DESIGN DATA					
Traffic	Average Daily				
Current 370	Pass: 370	Trucks N/A	Total: 370		
Forecast 409	Pass: 409	Trucks N/A	Total: 370		
Clear Zone Distance: N/A		Design Speed: N/A			
Minimum Sight Dist. for Stopping: N/A		Bridges: N/A			
Sight Dist. for No Passing Zone: N/A					
Pavement Design Life: N/A					
Design Accumulated One-way ESALs: N/A					

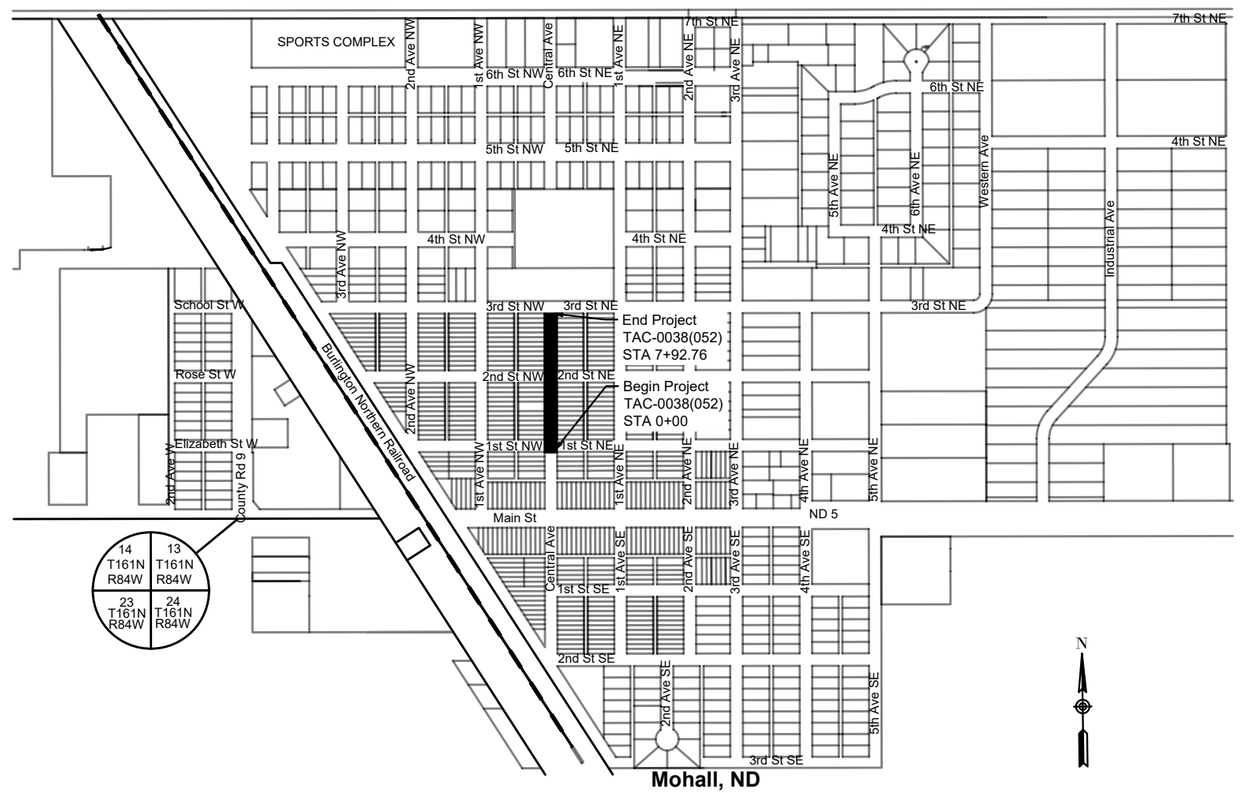
JOB # 23939
NORTH DAKOTA
Department of Transportation
PROJECT TAC-0038(052)

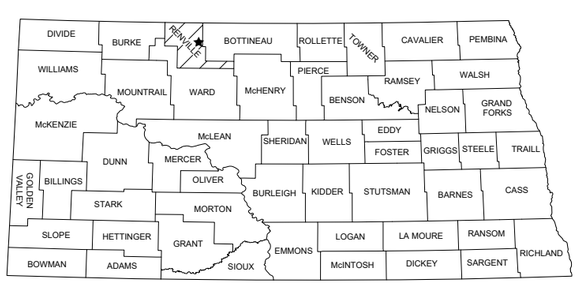
Renville County
Mohall, ND, Central Ave from 1st St NW to 3rd St NW
Sidewalks, Curb Ramp, Signing and Lighting

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	23939	1	1

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

PROJECT TAC-0038(052)	Net Miles	Gross Miles
Central Ave From 1st St NW to 3rd St NW	0.150	0.150





SKETCH MAP OF NORTH DAKOTA

ACKERMAN ESTVOLD
1907 17th St SE · Minot, ND 58701
701.837.8737 · www.ackerman-estvold.com
Minot, ND | Fargo, ND | Williston, ND | Boise, ID

DESIGNERS

Austin Becker, P.E.

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of North Dakota.

11/20/2024
APPROVED DATE

Austin Becker Digitally signed by Austin Becker Location: Ackerman-Estvold Minot, ND Date: 2024.11.20 09:33:40-06'00'

Ackerman-Estvold Engineering & Management Consulting, Inc.

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 11/20/2024
NORTH DAKOTA

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS DEPICTED HEREIN, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY ACKERMAN-ESTVOLD ENGINEERING AND MANAGEMENT CONSULTING, INC. SHALL BE WITHOUT LIABILITY TO ACKERMAN-ESTVOLD ENGINEERING AND MANAGEMENT CONSULTING, INC.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	2	1

TABLE OF CONTENTS

PLAN SECTIONS

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1	1	Title Sheet
2	1	Table of Contents
4	1	Scope of Work
6	1-2	Notes
8	1	Quantities
10	1	Basis of Estimate
20	1-2	General Details
30	1	Typical Sections
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76	1-2	Temporary Erosion Control
77	1-2	Permanent Erosion Control
80	1-2	Curb Ramp Layouts
81	1	Survey Coordinate and Curve Data
82	1-2	Survey Data Layouts
90	1-2	Sidewalk Layouts
100	1-4	Work Zone Traffic Control
110	1-4	Signing
140	1-2	Lighting

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32,33	Symbols
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-10	Construction Sign Details - Regulatory Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-50	Portable Sign Support Assembly
D-748-1	Curb & Gutter And Valley Gutter
D-750-1	Concrete Driveway - Urban
D-750-2	Sidewalk
D-750-3	Curb Ramp Retrofit Details
D-750-4	Curb Ramp Retrofit Transitional Area Details
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-86	911 Sign Support Information And Sign Details
D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)
D-770-2	Feed Points (Roadway Lighting)
D-770-4	Lighting And Signal Details
D-770-5	Light Standard Details

SPECIAL PROVISIONS

Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SP 279(24)	Temporary Pedestrain Facilities
SP 280(24)	Commercial Grade Asphalt

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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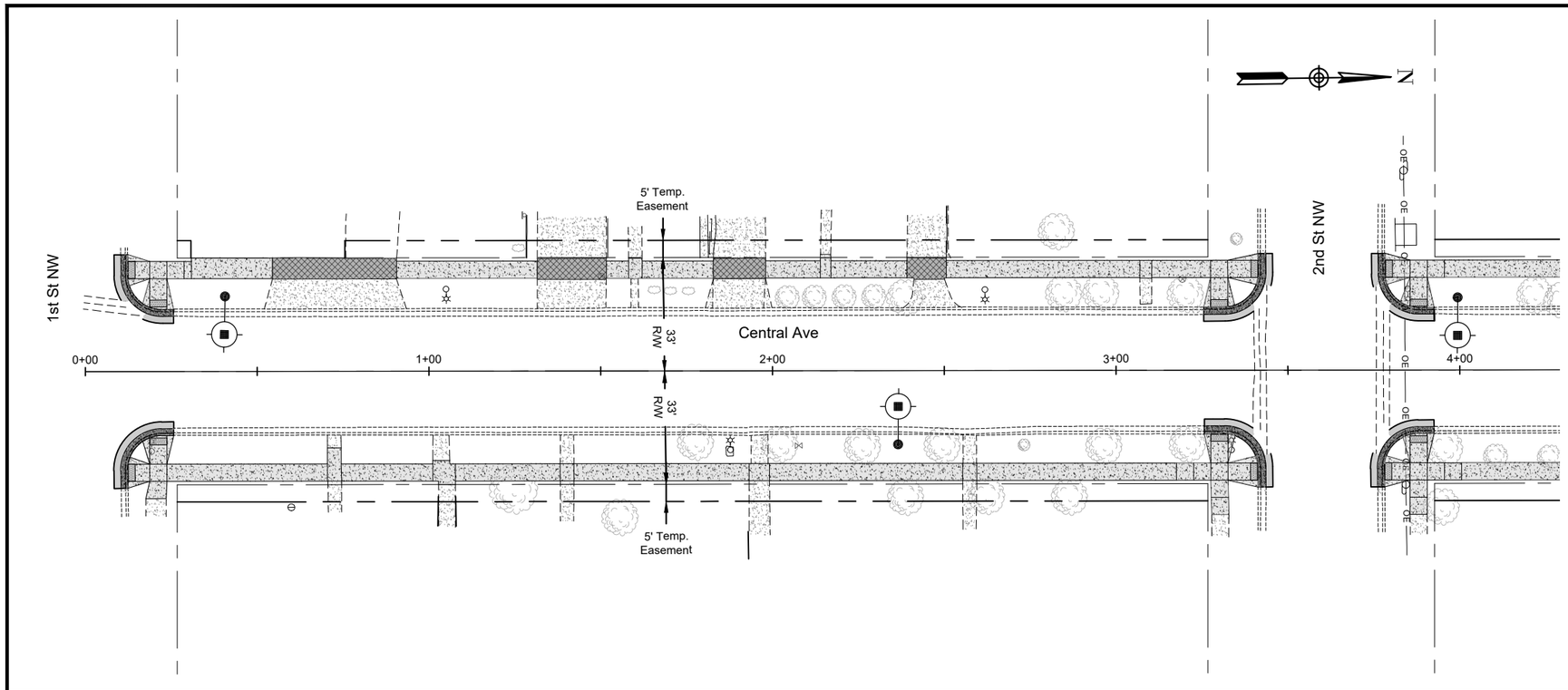

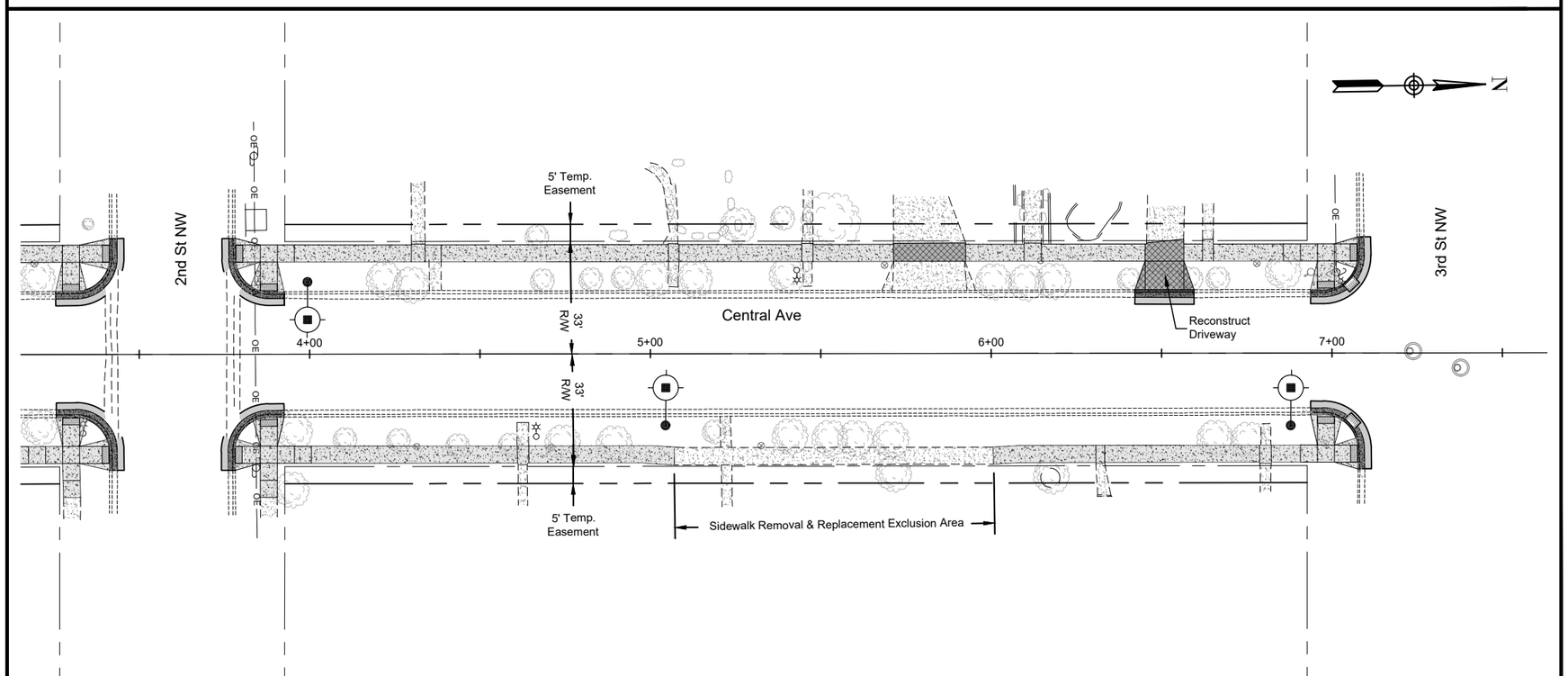

SCOPE:

- **Remove & Replace Concrete Sidewalk.**
- **Install ADA Curb Ramps.**
- **Curb and Gutter Replacement and Asphalt Patching to Install ADA Curb Ramps.**
- **Sign Replacement.**
- **Remove and Install Street Lighting.**

LEGEND:

- Proposed Detectable Warning Panel
- Existing Concrete
- Concrete Sidewalk Pavement Replacement
- Concrete Driveway Pavement Replacement
- Curb & Gutter Replacement
- Proposed Asphalt Patch
- Proposed Lighting

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SCALE (H): 1" = 40'
SCALE (V): N/A

20 10 0 20 40

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Scope of Work

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	6	1

NOTES

GENERAL NOTES

100-P01 ACCESS DURING CONSTRUCTION: Work on a driveway must be complete within 7 calendar days of starting removals on driveway. Lot owner(s) must be notified by Contractor minimum 2 calendar days prior to beginning removals. Removal of an existing driveway is not allowed until contact between the driveway Owner and Contractor has been documented by the Contractor and submitted to the Project Engineer for review.

3rd Street N is utilized for bus loading and unloading during the school year. Disruption to the bus service is prohibited. Coordinate construction activities to occur before or after school bus service.

100-P02 PROTECTION OF EXISTING FACILITIES: Exercise care during construction operations to ensure no damage to existing trees, shrubs, grasses, sod, signs, underground sprinklers, landscaping, pavement, curb, hydrants, gate valves, curb stops, manholes, and other existing infrastructure located in the construction zone, and outside of grading limits. Repair any and all damages caused by the Contractor at the Contractor's expense.

107-P01 PAVEMENT SWEEPING: Sweep the roadway adjacent to the construction area at the end of each day. Utilize a vacuum or pickup type sweeper.

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.

107-P01 HAUL ROAD RESTRICTIONS: No trucks or hauling will be allowed on City of Mohall Streets except for Central Avenue from ND 5/Main Street to 3rd Street NE unless approved by the City of Mohall. Written agreement granting approval for hauling on city streets to be supplied to the Engineer before hauling to occur.

202-P01 REMOVAL OF CONCRETE PAVEMENT: Existing aggregate base course beneath concrete pavement to be removed to the depth of the proposed subgrade. All cost of labor, equipment and materials to perform work shall be included in the price bid for "Removal of Concrete Pavement".

202-P02 REMOVAL OF BITUMINOUS SURFACING: Existing aggregate base course beneath bituminous surfacing to be removed to the depth of the proposed subgrade. All cost of labor, equipment and materials to perform work shall be included in the price bid for "Removal of Bituminous Surfacing".

302-P01 WATER: The cost of water needed for compaction is incidental to Aggregate Base Course CL 5.

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the traffic control sign layout, shown in Section 100.

724-P01 ADJUST GATE VALVE BOX: Adjust existing curb stops to final grade elevations if located within the proposed sidewalk concrete. The cost of labor, equipment and materials to perform the above work shall be included in the price bid for "Sidewalk Concrete 4IN".

970-P01 LANDSCAPE PREPARATION: Provide minimal grading and hydraulic mulch adjacent to the locations for sidewalk and curb & gutter replacement. Blend the existing topsoil adjacent to the sidewalk and or curb & gutter to eliminate any steep slopes or vertical edges. Remove excess topsoil from the project site. Import topsoil if needed. Provide hydraulic mulch and seed mixture that meets the following mix:

Species	% by Weight	Purity	Germination
Bluegrass – Park	60%	90%	85%
Creeping Red Rescue	10%	90%	85%
Fine Leaf Perennial Ryegrass	30%	90%	90%

Rate of Seeding = 120 lbs/Acre

Protect and reuse existing mulching and landscaping adjacent to the sidewalk replacement. Landscaping includes but is not limited to, pavers, bricks, planters, rock, concrete curbing, etc. Reinstall all landscaping to preconstruction conditions.

Use hydraulic mulch material as specified in Sections 253 of the NDDOT Standard Specifications. Apply the hydraulic mulch after the seed is incorporated into the topsoil. Apply fertilizer at a rate of 100 pounds per acre with a mixture of 5-10-5. Include work necessary to restore landscaping, topsoil areas, seeding and mulching in unit price bid for "Landscape Preparation".

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

SECTION 140

770-P01 ORNAMENTAL LIGHT STANDARD: Ornamental light standards to be round tapered steel type mounted on concrete foundation with 20' mounting height. Standards to include base cover and hand hole to be 180° from street side. Finish color to be Black.

770-P02 ORNAMENTAL LED LUMINAIRE: Ornamental LED Luminaire to consist of a vertically mounted light engine totally enclosed by a glass refractor and full cutoff top and decorative finial. Tenon mount base to incorporate tool less entry with separable driver and light engine assembly. Head to be of aluminum casting finished in Black. LED driver to be auto voltage sensing electronic type capable of operating between 120-277 volts and suitable for cold weather starting at ambient temperature of minus thirty degrees F. Surge protection to be integral to the luminaire. Light engine assembly to utilize 4000K CCT LED sources with 70 CRI minimum. LED distribution to be standard roadway classifications. Manufacturers: Holophane model #WAE3-P40-40-MVOLT-EN-GL3-BK-SK-TBK-FC, to match existing.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL QUANTITY				TOTAL
103	0100	CONTRACT BOND	L SUM	1				1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	763				763
202	0130	REMOVAL OF CURB & GUTTER	LF	236				236
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	47				47
261	0200	WEIGHTED FIBER ROLLS	LF	30				30
261	0201	REMOVE WEIGHTED FIBER ROLLS	LF	30				30
302	0120	AGGREGATE BASE COURSE CL 5	TON	207				207
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	9				9
702	0100	MOBILIZATION	L SUM	1				1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	690				690
704	1054	SIDEWALK BARRICADE	EA	6				6
704	1058	PEDESTRIAN WALKWAY	LF	25				25
704	1060	DELINEATOR DRUMS	EA	100				100
704	2108	TEMPORARY CURB RAMP	EA	3				3
708	1540	INLET PROTECTION-SPECIAL	EA	2				2
708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	2				2
748	0140	CURB & GUTTER-TYPE I	LF	235				235
750	0115	SIDEWALK CONCRETE 4IN	SY	699				699
750	0140	SIDEWALK CONCRETE 6IN	SY	92				92
750	2115	DETECTABLE WARNING PANELS	SF	80				80
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	11				11
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	11				11
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	70				70
754	0592	RESET SIGN PANEL	EA	3				3
770	0001	LIGHTING SYSTEM	EA	1				1
970	0008	LANDSCAPE PREPARATION	SY	520				520

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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BASIS OF ESTIMATE

Water (Incidental)

20 Gal/Ton for Aggregates

Aggregate Base Course Cl 5 @ 1.875 Ton/CY

Sidewalks - 4" Cl. 5 Base
Driveways - 4" Cl. 5 Base
Curb & Gutter - 2" Cl. 5 Base
Asphalt Patch - 5" Cl. 5 Base

Commercial Grade Hot Mix Asphalt (Includes)

Tack Coat @ 0.05 Gal/SY
4" Superpave FAA 43 @ 2 Ton/CY
PG 58S-28 Asphalt Cement @ 6.0%

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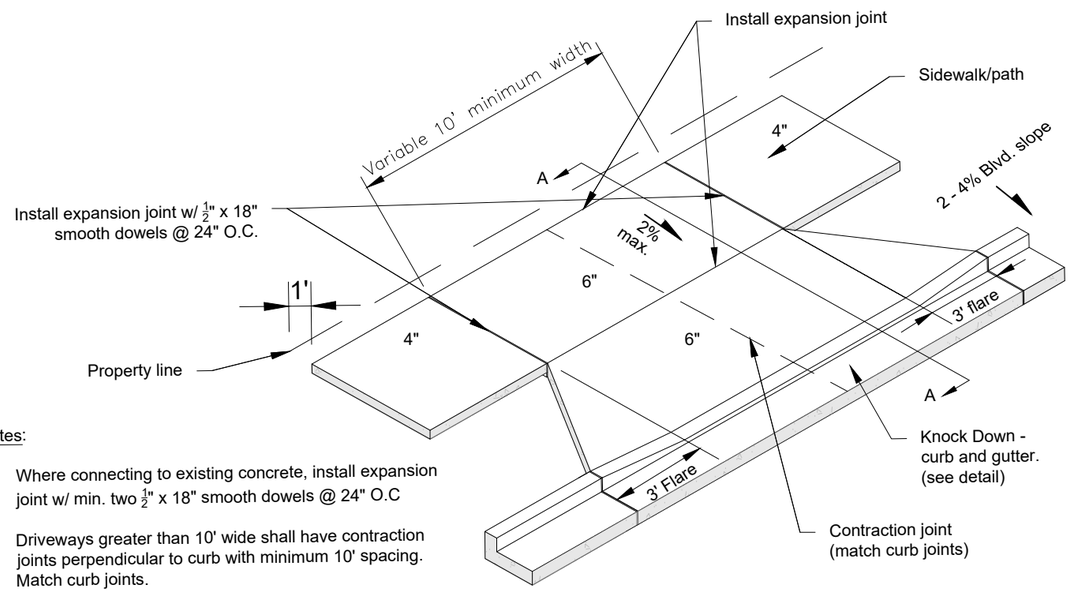
SCALE (H): N/A
SCALE (V): N/A

0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Basis of Estimate

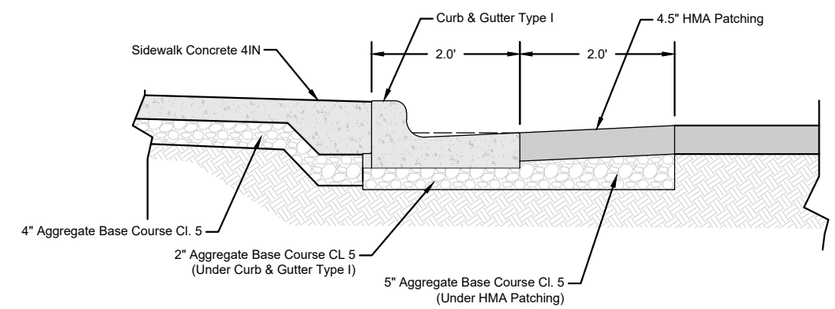
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	20	1



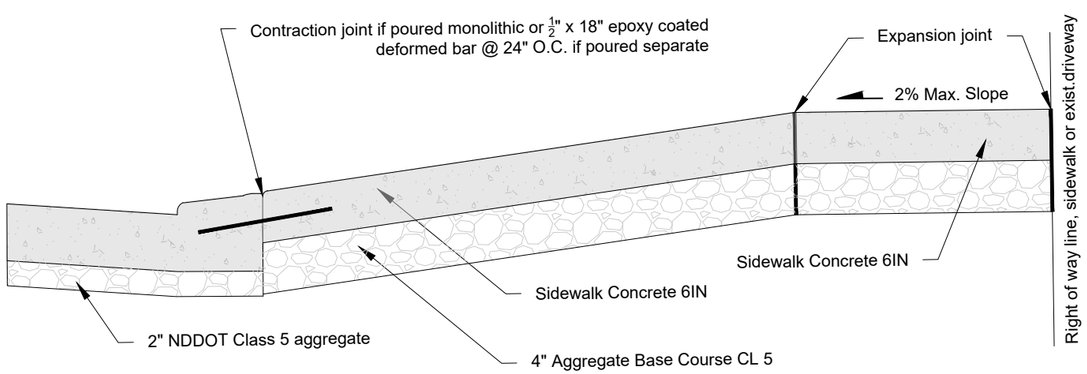
Notes:

1. Where connecting to existing concrete, install expansion joint w/ min. two ½" x 18" smooth dowels @ 24" O.C
2. Driveways greater than 10' wide shall have contraction joints perpendicular to curb with minimum 10' spacing. Match curb joints.
3. Forms are required on all edges.

ISOMETRIC



ASPHALT PAVEMENT PATCHING AREAS



SECTION A-A

CONCRETE DRIVEWAY APPRON

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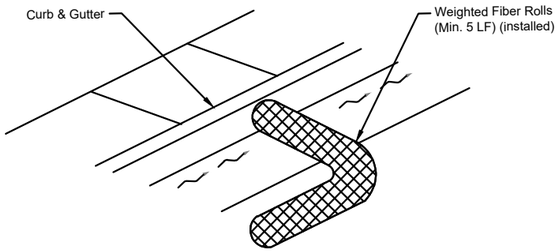
SCALE (H): N/A
SCALE (V): N/A

0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Street Details

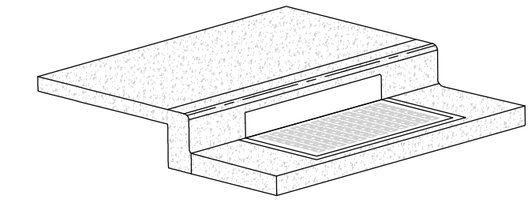
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	20	2

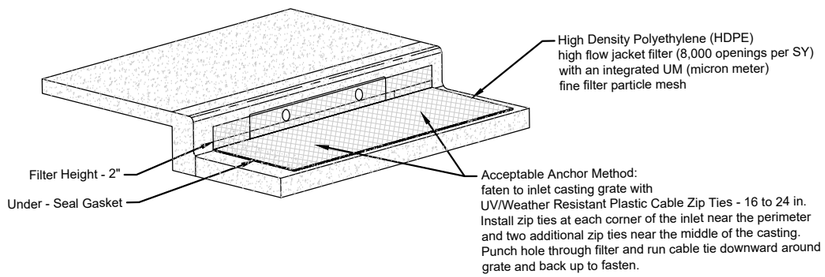


NOTES:

1. Provide materials that meet the following specifications:
   Netting tube filled with wood curled excelsior and weighted inner core.
   Roll Diameter: 6 Inches
   Weight: 8.33 Pounds per Linear Foot
2. Place weighted fiber rolls down slope from unprotected downstream areas, tight against and along the curb and gutters, to provide complete protection.
3. Remove and properly dispose of accumulated silt and debris to allow for proper function of device after every rain even, or as necessary for proper function.
4. Price includes weighted fiber roll, placement, and maintenance after each rain event. All costs related to this work shall be included in the price bid for "Weighted Fiber Rolls".
5. Removal of weighted fiber rolls shall be done after the up gradient surfaces are stabilized and surrounding streets and gutters are clean of debris.
6. Fiber Roll should be placed to avoid being in driving lane.

WEIGHTED FIBER ROLL





NOTES:

1. Place device tightly against drain opening and cover entire grate. Extend the device at least 2 inches past the grate toward the street.
2. Overlap the segments at longer openings.
3. Anchor the device so that the water cannot flow behind it.
4. Remove material that falls into the inlet during maintenance or removal of the device.

INLET PROTECTION - SPECIAL

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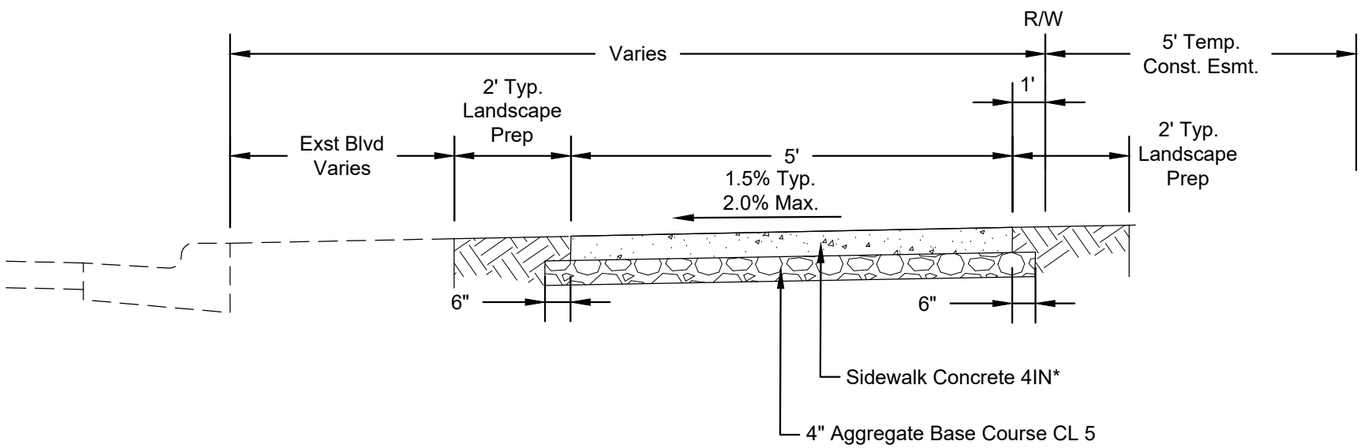
SCALE (H): N/A
SCALE (V): N/A

0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Erosion Control Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	30	1



Proposed Typical Section
Central Avenue
Sta 0+00 to 7+92.76 Lt/Rt

*Sidewalk Concrete 6IN used at driveway locations. See Section 90 for locations.

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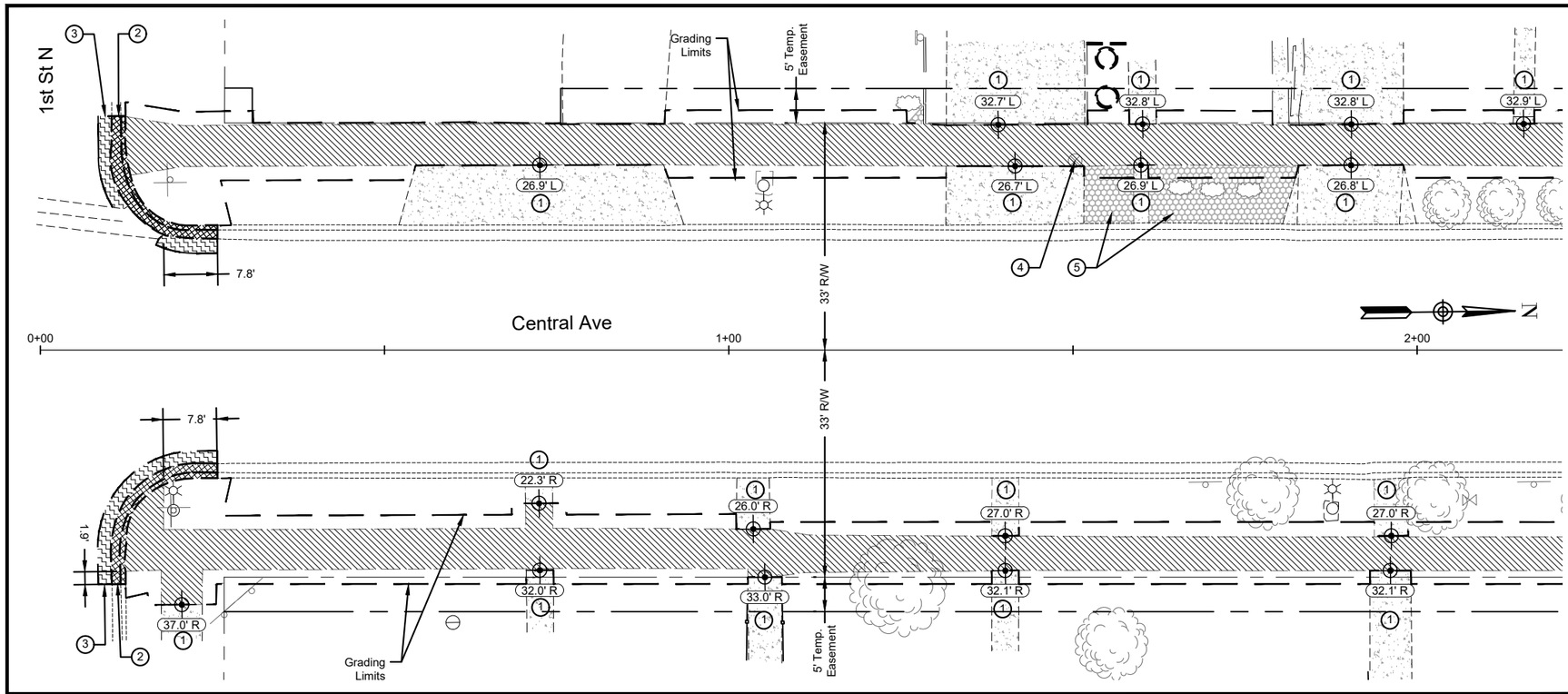
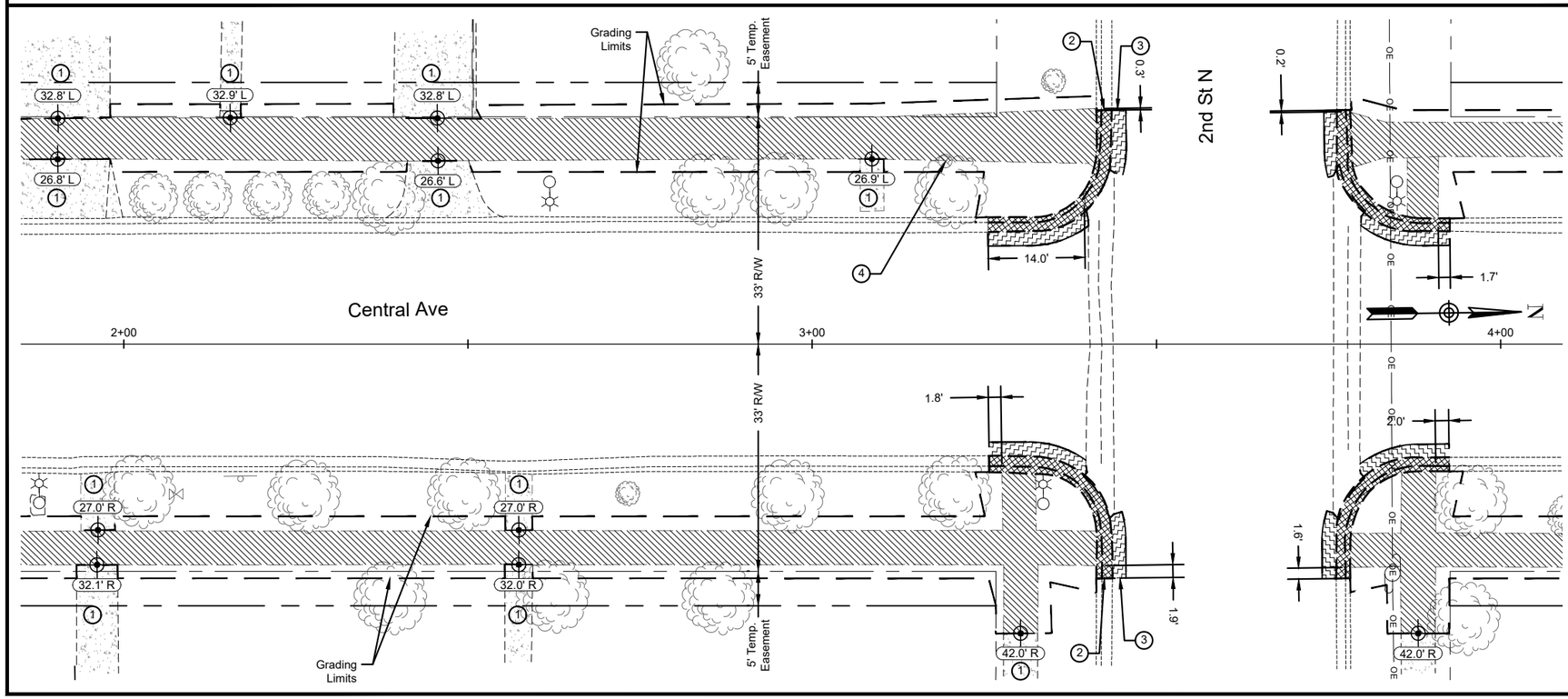
SCALE (V): N/A

0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Proposed Typical Section





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	40	1

SPEC	CODE	BID ITEM	QTY	UNIT
202	114	REMOVAL OF CONCRETE PAVEMENT		
		Central Ave from 1st St NW to 2nd St NW - Lt	226	SY
		Central Ave from 1st St NW to 2nd St NW - Rt	210	SY
202	130	REMOVAL OF CURB & GUTTER		
		Central Ave & 1st St - NW Quad	26	LF
		Central Ave & 1st St - NE Quad	26	LF
		Central Ave & 2nd St - SW Quad	29	LF
		Central Ave & 2nd St - SE Quad	29	LF
202	132	REMOVAL OF BITUMINOUS SURFACING		
		Central Ave & 1st St - NW Quad	5	SY
		Central Ave & 1st St - NE Quad	6	SY
		Central Ave & 2nd St - SW Quad	5	SY
		Central Ave & 2nd St - SE Quad	5	SY

NOTES:

1. Sawcut parallel to the R/W and remove existing concrete pavement as necessary to squarely tie in with proposed sidewalk..
2. Sawcut and remove existing curb and gutter.
3. Sawcut and remove existing asphalt pavement.
4. Existing curb stop - protect in place.
5. Landscaping w/Mulch - protect in place.

LEGEND:

- Asphalt Pavement Removal
- Concrete Pavement Removal
- Curb & Gutter Removal

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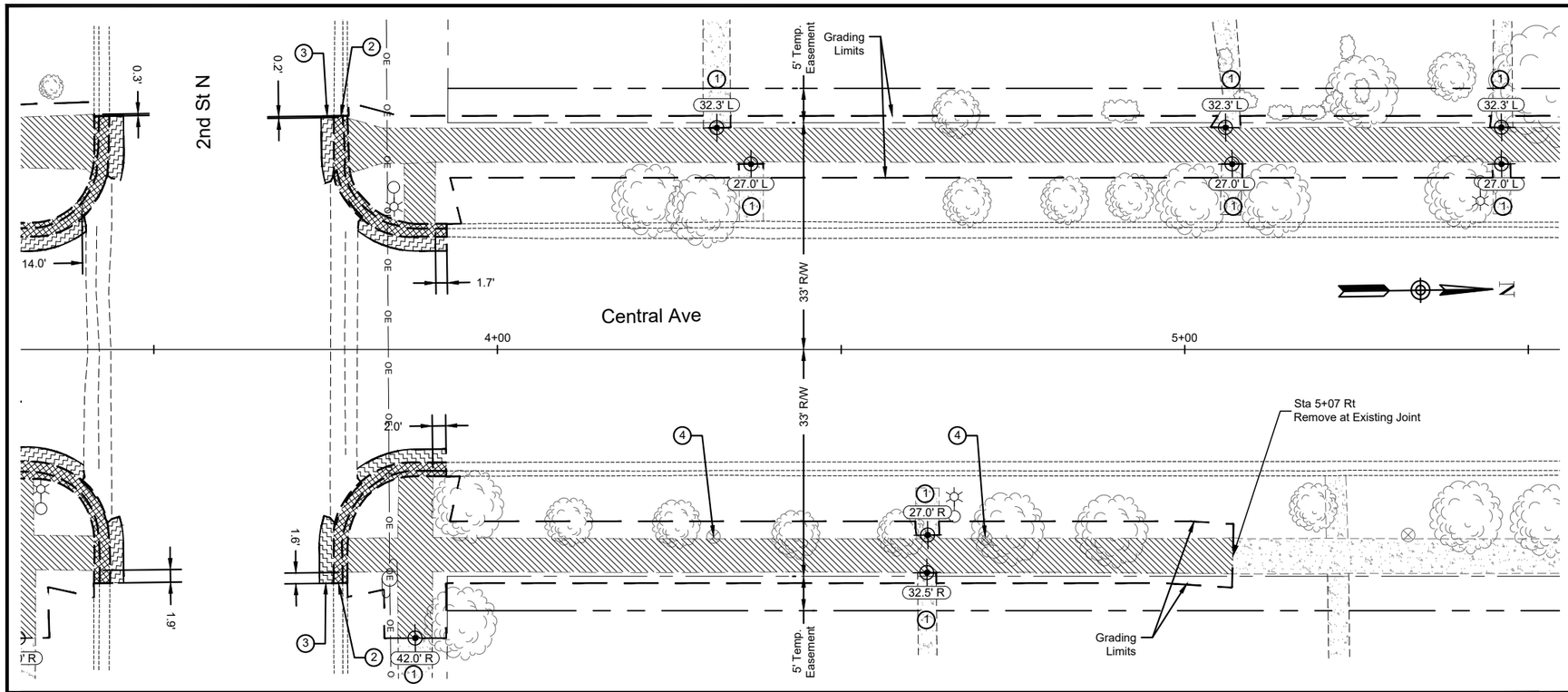
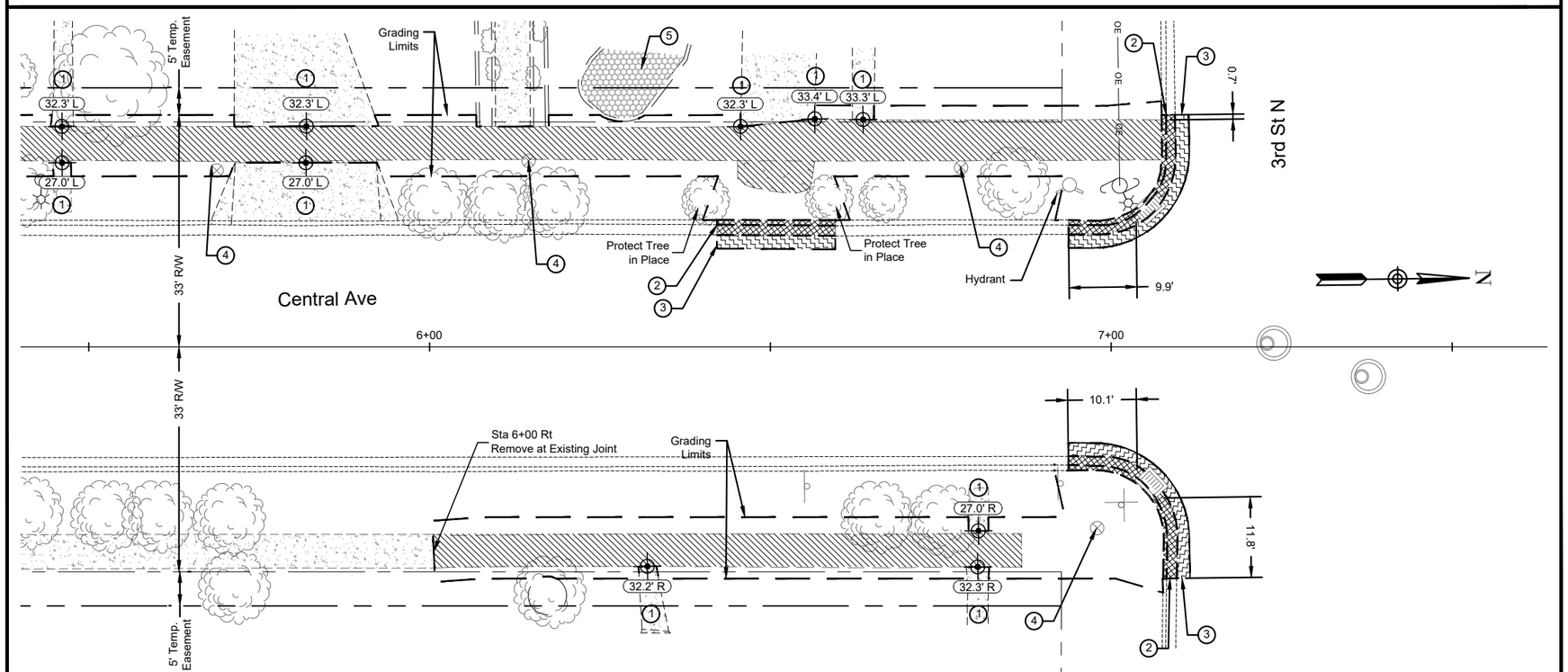
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Removals
1st St N to 2nd St N





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	40	2

SPEC	CODE	BID ITEM	QTY	UNIT
202	114	REMOVAL OF CONCRETE PAVEMENT		
		Central Ave from 2nd St NW to 3rd St NW - Lt	199	SY
		Central Ave from 2nd St NW to 3rd St NW - Rt	128	SY
202	130	REMOVAL OF CURB & GUTTER		
		Central Ave & 2nd St - NW Quad	27	LF
		Central Ave & 2nd St - NE Quad	27	LF
		Sta 6+42 to Sta 6+60 Lt	18	LF
		Central Ave & 3rd St - SW Quad	27	LF
		Central Ave & 3rd St - SE Quad	27	LF
202	132	REMOVAL OF BITUMINOUS SURFACING		
		Central Ave & 2nd St - NW Quad	5	SY
		Central Ave & 2nd St - NE Quad	5	SY
		Sta 6+42 to Sta 6+60 Lt	4	SY
		Central Ave & 3rd St - SW Quad	6	SY
		Central Ave & 3rd St - SE Quad	6	SY

NOTES:

1. Sawcut parallel to the R/W and remove existing concrete pavement as necessary to squarely tie in with proposed sidewalk..
2. Sawcut and remove existing curb and gutter.
3. Sawcut and remove existing asphalt pavement.
4. Existing curb stop - protect in place.
5. Landscaping w/Mulch - protect in place.

LEGEND:

- Asphalt Pavement Removal
- Concrete Pavement Removal
- Curb & Gutter Removal

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

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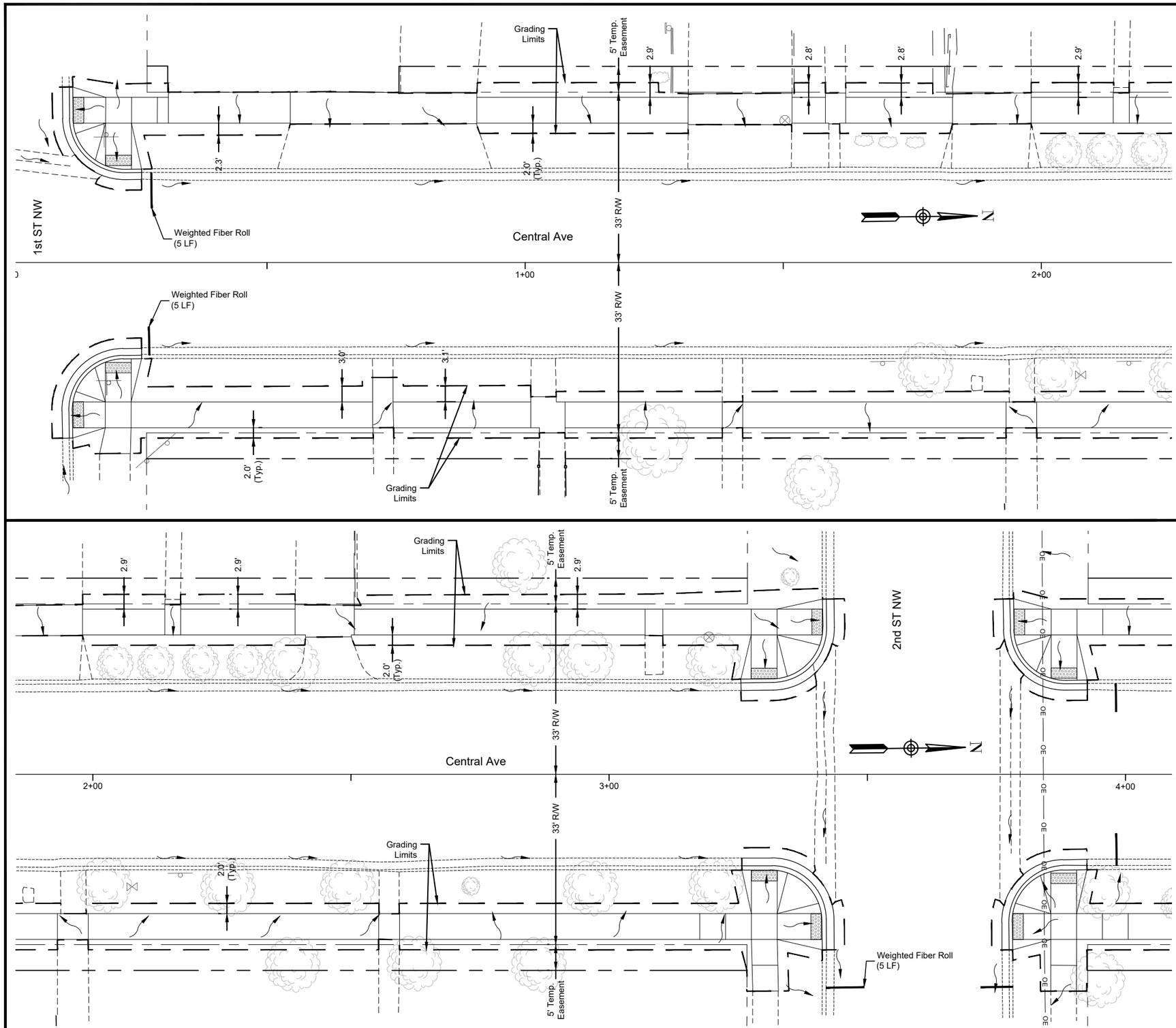
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Removals
2nd St NW to 3rd St NW



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
261	200	WEIGHTED FIBER ROLLS		
		Central Ave & 1st St - NW Quad	5	LF
		Central Ave & 1st St - NE Quad	5	LF
		Central Ave & 2nd St - SE Quad	5	LF
261	201	REMOVE WEIGHTED FIBER ROLLS		
		Central Ave & 1st St - NW Quad	5	LF
		Central Ave & 1st St - NE Quad	5	LF
		Central Ave & 2nd St - SE Quad	5	LF

LEGEND:

- Flow Direction
- Inlet Protection - Special
- Weighted Fiber Rolls

REGISTERED PROFESSIONAL ENGINEER
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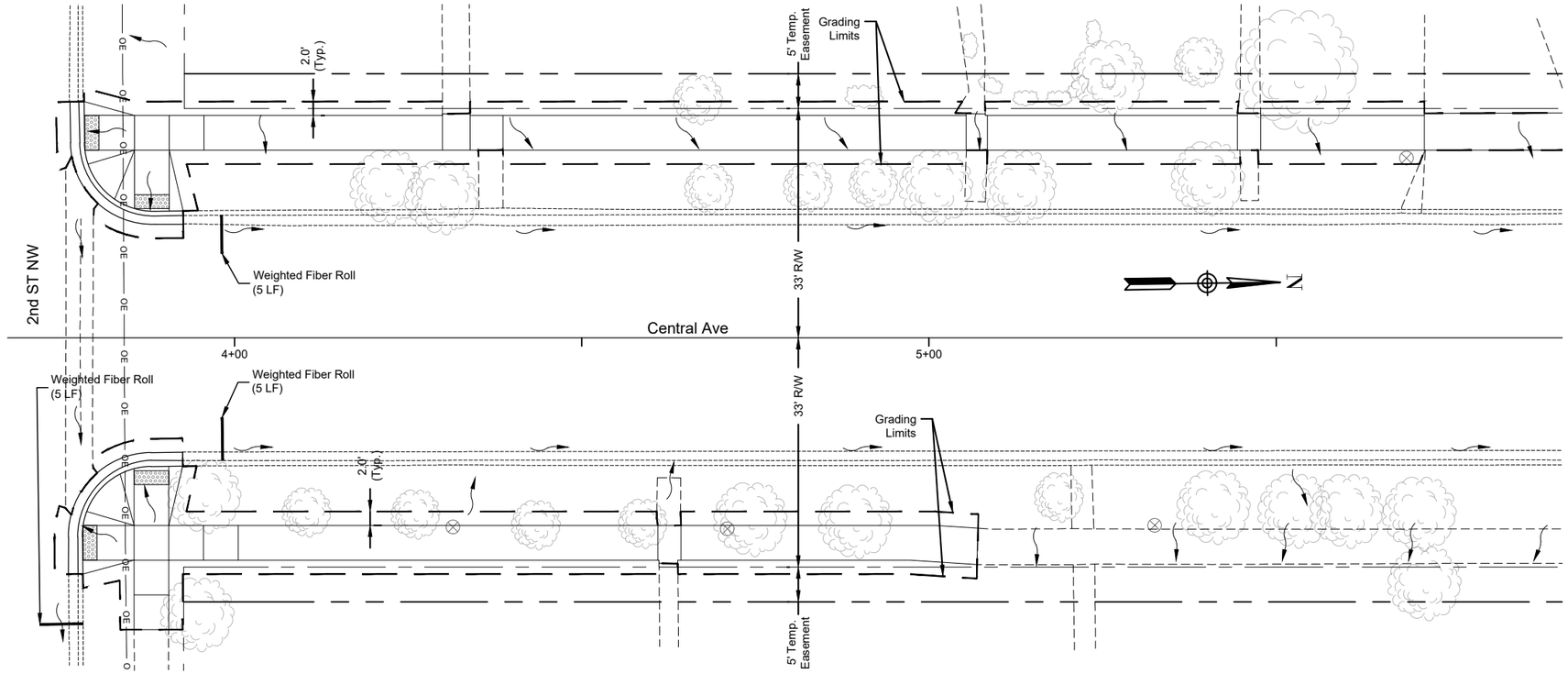
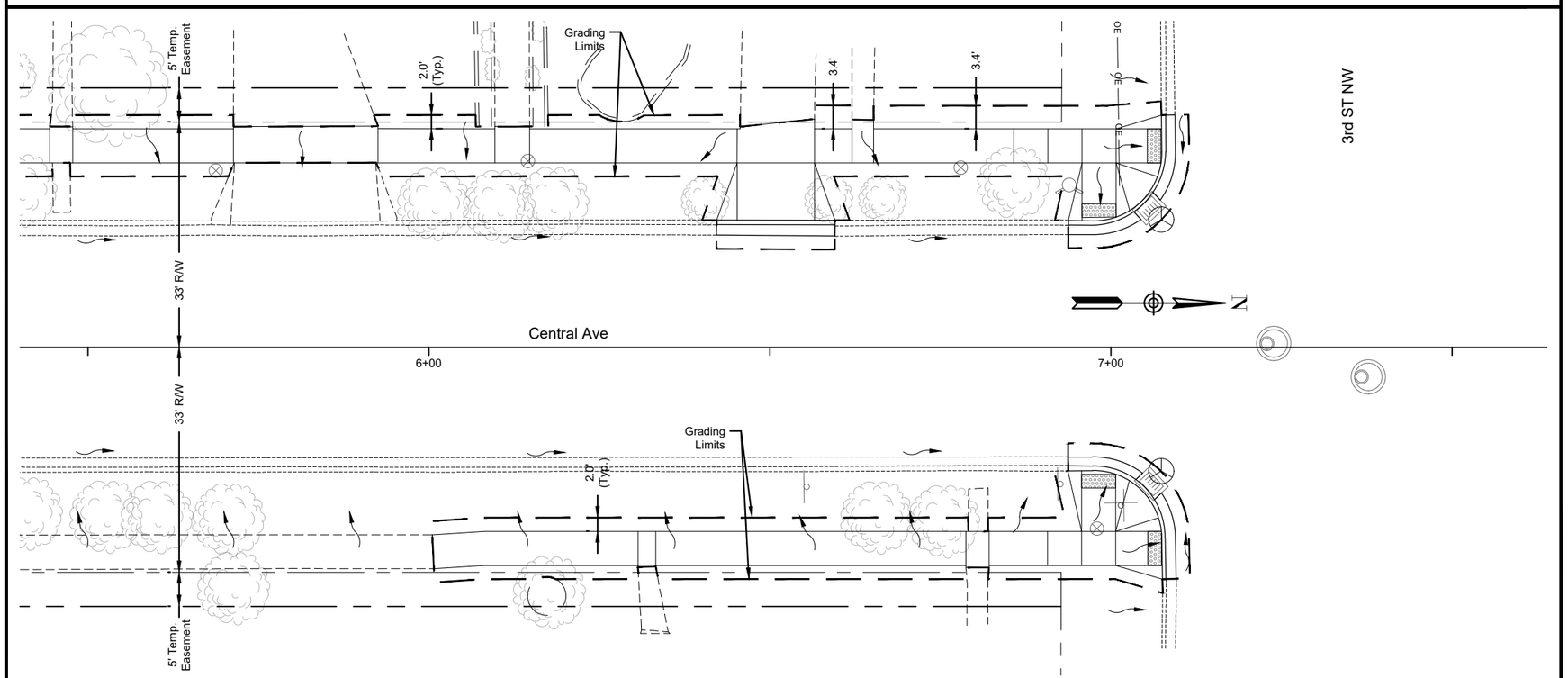
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Temporary Erosion Control
1st St NW to 2nd St NW





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	76	2

SPEC	CODE	BID ITEM	QTY	UNIT
261	200	WEIGHTED FIBER ROLLS		
		Central Ave & 2nd St - NW Quad	5	LF
		Central Ave & 2nd St - NE Quad	10	LF
261	201	REMOVE WEIGHTED FIBER ROLLS		
		Central Ave & 2nd St - NW Quad	5	LF
		Central Ave & 2nd St - NE Quad	10	LF
708	1540	INLET PROTECTION-SPECIAL		
		Central Ave & 3rd St - NW Quad	1	EA
		Central Ave & 3rd St - NE Quad	1	EA
708	1541	REMOVE INLET PROTECTION-SPECIAL		
		Central Ave & 3rd St - NW Quad	1	EA
		Central Ave & 3rd St - NE Quad	1	EA

LEGEND:

- Flow Direction
- Inlet Protection - Special
- Weighted Fiber Rolls

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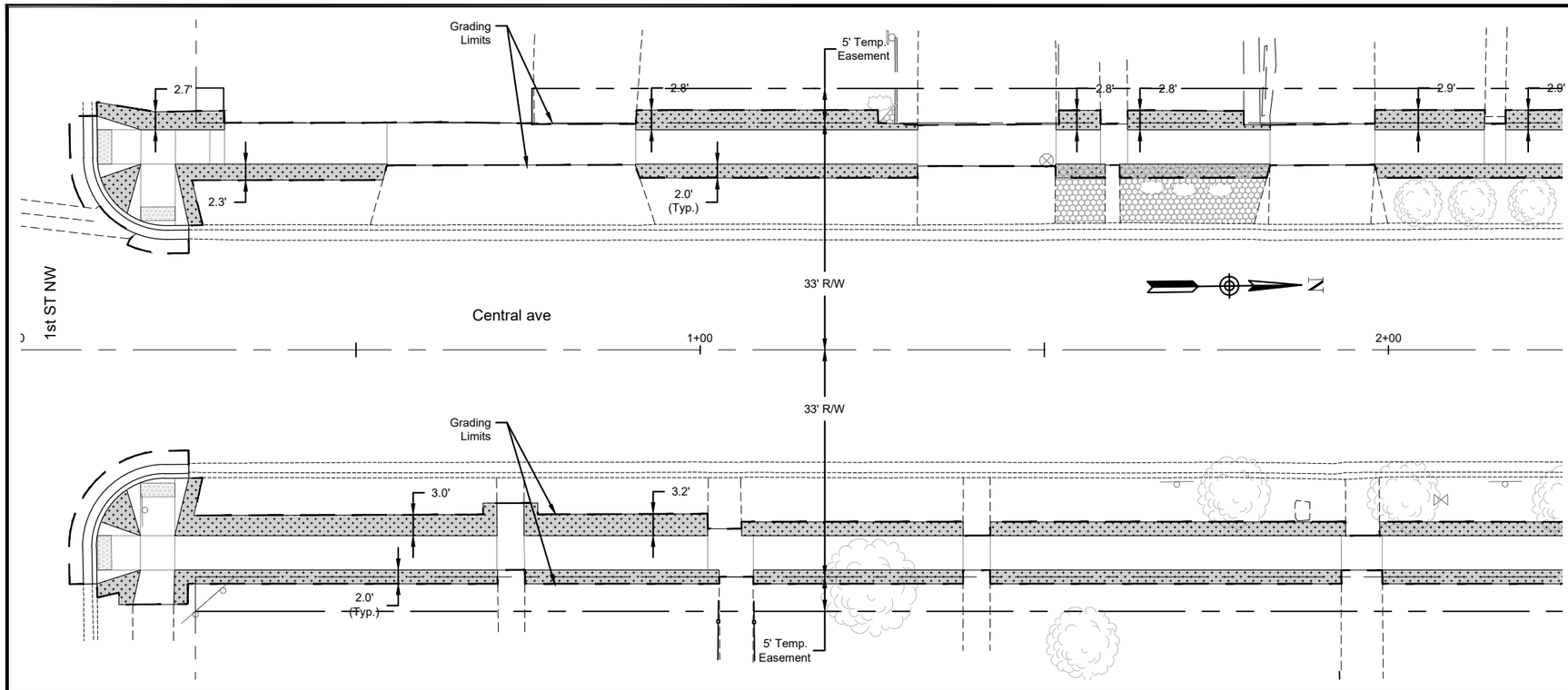
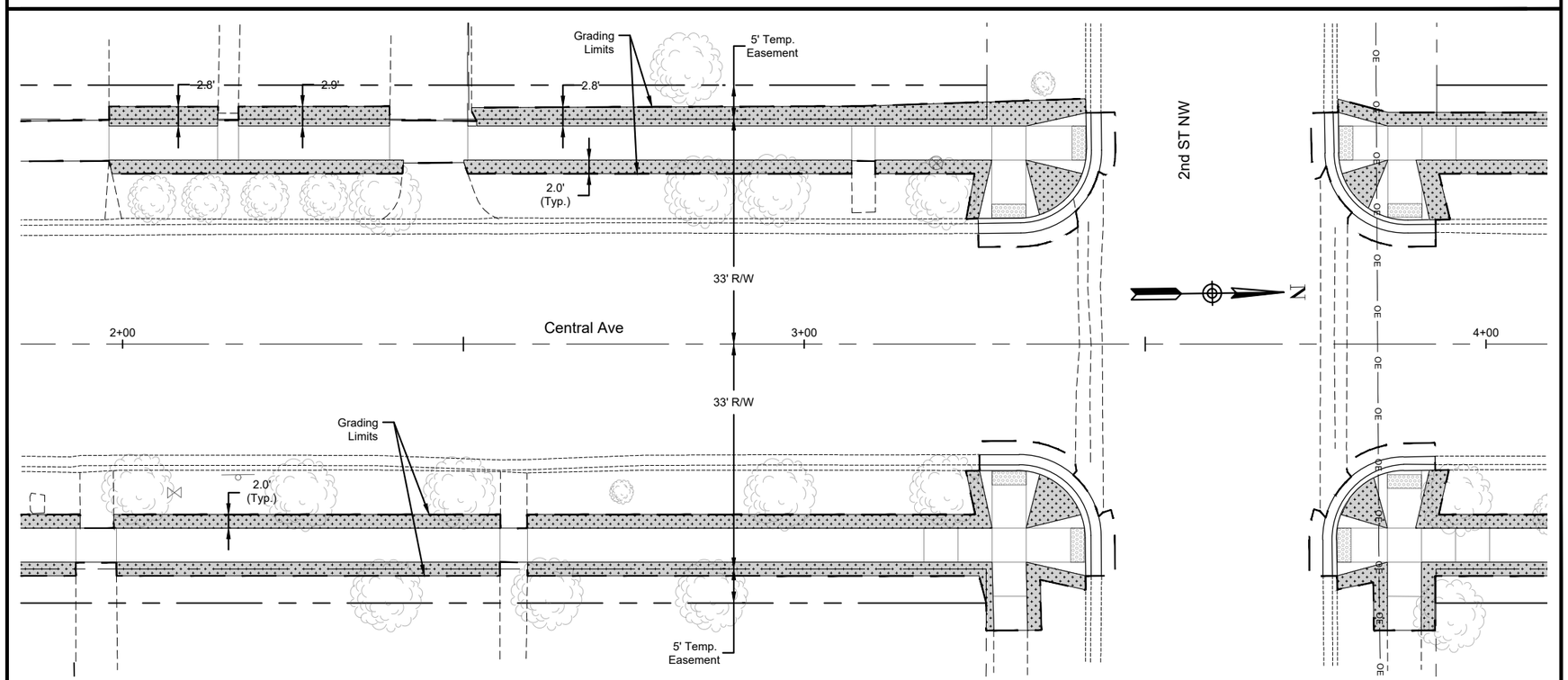
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Temporary Erosion Control
2nd St NW to 3rd St NW





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
970	0008	LANDSCAPE PREPARATION		
		Central Ave from 1st St NW to 2nd St NW - Lt	125	SY
		Central Ave from 1st St NW to 2nd St NW - Rt	150	SY

LEGEND:

Landscape Preparation

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
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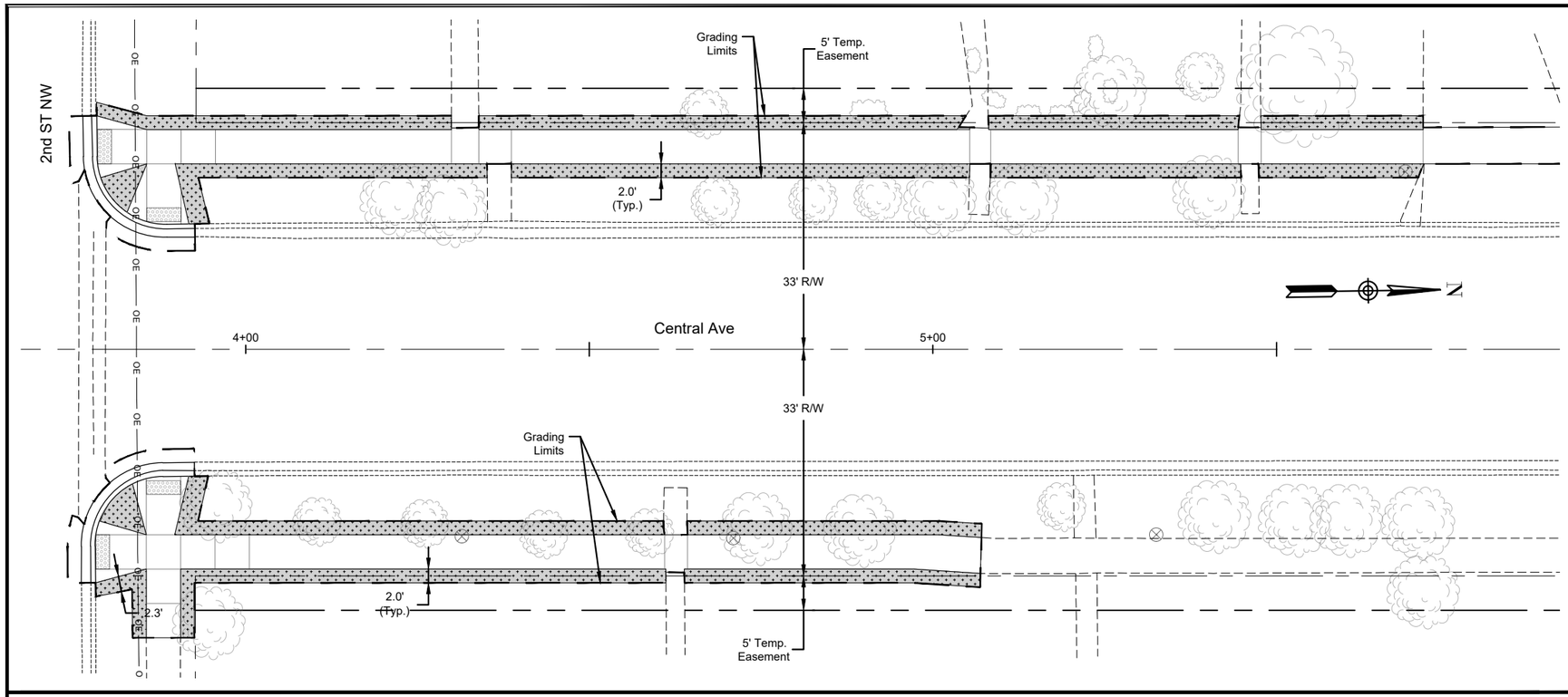
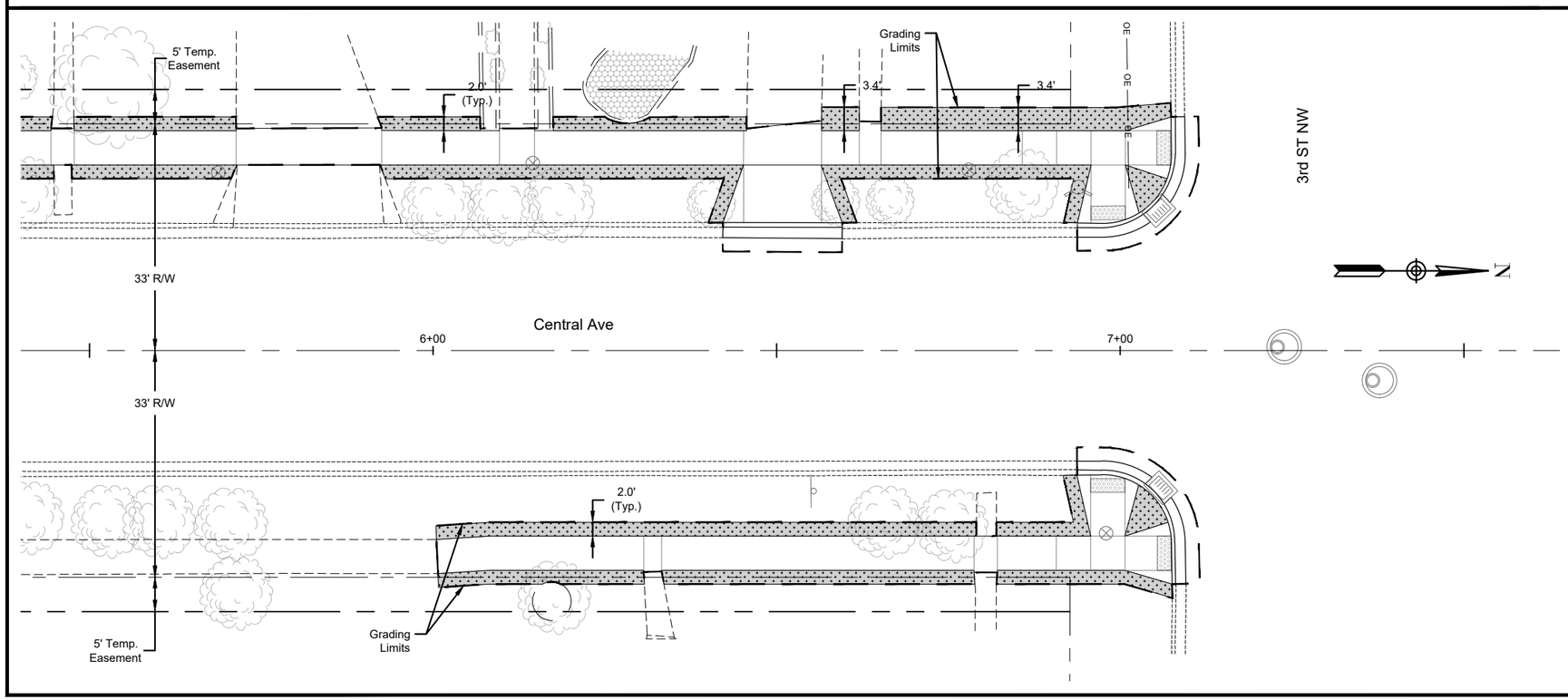
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Permanent Erosion Control
1st St NW to 2nd St NW





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
970	0008	LANDSCAPE PREPARATION		
		Central Ave from 2nd St NW to 3rd St NW - Lt	137	SY
		Central Ave from 2nd St NW to 3rd St NW - Rt	108	SY

LEGEND:

Landscape Preparation

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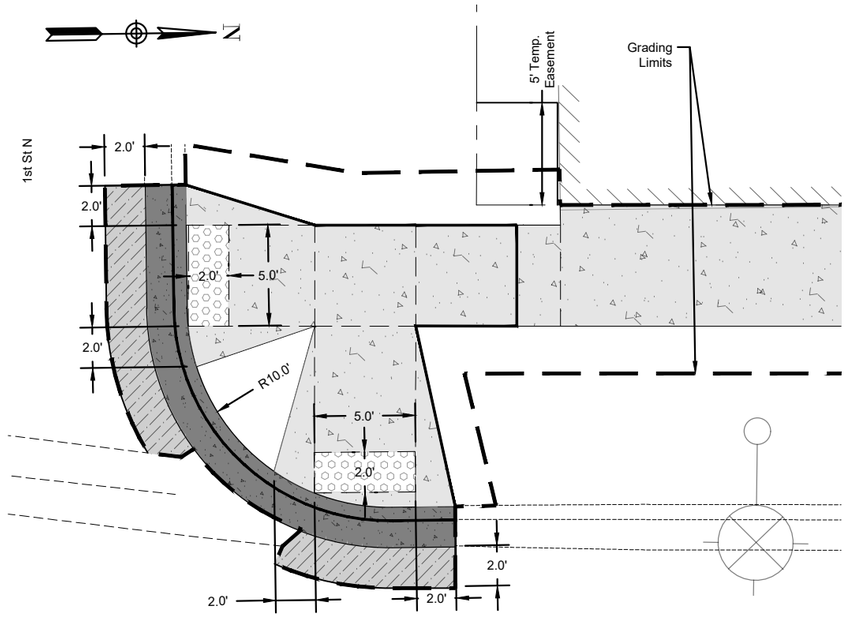
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

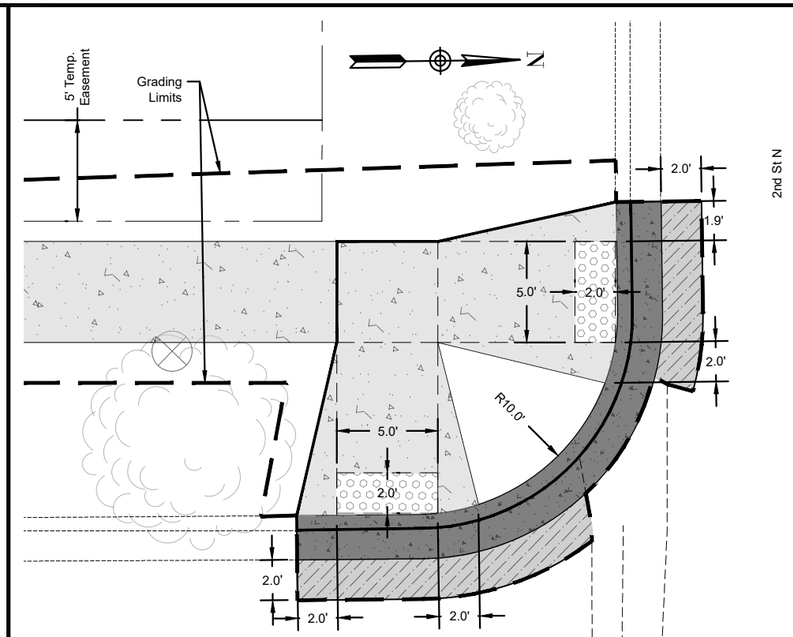
Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Permanent Erosion Control
2nd St NW to 3rd St NW



Central Ave & 1st St N - NW Quad

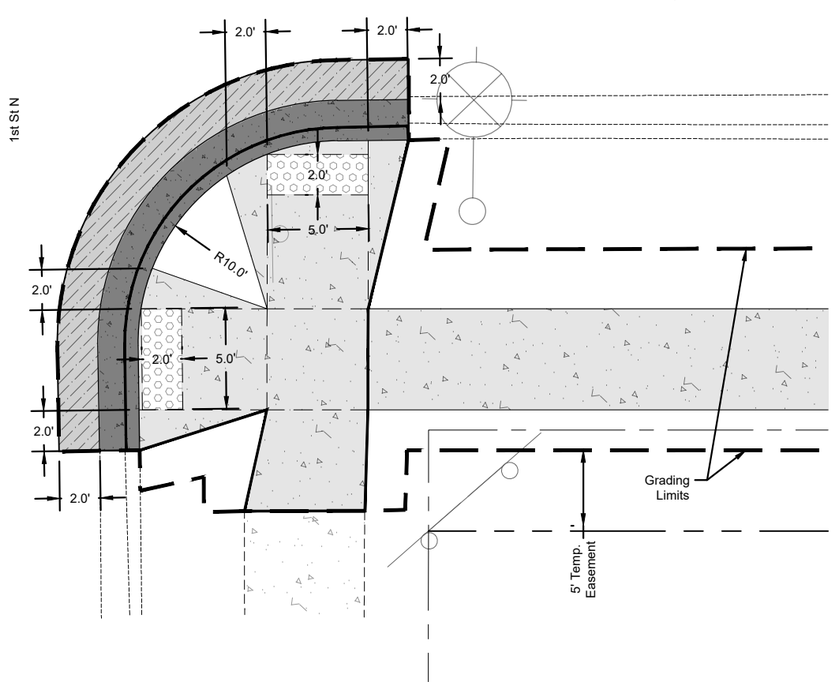
Central Ave



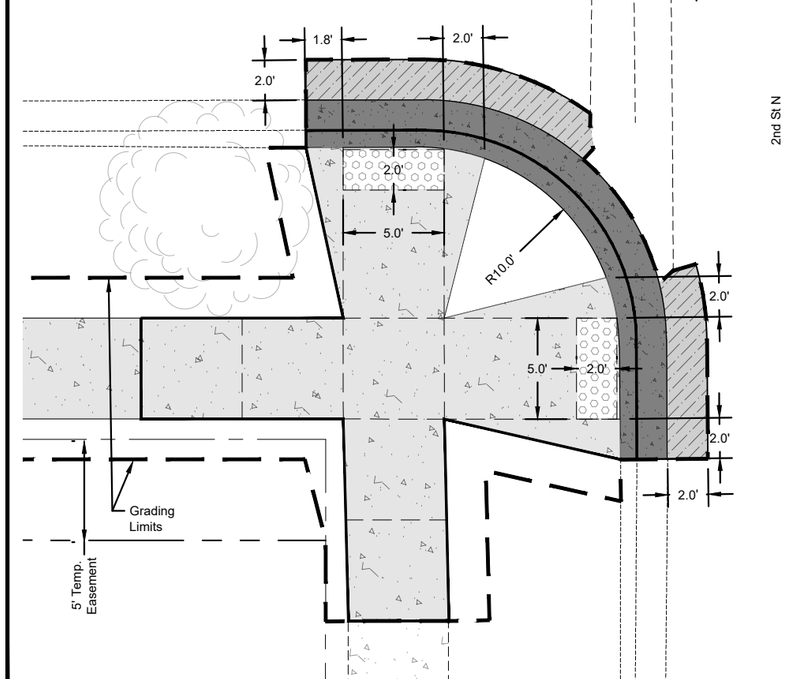
Central Ave & 2nd St N - SW Quad

Central Ave

Central Ave & 1st St N - NE Quad



Central Ave & 2nd St N - SE Quad



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	80	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	120	AGGREGATE BASE COURSE CL 5		
		Central Ave & 1st St - NW Quad	6	TON
		Central Ave & 1st St - NE Quad	6	TON
		Central Ave & 2nd St - SW Quad	6	TON
		Central Ave & 2nd St - SE Quad	9	TON
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Central Ave & 1st St - NW Quad	1	TON
		Central Ave & 1st St - NE Quad	1	TON
		Central Ave & 2nd St - SW Quad	1	TON
		Central Ave & 2nd St - SE Quad	1	TON
748	140	CURB & GUTTER - TYPE I		
		Central Ave & 1st St - NW Quad	26	LF
		Central Ave & 1st St - NE Quad	26	LF
		Central Ave & 2nd St - SW Quad	29	LF
		Central Ave & 2nd St - SE Quad	29	LF
750	115	SIDEWALK CONCRETE 4IN		
		Central Ave & 1st St - NW Quad	16	SY
		Central Ave & 2nd St - NW Quad	16	SY
		Central Ave & 1st St - NE Quad	15	SY
		Central Ave & 2nd St - SE Quad	26	SY
750	2115	DETECTABLE WARNING PANELS		
		Central Ave & 1st St - NW Quad	10	SF
		Central Ave & 2nd St - NW Quad	10	SF
		Central Ave & 1st St - NE Quad	10	SF
		Central Ave & 2nd St - SE Quad	10	SF

LEGEND:

- Proposed Detectable Warning Panel
- Existing Concrete
- Proposed 4" Concrete
- Proposed Curb & Gutter
- Proposed Asphalt Patch

REGISTERED PROFESSIONAL ENGINEER
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PE-27997
DATE 11/15/2024
NORTH DAKOTA

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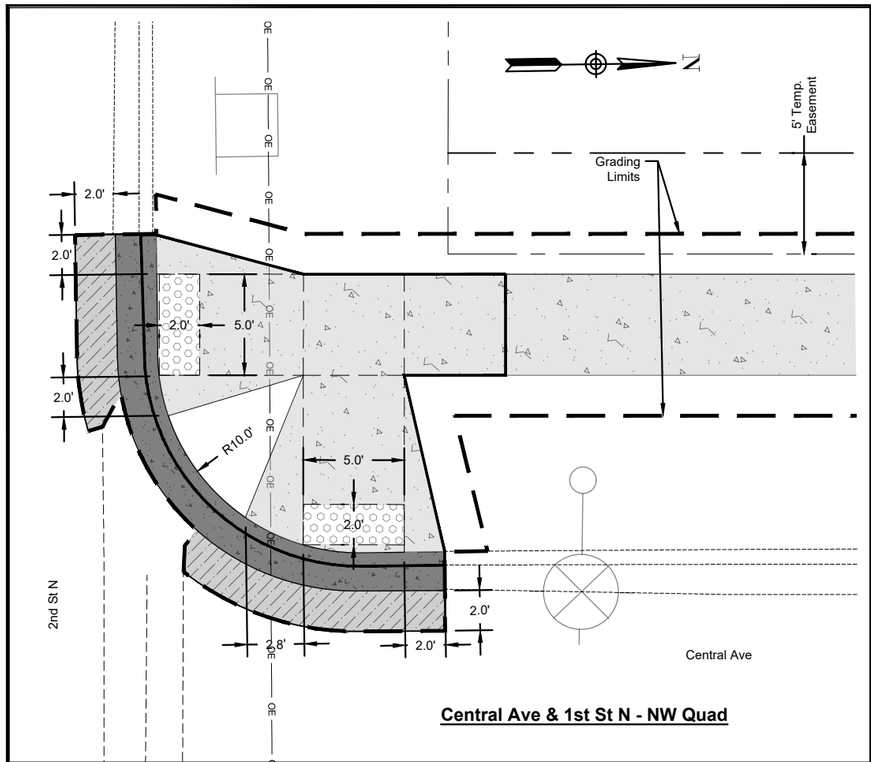
SCALE (H): 1" = 7.5'
SCALE (V): N/A

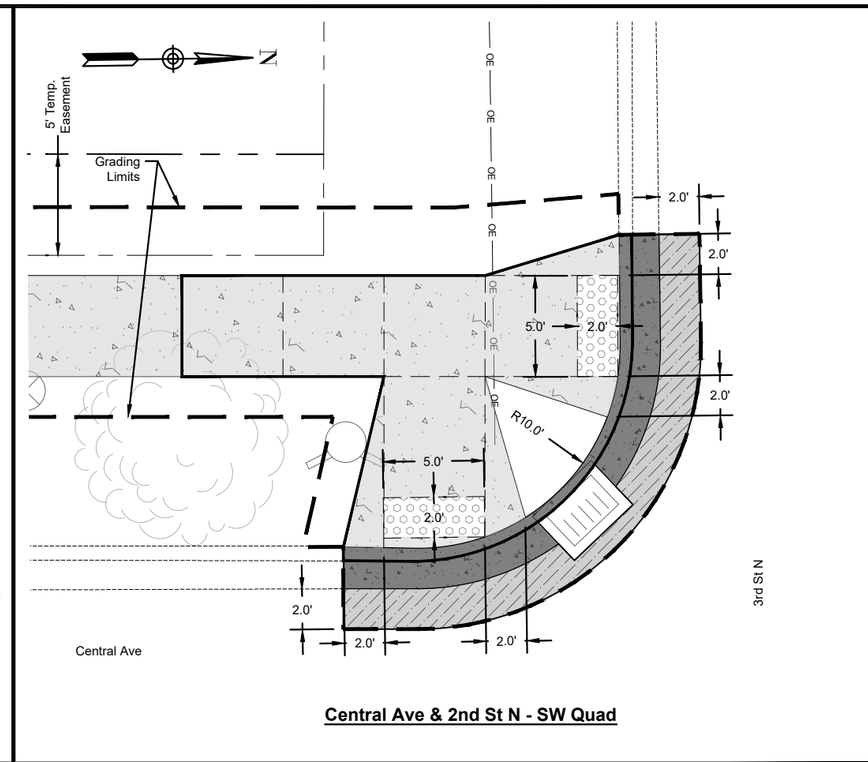
3.75 1.88 0 3.75 7.5

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

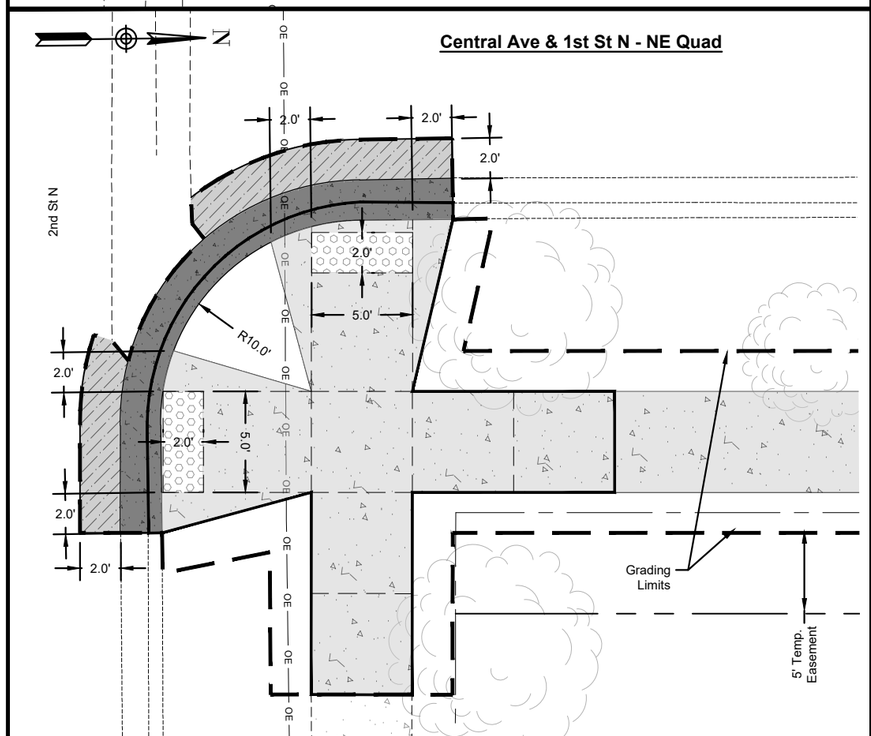
Curb Ramp Layouts
1st St NW to 2nd St NW



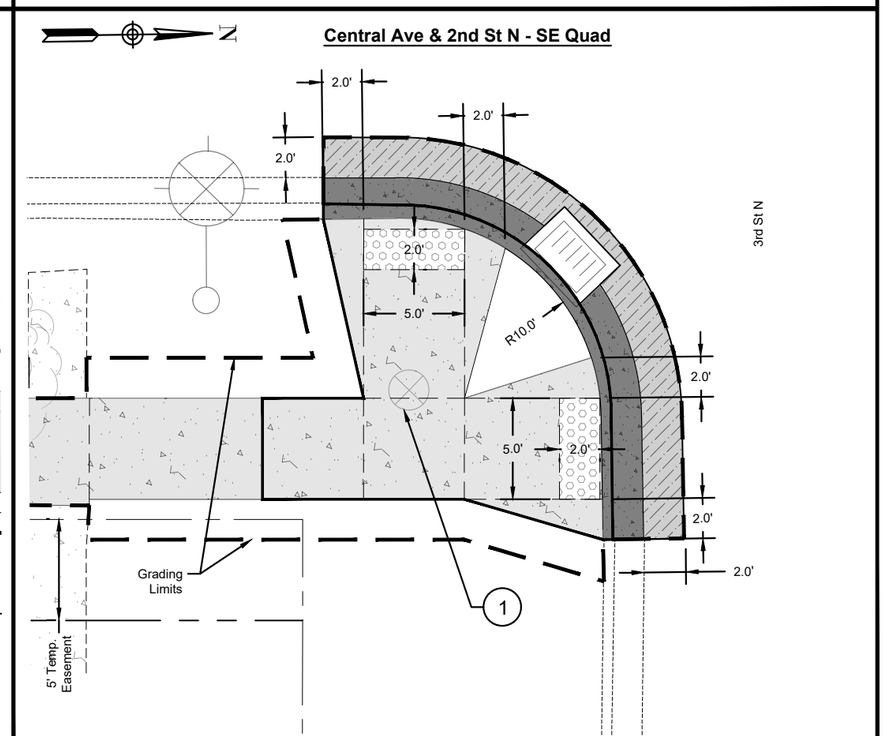
Central Ave & 1st St N - NW Quad



Central Ave & 2nd St N - SW Quad



Central Ave & 1st St N - NE Quad



Central Ave & 2nd St N - SE Quad

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	80	2

SPEC	CODE	BID ITEM	QTY	UNIT
302	120	AGGREGATE BASE COURSE CL 5		
		Central Ave & 2nd St - NW Quad	6	TON
		Central Ave & 2nd St - NE Quad	7	TON
		Central Ave & 3rd St - SW Quad	7	TON
		Central Ave & 3rd St - SE Quad	6	TON
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Central Ave & 2nd St - NW Quad	1	TON
		Central Ave & 2nd St - NE Quad	1	TON
		Central Ave & 3rd St - SW Quad	1	TON
		Central Ave & 3rd St - SE Quad	1	TON
748	140	CURB & GUTTER - TYPE I		
		Central Ave & 2nd St - NW Quad	27	LF
		Central Ave & 2nd St - NE Quad	27	LF
		Central Ave & 3rd St - SW Quad	26	LF
		Central Ave & 3rd St - SE Quad	27	LF
750	115	SIDEWALK CONCRETE 4IN		
		Central Ave & 2nd St - NW Quad	17	SY
		Central Ave & 2nd St - NE Quad	25	SY
		Central Ave & 3rd St - SW Quad	19	SY
		Central Ave & 3rd St - SE Quad	17	SY
750	2115	DETECTABLE WARNING PANELS		
		Central Ave & 2nd St - NW Quad	10	SF
		Central Ave & 2nd St - NE Quad	10	SF
		Central Ave & 3rd St - SW Quad	10	SF
		Central Ave & 3rd St - SE Quad	10	SF

NOTE:

1 Existing curb stop - protect in place.

LEGEND:

- Proposed Detectable Warning Panel
- Existing Concrete
- Proposed 4" Concrete
- Proposed Curb & Gutter
- Proposed Asphalt Patch

REGISTERED PROFESSIONAL ENGINEER
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PE-27997
DATE 11/15/2024
NORTH DAKOTA

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SCALE (H): 1" = 7.5'
SCALE (V): N/A

3.75 1.88 0 3.75 7.5

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Curb Ramp Layouts
2nd St NW to 3rd St NW

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Mohall Central Avenue

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Central Ave			
BOP	0+00.00	645,333.33	1724641.59
EOP	7+92.76	646126.03	1724651.96

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
CONTROL POINT DESCRIPTION					
PRIMARY CONTROL					
100	644350.58	1722922.95	1643.70		
200	645357.39	1724620.02	1639.22		
201	645670.79	1724684.27	1636.15		
202	645715.98	1724608.20	1636.74		
203	646126.03	1724652.12	1637.77		

NOTES:

Date Survey Completed: 10/23

☐ Assumed Coordinates

☒ All coordinates on this sheet are Renville County Ground Coordinates. They are derived from the "North Dakota Coordinate System of 1983", NAD83(Conus), North Zone. Combination Factor (cf) = 0.9999205

All coordinates and measurements on this document derived from the US Survey Foot Definition

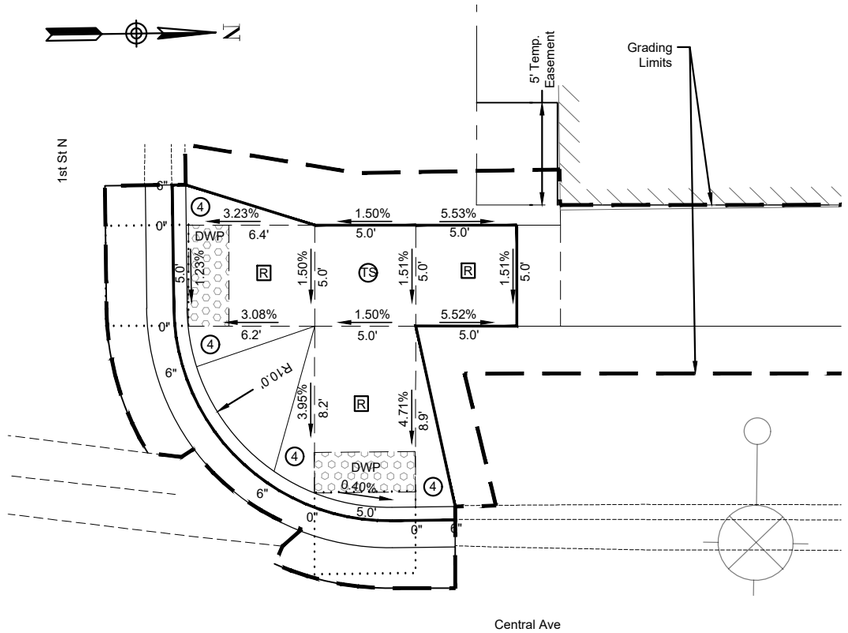
INITALIZING BENCH MARK
Midstates VRS Network

☒ NAVD-88
☐ NGVD-29

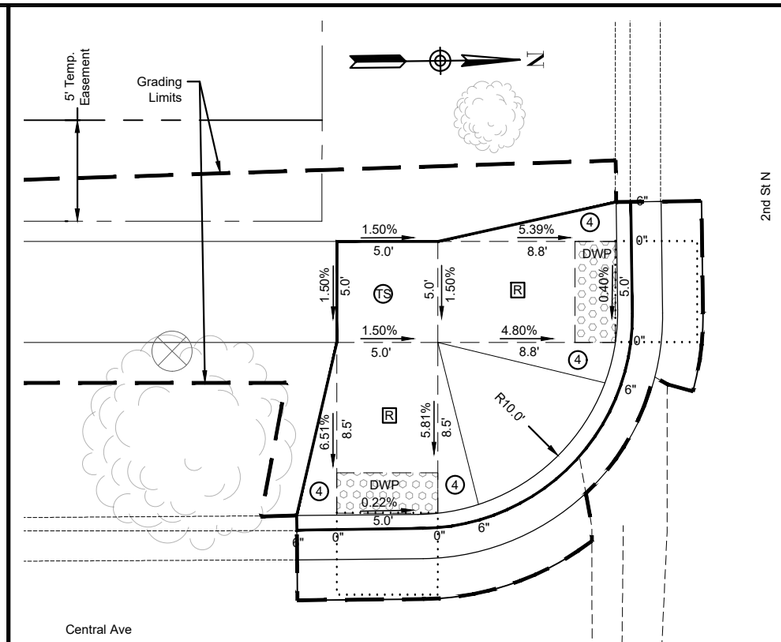
☒ ENGLISH UNITS
☐ METRIC UNITS

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 11/15/2024
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	82	1

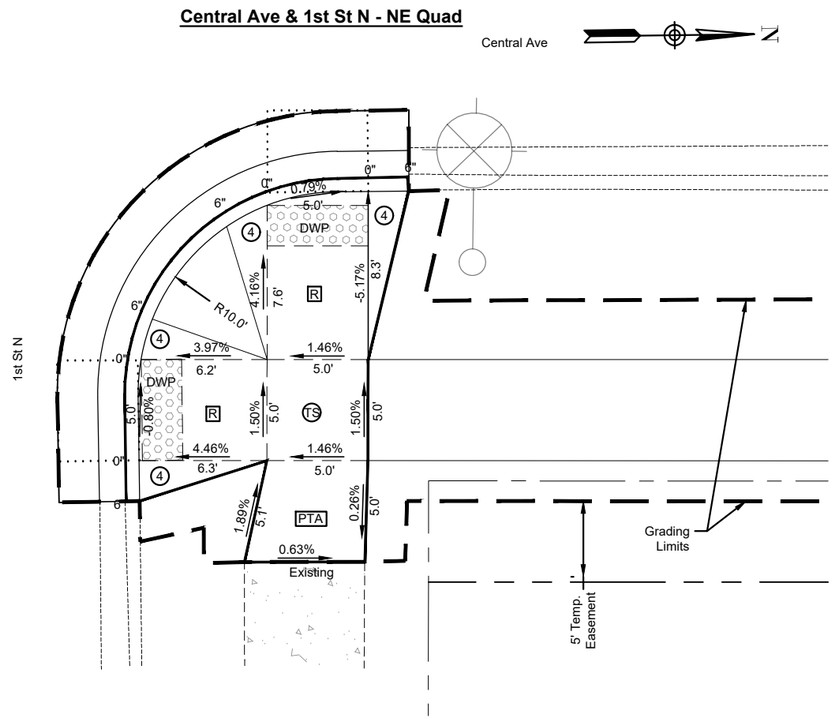


Central Ave & 1st St N - NW Quad

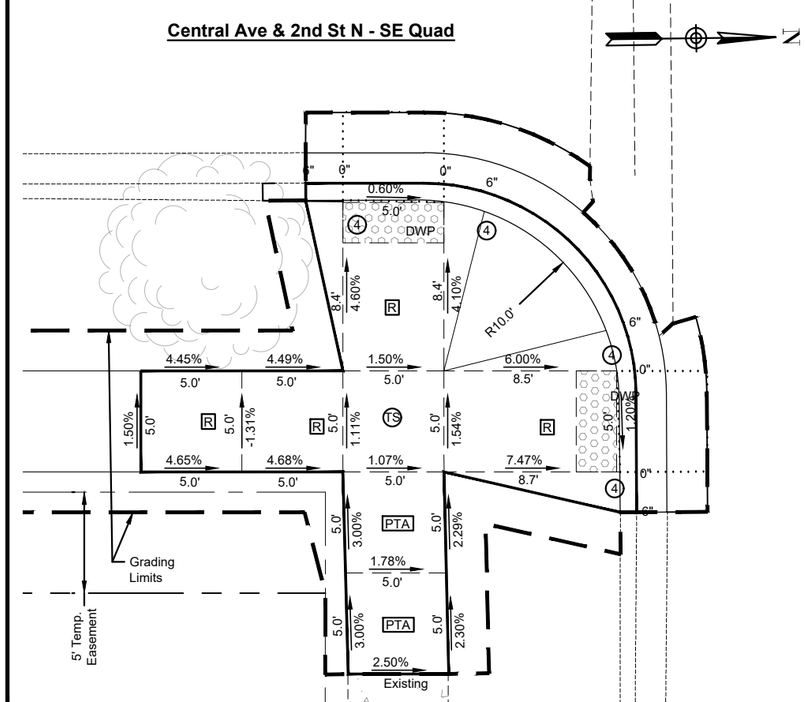


Central Ave & 2nd St N - SW Quad

Central Ave & 1st St N - NE Quad



Central Ave & 2nd St N - SE Quad



LEGEND

	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 $\frac{1}{2}$ percent per foot from the Ramp Area to EPF.
L TS	Turning Space/Landing Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions
R	Preferred Ramp Grade = 5% to 7.5% Maximum Constructed Grade = 8.3% Preferred Cross Slope = 1.5% Maximum Constructed Cross Slope = 2% Maximum Length = 15 Feet
B	Preferred Cross Slope = 1.5% Maximum Constructed Cross Slope = 2% Running Slope Consistent with the EPF Preferred Maximum Counter Slope = 4.7% Maximum Constructed Counter Slope = 5%
DWP	Detectable Warning Panel
4	4:1 maximum constructed slope
0", 3", 6"	Curb Height

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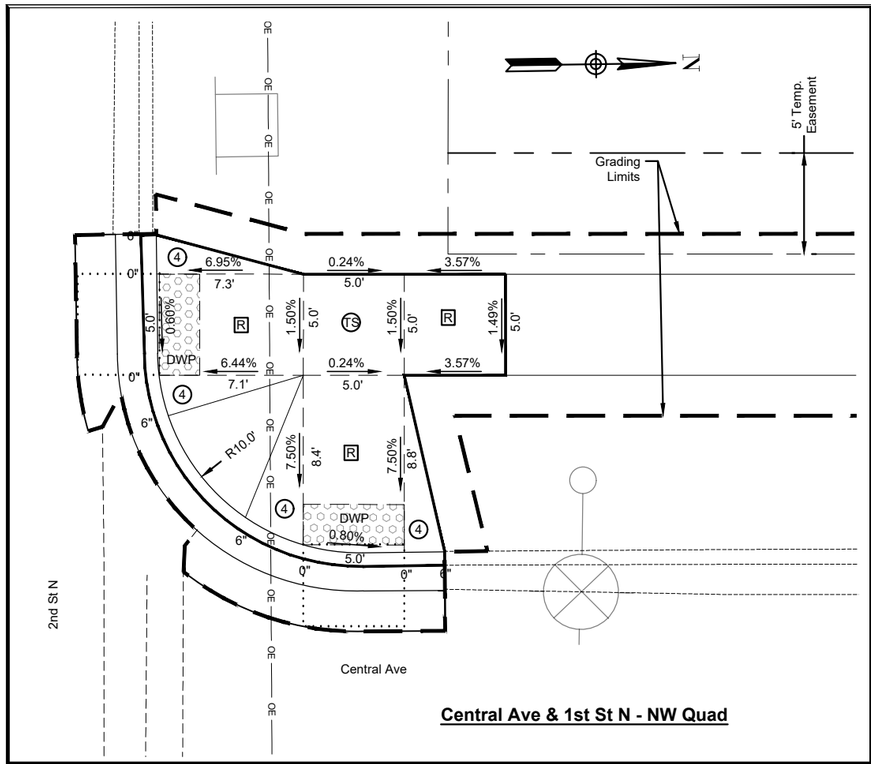
SCALE (H): 1" = 7.5'
SCALE (V): N/A

3.75 1.88 0 3.75 7.5

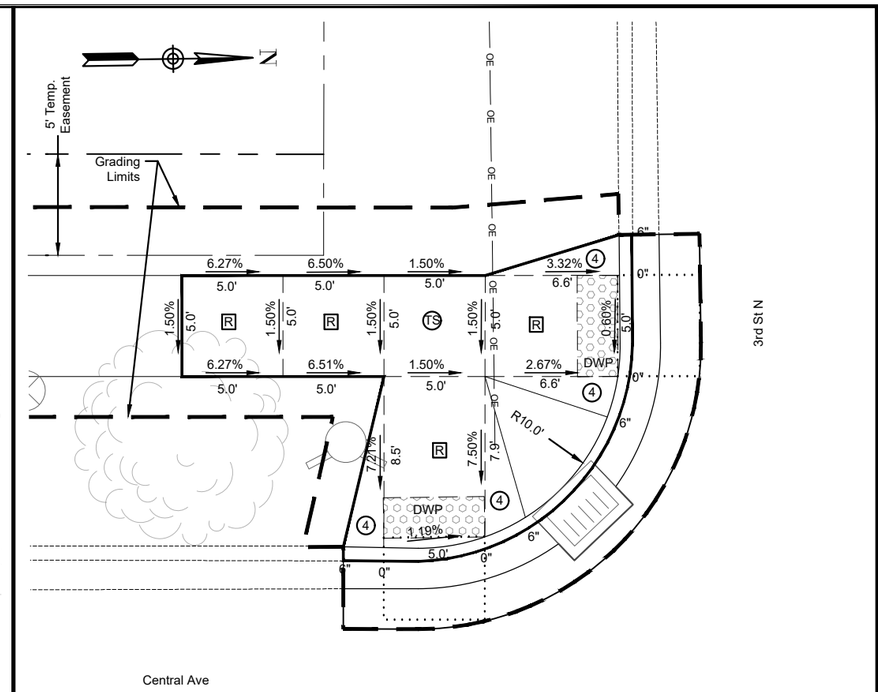
Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Survey Data Layouts
1st St NW to 2nd St NW

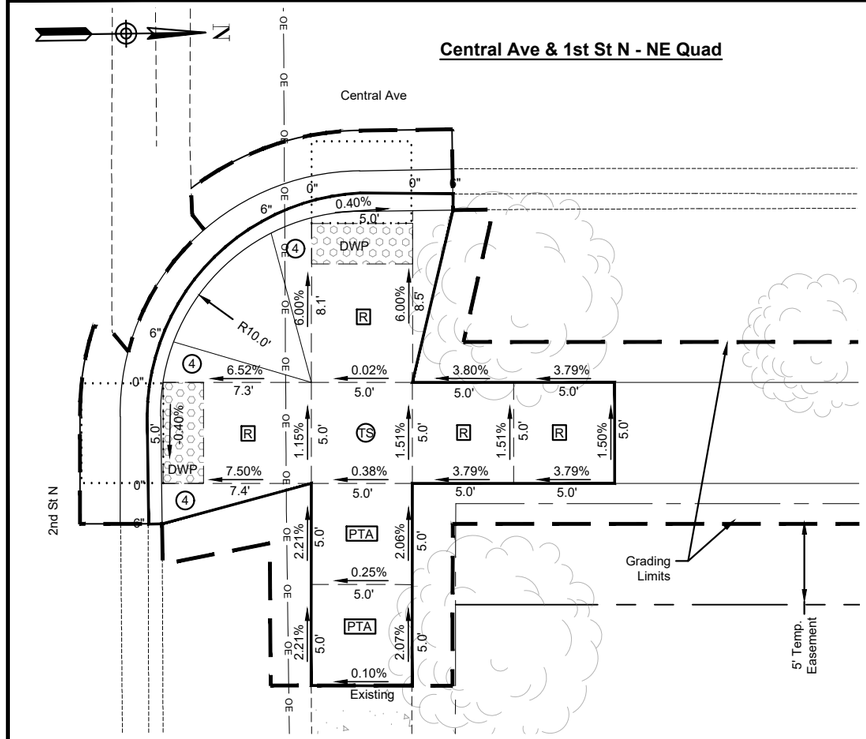
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	82	2



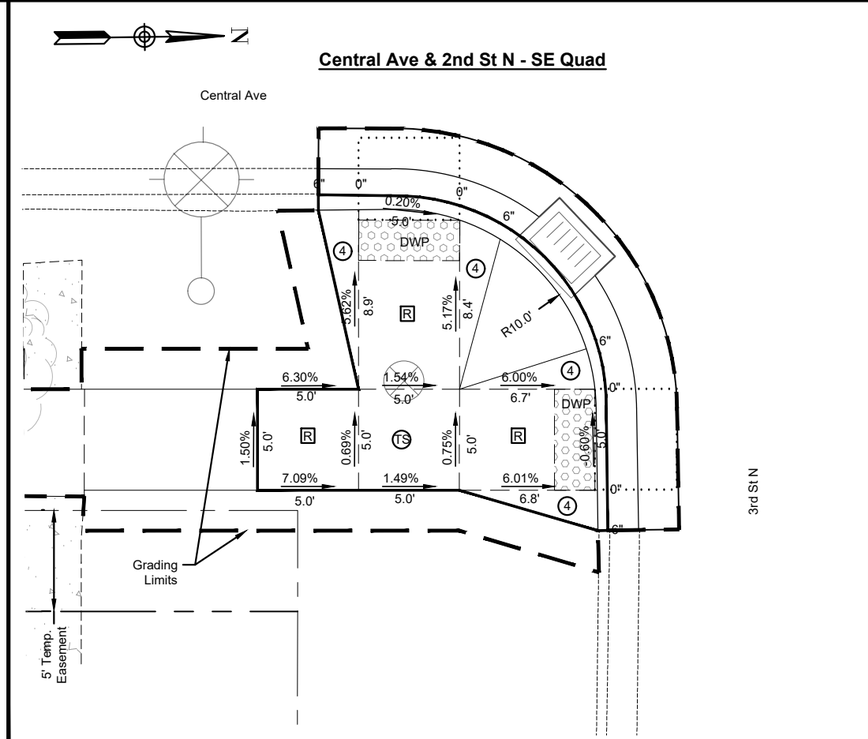
Central Ave & 1st St N - NW Quad



Central Ave & 2nd St N - SW Quad



Central Ave & 1st St N - NE Quad



Central Ave & 2nd St N - SE Quad

LEGEND

	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 $\frac{1}{2}$ percent per foot from the Ramp Area to EPF.
L TS	Turning Space/Landing Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions
R	Preferred Ramp Grade = 5% to 7.5% Maximum Constructed Grade = 8.3% Preferred Cross Slope = 1.5% Maximum Constructed Cross Slope = 2% Maximum Length = 15 Feet
B	Preferred Cross Slope = 1.5% Maximum Constructed Cross Slope = 2% Running Slope Consistent with the EPF Preferred Maximum Counter Slope = 4.7% Maximum Constructed Counter Slope = 5%
DWP	Detectable Warning Panel
4	4:1 maximum constructed slope
0", 3", 6"	Curb Height

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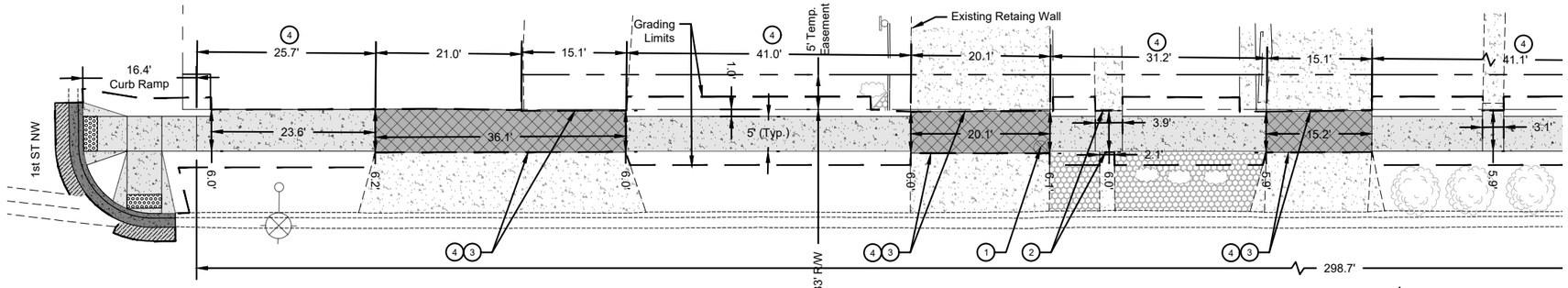
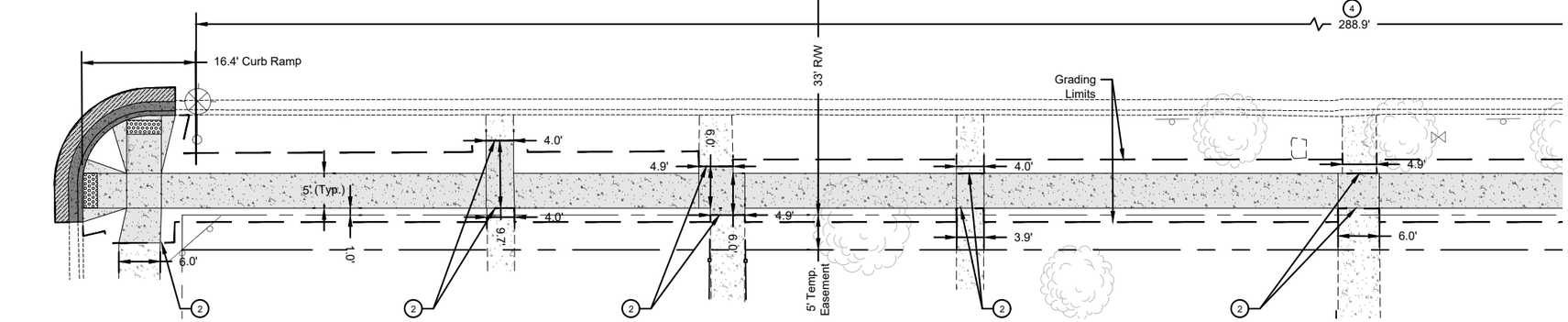
SCALE (H): 1" = 7.5'
SCALE (V): N/A

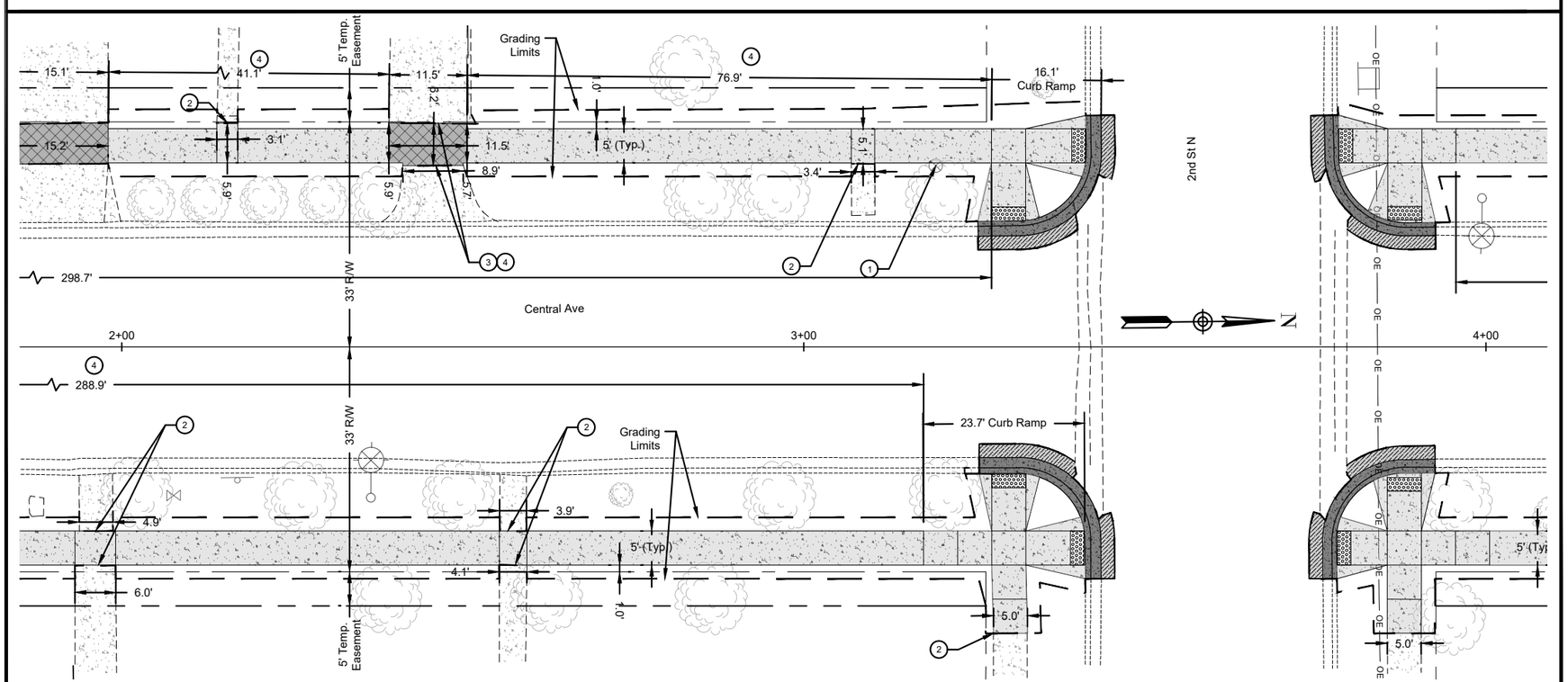
3.75 1.88 0 3.75 7.5

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Survey Data Layouts
2nd St NW to 3rd St NW







STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	90	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	120	AGGREGATE BASE COURSE CL 5		
		Sta 0+28.77 to Sta 3+27.52 Lt	42	TON
		Sta 0+23.69 to Sta 3+17.55 Rt	41	TON
750	115	SIDEWALK CONCRETE 4IN		
		Sta 0+28.77 to Sta 0+54.56 Lt	17	SY
		Sta 0+90.63 to Sta 1+31.57 Lt	23	SY
		Sta 1+51.69 to Sta 1+82.79 Lt	18	SY
		Sta 1+98.01 to Sta 2+39.16 Lt	24	SY
		Sta 2+50.63 to Sta 3+27.52 Lt	43	SY
		Sta 0+18.69 to Sta 3+17.55 Rt	167	SY
750	140	SIDEWALK CONCRETE 6IN		
		Driveway Sta 0+54.56 to Sta 0+90.63 Lt	25	SY
		Driveway Sta 1+31.57 to Sta 1+51.69 Lt	14	SY
		Driveway Sta 1+82.79 to Sta 1+98.01 Lt	11	SY
		Driveway Sta 2+39.16 to Sta 2+50.63 Lt	8	SY

NOTES:

1. Existing curb stop - protect in place.
2. Tie into existing concrete.
3. Tie into existing concrete driveway & match existing joint spacing.
4. Evenly space mainline sidewalk joints (approx. 5 ft).

LEGEND:

- Proposed Detectable Warning Panel
- Existing Concrete
- Proposed 4" Concrete
- Proposed 6" Concrete
- Proposed Curb & Gutter
- Proposed Asphalt Patch

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

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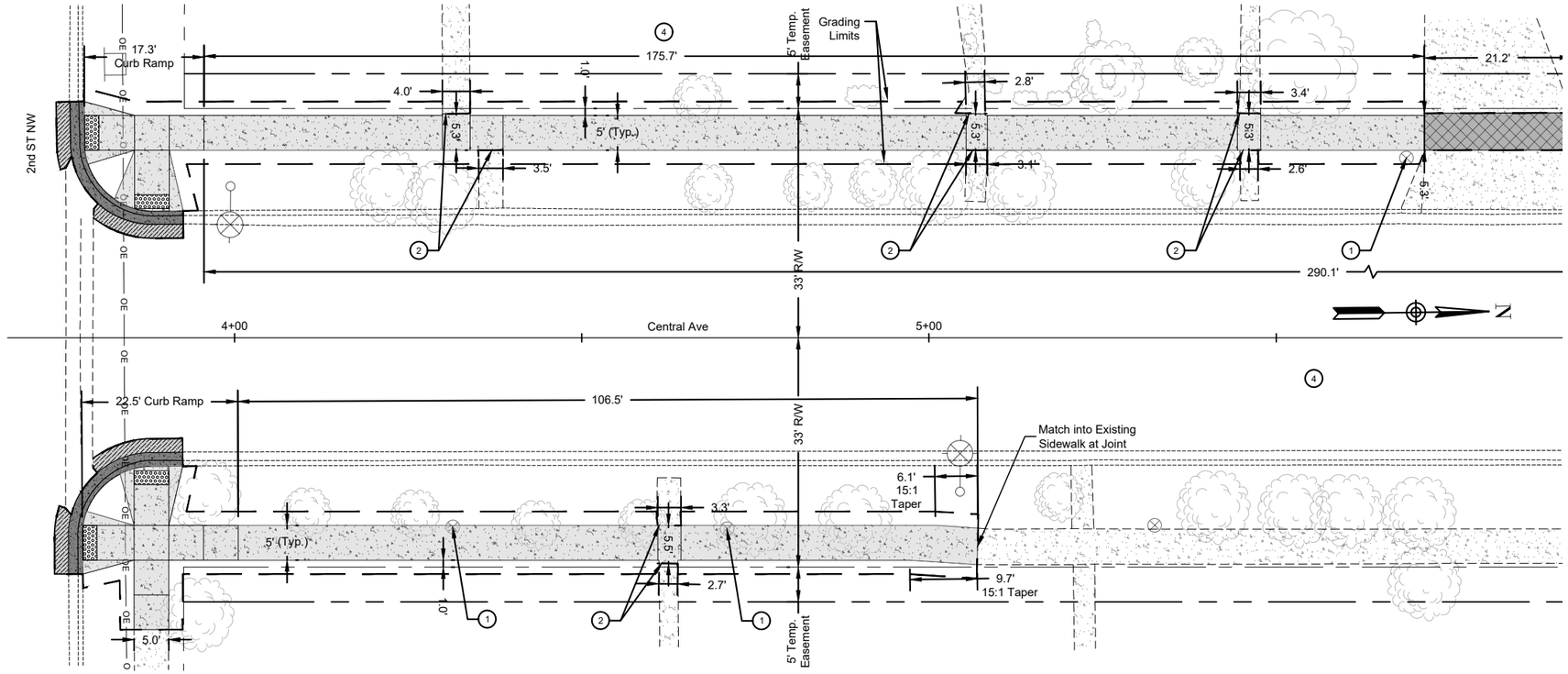
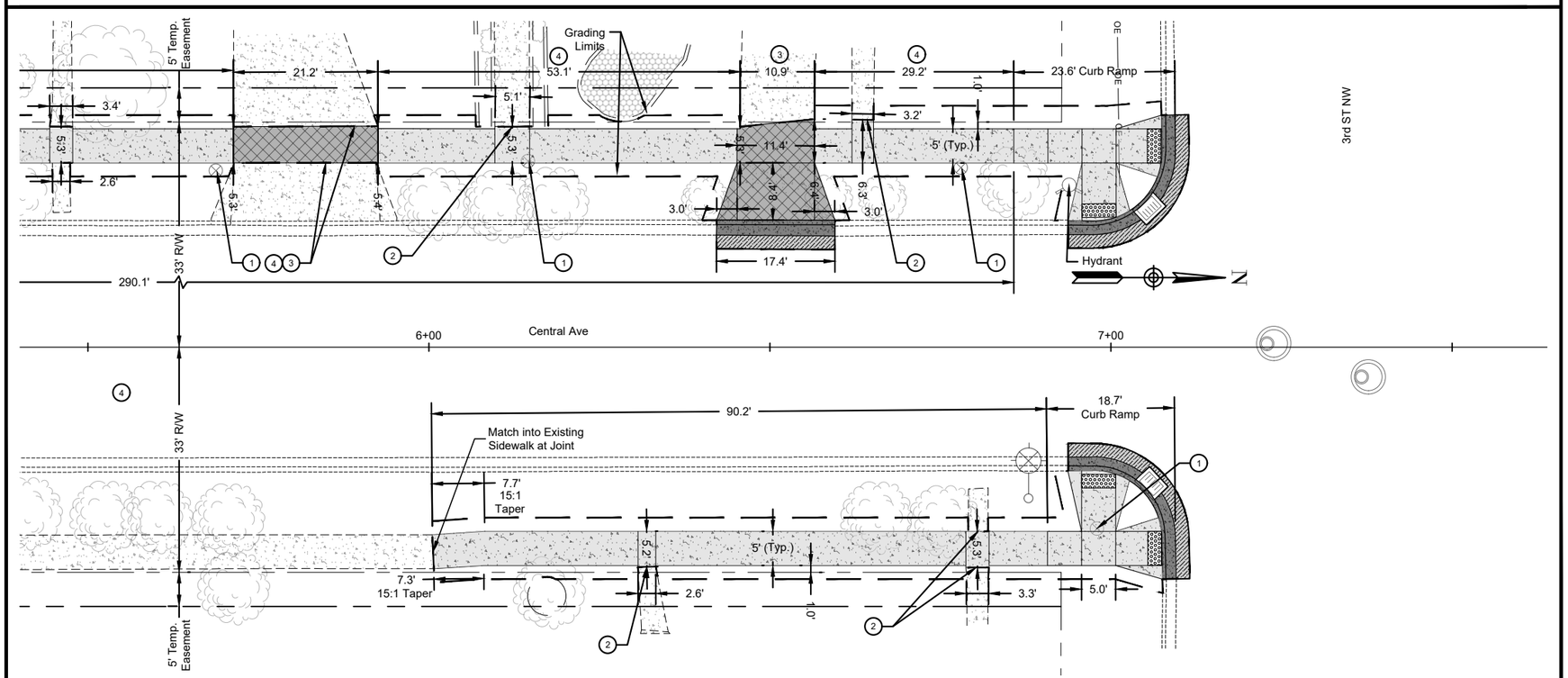
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Sidewalk Layouts
1st St NW to 2nd St NW





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	90	2

SPEC	CODE	BID ITEM	QTY	UNIT
302	120	AGGREGATE BASE COURSE CL 5		
		Sta 3+95.61 to Sta 6+85.76 Lt	44	TON
		Sta 4+00.55 to Sta 5+07.00 Rt	15	TON
		Sta 6+00.62 to Sta 6+90.69 Rt	12	TON
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 6+42 to Sta 6+60 Lt	1	TON
748	140	CURB & GUTTER - TYPE I		
		Sta 6+42 to Sta 6+60 Lt	18	LF
750	115	SIDEWALK CONCRETE 4IN		
		Sta 3+95.61 to Sta 5+71.34 Lt	98	SY
		Sta 5+92.54 to Sta 6+45.19 Lt	30	SY
		Sta 6+56.52 to Sta 6+85.76 Lt	17	SY
		Sta 4+00.55 to Sta 5+07.00 Rt	60	SY
		Sta 6+00.62 to Sta 6+90.69 Rt	51	SY
750	140	SIDEWALK CONCRETE 6IN		
		Driveway Sta 5+71.34 to Sta 5+92.54 Lt	13	SY
		Driveway Sta 6+45.19 to Sta 6+56.52 Lt	21	SY

NOTES:

1. Existing curb stop - protect in place.
2. Tie into existing concrete.
3. Tie into existing concrete driveway & match existing joint spacing.
4. Evenly space mainline sidewalk joints (approx. 5 ft).

LEGEND:

- Proposed Detectable Warning Panel
- Existing Concrete
- Proposed 4" Concrete
- Proposed 6" Concrete
- Proposed Curb & Gutter
- Proposed Asphalt Patch

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

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SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Sidewalk Layouts
2nd St NW to 3rd St NW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		70	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)		30	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R7-1-12	**12"x18"**	**NO PARKING ANY TIME RT or LT Arrow**	**8**	**11**	**88**
R9-9-24	**24"x12"**	**SIDEWALK CLOSED (Mounted on barricade)**	**6**	**10**	**60**
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	**48"x48"**	**ROAD NARROWS**	**7**	**35**	**245**
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**7**	**35**	**245**
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		35	
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**690**

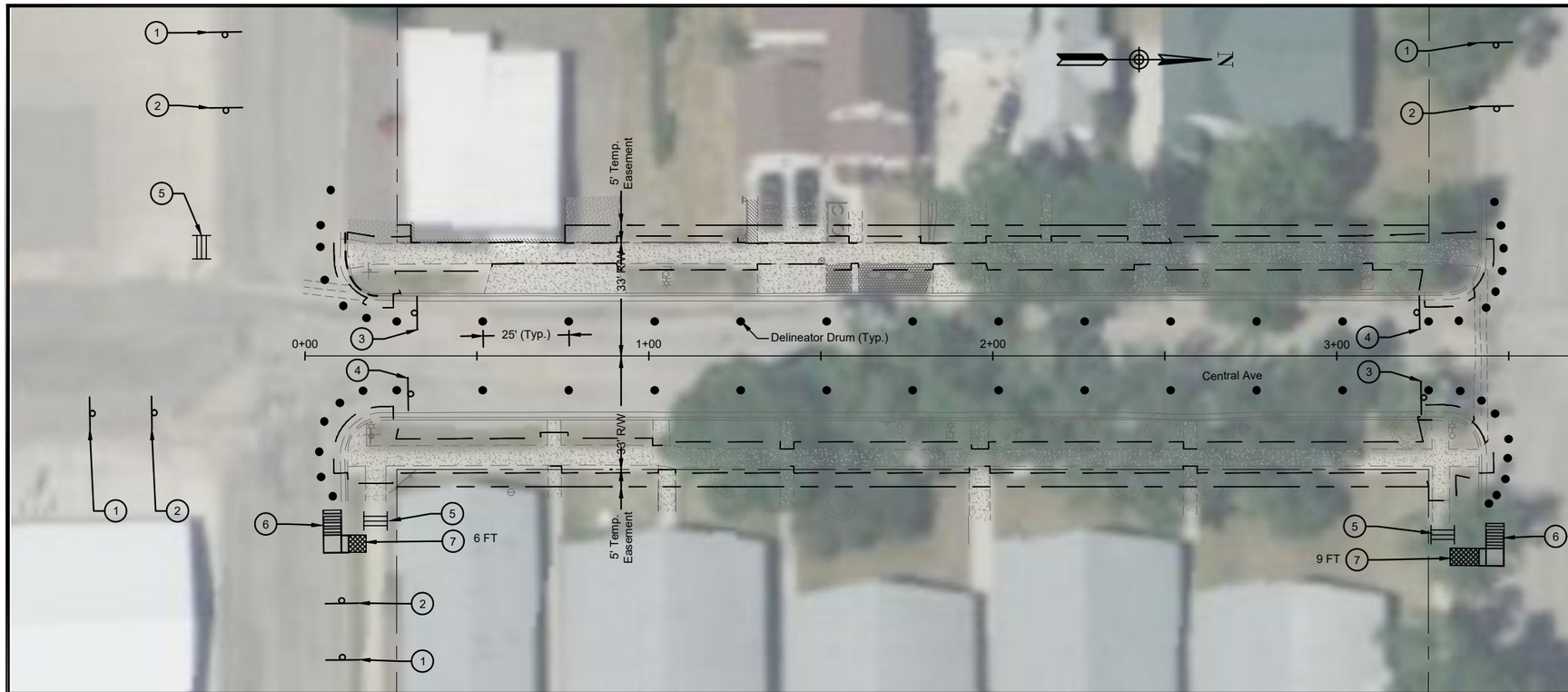
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1054	**SIDEWALK BARRICADE**	**EA**	**6**
704-1058	**TEMPORARY PEDESTRIAN WALKWAY**	**LF**	**25**
704-1060	**DELINEATOR DRUMS**	**EACH**	**100**
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
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	
704-1500	OBLITERATION OF PVMT MK	SF	
704-2108	**TEMPORARY CURB RAMP**	**EA**	**3**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
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
AUSTIN T. BECKER
PE-27997
DATE 11/15/2024
NORTH DAKOTA

Traffic Control Devices List
Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	100	2



①	ROAD WORK AHEAD	W20-1-48 Portable
②	ROAD NARROWS	W5-1-48 Portable
③	NO PARKING ANY TIME	R7-1-12R Portable
④	NO PARKING ANY TIME	R7-1-12L Portable
⑤	SIDEWALK CLOSED	R9-9-24 Sidewalk Barricade Mounted
⑥		Temporary Pedestrian Ramp
⑦		Temporary Pedestrian Walkway

REGISTERED PROFESSIONAL ENGINEER
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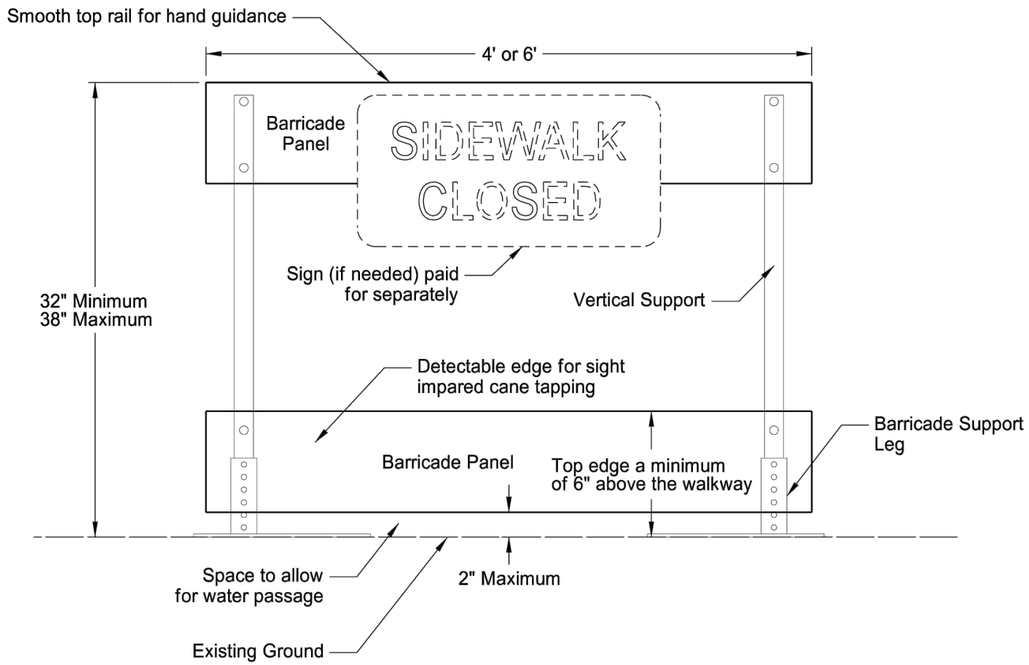
SCALE (H): 1" = 40'
SCALE (V): N/A

20 10 0 20 40

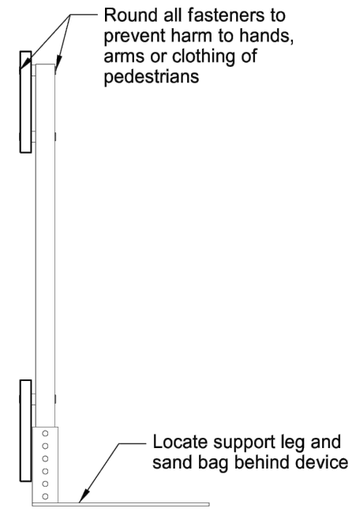
Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Work Zone Traffic Control
Layout

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	100	3



Front View

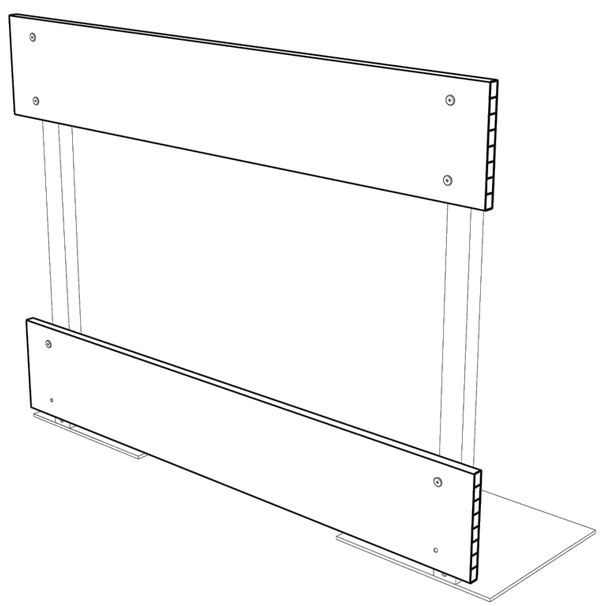


End View

NOTES:

Sidewalk Barricades

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



Perspective View

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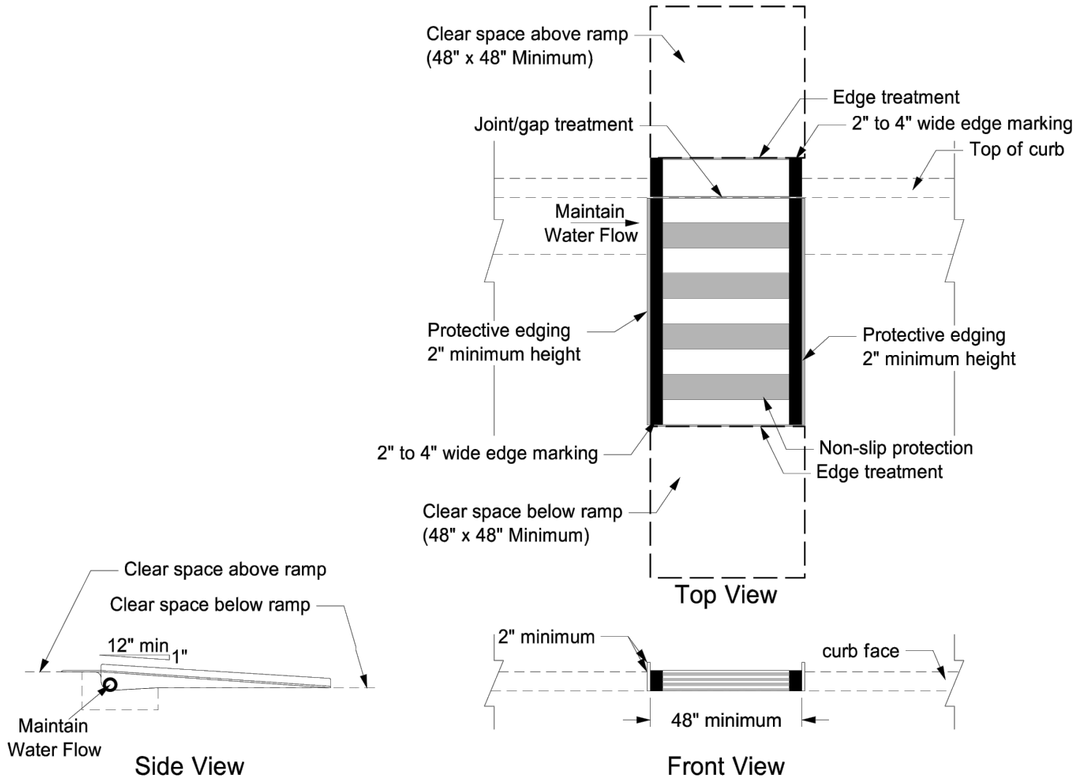
SCALE (H): N/A
SCALE (V): N/A

0.5 0.25 0 1 2

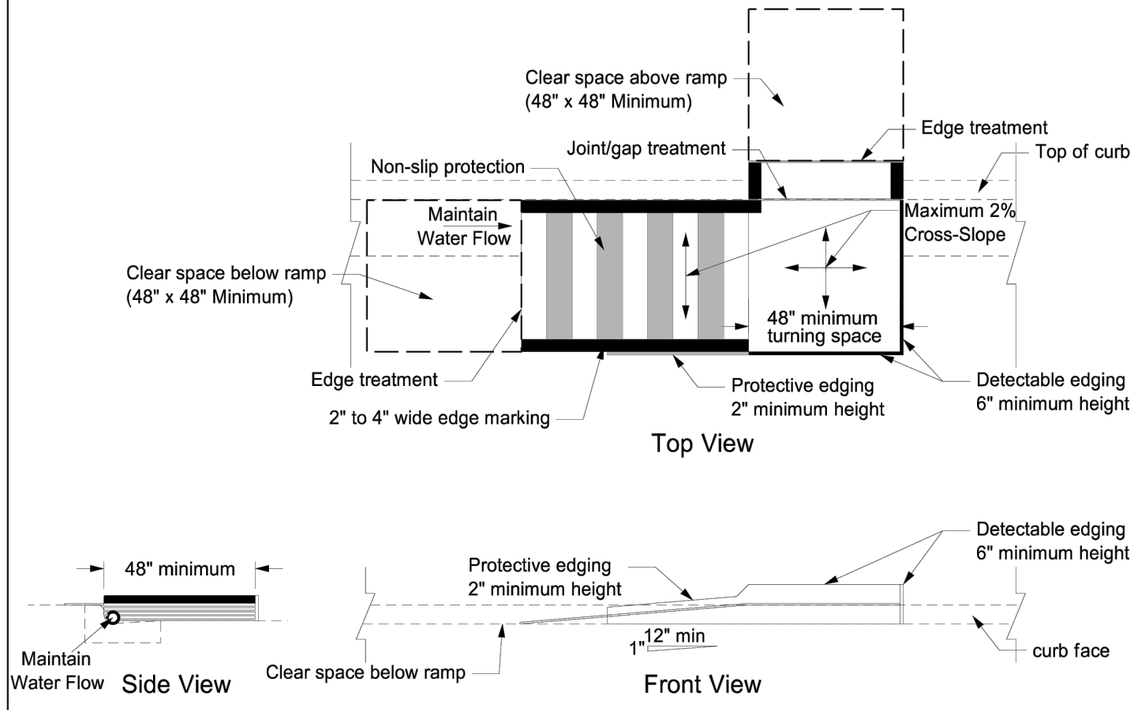
Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Work Zone Traffic Control
Sidewalk Barricade Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	100	4

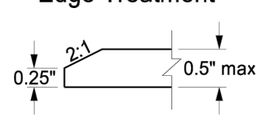


Temporary Perpendicular Curb Ramp



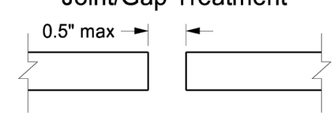
Temporary Parallel Curb Ramp

Edge Treatment



Maximum Surface
Height Change Detail

Joint/Gap Treatment



Maximum Width
Lateral Joints or Gaps

REGISTERED PROFESSIONAL ENGINEER
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SCALE (H): N/A
SCALE (V): N/A

0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Work Zone Traffic Control
Temporary Pedestrian Curb Ramp Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	TAC-0038(052)	110	1

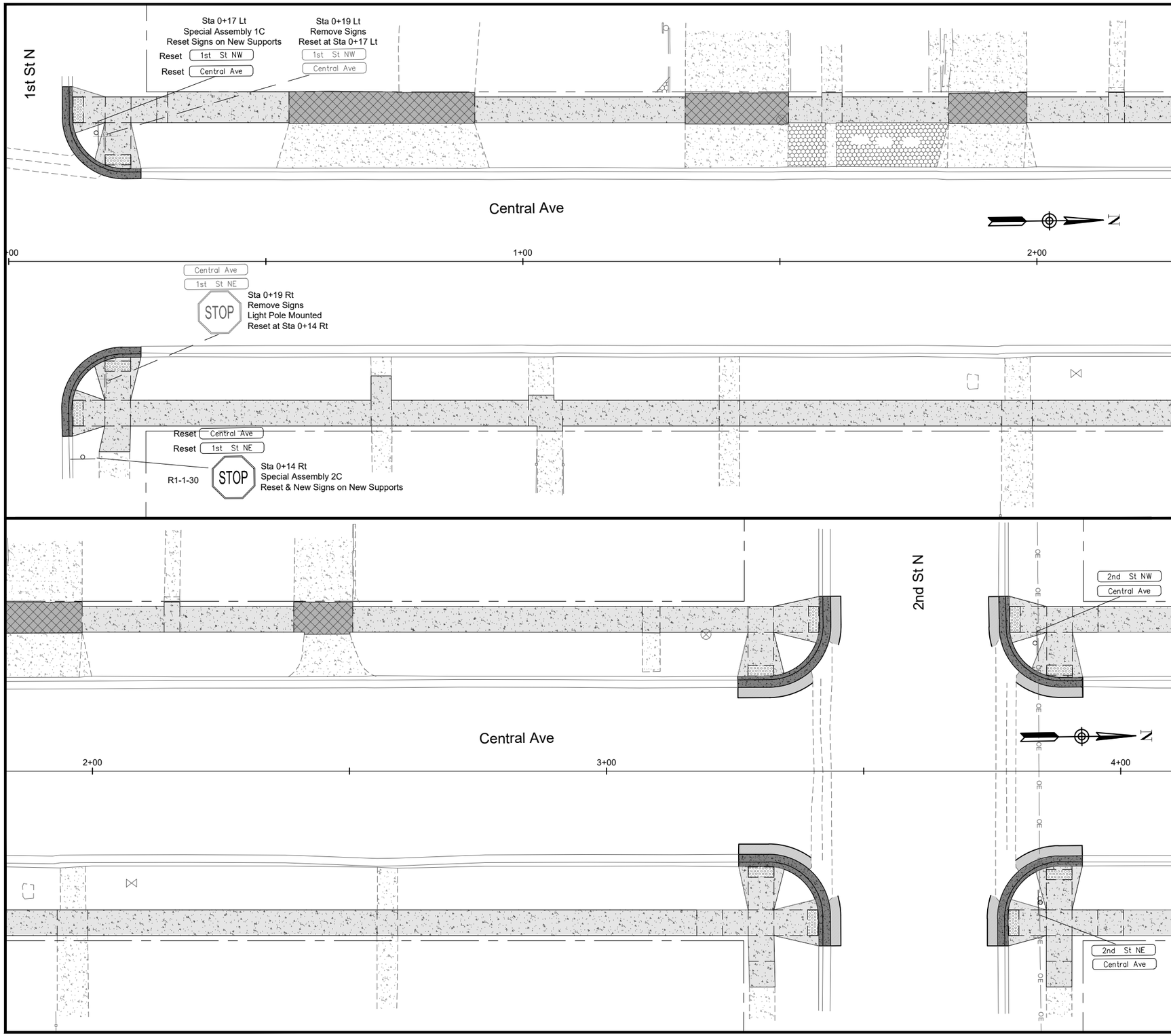
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	Sign Support Length 2nd LF	Sign Support Length 3rd LF	Sign Support Length 4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	Sleeve Length 2nd LF	Sleeve Length 3rd LF	Sleeve Length 4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
Central Ave																							
0+14 Rt	SA 2C			5.2	11.2				7.0	2.5 x 2.5 10 ga	11.8						1	4	3 x 3 7 ga	1		1	
0+17 Lt	SA 1C				9.2				7.0	2.25 x 2.25 12 ga	10.2						1	4	2.5 x 2.5 12 ga	1			
3+83 Lt	SA 1C		5.3		9.2				7.0	2.25 x 2.25 12 ga	10.2						1	4	2.5 x 2.5 12 ga				
3+84 Rt	SA 1C		5.3		9.2				7.0	2.25 x 2.25 12 ga	10.2						1	4	2.5 x 2.5 12 ga				
6+93 Rt	SA 2C			5.2	11.2				7.0	2.25 x 2.25 12 ga	12.2	3.3				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga	1		1	
Sub Total			10.6	10.4		**Total**	50.0										**Total**	20.0		3	0	2	
Grand Total			**10.6**	**10.4**		**Total**	**50.0**										**Total**	**20**	**0**	**3**	**0**	**2**	

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

Sign Summary
Perforated Tube

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	110	2



REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

ACKERMAN ESTVOLD
1907 17th St SE · Minot, ND 58701
701.837.8737 · www.ackerman-estvold.com
Minot, ND | Fargo, ND | Williston, ND | Boise, ID

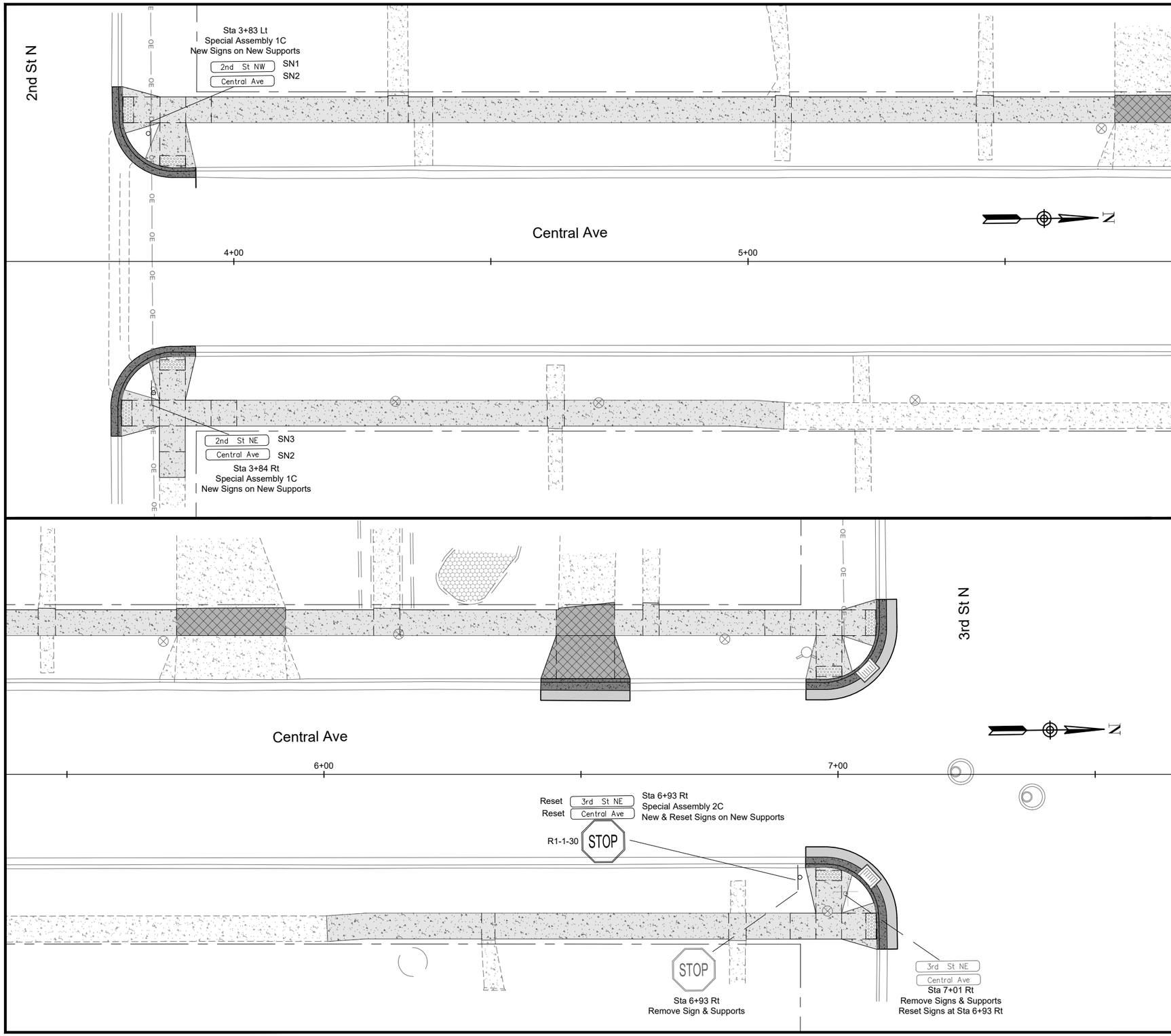
SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Signing
1st St NW to 2nd St NW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	110	3



REGISTERED PROFESSIONAL ENGINEER
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DATE
11/15/2024
NORTH DAKOTA

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Minot, ND | Fargo, ND | Williston, ND | Boise, ID

SCALE (H): 1" = 20'
SCALE (V): N/A

10 5 0 10 20

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Signing
2nd St NW to 3rd St NW

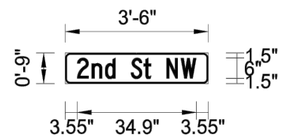
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	110	4

SIGN NUMBER	SN1
WIDTH X HEIGHT	3'-6" x 0'-9"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
3+83 Lt

AREA: 2.6 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Street Name.ssi

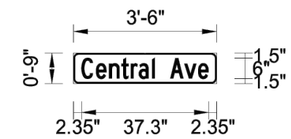
LETTER POSITION (X)									LENGTH	SIZE	SERIES
2	n	d		S	t		N	W	34.9	6/4.5	C 2000
3.5	7.8	11.7	14.8	19.3	23	25.2	29.7	33.9			

SIGN NUMBER	SN2
WIDTH X HEIGHT	3'-6" x 0'-9"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
3+83 Lt
3+84 Rt

AREA: 2.6 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Street Name.ssi

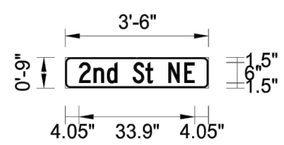
LETTER POSITION (X)											LENGTH	SIZE	SERIES
C	e	n	t	r	a	l		A	v	e	37.3	6/4.5	C 2000
2.4	6.6	10.5	14.1	16.8	19.2	23.1	23.9	28.4	32.6	36.6			

SIGN NUMBER	SN3
WIDTH X HEIGHT	3'-6" x 0'-9"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
3+84 Rt

AREA: 2.6 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Street Name.ssi

LETTER POSITION (X)									LENGTH	SIZE	SERIES
2	n	d		S	t		N	E	33.9	6/4.5	C 2000
4.1	8.3	12.2	15.3	19.8	23.6	25.7	30.2	34.9			

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE
11/15/2024
NORTH DAKOTA

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Minot, ND | Fargo, ND | Williston, ND | Boise, ID

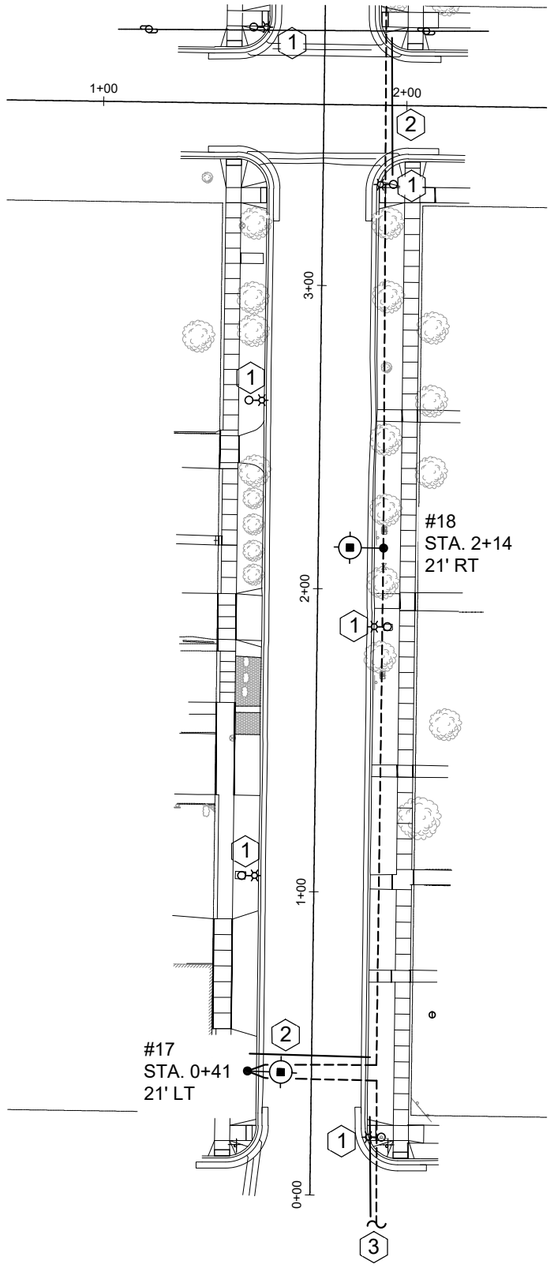
SCALE (H): N/A
SCALE (V): N/A

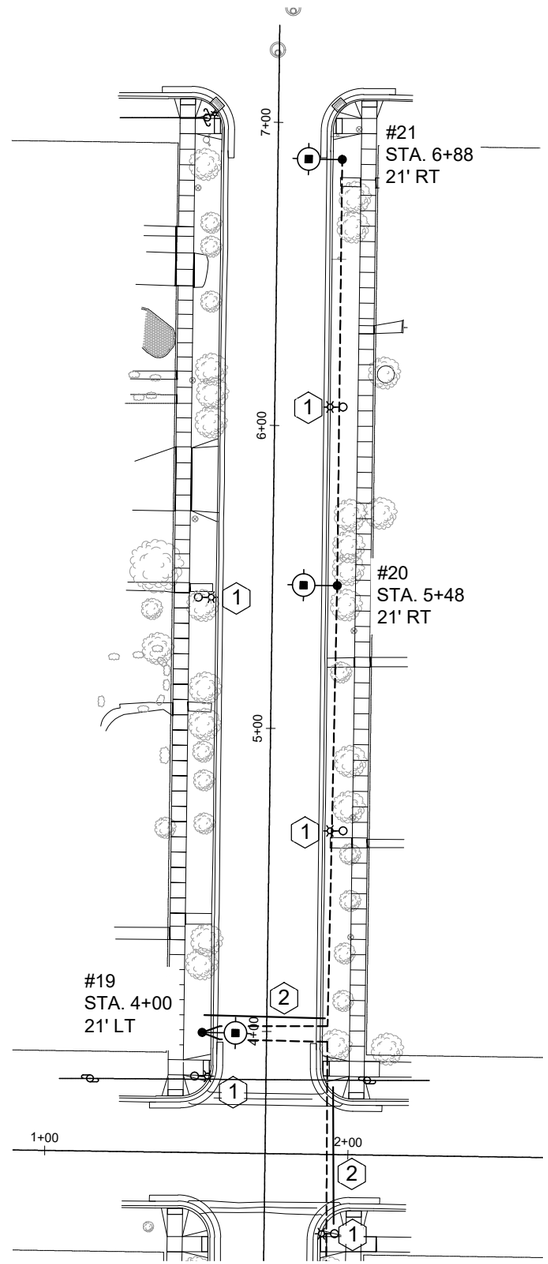
0.5 0.25 0 1 2

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Signing Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	140	1





KEYNOTES

1. REMOVE AND DISPOSE OF EXISTING LIGHTING STANDARD/LUMINAIRE AND CONCRETE FOUNDATION.
2. CONDUIT UNDER ROADWAY SHALL BE INSTALLED BY DIRECTIONAL BORING METHOD.
3. SPLICE TO EXISTING MAIN STREET LIGHTING CIRCUIT VIA EXISTING PULL BOX LOCATED AT STA. -3+50, 24' RT. INSTALL CONDUIT BY DIRECTION BORING METHOD FROM STA. 0+26, 21' RT TO PULL BOX.

QUANTITIES: INCLUDED IN PAY ITEM "LIGHTING SYSTEM"	
CONCRETE FOUNDATION-HIGHWAY LIGHTING	5 EA
CABLE TRENCH-TYPE II	615 LF
2IN DIAMETER RIGID CONDUIT	507 LF
MULTIPLE UNDERGROUND CABLE 2NO4-1NO6 STYLE USE	1164 LF
ORNAMENTAL LT STD 20FT MT HT	5 EA
ORNAMENTAL LED LUMINAIRE	5 EA
REMOVE LIGHT STANDARD	9 EA

STANDARD NUMBER	STATION & OFFSET	DELIVERED LUMENS	LUMINAIRE DISTRIBUTION	BASE DIM. DIA. x DEPTH
17	0+41 21'LT	11,000	R3	24 x 5'
18	2+14 21' RT	11,000	R3	24 x 5'
19	4+00 21' LT	11,000	R3	24 x 5'
20	5+48 21' RT	11,000	R3	24 x 5'
21	6+88 21' RT	11,000	R3	24 x 5'

DESCRIPTION	CABLE TRENCH-TYPE II	2 IN RIGID CONDUIT	MULTIPLE UNDERGROUND CABLE 2NO4-1NO6 STYLE USE
STA. -3+50 24'RT TO 0+41 21'RT TO 0+41 21' LT	15 LF	418 LF	443 LF
STA. 0+41 21'LT TO 2+14 21'RT	173 LF		181 LF
STA. 2+14 21'RT TO 4+00 21'RT TO 4+00 21'LT	139 LF	89 LF	236 LF
STA. 4+00 21'LT TO 5+48 21'RT	148 LF		156 LF
STA. 5+48 21'RT TO 6+88 21'RT	140 LF		148 LF

N

REGISTERED PROFESSIONAL ENGINEER
JASON L. HUNZE
4879
DATE 11/15/2024
NORTH DAKOTA

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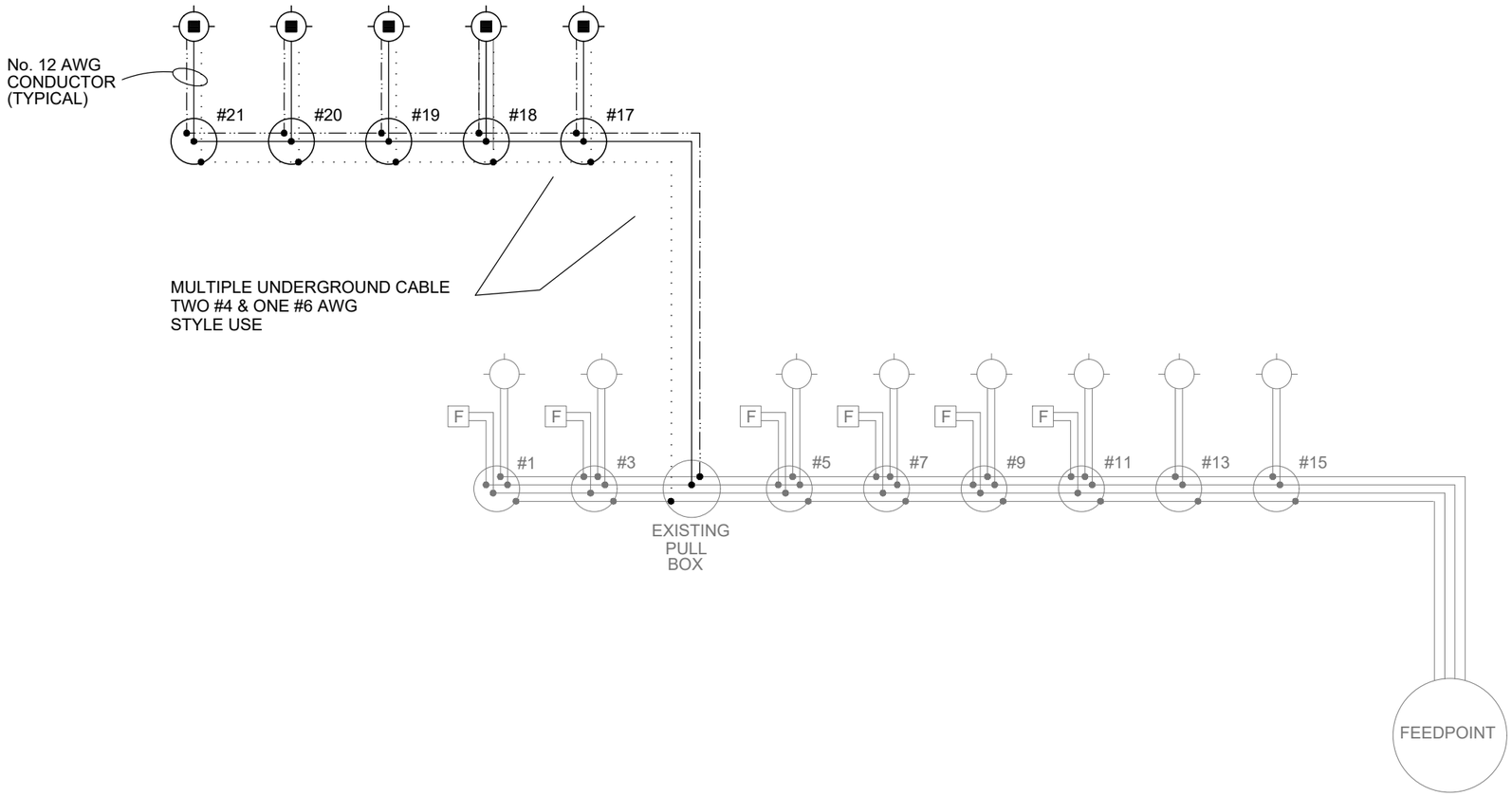
SCALE (H): 1" = 50'
SCALE (V): NA

25 12.5 0 25 50

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Lighting Layout

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-0038(052)	140	2



SCHEMATIC LEGEND

- LIGHT STANDARD
- LIGHTING CIRCUIT #2 PHASE "A" CONDUCTOR
- LIGHTING CIRCUIT #2 PHASE "B" CONDUCTOR
- NEUTRAL CONDUCTOR
- #6 AWG GROUND CONDUCTOR

REGISTERED PROFESSIONAL ENGINEER
JASON L. HUNZE
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SCALE (H): NA
SCALE (V): NA

0 0 0

Central Avenue Sidewalk Improvements
From 1st St NW to 3rd St NW
Mohall, ND

Schematic

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Bk	back
BF	back face
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
BI	beehive inlet
Beg	begin
BG	below grade
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
BH	bore hole
Bot	bottom
Blvd	Boulevard
Bndry	boundary
Brkwy	breakaway
Br	bridge
Bldg	building
Bus.	business
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
CL or ℄	centerline
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
CECB	concrete erosion control blanket
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSFES	corrugated steel flared end section
CSP	corrugated steel pipe
CSTES	corrugated steel traversable end section
Co	County
Crse	course
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	crossroad
Crn	crown
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
DInt	delineate
DIntr	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
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

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

08/16/22

NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Gov	government
Grd	graded/grade
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ht	height
Hel	helical
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
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
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
MGS	Midwest Guardrail System
MM	mile marker
MP	mile post
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Neop	neoprene
Ntwk	network
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number

Obsc	obscure(d)
Ocpd	occupied
Ocpy	occupy
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
Perm	permanent
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl or ℙ	plate
Pt	point
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd or Pref	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
RP	reference point
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCFES	reinforced concrete flared end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
RCTES	reinforced concrete traversable end section
Reinf	reinforcement
Res	reservation
Res	residence
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

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

KIRK J. HOFF
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Kirk J. Hoff

08/16/22

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

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
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
WC	witness corner

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

KIRK J. HOFF
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PE-4683
ENGINEER
NORTH DAKOTA

08/16/22

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

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

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08/16/22

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

07-01-14

REVISIONS

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

- Geotextile Fabric Type D — D — D
- Geogrid — Geo — Geo
- Geotextile Fabric Type R — R — R
- Geotextile Fabric Type R1 — R — R
- Geotextile Fabric Type RR — RR — RR
- Geotextile Fabric Type S — S — S
- Subgrade Reinforcement
- 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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups
12-18-20	General Revisions

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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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions

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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)

NORTH DAKOTA
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12-18-20	General Revisions

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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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REVISIONS

DATE	CHANGE
12-18-20	General Revisions

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

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

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

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

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

Median Drain

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

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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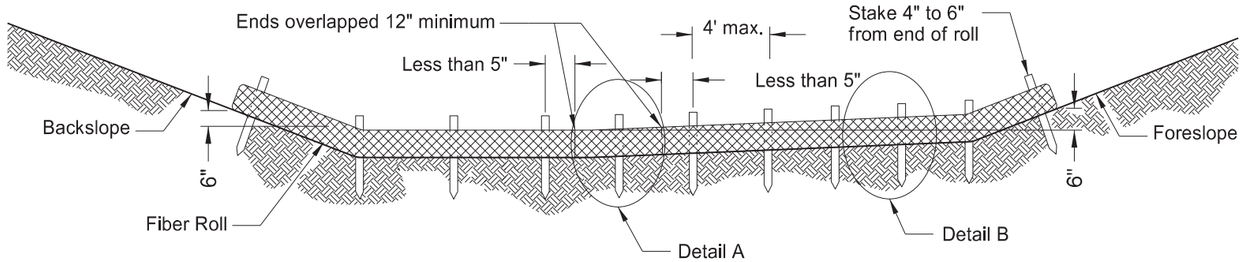
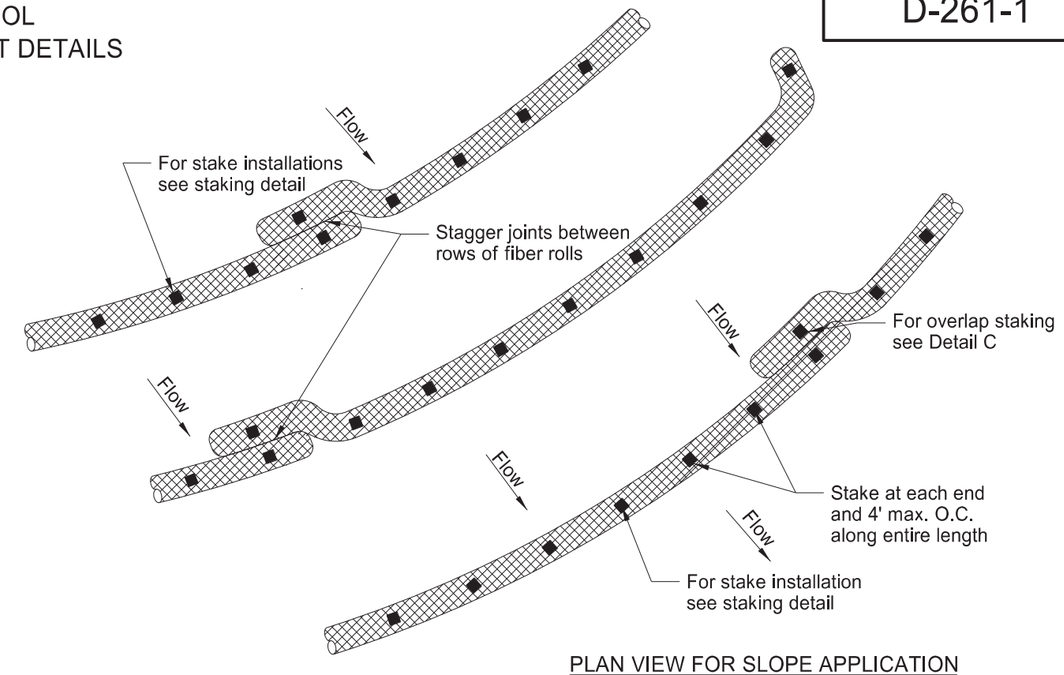
EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1

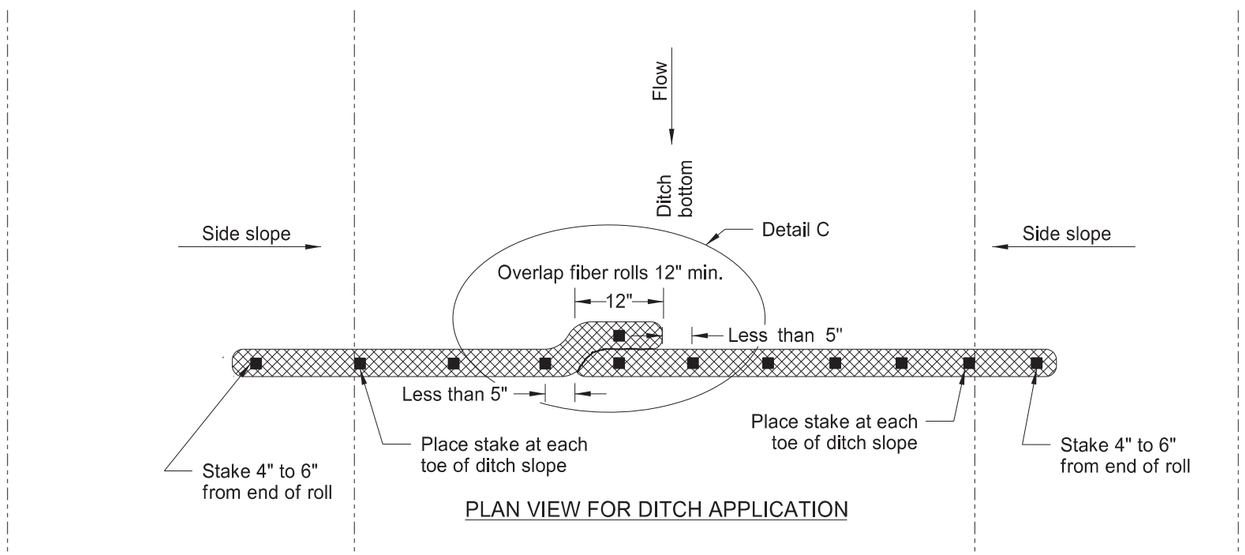


12 OR 20 INCH FIBER ROLL - DITCH BOTTOM

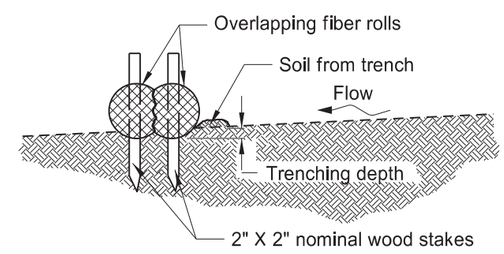


PLAN VIEW FOR SLOPE APPLICATION

Ensure fiber rolls are placed along the contours of the slope.

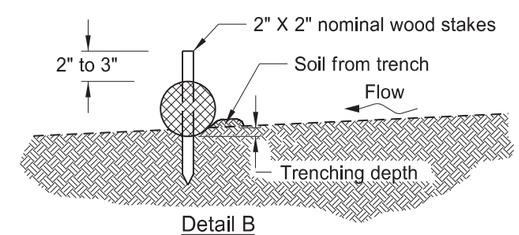


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

REVISIONS

DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp
04-22-24	Slope Plan View-Overlap Change.

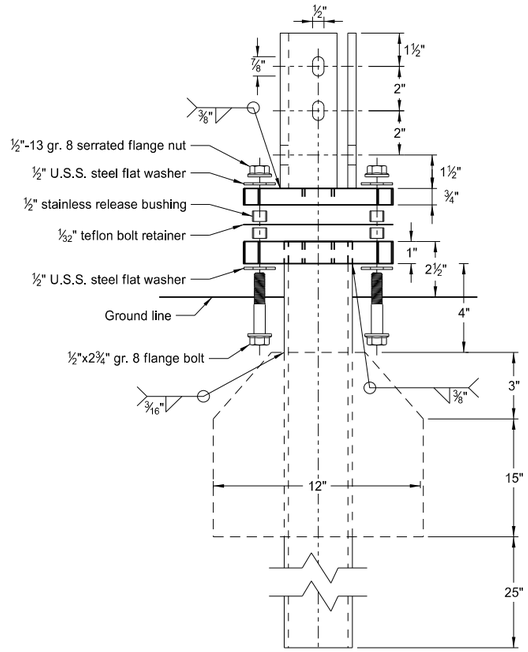
KIRK J. HOFF REGISTERED PROFESSIONAL ENGINEER PE-4683 NORTH DAKOTA

04/22/24

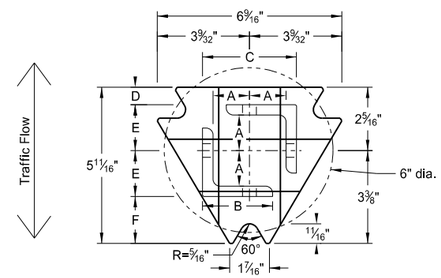
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

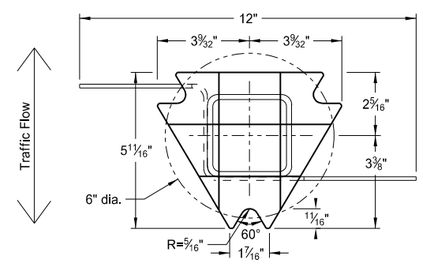
Perforated Tube



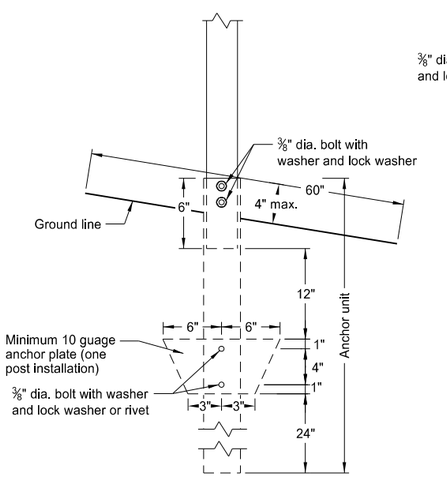
Multi-Directional
Slip Base Assembly



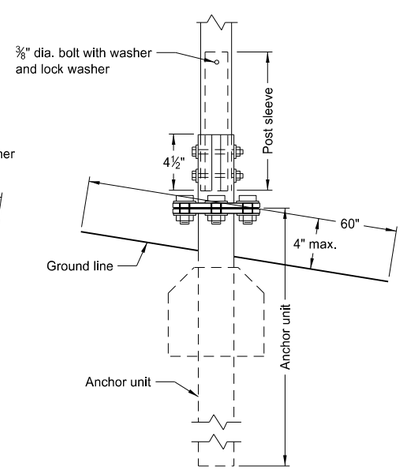
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



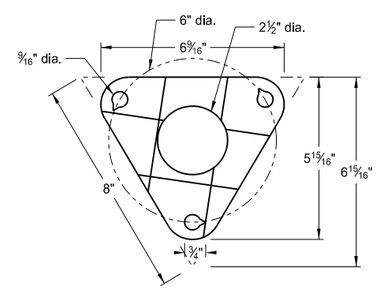
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50



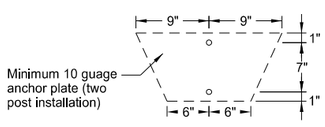
Anchor Unit and Post Assembly



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"	1⅞"
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

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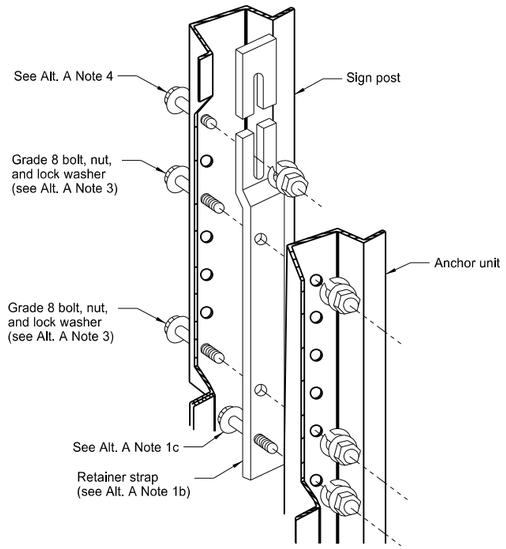
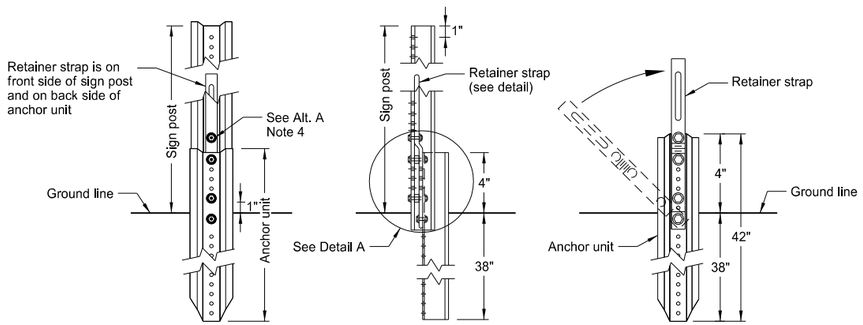
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



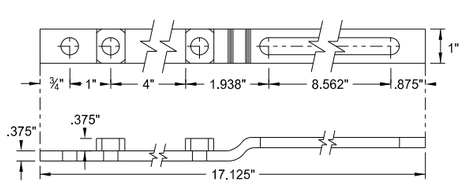
Detail A



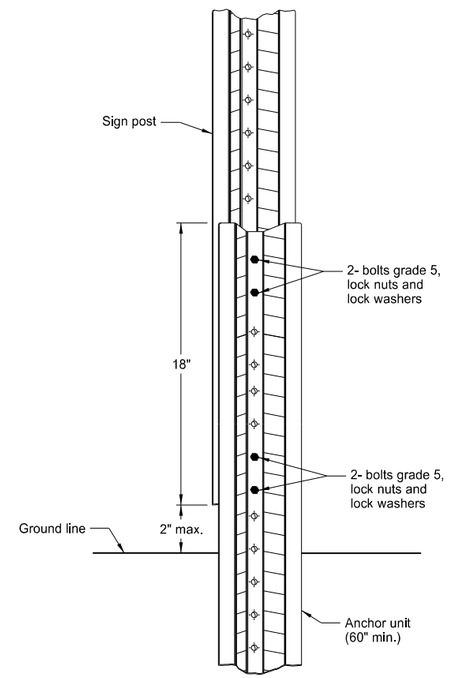
Front View | Side View | Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.

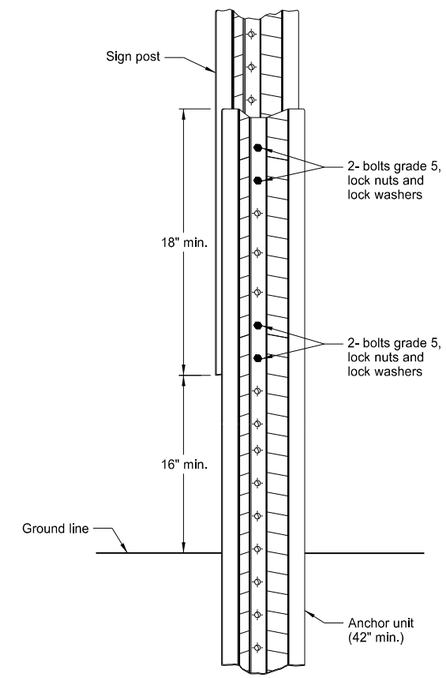


Retainer Strap Detail



Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

2-28-14

REVISIONS

DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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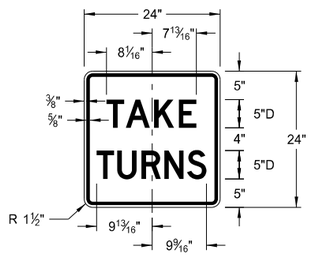
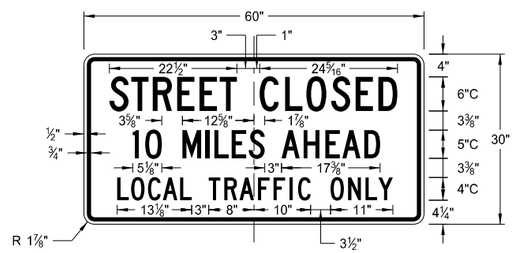
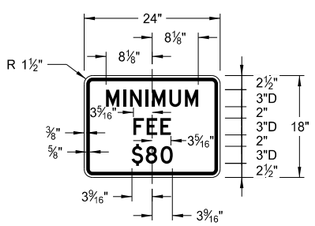
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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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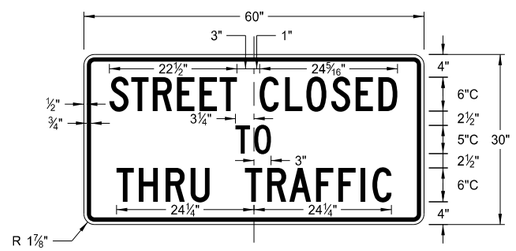

R11-4a-60
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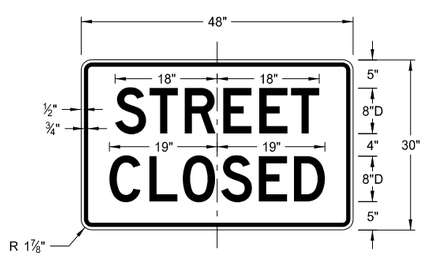
Background: white



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

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

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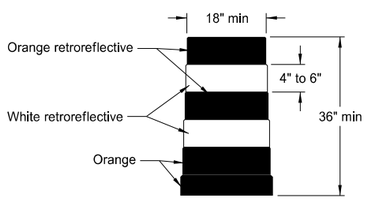
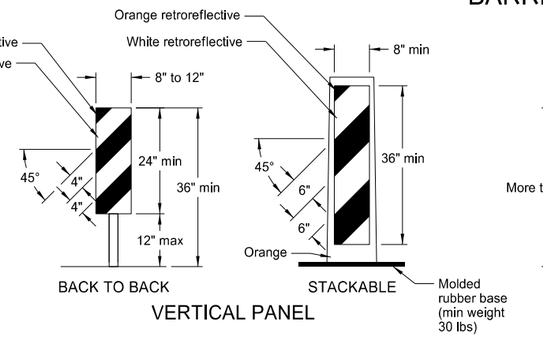
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



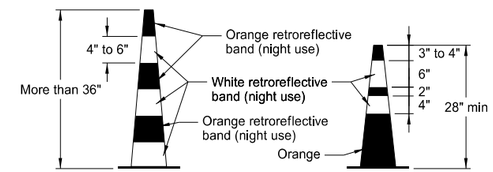
DELINEATOR DRUM

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.



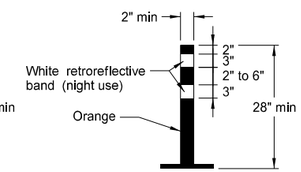
VERTICAL PANEL

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.



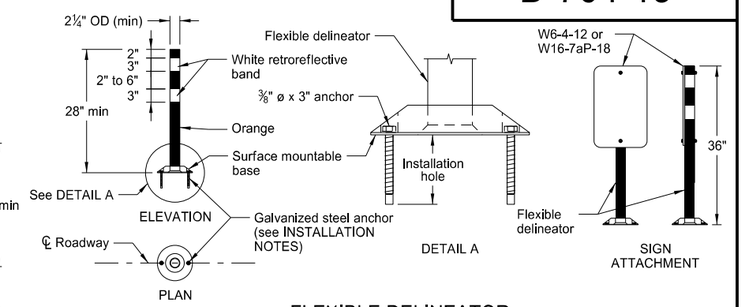
TRAFFIC CONE

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

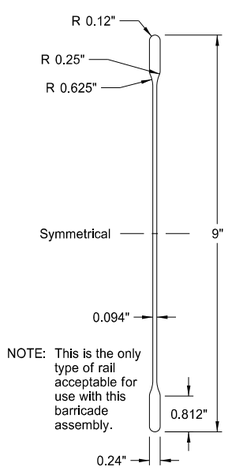
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



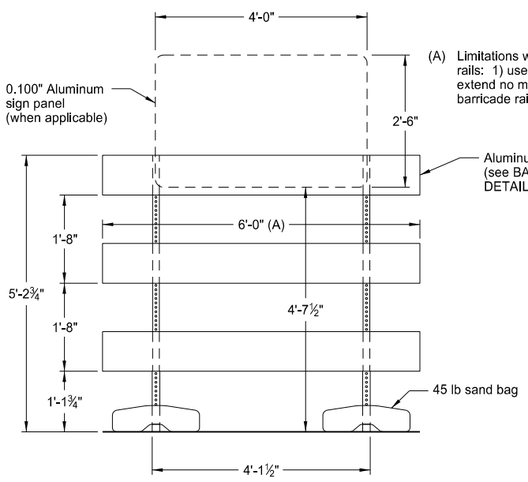
FLEXIBLE DELINEATOR

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.

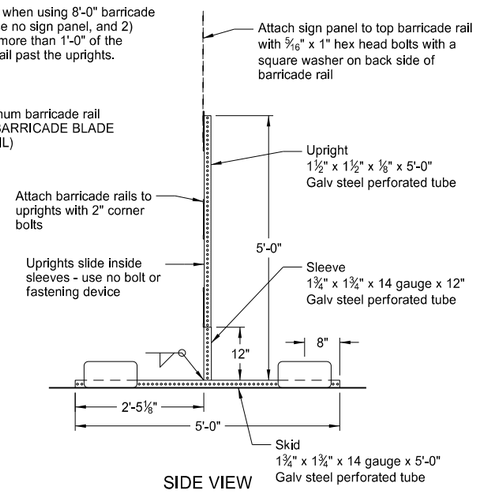


BARRICADE BLADE DETAIL



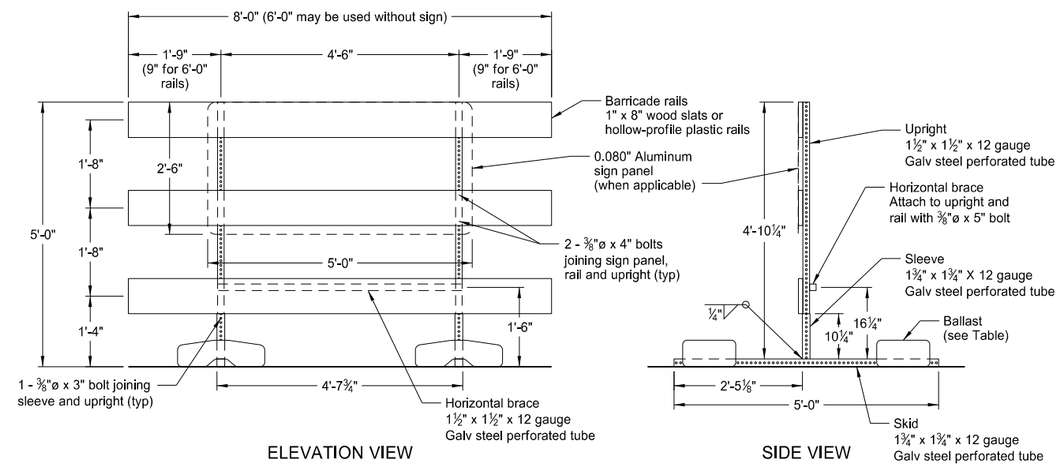
ELEVATION VIEW

(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.



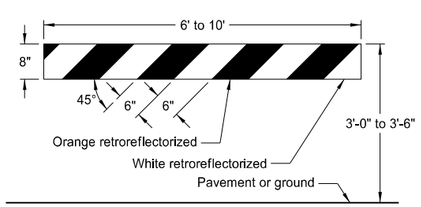
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

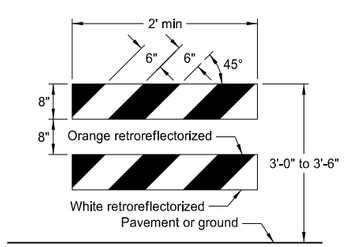


BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

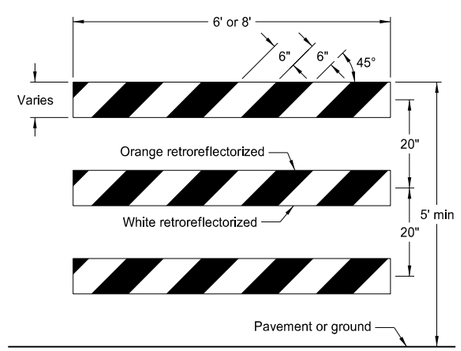
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

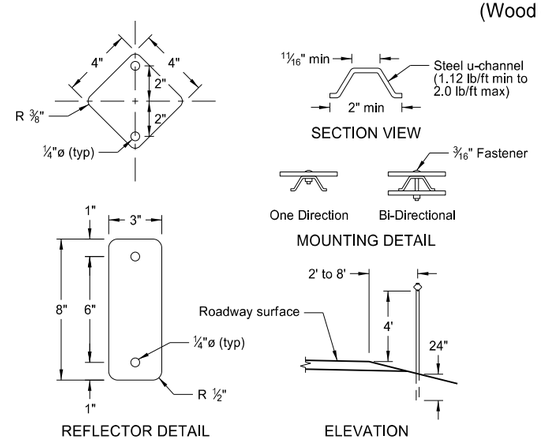


TYPE II BARRICADE



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

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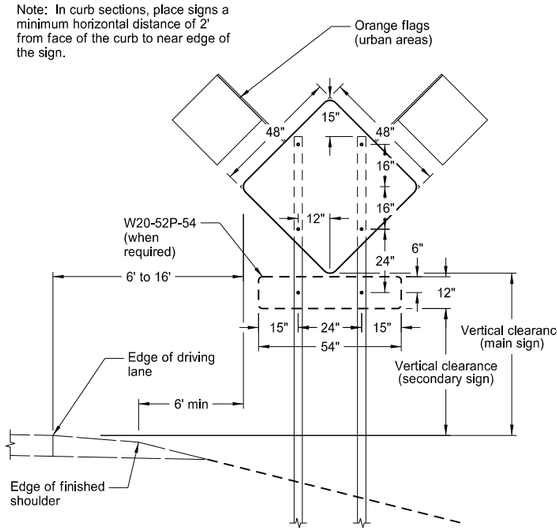
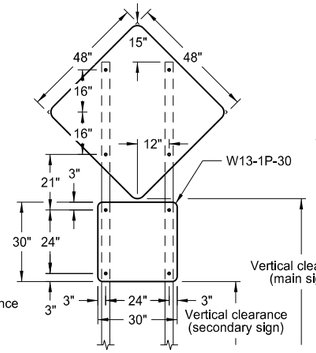
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

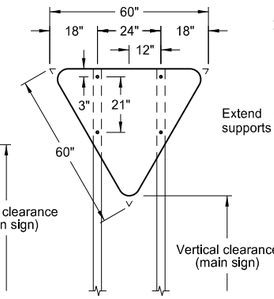
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



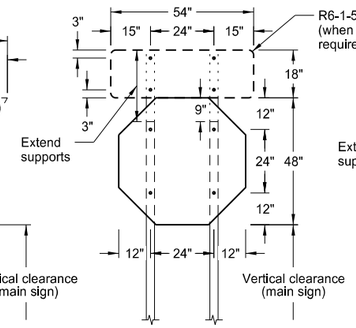
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



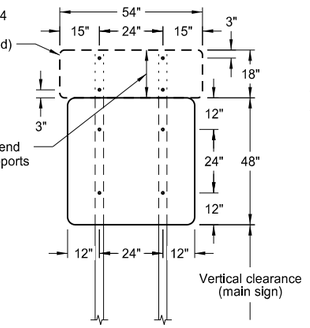
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



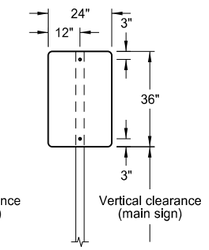
R1-2-60 - YIELD SIGN



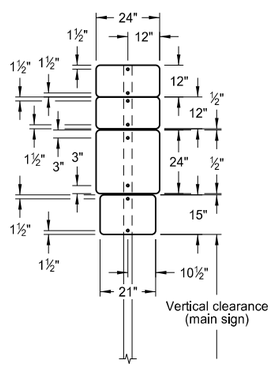
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



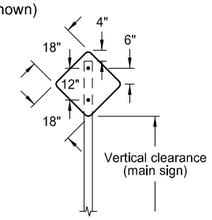
48" x 48" SIGN
(with R6-1-54 sign as required)



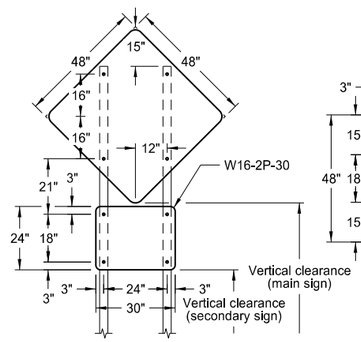
24" x 36" SIGN



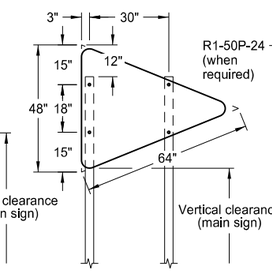
24" x 24"
ROUTE MARKER
ASSEMBLY



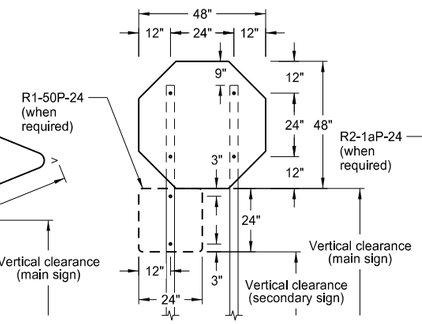
18" x 18"
DIAMOND SIGN



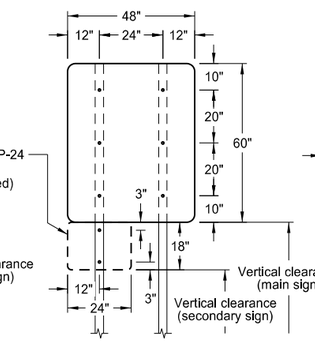
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



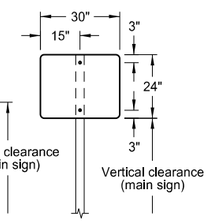
W14-3-64 - PENNANT SIGN



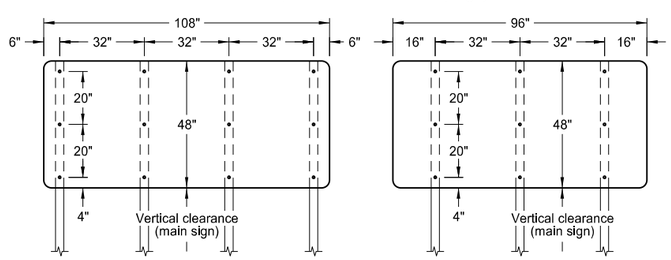
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



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

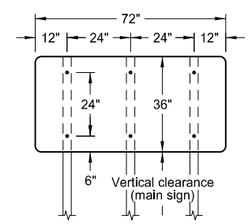


30" x 24" SIGN

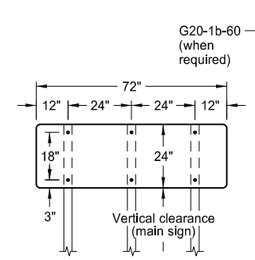


108" x 48" SIGN

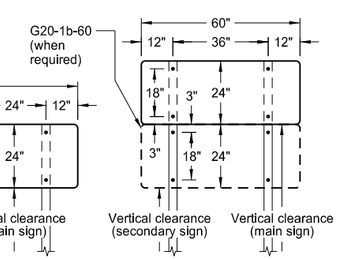
96" x 48" SIGN



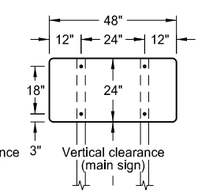
72" x 36" SIGN



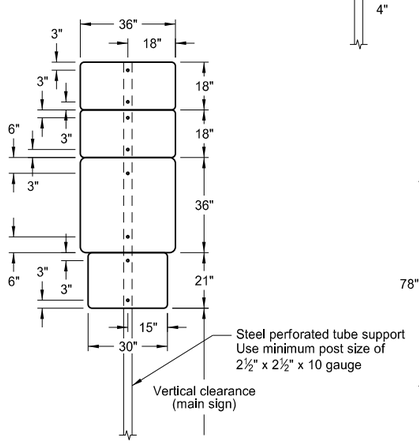
72" x 24" SIGN



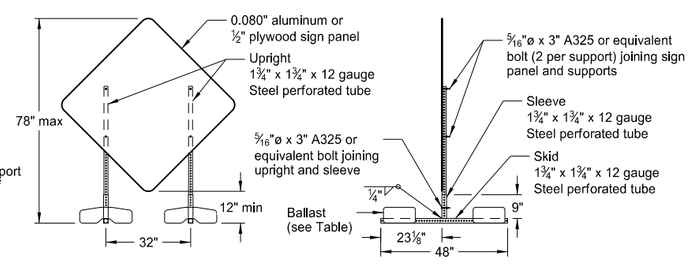
60" x 24" SIGN



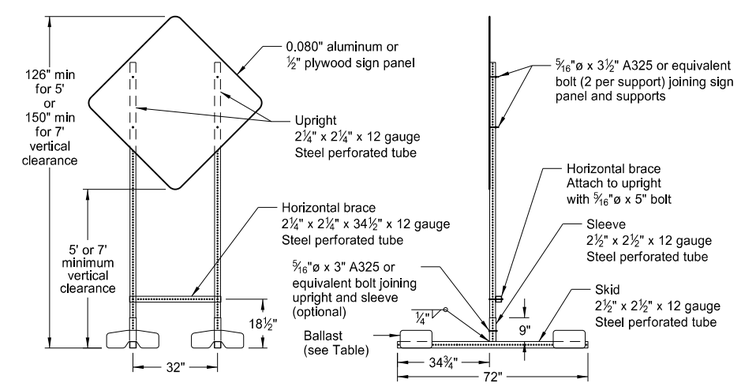
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-4-13

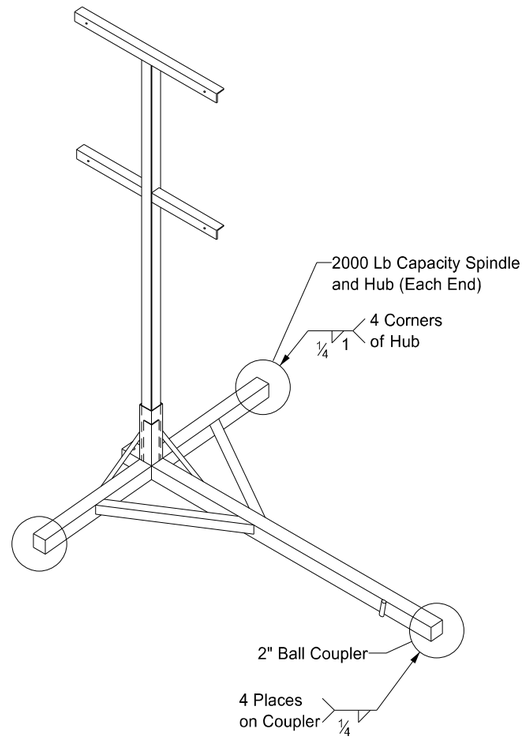
REVISIONS

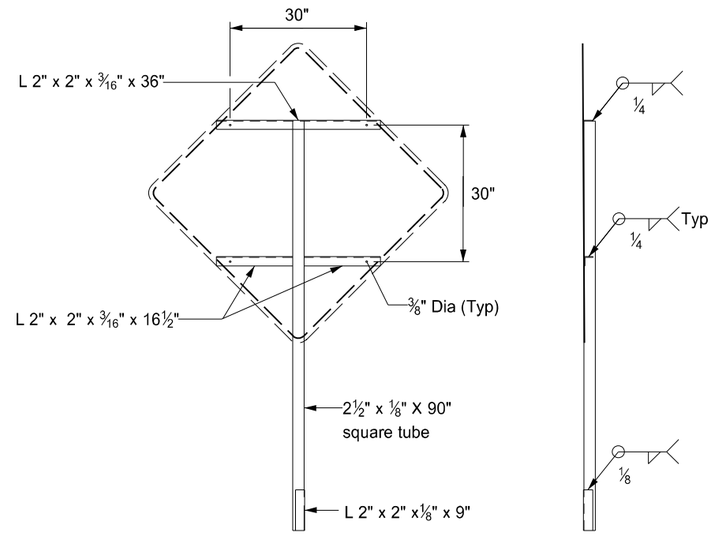
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

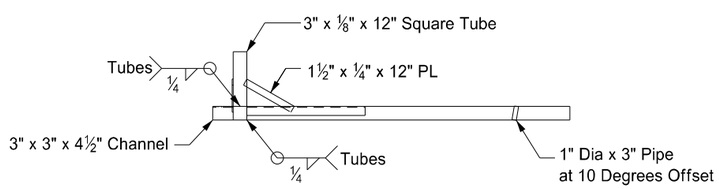


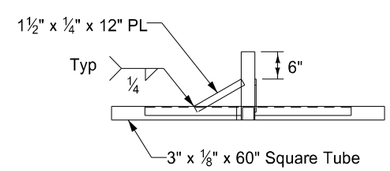


FRONT

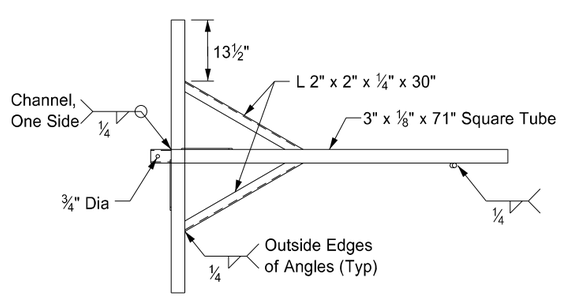
RIGHT

SIGN SUPPORT





RIGHT



TOP

TRAILER

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.

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

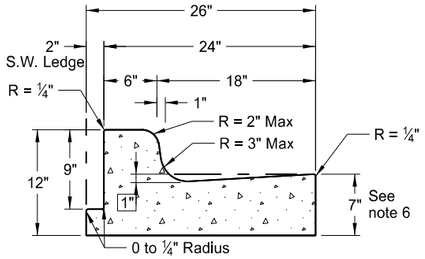
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

Kirk J Hoff

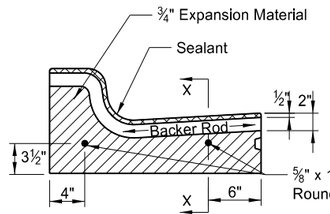
12 02 2020

Curb & Gutter and Valley Gutter

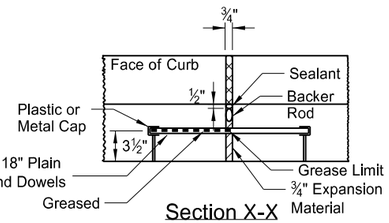
D-748-1



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

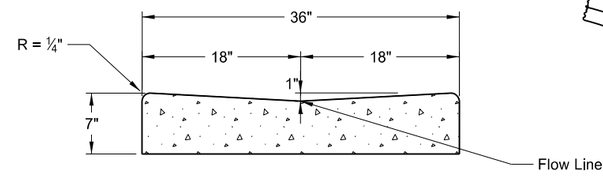


Detail

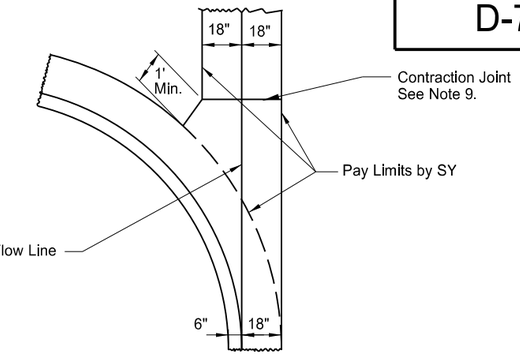


Section X-X

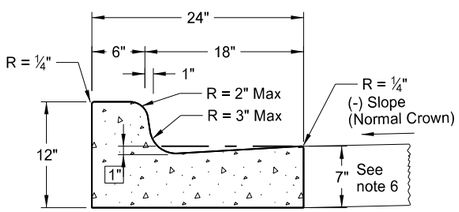
Isolation Joint



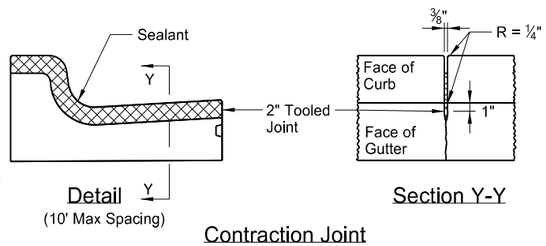
36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan



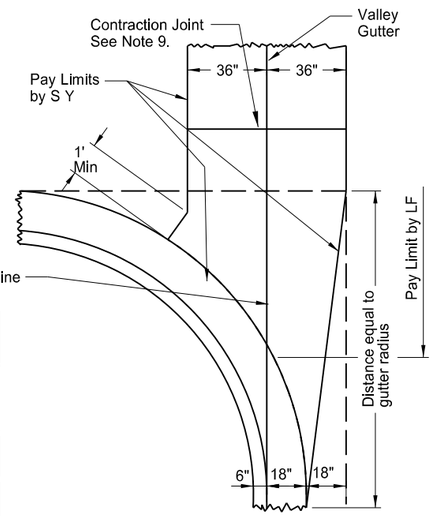
Curb & Gutter Type 1 (Sec. A)



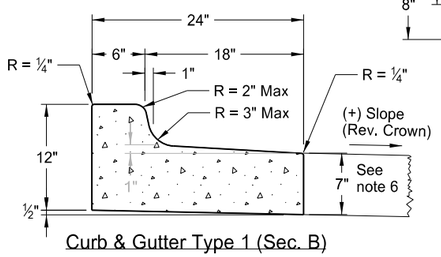
Detail
(10' Max Spacing)

Section Y-Y

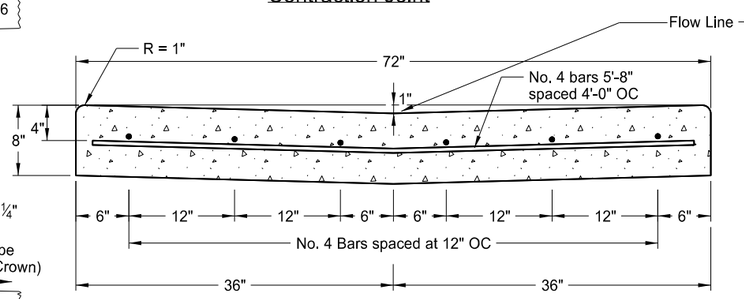
Contraction Joint



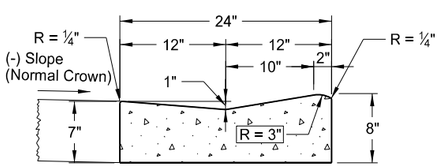
72" Concrete Valley Gutter Plan



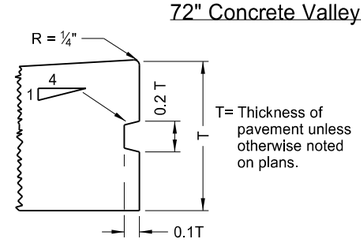
Curb & Gutter Type 1 (Sec. B)



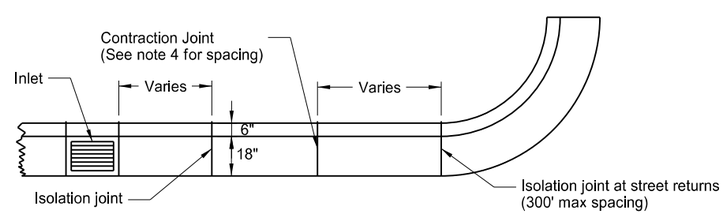
72" Concrete Valley Gutter Detail



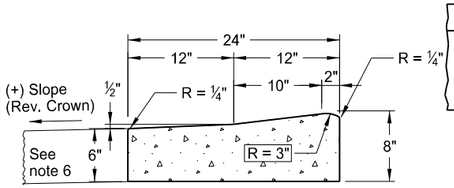
Mountable Curb & Gutter Type 1 (Sec. A)



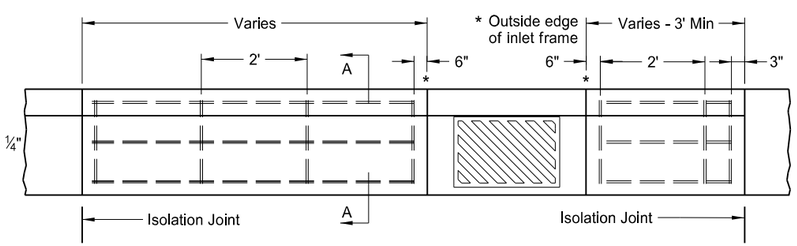
Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)



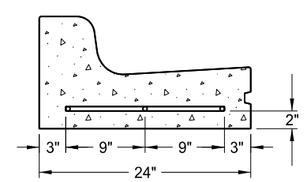
Joint Location Detail



Mountable Curb & Gutter Type 1 (Sec. B)



Curb & Gutter Reinforcing at Inlets



Section A-A

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use ¾" expansion joint filler for isolation joint material. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot bituminous pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: Seal contraction and isolation joints as shown in the details. Use joint sealant for contraction joints that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Face of Gutter Depth: For hot bituminous pavement use 7" gutter depth as shown. For PCC pavements, match the gutter depth to the depth of adjacent PCC pavement or to construct a 7" depth as shown.
7. Tie curb and gutter to abutting PCC pavement with No. 3 bars, 1'-6" in length, spaced at 4' centers.
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint, the same shape as the curb and gutter just ahead of the taper. Install an 18" tie bar across the joint.
9. Valley Gutter Joints: Form, saw, or score ⅛" min. to ⅜" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-7-2013

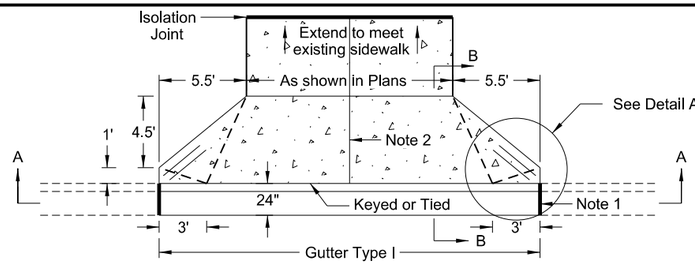
REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.

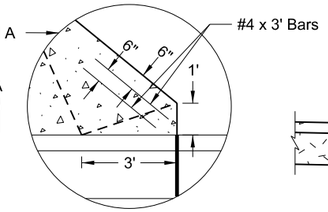
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8-27-19 and the original document is stored at the North Dakota Department of Transportation

CONCRETE DRIVEWAY - URBAN

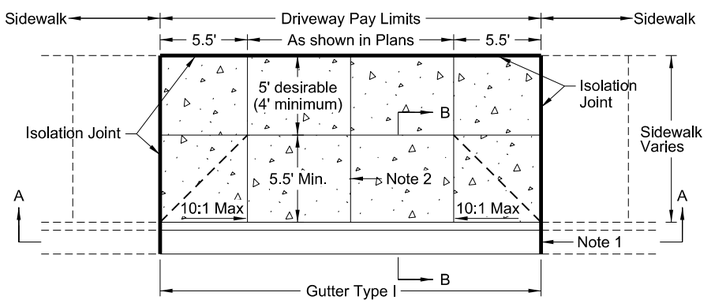
D-750-1



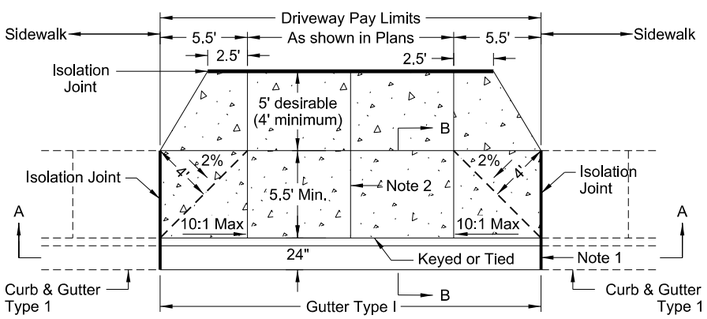
Driveway Type 1



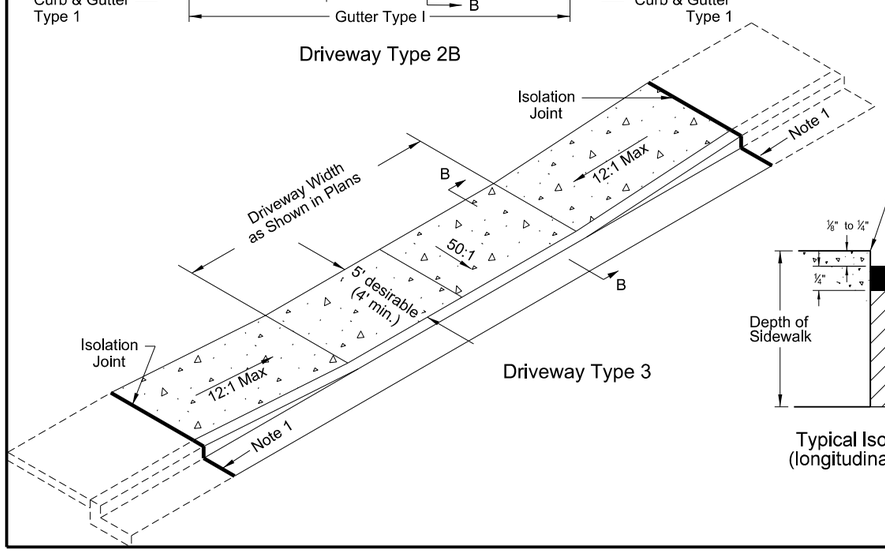
Detail A



Driveway Type 2A



Driveway Type 2B



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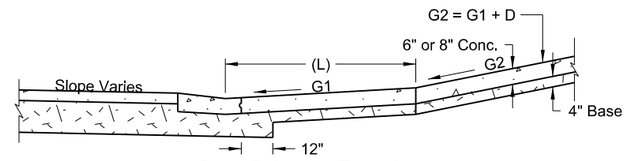
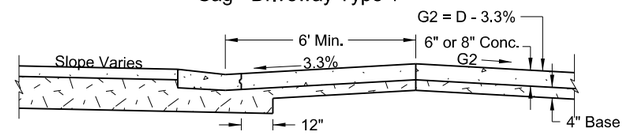


Sag - Driveway Type 1



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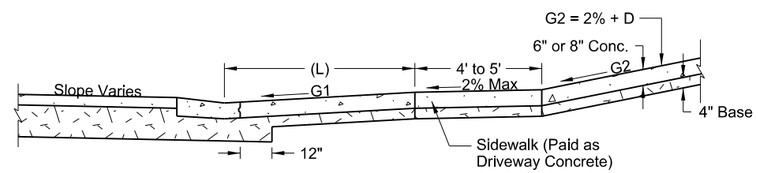
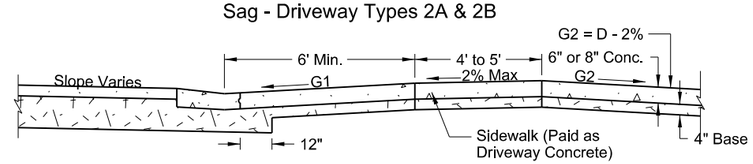


Sag - Driveway Types 2A & 2B



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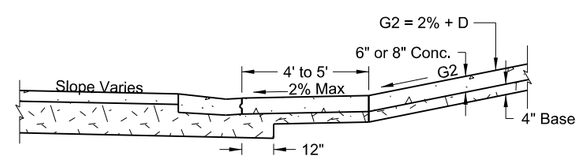
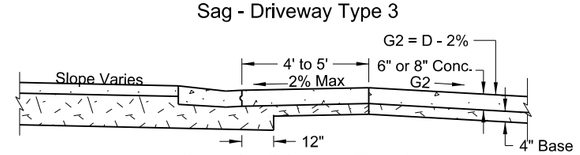
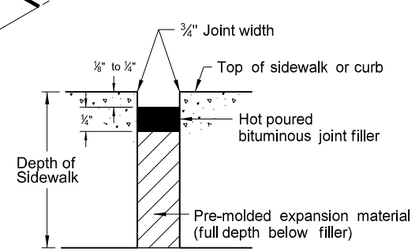


Sag - Driveway Type 3



Summit - Driveway Type 3



Typical Isolation Joint Seal
(longitudinal and transverse)

Driveway ADT	Grade G1		Dimension (L) ft.		Grade Changes (D)	
	Desirable	Maximum	Desirable	Maximum	Desirable	Maximum
(0-500)	5%	12% or controlled by vehicle clearance	12	6	6%	15% or controlled by vehicle clearance
(500-1500)	3%	8%	20	20	3%	6%
(> 1500)	2%	5%	40	40	0%	3%

NOTES:

1. See Standard D-748-1 for curb and gutter isolation joint detail. On PCC roadways, match curb and gutter joints with pavement joints, as much as practical.
2. Joint Spacing: Use 1 center contraction joint on driveways 20' width or less, 2 center contraction joints for driveways 20' to 30' width, and 3 center contraction joints for driveways greater than 30' width.

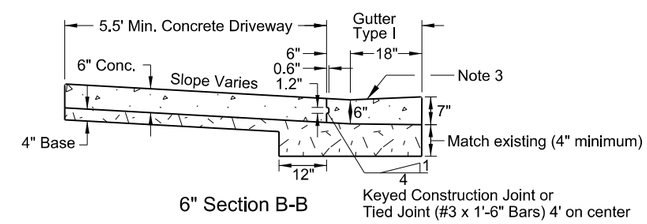
   Saw or groove contraction joints a minimum depth of 1/3 the depth of the concrete.

   Use isolatoin joints between separately poured concretes, or between old and new concrete.

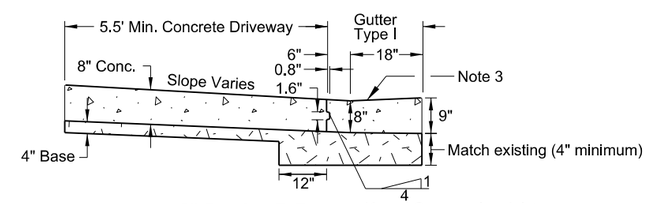
   Seal joints with hot pour bituminous filler or low modulus silicone. Install and tool sealant according to manufacturer's recommendations.

   Include all costs for labor, equipment, and material to construct and seal joints in the price bid for the driveway.
3. Include all costs for gutter-Type 1 in the unit price bid for "Curb and Gutter-Type 1".
4. Use 6" driveway unless otherwise specified.
5. Place 4" base material under concrete driveway. 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.
6. Construct sidewalk behind a driveway to the same thickness as the driveway. The Engineer will measure it as driveway concrete.

Section A-A



6" Section B-B



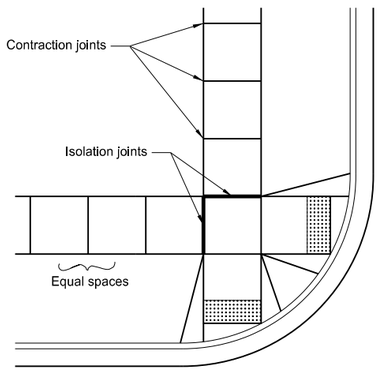
8" Section B-B

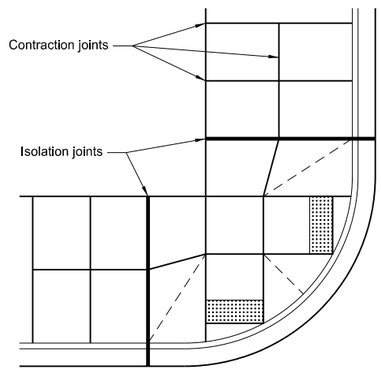
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-13-2014	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

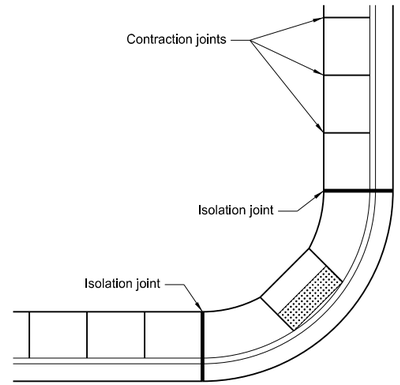
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

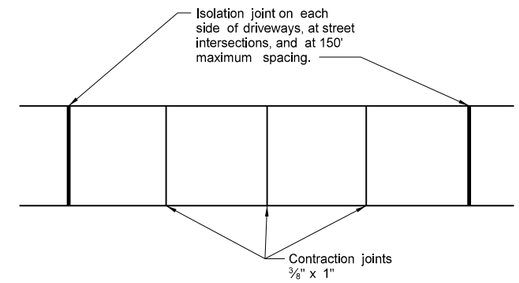
SIDEWALK

D-750-2









Typical Joint Layouts

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

   Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

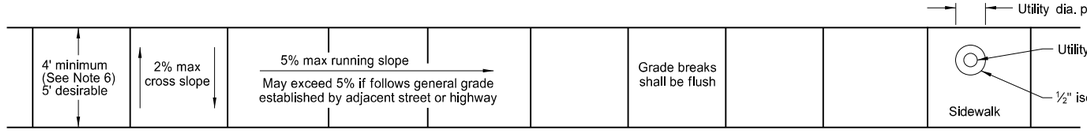
   Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

   When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

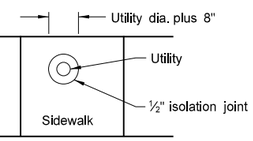
   Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

   Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

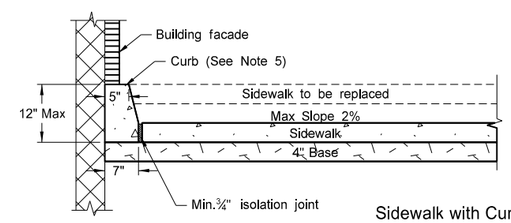
   When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



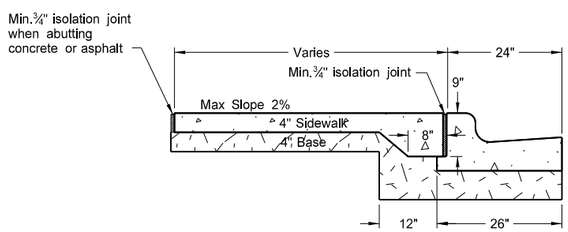
Sidewalk Width and Grade



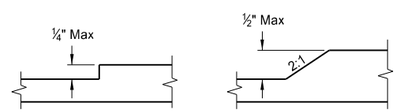
Utility Blockout



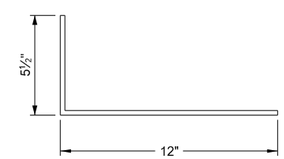
Sidewalk with Curb Detail
(Building face application)



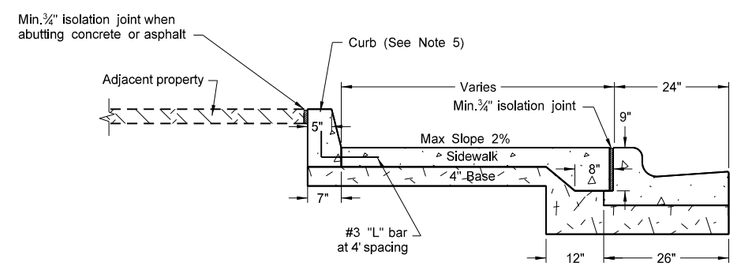
Sidewalk Detail
(Installed adjacent to curb and gutter)



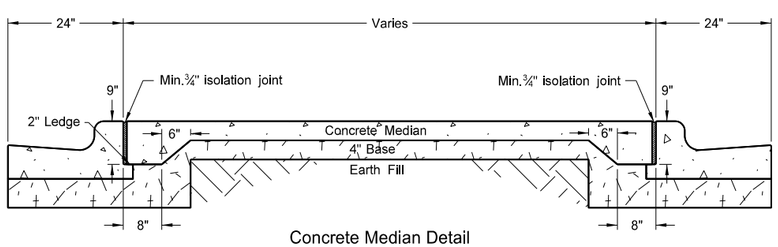
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



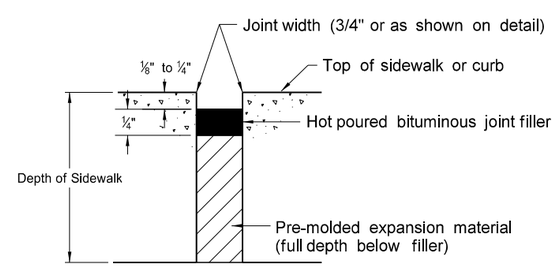
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



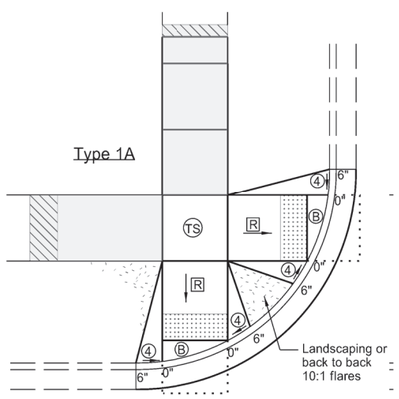
Typical Isolation Joint Seal
(longitudinal and transverse)

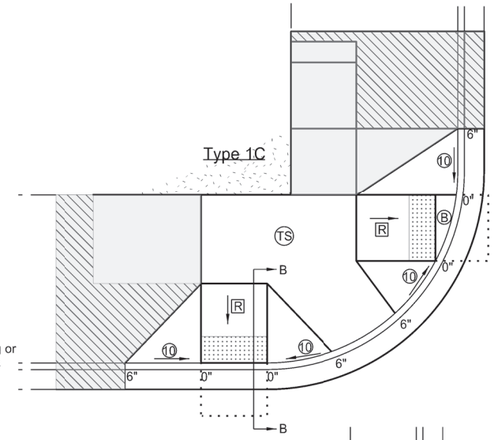
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width and grade and passing lane requirements.
08-27-19	New Design Engineer PE Stamp.

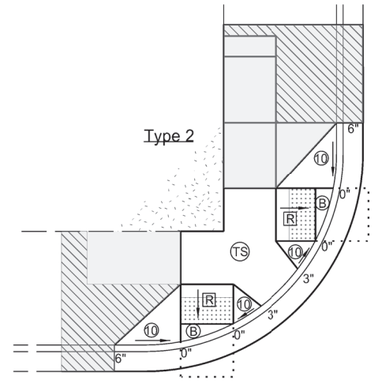
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

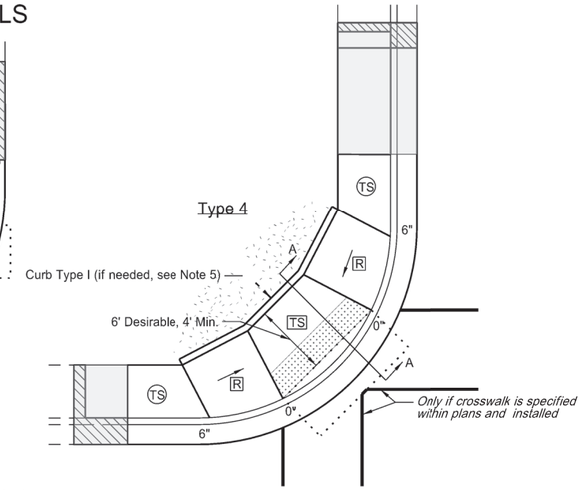
CURB RAMP RETROFIT DETAILS

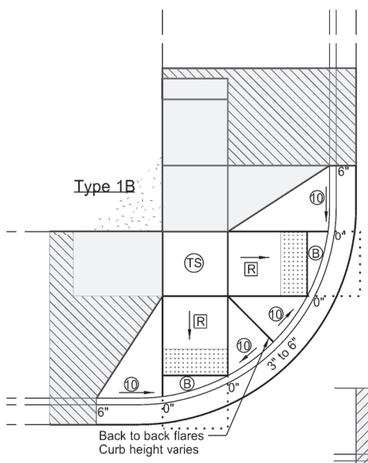
D-750-3

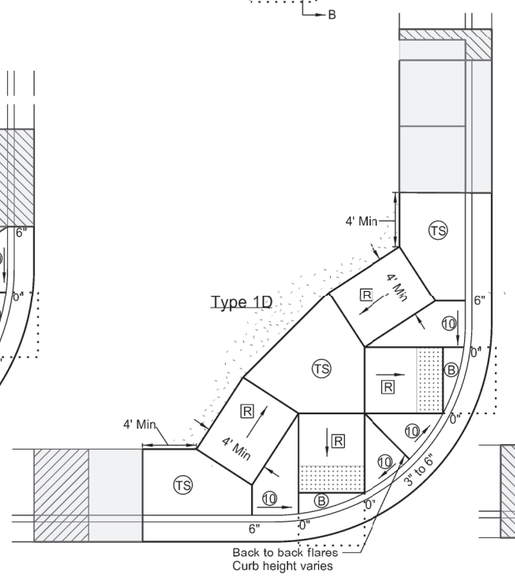


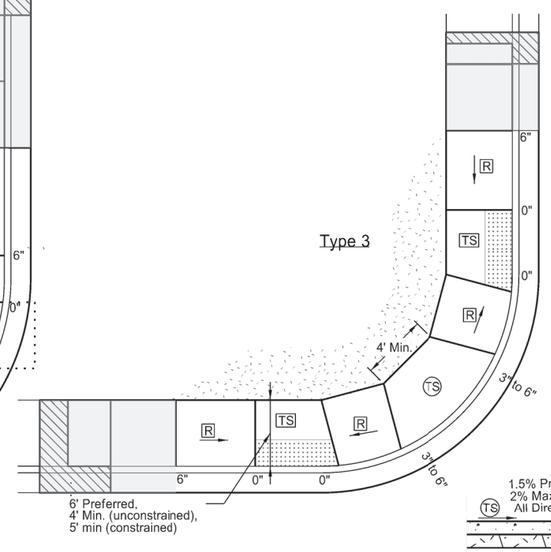


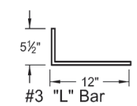


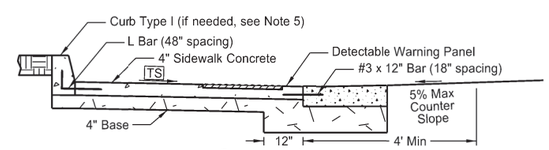




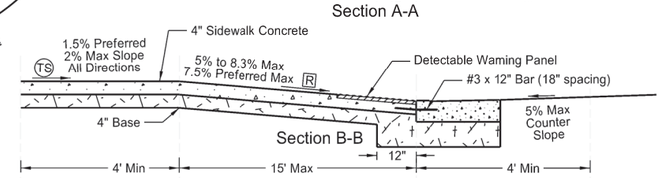




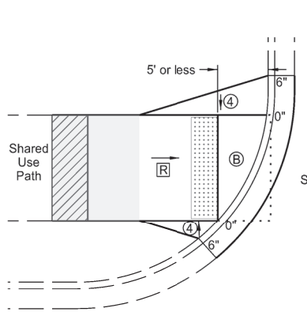


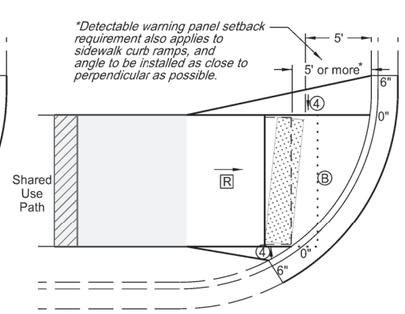


Section A-A

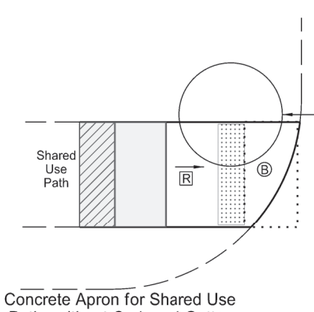


Section B-B

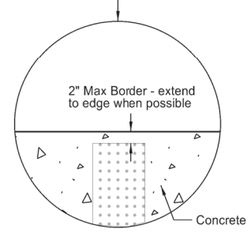




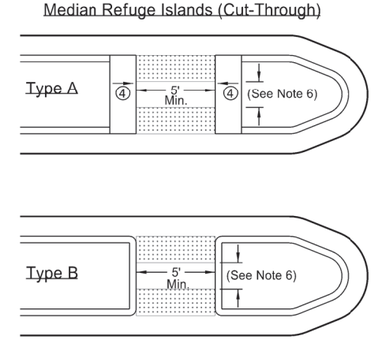
Concrete Apron for Shared Use Paths with Curb and Gutter

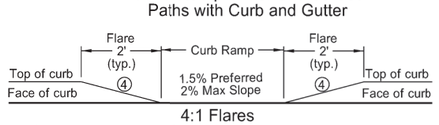


Concrete Apron for Shared Use Paths without Curb and Gutter

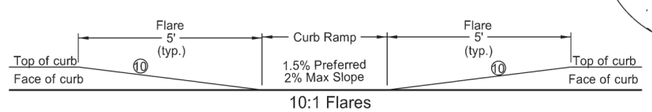


Median Refuge Islands (Cut-Through)





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



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

NOTES:

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

LEGEND:

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

11-26-13

REVISIONS

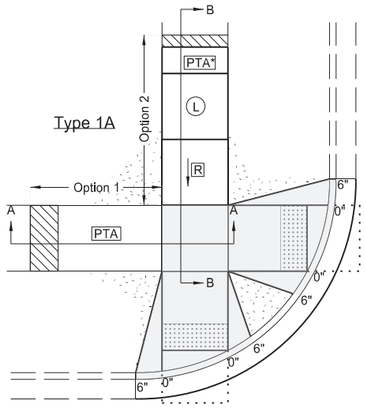
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area

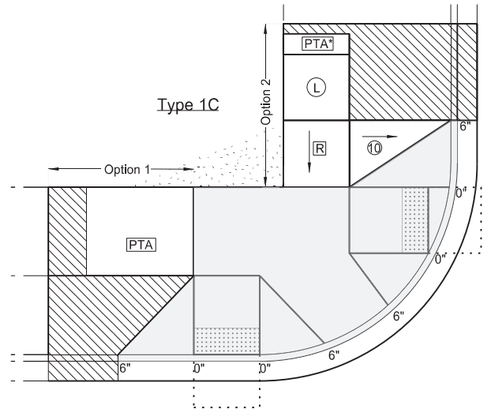
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

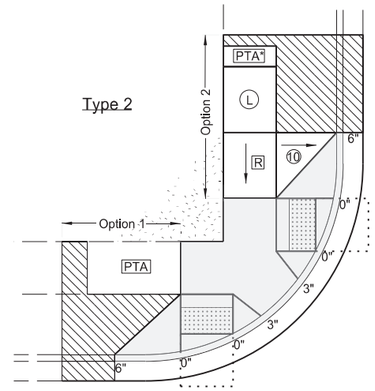
05 19 2021

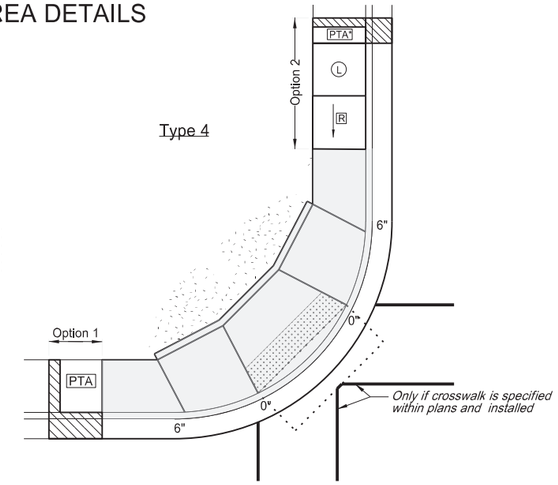
CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

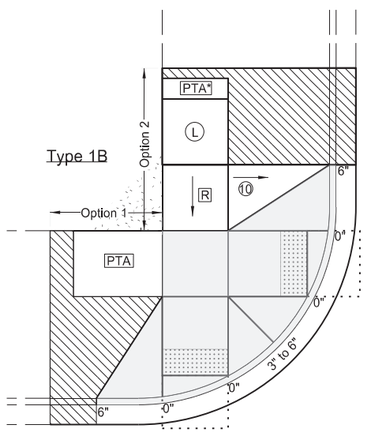
D-750-4

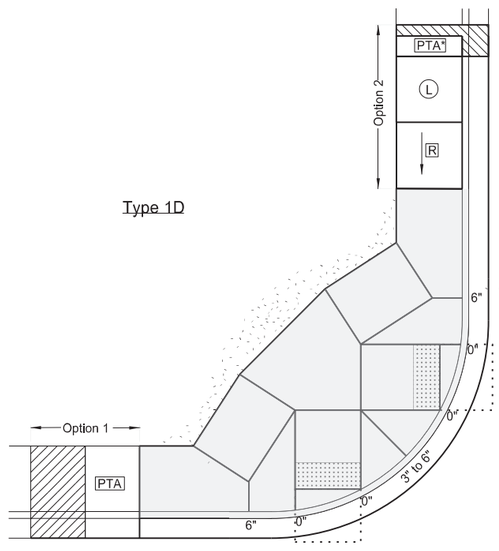


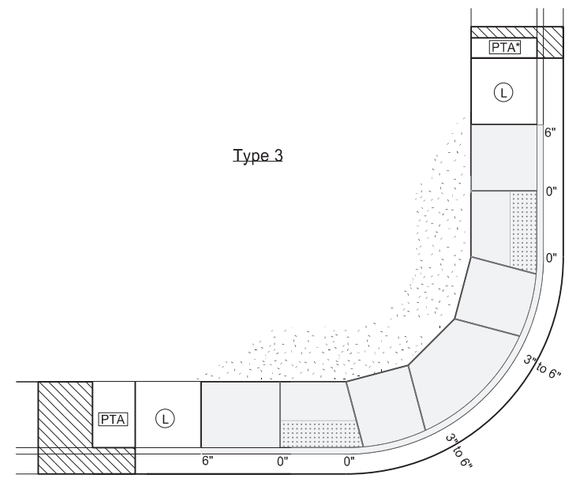


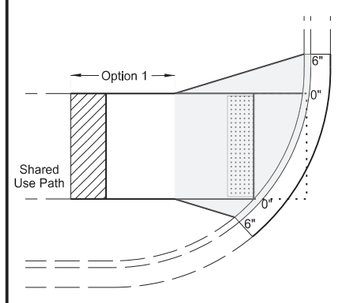


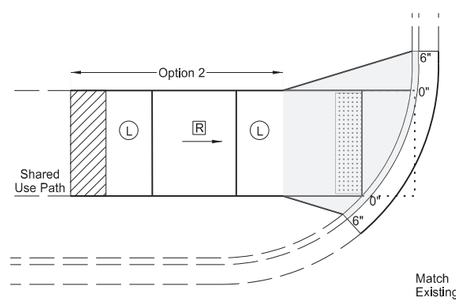




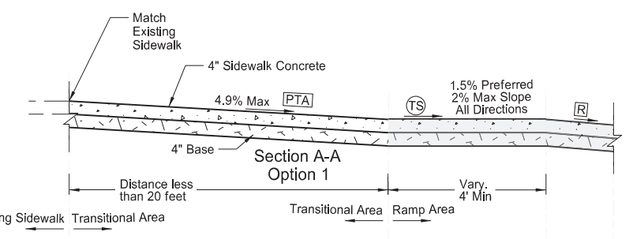


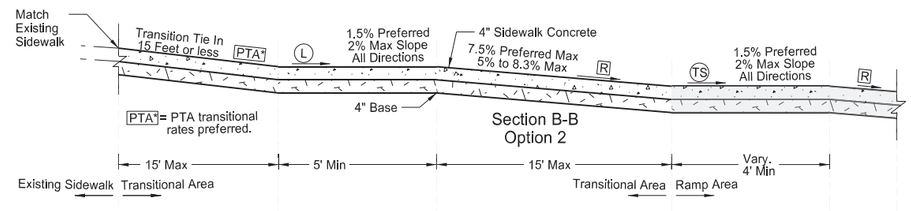






Transition Areas for Shared Use Paths





NOTES:

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

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

LEGEND:

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

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

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

Kirk J Hoff

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.

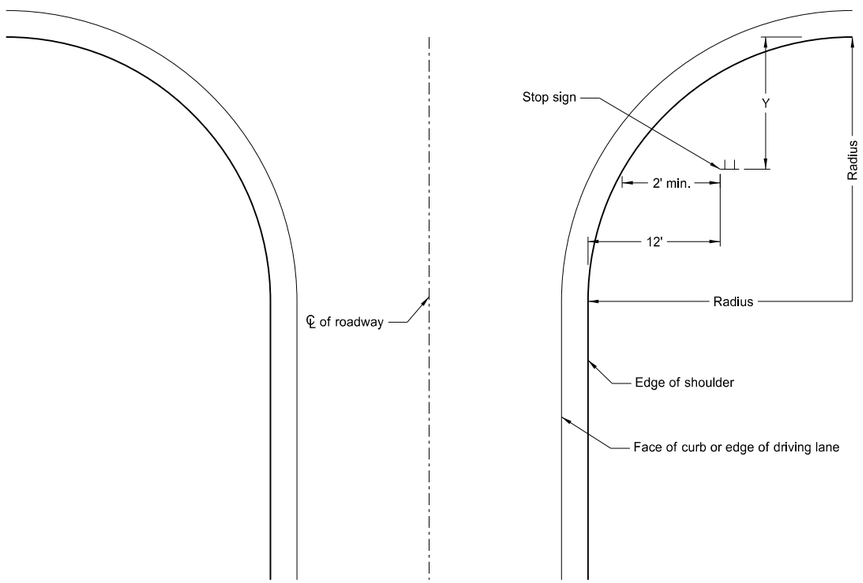
   Install signs on expressways a minimum height of 7'.

   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.

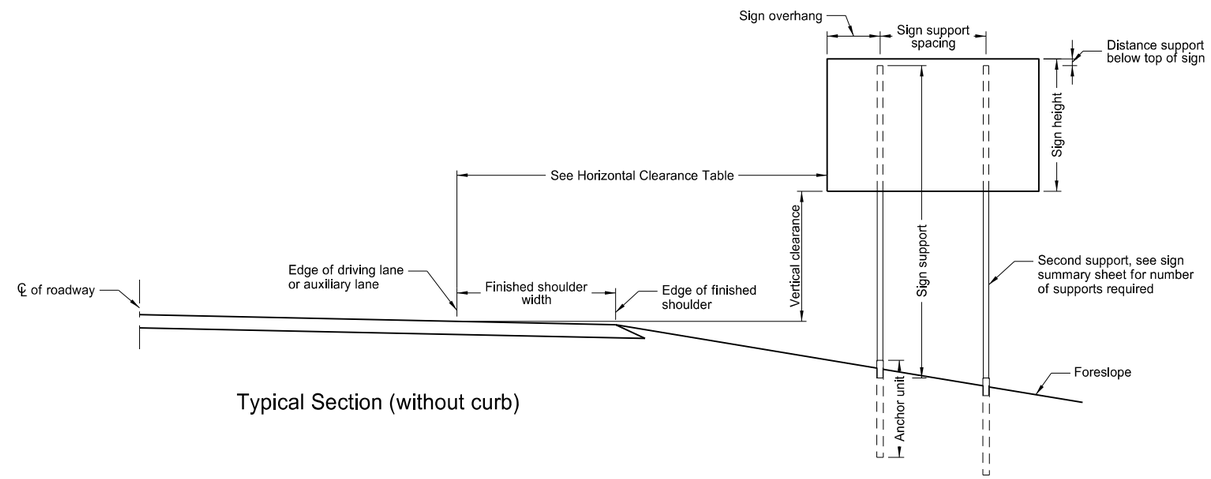
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

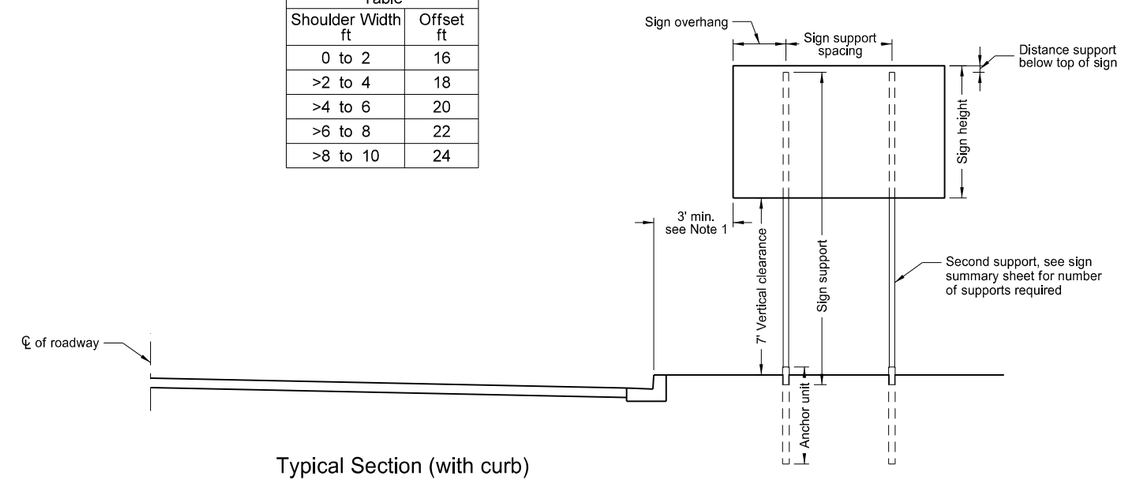
Use layout for the placement of "Stop" signs.

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



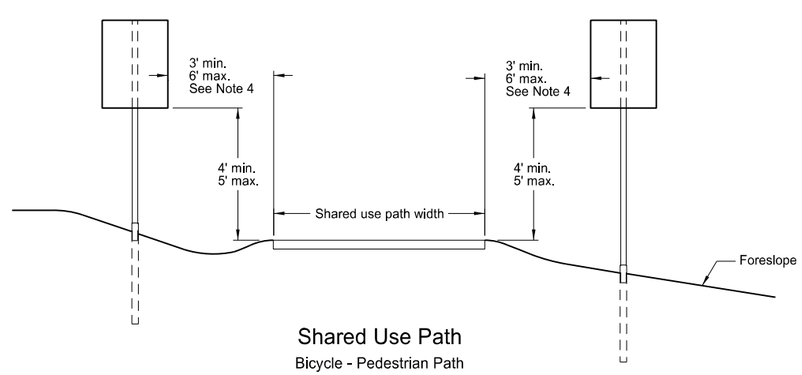
Typical Section (without curb)

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.

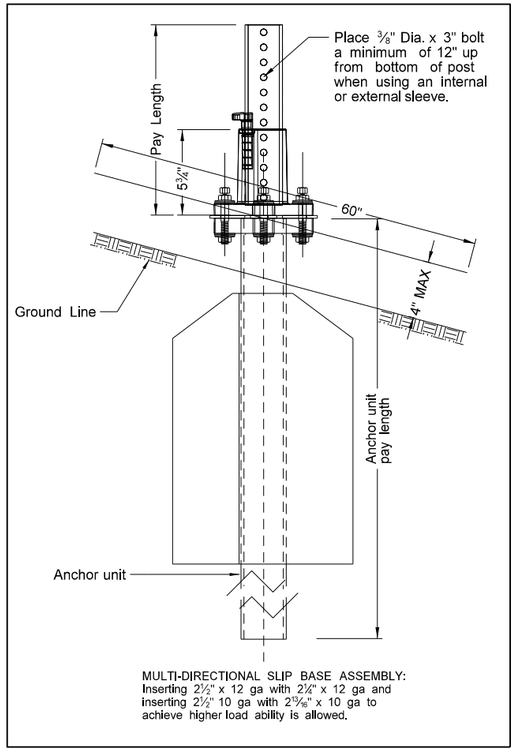
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

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.



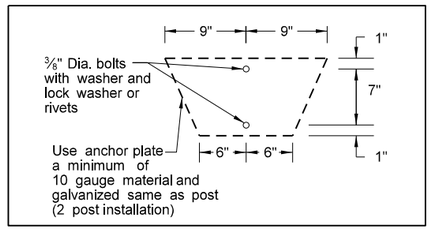
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY: Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2 13/16" x 10 ga to achieve higher load ability is allowed.

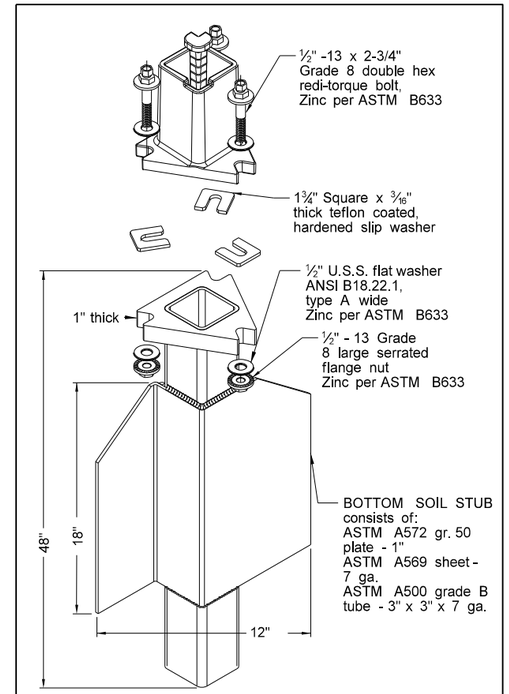
Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.^{4}	Cross Sect. Area In.^{2}	Section Modulud In.^{3}
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	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.

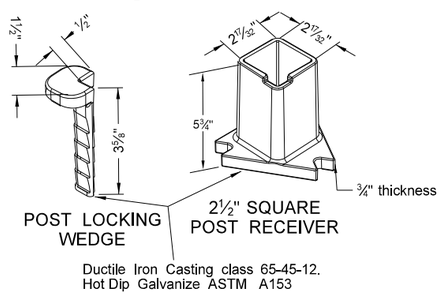
NOTE:

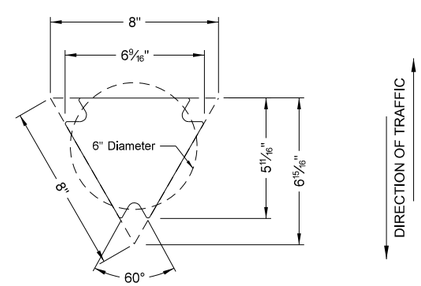
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless ortherwise 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.



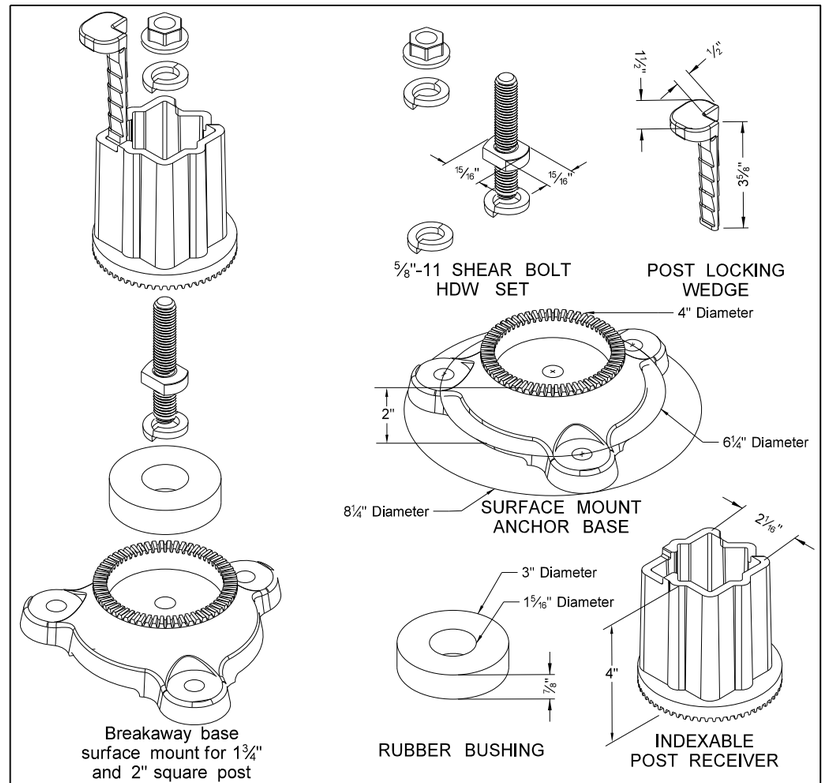


SLIP BASE FOR 2½" POST





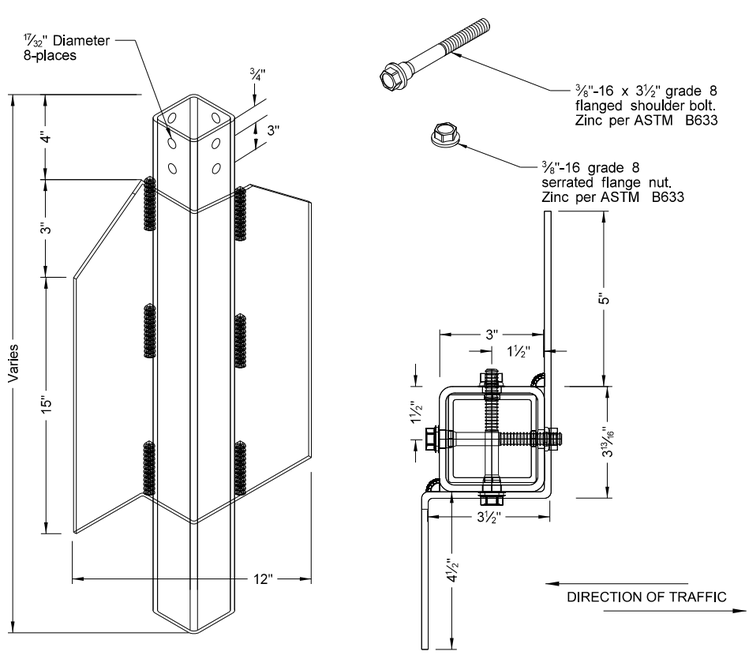
SLIP BASE DETAIL



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

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



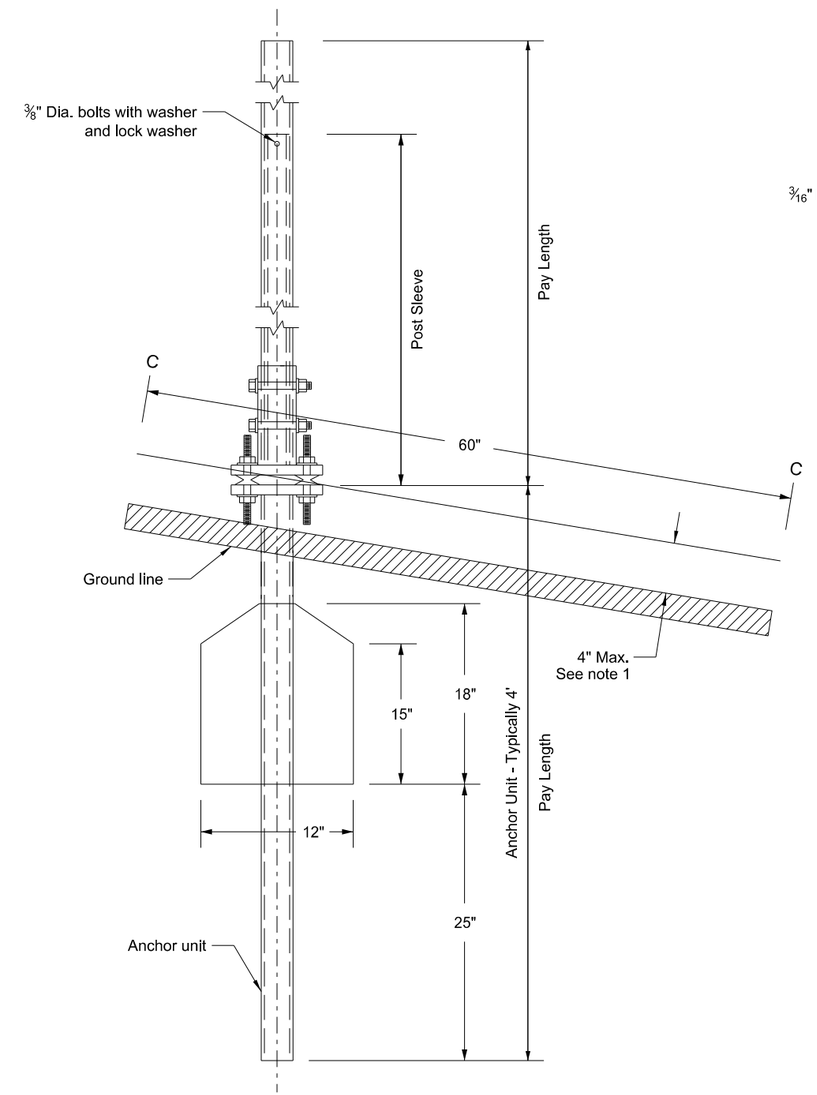
3" ANCHOR UNIT

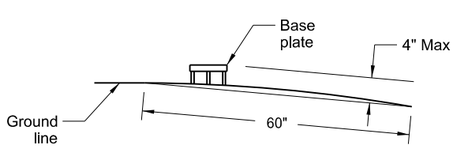
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

D-754-24A

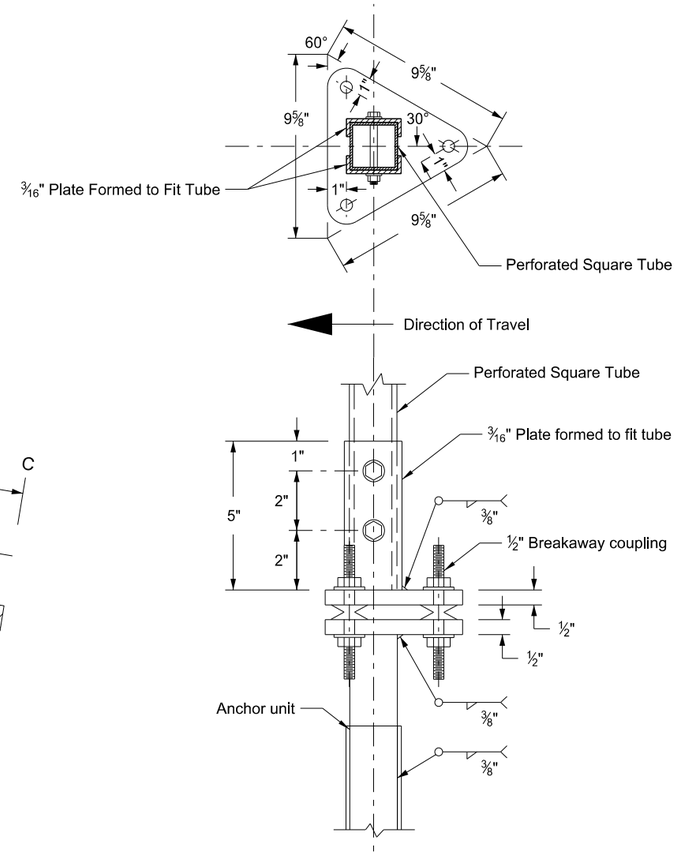
Breakaway Coupler System for Perforated Tubes





Section C-C

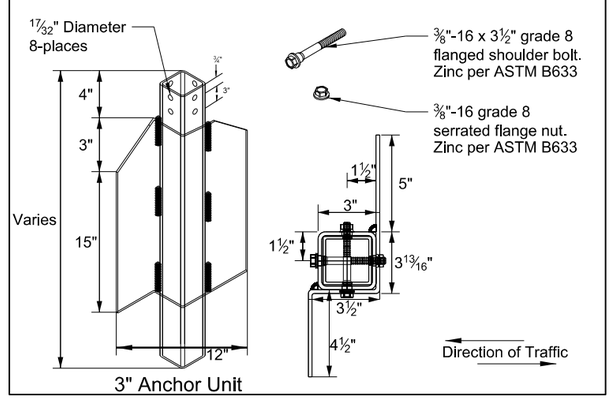
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



Base Plate with Breakaway Coupler

Shoulder Bolt

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



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

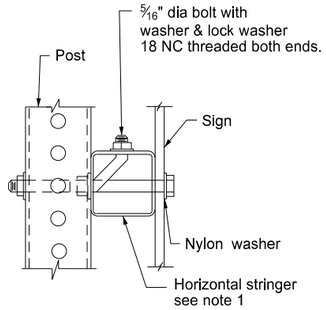
REVISIONS

DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

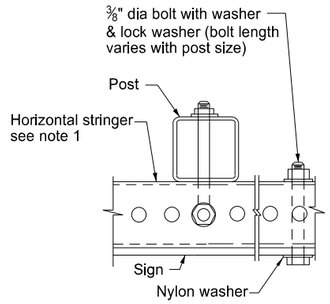
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

Mounting Details Perforated Tube

D-754-25

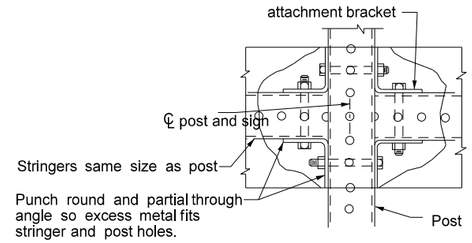


Side View



Top View

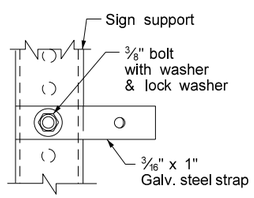
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



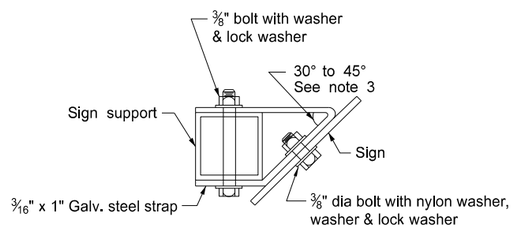
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

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.

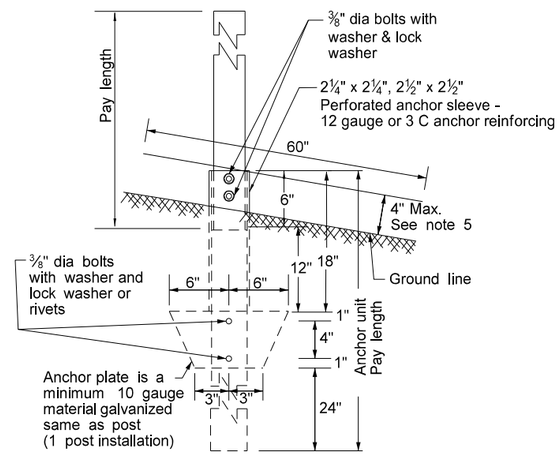


Side View



Top View

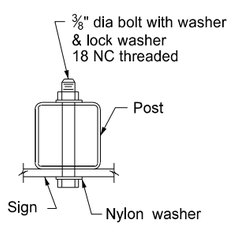
STRAP DETAIL



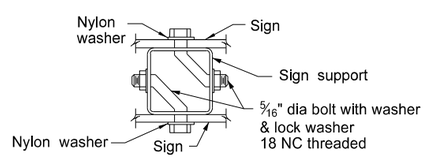
ANCHOR UNIT AND POST ASSEMBLY

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.

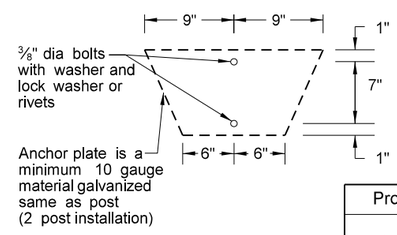


BOLT MOUNTING



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.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

911 SIGN SUPPORT INFORMATION AND SIGN DETAILS

D-754-86

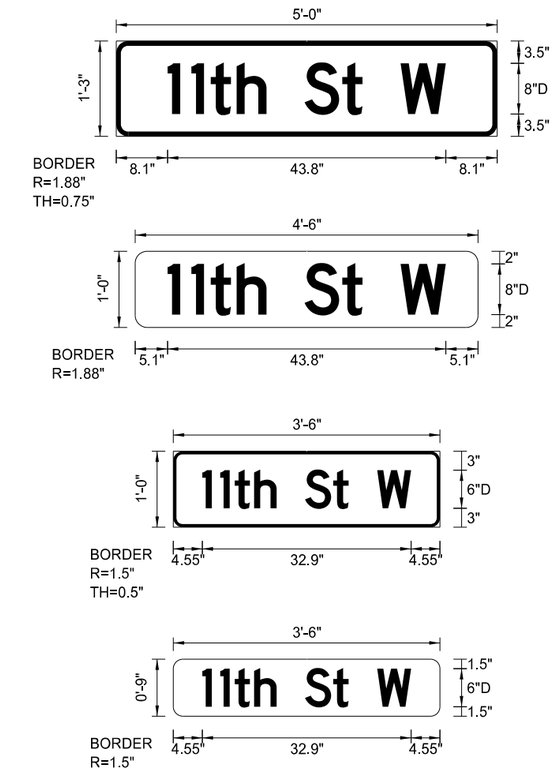
POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS

ASSEMBLY NUMBER	STREET NAME SIGN SIZE	VERTICAL CLEARANCE	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR			BREAKAWAY
						1st	2nd	3rd		NUMBER	LENGTH	SIZE	
	Inches	LF	LF			LF	LF	LF			LF		
Special Assembly 1	48"x15"	7	14.5	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	54"x15"	7	16.1	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	60"x15"	7	18.9	1	2.25 x 2.25 12 ga	2.6			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	66"x15"	7	15.8	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	72"x15"	7	14.6	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	78"x15"	7	17.6	2	2.5 x 2.5 12 ga					2	4.0	3 x 3 7 ga	2
	84"x15"	7	15.8	2	2.25 x 2.25 12 ga					2	4.0	2.5 x 2.5 12 ga	
	90"x15"	7	15.3	2	2.5 x 2.5 12 ga					2	4.0	3 x 3 7 ga	2
	96"x15"	7	17.4	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	48"x12"	7	17.5	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	54"x12"	7	15.2	1	2.25 x 2.25 12 ga					1	4.0	2.5 x 2.5 12 ga	
	60"x12"	7	14.2	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	66"x12"	7	15.9	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	72"x12"	7	14.7	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	78"x12"	7	15.7	2	2 x 2 12 ga					2	4.0	2.25 x 2.25 12 ga	
	84"x12"	7	15.6	2	2.25 x 2.25 12 ga					2	4.0	2.5 x 2.5 12 ga	
	90"x12"	7	18.6	2	2.5 x 2.5 12 ga					2	4.0	3 x 3 7 ga	2
	96"x12"	7	17.5	2	2.5 x 2.5 12 ga					2	4.0	3 x 3 7 ga	2
	24"x12"	5	20.3	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	30"x12"	5	16.4	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	36"x12"	5	13.8	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	42"x12"	5	14.7	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	48"x12"	5	12.9	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	54"x12"	5	15.2	1	2.25 x 2.25 12 ga					1	4.0	2.5 x 2.5 12 ga	
	60"x12"	5	13.8	1	2.25 x 2.25 12 ga					1	4.0	2.5 x 2.5 12 ga	
	24"x9"	5	24.1	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	30"x9"	5	21	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	36"x9"	5	17.3	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	42"x9"	5	15.4	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	48"x9"	5	13.5	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	54"x9"	5	14.8	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
	60"x9"	5	13.3	1	2 x 2 12 ga					1	4.0	2.25 x 2.25 12 ga	
Special Assembly 2	24"x12"	5	17.2	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	30"x12"	5	16.3	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	36"x12"	5	15.4	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	42"x12"	5	14.6	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	48"x12"	5	15.2	1	2.25 x 2.25 12 ga	4.5			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	54"x12"	5	20.6	1	2.5 x 2.5 10 ga	1.5			2.19 x 2.19 10 ga	1	4.0	3 x 3 7 ga	1
	60"x12"	5	16.7	1	2.5 x 2.5 12 ga	3.9			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	24"x9"	5	15.2	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	30"x9"	5	14.4	1	2.5 x 2.5 12 ga					1	4.0	3 x 3 7 ga	
	36"x9"	5	16.4	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	42"x9"	5	15.8	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	48"x9"	5	14.4	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	54"x9"	5	15.1	1	2.25 x 2.25 12 ga	4.2			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	60"x9"	5	14.5	1	2.25 x 2.25 12 ga	4.7			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1

POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS

ASSEMBLY NUMBER	STREET NAME SIGN SIZE	VERTICAL CLEARANCE	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR			BREAKAWAY
						1st	2nd	3rd		NUMBER	LENGTH	SIZE	
	Inches	LF	LF			LF	LF	LF			LF		
Special Assembly 3	24"x12"	5	16.2	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	30"x12"	5	15.3	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	36"x12"	5	15.9	1	2.25 x 2.25 12 ga	4.3			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	42"x12"	5	15.2	1	2.25 x 2.25 12 ga	4.8			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	48"x12"	5	15.2	1	2.5 x 2.5 12 ga	5			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	54"x12"	5	20.6	1	2.5 x 2.5 10 ga	1.9			2.19 x 2.19 10 ga	1	4.0	3 x 3 7 ga	1
	60"x12"	5	16	1	2.5 x 2.5 12 ga	4.7			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	24"x9"	5	16.8	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	30"x9"	5	16.1	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	36"x9"	5	15.4	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	42"x9"	5	14.9	1	2.5 x 2.5 10 ga					1	4.0	3 x 3 7 ga	1
	48"x9"	5	15.7	1	2.25 x 2.25 12 ga	4.2			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	54"x9"	5	14.9	1	2.5 x 2.5 12 ga	4.8			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	60"x9"	5	20.5	1	2.5 x 2.5 10 ga	1.6			2.19 x 2.19 10 ga	1	4.0	3 x 3 7 ga	1
Special Assembly 4	24"x12"	5	15.1	1	2.25 x 2.25 12 ga	4.8			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	30"x12"	5	15.1	1	2.5 x 2.5 12 ga	5			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	36"x12"	5	17.4	1	2.5 x 2.5 12 ga	3.6			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	42"x12"	5	16.8	1	2.5 x 2.5 12 ga	4.1			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	48"x12"	5	16.1	1	2.5 x 2.5 12 ga	4.5			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	54"x12"	5	15.5	1	2.5 x 2.5 12 ga	4.9			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	60"x12"	5	16.7	1	2.5 x 2.5 10 ga	4.2			2.19 x 2.19 10 ga	1	4.0	3 x 3 7 ga	1
	24"x9"	5	15.5	1	2.25 x 2.25 12 ga	4.2			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	30"x9"	5	15	1	2.25 x 2.25 12 ga	4.5			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	36"x9"	5	14.5	1	2.25 x 2.25 12 ga	4.8			2 x 2 12 ga	1	4.0	3 x 3 7 ga	1
	42"x9"	5	14.7	1	2.5 x 2.5 12 ga	4.9			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	48"x9"	5	17.2	1	2.5 x 2.5 12 ga	3.5			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	54"x9"	5	15.8	1	2.5 x 2.5 12 ga	4.4			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
	60"x9"	5	15.3	1	2.5 x 2.5 12 ga	4.7			2.25 x 2.25 12 ga	1	4.0	3 x 3 7 ga	1
Special Assembly 5	24"x12"	5	17.1	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	30"x12"	5	16.7	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	36"x12"	5	17.7	2	2.25 x 2.25 12 ga	4	4.5		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2
	42"x12"	5	17.3	2	2.25 x 2.25 12 ga	4.3	4.8		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2
	48"x12"	5	16.8	2	2.25 x 2.25 12 ga	4.5	5		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2
	54"x12"	5	16.5	2	2.25 x 2.25 12 ga	4.8	5.3		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2
	60"x12"	5	17.5	3	2.5 x 2.5 12 ga					3	4.0	3 x 3 7 ga	3
	24"x9"	5	17.3	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	30"x9"	5	17	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	36"x9"	5	16.6	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	42"x9"	5	16.3	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	48"x9"	5	16	2	2.5 x 2.5 10 ga					2	4.0	3 x 3 7 ga	2
	54"x9"	5	17.1	2	2.25 x 2.25 12 ga	4	4.6		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2
	60"x9"	5	16.8	2	2.25 x 2.25 12 ga	4.2	4.8		2 x 2 12 ga	2	4.0	3 x 3 7 ga	2

(A) The sleeve length shown is for the maximum post length. The required sleeve length is the "sleeve length" minus the difference between the "maximum post length" and the post length required in the field.



Notes:
Use 6 inch legend except on multi-lane divided roads with speeds of 45 mph or greater.
On divided multi-lane roadways, do not place 911 signs on top of stop sign.

When installing signs on existing supports, check support and sleeve size to determine if they meet table requirements. Measure maximum post length from ground to top of street name sign. If calculated support length is greater than maximum post length shown, recalculate support size.

See Standard Drawing D-754-87 for sign punching, stringer and support location details.

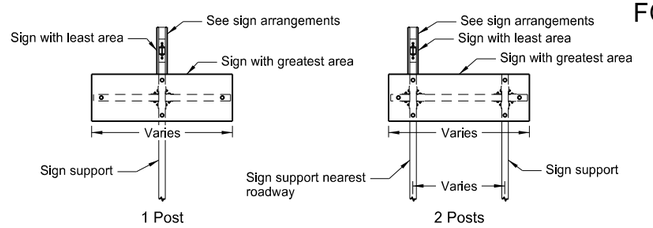
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-18-14	Revised street name sign layouts.
8-30-18	Revised tables, lettering, & signs and updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation

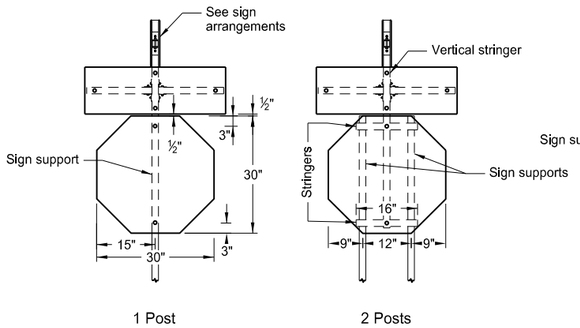
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

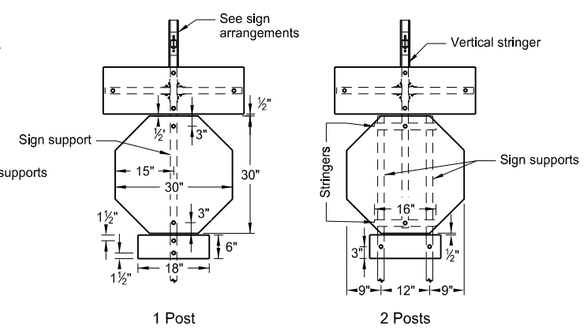
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



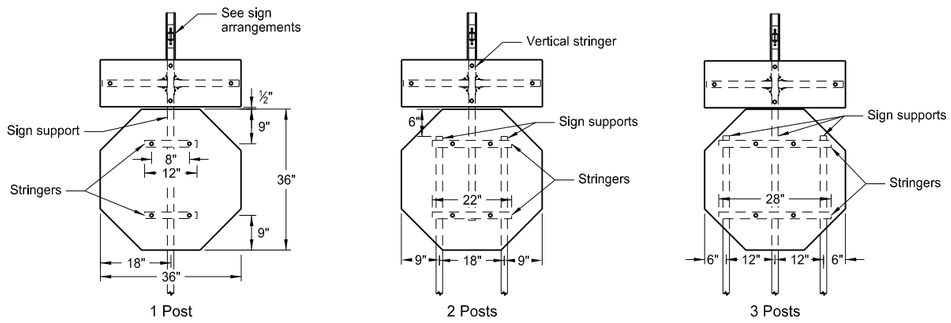
Special Assembly 1 (A, B, C, D or E)



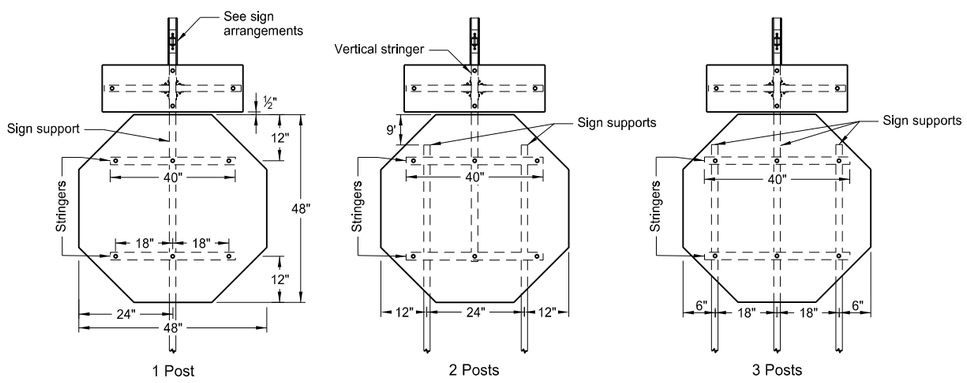
Special Assembly 2 (A, B, C, D or E)



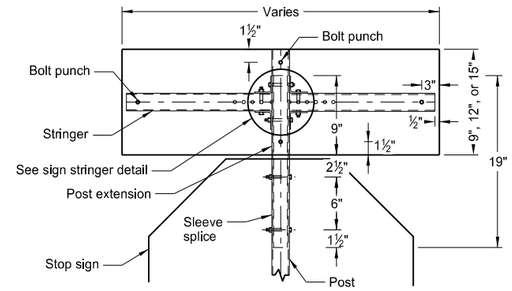
Special Assembly 3 (A, B, C, D or E)



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



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

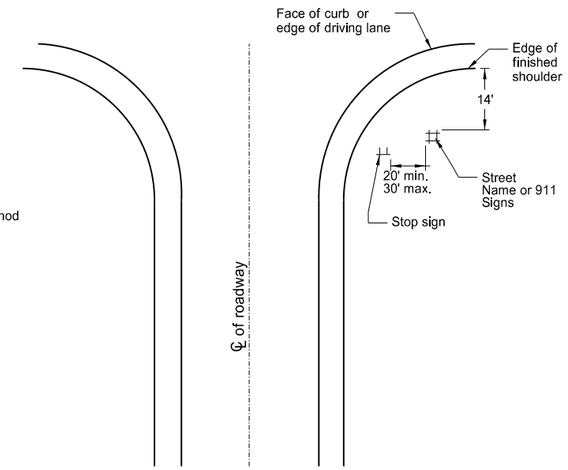


Front View

Sleeve Splice Detail

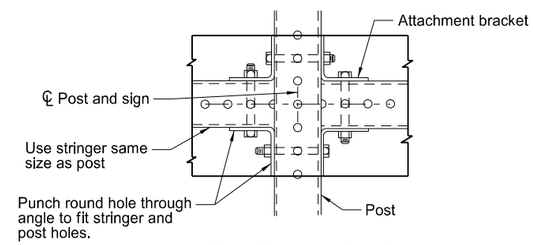
Note: Only use splice method with approval of engineer.

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

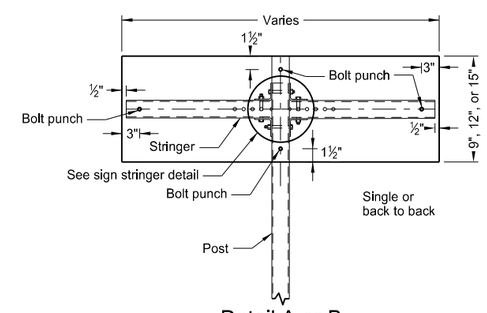


Intersection Layout

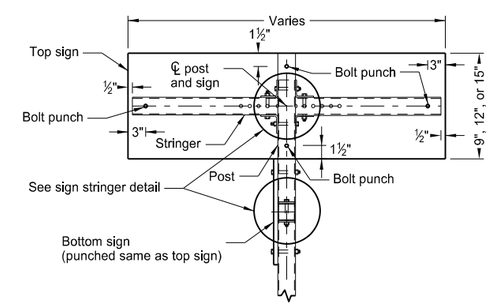
Note: Use layout for street name signs or 911 signs with Special Assembly 1 .



Sign Stringer Detail

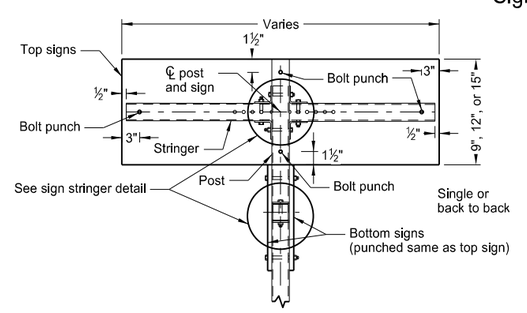


Detail A or B



Detail C

Sign Arrangements



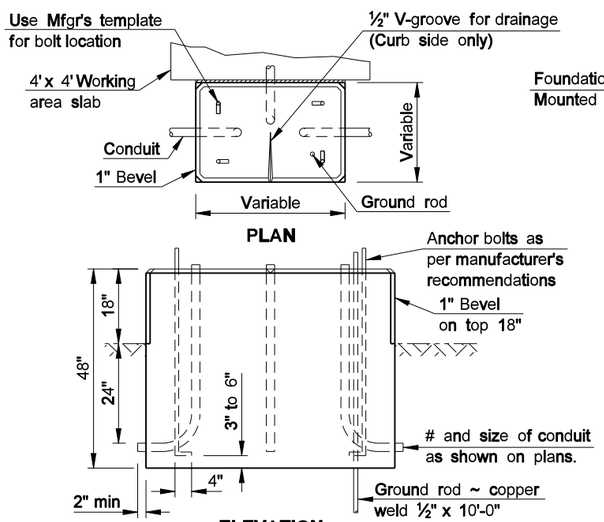
Detail D or E

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.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation

CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

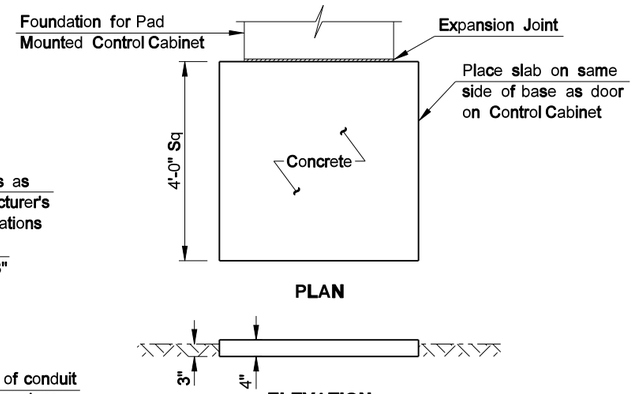
D-770-1



ELEVATION

CONTROLLER CABINET FOUNDATION PAD MOUNT

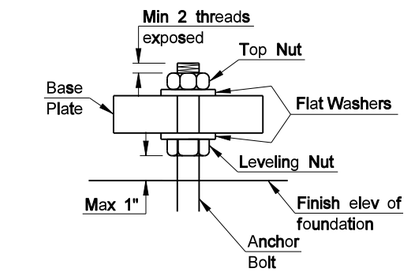
The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.



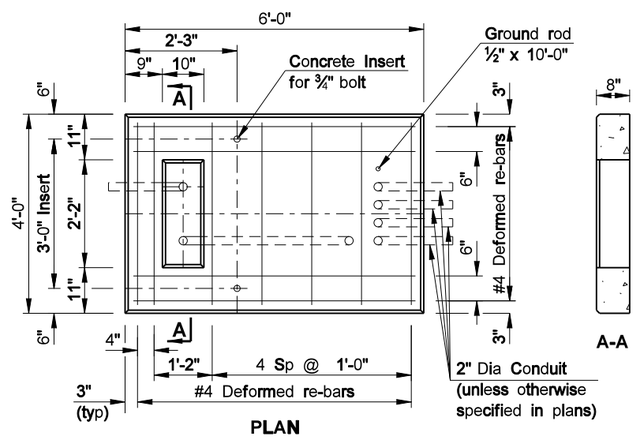
ELEVATION

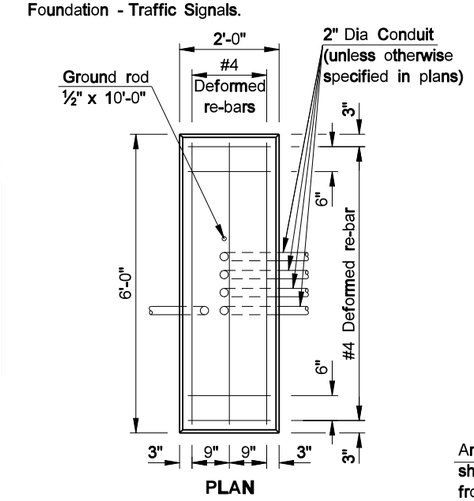
WORKING AREA SLAB

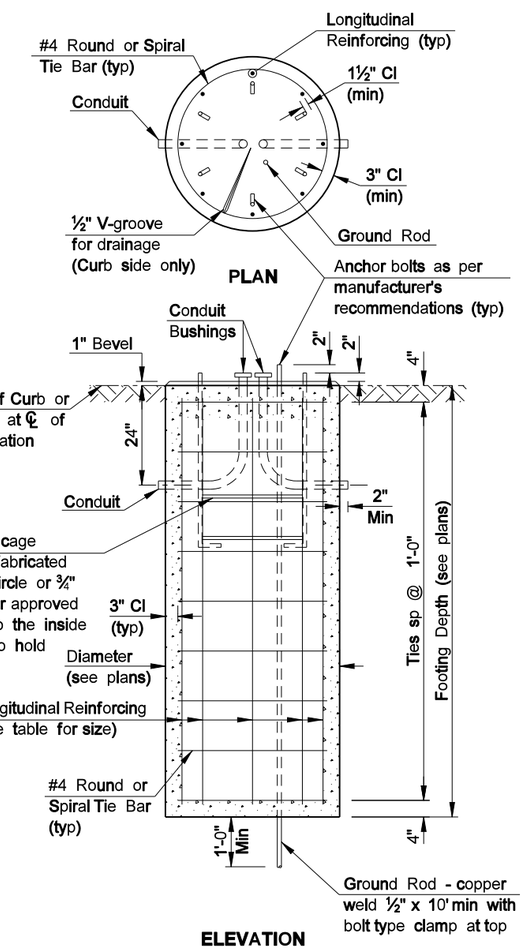
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



ANCHOR BOLT DETAIL

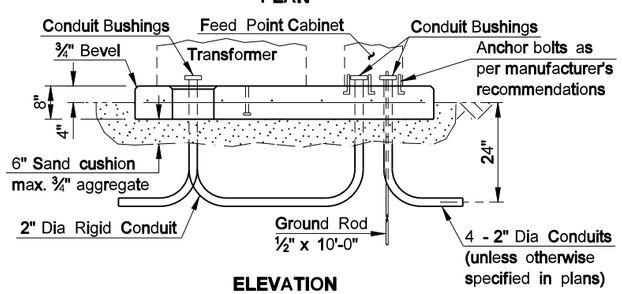






ELEVATION

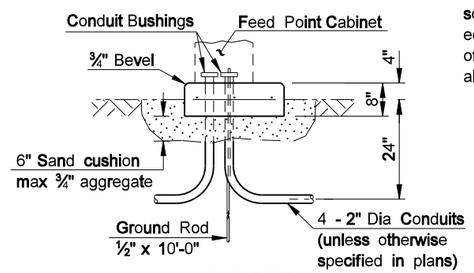
LIGHT & SIGNAL STANDARD FOUNDATION



ELEVATION

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.



ELEVATION

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.

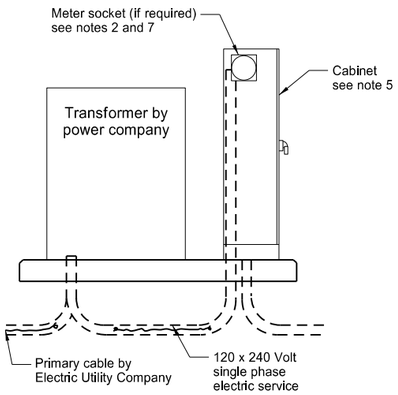
LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

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)

D-770-2



Elevation

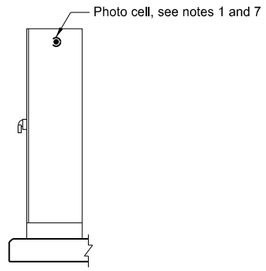
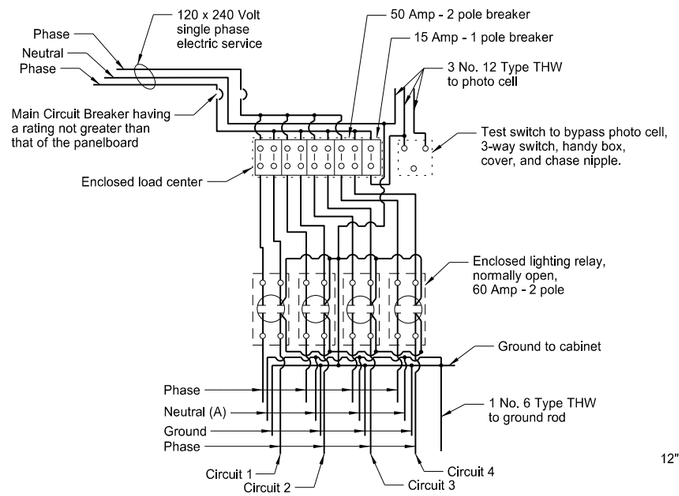


Photo Cell
Mounting Detail



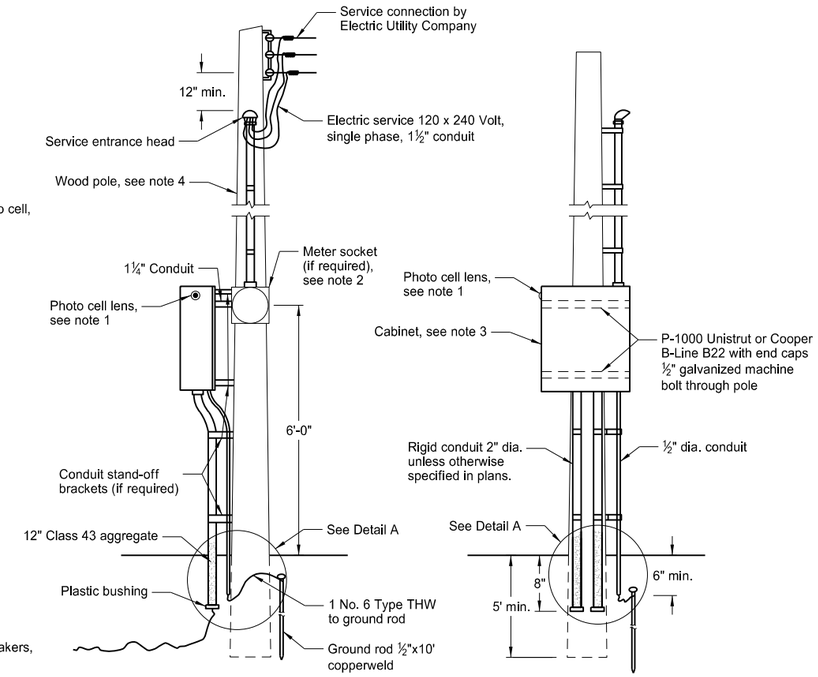
Feed Point Type IV

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.

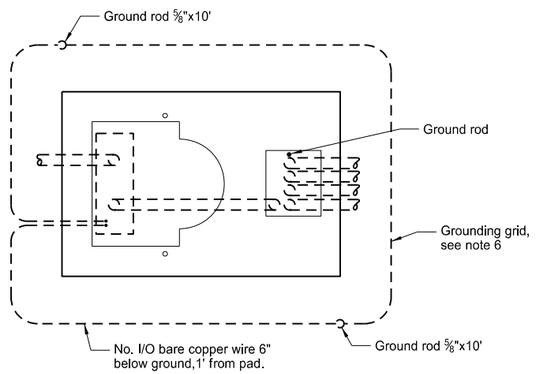
Provide Type II feed point similar to Type IV, except with two electrical circuit, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

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.

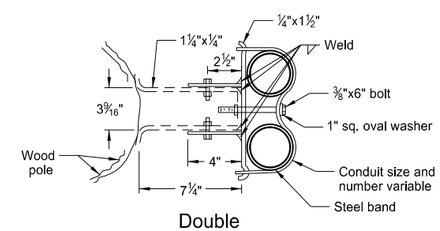


Feed Point Pole Mounted

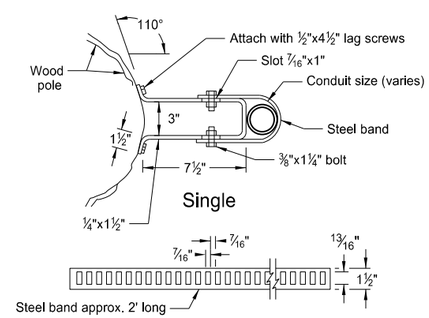


Plan

Transformer and Feed Point Cabinet Pad Mounted



Double



Single

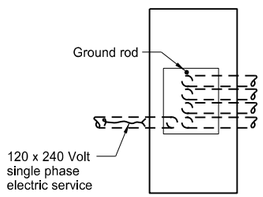
Conduit Standoff Bracket

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

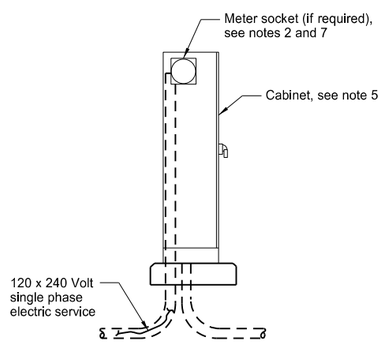
Notes:

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. Provide steel cabinet with one coat of primer and two coats of exterior dark green enamel.
6. Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more ⅝"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.

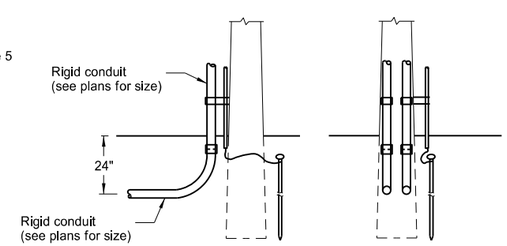


Plan



Elevation

Feed Point Cabinet Pad Mounted



Detail A

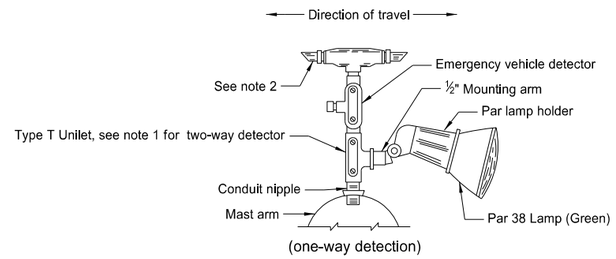
Use this detail for a continuous run of conduit from the feed point to the first light standard.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 3.
10-17-17	Updated to active voice.
8-28-19	New Design Engineer PE Stamp.

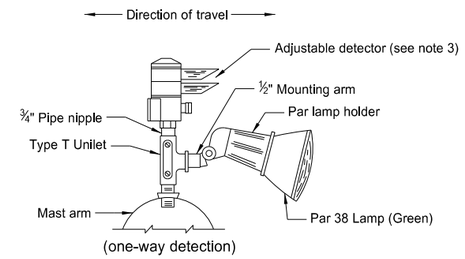
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/28/19 and the original document is stored at the North Dakota Department of Transportation

LIGHTING AND SIGNAL DETAILS

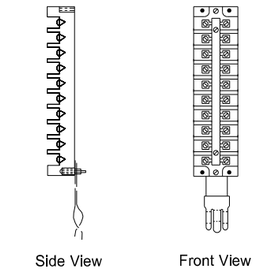
D-770-4



Emergency Vehicle Detector Detail

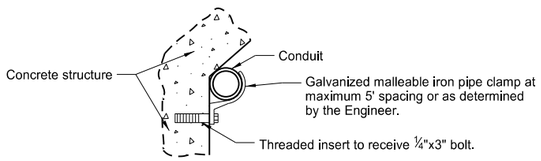


Alternate Emergency Vehicle Detector Detail (adjustable)

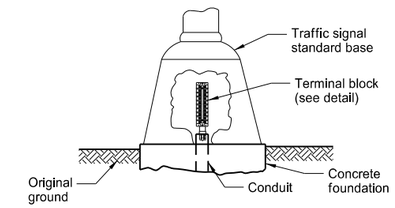


Terminal Block Detail

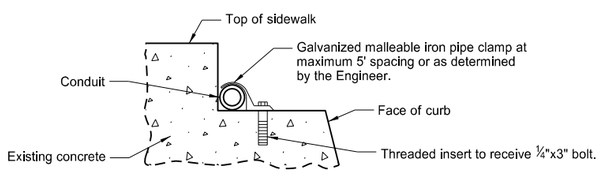
Notes:
1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
2. Plug unused end of One-way Detector with metal pipe plug.
3. Rotate detector lens to face direction of travel on Two-way Detectors.



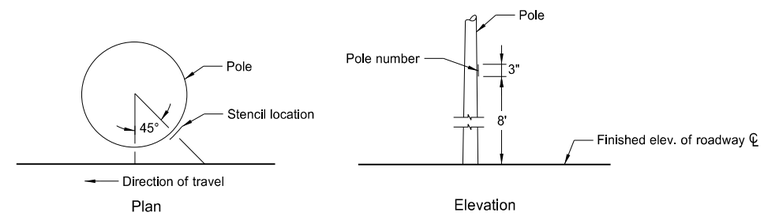
Bridge Mounted Conduit Hanger



Terminal Block
(rigid mounted)

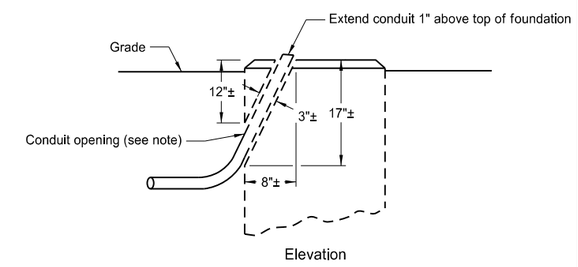


Bridge Curb Mounted Conduit



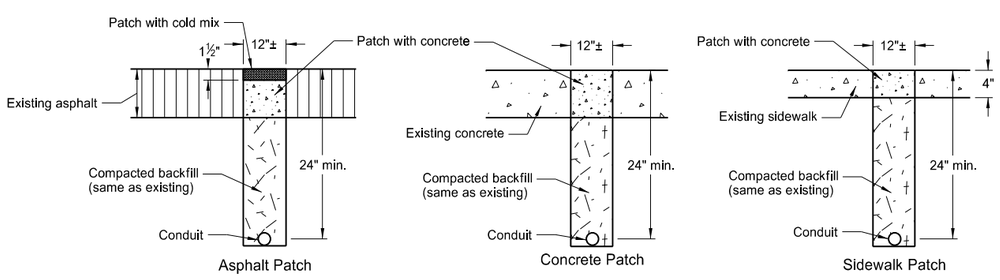
Light Standard Numbering

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



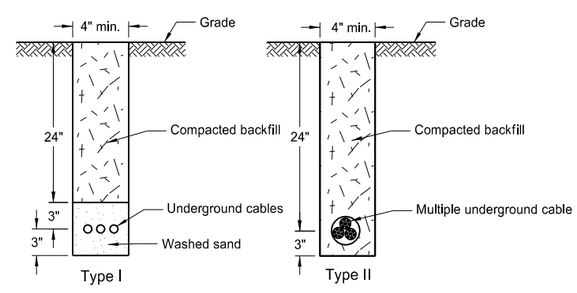
Revise Concrete Foundation

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

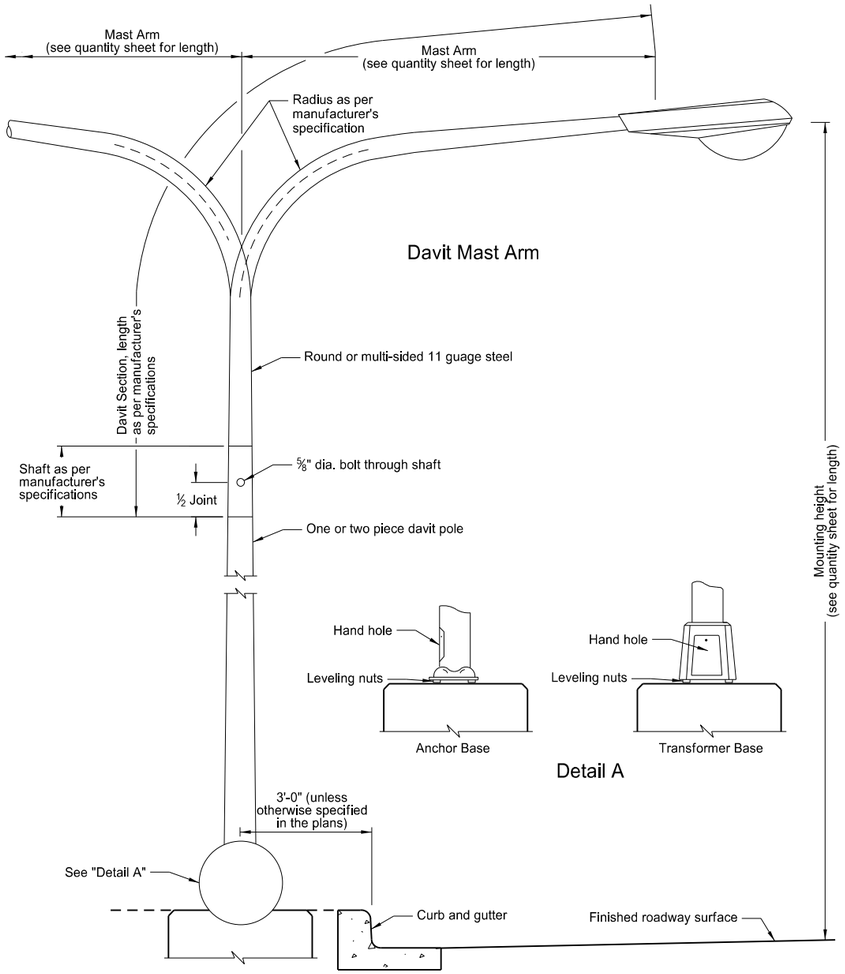
Note: Sod entire area disturbed by trenching, unless directed otherwise by the Engineer.

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.

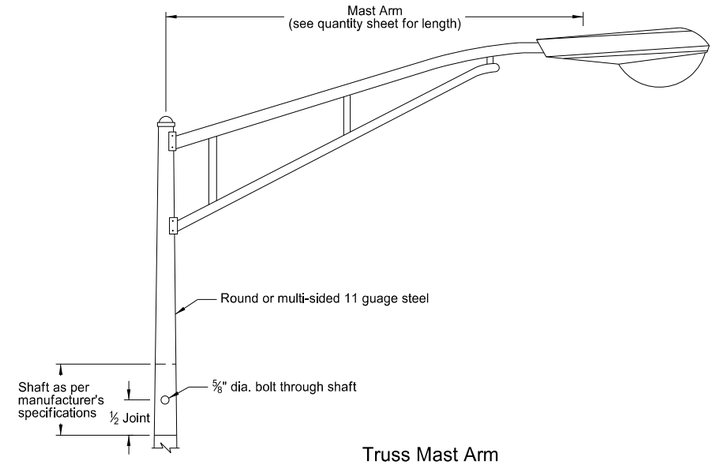
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/25/19 and the original document is stored at the North Dakota Department of Transportation

LIGHT STANDARD DETAILS

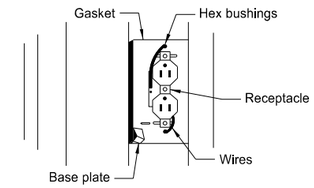
D-770-5



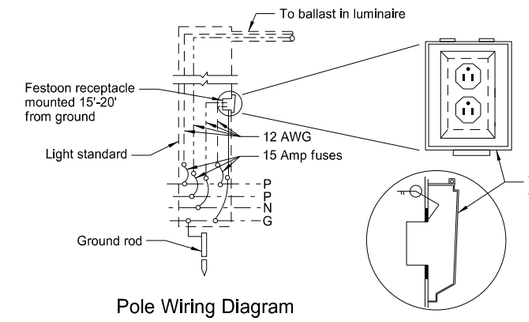
Light Standard Details



Truss Mast Arm



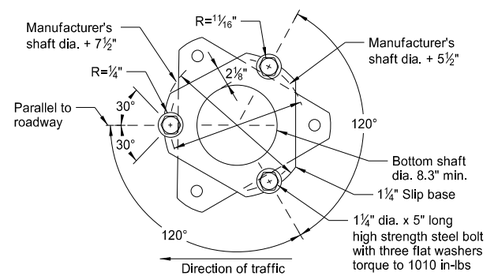
Optional: Festoon receptacle mounted on multi-sided pole.



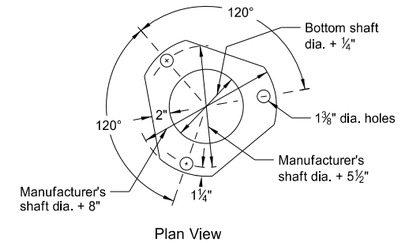
Pole Wiring Diagram

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:

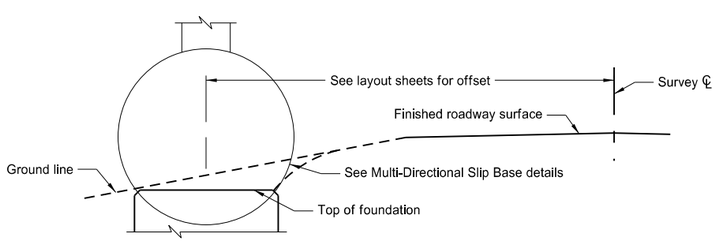
Light Standard Locations: The minimum offset distance from the curb face is 3 feet. Offset light standards at least 3 feet in urban areas and where speeds are less than 30 mph. Where speeds are 30 mph or more, place light standards at least 16 feet from the driving lane.

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

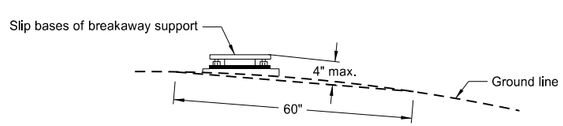
Luminaire: Use internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

Fusing: Fusing in base, see specifications.

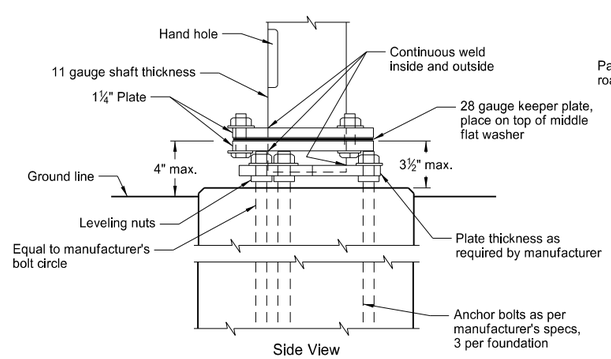
Slip Base Bolt Torque Procedure:
1. Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and to clean bolt threads, then loosen.
2. Retighten bolts with a systematic order to prescribed torque.
3. Loosen each bolt and retighten to prescribed torque in the same order as initial retightening.
4. Burr threads of junction with nut using center punch to prevent nut loosening.



Concrete Foundation Location

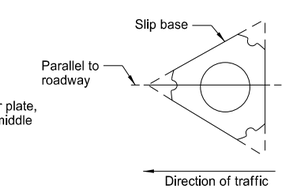


Breakaway Support Stub Clearance Diagram

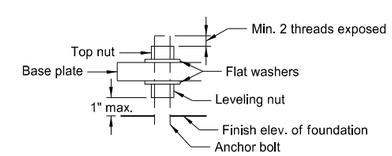


Side View

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.
8-28-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/28/19 and the original document is stored at the North Dakota Department of Transportation