DESIGN DATA				
Traffic	Average Daily			
Current 2019	Pass: 16685	Trucks: 285	Total: 16970	
Preventive Maintenance				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	23350	1	1

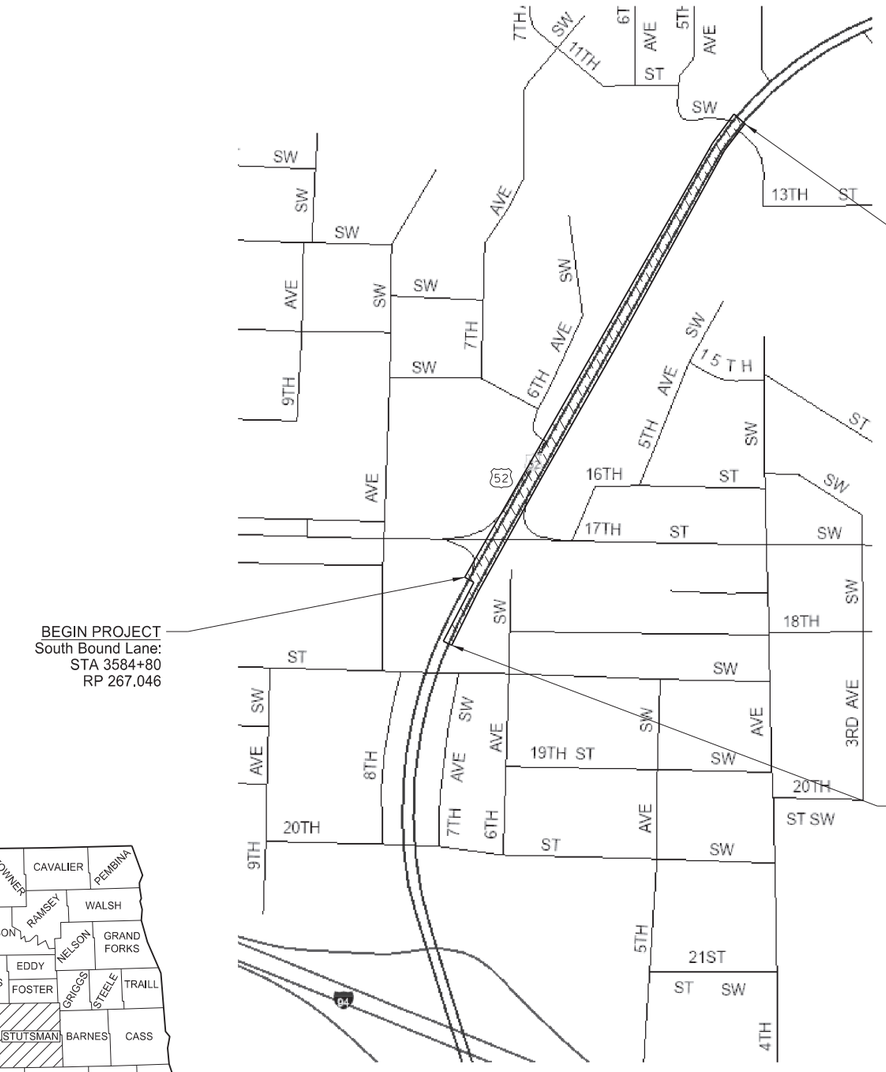
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

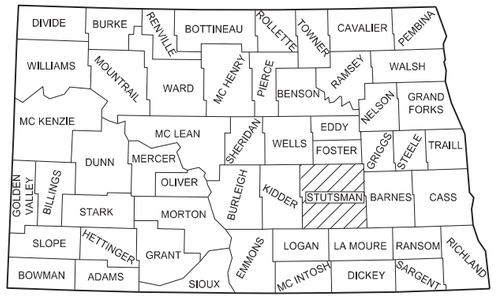
NHU-2-052(049)266

Stutsman County
Jamestown, US 52, End Concrete - 17th St SW
Concrete Pavement Repair / ADA Ramp Improvements

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	10/1/2020
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NHU-2-052(049)266 \ CPR		
(North Bound)	0.524	0.524
(South Bound)	0.468	0.468





STATE COUNTY MAP

DESIGNER
Harrison Philipp
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
VALLEY CITY DISTRICT
Haaland, Nathan A.
02/25/22

NDDOT Valley City District

REGISTERED PROFESSIONAL ENGINEER
NATHAN A HAALAND
PE-7116
DATE
NORTH DAKOTA

02/25/22

2/24/2022 3:29:37 PM hphilipp F:\VC\DESIGNS\CPR\NHU-2-052(049)266\001TS_001_TitleSheet.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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PLAN SECTIONS

LIST OF STANDARD DRAWINGS

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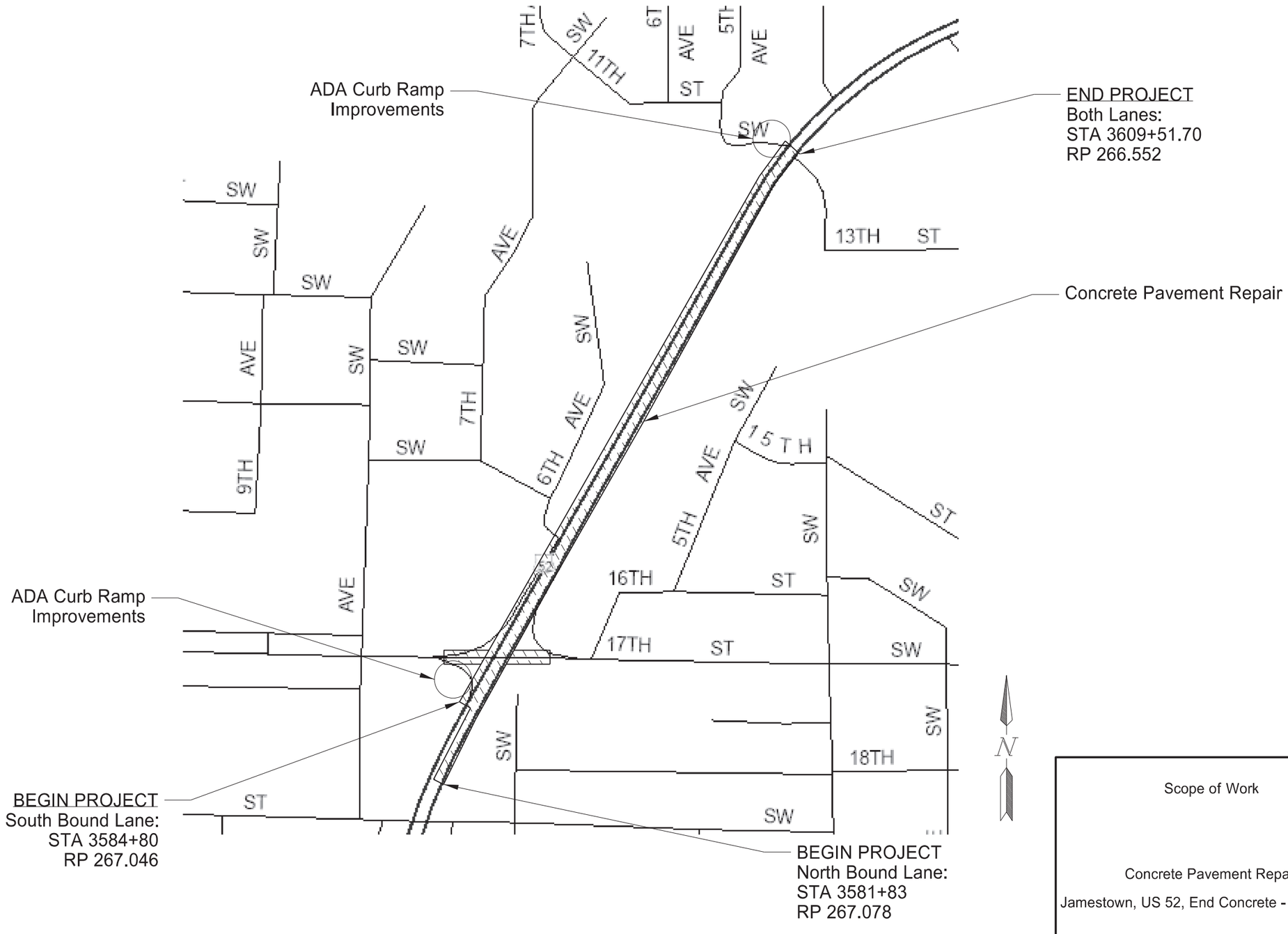

Scope of Work

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE
NORTH DAKOTA
02/24/22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	6	1

NOTES

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 a vacuum or pick-up type sweeper to perform this work.

107-P01 HAUL ROAD RESTORATION: Use Class 13 aggregate for haul road restoration

108-P01 OPERATIONS: Limit hours of operations within the City of Jamestown to 7:00 AM to 11:00 PM.

108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.

202-P01 REMOVAL OF PAVEMENT: Removal of pavement includes removing concrete pavement, bituminous pavement, sidewalk, and aggregate base.

570-P01 CONCRETE PAVEMENT REPAIR: An additional 25% has been added to the quantities for “Concrete Pavement Repair – Full Depth --Doweled”, “Doweled Contraction Joint Assembly” and “Spall Repair Partial Depth” to be used as directed by the Engineer.

704-P01 CONSTRUCTION PHASING PLAN: Provide a traffic control phasing plan at the pre-construction meeting for approval by the Engineer. The plan should include the following:

- Phasing to maintain pedestrian access for the duration of the project.
- Phasing to keep traffic flowing in all directions while under construction at the intersection of 17th St SW and US 52.

704-P02 PHASING - 17TH STREET SW: The contractor shall provide flagging operations at this intersection until signs and lane closer are operational for each phase of the project.

704-P03 17th STREET SW, 4 – WAY STOP: The contractor shall contact the head of the City of Jamestown’s Street Department, Rick Lipetzky at 701-252-4221 to coordinate the switching of signal lights to a 4 way stop. Switching the signal lights should be completed before phase 1.

704-P04 OBLITERATION OF PAVEMENT MARKINGS: Obliteration of pavement markings at the intersection 17th St SW & US 52 need to be completed before phase 1.

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".

REGISTERED PROFESSIONAL ENGINEER
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	6	2

NOTES

704-525 TRAFFIC CONTROL FOR CONCRETE PAVEMENT REPAIR: Provide traffic control consisting of a temporary lane closure and flagging.

The length of the work zone includes the daily construction area plus the longitudinal buffer space and does not include tapers.

Place vertical panels on the roadway centerline adjacent to full depth repair areas. Place panels every 10 feet and use a minimum of two panels at each full depth repair area.

Place Type I barricades in front of each full depth removal area. Position barricades so that they do not encroach into the traffic lane.

The traffic control device list is based on two 0.5-mile lane closures and the following list:

- Standard D-704-20, Type G;
- Standard D-704-22: Layout K for construction trucks hauling material
- Standard D-704-34 – quantities include 8 delineator drums for approaches
- Jct 17th St SW Phasing – included 48 delineator drums and 36 tubular markers

Quantities of Type I barricades and vertical panels are based on 10 full depth repair locations and 2 vertical panels per location.

Remove or shorten lane closures after new concrete has reached the required strength for opening to traffic specified in Section 570.04 A.1.b, "Full Depth Repairs".

704-610 PEDESTRIAN CHANNELIZATION: Provide pedestrian channelization meeting the following requirements:

- Interlocked with a 1" maximum gap between devices.
- Upper rail with a smooth continuous guide handrail positioned 32 to 38 inches above the walkway
- A smooth lower edge on the pedestrian side of the wall to allow sight impaired cane tapping positioned based on the following requirements:
  1. The bottom edge is less than 2 inches above the walkway; and
  2. The top edge a minimum of 6 inches above the walkway
- Openings in the bottom of the wall to allow for water passage.
- Support legs that do not impede the clear walkway.
- In compliance with NCHRP Report 350 or MASH Test Level 3 (TL3);
- Channelization portions are orange or white, or a combination of orange and white, in color.

Install the pedestrian channelization as follows:

- Place pedestrian channelization to delineate a clear, temporary pedestrian pathway directing pedestrians through the work area.
- Provide a minimum, continuous, clear width of 48 inches, free of vertical discontinuities greater than 0.25 inches and obstructions.
- Where the clear width of a temporary pedestrian access route is less than 60 inches, provide passing spaces at maximum intervals of 200 feet that have minimum dimension of 60 × 60 inches.
- Move and reset the pedestrian channelization as needed for multiple phase construction.

The Engineer will pay for the maximum required length of pedestrian channelization used at one time. The Engineer will measure channelization in place and will not make any deductions in length for hinged gaps or connection hardware. If pedestrian channelization is necessary to delineate both sides of the walkway, the Engineer will measure both sides of the walkway. Include all costs to furnish, install, maintain, move, relocate, replace, and remove pedestrian channelization in the contract unit price for "Pedestrian Channelization."

708-P01 INLET PROTECTION: Include all costs for installing, cleaning, removing sediment, maintaining, and replacing damaged inlet protection devices in the unit price bid for "INLET PROTECTION-SPECIAL". Keep all devices in place until final sweeping are placed or upon approval from the Engineer

762-P01 SHORT TERM 4IN LINE - TYPE R: A quantity has been included for channelization of traffic at the intersection of 17th ST SW & US 52 during each phase.

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-P10 LANDSCAPE PREPARATION: Provide minimal grading and hydraulic mulch adjacent to the locations for sidewalk and curb & gutter replacement. Blend the existing topsoil adjacent to the sidewalk and or curb & gutter to eliminate any steep slopes or vertical edges. Remove excess topsoil from the project site. Import topsoil if needed. Provide approximately 14 CY of additional topsoil. Provide hydraulic mulch and seed mixture (NDDOT Class I).

Use hydraulic mulch material as specified in Sections 253.01 to 253.04 of the NDDOT Standard Specifications. Apply the hydraulic mulch after the seed is incorporated into the topsoil. Apply fertilizer at a rate of 100 pounds per acre with a mixture of 5-10-5. Include work necessary to restore landscaping, topsoil areas, imported topsoil, seeding, and mulching in the unit price bid for “LANDSCAPE PREPARATION”.

REGISTERED PROFESSIONAL ENGINEER
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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	37.9	37.9
202	0130	REMOVAL OF CURB & GUTTER	LF	45	45
261	0200	WEIGHTED FIBER ROLLS	LF	170	170
261	0201	REMOVE WEIGHTED FIBER ROLLS	LF	170	170
570	0210	PCC PAVEMENT GRINDING	SY	16,840	16,840
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	255	255
570	0710	10IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	34	34
570	0713	8IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	768	768
570	0963	TRANSVERSE PCC JOINT CLEANING & SEALING	LF	1,616	1,616
570	0965	LONGITUDINAL PCC JOINT CLEANING & SEALING	LF	1,605	1,605
570	0966	RANDOM PCC CRACK CLEANING & SEALING	LF	1,009	1,009
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	1,910	1,910
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	100	100
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,382	2,382
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1050	TYPE I BARRICADE	EA	10	10
704	1052	TYPE III BARRICADE	EA	2	2
704	1054	SIDEWALK BARRICADE	EA	3	3
704	1056	PEDESTRIAN CHANNELIZATION	LF	137	137
704	1060	DELINEATOR DRUMS	EA	204	204
704	1067	TUBULAR MARKERS	EA	252	252
704	1080	STACKABLE VERTICAL PANELS	EA	20	20
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	391	391
704	2108	TEMPORARY CURB RAMP	EA	2	2
708	1540	INLET PROTECTION-SPECIAL	EA	23	23
708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	23	23
748	0140	CURB & GUTTER-TYPE I	LF	45	45
750	0115	SIDEWALK CONCRETE 4IN	SY	32.3	32.3
750	2115	DETECTABLE WARNING PANELS	SF	60	60
762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	406	406

ESTIMATE NUMBER: 22156 ESTIMATE TYPE: PSE FINALIZED: Y RUN DATE: 02/24/2022 TIME: 15:17:53

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
762	0420	SHORT TERM 4IN LINE-TYPE R	LF	398	398
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	12	12
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	4,551	4,551
762	1309	PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	LF	1,439	1,439
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	270	270
970	0008	LANDSCAPE PREPARATION	SY	34.7	34.7

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	10	1

BASIS OF ESTIMATE

SHORT TERM TRAFFIC CONTROL – JCT US 52 & 17TH ST SW PHASING			
PHASE	ITEM	UNIT	QUANTITY
1	Short Term 4IN Line (Type R)	LF	127
	Tubular Markers	EA	36
	Delineator Drums	EA	43
2	Short Term 4IN Line (Type R)	LF	137
	Short Term 24IN Line (Type R)	LF	12
	OBLITERATION DNPZ EAST	SF	65
	OBLITERATION DNPZ WEST	SF	50
	Tubular Markers	EA	22
	Delineator Drums	EA	48
3	Short Term 4IN Line (Type R)	LF	0
	Tubular Markers	EA	19
	Delineator Drums	EA	39
4	Short Term 4IN Line (Type R)	LF	134
	Tubular Markers	EA	17
	Delineator Drums	EA	6
5	Short Term 4IN Line (Type R)	LF	0
	Tubular Markers	EA	25
	Delineator Drums	EA	6
TOTAL	OBLITERATION DNPZ	SF	115
	Short Term 4IN Line (Type R)	LF	398
	Short Term 24IN Line (Type R)	LF	12
	Tubular Markers	EA	36
	Delineator Drums	EA	48

TEMPORARY EROISION CONTROL			
Item	Locations	Unit	Quantity
Inlet Protection Device	23 Inlets Throughout Project	EA	23
Weighted Fiber Rolls	5 Slotted Drain Locations	LF	140
	6 Unprotected Downstream Areas	LF	30

MAINLINE GRINDING QUANTITY								
Typical Sections	Stationing		Length	Widths		Total Width	Area SF	Area SY
1	3581+83	3583+30	147	36	33	69	10143	1127
2	3583+30	3584+80	150	24	45	69	10350	1150
3	3584+80	3585+95	115	24	45	69	7935	882
4	3587+35	3589+35	200	35	24	59	11700	1300
5	3590+80	3591+22	42	24	35	59	2457	273
6	3591+95	3593+10	115	36	33	69	7935	882
7	3594+30	3607+50	1320	24	24	48	63360	7040
8	3608+42	3609+52	110	39	38	77	8415	935
17th ST SW (EAST)	*Calculated Using Open Roads Designer						5693	633
17th ST SW (WEST)							23572	2619
							Total SY	16840

REGISTERED PROFESSIONAL ENGINEER
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PE-27417
DATE
NORTH DAKOTA
02/24/22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	10	2

BASIS OF ESTIMATE

PREFORMED PATTERNED PVMT MK - JCT US 52 & 17TH ST SW				
North	Stop Bar	24 IN	LF	36
	RT Turn Lane	Right Arrow x 2	SF	32
		(ONLY) message x 1	SF	22
		White 8 IN Channel	LF	205
	LT Turn Lane	Left Arrow x 2	SF	32
		(ONLY) message x 1	SF	22
		White 8 IN Channel	LF	215
	Gore Area	Yellow 4 IN Channel	LF	82
	NW Gore Area	Yellow 4 IN Channel	LF	245
	Obliteration	(Arrows & Messages)	SF	86
South	Stop Bar	24 IN	LF	48
	RT Edge Line	White 4 IN	LF	550
	RT Turn Lane	White 8 IN Channel	LF	135
		Right Arrow x1	SF	16
		(ONLY) message x 1	SF	22
	LT Turn Lane	White 8 IN Channel	LF	300
		Left Arrow x1	SF	16
		(ONLY) message x 1	SF	22
	Obliteration	(Arrows & Messages)	SF	76
East	Stop Bar	24 IN	LF	26
	RT Turn/ Merge	White 4 IN	LF	45
	LT Turn Lane	White 8 IN Channel	LF	56
		Left Arrow x1	SF	16
		(ONLY) message x 1	SF	22
		Yellow 4 IN DNPZ	LF	112
	Driving Lane	Forward Arrow x 1	SF	12
	Obliteration	(Arrows & Messages)	SF	50
	Obliteration	DPNZ (Phase 2)	SF	65
West	Stop Bar	24 IN	LF	30
	RT Turn/ Merge	Right Arrow x 2	SF	32
		White 8 IN Channel	LF	115
		White 4 IN	LF	45
	RT Edge Line	White 4 IN Barrier (S)	LF	380
	LT Turn Lane	White 8 IN Channel	LF	298
		Left Arrow x 2	SF	32
		Yellow 4 IN DNPZ	LF	752
	LT Edge Line	White 4 IN Barrier (N)	LF	325
	Cross Walk	White 4 IN	LF	105
		24 IN	LF	110
	Obliteration	(Arrows & Messages)	SF	64
	Obliteration	DPNZ (Phase 2)	SF	50

PREFORMED PATTERNED PVMT MK - North Bound			
Centerline Skips	White 4 IN	LF	690
LT Turn Lane - 16th St SW	Left Arrow x 1	SF	16
	(ONLY) message x 1	SF	22
	White 8 IN Channel	LF	55
Median Turn Lane	Yellow 4 IN - Skips	LF	50
	Yellow 4 IN - NPZ	LF	205
	Left Arrow x 1	SF	16

PREFORMED PATTERNED PVMT MK - South Bound			
Centerline Skips	White 4 IN	LF	610
RT Turn Lane - 16th St SW	Right Arrow x 1	SF	16
	(ONLY) message x 1	SF	22
	White 8 IN Channel	LF	115
Median Turn Lane	Yellow 4 IN - Skips	LF	50
	Yellow 4 IN - NPZ	LF	205
	Left Arrow x 1	SF	16
Cross Walk - 16th St SW	White 4 IN Channel Line	LF	100
	Stop Bar - 24 IN	LF	20

Longitudinal Joint Sealing

500 LF has been added for repairing joints after grinding operations.

Transverse PCC Joint Sealing

500 LF has been added for repairing joints after grinding operations.

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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RP	STATION	LANE	SPALL REPAIR DIMENSIONS LENGTH	X	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	FULL DEPTH REPAIR DIMENSIONS LENGTH	X	WIDTH	FULL DEPTH REPAIR AREA SF / 9	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
267.078	3581+83	D	2	X	3	6											
267.077	3581+89	D	2	X	2	4											
267.076	3581+95	D	2	X	2	4											
267.074	3582+02	D	2	X	2	4											
267.072	3582+12	D	2	X	2	4											
267.068	3582+35	D	2	X	2	4											
267.067	3582+43	D	2	X	4	8											
267.064	3582+56	D	2	X	2	4											
267.062	3582+68	D	2	X	4	8											
267.061	3582+71	D	2	X	2	4											
267.061	3582+75	D	4	X	4	16											
267.061	3582+75	D	2	X	2	4											
267.058	3582+87	P	2	X	2	4											
267.056	3583+00	D	3	X	6	18											
267.056	3583+00	P	2	X	2	4											
267.054	3583+08	D	2	X	2	4											
267.054	3583+08	D	2	X	2	4											
267.054	3583+11	D	1	X	3	3											
267.054	3583+12	D	2	X	2	4											
267.054	3583+12	D	2	X	2	4											
267.054	3583+12	D	2	X	2	4											
267.052	3583+22	D	2	X	2	4											
267.052	3583+22	D	2	X	2	4											
267.052	3583+22	P	2	X	2	4											
267.052	3583+22	P	2	X	2	4											
267.051	3583+26	D	2	X	2	4											
267.050	3583+30	P	2	X	2	4											
267.050	3583+33	D	2	X	2	4											
267.050	3583+33	D	2	X	2	4											
267.048	3583+39	D	2	X	2	4											
267.048	3583+39	D	2	X	2	4											
267.048	3583+39	P	2	X	2	4											
267.048	3583+39	P	2	X	2	4											
267.044	3583+64	L-TURN	2	X	2	4											
267.043	3583+67	D	2	X	2	4											
267.043	3583+67	P	2	X	2	4											
267.042	3583+72	D	2	X	2	4											
267.042	3583+72	L-TURN	2	X	3	6											
267.040	3583+82	D	2	X	2	4											
267.040	3583+82	L-TURN	2	X	2	4											
267.036	3584+04	D	2	X	2	4											
267.036	3584+04	P	2	X	2	4											
267.036	3584+04	P	2	X	2	4											
267.035	3584+12	P	2	X	2	4											
267.034	3584+14	D	1	X	3	3											
267.034	3584+14	P	1	X	3	3											
267.034	3584+15	D	1	X	4	4											
267.034	3584+17	P	2	X	2	4											

CPR Data Tables

Northbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
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02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	2

RP	STATION	LANE	SPALL REPAIR				RANDOM CRACK REPAIR	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
			DIMENSIONS			AREA		DIMENSIONS			AREA SF / 9						
			LENGTH	X	WIDTH			LENGTH	X	WIDTH							
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
267.033	3584+21	D	2	X	2	4											
267.033	3584+21	P	2	X	2	4											
267.033	3584+21	D	2	X	2	4											
267.032	3584+26	D	2	X	3	6											
267.031	3584+30	D	2	X	2	4											
267.031	3584+33	D						6	X	12	8.0	36	20		12	24	
267.031	3584+33	P	2	X	2	4											
267.031	3584+33	P	2	X	2	4											
267.029	3584+40	D	2	X	2	4											
267.029	3584+40	D	2	X	2	4											
267.029	3584+40	P	2	X	2	4											
267.029	3584+40	P	2	X	2	4											
267.029	3584+43	D	2	X	2	4											
267.029	3584+43	D	1	X	3	3											
267.029	3584+43	P	2	X	2	4											
267.029	3584+43	P	2	X	2	4											
267.027	3584+54	D	4	X	4	16											
267.027	3584+54	P	2	X	3	6											
267.025	3584+65	DP						6	X	24	16.0	60	20	12	12	48	
267.025	3584+65	L-TURN	2	X	2	4											
267.024	3584+69	L-TURN	4	X	4	16											
267.024	3584+69	R-TURN	4	X	4	16											
267.023	3584+74	DP						10	X	24	26.7	68	20	12	20	48	
267.019	3584+92	D	2	X	2	4											
267.019	3584+92	D	2	X	2	4											
267.019	3584+93	P	2	X	2	4											
267.019	3584+93	P	2	X	2	4											
267.019	3584+94	P	2	X	2	4											
267.019	3584+94	P	2	X	2	4											
267.017	3585+07	D	2	X	2	4		12	X	12	16.0	48	20		24	24	
267.017	3585+07	D	2	X	2	4											
267.017	3585+07	D	2	X	2	4											
267.017	3585+07	P	2	X	2	4											
267.014	3585+20	D	2	X	2	4											
267.014	3585+20	D	2	X	2	4											
267.014	3585+23	D	2	X	2	4											
267.014	3585+23	D	2	X	2	4											
267.013	3585+25	P	2	X	2	4											
267.008	3585+52	D	2	X	2	4											
267.007	3585+58	D	2	X	2	4											
267.007	3585+58	P	2	X	2	4											
267.007	3585+60	DP						6	X	24	16.0	60	20	12	12	48	
267.004	3585+71	D	2	X	2	4											
267.002	3585+82	D	2	X	3	6											
267.001	3585+91	D	2	X	2	4											
266.997	3586+10	D	2	X	2	4											
266.992	3586+37	D	2	X	2	4											
266.986	3586+68	D	2	X	2	4											

CPR Data Tables

Northbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	3

RP	STATION	LANE	SPALL REPAIR				RANDOM CRACK REPAIR	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
			DIMENSIONS			AREA		DIMENSIONS			AREA SF / 9						
			LENGTH	X	WIDTH			LENGTH	X	WIDTH							
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.985	3586+75	D	2	X	2	4											
266.983	3586+87	D	2	X	2	4											
266.981	3586+95	D	2	X	2	4											
266.981	3586+97	P	2	X	2	4											
266.981	3586+97	D	2	X	2	4											
266.980	3586+98	D	2	X	4	8											
266.980	3586+99	P	2	X	4	8											
266.980	3587+02	P						12	X	26	34.7	76	20	12	24	52	
266.977	3587+14	D						12	X	16	21.3	56	20		24	32	
266.977	3587+16	P	2	X	2	4											
266.974	3587+30	D	2	X	2	4											
266.974	3587+32	D	2	X	2	4											
266.974	3587+32	D	2	X	2	4											
266.972	3587+41	D	2	X	2	4											
266.972	3587+41	D	2	X	2	4											
266.972	3587+41	D	2	X	2	4											
266.972	3587+45	D	2	X	2	4											
266.971	3587+50	D	2	X	2	4											
266.967	3587+68	D	2	X	2	4											
266.966	3587+74	D	4	X	4	16											
266.964	3587+87	P	2	X	2	4											
266.963	3587+91	D						40	X	12	53.3	104	20	36	80	24	
266.955	3588+31	D	2	X	2	4											
266.955	3588+34	D					9										
266.952	3588+48	P	2	X	2	4											
266.952	3588+48	L-TURN	2	X	2	4											
266.941	3589+07	D	2	X	3	6											
266.939	3589+18	R-TURN	2	X	2	4											
266.939	3589+18	P	2	X	2	4											
266.936	3589+32	P	2	X	6	12											
266.934	3589+41	R-TURN	2	X	2	4											
266.934	3589+45	R-TURN	2	X	2	4											
266.928	3589+76	R-TURN	2	X	2	4											
266.923	3590+01	D	2	X	5	10											
266.923	3590+01	P	2	X	2	4											
266.923	3590+01	P	2	X	2	4											
266.921	3590+12	R-TURN	2	X	2	4											
266.921	3590+12	P						6	X	12	8.0	36	20		12	24	
266.918	3590+25	R-TURN	2	X	2	4											
266.918	3590+30	P						20	X	12	26.7	64	20	12	40	24	
266.915	3590+45	D	2	X	2	4											
266.913	3590+56	D	2	X	2	4											
266.913	3590+56	P	2	X	3	6											
266.908	3590+81	P	2	X	3	6											
266.907	3590+85	D						14	X	12	18.7	52	20		28	24	
266.906	3590+89	P	2	X	3	6											
266.906	3590+93	P	2	X	2	4											
266.902	3591+10	P	2	X	2	4											

CPR Data Tables

Northbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	4

RP	STATION	LANE	SPALL REPAIR DIMENSIONS LENGTH	X	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	FULL DEPTH REPAIR DIMENSIONS LENGTH	X	WIDTH	FULL DEPTH REPAIR AREA SF / 9	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.902	3591+10	D						41	X	12	54.7	106	20	36	82	24	
266.894	3591+55	D	2	X	2	4											
266.893	3591+58	D	2	X	2	4											
266.893	3591+58	D	2	X	2	4											
266.893	3591+60	D	2	X	2	4											
266.893	3591+60	D	2	X	2	4											
266.887	3591+90	D	2	X	2	4											
266.887	3591+91	P	2	X	2	4											
266.886	3591+99	D	2	X	4	8											
266.886	3591+99	P	2	X	2	4											
266.884	3592+08	D	2	X	2	4											
266.884	3592+08	D	2	X	2	4											
266.884	3592+08	P	2	X	2	4											
266.883	3592+13	D	2	X	2	4											
266.879	3592+31	D	2	X	2	4											
266.878	3592+41	D	2	X	5	10											
266.877	3592+46	P						12	X	12	16.0	48	20		24	24	
266.876	3592+52	D						20	X	12	26.7	64	20	12	40	24	
266.873	3592+64	P	2	X	2	4											
266.873	3592+64	P						26	X	12	34.7	76	20	12	52	24	
266.871	3592+75	D	2	X	3	6											
266.871	3592+75	D	2	X	3	6											
266.869	3592+86	D	2	X	2	4											
266.869	3592+86	D	2	X	2	4											
266.869	3592+86	P	2	X	2	4											
266.867	3592+98	D	2	X	2	4											
266.867	3592+98	P	2	X	2	4											
266.867	3592+99	D	2	X	2	4											
266.865	3593+08	D	2	X	2	4											
266.865	3593+08	P	2	X	2	4											
266.862	3593+21	D						14	X	12	18.7	52	20		28	24	
266.862	3593+21	P	2	X	2	4											
266.861	3593+28	P	2	X	2	4											
266.861	3593+28	P	2	X	2	4											
266.861	3593+28	P	2	X	4	8											
266.859	3593+40	P	2	X	2	4											
266.859	3593+40	D	2	X	2	4											
266.857	3593+52	D	2	X	2	4											
266.857	3593+52	P	2	X	2	4											
266.855	3593+62	P	2	X	2	4											
266.855	3593+62	P	2	X	2	4											
266.855	3593+62	P	2	X	2	4											
266.855	3593+62	D	2	X	2	4											
266.855	3593+62	D	2	X	2	4											
266.854	3593+68	D	2	X	2	4											
266.853	3593+70	D	2	X	2	4											
266.853	3593+70	P	2	X	2	4											
266.852	3593+74	D	2	X	2	4											

CPR Data Tables

Northbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE
NORTH DAKOTA
02/24/22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-2-052(049)266	11	5

RP	STATION	LANE	SPALL REPAIR				RANDOM CRACK REPAIR	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
			DIMENSIONS			AREA		DIMENSIONS			AREA SF / 9						
			LENGTH	X	WIDTH			LENGTH	X	WIDTH							
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.852	3593+74	P	2	X	2	4											
266.852	3593+74	P	2	X	2	4											
266.851	3593+83	D	2	X	4	8											
266.851	3593+83	D	2	X	2	4											
266.851	3593+83	P	2	X	2	4											
266.851	3593+83	P	2	X	2	4											
266.848	3593+95	D	2	X	2	4											
266.848	3593+95	D	2	X	2	4											
266.848	3593+95	P	2	X	3	6											
266.848	3593+99	D	2	X	2	4											
266.848	3593+99	D	2	X	2	4											
266.846	3594+06	D	2	X	2	4											
266.846	3594+06	D	2	X	2	4											
266.846	3594+06	P	2	X	2	4											
266.846	3594+06	P	2	X	2	4											
266.845	3594+13	D						20	X	12	26.7	64	20	12	40	24	
266.845	3594+13	P	2	X	2	4											
266.843	3594+22	P	2	X	2	4											
266.841	3594+32	P						6	X	12	8.0	36	20		12	24	
266.841	3594+36	D						6	X	12	8.0	36	20		12	24	
266.840	3594+38	P	2	X	2	4											
266.840	3594+38	D	2	X	2	4											
266.840	3594+41	P	2	X	2	4											
266.839	3594+47	D	2	X	2	4											
266.839	3594+47	D	2	X	3	6											
266.839	3594+47	P	2	X	2	4											
266.839	3594+47	P	2	X	4	8											
266.837	3594+57	D						6	X	12	8.0	36	20		12	24	
266.837	3594+57	P	2	X	2	4											
266.837	3594+57	P	2	X	2	4											
266.835	3594+67	P						12	X	12	16.0	48	20		24	24	
266.834	3594+71	D						6	X	12	8.0	36	20		12	24	
266.831	3594+85	D	2	X	2	4											
266.829	3594+97	P	2	X	2	4											
266.827	3595+08	D	2	X	2	4											
266.827	3595+08	D	2	X	2	4											
266.827	3595+08	P	2	X	2	4											
266.825	3595+19	P	2	X	2	4											
266.825	3595+19	P	2	X	2	4											
266.825	3595+19	P	2	X	4	8											
266.824	3595+22	D						28	X	12	37.3	80	20	12	56	24	
266.824	3595+24	P	2	X	4	8											
266.822	3595+33	P						6	X	12	8.0	36	20		12	24	
266.821	3595+40	D	2	X	2	4											
266.820	3595+44	P	2	X	2	4											
266.819	3595+50	PD						8	X	24	21.3	64	40		16	48	
266.818	3595+54	D	2	X	2	4											
266.818	3595+58	P	2	X	2	4											

CPR Data Tables

Northbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	6

RP	STATION	LANE	SPALL REPAIR DIMENSIONS LENGTH	X	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	FULL DEPTH REPAIR DIMENSIONS LENGTH	X	WIDTH	FULL DEPTH REPAIR AREA SF / 9	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.816	3595+64	D	2	X	2	4											
266.816	3595+64	D	2	X	2	4											
266.814	3595+75	D	2	X	3	6											
266.814	3595+75	P	2	X	2	4											
266.810	3595+99	D	2	X	2	4											
266.808	3596+11	D	2	X	2	4											
266.808	3596+11	D	2	X	3	6											
266.808	3596+11	P	2	X	2	4											
266.798	3596+59	P	2	X	3	6											
266.798	3596+59	D	2	X	2	4											
266.796	3596+73	D	2	X	2	4											
266.796	3596+73	P	2	X	2	4											
266.794	3596+82	D	2	X	2	4											
266.794	3596+82	P	2	X	2	4											
266.792	3596+93	P	2	X	2	4											
266.792	3596+93	D	2	X	2	4											
266.790	3597+04	P	2	X	2	4											
266.786	3597+27	D	2	X	2	4											
266.783	3597+38	P	2	X	2	4											
266.782	3597+48	P	2	X	3	6											
266.782	3597+48	D	2	X	2	4											
266.779	3597+60	P	2	X	2	4											
266.777	3597+71	P	2	X	2	4											
266.777	3597+71	D	2	X	2	4											
266.777	3597+71	D					12										
266.776	3597+79	P	2	X	2	4											
266.774	3597+89	D	2	X	3	6											
266.774	3597+89	P	2	X	2	4											
266.774	3597+89	P	2	X	3	6											
266.772	3598+01	P	2	X	2	4											
266.765	3598+35	D					12										
266.764	3598+43	P	2	X	2	4											
266.748	3599+27	P	2	X	2	4											
266.748	3599+27	P	2	X	2	4											
266.747	3599+33	D	2	X	2	4											
266.745	3599+42	D	2	X	2	4											
266.745	3599+42	P	2	X	2	4											
266.742	3599+58	D	2	X	2	4											
266.740	3599+69	D	2	X	2	4											
266.735	3599+92	D	2	X	2	4											
266.734	3599+98	D	2	X	2	4											
266.723	3600+55	D	2	X	2	4											
266.723	3600+55	D	2	X	2	4											
266.722	3600+65	D	2	X	2	4											
266.720	3600+73	D	2	X	2	4											
266.718	3600+86	D	2	X	2	4											
266.717	3600+90	D	2	X	2	4											
266.717	3600+90	P	2	X	3	6											

CPR Data Tables

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Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
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PE-27417
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	7

RP	STATION	LANE	SPALL REPAIR				RANDOM CRACK REPAIR	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
			DIMENSIONS			AREA		DIMENSIONS			AREA SF / 9						
			LENGTH	X	WIDTH			LENGTH	X	WIDTH							
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.712	3601+17	D	3	X	4	12											
266.709	3601+29	D	2	X	2	4											
266.709	3601+29	P						7	X	12	9.3	38	20		14	24	
266.705	3601+53	D	2	X	2	4											
266.701	3601+75	D	2	X	5	10											
266.699	3601+84	D						6	X	12	8.0	36	20		12	24	
266.694	3602+09	D	2	X	2	4											
266.692	3602+20	P	2	X	2	4											
266.692	3602+20	P	2	X	2	4											
266.690	3602+31	D						8	X	12	10.7	40	20		16	24	
266.687	3602+47	D	2	X	2	4											
266.686	3602+53	D	2	X	2	4											
266.683	3602+69	RT-SHDR	2	X	2	4											
266.679	3602+87	RT-SHDR	2	X	2	4											
266.679	3602+87	D	2	X	2	4											
266.552	3609+58																
TOTAL						**1276**	**33**				**565**	**1556**	**580**	**180**	**752**	**804**	
TOTAL * 25%						**1595**	**41**				**707**	**1945**	**725**	**225**	**940**	**1005**	
*Survey completed in 2021. Quantities may change in the field.																	

CPR Data Tables

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Jamestown, US 52, End Concrete - 17th ST SW

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DATE
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	8

RP	STATION	LANE	SPALL REPAIR DIMENSIONS LENGTH	X	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	FULL DEPTH REPAIR DIMENSIONS LENGTH	X	WIDTH	FULL DEPTH REPAIR AREA SF / 9	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.552	3609+52	D	2	X	2	4											
266.556	360932	R-TURN						30	X	8.5	28.3	77	20	24	60	17	
266.556	3609+32	R-TURN	2	X	2	4											
266.593	3607+36	D	2	X	2	4											
266.616	3606+15	P	2	X	2	4											
266.618	3606+02	D					24										
266.650	3604+32	D	2	X	5	10											
266.652	3604+22	P	2	X	2	4											
266.682	3602+68	D					141										
266.711	3601+14	P					33										
266.715	3600+90	D					25										
266.724	3600+42	D					36										
266.731	3600+06	P	2	X	2	4											
266.732	3600+02	D	2	X	2	4											
266.734	3599+91	D					37										
266.746	3599+29	D	2	X	2	4											
266.750	3599+06	D	2	X	3	6											
266.755	3598+80	D	2	X	2	4											
266.764	3598+31	D					65										
266.797	3596+60	D						16	X	12	21.3	56	20		32	24	
266.799	3596+48	D	2	X	2	4											
266.799	3596+48	P	2	X	2	4											
266.799	3596+48	D					13										
266.822	3595+26	P					15										
266.825	3595+09	D					106										
266.836	3594+52	D	2	X	2	4											
266.859	3593+32	D	2	X	2	4											
266.861	3593+19	D	2	X	2	4											
266.861	3593+19	D	2	X	2	4											
266.866	3592+93	P	2	X	2	4											
266.871	3592+69	P	2	X	4	8											
266.871	3592+69	P					3										
266.883	3592+02	D	2	X	2	4											
266.883	3592+02	D					12										
266.886	3591+87	P	2	X	2	4											
266.886	3591+87	P	2	X	2	4											
266.887	3591+82	D	2	X	2	4											
266.890	3591+66	D	2	X	2	4											
266.890	3591+66	D					21										

CPR Data Tables

Southbound

Jamestown, US 52, End Concrete - 17th ST SW

REGISTERED PROFESSIONAL ENGINEER
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DATE
NORTH DAKOTA
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-2-052(049)266	11	9

RP	STATION	LANE	SPALL REPAIR				RANDOM CRACK REPAIR	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	Longitudinal PCC Joint Clean & Seal	1/2" Transverse PCC Joint Clean & Seal	COMMENTS
			DIMENSIONS			AREA		DIMENSIONS			AREA SF / 9						
			LENGTH	X	WIDTH			LENGTH	X	WIDTH							
RP	STATION	LANE	FT	X	FT	SF	LF	FT	X	FT	SY	LF	EA	LF	LF	LF	COMMENTS
266.892	3591+57	P					36										
266.899	3591+21	P	2	X	2	4											
266.900	3591+13	D					94										
266.902	3591+05	P					4										
266.902	3591+03	P	2	X	2	4											
266.902	3591+02	D	2	X	2	4											
266.902	3591+02	D	2	X	4	8											
266.902	3591+02	P	2	X	2	4											
266.902	3591+02	P	2	X	2	4											
266.904	3590+92	D	2	X	2	4											
266.914	3590+43	D	2	X	2	4											
266.914	3590+43	P	2	X	2	4											
266.920	3590+09	L-TURN	2	X	2	4											
266.926	3589+78	P	2	X	2	4											
266.926	3589+77	R-TURN					9										
266.927	3589+70	P	2	X	2	4											
266.930	3589+58	P	2	X	2	4											
266.930	3589+58	P	2	X	2	4											
266.931	3589+49	P	2	X	2	4											
266.932	3589+47	P	2	X	2	4											
266.933	3589+40	P	2	X	2	4											
266.935	3589+32	P	2	X	2	4											
266.936	3589+22	P	2	X	2	4											
266.938	3589+13	P	2	X	2	4											
266.940	3589+01	P	2	X	2	4											
266.943	3588+89	P	2	X	2	4											
266.958	3588+09	D	2	X	2	4											
266.966	3587+65	D	2	X	2	4	43										
266.966	3587+65	P	2	X	3	6											
266.966	3587+65	D	2	X	2	4											
266.974	3586+68	P	2	X	2	4											
266.974	3586+68	P	2	X	2	4											
266.988	3586+49	D	2	X	5	10											
267.023	3584+63	P					12										
267.026	3584+51	D	2	X	2	4											
267.026	3584+51	P	2	X	2	4											
267.026	3584+51	D					20										
267.026	3584+51	P					15										
267.026	3584+50	P	2	X	2	4											
267.027	3584+43	P						8	X	12	10.7	40	20		16	24	10" PCC Pavement
267.029	3584+35	D	2	X	2	4											
267.029	3584+34	D						12	X	12	16.0	48	20		24	24	10" PCC Pavement
267.033	3584+11	D					10										
TOTAL						**252**	**774**				**76**	**221**	**80**	**24**	**132**	**89**	
TOTAL * 25%						**315**	**968**				**95**	**276**	**100**	**30**	**165**	**111**	

*Survey completed in 2021. Quantities may change in the field.

CPR Data Tables

Southbound

Jamestown, US 52, End Concrete - 17th ST SW

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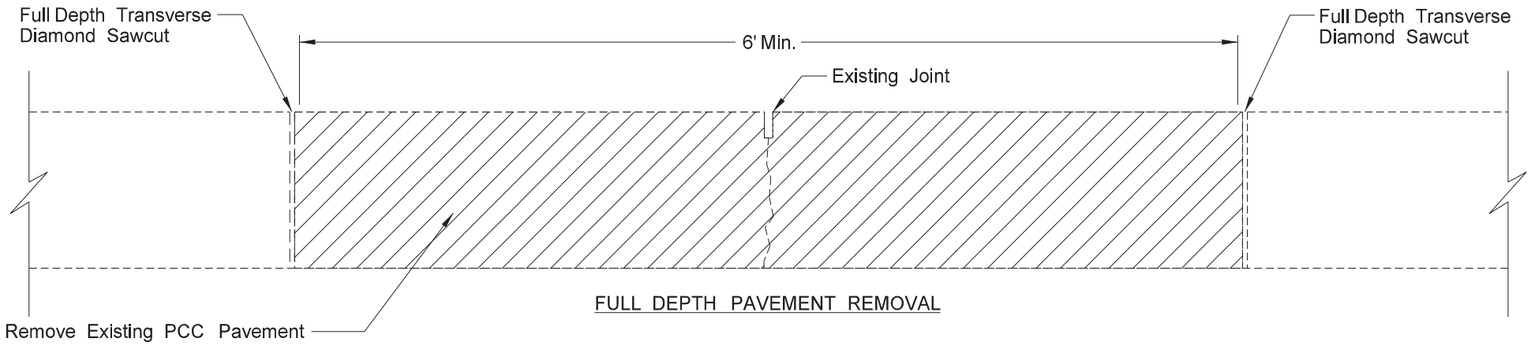
PE-27417
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	20	1

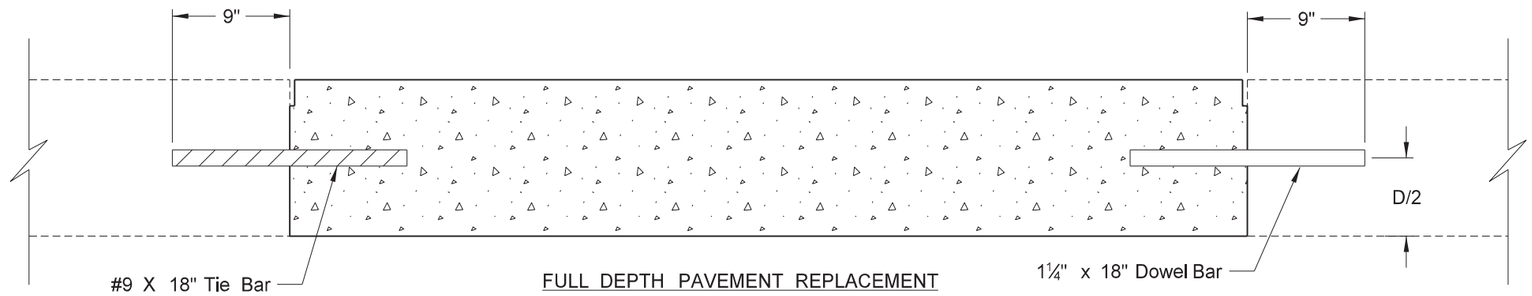


FULL DEPTH PAVEMENT REMOVAL

PCC Pavement Removal

Notes:

1. Variables: D = Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place dowel bars in new joint with the greatest distance to the next transverse joint or working random crack. Place dowels on approach side of repair when distance to next transverse joint or working random crack is equal for both new joints.



FULL DEPTH PAVEMENT REPLACEMENT

PCC Pavement Placement

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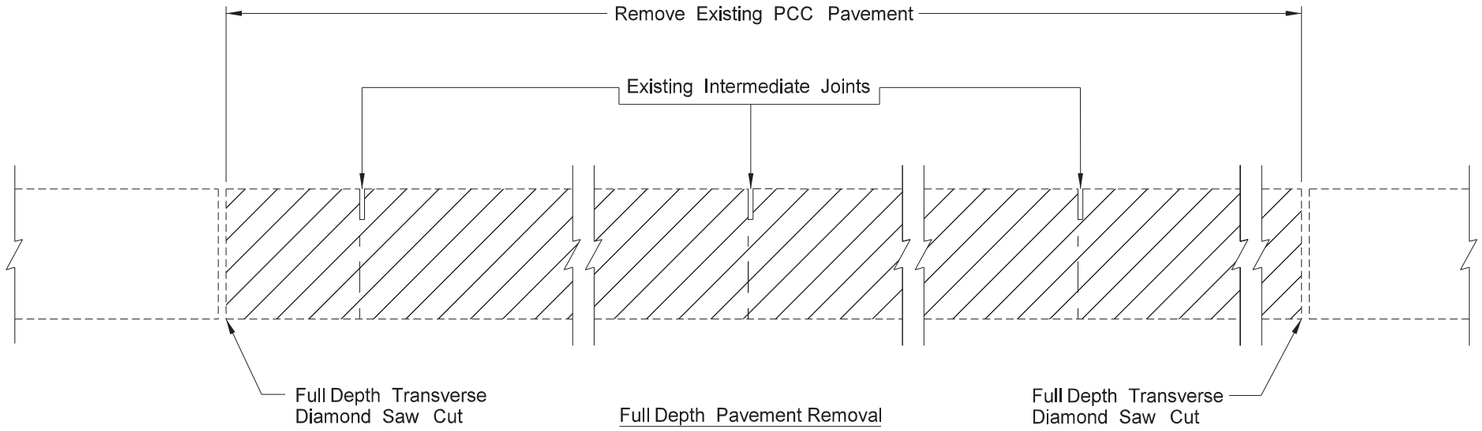
Jointed Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length Less than One Panel)

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	20	2

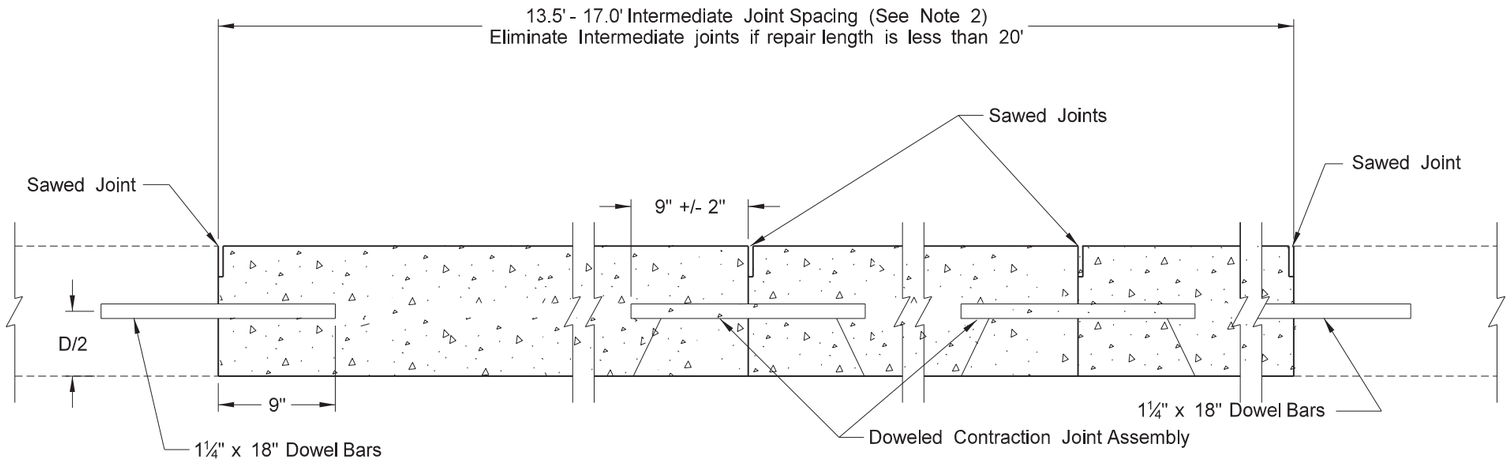


Full Depth Pavement Removal

PCC Removal

Notes:

1. Variables: D = Pavement Depth
2. Space joints 13.5' to 17.0'. Use a 10 foot minimum spacing when repair length requires.
3. Place new joints to match existing joints when repair widths are less than PCC pavement width.



Full Depth Pavement Replacement

PCC Placement

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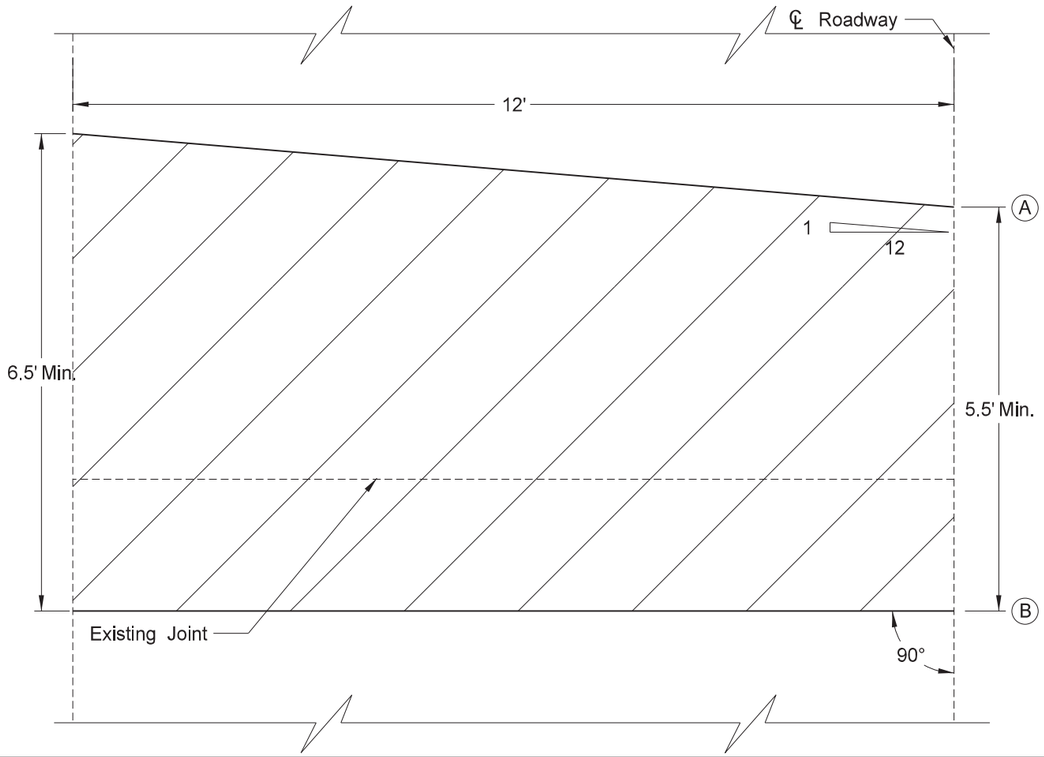
Jointed Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length One Panel or Longer)

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	20	3



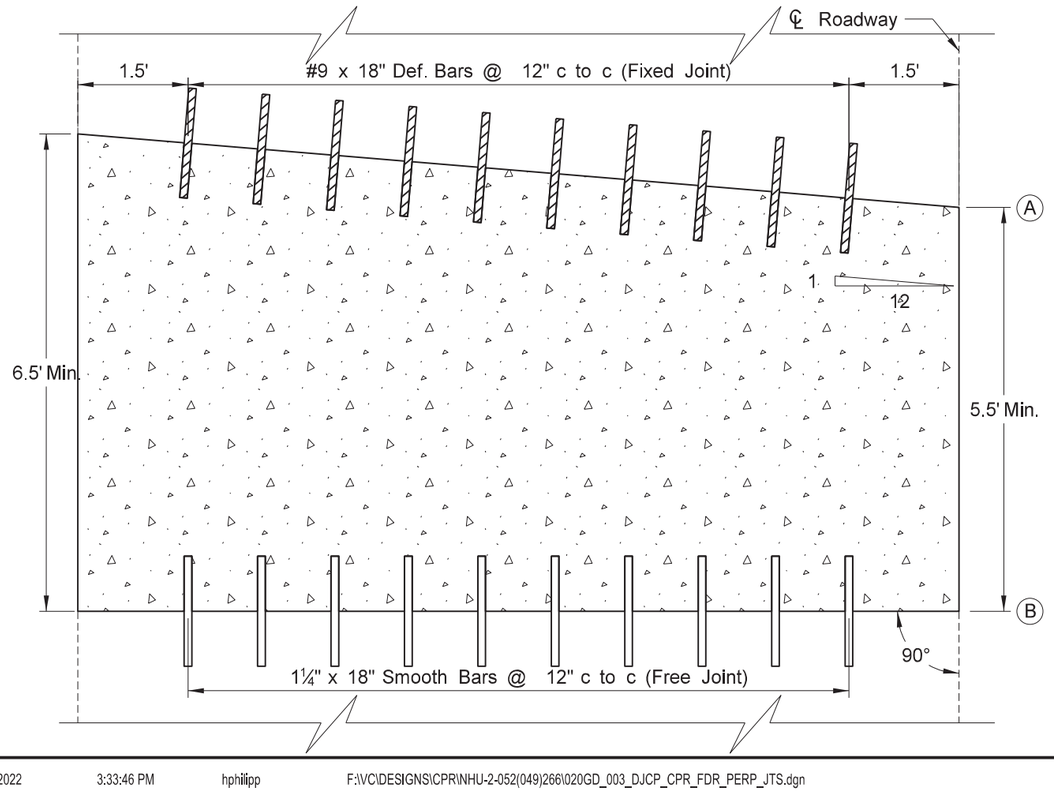
PCC Pavement Removal

Notes

1. Joint Ⓐ (Fixed Joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. Place deformed bars perpendicular to the face of the saw cut.

2. Joint Ⓑ (Free Joint) shall be the new joint with 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. Place free joint (Joint Ⓑ) on the approach side of the repair when the distance to the next transverse joint or working random crack is equal for both new joints.



PCC Pavement Placement

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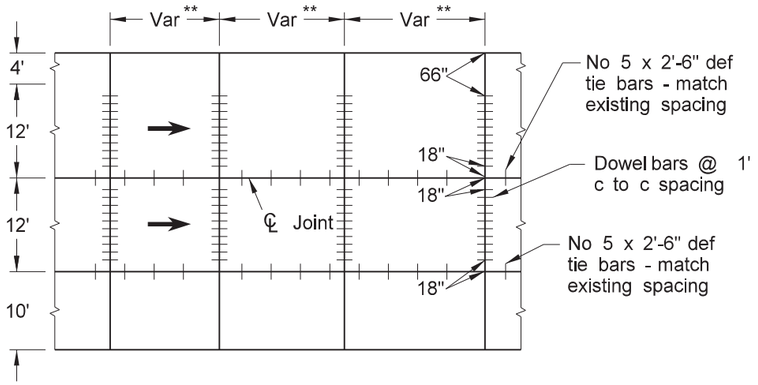
Concrete Pavement Repair For Non-Skewed Joints
Full Depth, Non-Reinforced PCC Pavement
(Longitudinal Length Less Than One Panel)

Concrete Pavement Repair

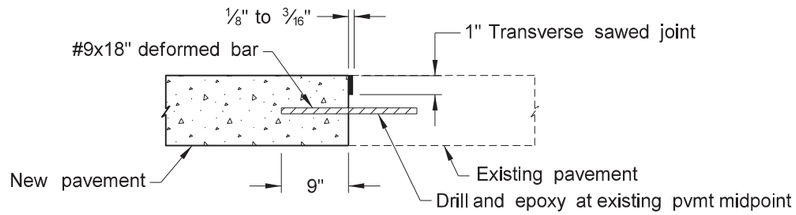
Jamestown, US 52, End Concrete - 17th St SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)226	20	4



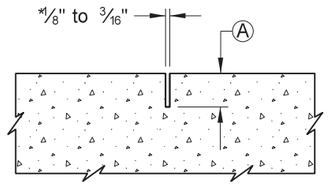
TRANSVERSE JOINTS

** Joint Spacing to match existing (Varies from 14' to 18')



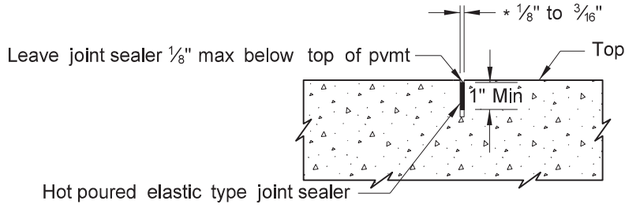
DEFORMED BAR INSTALLATION

(Spaced at 2'-0" C to C)



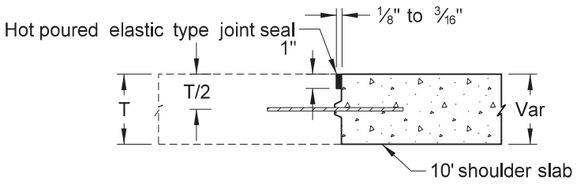
SAWED, TIED LONGITUDINAL JOINTS

(Mainline and ramps)



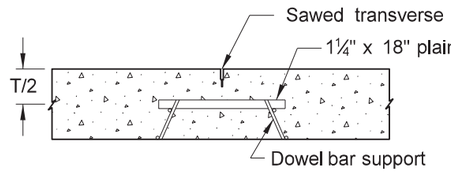
(All sawed and tied joints)

JOINT SEALING DETAIL

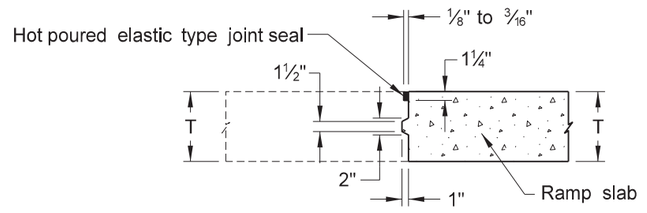


LONGITUDINAL CONSTRUCTION JOINT

(10' shoulder - keyed & tied)

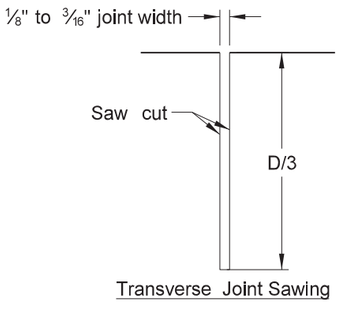


DOWELED TRANSVERSE JOINT

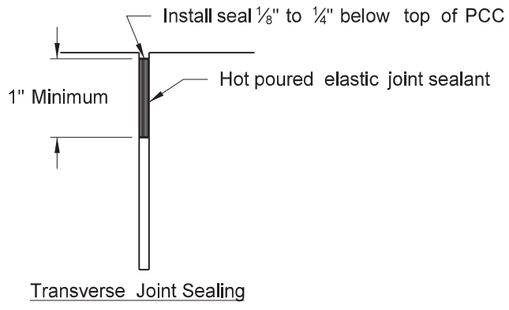


LONGITUDINAL CONSTRUCTION JOINT

(at Ramps - Keyed)



Transverse Joint Sawing



Transverse Joint Sealing

T = Thickness of PCC Pvmt

Ⓐ = One-Third thickness of PCC Pavement

*Width requirement for top 1" only, bottom portion of sawcut may be narrower.

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Joint Details for Repairs 1 Panel or More in Length

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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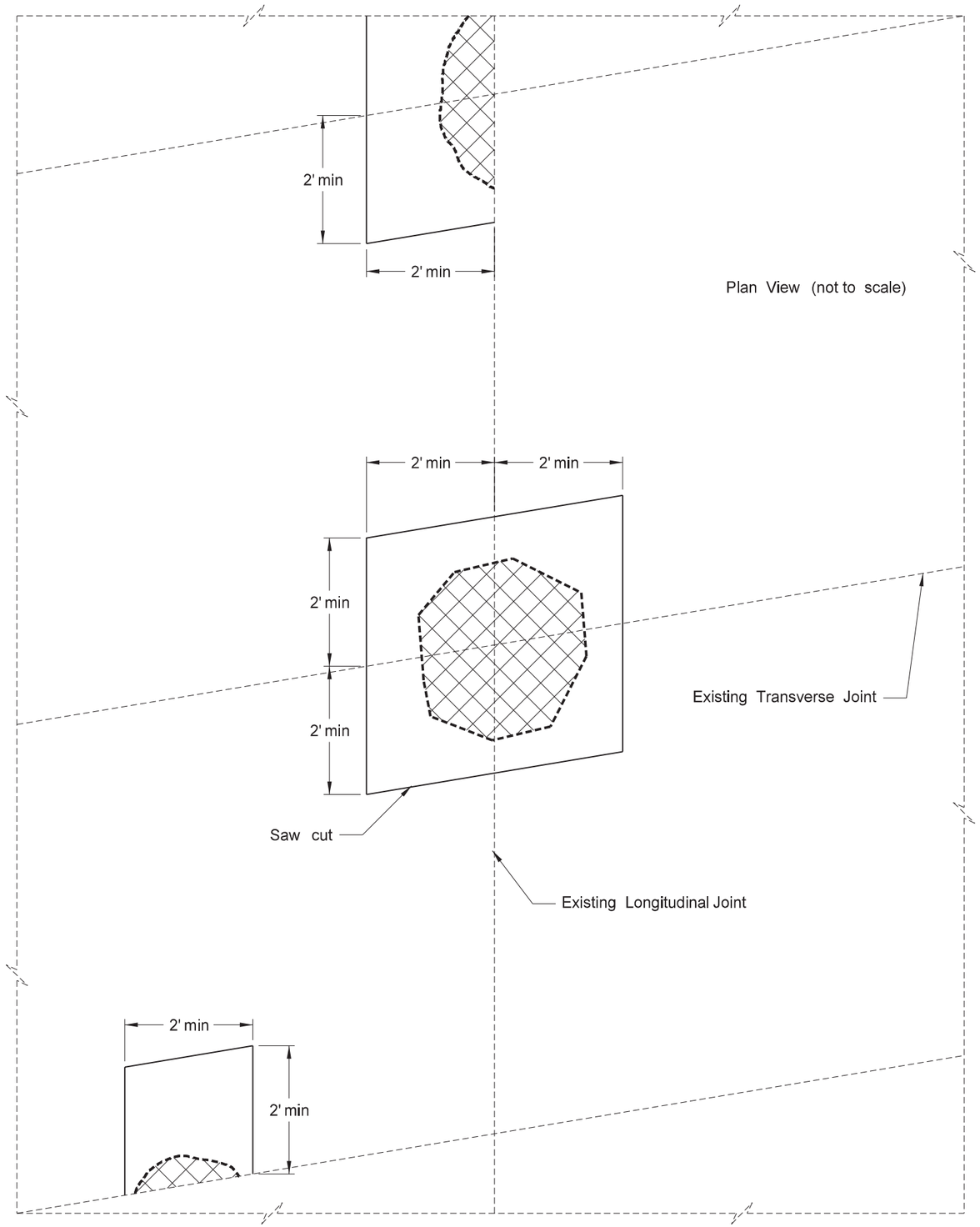
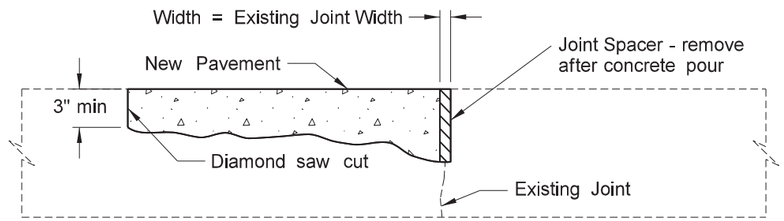


Spall Repair

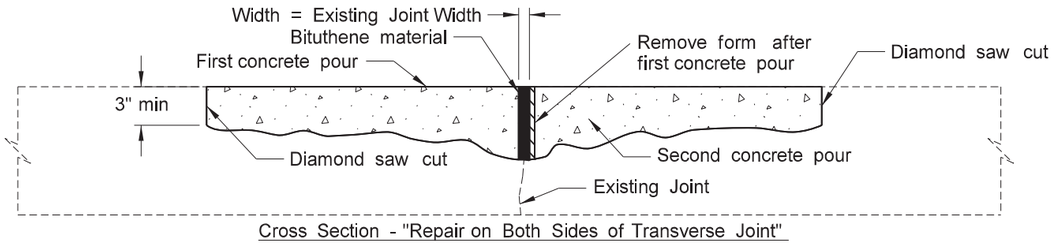


Cross Section - "Repair Area on One Side of Transverse Joint"

Notes:

1. Place a spacer material on the transverse joint face to maintain the joint during repair. The spacer material shall have the capability of maintaining a width equal to that of the existing joint and being easily removed after the pour. A bituthene waterproofing material may be used for this purpose. It shall be a minimum of 260 mil (approximately ¼") thick or equal to the width of the existing joint, whichever is greater. Cut it to fit over the entire face of the existing joint to provide for expansion and prevent water from entering the existing joint through the sides or bottom. Press it into place to conform to the face of the existing joint.

2. Diamond saw cut not mandatory when using milling machine for spall repair removals.



Cross Section - "Repair on Both Sides of Transverse Joint"

Spall

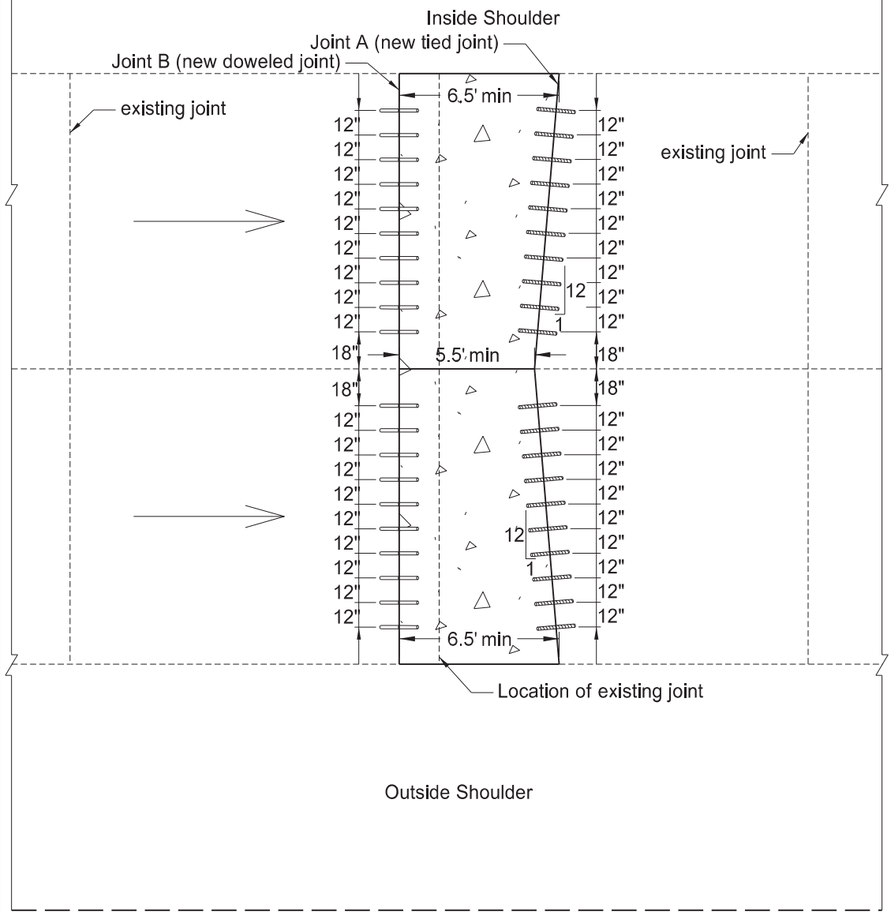
Concrete Removal Area

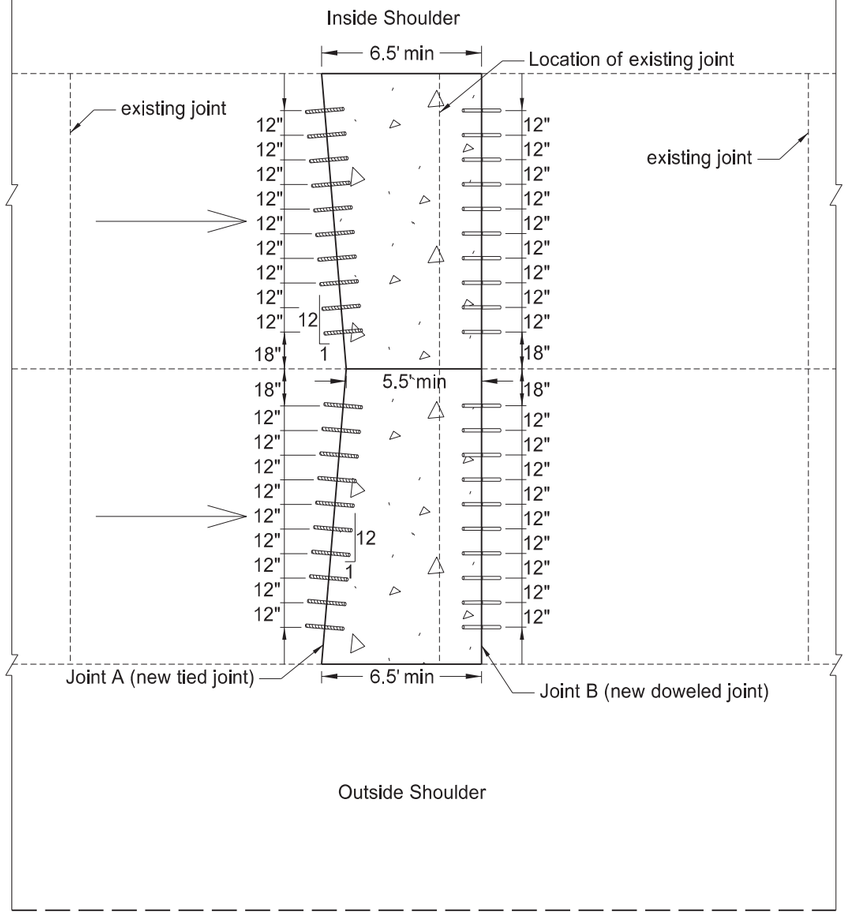
Jointed Non-Reinforced PCC Pavement
Spall Repair Detail

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	20	6

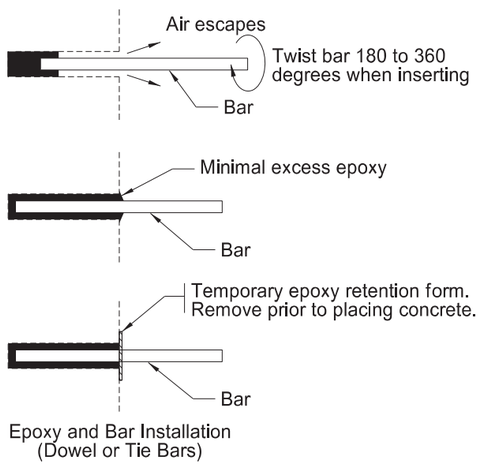




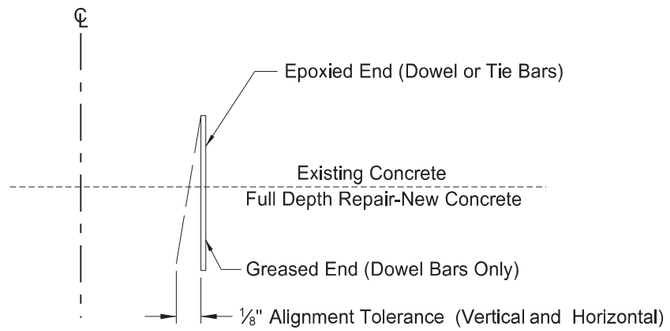
Perpendicular Transverse Joints

NOTES:

1. Align tie bars parallel to the roadway surface and perpendicular to the joint face.
2. Align dowel bars parallel to the roadway centerline and pavement surface (at vertical midpoint of slab.)
3. Existing tie bar spacing is 3'-9".
4. Place no tie bar within 15" of a transverse joint.
5. Construct Joint A (fixed joint) with the shortest distance to the next transverse joint or working random crack. Make the saw cut at a 1 to 12 skew.
6. Construct Joint B (free joint) with the greatest distance to the next transverse joint or working random crack.
7. Construct free joint (Joint B) on the approach side of the repair when the distance to the next transverse joint or working random crack is equal for both new joints.



Epoxy and Bar Installation (Dowel or Tie Bars)



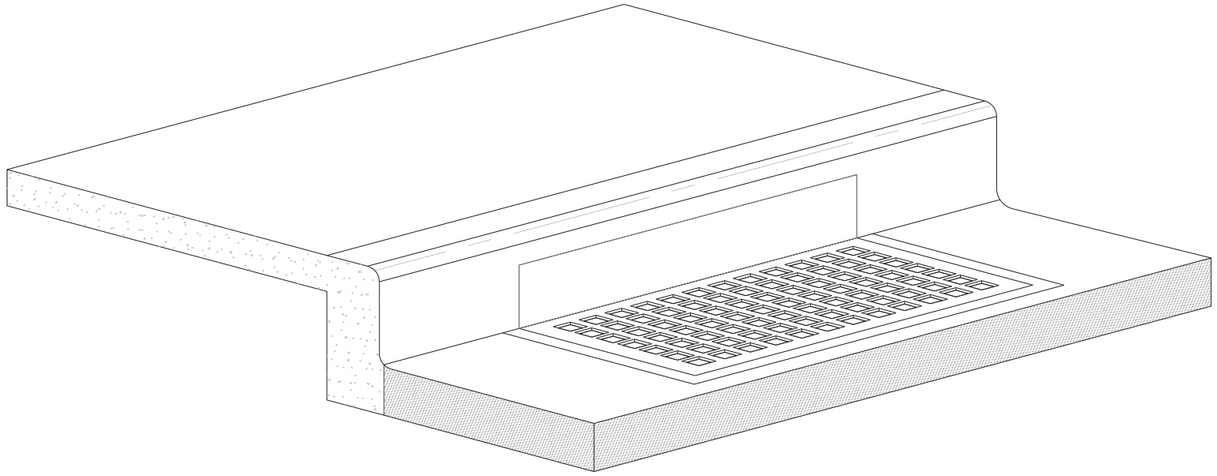
Bar Alignment Tolerance

Transverse Joint Dowel and Tie Bar Placement
Full Depth Concrete Pavement Repair-Perp Jts

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	20	7



Inlet Protection Device

Installation Notes:

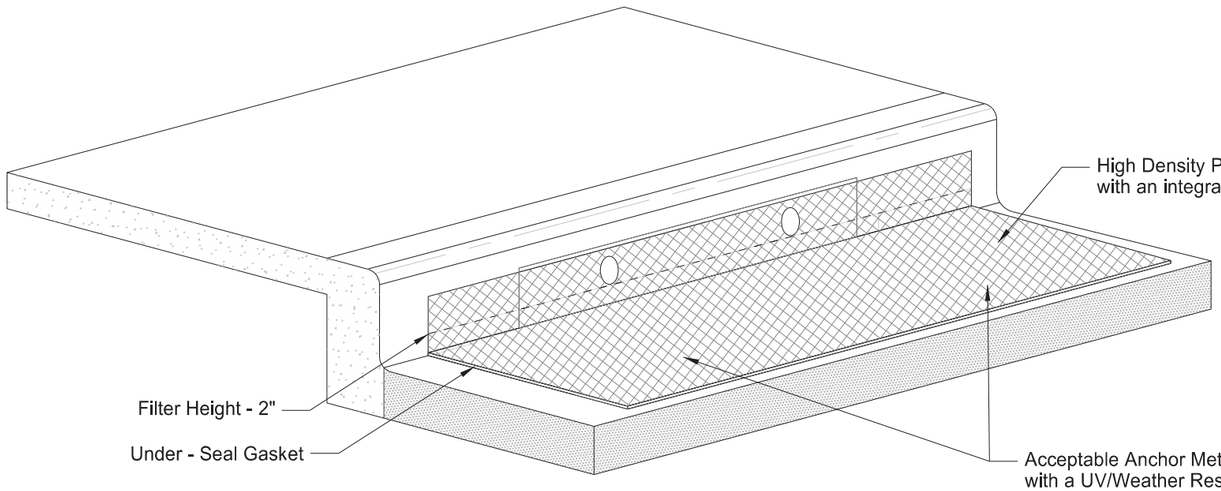
1. Place device tightly against drain opening and cover entire grate. Extend the device at least 2 inches past the grate toward the street.

2. Overlap the segments at longer openings.

3. Anchor the device so that water cannot flow behind it.

General Notes:

1. Remove material that falls into the inlet during maintenance or removal of the device.



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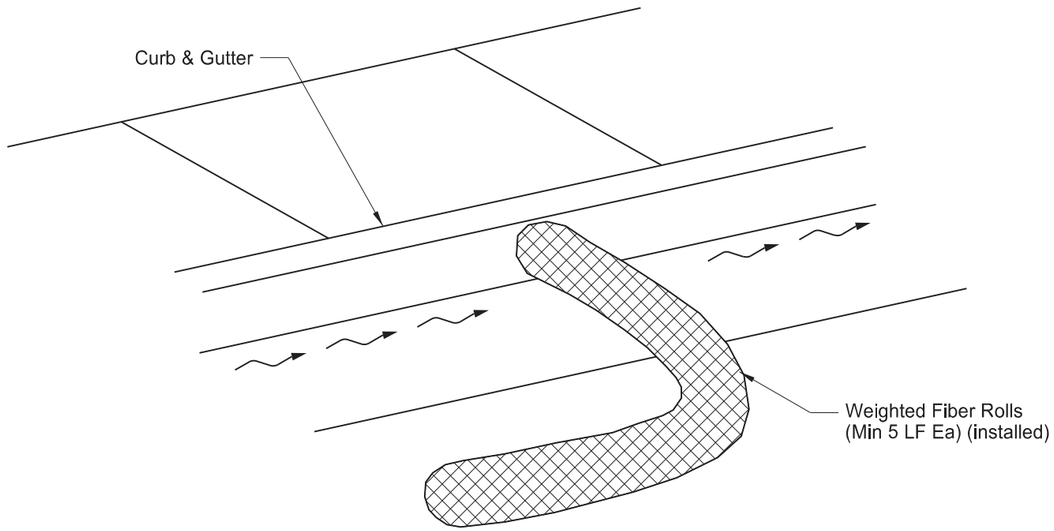
02/24/22

Inlet Protection Device

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	20	8



WATER LEAVING SITE DETAIL

NOTES:

1. Place an adequate number of weighted fiber rolls down slope from unprotected downstream areas, tight against and along the curb and gutters, to provide complete protection. Overlap ends approximately 12 inches.

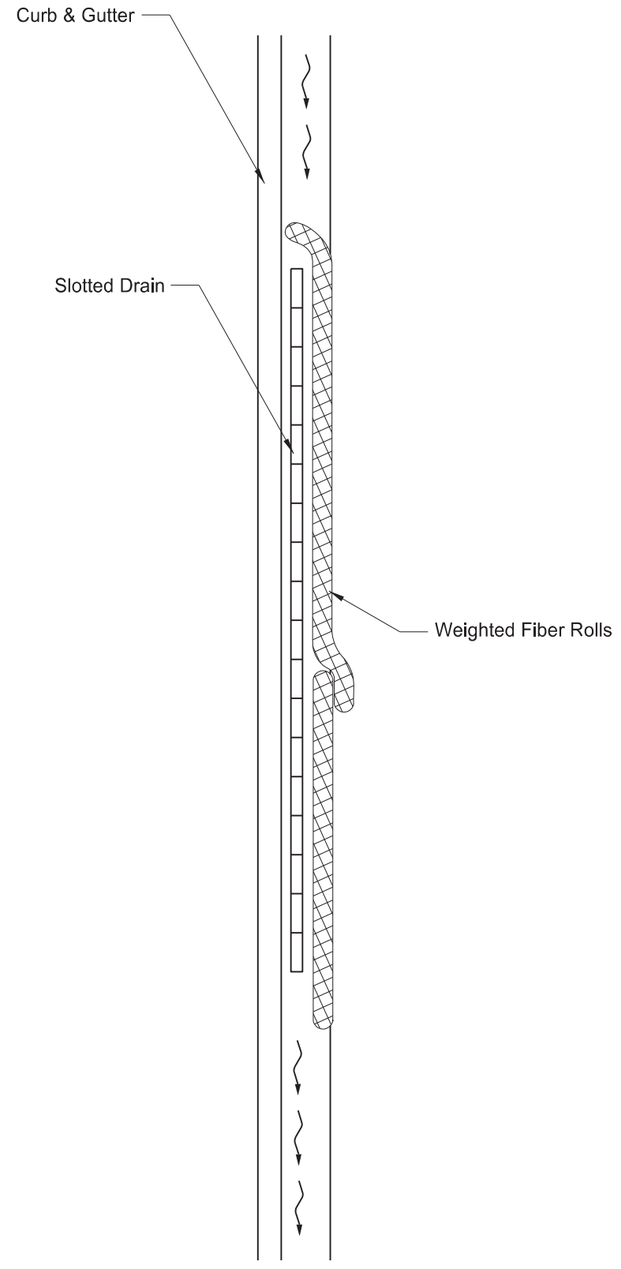
2. Place Weighted fiber rolls along slotted drain locations.

3. Unprotected downsteam locations include sides streets 11th St SW, 4th Ave SW, and US 52 at the end of concrete.

4. Remove and properly dispose of accumulated silt and debris to allow for proper function of device after every rain event, or as necessary for proper function.

5. Provide materials that meet the following specifications:
   A photo degradable extruded netting tube filled with wood curled excelsior and weighted inner core.
   Roll Diameter: 6 Inches
   Weight: 8.33 Pounds per Lineal Foot

6. Remove weighted fiber rolls after the up gradient surfaces are stabilized and surrounding streets and gutters are clean of debris. Costs related to this work to be included in the price bid for "REMOVE WEIGHTED FIBER ROLLS".



SLOTTED DRAIN DETAIL

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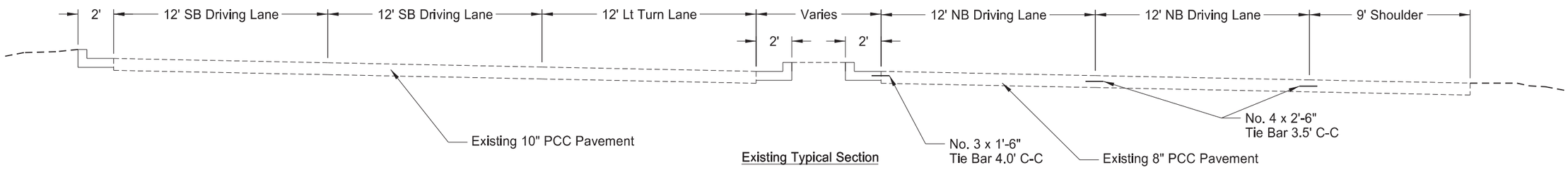
WEIGHTED FIBER ROLL DETAIL

Concrete Pavement Repair

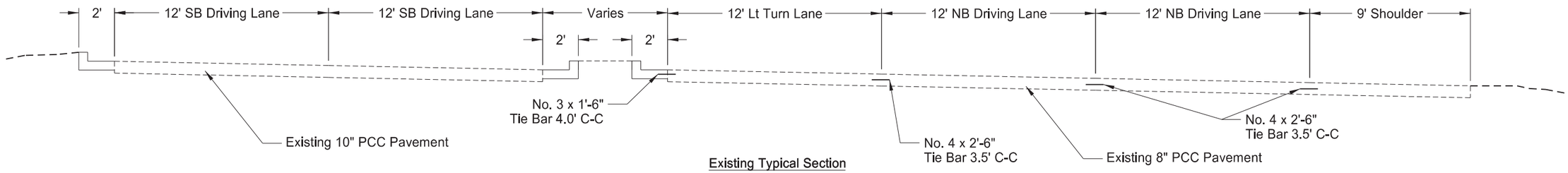
Jamestown, US 52, End Concrete - 17th St SW

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	30	1



Existing Typical Section

Sta 3581+83 to Sta 3583+30



Existing Typical Section

Sta 3583+30 to Sta 3584+80

EXISTING TYPICAL SECTION

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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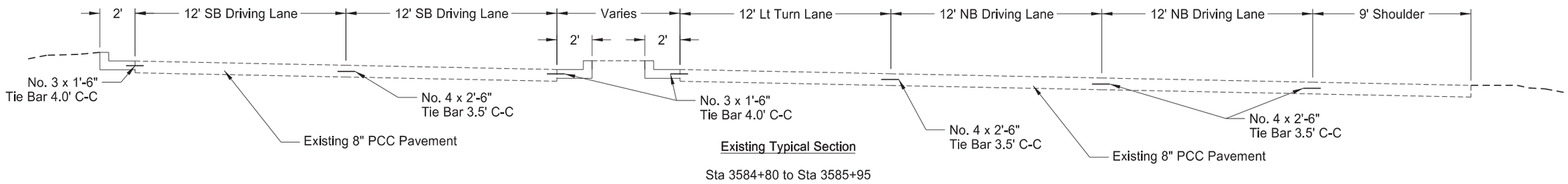
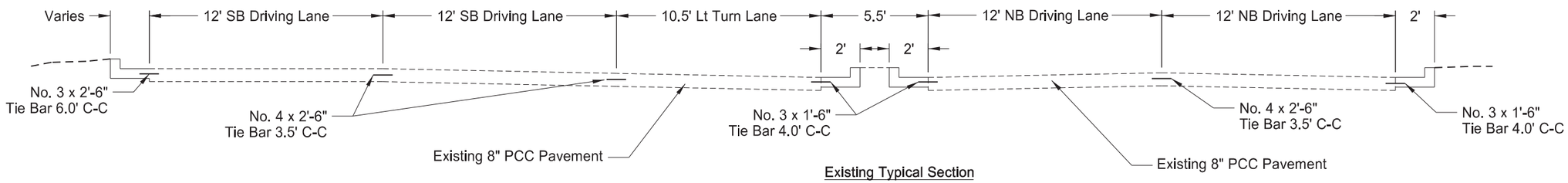
2/24/2022 3:34:06 PM hphilipp F:\VC\DESIGNS\CPR\NHU-2-052(049)266\030TP_001_Existing Typical Sections.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	30	2



Existing Typical Section

Sta 3584+80 to Sta 3585+95



Existing Typical Section

Sta 3587+35 to Sta 3589+35

EXISTING TYPICAL SECTION

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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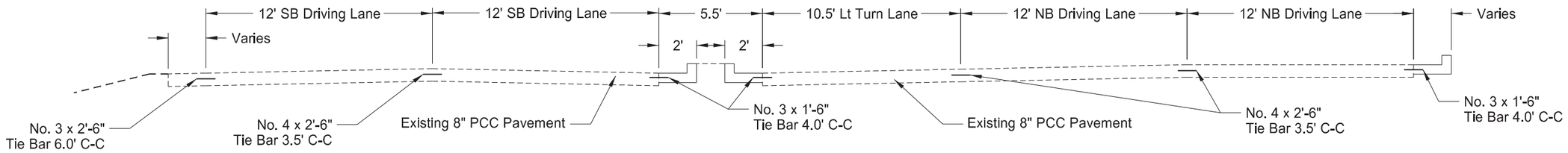
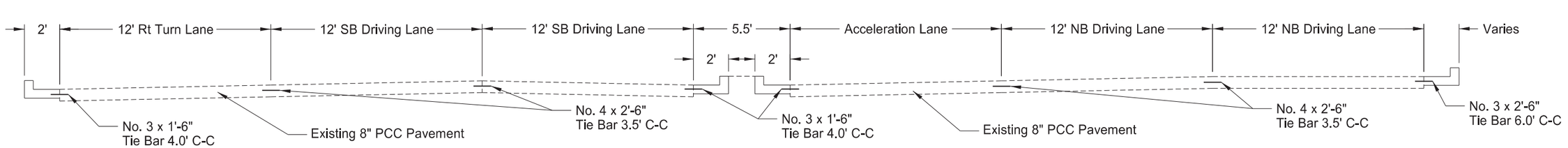
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	30	3



Existing Typical Section

Sta 3590+80 to Sta 3591+22



Existing Typical Section

Sta 3591+95 to Sta 3593+10

EXISTING TYPICAL SECTION

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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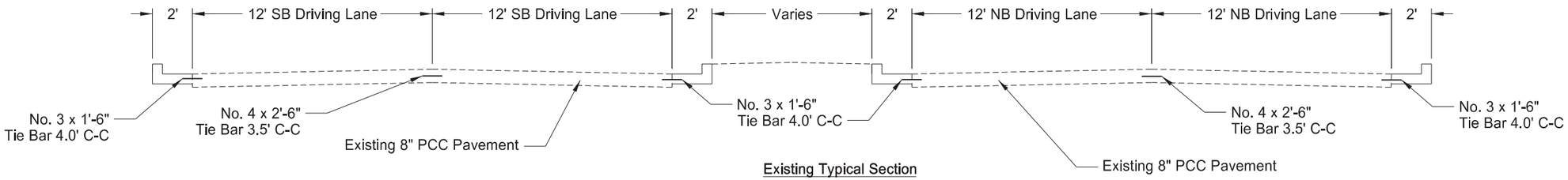
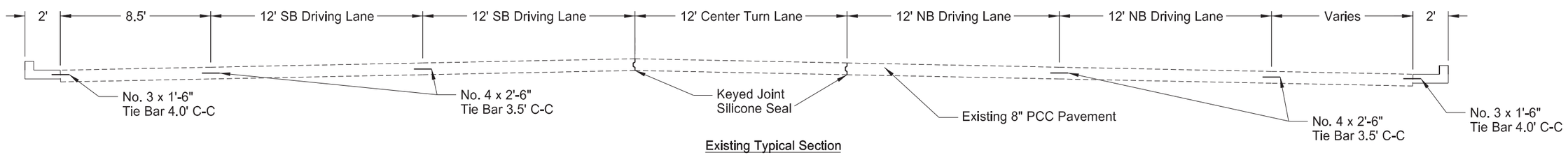
DATE
NORTH DAKOTA
02/24/22

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	30	4



Existing Typical Section

Sta 3594+30 to Sta 3607+50



Existing Typical Section

Sta 3608+42 to Sta 3609+52

EXISTING TYPICAL SECTION

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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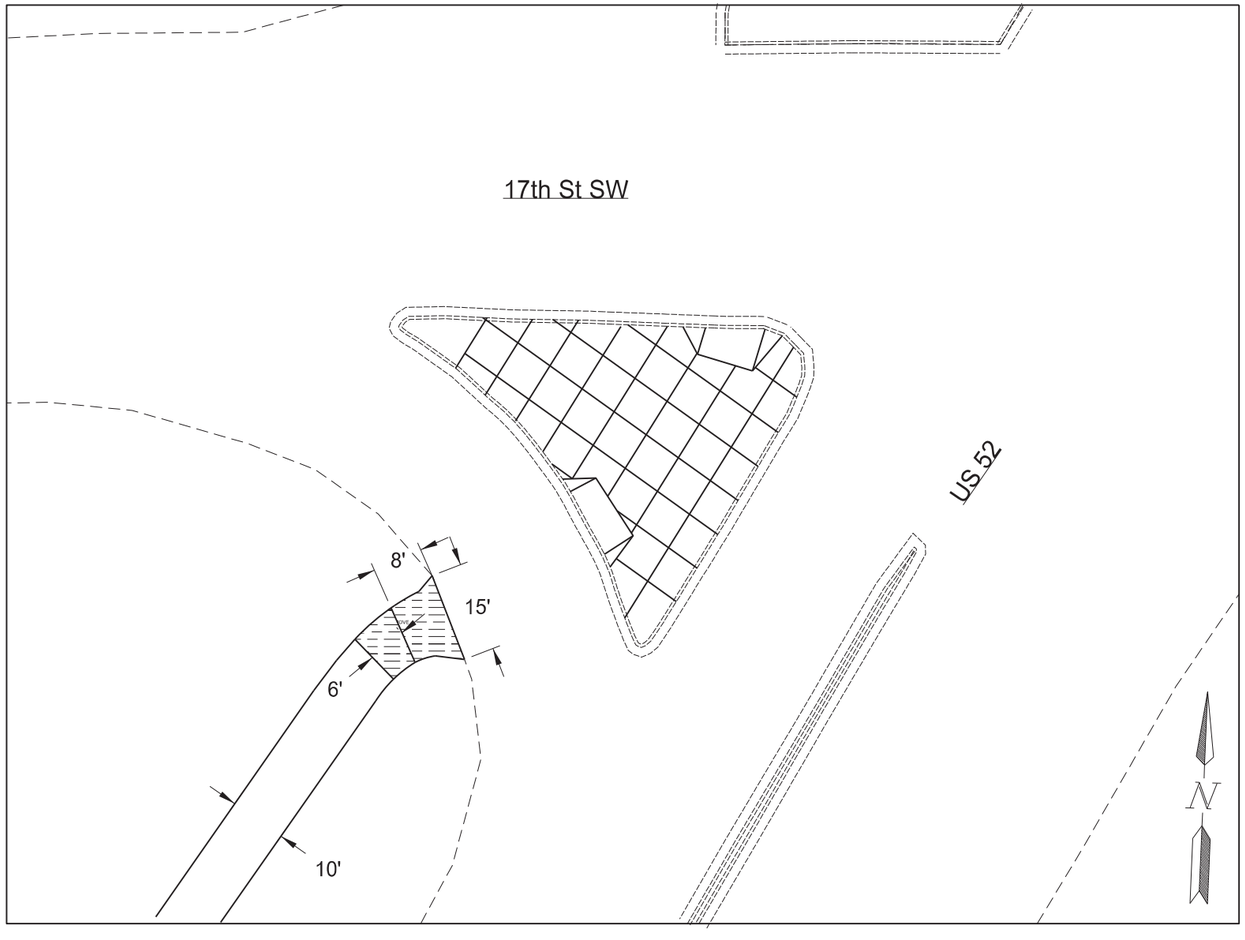
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	40	1

Spec	Code	Bid Item	Unit	Qty
202	0136	Removal of Pavement SW Corner	SY	17.8



US 52 & 17th St SW

SW Corner

REMOVE REMOVE Removal of Pavement (Sidewalk Pvmt)

Removals

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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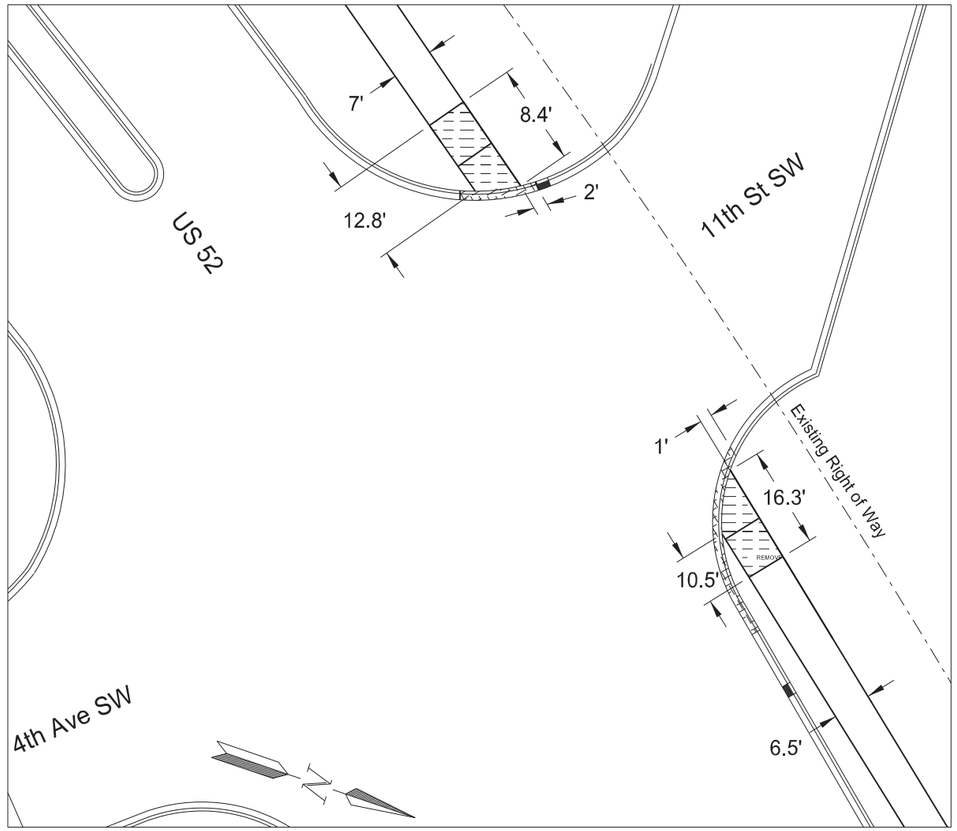
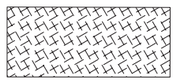
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	40	2



Spec	Code	Bid Item	Unit	Qty
202	0136	Removal of Pavement		
		SW Corner	SY	11.5
		NW Corner	SY	9.7
202	0130	Removal of Curb & Gutter		
		SW Corner	LF	14.0
		NW Corner	LF	31.0

Removal of Sidewalk Pavement



Removal of Curb & Gutter

US 52 & 11th St SW

SW & NW Corner

Removals

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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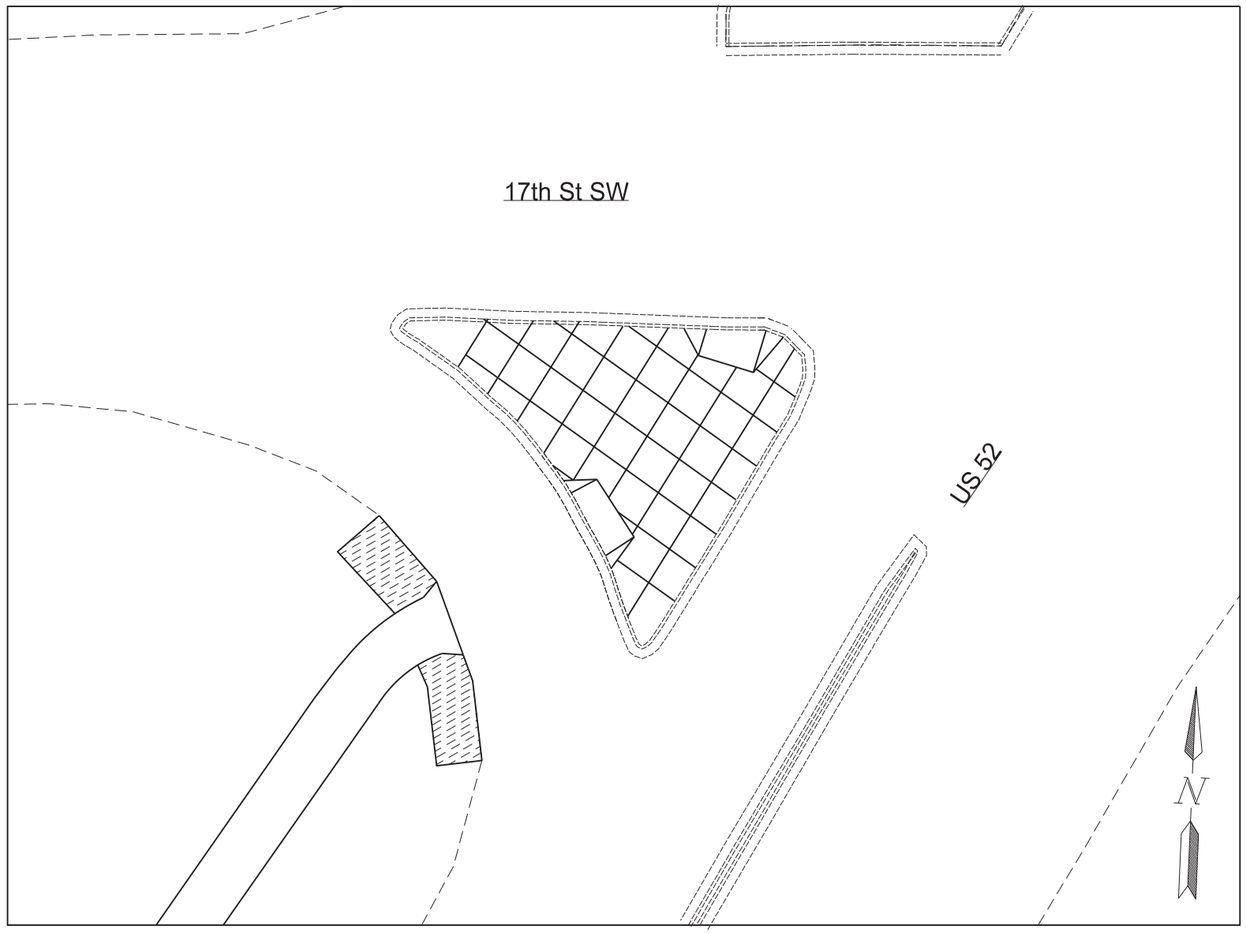
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	77	1

Spec	Code	Bid Item	Unit	Qty
970	0008	Landscape Preparation SW Corner	SY	14.4



US 52 & 17th St SW

SW Corner

Landscape Preparation

Permanent Erosion Control

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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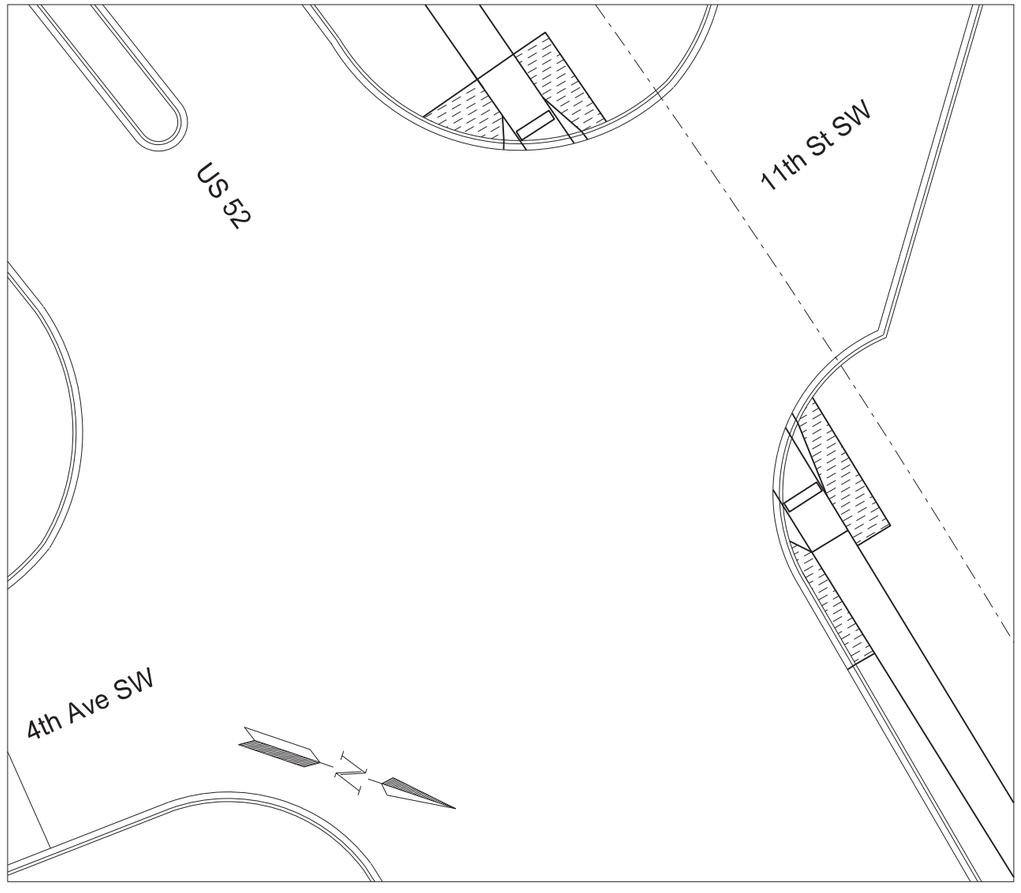
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	77	2



Spec	Code	Bid Item	Unit	Qty
970	0008	Landscape Preparation		
		SW Corner	SY	7.1
		NW Corner	SY	13.2

Landscape Preparation

US 52 & 11th St SW

NW & SW Corner

Permanent Erosion Control

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th ST SW

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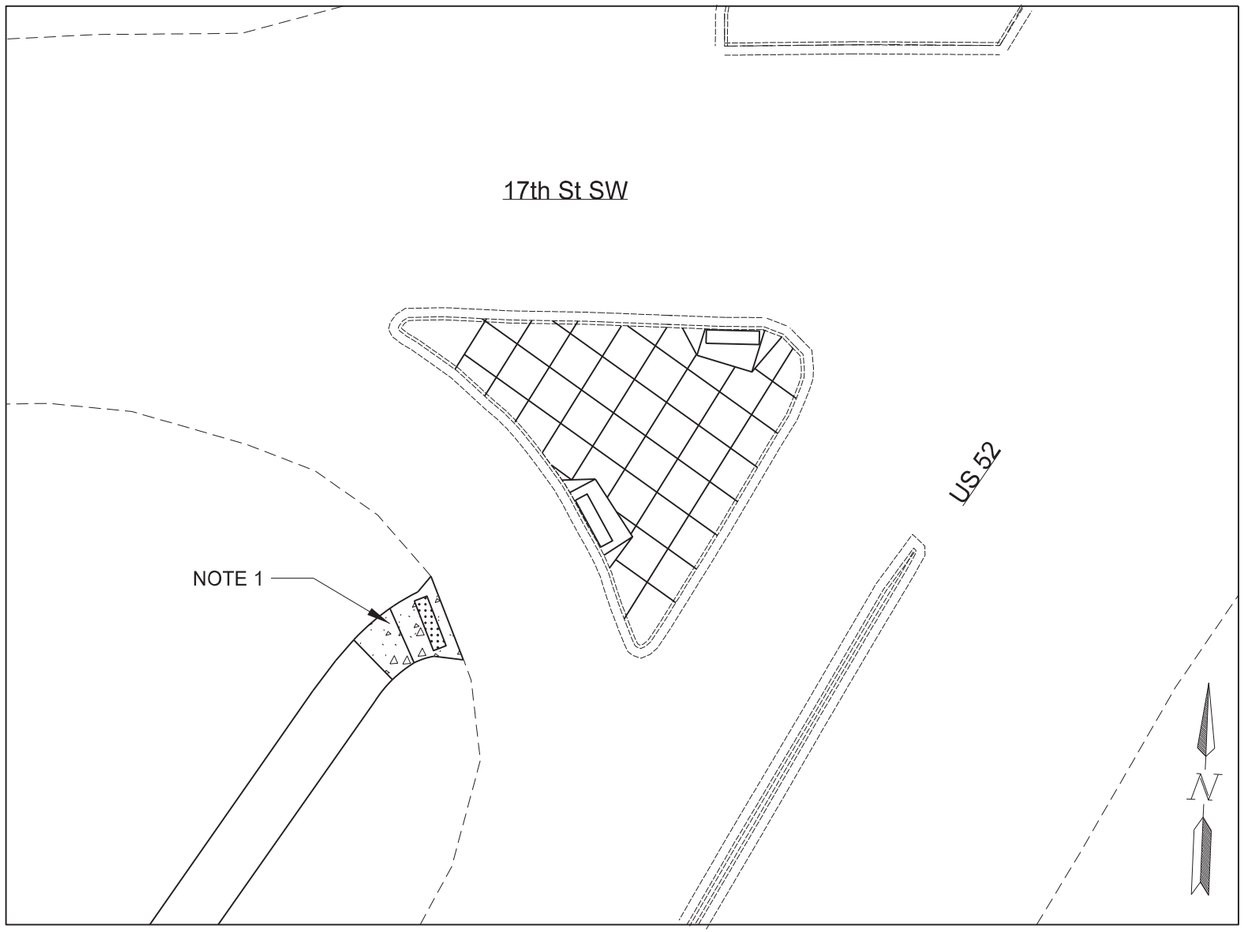
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	80	1



US 52 & 17th St SW

SW Corner

Spec	Code	Bid Item	Unit	Qty
302	0120	Aggregate Base Course CL 5 SW Corner	CY	1
750	0115	Sidewalk Concrete 4 IN SW Corner	SY	17.8
750	2115	Detectable Warning Panels SW Corner	SF	20

Sidewalk Concrete 4 IN

Detectable Warning Panels

NOTES:

1. See Standard Drawings D-750-2, D-750-3, and D-750-4 for additional information.
2. Inspect the form grades prior to any pouring of concrete. Remove and replace any concrete found to be out of compliance

Ramp Layout

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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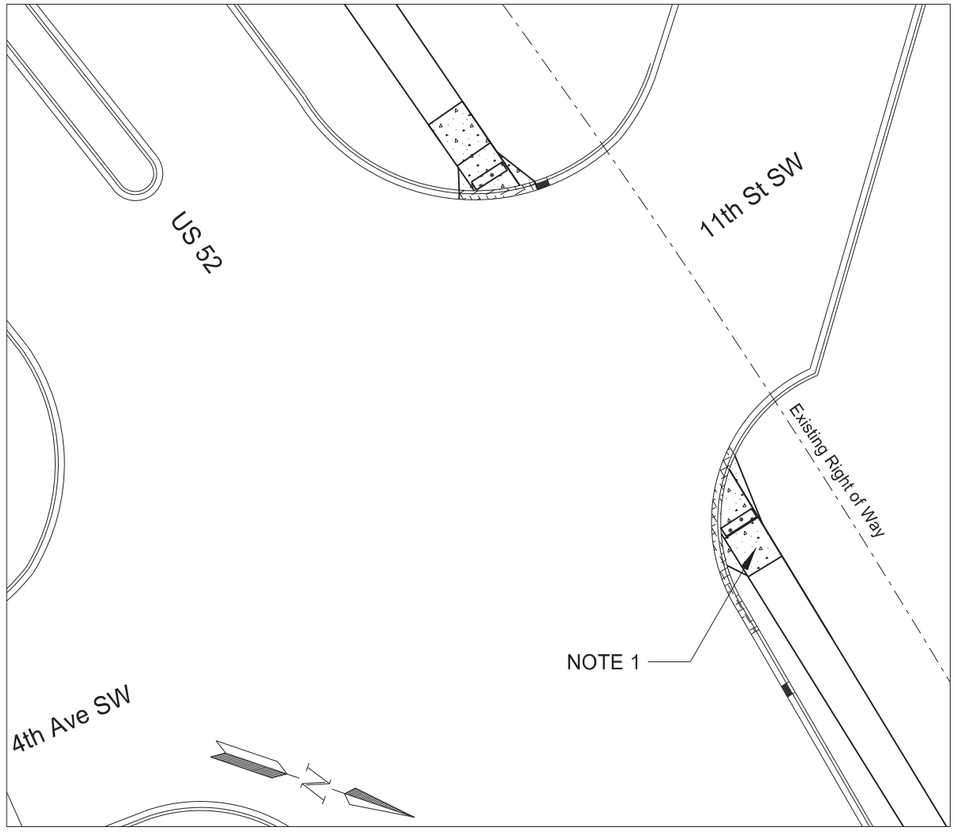
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	80	2



Spec	Code	Bid Item	Unit	Qty
302	0120	Aggregate Base Course CL 5		
		SW Corner	CY	1.5
		NW Corner	CY	2.1
748	0140	Curb & Gutter - Type I		
		SW Corner	LF	14
		NW Corner	LF	31
750	0115	Sidewalk Concrete 4 IN		
		SW Corner	SY	11.5
		NW Corner	SY	9.7
750	2115	Detectable Warning Panels		
		SW Corner	SF	20
		NW Corner	SF	20

NOTES:

1. See Standard Drawings D-750-2, D-750-3, and D-750-4 for additonal information.
2. Inspect the form grades prior to any pouring of concrete. Remove and replace any concrete found to be out of compliance

US 52 & 11th St SW

SW & NW Corner

Curb & Gutter - Type 1

Sidewalk Concrete 4 IN

Detectable Warning Panels

ADA Ramp Layout

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

REGISTERED PROFESSIONAL ENGINEER
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02/24/22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**28**	**56**
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		70	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**4**	**43**	**172**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**4**	**36**	**144**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**6**	**32**	**192**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**10**	**30**	**300**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**39**	**312**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**14**	**10**	**140**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**4**	**35**	**140**
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**4**	**35**	**140**
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	

SPECIAL SIGNS

I2-5-96	**48"x96"**	**PROJECT FUNDING (FEDERAL - STATE)**	**2**	**58**	**116**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2382**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**100**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	**TYPE I BARRICADES**	**EACH**	**10**
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1054	**SIDEWALK BARRICADE**	**EACH**	**3**
704-1060	**DELINEATOR DRUMS**	**EACH**	**204**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**252**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**20**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	**EACH**	**2**
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**391**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	**SHORT TERM 4IN LINE - TYPE R**	**LF**	**398**
762-0426	**SHORT TERM 24IN LINE - TYPE R**	**LF**	**12**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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

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Traffic Control Devices List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	100	2

Short Term 4IN Line (Type R)

Delineator Drums
Spaced @ 10' Intervals

24" White
Stop Bar

Delineator Drums
Spaced @ 10' Intervals

Tubular Markers
Spaced @ 25' Intervals

3589

3588

3587

+79'

3586

3585

Concrete

Asphalt

17th St SW

Work Area

PHASE 1

Tubular Markers
Spaced @ 25' Intervals

N

Note:
Arrows shown indicate traffic flow, not pavement markings

Traffic Control
Phase 1, Jct 17th St SW

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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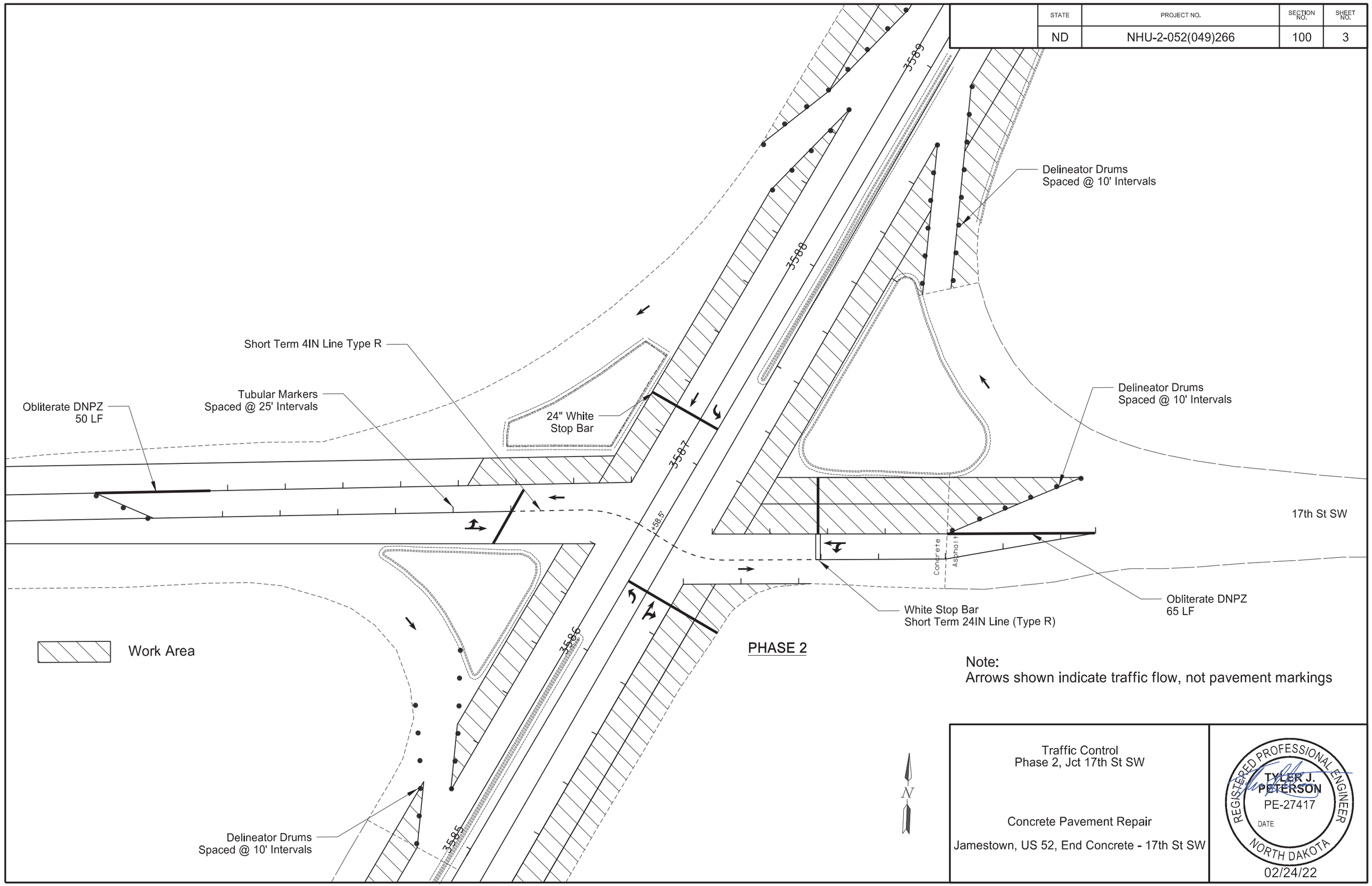

Note:
Arrows shown indicate traffic flow, not pavement markings

Traffic Control
Phase 2, Jct 17th St SW

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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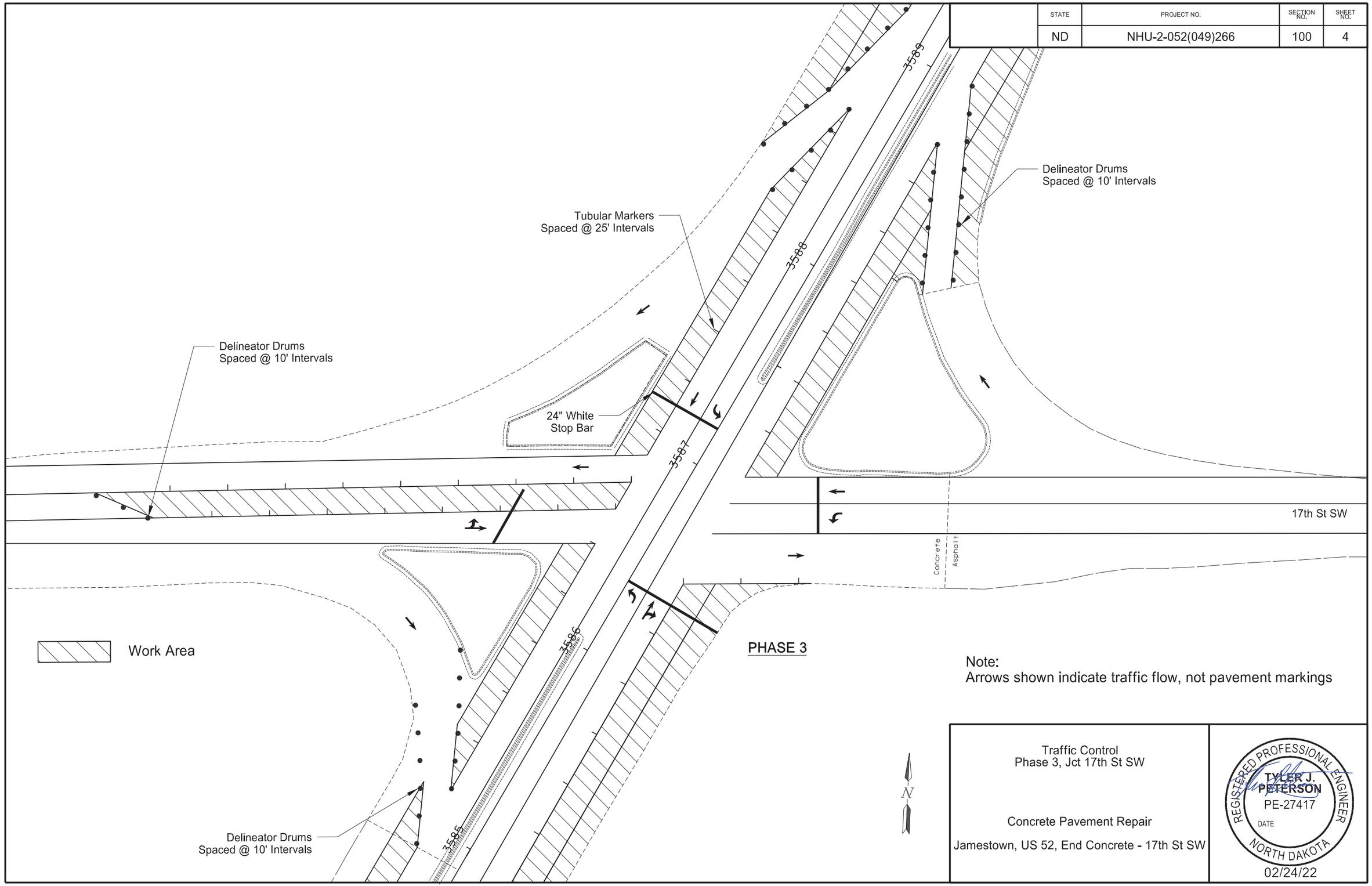
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	100	4



Note:
Arrows shown indicate traffic flow, not pavement markings

Traffic Control
Phase 3, Jct 17th St SW

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	100	5

Short Term 4IN Line (Type R)

Tubular Markers
Spaced @ 25' Intervals

24" White
Stop Bar

3589

3588

3587

3596

3595

165'

Concrete

Concrete

Asphalt

Concrete

Delineator Drums
Spaced @ 10' Intervals

17th St SW

Work Area

PHASE 4

Note:
Arrows shown indicate traffic flow, not pavement markings

N

Traffic Control
Phase 4, Jct 17th St SW

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-2-052(049)266	100	6

3589

3588

3587

24" White
Stop Bar

Concrete

17th St SW

Concrete

Asphalt

Concrete

3586

3585

Work Area

Tubular Markers
Spaced @ 25' Intervals

PHASE 5

Note:
Arrows shown indicate traffic flow, not pavement markings

N

Traffic Control
Phase 5, Jct 17th St SW

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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NORTH DAKOTA
02/24/22

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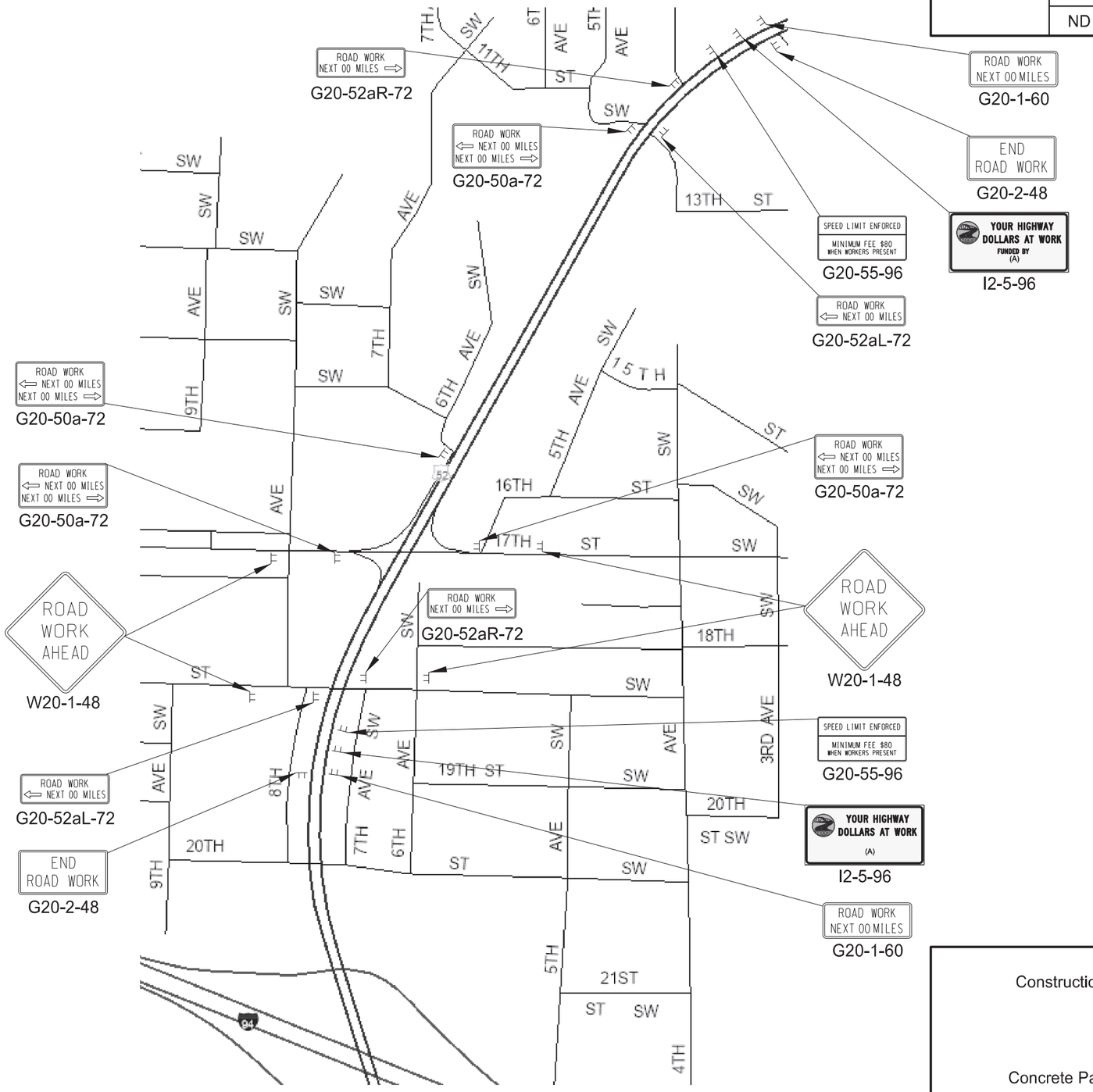
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	100	7



Construction Sign Layout

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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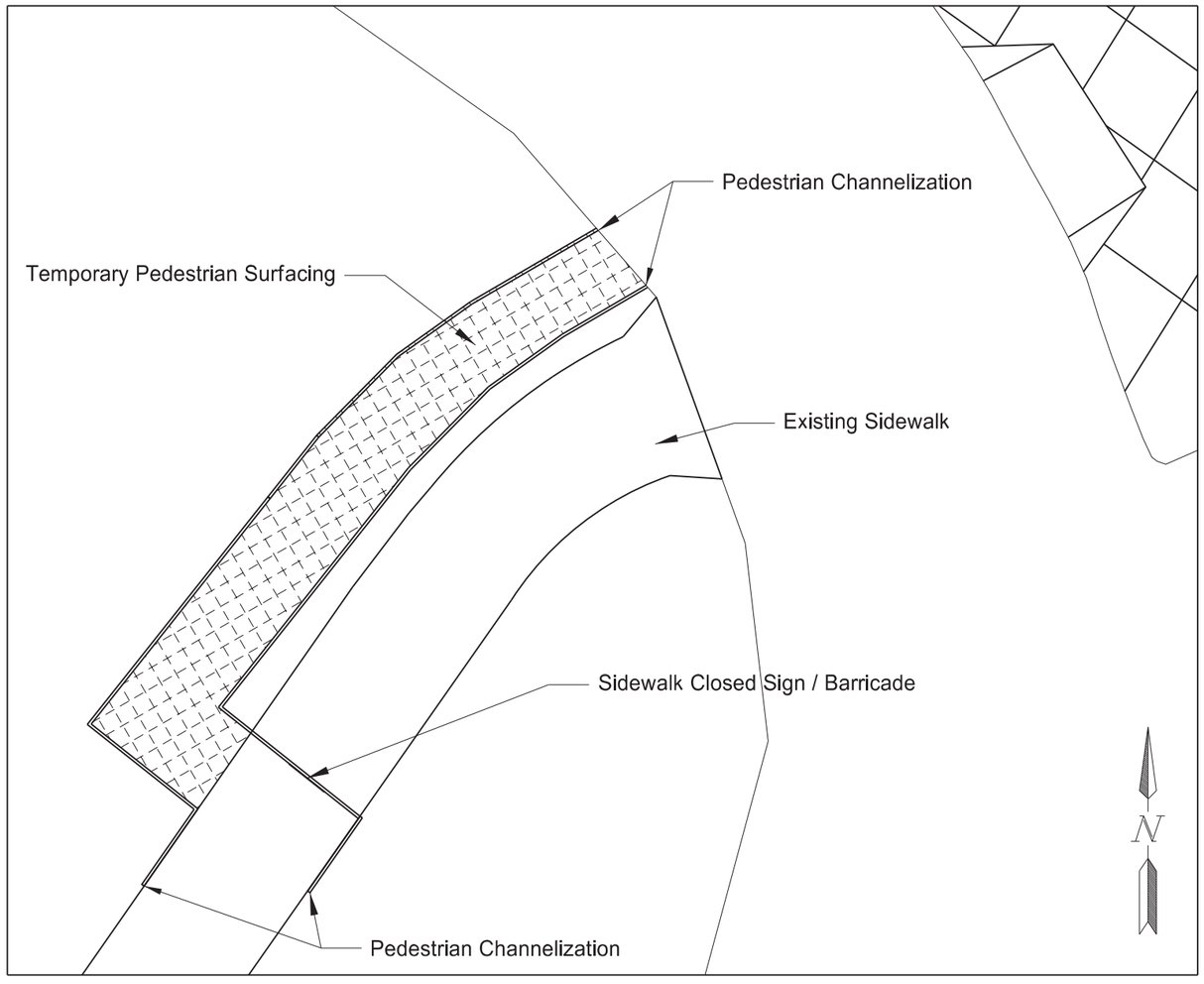
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-056(049)266	100	8



US 52 & 17th St SW

SW Corner

Spec	Code	Bid Item	Unit	Qty
704	1056	Pedestrian Channelization SW Corner	LF	55
704	1054	Sidewalk Barricade SW Corner	EA	1

Temporary Pedestrian Routes

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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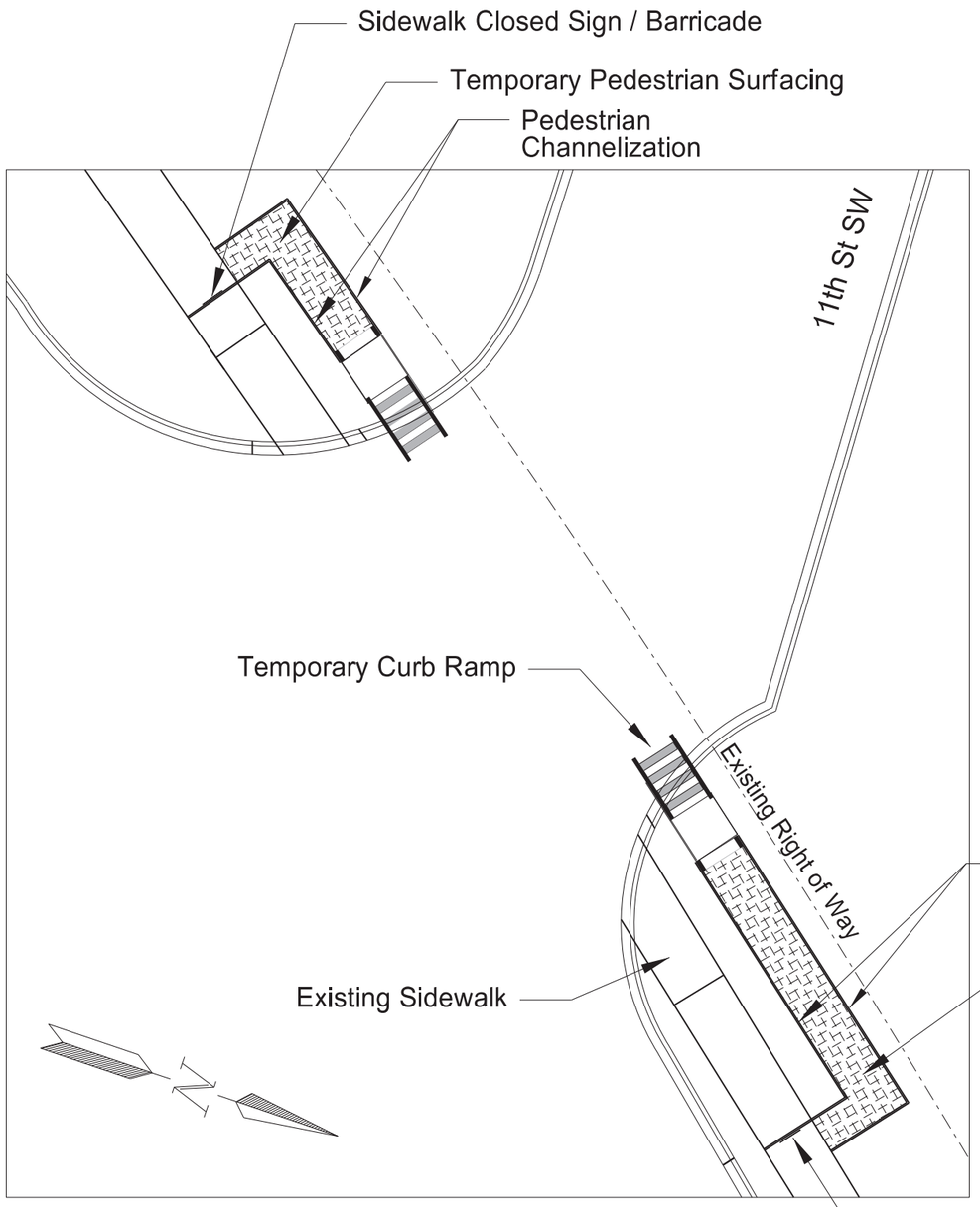
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-056(049)266	100	9



US 52 & 11th St SW

SW & NW Corner

Spec	Code	Bid Item	Unit	Qty
704	1056	Pedestrian Channelization		
		SW Corner	LF	30
		NW Corner	LF	52
704	1054	Sidewalk Barricade		
		SW Corner	EA	1
		NW Corner	EA	1

Note:
See Section 100 Sheet 10 for Temporary Pedestrian Curb Ramp Details

Temporary Pedestrian Routes

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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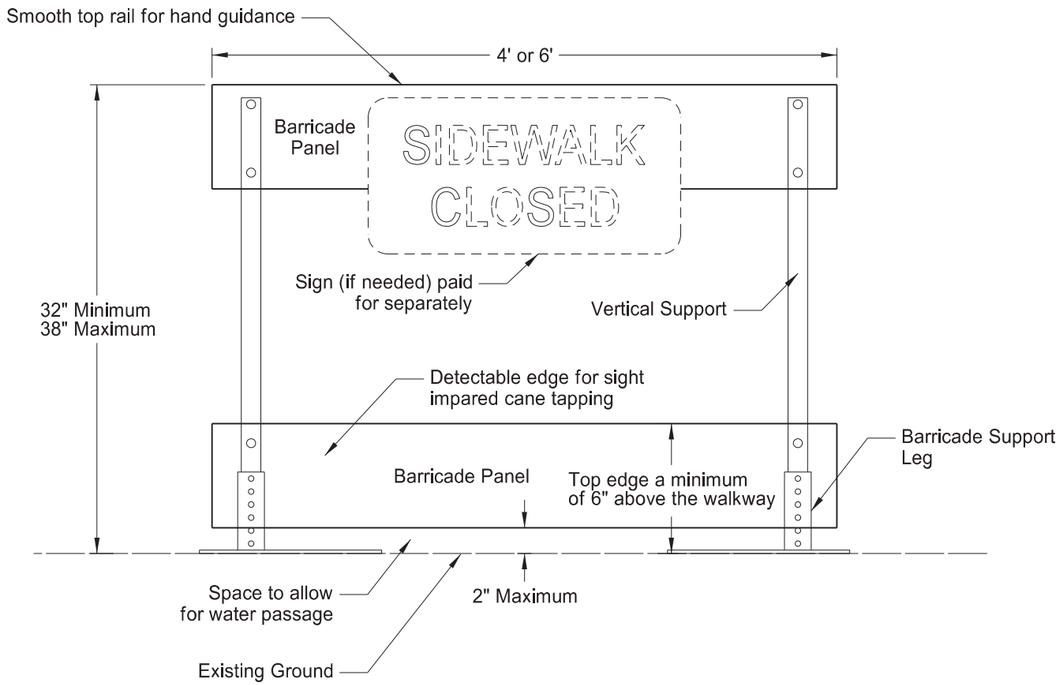
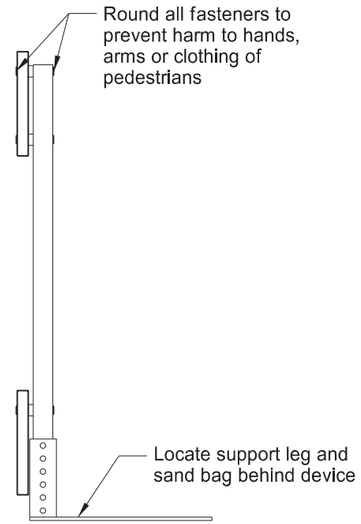
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	100	10



Front View

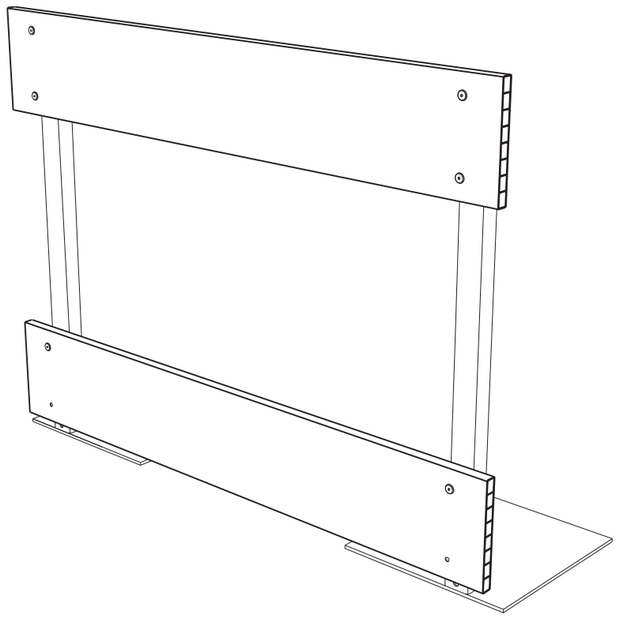


End View

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

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Sidewalk Barricade

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

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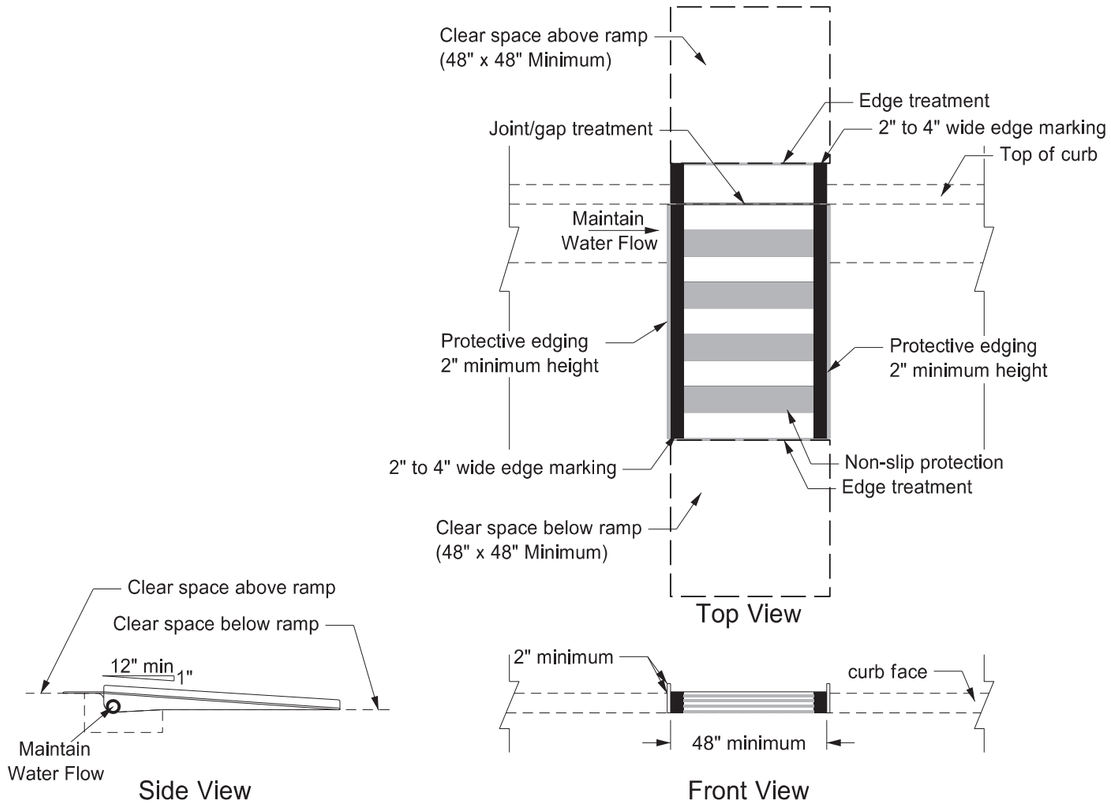
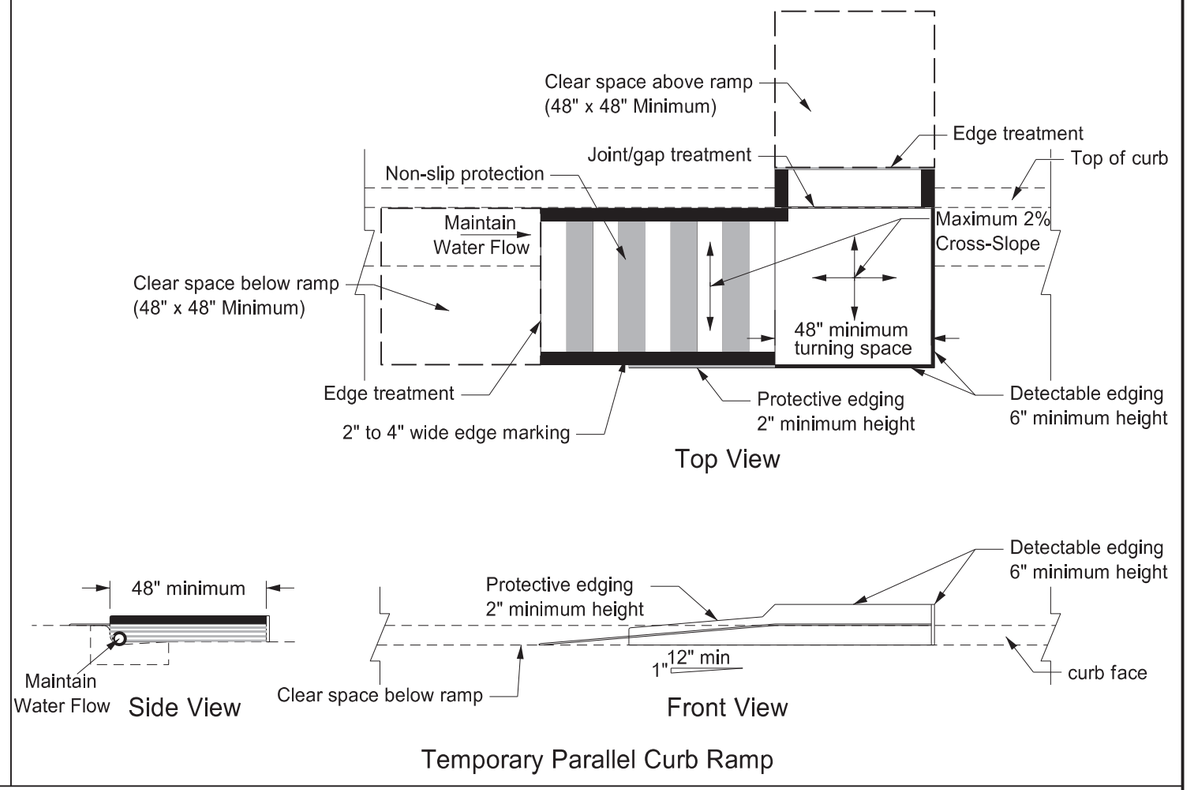
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	100	11

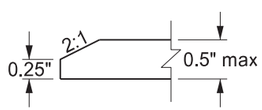


Temporary Perpendicular Curb Ramp



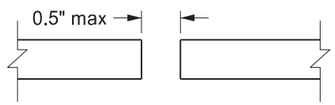
Temporary Parallel Curb Ramp

Edge Treatment



Maximum Surface
Height Change Detail

Joint/Gap Treatment



Maximum Width
Lateral Joints or Gaps

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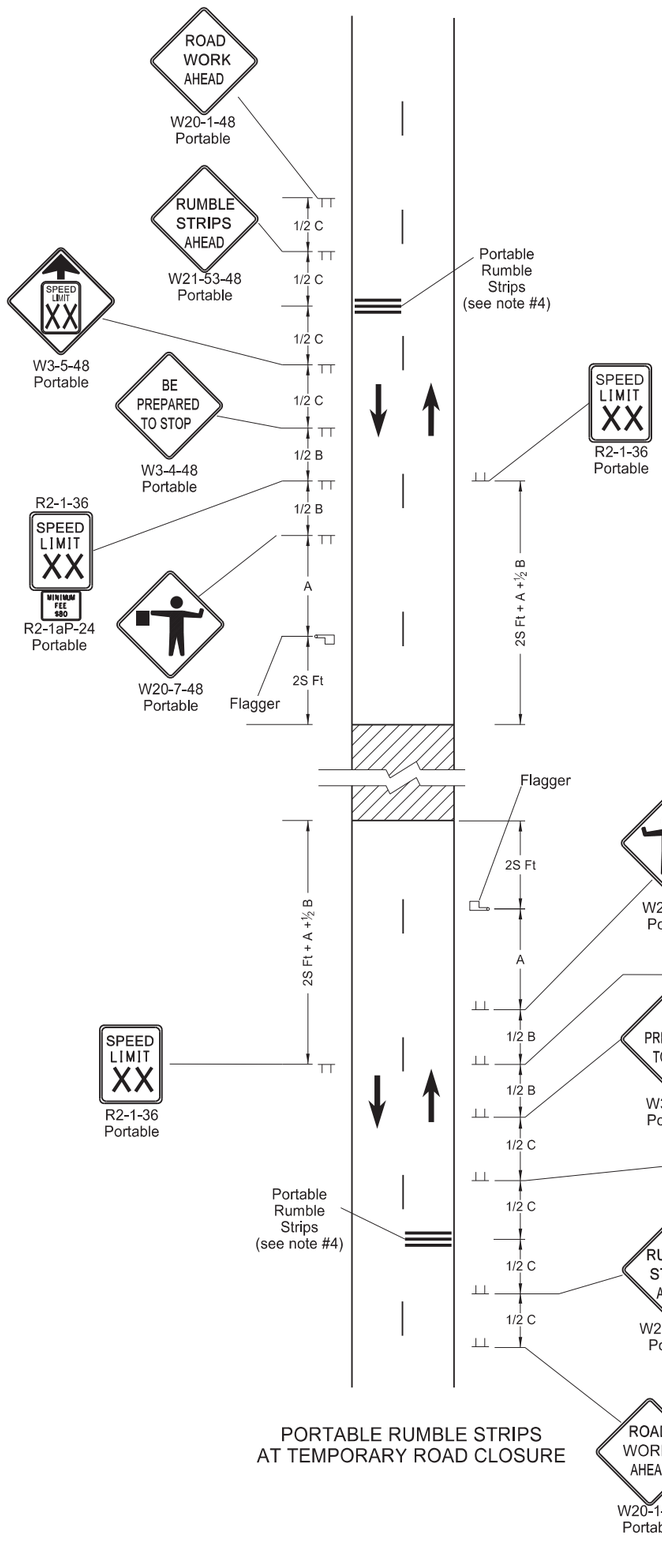
Temporary Pedestrian Curb Ramp Details

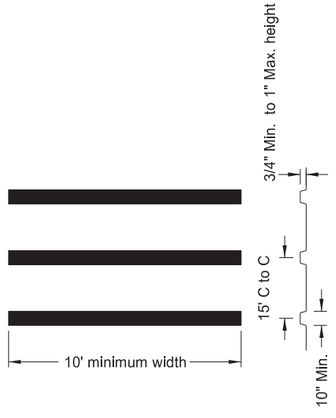
Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

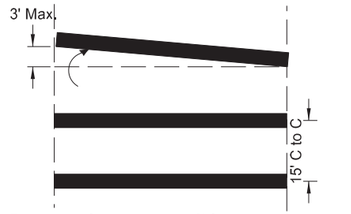
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-2-052(049)266	100	12



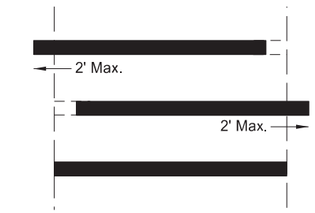
PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE



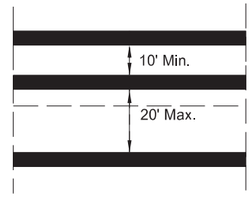
PORTABLE RUMBLE STRIPS ARRAY DETAIL



Reposition if movement is >3' from original position.
Skewing



Reposition if movement is >2' from original position.
Lateral



Reposition if distance between strips is <10' or >20'.
Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720

KEY
- Work area
- Flagger
- Sign

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

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TWO-LANE PORTABLE RUMBLE STRIPS

Concrete Pavement Repair

Jamestown, US 52, End Concrete - 17th St SW

NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions

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12 18 2020

NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner

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NDDOT ABBREVIATIONS

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
07-01-14

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12-18-20	Sheet Added - Continued from D-101-3

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions

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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
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed) (void — void — void — v)
- 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 (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement

Countours

- Failure Line
- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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SYMBOLS

D-101-31

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

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 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 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 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 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

Catch Basin (Riser 30 Inch, Beehive, Type A)

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

Inlet Special (Catch Basin, Type 1, Type A)

Inlet (Tee, Type 1, Type 2, Type 2 Double)

Median Drain

Headwall (Exst, Ppsd, Ppsd Single with Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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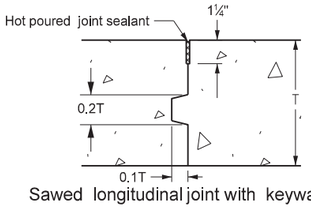
12 18 2020

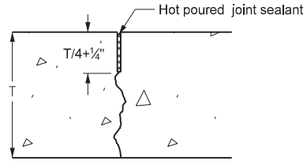
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS

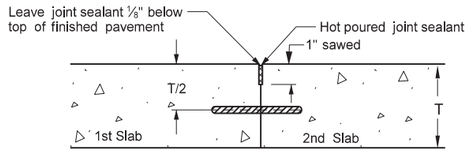


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

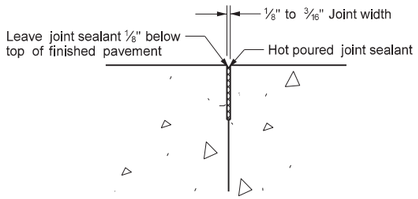
TIED JOINTS



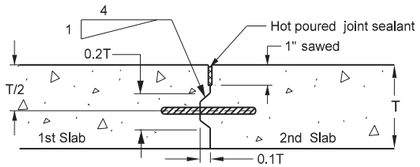
Longitudinal construction joint (tied butt joint)

Notes:

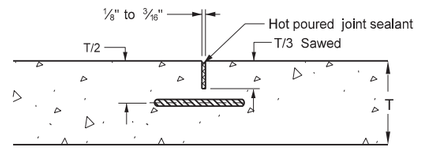
1. Provide hot poured joint sealant meeting the requirements of Section 826.02A.2 of the Standard Specifications.
2. Include all costs of the longitudinal joint and seal in the price bid for the PCC pavement.
3. Do not place tie bars within 18 inches of a transverse skewed joint.
4. Use Grade 40 steel for tie bars installed bent and later straightened.
5. Increase the tie bar spacing up to 10%, when necessary to facilitate construction.
6. Place tie Bars at a 48 inch maximum spacing.
7. A "Warp" joint is a sawed joint or a construction joint with a keyway.
8. A "Butt joint" is a construction joint with no keyway.



Contraction joint



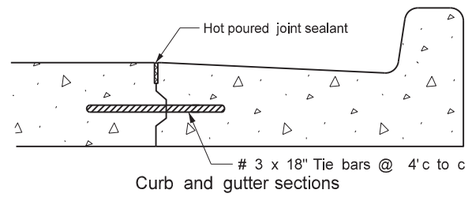
Longitudinal construction joint (tied keyed joint)



Sawed longitudinal joint

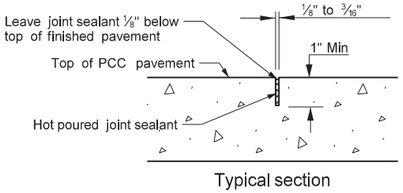
TIEBAR SPACINGS (In)

DIST TO FREE EDGE (FT) / BAR SIZE / GRADE STEEL / BAR LENGTH / JOINT TYPE / PVMT THICKNESS		# 3 BAR										# 4 BAR												# 5 BAR												# 6 BAR											
		GRADE 40				GRADE 60						GRADE 40					GRADE 60							GRADE 40						GRADE 60						GRADE 40							GRADE 60						
		24"				30"						24"					36"							30"						42"						36"							48"						
		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	8	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	19	22	24	10	12	14	16	19	22	24
6"	WARP		48	39			48	48				48					48																															
	BUTT		37	27			48	42				48					48																															
8"	WARP	48	39	29	24	48	48	44	35	29	25	48	42	35	30	26	48	48	48	45	39	28	26	48	48	47	41	30	27	48	48	48	48	45	41	48	48	48	48	48	43	39	48	48	48	48	48	48	48
	BUTT	42	27			48	42	31	25			37	29	24			48	44	37	32	27			46	39	33	29			48	48	48	43	32	29	48	48	48	48	35	30	27	48	48	48	48	48	45	41
8½"	WARP	48	37	28		48	48	42	33	28	24	48	39	33	28	24	48	48	48	42	37	27	24	48	48	44	38	28	25	48	48	48	48	42	38	48	48	48	47	40	37		48	48	48	48	48	48	48
	BUTT	39	26			44	39	29				35	27				48	42	35	29	26			44	36	31	27			48	48	47	41	30	27	48	48	45	39	33	28	26	48	48	48	48	48	42	39
9"	WARP	48	35	26		48	48	39	31	26		47	37	31	26		48	48	47	40	35	25		48	48	42	36	26	24	48	48	48	48	40	36	48	48	48	48	44	38	35	48	48	48	48	48	48	48
	BUTT	37	24			48	37	27				33	26				48	40	33	28	25			41	34	29	25			48	48	44	39	28	25	48	48	42	37	31	26	24	48	48	48	48	47	40	37
9½"	WARP	48	33	25		48	48	37	30	25		44	35	29	25		48	48	44	38	33	24		48	46	39	34	25		48	48	48	48	38	34	48	48	48	48	42	36	33	48	48	48	48	48	48	48
	BUTT	35				48	35	26				31	25				47	37	31	27				39	32	27	25			48	48	42	37	27	24	48	47	40	35	29	25		48	48	48	48	44	38	35
10"	WARP	47	31			48	47	35	28			42	34	28	24		48	48	42	36	31			48	44	37	33	24		48	48	48	48	36	33	48	48	48	48	40	34	31	48	48	48	48	48	48	47
	BUTT	33				48	33	25				29	24				45	36	29	25				37	31	26	24			48	46	40	35	25		48	45	38	33	28	24		48	48	48	48	42	36	33
10½"	WARP	45	30			48	45	34	27			40	32	26			48	48	40	34	30			48	42	36	31			48	48	48	47	34	31	48	48	48	48	45	38	33	30	48	48	48	48	48	48	45
	BUTT	32				48	32	24				28					42	34	28	24				35	29	25				48	44	38	33	24		48	42	36	32	27			48	48	48	48	40	34	31
11"	WARP	43	28			48	43	32	26			38	31	25			48	46	38	33	28			48	40	34	30			48	48	48	45	32	30	48	48	48	43	36	31	28	48	48	48	48	48	47	43
	BUTT	30				46	30					27					40	32	27					34	28	24				48	42	36	32			48	40	35	30	25			48	48	48	46	38	33	30
11½"	WARP	41	27			48	41	31	24			36	29	24			48	44	36	31	27			46	38	32	28			48	48	48	43	31	28	48	48	47	41	34	30	27	48	48	48	48	48	45	41
	BUTT	29				44	29					25					39	31	25					32	27					48	40	35	30			46	39	33	29	24			48	48	48	44	37	31	29
12"	WARP	39	26			48	39	29				35	28				48	42	35	30	26			44	36	31	28			48	48	47	41	30	27	48	48	45	40	33	28	26	48	48	48	48	48	43	39
	BUTT	27				42	27					25					37	30	25					31	25					46	39	33	29			45	37	32	28				48	48	48	42	35	30	27
12½"	WARP	38	25			48	38	28				33	27				48	40	33	29	25			42	35	30	26			48	48	45	39	28	26	48	48	43	38	32	27	25	48	48	48	48	48	41	38
	BUTT	27				40	27					25					35	28						29	25					44	37	32	27			42	35	30	27				48	48	45	40	34	29	26
13"	WARP	36	24			48	36	27				32	26				48	39	32	27	24			40	33	29	25			48	48	43	38	27	25	48	48	41	36	30	26	24	48	48	48	48	46	40	36
	BUTT	25				38	25					24	27				34	27						28						42	35	30	27			41	34	29	25				48	48	44	38	32	28	25
13½"	WARP	35				48	35	26				31	25				47	37	31	26				39	32	28	24			48	48	42	36	26	24	48	47	40	35	29	25		48	48	48	48	44	38	35
	BUTT	25				37	25					27					33	26						27						41	34	29	25			39	33	28	25				48	48	42	37	31	27	24
14"	WARP	34				48	34	25				30	24				45	36	30	25				37	31	27				48	47	40	35	25		48	45	38	34	28	24		48	48	48	48	43	37	34
	BUTT	24				35	24					25					32	25						26						39	33	28	25			38	32	27	24				48	47	40	35	30	26	
14½"	WARP	32				48	32	24				29					43	35	29	25				36	30	26				48	45	39	34	24		48	43	37	32	27			48	48	48	48	41	35	32
	BUTT					34						30	25				38	32	27	24				36	30	26				48	46	39	34	29	25								48	46	39	34	29	25	
15"	WARP	31				47	31					28					42	33	28	24				35	29	25				48	44	37	33	24		48	42	36	31	26			48	48	48	47	40	34	31
	BUTT					33						29					37	31	26					35	29	25				48	44	38	33	28	24								48	44	38	33	28	24	



Curb and gutter sections

JOINT SEALER DETAILS



Typical section

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-15-2010

REVISIONS

DATE	CHANGE
10/23/2012	Expanded Tie Bar Table
03/16/2016	Updated Jt Details & notes
10/25/2019	Corrected "Typo" in Note 3

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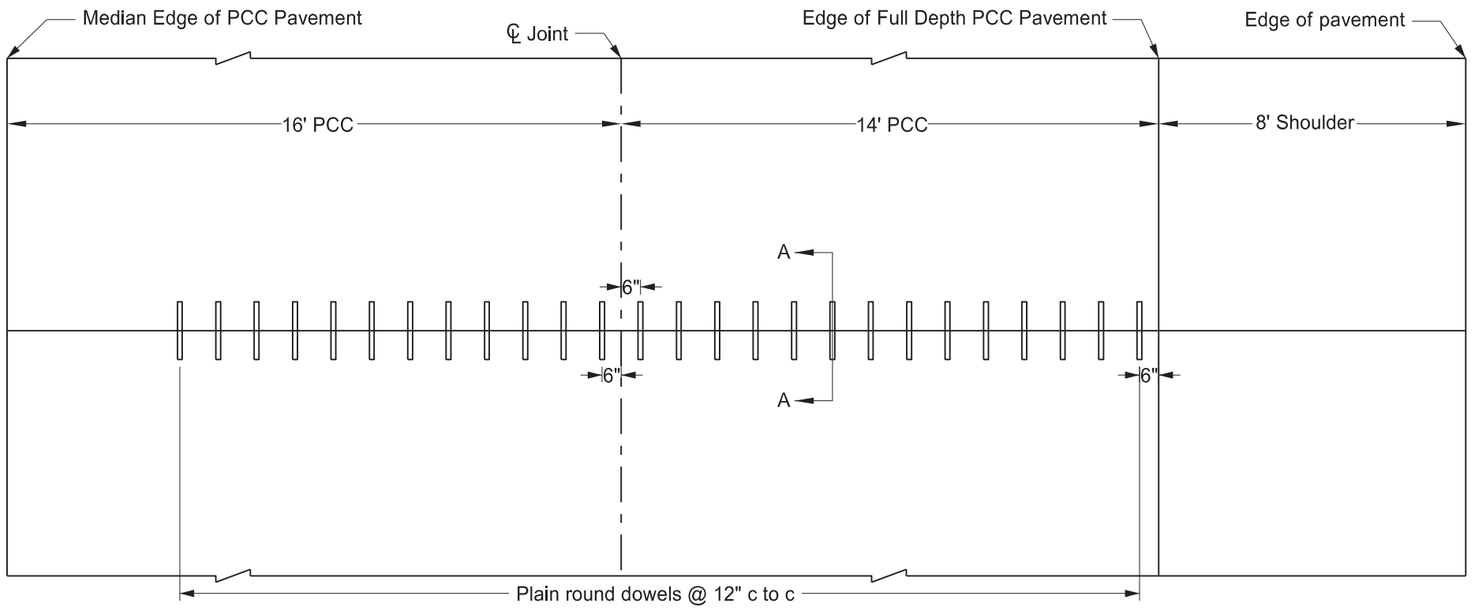
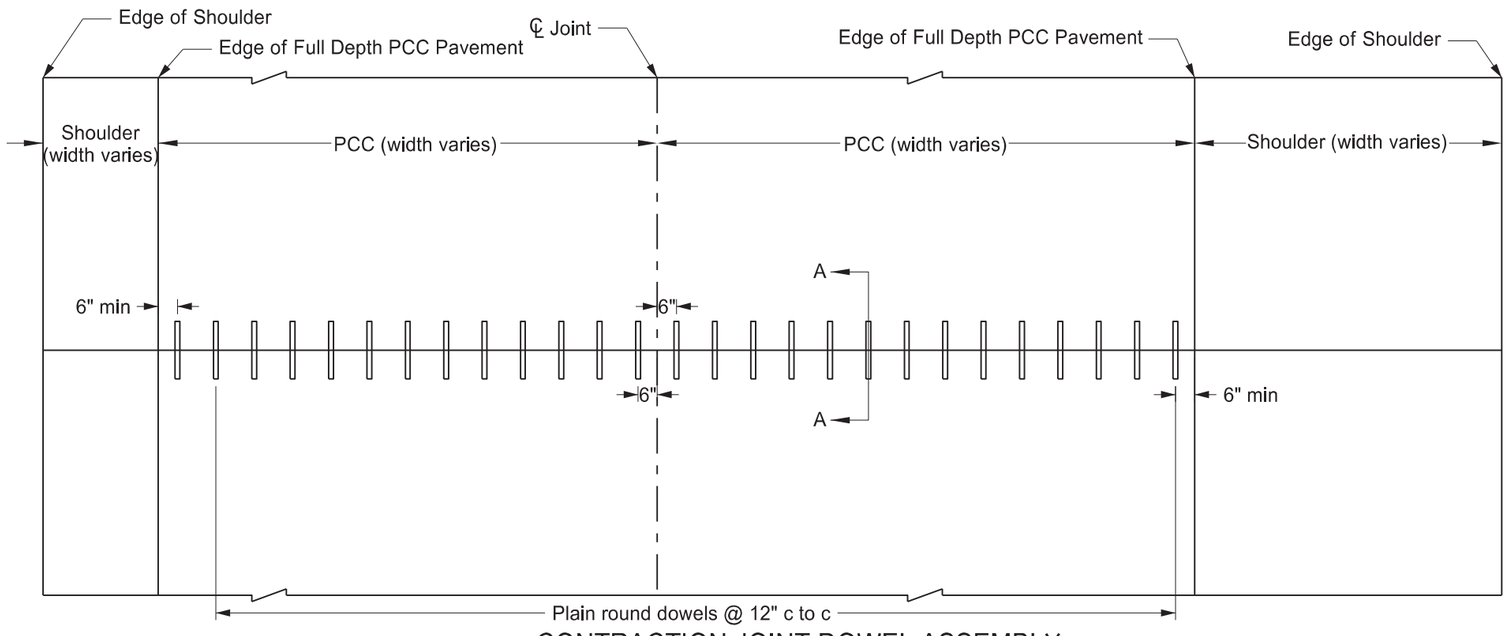
TRANSVERSE CONTRACTION JOINT DETAILS

D-550-3



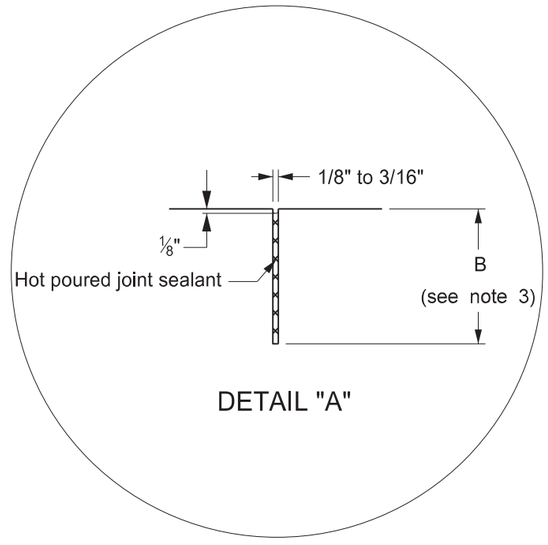
CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE



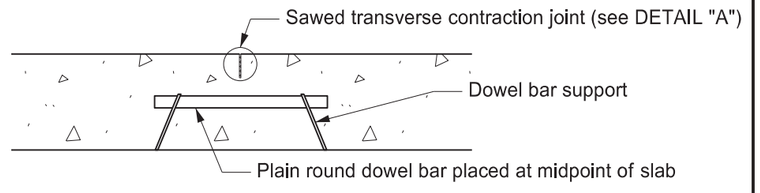
CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

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 + ¼" for AE or YE for non-dowelled concrete pavement or
   B = T/3 for AAE or dowelled concrete pavement



DETAIL "A"



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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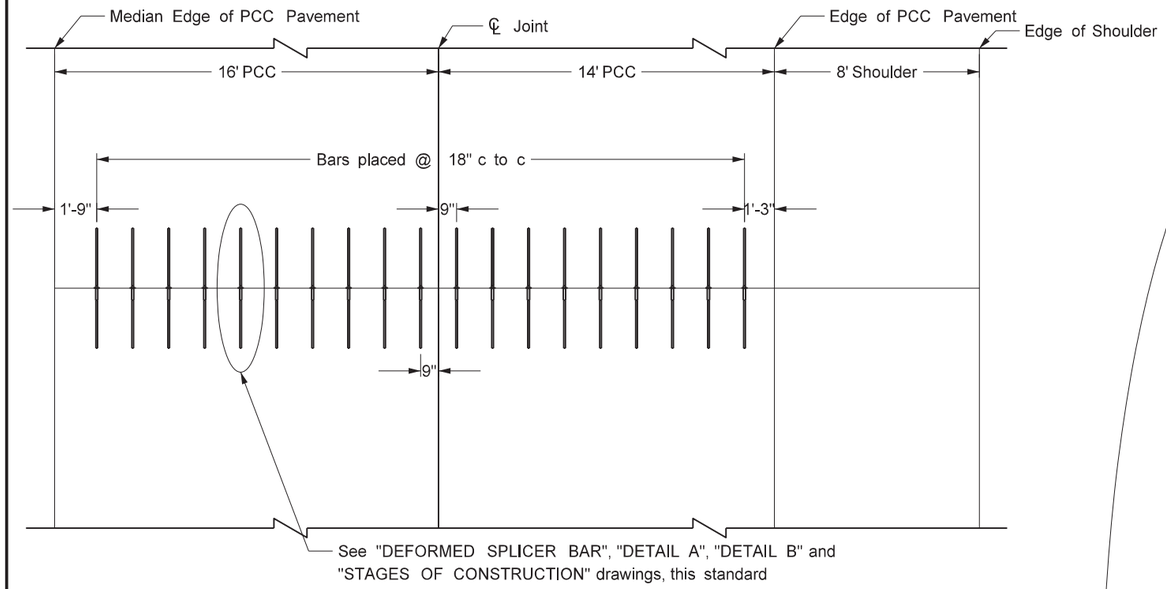
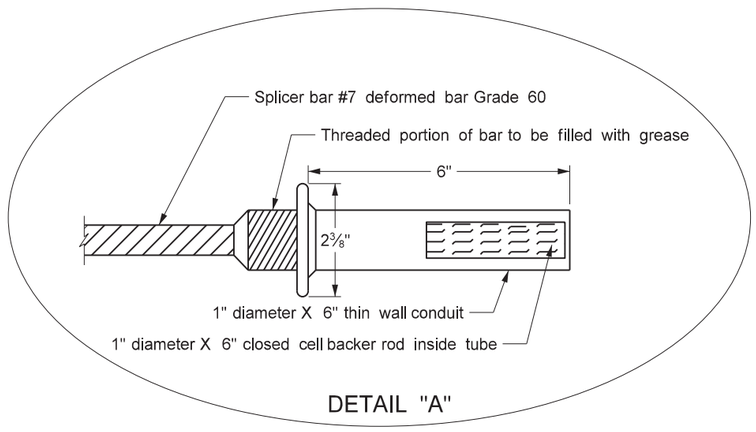
TRANSVERSE CONSTRUCTION JOINT

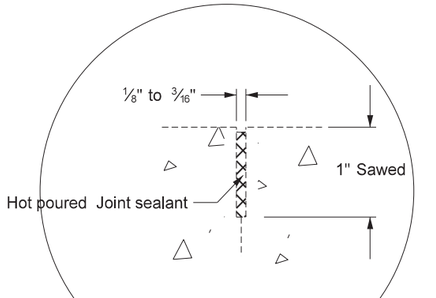
D-550-5



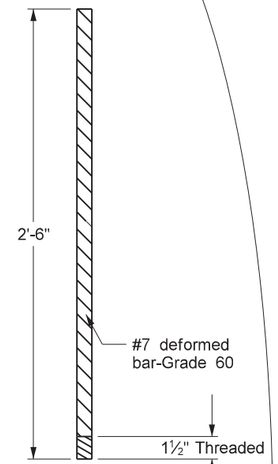
PLAN VIEW



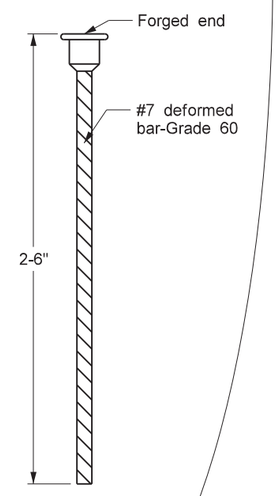
DETAIL "A"



DETAIL "B"

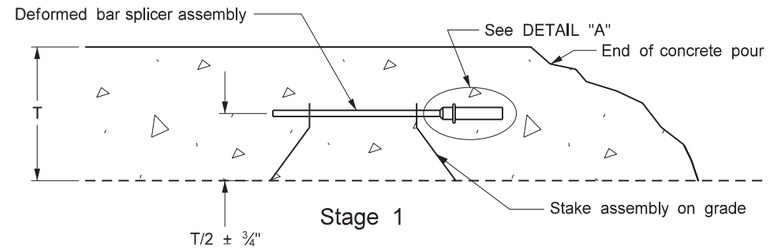


DEFORMED INSERT

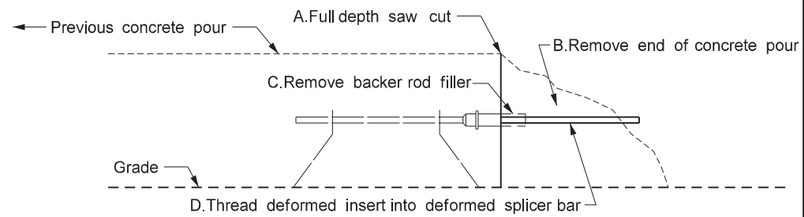


DEFORMED SPLICER BAR

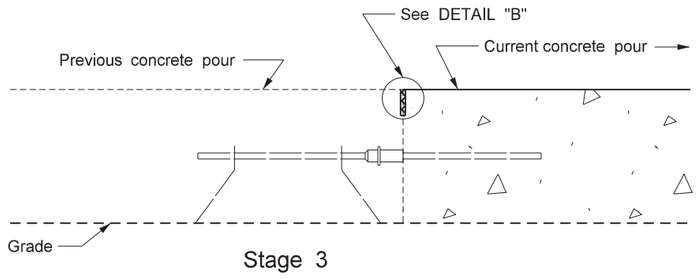
STAGES OF CONSTRUCTION



Stage 1



Stage 2



Stage 3

Notes

1. Saw and seal all construction joints.
2. Include all costs for transverse construction joints in the price bid for PCC pavement.
3. Do not saturate the subgrade during the sawing operation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
3-16-16 8-27-19	Revised Joint Details & notes. New Design Engr PE Stamp.

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CONSTRUCTION SIGN DETAIL

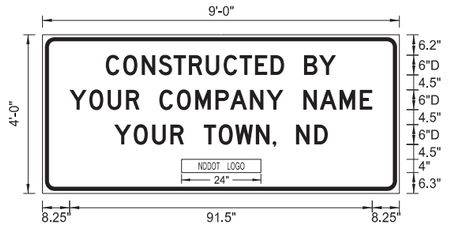
D-704-5

SIGN NUMBER	G20-10-108
WIDTH x HEIGHT	9'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Refl
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S):

AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y					69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7							
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E		91.5	6	D 2000
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96				
Y	O	U	R		T	O	W	N	,		N	D						64.6	6	D 2000
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2								

Notes:

1. Post mount sign a distance of ½A following the End Road Work (G20-2-48) sign (maximum 2 signs per project.)

2. Use sign on rural projects with a 30 day or longer duration (not required on seal coats or other short duration projects.)

3. Do not place sign in urban areas or within city limits.

Advance Warning Sign Spacing (A)			
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	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revise sheeting to type IV.
9-27-17	Updated to active voice.
8-30-18	Updated sign number in note 1.
10-03-19	New Design Engineer PE Stamp.

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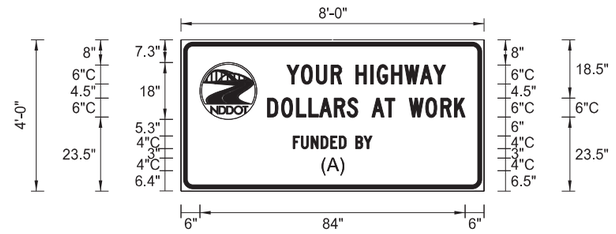
CONSTRUCTION SIGN DETAILS
PROJECT FUNDING SIGN

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

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

STATION(S): AREA: 32.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Reg_48_Large.ssi

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

(A)

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

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

Notes:

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

2) Contact Project Engineer for funding source message.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-08-21	
REVISIONS	
DATE	CHANGE

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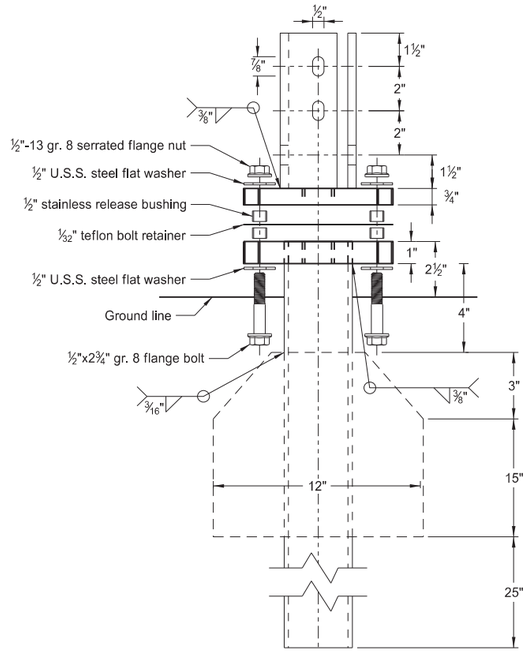
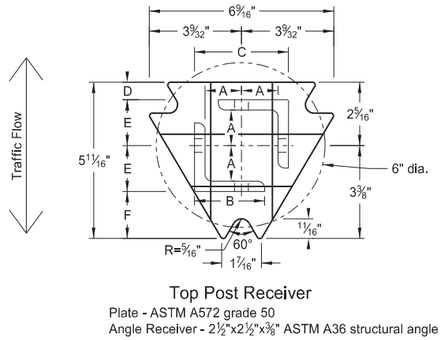
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

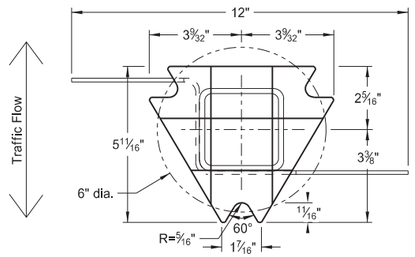


Multi-Directional
Slip Base Assembly

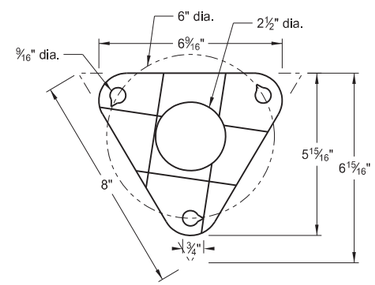
Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



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



Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon

Notes:

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

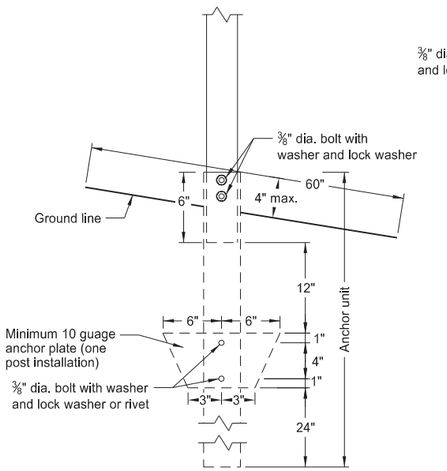
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2³/16	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
1½ x 1½	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
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2³/16 x 2³/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

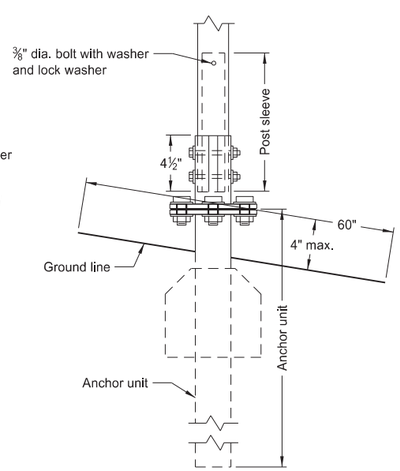
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³/16"x10 ga.	1⁹/64"	2½"	3¹/32"	2⁵/32"	1³³/64"	1⅞"
2½"x10 ga.	1⁹/32"	2½"	3⁵/16"	⅝"	1²¹/32"	1¾"

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

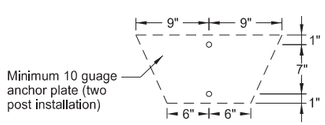
(B) For additional wind load, insert the 2³/16"x10 ga. into 2½"x10 ga.



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



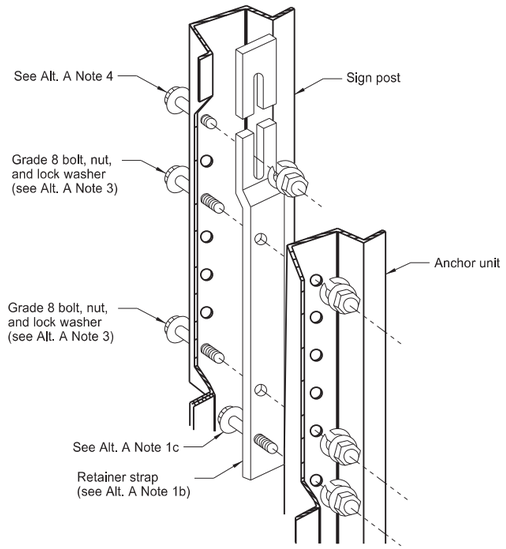
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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

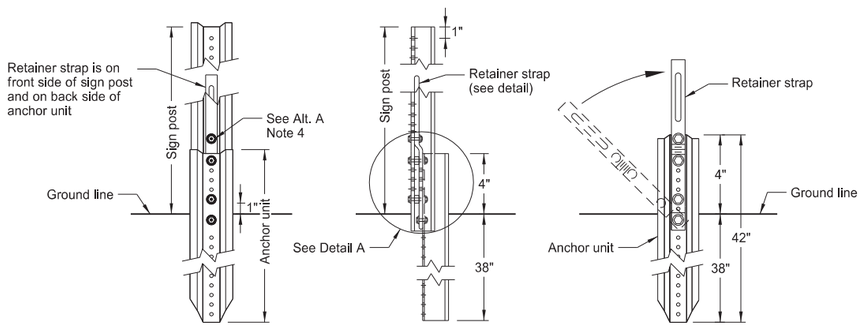
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



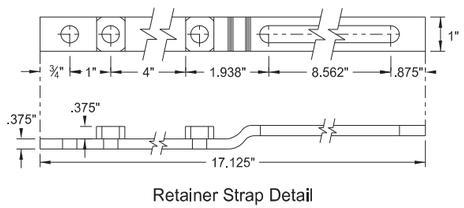
Detail A



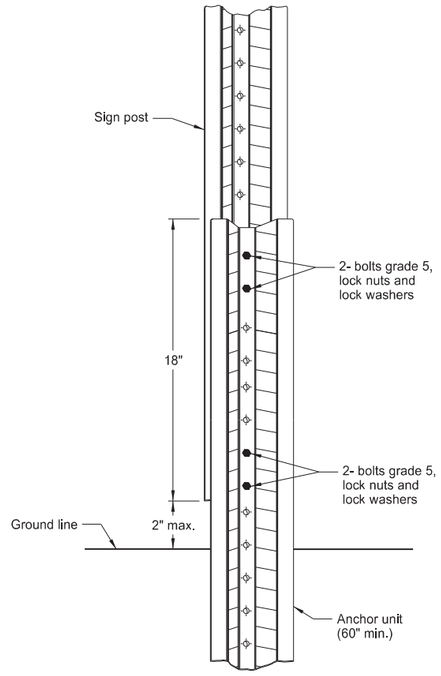
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.

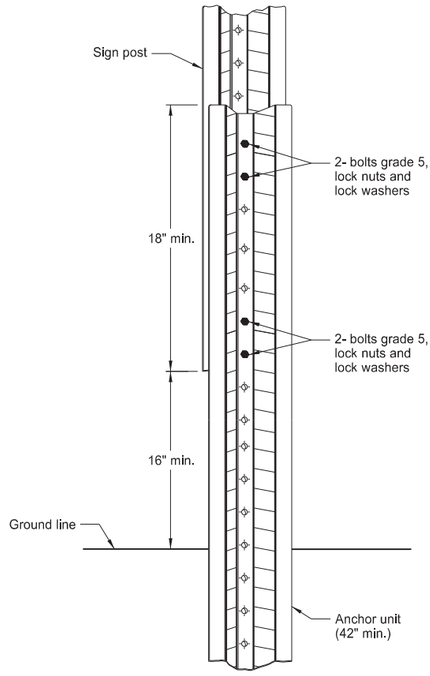


Retainer Strap Detail



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	Updated to active voice
10-03-19	New Design Engr PE Stamp

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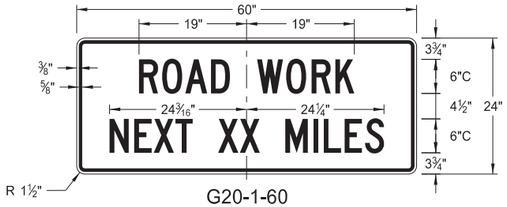
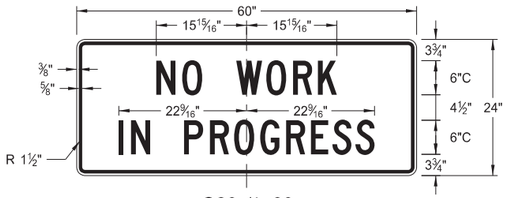
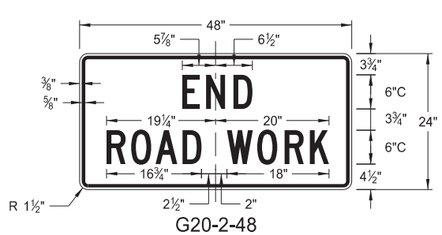
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



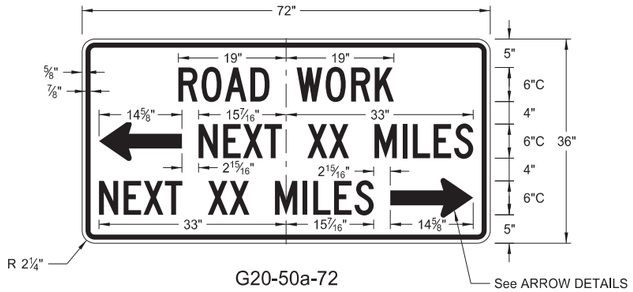
G20-1-60
Legend: black (non-refl)
Background: orange



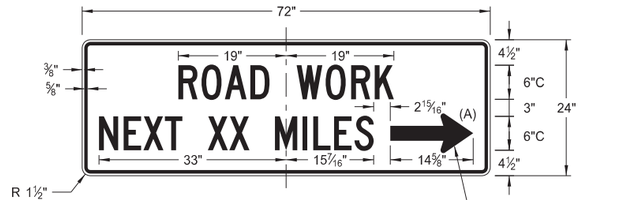
G20-1b-60
Legend: black (non-refl)
Background: orange



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



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



G20-52a-72
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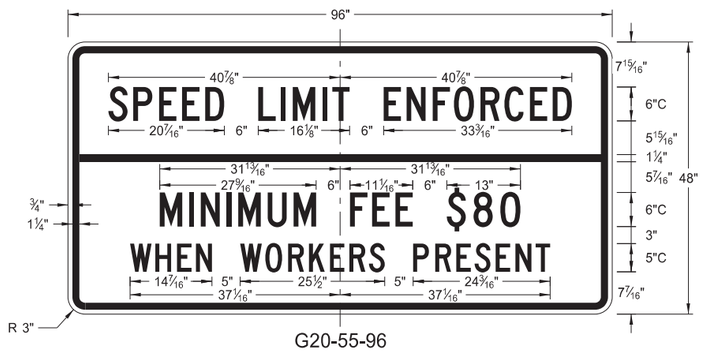
Background: orange



G20-55-96
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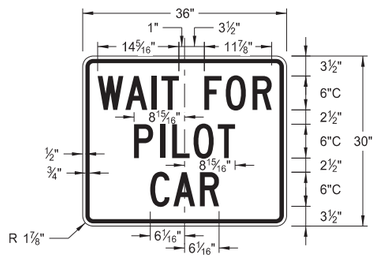
Background: orange



G20-4b-36
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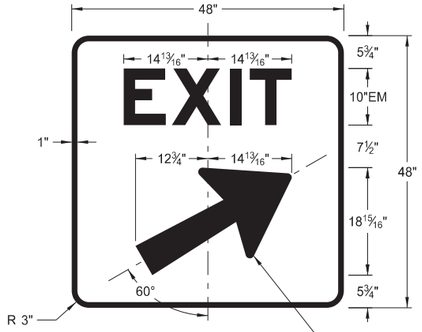
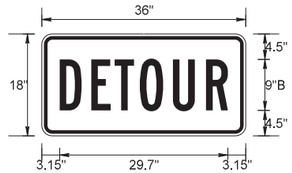
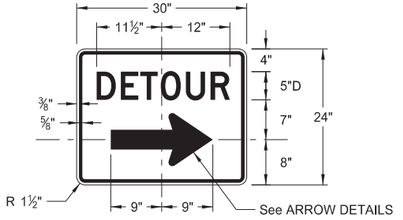
Background: orange



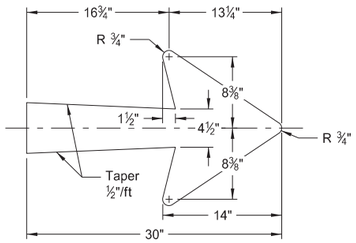
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



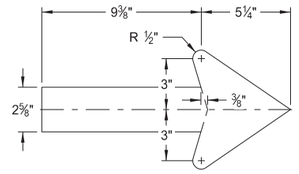
M4-8-36
Legend: black (non-refl)
Background: orange



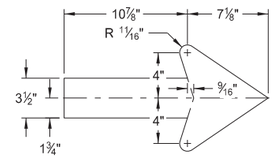
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



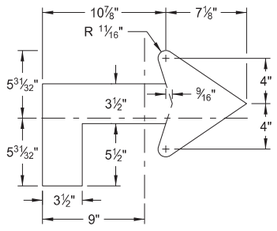
E5-1-48



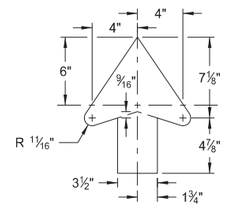
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

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

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

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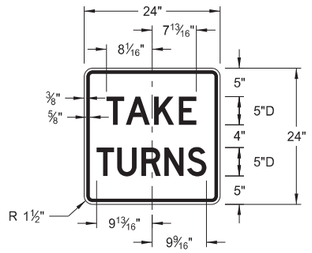
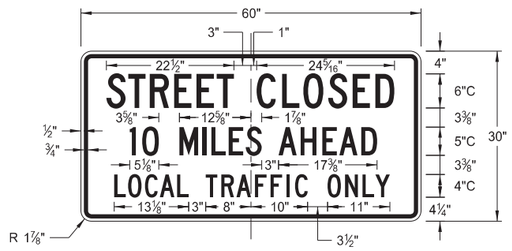
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
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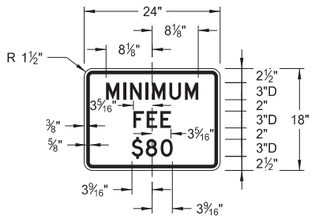
Background: white



R2-1aP-24
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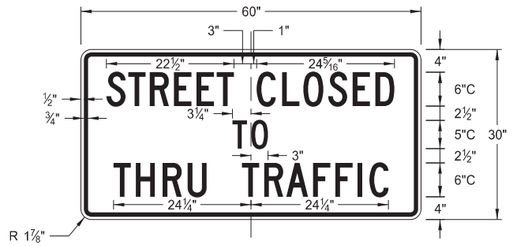
Background: white



R11-4a-60
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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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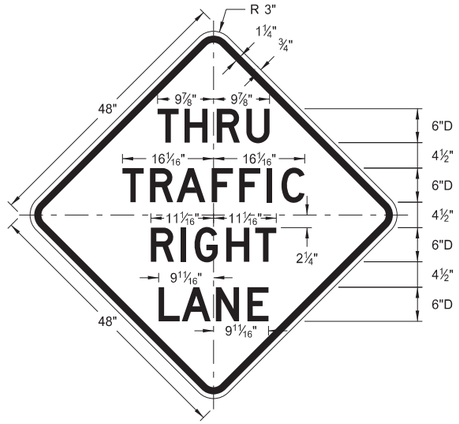
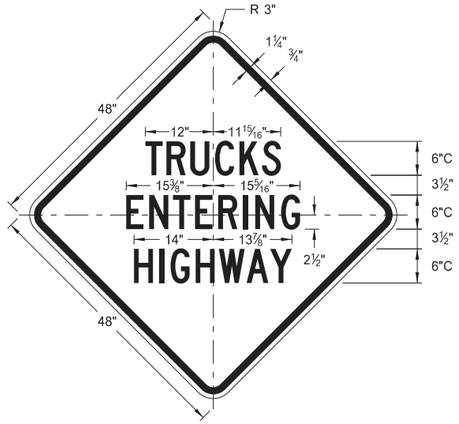
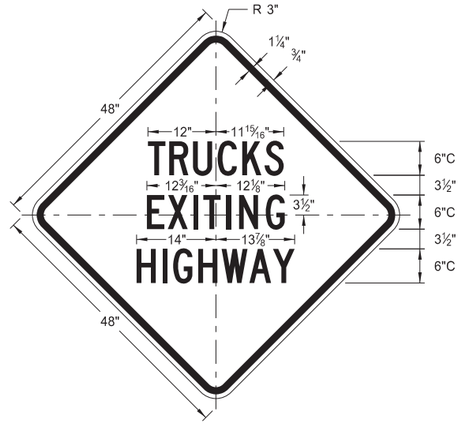
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



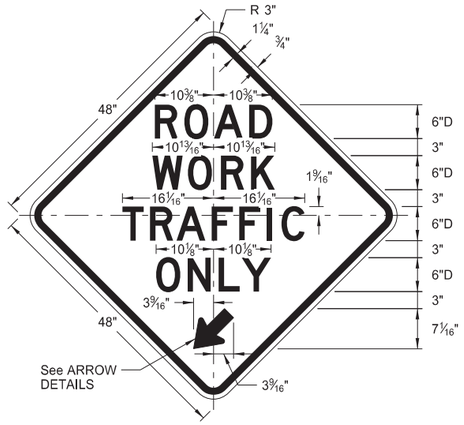
W5-8-48
Legend: black (non-refl)
Background: orange



W8-53-48
Legend: black (non-refl)
Background: orange



W8-56-48
Legend: black (non-refl)
Background: orange



W5-9-48
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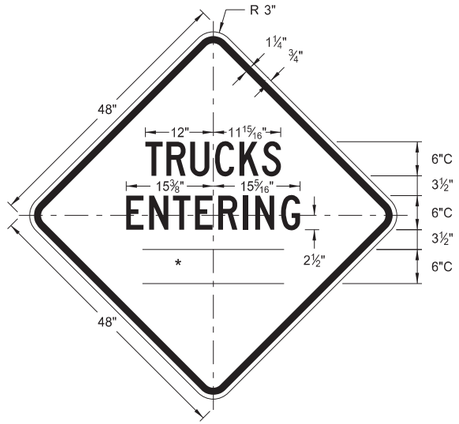
Background: orange



W8-54-48
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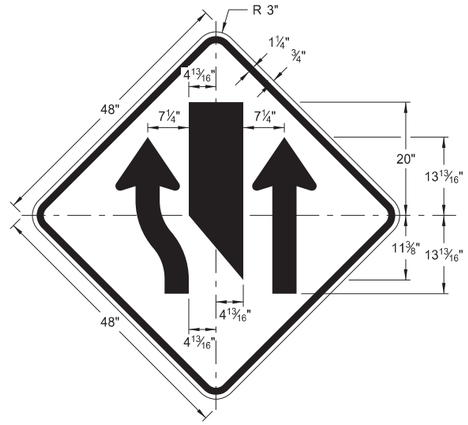
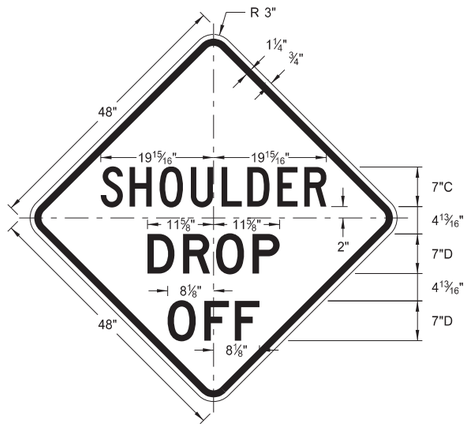


W9-3a-48
Legend: black (non-refl)
Background: orange



W8-9a-48
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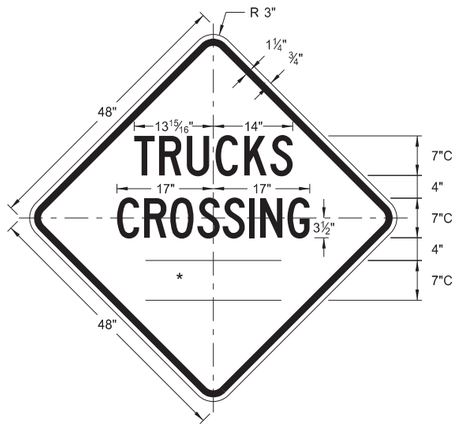
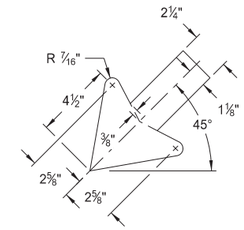
Background: orange



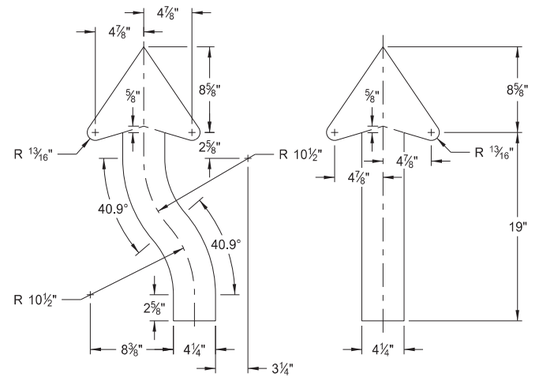
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

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

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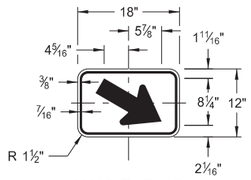
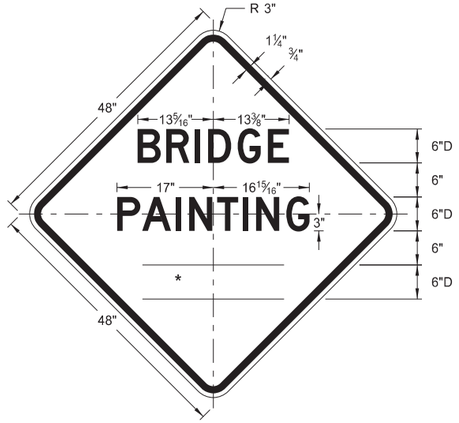
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W16-7aP-18
Legend: black (non-refl)
Background: orange



W21-50-48
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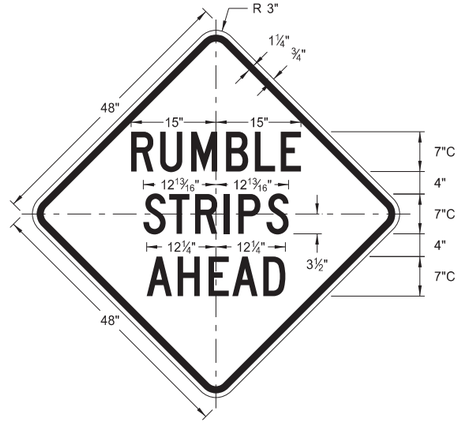
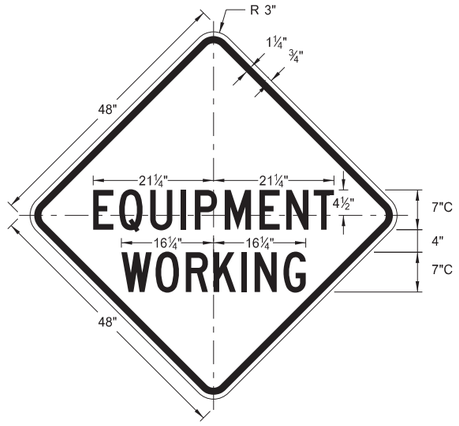
Background: orange



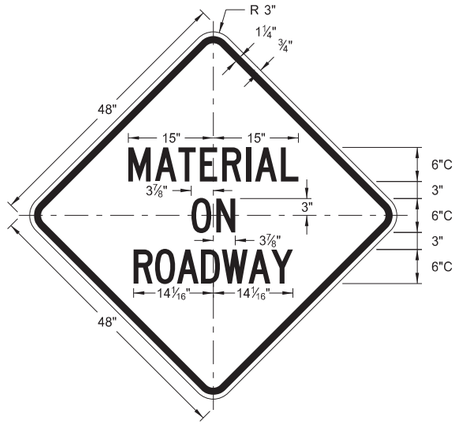
W21-53-48
Legend: black (non-refl)
Background: orange

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

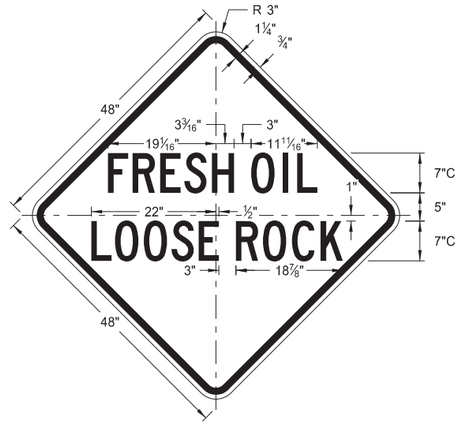
* DISTANCE MESSAGES



W20-51-48
Legend: black (non-refl)
Background: orange



W21-51-48
Legend: black (non-refl)
Background: orange



W22-8-48
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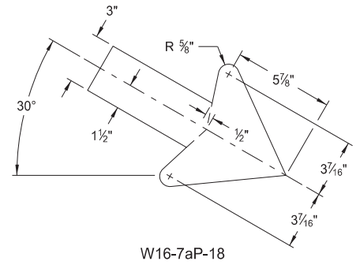
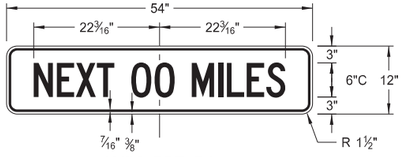
Background: orange



W16-7aP-18



W20-52P-54
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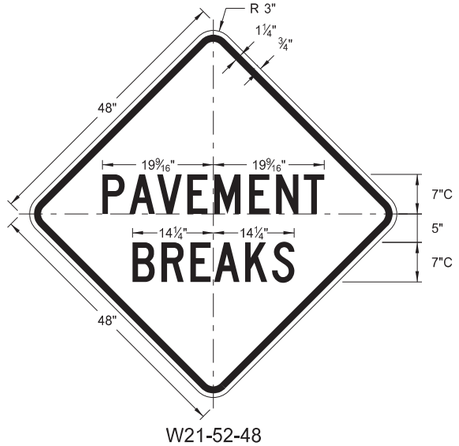

W21-52-48
Legend: black (non-refl)
Background: orange

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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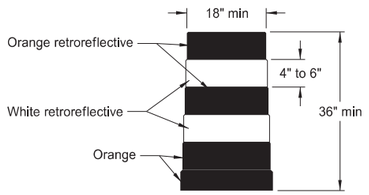
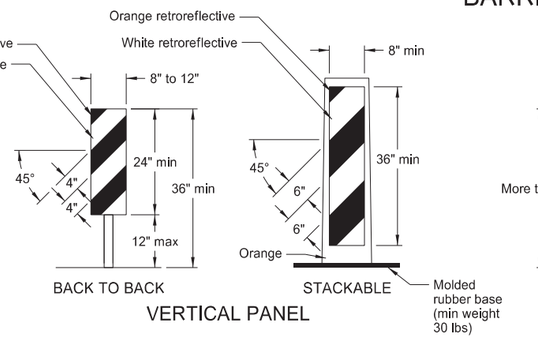
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



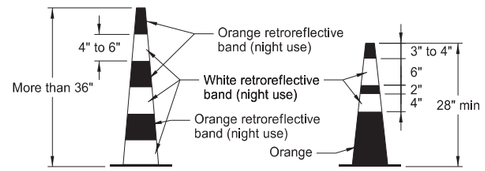
DELINEATOR DRUM

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



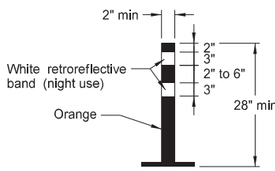
VERTICAL PANEL

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



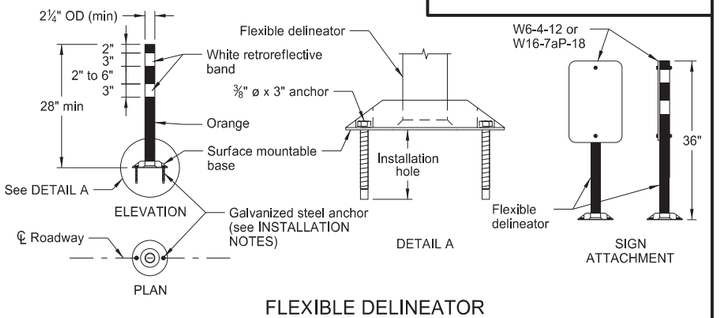
TRAFFIC CONE

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



TUBULAR MARKER

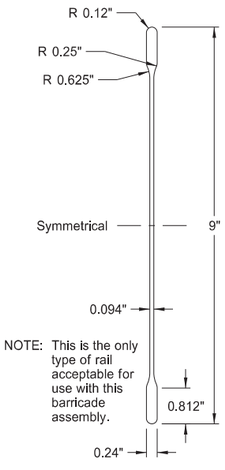
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



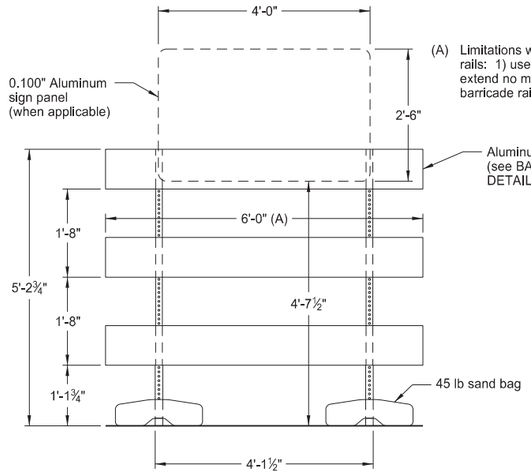
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

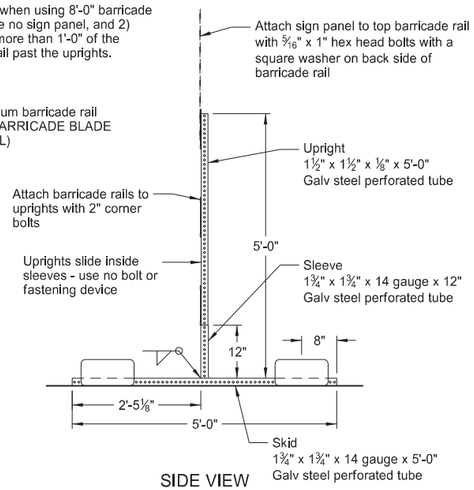


BARRICADE BLADE DETAIL



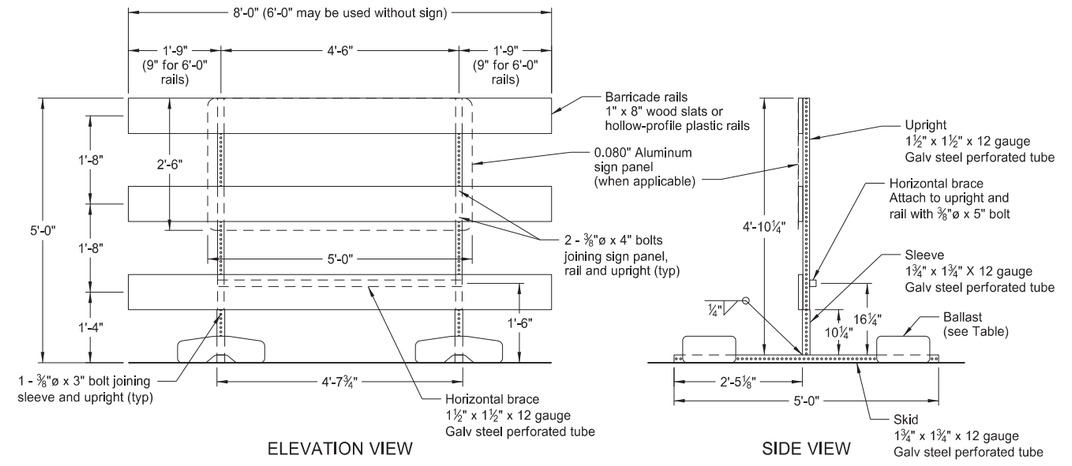
ELEVATION VIEW

(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.



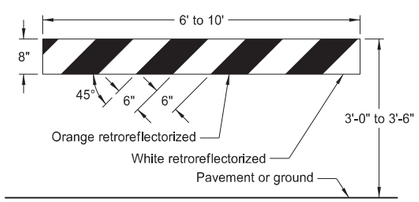
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

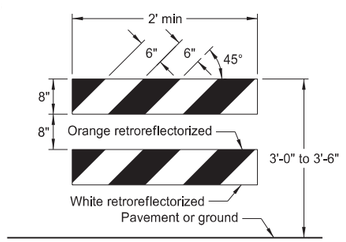


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

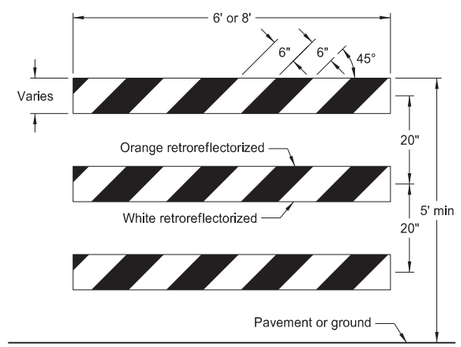
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

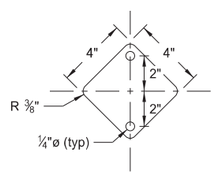


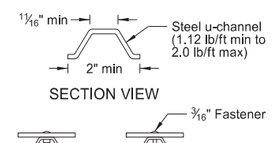
TYPE II BARRICADE

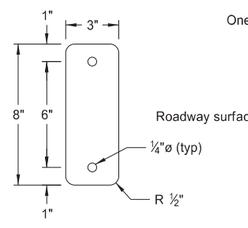


TYPE III BARRICADE

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.

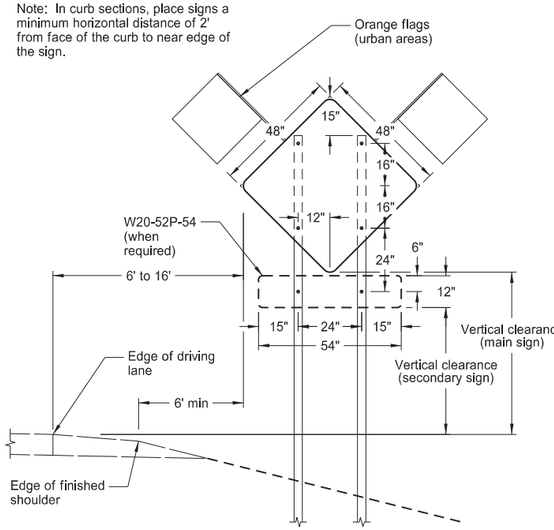
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

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

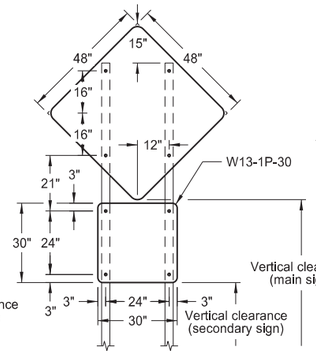
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

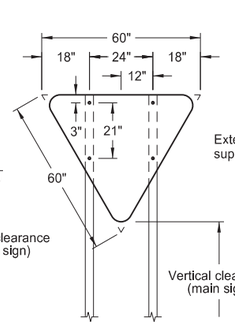
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



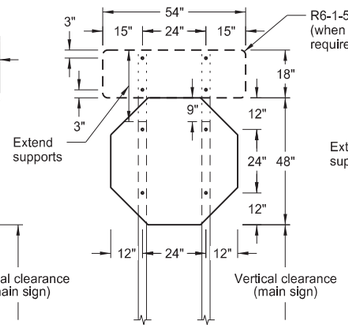
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



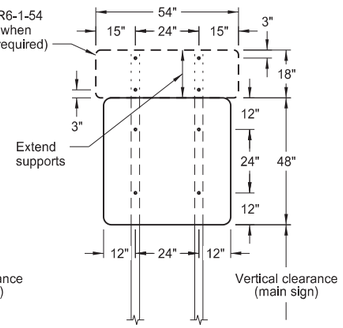
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



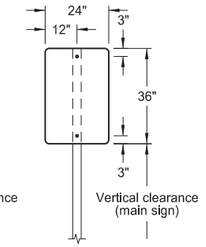
R1-2-60 - YIELD SIGN



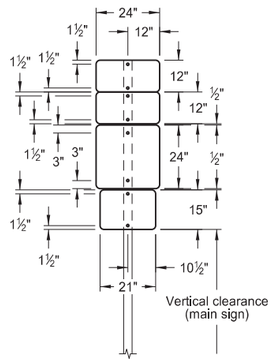
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



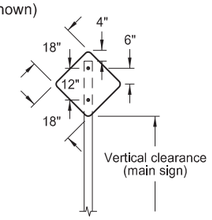
48" x 48" SIGN
(with R6-1-54 sign as required)



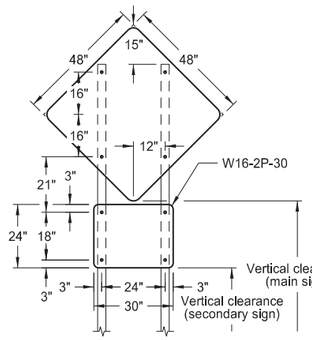
24" x 36" SIGN



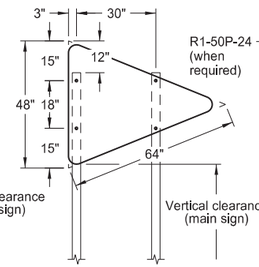
24" x 24"
ROUTE MARKER
ASSEMBLY



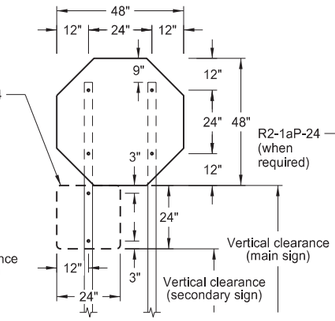
18" x 18"
DIAMOND SIGN



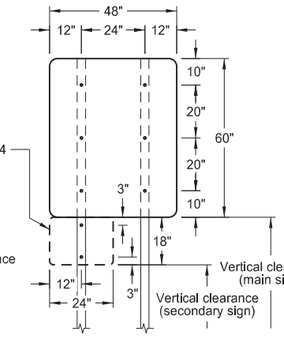
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



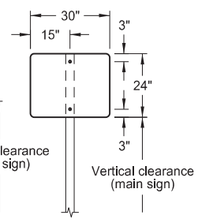
W14-3-64 - PENNANT SIGN



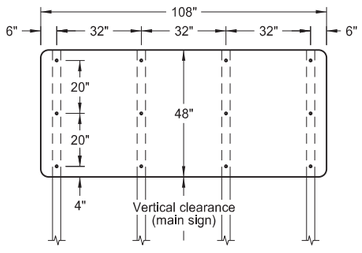
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



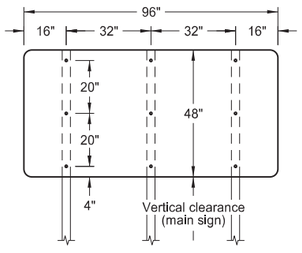
48" x 48" SIGN
(with R2-1aP-24 sign as required)



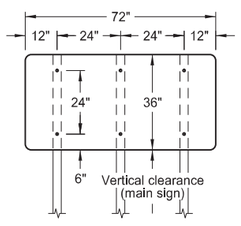
30" x 24" SIGN



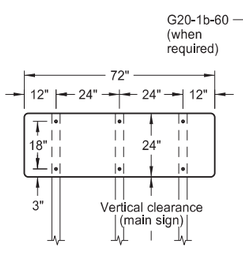
108" x 48" SIGN



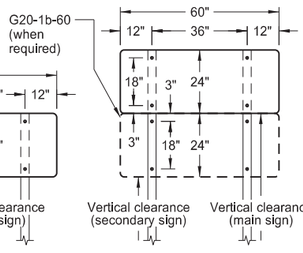
96" x 48" SIGN



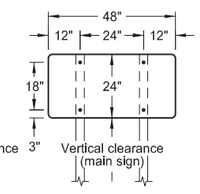
72" x 36" SIGN



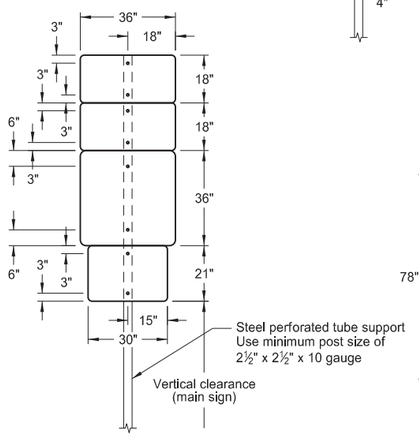
72" x 24" SIGN



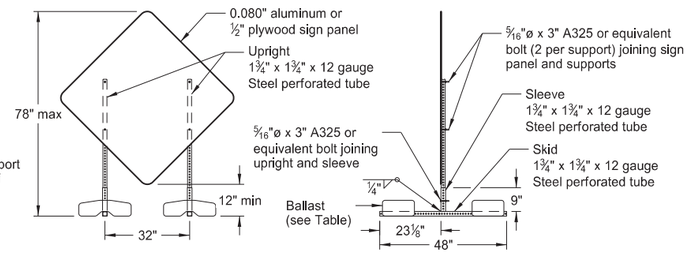
60" x 24" SIGN



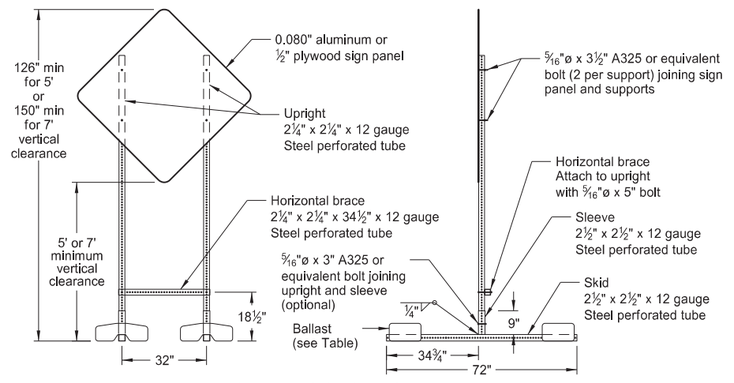
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

   Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅜" bolts.

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

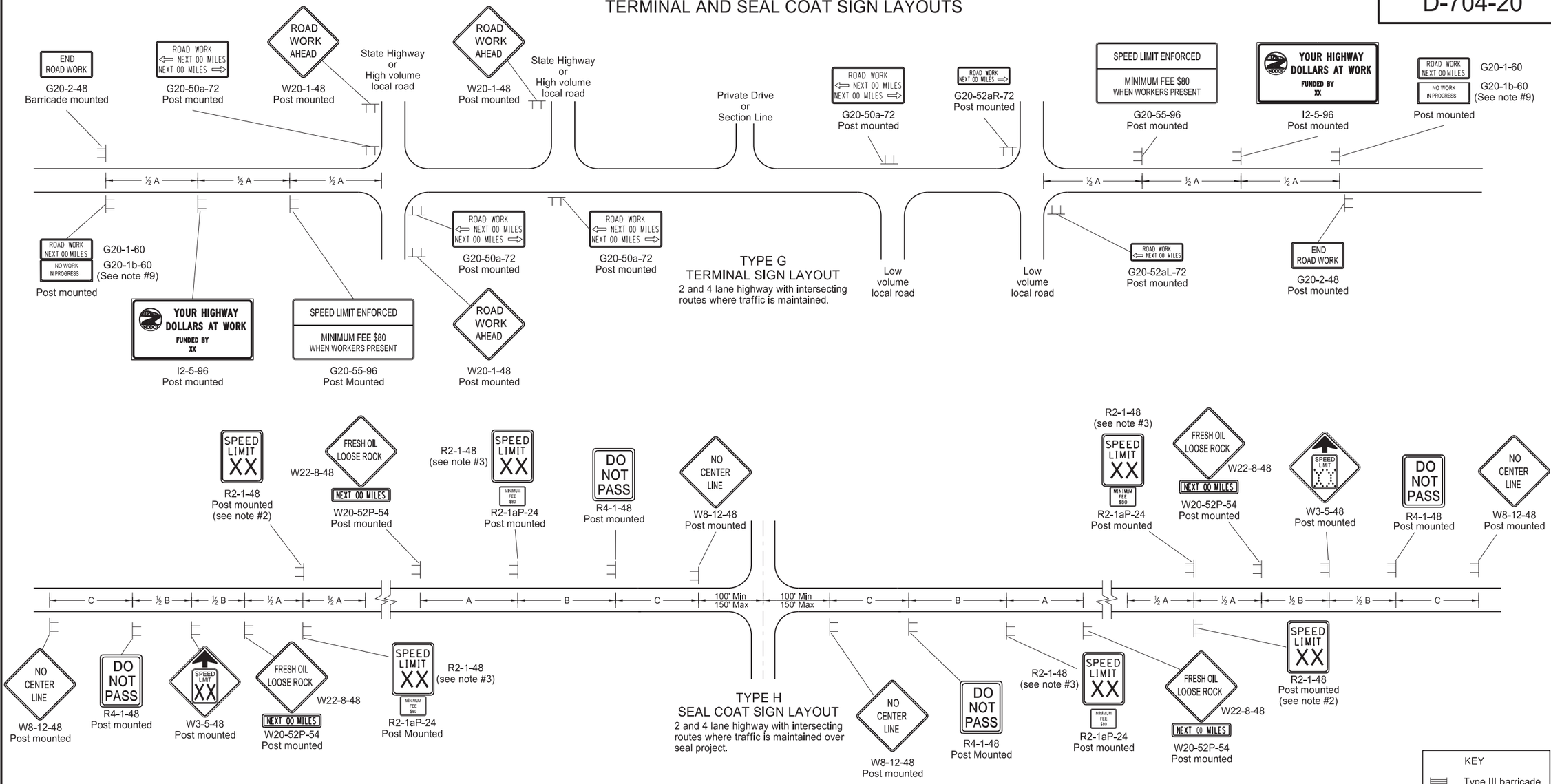
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

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

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Determine the exact speed limit in the field, based on location and conditions.
3. Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
9. Install sign G20-1b-60 when work is suspended for winter.
10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
11. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
13. Sign I2-5-96 is not required if this layout is a part of other traffic control that contains this sign.

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 11-01-19 12-08-21	Updated notes & sign numbers Updated note & sign Switched order of Road Work and Spd Limit Enforced & added Dollars At Work

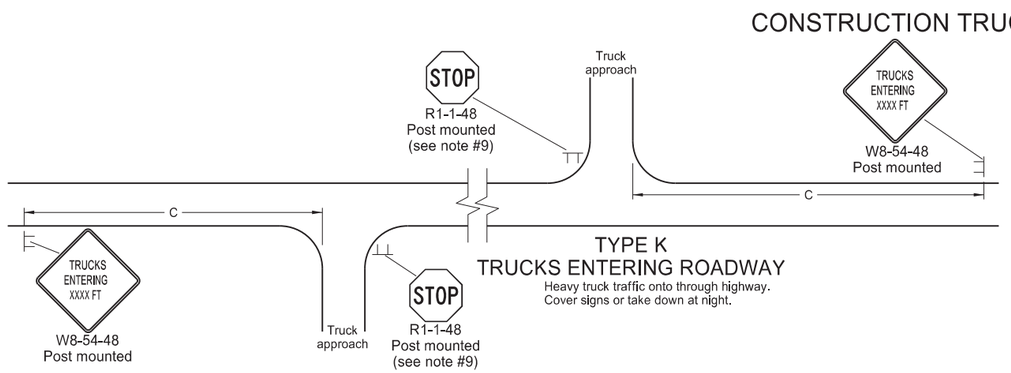
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 12/08/21 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

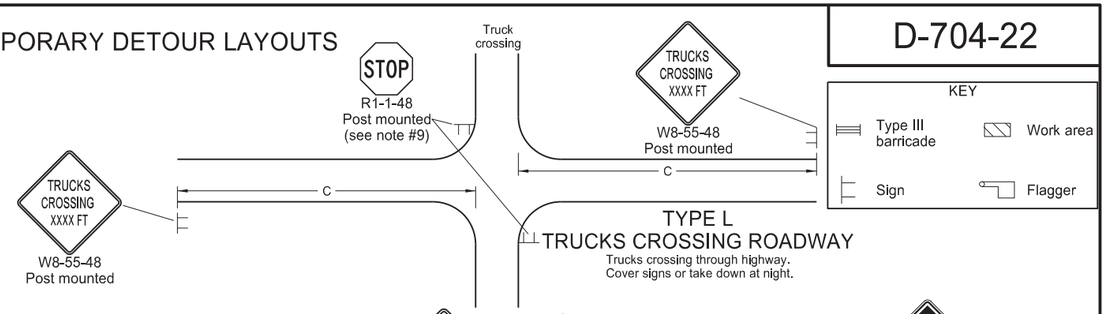
KEY

Type III barricade | Work area | Sign | Flagger



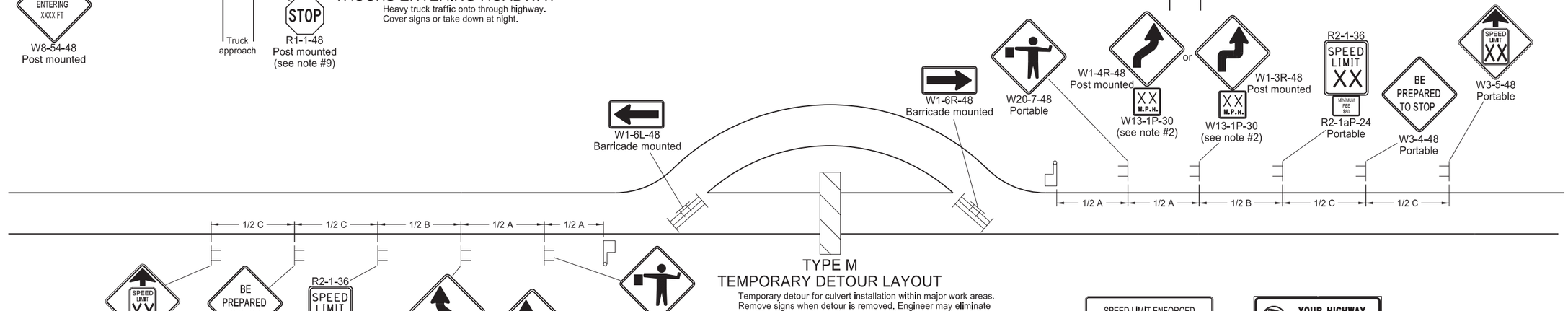
TYPE K
TRUCKS ENTERING ROADWAY

Heavy truck traffic onto through highway.
Cover signs or take down at night.



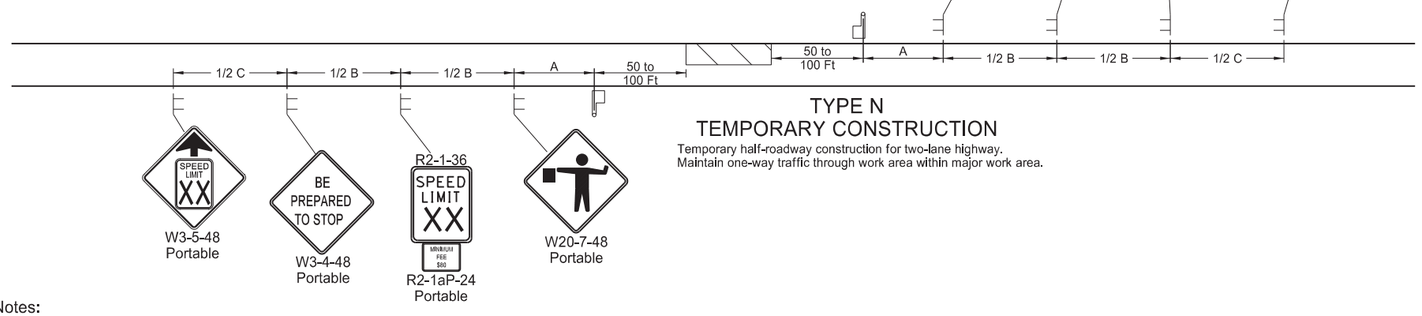
TYPE L
TRUCKS CROSSING ROADWAY

Trucks crossing through highway.
Cover signs or take down at night.



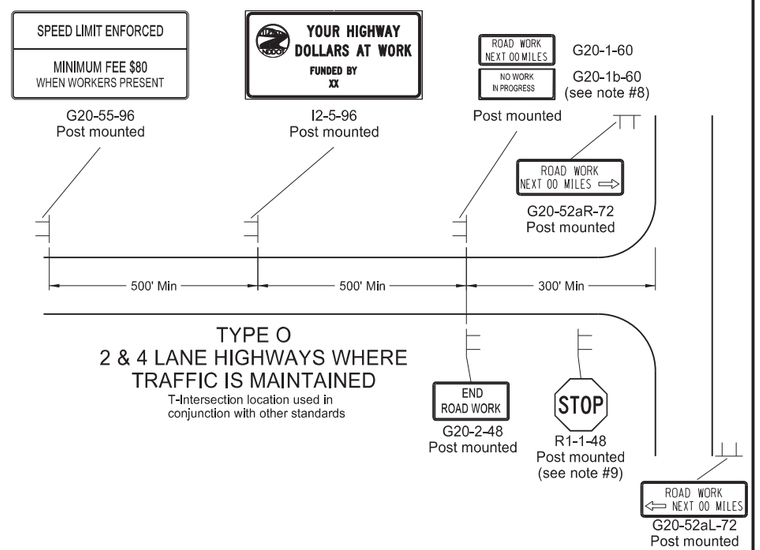
TYPE M
TEMPORARY DETOUR LAYOUT

Temporary detour for culvert installation within major work areas.
Remove signs when detour is removed. Engineer may eliminate need for flagman depending upon location and condition of detour.



TYPE N
TEMPORARY CONSTRUCTION

Temporary half-roadway construction for two-lane highway.
Maintain one-way traffic through work area within major work area.



TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. 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 ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. 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.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
12. Sign I2-5-96 is not required if layout is part of other traffic control that contains this sign.

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 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

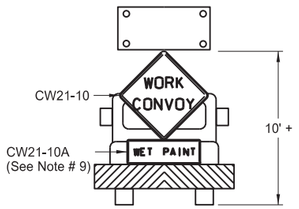
REVISIONS

DATE	CHANGE
08-17-17 11-01-19 12-09-21	Update notes & sign numbers Revised sign numbers & note 7 Added Speed Limit Enforced and Dollars At Work signs

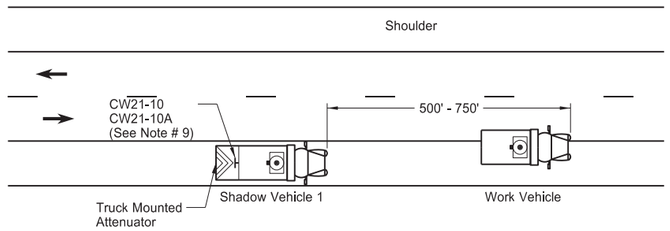
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 12/09/21 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
(PAVEMENT MARKING)

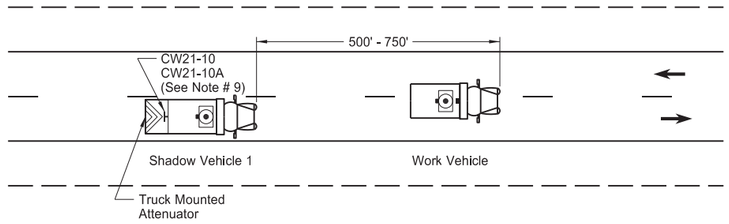
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

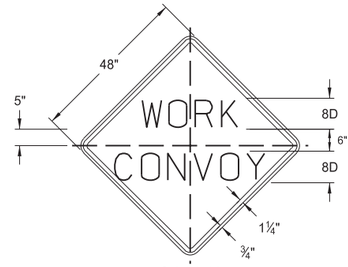


Two-Way Roadway with Paved Shoulders

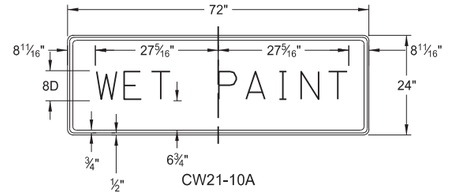


Two-Way Roadway without Paved Shoulders

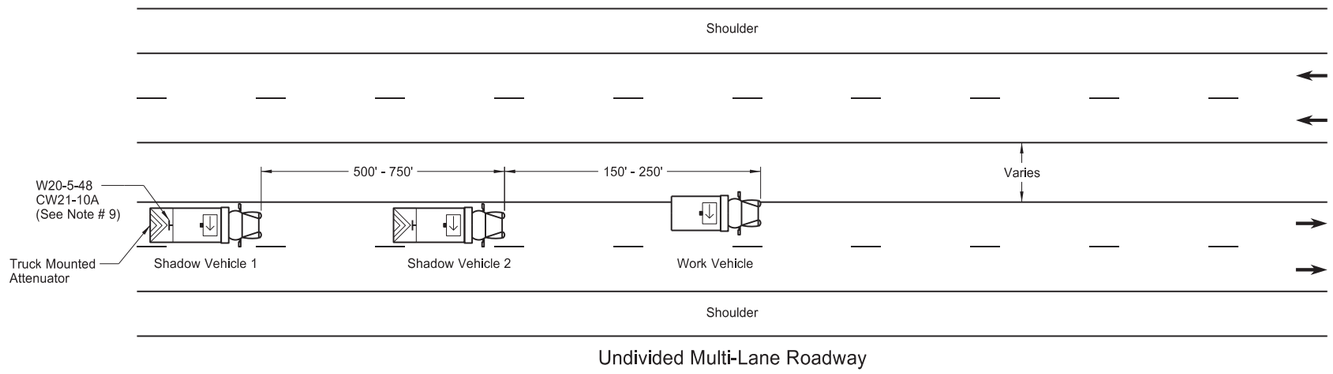
Sign Details



CW21-10

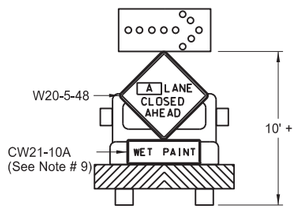


CW21-10A



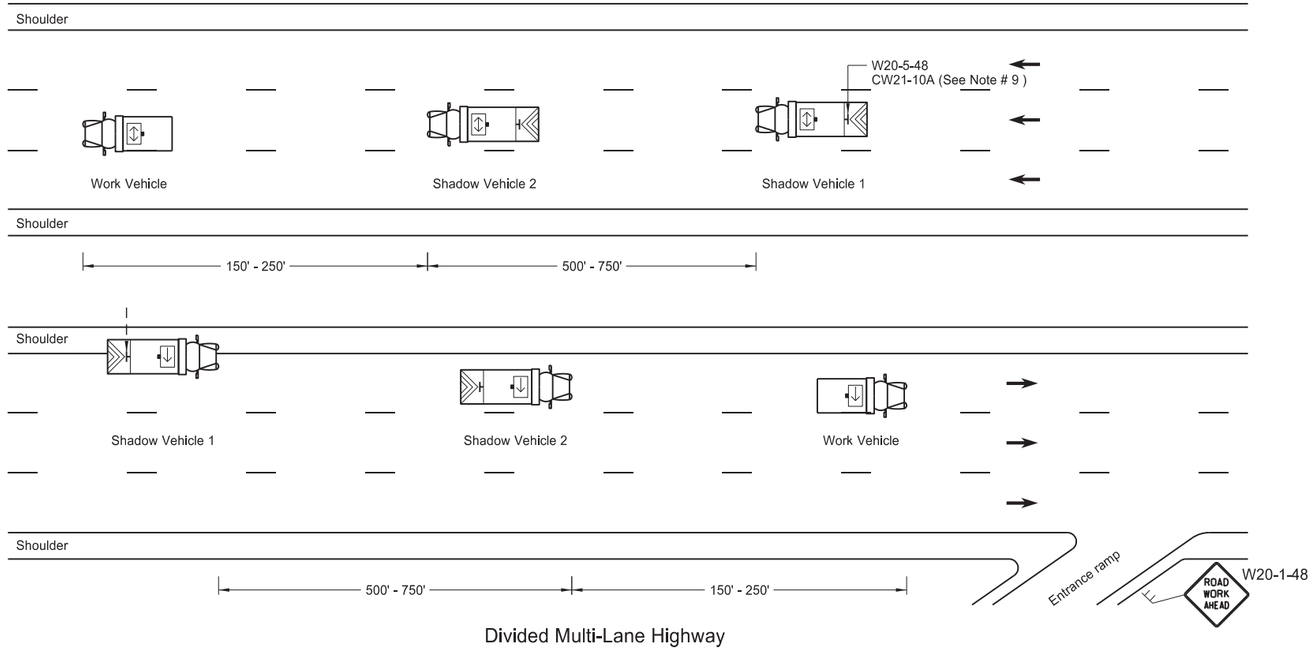
Undivided Multi-Lane Roadway

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 stobe 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.



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

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

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

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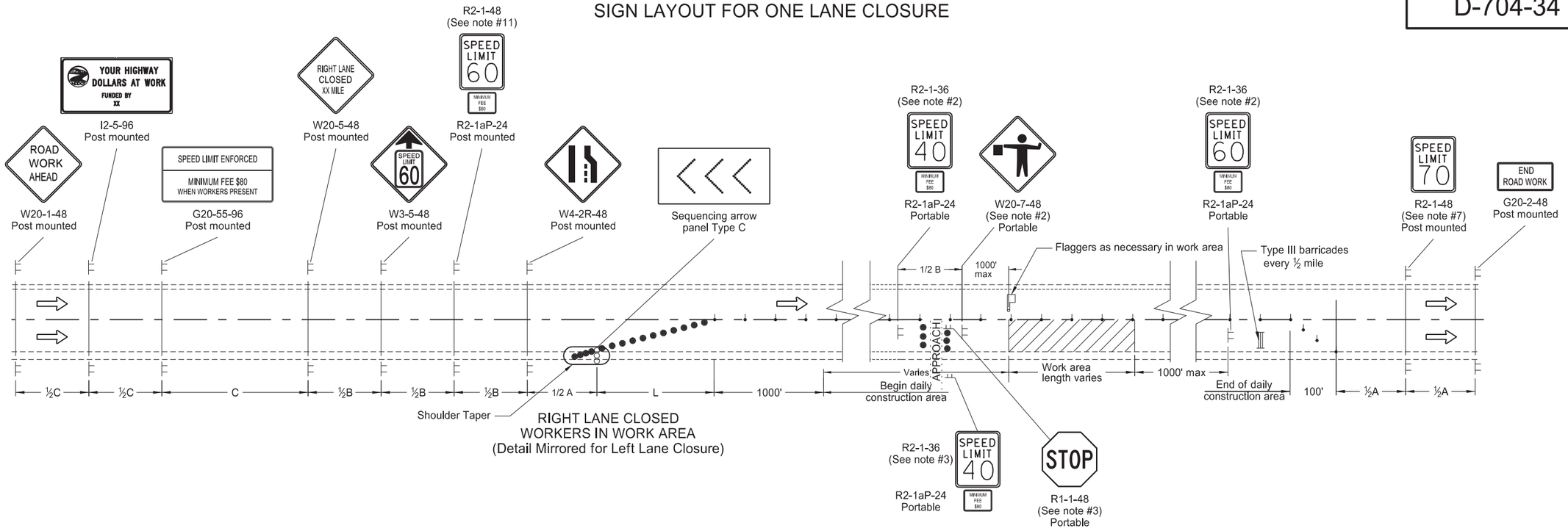
SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at ½A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee $80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
13. Sign I2-5-96 is not required if this layout is part of other traffic control that contains this sign.

KEY

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

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-26-2012

REVISIONS

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

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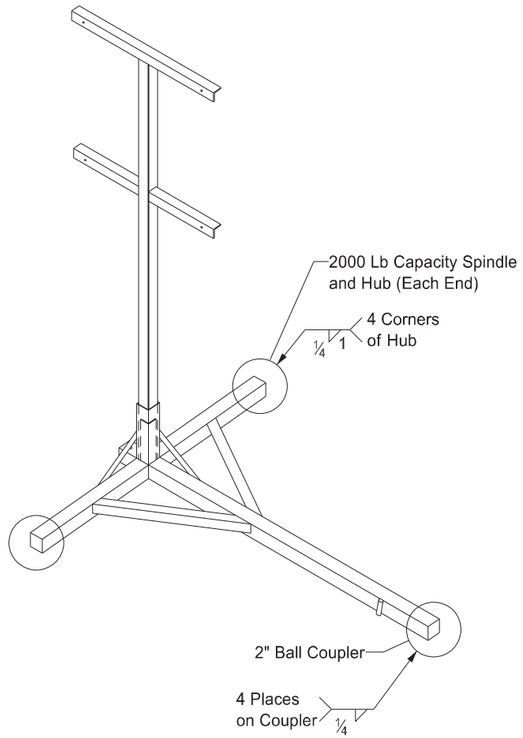
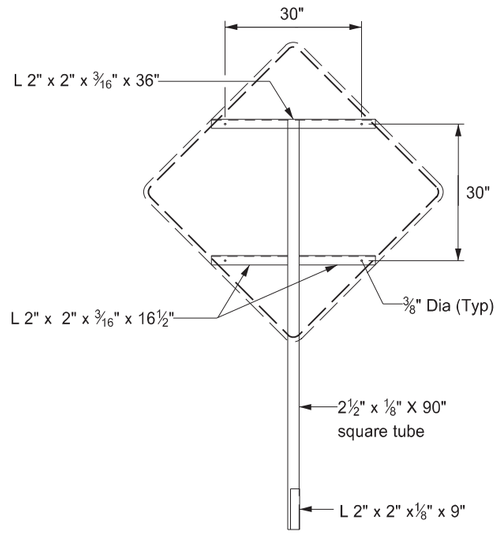
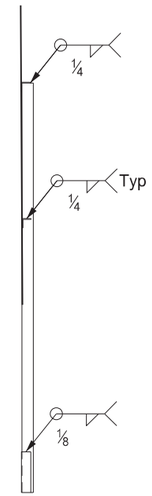
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

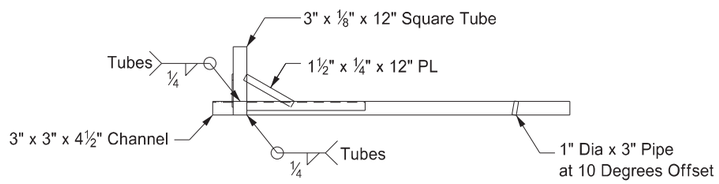


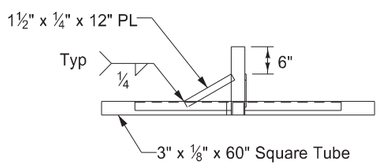
RIGHT

SIGN SUPPORT

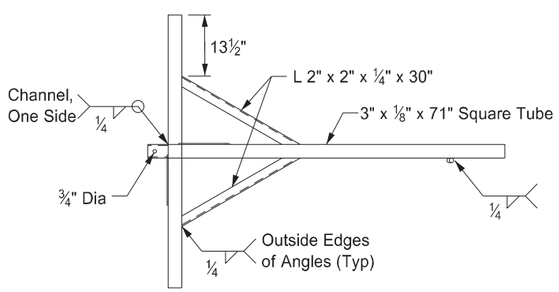
Notes:

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





RIGHT



TOP

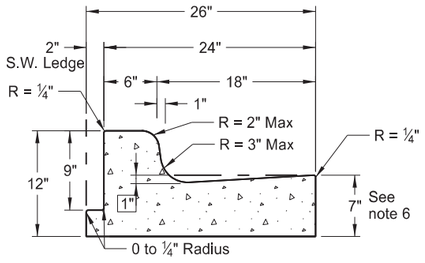
TRAILER

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

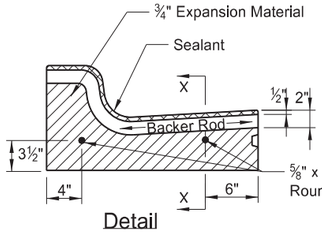
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

Curb & Gutter and Valley Gutter

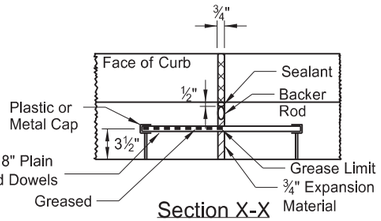
D-748-1



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

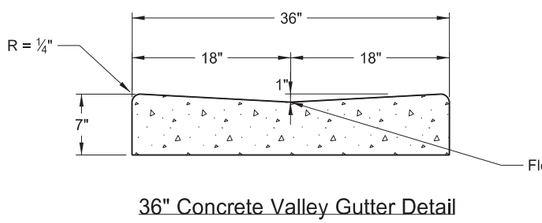


Detail

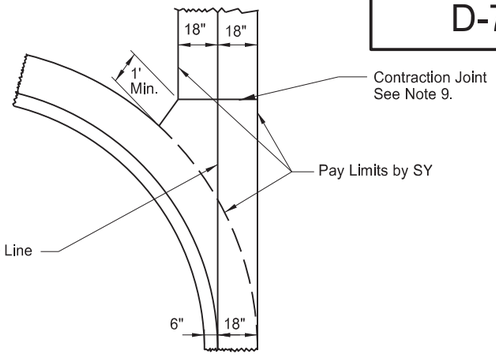


Section X-X

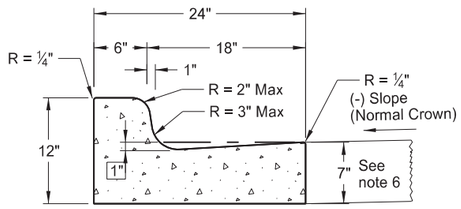
Isolation Joint



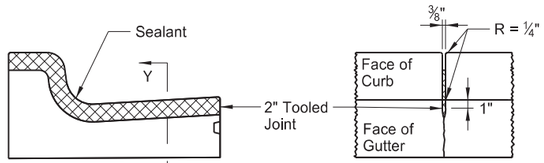
36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan



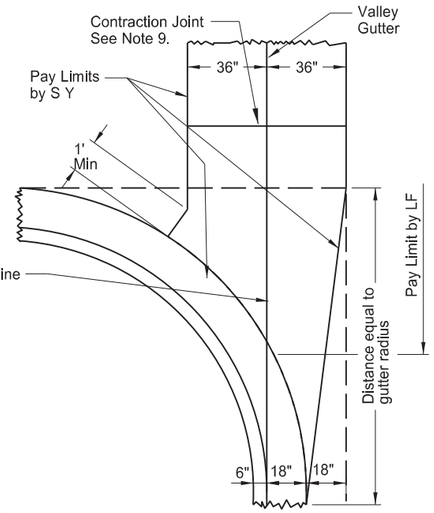
Curb & Gutter Type 1 (Sec. A)



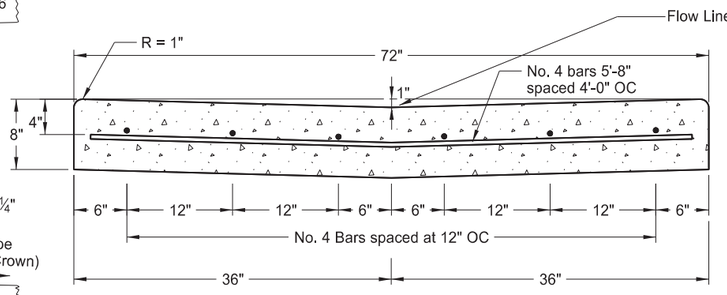
Detail
(10' Max Spacing)

Section Y-Y

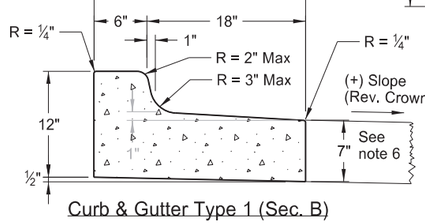
Contraction Joint



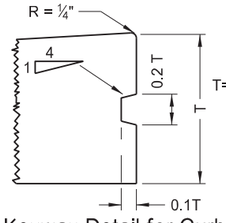
72" Concrete Valley Gutter Plan



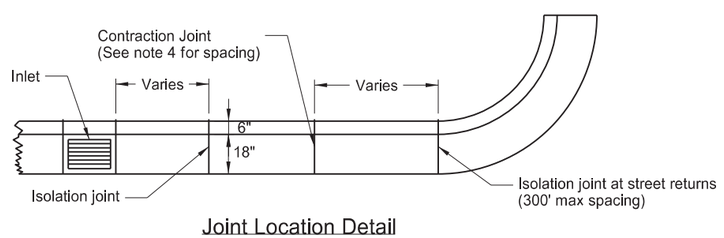
72" Concrete Valley Gutter Detail



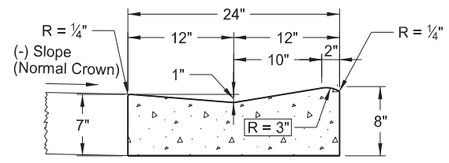
Curb & Gutter Type 1 (Sec. B)



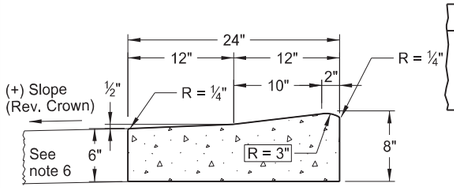
Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)



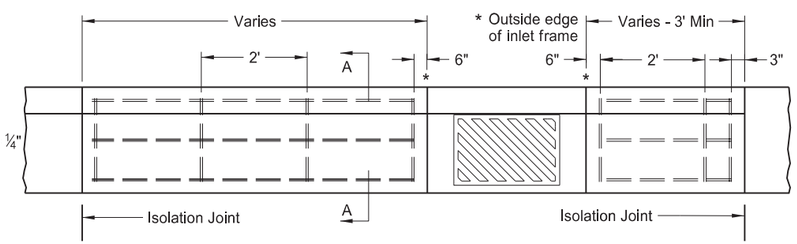
Joint Location Detail



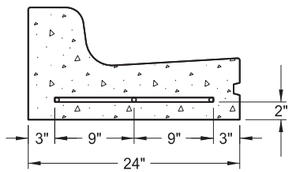
Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)



Curb & Gutter Reinforcing at Inlets



Section A-A

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 ¾" 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 ⅛" min. to ⅜" 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.

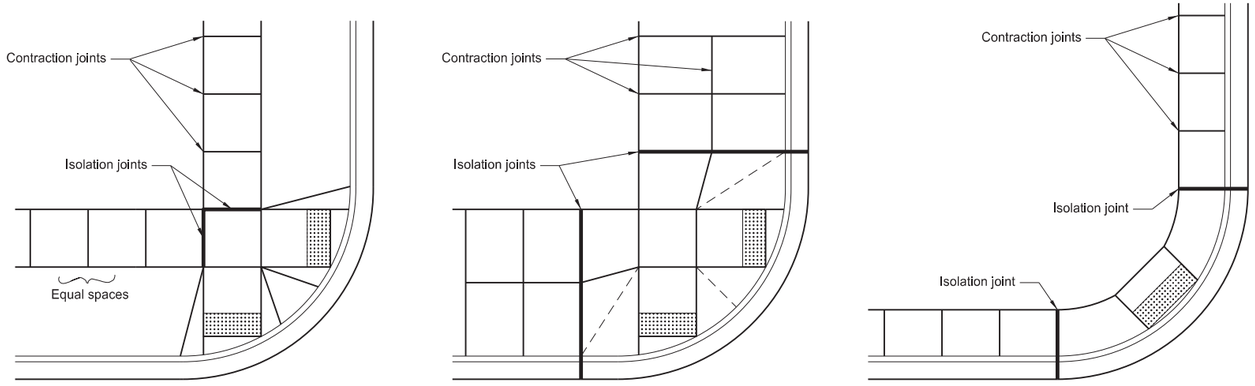
NOTE: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlet locations (even inlets located on radii) in the price bid for "Curb and Gutter - Type 1." Extend reinforcement to the second joint (rebar placed through the first joint) in cases where the 3' min.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

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.

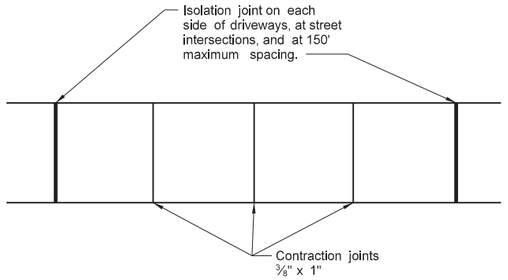
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8-27-19 and the original document is stored at the North Dakota Department of Transportation

SIDEWALK

D-750-2



Typical Joint Layouts



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.

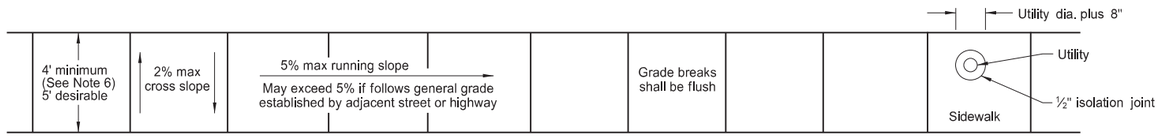
   Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

   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."

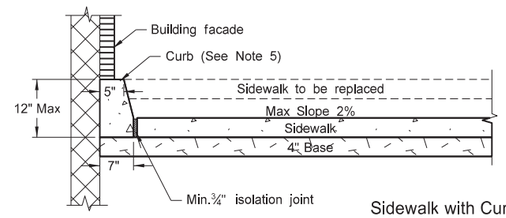
   Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear 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'.

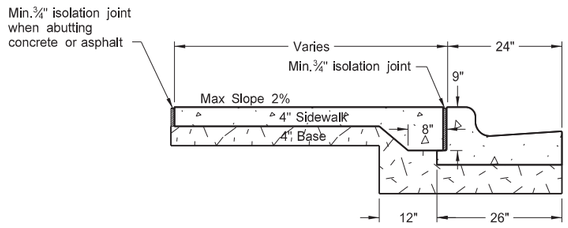


Sidewalk Width and Grade

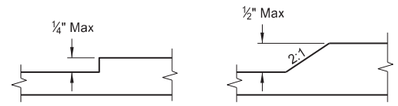
Utility Blockout



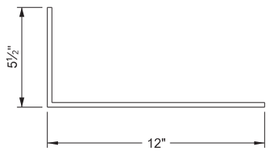
Sidewalk with Curb Detail
(Building face application)



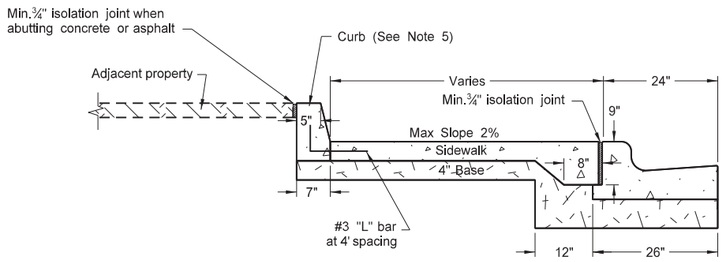
Sidewalk Detail
(Installed adjacent to curb and gutter)



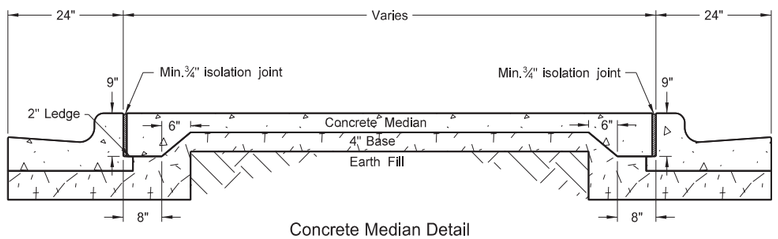
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



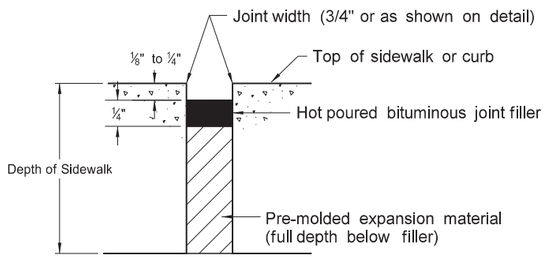
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



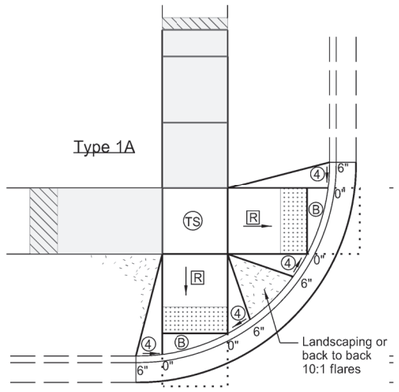
Typical Isolation Joint Seal
(longitudinal and transverse)

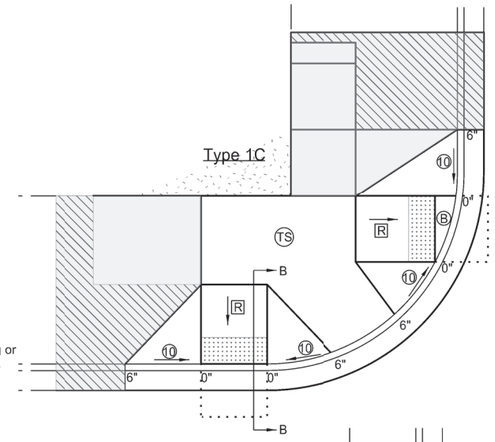
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width and grade and passing lane requirements.
08-27-19	New Design Engineer PE Stamp.

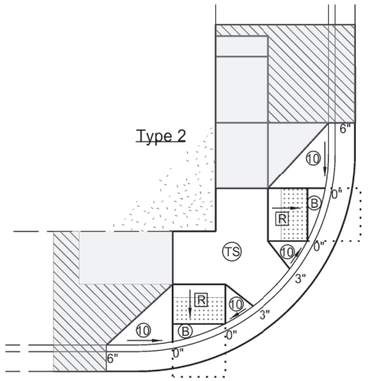
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

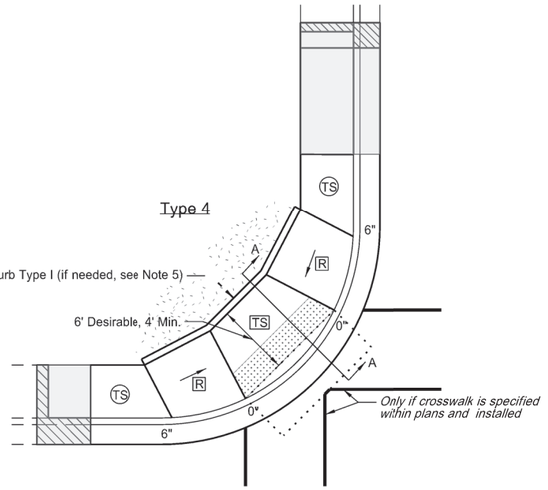
CURB RAMP RETROFIT DETAILS

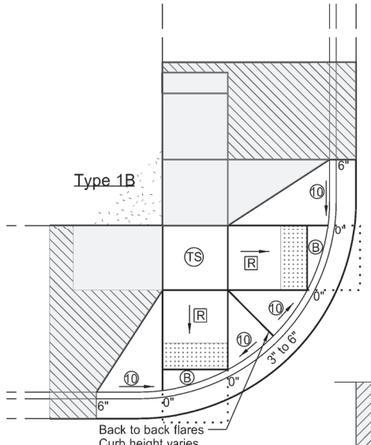
D-750-3

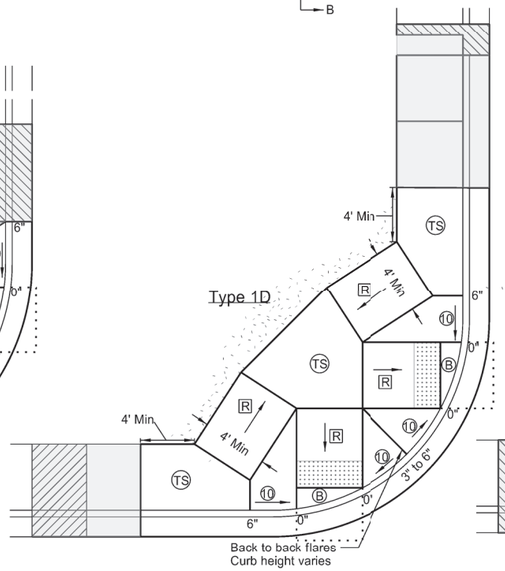


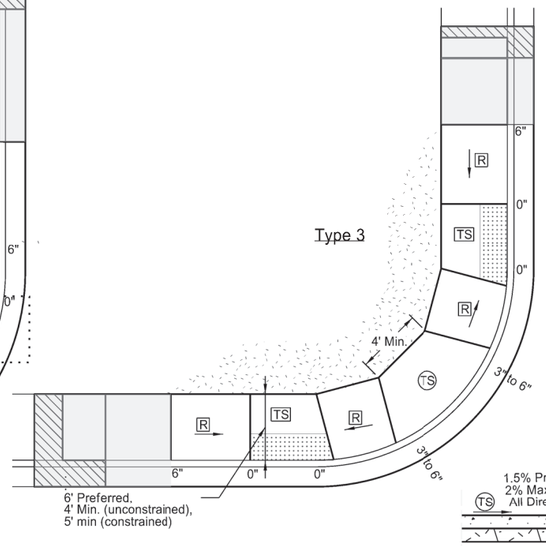


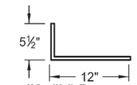


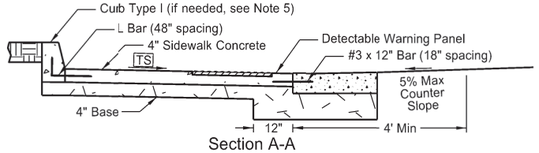




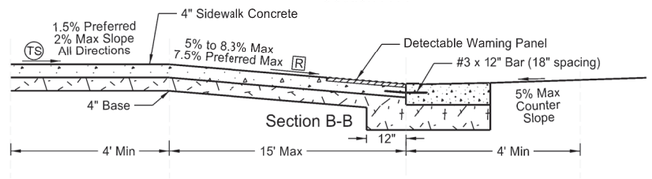




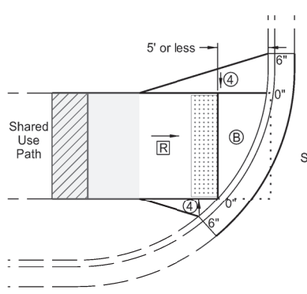


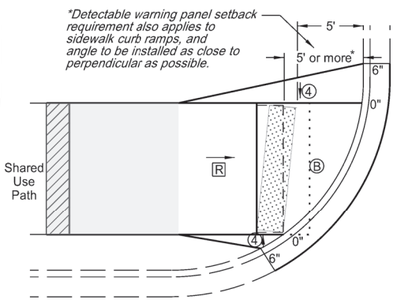


Section A-A

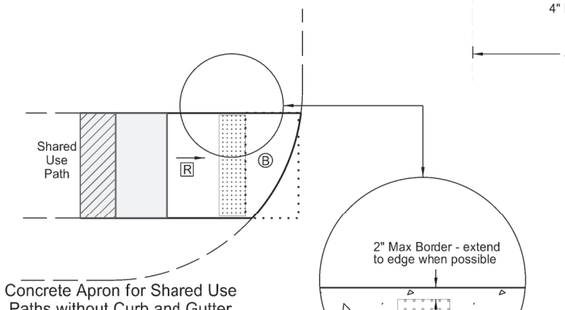


Section B-B

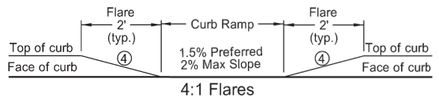




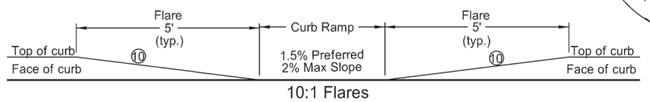
Concrete Apron for Shared Use
Paths with Curb and Gutter



Concrete Apron for Shared Use
Paths without Curb and Gutter

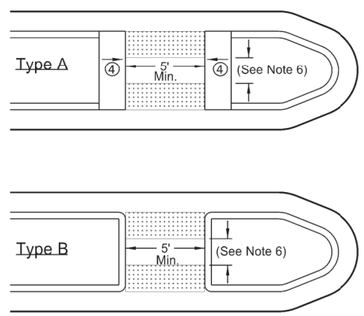


4:1 Flares
(To be used when flare is adjacent to landscaping)



10:1 Flares
(To be used when flare is adjacent to sidewalk)

Median Refuge Islands (Cut-Through)



NOTES:

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

LEGEND:

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

0", 3", or 6" : Curb Height.

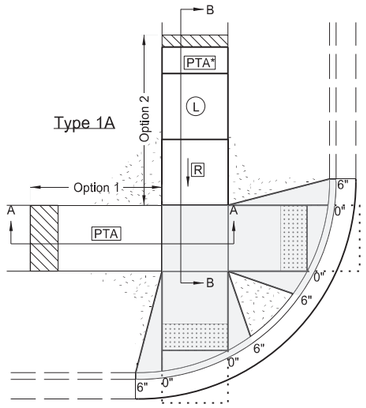
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition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

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

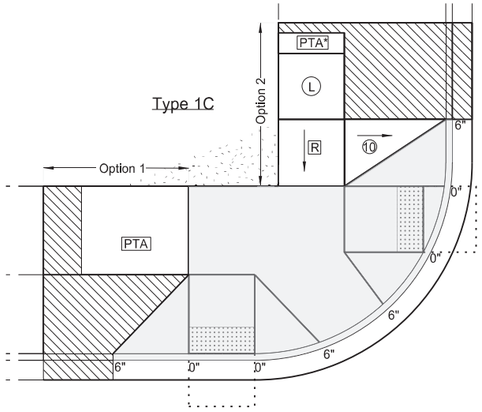
CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4

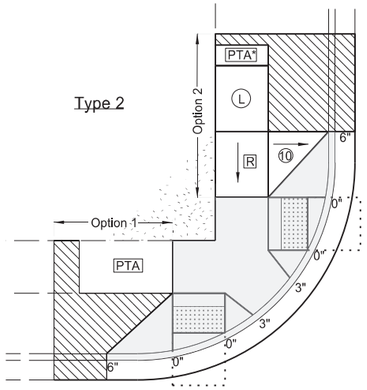
Type 1A



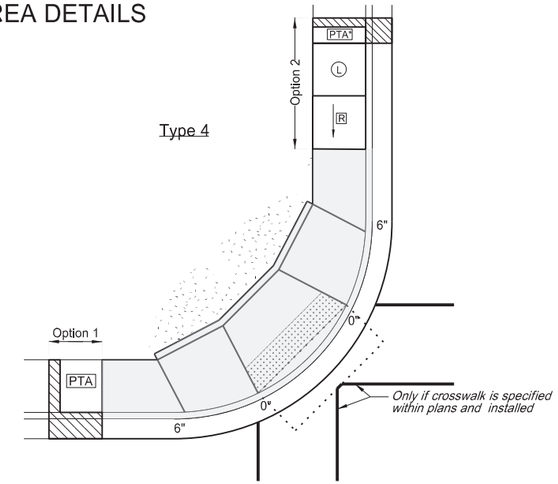
Type 1C



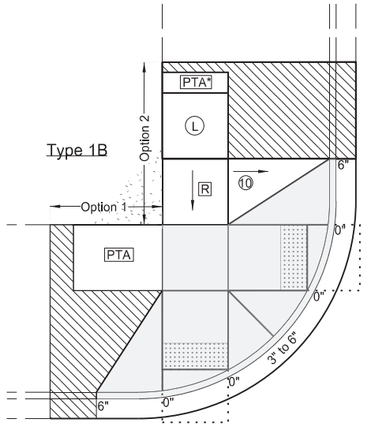
Type 2



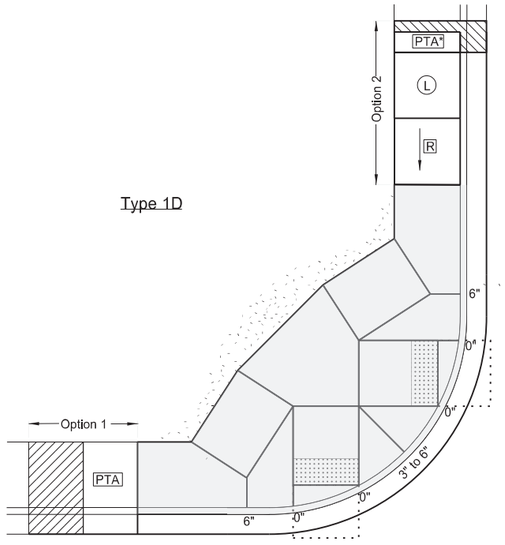
Type 4



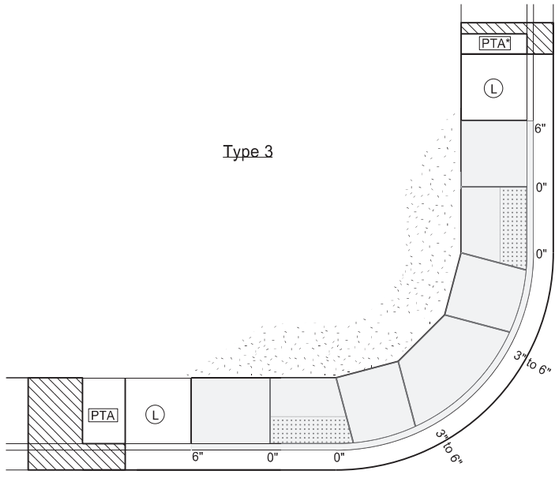
Type 1B

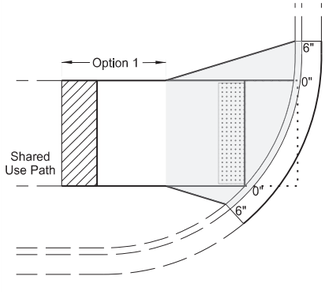


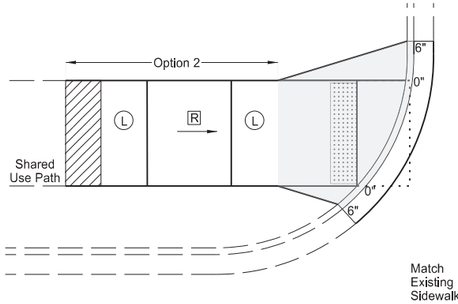
Type 1D



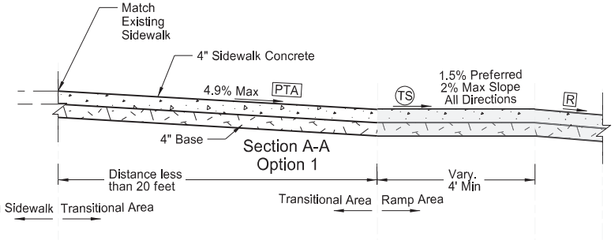
Type 3

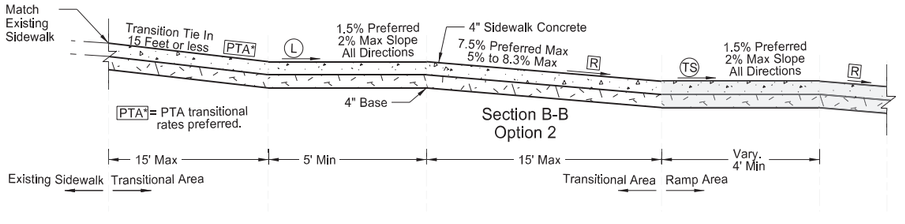






Transition Areas for
Shared Use Paths





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 from Ramp Area to EPF.
- (L) (TS) : Turning Space/Landing
  Use at top of ramp or when changing directions.
  1.5% preferred slope (2% maximum) all directions.
- R :Preferred Ramp Grade = 5% to 7.5%.
  Maximum Constructed Grade = 8.3%.
  Preferred Cross Slope = 1.5%.
  Maximum Constructed Cross Slope = 2%
  Maximum Length = 15 feet
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.

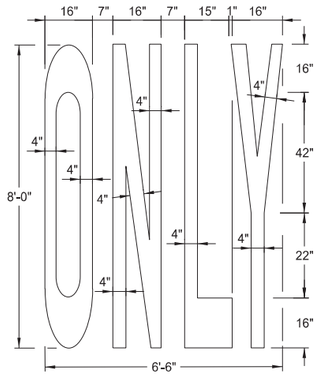
0", 3", or 6" : Curb Height.

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

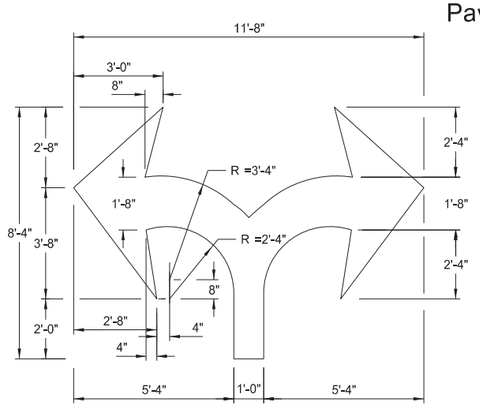
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
05 19 2021

Pavement Marking Message Details

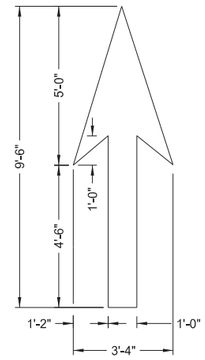
D-762-1



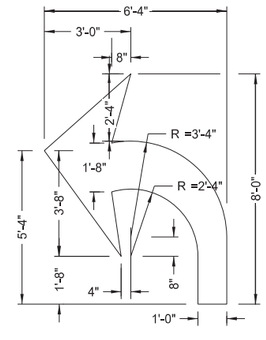
22 S. F.



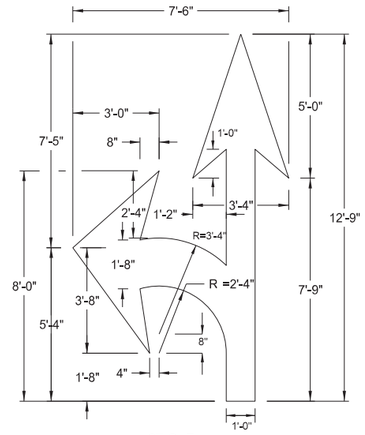
29 S. F.



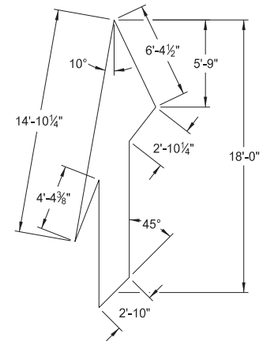
12 S. F.



16 S. F.

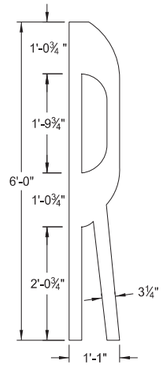


27 S. F.

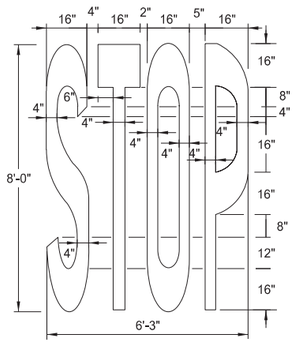


41 S. F.

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



4 S. F.



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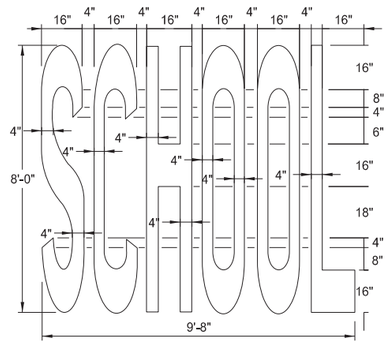
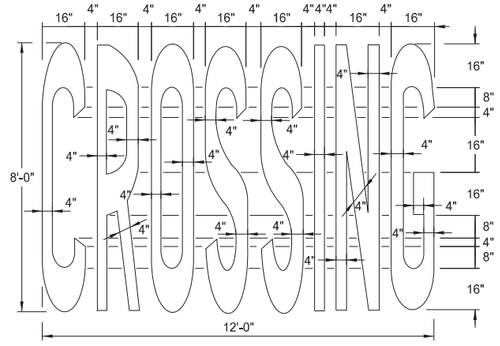


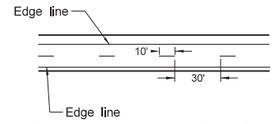
34.5 S. F.



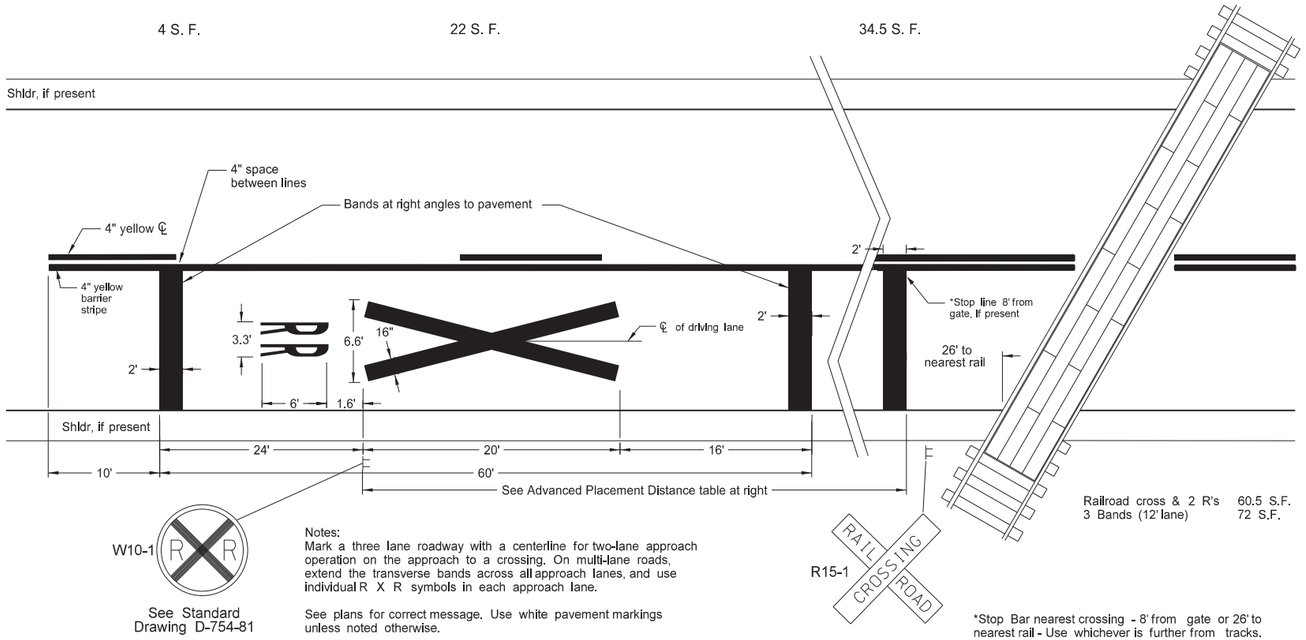
46 S. F.

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

Chevron Crosshatching Table



Centerline Pavement Marking Skip Spacing Detail

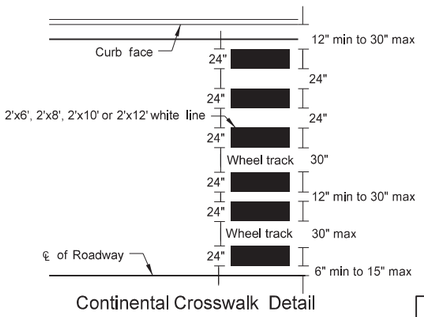


Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

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

Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

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



Continental Crosswalk Detail

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

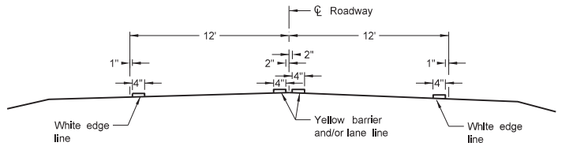
REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.

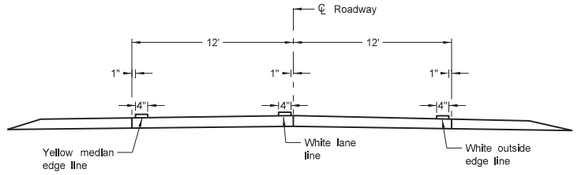
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 1/28/2020 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

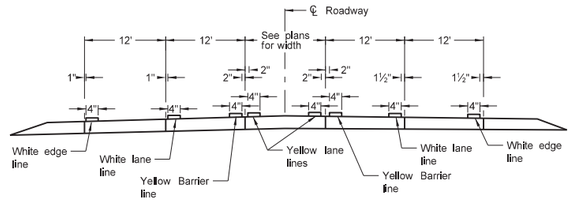
D-762-4



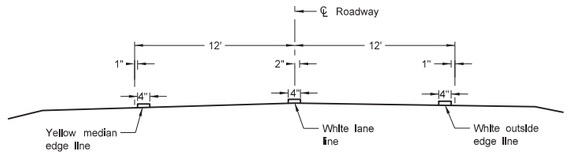
Two Lane Two Way
RURAL ROADWAY



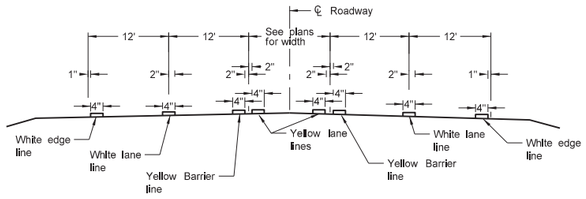
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



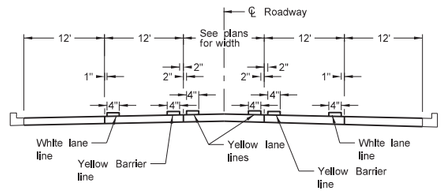
RURAL FIVE LANE ROADWAY
Concrete Section



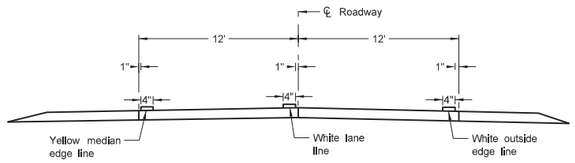
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



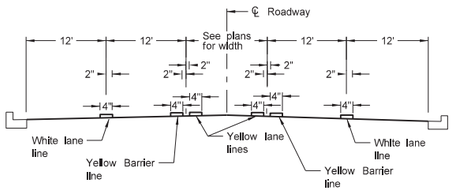
RURAL FIVE LANE ROADWAY
Asphalt Section



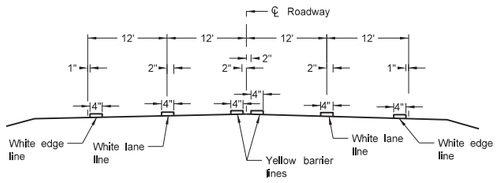
URBAN FIVE LANE SECTION
Concrete Section



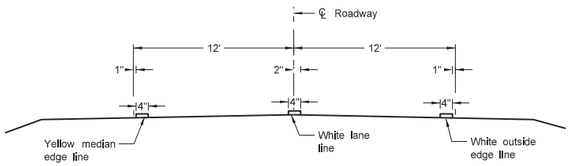
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



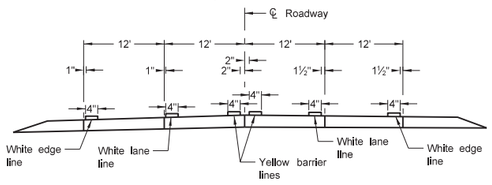
URBAN FIVE LANE SECTION
Asphalt Section



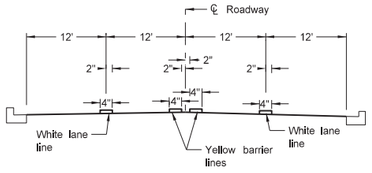
RURAL FOUR LANE ROADWAY
Asphalt Section



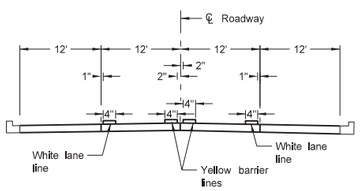
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



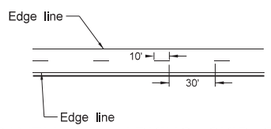
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

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

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