

DESIGN DATA

Traffic	Average Daily		
Current 2017	Pass: 1,090	Trucks: 225	Total: 1,315
Preventive Maintenance			

JOB # 52

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

H-8-200(035)359

Steele & Trail

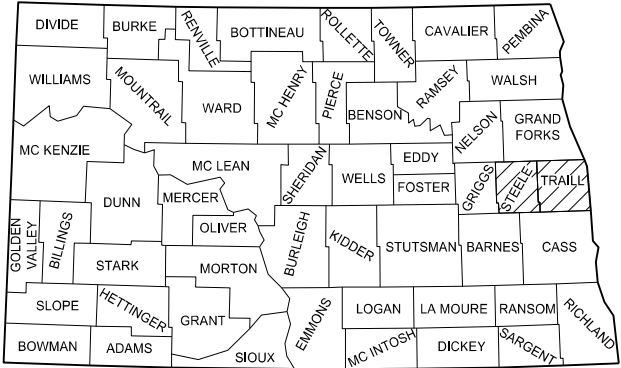
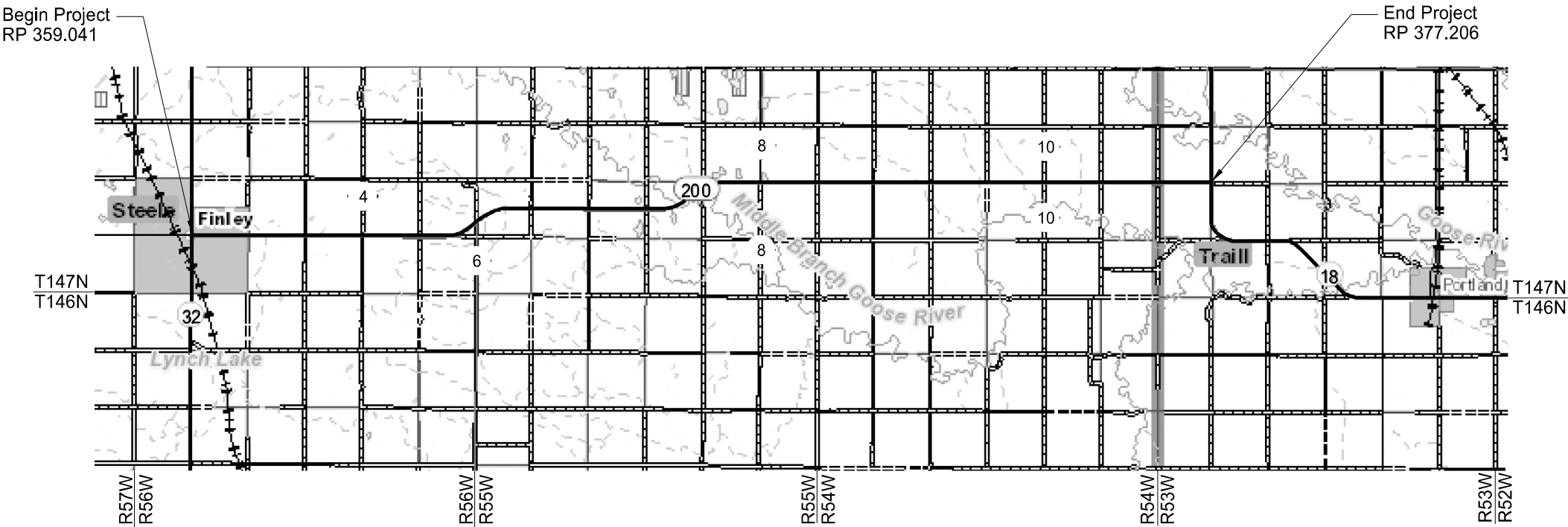
ND 200 from Jct. ND 32 Finley to West Jct of ND 18

Chip Seal

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	H-8-200(035)359	22034	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
H-8-200(035)359	18.165	18.165



STATE COUNTY MAP

DESIGNERS

Duane Carlstrom /s/

APPROVED DATE 12/21/17

Kevin Gorder /s/

NDDOT FARGO DISTRICT

ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 12/21/17

Duane Carlstrom /s/

NDDOT FARGO DIST

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NOTES		STATE		PROJECT NO.		SECTION NO.	SHEET NO.
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420-P01	SEAL COAT APPLICATION: Place the Seal Coat using the following stages:			
	1. The application rate for CHFRS-2P and installation of the Cover Coat Class 41-M is shown in the Basis of Estimate, or as otherwise directed by the Engineer. Complete initial brooming.			
	2. The roadway will be broomed again prior to the Fog Coat application. The dilution rate of the Fog Coat will be 50% water and 50% emulsified asphalt. Dilution at the supplier will be required.			
	3. The maintenance period will end 3 days after the application of the Fog Seal.			

420-P02	BLOTTER MATERIAL CL 44: In addition to preventing bleeding on the roadway etc., apply blotter material to all major intersections for maintenance, bleeding, and protection of the chips/asphalt from turning movements. An estimated 40 ton is provided.			

420-P03	BITUMEN: Apply the bituminous material at a rate such that residue bituminous binder would embed 70% of the aggregate height used for cover coat material.			

420-P04	COVER COAT MATERIAL CL 41-M: Within one minute following the application of the bitumen, spread the cover coat material uniformly over the bituminous material with an aggregate spreader. All aggregate used for cover coat should be tightly bound/packed and any small voids caused by the irregular shapes of the aggregate filled with residue asphalt. Produce bituminous seal coat free from bleeding and poor aggregate embedment.			

420-P05	EMULSIFIED ASPHALT: Use an Emulsified Asphalt that meets the following requirements:			

CHFRS-2P			
Test	Specification Minimum	Maximum	AASHTO Method
Viscosity, Saybolt Furol @ 122°F,Sec	100	400	T-59
Storage Stability Test, 1Day, %	---	1	T-59
Demulsibility, 35 ml 0.8% Sodium Dioctyl Sulfosuccinate,%	60	---	T-59
Sieve Test, %	---	0.10	T-59
Particle Charge Test	Positive		T-59

420-P06	MAINTENANCE OF SEAL: Use flagging at all major intersections. No turning movements will be allowed on the new chip seal for 30 minutes. Include the cost of flagging in the price bid for other items.			

420-P07	APPROACHES: Unless changes are made in the field, approaches on the project will be counted and the plan quantities identified in Section 20, Sheet 1 for each type of approach shall be used for the following bid items:			
	1. Cover Coat Material CL 41-M (SY)			

704-P01	TRAFFIC CONTROL FOR SEAL COATS: Provide traffic control consisting of a temporary lane closure, flagging, and a pilot car.			

	Traffic control device quantities are based on a 6 mile limitation and following list:			
	1. Standard D-704-15, layout A, Place flaggers and traffic control devices as shown on at the following intersections when the lane closer spans across them: Interstate Ramps.			
	2. Standard D-704-20, layout H, signing will be required at junctions: Steele County 4, Steele County 6, Steele County 8, & Steele County 10.			

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NOTES

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3. Standard D-704-22, layouts K and L.
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 the following intersections when the lane closure spans across them:

- 1. Steele County 4,
- 2. Steele County 6,
- 3. Steele County 8,
- 4. Steele County 10.

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”.

762-P01 SHORT TERM 4IN LINE-TYPE NR: Quantity for two applications of short term centerline pavement marking has been included in the plans. Additional applications required to accommodate the contractor’s operation are at the contractor’s expense.

- One application for chip seal each day
- One application for Fog Seal

762-P02 PAVEMENT MARKING: Pavement markings short term 4in line and painted pavement markings 4in line will not be measured for payment unless changes are made in the field. Payment for pavement markings short term 4in line and painted pavement markings 4in line will be at plan quantity.

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ESTIMATE OF QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	----	-----	-----
103	0100	CONTRACT BOND	L SUM	1	1
401	0070	FOG SEAL	GAL	15,352	15,352
420	0118	CHFRS-2P EMULSIFIED ASPHALT	GAL	125,876	125,876
420	0128	COVER COAT MATERIAL CL 41-M	SY	307,009	307,009
420	0160	BLOTTER MATERIAL CL 44	TON	40	40
702	0100	MOBILIZATION	L SUM	1	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,465	2,465
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	83,924	83,924
762	1104	PVMT MK PAINTED 4IN LINE	LF	233,785	233,785

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

ND

H-8-200(035)359

10

1

		CHIP SEAL							FOG SEAL			
Typical Sections	Section Lengths		CHFRS-2P EMULSIFIED ASPHALT @ 0.41 GAL/SY			COVER COAT MATERIAL CL. 41-M (@ 25 LBS/SY*)			SS-1H, MS-1 OR CSS-1H EMULSIFIED ASPHALT @ 0.10 GAL/SY (0.05 GAL/SY UNDILUTED)			COMMENTS
	LF	Mile	Width ft	Gal/Mile	Total Gal.	Ton/Mile*	Total Tons*	Total SY	Width ft	Gal/Mile	Total Gal	
1	766	0.145	37	8,899.7	1,291	271.4*	39.4*	3,150	37	1,085.4	158	
2	84,084	15.925	27	6,494.4	103,424	198.0*	3,153.2*	252,252	27	792.0	12,613	
3	11,062	2.095	31.5	7,576.8	15,874	231.0*	483.9*	38,717	31.5	924.0	1,936	
Approaches					4,760		145.1*	11,606			581	See Section 20, Sheets 1 for Details
Truck Turn Out					527		16.1*	1,284			65	See Section 20, Sheets 2 for Details
			Total		125,876	Total	3,837.7*	307,009		Total	15,352	

*For Information Only

Pavement Marking Quantities	LF/Mile	Total
SHORT TERM PAVEMENT MARKINGS: RP 951.437 to RP 959.790 (18.165 Miles)		
4" Yellow ☒ Skips: 10' Line, 30' Skip	1320	23,978 LF
4" Yellow Barrier Stripe	990	17,984 LF
	Sub Total:	41,962 LF
	Two Applications Total:	83,924 LF
PERMANENT EPOXY PVMT. MARKINGS: RP 951.437 to RP 959.790 (18.165 Miles)		
4" Yellow ☒ Skips; 10' Line, 30' Skip	1320	23,978 LF
4" Yellow Barrier Stripe	990	17,984 LF
4" White Edge Line	10,560	191,823 LF
	Total:	233,785 LF

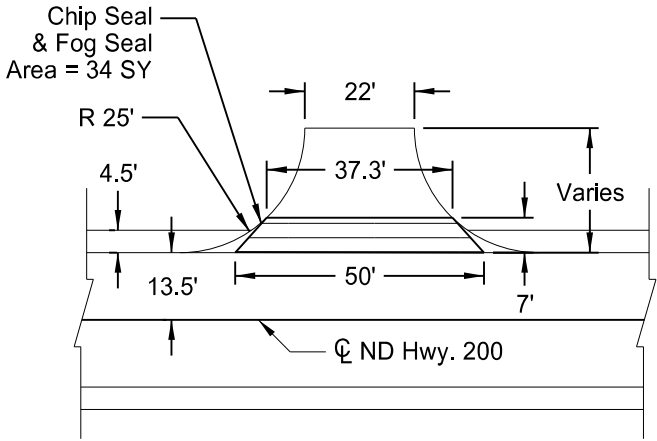
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BASIS OF ESTIMATE

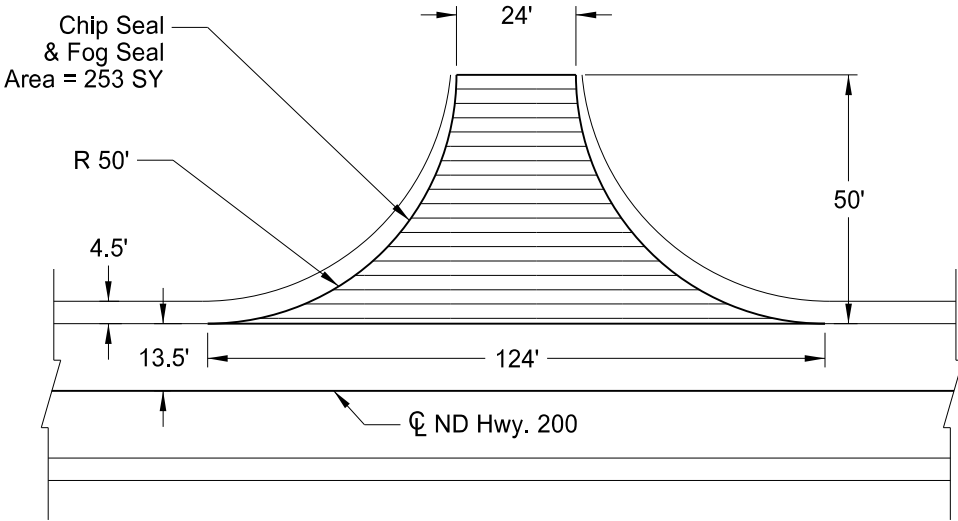
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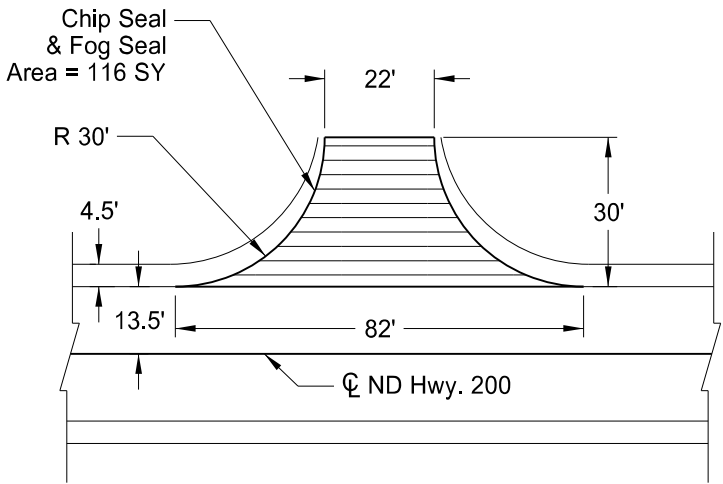
 - Chip Seal and Fog Seal



Field Drives



Township and Section Line Roads



Private Drives

Additional Quantities			Chip Seal		Fog Seal
			CHFRS-2P Emulsified Asphalt @ 0.41 Gal/SY	Cover Coat Material CL. 41-M	SS1H, MS-1, or CSS1H Emulsified Asphalt @ 0.10 Gal/SY (0.05 GAL/SY UNDILUTED)
Field Drives	44	34	614 Gal	1,496 SY	75 Gal
Private Drives	13	116	619 Gal	1,508 SY	75 Gal
Township and Section Line Roads	34	253	3,527 Gal	8,602 SY	430 Gal

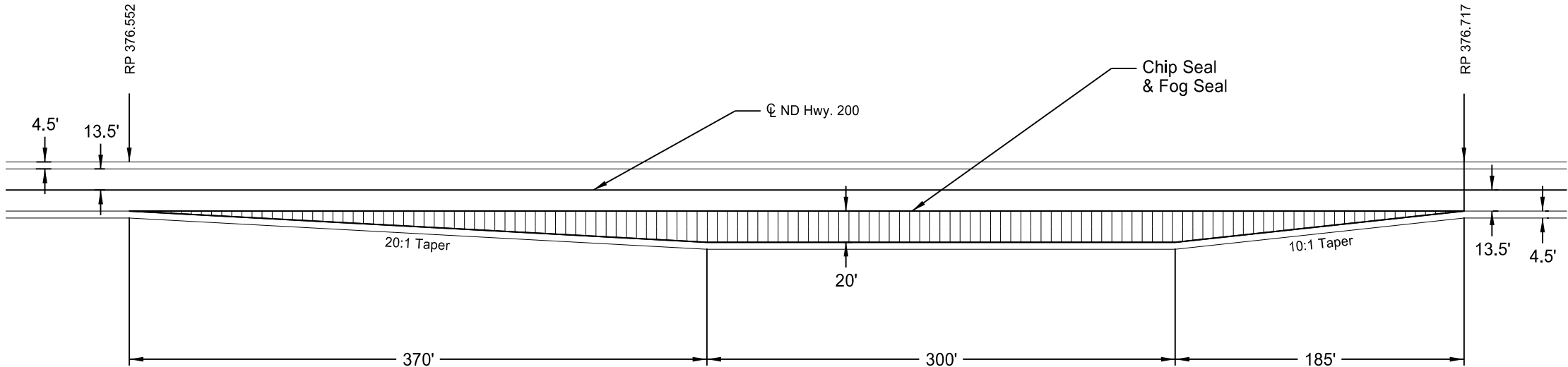
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Approach Details

KEY



- Chip Seal and Fog Seal

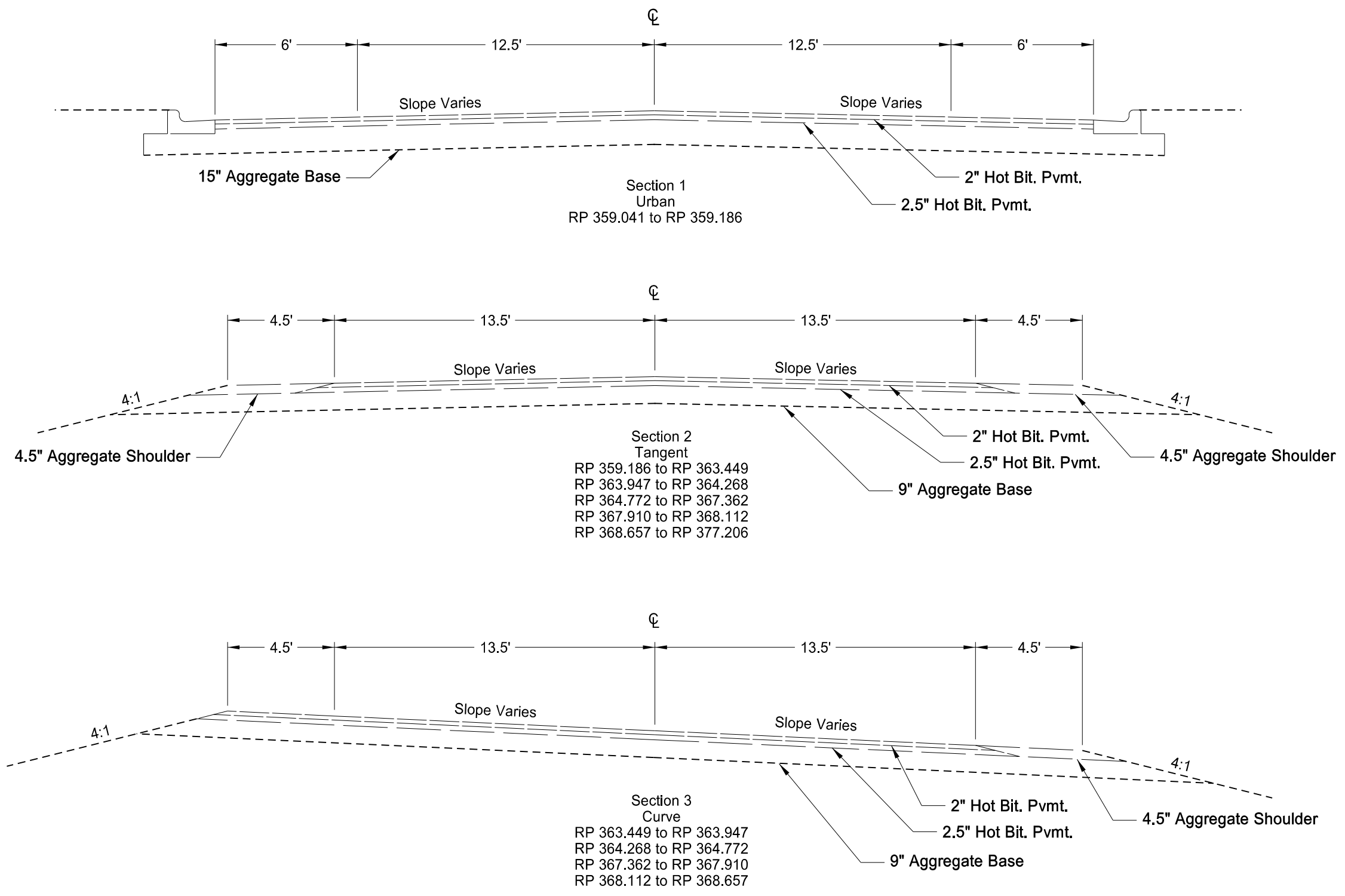


Additional Quantities	Total
Fog Seal: SS1H, MS-1 or CSS1H Emulsified Asphalt (Based on 0.05 Gal/SY, Apply at 0.10 Gal/SY diluted at 50-50)	65 Gal
Cover Coat Material CL. 41-M	1,284 SY
CHFRS-2P Emulsified Asphalt @ 0.41 Gal/SY	527 Gal

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Truck Turnout
RP 376.65

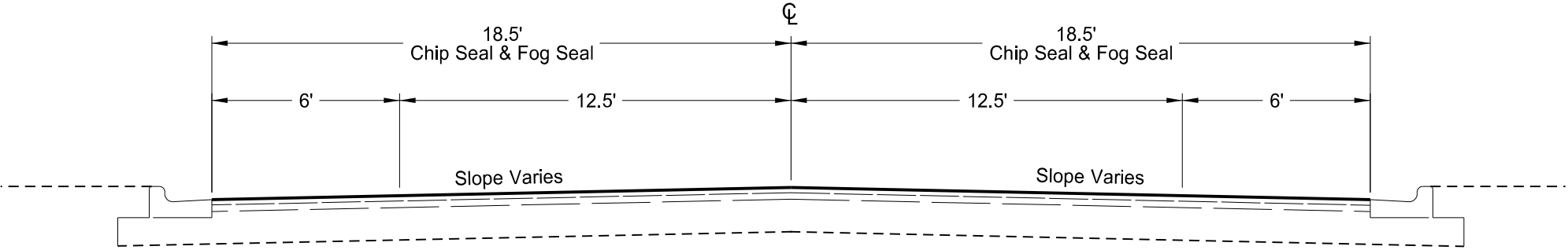
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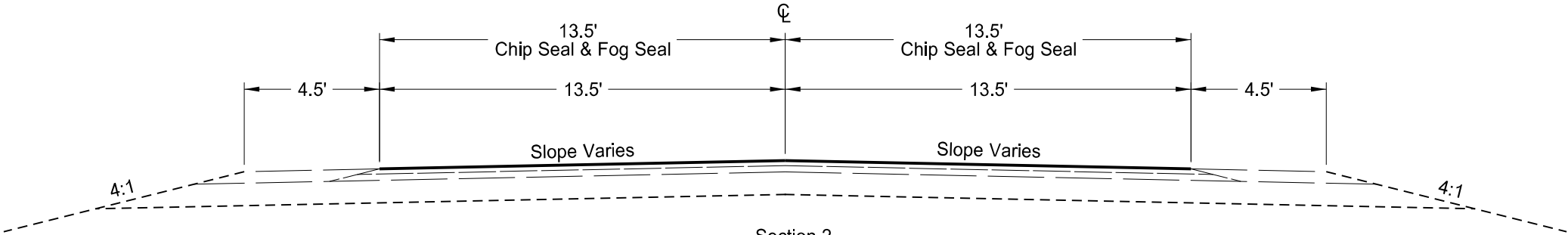
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Existing Typicals
ND 200

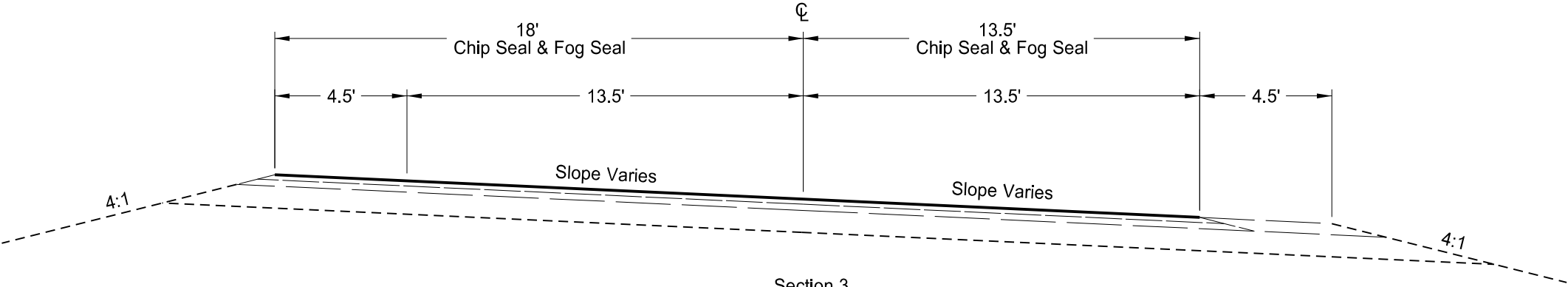
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Section 1
Urban
RP 359.041 to RP 359.186



Section 2
Tangent
RP 359.186 to RP 363.449
RP 363.947 to RP 364.268
RP 364.772 to RP 367.362
RP 367.910 to RP 368.112
RP 368.657 to RP 377.206

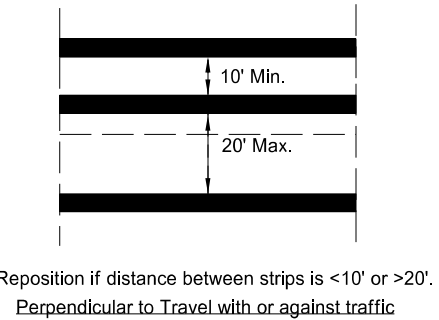
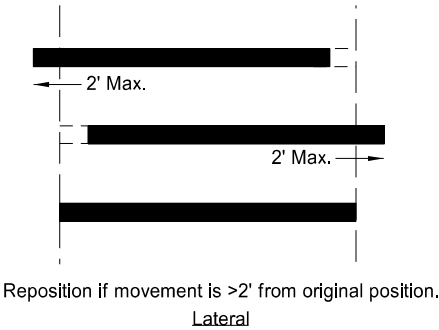
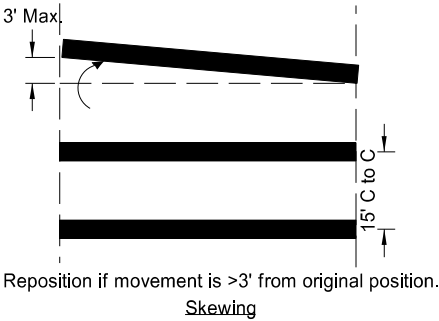


Section 3
Curve
RP 363.449 to RP 363.947
RP 364.268 to RP 364.772
RP 367.362 to RP 367.910
RP 368.112 to RP 368.657

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Proposed Typicals

ND 200



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. Use sign W20-52-54 when work area is 1 mile or longer.
 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

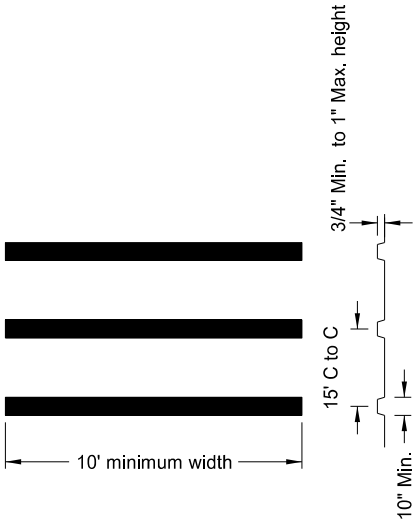
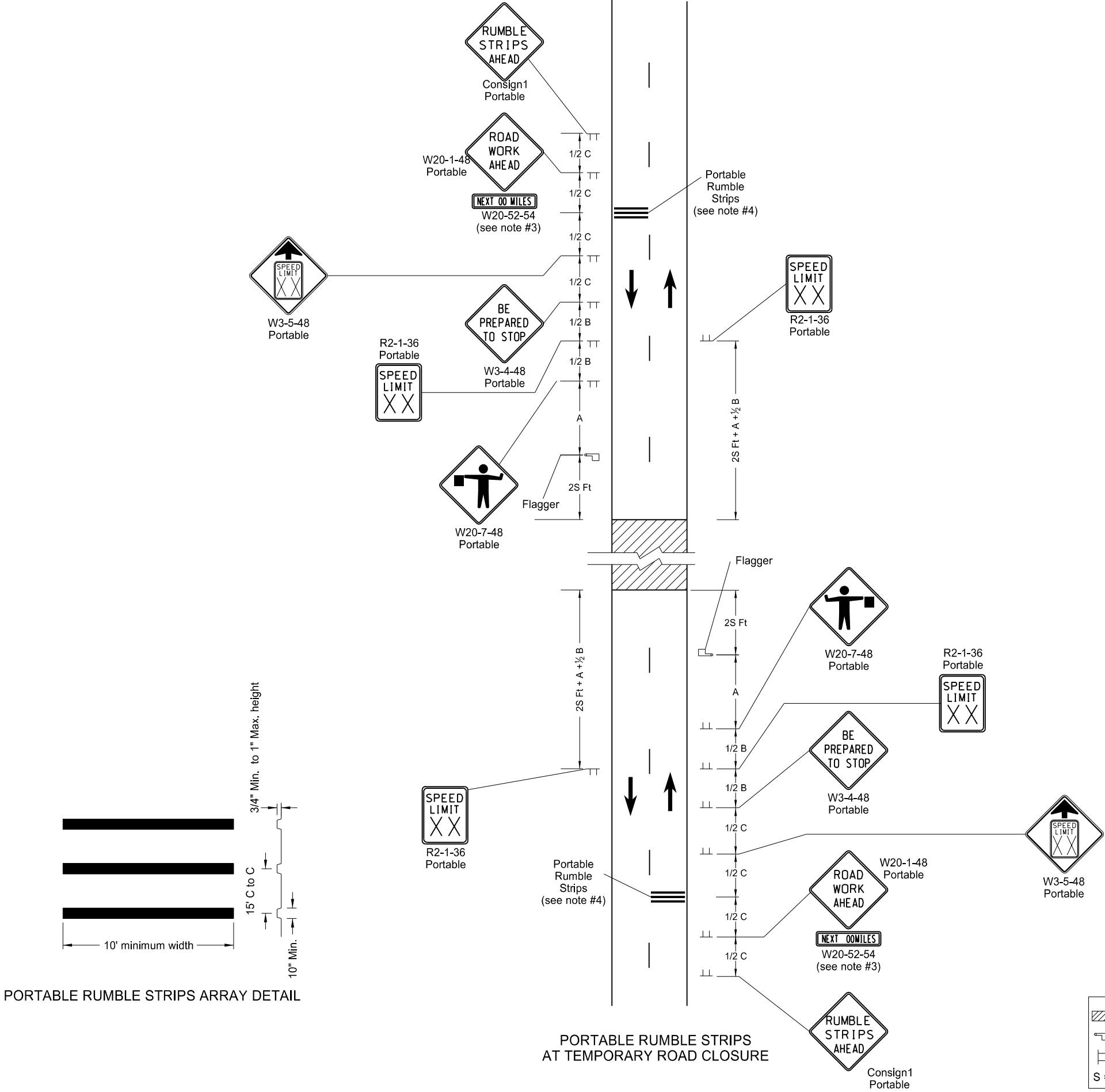
S = Numerical value of speed limit or 85th percentile.

PORTABLE RUMBLE STRIPS

ND 200

Drawing not to scale.

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PORTABLE RUMBLE STRIPS ARRAY DETAIL

PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

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

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

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NDDOT ABBREVIATIONS

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

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

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NDDOT ABBREVIATIONS

D-101-3

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

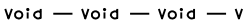
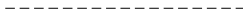
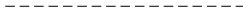
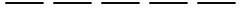
702COM	702 Communications	GT PLNS NAT GAS	Great Plains Natural Gas Company	RED RIV TEL	Red River Rural Telephone
ACCENT	Accent Communications	HALS TEL	Halstad Telephone Company	RESVTN TEL	Reservation Telephone
AGASSIZ WU	Agassiz Water Users Incorporated	IDEA1	Idea1	ROBRTS TEL	Roberts Company Telephone
AGC	Associated General Contractors of America	INT-COMM TEL	Inter-Community Telephone Company	R-RIDER ELEC	Roughrider Electric Coop
All PI	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	RSR ELEC	R.S.R. Electric Cooperative
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	MID-CONT CABLE	Mid-Continent Cable	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 W W S	Missouri West Water System	TRI-CNTY WU	Tri-County Water Users Incorporated
CAP ELEC	Capital Electric Cooperative Incorporat	MNKOTA PWR	Minnkota Power	TRL CO RWU	Traill County Rural Water Users
CASS CO ELEC	Cass County Electric Cooperative	MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative	UNTD TEL	United Telephone
CASS RWU	Cass Rural Water Users Incorporated	MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative	UPPR SOUR WUA	Upper Souris Water Users Association
CAV ELEC	Cavalier Rural Electric Cooperative	MRE LBTY TEL	Moore & Liberty Telephone	US SPRINT	U.S. Sprint
CBLCOM	Cablecom Of Fargo	MUNICIPAL	City Water And Sewer	USAF MSL CABLE	U.S.A.F. Missile Cable
CENEX PL	Cenex Pipeline	MUNICIPAL	City Of '.....'	USFWS	US Fish and Wildlife Service
CENT PL WATER DIST	Central Pipe Line Water District	N CENT ELEC	North Central Electric Cooperative	USW COMM	U.S. West Communications
CENT PWR ELEC	Central Power Electric Cooperative	N VALL W DIST	North Valley Water District	VRNDRY ELEC	Verendrye Electric Cooperative
COE	Corps of Engineers	ND PKS & REC	North Dakota Parks And Recreation	W RIV TEL	West River Telephone Incorporated
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	ONEOK	Oneok gas		
DVMW	Dakota, Missouri Valley & Western	OSHA	Occupational Safety and Health Administration		
ENBRDG	Enbridge Pipelines Incorporated	OTTR TL PWR	Otter Tail Power Company		
ENVENTIS	Enventis Telephone	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 W SUPPLY	R & T Water Supply Association		
GLDN W ELEC	Golden West Electric Cooperative	RAMSEY R SEW	Ramsey Rural Sewer Association		
GRGS CO TEL	Griggs County Telephone	RAMSEY RW	Ramsey Rural Water Association		
		RAMSEY UTIL	Ramsey County Rural Utilities		

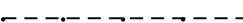
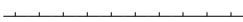
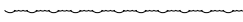
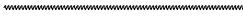
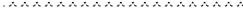
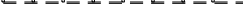
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE

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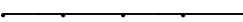
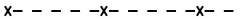
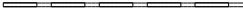
Line Styles

Existing Topography

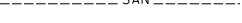
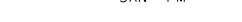
	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable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

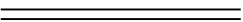
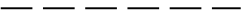
Proposed Topography

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

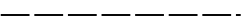
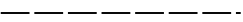
Existing Utilities

	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

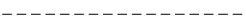
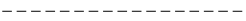
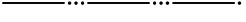
	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

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

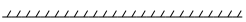
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Line Styles

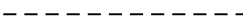
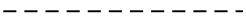
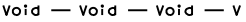
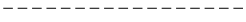
Right Of Way

	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

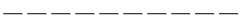
	Existing Ground
	Existing Topsoil (Cross Section View)
	Existing Ground Void (Not Surveyed)
	Existing Concrete
	Existing Aggregate (Cross Section View)
	Existing Curb and Gutter (Cross Section View)
	Existing Asphalt (Cross Section View)
	Existing Reinforcement Rebar

Geotechnical

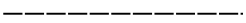
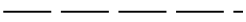
	D	Geotextile Fabric Type D
	Geo	Geogrid
	R	Geotextile Fabric Type R
	R	Geotextile Fabric Type R1
	RR	Geotextile Fabric Type RR
	S	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

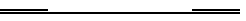
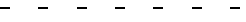
Countours

	Depression Contours
	Supplemental Contour

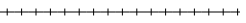
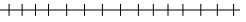
Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

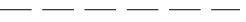
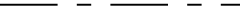
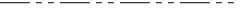
Striping

	Centerline Pavement Marking
	Barrier with Centerline Pavement Marking
	Barrier Pavement Marking
	Stripe 4 IN Dotted Extension White
	Stripe 8 IN Dotted Extension White
	Stripe 8 IN Lane Drop

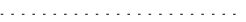
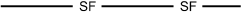
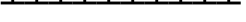
Pavement Joints

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

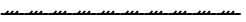
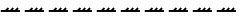
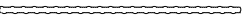
Bridge Details

	Hidden Object
	Small Hidden Object
	Large Hidden Object
	Phantom Object
	Centerline Main
	Centerline
	Existing Ground (Details)
	Existing Conditions
	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

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

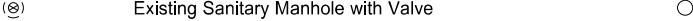
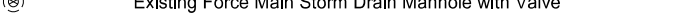
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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E										
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc										
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon										
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher										
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point										
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad										
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point										
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog										
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18										
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28										
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40										
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall										
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number										
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head										
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head										
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant										
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet										
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet										
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet										
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box										
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E	<table><tr><th colspan="2">NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</th></tr><tr><th colspan="2">07-01-14</th></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr></table>		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		07-01-14		REVISIONS		DATE	CHANGE		
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION																	
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	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A												
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B												
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C												
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D												

Symbols

D-101-31

	Existing Light Standard		Existing Manhole with Valve Water		Existing Telephone Pole		Existing Undefined Manhole												
	Existing High Mast Light Standard 10 Luminaire		Existing Water Manhole		Existing Wood Pole		Existing Undefined Pull Box												
	Existing High Mast Light Standard 3 Luminaire		Existing Mile Post Type A		Existing Post		Existing Undefined Pedestal												
	Existing High Mast Light Standard 4 Luminaire		Existing Mile Post Type B		Existing Pedestrian Push Button Post		Existing Undefined Valve												
	Existing High Mast Light Standard 5 Luminaire		Existing Mile Post Type C		Existing Control Point CP		Existing Undefined Pipe Vent												
	Existing High Mast Light Standard 6 Luminaire		Existing Reference Marker		Existing Control Point GPS-RTK		Existing Gas Valve												
	Existing High Mast Light Standard 7 Luminaire		Existing RW Marker		Existing Control Point TRI		Existing Water Valve												
	Existing High Mast Light Standard 8 Luminaire		Existing Utility Marker		Existing Reference Marker Point NGS		Existing Fuel Pipe Vent												
	Existing High Mast Light Standard 9 Luminaire		Iron Monument Found		Existing Pull Box		Existing Gas Pipe Vent												
	Existing Overhead Sign Structure Load Center		Iron Pin R/W Monument		Existing Intelligent Transportation Pull Box		Existing Sanitary Pipe Vent												
	Existing Luminaire		Existing Object Marker Type I		Existing Water Pump		Existing Storm Drain Pipe Vent												
	Existing Light Standard Luminaire		Existing Object Marker Type II		Existing Slotted Reinforced Concrete Pipe		Existing Water Pipe Vent												
	Existing Federal Mailbox		Existing Object Marker Type III		Existing RR Profile Spot		Existing Weather Station												
	Existing Private Mailbox		Existing Electrical Pedestal		Existing Fuel Leak Sensors		Existing Ground Water Well Bore Hole												
	Existing Meander Section Corner		Existing Telephone Pedestal		Existing Highway Sign		Existing Windmill or Tower												
	Existing Meter		Existing Fiber Optic Telephone Pedestal		Existing Miscellaneous Spot		Existing Witness Corner												
	Existing Electrical Manhole		Existing TV Pedestal		Existing Lighting Standard Pole		Flashing Beacon												
	Existing Gas Manhole		Existing Fiber Optic TV Pedestal		Existing Traffic Signal Standard		Flagger												
	Existing Sanitary Manhole		Existing Fuel Filler Pipes		Existing Transformer		Pipe Mounted Flasher												
	Existing Sanitary Force Main Manhole		Existing Traverse PI Aerial Panel		Existing Large Evergreen Tree		Sanitary Force Main with Valve												
	Existing Sanitary Manhole with Valve		Existing Pole		Existing Small Evergreen Tree	<table><tr><th colspan="2">NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</th></tr><tr><th colspan="2">07-01-14</th></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		07-01-14		REVISIONS		DATE	CHANGE				
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	Existing Storm Drain Manhole		Existing Power Pole		Existing Large Tree														
	Existing Force Main Storm Drain Manhole		Existing Power Pole with Transformer		Existing Small Tree														
	Existing Force Main Storm Drain Manhole with Valve				Existing Tree Trunk														
	Existing Telephone Manhole				Existing Pad Mounted Traffic Signal Control Box														

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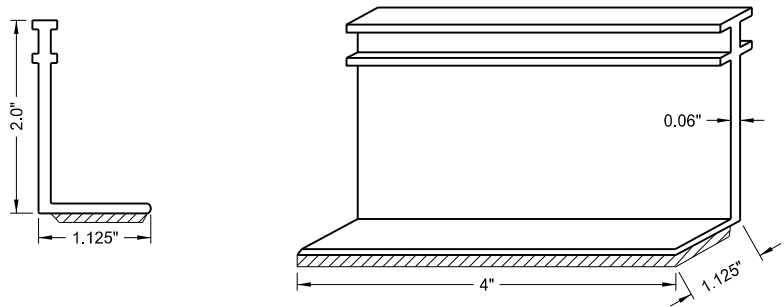
Symbols

	Pad Mounted Feed Point		Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type I		Reinforced Concrete End Section 48 Inch										
	Pipe Mounted Feed Point with Pad		Light Standard 150 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type II		Reinforced Concrete End Section 54 Inch										
	Pole Mounted Feed Point		Light Standard 175 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type III		Reset Right of Way Marker										
	Headwall		Light Standard 200 Watt High Pressure Sodium Vapor Luminaire		Caution Mode Arrow Panel		Reset USGS Marker										
	Double Headwall with Vegetation Barrier		Light Standard 250 Watt High Pressure Sodium Vapor Luminaire		Back to Back Vertical Panel Sign		Right of Way Markers										
	Single Headwall with Vegetation Barrier		Light Standard 310 Watt High Pressure Sodium Vapor Luminaire		Double Direction Arrow Panel		Riser 30 Inch										
	Pole Mounted Head		Light Standard 35 Watt High Pressure Sodium Vapor Luminaire		Left Directional Arrow Panel		Continuous Split Barrel Sample										
	Sprinkler Head		Light Standard 400 Watt High Pressure Sodium Vapor Luminaire		Right Directional Arrow Panel		Flight Auger Sample										
	Fire Hydrant		Light Standard 50 Watt High Pressure Sodium Vapor Luminaire		Sequencing Arrow Panel		Split Barrel Sample										
	Inlet Type 1		Light Standard 70 Watt High Pressure Sodium Vapor Luminaire		Truck Mounted Arrow Panel		Thinwall Tube Sample										
	Inlet Type 2		Light Standard 700 Watt High Pressure Sodium Vapor Luminaire		Power Pole		Highway Sign										
	Double Inlet Type 2		Manhole		Wood Pole		SNOW GATE 18 FT										
	Inlet Grate Type 2		Manhole 48 Inch		Pedestrian Push Button Post		SNOW GATE 28 FT										
	Junction Box		Sanitary Force Main Manhole		Property Corner		SNOW GATE 40 FT										
	High Mast Light Standard 10 Luminaire		Sanitary Sewer Manhole		Pull Box		Standard Penetration Test										
	High Mast Light Standard 3 Luminaire		Storm Drain Manhole		Intelligent Transportation Pull Box		Transformer										
	High Mast Light Standard 4 Luminaire		Storm Drain Manhole with Inlet		Sanitary Pump		Inclinometer Tube										
	High Mast Light Standard 5 Luminaire		Reset Mile Post		Storm Drain Pump		Underdrain Cleanout										
	High Mast Light Standard 6 Luminaire		Mile Post Type A		Reinforced Pavement		Excavation Unit										
	High Mast Light Standard 7 Luminaire		Mile Post Type B		Reinforced Concrete End Section 15 Inch		Water Valve										
	High Mast Light Standard 8 Luminaire		Mile Post Type C		Reinforced Concrete End Section 18 Inch	<table><tr><th colspan="2">NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</th></tr><tr><td colspan="2">07-01-14</td></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr></table>	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		07-01-14		REVISIONS		DATE	CHANGE			
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	High Mast Light Standard 9 Luminaire		Right of Way Marker		Reinforced Concrete End Section 24 Inch												
	Relocate Light Standard		Tubular Marker		Reinforced Concrete End Section 30 Inch												
	Overhead Sign Structure Load Center		Alignment Monument		Reinforced Concrete End Section 36 Inch												
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire		Iron Pin Reference Monument		Reinforced Concrete End Section 42 Inch												

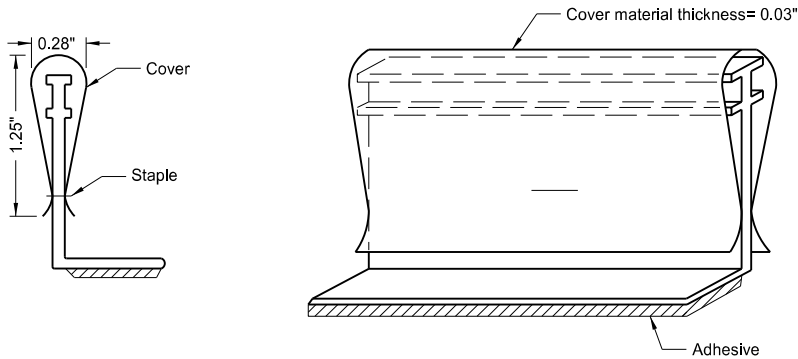
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LANE MARKERS
(Spotting Tab for Seal Projects only)

D-704-3



Marker Body



Marker Body with Protective Cover

Notes:

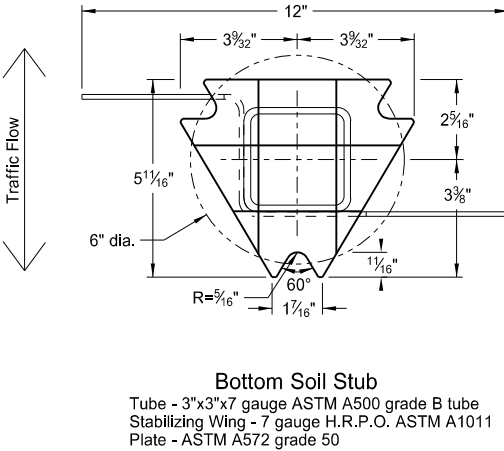
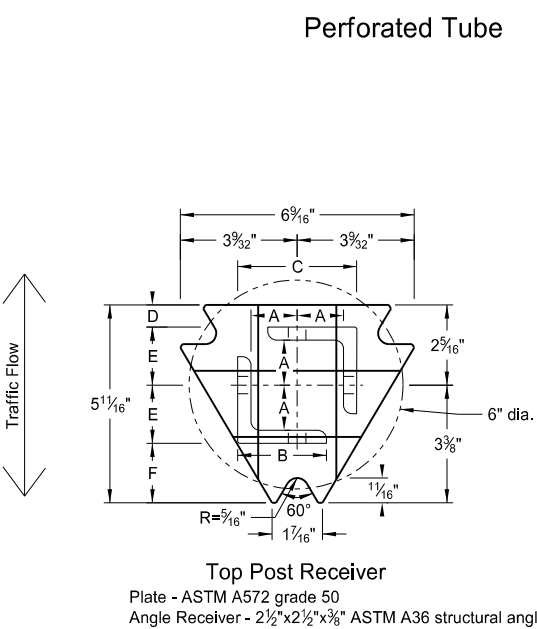
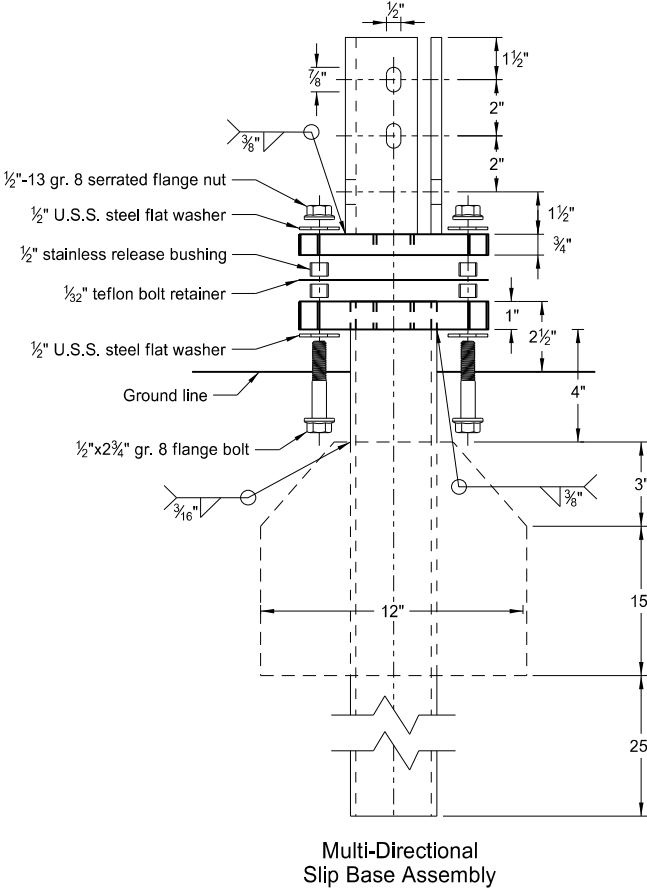
1. Install lane line markers as shown, prior to beginning the seal coat.
2. Attach cover to vertical part of marker so traffic does not cause it to detach, but it can be easily removed manually.
3. Remove protective covers immediately after seal coat is applied.
4. Remove markers after permanent pavement 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 retrorreflective 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.

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Perforated Tube

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

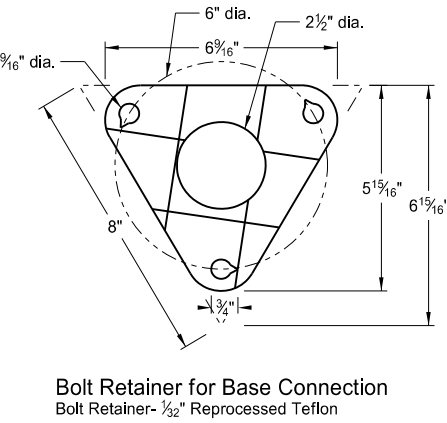
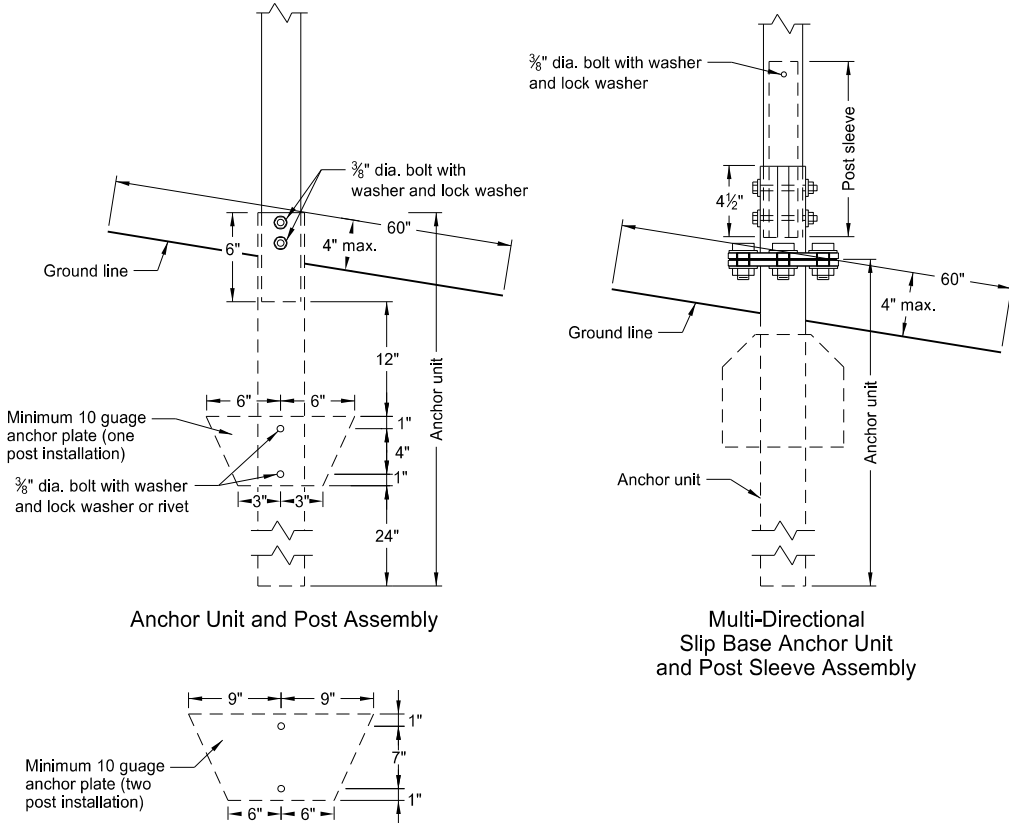


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No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

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

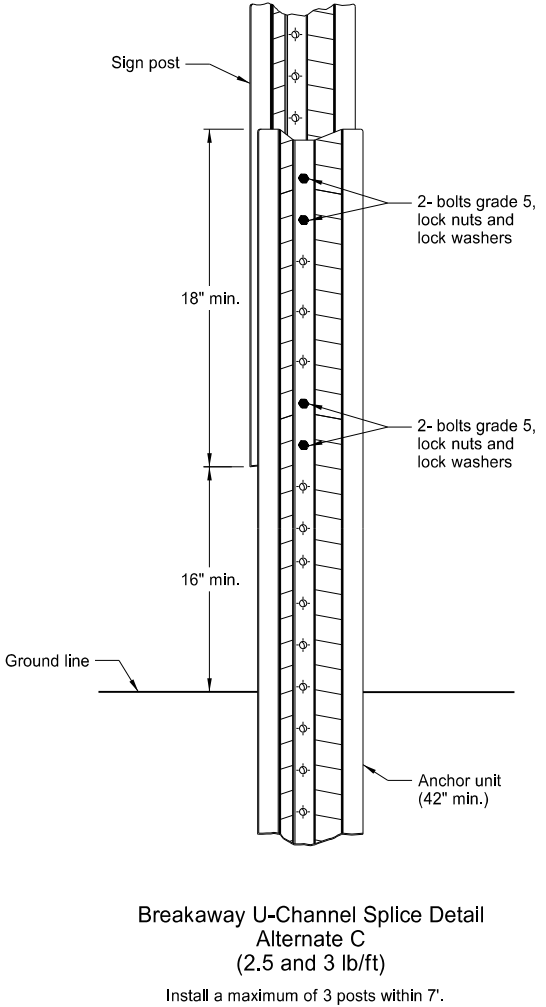
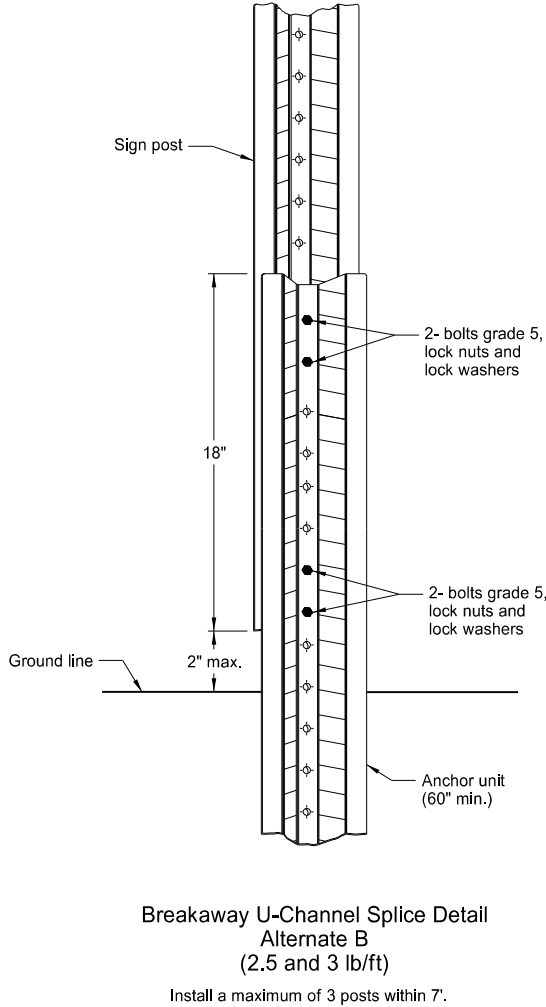
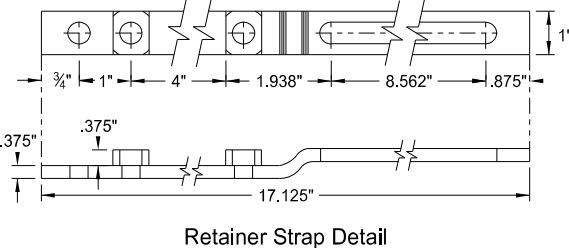
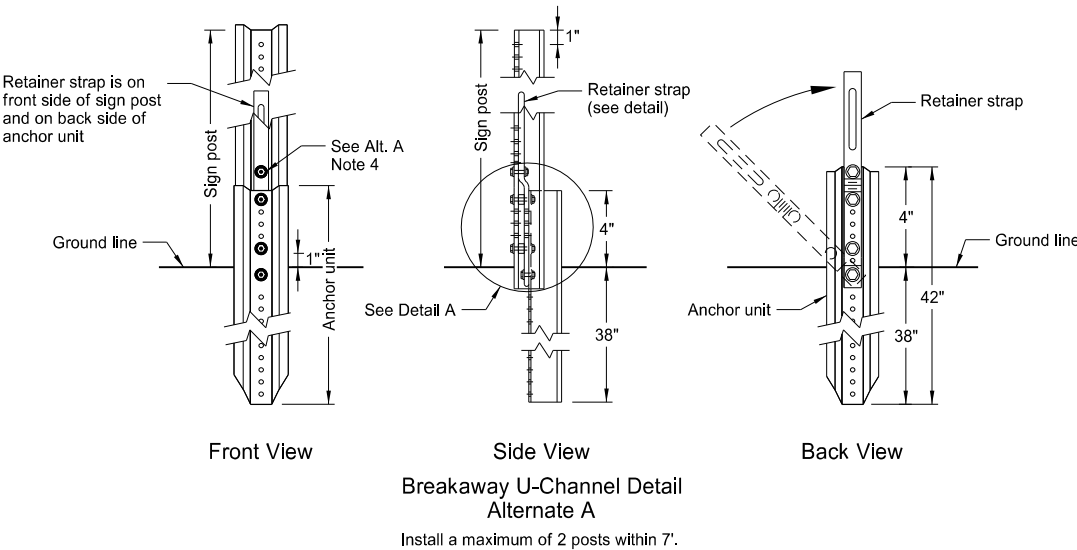
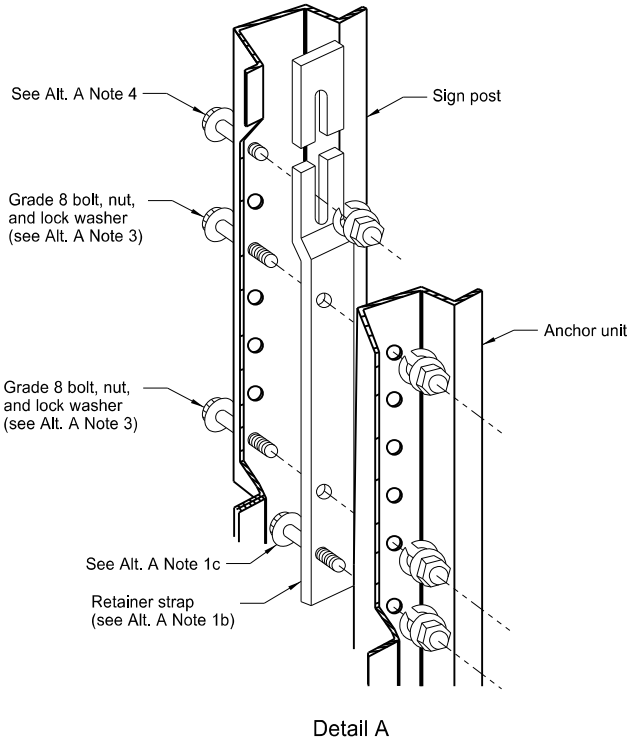
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

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



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U-Channel Post



Alternate A Steps of Installation:

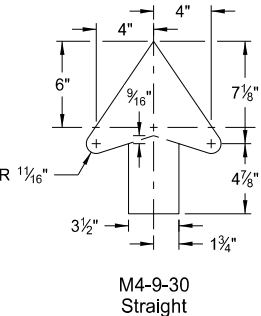
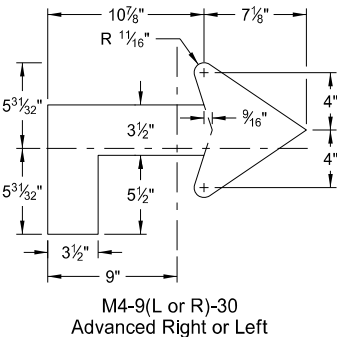
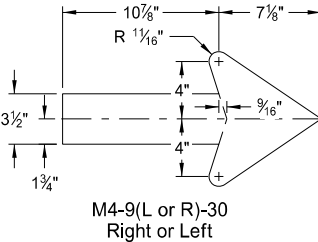
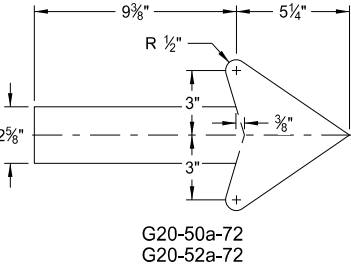
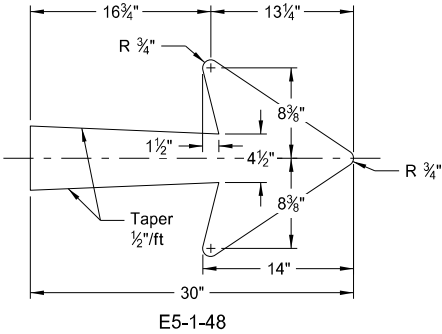
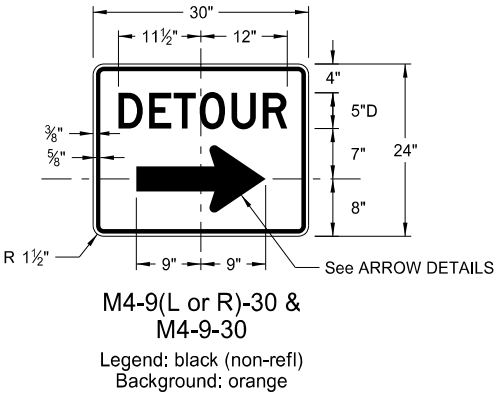
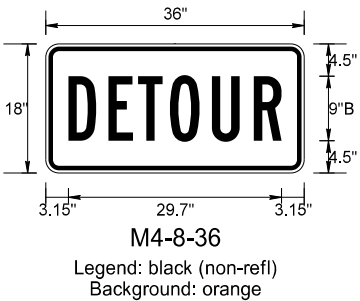
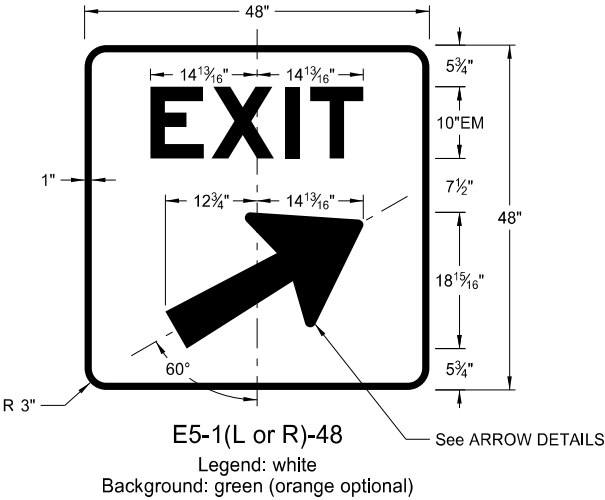
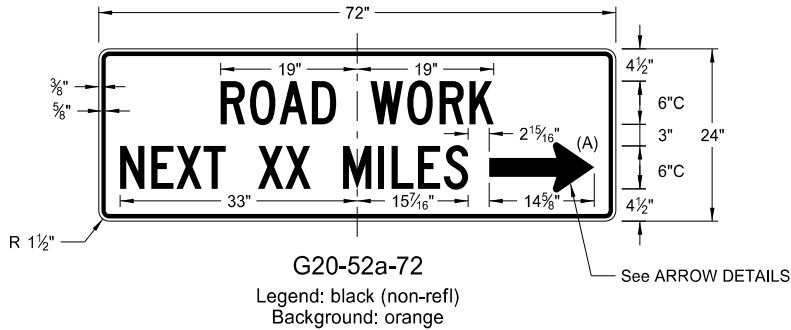
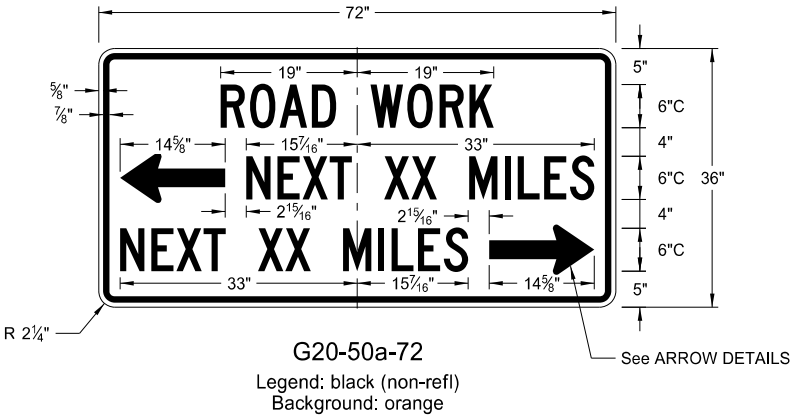
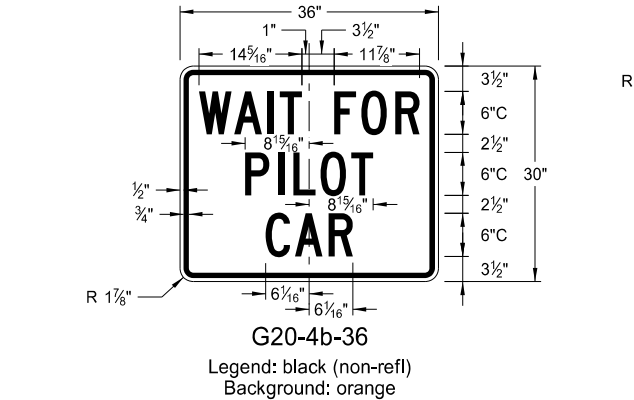
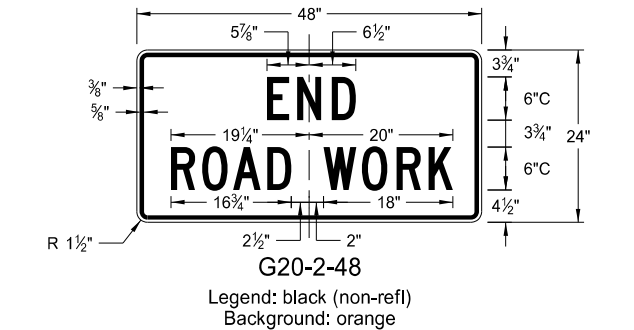
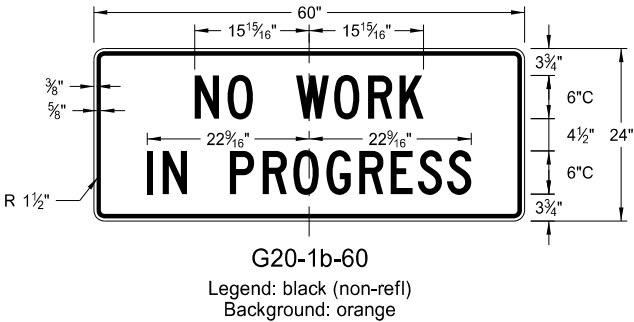
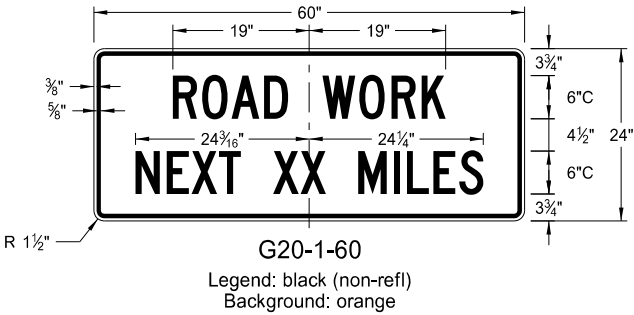
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor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

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of Transportation

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

D-704-9

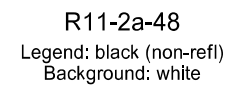
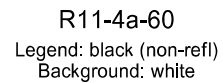
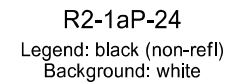
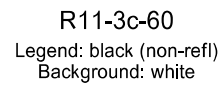
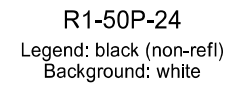


ARROW DETAILS

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	Added sign & background color

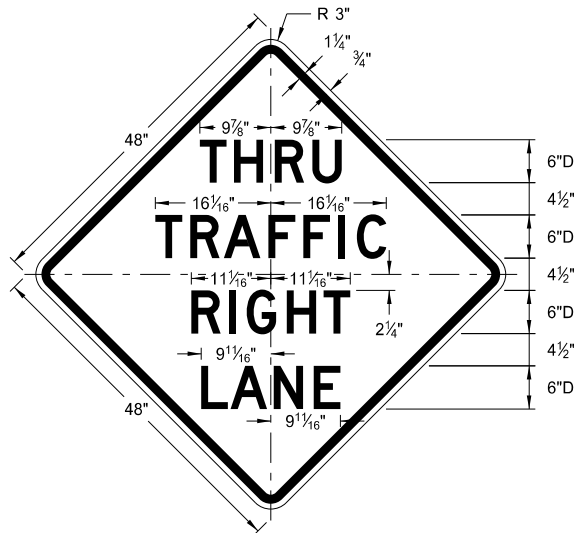
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8-13-13		
REVISIONS		
DATE	CHANGE	
8-17-17	Revised sign number	

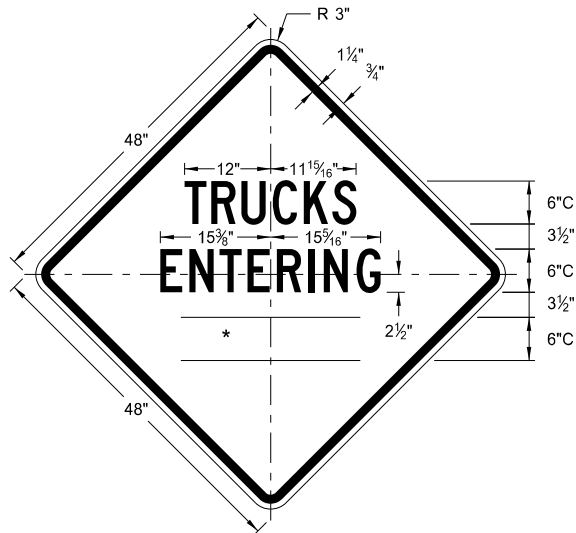
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



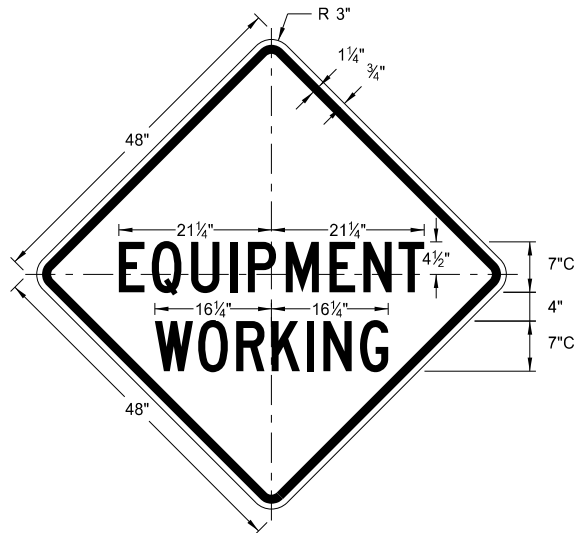
W5-8-48

Legend: black (non-refl)
Background: orange



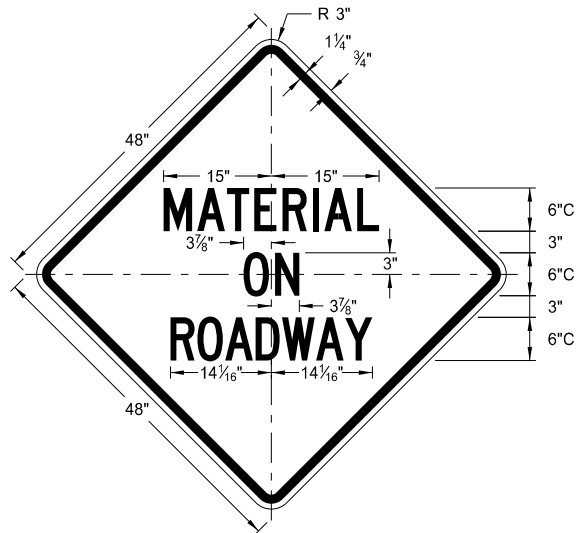
W8-54-48

Legend: black (non-refl)
Background: orange



W20-51-48

Legend: black (non-refl)
Background: orange

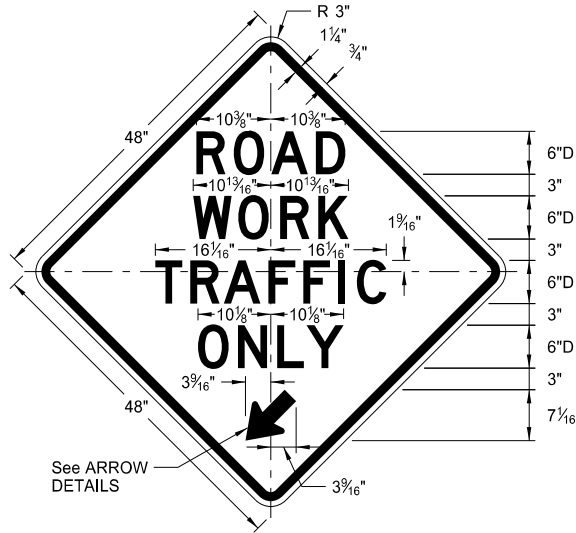


W21-51-48

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Background: orange

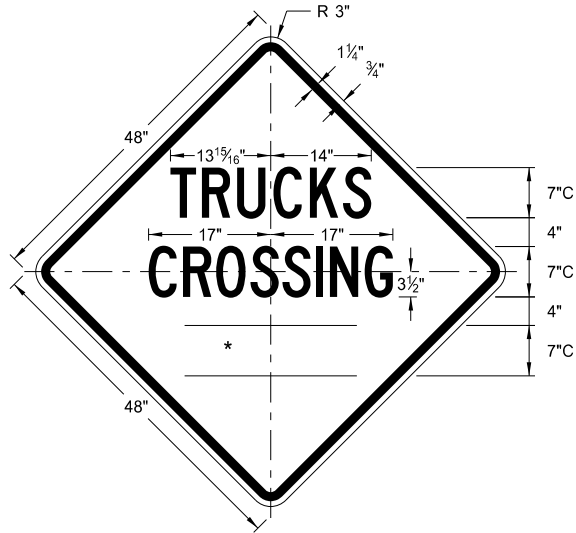
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



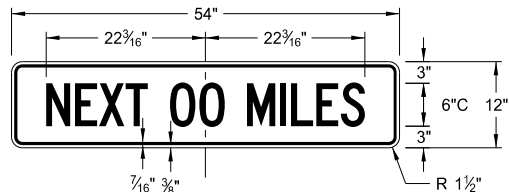
W5-9-48

Legend: black (non-refl)
Background: orange



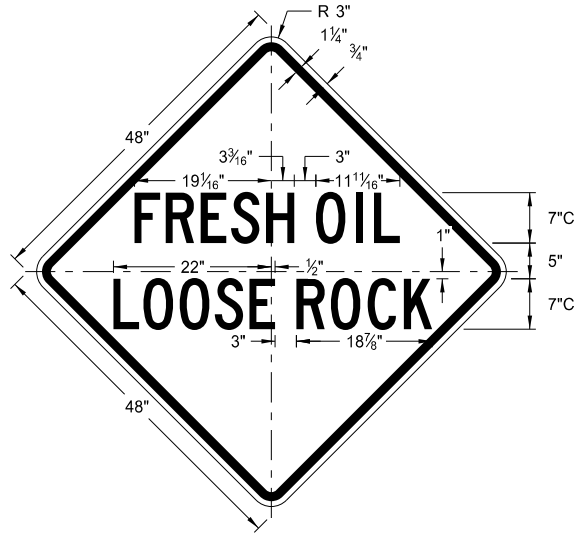
W8-55-48

Legend: black (non-refl)
Background: orange



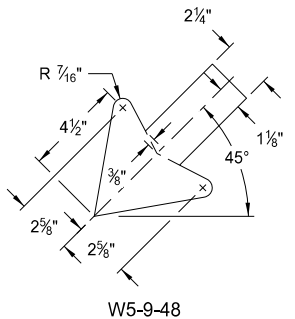
W20-52P-54

Legend: black (non-refl)
Background: orange



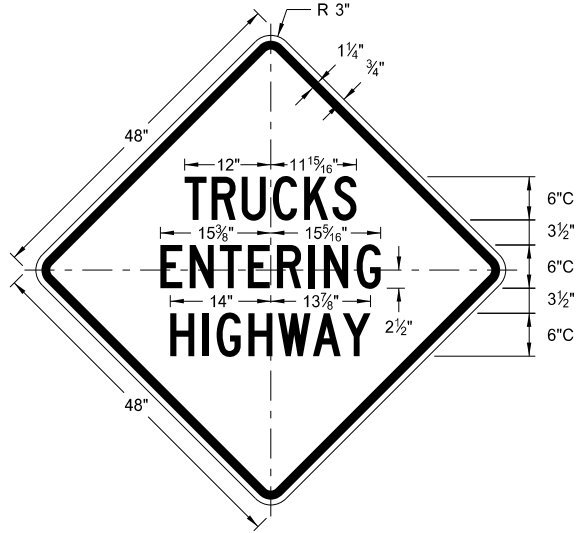
W22-8-48

Legend: black (non-refl)
Background: orange



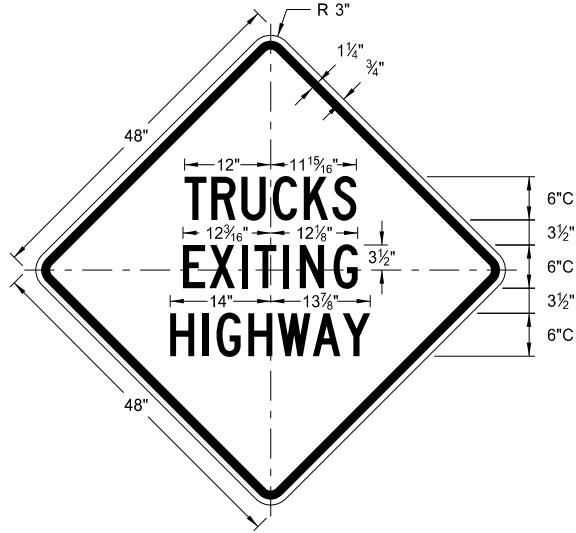
W5-9-48

ARROW DETAILS



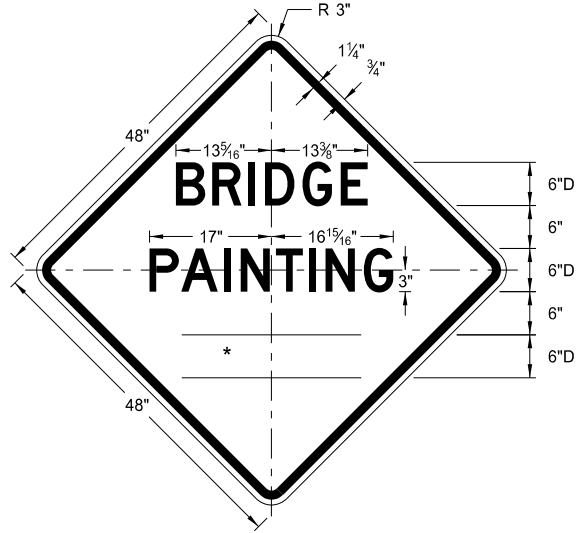
W8-53-48

Legend: black (non-refl)
Background: orange



W8-56-48

Legend: black (non-refl)
Background: orange



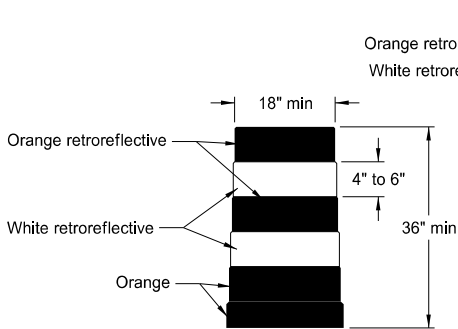
W21-50-48

Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number

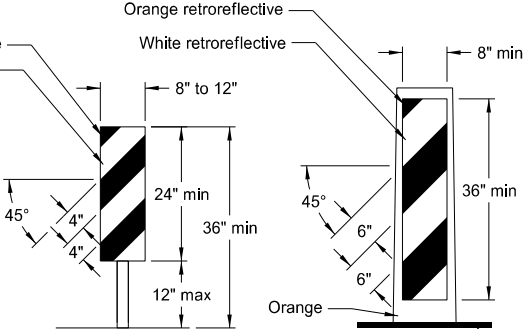
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North Dakota Department
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BARRICADE AND CHANNELIZING DEVICE DETAILS



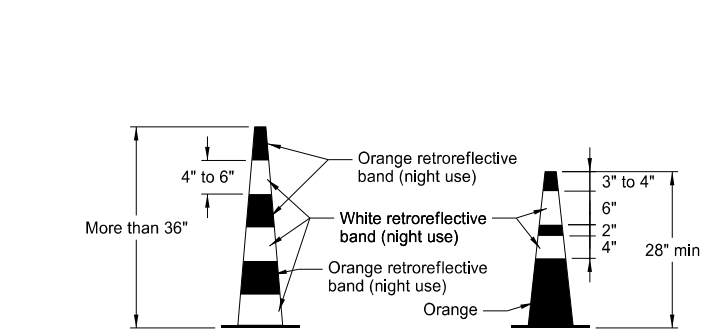
DELINEATOR DRUM

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.



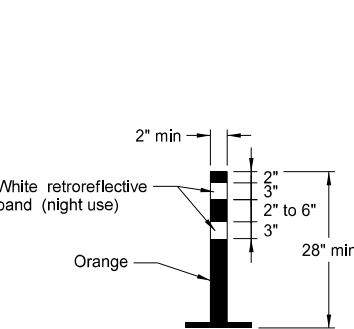
VERTICAL PANEL

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



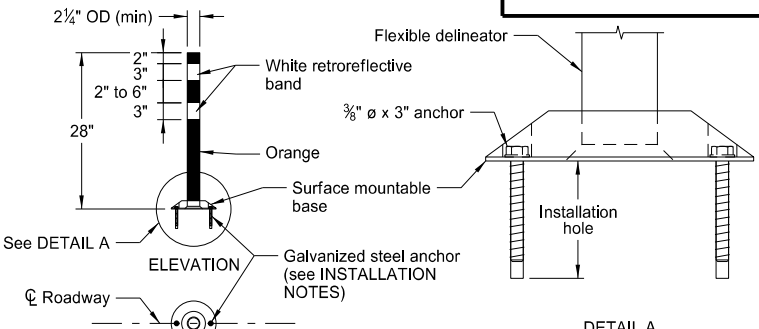
TRAFFIC CONE

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



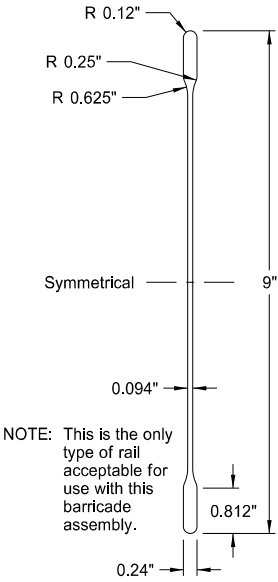
TUBULAR MARKER

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



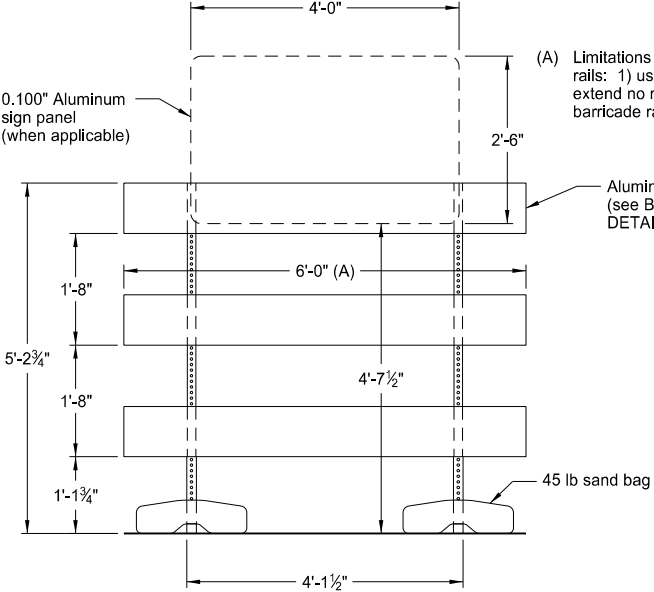
FLEXIBLE DELINEATOR

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

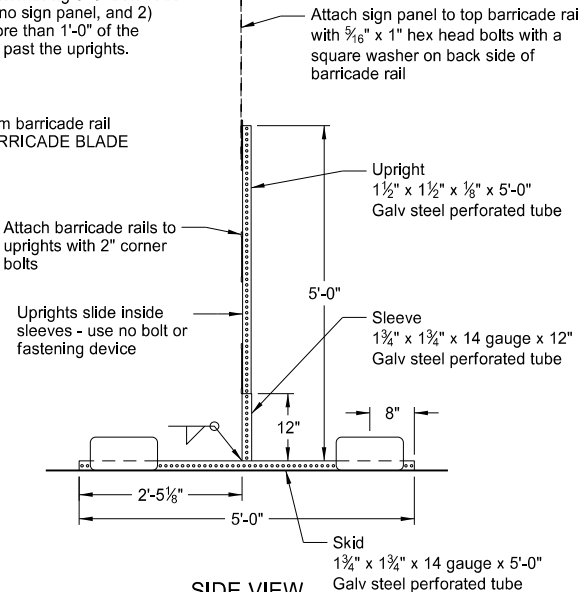


BARRICADE BLADE DETAIL

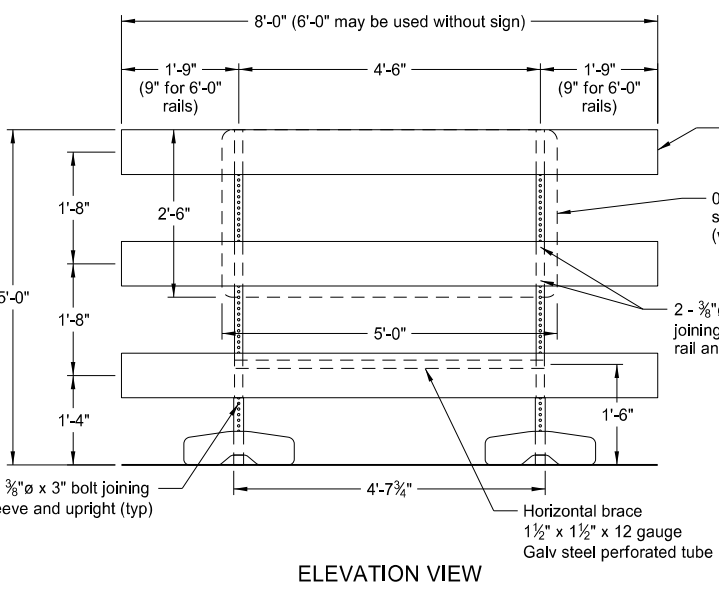
NOTE: This is the only type of rail acceptable for use with this barricade assembly.



ELEVATION VIEW
BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

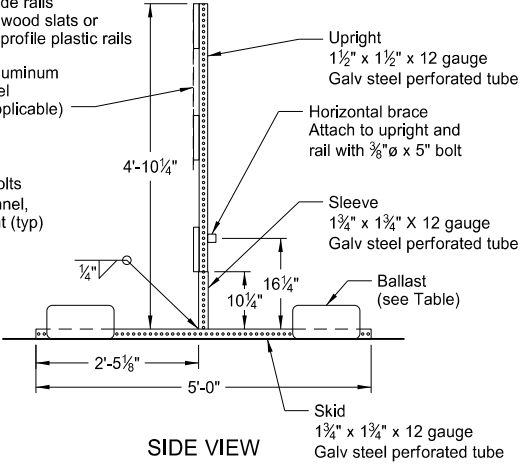


SIDE VIEW



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

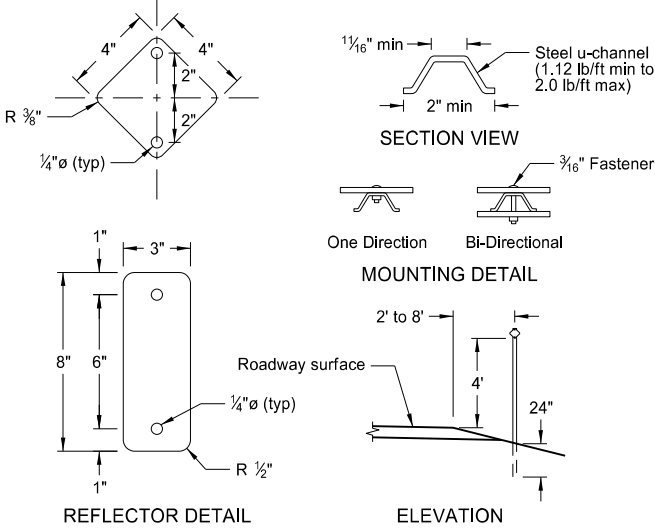


SIDE VIEW

MINIMUM BALLAST
(For each side of barricade support)

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

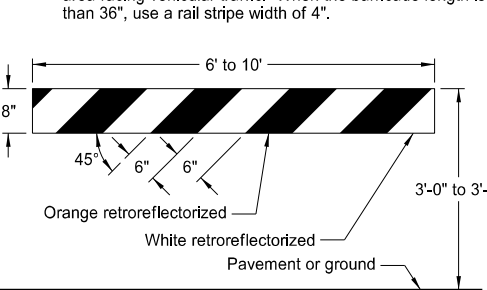
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.



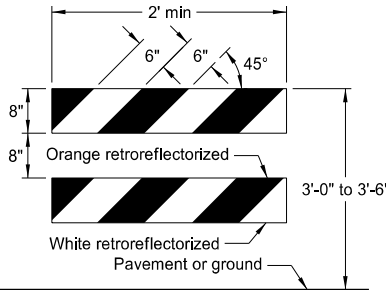
REFLECTOR DETAIL

ELEVATION

DELINEATORS

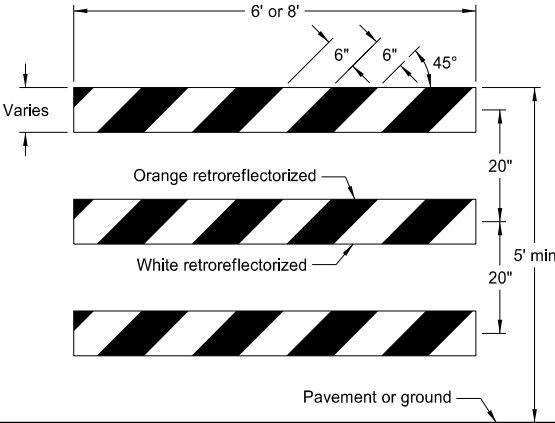


TYPE I BARRICADE



TYPE II BARRICADE

BARRICADE RAIL DETAILS



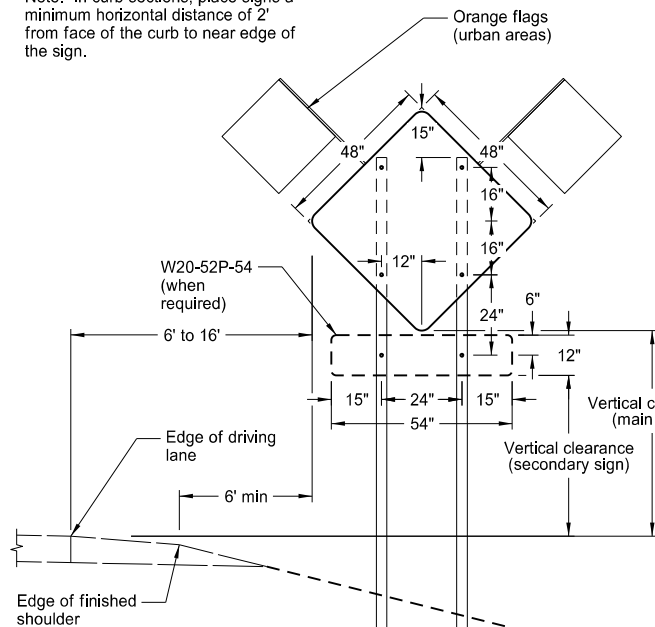
TYPE III BARRICADE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice

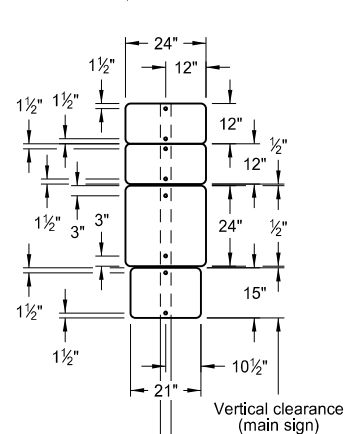
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

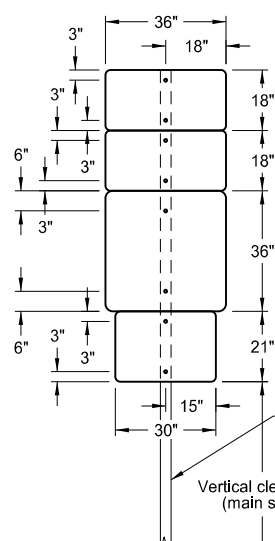
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



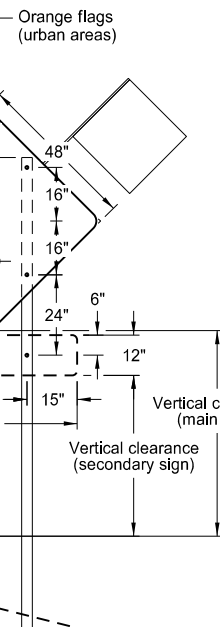
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



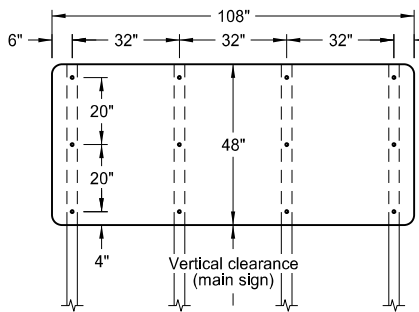
24" x 24"
ROUTE MARKER
ASSEMBLY



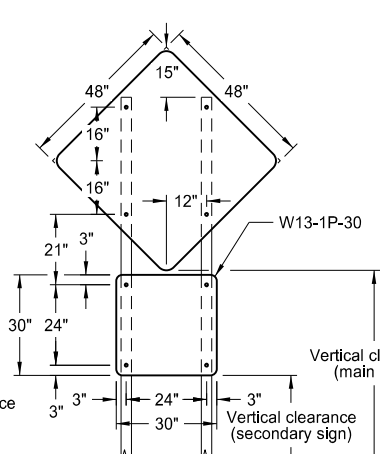
36" x 36"
ROUTE MARKER
ASSEMBLY



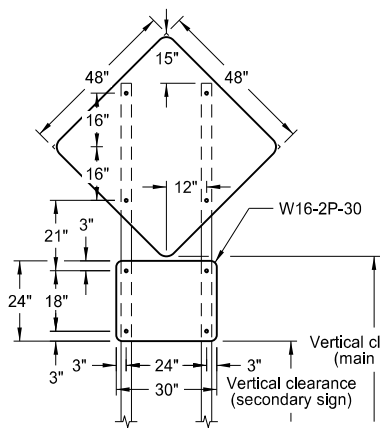
18" x 18"
DIAMOND SIGN



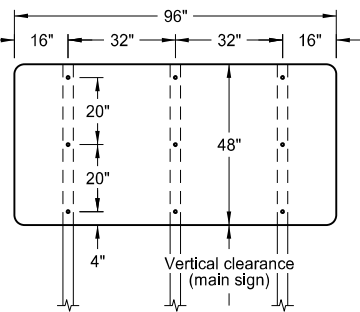
108" x 48" SIGN



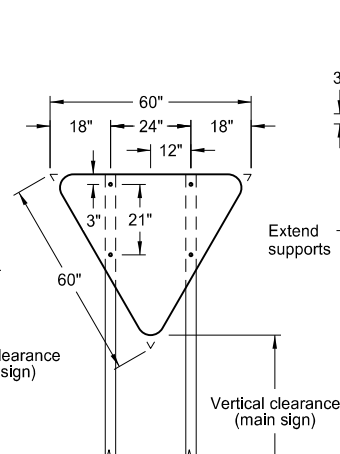
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



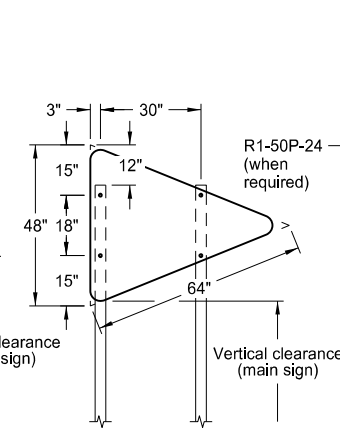
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



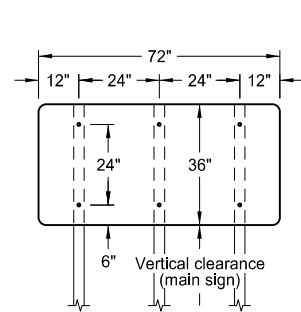
96" x 48" SIGN



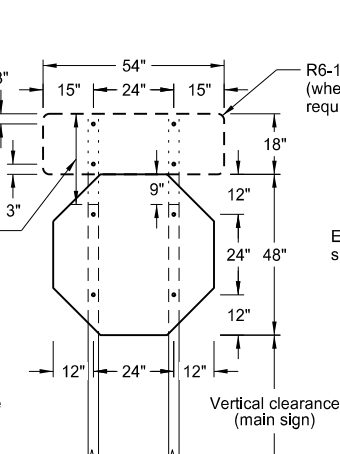
R1-2-60 - YIELD SIGN



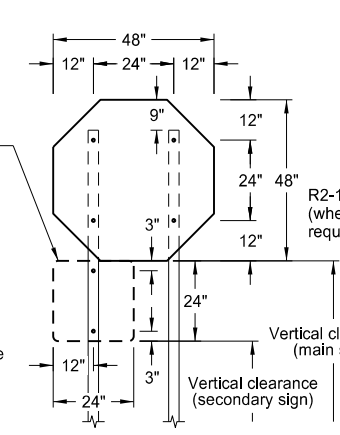
W14-3-64 - PENNANT SIGN



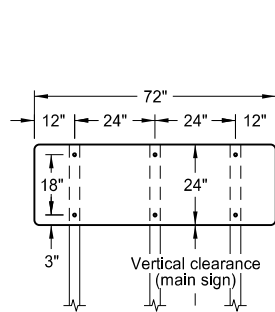
72" x 36" SIGN



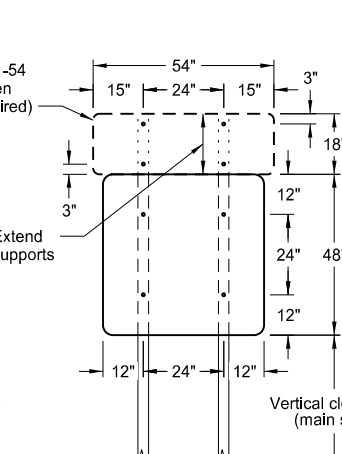
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



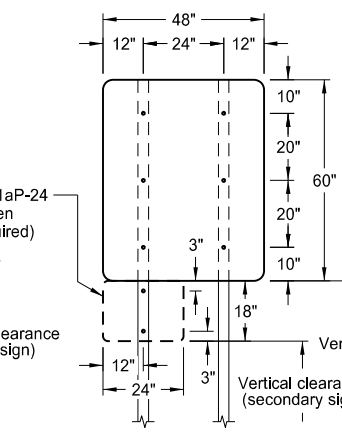
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



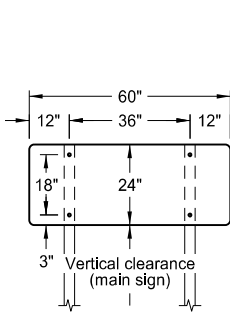
72" x 24" SIGN



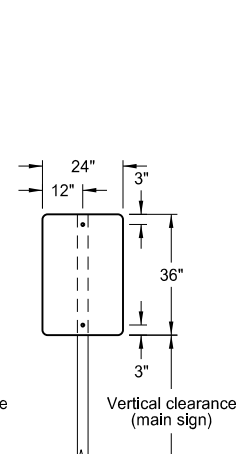
48" x 48" SIGN
(with R6-1-54 sign as required)



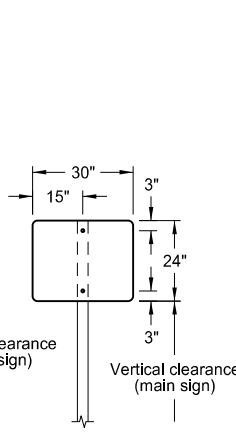
48" x 48" SIGN
(with R2-1aP-24 sign as required)



60" x 24" SIGN



24" x 36" SIGN



30" x 24" SIGN

NOTES:

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

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

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

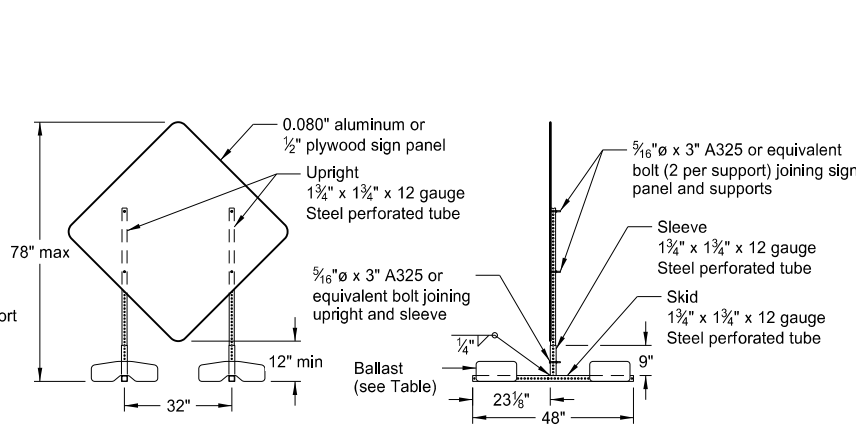
Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period.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

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

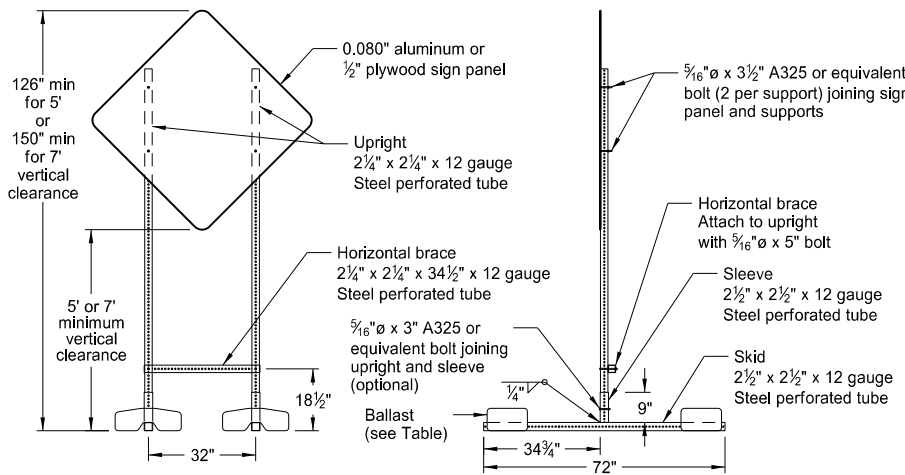
MINIMUM BALLAST
(For each side of sign support base)

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

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



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT

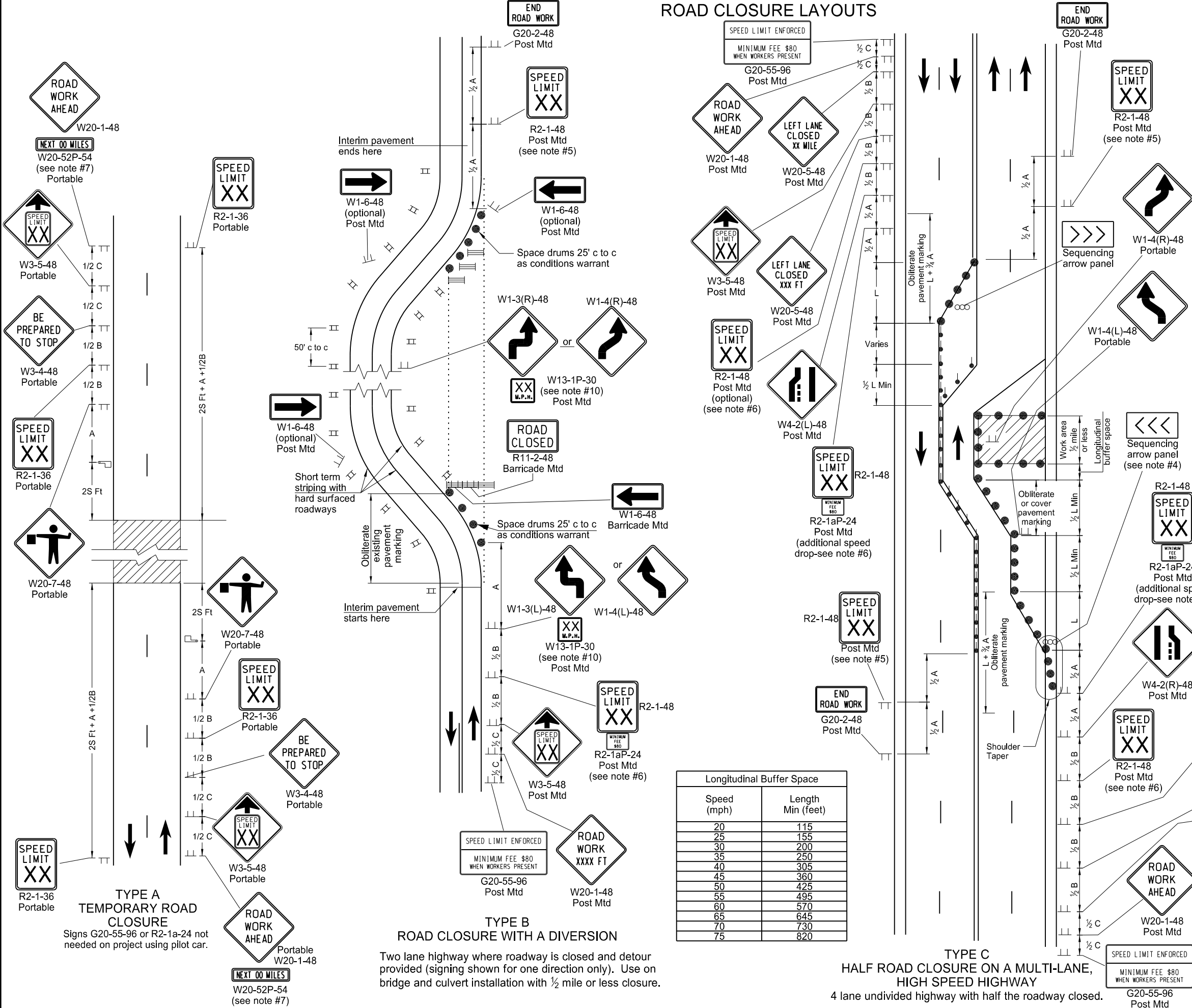


PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13 9-27-17	Revised Note 6, Updated to active voice

This document was originally issued and sealed by
Roger Weigel,
Registration Number
PE-2930,
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ROAD CLOSURE LAYOUTS



- Notes
1. Variables
- S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet.
 - L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
- Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
- Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
- Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
7. Use when work area is 1 mile or longer.
8. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
9. Cover existing speed limit signs within reduced speed zones.
10. Where necessary, engineer will determine safe speed.
11. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
12. Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.
13. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & Speed Limit signs

This document was originally issued and sealed by

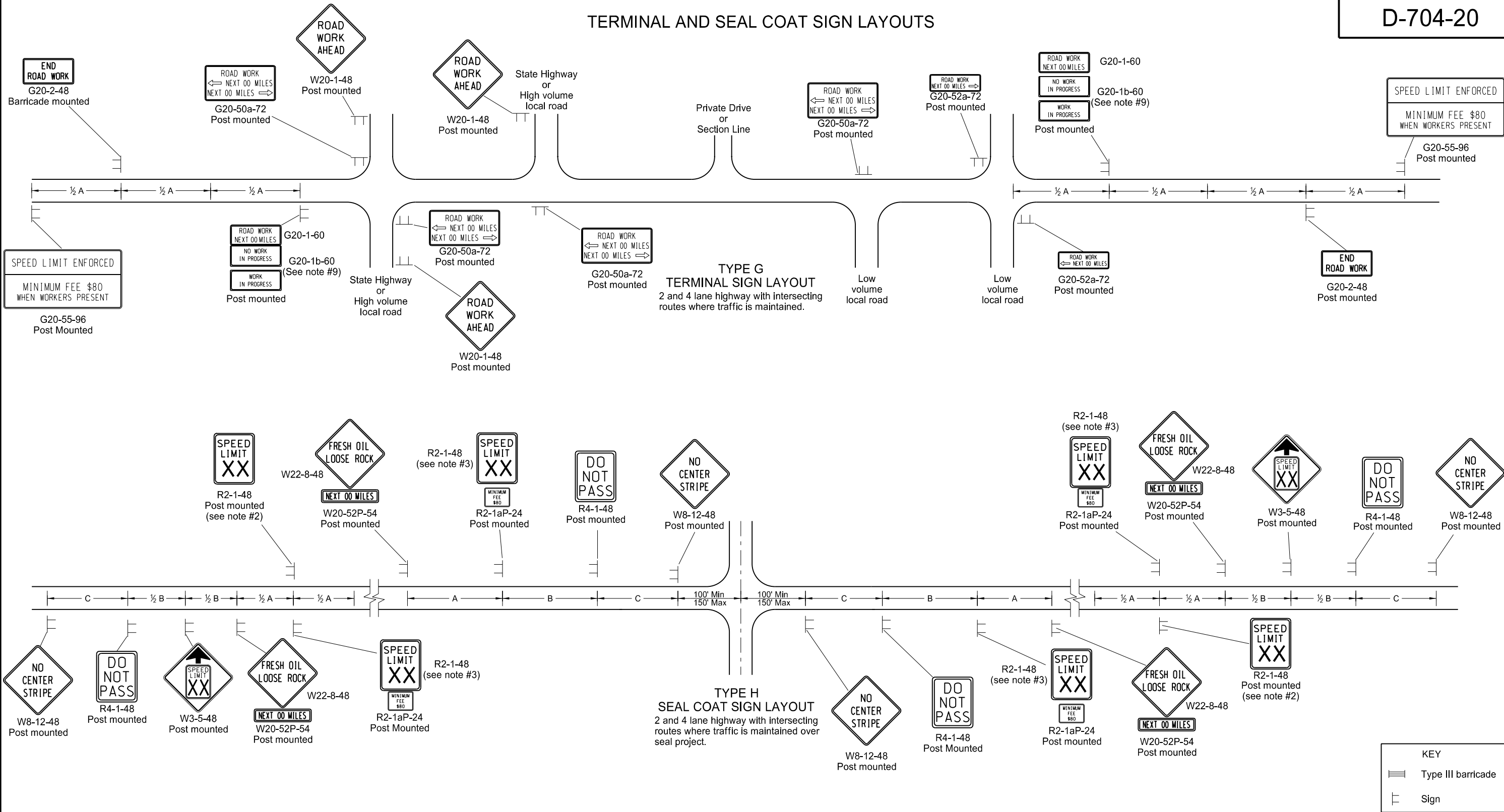
Roger Weigel

Registration Number PE-2930,

on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 2. Determine the exact speed limit in the field, based on location and conditions.
 3. Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
 4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 5. Cover existing speed limit signs within a reduced speed zone.
 6. On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
 7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
 8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
 9. Install sign G20-1b-60 when work is suspended for winter.
 10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
 11. Sign G20-55-96 is not required if work is less than 15 days.
 12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

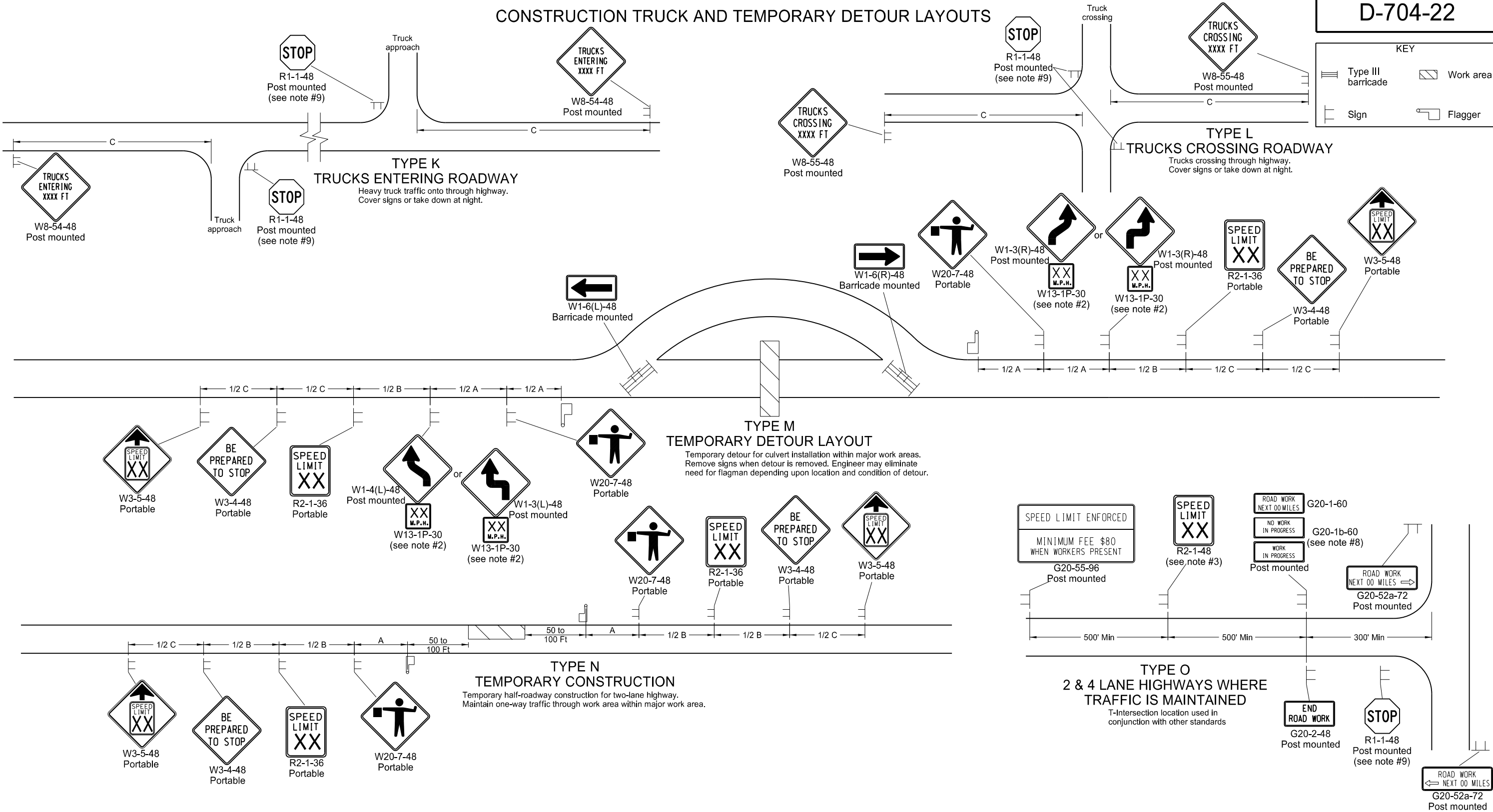
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & sign numbers

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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
- Install sign G20-1b-60 when work is suspended for winter.
- If existing stop sign is in place, a 48" stop sign is not required.
- Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

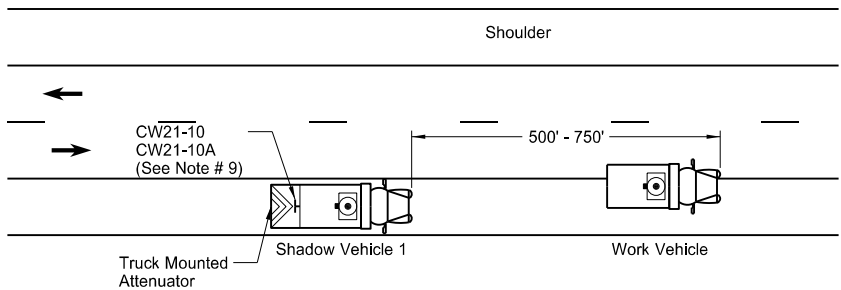
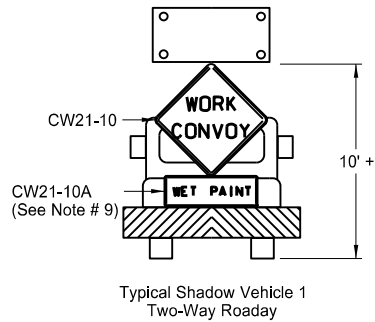
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Update notes & sign numbers

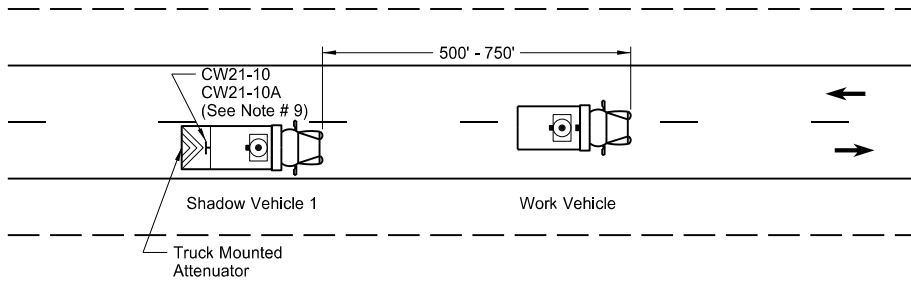
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Registration Number
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

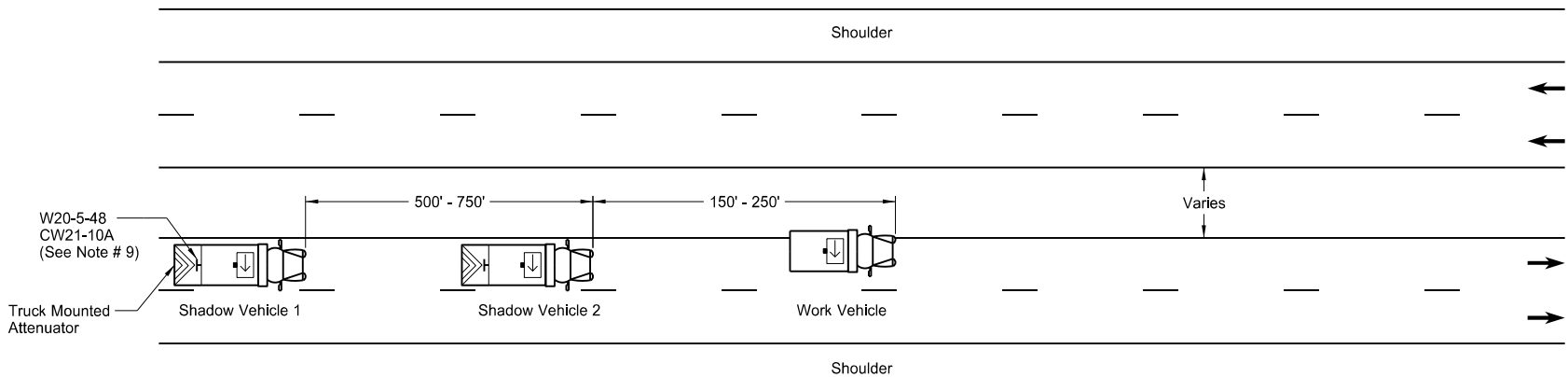
D-704-27



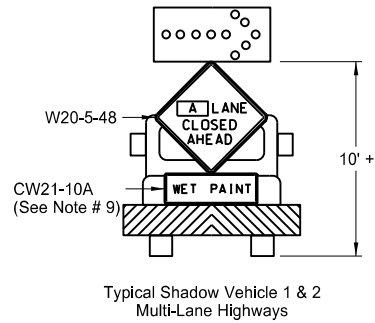
Two-Way Roadway with Paved Shoulders



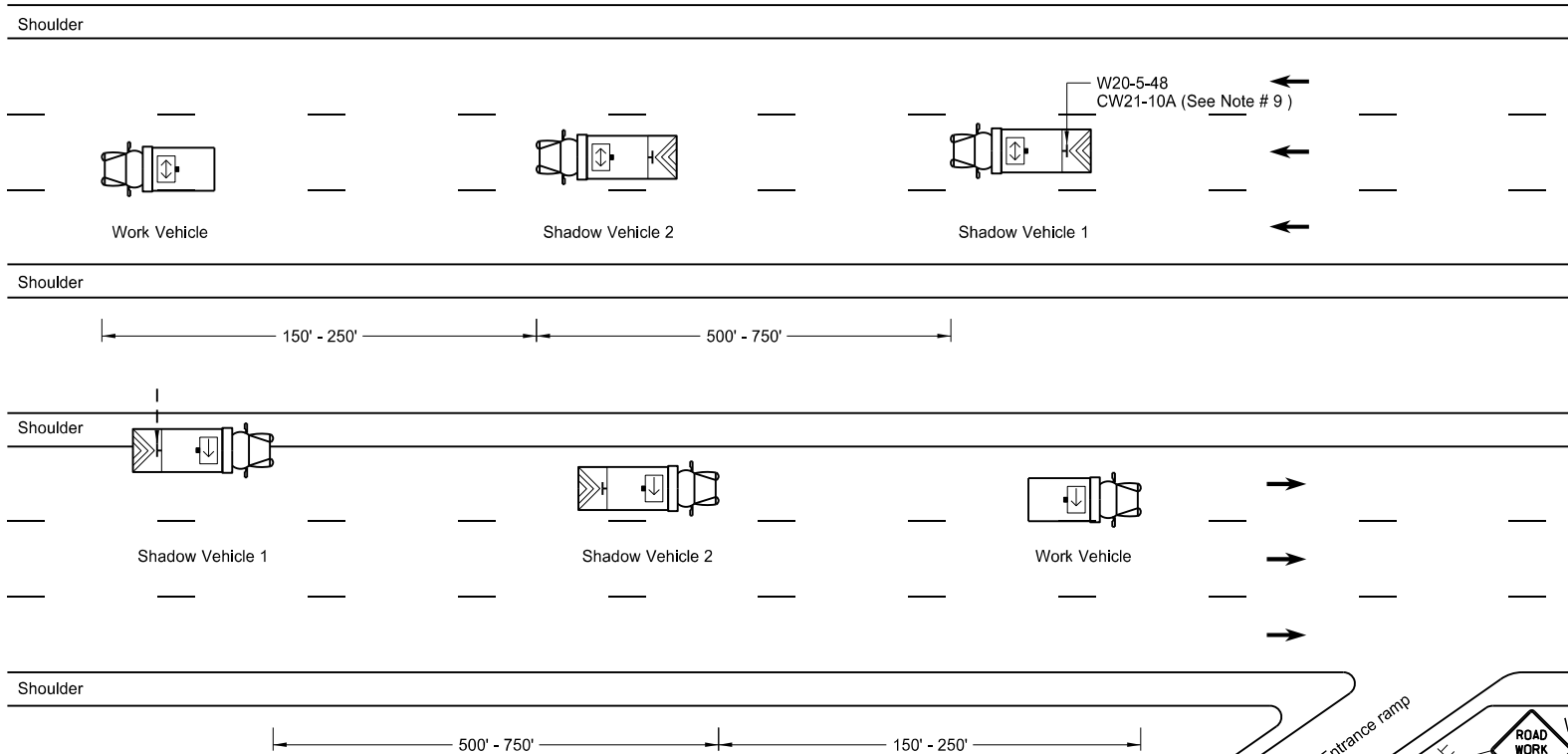
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

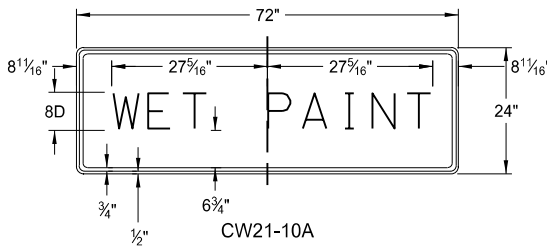
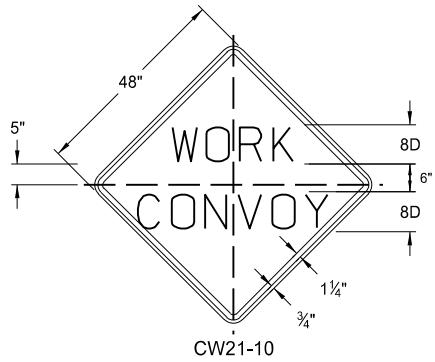


A = Left Right Center



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.

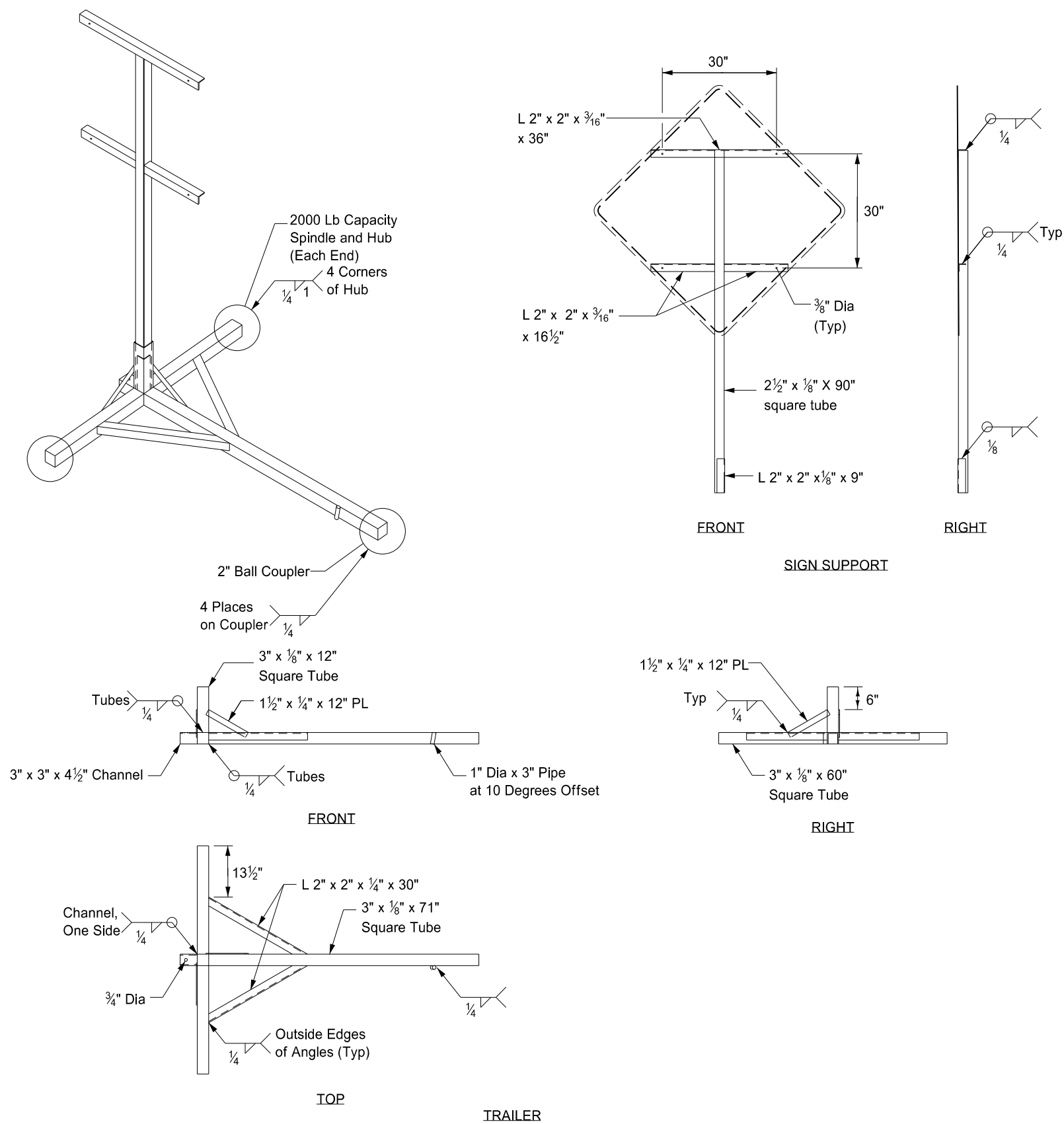
KEY	
	Sign
	Truck mounted attenuator
	Flashing arrow panels:
	Right directional
	Left directional
	Double arrow directional
	Caution Mode

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

This document was originally issued and sealed by
Roger Weigel
Registration Number
PE- 2930,
on 09/27/2017 and the original document is stored at the
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of Transportation

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

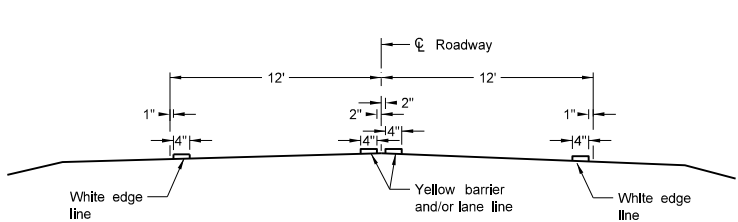
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

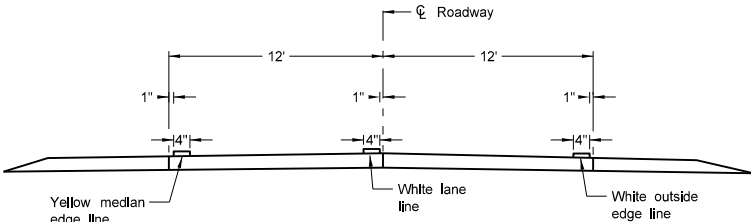
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on 11/23/10 and the original document is stored at the
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PAVEMENT MARKING

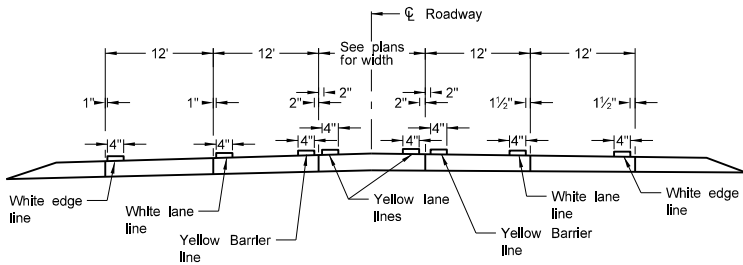
D-762-4



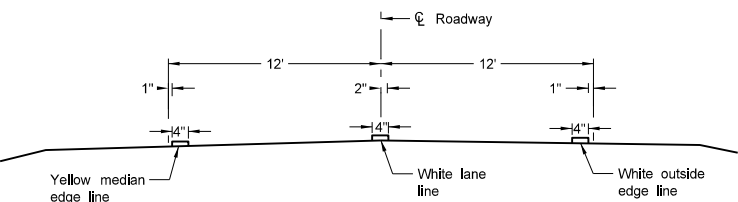
Two Lane Two Way
RURAL ROADWAY



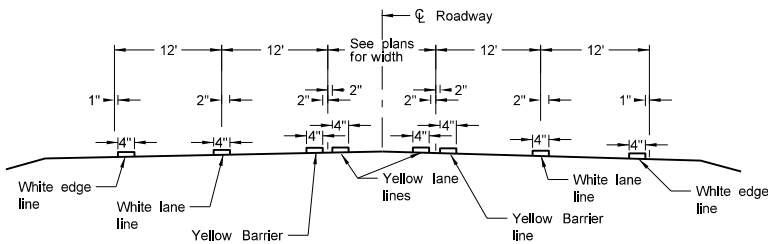
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



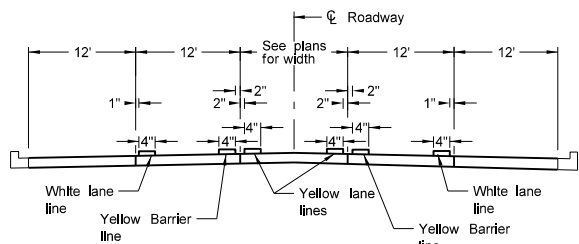
RURAL FIVE LANE ROADWAY
Concrete Section



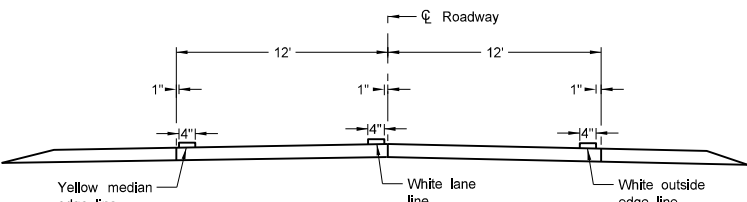
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



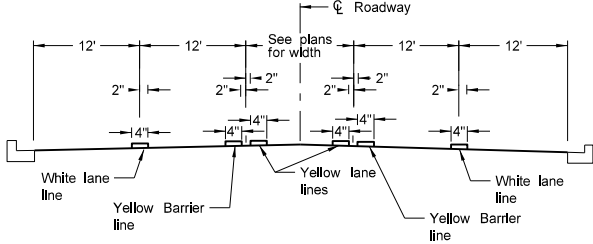
RURAL FIVE LANE ROADWAY
Asphalt Section



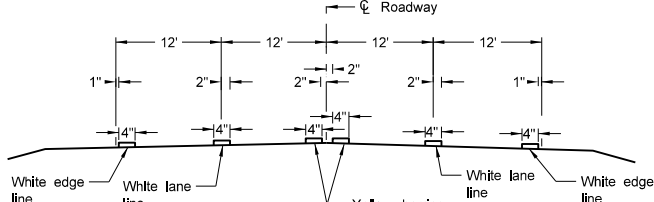
URBAN FIVE LANE SECTION
Concrete Section



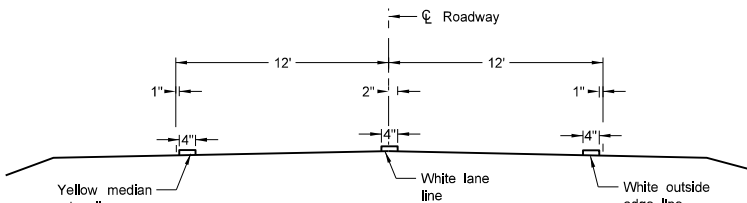
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



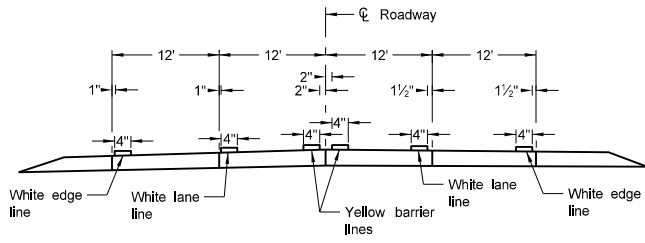
URBAN FIVE LANE SECTION
Asphalt Section



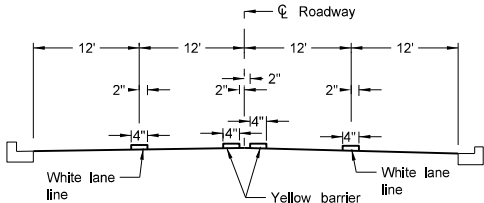
RURAL FOUR LANE ROADWAY
Asphalt Section



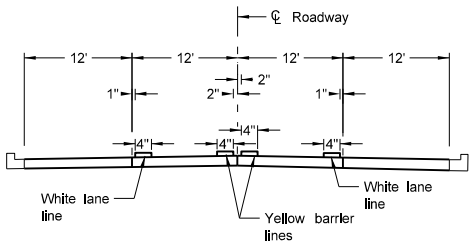
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



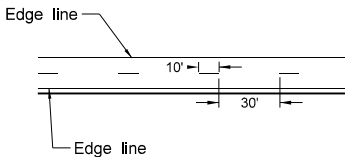
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

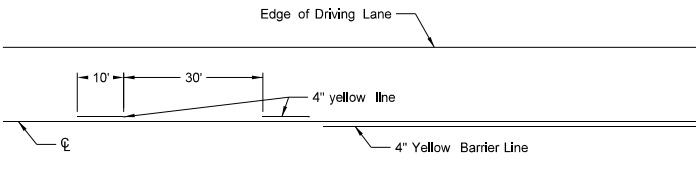
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.

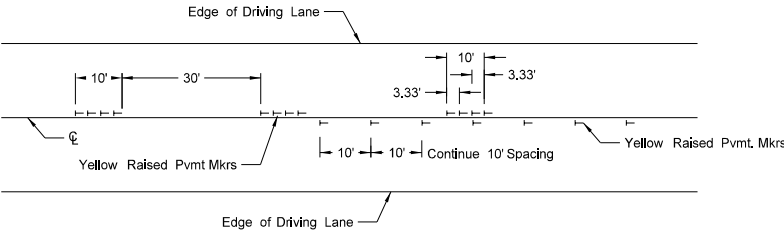
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SHORT-TERM PAVEMENT MARKING

D-762-11

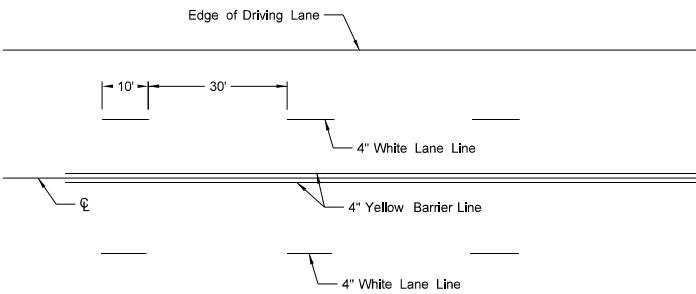


Painted or Tape Lines

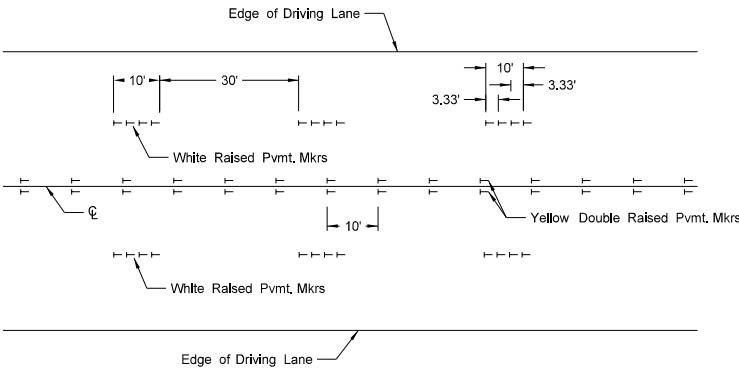


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

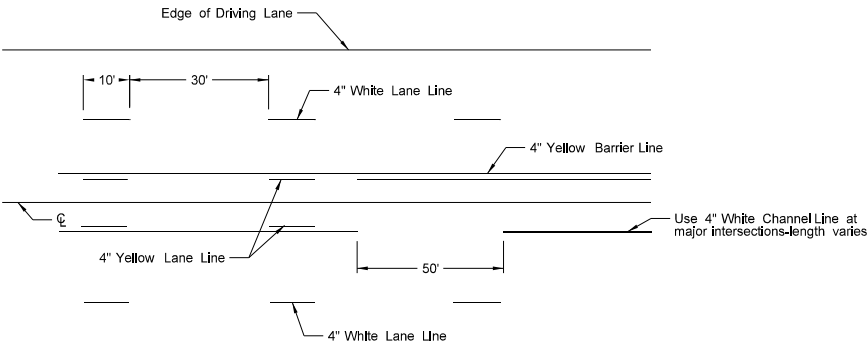


Painted or Tape Lines

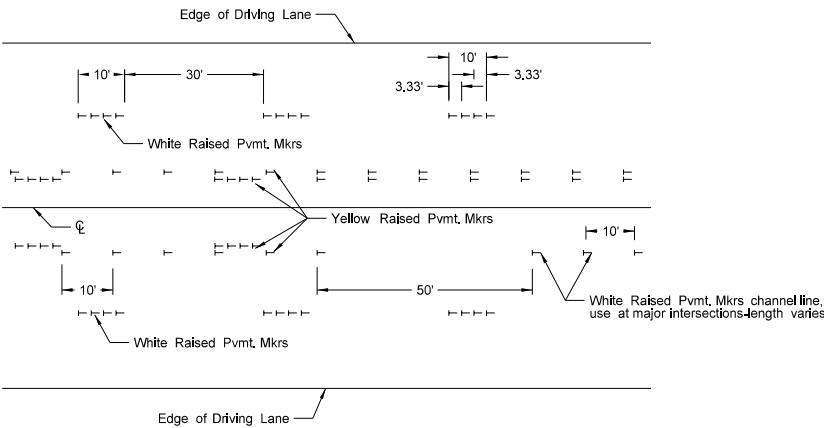


Raised Pavement Markers

FOUR LANE ROADWAY

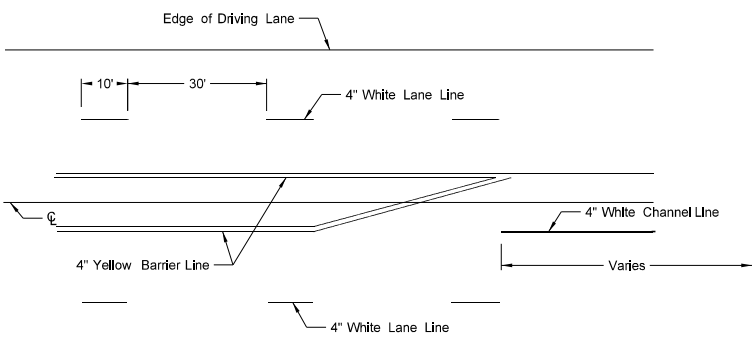


Painted or Tape Lines

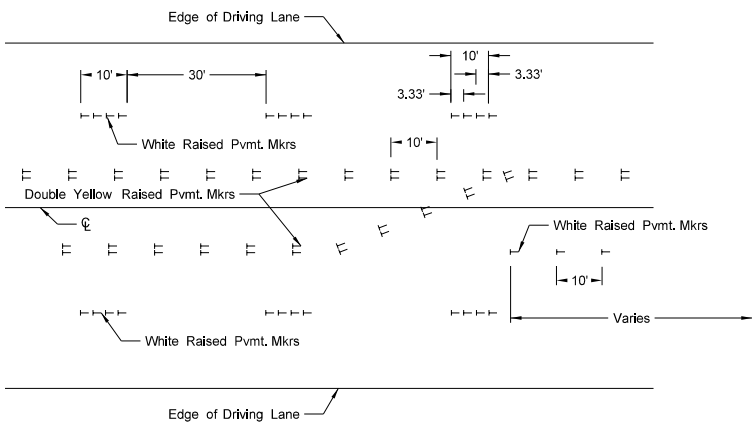


Raised Pavement Markers

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.

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.

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