

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	23340	1	1

NORTH DAKOTA  
DEPARTMENT OF TRANSPORTATION

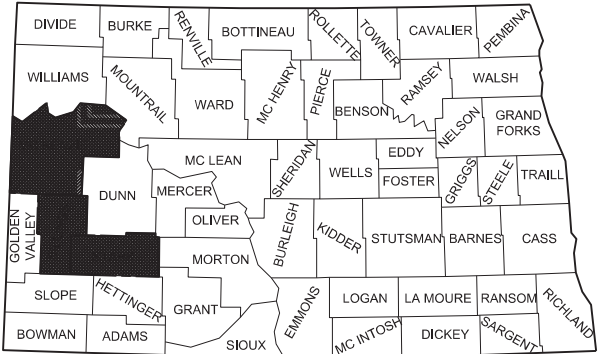
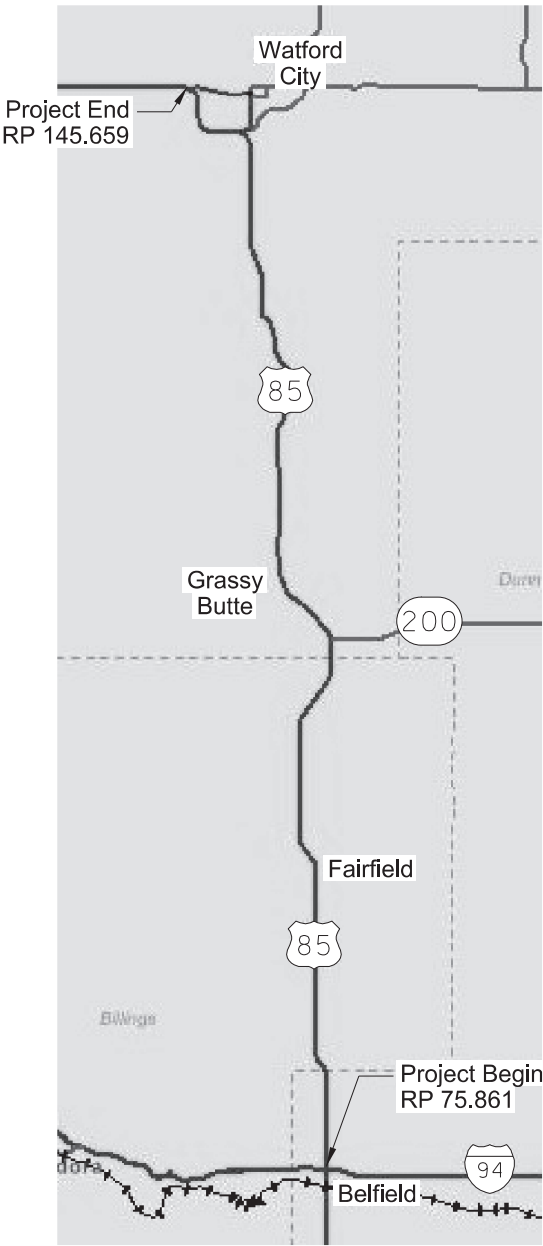
ARP-HEN-5-085(083)075

Billings, McKenzie, and Stark Counties  
I-94 to US 85B

Signing, Pavement Marking, Delineators, Changeable Message Signs  
US 85 Safety Corridor

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	1/1/2022
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
ARP-HEN-5-085(083)075	69.798	



STATE COUNTY MAP

DESIGNER Chad Abrahamson
DESIGNER Jaycee Allery
DESIGNER Spencer Ulvestad

ND DEPARTMENT OF TRANSPORTATION  
OFFICE OF PROJECT DEVELOPMENT  
Hoff, Kirk J.  
03/15/22

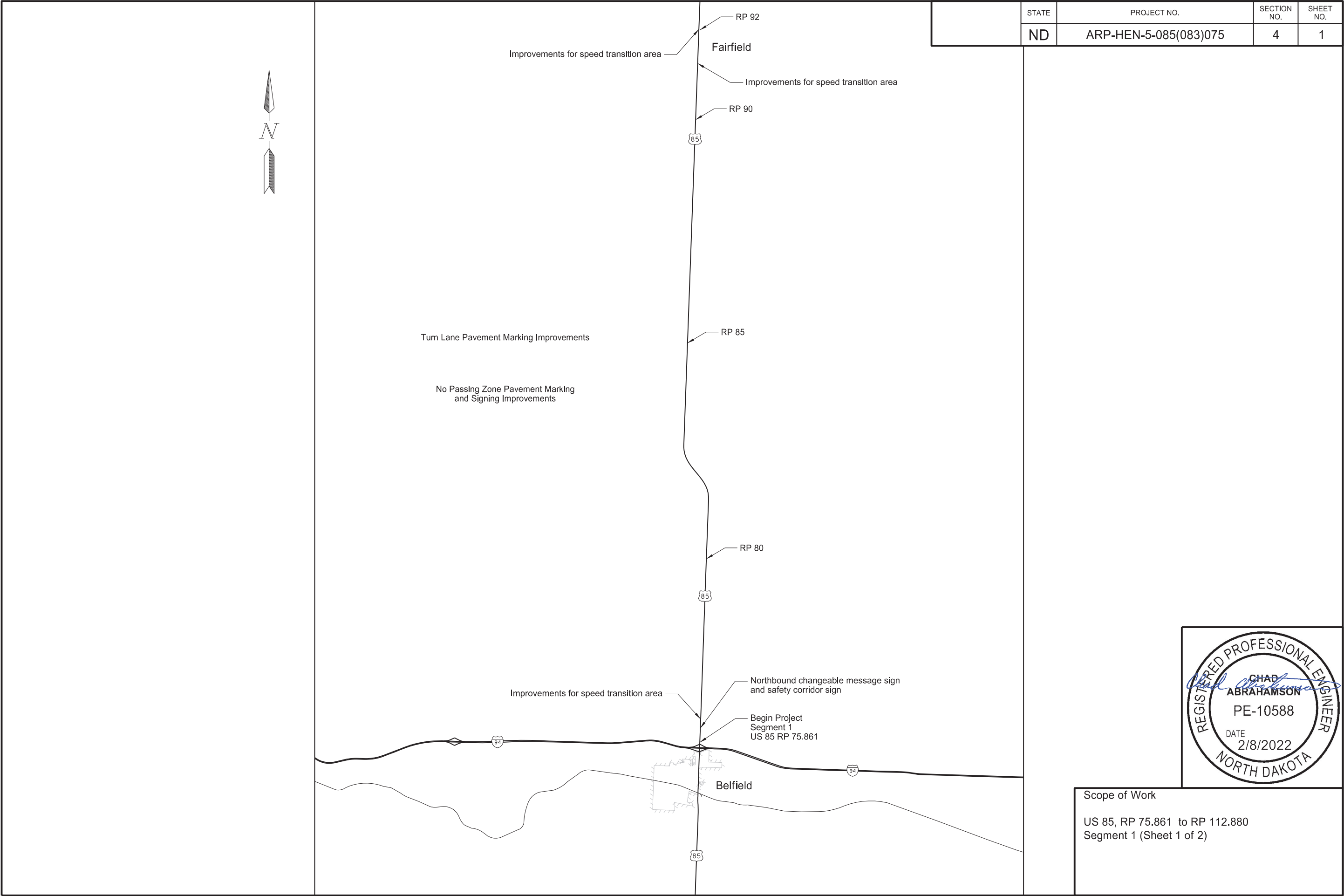
NDDOT DESIGN DIVISION

*James Douglas*

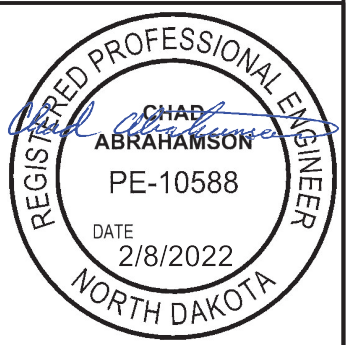
JAMES DOUGLAS  
REGISTERED  
PROFESSIONAL  
PE-4288  
ENGINEER  
NORTH DAKOTA

03 15 2022

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2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
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			D-754-49	Sign Punching, Stringer and Support Location Details For Variable Length Signs					
			D-754-79	Chevron Installation Details					
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SPECIAL PROVISIONS									
Number	Description								
SP 534(20)	Portable Changeable Message Sign								

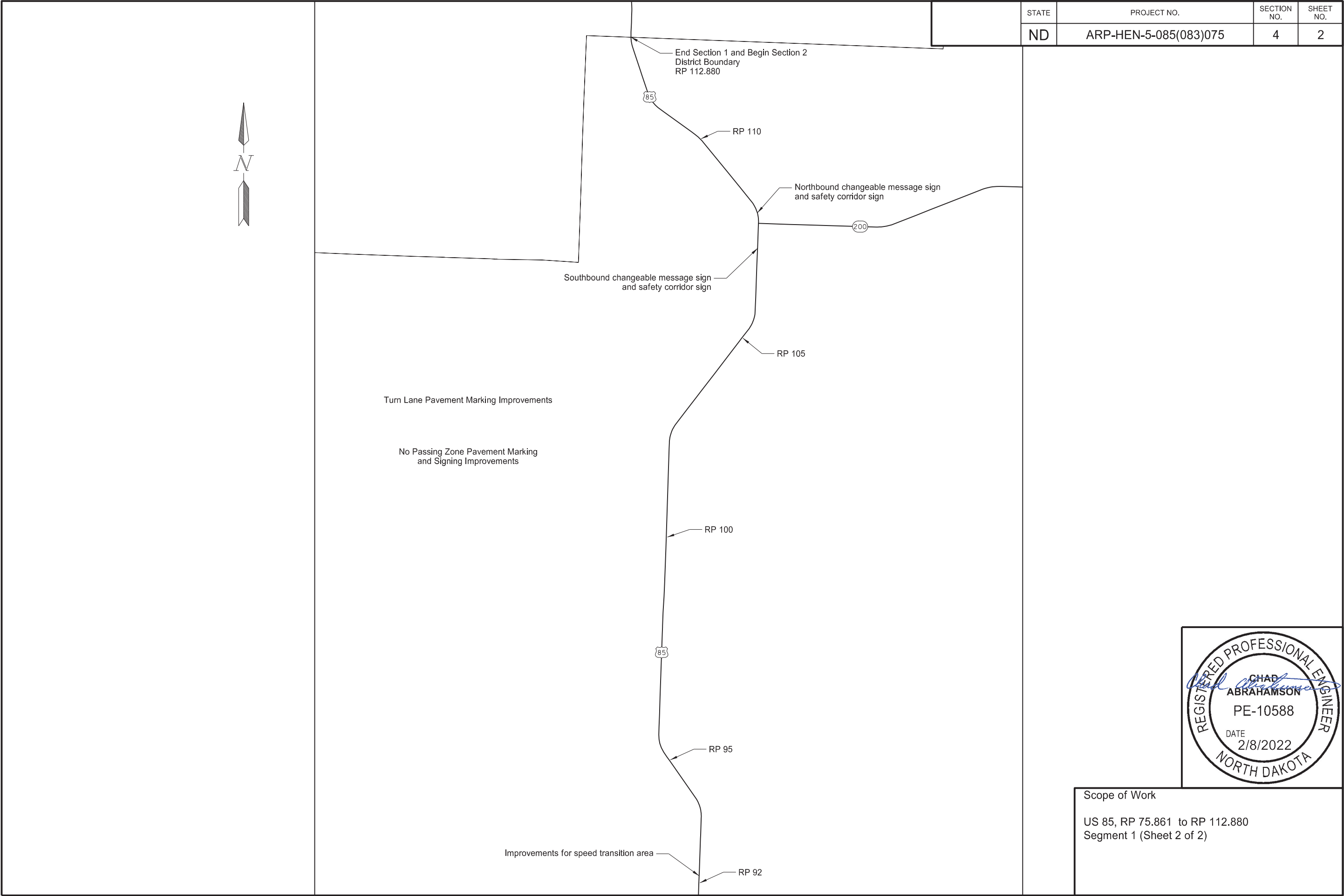


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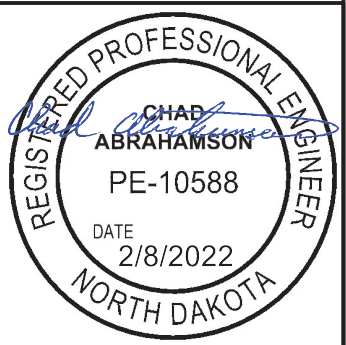


Scope of Work

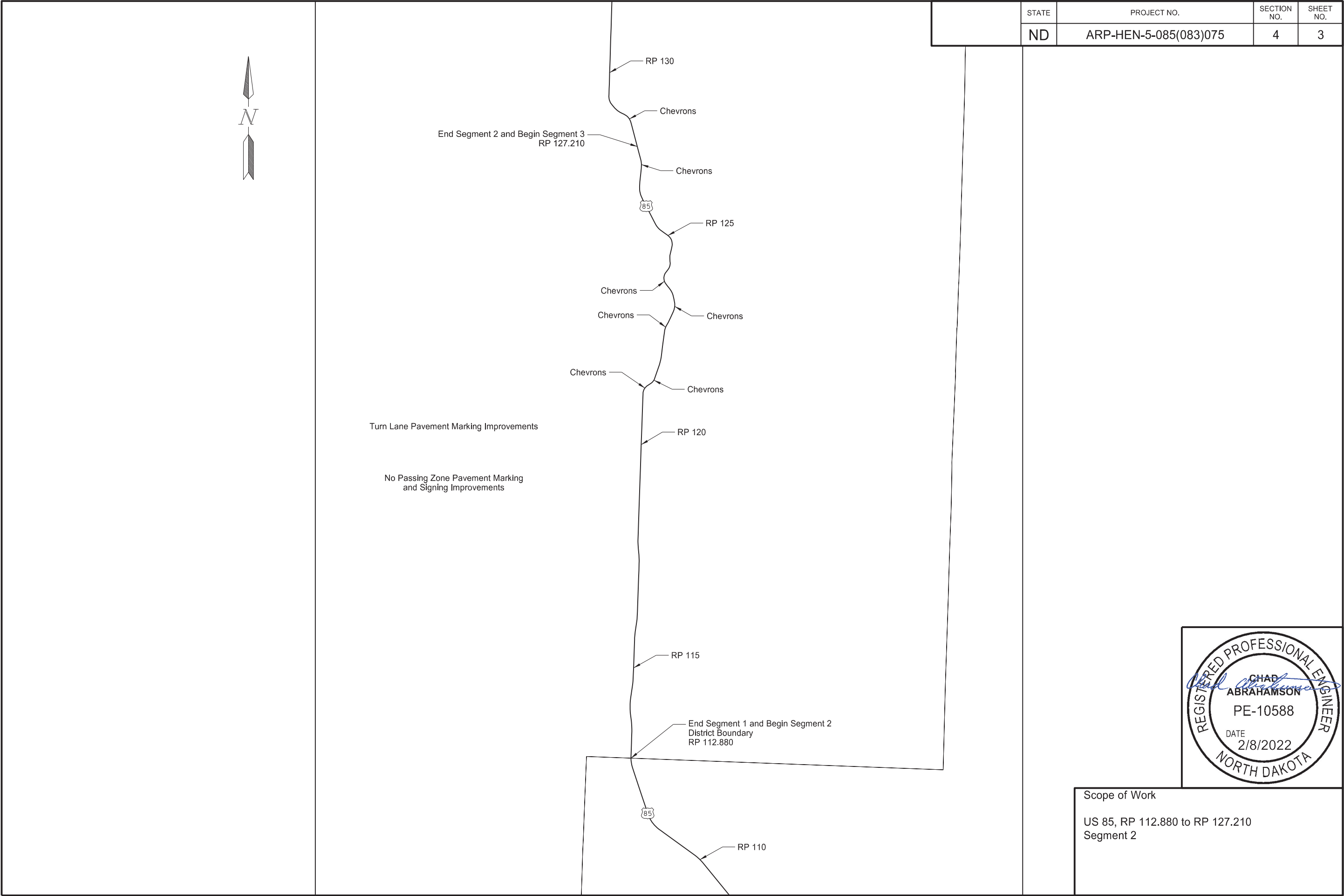
US 85, RP 75.861 to RP 112.880  
Segment 1 (Sheet 1 of 2)



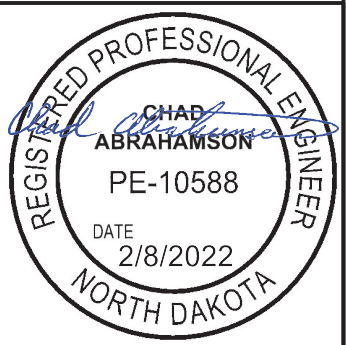
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Scope of Work  
US 85, RP 75.861 to RP 112.880  
Segment 1 (Sheet 2 of 2)



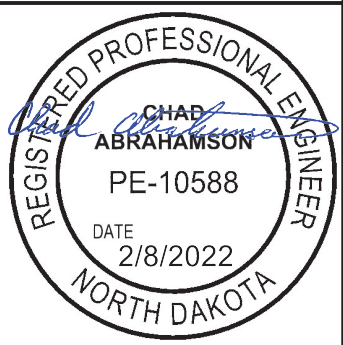
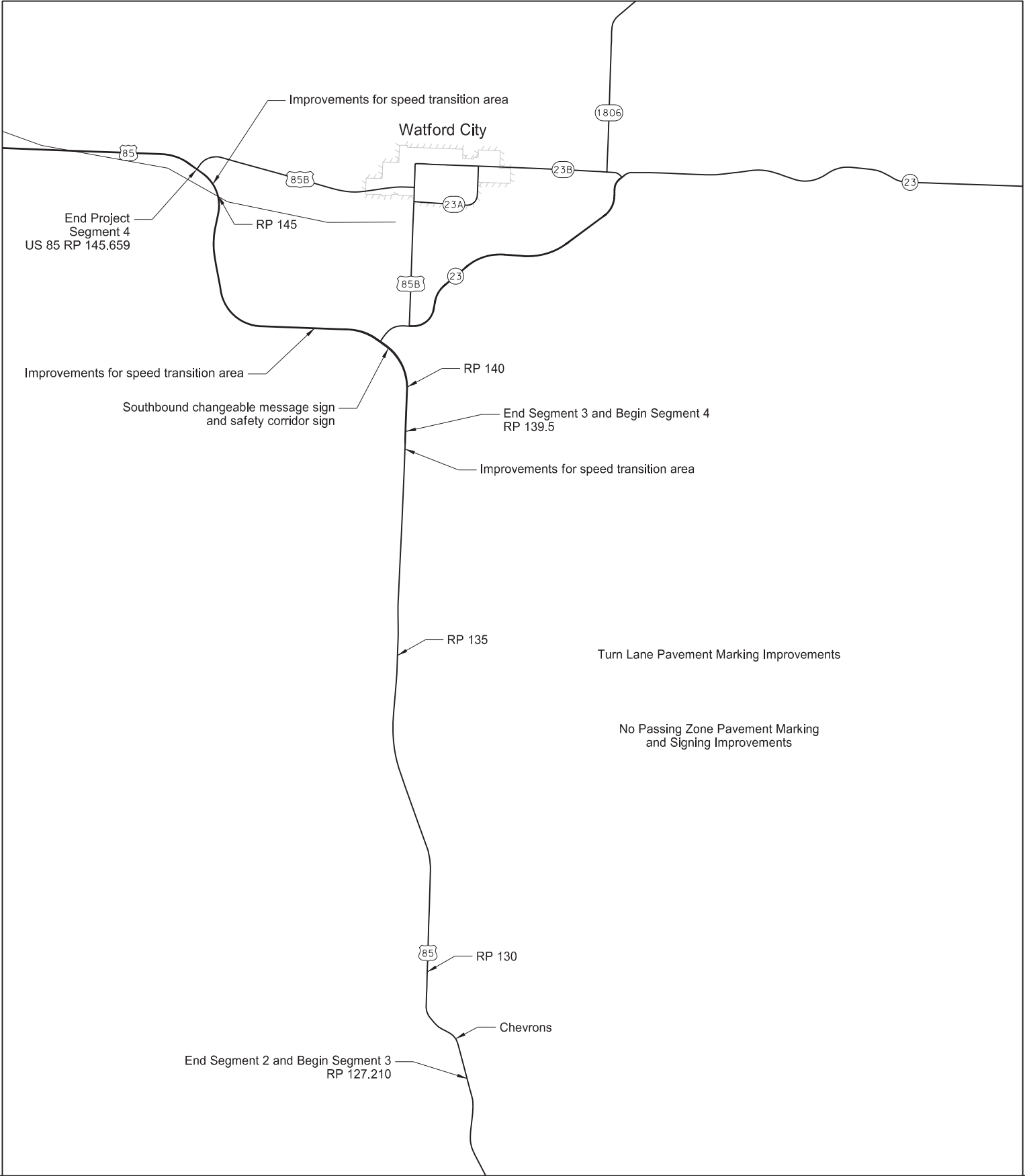
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Scope of Work

US 85, RP 112.880 to RP 127.210  
Segment 2

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Scope of Work

US 85, RP 127.210 to RP 139.5  
Segment 3

US 85, RP 139.5 to RP 145.659  
Segment 4

NOTES

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GENERAL NOTES

203-P01 BERM CONSTRUCTION: Install berms on US 85 at RP 76.11, and RP 107.33. Remove the existing topsoil and store at least 50 feet from the driving lane. Install Borrow/Embankment Type A and compact. Follow standard specifications section 203 "Excavation and Embankment". Reinstall topsoil and apply Type II Seeding and straw mulch to all disturbed areas.

Include costs associated with this work in the item "Portable Changeable Message Sign".

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
  - Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
  - Each strip in the array must weigh a minimum of 100 pounds.
- Use individual PRS constructed in one of the following manners:
- A single piece;
  - Inter locking segments; or
  - Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-P01 TRAFFIC CONTROL DEVICES: The Traffic Control Devices List has been developed using the following Standard Drawings and layouts for traffic control:

Road Segment	Layout	Description
1,2,3	D-704-24 Type R	two lane road shoulder closure
2,3,4	D-704-24 Type HH	four lane road shoulder closure, concrete barriers are not needed
1,2,3,4	Mobile Operation Detail	use for pavement marking and delineator installation
1,2,3	Portable Rumble Strips-Two Lane Layout	provide Delineator Drums according to the Standard Drawing D-704-19 Type F one lane closure
2,3,4	D-704-34	four lane road, lane closure

The required traffic control signs and devices shown on the layout will be paid for at the unit price for the bid item "Traffic Control Signs".

704-P02 TRAFFIC CONTROL: Properly place necessary traffic control devices and ensure they are in operation before starting construction. Keep the devices current and placed only in the areas of actual work activities.

Maintain traffic through the work area at all times according to Section 704 "Temporary Traffic Control".

Provide protection vehicles as specified in Section 704.04 M, "Protection Vehicle with Truck Mounted Attenuation Device".

Include the cost to furnish, operate, and maintain protection vehicles, in the unit price bid for "Protection Vehicle".

SECTION 110

754-P01 GUARDRAIL DELINEATORS: Remove old delineators and install w-beam guardrail delineators on posts spaced every 12.5 ft.

Include costs associated with this work in the item "Guardrail Reflectorized Plate".

754-P02 TYPE A DELINEATORS: Install new 3"x9" reflectors on delineator posts.

Segment 4: Remove the delineators on the curves shown in the chart. Install new delineators on these curves straight across from each other using the Spacing table shown on Delineator Curve Details sheet.

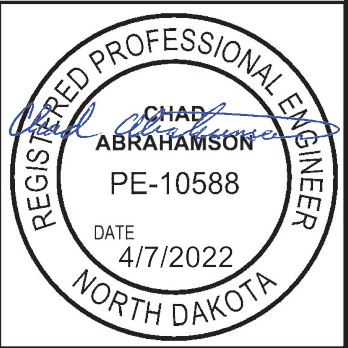
Include costs associated with this work in the item "Delineators – Type A".

754-P03 VEHICLE SPEED FEEDBACK SIGN: Provide installation, programming, and maintenance manuals to the Engineer prior to installation. Submit work drawings with mounting details prior to installation. Ensure the Vehicle speed feedback sign and controller are compliant with the current edition of the MUTCD. Ensure the sign and equipment have a minimum 2-year warranty.

Provide a sign that follows the minimum standards shown below.

Static Sign Requirements:

- Center the message "YOUR SPEED" on the sign above the Vehicle Speed Display,
- Use series E font,
- Provide a black legend with fluorescent yellow background, and
- Letter height:
  - 2 lane roadway: 4"
  - 4 lane roadway: 6"



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NOTES

Dynamic Sign Requirements:

- Sign dimensions:
  - 2 lane roadway: 24” width
  - 4 lane roadway: 36” width
- Digital number height:
  - 2 lane roadway: 10”
  - 4 lane roadway: 14”
- Provide an LED display,
- Display the speed of the approaching vehicle as “XX” in MPH,
- Monitor traffic speed via radar detecting up to 1000 feet,
- Display legible at 1000 feet,
- Display face non-glare, UV resistant, and high impact polycarbonate,
- Weatherproof NEMA Type 3R rating,
- Display numerals yellow color with a black background,
- Operate at a temperature range of -34 degree C to +74 degree C,
- 22 degree viewing angle, and
- Type XI Retroreflective Sign Sheeting.

Controller Requirements:

- Programmable display for the posted speed limit,
- Blank displayed when no advancing traffic is detected,
- Blank displayed when a vehicle exceeds the posted speed limit by 30 mph,
- Display radar generated speed input on the sign,
- Automatic nighttime dimming feature,
- Operates on solar power, and
- Operate 24 hours a day, 7 days a week.

Solar Power Requirements:

- Provide solar panels to charge battery,
- Provide a solar charge controller,
- Provide AGM batteries sufficient to power the display sign for 3 days without sunlight, and
- Install a ground wire and connect to a ground rod in the ground.

AC Power Requirements:

- Connect the conductor as shown in the plans, and
- Install a ground wire and connect to a ground rod in the ground.

Sign Supports:

- Mount the vehicle speed feedback sign to sign supports as shown in section 110.

Refer to Section 770 “Highway Lighting” for specifications regarding the Vehicle Speed Feedback Sign installation.

Include costs associated with installation, supply, and testing of this sign equipment in the item “Vehicle Speed Feedback Sign”.

754-P04 EXISTING EQUIPMENT: Remove the existing Vehicle Speed Feedback Signs. Deliver these signs to the sign shop at the address shown below:

Jeff Iverson, Highway Superintendent  
Fairfield Sign Shop  
12811 20<sup>th</sup> St SW  
Fairfield, ND 58627  
(701) 575-4661

Include all costs associated with this work in the price bid for “Vehicle Speed Feedback Sign”.

SECTION 120

760-P01 RUMBLE STRIPS: Install rumble strips in all segments at the locations shown in Section 120. For rumble strips on a four-lane roadway, refer to standard drawing D-760-3 for details on where to install the rumble strips on turn lanes.

Include all costs associated with this work in the price bid for “Rumble Strips – Asphalt Centerline”

762-P01 EPOXY PVMT MK-WET REFLECTIVE: Supply epoxy pavement marking, and retroreflective optics as outlined below.

The following pavement marking products may be used:

- 3M Series 51E All Weather Elements, or
- Potters Visimax Beads, or
- Approved equal.

Use epoxy pavement marking paint as specified in the section 880.02 of the standard specifications.

Apply pavement markings as specified in Section 762.04 C.3, “Epoxy Paint Pavement Markings”, with the following exceptions:

- Apply retroreflective optics using a double drop system. The first drop shall consist of applying 3M Series 51E All Weather Elements at a rate of 5.3 pounds per gallon of paint. The second drop shall consist of applying the glass beads specified in Section 880.02 D at a rate of 20 pounds per gallon of paint. or
- Apply retroreflective optics using a double drop system. The first drop shall consist of applying Potters Visimax Beads at a rate of 6.0 pounds per gallon of paint. The second drop shall consist of applying the glass beads specified in Section 880.02 D at a rate of 6.0 pounds per gallon of paint.

Ensure a company representative is present during the initial application of the retroreflective optics.

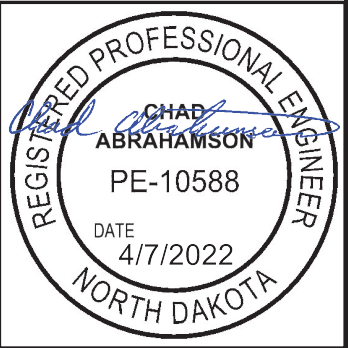
Include all costs associated with this work in the price bid for the item “Epoxy Pvmt Mk 6in Line-Wet Reflective”, “Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved”, and “Epoxy Pvmt Mk 12in Line-Wet Reflective-Grooved”.



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**NOTES**

- 762-P02 PLASTIC PVMT MK FILM-WET REFLECTIVE: Supply plastic pavement marking film as outlined below.
- The following pavement marking products may be used:
- 3M Stamark High-Performance All-Weather Pavement Marking Tape Series 380AW, or
  - Approved equal.
- Apply pavement markings as specified in Section 762 for “Preformed Patterned Pavement Marking Film”.
- Include all costs associated with this work in the price bid for the item “Plastic Pvmt Mk Film 6in-Wet Reflective-Grooved”.
- 766-P01 MAILBOXES: Notify affected mailbox owners in advance of disturbing the existing mailboxes and supports. Provide written notifications 30 days in advance of disturbance and provide copies of the notifications to the Engineer.
- Prior to removing the existing mailbox and support, coordinate verbally with the mailbox owner to discuss resetting the existing mailbox on a new support. Contact the U.S. Postal Service for the mailbox owners’ contact information.
- Include all costs associated with this work in the price bid for the item “Mailbox-All Types”.



ESTIMATE OF QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----	-----
103	0100	CONTRACT BOND	L SUM	1	1
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	40	40
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,857	1,857
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1060	DELINEATOR DRUMS	EA	38	38
704	1067	TUBULAR MARKERS	EA	30	30
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1	1
704	1200	PROTECTION VEHICLE	L SUM	1	1
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	139,820	139,820
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	1,583	1,583
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	119	119
754	0150	DELINEATORS-TYPE A	EA	2,840	2,840
754	0168	DELINEATORS-TYPE D	EA	176	176
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	4,479	4,479
754	8005	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4	4
754	8015	VEHICLE SPEED FEEDBACK SIGN	EA	7	7
760	0010	RUMBLE STRIPS - INTERSECTION	SET	12.9	12.9
762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	7,732	7,732
762	0156	EPOXY PVMT MK 6IN LINE-WET REFLECTIVE	LF	419,459	419,459
762	0157	EPOXY PVMT MK 6IN LINE-WET REFLECTIVE-GROOVED	LF	745,523	745,523
762	0163	EPOXY PVMT MK 12IN LINE-WET REFLECTIVE-GROOVED	LF	59,975	59,975
762	1236	PLASTIC PVMT MK FILM 6IN LINE-WET REFLECT-GROOVED	LF	10,497	10,497
764	2097	GUARDRAIL REFLECTORIZED PLATE	EA	156	156
766	0100	MAILBOX-ALL TYPES	EA	18	18

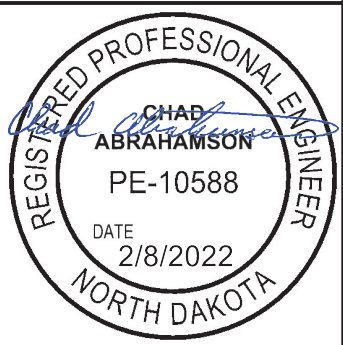
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Mailboxes - Segment 1					
Hwy	RP	Location	Type	# Mailboxes	Quan
US 85	77.336	RT	Multiple	3	1
US 85	79.651	RT	Single	1	1
US 85	90.565	RT	Multiple	3	1
US 85	106.995	LT	Single	1	1
US 85	111.603	RT	Single	1	1

Mailboxes - Segment 2					
Hwy	RP	Location	Type	# Mailboxes	Quan
US 85	115.11	LT	Single	1	1
US 85	115.16	LT	Single	1	1
US 85	115.63	LT	Single	1	1
US 85	119.54	RT	Single	1	1
US 85	121.45	RT	Single	1	1

Mailboxes - Segment 3					
Hwy	RP	Location	Type	# Mailboxes	Quan
US 85	133.63	LT	Single	1	1
US 85	136.14	LT	Single	1	1
US 85	138.68	LT	Multiple	9	3
US 85	139.11	LT	Multiple	6	2
US 85	139.22	LT	Single	1	1

SPEC CODE	BID ITEM	UNIT	QTY
766	0100 Mailbox-All Types (refer to chart)		
	Multiple supports	EA	7
	Single supports	EA	11
	Total	EA	18



Basis of Estimate

US 85, I-94 North to US 85B  
Safety Corridor

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES	3	28	84
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	48"x24"	END ROAD WORK	6	26	156
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		43	
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	59	118
I2-5-96	96"x48"	YOUR HIGHWAY DOLLARS AT WORK	2	59	118
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		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT ___ (Portable only)	8	30	240
R2-1-48	48"x60"	SPEED LIMIT ___	4	39	156
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	6	10	60
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
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)		12	
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		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP	1	35	35
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	6	35	210
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT	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		28	
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	6	35	210
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		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or ___ FT or ___ MILE	2	35	70
W20-7-48	48"x48"	FLAGGER	2	35	70
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	3	5	15
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	2	35	70
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED	2	35	70

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	1857

[illegible]

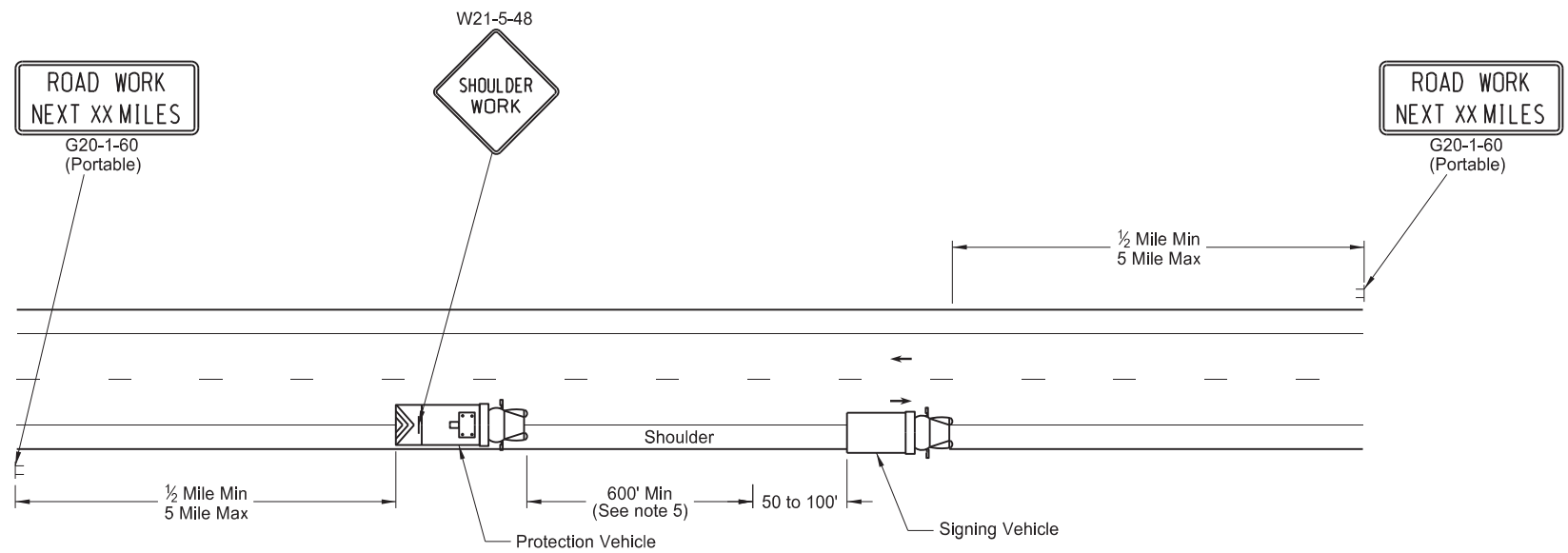
**NOTE:**  
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.  
<http://www.dot.nd.gov/>



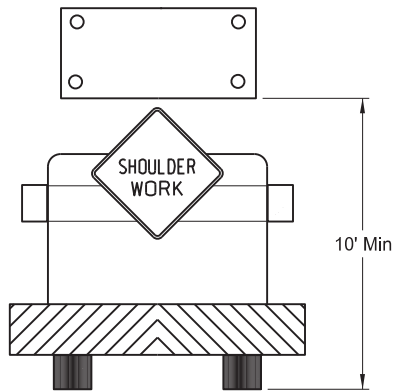
## Traffic Control Devices List

MOBILE OPERATION

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	100	2

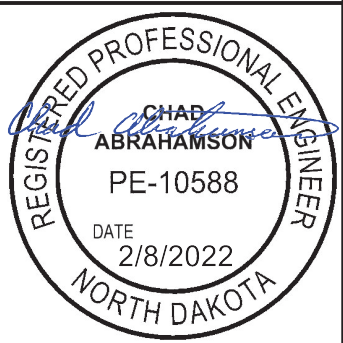
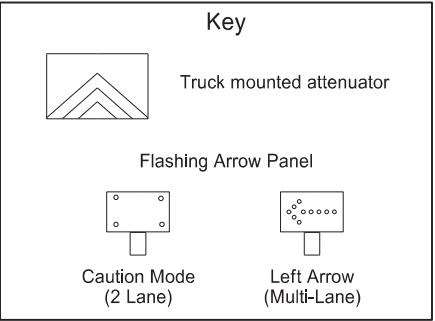


TWO LANE - TWO WAY ROADWAY

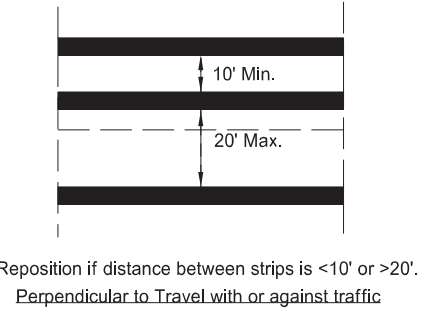
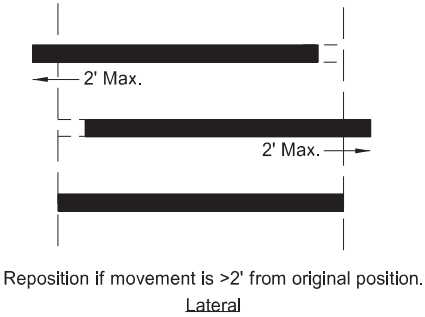
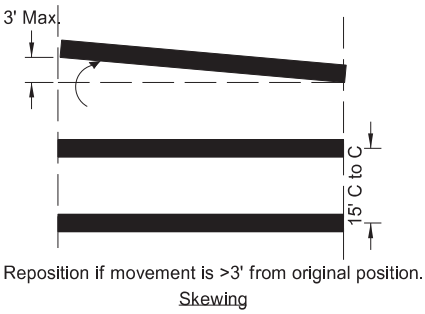


TWO LANE - TWO WAY ROADWAY  
Typical Protection Vehicle with  
Flashing Arrow Panel In Caution Mode

- 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.



Work Zone Traffic Control



PORTABLE RUMBLE STRIPS ARRAY  
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

- Notes:
1. Number of devices were calculated using 40 mph. Speed determined in the field based on location and conditions.
  2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
  3. Sign R2-1aP-24 is not required when pilot car operation is used.
  4. Rumble strips are not used on a non paved surface or in a pre-construction speed zone of 25 mph or less.

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



KEY

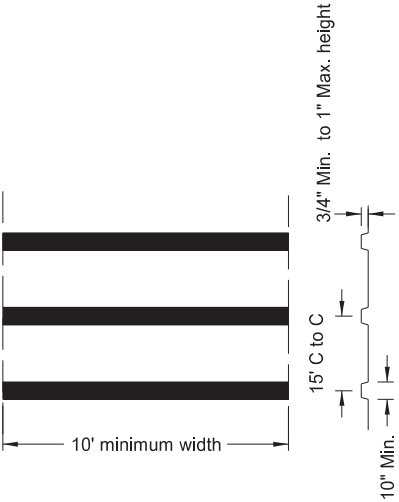
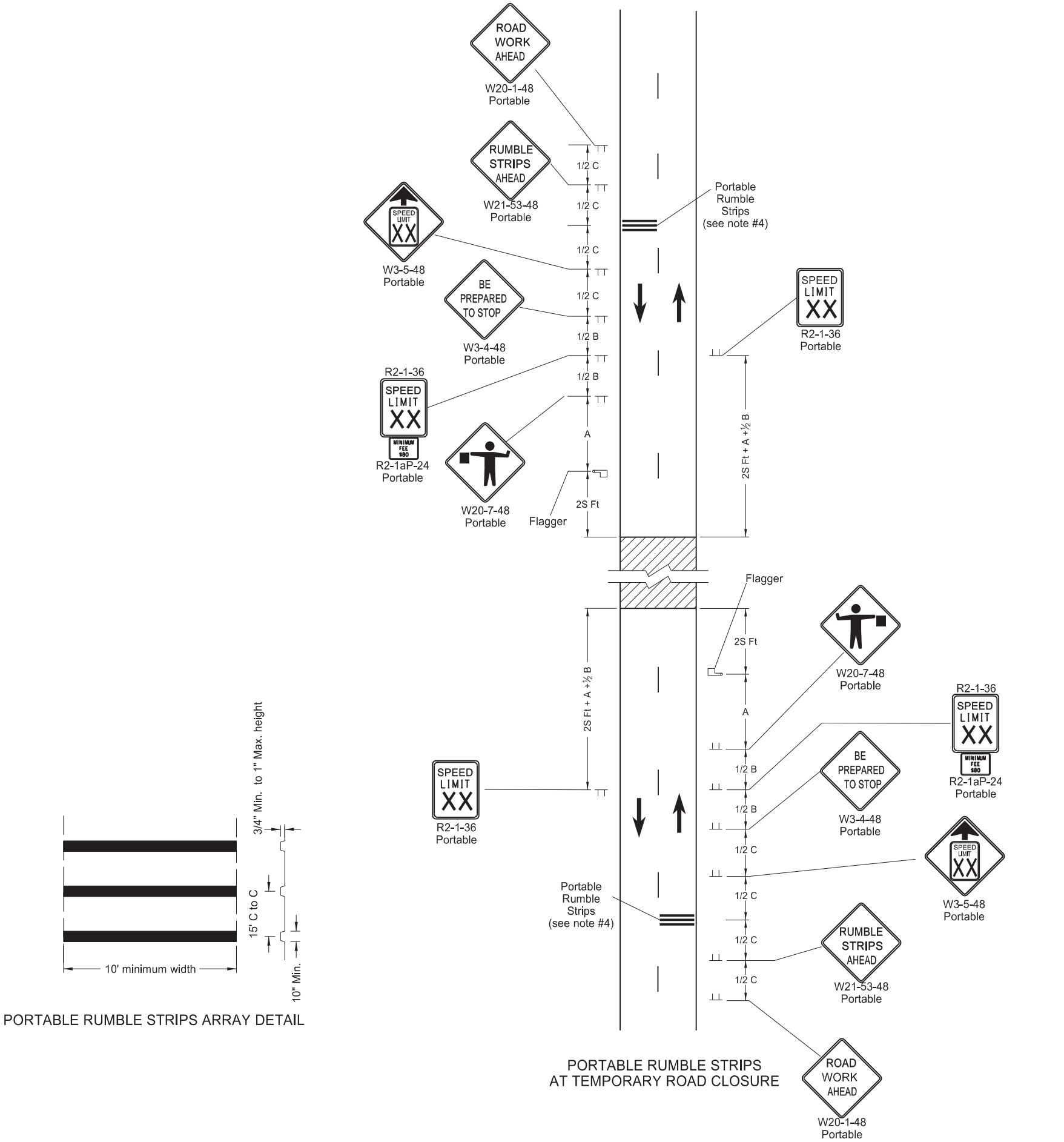
Work area

Flagger

Sign


S = Numerical value of speed limit or 85th percentile.


TWO-LANE PORTABLE RUMBLE STRIPS




PORTABLE RUMBLE STRIPS ARRAY DETAIL


PORTABLE RUMBLE STRIPS  
AT TEMPORARY ROAD CLOSURE

																			STATE		PROJECT NO.		SECTION NO.	SHEET NO.
																	N.D.		ARP-HEN-5-085(083)075		110	1		
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments	
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF									
Segment 1																								
75.950 Lt	SA B			5.0	15.7	16.0			5.0	2.25 x 2.25 12 ga	17.7	4.1	4.4			2 x 2 12 ga	2	4	3 x 3 7 ga			2		
75.990 Rt	SN 1		29.8		11.9	12.6	13.3	14.1	5.0	2.5 x 2.5 10 ga	14.8						4	4	3 x 3 7 ga			4		
76.440 Lt	SA B			5.0	15.7	16.0			5.0	2.25 x 2.25 12 ga	17.7	4.1	4.4			2 x 2 12 ga	2	4	3 x 3 7 ga			2		
76.580 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
76.580 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
76.740 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
76.960 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
76.960 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
81.950 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
81.950 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
82.060 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
82.120 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
82.250 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
82.250 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
86.300 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
86.300 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
89.240 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
89.240 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
89.440 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
89.470 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
89.470 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
89.890 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
89.890 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
90.480 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
90.480 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
91.090 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
91.090 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
91.160 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
91.340 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga					
91.340 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
91.360 Rt	SA A			5.0	14.6	14.9			5.0	2.5 x 2.5 10 ga	16.3						2	4	3 x 3 7 ga			2		
91.560 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga					
92.100 Lt	SA A			5.0	14.6	14.9			5.0	2.5 x 2.5 10 ga	16.3						2	4	3 x 3 7 ga			2		
92.280 Lt		20		9.0	13.1				5.0	2.25 x 2.25 12 ga	14.1	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1		
																			Sign Summary Perforated Tube  US 85 Safety Corridor I-94 to US 85B  US Hwy 85					
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																			STATE	PROJECT NO.			SECTION NO.	SHEET NO.	
																			N.D.	ARP-HEN-5-085(083)075			110	2	
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments		
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF										
92.400 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
92.400 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
92.600 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
92.600 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
92.600 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
92.920 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
92.960 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
93.220 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
93.220 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
95.880 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
95.880 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
95.960 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
96.090 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
96.230 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
96.230 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
98.480 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
98.480 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
98.740 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
98.750 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
98.960 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
98.960 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
99.730 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
99.730 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
99.940 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
100.010 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
100.260 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
100.260 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
100.670 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
100.670 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
100.820 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
100.890 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
101.020 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
101.020 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
102.350 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga						
102.350 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga						
																					Sign Summary Perforated Tube  US 85 Safety Corridor I-94 to US 85B  US Hwy 85				


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																					STATE		PROJECT NO.			SECTION NO.	SHEET NO.
																			N.D.		ARP-HEN-5-085(083)075			110	3		
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments				
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF												
102.490 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
102.500 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
102.710 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
102.710 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
103.380 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
103.380 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
103.590 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
103.630 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
103.900 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
103.900 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
104.500 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
104.500 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
104.560 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
104.710 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
104.780 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
104.780 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
107.460 Lt	SN 1		29.8		11.9	12.6	13.2	14.1	5.0	2.5 x 2.5 10 ga	14.8						4	4	3 x 3 7 ga			4					
107.810 Rt	SN 1		29.8		11.9	12.6	13.2	14.1	5.0	2.5 x 2.5 10 ga	14.8						4	4	3 x 3 7 ga			4					
108.280 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
108.280 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
108.470 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
108.560 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
108.790 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
108.790 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
110.600 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
110.600 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
110.680 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
110.810 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
110.910 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga								
110.910 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga								
Sub Total			89.4	503.8	Total		1,403.4					Total			448.0	0		0	21								
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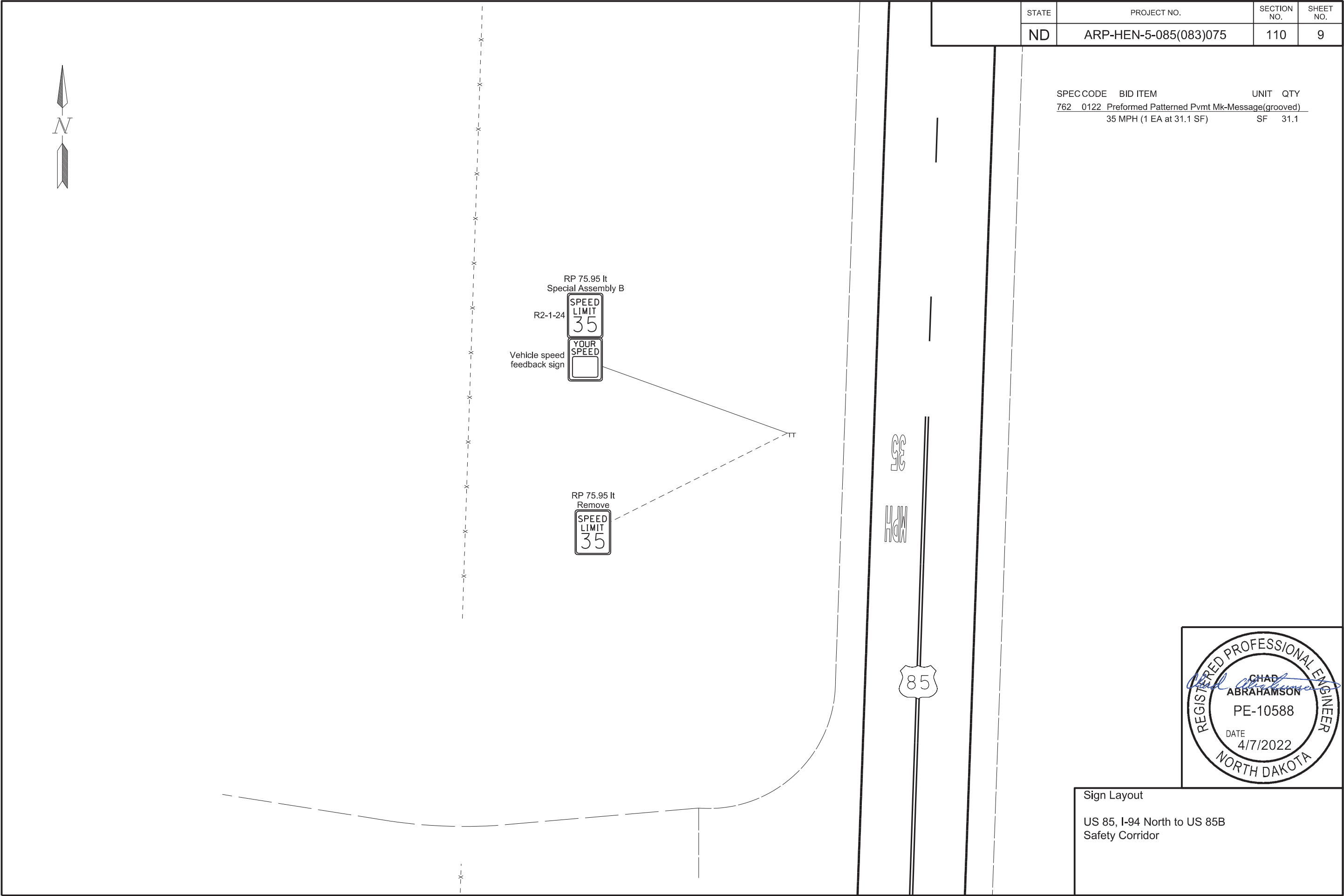
																				STATE	PROJECT NO.			SECTION NO.	SHEET NO.			
																				N.D.	ARP-HEN-5-085(083)075			110	4			
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments					
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF													
Segment 2																												
114.010 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
114.010 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
114.540 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
114.590 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
114.720 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
114.720 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
119.280 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
119.280 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
120.820 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
120.820 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
121.030 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.096 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.132 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.167 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.180 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.204 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.240 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.276 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.312 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.348 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.390 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
121.390 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.460 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.494 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.528 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.562 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga			1	4	3 x 3 7 ga		1						
121.596 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.680 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
121.680 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
121.890 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
122.140 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
122.360 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6							1	4	2.5 x 2.5 12 ga								
122.360 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
123.147 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0							1	4	2.5 x 2.5 12 ga								
																								Sign Summary Perforated Tube  US 85 Safety Corridor I-94 to US 85B  US Hwy 85				
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																						STATE		PROJECT NO.		SECTION NO.	SHEET NO.
																						N.D.		ARP-HEN-5-085(083)075		110	5
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments				
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF												
123.184 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.221 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.257 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.294 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.330 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.367 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.403 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.440 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
123.442 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
123.620 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
123.620 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6					1	4	2.5 x 2.5 12 ga									
123.689 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
123.725 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.762 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.799 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.835 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.872 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.880 Lt		20		9.0	13.1				5.0	2.25 x 2.25 12 ga	14.1	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.908 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.945 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
123.981 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
123.990 Lt		20		9.0	13.1				5.0	2.25 x 2.25 12 ga	14.1	4.3			2 x 2 12 ga	1	4	3 x 3 7 ga				1					
124.670 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
124.670 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
125.850 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga									
Sub Total			0.0	422.8	Total		742.7											Total	236.0			0	0	25			

																				STATE	PROJECT NO.			SECTION NO.	SHEET NO.	
																				N.D.	ARP-HEN-5-085(083)075			110	6	
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments			
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF				1st LF	2nd LF	3rd LF	4th LF											
Segment 3																										
127.220 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
127.685 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
127.723 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.761 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.798 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.837 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.875 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.912 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.950 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
127.988 Rt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.026 Rt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
128.152 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
128.195 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.233 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.270 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.308 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.345 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.380 Rt		20		9.0	13.1				5.0	2.25 x 2.25 12 ga	14.1	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.383 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.420 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.458 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.495 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.533 Lt				10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1				
128.570 Lt				5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
129.470 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
129.470 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
130.040 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
130.050 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
130.250 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
130.250 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
130.760 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
130.760 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
130.980 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
131.070 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
																							Sign Summary Perforated Tube  US 85 Safety Corridor I-94 to US 85B  US Hwy 85			
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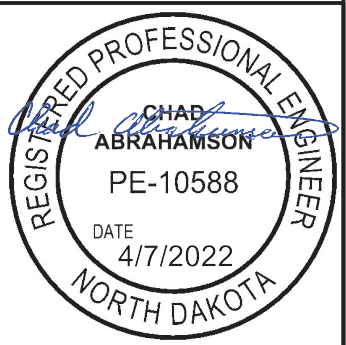
																		STATE	PROJECT NO.			SECTION NO.	SHEET NO.			
																	N.D.	ARP-HEN-5-085(083)075			110	7				
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance	Support Size	Max Post Len	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments			
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF	FT		LF	1st LF	2nd LF	3rd LF	4th LF											
131.280 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
131.280 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
131.750 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
131.750 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
131.900 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
131.960 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
132.110 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
132.110 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
133.350 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
133.350 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
133.570 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
133.630 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
133.760 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
133.760 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
134.530 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
134.530 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
134.750 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
134.940 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
134.940 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
135.610 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
135.610 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
135.730 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
135.940 Lt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
135.940 Rt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
137.010 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
137.010 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
137.320 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
137.320 Lt		65		5.6	12.5				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga							
137.380 Rt		9		5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga							
138.130 Rt	SA B			5.0	15.7	16.0			5.0	2.25 x 2.25 12 ga	17.7	4.1	4.4			2 x 2 12 ga	2	4	3 x 3 7 ga			2				
Sub Total			0.0	422.4	Total		818.6										Total	260.0		0	0	21				
																								Sign Summary Perforated Tube  US 85 Safety Corridor I-94 to US 85B  US Hwy 85		
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																						STATE		PROJECT NO.		SECTION NO.		SHEET NO.	
																						N.D.		ARP-HEN-5-085(083)075		110		8	
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clear- ance FT	Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments						
IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF	1st LF	2nd LF	3rd LF	4th LF	1st LF	2nd LF	3rd LF	4th LF	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments									
Segment 4																													
139.984 Rt			5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga												
140.019 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.054 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.090 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.125 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.160 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.195 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.231 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.266 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.301 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.336 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.372 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.400 Lt	SN 1		29.8		14.4	14.9	15.6	7.0	2.5 x 2.5 12 ga	16.0	4.8	5.4	6.0	2.25 x 2.25 12 ga	3	4	3 x 3 7 ga			3									
140.407 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.442 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.477 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.512 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.548 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.583 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.618 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.653 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.695 Rt			10.0	13.2				5.0	2.25 x 2.25 12 ga	14.0	4.3				2 x 2 12 ga	1	4	3 x 3 7 ga			1								
140.724 Rt			5.0	12.1				5.0	2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga												
141.390 Lt	SA C		12.0	18.8	19.0	19.2		7.0	2.5 x 2.5 12 ga	21.4	4.8	5.0	5.2	2.25 x 2.25 12 ga	3	4	3 x 3 7 ga			3									
145.160 Rt	SA C		12.0	18.8	19.0	19.2		7.0	2.5 x 2.5 12 ga	21.4	4.8	5.0	5.2	2.25 x 2.25 12 ga	3	4	3 x 3 7 ga			3									
Sub Total			29.8	234.0	Total		446.0											Total	124.0			0	0	29					
Grand Total			119.2	1,583.0	Total		3,410.6											Total	1068	0		0	0	96					



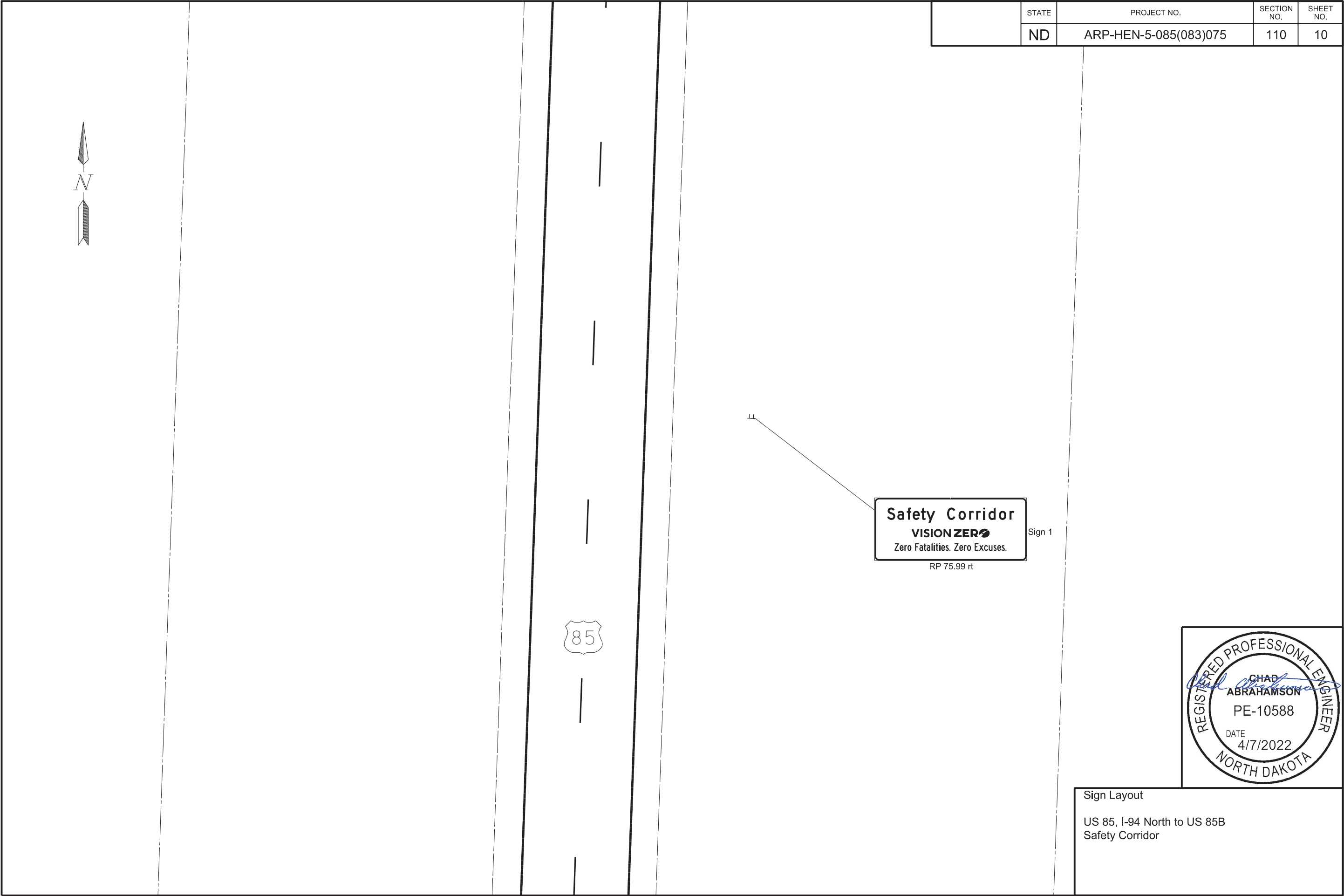
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	9

SPEC CODE	BID ITEM	UNIT	QTY
762	0122 Preformed Patterned Pvmt Mk-Message(grooved)		
	35 MPH (1 EA at 31.1 SF)	SF	31.1

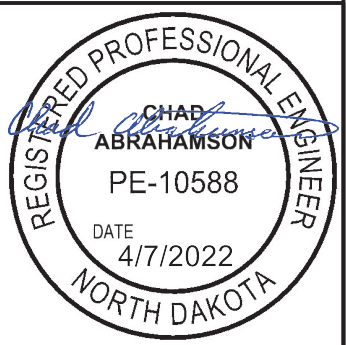


Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

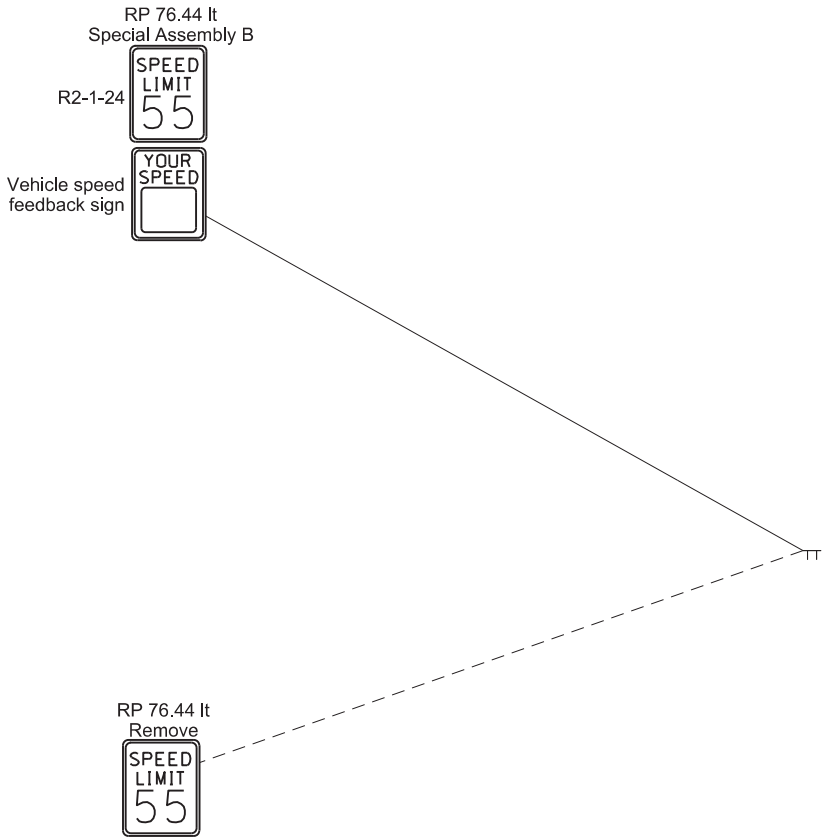


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	10



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

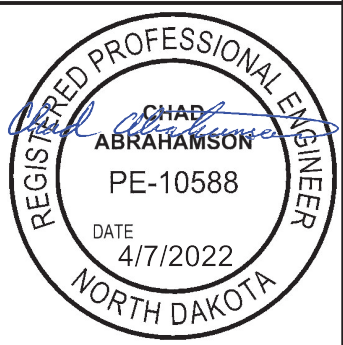


55  
MPH



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	11

SPEC CODE	BID ITEM	UNIT	QTY
762	0122 Preformed Patterned Pvmt Mk-Message(grooved)		
	55 MPH (1 EA at 31.8 SF)	SF	31.8



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



RP 76.63 It  
In place to remain

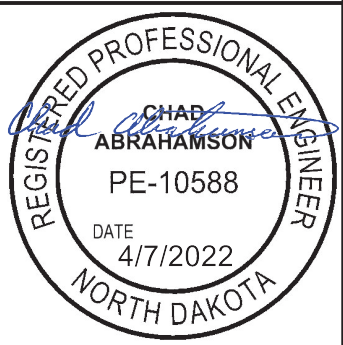


REDUCED  
SPEED  
AHEAD



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	12

SPECCODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	103
	(1 EA at 103 SF)		



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



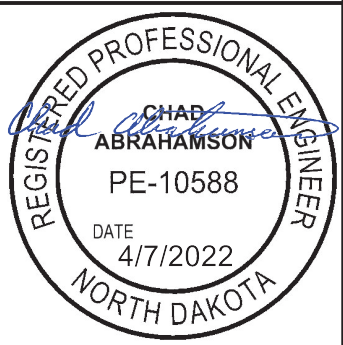
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	13

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	103
	(1 EA at 103 SF)		

AHEAD  
SPEED  
REDUCED



RP 91.19  
In place to remain



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



MPH

45



RP 91.39 rt  
Remove sign  
and supports

RP 91.36 rt  
Remove



RP 91.36 rt  
Special Assembly A

R2-1-24

Vehicle speed  
feedback sign

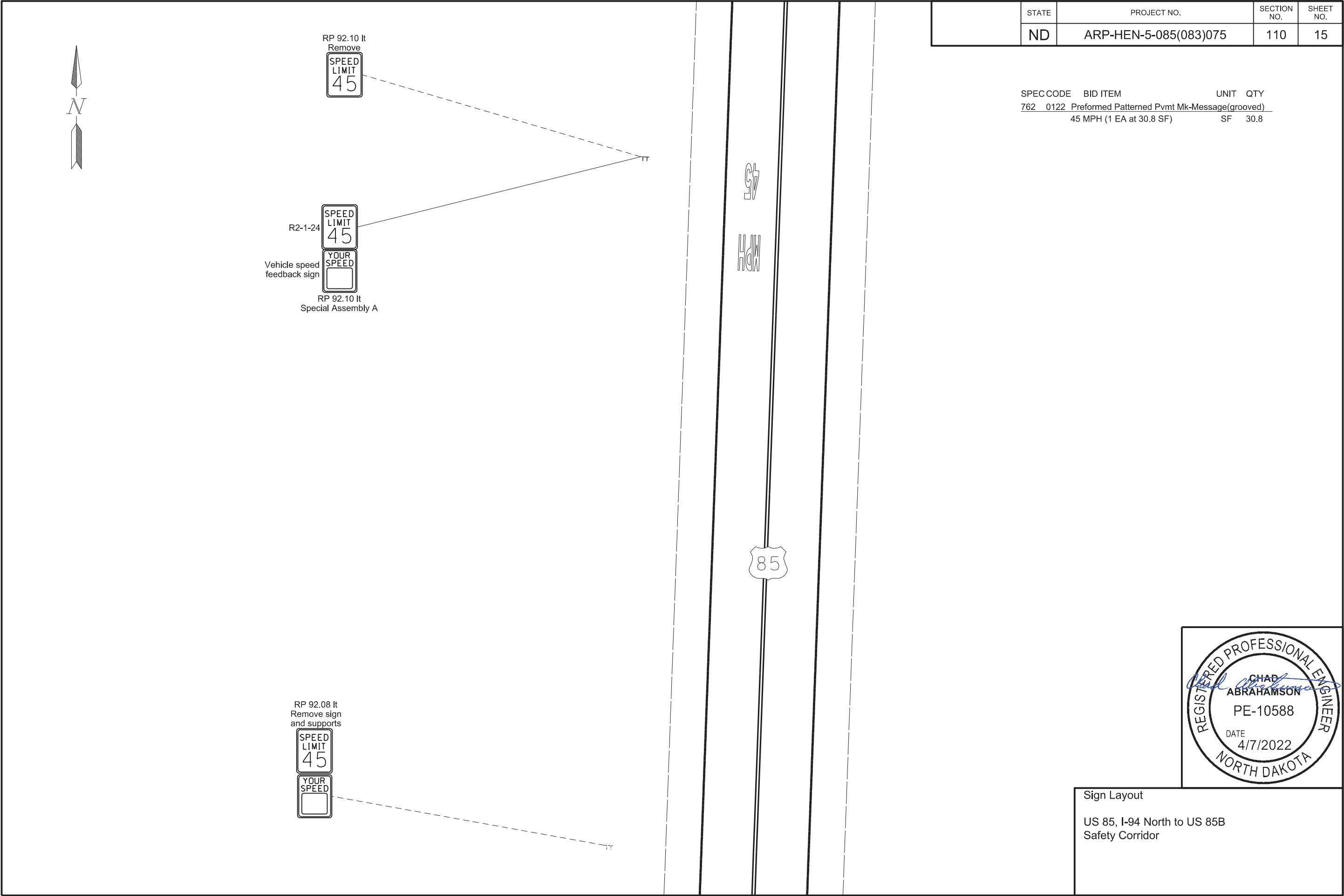
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	14

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	45 MPH (1 EA at 30.8 SF)	SF	30.8



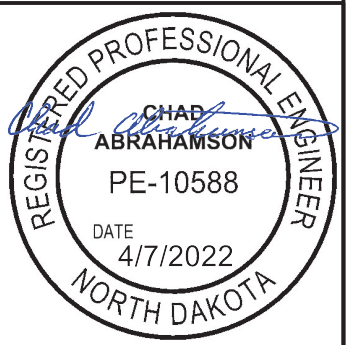
Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



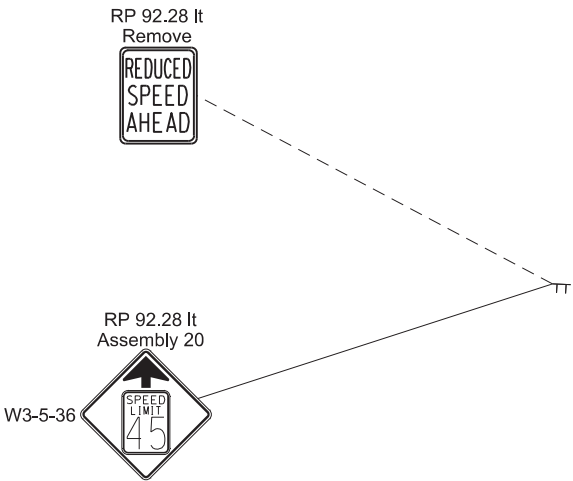
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	15

SPECCODE	BID ITEM	UNIT	QTY
762	0122 Preformed Patterned Pvmt Mk-Message(grooved)		
	45 MPH (1 EA at 30.8 SF)	SF	30.8



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



REDUCED  
SPEED  
AHEAD



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	16

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	103
	(1 EA at 103 SF)		



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

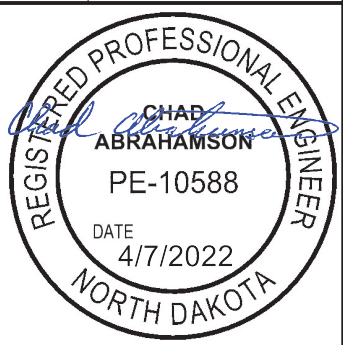
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	17



Sign 1

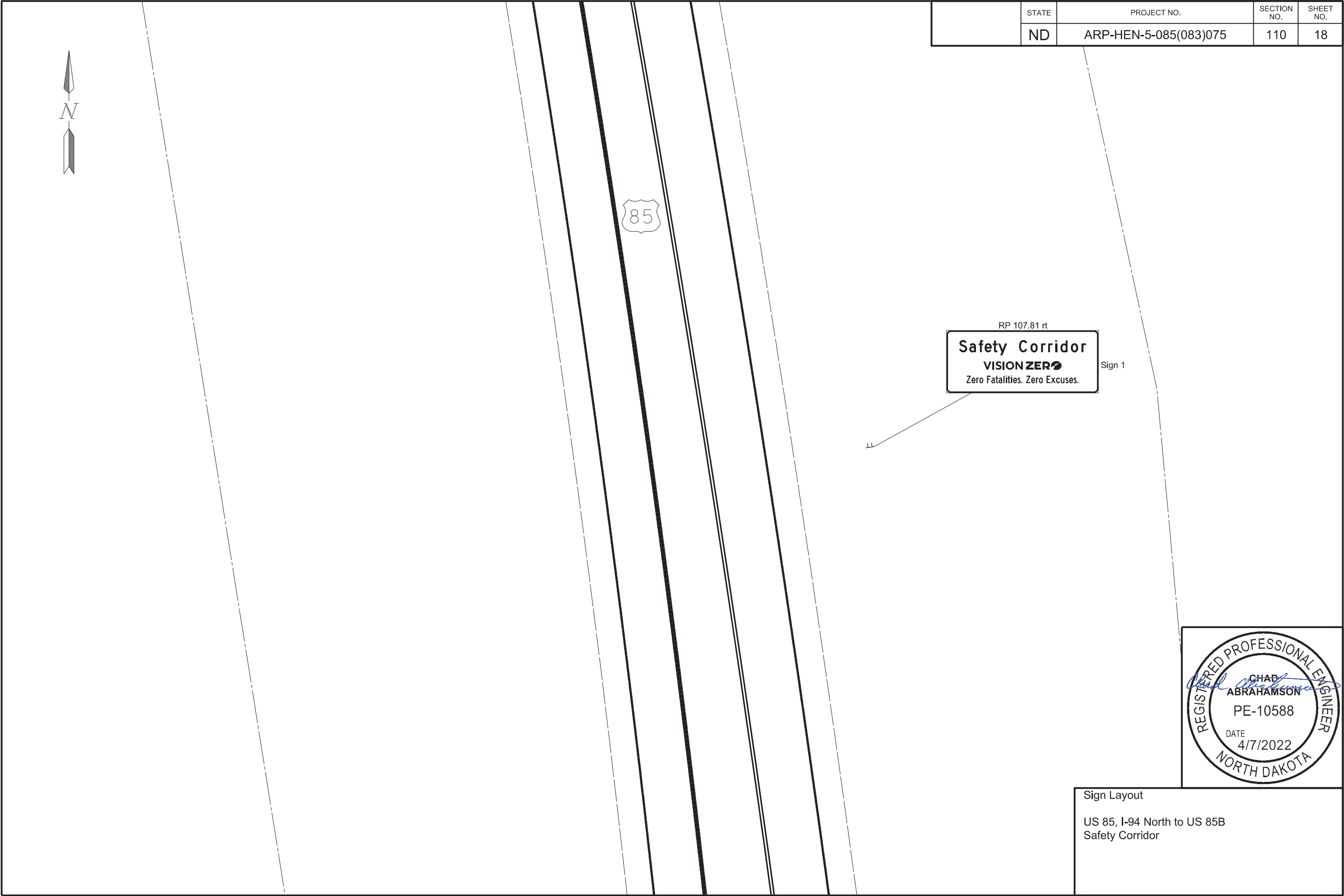
Safety Corridor  
VISION ZERO  
Zero Fatalities. Zero Excuses.

RP 107.46 It

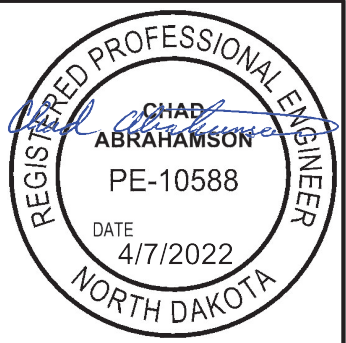


Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	18



Sign Layout

US 85, I-94 North to US 85B

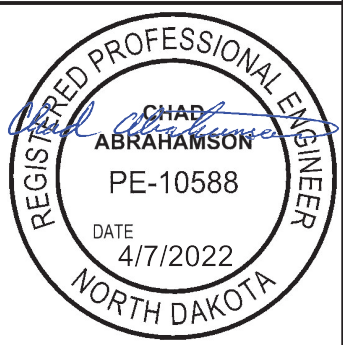
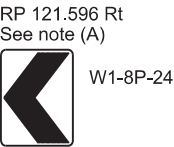
Safety Corridor





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	20

Note  
(A) Refer to Standard Drawing D-754-79 for mounting details



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



RP 123.442 Rt  
See note (A)



W1-8P-24

RP 123.403 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.367 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.330 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.294 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.257 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.221 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.184 Rt  
See note (A)



W1-8P-24

W1-8P-24

RP 123.147 Rt  
See note (A)



W1-8P-24

RP 123.164 Rt  
In place to remain



Note  
(A) Refer to Standard Drawing D-754-79 for mounting details.

STATE

ND

PROJECT NO.

ARP-HEN-5-085(083)075

SECTION NO.

110

SHEET NO.

21



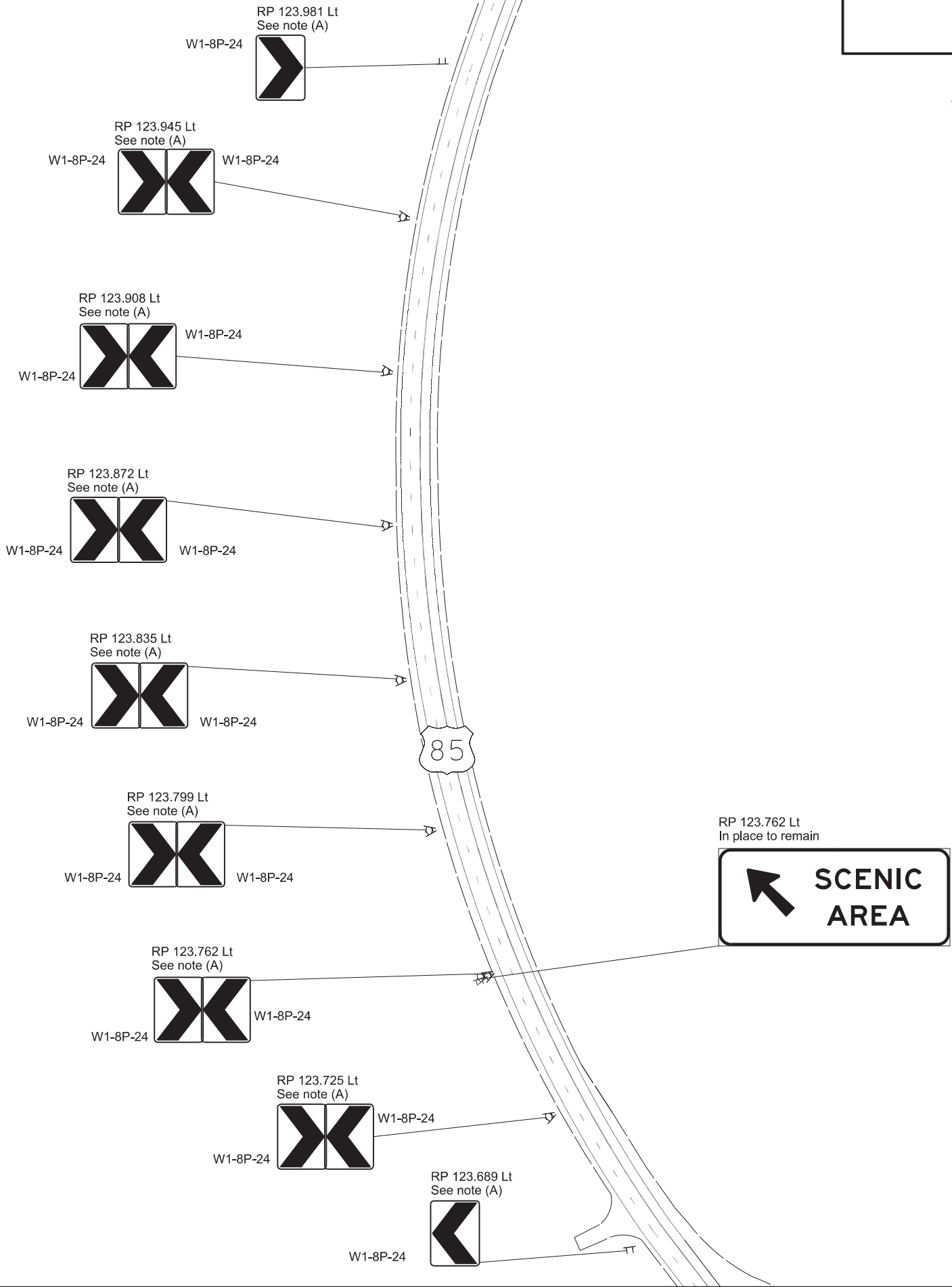
Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	22

Note  
(A) Refer to Standard Drawing D-754-79 for mounting details.



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	23

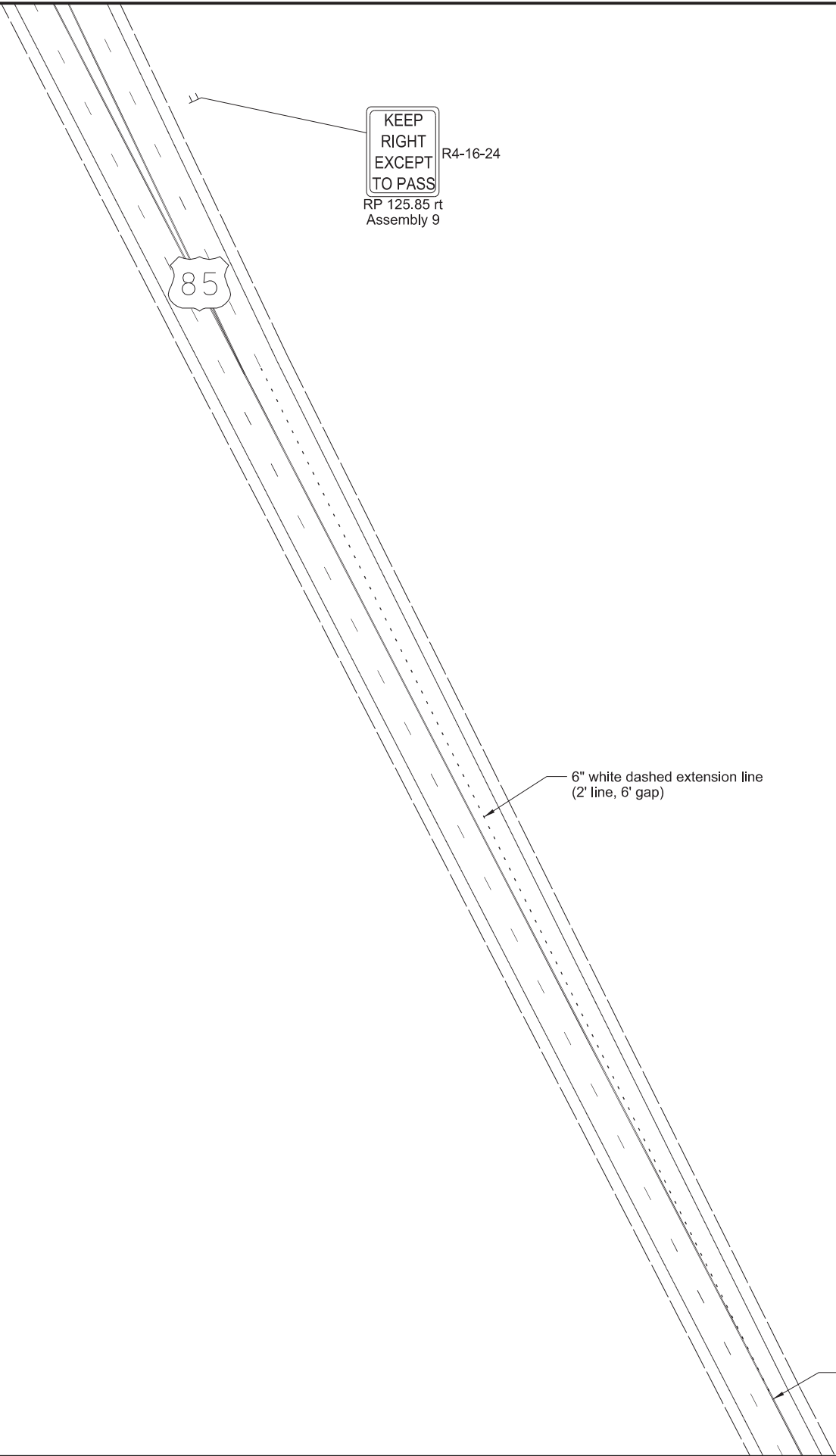
R4-16-24  
KEEP  
RIGHT  
EXCEPT  
TO PASS  
RP 124.67 It  
Assembly 9

85



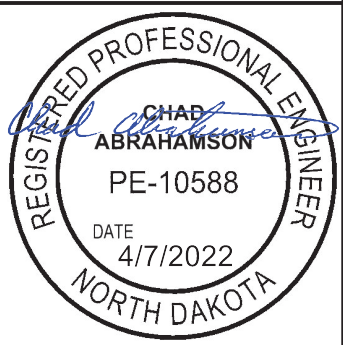
Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	24

SPEC CODE	BID ITEM	UNIT	QTY
762_0157	Epoxy Pymt Mk 6in Line-Wet Reflective-Grooved	LF	261
	6" white dashed line (2' line, 6' gap)		



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	27

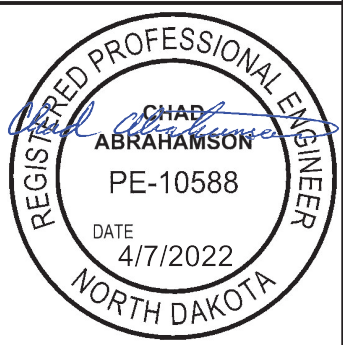
SPECCODE	BID ITEM	UNIT	QTY
762	0122 Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	103
	(1 EA at 103 SF)		



AHEAD  
SPEED  
REDUCED



RP 137.83 rt  
In place to remain

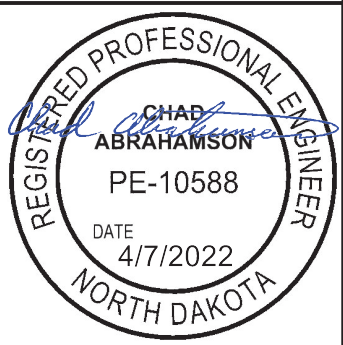
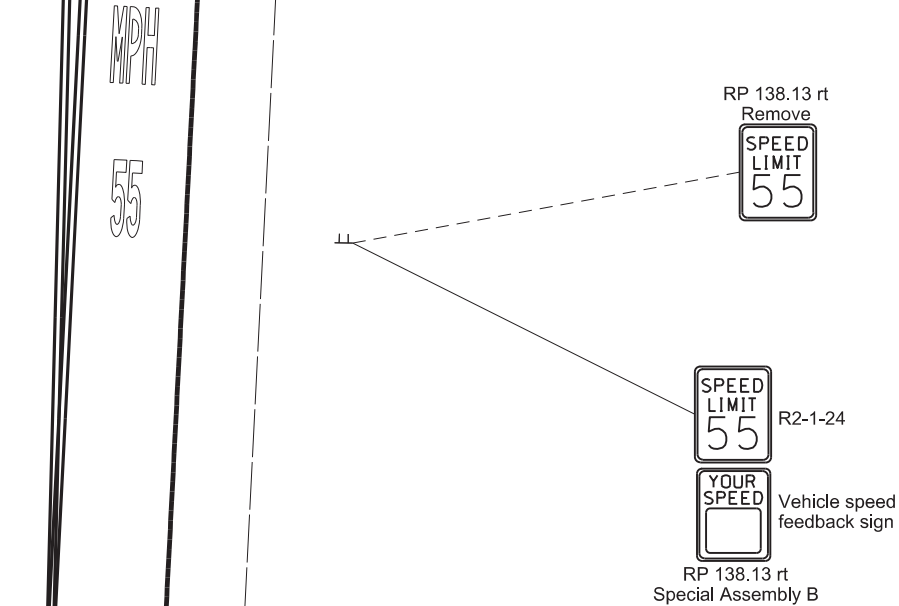


Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	28

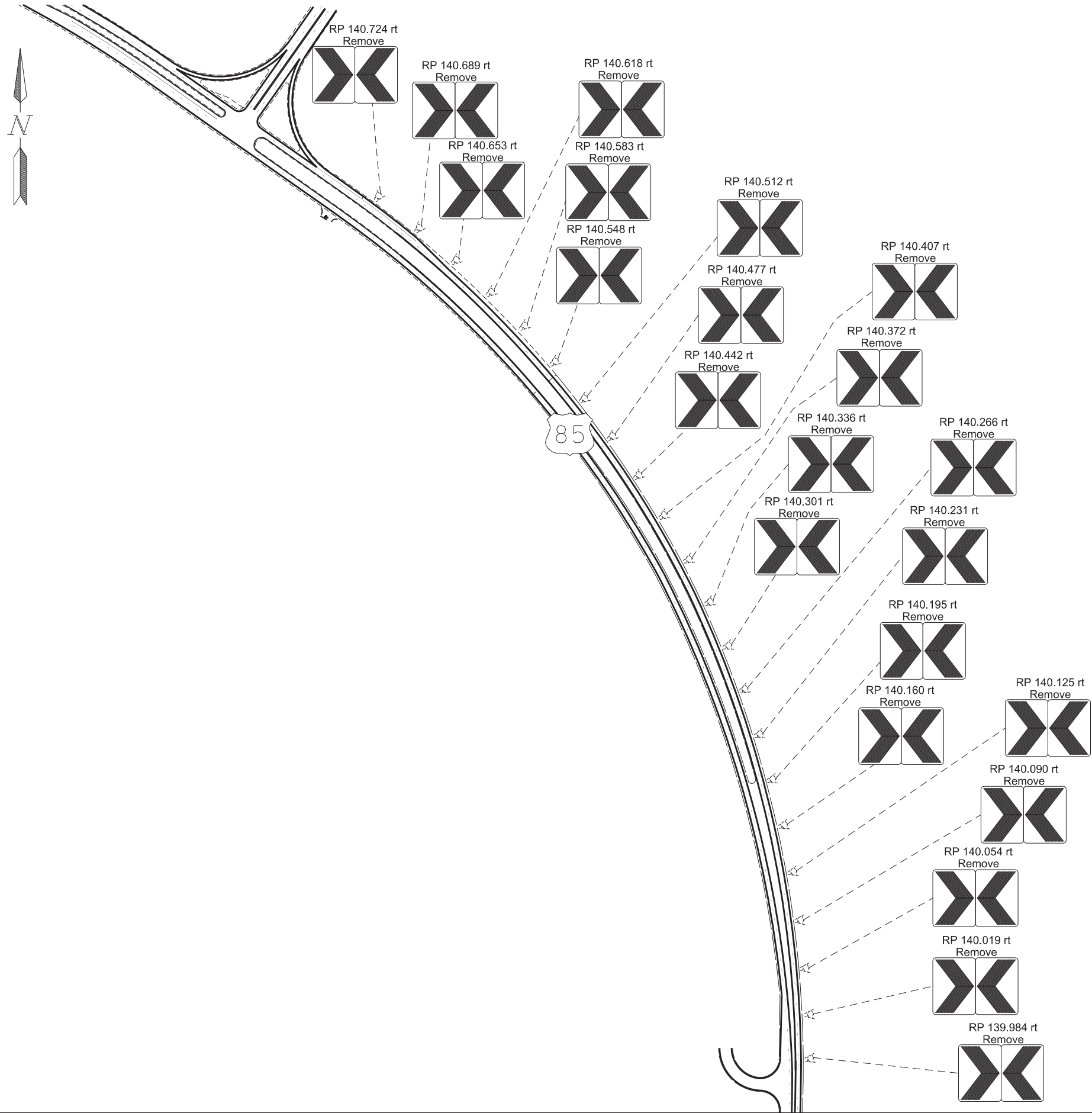
SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	55 MPH (1 EA at 31.8 SF)	SF	31.8



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	29

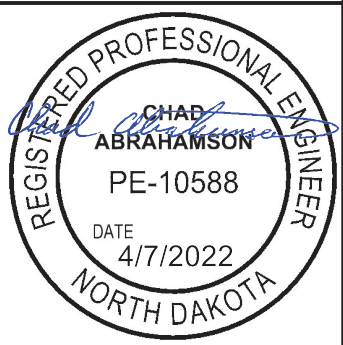
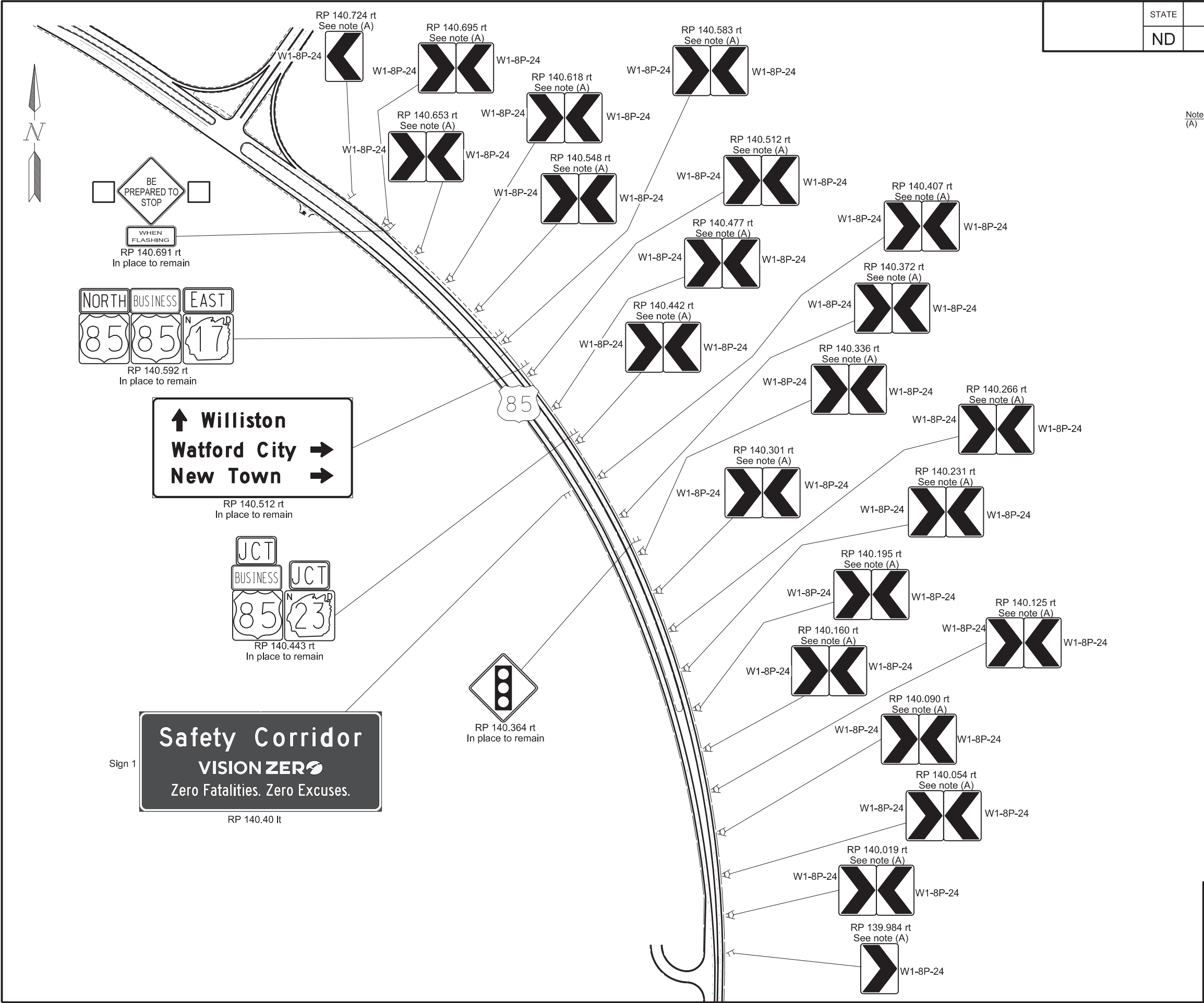


Sign Removal Layout

US 85, I-94 North to US 85B  
Safety Corridor

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	110	30

Note  
(A) Refer to Standard Drawing D-754-79 for mounting details.



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	31

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmnt Mk-Message(grooved)		
	55 MPH (2 EA at 31.8 SF)	SF	63.6



55 MPH  
55 MPH



RP 141.39 ft  
Remove



R2-1-36



Vehicle speed  
feedback sign

RP 141.39 ft  
Special Assembly C



Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	32

SPECCODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	206
	(2 EA at 103 SF)		



REDUCED  
SPEED  
AHEAD

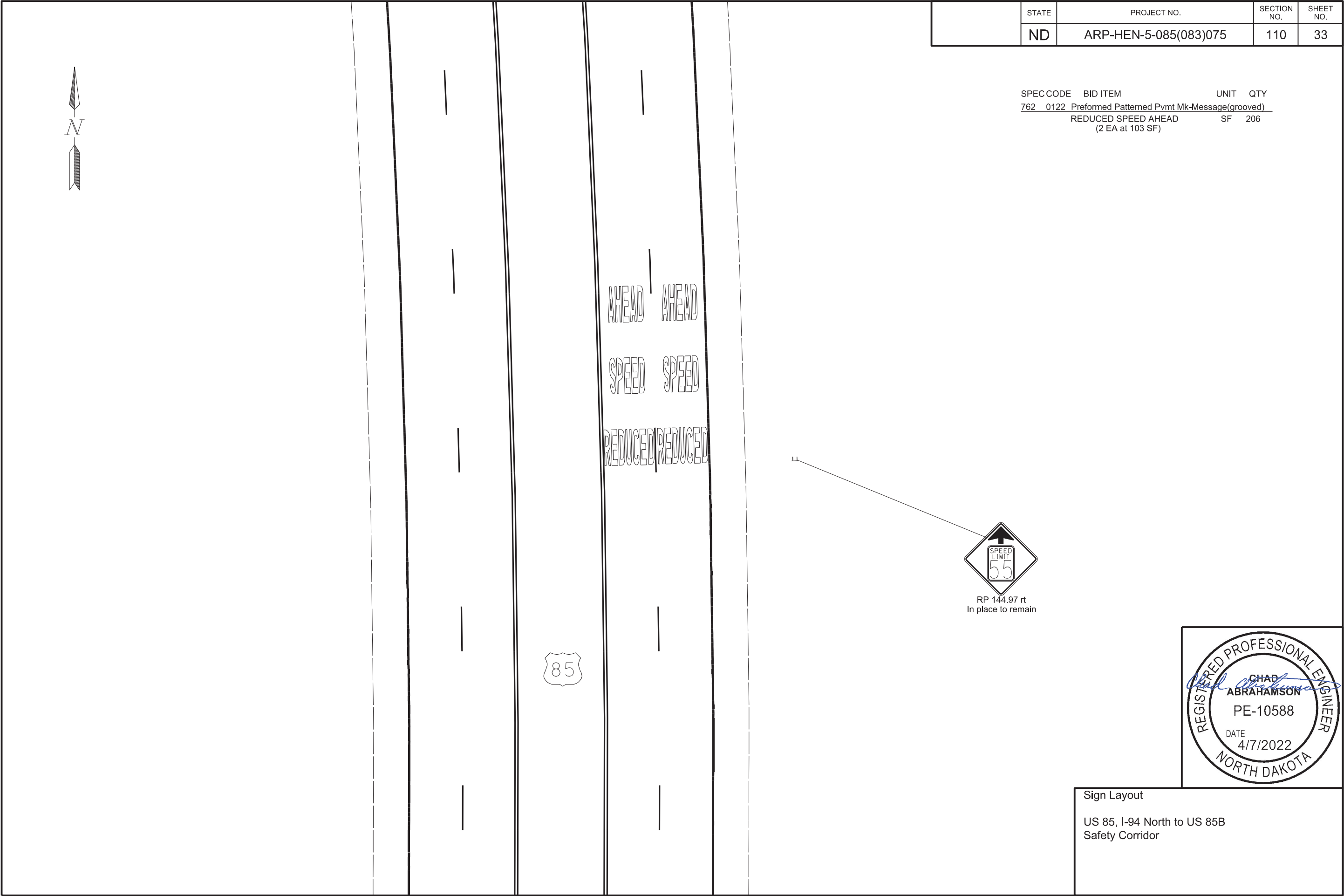


RP 141.58 ft  
In place to remain



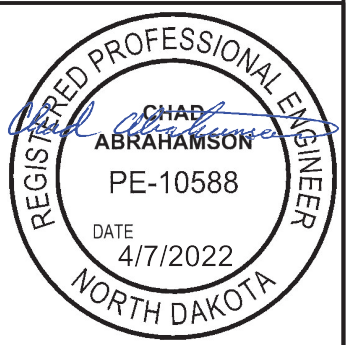
Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



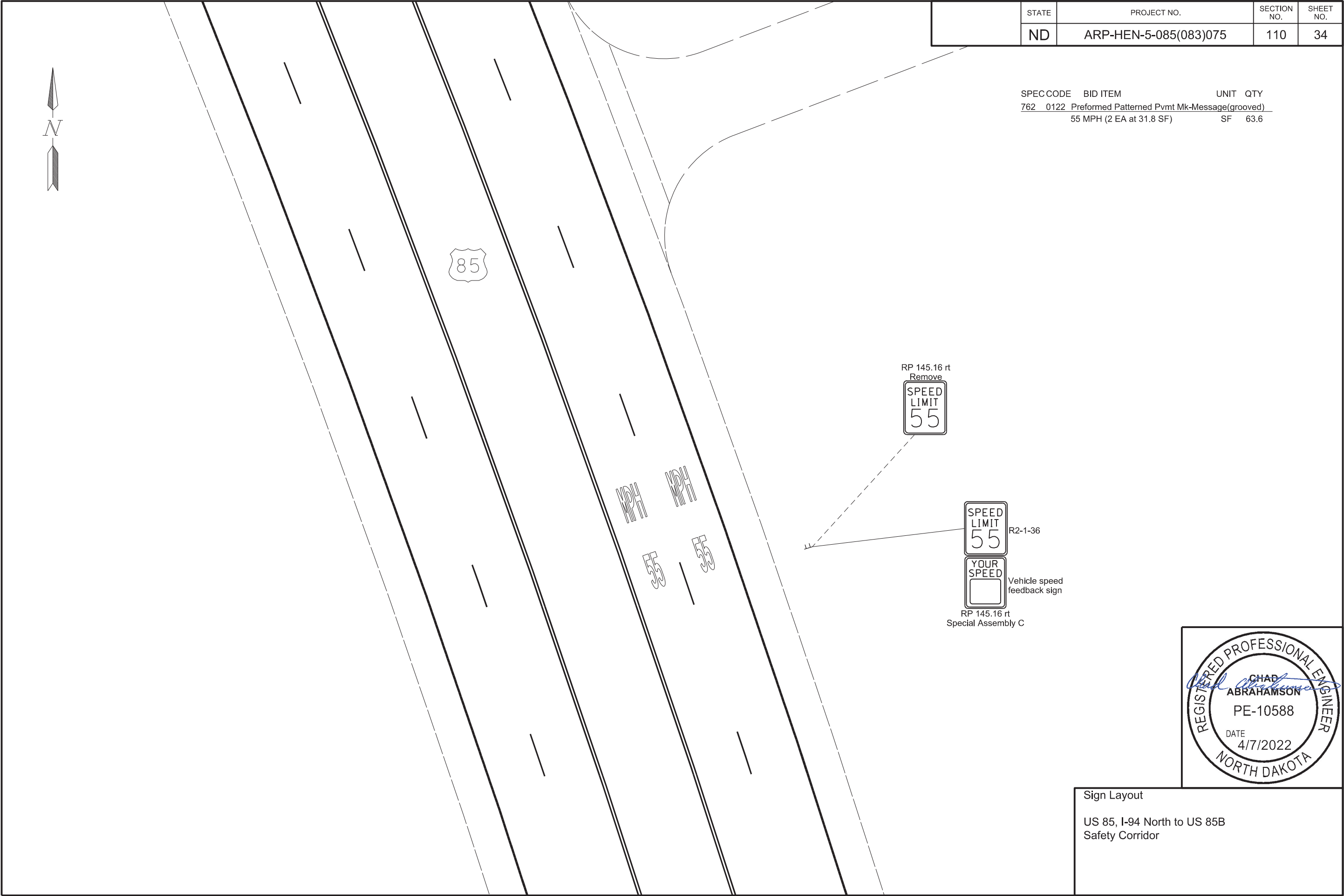
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	33

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	REDUCED SPEED AHEAD	SF	206
	(2 EA at 103 SF)		



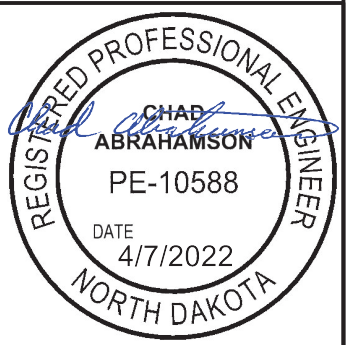
Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	34

SPEC CODE	BID ITEM	UNIT	QTY
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	55 MPH (2 EA at 31.8 SF)	SF	63.6



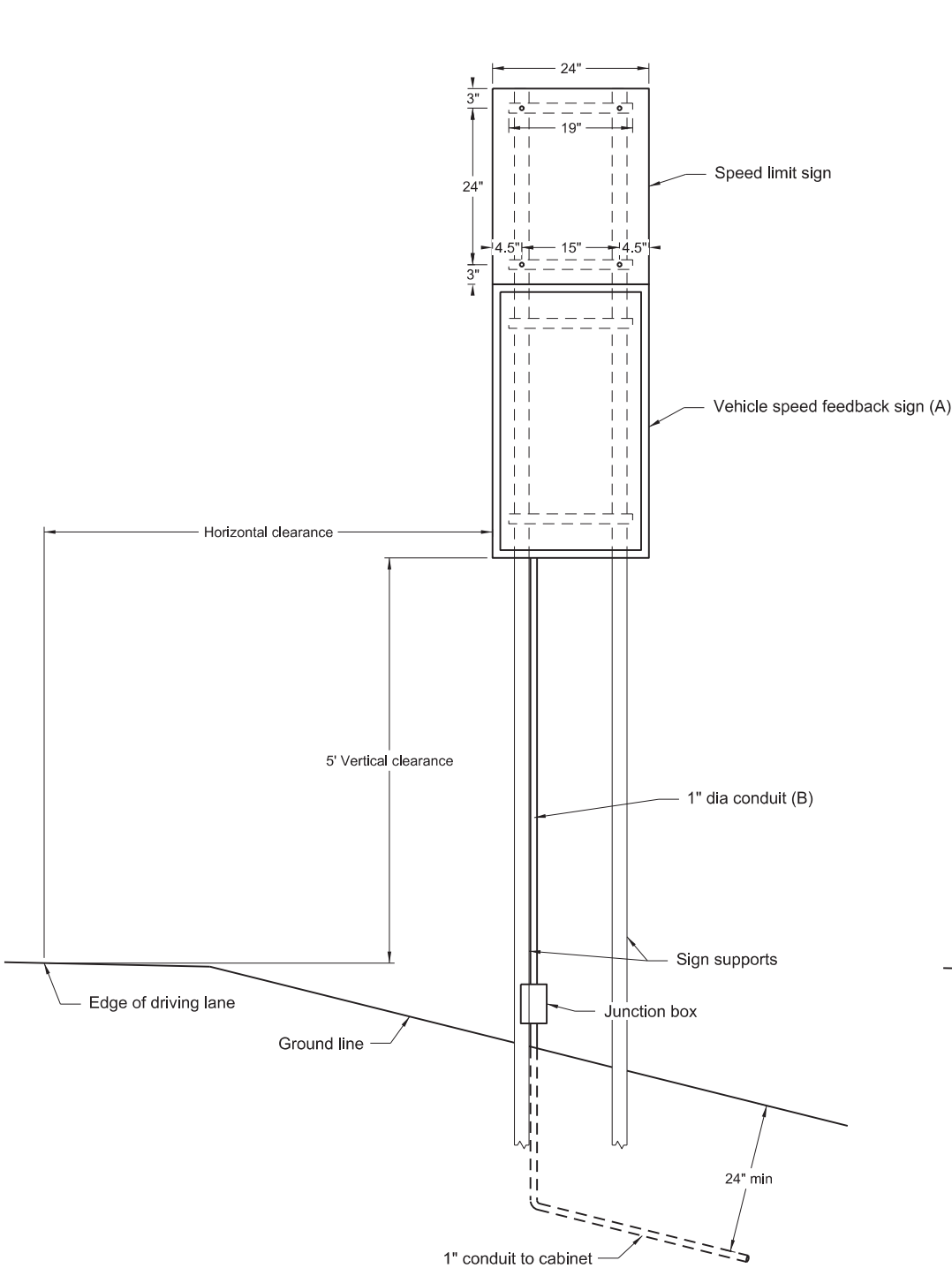


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	36

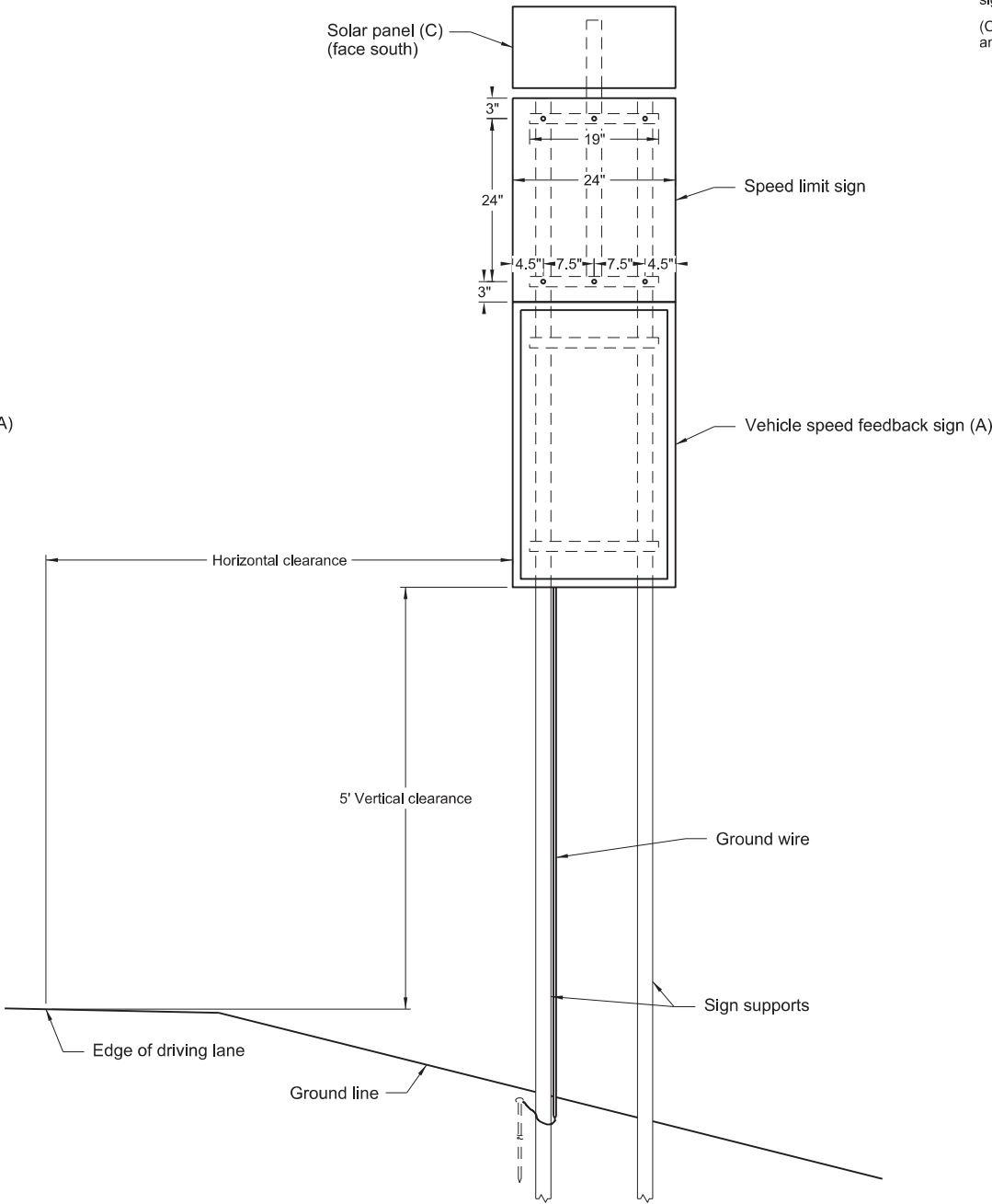
(A) Refer to manufacturer recommendations for mounting to sign supports.

(B) Conduit straps are required to securely attach the steel pipe to the sign supports and stringers.

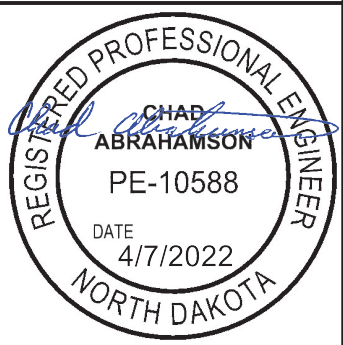
(C) Refer to manufacturer recommendations for solar panel mounting and orientation.



Special Assembly A  
AC Powered Vehicle Speed Feedback Sign  
RP 91.36 rt, RP 92.10 lt

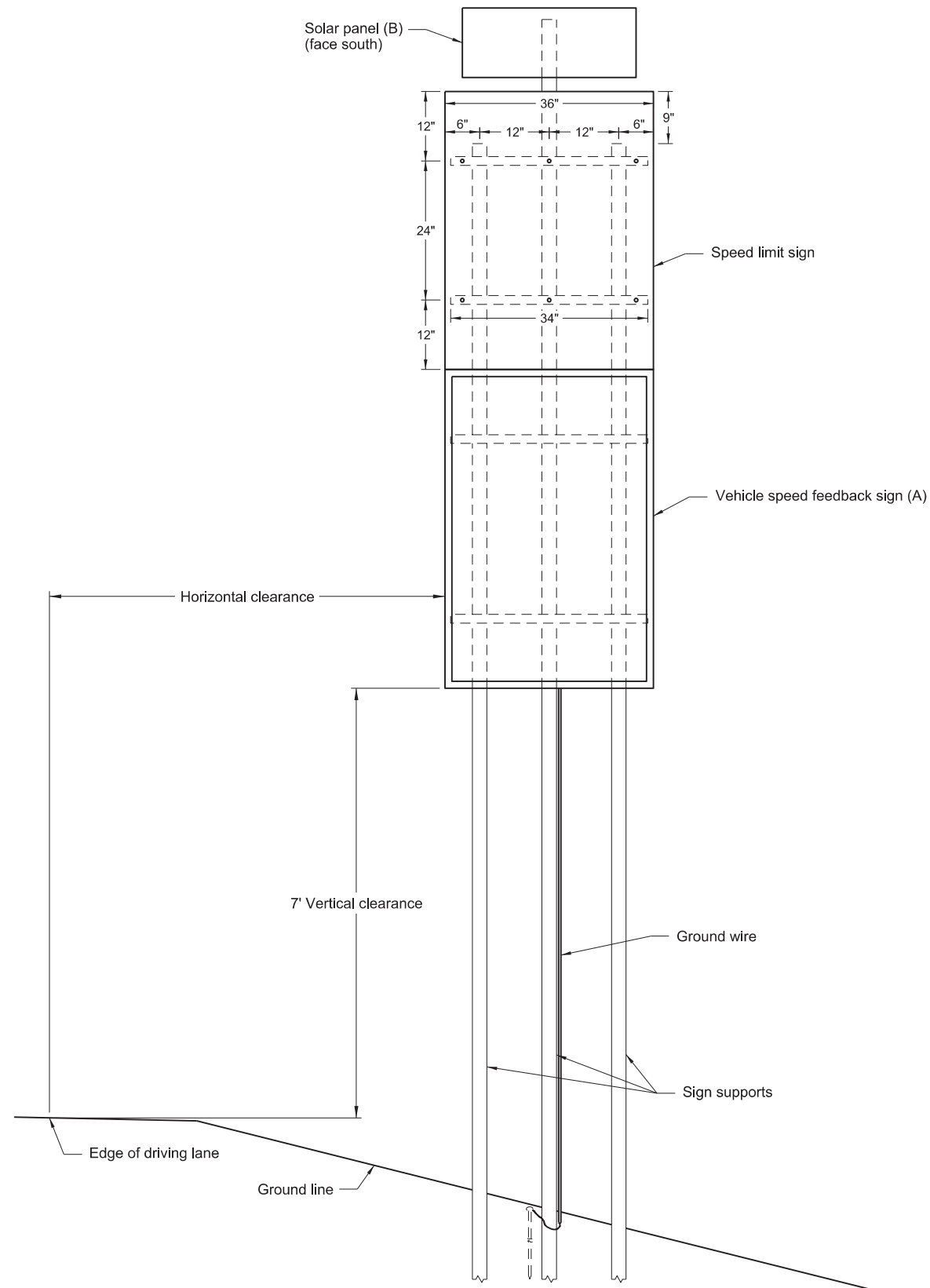


Special Assembly B  
Solar Powered Vehicle Speed Feedback Sign  
RP 75.95 lt, RP 76.44 lt, RP 138.13 rt



Special Assembly  
US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	37



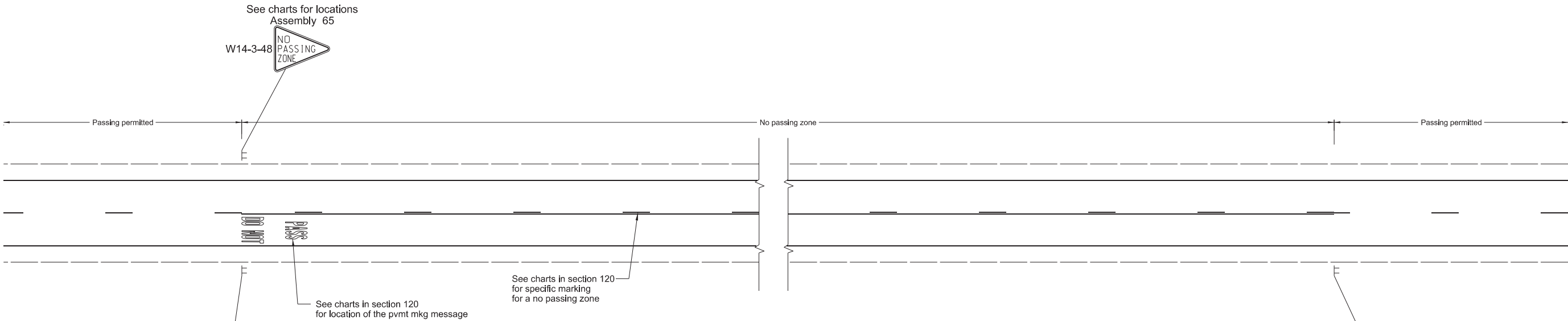
(A) Refer to manufacturer recommendations for mounting to sign supports.  
(B) Refer to manufacturer recommendations for solar panel mounting and orientation.



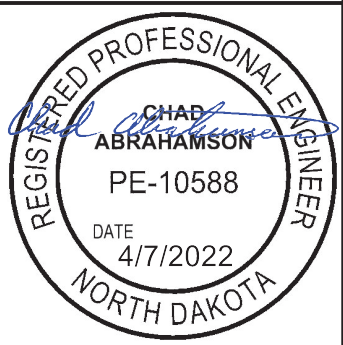
Special Assembly  
US 85, I-94 North to US 85B  
Safety Corridor

Special Assembly C  
Solar Powered Vehicle Speed Feedback Sign  
RP 141.39 lt, RP 145.16 rt

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	38



No Passing Zone Layout



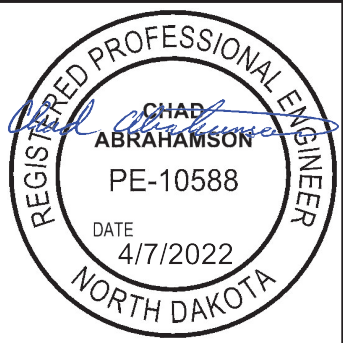
Signing Details

US 85, I-94 North to US 85B  
Safety Corridor

No Passing Zone Signs - Segment 1		
No Passing zone	Do Not Pass	Pass with Care
76.58 lt	76.58 rt	76.74 rt
76.96 rt	76.96 lt	
81.95 lt	81.95 rt	82.06 rt
82.25 rt	82.25 lt	82.12 lt
86.30 lt	86.30 rt	
89.24 lt	89.24 rt	
89.47 rt	89.47 lt	89.44 lt
89.89 lt	89.89 rt	
90.48 rt	90.48 lt	
91.09 lt	91.09 rt	91.16 rt
91.34 rt	91.34 lt	
92.40 rt	92.40 lt	91.56 lt
92.60 lt	92.60 rt	92.96 rt
93.22 rt	93.22 lt	92.92 lt
95.88 lt	95.88 rt	95.96 rt
96.23 rt	96.23 lt	96.09 lt
98.48 lt	98.48 rt	98.75 rt
98.96 rt	98.96 lt	98.74 lt
99.73 lt	99.73 rt	100.01 rt
100.26 rt	100.26 lt	99.94 lt
100.67 lt	100.67 rt	100.82 rt
101.02 rt	101.02 lt	100.89 lt
102.35 lt	102.35 rt	102.50 rt
102.71 rt	102.71 lt	102.49 lt
103.38 lt	103.38 rt	103.63 rt
103.90 rt	103.90 lt	103.59 lt
104.50 lt	104.50 rt	104.56 rt
104.78 rt	104.78 lt	104.71 lt
108.28 lt	108.28 rt	108.56 rt
108.79 rt	108.79 lt	108.47 lt
110.60 lt	110.60 rt	110.68 rt
110.91 rt	110.91 lt	110.81 lt

No Passing Zone Signs - Segment 2		
No Passing zone	Do Not Pass	Pass with Care
114.01 lt	114.01 rt	114.54 rt
114.72 rt	114.72 lt	114.59 lt
119.28 lt	119.28 rt	
120.82 lt	120.82 rt	121.18 rt
121.39 rt	121.39 lt	121.03 lt
121.68 lt	121.68 rt	122.14 rt
122.36 rt	122.36 lt	121.89 lt
123.62 rt	123.62 lt	123.44 lt

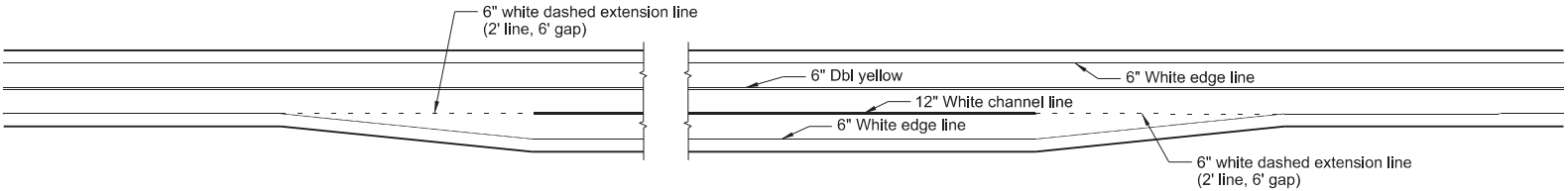
No Passing Zone Signs - Segment 3		
No Passing zone	Do Not Pass	Pass with Care
129.47 lt	129.47 rt	130.05 rt
130.25 rt	130.25 lt	130.04 lt
130.76 lt	130.76 rt	131.07 rt
131.28 rt	131.28 lt	130.98 lt
131.75 lt	131.75 rt	131.90 rt
132.11 rt	132.11 lt	131.96 lt
133.35 lt	133.35 rt	133.63 rt
133.76 rt	133.76 lt	133.57 lt
134.53 lt	134.53 rt	
134.94 rt	134.94 lt	134.75 lt
135.61 lt	135.61 rt	135.73 rt
135.94 rt	135.94 lt	
137.01 lt	137.01 rt	
137.32 lt	137.32 rt	137.38 rt



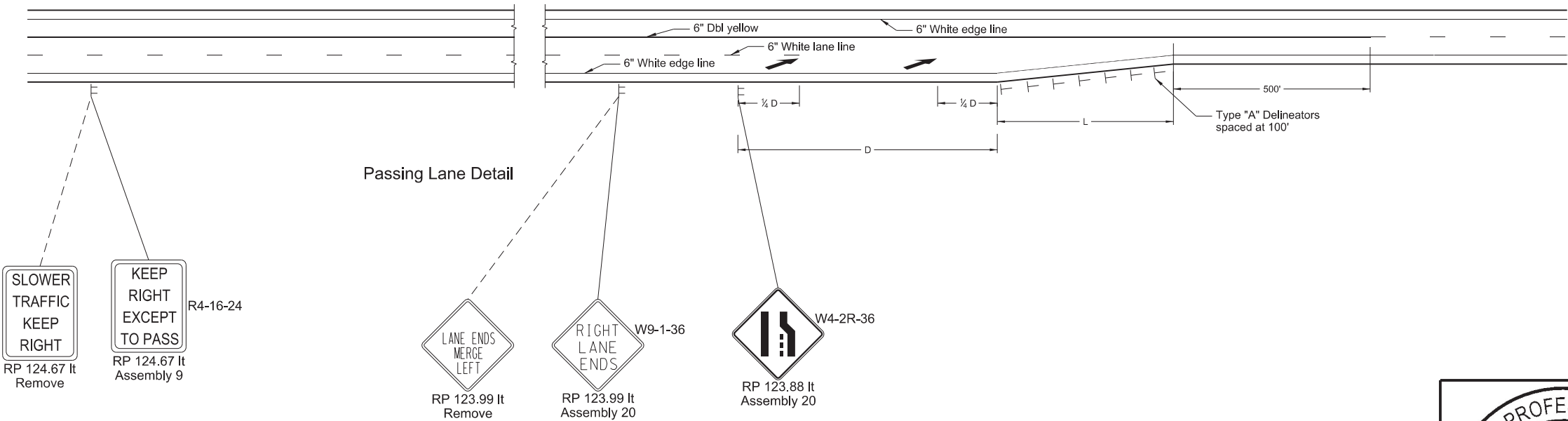
Signing Details

US 85, I-94 North to US 85B  
Safety Corridor

Passing Lane and Scenic Area - Segment 2								
	Begin RP	End RP	Direction	6" Dashed line (LF)	12" Channel line (LF)	6" Center line tape (LF)	Merge Arrows (EA)	Type A Delineators (EA)
Passing Lane	123.558	125.820	LT	222		2752	2	8
Scenic Area	123.532	123.837	RT	207	1061			
Scenic Area	124.703	125.019	RT	187	1082			



Scenic Turnout Detail



Passing Lane Detail

Distance Table		
Posted or 85th Percentile Speed	Distance "D" (ft)	Distance "L" (ft)
55	990	L = WS
65	1200	L = WS

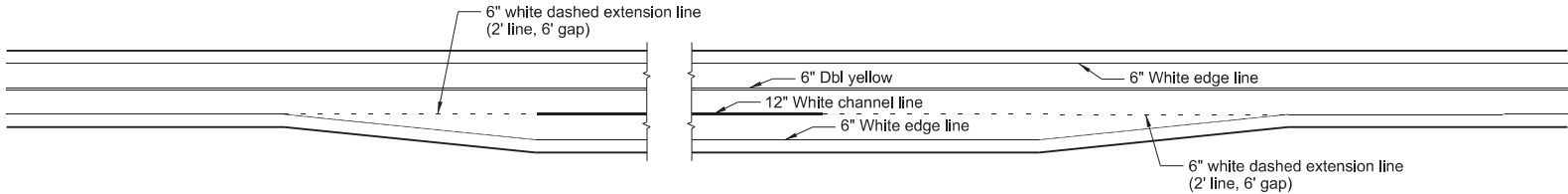
W = Width of Offset (ft)  
S = Posted Speed (mph)

SPEC CODE	BID ITEM	UNIT	QTY
754	0150 Delineators Type A white	EA	8
762	0122 Preformed Patterned Pvmt Mk-Message(grooved) Merge Arrow (2 EA at 41 SF)	SF	82
762	0157 Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved 6" white dashed line (2' line, 6' gap)	LF	616
762	0163 Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved 12" white channel line	LF	2143
762	1236 Plastic Pvmt Mk Film 6in Line-Wet Reflective-Grooved 6" white centerline (10' line, 30' gap)	LF	2752

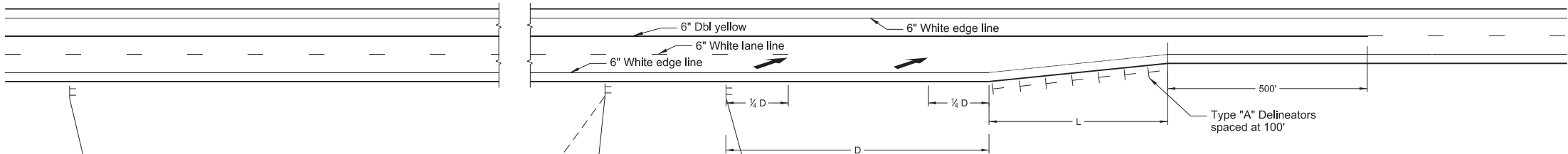


Sign Details  
US 85, I-94 North to US 85B  
Safety Corridor

Passing Lane and Scenic Area - Segment 3								
	Begin RP	End RP	Direction	6" Dashed line (LF)	12" Channel line (LF)	6" Center line tape (LF)	Merge Arrows (EA)	Type A Delineators (EA)
Passing Lane	127.277	129.190	RT			1881	2	8
Scenic Area	128.041	128.461	LT	498	612			



Scenic Turnout Detail



Passing Lane Detail



RP 127.22 rt  
Assembly 9



RP 128.38 rt  
Remove



RP 128.38 rt  
Assembly 20



RP 128.58 rt  
In place to remain

Distance Table		
Posted or 85th Percentile Speed	Distance "D" (ft)	Distance "L" (ft)
55	990	L = WS
65	1200	L = WS

W = Width of Offset (ft)  
S = Posted Speed (mph)

SPEC CODE	BID ITEM	UNIT	QTY
754	0150 Delineators Type A white	EA	8
762	0122 Preforemed Patterned Pvmt Mk-Message(grooved) Merge Arrow (2 EA at 41 SF)	SF	82
762	0157 Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved 6" white dashed line (2' line, 6' gap)	LF	498
762	0163 Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved 12" white channel line	LF	612
762	1236 Plastic Pvmt Mk Film 6in Line-Wet Reflective-Grooved 6" white centerline (10' line, 30' gap)	LF	1881



Sign Details  
US 85, I-94 North to US 85B  
Safety Corridor

Type A Delineators - Segment 1						
Location	Reference Point		Length (Ft)	Curve Radius (FT)	No. of Del. (B)	
	Begin	End			Left	Right
Tangent	76.861	81.322	23554		89	89
Curve	81.322	81.842	2746	4407	25	25
Tangent	81.842	82.209	1938		7	7
Curve	82.209	82.728	2740	4407	24	24
Tangent	82.728	93.471	56723		215	215
Curve	93.471	93.939	2471	4407	22	22
Tangent	93.939	95.140	6341		24	24
Curve	95.140	95.607	2463	4407	22	22
Tangent	95.607	102.127	34426		130	130
Curve	102.127	102.578	2379	4407	21	21
Tangent	102.578	105.239	14050		53	53
Curve	105.239	105.686	2360	4407	21	21
Tangent	105.686	107.655	10396		39	39
Curve	107.655	108.176	2752	4407	25	25
Tangent	108.176	109.867	8928		34	34
Curve	109.867	110.149	1488	5730	13	13
Tangent	110.149	111.116	5106		19	19
Curve	111.116	111.567	2383	4407	21	21
Tangent	111.567	112.790	6457		24	24
Totals					1661	

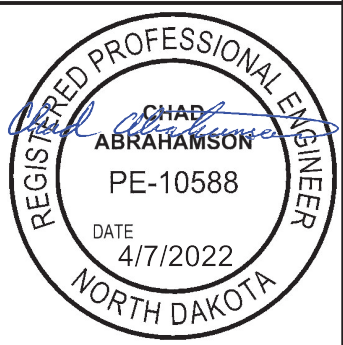
Type D Delineators - Segment 1	
Intersection	No. of Del.
35th St SW	4
34th St SW	4
33rd St SW	2
32nd St SW	4
31st St SW	4
30th St SW	4
29th St SW	4
28th St SW	4
Frank's Creek/27th St SW	4
26th St SW	4
South Ash Coule Rd	4
24th St SW	4
23rd St SW	4
22nd St SW	4
21st St SW	4
Blacktail Rd/20th St SW	4
19th St SW	4
18th St SW (South Approach)	4
18th St SW (North Approach)	2
16th St SW	2
15th St SW	2
Magpie Rd/14th St SW	4
Upper Magpie Rd/10th St SW	4
7th St SW	2
ND 200/5th St SW	8
East Beicegel Creek Rd	2
2nd St SW/Charlie Bob Creek	4
Totals	100

Guardrail Reflectorized Plates - Segment 1				
W-Beam Guardrail			New White	Remove (A)
begin RP	end RP	road side		
84.334	84.361	rt	18	10
84.336	84.378	lt	12	7
84.376	84.403	rt	12	10
84.388	84.429	lt	18	7
Totals			60	34

SPEC	CODE	BID ITEM	UNIT	QTY
754	0150	Delineators - Type A	EA	1661
754	0168	Delineators - Type D	EA	100
764	2097	Guardrail Reflectorized Plate	EA	60

(A) Removal of existing plates is included in the price bid for the new Guardrail Reflectorized Plates.

(B) Install new delineators at these locations.



Delineators

US 85, I-94 North to US 85B  
Safety Corridor

Type A Delineators - Segment 2										
Location	Reference Point		Length (Ft)	Curve Radius (FT)	No. of Del. (D)		Existing Del. (E)		New Chevrons	
	Begin	End			Left	Right	Left	Right	Left	Right
Curve	112.790	113.046	1353	4407	12	12				
Tangent	113.046	121.096	42504		161	161	3	5		
Curve	121.096	121.348	1331	1146		12	2		8	
Tangent	121.348	121.434	454		2	2	1			
Curve	121.434	121.611	935	1146	8		1	1		5
Tangent	121.611	121.893	1489		6	6	2	2		
Curve	121.893	122.104	1150	5730	10	10	2	2		
Tangent	122.104	122.659	2930		11	11	3	4		
Curve	122.659	122.723	442	1910	4	4	3	3		
Tangent	122.723	122.883	845		3	3		1		
Curve	122.883	122.980	512	5730	5	5	2	2		
Tangent	122.980	123.126	771		3	3	1	1		
Curve	123.126	123.415	1526	1910	14		3	3		9
Tangent	123.415	123.512	512		2	2		1		
Curve	123.512	123.746	1236	2524	11	11	4		9	
Curve	123.746	124.128	2017	2106	18	18	6	6		
Tangent	124.128	124.215	459		2	2	1	1		
Curve	124.215	124.385	898	1646	8	8	1	2		
Tangent	124.385	124.441	296		1	1				
Curve	124.441	124.544	544	2491	5	5	1	3		
Tangent	124.544	124.693	787		3	3		1		
Curve	124.693	125.052	1896	1146	17		3	4		9 (F)
Tangent	125.052	125.188	718		3	3				
Curve	125.188	125.380	1014	2491	9	9	4	5		
Tangent	125.380	125.996	3252		12	12	4	4		
Curve	125.996	126.248	1331	2865	6	6				
Tangent	126.248	126.700	2387		5	5				
Curve	126.700	126.834	707	2865	3	3				
Tangent	126.834	127.210	1985		4	4				
Totals					666		98			

Type D Delineators - Segment 2	
Intersection	No. of Del.
Museum Ave	2
Beicegel Creek Rd	2
Main St	2
Walker Ln	2
2nd St NW	2
3rd St NW	4
4th St NW	2
Lone Butte Rd/5th St NW	4
6th St NW	4
7th St NW	2
Summit Rd (South Approach)	2
Summit Rd (North Approach)	2
Forest Service (FS828)	2
Forest Service (FS842)	2
Long X Rd (South Approach)	2
Long X Rd (North Approach)	2
Scenic Drive Rd	2
Totals	40

SPEC	CODE	BID ITEM	UNIT	QTY
754	0150	Delineators - Type A	EA	666
754	0168	Delineators - Type D	EA	40
764	2097	Guardrail Reflectorized Plate	EA	34

Delineators on four lane curves will be placed straight across from each other according to the Spacing chart on the Delineator Curve Details sheet.

(A) Removal of existing plates is included in the price bid for the new Guardrail Reflectorized Plates.

(B) Bridge Rail Reflector Plates to be spaced approx. 200 ft starting at 215 ft from bridge end. Install the yellow color on both sides of the delineator and white color on one side facing traffic.

(C) These delineators will be installed on the bridge Jersey Barrier. This includes the left, right, and center barriers on the bridge. See notes for details.

(D) Install new delineators at these locations.

(E) Remove the existing delineators.

(F) Existing chevrons.

Guardrail Reflectorized Plates - Segment 2								
W-Beam Guardrail			Bridge Rail (B)			New White	New Yellow	Remove (A)
begin RP	end RP	road side	begin RP	end RP	road side			
126.544	126.575	rt				13		9
			126.575	126.732	(C)	6	3	
126.732	126.761	lt				12		9
Totals						31	3	18



Delineators  
  
US 85, I-94 North to US 85B  
Safety Corridor

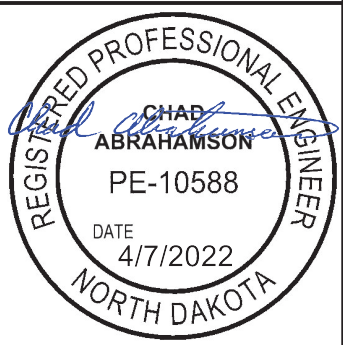
Type A Delineators - Segment 3										
Location	Reference Point		Length (Ft)	Curve Radius (FT)	No. of Del. (B)		Existing Del. (C)		New Chevrons	
	Begin	End			Left	Right	Left	Right	Left	Right
Tangent	127.210	127.436	1193		2	2				
Curve	127.436	127.537	533	1653	2					10
Tangent	127.537	127.679	750							
Curve	127.679	128.068	2054	2491	9	9				
Tangent	128.068	128.148	422		1	1				
Curve	128.152	128.570	2207	2503		10			12	
Tangent	128.570	131.558	15777		30	30		2		
Curve	131.558	131.966	2155	5730	10	10				
Tangent	131.966	139.500	39780		75	75	4	8		
Totals					266		14			

Type D Delineators - Segment 3	
Intersection	No. of Del.
Forest Service (FS852)	2
14th St NW	2
15th St NW	2
16th St NW	4
17th St NW	4
18th St NW (South Approach)	4
126th Ave NW	2
18th St NW (North Approach)	2
20th St NW	2
126 1/2 Ave NW	4
21st St NW	4
22nd St NW	4
Totals	36

SPEC CODE	BID ITEM	UNIT	QTY
754	0150 Delineators - Type A	EA	266
754	0168 Delineators - Type D	EA	36
764	2097 Guardrail Reflectorized Plate	EA	62

- (A) Removal of existing plates is included in the price bid for the new Guardrail Reflectorized Plates.
- (B) Install new delineators at these locations.
- (C) Remove the existing delineators and posts.

Guardrail Reflectorized Plates - Segment 3				
W-Beam Guardrail			New White	Remove (A)
begin RP	end RP	road side		
136.64	136.67	rt	18	9
136.64	136.68	lt	13	5
136.69	136.72	rt	18	5
136.70	136.74	lt	13	9
Totals			62	28



Delineators

US 85, I-94 North to US 85B Safety Corridor

Type A Delineators - Segment 4										
Location	Reference Point		Length (Ft)	Curve Radius (FT)	Existing Del. (A)		Existing Del. (B)		Existing Chevrons	
	Begin	End			Left	Right	Left	Right	Left	Right
Tangent	139.500	139.979	2529		6	6				
Curve	139.979	140.758	4113	4230	18	18				22 (C)
Curve	140.758	141.374	3252	4230	11	11				
Tangent	141.374	142.751	7271		14	14				
Curve	142.751	143.610	4536	3440	17	17	35	34		
Tangent	143.610	144.177	2994		3	3				
Curve	144.177	144.688	2698	6770	12	12				
Tangent	144.688	144.849	850		2	2				
Curve	144.849	145.544	3670	3220	14	14	28	26		
Tangent	145.544	145.659	607		1	1				
Totals					196		123			

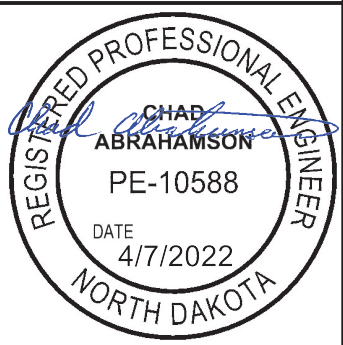
SPEC	CODE	BID ITEM	UNIT	QTY
754	0150	Delineators - Type A	EA	196

Delineators on four lane curves will be placed straight across from each other according to the Spacing chart on the Delineator Curve Details sheet.

(A) Install new reflectors on existing delineator posts at these locations.

(B) Remove the existing delineators.

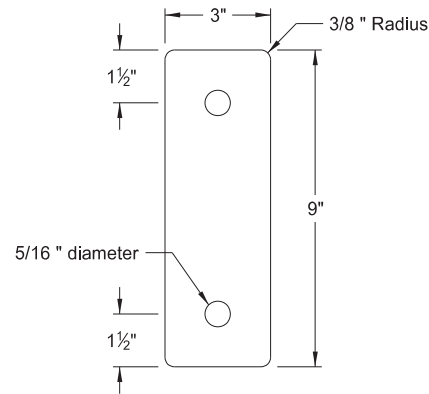
(C) These chevrons will be removed. See plan sheet.



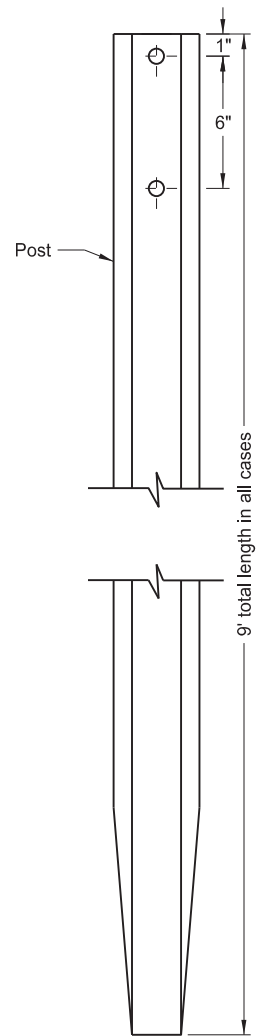
Delineators

US 85, I-94 North to US 85B  
Safety Corridor

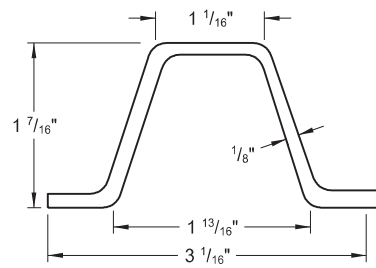
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	110	46



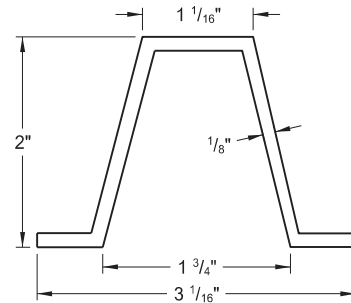
Reflector Detail  
(Type A Delineator)



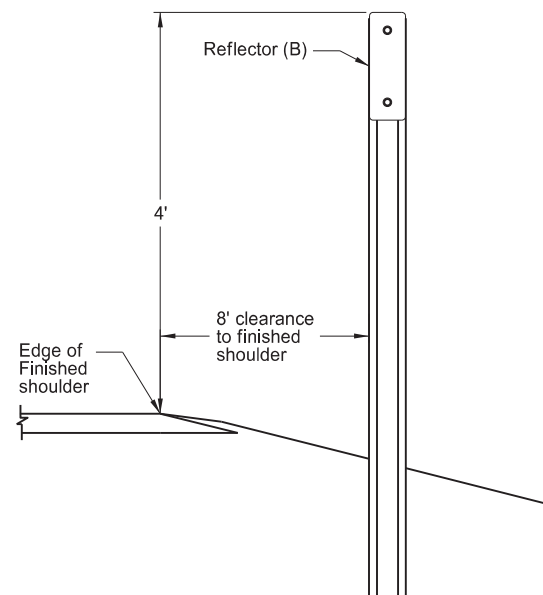
U-type Post  
(Type A Delineator)



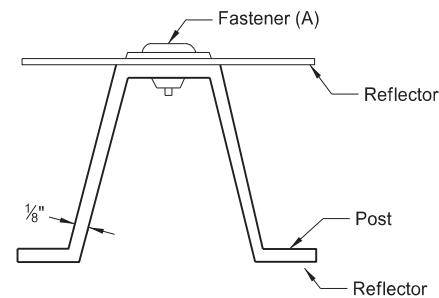
Steel Post Detail  
Approx. 2.0 lbs/ft



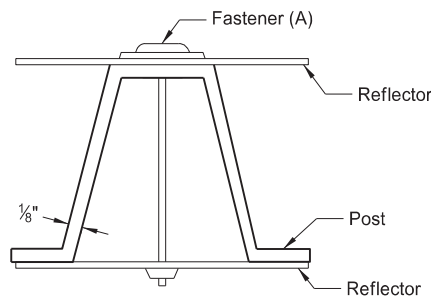
Aluminum Post Detail  
Approx. 0.88 lbs/ft



Installation  
(Type A Delineator)



Delineator Attachment Detail  
(Divided Highway)



Delineator Attachment Detail  
(Two-lane, Two-way Highway)

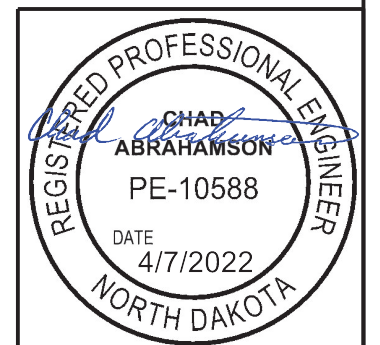
## Delineator Details

Installation: Install posts along the shoulder line unless shown otherwise on the plans.

Reflectors: Use Reflectors the same color as the adjacent pavement marking.  
Use 0.080 inch minimum thickness sign backing material.

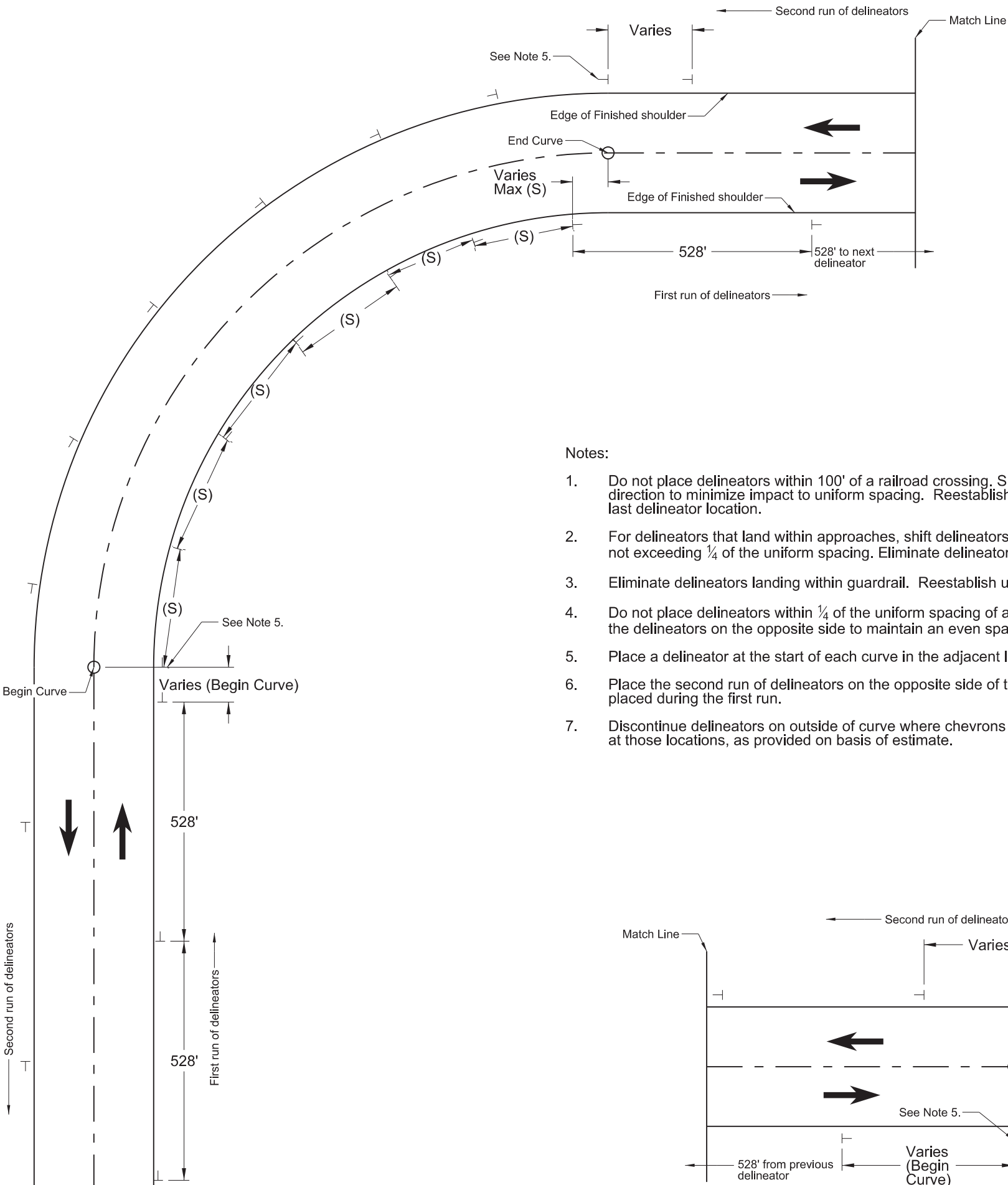
- (A) Use fasteners that are a minimum 1/4" diameter. Use double headed rivet or other non-rust vandal resistant fasteners.
- (B) Two-Lane, Two-Way Highway - Mount reflectors back to back at an angle of 90° away from oncoming traffic.

Divided Highway - Mount reflector facing traffic at an approximate angle of 93° away from oncoming traffic.



Delineator Detail

US 85, I-94 North to US 85B  
Safety Corridor



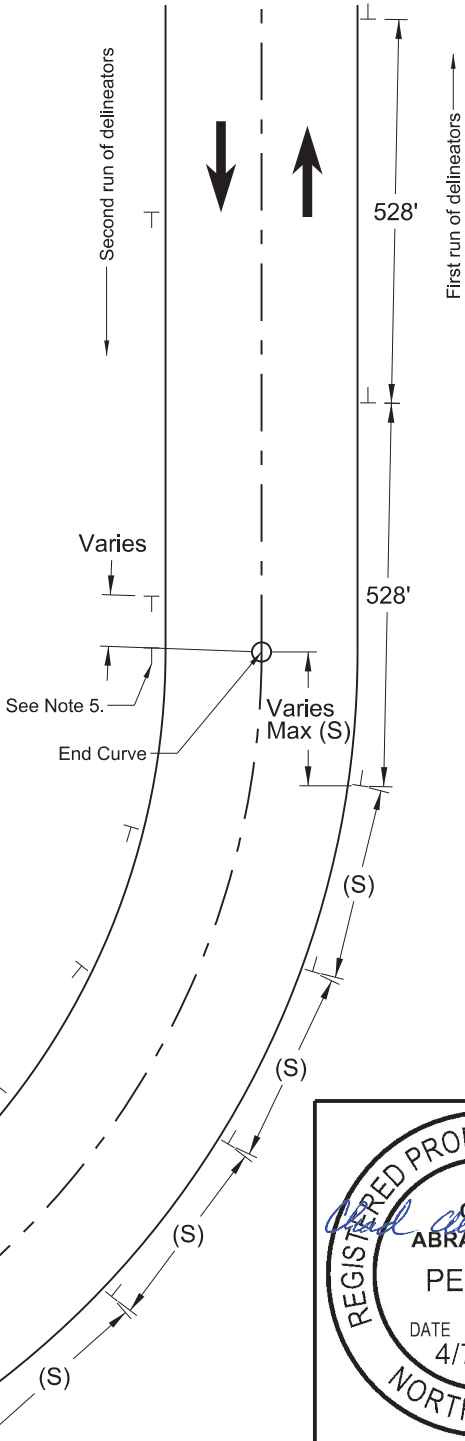
Spacing:

Curve Radius	Spacing (S) on Center
$R > 11,500'$	528'
$11,500' < R > 1,200'$	264'
$1,200' < R$	See table below

Radius (R) of Curve	Approx. Spacing (S) on Curve
$1,200' < R > 1,000'$	90'
$1,000' < R > 800'$	80'
$800' < R > 500'$	65'
$500' < R > 300'$	50'
$300' < R > 180'$	35'
$180' < R > 50'$	20'

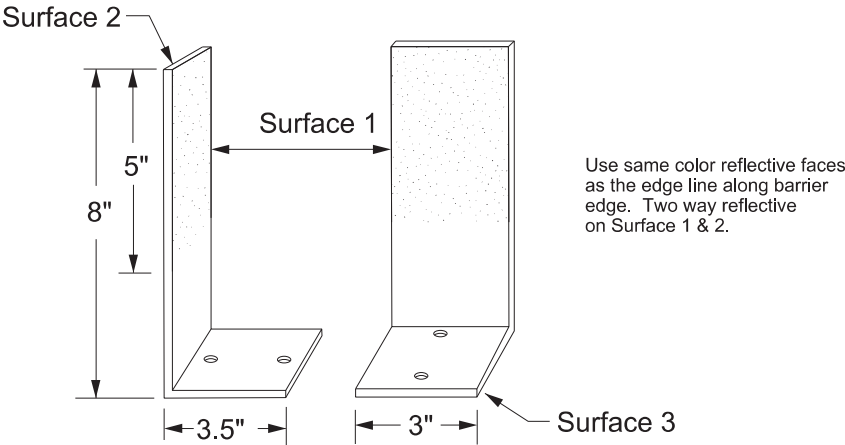
Notes:

- Do not place delineators within 100' of a railroad crossing. Shift delineators in either direction to minimize impact to uniform spacing. Reestablish uniform spacing based on the last delineator location.
- For delineators that land within approaches, shift delineators in either direction a distance not exceeding  $\frac{1}{4}$  of the uniform spacing. Eliminate delineators that still fall within approaches.
- Eliminate delineators landing within guardrail. Reestablish uniform spacing based on last delineator.
- Do not place delineators within  $\frac{1}{4}$  of the uniform spacing of a reference point marker. Adjust the delineators on the opposite side to maintain an even spacing between opposing sides.
- Place a delineator at the start of each curve in the adjacent lane's direction of travel.
- Place the second run of delineators on the opposite side of the road midpoint between delineators placed during the first run.
- Discontinue delineators on outside of curve where chevrons exist. Place delineators on inside of curve, at those locations, as provided on basis of estimate.



Delineator Curve Details

US 85, I-94 North to US 85B  
Safety Corridor



Barrier Marker Detail

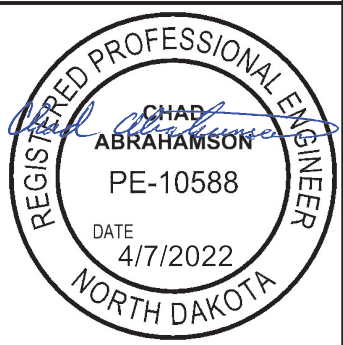
**Marker Body**  
Use high impact, weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	—
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI ¼" @ 73°F	8,000	D790
Flexural modulus, PSI ¼" @ 73°F	300,000	D790
Elongation @ yield	30%	D638

**Reflective Tape**  
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

**Adhesive**  
Use factory applied solid butyl rubber 1#8" thick, 2" wide on 21#4" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.



Bridge Rail Mounted Delineator Details

US 85, I-94 North to US 85B  
Safety Corridor

Turn Lanes - Segment 1										
start RP	end RP	Dir	Right Arrow (EA)	Left Arrow (EA)	6" Dbl Yellow (LF)		12" White Channel (LF)	6" Yellow Diagonal (LF)	6" Dashed line (LF)	Rumble Strips (LF)
					1 line	2 lines				
75.861	112.880	marking only				20064				
76.233	76.328	NB RT	3		500	1360	370	60	100	
76.362	76.601	SB LT		3	1320	2000	660		70	
77.099	77.331	NB LT		3	1320	2200	660		70	1774
		NB RT	3			560		100		
77.336	77.597	SB RT	3				560		70	1932
		SB LT		3	1320	2200	660		100	
79.107	79.343	NB LT		3	1320	2200	660		70	1885
		NB RT	3			560		100		
79.359	79.625	SB RT	3				640		70	2228
		SB LT		3	1360	2000	680		100	
80.087	80.341	NB LT		3	1360	2000	680		70	1827
		NB RT	3			580		100		
80.375	80.623	SB RT	3				640		70	1848
		SB LT		3	1400	2200	700		100	
81.274	81.520	NB LT		3	1440	1650	720		70	1684
		NB RT	3			620		100		
81.564	81.809	SB RT	3				540		70	1779
		SB LT		3	1280	2200	640		100	
84.372	84.502	NB RT	3		960	1400	480	60	100	1468
84.632	84.732	NB LT		3	1000		500		70	1167
84.512	84.632	SB LT		3	960		480		70	924
84.742	84.908	SB RT	3		1000	1800	500	60	100	
86.491	86.742	NB LT		3	1280	1700	640		70	1827
		NB RT	3			530		100		
86.738	87.006	SB RT	3				600		70	1890
		SB LT		3	1320	2000	660		100	
88.475	88.725	NB LT		3	1320	2000	660		70	1764
		NB RT	3			580		100		
88.740	88.994	SB RT	3				580		70	1896
		SB LT		3	1320	2200	660		100	
89.481	89.727	NB LT		3	1320	2000	660		70	1769
89.742	89.893	SB RT	3			1500	580	60	100	961
90.486	90.729	NB LT		3	1360	1800	680		70	1779
		NB RT	3			580		100		
90.745	90.983	SB RT	3				600		70	1711
		SB LT		3	1360	2100	680		100	
96.793	97.016	NB LT		3	920	2600	460		70	1874
97.046	97.306	SB RT	3		800	4300	400	60	100	2165
107.356	107.485	NB RT	3		1000	2600	500	60	100	1135
107.510	107.659	NB RT	3		1000	500	500	60	70	924
		SB LT		3	1320		660		100	
107.670	108.038	SB LT		3	2400	2000	1200		70	2313
111.498	111.733	NB LT		3	1360	2100	680		70	1822
		NB RT	3			560		100		
111.758	112.064	SB RT	3				500		70	1864
		SB LT		3	1400	2100	700		100	
112.064	112.357	NB LT		3	1400	2000	700		70	2001
112.368	112.577	SB RT	3		1080	1500	540	60	100	940
112.881		NB LT		3	1320	2000	660		70	1309
Totals			72	75	120094		29840	480	4150	48460

No Passing Zone - Segment 1				
Location			6" yellow solid-skip line (LF)	
RP start	RP end	direction	NB passing restricted	SB passing restricted
76.58	76.74	NB	1056	
76.75	76.96	SB		1386
81.95	82.06	NB	726	
82.12	82.25	SB		858
86.30	86.47	NB	1123	
89.24	89.40	NB	1056	
89.44	89.47	SB		198
89.89	90.17	NB	1848	
90.30	90.48	SB		1188
91.09	91.12	NB	198	
91.16	91.34	SB		1188
92.20	92.40	SB		1320
92.60	92.92	NB	2113	
92.96	93.22	SB		1716
95.88	95.96	NB	528	
96.09	96.23	SB		924
98.48	98.74	NB	1716	
98.75	98.96	SB		1386
99.73	99.95	NB	1453	
100.01	100.26	SB		1650
100.67	100.82	NB	990	
100.89	101.02	SB		858
102.35	102.50	NB	990	
102.49	102.71	SB		1453
103.38	103.59	NB	1386	
103.63	103.90	SB		1781
104.50	104.56	NB	396	
104.71	104.78	SB		463
108.28	108.48	NB	1320	
108.56	108.79	SB		1518
110.60	110.68	NB	528	
110.81	110.91	SB		660
Totals			35969	

No Passing Zone - Segment 1		
Location		DO NOT PASS (EA)
76.58	NB	1
76.96	SB	1
81.95	NB	1
82.25	SB	1
86.30	NB	1
89.24	NB	1
89.47	SB	1
89.89	NB	1
90.48	SB	1
91.09	NB	1
91.34	SB	1
92.40	SB	1
92.60	NB	1
93.22	SB	1
95.88	NB	1
96.23	SB	1
98.48	NB	1
98.96	SB	1
99.73	NB	1
100.26	SB	1
100.67	NB	1
101.02	SB	1
102.35	NB	1
102.71	SB	1
103.38	NB	1
103.90	SB	1
104.50	NB	1
104.78	SB	1
108.28	NB	1
108.79	SB	1
110.60	NB	1
110.91	SB	1
Total		32

SPEC	CODE	BID ITEM	UNIT	QTY
704	1500	Obliteration of Pvmt Mkg		
		4" yellow centerline	SF	9833
		4" yellow solid-skip line	SF	11990
		4" double yellow line	SF	40031
		Total	SF	61854 (A)

760	0007	Rumble Strips - Asphalt Centerline		
			MILE	9.2 (C)

762	0122	Preformed Patterned Pvmt Mk-Message(grooved)		
		Left Arrow (75 EA at 16 SF)	SF	1200
		Right Arrow (72 EA at 16 SF)	SF	1152
		DO NOT PASS (32 EA at 52 SF)	SF	1664
		Total	SF	4016

762	0156	Epoxy Pvmt Mk 6in Line-Wet Reflective		
		6" yellow centerline (10' line, 30' gap)	LF	29498 (A)
		6" yellow solid-skip line (10' line, 30' gap, 6" between)	LF	35969
		6" double yellow barrier line (6" between)	LF	120094
		Total	LF	185561

762	0157	Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved		
		6" white dashed line (2' line, 6' gap)	LF	4150 (B)
		6" yellow diagonal line (45 deg, 5' spacing)	LF	480
		6" white edge line	LF	390921 (A)
		Total	LF	395551

762	0163	Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved		
		12" white channel line	LF	29840

(A) These quantities are not in the charts. They were calculated using the road lengths.

(B) These dashed extension lines are for the entrance to turn lanes to connect the channel line to the edge line.

(C) Install rumble strips in the locations shown according to standard drawing D-760-3.



Pavement Marking Details

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	120	2

Turn Lanes - Segment 2										
start RP	end RP	Dir	Right Arrow (EA)	Left Arrow (EA)	6" Dbl Yellow (LF)		12" White Channel (LF)	6" Yellow Diagonal (LF)	6" Dashed line (LF)	Rumble Strips (LF)
					1 line	2 lines				
112.880	127.210	marking only				44035				
112.903	113.067	SB RT	3		1280	1800	640	60	100	803
119.499	119.883	NB LT		3	1360	2000	680		70	1748
		NB RT	3				540		100	
119.917	120.157	SB RT	3				560		70	1811
		SB LT		3	1360	2000	680		100	
Totals			9	6	53835		3100	60	440	4362

No Passing Zone - Segment 2					
Location			6" yellow solid-skip line (LF)		
RP start	RP end	direction	NB passing restricted	SB passing restricted	
114.01	114.53	NB	3433		
114.59	114.72	SB		858	
119.28	119.49	NB	1386		
120.82	121.02	NB	1320		
121.18	121.39	SB		1386	
121.68	121.88	NB	1320		
122.14	122.36	SB		1453	
123.44	123.62	SB		1188	
Totals			12343		

No Passing Zone - Segment 2		
Location		DO NOT PASS (EA)
114.01	NB	1
114.72	SB	1
119.28	NB	1
121.39	SB	1
121.68	NB	1
122.36	SB	1
123.62	SB	1
Total		8

SPEC CODE	BID ITEM	UNIT	QTY
704 1500	Obliteration of Pvmt Mkg		
	4" yellow centerline	SF	1477
	4" yellow solid-skip line	SF	4114
	4" double yellow line	SF	17945
	Total	SF	23537 (A)
760 0007	Rumble Strips - Asphalt Centerline		
	MILE		.8 (C)
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	Left Arrow (6 EA at 16 SF)	SF	96
	Right Arrow (9 EA at 16 SF)	SF	144
	DO NOT PASS (8 EA at 52 SF)	SF	416
	Total	SF	656
762 0156	Epoxy Pvmt Mk 6in Line-Wet Reflective		
	6" yellow centerline (10' line, 30' gap)	LF	4432 (A)
	6" yellow solid-skip line (10' line, 30' gap, 6" between)	LF	12343
	6" double yellow barrier line (6" between)	LF	53835
	Total	LF	70610
762 0157	Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved		
	6" white dashed line (2' line, 6' gap)	LF	440 (B)
	6" yellow diagonal line (45 deg, 5' spacing)	LF	60
	6" white edge line	LF	151325 (A)
	Total	LF	151825
762 0163	Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved		
	12" white channel line	EA	3100

(A) These quantities are not in the charts. They were calculated using the road lengths.

(B) These dashed extension lines are for the entrance to turn lanes to connect the channel line to the edge line.

(C) Install rumble strips in the locations shown according to standard drawing D-760-3.



Pavement Marking Details

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	120	3

Turn Lanes - Segment 3										
start RP	end RP	Dir	Right Arrow (EA)	Left Arrow (EA)	6" Dbl Yellow (LF)		12" White Channel (LF)	6" Yellow Diagonal (LF)	6" Dashed line (LF)	Rumble Strips (LF)
					1 line	2 lines				
127.210	139.500	marking only			49262					
129.212	129.446	NB RT	3		1080		540		100	
134.942	135.421	SB LT		3	1360	6800	680	60	70	4298
135.995	136.447	SB LT		3	1360	6300	680	60	70	4002
136.691	137.016	SB LT		3	1320	3500	660	60	70	2830
137.392	137.638	NB LT		3	1360	2200	680		70	1874
137.653	137.793	SB RT	3		1120	2200	560	60	100	1061
139.249	139.438	NB LT		3	1680		840		70	150
		NB RT	3			600		100		
Totals			9	15	79542		5240	240	650	14215

No Passing Zone - Segment 3					
Location			6" yellow solid-skip line (LF)		
RP start	RP end	direction	NB passing restricted	SB passing restricted	
129.47	130.04	NB	3763		
130.04	130.25	SB		1386	
130.76	130.97	NB	1386		
131.07	131.28	SB		1386	
131.75	131.90	NB	990		
131.96	132.11	SB		990	
133.35	133.56	NB	1386		
133.63	133.76	SB		858	
134.53	134.74	NB	1386		
134.76	134.94	SB		1188	
135.61	135.73	NB	793		
135.81	135.94	SB		858	
137.01	137.18	NB	1123		
137.32	137.38	NB	396		
137.79	137.94	NB	990		
Totals			18878		

No Passing Zone - Segment 3		
Location		DO NOT PASS (EA)
129.47	NB	1
130.25	SB	1
130.76	NB	1
131.28	SB	1
131.75	NB	1
132.11	SB	1
133.35	NB	1
133.76	SB	1
134.53	NB	1
134.94	SB	1
135.61	NB	1
135.94	SB	1
137.01	NB	1
137.32	NB	1
137.79	NB	1
Total		15

SPEC CODE	BID ITEM	UNIT	QTY
704 1500	Obliteration of Pvmt Mkg		
	4" yellow centerline	SF	1872
	4" yellow solid-skip line	SF	6293
	4" double yellow line	SF	26514
	Total	SF	34679 (A)
760 0007	Rumble Strips - Asphalt Centerline		
		MILE	2.7 (C)
762 0122	Preformed Patterned Pvmt Mk-Message(grooved)		
	Left Arrow (15 EA at 16 SF)	SF	240
	Right Arrow (9 EA at 16 SF)	SF	144
	DO NOT PASS (15 EA at 52 SF)	SF	780
	Total	SF	1164
762 0156	Epoxy Pvmt Mk 6in Line-Wet Reflective		
	6" yellow centerline (10' line, 30' gap)	LF	5616 (A)
	6" yellow solid-skip line (10' line, 30' gap, 6" between)	LF	18878
	6" double yellow barrier line (6" between)	LF	79542
	Total	LF	104036
762 0157	Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved		
	6" white dashed line (2' line, 6' gap)	LF	650 (B)
	6" yellow diagonal line (45 deg, 5' spacing)	LF	240
	6" white edge line	LF	129782 (A)
	Total	LF	130672
762 0163	Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved		
	12" white channel line	EA	5240
762 1236	Plastic Pvmt Mk Film 6in Line-Wet Reflect-Grooved		
	6" white centerline (10' line, 30' gap)	EA	882 (A)
(A) These quantities are not in the charts. They were calculated using the road lengths.			
(B) These dashed extension lines are for the entrance to turn lanes to connect the channel line to the edge line.			
(C) Install rumble strips in the locations shown according to standard drawing D-760-3.			



Pavement Marking Details

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	120	4

Turn Lanes - Segment 4									
start RP	end RP	Dir	Right Arrow (EA)	Left Arrow (EA)	6" Dbl Yellow (LF)		12" White Channel (LF)	6" Dashed line (LF)	Rumble Strips (LF)
					1 line	2 lines			
139.500	145.649	marking only				39852			
139.459	139.644	SB RT	3		1680	360	1680	100	150
		SB LT		3	1200	360	1200	70	
139.744	139.949	NB LT		3	1680	360	1680	100	150
140.634		NB RT Ramp	3				940	100	
140.843	141.032	SB DBL LT		3			1360	100	
142.465	142.666	NB LT		3	1680	360	1680	70	150
142.681	142.866	SB LT		3	1680	360	1680	70	150
143.504	143.705	NB LT		3	1680	360	1680	70	150
143.720	143.911	SB LT		3	1680	360	1680	70	150
144.528	144.723	NB LT		3	1680	360	2040	70	150
144.738	144.934	SB LT		3	1680	360	1680	70	150
145.500	145.649	NB RT	3				580	100	
		NB LT		3	1160	360	1160	70	
Totals			9	30	59252		19040	1060	1200

SPEC	CODE	BID ITEM	UNIT	QTY	
704	1500	Obliteration of Pvmt Mkg			
		4" dbl yellow lines	SF	19751	(A)
760	0007	Rumble Strips - Asphalt Centerline			
			MILE	.2	(C)
762	0122	Preformed Patterned Pvmt Mk-Message(grooved)			
		Left Arrow (30 EA at 16 SF)	SF	480	
		Right Arrow (9 EA at 16 SF)	SF	144	
		Total	SF	624	
762	0156	Epoxy Pvmt Mk 6in Line-Wet Reflective			
		6" double yellow barrier line	LF	59252	(A)
		(6" between)			
762	0157	Epoxy Pvmt Mk 6in Line-Wet Reflective-Grooved			
		6" white dashed line	LF	1060	(B)
		(2' line, 6' gap)			
		6" white edge line	LF	54352	(A)
		6" yellow edge line	LF	10687	(A)
		Total	LF	66099	
762	0163	Epoxy Pvmt Mk Film 12in Line-Wet Reflective-Grooved			
		12" white channel line	EA	19040	
762	1236	Plastic Pvmt Mk Film 6in Line-Wet Reflect-Grooved			
		6" white centerline	EA	4982	(A)
		(10' line, 30' gap)			

(A) These quantities are not in the charts.  
They were calculated using the road lengths.

(B) These dashed extension lines are for the entrance to turn lanes to connect the channel line to the edge line.

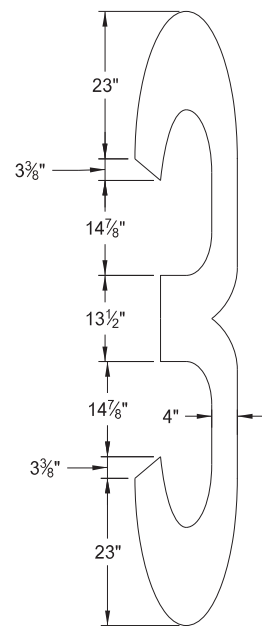
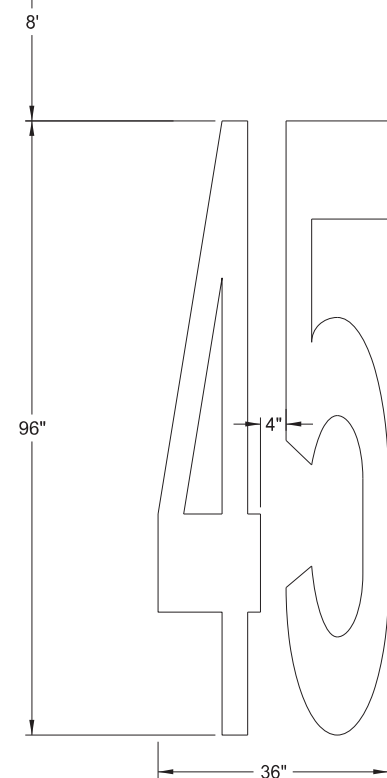
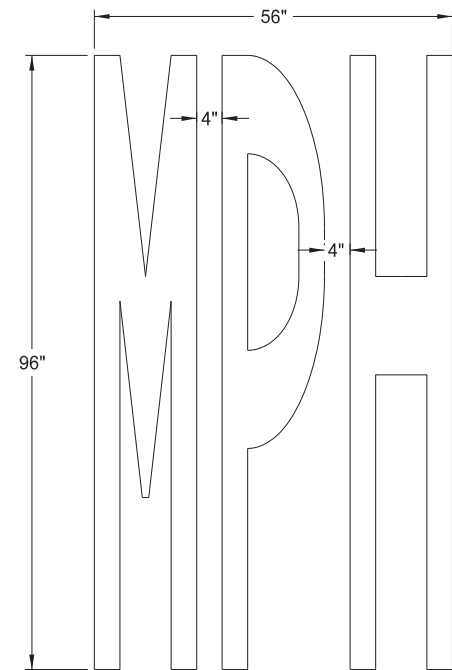
(C) Install rumble strips in the locations shown according to standard drawing D-760-3.



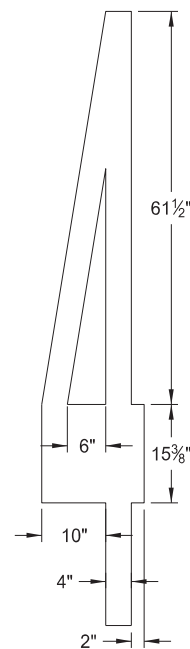
Pavement Marking Details

US 85, I-94 North to US 85B  
Safety Corridor

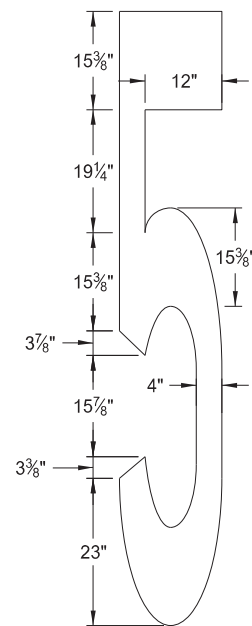
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	ND	ARP-HEN-5-085(083)075	120	5



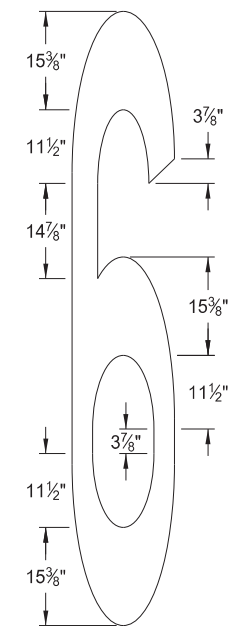
5.6 SF



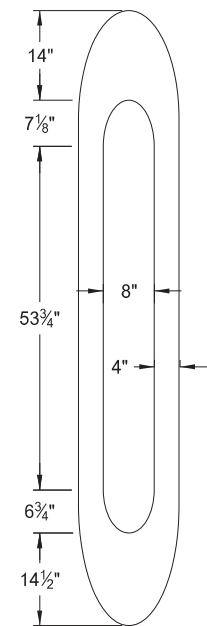
5.3 SF



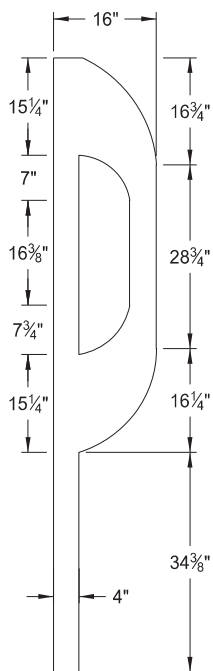
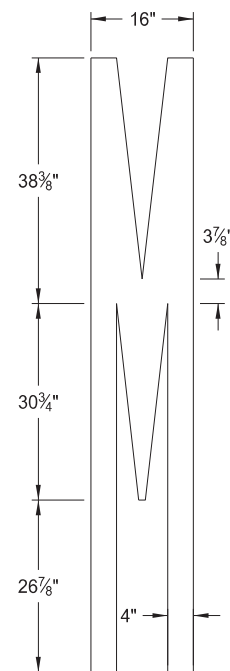
6.3 SF



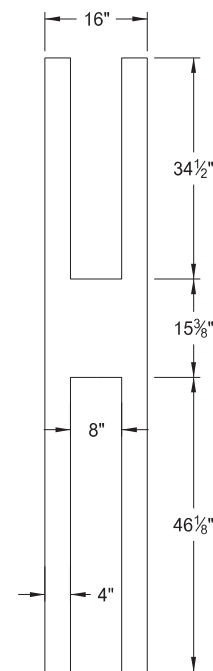
6.2 SF



6.1 SF



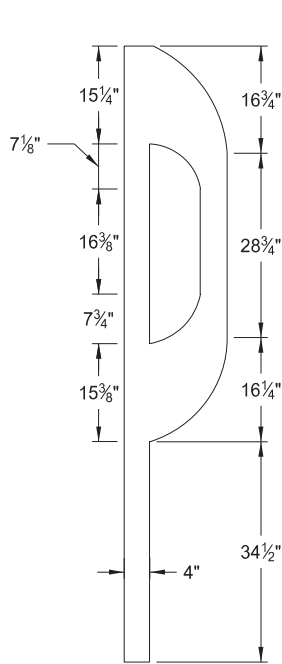
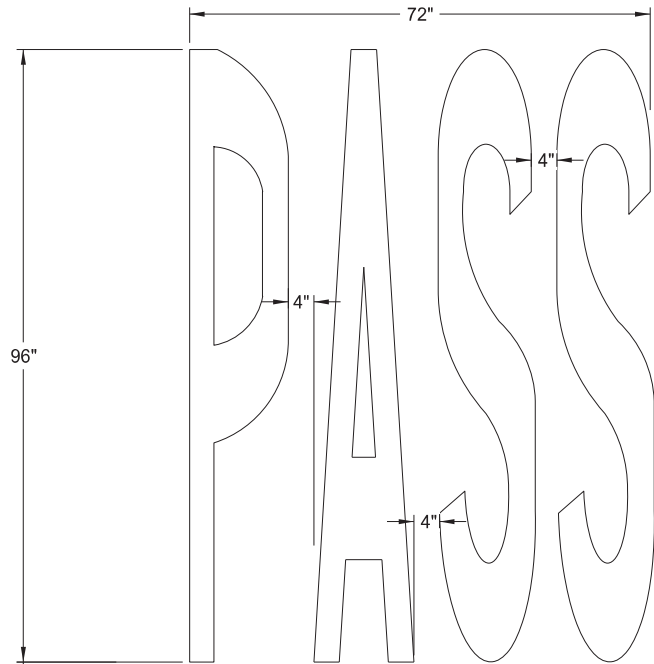
19.2 SF



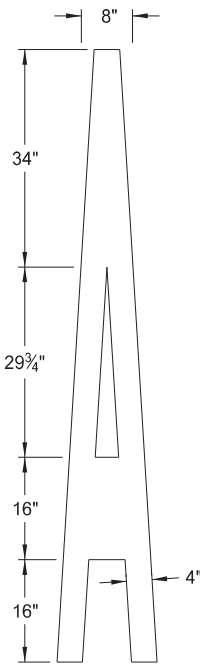
Pavement Marking Details

US 85, I-94 North to US 85B  
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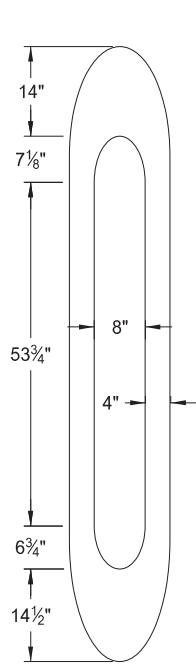
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	ND	ARP-HEN-5-085(083)075	120	6



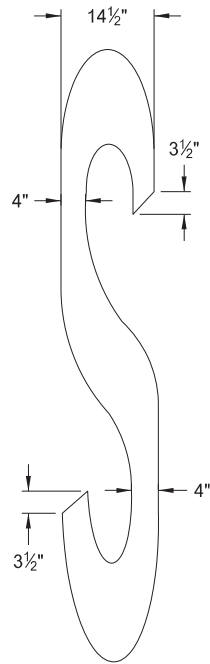
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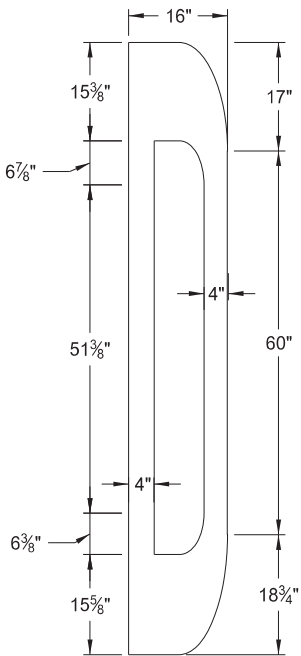
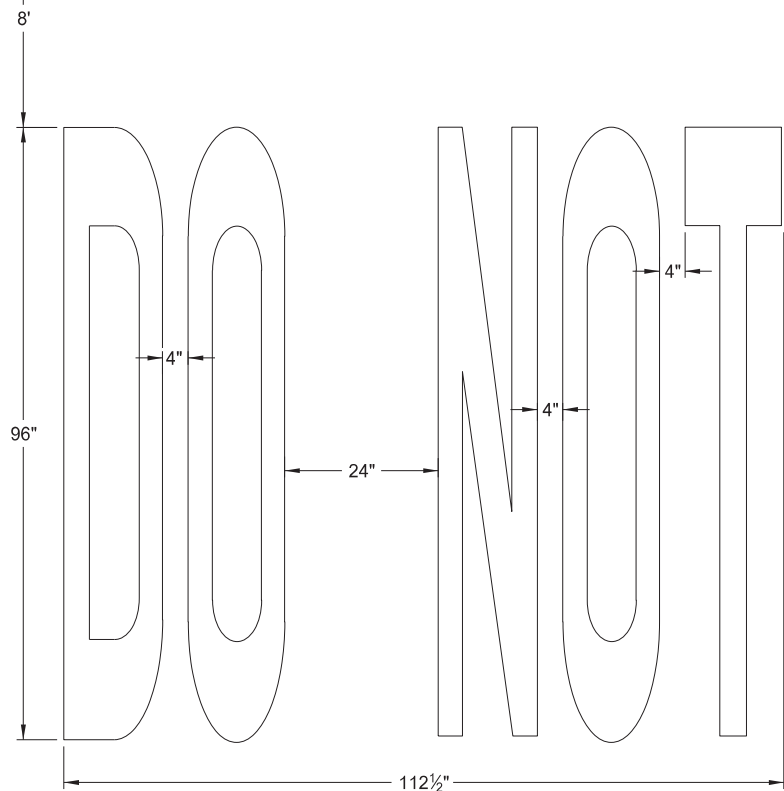
5.4 SF



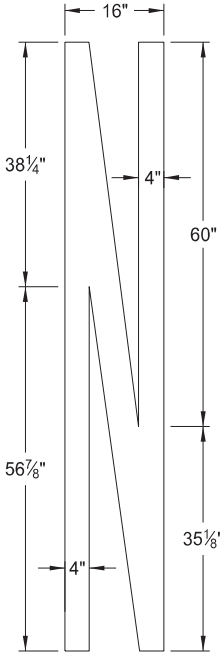
6.1 SF



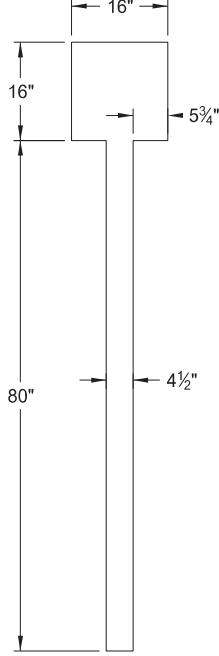
5.7 SF



6.4 SF



7.1 SF



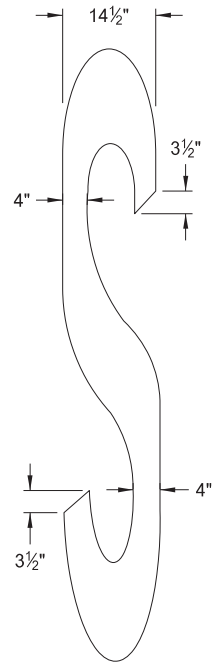
3.9 SF



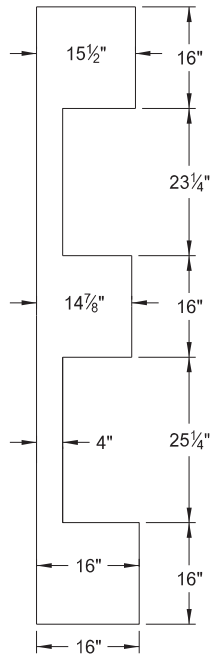
Pavement Marking Details

US 85, I-94 North to US 85B  
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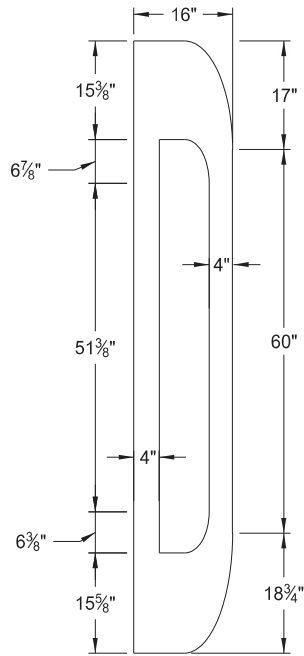
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	ND	ARP-HEN-5-085(083)075	120	7



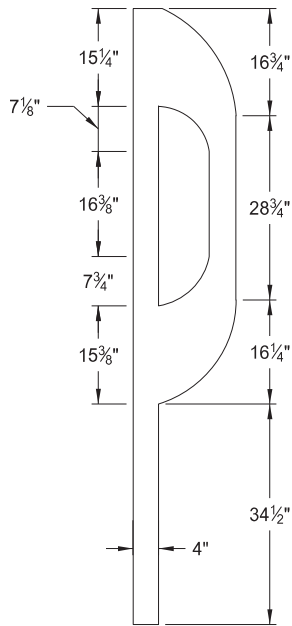
5.7 SF



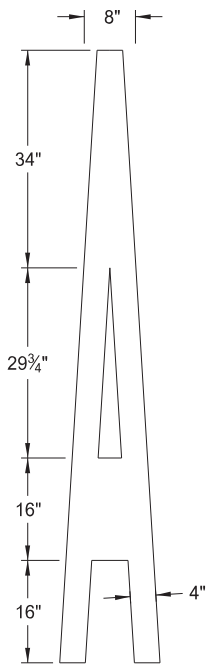
6.5 SF



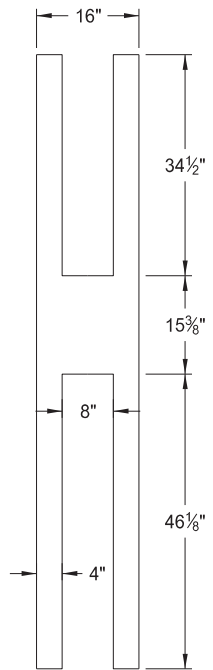
6.4 SF



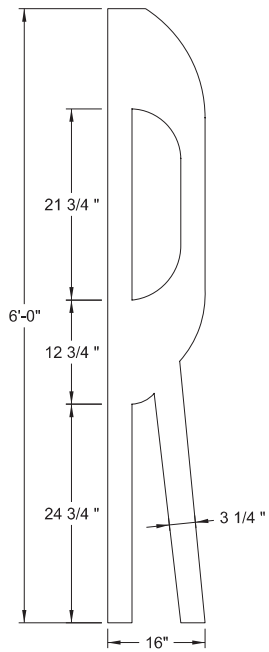
5.6 SF



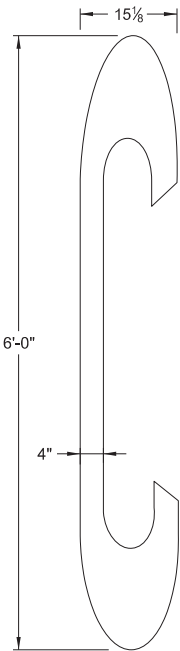
5.4 SF



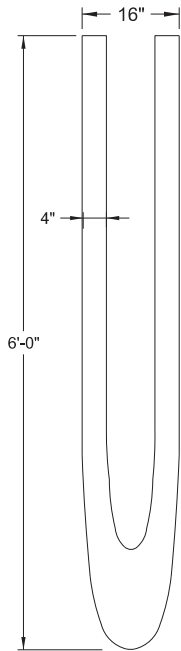
6.2 SF



6.4 SF



4.7 SF



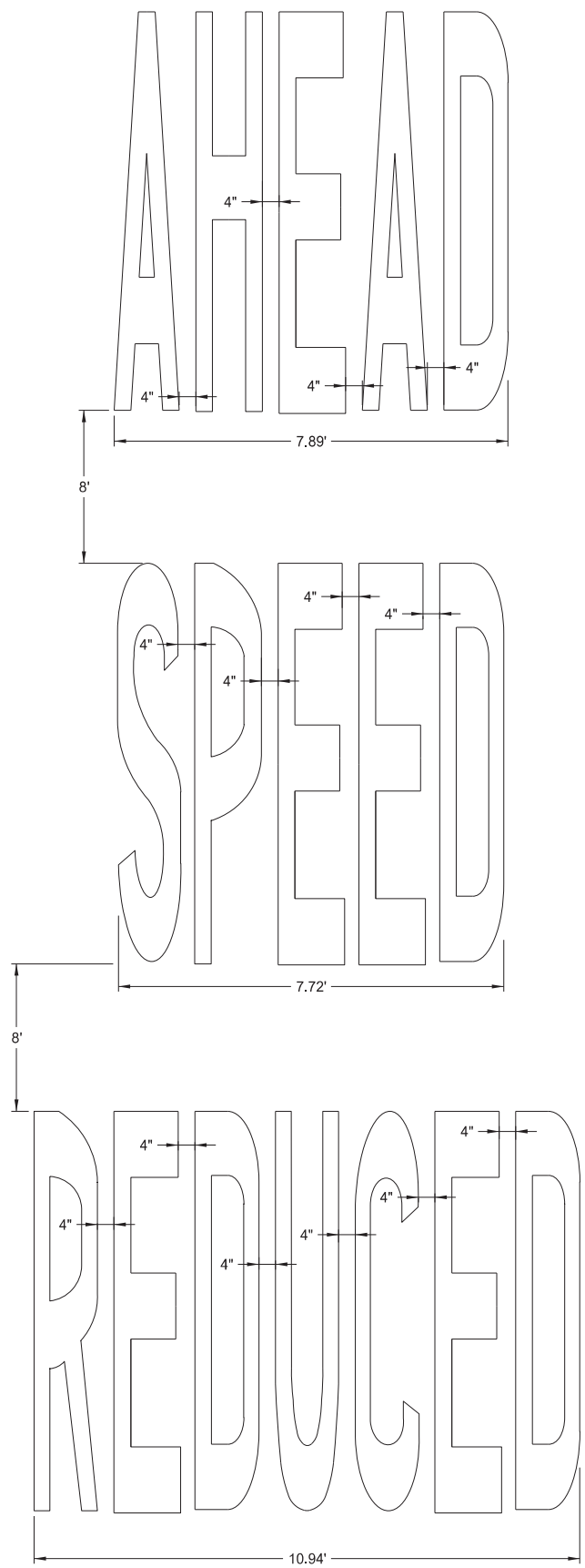
5.5 SF



Pavement Marking Details

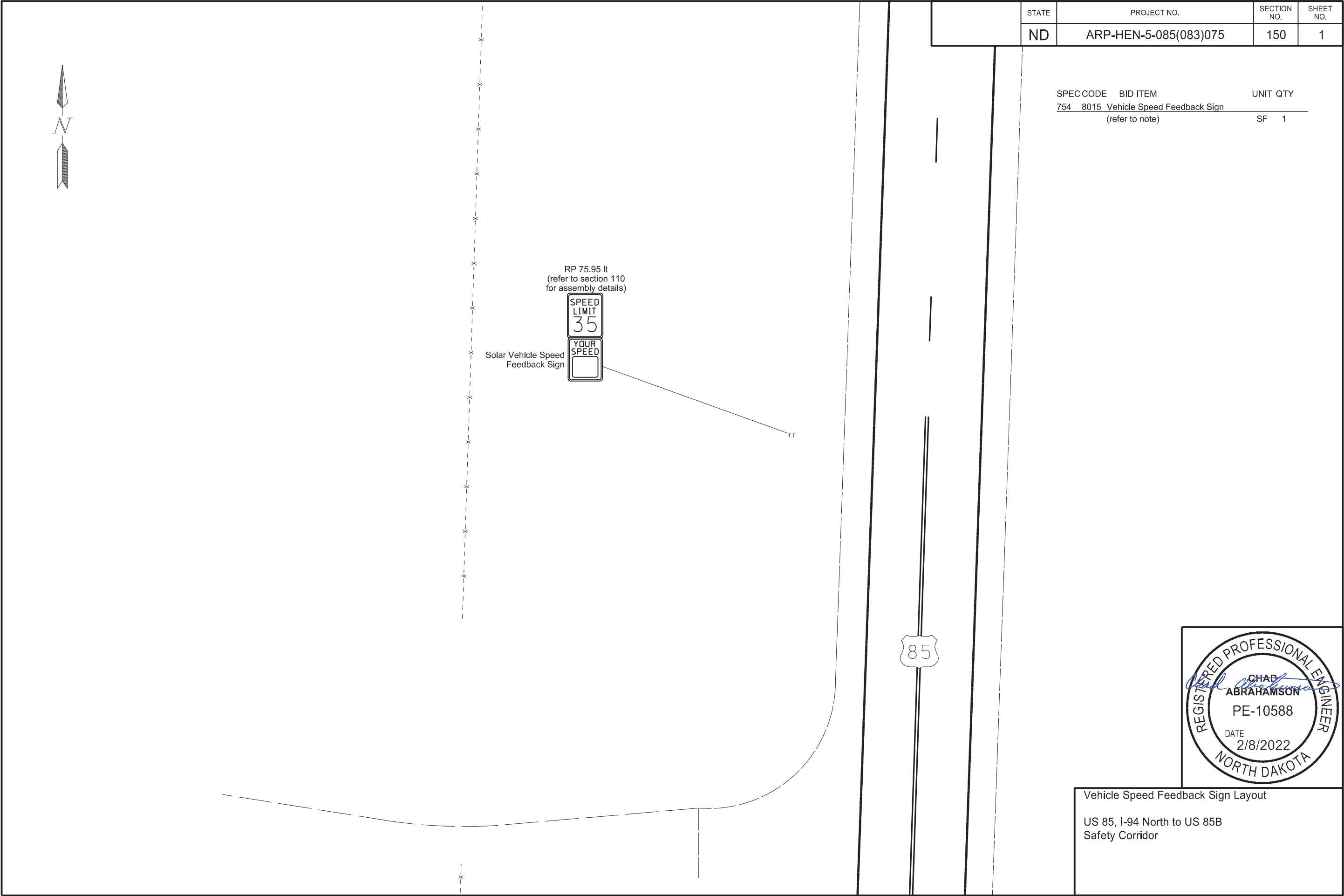
US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	120	8



Pavement Marking Details

US 85, I-94 North to US 85B  
Safety Corridor



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND ARP-HEN-5-085(083)075	150	1

SPEC CODE	BID ITEM	UNIT	QTY
754 8015	Vehicle Speed Feedback Sign (refer to note)	SF	1



Vehicle Speed Feedback Sign Layout  
US 85, I-94 North to US 85B  
Safety Corridor



RP 76.44 It  
(refer to section 110  
for assembly details)



Solar Vehicle Speed  
Feedback Sign



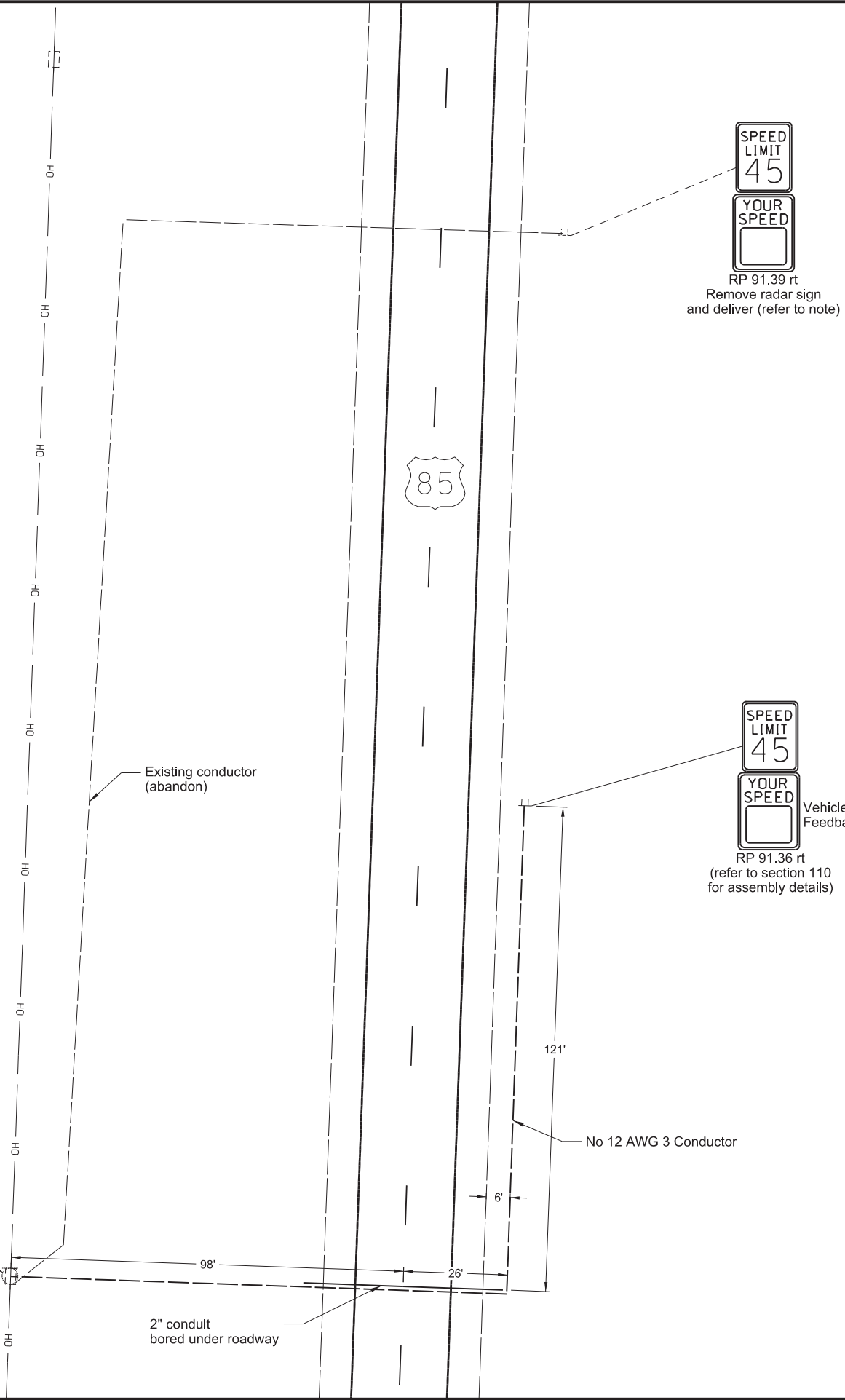
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	150	2

SPEC CODE	BID ITEM	UNIT	QTY
754	8015 Vehicle Speed Feedback Sign (refer to note)	SF	1



Vehicle Speed Feedback Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



RP 91.39 rt  
Remove radar sign  
and deliver (refer to note)



RP 91.36 rt  
(refer to section 110  
for assembly details)

Vehicle Speed  
Feedback Sign

No 12 AWG 3 Conductor

Existing pole mtd  
feed point

2" conduit  
bored under roadway

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	ARP-HEN-5-085(083)075	150	3

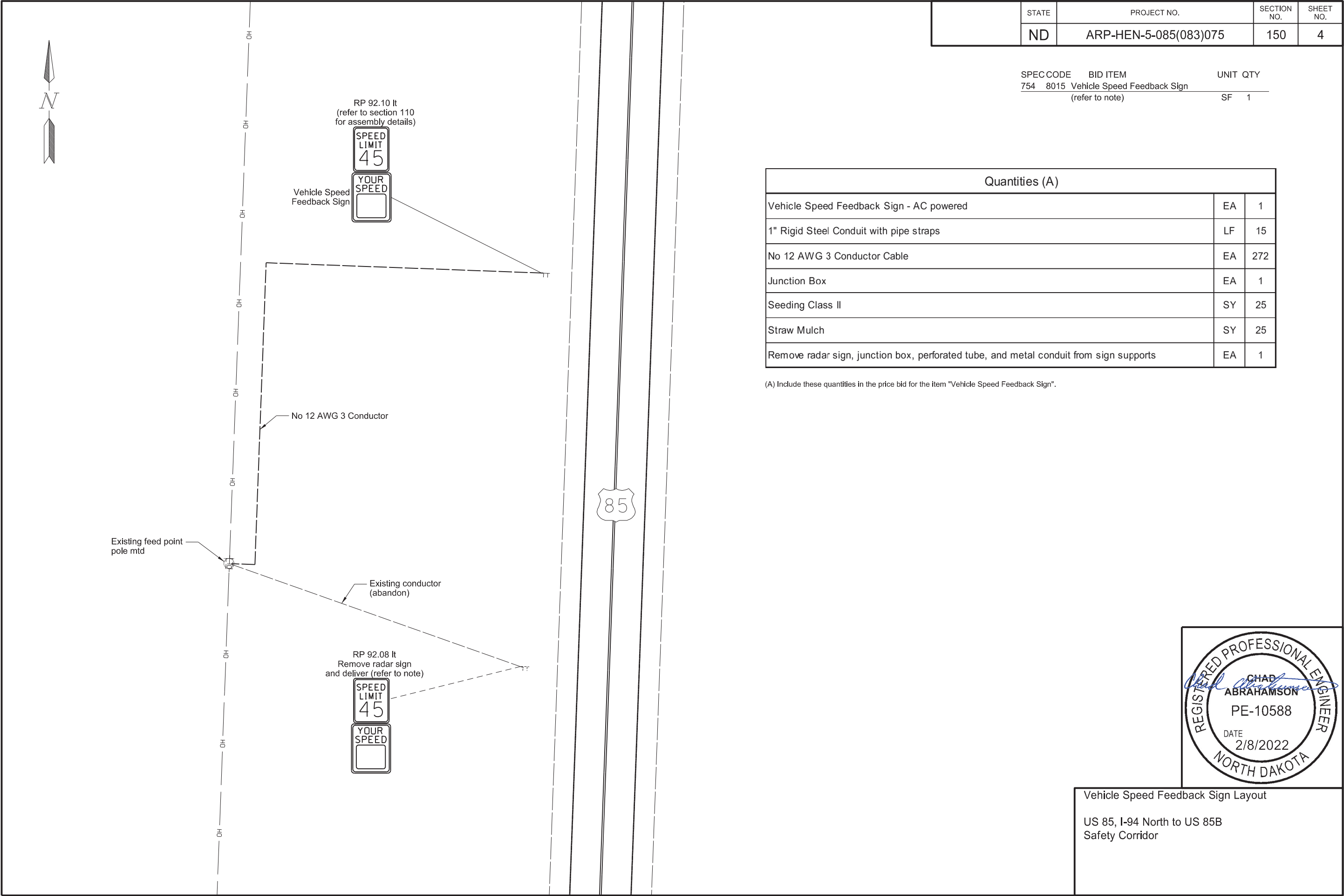
SPECCODE	BID ITEM	UNIT	QTY
754 8015	Vehicle Speed Feedback Sign (refer to note)	SF	1

Quantities (A)		
Vehicle Speed Feedback Sign - AC powered	EA	1
1" Rigid Steel Conduit with pipe straps	LF	15
2" HDPE Rigid Conduit-Bored	LF	50
No 12 AWG 3 Conductor Cable	EA	281
Junction Box	EA	1
Seeding Class II	SY	30
Straw Mulch	SY	30
Remove radar sign, junction box, perforated tube, and metal conduit from sign supports	EA	1

(A) Include these quantities in the price bid for the item "Vehicle Speed Feedback Sign".



Vehicle Speed Feedback Sign Layout  
US 85, I-94 North to US 85B  
Safety Corridor

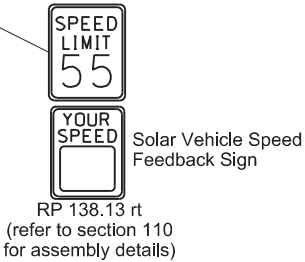


Vehicle Speed Feedback Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	150	5

SPEC CODE	BID ITEM	UNIT	QTY
754	8015 Vehicle Speed Feedback Sign (refer to note)	SF	1



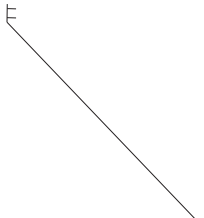
Vehicle Speed Feedback Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	150	6

SPEC CODE	BID ITEM	UNIT	QTY
754	8015 Vehicle Speed Feedback Sign (refer to note)	SF	1



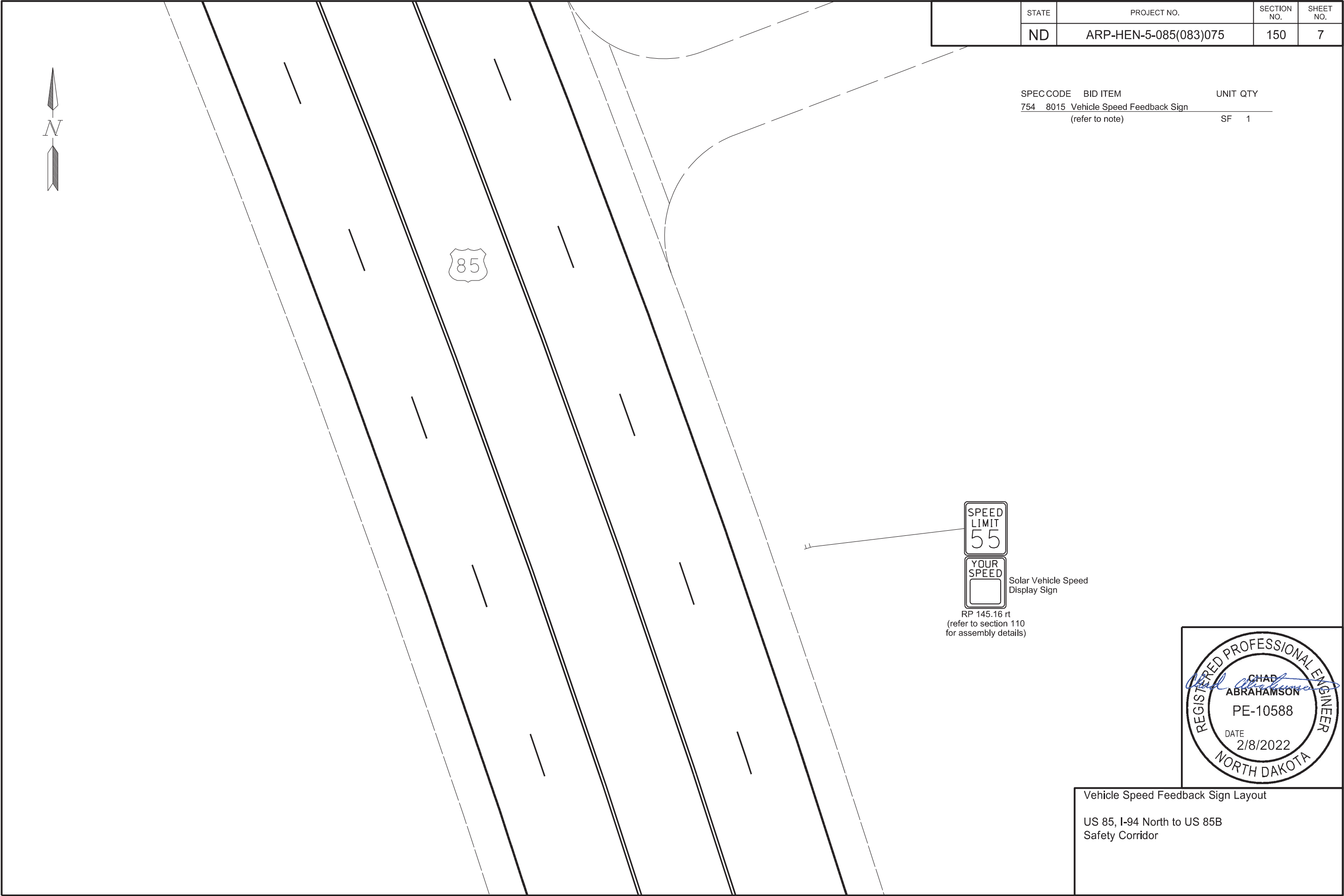
RP 141.39 ft  
(refer to section 110  
for assembly details)

Solar Vehicle Speed  
Feedback Sign



Vehicle Speed Feedback Sign Layout

US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	150	7

SPEC CODE	BID ITEM	UNIT	QTY
754	8015 Vehicle Speed Feedback Sign (refer to note)	SF	1

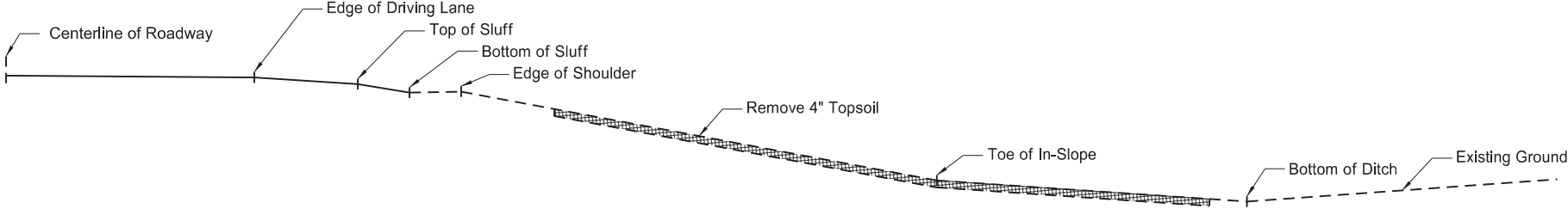


Vehicle Speed Feedback Sign Layout

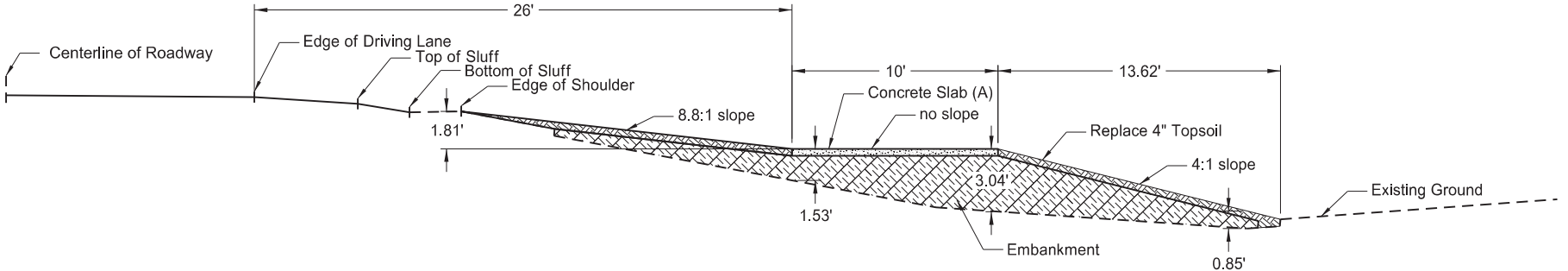
US 85, I-94 North to US 85B  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	160	2



Removal Typical Section  
US 85 Northbound RP 76.11 rt  
(facing north)



Berm Typical Section  
US 85 Northbound RP 76.11 rt  
(facing north)

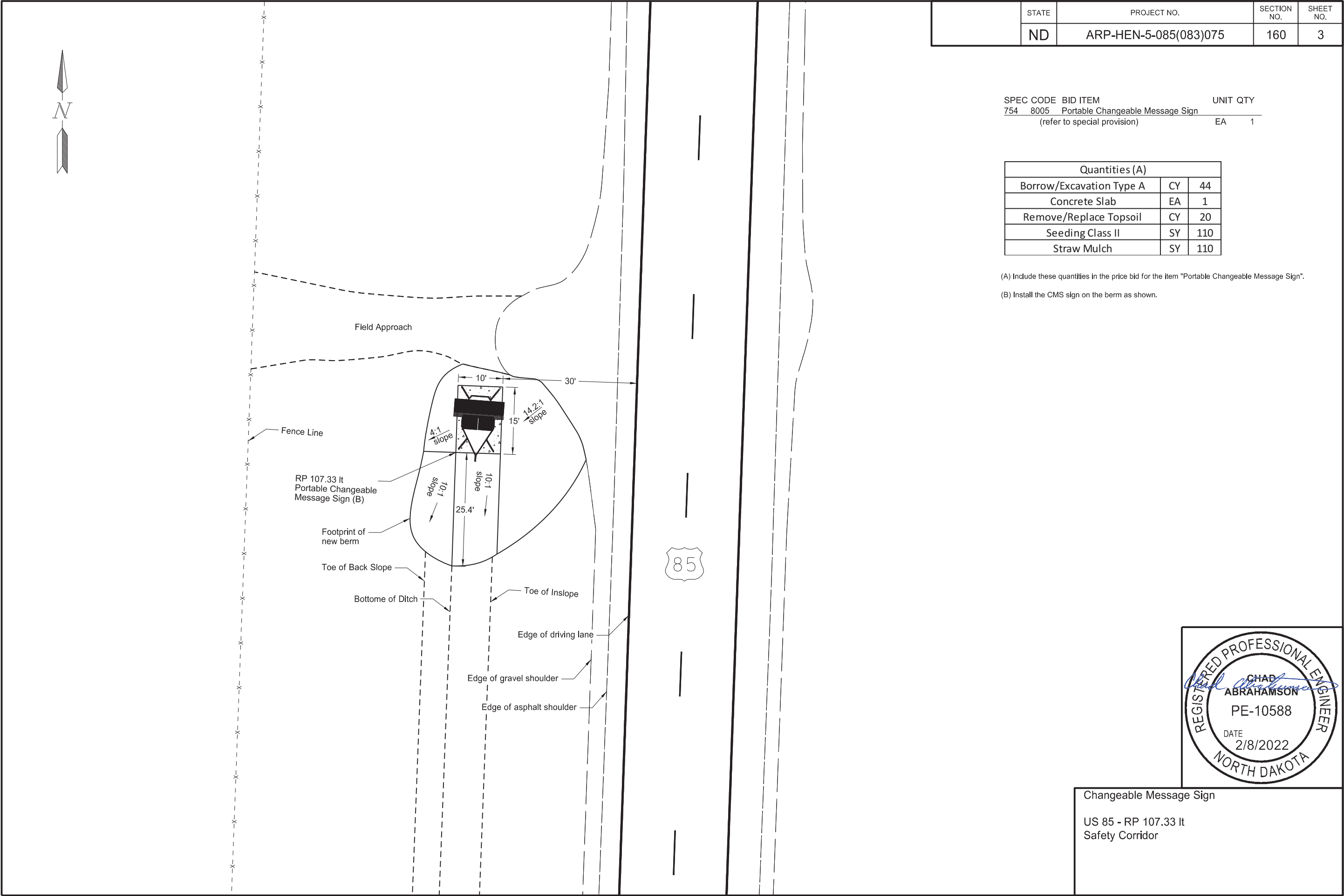
(A) The concrete slab will be 10'x15'x4".



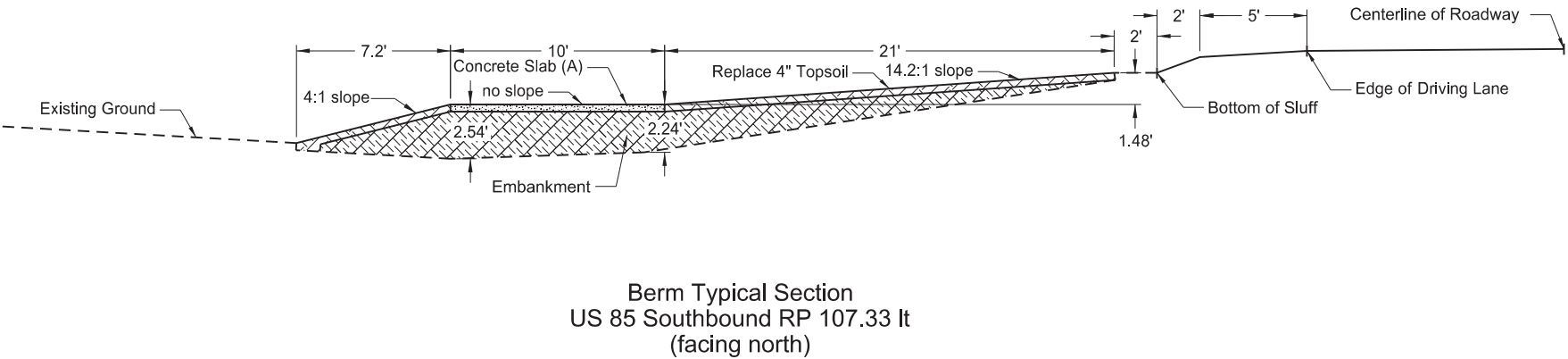
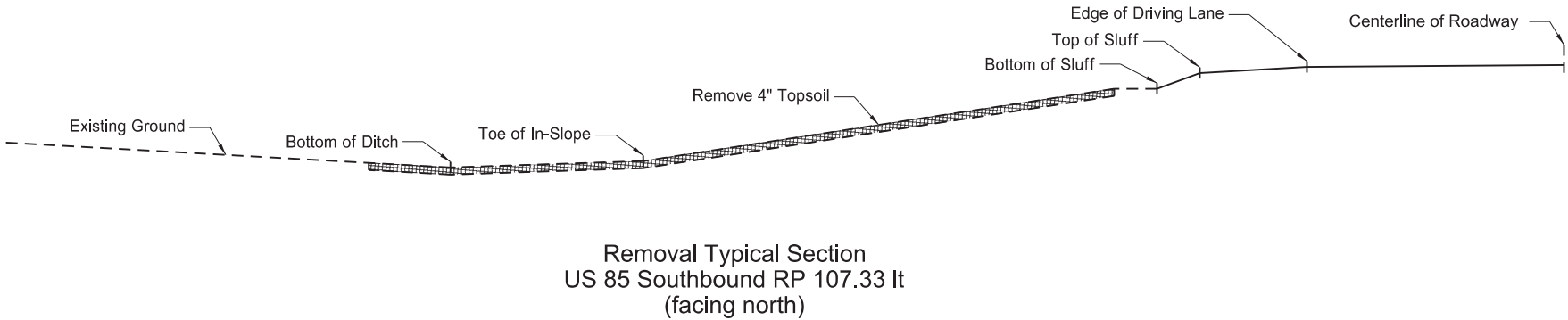
Berm Details

US 85 - RP 76.11 rt

Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	160	4



(A) The concrete slab will be 10'x15'x4".



Berm Details

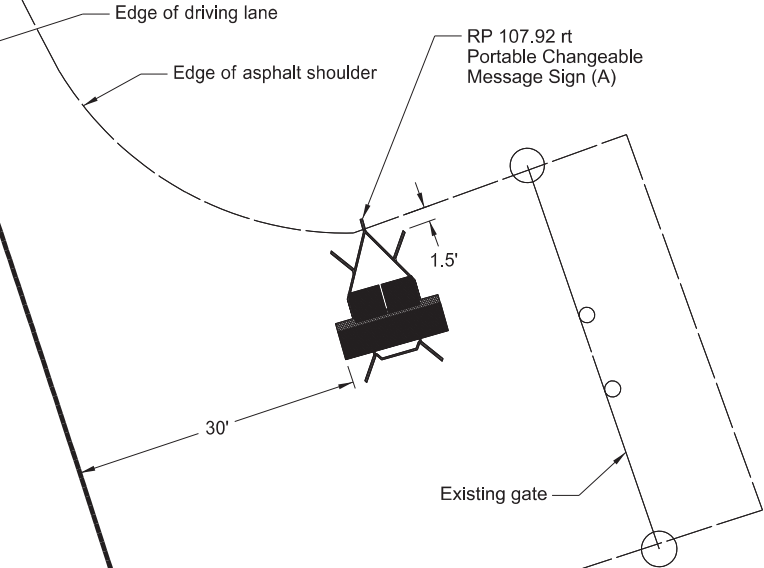
US 85 - RP 107.33 It  
Safety Corridor



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	160	5

SPEC CODE	BID ITEM	UNIT	QTY
754 8005	Portable Changeable Message Sign (refer to special provision)	EA	1

(A) Install the CMS sign on the approach as shown.



Changeable Message Sign

US 85 - RP 107.92 ft  
Safety Corridor

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	ARP-HEN-5-085(083)075	160	6

SPEC CODE	BID ITEM	UNIT	QTY
754 8005	Portable Changeable Message Sign (refer to special provision)	EA	1

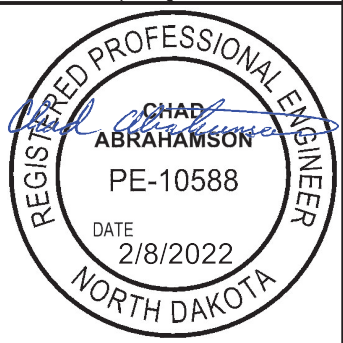
Quantities (A)		
Concrete Slab	EA	1
Remove and Regrade Gravel	CY	1.9

(A) Include these quantities in the price bid for the item "Portable Changeable Message Sign".  
(B) Install the CMS sign on the approach as shown.

Edge of concrete shoulder  
Edge of gravel shoulder  
Edge of driving lane

RP 140.73 lt  
Portable Changeable  
Message Sign (B)

26'



Changeable Message Sign  
US 85 - RP 140.73 lt  
Safety Corridor

Ⓢ 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  
Crm 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 ⌀ 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  
DSDS dynamic speed display sign

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
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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
H Plg	H piling			Pk	park	RCB	reinforced concrete box
Hdwl	headwall	Mb	mailbox	PSD	passing sight distance	RCES	reinforced concrete end section
Ht	height	ML	main line	Pvmt	pavement	RCFES	reinforced concrete flared end section
Hel	helical	MH	manhole	Ped	pedestal	RCP	reinforced concrete pipe
HDPE	high density polyethylene	Mkd	marked	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HM	high mast	Mkr	marker	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HP	high pressure	Mkg	marking	Pen.	penetration	Reinf	reinforcement
HPS	high pressure sodium	MA	mast arm	Perf	perforated	Res	reservation
Hwy	highway	Matl	material	Per.	perimeter	Res	residence
Hor	horizontal	Max	maximum	Perm	permanent	Ret	retaining
HBP	hot bituminous pavement	MC	meander corner	PL	pipeline	Rev	reverse
HMA	hot mix asphalt	Meas	measure	Pl	place	Rt	right
Hyd	hydrant	Mdn	median	P&P	plan & profile	R/W	right of way
Ph	hydrogen ion content	MD	median drain	PL	plastic limit	Riv	river
		MC	medium curing	Pl or $\overline{P}$	plate	Rd	road
		MGS	Midwest Guardrail System	Pt	point	Rdbd	road bed
Id	identification	MM	mile marker	PE	polyethylene	Rdwy	roadway
Incl	inclinometer tube	MP	mile post	PVC	polyvinyl chloride	RWIS	roadway weather information system
IMH	inlet manhole	Min	minimum	PCC	Portland Cement concrete	Rk	rock
ID	inside diameter	Misc	miscellaneous	PP	power pole	Rt	route
Inst	instrument	Mon	monument	Preempt	preemption		
Intchg	interchange	Mnd	mound	Prefab	prefabricated		
Intmdt	intermediate	Mtbl	mountable	Prfmd or Pref	preformed		
Intscn	intersection	Mtd	mounted	Prep	preperation		
Inv	invert	Mtg	mounting	Press.	pressure		
IP	iron pipe	Mk	muck	PRV	pressure relief valve		
				Prestr	prestressed		
				Pvt	private		
				PD	private drive		
Jt	joint			Prod.	production/produce		
Jct	junction			Prog	programmed		
				Prop.	property		
				Prop Ln	property line		
				Ppsd	proposed		
				PB	pull box		
		Neop	neoprene				
		Ntwk	network				
		N	North				
		NE	North East				
		NW	North West				
		NB	Northbound				
		No. or #	number				

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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NDDOT ABBREVIATIONS

D-101-3

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		
SB	split barrel sample	VG	valley gutter
SH	sprinkler head	Vap	vapor
SV	sprinkler valve	Vert	vertical
Sq	square	VCP	vitrified clay pipe
Stk	stake	Vol	volume
Std	standard		
N	standard penetration test		
Std Specs	standard specifications	Wkwy	walkway
Stm L	steam line	W	water content
SEC	steel encased concrete	WGV	water gate valve
SMA	stone matrix asphalt	WL	water line
SSD	stopping sight distance	WM	water main
SD	storm drain	WMV	water main valve
St	street	W Mtr	water meter
SPP	structural plate pipe	WSV	water service valve
SPPA	structural plate pipe arch	WW	water well
Str	structure	Wrng	wearing
Subd	subdivision	WIM	weigh in motion
Sub	subgrade	W	west
Sub Prep	subgrade preparation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing	WC	witness corner
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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12-18-20	Sheet Added - Continued from D-101-3

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

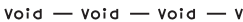


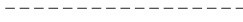
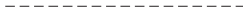


















702COM	702 Communications	GT PLNS NAT GAS	Great Plains Natural Gas Company	RED RIV COMM	Red River Rural Communications
ACCENT	Accent Communications	HALS TEL	Halstad Telephone Company	RESVTN TEL	Reservation Telephone
AGASSIZ WU	Agassiz Water Users Incorporated	IDEA1	Idea1	ROBRTS TEL	Roberts Company Telephone
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 HGH 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	WEB	W. E. B. Water Development Association
CONT RES	Continental Resource Inc	NDDOT	North Dakota Department of Transportation	WILLI RWA	Williams Rural Water Association
CPR	Canadian Pacific Railway	NDSU SOIL SCI DEPT	NDSU Soil Science Department	WILSTN BAS PL	Williston Basin Interstate Pipeline Company
D O E	Department Of Energy	NEMONT TEL	Nemont Telephone	WLSH RWD	Walsh Water Rural Water District
DAK CARR	Dakota Carrier Network	NODAK R ELEC	Nodak Rural Electric Cooperative	WOLVRTN TEL	Wolverton Telephone
DAK CENT TEL	Dakota Central Telephone	NOON FRMS TEL	Noonan Farmers Telephone Company	XLENER	Xcel Energy
DAK RWD	Dakota Rural Water District	NPR	Northern Plains Railroad	YSVR	Yellowstone Valley Railroad
DGC	Dakota Gasification Company	NSP	Northern States Power		
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		
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				






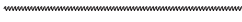
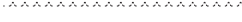







NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18 09-20-18 12-18-20	General Revisions General Revisions General Revisions

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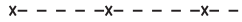





LINE STYLES

Existing Topography









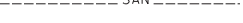













	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	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

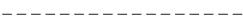
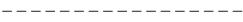


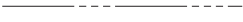








	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

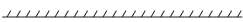








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LINE STYLES


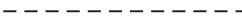
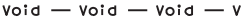





Right Of Way

	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


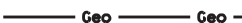




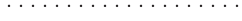
Boundary Control

	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


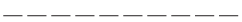
Cross Sections and Typicals

	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

	D	Geotextile Fabric Type D
	Geo	Geogrid
	R	Geotextile Fabric Type R
	R	Geotextile Fabric Type R1
	RR	Geotextile Fabric Type RR
	S	Geotextile Fabric Type S
		Subgrade Reinforcement







Countours

	Depression Contours
	Supplemental Contour





Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile




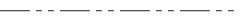

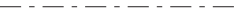



Striping

	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

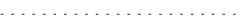
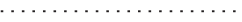
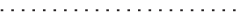




Pavement Joints

	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



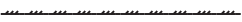

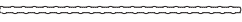
Bridge Details

	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
	S Floating Silt Curtain
	SF Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

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

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SYMBOLS



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

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

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

Continuous Split Barrel Sample

Flight Auger Sample

Split Barrel Sample

Thinwall Tube Sample

Standard Penetration Test

Inclinometer Tube


































Excavation Unit

Existing Ground Water Well Bore Hole

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions

















































































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SYMBOLS

	Flexible Delineator		Highway Sign (Exst, Ppsd)
	Flexible Delineator Type A (Exst, Ppsd)		Mile Post Type A (Exst-Ppsd-Reset)
	Flexible Delineator Type B (Exst, Ppsd)		Mile Post Type B (Exst, Ppsd)
	Flexible Delineator Type C (Exst, Ppsd)		Mile Post Type C (Exst, Ppsd)
	Flexible Delineator Type D (Exst, Ppsd)		Object Marker Type I (Exst, Ppsd)
	Flexible Delineator Type E (Exst, Ppsd)		Object Marker Type II (Exst, Ppsd)
	Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)		Object Marker Type III (Exst, Ppsd)
	Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)		Existing Reference Marker
	Delineator Type C (Exst, Ppsd, Diamond Grade)		Road Closure Gate 18 Ft (Exst, Ppsd)
	Delineator Type D (Exst, Ppsd, Diamond Grade)		Road Closure Gate 28 Ft (Exst, Ppsd)
	Delineator Type E (Exst, Ppsd, Diamond Grade)		Road Closure Gate 40 Ft (Exst, Ppsd)
	Barricade (Type I, Type II, Type III}		Existing Railroad Battery Box
	Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)		Existing RR Profile Spot
	Attenuation Device		Existing Railroad Crossbuck
	Truck Mounted Attenuator		Existing Railroad Frog
	Delineator Drums		Existing Mailbox (Private, Federal)
	Flagger		
	Tubular Marker		
	Traffic Cone		
	Back to Back Vertical Panel Sign		

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SYMBOLS

	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		This document was originally issued and sealed by  Kirk Hoff, Registration Number
07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	

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07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	

SYMBOLS

			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)		

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07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions Sheet added - Continued from D-101-32	

CONSTRUCTION SIGN DETAILS  
PROJECT FUNDING SIGN

D-704-6

SIGN NUMBER	I2-5-96
WIDTH X HEIGHT	8'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective COLOR: White
LEGEND/BORDER	TYPE: Non-reflective COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_CIRCLE_LOGO	6	22.8	18	18	0
	44.2	4.2	7.5	8.6	0

STATION(S):

AREA: 32.0 Sq.Ft.

Dimensions are in inches,tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND\_Reg\_48\_Large.ssi

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
Y	O	U	R	H	I	G	H	W	A	Y								50.3	6	C 2000
33.5	38.1	42.8	47.5	55.4	60.1	62.1	66.7	70.9	75.8	80										
D	O	L	L	A	R	S	A	T	W	O	R	K						62.6	6	C 2000
27.4	31.8	36.5	40.4	43.9	48.5	52.6	60.5	64.7	72.2	77.5	82.3	86.6								
F	U	N	D	E	D	B	Y											25	4	C 2000
35.5	38.1	41.2	44.3	47.4	50.1	55.3	57.9													

(A)

FUNDING SOURCE MESSAGE VARIATIONS
FEDERAL
STATE
FEDERAL - STATE
FEDERAL - LOCAL
FEDERAL - STATE - LOCAL
STATE - LOCAL

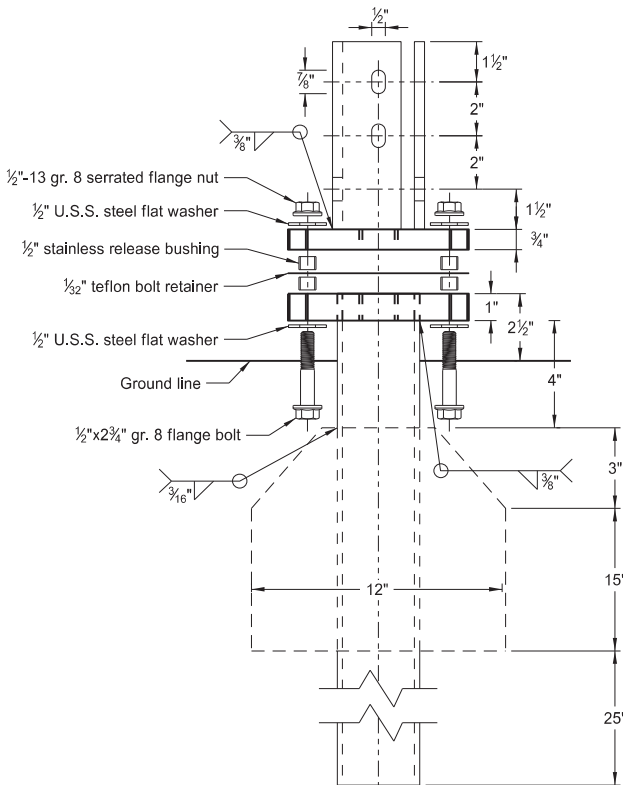
Use a horizontal spacing of 3" between words and hyphens. Center message horizontally in sign panel.

- Notes:
- 1)

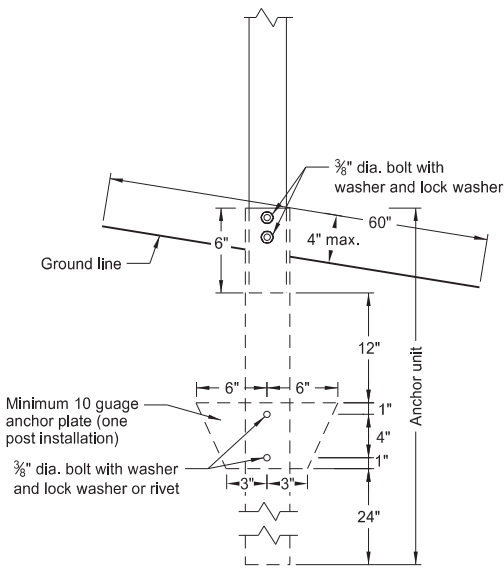
Contact the Communications Division of the NDDOT to obtain a copy of the image for the NDDOT Logo.
- 2)

Contact Project Engineer for funding source message.

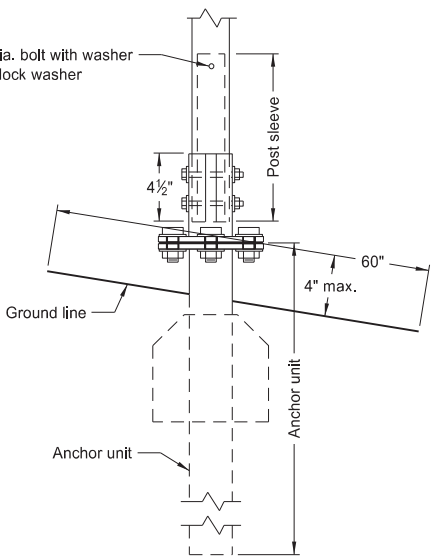
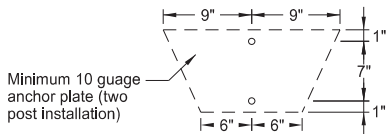
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12-08-21		
REVISIONS		
DATE	CHANGE	



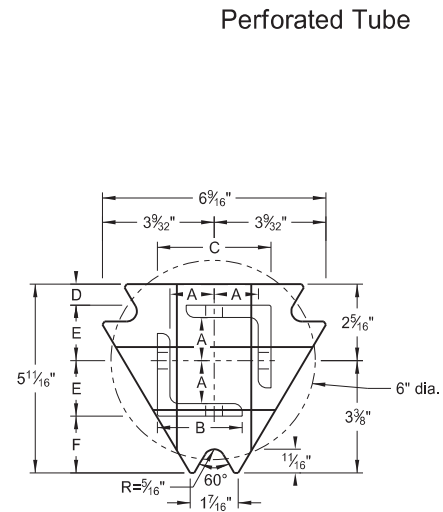
Multi-Directional Slip Base Assembly



Anchor Unit and Post Assembly

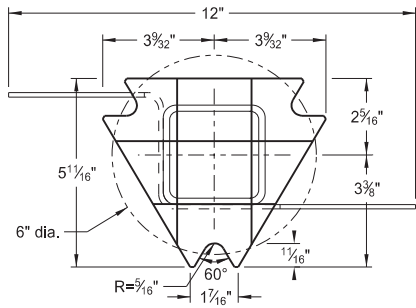


Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



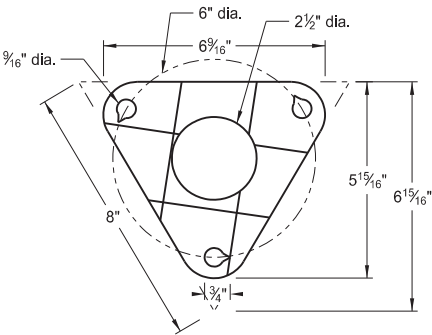
Top Post Receiver

Plate - ASTM A572 grade 50  
Angle Receiver - 2 1/2"x2 1/2"x3/8" ASTM A36 structural angle



Bottom Soil Stub

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



Bolt Retainer for Base Connection  
Bolt Retainer- 1/2" Reprocessed Teflon

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 Thickness Gauge	Sleeve Size in.	Wall Thickness 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. <sup>4</sup>	Cross Sec. Area in. <sup>2</sup>	Section Modulus in. <sup>3</sup>
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 3/16 x 2 3/16	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 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 1/4"

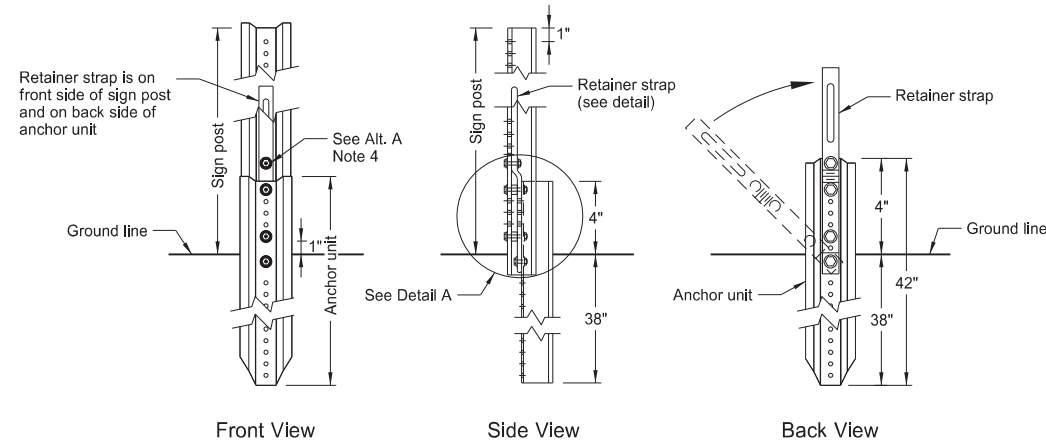
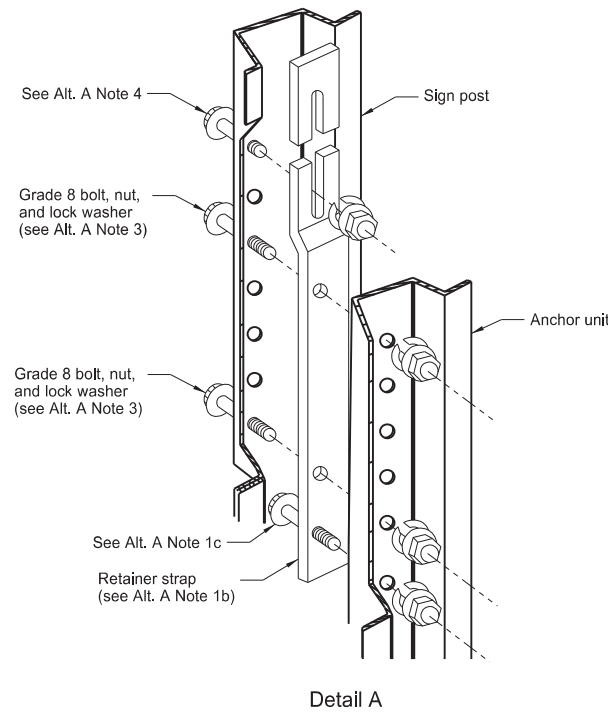
(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.

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

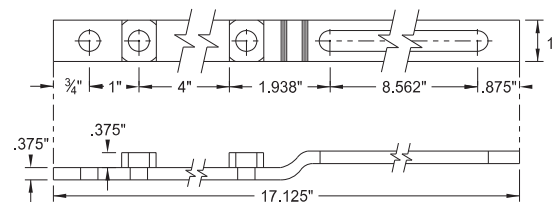
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U-Channel Post

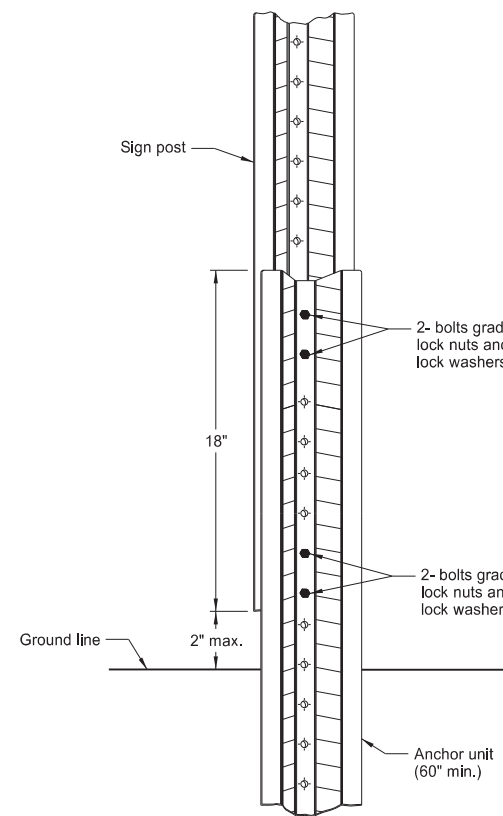


Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

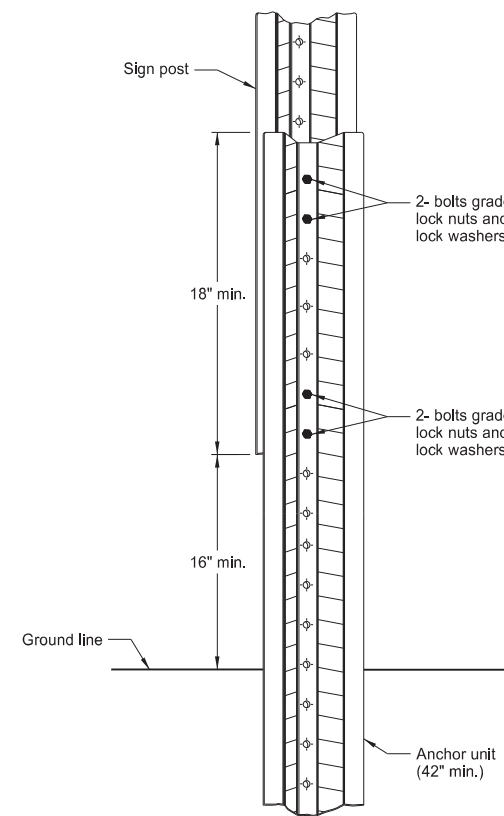


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

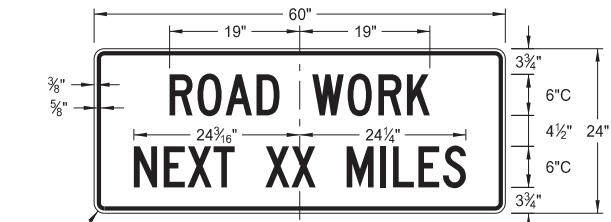
- a) Drive anchor unit to within 12" of ground level.  
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.  
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.  
d) Rotate strap 90° to left.
- a) Drive 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

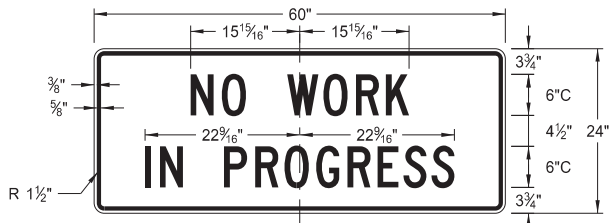
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CONSTRUCTION SIGN DETAILS  
TERMINAL AND GUIDE SIGNS

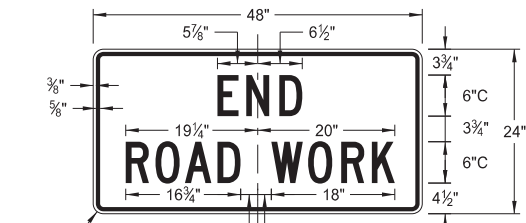
D-704-9



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



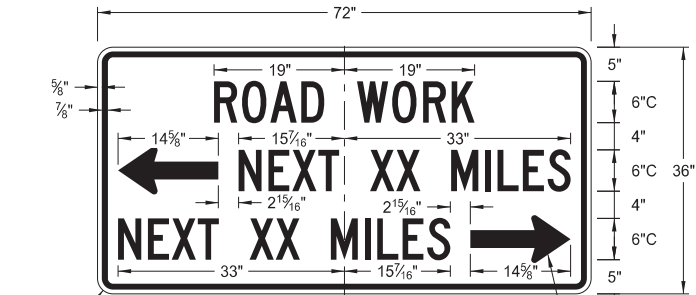
G20-1b-60  
Legend: black (non-refl)  
Background: orange



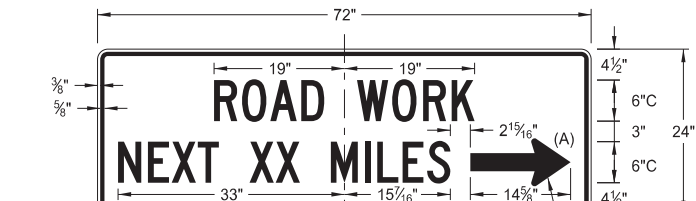
G20-2-48  
Legend: black (non-refl)  
Background: orange



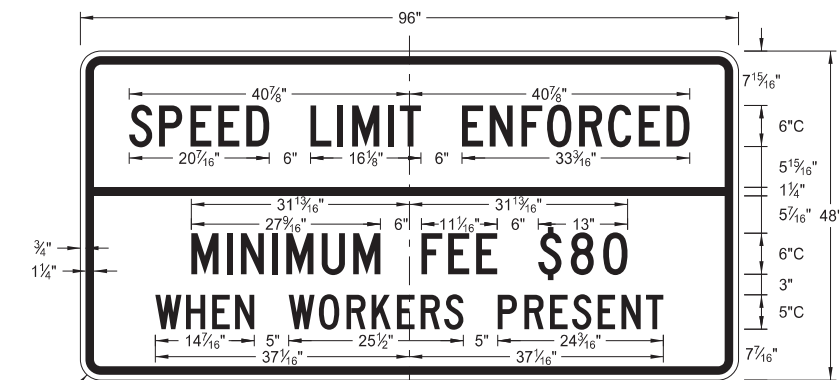
G20-4b-36  
Legend: black (non-refl)  
Background: orange



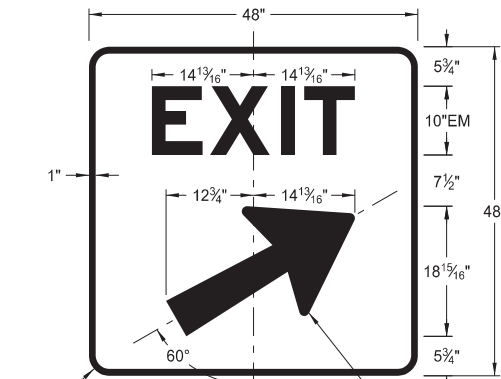
G20-50a-72  
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Background: orange



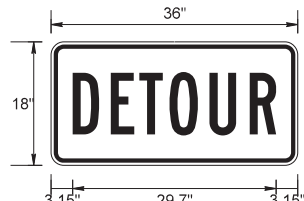
G20-52a-72  
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Background: orange



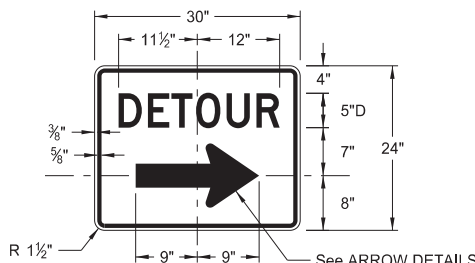
G20-55-96  
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Background: orange



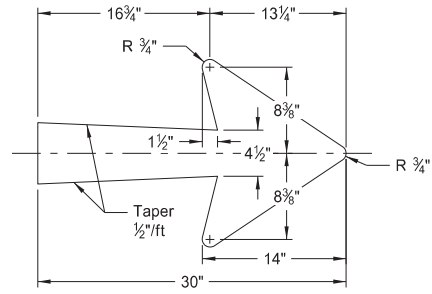
E5-1(L or R)-48  
Legend: white  
Background: green (orange optional)



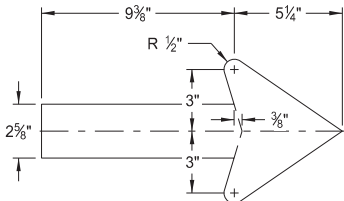
M4-8-36  
Legend: black (non-refl)  
Background: orange



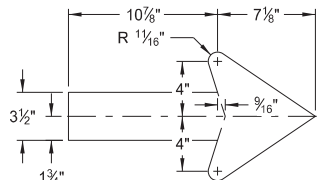
M4-9(L or R)-30 &  
M4-9-30  
Legend: black (non-refl)  
Background: orange



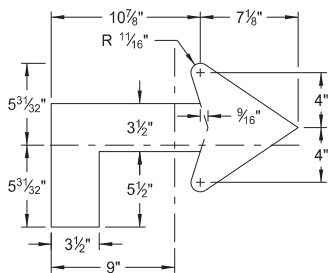
E5-1-48



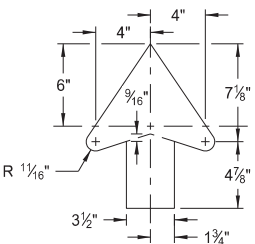
G20-50a-72  
G20-52a-72



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:

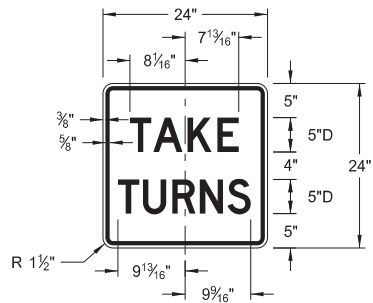
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

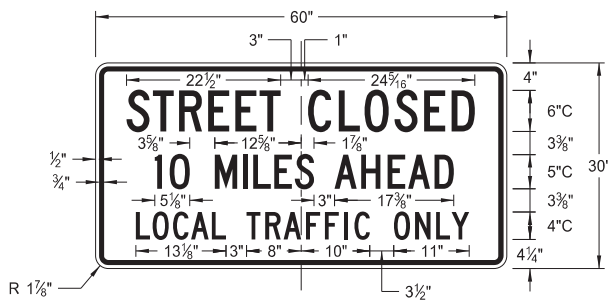
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CONSTRUCTION SIGN DETAILS  
REGULATORY SIGNS

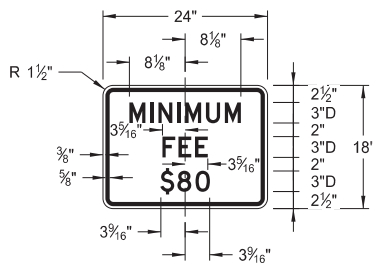
D-704-10



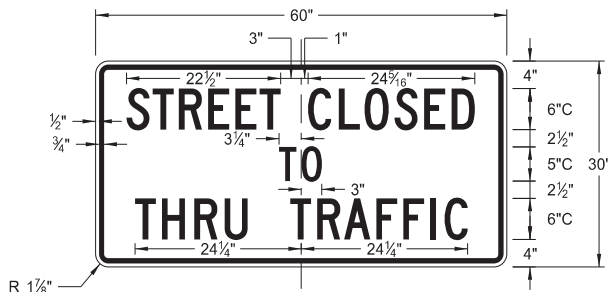
R1-50P-24  
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Background: white



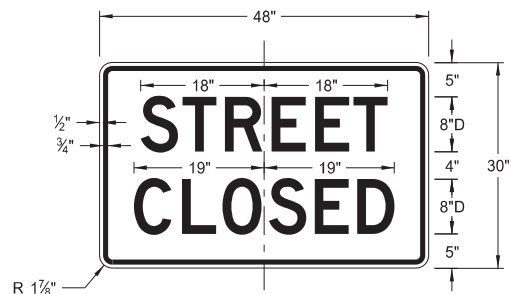
R11-3c-60  
Legend: black (non-refl)  
Background: white



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



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



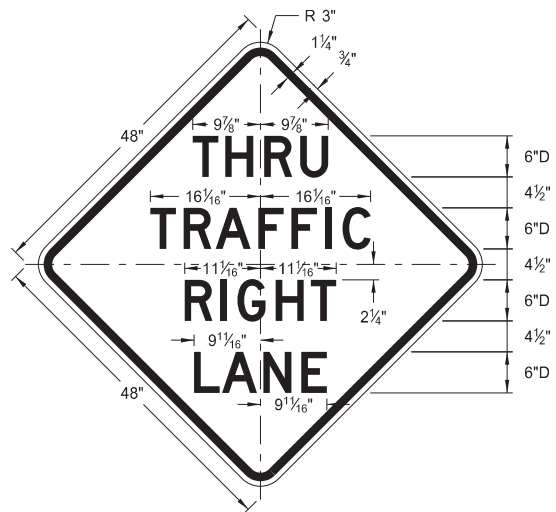
R11-2a-48  
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Background: white

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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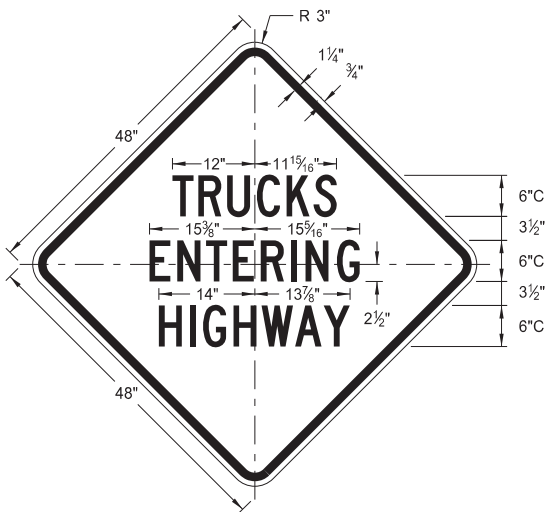
CONSTRUCTION SIGN DETAILS  
WARNING SIGNS

D-704-11



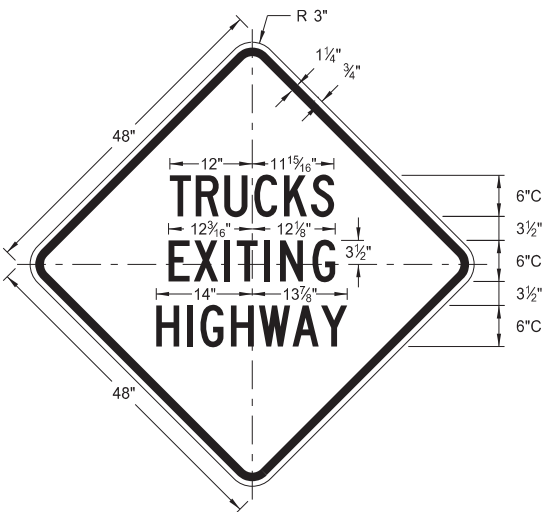
W5-8-48

Legend: black (non-refl)  
Background: orange



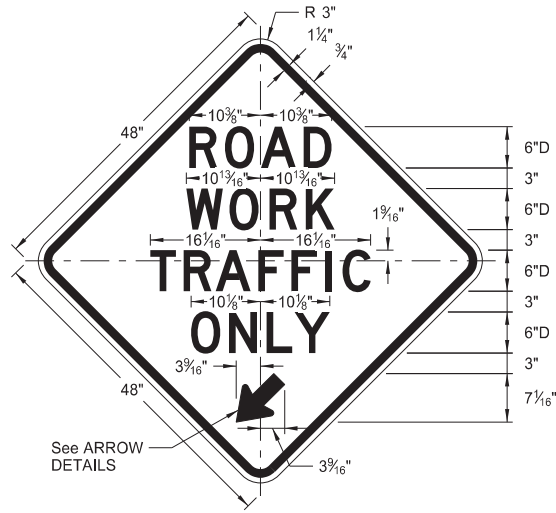
W8-53-48

Legend: black (non-refl)  
Background: orange



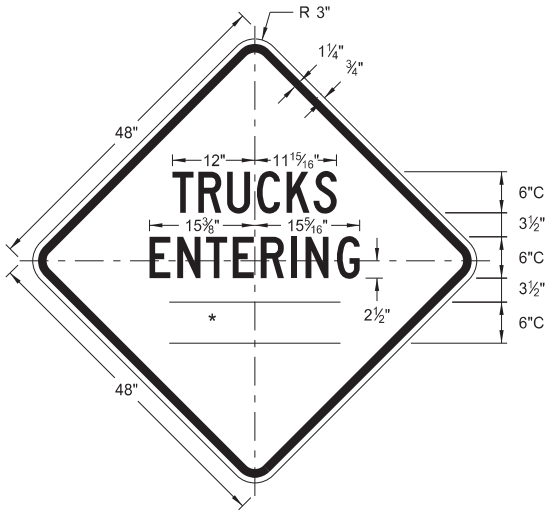
W8-56-48

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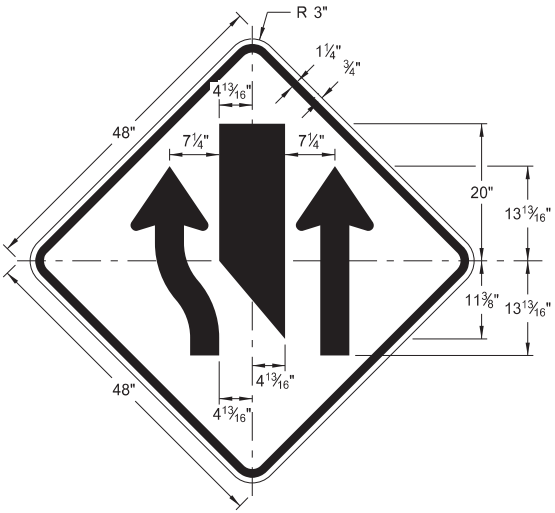
W5-9-48

Legend: black (non-refl)  
Background: orange



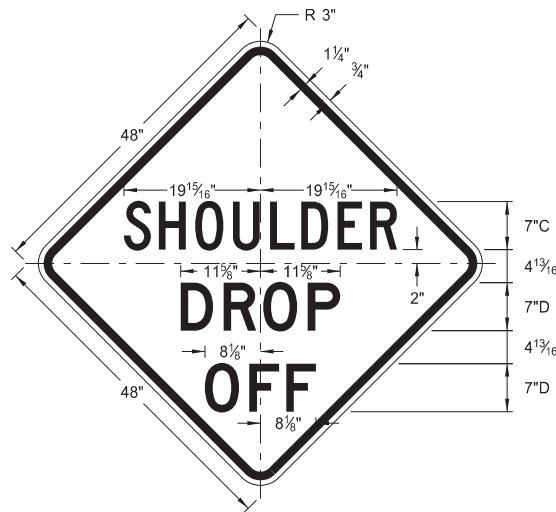
W8-54-48

Legend: black (non-refl)  
Background: orange



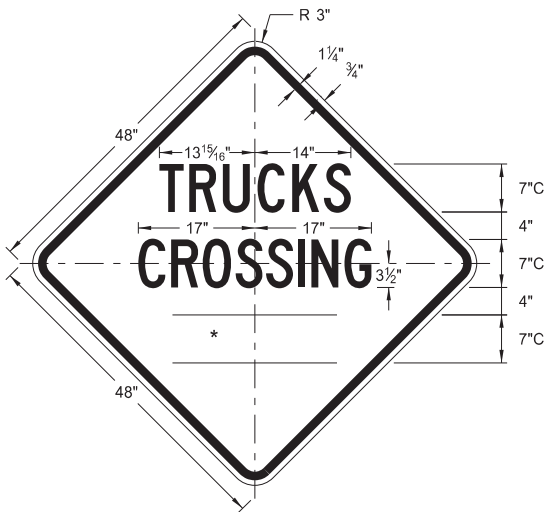
W9-3a-48

Legend: black (non-refl)  
Background: orange



W8-9a-48

Legend: black (non-refl)  
Background: orange

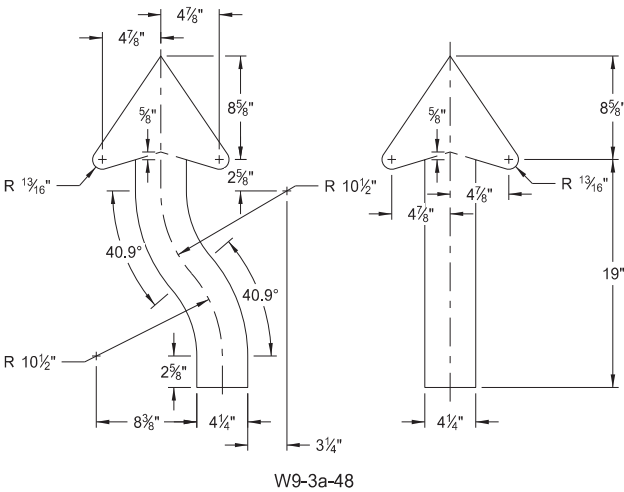
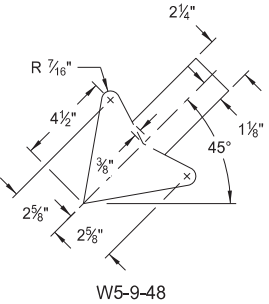


W8-55-48

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%
1/2 MILE	Reduce 50%
1 MILE	Standard

\* DISTANCE MESSAGES



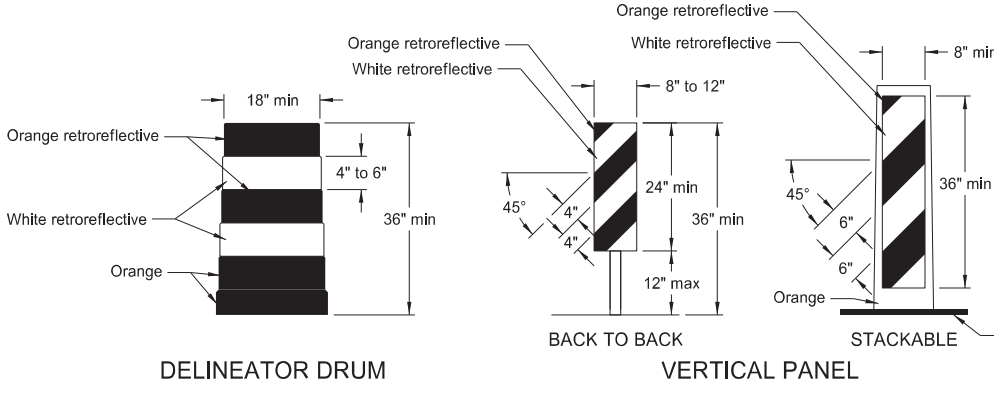
ARROW DETAILS

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

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Registration Number  
PE- 4683 ,  
on 10/03/19 and the original  
document is stored at the  
North Dakota Department  
of Transportation

BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



DELINEATOR DRUM

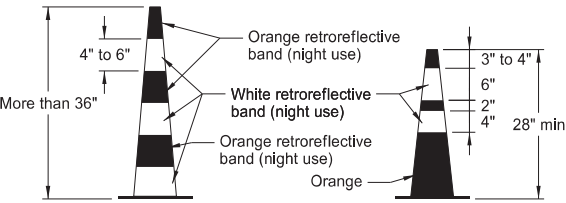
VERTICAL PANEL

STACKABLE

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.

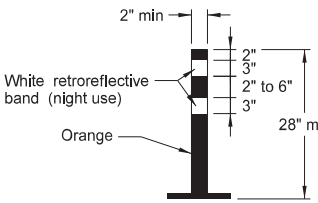
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.

Molded rubber base (min weight 30 lbs)



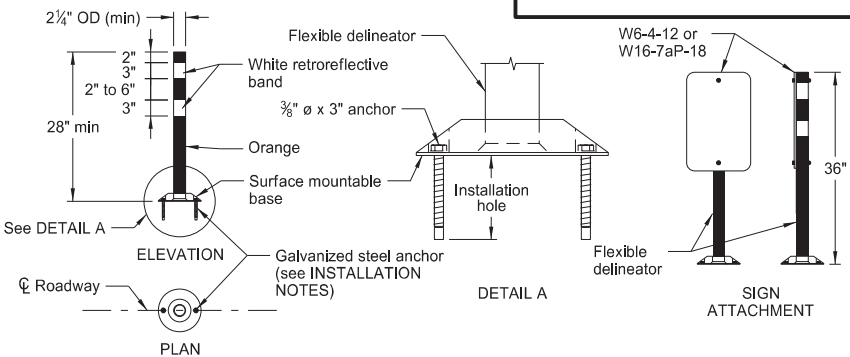
TRAFFIC CONE

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

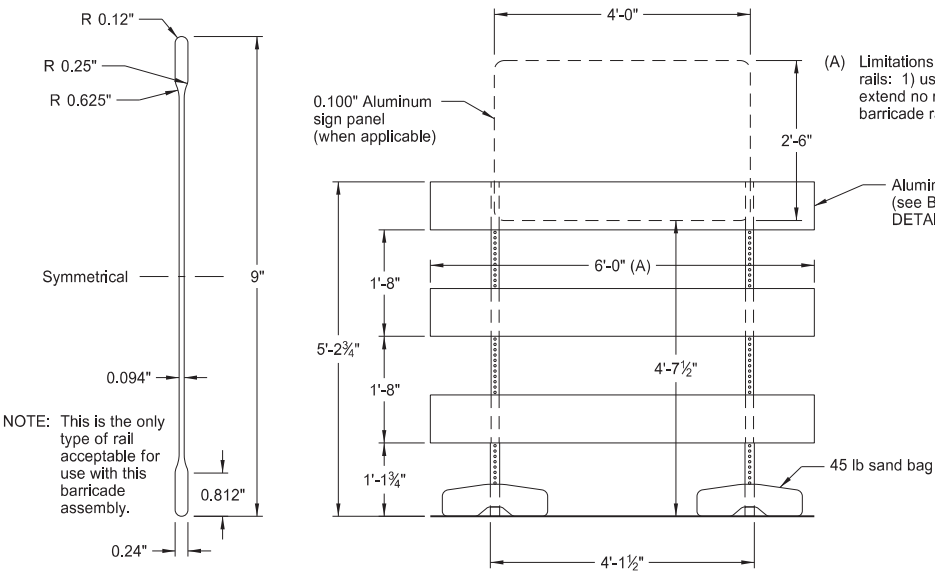
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



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.

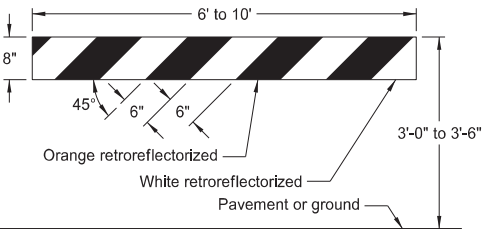


BARRICADE BLADE DETAIL

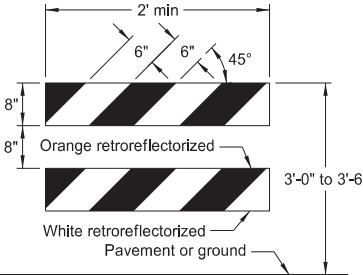
ELEVATION VIEW

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".

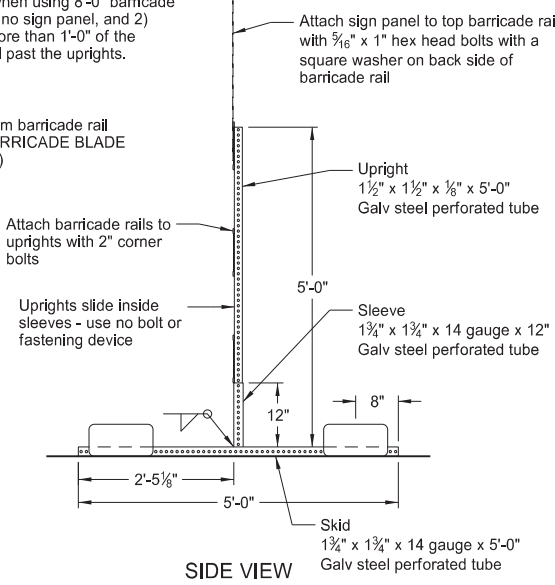


TYPE I BARRICADE



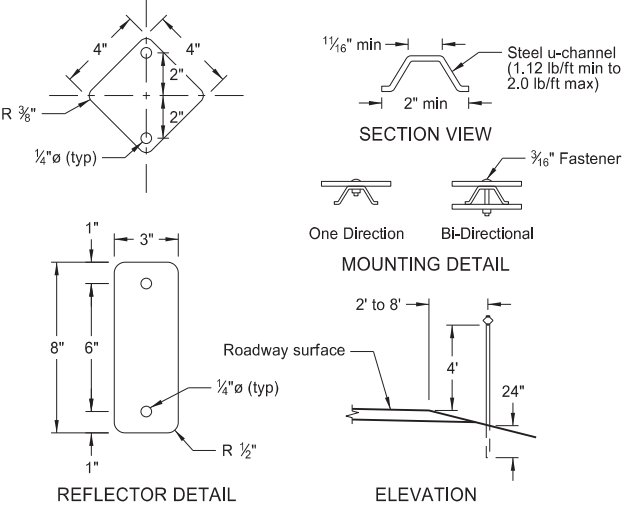
TYPE II BARRICADE

BARRICADE RAIL DETAILS

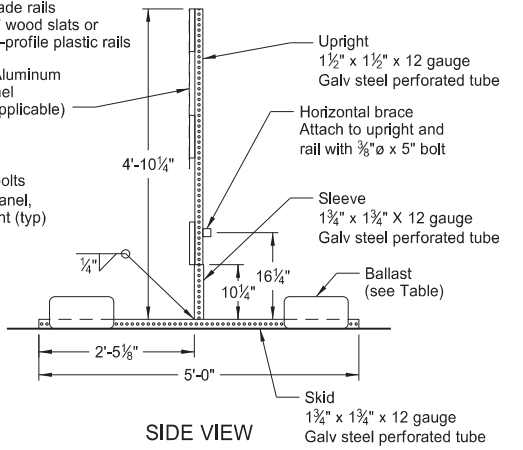


SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)



DELINEATORS



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.

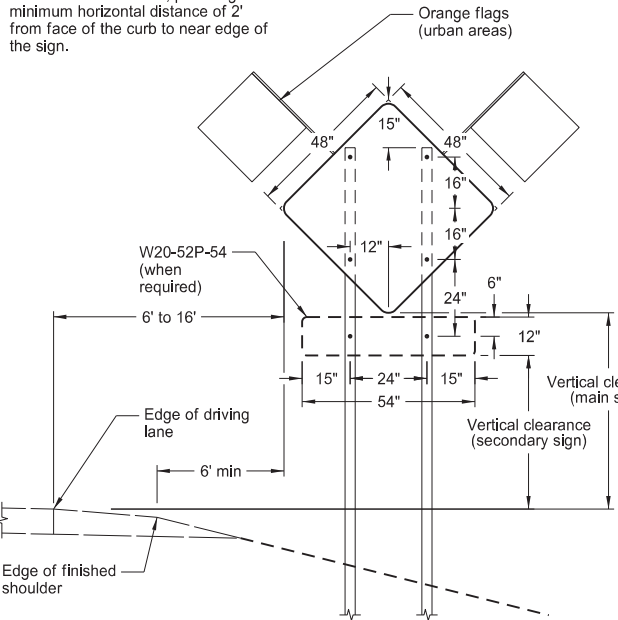
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

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

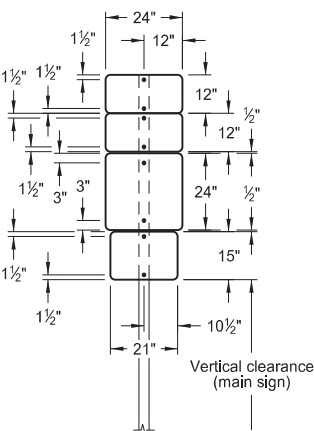
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

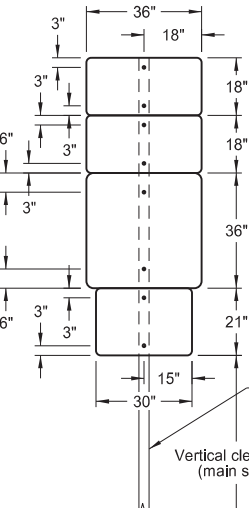
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



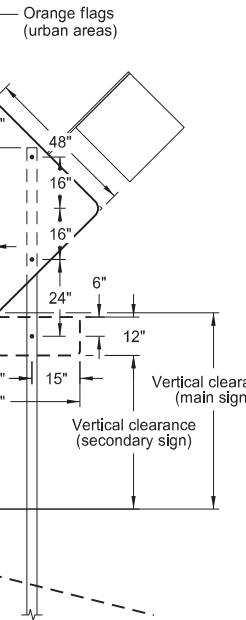
TYPICAL SECTION  
(48" x 48" diamond warning sign shown)



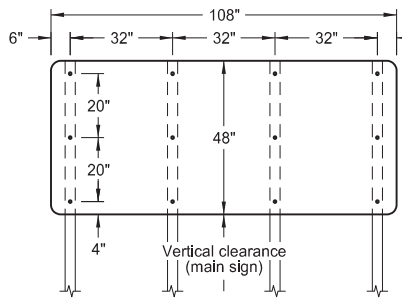
24" x 24"  
ROUTE MARKER  
ASSEMBLY



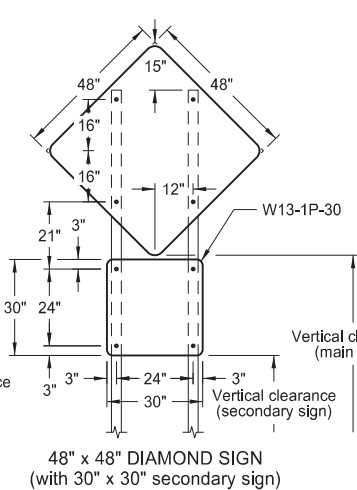
36" x 36"  
ROUTE MARKER  
ASSEMBLY



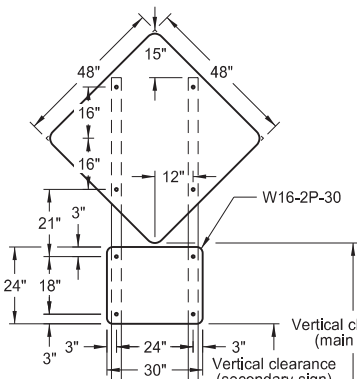
18" x 18"  
DIAMOND SIGN



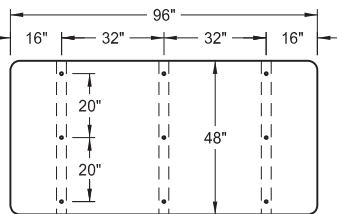
108" x 48" SIGN



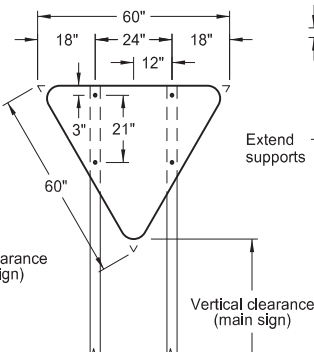
48" x 48" DIAMOND SIGN  
(with 30" x 30" secondary sign)



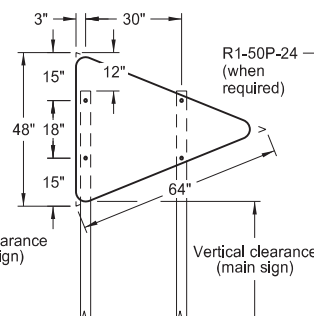
48" x 48" DIAMOND SIGN  
(with 30" x 24" secondary sign)



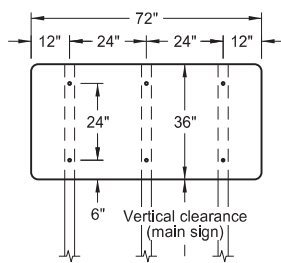
96" x 48" SIGN



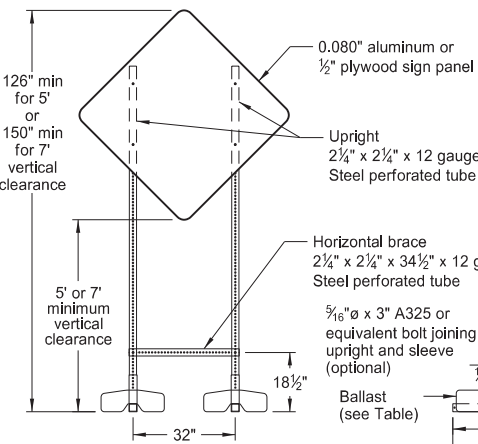
R1-2-60 - YIELD SIGN



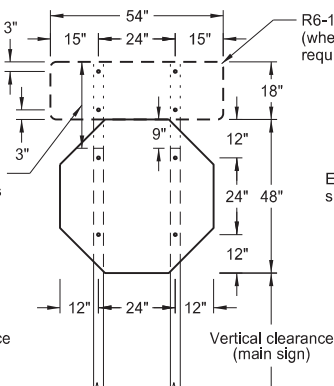
W14-3-64 - PENNANT SIGN



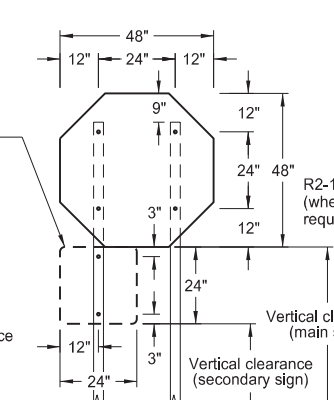
72" x 36" SIGN



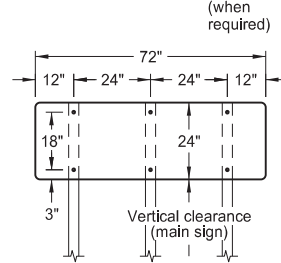
PORTABLE SIGN SUPPORT  
LOW-MOUNTING HEIGHT



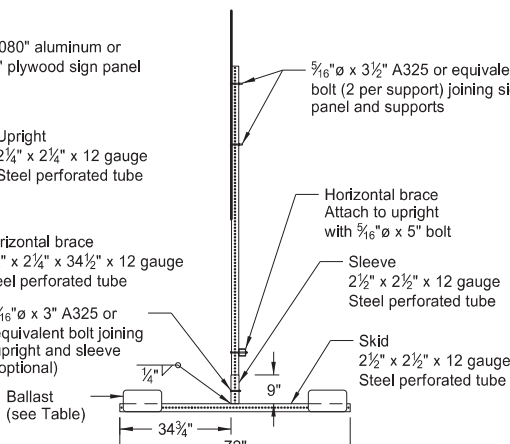
R1-1-48 - STOP SIGN  
(with R6-1-54 sign as required)



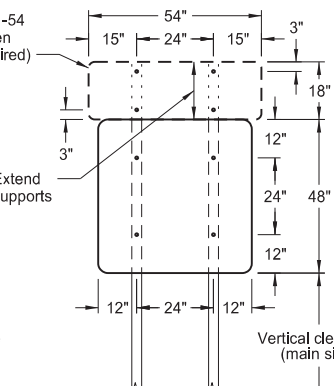
R1-1-48 - STOP SIGN  
(with R1-50P-24 sign as required)



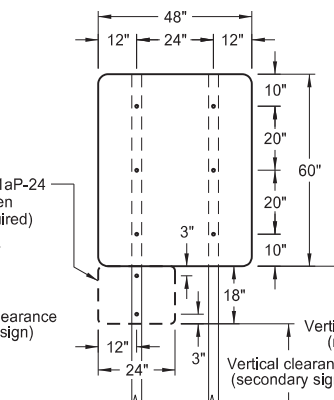
72" x 24" SIGN



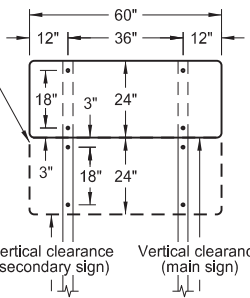
PORTABLE SIGN SUPPORT  
HIGH-MOUNTING HEIGHT



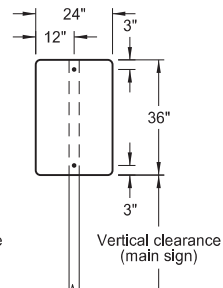
48" x 48" SIGN  
(with R6-1-54 sign as required)



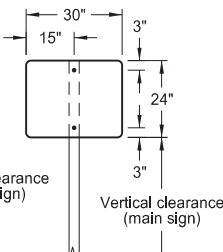
48" x 48" SIGN  
(with R2-1aP-24 sign as required)



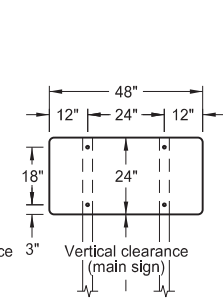
60" x 24" SIGN



24" x 36" SIGN



30" x 24" SIGN



48" x 24" SIGN

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 ⅜" 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

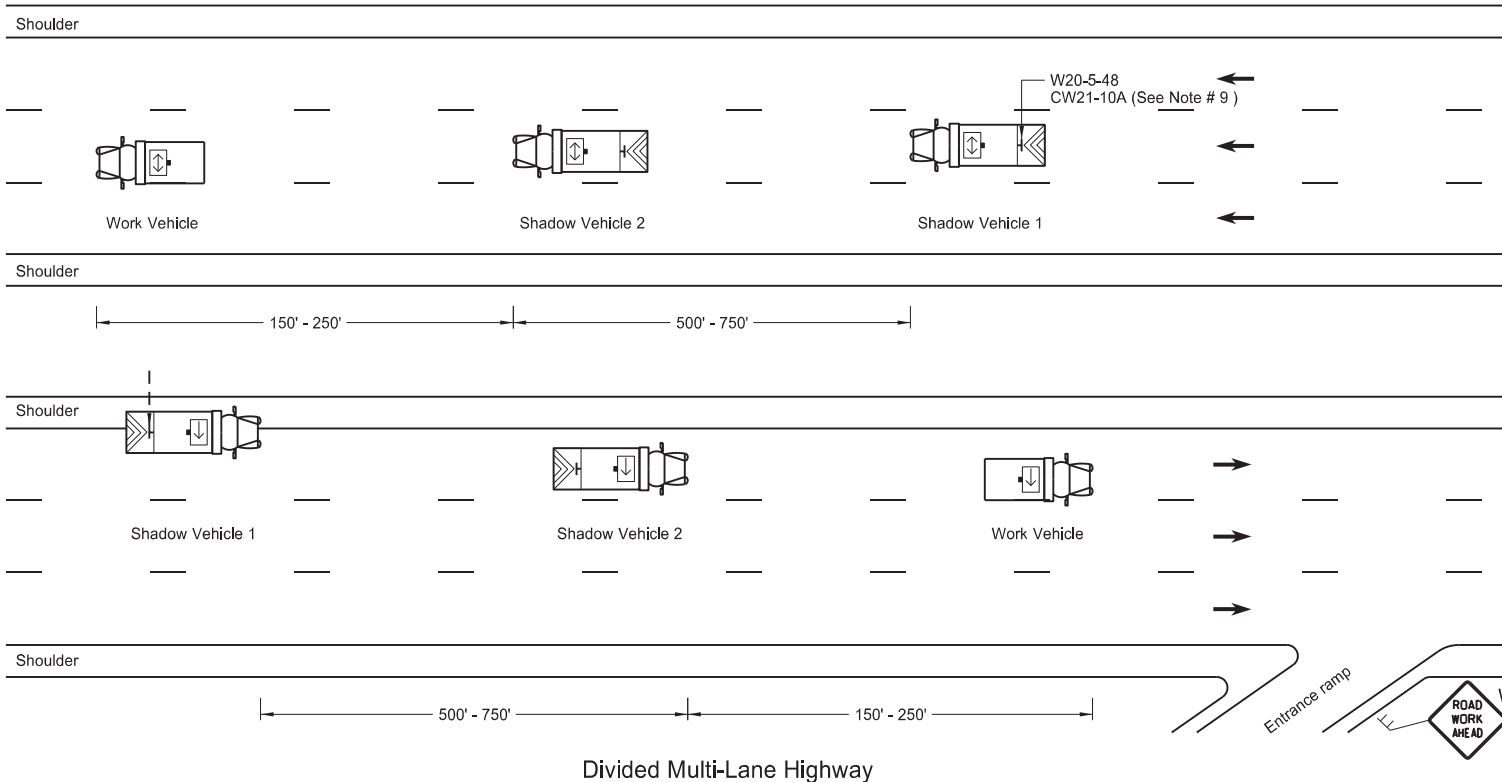
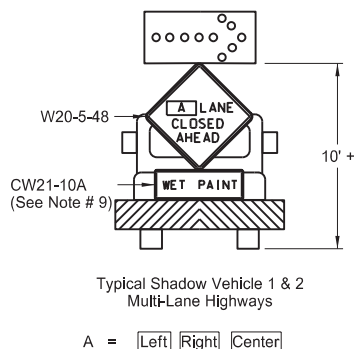
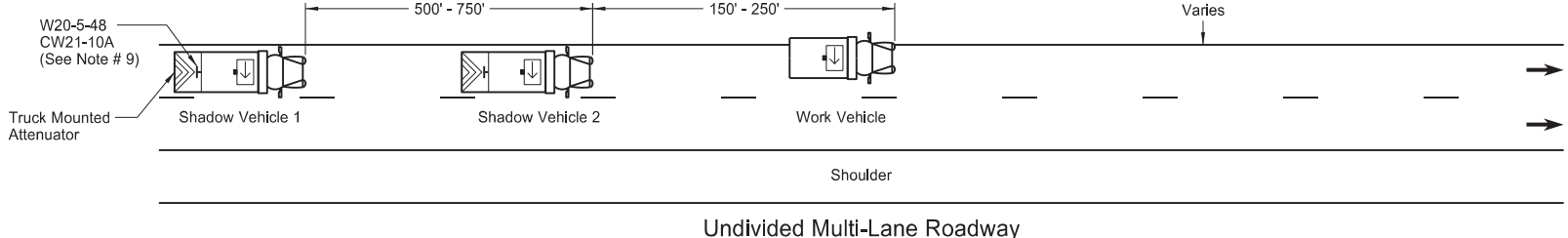
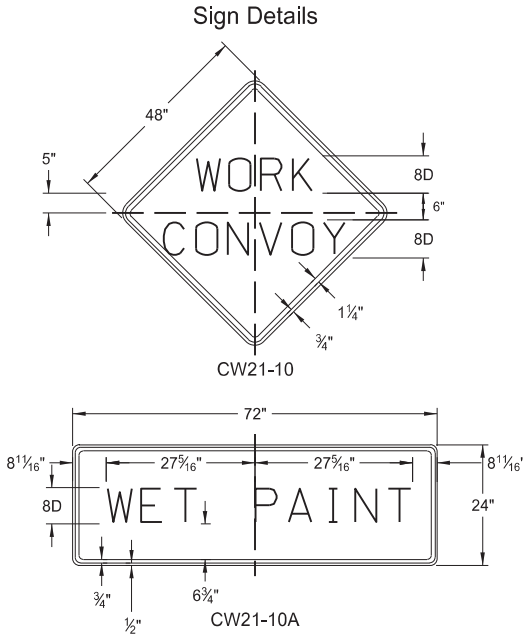
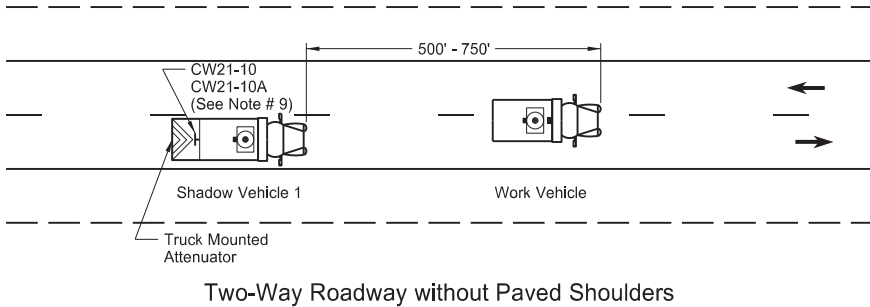
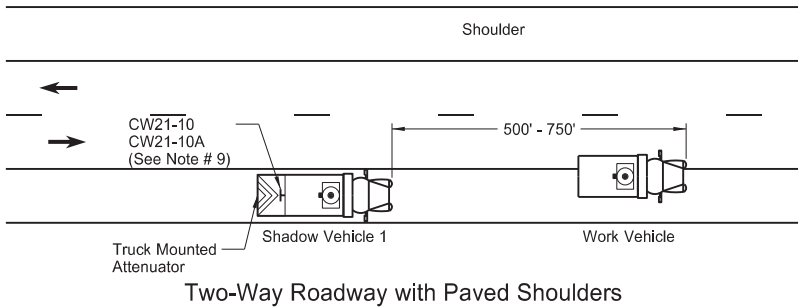
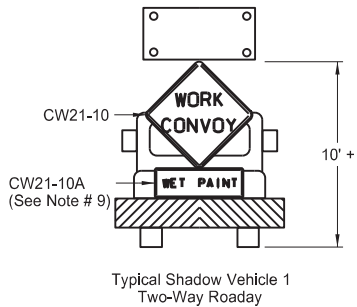
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

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Kirk J Hoff,  
Registration Number  
PE-4683,  
on 11/1/19 and the original document is stored at the  
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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.

KEY

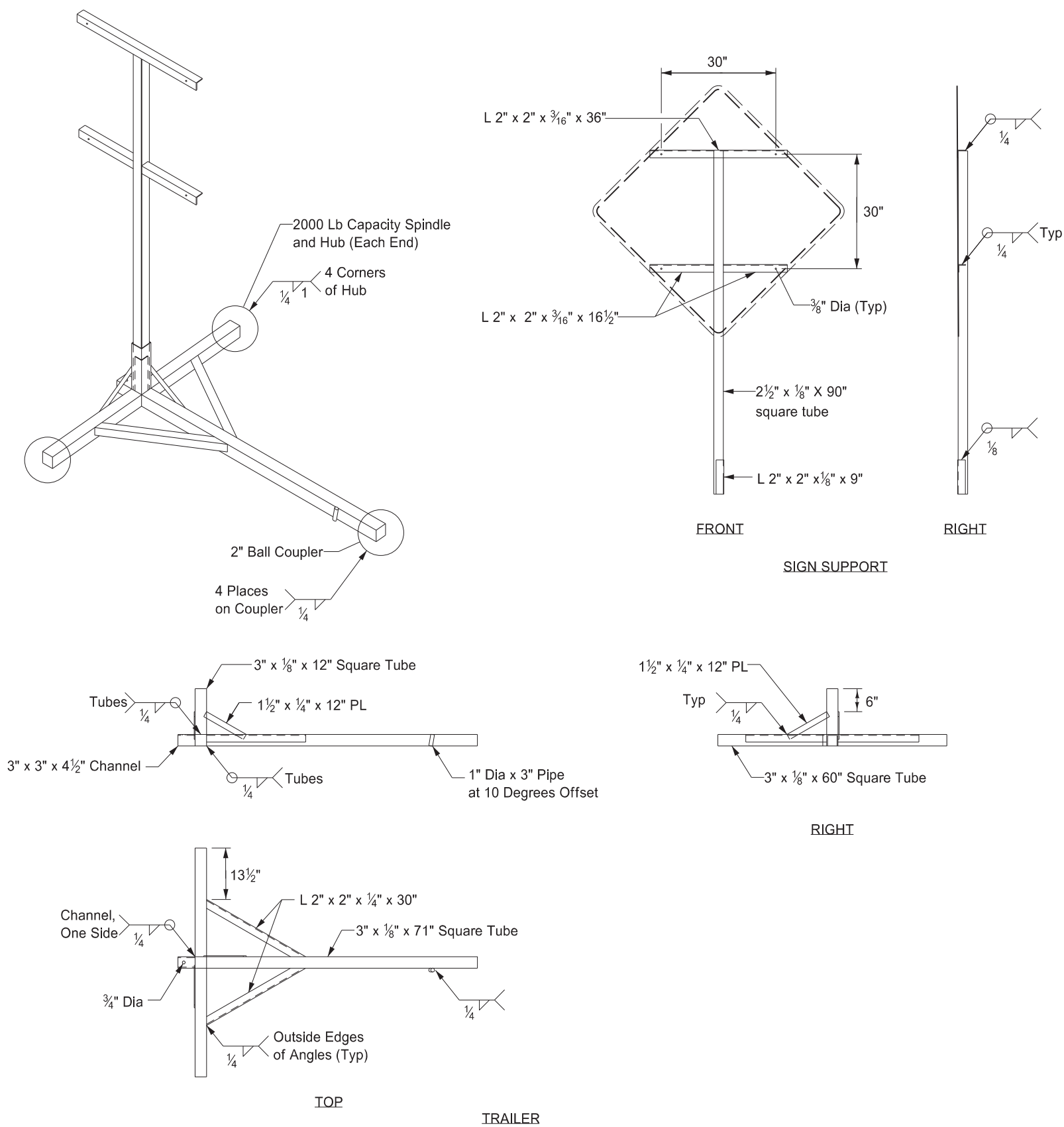
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

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

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

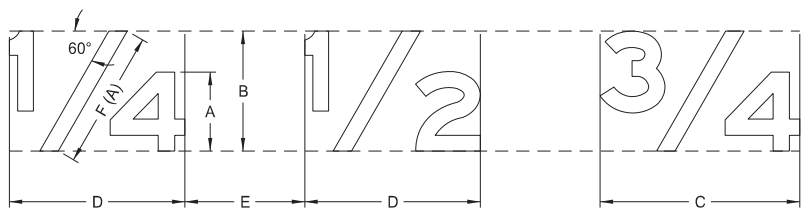
1. Maximum 250 pound weight of assembly.
2. Use a 14" wheel and tire.
3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

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Registration Number  
PE- 4683,  
on 12/2/20 and the original document is stored at the  
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of Transportation

LETTER AND ARROW DETAILS

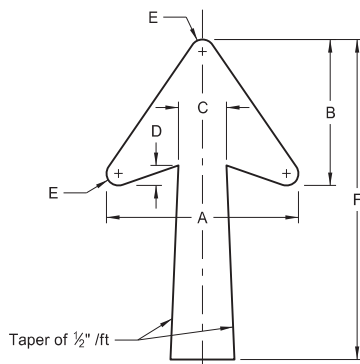
D-754-9



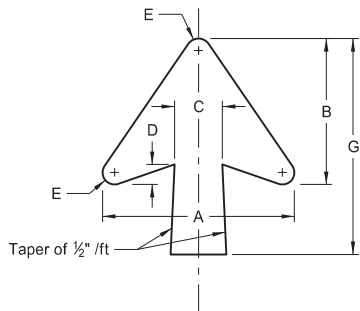
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

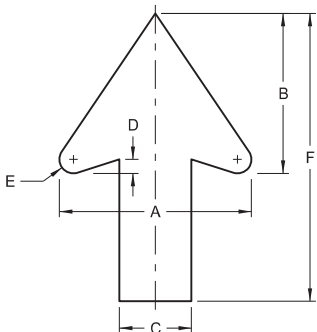
(A) Center diagonal stroke of fraction optically.



TYPE A



TYPE B

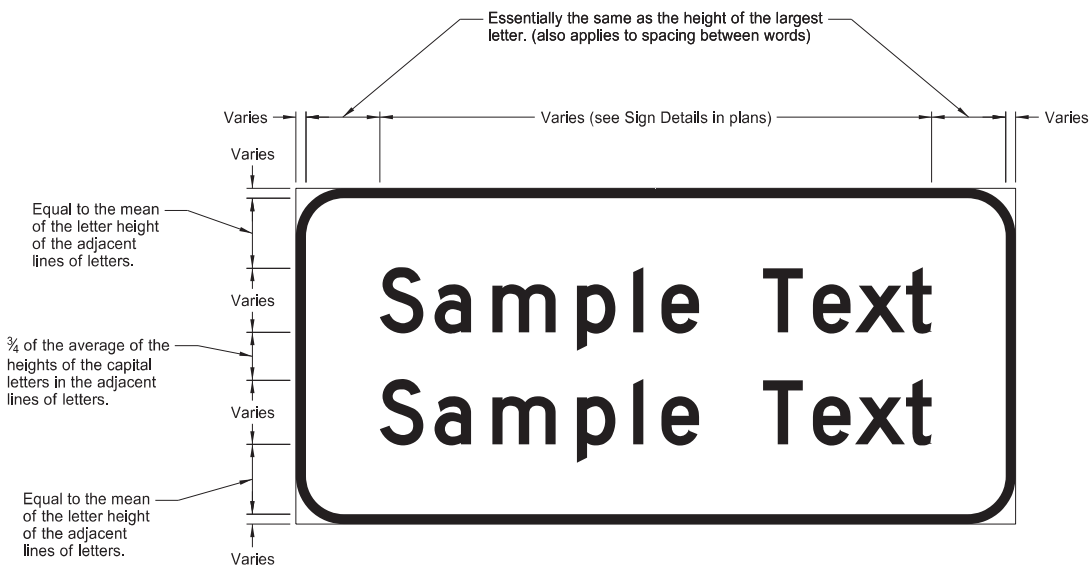


TYPE D

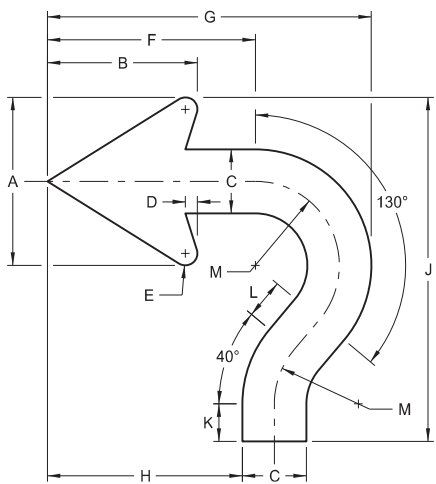
DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G
ND_6IN	6"	12"	9.125"	3"	1"	0.625"	20"	13.5"
ND_8IN	8"	15.125"	11.563"	3.75"	1.313"	0.813"	25"	17"
ND_10IN	10"	18.25"	14"	4.5"	1.5"	0.75"	30"	20"
ND_12IN	12"							
ND_13IN	13.3"							
ND_16IN	16"	22.25"	17"	5.375"	1.75"	1"	35"	25"
ND_20IN	20"							

NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F
ND_2IN	2"	2"	1.625"	0.75"	0.125"	0.125"	3"
ND_4IN	4"	4"	3.313"	1.5"	0.25"	0.25"	6"
ND_6IN	6"	6"	4.875"	2.25"	0.375"	0.375"	9"
ND_8IN	8"	8"	6.625"	3"	0.5"	0.5"	12"
ND_10IN	10"	10"	8.375"	3.75"	0.75"	0.75"	15"
ND_12IN	12"	12"	10"	4.5"	0.875"	0.875"	18"

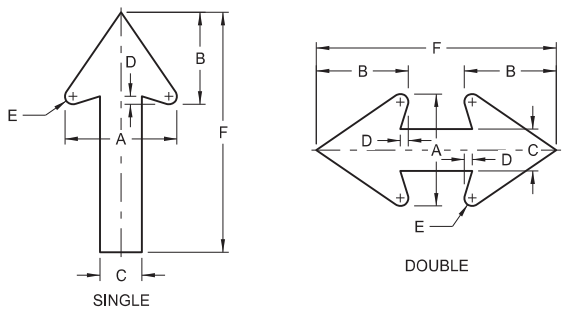


TYPICAL SPACING



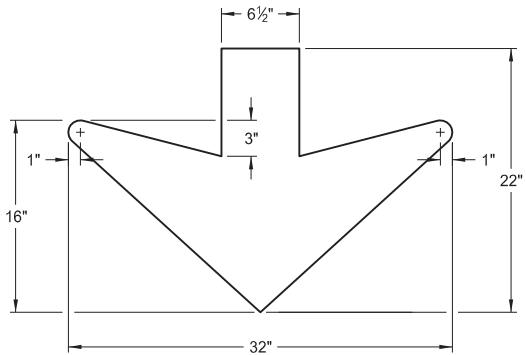
ROUNDBOUT

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G	H	J	K	L	M
ND_6IN	6"	5.25"	4.688"	2"	0.375"	0.375"	6.5"	10.125"	6.094"	10.75"	1.168"	1.25"	2.625"
ND_8IN	8"	7"	5.75"	2.625"	0.5"	0.5"	8.688"	13.5"	8.166"	14.333"	1.557"	1.667"	3.5"



SPECIAL

DESIGNATION	A	B	C	D	E	F	USES
ND_0.75IN	2"	1.625"	0.75"	0.125"	0.125"	7.75"	Parking Signs (Regulatory)
ND_2.625IN	7"	5.75"	2.625"	0.5"	0.5"	15"	Frontage Road Signs



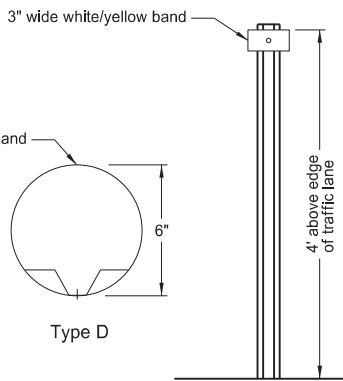
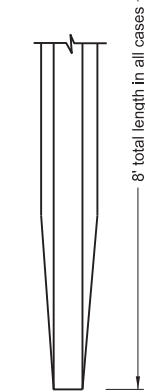
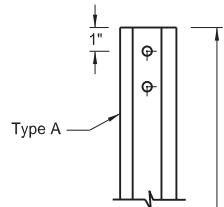
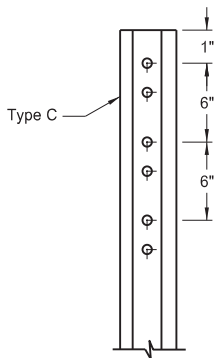
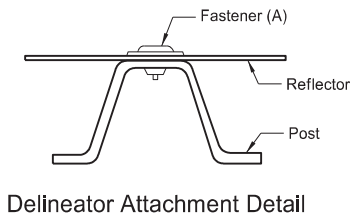
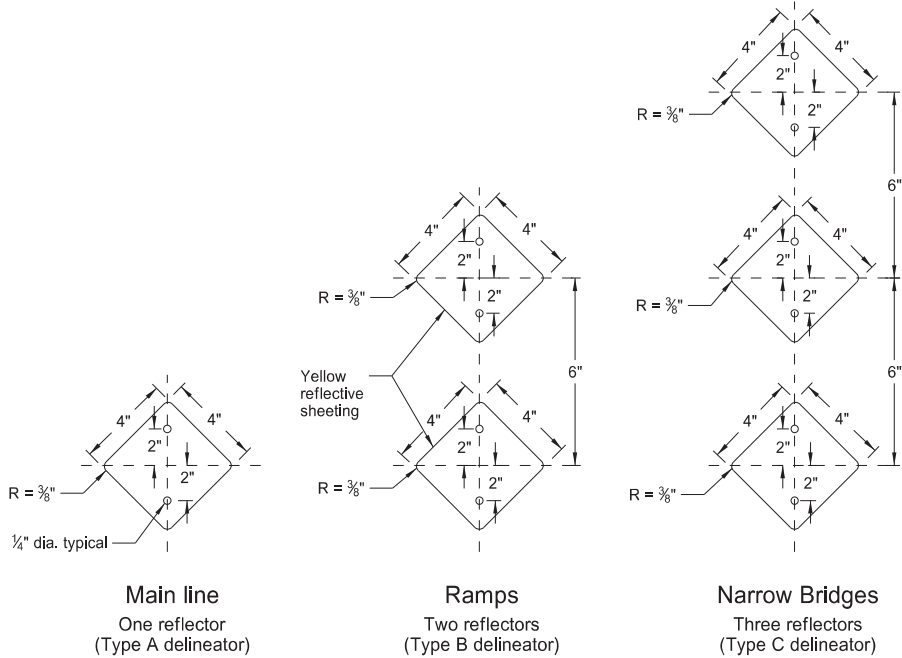
DOWN ARROW

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow
5-4-16	Revised Distance & Destination and Typical Spacing details
4-23-18	Revised arrow details
8-30-18	Updated notes to active voice.
8-29-19	New Design Engr PE Stamp.

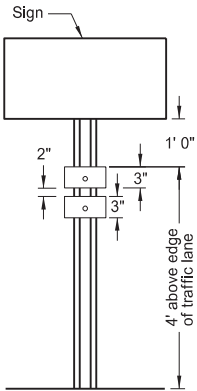
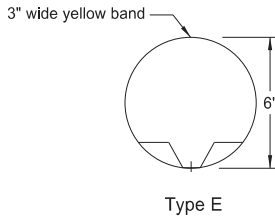
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Registration Number  
PE- 4683,  
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of Transportation

REFLECTORIZED DELINEATORS

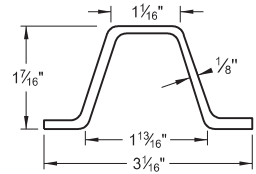
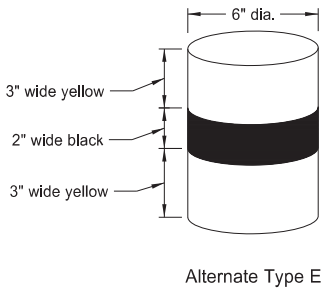
D-754-21



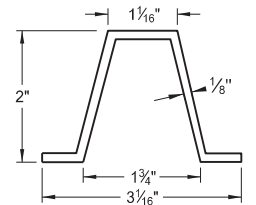
Median  
One reflector  
(Type D delineator)



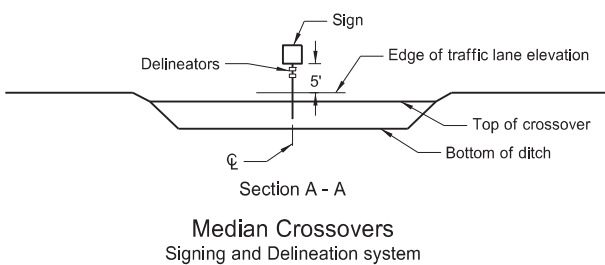
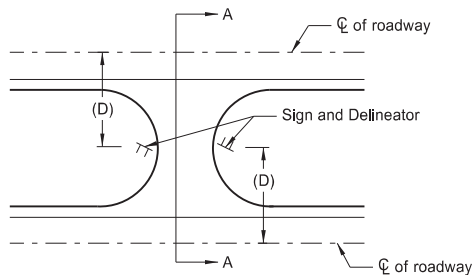
Median  
Two reflectors  
(Type E delineator)



Approx. 2.0 lbs/ft



Approx. 0.88 lbs/ft



Delineator Details  
Type A, B, and C

Installation: Install posts along the right shoulder line unless shown otherwise on the plans.

Reflectors: Use reflector of the same color as the adjacent pavement marking.

Spacing: For delineator spacing along main line tangents and curves with radius greater than 11500' (less than 0° 30') use 528' centers. For curves with a radius less than 11500', but greater than 1200', use 264' centers. With curves less than 1200' use spacing (S) = 3\*(Square Root(R))-50

Type E

Alternate: As an alternate, use one unit band consisting of two yellow stripes separated by a 2" black stripe in place of two 3" yellow bands.

(A) Use a 3/8" dia tension pin type or other non-rust vandal resistant fastener with min 1 3/16" outside dia flat washer.

(B) Drill only those holes required to attach the number of reflectors on that post, or drill all the posts the same so that any number of reflectors may be added.

(C) Mount reflector facing traffic at an angle of 93° away from oncoming traffic.

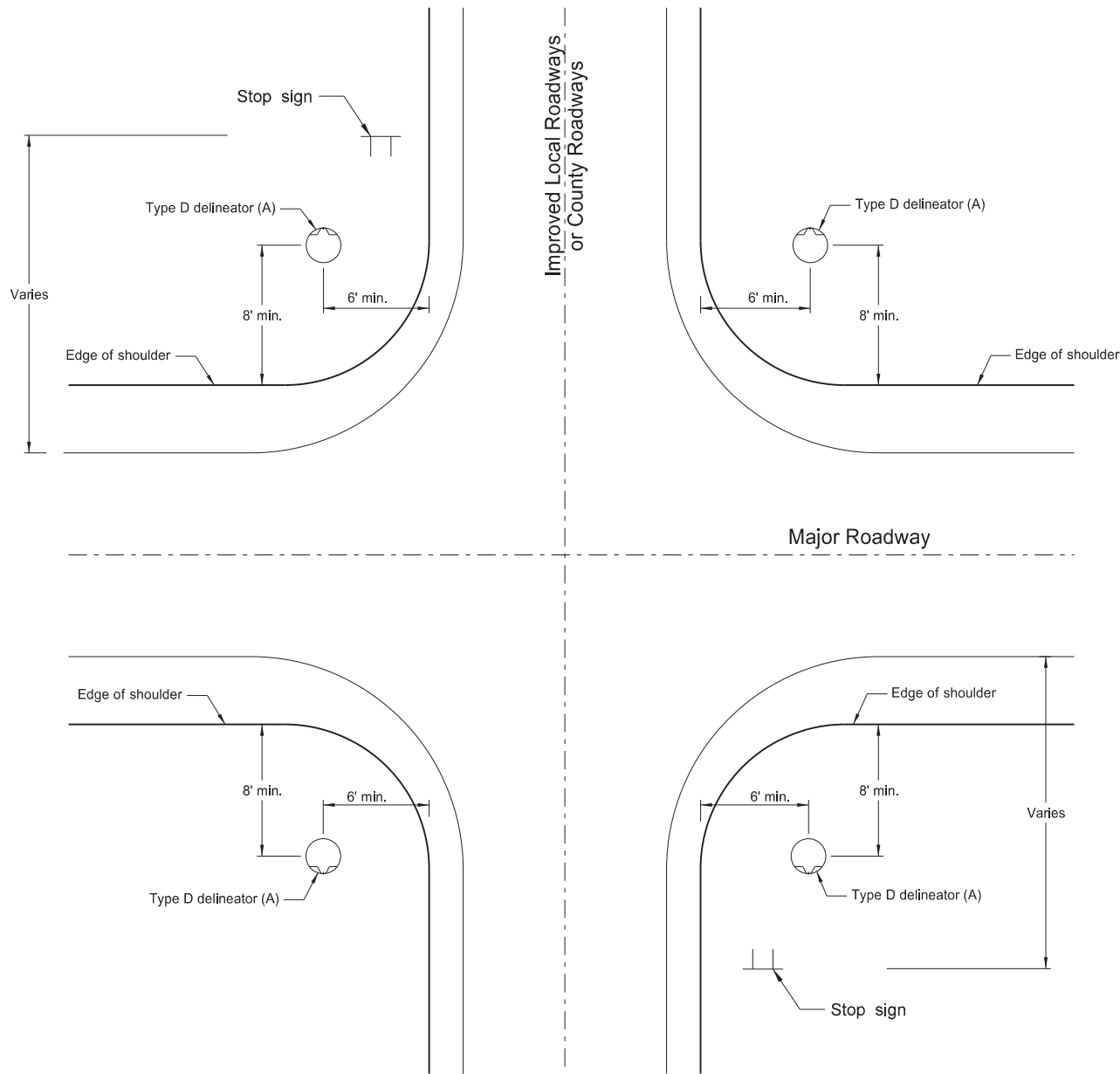
(D) The median width may vary. Place sign and delineator assembly in the median crossover an equal distance from each roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-19-14 10-25-19	Revised reflective sheeting. Updated notes to active voice and revised Median detail.

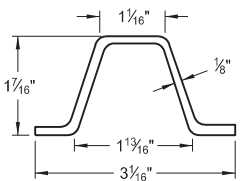
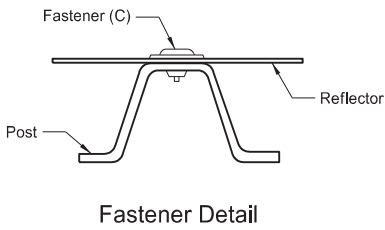
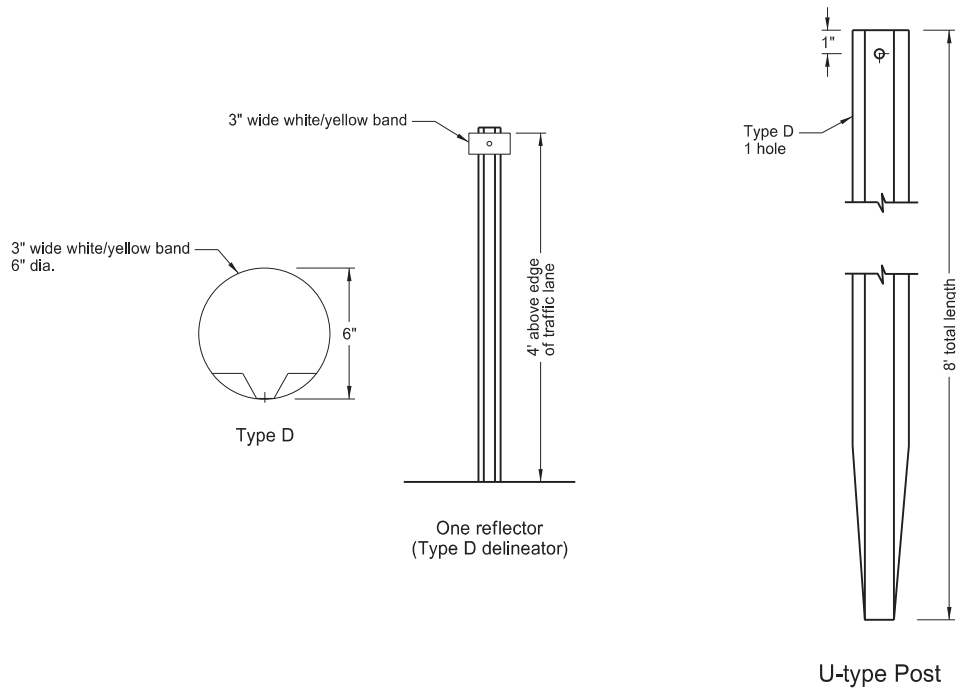
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APPROACH DELINEATION

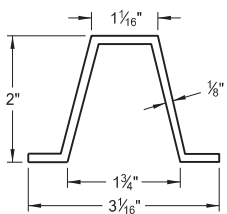
D-754-22C



- (A) Install delineators as shown in the plan layout. When a stop sign is present, place a delineator on the stop sign post at the height shown for the delineator. Place the opposite delineator directly across from the stop sign.
- (B) Drill only those holes required to attach reflectors on the post or provide posts with holes the entire length at 1" centers.
- (C) Use tension pin type or other non-rust vandal resistant  $\frac{3}{8}$ " diameter fastener with a min  $1\frac{3}{16}$ " outside diameter flat washer.



Steel Post Detail  
(approx. 2 lb/ft)



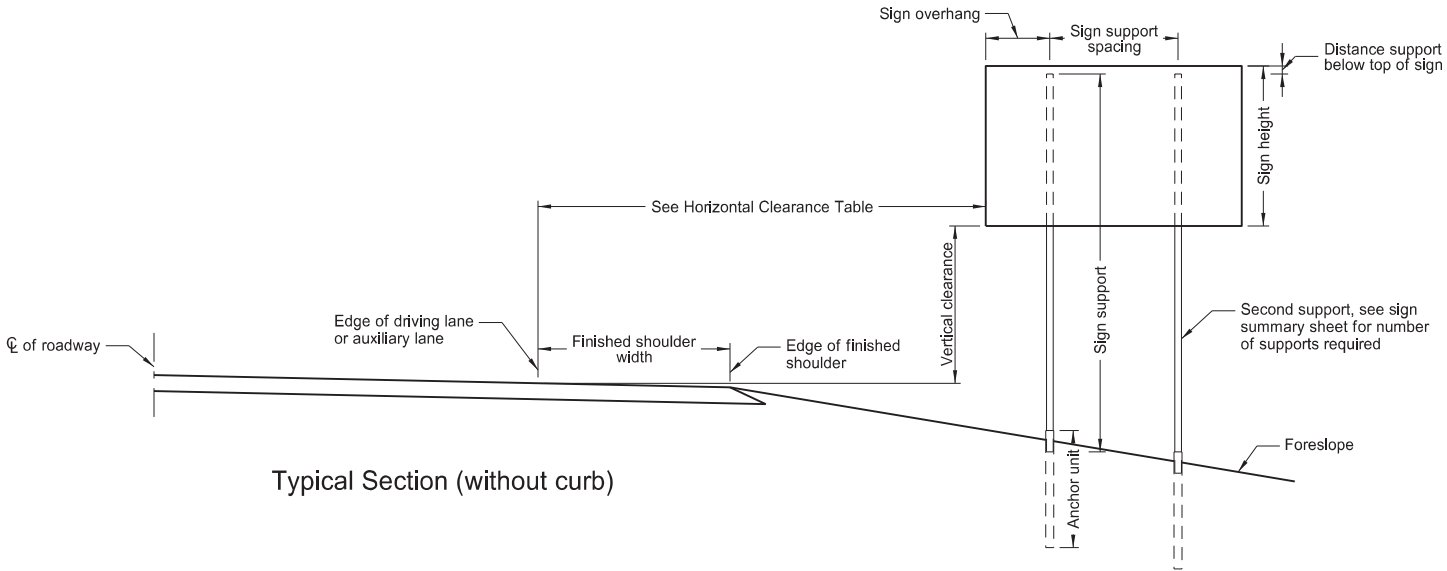
Aluminum Post Detail  
(approx. 0.88 lb/ft)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18 8-29-19	Updated notes to active voice. New Design Engineer PE Stamp.

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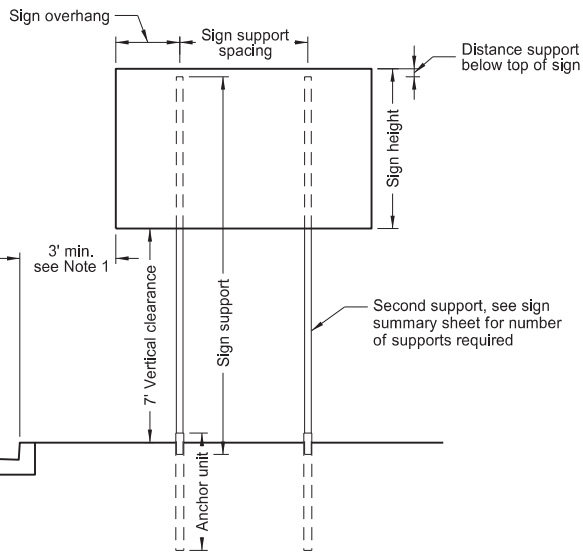
Notes:

- 1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
- 2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.  
  
Install signs on expressways a minimum height of 7'.  
  
Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.  
  
Maximum vertical clearance is 6" greater than the minimum vertical clearance.
- 3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
- 4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

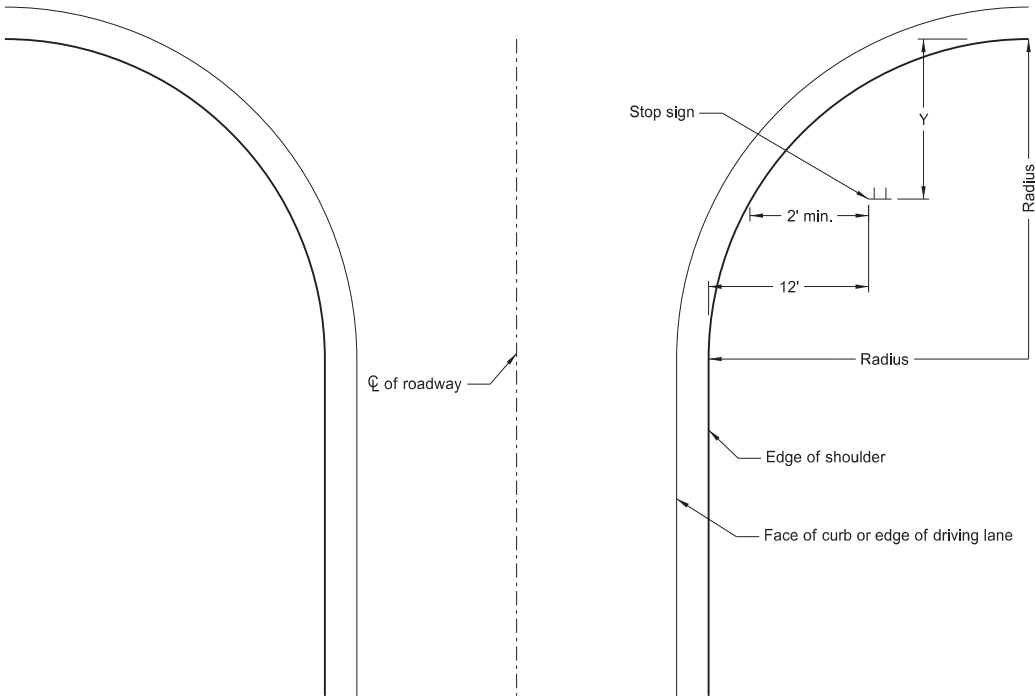


Typical Section (without curb)

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

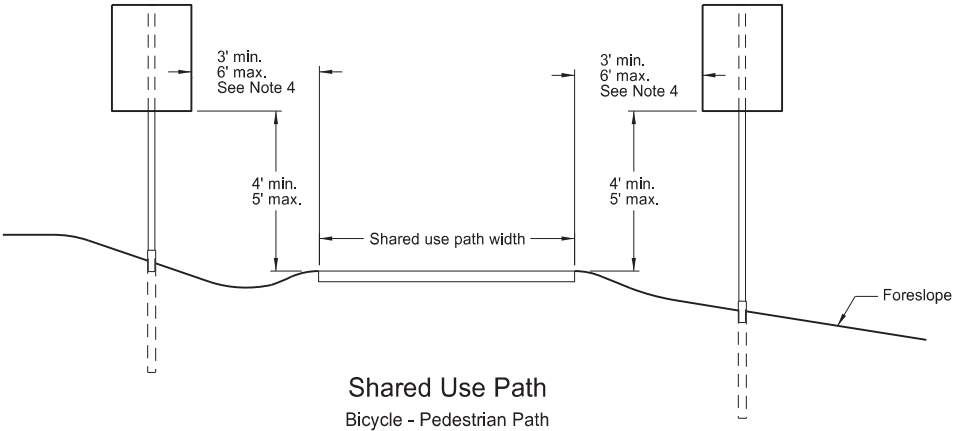


Typical Section (with curb)  
Residential or Business District



Stop Sign Location  
Wide Throat Intersection  
Use layout for the placement of "Stop" signs.

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



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-9-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.

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of Transportation



Breakaway Coupler System  
for Perforated Tubes

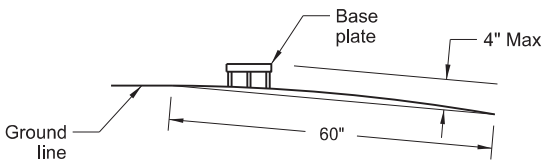
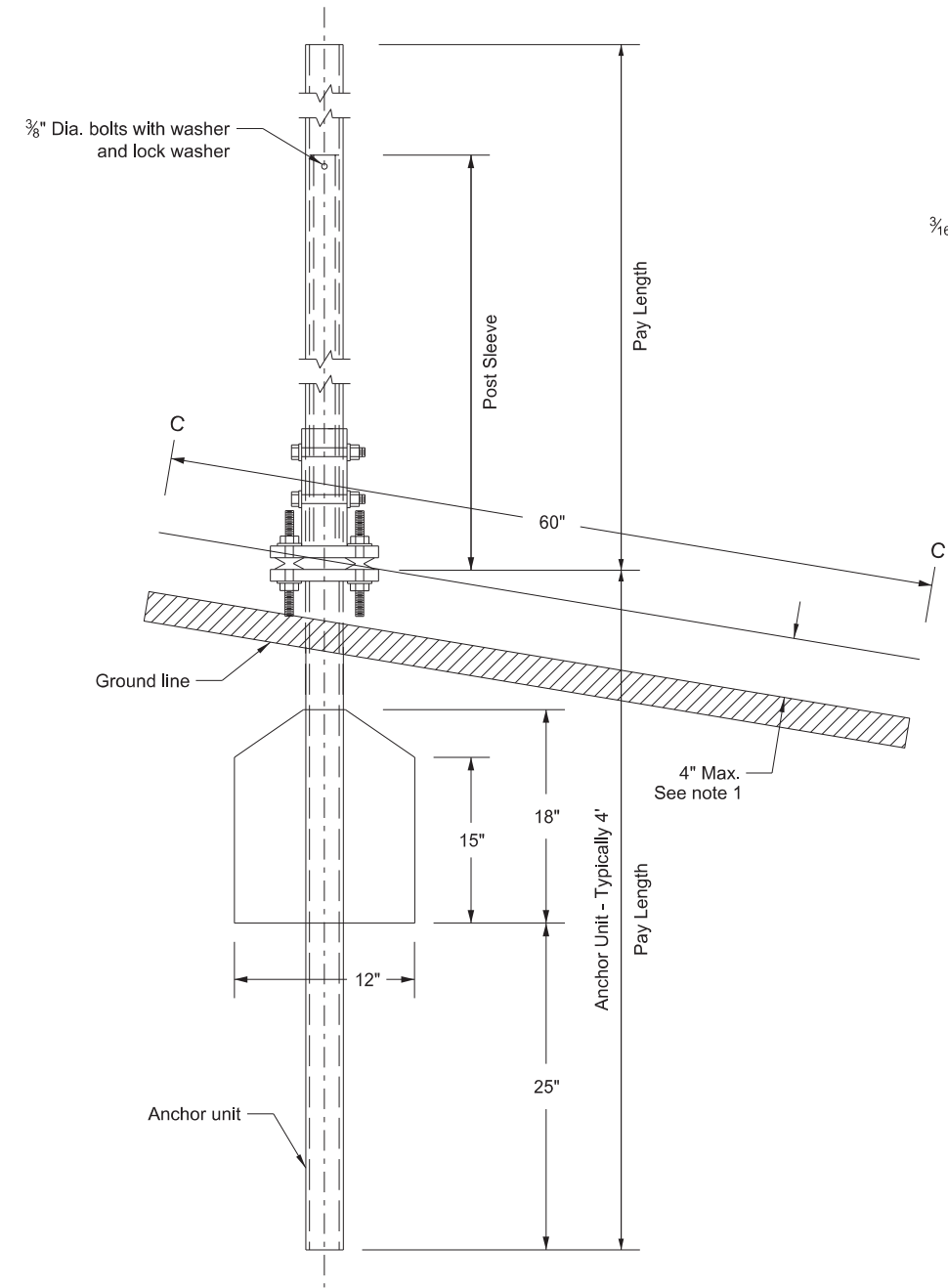
Notes:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- Use anchor unit of the same size and specification as the post.
- Provide a minimum 8' distance between the first and fourth post on four post signs.
- Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2¾	10	Yes		7

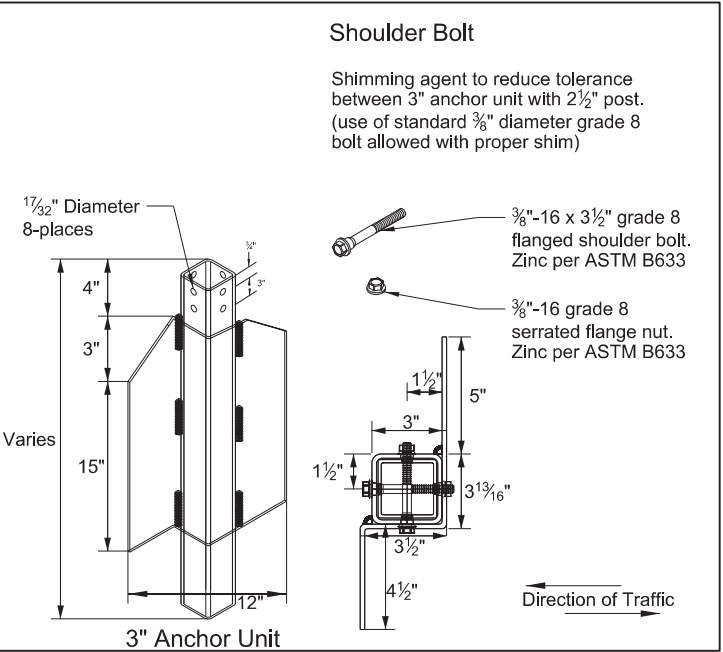
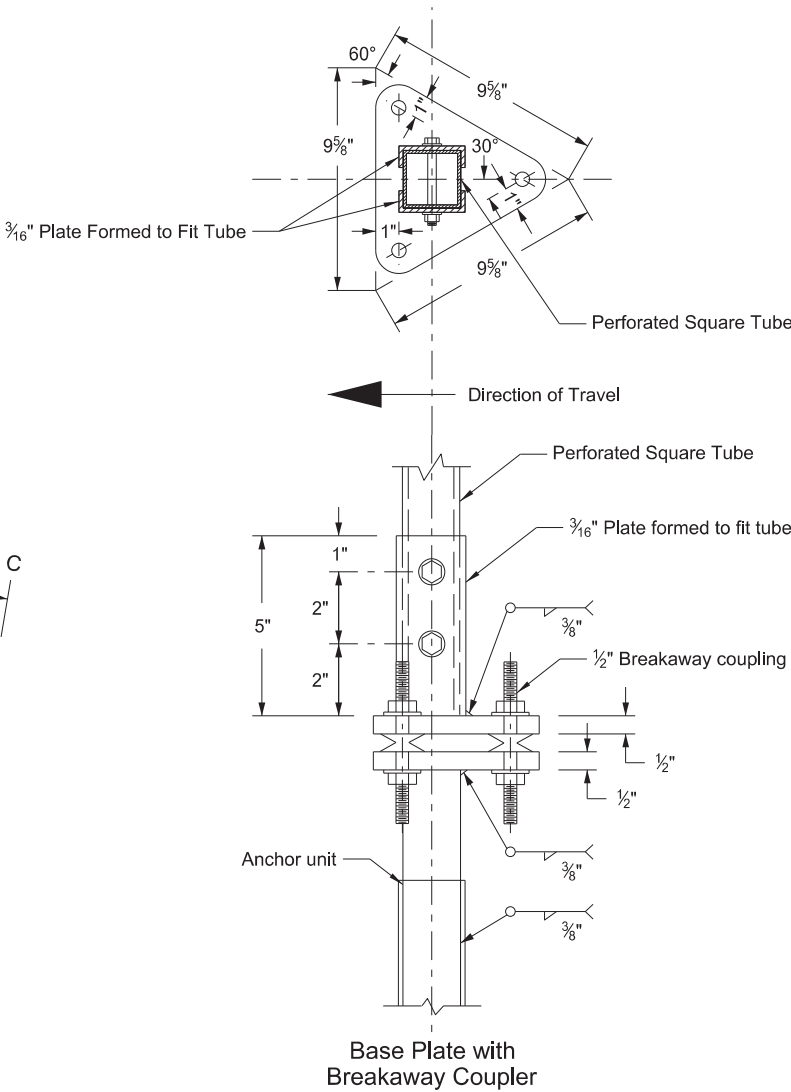
(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit



Section C-C

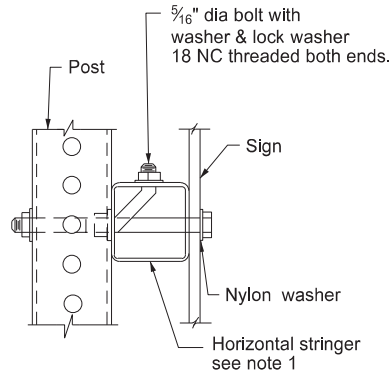
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



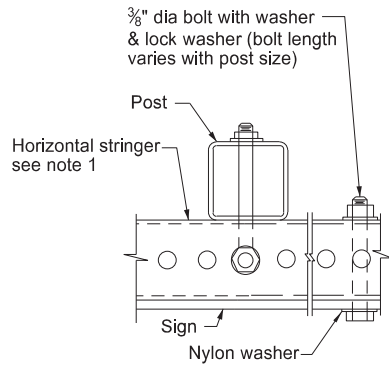
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

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Mounting Details Perforated Tube

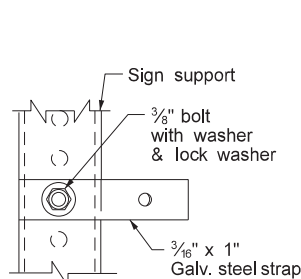


Side View

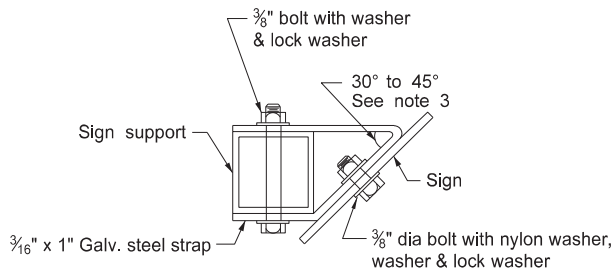


Top View

STRINGER MOUNTING  
(WITH STRINGER IN FRONT OF POST)

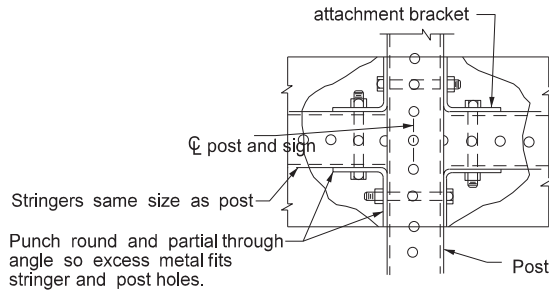


Side View

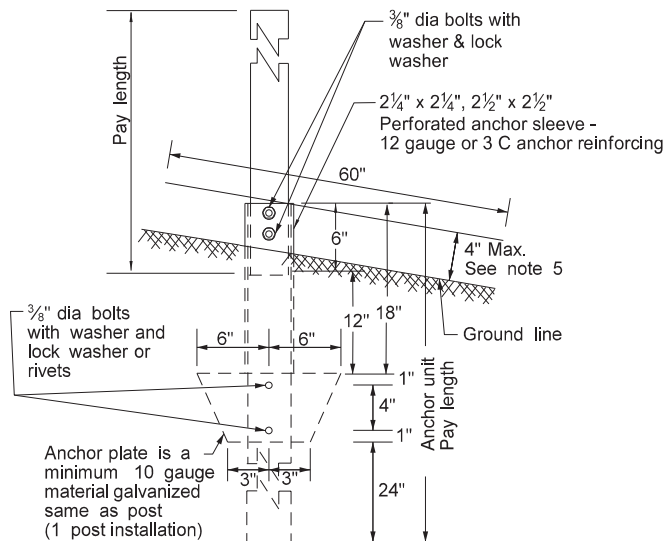


Top View

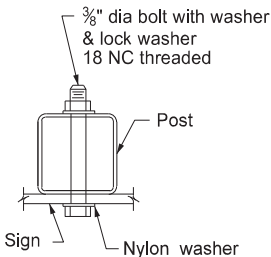
STRAP DETAIL



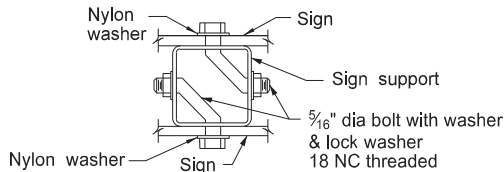
STREET NAME SIGNS AND ONE WAY SIGNS  
SINGLE POST ASSEMBLY  
ONE STRINGER OR BACK TO BACK MOUNTING



ANCHOR UNIT AND POST ASSEMBLY

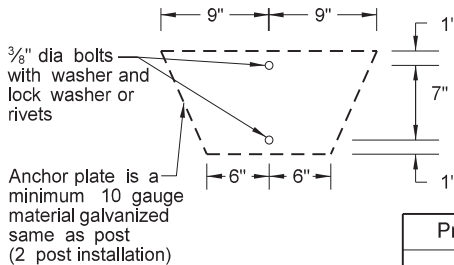


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. <sup>4</sup>	Cross Sect. area In. <sup>2</sup>	Section Modulus In. <sup>3</sup>	
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 3/16 x 2 3/16	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	0.783	

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.  
The 2 1/2" size is shown as 2.51" size on the plans.

Note:

- Horizontal stringers - Use perforated tubes or 1 3/4" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
- Use minimum outside diameter 15/16" ± 1/16" and 10 gauge thick metal washers on sign face.
- Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
- Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

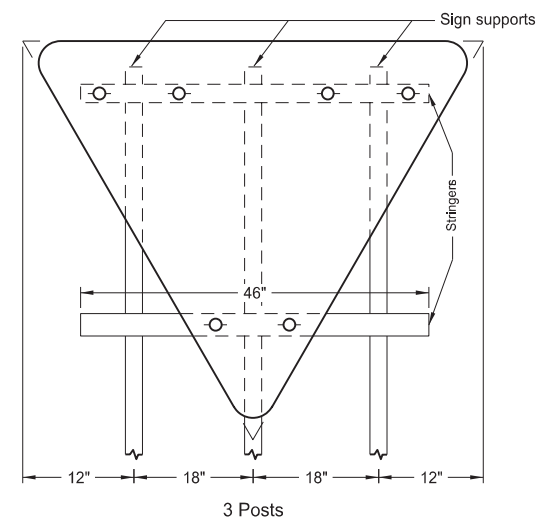
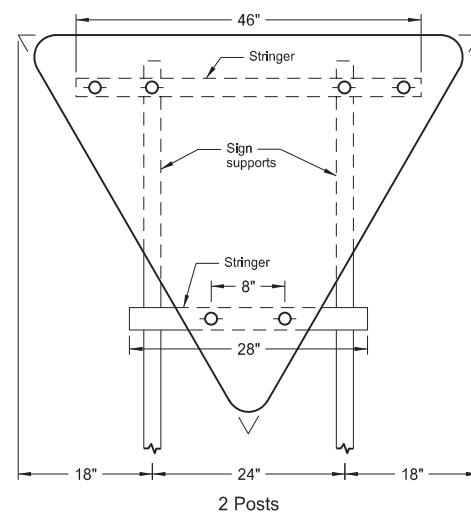
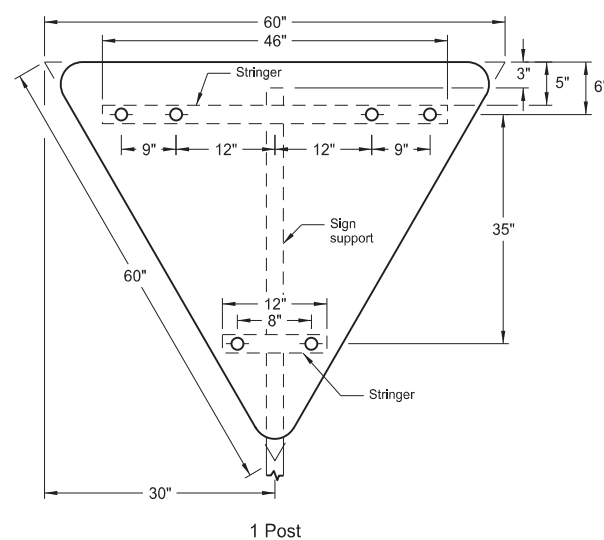
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

(B) - When placing 2 1/2", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.  
(C) - 3" anchor unit  
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-8-09	
REVISIONS	
DATE	CHANGE
7-8-14 8-30-18 8-30-19	Revised Note 3. Updated notes to active voice. New Design Engr PE Stamp.

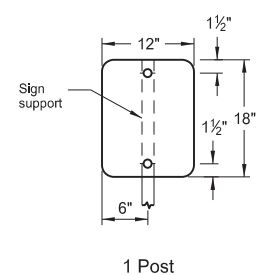
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## SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

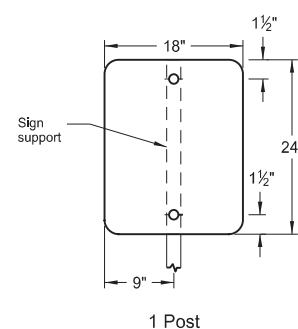


Assembly No. 6

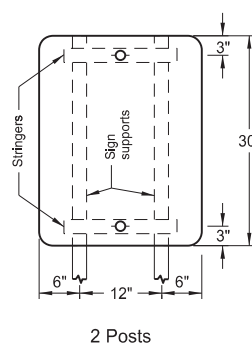
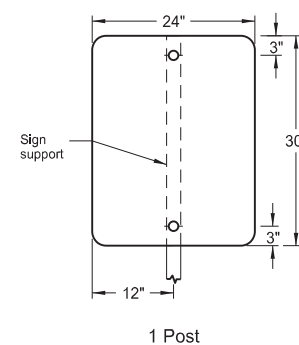
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Use 1½" x 1½" perforated square tube stringers.
  3. Punch holes round for ⅜" bolt.



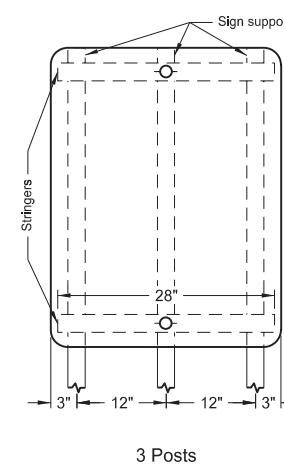
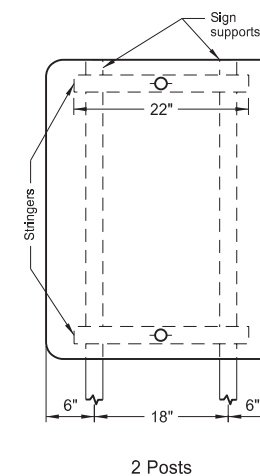
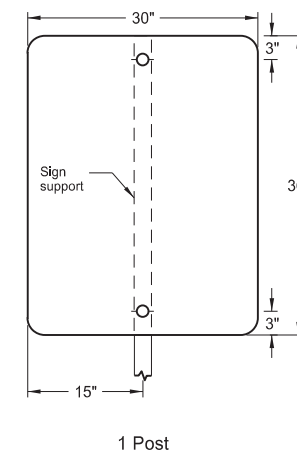
Assembly No. 7



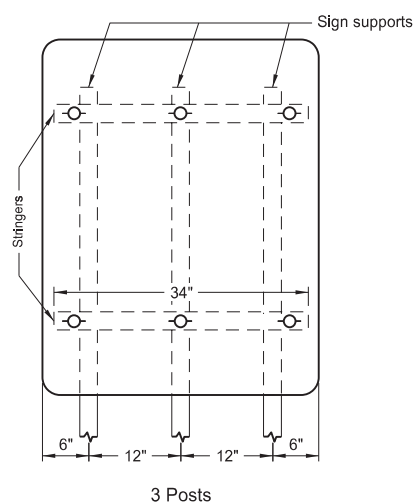
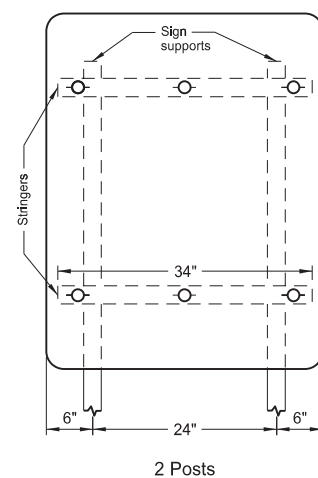
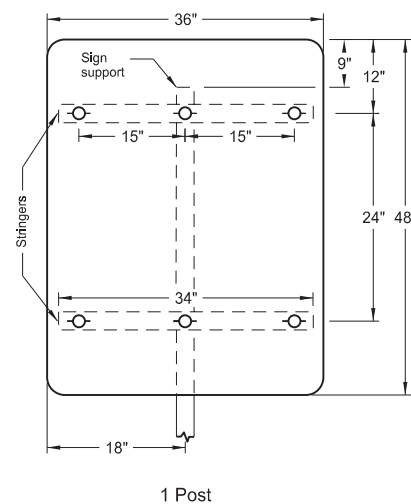
## Assembly No. 8



Assembly No. 9



Assembly No. 10

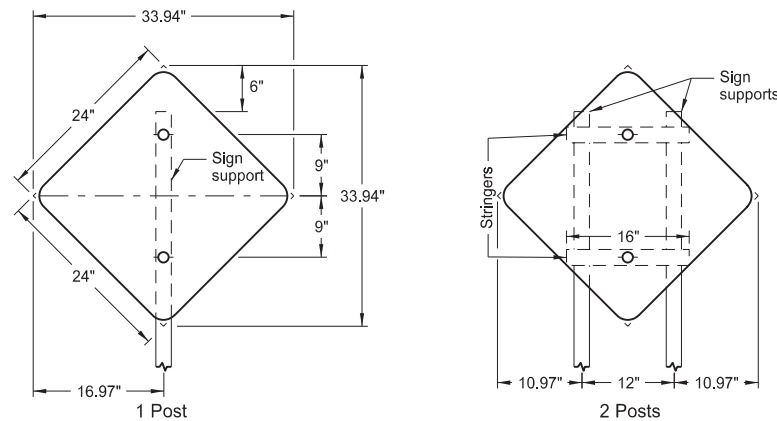


Assembly No. 11

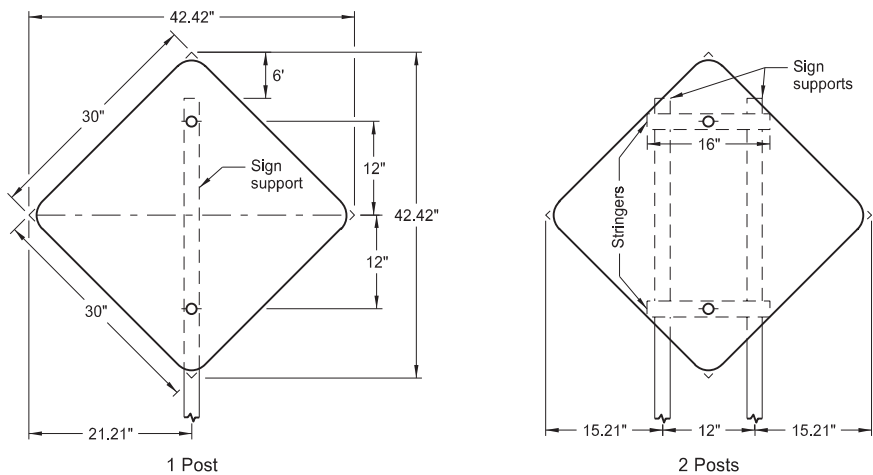
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice. New Design Engineer PE Stamp

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issued and sealed by  
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Registration Number  
PE-4683,  
on 8/30/19 and the original  
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North Dakota Department  
of Transportation

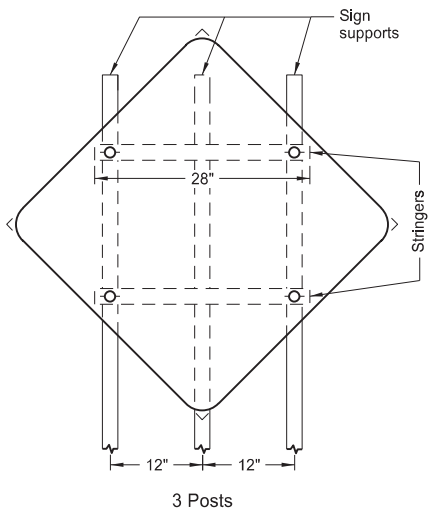
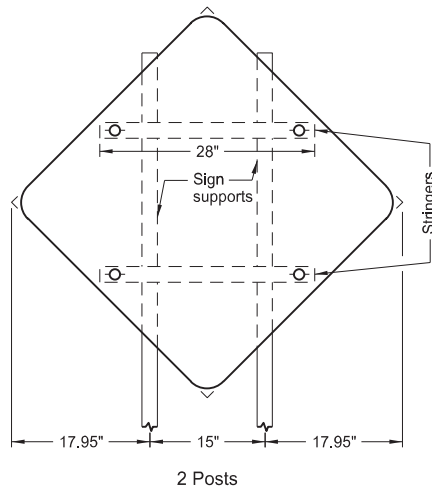
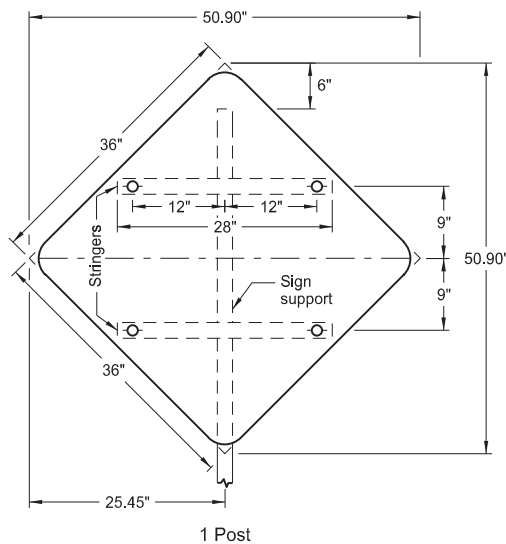
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION  
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



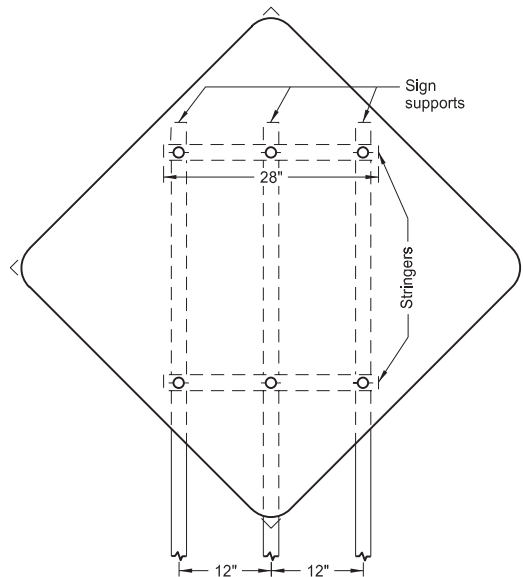
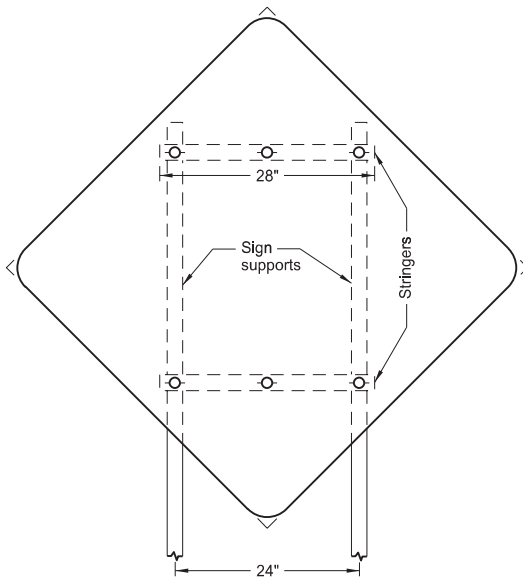
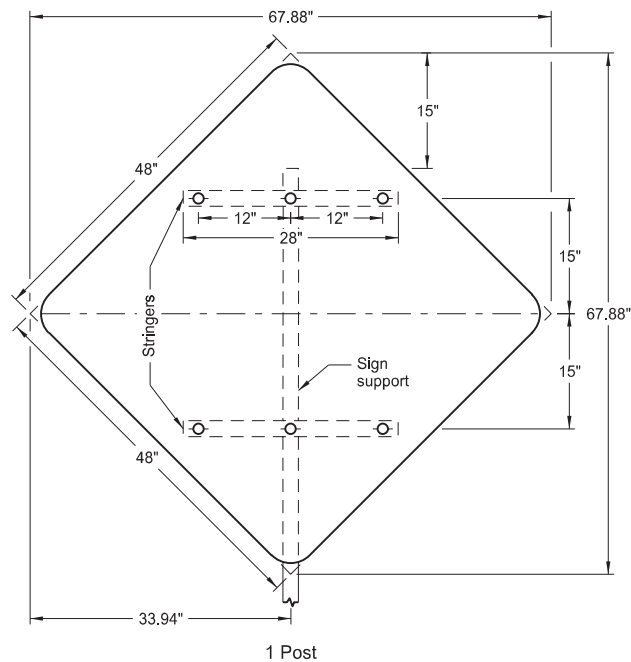
Assembly No. 18



Assembly No. 19



Assembly No. 20



Assembly No. 21

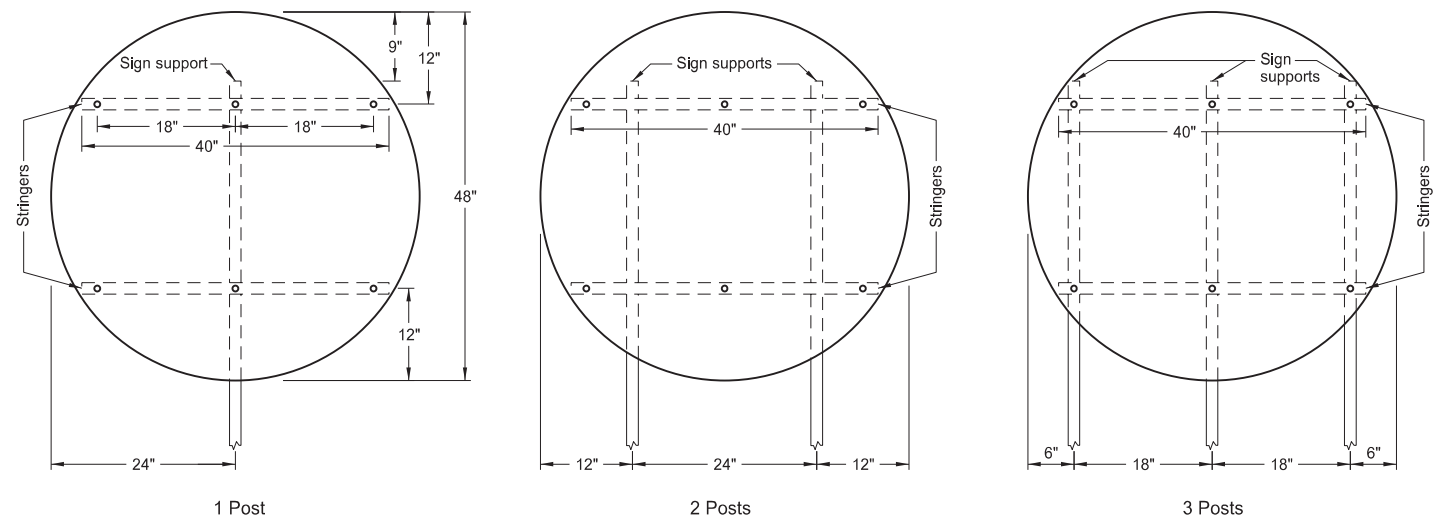
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Use 1½" x 1½" perforated square tube stringers.
  3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

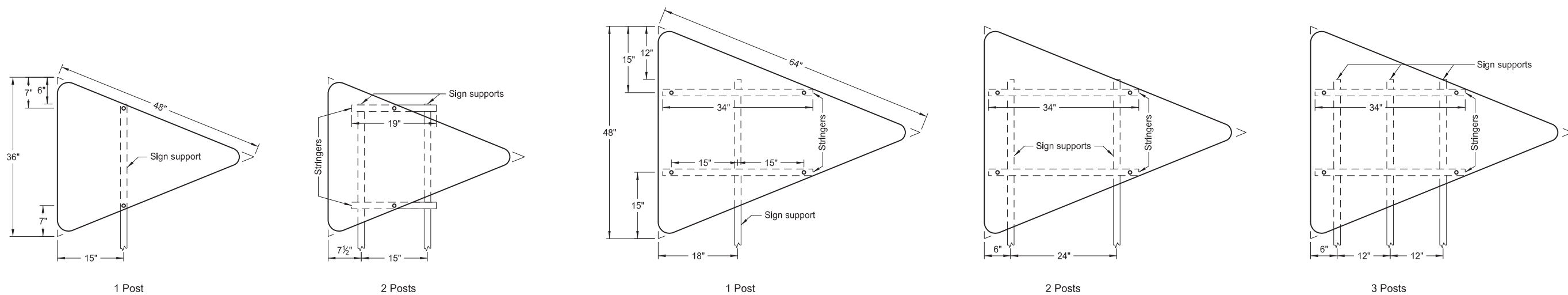
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS  
REGULATORY, WARNING AND GUIDE SIGNS

D-754-41

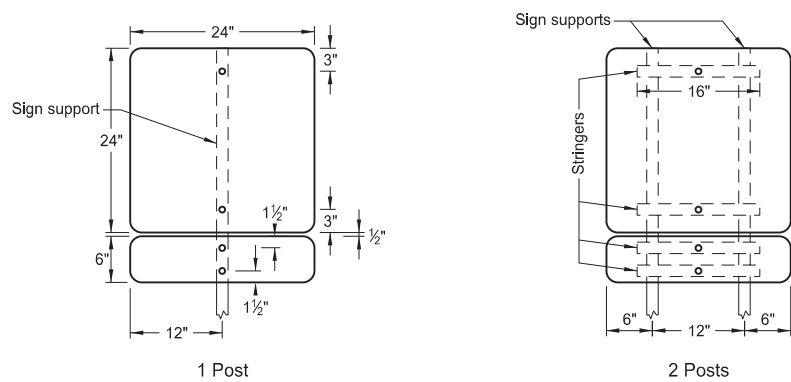


ASSEMBLY NO. 64



ASSEMBLY NO. 65

ASSEMBLY NO. 66



ASSEMBLY NO. 67

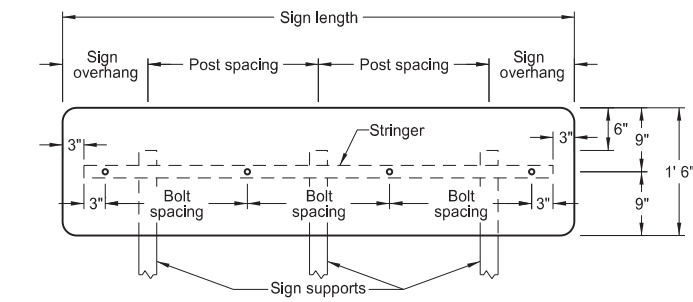
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
  2. Use 1 1/2"x1 1/2" perforated square tube stringers.
  3. Punch holes round for 3/8" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

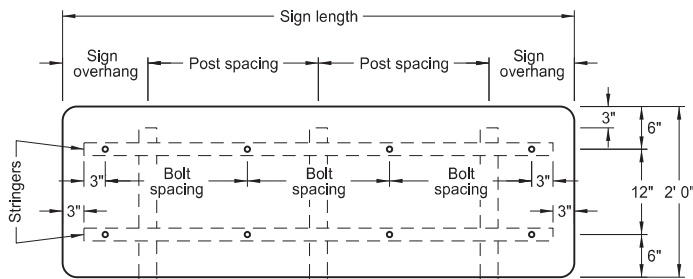
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS  
FOR VARIABLE LENGTH SIGNS

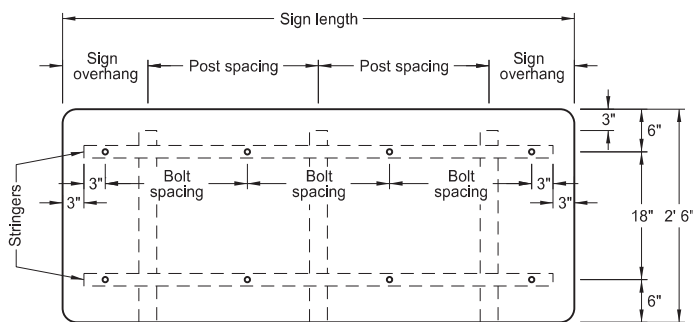
D-754-49



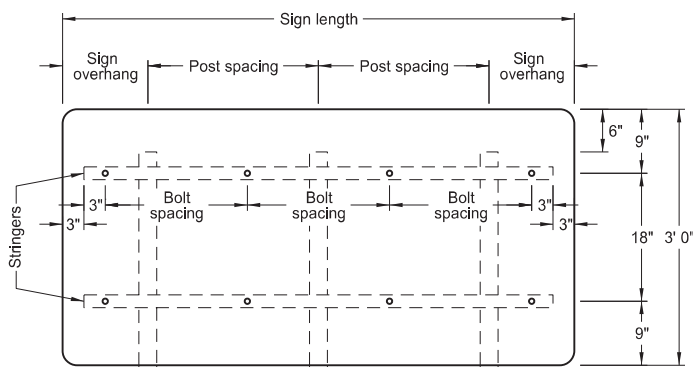
VARIES X 1'-6"



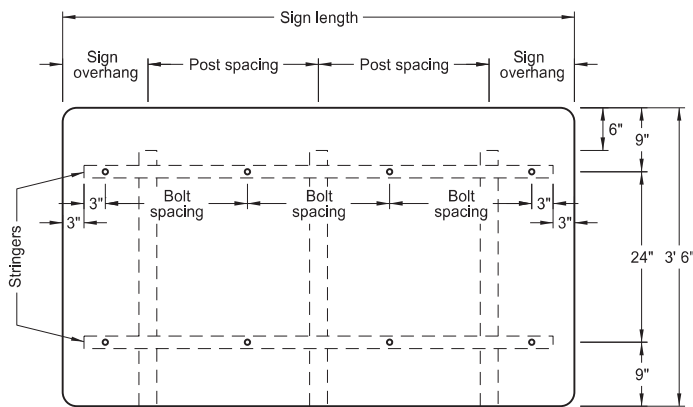
VARIES X 2'-0"



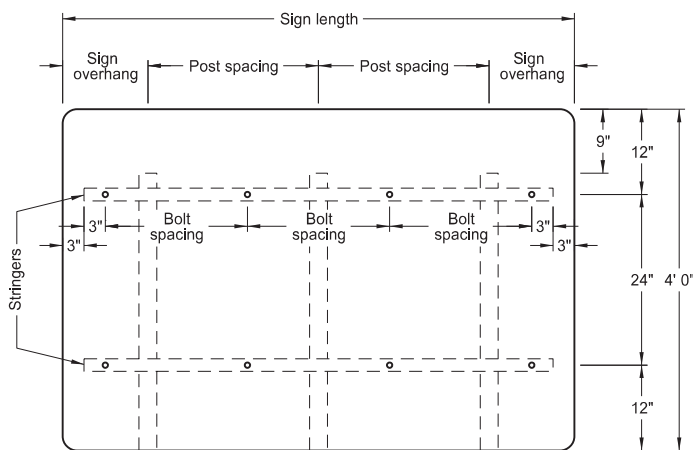
VARIES X 2'-6"



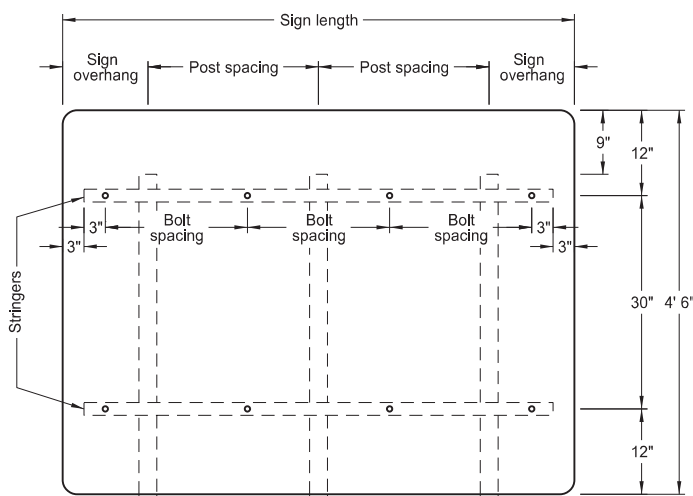
VARIES X 3'-0"



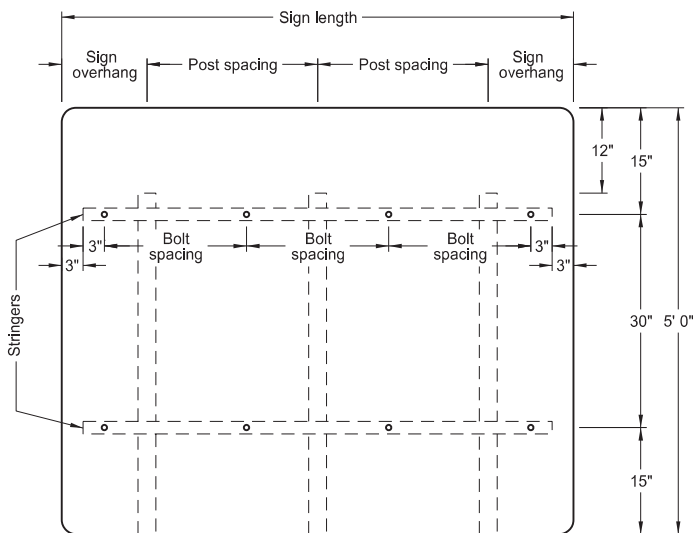
VARIES X 3'-6"



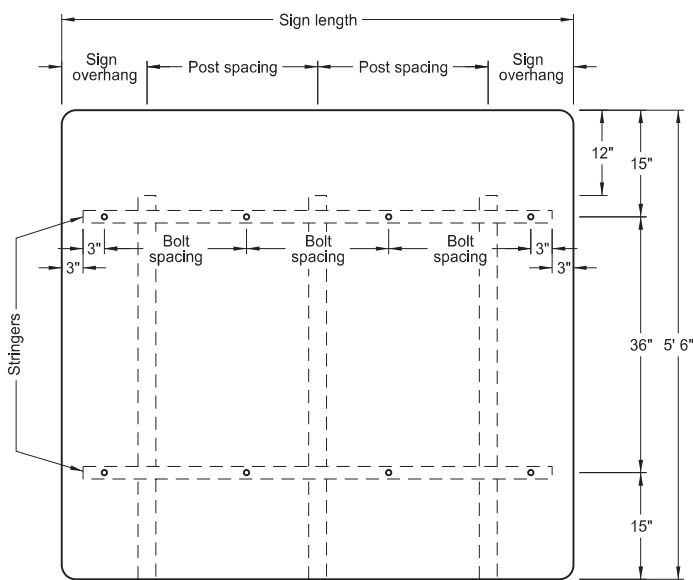
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

- Notes:
1. Use 0.100 minimum thickness sign backing material.
  2. Use 1½" x 1½" perforated square tube stringers.
  3. Punch holes round for ⅜" bolt.

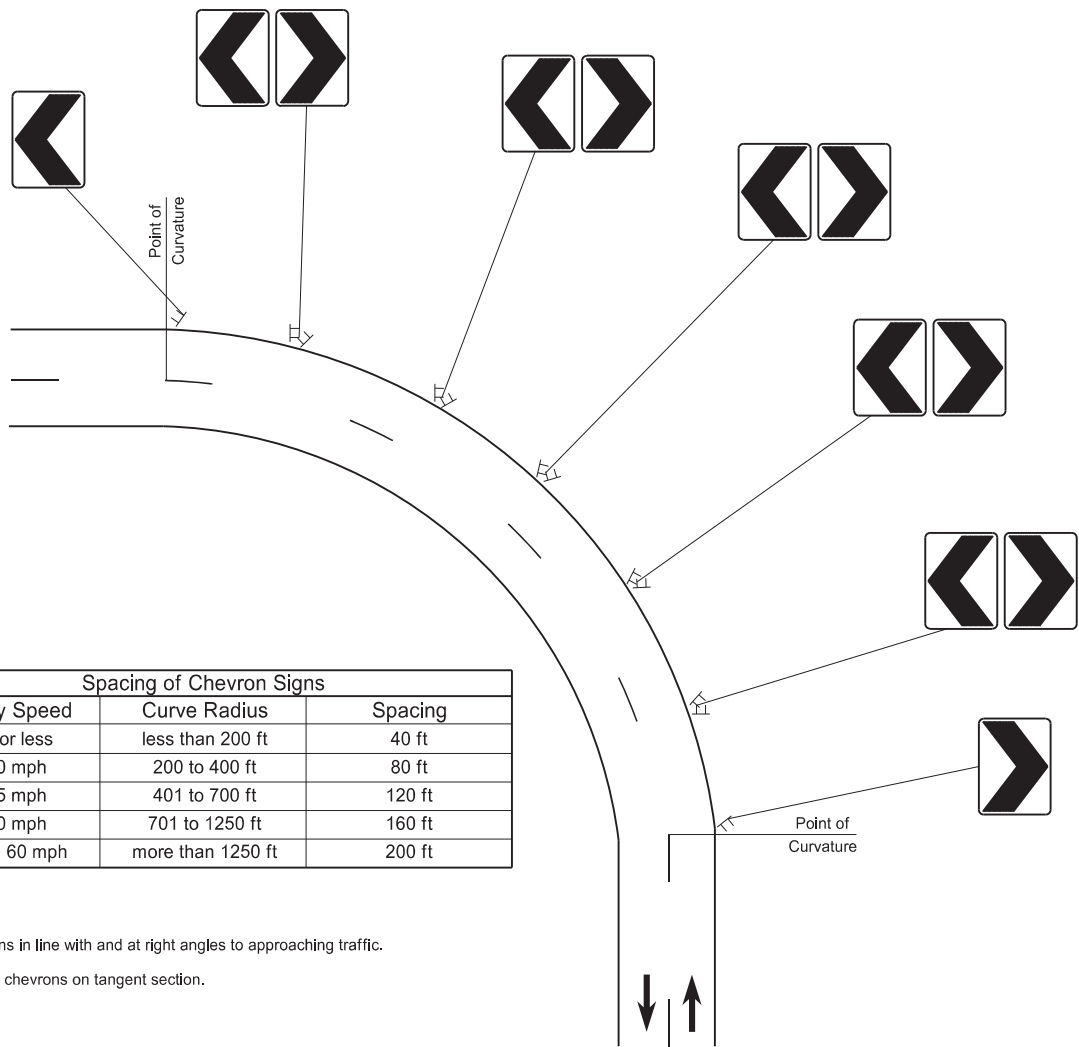
3 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	0'-6"	1'-6"	18"
4'-6"	0'-6"	1'-9"	21"
5'-0"	0'-6"	2'-0"	24"
5'-6"	1'-3"	1'-6"	18"
6'-0"	1'-0"	2'-0"	20"
6'-6"	1'-3"	2'-0"	22"
7'-0"	1'-6"	2'-0"	24"
7'-6"	1'-6"	2'-3"	2-20" & 2-19"
8'-0"	1'-9"	2'-3"	21"
8'-6"	2'-0"	2'-3"	2-22" & 2-23"
9'-0"	1'-6"	3'-0"	24"
9'-6"	1'-9"	3'-0"	4-20" & 1-22"
10'-0"	1'-9"	3'-3"	2-21" & 3-22"
10'-6"	1'-9"	3'-6"	4-23" & 1-22"
11'-0"	2'-0"	3'-6"	24"
11'-6"	2'-3"	3'-6"	21"
12'-0"	2'-4"	3'-8"	22"
12'-6"	2'-5"	3'-10"	23"
13'-0"	2'-6"	4'-0"	24"
13'-6"	2'-9"	4'-0"	3-22" & 4-21"
14'-0"	3'-0"	4'-0"	2-23" & 5-22"
14'-6"	3'-3"	4'-0"	6-23" & 1-24"
15'-0"	3'-6"	4'-0"	24"
15'-6"	2'-4"	5'-5"	6-22" & 2-21"
16'-0"	2'-5"	5'-7"	4-23" & 4-22"
16'-6"	2'-5"	5'-10"	6-23" & 2-24"
17'-0"	2'-6"	6'-0"	24"
17'-6"	3'-3"	5'-6"	22"
18'-0"	3'-6"	5'-6"	6-23" & 3-22"
18'-6"	3'-9"	5'-6"	6-23" & 3-24"
19'-0"	3'-6"	6'-0"	24"
19'-6"	4'-3"	5'-6"	8-22" & 2-23"
20'-0"	4'-4"	5'-8"	8-23" & 2-22"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

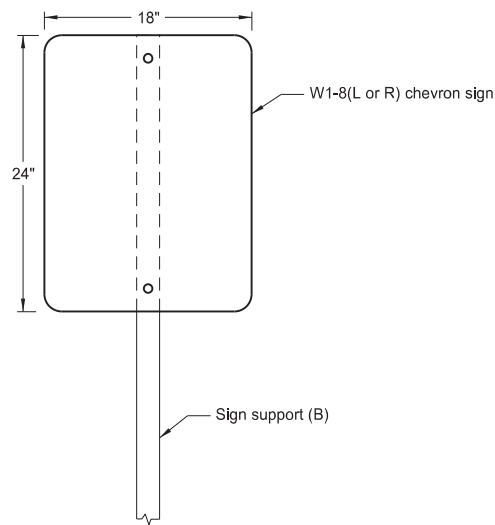
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CHEVRON INSTALLATION DETAILS

D-754-79

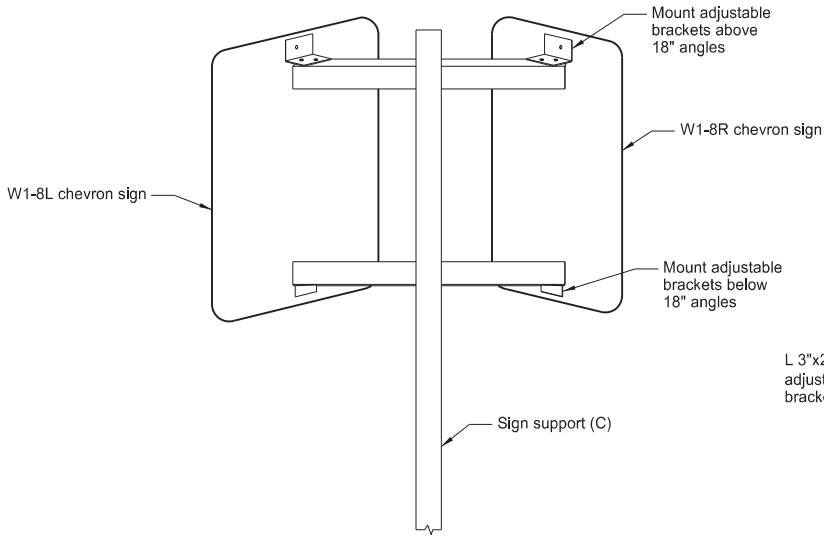


- Notes:
- Align chevrons in line with and at right angles to approaching traffic.
  - Do not place chevrons on tangent section.



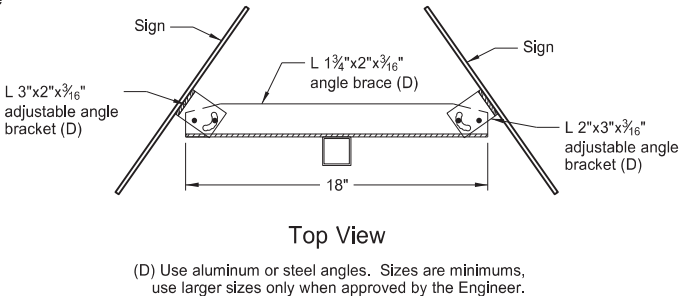
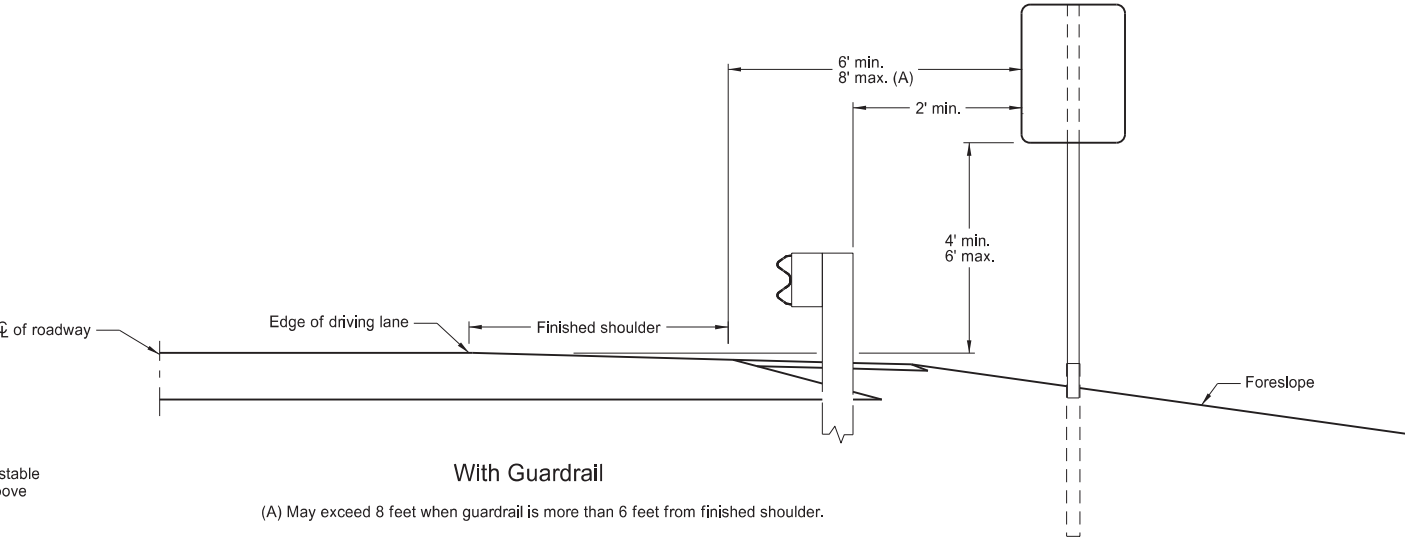
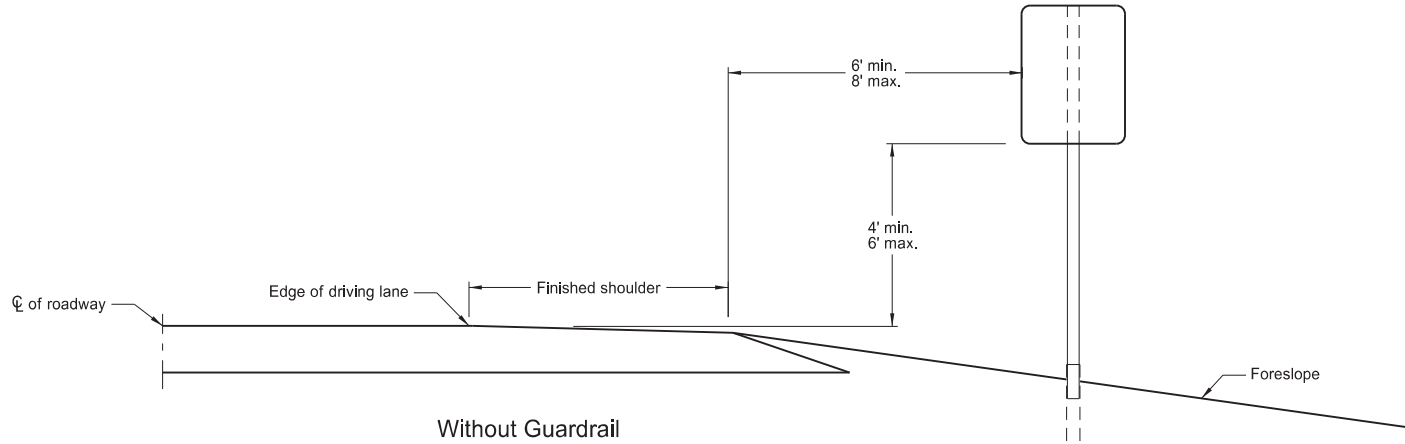
Chevron Single Sign Assembly

(B) Use 2x2x12ga. perforated tube single sign support and 2.25x2.25x12ga. perforated tube anchor unit.



Chevron Double Sign Assembly

(C) Use 2.25x2.25x12ga. perforated tube double sign support and 2.5x2.5x12ga. perforated tube anchor unit.



(D) Use aluminum or steel angles. Sizes are minimums, use larger sizes only when approved by the Engineer.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-10-13	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

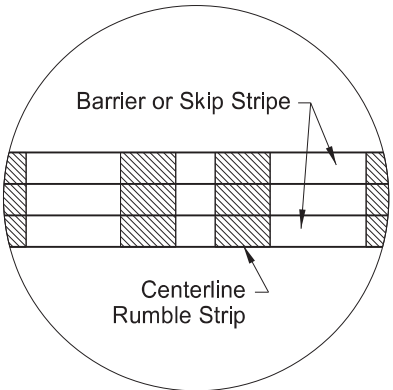
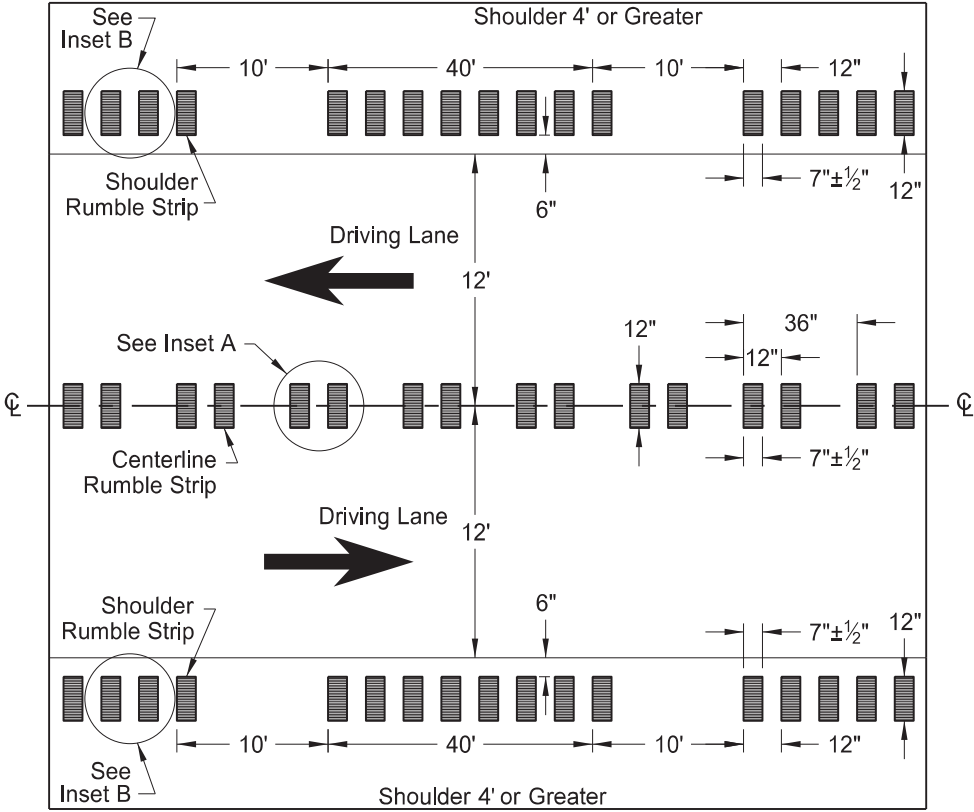
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RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

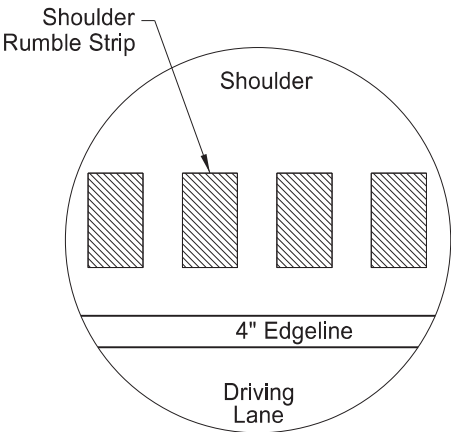
D-760-3

NOTES:

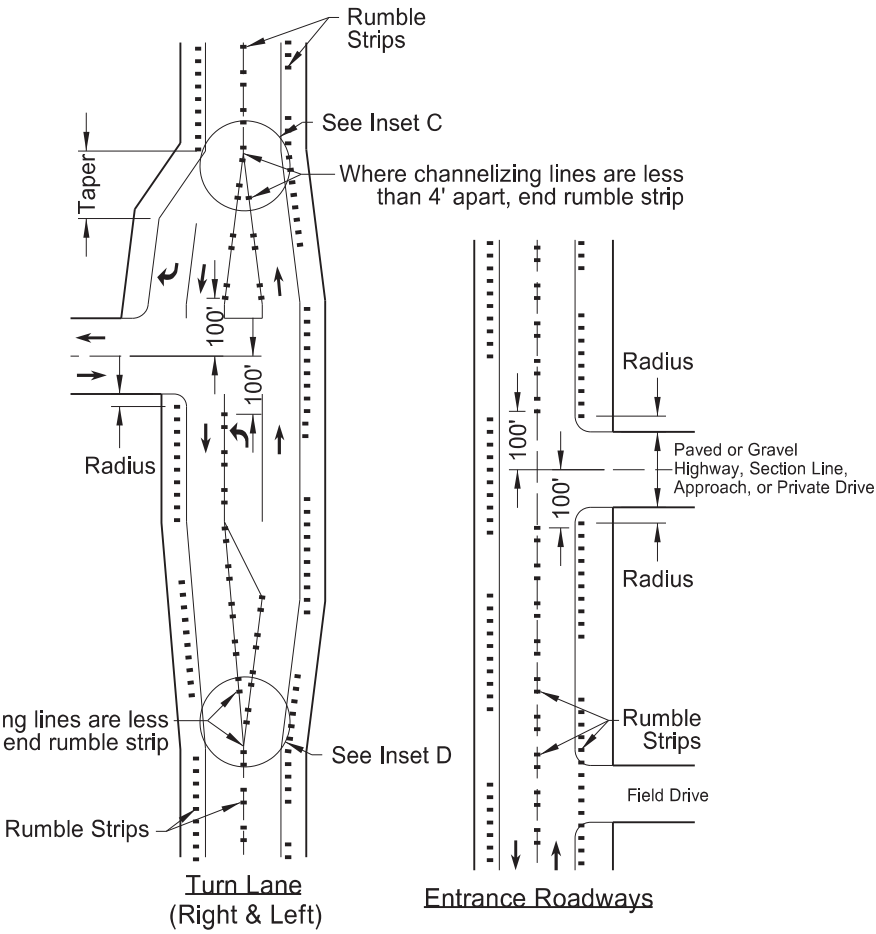
- 1) Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
- 2) Discontinue centerline rumble strips 100' before and after a paved or gravel highway, section line, approach, or private drive. Place rumble strips at left turn lanes as shown below.



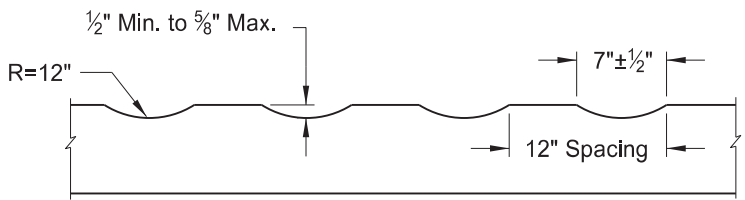
Inset A - Centerline Rumble Strip



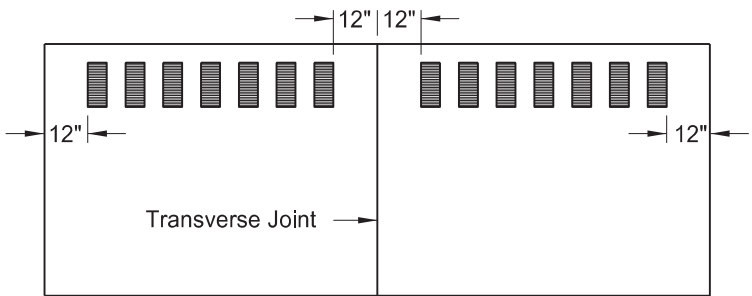
Inset B - Shoulder Rumble Strip



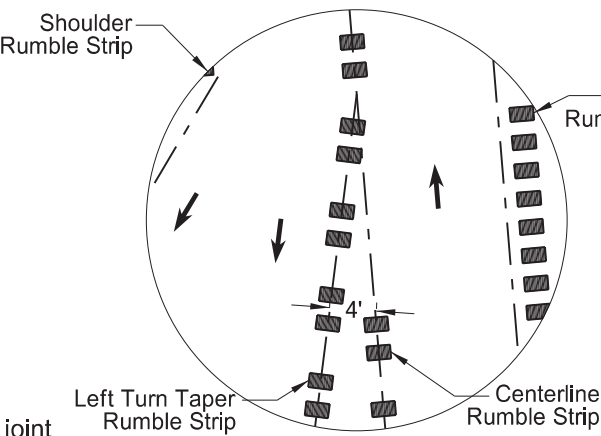
Undivided Highways (Shoulders 4' or Greater)



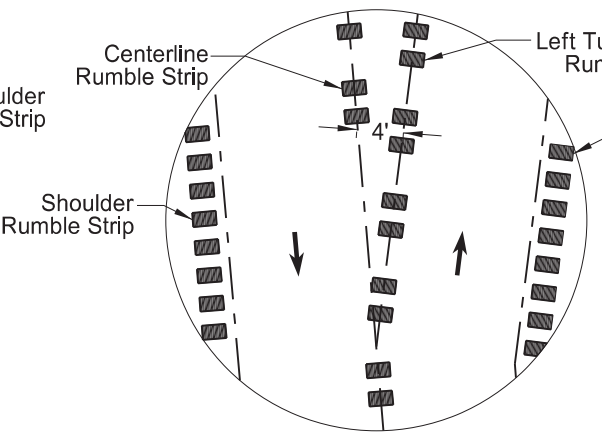
Profile of Rumble Strips - Bituminous and PCC Pavements



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



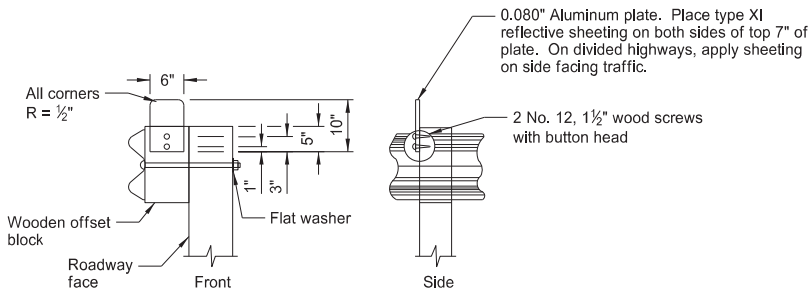
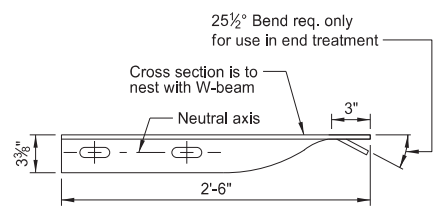
Inset C



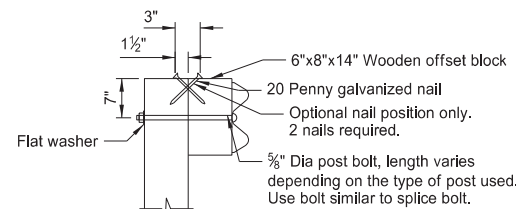
Inset D

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.
11-16-21	Changed turn lane rumble layouts.

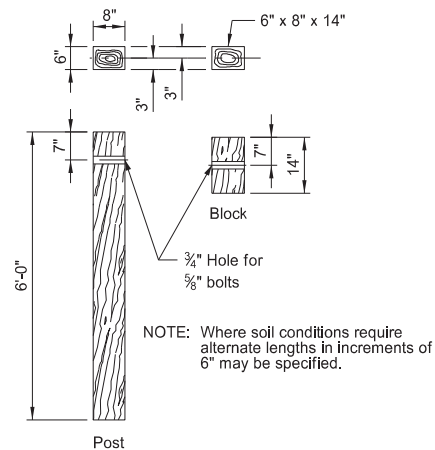
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Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



## W BEAM TERMINAL CONNECTOR

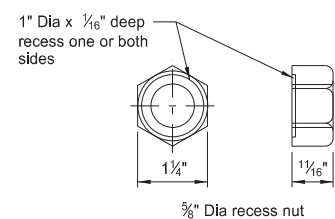


Technical drawing of a splice bolt slot for a guardrail bolt. The drawing shows a cross-section of a plate with a central slot. Dimensions include a total width of 8 1/2 inches, with 2-inch tolerance zones on either side. The central slot is 4 1/4 inches wide. A post bolt slot is 3/4 inch wide and 2 1/2 inches deep. A splice bolt slot is 2 1/2 inches wide and 1 1/8 inch deep. The splice bolt is 5/8 inch by 1 1/4 inch long.

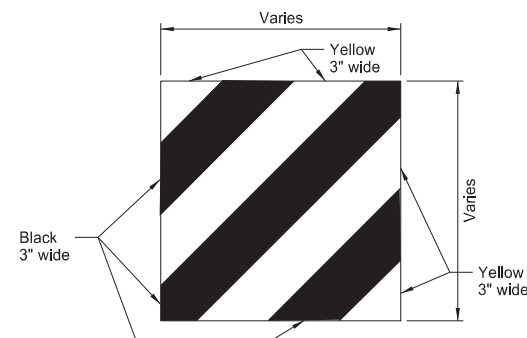
The diagram illustrates a 3' x 3' Rub Rail assembly. It features a central rectangular panel with a dashed border, flanked by two vertical rails. The assembly is supported by a base. Dimensions are indicated: the overall width is 3', the overall height is 3', and the central panel is 1 1/2" wide. The rails are 1 1/2" wide. The assembly is labeled 'Rub Rail' and 'Varies'.

Technical drawing of a bolt and nut. The bolt is shown in side and end views. Dimensions include: head diameter  $\frac{5}{16}$ "

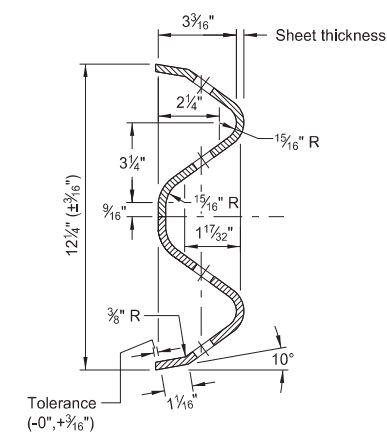
5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length



5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



### W-BEAM CROSS SECTION

NOTES:

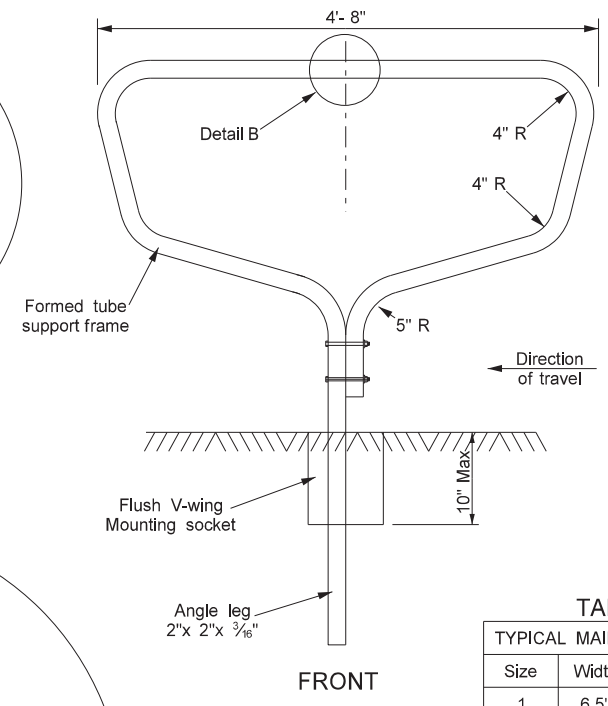
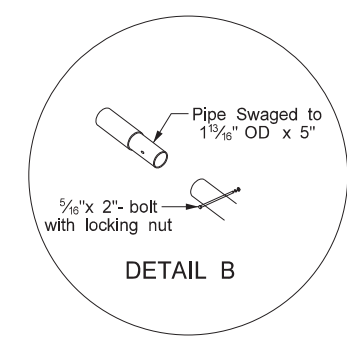
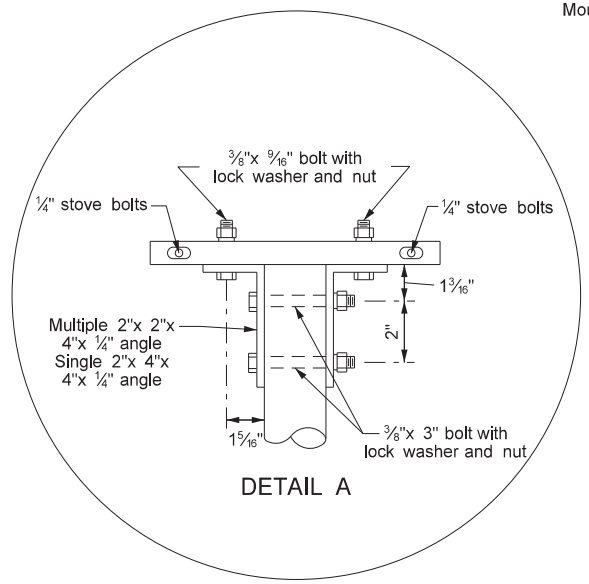
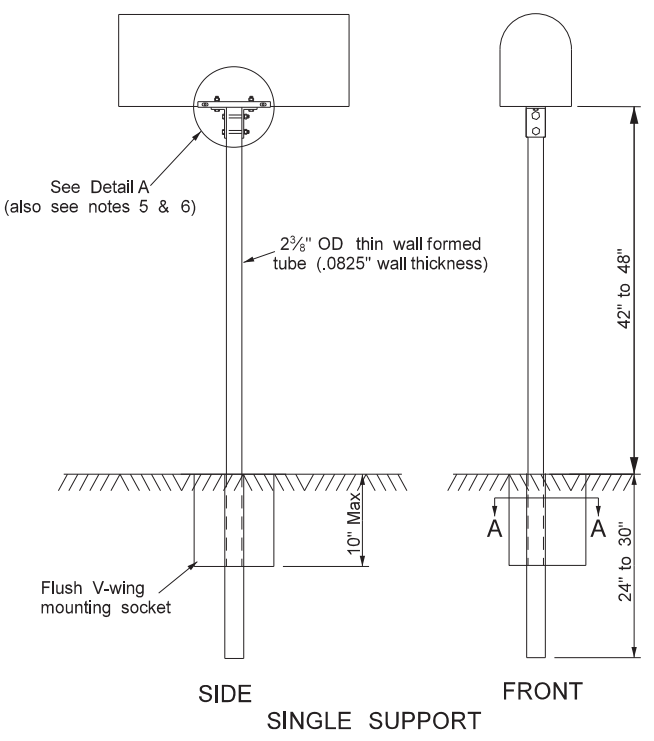
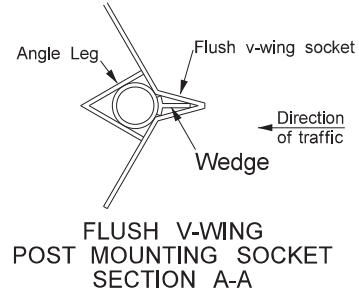
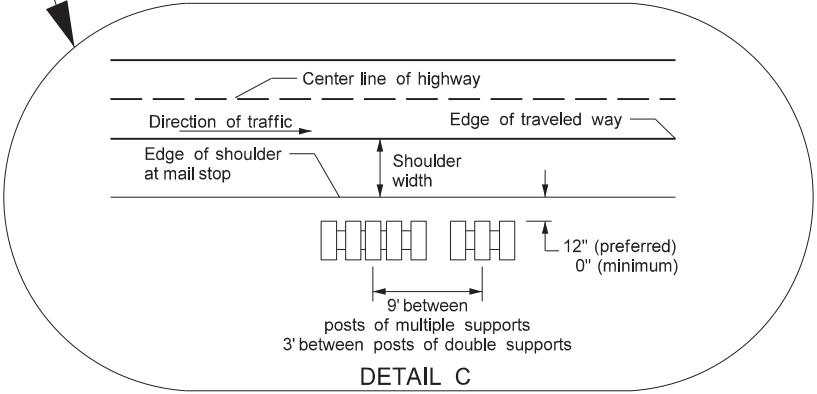
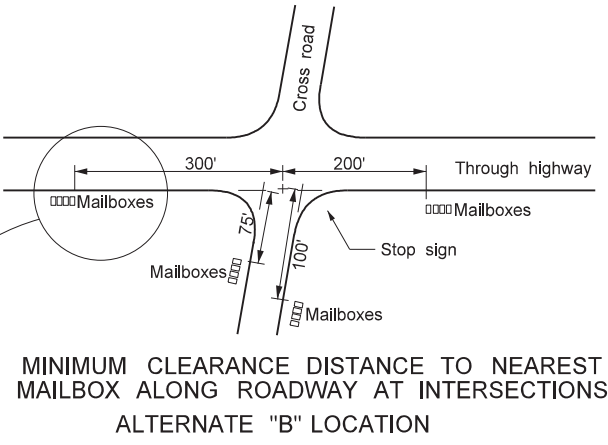
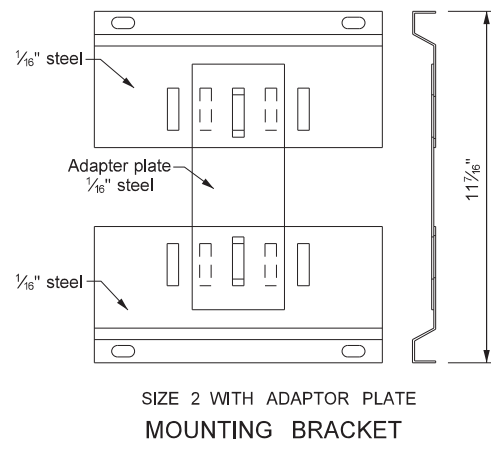
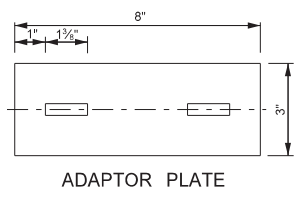
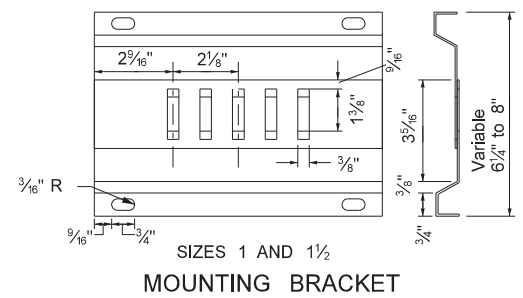
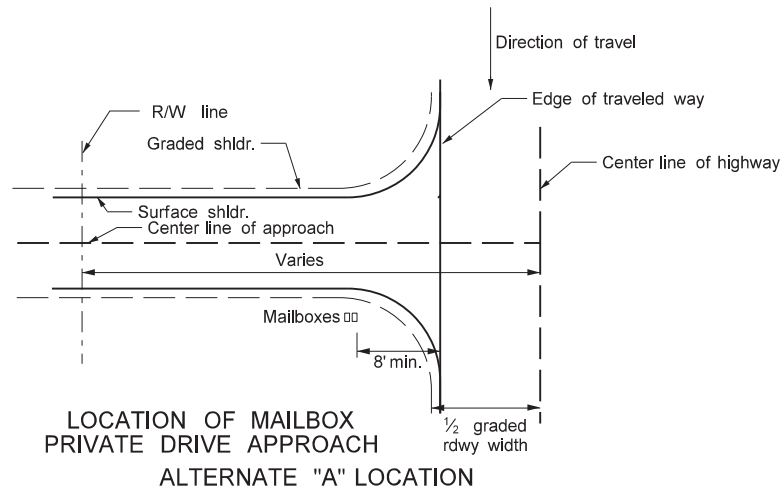
1. Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
3. Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
4. Guardrail installation height tolerance =  $- \frac{1}{4}"$  , + 1".
5. Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1 $\frac{1}{2}"$  is acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
10-25-19	Updated notes to active voice
12-02-20	and added Note 5. Updated clipped head to optional

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MAILBOX LOCATION DETAILS

D-766-1



TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6.5"	8.5"	19"
1A	8"	10.5"	21"
2	11.5"	13.5"	23.5"

- Notes:
- The mailbox support and hardware details shall consist of the "V-Loc Mailbox Support System" manufactured by:  
Tapco  
Traffic & Parking Control Co. Inc.  
Any other equal support system meeting the requirements of NCHRP Report 350, which has been crash tested, and approved by the Federal Highway Administration may be used. Approved alternate mailbox assemblies shall be installed in the manner and arrangement crash tested.
  - The preferred location for all mailboxes is the Alternate "A" location. However, the Engineer may approve the Alternate "B" location if warranted by existing field conditions.
  - Postal regulations require that mailboxes must be located on the right-hand side of the road in the direction traveled by the carrier. Therefore, the Engineer shall contact the local carrier or postmaster before installing new mailboxes to verify the direction of travel.
  - Mailboxes installed on private drive approaches must always be located on the downstream side of the approach.
  - Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.
  - Size 2 mailbox mounted on multiple support requires 2 each, 3/8" by 9/16" bolts with lock washers and nuts to attach the adapter plate to mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.
  - Space multiple support frames a minimum of 4 feet apart. Space single support frames a minimum of 3 ft apart. Do not place more than five No. 1 mailboxes, three No. 2 mailboxes, or any combination of four No. 1-A and No. 2 mailboxes on multiple support frames.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE

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