

DESIGN DATA			
Traffic	Average Daily		
Current 2023	Pass: 2,467	Trucks: 93	Total: 2,560

Preventive Maintenance

STATE	PROJECT NO.	PCN	SECTION NO.	HEET NO.
ND	H-6-002(157)342	24718	1	1

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

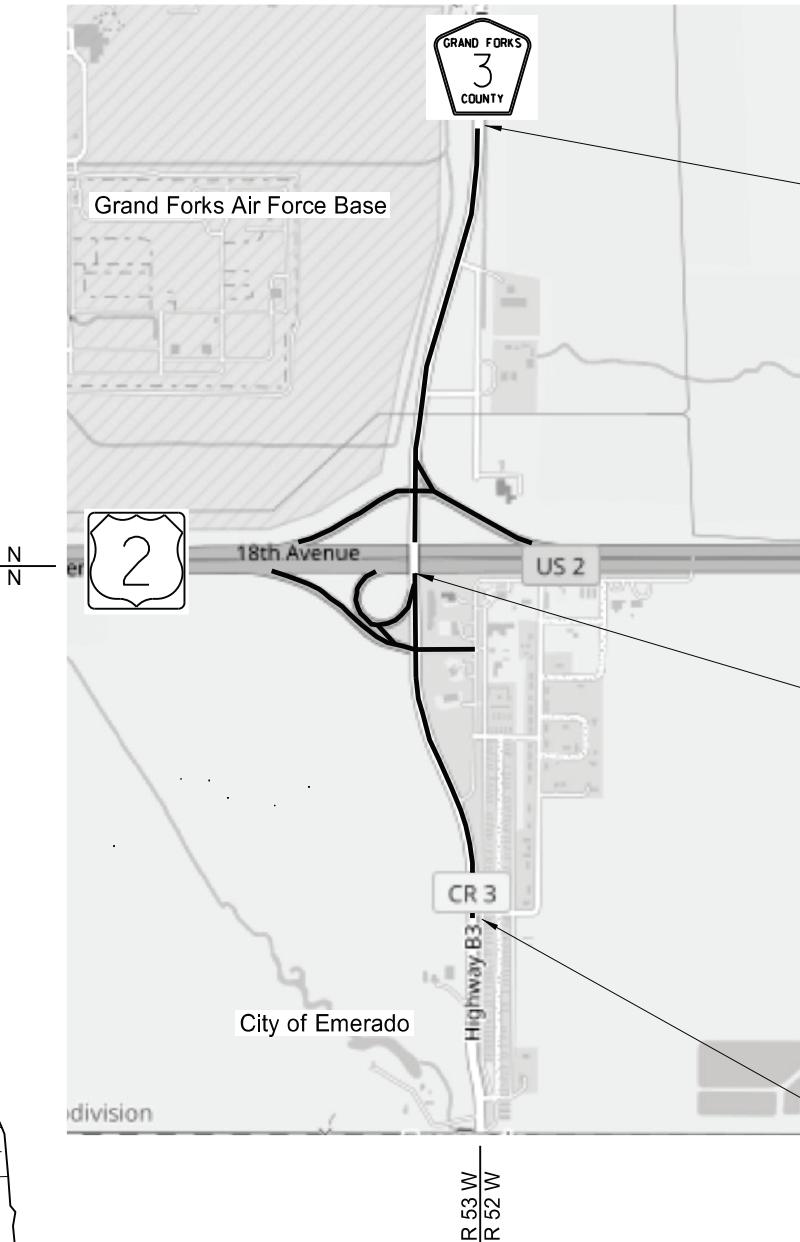
H-6-002(157)342

Grand Forks County
Emerado Interchange

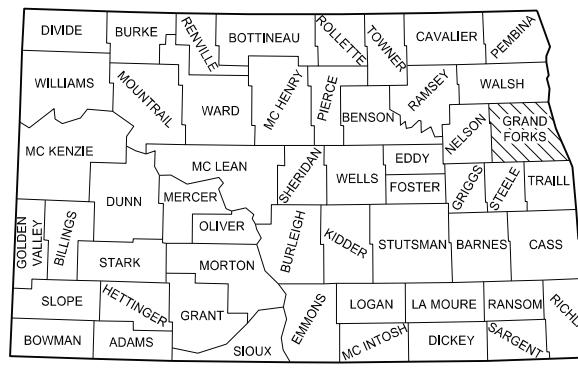
Chip Seal

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
H-6-002(157)342 \ Chip Seal	3.110	3.110



STATE COUNTY MAP



DESIGNER
Brian Ward
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
GRAND FORKS DISTRICT

12/18/25

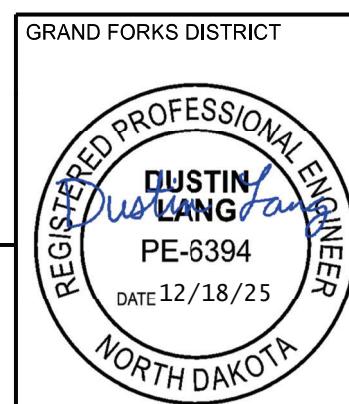
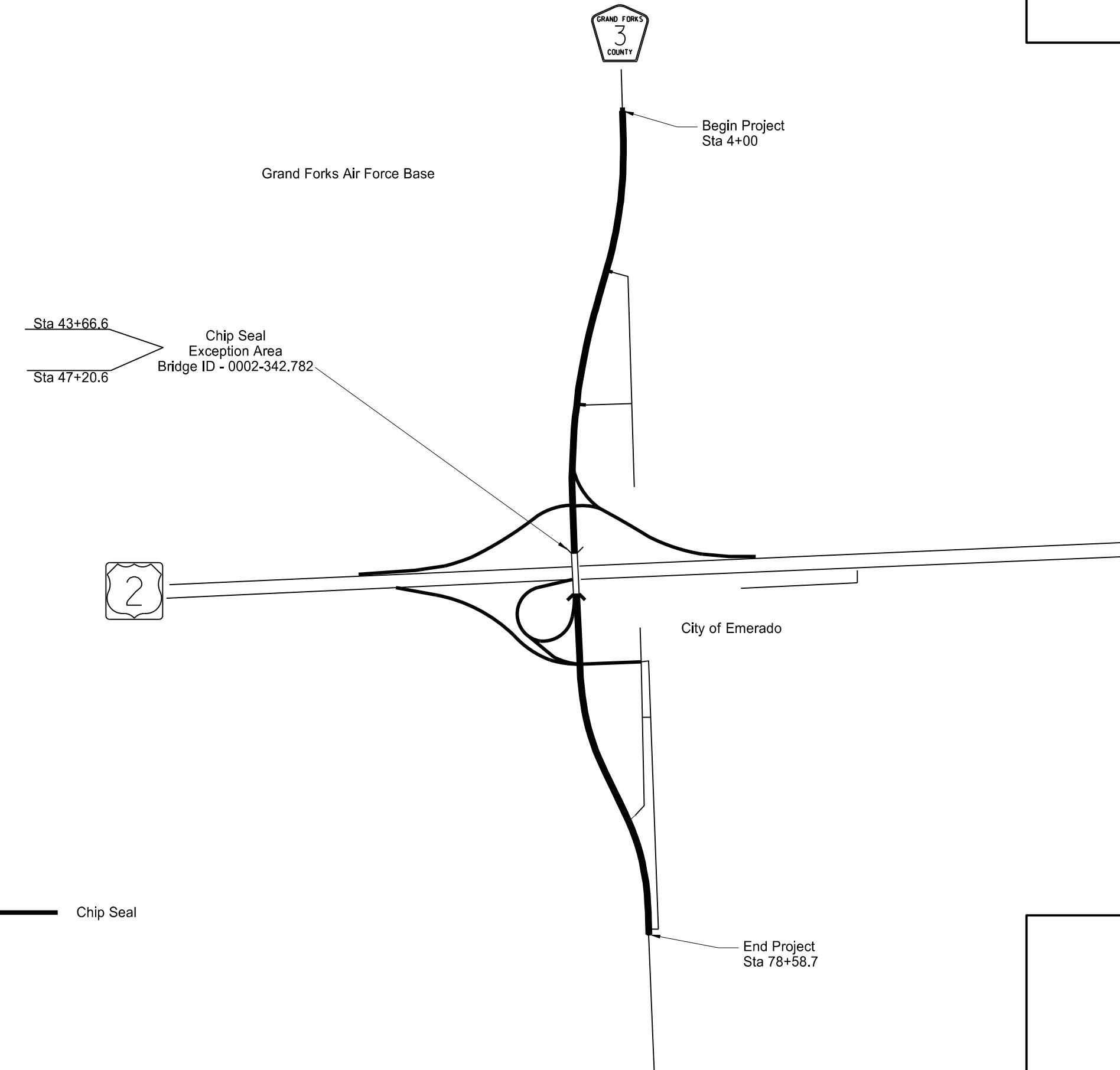


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			D-762-2	Interstate Pavement Marking 4 Lane Divided Highway			
			D-762-4	Pavement Marking			
			D-762-11	Short-Term Pavement Marking			
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Number	Description						
SP 163(25)	Warranty Chip Seal						

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ND	H-6-002(157)342	4	1	

N



Scope of Work

Chip Seal
Emerado Interchange



NOTES

STATE	PROJECT NO.	SECTION NO.	HEET NO.
ND	H-6-002(157)342	6	1

105-P01 AGENCY COORDINATION: Provide a detailed work activity schedule for this project 14 days prior to beginning work to the following:

Grand Forks Air Force Base

Contact Information: Lt Col Bentley, William Commander
319th Civil Engineer Squadron
525 Tuskegee Airmen Blvd
Grand Forks Air Force Base, ND 58205
Tel: 701 747 4769
Email: william.bentley.1@us.af.mil

401-P01 FOG SEAL APPLICATION: Use CSS-1H for Fog Seal. Broom roadway before Fog Seal application. Dilute the Fog Seal Oil 50% (Water) and 50% (CSS-1H). Dilution at the supplier will be required. Complete this work within 5 working days of the mainline seal completion.

Liquidated Damages for failure to complete the fog seal within 5 working days will be charged according to Section 108.07.

420-P01 SEAL COAT: Initial light brooming will be during the cool period of the early morning of the next day after seal coat application. Traffic control will be needed during the brooming operation..

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

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacturer'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;
- Interlocking 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 FOR CHIP SEAL: Provide traffic control consisting of a temporary lane closure, flagging, and a pilot car.

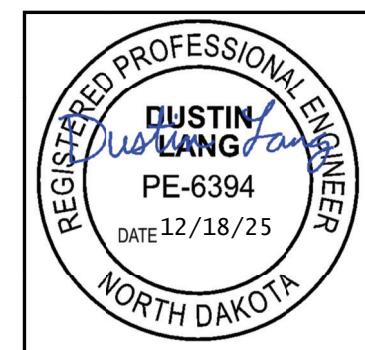
Traffic control device quantities are based on a day's production limitation and following list:

1. Standard D-704-15, layout A, place layout A at both ends of the work zone. Flagging stations located within the work zone require sign W20-7-48 only;
2. Standard D-704-20, layout H:

Provide additional devices at no cost to the department.

Place flaggers and traffic control devices as shown on Standard D-704-15, layout A at intersections when the lane closure spans across them.

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-6-002(157)342	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103 0100	CONTRACT BOND	L SUM	0.11	0.11
420 0405	SEAL COAT	SY	55,743	55,743
702 0100	MOBILIZATION	L SUM	0.11	0.11
704 1000	TRAFFIC CONTROL SIGNS	UNIT	2,676	2,676
704 1048	PORTABLE RUMBLE STRIPS	EA	3	3
762 0103	PVMT MK PAINTED-MESSAGE	SF	80	80
762 0432	SHORT TERM 6IN LINE-TYPE NR	LF	28,780	28,780
762 1106	PVMT MK PAINTED 6IN LINE	LF	43,522	43,522
762 1112	PVMT MK PAINTED 12IN LINE	LF	3,786	3,786
762 1124	PVMT MK PAINTED 24IN LINE	LF	160	160

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-6-002(157)342	10	1

Seal Coat Quantities				
Description	Unit	Basis	Total	
Seal Coat (Ramps, Loops, Folsom Way & Crossroad)	SY	See Sec. 90 Sheets 1-2	55,743	
• Cover Coat Material CI 41-M @ 25 lb/SY = 697 Tons				
• CRS2P Emulsified Asphalt @ 0.40 Gal/SY = 22,298 Gal				
• Fog Seal @ 0.05 Gal/SY = 2,788 Gal				

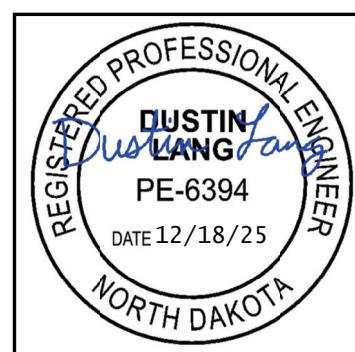
• indicates quantities to be included in contract price for Seal Coat

Temporary Pavement Marking		
Location	Basis	Quantity
GF Co Rd 3 & Folsom Way (Sta 4+00 to Sta 78+59) (2 Applications)		
Short Term 6IN Line-Type NR Yellow Double Barrier Line	10,560 LF/Mi	28,780 LF

Permanent Pavement Marking		
Location	Basis	Quantity
GF Co Rd 3 (Sta 4+00 to Sta 78+59)		
PVMT MK Painted 6IN White Edge Line	10,560 LF/Mi	14,534 LF
PVMT MK Painted 6IN White Dotted Line (2' Line, 6' Skip)	1,760 LF/Mi	124 LF
PVMT MK Painted 6IN Yellow Double Barrier Line	10,560 LF/Mi	11,923 LF
PVMT MK Painted 12IN White Channel Line	Sec. 120	741 LF
PVMT MK Painted - Message	Sheets 1 - 3	80 SF
Ramps, Loop & Folsom Way		
PVMT MK Painted 6IN White Edge Line	5,280 LF/Mi	9,633 LF
PVMT MK Painted 6IN Yellow Edge Line	5,280 LF/Mi	5,278 LF
PVMT MK Painted 12IN White Channel Line	D-762-2	1,632 LF
PVMT MK Painted 6IN Yellow Double Barrier Line	Sec. 120	649 LF
PVMT MK Painted 12IN White Channel Line	Sheets 1 - 3	1,413 LF
PVMT MK Painted 24IN White Stop Bar		160 LF

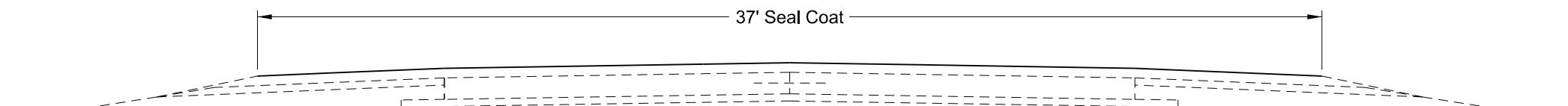
Total Pavement Marking		
	White	Yellow
Short Term 6IN Line - Type NR	-	28,780 LF
PVMT MK Painted 6IN Line	25,241 LF	18,281 LF
PVMT MK Painted 12IN Line	3,786 LF	-
PVMT MK Painted 24IN Line	160 LF	-
PVMT MK Painted - Message	80 SF	-

Barrier Striping Locations		
From Sta to Sta	Double Barrier (Mi)	
4+00	39+37.6	0.670
39+96.9	52+67.5	0.241
54+36.4	78+59	0.459
Folsom Way		0.082
		1.452



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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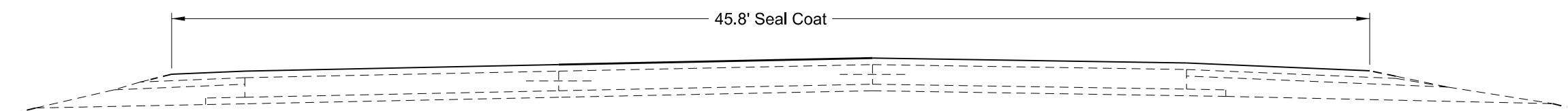
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Typical Proposed Section 1 - Crossroad

Sta 4+00 to Sta 29+00

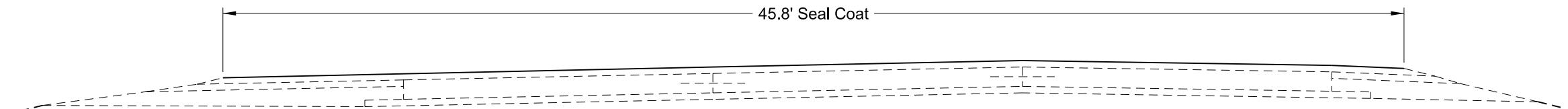
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Typical Proposed Section 2 - Crossroad

Curve - Sta 29+00 to Sta 35+50
Tangent - Sta 50+00 to Sta 53+73.3

Q

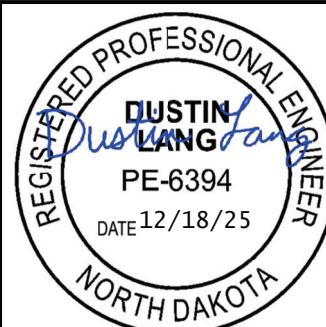


Typical Proposed Section 3 - Crossroad

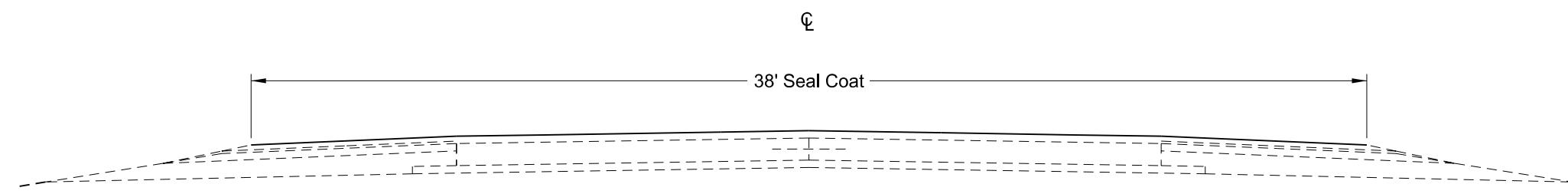
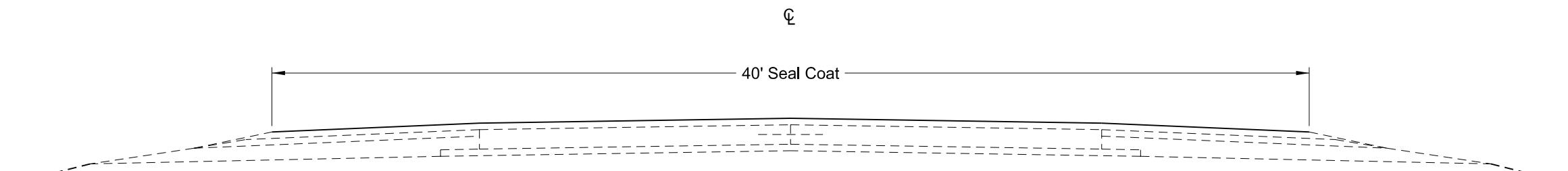
Sta 35+50 to Sta 39+37.6
Sta 53+73.3 to Sta 56+70

Typical Sections
Crossroad Co Rd 3

Chip Seal
Emerado Interchange

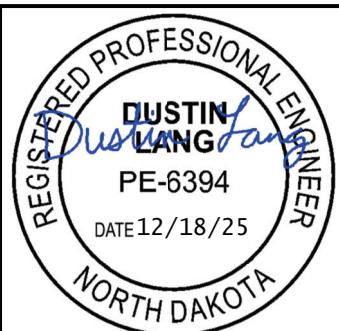


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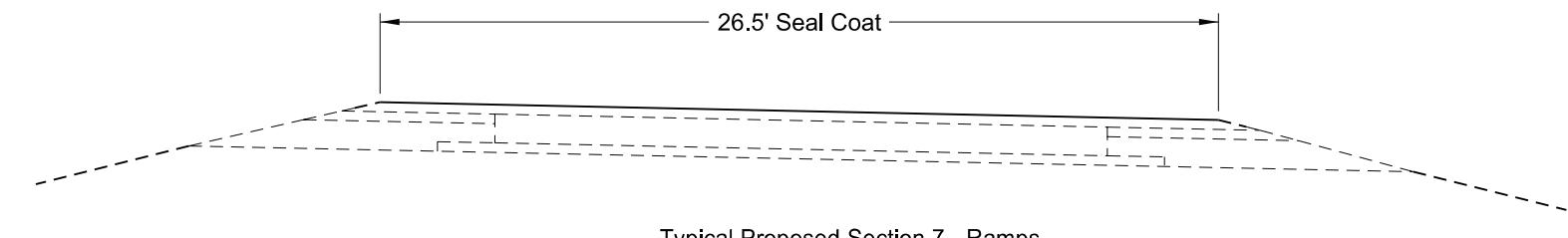
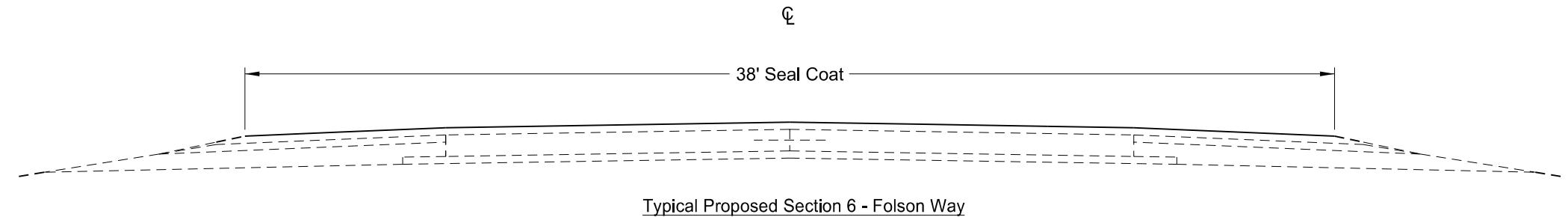


Typical Sections
Crossroad Co Rd 3

Chip Seal
Emerado Interchange



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ND		H-6-002(157)342	30	3

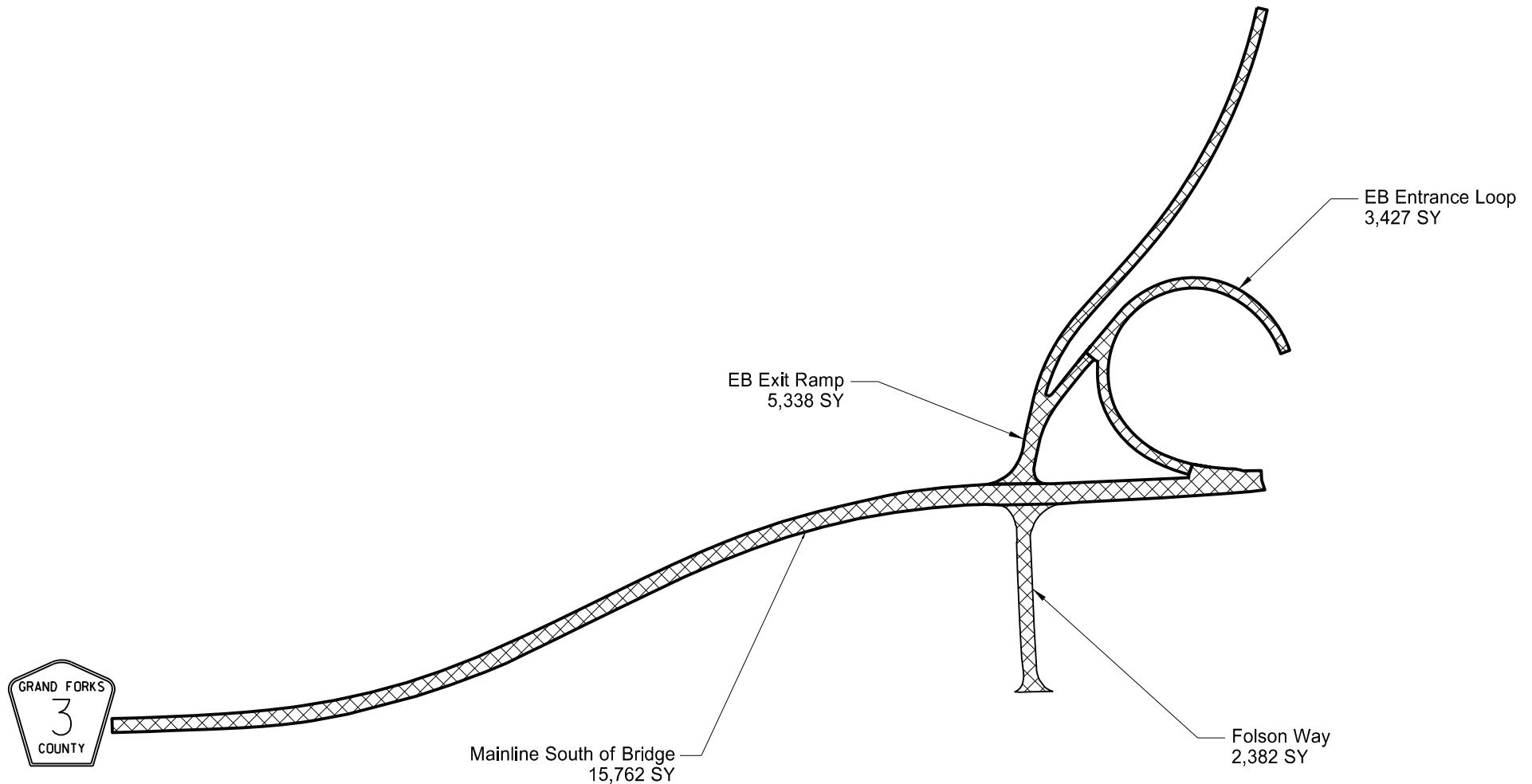
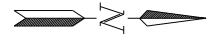


Typical Sections
Folson Way, Ramps & Loop

Chip Seal
Emerado Interchange



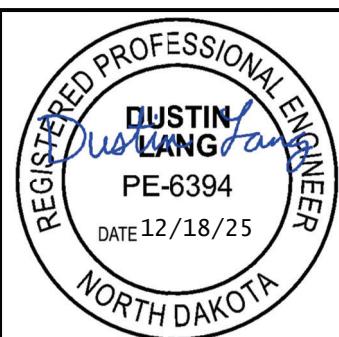
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ND		H-6-002(157)342	90	1



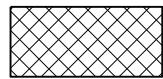
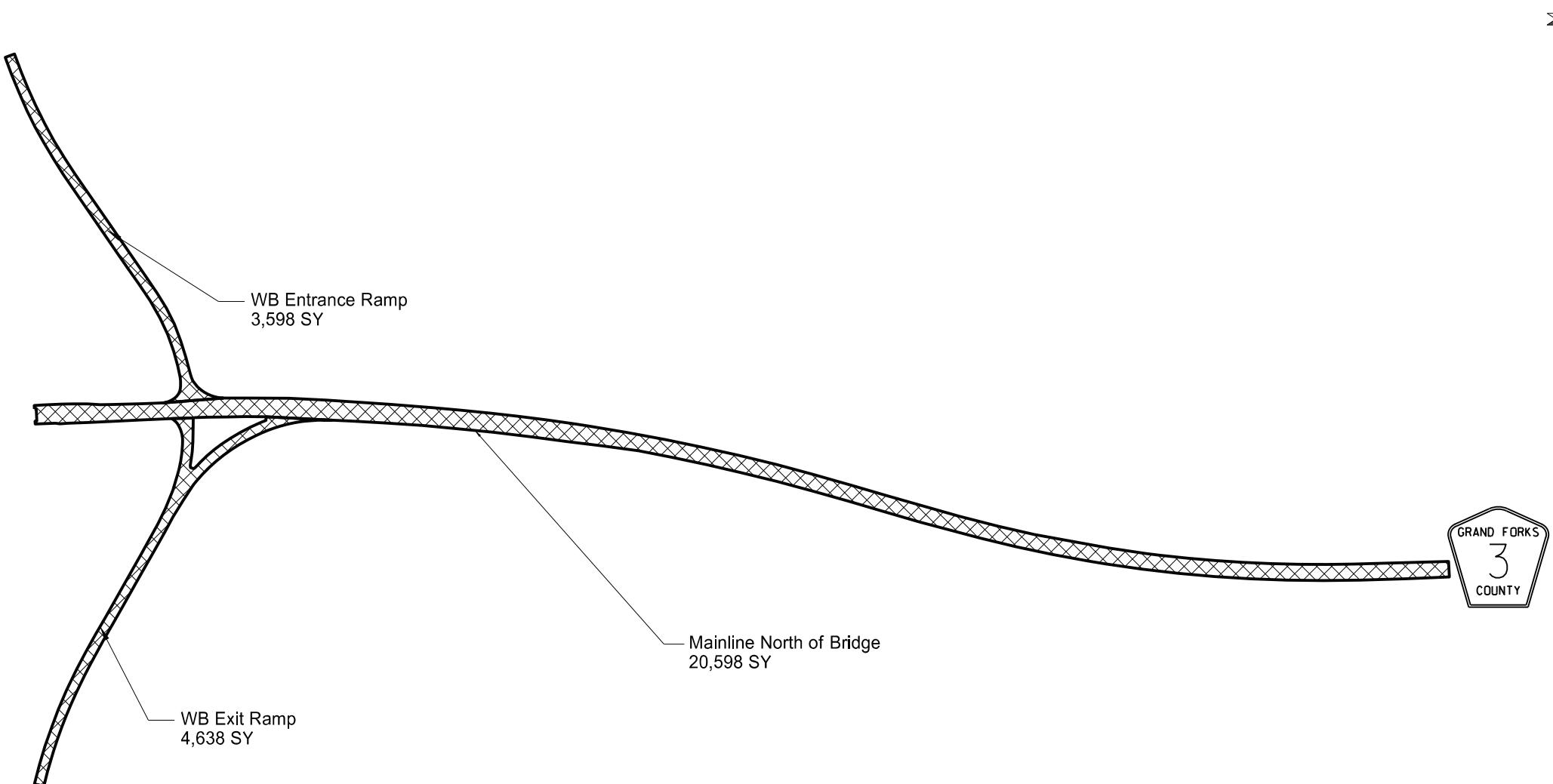
Seal Coat

Chip Seal Layout
South of Bridge

Chip Seal
Emerado Interchange



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND		H-6-002(157)342	90	2



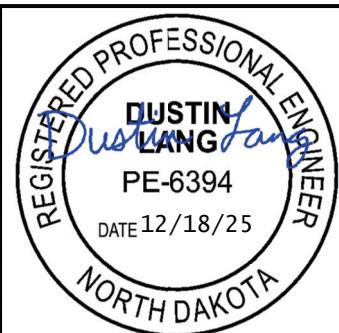
Seal Coat

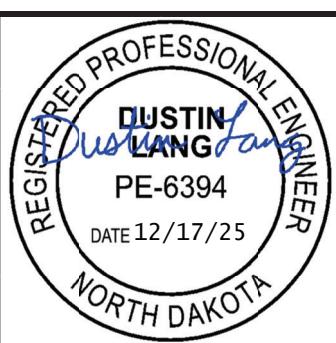
Estimated Quantities

Seal Coat 28,834 SY

Chip Seal Layout
North of Bridge

Chip Seal
Emerado Interchange



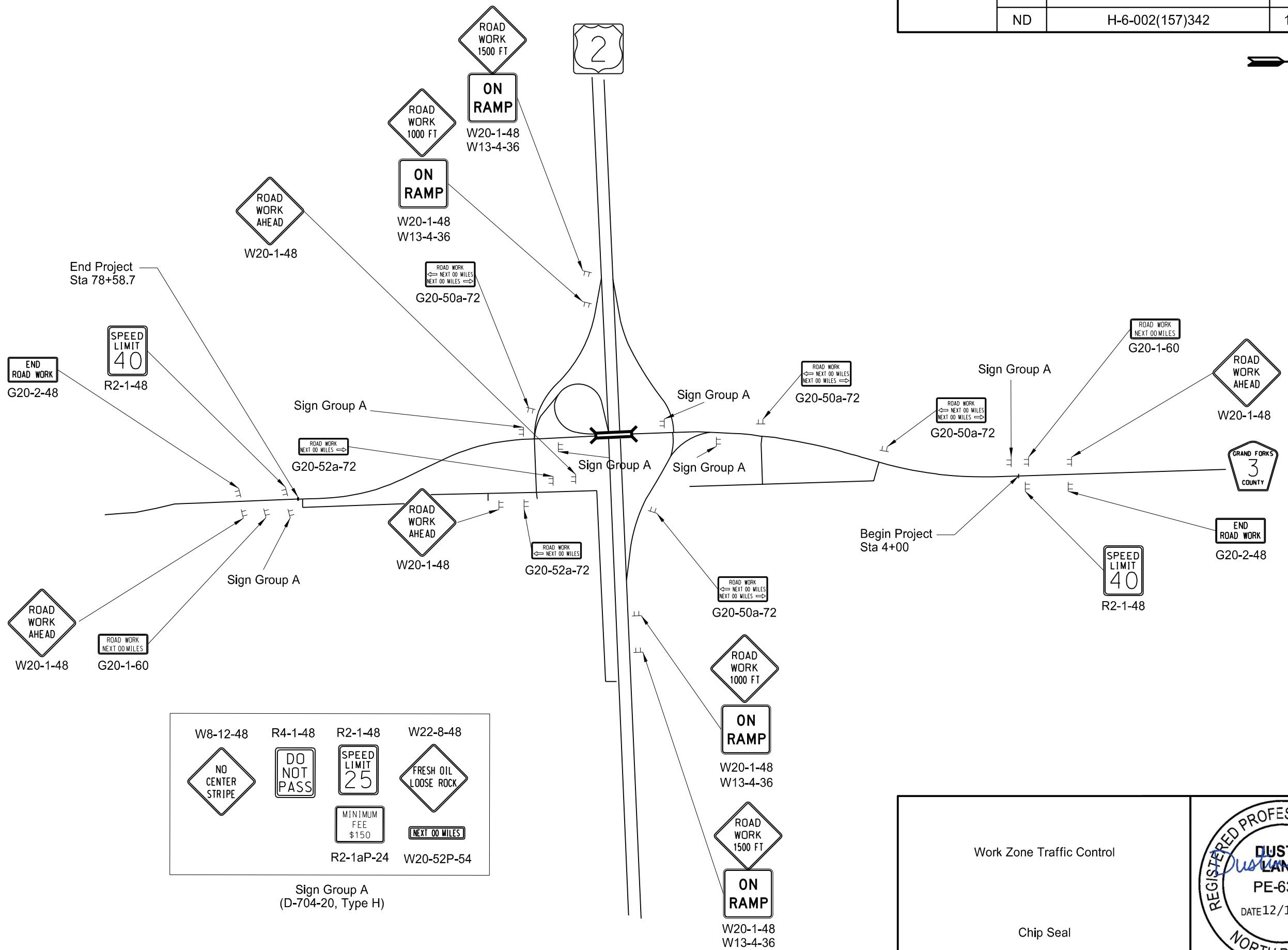
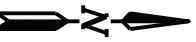


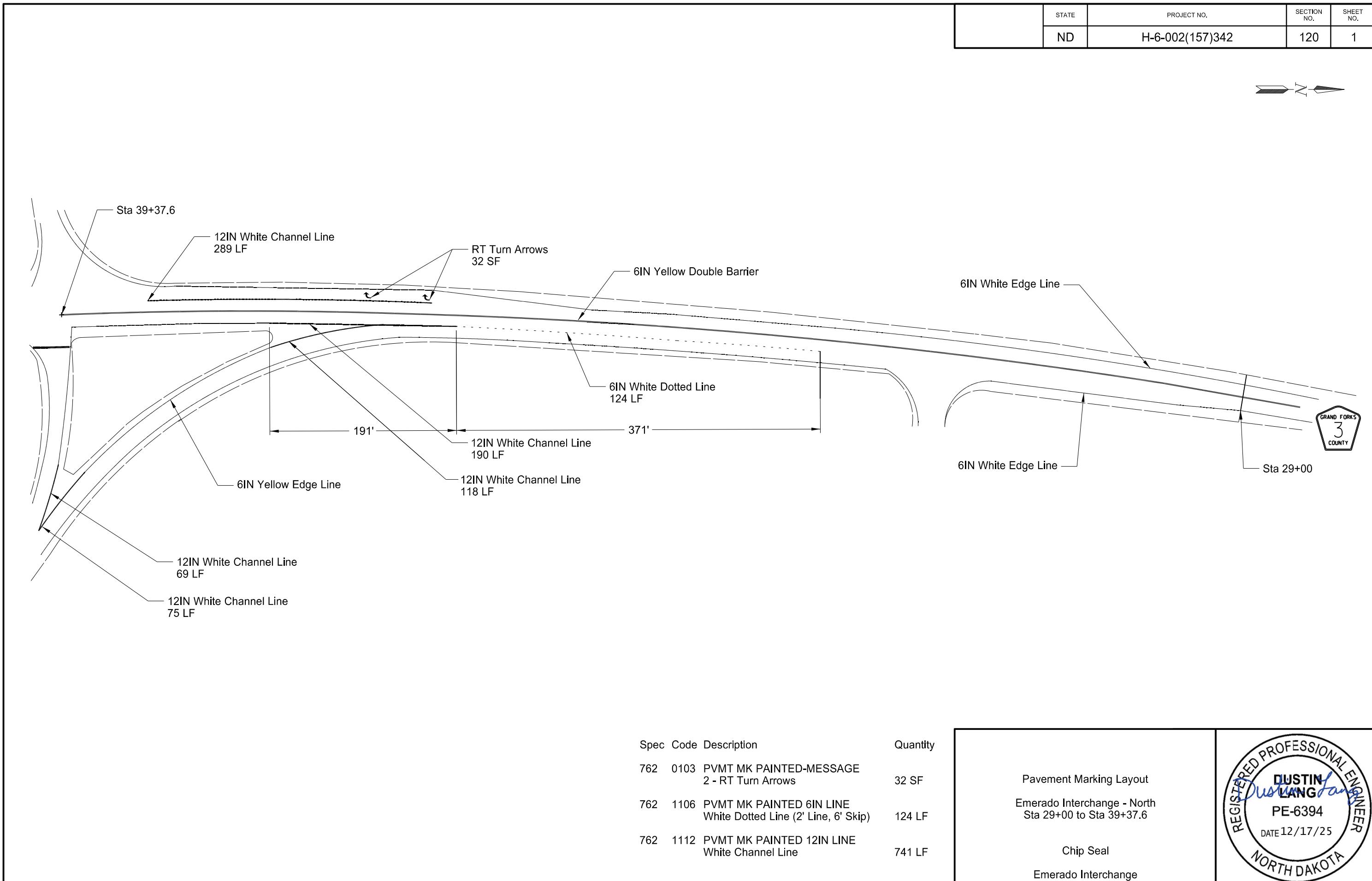
Traffic Control Devices List

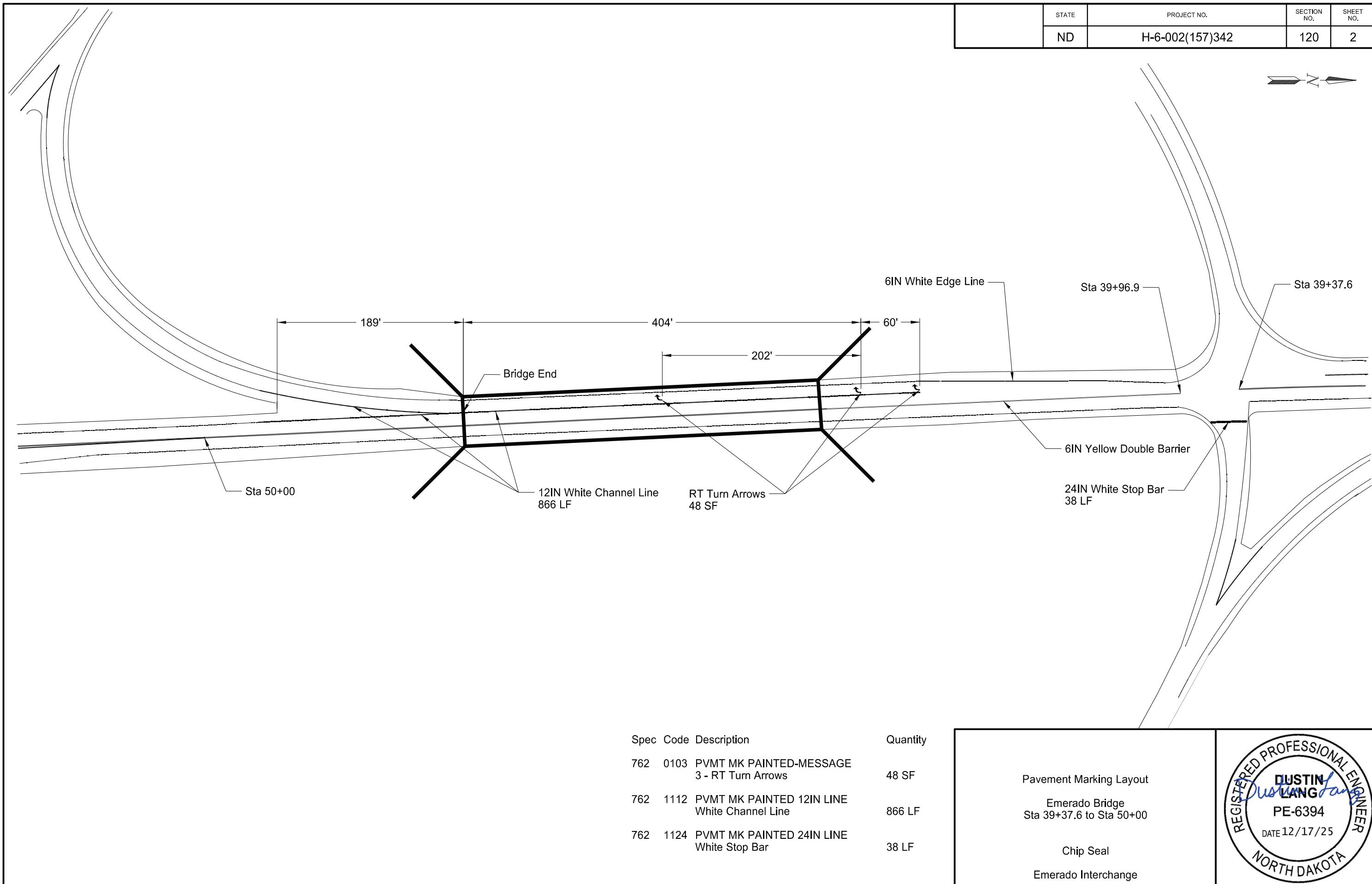
Chip Seal

Emerado Interchange

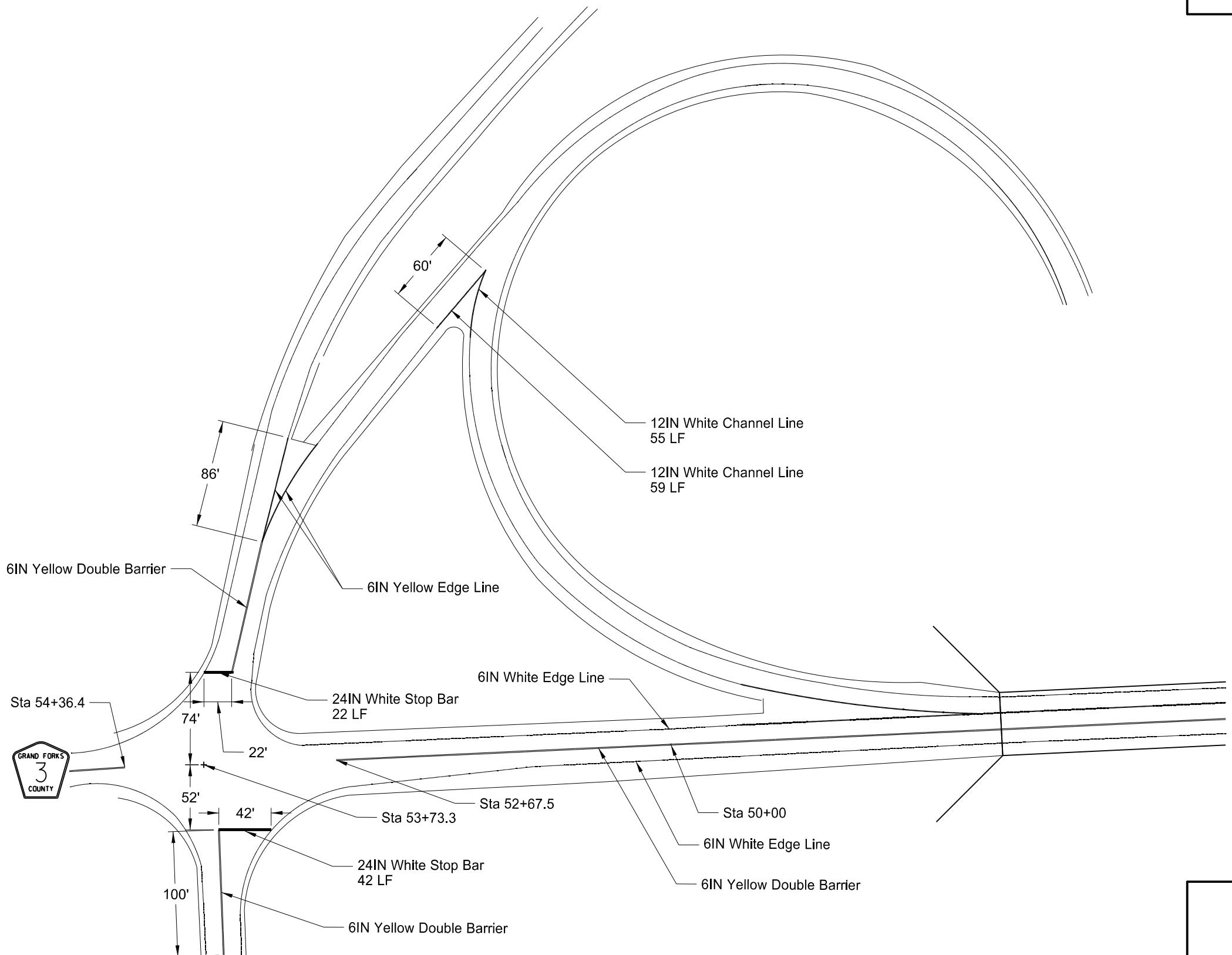
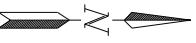
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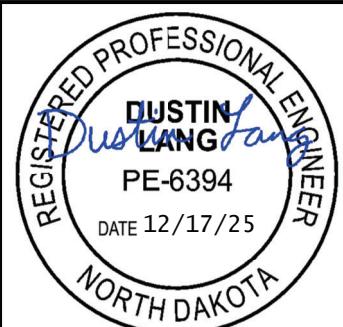
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Spec	Code	Description	Quantity
762	1112	PVMT MK PAINTED 12IN LINE White Channel Line	114 LF
762	1124	PVMT MK PAINTED 24IN LINE White Stop Bar	64 LF

Pavement Marking Layout
Southern Emerado Interchange
Sta 50+00 to Sta 53+73.3

Chip Seal
Emerado Interchange



NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18 09-20-18 12-18-20 08-16-22 04-14-25	General Revisions General Revisions General Revisions General Revisions General Revisions

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
04/14/25
ENGINEER
NORTH DAKOTA

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	Rlw	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	PMT	pad mounted transformer	RPCC	recycled portland cement concrete
GWM	ground water monitor	Long.	longitude	Pg	pages	Ref	reference
Gdrl	guardrail	Lp	loop	Pntd	painted	R Mkr	reference marker
Gtr	gutter	LD	loop detector	Pr	pair	RM	reference monument
		Lum	luminaire	Pnl	panel	RP	reference point
				Pk	park	Refl	reflectorized
H Plg	H piling			PSD	passing sight distance	RCB	reinforced concrete box
Hdwl	headwall	Mb	mailbox	Pvmt	pavement	RCES	reinforced concrete end section
Ht	height	ML	main line	Ped	pedestal	RCFES	reinforced concrete flared end section
Hel	helical	MH	manhole	Ped	pedestrian	RCP	reinforced concrete pipe
HDPE	high density polyethylene	Mkd	marked	PPP	pedestrian pushbutton post	RCPS	reinforced concrete pipe sewer
HM	high mast	Mkr	marker	Pen.	penetration	RCTES	reinforced concrete traversable end section
HP	high pressure	Mkg	marking	Perf	perforated	Reinf	reinforcement
HPS	high pressure sodium	MA	mast arm	Per.	perimeter	Res	reservation
HTCG	high tension cable guardrail	Matl	material	Perm	permanent	Res	residence
Hwy	highway	Max	maximum	PL	pipeline	Ret	retaining
Hor	horizontal			PI	place	Rev	reverse
HBP	hot bituminous pavement	Meas	measure	P&P	plan & profile	Rt	right
HMA	hot mix asphalt	Mdn	median	PL	plastic limit	R/W	right of way
Hyd	hydrant	MD	median drain	PI or P	plate	Riv	river
Ph	hydrogen ion content	MC	medium curing	Pt	point	Rd	road
		MGS	Midwest Guardrail System	PE	polyethylene	Rdbo	road bed
		MM	mile marker	PVC	polyvinyl chloride	Rdw	roadway
Id	identification	MP	mile post	PCC	Portland Cement concrete	RWIS	roadway weather information system
Incl	inclinometer tube	Min	minimum	PP	power pole	Rk	rock
IMH	inlet manhole	Misc	miscellaneous	Preempt	preemption	Rt	route
ID	inside diameter	Mon	monument	Prefab	prefabricated		
Inst	instrument	Mnd	mound	Prfmd or Pref	preformed		
Intchg	interchange	Mtbl	mountable	Prep	preperation		
Intmdt	intermediate	Mtd	mounted	Press.	pressure		
Intscn	intersection	Mtg	mounting	PRV	pressure relief valve		
Inv	invert	Mk	muck	Prestr	prestressed		
IP	iron pipe			Pvt	private		
				PD	private drive		
Jt	joint			Prod.	production/produce		
Jct	junction	Neop	neoprene	Prog	programmed	07-01-14	
		Ntwk	network	Prop.	property	REVISIONS	
		N	North	Ppsd	proposed	DATE	CHANGE
		NE	Northeast	PB	pull box	08-03-15	General Revisions
		NW	Northwest			04-23-18	General Revisions
		NB	Northbound			12-18-20	General Revisions
		No. or #	number			08-16-22	General Revisions
						04-14-25	General Revisions

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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	Southeast	TERO	tribal employment rights ordinance
SW	Southwest	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special		
SA	special assembly	Qu	unconfined compressive strength
SP	special provisions	Ugrnd	underground
G	specific gravity	Util	utility
Spk	spike		
SB	split barrel sample		
SH	sprinkler head	VG	valley gutter
SV	sprinkler valve	Vap	vapor
Sq	square	Vert	vertical
Stk	stake	VCP	vitrified clay pipe
Std	standard	Vol	volume
N	standard penetration test	VSFS	vehicle speed feedback sign
Std Specs	standard specifications		
Stm L	steam line	Wkwy	walkway
SEC	steel encased concrete	W	water content
SMA	stone matrix asphalt	WGV	water gate valve
SSD	stopping sight distance	WL	water line
SD	storm drain	WM	water main
St	street	WMV	water main valve
SPP	structural plate pipe	W Mtr	water meter
SPPA	structural plate pipe arch	WSV	water service valve
Str	structure	WW	water well
Subd	subdivision	Wrng	wearing
Sub	subgrade	WIM	weigh in motion
Sub Prep	subgrade preperation	W	west
Ss	subsoil	WB	westbound
SS	supplement specification	Wrng	wiring
Supp	supplemental	W/	with
Surf	surfacing	W/o	without
Surv	survey		
Sym	symmetrical		

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NDDOT ABBREVIATIONS

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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
CC	closing corner
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
MC	meander corner
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
SC	standard corner
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
WC	witness corner
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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

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LINE STYLES

D-101-20

Existing Topography

Void — Void — Void — v Existing Ground Void

—+—+— Existing Cemetery 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

- - - -x- - - -x- - Existing Fence

| | | | | Existing Railroad

---- Existing Field Line

— 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

— Existing Wet Area-Vegetation Break

— Existing High Tension Cable Guardrail

— Existing High Tension Cable Guardrail with Posts

Proposed Topography

— 3-Cable w Posts

— Flow

— Existing Flow

— Existing Curb

— REMOVE REMOVE Remove Line

— Wall

— Retaining Wall (Plan View)

— W-Beam w Posts

— High Tension Cable Guardrail with Posts

Existing Utilities

— E Existing Electrical

— FO Existing Fiber Optic Line

— FO Existing TV Fiber Optic

— G Existing Gas Pipe

— OH Existing Overhead Utility Line

— P Existing Power

— PL Existing Fuel Pipeline

— PL Existing Undefined Above Ground Pipe Line

— SAN Existing Sanitary Sewer

— SAN FM Existing Sanitary Force Main

— SD Existing Storm Drain

— SD FM Existing Storm Drain Force Main

— Existing Culvert

— T Existing Telephone Line

— TV Existing TV Line

— W Existing Water or Steam Line

— Existing Under Drain

— Existing Slotted Drain

— Existing Conduit

— Existing Conductor

— Existing Down Guy Wire Down Guy

— Existing Underground Vault or Lift Station

Proposed Utilities

— 24 Inch Pipe

— Reinforced Concrete Pipe

— Under Drain

— Edge Drain

Traffic Utilities

— Conductor

— Fiber Optic

— Existing Loop Detector

— Existing Double Micro Loop Detector

— Micro Loop Detector Double

— Existing Micro Loop Detector

— Micro Loop Detector

— Signal Head with Mast Arm

— Existing Signal Head with Mast Arm

Sign Structures

— Existing Overhead Sign Structure

— Existing Overhead Sign Structure Cantilever

— Overhead Sign Structure Cantilever

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LINE STYLES

D-101-21

Right Of Way

-----	Easement
-----	Existing Easement
-----	Right of Way
-----	Existing Right of Way
-----	Existing Right of Way Railroad
-----	Existing Right of Way Not State Owned
-----	Existing Government Lot Line
.....	Existing Adjacent Block Lines

Cross Sections and Typicals

-----	Existing Ground
-----	Existing Topsoil (Cross Section View)
void — void — void — v	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

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

Erosion Control

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

Geotechnical

----- D ----- D -----	Geotextile Fabric Type D
----- Geo ----- Geo -----	Geogrid
----- R ----- R -----	Geotextile Fabric Type R
----- R ----- R -----	Geotextile Fabric Type R1
----- RR ----- RR -----	Geotextile Fabric Type RR

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

Environmental

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

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

Contours

Depression Contours

Supplemental Contour

Profile

Subgrade, Subcut or Ditch Grade

Topsoil Profile

Small Hidden Object

Large Hidden Object

Phantom Object

Existing Conditions Object

Centerline Main

Centerline Secondary

Excavation Limits

Proposed Ground

Sheet Piling

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SYMBOLS

D-101-30

	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

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SYMBOLS

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■	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

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	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			

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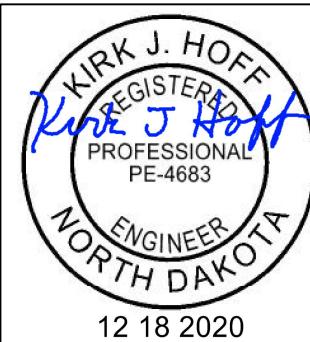
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12 18 2020

SYMBOLS

D-101-33

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

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



LANE MARKERS
(Spotting Tab for Seal Projects only)

D-704-3

Notes:

1. Install lane line markers as shown, prior to beginning the seal coat.
2. Attach cover to vertical part of marker so traffic does not cause it to detach, but it can be easily removed manually.

3. Remove protective covers immediately after seal coat is applied.

4. Remove markers after permanent pavement marking is installed.

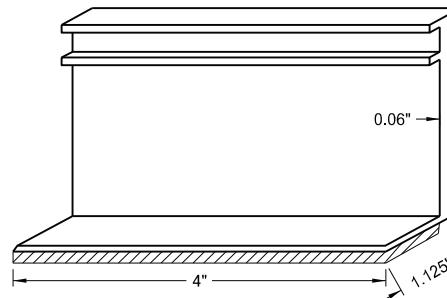
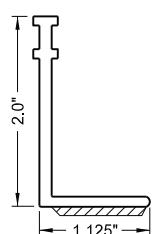
5. Use marker body and cover manufactured from polyurethane material.

6. Marker types:

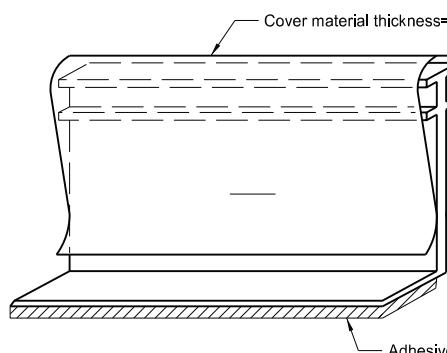
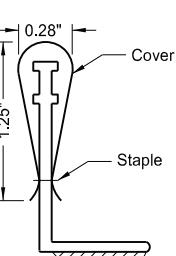
Type Y - Yellow body and cover with yellow reflective tape on both sides.
Type W - White body and cover with white reflective tape on one side.

7. Use retroreflective tape with a minimum reflectance of 1200 candle power per foot-candle per square foot, using a .1 degree observation angle and 0 degree entrance angle.

8. Use adhesive conforming to AASHTO M 237.



Marker Body



Marker Body with Protective Cover

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19 8-01-24	Updated to active voice New Design Engr PE Stamp Electronic Stamp/Signature



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

Perforated Tube

Multi-Directional Slip Base Assembly

Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times 3\frac{3}{8}''$ ASTM A36 structural angle

Bottom Soil Stub
Tube - $3'' \times 3'' \times 7$ gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

Anchor Unit and Post Assembly

Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly

Bolt Retainer for Base Connection
Bolt Retainer- $\frac{1}{32}''$ 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	Anchor Size without Slip Base in.
1	2	12			No $2\frac{1}{4}$
1	$2\frac{1}{4}$	12			No $2\frac{1}{2}$
1	$2\frac{1}{2}$	12			(A) 3
1	$2\frac{1}{2}$	10			Yes
1	$2\frac{1}{4}$	12	2	12	Yes
1	$2\frac{1}{2}$	12	$2\frac{1}{4}$	12	Yes
2	2	12			No $2\frac{1}{4}$
2	$2\frac{1}{4}$	12			No $2\frac{1}{2}$
2	$2\frac{1}{2}$	12			Yes
2	$2\frac{1}{4}$	10	2	12	Yes
2	$2\frac{1}{2}$	12	$2\frac{1}{4}$	12	Yes
3 & 4	$2\frac{1}{2}$	12			Yes
3 & 4	$2\frac{1}{2}$	10			Yes
3 & 4	$2\frac{1}{2}$	12	$2\frac{1}{4}$	12	Yes
3 & 4	$2\frac{1}{4}$	12	2	12	Yes
3 & 4	$2\frac{1}{2}$	10	$2\frac{1}{4}$	10	Yes

Properties of Telescoping Perforated Tube

Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
$1\frac{1}{2} \times 1\frac{1}{2}$	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
$2\frac{1}{4} \times 2\frac{1}{4}$	0.105	12	2.773	0.561	0.695	0.499
$2\frac{3}{16} \times 2\frac{3}{16}$	0.135	10	3.432	0.605	0.841	0.590
$2\frac{1}{2} \times 2\frac{1}{2}$	0.105	12	3.141	0.804	0.803	0.643
$2\frac{1}{2} \times 2\frac{1}{2}$	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
$2\frac{3}{16}'' \times 10$ ga.	$1\frac{1}{64}''$	$2\frac{1}{2}''$	$3\frac{1}{32}''$	$2\frac{5}{32}''$	$1\frac{33}{64}''$	$1\frac{7}{8}''$
$2\frac{1}{2}'' \times 10$ ga.	$1\frac{1}{32}''$	$2\frac{1}{2}''$	$3\frac{5}{16}''$	$\frac{5}{8}''$	$1\frac{21}{32}''$	$1\frac{3}{4}''$

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

(B) For additional wind load, insert the $2\frac{3}{16}'' \times 10$ ga. into $2\frac{1}{2}'' \times 10$ ga.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
2-28-14
REVISIONS

DATE	CHANGE
9-27-17 10-03-19 8-01-24	Updated to active voice New Design Engr PE Stamp Electronic Stamp/Signature

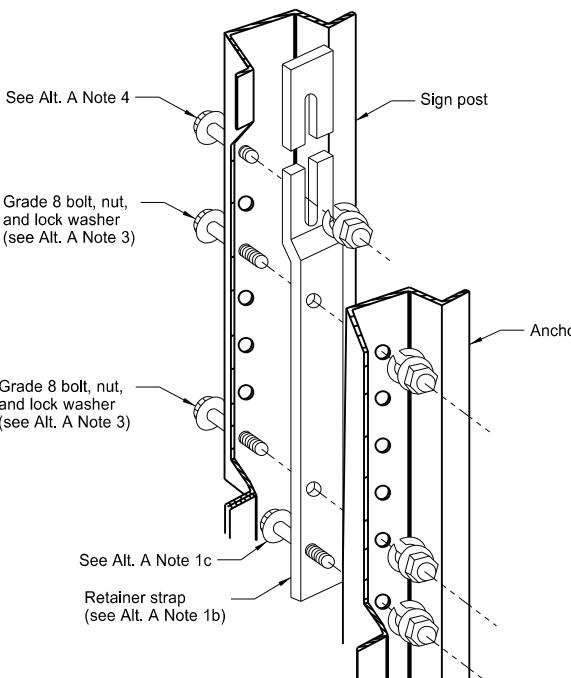
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

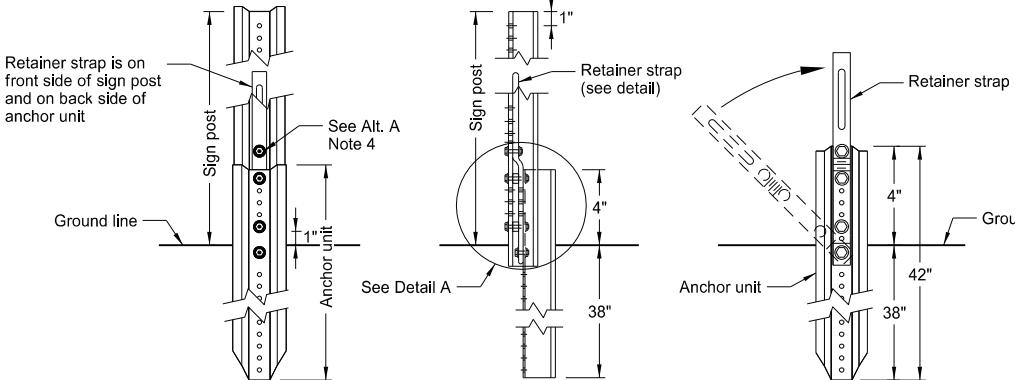
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Detail A



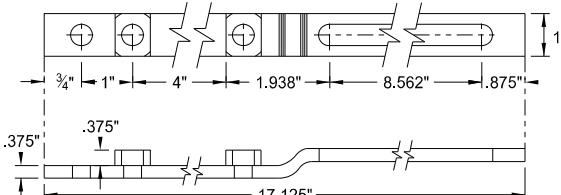
Front View

Side View

Back View

Breakaway U-Channel Detail
Alternate A

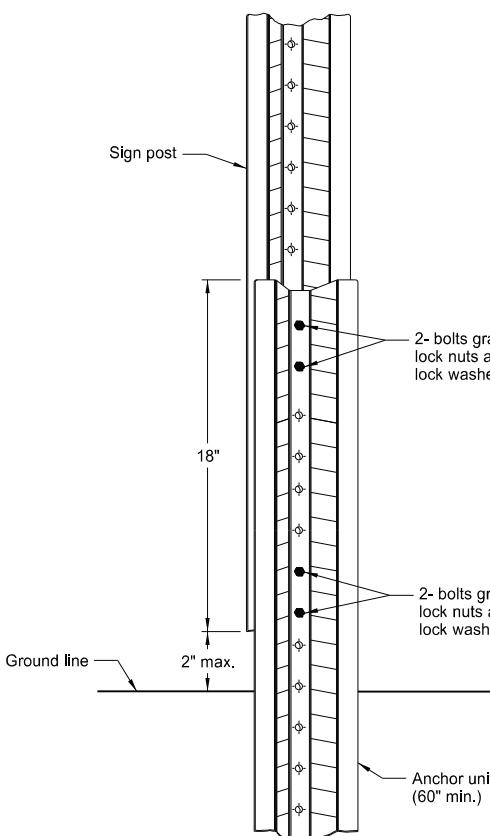
Install a maximum of 2 posts within 7'.



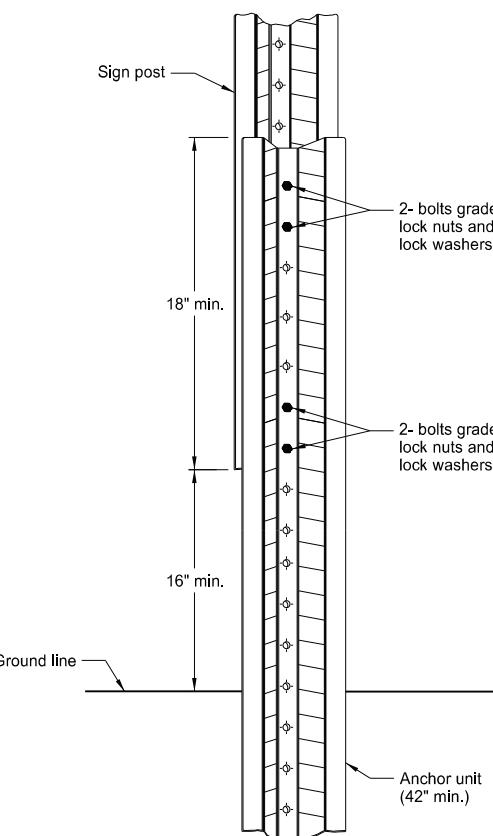
Retainer Strap Detail

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 $\frac{5}{16}$ "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 $\frac{5}{16}$ "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 $\frac{5}{16}$ "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.

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'.

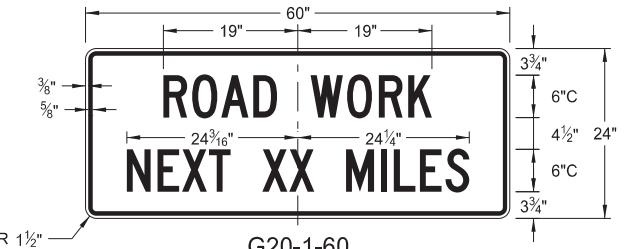
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19 8-01-24	Updated to active voice New Design Engr PE Stamp Electronic Stamp/Signature



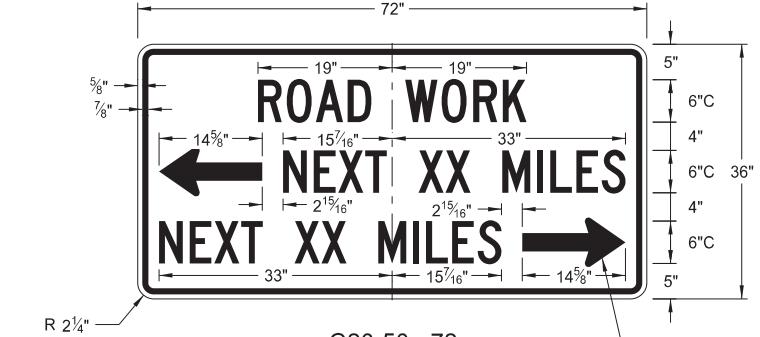
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

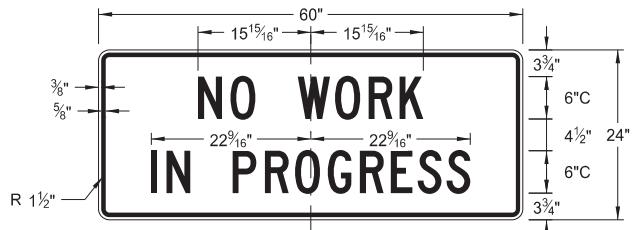
D-704-9



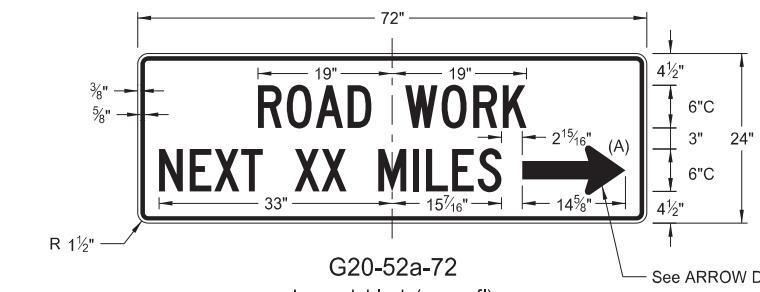
G20-1-60

Legend: black (non-refl)
Background: orange

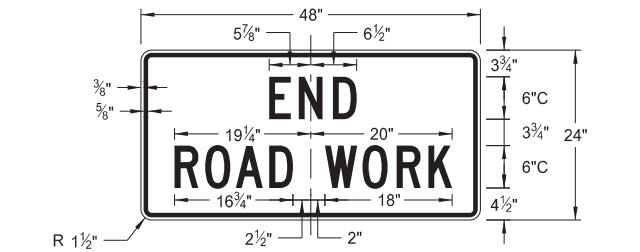
G20-50a-72

Legend: black (non-refl)
Background: orange

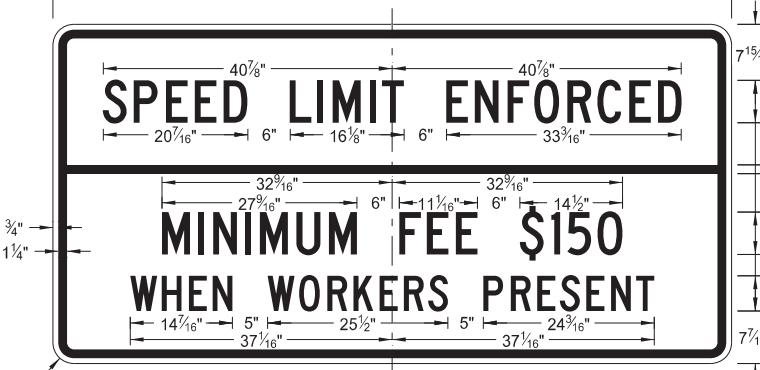
G20-1b-60

Legend: black (non-refl)
Background: orange

G20-52a-72

Legend: black (non-refl)
Background: orange

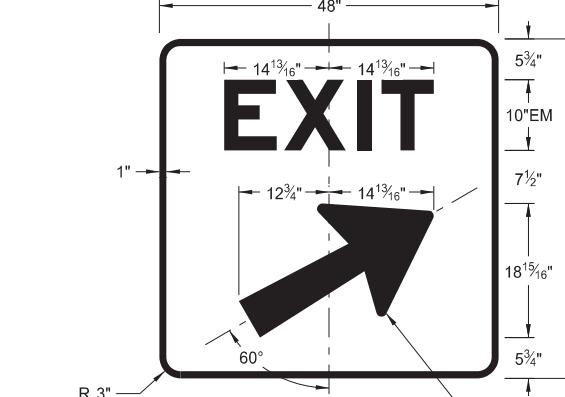
G20-2-48

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Background: orange

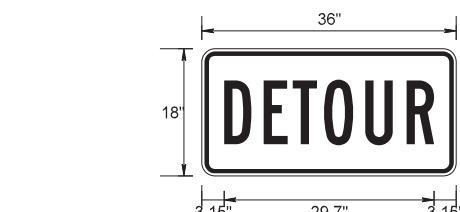
G20-55-96

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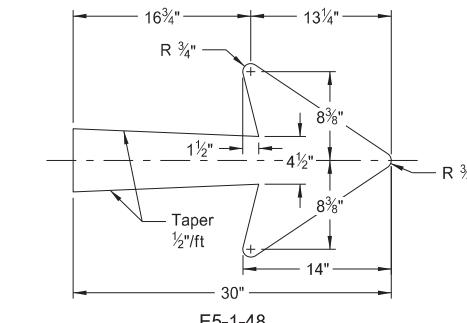
G20-4b-36

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Background: orange

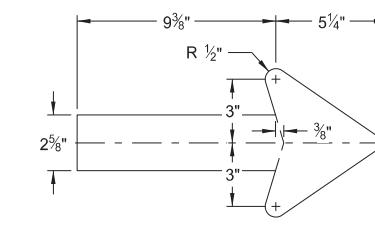
E5-1(L or R)-48

Legend: white
Background: green (orange optional)

M4-8-36

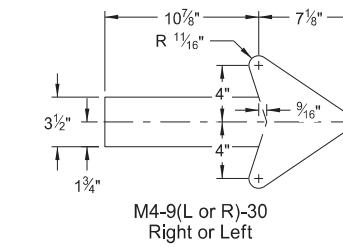
Legend: black (non-refl)
Background: orange

E5-1-48



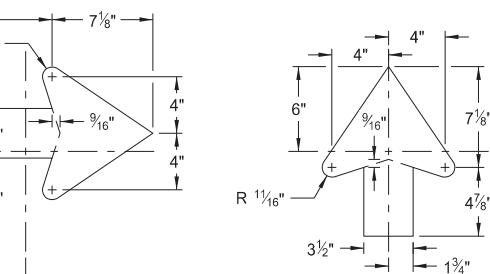
G20-50a-72

G20-52a-72



M4-9(L or R)-30

Right or Left



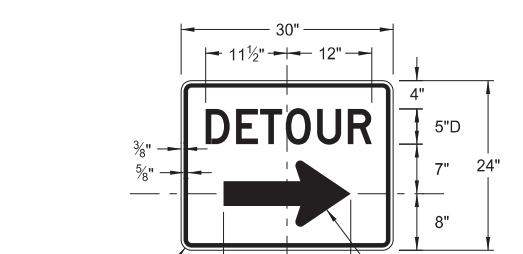
M4-9(L or R)-30

Advanced Right or Left



M4-9-30

Straight



M4-9(L or R)-30 & M4-9-30

Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17 10-03-19 08-01-24 06-30-25	Added sign & background color New Design Engineer PE Stamp Electronic Stamp/Signature Legislative Changes

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

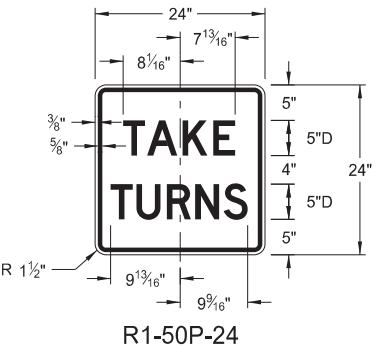
ARROW DETAILS

NOTES:

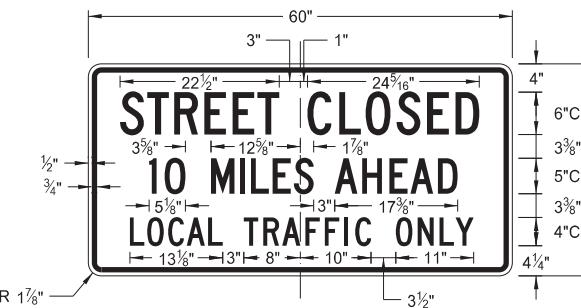
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

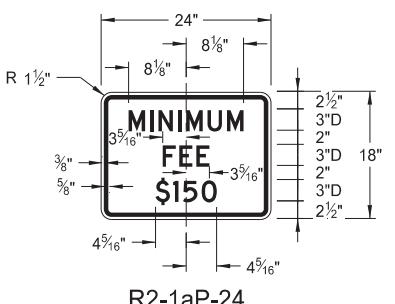
D-704-10



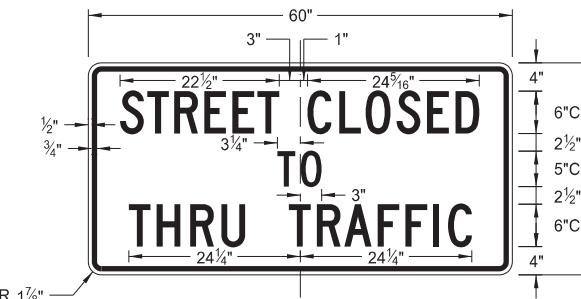
R1-50P-24

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Background: white

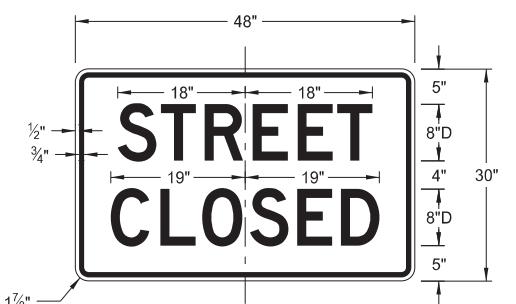
R11-3c-60

Legend: black (non-refl)
Background: white

R2-1aP-24

Legend: black (non-refl)
Background: white

R11-4a-60

Legend: black (non-refl)
Background: white

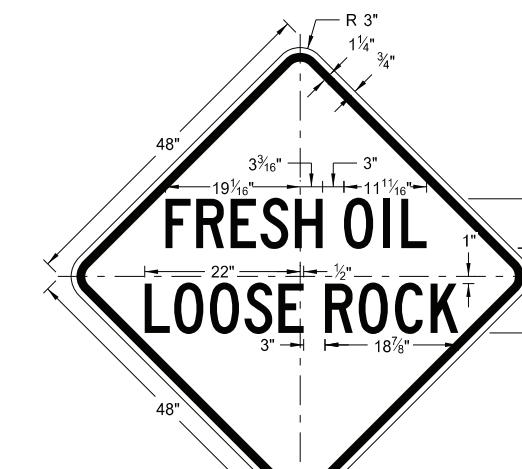
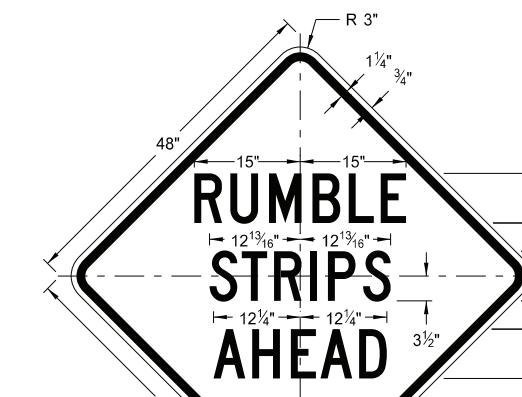
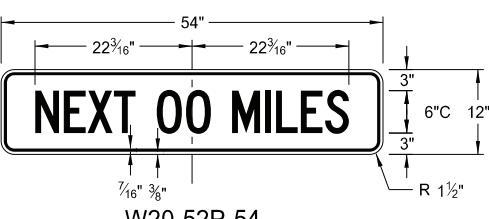
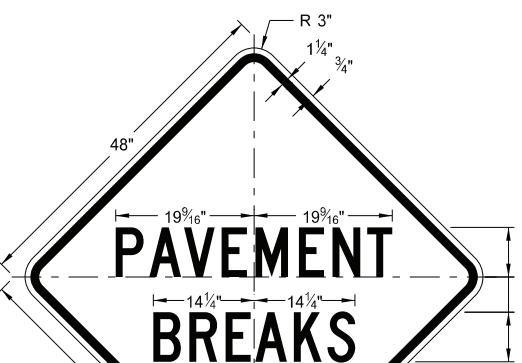
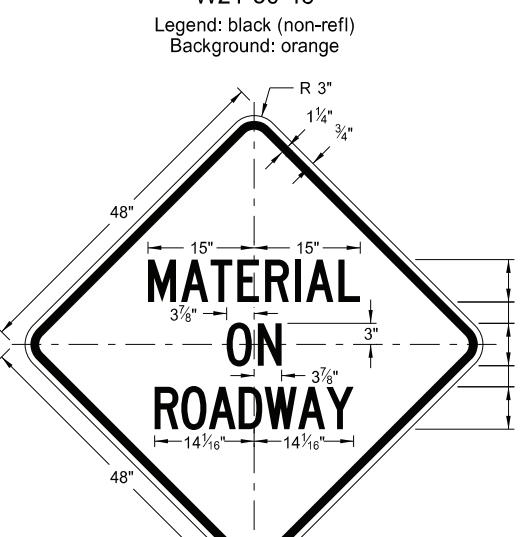
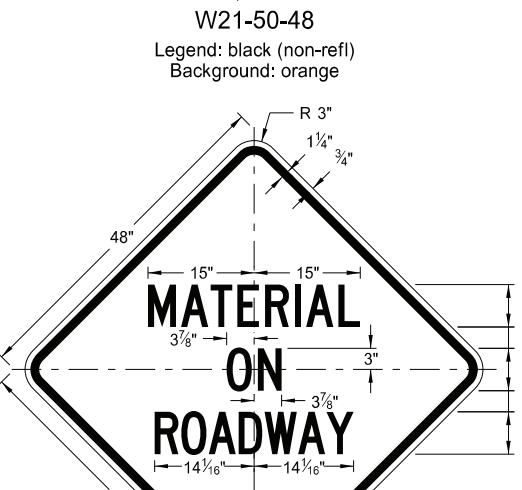
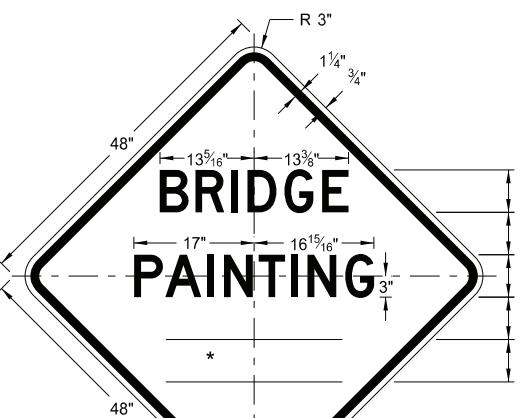
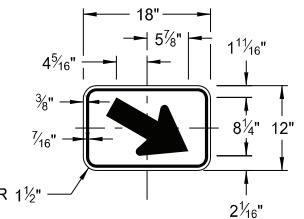
R11-2a-48

Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17 10-03-19 08-01-24 06-30-25	Revised sign number New Design Engineer PE Stamp Electronic Stamp/Signature Legislative Changes

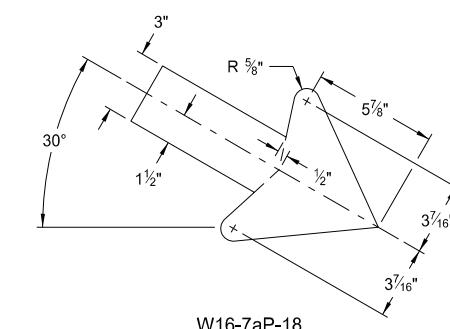


D-704-11A

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

* DISTANCE MESSAGES

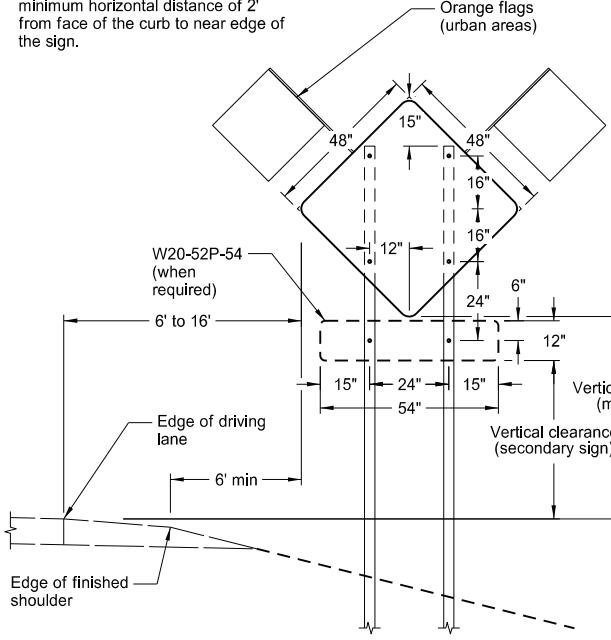
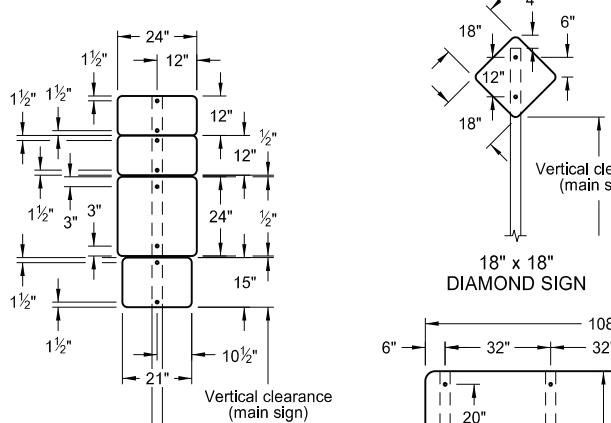
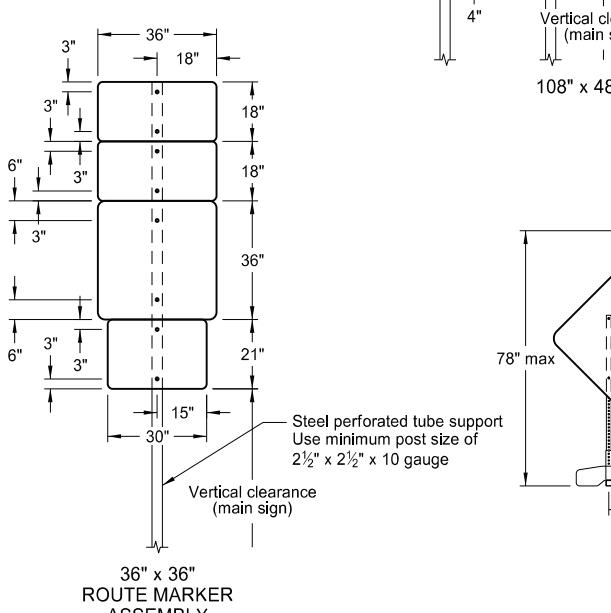
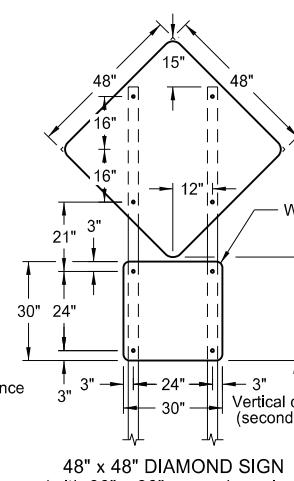
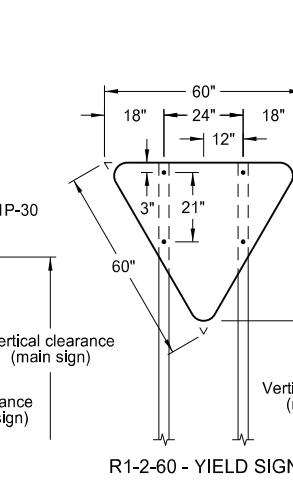


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19 8-01-24	Added details for sign W16-7aP-18. Electronic Stamp/Signature.
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683	
Kirk J. Hoff	
ENGINEER NORTH DAKOTA	
08/01/24	

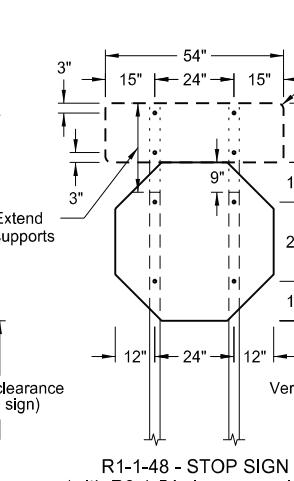
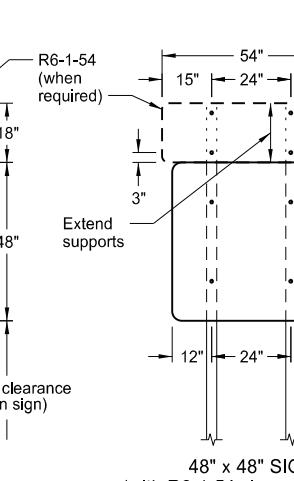
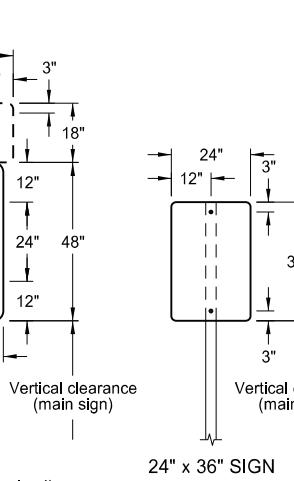
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

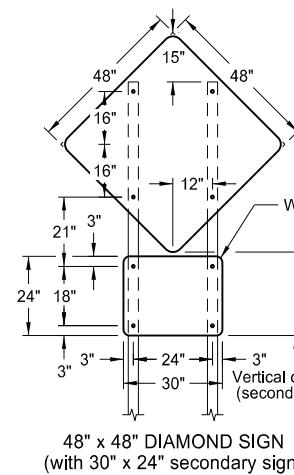
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.

TYPICAL SECTION
(48" x 48" diamond warning sign shown)ROUTE MARKER
ASSEMBLYROUTE MARKER
ASSEMBLY48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)

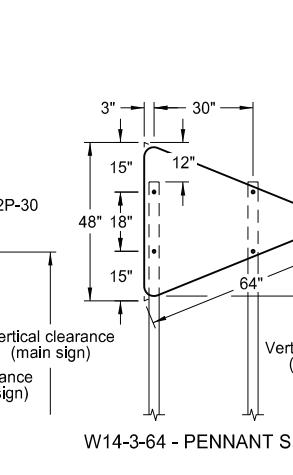
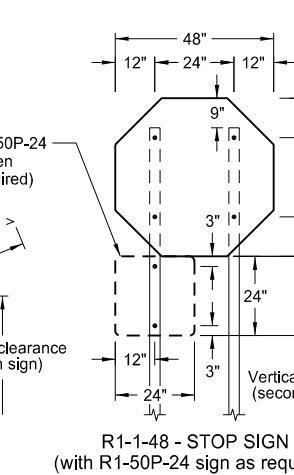
R1-2-60 - YIELD SIGN

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

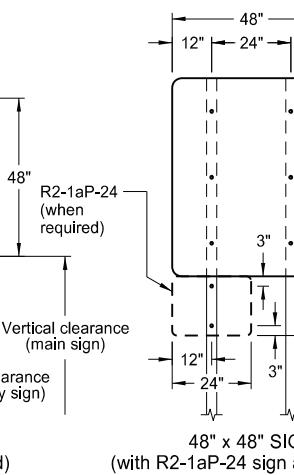
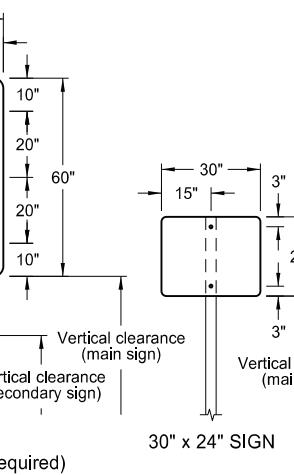
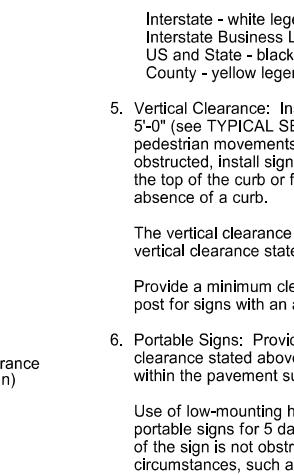
24" x 36" SIGN



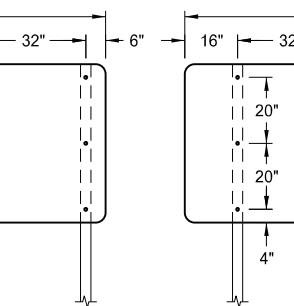
18" x 18" DIAMOND SIGN

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

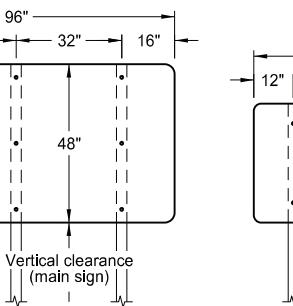
W14-3-64 - PENNANT SIGN

R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)48" x 48" SIGN
(with R2-1aP-24 sign as required)

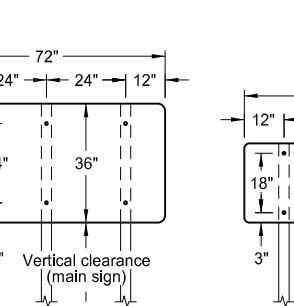
30" x 24" SIGN



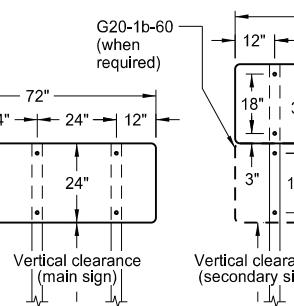
108" x 48" SIGN



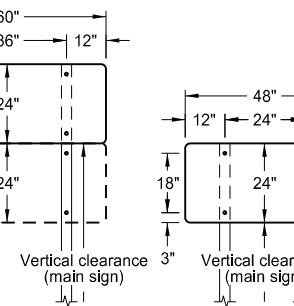
96" x 48" SIGN



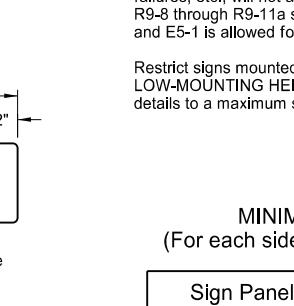
72" x 36" SIGN



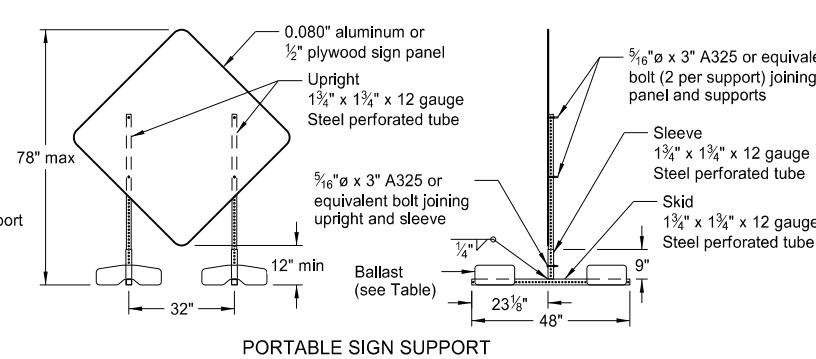
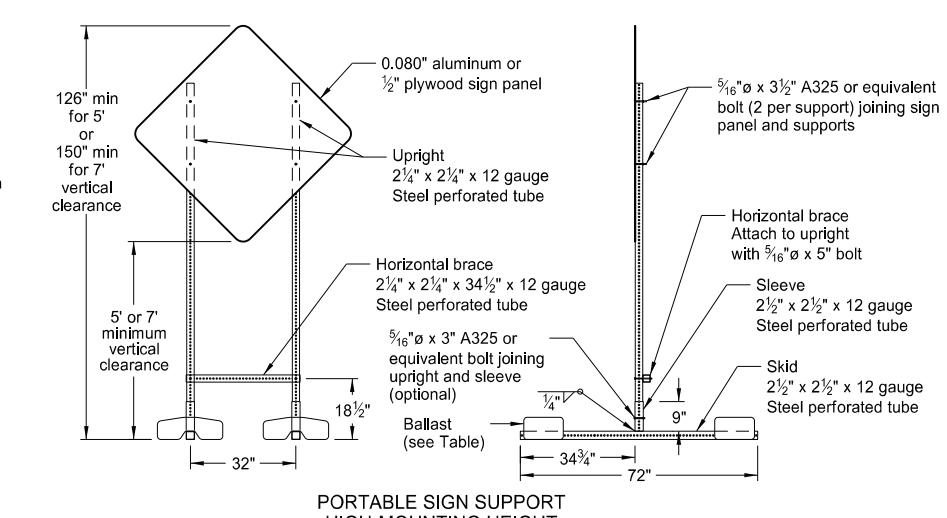
72" x 24" SIGN



60" x 24" SIGN



48" x 24" SIGN

PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHTPORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

Place signs over 50 square feet on 2 1/2" x 2 1/2" 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, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 3/8" 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

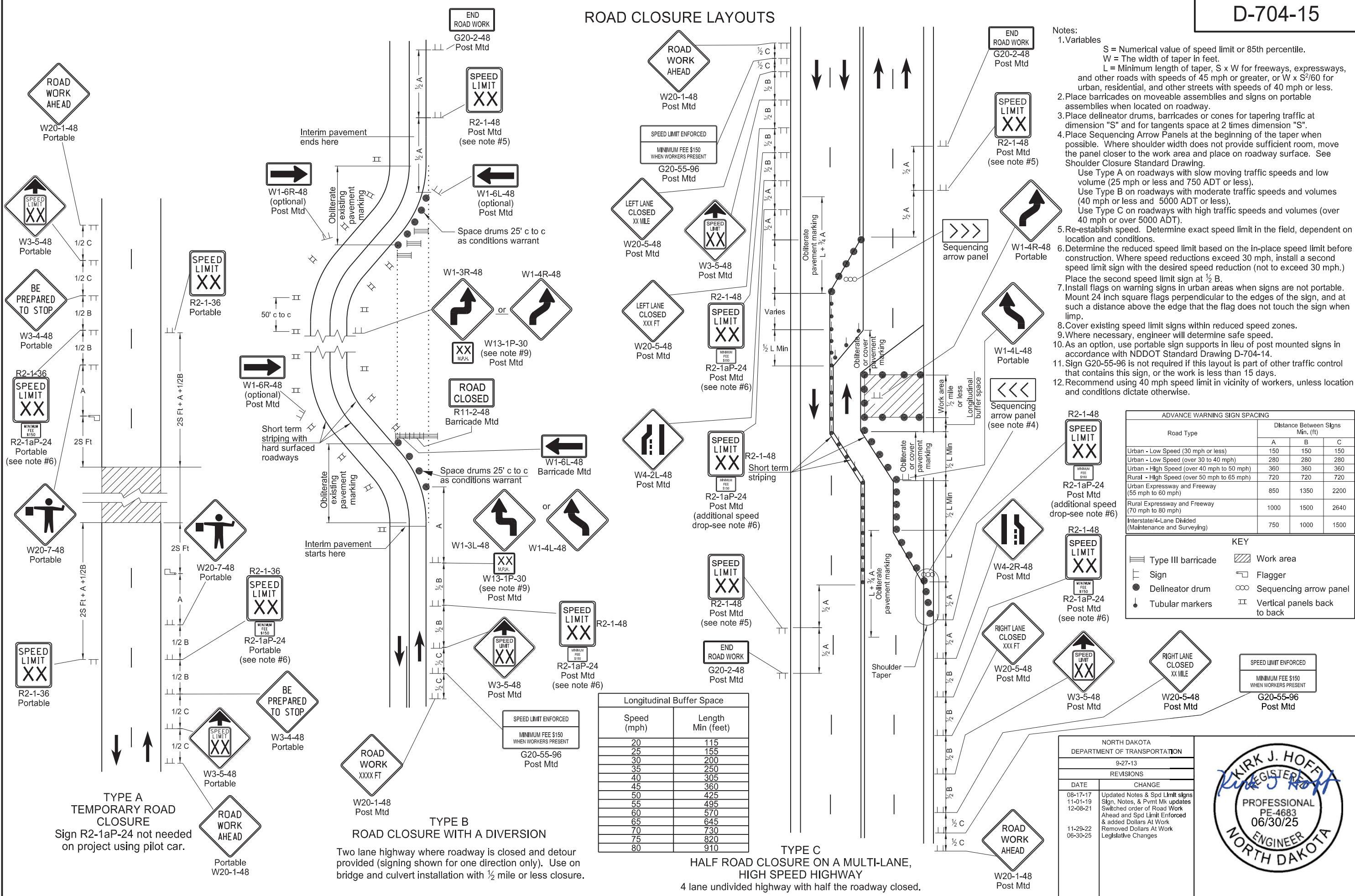
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13 9-27-17 11-01-19 8-01-24	Revised Note 6 Updated to active voice Revised 60"x24" sign detail Electronic Stamp/Signature

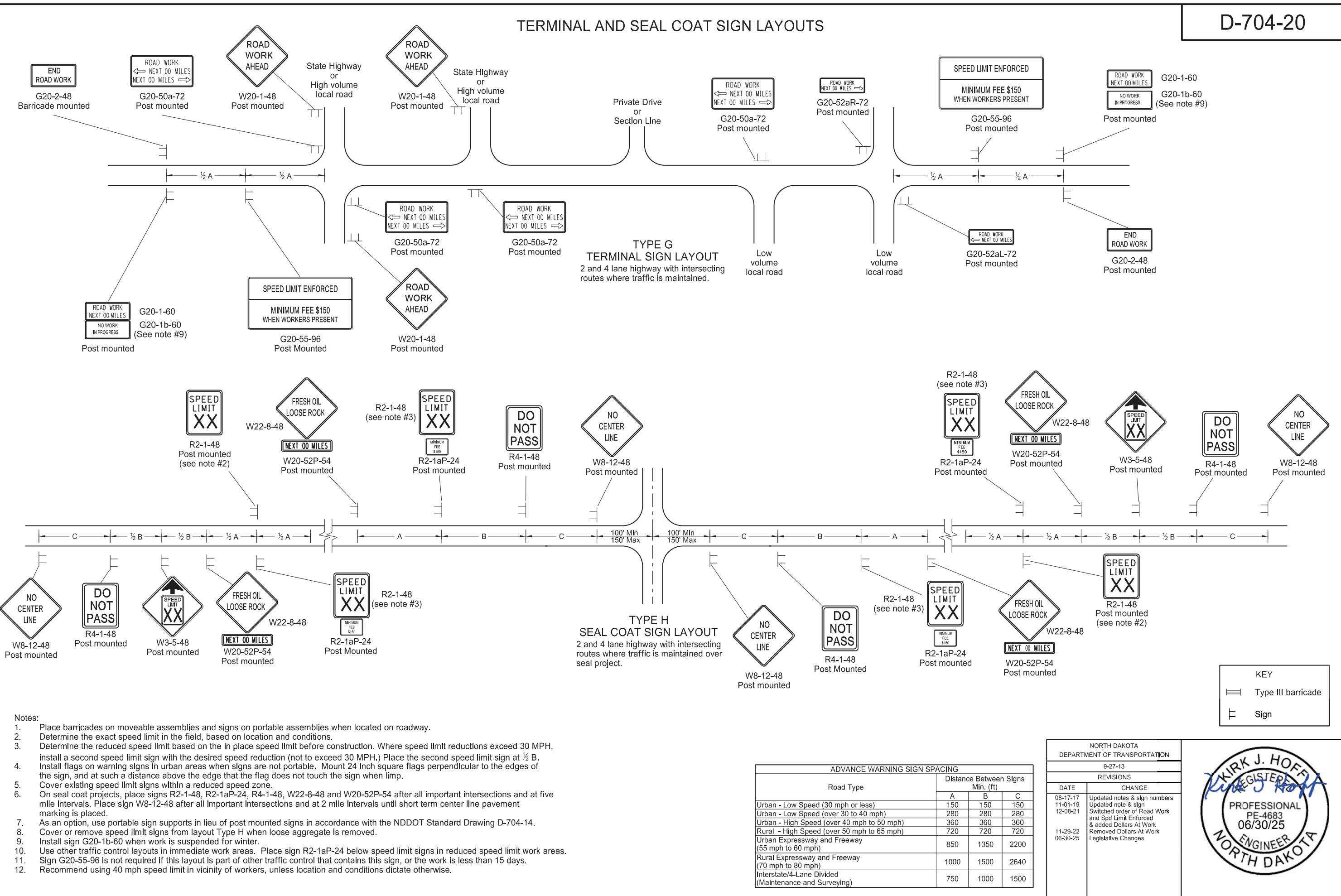


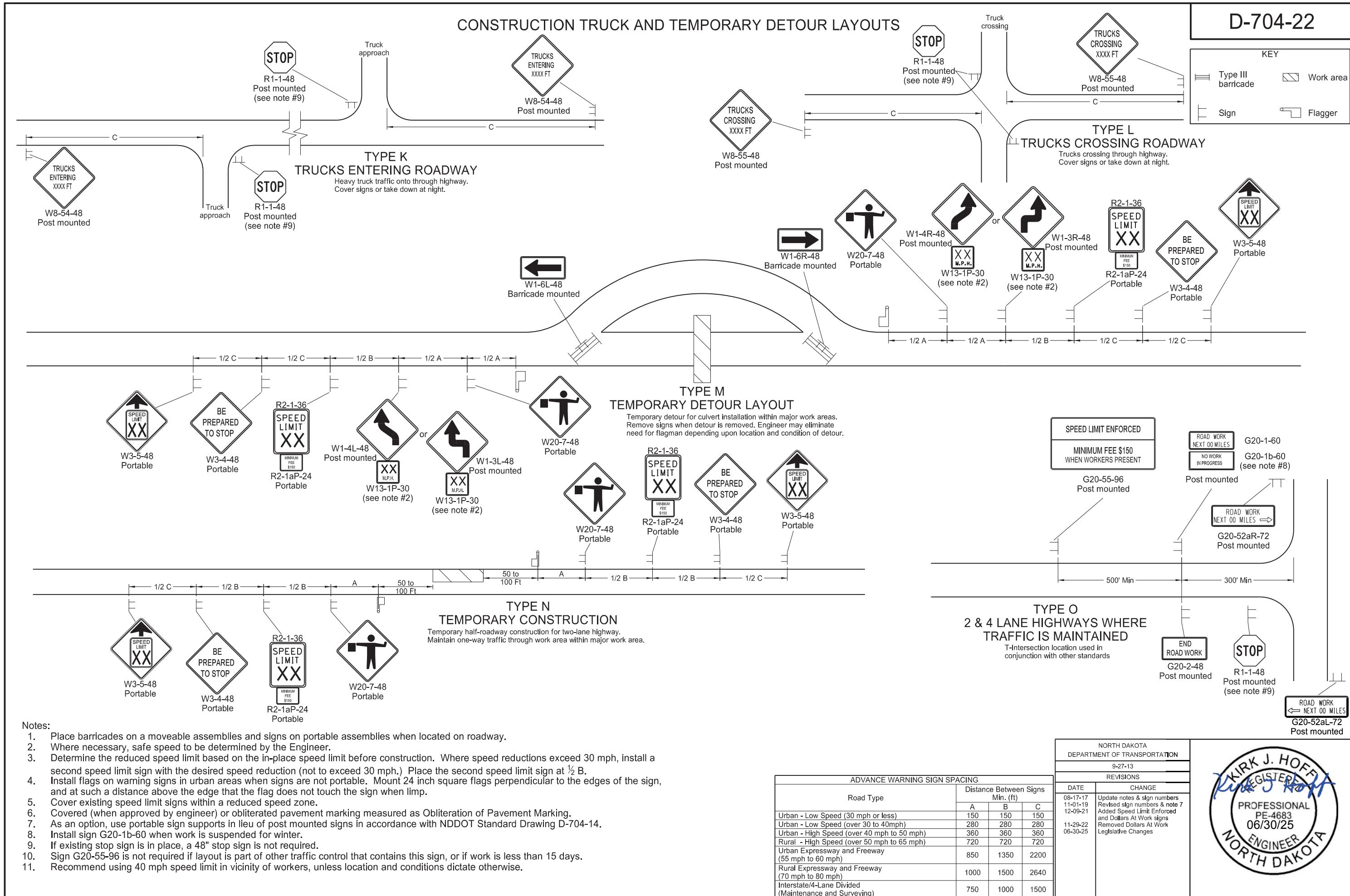
D-704-15

ROAD CLOSURE LAYOUTS



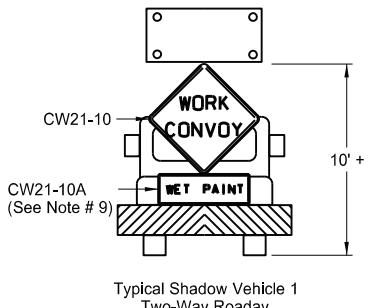
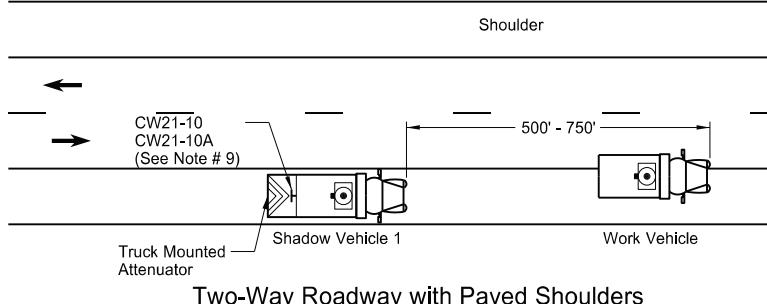
TERMINAL AND SEAL COAT SIGN LAYOUTS



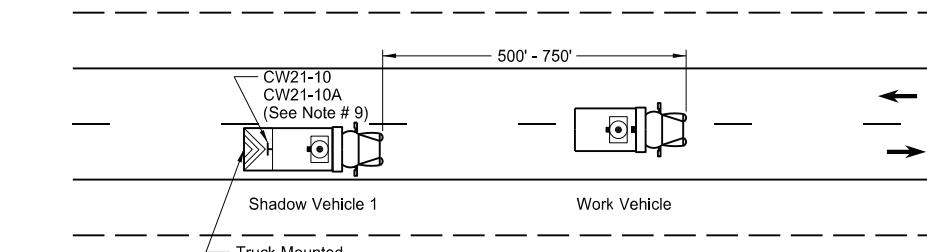


MOBILE OPERATION
(PAVEMENT MARKING)

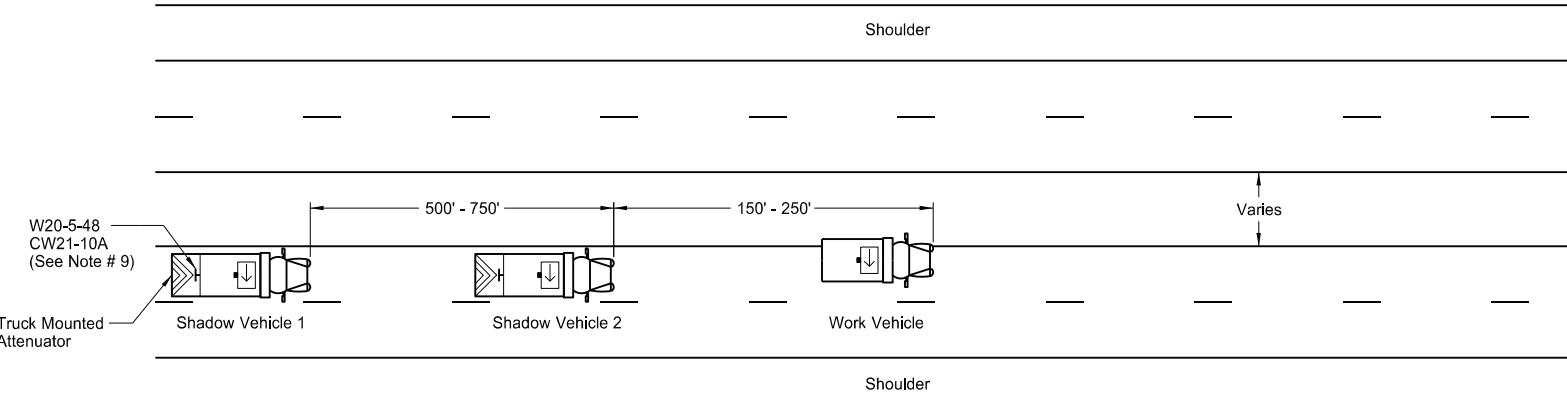
D-704-27

Typical Shadow Vehicle 1
Two-Way Roaday

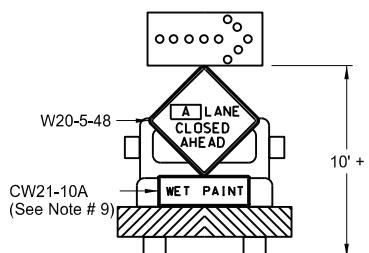
Two-Way Roadway with Paved Shoulders



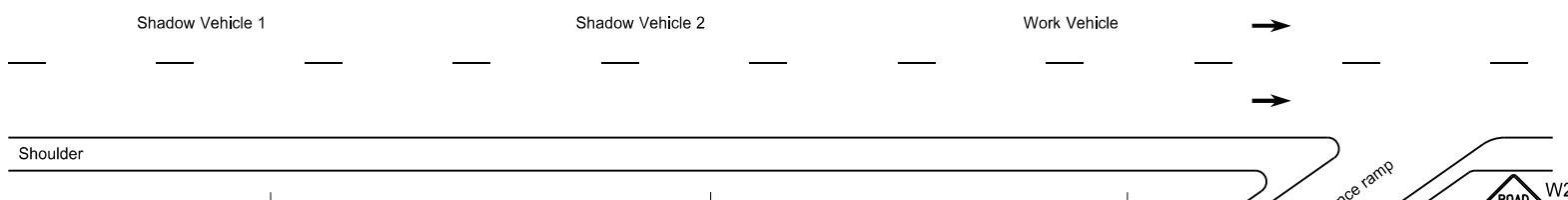
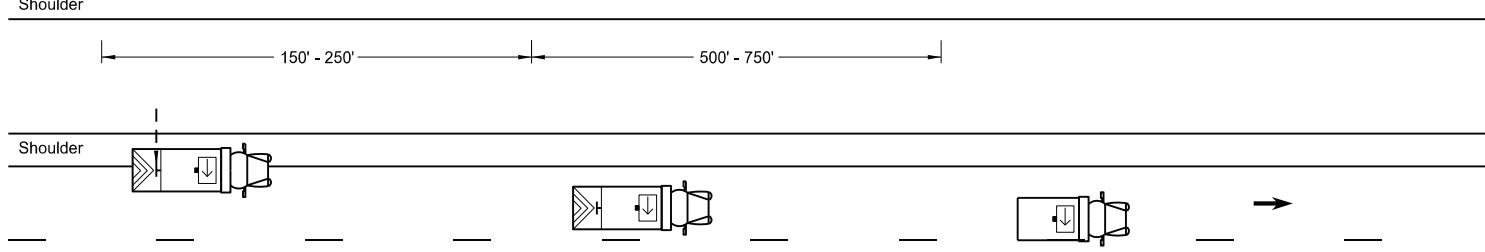
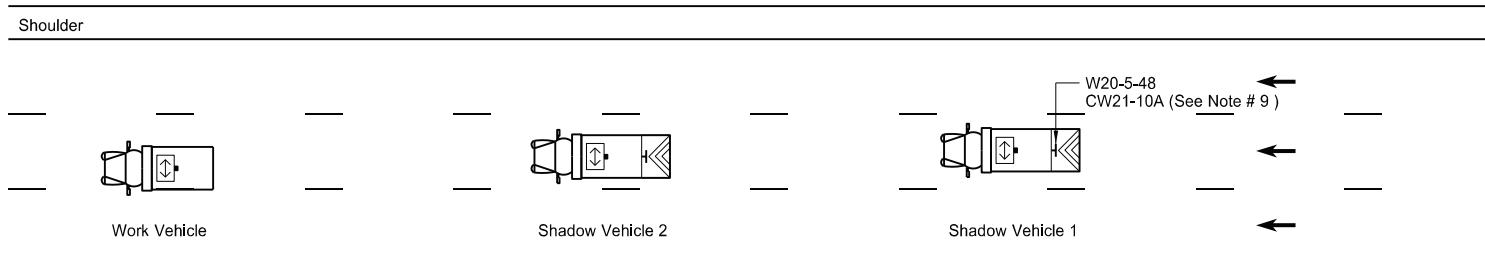
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

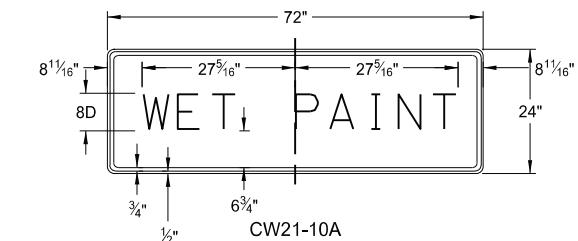
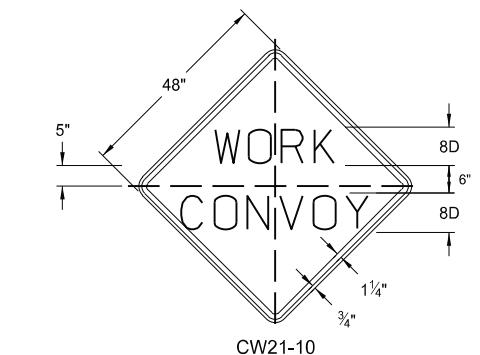
Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = [Left] [Right] [Center]



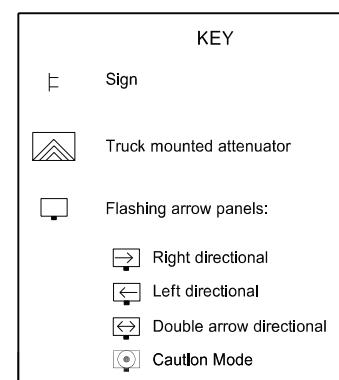
Divided Multi-Lane Highway

Sign Details



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.



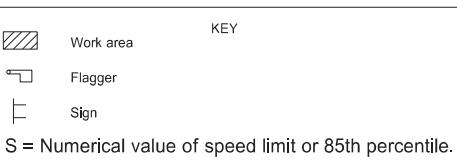
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17 11-08-19 8-02-24	Updated to active voice Changed Standard Heading Electronic Stamp/Signature



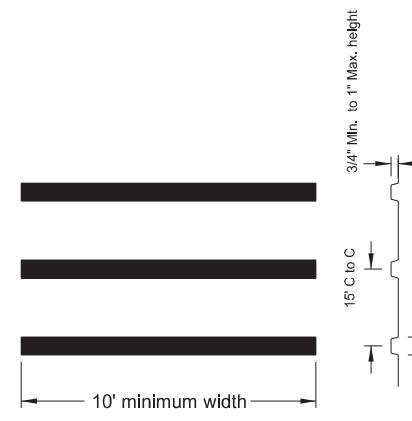
08/02/24

Two-Lane Roadway Portable Rumble Strips

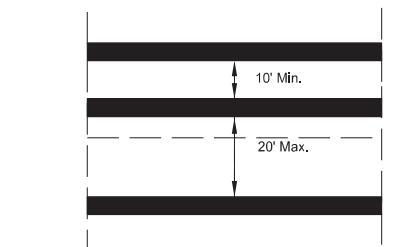
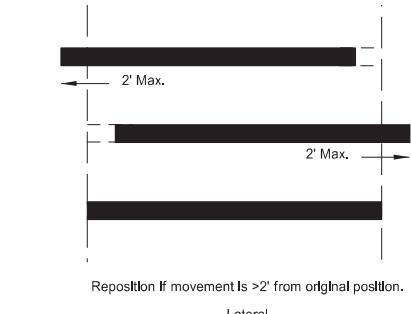
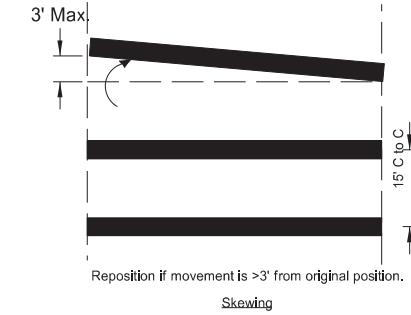
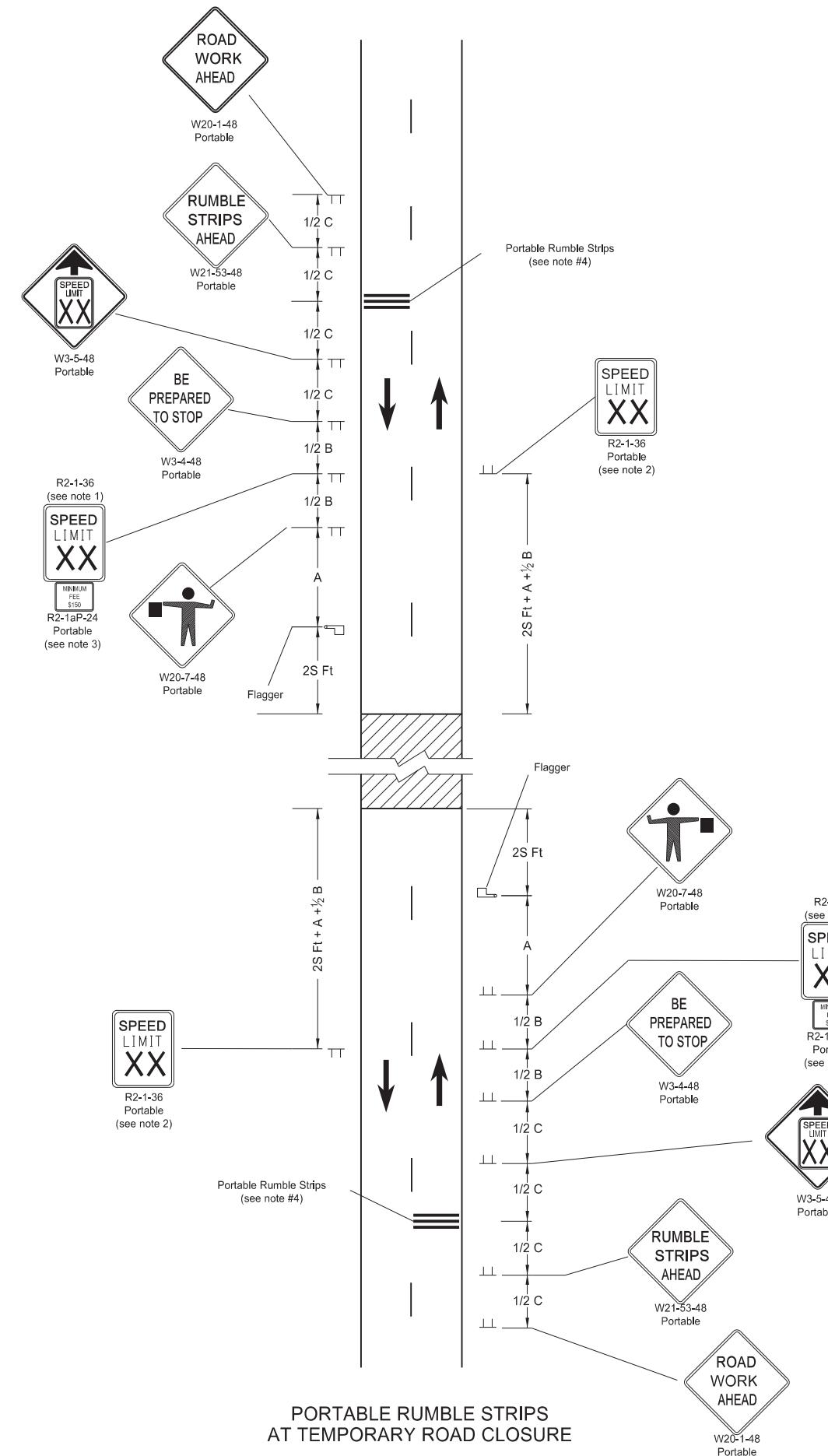
D-704-33



ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Mln. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTRABLE RUMBLE STRIPS ARRAY DETAIL



PORTRABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

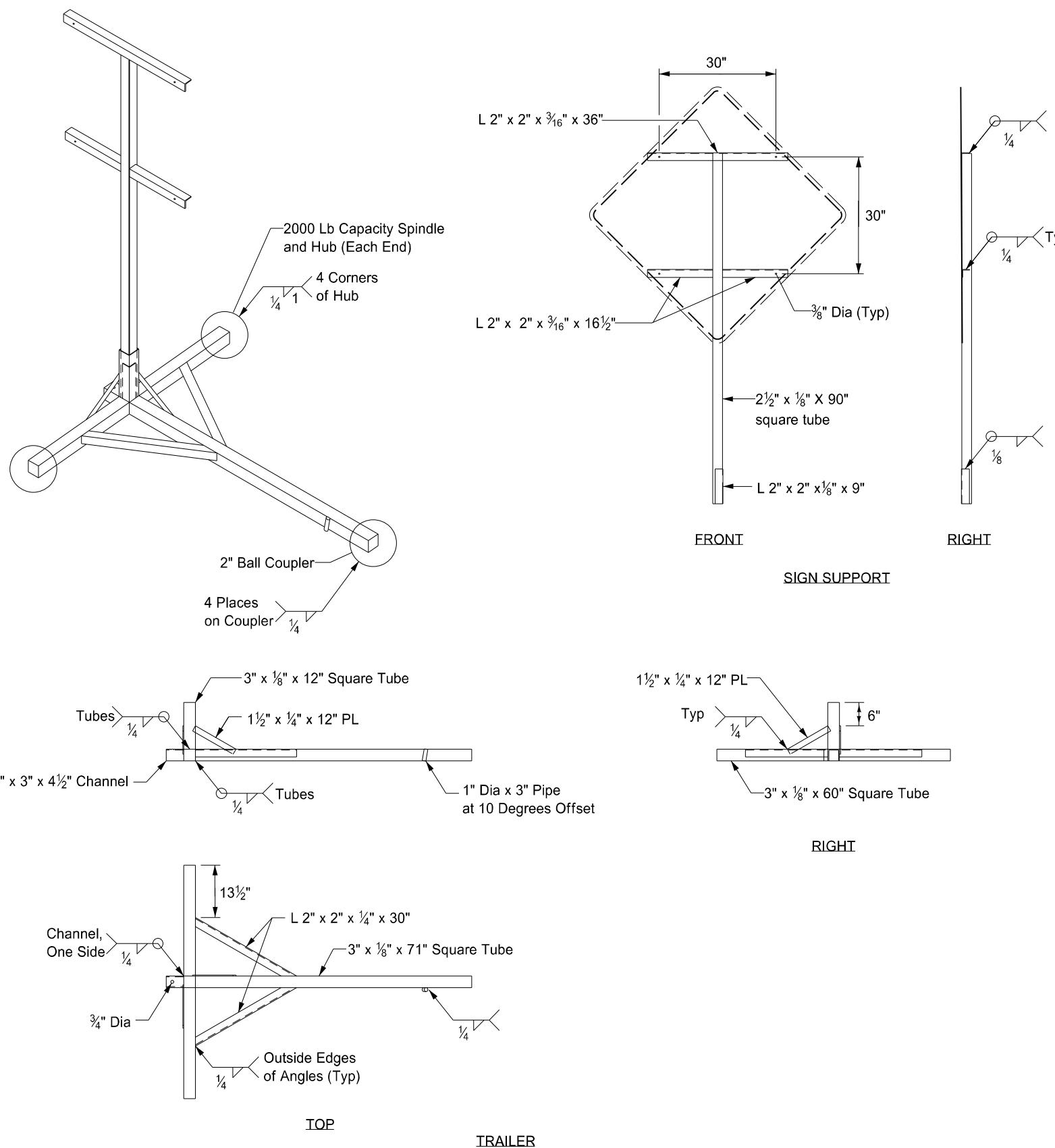
1. Determine speed in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23 06-30-25	Use changed to mln 45 mph Legislative Changes



PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

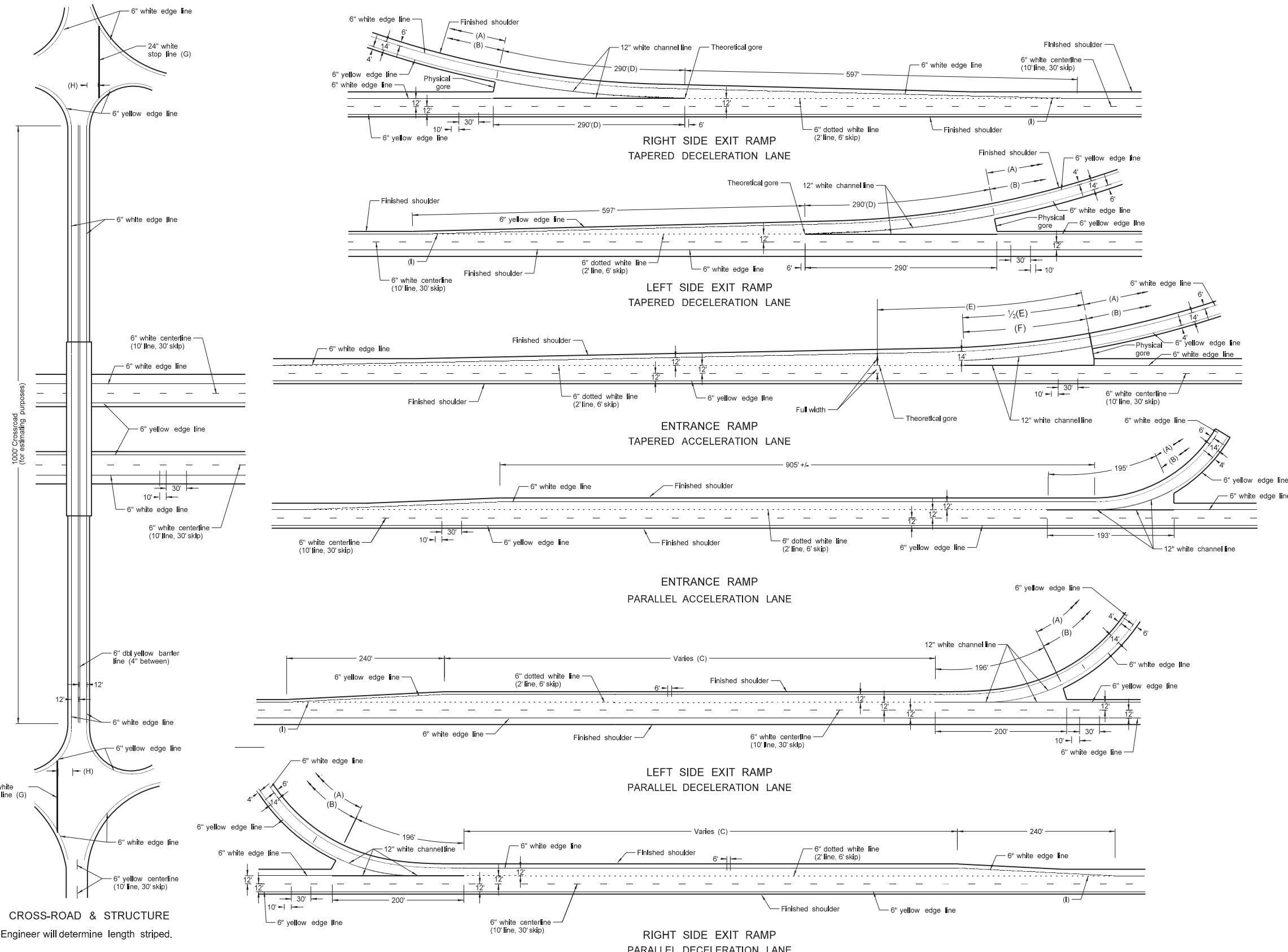


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.



INTERSTATE PAVEMENT MARKING 4 LANE DIVIDED HIGHWAY

D-762-2



CROSS-ROAD & STRUCTURE

Engineer will determine length striped.

NOTE:

- (A) Normal width white edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
- (B) Normal width yellow edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
- (C) Assume "varies" equals 790' for purpose of estimate. Place pavement marking from beginning of taper to the 12' line. Beginning of physical gore to theoretical gore.
If the distance is less than 350' extend the 12' channel line to the theoretical gore, otherwise use 195'.
Use 195 for estimating purposes.
- (D) Not required for gravel surface crossroad approaches.
4' minimum, 15' maximum from nearest edge of intersection traveled way.
- (E) Extend dotted line until it touches the edge line.

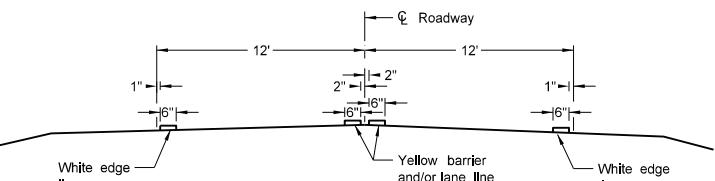
BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	12' White channel line	580 LF
	24" White stop line	60 LF
	6" White dotted line	148 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp TAPERED	12" White channel line	390 LF
	6" White dotted line	258 LF
	6" White edge line	1270 LF
	6" Yellow edge line	1075 LF
Right or Left Side Exit Ramp PARALLEL	12" White channel line	396 LF
	24" White stop line	60 LF
	6" White dotted line (C)	258 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp PARALLEL	12" White channel line	388 LF
	6" White dotted line	283 LF
	6" White edge line	1275 LF
	6" Yellow edge line	1075 LF
Main Line (Both Roadways)	6" White lane line, 10' line, 30' skip	2640 LF/M
	6" White edge line	10,560 LF/M
	6" Yellow edge line	10,560 LF/M
Cross Road	6" White edge line	2000 LF
	6" Dbl yellow barrier line (4" between)	2000 LF

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Replaced '2' Max dim with Note (1)
11-05-21	Revised labels
11-22-23	Revised pvtm marking widths
1-17-24	Revised wide pvtm marking width

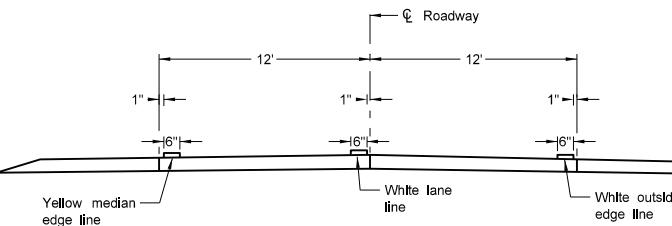


PAVEMENT MARKING

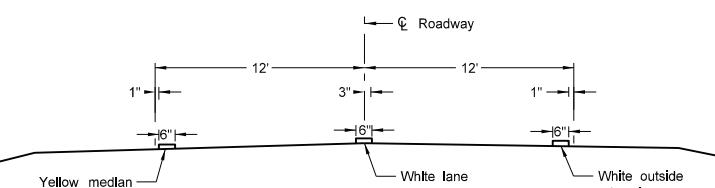
D-762-4



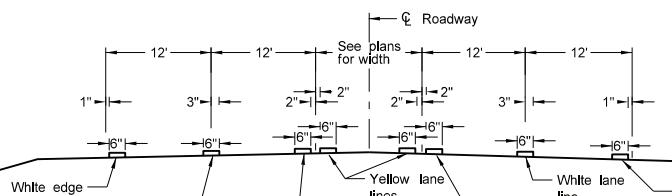
Two Lane Two Way
RURAL ROADWAY



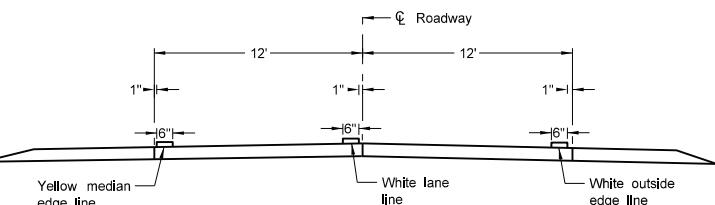
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



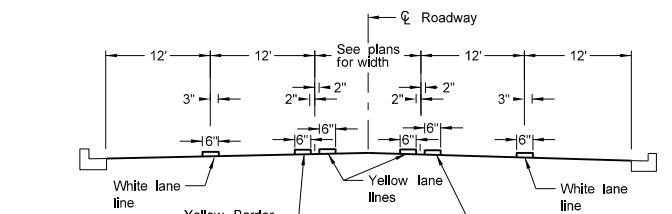
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



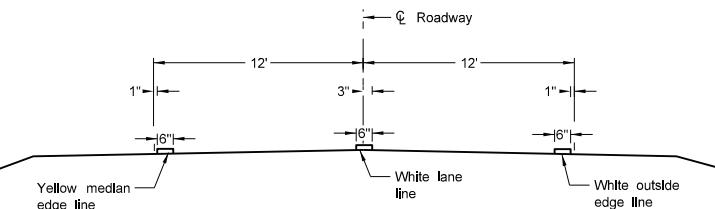
RURAL FIVE LANE ROADWAY
Asphalt Section



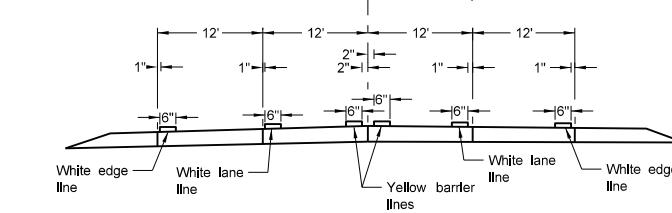
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



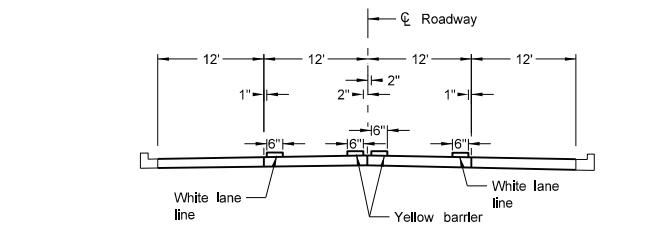
URBAN FIVE LANE SECTION
Asphalt Section



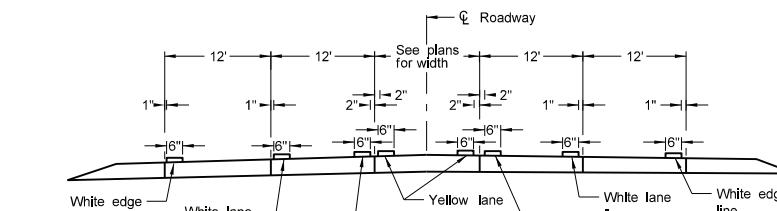
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



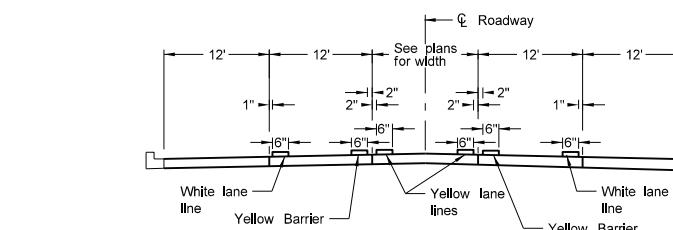
RURAL FOUR LANE ROADWAY
Concrete Section



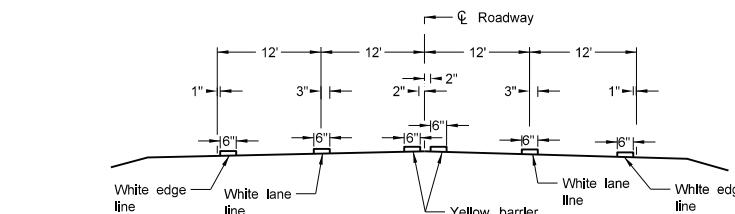
URBAN FOUR LANE SECTION
Concrete Section



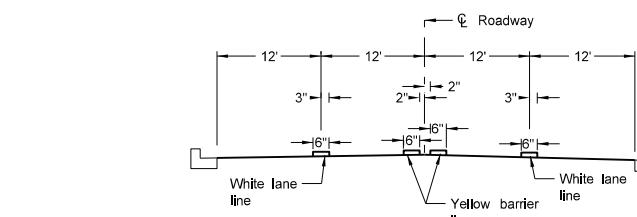
RURAL FIVE LANE ROADWAY
Concrete Section



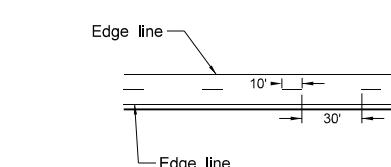
URBAN FIVE LANE SECTION
Concrete Section



RURAL FOUR LANE ROADWAY
Asphalt Section



URBAN FOUR LANE SECTION
Asphalt Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
12-1-10

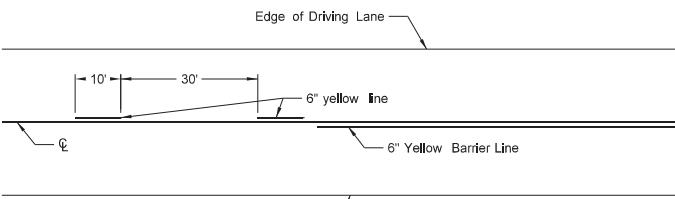
REVISIONS

DATE	CHANGE
10-17-17 08-27-19 11-22-23 07-09-24	Updated to active voice. New Design Engineer PE Stamp. Revised pavement marking widths. Modified Note 1.

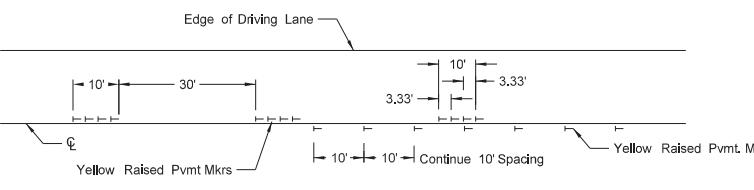


SHORT-TERM PAVEMENT MARKING

D-762-11

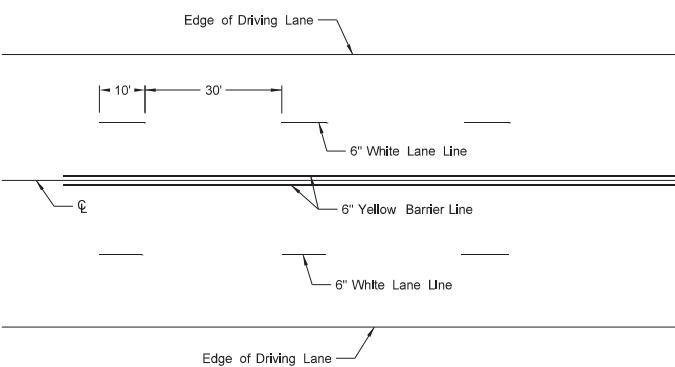


Painted or Tape Lines

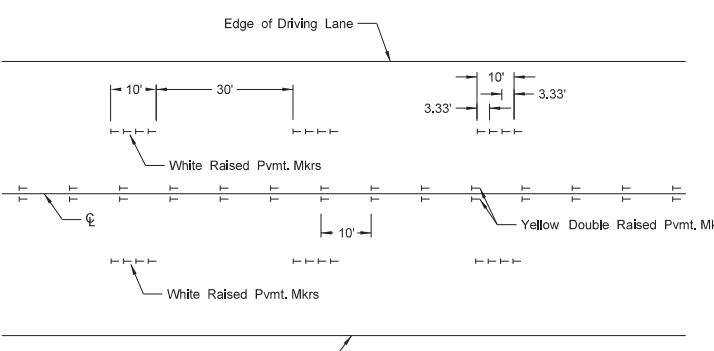


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

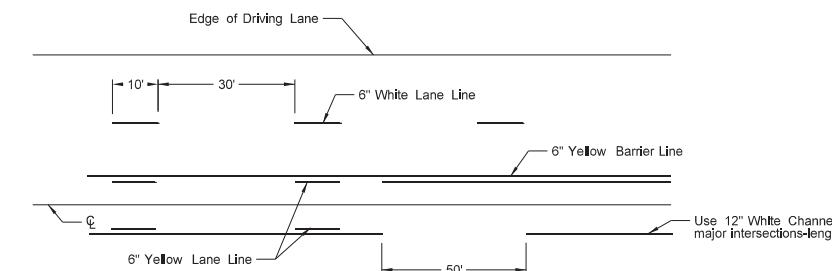


Painted or Tape Lines

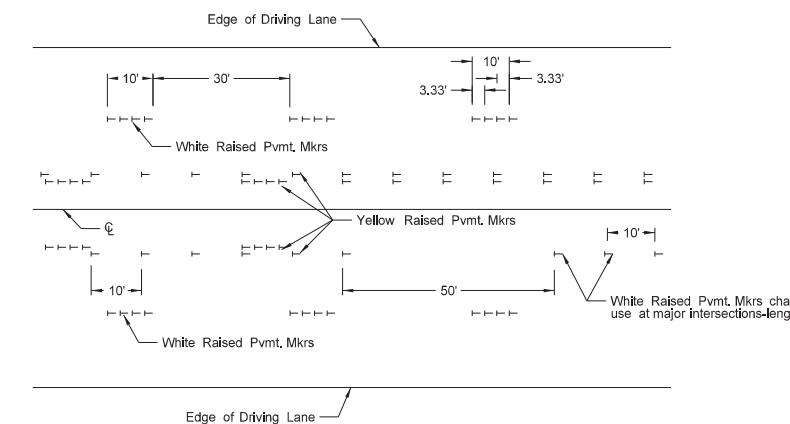


Raised Pavement Markers

FOUR LANE ROADWAY

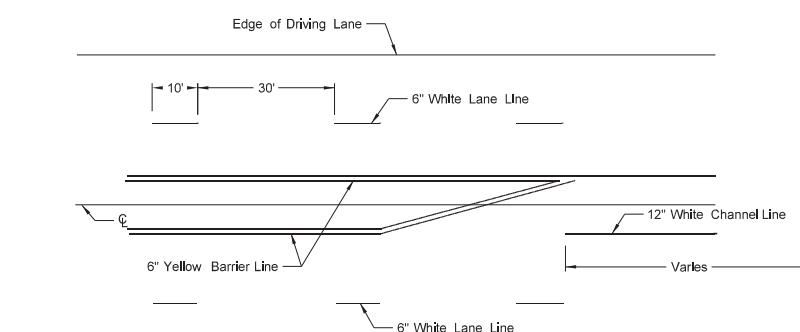


Painted or Tape Lines

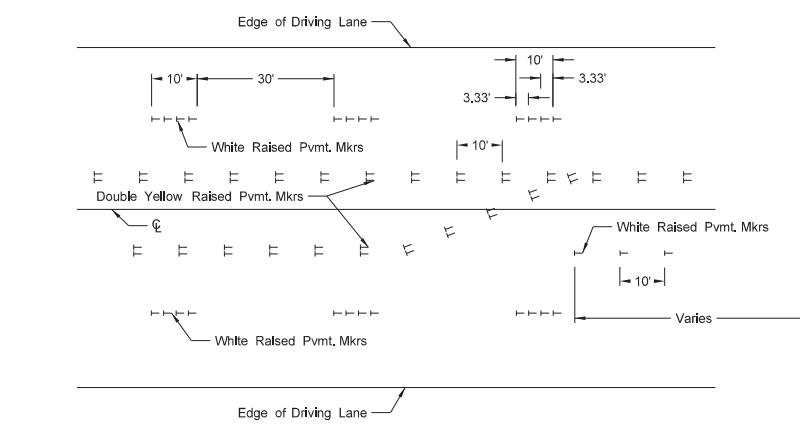


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvtm marking width.

