

DESIGN DATA			
Traffic		Average Daily	
Current 2023	Pass: 1655	Trucks: 130	Total: 1785
Preventive Maintenance			

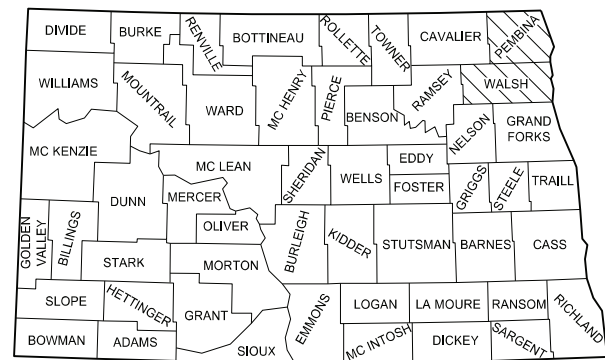
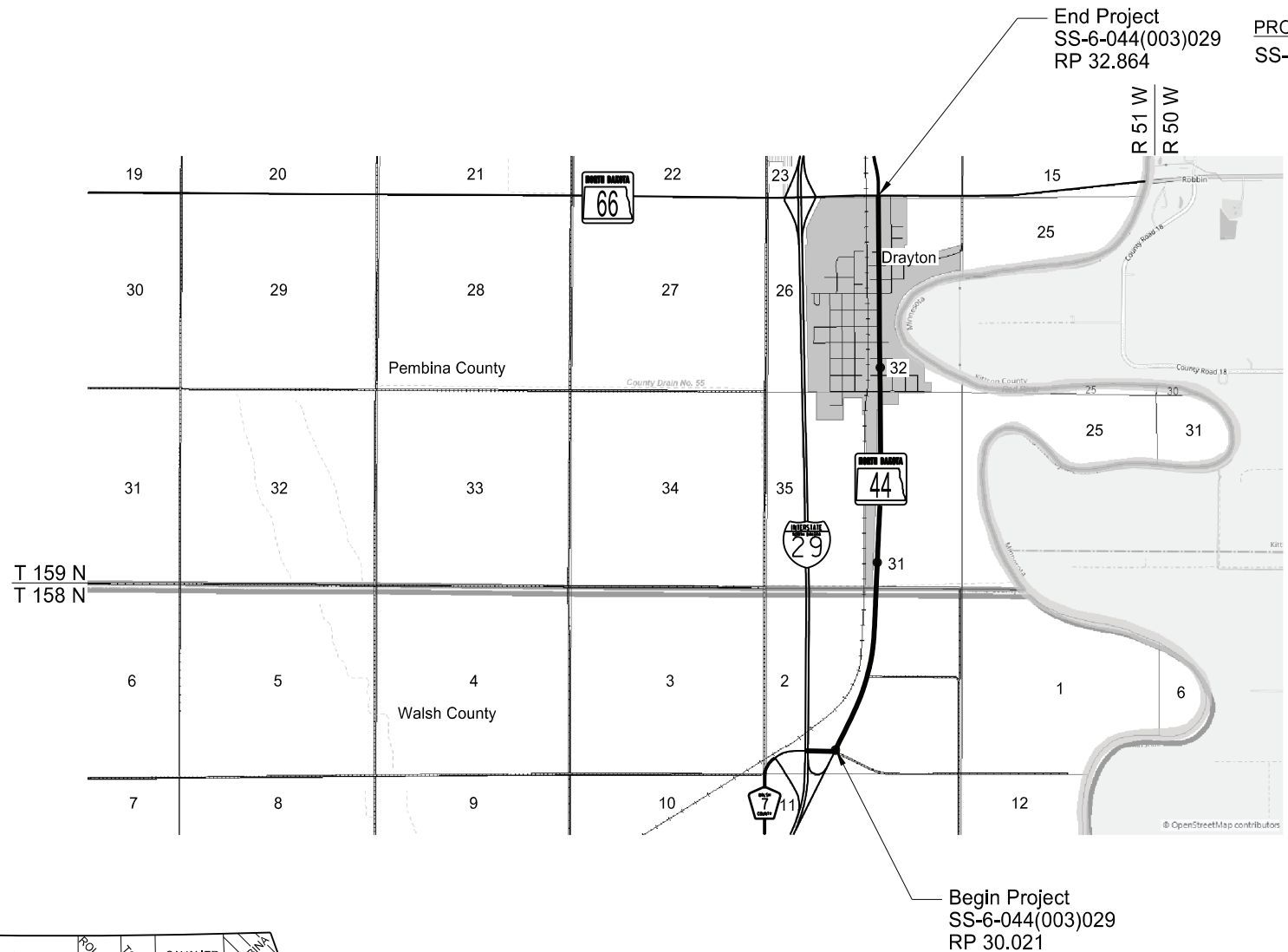
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ND	SS-6-044(003)029	24030	1	1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SS-6-044(003)029
 Pembina and Walsh Counties
 JCT I-29 N to JCT 66
 CPR, Mill & HMA, ADA Curb Ramp Revisions


GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-6-044(003)029	2.843	2.843

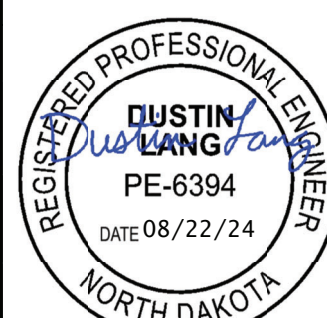


STATE COUNTY MAP

DESIGNER Tevin Wolnarowicz
DESIGNER Lynnette Steyn
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
 GRAND FORKS DISTRICT

 08/22/24

GRAND FORKS DISTRICT



DUSTIN LANG
 PE-6394
 DATE 08/22/24
 NORTH DAKOTA

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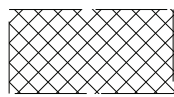
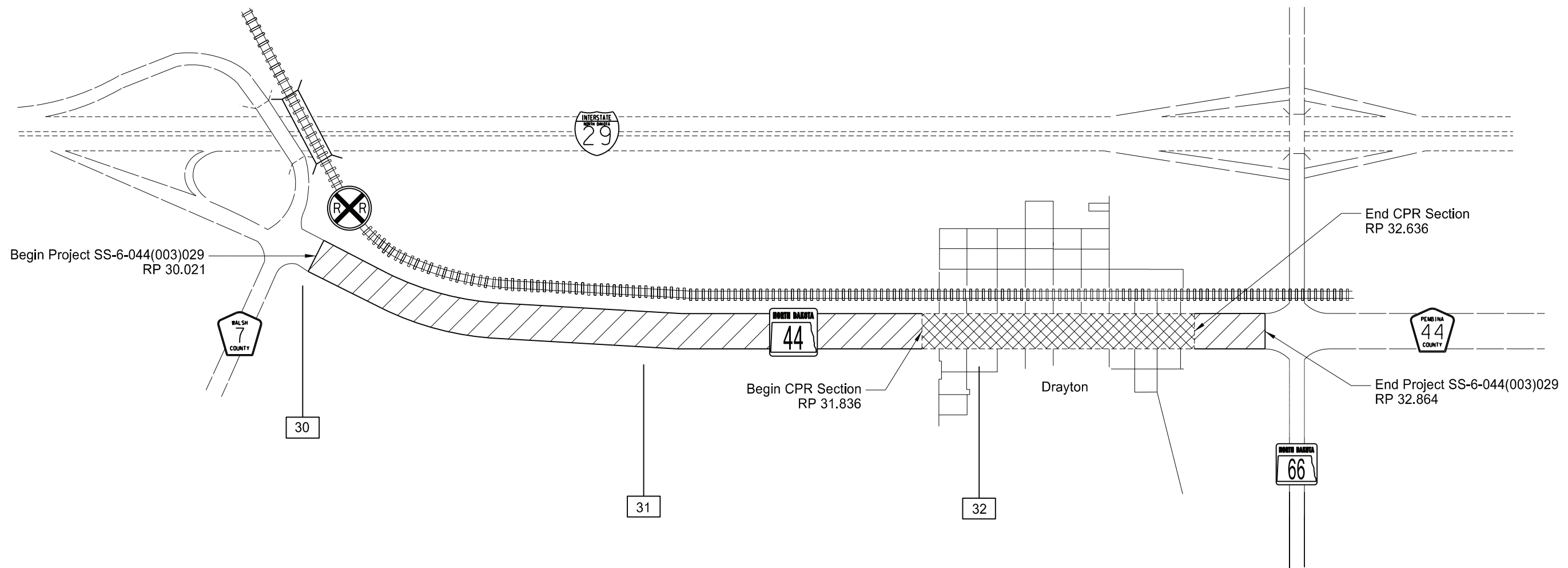
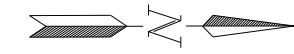
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D-704-50	Portable Sign Support Assembly
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D-706-1	Bituminous Laboratory
D-748-1	Curb & Gutter And Valley Gutter
D-750-2	Sidewalk
D-750-3	Curb Ramp Retrofit Details
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D-760-4	Rumble Strips Undivided Highways (Shoulders Less Than 4')
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking

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Number	Description
PSP 63(24)	Permits and Environmental Considerations
SSP 4	Longitudinal Joint Density
SP 475(24)	E-Ticketing (Mandatory)
SP 476(24)	Temporary Pedestrian Facilities

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CPR and ADA Ramp Revisions

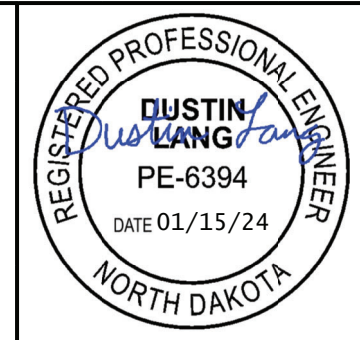


2" Mill and 2" HMA

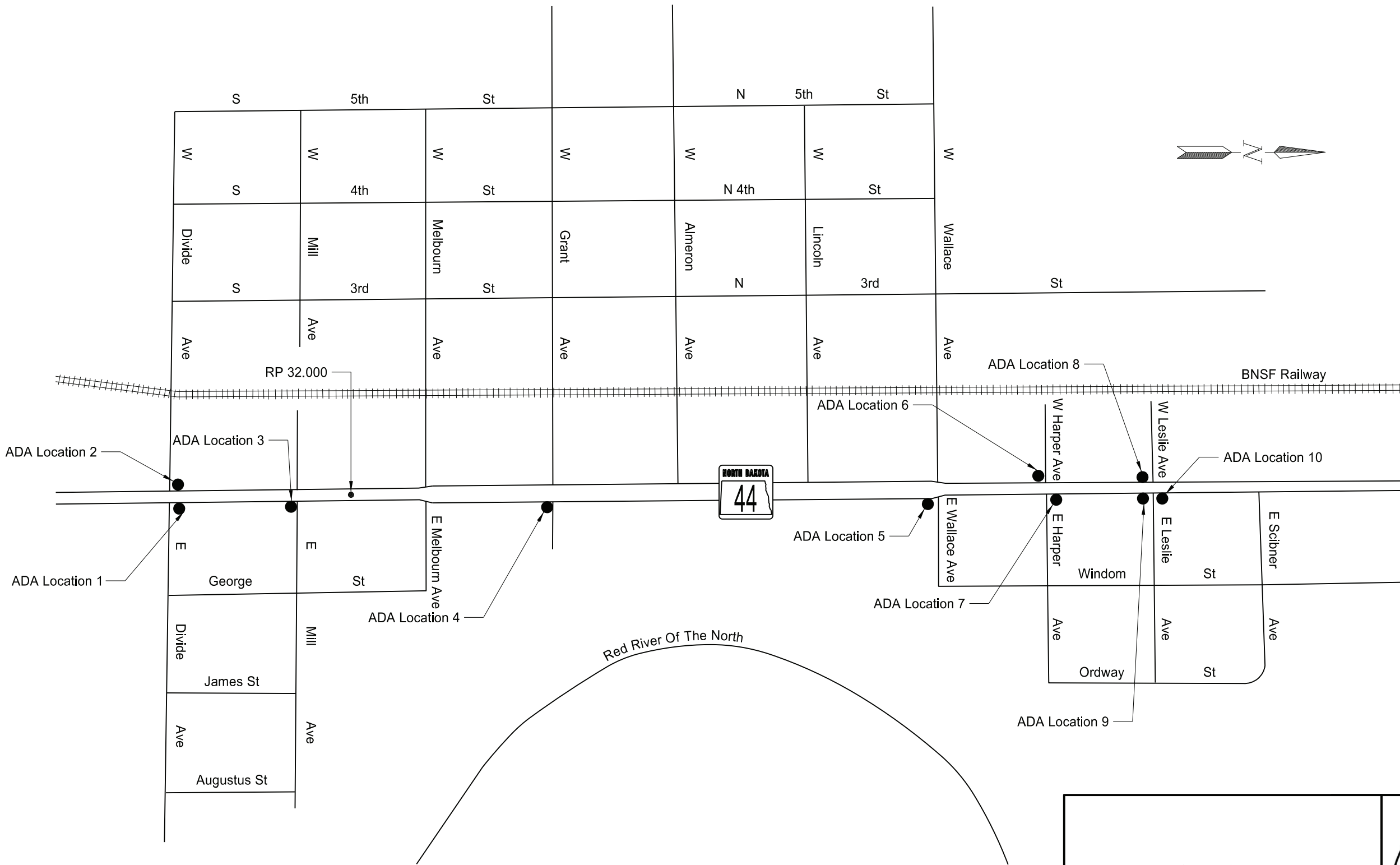
Scope of Work

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



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Scope of Work

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



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- 100-P01 PUBLIC NOTIFICATION: Provide written notices to each property and business adjacent to the perimeter of the project limits a minimum of 7 days in advance of work. Include proposed start/end date of construction, description of construction activities (Concrete Pavement Repair, ADA Ramps, etc.), and general schedule of activities for the project from start to end. Prior to delivering notices, submit notice to the Engineer for approval.
- 105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic. Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection. Use vacuum or pick-up type sweeper to perform this work.
- 105-P02 The Engineer will establish centerline prior to milling if requested by the Contractor. No additional horizontal control will be provided.
- 108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.
- 202-P01 REMOVALS (ADA CURB RAMP REVISIONS): Removal and disposal of existing aggregate (if needed) or common excavation is included in the costs of "REMOVAL OF CONCRETE PAVEMENT" or "REMOVAL OF CURB & GUTTER."
- 202-P02 REMOVAL OF CONCRETE PAVEMENT: Removal of concrete pavement consists of removing concrete pavement, bituminous pavement, sidewalks, and aggregate base. Existing pavement thicknesses are based on old plan sets.
- 411-P01 TEMPORARY ASPHALT WEDGES: Place temporary asphalt wedges at the beginning and ends of this project and intersecting routes to allow smooth passage of vehicles at these milled locations. Place wedges at these milled areas prior to the traffic being allowed back on the milled roadway section. Millings may be used instead of asphalt for all wedges. Include all costs associated with labor, materials, and equipment for the installation, maintenance, and removal of the wedges in the contract price bid for "MILLING PAVEMENT SURFACE."
- 430-200 FOG SEAL: Apply a fog seal at a rate of 0.05 Gal/SY to the final surface of the hot mix asphalt if the ND T 113 "Lightweight Pieces in Virgin Aggregate" test results exceeds 3.0% during mix design or production of the hot mix asphalt. Apply the fog seal behind the finish roller before the mat temperature drops below 130 degrees Fahrenheit. Use the same emulsion material as the Tack Coat. Apply the fog seal at no additional cost to the Department.
- 570-P01 CONCRETE PAVEMENT REPAIR: An additional 25% has been added to the quantities for "DOWELED CONTRACTION JOINT ASSEMBLY", "8 IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED", "SPALL REPAIR-PARTIAL DEPTH", and "EPOXY COATED DEFORMED BARS" to be used as directed by the Engineer.
- 570-P02 Provide a concrete mix for use in concrete pavement repairs that meets the requirements of NDDOT supplemental Specification 802.01 A.3, Class ASE mix. ASE mix will be used for all CPR work unless approved by the Engineer.
- 704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

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

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:
 - "Be Prepared to Stop" (W3-4); and
 - "Flagger" symbol (W20-7)
 Install PRS that meet the following criteria:
 - Have no adhesives or fasteners required for placement;
 - Have a 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;
 - Interlocking segments; or
 - Two pieces hinged at the midpoint.
 An installed array of PRS consists of a minimum of 3 individual strips.

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

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "PORTABLE RUMBLE STRIPS."
- 704-P01 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install the signal-controlled lane closure on Section 100, Sheet 5.

Obtain an electrical source for traffic signals. Solar powered signals may be used. Place generators a minimum of 60 feet from the roadway centerline, unless the generator and signal are part of a trailer mounted unit.

Place utility poles and equipment a minimum of 60 feet from the roadway centerline and place power conductors a minimum of 6 inches below the ground surface. Remove poles after they are no longer necessary.

The Engineer will measure individual traffic control devices, other than the signal system and flaggers, shown on the standards. Payment will be made at the respective contract unit price.

Include the cost of either a traffic signal system or flaggers in the contract unit price for "Lane Closure - Signal Control/Flagging Control".
- 704-P02 TRAFFIC CONTROL FOR MILLING & BITUMINOUS PAVEMENT (TYPICAL SECTION 1): Provide traffic control consisting of a temporary road closure, flagging, and a pilot car.

Traffic control device quantities are based on the project length and the list below. The Department will pay for all necessary deployed devices.
 1. Standard D-704-15, layout A;
 2. Standard D-704-20, layout G;
 3. Standard D-704-22, layouts K and L; and
 4. Standard D-704-26, layouts CC, EE, and GG.



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704-P03 TRAFFIC CONTROL FOR DRAYTON (TYPICAL SECTION 2): Utilize a LANE CLOSURE – SIGNAL CONTROL / FLAGGING CONTROL to complete repairs in one-block increments throughout Typical Section 2. See Section 100, Sheet 5. Do not install this set-up from Mill Ave. to Melbourne Ave. nor Wallace Ave. to Harper Ave. while traffic is head-to-head in downtown Drayton (Typical Section 3).

704-P04 TRAFFIC CONTROL FOR DOWNTOWN DRAYTON (TYPICAL SECTION 3): Restrict parking throughout all of Typical Section 3. Close half of the roadway and place public traffic head-to-head on the other half. Complete all operations except for permanent pavement marking before changing phases. See Section 100, Sheets 6-11.

706-P01 BITUMINOUS LABORATORY: Provide cellular internet service with Wi-Fi capabilities. Also provide a cell phone signal booster that allows for the reliable use of cellular voice and data services throughout the lab. Include all costs for installation and monthly fees for the cellular internet service and cellular signal booster in the contract price for "BITUMINOUS LABORATORY."

708-P01 INLET PROTECTION: Furnish, install, and maintain (clean) drainage inlet filter assemblies to collect sediment in surface storm water runoff. Dispose of debris or silt that has accumulated in the bag. Periodic cleaning of the filter is needed as necessary. Remove drainage inlet filter when vegetation has established.

Provide Wimco, Lange IPD, Flexstorm, Dandy Curbsack, or an approved equal.

Keep filter in place until after the gradient surfaces are stabilized and the surrounding street is clean of debris. Include all costs related to the material, installation, maintenance, replacement, and removal in the price bid for "INLET PROTECTION - SPECIAL."

750-P01 SIDEWALK CONCRETE: Provide salvaged base course for new sidewalk locations. Utilize the existing aggregate base in existing sidewalk locations and provide additional salvaged base course as necessary, or as directed by the Engineer. Include costs for salvaged base course used for sidewalk construction in the unit bid for "SIDEWALK CONCRETE 4IN."

750-P02 SIDEWALK CONCRETE: Construct sidewalk and ADA ramps as per Standard Drawings D-750-2, D-750-3, and as shown on the detail layouts in Section 80.

At replacement areas, excavate material to accommodate the proposed aggregate base and dispose of excess excavation.

Place a #3 deformed reinforcing bar placed 24 inches on center both longitudinally and transversely in all replacement areas. Use bars 6 inches shorter than the width of the slab and placed accurately at one-half the depth of the slab. Use plastic chairs. Construct contraction joints according to D-750-2. Place one-half-inch expansion joints as directed by the Engineer.

Saw all longitudinal and transverse contraction joints. Saw joints in a timely manner to prevent any uncontrolled random cracking. If random cracking occurs, remove, and replace all damaged panels.

Include the cost of materials, equipment, and labor to perform the above referenced work in the contract unit price for "SIDEWALK CONCRETE 4IN."

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

970-P01 LANDSCAPE PREPARATION: Areas requiring "LANDSCAPE PREPARATION" have been designated in Section 77 and will include grading, topsoil, seeding, hydraulic mulch, and watering.

Remove topsoil and earth necessary for placement of new sidewalk concrete, curb & gutter, and base material. Grade existing ground to blend into newly constructed curb ramps and replace topsoil prior to seeding.

It has been estimated to blend topsoil into the existing ground at a width of 2 feet. Widths may vary at the discretion of the Engineer.

Seed areas disturbed during the removal and construction of ADA Curb Ramps. Seeding will be Class III. Hydraulic mulch after areas have been seeded.

Grass Species	Variety	PLS per Acre
Western Blue Grass	Park	100
Perennial Rye Grass	----	40
Six-Week Fescue or Dural-hard Fescue	----	60
Annual Rye Grass	----	50

Water seed for three weeks minimum after placement in order to provide sufficient moisture for growth as determined by the Engineer. Prevent run-off and puddling. Water trucks will not be driven over turf areas.

Include all costs to remove and replace earth, topsoil, seed, mulch, and water in the contract unit price for "LANDSCAPE PREPARATION."



ESTIMATE OF QUANTITIES

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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	1	1
109	1000 E-TICKETING	L SUM	1	1
202	0114 REMOVAL OF CONCRETE PAVEMENT	SY	119	119
202	0130 REMOVAL OF CURB & GUTTER	LF	175	175
302	0120 AGGREGATE BASE COURSE CL 5	TON	221	221
401	0050 TACK COAT	GAL	2,630	2,630
411	0105 MILLING PAVEMENT SURFACE	SY	35,654	35,654
430	0143 RAP - SUPERPAVE FAA 43	TON	3,991	3,991
430	1000 CORED SAMPLE	EA	33	33
430	5815 PG 58S-34 ASPHALT CEMENT	TON	208	208
570	0240 DOWELED CONTRACTION JOINT ASSEMBLY	LF	495	495
570	0713 8IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	1,674	1,674
570	1512 SPALL REPAIR-PARTIAL DEPTH	SF	2,189	2,189
570	1600 EPOXY COATED DEFORMED BARS	EA	52	52
702	0100 MOBILIZATION	L SUM	1	1
704	0100 FLAGGING	MHR	528	528
704	1000 TRAFFIC CONTROL SIGNS	UNIT	3,520	3,520
704	1018 LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	1	1
704	1048 PORTABLE RUMBLE STRIPS	EA	2	2
704	1050 TYPE I BARRICADE	EA	50	50
704	1052 TYPE III BARRICADE	EA	63	63
704	1054 SIDEWALK BARRICADE	EA	20	20
704	1058 PEDESTRIAN WALKWAY	LF	350	350
704	1060 DELINEATOR DRUMS	EA	175	175
704	1067 TUBULAR MARKERS	EA	175	175
704	1080 STACKABLE VERTICAL PANELS	EA	100	100
704	1185 PILOT CAR	HR	84	84
704	2108 TEMPORARY CURB RAMP	EA	10	10
706	0500 AGGREGATE LABORATORY	EA	1	1
706	0550 BITUMINOUS LABORATORY	EA	1	1
706	0600 CONTRACTOR'S LABORATORY	EA	1	1
708	1540 INLET PROTECTION-SPECIAL	EA	22	22
748	0100 CURB & GUTTER	LF	175	175

ESTIMATE OF QUANTITIES

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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
750	0115 SIDEWALK CONCRETE 4IN	SY	121.6	121.6
750	2115 DETECTABLE WARNING PANELS	SF	90	90
760	0025 SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	3.148	3.148
760	0027 SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	1.574	1.574
762	0103 PVMT MK PAINTED-MESSAGE	SF	316	316
762	0422 SHORT TERM 6IN LINE-TYPE R	LF	17,300	17,300
762	0426 SHORT TERM 24IN LINE-TYPE R	LF	276	276
762	0432 SHORT TERM 6IN LINE-TYPE NR	LF	14,655	14,655
762	1106 PVMT MK PAINTED 6IN LINE	LF	35,055	35,055
762	1124 PVMT MK PAINTED 24IN LINE	LF	22	22
970	0008 LANDSCAPE PREPARATION	SY	84	84

BASIS OF ESTIMATE

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Design Calculations				
Description	Unit	Width	Unit/Mi.	Quantity
Typical Section 1: (RP 30.021 to RP 31.836 and RP 32.636 to RP 32.864) (2.043 Miles)				
Milling Pavement Surface <i>(28.5 FT X 5,280 LF/Mi. ÷ 9 SF/SY = 16,720 SY/Mi.)</i>	SY	28.5'	16,720	34,159
RAP Superpave FAA 43 <i>(4.6187 SF X 5,280 LF/Mi. X 2 Ton/CY ÷ 27 CF/CY = 1,807 Ton/Mi.)</i>	Ton	28'	1,807	3,692
PG 58S-34 Asphalt Cement @ 5.2% <i>(1,807 Tons/Mi. X 0.052 = 94 Ton/Mi.)</i>	Ton	28'	94	192
Tack Coat @ 0.075 Gal/SY <i>(28 FT X 5,280 LF/Mi. ÷ 9 SF/SY X 0.075 Gal/SY = 1,232 Gal/Mi.)</i>	Gal	28'	1,232	2,517

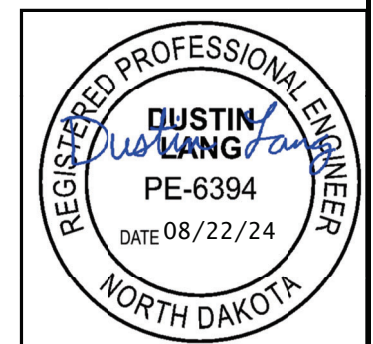
Design Calculations			
Description	Units	Basis	Quantity
Approaches			
Milling Pavement Surface	SY	See Sec. 20, Sheet 1 & Sec. 90, Sheet 1	1,495
RAP Superpave FAA 43	Ton		299
PG 58S-34 Asphalt Cement	Ton		16
Tack Coat	Gal		113
Aggregate Base Course CL5	Ton		221

Estimated Available Milled Material Quantities			
Milled Material Available	Milled Area (SF)	Length (Mi)	Tons (1.875 Tons/CY)
Typical Section 1	4.6612	2.043	3,492
JCT ND 66	See Sec. 90, Sheet 1		27
Approaches	See Sec. 20, Sheet 1		129
Total (Minus 10% for losses)			3,284

Estimated Required & Remaining Milled Material Quantities		
	% RAP by Mix Design	
	10% Min	25% Max
Milled Material required for production of HMA <i>(3,991 tons RAP-Superpave FAA 43)</i>	399	998
Milled Material to become the property of the Contractor	2,885	2,286

HMA Cored Samples							
	A	B	C				
Specification Section	Distance (FT) ÷ 1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	11	2	N/A	1	22	N/A	EA
SSP4 Longitudinal Joint Density in HMA Pavements (Centerline)	11	N/A	1	1	11	N/A	EA
430.04 I.2.b(2) "Pavement Thickness Determination Cores"	N/A	N/A	N/A	N/A	N/A	N/A	EA
				Total	33	N/A	EA

Estimated Flagging and Pilot Car Hours			
Operation	Basis	Flagging	Pilot Car
CPR	<i>30 Days x 12 Hrs/Day x 1 Flagger</i>	360 MHR	--
Milling Pavement	<i>2 Days x 12 Hrs/Day x 2 Flaggers 2 Days x 12 Hrs/Day x 1 Pilot Car</i>	48 MHR	24 HR
HMA	<i>5 Days x 12 Hrs/Day x 2 Flaggers 5 Days x 12 Hrs/Day x 1 Pilot Car</i>	120 MHR	60 HR



BASIS OF ESTIMATE

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Temporary Pavement Marking		
Location	Basis	Quantity
RP 30.021 to RP 31.595 (3 Applications - milled & paved surfaces, rumble strips)		
Short Term 6IN Line-Type NR Yellow Skip Line (10' Line, 30' Skip)	1,320 LF/MI	6,234 LF
Short Term 6IN Line-Type NR Yellow Single Barrier Line	5,280 LF/MI	2,505 LF
RP 31.595 to RP 31.836 (2 Applications - milled & paved surfaces)		
Short Term 6IN Line-Type NR Yellow Skip Line (10' Line, 30' Skip)	1,320 LF/MI	572 LF
Short Term 6IN Line-Type NR Yellow Double Barrier Line	10,560 LF/MI	528 LF
RP 32.636 to RP 32.864 (2 Applications - milled & paved surfaces)		
Short Term 6IN Line-Type NR Yellow Double Barrier Line	10,560 LF/MI	4,816 LF
Additional Temporary Pavement Marking Quantities		
Temporary Traffic Signal (7 locations x 2 for each side of the road)		
Short Term 6IN Line - Type R Yellow Double Barrier Line	D-704-16	7,500 LF
Short Term 6IN Line - Type R White Edge Line		9,800 LF
Short Term 24IN Line - Type R White Line - Stop Bar		276 LF

Permanent Pavement Marking		
Location	Basis	Quantity
RP 30.021 to RP 31.836		
Pvmt Mk Painted 6IN Yellow Skip Line (10' Line, 30' Skip)	1,320 LF/MI	2,363 LF
Pvmt Mk Painted 6IN Yellow Single Barrier Line	5,280 LF/MI	835 LF
Pvmt Mk Painted 6IN Yellow Double Barrier Line	10,560 LF/MI	264 LF
Pvmt Mk Painted 6IN White Edge Line	10,560 LF/MI	19,167 LF
RP 31.836 to RP 32.636		
Pvmt Mk Painted 6IN Yellow Double Barrier Line	10,560 LF/MI	6,875 LF
RP 32.636 to RP 32.864		
Pvmt Mk Painted 6IN Yellow Double Barrier Line	10,560 LF/MI	2,408 LF
Pvmt Mk Painted 6IN White Edge Line	10,560 LF/MI	2,408 LF
Additional Permanent Pavement Marking Quantities		
Drayton Municipal		
Pvmt Mk Painted 6IN White Crosswalk Lines	See Sec. 120, Sheets 1-5	735 LF
Pvmt Mk Painted-Message (Continental Crosswalk)		264 SF
Pvmt Mk Painted Curb Top & Face		28 LF
JCT ND 66		
Pvmt Mk Painted 24IN White Line - Stop Bar	D-762-5	22 LF
Pvmt Mk Painted Message - "STOP AHEAD"	See Sec. 20, Sheet 9	52 SF

Total 6IN Pavement Marking		
	White	Yellow
Short Term 6IN Line - Type NR	--	14,655 LF
Short Term 6IN Line - Type R	9,800 LF	7,500 LF
Pvmt Mk Painted 6IN Line	22,310 LF	12,745 LF

Barrier Striping Locations			
	From RP to RP	Single Barrier (Mi)	Double Barrier (Mi)
30.021	30.179	0.158	--
31.811	31.878	--	0.067
31.892	31.960	--	0.068
31.975	32.045	--	0.070
32.058	32.126	--	0.068
32.142	32.209	--	0.067
32.226	32.295	--	0.069
32.311	32.382	--	0.071
32.396	32.453	--	0.057
32.466	32.522	--	0.056
32.537	32.590	--	0.053
32.606	32.864	--	0.258
		0.158	0.904

Sinusoidal Rumble Strips - Asphalt Shoulder and Centerline		
Location	Basis	Quantity
RP 30.021 to RP 31.595		
Sinusoidal Rumble Strips - Centerline	1 Mi/Mi	1.574
Sinusoidal Rumble Strips - Asphalt Shoulder	2 Mi/Mi	3.148



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ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)						Dowel	Deformed	Tie
31.837	2 + 55	1001	N DL			0.0		8.1	6.5	5.9		4	4	2			**Begin Concrete, 4414' from RP 31**
31.838	2 + 44	1002	N DL			0.0				0.0					6	4	
31.839	2 + 38	1003	N APP			0.0		7.0	6.0	4.7			10	3			14' Offset
31.842	2 + 23	1004	N APP			0.0		19.0	9.0	19.0			17	3			20' Offset
31.844	2 + 13	1005	N APP			0.0		6.0	6.0	4.0		4	4	4			19' Offset
31.843	2 + 16	1006	N PRK			0.0		6.0	6.0	4.0		4	4	4			
31.852	1 + 67	1007	N DL	2	2	4.0				0.0							
31.855	1 + 52	1008	N DL	2	2	4.0				0.0							
31.857	1 + 43	1009	N DL			0.0		6.0	12.0	8.0		9	9	4			
31.861	1 + 22	1010	N DL	2	2	4.0				0.0							
31.864	1 + 07	1011	N DL	2	2	4.0				0.0							
31.864	1 + 07	1012	N DL	2	2	4.0				0.0							
31.870	0 + 77	1013	N DL	2	2	4.0				0.0							
31.870	0 + 77	1014	N DL	2	2	4.0				0.0							
31.873	0 + 62	1015	N PRK	2	2	4.0				0.0							
31.873	0 + 62	1016	N PRK	2	2	4.0				0.0							
31.877	0 + 39	2017	N DL			0.0		8.0	12.0	10.7		9	9	4			
31.879	0 + 30	2019	N APP			0.0		28.0	9.0	28.0	6	6	6	16			
31.884	0 + 02	1020	N APP			0.0		6.0	6.5	4.3		4	4	4			20' Offset
31.884	0 + 06	1021	N APP			0.0		9.5	18.0	19.0		9	9	4			38' Offset
31.887	905 + 42	1022	N APP			0.0		6.0	6.0	4.0		4	4	4			21' Offset
31.941	902 + 58	1023	N DL	2	2	4.0				0.0							
31.944	902 + 43	1024	N DL	2	2	4.0				0.0							
31.949	902 + 13	1025	N DL	2	2	4.0				0.0							
31.961	901 + 53	1027	N DL	2	2	4.0				0.0							
31.965	901 + 33	1029	N APP			0.0		6.0	6.0	4.0		4		6			26' Offset
31.978	900 + 63	1030	N DL	2	2	4.0				0.0							
31.982	900 + 42	1031	N DL				3.0			0.0							
31.989	900 + 05	n/a	N DL	2	2	4.0				0.0							
31.994	899 + 75	n/a	N DL	2	2	4.0				0.0							
32.005	899 + 19	n/a	N DL			0.0		10.0	12.0	13.3	9		18	14			Around manhole
32.007	899 + 06	n/a	N DL			0.0	3.0	6.0	6.0	4.0							C&G on driveway S radius
32.018	898 + 48	n/a	N DL	2	2	4.0				0.0							
32.028	897 + 96	1032	N DL			0.0		11.0	12.0	14.7	9		18	6			
32.035	897 + 59	1033	N DL	2	2	4.0				0.0							
32.037	897 + 47	1034	N DL	2	2	4.0				0.0							
32.043	897 + 17	1035	N DL	2	2	4.0				0.0							
						80.0	6.0			147.5	24	57	116	78	6	4	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
								DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)	SF	L (ft)	W (ft)	SY			BASKET (LF)	Dowel	Deformed	Tie	Dimensions (LF)	Dowel
32.046	897 + 02	1036	N DL	2	2	4.0			0.0								
32.050	896 + 83	1037	N DL			0.0		10	12	13.3		9	9	6			
32.050	896 + 79	1038	N APP			0.0		19	29	61.2	15		15	18		35' Offset	
32.054	896 + 58	1039	N APP			0.0		22	6	14.7	6	6	6	15		30' Offset	
32.057	896 + 46	1040	N APP			0.0		6	6	4.0		4	4	4			
32.058	896 + 39	1041	N DL			0.0		21	12	28.0	9	9	9	12			
32.062	896 + 19	1042	N APP			0.0		15	11	18.3		8	8	8			
32.068	895 + 86	1043	N DL	2	2	4.0			0.0								
32.074	895 + 55	1044	N DL	2	2	4.0			0.0								
32.077	895 + 40	1045	N DL	2	2	4.0			0.0								
32.080	895 + 25	1046	N DL	2	2	4.0			0.0								
32.088	894 + 80	1047	N DL	2	2	4.0			0.0								
32.091	894 + 64	1048	N DL	2	2	4.0			0.0								
32.100	894 + 19	1049	N DL	2	2	4.0			0.0								
32.100	894 + 19	1050	N PRK	2	3	6.0			0.0								
32.117	893 + 29	1051	N PRK	2	2	4.0			0.0								
32.117	893 + 29	1052	N PRK	2	3	6.0			0.0								
32.122	892 + 99	1053	N DL	2	2	4.0			0.0								
32.125	892 + 83	1054	N PRK	2	3	6.0			0.0								
32.128	892 + 69	1055	N APP			0.0	4.0	6	6	4.0		4	4	5			
32.130	892 + 61	1056	N APP			0.0		6	6	4.0		4	4	4		34' Offset	
32.135	892 + 34	1057	N DL			0.0		11	12	14.7	9		12	12		Around manhole	
32.136	892 + 25	1059	N DL	2	30	60.0			0.0								
32.138	892 + 17	1060	N APP			0.0		17	7	13.2	5	5	5	6		28' Offset	
32.142	891 + 95	1061	N PRK	2	2	4.0			0.0								
32.145	891 + 81	1062	N PRK	2	2	4.0			0.0								
32.148	891 + 66	1063	N DL	2	2	4.0			0.0								
32.151	891 + 50	1064	N DL	2	2	4.0			0.0								
32.153	891 + 35	1065	N PRK	2	2	4.0			0.0								
32.162	890 + 90	1066	N PRK	2	2	4.0			0.0								
32.162	890 + 90	1067	N PRK	2	2	4.0			0.0								
32.165	890 + 75	1068	N DL	2	2	4.0			0.0								
32.165	890 + 75	1069	N PRK	2	2	4.0			0.0								
32.170	890 + 46	1070	N PRK	2	2	4.0			0.0								
32.173	890 + 30	1071	N DL	2	2	4.0			0.0								
32.173	890 + 30	1072	N PRK	2	2	4.0			0.0								
32.176	890 + 15	1073	N PRK	2	2	4.0			0.0								
						170.0	4.0			175.4	44	49	76	90	0	0	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	11	3

ND 44 - Drayton Concrete Repair Locations																
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)	
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)					Dowel		Deformed
32.181	889 + 90	n/a	N PRK			0.0				0.0						12' saw and seal
32.185	889 + 69	1074	N PRK	2	2	4.0				0.0						
32.188	889 + 54	1075	N DL	2	2	4.0				0.0						
32.189	889 + 46	1077	N PRK			0.0				0.0				13	6	
32.192	889 + 33	1078	N PRK			0.0		32	10	35.6	27		15	20		
32.195	889 + 17	1079	N PRK			0.0		6	6.5	4.3	4		4	4		
32.204	888 + 72	1080	N PRK			0.0		6	6	4.0		4	4	4		
32.210	888 + 38	1081	N PRK			0.0		6	10	6.7	8		16	4		
32.214	888 + 16	1082	N DL			0.0		7	6	4.7		8	8	4		
32.216	888 + 05	1083	N PRK			0.0				0.0						Grind and seal
32.217	888 + 02	1084	N DL			0.0		6	6	4.0		4	4	4		Around manhole
32.222	887 + 73	1086	N DL					6	9	6.0	6		12	4		Around manhole
32.223	887 + 72	1085	N PRK			0.0		22	6	14.7	4		8	8		
32.227	887 + 48	1087	N DL	4	2	8.0				0.0						
32.227	887 + 48	1088	N PRK	2	2	4.0				0.0						
32.228	887 + 38	1089	N PRK			0.0		6	6	4.0		4	4	4		
32.229	887 + 34	1090	N DL	2	2	4.0				0.0						
32.233	887 + 18	1091	N PRK			0.0		6	6	4.0		4	4	4		
32.235	887 + 04	1092	N DL			0.0		6	6	4.0	4		8	4		
32.238	866 + 90	1093	N DL	2	2	4.0				0.0						
32.238	866 + 90	1094	N PRK	2	2	4.0				0.0						
32.241	886 + 75	1095	N PRK	2	2	4.0				0.0						
32.247	886 + 43	1096	N PRK	2	2	4.0				0.0						
32.248	886 + 33	1097	N PRK	2	3	6.0				0.0						
32.250	886 + 27	1098	N PRK	3	4	12.0				0.0						
32.255	886 + 01	1099	N PRK			0.0		6	6	4.0	4		8	4		
32.263	885 + 59	1100	N PRK			0.0				0.0						Grind and seal
32.266	885 + 39	1101	N PRK	2	2	4.0				0.0						
32.274	885 + 00	1102	N PRK			0.0				0.0						Saw and seal
32.275	884 + 94	1103	N PRK	2	2	4.0				0.0						
32.281	884 + 63	1104	N PRK	2	3	6.0				0.0						
32.287	884 + 29	1105	N PRK	2	2	4.0				0.0						
32.290	884 + 14	1106	N PRK	2	2	4.0				0.0						
32.293	883 + 99	1107	N PRK	2	2	4.0				0.0						
32.296	883 + 81	1108	N PRK			0.0		6	12	8.0		10	10	6		
32.298	883 + 70	1109	N PRK	2	2	4.0				0.0						
32.302	883 + 42	1110	N DL			0.0		6	12	8.0		8	8	6		
						88.0	0.0			111.9	57	42	113	80	13	6

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	11	4

ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
								DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)	SF	L (ft)	W (ft)	SY			BASKET (LF)	Dowel	Deformed	Tie	Dimensions (LF)	Dowel
32.303	883 + 49	1112	N APP			0.0		8	12	10.7	8		18	10			Around 2 manholes
32.305	883 + 35	1114	N PRK	2	2	4.0			0.0								
32.307	883 + 24	1115	N PRK	2	2	4.0			0.0								
32.309	883 + 11	1116	N DL	2	2	4.0			0.0								
32.310	883 + 09	1117	N PRK	2	2	4.0			0.0								
32.313	882 + 95	1118	N PRK	2	2	4.0			0.0								
32.318	882 + 65	1119	N PRK	2	2	4.0			0.0								
32.321	882 + 50	1120	N PRK	2	2	4.0			0.0								
32.324	882 + 34	1121	N PRK	2	2	4.0			0.0								
32.324	882 + 34	1122	N DL	2	2	4.0			0.0								
32.327	882 + 19	1123	N DL	2	2	4.0			0.0								
32.327	882 + 19	1124	N PRK	2	2	4.0			0.0								
32.332	881 + 81	1125	N DL	2	2	4.0			0.0								
32.332	881 + 91	1126	N PRK	4	2	8.0			0.0								
32.343	881 + 34	1127	N PRK			0.0		6	20	13.3	18		36	6			
32.369	879 + 97	1128	N PRK	2	2	4.0			0.0								
32.375	879 + 67	1129	N DL	2	2	4.0			0.0								
32.375	879 + 67	1130	N DL	2	2	4.0			0.0								
32.378	879 + 81	1131	N DL	2	2	4.0			0.0								
32.385	879 + 36	1132	N DL	2	2	4.0			0.0								
32.388	879 + 22	1133	N DL	2	2	4.0			0.0								
32.387	879 + 00	1135	N DL			0.0		15	10	16.7	8	16		8			Around manhole
32.391	878 + 83	1136	N APP	2	2	4.0			0.0								
32.393	878 + 71	n/a	N PRK			0.0		6	9	6.0		14		4			
32.393	878 + 71	1137	N DL			0.0		15	12	20.0		9	9	4			
32.394	878 + 66	n/a	N DL			0.0				0.0				15	8		
32.407	877 + 95	1138	N DL	2	2	4.0			0.0								
32.410	877 + 80	1139	N DL	2	2	4.0			0.0								
32.413	877 + 65	1140	N DL	2	2	4.0			0.0								
32.421	877 + 22	1141	N DL			0.0		6	6	4.0		4	4	4			
32.424	877 + 05	1142	N DL	2	2	4.0			0.0								
32.425	877 + 01	1143	N PRK	2	2	4.0			0.0								Near Inlet
32.438	876 + 30	1144	N DL	2	2	4.0			0.0								
32.455	875 + 39	1145	N APP			0.0		9.5	6	6.3		4	12				
32.456	875 + 35	1146	N APP	2	2	4.0			0.0								
32.457	875 + 31	n/a	N APP			0.0			0.0					15	8		
32.465	874 + 90	1147	N APP	2	2	4.0			0.0								
						116.0	0.0			77.0	34	43	71	48	30	16	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)						Dowel	Deformed	Tie
32.467	874 + 78	1148	N DL	2	2	4.0				0.0							
32.472	874 + 50	1149	N PRK			0.0		6	10	6.7		9	9	6			
32.473	874 + 48	1150	N DL	2	2	4.0				0.0							
32.477	874 + 24	1151	N DL	2	2	4.0				0.0							
32.483	873 + 94	1152	N DL	2	2	4.0				0.0							
32.486	873 + 79	1153	N DL	2	2	4.0				0.0							
32.489	873 + 64	1154	N DL	2	2	4.0				0.0							
32.492	873 + 49	1155	N DL	2	2	4.0	5.0			0.0						C&G at driveway N radius	
32.494	873 + 34	1156	N DL	2	2	4.0				0.0							
32.497	873 + 19	1157	N DL	2	2	4.0				0.0							
32.500	873 + 04	1158	N DL	2	2	4.0				0.0							
32.503	872 + 89	1159	N DL	2	2	4.0				0.0							
32.514	872 + 29	1160	N DL	2	2	4.0				0.0							
32.523	871 + 83	1161	N DL	2	2	4.0				0.0							
32.525	871 + 73	1162	N APP			0.0		16	10	17.8		16		12			
32.528	871 + 59	1163	N APP			0.0		30	19	63.3	18	36		15		Entire east approach	
32.529	871 + 51	1164	N DL	2	2	4.0				0.0							
32.531	871 + 42	1165	N DL	2	2	4.0				0.0							
32.532	871 + 36	1166	N APP			0.0		8	13	11.6		7	7	10		25' Offset	
32.532	871 + 33	1167	N DL			0.0		15	12	20.0	9		9	8		20' Offset	
32.535	871 + 22	1168	N DL			0.0				0.0					5	3	
32.535	871 + 22	1169	N APP			0.0		6	6	4.0		4	4	4			
32.543	870 + 77	1170	N DL	2	2	4.0				0.0							
32.546	870 + 62	1171	N DL	2	2	4.0				0.0							
32.549	870 + 49	1172	N DL	2	2	4.0				0.0							
32.553	870 + 27	1173	N DL			0.0		15	12	20.0	9		9	8			
32.553	870 + 23	1174	N PRK			0.0	30.0	15	9	15.0	6		12	6		C&G driveway and north	
32.559	869 + 90	1175	N PRK	2	2	4.0				0.0							
32.563	869 + 75	1176	N PRK	2	2	4.0				0.0							
32.568	869 + 45	1177	N PRK	2	2	4.0				0.0							
32.571	869 + 30	1178	N PRK	2	2	4.0				0.0							
32.580	868 + 85	1179	N PRK	2	2	4.0				0.0							
32.582	868 + 69	1180	N PRK	2	2	4.0				0.0							
32.585	868 + 55	1181	N PRK	2	2	4.0				0.0							
32.588	868 + 39	1182	N DL	4	4	16.0				0.0							
32.591	868 + 27	1183	N DL	4	4	16.0				0.0							
32.592	868 + 22	1184	N DL	2	2	4.0				0.0							
						136.0	35.0			158.3	42	72	50	69	5	3	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	11	6

ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)					Dowel	Deformed	Tie	
32.594	868 + 10	1185	N DL	3	4	12.0				0.0							
32.595	868 + 04	1186	N APP			0.0		15	10	16.7	7	15	7	8		19' Offset	
32.600	867 + 79	1187	N APP	3	3					0.0							
32.600	867 + 79	1188	N APP	2	2	4.0				0.0						25' Offset	
32.602	867 + 65	1190	N DL	2	2	4.0				0.0							
32.602	867 + 68	1189	N APP			0.0		6	6	4.0		4	4	4		25' Offset	
32.603	867 + 58	1191	N APP			0.0				0.0				12	7	20' Offset	
32.605	867 + 49	1192	N DL	2	2	4.0				0.0							
32.605	867 + 49	1193	N DL	2	2	4.0				0.0							
32.608	867 + 34	1194	N DL	2	2	4.0				0.0							
32.611	867 + 19	1195	N DL	2	2	4.0				0.0							
32.614	867 + 04	1196	N DL	2	2	4.0				0.0							
32.614	867 + 04	1197	N DL	4	2	8.0				0.0							
32.616	866 + 89	1198	N DL	2	2	4.0				0.0							
32.616	866 + 89	1199	N DL	2	2	4.0				0.0							
32.617	866 + 84	n/a	N PRK			0.0		6	9	6.0			12	6			
32.619	866 + 74	1200	N DL	4	2	8.0				0.0							
32.620	866 + 79	n/a	N PRK			0.0		6	9	6.0			12	6			
32.619	866 + 74	1201	N DL	2	2	4.0				0.0							
32.625	866 + 59	1202	N DL	2	2	4.0				0.0							
32.625	866 + 64	n/a		3	3	9.0				0.0							
32.626	866 + 59	1203	N PRK			0.0		6	9	6.0			12	6			
32.625	866 + 44	1204	N DL	2	2	4.0				0.0							
32.627	866 + 37	1205	N PRK			0.0		6	9	6.0			12	6			
32.628	866 + 29	1206	N DL	4	3	12.0				0.0							
32.629	866 + 24	n/a	N PRK			0.0	8.0	6	9	6.0			12	6			
32.631	866 + 14	1207	N DL	3	2	6.0				0.0							
32.634	865 + 99	1208	N DL	2	2	4.0				0.0							
32.637	865 + 84	1209	N DL	2	2	4.0				0.0							
32.642	865 + 54	1210	N DL	2	2	4.0				0.0							
32.645	865 + 39	1211	N DL	8	2	16.0				0.0							
32.648	865 + 21	1212	N DL	6	4	24.0				0.0							
32.652	865 + 04	1213	N DL	2	2	4.0				0.0							
32.654	864 + 90	1214	N DL	2	2	4.0				0.0							
32.657	864 + 75	1215	N DL	4	3	12.0				0.0							
32.657	864 + 77	1216	S DL			0.0		6	6	4.0		4	4	4		**Starting from north end concrete**	
32.653	864 + 98	1217	S DL	30	2	60.0				0.0							
						235.0	8.0			54.7	7	23	75	46	12	7	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)					Dowel	Deformed	Tie	(LF)
32.625	866 + 44	1218	S DL	2	2	4.0				0.0							
32.625	866 + 44	1219	S DL	2	2	4.0				0.0							
32.625	866 + 59	1220	S DL	2	2	4.0				0.0							
32.619	866 + 74	1221	S DL	2	2	4.0				0.0							
32.614	867 + 05	1222	S DL	2	2	4.0	3.0			0.0							
32.611	867 + 20	1223	S DL	2	2	4.0				0.0							
32.608	867 + 34	1224	S DL	2	2	4.0				0.0							
32.605	867 + 49	1225	S DL	2	2	4.0				0.0							
32.598	867 + 64	1226	S DL	3	2	6.0				0.0							
32.599	867 + 83	1227	S APP			0.0		10	10	11.1	7	7	7	6		15' Offset	
32.597	867 + 95	1228	S DL	2	2	4.0				0.0							
32.594	868 + 10	1229	S DL	2	2	4.0				0.0							
32.594	868 + 10	1230	S APP	2	2	4.0				0.0						20' Offset	
32.594	868 + 10	1231	S DL	2	2	4.0				0.0							
32.591	868 + 27	1232	S DL	2	2	4.0				0.0							
32.588	868 + 40	1233	S DL	2	3	6.0				0.0							
32.574	869 + 15	1234	S DL	2	2	4.0				0.0							
32.571	869 + 30	1235	S DL			0.0		6	12	8.0	9		18	4			
32.568	869 + 45	1236	S DL	2	2	4.0				0.0							
32.565	869 + 61	1237	S DL			0.0	10.0	6	6	4.0	4		8	4			
32.560	869 + 91	1238	S DL	2	4	8.0				0.0							
32.557	870 + 05	1239	S PRK	2	2	4.0				0.0							
32.556	870 + 10	1240	S DL			0.0		17	12	22.7		18		8			
32.549	870 + 47	1241	S PRK			0.0	4.0	6	10	6.7		8	8	4			
32.546	870 + 63	1242	S DL	2	2	4.0				0.0							
32.546	870 + 64	1243	S PRK	2	2	4.0				0.0							
32.540	870 + 93	1244	S DL	2	2	4.0				0.0							
32.538	871 + 06	1245	S DL	2	2	4.0				0.0							
32.532	871 + 36	1246	S DL			0.0		40	12	53.3	18	9	9	20			
32.527	871 + 64	1247	S APP	2	2	4.0				0.0						20' Offset	
32.525	871 + 74	1248	S APP			0.0	3.0	6	6	4.0			8	4		14' Offset	
32.524	871 + 80	1249	S DL	6	2	12.0				0.0							
32.514	872 + 29	1250	S DL	2	2	4.0				0.0							
32.512	872 + 44	1251	S DL	2	2	4.0				0.0							
32.506	872 + 75	1252	S PRK	2	2	4.0				0.0							
32.500	873 + 04	1253	S PRK	2	2	4.0				0.0							
32.497	873 + 19	1254	S DL	2	2	4.0				0.0							
						136.0	20.0				109.8	38	42	58	50	0	0

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes
								DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)	
RP	Station	GPS	Lane	L (ft)	W (ft)	SF	L (ft)	W (ft)	Dowel			Deformed	Tie	Dowel		
32.491	873 + 50	n/a	S DL	2	3	6.0				0.0						
32.489	873 + 65	n/a	S DL	2	2	4.0				0.0						
32.486	873 + 80	1255	S DL	5	2	10.0				0.0						
32.483	873 + 95	1256	S DL	2	3	6.0				0.0						
32.480	874 + 10	1257	S DL	2	3	6.0				0.0						
32.474	874 + 40	1258	S DL	3	4	12.0				0.0						
32.463	875 + 01	1260	S DL			0.0				0.0			15	8		
32.457	875 + 34	1264	S DL	2	2	4.0				0.0						
32.457	875 + 34	1263	S DL	6	6	36.0				0.0						
32.457	875 + 37	1262	S APP			0.0				0.0					7' saw and seal	
32.457	875 + 33	1261	S APP			0.0	6	6	4.0		4	4	4		30' Offset	
32.456	875 + 60	1265	S PRK			0.0	25	10	27.8	8	7	7	14			
32.450	875 + 69	1266	S DL	2	2	4.0				0.0						
32.444	876 + 01	1267	S DL	2	2	4.0				0.0						
32.441	876 + 16	1268	S DL	2	2	4.0				0.0						
32.435	876 + 50	1269	S PRK			0.0	10	10	11.1		7	7	6			
32.430	876 + 75	1270	S DL	2	2	4.0				0.0						
32.427	876 + 90	1271	S PRK	2	2	4.0				0.0						
32.425	876 + 99	1272	S PRK	4	2	8.0				0.0						
32.425	877 + 00	n/a	S DL	2	2	4.0				0.0					Centerline, along manhole	
32.424	877 + 05	1273	S DL	2	2	4.0				0.0						
32.419	877 + 35	1274	S DL	2	2	4.0				0.0						
32.413	877 + 65	1275	S DL	2	2	4.0				0.0						
32.408	877 + 93	1276	S PRK			0.0	15.0	10	10	11.1	7		14	6		
32.407	877 + 95	1277	S DL	2	5	10.0				0.0						
32.405	878 + 10	1278	S DL	2	2	4.0				0.0						
32.399	878 + 38	1279	S DL	2	2	4.0				0.0						
32.397	878 + 51	1280	S DL	3	4	12.0				0.0						
32.391	878 + 80	1281	S APP			0.0		6	6	4.0		4	4	4		
32.388	878 + 95	1282	S APP			0.0		6	15	10.0		12	12	4		
32.386	879 + 07	1283	S DL	2	2	4.0				0.0						
32.369	879 + 97	1284	S PRK	2	2	4.0				0.0						
32.369	879 + 97	1285	S DL			0.0		6	6	4.0	4		8			
32.358	880 + 57	1286	S PRK	2	2	4.0				0.0						
32.355	880 + 72	1287	S PRK	2	2	4.0				0.0						
32.344	881 + 32	1288	S PRK	2	3	6.0				0.0						
32.340	881 + 48	1289	S DL			0.0		6	6	4.0	4		8	4		
						180.0	15.0			76.0	23	34	64	42	15	8

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)		L (ft)	W (ft)	Dowel			Deformed	Tie	Dowel			
32.329	882 + 05	1290	S DL			0.0		6	6	4.0	4		8	4			
32.327	882 + 19	1291	S DL	2	2	4.0				0.0							
32.327	882 + 20	1292	S DL	2	2	4.0				0.0							
32.324	882 + 34	1293	S DL	2	2	4.0				0.0							
32.313	882 + 95	1294		2	2	4.0				0.0							
32.311	883 + 00	1295	S PRK			0.0		8	6	5.3		4	4	6			
32.309	883 + 12	1296	S DL	3	2	6.0				0.0							
32.308	883 + 20	1297	S PRK			0.0				0.0						18' Saw and seal	
32.305	883 + 35	1298	S DL	2	2	4.0				0.0							
32.301	883 + 55	1299	S DL			0.0		30	12	40.0	18		18	10			
32.299	883 + 67	1300	S APP			0.0		6	6	4.0	4		8	6			
32.297	883 + 74	1301	S APP			0.0		15	6	10.0		4	4	8			
32.293	883 + 98	1302	S DL			0.0		6	6	4.0	4		8	4			
32.290	884 + 13	1303	S DL	2	2	4.0				0.0							
32.289	884 + 21	1304	S PRK			0.0		10	7.5	8.3			14	6			
32.281	884 + 63	1305	S DL	2	2	4.0				0.0							
32.275	884 + 93	1306	S DL	2	2	4.0				0.0							
32.272	885 + 08	1307	S DL			0.0		6	6	4.0		4	4	4			
32.266	885 + 38	1308	S DL	2	2	4.0				0.0							
32.261	885 + 68	1309	S DL	2	2	4.0				0.0							
32.258	885 + 83	1310	S PRK	2	5	10.0				0.0							
32.258	885 + 83	1311	S DL	2	2	4.0				0.0							
32.255	885 + 99	1312	S DL	2	2	4.0				0.0							
32.252	886 + 14	1313	S PRK	2	2	4.0				0.0							
32.244	886 + 59	1314	S PRK	2	2	4.0				0.0							
32.244	886 + 59	1315	S PRK	2	2	4.0				0.0							
32.241	886 + 74	1316	S DL	2	2	4.0				0.0							
32.238	886 + 89	1317	S PRK	2	2	4.0				0.0							
32.235	887 + 04	1318	S PRK	2	2	4.0				0.0							
32.232	887 + 19	1319	S DL	3	3	9.0				0.0							
32.230	887 + 33	1320	S DL	2	2	4.0				0.0							
32.227	887 + 48	1321	S PRK	2	2	4.0				0.0							
32.227	887 + 48	1322	S DL	2	2	4.0				0.0							
32.227	887 + 48	1323	S DL	2	3	6.0				0.0							
32.225	887 + 58	1324	S PRK	2	2	4.0				0.0							
32.222	887 + 73	1325	S APP			0.0		8	6	5.3		4	4	6			
32.222	887 + 74	1326	S DL	2	2	4.0				0.0							
				123.0			0.0			85.0	30	16	72	54	0	0	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



ND 44 - Drayton Concrete Repair Locations																	
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes	
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars
RP	Station	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)					Dowel	Deformed	Tie	
32.217	887 + 98	1327	S APP	2	2	4.0				0.0							
32.217	887 + 98	1328	S APP	2	2	4.0				0.0							
32.215	888 + 10	1329	S APP	2	2	4.0				0.0							
32.215	888 + 10	1331	S APP			0.0		30	6	20.0	4	8		16			
32.213	888 + 21	1332	S APP	3	3	9.0				0.0							
32.210	888 + 34	1333	S APP	2	2	4.0				0.0							
32.210	888 + 35	1334	S PRK			0.0		6	6	4.0	4		8	4		Inlet 1335	
32.207	888 + 49	1336	S PRK	2	2	4.0				0.0							
32.207	888 + 52	1337	S DL			0.0		6	7	4.7		5	5	4			
32.205	888 + 64	1338	S PRK	2	12	24.0				0.0							
32.199	888 + 94	1339	S DL	2	2	4.0				0.0							
32.199	888 + 94	1340	S DL			0.0		6	6	4.0		4	4	4			
32.199	888 + 94	1341	S PRK	2	3	6.0				0.0							
32.196	889 + 09	1342	S PRK	4	3	12.0				0.0							
32.193	889 + 24	1343	S PRK	2	3	6.0				0.0							
32.190	889 + 39	1344	S PRK	2	2	4.0				0.0							
32.188	889 + 51	1345	S PRK			0.0				0.0						Saw and seal 6'	
32.188	889 + 56	1346	S PRK	2	2	4.0				0.0							
32.187	889 + 58	1347	S DL	2	2	4.0				0.0							
32.185	889 + 69	1348	S PRK	2	2	4.0				0.0							
32.182	889 + 95	1349	S PRK	2	2	4.0				0.0							
32.179	890 + 01	1350	S PRK			0.0	6.0	6	6	4.0		4	4	4			
32.176	890 + 15	1351	S PRK	2	2	4.0				0.0							
32.174	890 + 26	1352	S PRK			0.0		10	16	17.8		12	12	6			
32.170	890 + 45	1353	S PRK	3	3	9.0				0.0							
32.170	890 + 45	1354	S DL	2	2	4.0				0.0							
32.168	890 + 60	1355	S PRK	4	2	8.0				0.0							
32.168	890 + 60	1356	S PRK	2	2	4.0				0.0							
32.165	890 + 76	1357	S PRK			0.0		6	16	10.7		12	12	6			
32.164	890 + 79	1358	S PRK			0.0	15.0			0.0							
32.156	891 + 20	1359	S PRK	2	2	4.0				0.0							
32.153	891 + 35	1360	S PRK	2	3	6.0				0.0							
32.153	891 + 36	1361	S PRK			0.0	15.0			0.0							
32.153	891 + 35	1362	S PRK	2	2	4.0				0.0							
32.150	891 + 50	1363	S PRK	2	2	4.0				0.0							
32.148	891 + 66	1364	S PRK	2	2	4.0				0.0							
32.145	891 + 77	1365	S PRK			0.0		8	6	5.3		4	4	6			
						152.0	36.0			70.4	8	49	49	50	0	0	

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	11	11

ND 44 - Drayton Concrete Repair Locations																
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)	
RP	Feet from RP	GPS	Lane	L (ft)	W (ft)		L (ft)	W (ft)	Dowel			Deformed	Tie	Dowel		
32.145	891 + 81	1366	S DL			0.0		6	6	4.0	4		8	4		
32.141	892 + 00	1367	S PRK			0.0		25	22	61.1	13	20	5	16		2 water valves, hydrant, inlet 1368- 1370
32.137	892 + 21	1371	S APP			0.0		46	6	30.7	16	25		20		28' Offset
32.135	892 + 33	1372	S DL	3	2	6.0				0.0						
32.135	892 + 33	1373	S DL	2	2	4.0				0.0						
32.134	892 + 40	1374	S APP	2	2	4.0				0.0						
32.133	892 + 45	1375	S DL	2	2	4.0				0.0						
32.130	892 + 56	1376	S APP	2	2	4.0				0.0						
32.130	892 + 56	1377	S APP	2	3	6.0				0.0						
32.130	892 + 56	1378	S DL	3	3	9.0				0.0						
32.128	892 + 71	1379	S PRK			0.0				0.0						
32.127	892 + 77	1380	S PRK			0.0		6	11	7.3			18	6		
32.123	892 + 94	1381	S PRK			0.0		11	11	13.4		9	9	8		
32.122	893 + 00	1382	S PRK	2	2	4.0				0.0						
32.119	893 + 14	1383	S PRK	4	4	16.0				0.0						
32.116	893 + 29	1384	S PRK	2	2	4.0				0.0						
32.111	893 + 59	1385	S PRK	2	3	6.0				0.0						
32.105	893 + 90	1386	S PRK	2	2	4.0				0.0						
32.102	894 + 05	1387	S PRK	3	4	12.0				0.0						
32.100	894 + 19	1388	S DL			0.0		6	6	4.0		4	4	4		
32.099	894 + 24	1389	S PRK	8	5	40.0				0.0						
32.097	894 + 35	1390	S PRK	4	8	32.0				0.0						
32.093	894 + 53	1391	S PRK	12	5	60.0				0.0						
32.088	894 + 80	1392	S PRK	2	2	4.0				0.0						
32.085	894 + 96	1394	S PRK	2	2	4.0				0.0						
32.085	894 + 95	1395	S DL	3	3	9.0				0.0						
32.080	895 + 25	1396	S DL	2	2	4.0				0.0						
32.080	895 + 25	1397	S PRK	2	3	6.0				0.0						
32.077	895 + 40	1398	S PRK	2	3	6.0				0.0						
32.077	895 + 40	1399	S PRK	3	3	9.0				0.0						
32.077	895 + 40	1400	S DL	3	3	9.0				0.0						
32.077	895 + 40	1401	S DL	2	2	4.0				0.0						
32.074	895 + 56	1402	S PRK	2	4	8.0				0.0						
32.068	895 + 85	1430	S DL	2	2	4.0										
32.065	896 + 02	1404	S PRK			0.0		6	18	12.0	15		30	4		
32.060	896 + 31	1405	S DL	2	2	4.0				0.0						
32.055	896 + 55	1406	S DL			0.0		10	12	13.3		9	9	8		
						286.0	0.0			145.9	48	67	83	70	0	0

CPR Data Tables

CPR, Mill & HMA, ADA Curb Ramp Revisions
JCT I-29 N to JCT 66




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	11	12

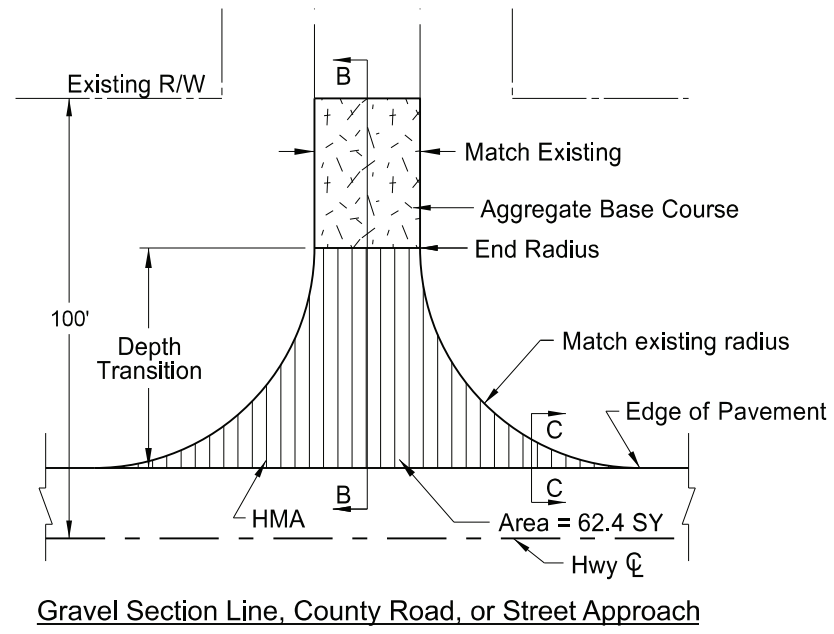
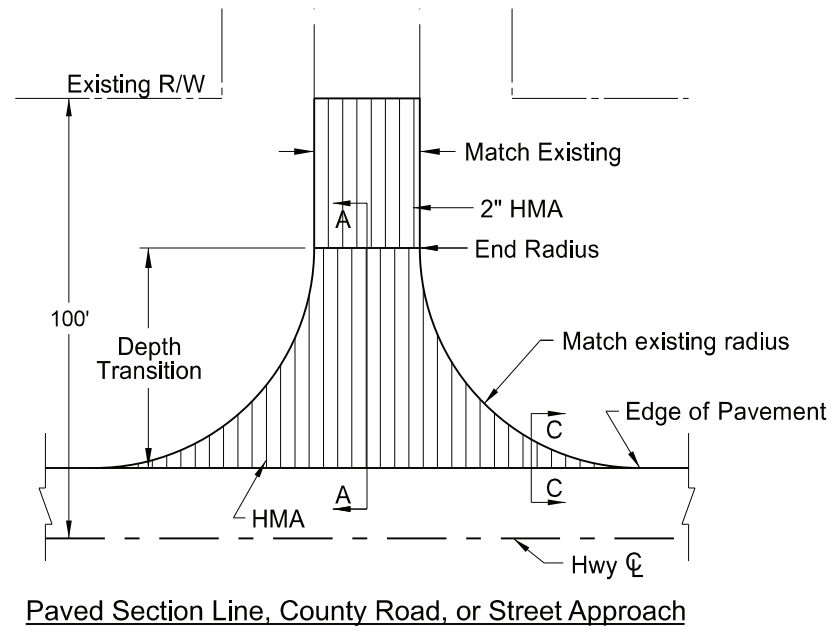
ND 44 - Drayton Concrete Repair Locations																		
LOCATION				SPALL			Curb and Gutter (LF)	Full Depth 8"						Stitching		Notes		
				DIMENSIONS		SF		DIMENSIONS		SY	BASKET (LF)	Bar Type			Dimensions (LF)		# of Bars	
RP	Feet from RP	GPS	Lane	L (ft)	W (ft)			L (ft)	W (ft)						Dowel	Deformed	Tie	
32.053	896 + 63	1407	S DL			0.0				0.0						15	8	
32.050	896 + 81	1408	S APP			0.0		33	11	40.3	18		9	20				W Melbourne Av north corner
32.046	897 + 02	1409	S DL	3	3	9.0				0.0								
32.008	899 + 01	1410	S PRK			0.0	10.0	6	6	4.0								Around inlet
32.008	899 + 04	1411	S PRK			0.0	15.0			0.0								
31.971	900 + 99	1412	S APP			0.0		6	6	4.0		4	4	4				
31.970	901 + 03	1413	S DL			0.0		15	12	20.0		18		8				
31.968	901 + 12	1414	S DL	2	2	4.0				0.0								
31.968	901 + 15	1415	S DL			0.0		10	6	6.7								
31.958	901 + 18	1416	S DL	2	2	4.0				0.0								
31.952	901 + 98	1417	S DL	2	2	4.0				0.0								
31.949	902 + 12	1418	S DL	2	2	4.0				0.0								
31.891	905 + 22	1419	S DL			0.0		16	7	12.4	6		10	6				
31.884	0 + 00	1420	S DL	2	2	4.0				0.0								Stationing restarts at 905 + 56.15
31.882	0 + 12	1421	S DL	2	2	4.0				0.0								
31.877	0 + 35	1422	S DL			0.0		18	12	24.0	9	9	9	12				
31.877	0 + 38	1423	S PRK			0.0		6	12	8.0			18	6				
31.864	1 + 07	1424	S DL	2	2	4.0				0.0								
31.861	1 + 22	1425	S DL	2	2	4.0				0.0								
31.858	1 + 37	1426	S DL			0.0		6	6	4.0	4		8	4				
31.855	1 + 52	1427	S DL			0.0		6	6	4.0	4		8	4				
31.852	1 + 68	1428	S PRK	2	2	4.0				0.0								
31.850	1 + 83	1429	S DL	2	2	4.0				0.0								
31.836	2 + 54	1430	END			0.0				0.0								**END**
						49.0	25.0			127.4	41	31	66	64	15	8		

<p>CPR Data Tables</p> <p>CPR, Mill & HMA, ADA Curb Ramp Revisions</p> <p>JCT I-29 N to JCT 66</p>	
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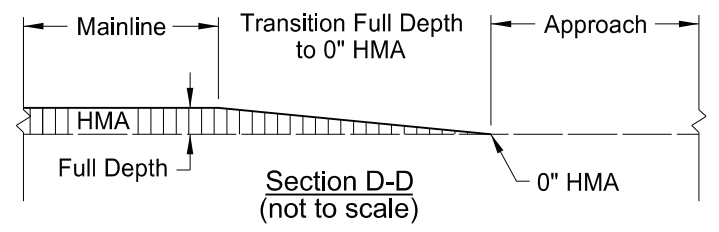
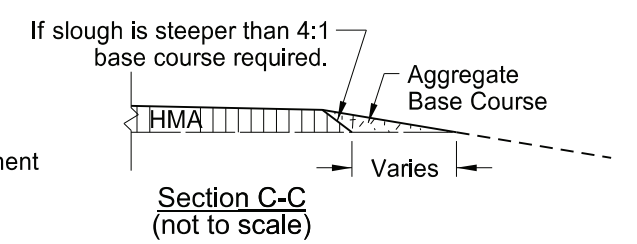
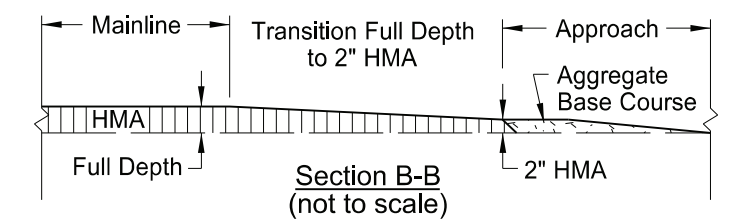
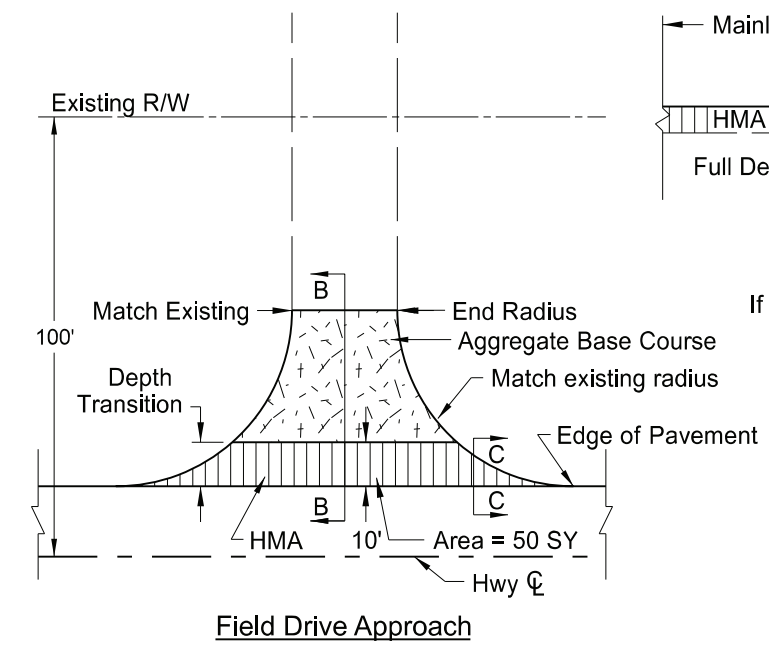
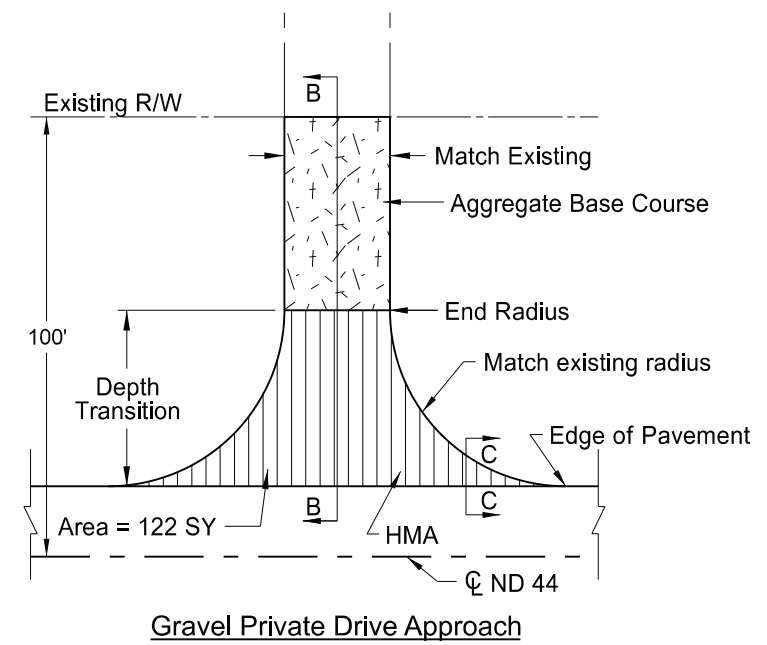
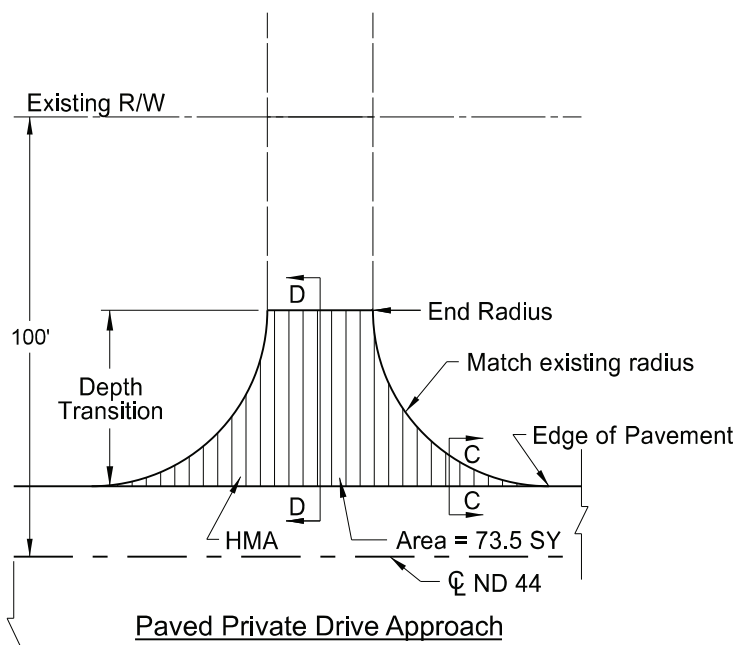
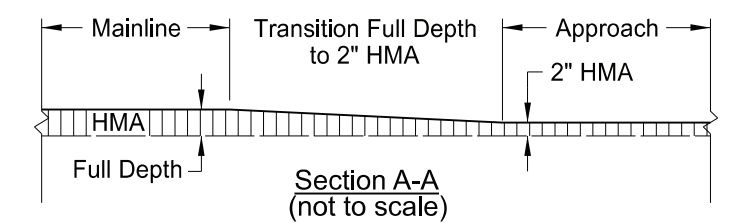
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	11	13

Item Description	Spall	Curb and Gutter	Stitching		Full Depth				
	SF	LF	Dimensions	# of Bars	SY	Basket (LF)	Bar Type		
			(LF)	Dowel			Dowel	Deformed	Tie
Totals	1751	149	96	52	1339	396	525	893	741
Totals + 25%	2189				1674	495	656	1116	926

<p>CPR Data Tables</p> <p>CPR, Mill & HMA, ADA Curb Ramp Revisions</p> <p>JCT I-29 N to JCT 66</p>	
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- Notes:
1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
 2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
 3. 80 tons AGGREGATE BASE COURSE CL 5 has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C).




BASIS OF ESTIMATE							
ITEM	UNIT	Gravel Section Line	Gravel Private Drive	Paved Private Drive	Concrete Private Drive w/ Bumper	Field Drive	TOTALS
Number of Locations	#	2	15	1	4	5	27
Milling Pavement Surface	SY	53.0	53.0	73.5	34.3	25.0	1,237
Aggregate Base Course Cl. 5	TON	4.8	7.5	N/A	N/A	3.8	141
RAP Superpave FAA 43	TON	6.9	13.6	8.2	3.8	5.6	270
PG 58S-34 Asphalt Cement	TON	0.4	0.7	0.6	0.2	0.7	14
Tack Coat	GAL	4.0	4.0	5.5	2.6	1.9	94



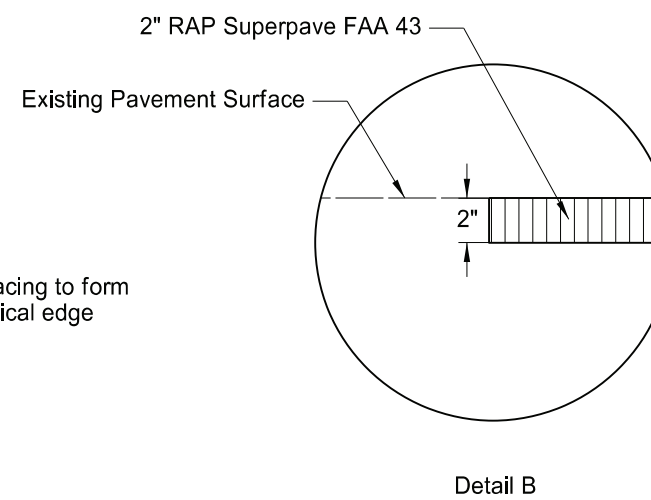
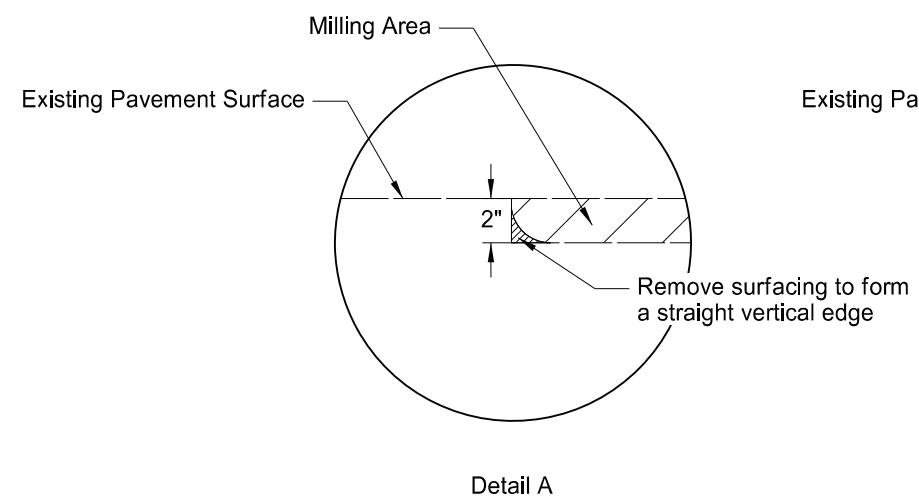
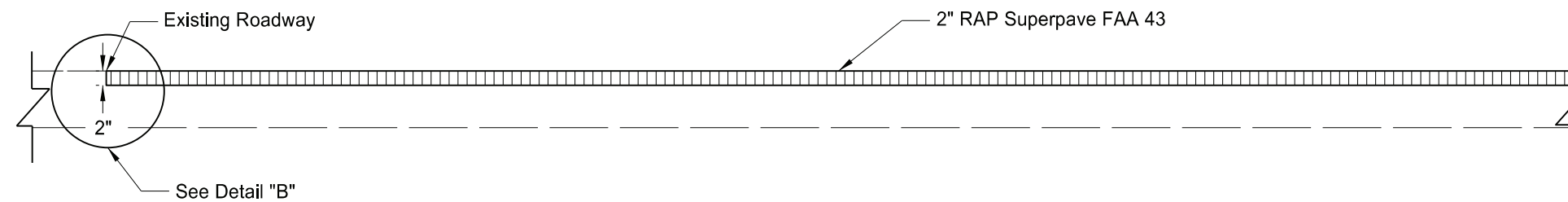
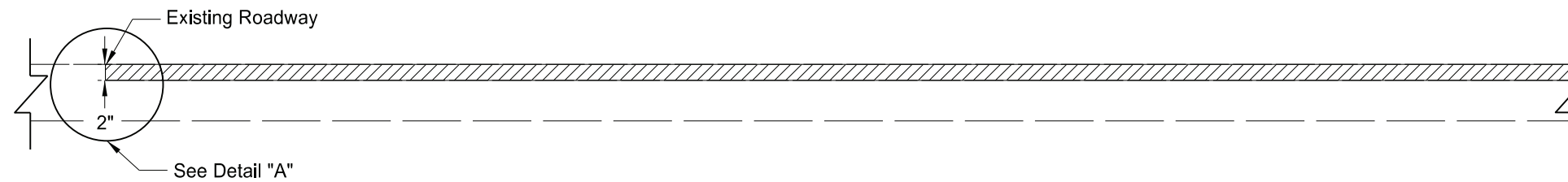
Approach Paving Details for Proposed Approaches
(No Approach Grading)
Milling, HMA, CPR and ADA Curb Ramp Revisions
JCT I-29 N to JCT 66

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	20	2

Approach Locations		
RP 30.159	RT	Field Drive Approach
RP 30.417	LT	Gravel Private Drive
RP 30.417	RT	Gravel Section Line
RP 30.521	RT	Gravel Private Drive
RP 30.670	LT	Gravel Private Drive
RP 30.720	LT	Concrete Private Drive w/ Asphalt Bumper
RP 30.750	LT	Paved Private Drive
RP 30.804	LT	Gravel Private Drive
RP 30.874	LT	Field Drive Approach
RP 30.874	RT	Gravel Section Line
RP 30.913	RT	Field Drive Approach
RP 30.913	LT	Field Drive Approach
RP 31.038	LT	Gravel Private Drive
RP 31.188	LT	Gravel Private Drive
RP 31.244	RT	Gravel Private Drive
RP 31.405	LT	Gravel Private Drive
RP 31.405	RT	Gravel Private Drive
RP 31.464	RT	Field Drive Approach
RP 31.500	LT	Gravel Private Drive
RP 31.555	LT	Gravel Private Drive
RP 31.595	LT	Gravel Private Drive
RP 31.781	LT	Gravel Private Drive
RP 32.723	RT	Concrete Private Drive w/ Asphalt Bumper
RP 32.738	LT	Gravel Private Drive
RP 32.783	RT	Gravel Private Drive
RP 32.823	LT	Concrete Private Drive w/ Asphalt Bumper
RP 32.843	RT	Concrete Private Drive w/ Asphalt Bumper

<p>Approach Locations</p> <p>CPR, Mill & HMA, ADA Curb Ramp Revisions</p> <p>JCT I-29 N to JCT 66</p>	
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	20	3



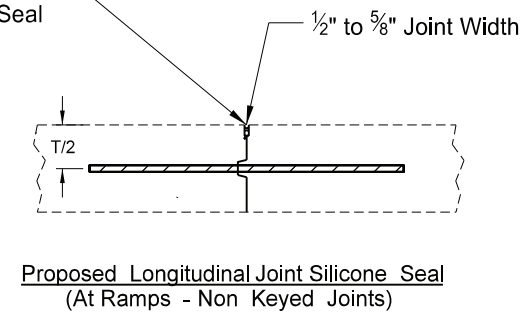
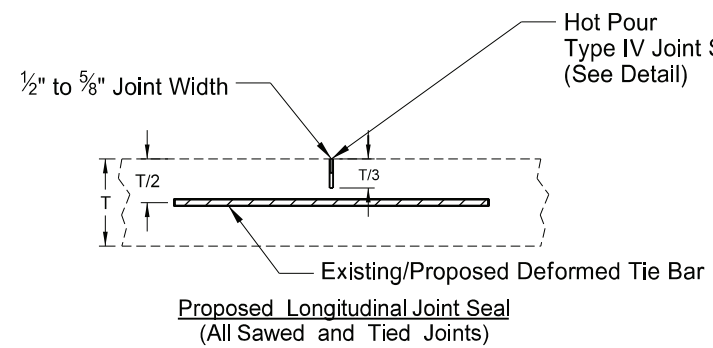
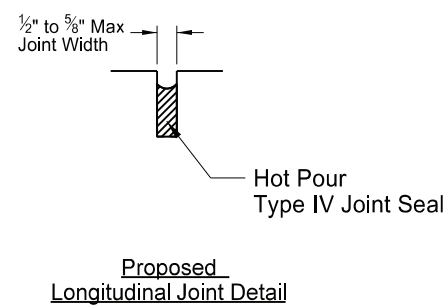
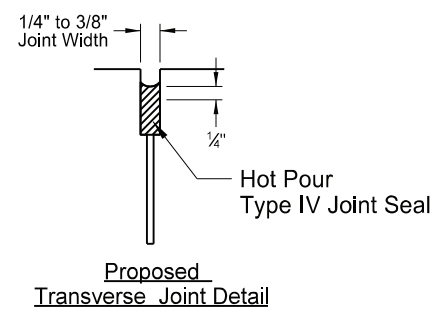
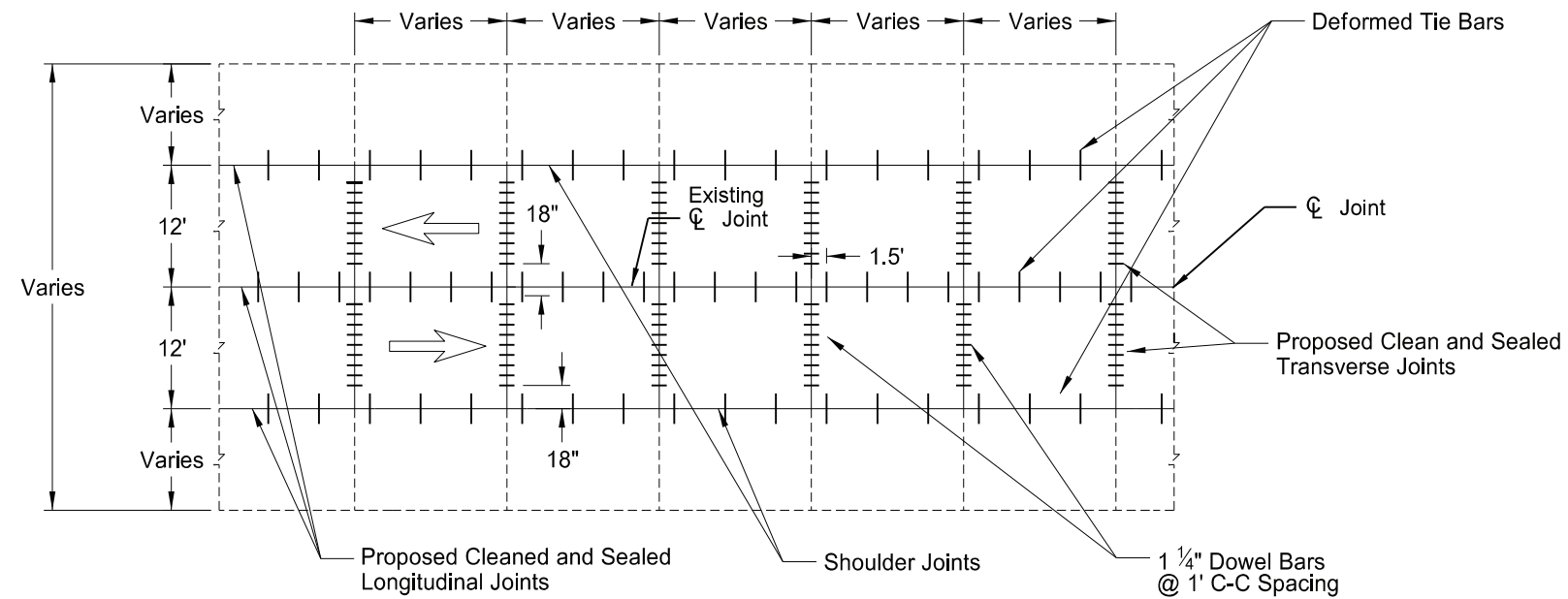
Milling & Paving Transitions

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	20	4

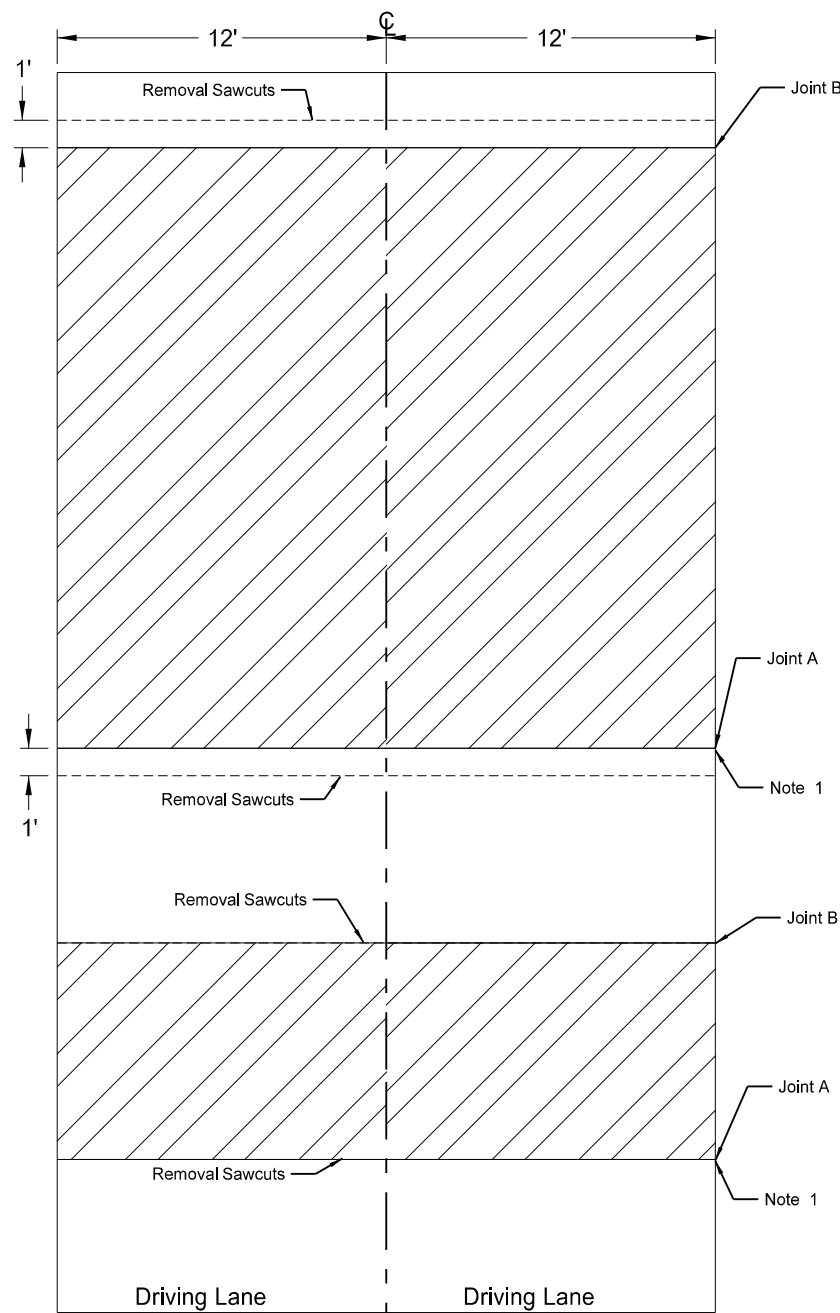


Proposed PCC Pavement Joint Details
Straight Joints

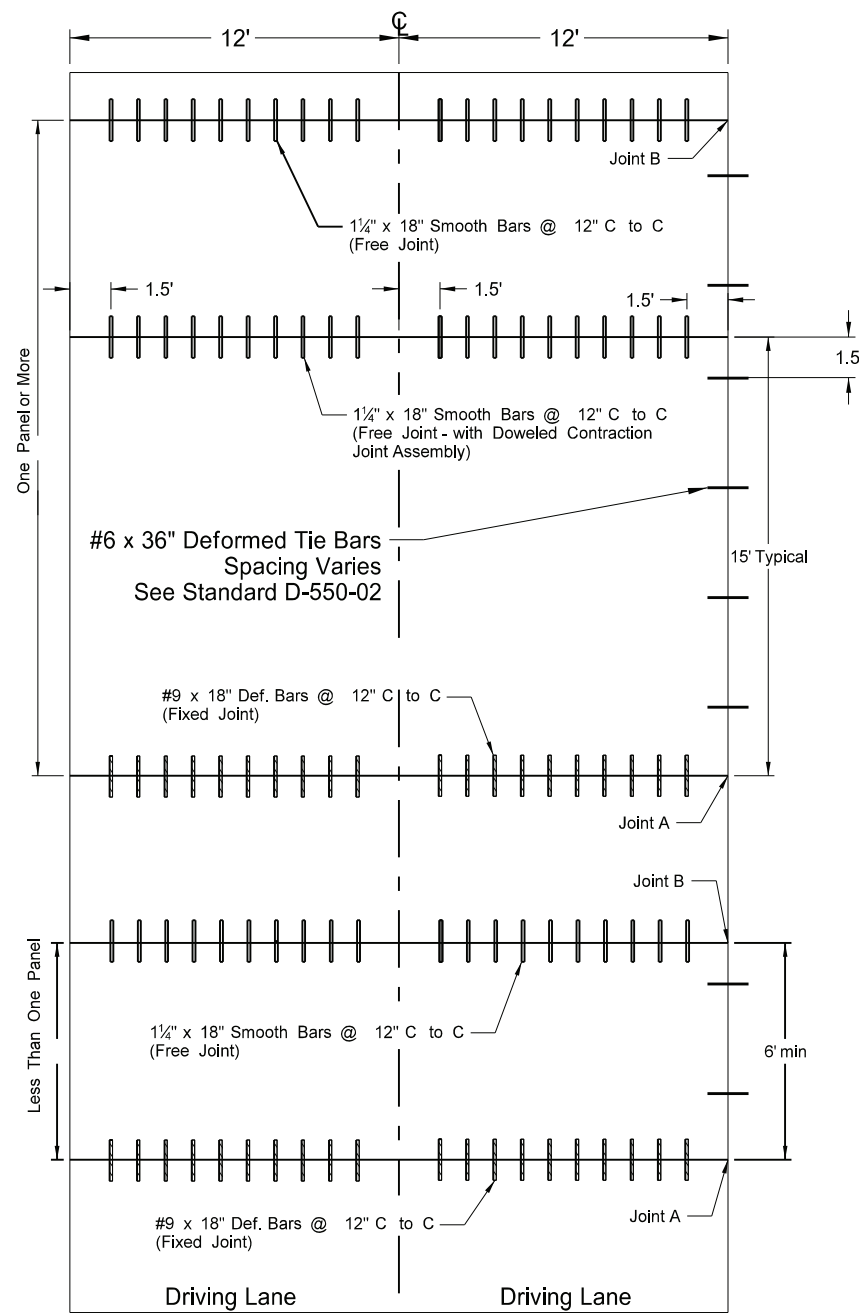
CPR, Mill & HMA, ADA Curb Ramp Revisions
JCT I-29 N to JCT 66



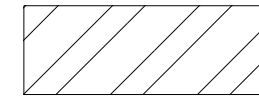
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	20	5



Removal



Proposed



PCC Removal

- Notes:
1. Provide a Fixed Joint (Joint A) when the new joint is the shortest distance to the next transverse joint or working random crack. Saw cut perpendicular to the centerline. Place deformed bars parallel to the centerline on the face of the saw cut.
 2. Provide a Free Joint (Joint B) when the new joint is the greatest distance to the next transverse joint or working random crack. Install smooth bars within the tolerances shown on the "Dowel Bar Placement - Full Depth Repair" detail sheet.
 3. When the distance to the next transverse joint or working random crack is equal for both new joints, place the free joint (Joint B) on the approach side of the repair.
 4. Install a Doweled Contraction Joint Assembly at the transverse contraction joint if the distance is greater than one panel in length.
 5. The joints at the beginning and end of a full depth repair section can be either a Free Joint or Fixed Joint depending on the existing joint.

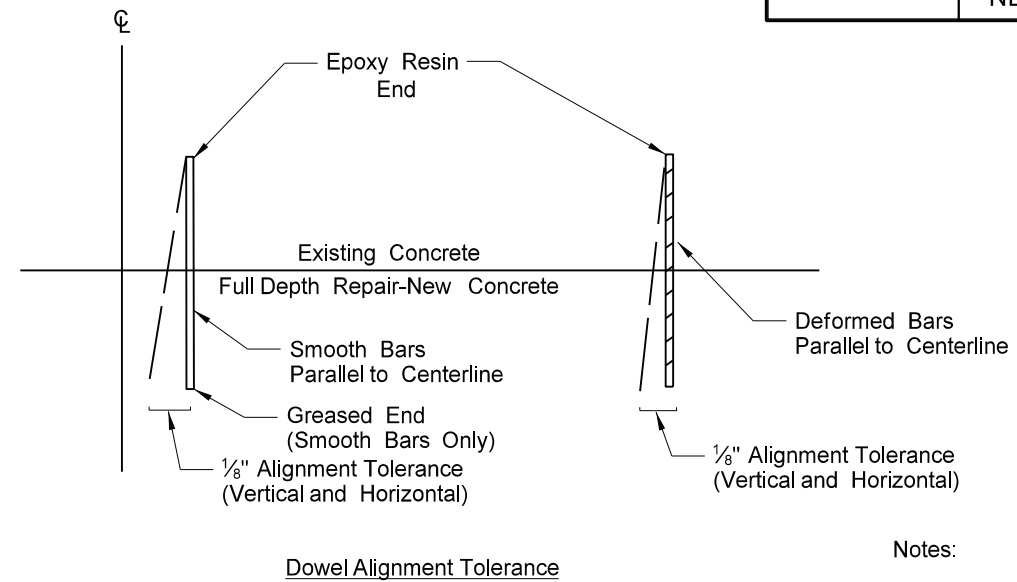
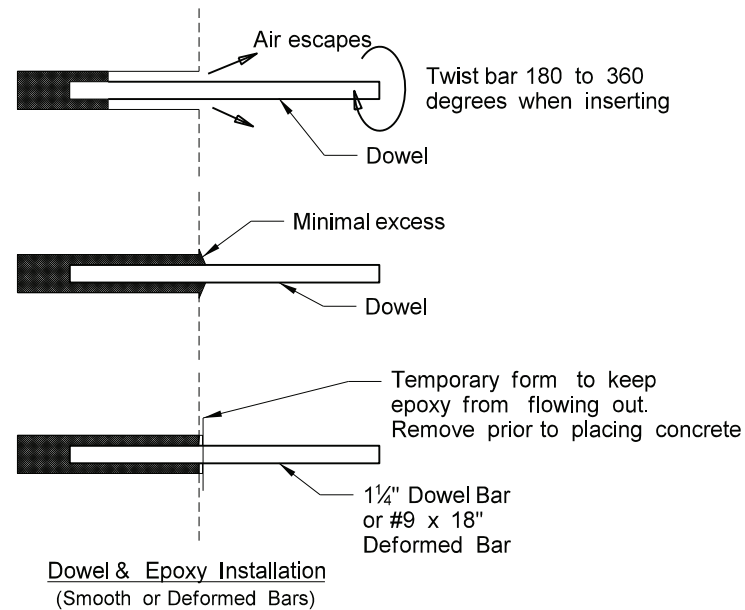
Removal of Concrete & Dowel Bar
Placement - Full Depth Repair
Straight Joints

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66

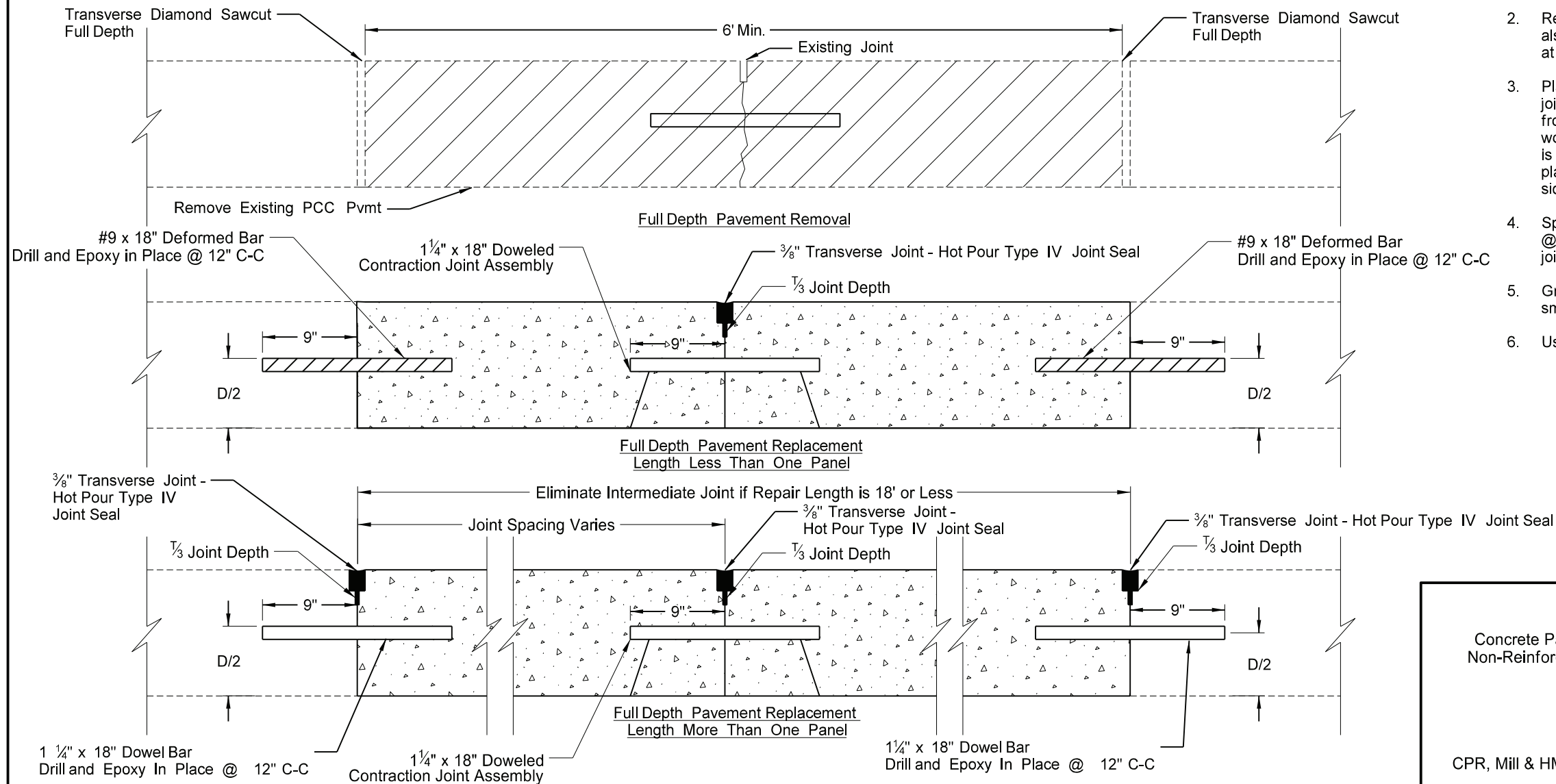


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	20	6



Notes:

- Variables:
D = Depth of Pavement
- Removal and replacement also applies to full depth repairs at cracks.
- Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
- Space Dowel / Deformed Bars, or Baskets @ 12" C-C and 18" from longitudinal joints; total of 10 bars per 12' lane.
- Grease the exposed end of 1 1/4" x 18" smooth bar.
- Use 1-1/4" Dowel Bars for 8" Pavement.



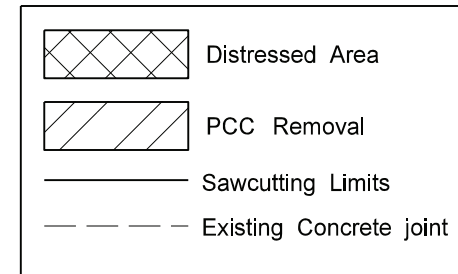
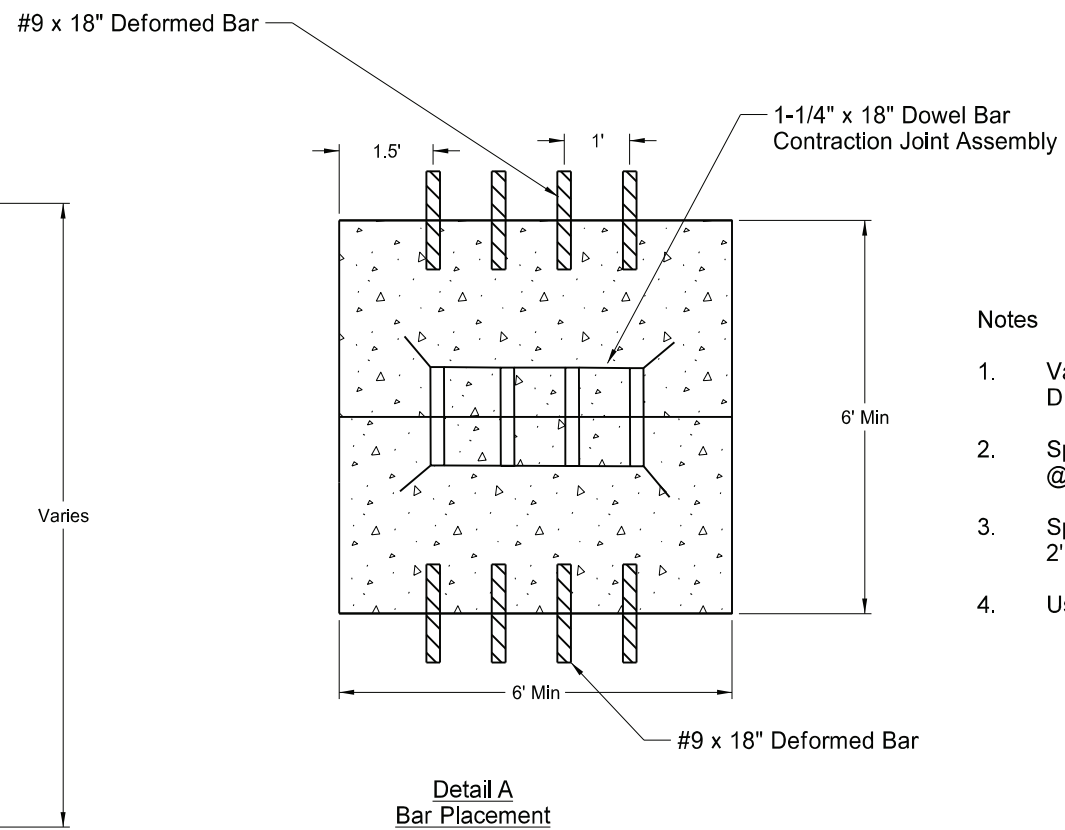
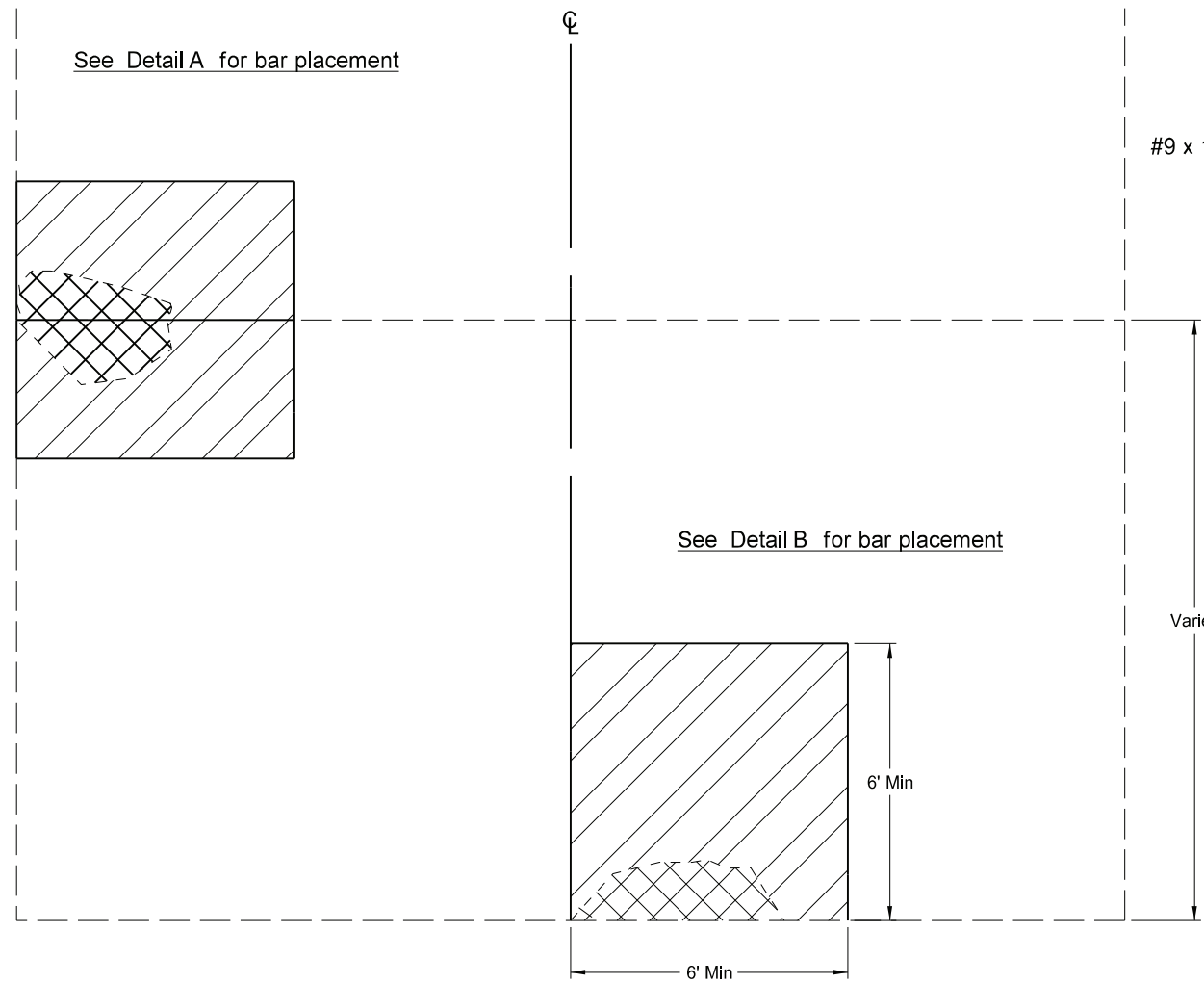
Concrete Pavement Repair - Full Depth
Non-Reinforced PCC Pavement Doweled

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



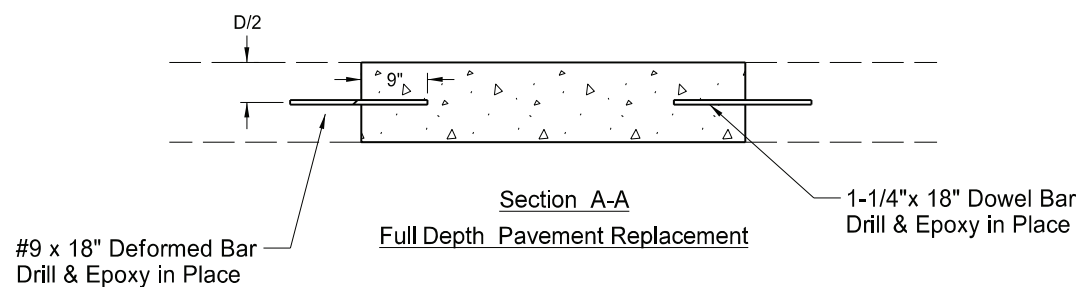
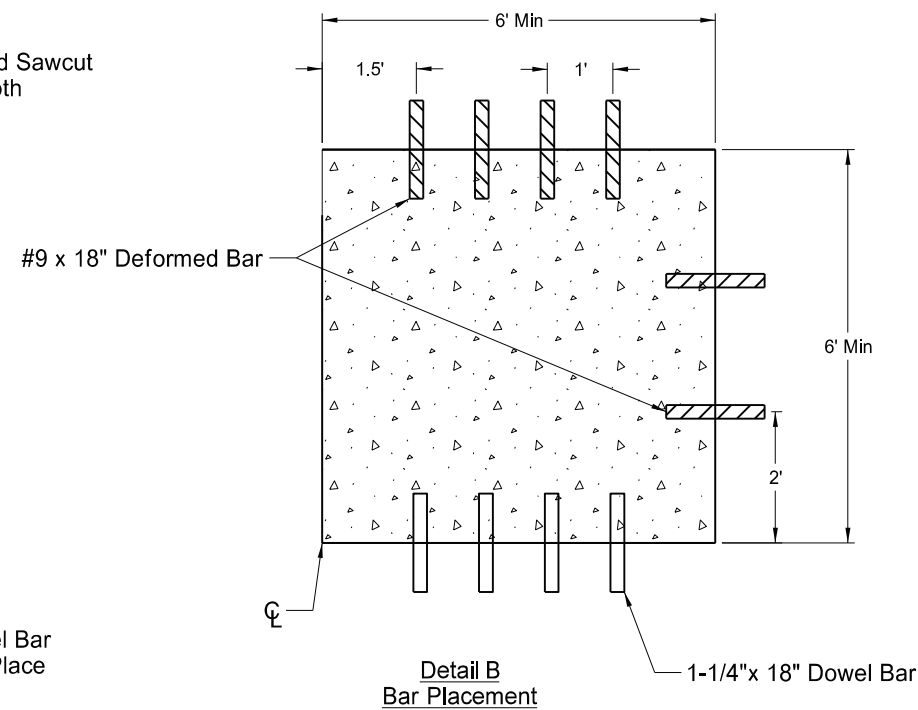
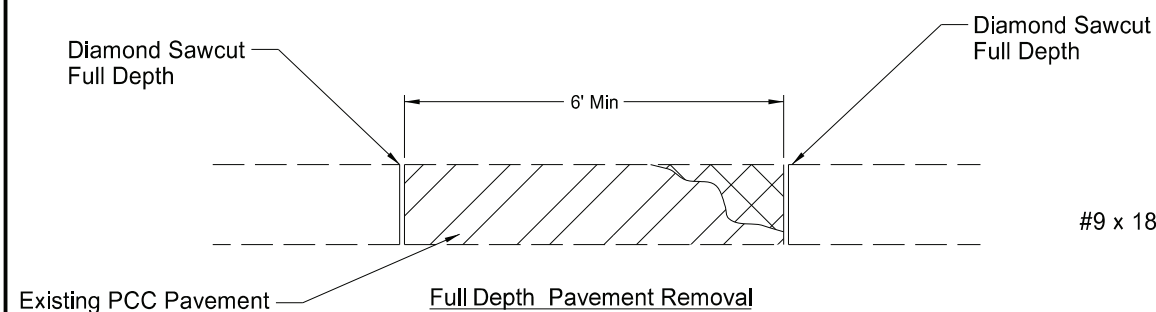
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	20	7



Notes

- Variables
D = Depth of Pavement
- Space Dowel/Deformed Bars, or Baskets @ 12" C-C and 18" from longitudinal joints.
- Space Deformed Bars along construction joint 2' from transverse joint and 2' C-C.
- Use 1-1/4" Dowels for 8" Pavement.

Full Depth Repairs
Removal Areas



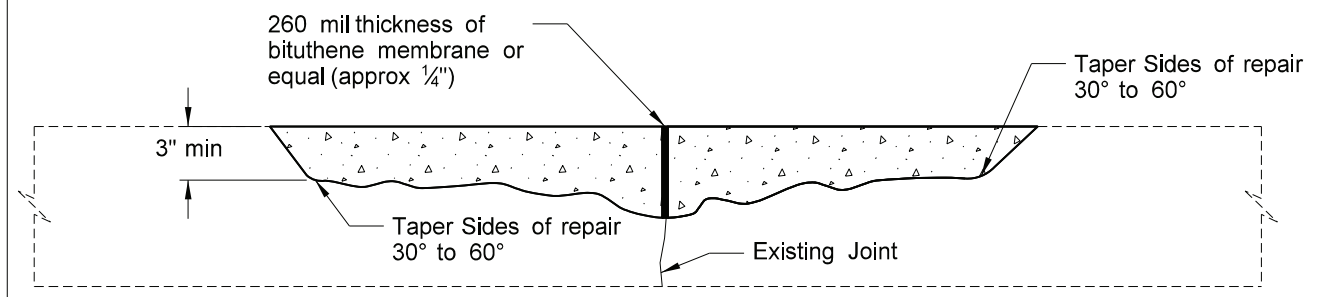
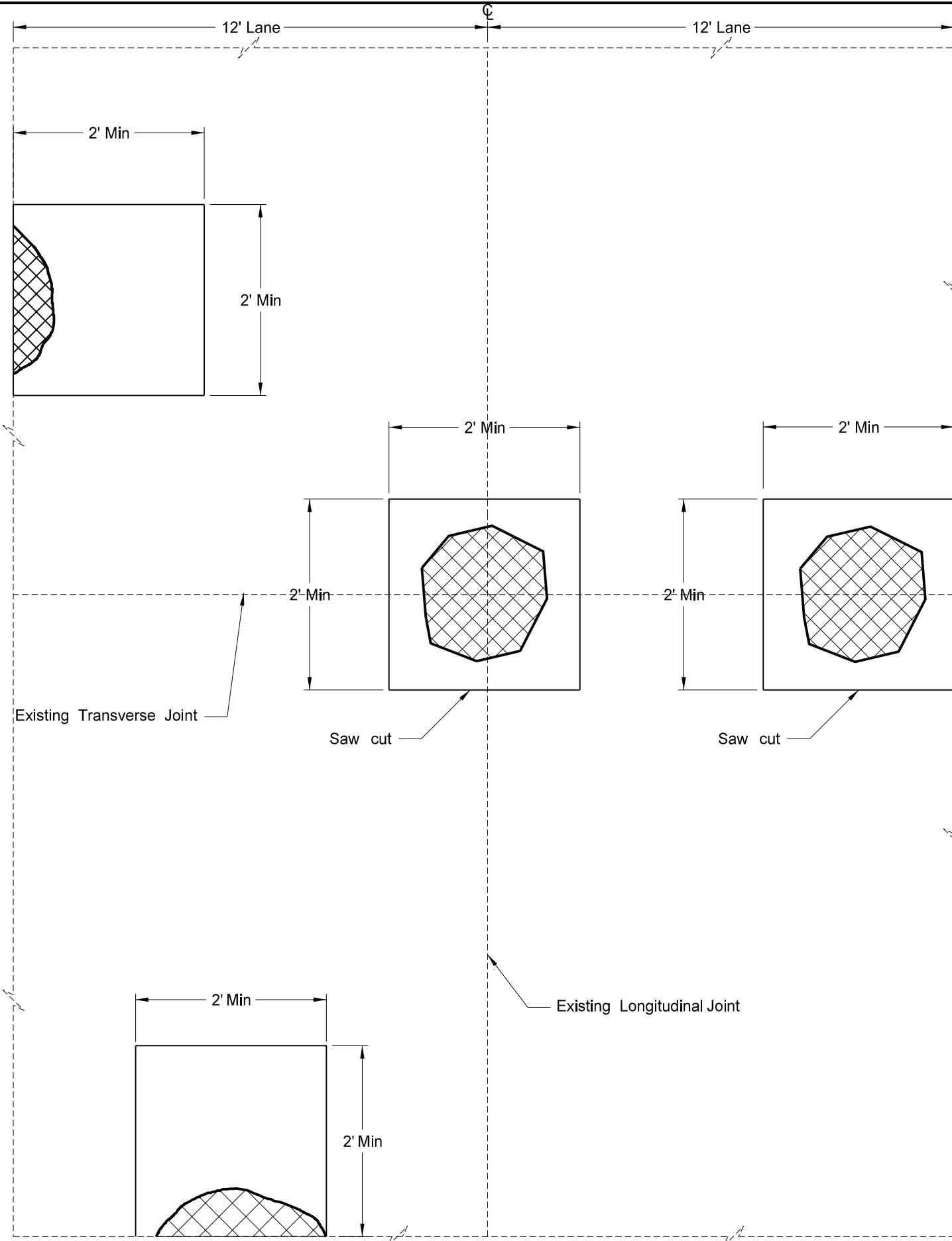
CPR Segments
Spall Repair Detail
Straight Joints

CPR, Mill & HMA, ADA Curb Ramp Revisions

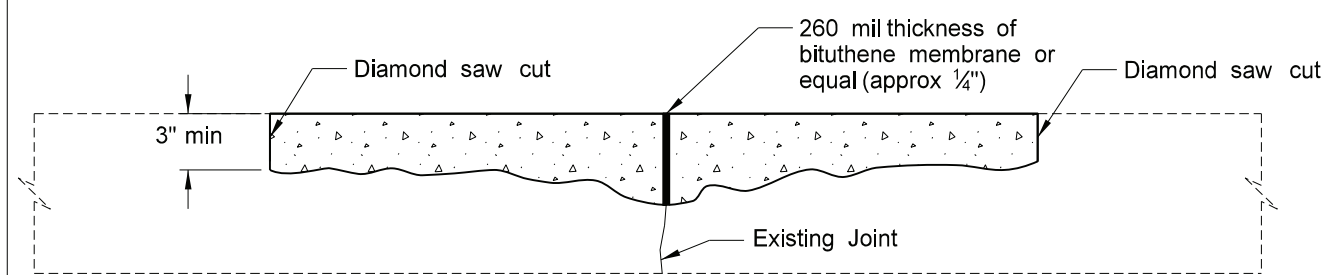
JCT I-29 N to JCT 66



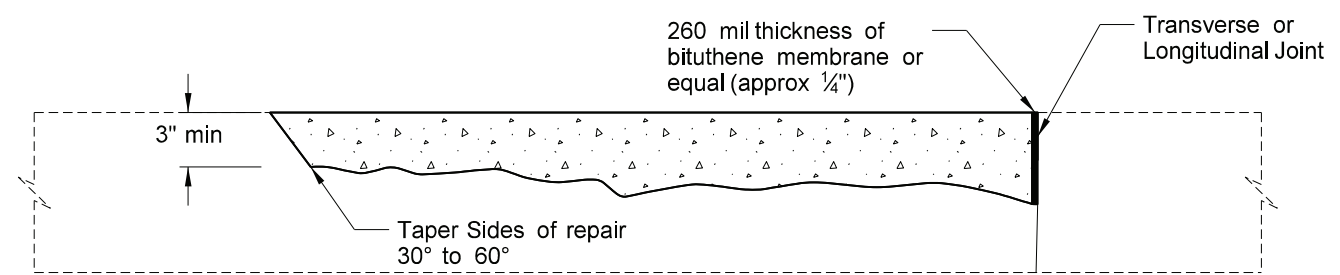
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	20	8



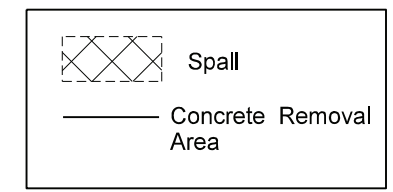
Cross Section - Repair Area
Milling



Cross Section - Repair Area
Chipping



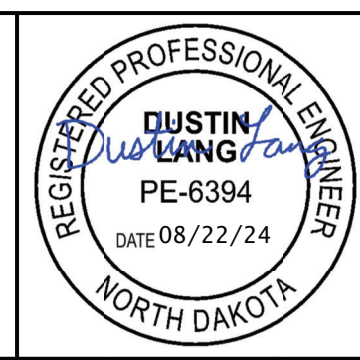
Cross Section - Repair Area
Milling



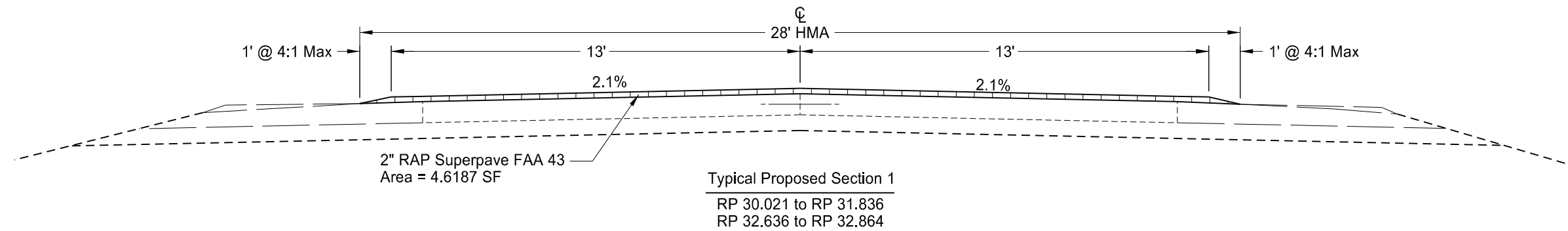
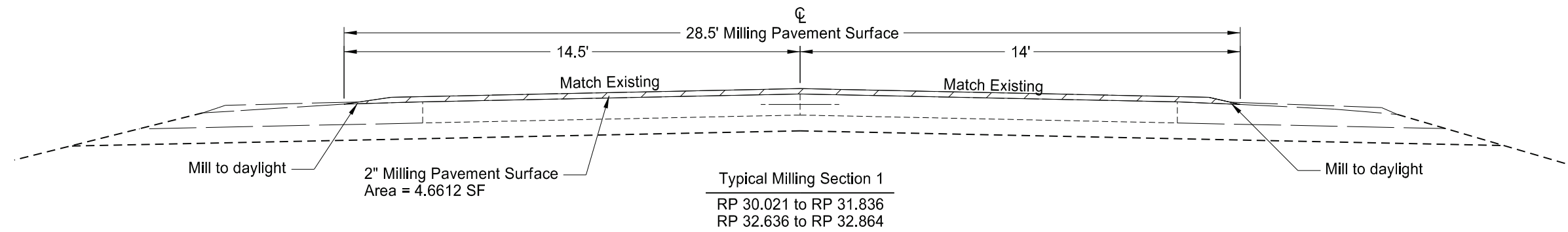
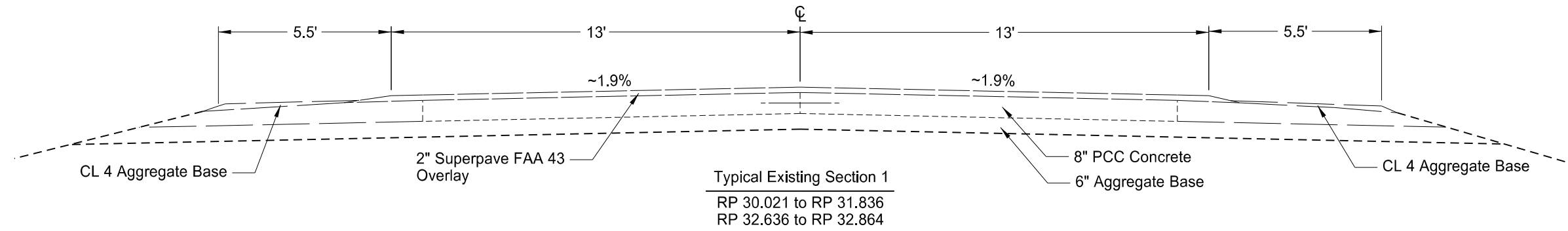
Plan View (not to scale)

CPR Segments
Spall Repair Detail
Straight Joints

CPR, Mill & HMA, ADA Curb Ramp Revisions
JCT I-29 N to JCT 66



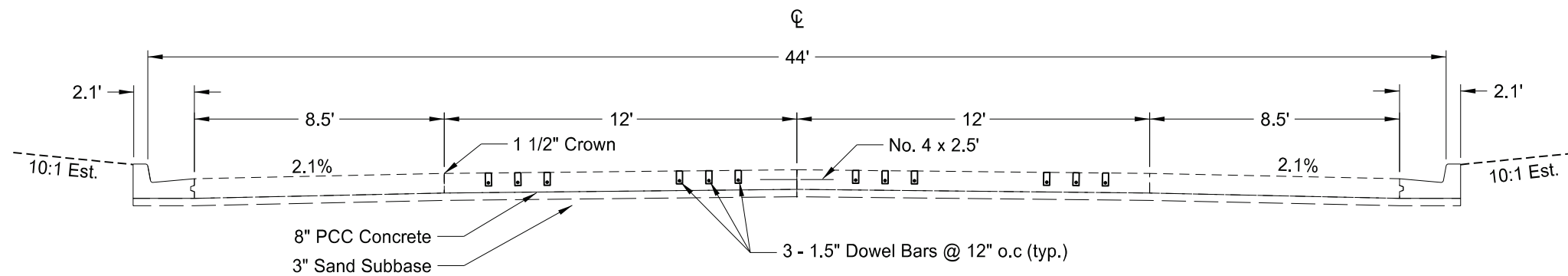
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	30	1



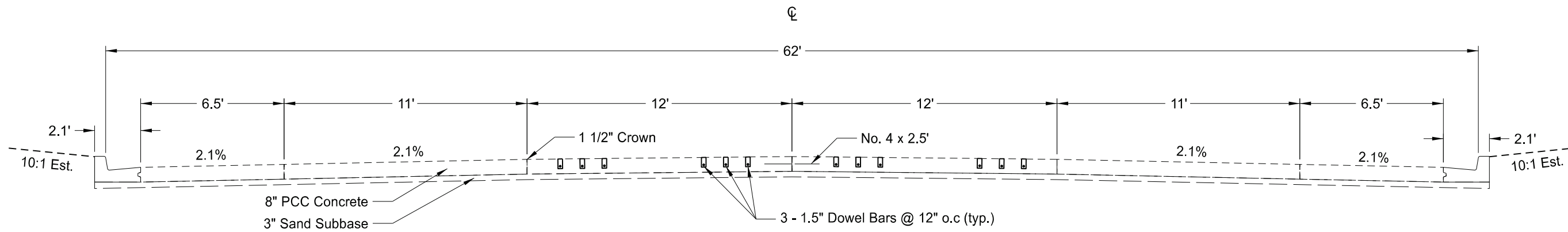
Typical Sections

CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	30	2



Typical Existing Section 2
 RP 31.836 to RP 32.030
 RP 32.370 to RP 32.636

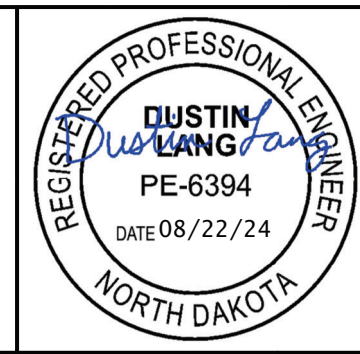


Typical Existing Section 3
 RP 32.030 to RP 32.370

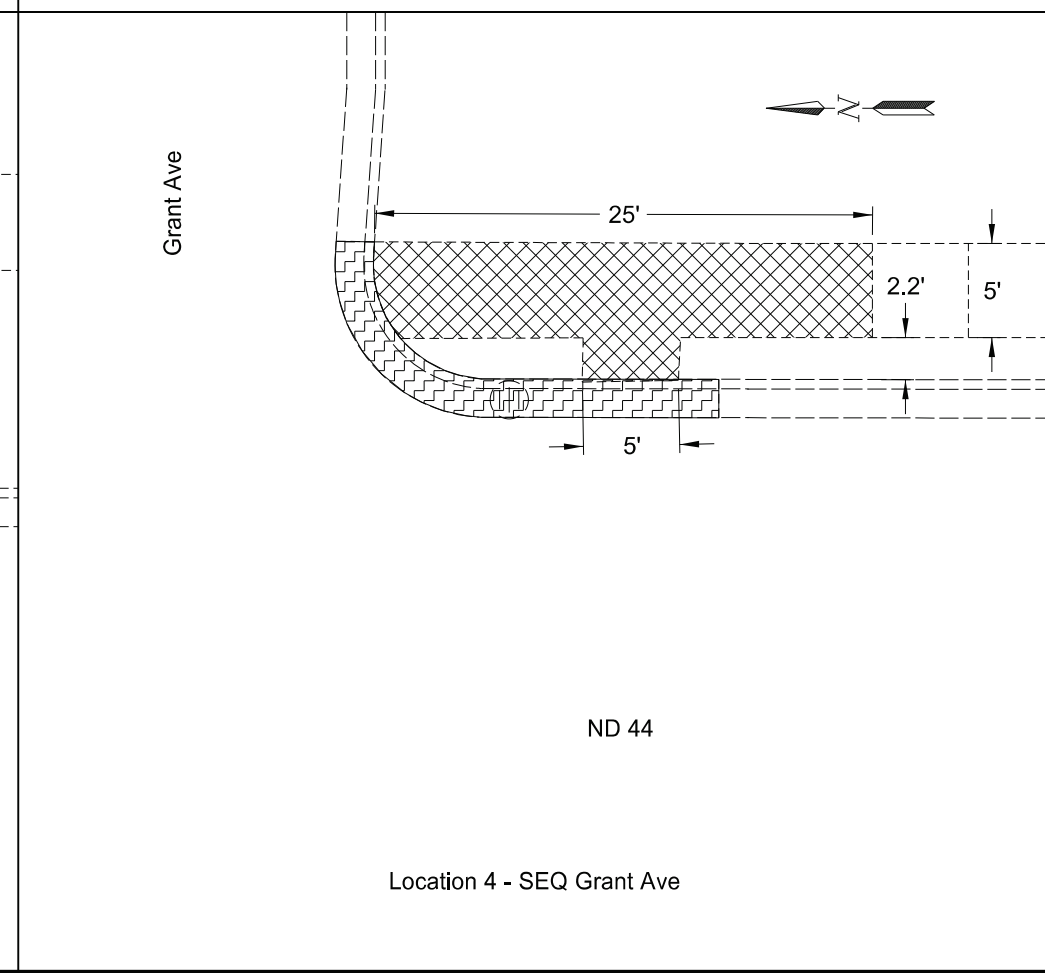
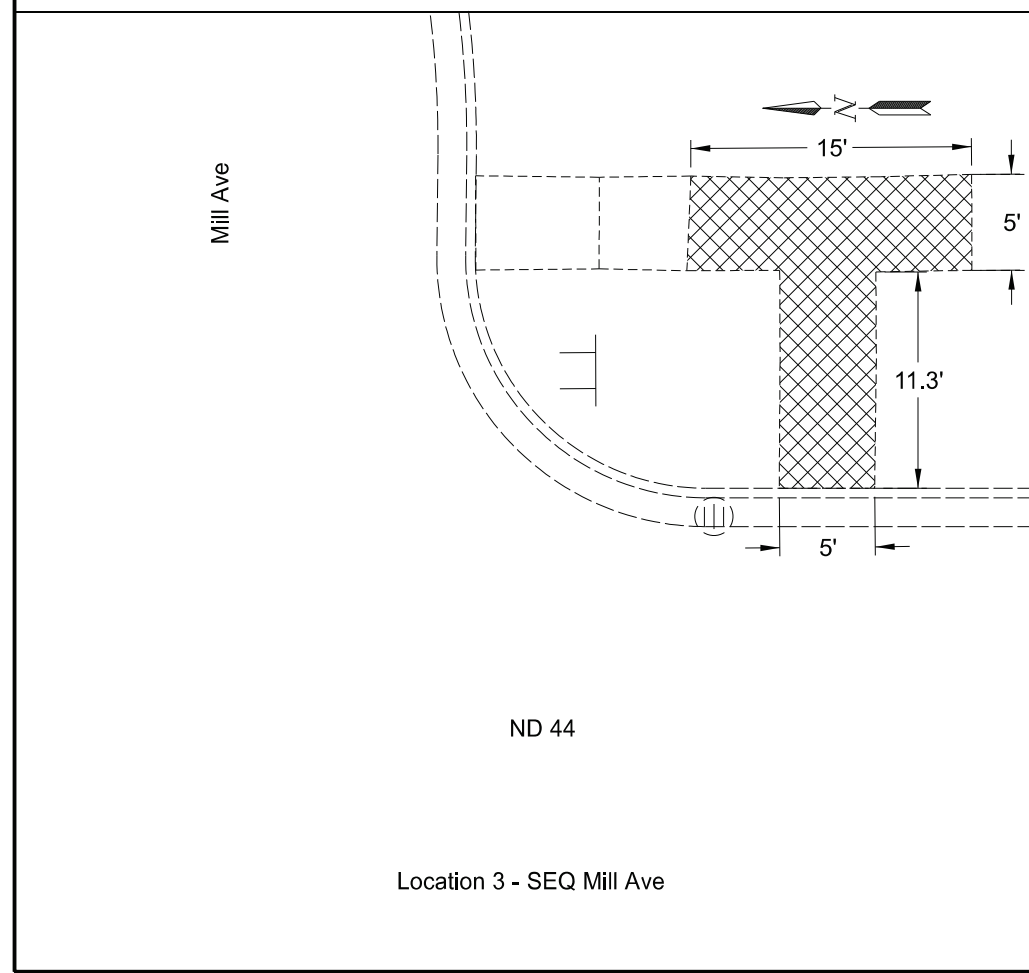
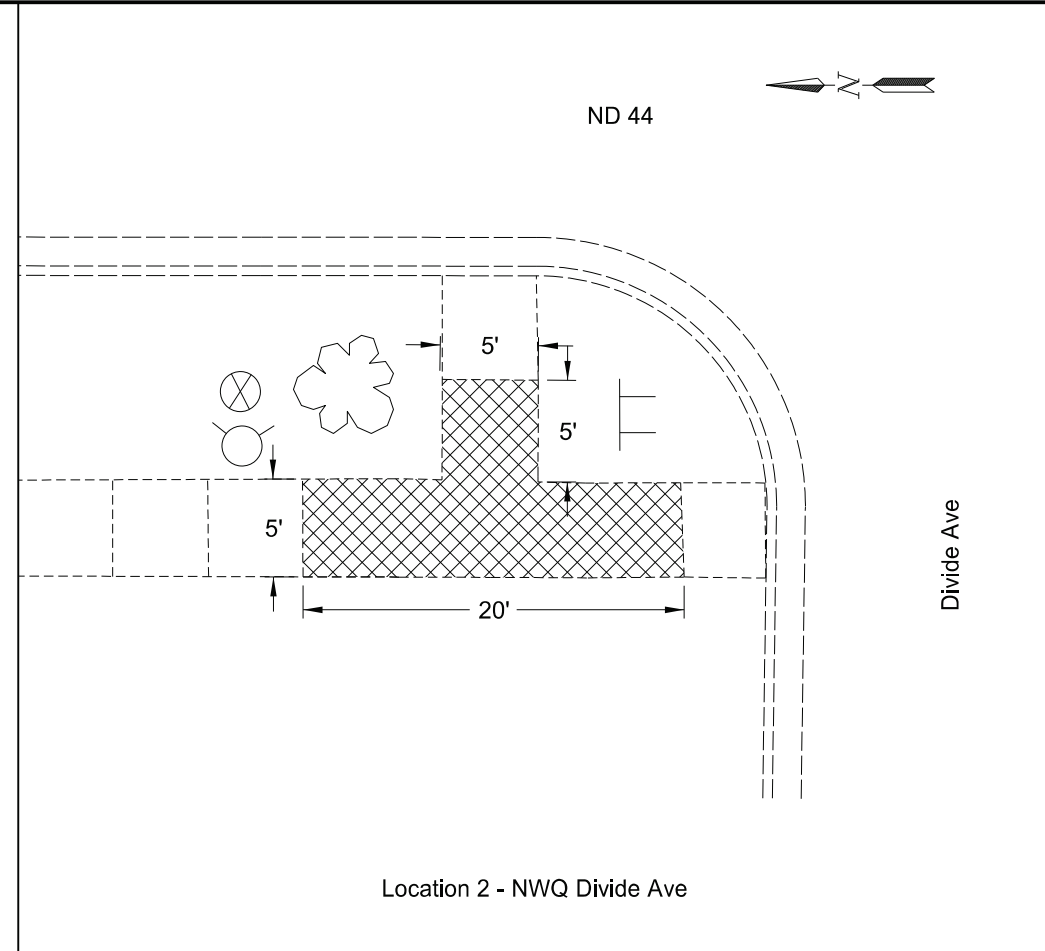
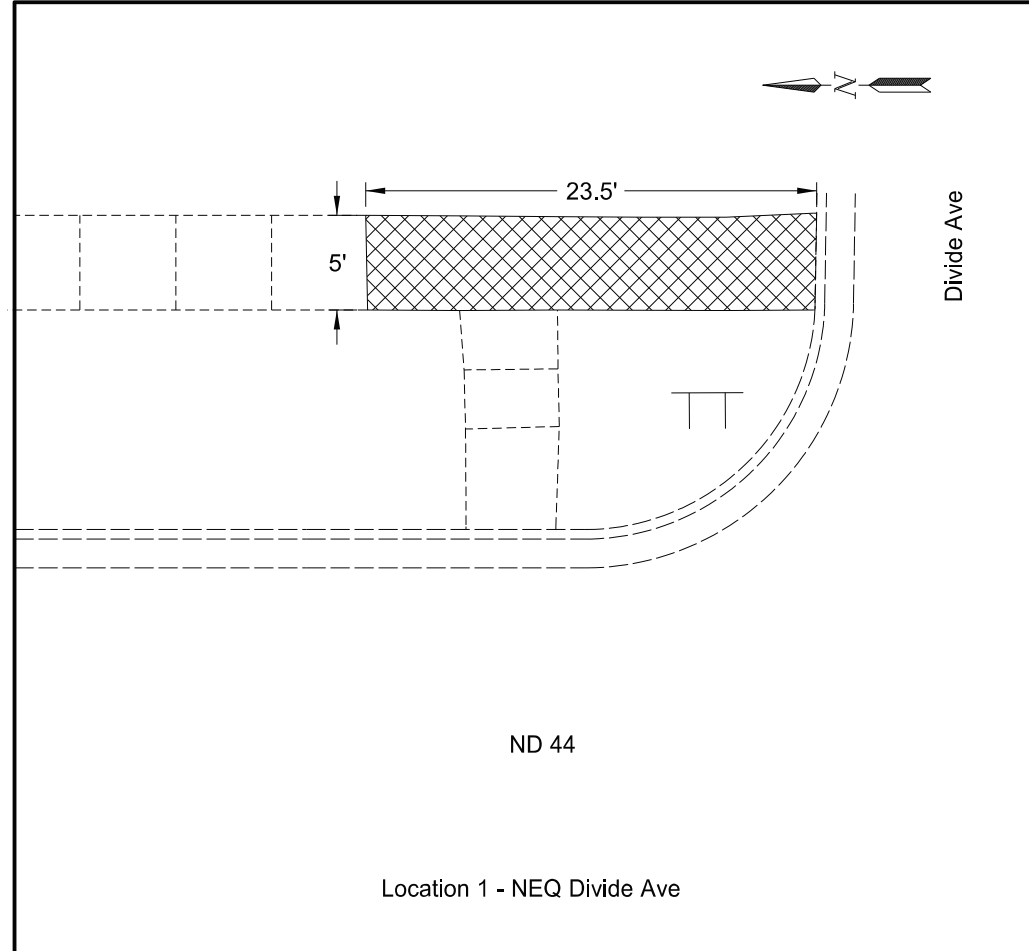
Typical Sections

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	40	1



202 0114	Removal of Concrete Pavement	
Location 1		13.1 SY
Location 2		13.9 SY
Location 3		14.6 SY
Location 4		15.1 SY

202 0130	Removal of Curb & Gutter	
Location 4		26 LF

	Removal of Concrete Pavement
	Removal of Curb & Gutter

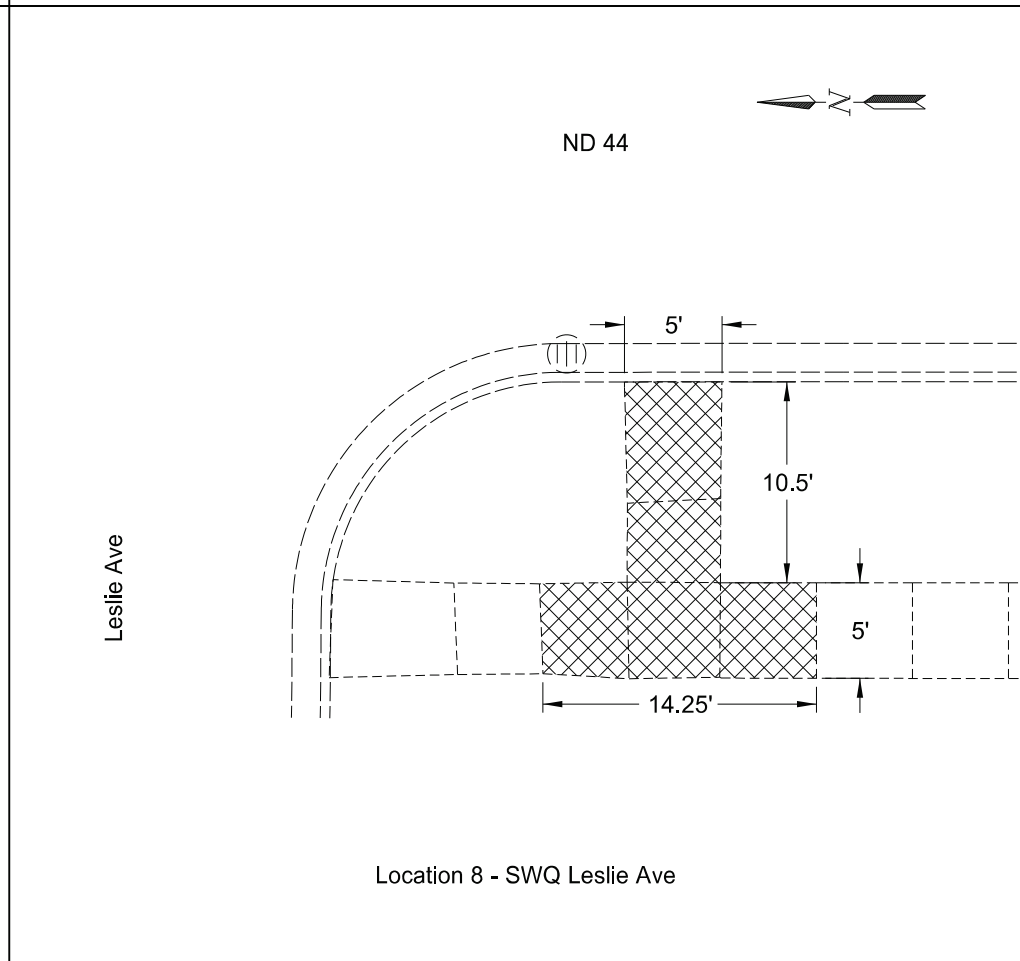
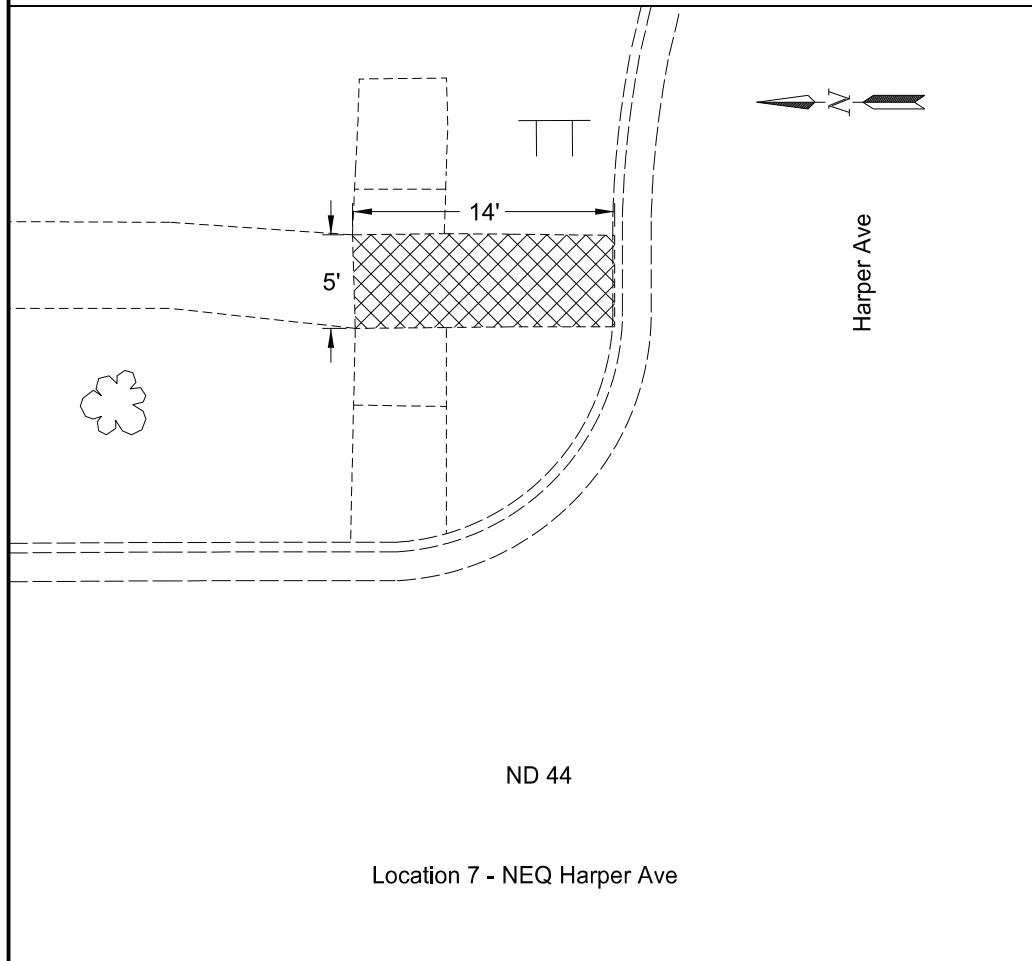
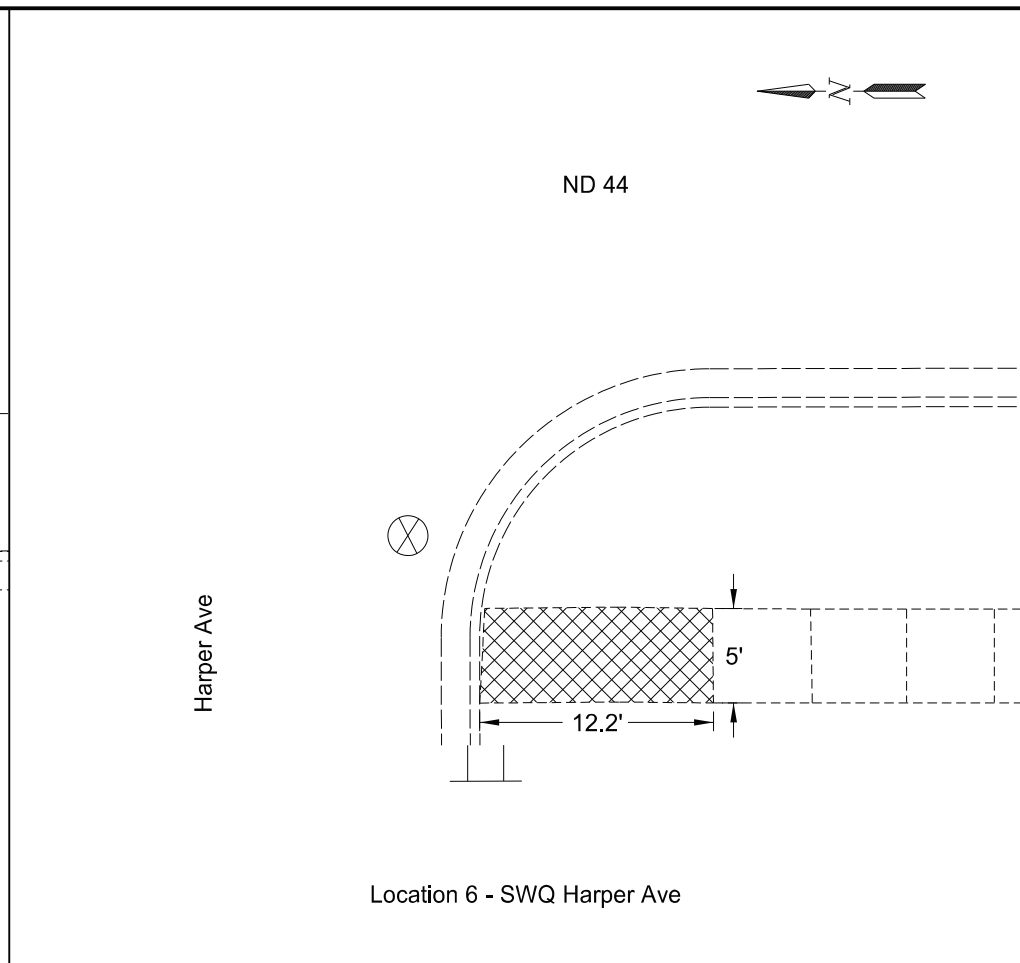
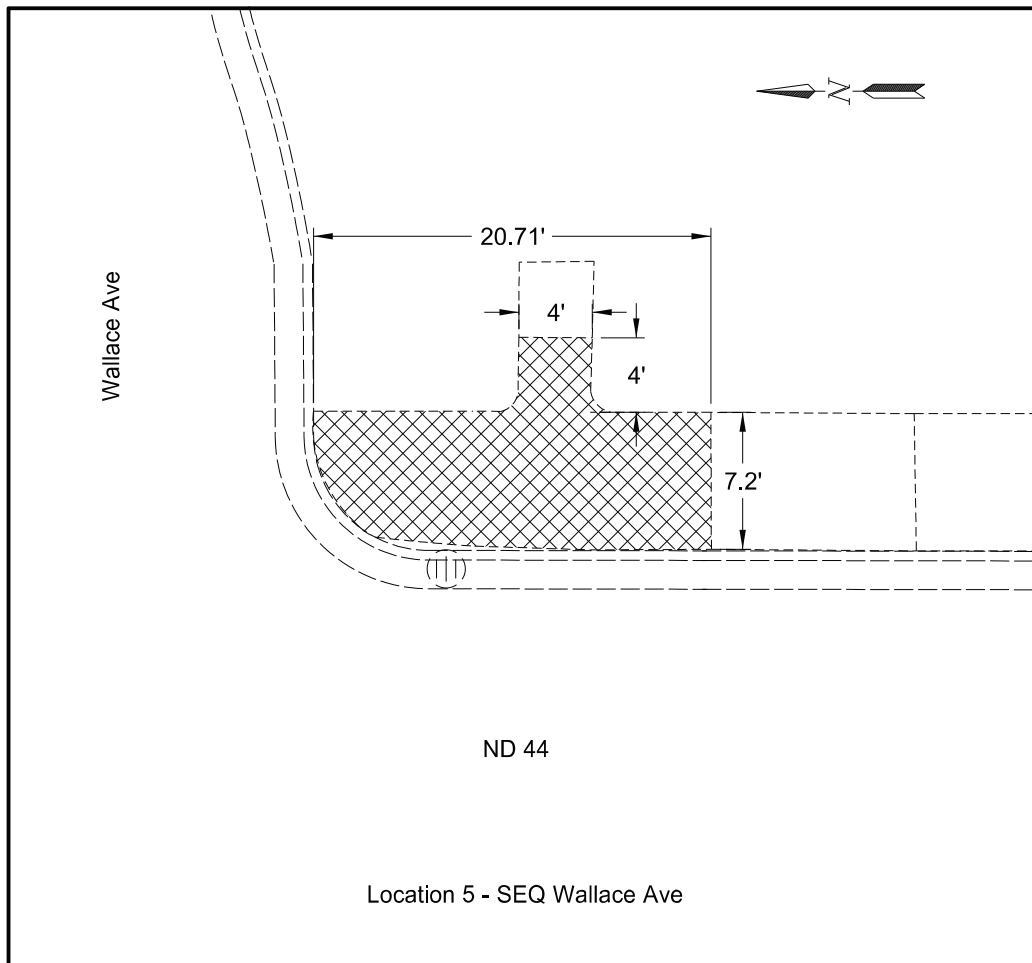
Removals

CPR, Mill & HMA, ADA Curb Ramp Revisions


JCT I-29 to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	40	2



202 0114	Removal of Concrete Pavement	
Location 5		17.2 SY
Location 6		6.7 SY
Location 7		7.8 SY
Location 8		13.9 SY

 Removal of Concrete Pavement

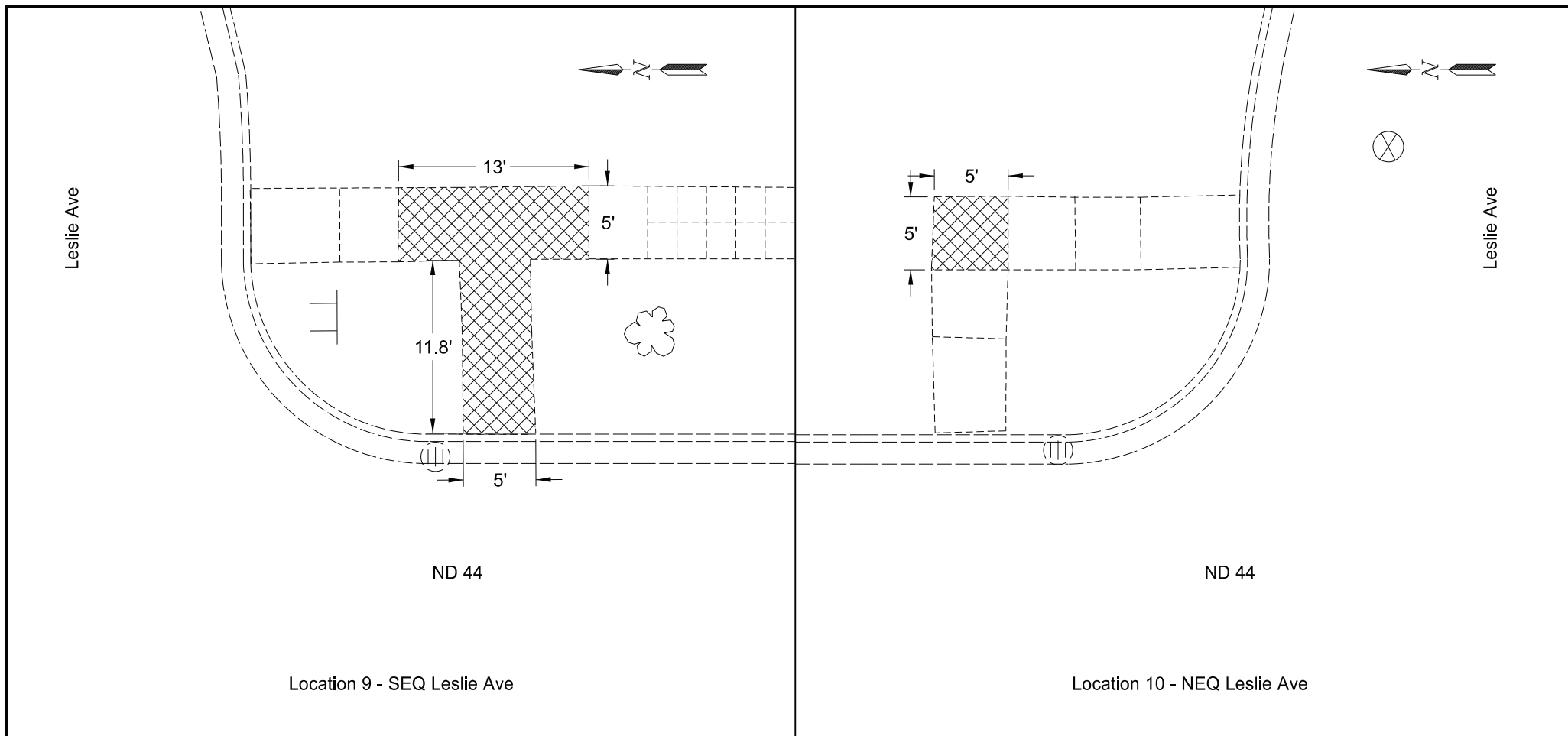
Removals

CPR, Mill & HMA, ADA Curb Ramp Revisions


JCT I-29 to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	40	3



202 0114 Removal of Concrete Pavement	
Location 9	13.8 SY
Location 10	2.8 SY

 Removal of Concrete Pavement

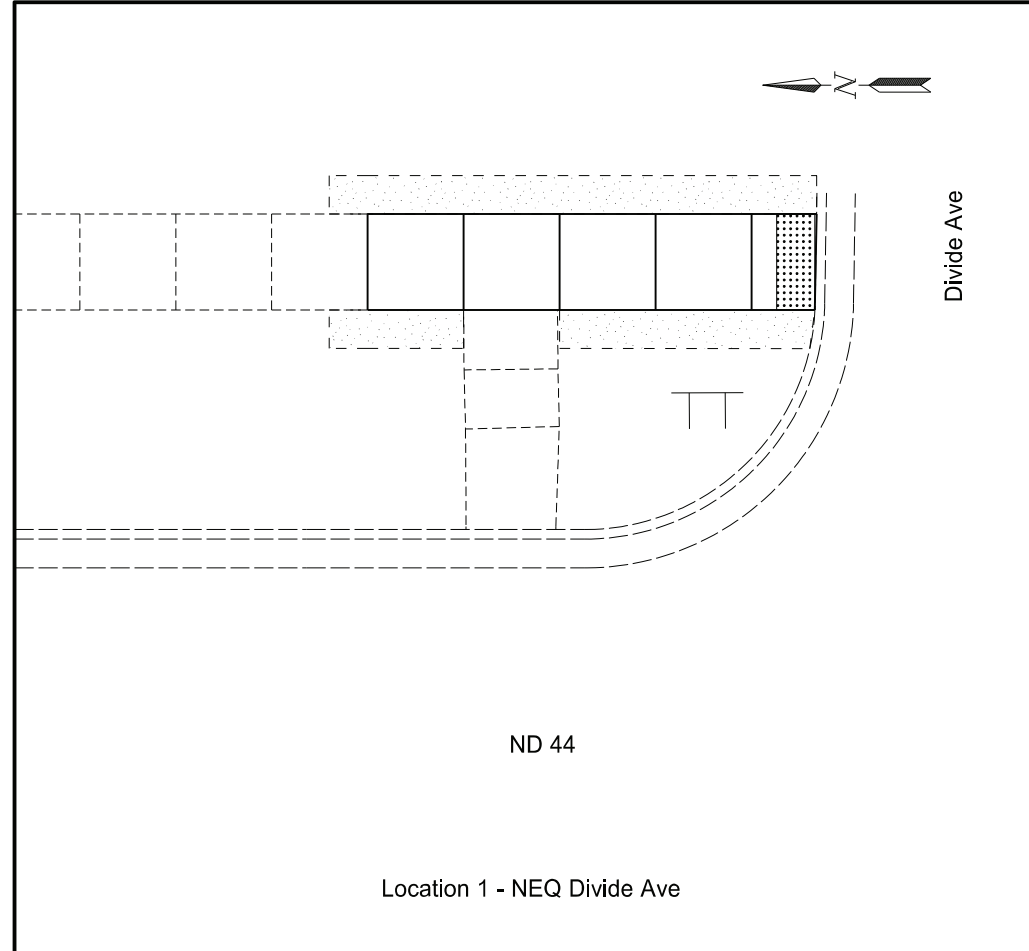
Removals

CPR, Mill & HMA, ADA Curb Ramp Revisions

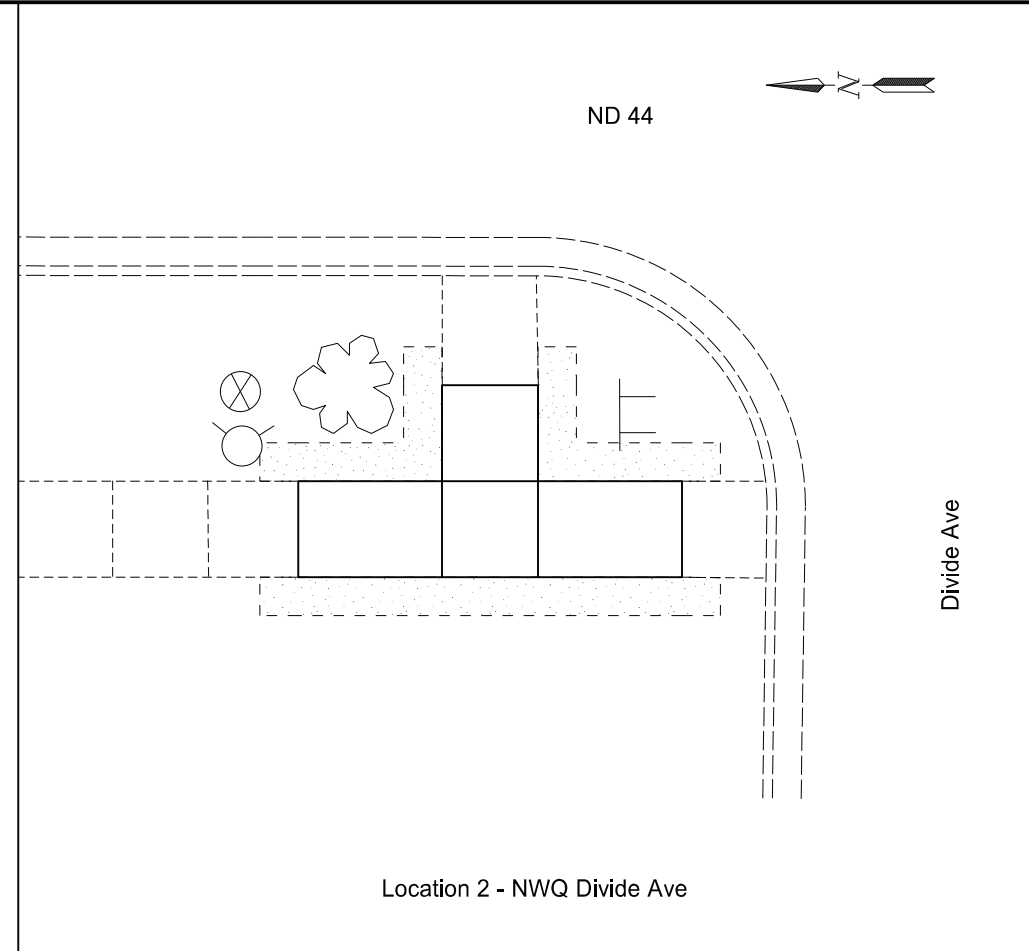
JCT I-29 to JCT 66



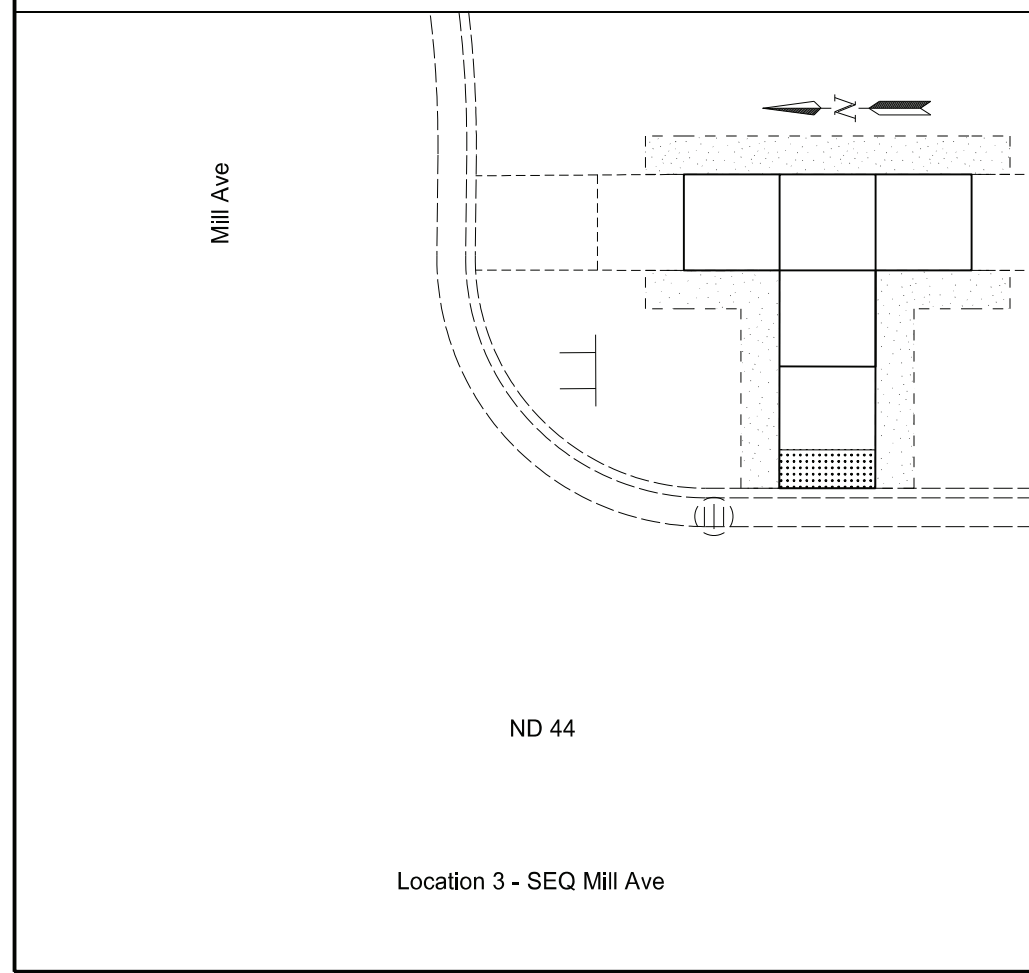
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ND	SS-6-044(003)029	77	1



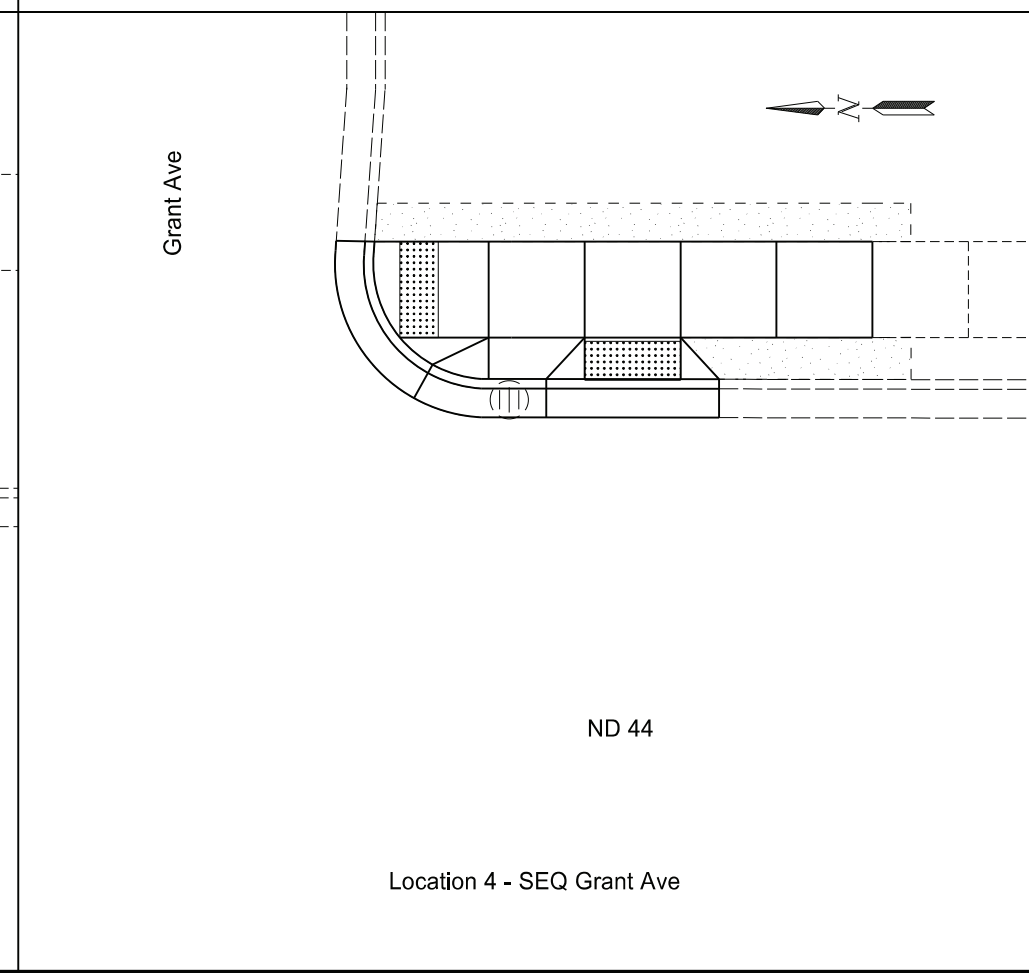
Location 1 - NEQ Divide Ave



Location 2 - NWQ Divide Ave



Location 3 - SEQ Mill Ave



Location 4 - SEQ Grant Ave

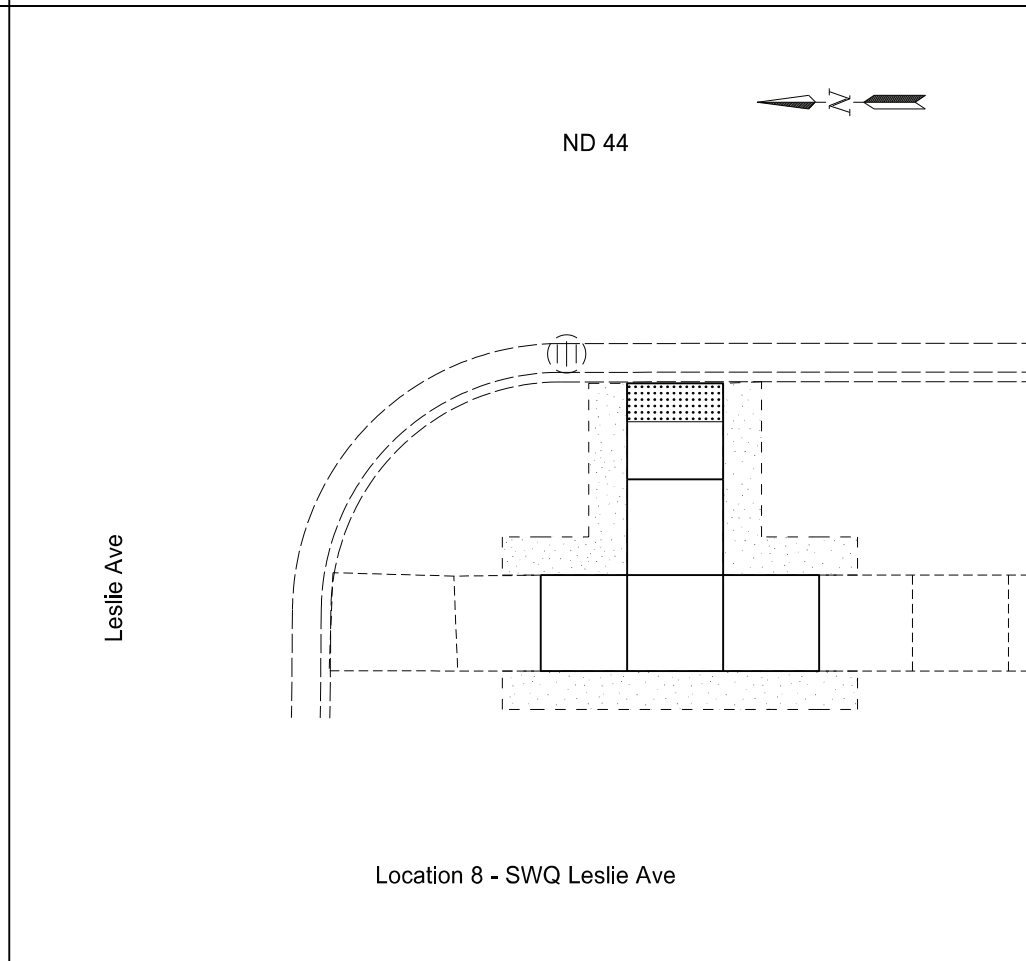
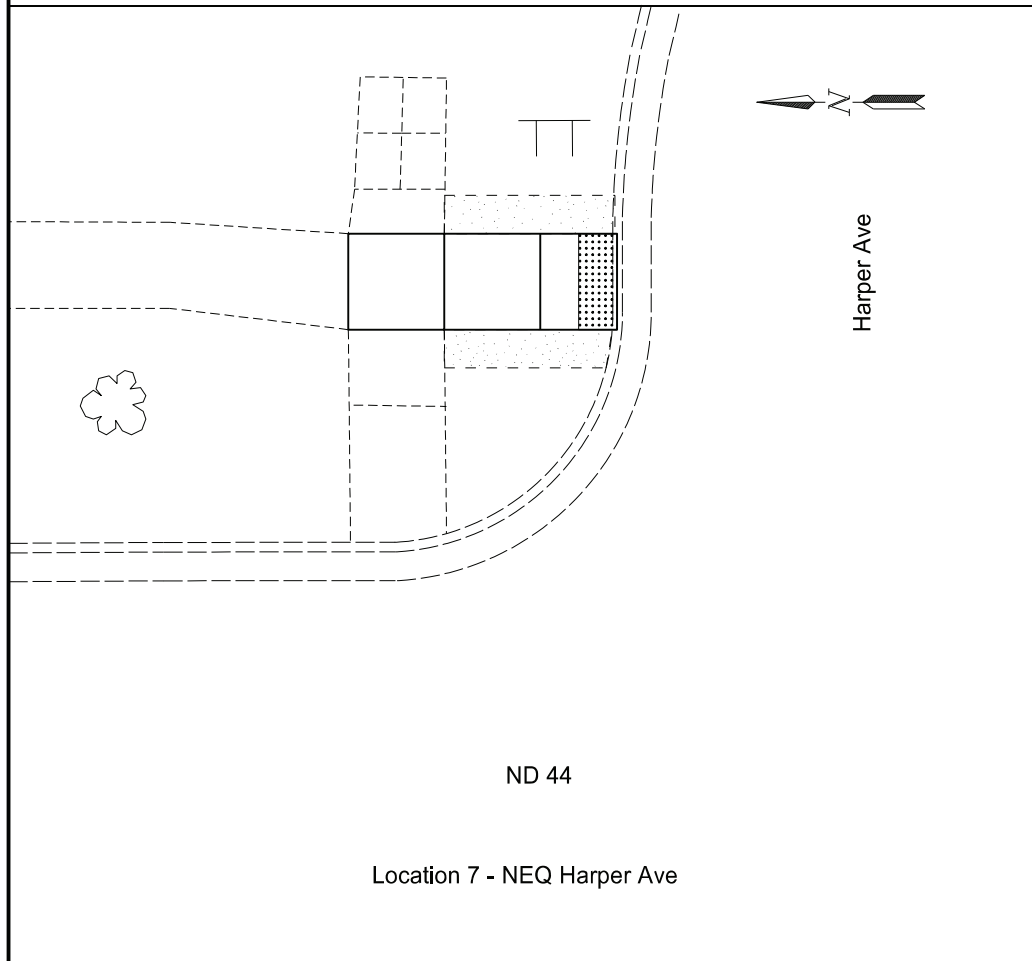
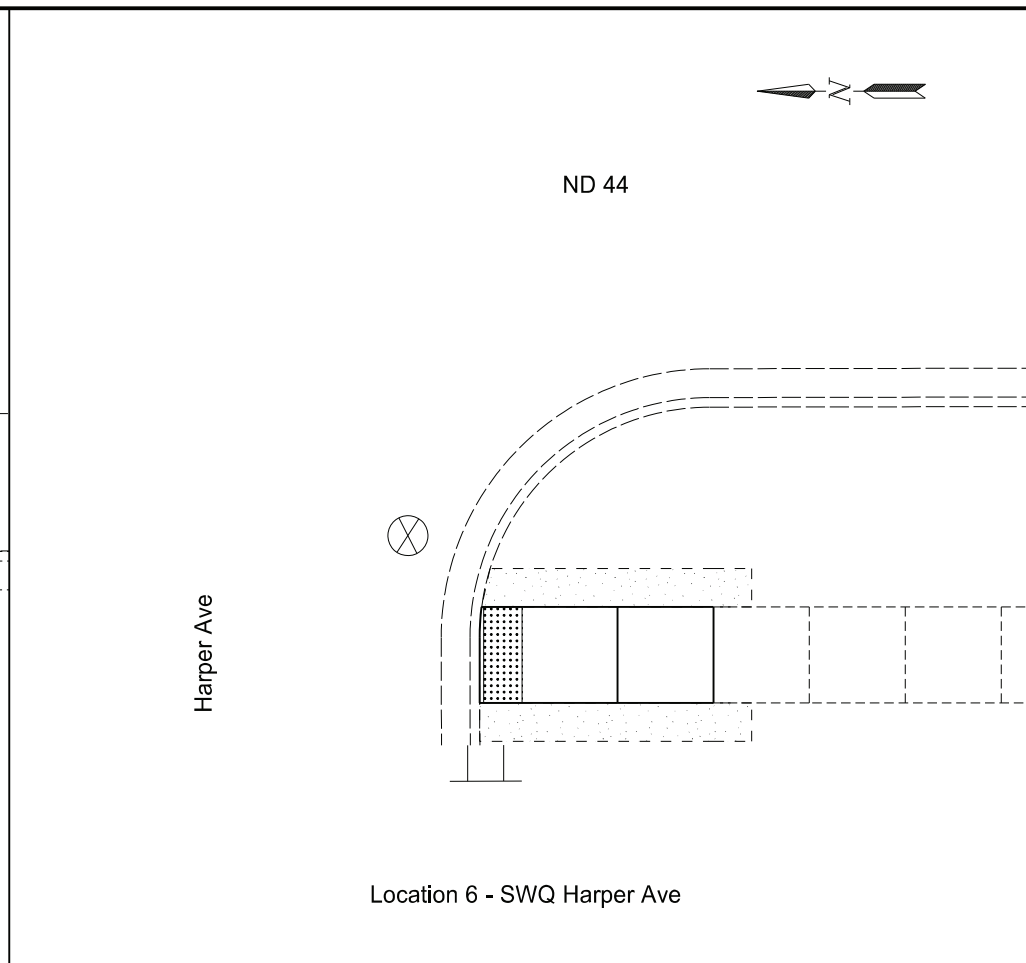
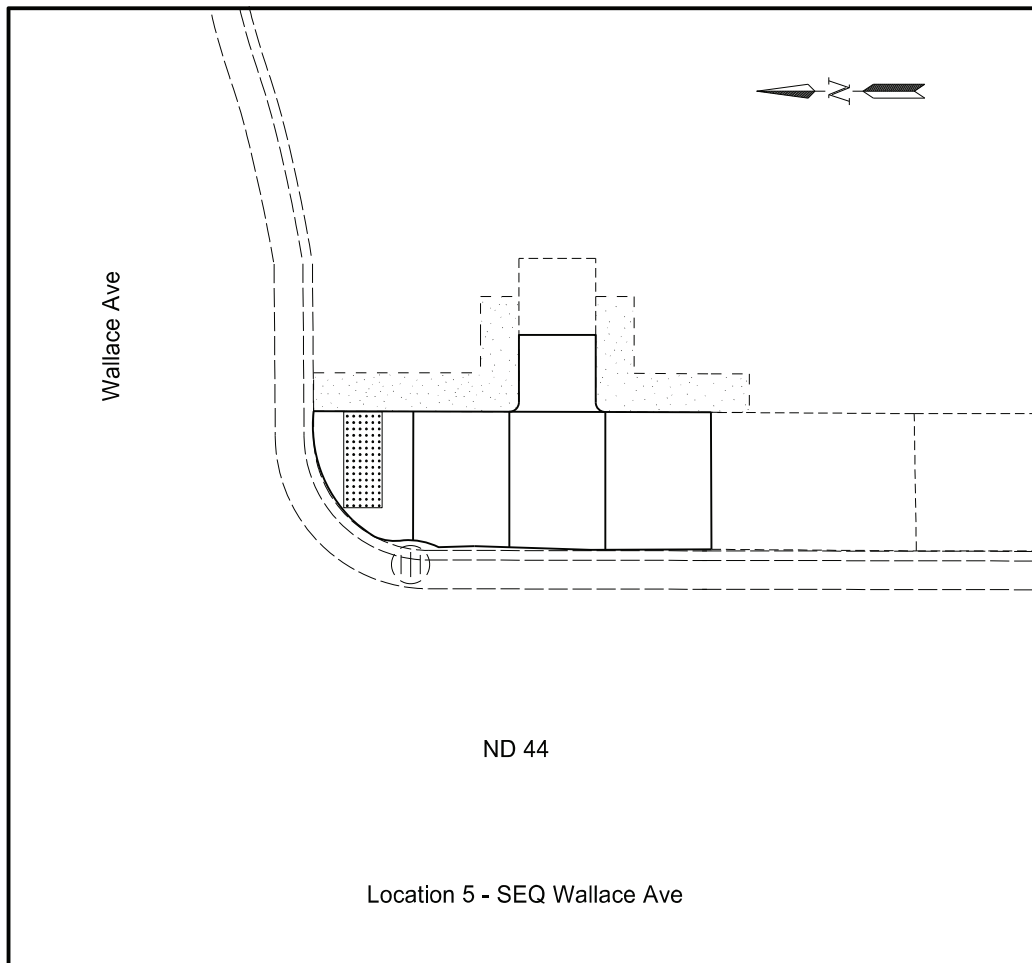
970 0008	Landscape Preparation	
Location 1		10.1 SY
Location 2		11.8 SY
Location 3		11.5 SY
Location 4		8.9 SY

 Landscape Preparation


Permanent Sediment & Erosion Control
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	77	2



970 0008	Landscape Preparation	
Location 5		5.9 SY
Location 6		6.2 SY
Location 7		3.9 SY
Location 8		10.7 SY

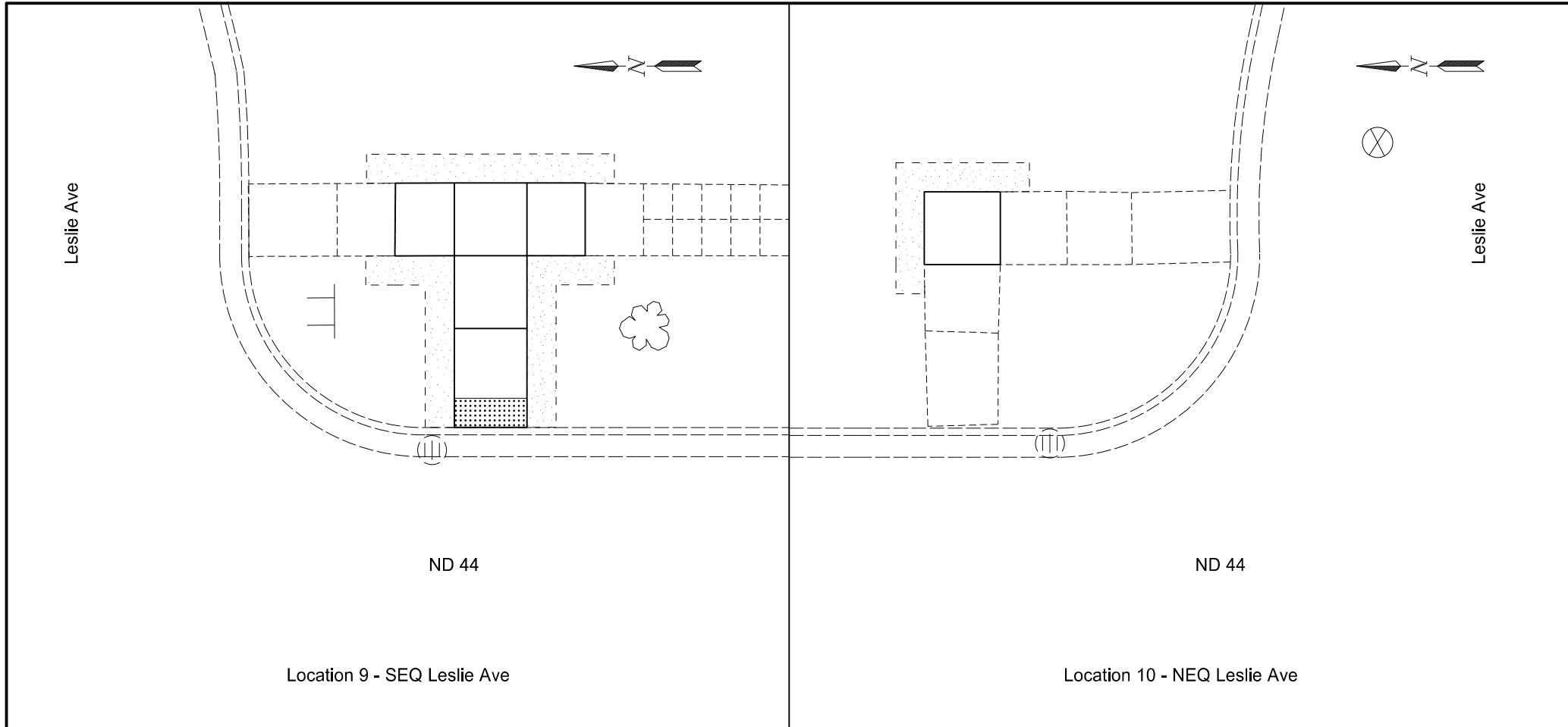
 Landscape Preparation

Permanent Sediment & Erosion Control

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	77	3

970 0008 Landscape Preparation	
Location 9	10.8 SY
Location 10	3.6 SY

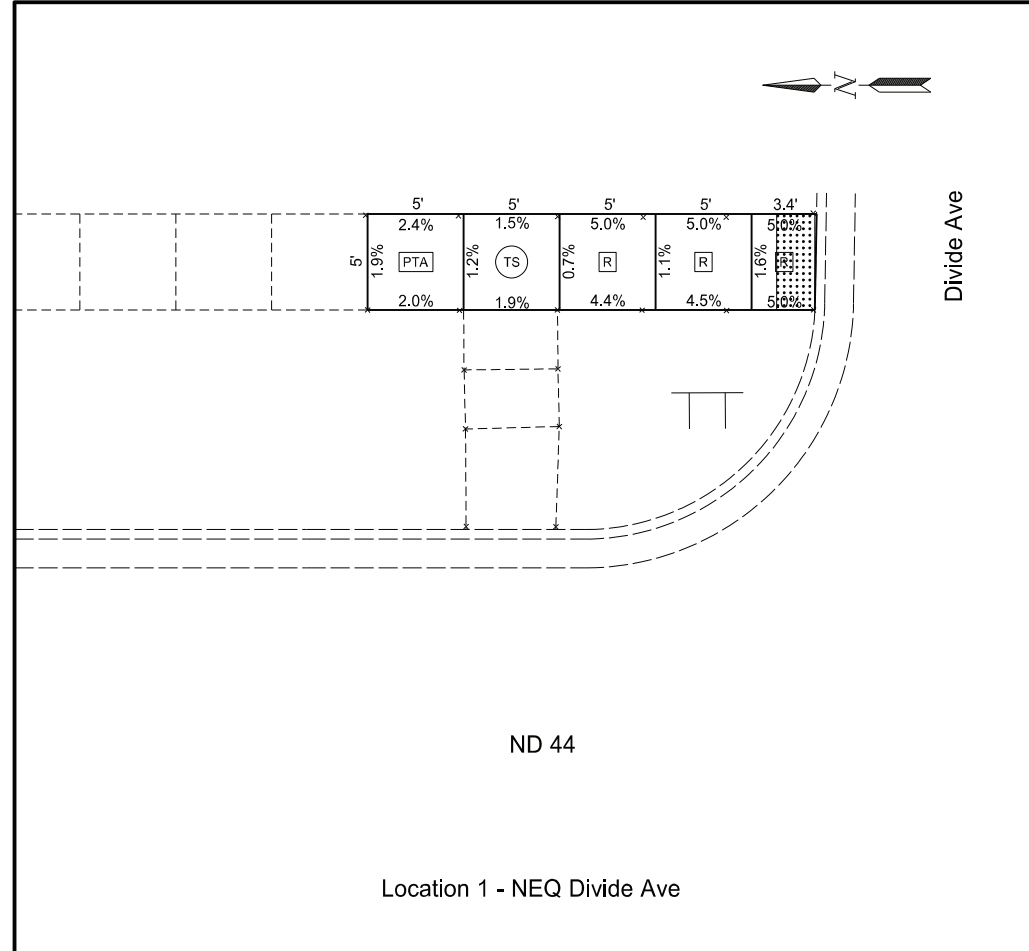
Permanent Sediment & Erosion Control

CPR, Mill & HMA, ADA Curb Ramp Revisions

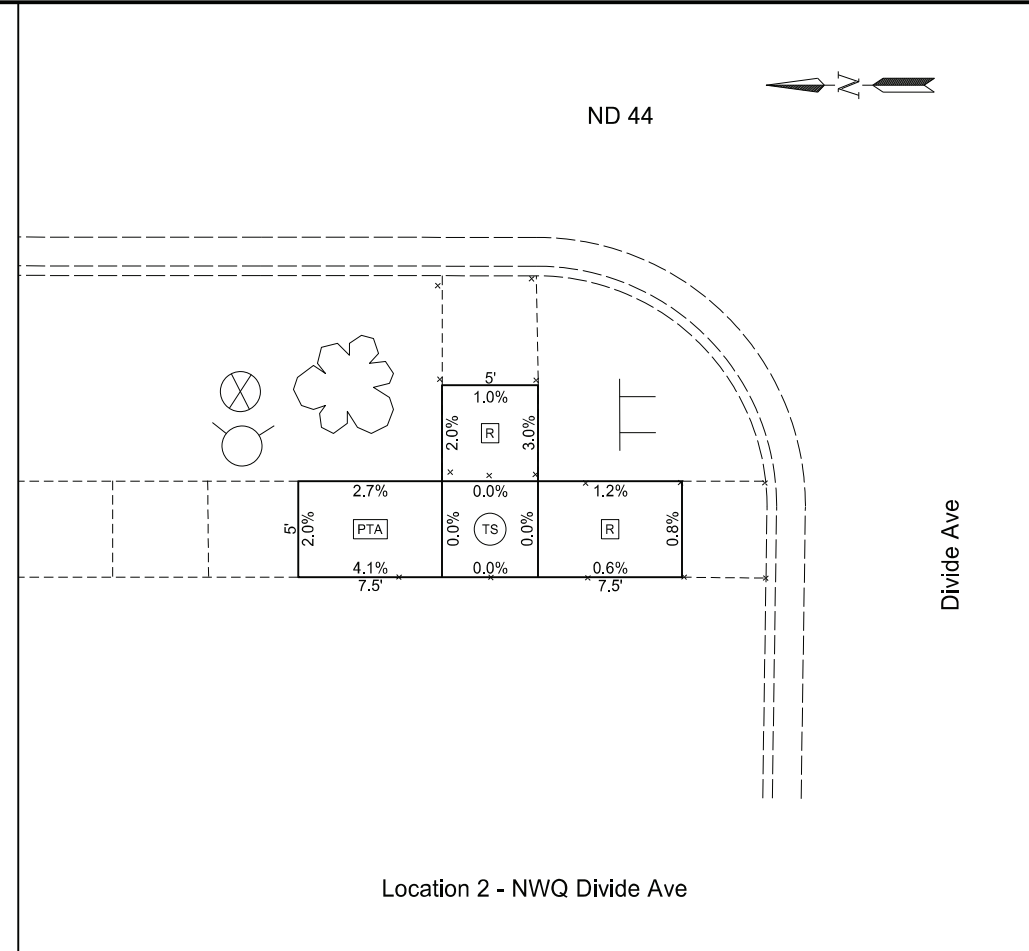
JCT I-29 N to JCT 66



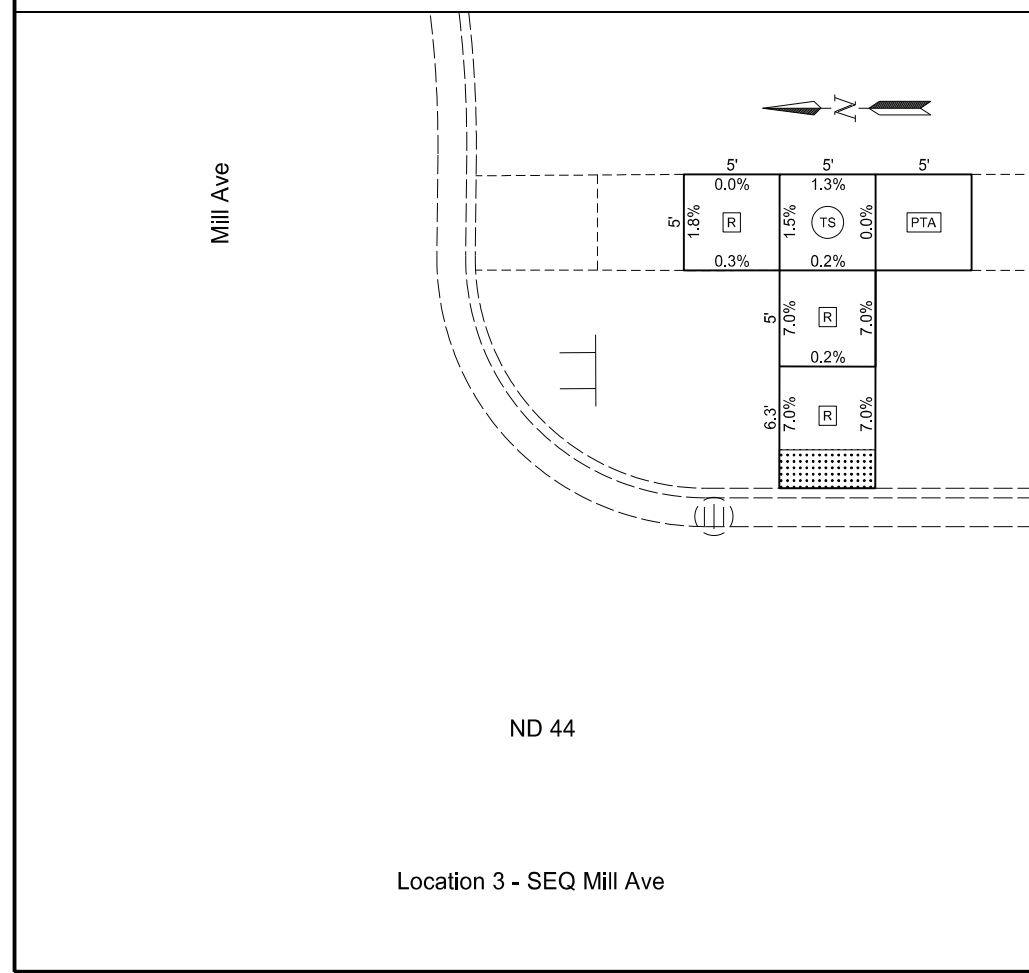
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	80	1



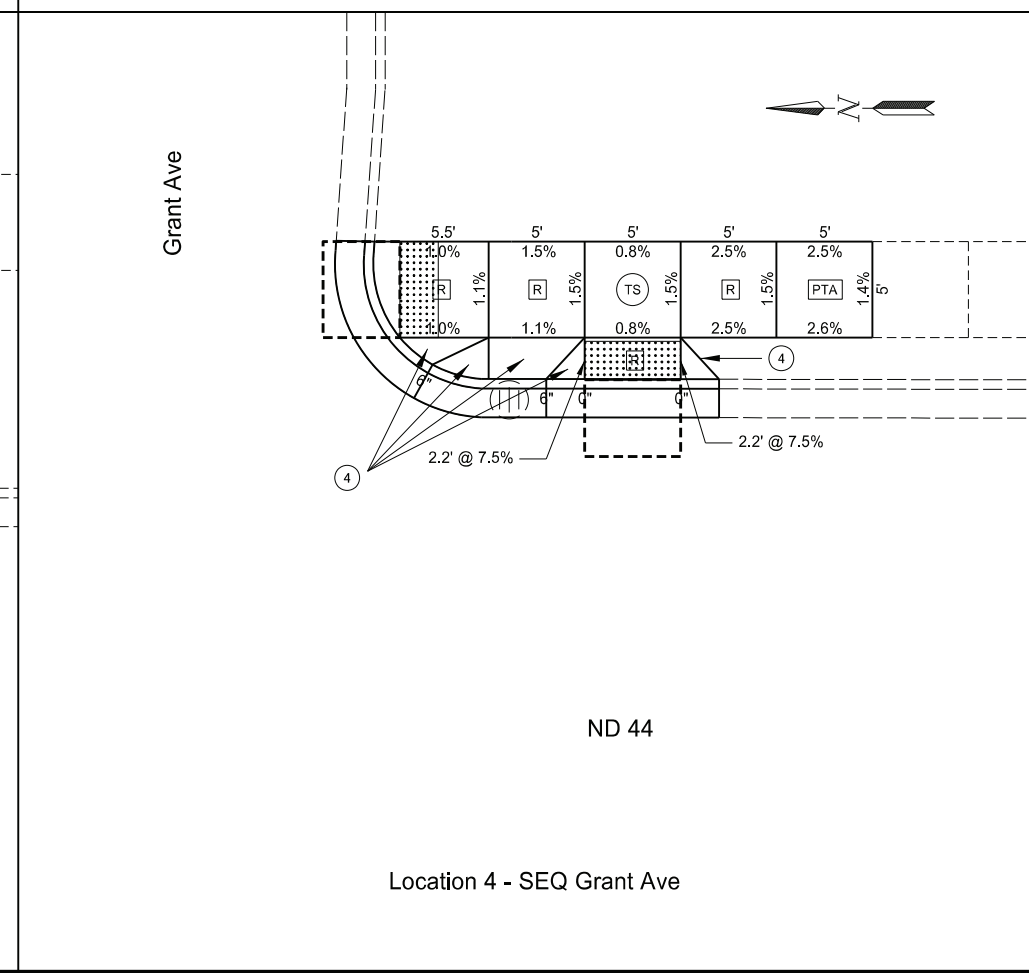
ND 44
Location 1 - NEQ Divide Ave



ND 44
Location 2 - NWQ Divide Ave











ND 44
Location 3 - SEQ Mill Ave



ND 44
Location 4 - SEQ Grant Ave

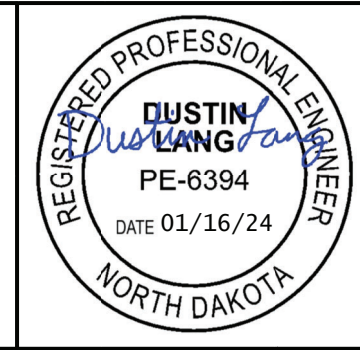
748 0100 Curb & Gutter	
Location 4	26 LF
750 0115 Sidewalk Concrete 4IN	
Location 1	13.0 SY
Location 2	13.9 SY
Location 3	14.6 SY
Location 4	17.8 SY
750 2115 Detectable Warning Panels	
Location 1	10 SF
Location 3	10 SF
Location 4	20 SF

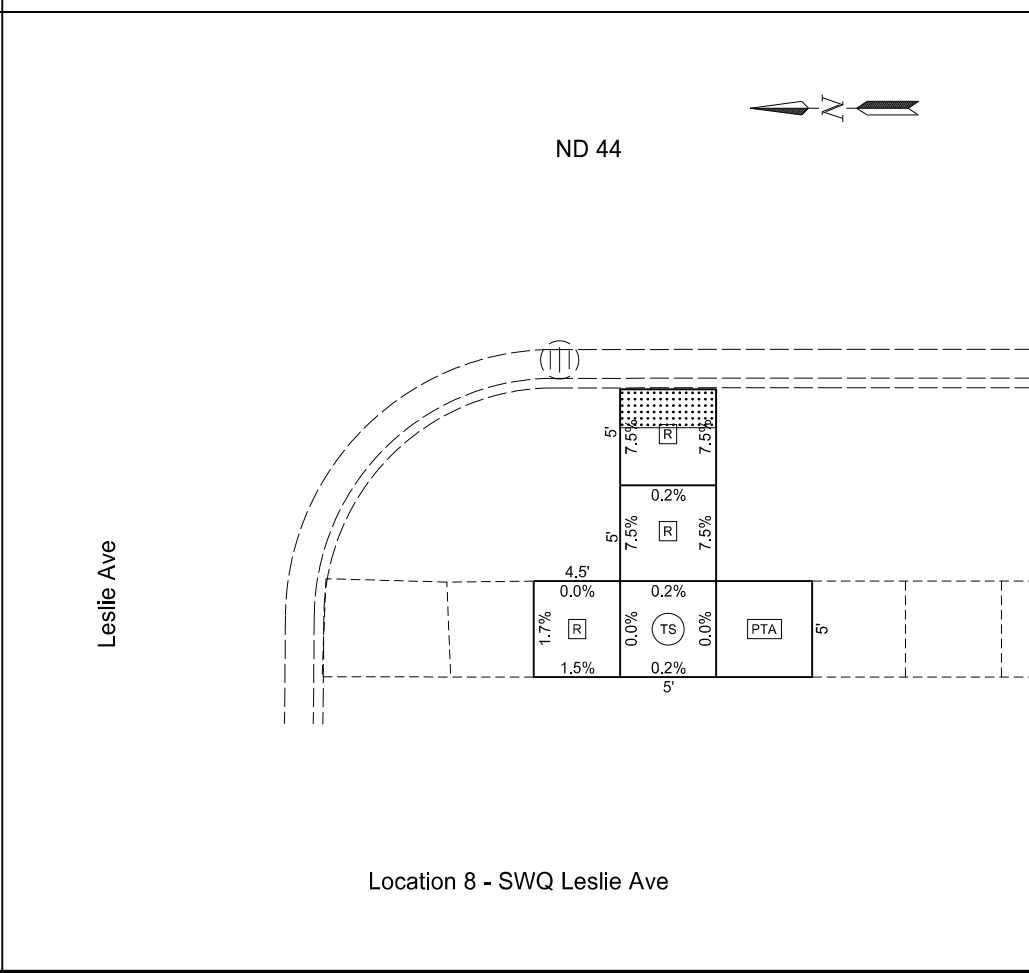
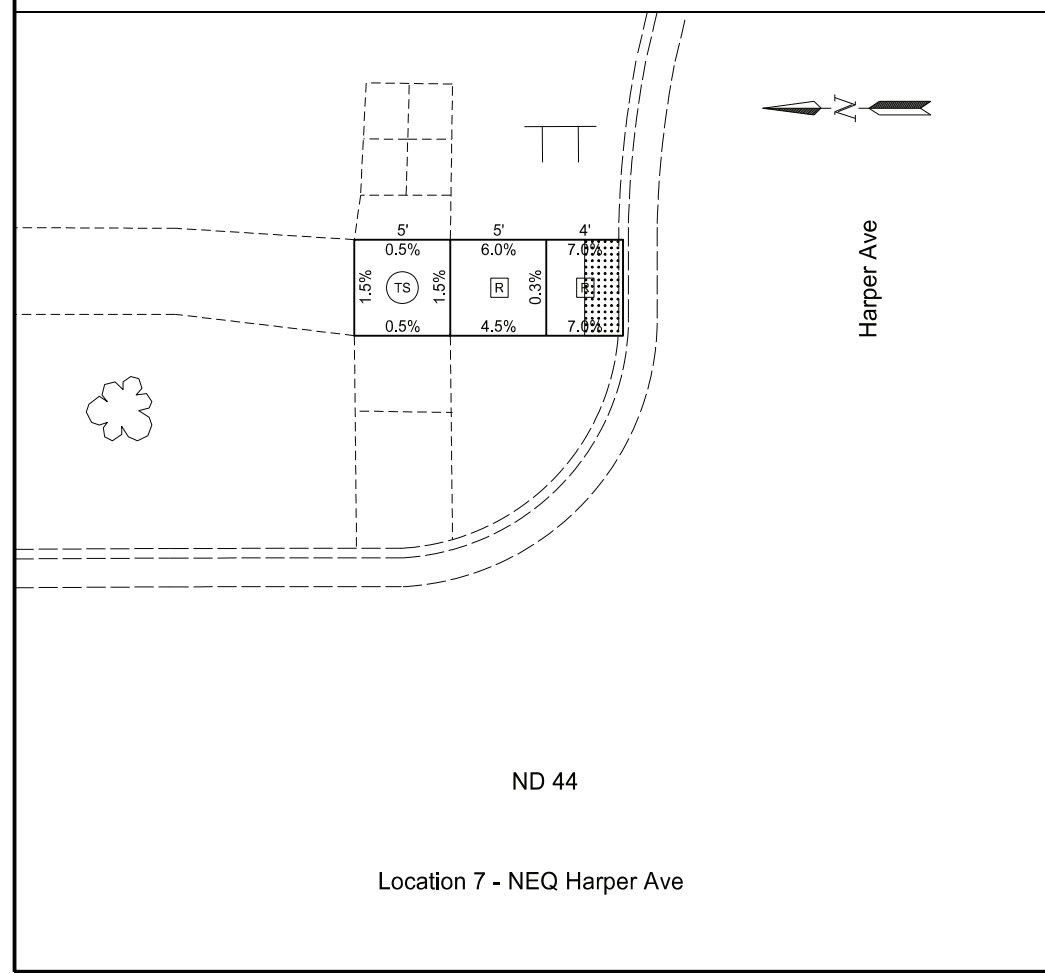
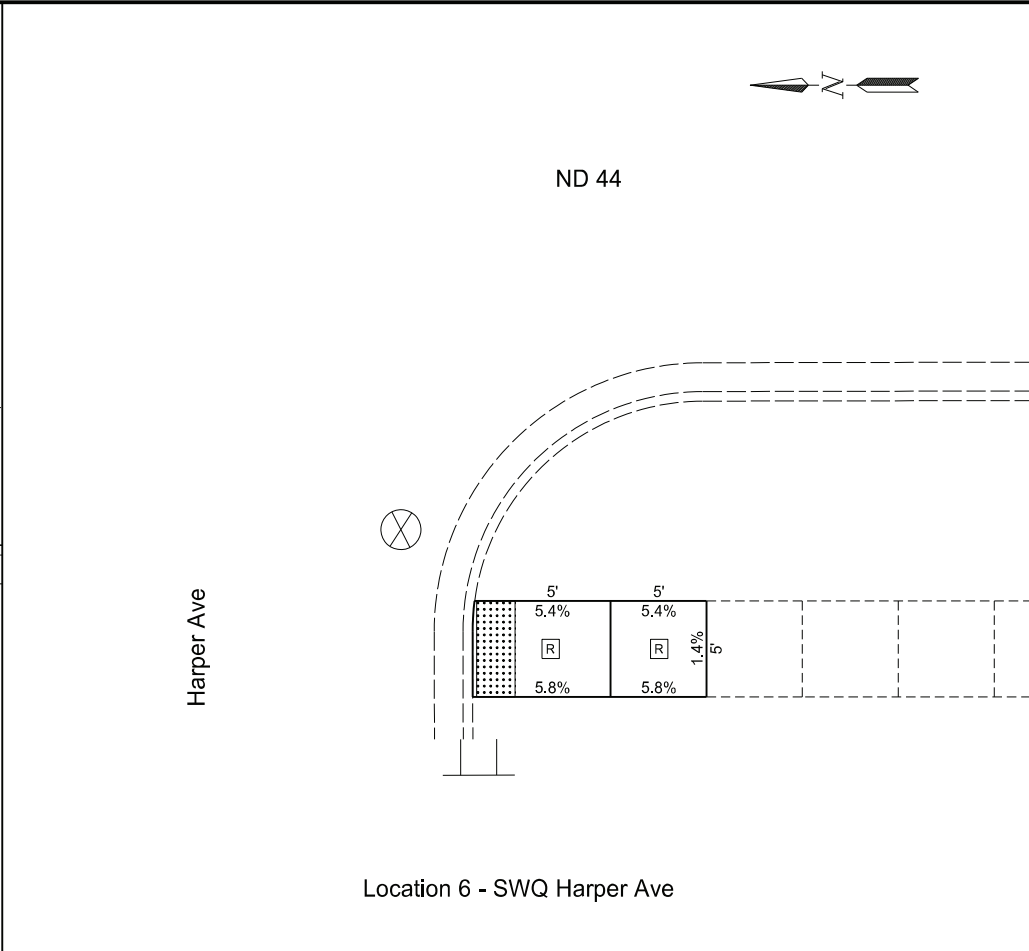
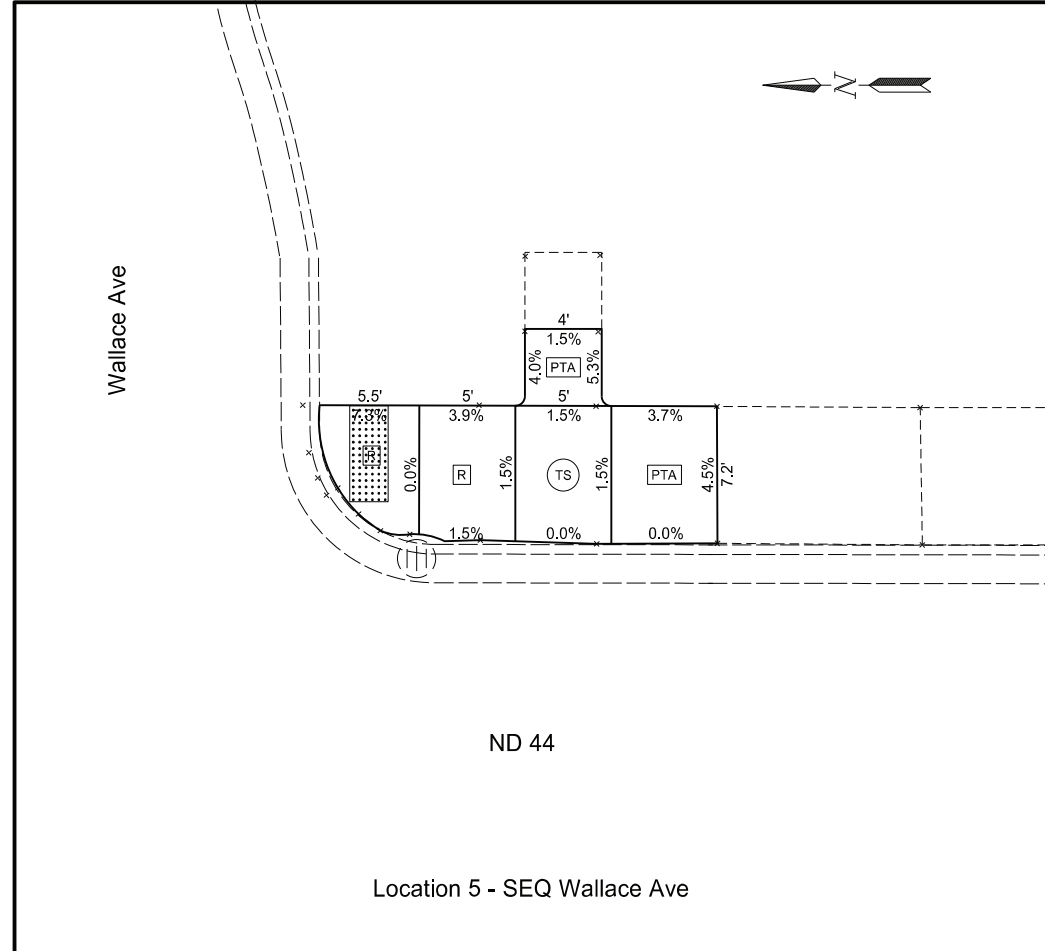
	Detectable Warning Panel						
	Pedestrian Access Route (PAR)						
	Clear Space (4' long x width of PAR clear space outside traffic lanes of travel.)						
	<table border="0"> <tr> <td>Cross Slope</td> <td>Running and Counter Slope</td> </tr> <tr> <td>1.5 % preferred</td> <td>< 4.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>5.0 % maximum</td> </tr> </table>	Cross Slope	Running and Counter Slope	1.5 % preferred	< 4.5 % preferred	2.0 % maximum	5.0 % maximum
Cross Slope	Running and Counter Slope						
1.5 % preferred	< 4.5 % preferred						
2.0 % maximum	5.0 % maximum						
	Pedestrian Access Transition Area (PTA) tie-in to nearest joint (if needed)						
	<table border="0"> <tr> <td>Transition Cross Slope</td> <td>Running Slope</td> </tr> <tr> <td>< 0.5 % change per foot longitudinally</td> <td>< 4.5 % preferred</td> </tr> </table>	Transition Cross Slope	Running Slope	< 0.5 % change per foot longitudinally	< 4.5 % preferred		
Transition Cross Slope	Running Slope						
< 0.5 % change per foot longitudinally	< 4.5 % preferred						
	Turning Space Used at top of ramp or when changing directions.						
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Slope (all directions)							
1.5 % preferred							
2.0 % maximum							
	Ramp						
	<table border="0"> <tr> <td>Cross Slope</td> <td>Running Slope</td> </tr> <tr> <td>1.5 % Preferred</td> <td>< 7.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>8.3 % maximum</td> </tr> </table>	Cross Slope	Running Slope	1.5 % Preferred	< 7.5 % preferred	2.0 % maximum	8.3 % maximum
Cross Slope	Running Slope						
1.5 % Preferred	< 7.5 % preferred						
2.0 % maximum	8.3 % maximum						
	Blended Transition						
	<table border="0"> <tr> <td>Cross Slope</td> <td>Counter Slope</td> </tr> <tr> <td>1.5 % preferred</td> <td>< 4.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>5.0 % maximum</td> </tr> </table>	Cross Slope	Counter Slope	1.5 % preferred	< 4.5 % preferred	2.0 % maximum	5.0 % maximum
Cross Slope	Counter Slope						
1.5 % preferred	< 4.5 % preferred						
2.0 % maximum	5.0 % maximum						
	Flare						
	<table border="0"> <tr> <td>Cross Slope</td> <td></td> </tr> <tr> <td>4:1 or 10:1 maximum (adjacent to non-walkable surface)</td> <td></td> </tr> </table>	Cross Slope		4:1 or 10:1 maximum (adjacent to non-walkable surface)			
Cross Slope							
4:1 or 10:1 maximum (adjacent to non-walkable surface)							
	Curb heights are noted adjacent to curb (0", 3" or 6")						
	HMA						

ADA Curb Ramp Revisions

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66





750 0115 Sidewalk Concrete 4IN	
Location 5	17.3 SY
Location 6	6.7 SY
Location 7	7.8 SY
Location 8	13.9 SY
750 2115 Detectable Warning Panels	
Location 5	10 SF
Location 6	10 SF
Location 7	10 SF
Location 8	10 SF

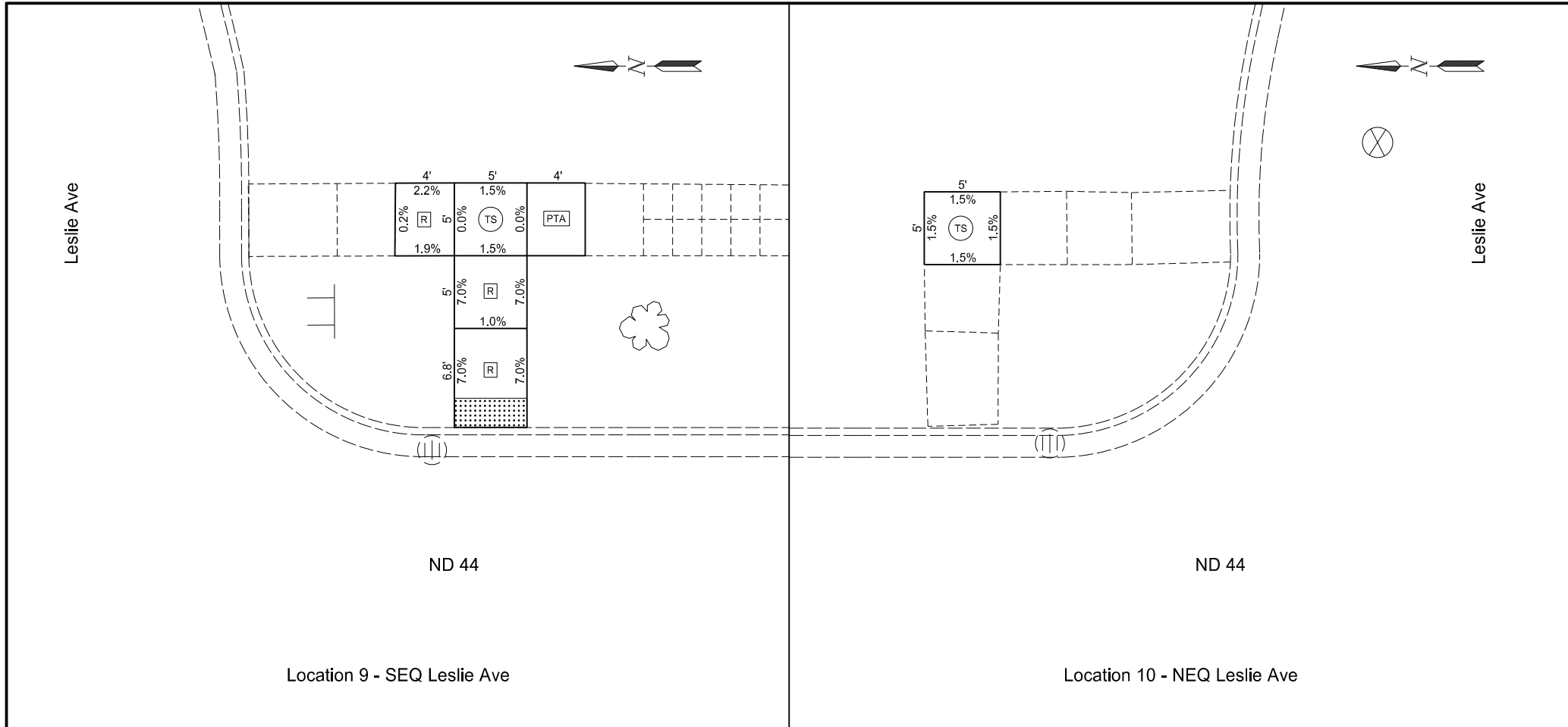
	Detectable Warning Panel						
	Pedestrian Access Route (PAR)						
	Clear Space (4' long x width of PAR clear space outside traffic lanes of travel.)						
	<table border="0"> <tr> <td><u>Cross Slope</u></td> <td><u>Running and Counter Slope</u></td> </tr> <tr> <td>1.5 % preferred</td> <td>< 4.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>5.0 % maximum</td> </tr> </table>	<u>Cross Slope</u>	<u>Running and Counter Slope</u>	1.5 % preferred	< 4.5 % preferred	2.0 % maximum	5.0 % maximum
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	Pedestrian Access Transition Area (PTA) tie-in to nearest joint (if needed)						
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<u>Transition Cross Slope</u>	<u>Running Slope</u>						
< 0.5 % change per foot longitudinally	< 4.5 % preferred						
	Turning Space Used at top of ramp or when changing directions.						
	<table border="0"> <tr> <td><u>Slope (all directions)</u></td> <td></td> </tr> <tr> <td>1.5 % preferred</td> <td></td> </tr> <tr> <td>2.0 % maximum</td> <td></td> </tr> </table>	<u>Slope (all directions)</u>		1.5 % preferred		2.0 % maximum	
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1.5 % preferred							
2.0 % maximum							
	Ramp						
	<table border="0"> <tr> <td><u>Cross Slope</u></td> <td><u>Running Slope</u></td> </tr> <tr> <td>1.5 % Preferred</td> <td>< 7.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>8.3 % maximum</td> </tr> </table>	<u>Cross Slope</u>	<u>Running Slope</u>	1.5 % Preferred	< 7.5 % preferred	2.0 % maximum	8.3 % maximum
<u>Cross Slope</u>	<u>Running Slope</u>						
1.5 % Preferred	< 7.5 % preferred						
2.0 % maximum	8.3 % maximum						
	Blended Transition						
	<table border="0"> <tr> <td><u>Cross Slope</u></td> <td><u>Counter Slope</u></td> </tr> <tr> <td>1.5 % preferred</td> <td>< 4.5 % preferred</td> </tr> <tr> <td>2.0 % maximum</td> <td>5.0 % maximum</td> </tr> </table>	<u>Cross Slope</u>	<u>Counter Slope</u>	1.5 % preferred	< 4.5 % preferred	2.0 % maximum	5.0 % maximum
<u>Cross Slope</u>	<u>Counter Slope</u>						
1.5 % preferred	< 4.5 % preferred						
2.0 % maximum	5.0 % maximum						
	Flare						
	<u>Cross Slope</u>						
	4:1 or 10:1 maximum (adjacent to non-walkable surface)						
	Curb heights are noted adjacent to curb (0", 3" or 6")						
	HMA						

ADA Curb Ramp Revisions

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66










STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	80	3


750 0115 Sidewalk Concrete 4IN	
Location 9	13.8 SY
Location 10	2.8 SY


750 2115 Detectable Warning Panels	
Location 9	10 SF


-  Detectable Warning Panel
-  Pedestrian Access Route (PAR)
-  Clear Space (4' long x width of PAR clear space outside traffic lanes of travel.)



<u>Cross Slope</u>	<u>Running and Counter Slope</u>
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum
-  Pedestrian Access Transition Area (PTA) tie-in to nearest joint (if needed)

<u>Transition Cross Slope</u>	<u>Running Slope</u>
< 0.5 % change per foot longitudinally	< 4.5 % preferred
-  Turning Space
Used at top of ramp or when changing directions.

<u>Slope (all directions)</u>
1.5 % preferred
2.0 % maximum
-  Ramp

<u>Cross Slope</u>	<u>Running Slope</u>
1.5 % Preferred	< 7.5 % preferred
2.0 % maximum	8.3 % maximum
-  Blended Transition

<u>Cross Slope</u>	<u>Counter Slope</u>
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum
-  Flare

<u>Cross Slope</u>
4:1 or 10:1 maximum (adjacent to non-walkable surface)
-  Curb heights are noted adjacent to curb (0", 3" or 6")
-  HMA

ADA Curb Ramp Revisions

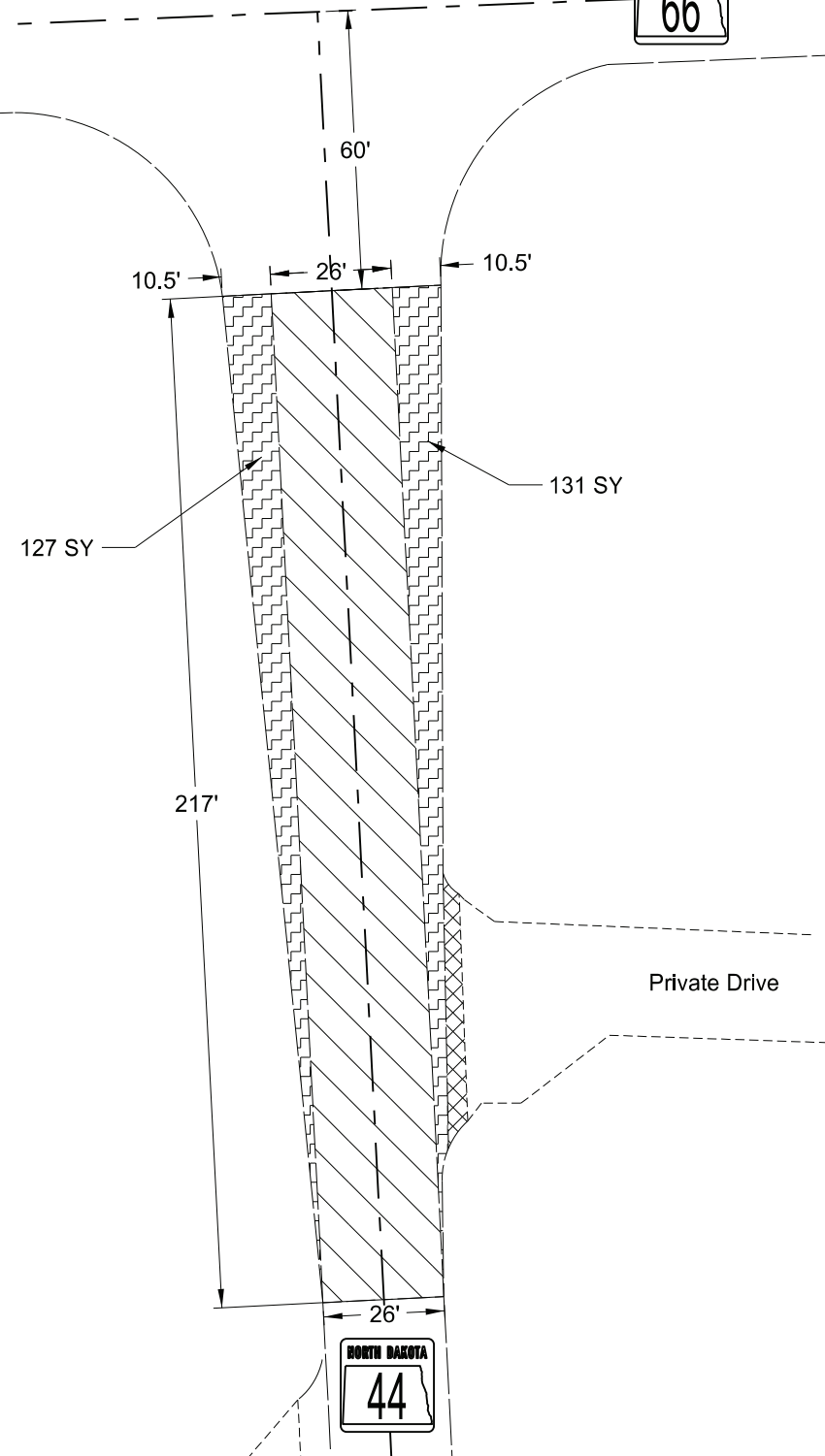
CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



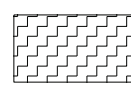




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	90	1



Estimated Quantities

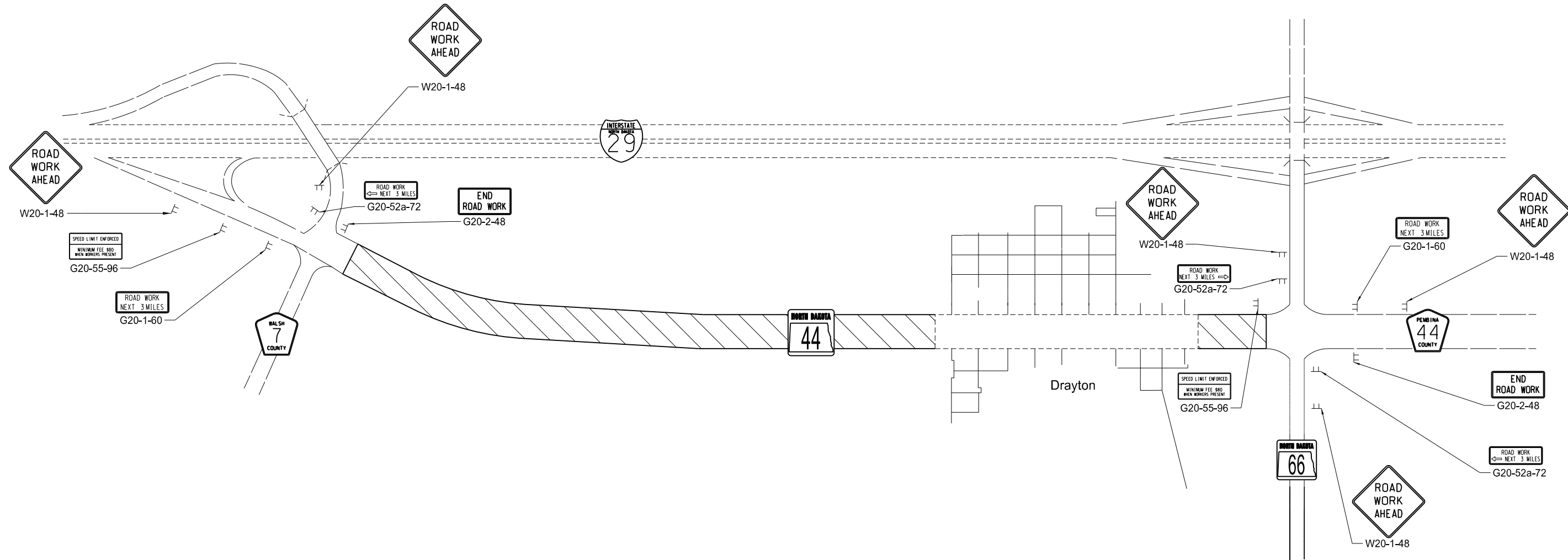
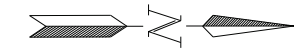
Milling Pavement Surface	258 SY
RAP - Superpave FAA 43 @ 2 Ton/CY	29 Ton
PG 58S-34 Asphalt Cement @ 5.2%	2 Ton
Tack Coat @ 0.075 Gal/SY	19 Gal

-  2" Mill & 2" HMA (Additional Quantity)
-  Mill & HMA (Typical Section 1)
-  Mill & HMA (See Approach Detail)

Paving Layout
 JCT ND 66
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66

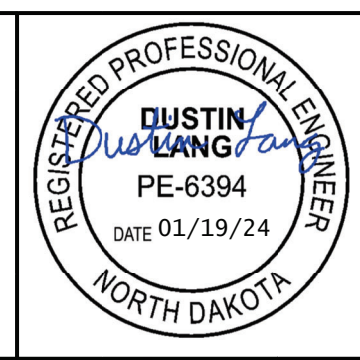


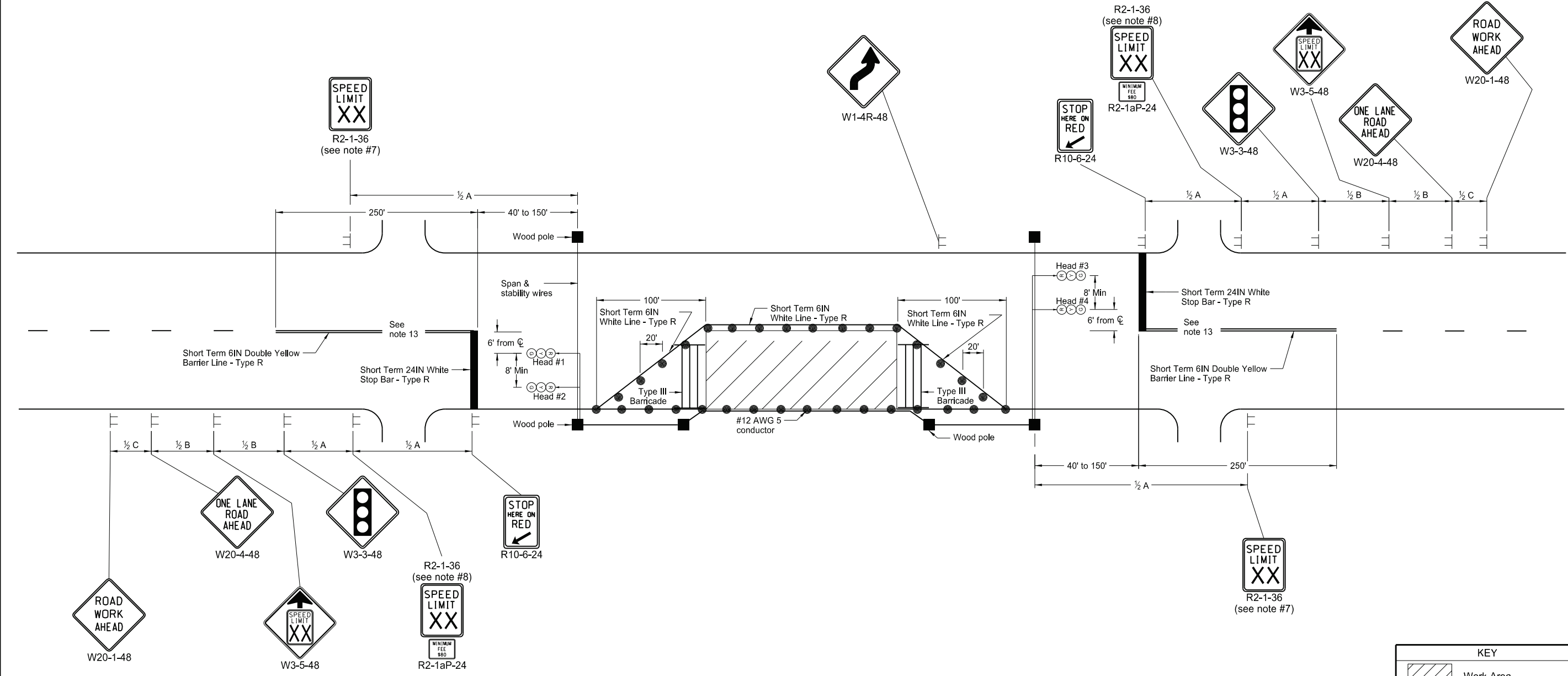
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	100	4



 Work Zone

Work Zone Traffic Control
 Typical Section 1
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66





KEY	
	Work Area
	Type III Barricade
	Sign
	Delineator Drum
	Wood Pole

- Notes:
- Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
 - Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
 - The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
 - Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
 - Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
 - See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 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.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Continue double yellow centerline thru private drives.
 - Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 - As an option, use solar powered signals instead of wood pole signal system.

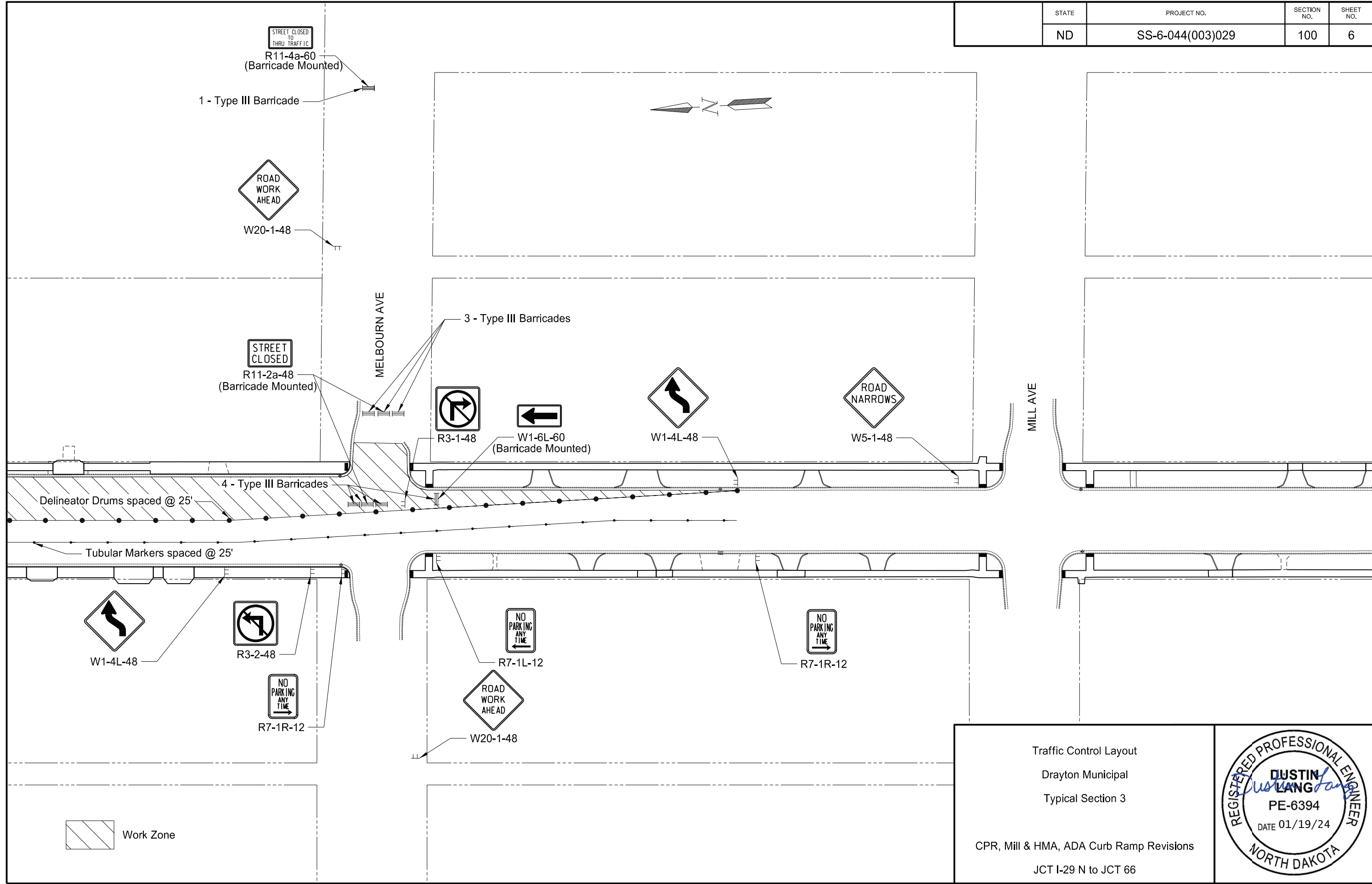
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 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

SUGGESTED TIMING AND SIGNAL SEQUENCE	Green			Yellow			Red		
	Heads 1 & 2	Heads 3 & 4	Time	Heads 1 & 2	Heads 3 & 4	Time	Heads 1 & 2	Heads 3 & 4	Time
Cycle = 90 seconds	18.0	4.5	22.5	18.0	4.5	22.5	18.0	4.5	22.5
Percent of Cycle	20	5	25	20	5	25	20	5	25

Traffic Control Layout
 Drayton Municipal
 Typical Section 2
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66

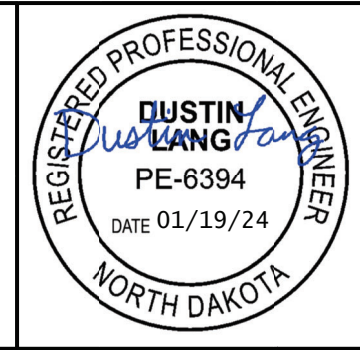


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	100	6

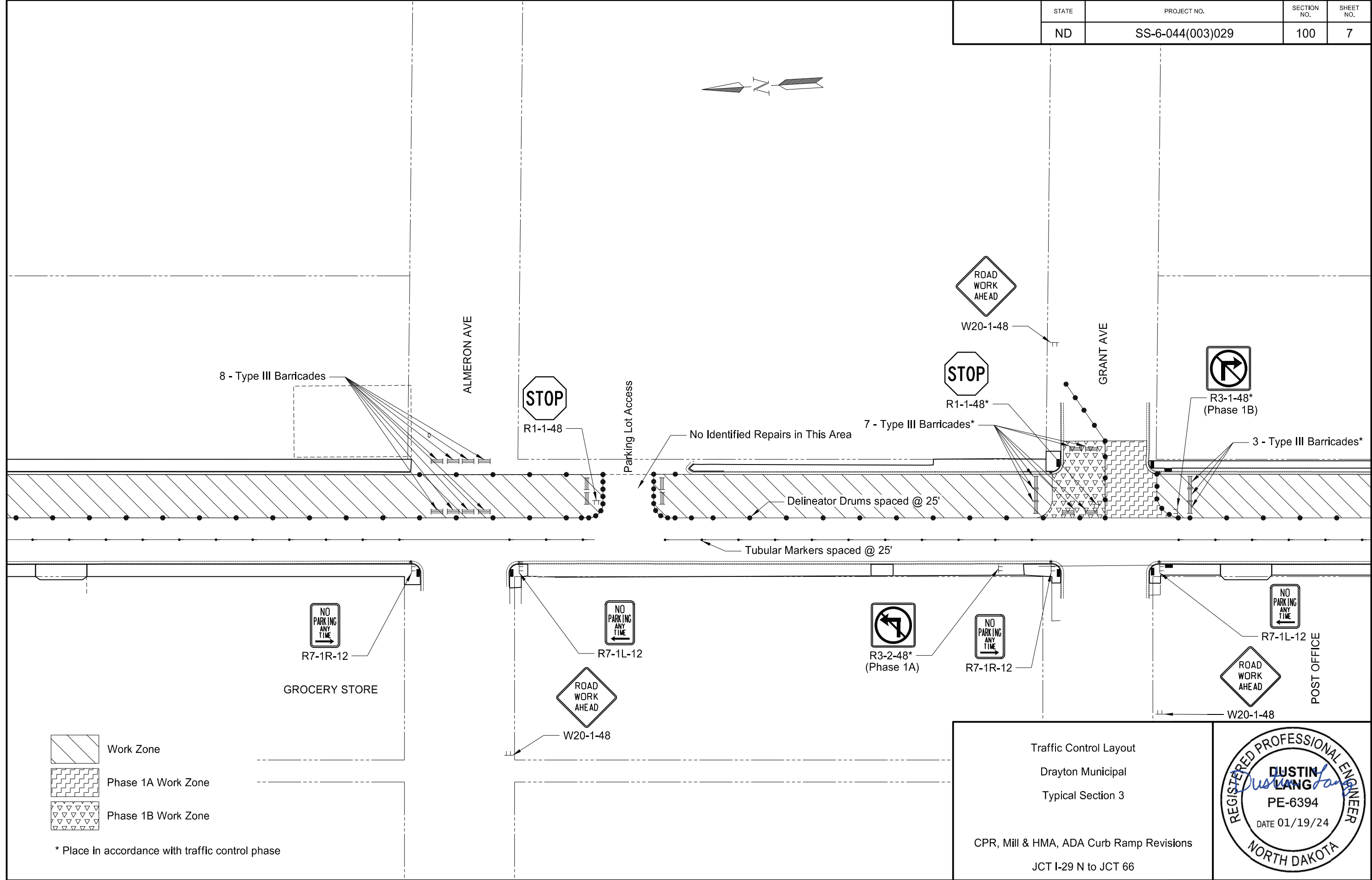


 Work Zone

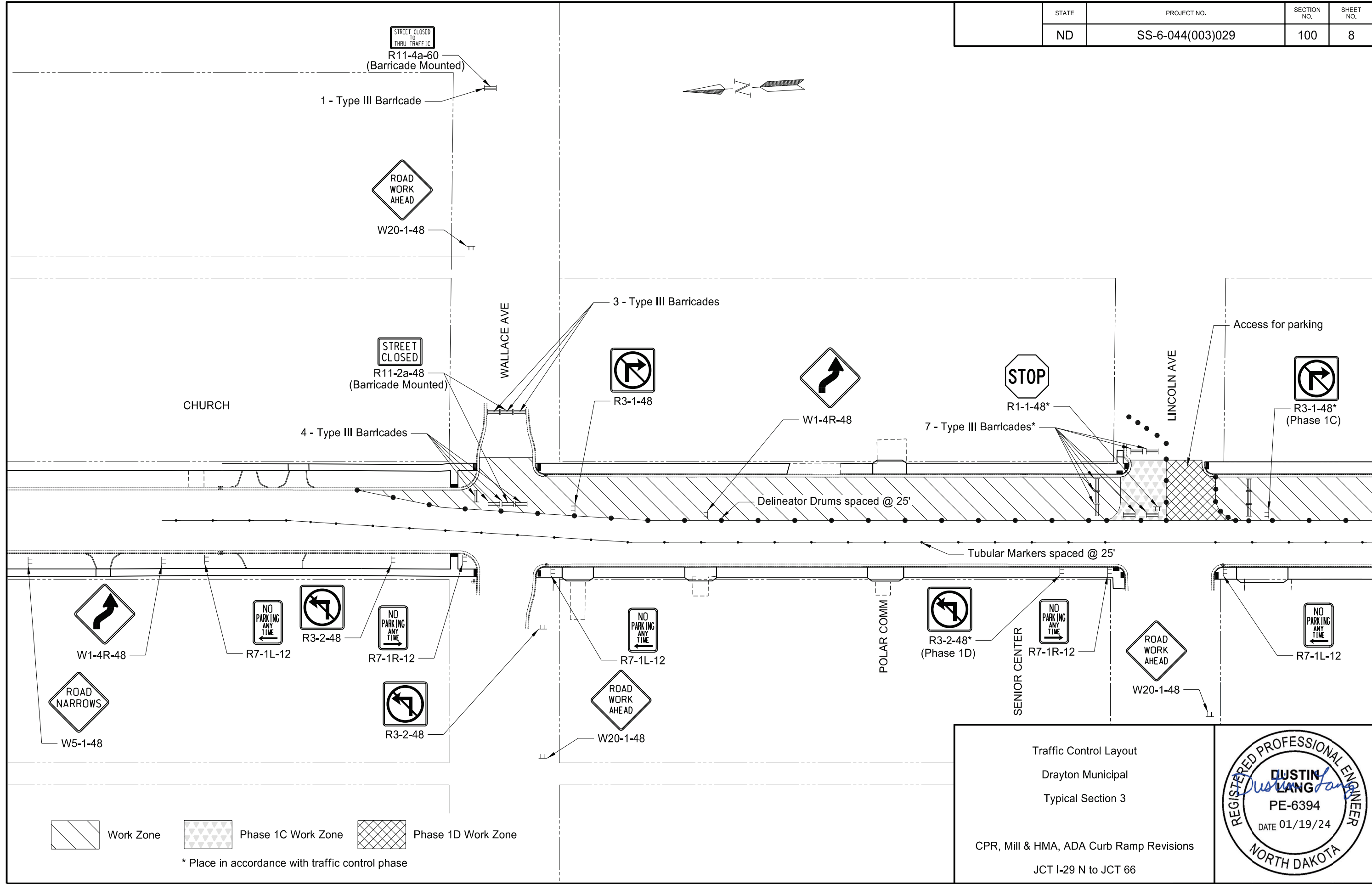
Traffic Control Layout
 Drayton Municipal
 Typical Section 3
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



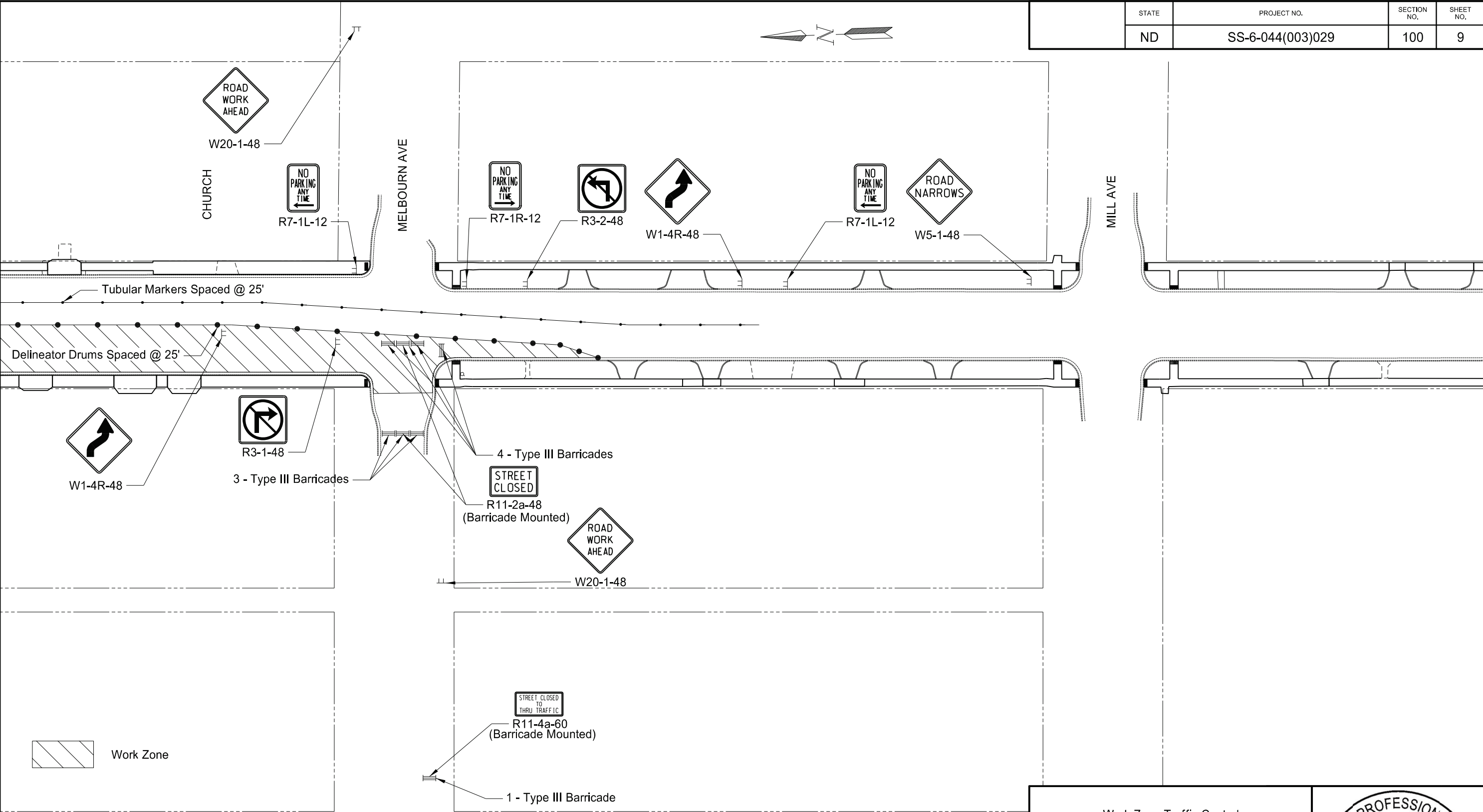
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	7



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	8



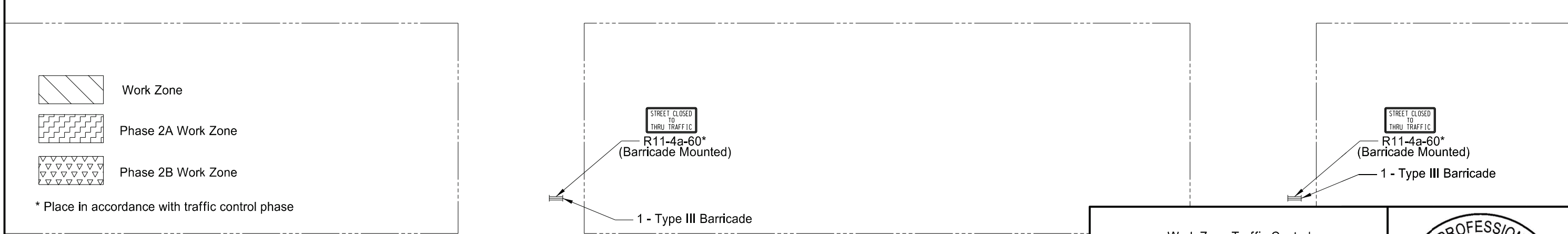
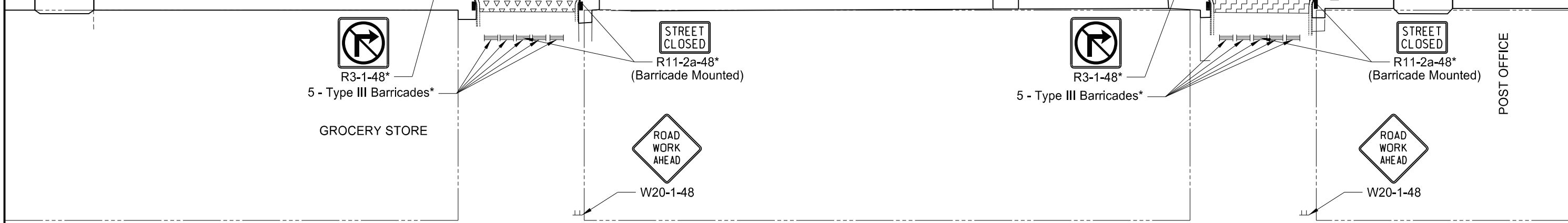
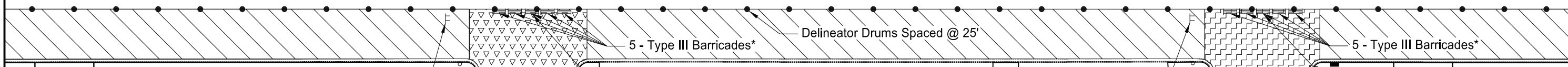
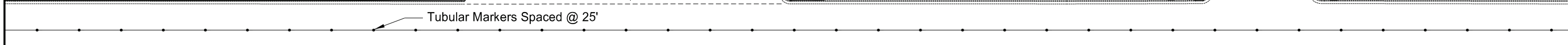
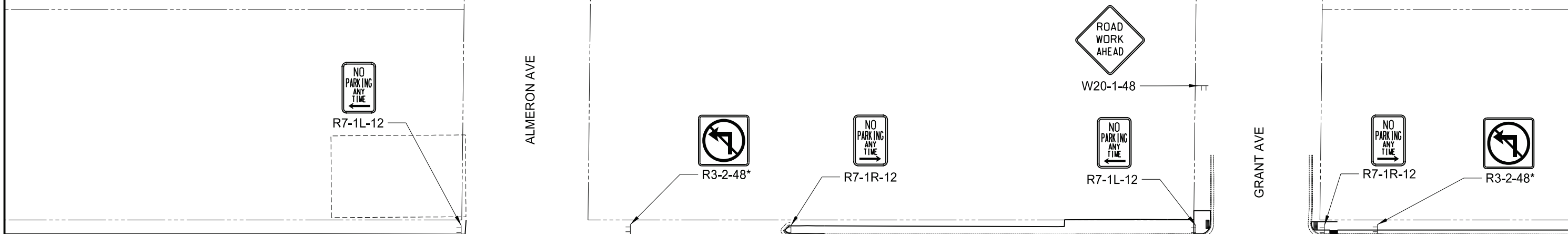
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	9



Work Zone Traffic Control
 Drayton Municipal
 Typical Section 3
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



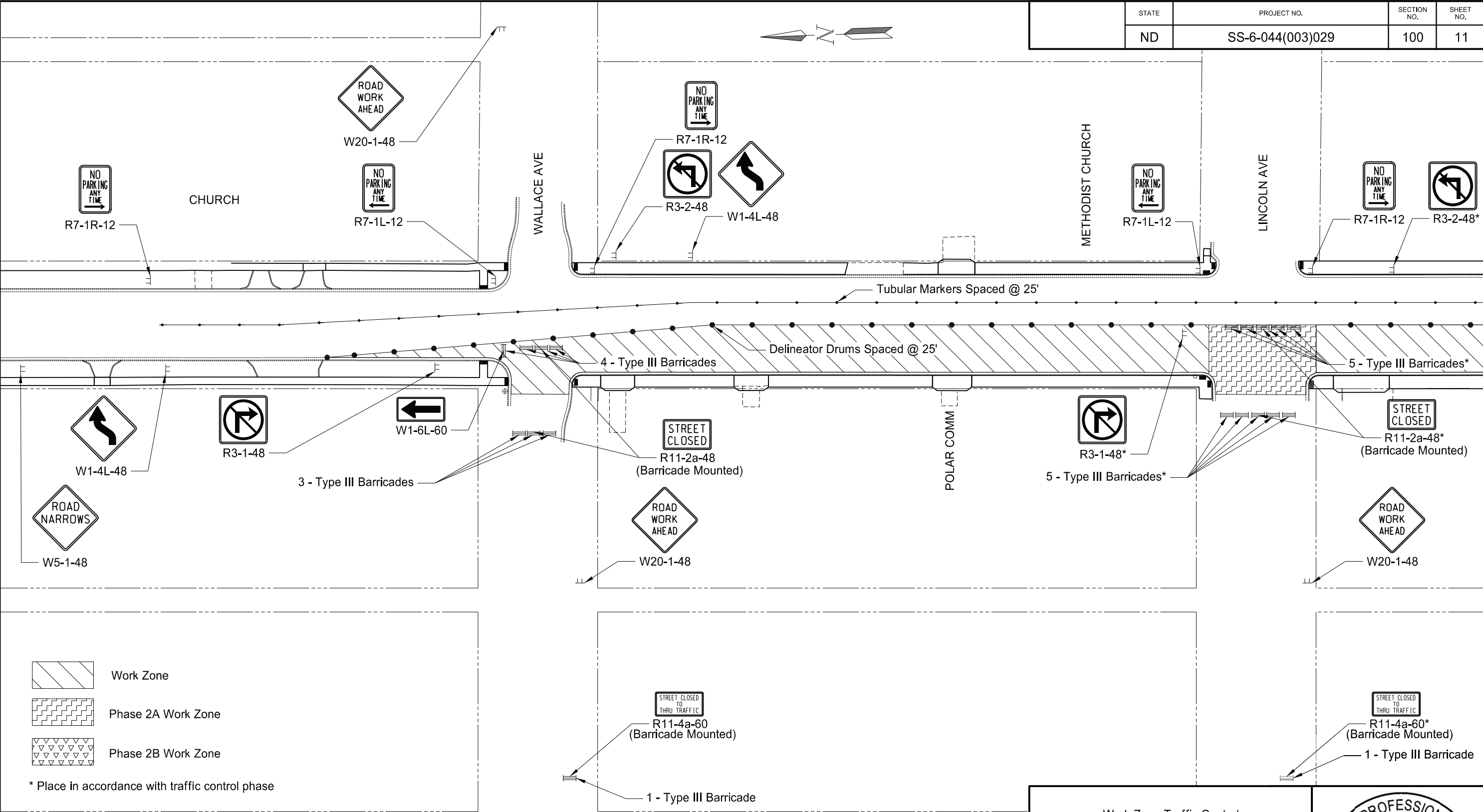
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	100	10



Work Zone Traffic Control
 Drayton Municipal
 Typical Section 3
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	11

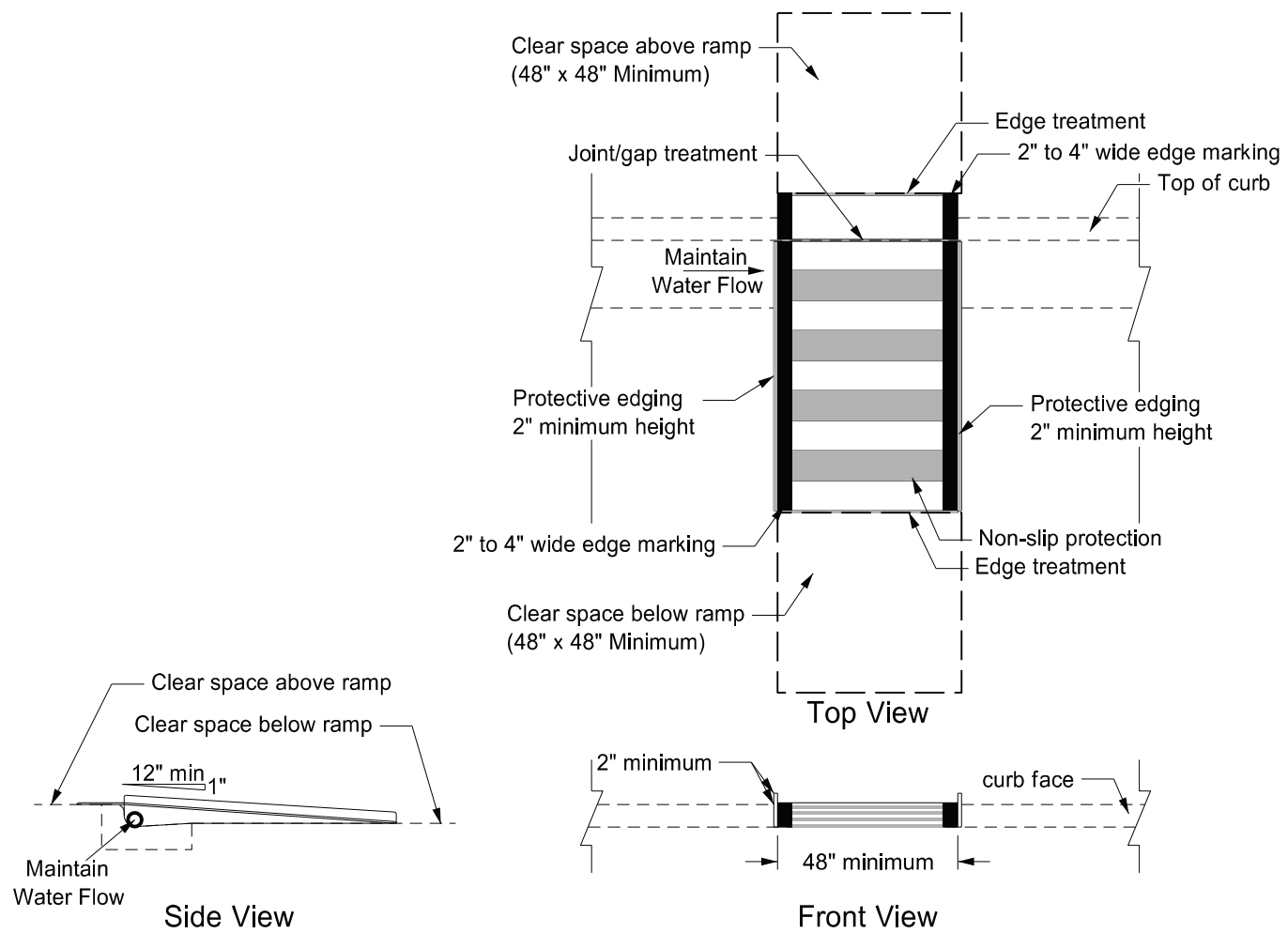


Work Zone Traffic Control
 Drayton Municipal
 Typical Section 3

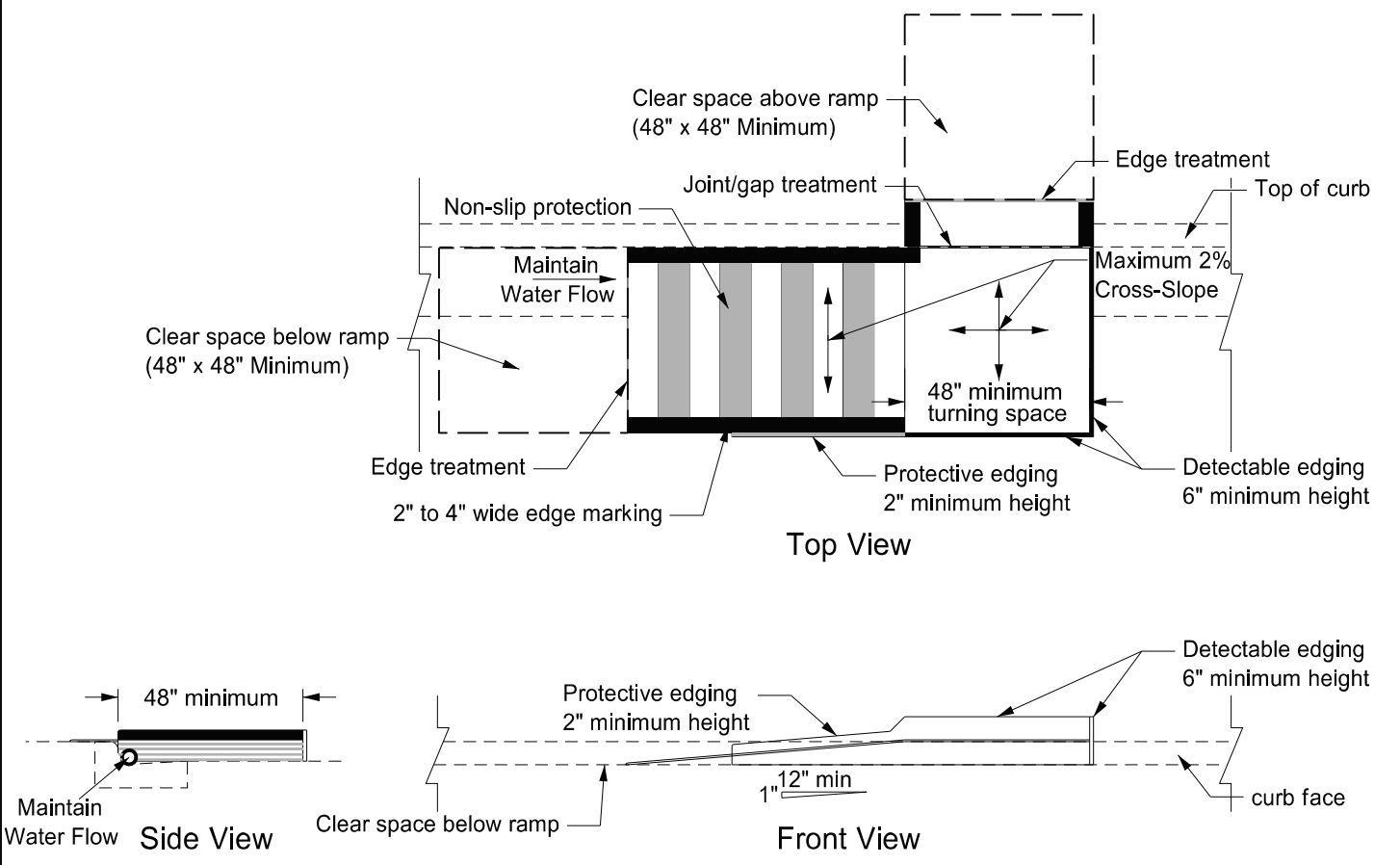
CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



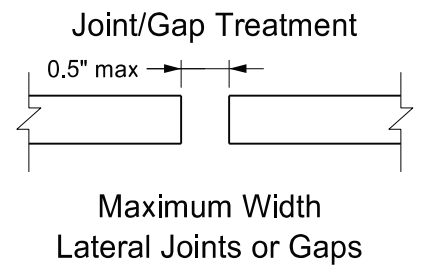
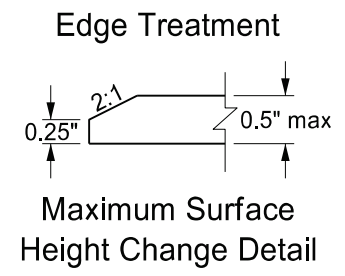
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	12



Temporary Perpendicular Curb Ramp



Temporary Parallel Curb Ramp



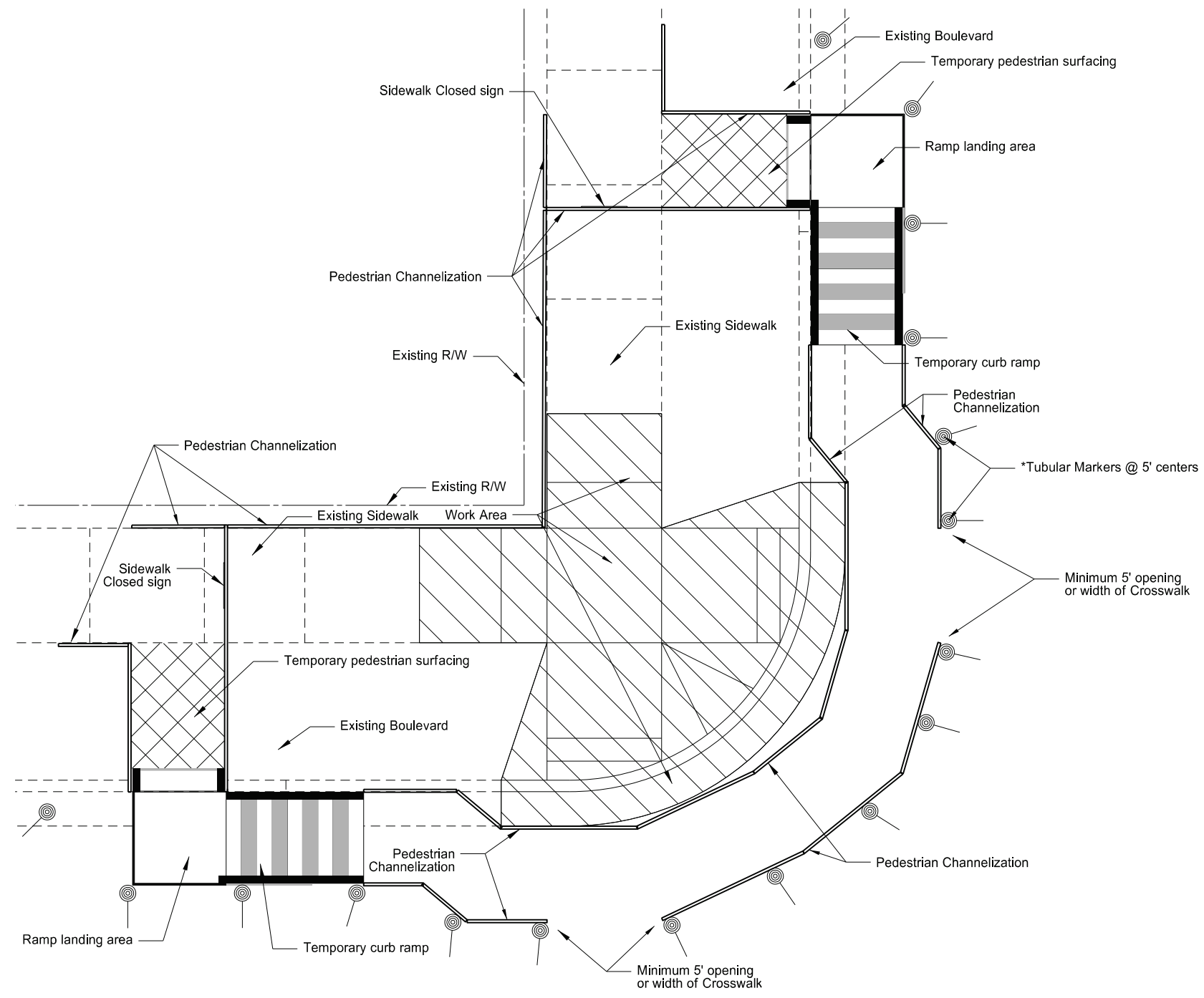
Temporary Pedestrian Curb Ramp Details

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



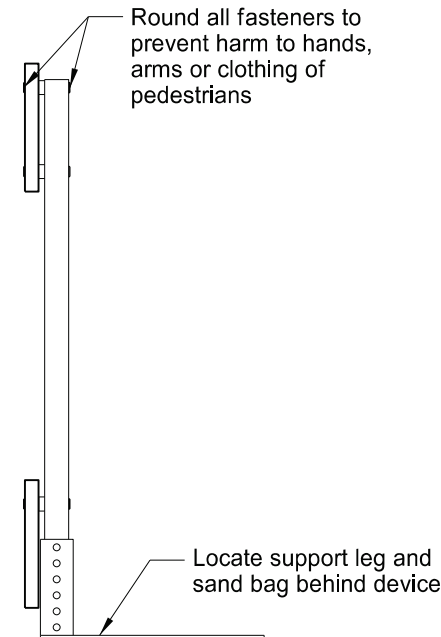
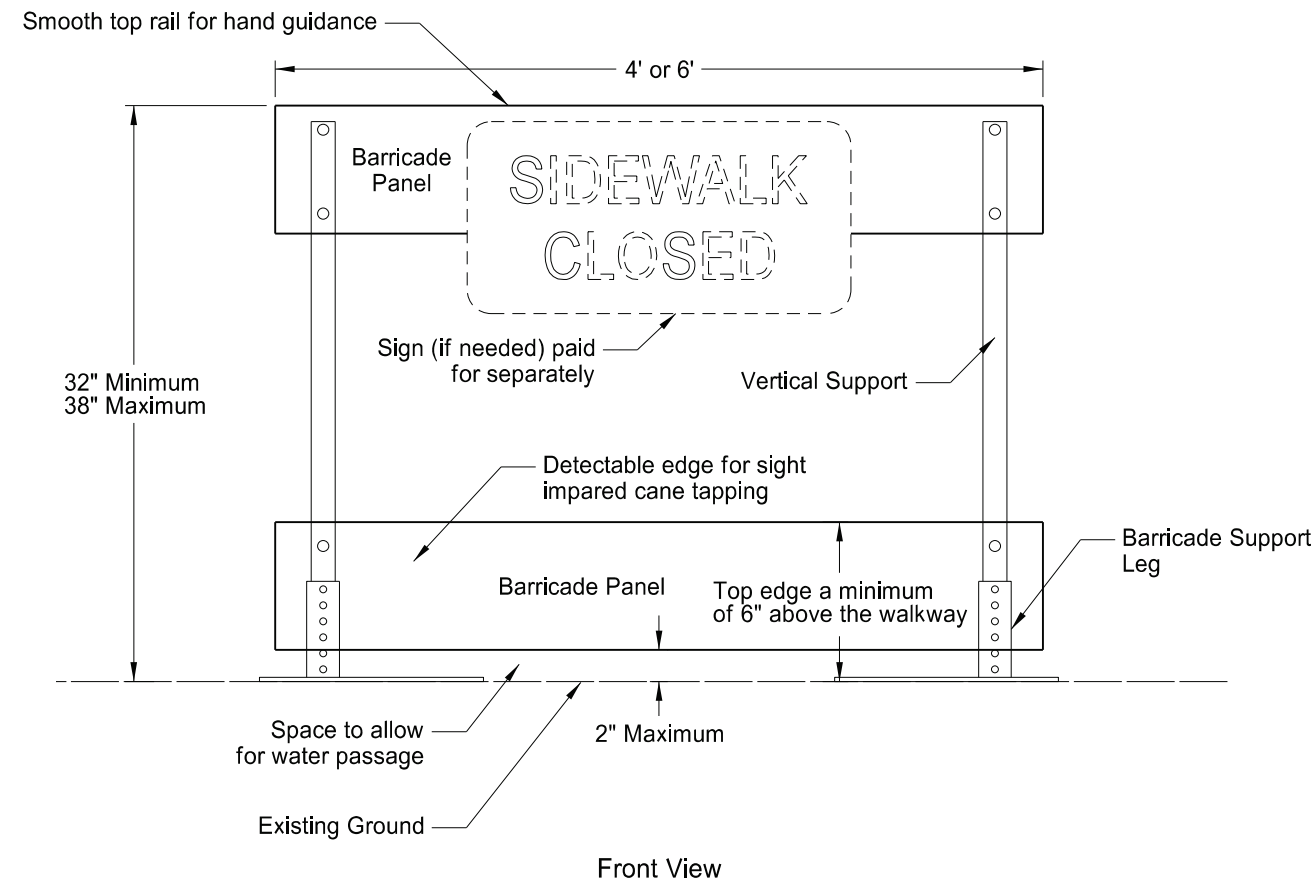
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	100	13



*NOTE: Eliminate tubular markers if pedestrian channelization is retro-reflective

<p>Temporary Pedestrian Access Route</p> <p>CPR, Mill & HMA, ADA Curb Ramp Revisions</p> <p>JCT I-29 N to JCT 66</p>	<p>REGISTERED PROFESSIONAL ENGINEER DUSTIN LANG PE-6394 DATE 01/19/24 NORTH DAKOTA</p>
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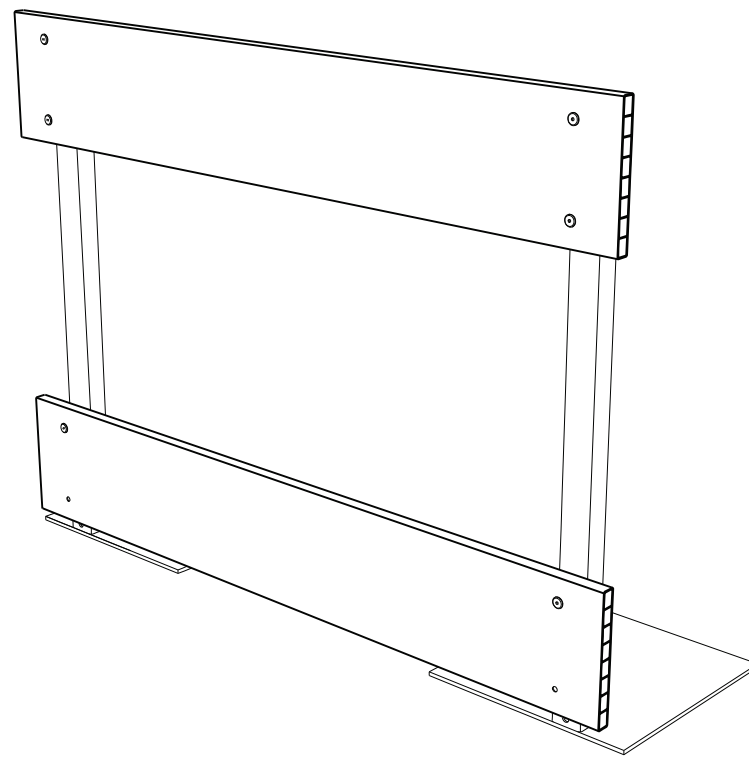
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	100	14



NOTES:

Sidewalk Barricades

1. Provide self standing sidewalk barricade with no supports extending into the pedestrians path.
2. Use orange or orange and white diagonal striped barricade panels contrasting with the walkway surface.
3. Provide ADA compliant and NCHRP 350 or Mash Test Level 3 (TL3) approved sidewalk barricades.
4. Include all costs to furnish, maintain and remove sidewalk barricades in the price bid for "Sidewalk Barricade".



Perspective View

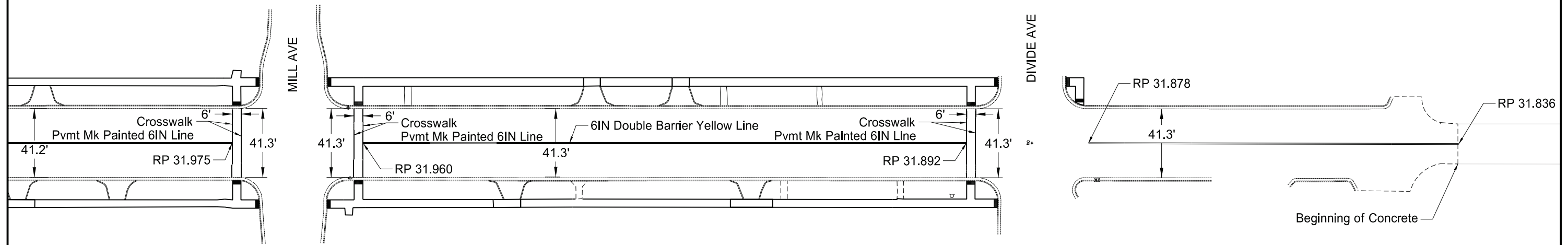
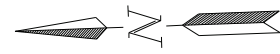
Sidewalk Barricade

CPR, Mill & HMA, ADA Curb Ramp Revisions

JCT I-29 N to JCT 66



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	120	1

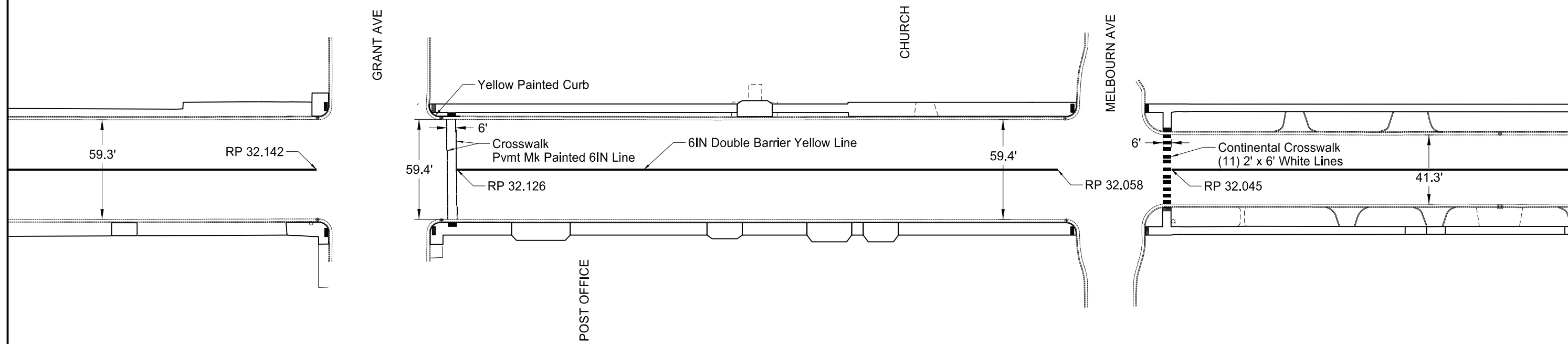
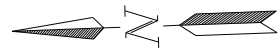


762 1106 Pvmt Mk Painted 6IN Line
 Crosswalk 248 LF

GAS STATION

Pavement Marking Layout Drayton Municipal CPR, Mill & HMA, ADA Curb Ramp Revisions JCT I-29 N to JCT 66	
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-044(003)029	120	2



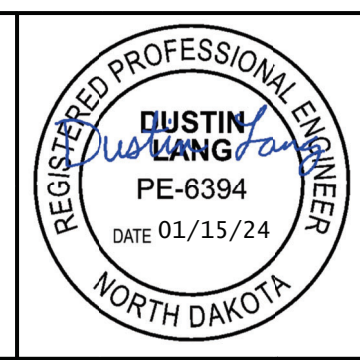
762 0103 Pvmt Mk Painted-Message
Continental Crosswalk 132 SF

762 1106 Pvmt Mk Painted 6IN Line
Crosswalk 119 LF

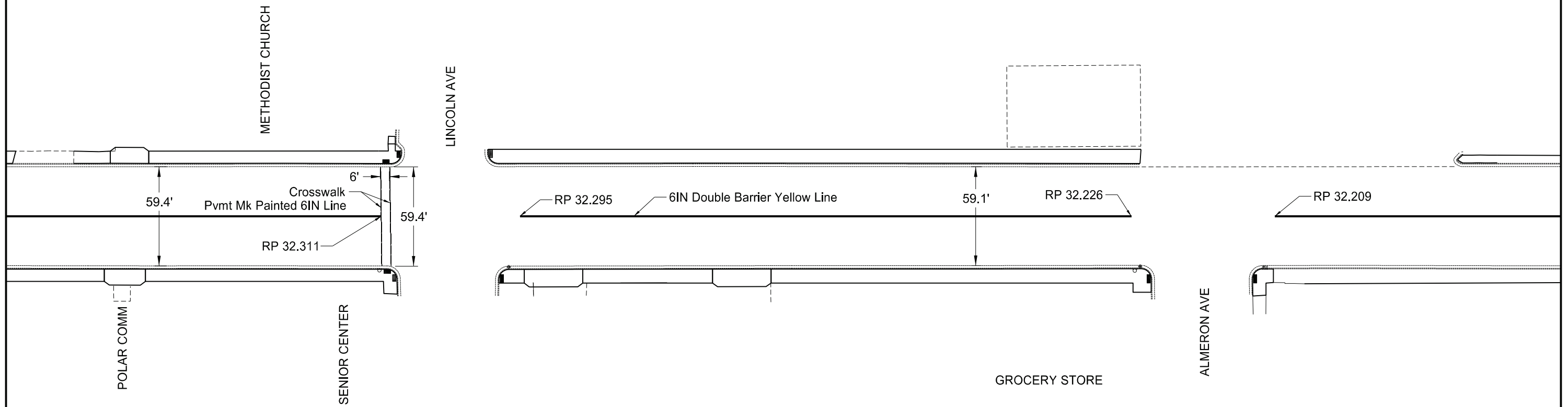
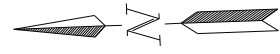
762 1140 Pvmt Mk Painted-Curb Top & Face
Yellow Curb Top & Face 28 LF

Pavement Marking Layout
Drayton Municipal

CPR, Mill & HMA, ADA Curb Ramp Revisions
JCT I-29 N to JCT 66



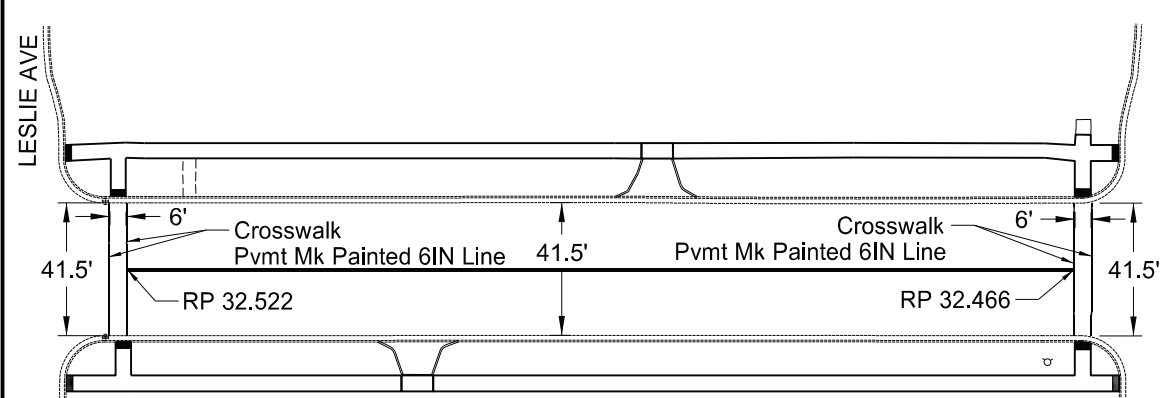
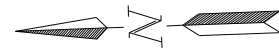
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	ND	SS-6-044(003)029	120	3



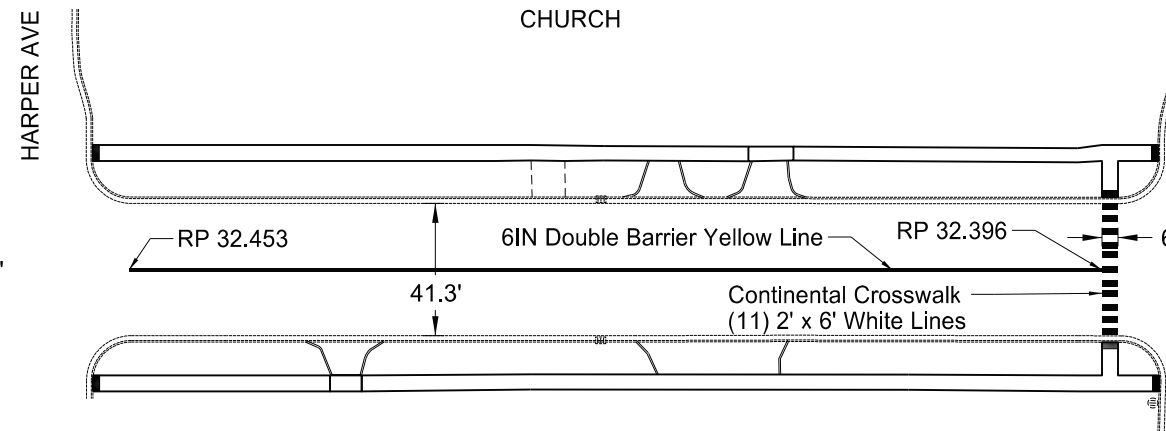
762 1106 Pvmt Mk Painted 6IN Line
 Crosswalk 119 LF

Pavement Marking Layout Drayton Municipal CPR, Mill & HMA, ADA Curb Ramp Revisions JCT I-29 N to JCT 66	
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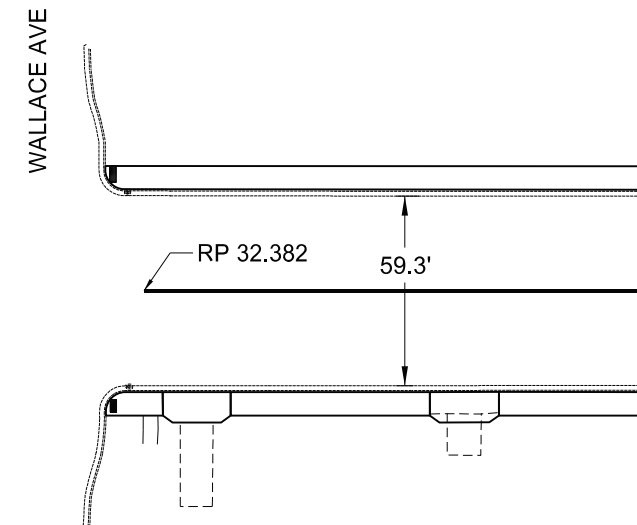
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	ND	SS-6-044(003)029	120	4



762 0103 Pvmt Mk Painted-Message
Continental Crosswalk 132 SF

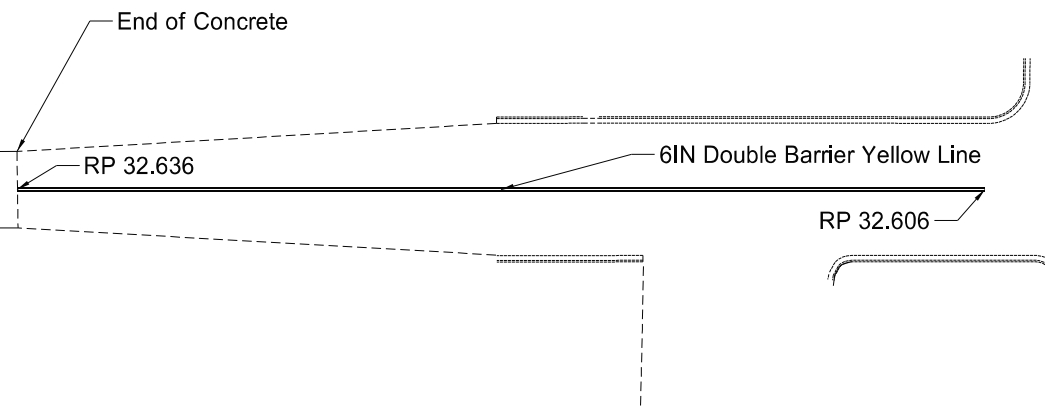
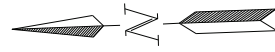


762 1106 Pvmt Mk Painted 6IN Line
Crosswalk 166 LF

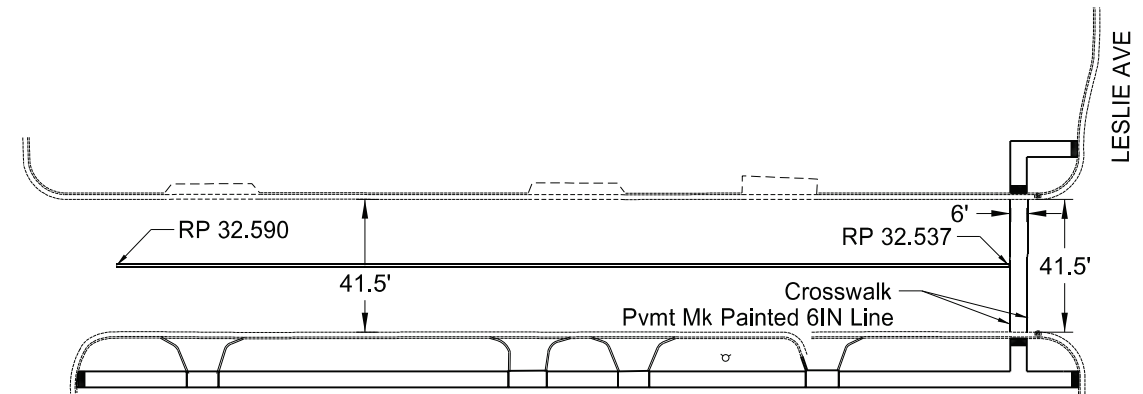


<p>Pavement Marking Layout Drayton Municipal</p> <p>CPR, Mill & HMA, ADA Curb Ramp Revisions JCT I-29 N to JCT 66</p>	
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-044(003)029	120	5



SCRIBNER AVE



LESLIE AVE

762 1106 Pvmt Mk Painted 6IN Line
 Crosswalk 83 LF

Pavement Marking Layout
 Drayton Municipal
 CPR, Mill & HMA, ADA Curb Ramp Revisions
 JCT I-29 N to JCT 66



NDDOT ABBREVIATIONS

? This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned
 Abut abutment
 Ac acres
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 A ampere
 & and
 Appr approach
 Approx approximate
 ACP asbestos cement pipe
 Asph asphalt
 AC asphalt cement
 Assmd assumed
 @ at
 Atten attenuation
 ATR automatic traffic recorder
 Ave Avenue
 Avg average
 ADT average daily traffic
 Az azimuth
 Bk back
 BF back face
 Bs backsight
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 Brg bearing
 BI beehive inlet
 Beg begin
 BG below grade
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 Bd Ft board feet
 BH bore hole
 BS both sides
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 BC brass cap
 Brkwy breakaway
 Br bridge

Bldg building
 BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 C Gr coarse gravel
 CS coarse sand
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 CECB concrete erosion control blanket
 Cond conductor
 Const construction
 Cont continuous
 CSB continuous split barrel sample
 Contr contraction
 Contr contractor
 CP control point
 Coord coordinate
 Cor corner
 Corr corrected
 CAES corrugated aluminum end section
 CAP corrugated aluminum pipe
 CMES corrugated metal end section
 CMP corrugated metal pipe
 CPVCP corrugated poly-vinyl chloride pipe
 CSES corrugated steel end section
 CSFES corrugated steel flared end section

CSP corrugated steel pipe
 CSTES corrugated steel traversable end section
 C coulomb
 Co County
 Crse course
 Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia or \emptyset diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density
 DSDS dynamic speed display sign
 Ea each
 Esmt easement
 E East
 EB Eastbound
 Elast elastomeric
 EL electric locker
 E Mtr electric meter
 Elec electric/al

EDM electronic distance meter
 Elev or El elevation
 Ellipt elliptical
 Emb embankment
 Emuls emulsion/emulsified
 ES end section
 Engr engineer
 ESS environmental sensor station
 Eq equal
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fs foresight

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

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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08-03-15 04-23-18	General Revisions General Revisions

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NDDOT ABBREVIATIONS

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

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MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	Sheet Added - Continued from D-101-3



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
05-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



Line Styles

D-101-20

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

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typical

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

Geotechnical

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

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
- Floating Silt Curtain
- 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		
	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		

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

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






























































































	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		
	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		

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

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Symbols

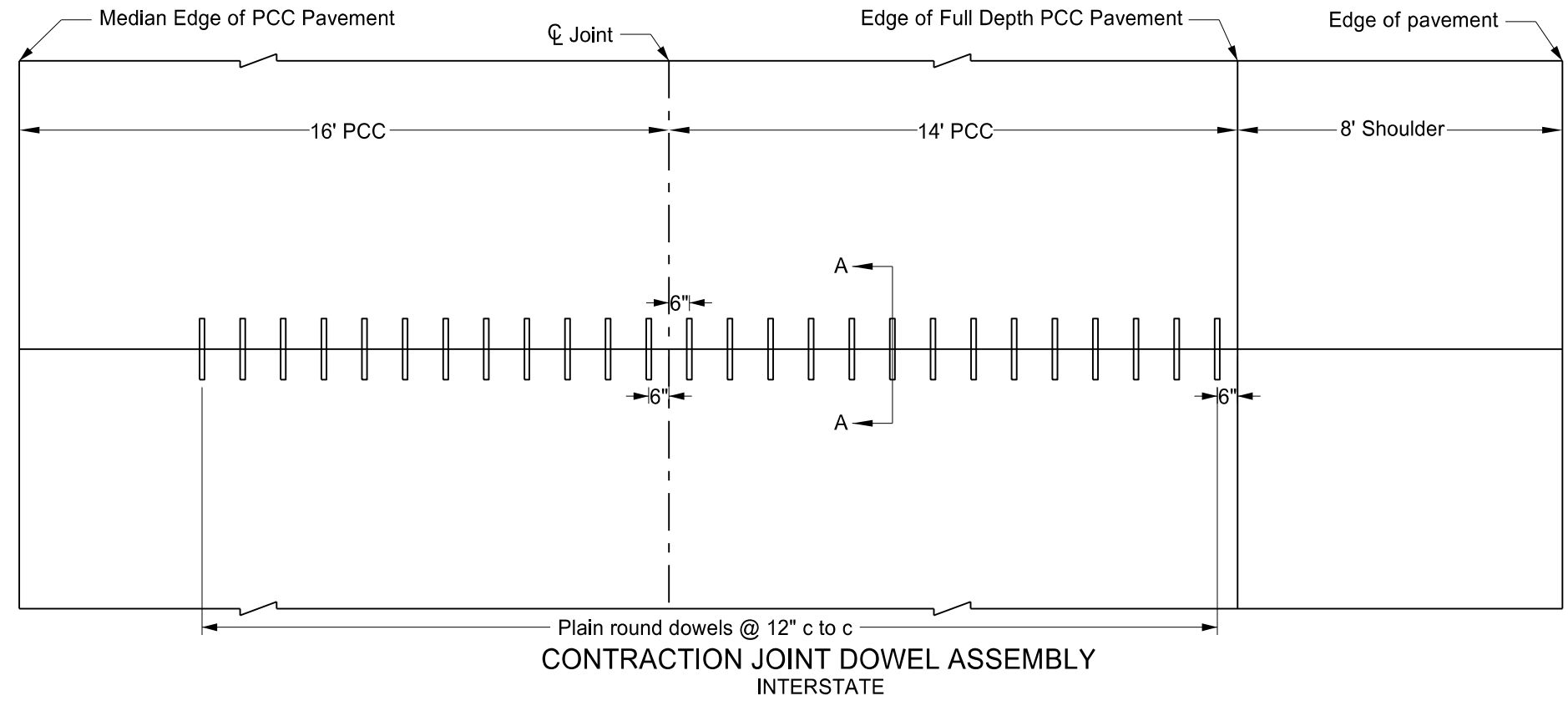
D-101-32

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

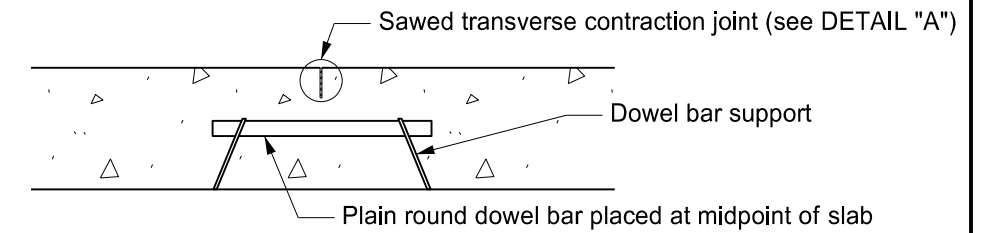
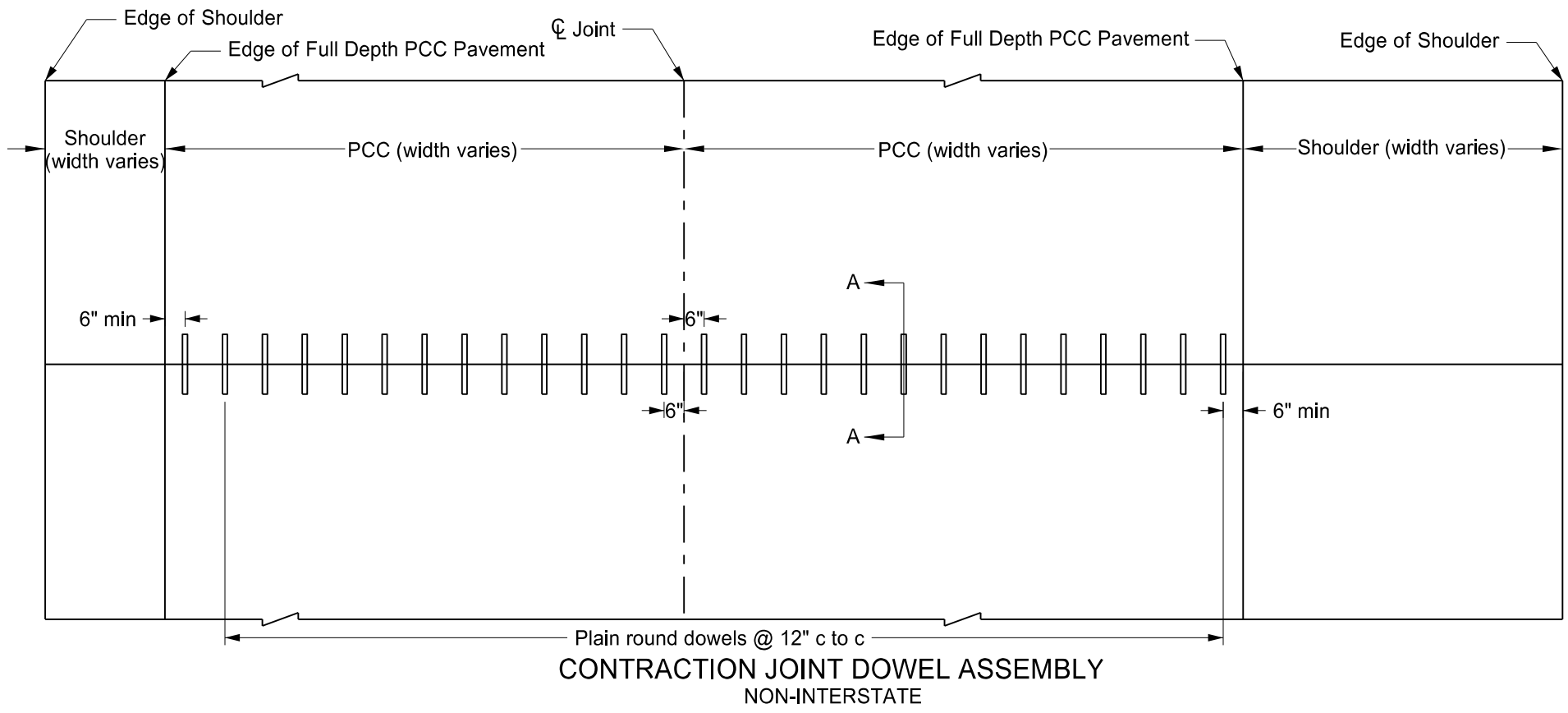
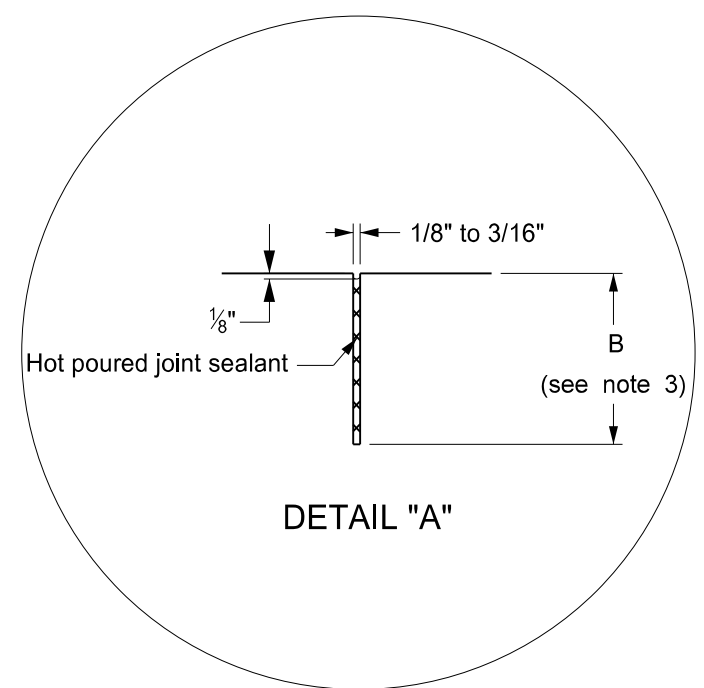
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TRANSVERSE CONTRACTION JOINT DETAILS



Notes

1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. $B = T/4 + 1/4"$ for AE or YE for non-doweled concrete pavement or $B = T/3$ for AAE or doweled concrete pavement

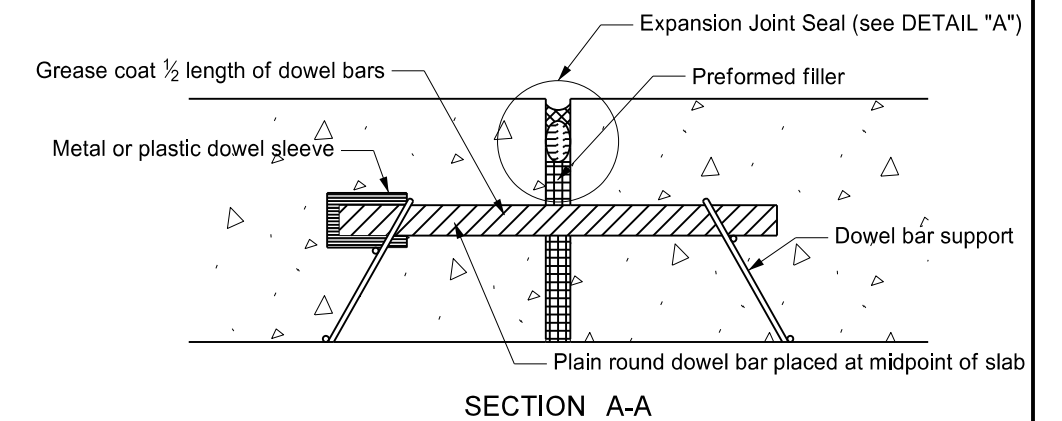
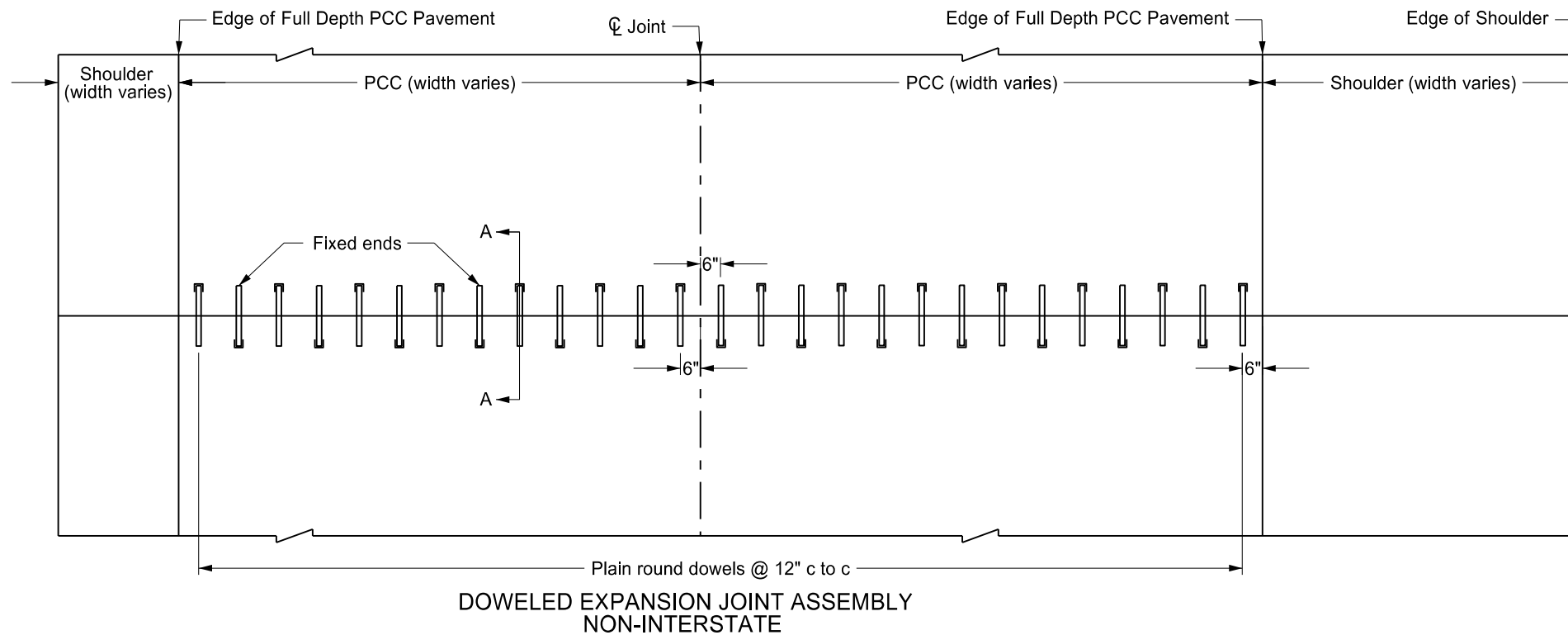
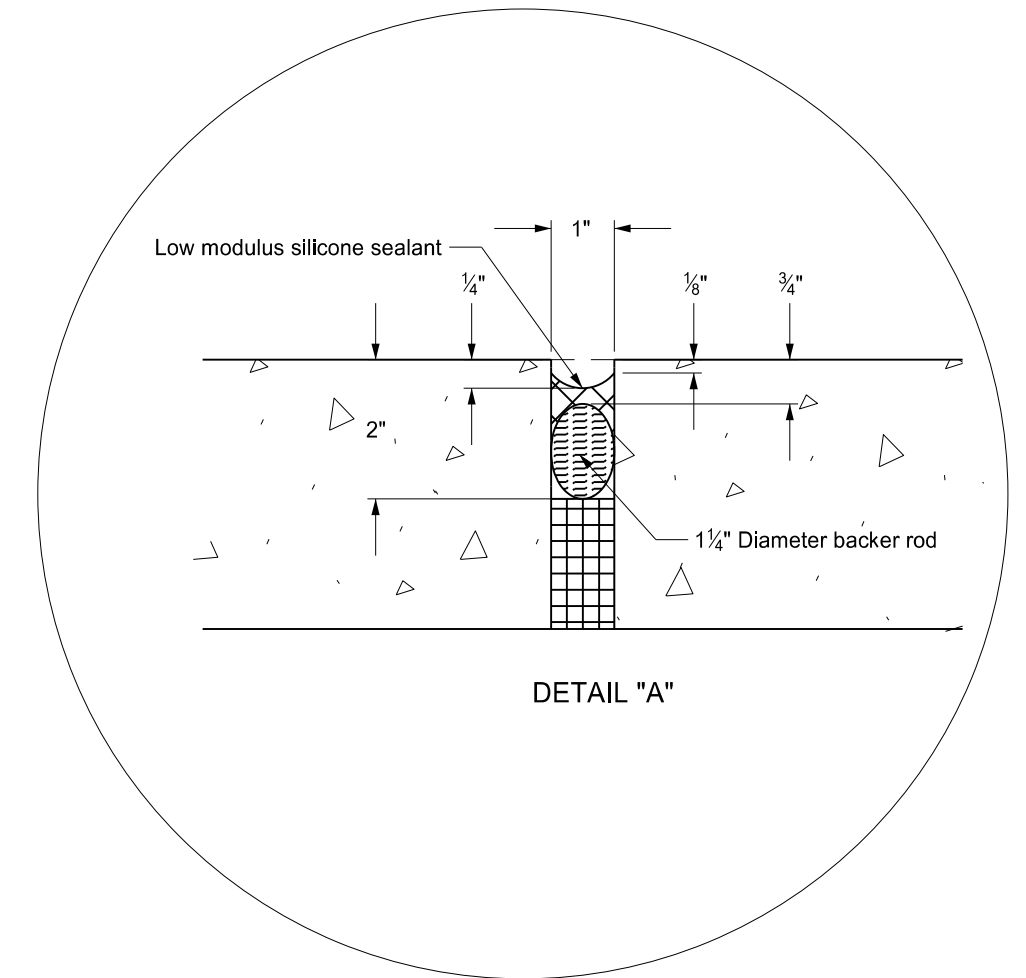
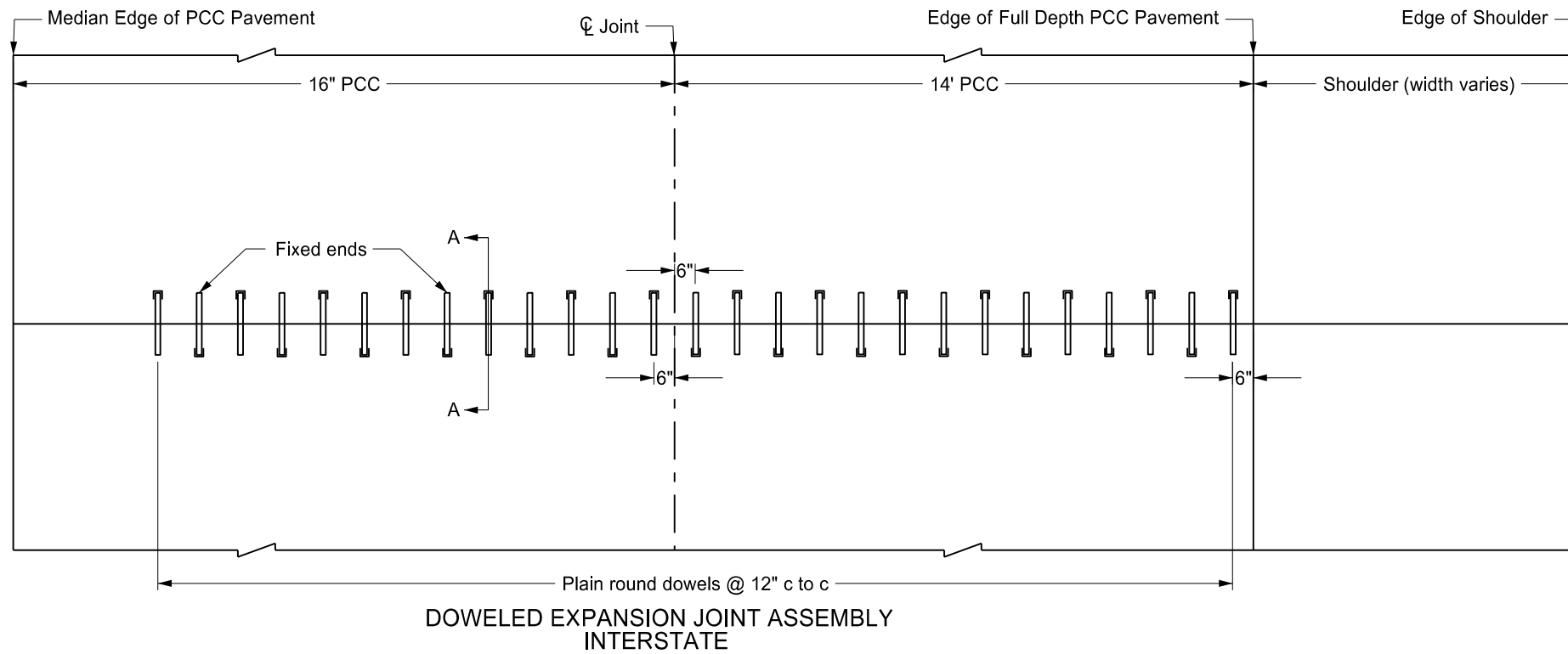


SECTION A-A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity

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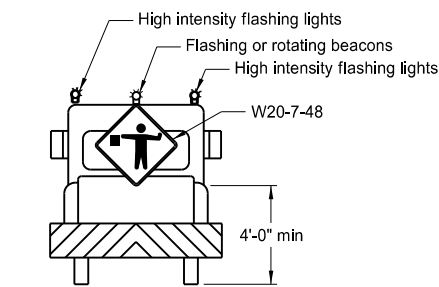
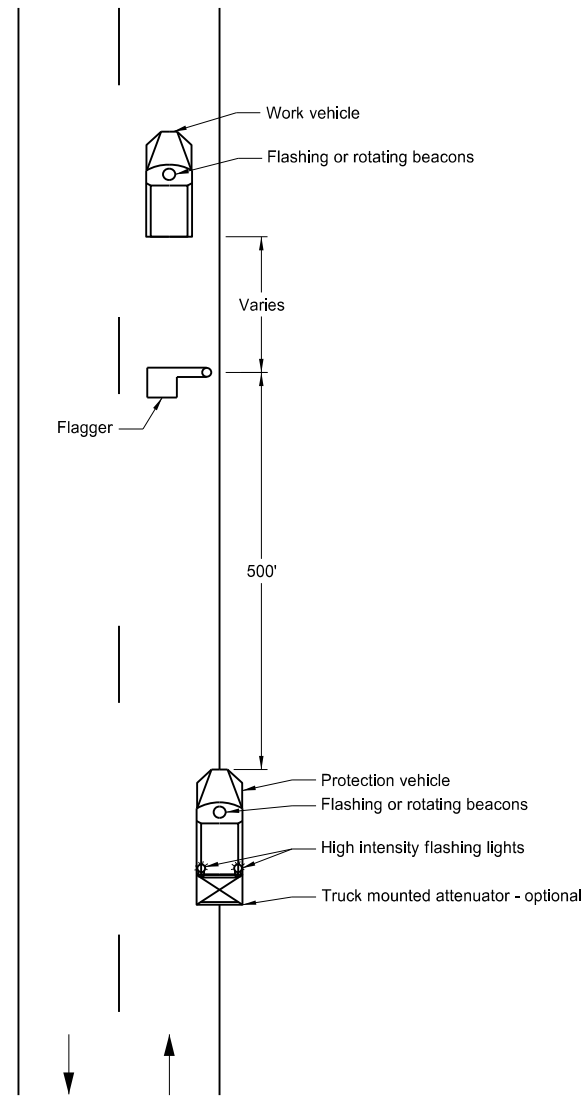
TRANSVERSE EXPANSION JOINT DETAIL



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel bar sizes
10/25/2019	Expanded details for clarity

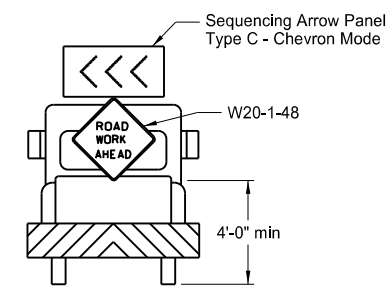
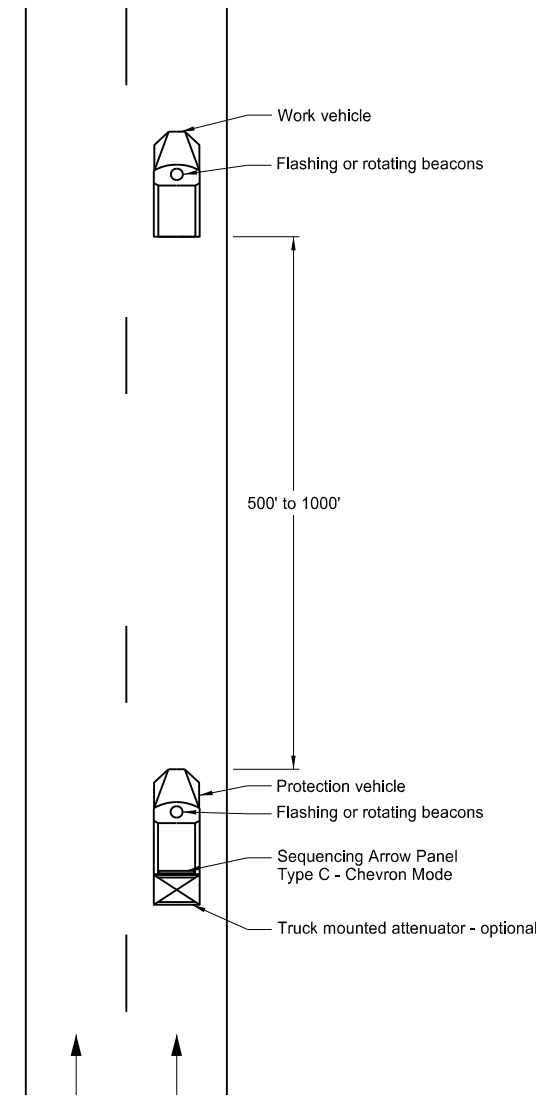
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 Registration Number
 PE- 4683,
 on 10/25/19 and the original document is stored at the
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 of Transportation

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

Notes:

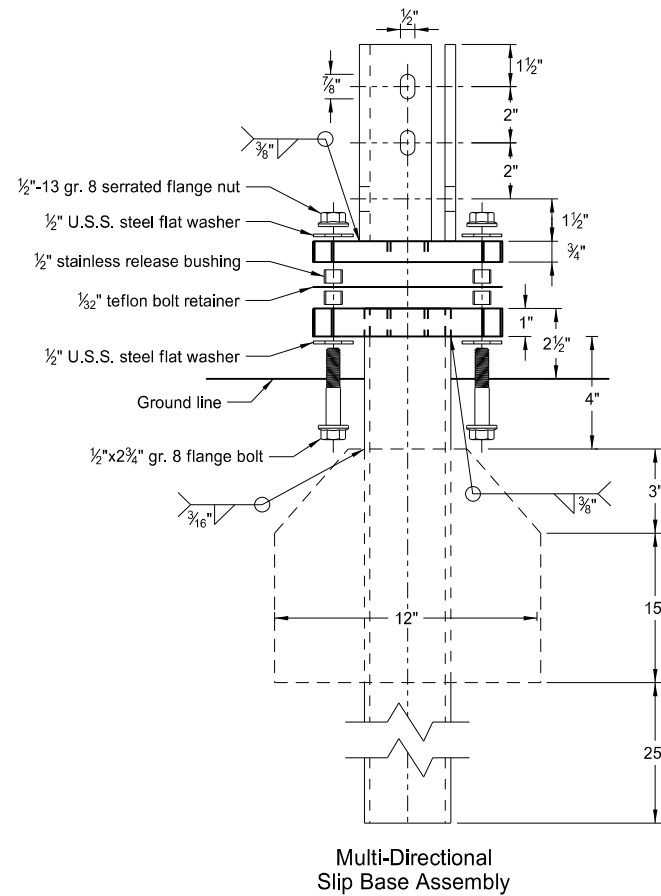
1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
3. Use these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

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

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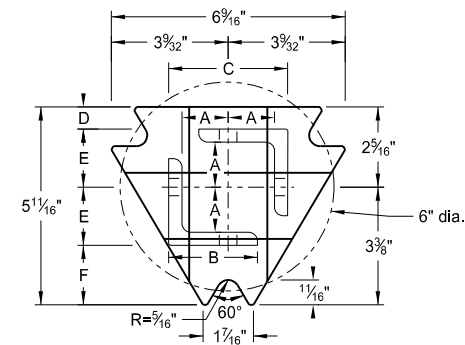
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

Perforated Tube



Multi-Directional Slip Base Assembly

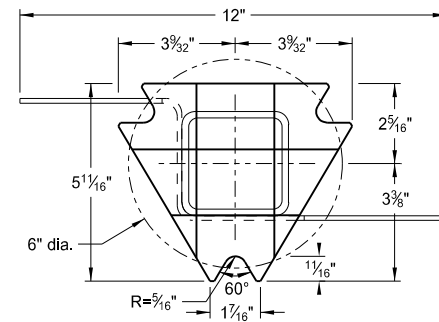
Traffic Flow



Top Post Receiver

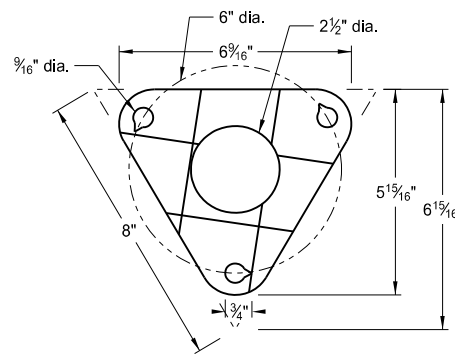
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

Traffic Flow



Bottom Soil Stub

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



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

Notes:

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

Telescoping Perforated Tube

Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/2	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

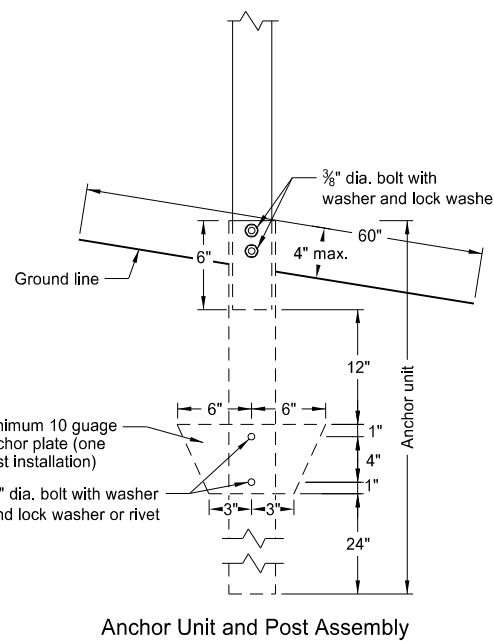
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table

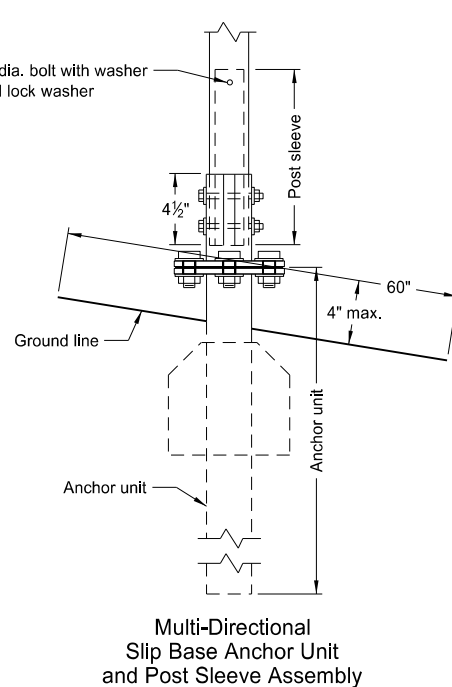
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16" x 10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2" x 10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

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

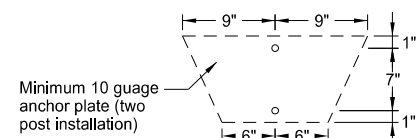
(B) For additional wind load, insert the 2 3/16" x 10 ga. into 2 1/2" x 10 ga.



Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly

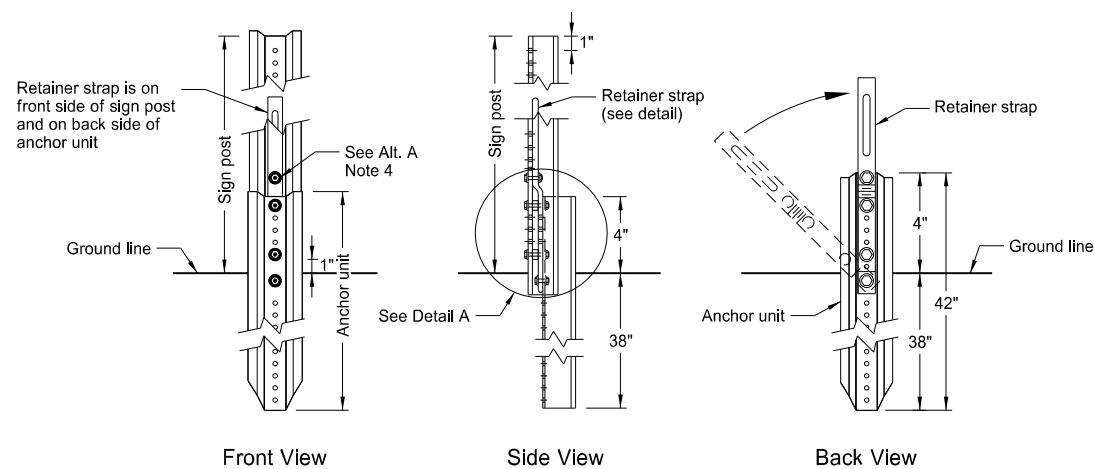
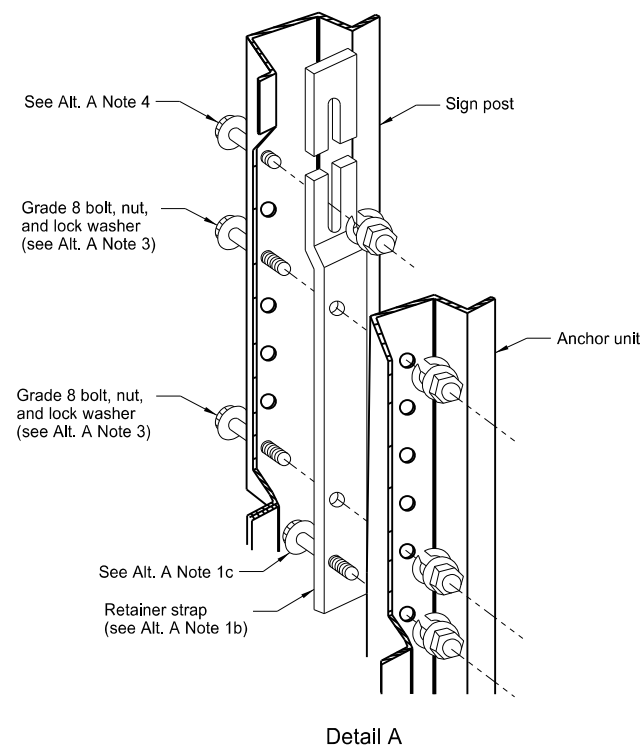


Minimum 10 gauge anchor plate (two post installation)

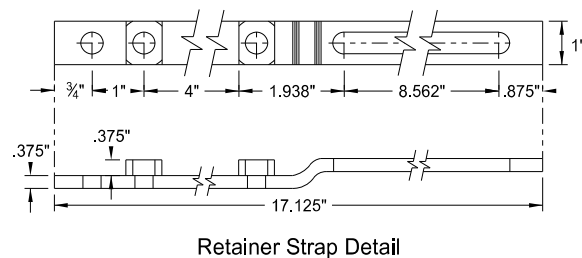
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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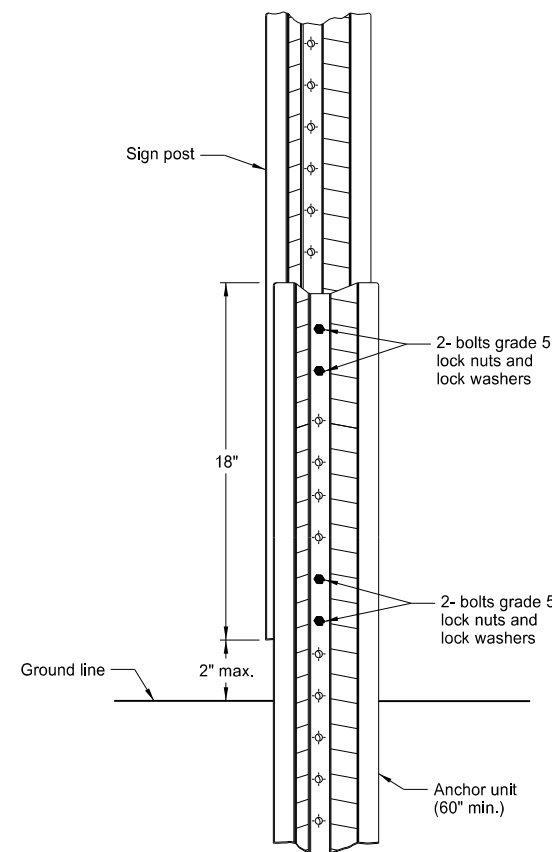
U-Channel Post



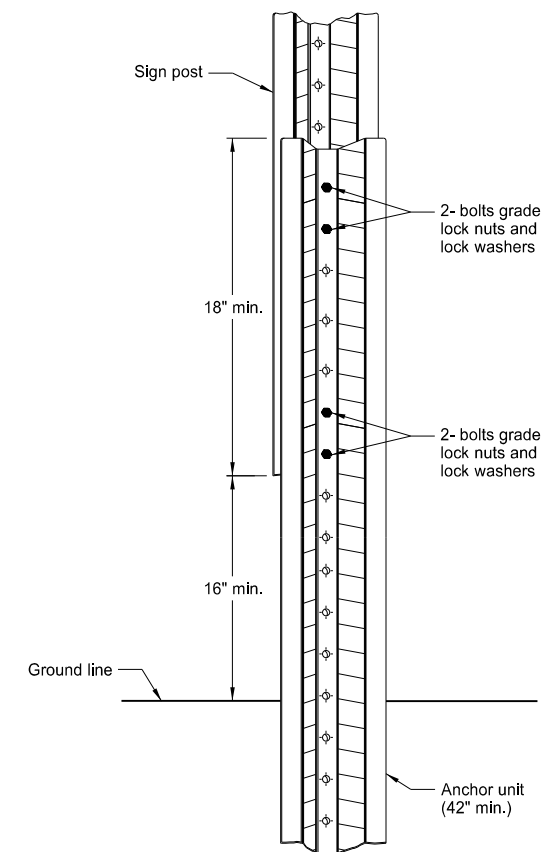
Breakaway U-Channel Detail Alternate A
Install a maximum of 2 posts within 7'.



Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail Alternate C
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

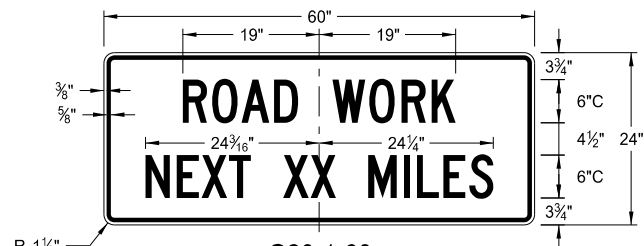
1. a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) Drive anchor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

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

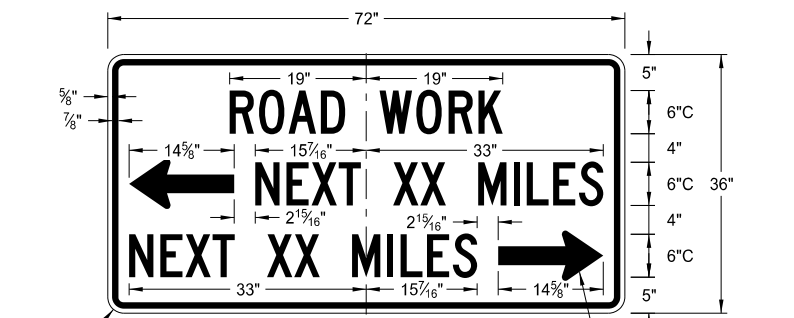
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

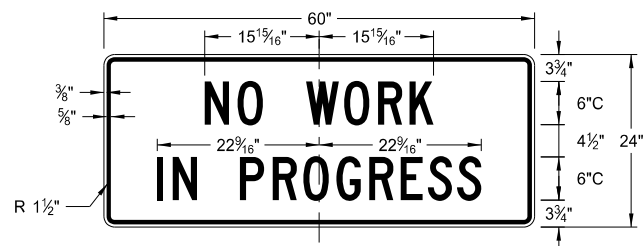
D-704-9



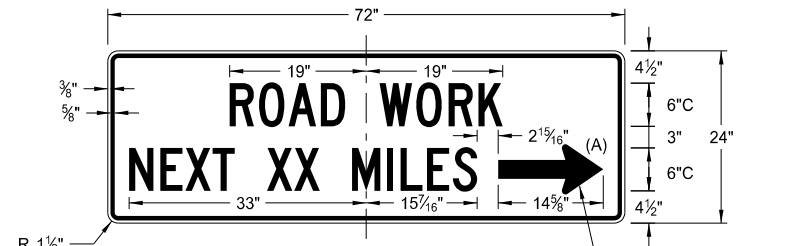
G20-1-60
 Legend: black (non-refl)
 Background: orange



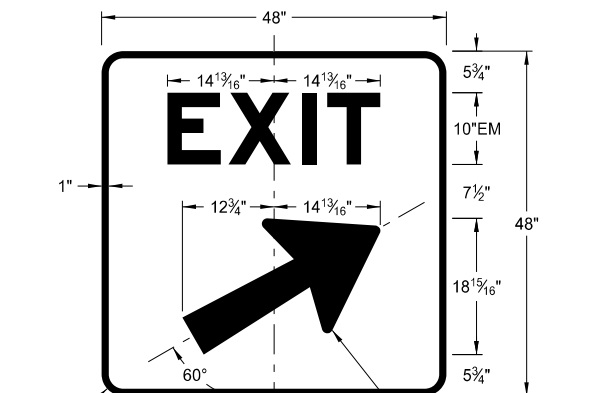
G20-50a-72
 Legend: black (non-refl)
 Background: orange



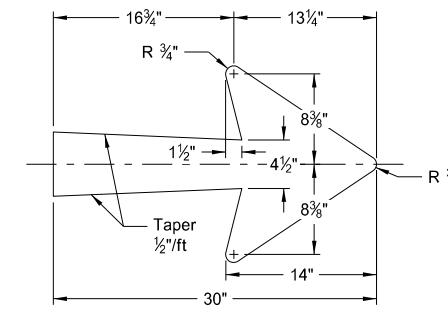
G20-1b-60
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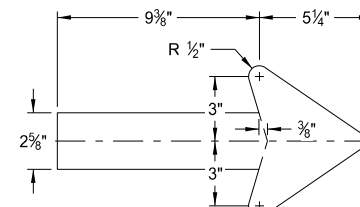
G20-52a-72
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 Background: orange



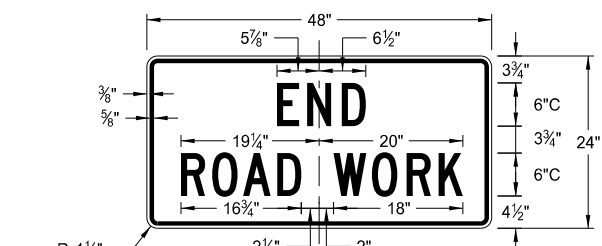
E5-1(L or R)-48
 Legend: white
 Background: green (orange optional)



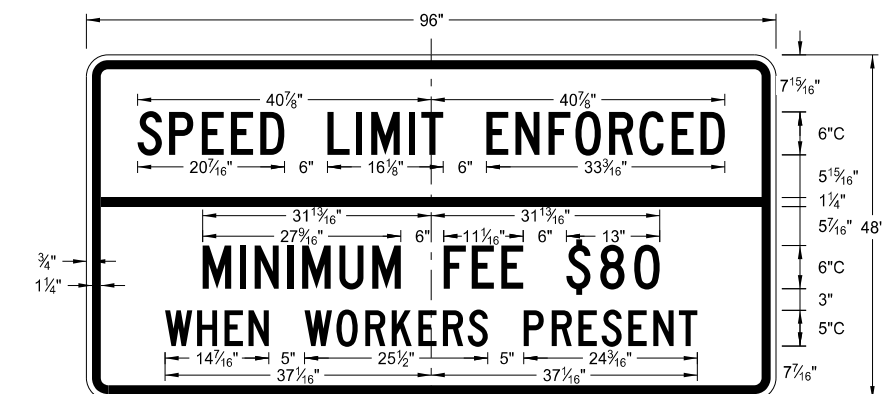
E5-1-48



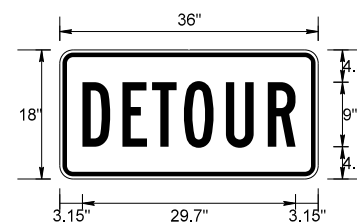
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 G20-52a-72



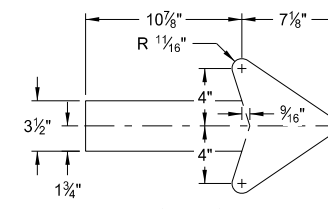
G20-2-48
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 Background: orange



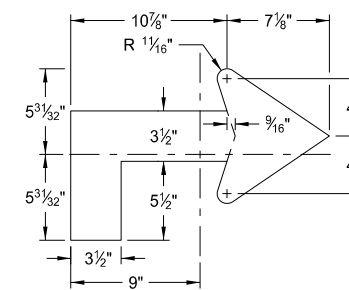
G20-55-96
 Legend: black (non-refl)
 Background: orange



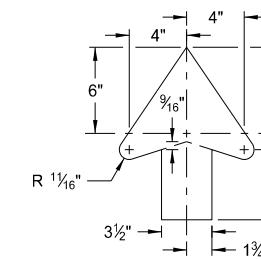
M4-8-36
 Legend: black (non-refl)
 Background: orange



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



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

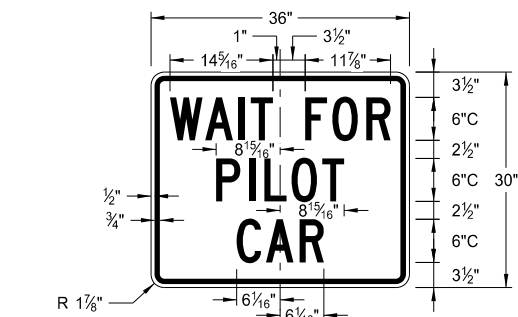


M4-9-30
 Straight

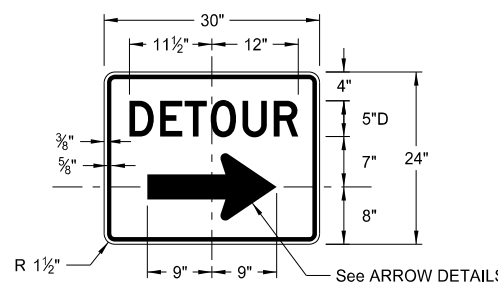
ARROW DETAILS

NOTES:

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



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

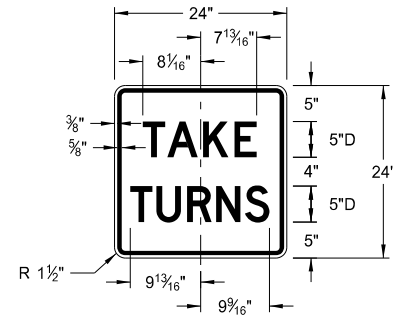


M4-9(L or R)-30 &
 M4-9-30
 Legend: black (non-refl)
 Background: orange

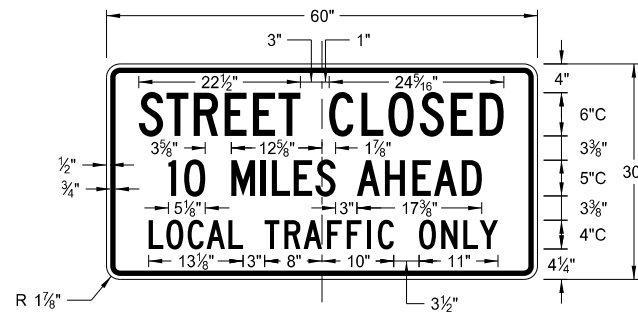
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

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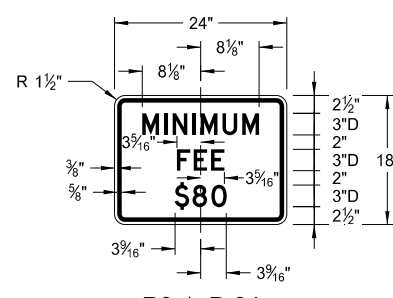
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



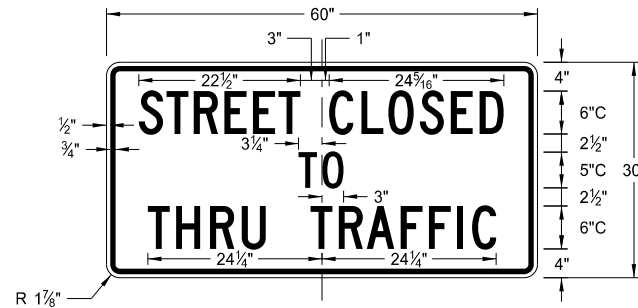
R1-50P-24
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Background: white



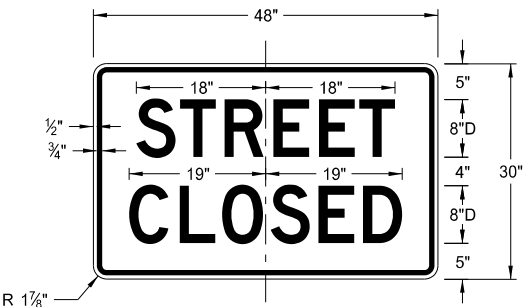
R11-3c-60
Legend: black (non-refl)
Background: white



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



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

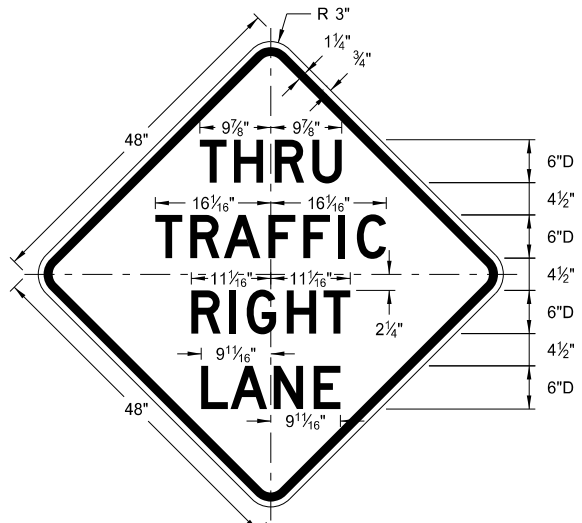


R11-2a-48
Legend: black (non-refl)
Background: white

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

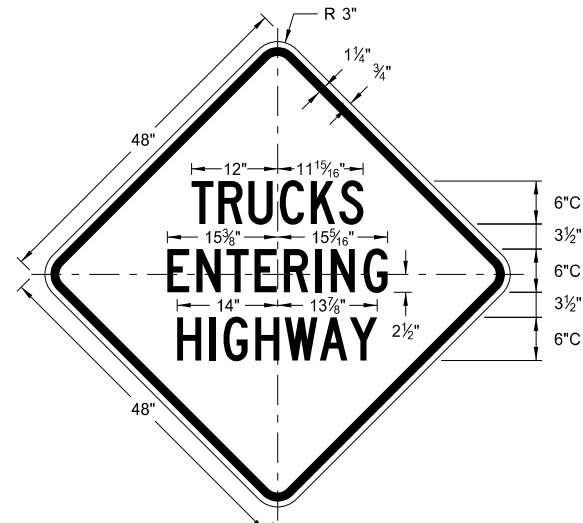
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS



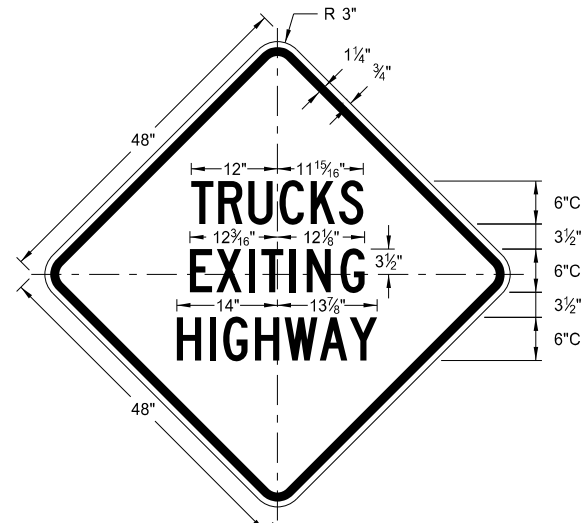
W5-8-48

Legend: black (non-refl)
Background: orange



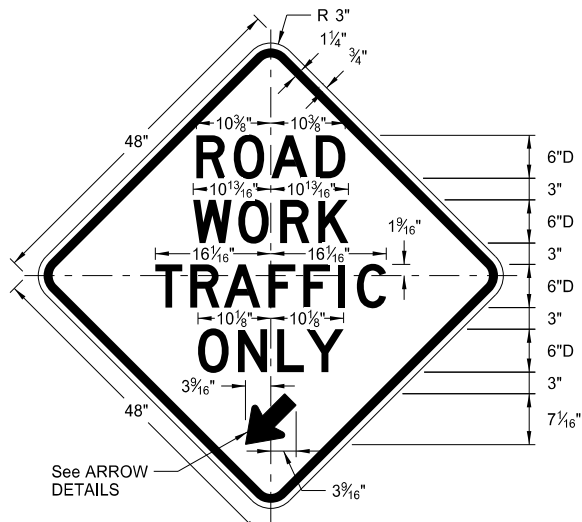
W8-53-48

Legend: black (non-refl)
Background: orange



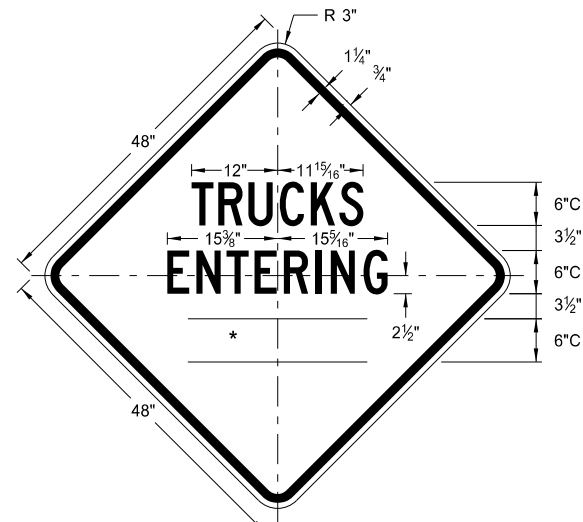
W8-56-48

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Background: orange



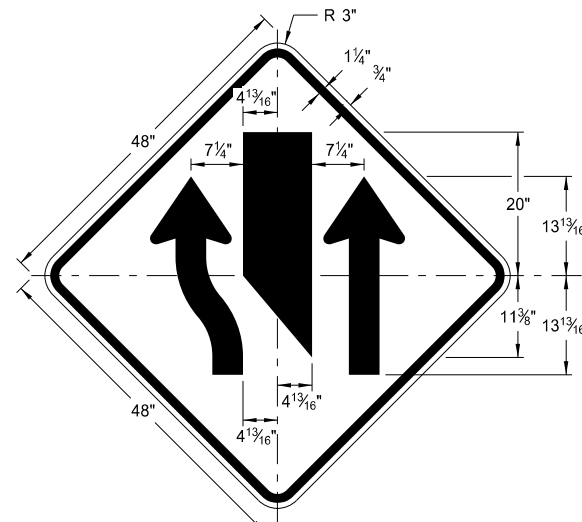
W5-9-48

Legend: black (non-refl)
Background: orange



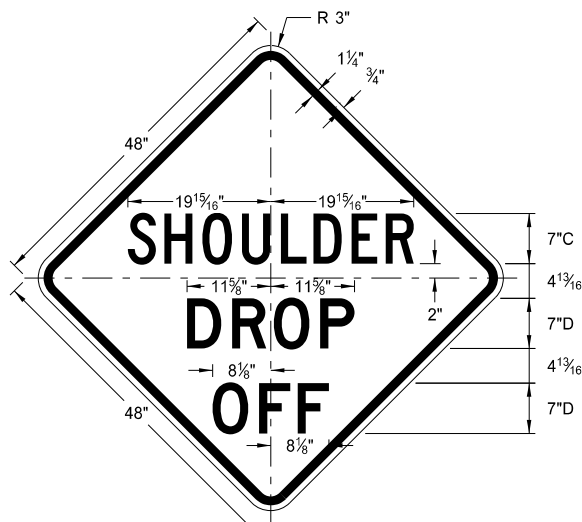
W8-54-48

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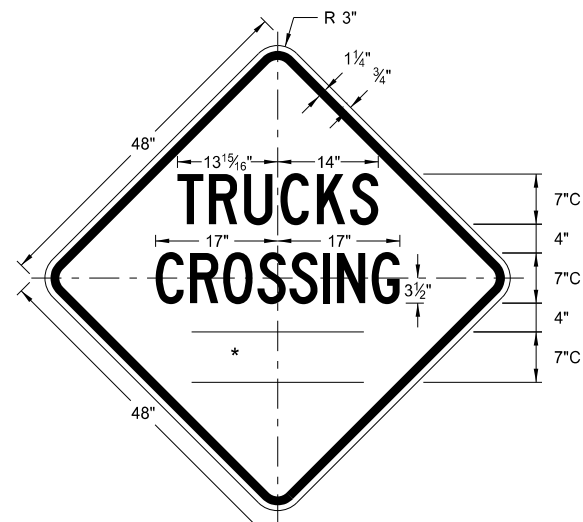
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

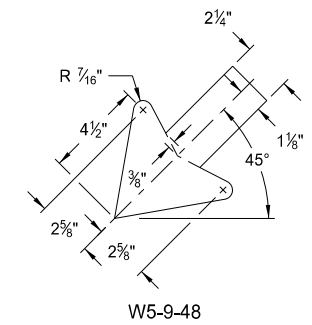


W8-55-48

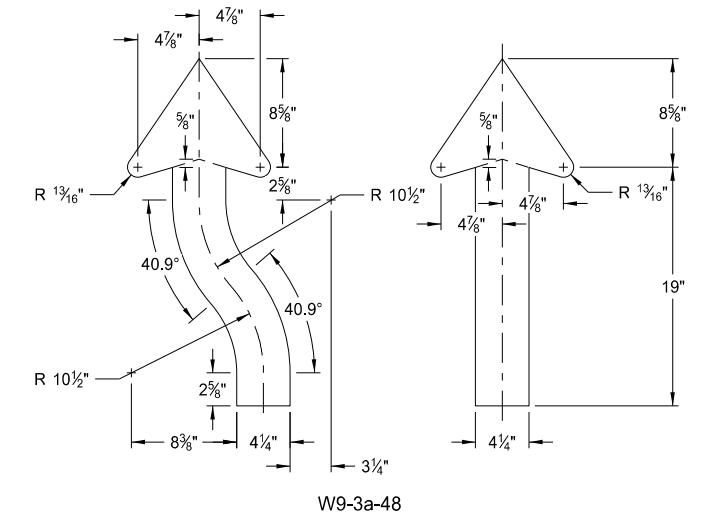
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

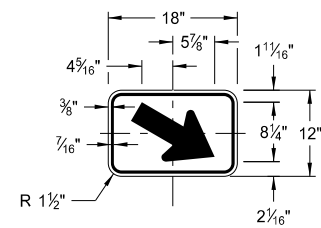
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

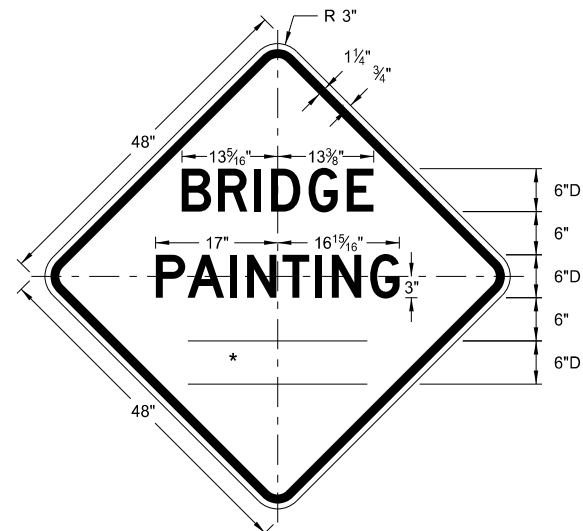
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



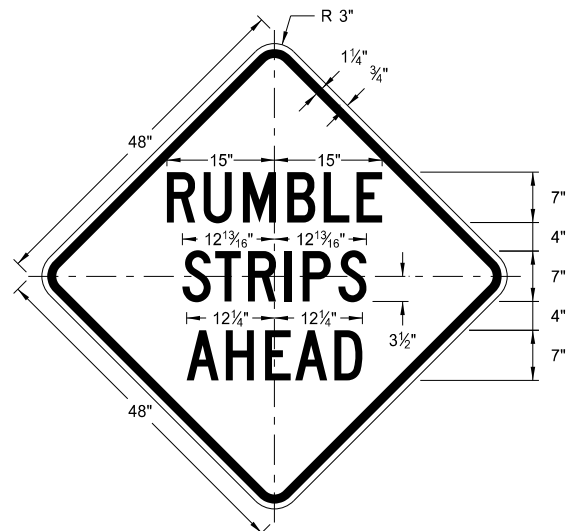
W16-7aP-18

Legend: black (non-refl)
Background: orange



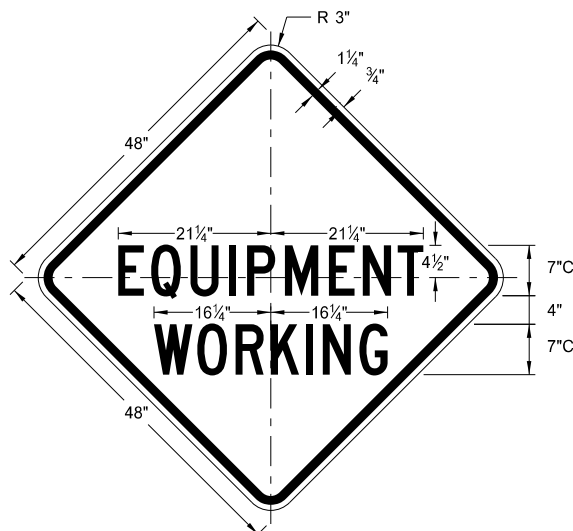
W21-50-48

Legend: black (non-refl)
Background: orange



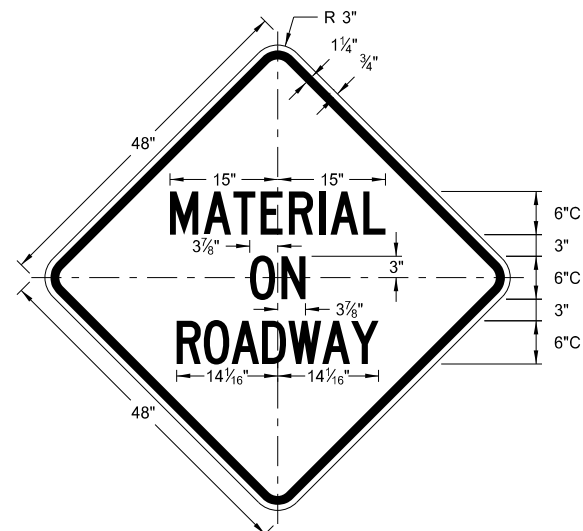
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Background: orange



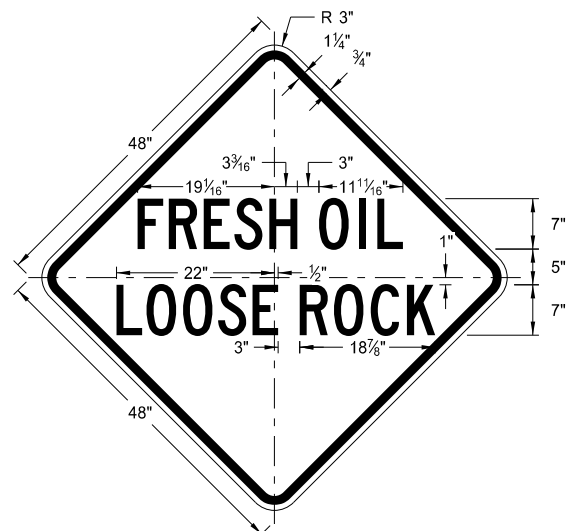
W20-51-48

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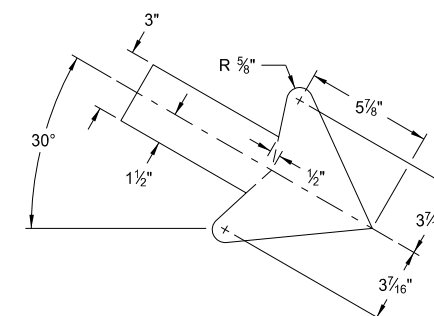
W21-51-48

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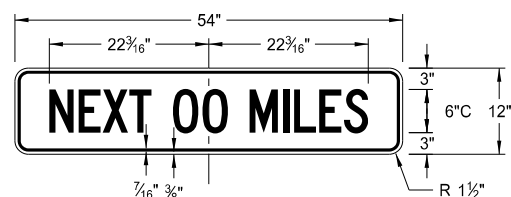


W22-8-48

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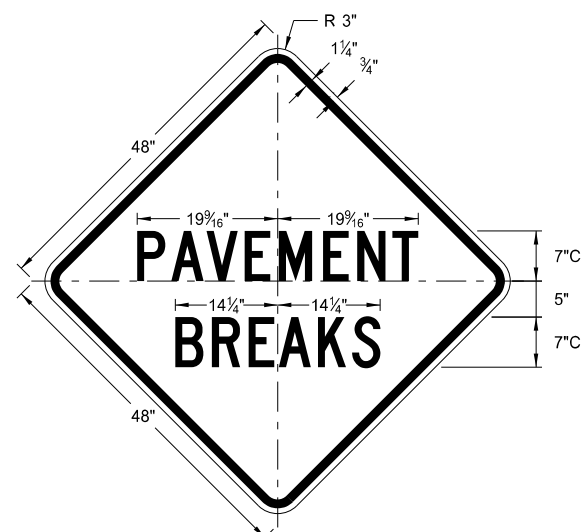


W16-7aP-18



W20-52P-54

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Background: orange



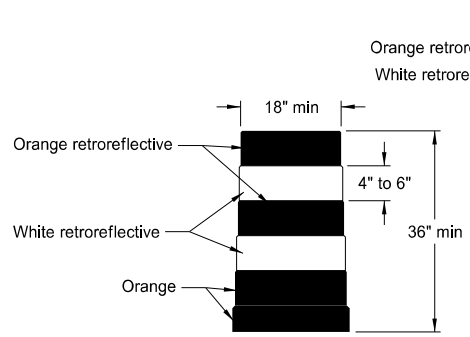
W21-52-48

Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

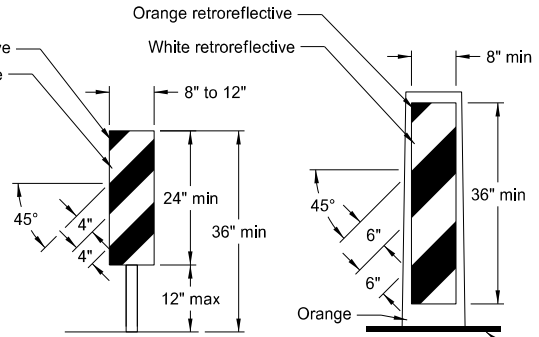
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BARRICADE AND CHANNELIZING DEVICE DETAILS



DELINEATOR DRUM

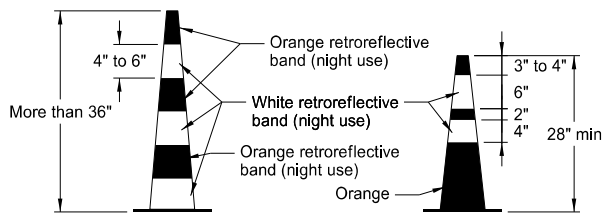
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and 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.



BACK TO BACK VERTICAL PANEL STACKABLE

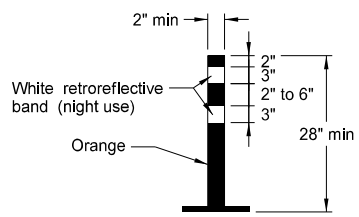
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

Molded rubber base (min weight 30 lbs)



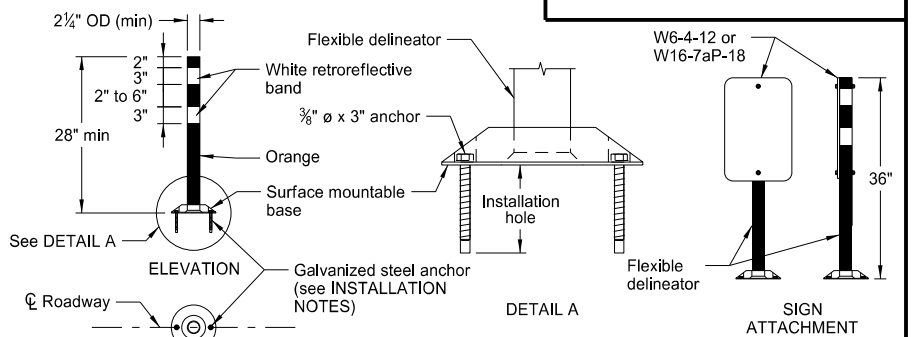
TRAFFIC CONE

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



TUBULAR MARKER

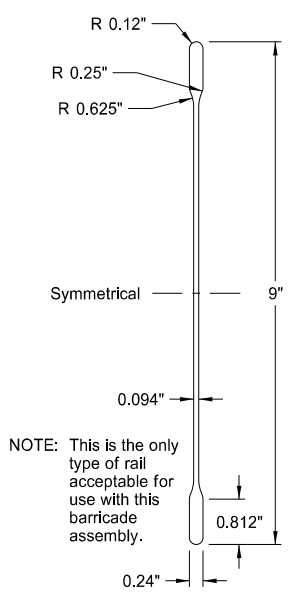
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



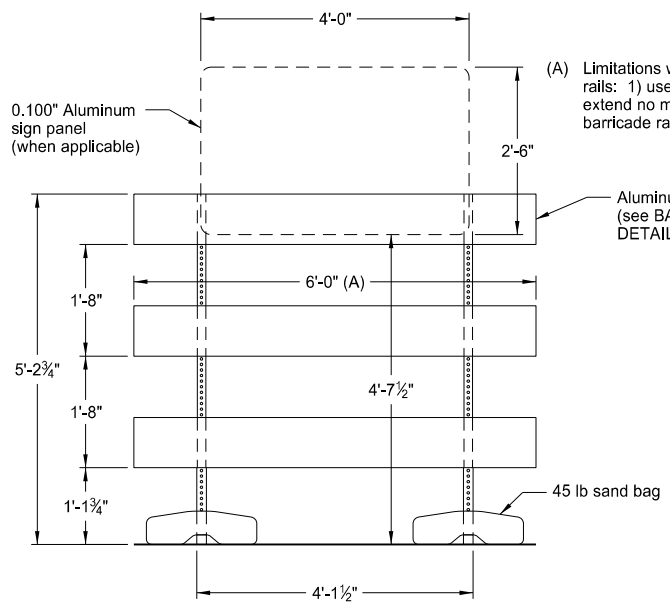
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

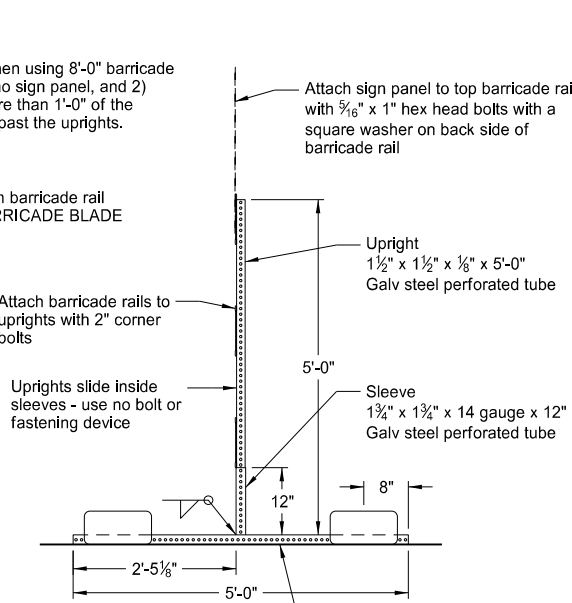
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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



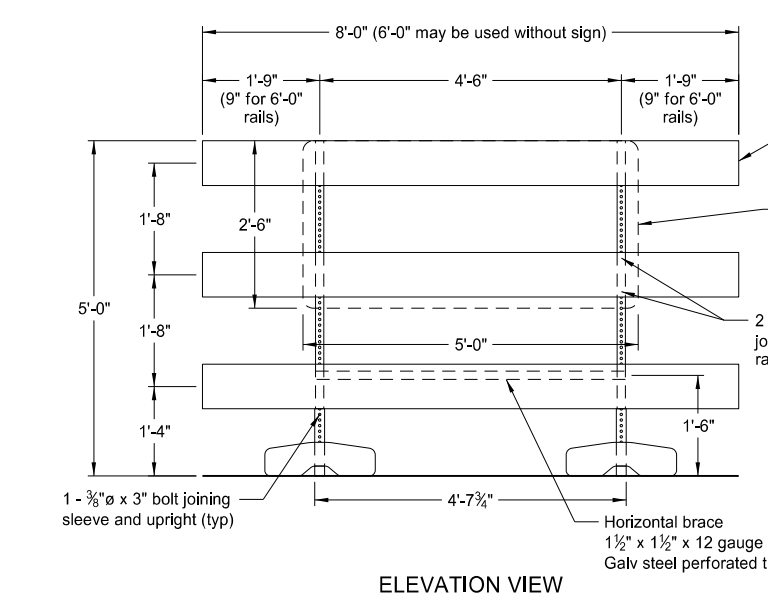
BARRICADE BLADE DETAIL



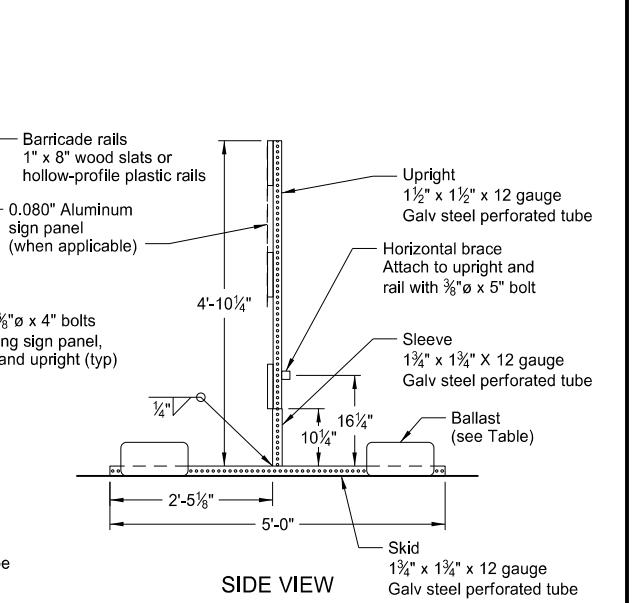
ELEVATION VIEW BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



SIDE VIEW BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

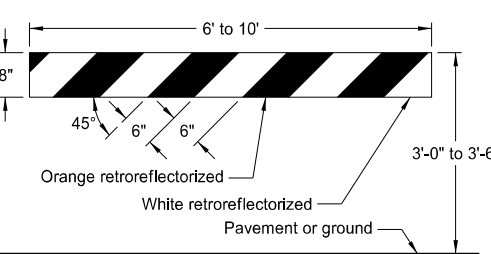


ELEVATION VIEW BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

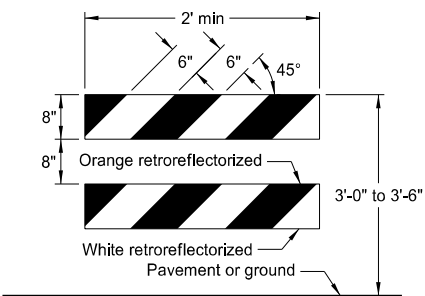


SIDE VIEW BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

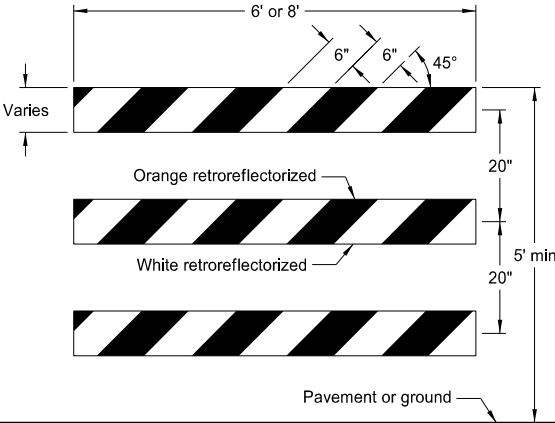
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

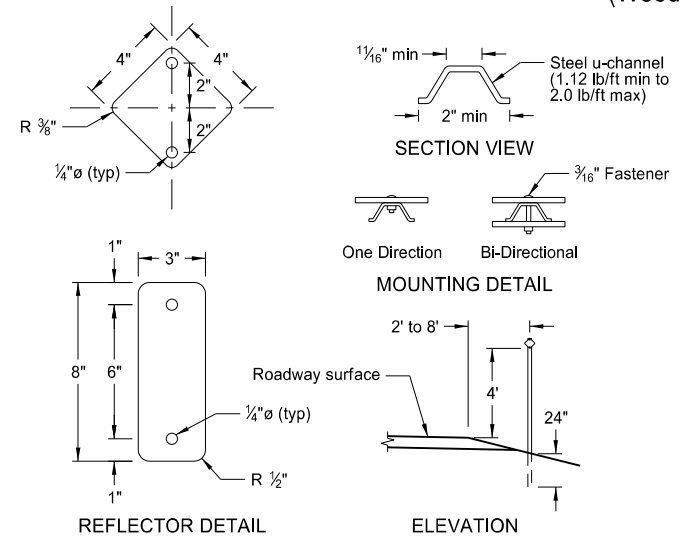


TYPE II BARRICADE



TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

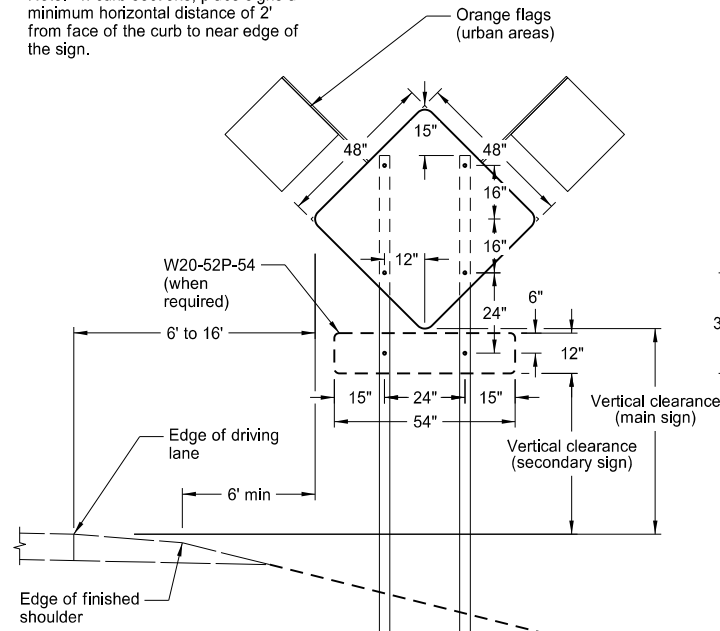
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

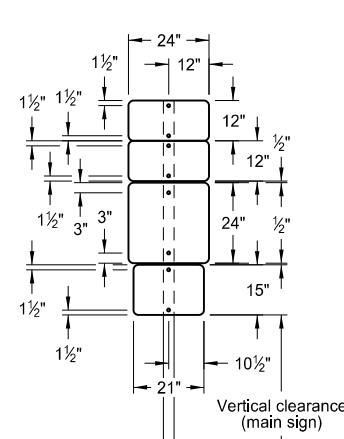
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

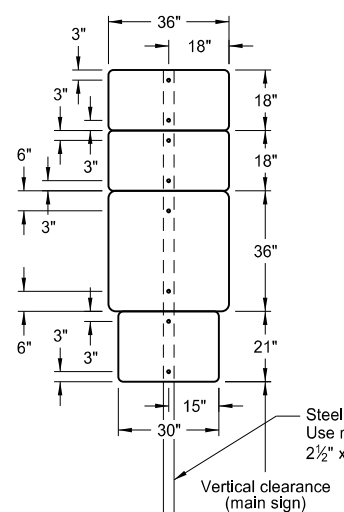
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



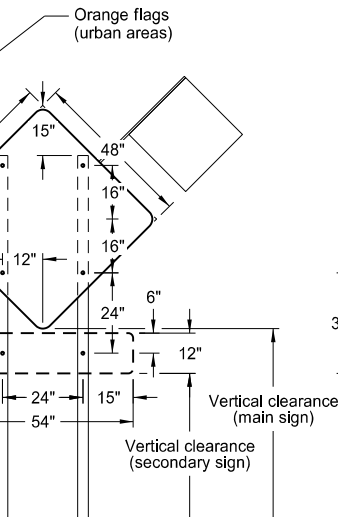
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



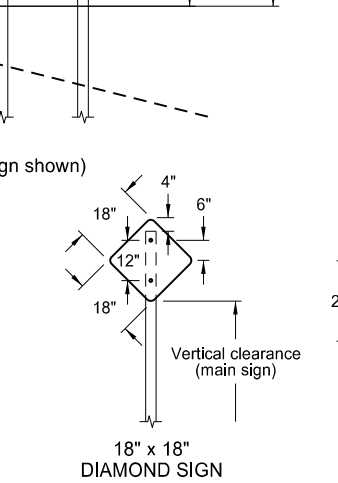
24" x 24" ROUTE MARKER ASSEMBLY



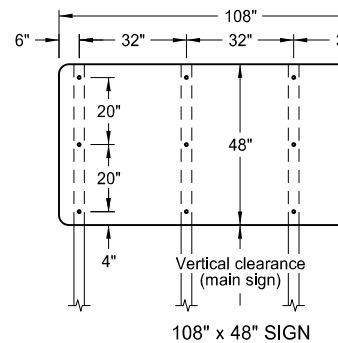
36" x 36" ROUTE MARKER ASSEMBLY



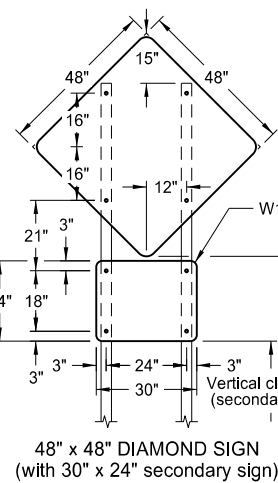
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



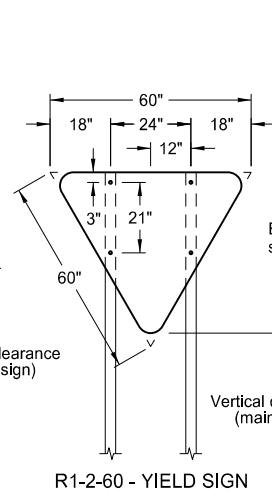
18" x 18" DIAMOND SIGN
(with 30" x 24" secondary sign)



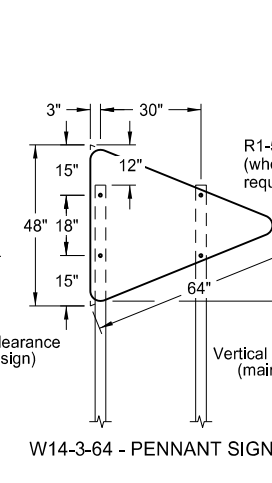
108" x 48" SIGN



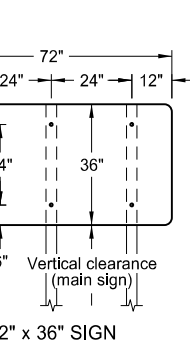
96" x 48" SIGN



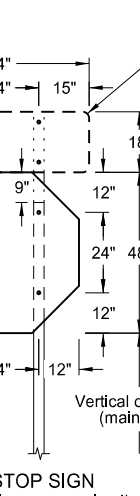
R1-2-60 - YIELD SIGN



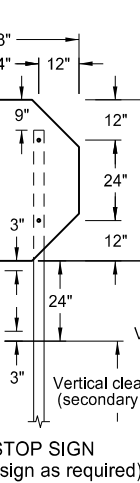
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



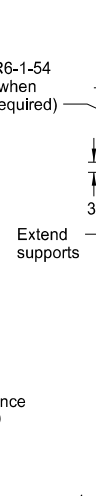
72" x 36" SIGN



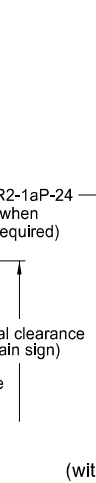
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



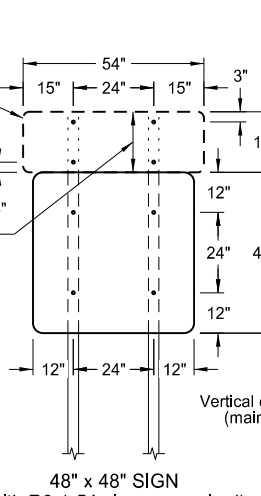
72" x 24" SIGN



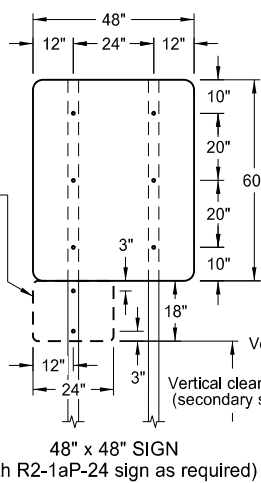
48" x 48" SIGN
(with R2-1aP-24 sign as required)



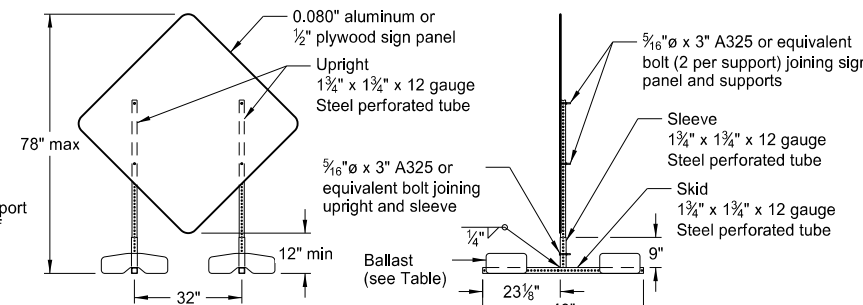
60" x 24" SIGN



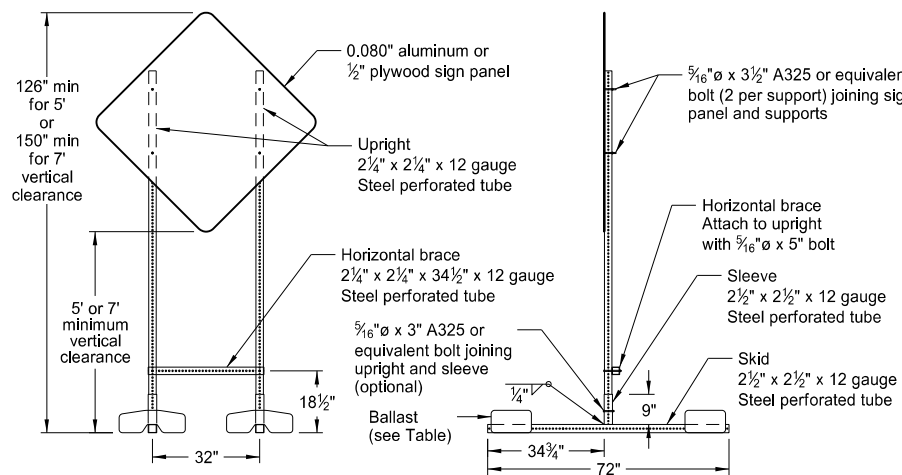
24" x 36" SIGN



30" x 24" SIGN



PORTABLE SIGN SUPPORT LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT HIGH-MOUNTING HEIGHT

NOTES:

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

Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
- Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 5/16" bolts.
- 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)
- 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

- 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.

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 breakdowns, 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.

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

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

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

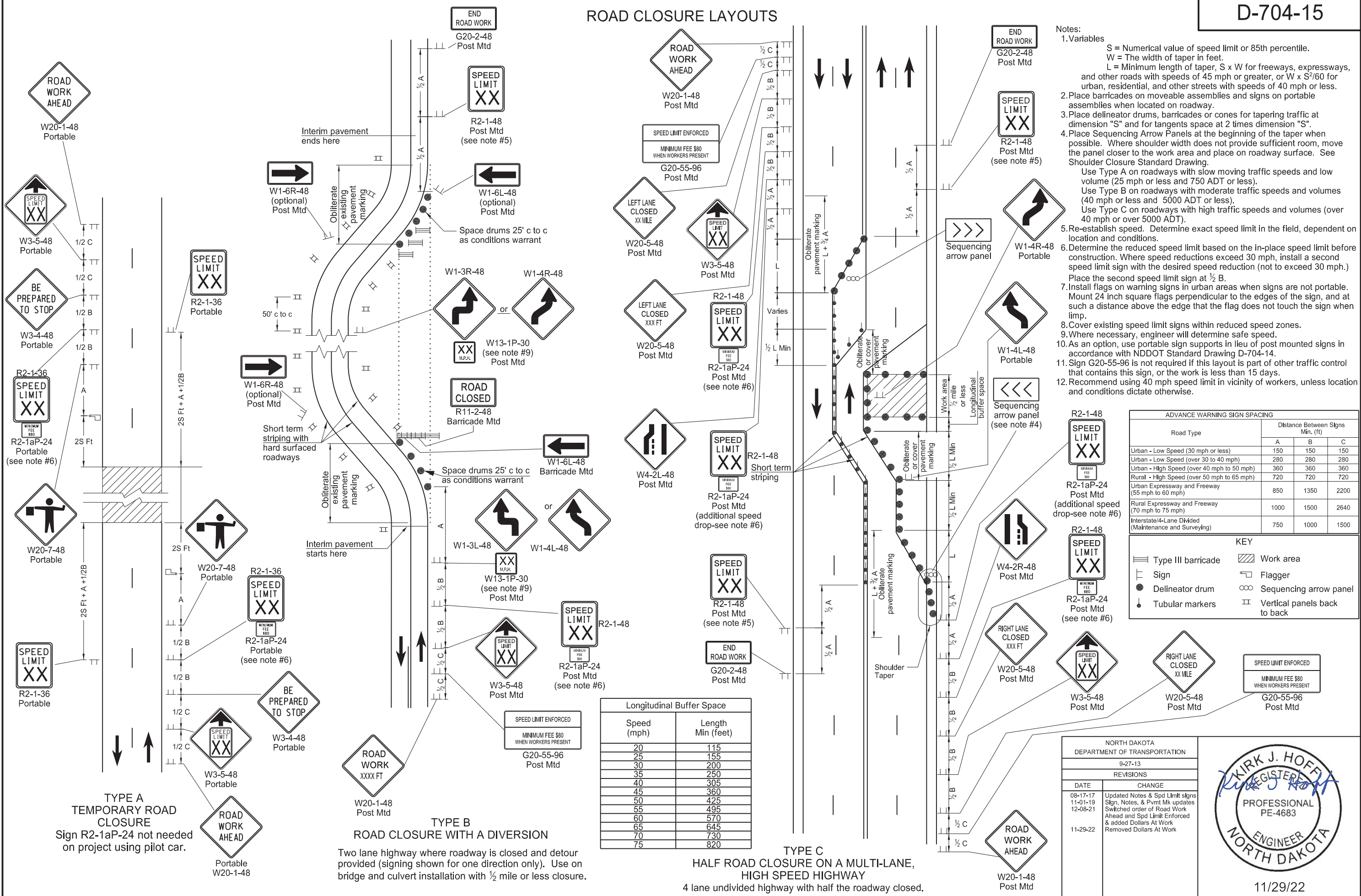
ROAD CLOSURE LAYOUTS

Notes:

- 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.
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
- 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).
- Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 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 reduced speed zones.
- Where necessary, engineer will determine safe speed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

Road Type	ADVANCE WARNING SIGN SPACING		
	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		Work area
	Sign		Flagger
	Delineator drum		Sequencing arrow panel
	Tubular markers		Vertical panels back to back

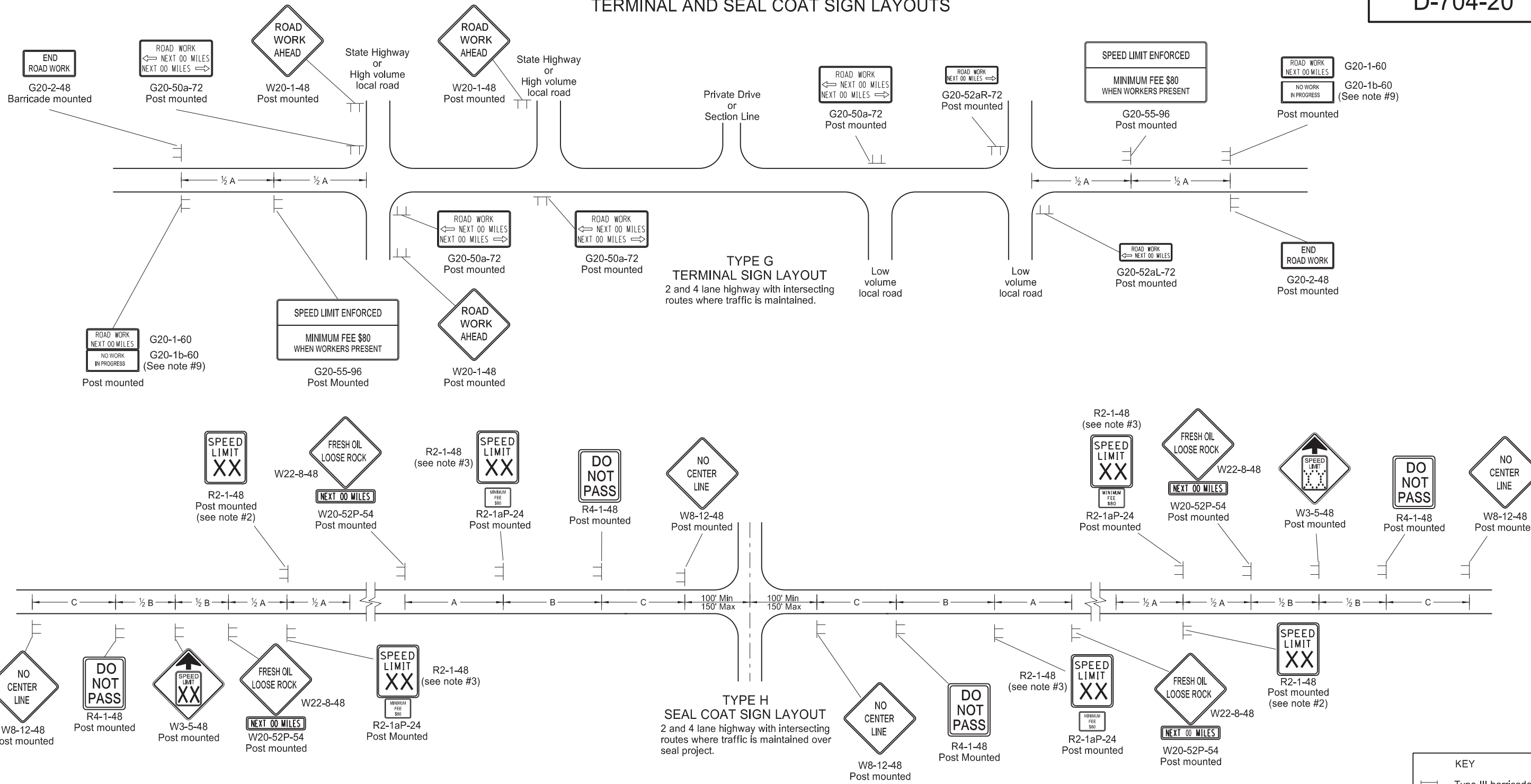


Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmnt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



TERMINAL AND SEAL COAT SIGN LAYOUTS



- Notes:
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - Determine the exact speed limit in the field, based on location and conditions.
 - 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 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.
 - 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.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
 - Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
 - Install sign G20-1b-60 when work is suspended for winter.
 - Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
 - Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

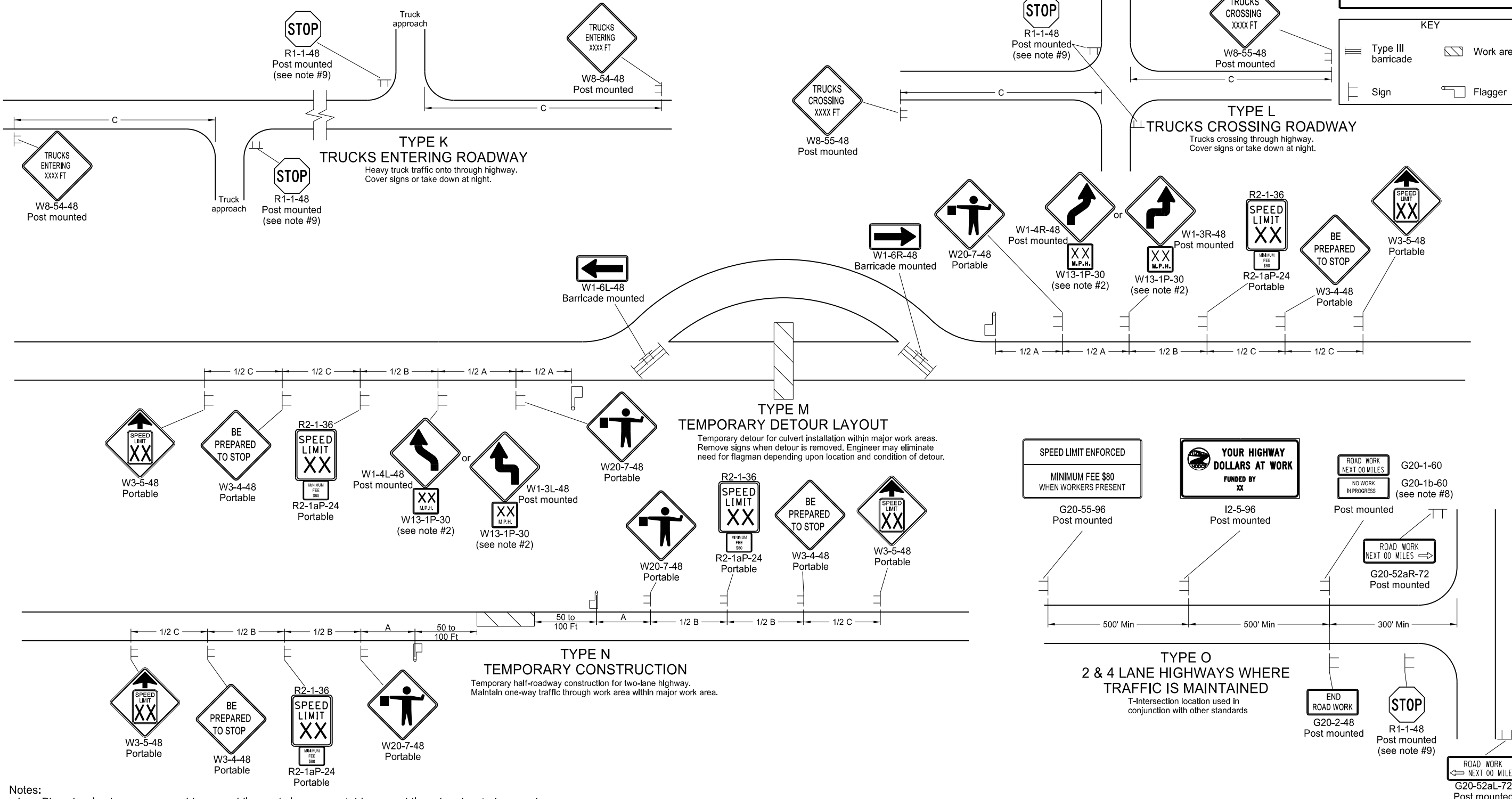
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

KEY	
	Type III barricade
	Sign
	Work area
	Flagger



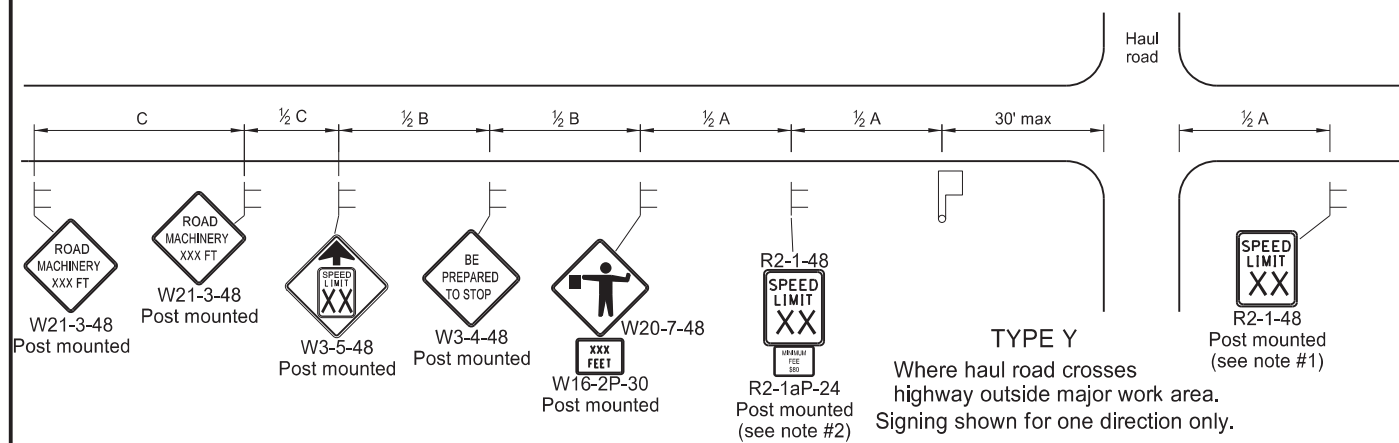
- Notes:
- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
 - Where necessary, safe speed to be determined by the Engineer.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 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 Drawing D-704-14.
 - 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 that contains this sign, or if work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 - Sign I2-5-96 is not required if layout is part of other traffic control that contains this sign.

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

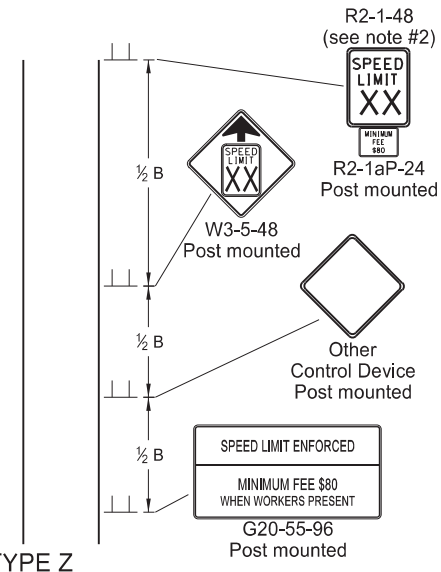
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs

This document was originally issued and sealed by
Kirk J Hoff,
 Registration Number
PE-4683,
 on 12/09/21 and the original document is stored at the North Dakota Department of Transportation

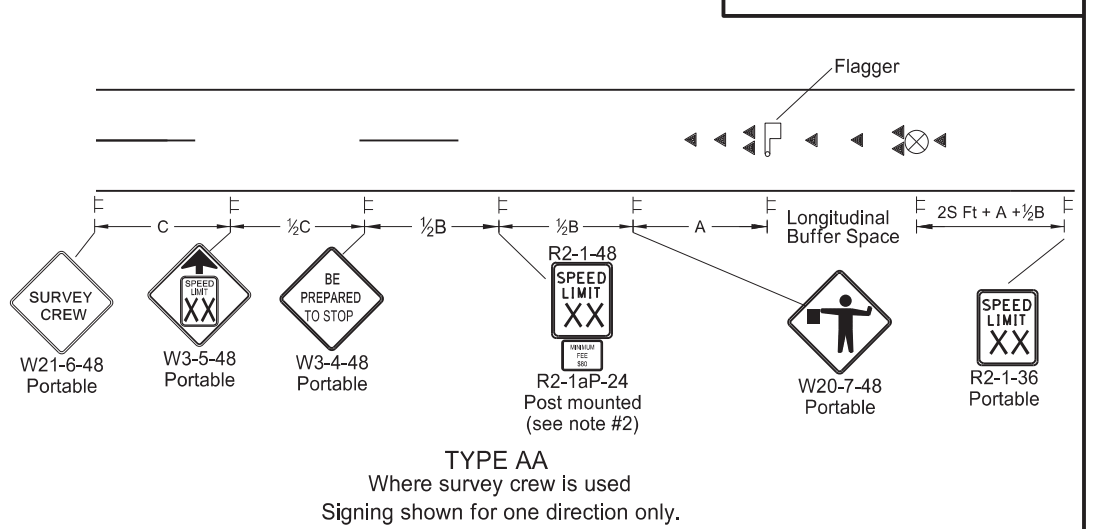
MISCELLANEOUS SIGN LAYOUTS



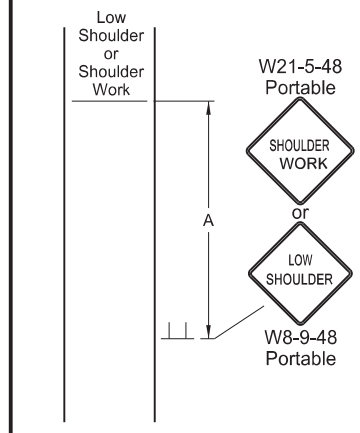
TYPE Y
Where haul road crosses highway outside major work area. Signing shown for one direction only.



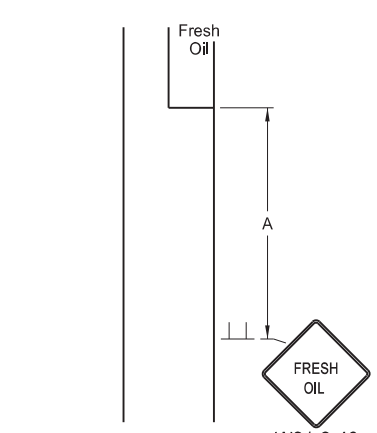
TYPE Z
Where speed zone is needed. Signing shown for one direction only.



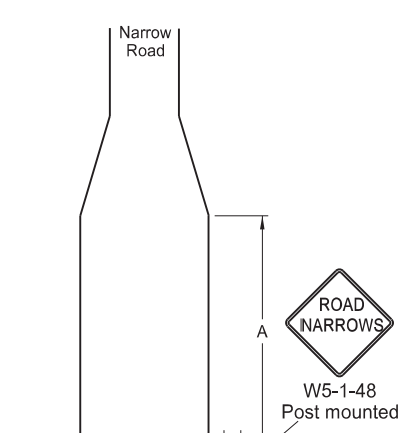
TYPE AA
Where survey crew is used. Signing shown for one direction only.



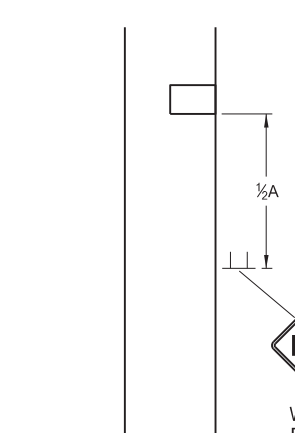
TYPE BB
Within major work area where sign conditions exist



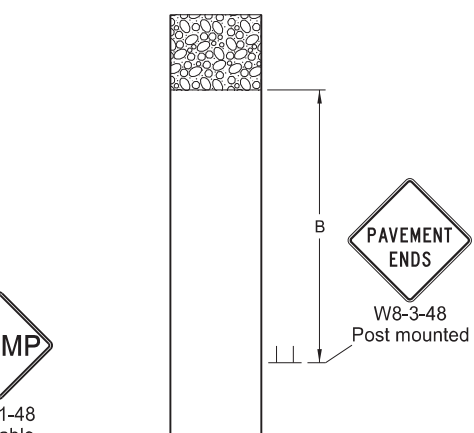
TYPE CC
Where sign conditions exist



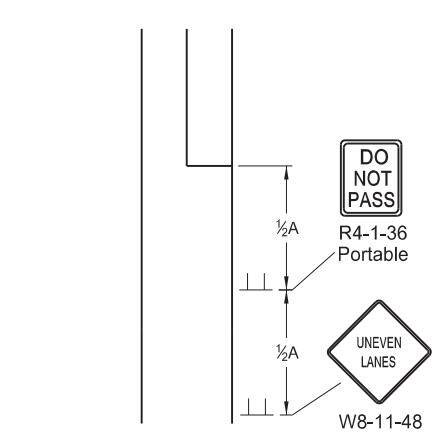
TYPE DD
Where sign conditions exist



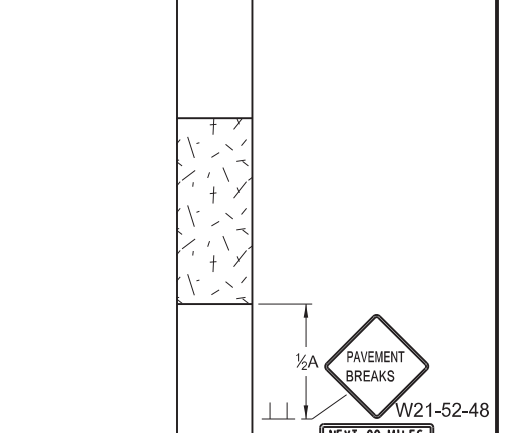
TYPE EE
Where sign conditions exist



TYPE FF
Where sign conditions exist. Signing shown for one direction only.



TYPE GG
Where elevation difference exists between lanes

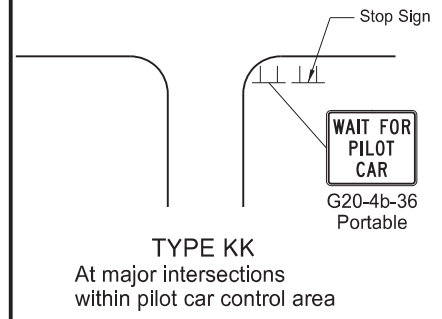


TYPE JJ
For break in pavement. Install signs when conditions exist and remove when not applicable. Signing shown for one direction only.

KEY

- ☐ Flagger
- ☐ Sign
- ▲ Cones
- ⊗ Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

- Notes**
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 2. Determine reduced speed limit based on 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.
 3. 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.
 4. Cover existing speed limit signs within reduced speed zones.
 5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
 7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
 8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 9. Layouts shown for one direction only.

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

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

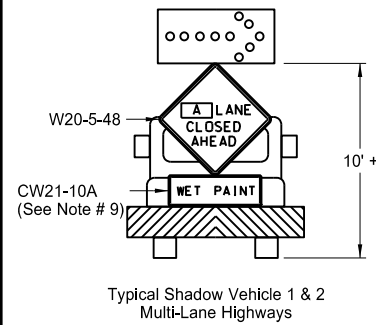
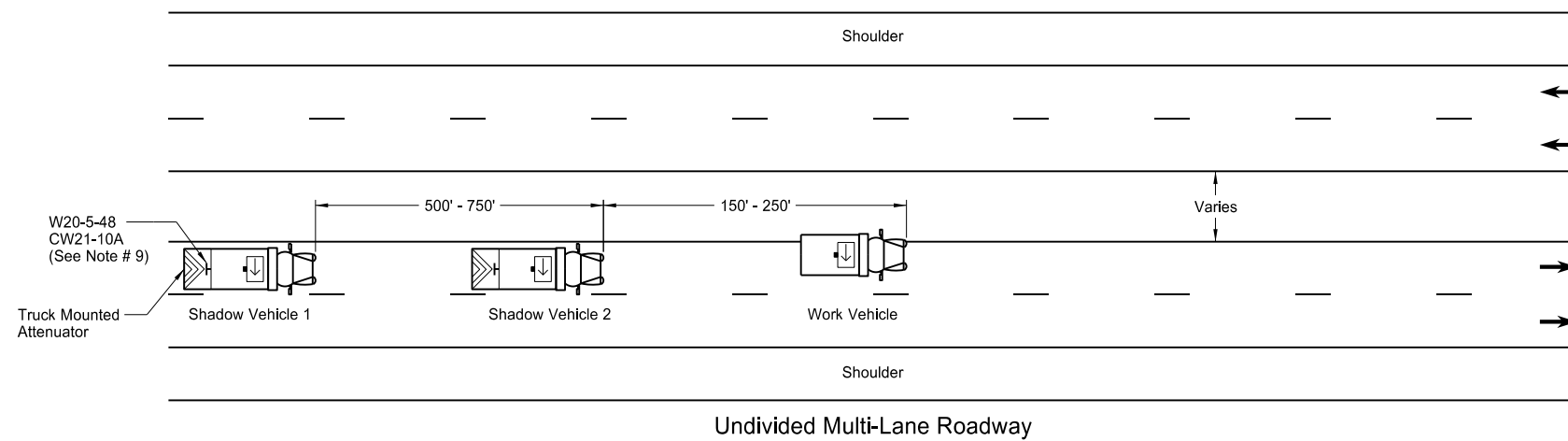
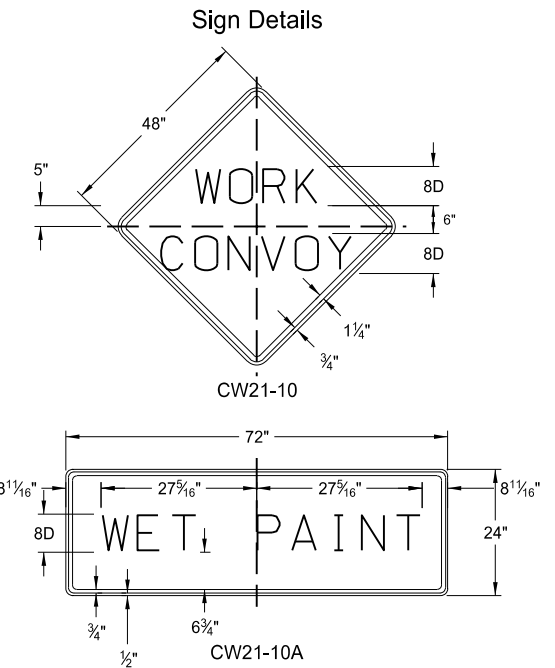
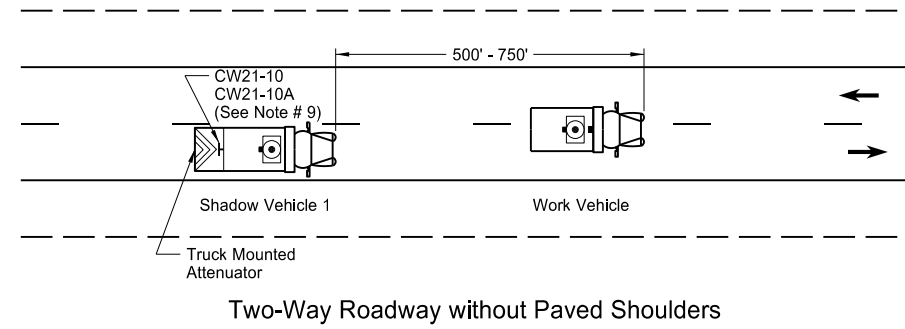
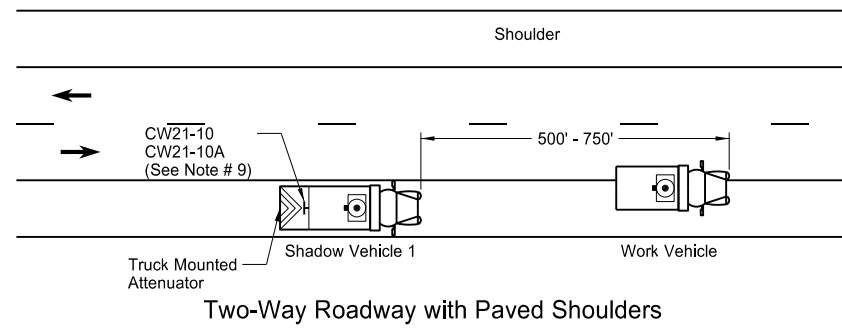
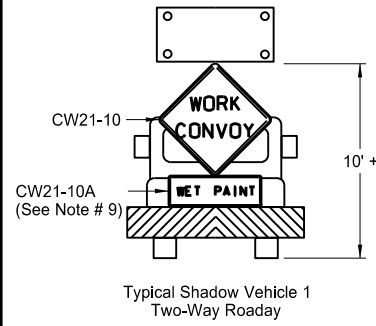
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.

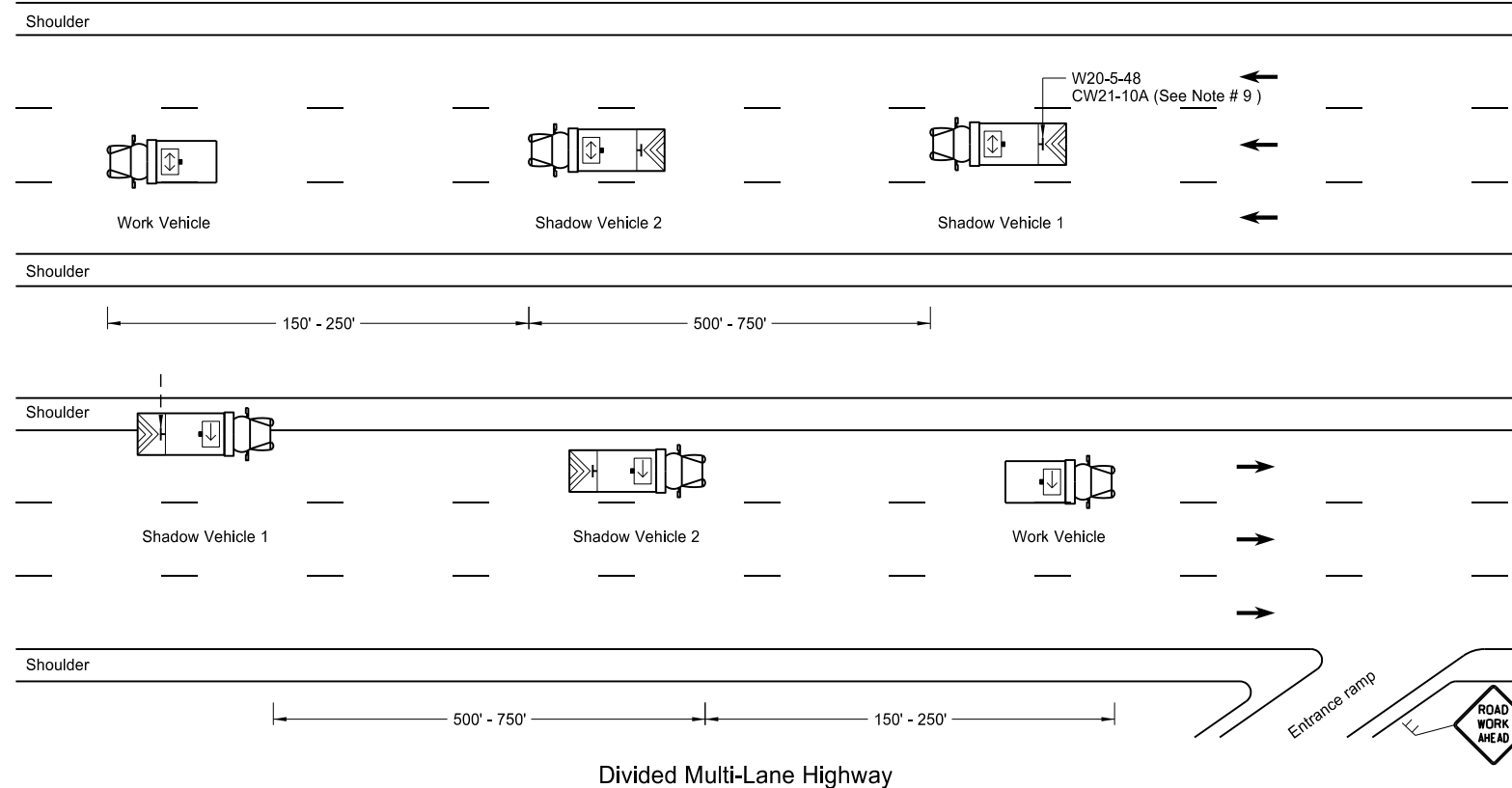


02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

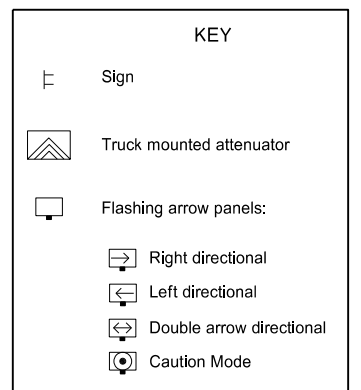


A = Left Right Center



Notes

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



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

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

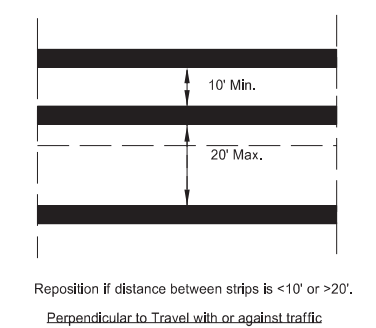
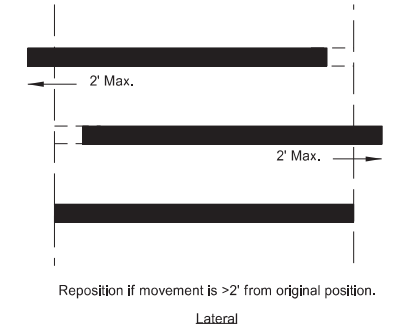
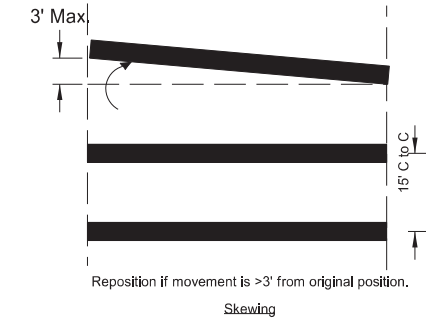
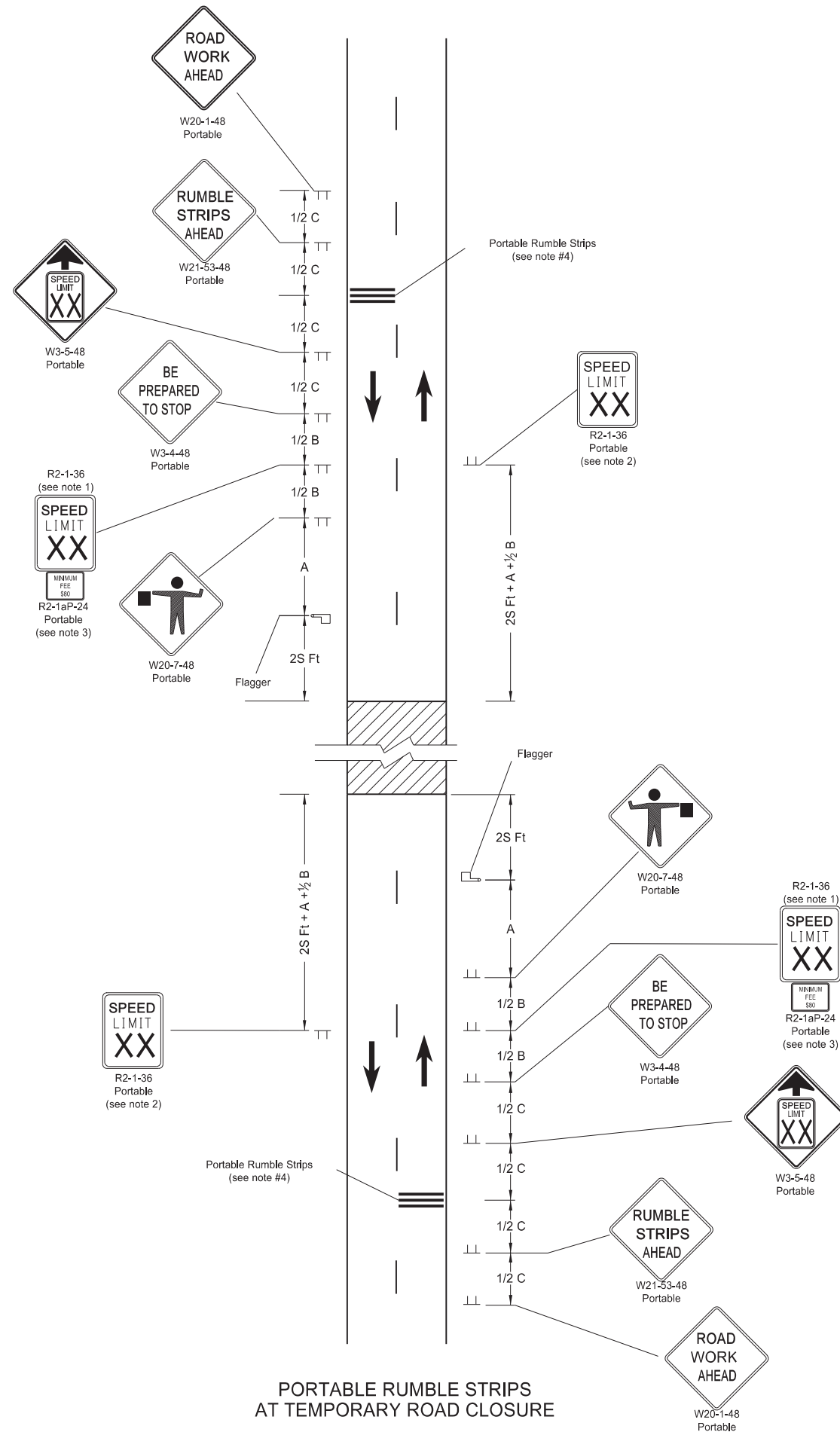
Two-Lane Roadway Portable Rumble Strips

KEY

	Work area
	Flagger
	Sign

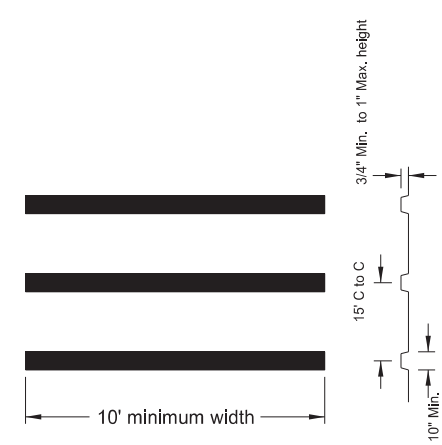
S = Numerical value of speed limit or 85th percentile.

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



PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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



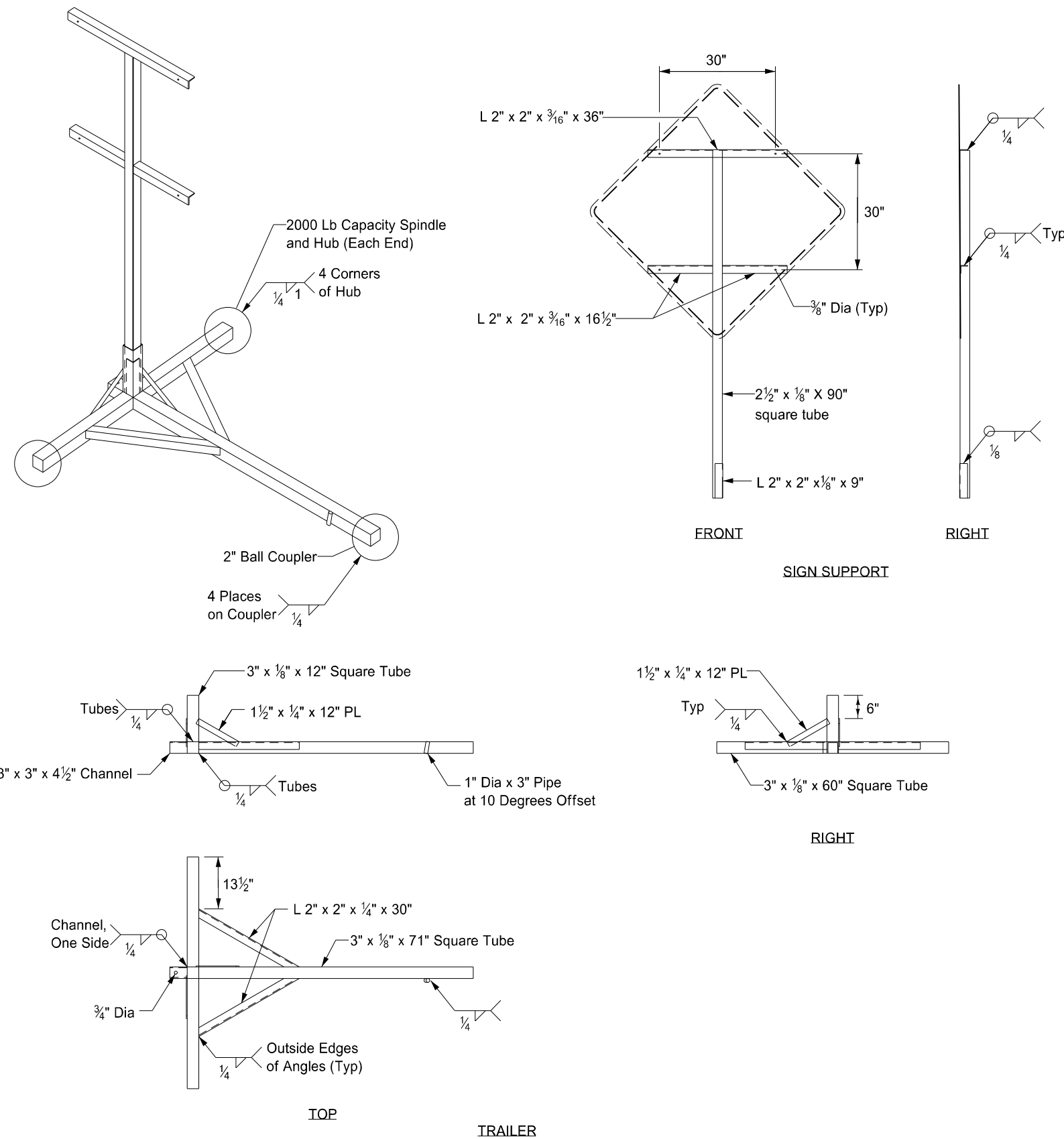
PORTABLE RUMBLE STRIPS ARRAY DETAIL

PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
02-22-22 REVISIONS		
DATE	CHANGE	<p>03/07/23 Use changed to min 45 mph.</p>
03/07/23		
		03/07/23

PORTABLE SIGN SUPPORT ASSEMBLY

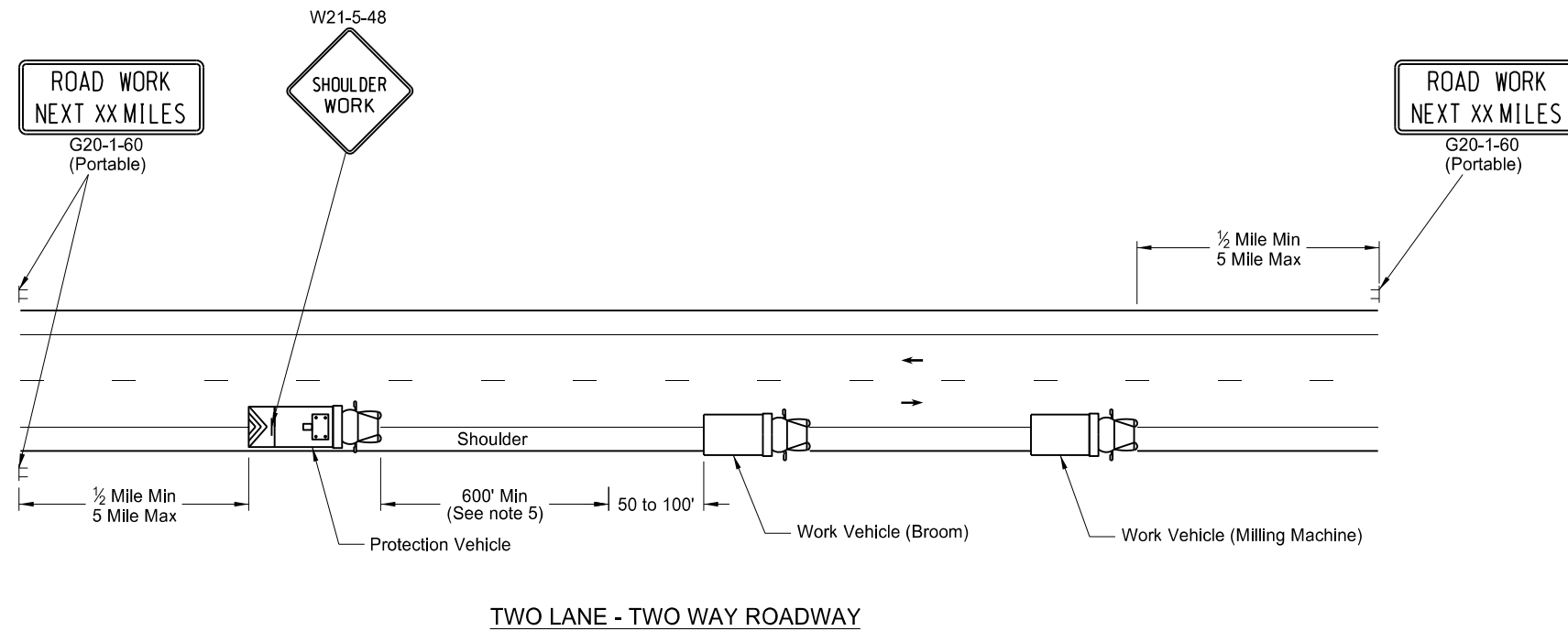
D-704-50



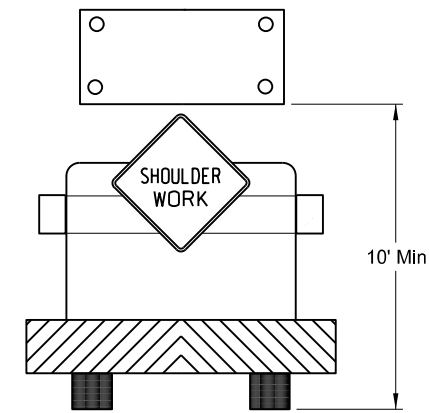
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

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

MOBILE OPERATION
Grinding Shoulder Rumble Strips



TWO LANE - TWO WAY ROADWAY

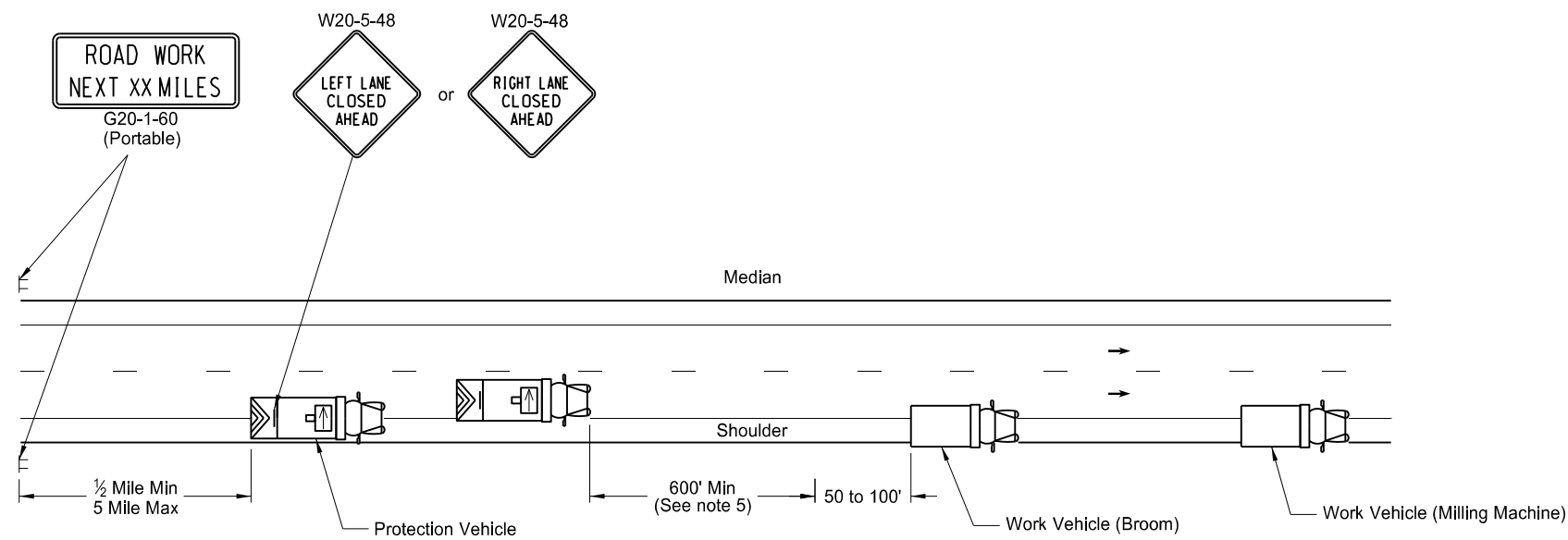


TWO LANE - TWO WAY ROADWAY

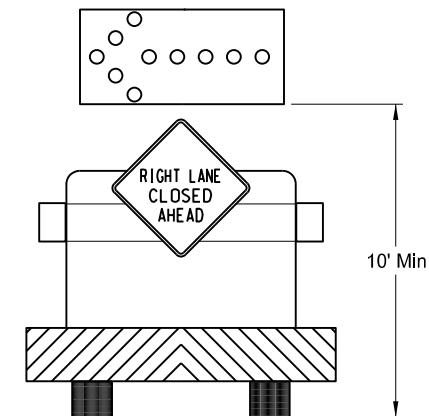
Typical Protection Vehicle with Flashing Arrow Panel In Caution Mode

Notes:

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

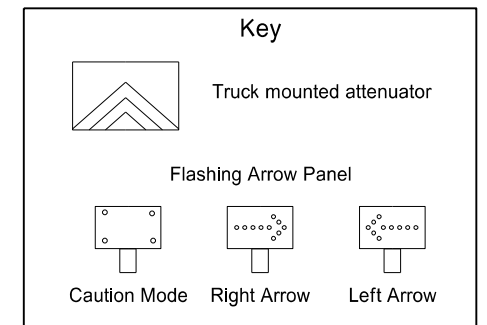


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow Panel In Flashing Arrow Mode

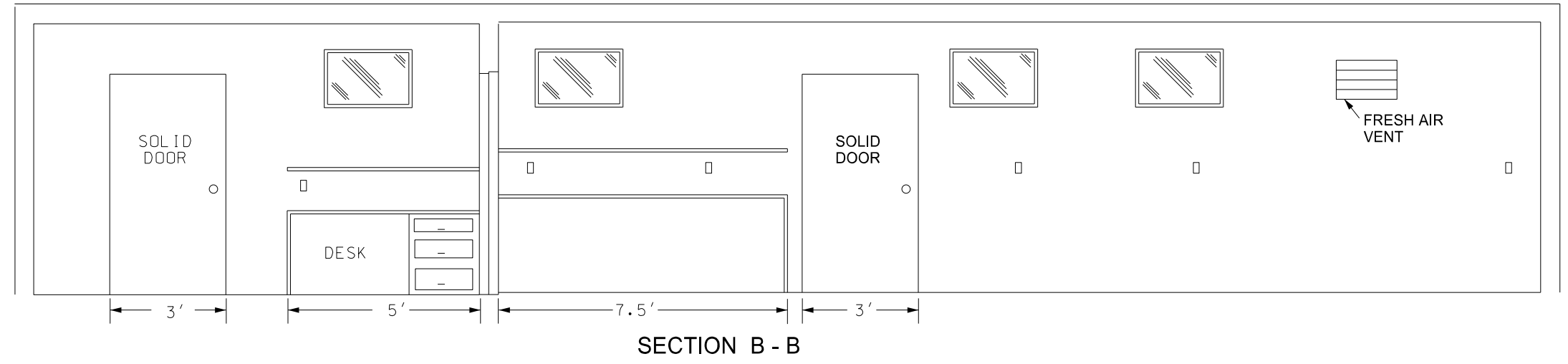
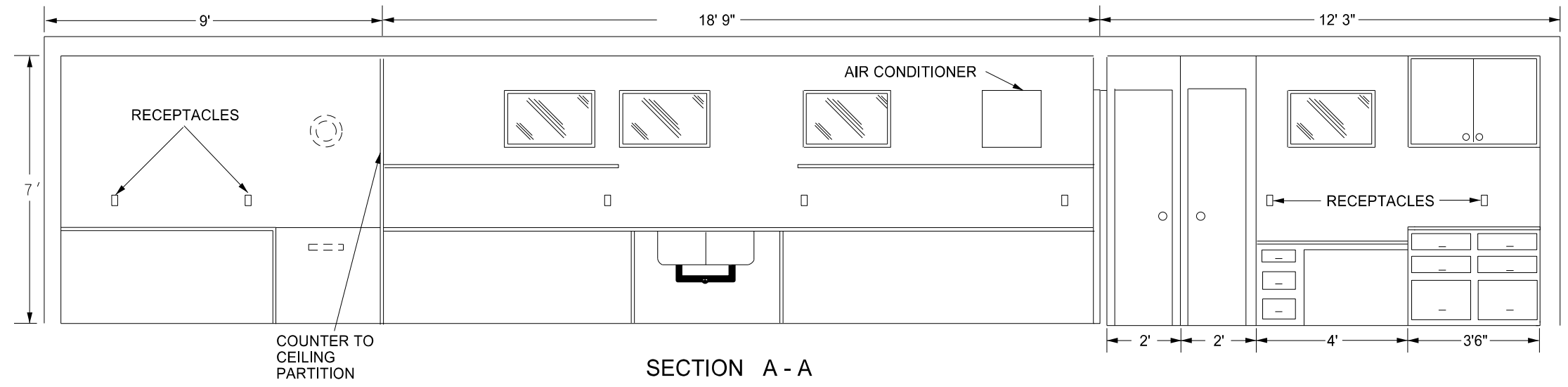
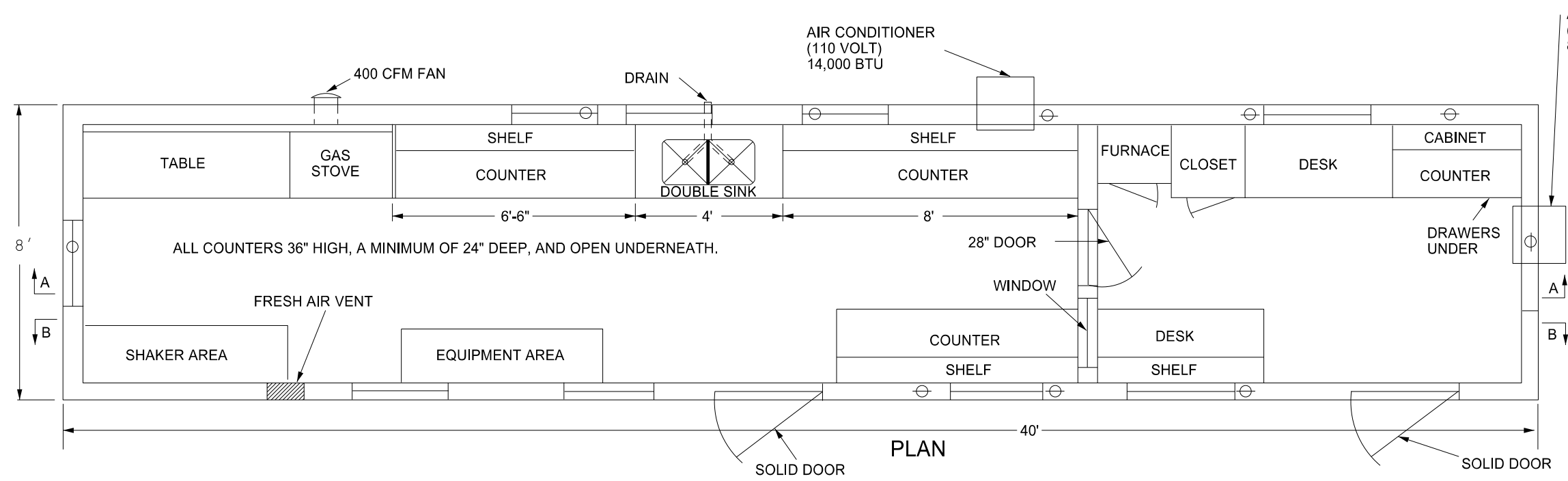


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

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BITUMINOUS LABORATORY

D-706-1



AIR CONDITIONER
(110 VOLT)
8,000 BTU

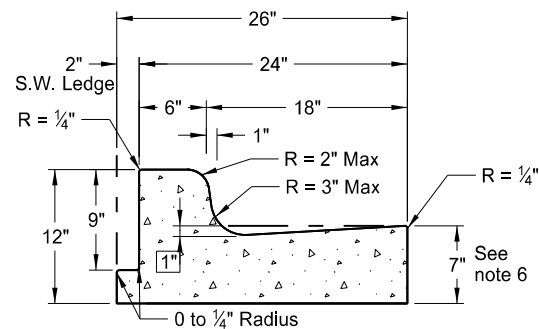
Provide a laboratory with the following:

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

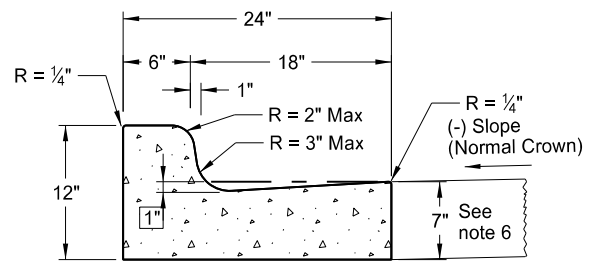
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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

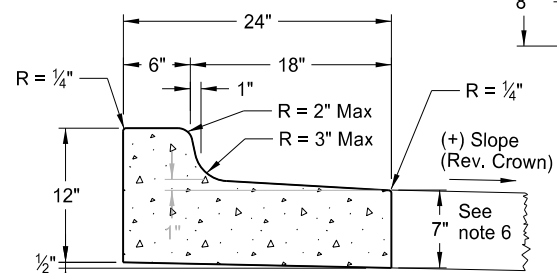
Curb & Gutter and Valley Gutter



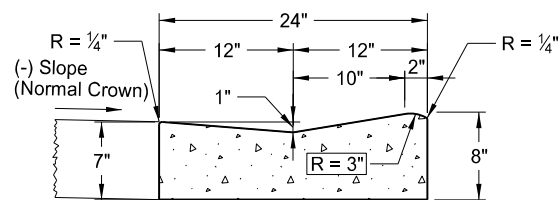
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk,
Median, or Parking Lot.
(Sec. A shown. See Sec B for
additional details.)



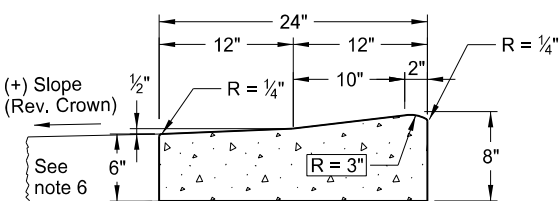
Curb & Gutter Type 1 (Sec. A)



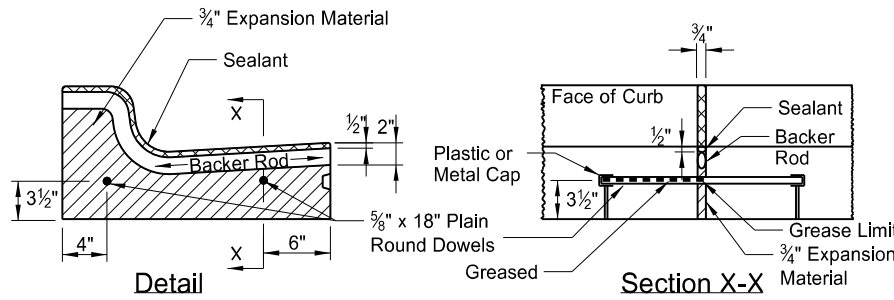
Curb & Gutter Type 1 (Sec. B)



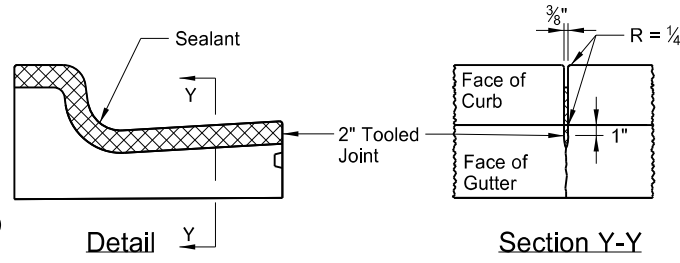
Mountable Curb & Gutter Type 1 (Sec. A)



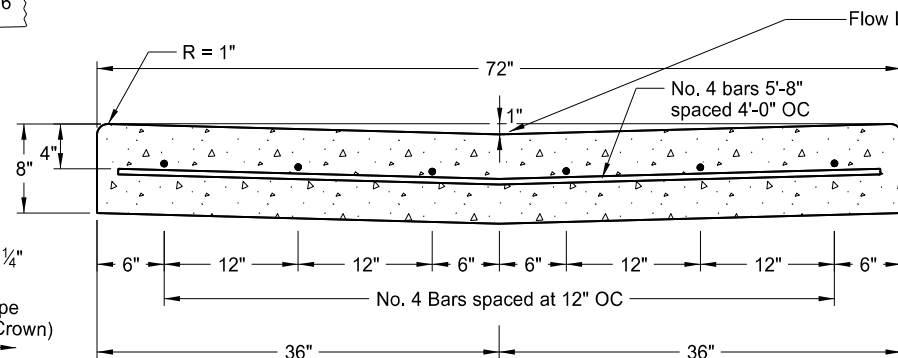
Mountable Curb & Gutter Type 1 (Sec. B)



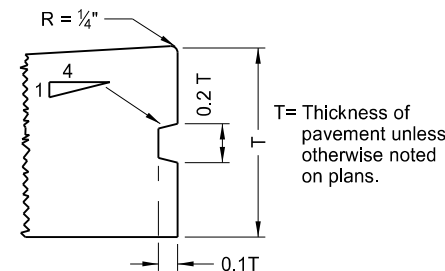
Isolation Joint



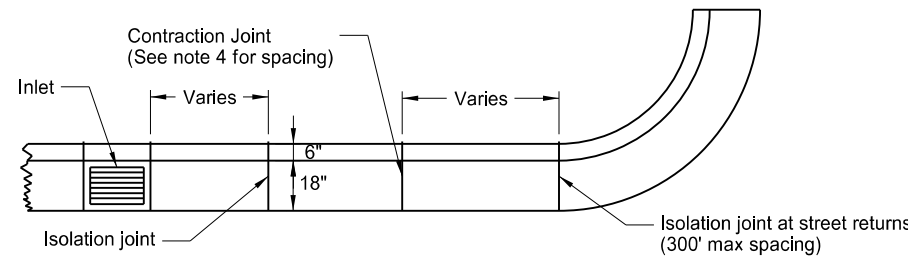
Contraction Joint
(10' Max Spacing)



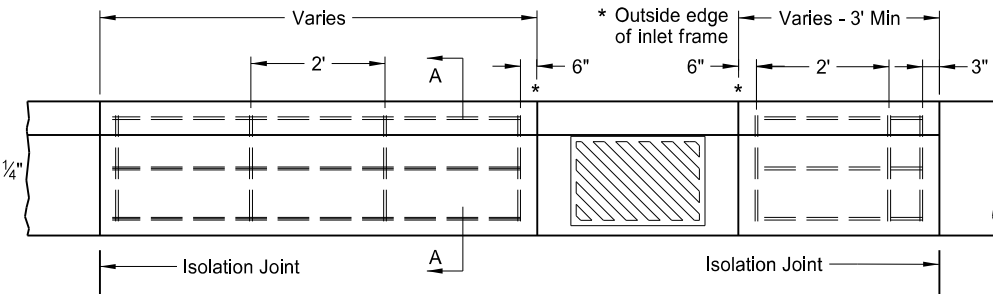
72" Concrete Valley Gutter Detail



Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)

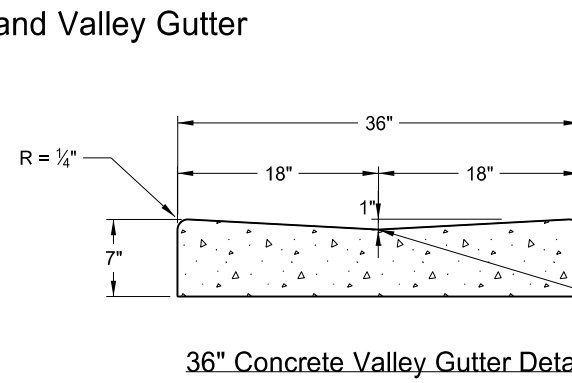


Joint Location Detail

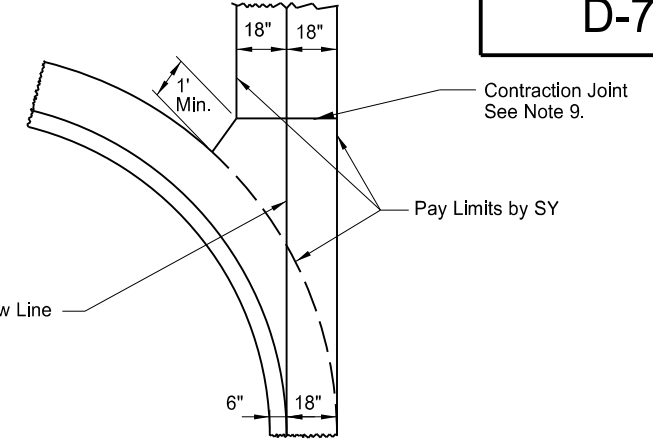


Curb & Gutter Reinforcing at Inlets

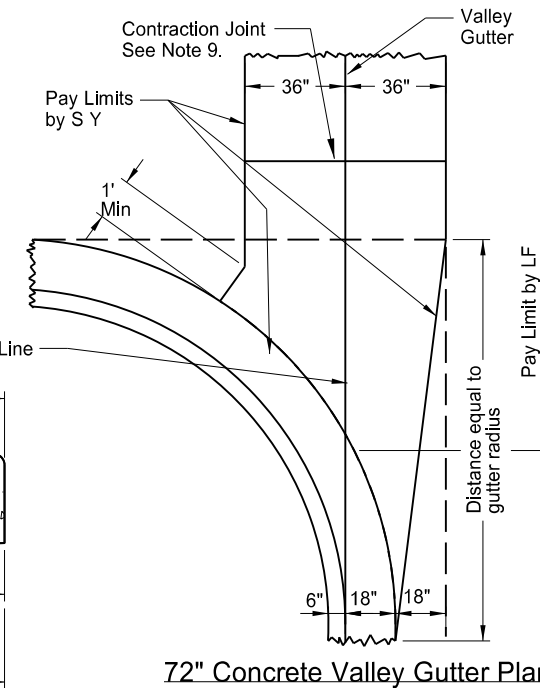
NOTE: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlet locations (even inlets located on radii) in the price bid for "Curb and Gutter - Type 1." Extend reinforcement to the second joint (rebar placed through the first joint) in cases where the 3' min.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



36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan



72" Concrete Valley Gutter Plan

NOTES:

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

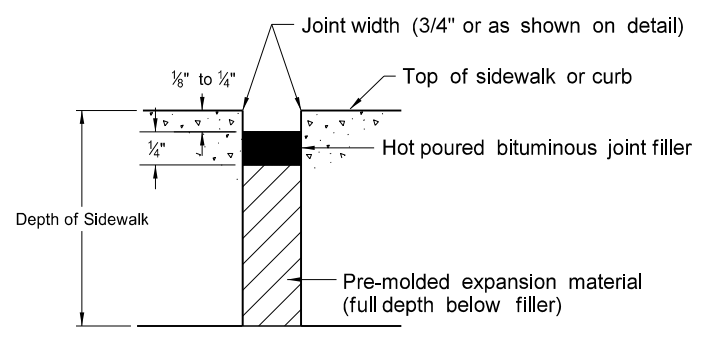
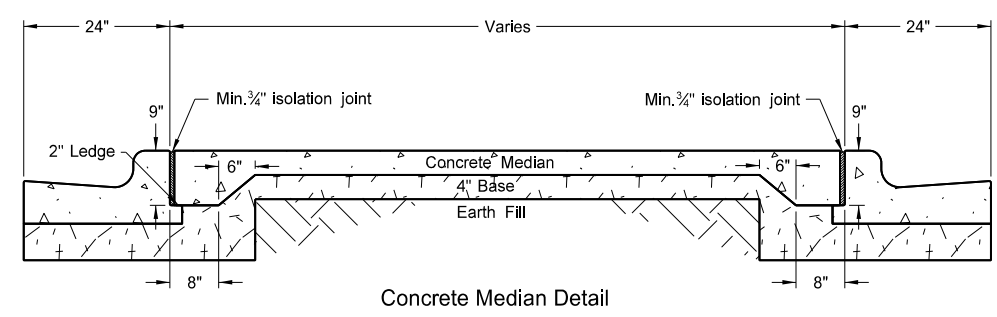
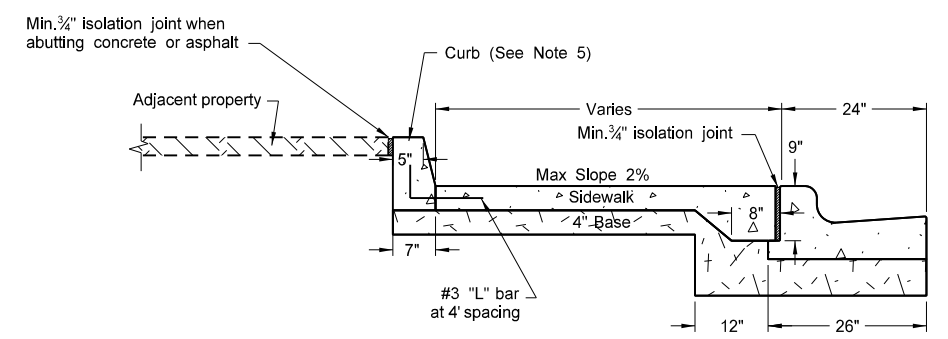
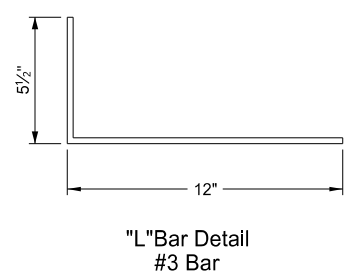
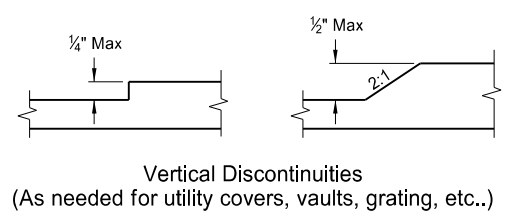
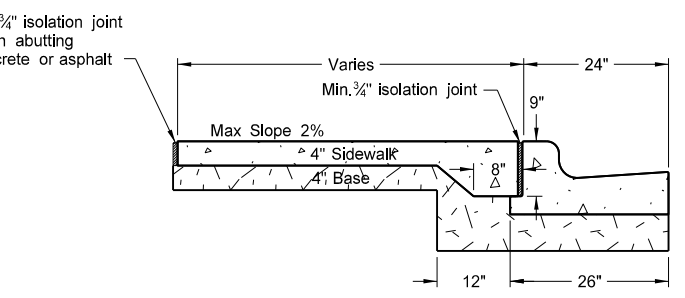
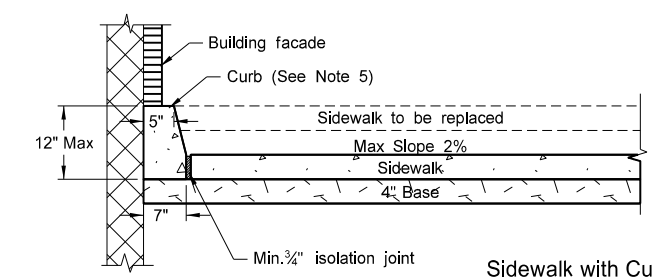
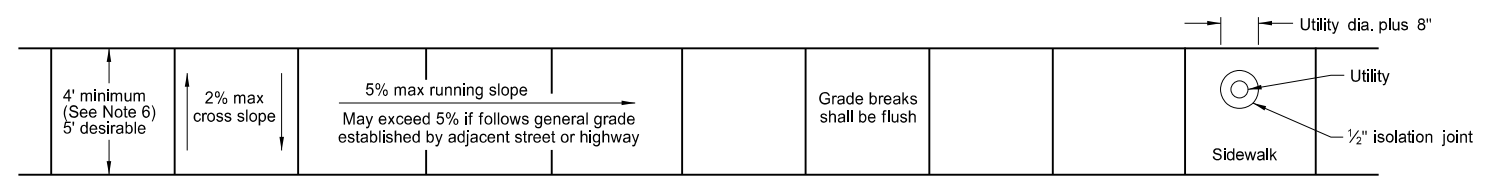
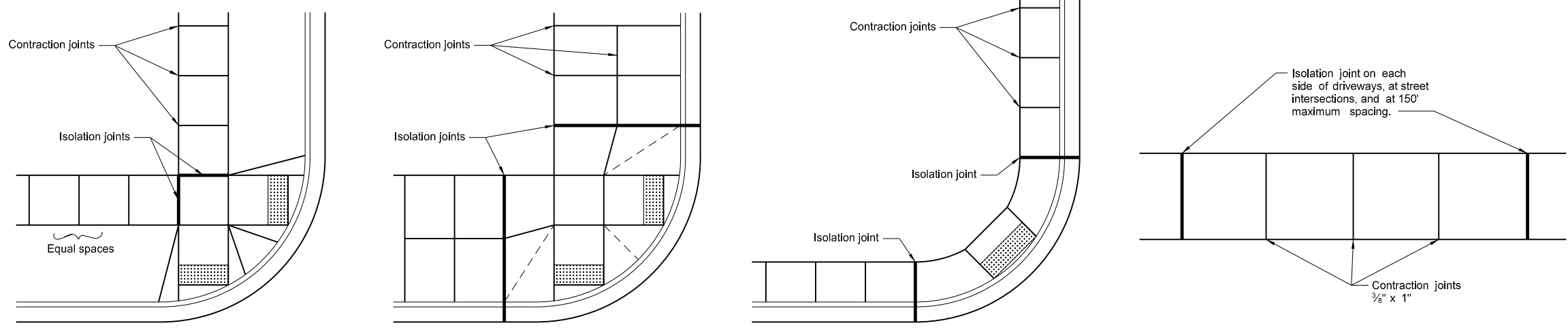
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.

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

SIDEWALK

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.
Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.
When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."
Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.
When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



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

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

CURB RAMP RETROFIT DETAILS

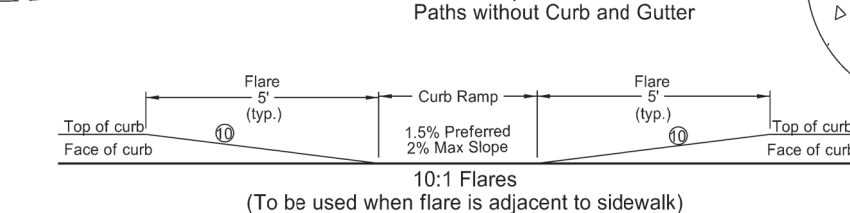
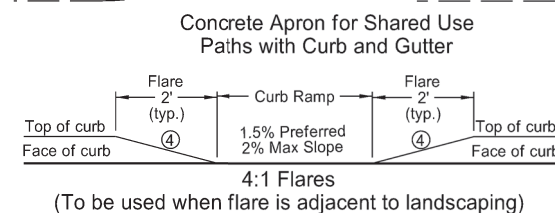
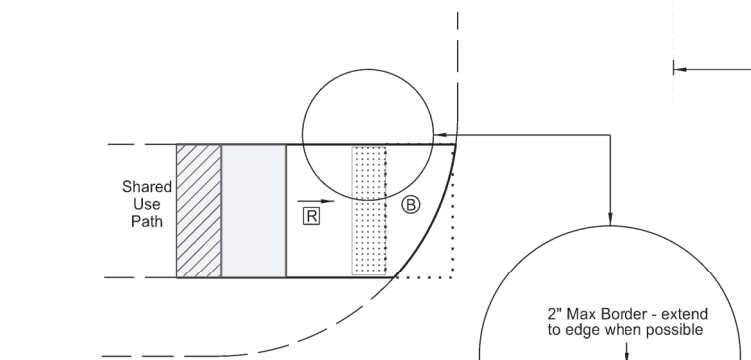
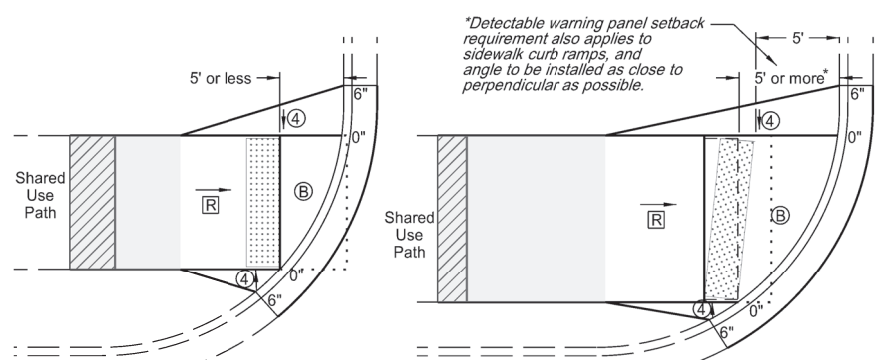
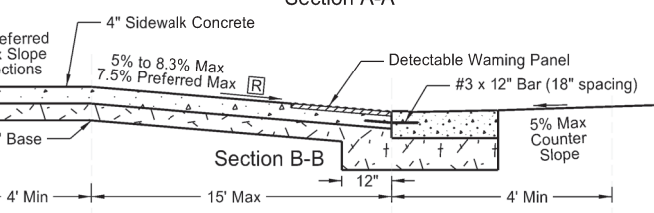
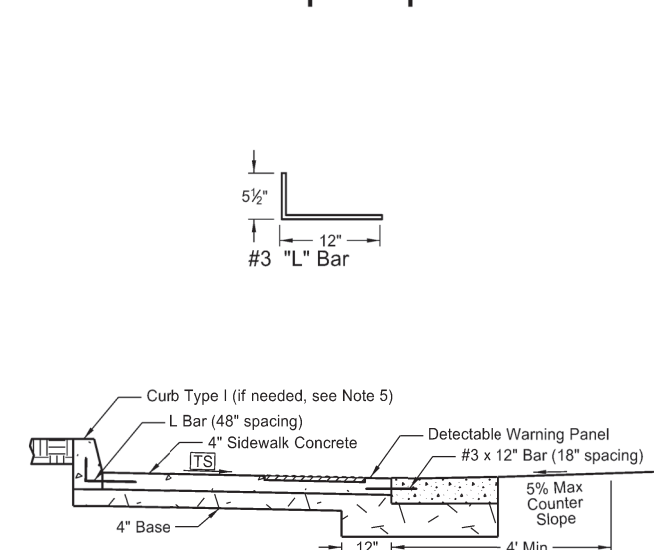
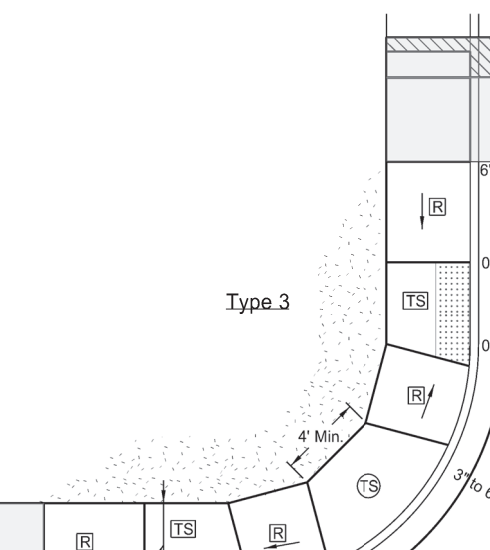
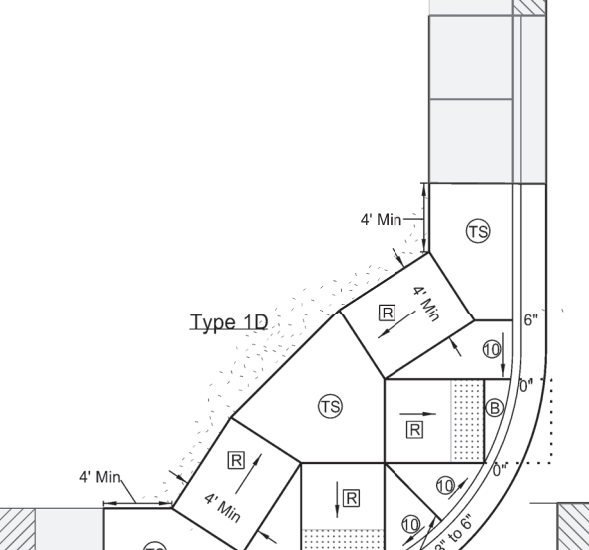
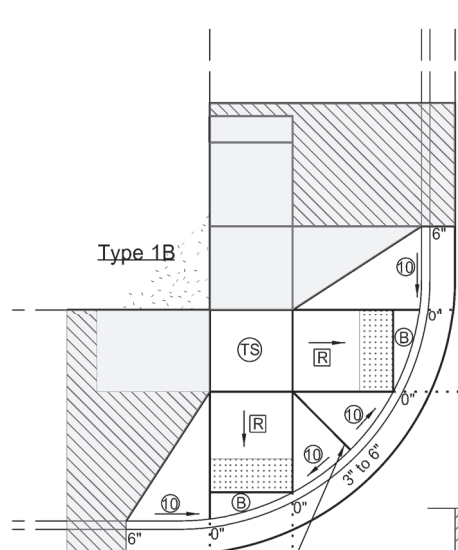
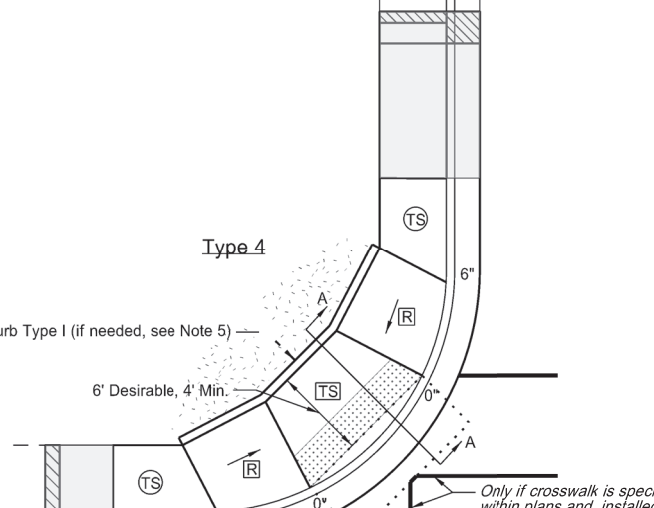
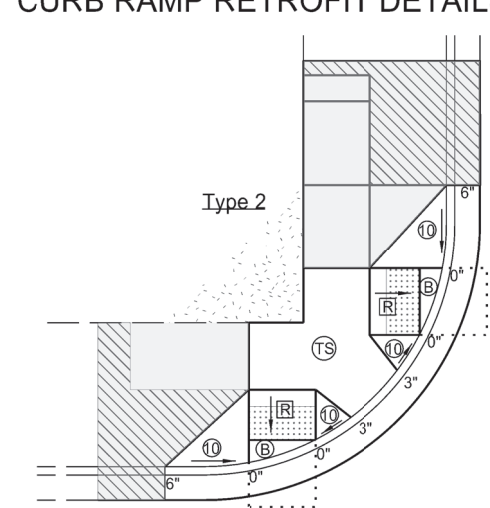
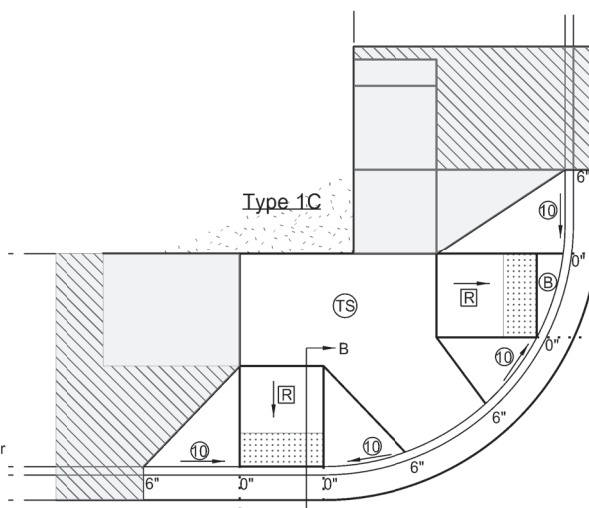
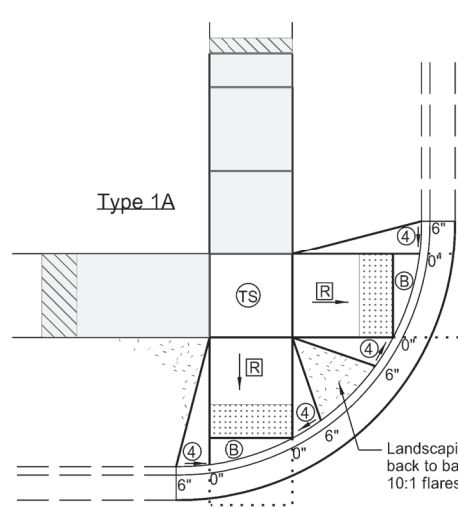
D-750-3

NOTES:

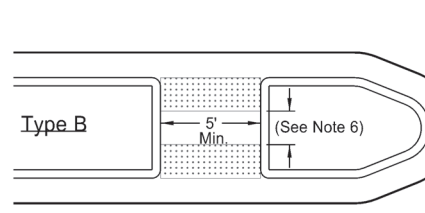
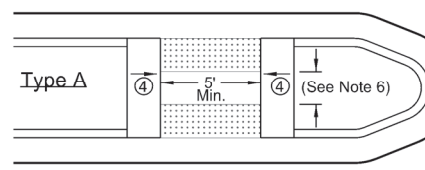
- Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
- Provide turning space with desirable 5' x 5' size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

LEGEND:

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



Median Refuge Islands (Cut-Through)



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

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

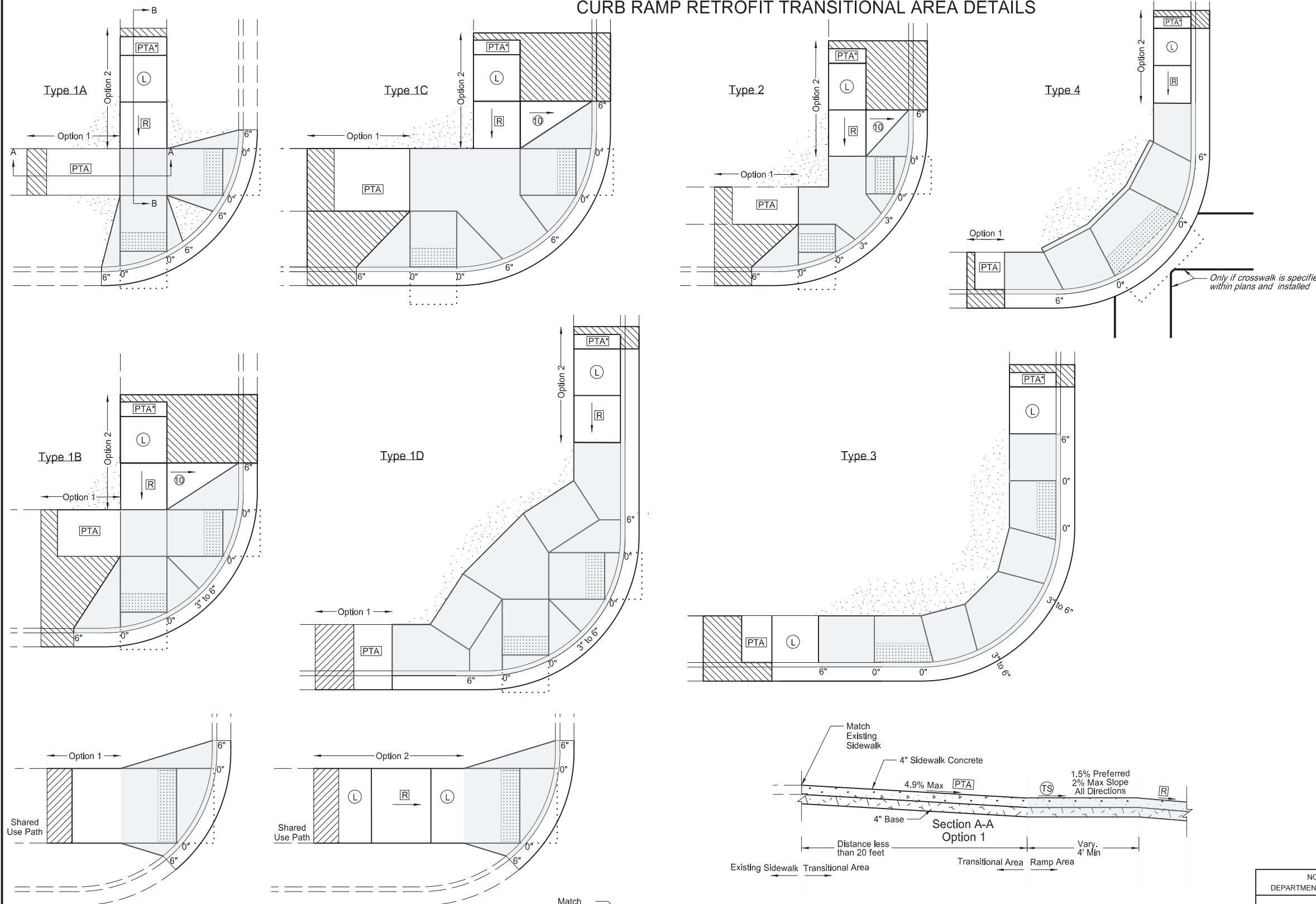
CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4

NOTES:

1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.

Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.



LEGEND:

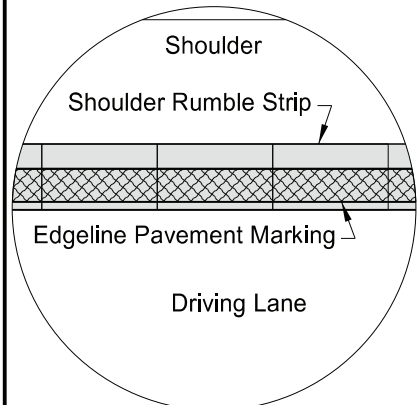
- : Detectable Warning Panel.
- : Landscaping.
- : Transitional tie-in to nearest joint, if needed.
- : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
- : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred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

Transition Areas for Shared Use Paths

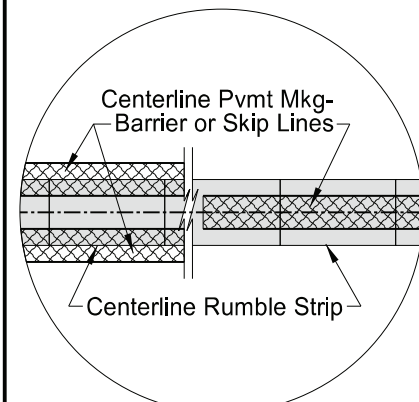
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE



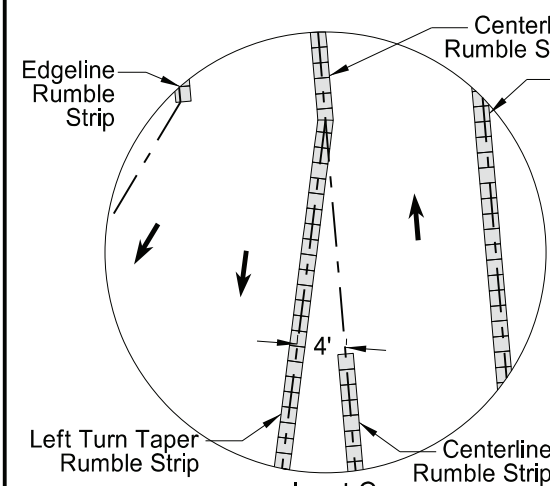
05 19 2021



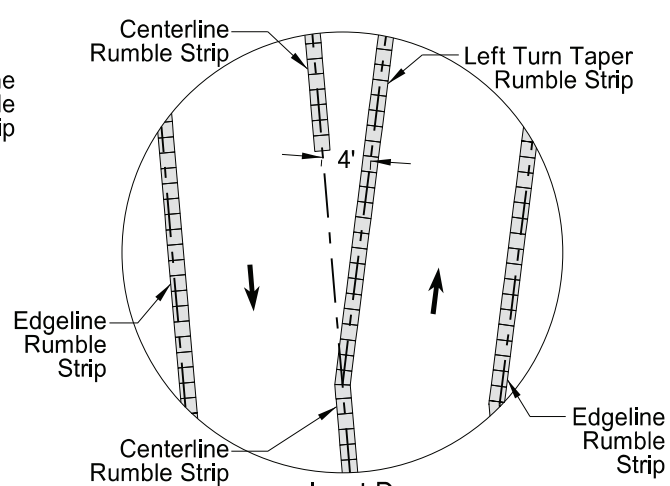
Inset A - Edgeline Rumble Strip
(Layout for opposite shoulder reversed)



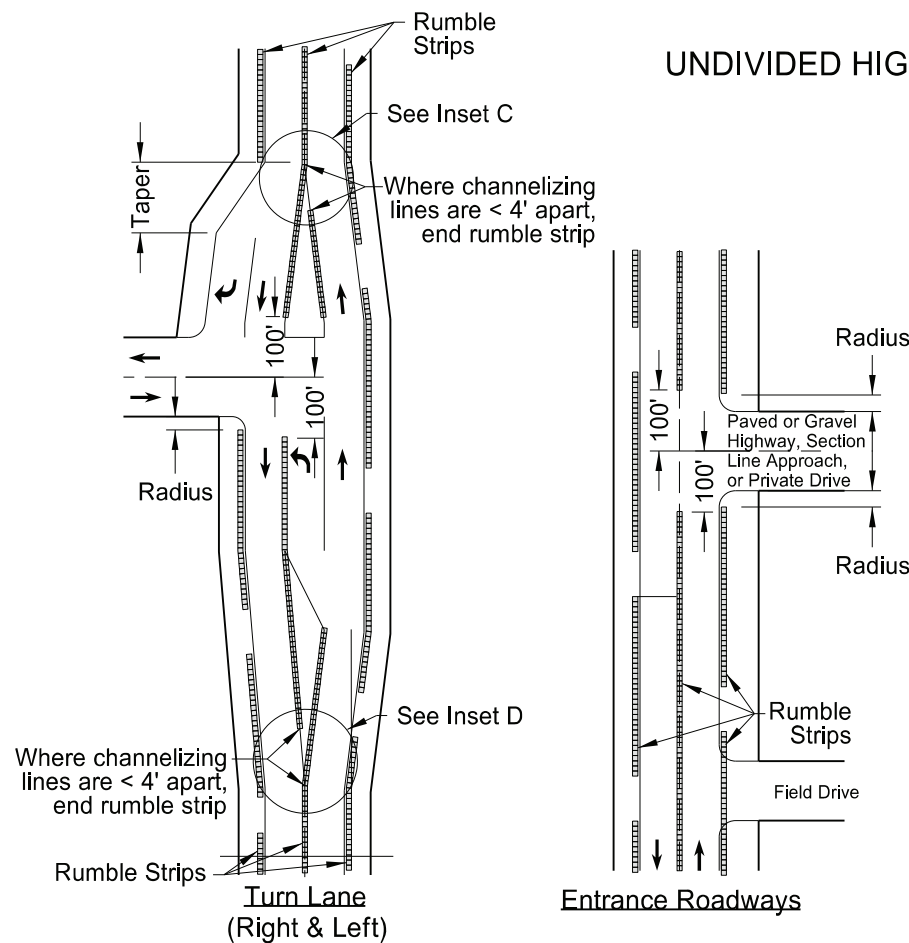
Inset B - Centerline Rumble Strip



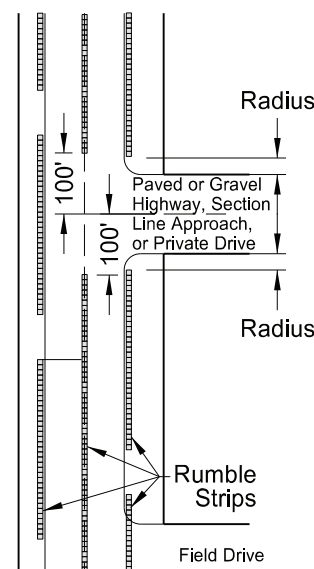
Inset C



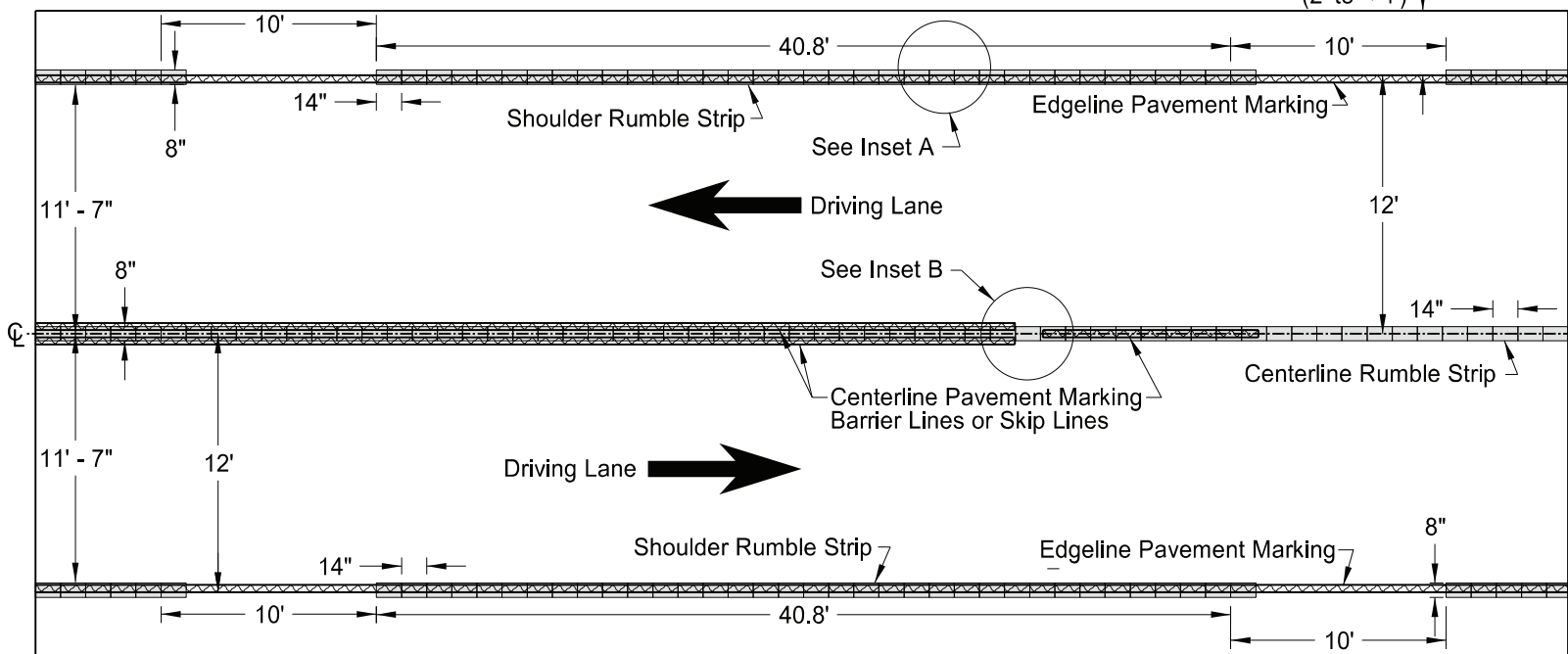
Inset D



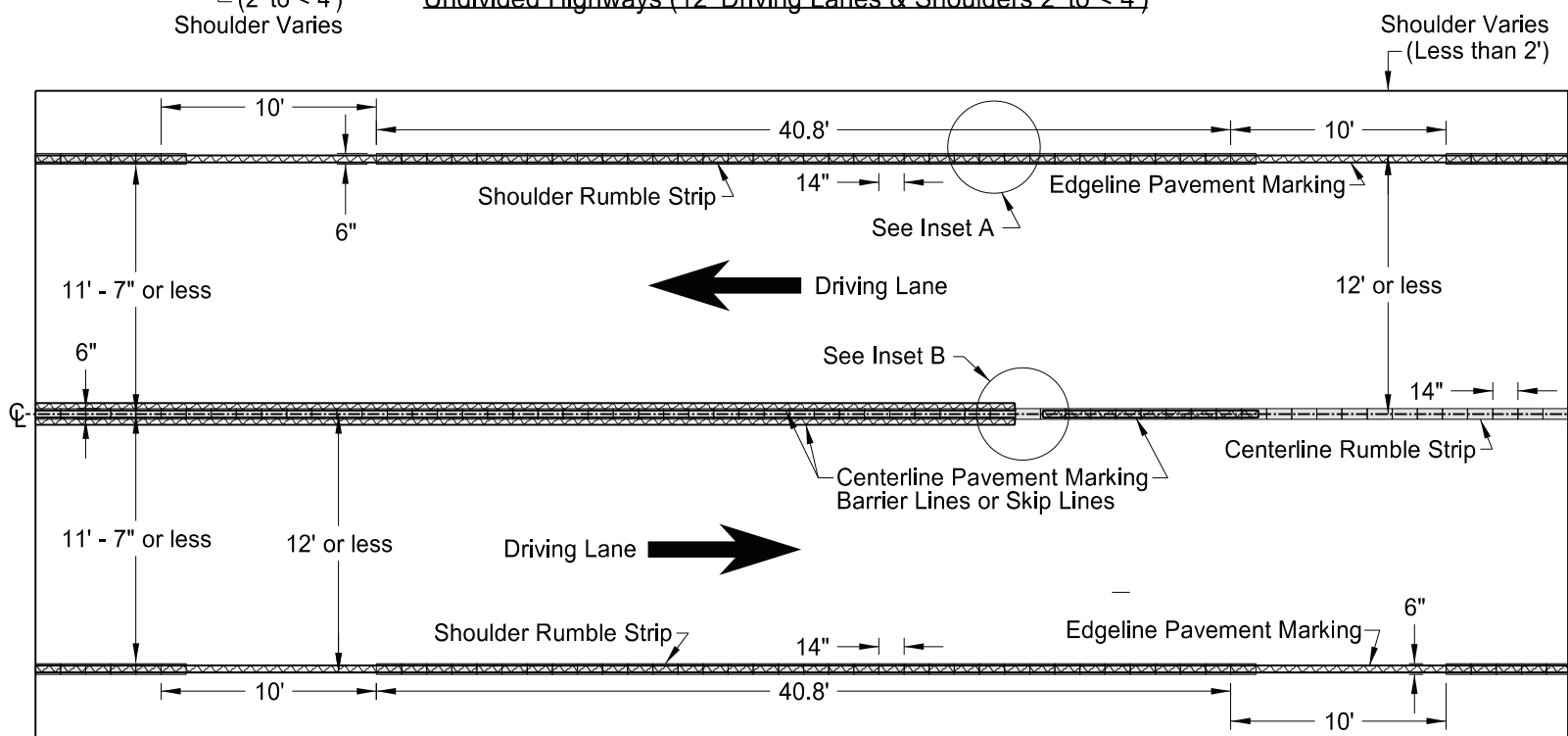
Entrance Roadways



RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')

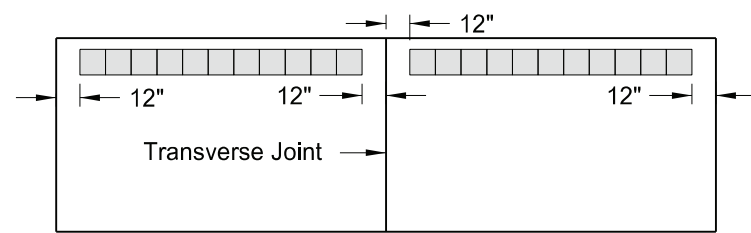
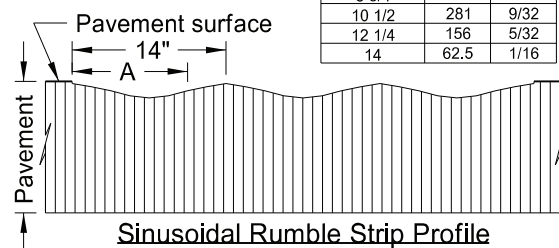


Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')

Milling Depths		
Location A (in)	MIL	Depth in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16



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

- NOTES:**
- Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of paved or gravel highways, section line approaches, or private drives.
 - Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.
 - No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".

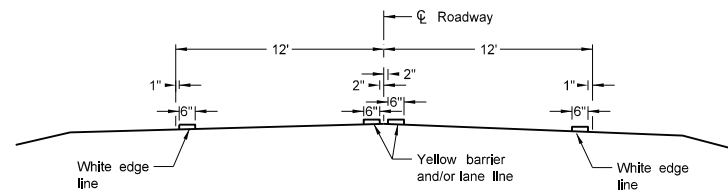
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-4. Revised details for rumble strip widths and dimensions.
1-26-12	Added missing dimensions.
10-25-19	Revised turn lane rumble layout.
11-16-21	Added Note 3.
3-07-23	Rumble Strips made Sinusoidal.
5-26-23	



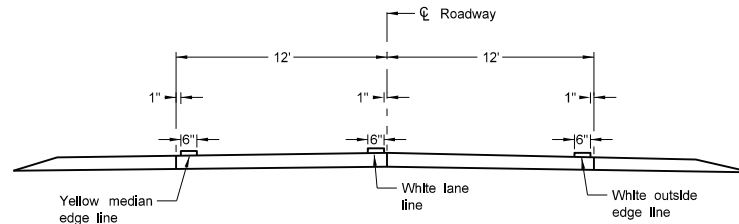
05/26/23

PAVEMENT MARKING

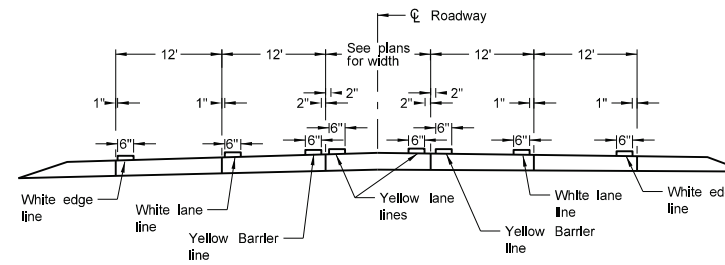
D-762-4



Two Lane Two Way
RURAL ROADWAY



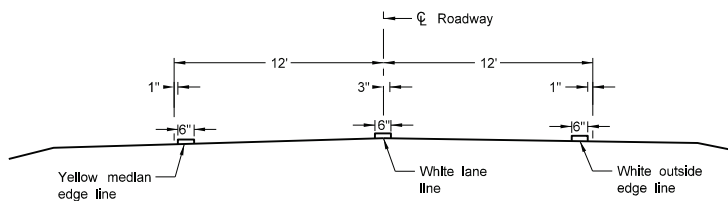
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



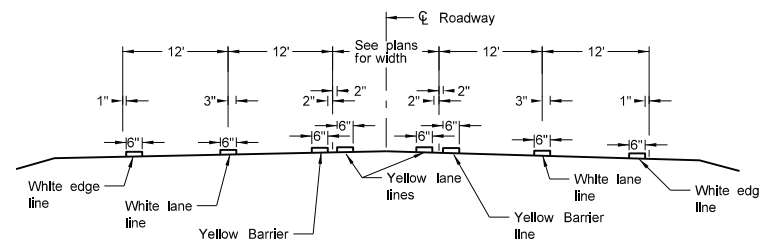
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

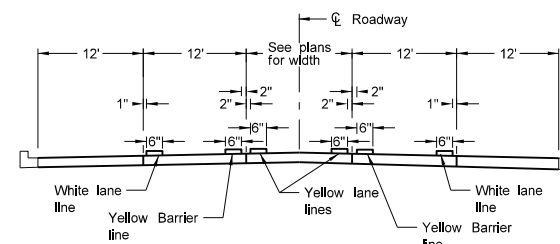
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.



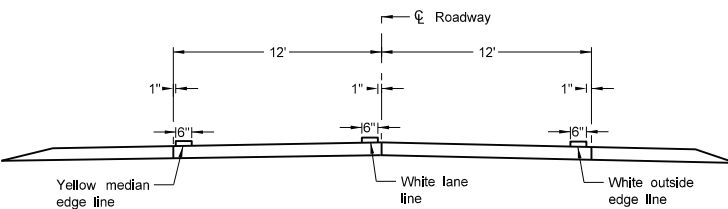
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



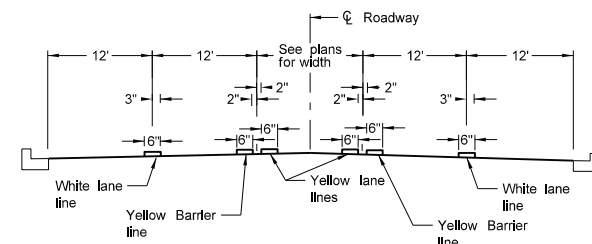
RURAL FIVE LANE ROADWAY
Asphalt Section



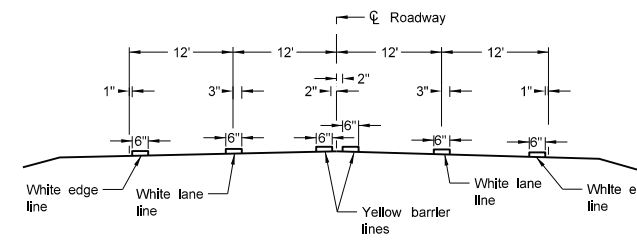
URBAN FIVE LANE SECTION
Concrete Section



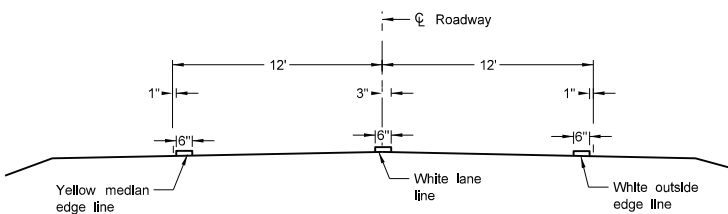
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



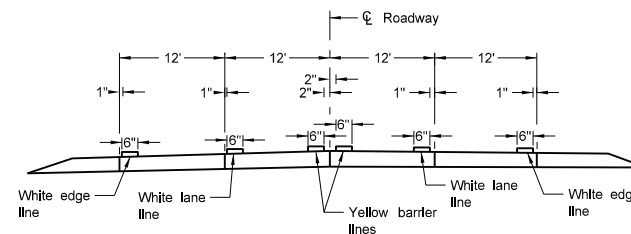
URBAN FIVE LANE SECTION
Asphalt Section



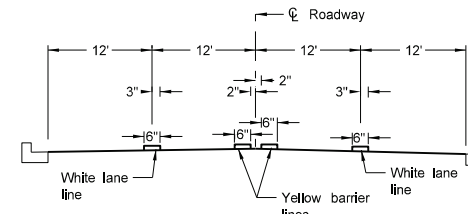
RURAL FOUR LANE ROADWAY
Asphalt Section



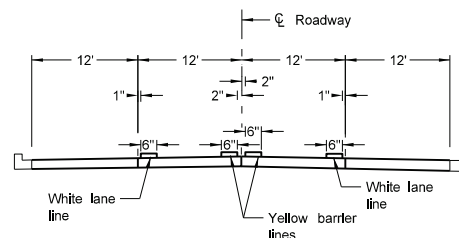
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



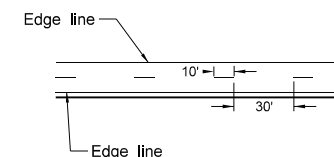
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



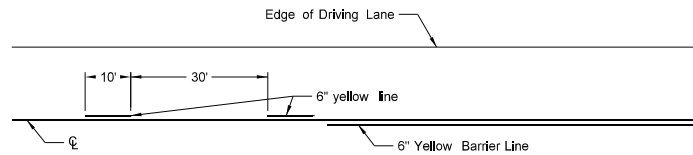
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.

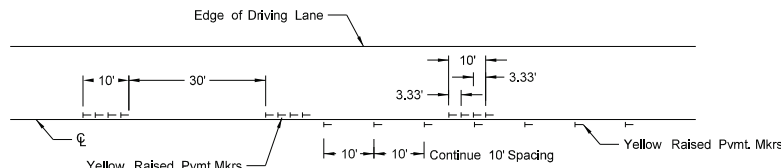


SHORT-TERM PAVEMENT MARKING

D-762-11

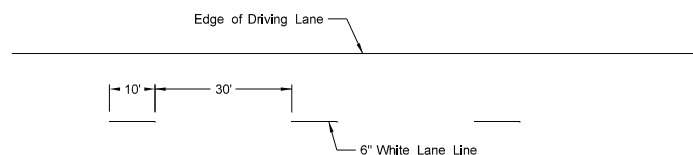


Painted or Tape Lines

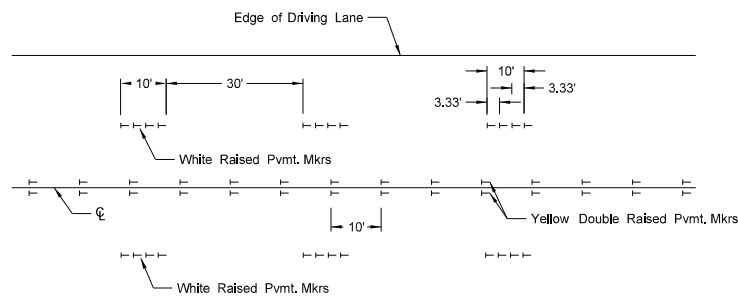


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

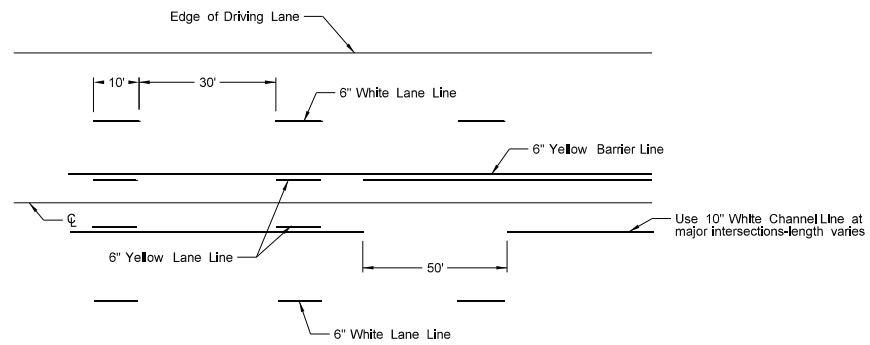


Painted or Tape Lines

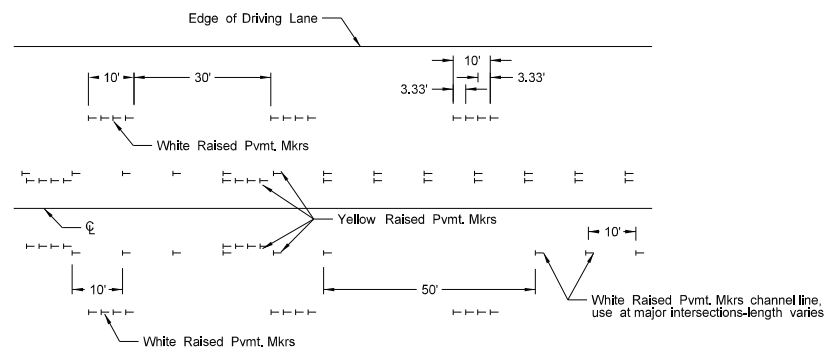


Raised Pavement Markers

FOUR LANE ROADWAY

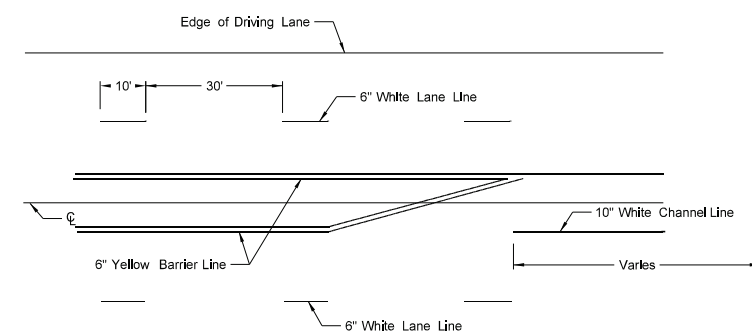


Painted or Tape Lines

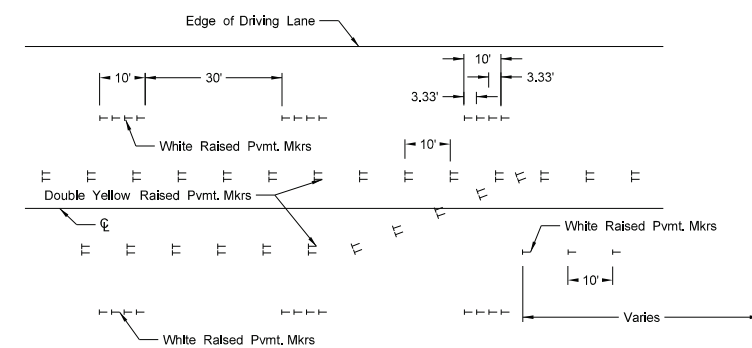


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 10 inches wide if 6 inch normal width lines are used.

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

