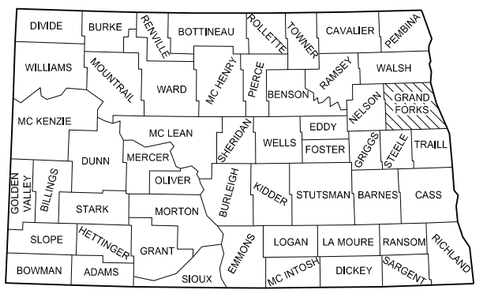
DESIGN DATA: ND 297 (Westbound)				
Traffic	Average Daily			
Current 2024	Pass: 10,435	Trucks: 120	Total: 10,555	
Forecast 2044	Pass: 15,235	Trucks: 180	Total: 15,415	
Clear Zone Distance: 14'		Design Speed: 35 MPH		
Minimum Sight Dist. for Stopping: 250'		Bridges: 0297-002.696		
Limited Access Control				
Pavement Design Life: NA (years)				
Design Accumulated One-way Rigid ESALs: NA				

DESIGN DATA: ND 297 (Eastbound)				
Traffic	Average Daily			
Current 2024	Pass: 10,310	Trucks: 120	Total: 10,430	
Forecast 2044	Pass: 15,055	Trucks: 180	Total: 15,235	
Clear Zone Distance: 14'		Design Speed: 35 MPH		
Minimum Sight Dist. for Stopping: 250'		Bridges: 0297-002.696		
Limited Access Control				
Pavement Design Life: NA (years)				
Design Accumulated One-way Rigid ESALs: NA				

DESIGN DATA: 4th Avenue South				
Traffic	Average Daily			
Current 2024	Pass: 8,810	Trucks: 0	Total: 8,810	
Forecast 2044	Pass: 9,216	Trucks: 0	Total: 9,216	
Clear Zone Distance: NA		Design Speed: 25 MPH		
Minimum Sight Dist. for Stopping: NA		Bridges: NA		
Limited Access Control				
Pavement Design Life NA (years)				
Design Accumulated One-way Rigid ESALs: NA				

DESIGNER
Tevin Woinarowicz
DESIGNER
DESIGNER



STATE COUNTY MAP

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	24333	1	1

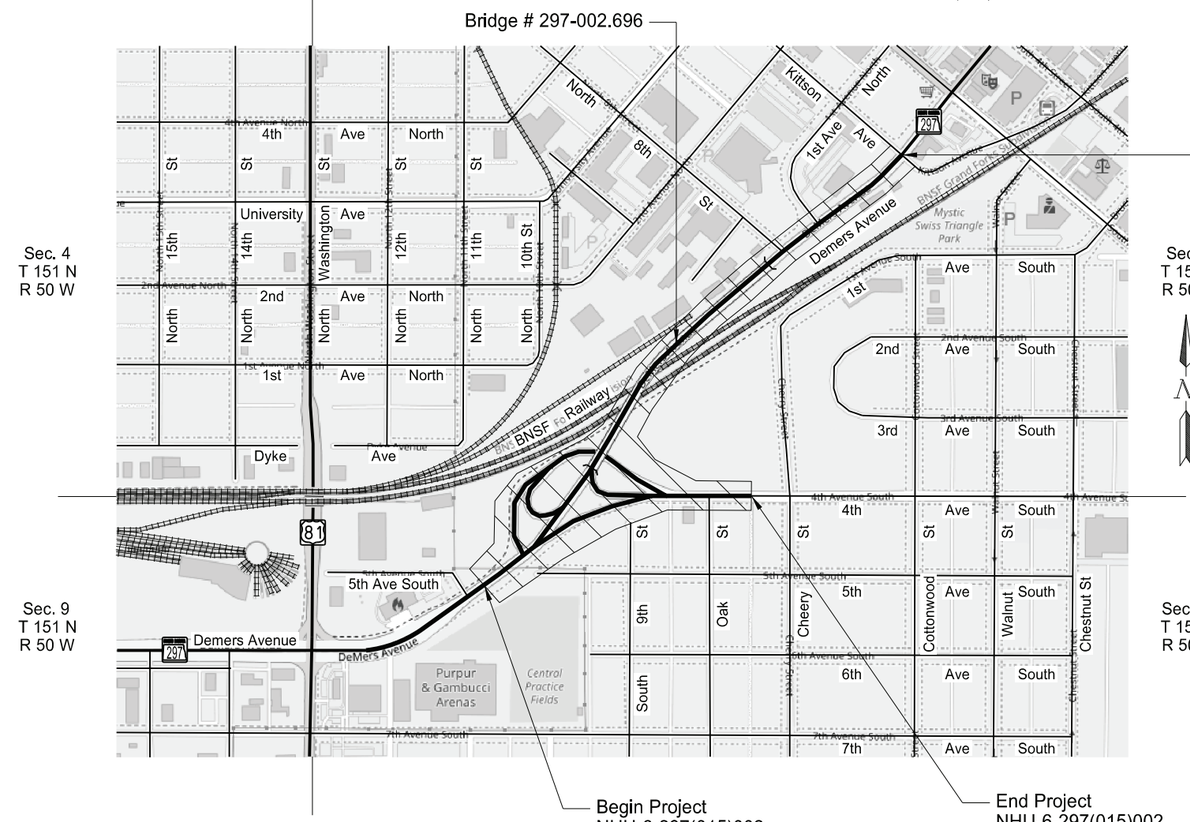
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NHU-6-297(015)002

Grand Forks County
GF ND 297,
Washington St to N 6th St
CPR, GRINDING, ADA IMPROVEMENTS,
MILL/OL 2" MAX, SEAL COAT

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NHU-6-297(015)002 \ ND 297	0.537	0.537
NHU-6-297(015)002 \ 4th Avenue South	0.160	0.160



ND DEPARTMENT OF TRANSPORTATION
GRAND FORKS DISTRICT

08/18/25

GRAND FORKS DISTRICT

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	2	1

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SP 34(25)	Warranty Chip Seal
SP 35(25)	Temporary Pedestrian Facilities
SP 36(25)	Utility Coordination
SSP 4	Longitudinal Joint Density
SSP 5	Limitations of Operations
SSP 10	E-Ticketing

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D-550-2	Longitudinal Joint Details
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D-704-3	Lane Markers (Spotting Tab For Seal Projects Only)
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
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D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-23	Short Term Urban Detour And Lane Closure On A Divided Highway Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Mobile Operation (Pavement Marking)
D-704-34	Sign Layout For One Lane Closure
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D-764-40	MGS W-Beam Guardrail General Details
D-764-49	Typical Grading at Obstructions with MGS W-Beam Guardrail
D-764-50	MASH SoftStop End Terminal - Steel Post
D-764-51	MASH Sequential Kinking Terminal - Wood Post
D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)
D-770-2	Feed Points (Roadway Lighting)
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D-770-4	Lighting And Signal Details
D-770-5	Light Standard Details

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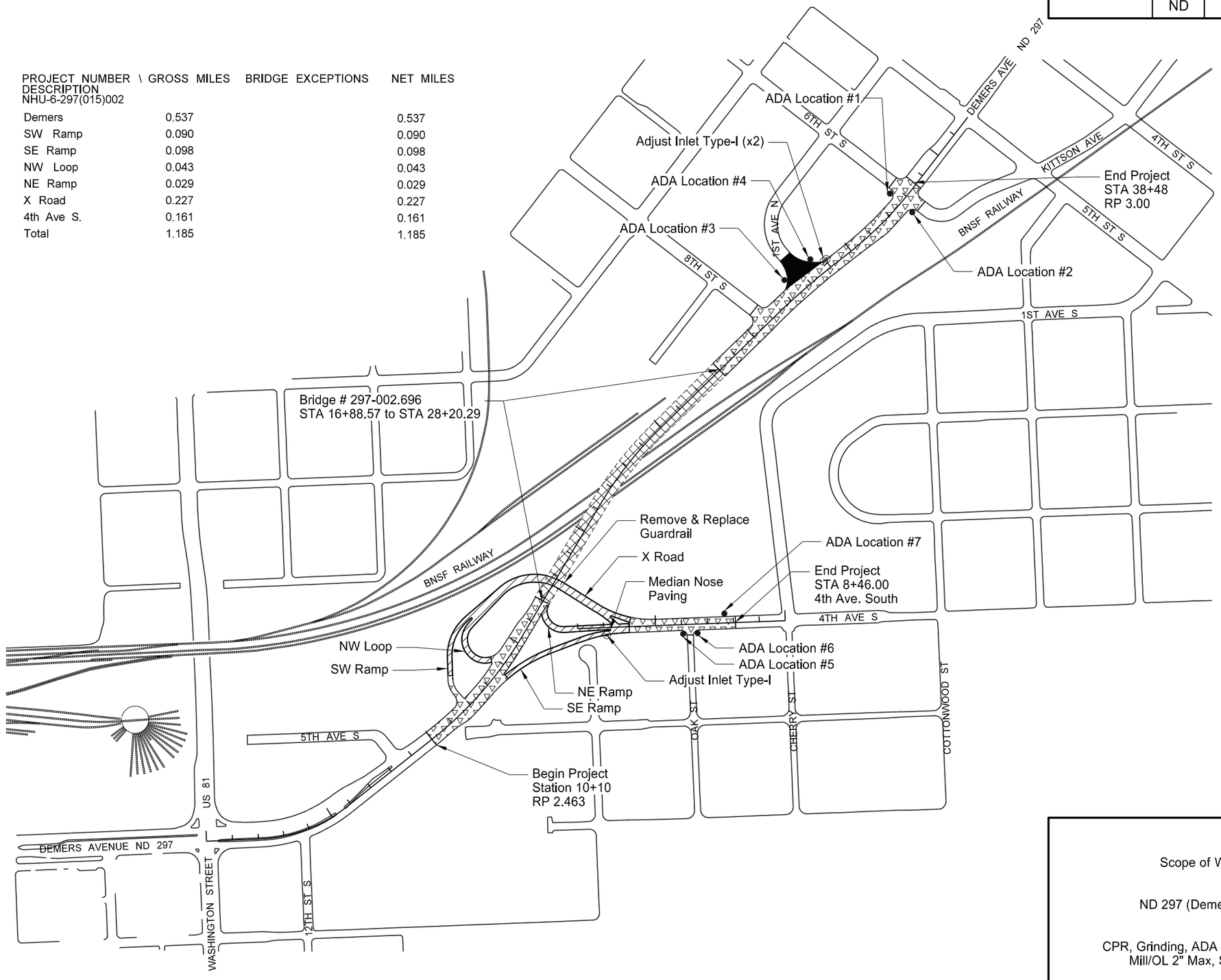
PROJECT NUMBER \ DESCRIPTION	GROSS MILES	BRIDGE EXCEPTIONS	NET MILES
NHU-6-297(015)002			
Demers	0.537		0.537
SW Ramp	0.090		0.090
SE Ramp	0.098		0.098
NW Loop	0.043		0.043
NE Ramp	0.029		0.029
X Road	0.227		0.227
4th Ave S.	0.161		0.161
Total	1.185		1.185



N

2" Milling & HMA Overlay, Seal Coat, Pavement Marking

CPR, PCC Pavement Grinding, Pavement Marking

Pavement Marking

Safety Improvements

ADA Improvement Location

Adjust Inlet Type-I

Scope of Work

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

7/31/2025 1:50:35 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\004SW_Scope\004SW_001_Scope.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	6	1

NOTES

100-P01 PUBLIC NOTIFICATION: Provide written notices to each property and business adjacent to the perimeter of the project limits a minimum of 7 days in advance of work. Notify Cities Area Transit (CAT) before starting work on the Bus Stop sidewalk at ADA Location # 7. Include proposed start/end date of construction, description of construction activities (Concrete Pavement Repair, ADA Ramps, etc.), and general schedule of activities for the project from start to end. Prior to delivering notices submit notice to Project Engineer for approval. Notify the City Public Works Department, Public Safety Answering Point (PSAP), City Fire Department and Altru EMS a minimum of 3 business days in advance of street intersection closures.

100-P02 ORDER OF OPERATION:

1. ADA Curb Ramp Revisions, CPR, 1st Ave N improvements, & PCC Pavement Grinding
2. Milling
3. HMA (RAP Superpave FAA 45)
4. Seal Coat
5. Pavement Marking

100-P03 NOISE RESTRICTIONS: Comply with the City of Grand Forks noise ordinance by scheduling operations between the hours of 6:30 AM and 10:00 PM. Submit written request to the Grand Forks Public Health Department at 151 South 4th Street, Suite N-301, Grand Forks, ND 58201-4735 , Phone Number: (701)787-8100 for each occurrence to work outside these hours. Obtain approval from the Health Department 24 hours prior to beginning work. Follow procedures in Standard Specification 108.05 “” Limitation of Operations” to perform work on holidays. Submit requests 72 hours prior to beginning work, stating the specific nature of the work, additional hours required, and the number of days needed to complete the specified work. Furnish a copy of the approved permit to the Grand Forks Police Department a minimum of 24 hours prior to beginning of work and notify the department of the days and hours planned for work under the permit.

100-P04 EMERGENCY PERSONNEL: Provide the City of Grand Forks and Engineer the name, address, and telephone number of personnel who have access to equipment and are authorized to make emergency repairs to completed work. Provide personnel with authorization to maintain barricades, move excavated materials, and correct other problems during weekends and off- work hours, so access can be maintained for emergency equipment. Authorize personnel to make decisions and commit funds to correct work in an emergency.

100-P05 SIDEWALK CLOSURES: Limit closures of sidewalks to no more than one week for each crosswalk location.

105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection.

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

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

202-P01 REMOVALS (ADA CURB RAMP REVISIONS): Removal and disposal of existing aggregate (if needed) or common excavation is included in the costs of “REMOVAL OF CONCRETE PAVEMENT”.

202-P02 REMOVAL OF CONCRETE PAVEMENT: Removal of concrete pavement consists of removing concrete pavement, bituminous pavement, concrete median, sidewalks, and aggregate base. Existing pavement thicknesses are based on old plan sets.

252-P01 SOD: Rake smooth the final topsoil surface to provide positive drainage with mechanical power raking equipment and hand raking in accessible areas to power raking. Keep sodded areas moist a minimum of 3 inches deep until well rooted. Continue to water sodded areas as directed by the Engineer until accepted. Prevent runoff and puddling. Do not drive watering trucks over turfed areas. Perform maintenance on sodded areas for a minimum six weeks following placement of sod. Maintenance of the sodded areas includes eradicating weeds, maintaining erosion control devices, protecting installed areas from traffic, mowing, and post-fertilization.

401-P01 FOG SEAL APPLICATION: Use CSS-1H for Fog Seal. Broom roadway before Fog Seal application. Dilute the Fog Seal Oil 50% (Water) and 50% (CSS-1H). Dilution at the supplier will be required. Begin this work within 48 hours of the mainline seal completion.

411-P01 MILLED MATERIAL: Process and stockpile all remaining milled material at the NDDOT Grand Forks Maintenance Yard in Grand Forks. Notify the Section Supervisor (701-741-7954) 72 hours prior to delivery of any millings. Before stockpiling, process the milled material so the maximum particle size does not exceed 1-1/2”. Stockpile material with a front-end loader. Do not operate on the milled material while stockpiling. Include all costs for labor and equipment to mill, haul, process, and stockpile the material in the contract price for “MILLING PAVEMENT SURFACE”.

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

420-P02 PROTECTION OF UTILITIES: All manholes, catch basins and valves shall be covered and protected from seal coat operations. Monuments in the limits of the seal coat not shown on the plans shall be protected.

570-P01 CONCRETE PAVEMENT REPAIR: An additional 25% has been added to the quantities for “DOWELED CONTRACTION JOINT ASSEMBLY”, “9IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED”, “SPALL REPAIR-PARTIAL DEPTH”, and “CURB & GUTTER-TYPE I” to be used as directed by the Engineer.

570-P02 Dowel Bars will be 1-1/4" x 18" when the pavement thickness is 10" or less.

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

704-P01 TRAFFIC CONTROL FOR ADA CURB RAMP REVISIONS: Provide traffic control consisting of temporary lane closures.

The traffic control device list is based on two lane closures and the following list:
1. Standard D-704-20, Type G;
2. Standard D-704-34 – Includes delineator drums for approaches;

The Department will pay for delineator drums used for approach access within the work zone at the contract unit price.

704-P02 TRAFFIC CONTROL FOR CPR, MILLING, HMA OVERLAY: Provide traffic control consisting of a temporary lane closure and flagging. For estimating purposes, the traffic control device list is based on a Sec. 100, Sheets 5-17, and the following list:

1. Standard D-704-20, Type G;
2. Standard D-704-22, Types K and L;
3. Standard D-704-23.

The Department will pay for all necessary deployed devices per phase to perform work.

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NOTES

704-P03 TRAFFIC CONTROL PHASING: Traffic Control Phasing is as follows:

Phase 1A – Eastbound and center turn lanes to be closed, head-to-head traffic in the westbound lanes. CPR, ADA improvement, and PCC Pavement Grinding work to be done along Demers Avenue in the eastbound lanes. Maintain access to the following throughout the entire phase; both ramps connecting Demers Avenue eastbound to 4th Ave S, private gravel driveway at east end of the Skyway Bridge, private business access east of 1st Ave N, and Kittson Ave.

Phase 1B – Westbound and center turn lanes of Demers Avenue to be closed, head-to-head traffic in the eastbound lanes. CPR, ADA improvement, 1st Ave N safety improvement, and PCC Pavement Grinding work to be done along Demers Avenue in the westbound lanes. Maintain access to the following throughout the entire phase; both ramps connecting Demers Avenue westbound to 4th Ave S, S 8th St, private business access east of 1st Ave N, and S 6th St.

Phase 2A – Westbound lanes of 4th Avenue S to be closed, head-to-head traffic in the eastbound lanes. CPR, ADA improvement, and PCC Pavement Grinding work to be done along 4th Avenue S in the westbound lanes. Maintain access to The Link apartment complex parking lot.

Phase 2B – Eastbound lanes of 4th Avenue S to be closed, head-to-head traffic in the westbound lanes. CPR, ADA improvement, and PCC Pavement Grinding work to be done along 4th Avenue S in the eastbound lanes. Maintain access to the parking lot to the apartment complex located at the corner of 4th Avs S and Oak St.

Phase 2C – Closure of 4th Avenue S between Demers Avenue and Oak St. Perform CPR, Curb and Gutter, Median Nose Paving, and PCC Pavement Grinding work on 4th Ave S between Demers Avenue and Oak St. Maintain access to the parking lot of the apartment complex located at the corner of 4th Ave S and Oak St. Utilize Portable Changeable Message Signs to inform the public about the closure. Limit closure to no more than 36 hours.

Phase 3 – Closure of 4th Avenue S between Demers Avenue and Oak St and right lane closure in the eastbound lanes of Demers Avenue. Perform Milling, Paving, and Seal Coat work. Maintain access to the parking lot of the apartment complex located at the corner of 4th Ave S and Oak St. Utilize Portable Changeable Message Signs to inform the public about the closure. Limit closure to between the hours of 10:00 p.m. and 6:30 a.m.

Closure of consecutive left turn lanes and intersections is prohibited.

Upon approval by the Engineer, an alternative traffic control phasing plan will be utilized. Submit alternative plans 1 week prior to start of proposed work.

704-P04 MAINTENANCE & PROTECTION OF TRAFFIC FOR CONCRETE PAVEMENT REPAIRS: Space vertical panels at 10 feet along the edge of full depth repairs until the concrete has been replaced in full depth removal areas. Use a minimum of two (2) stackable vertical panels and one (1) Type I barricade at each full depth repair area until concrete has met strength.

704-P05 PORTABLE CHANGEABLE MESSAGE SIGN: Install Portable Changeable Message Signs (PCMS) 2 weeks before work begins on the project. The Engineer will determine the locations for PCMS installation. Relocate the PCMS as directed by the Engineer. Use PCMS's conforming to the requirements of the MUTCD, part 6.

Provide an operator trained in the use of the PCMS.

The Engineer will determine the message to be displayed. The operator shall program the message within one hour of the Engineer's request to change the message.

704-P06 TRAFFIC CONTROL AT MAJOR INTERSECTIONS: It is required to keep the approaches of the fire station, Southern Manor and 5th Ave S. (just east of the Fire Station) open at all times. The intersections of N 8th St, 1st Ave N, N 6th St, and Kittson Ave shall maintain traffic during construction.

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

708-P01 INLET PROTECTION-SPECIAL: Include all costs to furnish, install, maintain, replace, and remove inlet protection-special in the contract unit price for "INLET PROTECTION-SPECIAL".

722-P01 ADJUST INLET: Remove existing casting and adjusting rings. Provide new adjusting rings, new chimney seals (on Type 1 Inlets), reset existing casting and adjust castings to finished grade. See Section 11 for locations. Include the cost for materials, equipment, labor, and incidentals in the contract unit price for "ADJUST INLET".

748-P01 CURB & GUTTER-TYPE I: Construct curb and gutter separate from adjacent concrete pavement. Match existing curb and gutter height whenever connecting into existing. Include all cost to perform this work in the unit bid for "CURB & GUTTER-TYPE I".

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

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

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

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

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

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

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

750-P03 PIGMENTED CONCRETE: Develop a mix design using any size coarse aggregate specified in Section 802.01 C.2, “Coarse Aggregate” and with a 60-40 fine aggregate coarse aggregate ratio.

Provide a pigment from the list below or provide an approved equal. To be considered an approved equal, pigments must meet the requirements of ASTM C 979.

1. Number 413 Terra Cotta, produced by Soloman Colors, Inc. http://www.solomoncolors.com/;

2. Terra Cotta Pigment Number 10134, produced by Davis Colors http:/www.daviscolors.com/; or

Use the same supplier for all colored concrete placed under the contract. Add pigment at the ratio recommended by the manufacturer directly into the mixer along with the aggregate, cement, and water. Add pigment while the mixer is operating at mixing speed. Continue mixing for 5 to 10 minutes to between 50 and 100 revolutions.

Cure concrete using curing compound that meets the requirements of ASTM C 309, Type 1.

750-P04 CONCRETE MEDIAN NOSE PAVING: Measurement will be from the curb joint to the end of the median nose, excluding the area beyond the top of the median taper. Paint all median noses with yellow wet reflective epoxy. Include all costs for sandblasting and materials in the price bid for “CONCRETE MEDIAN NOSE PAVING”.

750-P05 CURB RAMPS AND LANDINGS: Construct adjacent roadway prior to curb ramps and landings. Install concrete landings labeled “D” in Section 80, prior to adjacent ramps or sidewalk. Allow landings to cure at least 24 hours before constructing adjacent concrete. Adjust the elevations of the landings so that maximum grades are not exceeded. Construct sidewalk, curb ramps and landings in accordance with D-750-3, and the details shown in Section 80 of these plans.

750-P06 DETECTABLE WARNING PANELS: Supply cast iron detectable warning panels.

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

970-P01 LANDSCAPE PREPARATION: In designated landscaping areas, remove and salvage topsoil to its full depth not to exceed 6 inches. Stockpile topsoil at site located by the Contractor.

Following construction, backfill topsoil and grade existing ground to blend into newly constructed curb and gutter, sidewalk, bikeway, guardrail areas, and ADA ramps prior to sod. Dispose of excess material.

Include the cost for materials, equipment, and labor required to strip, stockpile, backfill, finish grading, and disposal of excess material in the contract unit price for “LANDSCAPE PREPARATION”.

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

SECTION 130

202-P03 REMOVAL OF SLOPE PROTECTION: Remove the existing concrete slope protection at the north pier of the Demers Ave Overhead Crossroad, RP 2.696, from the back of the existing curb to the existing joint as shown in the plans. This may require sawing through the existing concrete slope protection at the joint. At the edges of the existing slope protection there are 1'-8" thick sidewalls that will require sawing.

Include all costs to remove the slope protection and sidewalls, including sawing, in the contract unit price bid for "Removal of Slope Protection."

722-P02 ADJUST INLET: Remove, salvage and reset the existing storm sewer inlet casting frame, and grate, at the Demers Ave Overhead Crossroad, RP 2.696. Furnish new adjustment rings to ensure proper drainage to meet the finished grade. Include all costs associated with this work in the unit price bid for "Adjust Inlet".

748-P02 CURB & GUTTER – TYPE 1 SPECIAL: Install curb and gutter at the Demers Ave Overhead Crossroad, RP 2.696, in accordance with Standard Drawing D-748-1, except with a 3" curb height, and 5' long curb height transitions from 3" to 6" at each end.

Include all costs for constructing the curb and gutter as described above in the contract unit price bid for "Curb & Gutter – Type 1 Special."

SECTION 140

770-P01 RESET LIGHT STANDARD: Reset the light standard on a new foundation. Verify the bolt circle size before installing the new foundation.

The light standards on this circuit have existing festoon circuits. Ensure these circuits are operational.

Include all costs associated with this work in the unit price bid for "Revise Lighting System".

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	664	664
202	0130	REMOVAL OF CURB & GUTTER	LF	590	590
202	0290	REMOVAL OF SLOPE PROTECTION	SY	57	57
252	0100	SOD	SY	551	551
302	0120	AGGREGATE BASE COURSE CL 5	TON	409	409
401	0050	TACK COAT	GAL	392	392
411	0105	MILLING PAVEMENT SURFACE	SY	5,217	5,217
420	0405	SEAL COAT	SY	5,217	5,217
430	0145	RAP - SUPERPAVE FAA 45	TON	580	580
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	18	18
430	1000	CORED SAMPLE	EA	5	5
430	5818	PG 58H-34 ASPHALT CEMENT	TON	31	31
550	0305	9IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	254	254
570	0210	PCC PAVEMENT GRINDING	SY	15,800	15,800
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	1,919	1,919
570	0711	9IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	3,394	3,394
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	3,130	3,130
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	624	624
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,670	2,670
704	1050	TYPE I BARRICADE	EA	40	40
704	1052	TYPE III BARRICADE	EA	42	42
704	1054	SIDEWALK BARRICADE	EA	6	6
704	1056	PEDESTRIAN CHANNELIZATION	LF	250	250
704	1060	DELINEATOR DRUMS	EA	290	290
704	1067	TUBULAR MARKERS	EA	10	10
704	1072	FLEXIBLE DELINEATORS	EA	160	160
704	1080	STACKABLE VERTICAL PANELS	EA	80	80
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	569	569
704	2108	TEMPORARY CURB RAMP	EA	4	4
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3	3

ESTIMATE NUMBER: 24738 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 08/15/2025 TIME: 13:13:44

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
706	0500	AGGREGATE LABORATORY	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
708	1540	INLET PROTECTION-SPECIAL	EA	31	31
722	6160	ADJUST INLET	EA	4	4
748	0140	CURB & GUTTER-TYPE I	LF	470	470
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	186	186
748	1020	VALLEY GUTTER 36IN	SY	41	41
750	0020	PIGMENTED CONCRETE	SY	4	4
750	0115	SIDEWALK CONCRETE 4IN	SY	138	138
750	0210	CONCRETE MEDIAN NOSE PAVING	SY	4	4
750	2115	DETECTABLE WARNING PANELS	SF	122	122
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	213	213
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	212	212
754	0592	RESET SIGN PANEL	EA	4	4
754	0593	RESET SIGN SUPPORT	EA	2	2
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	LF	9,809	9,809
762	0112	EPOXY PVMT MK MESSAGE	SF	17	17
762	0118	EPOXY PVMT MK CURB TOP & FACE	LF	35	35
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED	LF	1,246	1,246
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED	LF	149	149
762	0136	EPOXY PVMT MK MESSAGE-GROOVED	SF	320	320
762	0420	SHORT TERM 4IN LINE-TYPE R	LF	4,063	4,063
762	1104	PVMT MK PAINTED 4IN LINE	LF	6,030	6,030
764	0131	W-BEAM GUARDRAIL	LF	100	100
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	2	2
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	163	163
770	4525	REVISE LIGHTING SYSTEM	EA	1	1
970	0008	LANDSCAPE PREPARATION	SY	551	551

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BASIS OF ESTIMATE

Estimated Quantities			
Description	Units	Basis	Quantity
4th Ave S Ramps			
Milling Pavement Surface	SY	See Sec. 90, Sheet 1	5,217
RAP Superpave FAA 45	Ton		580
PG 58H-34 Asphalt Cement	Ton		31
Tack Coat	Gal		392
Seal Coat	SY		5,217

Estimated Quantities		
Description	Basis	Quantity
4th Ave S Ramps		
Seal Coat	See Sec 90, Sheet 1	5,217 SY
Cover Coat Material CI 41-M @ 25 lb/SY = 65.22 Ton		
CRS2P Emulsified Asphalt @ 0.40 Gal/SY = 2,087 Gal		
Fog Seal @ 0.05 Gal/SY = 261 Gal		

Estimated Available Milled Material Quantities			
Milled Material Available	Milled Area (SF)	Length (Mi)	Tons (1.875 Tons/CY)
4th Ave S Ramps	See Sec. 90, Sheet 1		544
Total (Minus 10% for losses)			486

Estimated Required & Remaining Milled Material Quantities		
	% RAP by Mix Design	
Milled Material required for production of HMA	10% Min	25% Max
(580 tons RAP-Superpave FAA 45)	**58**	**145**
Milled Material to become the property of the NDDOT	**428**	**341**

HMA Cored Samples							
	A	**B**		**C**			
Specification Section	**Distance (FT) ÷ 1000**	**Lanes**	**Joints**	**Lifts**	**Quantity** (A x B x C)	**Quantity** (1 per mile)	**Unit**
430.04 I.2.b(1), "General"	3	1	N/A	1	3	N/A	EA
SSP4 Longitudinal Joint Density in HMA Pavements (Centerline)	2	N/A	1	1	2	N/A	EA
430.04 I.2.b(2) "Pavement Thickness Determination Cores"	N/A	N/A	N/A	N/A	N/A	N/A	EA
				Total	5	N/A	EA

Estimated Flagging Hours		
Operation	**Basis**	**Flagging**
CPR, ADA,	*21 Days x 12 Hrs/Day x 2 Flaggers*	504 MHR
Milling Pavement	*2 Days x 12 Hrs/Day x 2 Flaggers*	48 MHR
HMA	*2 Days x 12 Hrs/Day x 2 Flaggers*	48 MHR
Seal Coat	*1 Day x 12 Hrs/Day x 2 Flaggers*	24 MHR

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
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NORTH DAKOTA

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BASIS OF ESTIMATE

Temporary Pavement Marking		
Location	Basis	Quantity
Demers Avenue		
Short Term 4IN Line-Type R Yellow Single Barrier Line	See Sec 100, Sheets 7-13	1,423 LF
Short Term 4IN Line-Type R White Edge Line		1,215 LF
4th Ave S		
Short Term 4IN Line-Type R Yellow Single Barrier Line	See Sec 100, Sheets 14-15	964 LF
Short Term 4IN Line-Type R White Edge Line		461 LF

Permanent Pavement Marking		
Type	Basis	Quantity
Epoxy Pvmt Mk 4IN Yellow Skip Line *(10' Line, 30' Skip)*	See Sec 120, Sheets 1-4	140 LF
Epoxy Pvmt Mk 4IN Yellow Single Barrier Line		496 LF
Epoxy Pvmt Mk 4IN Yellow Double Barrier Line		8,153 LF
Epoxy Pvmt Mk 4IN White Ceneterline Skips *(10' Line, 30' Skip)*		1,020 LF
Epoxy Pvmt Mk 8IN White Channel Line		1,246 LF
Epoxy Pvmt Mk 8IN White Cross Walk Line		461 LF
Epoxy Pvmt Mk 24IN White Stop Bar		149 LF
Epoxy Pvmt Mk Curb Top & Face (Yellow)		20 LF
Epoxy Pvmt Mk Message (Yellow Painted Median Nose)		17 SF
Epoxy Pvmt Mk Message Right Turn Arrows		128 SF
Epoxy Pvmt Mk Message Left Turn Arrows		192 SF
Pvmt Mk Painted 4IN Yellow Double Barrier Line		2,894 LF
Pvmt Mk Painted 4IN White Centerline Skips		580 LF
Pvmt Mk Painted 4IN White Edge Line		2,556 LF

Total 4IN Pavement Marking		
	White	Yellow
Short Term 4IN Line - Type R	1,676 LF	2,387 LF
Epoxy Pvmt Mk 4IN Line	1,020 LF	8,789 LF
Pvmt Mk Painted 4IN Line	3,136 LF	2,894 LF

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NORTH DAKOTA

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ESTIMATED QUANTITIES FOR GUARDRAIL EMBANKMENT SURFACING

Demers Ave Overhead Crossroad, RP 2.696 Outside Pier Protection				
Spec	Code	Bid Item	UNIT	LT
202	0290	REMOVAL OF SLOPE PROTECTION	SY	56.1
		4" Concrete with 4" Aggregate Base	-	-
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 Ton/CY	TON	58.7
*	*	TACK COAT @ 0.05 Gal/SY	GAL	8.2
*	*	PRIME COAT @ 0.25 Gal/SY	GAL	41
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT @ 2 Ton/CY	TON	17.3
*	*	PG ASPHALT CEMENT @ 6%	TON	1

* Not a pay item. Included in the contract unit price bid for 430 0500 Commercial Grade Hot Mix Asphalt.
See Section 130 and Standard Drawing D-764-48 for details

Basis of Estimate
HMA Quantities

Outside Pier Protection

Demers Ave Overhead Crossroad
RP 2.696
ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
08/15/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	1

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
10+10	C/P	2	2	4.0				0.0							
10+10	P	2	2	4.0				0.0							
10+10	D			0.0		6	6	4.0	3		8				
10+15	P			0.0		39	12	52.0	27		20	20			
10+24	D	2	2	4.0				0.0							
10+35	C			0.0		6	11	7.3			18				
10+35	D	2	2	4.0				0.0							
10+52	C			0.0		6	11	7.3			18				
10+52	D	13.2	2	26.4				0.0							
10+55	C/P	10	2	20.0				0.0							
10+55	P/D	8	2	16.0				0.0							
10+55	D	2	2	4.0				0.0							
10+64	P	2	2	4.0				0.0							
10+69	C			0.0		18	10	20.0			16				
10+69	P			0.0		37	12	49.3	18		20	16			
10+83	D	2	2	4.0				0.0							
10+97	C			0.0		20	10	22.2			16				Adjacent repair in WB lane
10+99	D			0.0	28.5			0.0							
11+11	D/RAMP			0.0		10	6	6.7		4	8	2			
11+31	RAMP	10	2	20.0				0.0							
11+57	RAMP			0.0		8	11	9.8	8		18	2			
11+70	RAMP	2	2	4.0				0.0							
11+73	RAMP			0.0		6	8.8	5.9	6		14				
11+76	D/RAMP			0.0		9.5	6	6.3			16				
11+88	RAMP			0.0		6	8.5	5.7	4		10				
11+91	D/RAMP	10	2	20.0				0.0							
12+00	C/P	13	2	26.0				0.0							
12+04	D/RAMP			0.0		6	15	10.0	12		26				
12+07	D/RAMP	29.5	2	59.0				0.0							
12+21	C			0.0		6	7	4.7	4		10				
12+21	RAMP			0.0		6	8.7	5.8	6		14				
12+35	P/D			0.0		68.5	24	182.7	72	20	20	48			Repair ends near Sta 13+03
12+36	RAMP			0.0		6	8.5	5.7	5		12				
12+68	C			0.0		6	5.5	3.7	3		12				
12+68	RAMP			0.0		9	6	6.0	3		8				
12+84	C			0.0		6	5.4	3.6	3		8				Adjacent repair in WB lane
13+00	C			0.0		6	5.4	3.6	3		8				Adjacent repair in WB lane
Sheet Totals				**219.4**	**28.5**			**422.2**	**177.0**	**24.0**	**300.0**	**88.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	2

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
13+03	C/P	28	2	56.0				0.0							
13+05	D	9	2	18.0				0.0							
13+14	P/D	4	4	16.0				0.0							
13+16	RAMP			0.0		18	8.8	17.6		14		8			
13+34	C			0.0		6	4.5	3.0			4				Adjacent repair in WB lane
13+34	P	2	4	8.0				0.0							
13+37	C/P	8.7	2	17.4				0.0							
13+37	P	2	2	4.0				0.0							
13+48	P			0.0		6	12	8.0	9		20				
13+53	P/D	8.7	2	17.4				0.0							
13+65	C/P			0.0		7	16	12.4	9		24				Adjacent repair in WB lane
13+65	D/RAMP	2	2	4.0				0.0							
13+68	P/D	6	2	12.0				0.0							
13+71	C/P	16	2	32.0				0.0							
13+75	P	2	4	8.0				0.0							
13+75	D	2	3	6.0				0.0							
13+76	D	4	2	8.0				0.0							
13+92	C/P			0.0		6	12.3	8.2	6		16				*Reinforced Panel over Pipe*
13+93	D			0.0		6	12	8.0	9		20				*Reinforced Panel over Pipe*
13+93	P/D	11	2	22.0				0.0							
13+95	C/P	9.7	2	19.4				0.0							
14+01	D			0.0		8	6	5.3		4	7	2			*Reinforced Panel over Pipe*
14+08	C/P			0.0		6	15.1	10.1	9		20				*Reinforced*/Adjacent repair in WB lane
14+11	C/P	10.4	2	20.8				0.0							
14+24	C/P/D			0.0		6	26.5	17.7	18		40				Adjacent repair in WB lane
14+28	P/CL/P			0.0		9.7	9	9.7			8				**Repair goes into WB passing lane**
14+28	P/D	10.2	2	20.4				0.0							
14+40	P/C/P			0.0		6	30	20.0	21		44				**Repair goes into WB passing lane**
14+43	P/D			0.0		10.1	6	6.7			8				
14+43	D	10.4	2	20.8				0.0							
14+55	C/P/D			0.0		6	25.7	17.1	18		40				
14+58	P	3.5	2	7.0				0.0							
14+58	D	10	2	20.0				0.0							
14+64	P/C/P			0.0		20.7	7	16.1			20				**Repair goes into WB passing lane**
14+71	P			0.0		6	7	4.7	4		10				
14+71	D			0.0		6	10	6.7	7		16				
14+88	P			0.0		6	10.3	6.9	7		16				Adjacent repair in WB lane
Sheet Totals				**337.2**	**0.0**			**178.2**	**117.0**	**18.0**	**313.0**	**10.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	11	3

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
14+88	D			0.0		6	10.2	6.8	7		16				
14+91	CL	26	2	52.0				0.0							
14+91	D	10.6	2	21.2				0.0							
15+04	P			0.0		6	6.5	4.3	3		8				
15+04	D			0.0		6	10.2	6.8	7		16				
15+20	P			0.0		6	6	4.0	3		8				
15+20	D			0.0		6	10	6.7	7		16				
15+23	CL	10	2	20.0				0.0							
15+23	D	8	2	16.0				0.0							
15+35	P			0.0		6	10	6.7	7		10				Adjacent repair in WB lane
15+35	D			0.0		6	6	4.0	3		8				
15+36	D	3	2	6.0				0.0							
15+38	CL	10	2	20.0				0.0							
15+45	D	4	2	8.0				0.0							
15+52	P			0.0		6	10.1	6.7	7		10				
15+55	CL	9	2	18.0				0.0							
15+55	D	2	2	4.0				0.0							
15+57	P	14	2	28.0				0.0							
15+60	D	2	2	4.0				0.0							
15+61	D	9	2	18.0				0.0							
15+71	CL	11	2	22.0				0.0							
15+79	P	6	2	12.0				0.0							
15+79	D	4	2	8.0				0.0							
15+86	CL	6.5	2	13.0				0.0							
15+86	D	2	4	8.0				0.0							
15+95	P	2	4	8.0				0.0							
15+95	D	2	2	4.0				0.0							
15+95	D			0.0		6	7	4.7		5	7	3			
16+03	CL	11	2	22.0				0.0							
16+03	P	2	2	4.0				0.0							
16+03	D	11	2	22.0				0.0							
16+03	D	2	2	4.0				0.0							
16+15	P			0.0		10	6	6.7							Adjacent repair in WB lane
16+15	D			0.0		6	6	4.0							
16+15	D	14	2	28.0				0.0							
16+18	CL	10	2	20.0				0.0							
16+29	D	2	2	4.0				0.0							
Sheet Totals				**394.2**	**0.0**			**61.3**	**44.0**	**5.0**	**99.0**	**3.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

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NORTH DAKOTA

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ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
16+31	P			0.0		6	10	6.7	7		16				Adjacent repair in the WB lane
16+33	D	2	2	4.0				0.0							
16+44	D	2	2	4.0				0.0							
16+44	D	2	2	4.0				0.0							
16+47	P			0.0		6	10.2	6.8	7		16				Adjacent repair in the WB lane
16+50	P/D			0.0		13	6	8.7		4	4	8			
16+50	D	13	2	26.0				0.0							
16+74	P/D			0.0		7.5	24	20.0		20	20	6			Adjacent repair in WB lane
16+80	****			0.0				0.0							****Beginning of Bridge****
****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	******
28+40	****			0.0				0.0							****End of Bridge****
28+53	C/P			0.0		7.5	6	5.0		4	6				
28+53	D			0.0		7	12	9.3		10	10	4			
28+70	D	2	2.5	5.0				0.0							
28+73	C/P			0.0		8	6	5.3			6	4			
28+83	C	2	2	4.0				0.0							
28+88	P/D			0.0		38	24	101.3	27		20	24			
29+12	LT			0.0		12	4.6	6.1	2		6	4			
29+36	LT/P			0.0		6	16.6	11.1	9		20				
29+36	D			0.0		22	12	29.3	18		20	6			
29+53	P			0.0		6	12	8.0	9		20				
29+68	LT	2	2	4.0				0.0							
29+68	LT/P			0.0		6	9	6.0	4		10				
29+76	LT	3	2	6.0				0.0							
29+76	P			0.0		13	12	17.3	9		20	6			
29+84	LT	2	2	4.0				0.0							
30+14	D			0.0		15	12	20.0	9		20	6			*Reinforced Panel over Pipe*
30+24	P			0.0		6	12	8.0	9		20				*Reinforced Panel over Pipe*
30+43	LT	2	2	4.0				0.0							
30+43	LT/P	2	2	4.0				0.0							
30+43	P	2	2	4.0				0.0							
30+43	D	2	4	8.0				0.0							
30+63	D	2	2	4.0				0.0							
30+70	LT	2	3.5	7.0				0.0							
30+71	LT	2	2	4.0				0.0							
30+80	P			0.0		6	12	8.0	9		20				
30+80	D	2	2	4.0				0.0							
Sheet Totals				**100.0**	**0.0**			**277.0**	**119.0**	**38.0**	**254.0**	**68.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	5

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
30+96	C	2	2	4.0				0.0							
31+12	P			0.0		6	12	8.0	9		20				
31+12	D	2	2	4.0				0.0							
31+45	P/D			0.0		6	24	16.0	18		40				
31+61	P/D			0.0		6	24	16.0	18		40				
31+77	C/P/D			0.0		6	30	20.0	18		48				
31+93	C	2	2	4.0				0.0							
31+93	C	2	2	4.0				0.0							
31+93	P			0.0		6	8.2	5.5	5		12				
31+95	D	2	2	4.0				0.0							
32+09	P/D			0.0		6	17.5	11.7	12		28				
32+25	P/D			0.0		6	17.5	11.7	12		28				
32+26	C/P	2	2	4.0				0.0							
32+40	C	2	2	4.0				0.0							
32+40	P/D			0.0		6	24	16.0	18		40				
32+57	P/D			0.0		6	24	16.0	18		40				
32+73	P/D			0.0		6	24	16.0	18		40				
32+89	P/D			0.0		6	24	16.0	18		40				
33+05	P/D			0.0		6	24	16.0	18		40				
33+20	P/D			0.0		6	24	16.0	18		40				
33+36	LT/P/D			0.0		6	27	18.0	18		44				
33+53	D			0.0		6	12	8.0	9		20				
33+69	LT/P/D			0.0		6	30	20.0	18		48				
33+85	LT/P/D			0.0		6	27	18.0	18		44				
34+00	LT/P	2	2	4.0				0.0							
34+01	LT/P			0.0		6	15	10.0	9		24				
34+01	D			0.0		22	12	29.3	18		20	8			*Reinforced Panel over Pipe*
34+04	P			0.0		6	10	6.7			3				*Reinforced Panel over Pipe*
34+07	LT	2	2	4.0				0.0							
34+16	LT	2	2	4.0				0.0							
34+16	P			0.0		6	12	8.0	9		20				
34+33	LT	2	2	4.0				0.0							
34+33	P/D			0.0		6	24	16.0	18		40				
34+48	P/D			0.0		6	24	16.0	18		40				
34+65	C/P			0.0		6	15.5	10.3	9		24				
34+67	D	2	2	4.0				0.0							
34+80	P/D			0.0		6	24	16.0	18		40				
Sheet Totals				**48.0**	**0.0**			**361.1**	**362.0**	**0.0**	**823.0**	**8.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	6

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
34+97	P			0.0		22	12	29.3	18		20	8			
35+29	C/P	2	2	4.0				0.0							
35+29	P/D	2	2	4.0				0.0							
35+45	C/P			0.0		6	9	6.0	3		10				
35+61	C/P	2	2	4.0				0.0							
35+61	P	2	2	4.0				0.0							
35+89	D	3	2	6.0				0.0							
35+93	LT	2	4.5	9.0				0.0							
35+93	P	2	2	4.0				0.0							
35+93	P	2	2	4.0				0.0							
36+09	LT	2	2	4.0				0.0							
36+09	LT/P	2	3.5	7.0				0.0							
36+09	D			0.0		10	12	13.3		10	10	4			
36+09	RT	2	2	4.0				0.0							
36+25	LT	2	2	4.0				0.0							
36+25	RT			0.0		6	9	6.0			14				
36+40	RT	2	2	4.0				0.0							
36+41	LT	2	2	4.0				0.0							
36+41	LT/P	2	2	4.0				0.0							
36+41	D			0.0		6	6	4.0	3		8				*Reinforced Panel over Pipe*
36+57	LT/P	2	2	4.0				0.0							
36+57	D	2	2	4.0				0.0							
36+57	RT	2	2	4.0				0.0							
36+73	LT	2	2	4.0				0.0							
36+73	P/D	2	2	4.0				0.0							
36+73	D	2	2	4.0				0.0							
36+89	LT	2	2	4.0				0.0							
36+89	P	2	2	4.0				0.0							
36+89	D	2	2	4.0				0.0							
36+89	RT	2	2	4.0				0.0							
37+01	LT			0.0		6	6	4.0	3		8				
37+01	P/D	2	2	4.0				0.0							
37+16	LT	2	2	4.0				0.0							
37+16	P/D	2	2	4.0				0.0							
37+16	D/RT	2	2	4.0				0.0							
37+31	D/RT	2	2	4.0				0.0							
37+46	D/RT	4	2	8.0				0.0							
Sheet Totals				**138.0**	**0.0**			**62.7**	**27.0**	**10.0**	**70.0**	**12.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	7

ND 297 - Demers Ave (Eastbound and Center Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
37+46	RT	2	2	4.0				0.0							
37+46	RT	2	2	4.0				0.0							
37+60	D	2	2	4.0				0.0							
37+60	RT	2	13	26.0				0.0							
37+76	LT	2	2	4.0				0.0							
37+76	P	2	2	4.0				0.0							
37+76	D/RT	2	2	4.0				0.0							
37+85	APP	2	2	4.0				0.0							Offset 43' RT
37+92	C	2	2	4.0				0.0							
37+92	P/D	2	2	4.0				0.0							
37+97	D/APP	2	2	4.0				0.0							
37+97	APP			0.0		14	6	9.3							Offset 60' RT
38+07	C			0.0		6	8	5.3	5		12				*Reinforced Panel over Pipe*
38+07	APP	2	2	4.0				0.0							Offset 44' RT
38+14	APP			0.0		11	9	11.0		9	9	4			Offset 64' RT
38+18	D/APP	3.6	2	7.2				0.0							
38+23	P			0.0		6	12	8.0	9		20				*Reinforced Panel over Pipe*
38+24	C	2	2	4.0				0.0							
38+29	D/APP	2	2	4.0				0.0							
38+38	C	2	2	4.0				0.0							
38+48	*END*			0.0				0.0							**East Project Limits**
Sheet Totals				**89.2**	**0.0**			**33.7**	**14.0**	**9.0**	**41.0**	**4.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	8

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
10+10	P	2	2	4.0				0.0							*Begin WB Project Limits*
10+10	P/D	2	2	4.0				0.0							
10+15	P	2	2	4.0				0.0							
10+16	D			0.0		6	6	4.0	3	4	6				
10+17	C/P	16	2	32.0				0.0							
10+23	D	4	2	8.0				0.0							
10+24	P/D			0.0		9.3	6	6.2			4	2			
10+35	D	2	2	4.0				0.0							
10+38	C/P	10	2	20.0				0.0							
10+38	P	2	2	4.0				0.0							
10+44	P	4	2	8.0				0.0							
10+62	C/P	2	2	4.0				0.0							
10+84	P			0.0				0.0							
10+84	D	2	2	4.0		25	12	33.3	9	10	10	10			
11+14	P/D			0.0		6	24	16.0	18		40				
11+17	P/D			0.0		36.7	6	24.5	6		34				
11+18	P	2	2	4.0				0.0							
11+27	C/P	28	2	56.0				0.0							
11+27	D	2	2	4.0				0.0							
11+57	P/D			0.0		6	24	16.0	18		40				
11+60	C/P	4	2	8.0				0.0							
11+73	C/P			0.0		6	14	9.3	8		18				
11+73	D			0.0		6	10.2	6.8	7		16				
11+76	C/P	18	2	36.0				0.0							
11+79	P	2	2	4.0				0.0							
11+79	D	2	2	4.0				0.0							
11+80	APP			0.0		6	6	4.0			12				
11+88	D			0.0		6	10.2	6.8	7		16				
11+91	P/D			0.0		9.7	6	6.5			12				
12+00	C/P	2	2	4.0				0.0							
12+04	C	2	2	4.0				0.0							
12+04	P			0.0		6	12	8.0	9		20				
12+07	C/P	10.5	2	21.0				0.0							
12+21	P			0.0		6	10.2	6.8	7		16				
12+21	D	2	2	4.0				0.0							
12+21	D	2	5	10.0				0.0							
12+24	D			0.0		6	6	4.0			6	2			
Sheet Totals				**255.0**	**0.0**			**152.2**	**92.0**	**14.0**	**250.0**	**14.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	11	9

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
12+37	C/P	7	2	14.0				0.0							
12+37	D			0.0		6	6.6	4.4							
12+45	C/P	3	2	6.0				0.0							
12+50	D	2	2	4.0				0.0							
12+53	P			0.0		6	10.2	6.8	7		16				
12+55	D	2	2	4.0				0.0							
12+56	P	2	2	4.0				0.0							
12+64	D			0.0		11	6	7.3	3		10	4			*Reinforced Panel over Pipe*
12+65	P	2	2	4.0				0.0							
12+78	C/P	2	2	4.0				0.0							
12+84	P			0.0		6	10.3	6.9	7		16				
12+84	D			0.0		6	10	6.7	7		16				
12+96	P	2	2	4.0				0.0							
12+67	D	2	2	4.0				0.0							
13+00	P			0.0		6	10.3	6.9	7		16				
13+13	D	3.5	3.5	12.3				0.0							
13+17	P			0.0		6	6.8	4.5	3		8				
13+17	D	2	2	4.0				0.0							
13+18	C/P	4.5	2	9.0				0.0							
13+21	D	2	2	4.0				0.0							
13+24	C/P	3.5	2	7.0				0.0							
13+30	C/P	2	2	4.0				0.0							
13+31	D	2	2	4.0				0.0							
13+34	P			0.0		6	10.3	6.9	7		16				
13+34	D			0.0		6	6	4.0	3		8				
13+38	D	8	2	16.0				0.0							
13+41	C/P	2	2	4.0				0.0							
13+49	P			0.0		6	10.3	6.9	7		16				
13+49	D/GORE			0.0		6	14	9.3	7		21	2			
13+58	P/D			0.0		6	6	4.0			12				
13+61	D/GORE			0.0		10	6	6.7	2		16				
13+65	P			0.0		6	8.5	5.7	5		12				
13+68	P/D			0.0		41.2	6	27.5	9		46				*Reinforce between 13+92 and 14+09*
13+71	D/GORE	5	2	10.0				0.0							
13+74	D	2	2	4.0				0.0							
13+78	C/P	10.5	2	21.0				0.0							
13+91	GORE	2.5	2	5.0				0.0							
Sheet Totals				**152.3**	**0.0**			**114.3**	**74.0**	**0.0**	**229.0**	**6.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	11	10

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
13+92	GORE	2	5	10.0				0.0							
13+95	D/GORE	5.2	2	10.4				0.0							
13+95	RAMP			0.0		11.3	13.5	17.0		16		6			North Panel right before asphalt
13+98	C/P	3	2	6.0				0.0							
14+08	P			0.0		13.2	9.3	13.6	6		14	2			*Reinforce Panel over Pipe*
14+08	D			0.0		11.3	9.3	11.7	6		14	4			*Reinforce Panel over Pipe*
14+11	RAMP	2	2	4.0				0.0							
14+12	RAMP	2	2	4.0				0.0							
14+20	D	2	5.8	11.6				0.0							
14+24	P			0.0		6	9.5	6.3	6		14				*Reinforce Panel over Pipe*
14+25	D	2	3.5	7.0				0.0							
14+29	D/RT	9.5	2	19.0				0.0							
14+40	P	2	2	4.0				0.0							
14+40	D			0.0		6	9.5	6.3	6		14				
14+40	RT	2	6	12.0				0.0							
14+41	RT	5.7	2	11.4				0.0							
14+53	D	2	2	4.0				0.0							
14+55	P	2	2	4.0				0.0							
14+55	D	2	2	4.0				0.0							
14+55	D	2	2	4.0				0.0							
14+56	RT			0.0		33	6	22.0	3	8	15				
14+55	D	2	2	4.0				0.0							
14+56	RT			0.0		33	6	22.0	3	8	15				
14+65	D	2	2	4.0				0.0							
14+72	P	2	2	4.0				0.0							
14+72	P	2	2	4.0				0.0							
14+72	P/D	2	2	4.0				0.0							
14+72	D	2	5.2	10.4				0.0							
14+75	D	4	2	8.0				0.0							
14+88	P			0.0		6	9.7	6.5	7		16				
14+88	D			0.0		6	9.2	6.1	6		14				
15+01	RT	2	2	4.0				0.0							
15+04	RT	2	2	4.0				0.0							
15+04	RT	2	2	4.0				0.0							
15+07	D/RT	9.2	2	18.4				0.0							
15+20	P			0.0		6	9.2	6.1	6		16				
15+20	D/RT			0.0		6	14	9.3	7		20				
15+20	RT	2.5	2	5.0				0.0							
15+26	D/RT	6.7	2	13.4				0.0							
Sheet Totals				**198.6**	**0.0**			**105.0**	**53.0**	**24.0**	**137.0**	**12.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	11

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
15+30	RT	2	2	4.0				0.0							
15+35	P			0.0		6	9.3	6.2	6		16				
15+35	D/RT	2	2	4.0				0.0							
15+39	D/RT	10	2	20.0				0.0							
15+46	RT	2.5	2	5.0				0.0							
15+50	P	4	2	8.0				0.0							
15+52	P/D	2	2	4.0				0.0							
15+52	RT			0.0		6	12	8.0	9		20				
15+55	D/RT	10	2	20.0				0.0							
15+68	P			0.0		7.3	9	7.3	6		14				
15+68	D	2	2.5	5.0				0.0							
15+68	RT			0.0		6	11	7.3	8		19				
15+71	D/RT	12.8	2	25.6				0.0							
15+83	P			0.0		6	6	4.0	3		8				
15+83	D			0.0		6	7.5	5.0	4		8				
15+86	D/RT	9	2	18.0				0.0							
15+99	P			0.0		6	9	6.0	6		14				
15+99	P/D	2	2	4.0				0.0							
15+99	RT			0.0		8	6	5.3	3		8	2			
16+13	P			0.0		6	9	6.0	6		14				
16+15	D/RT			0.0		8.5	13	12.3	9		20	1			
16+28	D/RT	4	2	8.0				0.0							
16+28	P			0.0		36	12	48.0	18	10	10	12			
16+44	D			0.0		24	6	16.0	3	4	15	6			
16+74	P/D			0.0		7.5	24	20.0		20	20	6			
16+80	****			0.0				0.0							****Beginning of Bridge****
****	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
28+40	****			0.0				0.0							****End of Bridge****
28+75	D			0.0		6	6	4.0		4	6	2			
28+83	P	2	2	4.0				0.0							
28+84	D	2	2	4.0				0.0							
28+89	D	2	2	4.0				0.0							
28+91	P			0.0		13	6	8.7		4	9	3			
29+20	P			0.0		6	6	4.0	3		8				
29+20	D	2	2	4.0				0.0							
29+68	P			0.0		6	12	8.0	9		20				
29+68	D	2	2	4.0				0.0							
Sheet Totals				**145.6**	**0.0**			**176.1**	**93.0**	**42.0**	**229.0**	**32.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	12

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
29+84	P	2	2	4.0				0.0							
29+97	D			0.0		15.5	14	24.1	9		22				
30+24	D	2	2	4.0				0.0							
30+30	D			0.0		15.5	12.8	22.0	9		20	4			*Reinforced Panel over Pipe*
30+43	P			0.0		6	7	4.7	4		10				*Reinforced Panel over Pipe*
30+44	APP	2	2	4.0				0.0							
30+47	D/APP	2	2	4.0				0.0							
30+60	D/APP	2	2	4.0				0.0							
30+64	P			0.0		11.3	6	7.5	3		10				*Reinforced Panel over Pipe*
30+64	APP			0.0		34.6	7	26.9		30	30				
30+73	APP	2	11	22.0				0.0							Offset 41' LT
30+73	APP	2	2	4.0				0.0							Offset 58' LT
30+82	APP	2	2	4.0				0.0							Offset 60' LT
30+89	APP	2	2	4.0				0.0							Offset 41' LT
30+94	APP			0.0		6	6	4.0	3		8				Offset 60' LT
30+95	APP	2	2	4.0				0.0							Offset 42' LT
30+96	D			0.0		6	12	8.0	9		20				
30+96	D	2	2	4.0				0.0							
31+00	APP	2	2	4.0				0.0							Offset 62' LT
31+00	APP	2	2	4.0				0.0							Offset 41' LT
31+13	P			0.0		6	6	4.0	3		8				
31+13	D			0.0		6	12	8.0	9		20				
31+15	RT	2	2	4.0				0.0							
31+29	D			0.0		6	6	4.0	3		8				
31+92	P			0.0		6	6	4.0	3		8				
32+25	D	2	2	4.0				0.0							
32+40	D	2	2	4.0				0.0							
32+40	RT/APP	2	2	4.0				0.0							
32+45	RT/APP	4	2	8.0				0.0							
33+00	APP			0.0		70	9	70.0			34	15			
33+53	P	2	2	4.0				0.0							
33+53	P/D	2	2	4.0				0.0							
33+64	P	2	2	4.0				0.0							
33+68	P	2	2	4.0				0.0							
33+68	D	2	2	4.0				0.0							
33+69	APP			0.0		19	4	8.4			8	6			
34+01	D			0.0	14			0.0							Adjust Inlet (x2)
Sheet Totals				**114.0**	**14.0**			**195.7**	**55.0**	**30.0**	**206.0**	**25.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	13

ND 297 - Demers Ave (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
34+84	LT/P	2	2	4.0				0.0							
34+84	D			0.0		6	12	8.0	9		20				
34+88	D	2	2	4.0				0.0							
35+01	LT/P	2	2	4.0				0.0							
35+13	C/P	2	2	4.0				0.0							
35+13	D			0.0		10	12	13.3		10	10	4			
35+29	P/D	2	2	4.0				0.0							
35+93	D			0.0		6	12	8.0	9		20				
36+41	D			0.0		6	6	4.0	3		9				*Reinforced Panel over Pipe*
36+84	D	2	2	4.0				0.0							
37+16	D	2	3.5	7.0				0.0							
37+60	P/D			0.0		6	8	5.3	6		16				
37+75	P			0.0		6	12	8.0	9		20				
37+75	D	4	2	8.0				0.0							
37+90	P			0.0		6	12	8.0	9		20				
37+90	D	2	2	4.0				0.0							
37+97	APP	9.5	3	28.5				0.0							
38+00	D/APP	3	2	6.0				0.0							
38+07	P/D			0.0		6	12.5	8.3	7		16				
38+14	D/APP	3	3.5	10.5				0.0							
38+23	P			0.0		6	12	8.0	9		20				
38+25	APP	2	2	4.0				0.0							Offset 41' LT
38+35	APP	2	2	4.0				0.0							Offset 41' LT
38+48	D	2	2	4.0				0.0							
38+48	*End*			0.0				0.0							*East Project Limits*
Sheet Totals				**100.0**	**0.0**			**71.0**	**61.0**	**10.0**	**151.0**	**4.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	14

ND 297 - 4th Ave S (Eastbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
3+00	EB Ramp			0.0	33			0.0							Adjust Inlet
3+17	D			0.0	30.7			0.0							Construct traversable median curb end
4+03	****			0.0				0.0							**Begin Concrete**
4+03	D			0.0		20.5	11.7	26.7	9	10	10	6			*Repair in both EB & WB lanes*
4+24	P			0.0		12	7.5	10.0	4		16				
4+33	D			0.0		6	7.5	5.0	4		10				
4+47	P			0.0		6	6	4.0	3		8				
4+62	P			0.0		6	6	4.0	3		8				
4+62	D			0.0		6	7.5	5.0	4		10				
4+65	P	7.5	2	15.0				0.0							
4+72	P			0.0		6	6	4.0	3		8				
4+72	D			0.0		6	7.5	5.0	4		10				
4+93	P			0.0		6	9	6.0	6		14				
4+93	D			0.0		6	7.5	5.0	4		10				
5+09	P			0.0		6	6	4.0	3		8				
5+09	D	2	2	4.0				0.0							
5+09	D	2	2	4.0				0.0							
5+25	P			0.0		6	9	6.0	6		14				
5+25	D			0.0		6	7.5	5.0	4		10				
5+41	P			0.0		6	9	6.0	6		14				
5+41	D	2	2	4.0				0.0							
5+41	D	2	2	4.0				0.0							
5+44	CL	16	2	32.0				0.0							
5+71	CL			0.0		10	9	10.0	5		22				*Repiar in EB & WB lanes*
5+76	CL	4	2	8.0				0.0							
5+77	P/D			0.0		27.3	6	18.2							*Reinforce between 5+89 & 6+04*
6+04	P			0.0		6	9	6.0	6		14				*Reinforce Panel over Pipe*
6+07	CL	10	2	20.0				0.0							
6+20	D	2	2	4.0				0.0							
6+29	D/APP			0.0		20	6	13.3			28				
6+30	P/D			0.0		8.5	7.5	7.1			14				
6+32	CL	2	2	4.0				0.0							
6+42	CL			0.0		8.5	6	5.7			16	3			
6+45	P			0.0		6.5	6	4.3			11	2			
6+47	D/APP	2	2	4.0				0.0							
6+57	CL	10	2	20.0				0.0							
6+59	P/D			0.0		9	6	6.0			16	3			
6+71	P			0.0		6	9	6.0	6		14				
Sheet Totals				**119.0**	**63.7**			**172.3**	**80.0**	**10.0**	**285.0**	**14.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	15

ND 297 - 4th Ave S (Eastbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
6+71	D	2	2	4.0				0.0							
6+82	P			0.0		6	9	6.0	6		14				
6+90	CL			0.0		9.5	6	6.3			12				
7+03	P			0.0		6	9	6.0	6		14				
7+03	D			0.0		6	7.5	5.0	4		10				
7+15	D	2	2	4.0				0.0							
7+16	P/D			0.0		10	6	6.7		4	14				*Reinforced Panel over Pipe*
7+16	D	2	2	4.0				0.0							
7+18	P			0.0		6	9	6.0	6		14				*Reinforced Panel over Pipe*
7+25	D	2	2	4.0				0.0							
7+26	D	2	2	4.0				0.0							
7+34	P			0.0		6	6	4.0	3		8				*Reinforced Panel over Pipe*
7+34	D	2	2	4.0				0.0							
7+51	P/D			0.0		28	6	18.7	8	4	30	6			
7+62	P			0.0		6	6	4.0	3		8				
7+76	CL	2	2	4.0				0.0							
7+91	P/D	2	2	4.0				0.0							
8+13	P/D	2	2	4.0				0.0							
8+45	*END*			0.0				0.0							***Project Limits***
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
Sheet Totals				**36.0**	**0.0**			**62.7**	**36.0**	**8.0**	**124.0**	**6.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	11	16

ND 297 - 4th Ave S (Westbound Lanes) Conrete Repair Locations

LOCATION		SPALL			Curb and	Full Depth 9"							Stitching		Notes
		DIMENSIONS		SF	Gutter	DIMENSIONS		SY	BASKET	Bar Type			Dimensions	# of Bars	
Station	Lane	L (ft)	W (ft)		(LF)	L (ft)	W (ft)		(LF)	Dowel	Deformed	Tie	(LF)	Dowel	
4+03	****			0.0				0.0							**Begin Concrete**
4+03	D			0.0		20.5	10.7	24.4	8	9	9	3			
4+19	RAMP	2	2	4.0				0.0							
4+21	GORE	2	2	4.0				0.0							
4+25	D	2	2	4.0				0.0							
4+33	D			0.0		25.5	6	17.0	6		15				
4+33	RAMP			0.0		6	7	4.7	4		12				
4+48	RAMP	4.2	2	8.4				0.0							
4+62	P			0.0		6	6	4.0	3		8				
4+62	D			0.0		30.7	6	20.5	6		20				
4+77	P			0.0		6	6	4.0	3		8				
4+90	P			0.0		38	11.7	49.4	27		20	12			
4+96	D			0.0		16.5	6	11.0	3		20				
5+25	D			0.0		6	7.5	5.0	4		12				
5+41	P	2	2	4.0				0.0							
5+57	D			0.0		6	7.5	5.0	4		12				
5+73	D			0.0		6	7.5	5.0	4		12				
5+75	P/D			0.0		14.5	6	9.7		4	16	3			
5+95	P/D	2.5	2	5.0				0.0							
6+04	P			0.0		6	6	4.0	3		8				*Reinforced Panel over Pipe*
6+08	P/D	9	2	18.0				0.0							
6+21	P/D			0.0		10	16	17.8	11		29				
6+52	D			0.0		15.7	10.6	18.5	8		9	6			
6+56	P	3	2	6.0				0.0							
6+68	P/D			0.0		21.8	22.4	54.3	34		38	4			
6+90	P/D			0.0		11	6	7.3			12	3			
7+15	P	2	2	4.0				0.0							
8+29	D			0.0		6	6	4.0	3		8				
8+29	D			0.0	16			0.0							
8+39	P			0.0		6	6	4.0		4	6	2			
8+45	*END*			0.0				0.0							***Project Limits***
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
				0.0				0.0							
Sheet Totals				**57.4**	**16.0**			**269.4**	**131.0**	**17.0**	**274.0**	**33.0**	**0.0**	**0.0**	

CPR Data Tables

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	11	17

Item Description	Spall	Curb and Gutter	Stitching		Full Depth				
	SF	LF	Dimensions (LF)	# of Bars Dowel	SY	Basket (LF)	Bar Type Dowel	Deformed	Tie
Totals	2503.85	122.2	0	0	2715	1535	259	3785	339
Totals + 25%	3130	152.8			3394	1919	324	4731	424

CPR Data Tables
Totals

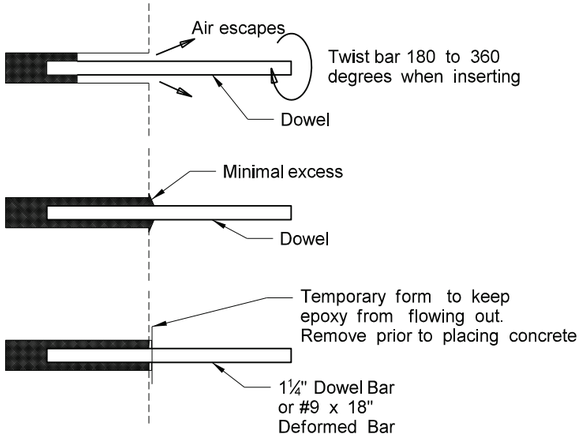
ND 297 (Demers Ave, 4th Avs S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

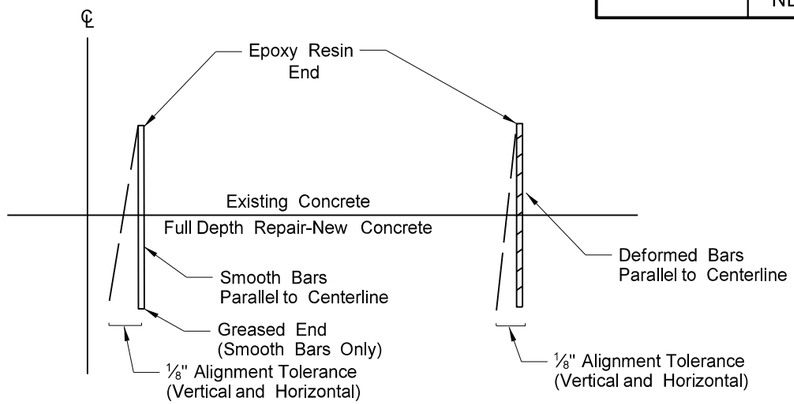
Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

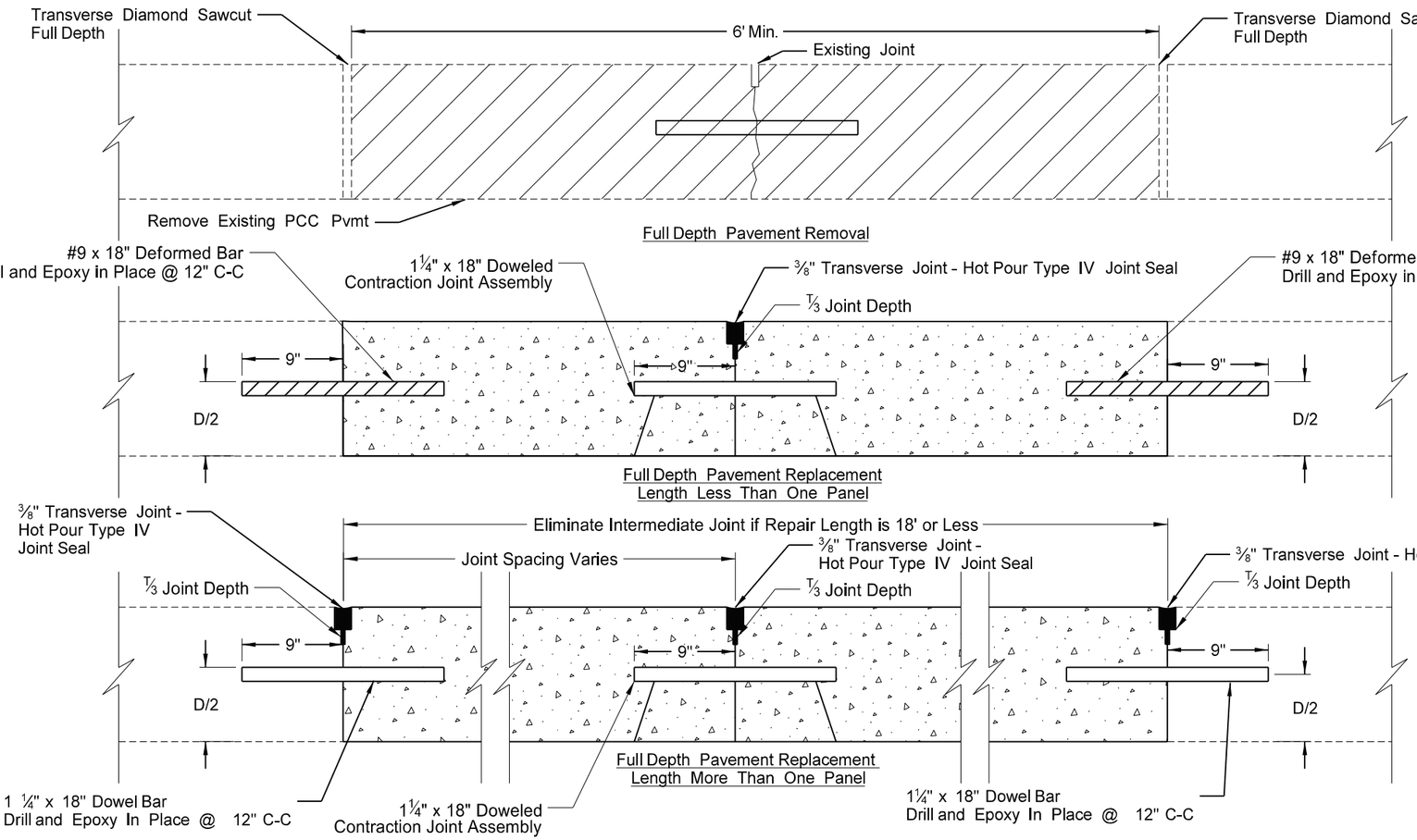
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	20	1



Dowel & Epoxy Installation
(Smooth or Deformed Bars)



Dowel Alignment Tolerance



Notes:

1. Variables:
   D = Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
4. Space Dowel / Deformed Bars, or Baskets @ 12" C-C and 18" from longitudinal joints; total of 10 bars per 12' lane.
5. Grease the exposed end of 1¼" x 18" smooth bar.
6. Use 1-1/2" Dowel Bars for 11" Pavement.

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

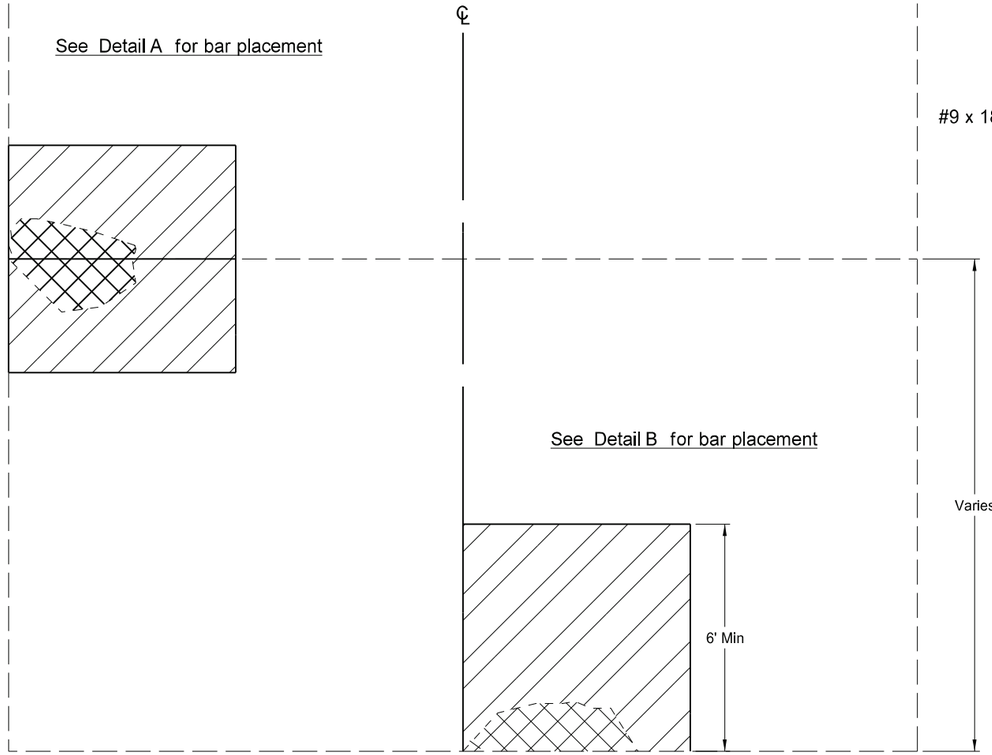
ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

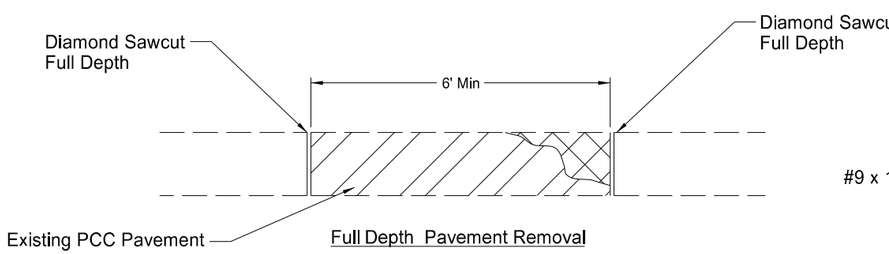
Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

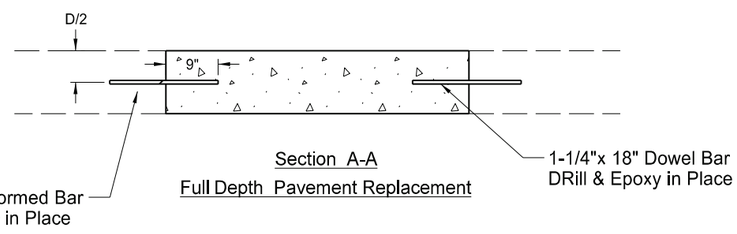
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	20	2



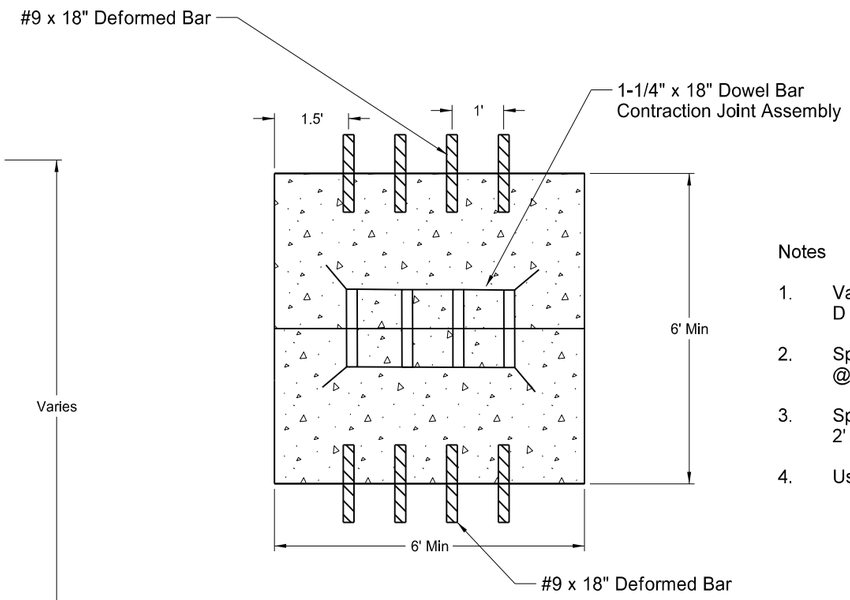
Full Depth Repairs
Removal Areas



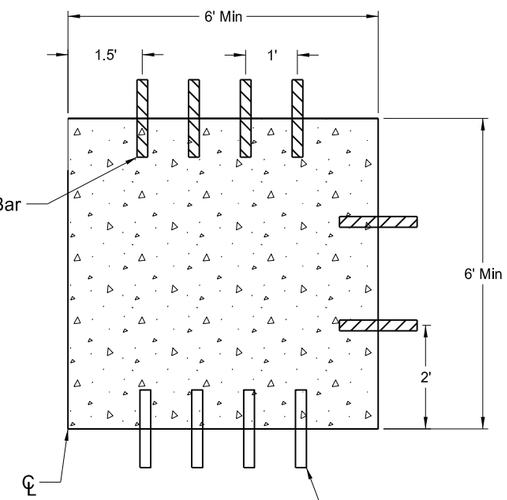
Full Depth Pavement Removal



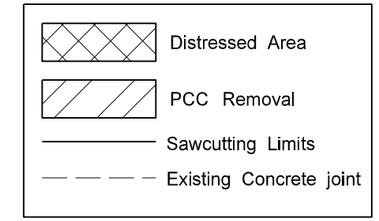
Full Depth Pavement Replacement



Detail A
Bar Placement



Detail B
Bar Placement



Notes

1. Variables
   D = Depth of Pavement
2. Space Dowel/Deformed Bars, or Baskets @ 12" C-C and 18" from longitudinal joints.
3. Space Deformed Bars along construction joint 2' from transverse joint and 2' C-C.
4. Use 1-1/2" Dowels for 11" Pavement.

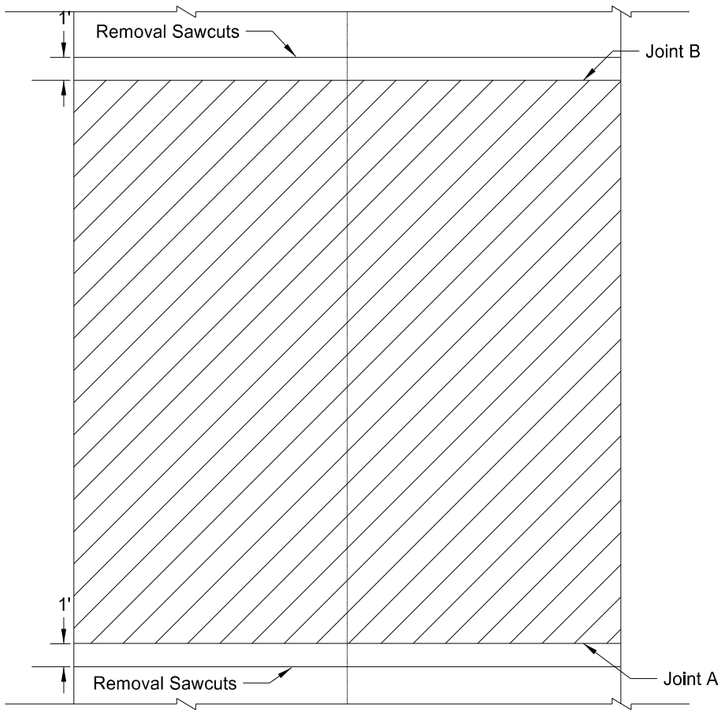
CPR Segments
Spall Repair Detail
Straight Joints

ND 297 (Demers Ave)

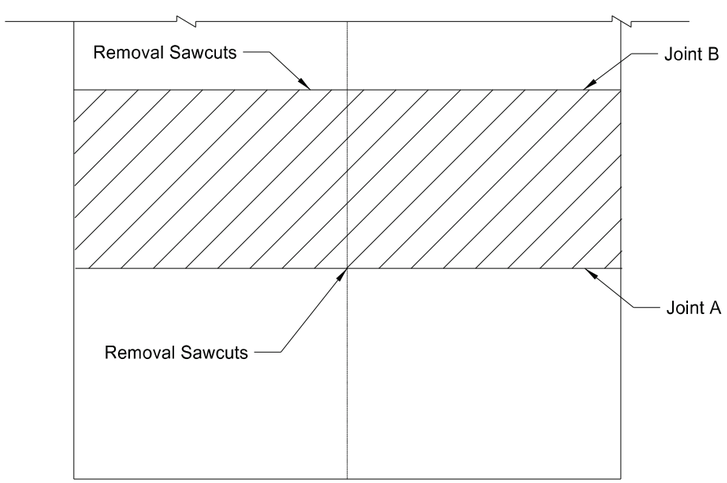
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

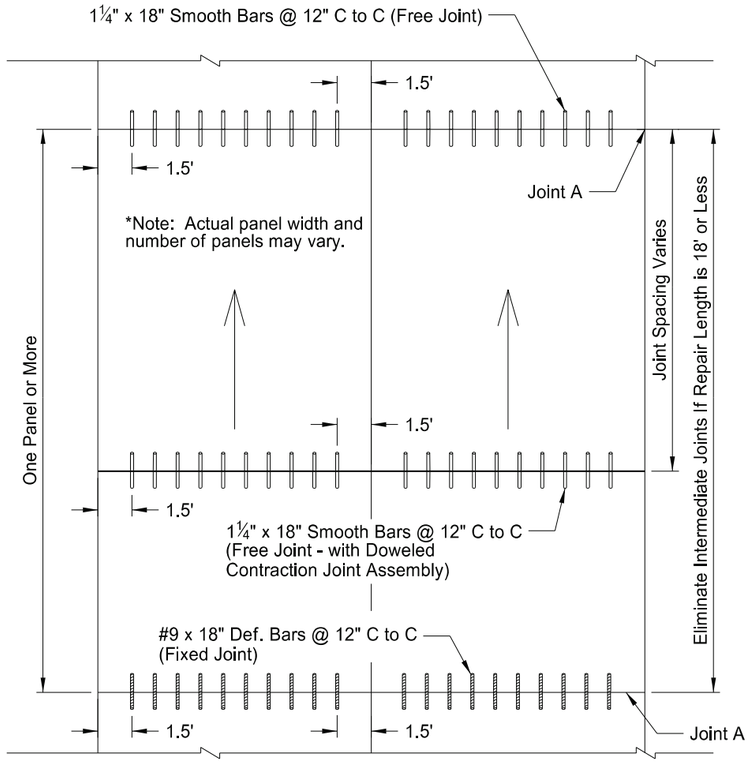
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	20	3

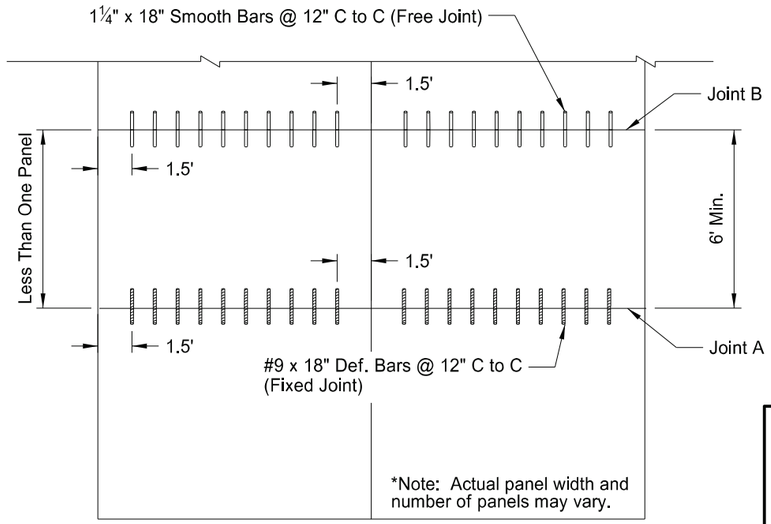


*Note: Actual panel width and number of panels may vary.

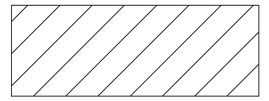


Removal





Proposed



PCC Removal

Notes:

1. Joint A (Fixed Joint) will be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut will be made at 90° to the centerline. Place deformed bars perpendicular to the face of the saw cut.

2. Joint B (Free Joint) will be the new joint with the greatest distance to the next transverse joint or working random crack. Install the smooth bars within the tolerances shown on the "Dowel Bar Placement - Full Depth Repair" detail sheet.

3. When the distance to the next transverse joint or working random crack is equal for both new joints, place (Joint B), the free joint, on the approach side of the repair.

4. If a repair is greater than one panel in length, install a Doweled Contraction Joint Assembly at transverse contraction joints.

5. In repair areas which are not the entire roadway width, place joints to match the existing pavement wherever possible.

6. The joints at the beginning and end of a full dpeth repair section can be either a Joint B or Joint A depending on the existing joint.

7. Dowel Bars will be 1-1/4" x 18" when the pavement thickness is 10" or less and 1-1/2" x 18" when the pavement thickness is greater than 10".

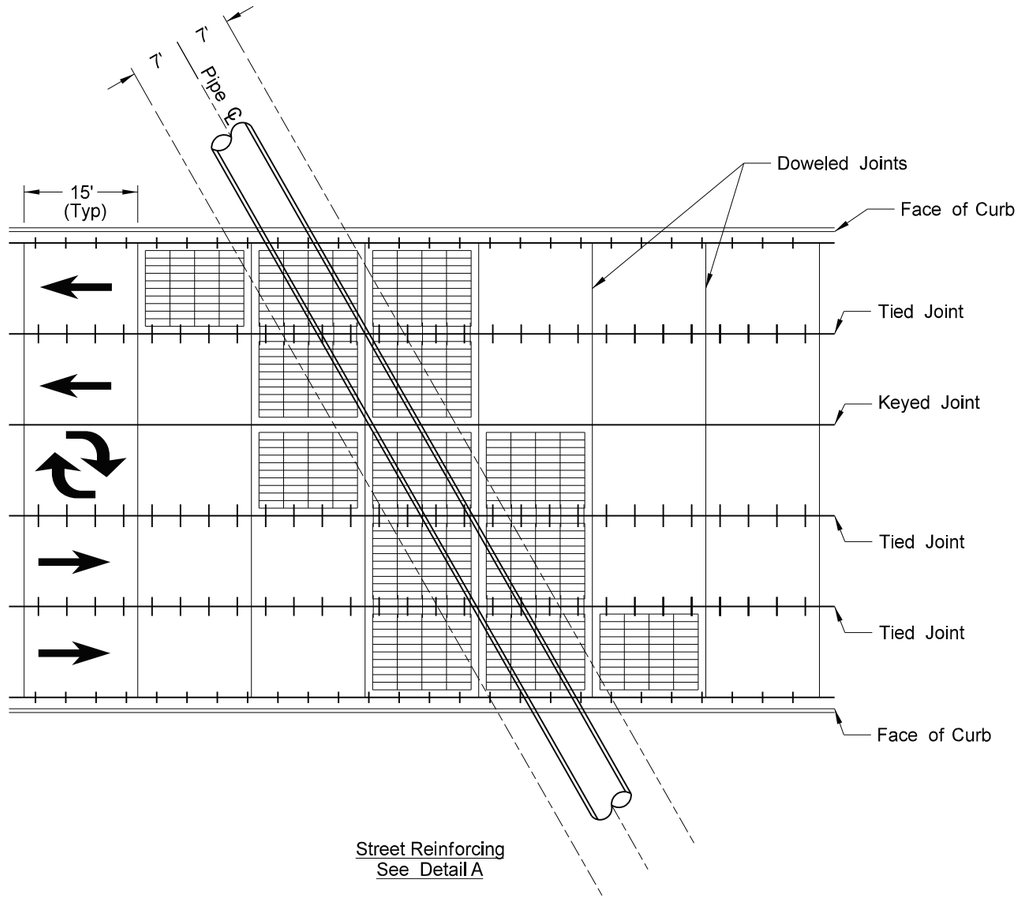
Removal of Concrete & Dawel Bar Placement
Full Depth Repair
Perpendicular Joints

ND 297 (Demers Ave)

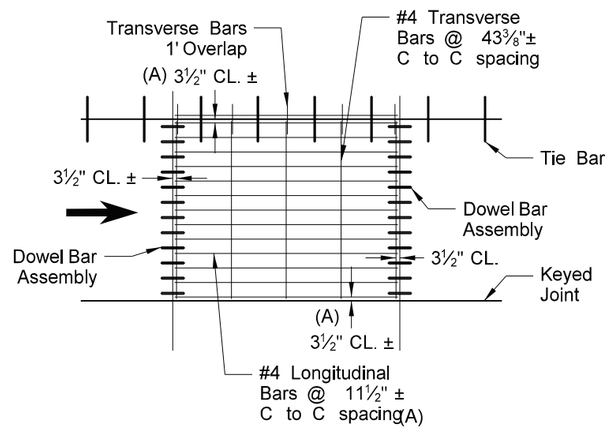
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	20	4



Street Reinforcing
See Detail A



Detail A
Reinforcing Layout

Longitudinal Bar Spacings		
Panel Width	Longitudinal Bar Spacing	Bar Clearance, From Long. Joint
12'	11⅜"	3½"
14'	11½"	3¼"
16'	11½"	3¾"

(A) See Longitudinal Bar Spacings table for various panel widths.

NOTES:

1. Place reinforcing steel above dowel bars, above longitudinal centerline tie bars, and under shoulder tie bars.
2. A 1 foot minimum overlap of transverse reinforcing steel across the longitudinal tied joints shall be provided.
3. Transverse reinforcing steel shall be gapped across keyed joints a minimum of 6 inches (3 inches on each side of joint).
4. The complete panel shall be reinforced if any part of the panel lies within 7 feet of the pipe centerline.
5. All costs to furnish and install the reinforcing steel as shown shall be included in the price bid for concrete pavement items.

Pavement Reinforcing at Pipe Locations Detail

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

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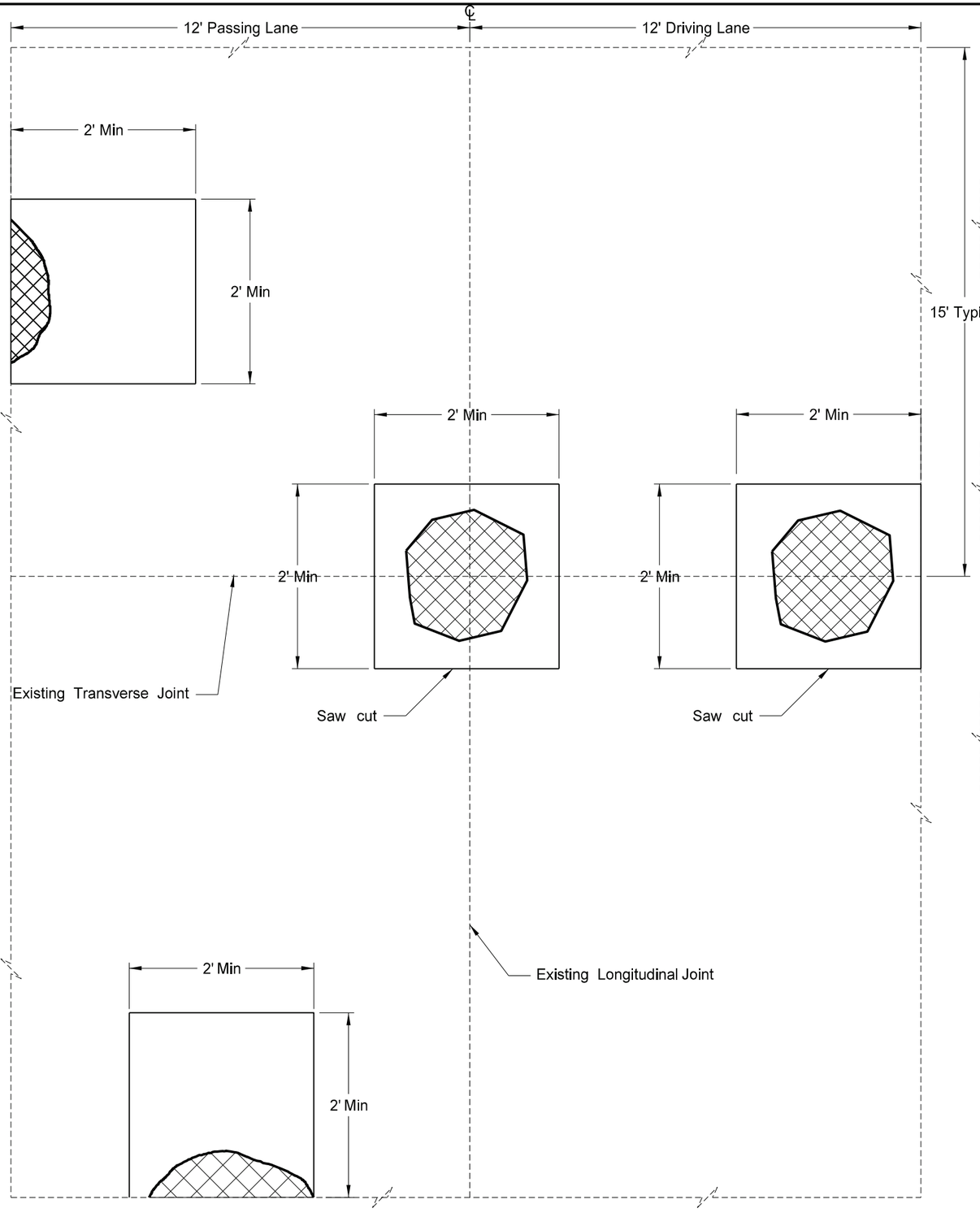
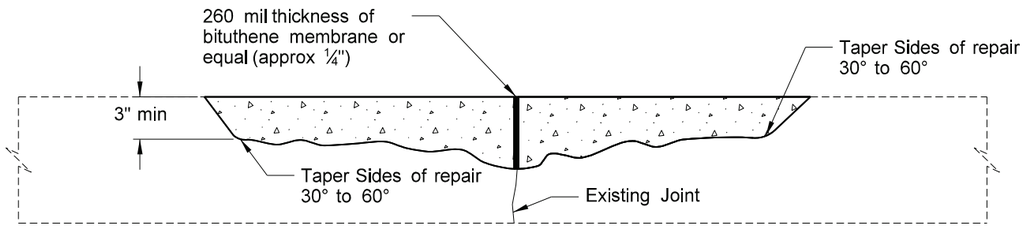
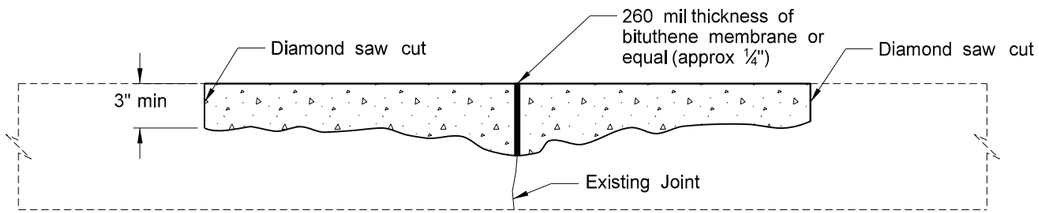




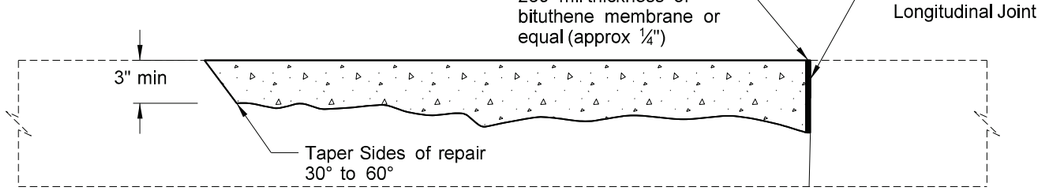
Cross Section - Repair Area

Milling



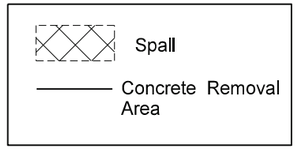
Cross Section - Repair Area

Chipping



Cross Section - Repair Area

Milling



Plan View (not to scale)

CPR Segments
Spall Repair Detail
Straight Joints

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
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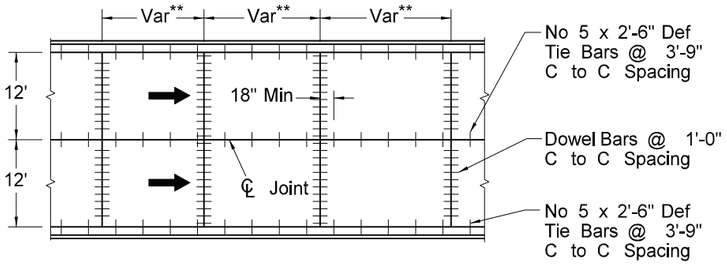
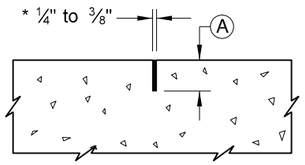


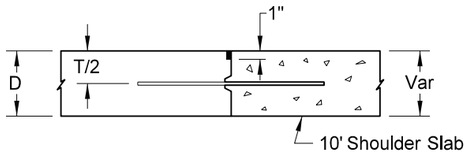
TRANSVERSE JOINTS

** Joint Spacing to match existing (Varies from 10' to 18')



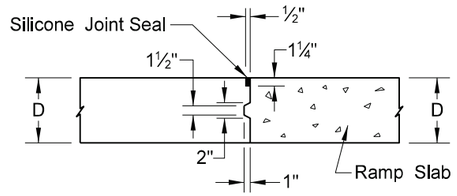
SAWED, TIED LONGITUDINAL JOINTS

(Mainline and ramps)



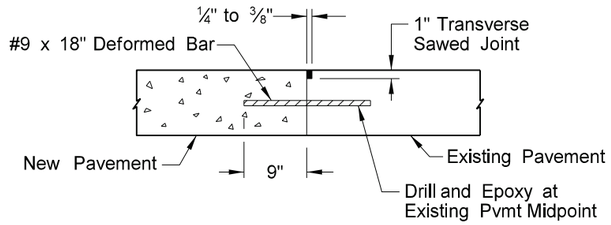
LONGITUDINAL CONSTRUCTION JOINT

(at 10' Shoulder - Keyed & Tied)



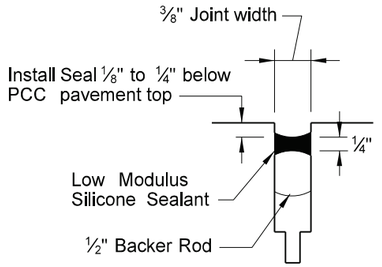
LONGITUDINAL CONSTRUCTION JOINT

(at Ramps - Keyed)



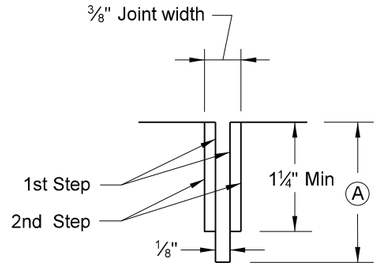
DEFORMED BAR INSTALLATION

(Spaced at 1'-0" C to C)

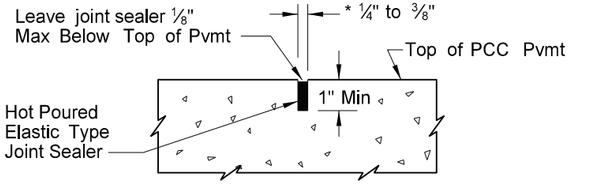


TRANSVERSE JOINT SEAL

SILICONE SEAL

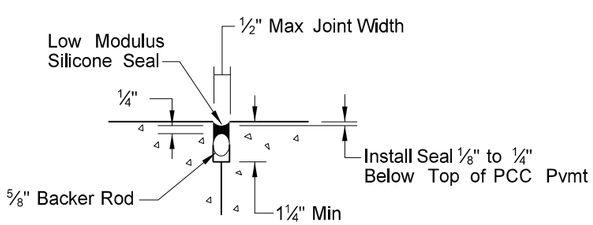


TRANSVERSE JOINT SAWING



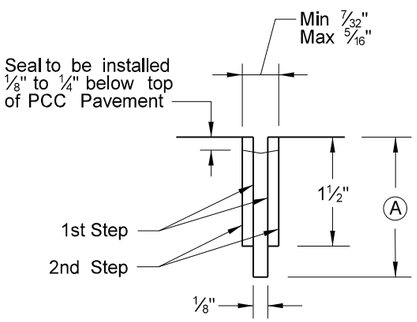
JOINT SEALER DETAIL

(Applies to all Sawed and Tied Joints)

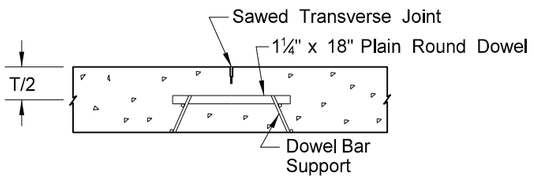


LONGITUDINAL JOINT SILICONE SEAL

(Non-Tied Joint)



SAWED TRANSVERSE JOINT



DOWELED TRANSVERSE JOINT

D = Depth of Pvmt

Ⓐ = One-Third thickness of PCC Pavement

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

All dowel bars used for the Doweled Contraction Joints on this project shall be epoxy coated and conform to AASHTO M-254 Type B.

NOTE:
Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer. No preformed compression joint seals with fewer than 5 cells shall be approved.

Joint Details for Repairs
One Panel or More in Length

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/6/2025 8:11:39 AM tgwoinarowicz R:\project\60297002.015\District\Sheets\020GD_Details\020GD_006_DJR_10SC.dgn

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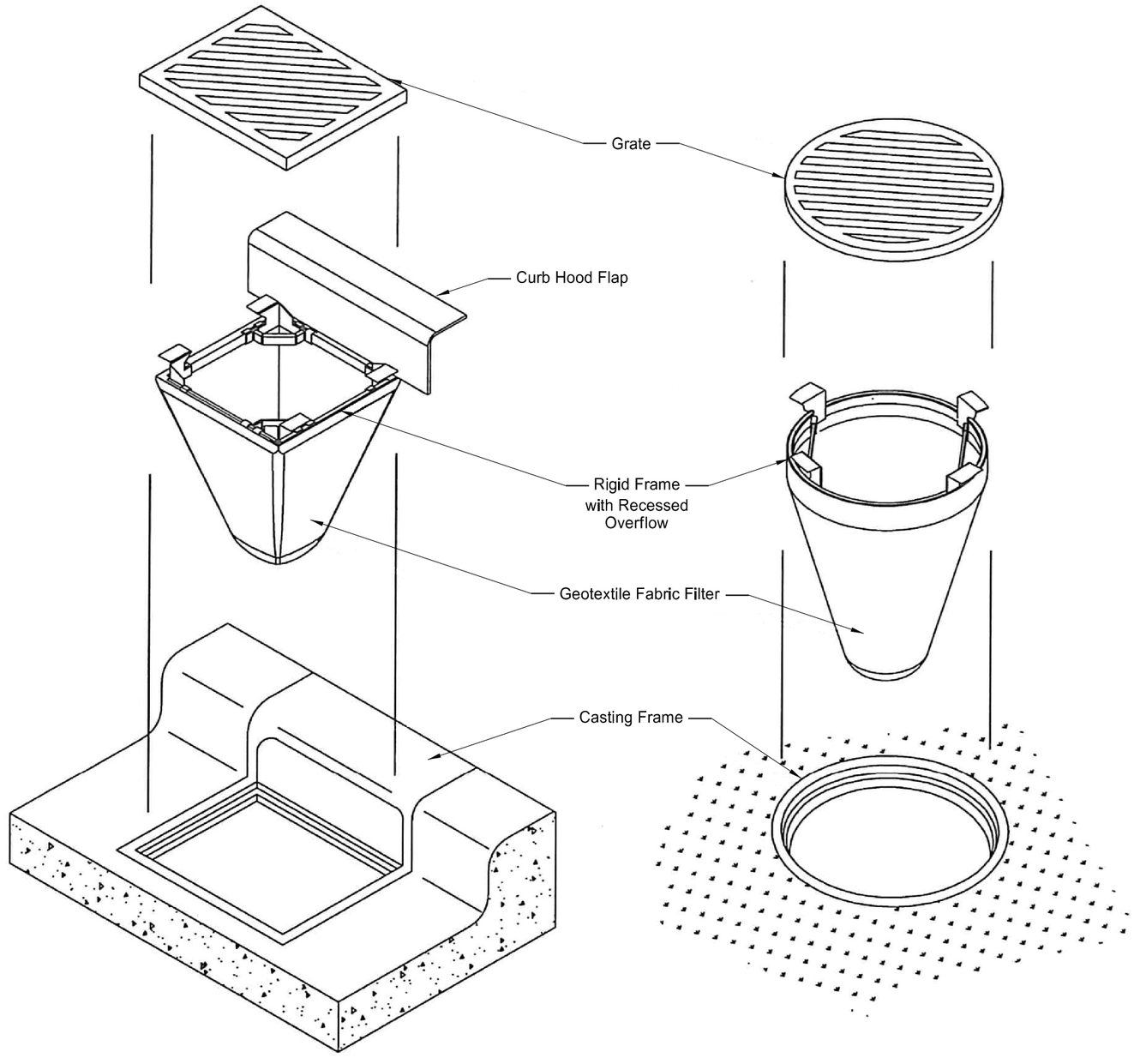

Catch Basin

Area Drain

Notes:

1. Inlet protection device will be manufactured to be recessed within specified or existing casting.
2. Overflow to be sized at a minimum to accommodate the grate flow capacity.

Inlet Protection Special (Demers Ave)	
Station	Offset
12+66	LT
12+68	RT
13+76	RT
15+95	RT
16+00	LT
29+94	LT
30+24	LT
30+27	RT
N 8th St	LT
N 8th St	RT
1st Ave N	LT
1st Ave N	RT
34+00	LT
34+01	LT
34+07	RT
36+40	LT
36+42	RT

Inlet Protection Special (NW Loop)	
Station	Offset
1+06	RT

Inlet Protection Special (4th Ave S)	
Station	Offset
3+00	RT
3+27	LT
3+29	LT
6+04	RT
6+04	LT
7+20	LT
7+20	RT

Inlet Protection Special (X Road)	
Station	Offset
8+01	RT
9+70	LT
9+70	RT

Inlet Protection Special (NE Ramp)	
Station	Offset
0+92	RT
1+22	LT

Inlet Protection Special (SW Ramp)	
Station	Offset
2+45	RT

Inlet Protection Device

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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NORTH DAKOTA

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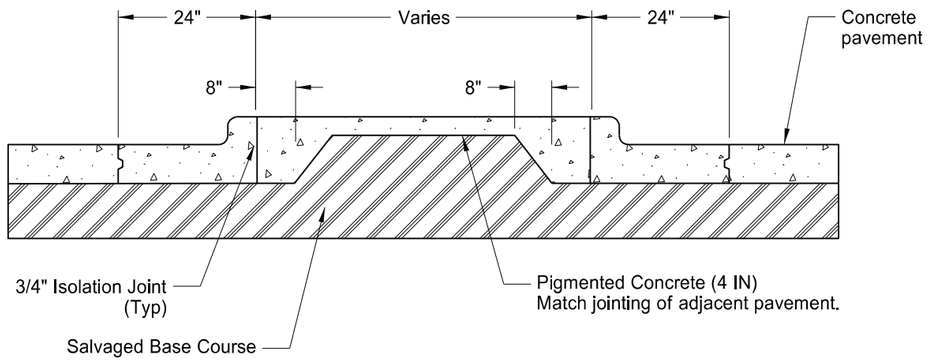
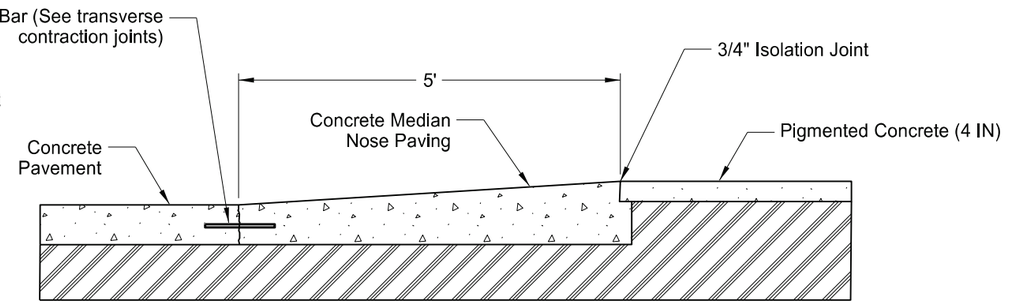
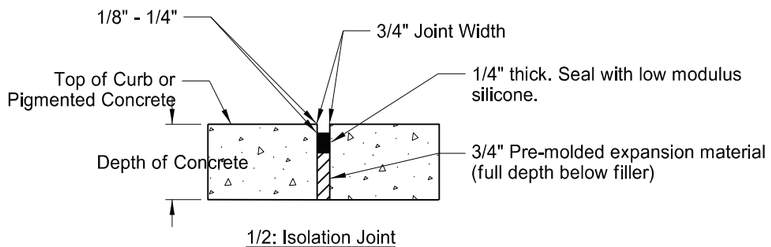


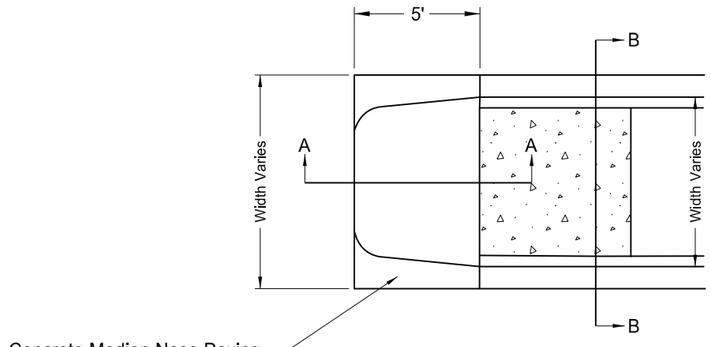
Median Section B-B



Section A-A



1/2: Isolation Joint



Concrete Median Nose Detail

Notes:

1. Construct Pigmented Concrete with positive drainage.
2. Saw transverse contraction joints in the Pigmented Concrete that are 1/8" wide and 1-1/4" deep.
3. Construct Pigmented Concrete Panels to be no smaller than 2' x 2'.
4. Construct a transverse 3/4" Isolation Joint every 50' in the Pigmented Concrete.
5. Construct Pigmented Concrete in median areas less than 6' wide.
6. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in teh price bid for sidewalk concrete.

Concrete Median Paving

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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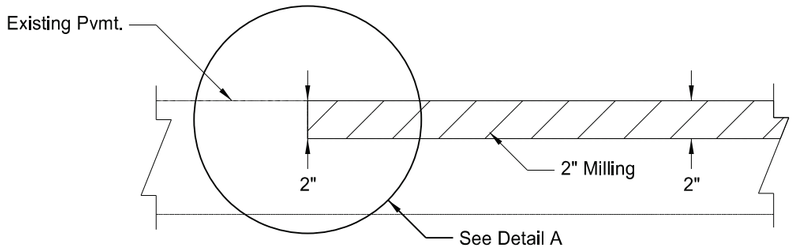
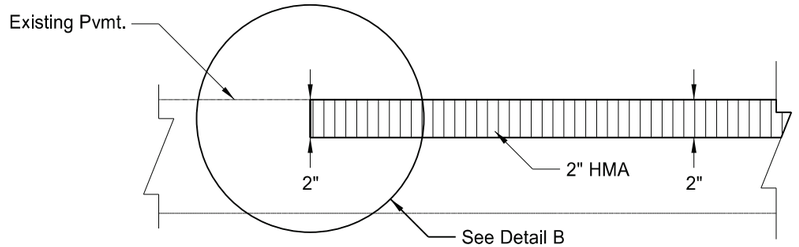
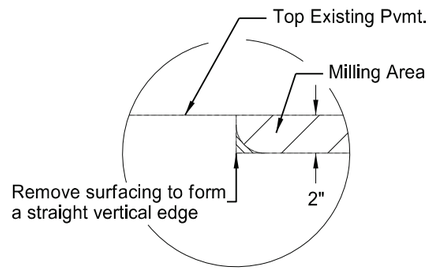
DATE 08/15/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	20	9



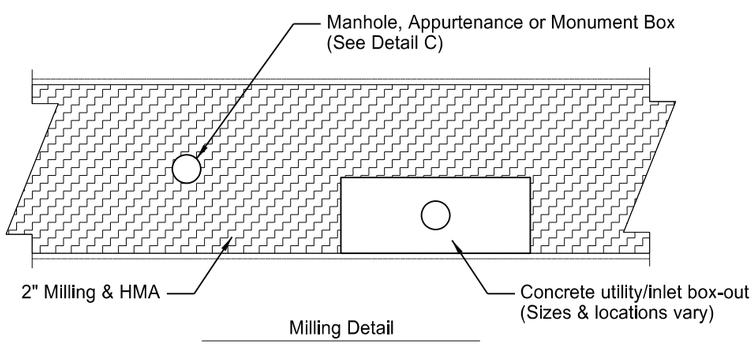




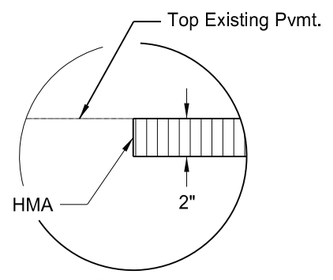
Detail A

Milling & HMA Details

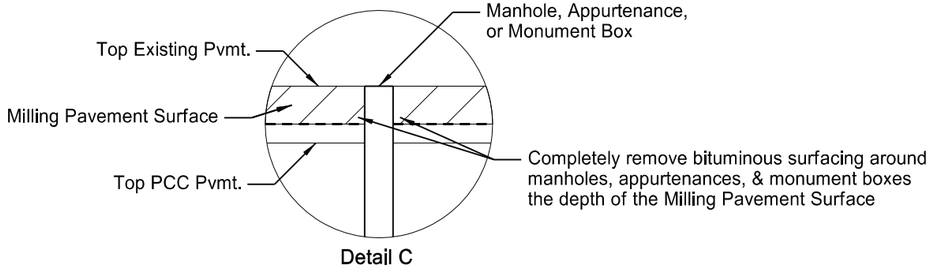
Beginning & end of project
Street returns
Concrete utility/inlet box-outs



Milling Detail



Detail B



Detail C
(Profile View)

Milling and HMA Details

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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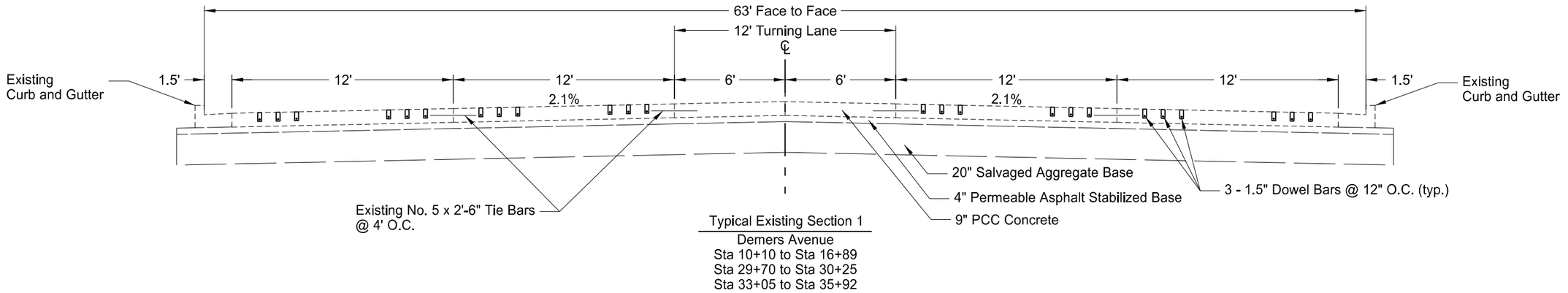
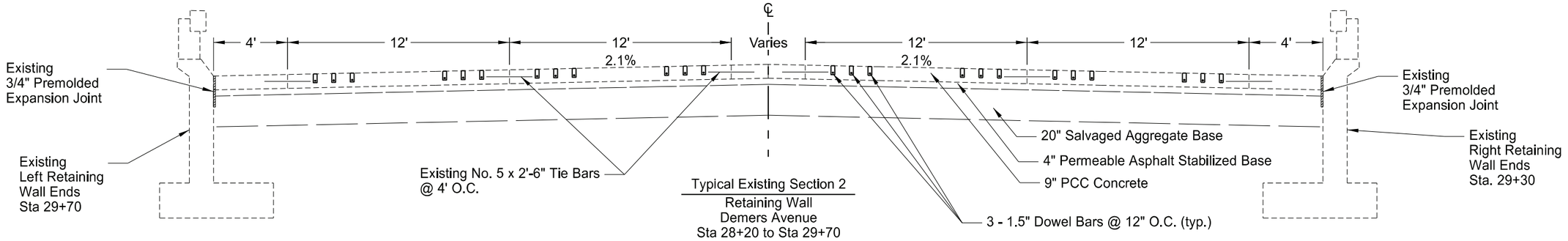
PE-6394
DATE 08/15/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	30	1



Typical Existing Section 1
Demers Avenue
Sta 10+10 to Sta 16+89
Sta 29+70 to Sta 30+25
Sta 33+05 to Sta 35+92



Typical Existing Section 2
Retaining Wall
Demers Avenue
Sta 28+20 to Sta 29+70

Typical Sections

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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PE-6394
DATE 08/13/25
NORTH DAKOTA

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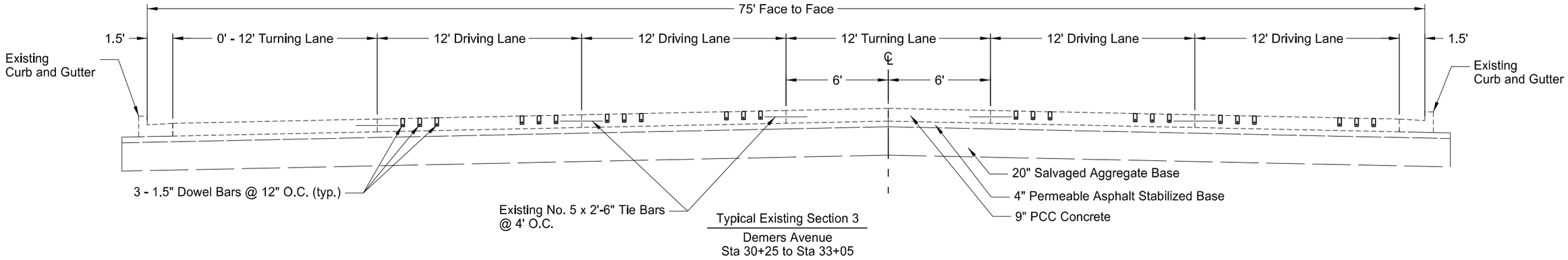
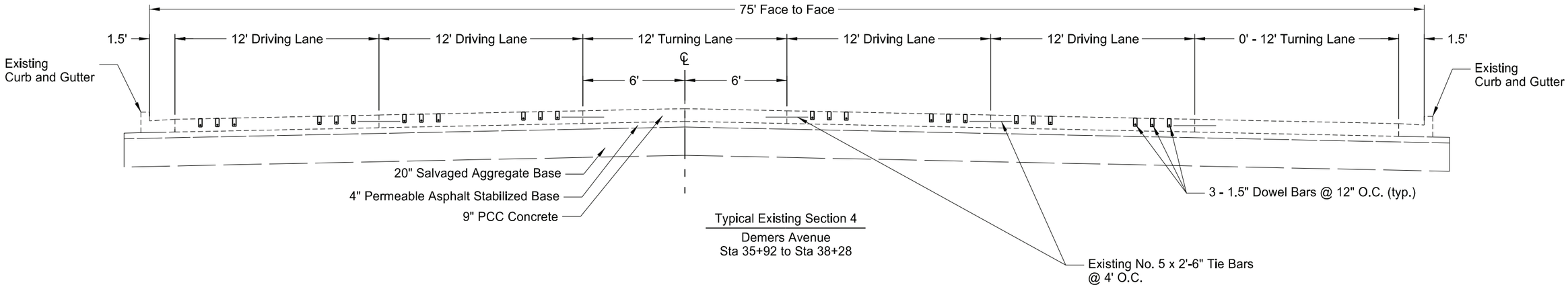
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	30	2



Typical Existing Section 3

Demers Avenue
Sta 30+25 to Sta 33+05



Typical Existing Section 4

Demers Avenue
Sta 35+92 to Sta 38+28

Typical Sections

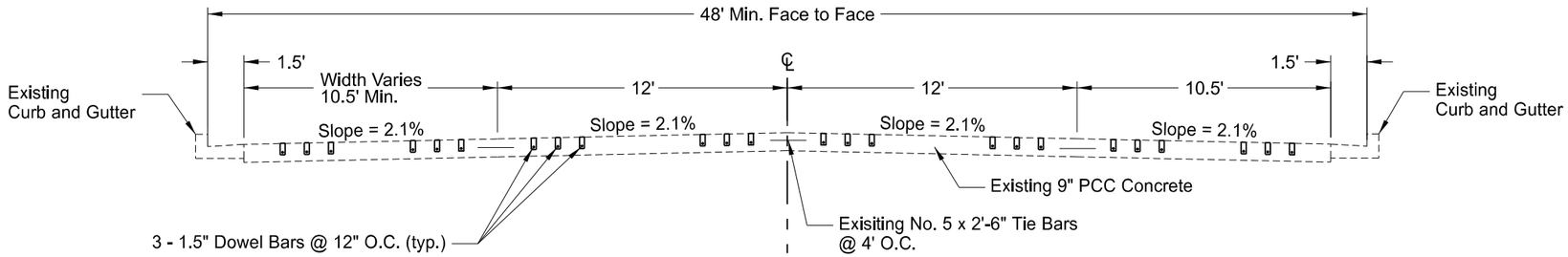
ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

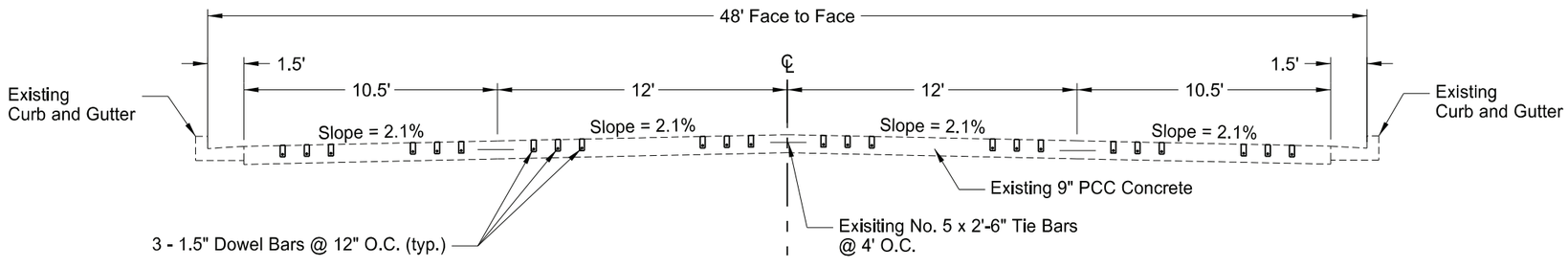
REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	30	3



Typical Existing Section 5

4th Avenue South
Sta 4+03 to 5+05



Typical Existing Section 6

4th Avenue South
Sta 5+05 to 8+50

Typical Sections

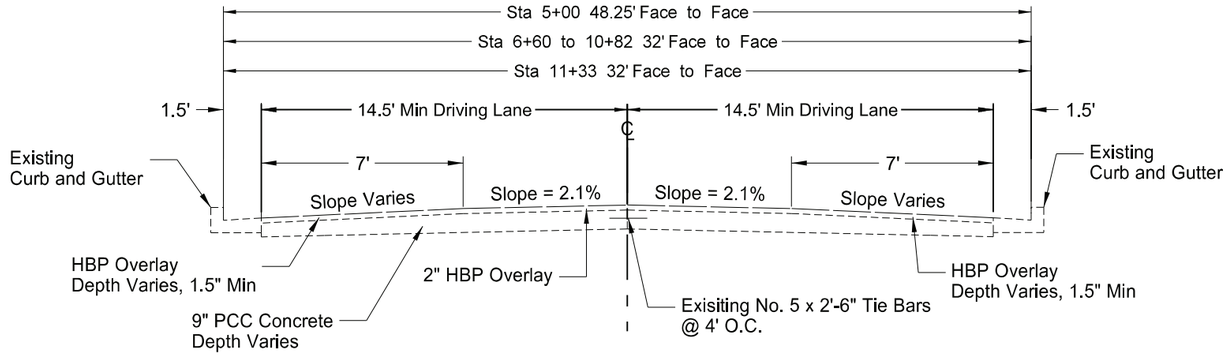
ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

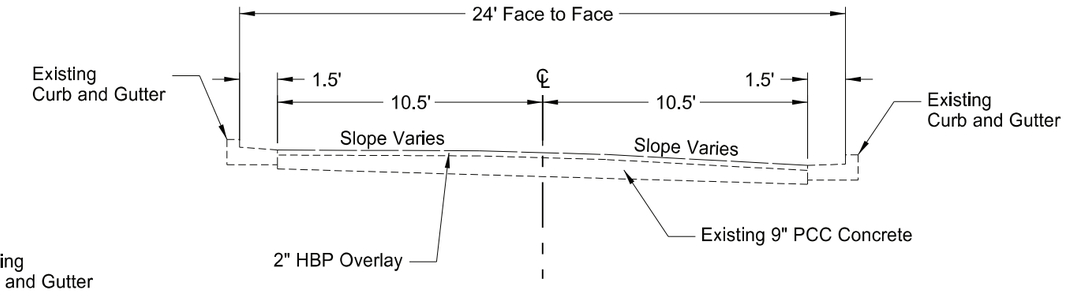
REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	30	4



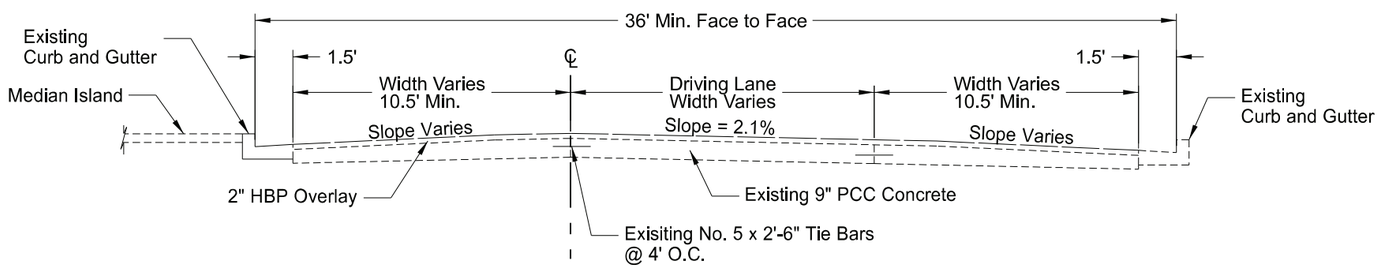
Typical Existing Section 7

X Road Section
Sta 5+00 to Sta 11+33



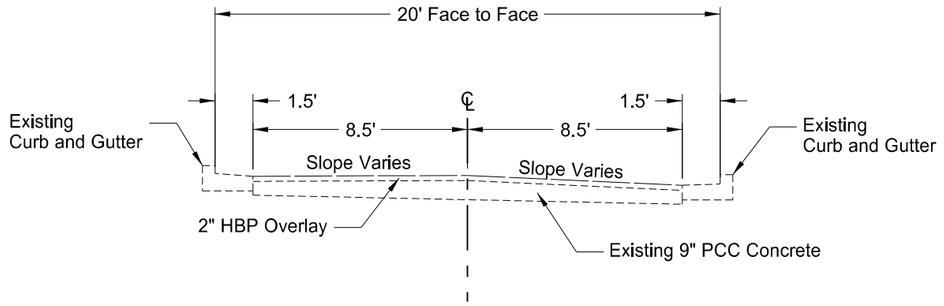
Typical Existing Section 9

Ramp Section
NW Loop: Sta 0+45 to Sta 2+50
NE Ramp: Sta 0+60 to Sta 3+35



Typical Existing Section 8

4th Avenue South
Sta 3+35 to Sta 4+03



Typical Existing Section 10

Ramp Section
SW Ramp: Sta 2+24 to Sta 5+00
SE Ramp: Sta 0+80 to Sta 5+50

Typical Sections

ND 297 (Demers Ave)

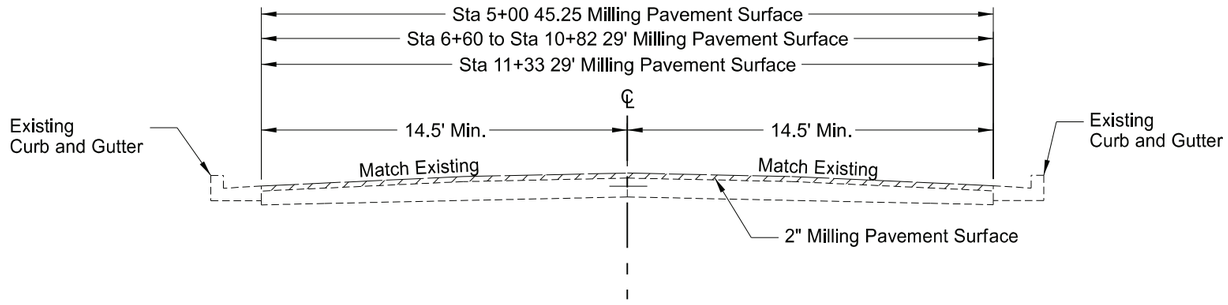
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

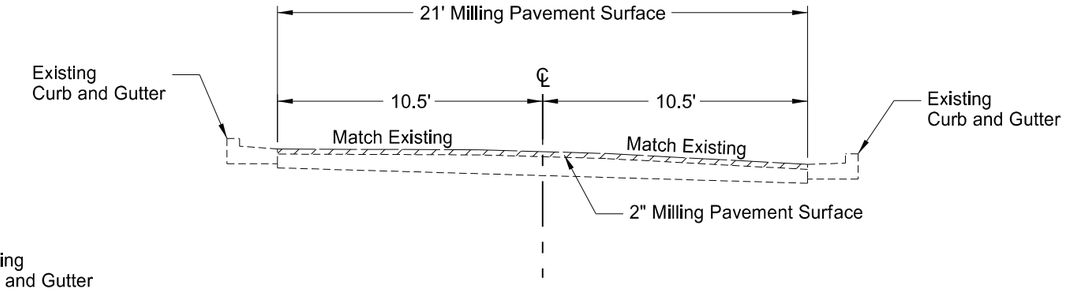
7/31/2025 4:24:56 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\030TP_Typicals\030TP_000_Typical_Sections.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	30	5



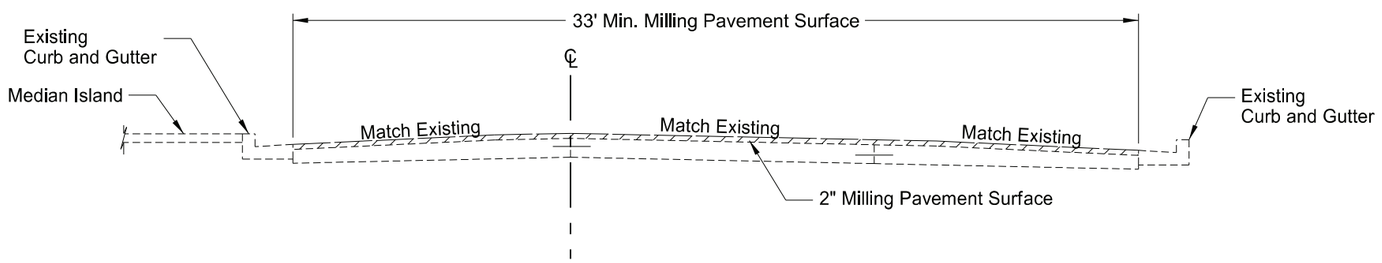
Typical Milling Section 7

X Road Section
Sta 5+00 to Sta 11+33



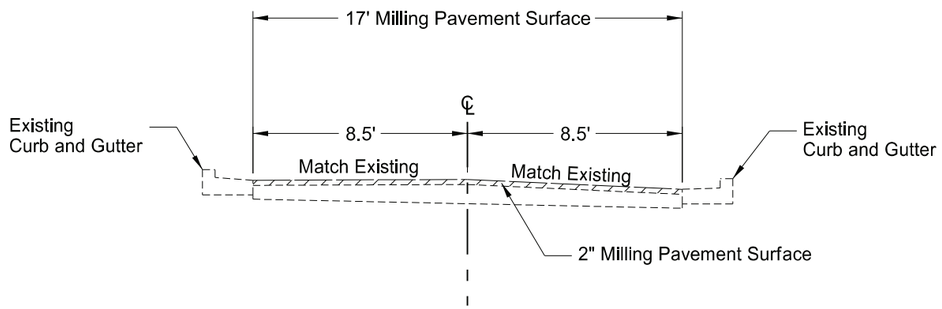
Typical Milling Section 9

Ramp Section
NW Loop: Sta 0+45 to Sta 2+50
NE Ramp: Sta 0+60 to Sta 3+35



Typical Milling Section 8

4th Avenue South
Sta 3+35 to Sta 4+03



Typical Milling Section 10

Ramp Section
SW Ramp: Sta 2+24 to Sta 5+00
SE Ramp: Sta 0+80 to Sta 5+50

Typical Sections

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

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DUSTIN LANG
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DATE 08/13/25
NORTH DAKOTA

7/31/2025 4:24:56 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\030TP_Typicals\030TP_000_Typical_Sections.dgn

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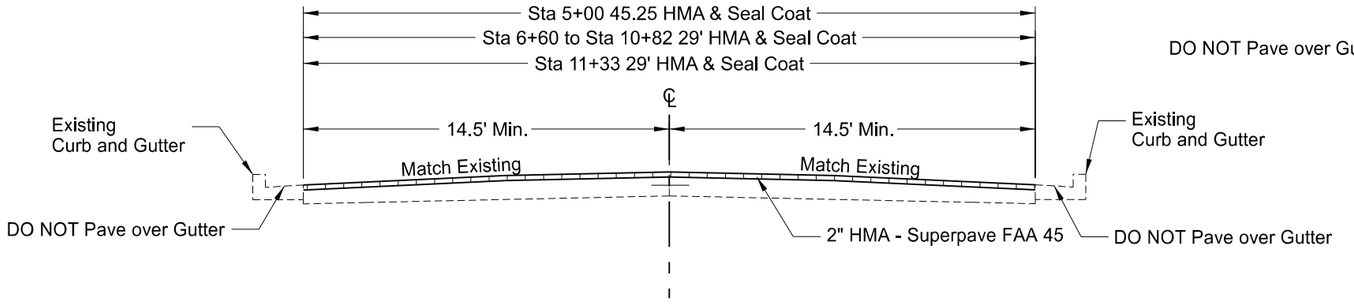
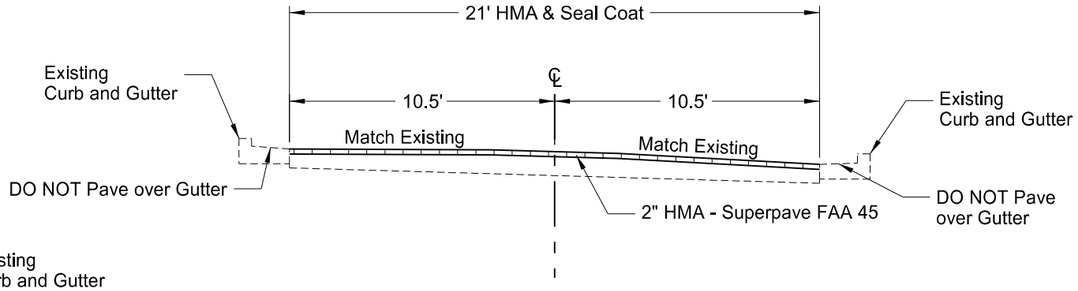


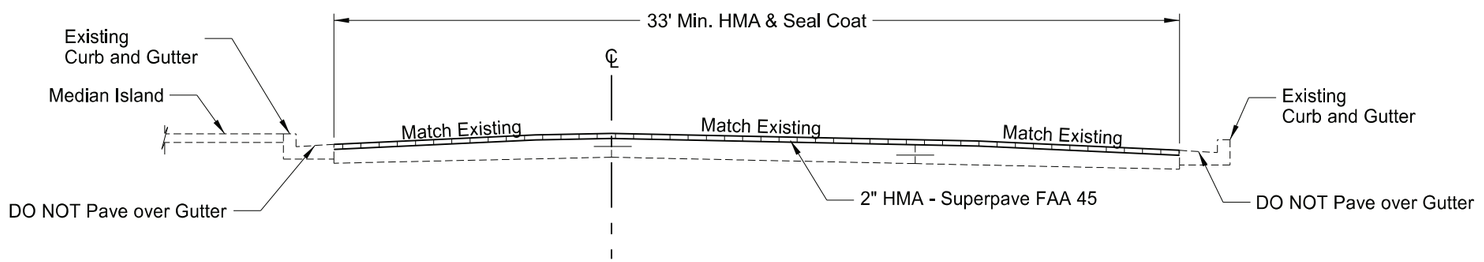
Typical Paving Section 7

X Road Section
Sta 5+00 to Sta 11+33



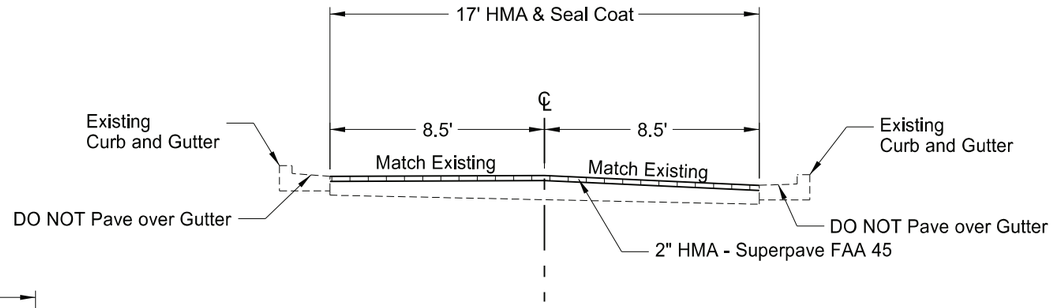
Typical Paving Section 9

Ramp Section
NW Loop: Sta 0+45 to Sta 2+50
NE Ramp: Sta 0+60 to Sta 3+35



Typical Paving Section 8

4th Avenue South
Sta 3+35 to Sta 4+03



Typical Paving Section 10

Ramp Section
SW Ramp: Sta 2+24 to Sta 5+00
SE Ramp: Sta 0+80 to Sta 5+50

Typical Sections

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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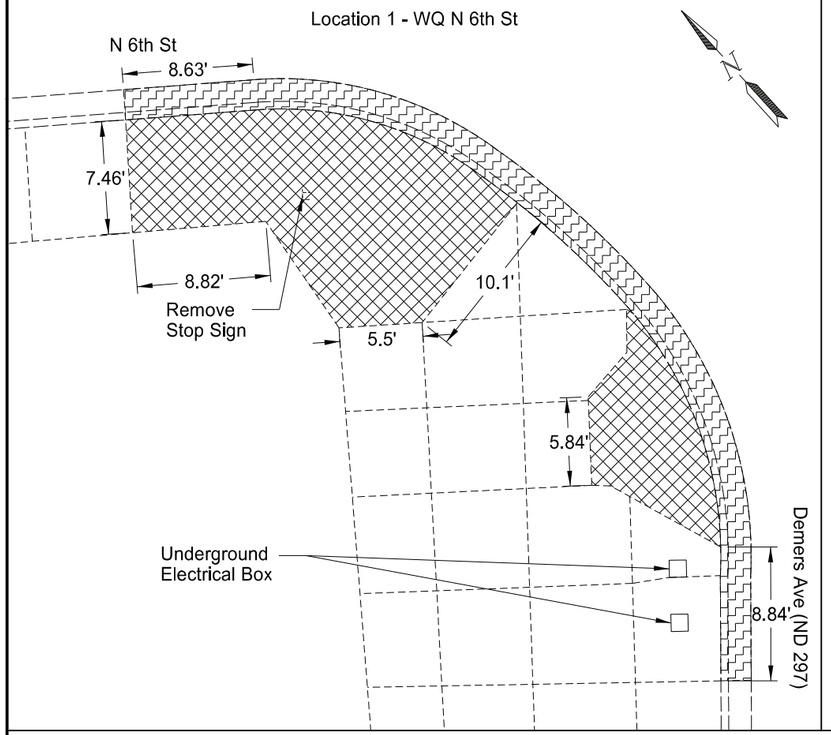
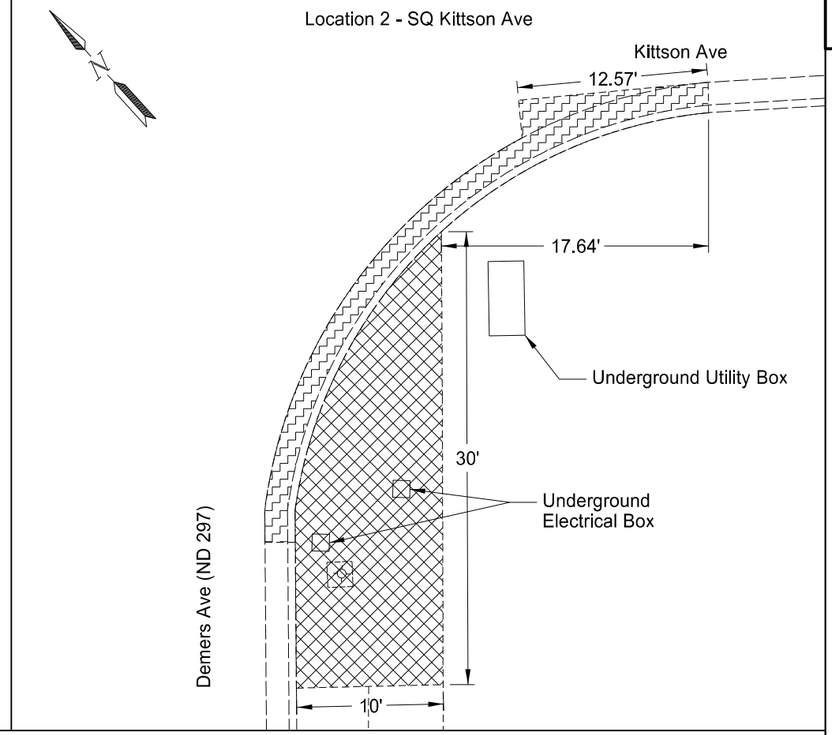




202 0114 Removal of Concrete Pavement

Location 1	25.7 SY
Location 2	25.3 SY

202 0130 Removal of Curb & Gutter

Location 1	58 LF
Location 2	44 LF

Removal of Concrete Pavement

Removal of Curb & Gutter

Removals

ND 297 (Demers Ave)

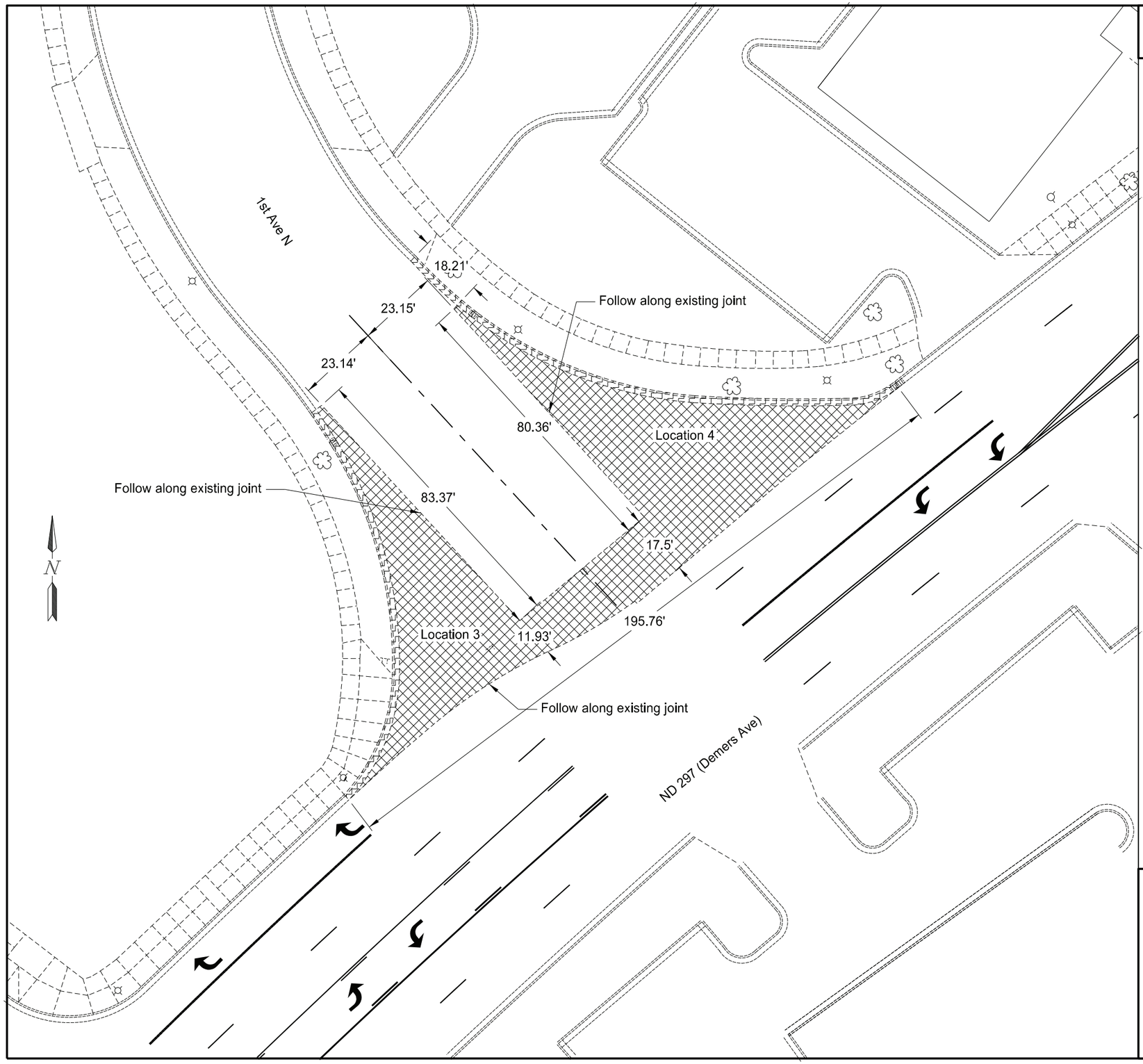
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

8/1/2025 10:41:16 AM tgwoinarowicz R:\project\60297002.015\District\Sheets\040RM_Removals\040RM_001_Removals.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	40	2



Spec Code Description

202 0114 Removal of Concrete Pavement

Locations 3 & 4: 1st Ave N	574 SY

202 0130 Removal of Curb & Gutter

Location 4: 1st Ave N (East Side)	151 LF
Location 3: 1st Ave N (West Side)	119 LF

Removal of Concrete Pavement

Removal of Curb & Gutter

Removals

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

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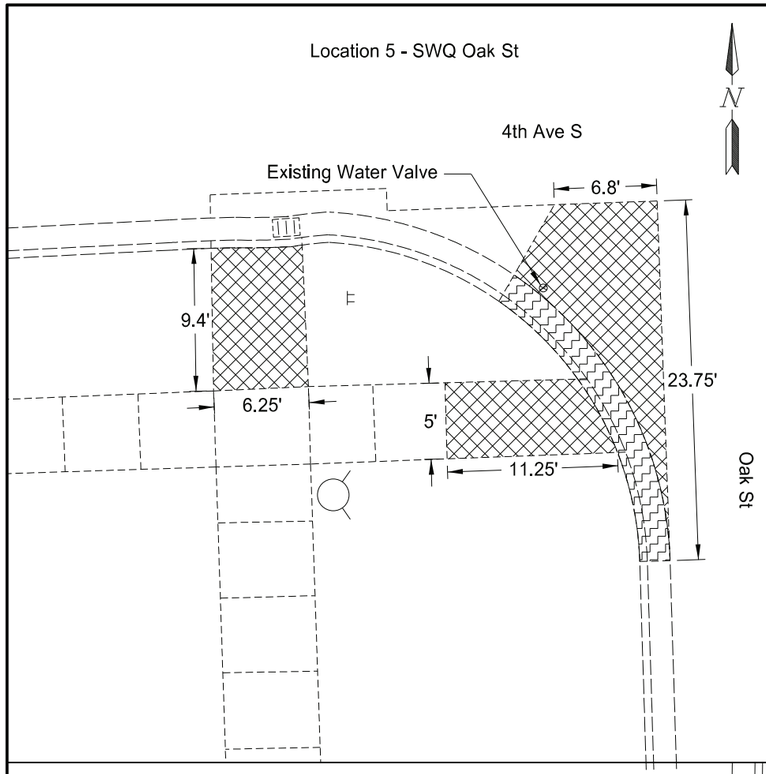
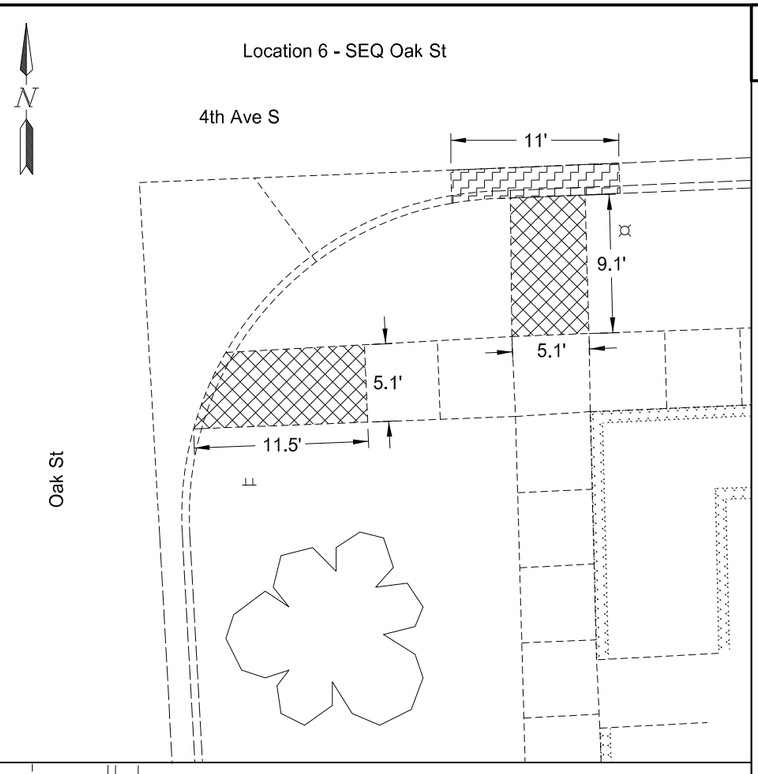
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	40	3

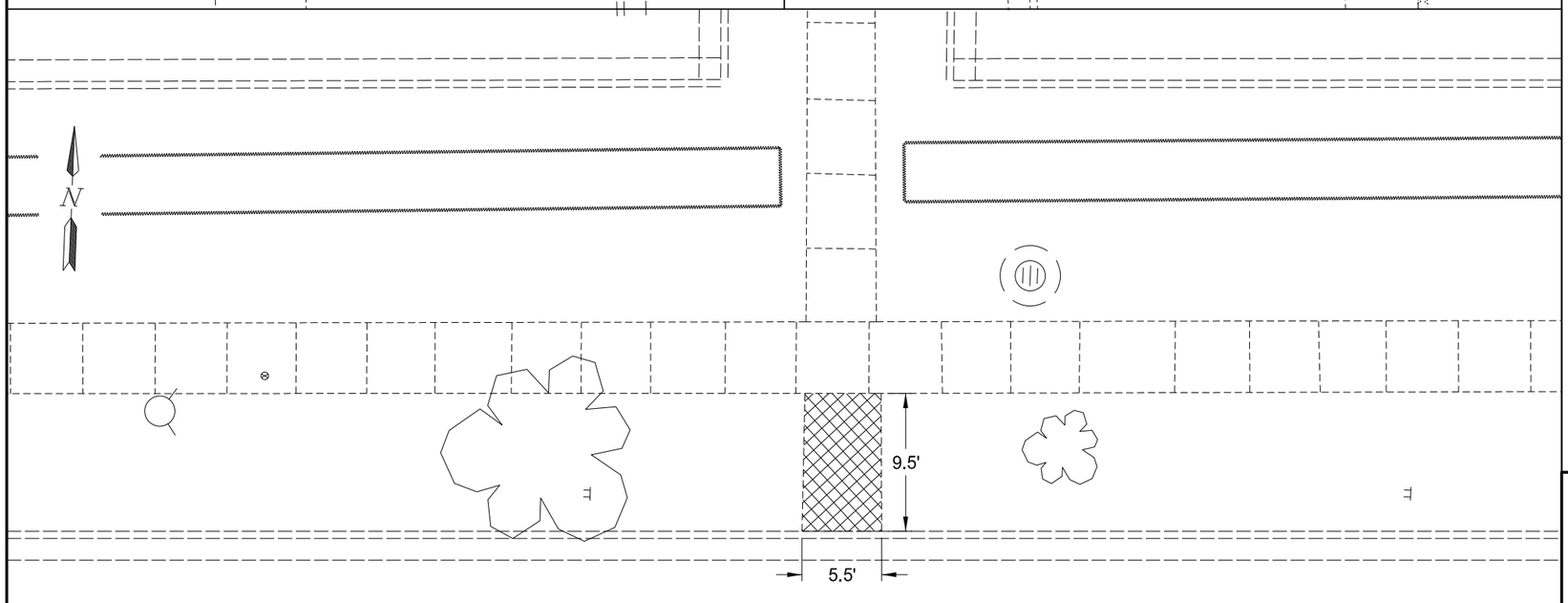
Location 5 - SWQ Oak St



Location 6 - SEQ Oak St



Location 7 - Cities Area Transit Bus Stop



202 0114 Removal of Concrete Pavement

Location 5	22.3 SY
Location 6	10.9 SY
Location 7	5.8 SY

202 0130 Removal of Curb & Gutter

Location 5	21 LF
Location 6	11 LF

Removal of Concrete Pavement

Removal of Curb & Gutter

Removals

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

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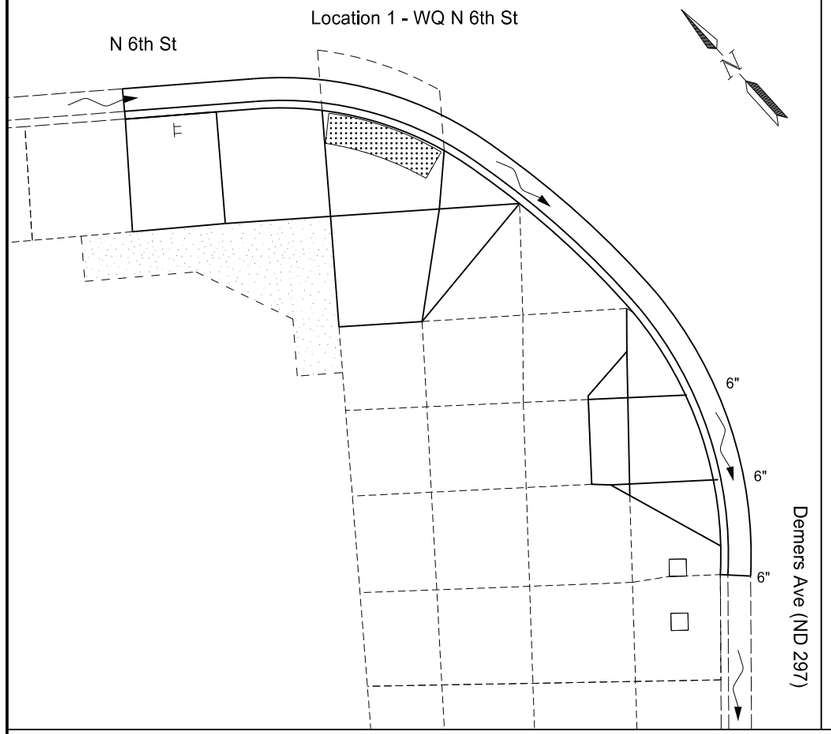
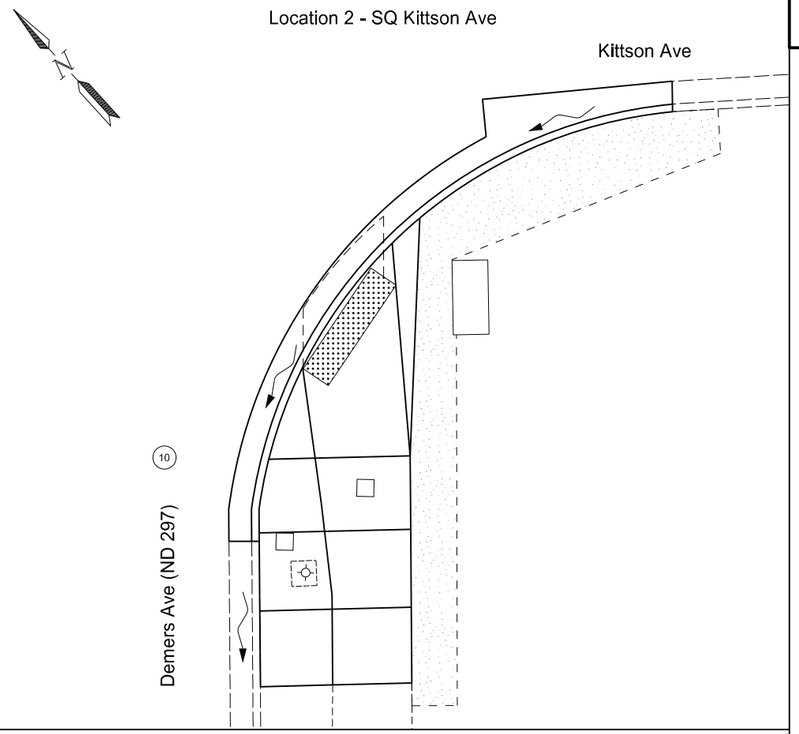
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	77	1

Location 1 - WQ N 6th St



Location 2 - SQ Kittson Ave



252 0100 Sod

Location 1	9.2 SY
Location 2	19.6 SY

970 0008 Landscape Preparation

Location 1	9.2 SY
Location 2	19.6 SY

Landscape Preparation/Sod

Permanent Sediment & Erosion Control

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
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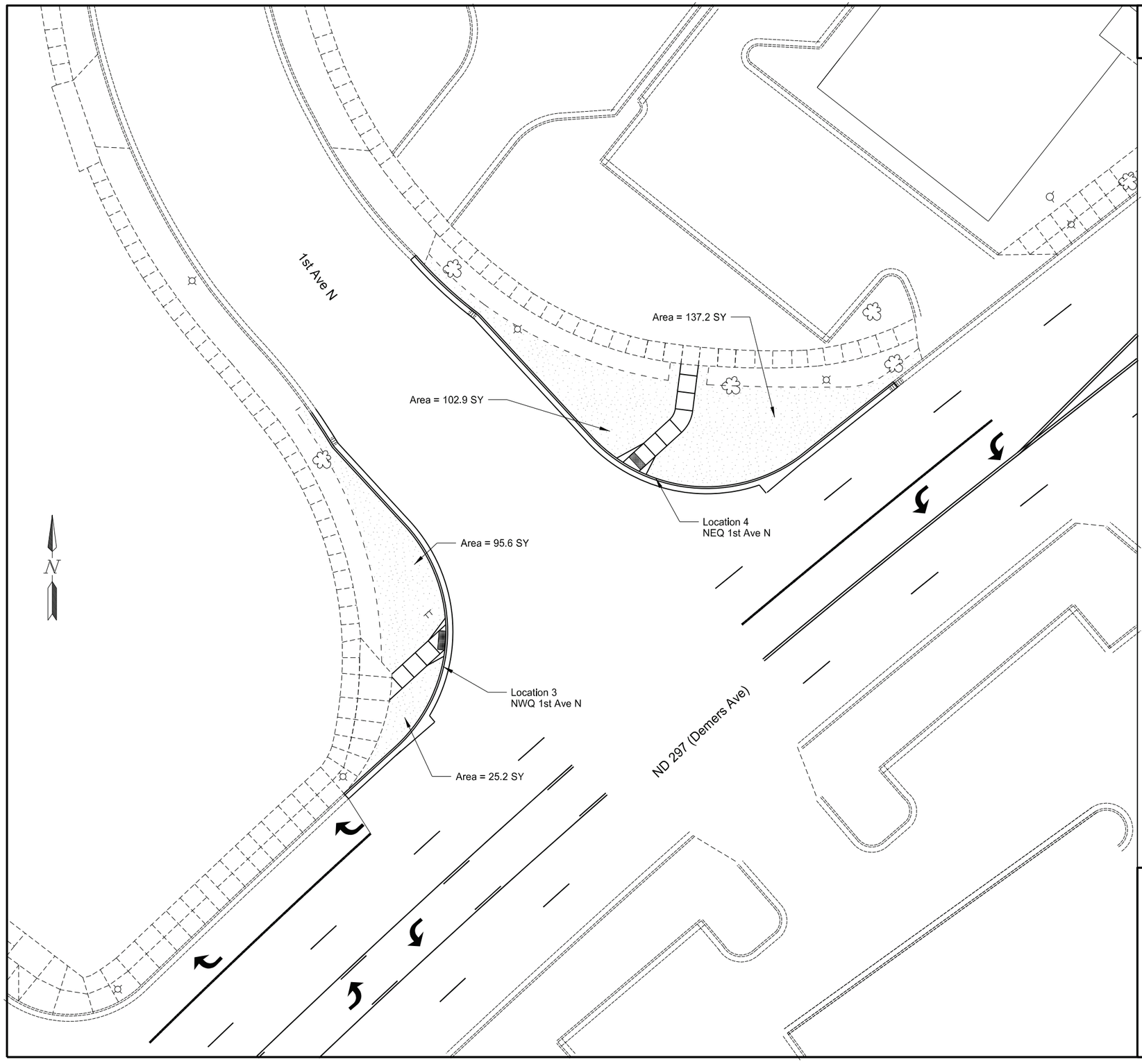
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	77	2



252 0100 Sod

Location 3	120.8 SY
Location 4	240.1 SY

970 0008 Landscape Preparation

Location 3	120.8 SY
Location 4	240.1 SY

Landscape Preparation/Sod

Permanent Sediment & Erosion Control

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
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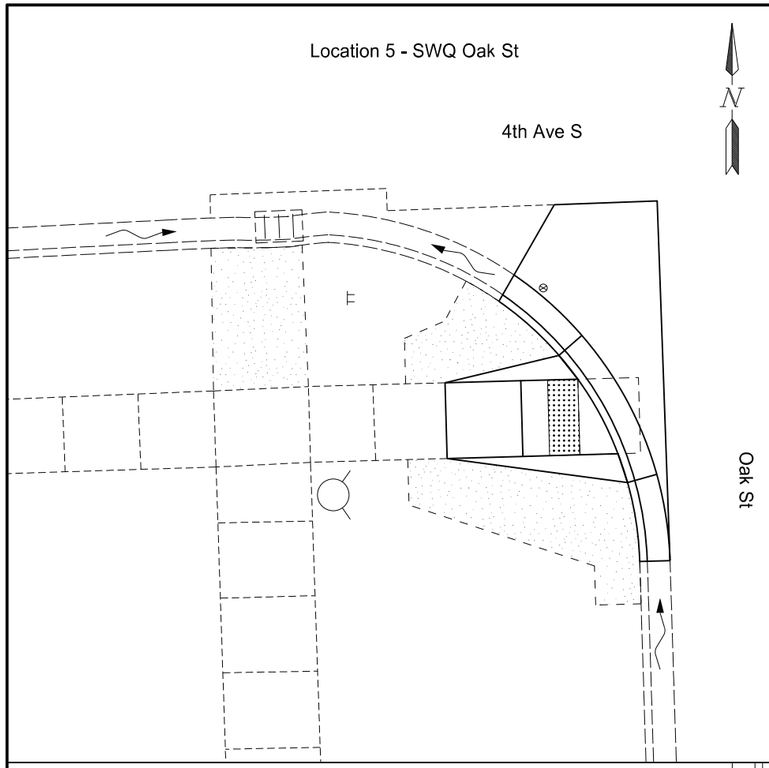
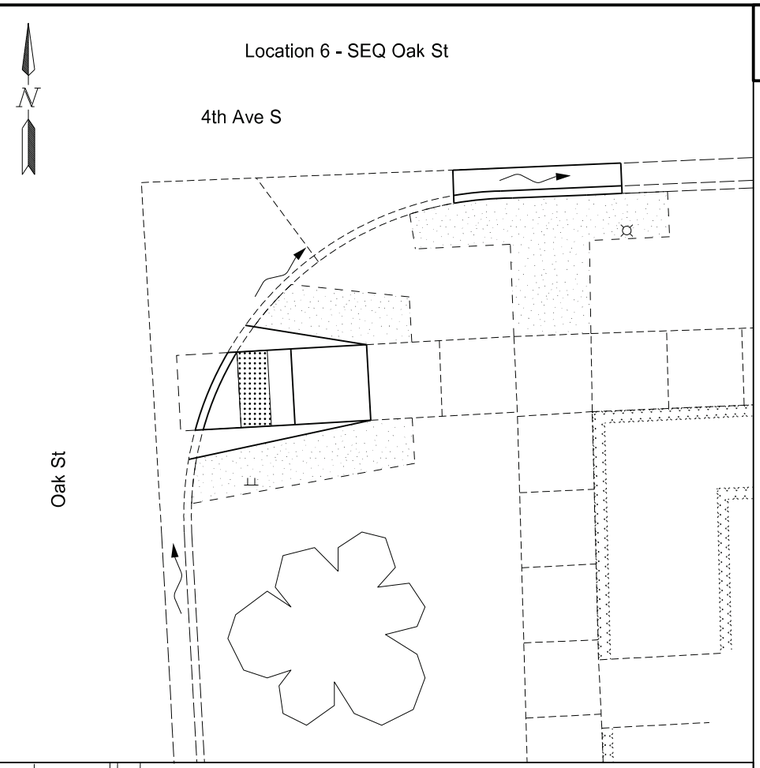
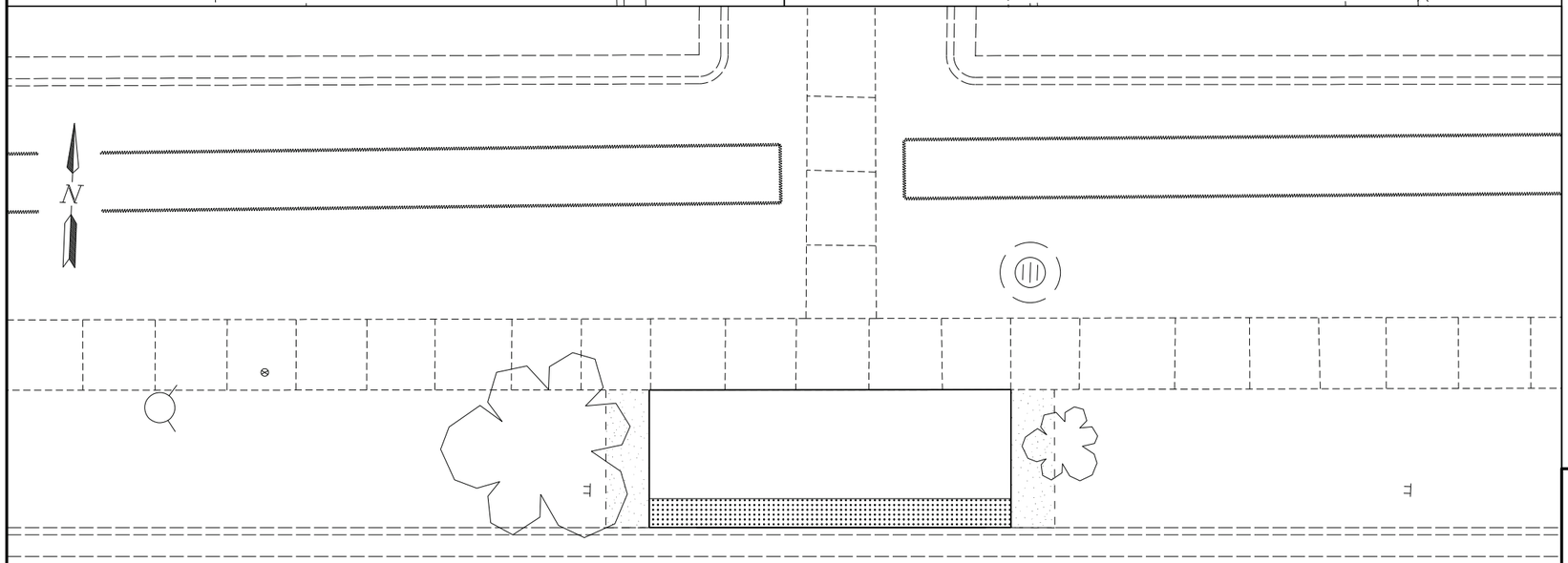
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	77	3

Location 5 - SWQ Oak St



Location 6 - SEQ Oak St





Location 7 - Cities Area Transit Bus Stop

252 0100 Sod

Location 5	19.4 SY
Location 6	17.5 SY
Location 7	6.4 SY

970 0008 Landscape Preparation

Location 5	19.4 SY
Location 6	17.5 SY
Location 7	6.4 SY

Landscape Preparation/Sod

Permanent Sediment & Erosion Control

ND 297 (Demers Ave)

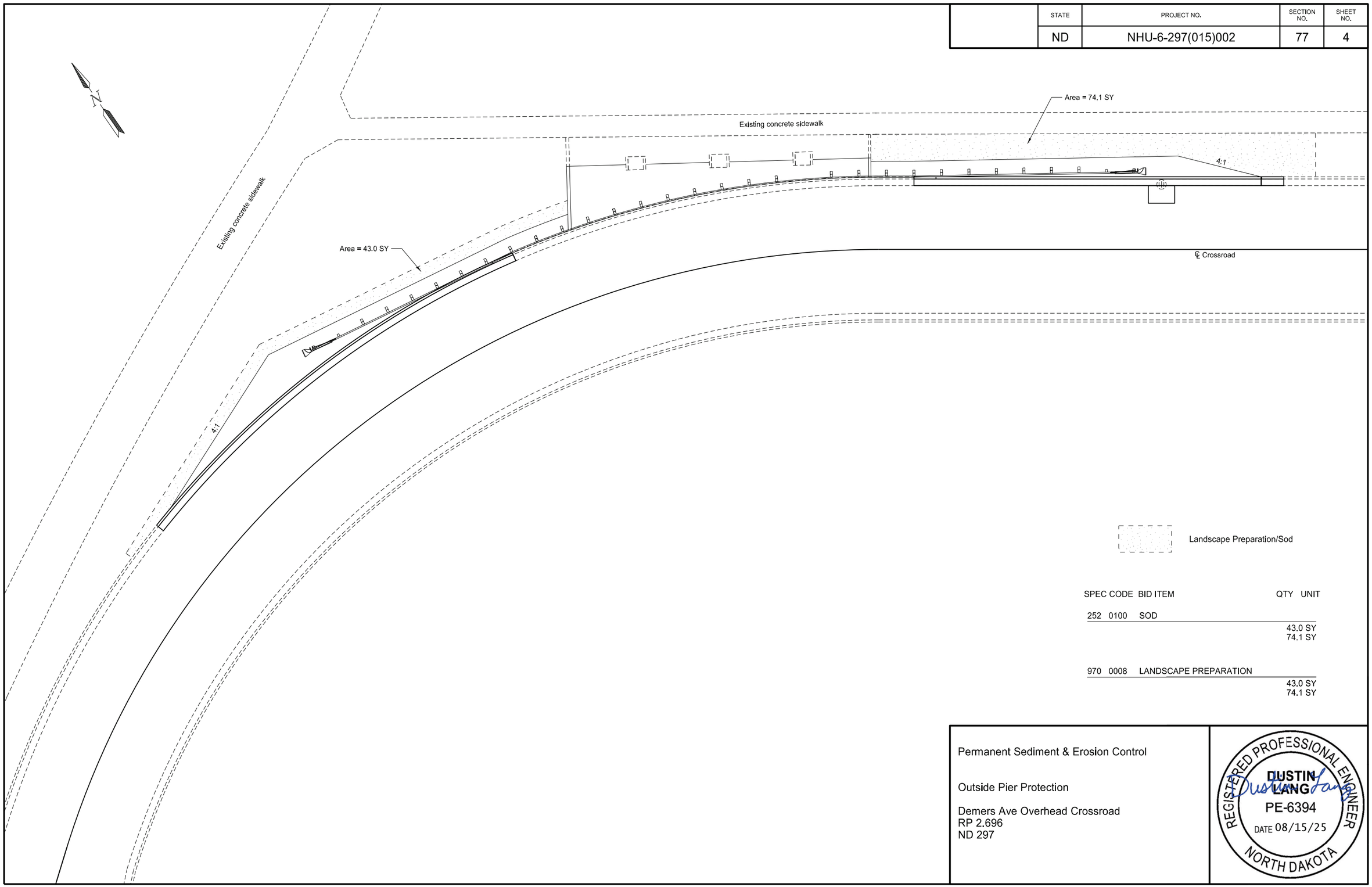
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/1/2025 1:18:13 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\077PE_Erosion Control\077PE_001_Erosion_Control.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	77	4



Landscape Preparation/Sod

SPEC CODE	BID ITEM	QTY	UNIT
252 0100	SOD	43.0	SY
		74.1	SY
970 0008	LANDSCAPE PREPARATION	43.0	SY
		74.1	SY

Permanent Sediment & Erosion Control

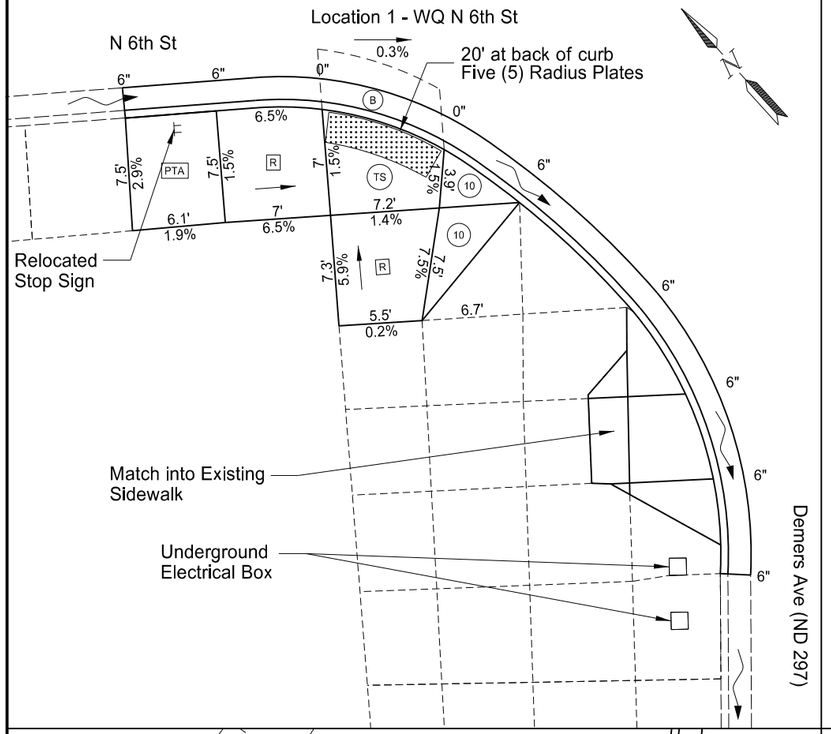
Outside Pier Protection

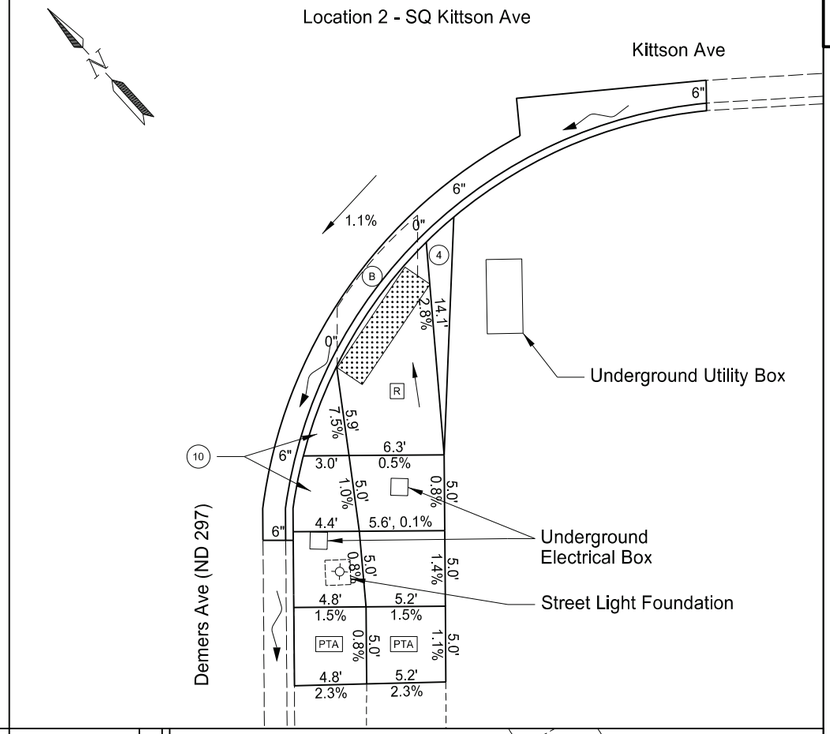
Demers Ave Overhead Crossroad
RP 2.696
ND 297

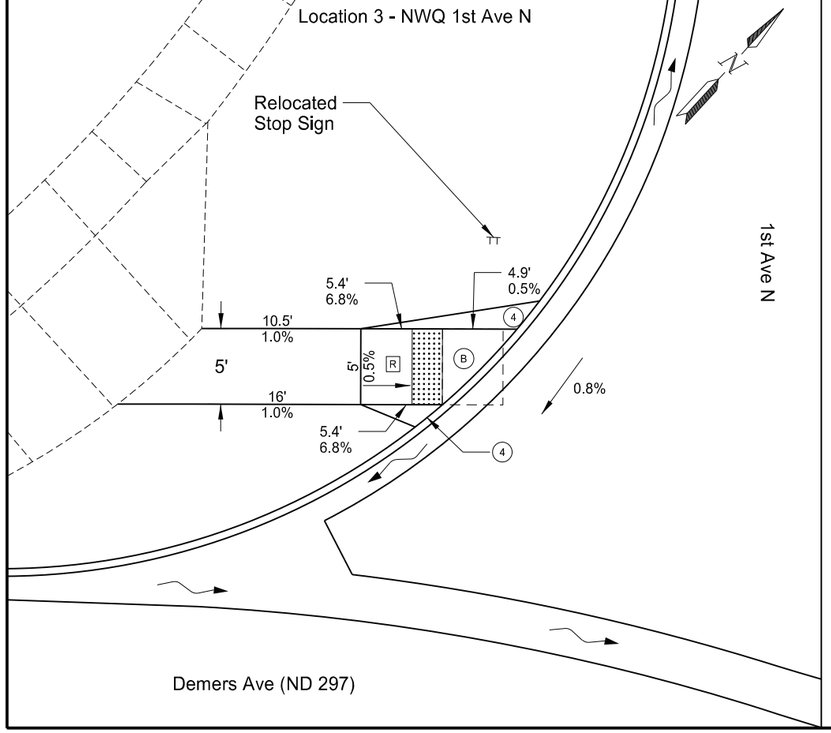
REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

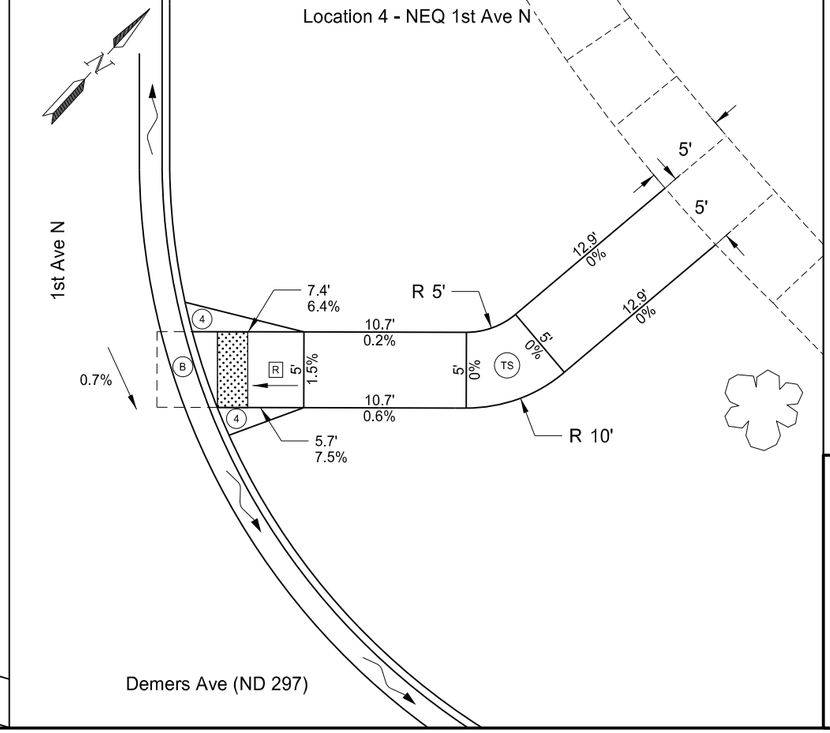
8/15/2025 9:44:11 AM kallepeter R:\project\60297002.015\Traffic\Sheets\077PE_004_Erosion_Control_297_002.696B.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	80	1









748 0140 CURB & GUTTER - TYPE I

Location 1	58 LF
Location 2	44 LF
Location 3	See Sec. 90, Sheet 2
Location 4	See Sec. 90, Sheet 2

750 0115 SIDEWALK CONCRETE 4IN

Location 1	35.0 SY
Location 2	26.7 SY
Location 3	13.4 SY
Location 4	31.7 SY

750 2115 DETECTABLE WARNING PANELS

Location 1	16 SF
Location 2	16 SF
Location 3	10 SF
Location 4	10 SF

Detectable Warning Panel

Pedestrian Access Route (PAR)

Clear Space
4' long x width of PAR or
4' minimum clear space outside traffic lanes of travel.

Cross Slope	Running and Counter Slope
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum

PTA — Pedestrian Access Transition Area (PTA)
Tie-in to nearest joint (if needed)

Transition Cross Slope	Running Slope
< 0.5 % change per foot longitudinally	< 4.5 % preferred

TS — Turning Space
Used at top of ramp or when changing directions.

Slope (all directions)
1.5 % preferred
2.0 % maximum

R — Ramp

Cross Slope	Running Slope
1.5 % Preferred	< 7.5 % preferred
2.0 % maximum	8.3 % maximum

B — Blended Transition

Cross Slope	Counter Slope
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum

Flare
Cross Slope

4 — 4:1 maximum (adjacent to non-walkable surface)

10 — 10:1 maximum (adjacent to walkable surface)

Curb heights are noted adjacent to curb
0", 3" or 6"

Layouts

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

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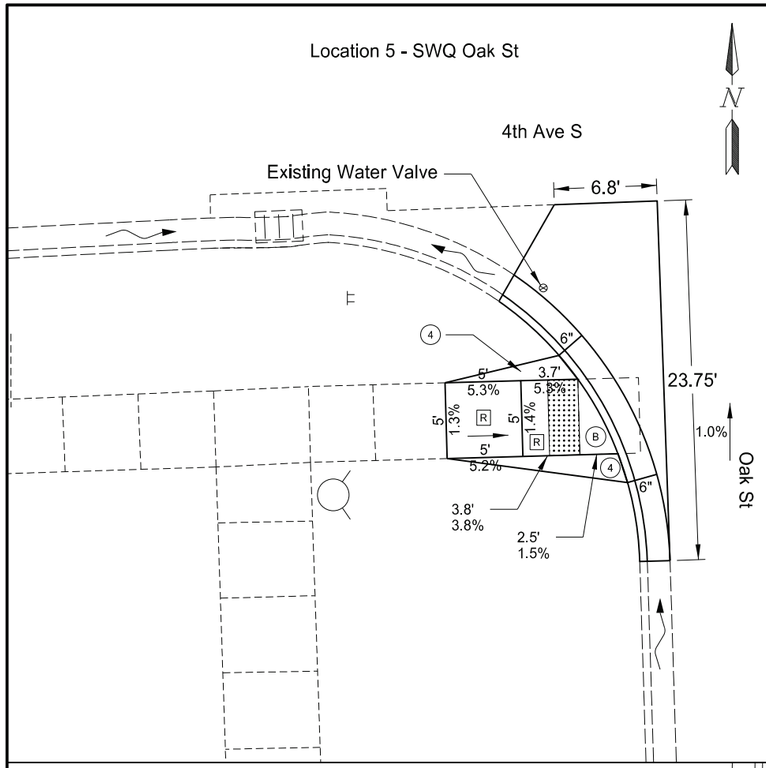
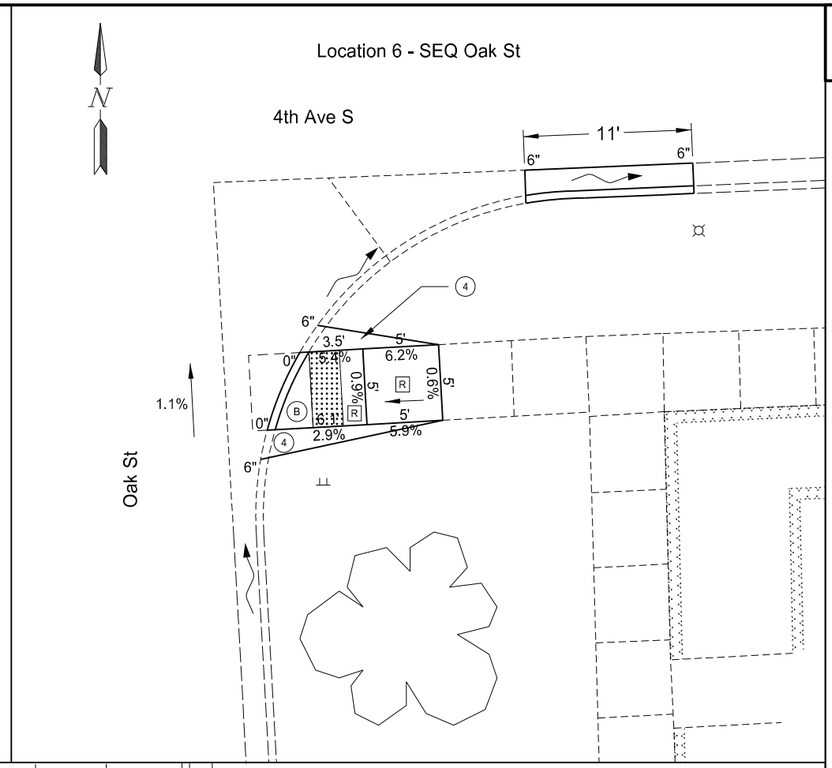
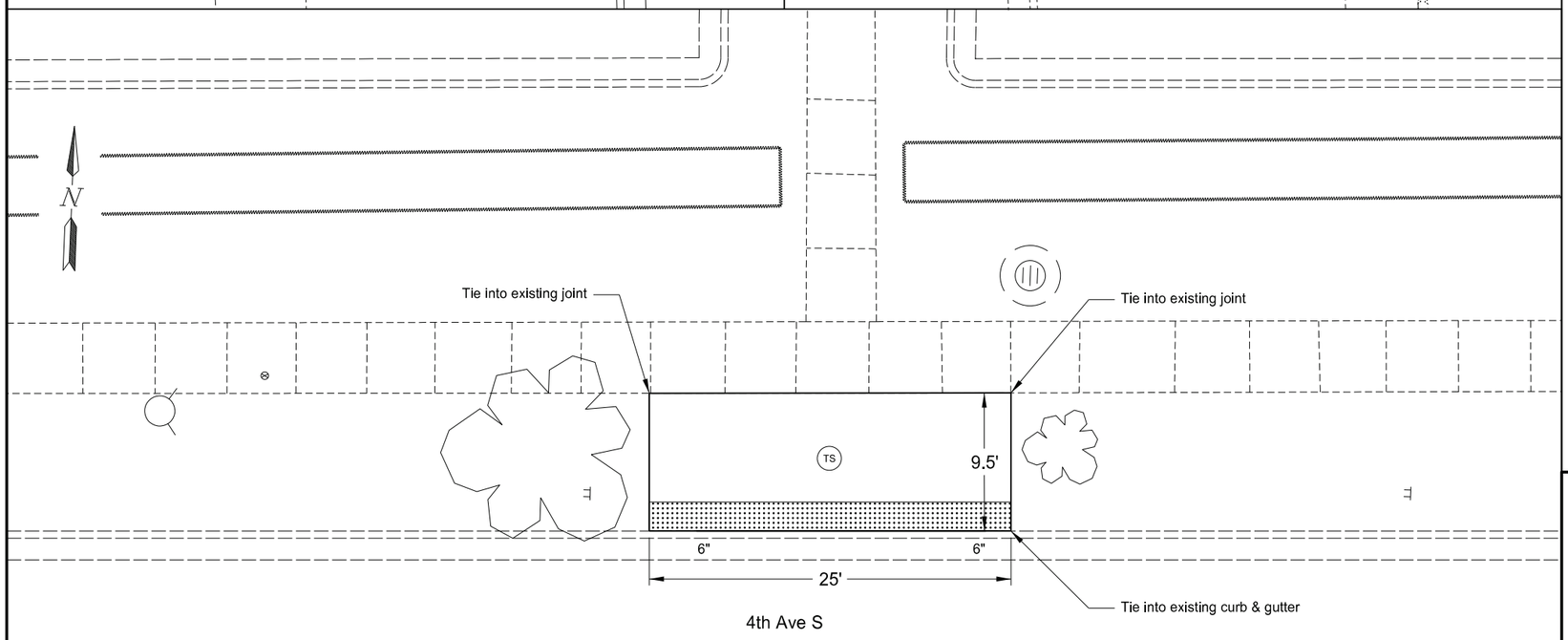
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	80	2







748 0140 CURB & GUTTER - TYPE I

Location 5	21 LF
Location 6	11 LF
Location 7	0 LF

750 0115 SIDEWALK CONCRETE 4IN

Location 5	7.7 SY
Location 6	7.8 SY
Location 7	26.4 SY

750 2115 DETECTABLE WARNING PANELS

Location 5	10 SF
Location 6	10 SF
Location 7	50 SF

Detectable Warning Panel

Pedestrian Access Route (PAR)

Clear Space
4' long x width of PAR or
4' minimum clear space outside traffic lanes of travel.

Cross Slope	Running and Counter Slope
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum

PTA — Pedestrian Access Transition Area (PTA)
Tie-in to nearest joint (if needed)

Transition Cross Slope	Running Slope
< 0.5 % change per foot longitudinally	< 4.5 % preferred

TS — Turning Space
Used at top of ramp or when changing directions.

Slope (all directions)
1.5 % preferred
2.0 % maximum

R — Ramp

Cross Slope	Running Slope
1.5 % Preferred	< 7.5 % preferred
2.0 % maximum	8.3 % maximum

B — Blended Transition

Cross Slope	Counter Slope
1.5 % preferred	< 4.5 % preferred
2.0 % maximum	5.0 % maximum

Flare
Cross Slope

4 — 4:1 maximum (adjacent to non-walkable surface)

10 — 10:1 maximum (adjacent to walkable surface)

Curb heights are noted adjacent to curb
0", 3" or 6"

Layouts

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

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DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

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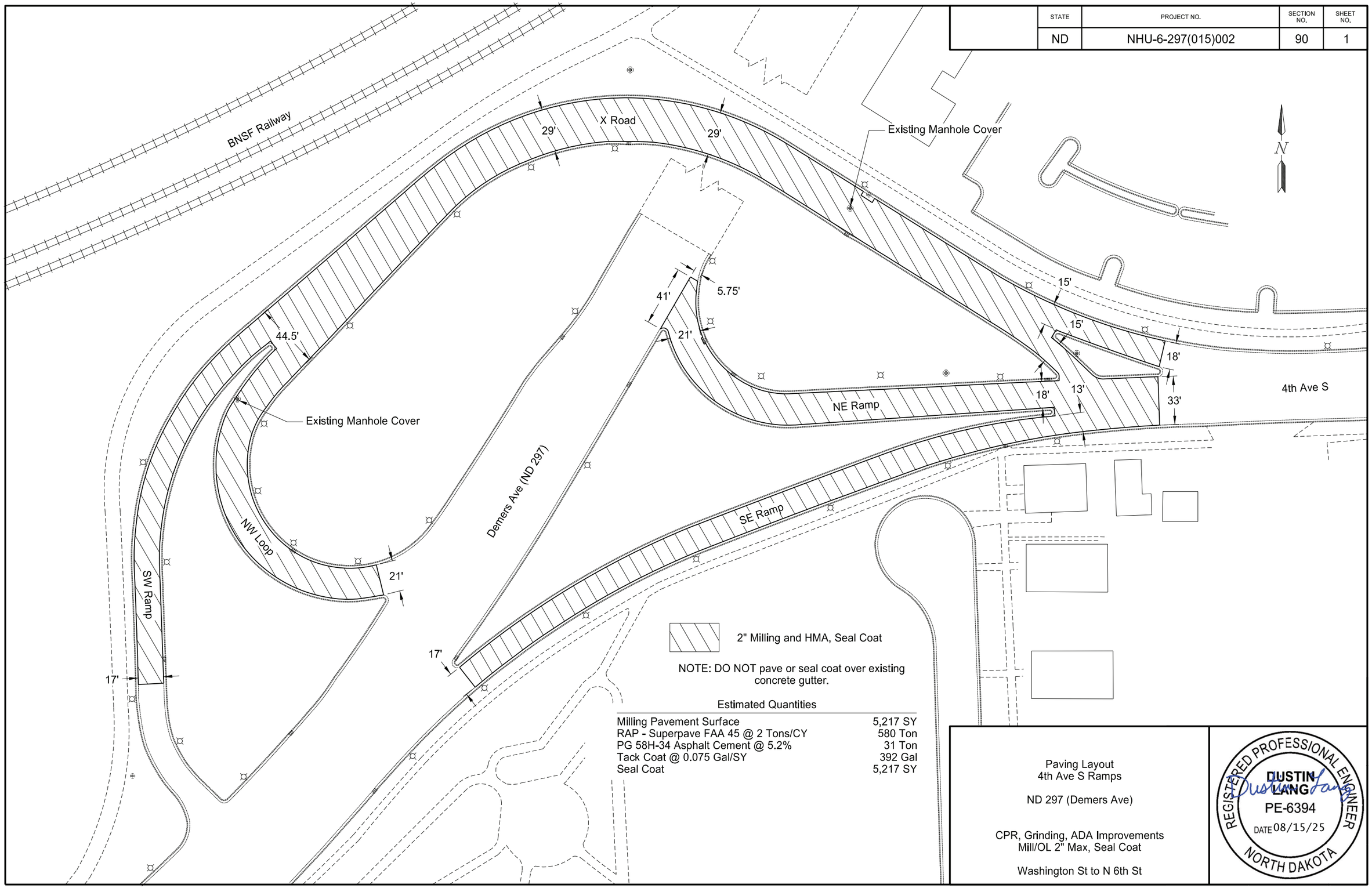
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	90	1



Estimated Quantities

Milling Pavement Surface	5,217 SY
RAP - Superpave FAA 45 @ 2 Tons/CY	580 Ton
PG 58H-34 Asphalt Cement @ 5.2%	31 Ton
Tack Coat @ 0.075 Gal/SY	392 Gal
Seal Coat	5,217 SY

Paving Layout
4th Ave S Ramps

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

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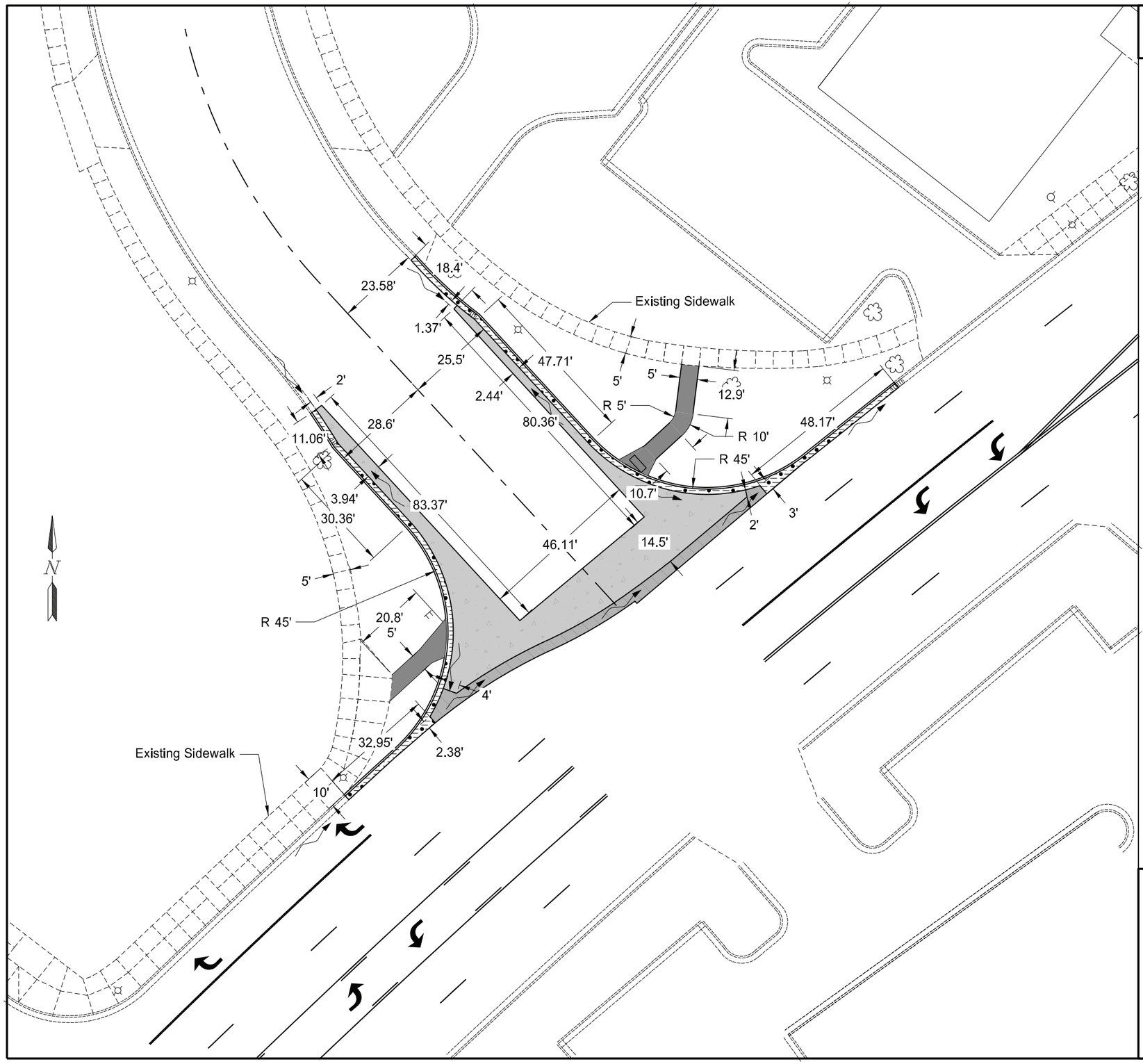
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	90	2



Spec Code Description — Qty Unit

550 0305 9IN NON-REINF CONCRETE PVMT CL AE DOWELED
1st Ave N — 254 SY

748 0140 CURB & GUTTER - TYPE I
1st Ave N (East Side) — 173 LF
1st Ave N (West Side) — 144 LF

748 1020 VALLEY GUTTER 36IN
1st Ave N — 41 SY

750 0115 SIDEWALK CONCRETE 4IN
1st Ave N (East Side) — See Sec. 80, Sheet 1
1st Ave N (West Side) — See Sec. 80, Sheet 1

SIDEWALK CONCRETE 4IN

9IN NON-REINF CONCRETE PVMT CL AE DOWELED

CURB & GUTTER - TYPE I

36" VALLEY GUTTER

Paving Layout

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/1/2025 2:36:48 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\090PL_Paving\090PL_002_1st Ave N Layout.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. ALL	1A	1B	2A	2B	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	**48"x48"**	**EXIT GORE**	**1**	**1**	**1**			**1**	**35**	**35**
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES							28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)							18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**3**	**3**	**3**	**3**	**3**	**3**	**26**	**78**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)							18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR							18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS							43	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**6**	**6**	**6**	**6**	**6**	**6**	**36**	**216**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**4**	**4**	**4**	**4**	**4**	**59**	**236**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)							11	
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**	**5**	**4**	**5**	**1**	**1**	**5**	**32**	**160**
R1-2-60	60"x60"	YIELD							29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**1**	**1**	**1**			**1**	**30**	**30**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**5**	**5**	**5**	**1**	**1**	**5**	**39**	**195**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**5**	**5**	**5**	**1**	**1**	**5**	**10**	**50**
R3-1-48	**48"x48"**	**NO RIGHT TURN**	**2**	**1**	**1**		**1**	**2**	**35**	**70**
R3-2-48	**48"x48"**	**NO LEFT TURN**	**3**	**3**	**2**		**2**	**3**	**35**	**105**
R4-1-48	48"x60"	DO NOT PASS							39	
R4-7-48	**48"x60"**	**KEEP RIGHT**	**1**			**1**	**1**	**1**	**39**	**39**
R5-1-48	**48"x48"**	**DO NOT ENTER**	**1**		**1**			**1**	**35**	**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	
R9-9-24	**24"x12"**	**SIDEWALK CLOSED (Mounted on barricade)**	**3**	**3**	**3**		**2**	**3**	**3**	**9**
R9-11-24	**24"x12"**	**SIDEWALK CLOSED AHEAD CROSS HERE (Mounted on barricade)**	**2**	**2**	**2**		**2**	**2**	**3**	**6**
R9-11a-24	24"x12"	SIDEWALK CLOSED CROSS HERE (Mounted on barricade)							3	
R10-6-24	24"x36"	STOP HERE ON RED							16	
R11-2-48	**48"x30"**	**ROAD CLOSED (Mounted on barricade)**	**4**	**2**	**3**	**1**	**4**	**4**	**12**	**48**
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)**	**1**		**1**		**1**	**1**	**15**	**15**
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT							35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**2**	**2**	**2**	**2**	**2**	**2**	**35**	**70**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT							35	
W1-6-48	**48"x24"**	**ONE DIRECTION LARGE ARROW**	**3**	**3**	**2**	**1**	**1**	**3**	**26**	**78**
W3-1-48	**48"x48"**	**STOP AHEAD**	**1**	**1**	**1**			**1**	**35**	**35**
W3-3-48	48"x48"	SIGNAL AHEAD							35	
W3-4-48	48"x48"	BE PREPARED TO STOP							35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**2**	**2**			**2**	**35**	**70**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**	**2**	**1**	**1**	**1**	**2**	**35**	**70**
W5-1-48	48"x48"	ROAD NARROWS							35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE							35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW							35	
W6-3-48	**48"x48"**	**TWO WAY TRAFFIC**	**2**	**2**	**2**	**2**	**2**	**2**	**35**	**70**
W6-4-12	**12"x18"**	**TWO-WAY TRAFFIC (Mounted on tubular marker)**	**8**	**8**	**7**	**3**	**3**	**8**	**2**	**16**
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**	**2**					**2**	**35**	**70**
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**	**2**					**2**	**35**	**70**
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL							35	
W12-1-48	**48"x48"**	**CROSSING DOUBLE ARROWS**	**1**			**1**	**1**	**1**	**35**	**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**	**11**	**11**	**11**	**11**	**11**	**11**	**35**	**385**
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**	**5**	**5**	**5**	**1**	**1**	**5**	**35**	**175**
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**2**	**2**	**2**	**2**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**2**	**2**	**2**	**2**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)							12	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. ALL	1A	1B	2A	2B	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	
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							35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK							35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE							35	
SPECIAL SIGNS										
Consign 1	**48"x60"**	**USE BOTH LANES DURING BACKUPS**	**2**	**2**	**2**			**2**	**23**	**46**
Consign 2	**60"x24"**	**TAKE TURNS AT MERGE**	**2**	**2**	**2**			**2**	**12**	**24**
Consign 3	**48"x18"**	**TAKE TURNS**	**2**	**2**	**2**			**2**	**7**	**14**
Consign 4	**48"x48"**	**BEGIN MERGE**	**1**	**1**	**1**			**1**	**35**	**35**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 2670**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. ALL	1A	1B	2A	2B	TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**624**					**624**
704-1048	PORTABLE RUMBLE STRIPS	EACH						
704-1050	**TYPE I BARRICADES**	EACH	**40**	**40**	**40**	**20**	**20**	**40**
704-1052	**TYPE III BARRICADES**	EACH	**42**	**39**	**42**	**10**	**14**	**42**
704-1054	**SIDEWALK BARRICADE**	EA	**6**					**6**
704-1056	**PEDESTRIAN CHANNELIZATION**	LF	**250**					**250**
704-1060	**DELINEATOR DRUMS**	EACH	**290**	**280**	**290**	**80**	**65**	**290**
704-1065	TRAFFIC CONES	EACH						
704-1067	**TUBULAR MARKERS**	EACH	**10**					**10**
704-1070	DELINEATOR	EACH						
704-1072	**FLEXIBLE DELINEATORS**	EACH	**160**	**140**	**160**	**25**	**35**	**160**
704-1080	**STACKABLE VERTICAL PANELS**	EACH	**80**	**80**	**80**	**40**	**40**	**80**
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**	**2**	**1**	**1**	**1**	**2**
704-1500	**OBLITERATION OF PVMT MK**	SF		**226**	**183**	**160**		**569**
704-2108	**TEMPORARY CURB RAMP**	EA	**4**					**4**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF						
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH						
704-4011	**PORTABLE CHANGEABLE MESSAGE SIGN**	EA	**3**					**3**
762-0200	RAISED PAVEMENT MARKERS	EACH						
762-0420	**SHORT TERM 4IN LINE - TYPE R**	LF		**1415**	**1223**	**765**	**660**	**4063**
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/

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

Traffic Control Devices List
ND 297 (Demers Ave)
CPR, Grinding, ADA Improvements,
Mill/OL 2" Max, Seal Coat
Washington St to N 6th St

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. ALL	2C	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	**48"x48"**	**EXIT GORE**	**1**				**1**	**35**	**35**
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES						28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)						18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**3**	**3**	**3**		**3**	**26**	**78**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)						18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR						18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS						43	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**6**	**6**	**6**		**6**	**36**	**216**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**4**	**4**		**4**	**59**	**236**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)						11	
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**	**5**				**5**	**32**	**160**
R1-2-60	60"x60"	YIELD						29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**1**				**1**	**30**	**30**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**5**		**1**		**5**	**39**	**195**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**5**		**1**		**5**	**10**	**50**
R3-1-48	**48"x48"**	**NO RIGHT TURN**	**2**	**2**	**2**		**2**	**35**	**70**
R3-2-48	**48"x48"**	**NO LEFT TURN**	**3**	**2**	**1**		**3**	**35**	**105**
R4-1-48	48"x60"	DO NOT PASS						39	
R4-7-48	**48"x60"**	**KEEP RIGHT**	**1**				**1**	**39**	**39**
R5-1-48	**48"x48"**	**DO NOT ENTER**	**1**				**1**	**35**	**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	
R9-9-24	**24"x12"**	**SIDEWALK CLOSED (Mounted on barricade)**	**3**				**3**	**3**	**9**
R9-11-24	**24"x12"**	**SIDEWALK CLOSED AHEAD CROSS HERE (Mounted on barricade)**	**2**				**2**	**3**	**6**
R9-11a-24	24"x12"	SIDEWALK CLOSED CROSS HERE (Mounted on barricade)						3	
R10-6-24	24"x36"	STOP HERE ON RED						16	
R11-2-48	**48"x30"**	**ROAD CLOSED (Mounted on barricade)**	**4**	**4**	**4**		**4**	**12**	**48**
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)**	**1**	**1**	**1**		**1**	**15**	**15**
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT						35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**2**				**2**	**35**	**70**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT						35	
W1-6-48	**48"x24"**	**ONE DIRECTION LARGE ARROW**	**3**	**1**	**1**		**3**	**26**	**78**
W3-1-48	**48"x48"**	**STOP AHEAD**	**1**				**1**	**35**	**35**
W3-3-48	48"x48"	SIGNAL AHEAD						35	
W3-4-48	48"x48"	BE PREPARED TO STOP						35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**		**1**		**2**	**35**	**70**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**		**1**		**2**	**35**	**70**
W5-1-48	48"x48"	ROAD NARROWS						35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE						35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW						35	
W6-3-48	**48"x48"**	**TWO WAY TRAFFIC**	**2**				**2**	**35**	**70**
W6-4-12	**12"x18"**	**TWO-WAY TRAFFIC (Mounted on tubular marker)**	**8**				**8**	**2**	**16**
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**	**2**		**2**		**2**	**35**	**70**
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**	**2**		**2**		**2**	**35**	**70**
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL						35	
W12-1-48	**48"x48"**	**CROSSING DOUBLE ARROWS**	**1**				**1**	**35**	**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**	**11**	**11**	**11**		**11**	**35**	**385**
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**	**5**		**1**		**5**	**35**	**175**
W20-7-48	**48"x48"**	**FLAGGER**	**2**				**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**				**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)						12	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. ALL	2C	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	
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						35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE						35	
SPECIAL SIGNS									
Consign 1	**48"x60"**	**USE BOTH LANES DURING BACKUPS**	**2**				**2**	**23**	**46**
Consign 2	**60"x24"**	**TAKE TURNS AT MERGE**	**2**				**2**	**12**	**24**
Consign 3	**48"x18"**	**TAKE TURNS**	**2**				**2**	**7**	**14**
Consign 4	**48"x48"**	**BEGIN MERGE**	**1**				**1**	**35**	**35**

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	2670

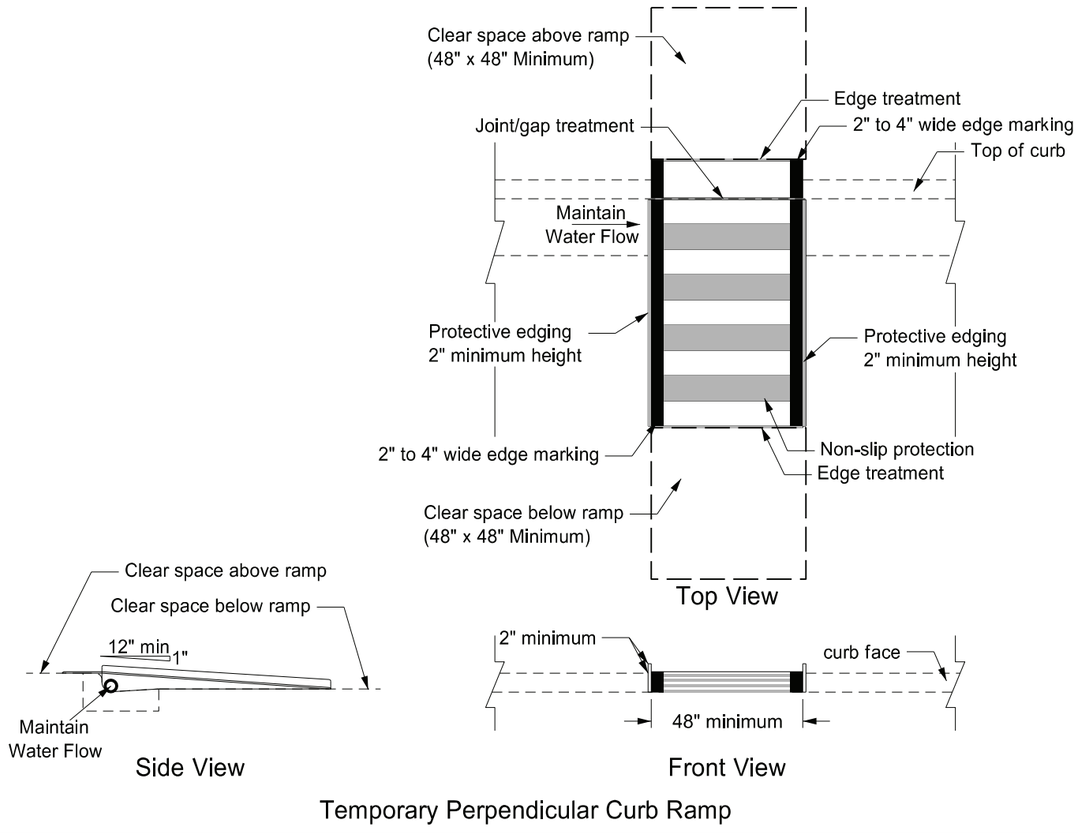
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. ALL	2C	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**624**				**624**
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	**TYPE I BARRICADES**	EACH	**40**				**40**
704-1052	**TYPE III BARRICADES**	EACH	**42**	**11**	**13**		**42**
704-1054	**SIDEWALK BARRICADE**	EA	**6**				**6**
704-1056	**PEDESTRIAN CHANNELIZATION**	LF	**250**				**250**
704-1060	**DELINEATOR DRUMS**	EACH	**290**	**20**	**55**		**290**
704-1065	TRAFFIC CONES	EACH					
704-1067	**TUBULAR MARKERS**	EACH	**10**		**10**		**10**
704-1070	DELINEATOR	EACH					
704-1072	**FLEXIBLE DELINEATORS**	EACH	**160**				**160**
704-1080	**STACKABLE VERTICAL PANELS**	EACH	**80**				**80**
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**		**1**		**2**
704-1500	**OBLITERATION OF PVMT MK**	SF	**569**				**569**
704-2108	**TEMPORARY CURB RAMP**	EA	**4**				**4**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH					
704-4011	**PORTABLE CHANGEABLE MESSAGE SIGN**	EA	**3**	**3**	**3**		**3**
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	**SHORT TERM 4IN LINE - TYPE R**	LF	**4063**				**4063**
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/

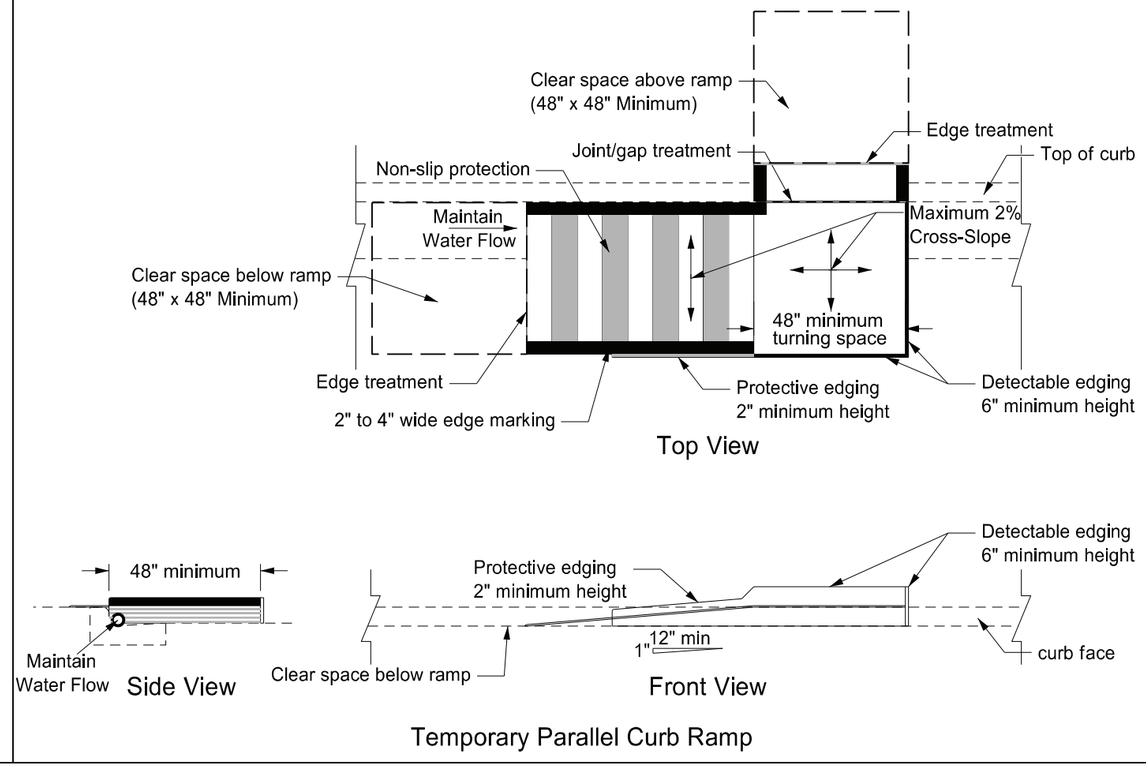
REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

Traffic Control Devices List
ND 297 (Demers Ave)
CPR, Grinding, ADA Improvements,
Mill/OL 2" Max, Seal Coat
Washington St to N 6th St

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	3

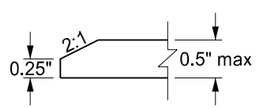


Temporary Perpendicular Curb Ramp



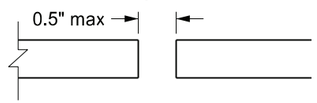
Temporary Parallel Curb Ramp

Edge Treatment



Maximum Surface
Height Change Detail

Joint/Gap Treatment



Maximum Width
Lateral Joints or Gaps

Temporary Pedestrian Curb Ramp Details

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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PE-6394
DATE 08/15/25
NORTH DAKOTA

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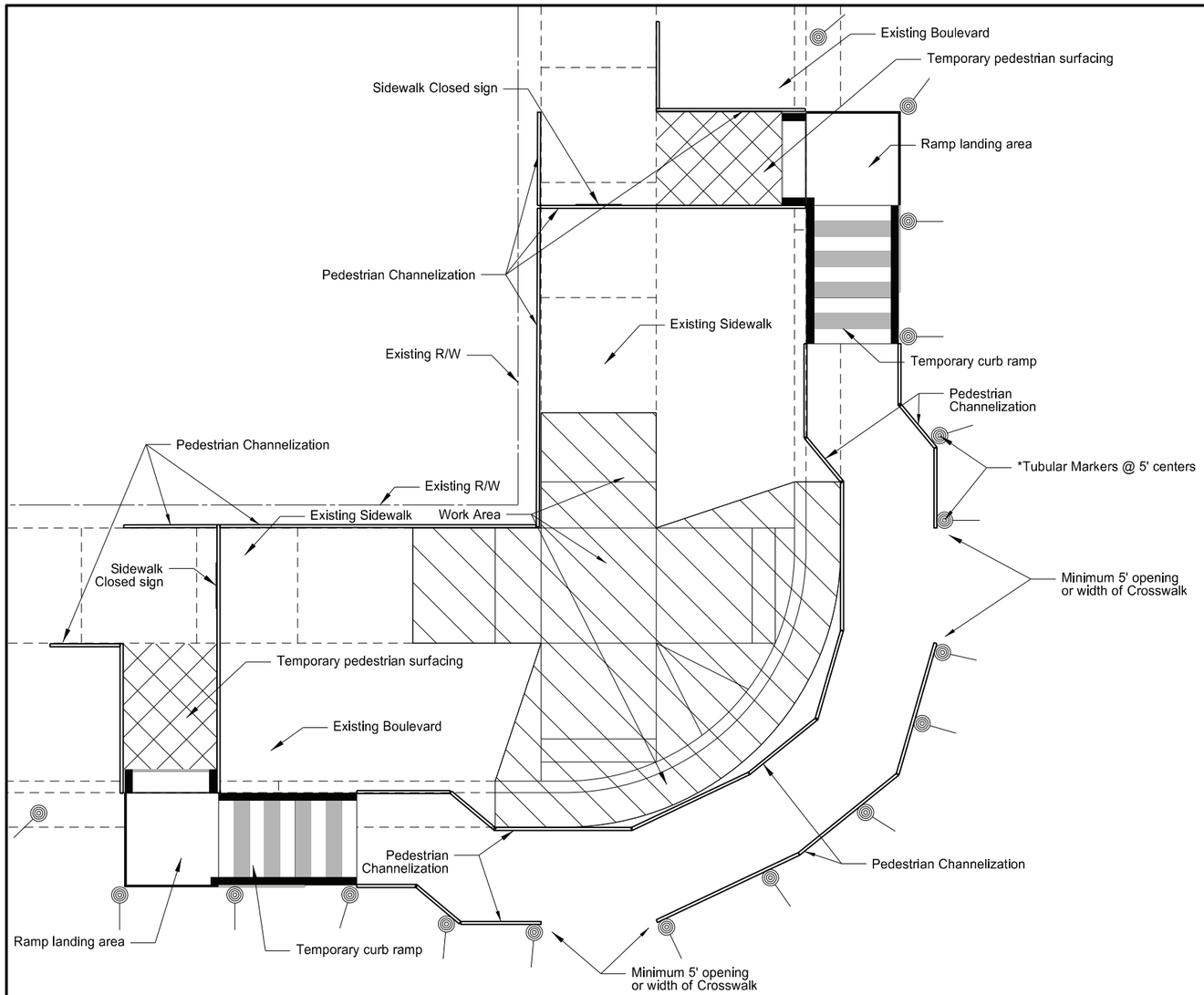
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	4

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



Temporary Pedestrain Access Route

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	5

NOTE: Post mount terminal signs when possible.
Place terminal signs to work with all traffic control phases.

Traffic Control Layout
Terminal Signs

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

DUSTIN LANG
PE-6394
DATE 08/15/25
Dustin Lang

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	6

N

ROAD WORK AHEAD
W20-1-48
Post mounted

SPEED LIMIT ENFORCED
MINIMUM FEE $150 WHEN WORKERS PRESENT
G20-55-96
Post mounted

USE BOTH LANES DURING BACKUPS
Consign 1
Post Mounted

W20-5-48
RIGHT LANE CLOSED 1000 FT
TAKE TURNS AT MERGE
Consign 2
Post Mounted

SPEED LIMIT 25
W3-5-48
Post mounted

W20-5-48
RIGHT LANE CLOSED 500 FT
TAKE TURNS AT MERGE
Consign 2
Post Mounted

ROAD WORK
⇐ NEXT 1 MILES
G20-52aL-72

US 81

DEMERS AVE

230' to next sign

140'
325'
140'
140'
280'

6TH AVE S

SOUTH 16TH ST

SOUTH 15TH ST

SOUTH 14TH ST

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Dellneator
Traffic Flow Direction	Sequencing Arrow Board

Traffic Control Layout
Phase 1A

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	7

5TH AVE S

ND 297

US 81

WASHINGTON ST

S 12TH ST

ROAD WORK NEXT 1 MILES
G20-52aL-72

ROAD WORK AHEAD
W20-1-48
Post mounted

R11-2-48
ROAD CLOSED
W1-6R-60
(Barricade Mounted)

Flexible Delineators
spaced @ 25'

ROAD CLOSED

1 - R11-2-48 (Barricade Mounted)
1 - W1-6L-60 (barricade Mounted)
3 - Type III Barricades

250'

W6-3-48

Obliderate Pavement Marking
as needed (148 SF)

SPEED LIMIT 35
R2-1-36

R3-2-48

END ROAD WORK
G20-2-48

Delineator Drums
spaced @ 10'

W1-4L-48

Temp 4" Yellow
PVMT MK (360 LF)

250'

Delineator Drums
spaced @ 25'

Arrow Board
Type C

Temp 4" White
PVMT MK (597 LF)

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24
Portable

W4-2(R)-48
TAKE TURNS
Consign 3
Post Mounted

Consign 4
BEGIN MERGE
TAKE TURNS
Consign 3
Post Mounted

140'

180'

ROAD WORK AHEAD
W20-1-48
Post mounted

ROAD WORK NEXT 1 MILES
G20-52aR-72

N

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Delineator
Traffic Flow Direction	Sequencing Arrow Board

Traffic Control Layout
Phase 1A

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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PE-6394
DATE 08/15/25
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	8

R3-1-48

11 Flexible Delineators spaced @ 10'

R2-1-48

SPEED LIMIT 25

MINIMUM FEE $150

R2-1a-24 Portable

Flexible Delineators spaced @ 25'

EXIT

E5-1-48

STOP

R1-1-48

8 Flexible Delineators spaced @ 10'

Delineator Drums spaced @ 10'

Cover Existing Yield Sign

W3-1A-48

Delineator Drums spaced @ 10'

Delineator Drums spaced @ 25'

R3-2-48

4TH AVE S

S 9TH ST

N

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Dellneator
Traffic Flow Direction	Sequencing Arrow Board

Traffic Control Layout
Phase 1A

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	9

S 8TH ST

1ST AVE N

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24 Portable

W6-4-12 (Delineator Mounted)

W6-4-12 (Delineator Mounted)

STOP
R1-1-48

50' Min.

50' Min.

50' Min.

Delineator Drums spaced @ 10'

R1-1-48

Delineator Drums spaced @ 10'

Flexible Delineators spaced @ 25'

KEY

- Type III Baricade
- Work Area
- Sign
- Work Area (Constructed Under Traffic)
- Delineator Drum
- Flexible Delineator
- Traffic Flow Direction
- Sequencing Arrow Board

W6-3-48

W1-4R-48

S 6TH ST

W6-4-12 (Delineator Mounted)

Temp 4" Yellow PVMT MK (120 LF)

Obliderate Pavement Marking As Needed (78 LF)

Arrow Board Type C

W4-2L-48

240'

50' Min.

STOP
R1-1-48

W1-6R-60 (Barricade Mounted)

Temp 4" Yellow PVMT MK (242 LF)

Delineator Drums spaced @ 10'

Temp 4" White PVMT MK (96 LF)

Delineator Drums spaced @ 10'

KITTSON AVE

S 5TH ST

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24 Portable

LEFT LANE CLOSED AHEAD
W20-5-48 Skid Mounted

SPEED LIMIT ENFORCED
MINIMUM FEE $150 WHEN WORKERS PRESENT
G20-55-96 Skid Mounted

ROAD WORK AHEAD
W20-4-48 Skid Mounted

75' Min. 75' Min. 75' Min.

ND 297

S 4TH ST

END ROAD WORK
G20-2-48

Traffic Control Layout
Phase 1A

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	10

N

ROAD WORK AHEAD
W20-1-48
Post mounted

SPEED LIMIT ENFORCED
MINIMUM FEE $150 WHEN WORKERS PRESENT
G20-55-96
Post mounted

USE BOTH LANES DURING BACKUPS
Consign 1
Post Mounted

W20-5-48
LEFT LANE CLOSED 1000 FT
TAKE TURNS AT MERGE
Consign 2
Post Mounted

SPEED LIMIT 25
W3-5-48
Post mounted

W20-5-48
LEFT LANE CLOSED 500 FT
TAKE TURNS AT MERGE
Consign 2
Post Mounted

ROAD WORK
⇐ NEXT 1 MILES
G20-52aL-72

US 81

DEMERS AVE

230' to next sign

140'
325'
140'
140'
280'

6TH AVE S

SOUTH 16TH ST

SOUTH 15TH ST

SOUTH 14TH ST

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Dellneator
Traffic Flow Direction	Sequencing Arrow Board

Traffic Control Layout
Phase 1B

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	11

ROAD WORK AHEAD
W20-1-48
Post mounted

Temp 4" Yellow
PVMT MK (182 LF)

Delineator Drums
spaced @ 10'

DO NOT ENTER
R5-1-48

W6-3-48

5TH AVE S

Temp 4" White
PVMT MK (191 LF)

W1-6R-60
(Barricade Mounted)

Obliderate Pavement Marking
as needed (51 SF)

ROAD WORK NEXT 1 MILES
G20-52aL-72

SPEED LIMIT 35
R2-1-36

Temp 4" Yellow
PVMT MK (192 LF)

END ROAD WORK
G20-2-48

250'

Delineator Drums
spaced @ 10'

R2-1-48
(See note #2)

SPEED LIMIT 25
MINIMUM FEE $150

R2-1a-24
Portable

Consign 4

BEGIN MERGE
TAKE TURNS

Consign 3
Post Mounted

W4-2(L)-48

TAKE TURNS

Consign 3
Post Mounted

US 81

ND 297

Arrow Board
Type C

Temp 4" Yellow
PVMT MK (235 LF)

330'

ND 297

140'

ROAD WORK AHEAD
W20-1-48
Post mounted

WASHINGTON ST

S 12TH ST

ROAD WORK NEXT 1 MILES
G20-52aR-72

N

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Delineator
Traffic Flow Direction	Sequencing Arrow Board

Traffic Control Layout
Phase 1B

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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PE-6394
DATE 08/15/25
NORTH DAKOTA

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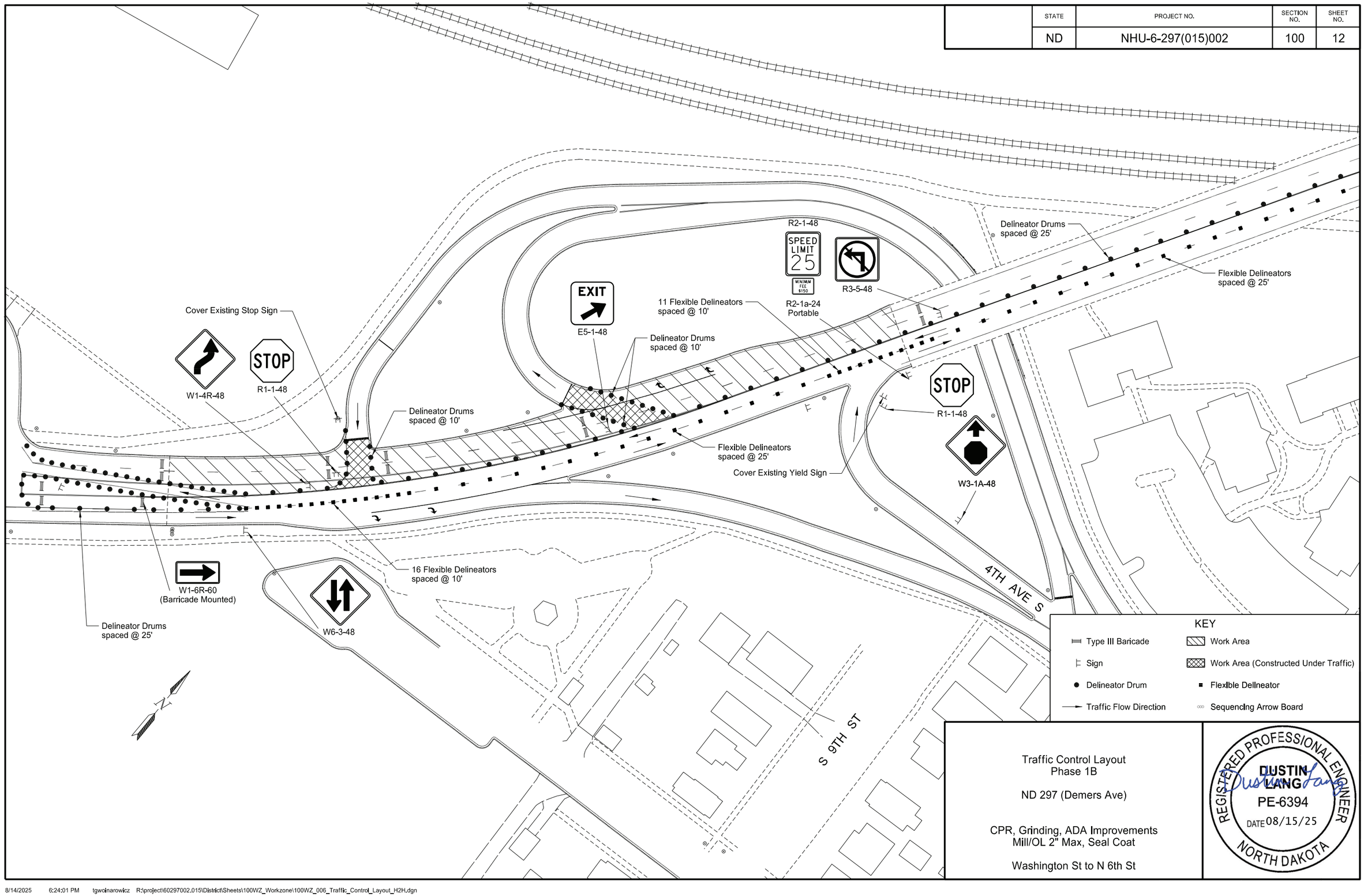
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	12



Traffic Control Layout
Phase 1B

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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DATE 08/15/25
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	13

STREET CLOSED TO THRU TRAFFIC
R11-4A-60
(Barricade Mounted)
Place 1 city block from closure.

1ST AVE N

S 8TH ST

ROAD CLOSED
R11-2-60
(Barricade Mounted)

W6-4-12
(Delineator Mounted)

R3-1-48

STOP
R1-1-48

W6-4-12
(Delineator Mounted)

Delineator Drums
spaced @ 25'

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24
Portable

Delineator Drums
spaced @ 25'

Delineator Drums
spaced @ 10'

50' Min.

50' Min.

STOP
R1-1-48

R3-2-48

Delineator Drums
spaced @ 10'

Flexible Delineators
spaced @ 25'

KEY

Type III Baricade	Work Area
Sign	Work Area (Constructed Under Traffic)
Delineator Drum	Flexible Delineator
Traffic Flow Direction	Sequencing Arrow Board

S 6TH ST

Delineator Drums
spaced @ 10'

ROAD CLOSED

1 - R11-2-48 (Barricade Mounted)
1 - W1-6L-60 (Barricade Mounted)
3 - Type III Barricades

W1-4L-48

STOP
R1-1-48

W6-3-48

Temp 4" White
PVMT MK (331 LF)

170' Shift

50' Min.

Obliderate Pavement Marking
as needed (133 SF)

Temp 4" Yellow
PVMT MK (92 LF)

Flexible Delineators
spaced @ 25'

Flexible Delineators
spaced @ 10'

Delineator Drums
spaced @ 10'

W6-4-12
(Delineator Mounted)

Delineator Drums
spaced @ 25'

W6-4-12
(Delineator Mounted)

KITTSON AVE

S 5TH ST

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24
Portable

RIGHT LANE CLOSED AHEAD
W20-5-48
Skid Mounted

SPEED LIMIT ENFORCED
MINIMUM FEE $150
WHEN WORKERS PRESENT
G20-55-96
Skid Mounted

ROAD WORK AHEAD
W20-4-48
Skid Mounted

S 4TH ST

75' Min. 75' Min. 75' Min.

ND 297

END ROAD WORK
G20-2-48

Traffic Control Layout
Phase 1B

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
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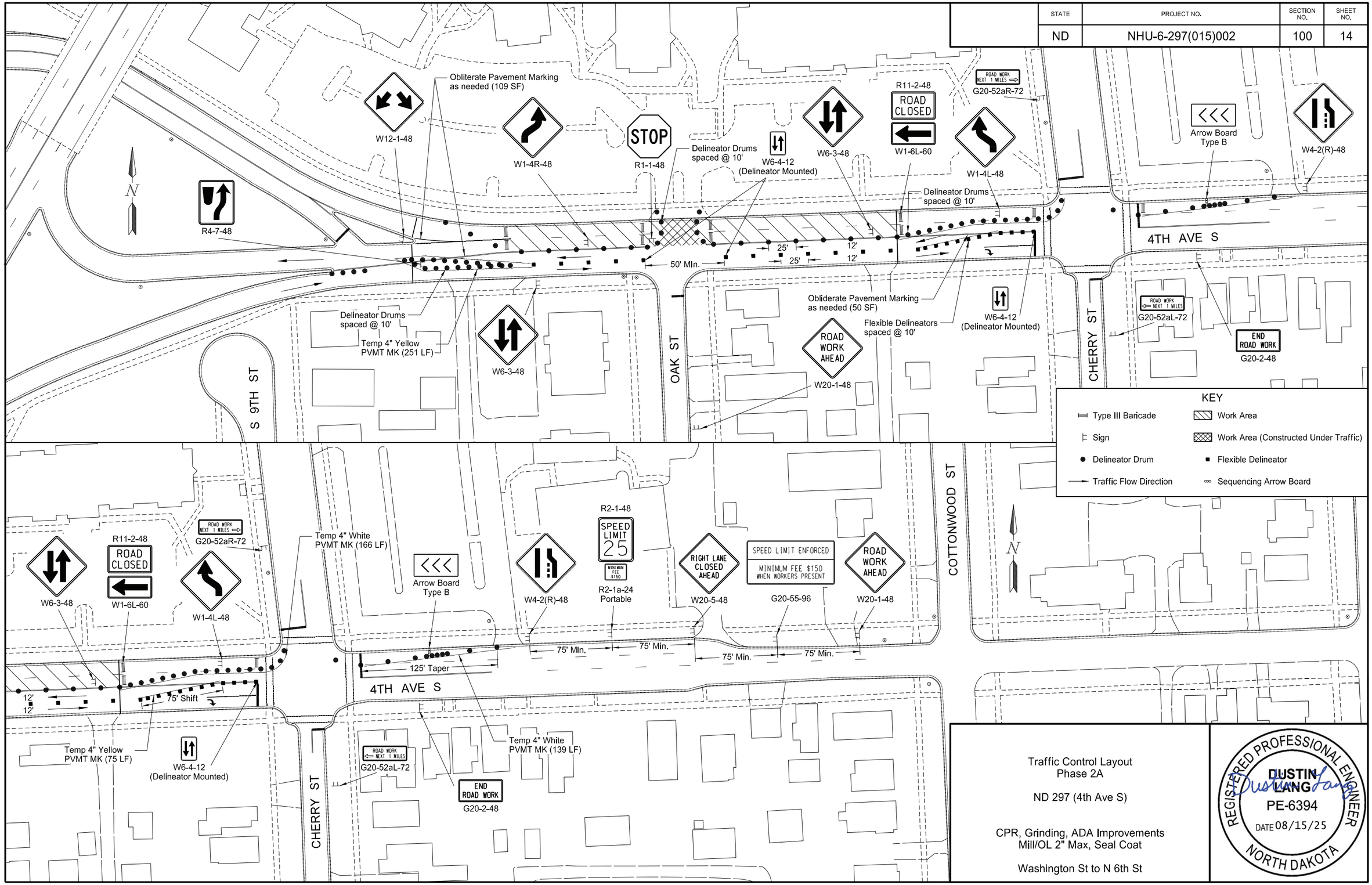
DATE 08/15/25
NORTH DAKOTA

8/14/2025 6:24:02 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\100WZ_Workzone\100WZ_006_Traffic_Control_Layout_H2H.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	14



Traffic Control Layout
Phase 2A

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/14/2025 6:25:39 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\100WZ_Workzone\100WZ_014_Traffic_Control_4th.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	100	15

W12-1-48
R11-2-48 ROAD CLOSED
W1-6L-60 (Barricade Mounted)
Flexible Delineators spaced @ 10'
R3-1-48
W6-3-48
W6-4-12 (Delineator Mounted)
R3-2-48
W6-3-48
ROAD WORK NEXT 1 MILES
G20-52aR-72
R4-7-48
Arrow Board Type B
W4-2(L)-48
W6-4-12 (Delineator Mounted)
Temp 4" Yellow PVMT MK (78 LF x2)
12'
12'
120'
50' Min.
25'
25'
4TH AVE S
Temp 4" White PVMT MK (80 LF)
Delineator Drums spaced @ 10'
W1-4L-48
R3-2-48
STOP
R1-1-48
STREET CLOSED TO THRU TRAFFIC
R11-4A-60 (Barricade Mounted)
Place 1 city block from closure.
OAK ST
ROAD CLOSED
R11-2-48 (Barricade Mounted)
ROAD WORK AHEAD
W20-1-48
W1-4R-48
CHERRY ST
ROAD WORK NEXT 1 MILES
G20-52aL-72
END ROAD WORK
G20-2-48
S 9TH ST
Temp 4" White PVMT MK (20 LF)
N

KEY

- Type III Baricade
- Work Area
- Sign
- Work Area (Constructed Under Traffic)
- Delineator Drum
- Flexible Delineator
- Traffic Flow Direction
- Sequencing Arrow Board

ROAD WORK NEXT 1 MILES
G20-52aR-72
R4-7-48
Arrow Board Type B
W4-2(L)-48
R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24 Portable
W4-2(L)-48
LEFT LANE CLOSED AHEAD
W20-5-48
SPEED LIMIT ENFORCED
MINIMUM FEE $150 WHEN WORKERS PRESENT
G20-55-96
ROAD WORK AHEAD
W20-1-48
COTTONWOOD ST
W1-4R-48
W6-3-48
Temp 4" Yellow PVMT MK (210 LF)
12'
12'
75'
75' Min.
75' Min.
75' Min.
75' Min.
125' Taper
4TH AVE S
Temp 4" White PVMT MK (56 LF)
16 Delineator Drums spaced @ 10'
Temp 4" Yellow PVMT MK (138 LF)
ROAD WORK NEXT 1 MILES
G20-52aL-72
END ROAD WORK
G20-2-48
CHERRY ST
N

Traffic Control Layout
Phase 2B

ND 297 (4th Ave S)

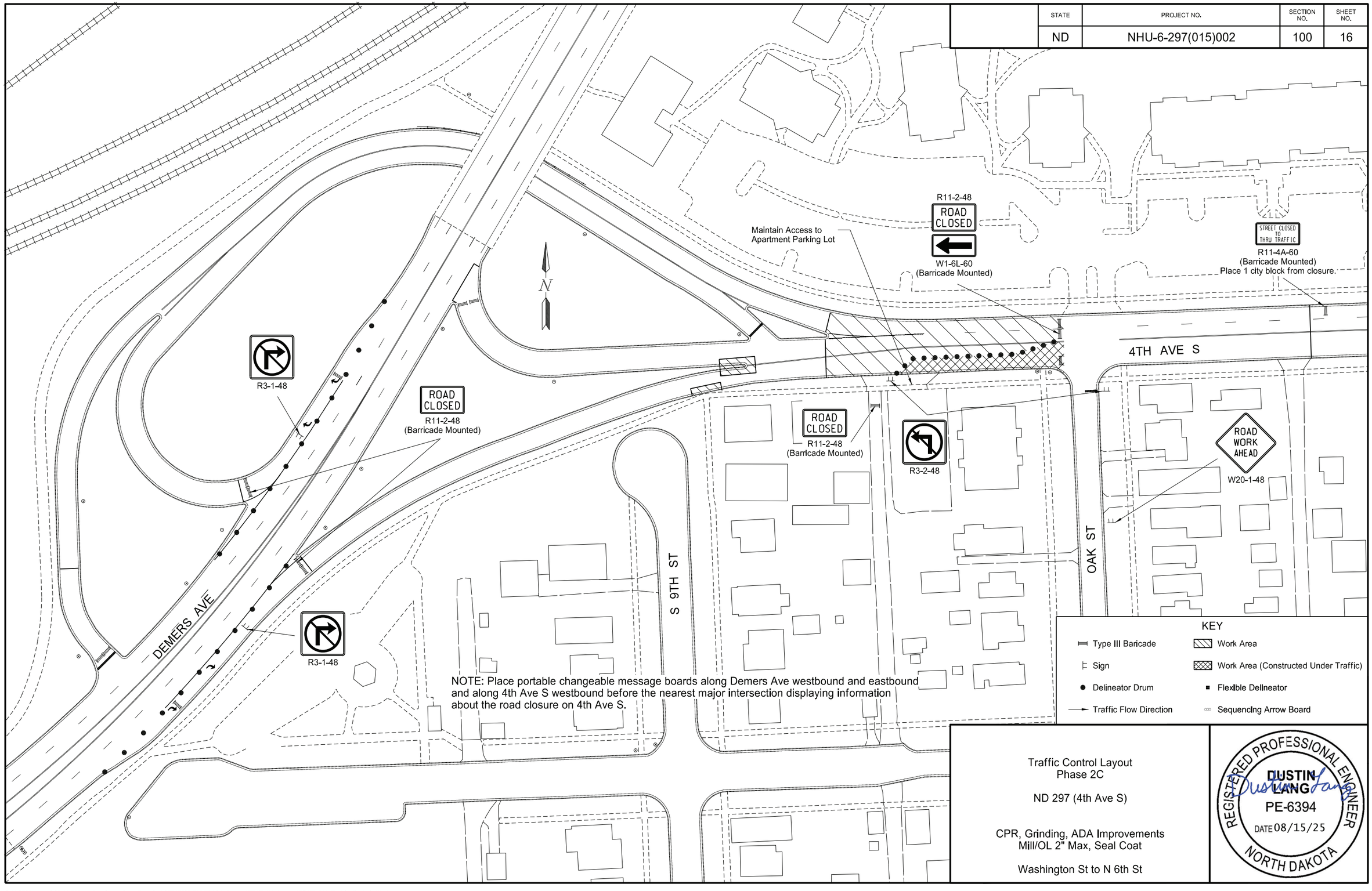
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/14/2025 6:25:40 PM tgwolnarowicz R:\project\60297002.015\District\Sheets\100WZ_Workzone\100WZ_014_Traffic_Control_4th.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	16



Traffic Control Layout
Phase 2C

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/14/2025 6:25:41 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\100WZ_Workzone\100WZ_014_Traffic_Control_4th.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	17

TRUCKS ENTERING HIGHWAY
W8-53-48

R3-1-48

Arrow Board Type C

ROAD CLOSED
R11-2-48
(Barricade Mounted)

DEMERS AVE

R3-1-48

TRUCKS EXITING HIGHWAY
W8-56-48

N

Maintain Access to Apartment Parking Lot

R11-2-48
ROAD CLOSED
W1-6L-60
(Barricade Mounted)

STREET CLOSED TO THRU TRAFFIC
R11-4A-60
(Barricade Mounted)
Place 1 city block from closure.

4TH AVE S

ROAD CLOSED
R11-2-48
(Barricade Mounted)

R3-2-48

ROAD WORK AHEAD
W20-1-48

S 9TH ST

OAK ST

NOTE: Place portable changeable message boards along Demers Ave westbound and eastbound and along 4th Ave S westbound before the nearest major intersection displaying information about the road closure on 4th Ave S.

R2-1-48

W3-5-48 Portable → W20-5-48 Portable → R2-1a-24 Portable → W4-2R-48 Portable

Minimum 140' spacing between signs.

KEY

- Type III Baricade
- Sign
- Delineator Drum
- Traffic Flow Direction
- Work Area
- Work Area (Constructed Under Traffic)
- Flexible Dellneator
- Sequencing Arrow Board

Traffic Control Layout
Phase 3

ND 297 (4th Ave S)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

8/14/2025 6:25:41 PM tgwolnarowicz R:\project\60297002.015\District\Sheets\100WZ_Workzone\100WZ_014_Traffic_Control_4th.dgn

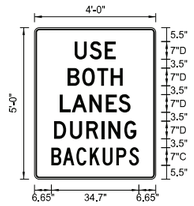
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	100	18

SIGN NUMBER	ConSign 1
WIDTH x HEIGHT	4'-0" x 5'-0"
BORDER WIDTH	0.63" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): none

AREA: 20.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Warning.sst

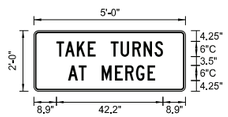
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
U	S	E																		16.2	7	D 2000
15.9	21.8	27.8																				
B	O	T	H																	21.8	7	D 2000
13.1	18.9	24.8	30.2																			
L	A	N	E	S																28	7	D 2000
10	14.8	21.8	28.2	33.2																		
D	U	R	I	N	G															32.6	7	D 2000
7.7	14	20.5	26.4	29.2	35.5																	
B	A	C	K	U	P	S														34.7	7	C 2000
6.7	11.2	16.5	21.9	27	32.4	37.4																

SIGN NUMBER	ConSign 2
WIDTH x HEIGHT	5'-0" x 2'-0"
BORDER WIDTH	0.63" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): none

AREA: 10.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Warning.sst

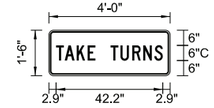
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
T	A	K	E		T	U	R	N	S											42.2	6	C 2000
8.9	12.3	17	21.4	24.4	30.4	34.3	39	43.4	47.8													
A	T		M	E	R	G	E													34.5	6	C 2000
13.5	17.7	20.8	26.8	32.1	36.2	40.4	45															

SIGN NUMBER	ConSign 3
WIDTH x HEIGHT	4'-0" x 1'-6"
BORDER WIDTH	0.63" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): none

AREA: 6.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Warning.sst

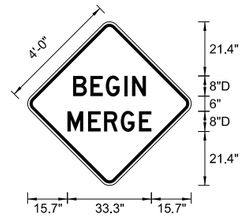
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
T	A	K	E		T	U	R	N	S											42.2	6	C 2000
2.9	6.3	11	15.4	18.4	24.4	28.3	33	37.4	41.8													

SIGN NUMBER	ConSign 4
WIDTH x HEIGHT	5'-5" x 5'-5"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): none

AREA: 29.1 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Warning.sst

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
B	E	G	I	N																28.8	8	D 2000
18	24.8	30.9	38.1	41.3																		
M	E	R	G	E																33.3	8	D 2000
15.7	23.9	30.2	36.9	44.1																		

Construction Sign Details

ND 297 (Demers Ave)

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-6-297(015)002	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
DeMers Ave																							
10+52 Rt		16		9.0	9.9				7.0	2.5 x 2.5 12 ga	10.5						1	4	3 x 3 7 ga				
10+75 Rt		10		7.5					7.0														Mount on Light Standard
11+70 Lt	S.A.C			16.5	10.2				7.0	2.5 x 2.5 12 ga	10.7						1	4	3 x 3 7 ga				
12+03 Lt	S.A.B			18.0	10.2				7.0	2.5 x 2.5 12 ga	10.7						1	4	3 x 3 7 ga				
15+30 Rt		20		9.0					7.0														Mount on Light Standard
16+15 Rt		16		9.0	9.9				7.0	2.5 x 2.5 12 ga	10.5						1	4	3 x 3 7 ga				
16+19 Lt									7.0											1			Mount on Light Standard
21+30 Rt		10		7.5					7.0														Mount on Light Standard
21+96 Lt		10		7.5					7.0														Mount on Light Standard
29+30 Lt		10		7.5					7.0														Mount on Light Standard
30+12 Lt									7.0											1			Mount on Light Standard
30+49 Lt		1		5.2	9.7				7.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				
32+41 Lt					9.4				7.0	2 x 2 12 ga	10.2						1	4	2.25 x 2.25 12 ga	1			
35+80 Rt		20		9.0					7.0														Mount on Light Standard
37+80 Lt					10.9				7.0	2.25 x 2.25 12 ga	13.6	2.4				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga	1		1	
Sub Total			0.0	105.7		**Total**	70.2										**Total**	28.0		4	0	1	
EB Off Ramp																							
0+12 Rt		14		4.0					7.0														Mount on Light Standard
2+49 Rt		9		5.0					7.0														Mount on Light Standard
3+25 Lt		1		5.2	9.7				7.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				
3+30 Rt		8		3.0					7.0														Mount on Light Standard
3+95 Lt		20		9.0					7.0														Mount on Light Standard
5+20 Rt		8		3.0					7.0														Mount on Light Standard
5+44 Lt		8		3.0					7.0														Mount on Light Standard
6+54 Rt		1		5.2	9.7				7.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				
7+40 Lt		8		3.0					7.0														Mount on Light Standard
Sub Total			0.0	40.4		**Total**	19.4										**Total**	8.0		0	0	0	
WB On Ramp																							
1+92 Lt		10		7.5	10.2				7.0	2.25 x 2.25 12 ga	10.6						1	4	2.5 x 2.5 12 ga				
4+32 Lt	S.A.A			9.3	12.0	12.0			7.0	2.5 x 2.5 10 ga	13.5						2	4	3 x 3 7 ga			2	
5+00 Lt		9		5.0	9.7				7.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
9+92 Lt		8		3.0	9.2				7.0	2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
Sub Total			0.0	24.8		**Total**	53.1										**Total**	20.0		0	0	2	

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

Sign Summary
Perforated Tube

Washington St to N 6th St

ND 297

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-6-297(015)002	110	2

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
EB On Ramp																							
0+65 Lt		4		3.9					7.0														Mount on Light Standard
1+29 Lt		8		3.0					7.0														Mount on Light Standard
1+54 Rt		33		6.0	9.2				7.0	2.25 x 2.25 12 ga	11.7						1	4	2.5 x 2.5 12 ga				
Sub Total			0.0	12.9		**Total**	9.2										**Total**	4.0		0	0	0	
WB Off Ramp																							
1+09 Rt		20		9.0					7.0														Mount on Light Standard
2+05 Rt		15		6.3					7.0														Mount on Light Standard
5+50 Rt		9		5.0					7.0														Mount on Light Standard
7+21 Rt		20		9.0					7.0														Mount on Light Standard
Sub Total			0.0	29.3		**Total**	0.0										**Total**	0.0		0	0	0	
Grand Total			**0.0**	**213.1**		**Total**	**151.9**										**Total**	**60**	**0**	**4**	**0**	**3**	

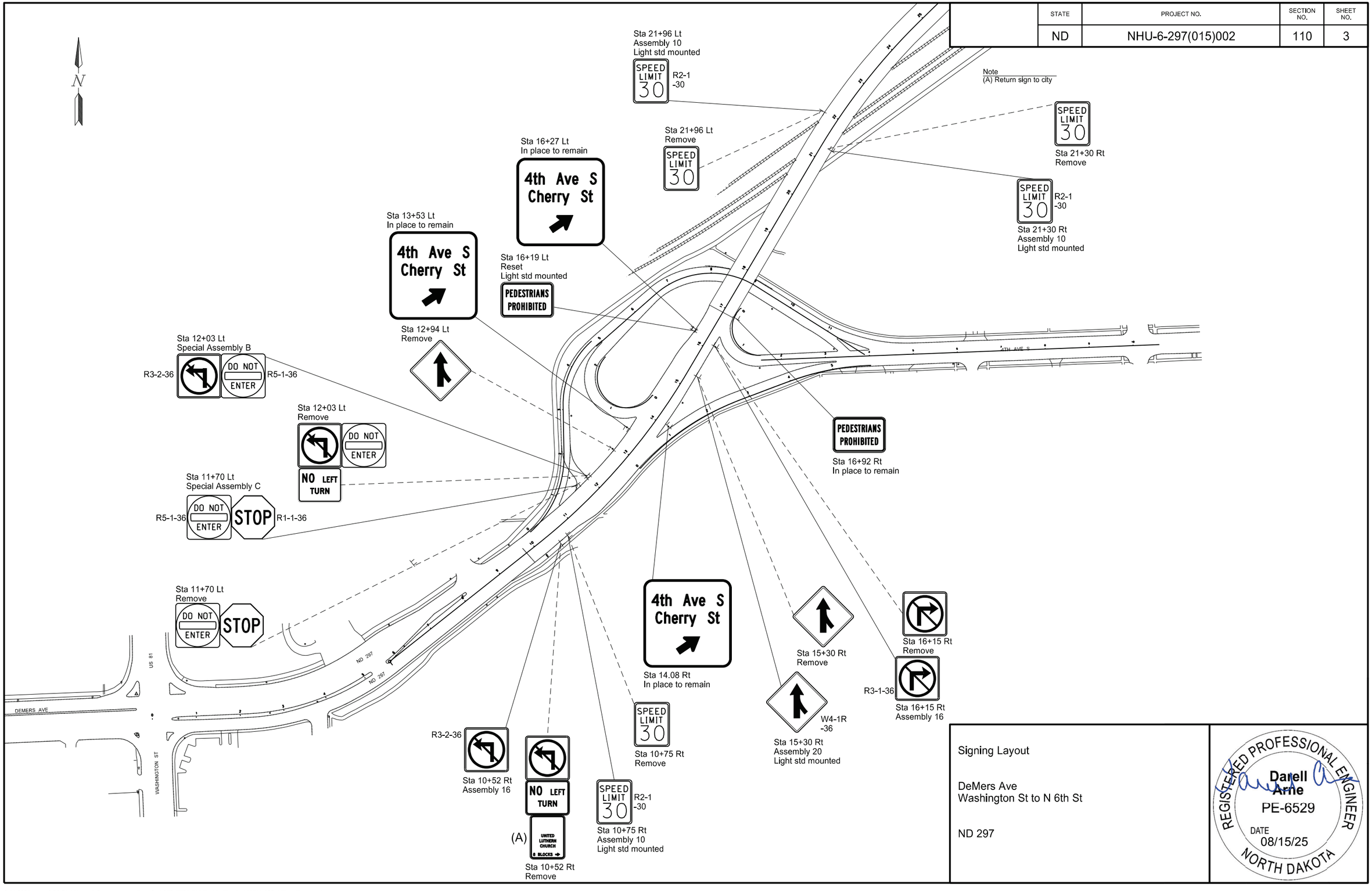
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

Sign Summary
Perforated Tube

Washington St to N 6th St

ND 297

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	110	3



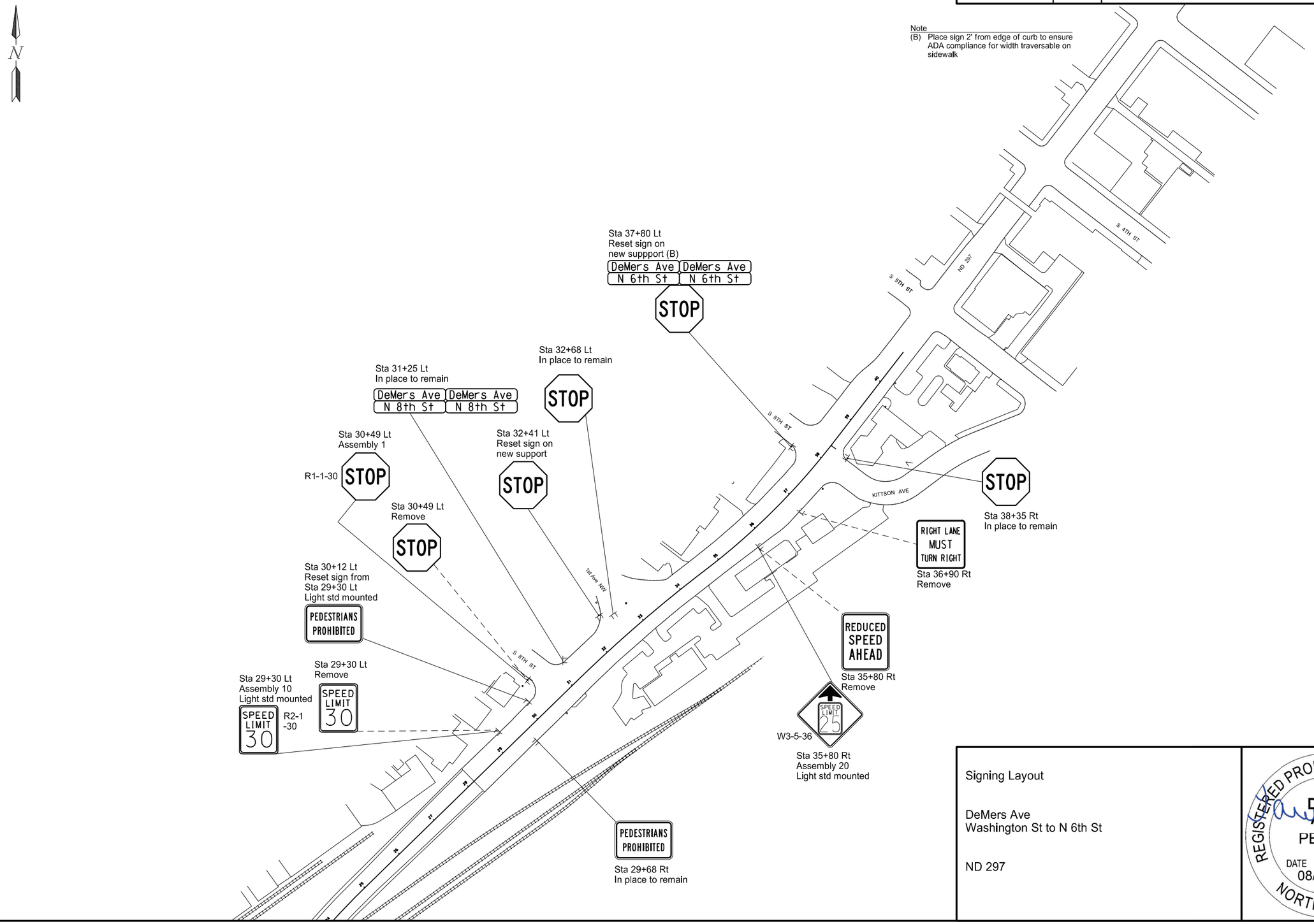
Signing Layout

DeMers Ave
Washington St to N 6th St

ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	110	4



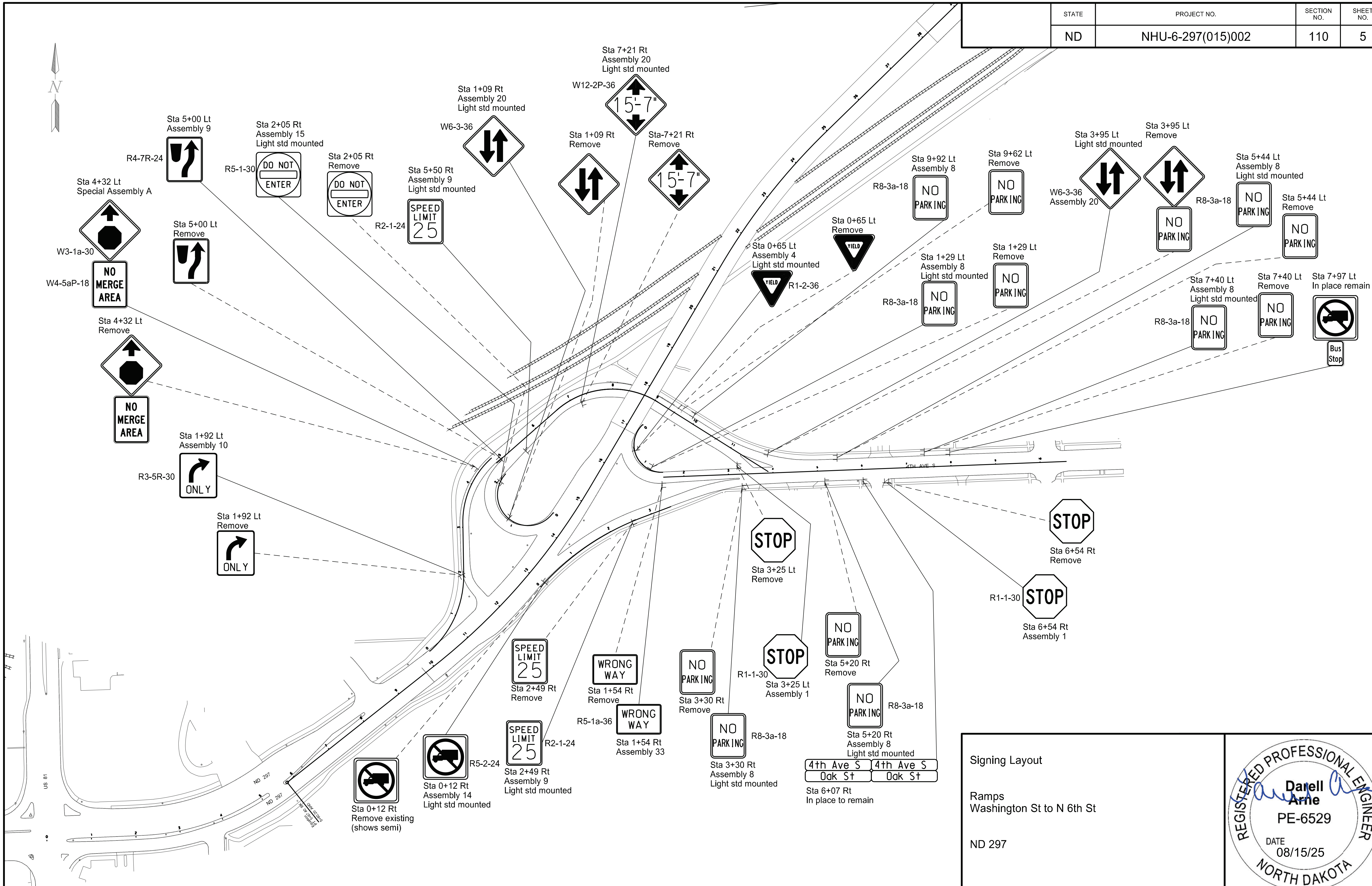
Signing Layout

DeMers Ave
Washington St to N 6th St

ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	110	5



Signing Layout

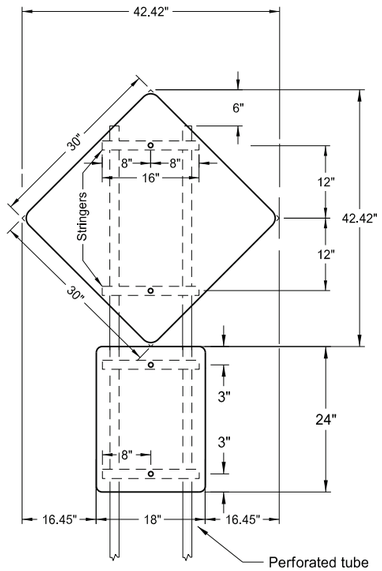
Ramps
Washington St to N 6th St

ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

Docusign Envelope ID: 6304A2DD-3D9E-4272-AF5E-640A017E89AE

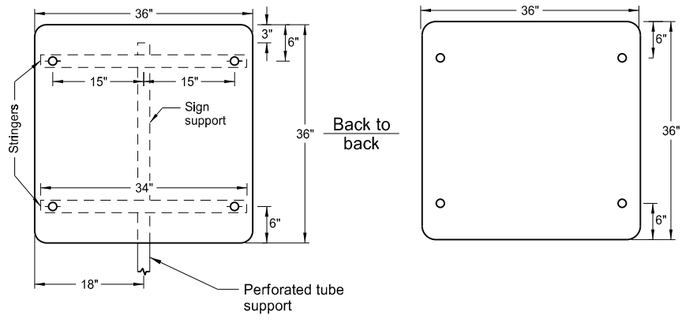
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	110	6



Special Assembly A

Sta 4+32 Lt

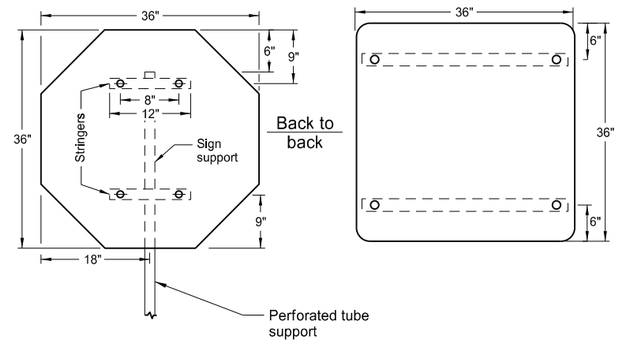
Pay area: 9.3 SF



Special Assembly B

Sta 12+03 Lt

Pay area: 18 SF



Special Assembly C

Sta 11+70 Lt

Pay area: 16.5 SF

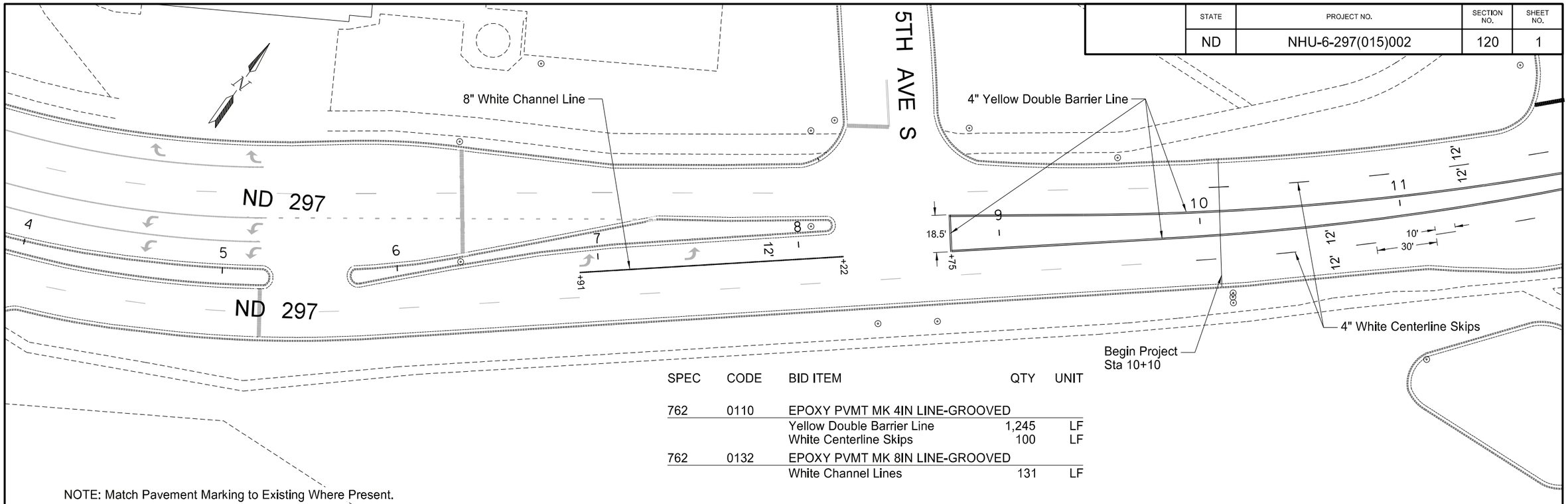
Sign Assemblies

Washington St to N 6th St

ND 297

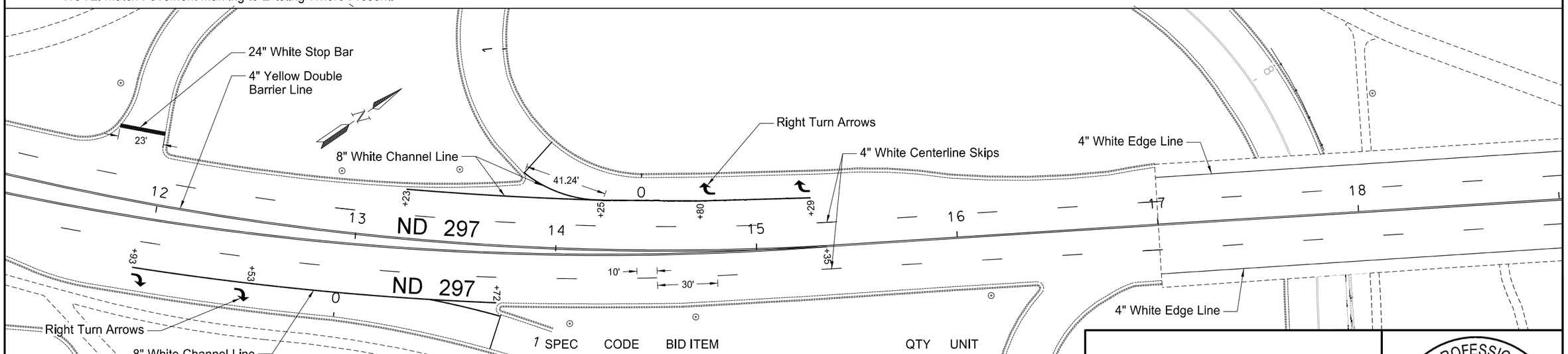
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	120	1



NOTE: Match Pavement Marking to Existing Where Present.

SPEC	CODE	BID ITEM	QTY	UNIT
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	1,245	LF
		White Centerline Skips	100	LF
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED		
		White Channel Lines	131	LF



SPEC	CODE	BID ITEM	QTY	UNIT
762	0136	EPOXY PVMT MK MESSAGE-GROOVED		
		4 - Right Turn Arrows	64	SF
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	1,762	LF
		White Centerline Skips	360	LF

NOTE: Match Pavement Marking to Existing Where Present.

SPEC	CODE	BID ITEM	QTY	UNIT
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED		
		White Channel Lines	450	LF
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED		
		White Stop Bar	23	LF
762	1104	PVMT MK PAINTED 4IN LINE		
		Yellow Double Barrier Line (Over Structure)	400	LF
		White Centerline Skips (Over Structure)	100	LF
		White Edge Line (Over Structure)	400	LF

Pavement Marking

ND 297 (Demers Ave)
STA 4+00 - STA 19+00

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

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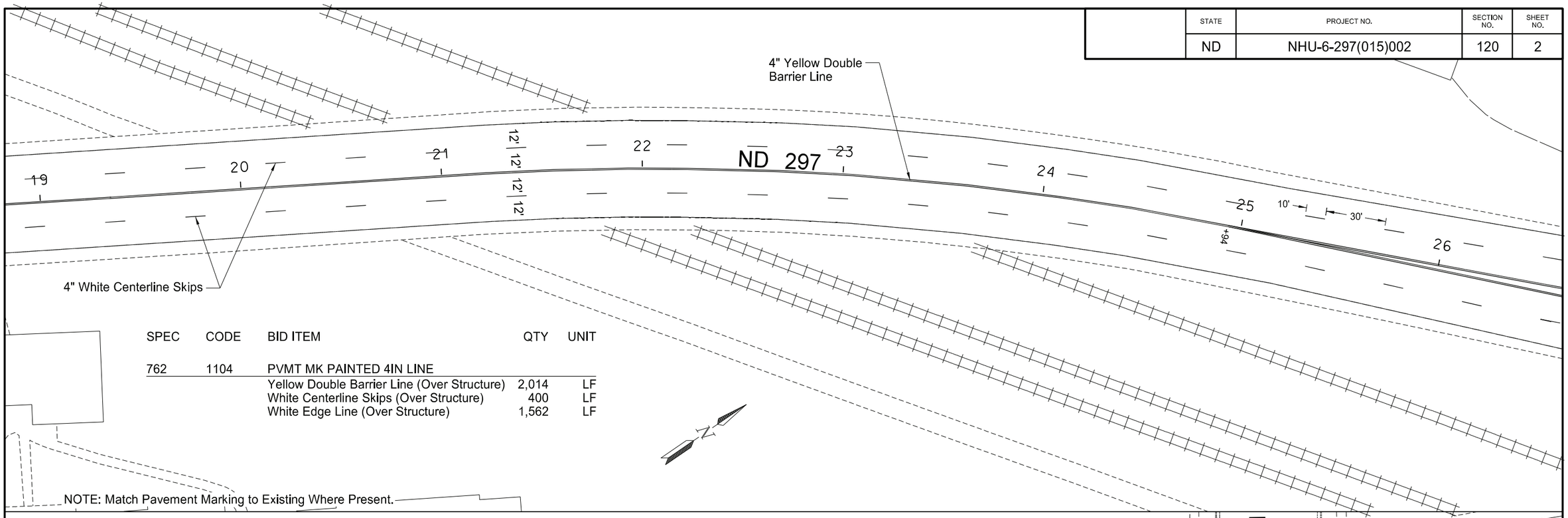
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	120	2

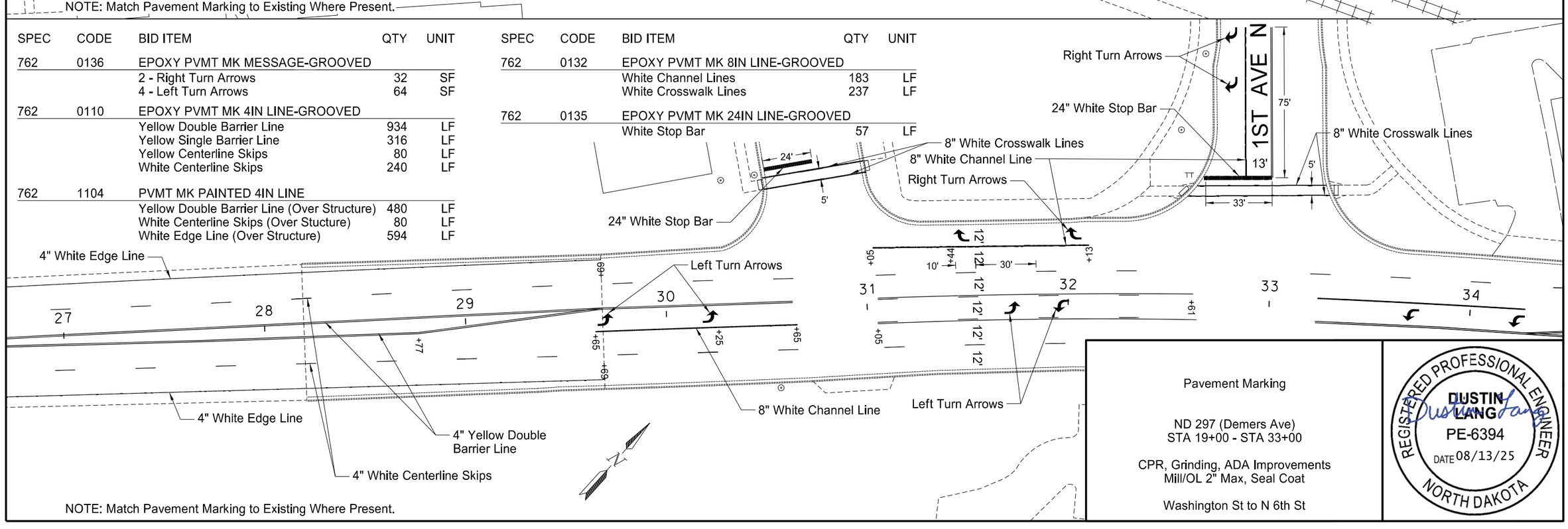


SPEC	CODE	BID ITEM	QTY	UNIT
762	1104	PVMT MK PAINTED 4IN LINE		
		Yellow Double Barrier Line (Over Structure)	2,014	LF
		White Centerline Skips (Over Structure)	400	LF
		White Edge Line (Over Structure)	1,562	LF

NOTE: Match Pavement Marking to Existing Where Present.

SPEC	CODE	BID ITEM	QTY	UNIT
762	0136	EPOXY PVMT MK MESSAGE-GROOVED		
		2 - Right Turn Arrows	32	SF
		4 - Left Turn Arrows	64	SF
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	934	LF
		Yellow Single Barrier Line	316	LF
		Yellow Centerline Skips	80	LF
		White Centerline Skips	240	LF
762	1104	PVMT MK PAINTED 4IN LINE		
		Yellow Double Barrier Line (Over Structure)	480	LF
		White Centerline Skips (Over Stucture)	80	LF
		White Edge Line (Over Structure)	594	LF

SPEC	CODE	BID ITEM	QTY	UNIT
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED		
		White Channel Lines	183	LF
		White Crosswalk Lines	237	LF
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED		
		White Stop Bar	57	LF



NOTE: Match Pavement Marking to Existing Where Present.

Pavement Marking

ND 297 (Demers Ave)
STA 19+00 - STA 33+00

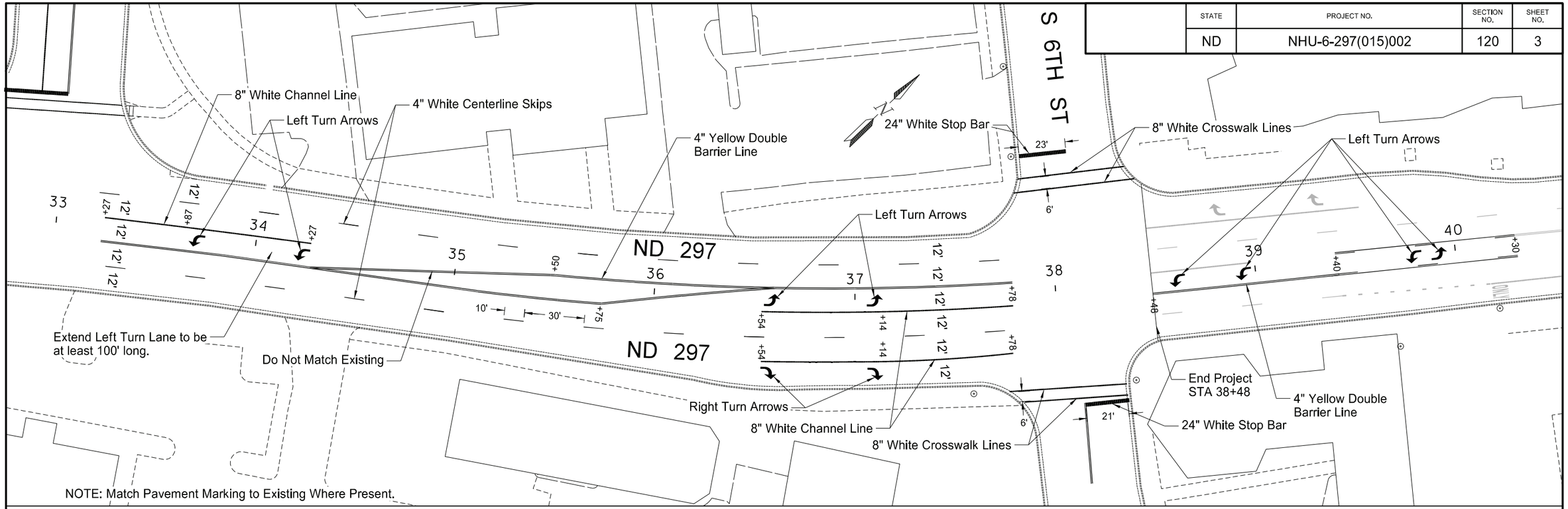
CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

8/1/2025 3:24:07 PM tgwoinarowicz R:\project\60297002.015\District\Sheets\120MK_PVMK\120MK_001_PVMT_MK.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	120	3



SPEC	CODE	BID ITEM	QTY	UNIT
762	0136	EPOXY PVMT MK MESSAGE-GROOVED		
		2 - Right Turn Arrows	32	SF
		8 - Left Turn Arrows	128	SF
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	1,562	LF
		Yellow Single Barrier Line	180	LF
		Yellow Centerline Skips	60	LF
		White Centerline Skips	240	LF

SPEC	CODE	BID ITEM	QTY	UNIT
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED		
		White Channel Lines	351	LF
		White Crosswalk Lines	224	LF
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED		
		White Stop Bar	44	LF

Pavement Marking

ND 297 (Demers Ave)
STA 33+00 - STA 40+50

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

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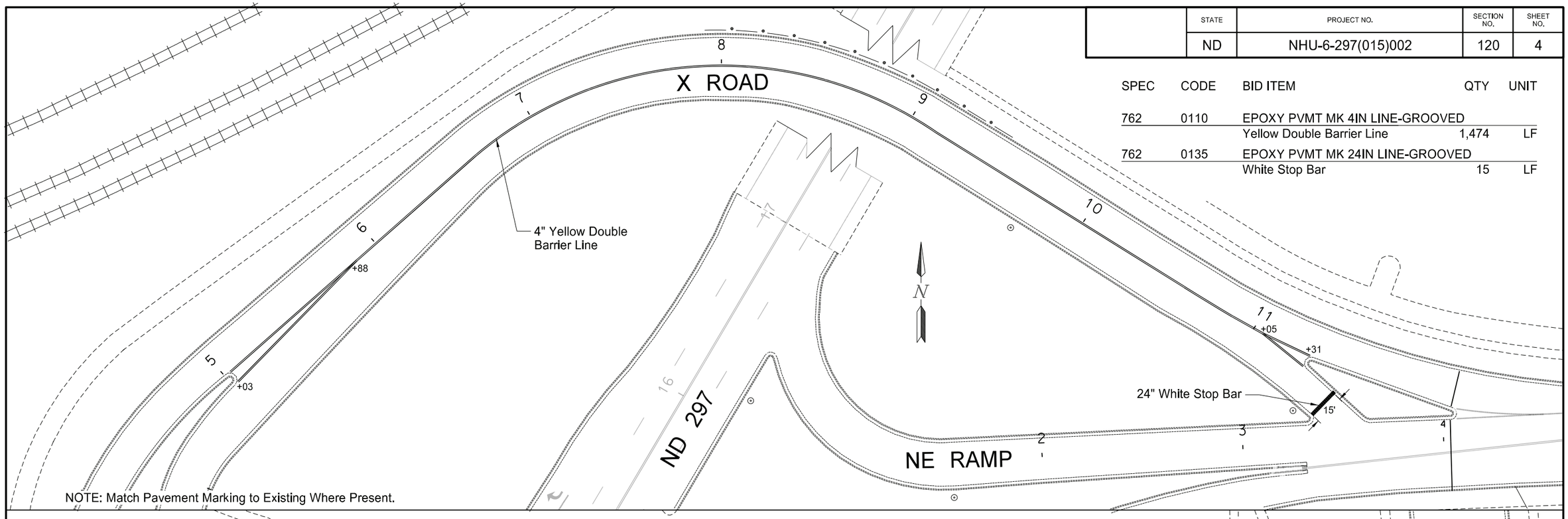
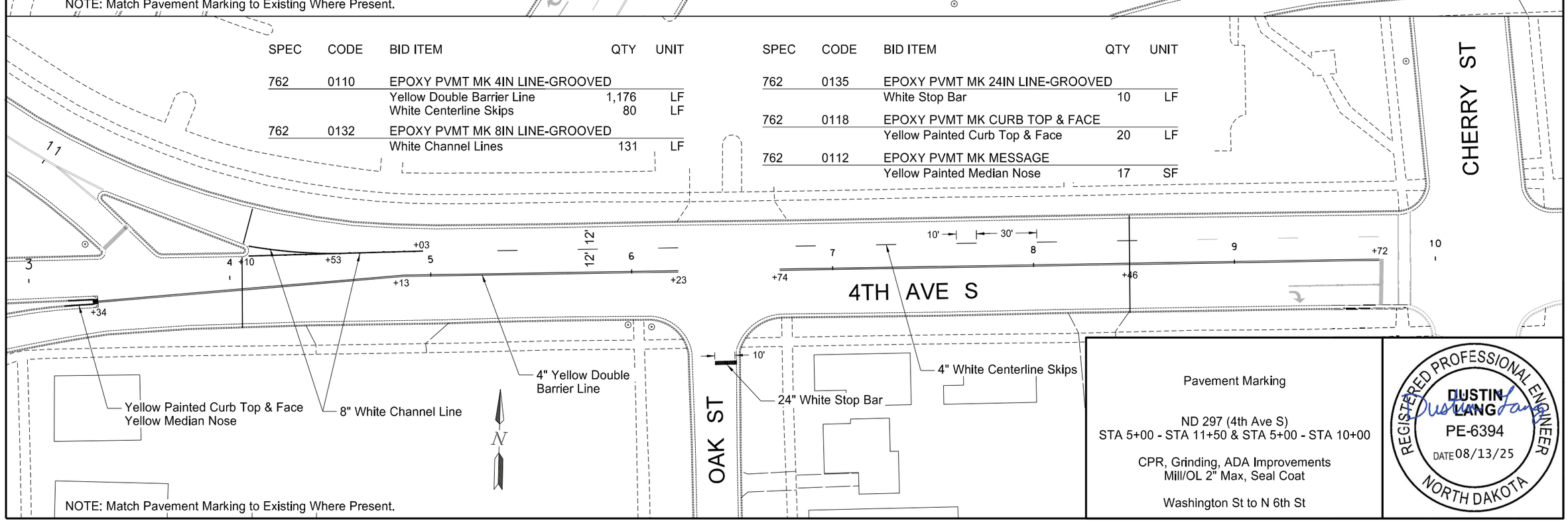
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	120	4

SPEC	CODE	BID ITEM	QTY	UNIT
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	1,474	LF
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED		
		White Stop Bar	15	LF



SPEC	CODE	BID ITEM	QTY	UNIT
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED		
		Yellow Double Barrier Line	1,176	LF
		White Centerline Skips	80	LF
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED		
		White Channel Lines	131	LF

SPEC	CODE	BID ITEM	QTY	UNIT
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED		
		White Stop Bar	10	LF
762	0118	EPOXY PVMT MK CURB TOP & FACE		
		Yellow Painted Curb Top & Face	20	LF
762	0112	EPOXY PVMT MK MESSAGE		
		Yellow Painted Median Nose	17	SF



Pavement Marking

ND 297 (4th Ave S)
STA 5+00 - STA 11+50 & STA 5+00 - STA 10+00

CPR, Grinding, ADA Improvements
Mill/OL 2" Max, Seal Coat

Washington St to N 6th St

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 08/13/25
NORTH DAKOTA

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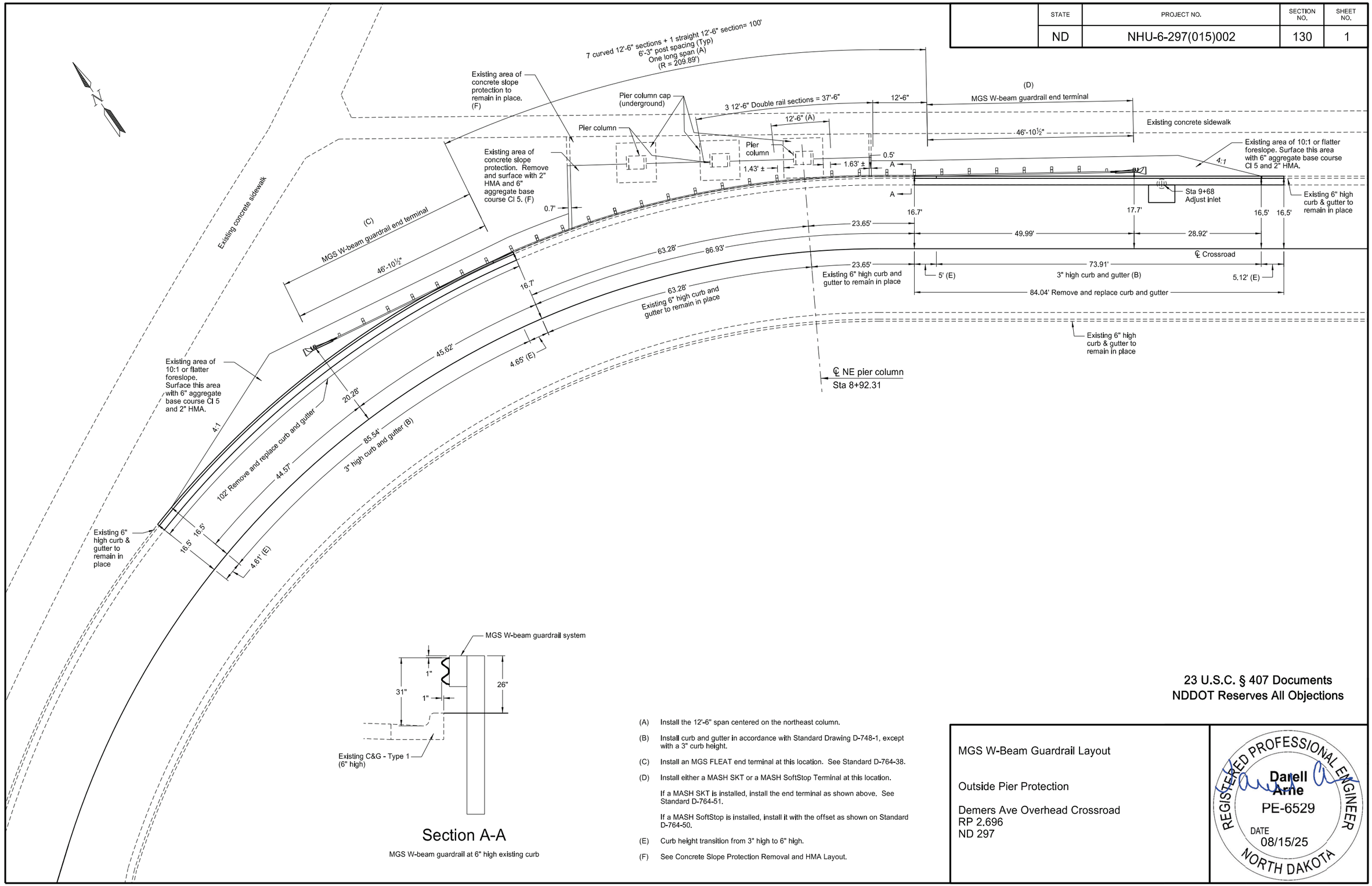
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	130	1



Section A-A

MGS W-beam guardrail at 6" high existing curb

(A) Install the 12'-6" span centered on the northeast column.

(B) Install curb and gutter in accordance with Standard Drawing D-748-1, except with a 3" curb height.

(C) Install an MGS FLEAT end terminal at this location. See Standard D-764-38.

(D) Install either a MASH SKT or a MASH SoftStop Terminal at this location.

If a MASH SKT is installed, install the end terminal as shown above. See Standard D-764-51.

If a MASH SoftStop is installed, install it with the offset as shown on Standard D-764-50.

(E) Curb height transition from 3" high to 6" high.

(F) See Concrete Slope Protection Removal and HMA Layout.

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

MGS W-Beam Guardrail Layout

Outside Pier Protection

Demers Ave Overhead Crossroad
RP 2.696
ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	130	2

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

MGS W-BEAM GUARDRAIL AT OBSTRUCTIONS TWO-LANE HIGHWAYS

LOCATION	(A) 5/8" Ø x 18" LONG BUTTON HEAD BOLT	(A) 5/8" Ø x 1 1/4" LONG BUTTON HEAD BOLT	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 12'-6" CURVED RAIL SECTION	(A) 12'-6" CURVED DOUBLE RAIL SECTION	(A) 12'-6" STRAIGHT RAIL SECTION	(A) REFLECTOR-IZED PLATES
	EACH	EACH	EACH	EACH	EACH	EACH	CY	EACH
Sta 8+26.12 to 9+19.09 Lt	15	64	15	15	4	3	1	9
TOTAL	15	64	15	15	4	3	1	9

(A) Include these items in the contract unit price bid for "W-Beam Guardrail".

SPEC	CODE	BID ITEM	QTY	UNIT
202	0130	REMOVAL OF CURB & GUTTER		
		Sta 7+34.23 to 8+29.03 Lt	102	LF
		Sta 9+15.97 to 10+00.00 Lt	84	LF
		Total	186	LF
722	6160	ADJUST INLET		
		Sta 9+68 Lt	1	Ea
748	0141	CURB & GUTTER - TYPE 1 SPECIAL		
		Sta 7+34.23 to 8+29.03 Lt	102	LF
		Sta 9+15.97 to 10+00.00 Lt	84	LF
		Total	186	LF
764	0131	W-BEAM GUARDRAIL		
		Sta 8+26.12 to 9+19.09 Lt	100	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 7+83.41 to 8+26.12 Lt	1	Ea
		Sta 9+19.09 to 9+65.95 Lt	1	Ea
		Total	2	Ea
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 7+94.20 to 9+46.78 Lt	162.5	LF

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

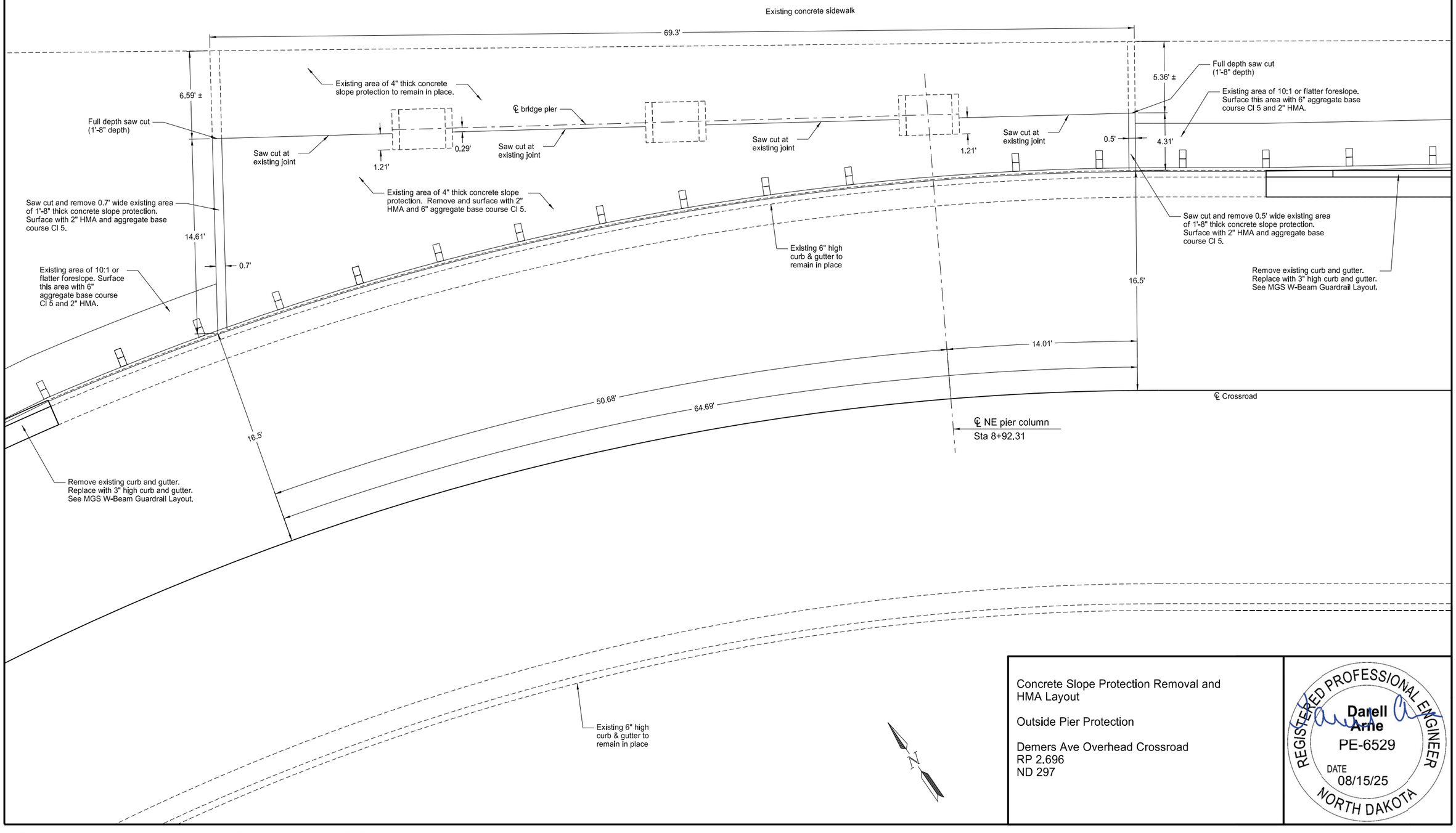
MGS W-Beam Guardrail Quantities

Outside Pier Protection

Demers Ave Overhead Crossroad
RP 2.696
ND 297

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	130	3



Concrete Slope Protection Removal and HMA Layout

Outside Pier Protection

Demers Ave Overhead Crossroad
RP 2.696
ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

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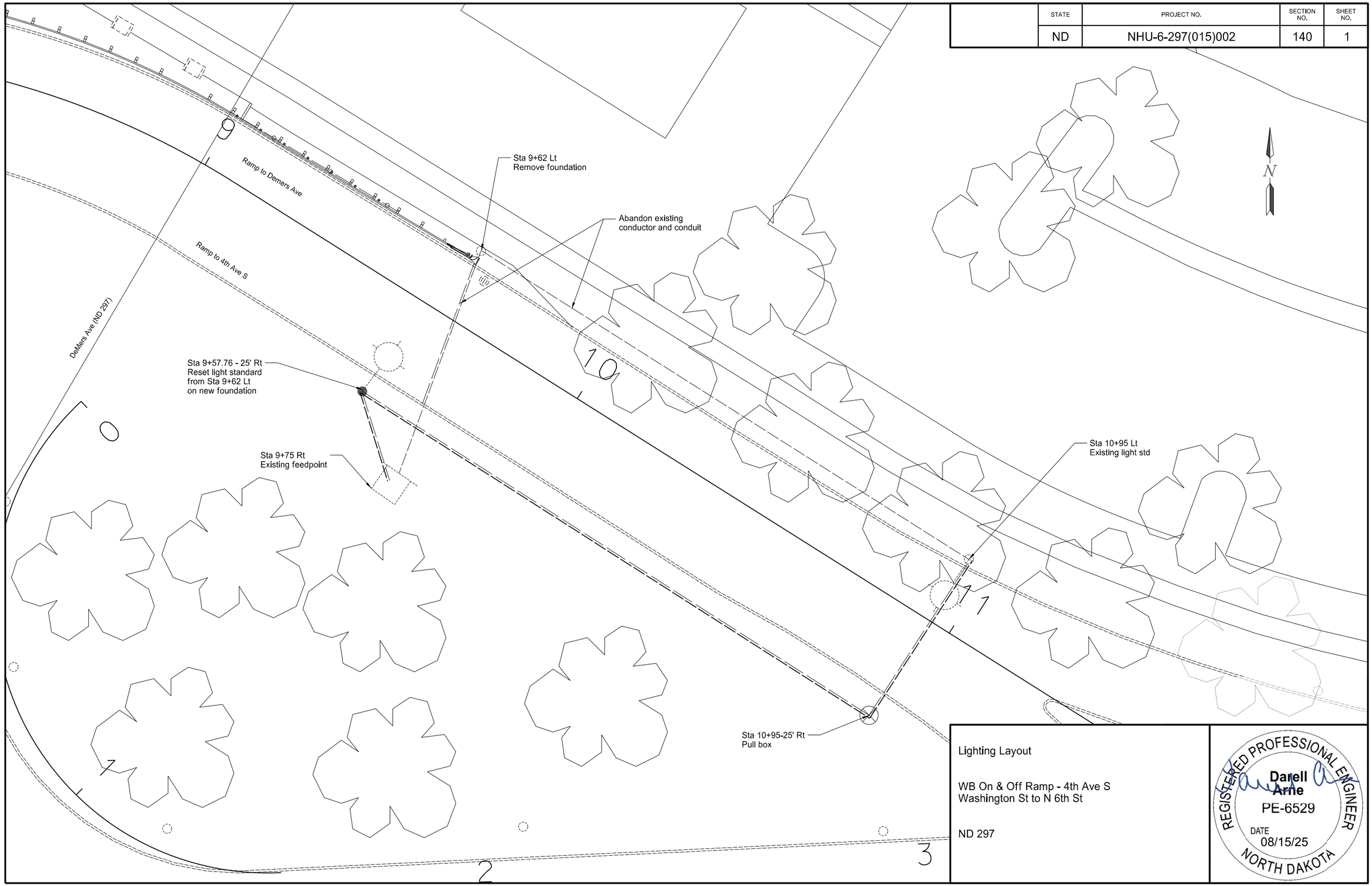
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-6-297(015)002	140	1



Lighting Layout

WB On & Off Ramp - 4th Ave S
Washington St to N 6th St

ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

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Lighting Quantities (A)		
Description	Unit	Qty
Pull box	EA	1
2" Diameter Conduit	LF	212
Underground Conductor No 2 Type RHW	LF	738
Underground Conductor No 6 Type THW	LF	246
Reset 35' Light standard	EA	1
Light Standard Foundation	EA	1
Remove Light Standard Foundation	EA	1

(A) Include these quantities in the price bid for the item "Revise Lighting System".

Light Standard Foundation Table				
Height FT	Footing Depth FT			
	24 IN Dia	30 IN Dia	36 IN Dia	42 IN Dia
30-42	6	6	5	5

Lighting Cable & Conduit Runs - Circuit 1						
Run		Conduit		Cable		
No	Station	Size IN	LF	# of Cables	Size/Type	LF
FP	9+75 Lt	2	25	3	Underground Conductor No 2-Type RHW	117
Light Std	9+57.76-25' Lt			1	Underground Conductor No 6-Type THW	39
Light Std	9+57.76-25' Lt	2	141	3	Underground Conductor No 2-Type RHW	453
Pullbox	10+95-25' Lt			1	Underground Conductor No 6-Type THW	151
Pullbox	10+95-25' Lt	2	46	3	Underground Conductor No 2-Type RHW	168
Ex Lt Std	10+95 Rt			1	Underground Conductor No 6-Type THW	56

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-6-297(015)002	140	2

SPEC	CODE	BID ITEM	QTY	UNIT
770	4525	Revise Lighting System	1	EA

Lighting Quantities
Cable and Conduit Runs

WB On & Off Ramp - 4th Ave S
Washington St to N 6th St

ND 297

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 08/15/25
NORTH DAKOTA

NDDOT ABBREVIATIONS

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
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
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
EVSE	electric vehicle supply equipment
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
Fed	Federal
FP	feed point
Fn	fence
Fn P	fence post
FO	fiber optic
FD	field drive
F	fill
FAA	fine aggregate angularity
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser
FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed

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

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

NDDOT ABBREVIATIONS

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
HTCG	high tension cable guardrail
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
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	Northeast
NW	Northwest
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 ℄	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
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

07-01-14

REVISIONS

DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

KIRK J. HOFF
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04/14/25
ENGINEER
NORTH DAKOTA

NDDOT ABBREVIATIONS

D-101-3

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	Southeast
SW	Southwest
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
VSFS	vehicle speed feedback sign
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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
07-01-14

REVISIONS

DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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

SOIL TYPES

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

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DATE	CHANGE
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 District
AGC	Associated General Contractors of America
ALL PL	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users District
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 WRD	Burleigh County Water Resource District
CABLE ONE	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporated
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users District
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 COMM	Consolidated Communications
CONS TELCOM	Consolidated Telcom
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 WRD	Dickey County Water Resource District
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
E CENT REG WD	East Central Water District
ENBRDG	Enbridge Pipelines Incorporated
ENVENTIS	Enventis Telephone
EQUINOR	Equinor Pipeline
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
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
LWR YELL R ELEC	Lower Yellowstone Rural Electric
LUMEN	Lumen Technologies Incorporated
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 District
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 Incorporated
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
MLGC	Moore & Liberty - Griggs County
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N PRAIR REG WD	North Prairie Regional Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NE REG WD	Northeast Regional Water District
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
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
PAAP	Plains All American Pipeline
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T REG WD	R & T Water District
RED RIV COMM	Red River 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
SE W U	Southeast 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 RWD	Stutsman Rural Water District
SW PL PRJ	Southwest Pipeline Project
SWWA	Southwest Water Authority
SUNOCO	Sunoco LP
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 WRD	Traill County Water Resource District
UNTD TEL	United Telephone
UPPR SOUR WD	Upper Souris Water District
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
WAWSA	Western Area Water Supply Authority
WEB	W. E. B. Water Development Association
WILLI WRD	Williams County Water Resource District
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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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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12 18 2020

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
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

- 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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12 18 2020

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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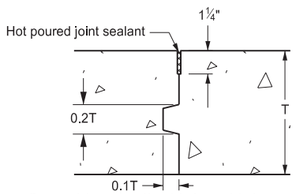
12 18 2020

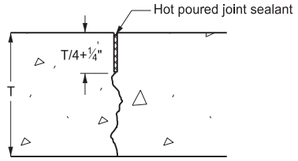
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS

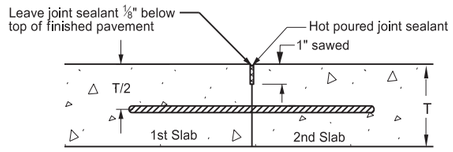


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

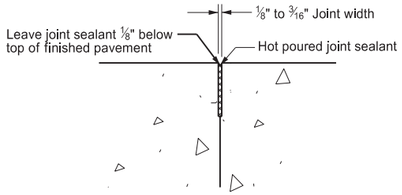
TIED JOINTS



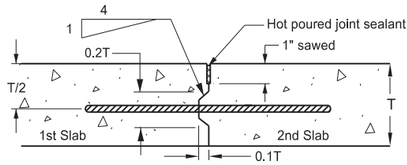
Longitudinal construction joint (tied butt joint)

Notes:

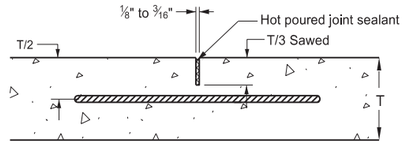
1. Provide hot poured joint sealant meeting the requirements of Section 826.02A.2 of the Standard Specifications.
2. Include all costs of the longitudinal joint and seal in the price bid for the PCC pavement.
3. Do not place tie bars within 18 inches of a transverse joint.
4. Use Grade 40 steel for tie bars installed bent and later straightened.
5. Increase the maximum 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)

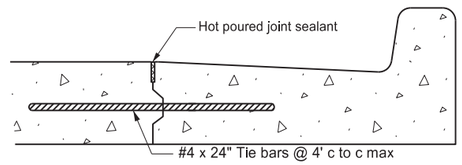


Sawed longitudinal joint

TIEBAR SPACINGS (In)*

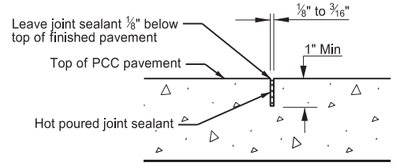
TIE BARS	STEEL GRADE	40				60						40					60						40						60						40						60					
	SIZE & LENGTH	#3x24" BARS				#3x30" BARS						#4x24" BARS					#4x36" BARS							#5x30" BARS						#5x42" BARS						#6x36" BARS						#6x48" BARS					
DIST TO NEAREST FREE EDGE		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	8	10	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
PCC PVMT DEPTH	JOINT TYPE																																															
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	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	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										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										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	48	38	35
	BUTT	25				37	25										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										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						25						38	32	27	24			36	30	26					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							25						37	31	26				35	29	25					48	44	38	33	28	24	

*Spacing where the calculated pullout strength of the tiebar equals the calculated yield strength of the tiebar - 48 inch spacing indicates a calulated spacing of 4 feet or greater.



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
03/13/2025	Revised C&G Tie Bar Size

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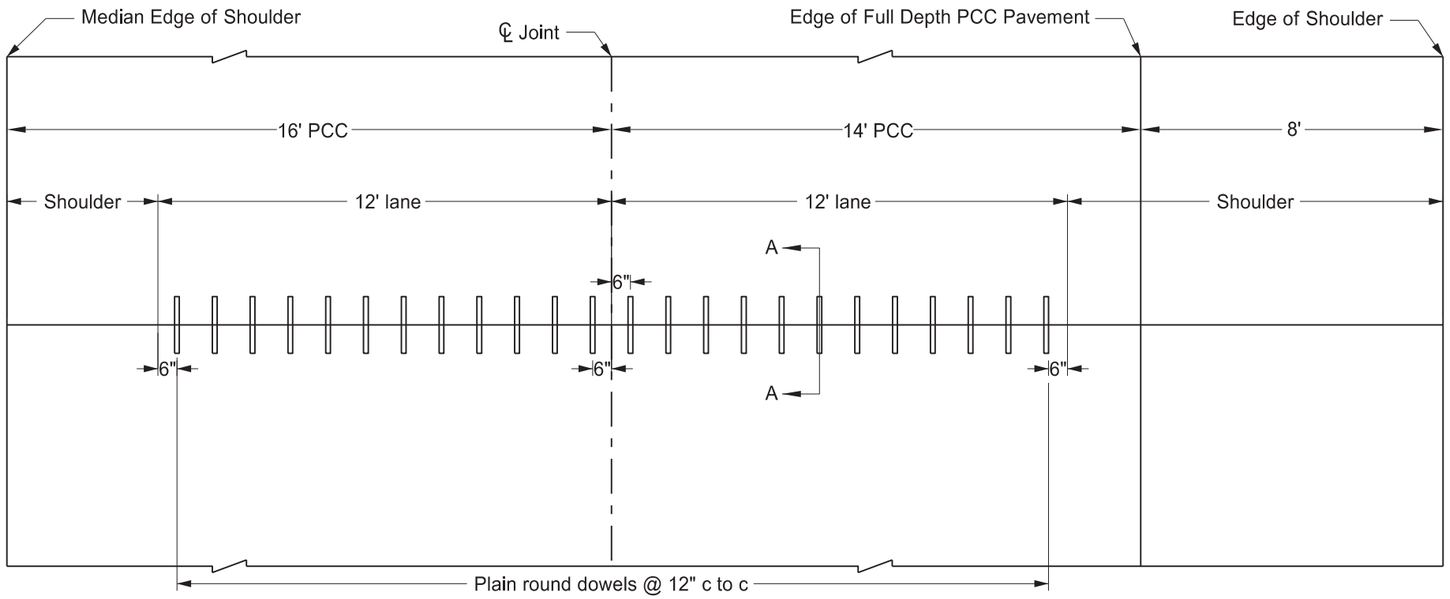
Kirk J Hoff

03/13/25

TRANSVERSE CONTRACTION JOINT DETAILS

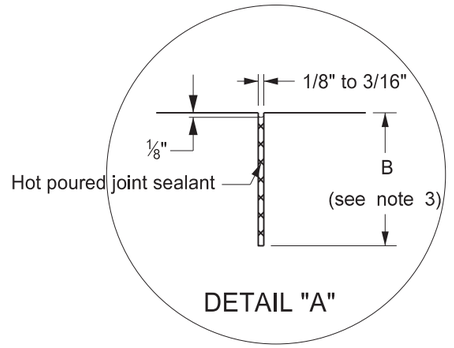
D-550-3



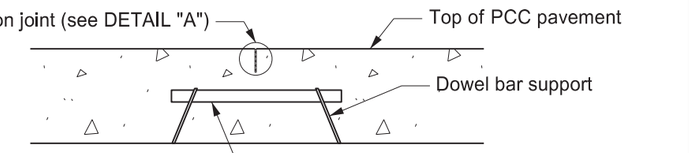
CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE

Notes

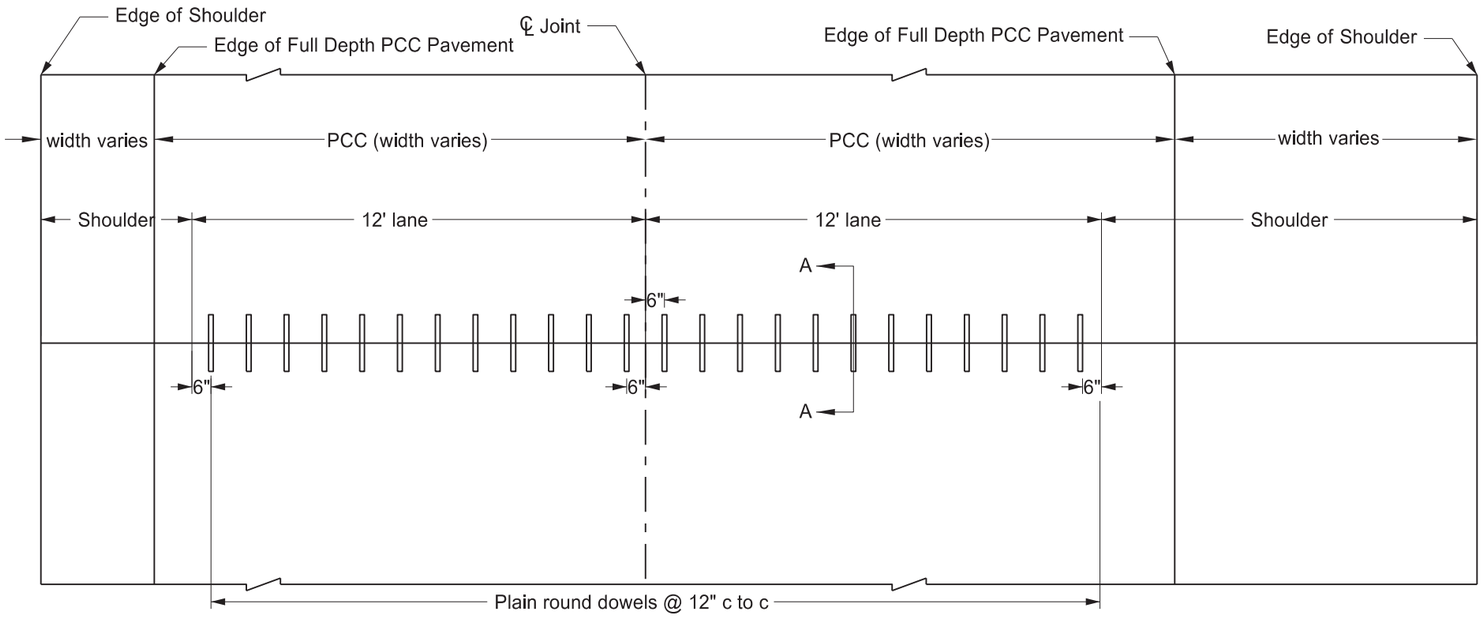
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. B = T/4 + ¼" for AE or non-dowelled concrete pavement or
   B = T/3 for AAE or dowelled concrete pavement



DETAIL "A"



SECTION A-A



CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

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
03/13/2025	Revised # of Dowels & Note 3.

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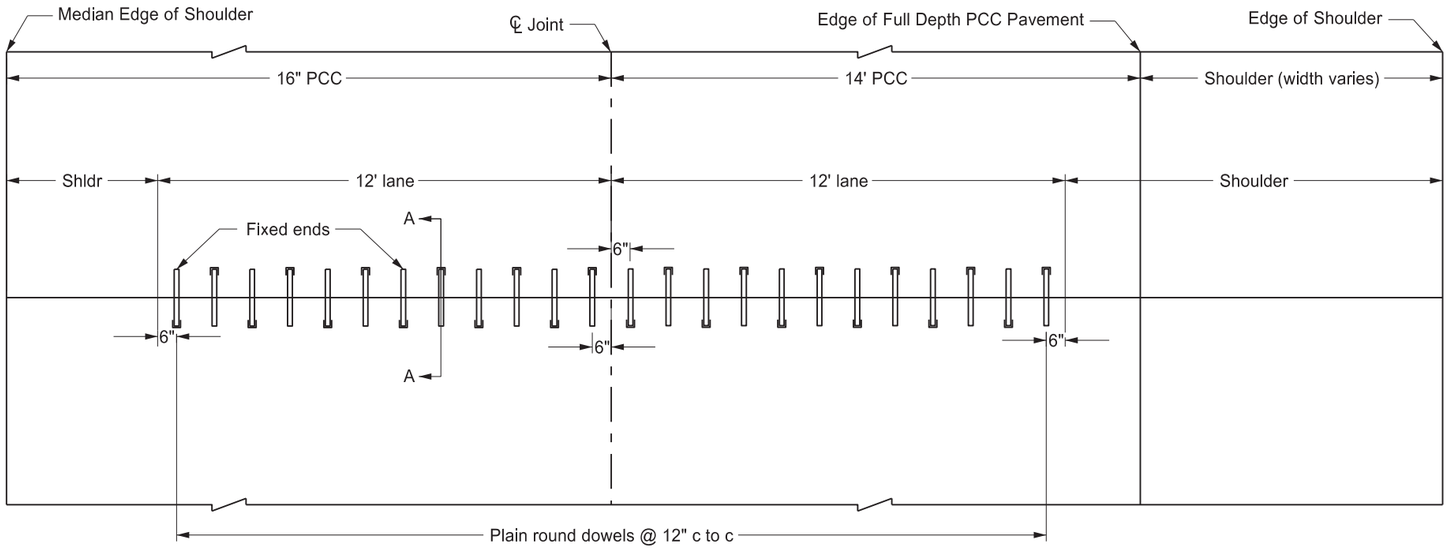
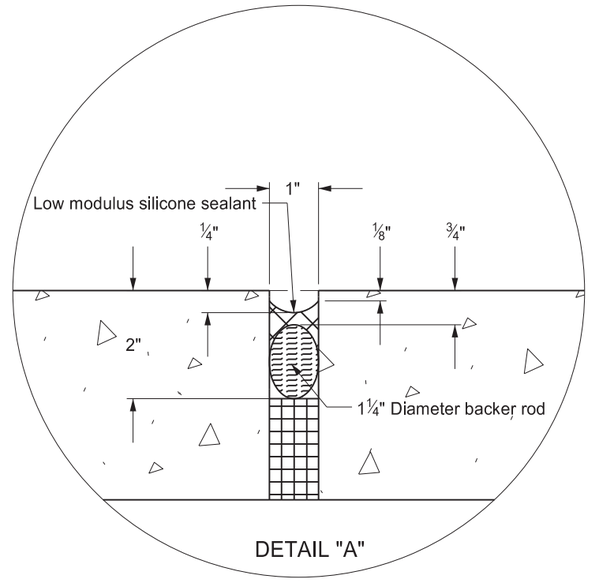
TRANSVERSE EXPANSION JOINT DETAIL

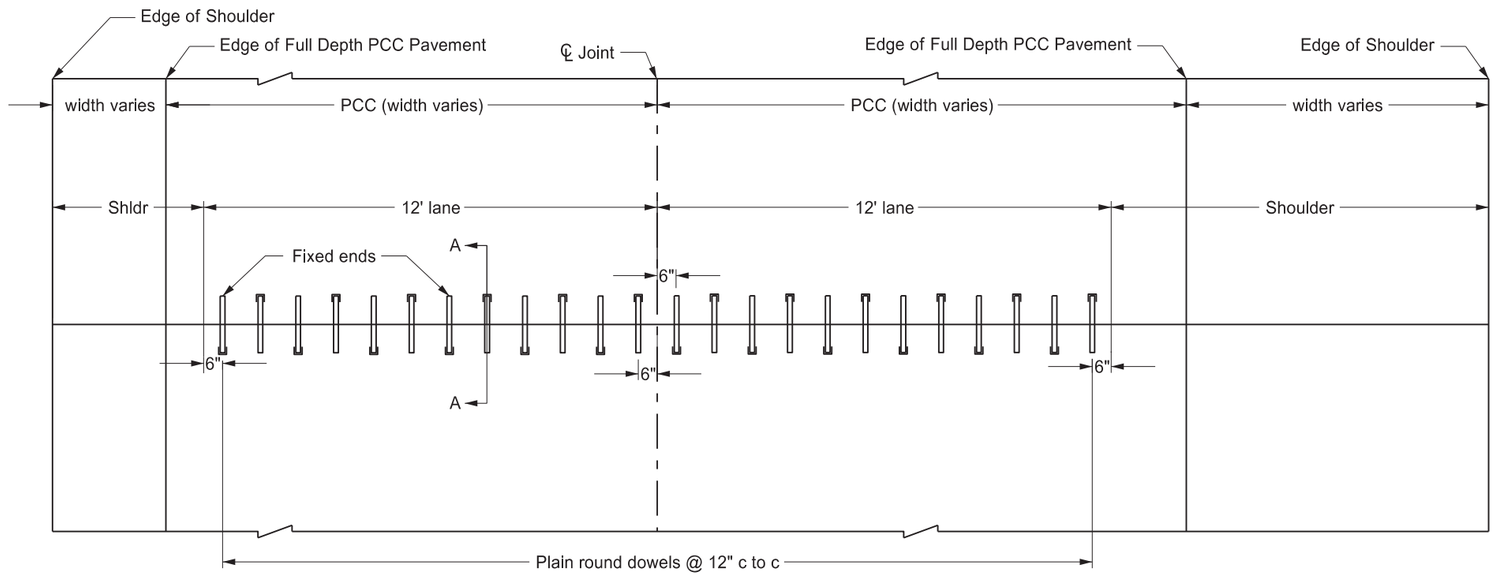
D-550-4



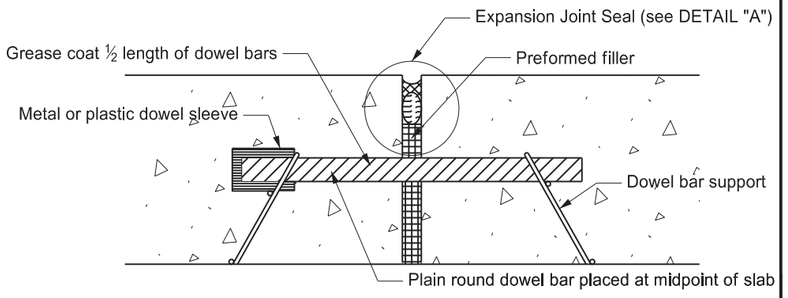
DOWELED EXPANSION JOINT ASSEMBLY
INTERSTATE



DETAIL "A"



DOWELED EXPANSION JOINT ASSEMBLY
NON-INTERSTATE



SECTION A-A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel bar sizes
10/25/2019	Expanded details for clarity
3/13/2025	Revised # of dowels.

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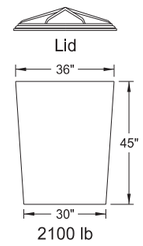
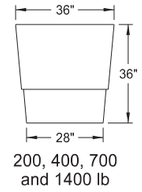
ATTENUATION DEVICE

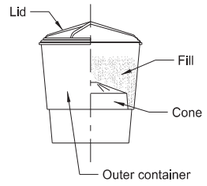
D-704-1





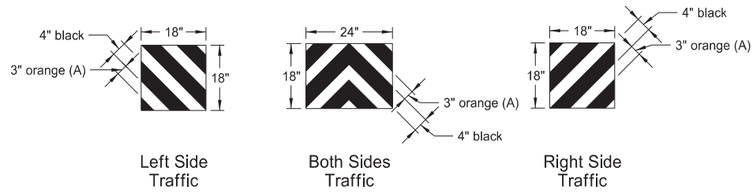
Outer Containers

Cones



Typical Assembly

Typical Module
Construction Detail

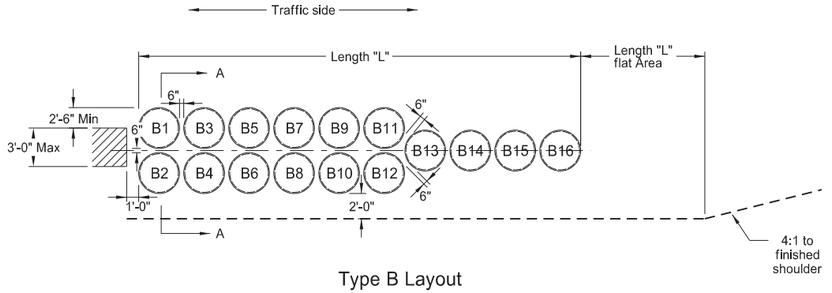


Reflective Sheet Detail

Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above. Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

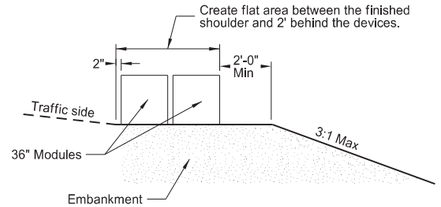
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Type B Layout

Note:
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.



Section A-A
(Type B Layout)

Type B Attenuation Device												
Module Number	Dash Number											
	80	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)											
B1	2100	2100										
B2	2100	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module											
2100	1	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	2	1	1	1	1	1	1	1	1

Notes:

1. Materials
   A) Use modules manufactured from frangible polyethylene material which shatters upon impact.
   B) Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.

2. Modules
   Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.
   A) Provide three components for 2, 4, or 7 cubic foot module containers:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
      3) A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
   B) Provide two components for the 14 cubic foot module container:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
   C) Provide two components for the 21 cubic foot module container:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.

4. For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

DATE	CHANGE
07-18-14	Revised sheeting in reflective sheet detail
09-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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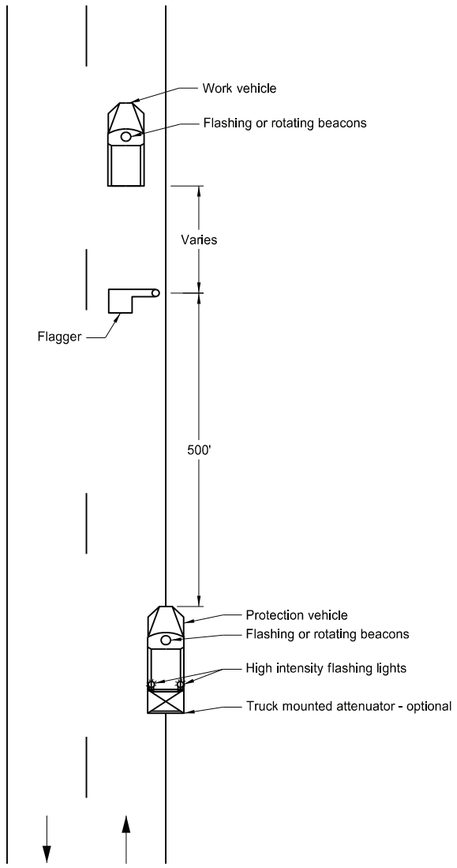
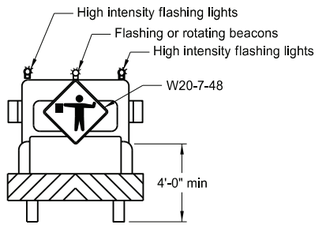
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

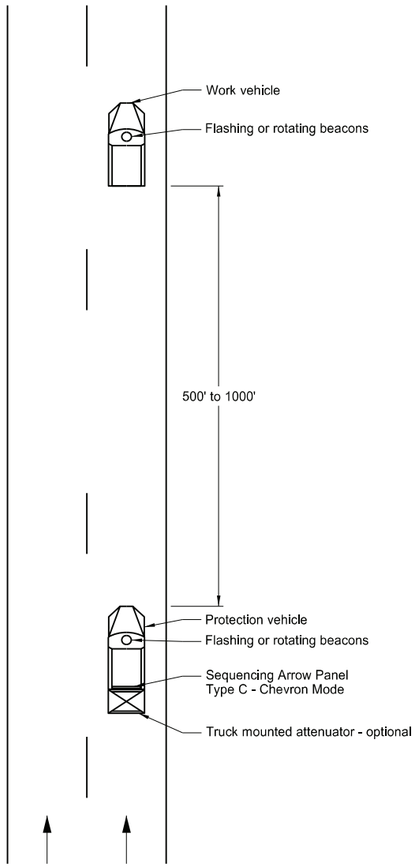
Two Lane, Two Way Roadways

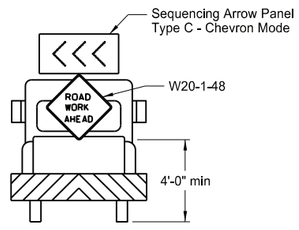




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

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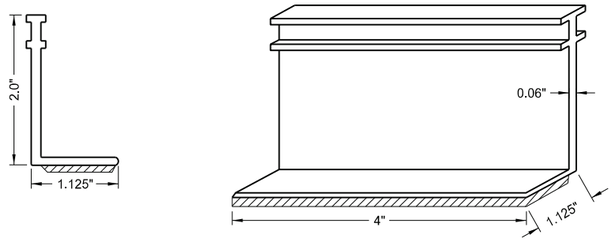
ENGINEER
NORTH DAKOTA

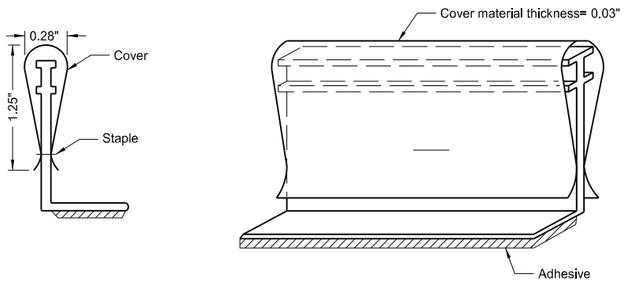
08/01/24

LANE MARKERS
(Spotting Tab for Seal Projects only)

D-704-3



Marker Body



Marker Body with Protective Cover

Notes:

1. Install lane line markers as shown, prior to beginning the seal coat.
2. Attach cover to vertical part of marker so traffic does not cause it to detach, but it can be easily removed manually.
3. Remove protective covers immediately after seal coat is applied.
4. Remove markers after permanent pavement marking is installed.
5. Use marker body and cover manufactured from polyurethane material.
6. Marker types:
   Type Y - Yellow body and cover with yellow reflective tape on both sides.
   Type W - White body and cover with white reflective tape on one side.
7. Use retroreflective tape with a minimum reflectance of 1200 candle power per foot-candle per square foot, using a .1 degree observation angle and 0 degree entrance angle.
8. Use adhesive conforming to AASHTO M 237.

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

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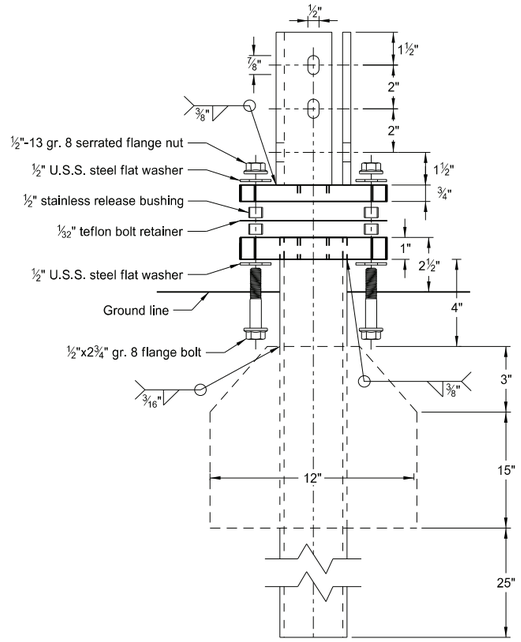
08/01/24

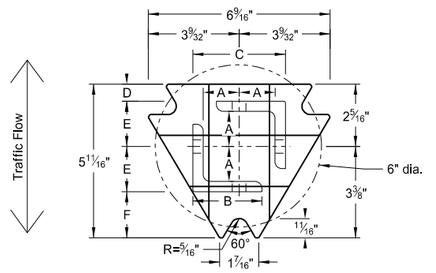
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

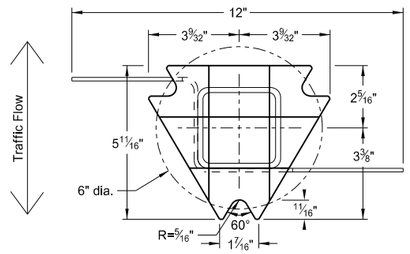


Multi-Directional
Slip Base Assembly

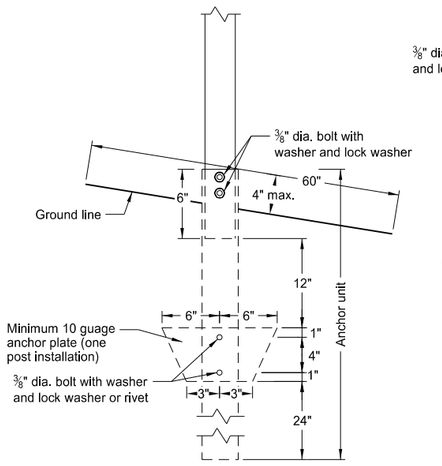
Perforated Tube



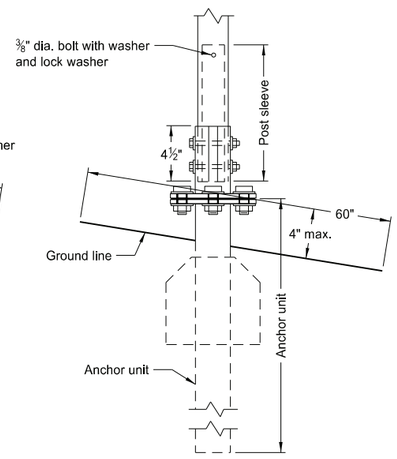
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



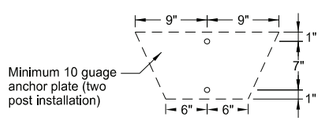
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

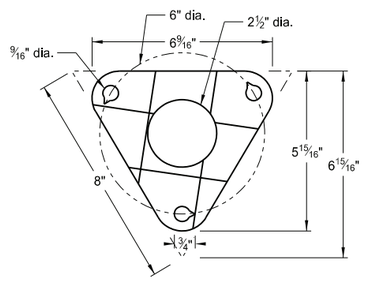


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
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
2 3/16 x 2 3/16	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
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	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 2 3/16"x10 ga. into 2½"x10 ga.

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

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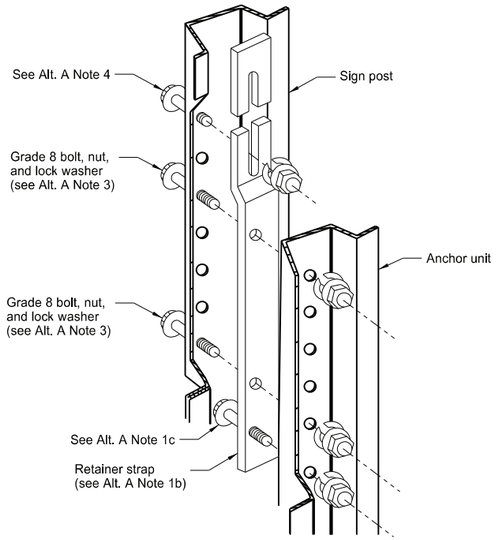
08/01/24

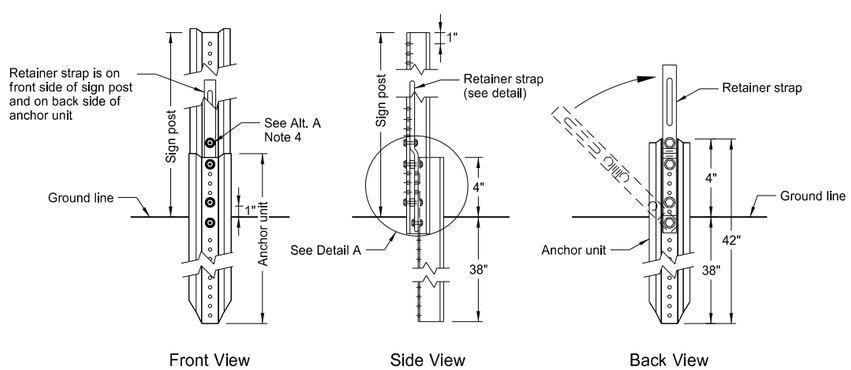
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



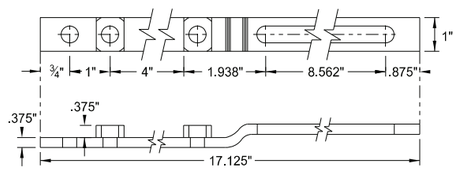
Detail A



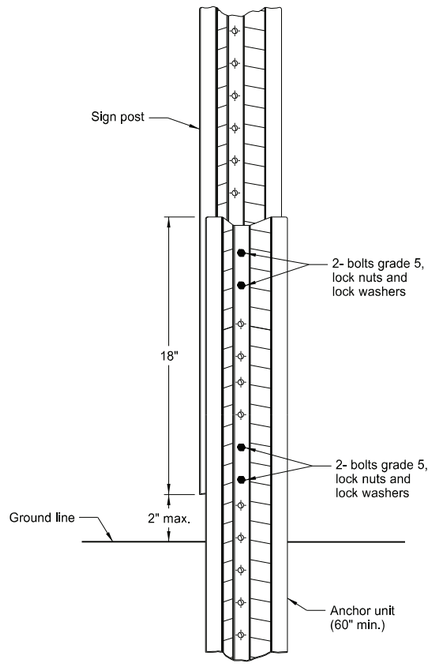
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

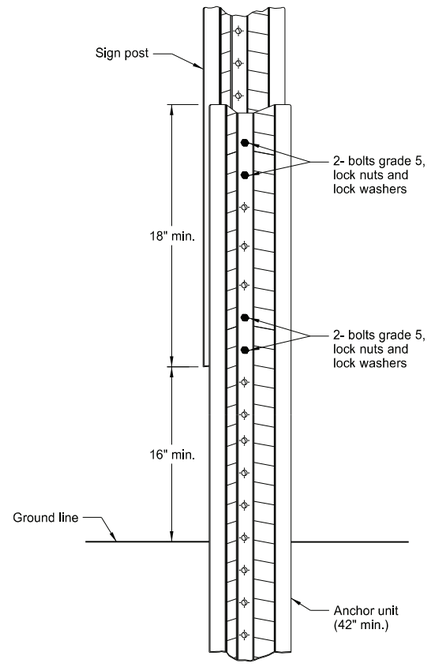


Retainer Strap Detail



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
8-01-24	Electronic Stamp/Signature

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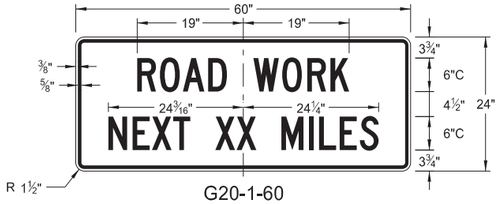
NORTH DAKOTA

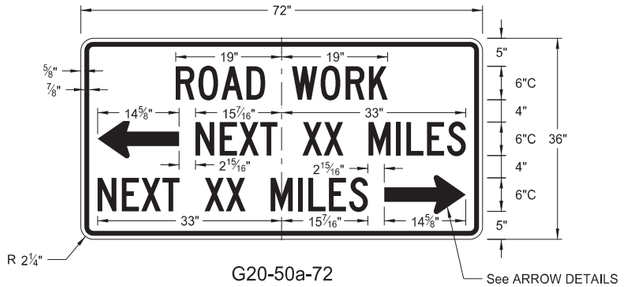
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

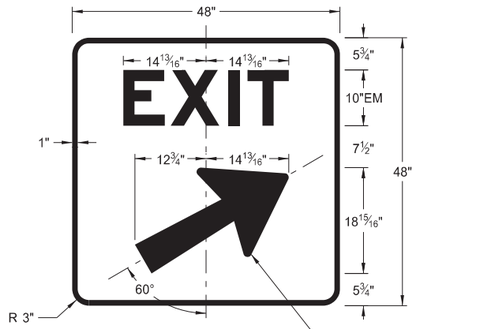
D-704-9



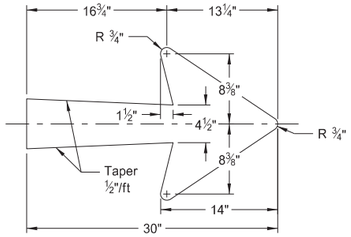
G20-1-60
Legend: black (non-refl)
Background: orange



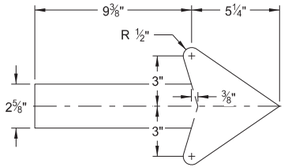
G20-50a-72
Legend: black (non-refl)
Background: orange



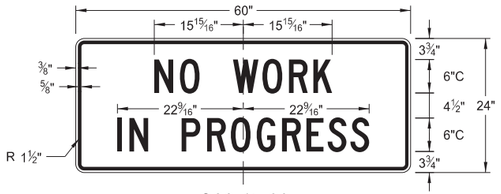
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



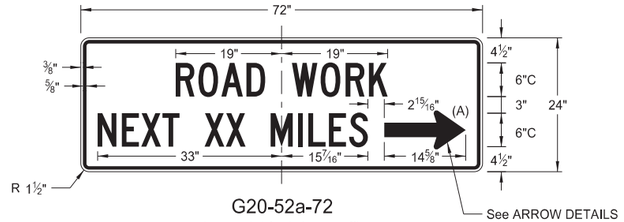
E5-1-48



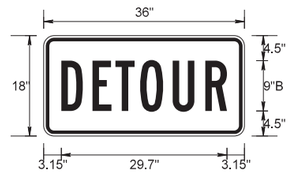
G20-50a-72
G20-52a-72



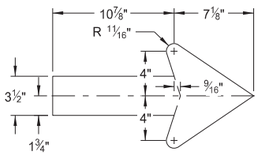
G20-1b-60
Legend: black (non-refl)
Background: orange



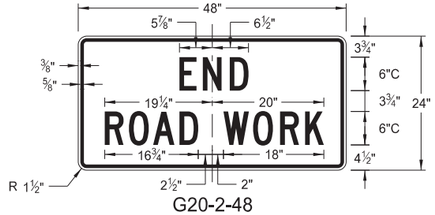
G20-52a-72
Legend: black (non-refl)
Background: orange



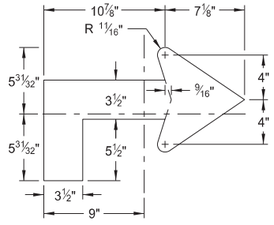
M4-8-36
Legend: black (non-refl)
Background: orange



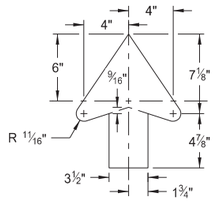
M4-9(L or R)-30
Right or Left



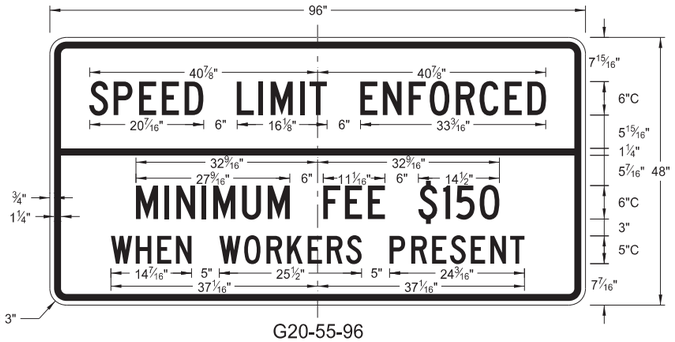
G20-2-48
Legend: black (non-refl)
Background: orange



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

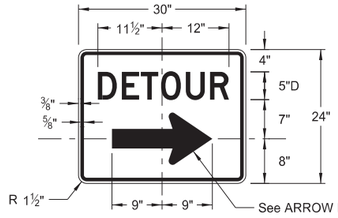


M4-9-30
Straight



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

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



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

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
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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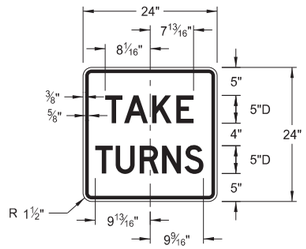
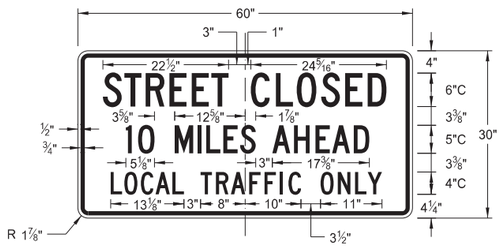
06/30/25
ENGINEER
NORTH DAKOTA

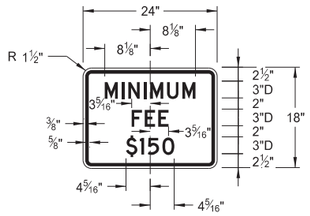
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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



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



R2-1aP-24
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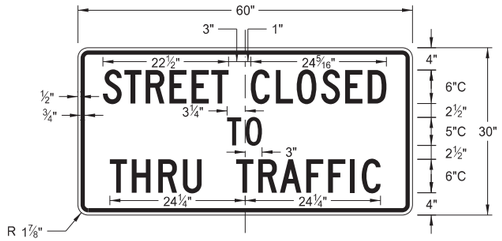
Background: white



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

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

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

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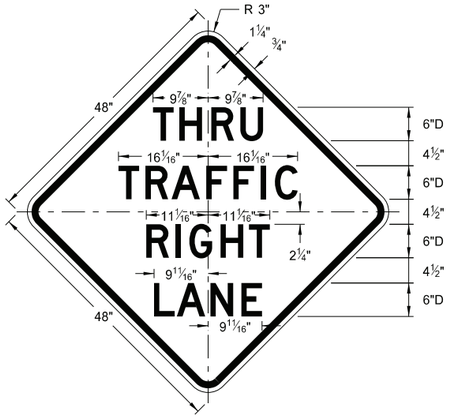
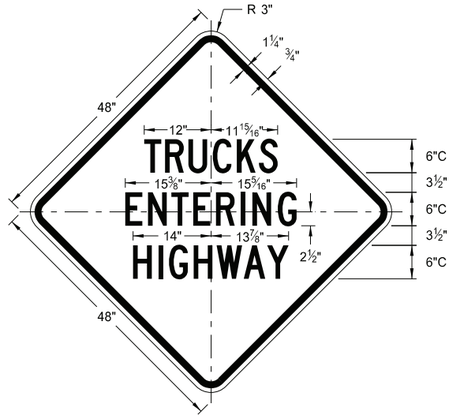
NORTH DAKOTA

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

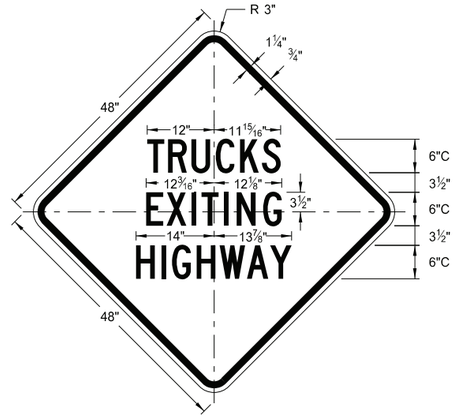
D-704-11



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



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



W8-56-48
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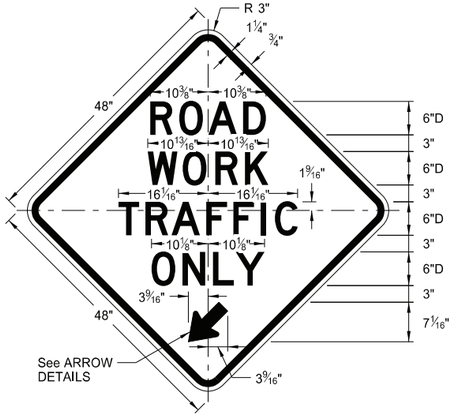
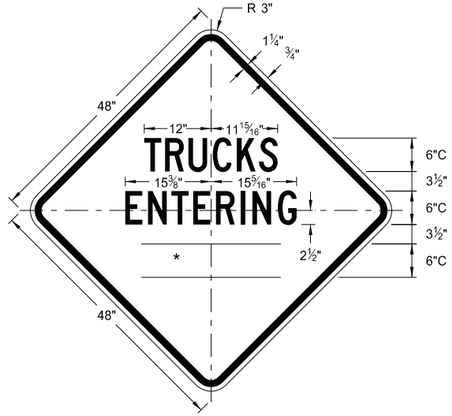
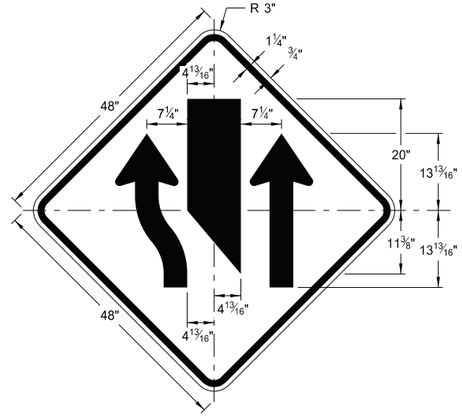
Background: orange



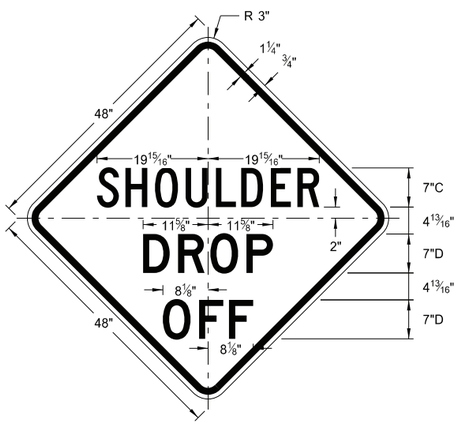
W5-9-48
Legend; black (non-refl)
Background: orange



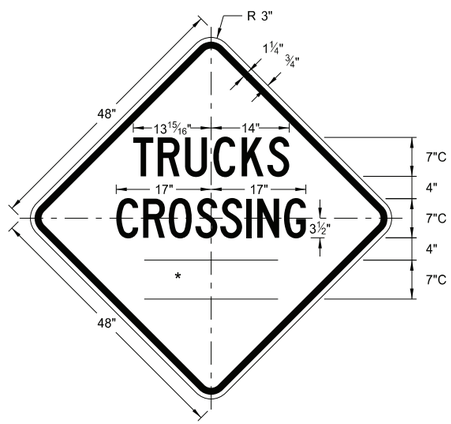
W8-54-48
Legend; black (non-refl)
Background: orange



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



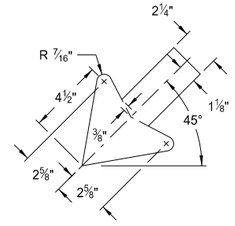
W8-9a-48
Legend: black (non-refl)
Background: orange



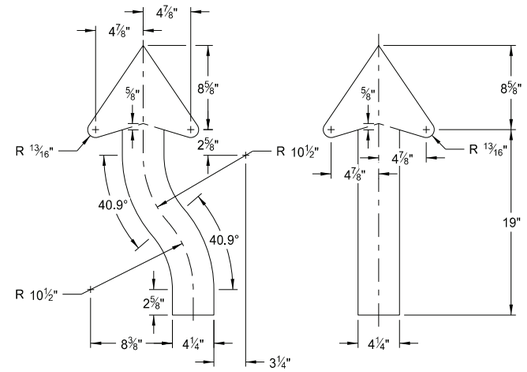
W8-55-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
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
8-01-24	Electronic Stamp/Signature

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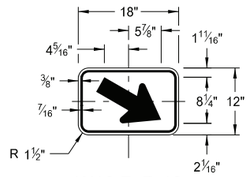
PE-4683
ENGINEER
NORTH DAKOTA

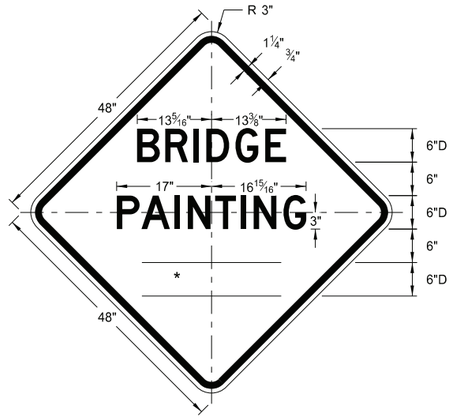
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

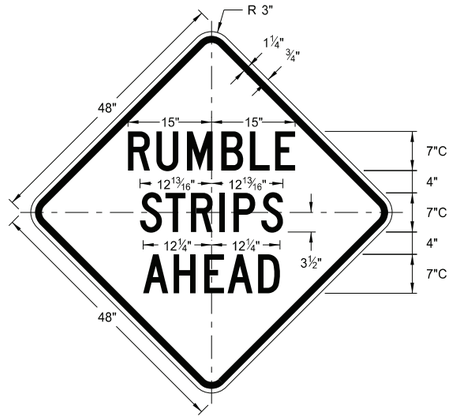
D-704-11A



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



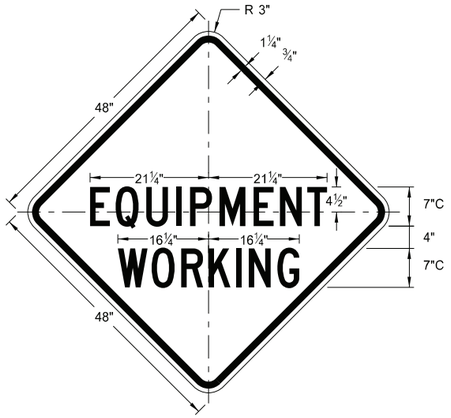
W21-50-48
Legend: black (non-refl)
Background: orange



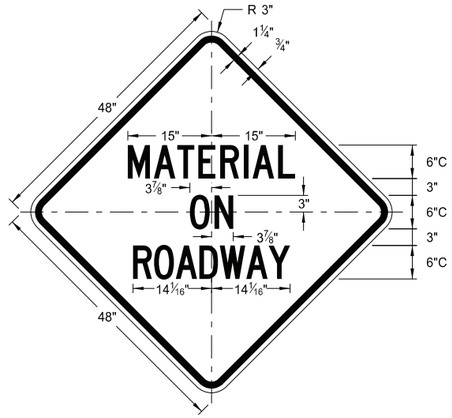
W21-53-48
Legend: black (non-refl)
Background: orange

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

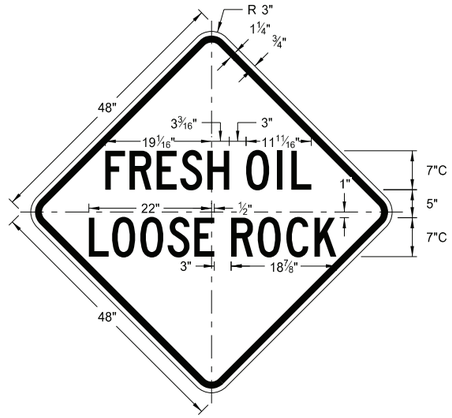
* DISTANCE MESSAGES



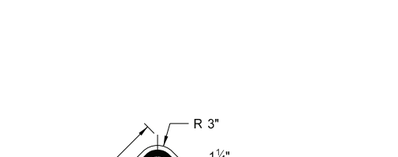
W20-51-48
Legend: black (non-refl)
Background: orange



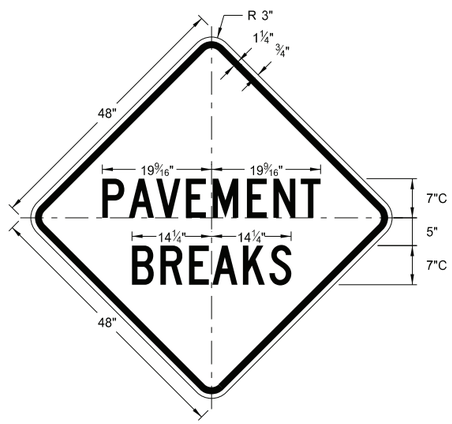
W21-51-48
Legend: black (non-refl)
Background: orange



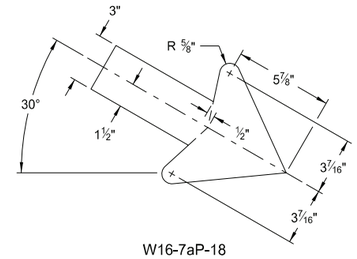
W22-8-48
Legend: black (non-refl)
Background: orange



W20-52P-54
Legend: black (non-refl)
Background: orange



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



W16-7aP-18

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.

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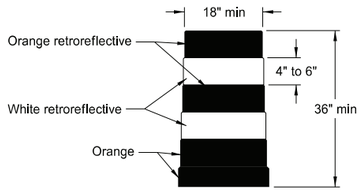
08/01/24

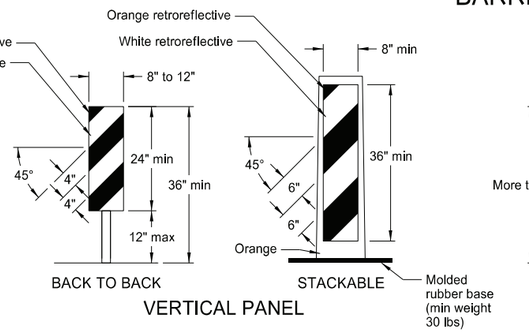
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



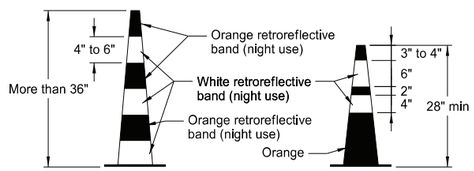
DELINEATOR DRUM

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.



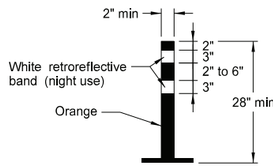
VERTICAL PANEL

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.



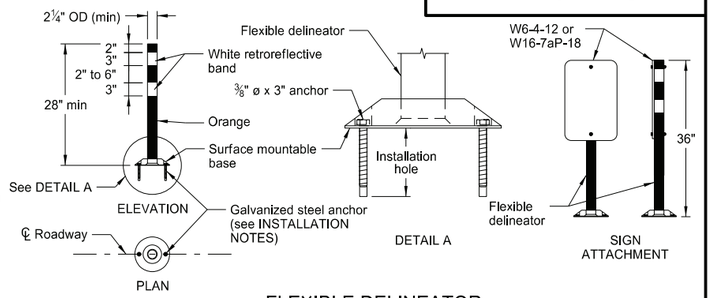
TRAFFIC CONE

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

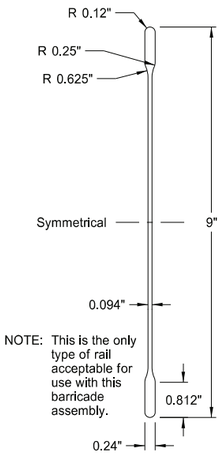
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



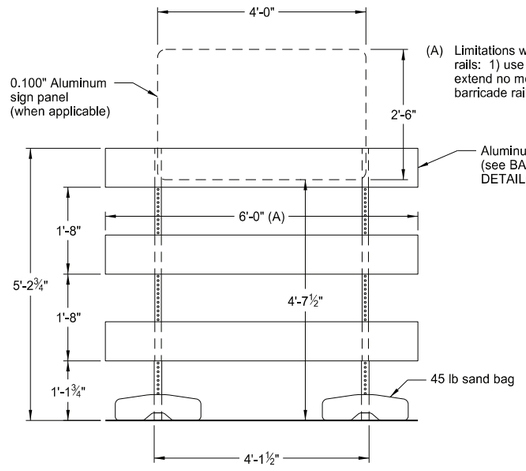
FLEXIBLE DELINEATOR

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.

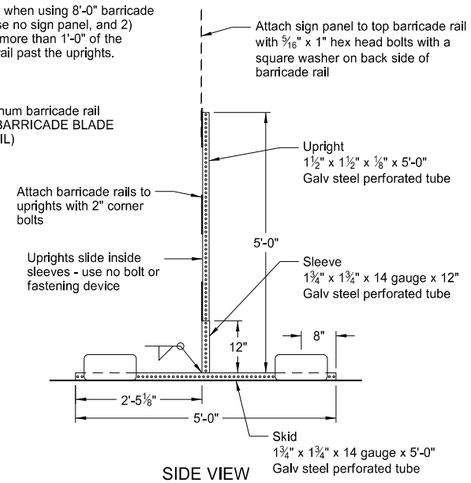


BARRICADE BLADE DETAIL



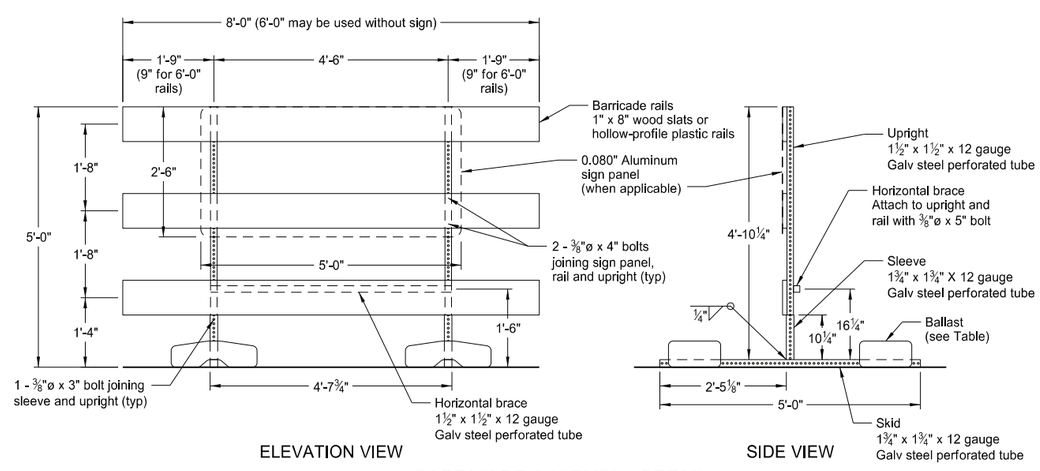
ELEVATION VIEW

(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.



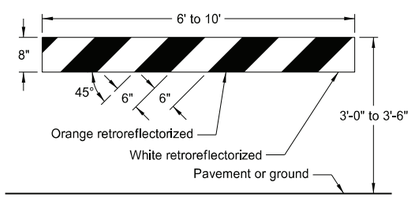
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

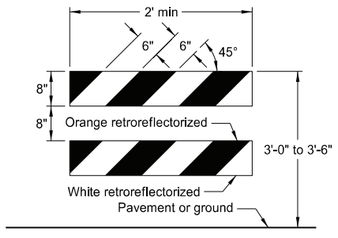


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

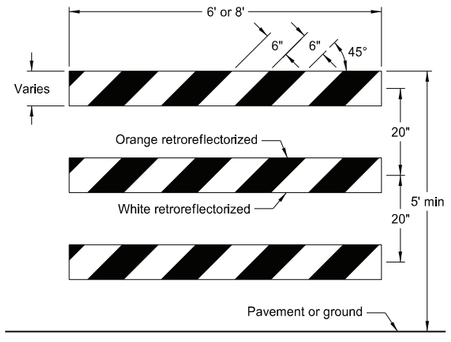
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

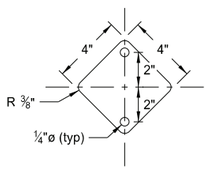


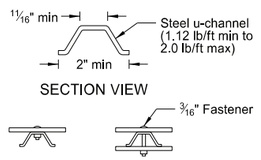
TYPE II BARRICADE

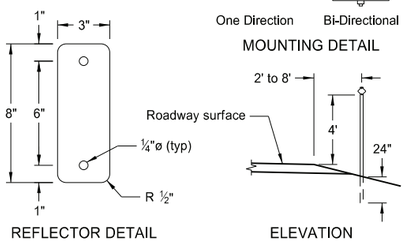


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature

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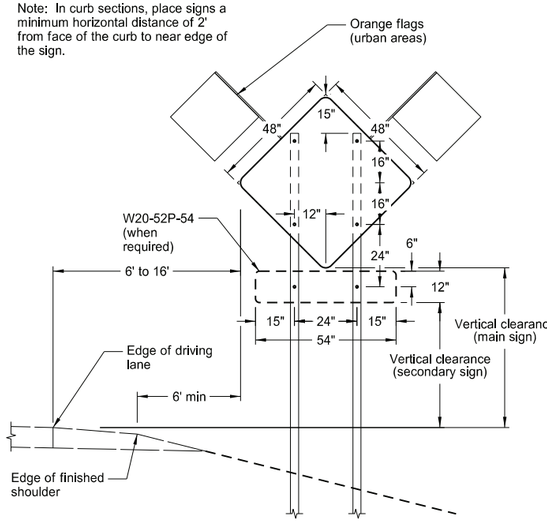
08/01/24

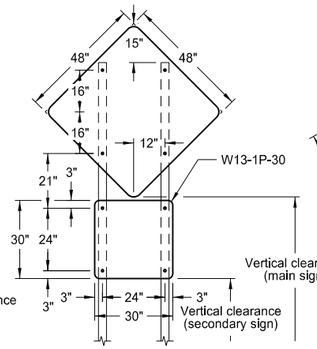
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

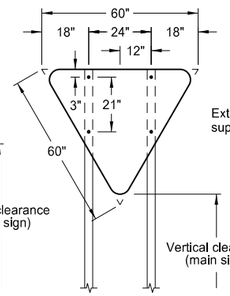
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



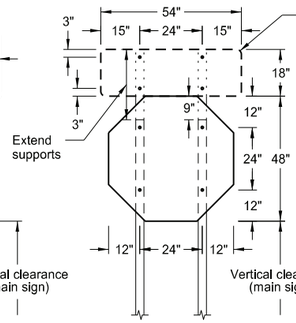
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



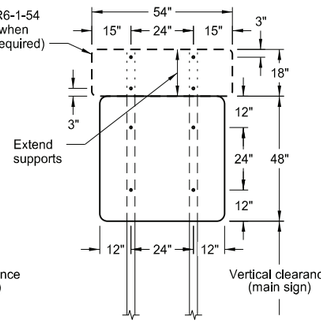
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



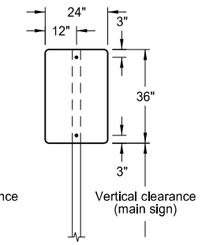
R1-2-60 - YIELD SIGN



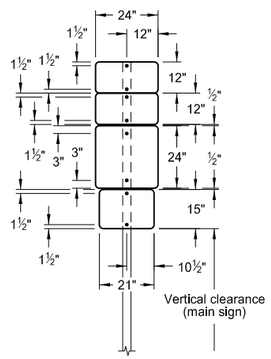
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



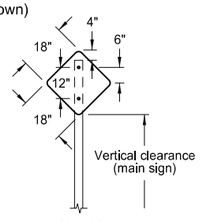
48" x 48" SIGN
(with R6-1-54 sign as required)



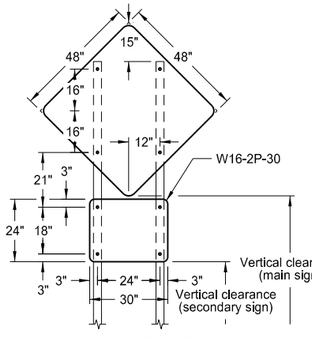
24" x 36" SIGN



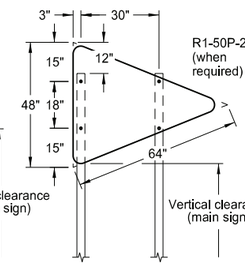
24" x 24"
ROUTE MARKER
ASSEMBLY



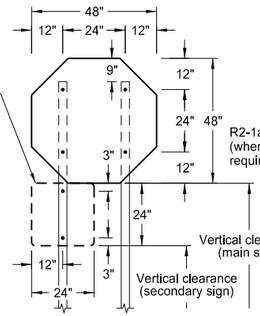
18" x 18"
DIAMOND SIGN



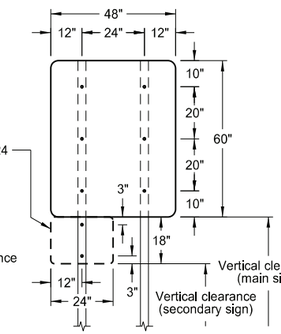
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



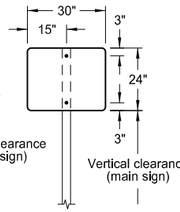
W14-3-64 - PENNANT SIGN



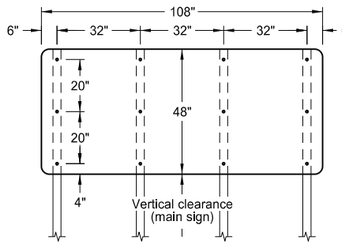
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



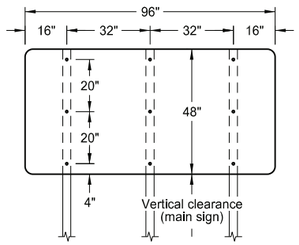
48" x 48" SIGN
(with R2-1aP-24 sign as required)



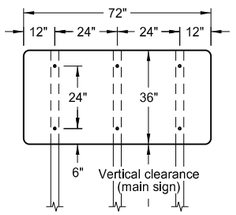
30" x 24" SIGN



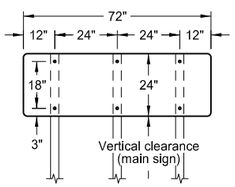
108" x 48" SIGN



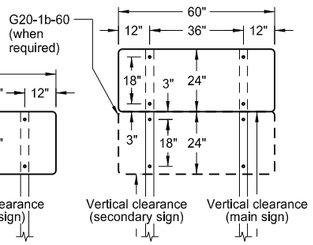
96" x 48" SIGN



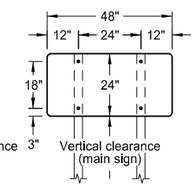
72" x 36" SIGN



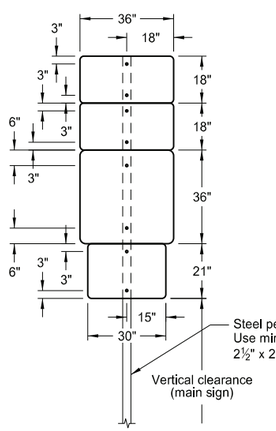
72" x 24" SIGN



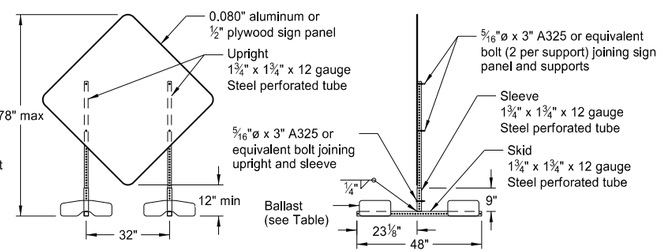
60" x 24" SIGN



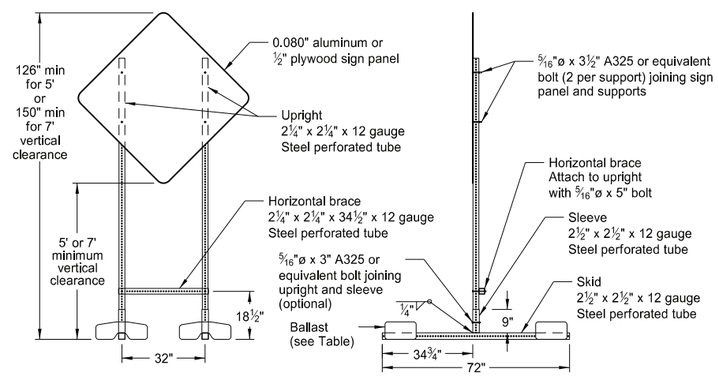
48" x 24" SIGN



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
8-01-24	Electronic Stamp/Signature

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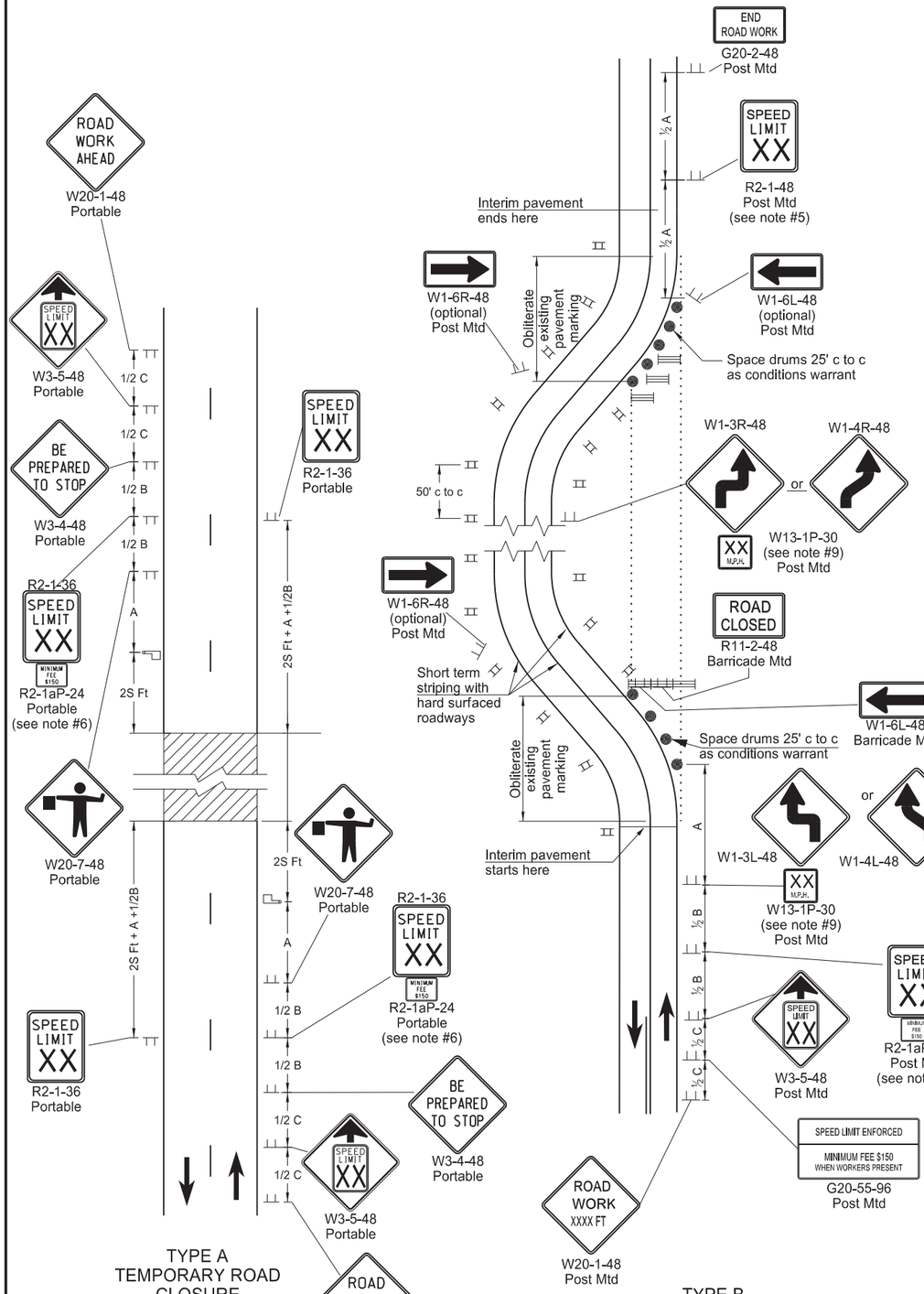
NORTH DAKOTA

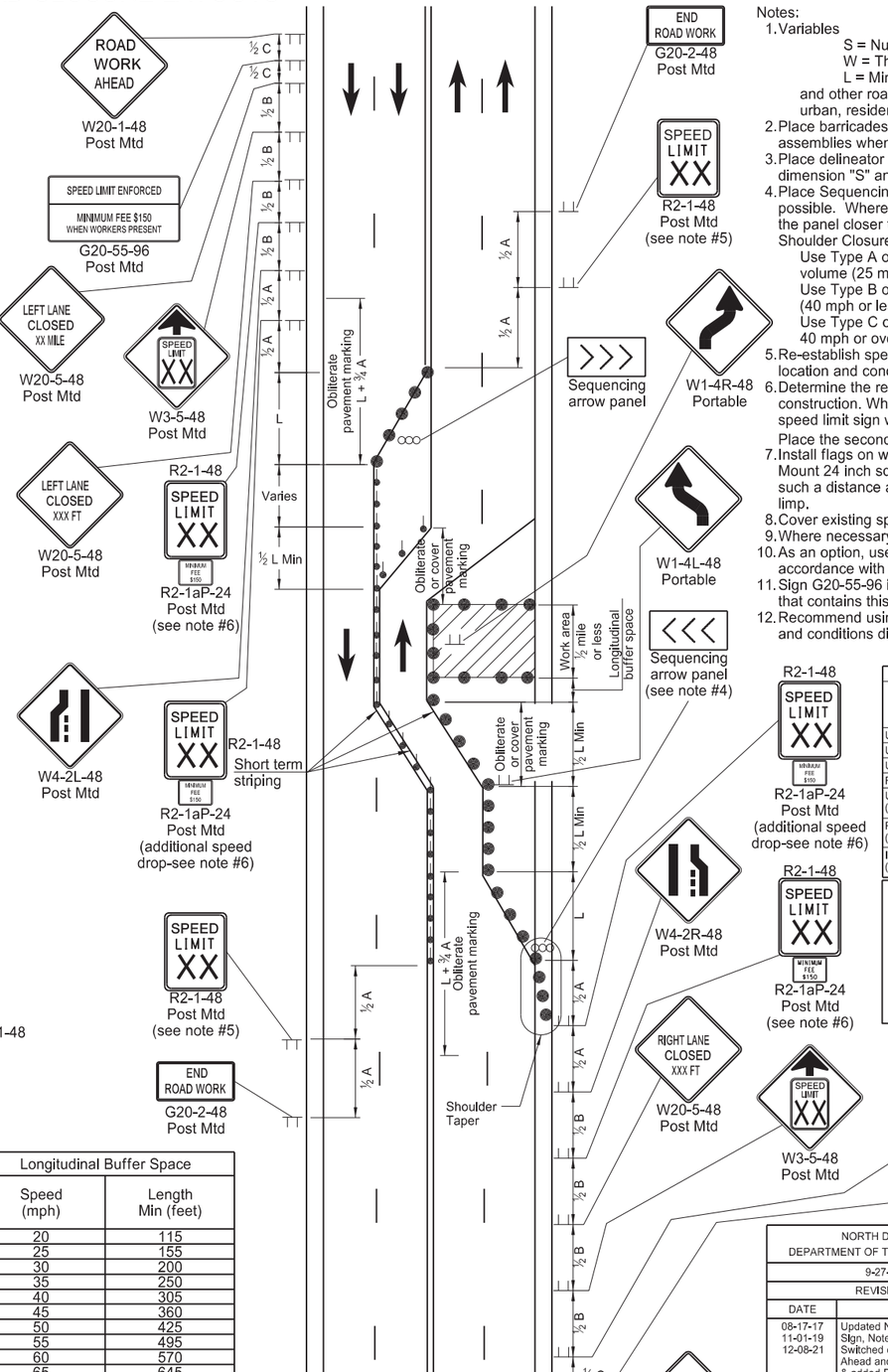
08/01/24

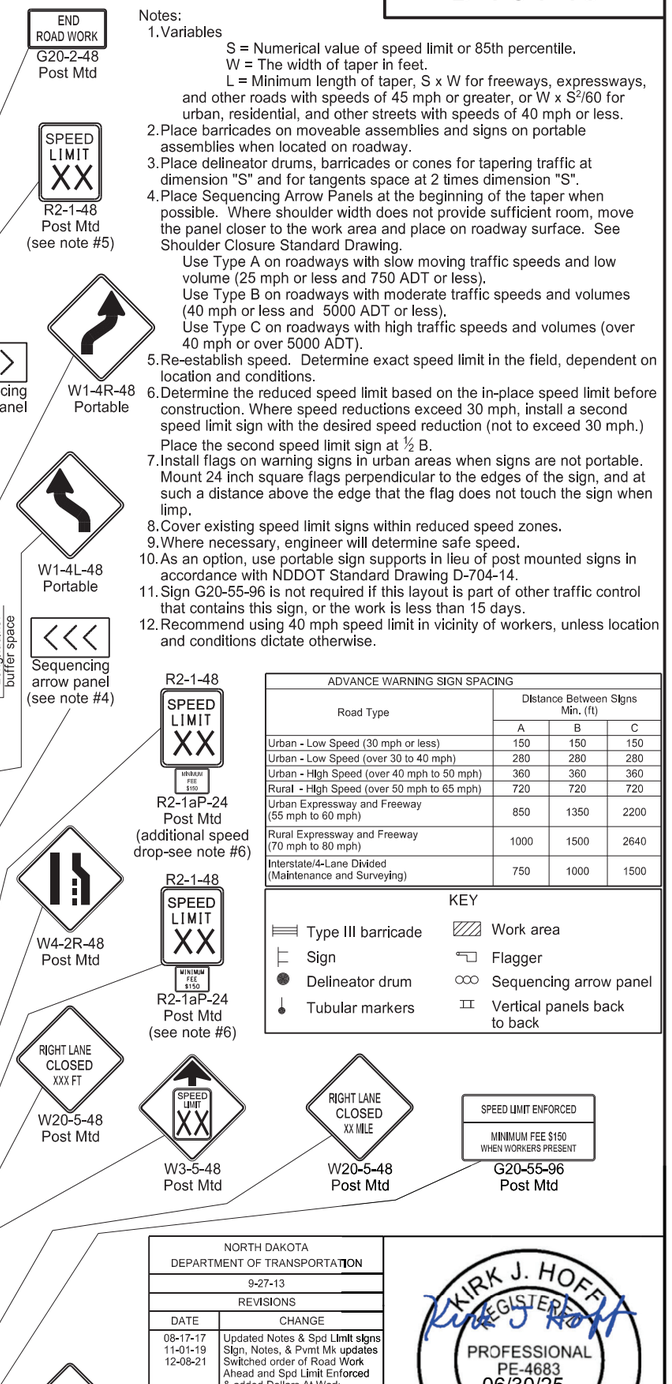
ROAD CLOSURE LAYOUTS

D-704-15



Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910





Notes:

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. 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.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
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.

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

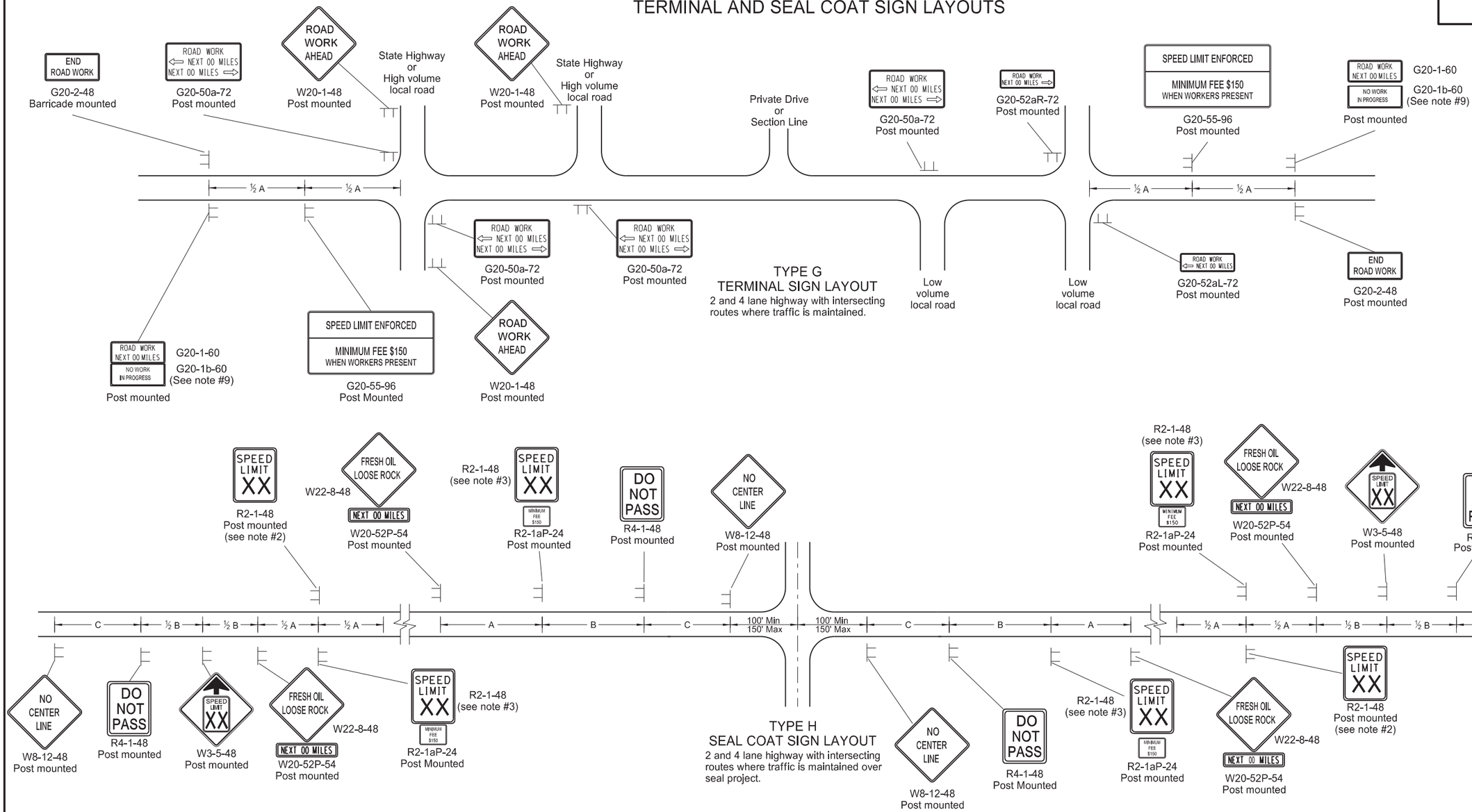
REVISIONS

DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pvmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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

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.

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

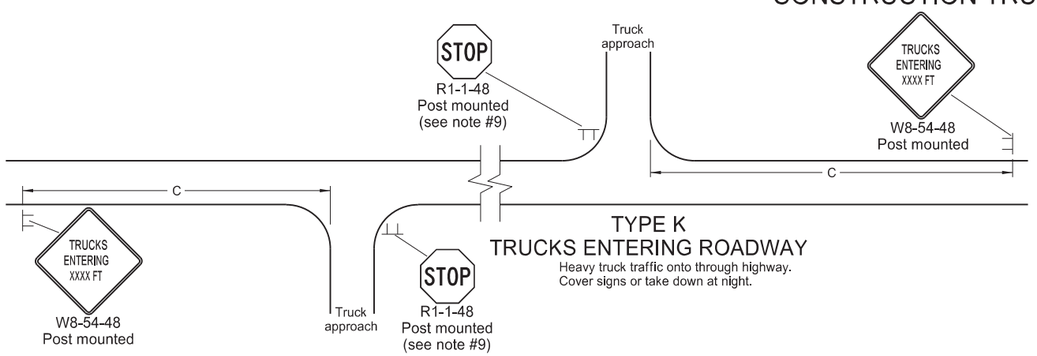
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

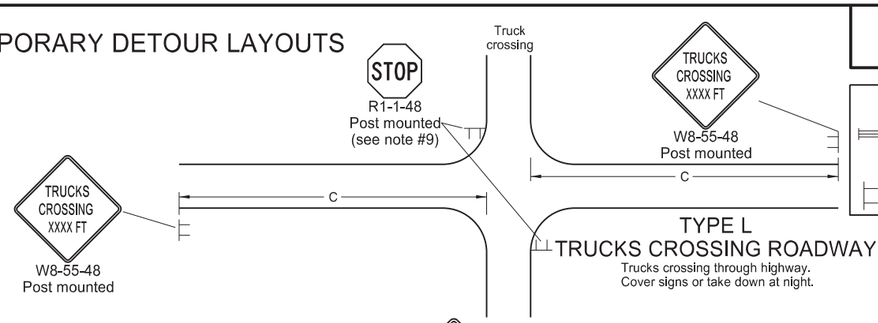
D-704-22

KEY: Type III barricade; Work area; Sign; Flagger



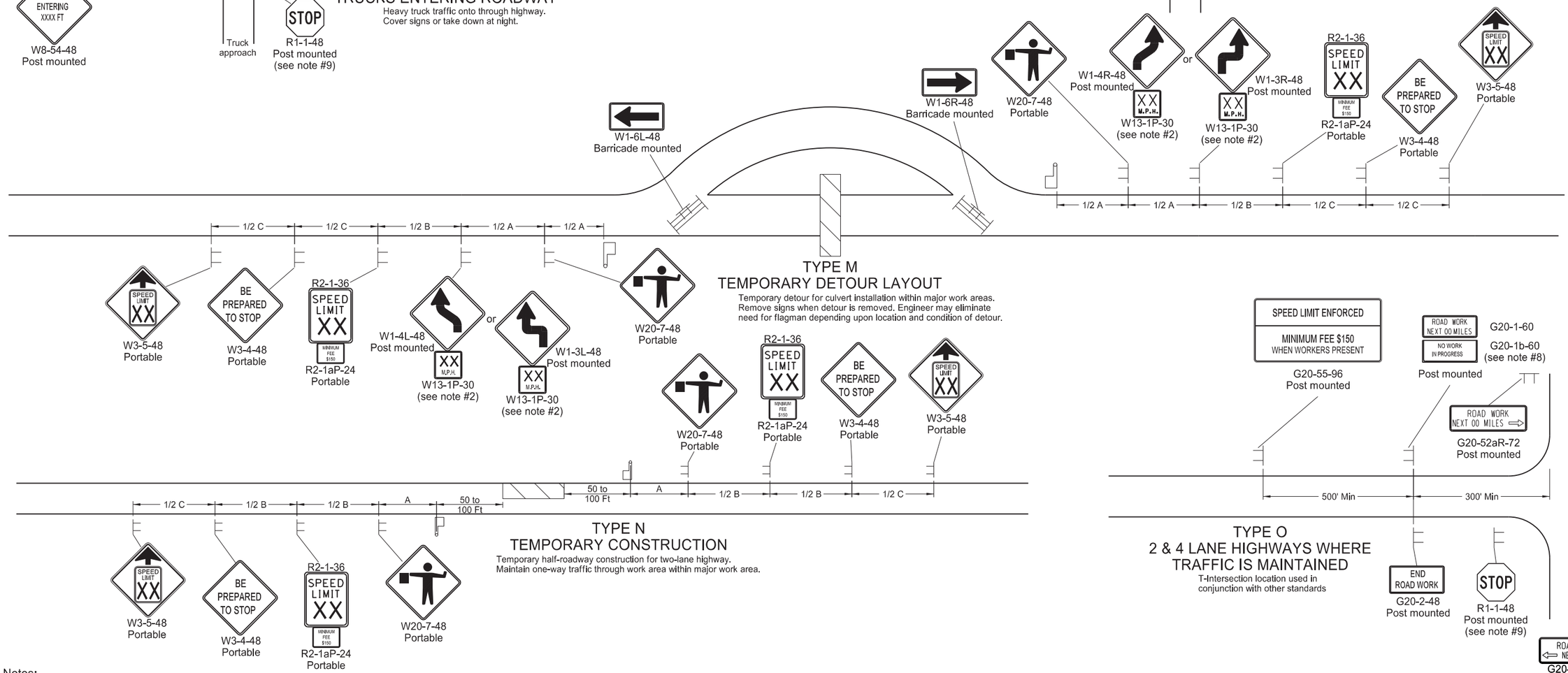
TYPE K
TRUCKS ENTERING ROADWAY

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 areas.

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.

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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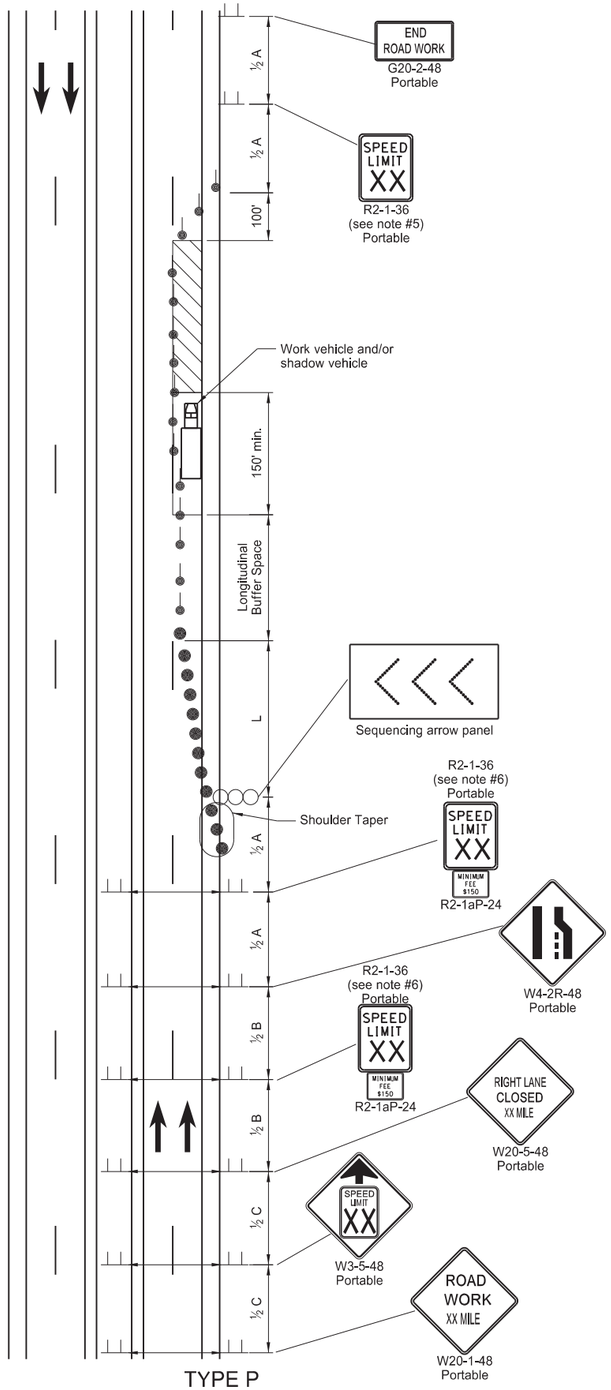
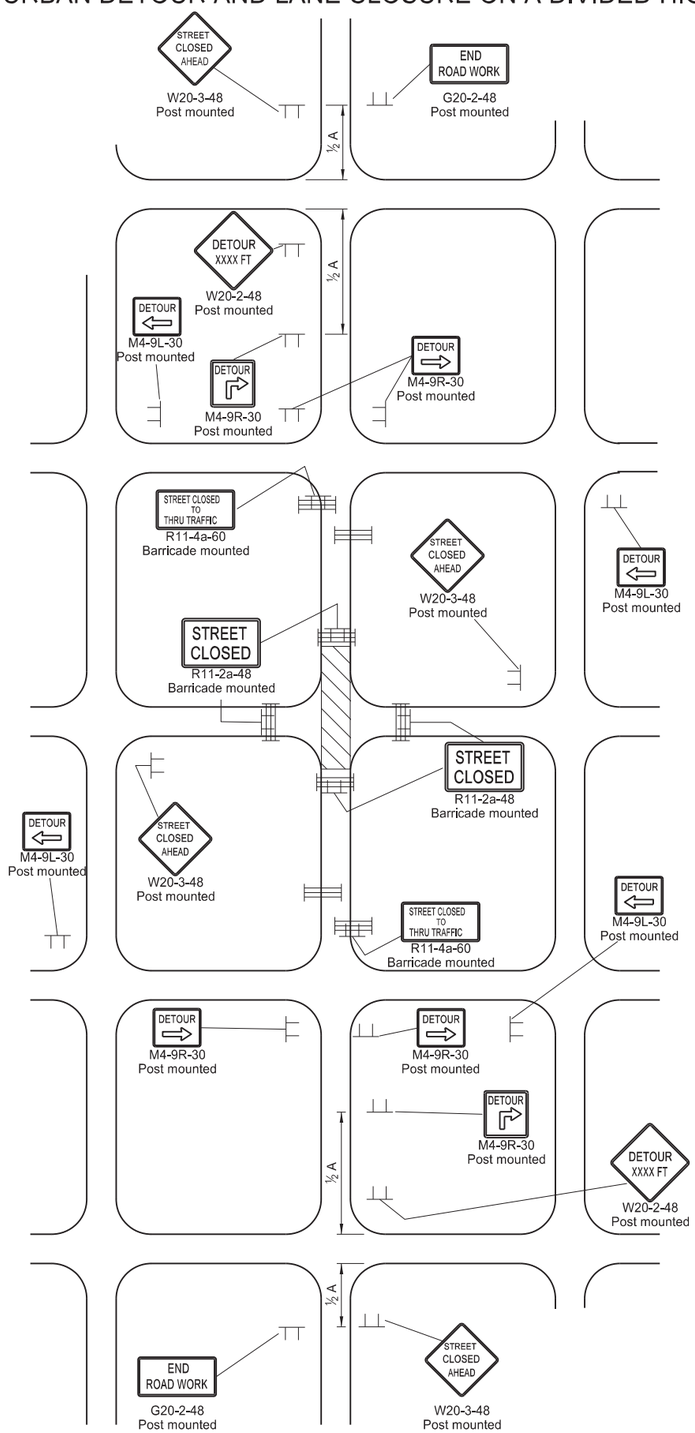
SHORT TERM URBAN DETOUR AND LANE CLOSURE ON A DIVIDED HIGHWAY LAYOUTS

D-704-23



TYPE P
STATIONARY LANE CLOSURE ON A DIVIDED HIGHWAY
4 lane divided roadway where ½ of roadway is closed.
Short-term (more than 1 hour within a single daylight period.)



TYPE Q
DETOUR FOR A CLOSED STREET
Where city streets are used for detouring traffic.
Urban projects do not require the G20-55-96 and R2-1aP-24 signs.

Notes:
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
4. Place Sequencing Arrow Panels at the beginning of taper. Where shoulder width does not provide sufficient room, move panel closer to the work area and place on 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).
5. Re-established speed limit. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. 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.
8. Cover existing speed limit signs within a reduced speed zone.
9. Covered (when approved by engineer) or obliterated payment marking measured as as Obliteration of Pavement Marking.
10. Change intersection control on detour for Type Q when determined necessary by the engineer.
11. Engineer to determine safe speed where necessary. When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Recommend using 40 mph speed limit in vicinity of workers for Layout Type P, unless location and conditions dictate otherwise.

KEY

Type III barricade	Work area
Sign	Sequencing arrow panel
Delineator Drum	Tubular Markers

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

DATE	CHANGE
08-17-17	Removed speed limit signs, & updated notes & sign numbers
11-01-19	Revised sign numbers & note
12-08-21	Added Dollars At Work sign
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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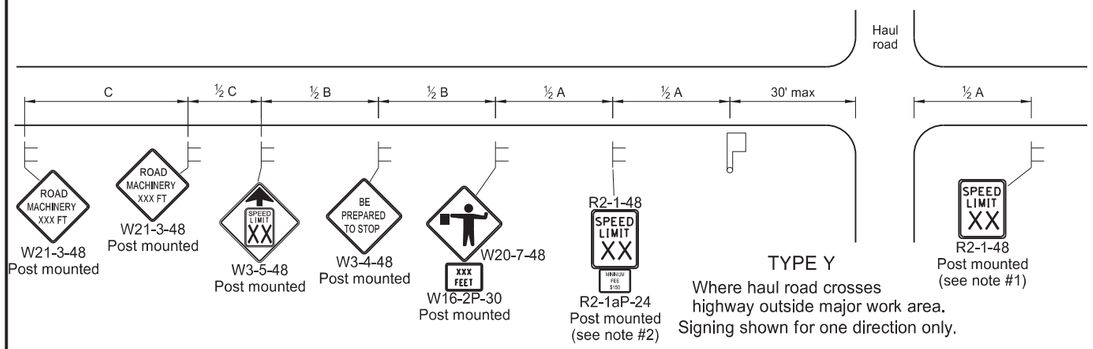
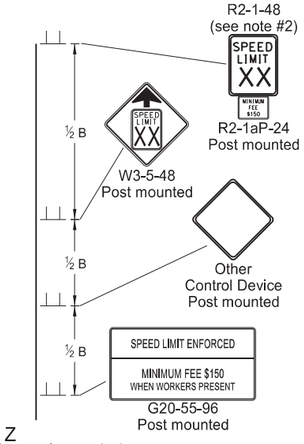
MISCELLANEOUS SIGN LAYOUTS

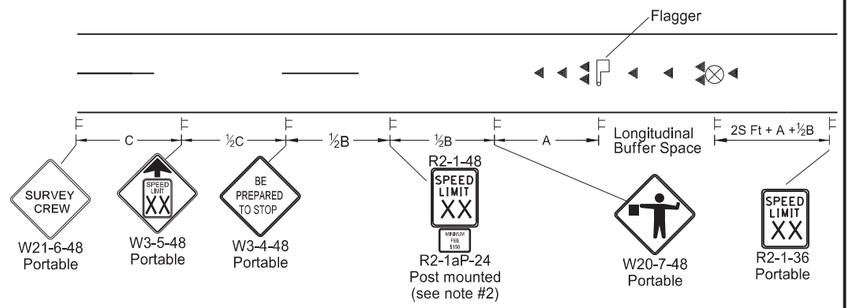
D-704-26



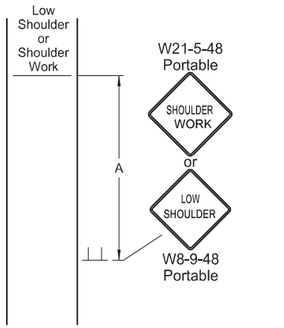
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



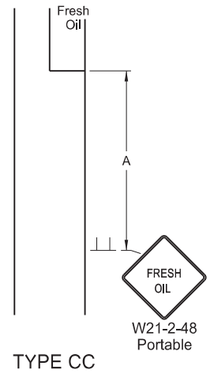
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



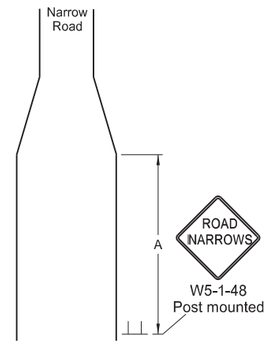
TYPE AA
Where survey crew is used
Signing shown for one direction only.



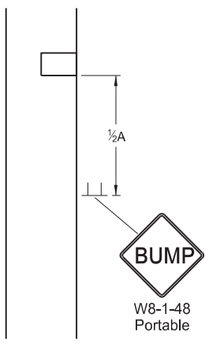
TYPE BB
Within major work area where sign conditions exist



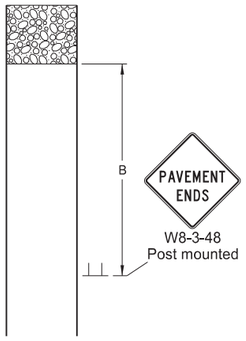
TYPE CC
Where sign conditions exist



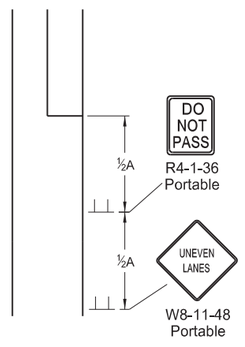
TYPE DD
Where sign conditions exist



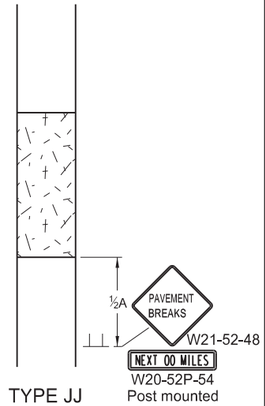
TYPE EE
Where sign conditions exist



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

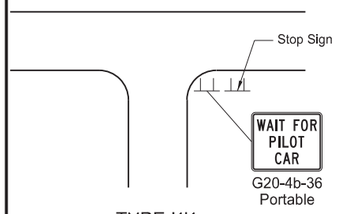


TYPE GG
Where elevation difference exists between lanes



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

KEY
Flagger
Sign
Cones
Survey Equipment
S = Numerical value of speed limit or 85th percentile.



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

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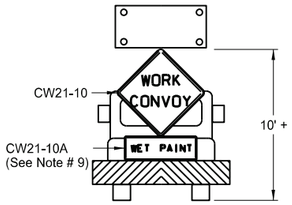
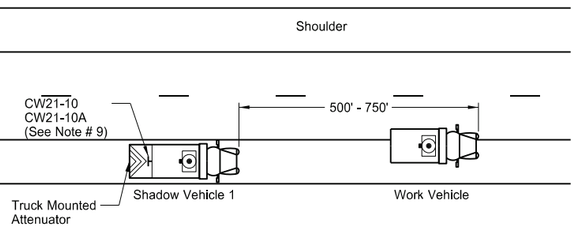
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

MOBILE OPERATION
(PAVEMENT MARKING)

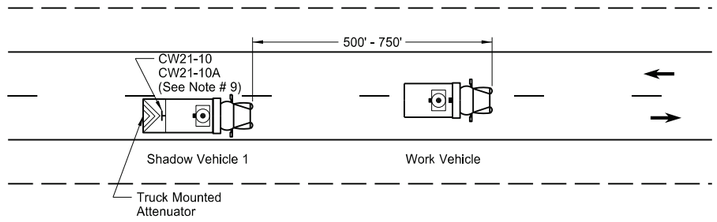
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

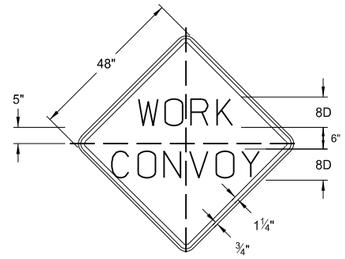


Two-Way Roadway with Paved Shoulders

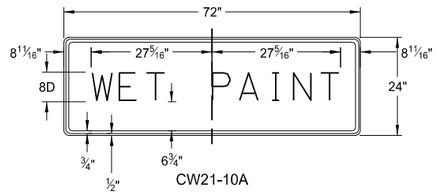


Two-Way Roadway without Paved Shoulders

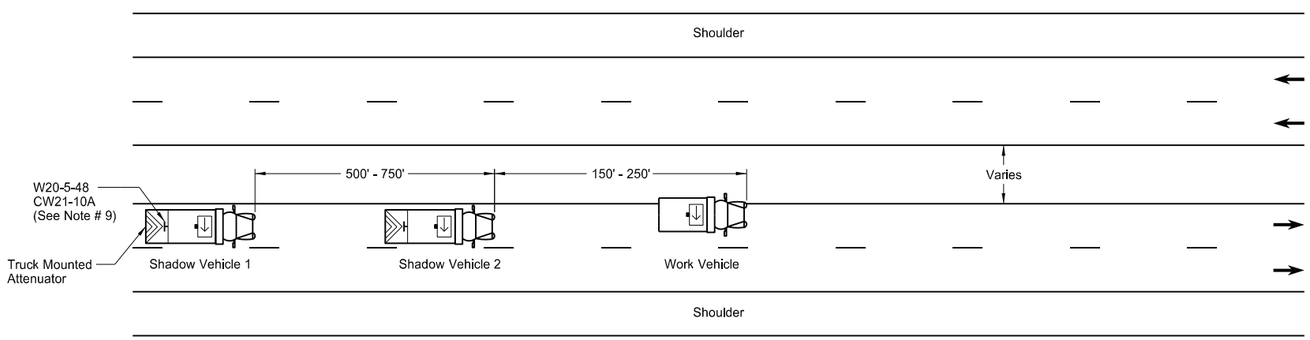
Sign Details



CW21-10

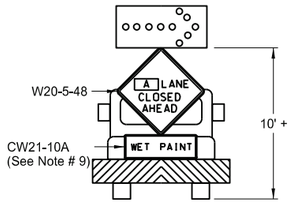


CW21-10A



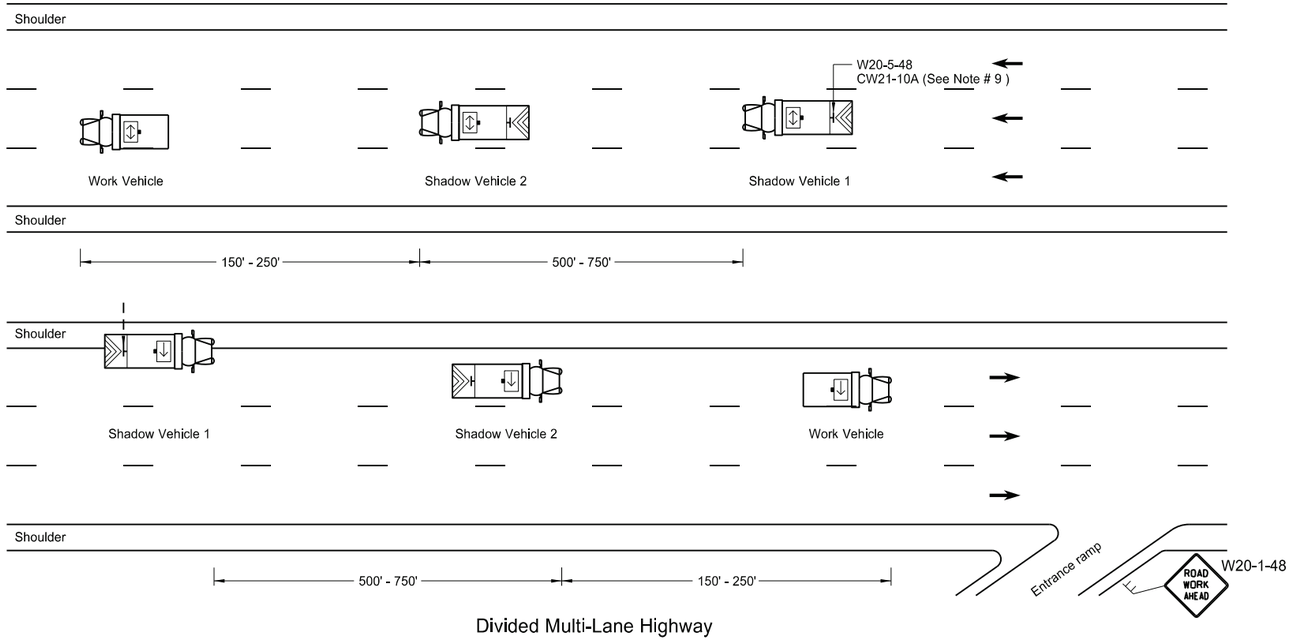
Undivided Multi-Lane Roadway

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
8-02-24	Electronic Stamp/Signature.

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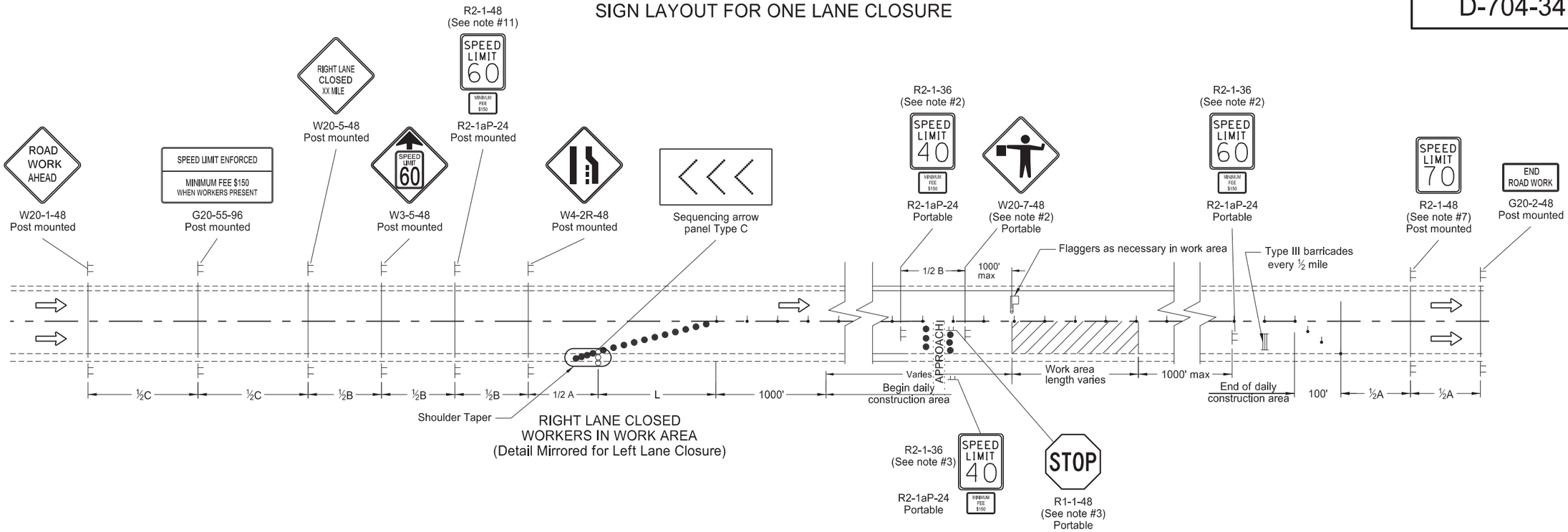
08/02/24

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 $150 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.

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-26-2012

REVISIONS

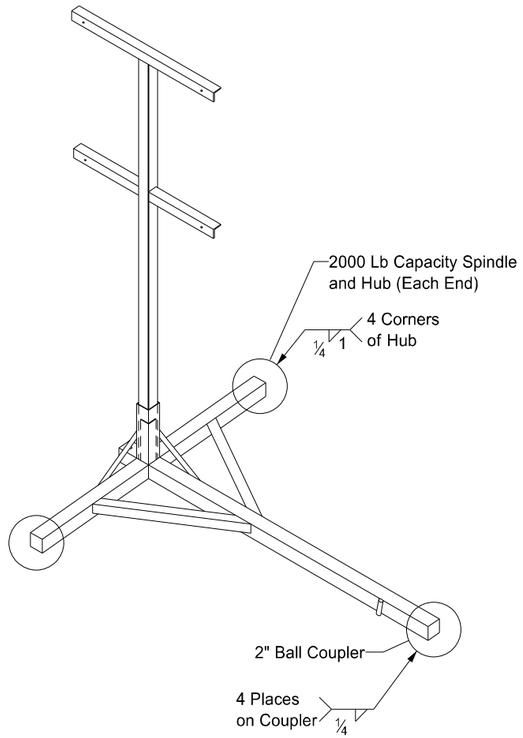
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd Limit Enforced, removed table, & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

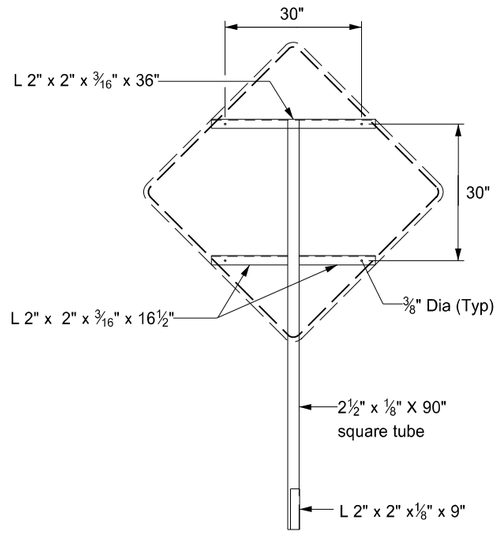
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

Kirk J Hoff

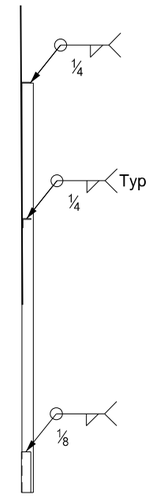
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

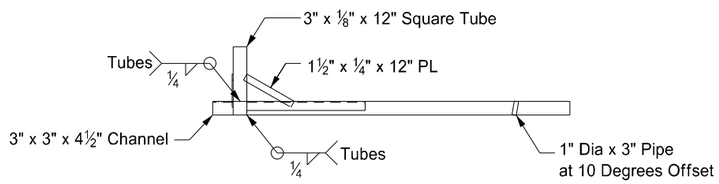


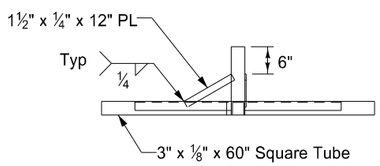
RIGHT

SIGN SUPPORT

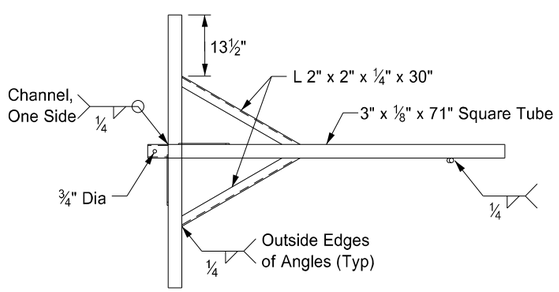
Notes:

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.

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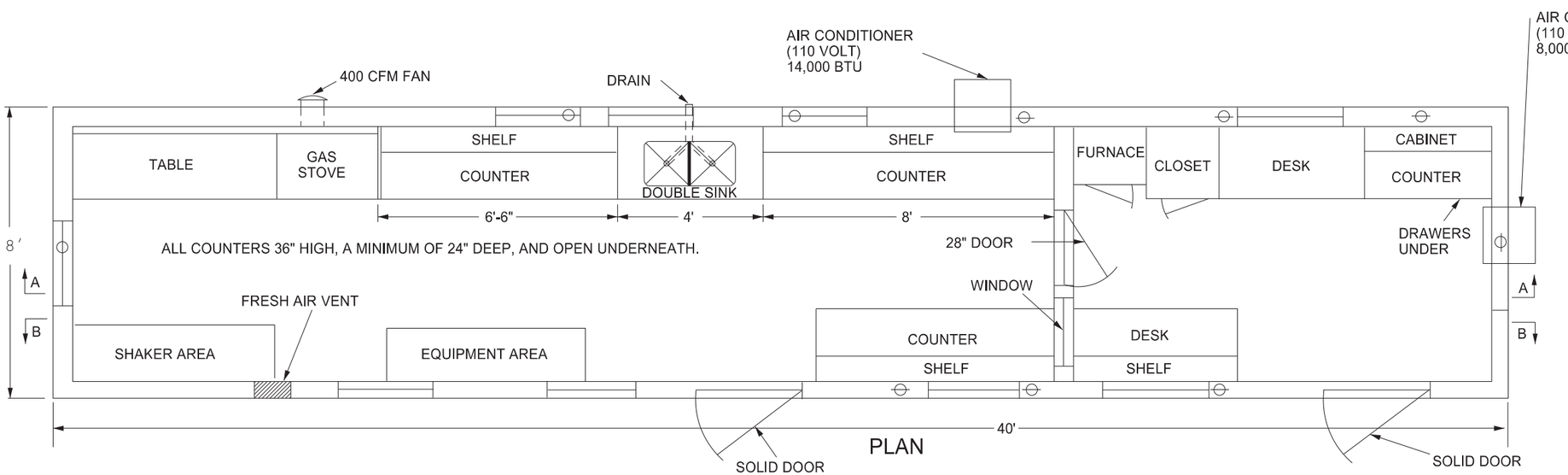
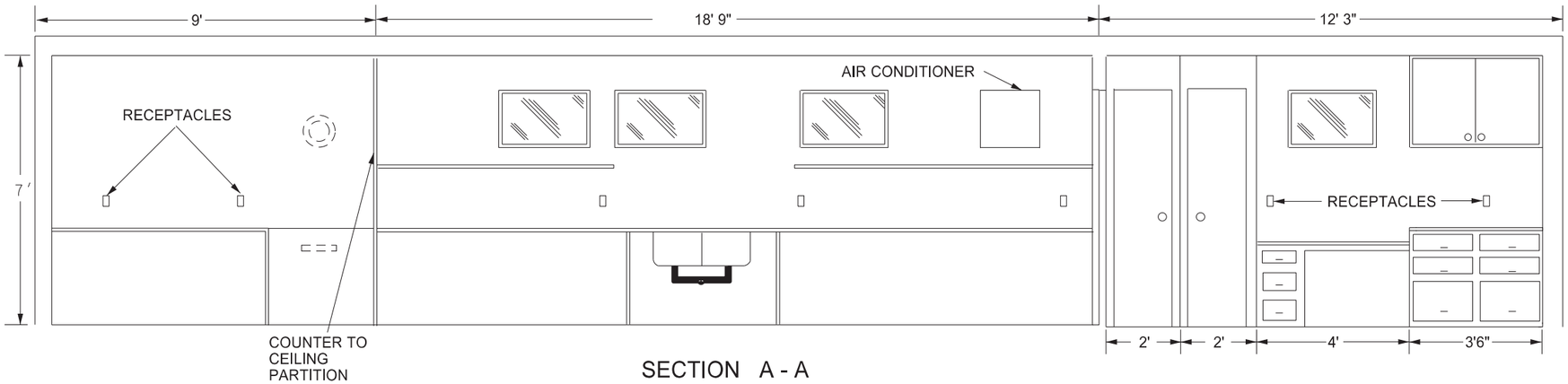
12 02 2020

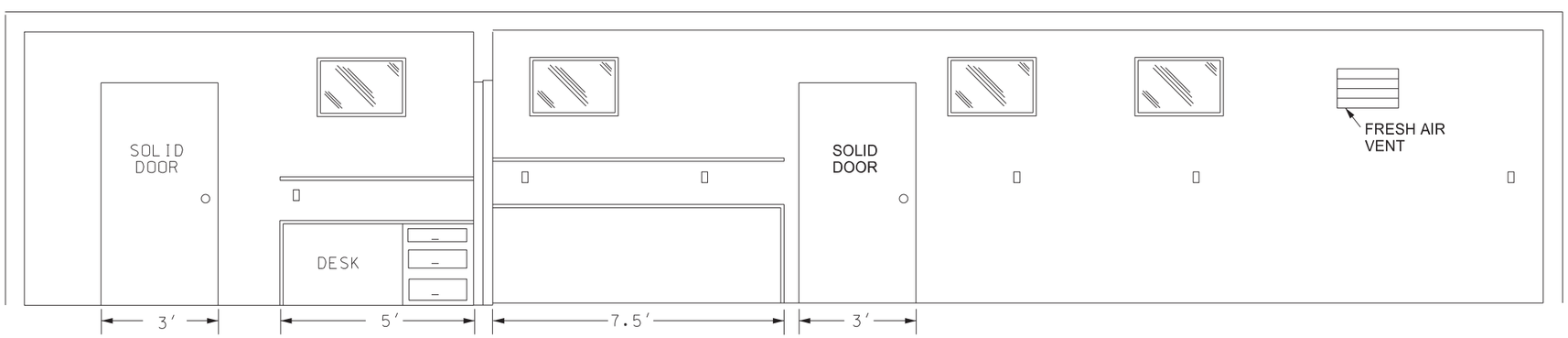
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-03-13

REVISIONS

DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp
08-09-24	Electronic Stamp/Signature.

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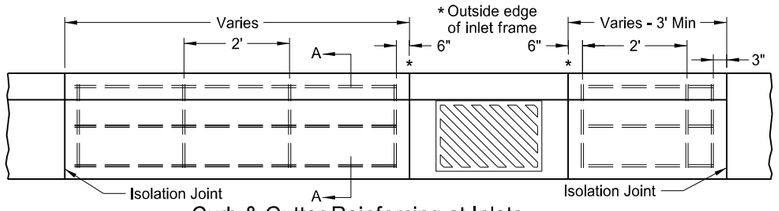
NORTH DAKOTA

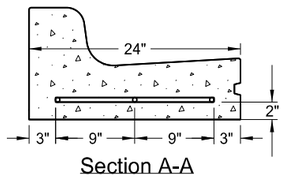
08/09/24

Curb & Gutter and Valley Gutter

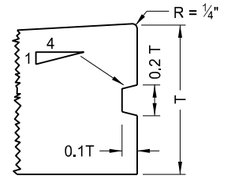
D-748-1



Curb & Gutter Reinforcing at Inlets



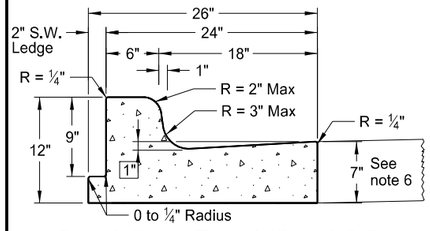
Section A-A



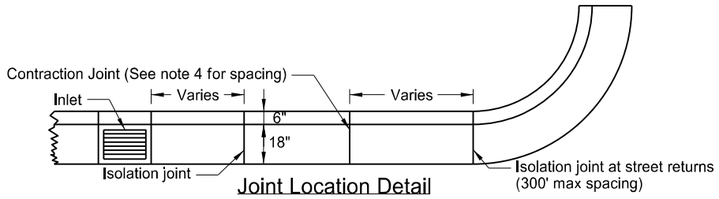
Keyway Detail for Curb & Gutter

(To be used with PCC Pavement and Drives)

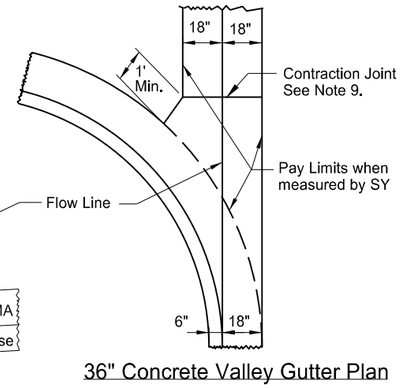
T= Thickness of pavement unless otherwise noted on plans.



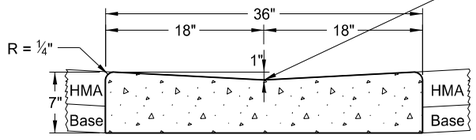
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



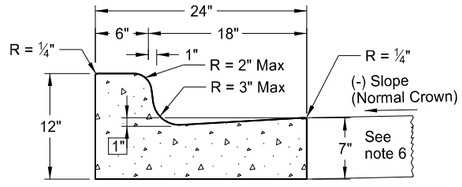
Joint Location Detail



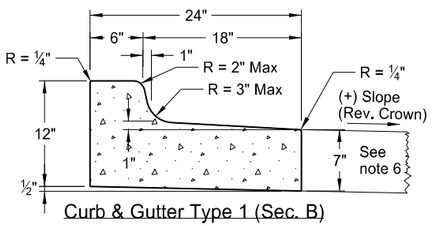
36" Concrete Valley Gutter Plan



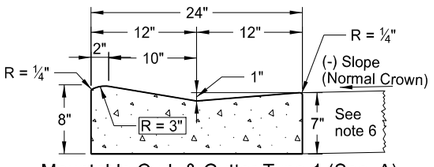
36" Concrete Valley Gutter Detail



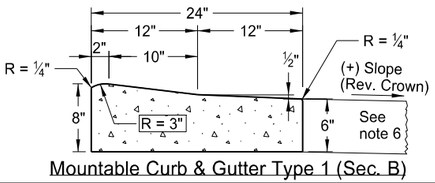
Curb & Gutter Type 1 (Sec. A)



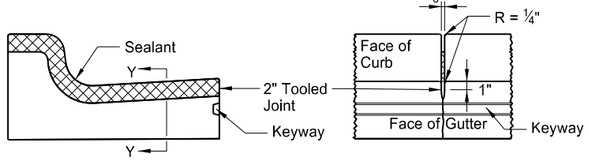
Curb & Gutter Type 1 (Sec. B)



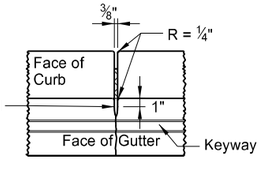
Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)

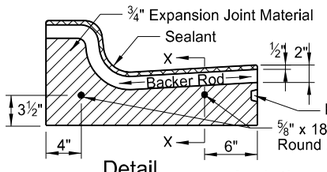


Detail
(10' Max Spacing)

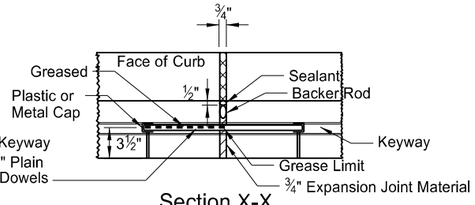


Section Y-Y

Contraction Joint

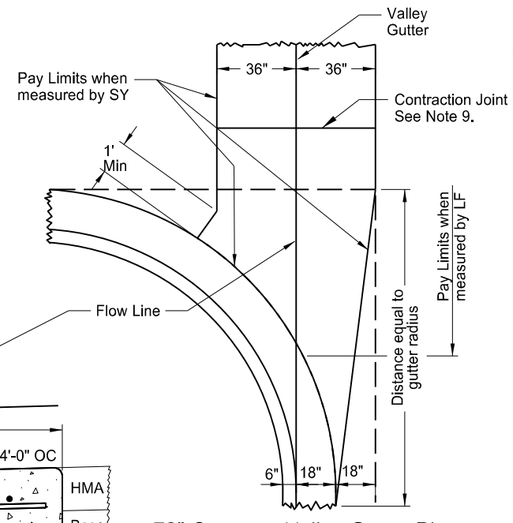


Detail

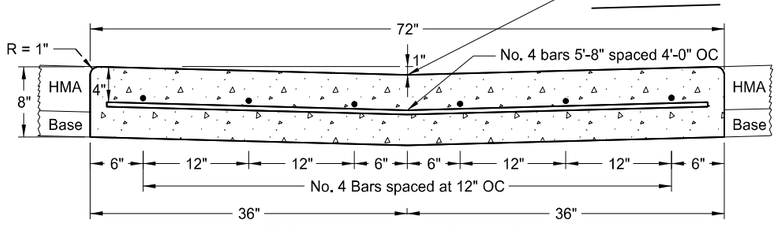


Section X-X

Isolation Joint



72" Concrete Valley Gutter Plan



72" Concrete Valley Gutter Detail

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 material for isolation joints. 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 mix asphalt 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: For contraction joint, use joint sealant 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. Curb & Gutter-Pavement Interface: For hot mix asphalt pavement use gutter depth shown. For PCC pavements, either match gutter depth to adjacent pavement depth or construct gutter depth shown.
7. Tie curb and gutter to abutting PCC pavement with No. 4 bars, 2'-0" in length, spaced at 3'-9" centers for 15' joint spacing (maximum spacing of 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) with an 18" plain round 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.
10. Reinforcing at Inlets: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlets (even inlets located on radii) in the price bid for "Curb & Gutter - Type 1" or "Curb & Gutter Mountable - Type 1." Extend reinforcement to the second joint (with rebar placed through the first joint) in cases where the 3' minimum panel length can't 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.
10-30-24	Revised bar size & notes.

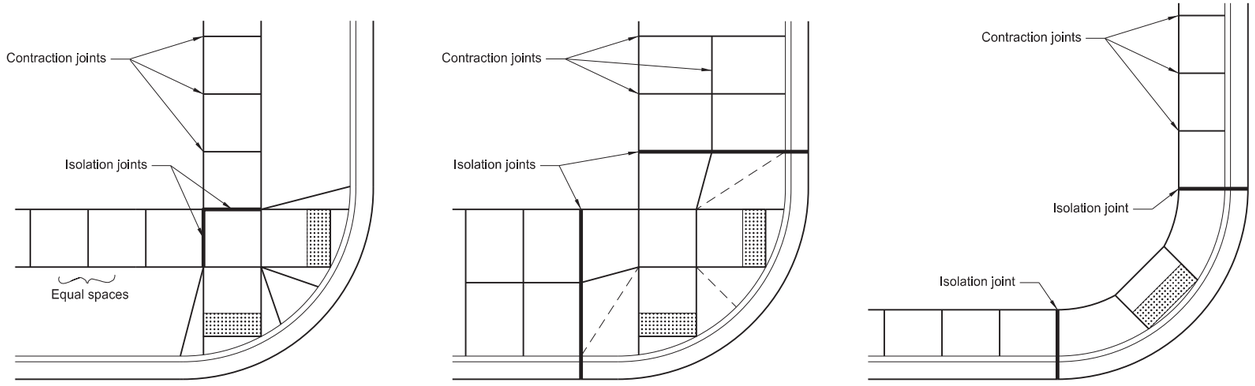
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

Kirk J Hoff

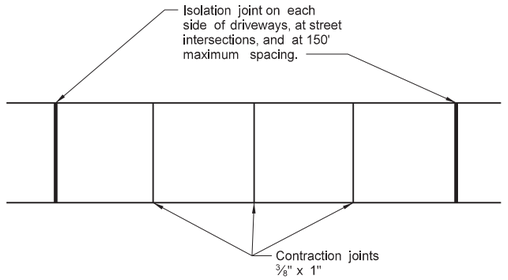
10/30/24

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.

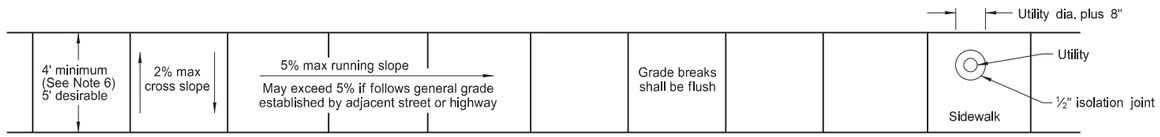
   Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

   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."

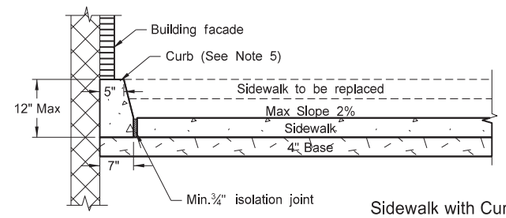
   Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear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

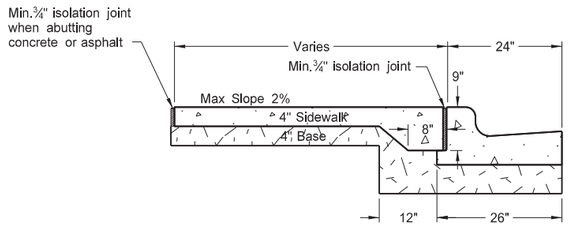


Sidewalk Width and Grade

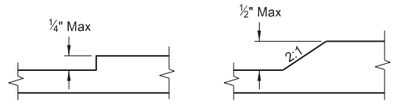
Utility Blockout



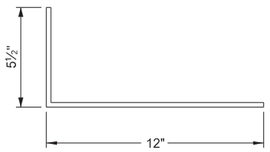
Sidewalk with Curb Detail
(Building face application)



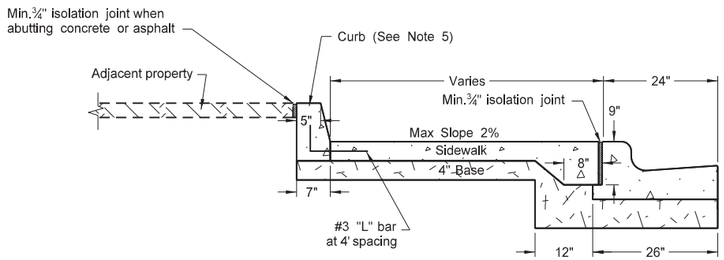
Sidewalk Detail
(Installed adjacent to curb and gutter)



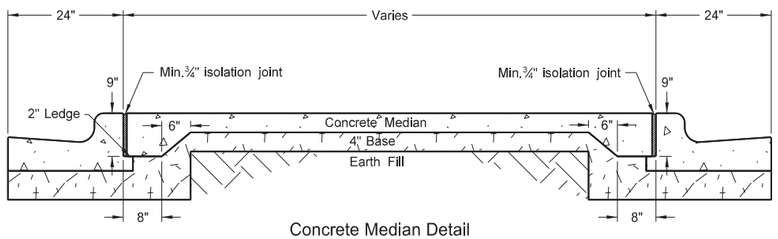
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



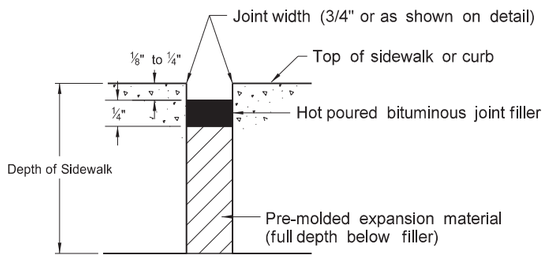
"L"Bar Detail
#3 Bar



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 & grade & passing lane requirements.
08-27-19	New Design Engineer PE Stamp.
08-09-24	Electronic Stamp/Signature.

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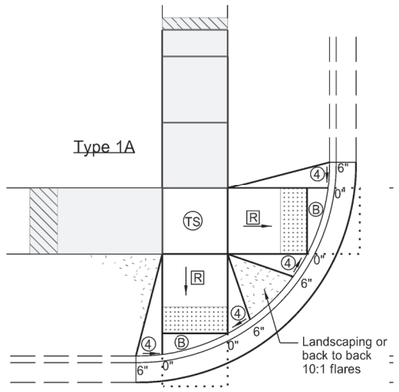
PE-4683
ENGINEER
NORTH DAKOTA

08/09/24

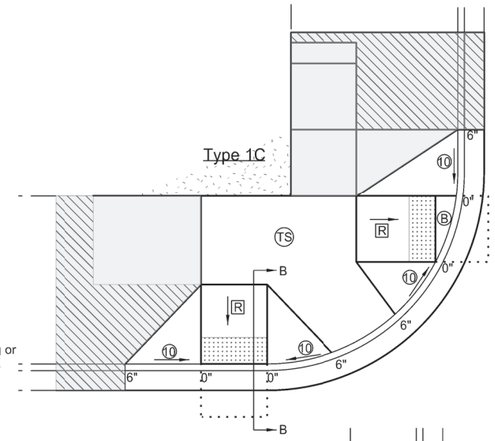
CURB RAMP RETROFIT DETAILS

D-750-3

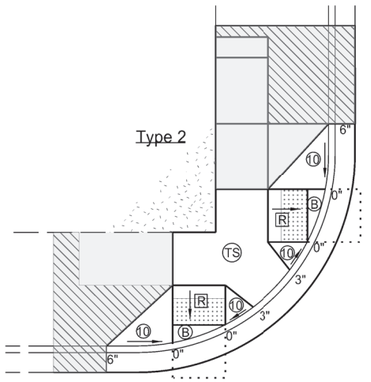
Type 1A



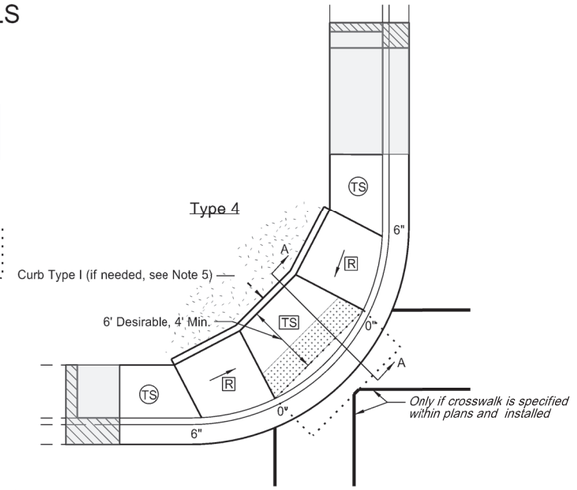
Type 1C



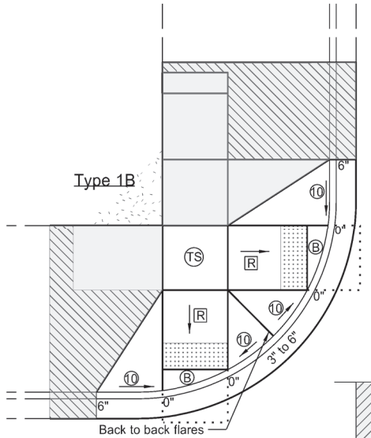
Type 2



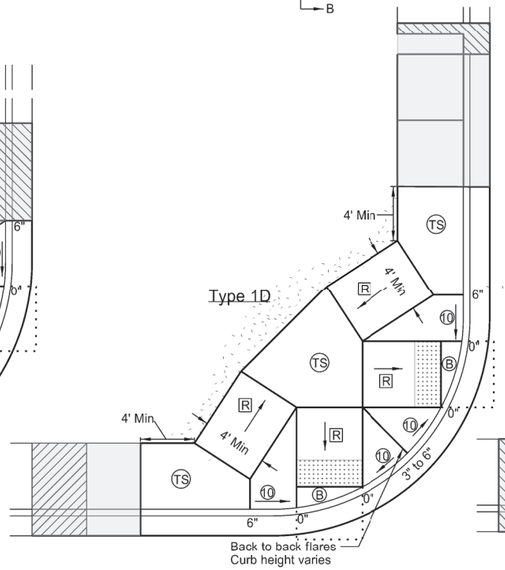
Type 4



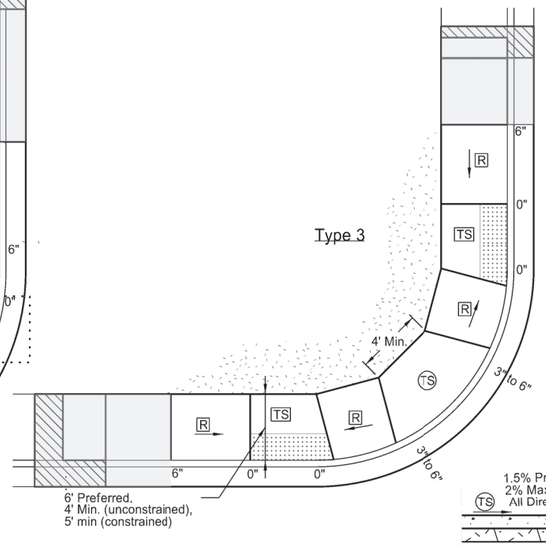
Type 1B



Type 1D



Type 3



5½"
12"
#3 "L" Bar

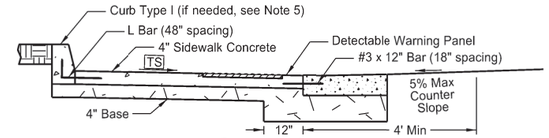
NOTES:

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.

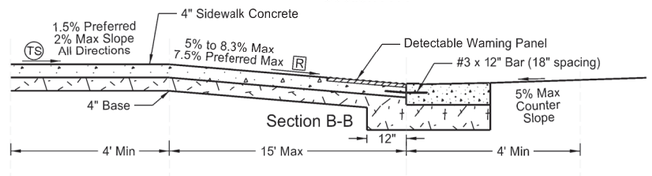
LEGEND:

- : 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.

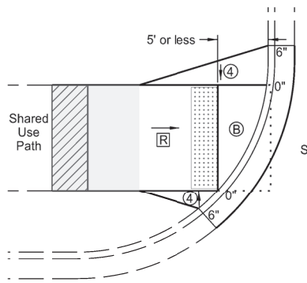


Section A-A



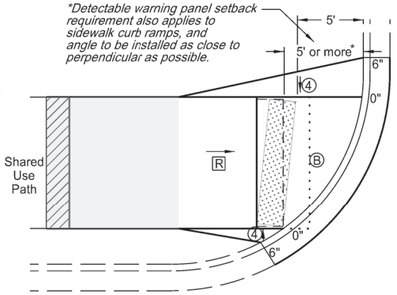
Section B-B

5' or less

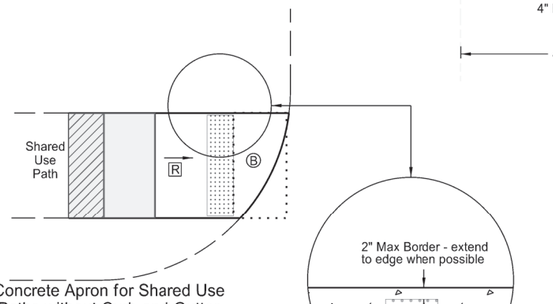


*Detectable warning panel setback requirement also applies to sidewalk curb ramps, and angle to be installed as close to perpendicular as possible.

5' or more*

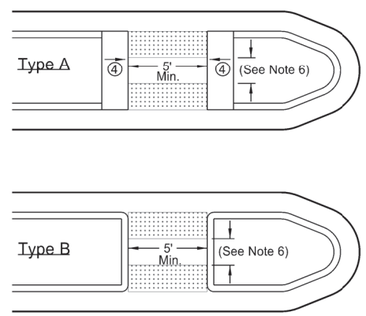


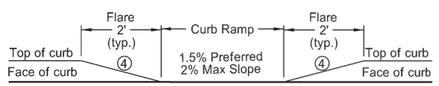
Concrete Apron for Shared Use Paths with Curb and Gutter



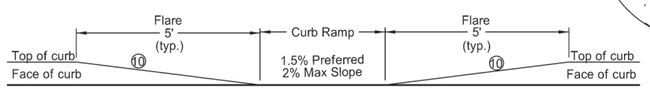
Concrete Apron for Shared Use Paths without Curb and Gutter

Median Refuge Islands (Cut-Through)





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



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

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

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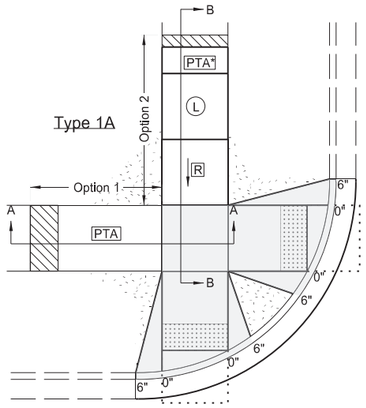
ENGINEER
NORTH DAKOTA
05 19 2021

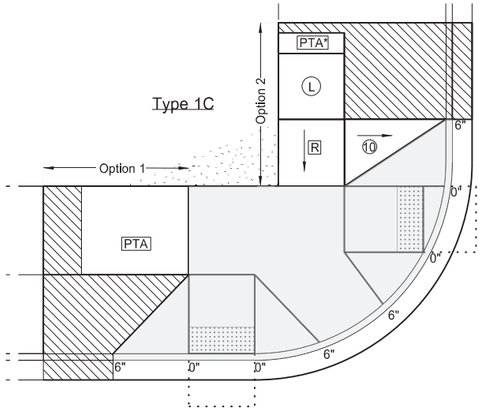
CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4

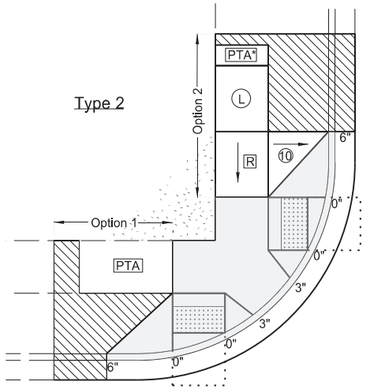
Type 1A



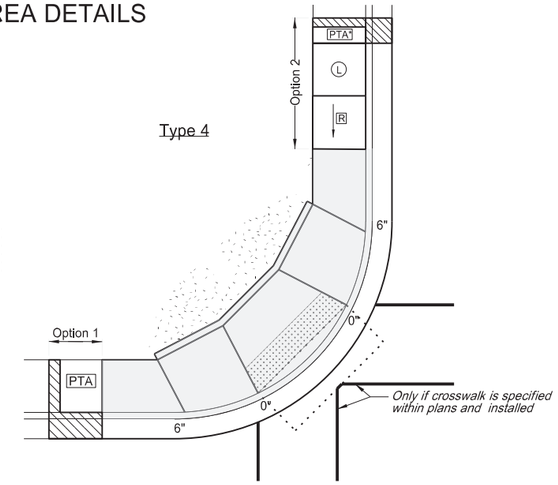
Type 1C



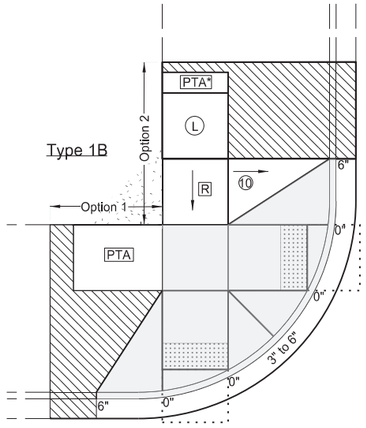
Type 2



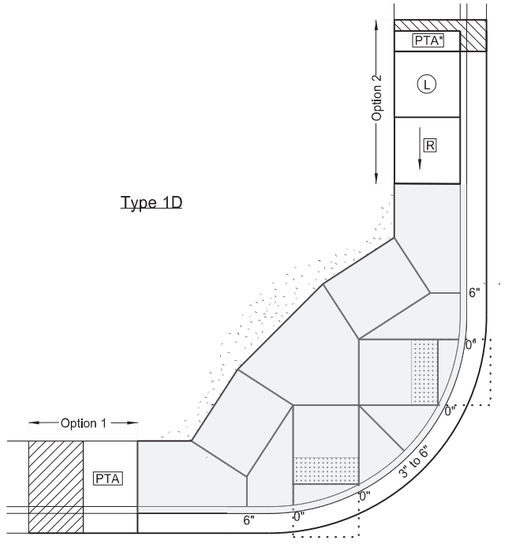
Type 4



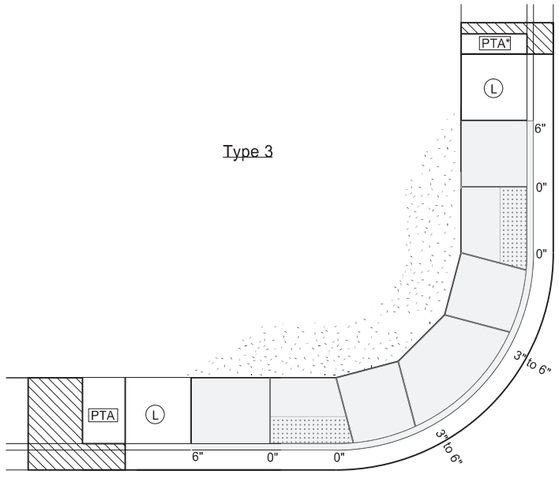
Type 1B

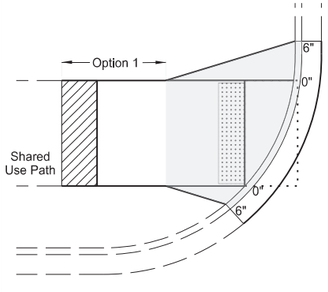


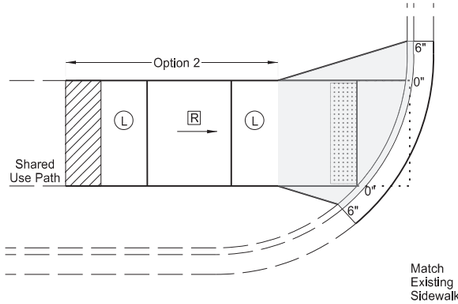
Type 1D



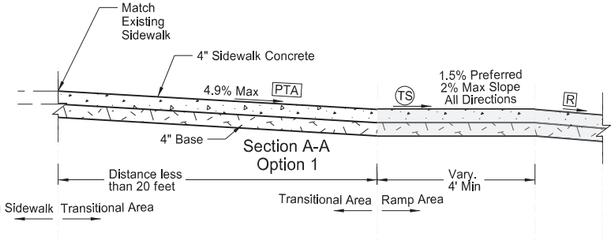
Type 3

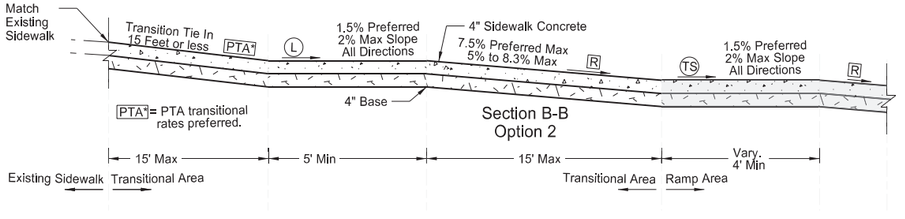






Transition Areas for Shared Use Paths





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

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NORTH DAKOTA
05 19 2021

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.

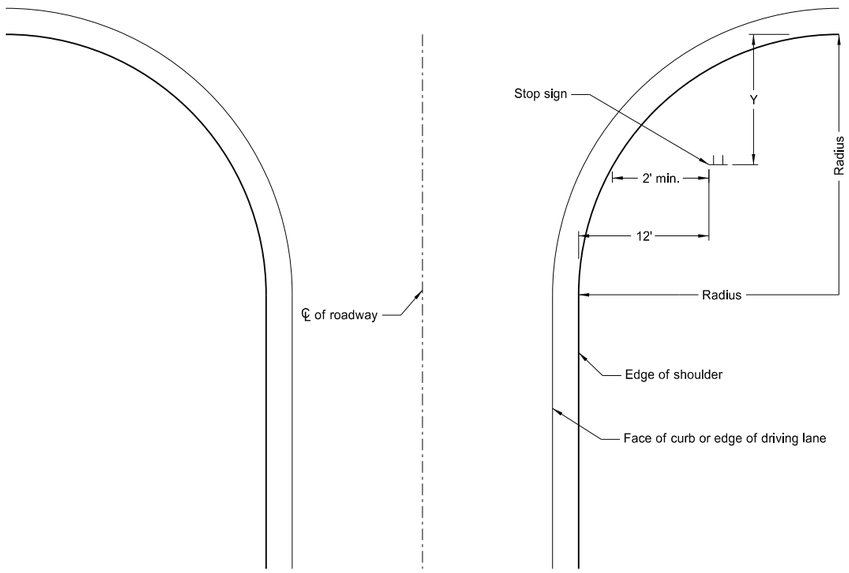
   Install signs on expressways a minimum height of 7'.

   Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.

   Maximum vertical clearance is 6" greater than the minimum vertical clearance.

3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.

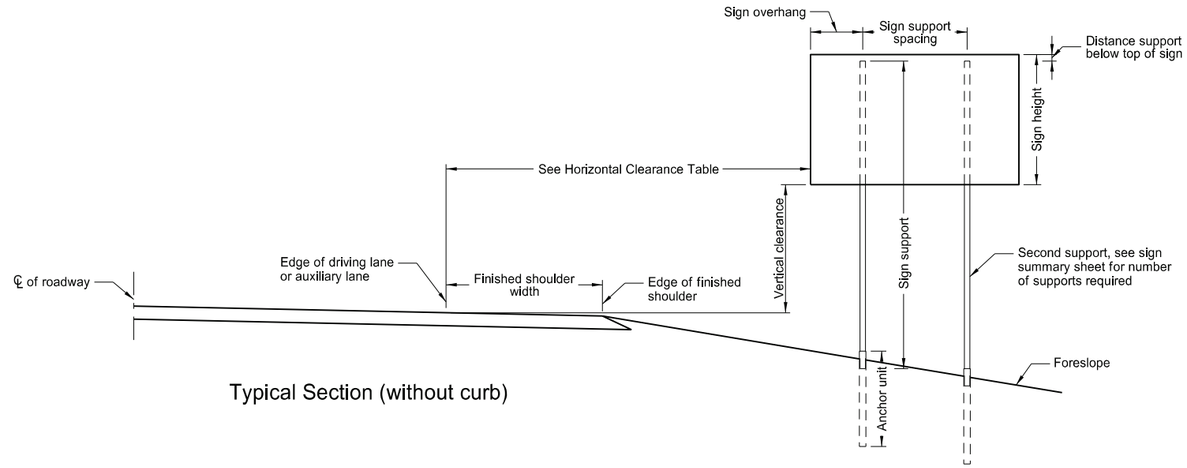
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

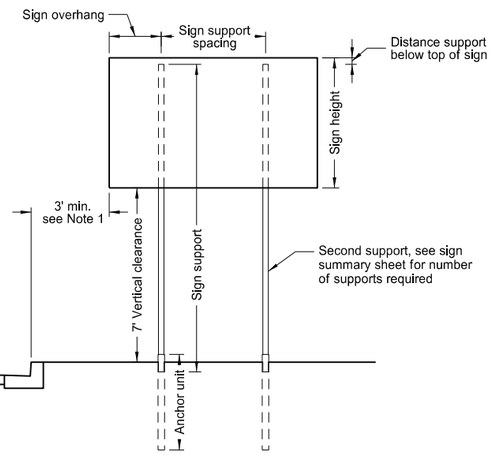
Use layout for the placement of "Stop" signs.

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



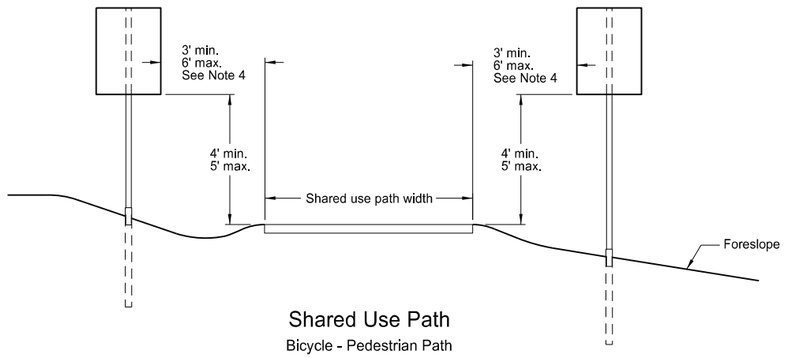
Typical Section (without curb)

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



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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ENGINEER
NORTH DAKOTA

Kirk J. Hoff

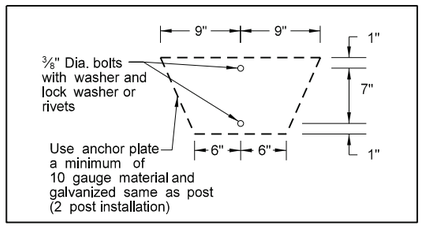
08/05/24

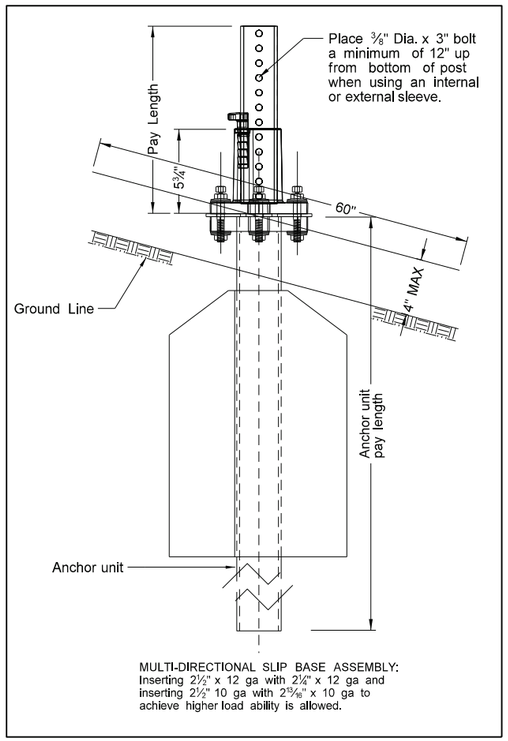
Mounting Details Perforated Tube

D-754-24

Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

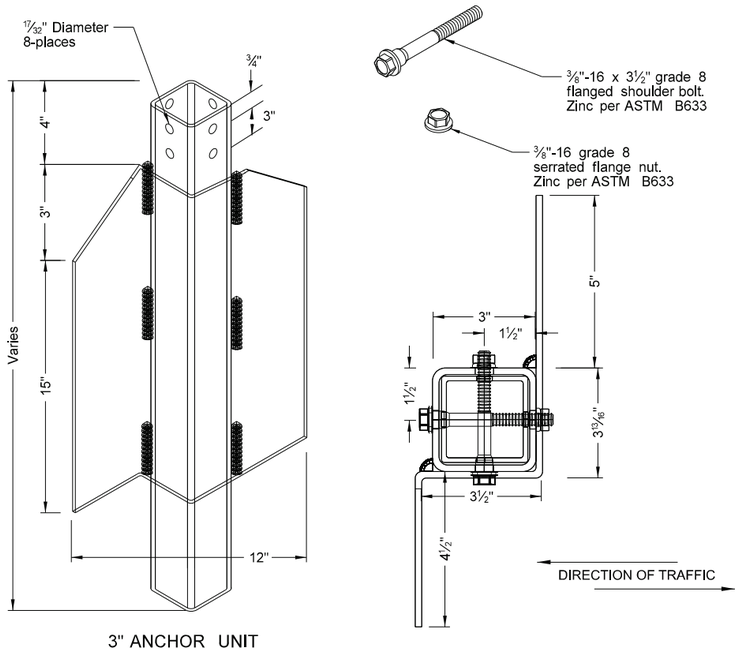




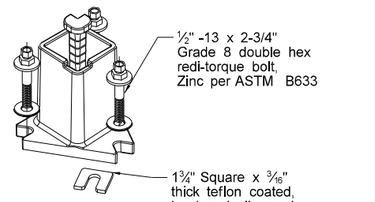
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2 15/16" x 10 ga to achieve higher load ability is allowed.

SHOULDER BOLT

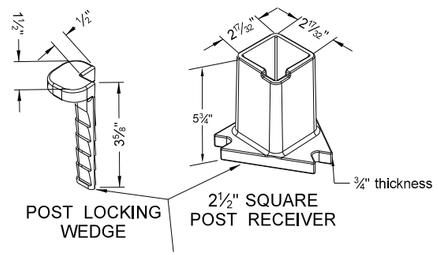
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)

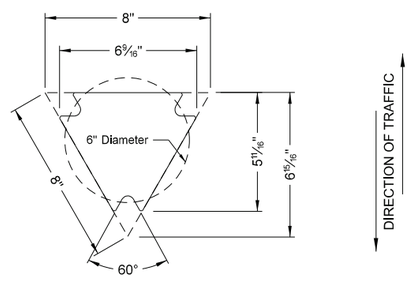


3" ANCHOR UNIT



SLIP BASE FOR 2½" POST





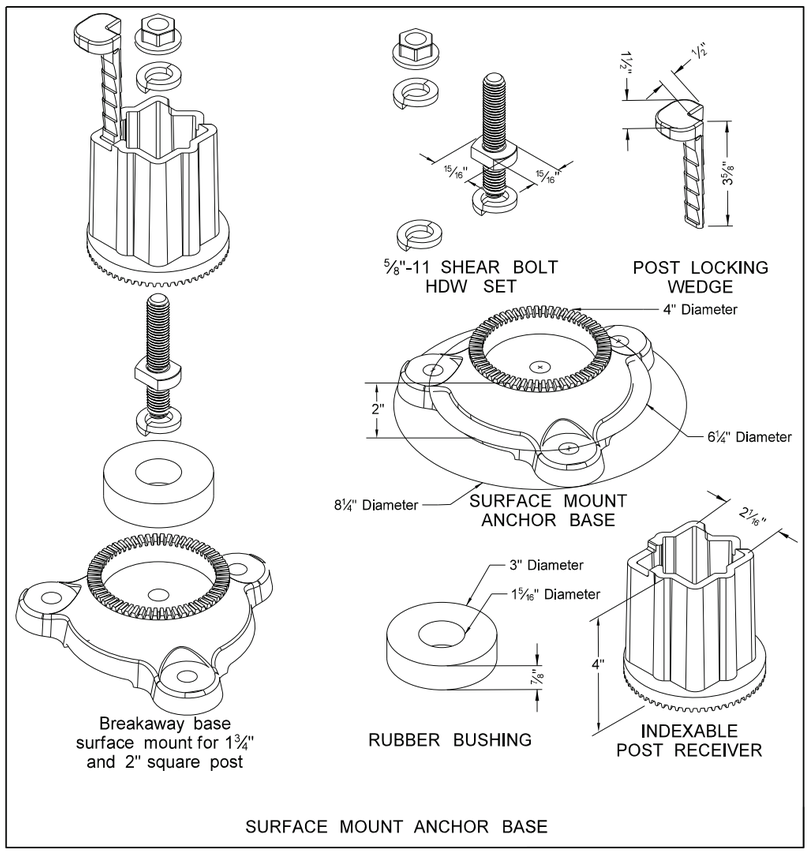
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes: Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulud 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
2 3/16 x 2 3/16	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	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-6-09

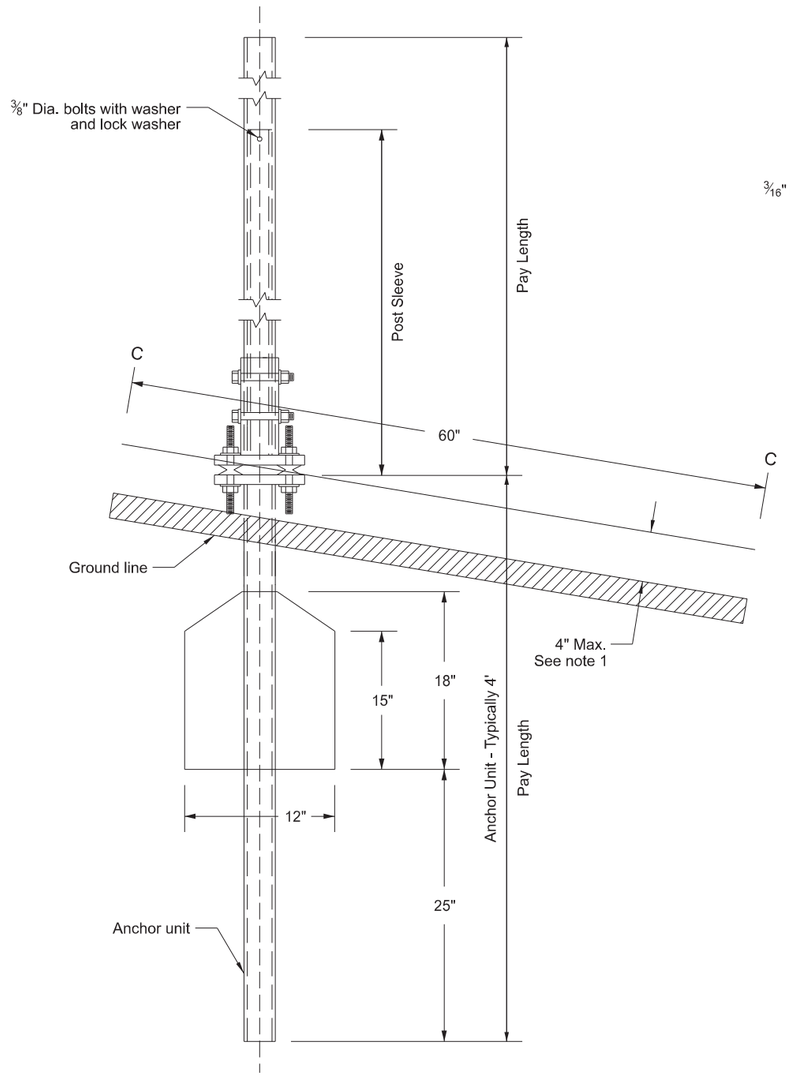
REVISIONS

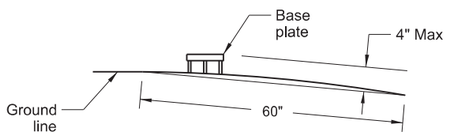
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

08/05/24

D-754-24A

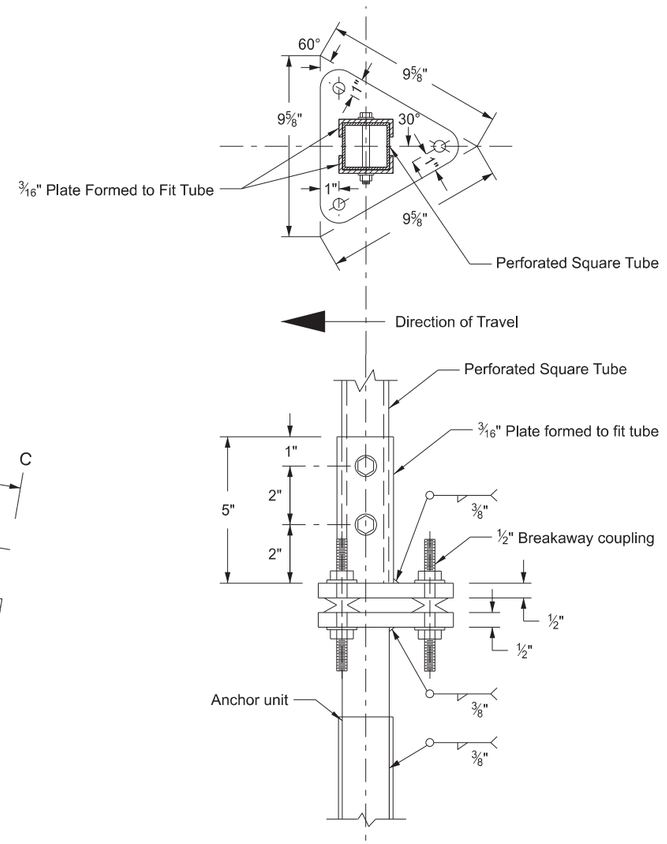




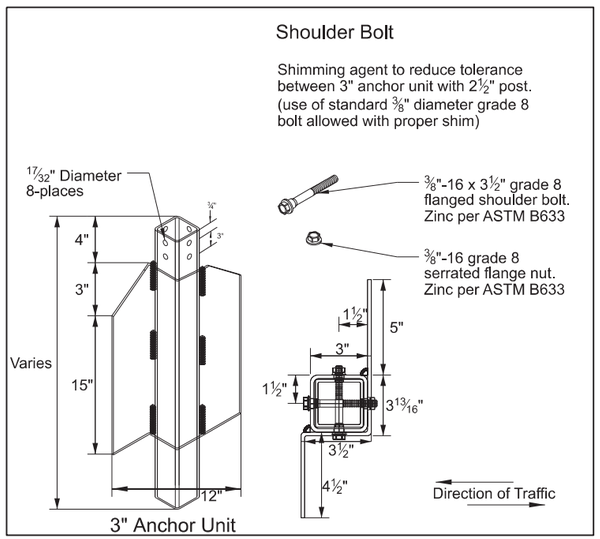
Section C-C

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

Breakaway Coupler System for Perforated Tubes



Base Plate with Breakaway Coupler



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

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

(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-2013

REVISIONS

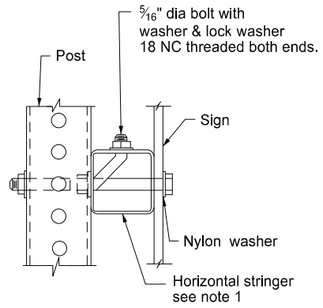
DATE	CHANGE
08-30-18	Updated notes to active voice.
08-30-19	New Design Engr PE Stamp.
08-05-24	Electronic Stamp/Signature.
07-22-25	Corrected "typo" in C-C note.

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

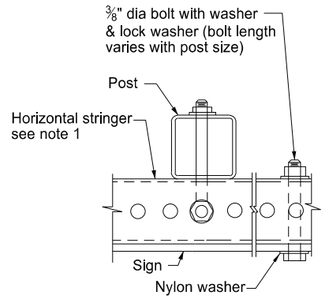
07/22/25

Mounting Details Perforated Tube

D-754-25

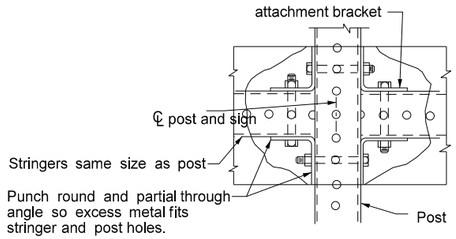


Side View



Top View

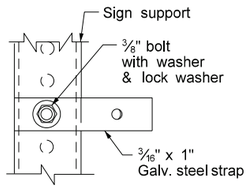
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



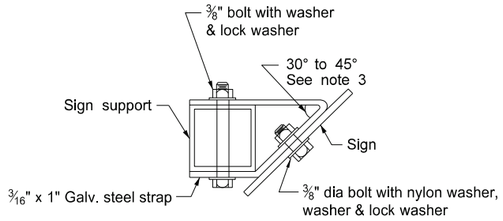
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

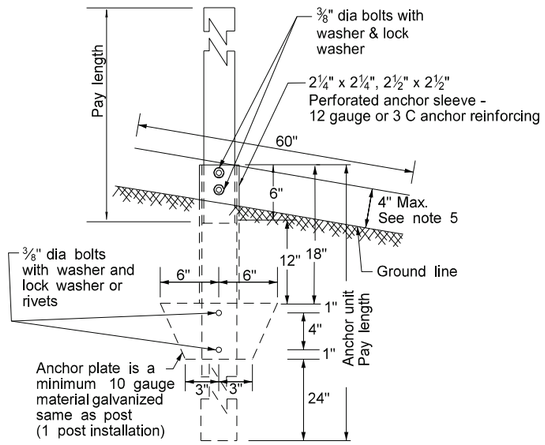


Side View



Top View

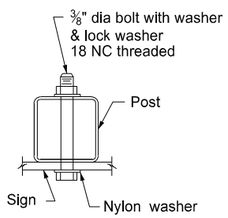
STRAP DETAIL



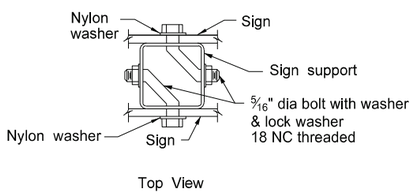
ANCHOR UNIT AND POST ASSEMBLY

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - When placing 2½", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

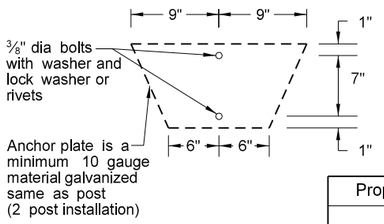


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. 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
2 3/16 x 2 3/16	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	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

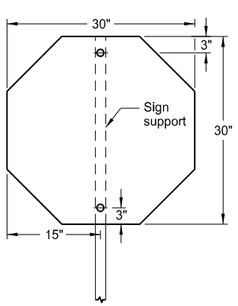
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

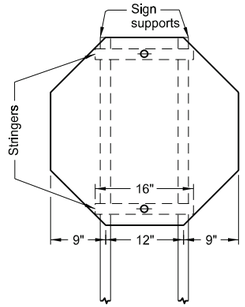
08/05/24

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

D-754-26

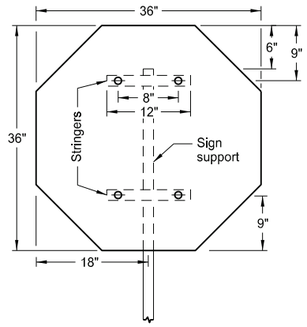


1 Post



2 Posts

Assembly No. 1



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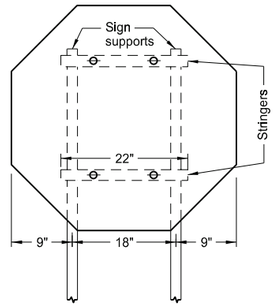
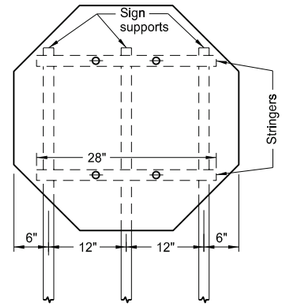


2 Posts

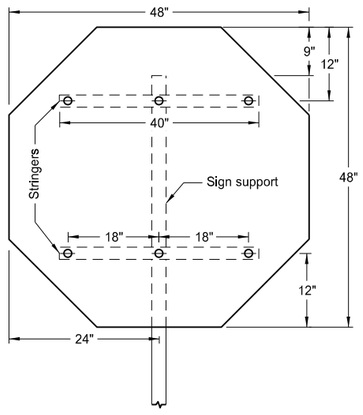


3 Posts

Assembly No. 2

Notes:

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



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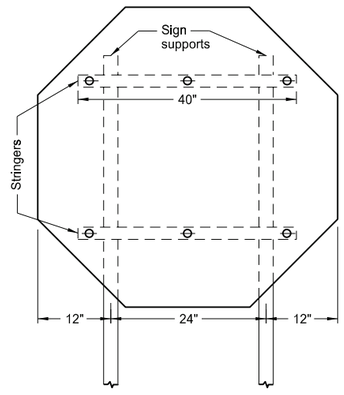
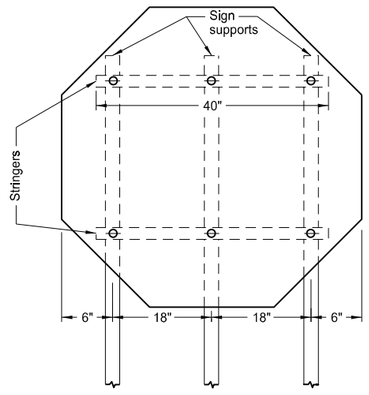
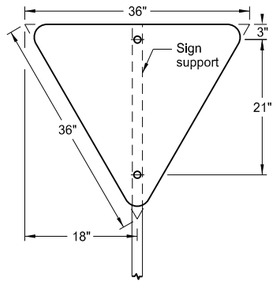


2 Posts



3 Posts

Assembly No. 3



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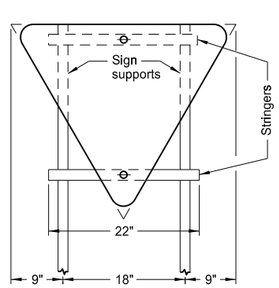
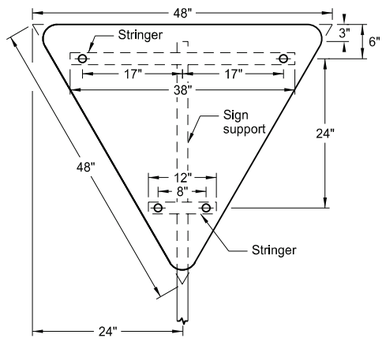
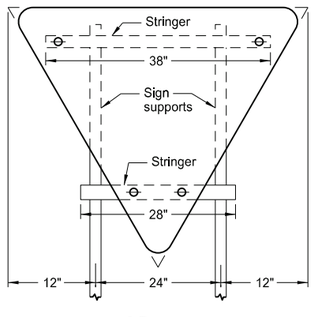


2 Posts

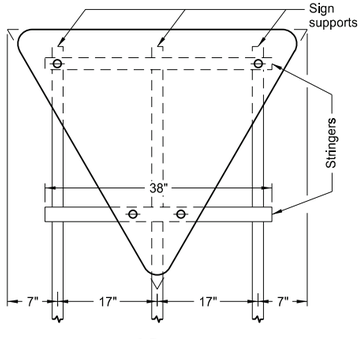
Assembly No. 4



1 Post



2 Posts



3 Posts

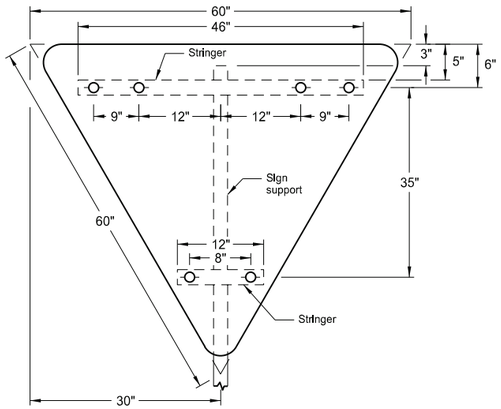
Assembly No. 5

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19 8-05-24	Updated notes to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

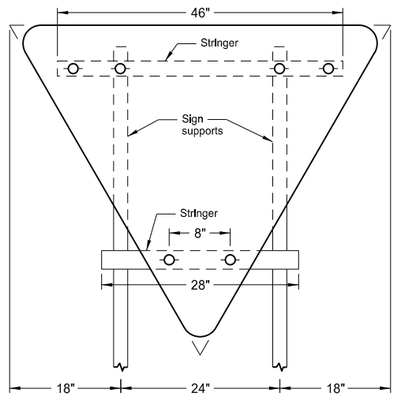
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/05/24

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

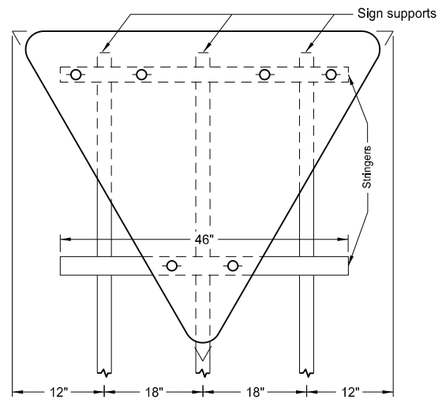
D-754-27



1 Post



2 Posts

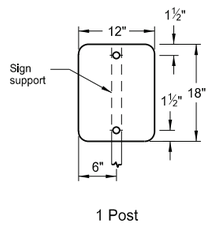


3 Posts

Assembly No. 6

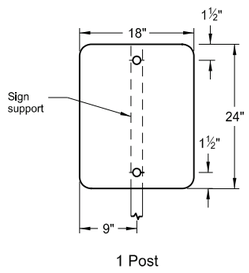
Notes:

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



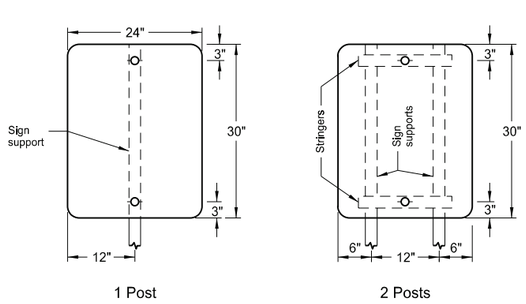
1 Post

Assembly No. 7



1 Post

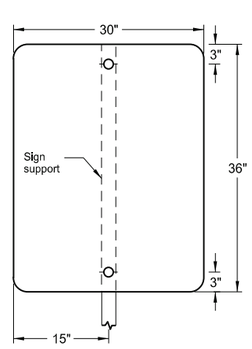
Assembly No. 8



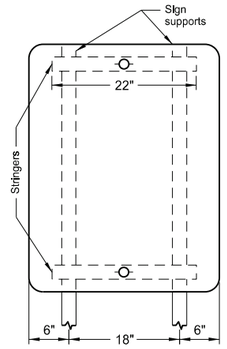
1 Post

2 Posts

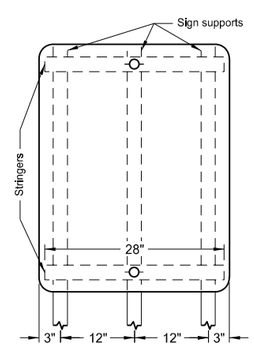
Assembly No. 9



1 Post

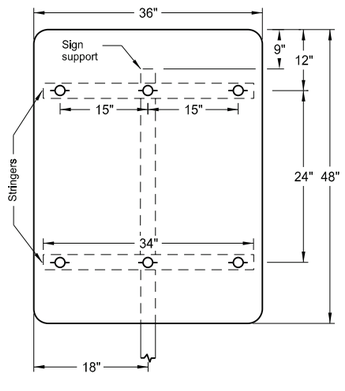


2 Posts

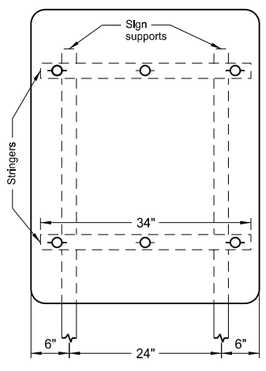


3 Posts

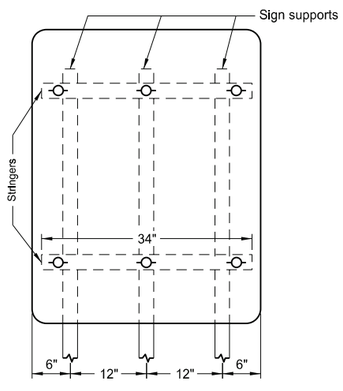
Assembly No. 10



1 Post



2 Posts



3 Posts

Assembly No. 11

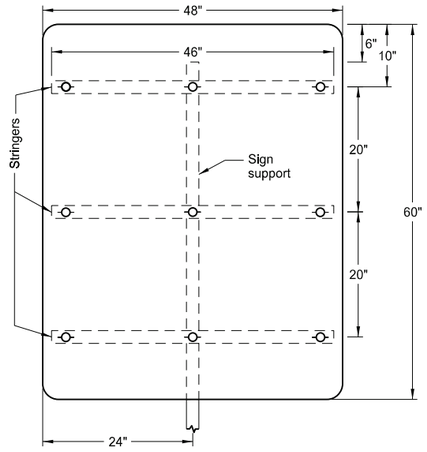
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

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

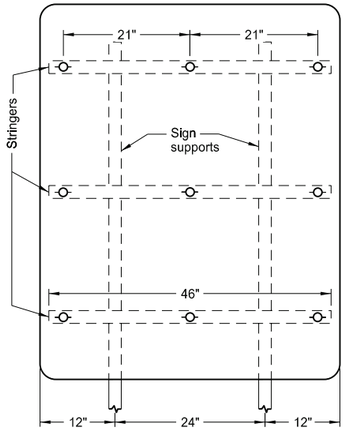
08/06/24

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

D-754-28

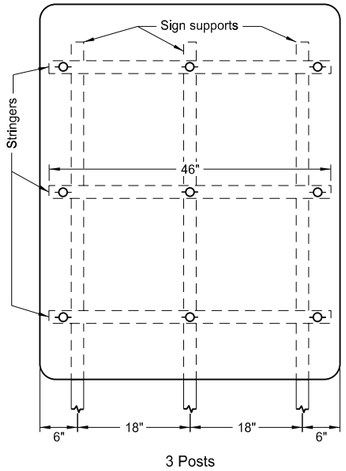


1 Post

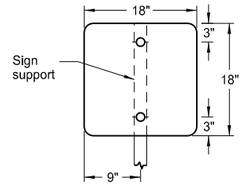


2 Posts

Assembly No. 12

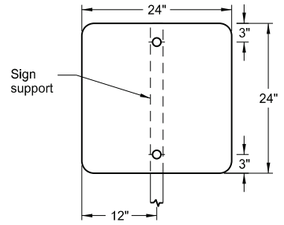


3 Posts

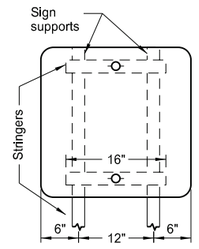


1 Post

Assembly No. 13

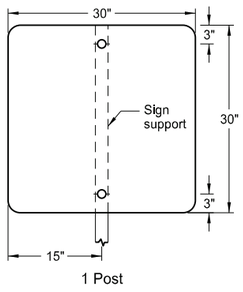


1 Post

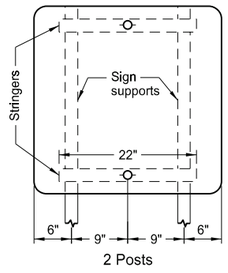


2 Posts

Assembly No. 14

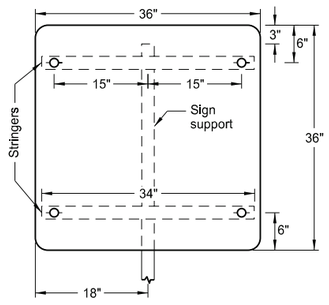


1 Post

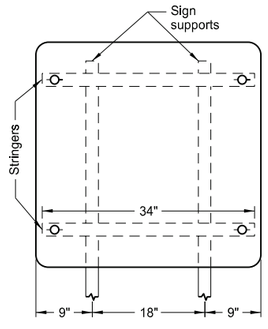


2 Posts

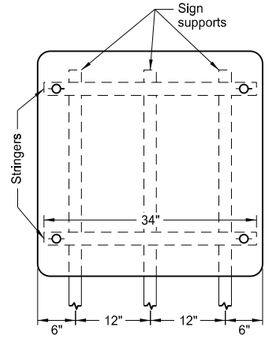
Assembly No. 15



1 Post

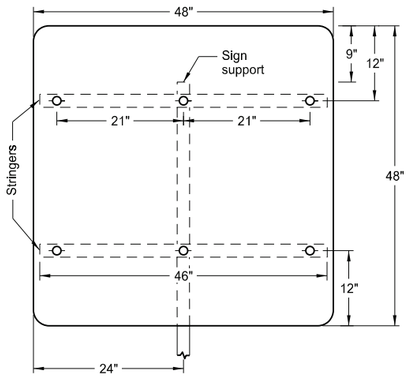


2 Posts

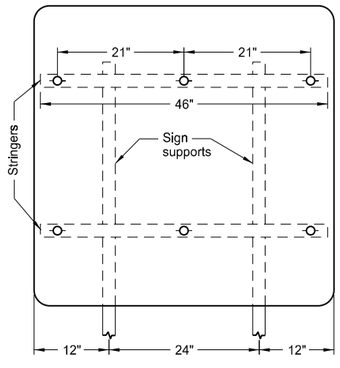


3 Posts

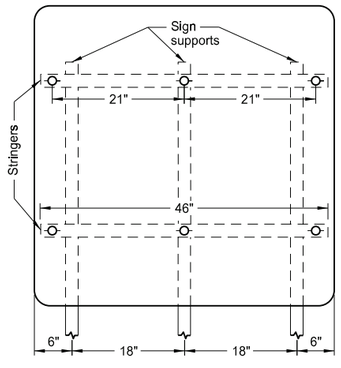
Assembly No. 16



1 Post



2 Posts



3 Posts

Assembly No. 17

Notes:

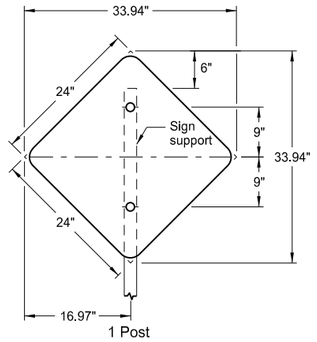
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

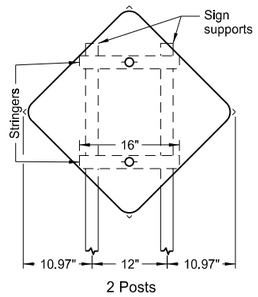
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

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

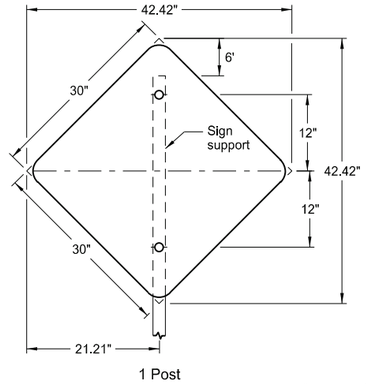


1 Post

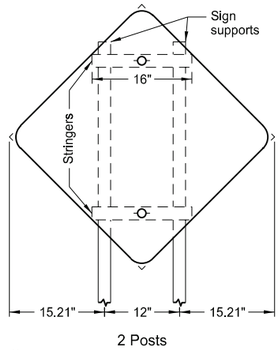


2 Posts

Assembly No. 18

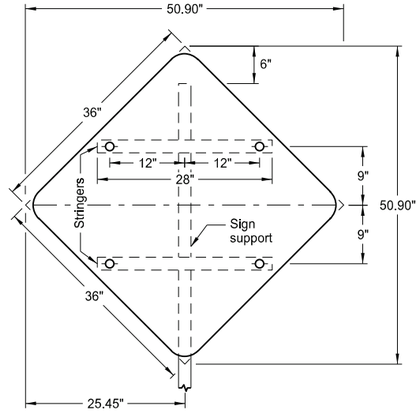


1 Post

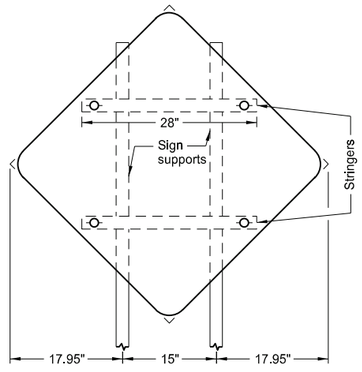


2 Posts

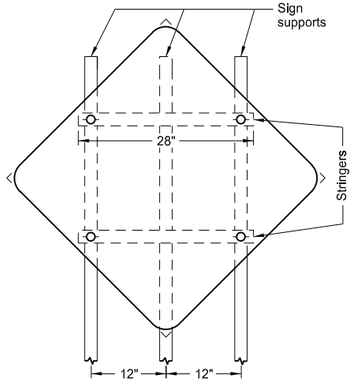
Assembly No. 19



1 Post

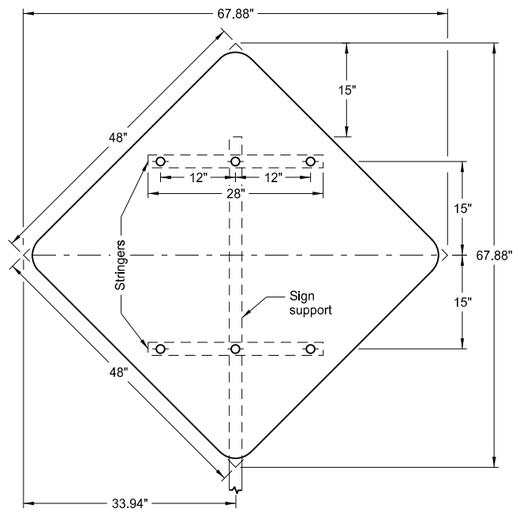


2 Posts

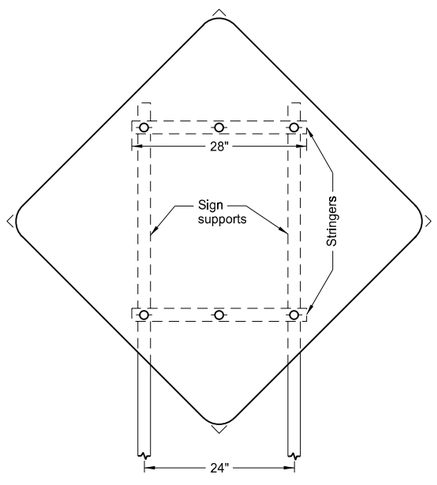


3 Posts

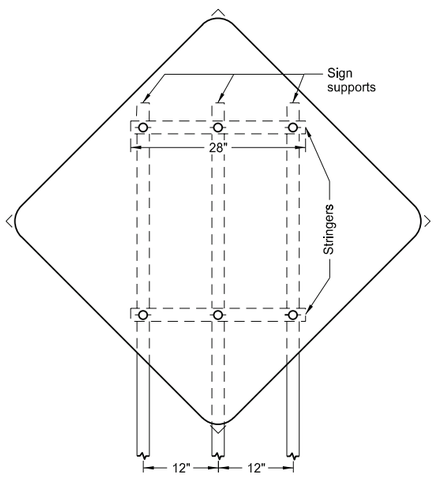
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

KIRK J. HOFF
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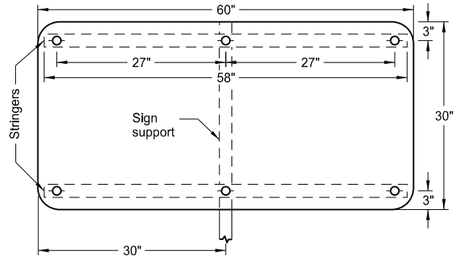
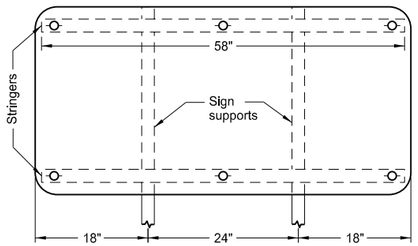
08/06/24

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

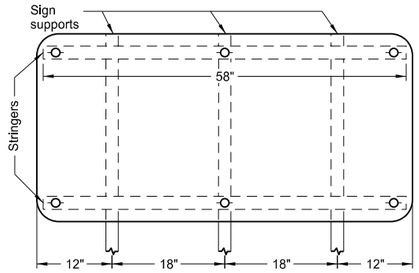
D-754-33



1 Post



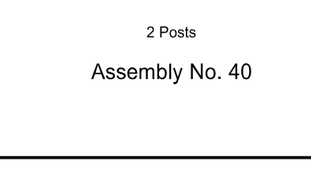
2 Posts



3 Posts

Assembly No. 38

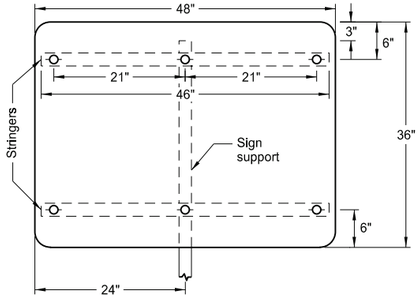
1 Post



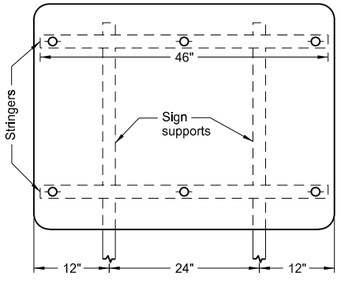
2 Posts

3 Posts

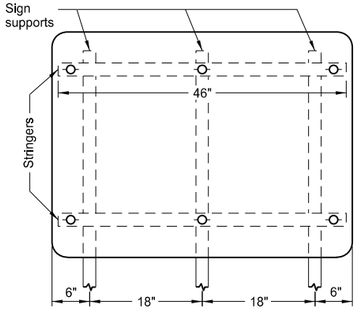
Assembly No. 39



1 Post



2 Posts



3 Posts

Assembly No. 40

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

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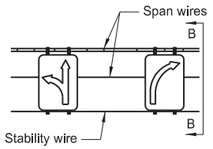
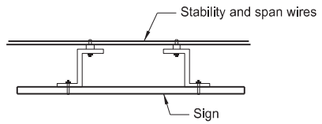
ENGINEER
NORTH DAKOTA

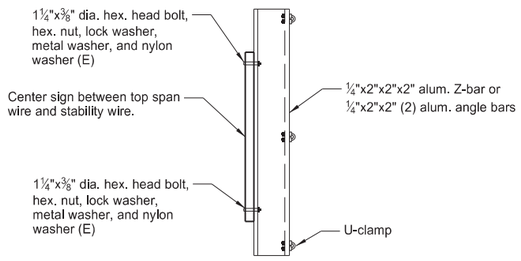
08/06/24

LIGHT STANDARD, SIGNAL STANDARD, AND SPAN WIRE MOUNTED SIGN ASSEMBLY DETAIL



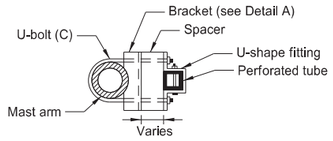


Plan

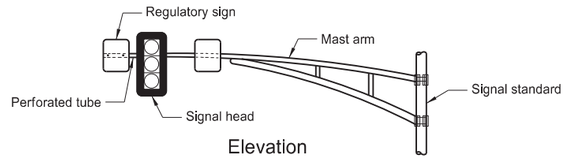


Section B-B

Span Wire Mounted Sign Detail

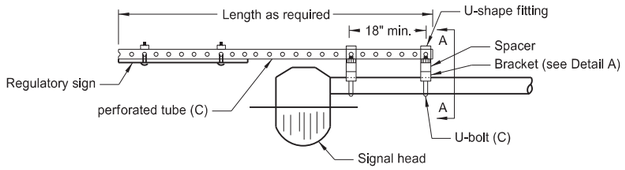


Section A-A

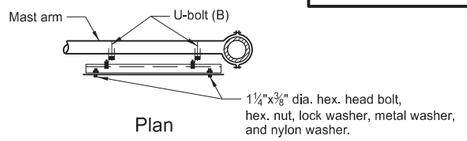


Elevation

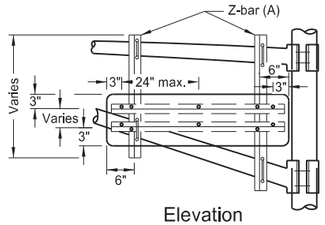
Plan



Sign Mounted Beyond End of Mast Arm Detail

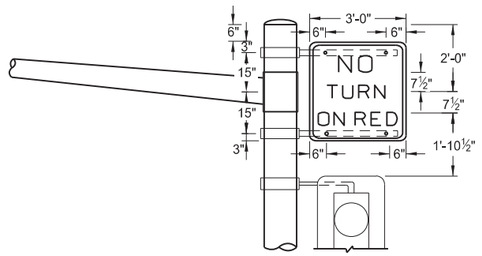


Plan

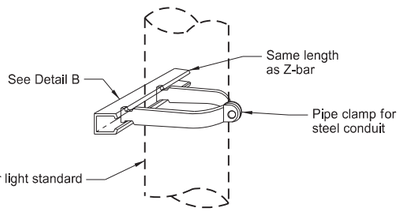


Elevation

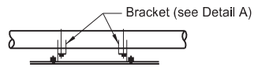
Mast Arm Mounted Street Name Sign Detail



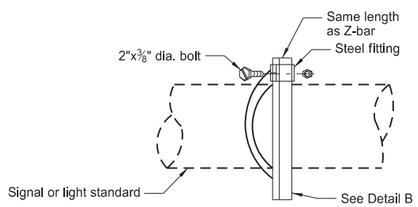
Signal Standard Mounted Sign Attachment Detail



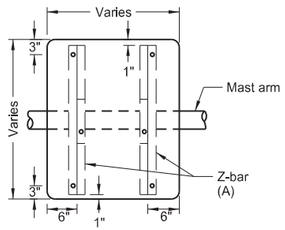
Vertical Mounting
(Use 2 clamps per sign)



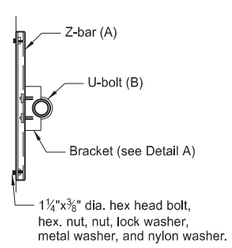
Plan



Horizontal Mounting
alternate clamp mounting
(Use 2 clamps per sign)

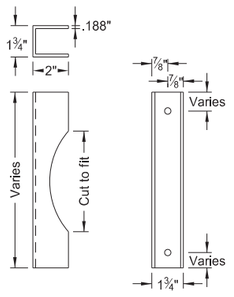


Elevation

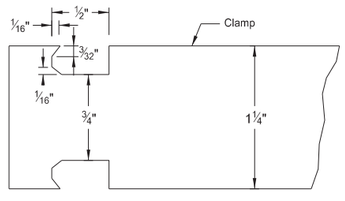


Side View

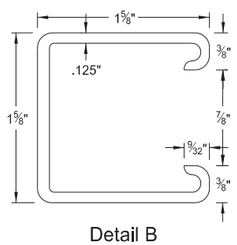
Mast Arm Mounted Regulatory Sign Detail



Detail A



Clamp Detail



Detail B
Steel Channel

Post Size dia.	Clamp Gauge min.
3½" to 5"	11
6" to 12"	10

Clamp	
Post Size dia. in.	D in.
3½	3
4	3 3/16
5	5 1/8
6	7 7/16
8	13 1/16
10	20 3/4
12	29 5/8

Notes:

(A) Use 1¾"x3/16" thick 1.08 lb/ft aluminum alloy Z-bar. In place of Z-bar, use two 1¾"x1¾"x3/16" angles bolted together or a 1¾"x2"x.188" channel.

(B) ⅜" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

(C) ⅜" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

Maximum perforated tube lengths for mounting signs beyond end of mast arm:
2"x2" maximum support length 9.9'
2½"x2½" maximum support length 12.6'
2½"x2½" maximum support length 15.7'

(D) Use galv. steel strap and sign attachment bracket similar to the one shown in the detail. Include all costs of bracket assembly in the price bid for flat sheet signs. Punch as shown on Standard Drawings. Provide a 7' minimum vertical clearance to the bottom of signs mounted on light standards.

(E) Use metal washers and nylon washers with a minimum outside dia. of 15/16" ± 1/16" and 10 gauge thickness on sign face.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-13

REVISIONS

DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
8-08-24	Electronic Stamp/Signature.

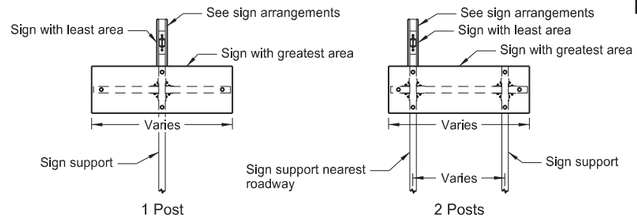
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/08/24

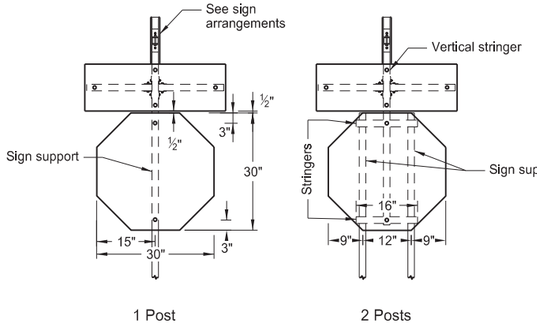
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

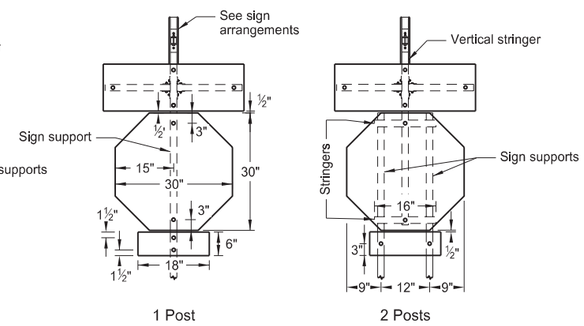
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



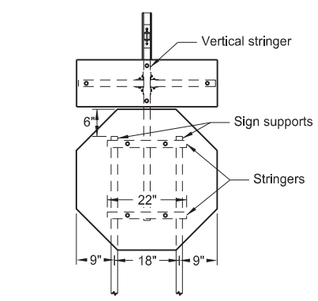
Special Assembly 1 (A, B, C, D or E)

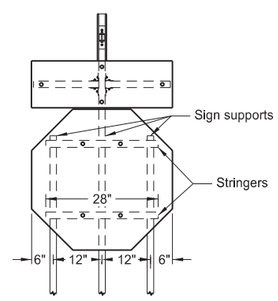


Special Assembly 2 (A, B, C, D or E)

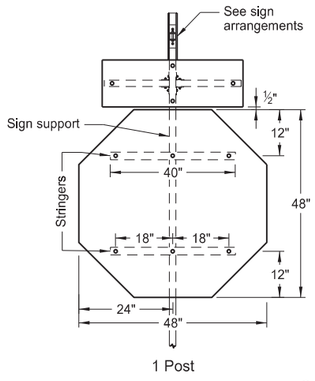


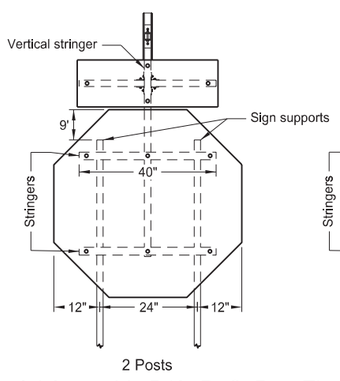
Special Assembly 3 (A, B, C, D or E)

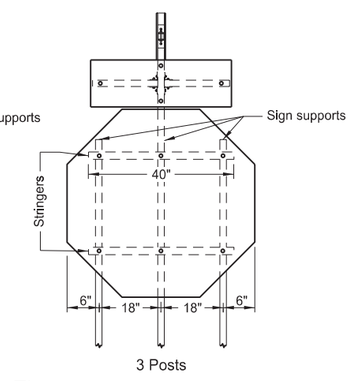




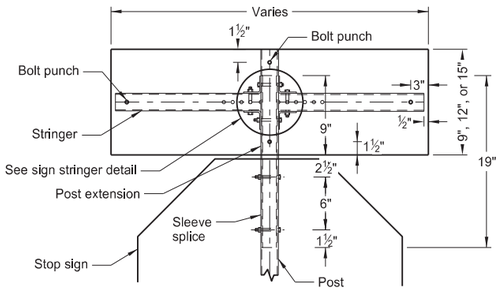
Special Assembly 4 (A, B, C, D or E)





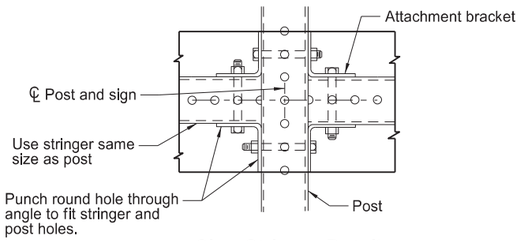


Special Assembly 5 (A, B, C, D or E)



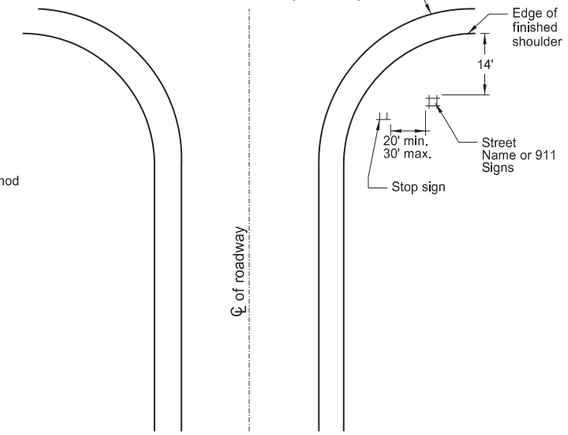
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



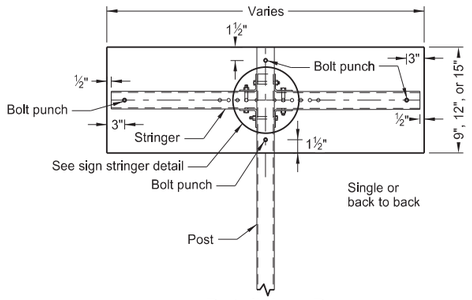
Sign Stringer Detail

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.

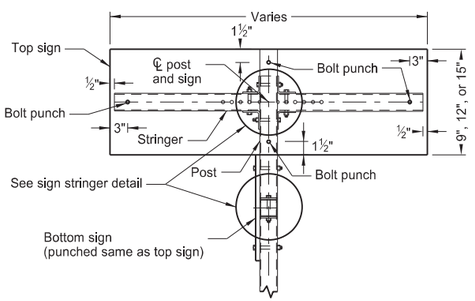


Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1 .

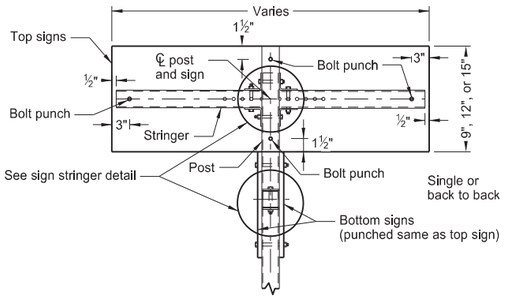


Detail A or B



Detail C

Sign Arrangements



Detail D or E

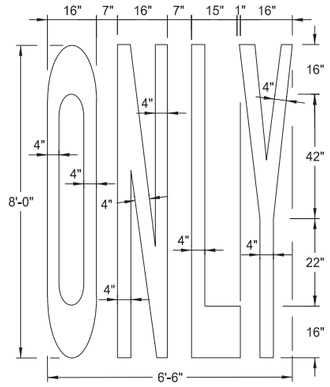
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
8-08-24	Electronic Stamp/Signature.

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

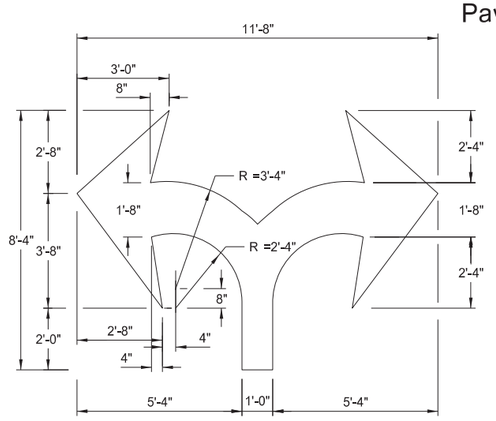
08/08/24

Pavement Marking Message Details

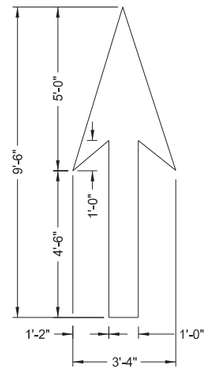
D-762-1



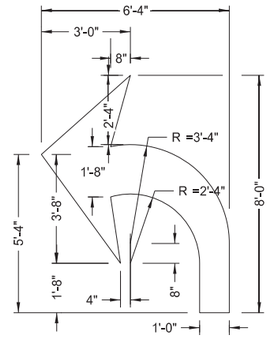
22 S. F.



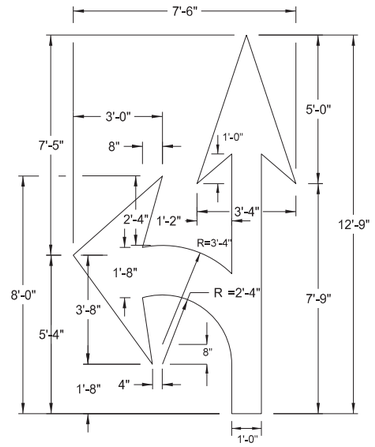
29 S. F.



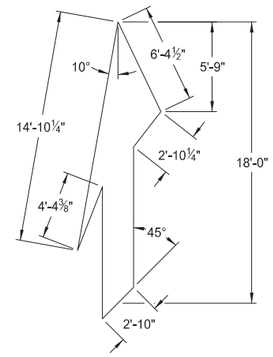
12 S. F.



16 S. F.

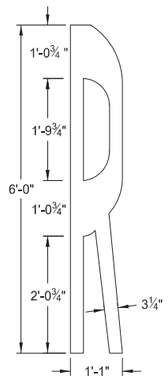


27 S. F.

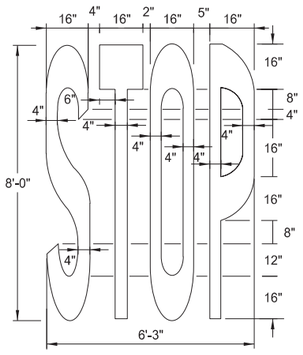


41 S. F.

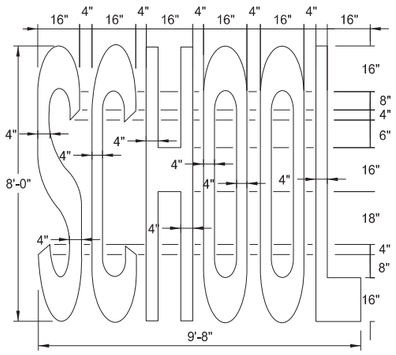
Note: Rotate merge arrow 20° from edge of roadway.



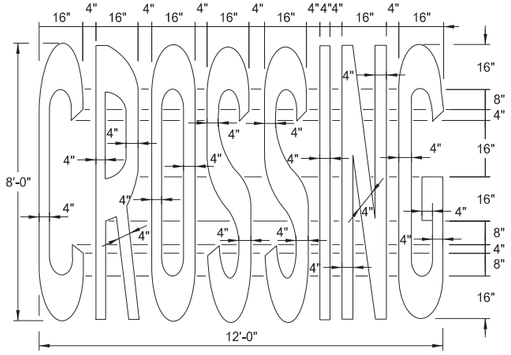
4 S. F.



22 S. F.



34.5 S. F.

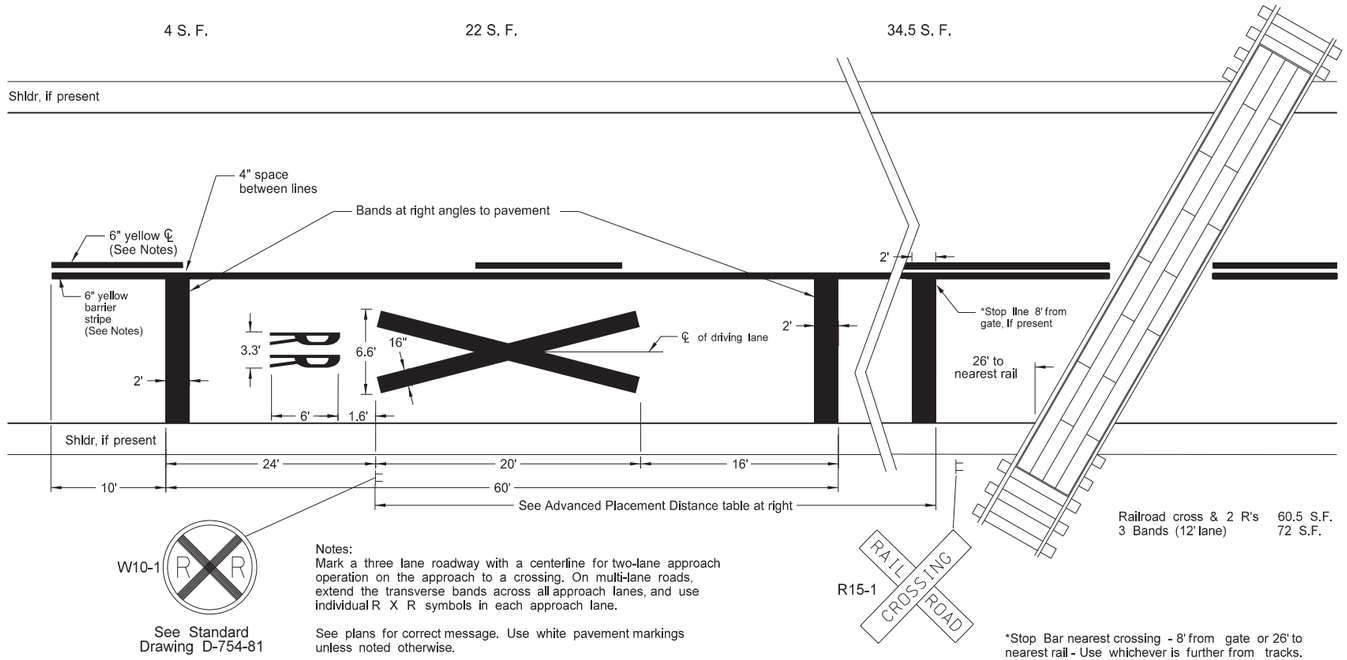


46 S. F.

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



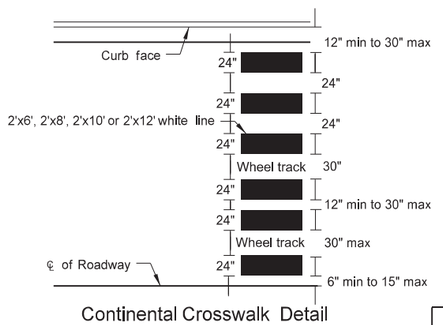
Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

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.

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



Continental Crosswalk Detail

NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

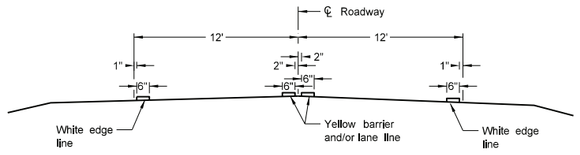
REVISIONS

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.
11-22-2023	Revised pavement marking widths.

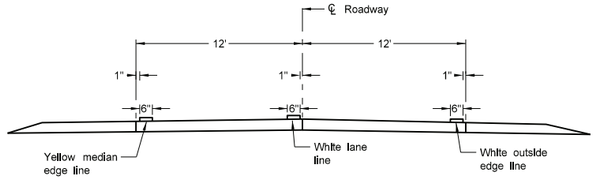
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

PAVEMENT MARKING

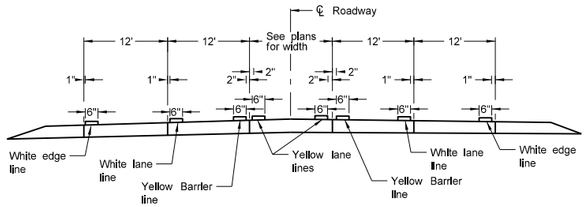
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

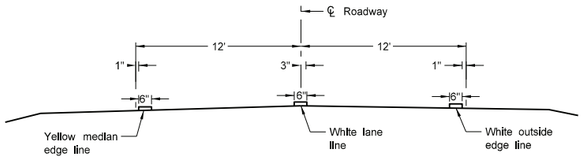
NOTES:

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

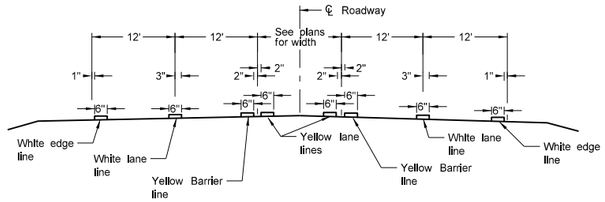
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

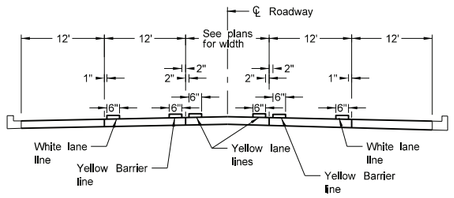
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



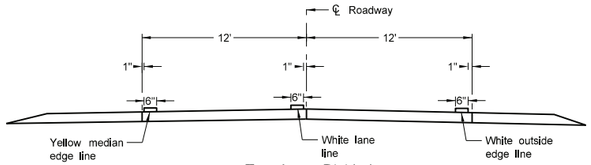
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



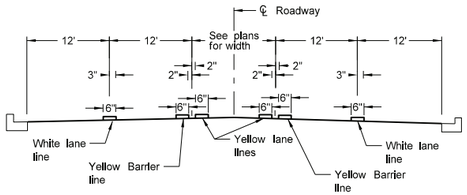
RURAL FIVE LANE ROADWAY
Asphalt Section



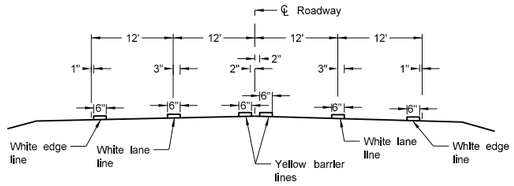
URBAN FIVE LANE SECTION
Concrete Section



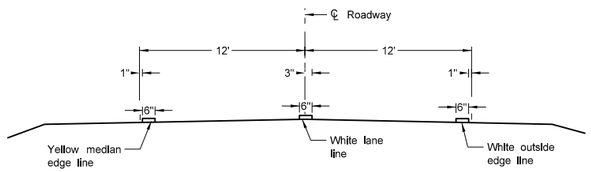
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



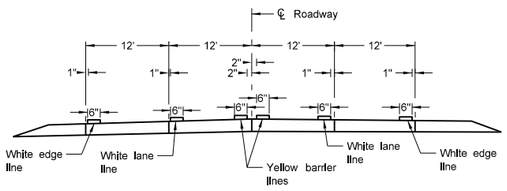
URBAN FIVE LANE SECTION
Asphalt Section



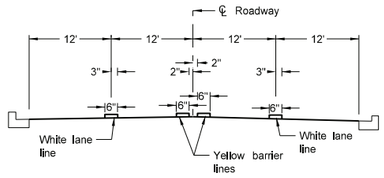
RURAL FOUR LANE ROADWAY
Asphalt Section



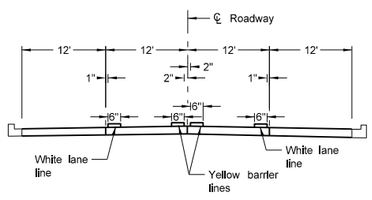
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



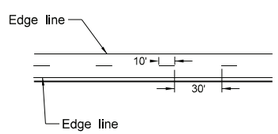
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



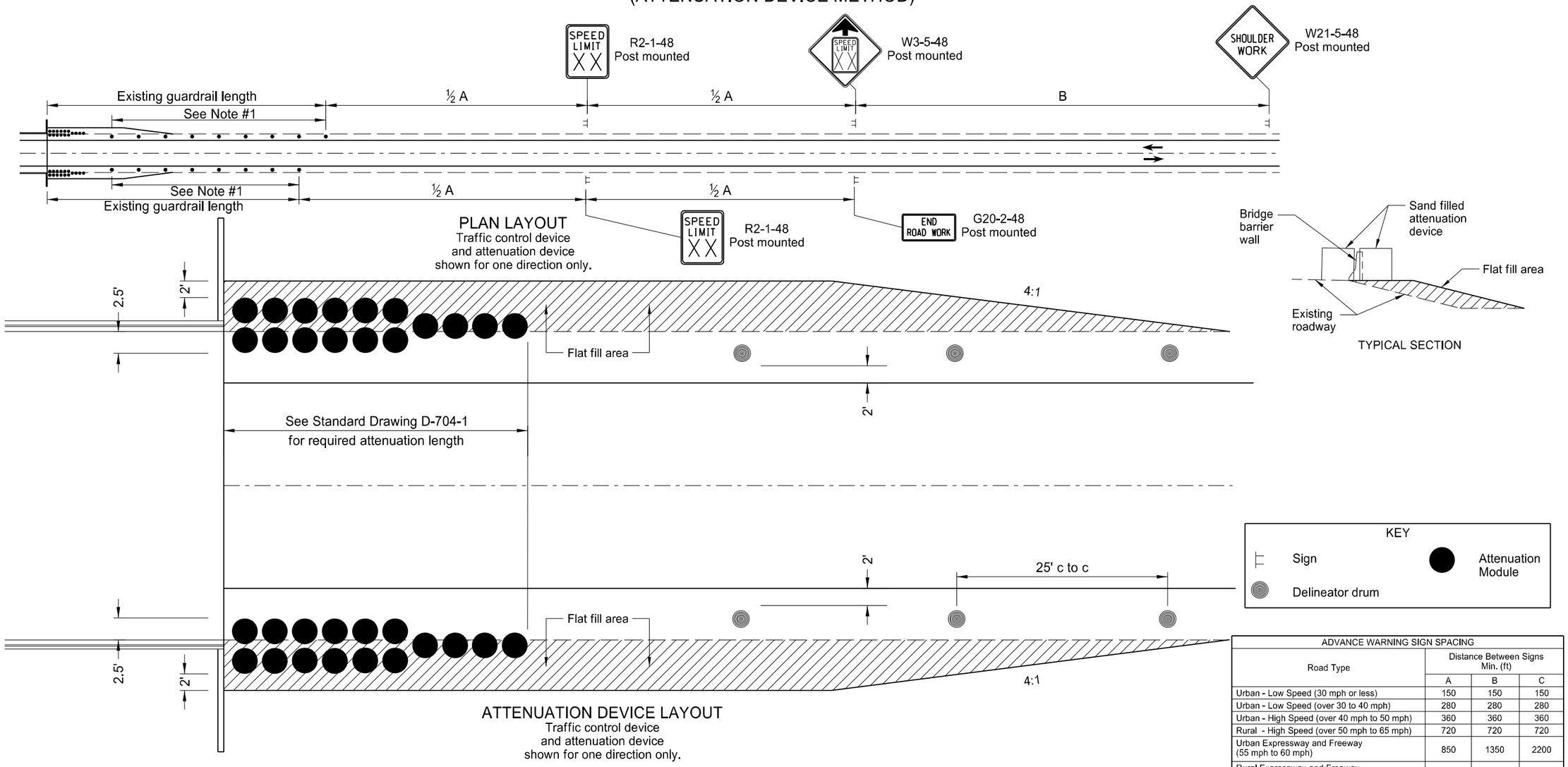
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

D-764-20

SHORT TERM END TREATMENT FOR BRIDGES
(ATTENUATION DEVICE METHOD)



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

Notes

1. When the shoulder width is less than 3', use vertical panels placed as far from the driving lane as possible on the finished shoulder. When there is no shoulder, place vertical panels as near as possible to the driving lane on the foreslope of the shoulder.
2. When the bridge is within the construction zone signing, eliminate the reduced speed ahead sign.
3. Determine the reduced speed limit dependent on the in place speed limit before construction. Where total speed reduction exceed 30 mph, reduce the speed limit in two stages with each reduction not exceeding 30 mph. Place the second speed limit sign at ½ B.
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Cover existing speed limit signs within a reduced speed zone.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

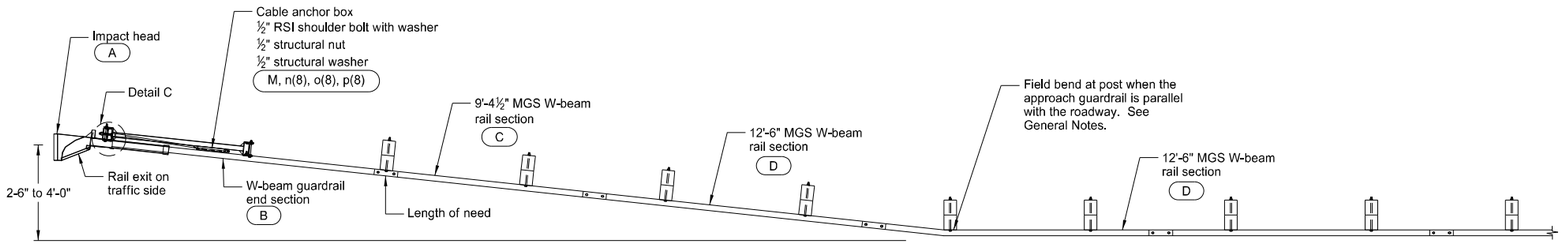
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

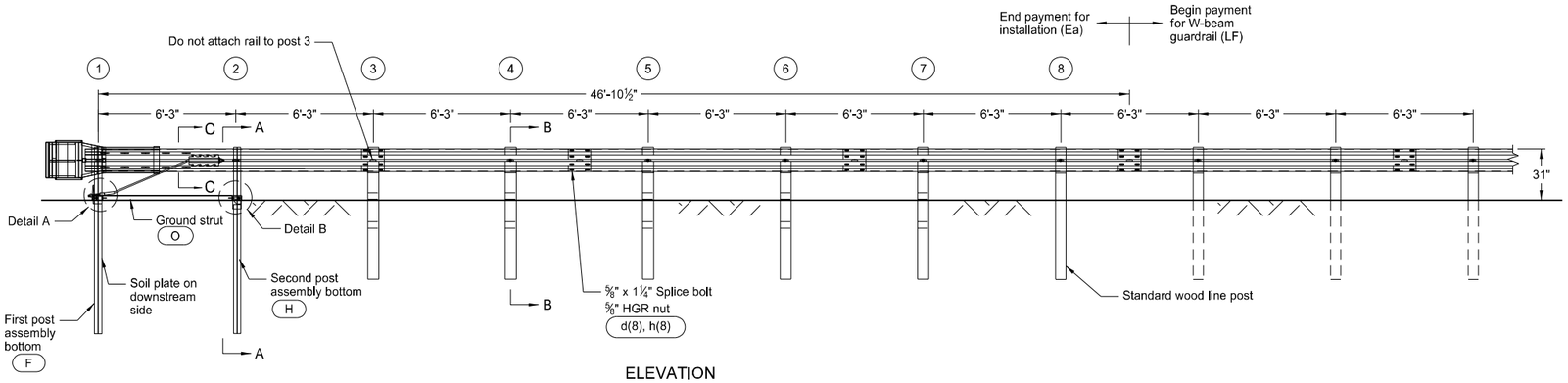
12 02 2020

MGS FLARED ENERGY ABSORBING TERMINAL - WOOD POST

D-764-38



PLAN



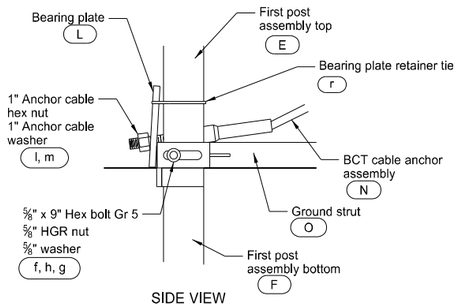
ELEVATION

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	F3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	UHP1A	FIRST POST ASSEMBLY TOP	1
F	HP1B	FIRST POST ASSEMBLY BOTTOM	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
J	UP671	WOOD CRT POST	5
K	P675	WOOD BLOCKOUT OR RECYCLE EQUIVALENT	5
L	E750	BEARING PLATE	1
M	S760	CABLE ANCHOR BOX	1
N	E770	BCT CABLE ANCHOR ASSEMBLY	1
O	S785	GROUND STRUT HINGED POST	1
		HARDWARE	
a	B5160304A	⅝" x 3" HEX BOLT A325	2
b	W0516	⅝" WASHER	4
c	N0516	⅝" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia X 18" HGR BOLT	5
f	B580904A	⅝" Dia x 9" HEX BOLT GRD 5	1
g	W050	⅝" WASHER	7
h	N050	⅝" Dia HGR NUT	39
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

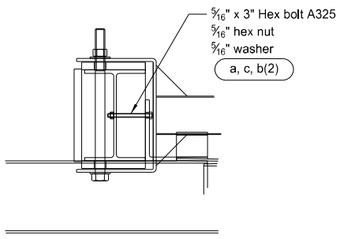
NOTE: Standard wood line post, block, and associated hardware not included in Bill of Materials Table.

GENERAL NOTES:

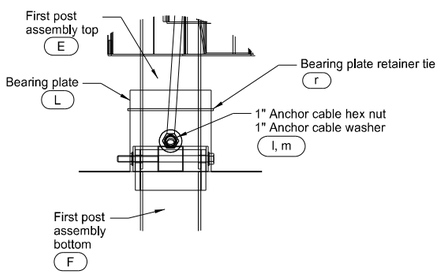
1. Wood posts are required with the Flared Energy Absorbing Terminal except posts 1 and 2.
2. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, ensure the Flared Energy Absorbing Terminal has only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, ensure the Flared Energy Absorbing Terminal is turned parallel to the roadway.
4. Site grade as necessary to ensure the lower sections of the posts do not protrude more than 4" above the ground (measured along a 5' cord).
5. Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
6. Install the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent cable from twisting when tightening nuts.
7. "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails to prevent them from turning when the wood shrinks.



SIDE VIEW

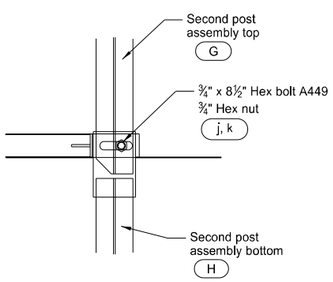


DETAIL C
Post 1 (Impact Head connection)

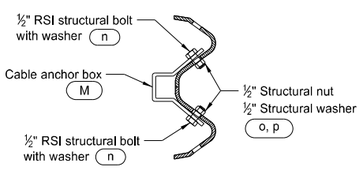


FRONT VIEW

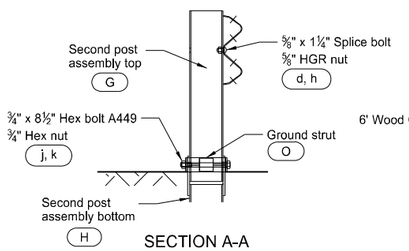
DETAIL A
Post 1



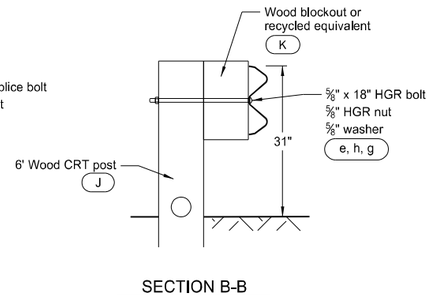
DETAIL B
Post 2



SECTION C-C



SECTION A-A
Post 2



SECTION B-B
Posts 3 through 7

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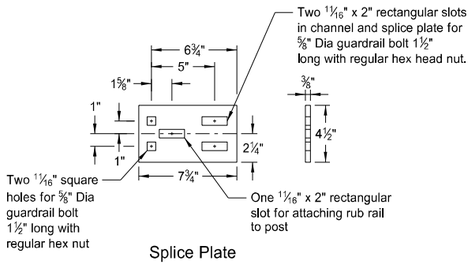
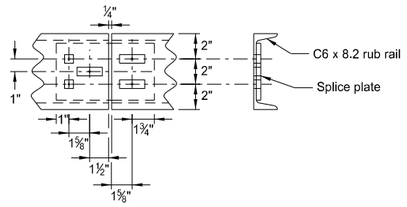
MGS W-BEAM GUARDRAIL GENERAL DETAILS

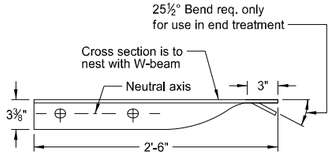
D-764-40

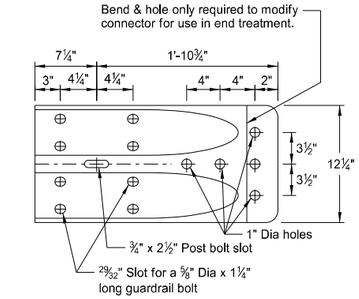


Splice Plate

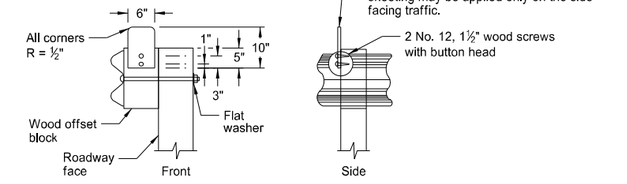


Splice Detail



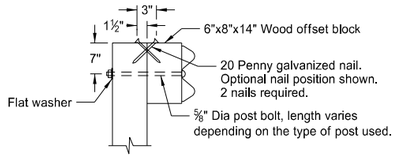


W BEAM TERMINAL CONNECTOR



REFLECTORIZED PLATE DETAIL

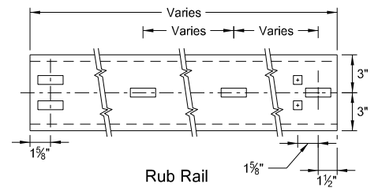
NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



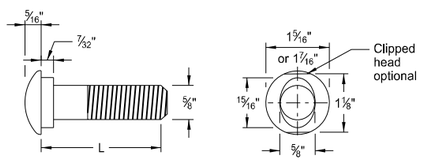
TYPICAL WOOD POST ATTACHMENT DETAIL

NOTES:

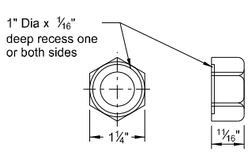
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material at guardrail post: Dispose all excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. Fit the Object Marker within the vertical edges of the Impact Plate. Provide type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply the sheeting to 0.100 Aluminum sheeting meeting the requirements of Section 894.01.A. Attach the Object Marker to the Impact Head Plate with rivets or other attachment device. Ensure the rivets or attachment device are non-rust. Slope the stripes downward toward the roadway side.
4. Guardrail installation height tolerance = ±1".



C6x8.2 RUB RAIL AND SPLICE PLATE

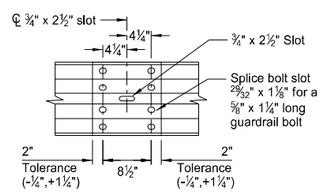


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



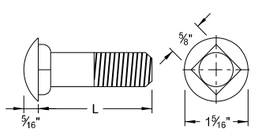
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



SPLICE DETAIL

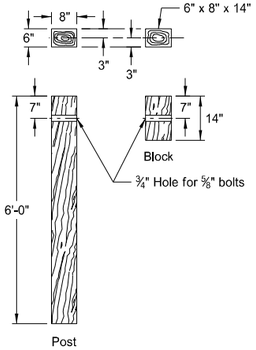
NOTE: Do not install center bolt in the 3/4" x 2 1/2" slot at mid span splices.



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

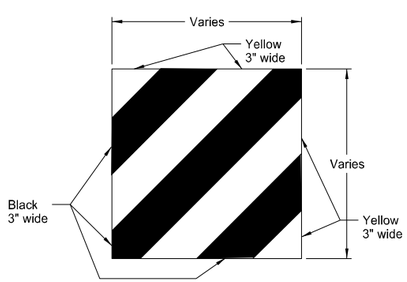
5/8" Dia hex nut

5/8" CARRIAGE BOLT & NUT

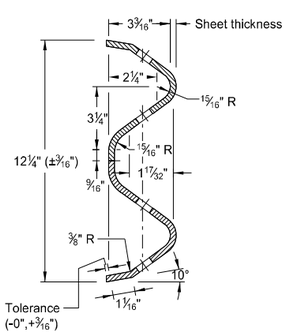


6" x 8" WOOD POST & BLOCK

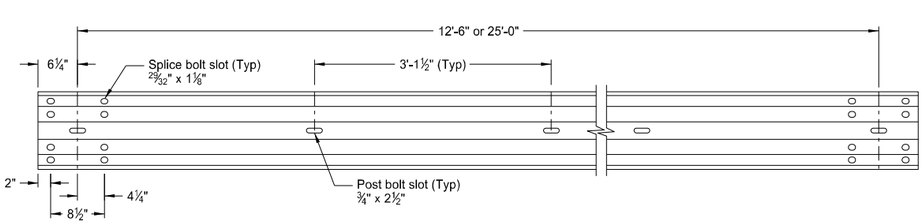
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



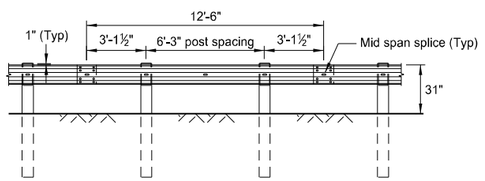
IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
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DATE	CHANGE
12-02-20	Updated clipped head to optional

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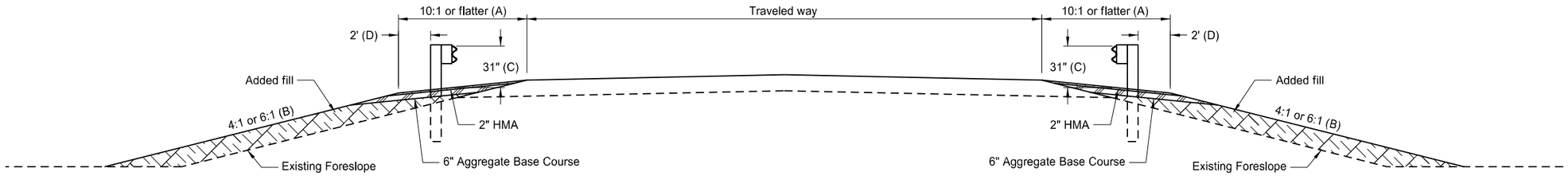
Kirk J Hoff

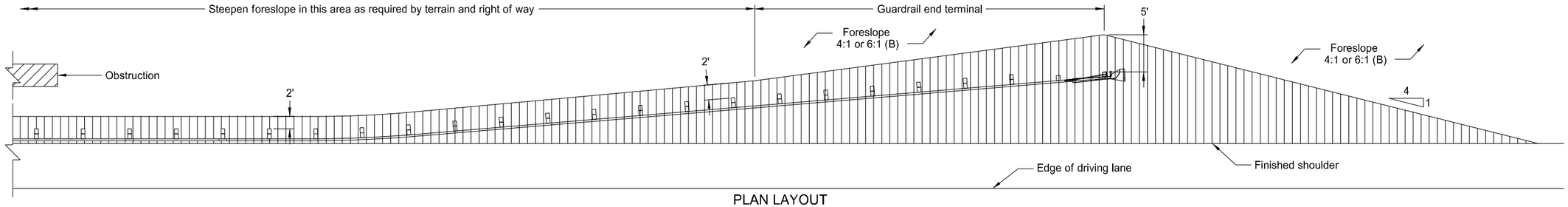
12 02 2020

D-764-49

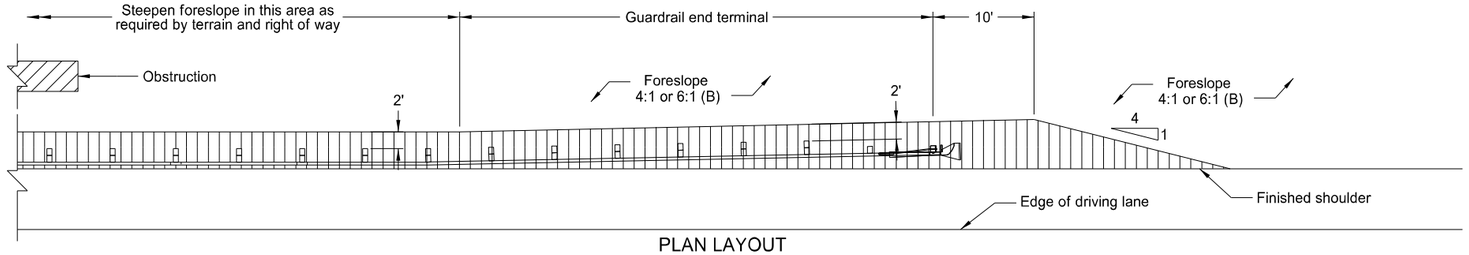
TYPICAL GRADING AT OBSTRUCTIONS WITH MGS W-BEAM GUARDRAIL



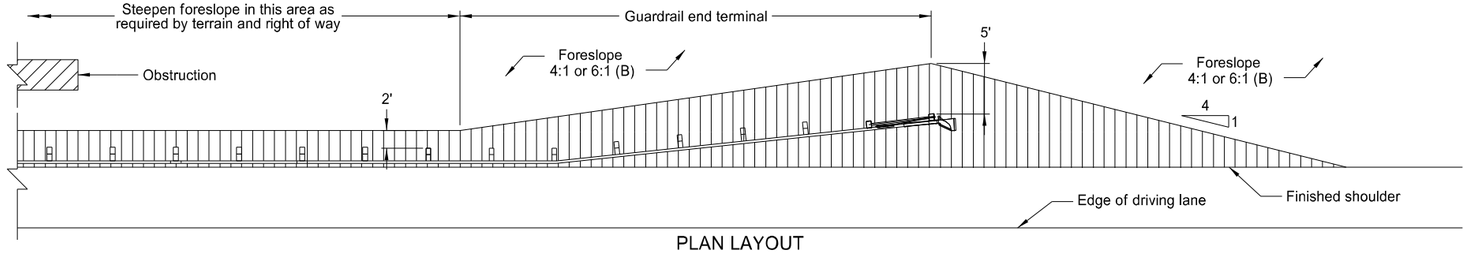
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Use slope flatter than 10:1 when required to provide proper guardrail height.

(B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.

(C) Measure from top of guardrail to top of surfacing at front face of guardrail.

(D) Dimension at end terminals vary per Plan Layouts shown on this sheet.

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12/02/20	Updated notes to active voice.

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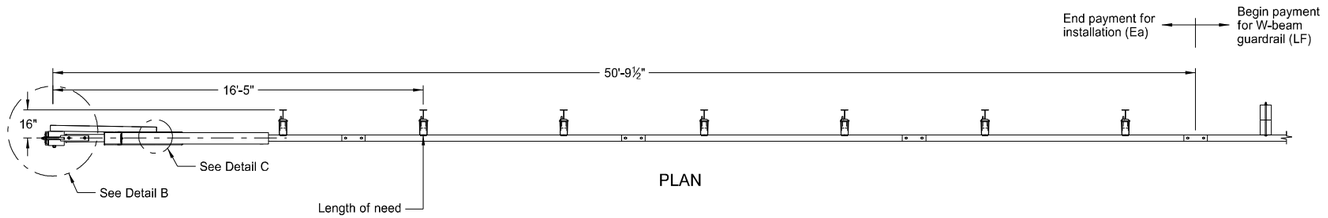
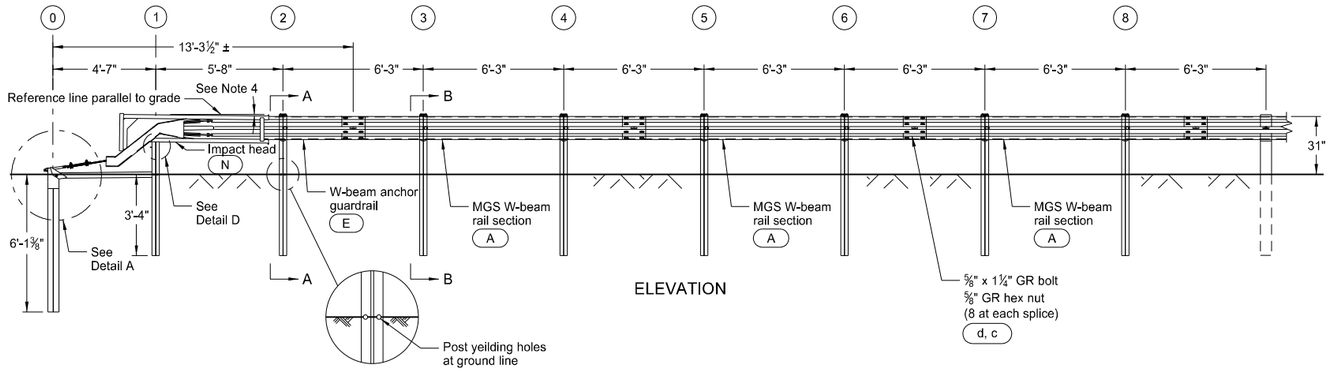
MASH SOFTSTOP END TERMINAL - STEEL POST

D-764-50



PLAN

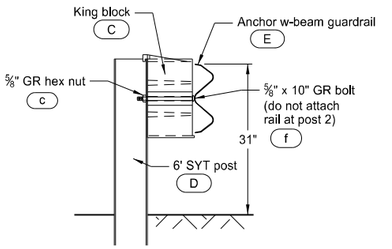


ELEVATION

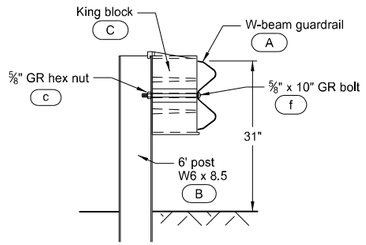
DETAIL E
Posts 1 & 2

GENERAL NOTES:

1. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
2. Flare the SoftStop at a rate of 25:1 or flatter.
3. Do not curve the guardrail within the SoftStop under any circumstances.
4 If necessary, install the SoftStop impact head parallel to the grade line or with an upward tilt. See softstop assembly manual for specific details.

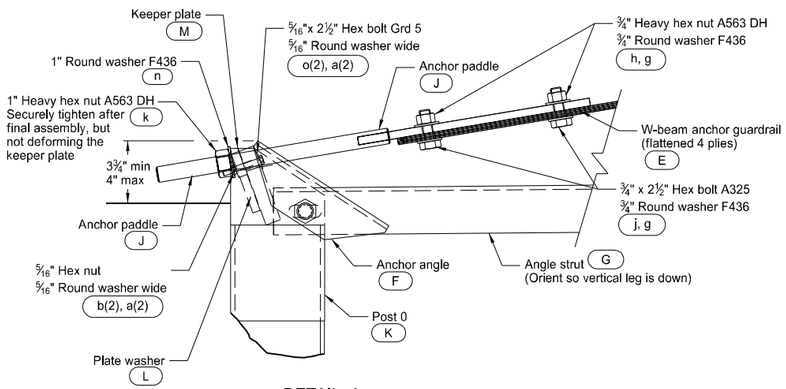


SECTION A-A
Post 2

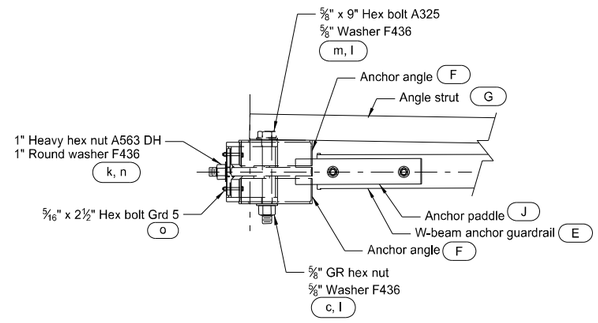


SECTION B-B
Posts 3 through 8

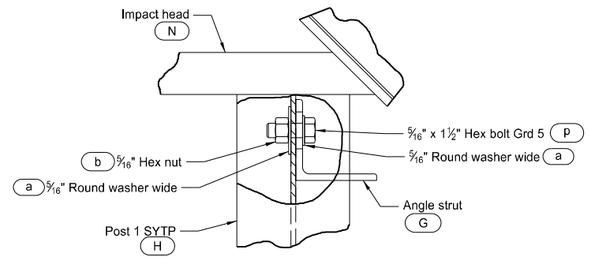
ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	000011	12 / 12'-6" / 3'-1½" / S MGS W-BEAM RAIL SECTION	3
B	000533	6'-0" STEEL POST W6 x 8.5	6
C	006777	KING BLOCK 4" X 7½" X 1'-2"	7
D	015000	6'-0" SYT POST / 8.5 / 31" GR HT	1
E	015200	SFST - ANCHOR GUARDRAIL 12'-6"	1
F	015201	SFST - ANCHOR ANGLE	2
G	015202	SFST - ANGLE STRUT	1
H	015203	SFST - POST #1 SYTP	1
J	015204	SFST - ANCHOR PADDLE	1
K	015205	SFST - POST #0	1
L	015206	SFST - PLATE WASHER	1
M	015207	SFST - KEEPER PLATE	1
N	015208	SFST - IMPACT HEAD	1
		HARDWARE	
a	003240	5/16" ROUND WASHER WIDE	6
b	003245	5/16" HEX NUT	3
c	003340	⅝" GR HEX NUT	41
d	003360	⅝" x 1¼" GR BOLT	32
e	003391	⅝" x 1¾" HEX BOLT A325	1
f	003500	⅝" x 10" GR BOLT A307	7
g	003701	¾" ROUND WASHER F436	4
h	003704	¾" HVY HEX NUT A563 DH	2
j	003717	¾" x 2½" HEX BOLT A325	2
k	003908	1" HVY HEX NUT A563 DH	1
l	004372	⅝" WASHER F436	4
m	004489	⅝" x 9" HEX BOLT A325	1
n	004902	1" ROUND WASHER F436	1
o	105285	5/16" x 2½" HEX BOLT GRD 5	2
p	105286	5/16" x 1½" HEX BOLT GRD 5	1



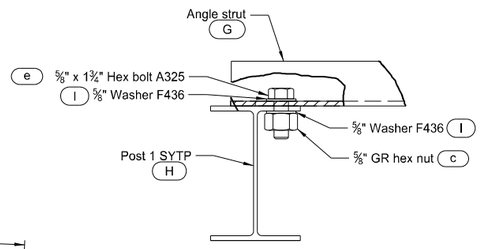
DETAIL A
Post 0



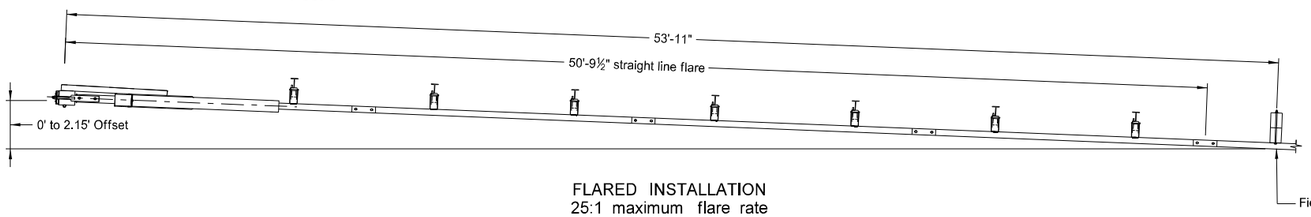
DETAIL B
Post 0



DETAIL D
Post 1



DETAIL C
Post 1
(shown near ground)



FLARED INSTALLATION
25:1 maximum flare rate

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7-14-17	
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DATE	CHANGE
12-02-20	Updated notes to active voice.

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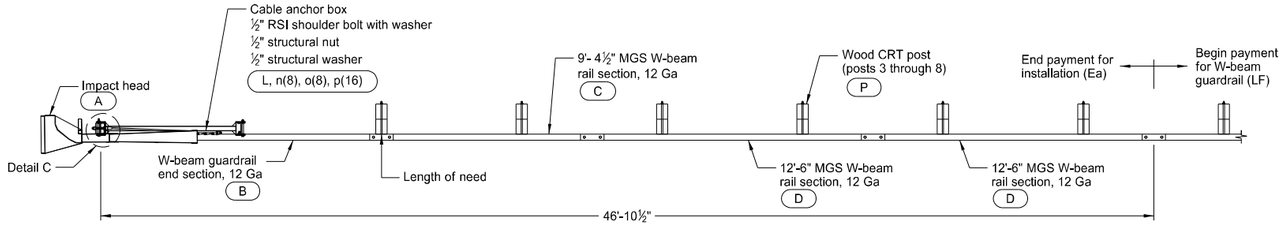
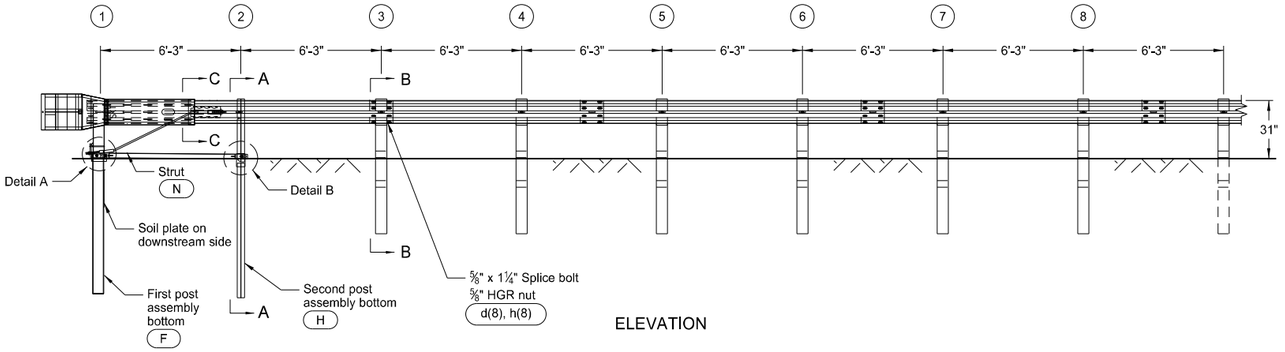
12 02 2020

MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

D-764-51



PLAN

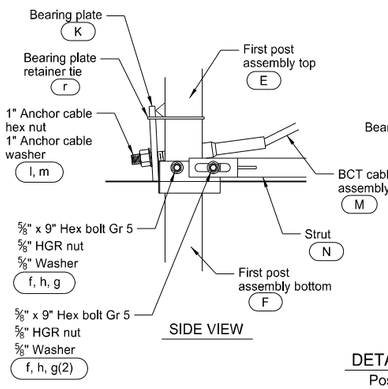


ELEVATION

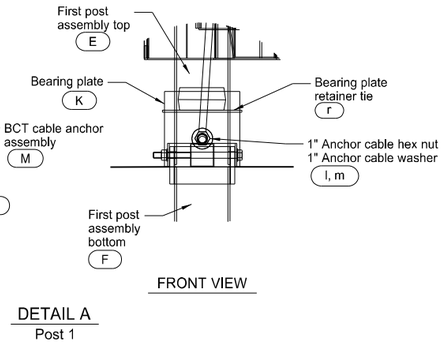
GENERAL NOTES:

1. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
2. Flare the MSKT at a rate of up to 25:1, as needed to prevent the impact head from encroaching on the shoulder.
3. Site grade as necessary to ensure the lower sections of posts do not protrude more than 4" above the ground (measured along a 5' cord).
4. Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
5. Install breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
6. "Toe nail" the wood blockouts to the rectangular wood posts at post 3 through post 8 with two 20 penny galvanized nails to prevent them from turning when the wood warps.

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	MS3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	MTPHP1A	FIRST POST ASSEMBLY TOP (6" X 6" X⅛" Tube)	1
F	MTPHP1B	FIRST POST ASSEMBLY BOTTOM (6' W6X15)	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
K	E750	BEARING PLATE	1
L	S760	CABLE ANCHOR BOX	1
M	E770	BCT CABLE ANCHOR ASSEMBLY	1
N	MS785	STRUT	1
P	UP671	6' WOOD CRT POST	6
R	P675	WOOD BLOCKOUT OR RECYCLED EQUIVALENT	6
		HARDWARE	
a	B5160104A	5/16" x 1" HEX BOLT GR 5	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia x 18" HGR BOLT (POSTS 3 THRU 8)	6
f	B580904A	⅝" x 9" HEX BOLT GR 5	2
g	W050	⅝" WASHER	9
h	N050	⅝" Dia HGR NUT	35
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

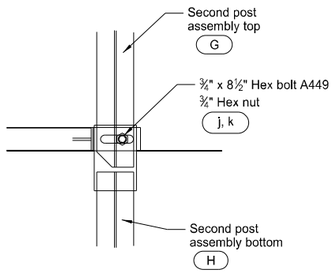


SIDE VIEW



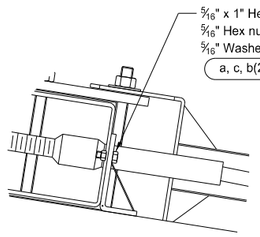
FRONT VIEW

DETAIL A
Post 1

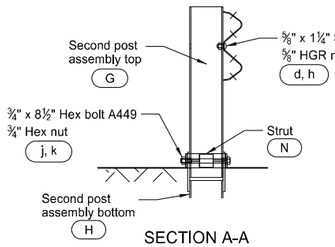


SIDE VIEW

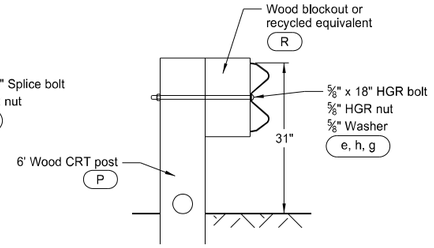
DETAIL B
Post 2



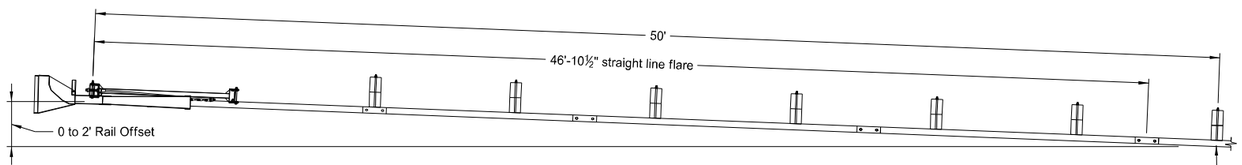
DETAIL C
Post 1 (Impact Head connection)



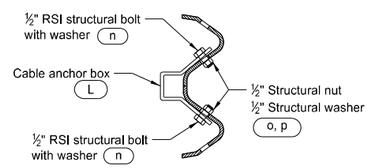
SECTION A-A
Post 2



SECTION B-B
Posts 3 through 8



FLARED INSTALLATION
25:1 maximum flare rate



SECTION C-C

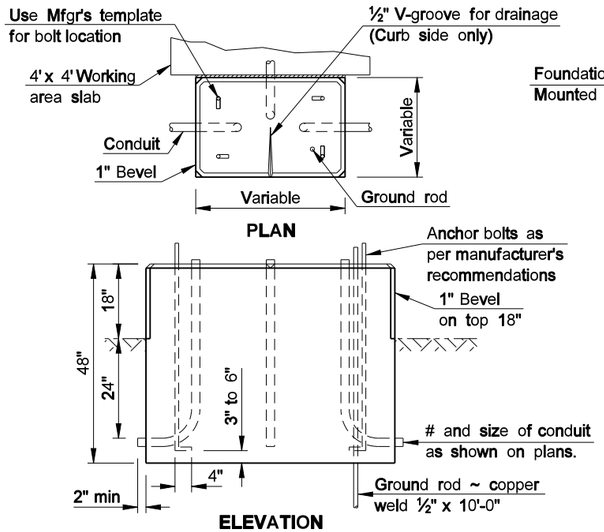
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

12 02 2020

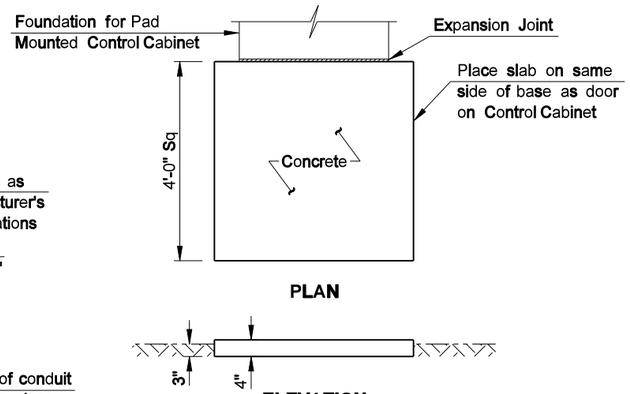
CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

D-770-1



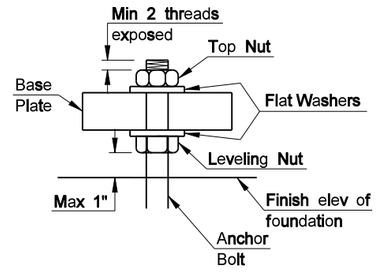
CONTROLLER CABINET FOUNDATION PAD MOUNT

The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.

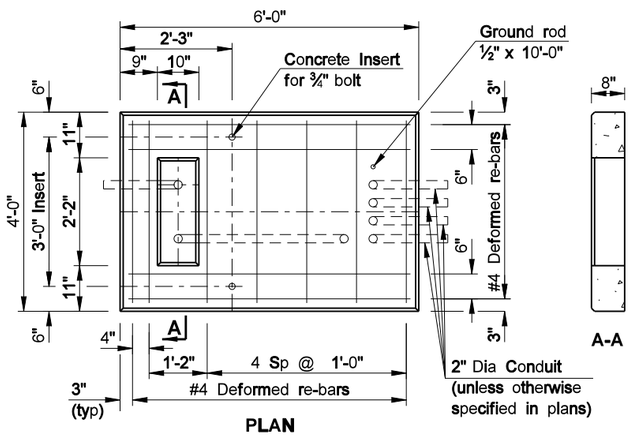


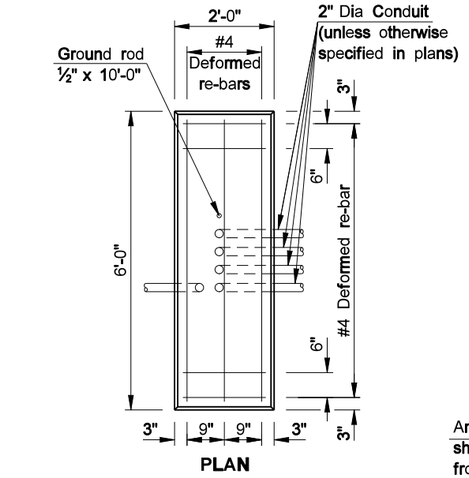
WORKING AREA SLAB

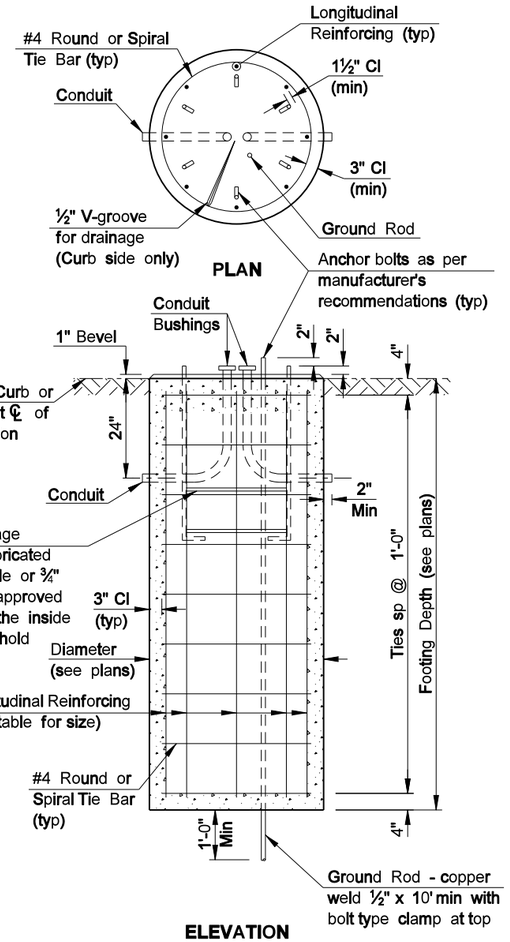
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



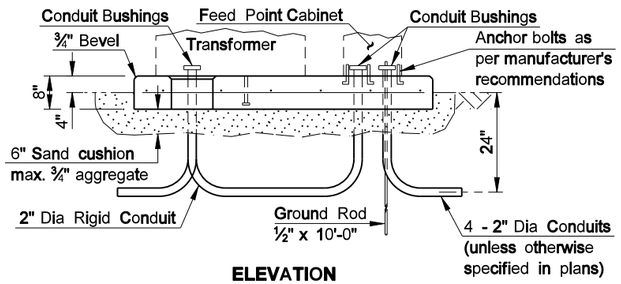
ANCHOR BOLT DETAIL





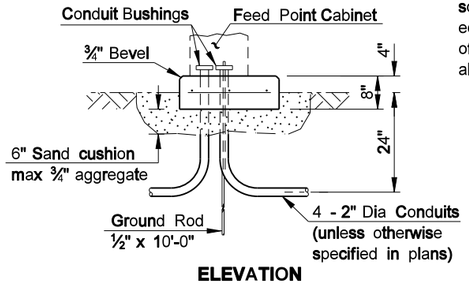


LIGHT & SIGNAL STANDARD FOUNDATION



TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT

The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.



FEED POINT CABINET FOUNDATION PAD MOUNT

The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.

NOTES:

LIGHT & SIGNAL STANDARD FOUNDATIONS: See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controler cabinet and the foundation by caulking, except for V-groove.

WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

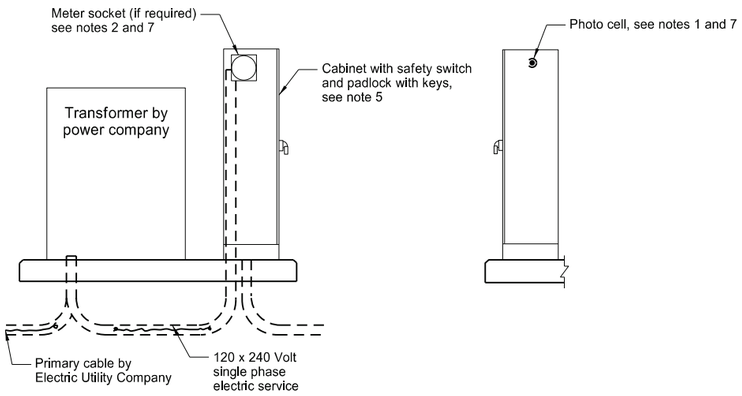
FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
DATE	CHANGE

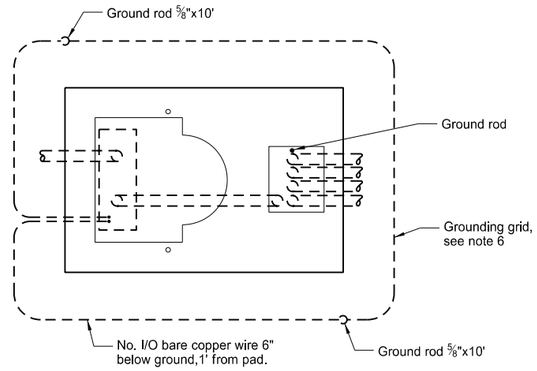
This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674 , on 6/15/10 and the original document is stored at the North Dakota Department of Transportation

FEED POINTS
(ROADWAY LIGHTING)



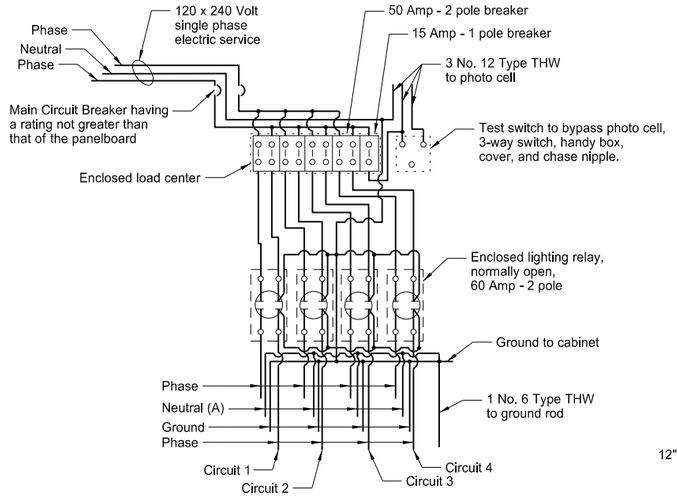
Elevation

Photo Cell
Mounting Detail



Plan

Transformer and Feed Point Cabinet Pad Mounted



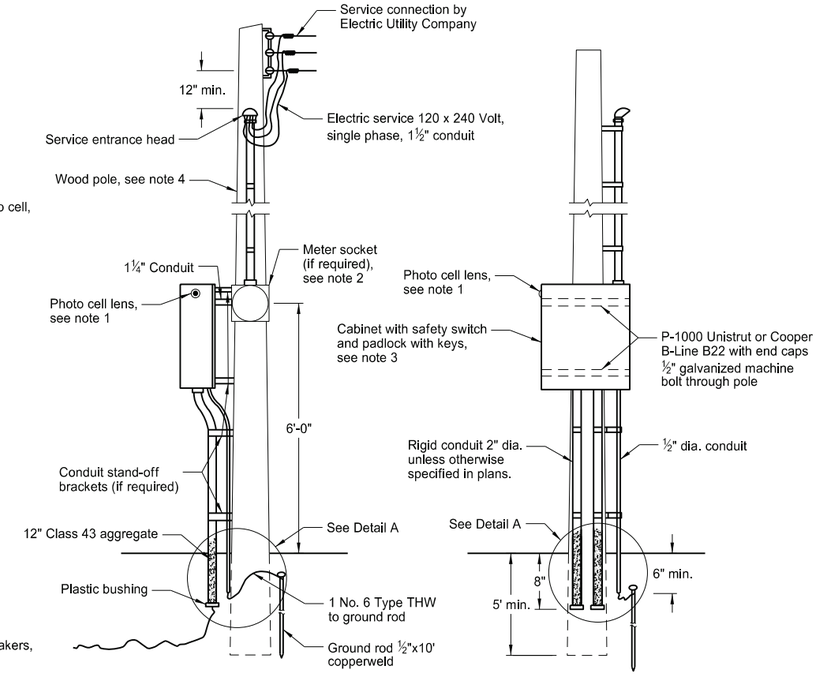
Feed Point Type IV

Provide Type I feed point similar to Type IV, except with one electrical circuit, one 50 Amp - 2 pole breakers, and one lighting relay, normally open.

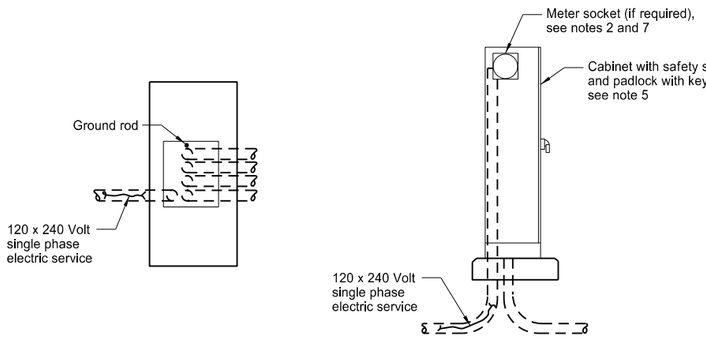
Provide Type II feed point similar to Type IV, except with two electrical circuit, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.

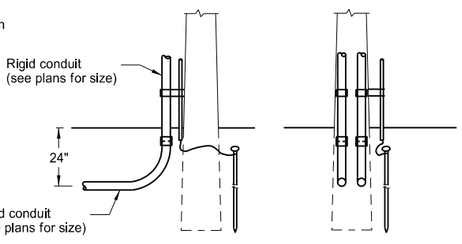


Feed Point Pole Mounted



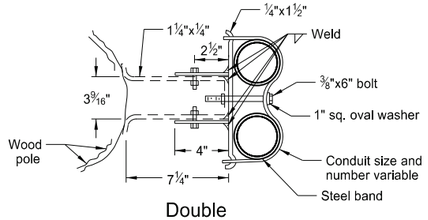
Plan Elevation

Feed Point Cabinet Pad Mounted

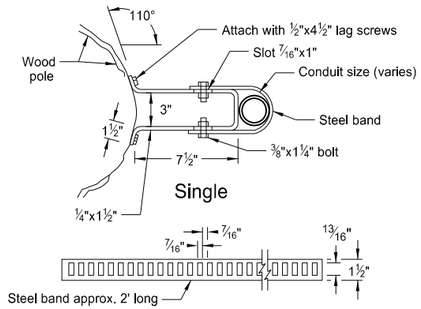


Detail A

Use this detail for a continuous run of conduit from the feed point to the first light standard.



Double



Single

Conduit Standoff Bracket

Omission of conduit standoff brackets allowed when not required by local utility company.

Notes:

1. Photo Cell: Furnish and install the photoelectric cell. Face photo lens north.
2. Meter Socket: Install meter socket and trim if the meter is required by local Utility Company. Meter furnished and installed by Utility Company.
3. Pole Mounted Cabinet: Provide cabinet with lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Shop coat cabinet with one coat of primer and two coats of exterior gray enamel.

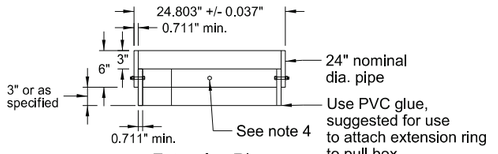
   Provide 30" high x 24" wide x 8" deep Type I and II feed points. Provide 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep Type III and IV feed points.
4. Wood Pole: Provide minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
5. Pad Mounted Cabinet: Provide 56" high x 26" wide x 14" deep weatherproof cabinet. Minimum 12 gauge steel or aluminum with provisions for padlock.
6. Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more 5/8"x10' copperweld ground rods in parallel or series at two corners. Provide a minimum distance between ground unit assemblies of 6'0".
7. Meter Location: Do not mount the meter (if required) on the same side of the cabinet as the photo cell.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
07-08-14	Revised note 3.
10-17-17	Updated to active voice.
08-28-19	New Design Engineer PE Stamp.
11-01-24	Revised note 5.

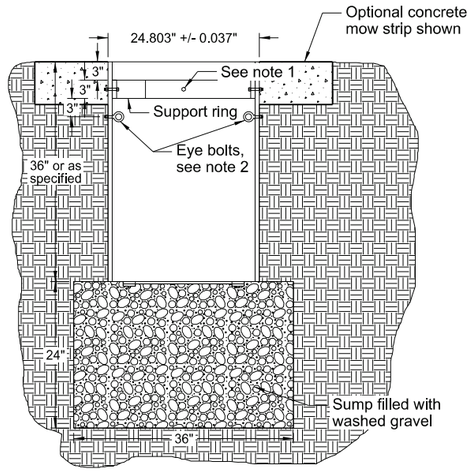
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
12/06/24
ENGINEER
NORTH DAKOTA

PULL BOX & TRENCHING DETAILS

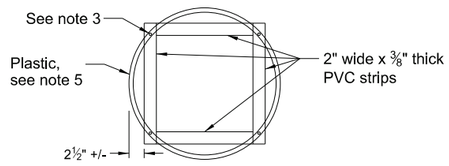
D-770-3



Extension Ring
(future adjustment)

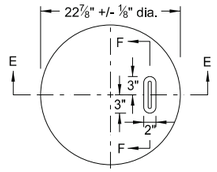


Elevation

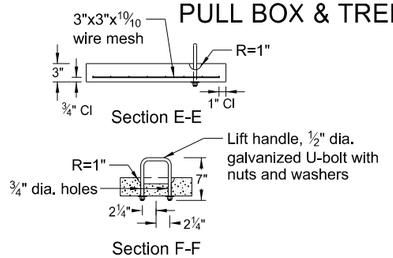


Bottom View

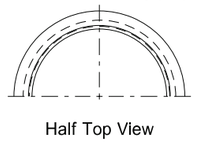
PVC Pull Box



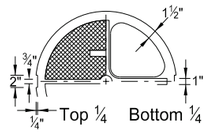
Top View

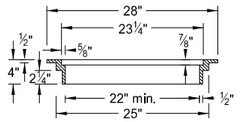


Concrete Cover

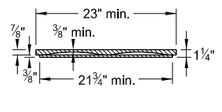


Half Top View



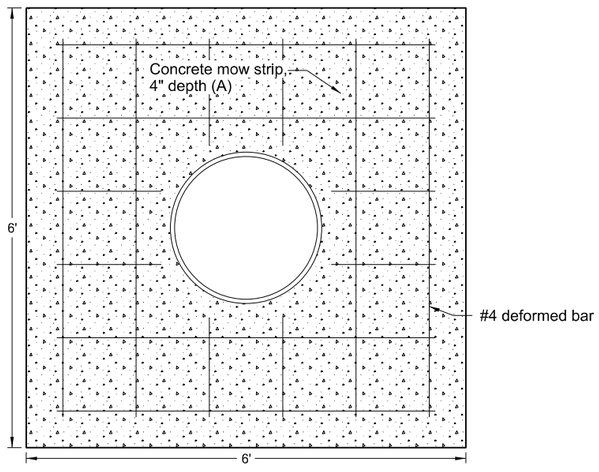


Section Frame



Section Cover

Cast Iron Frame and Cover



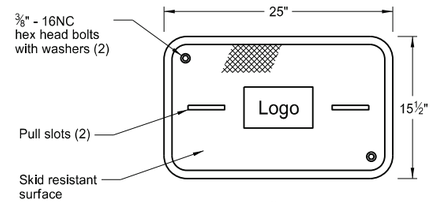
Top View
with optional concrete mow strip

PVC Pull Box Notes:

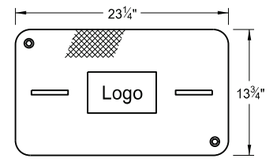
1. Attach split 24" nominal diameter PVC cover support ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, ⅜" dia. x 1¼" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four ¼" x 1¼" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Size conduit holes located in barrel section no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation, install water tight seal for inside walls and cover.
8. PVC pipe to meet requirements of ASTM F679 or equal.
9. Provide Austenitic Stainless Steel Hex Head bolts and nuts. Other fasteners to be galvanized as per ASTM A153.
10. Install an epoxy coating on the top and sides of the concrete cover. Provide an epoxy protective coating that is light gray, clear, or neutral in color and apply as recommended by the pull box manufacturer. Before application, clean with a wire brush and dry the surfaces of the concrete to which the epoxy protective coating is applied.
11. If a Cast Iron cover is provided, use grey iron as per AASHTO M 306.

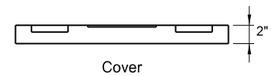
General Pull Box Notes:

1. Duct seal all conduits entering and exiting pull boxes.
2. Ensure all pull boxes are UL listed.

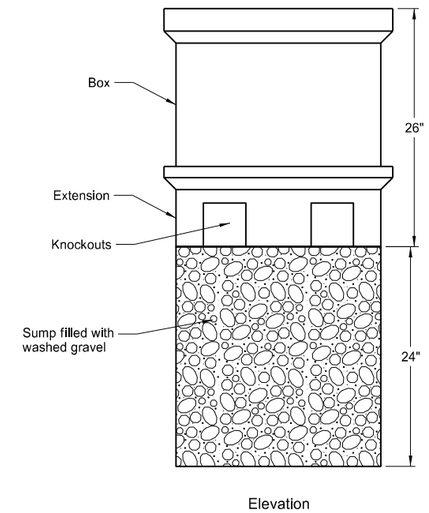


Plan





Cover

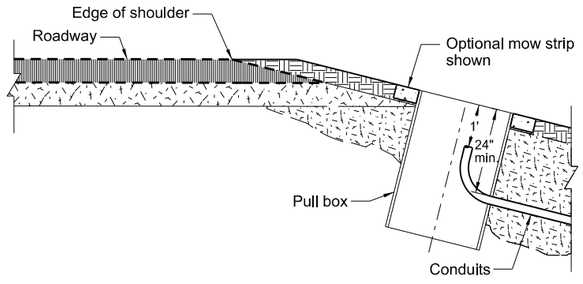


Elevation

Polymer Concrete Pull Box Notes:

1. Place top of pull box flush with surfaced area and approximately one inch above earth or sodded areas on level surfaces.
2. Provide at least one knockout per side in pull box.
3. Provide Polymer Concrete pull box meeting Tier 22 as per ANSI / SCTE 77.
4. Ensure the pull box constructed of polymer concrete reinforced by a heavy weave fiberglass.

Polymer Concrete Pull Box



Pull Box Installation Details

Note: The location of pull box will vary, refer to layout sheets for actual location.

When required, install a mow strip around the pull box. Place expansion material between the foundation and the mow strip. Ensure the mow strip is 4" depth and 2' width from the foundation. Use #4 deformed bars in the mow strip. Space the bars 6" from the outside edge. Place the bars in a grid pattern at 1' apart.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
11-01-24	Updated PVC pull box, trenching.

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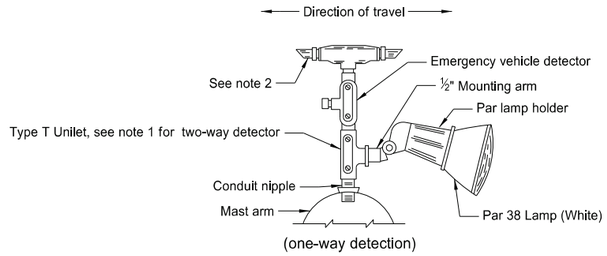
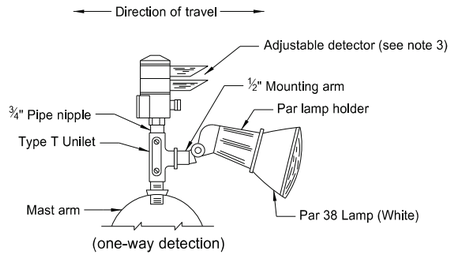
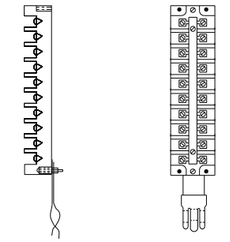
LIGHTING AND SIGNAL DETAILS



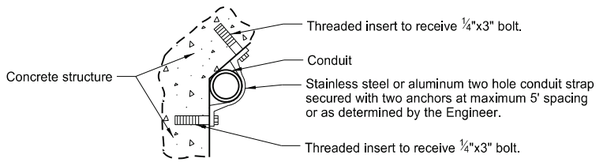
Emergency Vehicle Detector Detail



Alternate Emergency Vehicle Detector Detail (adjustable)

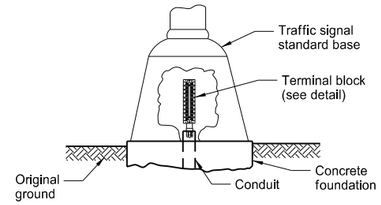


Terminal Block Detail

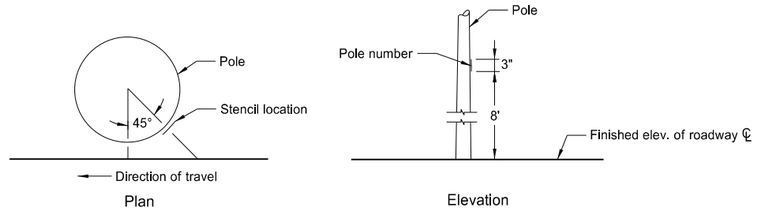


Bridge Mounted Conduit Hanger

Notes:
1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
2. Plug unused end of One-way Detector with metal pipe plug.
3. Rotate detector lens to face direction of travel on Two-way Detectors.

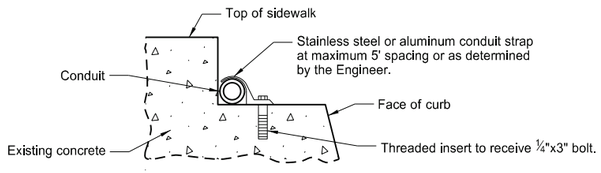


Terminal Block
(rigid mounted)

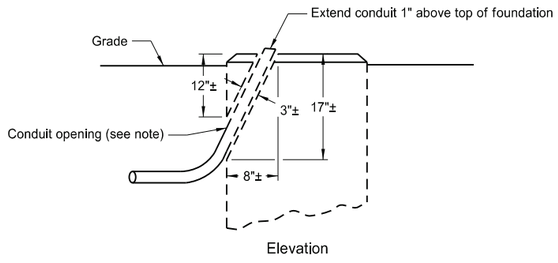


Light Standard Numbering

Note: On the roadway side of each light standard, stencil the pole number using contrasting color paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.

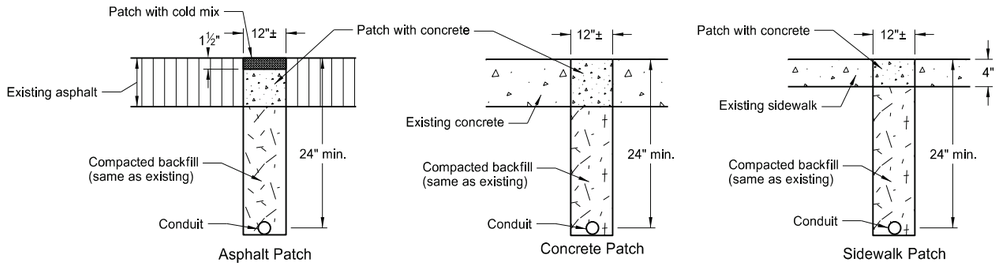


Bridge Curb Mounted Conduit



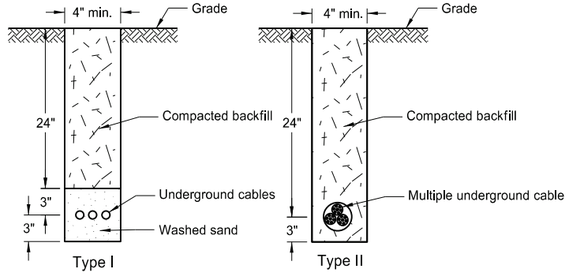
Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.



Surface Patch Details

Note: Saw cut trenches. Use PCC pavement for replacement concrete with the coarse aggregate gradation, maximum size and method of curing as approved by the Engineer. Immediately prior to pouring replacement concrete, paint all surfaces with an approved epoxy compound.



Cable Trench

Note: Seed entire area disturbed by trenching.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
10-25-19	Removed conduit under RR detail.
11-01-24	Updated bridge hanger detail.

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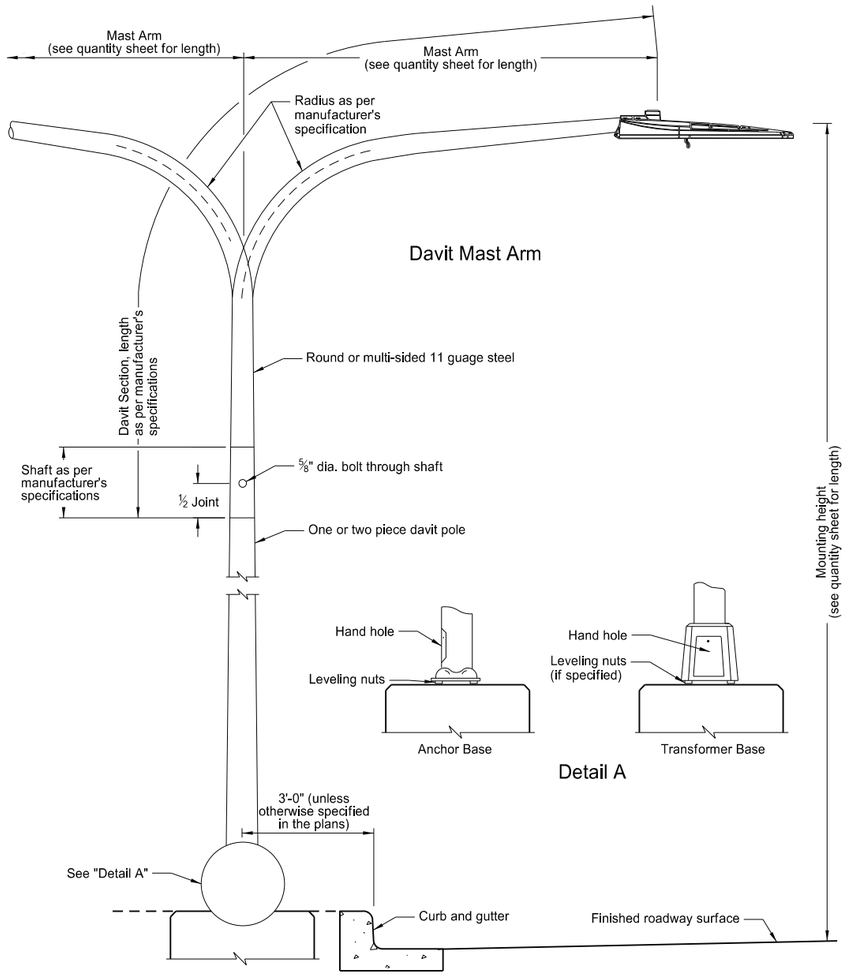
LIGHT STANDARD DETAILS

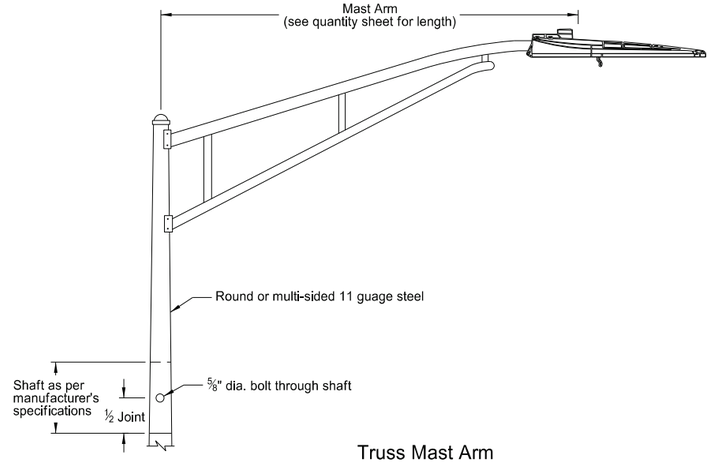
D-770-5



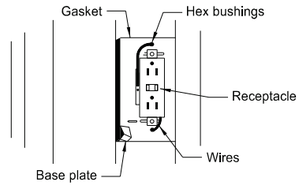
Davit Mast Arm

Detail A

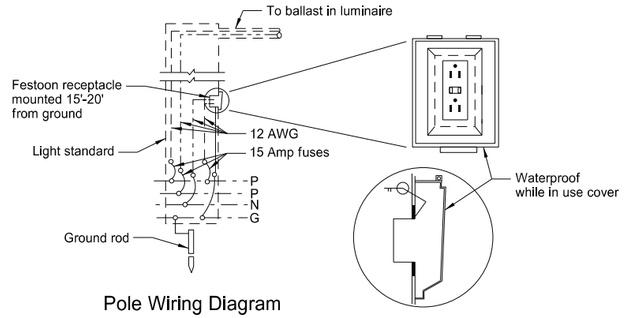
Light Standard Details



Truss Mast Arm



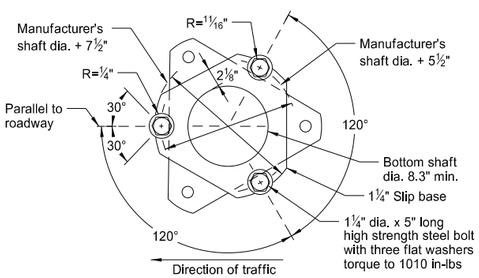
Optional: Festoon receptacle mounted on multi-sided pole.



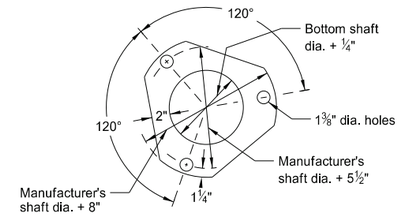
Pole Wiring Diagram

Receptacle Mounting Detail (B)

(B) Mount receptacle on side of pole that faces the street. Install Festoon Receptacle only when specified in the plans.



Top View



Plan View

Keeper Plate Detail (A)

(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. Galvanize Keeper plate after fabrication.

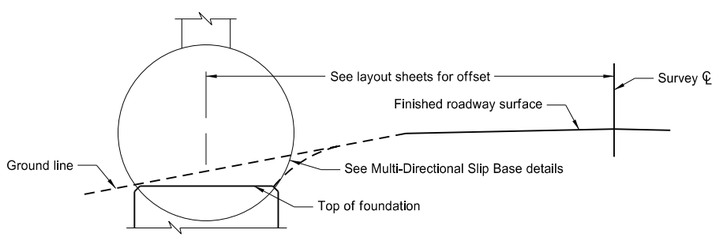
Notes:

Light Standard Locations: The minimum offset distance from the curb face is 3 feet. Offset light standards at least 3 feet in urban areas and where speeds are less than 30 mph. Where speeds are 30 mph or more, place light standards at least 16 feet from the driving lane.

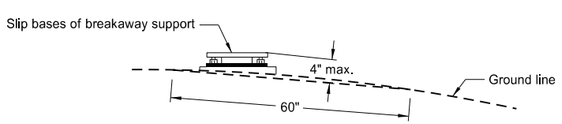
Steel Standards: Touch up marred or scratched areas after erection.

Luminaire: Use internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

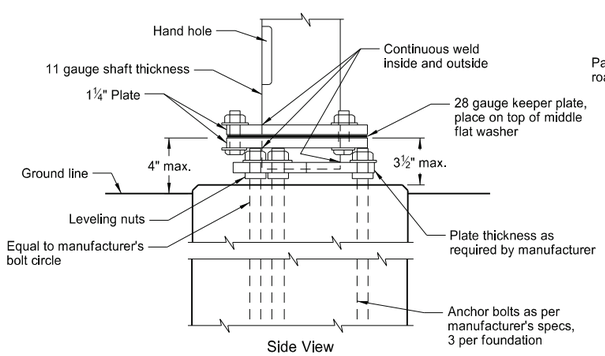
Fusing: Fusing in base, see specifications.



Concrete Foundation Location

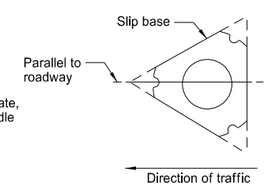


Breakaway Support Stub Clearance Diagram

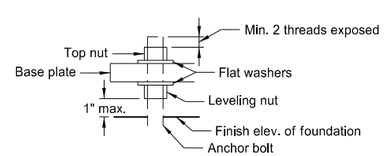


Side View

Steel Base Detail



Slip Base Placement Detail



Anchor Bolt Detail

Multi-Directional Slip Base

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-28-19	New Design Engineer PE Stamp.
11-01-24	Revised luminaire details/notes.

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