
*See Section 20 Sheet 2 for
Full Depth Pavement Repair details
Sta 80+99 to Sta 88+21

Proposed Typical Sections
Frontage Roads

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



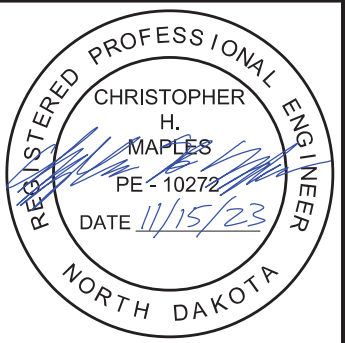
Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1	Sec 2 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
2	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3A	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3B	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3C	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3D	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3E	Sec 2 T-153-N R-64-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3F	Sec 1 & 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3G	Sec 12 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3H	Sec 12 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3I	Sec 12 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3J	Sec 1 & 2 T-153-N R-64-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
3K	Sec 1 & 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
3L	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-



Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND

Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)
4	Sec 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
5	Sec 1 & 2 T-153-N R-64-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
6A	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
6B	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
6C	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
6D	Sec 12 T-153-N R-64-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
6E	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
7	Sec 12 T-153-N R-64-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
8A	Sec 18 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
8B	Sec 18 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
8C	Sec 18 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
8D	Sec 18 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-

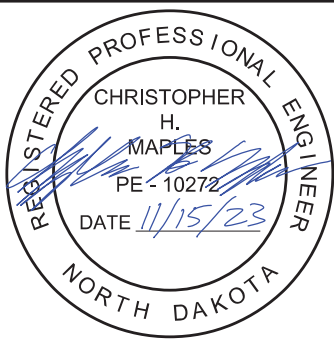


Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND

8E	Sec 18 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
8G	Sec 18 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
9	Sec 18 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-

Wetland Impact Table																			
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation											
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite		
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #
10A	Sec 7 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
10B	Sec 7 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
11A	Sec 17&18 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
11B	Sec 18 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
12	Sec 17 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
13	Sec 17 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
14	Sec 17 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
15A	Sec 17 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
15B	Sec 17 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-

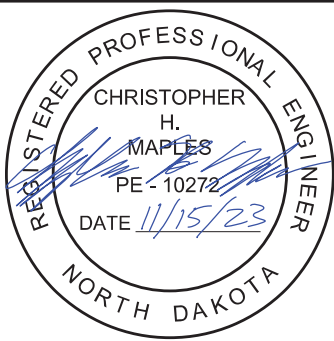


Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND

16	Sec 17 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
17	Sec 17 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
18	Sec 17 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
19	Sec 17&20 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
20A	Sec 20 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
20B	Sec 20 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-

Wetland Impact Table																			
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation											
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite		
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #
21	Sec 20 T-153-N R-63-W	Artificial	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
22A	Sec 20 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
22B	Sec 20 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
22C	Sec 20 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
22D	Sec 20 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
23A	Sec 20 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-

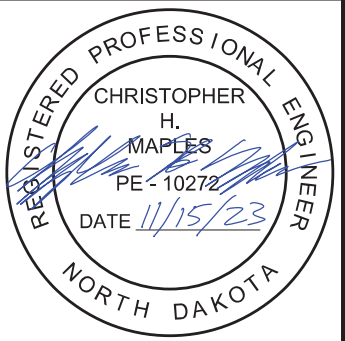


Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
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Ramsey County, ND

23B	Sec 20 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
24A	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
24B	Sec 21 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
25A	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25B	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25C	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25D	Sec 22 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25E	Sec 28 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25F	Sec 28 T-153-N R-63-W	Artificial	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-

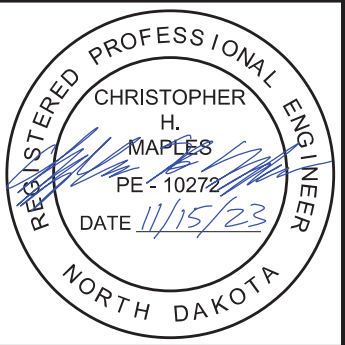
Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)
25G	Sec 28 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
25I	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-
25J	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-	-



Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
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Ramsey County, ND

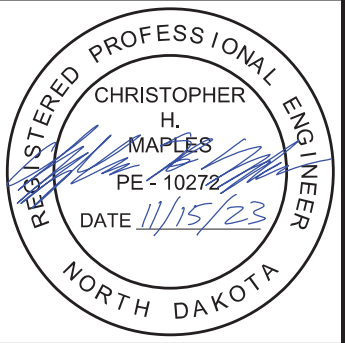
25K	Sec 27 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25L	Sec 27 T-153-N R-63-W	Created	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25M	Sec 27 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25N	Sec 22 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
25O	Sec 22 T-153-N R-63-W	Created	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
26A	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
26B	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
26C	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
26D	Sec 21 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
27	Sec 22 T-153-N R-63-W	Natural	Yes	-	-	-	-	N	N		-	-	-	-	-	-	-	-	-
28	Sec 22 T-153-N R-63-W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-
29	Sec 22 T-153-N R-63-W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-



Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND

Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
31	Sec.23, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32A	Sec.23, T153N, R63W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32B	Sec.23, T153N, R63W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32C	Sec.23, T153N, R63W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32D	Sec.23, T153N, R63W	Natural/ Manipulated	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32E	Sec.23, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32F	Sec.23, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
32G	Sec.26, T153N, R63W	Natural	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
33	Sec.23, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
34A	Sec.23, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-
34B	Sec.26, T153N, R63W	Created	No	-	-	-	-	N			-	-	-	-	-	-	-	-	-	-



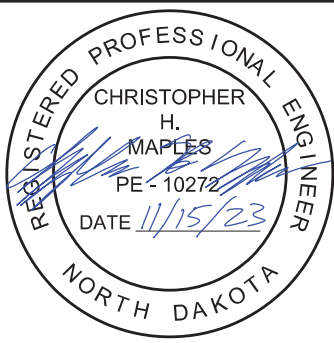
Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND

Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)
35	Sec.26, T153N, R63W	Created	No	-	-	-	-	N				-	-	-	-	-	-	-	-	-
36	Sec.25, T153N, R63W	Created	No	-	-	-	-	N		N		-	-	-	-	-	-	-	-	-
37	Sec.24, T153N, R63W	Created	No	-	-	-	-	N		N		-	-	-	-	-	-	-	-	-
38A	Sec.24, T153N, R63W	Created	No	-	-	-	-	N				-	-	-	-	-	-	-	-	-
38B	Sec.24, T153N, R63W	Created	No	-	-	-	-	N				-	-	-	-	-	-	-	-	-
38C	Sec.25, T153N, R63W	Created	No	-	-	-	-	N				-	-	-	-	-	-	-	-	-
39	Sec.24, T153N, R63W	Natural	No	-	-	-	-	N				-	-	-	-	-	-	-	-	-
				-	-	-	-					0		0		0		0		0

Other Waters Impact Table															
Other Waters								Other Water Mitigation							
Number	Location	Type	Size		Feature	USACE Jurisdictional ¹	Impacts to Other Waters				Mitigation Required			Mitigation Location; ratio	Method
			Acre(s)	Linear Feet			Acre(s)		Linear Feet		EO 11990	USACE	USFWS		
OW-8F	Sec 18 T-153-N R-63-W	Lake	0.58	-	Natural	Yes	-	-	-	-	N	N	N	NA	NA
OW-25H	Sec 21&28 T-153-N R-63-W	Lake	1.37	-	Natural	Yes	-	-	-	-	N	N	N	NA	NA
OW-30-d	Sec 27 T-153-N R-63-W	Ephemeral Swale	-	123	-	No	-	-	-	-	N	N	N	NA	NA
Totals			1.95	123			-	-	-	-					

¹ A wetland Jurisdictional Determination was issued by the USACE on 01/10/2022; NWO-2013-02562-BIS.

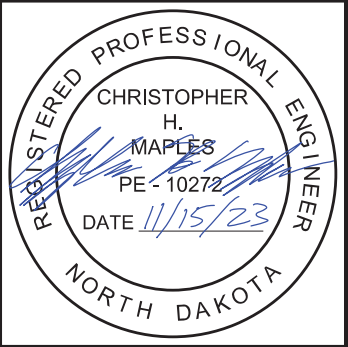


Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Heftie Rest Area EB & WB
Ramsey County, ND

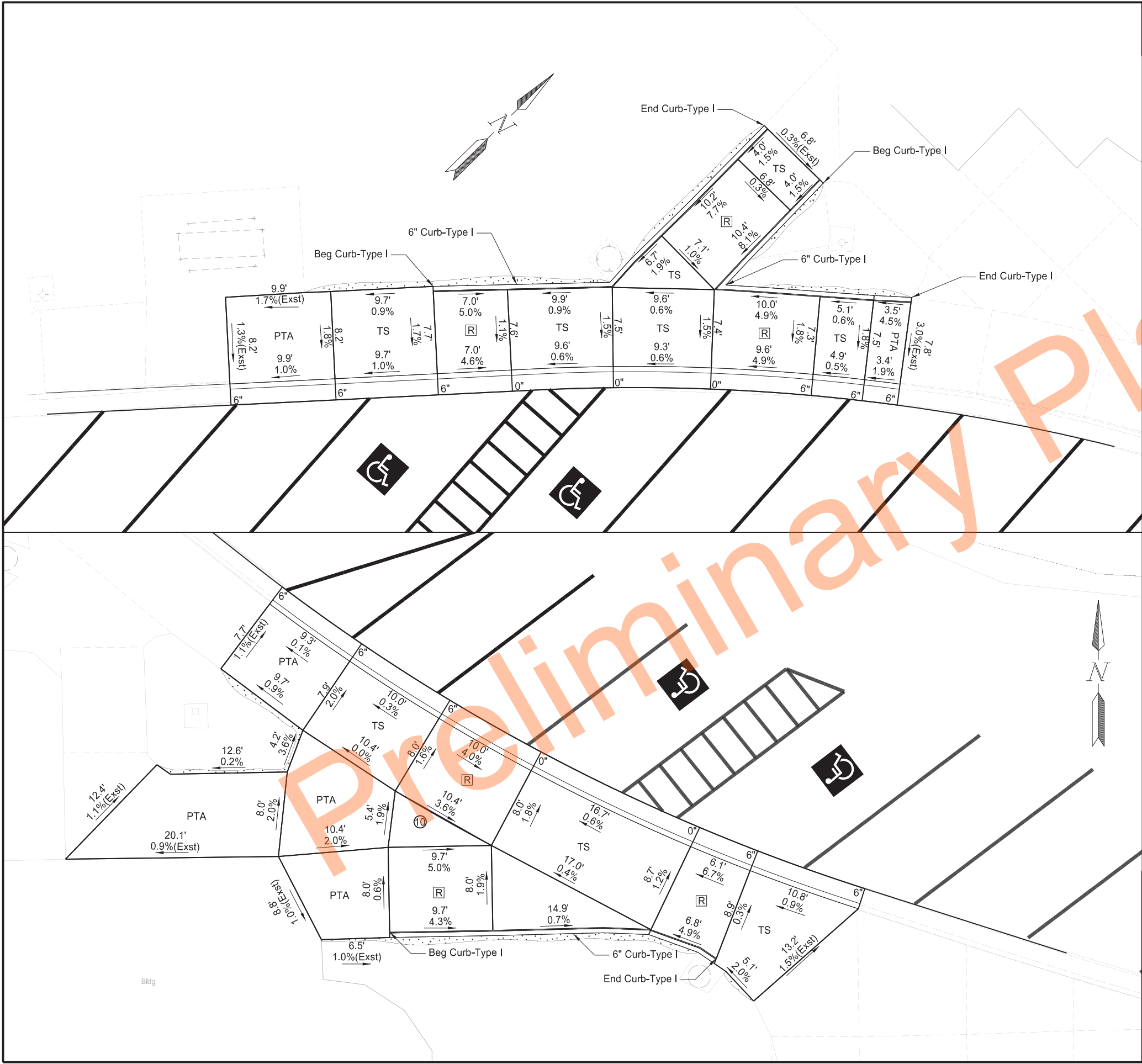
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0	Temporary JD	0
Natural/Non-JD	0	Non-JD Temporary	0
Artificial/JD	0	Permanent JD > 0.10	0
Artificial /Non-JD	0	Permanent OW	0 ac/0 ft.
Total	0	Temporary OW	0/0

Mitigation Summary Table					
	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Onsite	-			
EO 11990 Only	Onsite and Vollrath16/17	-	-		
USACE/11990	Onsite	-			
USFWS	Vollrath 15/21 UFWSEasement				-
Total		0	0	0	0



Wetlands Mitigation and Environmental

US-2 Devils Lake 4 Lane
To Hefti Rest Area EB & WB
Ramsey County, ND



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	NH-3-002(173)270	80	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 441+57 - 99' Lt to Sta 442+09 - 136' Lt	13	TON
		Sta 441+82 - 202' Lt to Sta 442+57 - 197' Lt	17	TON
		TOTAL	30	TON
748	0140	CURB & GUTTER-TYPE I		
		Sta 441+63 - 93' Lt to Sta 442+09 - 136' Lt	63	LF
		Sta 442+02 - 226' Lt to Sta 442+57 - 197' Lt	63	LF
		TOTAL	126	LF
748	0520	CURB-TYPE I		
		Sta 441+70 - 113' Lt to Sta 441+82 - 146' Lt	37	LF
		Sta 441+89 - 146' Lt to Sta 442+03 - 144' Lt	31	LF
		Sta 442+12 - 194' Lt to Sta 442+43 - 191' Lt	31	LF
		TOTAL	99	LF
750	0115	SIDEWALK CONCRETE 4IN		
		Sta 441+57 - 99' Lt to Sta 442+08 - 137' Lt	68	SY
		Sta 441+82 - 202' Lt to Sta 442+57 - 196' Lt	107	SY
TOTAL			175	SY

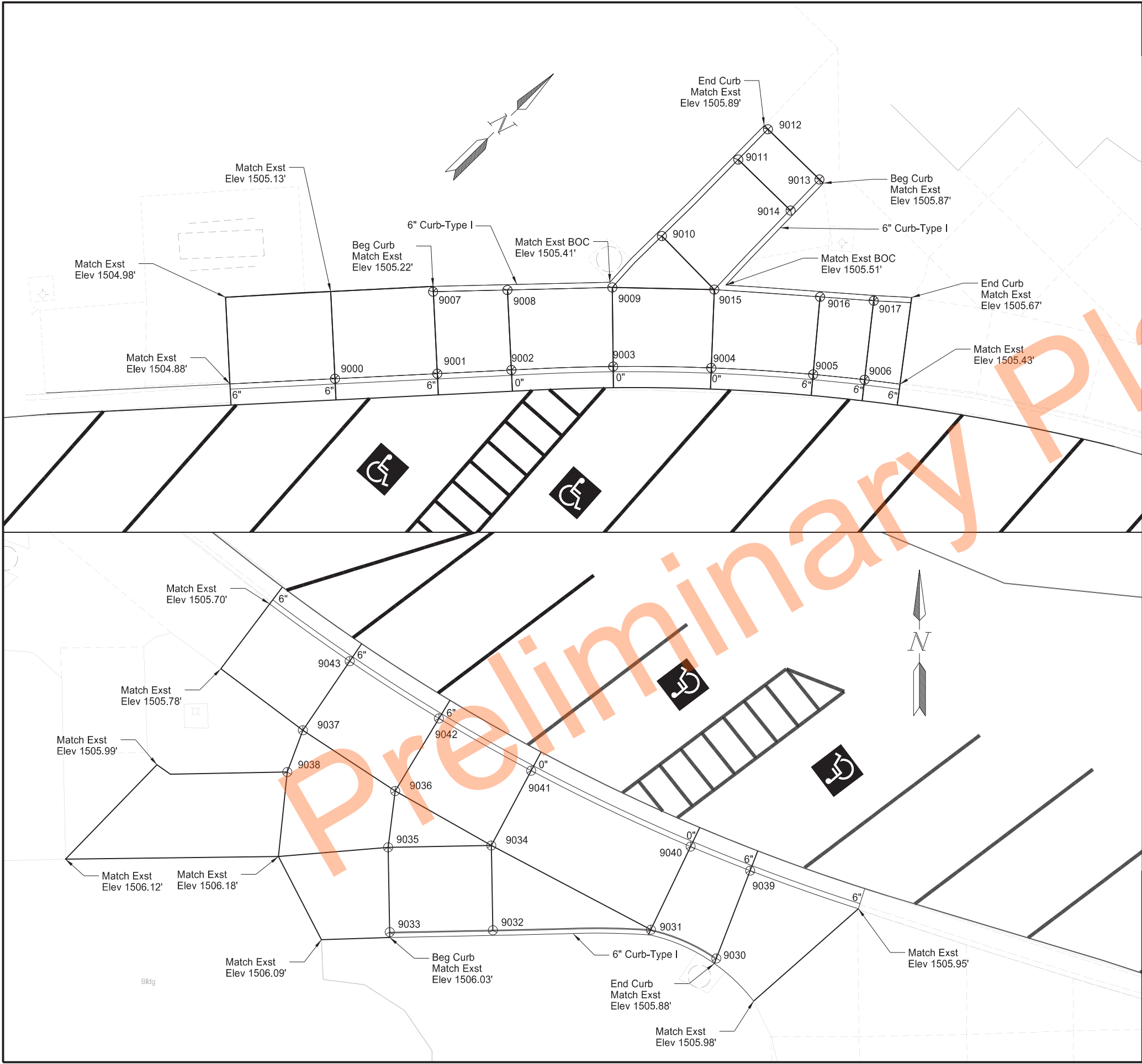
LEGEND

- R** Ramp Running Slope Maximum of 8.3% / 7.5% Preferred
Cross Slope Maximum of 2.0% / 1.5% Preferred
- L/TS** Landing/Turning Space, use at top of ramp or when changing directions
1.5% preferred slope (2% maximum) all directions
- B** 1.5% Preferred Cross Slope
2.0% Maximum Constructed Cross Slope
Running Slope Consistent with the Existing Pedestrian Facility (EPF)
4.7% Preferred Max Counter Slope
5.0% Max Constructed Counter Slope
- ④** Flare Slope Maximum of 4:1
- ⑩** Flare Slope Maximum of 10:1
- #"** Curb Height
- PTA** Pedestrian Access Transition Area
Running Slope less than 4.9%
Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF
- Detectable Warning Panel
- Landscape Restoration

Curb Ramps Retrofit
US-2 Hefti Rest Area
Layout

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - US 2 DEVILS LAKE 4 LANE TO HEFTI REST AREA										STATE	PROJECT NO.		SECTION NO.	SHEET NO.	
										ND	NH-3-002(173)270		81	1	
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
US 2 (Chain: SCL_2)				SCL_2		T-153-N R-63-W				MONUMENT DESCRIPTION					
BEG	19+76.28	405914.03	2372411.14	Curve C1	Curve C2	NW Sec Cor Sec 7	1-C	403396.74	2381518.91	Primary Control					
PC	22+16.52	405919.38	2372651.32	PI STA = 39+27.88	PI STA = 118+39.83	SE Sec Cor Sec 7	3-E	398239.41	2386896.96						
1/4 Line	29+70.96	405861.82	2373402.33	Delta = 48° 16' 00" Rt	Delta = 17° 52' 12" Lt	NW Sec Cor Sec 21	5-G	393060.38	2392321.63	GPS 1	404988.99	2375220.23	1452.04	50+14	10' RT
PI	39+27.88	405957.46	2374362.26	Da = 1° 30' 00"	Da = 1° 00' 00"	W 1/4 Cor Sec 21	5-H	390421.29	2392392.07	1.5" Aluminum Cap					
PT	54+34.39	404706.02	2375529.59	R = 3,819.83	R = 5,729.65	NW Sec Cor Sec 28	5-J	387782.08	2392462.55	GPS 2	388511.09	2408350.53	1505.76	446+64	290' LT
Sec line	64+42.98	403968.49	2376217.55	T = 1,711.36	T = 900.83	SE Sec Cor Sec 21	7-J	387912.85	2397741.34	1.5" Aluminum Cap					
Sec line	73+71.36	403289.61	2376850.81	L = 3217.87	L = 1,787.03	E 1/4 Cor Sec 28	7-K	385271.32	2397800.32	Secondary Control					
1/4 Line	104+16.07	401063.15	2378927.62			SE Sec Cor Sec 28	7-L	382629.03	2397859.94						
1/4 Line	109+10.30	400701.74	2379264.74	Curve C3	Curve C4	NE Sec Cor Sec 22	9-G	393315.60	2402892.33	Secondary Control					
PC	109+39.00	400680.76	2379284.32	PI STA = 159+06.47	PI STA = 181+80.81	E 1/4 Cor Sec 22	9-H	390678.43	2402948.09						
PI	118+39.83	400022.02	2379898.77	Delta = 22° 39' 32" Rt	Delta = 8° 57' 46" Lt	SE Sec Cor Sec 22	9-J	388041.34	2403003.90	223	388191.61	2413605.82	1471.14	499+11.94	138' Rt
PT	127+26.03	399583.62	2380685.73	Da = 1° 30' 00"	Da = 1° 00' 00"	NE Sec Cor Sec 34	9-L	382756.54	2403132.93	NGS Bench Mark F478 Stainless Steel Rod					
Twp line	137+90.87	399065.40	2381615.96	R = 3,819.83	R = 5,729.65	NE Sec Cor Sec 23	11-G	393474.88	2408186.93	250	388172.04	2397776.19	1460.97	340+85.99	216' Lt
PC	151+41.15	398408.27	2382795.56	T = 765.32	T = 449.06	SE Sec Cor Sec 23	11-J	388177.97	2408301.95	NGS Bench Mark H478 Stainless Steel Rod					
Sec line	156+21.82	398148.58	2383199.66	L = 1,510.64	L = 896.28	SE Sec Cor Sec 26	11-L	382893.53	2408421.97	251	389613.29	2392367.28	1462.55	281+81.75	218' Lt
PI	159+06.47	398035.81	2383464.13							NGS Bench Mark Andy Stainless Seel					
PT	166+51.79	397434.54	2383937.62	Curve C5						252	393058.40	2388619.68	1476.76	230+77.34	210' Lt
PC	177+31.75	396586.07	2384605.77	PI STA = 304+98.31						NGS Bench Mark K478 Stainless Steel Rod					
PI	181+80.81	396233.27	2384883.59	Delta = 44° 14' 13" Lt		T-153-N R-64-W				253	387939.74	2402908.42	1492.02	392+11.03	141' Rt
PT	186+28.04	395928.06	2385212.98	Da = 0° 51' 00"		NE Sec Cor Sec 2	11-A	408568.03	2376110.62	NGS Benchmark G478 Stainless Steel Rod					
Sec line	210+05.25	394312.35	2386956.71	R = 6,740.74		SE Sec Cor Sec 2	11-C	403275.44	2376233.69						
Sec line	229+68.88	392977.73	2388397.07	T = 2,739.66		NE Sec Cor Sec 1	13-A	408690.42	2381403.00						
PC	277+58.65	389722.26	2391910.46	L = 5,204.39		E 1/4 Cor Sec 12	13-D	400754.54	2381578.11						
Sec line	284+26.75	389293.19	2392422.20												
PI	304+98.31	387860.20	2393920.05												
1/4 Line	313+90.08	388072.09	2395096.09												
PT	329+63.04	387928.05	2396658.86												
Continued on Sheet 2															
										All coordinates and measurements on this document derived from the International Foot definition.					
										INITIALIZING BENCH MARK NDGPS Station (OPUS)					
										☒ NAVD-88 ☐ NGVD-29					
										☐ GEOID12B ☒ GEOID18					
NOTES: Sheet 1 of 2					Date Survey Completed 12/15/21	☐ Assumed Coordinates ☒ All coordinates on this sheet are Ramsey County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998685									

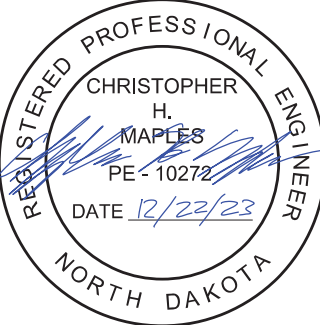


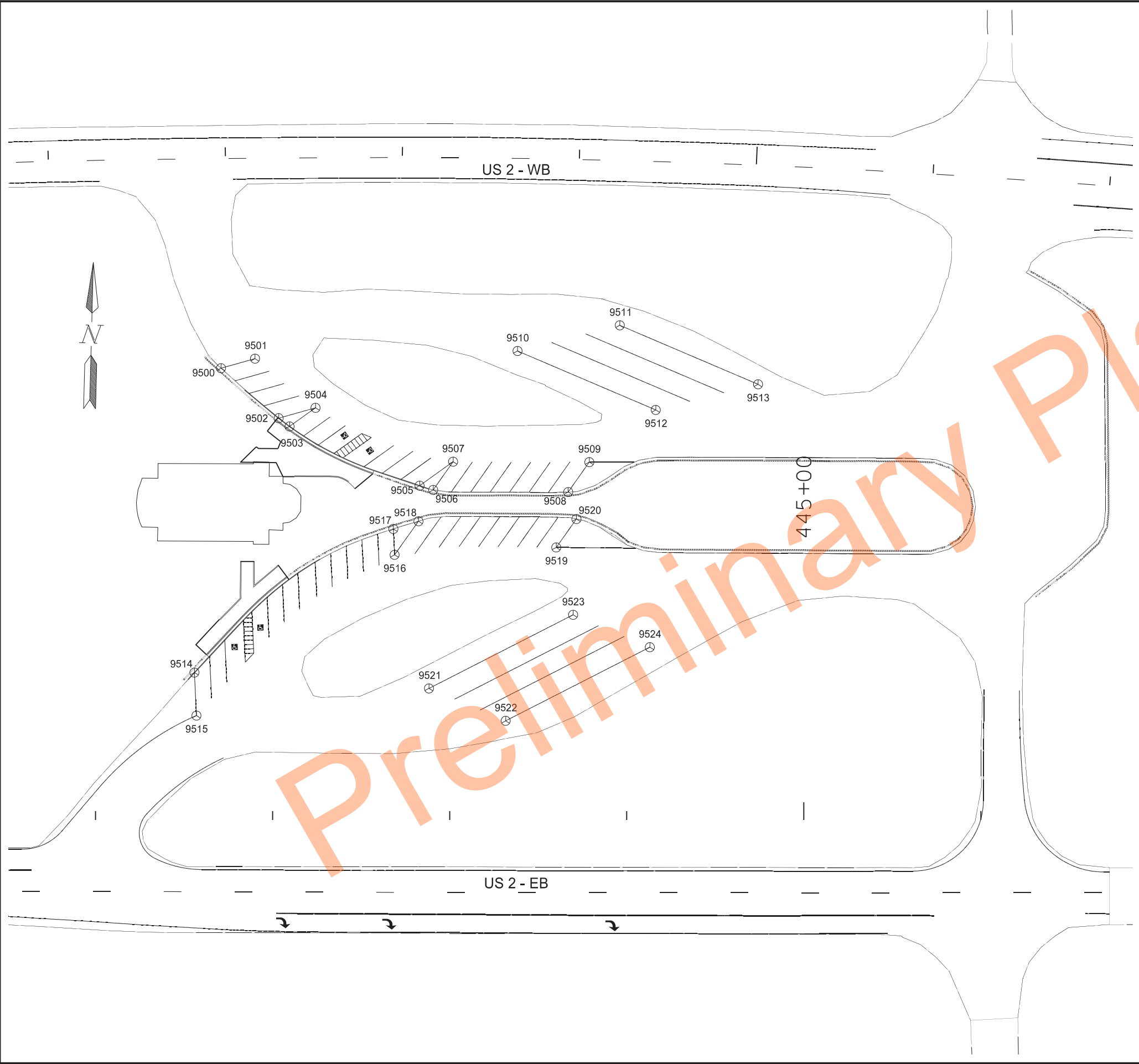
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	82	1

Point	Northing	Easting	Elevation
9000	388309.295	2407859.097	1504.98
9001	388316.523	2407865.518	1505.08
9002	388321.754	2407870.164	1504.76
9003	388328.843	2407876.652	1504.81
9004	388335.362	2407883.227	1504.87
9005	388341.792	2407890.395	1505.34
9006	388344.908	2407894.147	1505.36
9007	388321.658	2407859.717	1505.19
9008	388326.776	2407864.511	1504.83
9009	388334.009	2407871.273	1504.92
9010	388340.743	2407871.078	1505.05
9011	388350.944	2407870.970	1505.83
9012	388354.943	2407870.896	1505.89
9013	388355.093	2407877.676	1505.87
9014	388351.098	2407877.866	1505.81
9015	388340.736	2407878.153	1504.98
9016	388347.384	2407885.630	1505.47
9017	388350.738	2407889.433	1505.50
9030	388401.678	2407930.404	1505.88
9031	388404.391	2407924.229	1505.55
9032	388404.335	2407909.321	1505.64
9033	388404.158	2407899.586	1506.02
9034	388412.334	2407909.176	1505.49
9035	388412.157	2407899.440	1505.97
9036	388417.477	2407900.106	1505.87
9037	388423.208	2407891.395	1505.87
9038	388419.264	2407889.926	1506.02
9039	388409.963	2407933.594	1505.85
9040	388412.232	2407927.974	1505.45
9041	388419.396	2407912.934	1505.34
9042	388424.328	2407904.237	1505.74
9043	388429.720	2407895.813	1505.71

Survey Data Layouts
US-2 Rest Area
Curb Ramps Retrofit

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	82	2

Point	Northing	Easting
9500	388463.818	2407856.580
9501	388469.711	2407875.635
9502	388436.427	2407889.855
9503	388431.929	2407896.124
9504	388442.821	2407910.528
9505	388400.343	2407970.412
9506	388398.159	2407978.164
9507	388414.399	2407989.000
9508	388398.917	2408054.406
9509	388416.127	2408065.889
9510	388477.855	2408023.752
9511	388493.825	2408081.132
9512	388446.558	2408102.663
9513	388462.528	2408160.043
9514	388291.531	2407845.994
9515	388267.285	2407847.741
9516	388360.935	2407957.294
9517	388375.512	2407956.244
9518	388380.246	2407970.287
9519	388367.462	2408048.467
9520	388383.792	2408059.455
9521	388285.973	2407978.646
9522	388268.799	2408022.426
9523	388329.651	2408058.985
9524	388312.476	2408102.766

See Section 120 Sheet 23 for additional details.

Survey Data Layouts
Hefti Rest Area

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	100	1

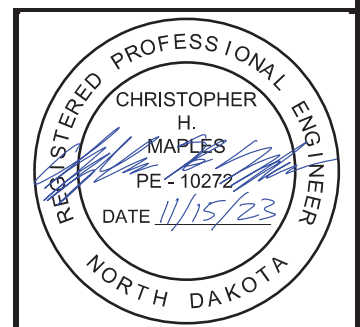
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.			
			1			
E5-1-48	48"x48"	EXIT GORE			35	
G20-1-60	60"x24"	ROAD WORK NEXT _ MILES	2	2	28	56
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)			18	
G20-2-48	48"x24"	END ROAD WORK	2	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)			18	
G20-10-108	108"x48"	CONTRACTOR SIGN			70	
G20-50a-72	72"x36"	ROAD WORK NEXT _ MILES RT & LT ARROWS	15	15	43	645
G20-52a-72	72"x24"	ROAD WORK NEXT _ MILES RT or LT ARROW	2	2	36	72
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	4	4	59	236
I2-5-96	96"x48"	YOUR HIGHWAY DOLLARS AT WORK			59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)			10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)			10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)			10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)			7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)			7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)			7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)			7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)			7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD and RT or LT			15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)			7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)			7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)			9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)			7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)			9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)			7	
R1-1-48	48"x48"	STOP	52	52	32	1664
R1-2-60	60"x60"	YIELD			29	
R2-1-36	36"x48"	SPEED LIMIT _ (Portable only)	48	48	30	1440
R2-1-48	48"x60"	SPEED LIMIT _	8	8	39	312
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	48	48	10	480
R3-2-48	48"x48"	NO LEFT TURN			35	
R3-7	36"x36"	RIGHT (LEFT) TURN LANE MUST TURN RIGHT (LEFT)			20	
R4-1-48	48"x60"	DO NOT PASS	2	2	39	78
R4-7-48	48"x60"	KEEP RIGHT			39	
R5-1-48	48"x48"	DO NOT ENTER			35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)			14	
R7-1-12	12"x18"	NO PARKING ANY TIME			11	
R10-6-24	24"x36"	STOP HERE ON RED			16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)	6	6	12	72
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)			12	
R11-3a-60	60"x30"	ROAD CLOSED _ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)			15	
R11-3c-60	60"x30"	STREET CLOSED _ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)			15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)			15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT			35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT			35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT			35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW			26	
W3-1-48	48"x48"	STOP AHEAD	2	2	35	70
W3-3-48	48"x48"	SIGNAL AHEAD			35	
W3-4-48	48"x48"	BE PREPARED TO STOP			35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	4	4	35	140
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT	2	2	35	70
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			35	
W8-1-48	48"x48"	BUMP			35	
W8-3-48	48"x48"	PAVEMENT ENDS			35	
W8-7-48	48"x48"	LOOSE GRAVEL			35	
W8-11-48	48"x48"	UNEVEN LANES			35	
W8-12-48	48"x48"	NO CENTER LINE			35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL			35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY			35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or _ FT or _ MILE			35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or _ FT or _ MILE			35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY			35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL			35	
W13-1P-30	30"x30"	_ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)			14	
W14-3-64	64"x48"	NO PASSING ZONE	2	2	28	56
W16-2P-30	30"x24"	_ FEET PLAQUE (Mounted on warning sign post)			10	
W20-1-48	48"x48"	ROAD WORK AHEAD or _ FT or _ MILE	22	22	35	770
W20-2-48	48"x48"	DETOUR AHEAD or _ FT or _ MILE			35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or _ FT or _ MILE			35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or _ FT or _ MILE	4	4	35	140
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or _ FT or _ MILE	2	2	35	70
W20-7-48	48"x48"	FLAGGER	4	4	35	140
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	4	4	5	20
W20-52P-54	54"x12"	NEXT _ MILES (Mounted on warning sign post)			12	
W21-1-48	48"x48"	WORKERS			35	
W21-2-48	48"x48"	FRESH OIL			35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or _ FT or _ MILE			35	
W21-5-48	48"x48"	SHOULDER WORK			35	

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	6619

[illegible]

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>

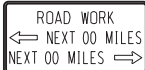


Traffic Control Devices List

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

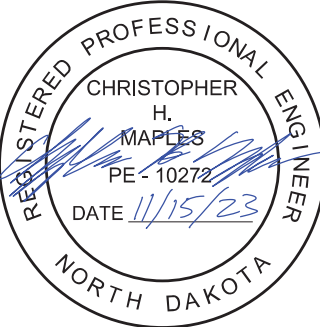
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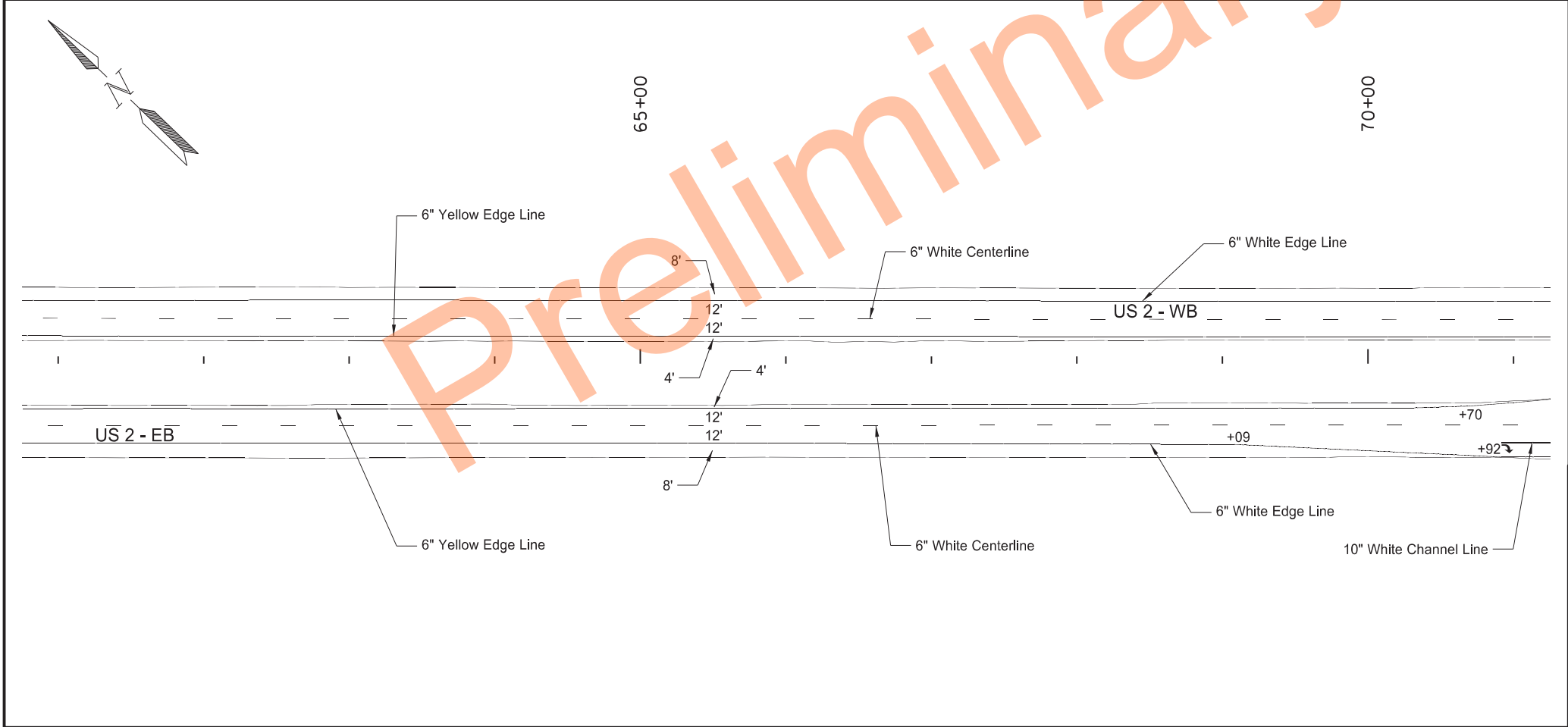
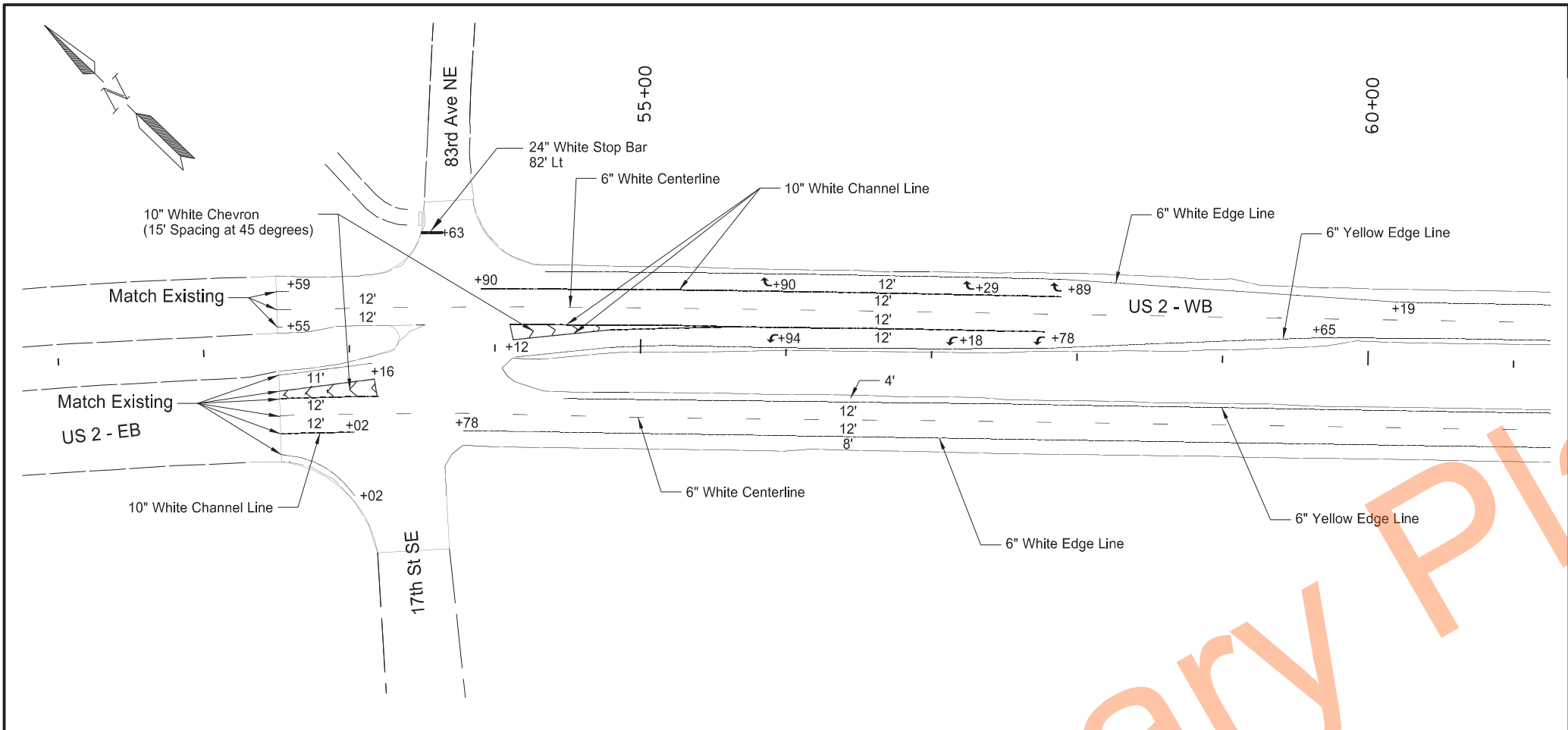


- A 
W20-1-48
- B 
G20-2-48
- C 
G20-1-60
- D 
G20-52aR-72
- E 
G20-52aL-72
- F 
G20-50a-72

Construction Sign Layout

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



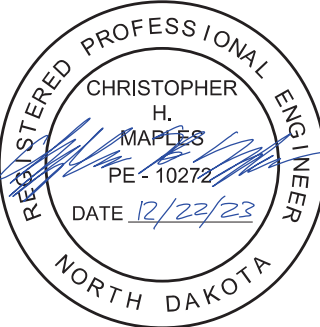


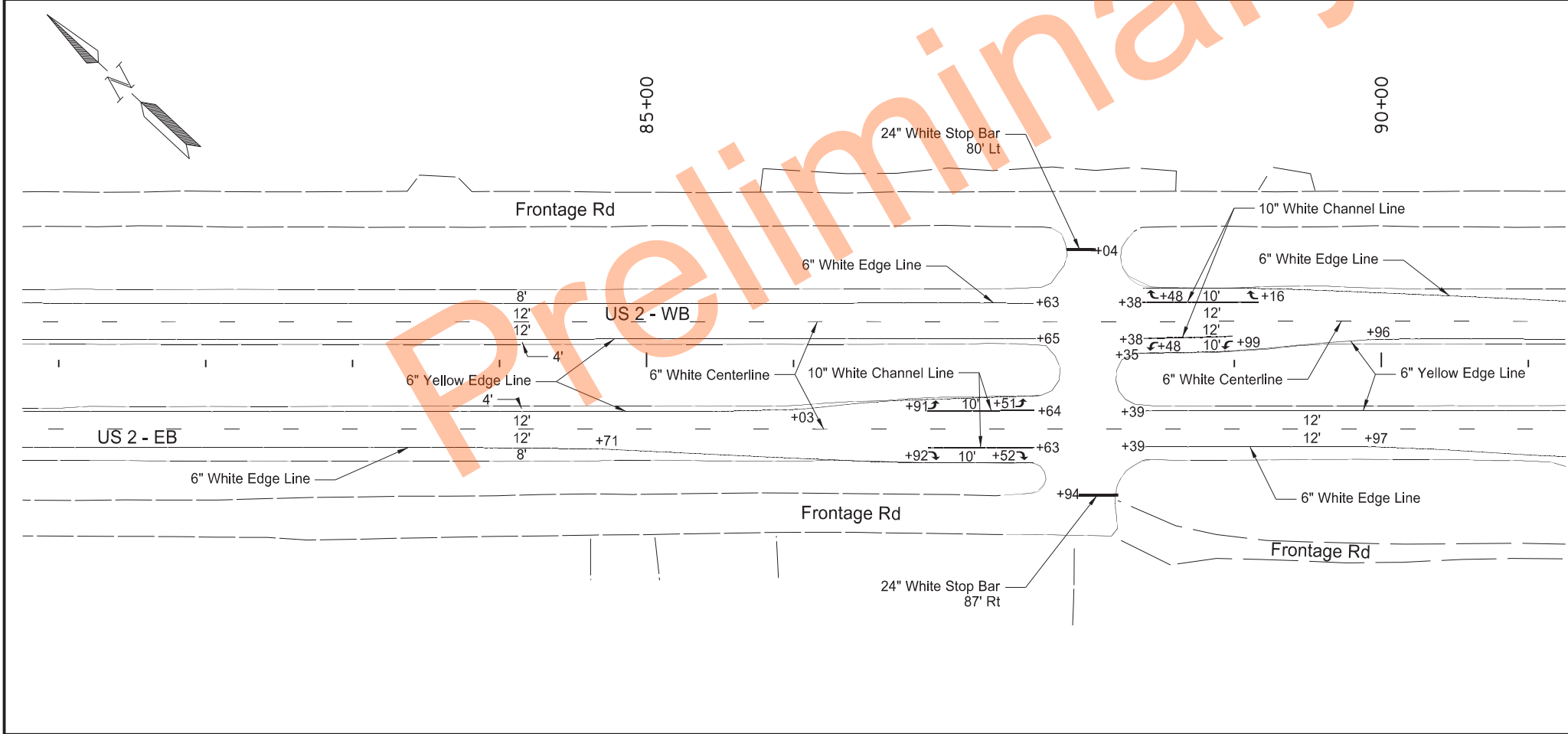
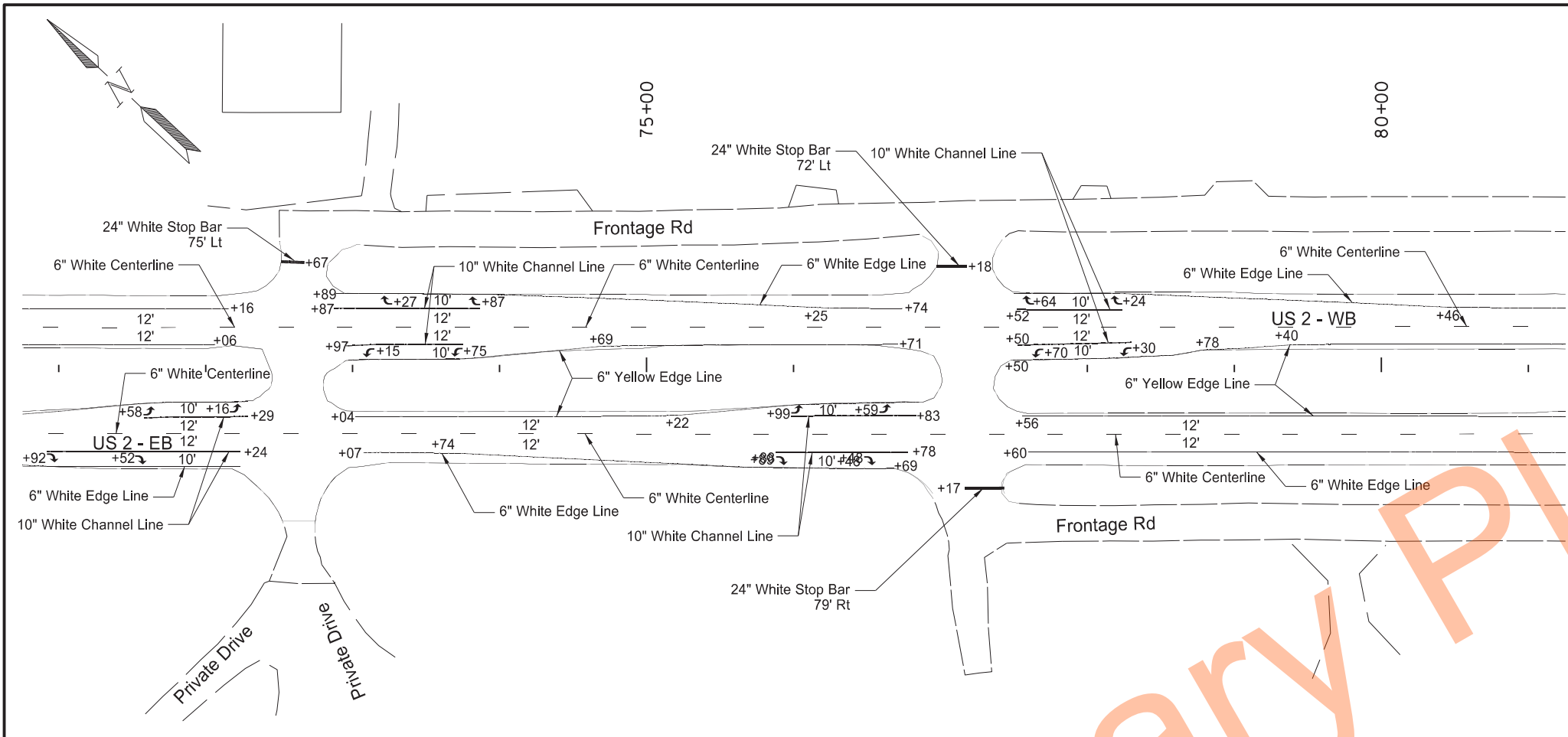
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	1

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (3)	48	SF
		Right Turn Arrow (4)	64	SF
		TOTAL	112	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3456	LF
		6" White Centerline	924	LF
		6" Yellow Edge Line	3408	LF
		TOTAL	7788	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	1138	LF
		10" White Chevron	95	LF
		TOTAL	1233	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" White Stop Bar	13	LF

Pavement Marking Layout
Sta 51+00 to Sta 71+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



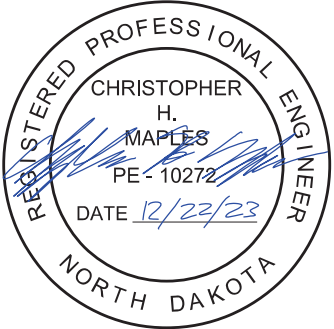


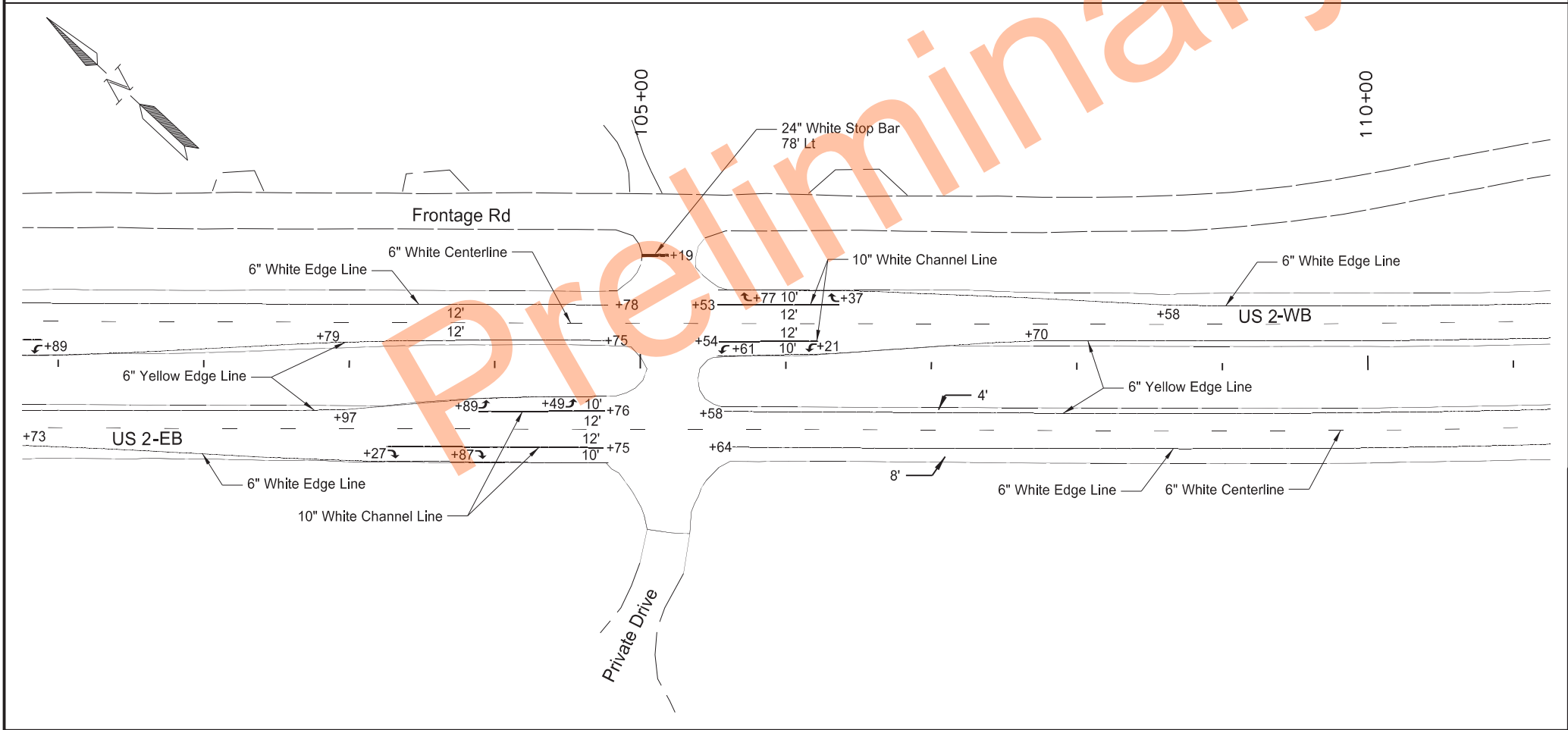
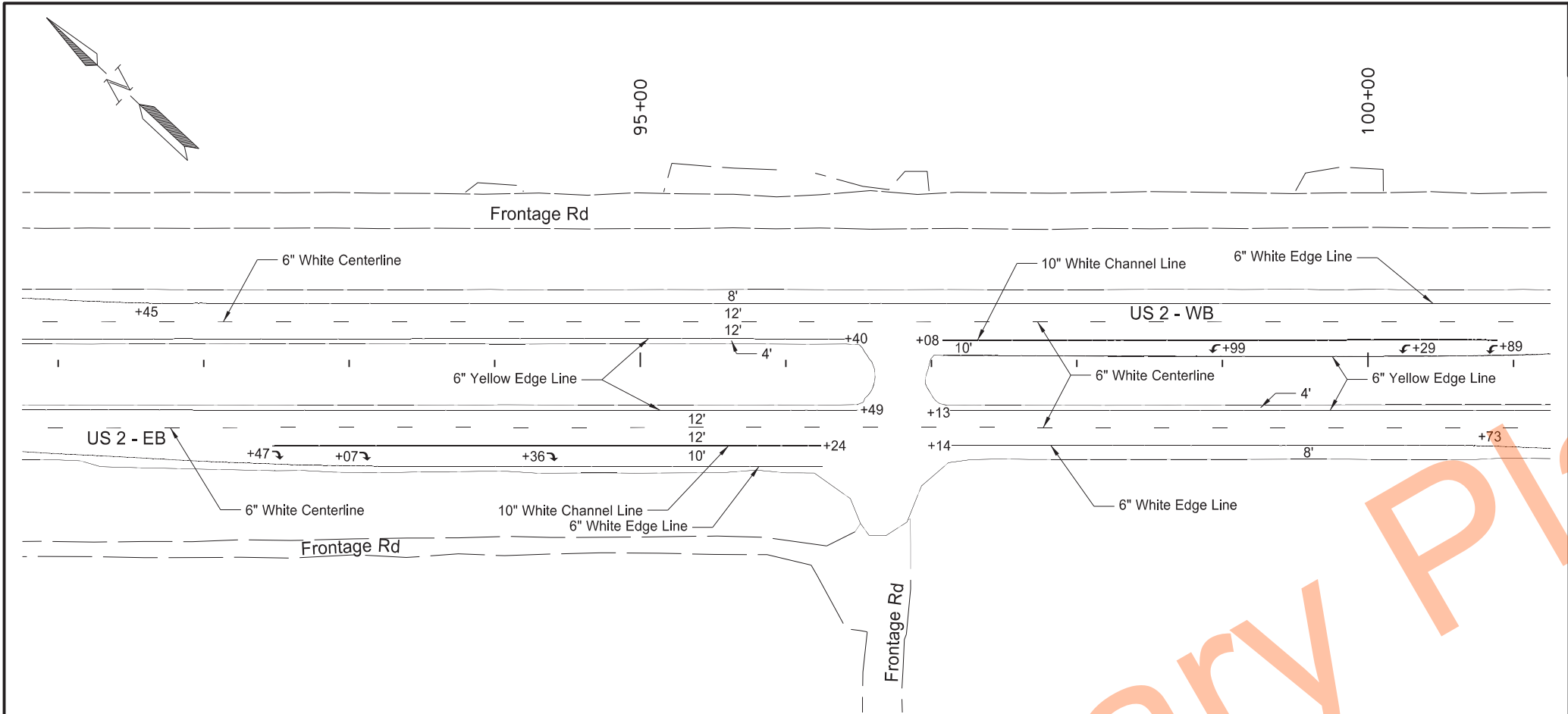
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	2

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (12)	192	SF
		Right Turn Arrow (11)	176	SF
		TOTAL	368	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3527	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3545	LF
		TOTAL	8072	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	980	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" White Stop Bar	104	LF

Pavement Marking Layout
Sta 71+00 to Sta 91+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



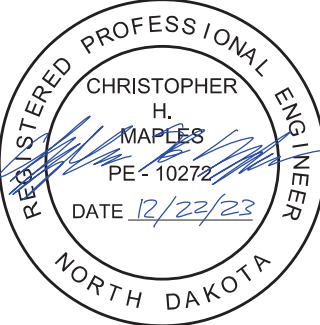


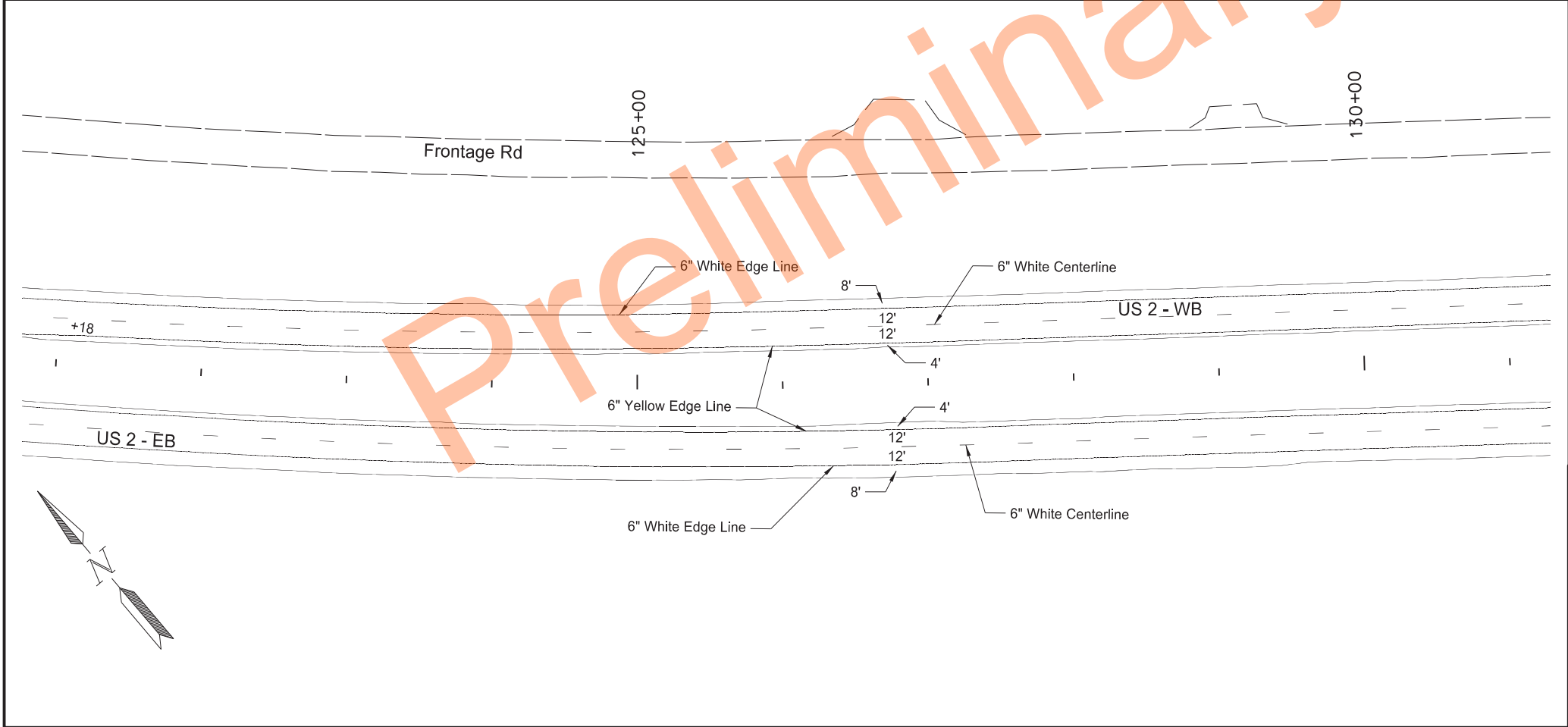
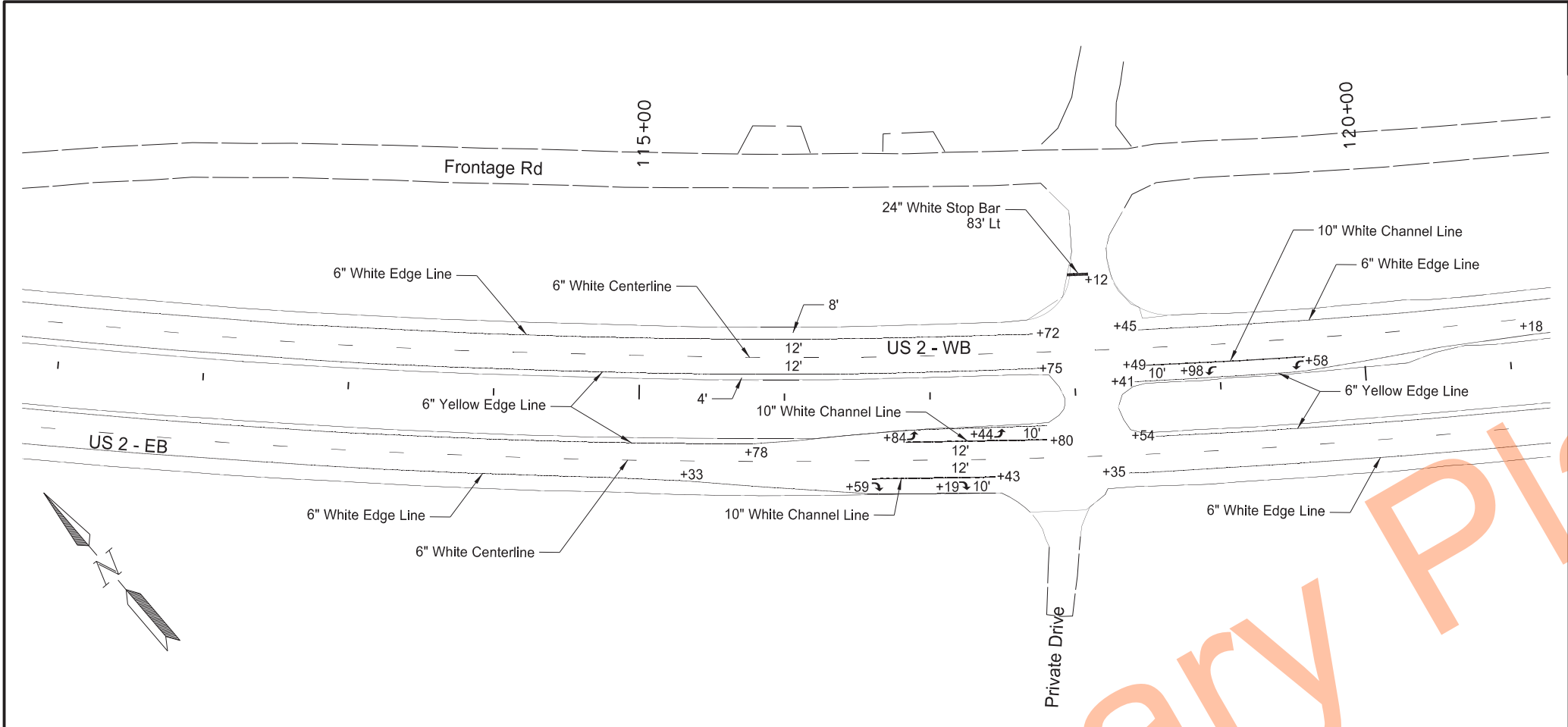
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ND	NH-3-002(173)270	120	3

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (7)	112	SF
		Right Turn Arrow (7)	112	SF
		TOTAL	224	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3751	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3710	LF
		TOTAL	8461	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	1143	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" White Stop Bar	18	LF

Pavement Marking Layout
Sta 91+00 to Sta 111+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



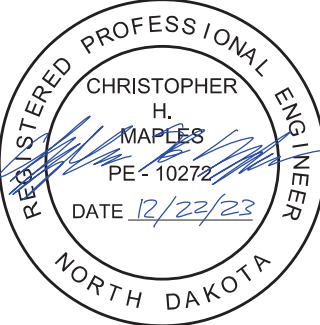


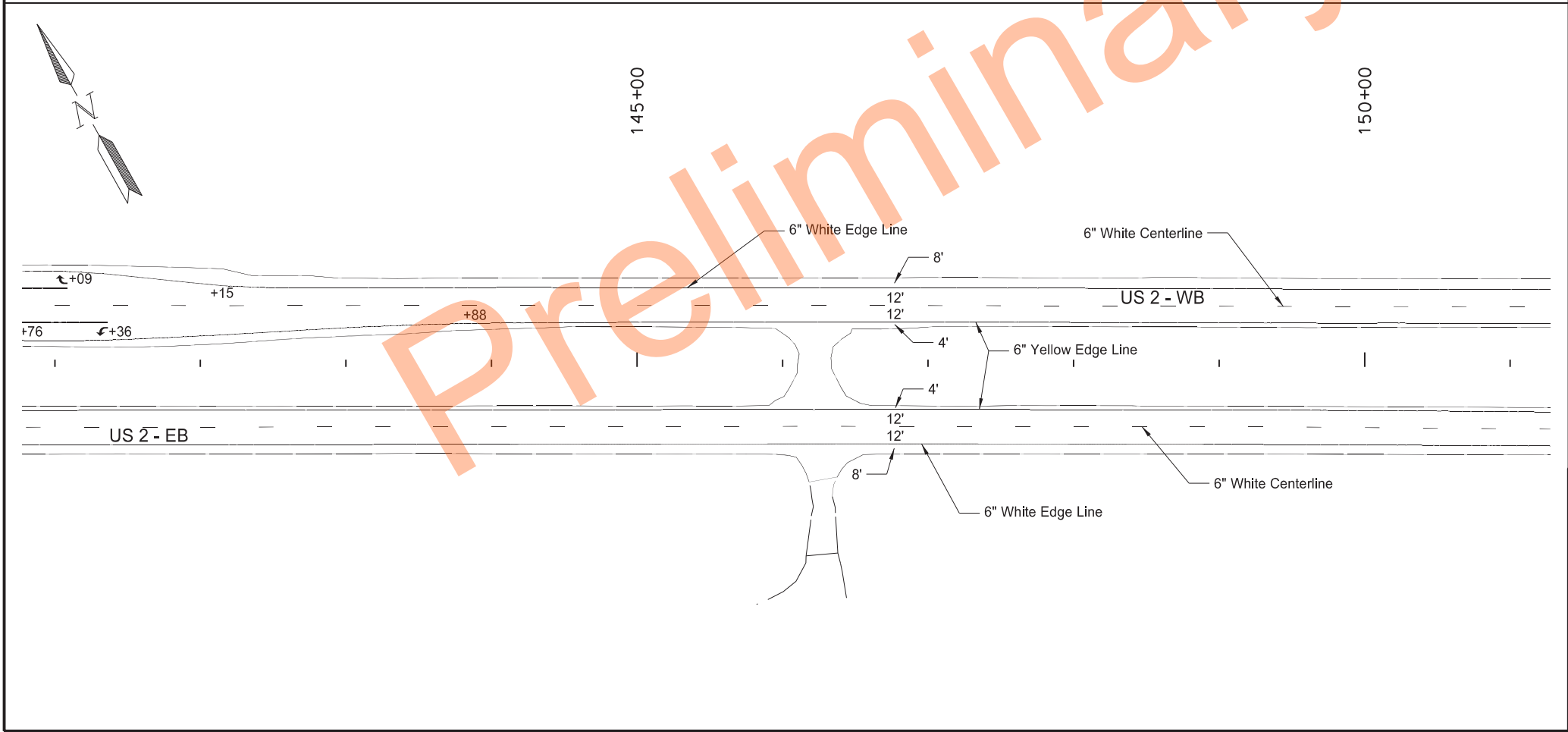
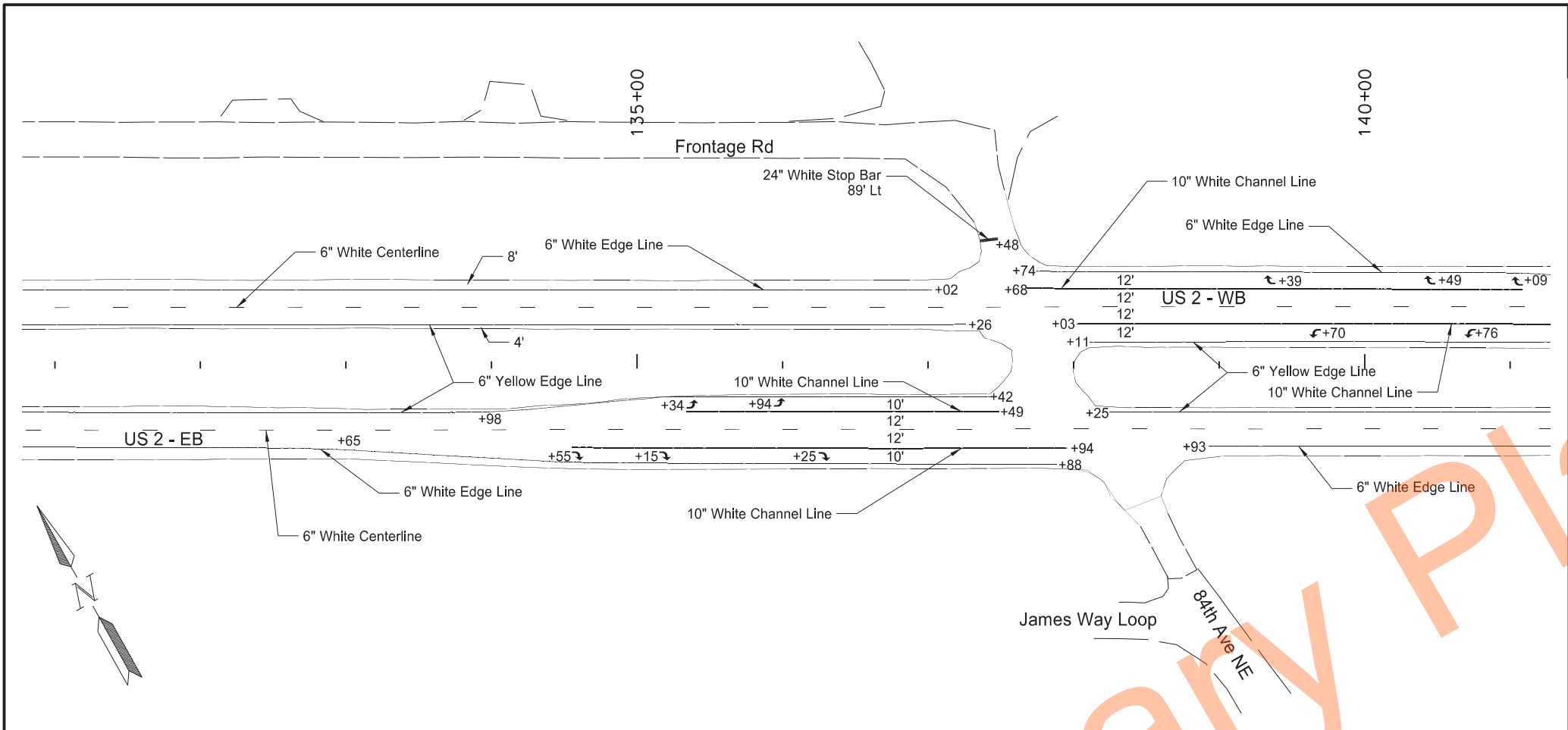
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	4

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (4)	64	SF
		Right Turn Arrow (2)	32	SF
		TOTAL	96	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3838	LF
		6" White Centerline	1001	LF
		6" Yellow Edge Line	3863	LF
		TOTAL	8702	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	289	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" White Stop Bar	15	LF

Pavement Marking Layout
Sta 111+00 to Sta 131+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	5
SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (5)	80	SF
		Right Turn Arrow (6)	96	SF
		TOTAL	176	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3824	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3833	LF
		TOTAL	8657	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	1227	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" White Stop Bar	12	LF

Pavement Marking Layout

Sta 131+00 to Sta 151+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

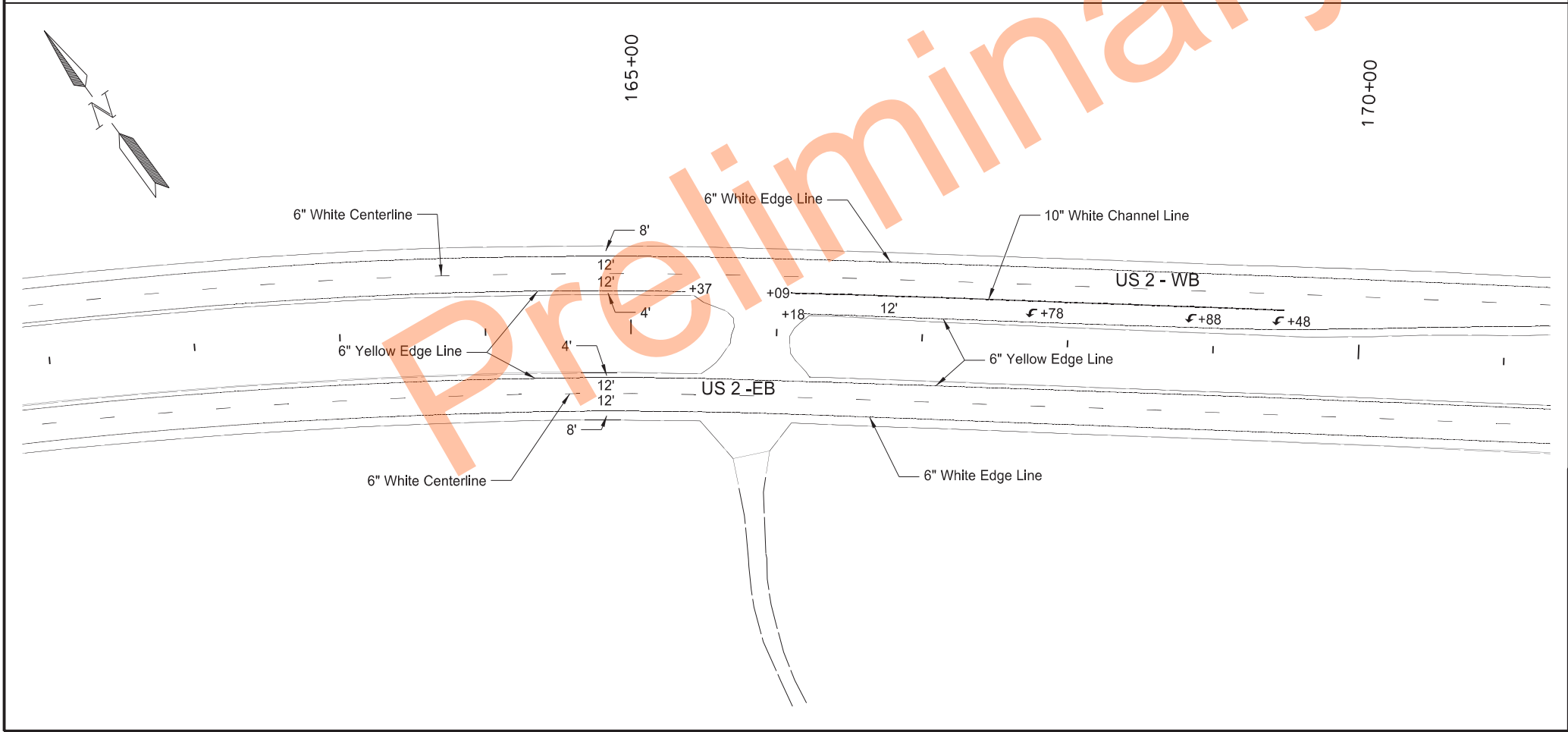
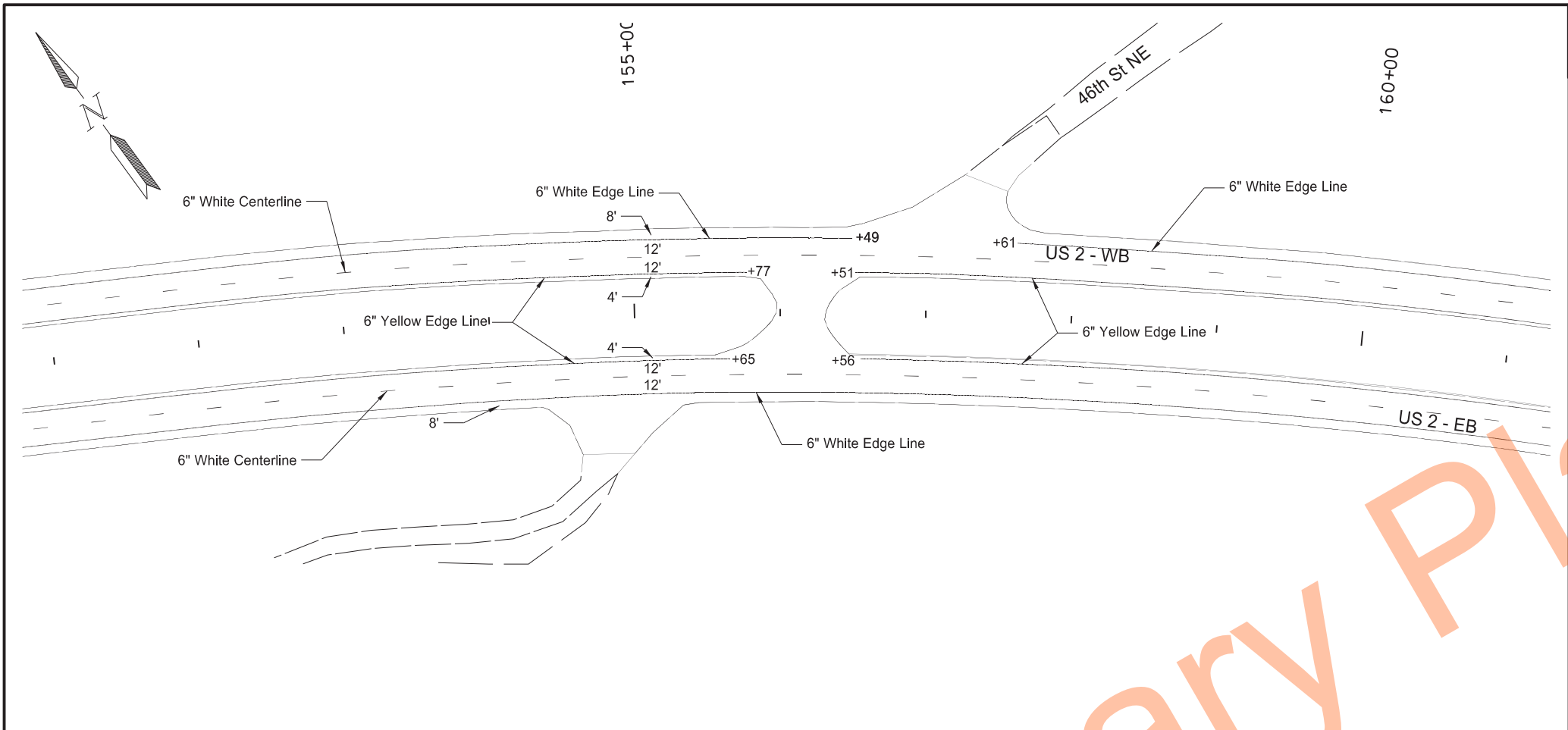
REGISTERED PROFESSIONAL ENGINEER

CHRISTOPHER H. MAPLES

PE - 10272

DATE 12/22/23

NORTH DAKOTA

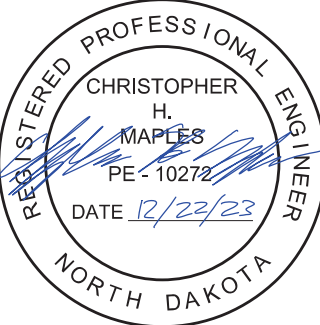


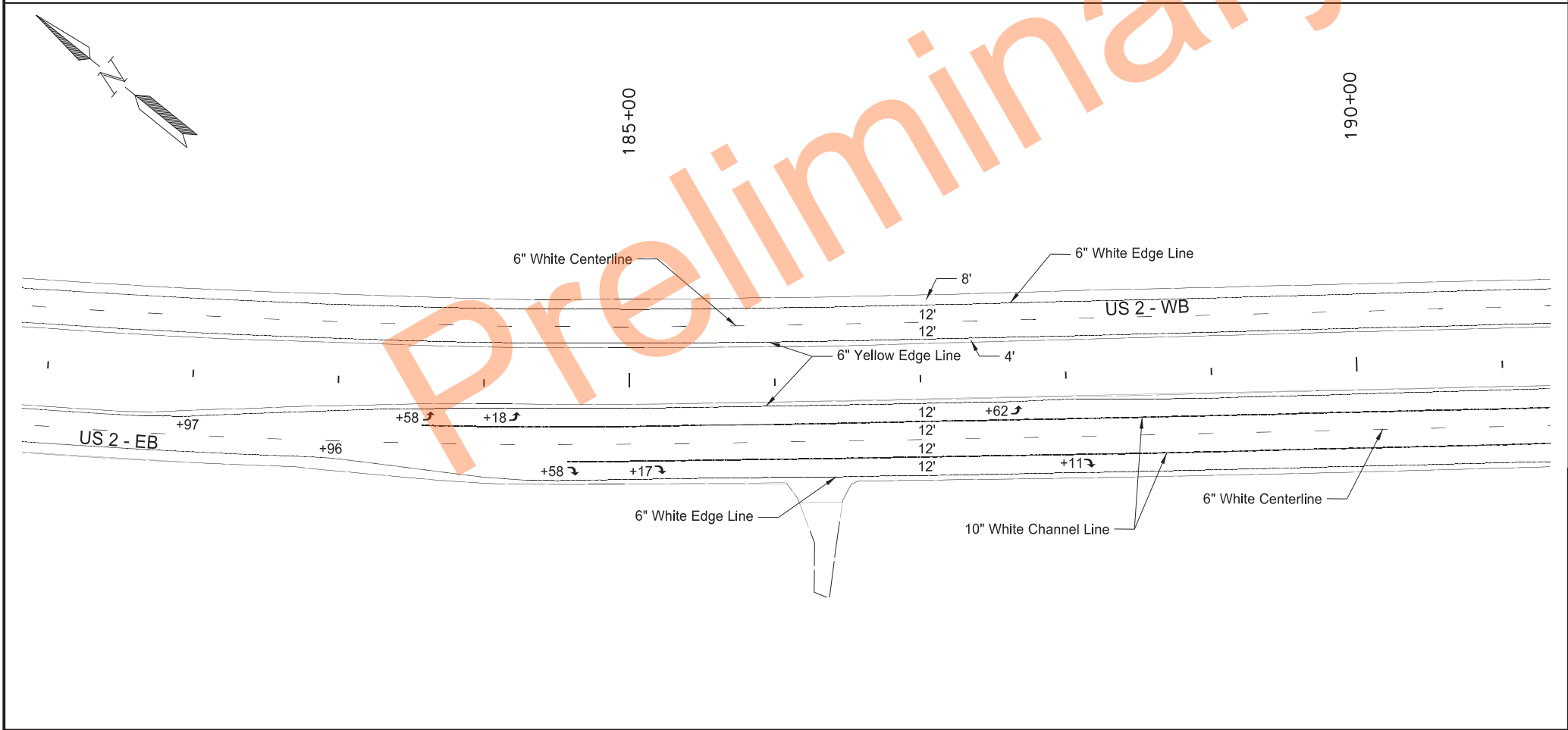
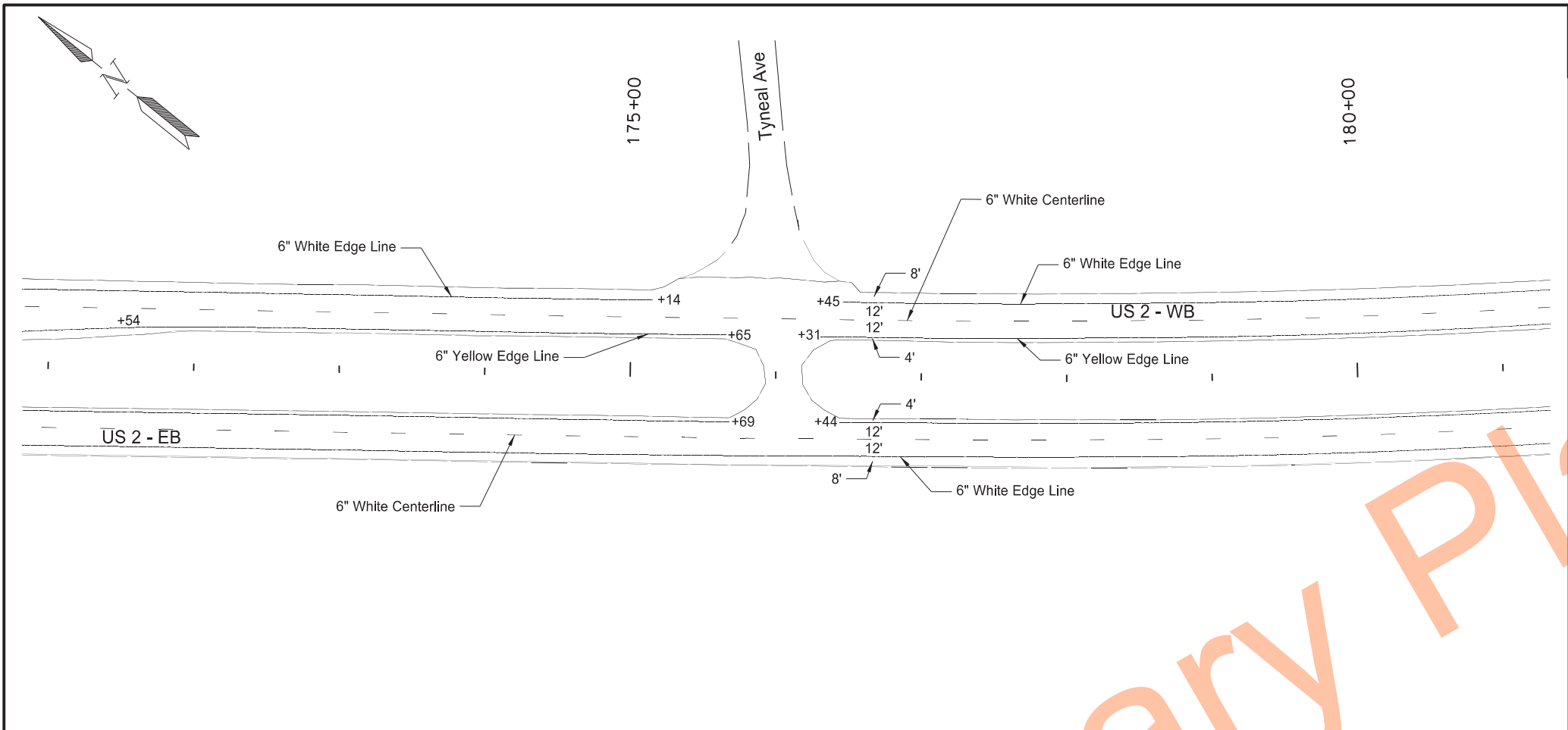
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	6

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE Left Turn Arrow (3)	48	SF
762	1106	PVMT MK PAINTED 6IN LINE 6" White Edge Line 6" White Centerline 6" Yellow Edge Line	3886 1000 3754	LF
		TOTAL	8640	LF
762	1110	PVMT MK PAINTED 10IN LINE 10" White Channel Line	339	LF

Pavement Marking Layout
Sta 151+00 to Sta 171+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



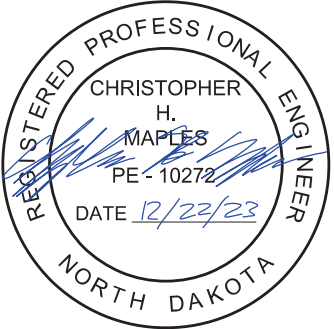


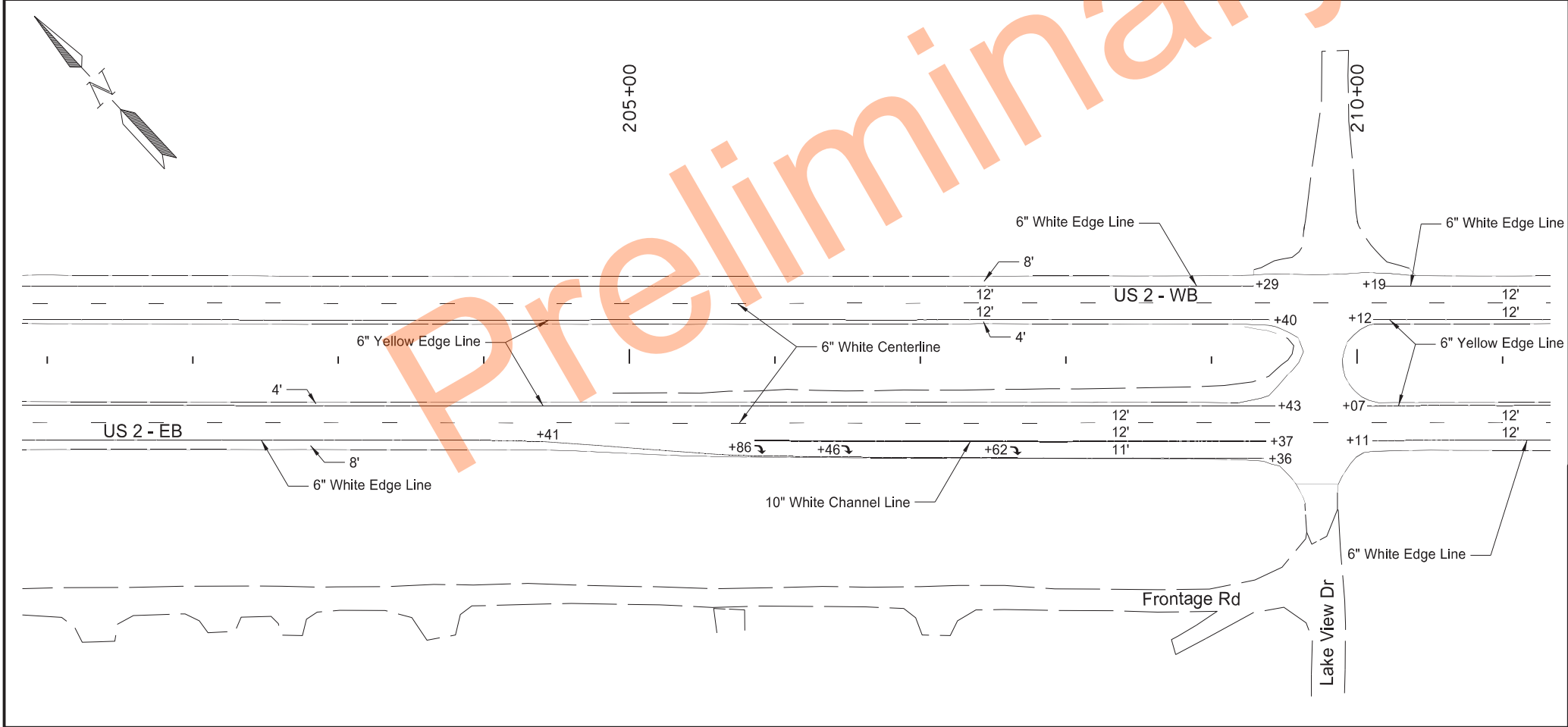
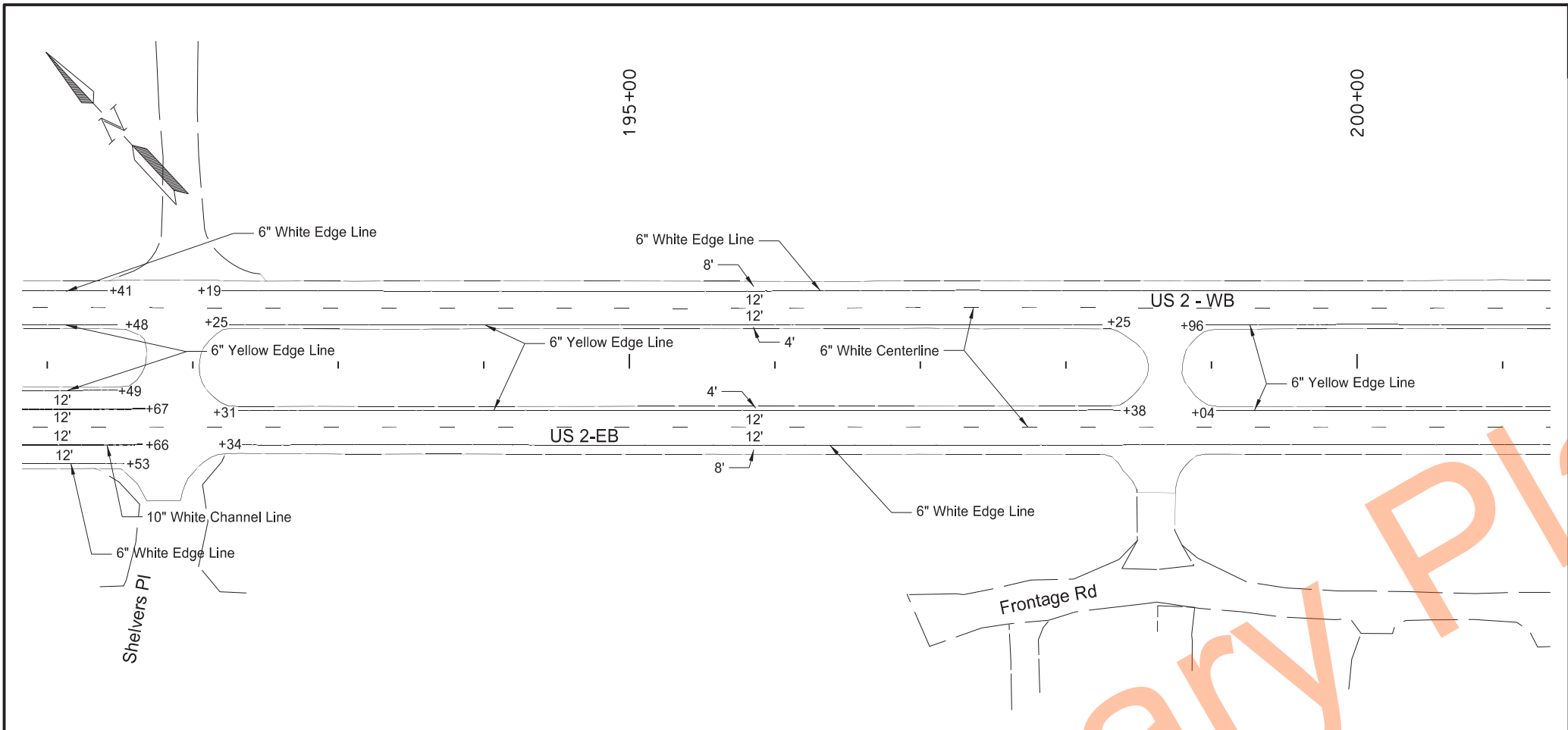
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ND	NH-3-002(173)270	120	7

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (3)	48	SF
		Right Turn Arrow (3)	48	SF
		TOTAL	96	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3870	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3858	LF
		TOTAL	8728	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	1387	LF

Pavement Marking Layout
Sta 171+00 to Sta 191+00

US-2 Devils Lake 4 Lane
to Heftl Rest Area EB & WB
Ramsey County, ND



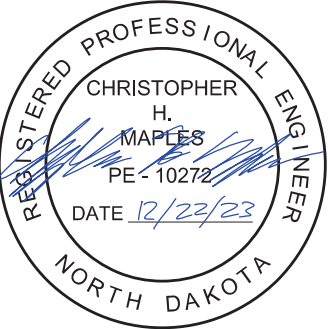


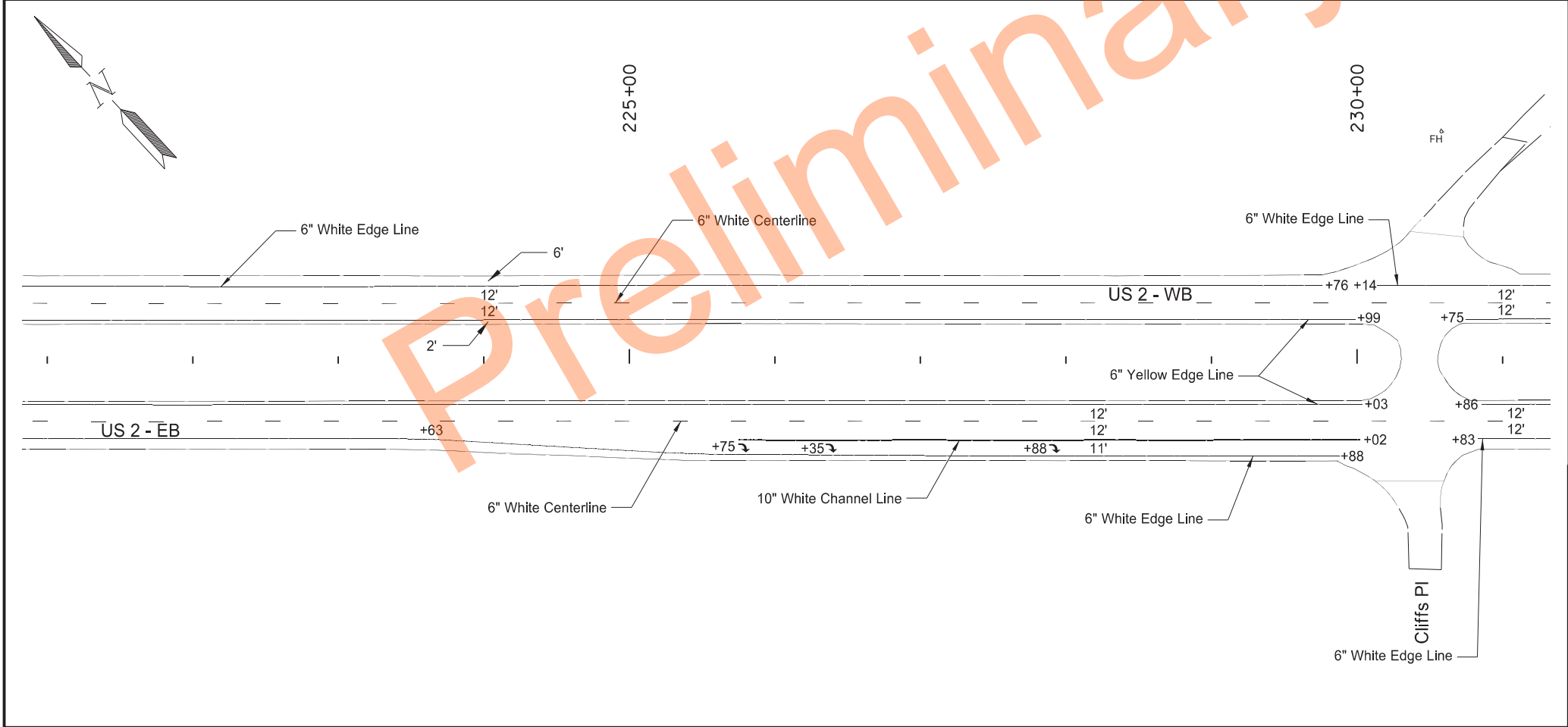
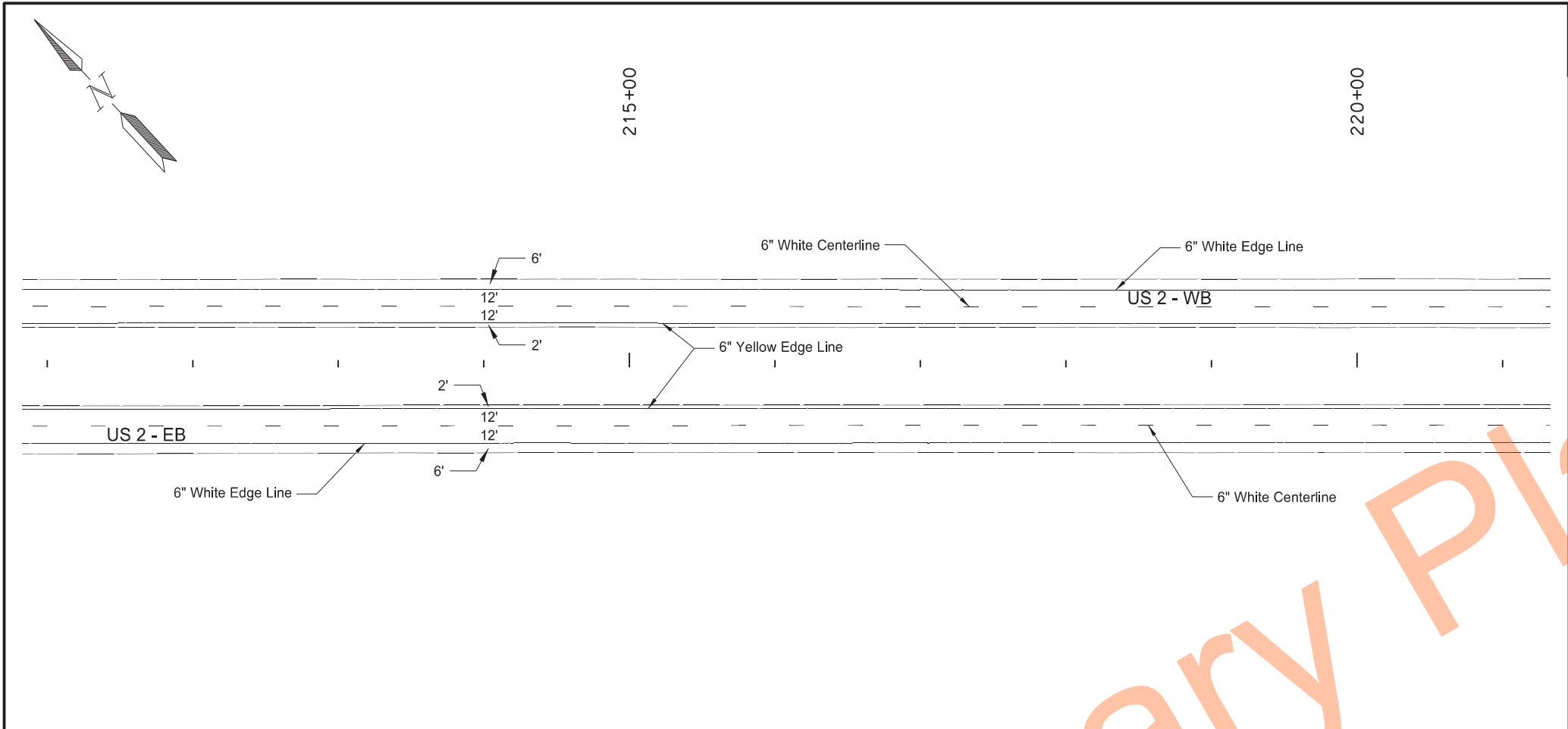
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	8

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE Right Turn Arrow (3)		48 SF
762	1106	PVMT MK PAINTED 6IN LINE 6" White Edge Line 6" White Centerline 6" Yellow Edge Line	3676 LF 1000 LF 3567 LF	
		TOTAL	8243 LF	
762	1110	PVMT MK PAINTED 10IN LINE 10" White Channel Line	485 LF	

Pavement Marking Layout
Sta 191+00 to Sta 211+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



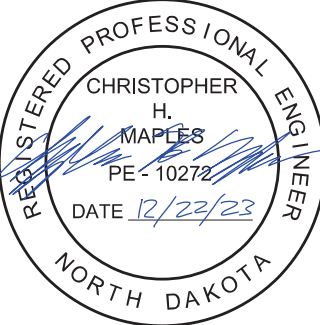


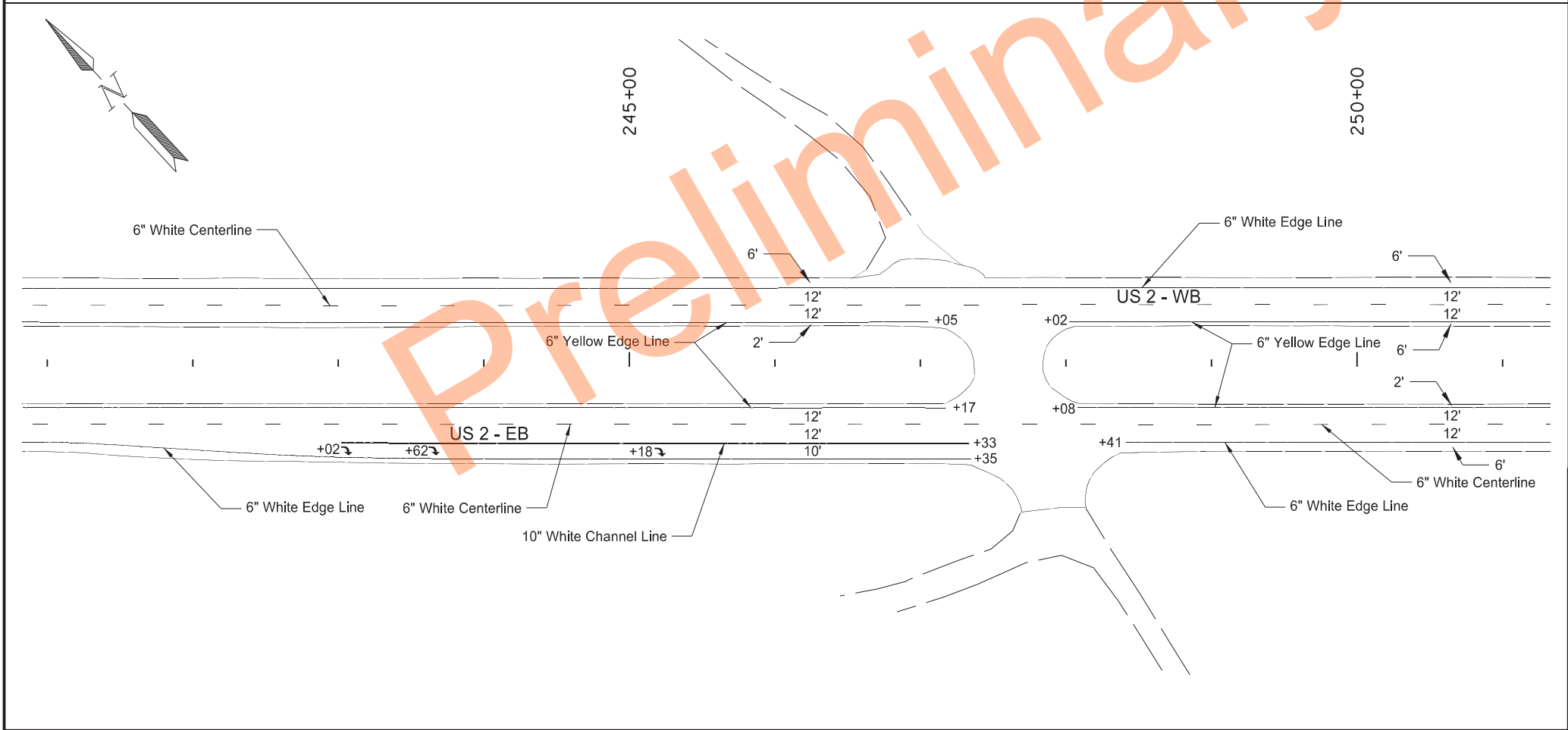
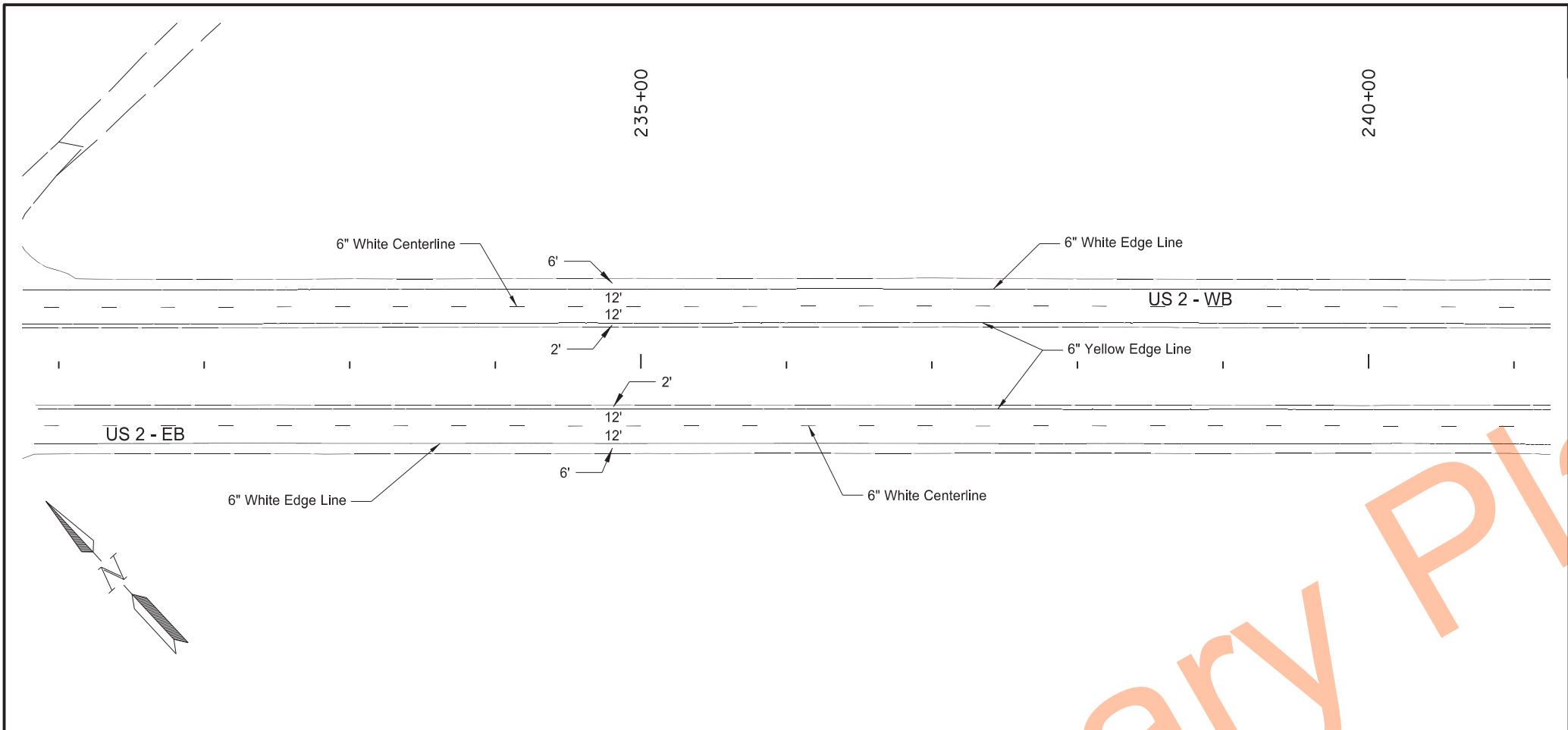
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	9

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE Right Turn Arrow (3)		48 SF
762	1106	PVMT MK PAINTED 6IN LINE 6" White Edge Line 6" White Centerline 6" Yellow Edge Line	3781 LF 1000 LF 3842 LF	
		TOTAL	8623 LF	
762	1110	PVMT MK PAINTED 10IN LINE 10" White Channel Line	427 LF	

Pavement Marking Layout
Sta 211+00 to Sta 231+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



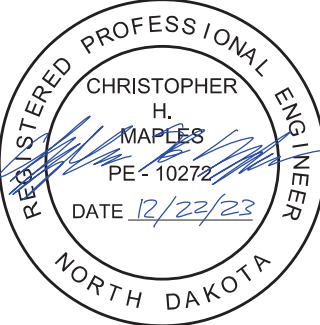


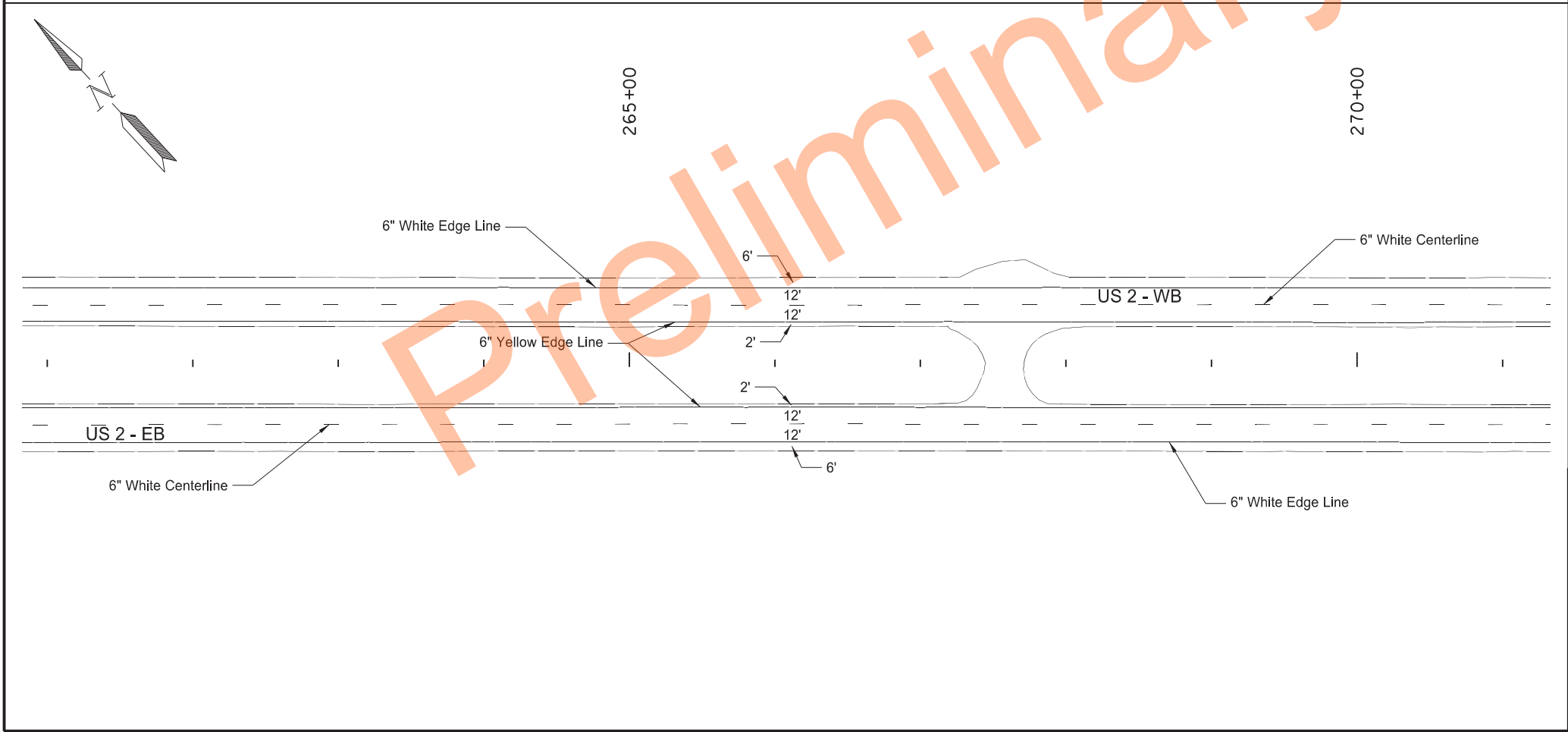
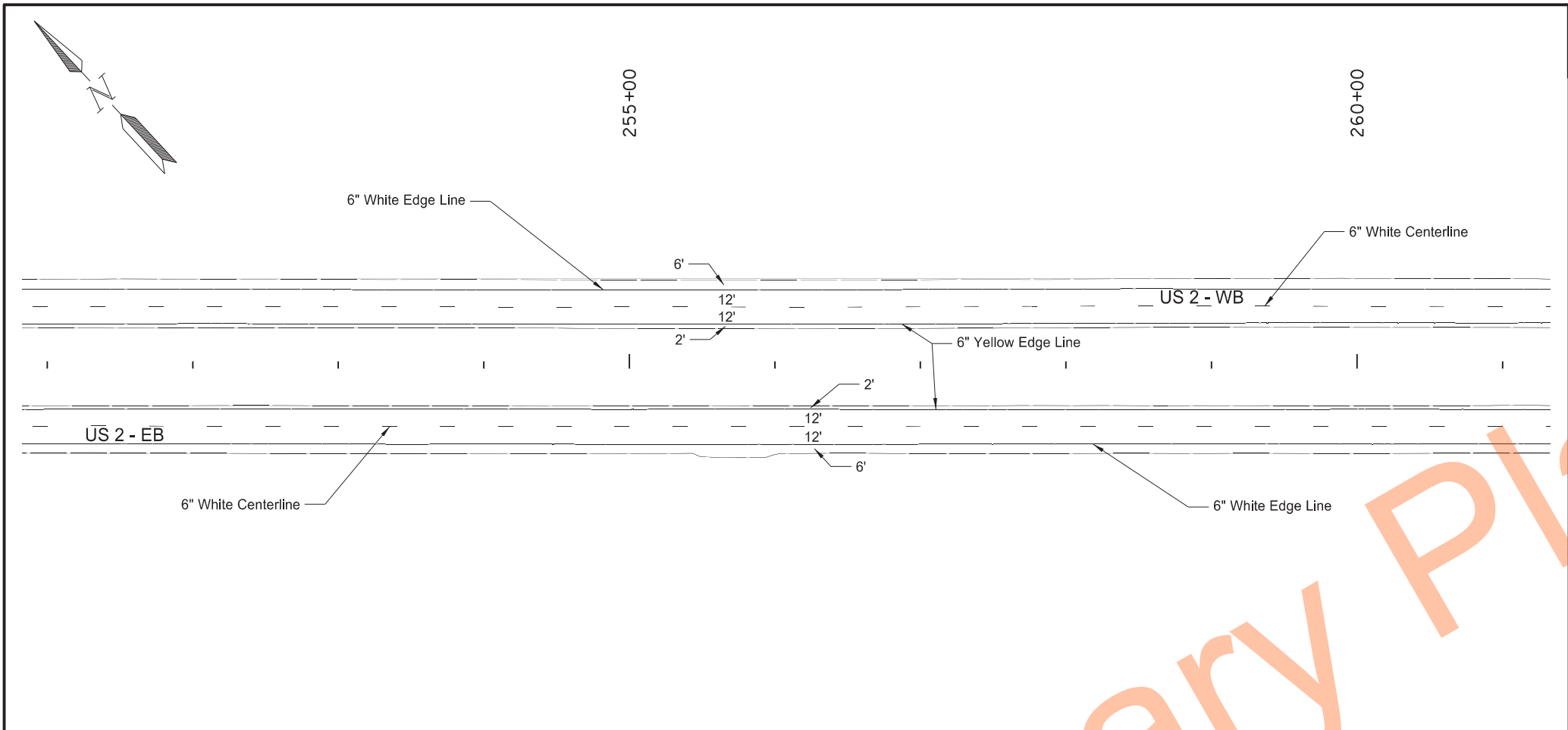
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	10

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE Right Turn Arrow (3)		48 SF
762	1106	PVMT MK PAINTED 6IN LINE 6" White Edge Line 6" White Centerline 6" Yellow Edge Line	3879 LF 1000 LF 3812 LF	
		TOTAL	8691 LF	
762	1110	PVMT MK PAINTED 10IN LINE 10" White Channel Line	431 LF	

Pavement Marking Layout
Sta 231+00 to Sta 251+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



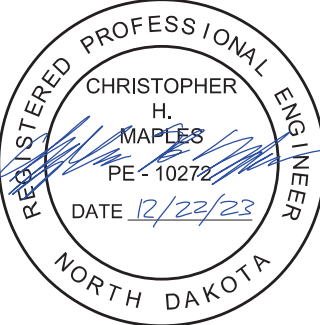


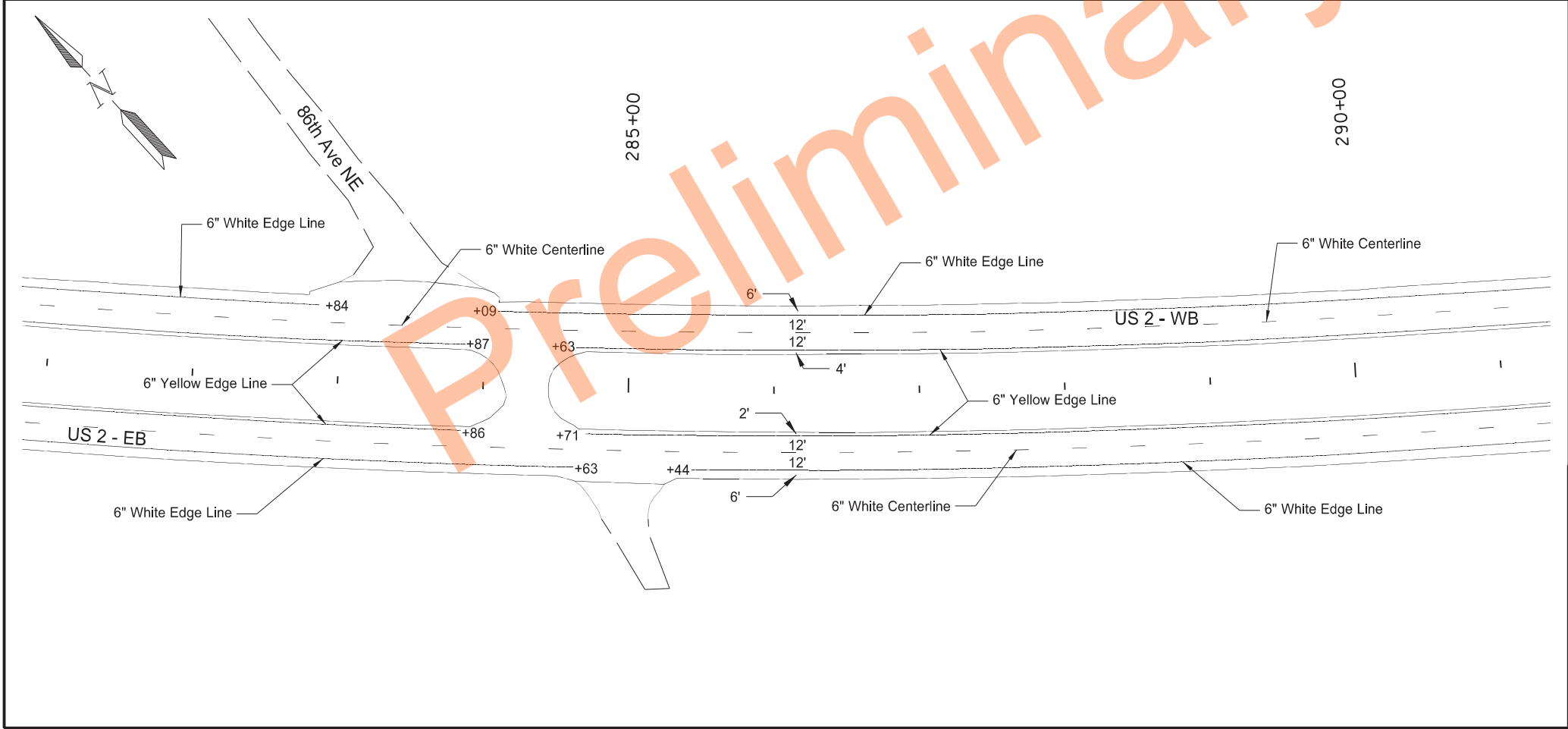
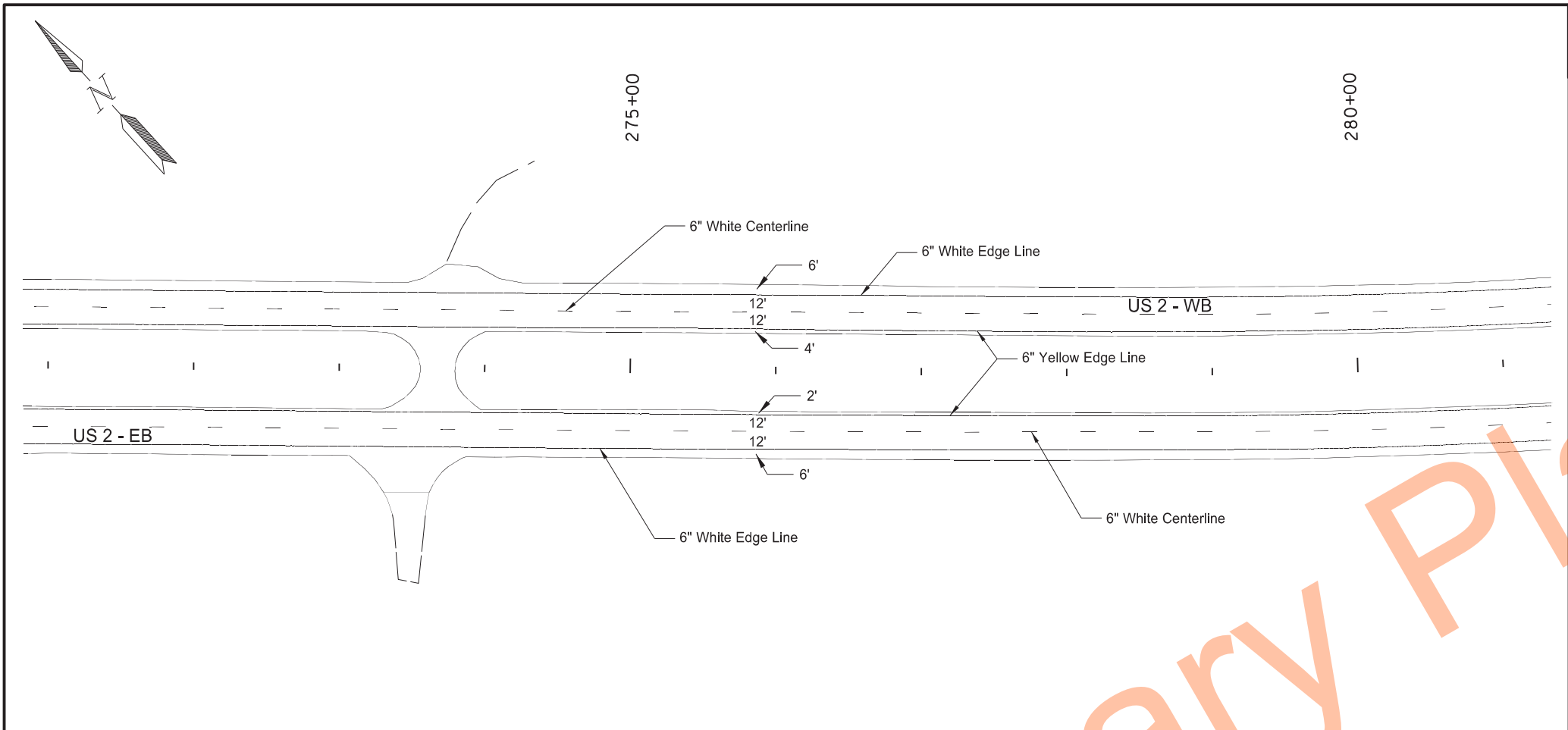
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	11

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	4000	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	4000	LF
		TOTAL	9000	LF

Pavement Marking Layout
Sta 251+00 to Sta 271+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



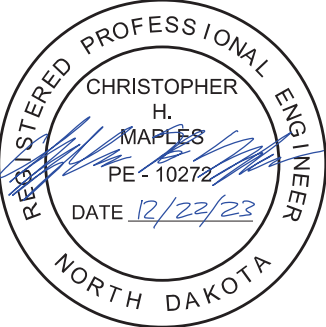


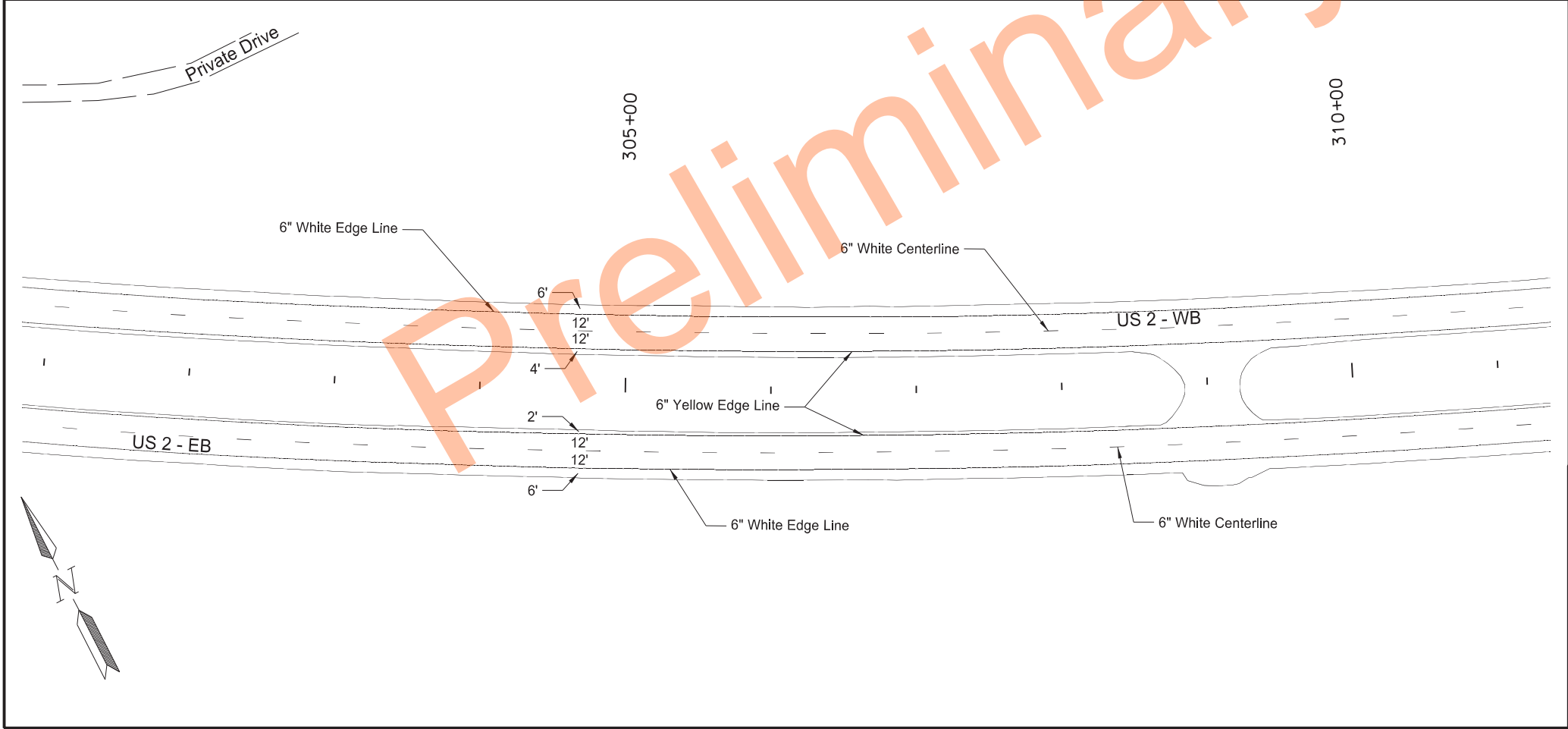
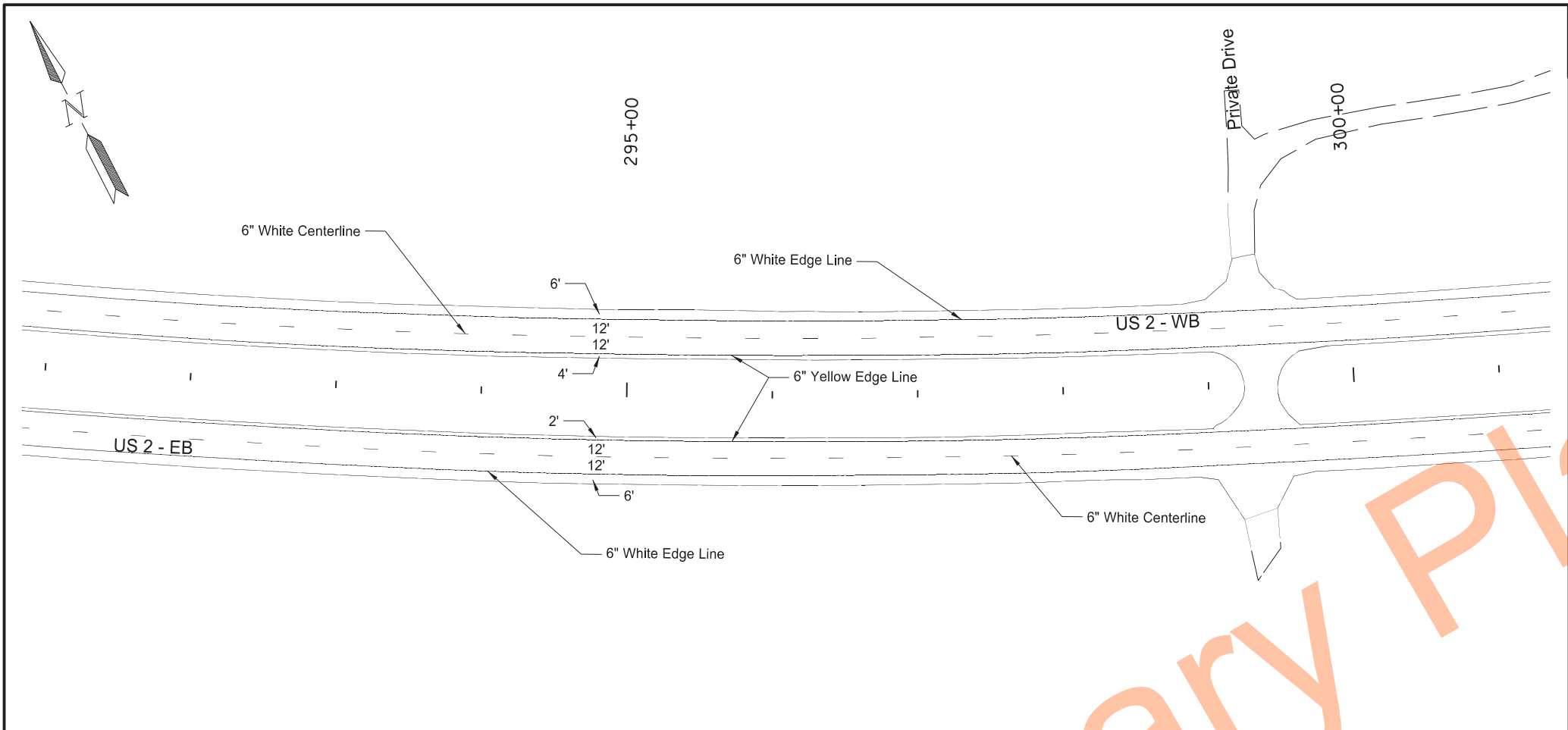
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	12

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3794	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3838	LF
		TOTAL	8632	LF

Pavement Marking Layout
Sta 271+00 to Sta 291+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



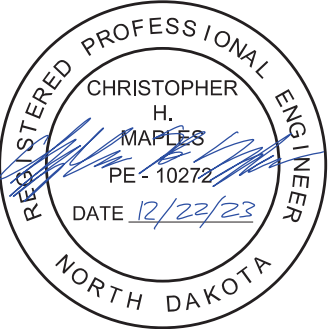


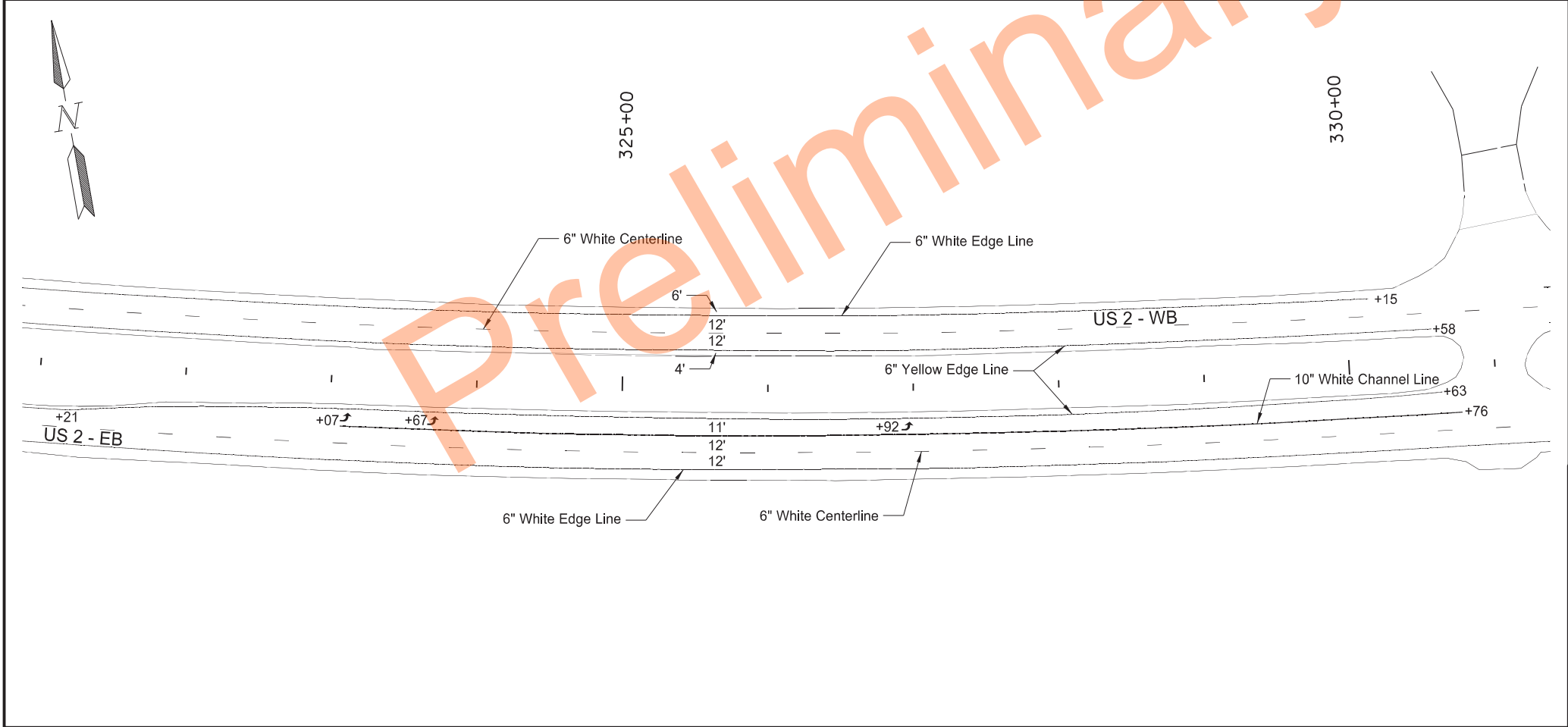
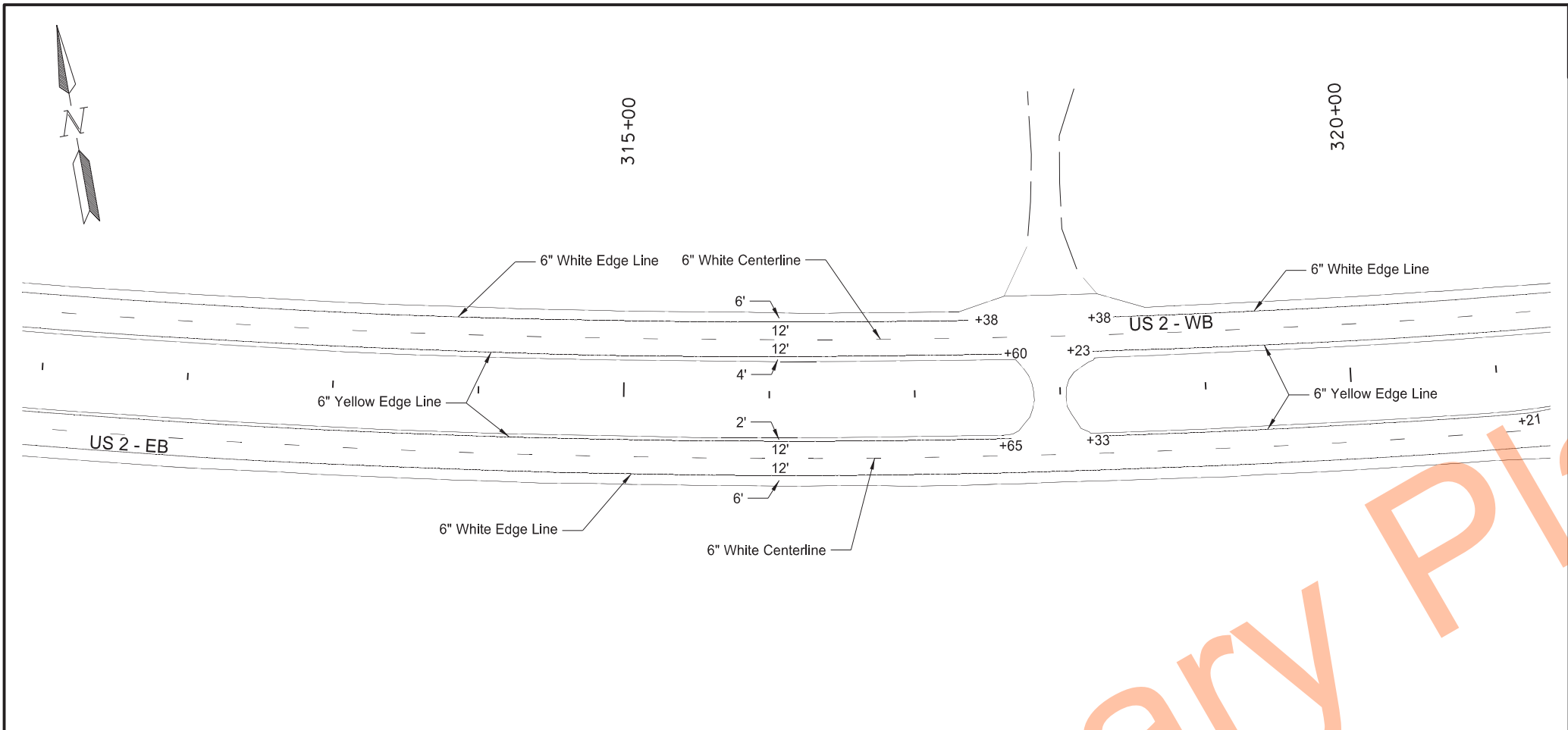
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	13

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	4000	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	4000	LF
		TOTAL	9000	LF

Pavement Marking Layout
Sta 291+00 to Sta 311+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



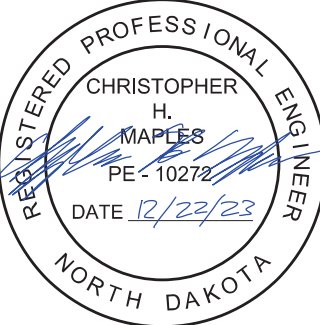


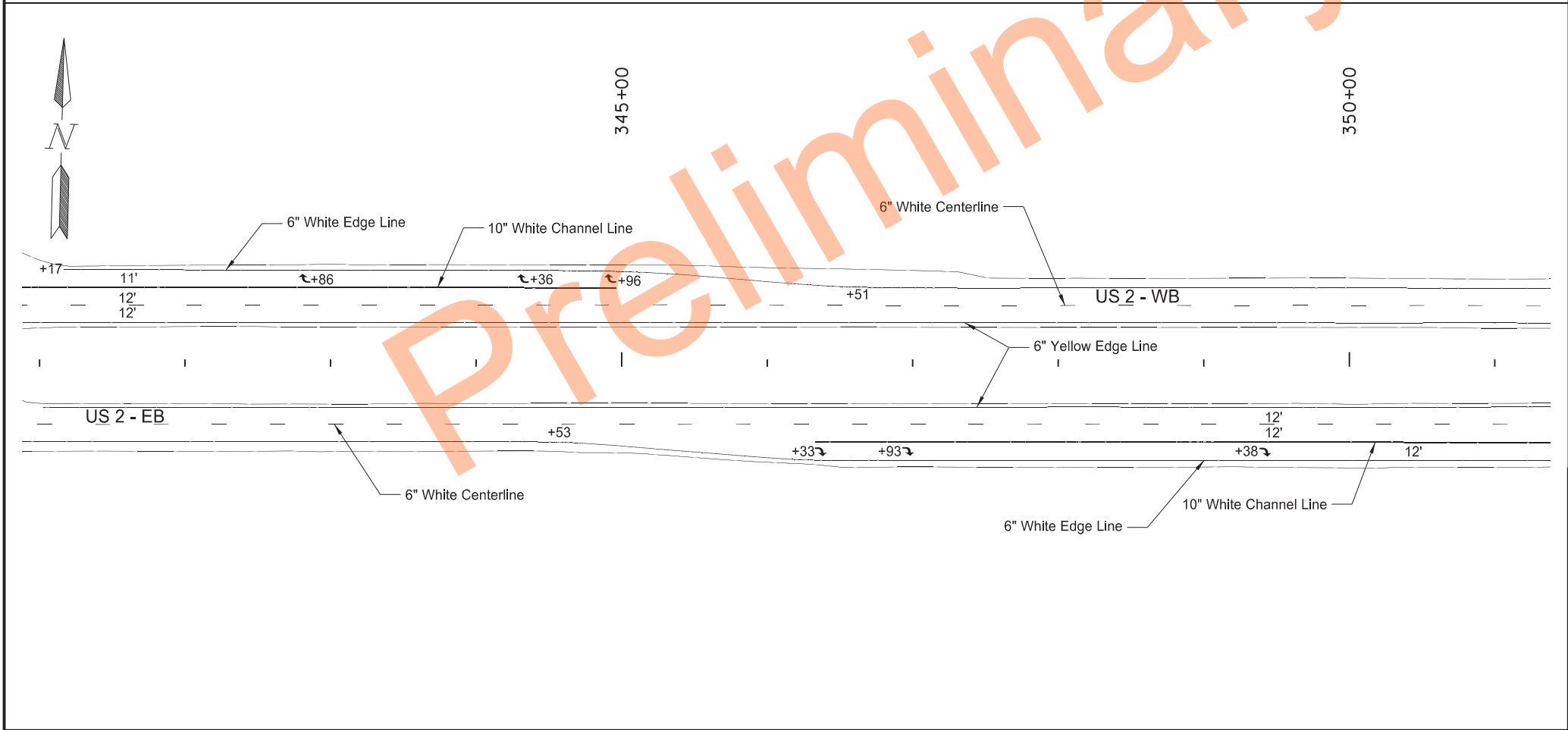
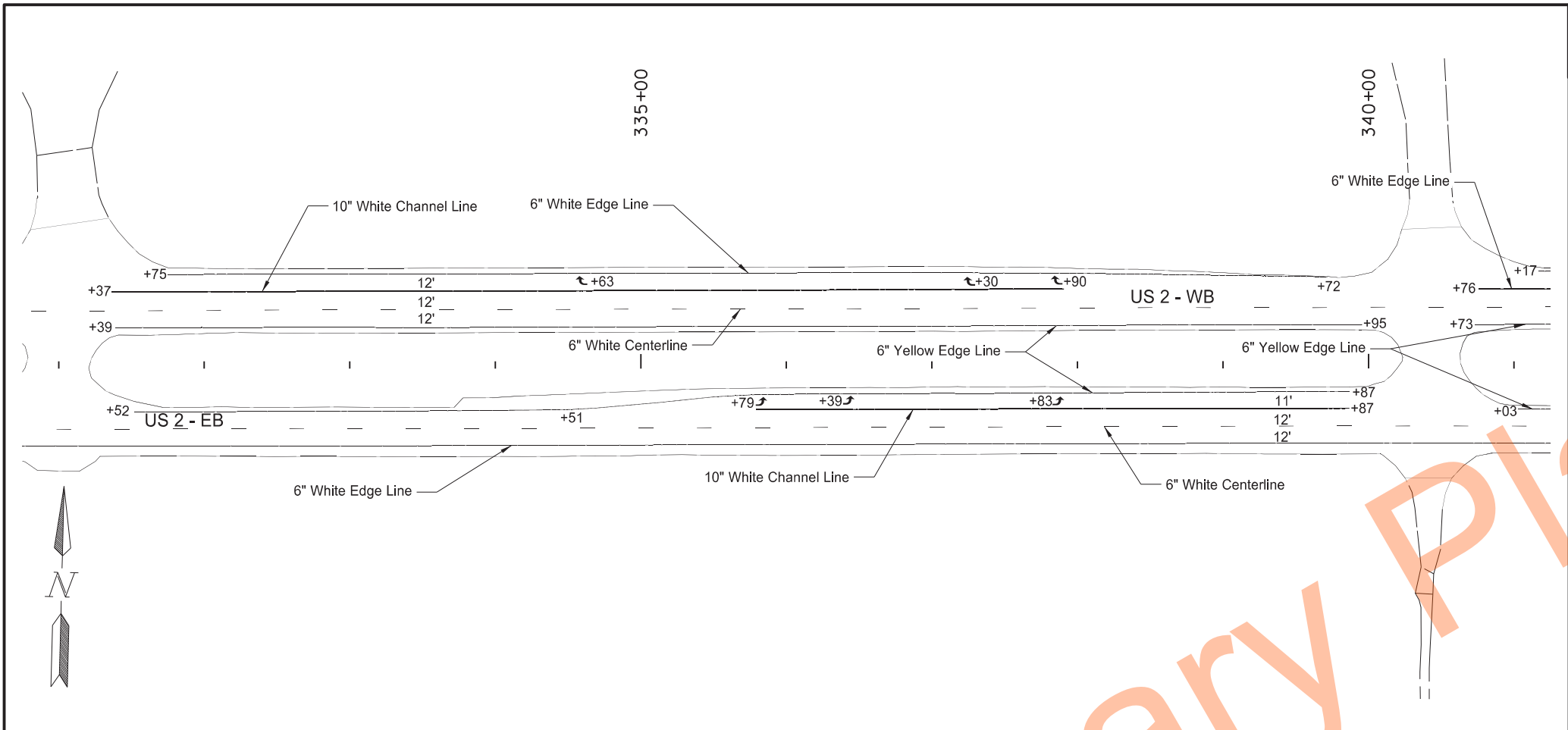
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	14

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE Left Turn Arrow (3)		48 SF
762	1106	PVMT MK PAINTED 6IN LINE 6" White Edge Line 6" White Centerline 6" Yellow Edge Line		3816 LF 1000 LF 3790 LF
		TOTAL		8606 LF
762	1110	PVMT MK PAINTED 10IN LINE 10" White Channel Line		772 LF

Pavement Marking Layout
Sta 311+00 to Sta 331+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



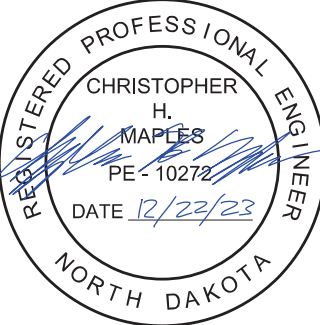


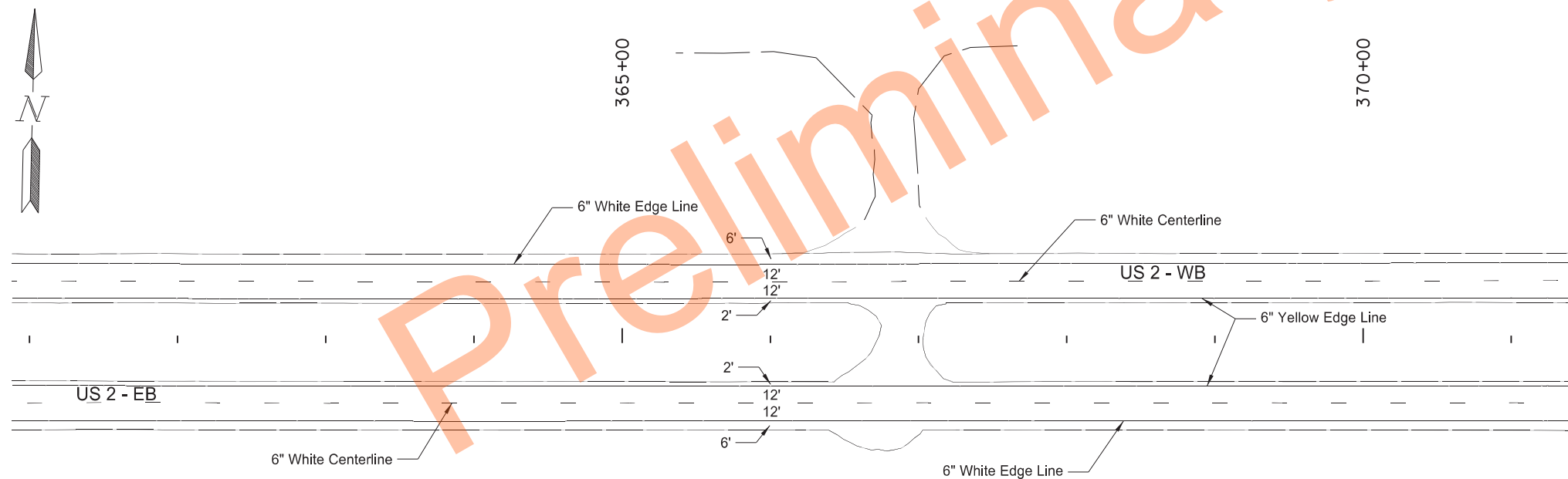
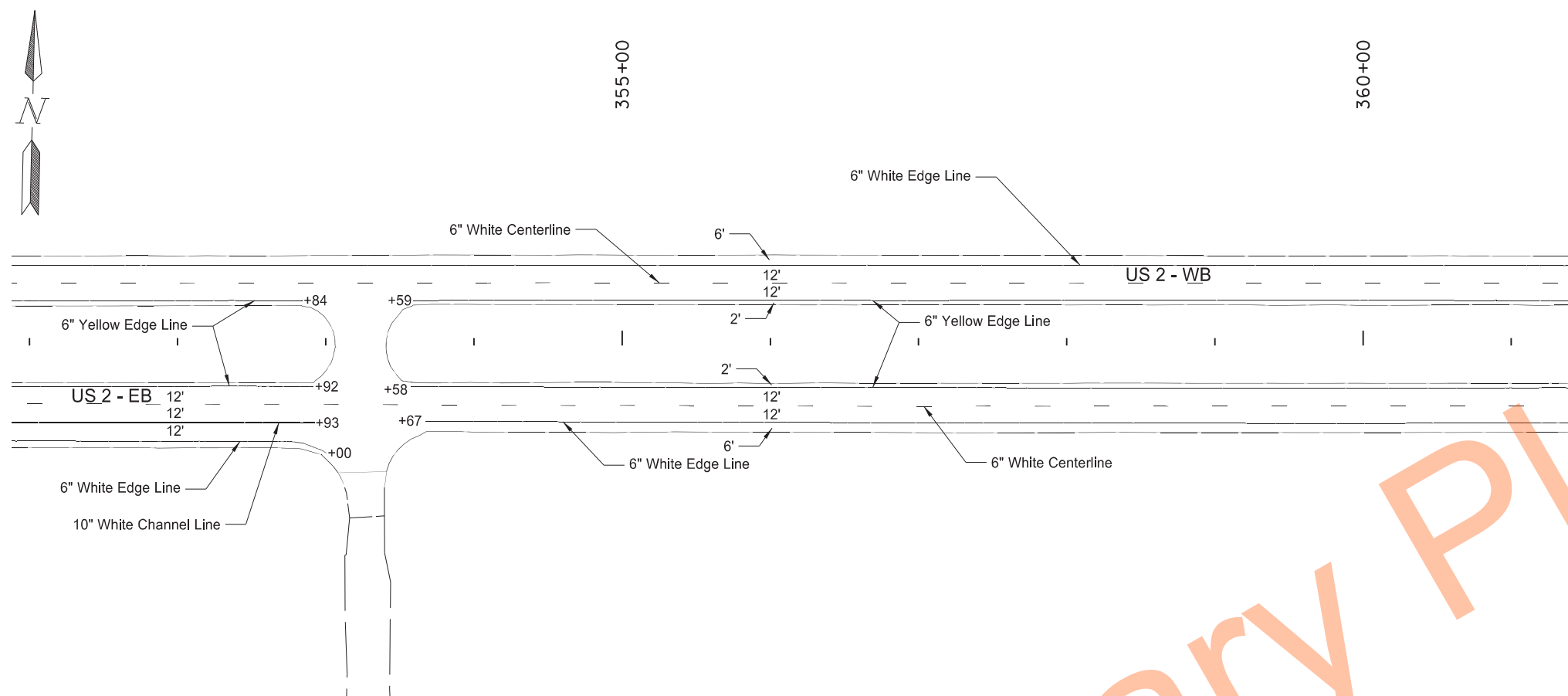
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	15

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (3)	48	SF
		Right Turn Arrow (9)	144	SF
		TOTAL	192	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3781	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3716	LF
		TOTAL	8497	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	1949	LF

Pavement Marking Layout
Sta 331+00 to 351+00

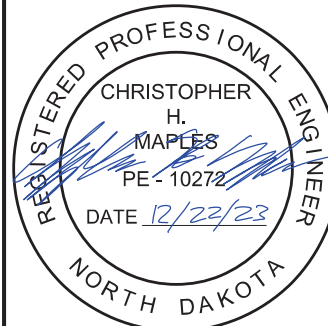
US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

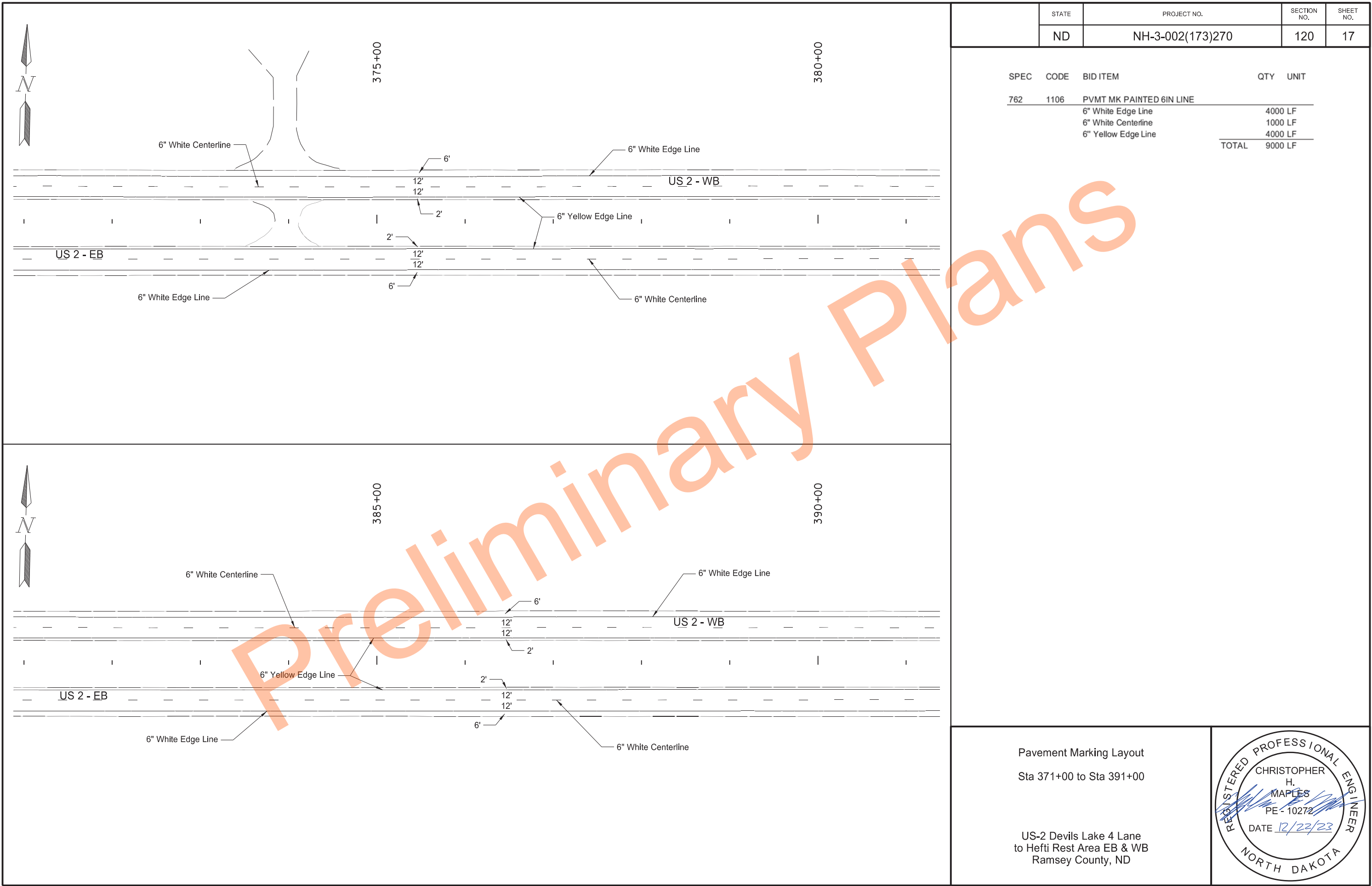


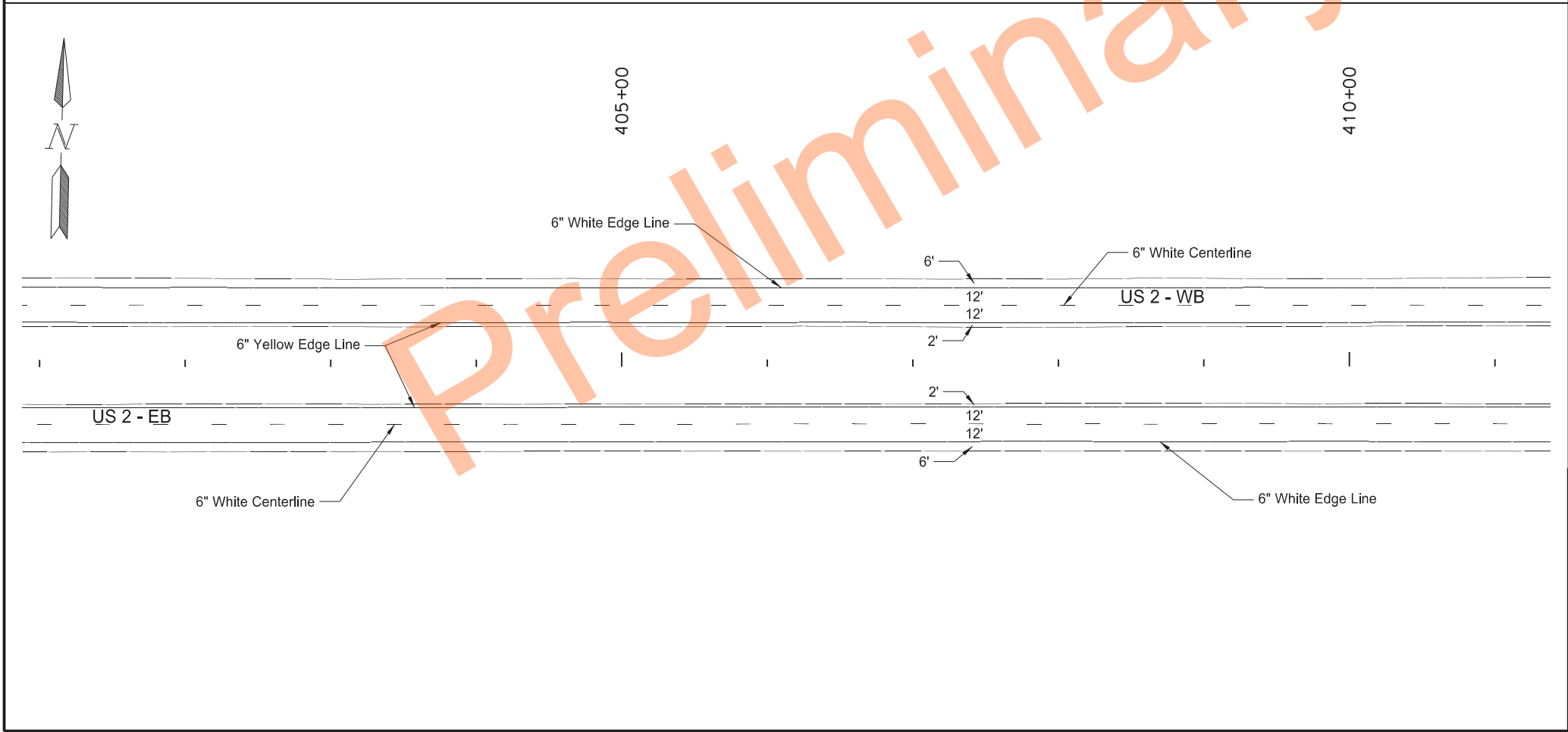
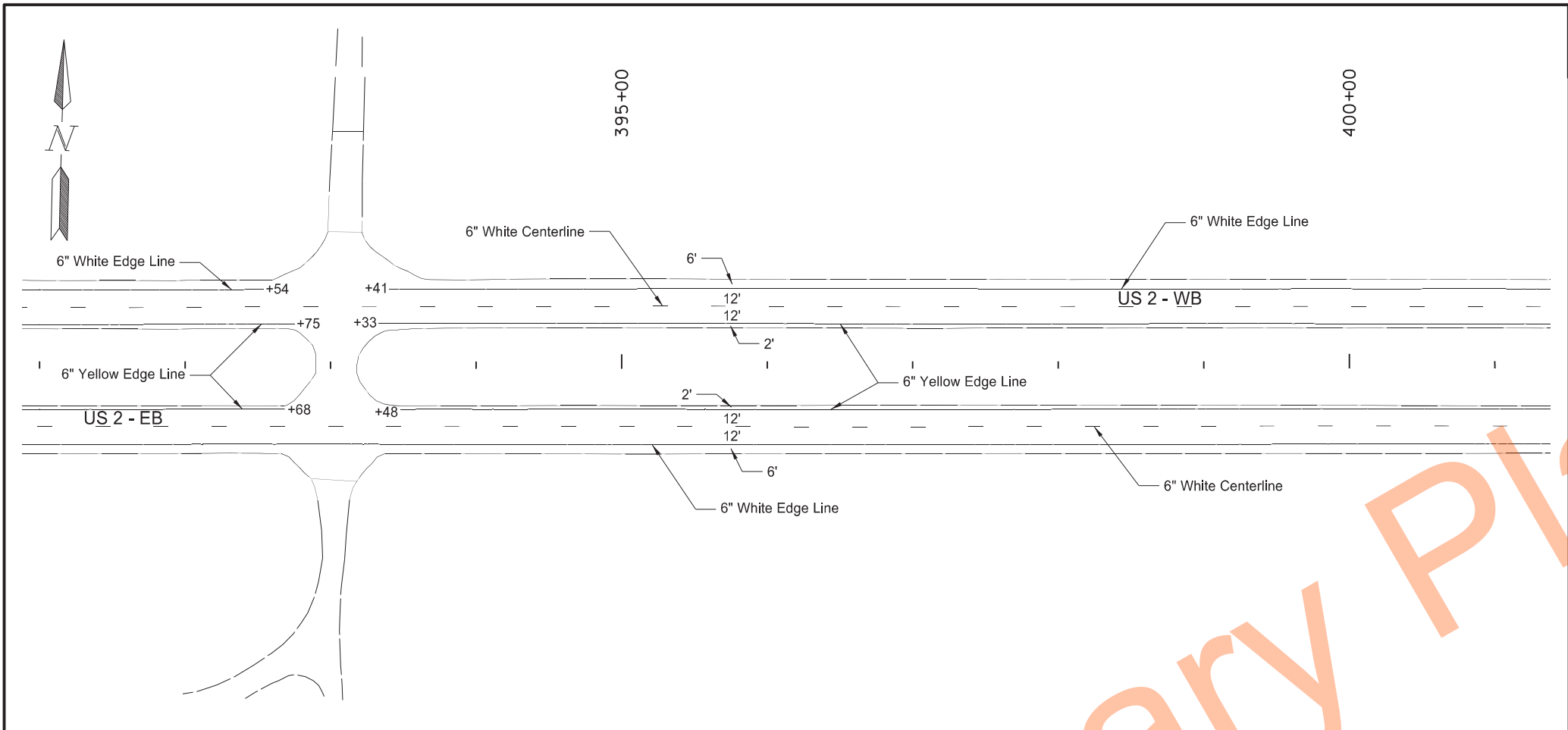


Pavement Marking Layout

Sta 351+00 to Sta 371+00





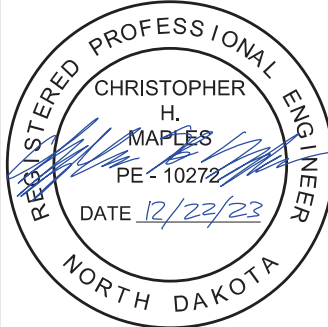


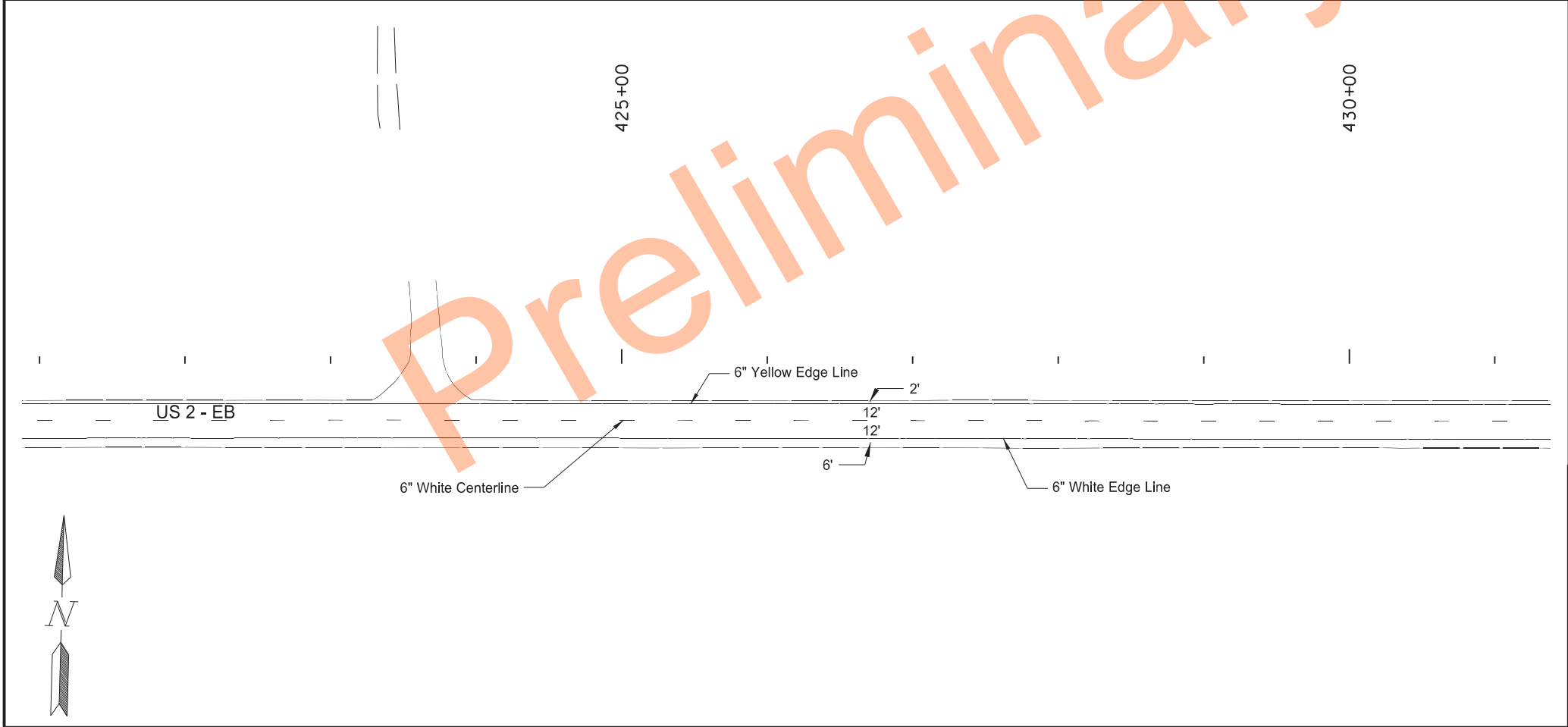
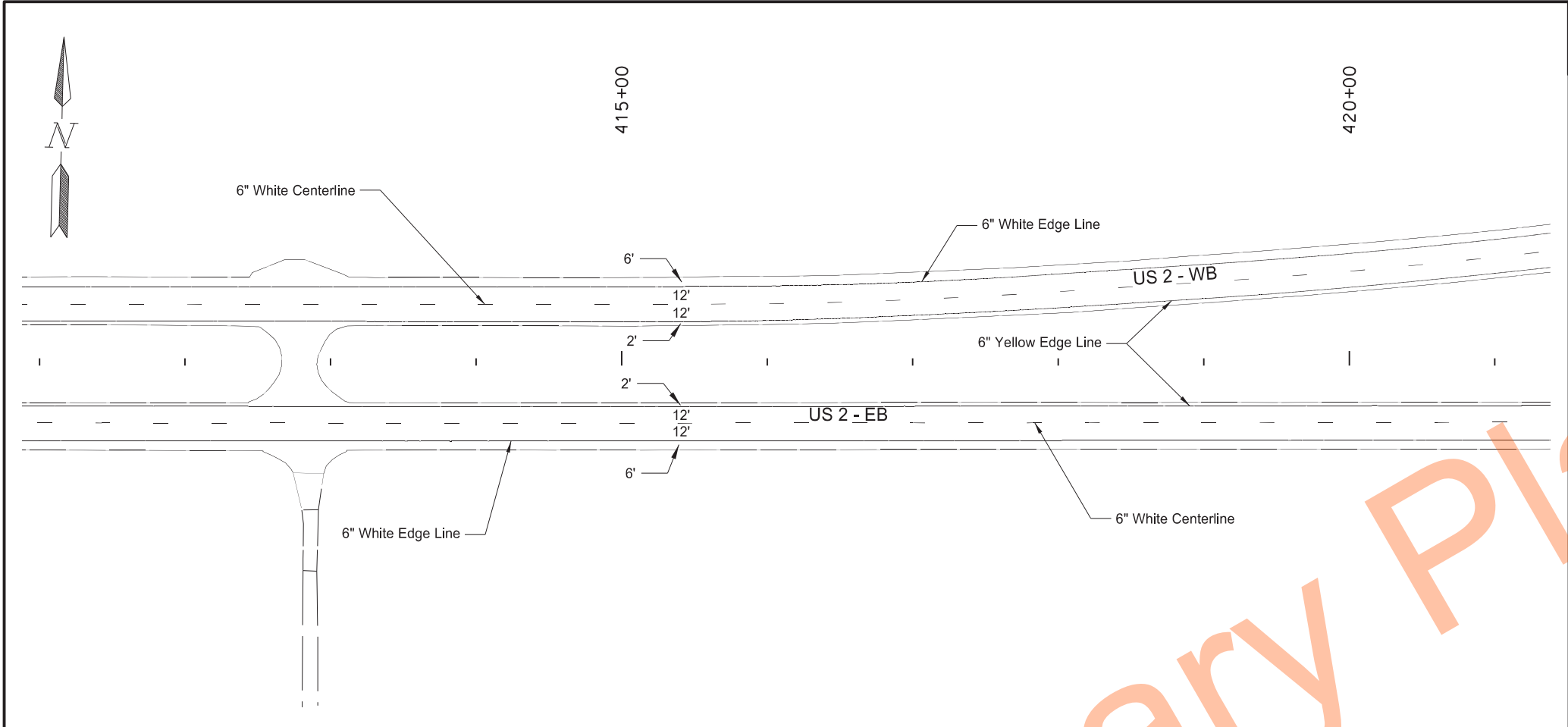
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	18

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3914	LF
		6" White Centerline	1000	LF
		6" Yellow Edge Line	3863	LF
		TOTAL	8777	LF

Pavement Marking Layout
Sta 391+00 to Sta 411+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND



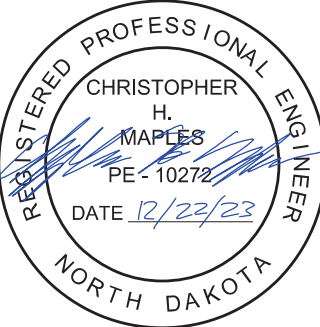


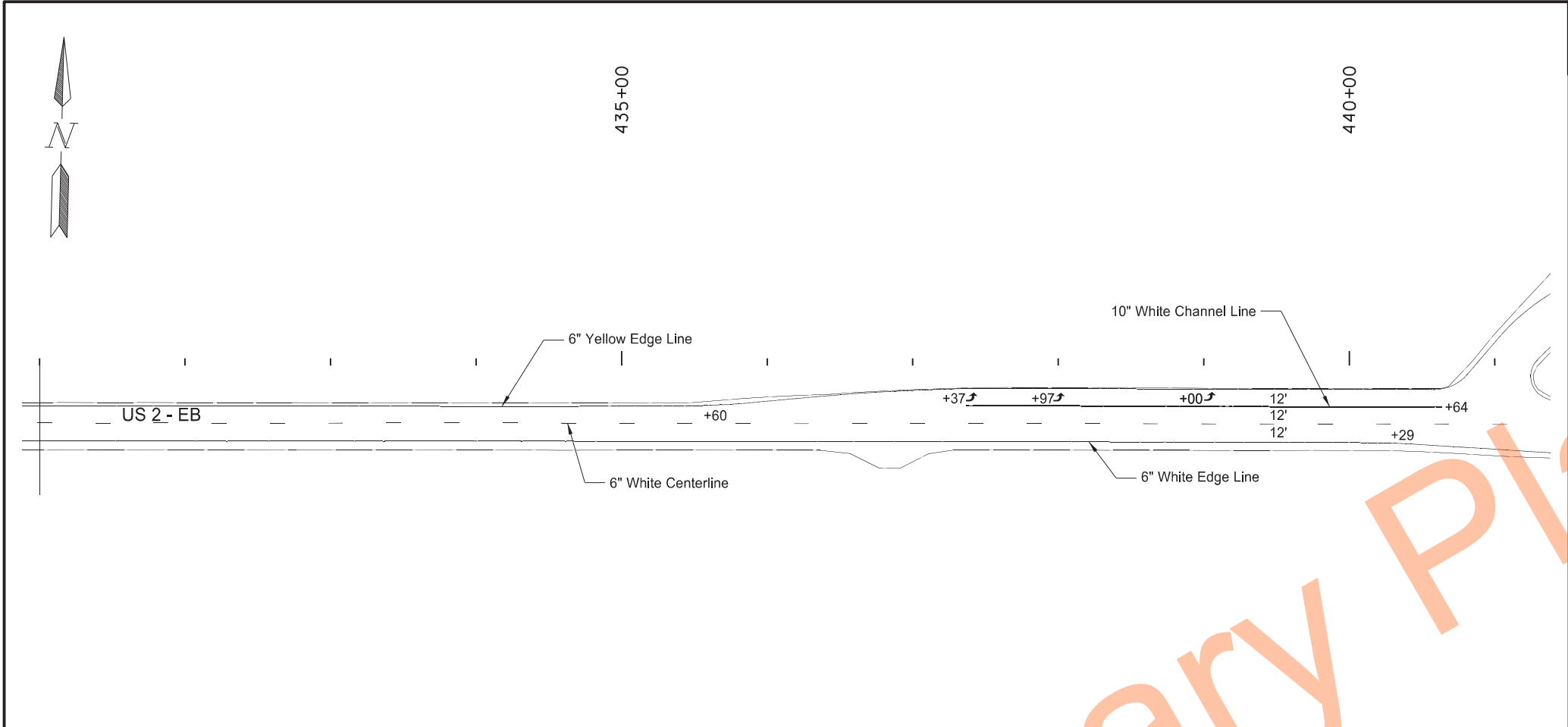
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	19

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	3001	LF
		6" White Centerline	750	LF
		6" Yellow Edge Line	3001	LF
		TOTAL	6752	LF

Pavement Marking Layout
Sta 411+00 to Sta 431+00

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	20
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (3)	48 SF	
		Right Turn Arrow (3)	48 SF	
		TOTAL	96 SF	
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	1461 LF	
		6" White Centerline	393 LF	
		6" Yellow Edge Line	1364 LF	
		TOTAL	3218 LF	
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	698 LF	

Pavement Marking Layout

Sta 431+00 to Sta 451+00

US-2 Devils Lake 4 Lane

to Hefti Rest Area EB & WB

Ramsey County, ND

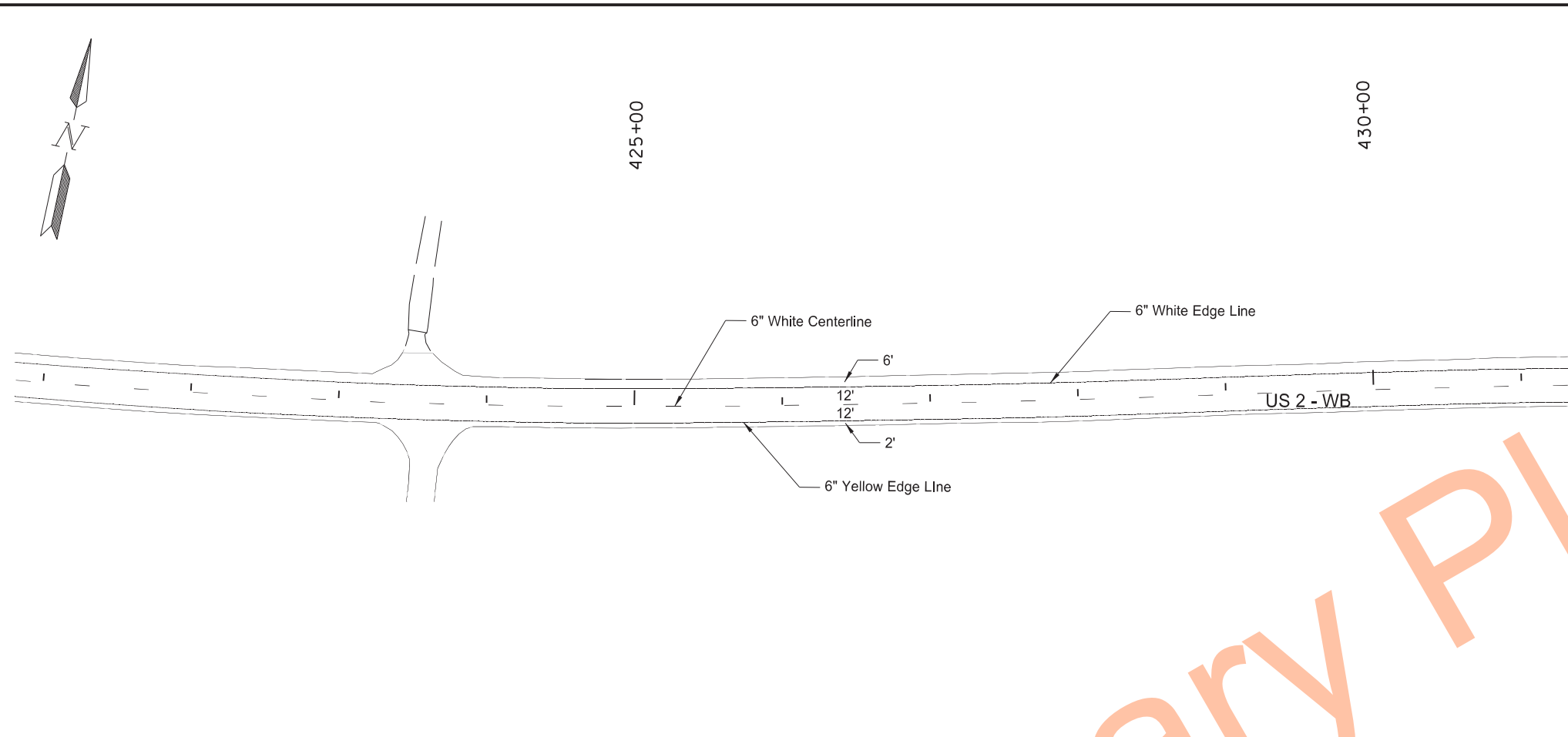
REGISTERED PROFESSIONAL ENGINEER

CHRISTOPHER H. MAPLES

PE - 10272

DATE 12/22/23

NORTH DAKOTA

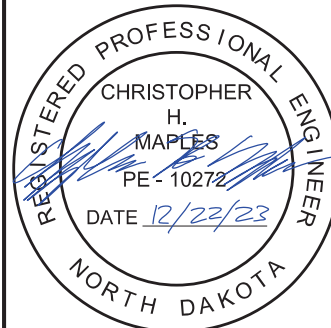


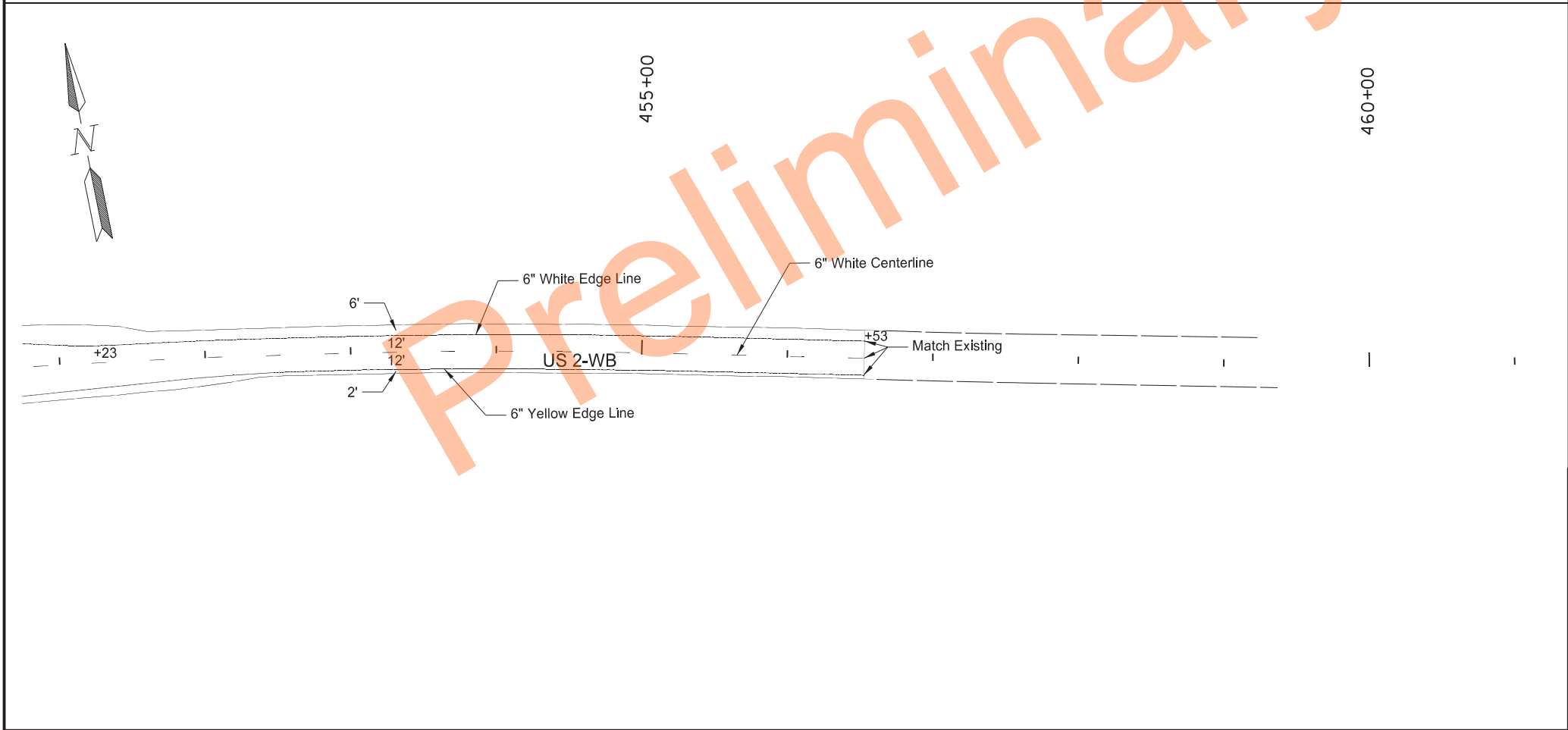
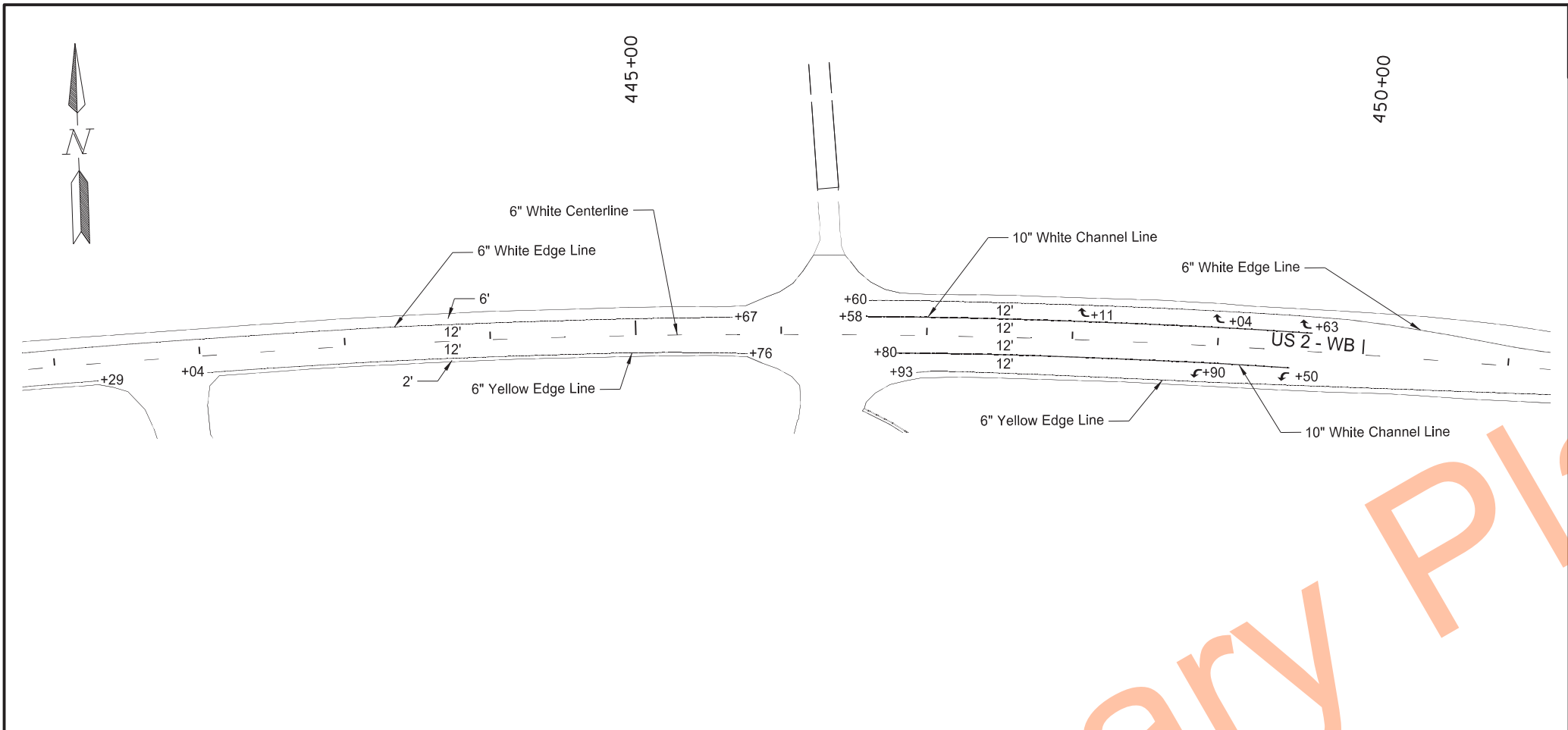
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(173)270	120	21

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	2025	LF
		6" White Centerline	506	LF
		6" Yellow Edge Line	2025	LF
		TOTAL	4556	LF

Pavement Marking Layout
Sta 421+00 to Sta 441+00
US-2 Westbound

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(173)270	120	22

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Left Turn Arrow (2)	32	SF
		Right Turn Arrow (3)	48	SF
		TOTAL	80	SF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" White Edge Line	1437	LF
		6" White Centerline	382	LF
		6" Yellow Edge Line	1331	LF
		TOTAL	3150	LF
762	1110	PVMT MK PAINTED 10IN LINE		
		10" White Channel Line	575	LF

Pavement Marking Layout

Sta 441+00 to Sta 461+00

US-2 Westbound

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

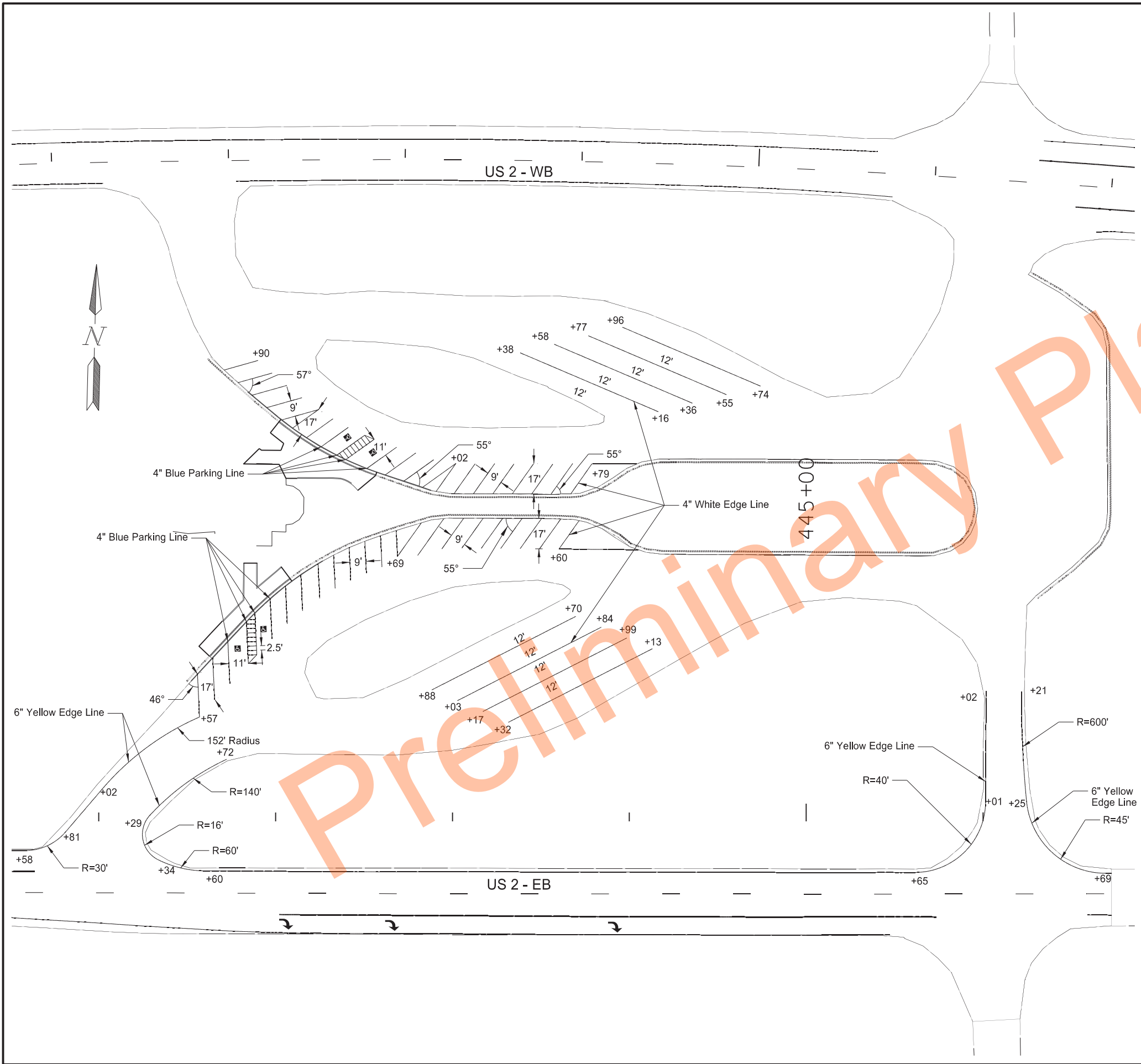
REGISTERED PROFESSIONAL ENGINEER

CHRISTOPHER H. MAPLES

PE - 10272

DATE 12/23/23

NORTH DAKOTA



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		NH-3-002(173)270	120	23
SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE		
		Accessibility Parking Symbol		
		Sta 441+79 - 98' Lt	16	SF
		Sta 441+93 - 109' Lt	16	SF
		Sta 442+55 - 209' Lt	16	SF
		Sta 442+41 - 217' Lt	16	SF
		TOTAL	64	SF
762	1104	PVMT MK PAINTED 4IN LINE		
		4" Blue Edge Line	268	LF
		4" White Edge Line	1536	LF
		TOTAL	1804	LF
762	1106	PVMT MK PAINTED 6IN LINE		
		6" Yellow Edge Line	495	LF

Pavement Marking Layout

Hefti Rest Area

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND

REGISTERED PROFESSIONAL ENGINEER

CHRISTOPHER H. MAPLES

PE - 10272

DATE 12/23/23

NORTH DAKOTA

STATE

PROJECT NO.

SECTION NO.

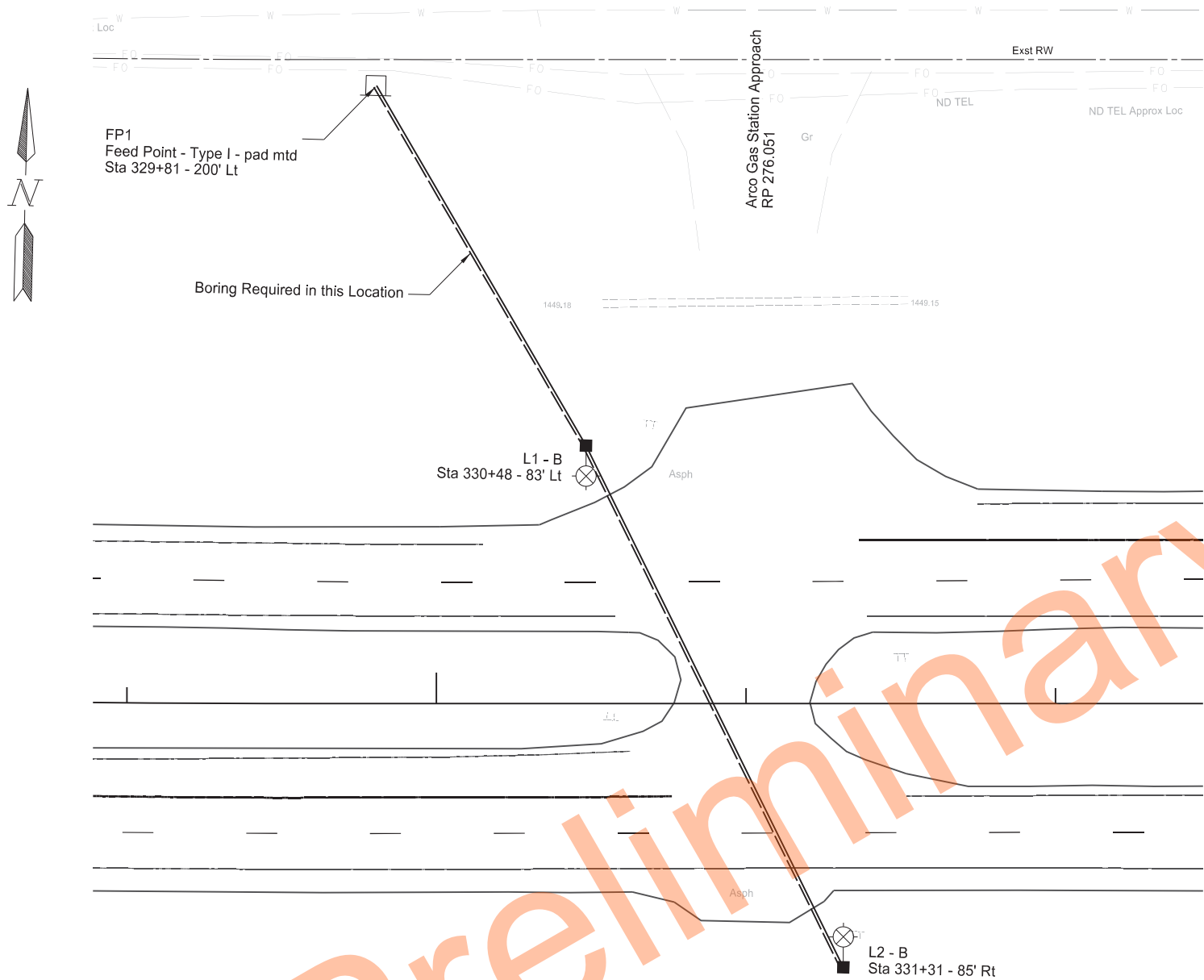
SHEET NO.

ND

NH-3-002(173)270

140

1



LEGEND



Proposed LED Lighting Unit with Concrete Foundation



Proposed LED Lighting Unit with Wood Pole



Proposed Circuit in Conduit



Power Pole Cell Existing



Feed Point - Pad Mounted

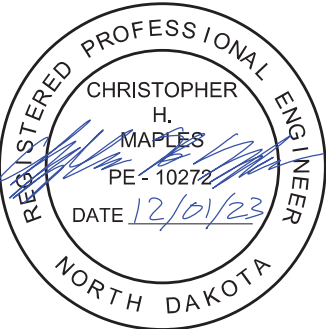


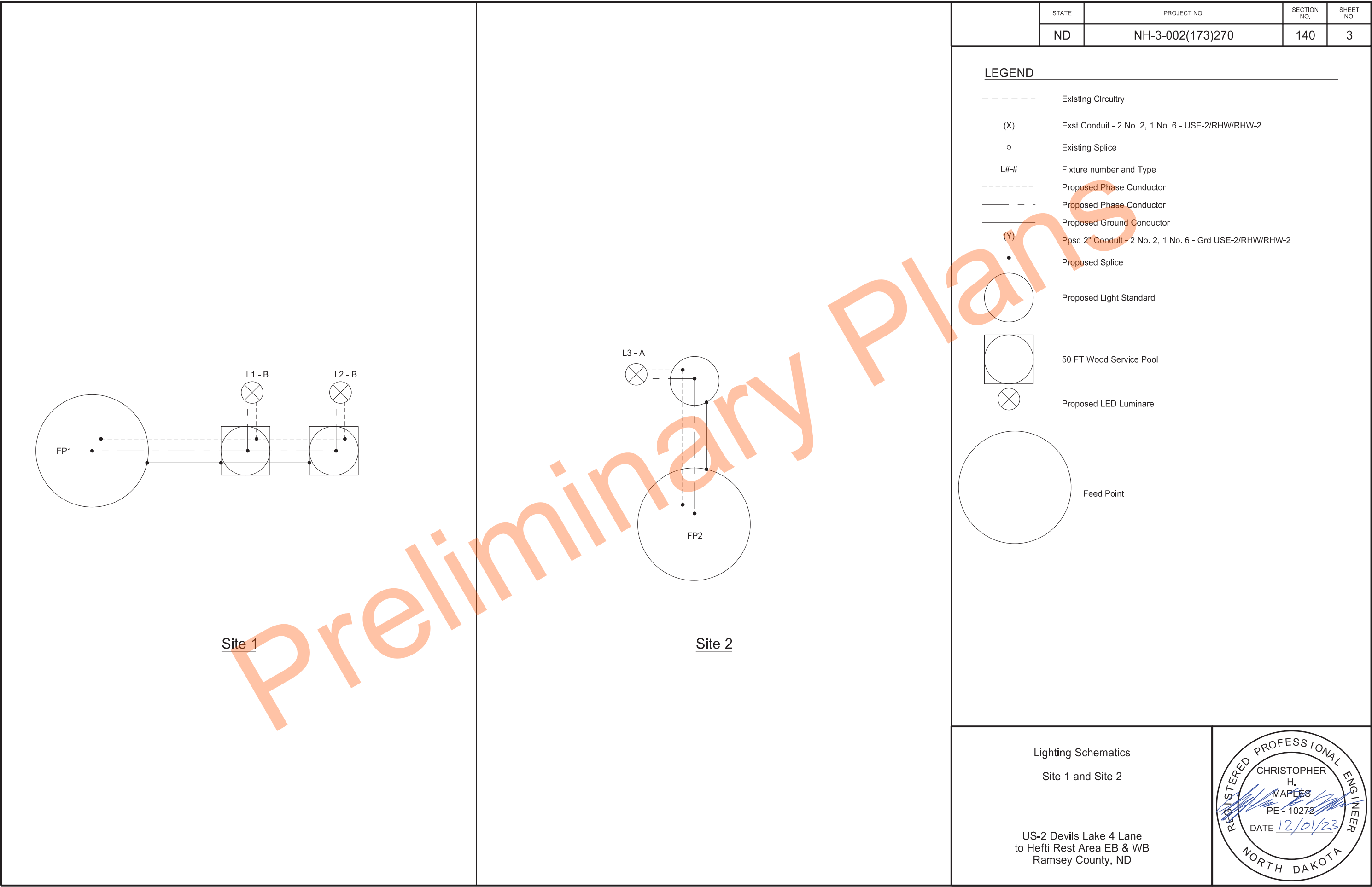
Feed Point - Pole Mounted

Lighting Plans

US-2
Site 1

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





"FP1" Site 1 (Existing Gas Station Sign)								
Point to Point	Station No. to Station No.		Conduit Runs		Conductor Runs			
					Phase Conductors		Ground Conductors	
			Length	Size	Total Conductor or Length	Conductor Quantity, Size, & Type	Total Conductor Length	Conductor Quantity, Size, & Type
FP1 to L1 - B	329+81 - 200' Lt	330+48 - 83' Lt	135	2"	290	(2) #4 USE-2/RHW/RHW-2	145	(1) #6 USE-2/RHW/RHW-2
L1 - B to L2 - B	330+48 - 83' Lt	331+31 - 85' Rt	188	2"	392	(2) #4 USE-2/RHW/RHW-2	196	(1) #6 USE-2/RHW/RHW-2

"FP2" Site 2 (Exsiting Electric Line Running South of US-2 EB)								
Point to Point	Station No. to Station No.		Conduit Runs		Conductor Runs			
					Phase Conductors		Ground Conductors	
			Length	Size	Total Conductor or Length	Conductor Quantity, Size, & Type	Total Conductor Length	Conductor Quantity, Size, & Type
FP2 to L3 - A	446+39 - 85' Rt	446+53 - 142' Rt	59	2"	138	(2) #4 USE-2/RHW/RHW-2	69	(1) #6 USE-2/RHW/RHW-2

Site 1 Light Standards							
Pole No.	Station	Offset	Wattage	Circuit	IES Type	Pole Height	Mast Arm
L1-B	330+48	83' Lt	LED	#1	III	39'	6'
L2-B	331+31	85' Rt	LED	#1	III	39'	6'

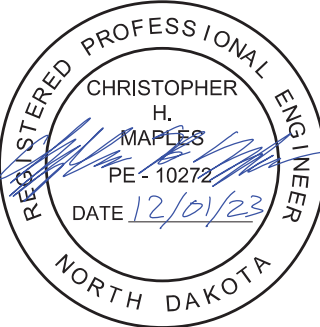
Site 2 Light Standards							
Pole No.	Station	Offset	Wattage	Circuit	IES Type	Pole Height	Mast Arm
L3-A	446+39	85' Rt	LED	#1	III	39'	6'

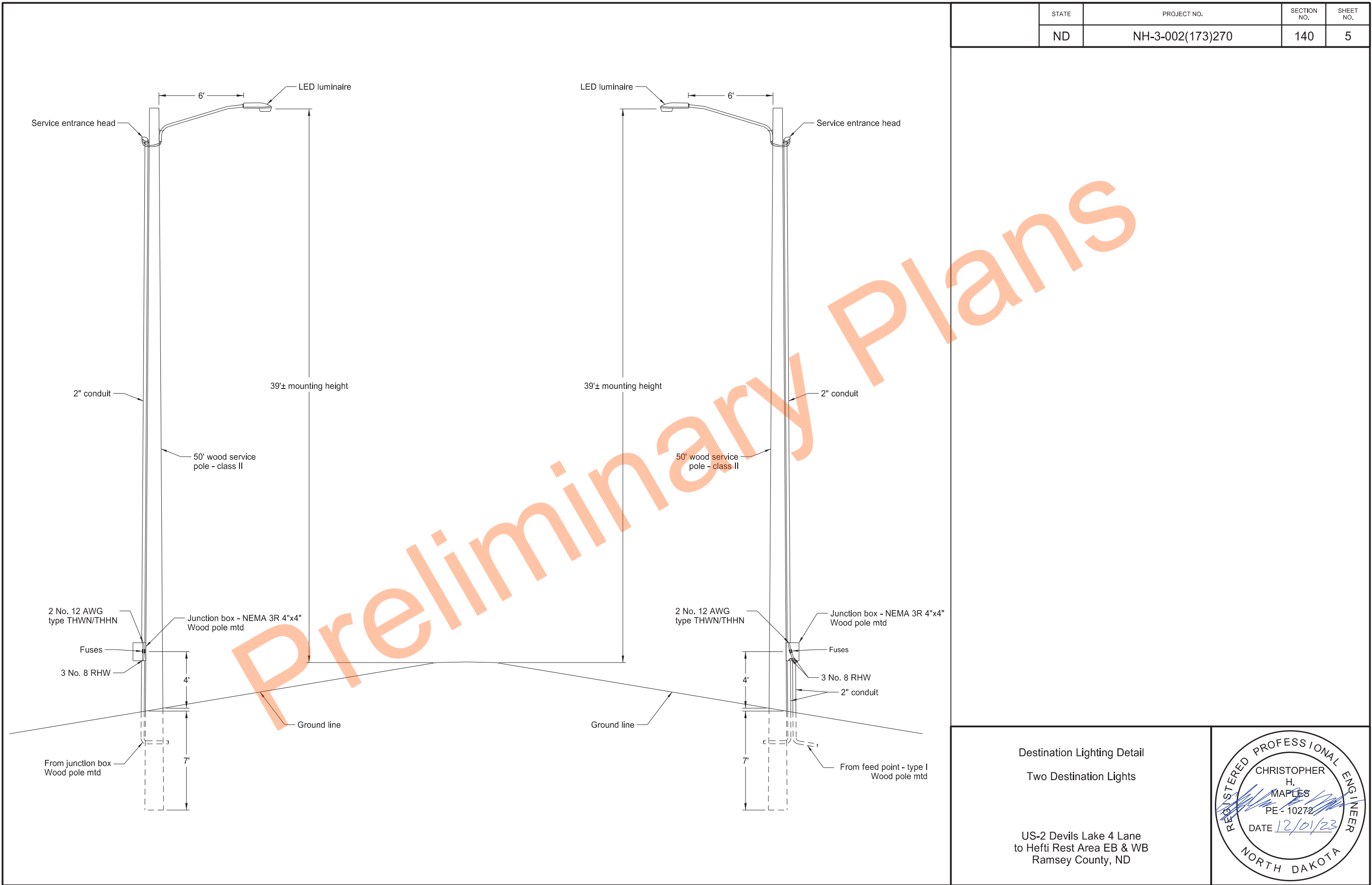
LIGHTING FOUNDATION TABLE - Type "A"		
Description	Footing Depth "D"	Footing Depth "D"
	24" and 30" Dia (Ft)	36" and 42" Dia (Ft)
Light Standard		
36' - 44' Mounting Height	6	5

Lighting Quantities										Pay Item	
Location	Feed Point - Pad Mounted	Feed Point - Pole Mounted	Concrete Foundation - Highway Lighting	2" Dia Rigid Conduit	Conductor No. 4 - Type THW-2	Conductor No. 6 - Type THW-2	LED Luminaire	Light Standard 6 FT Mast Arm 39 FT Height Breakaway	60 FT Wood Service Pole	Destination Lighting	Destination Lighting (Two or More Poles)
Site 1	1		--	323	682	341	2	--	2	--	1
Site 2		1	1	59	138	69	1	1	--	1	--

Lighting System
Lighting Quantities

US-2 Devils Lake 4 Lane
to Hefti Rest Area EB & WB
Ramsey County, ND





Ⓢ 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
Adj adjusted
Aggr aggregate
Ahd ahead
ARV air release valve
Align alignment
Al alley
Alt alternate
Alum aluminum
ADA Americans with Disabilities Act
& 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

Bk back
BF back face
Balc balcony
B Wire barbed wire
Barr barricade
Btry battery
BI beehive inlet
Beg begin
BG below grade
BM bench mark
Bkwy bikeway
Bit bituminous
Blk block
BH bore hole
Bot bottom
Blvd Boulevard
Bndry boundary
Brkwy breakaway
Br bridge
Bldg building
Bus. business
BV butterfly valve
Byp bypass

C Gdrl cable guardrail
Calc calculate
CIP cast iron pipe
CB catch basin
CRS cationic rapid setting
C Gd cattle guard
C To C center to center
CL or ☐ centerline
Ch chain
Chnlk chain-link
Ch Blk channel block
Ch Ch channel change
Chk check
Chsld chiseled
Cir circle
Cl class
Clnt clean-out
Clr clear
Cl&gr clearing & grubbing
Comb. combination
Coml commercial
Compr compression
CADD computer aided drafting & design
Conc concrete
CECB concrete erosion control blanket
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
CSFES corrugated steel flared end section
CSP corrugated steel pipe
CSTES corrugated steel traversable end section
Co County
Crse course
Ct Court
Xarm cross arm
Xbuck cross buck
Xsec cross sections
Xing crossing
Xrd crossroad
Cm crown

Culv culvert
C&G curb & gutter
CI curb inlet
CR curb ramp
C cut

Dd Ld dead load
Defl deflection
Defm deformed
DInt delineate
DIntr delineator
Depr depression
Desc description
Det detail
DWP detectable warning panel
Dtr detour
Dia or ø 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
Evgr evergreen
Exc excavation
Exst existing
Exp expansion
Expy Expressway
E external of curve
Extru extruded

FOS factor of safety
Fed Federal
FP feed point
Fn fence
Fn P fence post
FO fiber optic
FD field drive
F fill
FAA fine aggregate angularity
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
Fnd found
Fdn foundation
Frac fractional
Frwy freeway
Frt front
FF front face
F Disp fuel dispenser
FFP fuel filler pipes
FLS fuel leak sensor
Furn furnish/ed

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NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized	Ln	lane	Obsc	obscure(d)	Qty	quantity
Gar	garage	Lg	large	Ocpd	occupied	Qtr	quarter
Gs L	gas line	Lat	latitude	Ocpy	occupy		
G Reg	gas line regulator	Lt	left	O/s	offset		
GMV	gas main valve	Lens	lenses	OC	on center	Rad or R	radius
G Mtr	gas meter	Lvl	level	C	one dimensional consolidation	RR	railroad
GSV	gas service valve	Lvng	leveling	OC	organic content	Rlwy	railway
GVP	gas vent pipe	Lht	light	Orig	original	Rsd	raised
GV	gate valve	LP	light pole	O To O	out to out	RC	rapid curing
Ga	gauge	Ltg	lighting	OD	outside diameter	Rec	record
Gov	government	Liq	liquid	OH	overhead	Rcy	recycle
Grd	graded/grade	LL	liquid limit			RAP	recycled asphalt pavement
Grnd	ground	Loc	location			RPCC	recycled portland cement concrete
GWM	ground water monitor	Long.	longitude	PMT	pad mounted transformer	Ref	reference
Gdrl	guardrail	Lp	loop	Pg	pages	R Mkr	reference marker
Gtr	gutter	LD	loop detector	Pntd	painted	RM	reference monument
		Lum	luminaire	Pr	pair	RP	reference point
				Pnl	panel	Refl	reflectorized
				Pk	park	RCB	reinforced concrete box
H Plg	H piling			PSD	passing sight distance	RCES	reinforced concrete end section
Hdwl	headwall	Mb	mailbox	Pvmt	pavement	RCFES	reinforced concrete flared end section
Ht	height	ML	main line	Ped	pedestal	RCP	reinforced concrete pipe
Hel	helical	MH	manhole	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HDPE	high density polyethylene	Mkd	marked	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HM	high mast	Mkr	marker	Pen.	penetration	Reinf	reinforcement
HP	high pressure	Mkg	marking	Perf	perforated	Res	reservation
HPS	high pressure sodium	MA	mast arm	Per.	perimeter	Res	residence
HTCG	high tension cable guardrail	Matl	material	Perm	permanent	Ret	retaining
Hwy	highway	Max	maximum	PL	pipeline	Rev	reverse
Hor	horizontal	MC	meander corner	PI	place	Rt	right
HBP	hot bituminous pavement	Meas	measure	P&P	plan & profile	R/W	right of way
HMA	hot mix asphalt	Mdn	median	PL	plastic limit	Riv	river
Hyd	hydrant	MD	median drain	PI or P _L	plate	Rd	road
Ph	hydrogen ion content	MC	medium curing	Pt	point	Rdbd	road bed
		MGS	Midwest Guardrail System	PE	polyethylene	Rdwy	roadway
		MM	mile marker	PVC	polyvinyl chloride	RWIS	roadway weather information system
Id	identification	MP	mile post	PCC	Portland Cement concrete	Rk	rock
Incl	inclinometer tube	Min	minimum	PP	power pole	Rt	route
IMH	inlet manhole	Misc	miscellaneous	Preempt	preemption		
ID	inside diameter	Mon	monument	Prefab	prefabricated		
Inst	instrument	Mnd	mound	Prfmd or Pref	preformed		
Intchg	interchange	Mtbl	mountable	Prep	preperation		
Intmdt	intermediate	Mtd	mounted	Press.	pressure		
Intscn	intersection	Mtg	mounting	PRV	pressure relief valve		
Inv	invert	Mk	muck	Prestr	prestressed		
IP	iron pipe			Pvt	private		
				PD	private drive		
				Prod.	production/produce		
				Prog	programmed		
				Prop.	property		
				Prop Ln	property line		
				Ppsd	proposed		
				PB	pull box		
Jt	joint	Neop	neoprene				
Jct	junction	Ntwk	network				
		N	North				
		NE	North East				
		NW	North West				
		NB	Northbound				
		No. or #	number				

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Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	South East	TERO	tribal employment rights ordinance
SW	South West	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike	VG	valley gutter
SB	split barrel sample	Vap	vapor
SH	sprinkler head	Vert	vertical
SV	sprinkler valve	VCP	vitrified clay pipe
Sq	square	Vol	volume
Stk	stake	VSFS	vehicle speed feedback sign
Std	standard		
N	standard penetration test	Wkwy	walkway
Std Specs	standard specifications	W	water content
Stm L	steam line	WGV	water gate valve
SEC	steel encased concrete	WL	water line
SMA	stone matrix asphalt	WM	water main
SSD	stopping sight distance	WMV	water main valve
SD	storm drain	W Mtr	water meter
St	street	WSV	water service valve
SPP	structural plate pipe	WW	water well
SPPA	structural plate pipe arch	Wrng	wearing
Str	structure	WIM	weigh in motion
Subd	subdivision	W	west
Sub	subgrade	WB	westbound
Sub Prep	subgrade preparation	Wrng	wiring
Ss	subsoil	W/	with
SS	supplement specification	W/o	without
Supp	supplemental	WC	witness corner
Surf	surfacing		
Surv	survey		
Sym	symmetrical		

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MEASUREMENTS

ac	acres
A	ampere
Bd Ft	board feet
Cd	candela
cm	centimeter
C	coulomb
CF	cubic feet
m3	cubic meter
m3/s	cubic meters per second
CY	cubic yard
CY/mi	cubic yards per mile
D or Deg	degree
F	Fahrenheit
F	farad
ft	feet/foot
Gal	gallon
G	giga
Ha	hectare
H	henry
Hz	hertz
hr	hour(s)
in	inch
J	joule
K	kelvin
kN	kilo newton
kPa	kilo pascal
kg	kilogram
kg/m3	kilogram per cubic meter
km	kilometer
K	Kip(s)
LF	linear foot
L	litre
Lm	lumen
L sum	lump sum
Lx	lux
M Hr	man hour
M	mega
m	meter
m/s	meters per second
mi	mile
mL	milliliter
mm	millimeter
mm/hr	millimeters per hour
n	nano
N	newton
Pa	pascal
lb	pounds
sec	seconds
S	siemens
SF	square feet
km2	square kilometer
m2	square meter
SY	square yard
Sta Yd	station yards
SI	Systems International

T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

Az	azimuth
Bs	backsight
Brg	bearing
BP Cap	blue plastic cap
BS	both sides
BC	brass cap
CS	curve to spiral
Eq	equation
E	external of curve
FS	far side
FB	field book
Fs	foresight
Geod	geodetic
GIS	Geographical Information System
GPS	Global Positioning System
HI	height of instrument
IM	iron monument
I Pn	iron pin
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
L	length of curve
LC	long chord
LB	level book
Mer	meridian
M	mid ordinate of curve
NGS	National Geodetic Survey
NS	near side
Obsn	observation
Off Loc	office location
OP Cap	orange plastic cap
PK	Parker-Kalon nail
P Cap	plastic cap
PP Cap	pink plastic cap
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
RTP	random traverse point
Rge	range
RP Cap	red plastic cap
SC	spiral to curve
ST	spiral to tangent
Sta	station
SE	superelevation
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Twp	township
TB	transit book
TP	traverse point
TP	turning point
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
VC	vertical curve
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Co S	coal slack
C Gr	coarse gravel
CS	coarse sand
FS	fine sand
Gr	gravel
Lig Co	lignite coal
Lig Sl	lignite slack
Lm	loam
Rk	rock
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
Sc	scoria
Sh	shale
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications	GT PLNS NAT GAS	Great Plains Natural Gas Company	RED RIV COMM	Red River Rural Communications
ACCENT	Accent Communications	HALS TEL	Halstad Telephone Company	RESVTN TEL	Reservation Telephone
AGASSIZ WU	Agassiz Water Users Incorporated	IDEA1	Idea1	ROBRTS TEL	Roberts Company Telephone
AGC	Associated General Contractors of America	INT-COMM TEL	Inter-Community Telephone Company	R-RIDER ELEC	Roughrider Electric Cooperative
ALL PL	Alliance Pipeline	KANEB PL	Kaneb Pipeline Company	RRVW	Red River Valley & Western Railroad
ALL SEAS WU	All Seasons Water Users Association	KEM ELEC	Kem Electric Cooperative Incorporated	S CENT REG WD	South Central Regional Water District
AMOCO PI	Amoco Pipeline Company	KOCH GATH SYS	Koch Gathering Systems Incorporated	S E W U	South East Water Users Incorporated
AMRDA HESS	Amerada Hess Corporation	LKHD PL	Lakehead Pipeline Company	SCOTT CABLE	Scott Cable Television Dickinson
AT&T	AT&T Corporation	LNGDN RWU	Langdon Rural Water Users Incorporated	SHERDN ELEC	Sheridan Electric Cooperative
B PAW	Bear Paw Energy Incorporated	LWR YELL R ELEC	Lower Yellowstone Rural Electric	SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
BAKER ELEC	Baker Electric	MCKNZ CON	McKenzie Consolidated Telcom	SKYTECH	Skyland Technologies Incorporated
BASIN ELEC	Basin Electric Cooperative Incorporated	MCKNZ ELEC	McKenzie Electric Cooperative	SLOPE ELEC	Slope Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative	MCKNZ WRD	McKenzie County Water Resource District	SOURIS RIV TELCOM	Souris River Telecommunications
BELLE PL	Belle Fourche Pipeline Company	MCLEOD	McLeod USA	ST WAT COMM	State Water Commission
BLM	Bureau of Land Management	MCLN ELEC	McLean Electric Cooperative	STATE LN WATER	State Line Water Cooperative
BNSF	Burlington Northern Santa Fe Railway	MCLN-SHRDN R WAT	McLean-Sheridan Rural Water	STER ENG	Sterling Energy
BOEING	Boeing	MDU	Montana-dakota Utilities	STUT RWU	Stutsman Rural Water Users
BRNS RWD	Barnes Rural Water District	MIDCO	MidContinent Communications	SW PL PRJ	Southwest Pipeline Project
BURK-DIV ELEC	Burke-Divide Electric Cooperative	MIDSTATE TEL	Midstate Telephone Company	T M C	Turtle Mountain Communications
BURL WU	Burleigh Water Users	MINOT CABLE	Minot Cable Television	TCI	TCI of North Dakota
CABLE ONE	Cable One	MINOT TEL	Minot Telephone Company	TESORO GHG PLNS PL	Tesoro High Plains Pipeline
CABLE SERV	Cable Services	MISS VALL COMM	Missouri Valley Communications	TRI-CNTY WU	Tri-County Water Users Incorporated
CAP ELEC	Capital Electric Cooperative Incorporat	MISS W W S	Missouri West Water System	TRL CO RWU	Traill County Rural Water Users
CASS CO ELEC	Cass County Electric Cooperative	MNKOTA PWR	Minnkota Power	UNTD TEL	United Telephone
CASS RWU	Cass Rural Water Users Incorporated	MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative	UPPR SOUR WUA	Upper Souris Water Users Association
CAV ELEC	Cavalier Rural Electric Cooperative	MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative	US SPRINT	U.S. Sprint
CBLCOM	Cablecom Of Fargo	MRE LBTY TEL	Moore & Liberty Telephone	USAF MSL CABLE	U.S.A.F. Missile Cable
CENEX PL	Cenex Pipeline	MUNICIPAL	City Water And Sewer	USFWS	US Fish and Wildlife Service
CENT PL WATER DIST	Central Pipe Line Water District	MUNICIPAL	City Of '.....'	USW COMM	U.S. West Communications
CENT PWR ELEC	Central Power Electric Cooperative	N CENT ELEC	North Central Electric Cooperative	VRNDRY ELEC	Verendrye Electric Cooperative
CENTURYLINK	CenturyLink	N VALL W DIST	North Valley Water District	W RIV TEL	West River Telephone Incorporated
COE	Corps of Engineers	ND PKS & REC	North Dakota Parks And Recreation	WAPA	Western Area Power Administration
CONS TEL	Consolidated Telephone	ND TEL	North Dakota Telephone Company	WAWSA	Western Area Water Supply Authority
CONT RES	Continental Resource Inc	NDDOT	North Dakota Department of Transportation	WEB	W. E. B. Water Development Association
CPR	Canadian Pacific Railway	NDSU SOIL SCI DEPT	NDSU Soil Science Department	WILLI RWA	Williams Rural Water Association
D O E	Department Of Energy	NEMONT TEL	Nemont Telephone	WILSTN BAS PL	Williston Basin Interstate Pipeline Company
DAK CARR	Dakota Carrier Network	NODAK R ELEC	Nodak Rural Electric Cooperative	WLSH RWD	Walsh Water Rural Water District
DAK CENT TEL	Dakota Central Telephone	NOON FRMS TEL	Noonan Farmers Telephone Company	WOLVRTN TEL	Wolverton Telephone
DAK RWD	Dakota Rural Water District	NPR	Northern Plains Railroad	XLENER	Xcel Energy
DGC	Dakota Gasification Company	NSP	Northern States Power	YSVR	Yellowstone Valley Railroad
DICKEY R NET	Dickey Rural Networks	NTH PRAIR RW	Northern Prairie Rural Water Association		
DICKEY RWU	Dickey Rural Water Users Association	NTHN BRDR PL	Northern Border Pipeline		
DICKEY TEL	Dickey Telephone	NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated		
DNRR	Dakota Northern Railroad	NTHWSTRN REF	Northwestern Refinery Company		
DOME PL	Dome Pipeline Company	NW COMM	Northwest Communication Cooperation		
DVELEC	Dakota Valley Electric Cooperative	NWRWD	Northwest Rural Water District		
DVMW	Dakota, Missouri Valley & Western	ONEOK	Oneok gas		
ENBRDG	Enbridge Pipelines Incorporated	OSHA	Occupational Safety and Health Administration		
ENVENTIS	Enventis Telephone	OTTR TL PWR	Otter Tail Power Company		
EQUINOR	Equinor Pipeline	PAAP	Plains All American Pipeline		
FALK MNG	Falkirk Mining Company	P L E M	Prairielands Energy Marketing		
FHWA	Federal Highway Administration	POLAR COM	Polar Communications		
G FKS-TRL WD	Grand Forks-traill Water District	PVT ELEC	Private Electric		
GETTY TRD & TRAN	Getty Trading & Transportation	QWEST	Qwest Communications		
GLDN W ELEC	Golden West Electric Cooperative	R&T W SUPPLY	R & T Water Supply Association		
GRGS CO TEL	Griggs County Telephone				
GTR RAMSEY WD	Greater Ramsey Water District				

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LINE STYLES

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Existing Topography

	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	Existing Guardrail Metal
	Existing Edge of Water
	Existing Fence
	Existing Railroad
	Existing Field Line
	Exst Flow
	Existing Curb
	Existing Valley Gutter
	Existing Driveway Gutter
	Existing Curb and Gutter
	Existing Mountable Curb and Gutter

	Existing 3-Cable w Posts
	Site Boundary
	Existing Berm, Dike, Pit, or Earth Dam
	Existing Ditch Block
	Existing Tree Boundary
	Existing Brush or Shrub Boundary
	Existing Retaining Wall
	Existing Planter or Wall
	Existing W-Beam Guardrail with Posts
	Existing Railroad Switch
	Gravel Pit - Borrow Area
	Existing Wet Area-Vegetation Break
	Existing High Tension Cable Guardrail
	Existing High Tension Cable Guardrail with Posts

Proposed Topography

	3-Cable w Posts
	Flow
	Fence
	Remove Line
	Wall
	Retaining Wall (Plan View)
	W-Beam w Posts
	High Tension Cable Guardrail with Posts

Existing Utilities

	Existing Electrical
	Existing Fiber Optic Line
	Existing TV Fiber Optic
	Existing Gas Pipe
	Existing Overhead Utility Line
	Existing Power
	Existing Fuel Pipeline
	Existing Undefined Above Ground Pipe Line
	Existing Sanitary Sewer
	Existing Sanitary Force Main
	Existing Storm Drain
	Existing Storm Drain Force Main
	Existing Culvert
	Existing Telephone Line
	Existing TV Line
	Existing Water or Steam Line
	Existing Under Drain
	Existing Slotted Drain
	Existing Conduit
	Existing Conductor
	Existing Down Guy Wire Down Guy
	Existing Underground Vault or Lift Station

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

	Conductor
	Fiber Optic
	Existing Loop Detector
	Existing Double Micro Loop Detector
	Micro Loop Detector Double
	Existing Micro Loop Detector
	Micro Loop Detector
	Signal Head with Mast Arm
	Existing Signal Head with Mast Arm

Sign Structures

	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

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LINE STYLES

D-101-21

Right Of Way

	Easement
	Existing Easement
	Right of Way
	Existing Right of Way
	Existing Right of Way Railroad
	Existing Right of Way Not State Owned
	Existing Government Lot Line
	Existing Adjacent Block Lines
	Existing Adjacent Lot Lines
	Existing Adjacent Property Line
	Existing Adjacent Subdivision Lines
	Sight Distance Triangle Line
	Dimension Leader

Boundary Control

	Existing City Corporate Limits or Reservation Boundary
	Existing State or International Line
	Existing Township
	Existing County
	Existing Section Line
	Existing Quarter Section Line
	Existing Sixteenth Section Line
	Existing Centerline
	Tangent Line

Cross Sections and Typicals

	Existing Ground
	Existing Topsoil (Cross Section View)
	Existing Ground Void (Not Surveyed)
	Existing Concrete
	Existing Aggregate (Cross Section View)
	Existing Curb and Gutter (Cross Section View)
	Existing Asphalt (Cross Section View)
	Existing Reinforcement Rebar

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S
	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

	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

Pavement Joints

	Doweled Joint
	Tie Bar 30 Inch 4 Foot Center to Center
	Tie Bar 18 Inch 3 Foot Center to Center
	Tie Bar at Random Spacing

Bridge Details

	Small Hidden Object
	Large Hidden Object
	Phantom Object
	Existing Conditions Object
	Centerline Main
	Centerline Secondary
	Excavation Limits
	Proposed Ground
	Sheet Piling

Erosion Control

	Limits of Const Transition Line
	Bale Check
	Rock Check
	Floating Silt Curtain
	Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

	Wetland Mitigation
	Existing Wetland Easement USFWS
	Existing Wetland Jurisdictional
	Existing Wetland
	Tree Row

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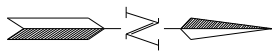
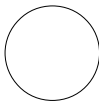
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NORTH DAKOTA

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SYMBOLS

D-101-30

	North Arrow (Half Scale)		Existing Bush or Shrub		Continuous Split Barrel Sample
	Alignment Data Point		Existing Large Evergreen Tree		Flight Auger Sample
	Alignment Monument		Existing Small Evergreen Tree		Split Barrel Sample
	Spot Elevation		Existing Large Tree		Thinwall Tube Sample
	Existing Miscellaneous Spot		Existing Small Tree		Standard Penetration Test
	Existing Access Control Arrow		Existing Tree Trunk		Inclinometer Tube
	Existing Benchmark		Cairn or Stone Circle		Excavation Unit
	Reset USGS Marker		Existing Artifact		Existing Ground Water Well Bore Hole
	Iron Monument Found		Existing Satellite Dish		
	Iron Pin R/W Monument		Existing Weather Station		
	Property Corner		Existing Windmill or Tower		
	Iron Pin Reference Monument		Reinforced Pavement		
	Right of Way Marker (Exst, Ppsd, Reset)				
	Existing Federal Reference Corner				
	Existing Section Corner (Full, Quarter, Sixteenth, Meander)				
	Existing Witness Corner				
	Existing Control Point (CP, GPS-RTK, TRI)				
	Existing Traverse PI Aerial Panel				
	Existing Reference Marker Point NGS				
	Existing EFB Misc				

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



12 18 2020

SYMBOLS

D-101-31

Legend			
		Flexible Delineator	
		Flexible Delineator Type A (Exst, Ppsd)	
		Flexible Delineator Type B (Exst, Ppsd)	
		Flexible Delineator Type C (Exst, Ppsd)	
		Flexible Delineator Type D (Exst, Ppsd)	
		Flexible Delineator Type E (Exst, Ppsd)	
		Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)	
		Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)	
		Delineator Type C (Exst, Ppsd, Diamond Grade)	
		Delineator Type D (Exst, Ppsd, Diamond Grade)	
		Delineator Type E (Exst, Ppsd, Diamond Grade)	
		Barricade (Type I, Type II, Type III)	
		Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)	
		Attenuation Device	
		Truck Mounted Attenuator	
		Delineator Drums	
		Flagger	
		Tubular Marker	
		Traffic Cone	
		Back to Back Vertical Panel Sign	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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SYMBOLS

D-101-32

	Existing Luminaire		High Mast Light Standard 3 Luminaire (Exst, Ppsd)		Existing Traffic Signal Standard
	Luminaire LED		High Mast Light Standard 4 Luminaire (Exst, Ppsd)		Pull Box (Exst-Ppsd-Undefined)
	Existing Light Standard Luminaire		High Mast Light Standard 5 Luminaire (Exst, Ppsd)		Intelligent Transportation Pull Box (Exst, Ppsd)
	Relocate Light Standard		High Mast Light Standard 6 Luminaire (Exst, Ppsd)		Transformer (Exst, Ppsd)
	Light Standard Light LED Luminaire		High Mast Light Standard 7 Luminaire (Exst, Ppsd)		Power Pole (Exst-Ppsd-with Transformer)
	Light Standard 35 Watt High Pressure Sodium Vapor Luminaire		High Mast Light Standard 8 Luminaire (Exst, Ppsd)		Wood Pole (Exst, Ppsd)
	Light Standard 50 Watt High Pressure Sodium Vapor Luminaire		High Mast Light Standard 9 Luminaire (Exst, Ppsd)		Pedestrian Push Button Post (Exst, Ppsd)
	Light Standard 70 Watt High Pressure Sodium Vapor Luminaire		High Mast Light Standard 10 Luminaire (Exst, Ppsd)		Existing Pole
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire		Overhead Sign Structure Load Center (Exst, Ppsd)		Existing Telephone Pole
	Light Standard 150 Watt High Pressure Sodium Vapor Luminaire		Traffic Signal Controller (Exst, Ppsd)		Existing Post
	Light Standard 200 Watt High Pressure Sodium Vapor Luminaire		Pad Mounted Traffic Signal Controller (Exst, Ppsd)		Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
	Light Standard 250 Watt High Pressure Sodium Vapor Luminaire		Flashing Beacon (Exst, Ppsd)		
	Light Standard 310 Watt High Pressure Sodium Vapor Luminaire		Concrete Foundation (Exst, Ppsd)		
	Light Standard 400 Watt High Pressure Sodium Vapor Luminaire		Pipe Mounted Flasher (Exst, Ppsd)		
	Light Standard 700 Watt High Pressure Sodium Vapor Luminaire		Pad Mounted Feed Point (Exst, Ppsd)		
	Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire		Pipe Mounted Feed Point with Pad (Exst, Ppsd)		
	Emergency Vehicle Detector		Pole Mounted Feed Point (Exst, Ppsd)		
	Video Detection Camera		Junction Box (Exst, Ppsd)		
			Existing Pedestrian Head with Number		
			Existing Signal Head		
			Pole Mounted Head		
			Existing Lighting Standard Pole		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14 REVISIONS	
DATE	CHANGE
12-18-20	General Revisions

12 18 2020

SYMBOLS

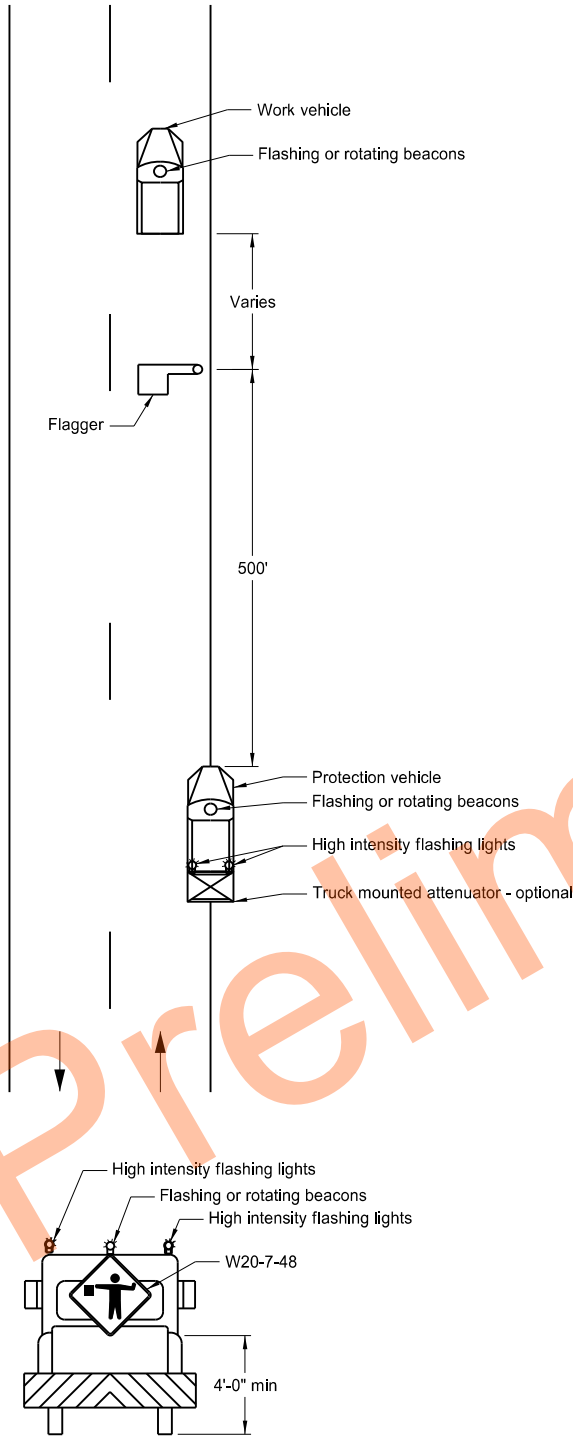
D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			Existing Curb Inlet (Round, Square)		
			Existing Slotted Reinforced Concrete Pipe		
			Catch Basin (Riser 30 Inch, Beehive, Type A)		
			Inlet Mountable Curb (Type A, Type B)		
			Inlet Saddle Base (Type 1, Type 2)		
			Inlet Special (Catch Basin, Type 1, Type A)		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		
			Median Drain		
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

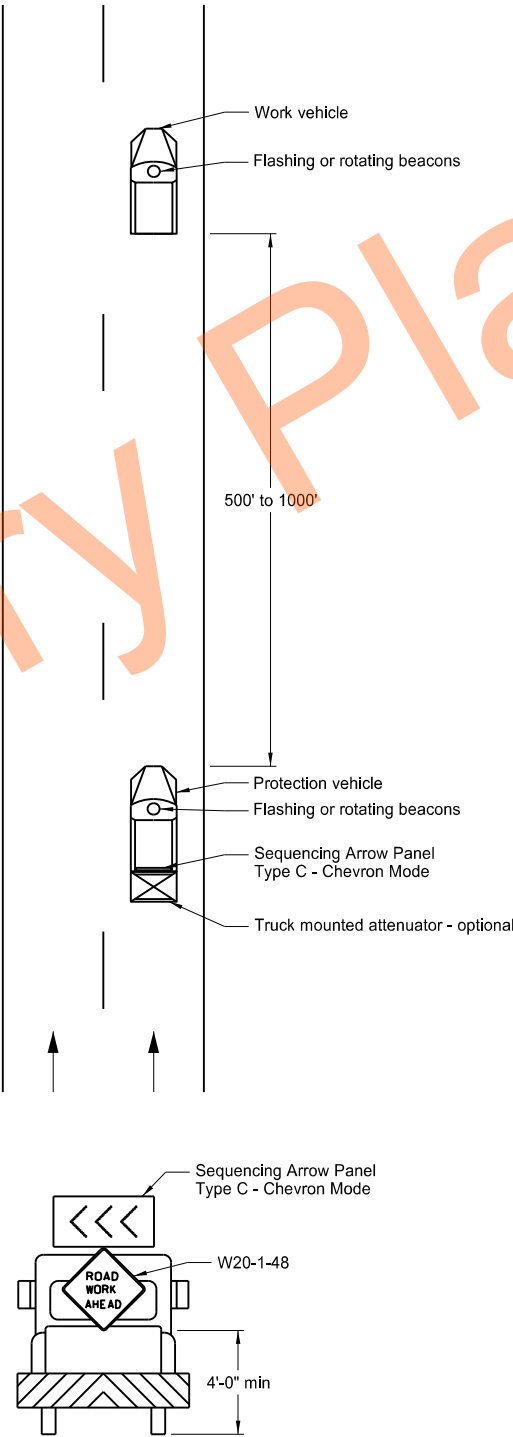
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

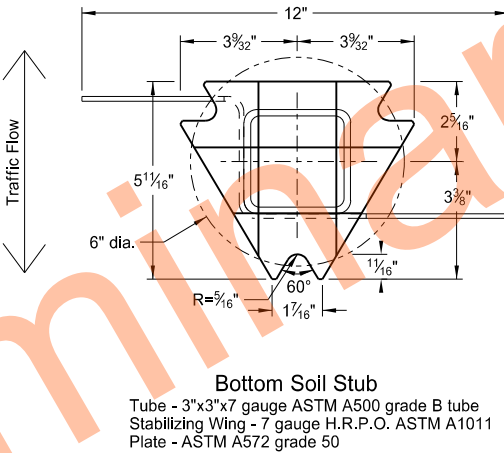
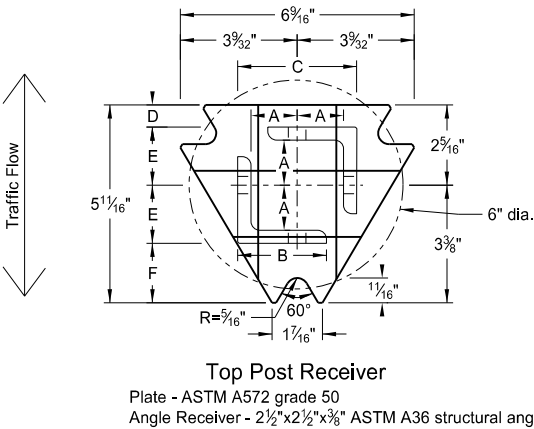
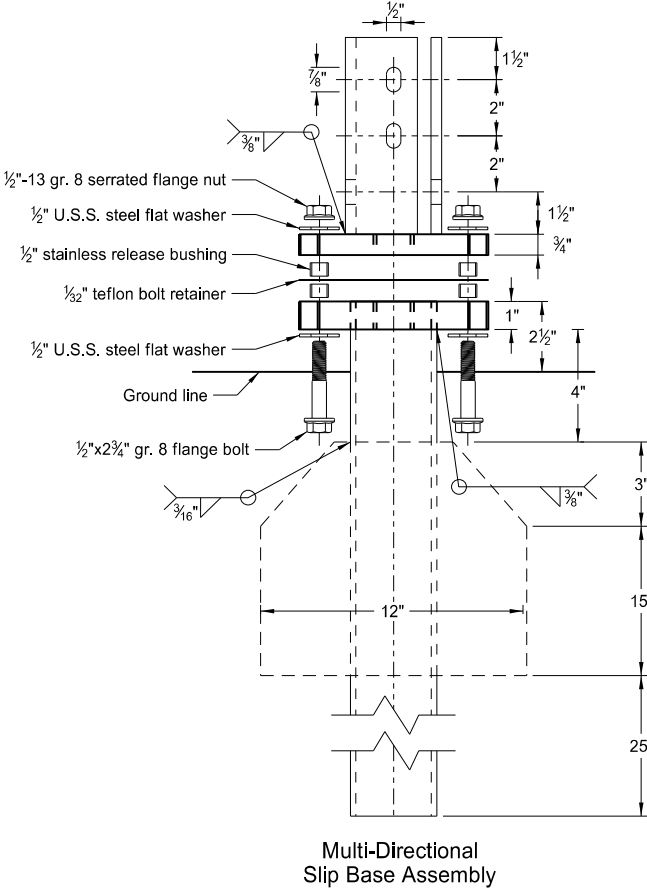
- Notes:
1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
 2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
 3. Use these layouts during daylight hours and in areas of good visibility only.
 4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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Kirk J Hoff,
Registration Number
PE- 4683,
on 10/03/19 and the original document is stored at the
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Perforated Tube

- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete sidewalk, use same anchor without wings.
 5. Provide more than 7' between the first and fourth posts of a four post sign.

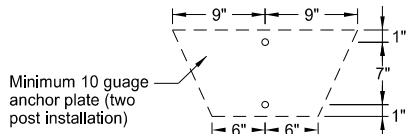
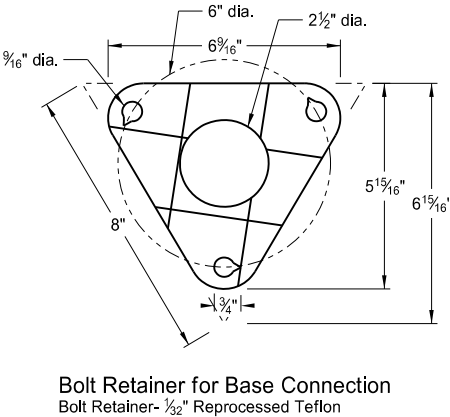
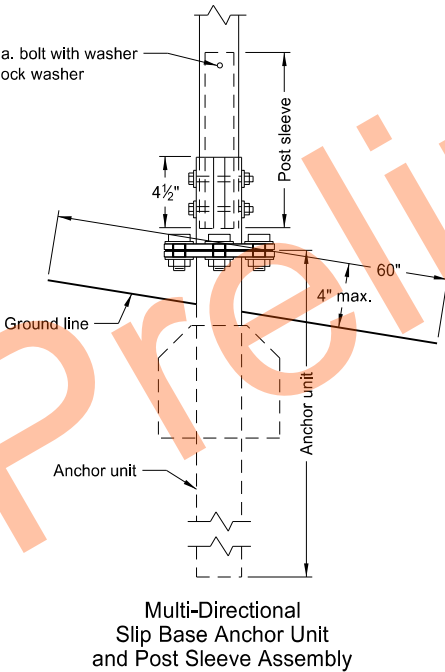
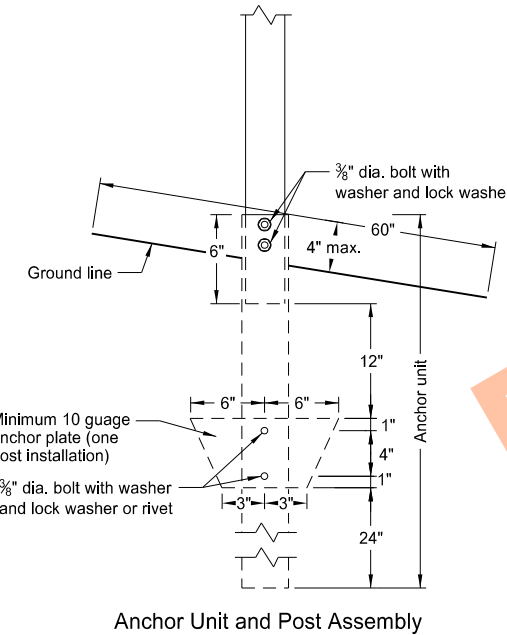


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	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
1 1/2 x 1 1/2	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
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	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 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/8"x10 ga. into 2 1/2"x10 ga.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp

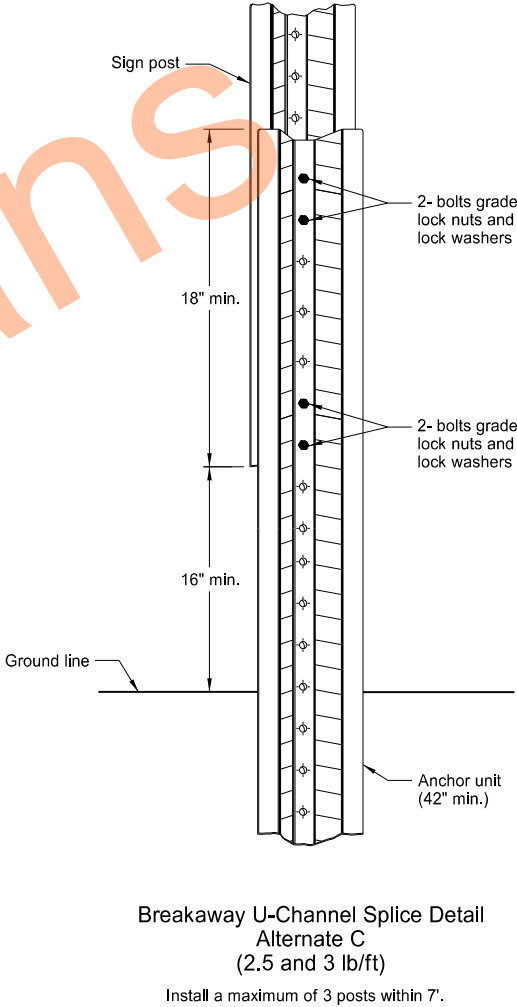
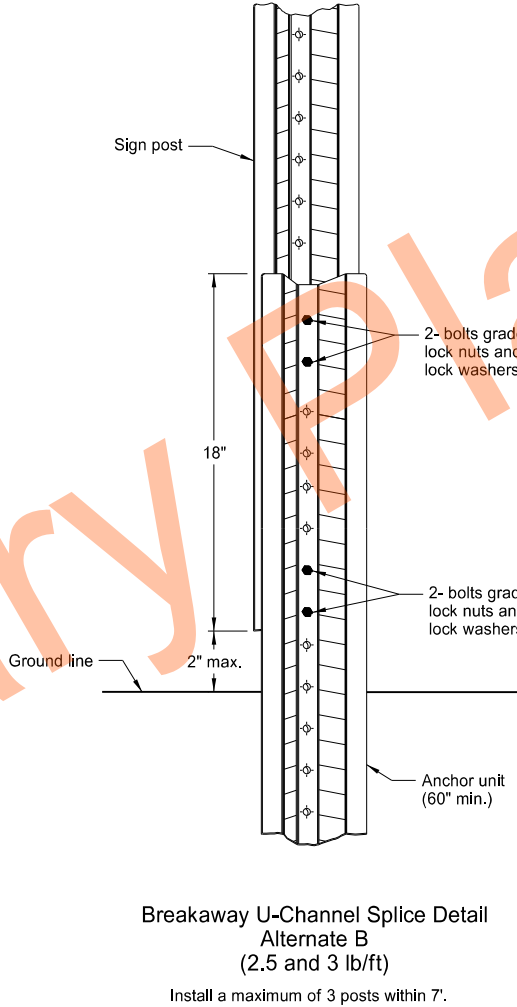
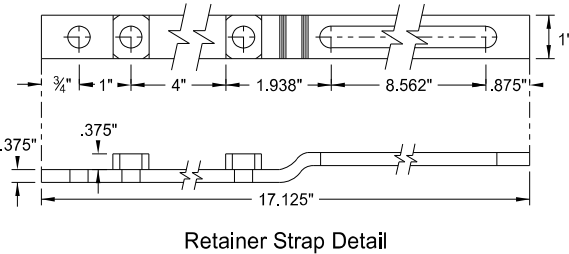
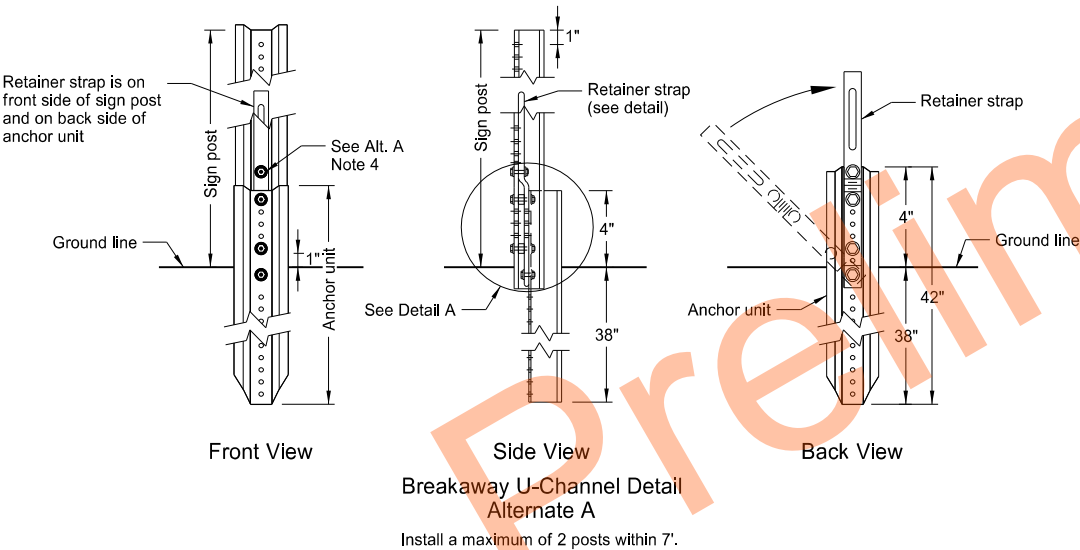
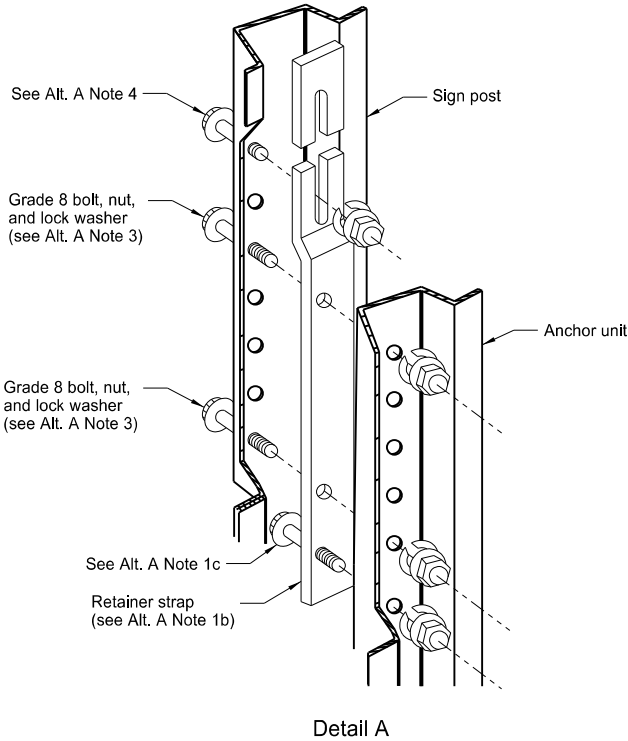
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Registration Number
PE-4683,

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U-Channel Post



Alternate A Steps of Installation:

- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 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.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- 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.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

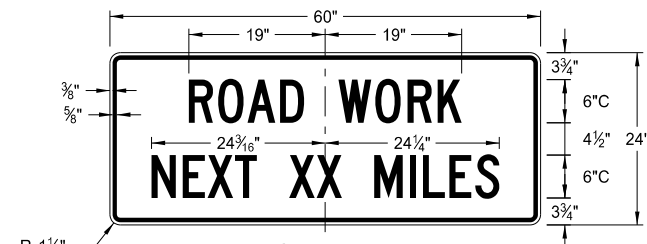
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp

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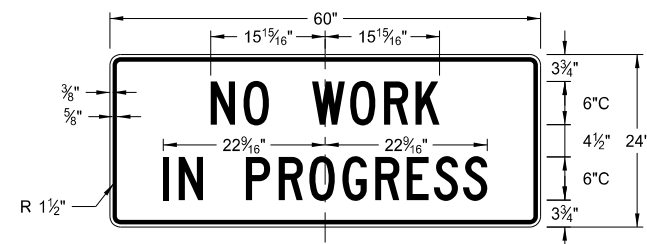
CONSTRUCTION SIGN DETAILS

TERMINAL AND GUIDE SIGNS



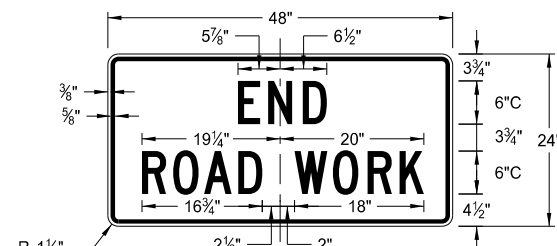
G20-1-60

Legend: black (non-refl)
Background: orange



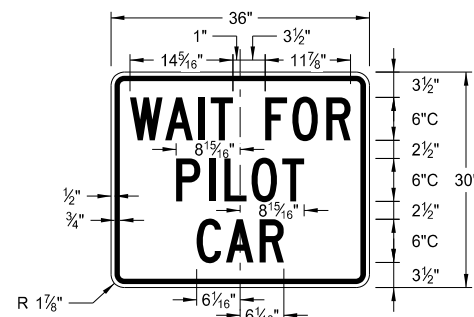
G20-1b-60

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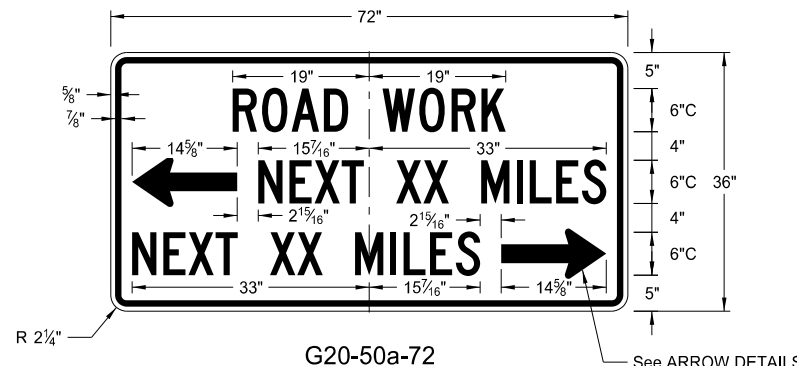


G20-2-48

Legend: black (non-refl)
Background: orange

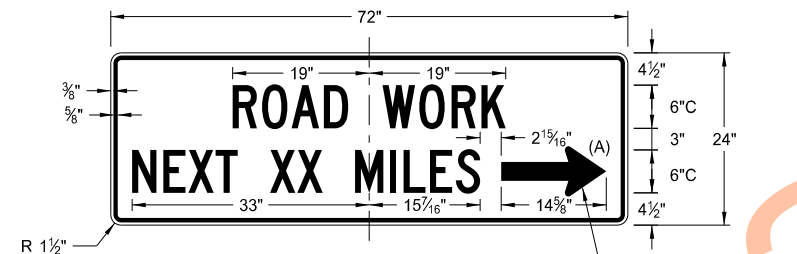


G20-4b-36
Legend: black (non-refl)
Background: orange



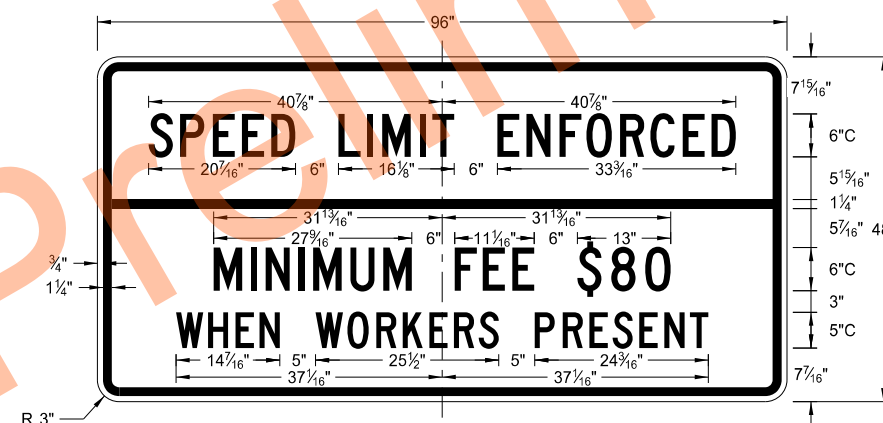
G20-50a-72

Legend: black (non-refl)
Background: orange



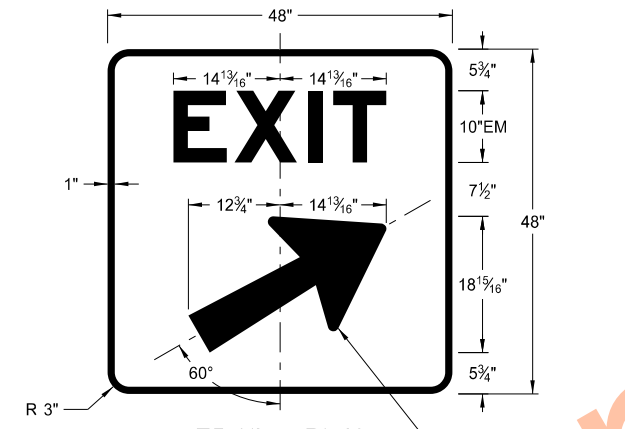
G20-52a-72

Legend: black (non-refl)
Background: orange



G20-55-96

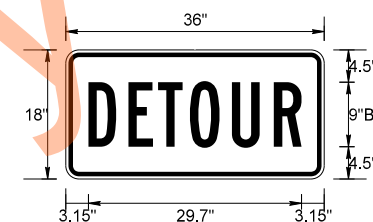
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Background: orange



E5-1(L or R)-48

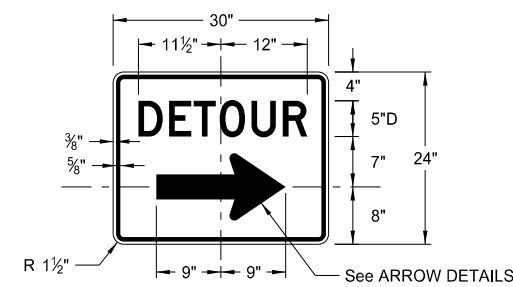
Legend: white
Background: green (orange optional)

See ARROW DETAILS

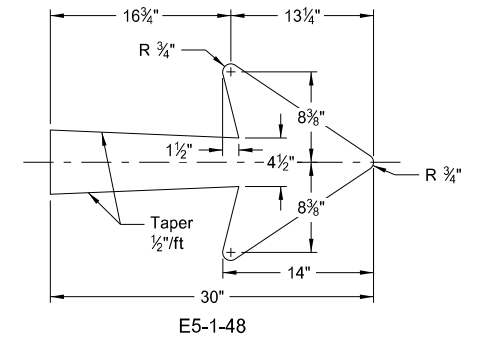


M4-8-36

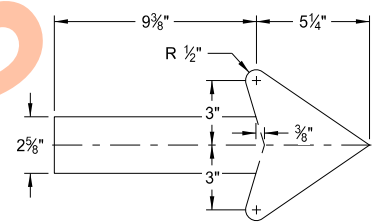
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Background: orange



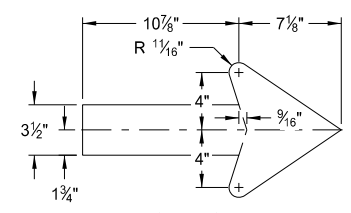
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



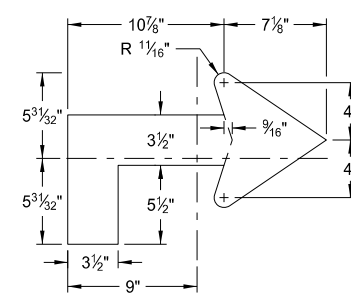
E5-1-48



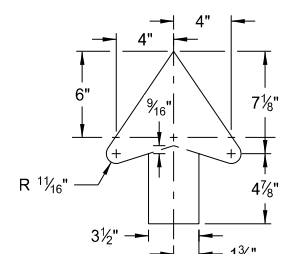
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

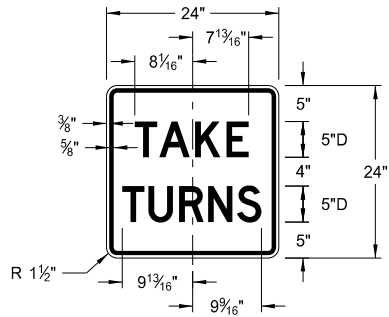
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

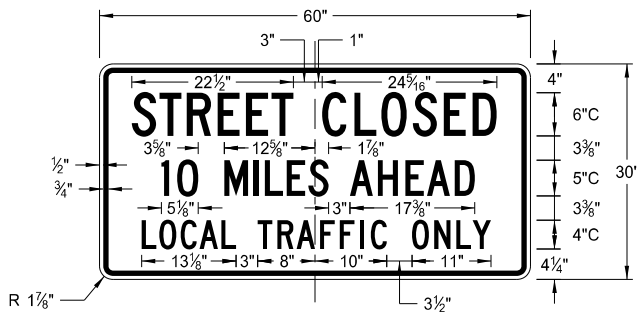
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

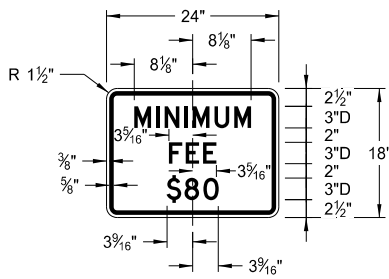
D-704-10



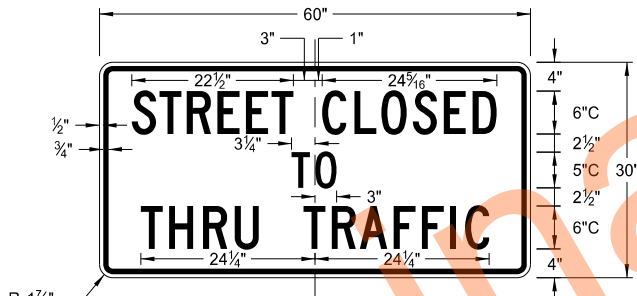
R1-50P-24
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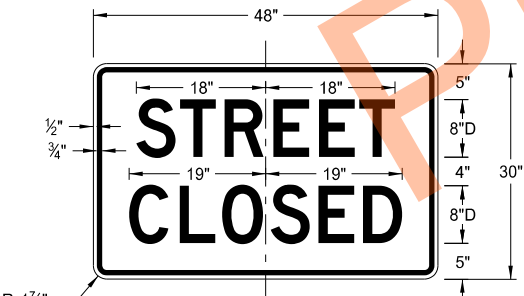
R11-3c-60
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R2-1aP-24
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Background: white



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



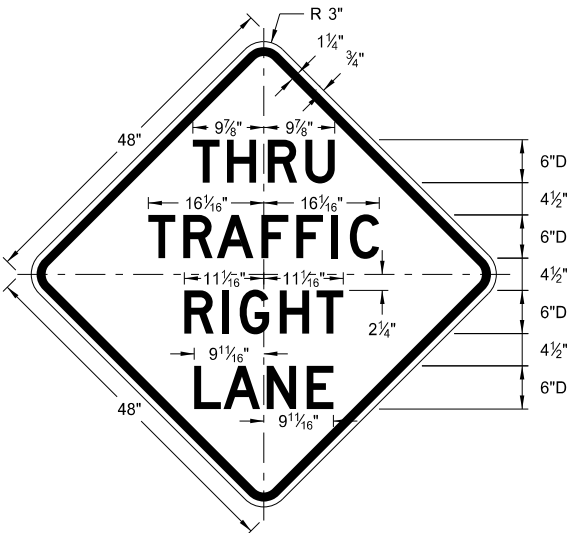
R11-2a-48
Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

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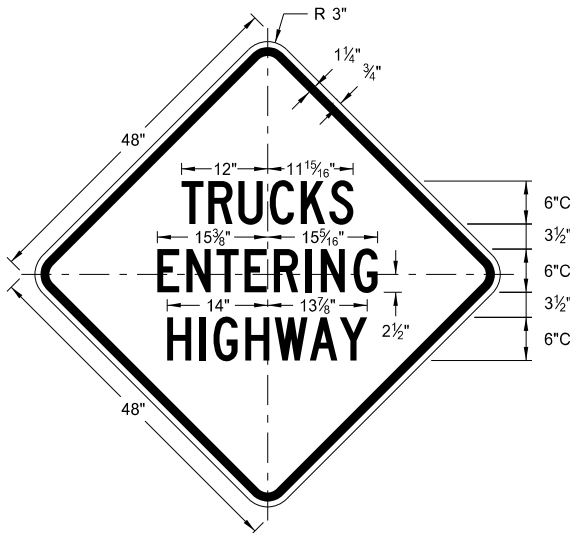
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



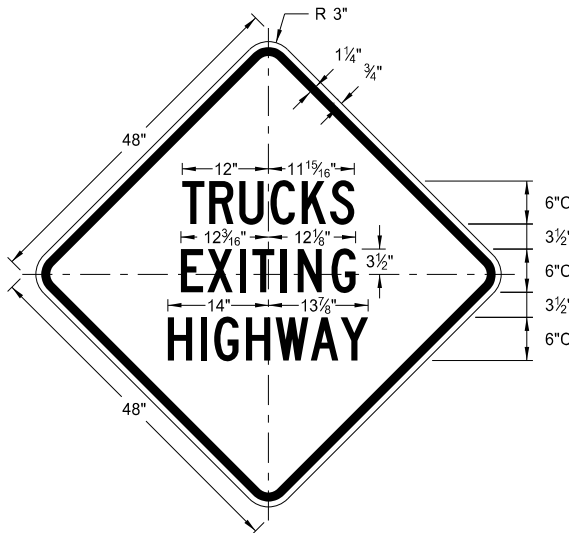
W5-8-48

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Background: orange



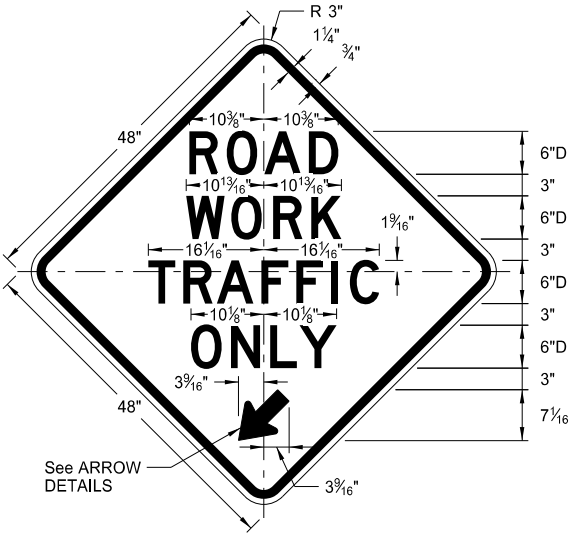
W8-53-48

Legend: black (non-refl)
Background: orange



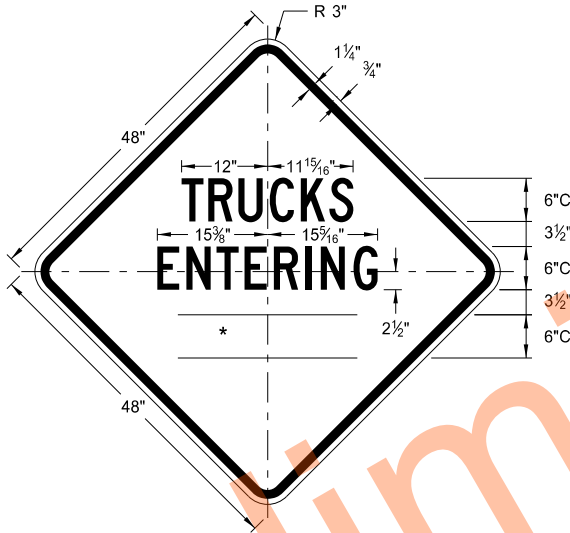
W8-56-48

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Background: orange



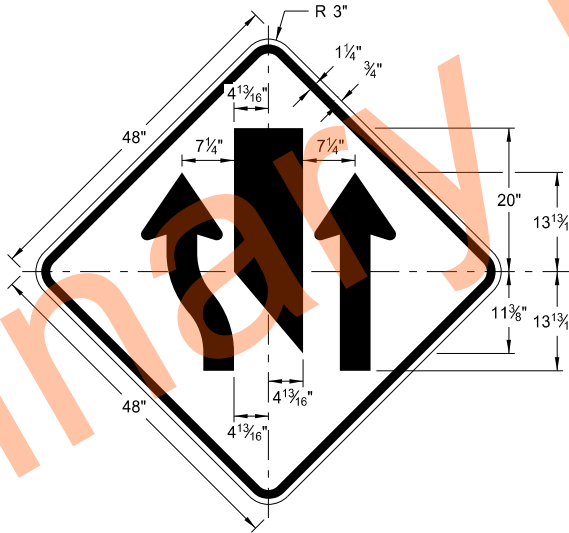
W5-9-48

Legend: black (non-refl)
Background: orange



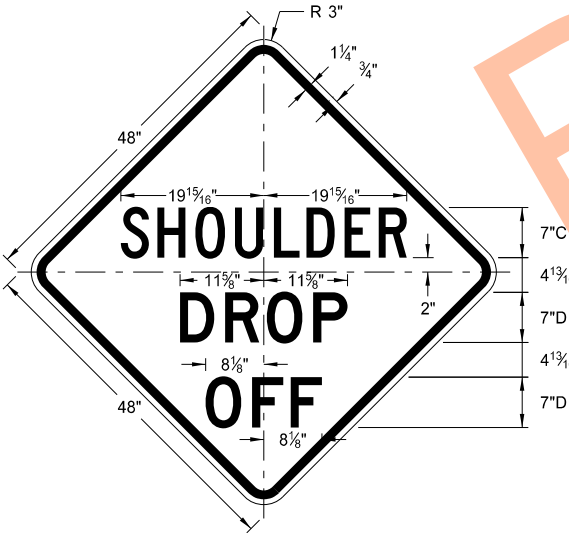
W8-54-48

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Background: orange



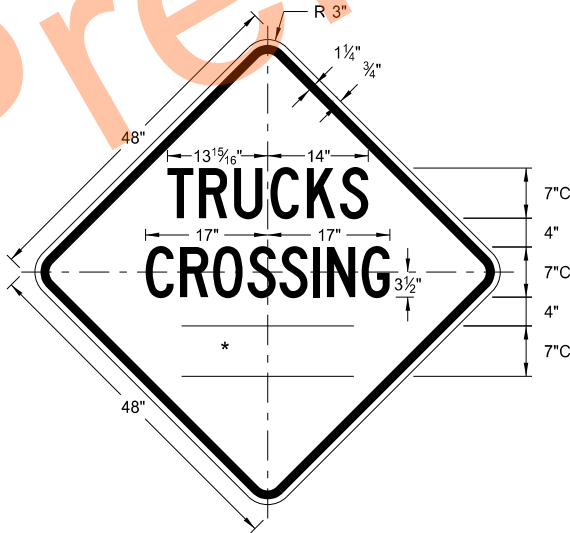
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

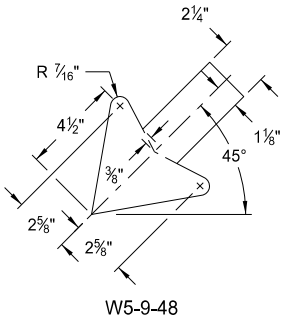


W8-55-48

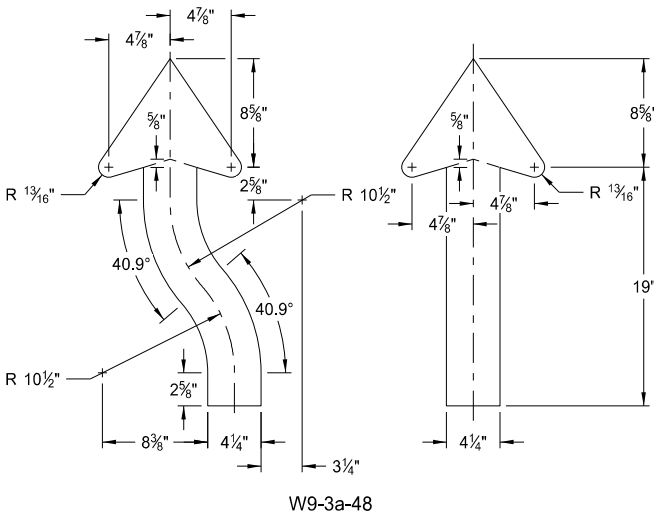
Legend: black (non-refl)
Background: orange

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



W9-3a-48

ARROW DETAILS

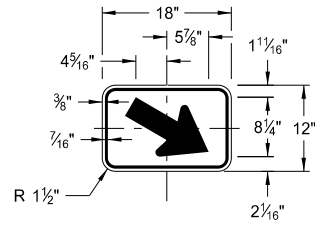
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

This document was originally
issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/03/19 and the original
document is stored at the
North Dakota Department
of Transportation

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

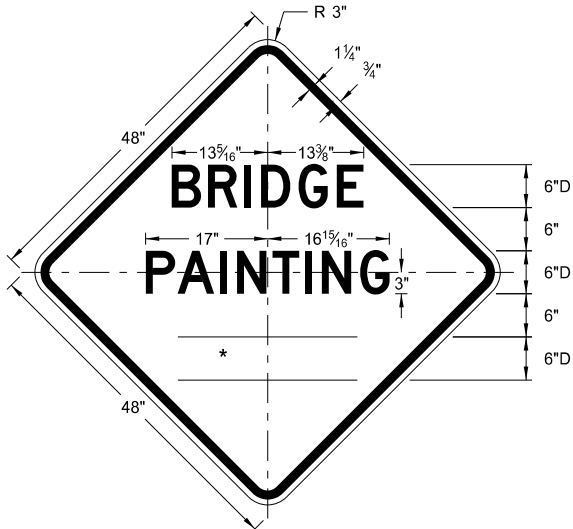
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



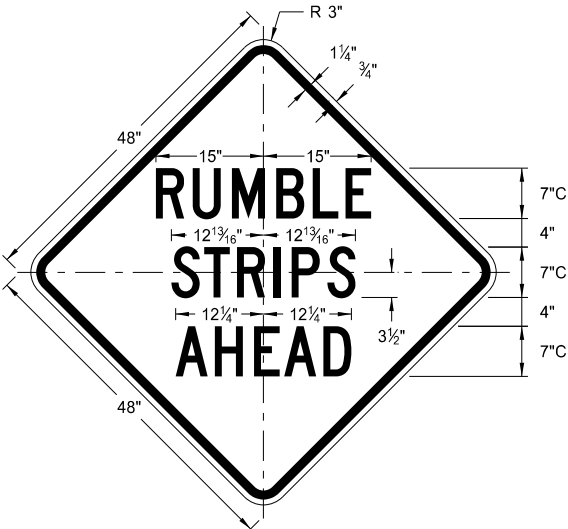
W16-7aP-18

Legend: black (non-refl)
Background: orange



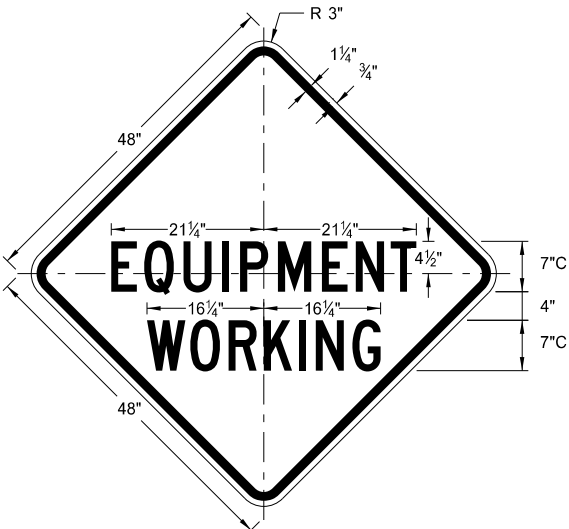
W21-50-48

Legend: black (non-refl)
Background: orange



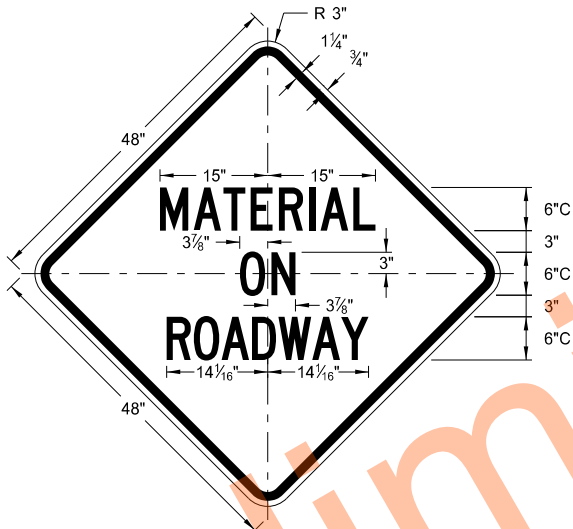
W21-53-48

Legend: black (non-refl)
Background: orange



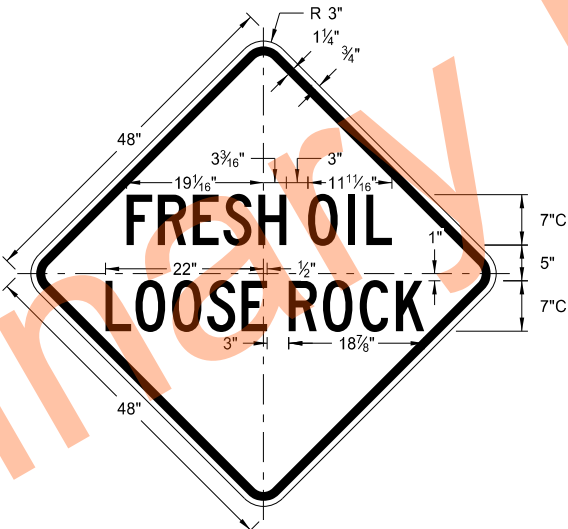
W20-51-48

Legend: black (non-refl)
Background: orange



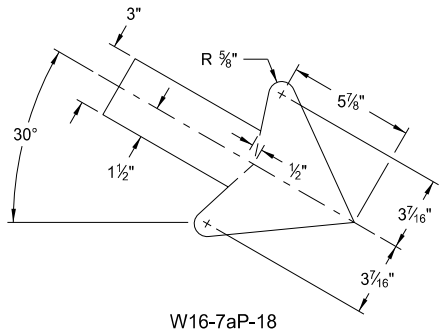
W21-51-48

Legend: black (non-refl)
Background: orange

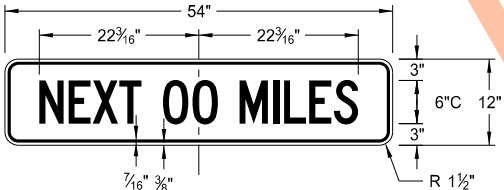


W22-8-48

Legend: black (non-refl)
Background: orange

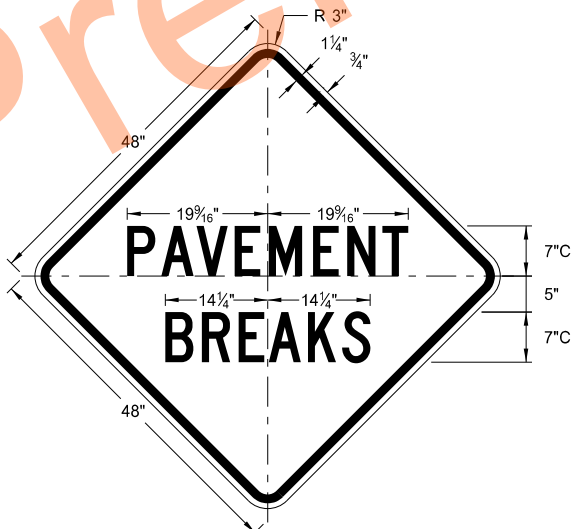


W16-7aP-18



W20-52P-54

Legend: black (non-refl)
Background: orange

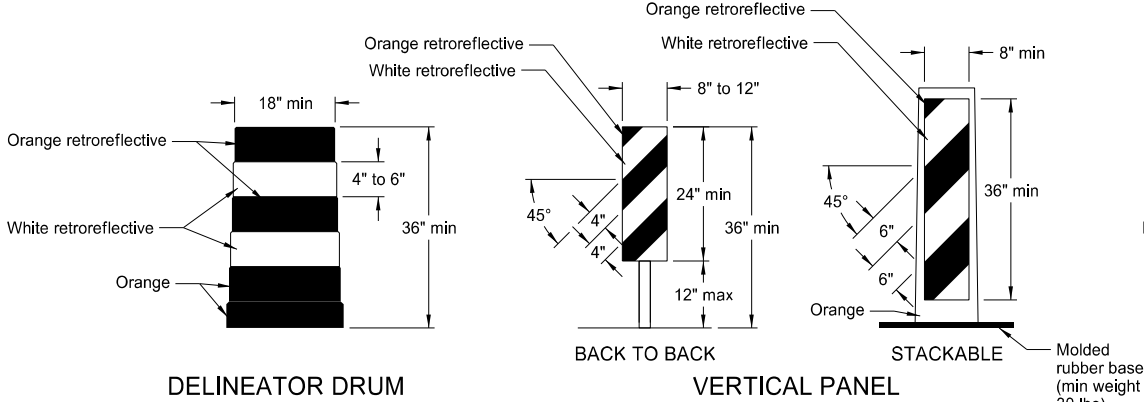


W21-52-48

Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation
5-31-18		
REVISIONS		
DATE	CHANGE	
11-01-19	Added details for sign W16-7aP-18.	

BARRICADE AND CHANNELIZING DEVICE DETAILS



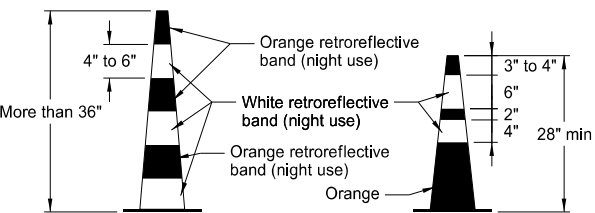
DELINEATOR DRUM

VERTICAL PANEL

STACKABLE
Molded rubber base (min weight 30 lbs)

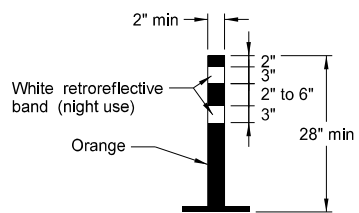
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with 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, use a stripe width of 6 inches.



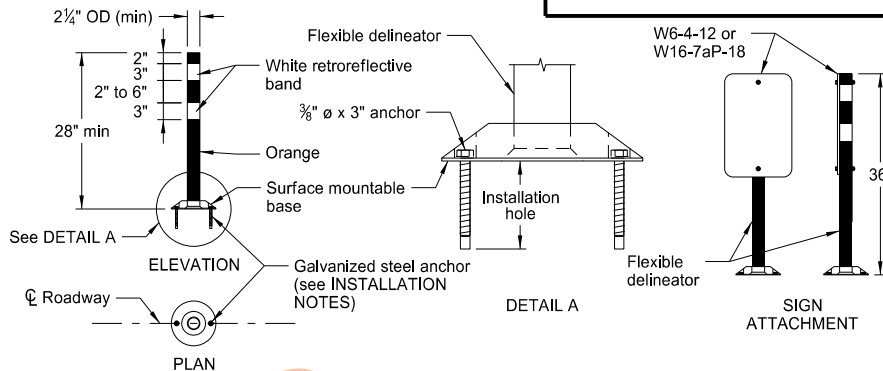
TRAFFIC CONE

Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



TUBULAR MARKER

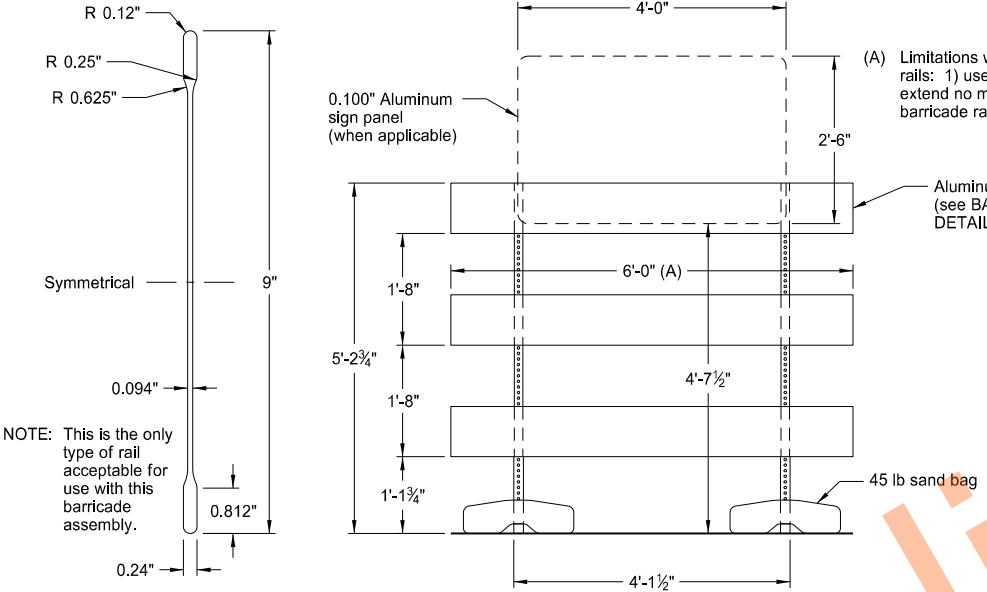
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth 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, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.

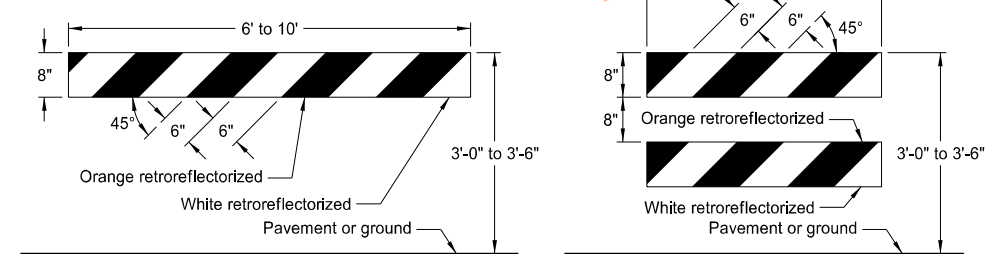


BARRICADE BLADE DETAIL

ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

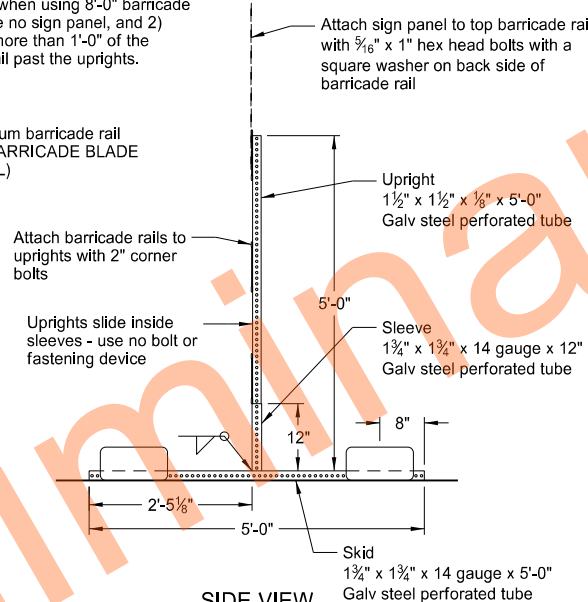
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".



TYPE I BARRICADE

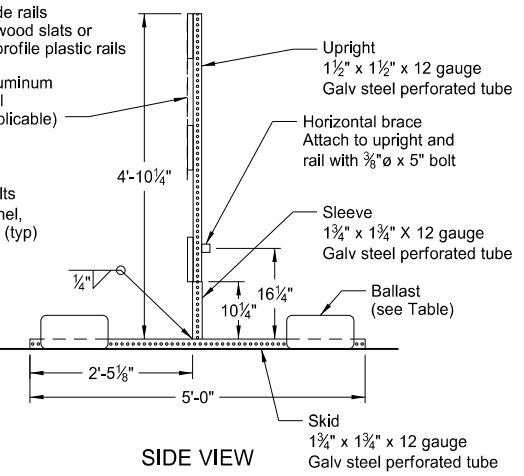
TYPE II BARRICADE

BARRICADE RAIL DETAILS



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

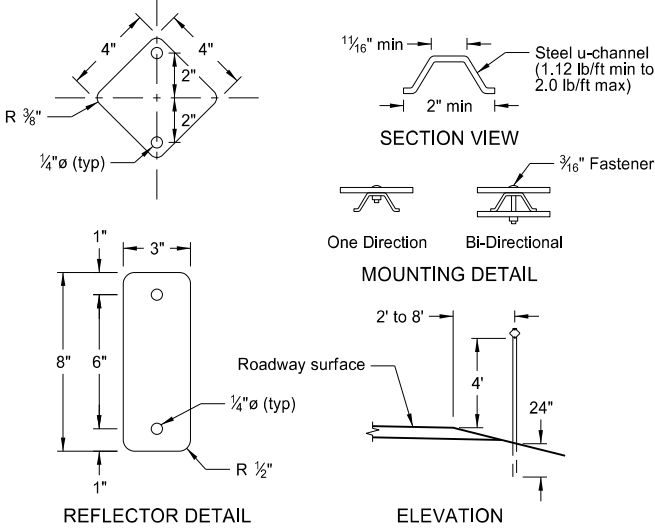


SIDE VIEW

MINIMUM BALLAST
(For each side of barricade support)

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

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



REFLECTOR DETAIL

ELEVATION

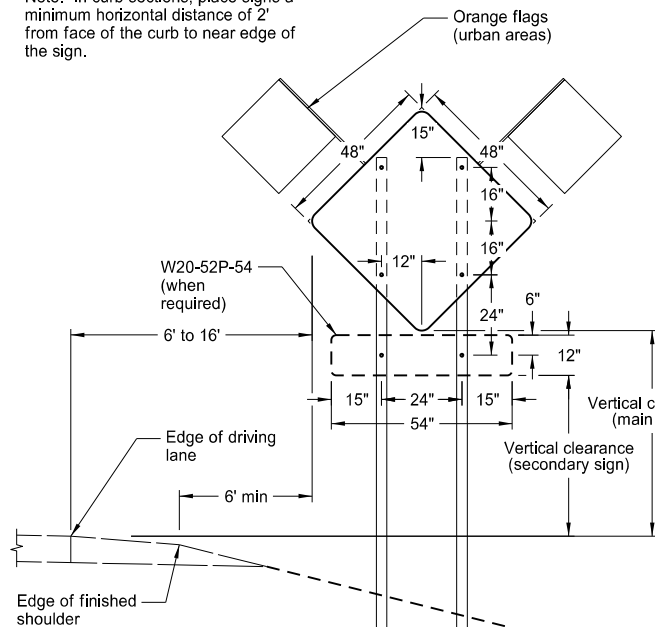
DELINEATORS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

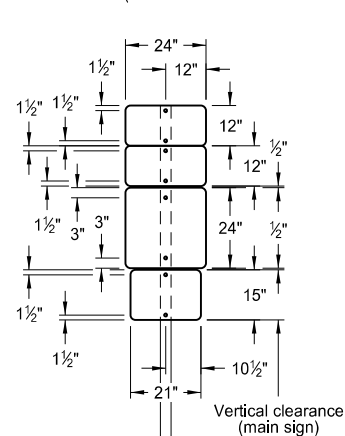
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

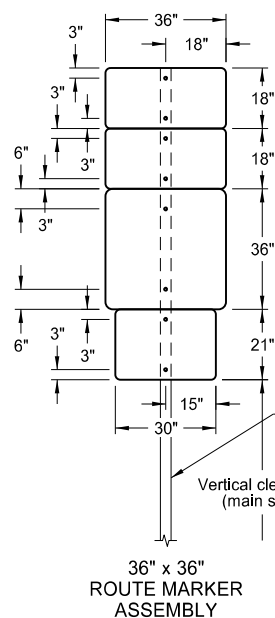
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



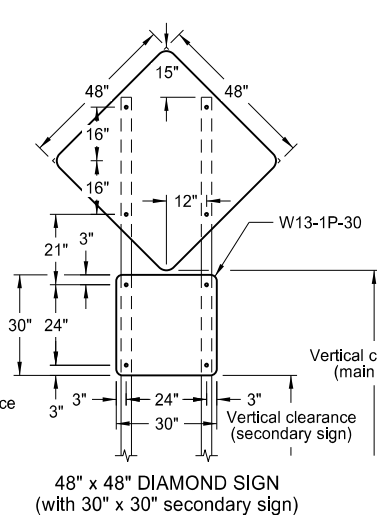
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



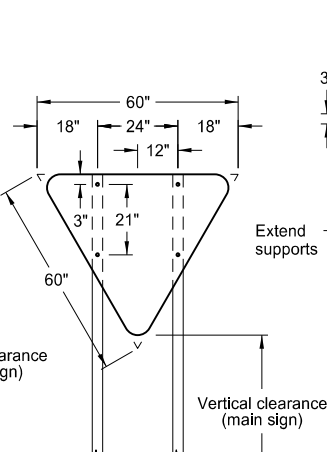
24" x 24"
ROUTE MARKER
ASSEMBLY



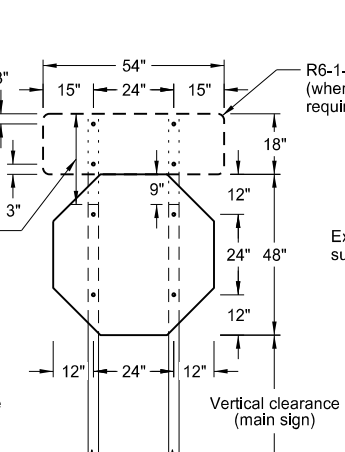
36" x 36"
ROUTE MARKER
ASSEMBLY



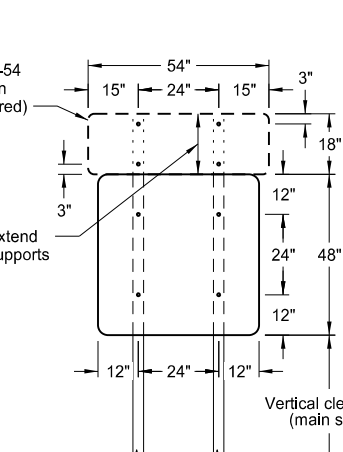
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



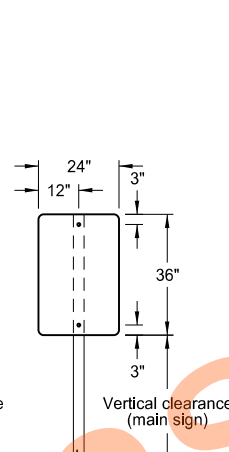
R1-2-60 - YIELD SIGN



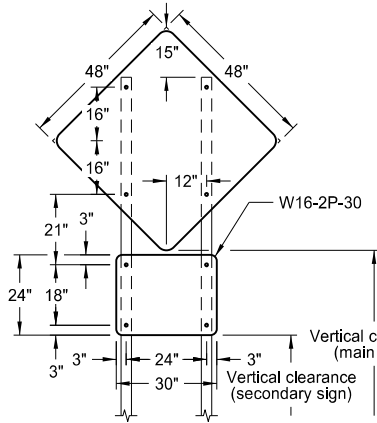
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



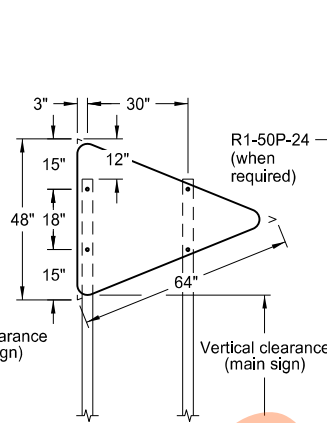
48" x 48" SIGN
(with R6-1-54 sign as required)



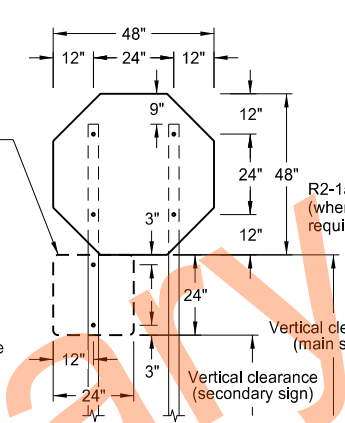
24" x 36" SIGN



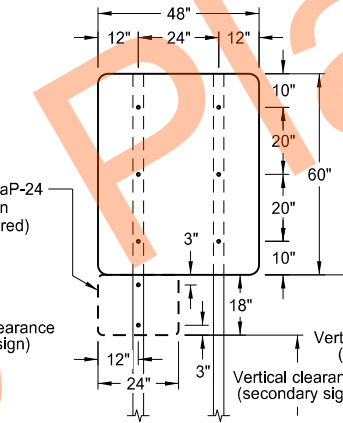
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



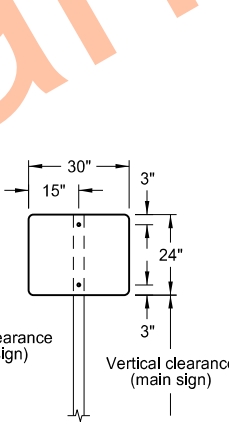
W14-3-64 - PENNANT SIGN



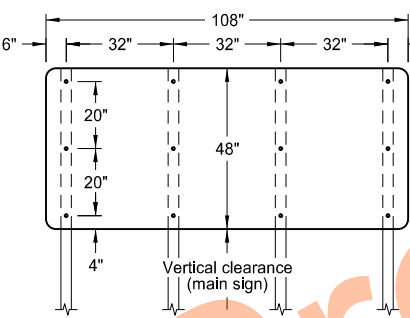
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



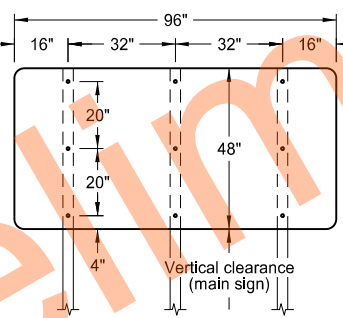
48" x 48" SIGN
(with R2-1aP-24 sign as required)



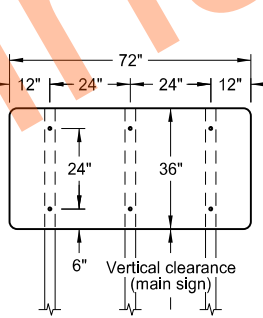
30" x 24" SIGN



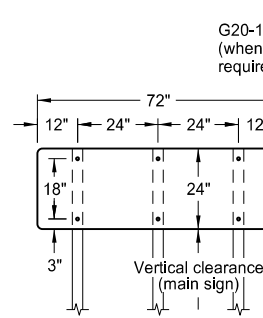
108" x 48" SIGN



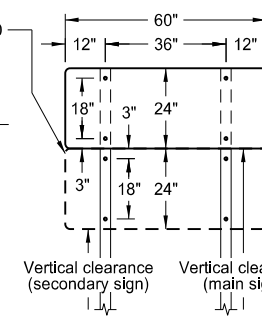
96" x 48" SIGN



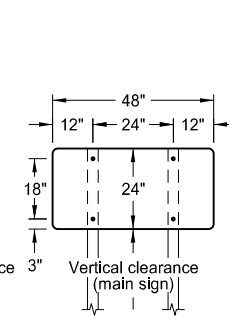
72" x 36" SIGN



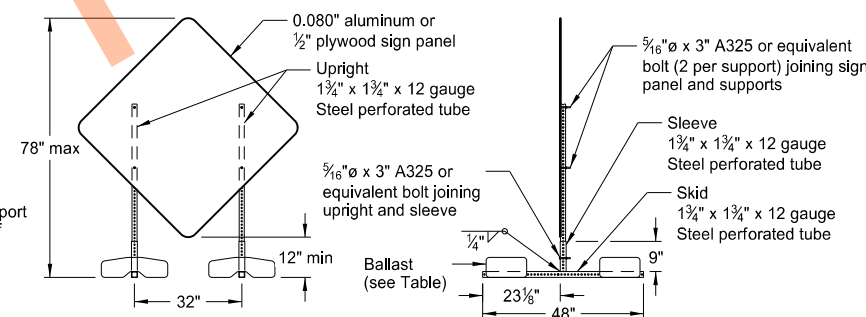
72" x 24" SIGN



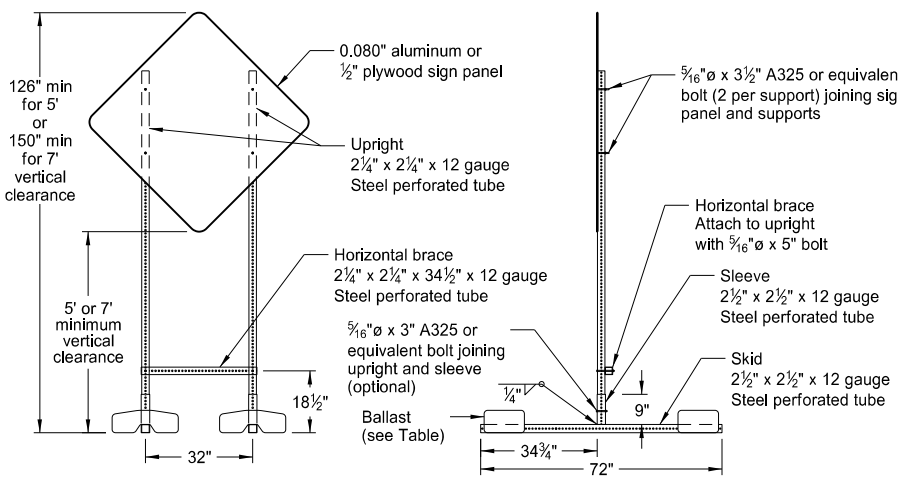
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Galvanize or paint supports. 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, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on 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 stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

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

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

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to 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. Place sandbags at or near the ends of skids.

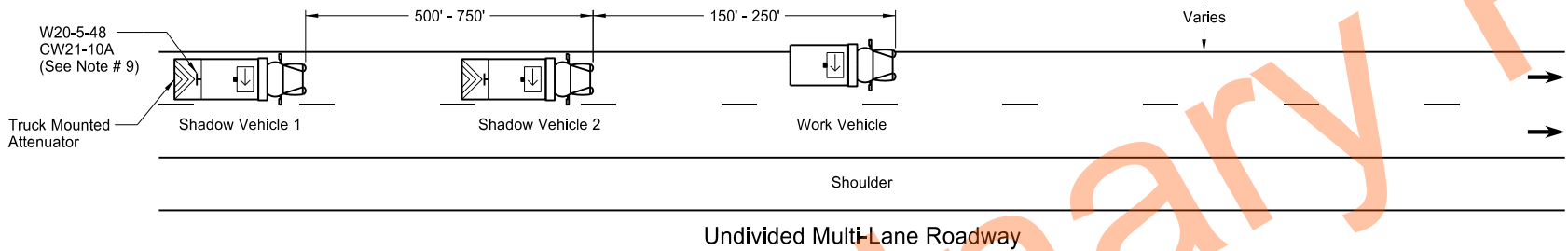
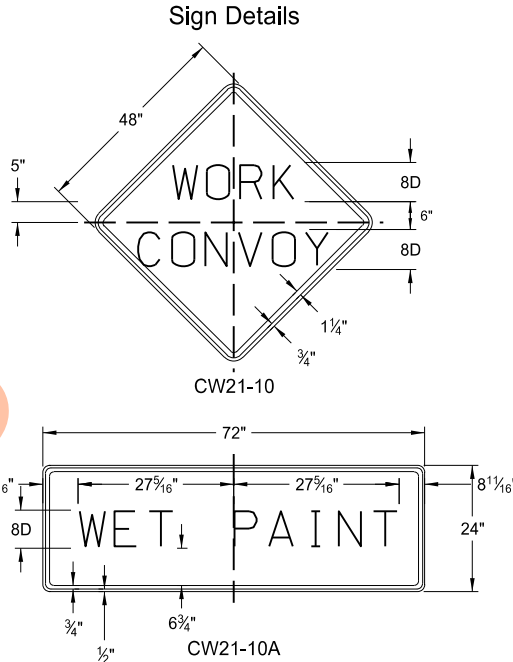
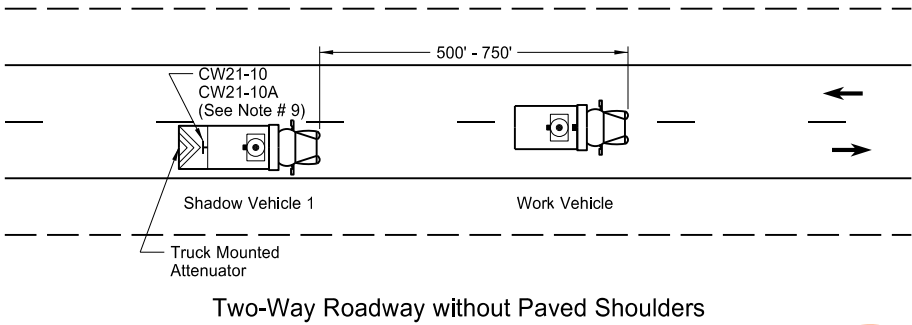
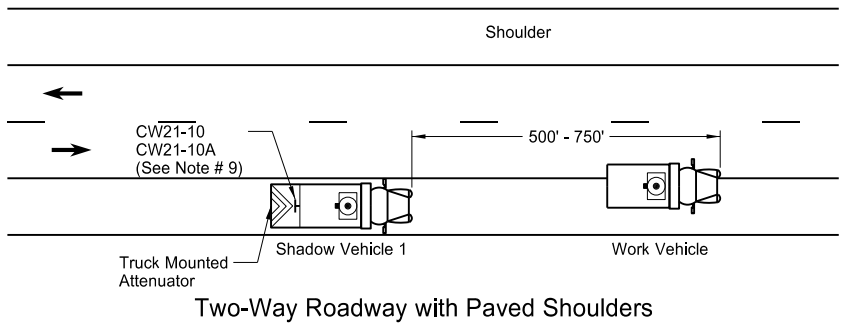
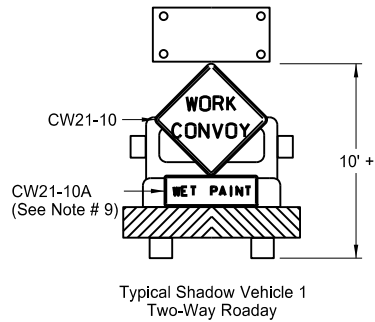
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

This document was originally issued and sealed by

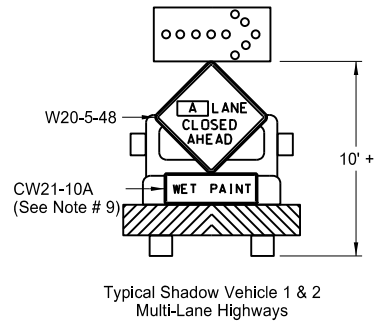
Kirk J Hoff,
Registration Number
PE-4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
(PAVEMENT MARKING)

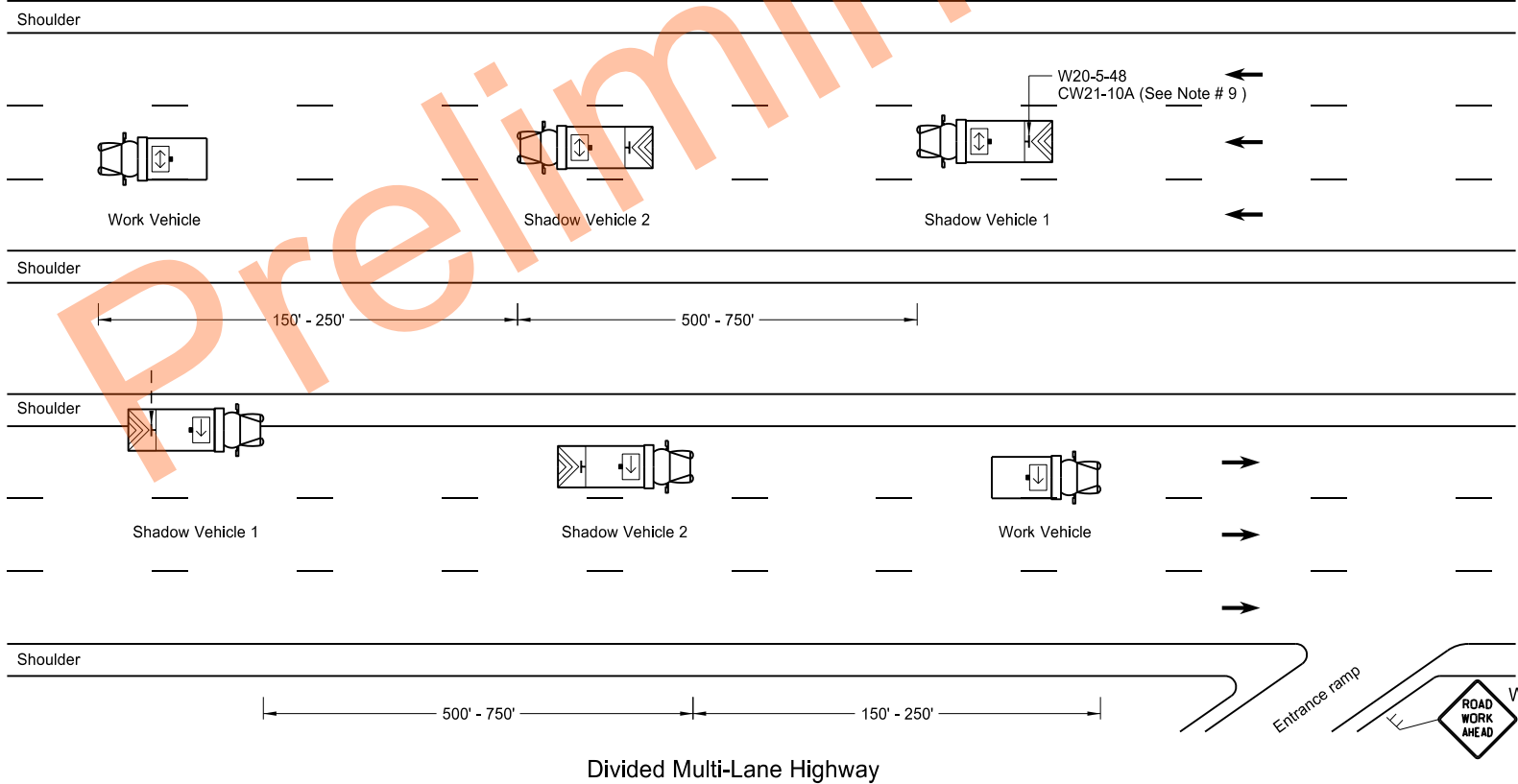
D-704-27



- Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 2. Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
 4. Provide each vehicle with two-way electronic communication capability.
 5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
 6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
 7. Sign Colors
Letters = Black
Border = Black
Background = Orange
 8. As an option, use shadow vehicle 2 the paint tender vehicle.
 9. Use sign CW21-10A only during painting operation.
 10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.



A = [Left] [Right] [Center]



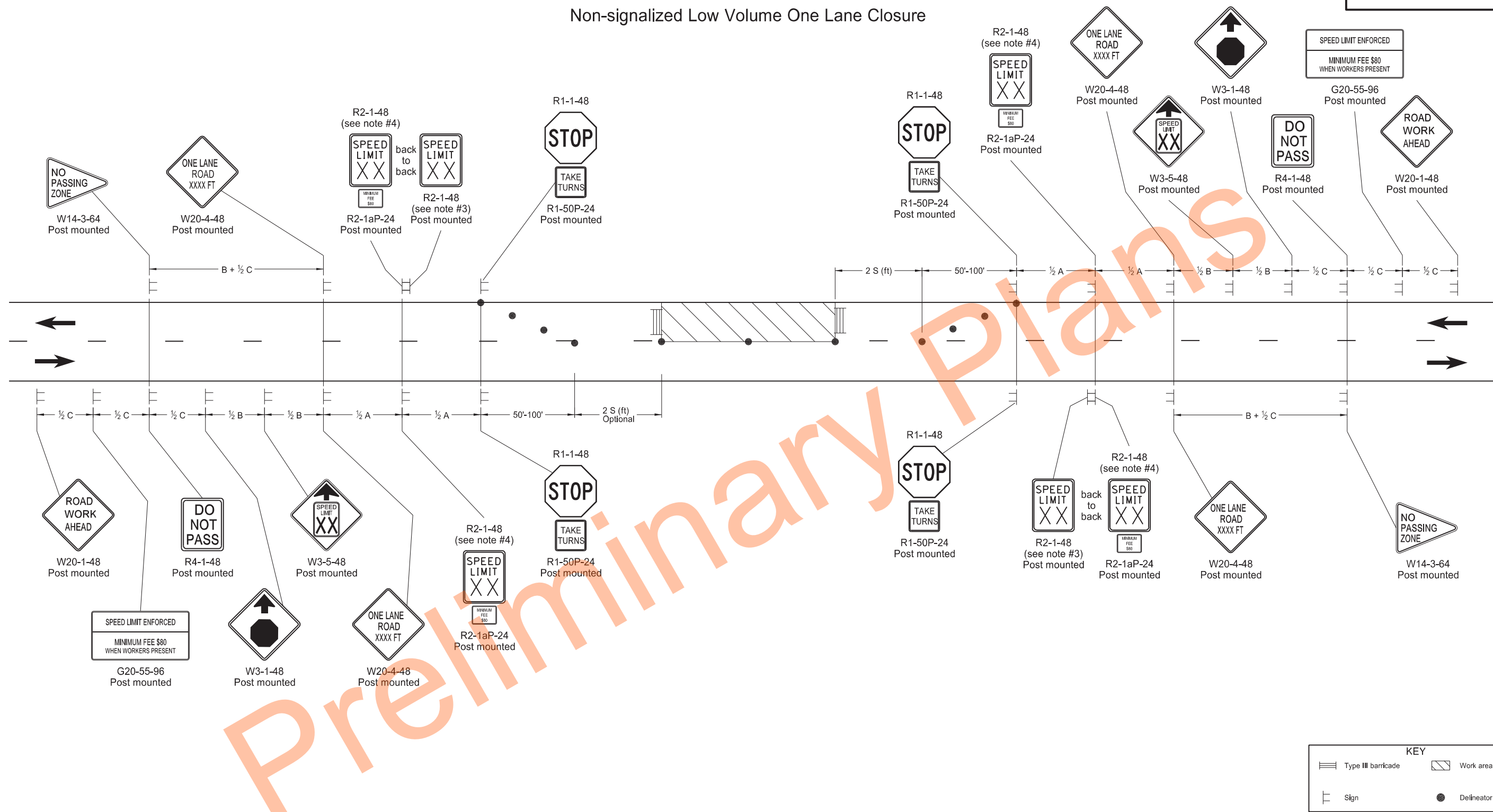
KEY	
	Sign
	Truck mounted attenuator
	Flashing arrow panels:
	Right directional
	Left directional
	Double arrow directional
	Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/08/19 and the original document is stored at the
North Dakota Department
of Transportation

CONSTRUCTION SIGN LAYOUT
Non-signalized Low Volume One Lane Closure

D-704-31



- Notes:
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - Place delineator drums or cones used for tapering traffic at 3 equal spaces and delineator drums for tangents at dimension "S". "S" = the numerical value of speed limit.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph). Place the second speed limit sign at $\frac{1}{2}$ B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within a reduced speed zone.
 - Covered (when approved by engineer) or obliterated pavement marking measured as "Obliteration of Pavement Marking".
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

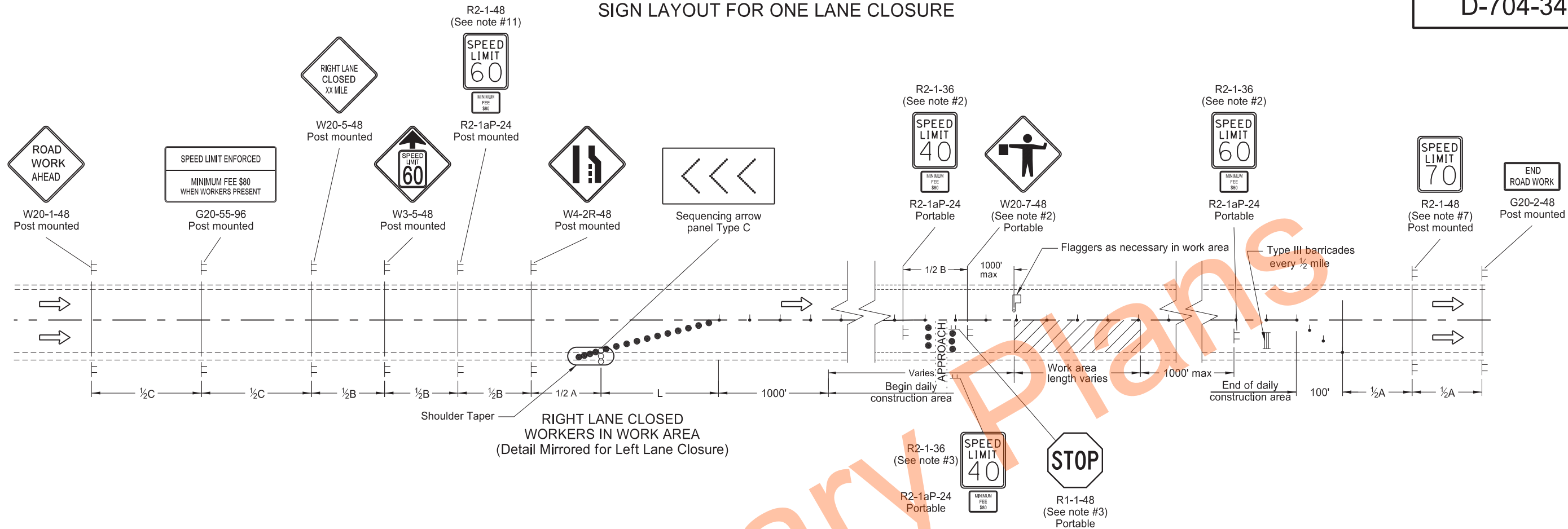
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Revised note 8 & sign numbers
12-03-19	Corrected sign number
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



11/29/22

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
S=Numerical value of speed limit or 85th percentile
W=The width of taper.
L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

KEY	
	Type I barricade
	Type II barricade
	Type III barricade
	Sign
	Delineator drum
	Work area
	Flagger
	Sequencing arrow panel
	Tubular markers

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

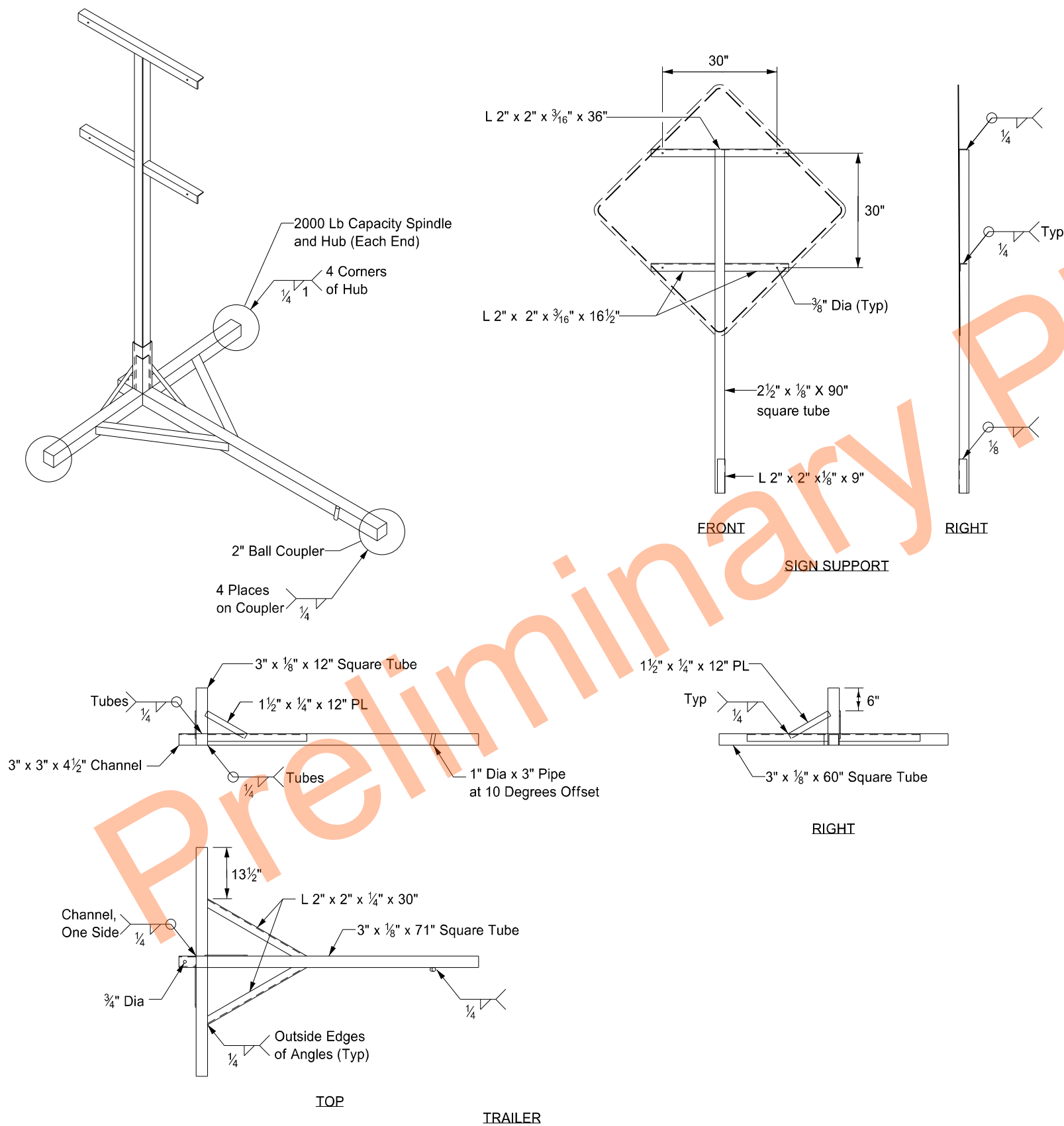
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd Limit Enforced, removed table, & added Dollars At Work
11-29-22	Removed Dollars At Work

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11/29/22

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



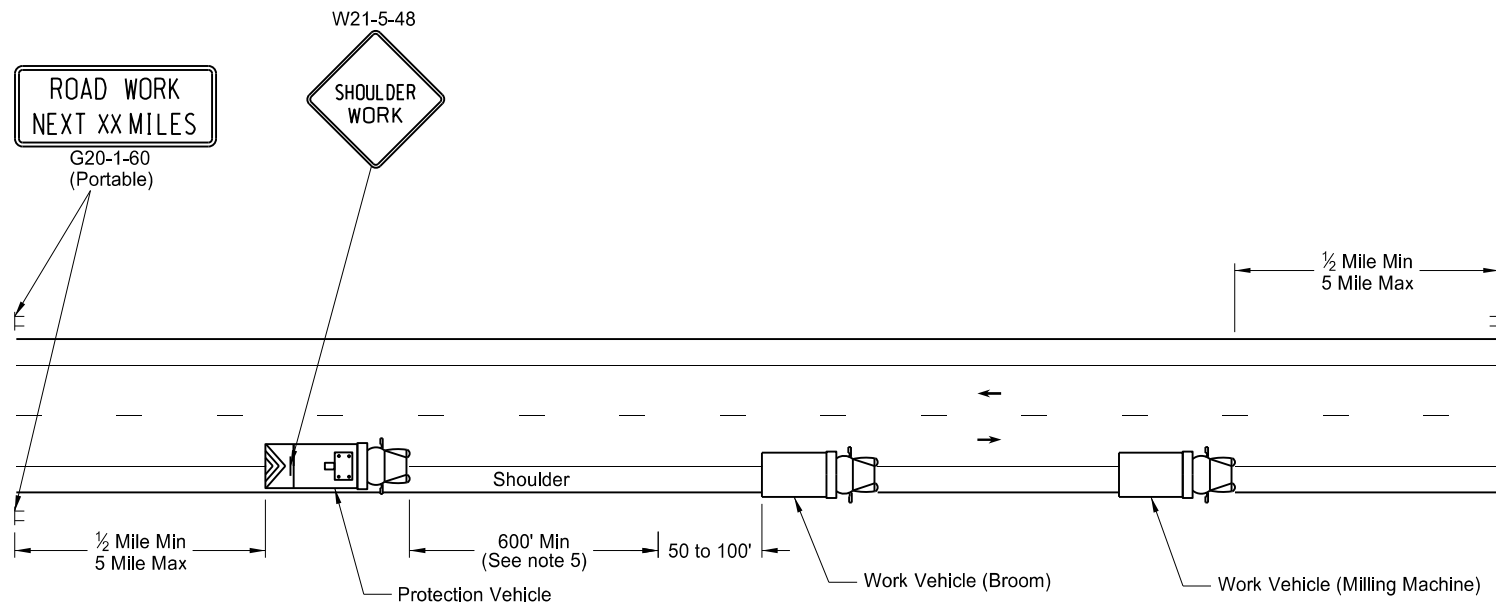
- Notes:
- Maximum 250 pound weight of assembly.
 - Use a 14" wheel and tire.
 - Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - Other NCHRP 350 or MASH crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

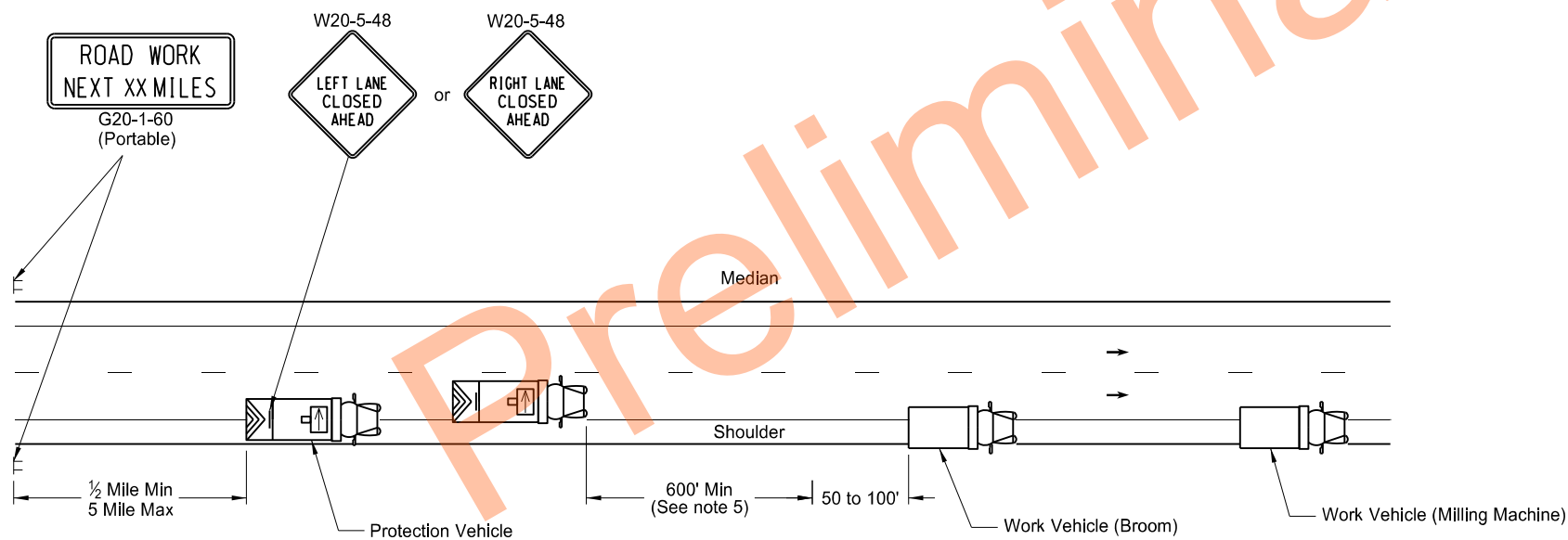
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

MOBILE OPERATION
Grinding Shoulder Rumble Strips

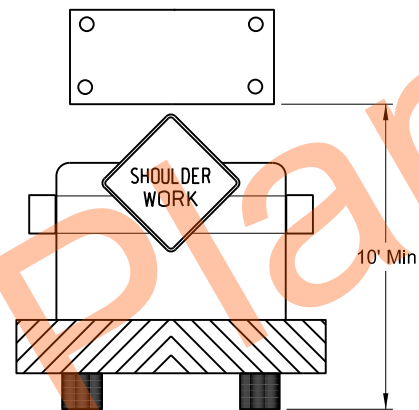
D-704-56



TWO LANE - TWO WAY ROADWAY



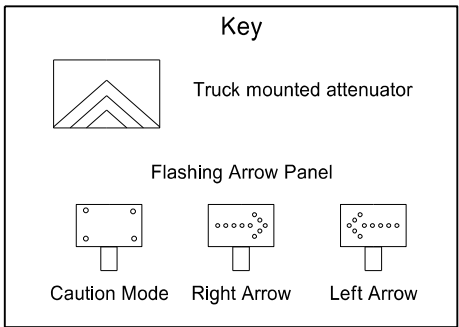
INTERSTATE & 4 LANE DIVIDED HIGHWAY



TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

- Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
 2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
 3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
 4. Provide two - way electronic communication capability in each vehicle.
 5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
 6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

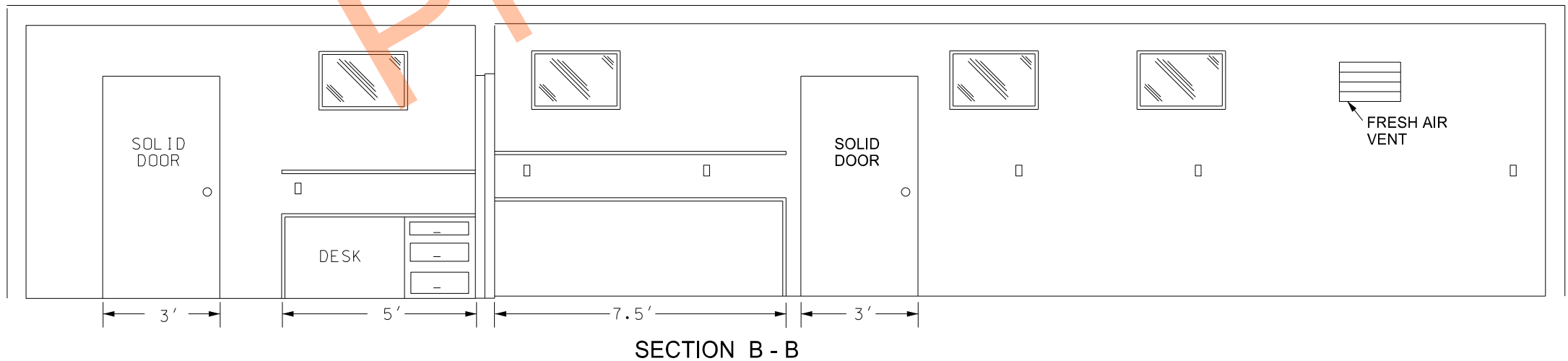
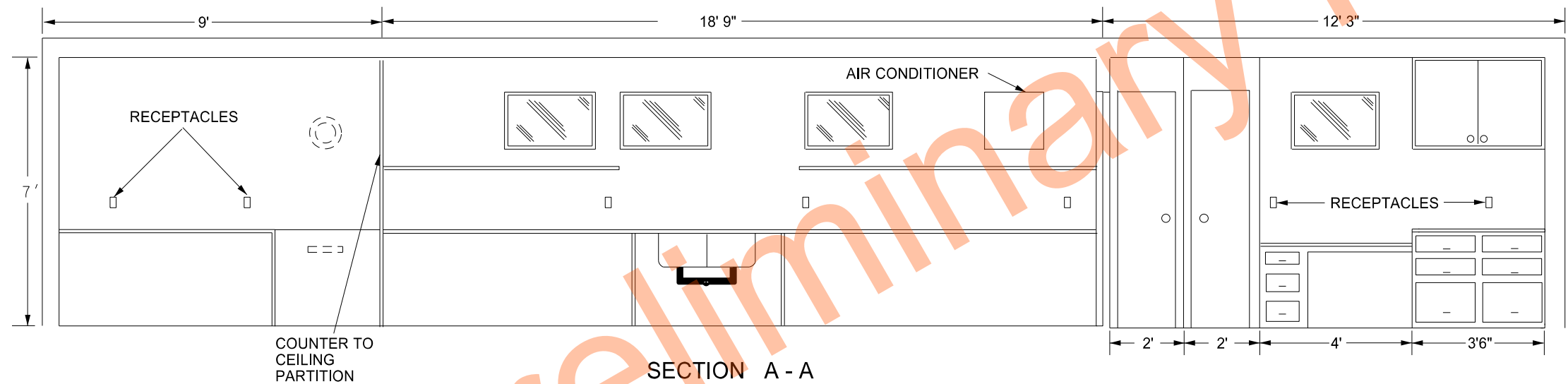
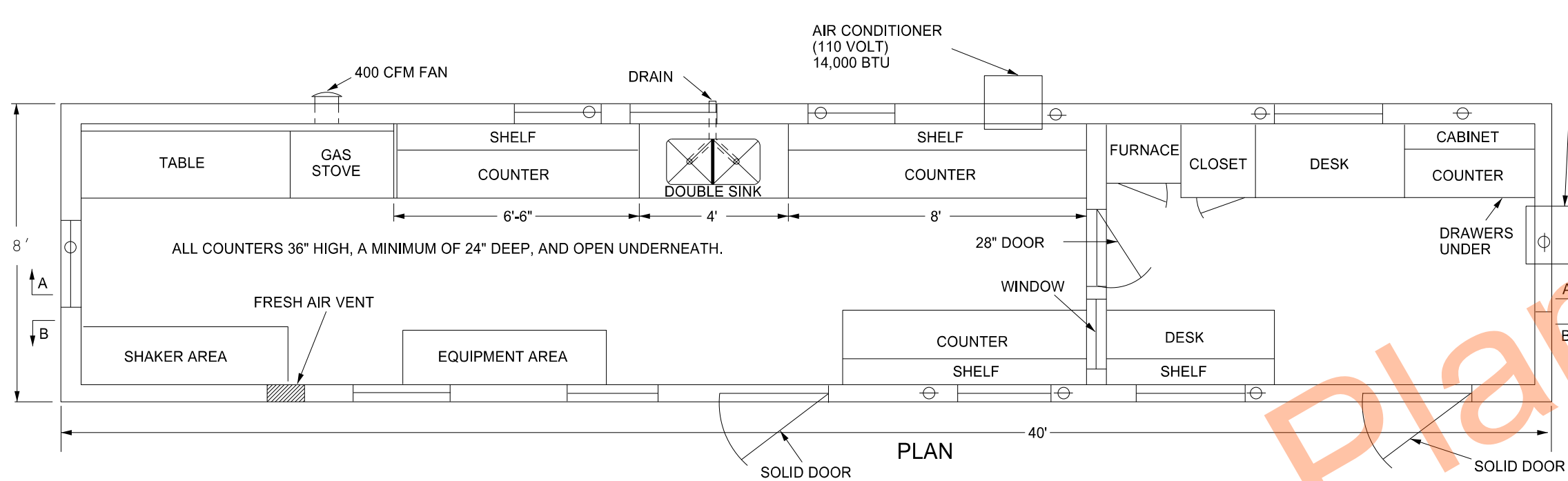


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Updated notes & signs New Design Engineer PE Stamp

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BITUMINOUS LABORATORY

D-706-1



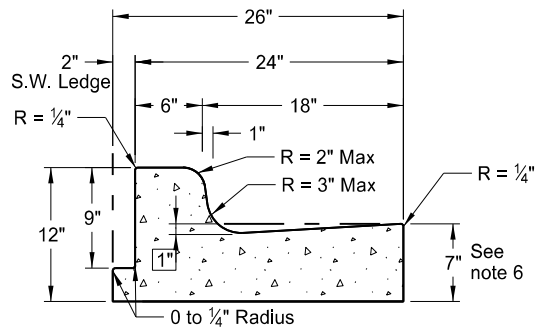
Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of 1/2 inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

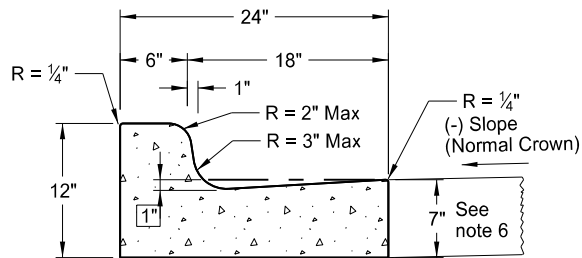
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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on 08/27/19 and the original document is stored at the
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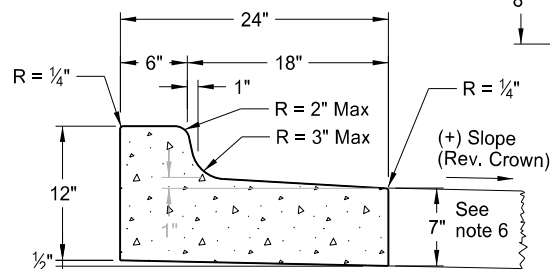
Curb & Gutter and Valley Gutter



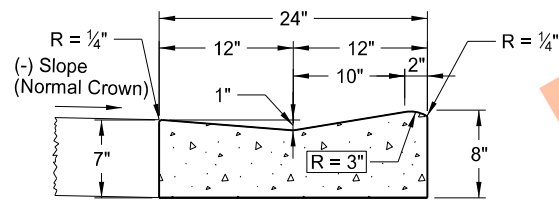
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk,
Median, or Parking Lot.
(Sec. A shown. See Sec B for
additional details.)



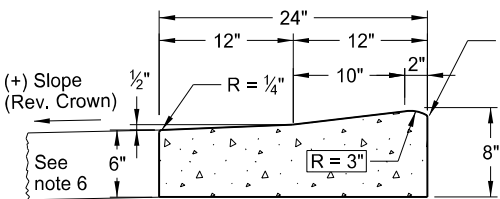
Curb & Gutter Type 1 (Sec. A)



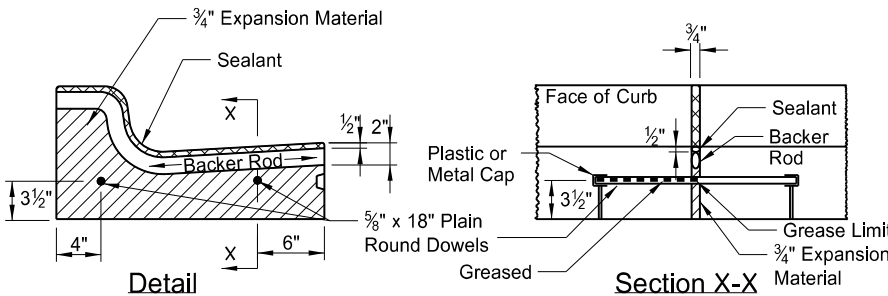
Curb & Gutter Type 1 (Sec. B)



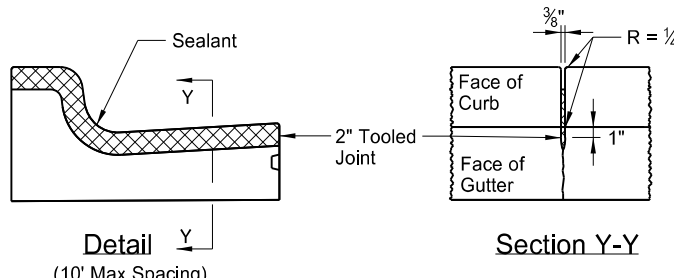
Mountable Curb & Gutter Type 1 (Sec. A)



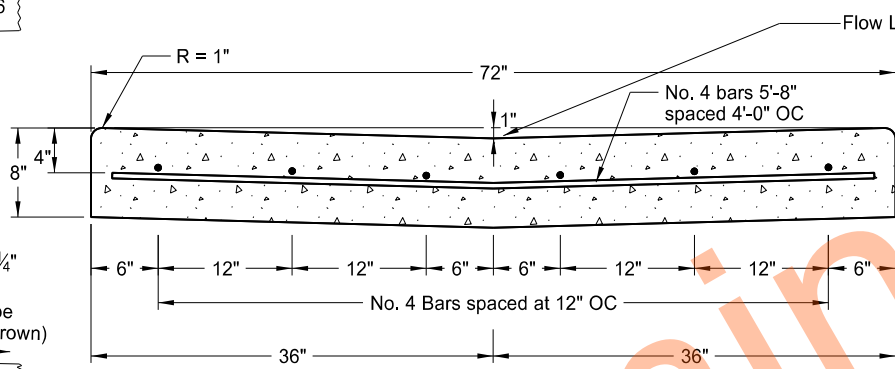
Mountable Curb & Gutter Type 1 (Sec. B)



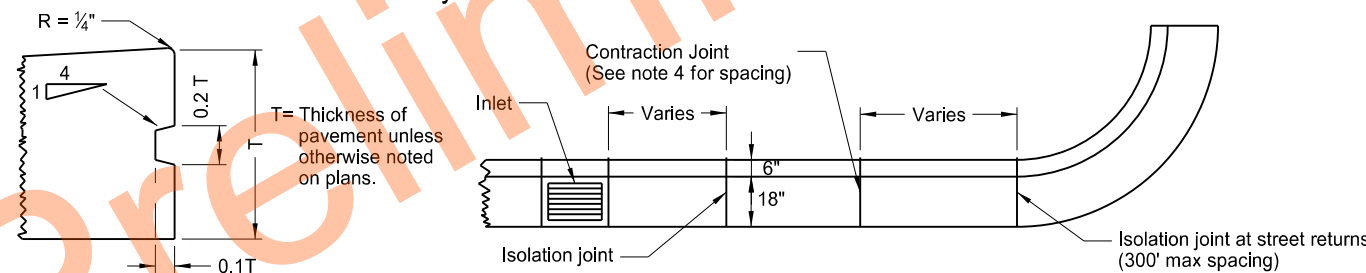
Isolation Joint



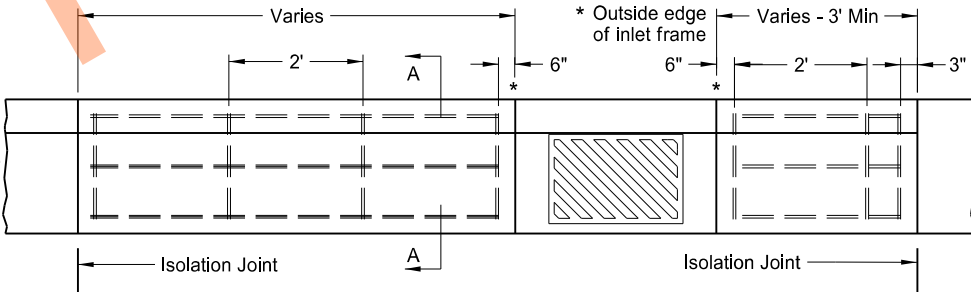
Contraction Joint



72" Concrete Valley Gutter Detail

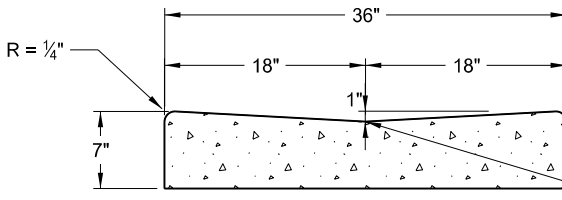


Joint Location Detail

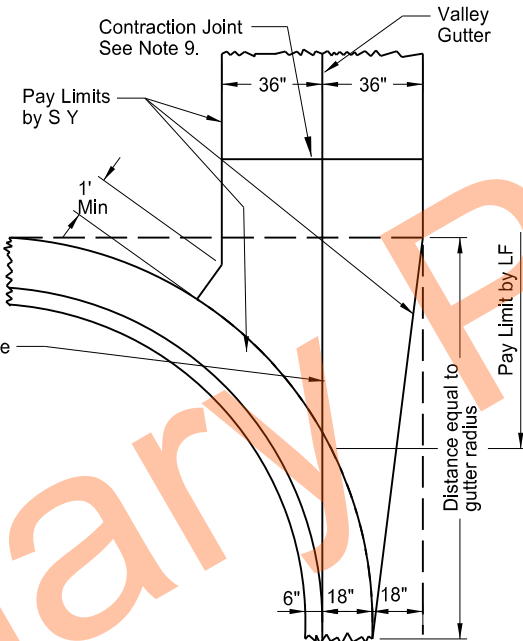


Curb & Gutter Reinforcing at Inlets

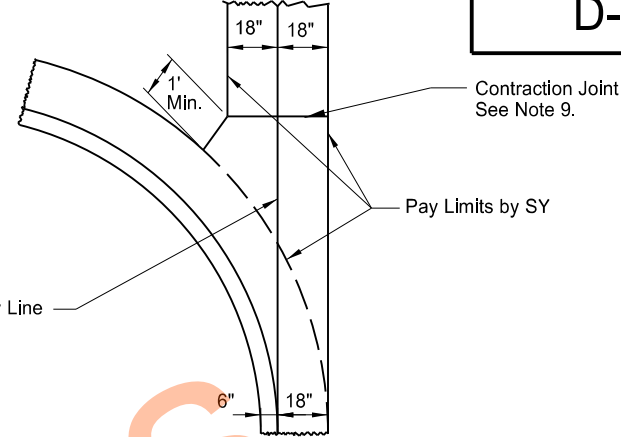
NOTE: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlet locations (even inlets located on radii) in the price bid for "Curb and Gutter - Type 1." Extend reinforcement to the second joint (rebar placed through the first joint) in cases where the 3' min. panel length cannot be obtained.



36" Concrete Valley Gutter Detail



72" Concrete Valley Gutter Plan



36" Concrete Valley Gutter Plan

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use 3/4" expansion joint filler for isolation joint material. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot bituminous pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: Seal contraction and isolation joints as shown in the details. Use joint sealant for contraction joints that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Face of Gutter Depth: For hot bituminous pavement use 7" gutter depth as shown. For PCC pavements, match the gutter depth to the depth of adjacent PCC pavement or to construct a 7" depth as shown.
7. Tie curb and gutter to abutting PCC pavement with No. 3 bars, 1'-6" in length, spaced at 4' centers.
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint, the same shape as the curb and gutter just ahead of the taper. Install an 18" tie bar across the joint.
9. Valley Gutter Joints: Form, saw, or score 1/8" min. to 3/8" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.

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Kirk J Hoff,
Registration Number
PE- 4683,
on 8-27-19 and the original
document is stored at the
North Dakota Department
of Transportation

SIDEWALK

D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

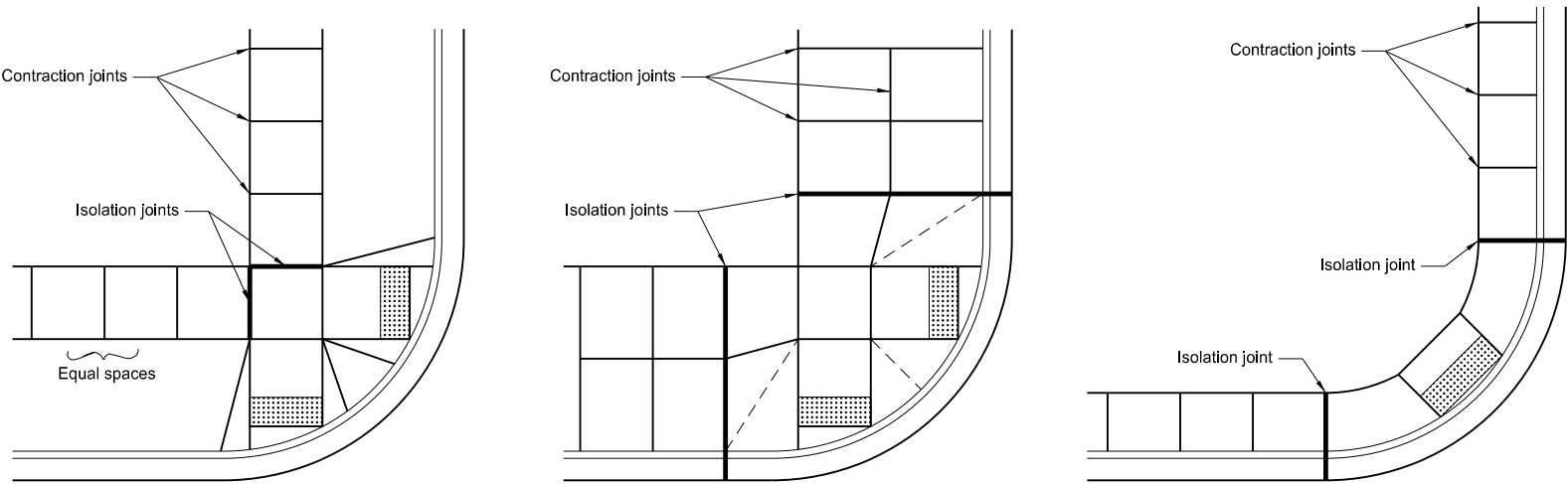
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

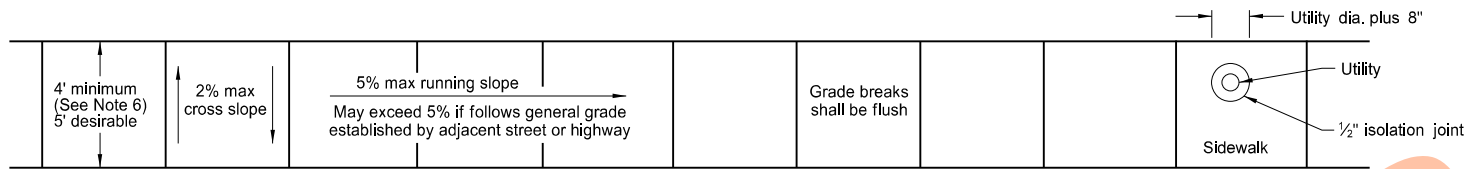
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

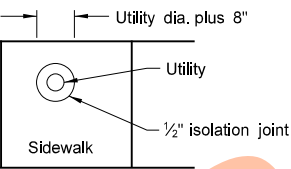
When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



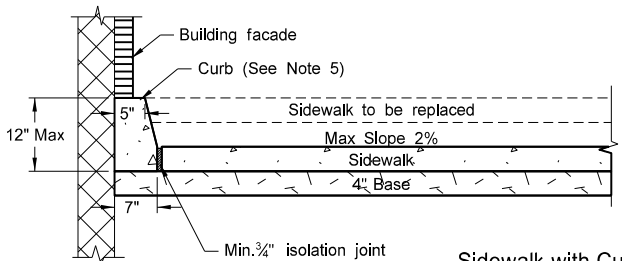
Typical Joint Layouts



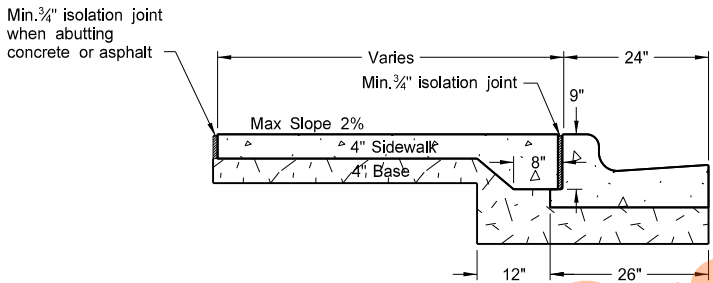
Sidewalk Width and Grade



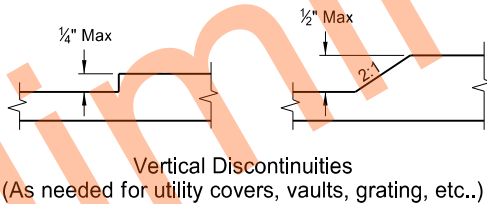
Utility Blockout



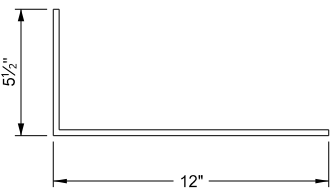
Sidewalk with Curb Detail
(Building face application)



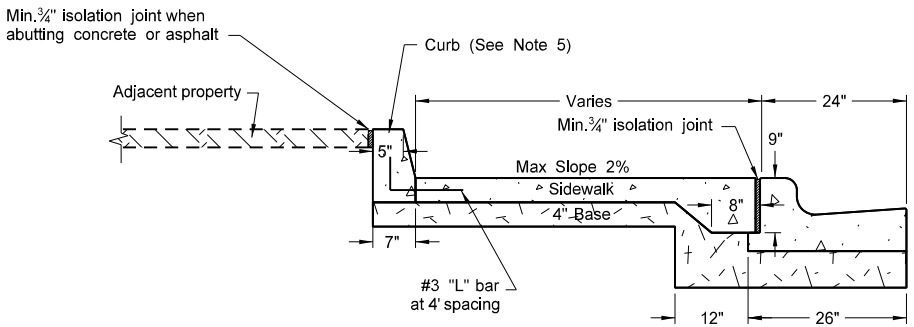
Sidewalk Detail
(Installed adjacent to curb and gutter)



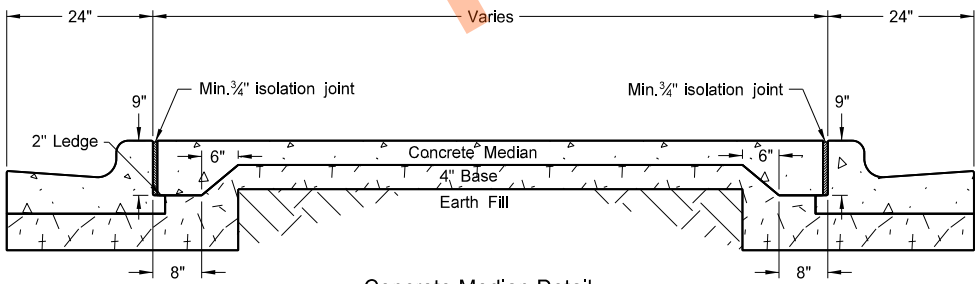
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



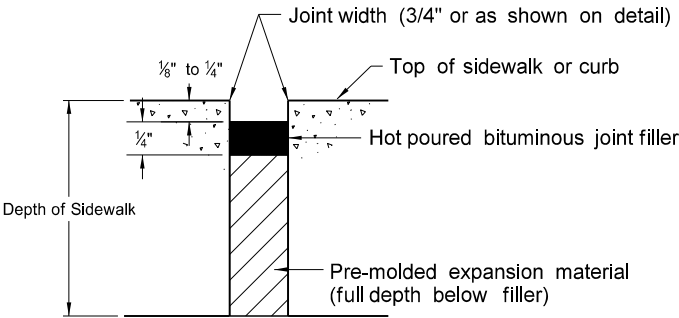
"L" Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



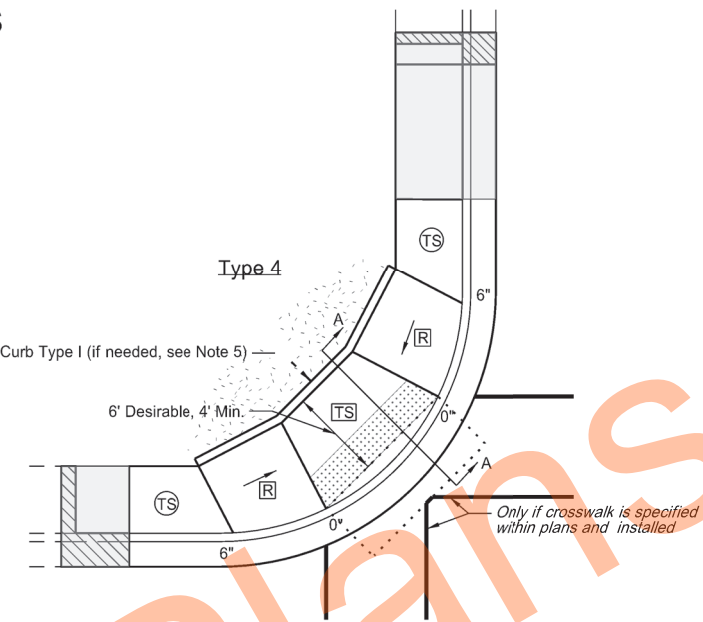
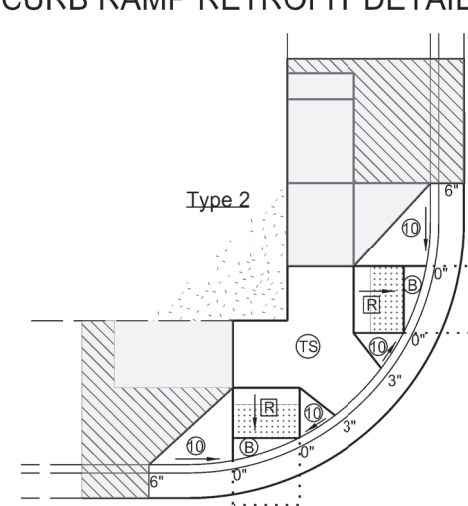
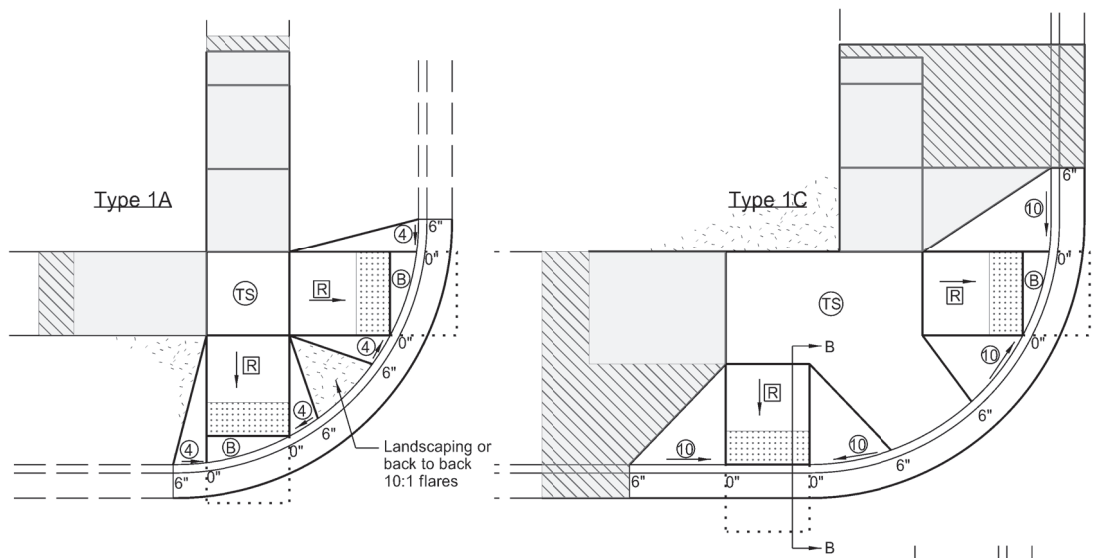
Typical Isolation Joint Seal
(longitudinal and transverse)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width and grade and passing lane requirements.
08-27-19	New Design Engineer PE Stamp.

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Kirk J Hoff,
Registration Number
PE- 4683,
on **08/27/19** and the original document is stored at the North Dakota Department of Transportation

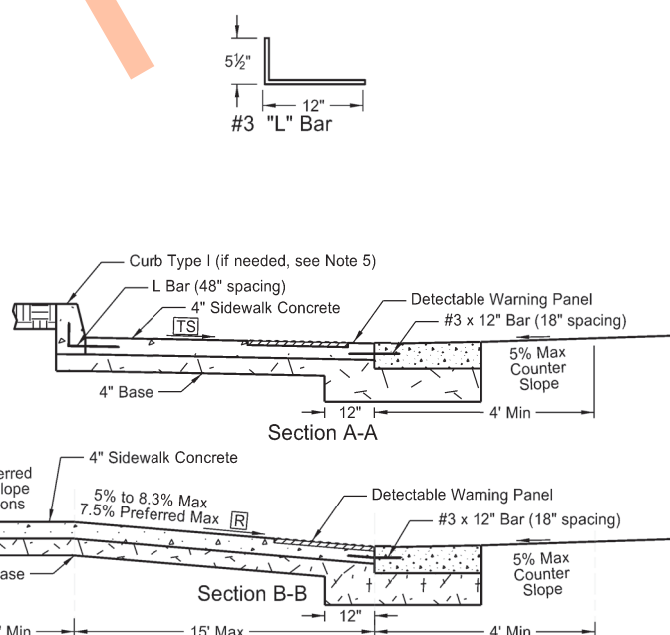
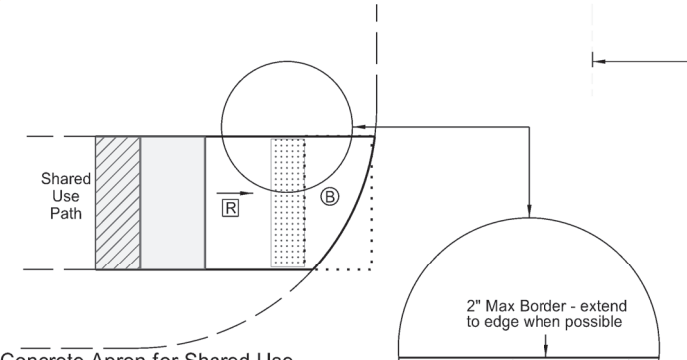
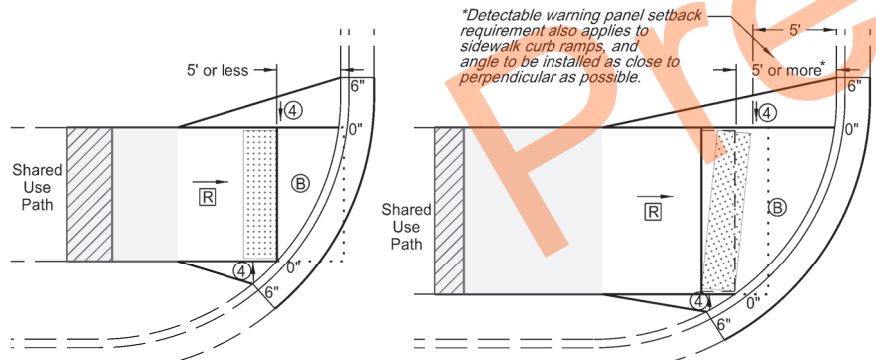
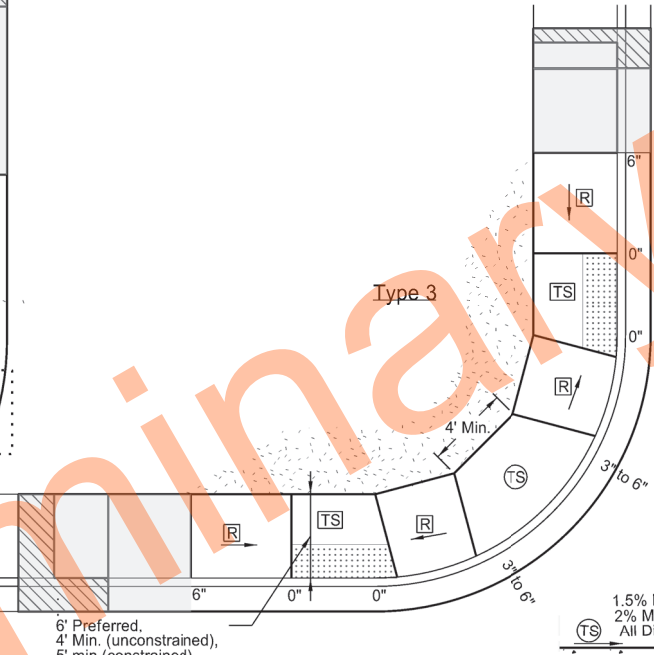
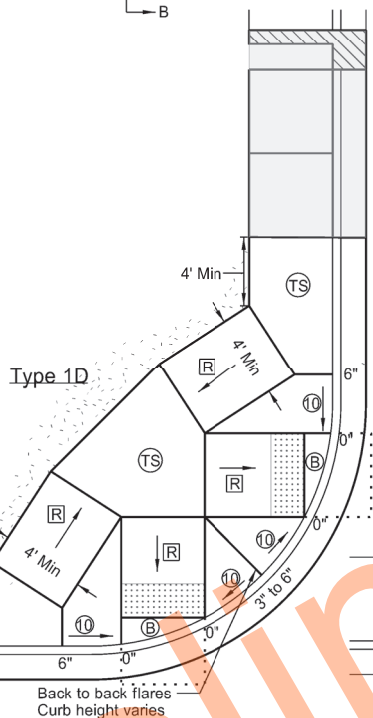
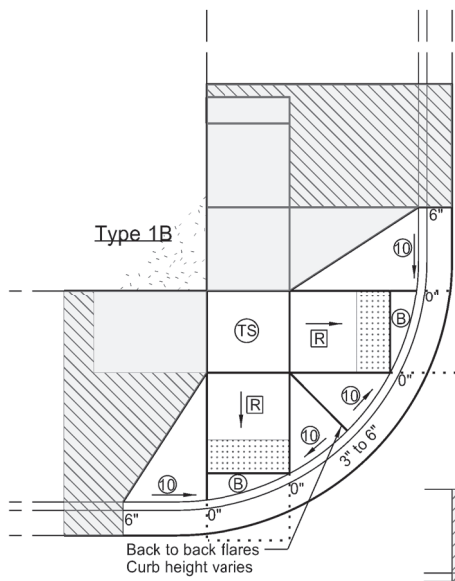
CURB RAMP RETROFIT DETAILS

D-750-3



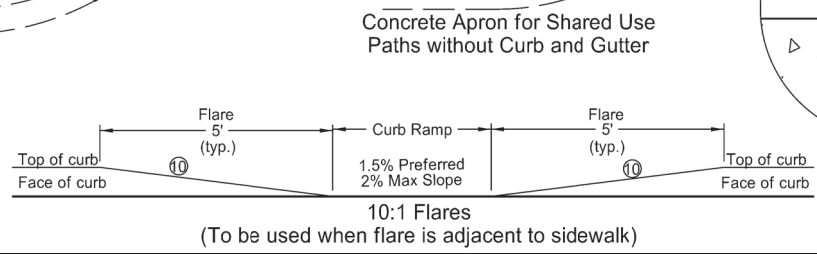
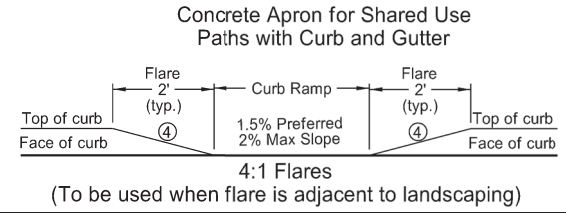
NOTES:

1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type 1" per lineal foot.
6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
9. Grade transitions shall be flush.

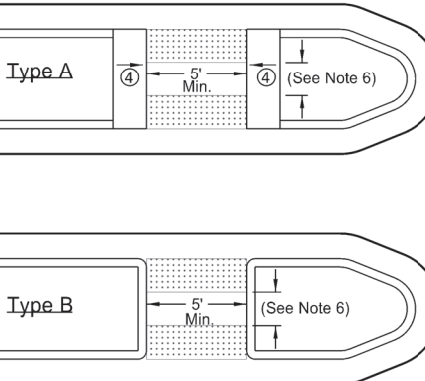


LEGEND:

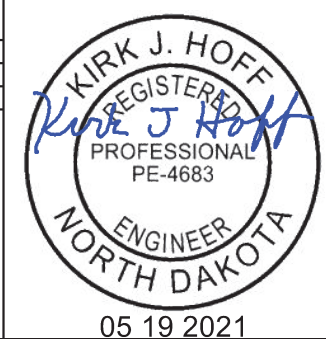
- Detectable Warning Panel.
- Landscaping.
- Transitional tie-in to nearest joint, if needed.
- Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.



Median Refuge Islands (Cut-Through)

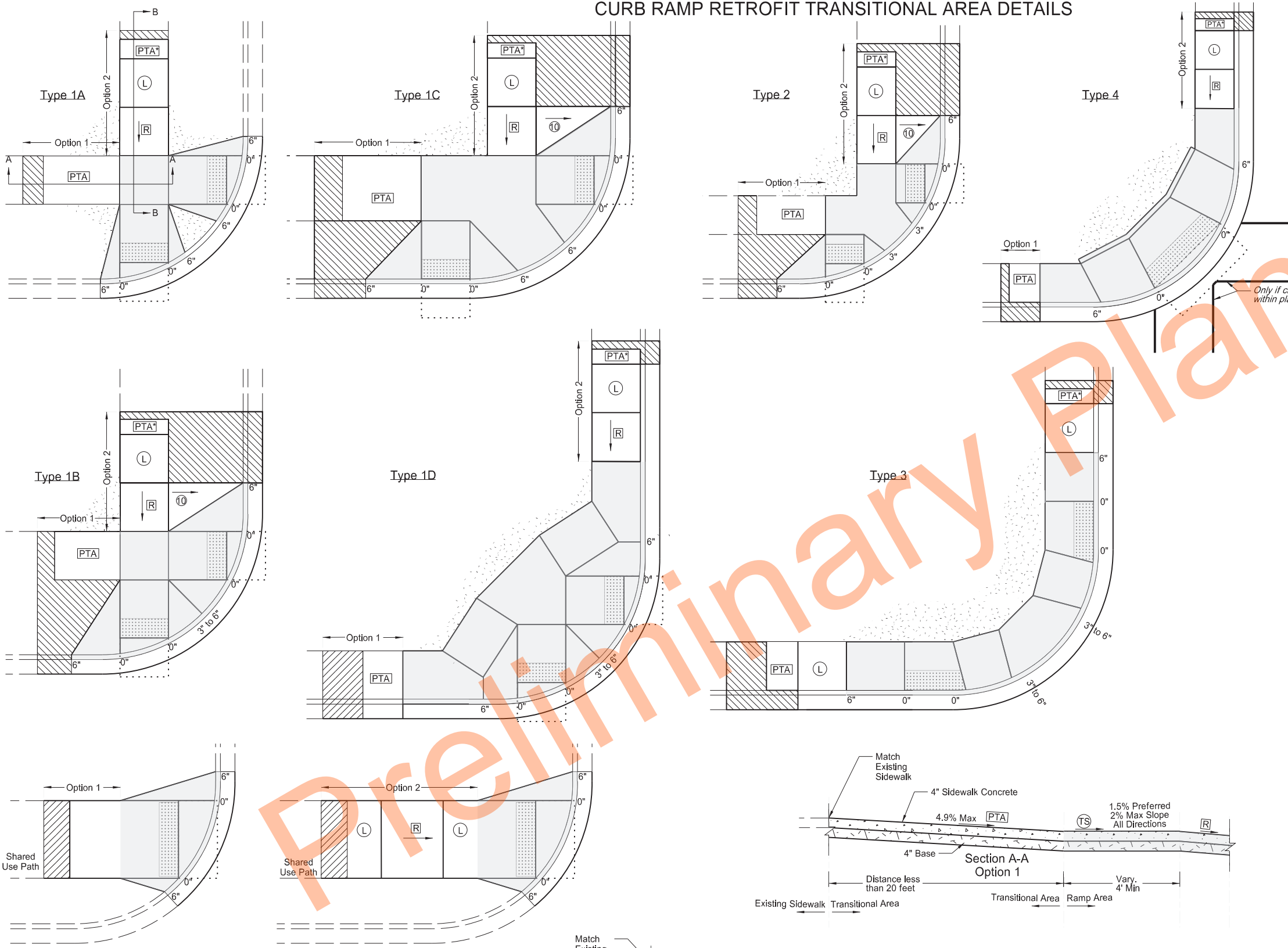


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area



CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

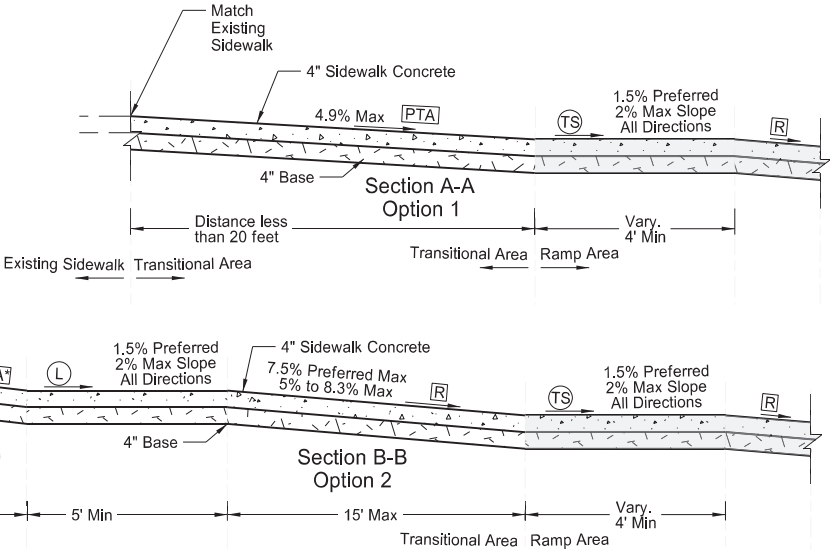
D-750-4



- NOTES:
1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
 2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
 3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.
- Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
 5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

- LEGEND:
- [Pattern] : Detectable Warning Panel.
 - [Pattern] : Landscaping.
 - [Pattern] : Transitional tie-in to nearest joint, if needed.
 - [Pattern] : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
 - [Pattern] : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running slope 5% maximum running slope
 - [PTA] : Pedestrian Access Transition Area Running Slope less than 4.9%. Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
 - [L] [TS] : Turning Space/Landing Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
 - [R] : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2% Maximum Length = 15 feet
 - [10] : 10:1 maximum constructed slope.
 - [4] : 4:1 maximum constructed slope.
 - 0", 3", or 6" : Curb Height.

Transition Areas for Shared Use Paths



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE

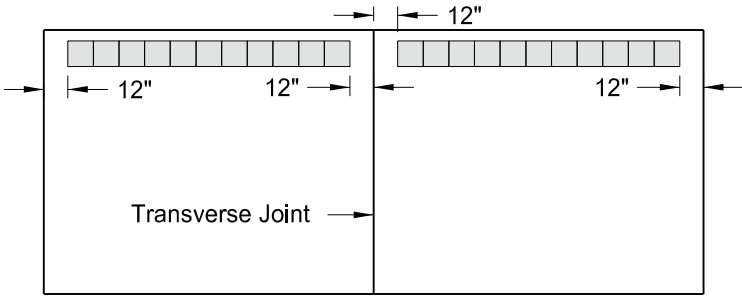
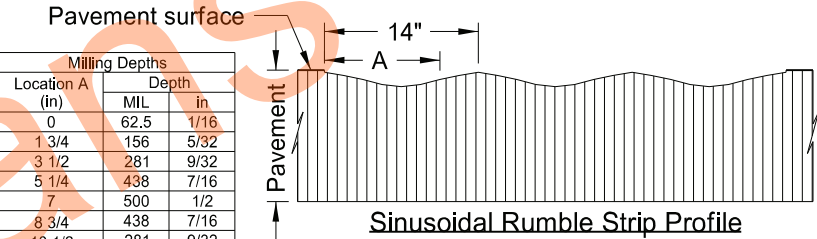
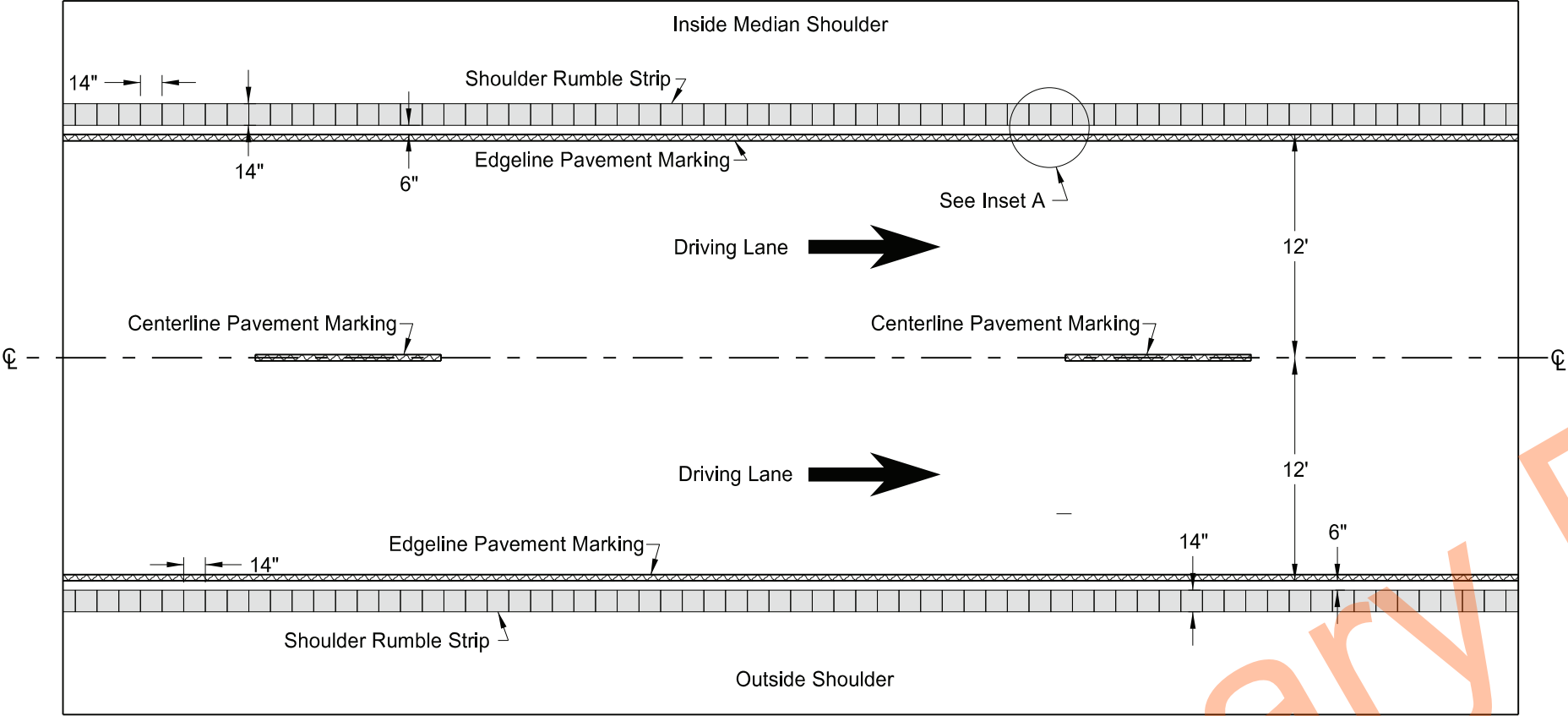
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
05 19 2021

RUMBLE STRIPS
DIVIDED HIGHWAYS (NON-INTERSTATE)

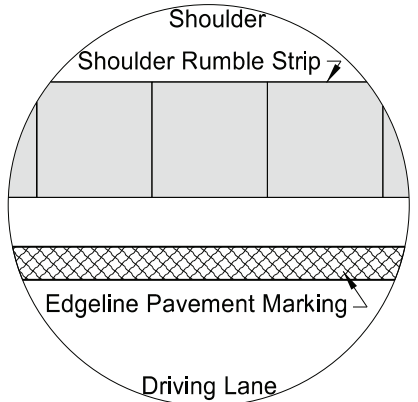
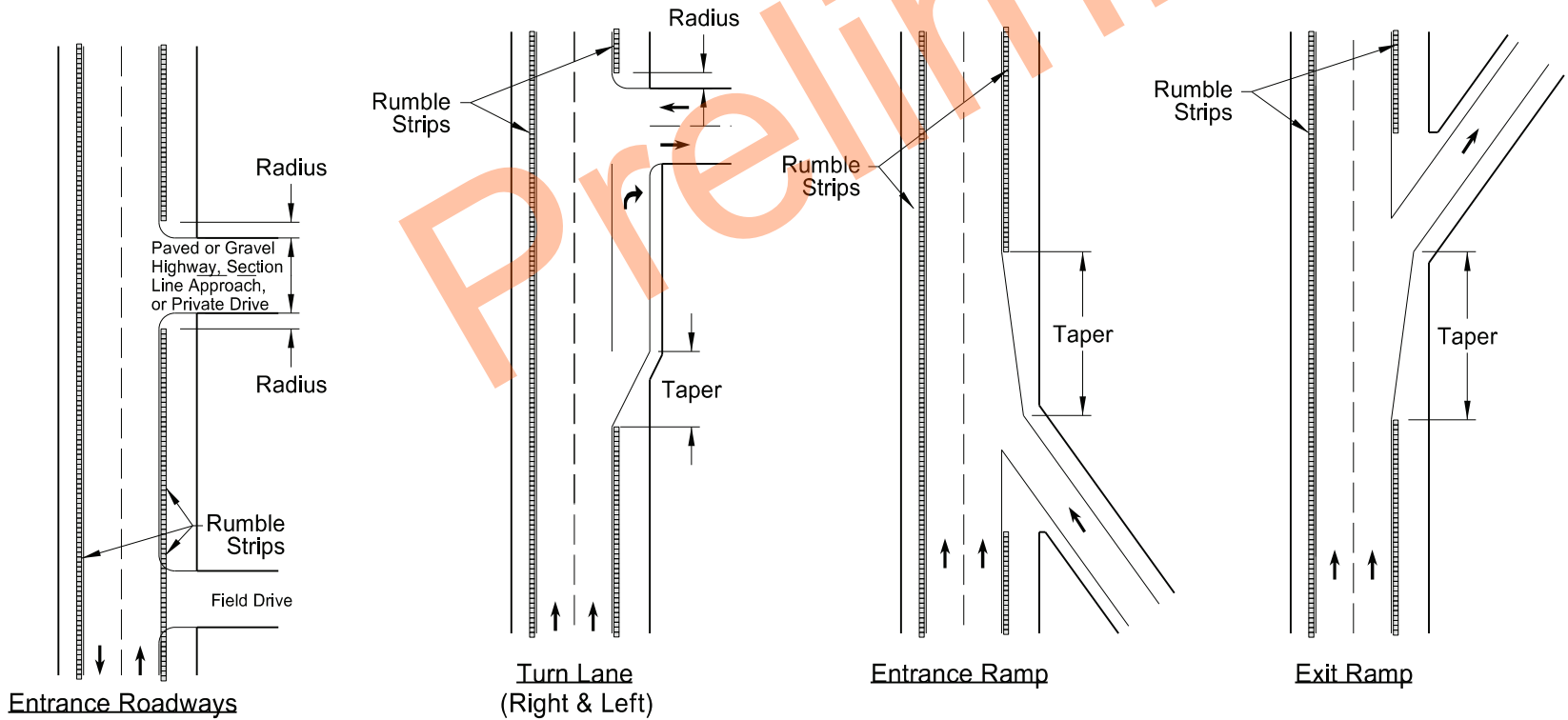
D-760-2

NOTES:

1) Discontinue rumble strips through the entire length of turn lanes and tapers, at ramps and tapers, and at the radius of paved or gravel highways, section line approaches, and private drives.



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

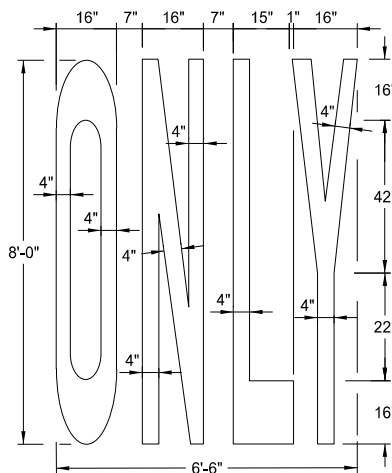
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
9-08-11	Revised Notes and D-760-2.
8-27-19	New Design Engr PE Stamp.
11-16-21	Added rumbles to end of taper.
5-26-23	Rumble strips made sinusoidal.



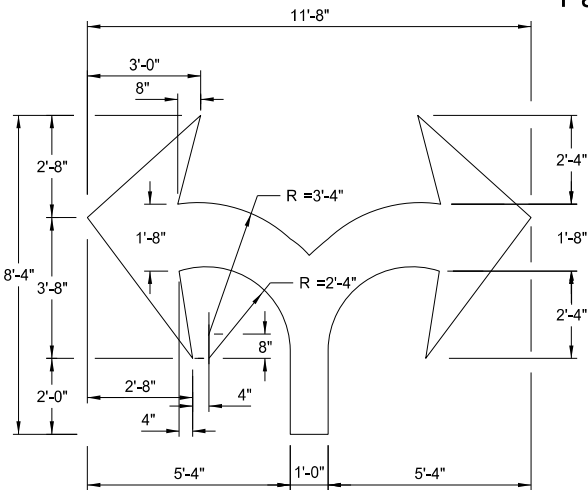
05/26/23

Pavement Marking Message Details

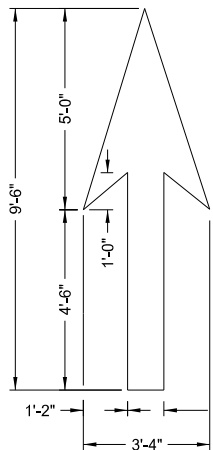
D-762-1



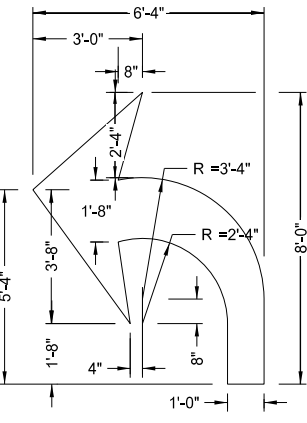
22 S. F.



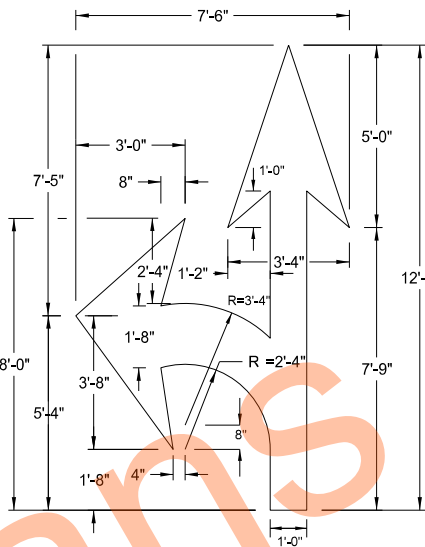
29 S. F.



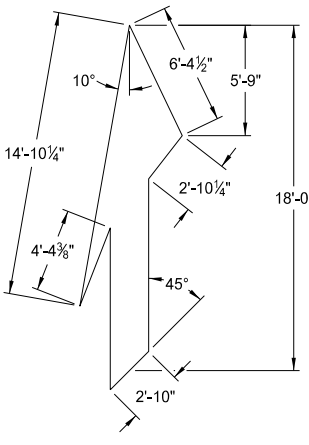
12 S. F.



16 S. F.



27 S. F.

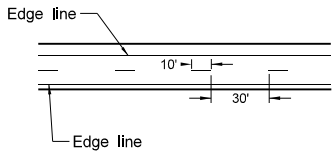


41 S. F.

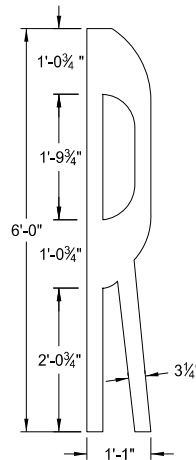
Note: Rotate merge arrow 20° from edge of roadway.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

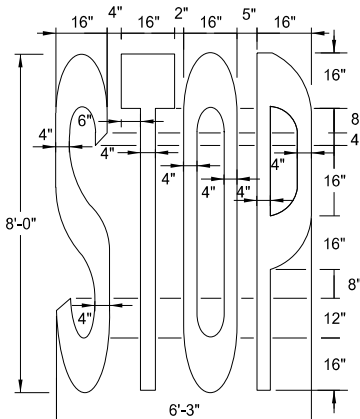
Chevron Crosshatching Table



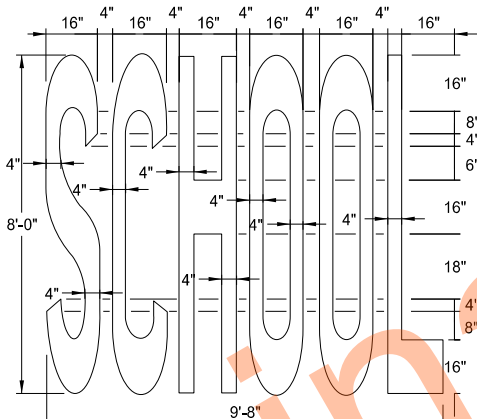
Centerline Pavement Marking Skip Spacing Detail



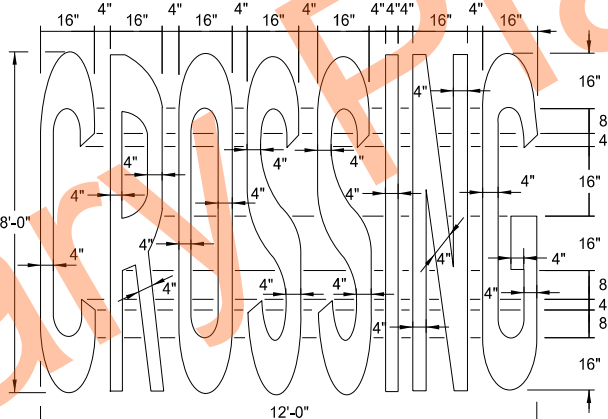
4 S. F.



22 S. F.

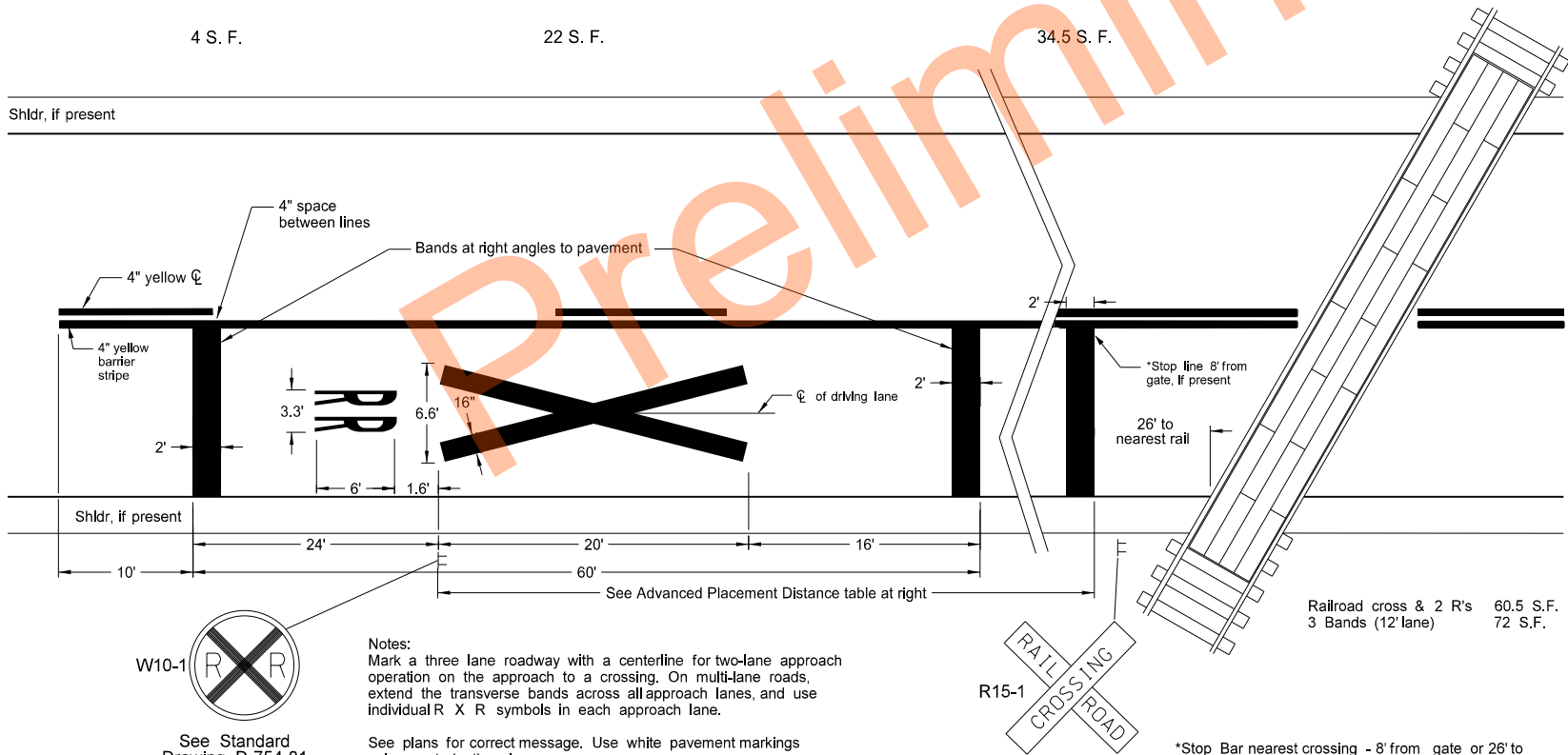


34.5 S. F.



46 S. F.

Shldr, if present



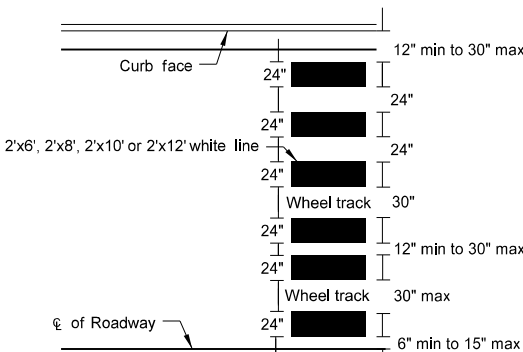
See Standard Drawing D-754-81

Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

See plans for correct message. Use white pavement markings unless noted otherwise.



*Stop Bar nearest crossing - 8' from gate or 26' to nearest rail - Use whichever is further from tracks.



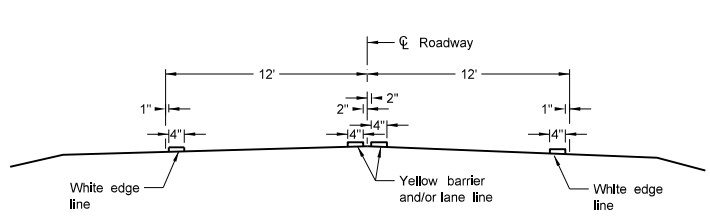
Continental Crosswalk Detail

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

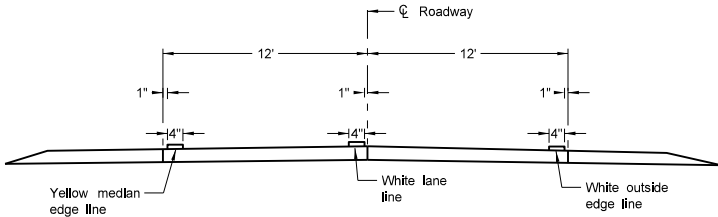
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19 01-28-2020	Updated to active voice. New Design Engineer PE Stamp. Revised min Stop Bar distance to rail.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE-4683,
on 1/28/2020 and the original document is stored at the
North Dakota Department
of Transportation

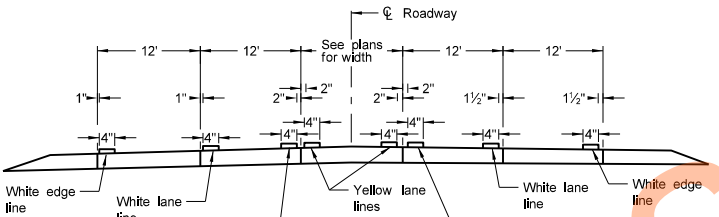
NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.



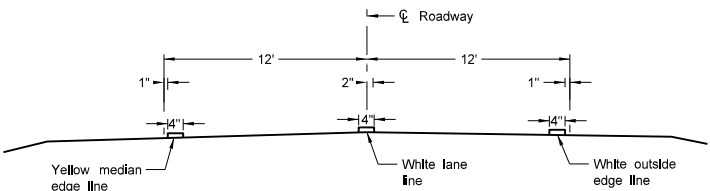
Two Lane Two Way
RURAL ROADWAY



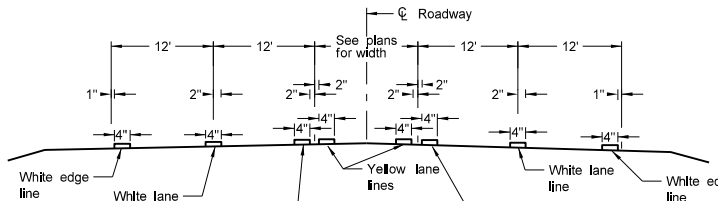
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



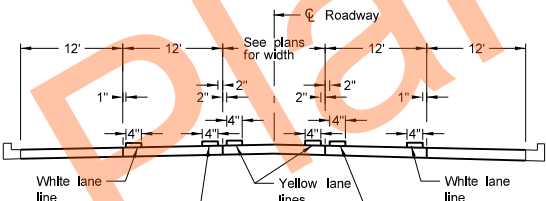
RURAL FIVE LANE ROADWAY
Concrete Section



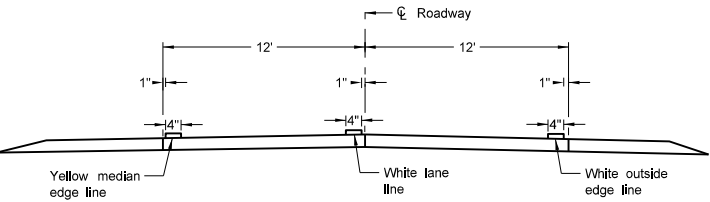
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



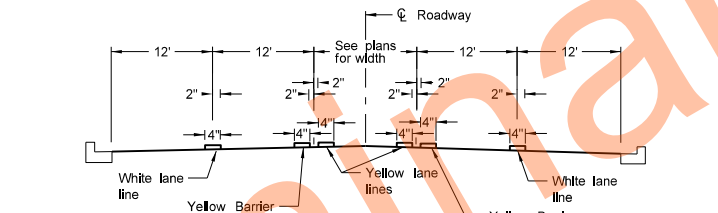
RURAL FIVE LANE ROADWAY
Asphalt Section



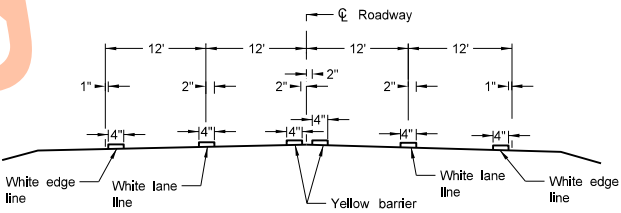
URBAN FIVE LANE SECTION
Concrete Section



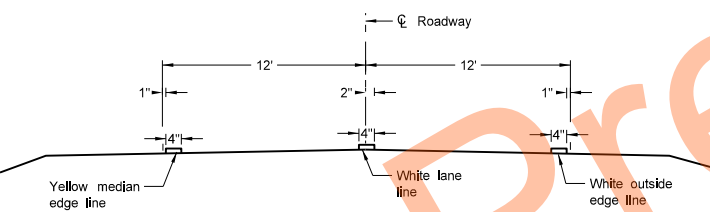
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



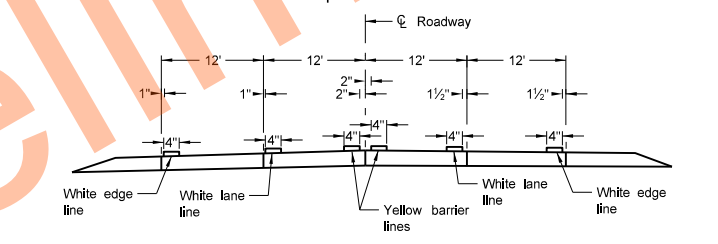
URBAN FIVE LANE SECTION
Asphalt Section



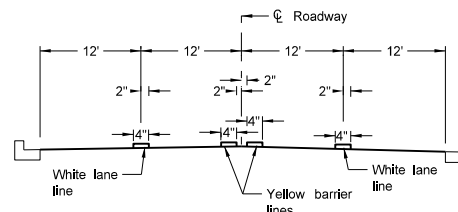
RURAL FOUR LANE ROADWAY
Asphalt Section



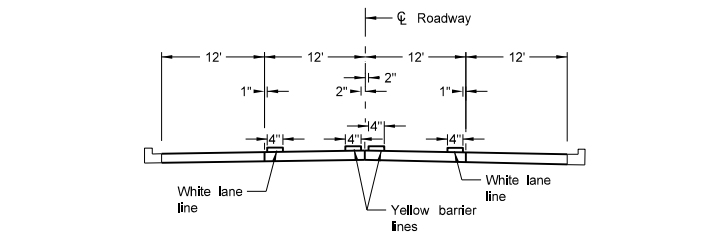
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



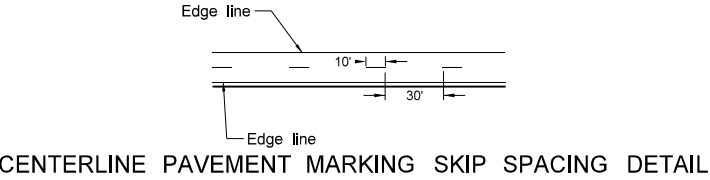
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section

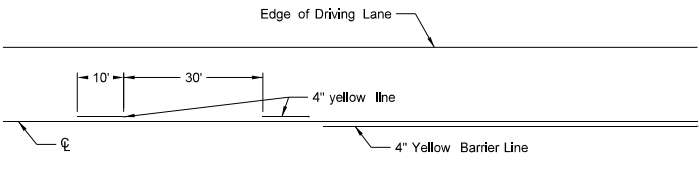


URBAN FOUR LANE SECTION
Concrete Section

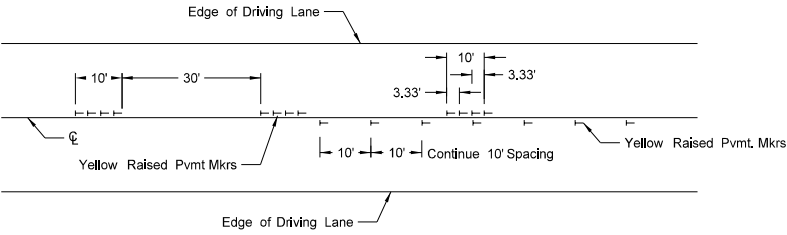


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE-4683,
on 8/27/19 and the original document is stored at the
North Dakota Department
of Transportation

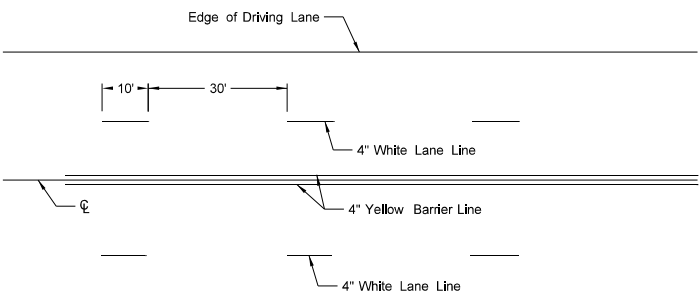


Painted or Tape Lines

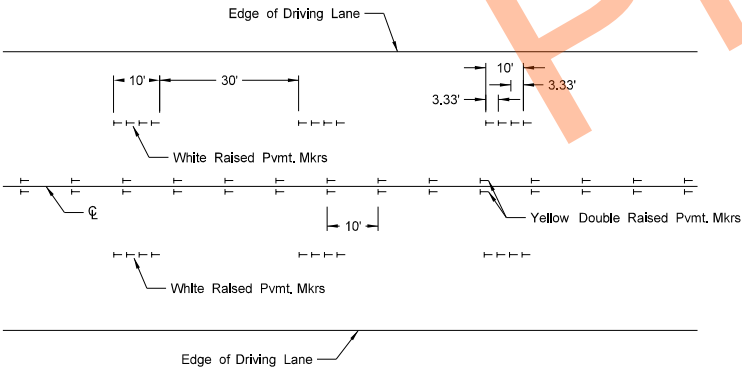


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

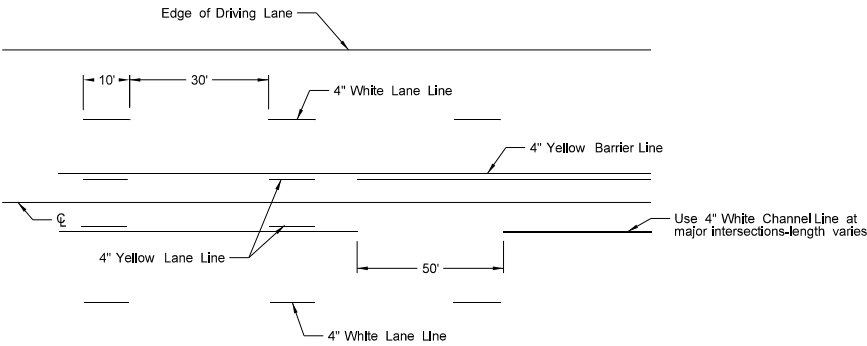


Painted or Tape Lines

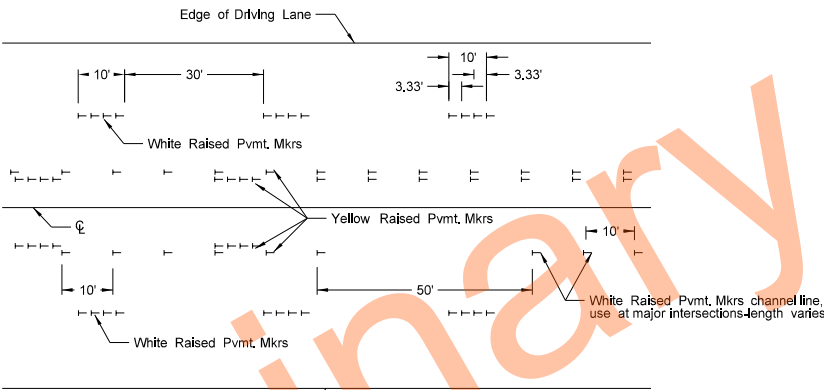


Raised Pavement Markers

FOUR LANE ROADWAY

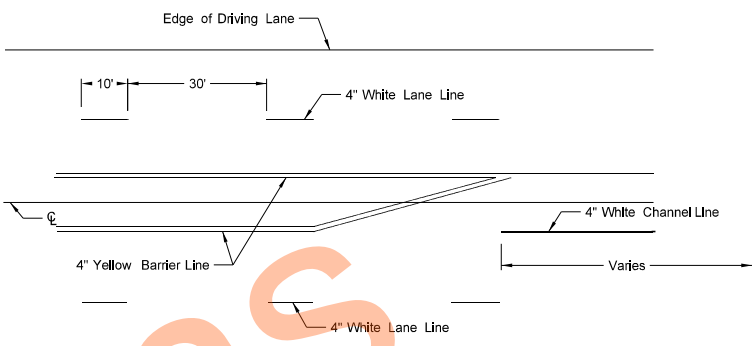


Painted or Tape Lines

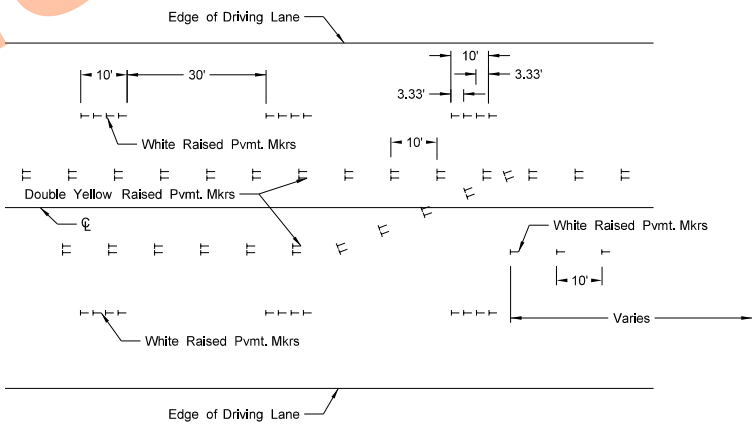


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
 3. Remove raised markers and tape markings after permanent pavement marking is installed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by

Kirk J Hoff,
Registration Number
PE- 4683,
on 8/27/19 and the original document is stored at the
North Dakota Department
of Transportation

CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

NOTES:

LIGHT & SIGNAL STANDARD FOUNDATIONS:
See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT
FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controller cabinet and the foundation by caulking, except for V-groove.

WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

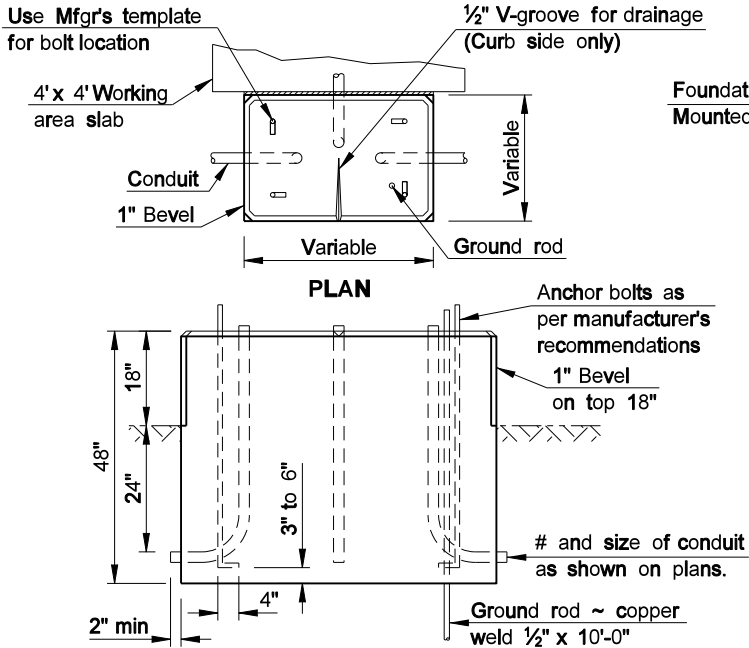
TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

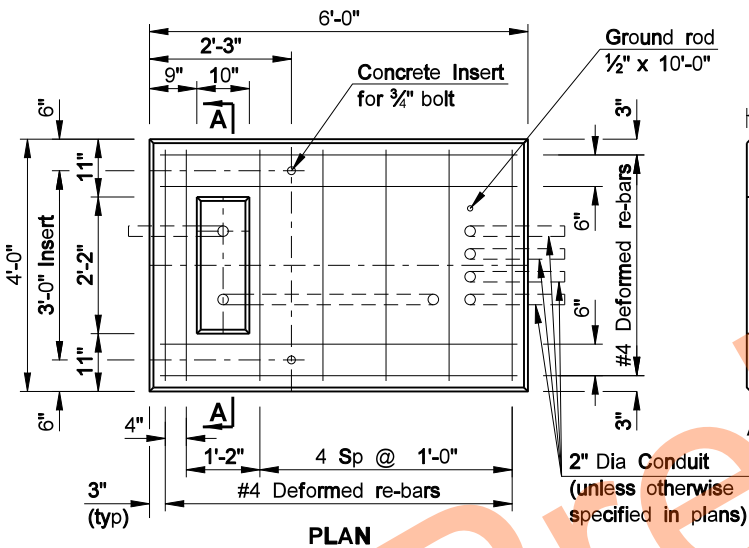
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674 , on 6/15/10 and the original document is stored at the North Dakota Department of Transportation



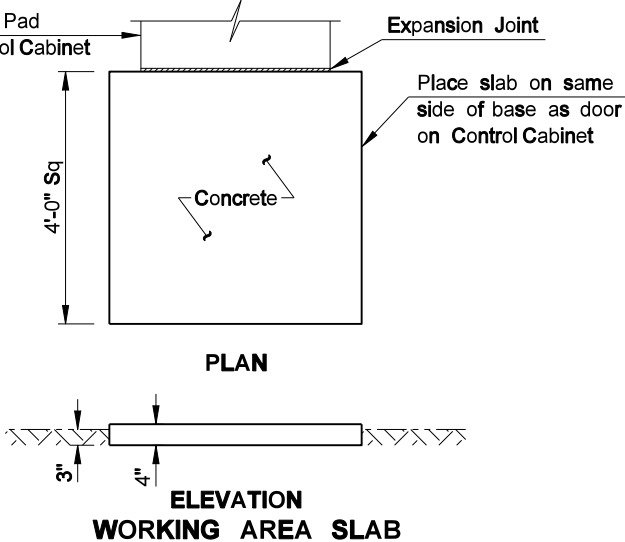
CONTROLLER CABINET FOUNDATION PAD MOUNT

The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.

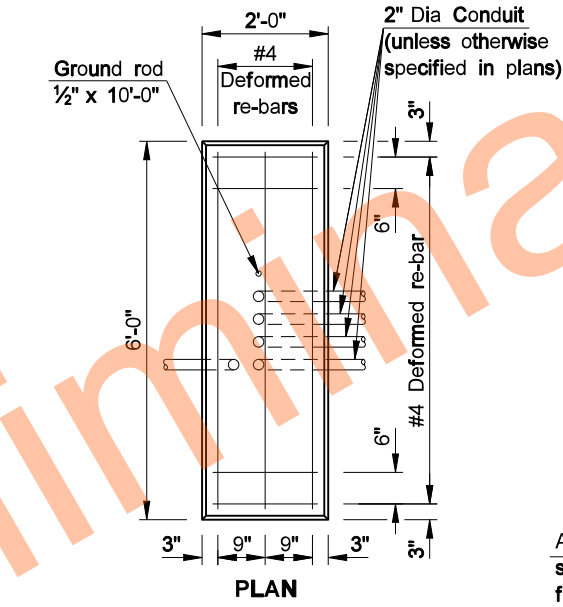


TRANSFORMER & FEED POINT
CABINET FOUNDATION PAD MOUNT

The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.

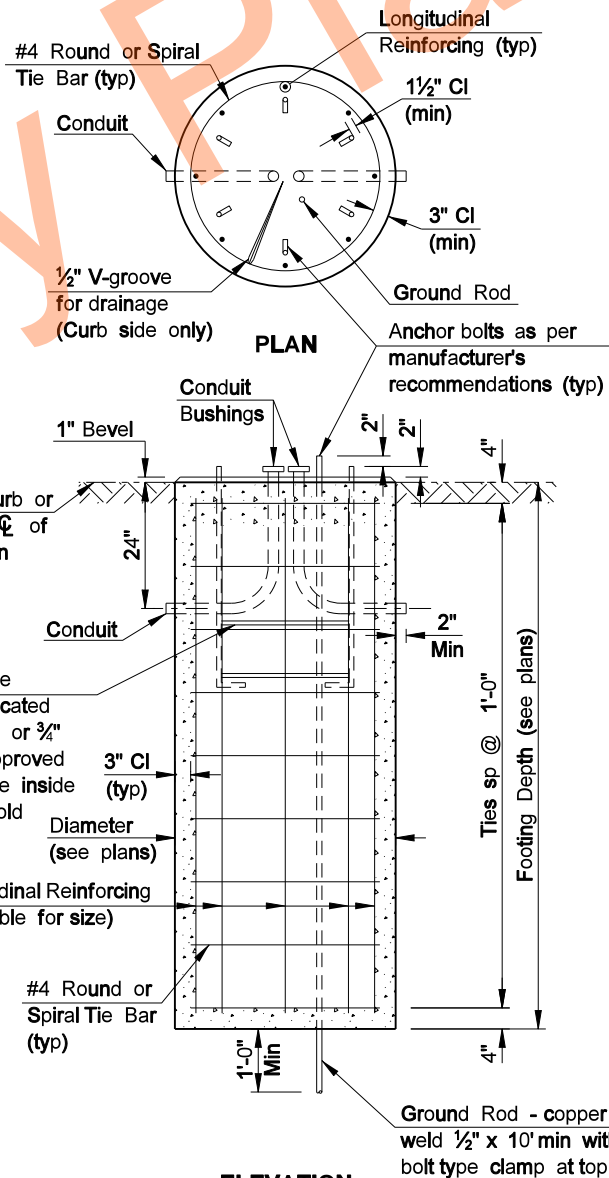
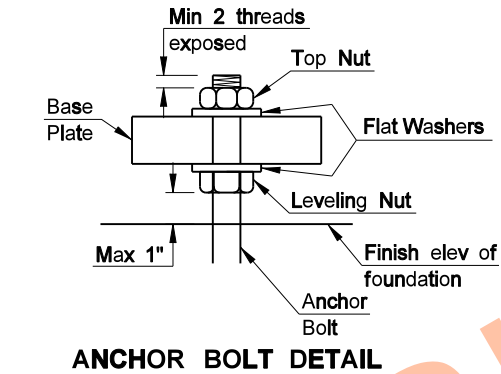


The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



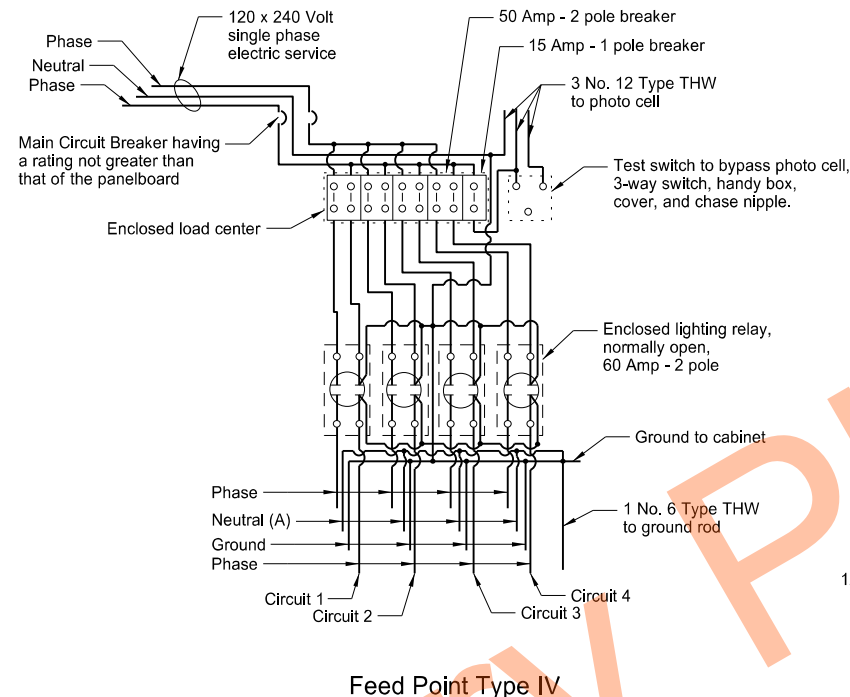
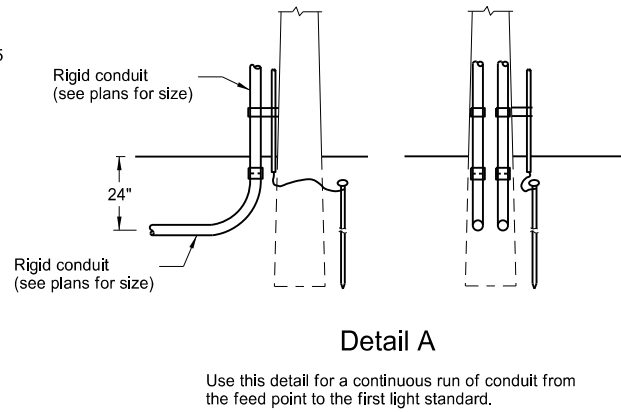
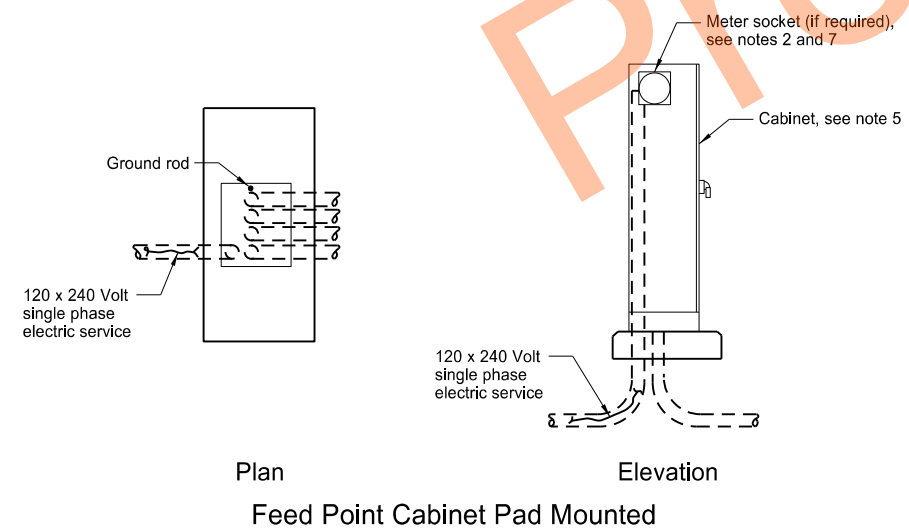
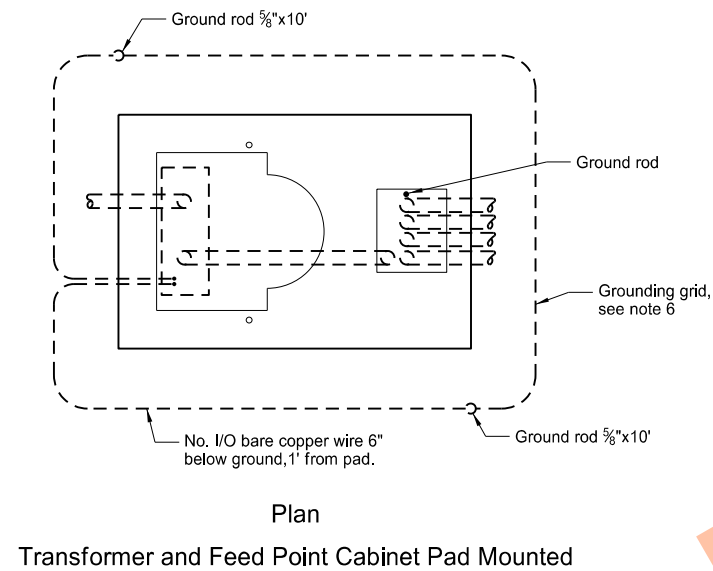
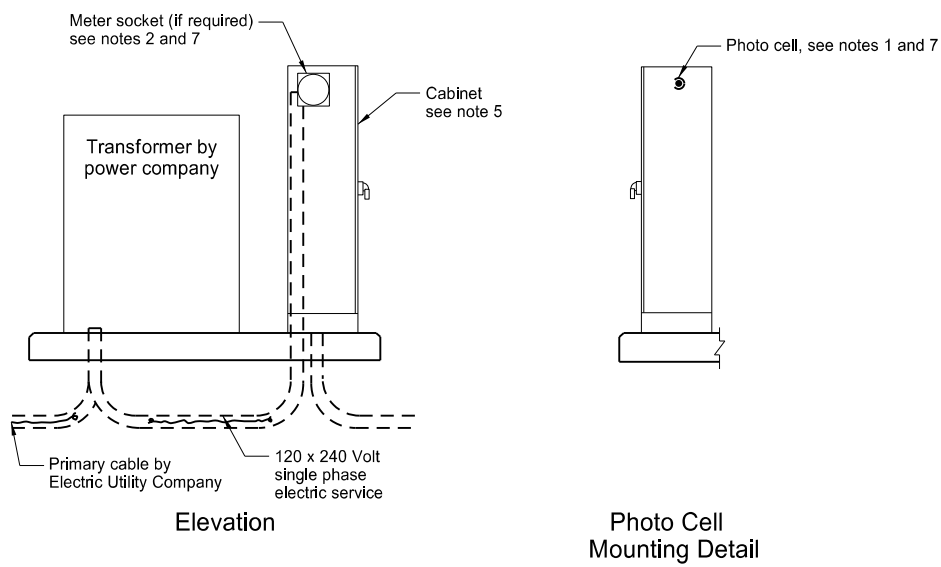
FEED POINT CABINET
FOUNDATION PAD MOUNT

The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.



LIGHT & SIGNAL STANDARD FOUNDATION

FEED POINTS
(ROADWAY LIGHTING)

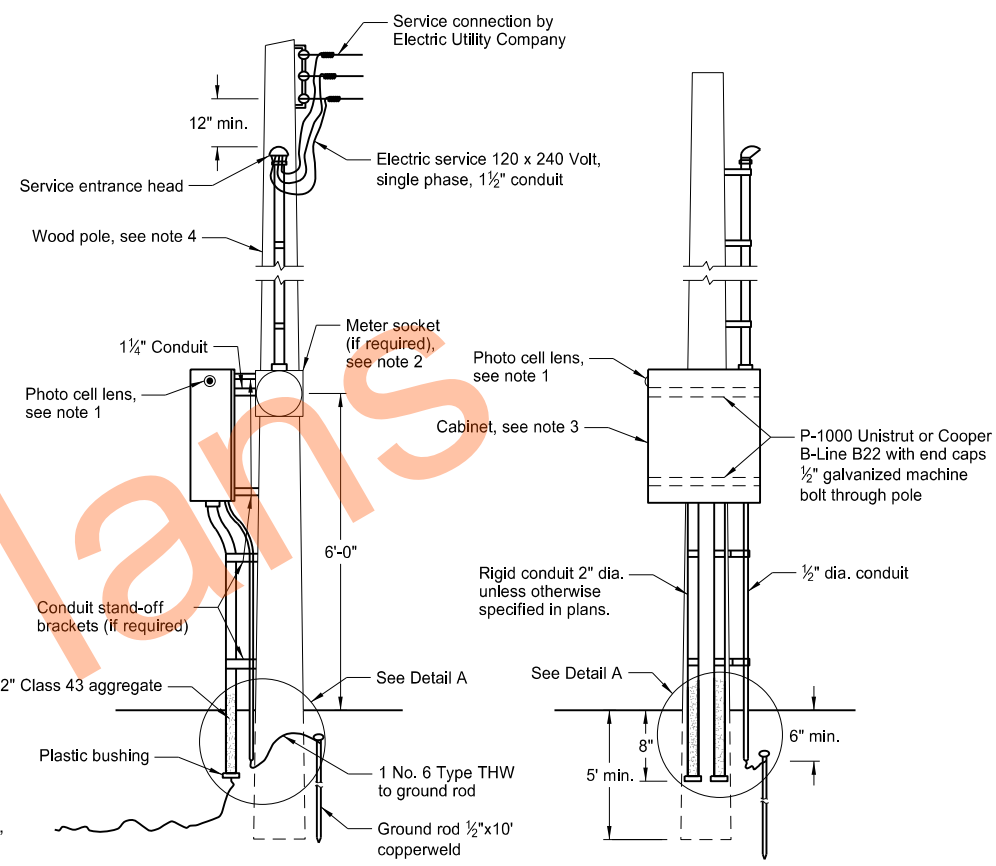


Provide Type I feed point similar to Type IV, except with one electrical circuit, one 50 Amp - 2 pole breakers, and one lighting relay, normally open.

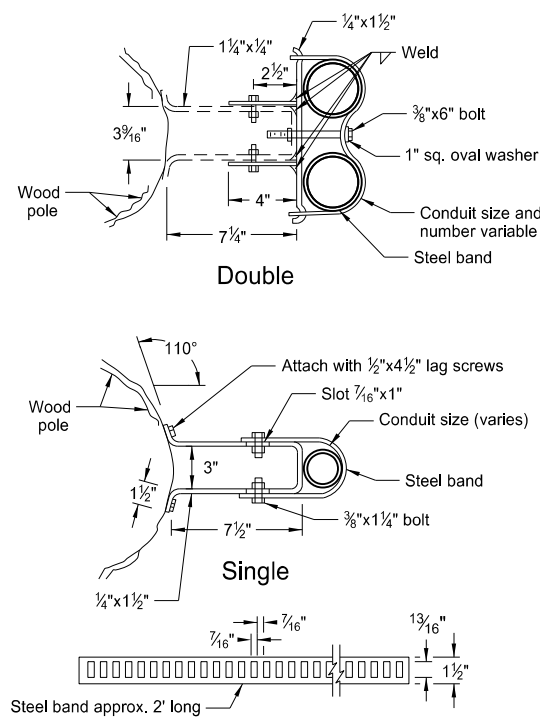
Provide Type II feed point similar to Type IV, except with two electrical circuit, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.



- Notes:
- Photo Cell: Furnish and install the photoelectric cell. Face photo lens north.
 - Meter Socket: Install meter socket and trim if the meter is required by local Utility Company. Meter furnished and installed by Utility Company.
 - Pole Mounted Cabinet: Provide cabinet with lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Shop coat cabinet with one coat of primer and two coats of exterior gray enamel.
- Provide 30" high x 24" wide x 8" deep Type I and II feed points. Provide 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep Type III and IV feed points.
- Wood Pole: Provide minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
 - Pad Mounted Cabinet: Provide 56" high x 26" wide x 14" deep weatherproof cabinet. Minimum 12 gauge steel or aluminum with provisions for padlock. Provide steel cabinet with one coat of primer and two coats of exterior dark green enamel.
 - Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more 5/8"x10' copperweld ground rods in parallel or series at two corners. Provide a minimum distance between ground unit assemblies of 6'0".
 - Meter Location: Do not mount the meter (if required) on the same side of the cabinet as the photo cell.



Conduit Standoff Bracket

Omission of conduit standoff brackets allowed when not required by local utility company.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 3.
10-17-17	Updated to active volcs.
8-28-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by

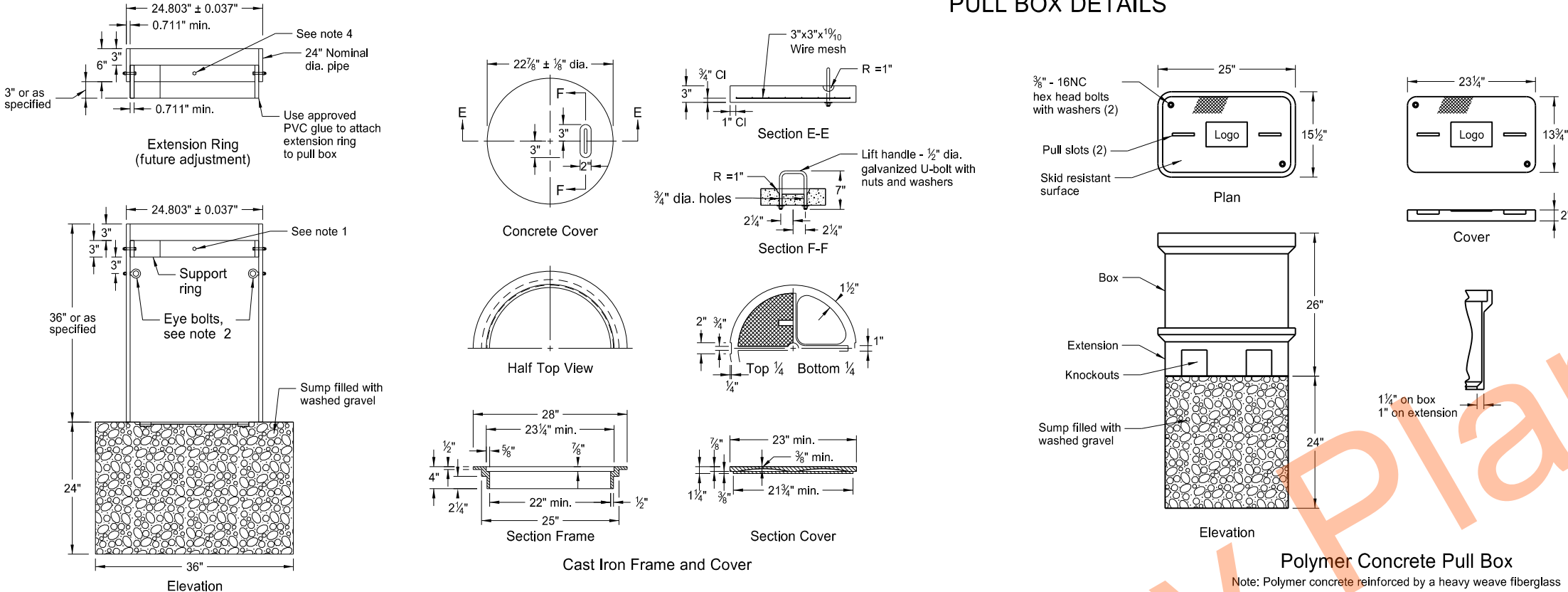
Kirk J Hoff,

Registration Number

PE- 4683,

on 8/28/19 and the original document is stored at the North Dakota Department of Transportation

PULL BOX DETAILS



- Polymer Concrete Pull Box Notes:
- Place top of pull box flush with surfaced area and approximately one inch above earth or sodded areas on level surfaces.
 - Provide at least one knockout per side in pull box.
 - Provide Polymer Concrete pull box meeting Tier 22 as per ANSI / SCTE 77.

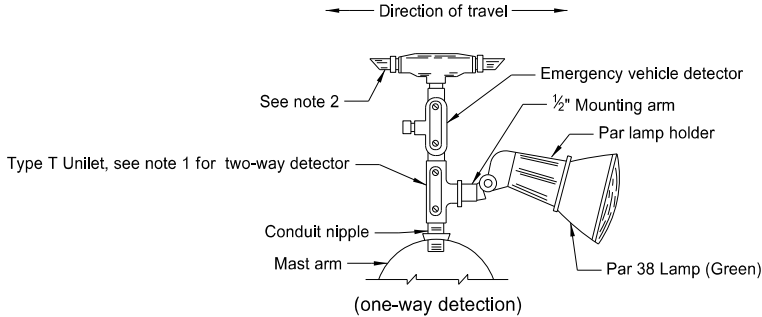
- PVC Pull Box Notes:
- Attach split 24" nominal diameter PVC cover support ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
 - Two type 2 shoulder eye bolts, 3/8" dia. x 1 1/4" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
 - Four 1/4" x 1 1/4" long galvanized lag screws. Screw assembly together.
 - Attach split 24" nominal diameter PVC cover support extension ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
 - Bolt assembly together.
 - Size conduit holes in barrel section a maximum of 1" larger than size of conduit being used.
 - After pull box and conduit installation, make inside walls and cover water tight to the satisfaction of the Engineer.
 - PVC pipe to meet requirements of ASTM F679T-1 or equal.
 - Use austenitic stainless steel hex head bolts and nuts. Galvanize other fasteners as per AASHTO M-232.
 - Coat concrete cover on top and sides with an approved epoxy coating. Apply light gray, clear, or neutral color epoxy protective coating as recommended by the manufacturer. Clean the surfaces of concrete receiving the epoxy protective coating by wire brush and dry before application.
 - Cast Iron Cover castings shall be gray iron as per AASHTO M 105, Class 35B.

Typical Pull Box in Rural Section

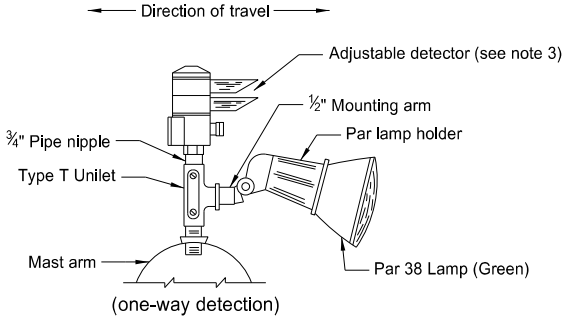
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DATE	CHANGE
7-8-14 10-17-17 8-28-19	Added Note 3 Updated to active voice. New Design Engineer PE Stamp.

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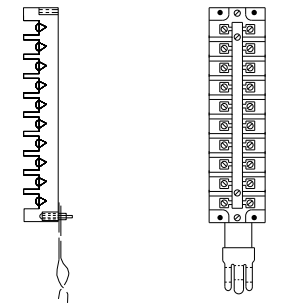
LIGHTING AND SIGNAL DETAILS



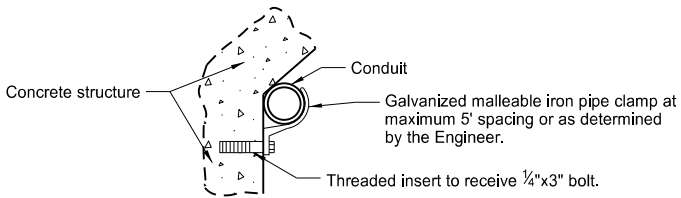
Emergency Vehicle Detector Detail



Alternate Emergency Vehicle Detector Detail (adjustable)

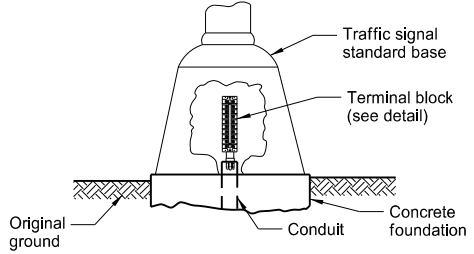


Terminal Block Detail

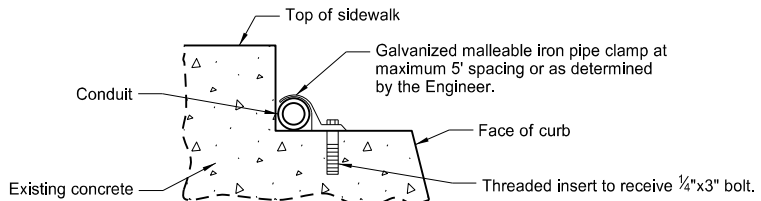


Bridge Mounted Conduit Hanger

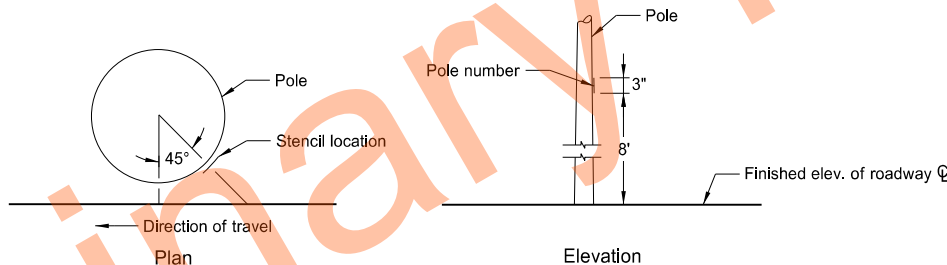
- Notes:
- 1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
 - 2. Plug unused end of One-way Detector with metal pipe plug.
 - 3. Rotate detector lens to face direction of travel on Two-way Detectors.



Terminal Block (rigid mounted)

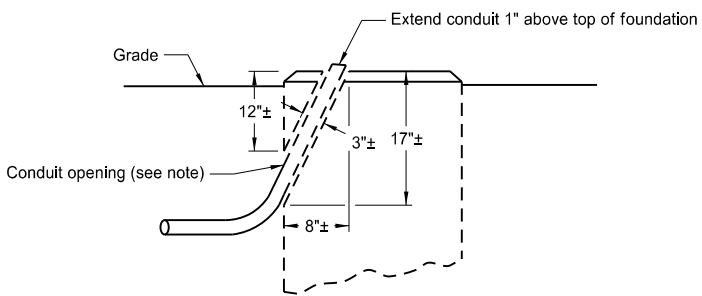


Bridge Curb Mounted Conduit



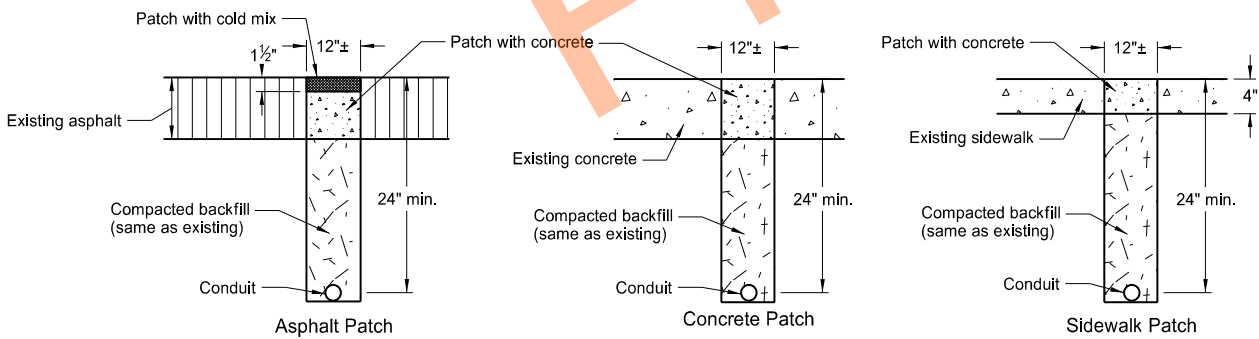
Light Standard Numbering

Note: On the roadway side of each light standard, stencil the pole number using black paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.



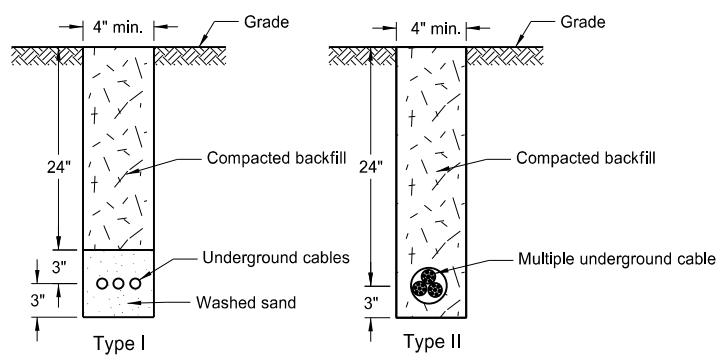
Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.



Surface Patch Details

Note: Saw cut trenches. Use PCC pavement for replacement concrete with the coarse aggregate gradation, maximum size and method of curing as approved by the Engineer. Immediately prior to pouring replacement concrete, paint all surfaces with an approved epoxy compound.

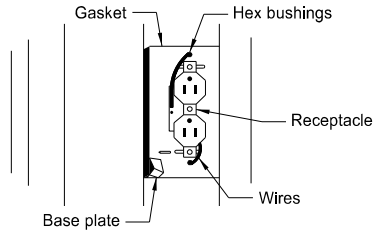
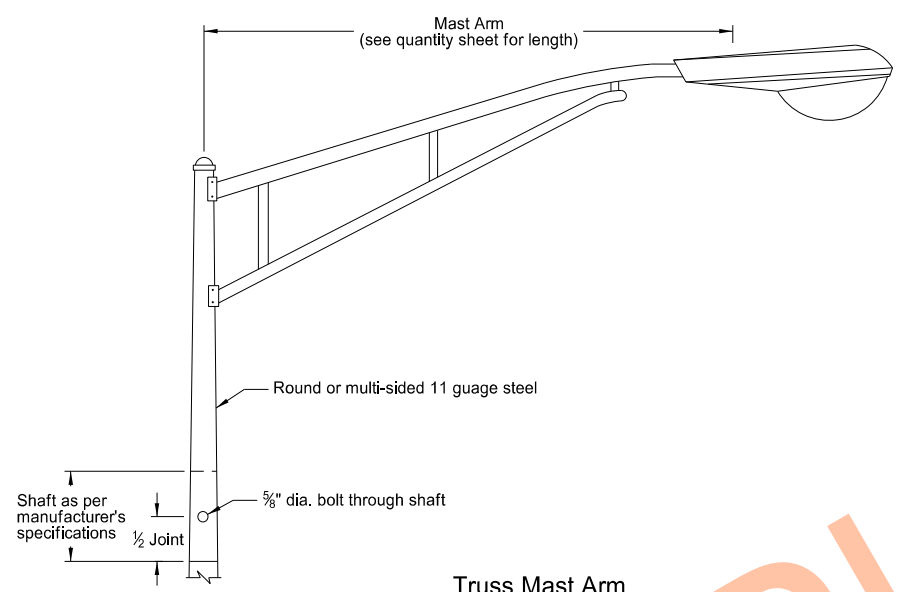
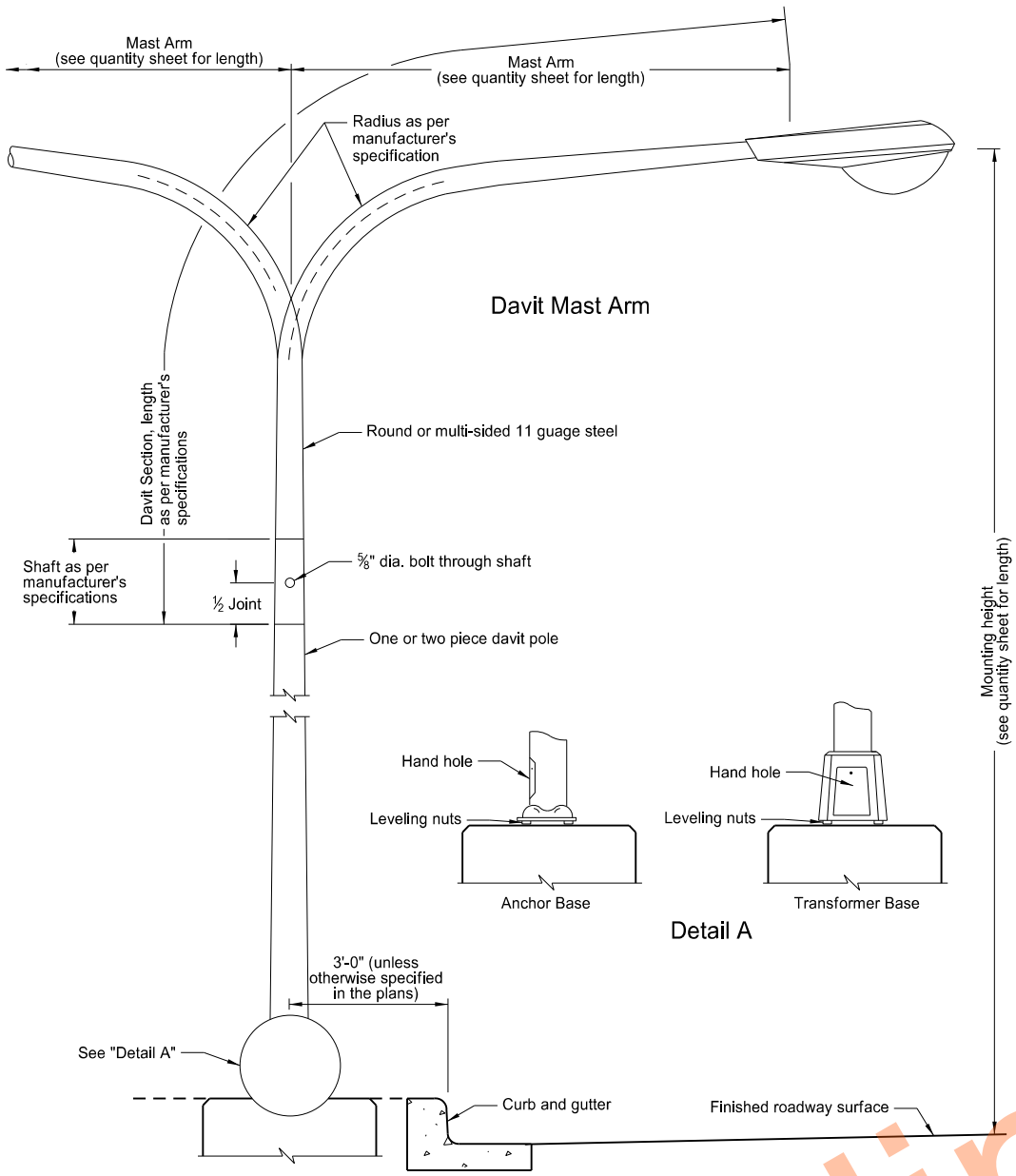


Cable Trench

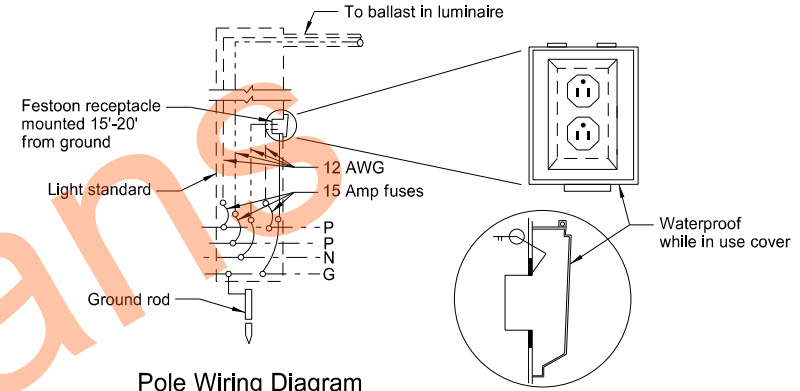
Note: Sod entire area disturbed by trenching, unless directed otherwise by the Engineer.

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10-17-17 10-25-19	Updated to active voice. Removed conduit under RR detail.	

LIGHT STANDARD DETAILS

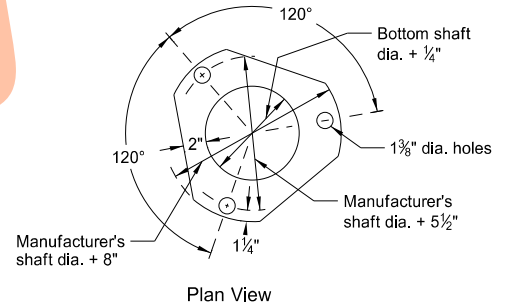
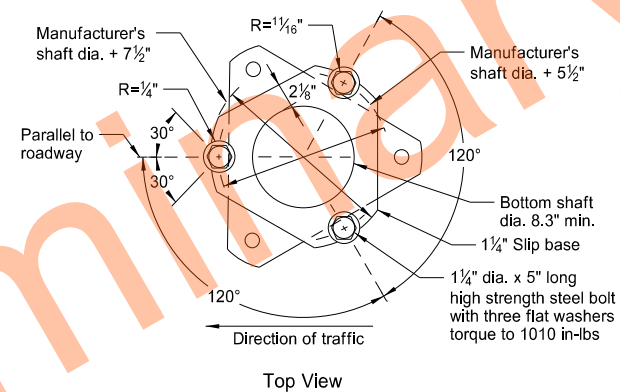


Optional: Festoon receptacle mounted on multi-sided pole.



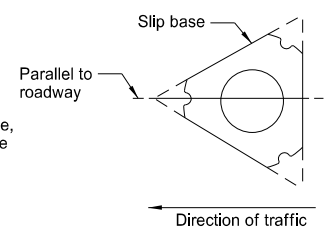
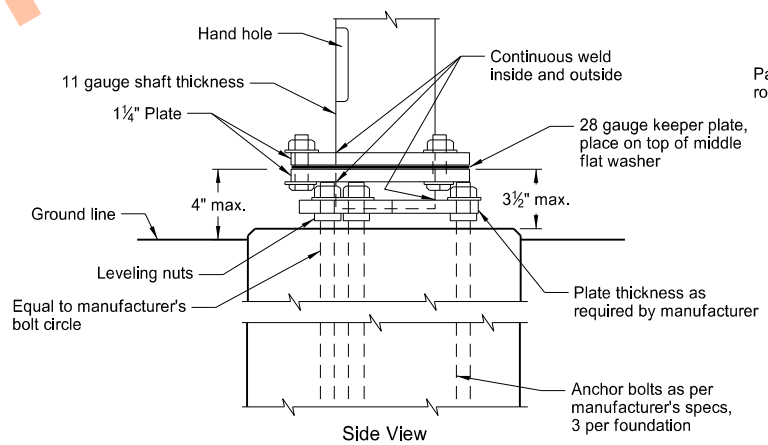
Receptacle Mounting Detail (B)

(B) Mount receptacle on side of pole that faces the street. Install Festoon Receptacle only when specified in the plans.

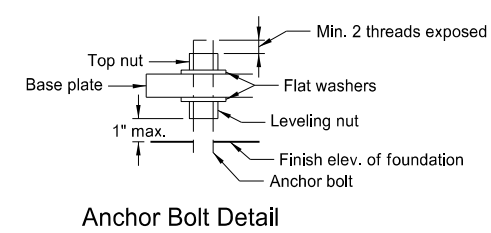


Keeper Plate Detail (A)

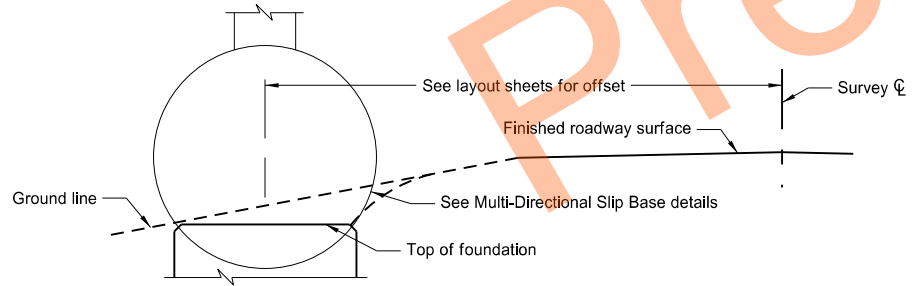
(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. Galvanize Keeper plate after fabrication.



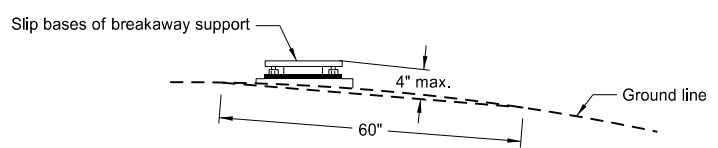
Slip Base Placement Detail



Multi-Directional Slip Base



Concrete Foundation Location



Breakaway Support Stub Clearance Diagram

Notes:

Light Standard Locations: The minimum offset distance from the curb face is 3 feet. Offset light standards at least 3 feet in urban areas and where speeds are less than 30 mph. Where speeds are 30 mph or more, place light standards at least 16 feet from the driving lane.

Steel Standards: Touch up marred or scratched areas after erection.

Luminaire: Use internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

Fusing: Fusing in base, see specifications.

Slip Base Bolt Torque Procedure:

1. Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and to clean bolt threads, then loosen.
2. Retighten bolts with a systematic order to prescribed torque.
3. Loosen each bolt and retighten to prescribed torque in the same order as initial retightening.
4. Burr threads of junction with nut using center punch to prevent nut loosening.

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