

STATE COUNTY MAP

JOB #2 BILLINGS COUNTY NORTH DAKOTA

FEDERAL AID PROJECT SC-COIB-0427(051)

CMC 0427
GRADING, PRECAST RCB, FENCING, & INCIDENTALS
STRUCTURE NO. 04-127-19.0
5 miles east and 3 miles south of South Fairfield

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	14127	1	1

GOVERNING SPECIFICATIONS

Standard Specifications for Road and Bridge Construction adopted by the North Dakota Department of Transportation October 2014; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT LENGTH

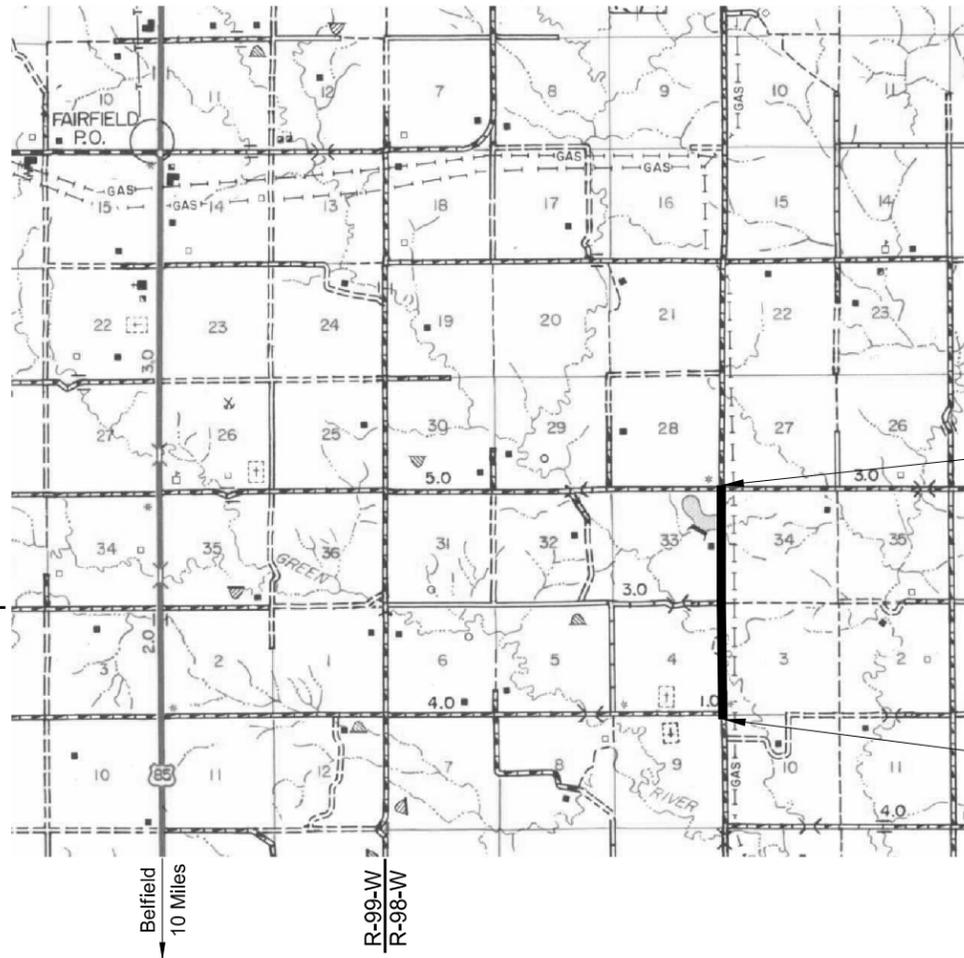
Project	Gross Miles	Net Miles
SC-COIB-0427(051)	2.074	2.074

This project consists of the reconstruction of a county road located 5 miles east and 3 miles south of South Fairfield in Billings County, North Dakota.

DESIGN DATA

Traffic SC-COIB-0427(051)		Average Daily			Est. 30th Max. Hr.
		Passenger	Trucks	Total	
Current Traffic	2015	<100	-	<100	-
Forecast Traffic	2035	<100	-	<100	-

Clear Zone Distance: 18 Feet
 Design Speed: 55 MPH
 Minimum Sight Dist. for Stopping: 495 Feet
 Structure Design Loading: HL-93



END PROJECT
 Sta 158+00. A point 34.03 feet South of the Southwest Corner of Section 27, Township 142 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

BEGIN PROJECT
 Sta 48+50. A point 423.93 feet South of the Southwest Corner of Section 3, Township 141 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

SURVEY FIELD BOOK:	C-716 Pages 1-17
DESIGNERS	
Andrew Krebs, PE	
Dustin Kinnischtzke, PE	
Jordan Woroniecki, EI	
Tommy Brown, EI	

Any questions regarding these plans can be directed to:
 Andrew Krebs, P.E.
 Kadmas, Lee & Jackson
 P.O. Box 290
 Dickinson, ND 58602-0290
 (701) 483-1284 Phone

This document was originally issued and sealed by Andrew J. Krebs Registration Number PE-7876, on August 25, 2015, and the original document is stored at KLJ Dickinson, ND 58601

CERTIFICATION
 I HEREBY CERTIFY THAT THESE 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.
 Andrew J. Krebs /s/
 ANDREW J. KREBS, P.E.
 KADRMAS, LEE & JACKSON, INC.
 DATE 8/25/2015 REGISTRATION NUMBER PE-7876



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 DICKINSON, ND 58602-0290
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SP 3(14)	Temporary Erosion and Sediment Best Management Practices
SP 206(14)	Temporary Water Diversion
SP 5071(14)	Permits and Environmental Considerations

LIST OF STANDARD DRAWINGS

<u>STANDARD NO.</u>	<u>DESCRIPTION</u>
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GENERAL NOTES

100-P01 COORDINATION OF PROJECTS: Ken Obrigewitch (landowner) will be completing all fencing from Sta 79+15 Lt to the end of the project and from Sta 88+70 Rt to the end of the project. Notify Ken a minimum of three weeks prior to beginning work to allow him to remove the existing fence.

100-P02 STAGING AREAS: Avoid all wetlands outside the construction limits with staging areas and ancillary construction activities.

105-200 UTILITY COORDINATION: A utility coordination meeting is required.

107-710 HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

109-P01 PROGRESS ESTIMATES: In Section 109.04 A insert the following after the 2nd paragraph:

Until a Request to Sublet Agreement is approved, no work shall be performed under the contract by the Subcontractor.

If the Contractor or Subcontractor(s) is delinquent by four (4) weeks in the submission of payrolls, no further Progress Estimates will be issued until all delinquent payrolls are received.

If a material is to be accepted by certification and the certification has not been approved by the Engineer, the material will not be included for payment. When the certification has been received and approved by the Engineer it will be included in the following estimate.

202-P01 REMOVAL OF PIPE ALL TYPES & SIZES: Remove and stockpile all existing pipe culverts and end sections that are in good condition without breakage or damage. The Engineer will inspect the pipe culverts and end sections prior to removal to determine if they are salvageable. All salvageable pipe material damaged by negligence will be replaced at the Contractor's expense.

202-P02 REMOVE EXISTING FENCE: Remove and stockpile the existing fence on the outside edge of the right of way and adjacent to the landowner's property. If the landowner wants any of the materials from the existing fence allow them the opportunity to pick them up. If the landowner doesn't want the existing fence it will become the property of the Contractor. Dispose of outside the right of way.

Prior to removing the existing fence on Arvid Hecker's property, install the permanent fence.

202-P03 REMOVED ITEMS: Any item designated for removal but not to remain County property, will be considered property of the Contractor. Dispose of said property as per Section 107.17 of the Standard Specifications. Include the disposal in the unit price bid for "MOBILIZATION". The following removal and salvage items will remain County property. Remove without further damage to these items:

- All pipe culverts and end sections.
- All signs
- All cattle guards and bases.
- All removed and salvaged items will be reviewed by the Engineer. If the Engineer determines that the item is not salvageable based on the condition, it becomes the Contractor's property.

202-P04 SALVAGE AGGREGATE COURSE: Remove and stockpile the aggregate surfacing on the existing roadway for reuse. Use the material as a traffic surface gravel upon completion of the newly constructed roadbed, or as deemed necessary by the Engineer. Do not use the salvaged aggregate as foundation fill.

The salvaged material is included in the topsoil quantity. Include the salvaging, stockpiling, re-spreading and laying of the salvaged material in the unit price bid for "TOPSOIL".

203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

203-P01 COMPACTION CONTROL, TYPE C: In Section 203.04 E.4 insert the following after the 2nd paragraph:

The addition of water or drying of fill material is required when directed by the Engineer.

203-P02 CONTRACT QUANTITY PAYMENT: The quantities of COMMON EXCAVATION-TYPE C to be paid will be those shown in the Contract, provided the Project is constructed to the lines and grades shown on the plans.

When disagreement exists between the Contractor and the Engineer as to the accuracy of the Plan quantities in any balance or the entire Project, either party may request that the quantities be measured. Additional original cross sections may be interpolated at points where necessary to more accurately determine the quantities.

Any additional required excavation will be measured as per Section 203.05 A or 203.05 B of the Standard Specifications.

203-P03 UTILITY POLES: Complete the finish grading work around utility poles in the construction area. Level any earth mounds, etc. that remain around the utility poles after the utility has been adjusted. Include this work in the unit price bid for "COMMON EXCAVATION-TYPE C".

203-P04 BACKSLOPE ROUNDING: Round backslopes on all cut sections as shown on the Typical Sections. Include this work in the unit price bid for "COMMON EXCAVATION-TYPE C".

203-P05 APPROACHES & DITCH BLOCKS: Construct approaches and ditch blocks at locations shown on the plans. Any location adjustments will be determined by the Engineer. Include all associated costs with the construction of approaches and ditch blocks in the unit price bid for "COMMON EXCAVATION-TYPE C".

203-P06 TOPSOIL-WETLAND: Excavate the Wetland 3, 4, & 5 mitigation areas an additional 6 inches, and fill the mitigation area with the stockpiled topsoil from the impacted wetland a depth of 6 inches to the elevations as specified in Sections 75 & 200. Include all associated price costs for the wetland mitigation and any necessary manipulating and drying of material in the unit price bid for "TOPSOIL-WETLAND".

Stockpiled topsoil from impacted Wetlands 3, 4, & 5 to the proposed wetland mitigation site will be used as the seed source for the establishment of wetland vegetation. In addition furnish wetland seed mix according to Section 251.03 F of the Standard Specifications and seed the mitigation area after placing the wetland topsoil in the mitigation area. Include all associated costs for seeding the mitigation area in the unit price bid for "WETLAND SEED".

203-P07 REMOVE & SALVAGE TOPSOIL: Low areas of the new construction corridor may contain additional topsoil beyond the estimated 4 inches. Remove, salvage, and haul this additional topsoil to locations that are short of topsoil in the areas of reconstruction located in the north 1 mile of the project. 3,000 CY of "REMOVE & SALVAGE TOPSOIL" has been provided for use as directed by the Engineer.

Notify the Engineer prior to hauling additional topsoil. Remove & Salvage Topsoil will be measured in the hauling vehicle by the cubic yard. Reach an agreement with the Engineer as to the volume for each hauling unit based on three-dimensional measurements and calculations for the hauling unit. Payment will be made by load counts for only the

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SC-COIB-0427(051)		
CMC 0427/123 rd Ave SW		
	Plan Notes	
	Billings County, ND	
DRWN. BY TB	CHKD. BY AK	PROJECT NO. 3313119

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topsoil hauled from the low areas to the areas that are short in the north mile.

Replace the removed material with suitable material for embankment, as determined by the Engineer, at no additional cost.

The unit price bid for "REMOVE & SALVAGE TOPSOIL" will govern regardless of the quantity used. An increase or decrease from plan quantity will not be accepted as a reason to negotiate any pay adjustment under this bid item. The bid item "REMOVE & SALVAGE TOPSOIL" may be eliminated at the discretion of the Engineer.

203-P08 COMMON EXCAVATION-SUBCUT: 1000 CY of COMMON EXCAVATION-SUBCUT has been provided, if needed, for use to remove existing unsuitable material in the roadbed as determined by the Engineer. Notify the Engineer prior to intent to subcut. The Engineer will determine the location and actual quantity of "COMMON EXCAVATION-SUBCUT". Backfill subcut areas with suitable onsite material. Spread the subcut material in the fills outside the main roadbed, or outside the road right of way, not adjacent to the construction site, in accordance with Section 107.17 of the Standard Specifications. The unit price bid for "COMMON EXCAVATION-SUBCUT" will govern regardless of the quantity used. An increase or decrease from plan quantity will not be accepted as a reason to negotiate any pay adjustment under this bid item. The bid item "COMMON EXCAVATION-SUBCUT" may be eliminated at the discretion of the Engineer.

210-P01 FOUNDATION FILL: Delete Section 210.03 B and insert the following:

B. Foundation Fill.

Foundation fill material shall be any granular material, other than scoria or shale, with less than 35% passing the No. 200 sieve.

Delete Section 210.04 B.3 and insert the following:

3. Foundation Fill.

Place foundation fill in layers not exceeding 6 inches to the required elevation. Thoroughly compact each layer with mechanical tamping equipment. Use water as required to achieve satisfactory compaction and stability.

Suitable material found onsite may be used for foundation fill provided it meets required specifications. If onsite material is used, it will be measured and paid for at twice the unit price bid for "COMMON EXCAVATION-TYPE C". Payment shall include all costs for removal, transportation, laying, and compacting the suitable material as well as all associated costs for pipe excavation and disposal of excess material. Payment will be according to the limits for width, length, and depth and adding 25% for shrinkage as shown on Section 20 Sheet 1.

When additional Foundation Fill is placed under the box, payment will be determined by computation using plan dimensions and adding 25% for shrinkage.

210-P02 APPROVED SUITABLE BACKFILL: Approved suitable backfill shall consist of approved natural compactable soil selected from excavation. The soil shall not be saturated or contain organic material.

210-P03 PIPE EXCAVATION: The amount of excavation under the centerline pipe may vary due to the depth of poor foundation soil and will be determined by the Engineer. The actual excavation, regardless of depth, will not be measured for payment but will be included in the unit price bid for "FOUNDATION FILL". Excavate according to the limits for width and length as shown on Section 20 Sheet 1. Use Foundation Fill material to backfill the excavation areas. Payment for Foundation Fill will be according to the limits for width and length as shown on Section 20 Sheet 1 and depth measured in the field.

251-P01 SEEDING: Seeding Class III shall consist of the following mixture:

Species	Lbs. of PLS/Acre
Alfalfa	9
Western Wheatgrass	4
Fairway Crested Wheatgrass	5
Slender Wheatgrass	2
Oats	10
Total	30

256-P01 RIPRAP GRADE II: Riprap Grade II will be paid according to designated length, width, and depth as shown on the plans unless otherwise designated by the Engineer.

261-P01 FIBER ROLLS: Fiber rolls have been provided for temporary and permanent erosion control. The temporary erosion control has been provided for placement prior to disturbing the topsoil or as indicated by the Engineer.

Preserve the temporary erosion control throughout the duration of the project. If the erosion control is damaged due to negligence, repair at the Contractor's expense.

Place permanent fiber rolls within the construction limits as construction progresses. Locations are shown in Section 77.

An additional 400 LF of Fiber Rolls 12IN have been provided for locations to be determined by the Engineer. Include all costs for labor, equipment and materials necessary to complete this work and all costs to relocate fiber rolls as needed for construction related activities in the unit price bid for "FIBER ROLLS 12IN".

261-P02 EROSION CONTROL SEQUENCING: In areas where erosion control blankets and fiber rolls are both specified, follow the following installation sequence:

1. Trench for fiber rolls per Standard Drawing D-261-1
2. Install erosion control blanket per Standard Drawing D-255-2
3. Install fiber rolls per Standard Drawing D-261-1

302-P01 AGGREGATE SURFACE COURSE: County forces will haul, lay, & compact the 6 inches of aggregate surfacing, as noted on the Typical Sections. Coordinate grading operation with Billings County so that the surfacing can be placed within 48 hours after the finished grading is complete. The County is available to haul, lay, and compact Aggregate Surface Course from Monday through Thursday only.

The Contractor is responsible for all roadway maintenance from the project start through final acceptance. The only exception is if the County does not begin delivery of aggregate surface course within the 48 hours notice period, not including Friday through Sunday. The contact is Jeff Iverson at (701) 290-9581.

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SC-COIB-0427(051)
CMC 0427/123rd Ave SW

Plan Notes

Billings County, ND

DRWN. BY TB	CHKD. BY AK	PROJECT NO. 3313119
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704-P01 TRAFFIC CONTROL DEVICES LIST: The traffic control devices list has been developed using the following layouts on the Standard Drawing for traffic control:

- Standard D-704-19, Type E: For road closure to all but local traffic. Detour is not provided.
- Standard D-704-22, Type K: For trucks hauling material.
- Standard D-704-22, Type M for culvert installations. Flagging will not be required.
- Standard D-704-30: For installation of aggregate surfacing. Contractor is to provide vertical panels and other construction signs for use by the County.
- Standard Drawings D-704-7, 8, 9, 10, 11, 13, 14, and 50 are applicable.
- Traffic Control Layouts for construction are in Section 100 of the plans.

704-P02 TRAFFIC CONTROL: Leave roadway open to local traffic during construction. In addition to the traffic control items listed in the plans, maintain traffic around the culvert installation locations. Include the cost in the unit price bid of installing the culverts.

704-P03 PIPE INSTALLATION: Complete all centerline pipe culvert installations within the existing roadway cross section in the same calendar day as the existing culvert is removed. This includes backfilling the culvert to the adjacent roadway elevation to allow local traffic to utilize the roadbed.

714-P01 VOID AREAS: Flared end sections shall have no void areas underneath them. Level and compact the material under the flared end sections to grade prior to setting all flared end sections.

714-P02 DEFLECTION TESTING: Delete Section 714.04 A.5 in its entirety and insert the following:

The Engineer will visually inspect all metal pipe used on the project for deflection a minimum of 30 days after the pipe is installed. If the Engineer sees any deflection, the Engineer will require the Contractor to pass a nine point mandrel or approved object through the pipe to check for deflection. Use a mandrel with a diameter not less than 95 percent of the inside diameter of the pipe. If the mandrel cannot be passed through the pipe, either repair or replace the pipe.

Perform the deflection test under the observation of the Engineer.

714-P03 COMPACTION CONTROL FOR AGGREGATE: Delete Section 714.04 A.7 in its entirety and insert the following:

7. Compaction Control for Aggregate.

Place foundation fill in layers not exceeding 6 inches to the required elevation. Thoroughly compact each layer with mechanical tamping equipment. Use water as required to achieve satisfactory compaction and stability.

752-P01 TEMPORARY FENCE: Field fit temporary fencing in areas of deep draws and wooded areas, with Engineer approval. Place temporary/permanent fencing prior to removing existing fencing.

“TEMPORARY FENCE” shall consist of 3-strand barb wire with steel line posts. Install gates at existing gate locations. The cost to install temporary fence, gates, and removal of temporary fencing shall be included in the unit price bid for “TEMPORARY FENCE”.

830-P01 POLYMERIC CULVERTS: Provide polymeric coating (inside and out) for all centerline corrugated steel pipe culverts and coupling bands. Coating shall conform to the requirements as set forth under AASHTO M-245 & M-246. The coating thickness shall be 10 mils inside and outside.

In truck shipments, support the pipe on wide cradles of suitably padded timbers. Pad all chains, cable or other equipment used for fastening the load.

Repair or replace, as directed by the Engineer, any damage to the protective coating from any cause during the installation of the culvert and before final acceptance of the purchase. Repair at no additional cost to the project.

830-P02 APPROACH CULVERTS: Provide culverts installed in approaches that are zinc galvanized and meet the requirements of Section 830.02 B of the Standard Specifications.

980-P01 REMOVE CATTLE GUARD: Include all work required to remove and salvage the existing cattle guards and bases in the unit price bid for “REMOVE CATTLE GUARD”. Stockpile the removed cattle guards and bases onsite. Continental Resources will reset the removed cattle guard from Sta 104+96 Rt. Coordinate operations with Lester Iverson (701) 690-2104 prior to installing the permanent fence. Ken Obrigewitch will reset the removed cattle guard from Sta 105+19 Lt.

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ENVIRONMENTAL COMMITMENTS

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ENVIRONMENTAL COMMITMENTS (EC): Billings County, the North Dakota Department of Transportation, and the Federal Highway Administration have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable impacts to wetlands will be mitigated on site, adjacent to the project, or at a NDDOT approved mitigation site or bank.

ACTION REQUIRED/TAKEN: 0.18 acres of permanent impacts to jurisdictional waters will require mitigation. Billings County proposes to mitigate 0.18 acres onsite.

Wetland Impact Table															
Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size Ac.	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		WETLAND MITIGATION			Location; Acreage; Wetland#; Ratio	Onsite Mitigation Acres
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	Mitigation Required				
											EO 11990	USACE	USFWS		
1	Sec. 33, T142N, R98W	PEME	Drainage	0.38	Natural	Yes	0.00	0.00			N	N	N	none	
2	Sec. 33, T142N, R98W	PEME	Drainage	0.11	Natural	Yes	0.00	0.00			N	N	N	none	
3	Sec. 3&4, T141N, R98W	PEMC	Intermittent Stream	0.70	Natural	Yes	0.03	0.13			Y	N	N	Onsite 0.06 at WL3 (1:1)	0.06 ¹
4	Sec. 3&4, T141N, R98W	PEME	Drainage	0.27	Natural	Yes	0.00	0.08			Y	N	N	Onsite 0.08 at WL4 (1:1)	0.08
5	Sec. 3, T141N, R98W	PEME	Drainage	0.83	Natural	Yes	0.00	0.04			Y	N	N	Onsite 0.04 at WL5 (1:1)	0.04
Totals				2.29			0.03	0.25	0.00	0.00					0.18

*A wetland Jurisdictional Determination was issued by the USACE on 2/28/2014; NWO-2014-0435-BIS.

**All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

***All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), Preamble Wetlands, and temporary impacts do not require mitigation.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.25	Temporary JD	0.03
Natural/Non-JD	0	Non-JD Temporary	0
Artificial/JD	0	Permanent JD > 0.10	0
Artificial /Non-JD	0	Permanent OW	0
Total	0.25	Temporary OW	0

Compensation Requirements by Agency and Water Type		
Water Type	USACE Mitigation	EO 11990 Mitigation
Natural/JD Wetland	> 0.1 acre	All
Natural/Non-JD Wetland	No mitigation required	All
Artificial/JD Wetland	> 0.1 acre	No mitigation required
Artificial/Non-JD Wetland	No mitigation required	No mitigation required
Deep Water (> than 6.6 feet)	No mitigation required	No mitigation required
Other Water	> 300 linear feet	No mitigation required
Preamble	No mitigation required	No mitigation required

EC-2: No construction or demolition activities will take place during the spawning season in the Spring Creek Channel from April 15 to June 1.

¹ Approximately 0.07 acres of impacts to Wetland 3 were minimized by sinking of the box and riprap, or were impacts that occurred parallel to the structure.



ENVIRONMENTAL COMMITMENTS

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EC-3: The Contractor shall prevent the introduction of ANS into North Dakota waters, or transport of aquatic vegetation to or from any waters of the state, or transport of any aquatic vegetation into the state.

ACTION REQUIRED/TAKEN: The contractor shall follow the North Dakota Game and Fish Department's (NDGFD) Administrative Rules 30-3-06 for compliance with ND Century Code Chapter 20.1-17 on Aquatic Nuisance Species (ANS). Contractor shall notify the NDGFD at least 72 hours prior to the placement IN or ON the waters of the State of North Dakota of any and all vehicles, vessels, pumps and equipment that will be used in the project, to allow the Department sufficient time to inspect any and all such equipment for ANS. The NDGFD ANS Coordinator, Fred Ryckman, shall be contacted by phone (701.770.0920) or e-mail fryckman@nd.gov for equipment inspections, or any additional information regarding ANS prevention protocol.



SUMMARY OF QUANTITIES

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Spec	Code	Description	Unit	Total Quantities
103	0100	CONTRACT BOND	LSUM	1
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	376
202	0312	REMOVE EXISTING FENCE	LF	3,787
203	0103	COMMON EXCAVATION-TYPE C	CY	82,399
203	0109	TOPSOIL	CY	16,631
203	0121	TOPSOIL-WETLAND	CY	218
203	0125	REMOVE & SALVAGE TOPSOIL	CY	3,000
203	0138	COMMON EXCAVATION-SUBCUT	CY	1,000
203	0180	ROADWAY OBLITERATION	LF	100
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,043
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
216	0100	WATER	MGAL	889
251	0350	SEEDING CLASS III	MILE	2.1
251	1000	WETLAND SEED	ACRE	0.2
251	2001	TEMPORARY COVER CROP	MILE	2.1
255	0103	ECB TYPE 3	SY	2,247
256	0200	RIPRAP GRADE II	CY	354
256	1000	GROUT FOR RIPRAP	SY	321
260	0200	SILT FENCE SUPPORTED	LF	520
260	0201	REMOVE SILT FENCE SUPPORTED	LF	520
261	0112	FIBER ROLLS 12IN	LF	6,000
261	0113	REMOVE FIBER ROLLS 12IN	LF	1,680
606	3111	DBL 11FT X 11FT PRECAST RCB CULVERT	LF	120
606	7111	DBL 11FT X 11FT PRECAST RCB END SECTION	EA	2
702	0100	MOBILIZATION	LSUM	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	951
704	1052	TYPE III BARRICADE	EA	16
704	1081	VERTICAL PANELS-BACK TO BACK	EA	16
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	763
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	725
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	348
714	4105	PIPE CONDUIT 24IN	LF	62
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	220
714	4110	PIPE CONDUIT 30IN	LF	68
714	4115	PIPE CONDUIT 36IN	LF	236
714	4120	PIPE CONDUIT 42IN	LF	168
752	0200	FENCE BARBED WIRE 4 STRAND	LF	7,197
752	0905	TEMPORARY FENCE	LF	187
752	2100	VEHICLE GATE	EA	4
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	9
752	4140	DOUBLE BRACE ASSEMBLY BARBED WIRE-WOOD POST	EA	9
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	33.4
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	31.8
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	138.2
754	0592	RESET SIGN PANEL	EA	3
766	0100	MAILBOX-ALL TYPES	EA	1
900	1000	TEMPORARY STREAM DIVERSION	EA	1
980	0171	REMOVE CATTLE GUARD	EA	2

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SC-COIB-0427(051)	
<small>CMC 0427/123rd Ave SW</small>	
	Summary of Quantities Billings County, ND
DRWN. BY JMW	CHKD. BY AK
PROJECT NO. 3313119	

BASIS OF ESTIMATE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	10	1

Average Haul

Mile #1 = 5.51 Sta
 Mile #2 = 17.59 Sta
 Project = 10.41 Sta

Topsoil

4" depth

Topsoil-Wetland

6" depth

Box Culvert Excavation

Limits as shown on Plans and Specifications

Foundation Fill – (Volume +25%)

Pipe Conduit: Depth & Limits as shown in Section 20 Sheet 1
 RCB Culvert: 2.0' Depth; Limits same as Box Culvert Excavation

Water

10 Gal/CY Common Excavation
 30 MGal/Mile for Dust Palliative

Seeding CI III & Temporary Cover Crop

Entire disturbed area except the newly constructed roadbed
 Minimum 29.3 acres to Maximum 34.4 acres

Riprap Grade II

1.5' Depth; Length and Width as shown on the plans

Aggregate Surface Course – (Volume +25%) (For Information Only)

3,178 CY/Mile Mainline
 20 CY/Field Drive
 40 CY/Section Line & Private Drives

MAILBOXES			
Station	Type	Assembly	Support
132+72 Lt	1A	Single	1

Earthwork and Topsoil Summary				
Location	Excavation (CY)	Embankment (CY)	Topsoil (CY)	Wetland Topsoil (CY)
123rd Ave SW	69,897	82,370	15,837	218
Approach Road	12,502	16	794	
Totals =	82,399	82,386	16,631	218

Note: Quantity shown for embankment has been increased by 25% to account for shrinkage.

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SC-COIB-0427(051)		
CMC 0427/123 rd Ave SW		
	Basis of Estimate Billings County, ND	
DRWN. BY JMW	CHKD. BY AK	PROJECT NO. 3313119

DRAINAGE DATA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	11	1

SC-COIB-0427(051) - DRAINAGE DATA								
Location	Size	Drainage Area Acres	25 YEAR DESIGN FREQUENCY				100 YEAR DESIGN FREQUENCY	
			Design H.W. Ft.	Design Discharge C.F.S.	Design Velocity F.P.S.	Max Stage Elev.	Design Discharge C.F.S.	Max Stage Elev.
Mile 1								
Sta 58+84 Cl 30"x68' CSP .079" 2 EA 30" CSES .079"	30"	17	2.5	20	9.8	2580.5	32	2581.0
Sta 67+00 Lt 24"x80' CSP .079" 2 EA 24" CSES .064"	24"							
Sta 67+00 Rt 18"x76' CSP .064" 2 EA 18" CSES .064"	18"							
Sta 70+80 Cl 36"x74' CSP .079" 2 EA 36" CSES .079"	36"	55	3.0	1482	4.6	2556.9	2523	2558.0
Sta 88+72 Cl Skewed 23° Lt & Ahd Dbl 11'x11'x120' Precast RCB Culvert 2 EA Dbl 11'x11' Precast RCB End Sections		25643	11.2		6.6			
Sta 82+00 Lt 24"x70' CSP .079" 2 EA 24" CSES .064"	24"							
Sta 82+00 Rt 24"x70' CSP .079" 2 EA 24" CSES .064"	24"							
Mile 2								
Sta 105+64 Rt 18"x72' CSP .064" 2 EA 18" CSES .064"	18"							
Sta 106+40 Cl 42"x68' CSP .079" 2 EA 42" CSES .109"	42"	75	3.9	49	7.8	2588.9	78	2590.8
Sta 132+20 Lt 18"x74' CSP .064" 2 EA 18" CSES .064"	18"							
Sta 132+20 Rt 18"x56' CSP .064" 2 EA 18" CSES .064"	18"							
Sta 135+42 Cl 36"x70' CSP .079" 2 EA 36" CSES .079"	36"	65	3.8	42	9.1	2596.4	68	2597.4
Sta 139+80 Cl 42"x100' CSP .079" 2 EA 42" CSES .109"	42"	89	4.1	57	10.2	2591.5	91	2594.4
Sta 145+64 Cl 36"x92' CSP .079" 2 EA 36" CSES .079"	36"	70	4.1	45	8.3	2598.0	72	2601.6
Sta 149+00 Lt 18"x70' CSP .064" 2 EA 18" CSES .064"	18"							
Sta 157+93 Cl 24"x62' CSP .079" 2 EA 18" CSES .064"	24"	1	0.5	1	3.2	2628.8	2	2628.8

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SC-COIB-0427(051)		
CMC 0427/123 rd Ave SW		
Drainage Data		
Billings County, ND		
	DRWN. BY <small>JMW</small>	CHKD. BY <small>AK</small>
PROJECT NO. <small>3313119</small>		

EARTHWORK VALUES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	11	2

Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
48+50.00	2.84	23.82	0	0	0
49+00.00	4.68	33.53	7	66	-59
50+00.00	7.97	46.22	23	185	-221
51+00.00	54.33	28.61	115	173	-279
52+00.00	259.97	32.62	582	142	161
52+74.00	Approach Road		12486	500	12147
53+00.00	113.01	155.65	691	436	12402
54+00.00	0.73	409.54	211	1308	11305
55+00.00	0.00	490.85	1	2084	9222
56+00.00	21.95	581.67	41	2483	6780
57+00.00	13.16	552.18	65	2625	4220
58+00.00	0.00	463.89	24	2352	1892
58+84.00	0.00	366.51	0	1615	277
59+00.00	0.00	343.94	0	263	14
59+75.00	Ditch Block		0	200	-186
60+00.00	118.87	185.44	220	1225	-1191
61+00.00	215.02	51.95	618	550	-1123
62+00.00	410.28	4.35	1158	130	-95
63+00.00	357.48	17.82	1422	51	1276
64+00.00	319.04	27.38	1253	105	2424
65+00.00	266.59	41.76	1084	160	3348
66+00.00	387.67	7.83	1212	115	4445
67+00.00	411.05	1.25	1479	21	5903
67+00.00	Approaches		0	600	5303
68+00.00	513.97	0.38	1713	4	7012
69+00.00	0.00	344.10	952	797	7167
70+00.00	0.00	602.77	0	2192	4975
70+80.00	0.00	518.93	0	2077	2898
71+00.00	0.00	461.73	0	454	2444
72+00.00	0.00	285.21	0	1729	715
73+00.00	18.82	184.06	35	1086	-336
74+00.00	80.51	138.54	184	747	-899
75+00.00	105.32	115.17	344	587	-1142
76+00.00	124.58	109.91	426	521	-1237
77+00.00	131.97	90.15	475	463	-1225
78+00.00	158.06	84.97	537	405	-1093
78+70.00	198.69	124.69	462	340	-971

Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
78+80.00	238.95	144.62	81	62	-952
78+90.00	237.48	155.92	88	70	-934
79+00.00	256.74	202.54	92	83	-925
79+10.00	281.57	247.92	100	104	-929
79+20.00	292.43	275.01	106	121	-944
79+30.00	289.09	305.77	108	134	-970
79+40.00	286.36	329.00	107	147	-1010
79+50.00	285.53	346.02	106	156	-1060
79+60.00	287.92	344.45	106	160	-1114
79+70.00	295.11	333.66	108	157	-1163
79+80.00	305.86	322.11	111	152	-1204
79+90.00	317.08	324.30	115	150	-1239
80+00.00	320.72	320.27	118	149	-1270
80+10.00	324.22	324.05	119	149	-1300
80+20.00	290.67	345.74	114	155	-1341
80+30.00	236.79	306.88	98	151	-1394
80+40.00	174.33	233.41	76	125	-1443
81+00.00	211.78	62.93	429	412	-1426
82+00.00	201.65	68.00	766	303	-963
82+00.00	Approaches		0	550	-1513
83+00.00	226.32	46.89	793	266	-986
84+00.00	230.20	33.66	845	186	-327
85+00.00	254.71	27.65	898	142	429
86+00.00	213.77	63.97	868	212	1085
87+00.00	163.85	179.89	699	564	1220
88+00.00	125.17	631.75	535	1879	-124
88+50.00	78.18	1129.58	188	2039	-1975
88+72.00	RCB Culvert		0	-1700	-275
88+97.00	17.22	1578.19	83	2946	-3138
89+00.00	18.51	1516.30	2	215	-3351
90+00.00	30.68	310.08	91	4228	-7488
91+00.00	511.05	53.74	1003	842	-7327
92+00.00	466.84	1.68	1811	128	-5644
92+00.00	Approach		0	300	-5944
93+00.00	74.09	275.46	1002	642	-5584
94+00.00	0.00	400.90	137	1566	-7013
95+00.00	44.93	149.52	83	1274	-8204

Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
96+00.00	560.16	0.37	1121	347	-7430
97+00.00	345.21	25.79	1677	61	-5814
98+00.00	208.18	97.89	1025	286	-5075
99+00.00	318.72	42.19	976	324	-4423
100+00.00	393.87	0.44	1320	99	-3202
101+00.00	379.69	0.47	1433	2	-1771
102+00.00	379.01	0.82	1405	3	-369
103+00.00	351.55	2.45	1353	8	976
104+00.00	345.63	8.85	1291	26	2241
105+00.00	109.03	119.36	842	297	2786
105+64.00	15.57	221.34	148	505	2429
105+64.00	Approaches		0	600	1829
106+00.00	36.98	239.80	35	384	1480
106+40.00	31.99	304.89	51	504	1027
107+00.00	21.71	267.86	60	795	292
108+00.00	28.16	140.10	92	944	-560
109+00.00	98.23	56.44	234	455	-781
110+00.00	172.46	10.05	501	154	-434
111+00.00	182.69	13.50	658	55	169
112+00.00	78.87	63.90	484	179	474
113+00.00	81.75	50.50	297	265	506
114+00.00	50.51	69.35	245	277	474
115+00.00	55.65	104.88	197	403	268
116+00.00	82.48	72.67	256	411	113
117+00.00	142.96	31.40	417	241	289

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SC-COIB-0427(051)

CMC 0427/123rd Ave sw

Earthwork Values

Billings County, ND

DRWN. BY AK	CHKD. BY AK	PROJECT NO. 3313119
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EARTHWORK VALUES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	11	3

Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
118+00.00	183.77	11.66	605	100	794
119+00.00	360.26	0.60	1007	28	1773
120+00.00	600.21	0.46	1779	2	3550
121+00.00	828.01	0.43	2645	2	6193
122+00.00	1102.72	0.43	3575	2	9766
122+40.00	Approaches		0	600	9166
123+00.00	639.95	0.43	3227	2	12391
124+00.00	153.49	16.60	1469	39	13821
125+00.00	129.46	36.37	524	123	14222
126+00.00	154.49	24.45	526	141	14607
127+00.00	213.73	15.50	682	92	15197
128+00.00	268.43	8.80	893	56	16034
129+00.00	256.60	10.74	972	45	16961
130+00.00	148.22	30.43	750	95	17616
131+00.00	95.42	56.29	451	201	17866
132+00.00	177.66	5.35	506	143	18229
132+20.00	Approaches		0	500	17729
133+00.00	145.37	28.18	598	78	18249
134+00.00	61.89	119.59	384	342	18291
135+00.00	23.29	355.79	158	1100	17349
135+42.00	12.38	339.59	28	676	16701
135+82.00	Ditch Block		0	150	16551
136+00.00	104.94	189.89	126	711	15966
137+00.00	314.18	1.78	776	444	16298
138+00.00	71.39	102.16	714	241	16771
139+00.00	53.84	389.38	232	1138	15865
139+80.00	17.66	691.12	106	2001	13970
140+00.00	2.50	734.80	7	660	13317
141+00.00	21.46	386.18	44	2595	10766
142+00.00	46.62	178.18	126	1306	9586
143+00.00	74.70	73.38	225	582	9229
144+00.00	191.30	0.85	493	172	9550
144+21.00	Approaches		0	500	9050
145+00.00	91.28	339.63	523	788	8785
145+64.00	4.94	675.10	114	1503	7396
146+00.00	1.09	665.18	4	1117	6283
147+00.00	40.69	489.38	77	2673	3687

Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
148+00.00	30.98	324.32	133	1884	1936
149+00.00	27.11	162.50	108	1127	917
149+00.00	Approach		0	250	667
150+00.00	68.99	47.86	178	487	358
151+00.00	103.11	31.55	319	184	493
152+00.00	59.95	52.56	302	195	600
153+00.00	53.00	84.77	209	318	491
154+00.00	54.28	83.89	199	390	300
155+00.00	59.85	76.89	211	372	139
156+00.00	85.45	52.59	269	300	108
157+00.00	3.08	18.79	164	165	107
157+93.00	7.25	31.25	18	108	17
158+00.00	18.08	12.00	3	7	13
			Volume (CY)		
			Exc	Fill	Mass Ordinate
Totals			82383	82370	13

Note: 12,486 CY of Exc from the Approach Road was inserted at Sta 52+74 and included in the mainline Exc.

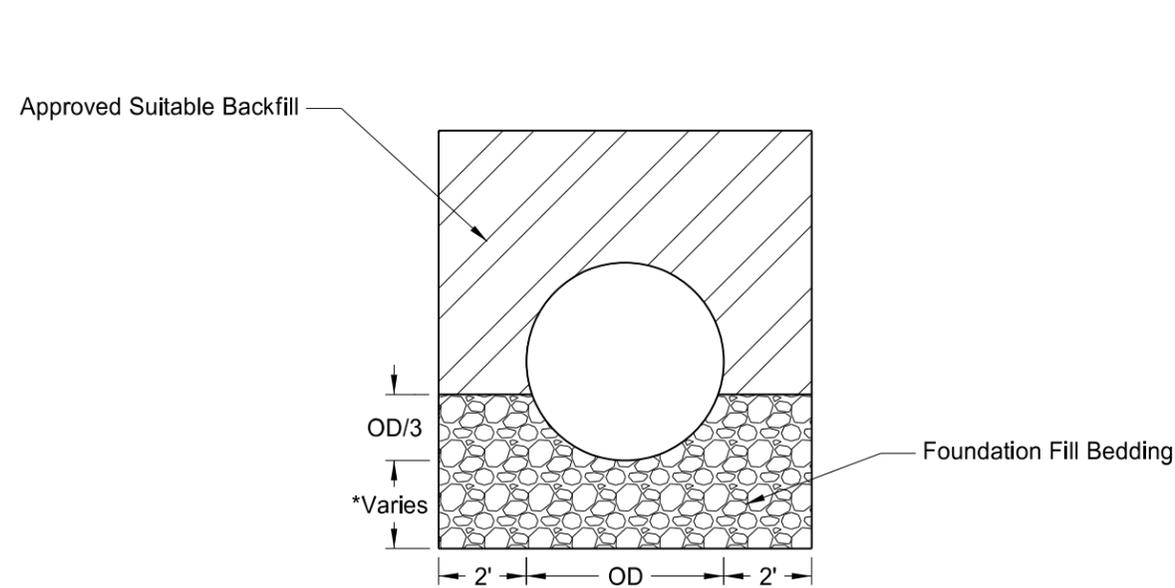
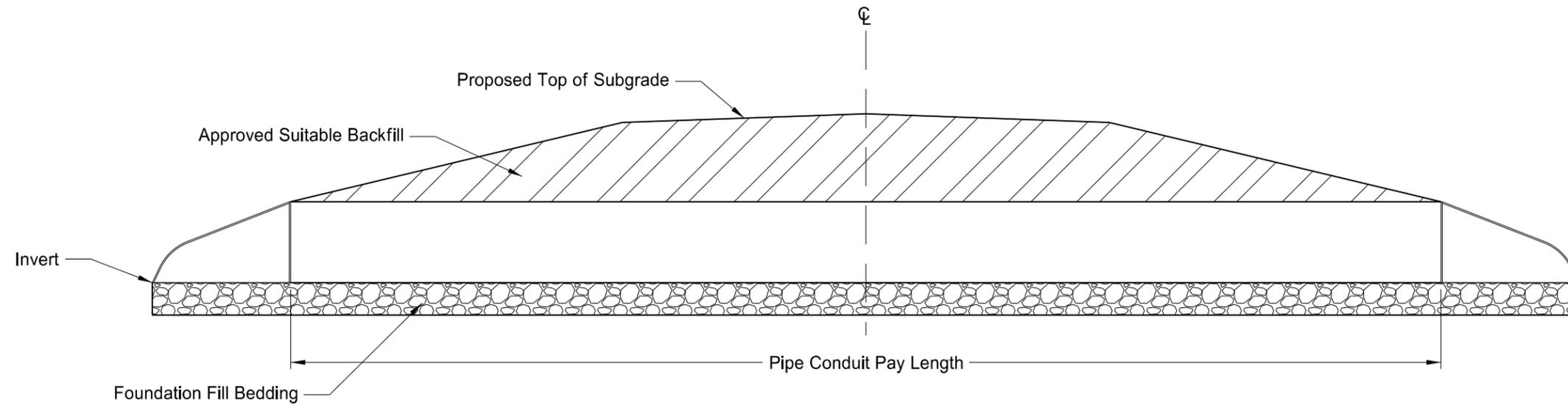
Approach Road					
Station	End Area (SF)		Adjusted Volume (CY)		
	Exc	Fill	Exc	Fill	Mass Ordinate
400+14.00	331.73	0.40	0	0	0
400+50.00	423.24	0.43	503	1	502
401+00.00	393.20	0.36	756	1	1257
401+50.00	533.34	0.39	858	1	2114
402+00.00	936.50	0.36	1361	1	3474
402+50.00	1305.85	0.34	2076	1	5549
403+00.00	1486.24	0.34	2585	1	8133
403+50.00	1182.65	0.40	2471	1	10603
404+00.00	414.41	0.49	1479	1	12081
404+50.00	25.38	4.81	407	6	12482
404+60.00	6.91	3.26	6	2	12486
			Volume (CY)		
			Exc	Fill	Mass Ordinate
Totals			12502	16	12486

Note: 12,486 CY Exc to be used for mainline.

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SC-COIB-0427(051)		
CMC 0427/123 rd Ave sw		
		Earthwork Values
Billings County, ND		
DRWN. BY AK	CHKD. BY AK	PROJECT NO. 3313119

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	20	1



Bedding
CY Per Foot
(for centerline CSP)

Size	CSP
24"	0.70
30"	0.79
36"	0.88
42"	0.97

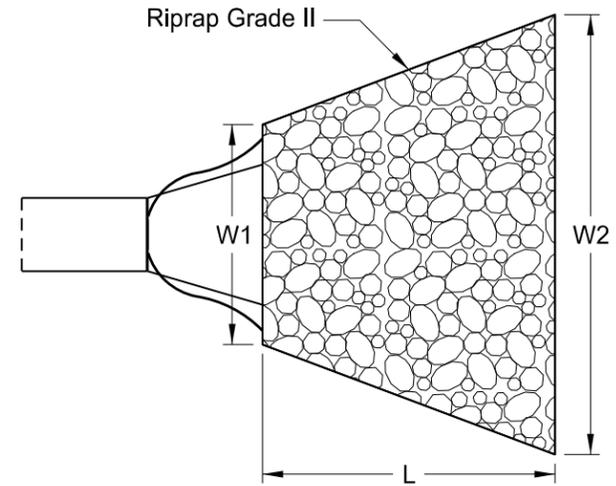
*2' has been provided for use if needed as determined by the Engineer in the field.

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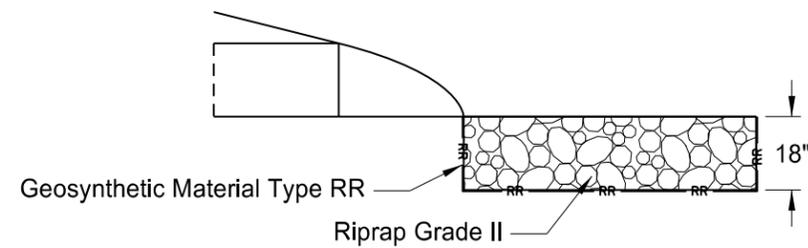
SC-COIB-0427(051)	
<small>CMC 0427/123rd Ave SW</small>	
	Pipe Conduit Bedding & Backfill Details
	Billings County, ND
<small>DRAWN BY</small> JMW	<small>PROJECT NO.</small> 3313119

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	20	2

PLAN VIEW



PROFILE VIEW

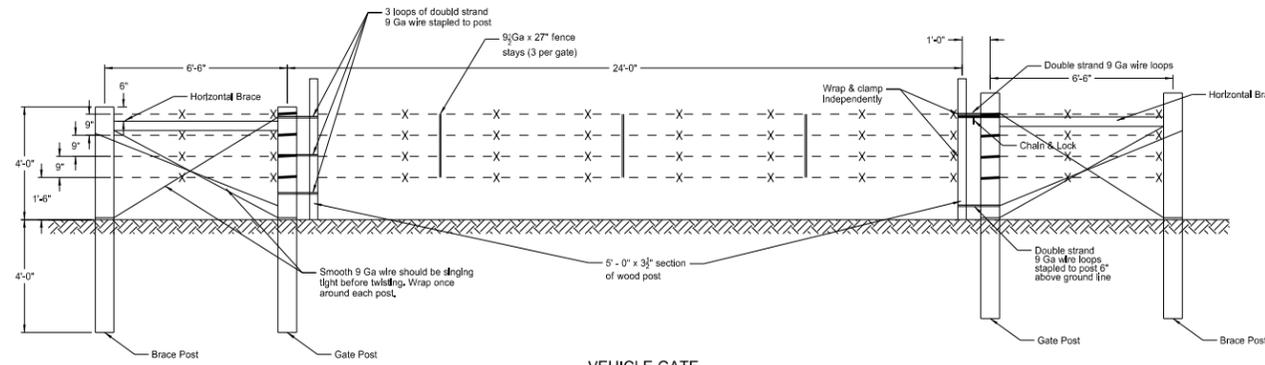


Culvert Diameter Inches	L Feet	W1 Feet	W2 Feet	Riprap Depth, D Inches	RR Fabric SY	Riprap CY
36	10	10	17	18	23	8
42	10	11	18	18	25	8

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SC-COIB-0427(051) CMC 0427/123rd Ave SW	
	Riprap Detail Culvert End Sections
	Billings County, ND
DRWN BY JMW	CHKD BY AK
PROJECT NO. 3313119	

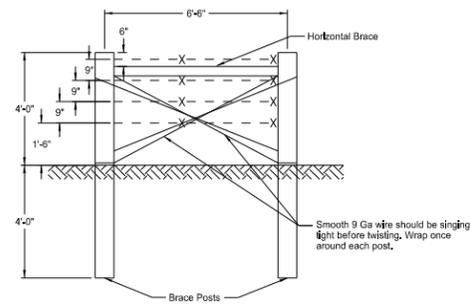
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	20	3



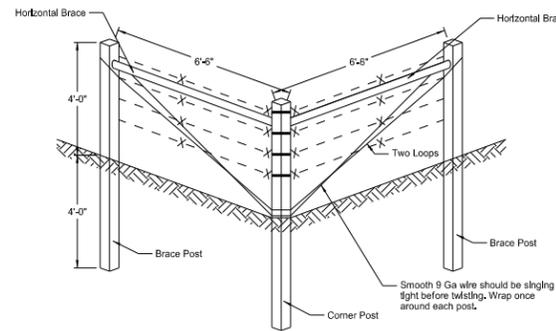
VEHICLE GATE

NOTES

1. No deduction in measured pay length of cable fence will be made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Abutment fencing shall be included in the price bid for fencing bid items.
2. Double brace assemblies shall be installed at locations shown on the plans or established by the Engineer. The distance between adjacent fence terminals, corner assemblies, or double brace assemblies shall not exceed 1,320 feet.
3. Place line posts in a repeating pattern of 5 steel posts and then 1 wood post. Locations of double brace assemblies and vehicle gates as shown on the plans may be adjusted by the Engineer.

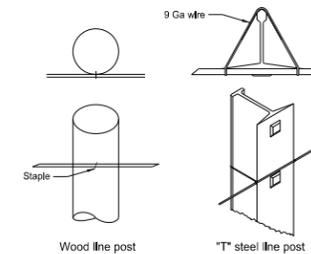


DOUBLE BRACE ASSEMBLY

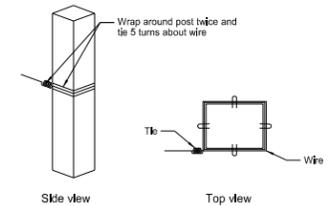


CORNER ASSEMBLY

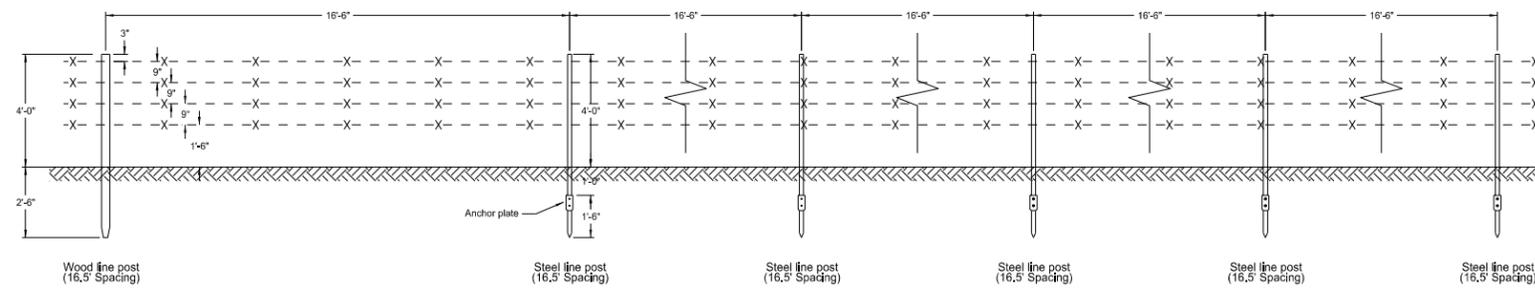
USE OF POST	POST SIZES						
	TREATED WOOD		TREATED RAILROAD TIE		STEEL		
	Post dia.	Post length	Post dimensions	Post length	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs.
Line Post	3 1/2"	6'-6"			6'-6"	1.33	0.67
Corner Post			7"x9"	8'			
Brace Post			7"x9"	8'			
Gate Post			7"x9"	8'			
Horizontal Brace	3 1/2"	6'-6"					



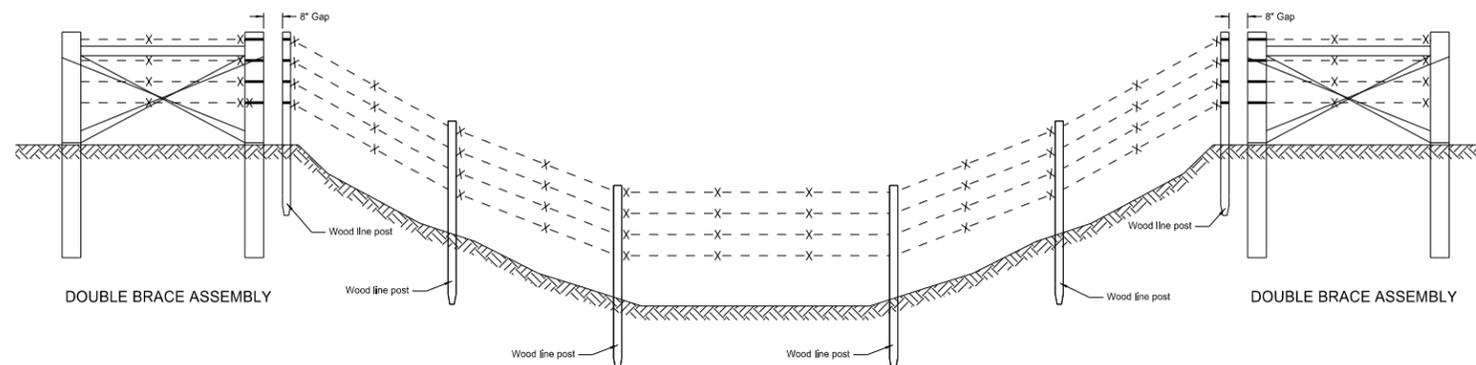
FASTENING TO POSTS



WRAP-AROUND DETAIL



LINE POST DETAIL



BREAK-AWAY FENCE FOR WIDE DEPRESSIONS SUBJECT TO FLOODING

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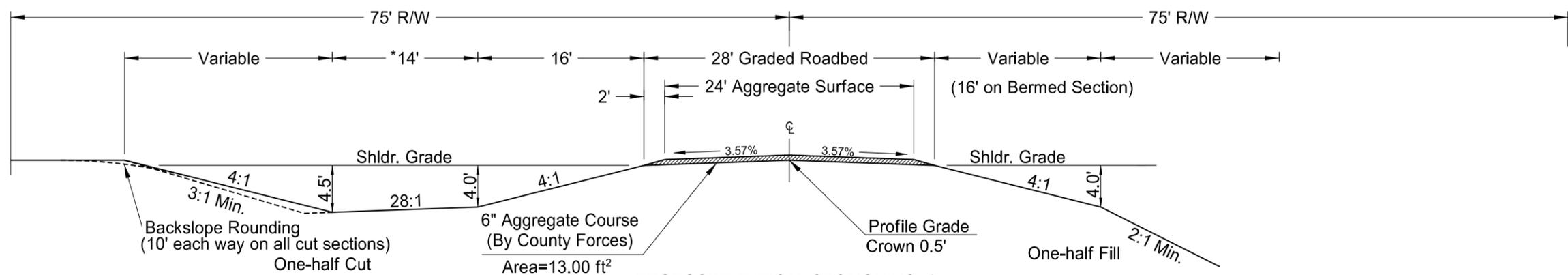
SC-COIB-0427(051)
CMC 0427/123rd Ave SW

Permanent Fencing Details

Billings County, ND

DRWN. BY: JMW CKRD. BY: AK PROJECT NO.: 3313119

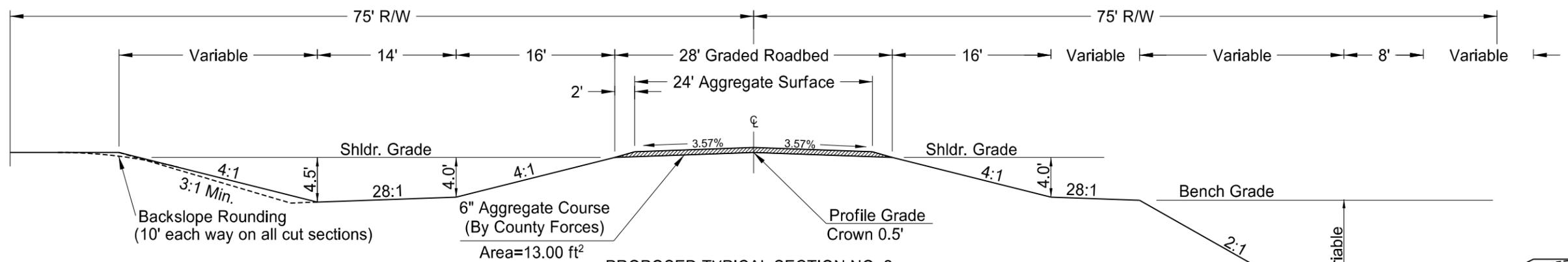
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	30	1



PROPOSED TYPICAL SECTION NO. 1
 STA 48+50 TO 78+00
 STA 81+00 TO 158+00
 STA 400+14 TO 404+60

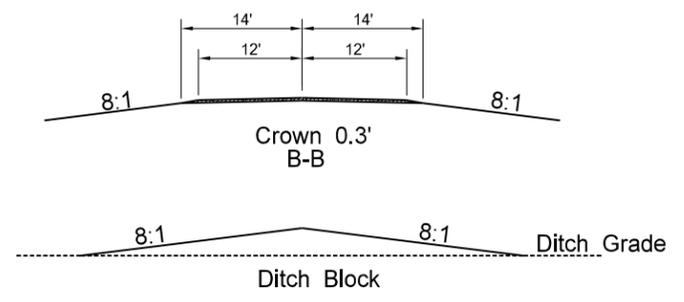
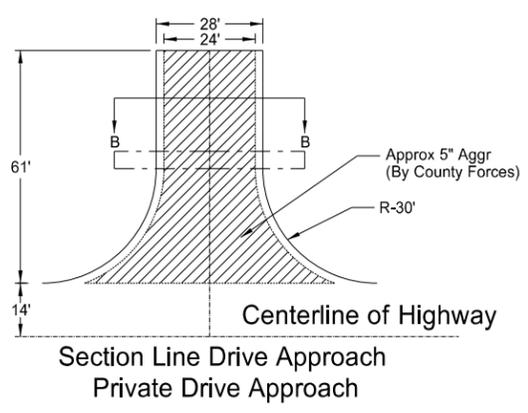
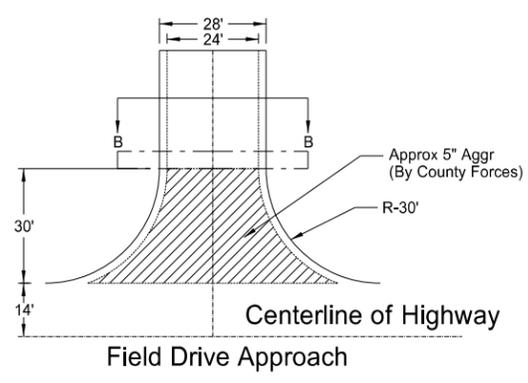
Transition Typ 1 to Typ 2
 Sta 78+00 to Sta 78+70

- One-half Cut
- *24' Sta 60+00 - 68+00 Lt
 - *24' Sta 61+00 - 68+00 Rt
 - *24' Sta 74+00 - 83+00 Lt
 - *24' Sta 73+00 - 78+00 Rt
 - *19' Sta 84+00 Lt
 - *24' Sta 96+00 - 100+00 Lt



PROPOSED TYPICAL SECTION NO. 2
 STA 78+70 TO 80+40

Transition Typ 2 to Typ No 1
 Sta 80+40 to Sta 81+00



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SC-COIB-0427(051)
 CMC 0427/123rd Ave SW

KLJ

28' Roadway Typical Sections
 Billings County, ND

DRWN BY: JMW CKRD BY: AK PROJECT NO.: 3313119

ALLOWABLE PIPE LIST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	(*) End Sections		Applicable Backfill Detail
													Begin	End	
													EA	EA	
				In	Bid Item	LF		In	Type		In	SY			
58+84	28' Lt	58+84	40' Rt	30	Pipe Conduit	68'	Corrugated Steel Pipe	30	P	2	0.079	-	FES	FES	Sheet 20 - 1
66+66	54' Lt	67+46	54' Lt	24	Pipe Conduit - Approach	80'	Corrugated Steel Pipe	24	Z or A	2	0.079	-	FES	FES	-
66+68	54' Rt	67+44	54' Rt	18	Pipe Conduit - Approach	76'	Corrugated Steel Pipe	18	Z or A	2	0.064	-	FES	FES	-
70+80	36' Lt	70+80	38' Rt	36	Pipe Conduit	74'	Corrugated Steel Pipe	36	P	2	0.079	-	FES	FES	Sheet 20 - 1
81+65	54' Lt	82+35	54' Lt	24	Pipe Conduit - Approach	70'	Corrugated Steel Pipe	24	Z or A	2	0.079	-	FES	FES	-
81+65	48' Rt	82+35	48' Rt	24	Pipe Conduit - Approach	70'	Corrugated Steel Pipe	24	Z or A	2	0.079	-	FES	FES	-
105+28	47' Rt	106+00	47' Rt	18	Pipe Conduit - Approach	72'	Corrugated Steel Pipe	18	Z or A	2	0.064	-	FES	FES	-
106+40	36' Lt	106+40	32' Rt	42	Pipe Conduit	68'	Corrugated Steel Pipe	42	P	2	0.079	-	FES	FES	Sheet 20 - 1
131+92	44' Lt	132+66	44' Lt	18	Pipe Conduit - Approach	74'	Corrugated Steel Pipe	18	Z or A	2	0.064	-	FES	FES	-
131+98	44' Rt	132+54	44' Rt	18	Pipe Conduit - Approach	56'	Corrugated Steel Pipe	18	Z or A	2	0.064	-	FES	FES	-
135+42	39' Lt	135+42	31' Rt	36	Pipe Conduit	70'	Corrugated Steel Pipe	36	P	2	0.079	-	FES	FES	Sheet 20 - 1
139+80	56' Lt	139+80	44' Rt	42	Pipe Conduit	100'	Corrugated Steel Pipe	42	P	2	0.079	-	FES	FES	Sheet 20 - 1
145+64	50' Lt	145+64	42' Rt	36	Pipe Conduit	92'	Corrugated Steel Pipe	36	P	2	0.079	-	FES	FES	Sheet 20 - 1
148+65	46' Lt	149+35	46' Lt	18	Pipe Conduit - Approach	70'	Corrugated Steel Pipe	18	Z or A	2	0.064	-	FES	FES	-
157+93	36' Lt	157+93	26' Rt	24	Pipe Conduit	62'	Corrugated Steel Pipe	24	P	2	0.079	-	FES	FES	Sheet 20 - 1

Coatings: Z = Zinc

A = Aluminum

P = Polymeric (over Zinc or Aluminum)

Corrugations: 2 = 2-2/3"x1/2"

3 = 3"x1"

5 = 5"x1"

Spiral Ribs: 3/4 = 3/4"x3/4"@7-1/2"

1 = 3/4"x1"@11-1/2"

(*) The price bid for "Pipe Conduit" bid items includes end sections. Pipe Extensions shall pay for end sections separately.

FES = Flared End Section

TES = Traversable End Section

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SC-COIB-0427(051)

CMC 0427/123rd Ave SW



Allowable Pipe List

Billings County, ND

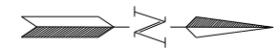
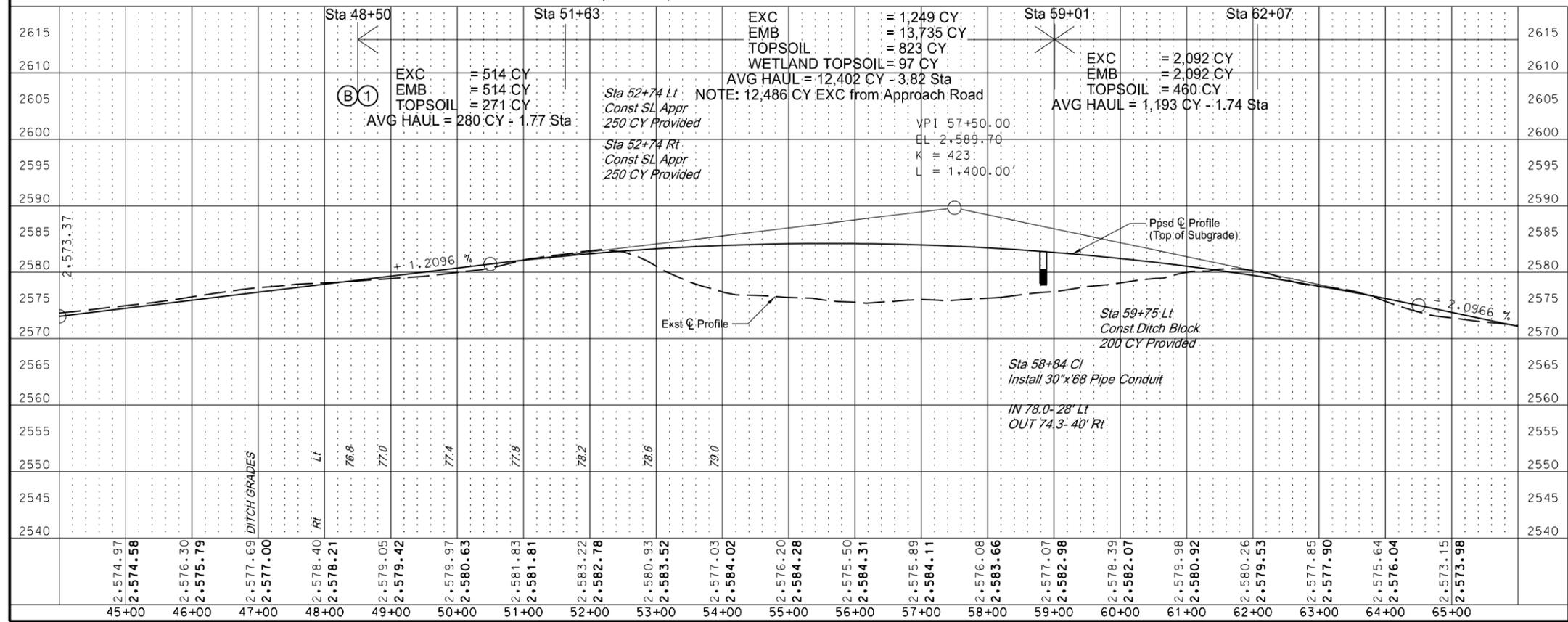
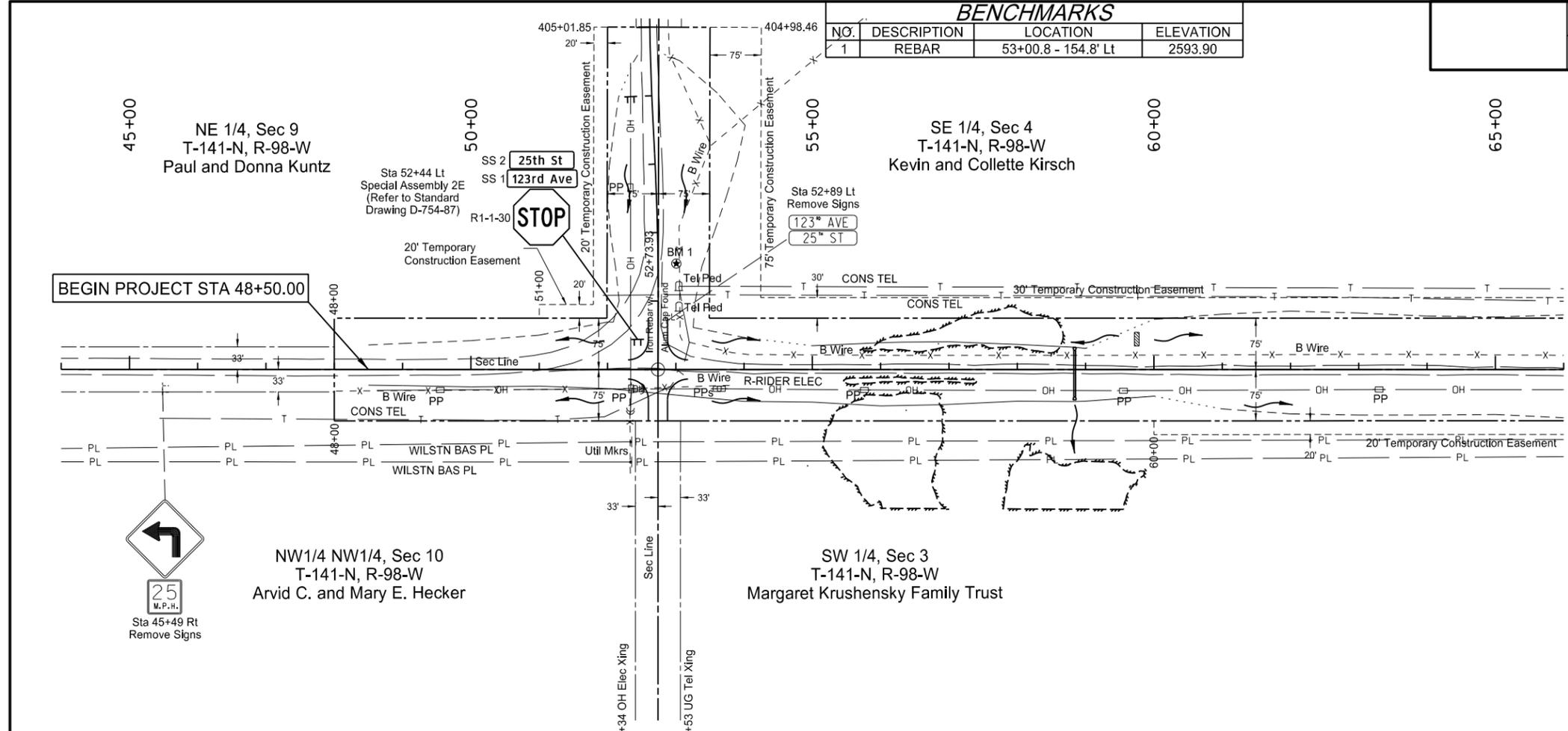
DRWN. BY JMW	CHKD. BY AK	PROJECT NO. 3313119
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BENCHMARKS

NO.	DESCRIPTION	LOCATION	ELEVATION
1	REBAR	53+00.8 - 154.8' Lt	2593.90

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	1

PIPE CONDUIT 30IN
Sta 58+84 CI 68 LF



SCALE

Horizontal 1"=200'
Vertical 1"=20'

SURVEY COMPLETED USING NAVD 88 DATUM

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SC-COIB-0427(051)
CMC 0427/123rd Ave SW

Plan & Profile
Sta 48+50 to 65+00

Billings County, ND

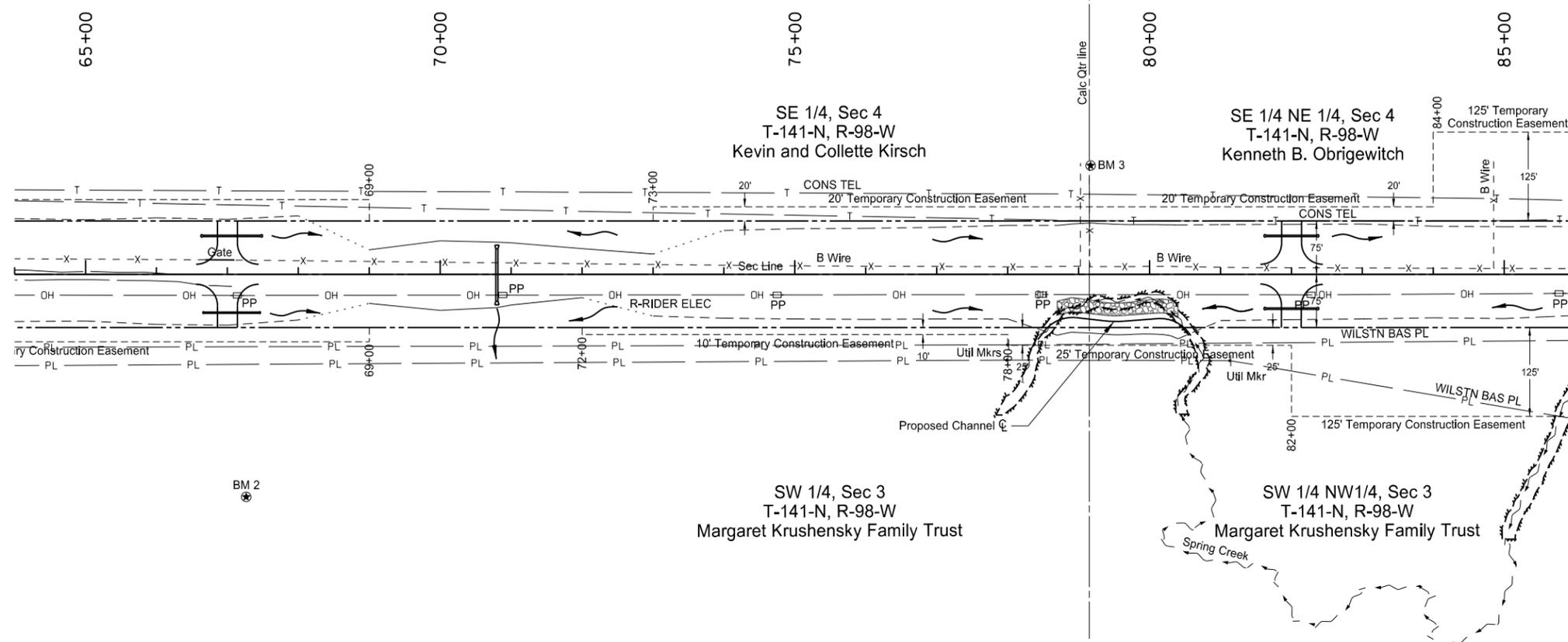
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CHKD BY: AK

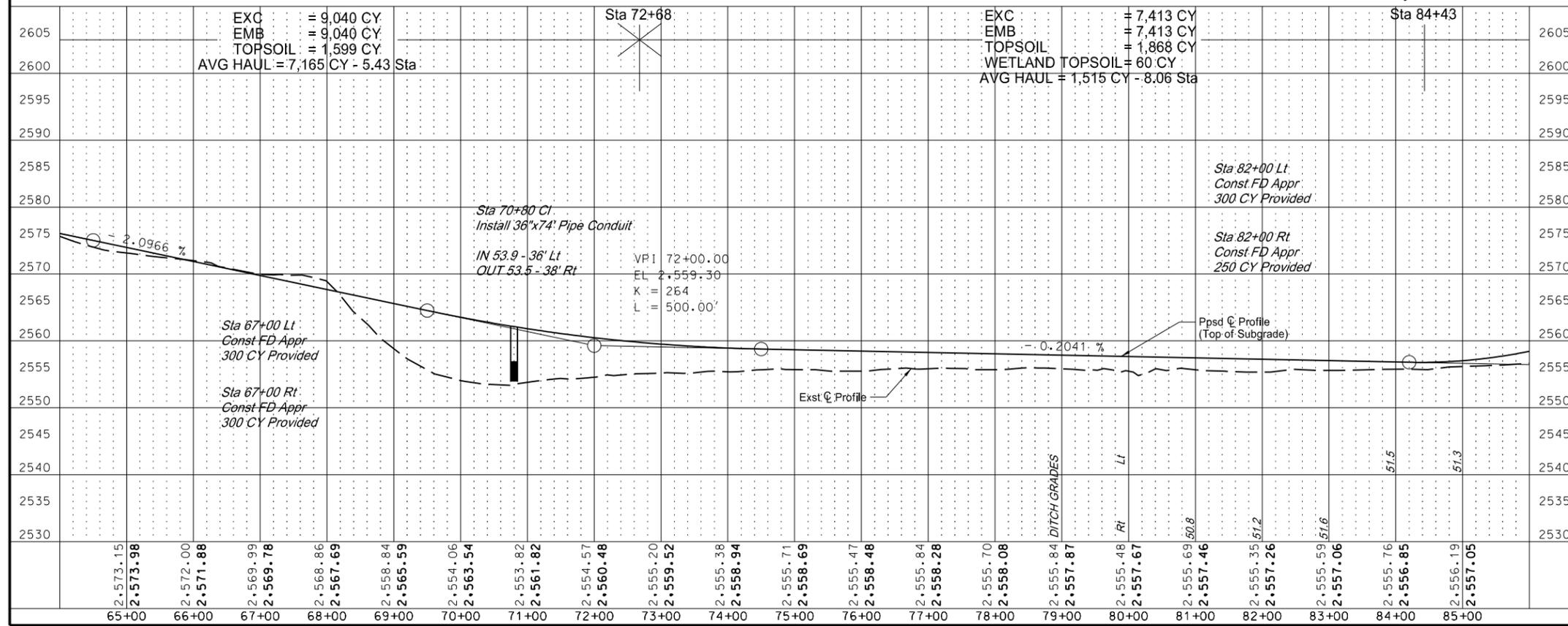
PROJECT NO.: 3313119

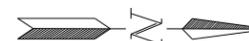
BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
2	REBAR	67+26.5 - 313.0' Rt	2565.92
3	REBAR	79+16.9 - 152.9' Lt	2557.12

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	2



RIPRAP GRADE II Sta 78+70 to 80+40 Rt (3203 SF x 1.5' D)	178 CY
GEOSYNTHETIC MATERIAL TYPE RR Sta 78+70 to 80+40 Rt	356 SY
PIPE CONDUIT 18IN-APPROACH Sta 67+00 Rt	76 LF
PIPE CONDUIT 24IN-APPROACH Sta 67+00 Lt Sta 82+00 Lt Sta 82+00 Rt	80 LF 70 LF 70 LF
PIPE CONDUIT 36IN Sta 70+80 CI	74 LF



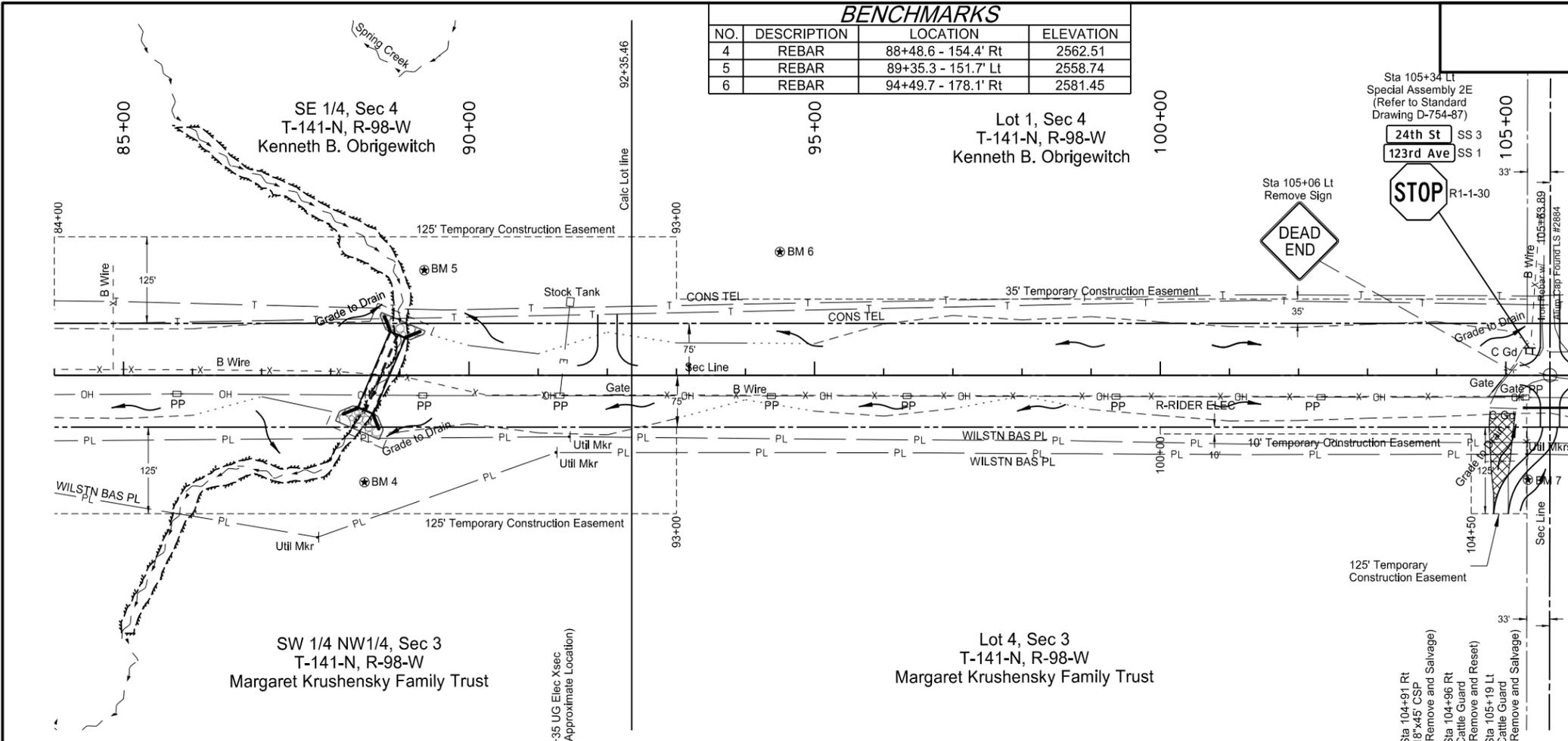

SCALE
 Horizontal 1"=200'
 Vertical 1"=20'
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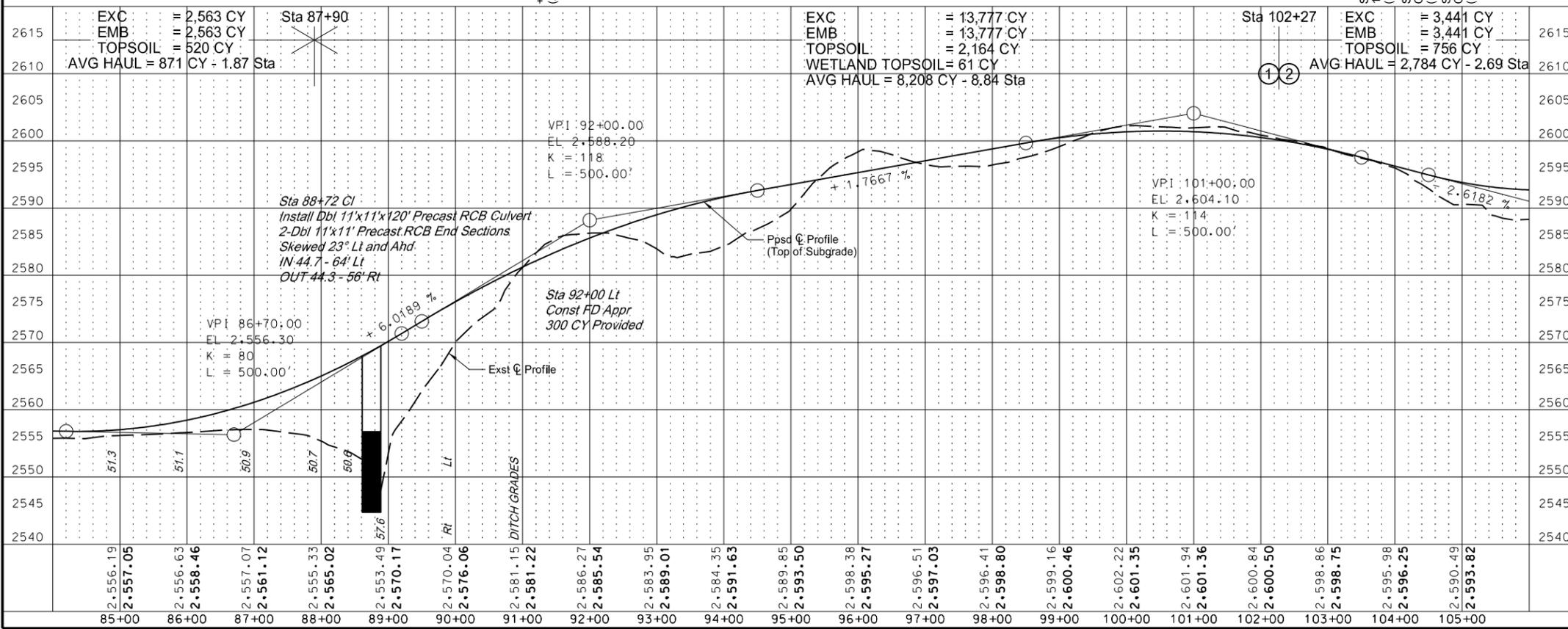
SC-COIB-0427(051) <small>CMC 0427/123rd Ave SW</small>	
	Plan & Profile Sta 65+00 to 85+00 Billings County, ND
DRAWN BY: JMW CHECKED BY: AK	PROJECT NO.: 3313119

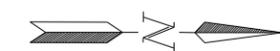
BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
4	REBAR	88+48.6 - 154.4' Rt	2562.51
5	REBAR	89+35.3 - 151.7' Lt	2558.74
6	REBAR	94+49.7 - 178.1' Rt	2581.45

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	3



REMOVAL OF PIPE ALL TYPES AND SIZES Sta 104+91 Rt	45 LF
ROADWAY OBLITERATION Sta 104+90 Rt	100 LF
RIPRAP GRADE II Sta 88+50 Rt (1786 SF x 1.5' D) Sta 88+97 Lt (1102 SF x 1.5' D)	99 CY 61 CY
DBL 11FT X 11FT PRECAST RCB CULVERT Sta 88+72 Cl	120 LF
DBL 11FT X 11FT PRECAST RCB END SECTION Sta 88+50 Rt Sta 88+97 Lt	1 EA 1 EA
GEOSYNTHETIC MATERIAL TYPE R1 Sta 88+72	763 SY
GEOSYNTHETIC MATERIAL TYPE RR Sta 88+50 Rt Sta 88+97 Lt	198 SY 123 SY
REMOVE CATTLE GUARD Sta 104+96 Rt Sta 105+19 Lt	1 EA 1 EA




SCALE
 Horizontal 1"=200'
 Vertical 1"=20'
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SC-COIB-0427(051)
CMC 0427/123rd Ave SW



Plan & Profile
Sta 85+00 to 105+00

Billings County, ND

DRWN BY: JMW

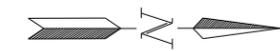
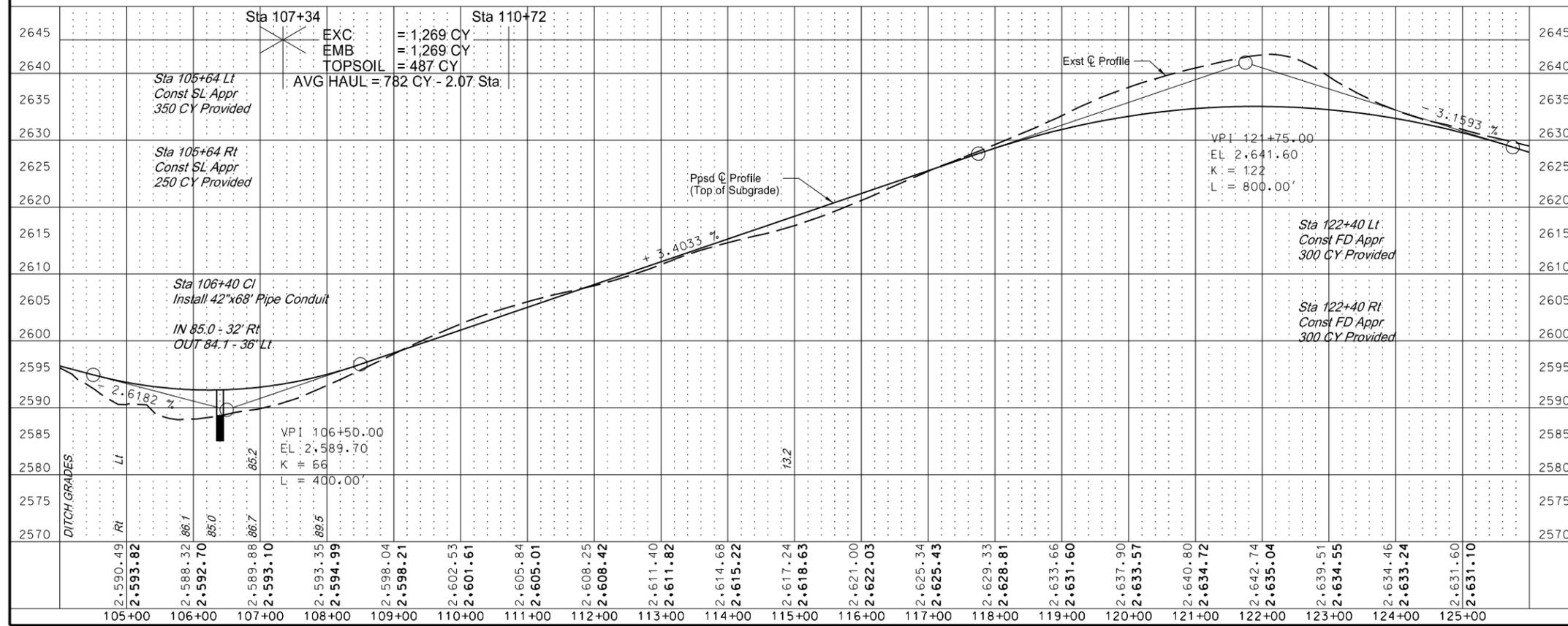
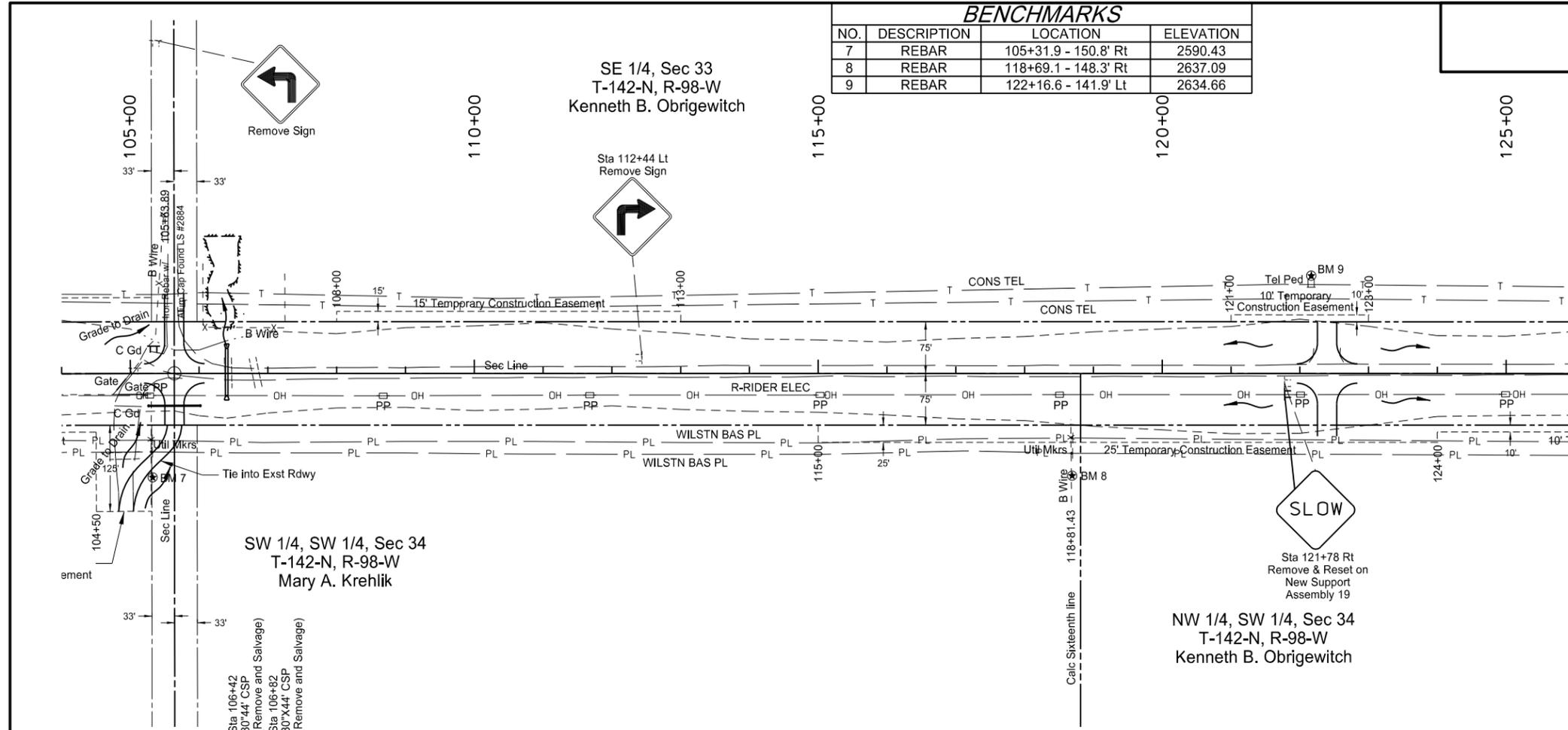
CHKD BY: AK

PROJECT NO: 3313119

BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
7	REBAR	105+31.9 - 150.8' Rt	2590.43
8	REBAR	118+69.1 - 148.3' Rt	2637.09
9	REBAR	122+16.6 - 141.9' Lt	2634.66

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	4

DESCRIPTION	LENGTH
REMOVAL OF PIPE TYPES AND SIZES	
Sta 106+42 CI	44 LF
Sta 106+82 CI	44 LF
PIPE CONDUIT 18IN-APPROACH	
Sta 105+64 Rt	72 LF
PIPE CONDUIT 42IN	
Sta 106+40 CI	68 LF



SCALE

Horizontal 1"=200'
Vertical 1"=20'

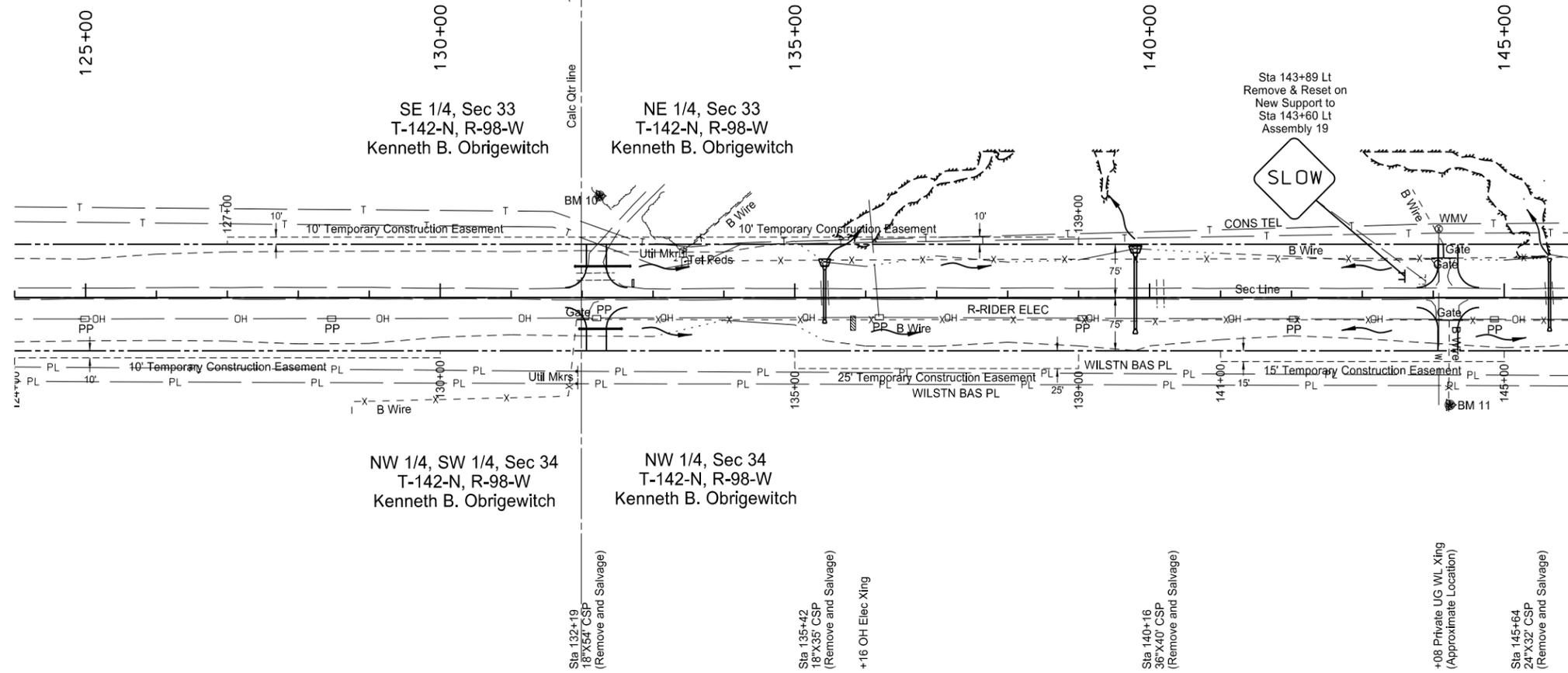
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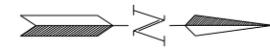
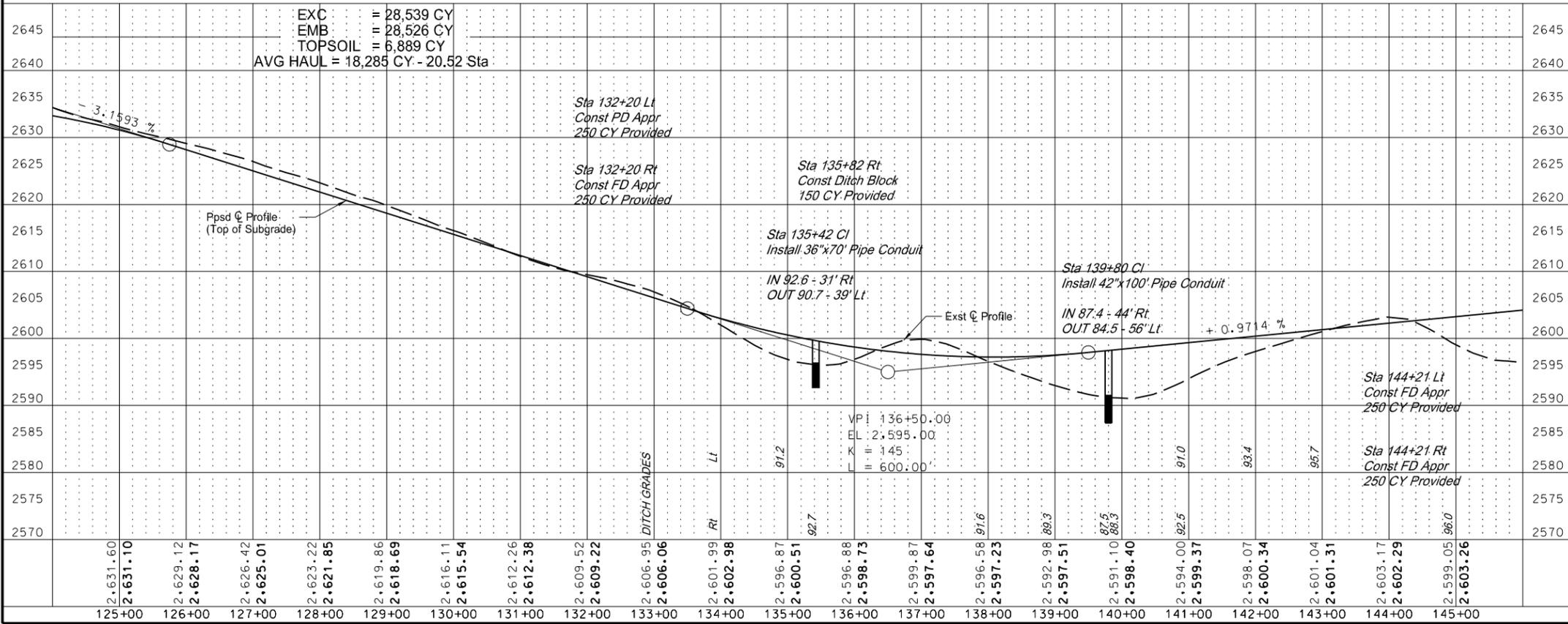
	SC-COIB-0427(051)	
	CMC 0427/123rd Ave SW	
Plan & Profile Sta 105+00 to 125+00		
Billings County, ND		
DRWN BY JMW	CHKD BY AK	PROJECT NO. 3313119

BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
10	REBAR	132+24.8 - 142.8' Lt	2608.79
11	REBAR	144+23.3 - 151.0' Rt	2604.01

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	5



REMOVAL OF PIPE ALL TYPES AND SIZES	
Sta 132+19 Lt	54 LF
Sta 135+42 Cl	35 LF
Sta 140+16 Cl	40 LF
RIPRAP GRADE II	
Sta 135+42 Lt (135 SF x 1.5' D)	8 CY
Sta 139+80 Lt (145 SF x 1.5' D)	8 CY
GEOSYNTHETIC MATERIAL TYPE RR	
Sta 135+42 Lt	23 SY
Sta 139+80 Lt	25 SY
PIPE CONDUIT 18IN-APPROACH	
Sta 132+20 Lt	74 LF
Sta 132+20 Rt	56 LF
PIPE CONDUIT 36IN	
Sta 135+42 Cl	70 LF
PIPE CONDUIT 42IN	
Sta 139+80 Cl	100 LF
MAILBOX - ALL TYPES	
Sta 132+72 Lt	1 EA



SCALE

Horizontal 1"=200'
Vertical 1"=20'

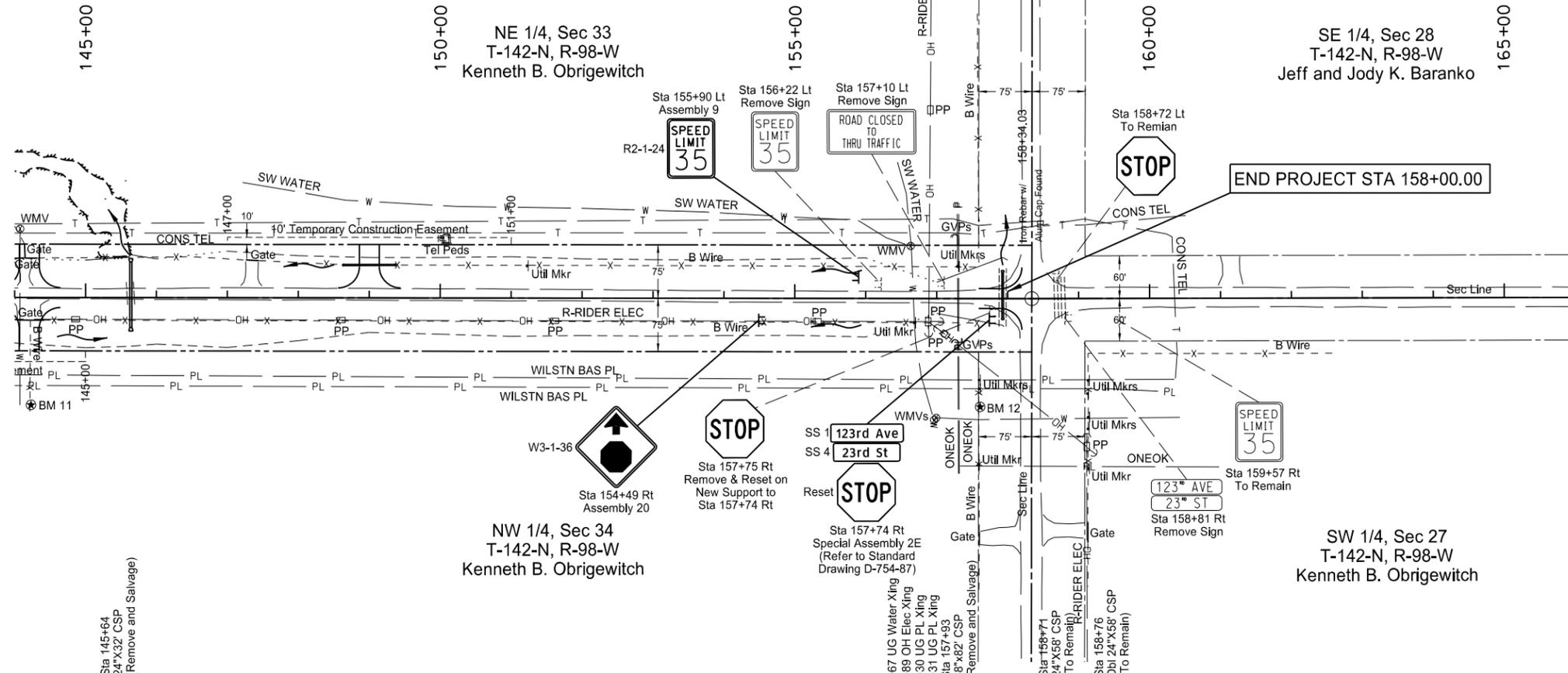
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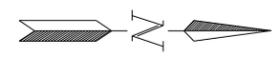
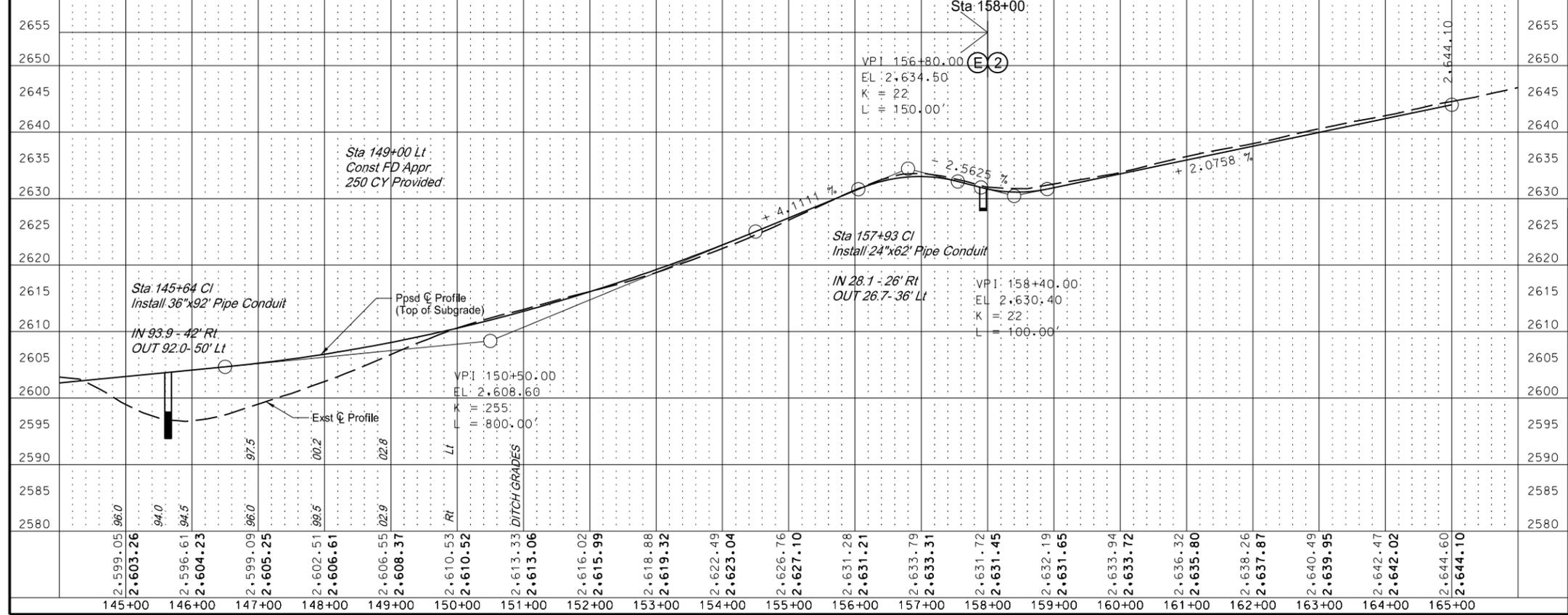
	
SC-COIB-0427(051) CMC 0427/123rd Ave SW Plan & Profile Sta 125+00 to 145+00 Billings County, ND	
<small>DRWN BY</small> JMW	<small>CHKD BY</small> AK
<small>PROJECT NO.</small> 3313119	

BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
11	REBAR	144+23.3 - 151.0' Rt	2604.01
12	REBAR	157+61.3 - 152.2' Rt	2636.25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	6



REMOVAL OF PIPE ALL TYPES AND SIZES	Sta 145+64 CI Sta 157+93 CI	32 LF 82 LF
PIPE CONDUIT 18IN-APPROACH	Sta 149+00 Lt	70 LF
PIPE CONDUIT 24IN	Sta 157+93 CI	62 LF
PIPE CONDUIT 36IN	Sta 145+64 CI	92 LF



SCALE
Horizontal 1"=200'
Vertical 1"=20'

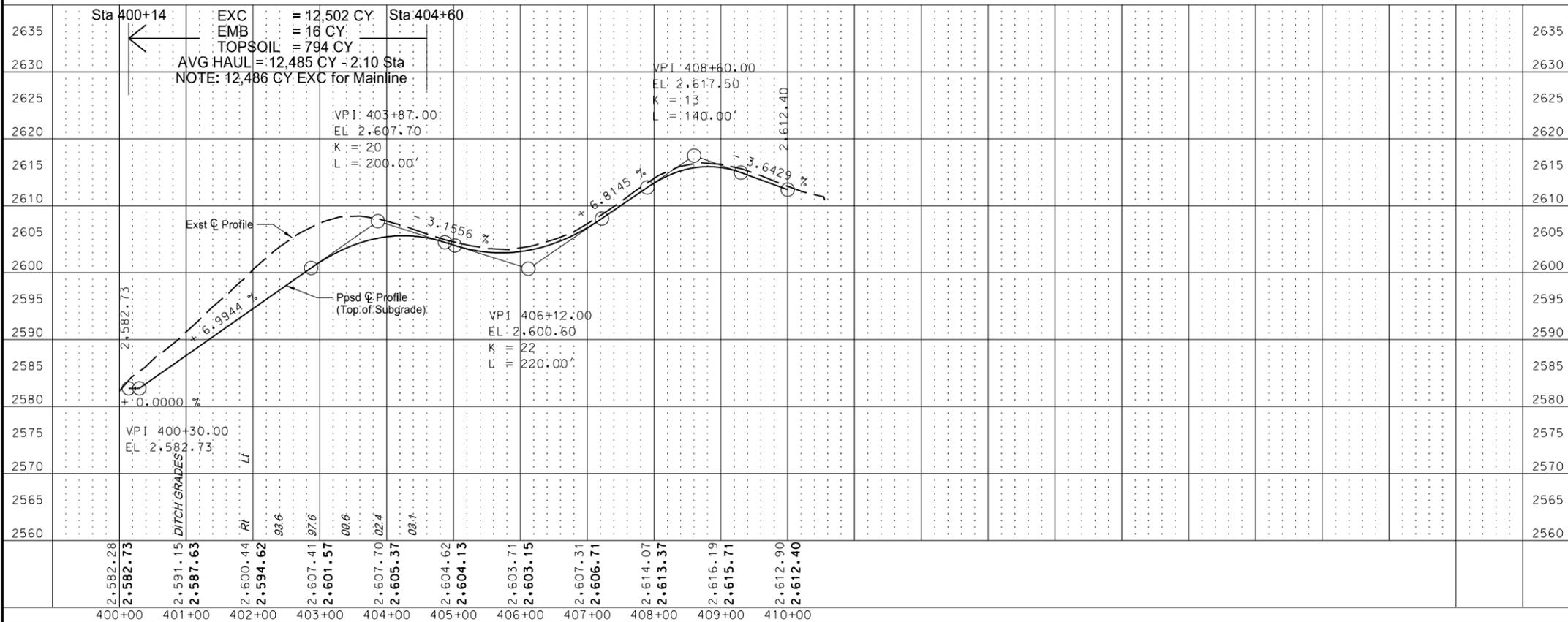
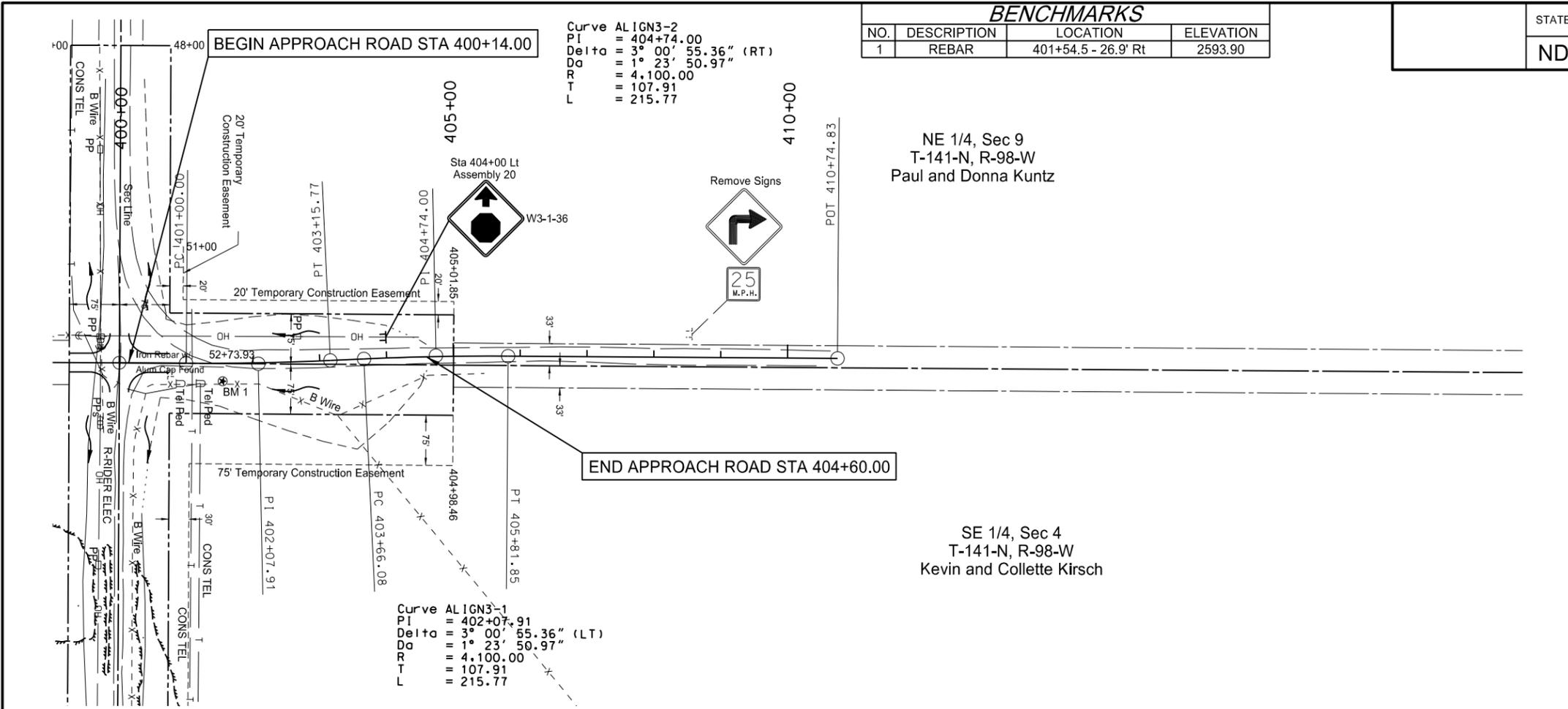
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SC-COIB-0427(051) CMC 0427/123rd Ave SW		
KLJ		
Plan & Profile Sta 145+00 to 158+00 Billings County, ND		
DRWN BY JMW	CHKD BY AK	PROJECT NO. 3313119

BENCHMARKS			
NO.	DESCRIPTION	LOCATION	ELEVATION
1	REBAR	401+54.5 - 26.9' RT	2593.90

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	60	7



SCALE

Horizontal 1"=200'
 Vertical 1"=20'

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SC-COIB-0427(051)		
25th St		
Plan & Profile Sta 400+14 to 404+60 Approach Road Billings County, ND		
	DRAWN BY: JMW CHECKED BY: AK	PROJECT NO.: 3313119

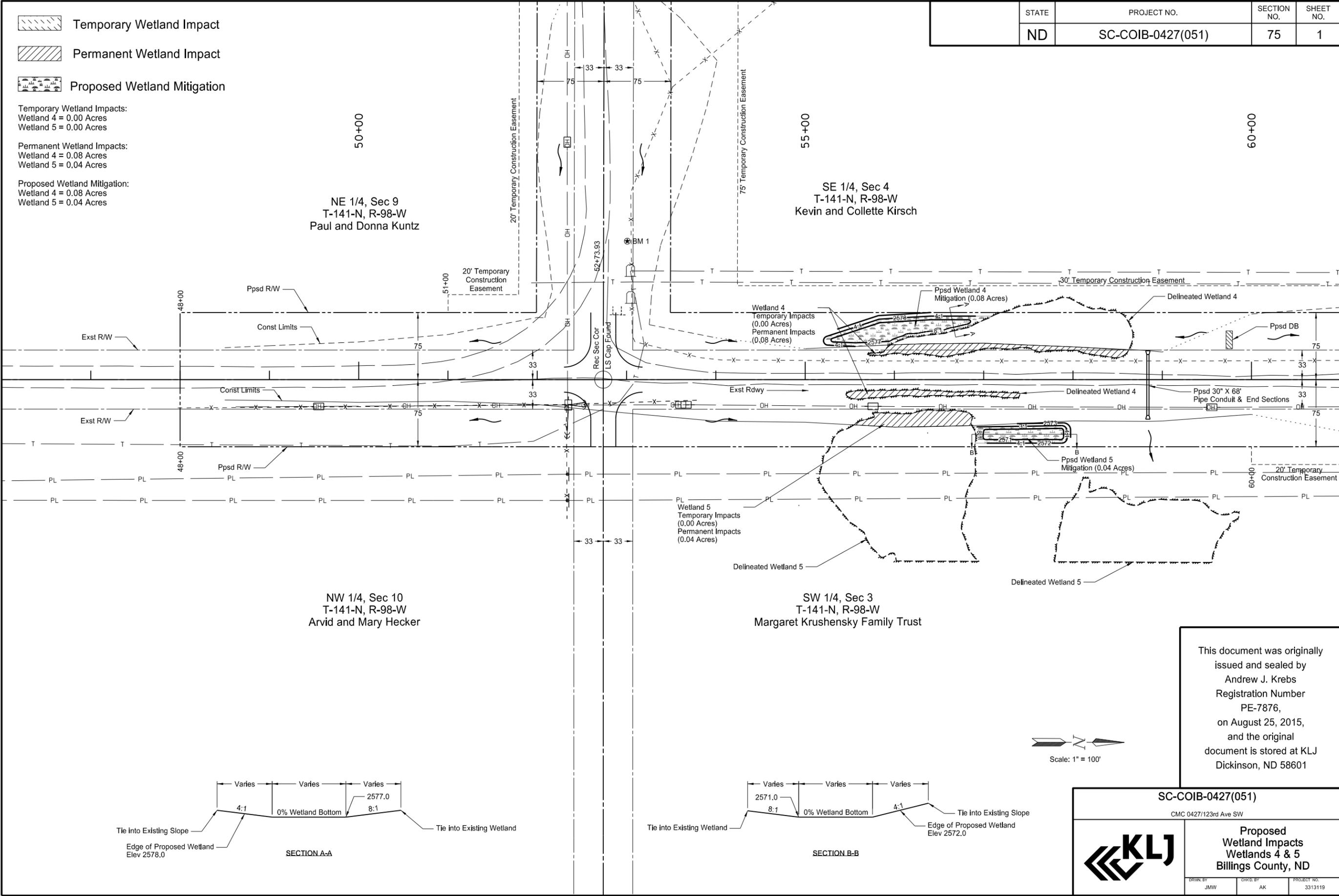
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	75	1

-  Temporary Wetland Impact
-  Permanent Wetland Impact
-  Proposed Wetland Mitigation

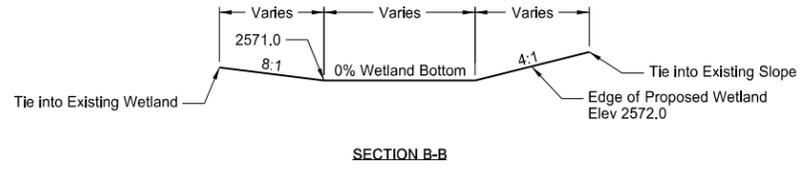
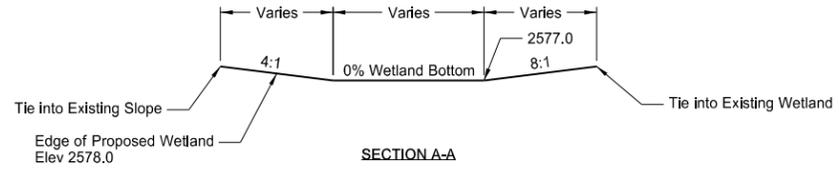
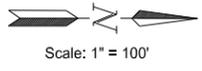
Temporary Wetland Impacts:
Wetland 4 = 0.00 Acres
Wetland 5 = 0.00 Acres

Permanent Wetland Impacts:
Wetland 4 = 0.08 Acres
Wetland 5 = 0.04 Acres

Proposed Wetland Mitigation:
Wetland 4 = 0.08 Acres
Wetland 5 = 0.04 Acres



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SC-COIB-0427(051)		
<small>CMC 0427/123rd Ave SW</small>		
Proposed Wetland Impacts Wetlands 4 & 5 Billings County, ND		
<small>DRWN. BY</small> JMW	<small>CHKD. BY</small> AK	<small>PROJECT NO.</small> 3313119

-  Temporary Wetland Impact
-  Permanent Wetland Impact
-  Permanent Impacts that are Minimized (Sunk or Parallel to Box)
-  Proposed Wetland Mitigation

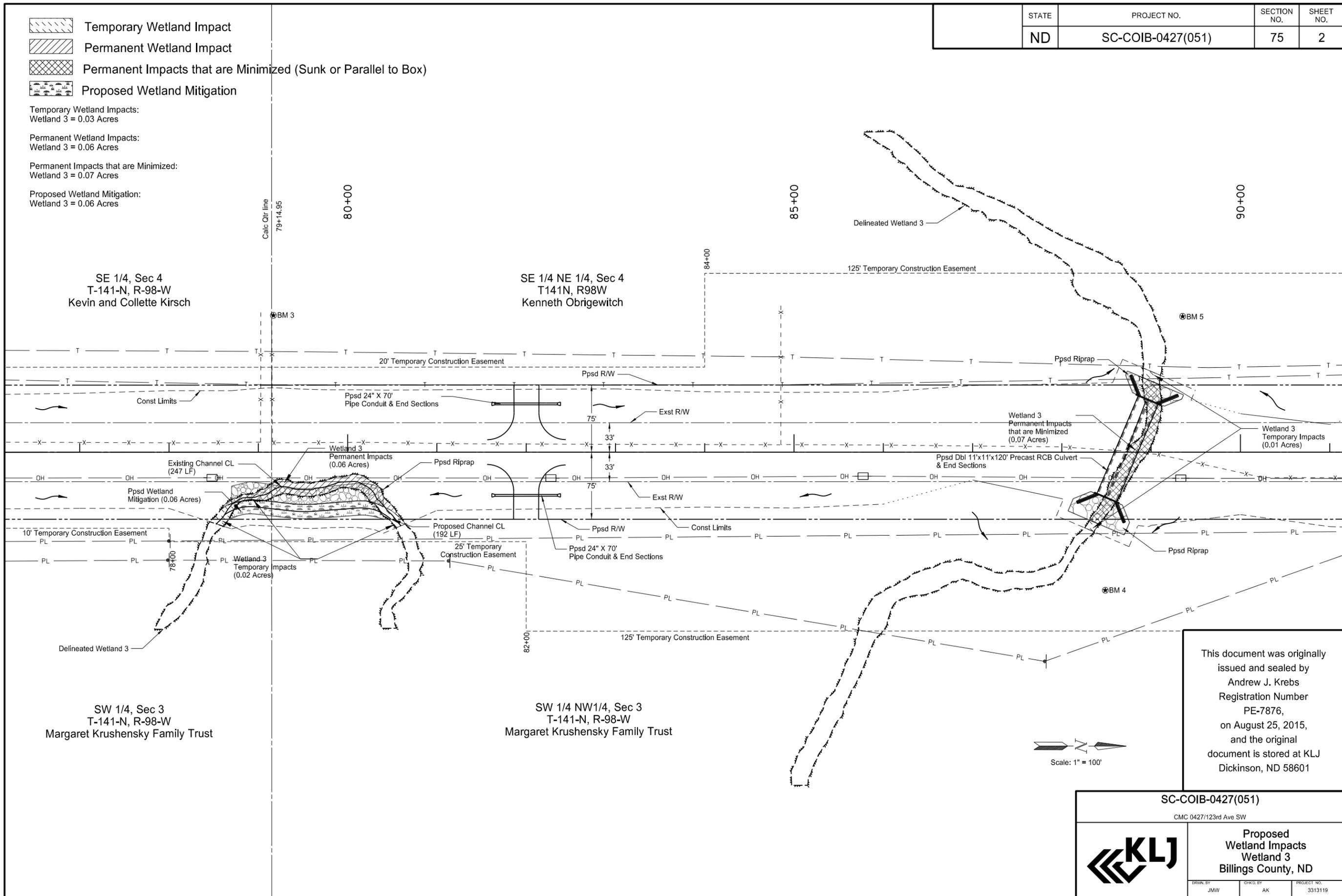
Temporary Wetland Impacts:
Wetland 3 = 0.03 Acres

Permanent Wetland Impacts:
Wetland 3 = 0.06 Acres

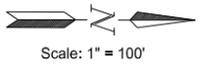
Permanent Impacts that are Minimized:
Wetland 3 = 0.07 Acres

Proposed Wetland Mitigation:
Wetland 3 = 0.06 Acres

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	75	2



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SC-COIB-0427(051)			
CMC 0427/123rd Ave SW			
	Proposed Wetland Impacts Wetland 3 Billings County, ND		
	<table border="1"> <tr> <td>DRWN. BY JMW</td> <td>CHKD. BY AK</td> <td>PROJECT NO. 3313119</td> </tr> </table>	DRWN. BY JMW	CHKD. BY AK
DRWN. BY JMW	CHKD. BY AK	PROJECT NO. 3313119	

Temporary Wetland Impacts:
Wetland 2 = 0.00 Acres

Permanent Wetland Impacts:
Wetland 2 = 0.00 Acres

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	75	3

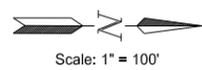
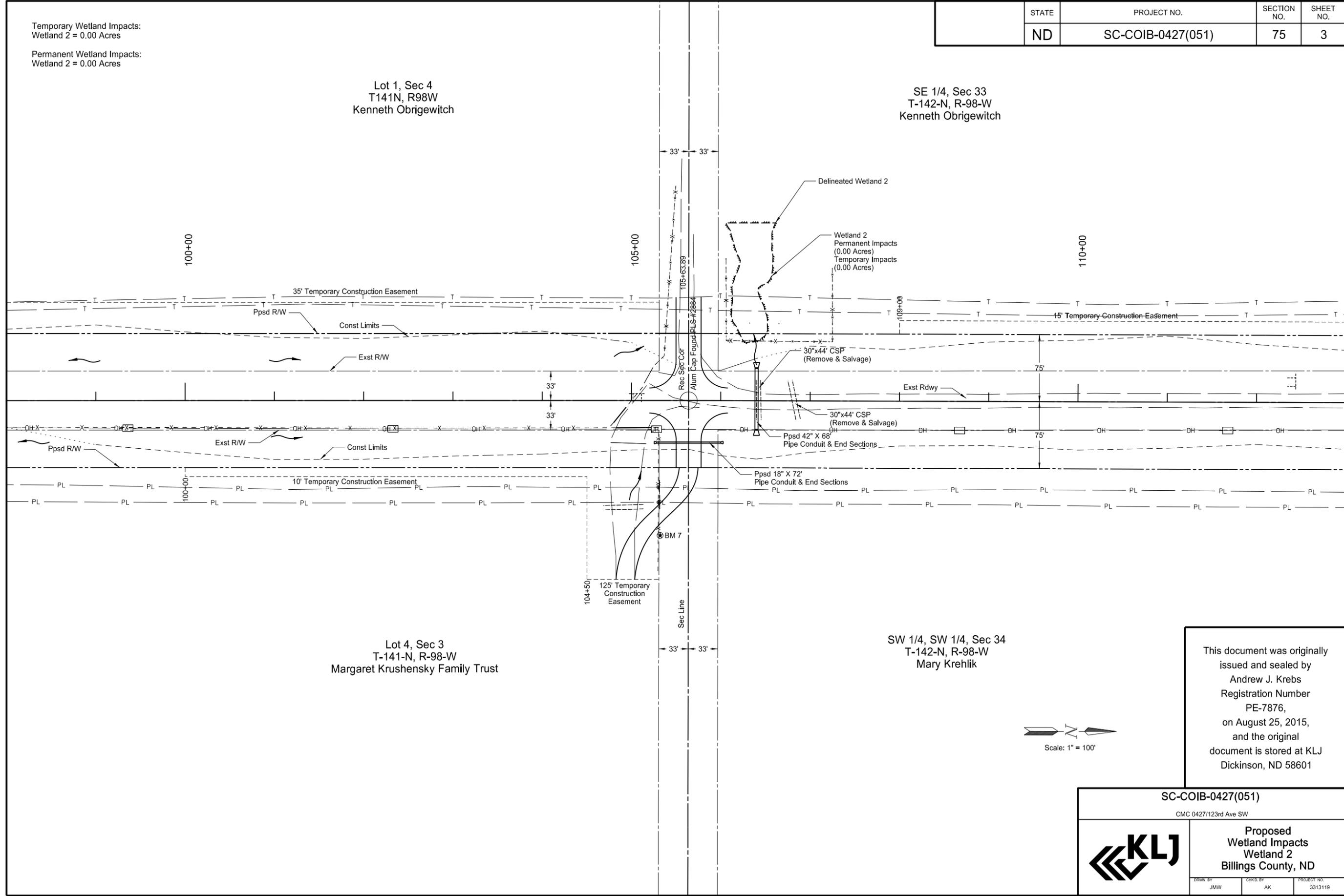
Lot 1, Sec 4
T141N, R98W
Kenneth Obrigewitch

SE 1/4, Sec 33
T-142-N, R-98-W
Kenneth Obrigewitch

Lot 4, Sec 3
T-141-N, R-98-W
Margaret Krushensky Family Trust

SW 1/4, SW 1/4, Sec 34
T-142-N, R-98-W
Mary Krehlik

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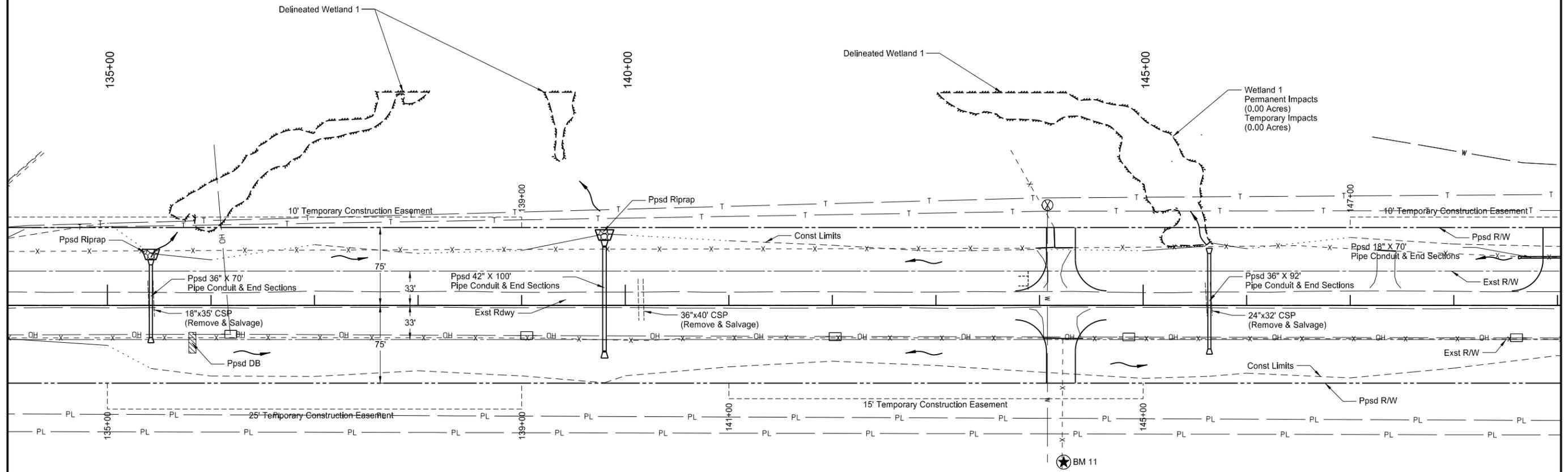
SC-COIB-0427(051) CMC 0427/123rd Ave SW			
	Proposed Wetland Impacts Wetland 2 Billings County, ND		
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DRWN. BY JMW	CHKD. BY AK	PROJECT NO. 3313119	

Temporary Wetland Impacts:
Wetland 1 = 0.00 Acres

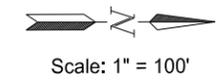
Permanent Wetland Impacts:
Wetland 1 = 0.00 Acres

NE 1/4, Sec 33
T-142-N, R-98-W
Kenneth Obrigewitch

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	75	4



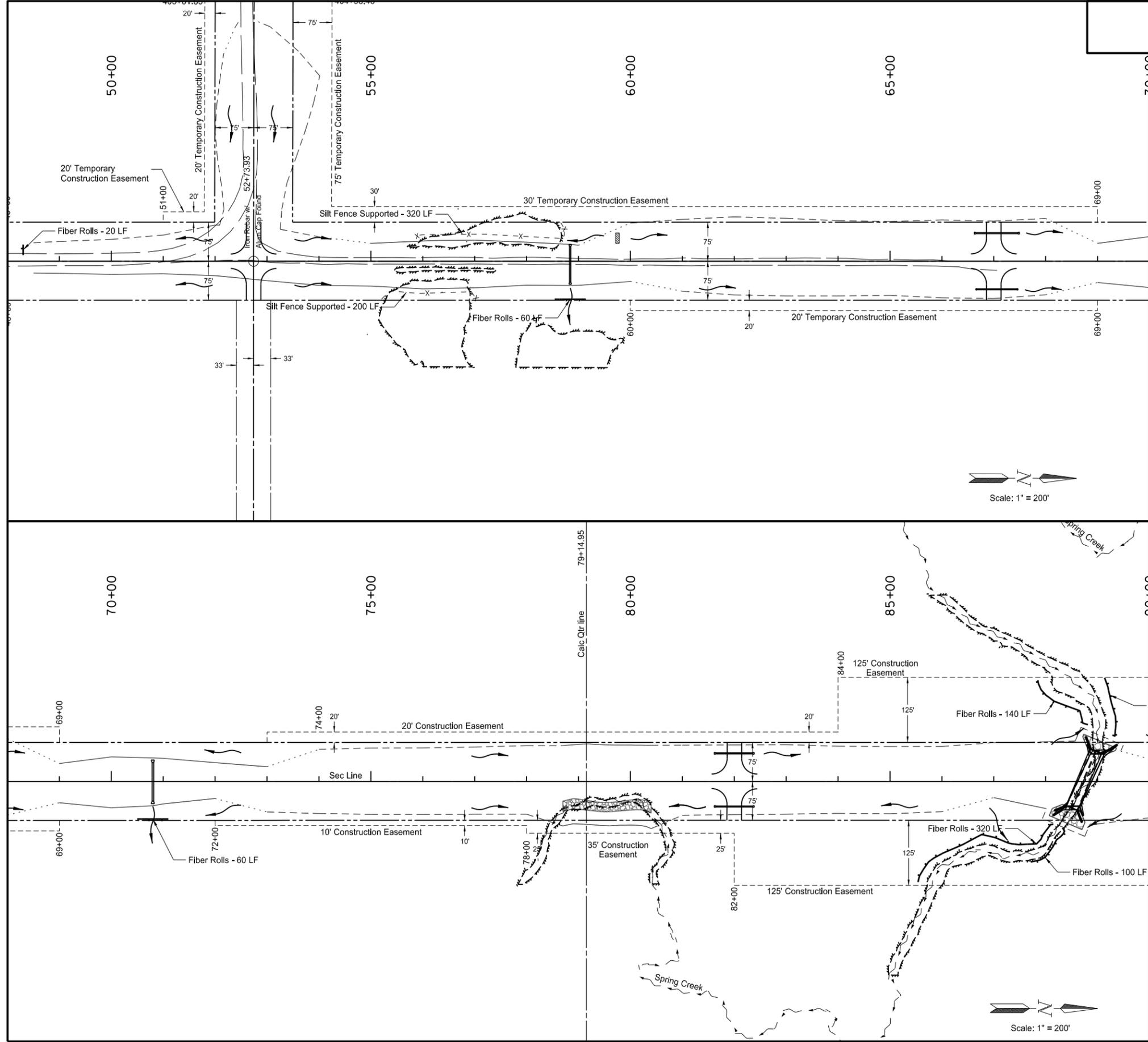
NW 1/4, Sec 34
T-142-N, R-98-W
Kenneth Obrigewitch



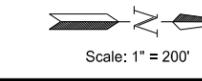
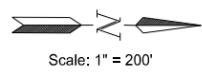
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SC-COIB-0427(051) CMC 0427/123rd Ave SW		
KLJ		
Proposed Wetland Impacts Wetland 1 Billings County, ND		
DRWN BY JMW	CHKD BY AK	PROJECT NO. 3313119

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	76	1



SILT FENCE SUPPORTED	
Sta 55+20 to 57+06 Rt	200 LF
Sta 55+84 to 58+74 Lt	320 LF
TOTAL =	520 LF
FIBER ROLLS 12IN	
Sta 48+40 Lt	20 LF
Sta 58+54 to 59+14 Rt	60 LF
Sta 70+50 to 71+10 Rt	60 LF
Sta 85+54 to 88+14 Rt	320 LF
Sta 87+85 to 88+81 Lt	140 LF
Sta 87+71 to 88+36 Rt	100 LF
TOTAL =	700 LF

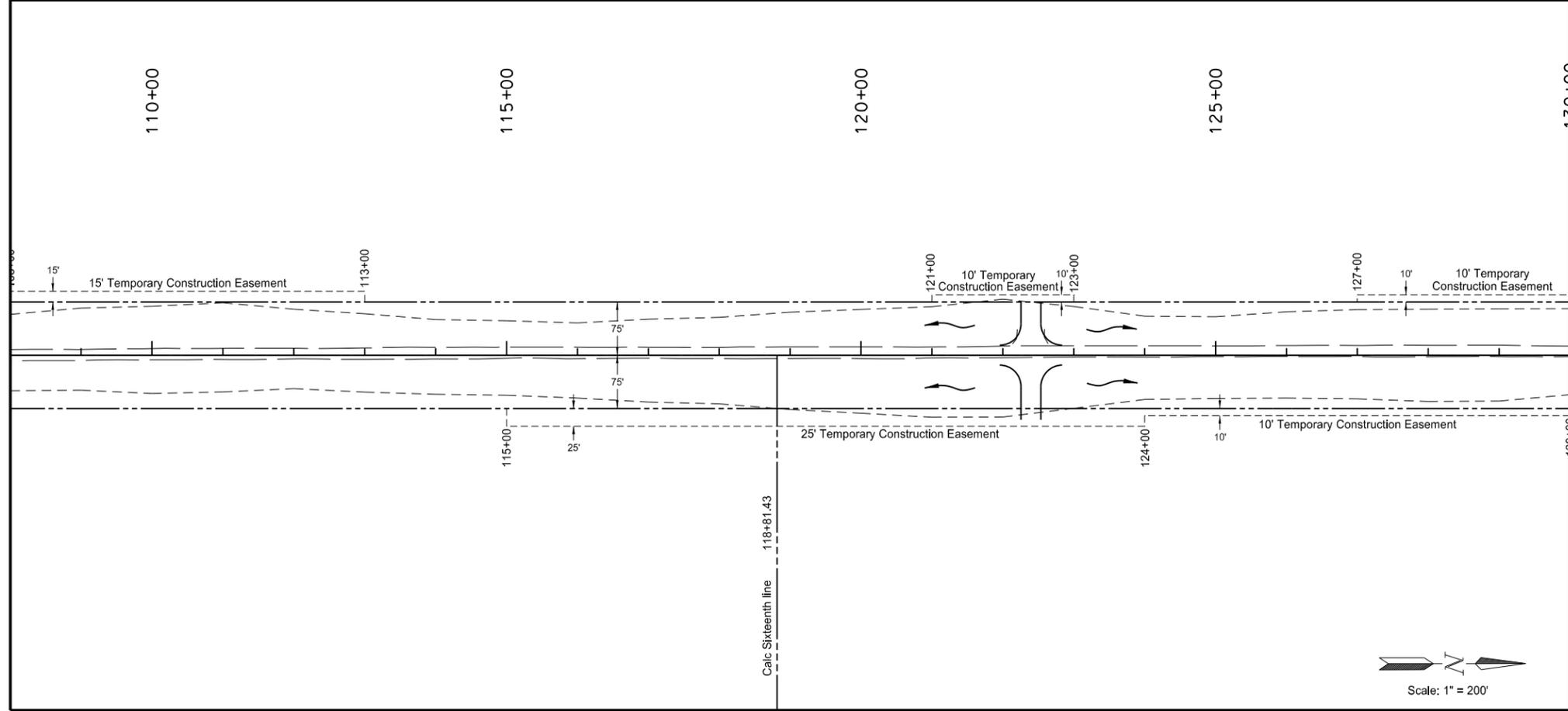
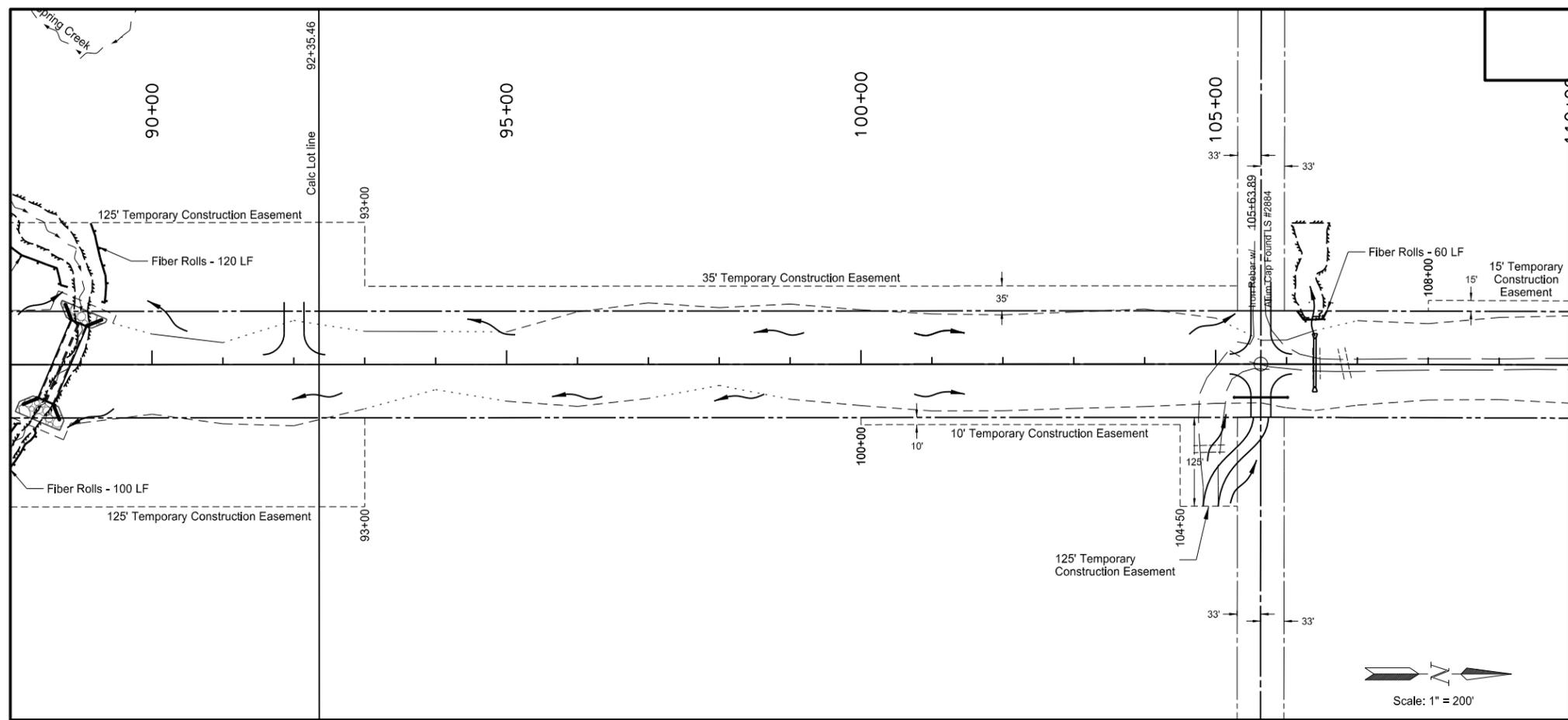


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SC-COIB-0427(051)	
CMC 0427/123rd Ave SW	
	Temporary Erosion Control Sta 48+50 to 89+00
	Billings County, ND
DRWN: BY JMW	CHKD: BY AK
PROJECT NO. 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	76	2

FIBER ROLLS 12IN
 Sta 89+13 to 89+35 Lt 120 LF
 Sta 106+15 to 106+57 Lt 60 LF
TOTAL = 180 LF

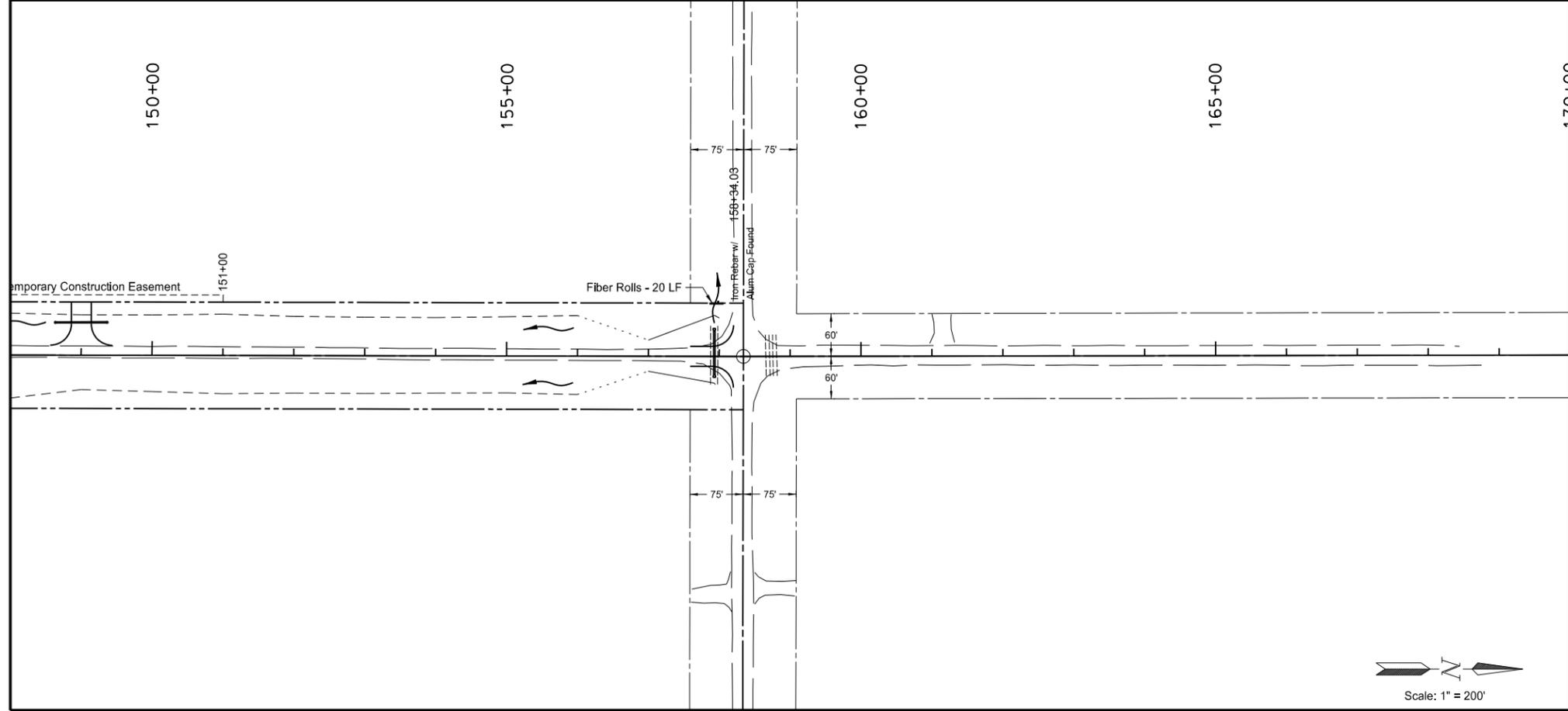
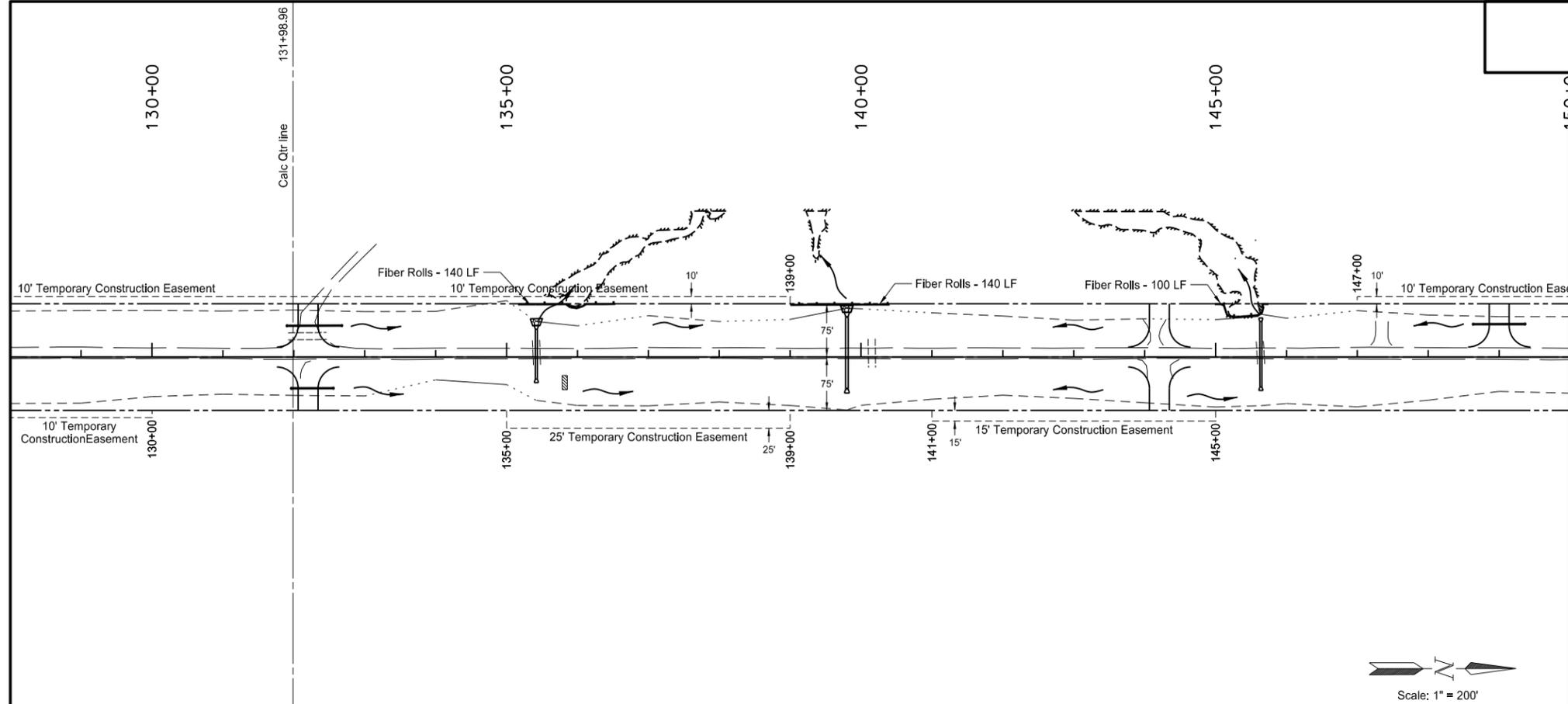


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SC-COIB-0427(051)	
<small>CMC 0427/123rd Ave SW</small>	
KLJ	
Temporary Erosion Control Sta 89+00 to 129+00	
Billings County, ND	
<small>DRAWN BY</small> JMW	<small>CHECKED BY</small> AK
<small>PROJECT NO.</small> 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	76	3

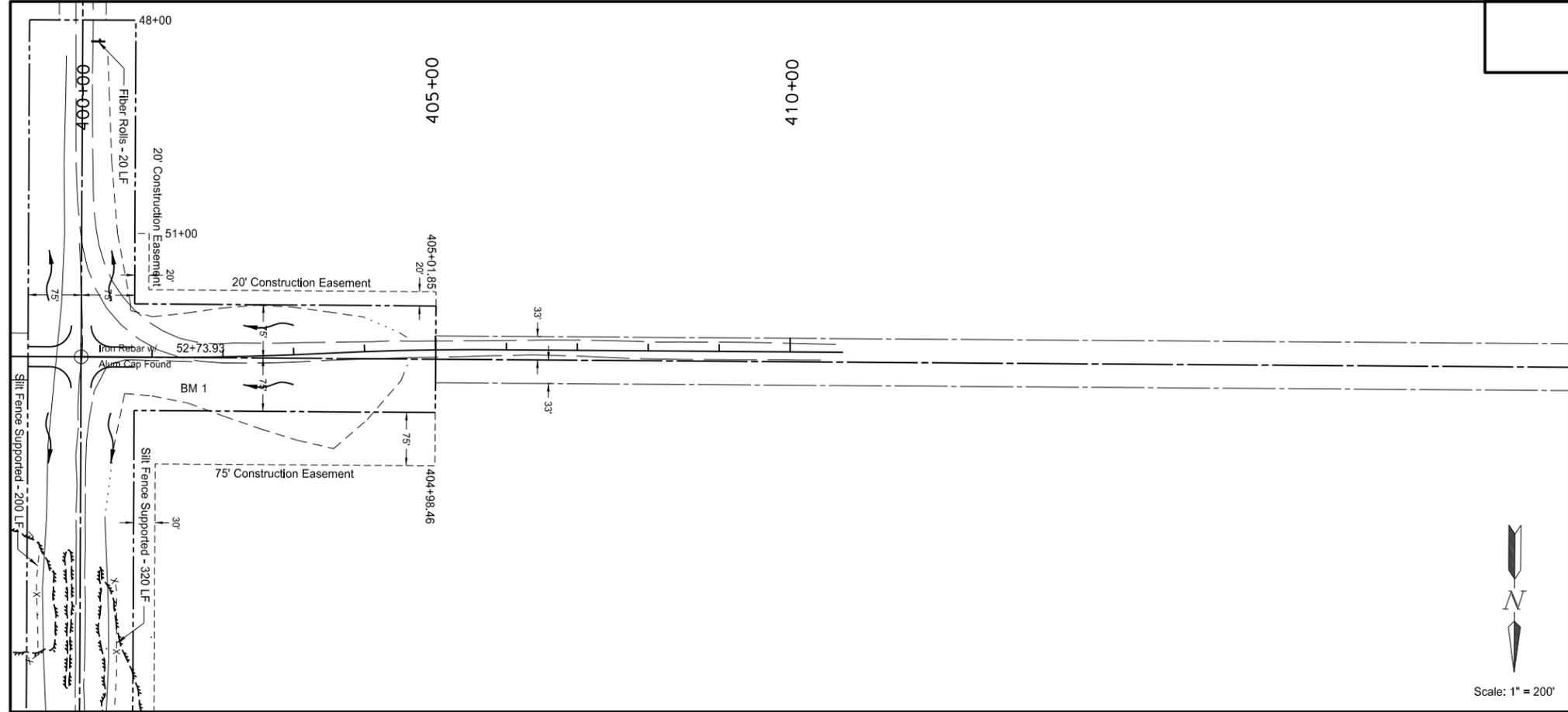
FIBER ROLLS 12IN	
Sta 135+16 to 136+54 Lt	140 LF
Sta 139+00 to 140+40 Lt	140 LF
Sta 144+99 to 145+75 Lt	100 LF
Sta 157+86 to 158+06 Lt	20 LF
TOTAL = 400 LF	



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SC-COIB-0427(051)							
CMC 0427/123rd Ave SW							
Temporary Erosion Control Sta 129+00 to 158+00							
Billings County, ND							
	<table border="1"> <tr> <td>DRWN. BY</td> <td>CHKD. BY</td> <td>PROJECT NO.</td> </tr> <tr> <td>JMW</td> <td>AK</td> <td>3313119</td> </tr> </table>	DRWN. BY	CHKD. BY	PROJECT NO.	JMW	AK	3313119
DRWN. BY	CHKD. BY	PROJECT NO.					
JMW	AK	3313119					

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	76	4

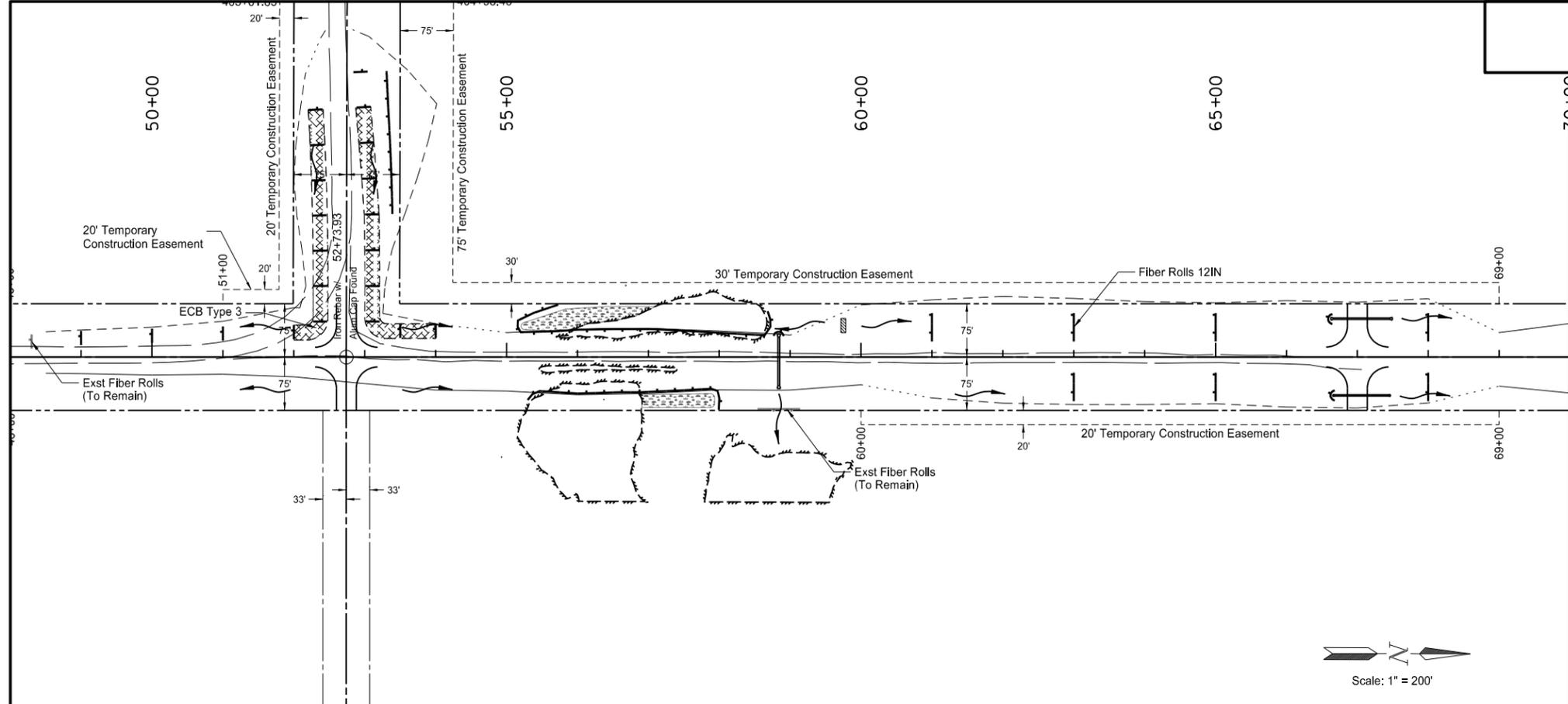


Scale: 1" = 200'

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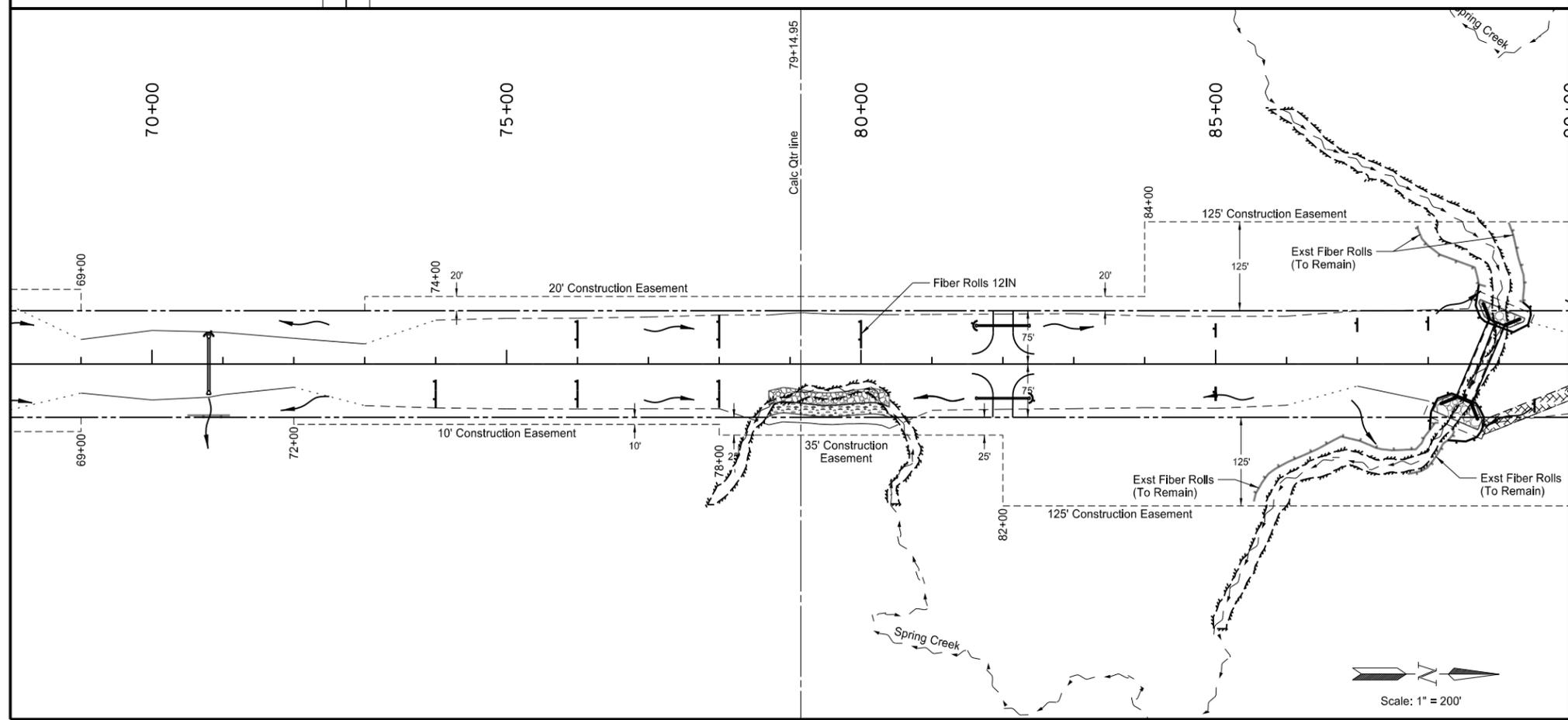
SC-COIB-0427(051)		
25th St		
Temporary Erosion Control Sta 400+00 to 405+00		
Billings County, ND		
	DRWN. BY JMW	PRJCT. NO. 3313119

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	77	1



FIBER ROLLS 12IN

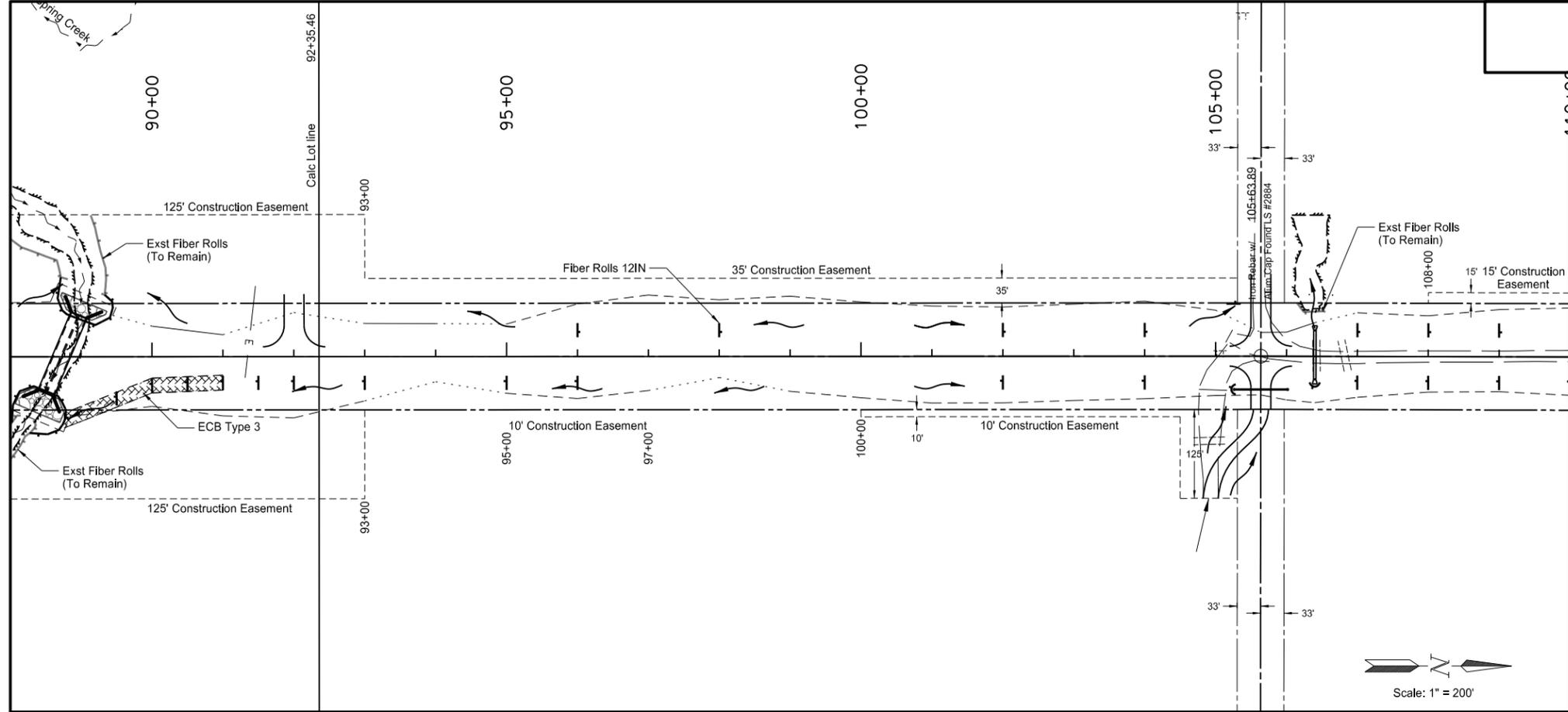
Sta 49+00 Lt	20 LF
Sta 50+00 Lt	20 LF
Sta 51+00 Lt	20 LF
Sta 52+00 Lt	20 LF
Sta 53+50 Lt	20 LF
Sta 54+00 Lt	20 LF
Sta 55+16 to 58+72 Lt	460 LF
Sta 55+30 to 58+00 Rt	300 LF
Sta 58+84 Lt	20 LF
Sta 61+00 Lt	40 LF
Sta 63+00 Lt & Rt	80 LF
Sta 65+00 Lt & Rt	80 LF
Sta 66+63 Lt	20 LF
Sta 66+65 Rt	20 LF
Sta 68+00 Lt & Rt	80 LF
Sta 70+80 Lt	20 LF
Sta 74+00 Rt	40 LF
Sta 76+00 Lt & Rt	80 LF
Sta 78+00 Lt & Rt	80 LF
Sta 80+00 Lt	40 LF
Sta 81+62 Lt	20 LF
Sta 82+38 Rt	20 LF
Sta 85+00 Lt & Rt	40 LF
Sta 87+00 Lt	20 LF
Sta 88+00 Lt	20 LF
Sta 88+02 to 88+78 Rt	200 LF
Sta 88+67 to 89+45 Lt	160 LF
TOTAL =	1960 LF



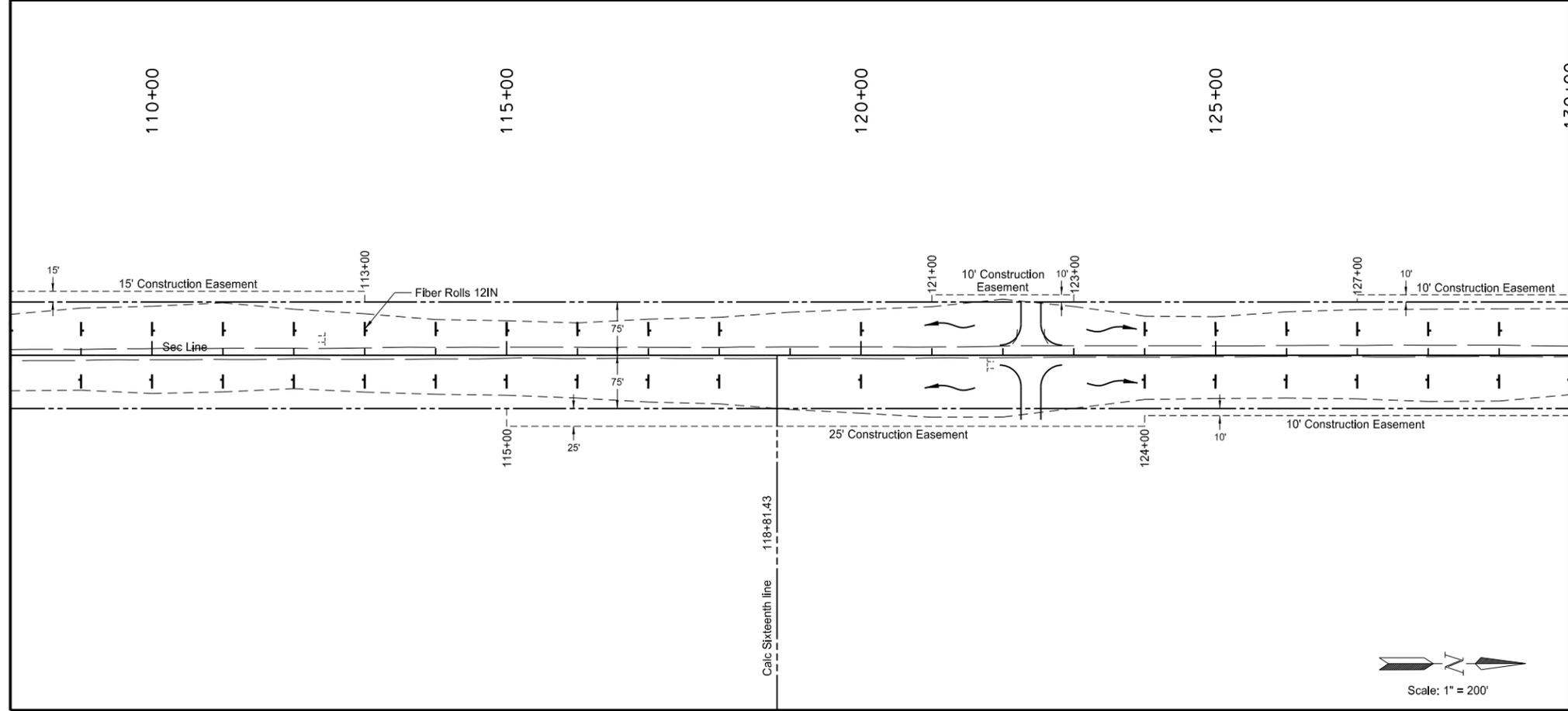
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SC-COIB-0427(051)	
CMC 0427/123rd Ave SW	
	Permanent Erosion Control Sta 48+50 to 89+00
	Billings County, ND
DRWN. BY JMW	CHKD. BY AK
PROJECT NO. 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	77	2



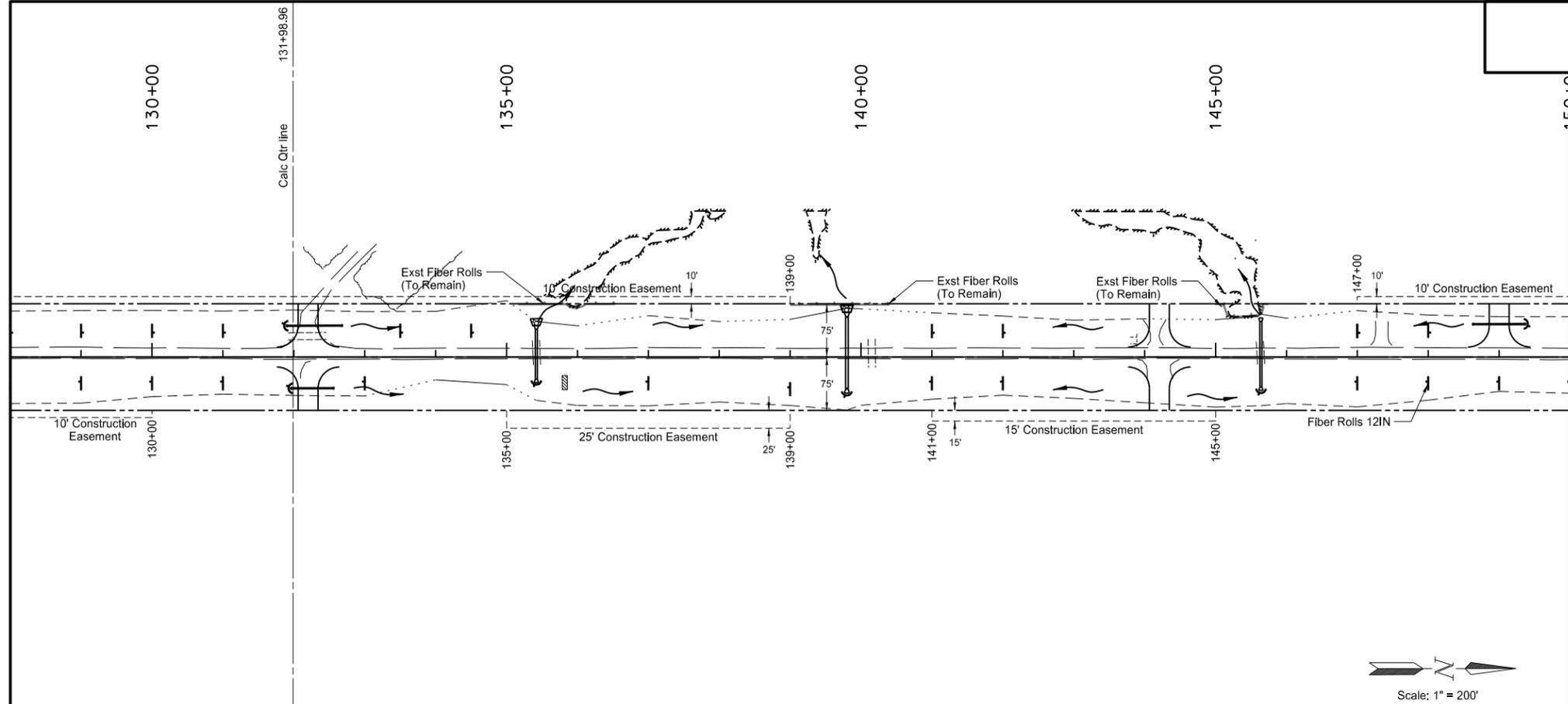
ECB TYPE 3 Sta 88+76 to 91+00 Rt	522 SY
FIBER ROLLS 12IN	
Sta 89+50 Rt	20 LF
Sta 90+00 Rt	20 LF
Sta 90+50 Rt	20 LF
Sta 91+00 Rt	20 LF
Sta 91+50 Rt	20 LF
Sta 92+00 Rt	20 LF
Sta 93+00 Rt	20 LF
Sta 95+00 Rt	20 LF
Sta 96+00 Lt & Rt	40 LF
Sta 98+00 Lt	20 LF
Sta 102+00 Lt & Rt	40 LF
Sta 104+00 Lt & Rt	40 LF
Sta 105+25 Lt & Rt	40 LF
Sta 106+40 Rt	20 LF
Sta 107+00 Lt & Rt	40 LF
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Sta 117+00 Lt & Rt	40 LF
Sta 118+00 Lt & Rt	40 LF
Sta 120+00 Lt & Rt	40 LF
Sta 124+00 Lt & Rt	40 LF
Sta 125+00 Lt & Rt	40 LF
Sta 126+00 Lt & Rt	40 LF
Sta 127+00 Lt & Rt	40 LF
Sta 128+00 Lt & Rt	40 LF
Sta 129+00 Lt & Rt	40 LF
TOTAL = 1120 LF	



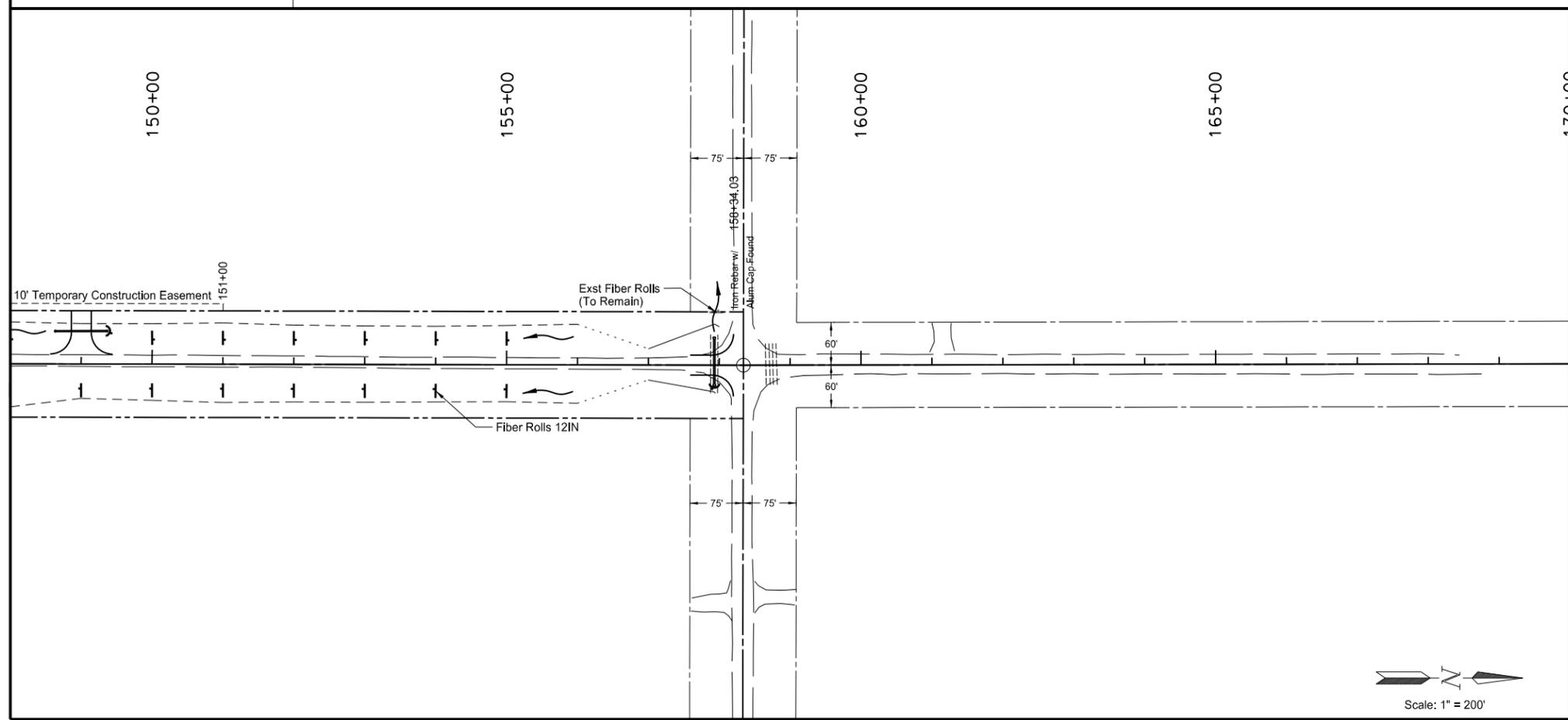
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SC-COIB-0427(051)	
CMC 0427/123rd Ave SW	
KLJ	
Permanent Erosion Control Sta 89+00 to 129+00	
Billings County, ND	
DRWN: BY JMW	CHKD: BY AK
PROJECT NO. 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	77	3



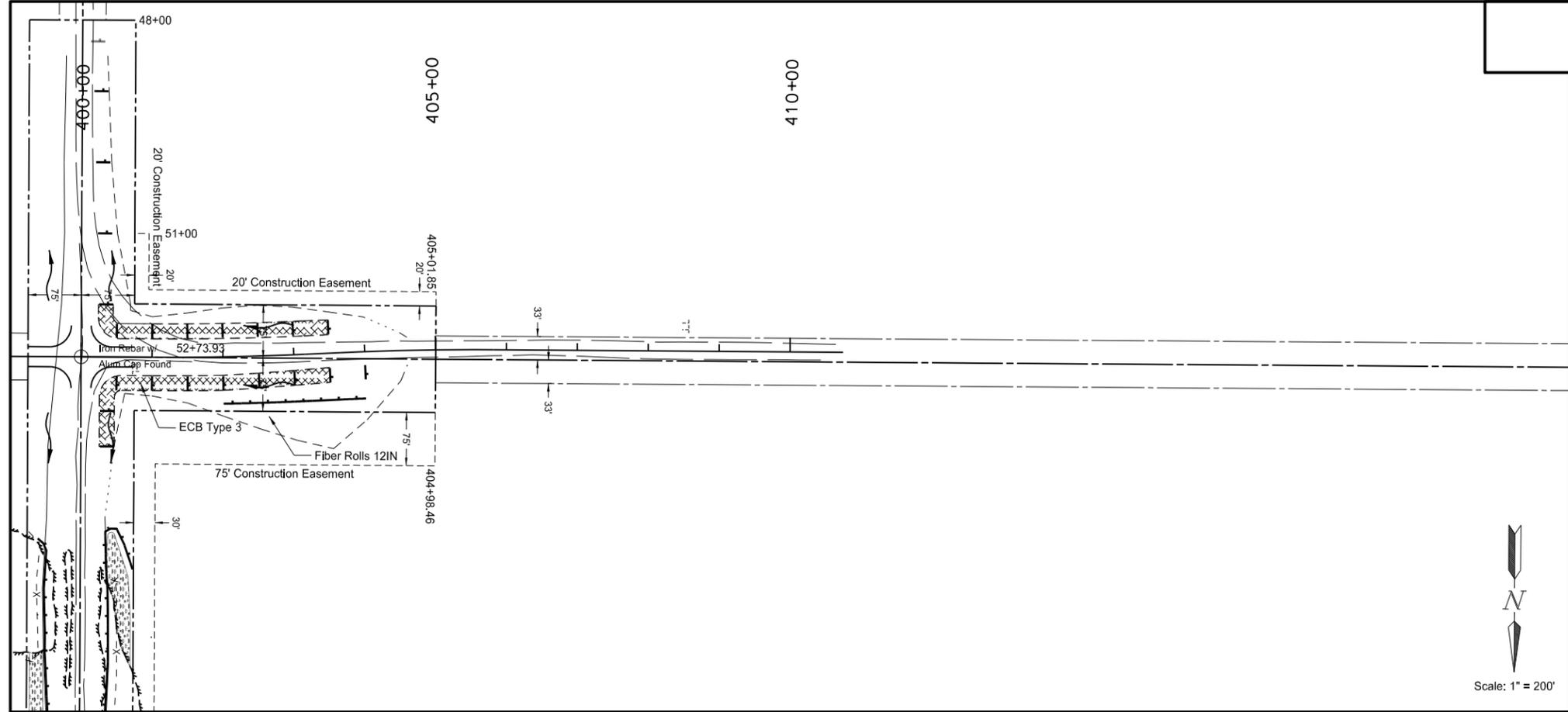
FIBER ROLLS 12IN	
Sta 130+00 Lt & Rt	40 LF
Sta 131+00 Lt & Rt	40 LF
Sta 131+89 Lt	20 LF
Sta 131+95 Rt	20 LF
Sta 133+00 Rt	20 LF
Sta 133+50 Lt	20 LF
Sta 134+50 Lt	20 LF
Sta 135+42 Rt	20 LF
Sta 137+00 Rt	20 LF
Sta 139+00 Rt	20 LF
Sta 139+80 Rt	20 LF
Sta 141+00 Lt & Rt	40 LF
Sta 142+00 Lt & Rt	40 LF
Sta 145+64 Rt	20 LF
Sta 147+00 Lt & Rt	40 LF
Sta 148+00 Lt & Rt	40 LF
Sta 149+00 Rt	20 LF
Sta 149+38 Lt	20 LF
Sta 150+00 Lt & Rt	40 LF
Sta 151+00 Lt & Rt	40 LF
Sta 152+00 Lt & Rt	40 LF
Sta 153+00 Lt & Rt	40 LF
Sta 154+00 Lt & Rt	40 LF
Sta 155+00 Lt & Rt	40 LF
Sta 157+93 Rt	20 LF
TOTAL = 740 LF	



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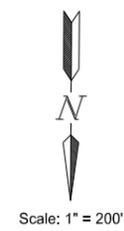
SC-COIB-0427(051)	
CMC 0427/123rd Ave SW	
KLJ	
Permanent Erosion Control Sta 129+00 to 158+00	
Billings County, ND	
DRWN. BY JMW	CHKD. BY AK
PROJECT NO. 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	77	4



ECB TYPE 3
 Sta 400+26 to 403+50 Lt 800 SY
 Sta 400+26 to 403+50 Rt 925 SY
TOTAL = 1725 SY

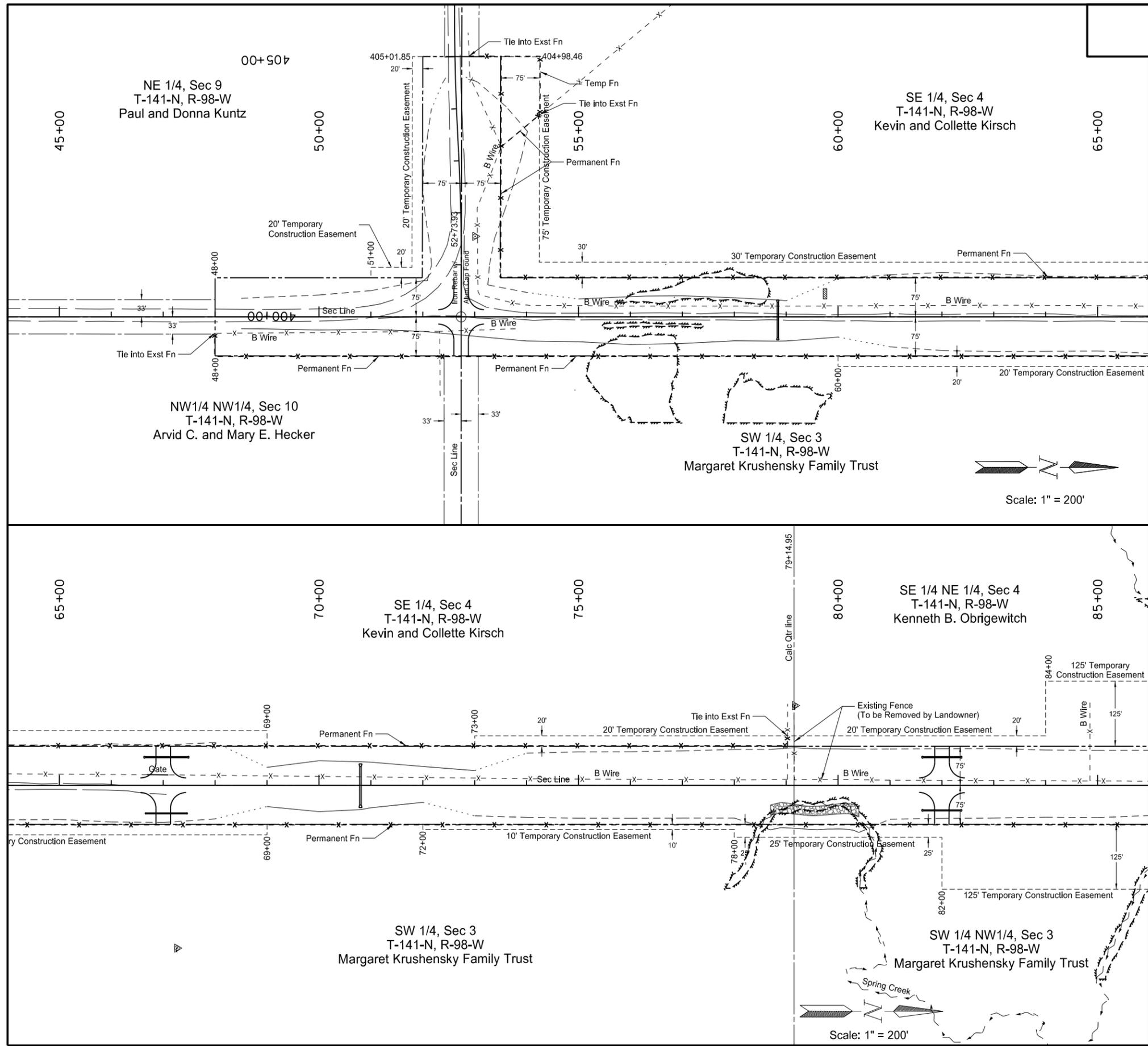
FIBER ROLLS 12IN
 Sta 400+50 Lt & Rt 40 LF
 Sta 401+00 Lt & Rt 40 LF
 Sta 401+50 Lt & Rt 40 LF
 Sta 402+00 Lt & Rt 40 LF
 Sta 402+00 to 404+00 Rt 200 LF
 Sta 402+50 Lt & Rt 40 LF
 Sta 403+00 Lt & Rt 40 LF
 Sta 403+50 Lt & Rt 40 LF
 Sta 404+00 Rt 20 LF
TOTAL = 500 LF



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SC-COIB-0427(051)	
25th St	
	Permanent Erosion Control Sta 400+00 to 405+00
	Billings County, ND
DRAWN BY JMW	CHECKED BY AK
PROJECT NO. 3313119	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	80	1



REMOVE EXISTING FENCE	
Sta 47+99 to 53+79 Rt	580 LF
Sta 52+33 Rt	48 LF
Sta 400+42 to 405+00 Rt	481 LF
Sta 53+09 to 79+03 Lt	2594 LF
Sta 79+03 Lt	84 LF
Total =	3787 LF
FENCE BARBED WIRE 4 STRAND	
Sta 47+99 to 85+00 Rt	3745 LF
Sta 400+76 to 405+00 Rt	486 LF
Sta 403+22 to 403+82 Rt	63 LF
Sta 53+50 to 79+03 Lt	2572 LF
Total =	6866 LF
TEMPORARY FENCE	
Sta 403+82 to 405+00 Rt	187 LF
VEHICLE GATE	
Sta 52+74 Rt - 24' Wide	1 EA
Sta 67+00 Lt - 24' Wide	1 EA
Sta 67+00 Rt - 24' Wide	1 EA
Sta 82+00 Rt - 24' Wide	1 EA
Total =	4 EA
CORNER ASSEMBLY BARBED WIRE-WOOD POST	
Sta 47+99 Rt	2 EA
Sta 403+22 Rt	1 EA
Sta 405+00 Rt	2 EA
Sta 52+33 Rt	1 EA
Sta 53+50 Lt	1 EA
Sta 79+03 Lt	1 EA
Total =	8 EA
DOUBLE BRACE ASSEMBLY BARBED WIRE-WOOD POST	
Sta 58+85 Lt	1 EA
Sta 61+63 Rt	1 EA
Sta 68+17 Lt	1 EA
Sta 69+55 Rt	1 EA
Sta 70+28 Lt	1 EA
Sta 78+19 Rt	1 EA
Sta 78+75 Rt	1 EA
Sta 80+30 Rt	1 EA
Sta 80+87 Rt	1 EA
Total =	9 EA

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SC-COIB-0427(051)
CMC 0427/123rd Ave SW

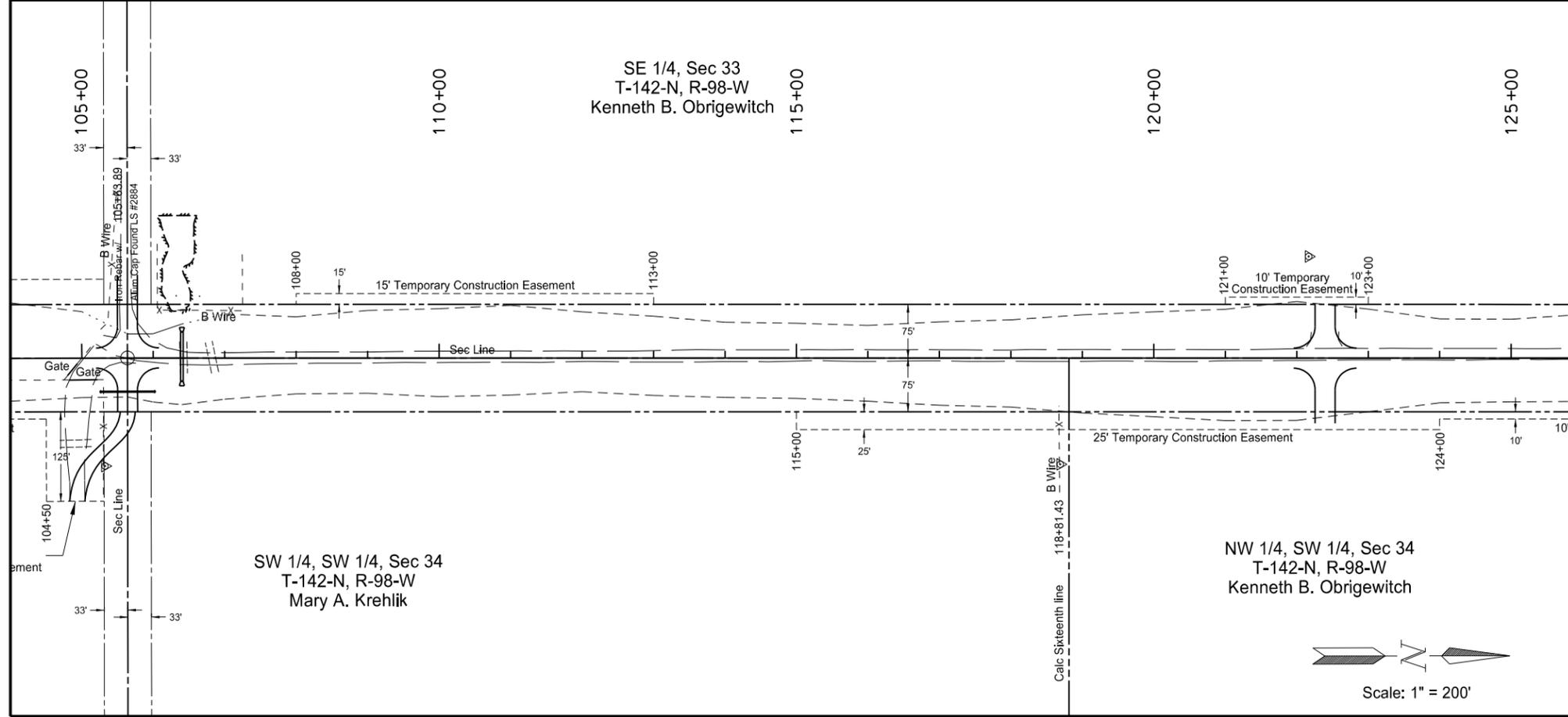
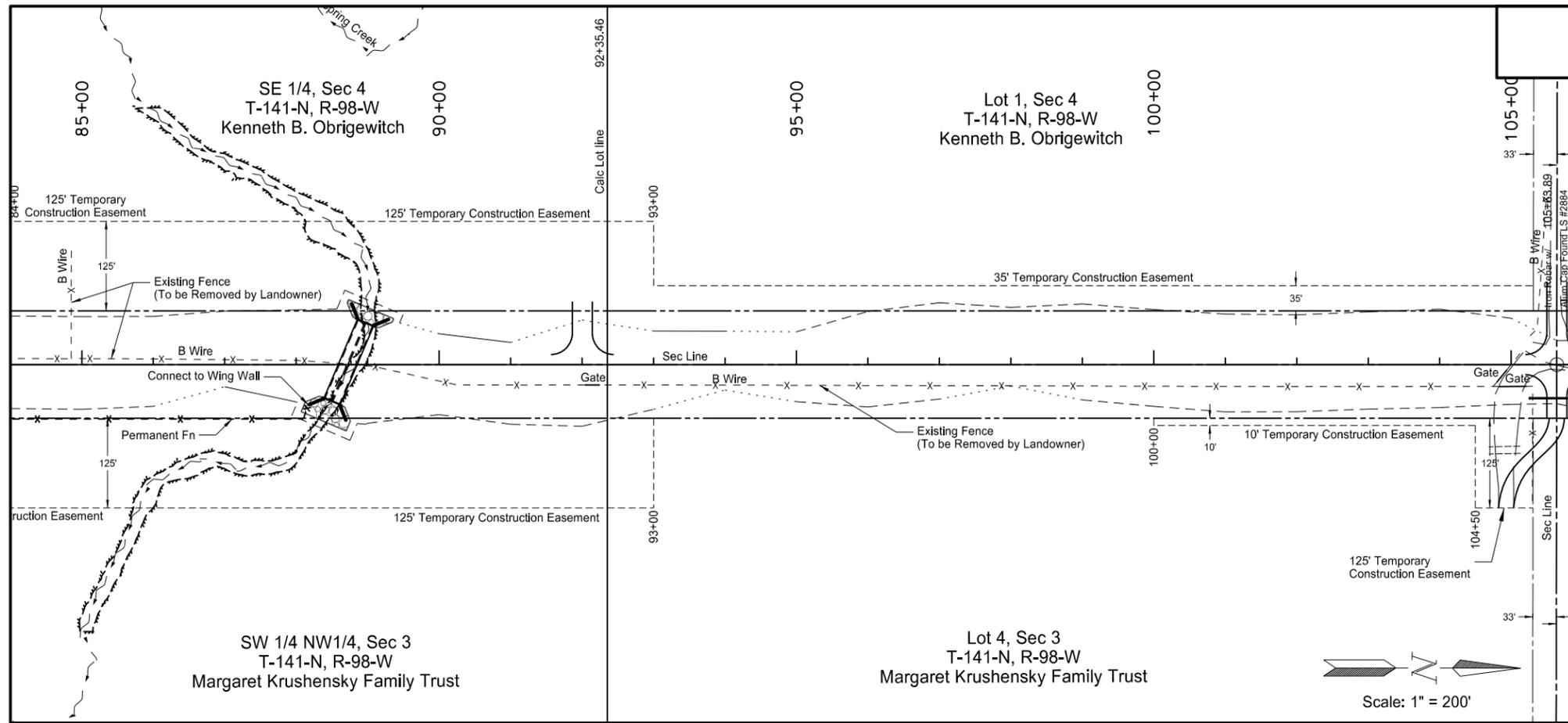


Temporary and Permanent Fencing Layout
Sta 45+00 to 85+00
Billings County, ND

DRWN: BY AK	CHKD: BY AK	PROJECT NO. 3313119
----------------	----------------	------------------------

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	80	2

FENCE BARBED WIRE 4 STRAND Sta 85+00 to 88+17 Rt	331 LF
CORNER ASSEMBLY BARBED WIRE-WOOD POST Sta 88+10 Rt	1 EA



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SC-COIB-0427(051) <small>CMC 0427/123rd Ave SW</small>	
KLJ	
Temporary and Permanent Fencing Layout Sta 85+00 to 125+00 Billings County, ND	
<small>DRAWN BY</small> AK	<small>PROJECT NO.</small> 3313119

ALIGNMENT SURVEY COORDINATE DATA - 123RD AVE SW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	81	1

HORIZONTAL ALIGNMENT							SURVEY CONTROL POINTS						
POINT	STATION	NORTHING	EASTING	LATITUDE	LONGITUDE	DESCRIPTION	POINT	NORTHING	EASTING	ELEVATION	LATITUDE	LONGITUDE	DESCRIPTION
Sec Cor	0+00.00	44,726.07	50,007.29	47°02'18.34" N	103°05'46.80" W	SE Cor Sec 9 T-141-N R-98-W	500	60,473.97	35,291.50	2670.08	47°04'53.70" N	103°09'19.41" W	CP 1
Sec Cor	52+73.93	50,000.00	50,000.00	47°03'10.39" N	103°05'46.91" W	NE Cor Sec 9 T-141-N R-98-W	501	44,662.92	34,112.80	2648.50	47°02'17.65" N	103°09'36.25" W	CP 2
Sec Cor	105+63.89	55,289.95	49,991.79	47°04'02.59" N	103°05'47.03" W	SE Cor Sec 33 T-142-N R-98-W	502	56,942.96	49,852.72	2634.66	47°04'18.91" N	103°05'49.04" W	BM 9
Sec Cor	158+34.03	60,560.08	50,000.84	47°04'54.61" N	103°05'46.90" W	SW Cor Sec 27 T-142-N R-98-W	503	60,487.08	50,152.94	2636.25	47°04'53.88" N	103°05'44.70" W	BM 12
Sec Cor	211+25.47	65,851.51	49,991.30	47°05'46.83" N	103°05'47.03" W	SW Cor Sec 22 T-142-N R-98-W	504	59,149.09	50,149.40	2604.01	47°04'40.68" N	103°05'44.75" W	BM 11
PC	401+00.00	50,000.09	49,900.00	47°03'10.39" N	103°05'48.35" W		505	57,951.13	49,853.54	2608.79	47°04'28.86" N	103°05'49.02" W	BM 10
PI	402+07.91	50,000.18	49,792.09	47°03'10.39" N	103°05'49.91" W		506	56,594.87	50,142.34	2637.09	47°04'15.47" N	103°05'44.85" W	BM 8
PT	403+15.77	49,994.60	49,684.32	47°03'10.34" N	103°05'51.47" W		507	55,258.24	50,142.62	2590.43	47°04'02.28" N	103°05'44.85" W	BM 7
PC	403+66.08	49,992.00	49,634.07	47°03'10.31" N	103°05'52.19" W		508	54,175.52	49,815.38	2581.45	47°03'51.60" N	103°05'49.57" W	BM 6
PI	404+74.00	49,986.41	49,526.30	47°03'10.25" N	103°05'53.75" W		509	53,661.11	49,842.60	2558.74	47°03'46.52" N	103°05'49.18" W	BM 5
PT	405+81.85	49,986.51	49,418.39	47°03'10.26" N	103°05'55.31" W		510	53,574.95	50,148.85	2562.51	47°03'45.67" N	103°05'44.76" W	BM 4
POT	410+74.83	49,986.94	48,925.41	47°03'10.26" N	103°06'02.43" W		511	50,026.65	49,845.19	2593.90	47°03'10.65" N	103°05'49.14" W	BM 1
							512	51,453.04	50,310.75	2565.92	47°03'24.73" N	103°05'42.42" W	BM 2
							513	52,642.73	49,842.95	2557.12	47°03'36.47" N	103°05'49.18" W	BM 3

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Assumed Coordinates
 All coordinates on this sheet are Local.

SC-COIB-0427(051)
 CMC 0427/123rd Ave SW



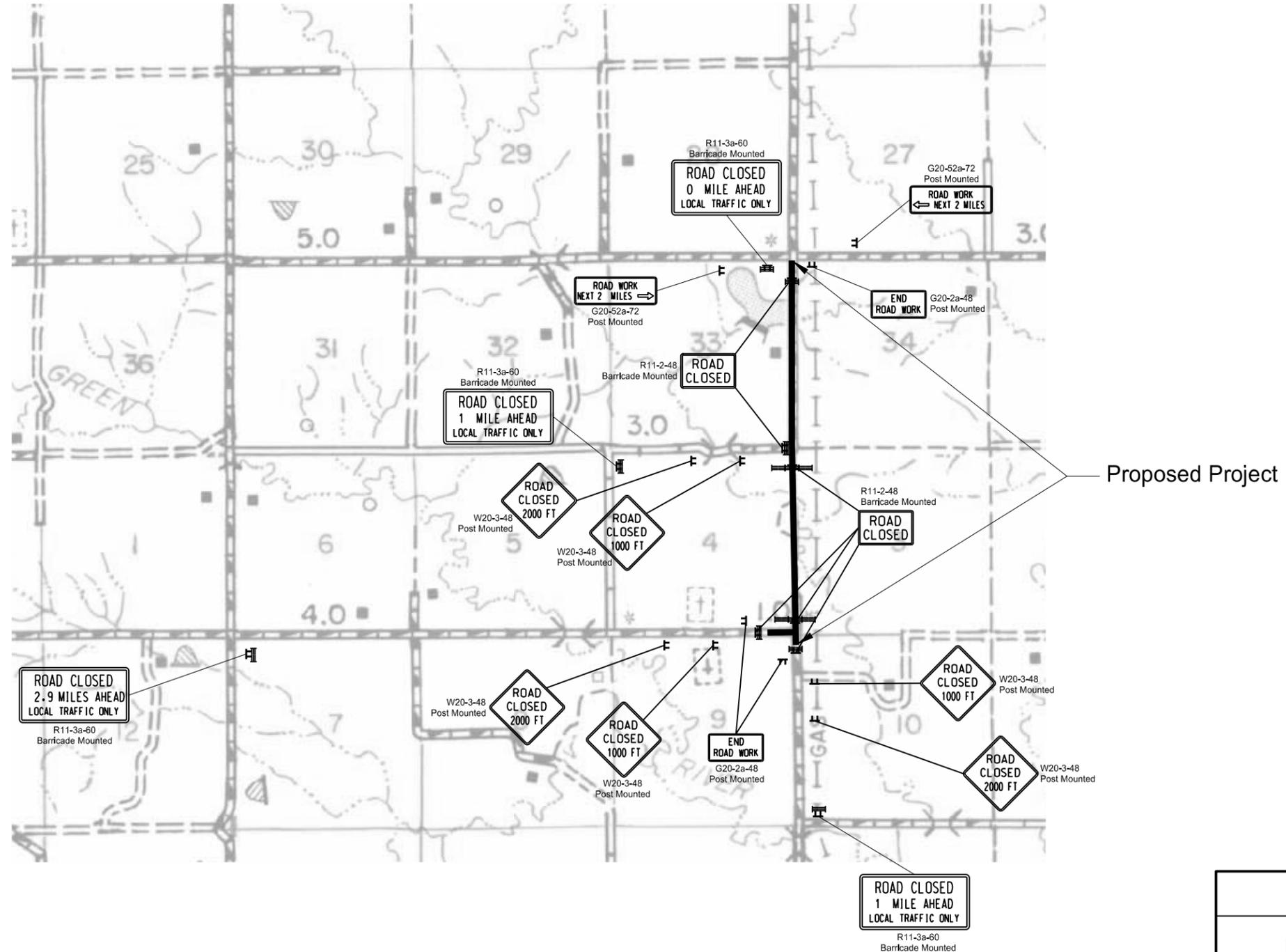
Alignment Survey
 Coordinate Data
 Billings County, ND

DRWN BY: AK CKRD BY: MEW PROJECT NO.: 3313119

NOTES: All coordinates and measurements on this document are local coordinates, based upon the US Survey Foot definition, NAD83(2011)
 Vertical Datum: NAVD 88, GEOID 12A (CONUS)
 Derived from OPUS Solution

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	100	2

CONSTRUCTION SIGN LAYOUT



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SC-COIB-0427(051) CMC 0427/123rd Ave SW	
	Work Zone Traffic Control
	Billings County, ND
<small>DRAWN BY</small> JMW	<small>CHKD. BY</small> AK
<small>PROJECT NO.</small> 3313119	

SIGN SUMMARY

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
123rd Ave SW																						
52+44 Lt	SA 2E		10.6	5.2	13.6				2.5 x 2.5 10 ga	14.8					1	4	3 x 3 7 ga				1	
105+34 Lt	SA 2E		10.6	5.2	13.6				2.5 x 2.5 10 ga	14.8					1	4	3 x 3 7 ga				1	
121+78 Rt		19			13.4				2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga	1				
143+60 Lt		19			13.4				2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga	1				
154+49 Rt		20		9.0	13.7				2.25 x 2.25 12 ga	14.1	4.9			2 x 2 12 ga	1	4	3 x 3 7 ga				1	
155+90 Lt		9		5.0	12.7				2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
157+74 Rt	SA 2E		10.6		12.1				2.5 x 2.5 12 ga	14.2					1	4	3 x 3 7 ga	1				
Sub Total			31.8	24.4		Total		92.5							Total	28			3	0	3	
25th St SW																						
404+00 Lt		20		9.0	13.7				2.25 x 2.25 12 ga	14.1	4.9			2 x 2 12 ga	1	4	3 x 3 7 ga				1	
Sub Total			0.0	9.0		Total		13.7							Total	4			0	0	1	
Grand Total			31.8	33.4		Total		106.2							Total	32			3	0	4	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Rural Roadway - 60"

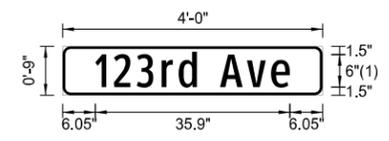
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SC-COIB-0427(051)		
CMC 0427/123 rd Ave SW		
Sign Summary		
Billings County, ND		
	DRWN. BY JMW	CHKD. BY AK
PROJECT NO. 3313119		

SIGN NUMBER	SS 1
WIDTH x HEIGHT	4'-0" 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

STATION(S):
52+44 Lt
105+34 Lt
157+74 Rt

AREA: 3.0 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

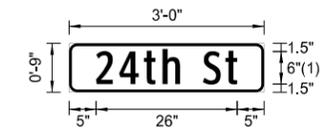
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)										LENGTH	SIZE	SERIES
1	2	3	r	d	A	v	e			35.9	6/4.9	ClearviewHwy-2-W
6	9.4	13.7	18.3	21.4	24.8	29.1	34	38.5				

SIGN NUMBER	SS 3
WIDTH x HEIGHT	3'-0" 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

STATION(S):
105+34 Lt

AREA: 2.3 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

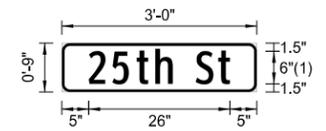
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)										LENGTH	SIZE	SERIES
2	4	t	h	S	t					26	6/4.9	ClearviewHwy-2-W
5	9.2	13.8	17.3	20.5	24.7	28.9						

SIGN NUMBER	SS 2
WIDTH x HEIGHT	3'-0" 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

STATION(S):
52+44 Lt

AREA: 2.3 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

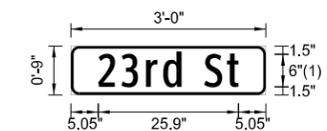
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)										LENGTH	SIZE	SERIES
2	5	t	h	S	t					26	6/4.9	ClearviewHwy-2-W
5	9.2	13.8	17.3	20.5	24.7	28.9						

SIGN NUMBER	SS 4
WIDTH x HEIGHT	3'-0" 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

STATION(S):
157+74 Rt

AREA: 2.3 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)										LENGTH	SIZE	SERIES
2	3	r	d	S	t					25.9	6/4.9	ClearviewHwy-2-W
5.1	9.3	13.9	17	20.4	24.6	28.8						

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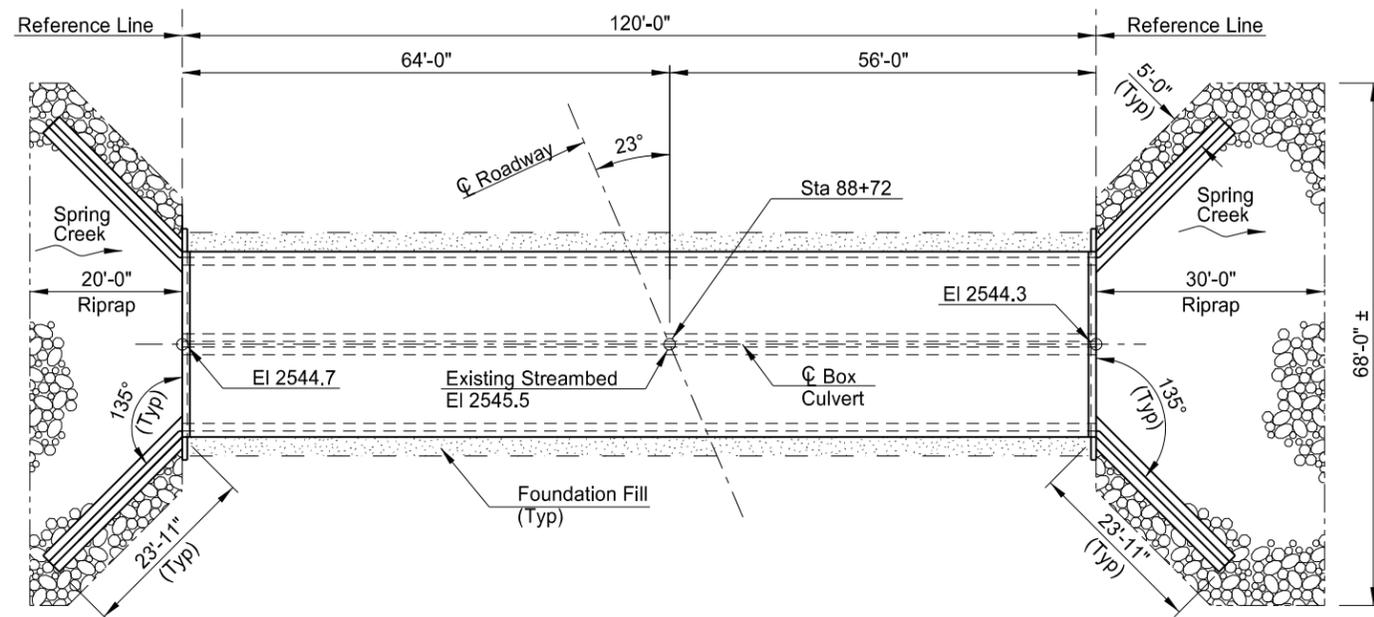
SC-COIB-0427(051)
CMC 0427/123rd Ave SW



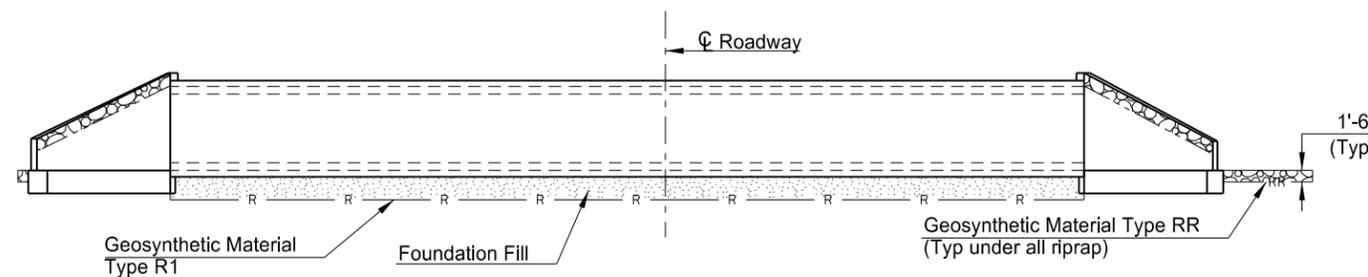
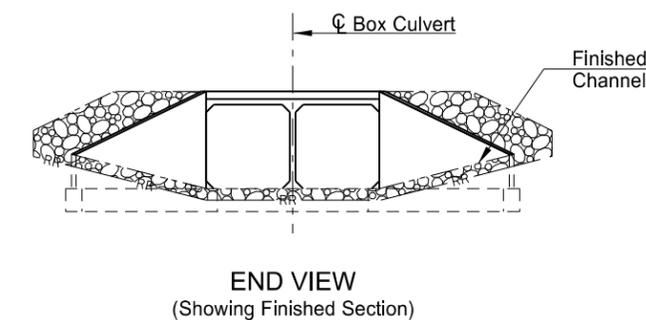
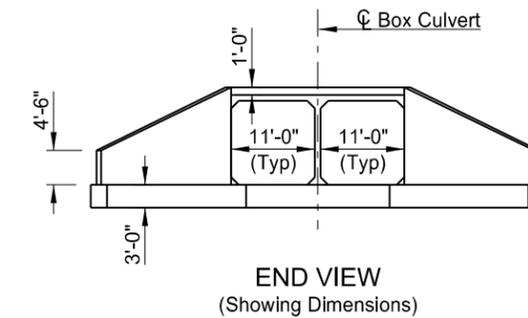
Sign Details
Billings County, ND

DRWN. BY JK	CHKD. BY AK	PROJECT NO. 3313119
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	170	1



PLAN



ELEVATION

HYDRAULIC DATA:

Drainage Area	40.62	sq mi
Stream Gradient	0.00192	ft/ft
Design Frequency	25	yr
Design Discharge	1,482	cfs
Design Headwater Stage	2556.9	ft
Design Tailwater Stage	2556.4	ft
Velocity Through Bridge	6.62	fps
100-Year Frequency Discharge	2,523	cfs
100-Year Frequency Headwater	2558.0	ft
Overtopping Stage	2556.9	ft
Overtopping Discharge	1,599	cfs

NOTE:

The invert elevations shown represent an elevation 1 foot below the existing streambed.

For a double barrel box culvert with a 9" thick roof, 9" floor, and 9" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	3,310 ft-lbs	WALL SHEAR	7,787 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	-20,217 ft-lbs	CORNER	11,625 lbs
BOTTOM	22,520 ft-lbs	WALL	15,639 lbs
TOP	-43,631 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	15,572 lbs
CORNER	-24,561 ft-lbs	WALL	19,301 lbs
TOP	23,497 ft-lbs		
BOTTOM	-46,312 ft-lbs		

PRECAST BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	515
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	160
256	1000	GROUT FOR RIPRAP	SY	321
606	3111	DBL 11FT X 11FT PRECAST RCB CULVERT	LF	120
606	7111	DBL 11FT X 11FT PRECAST RCB END SECTION	EA	2
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	763
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	321

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SC-COIB-0427(051)

Structure #04-127-19.0



Precast Box Culvert Layout

Billings County, ND

DRWN BY	CHKD BY	PROJECT NO.
BJJ	CLT	3313119

STRUCTURAL NOTES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-COIB-0427(051)	170	2

100 **SCOPE OF WORK:** Work at this site consists of installing a new double barrel 11' x 11' x 120' precast concrete box culvert. A double cell precast unit is required for the box culvert.

606 **PRECAST REINFORCED CONCRETE BOX CULVERT AND END SECTIONS:** Tie all barrel sections together with prestressing strands or 1" \emptyset tie bolts as shown on Standard Drawing D-714-22. If strands are used, use a minimum of six 1/2" diameter strands through each joint placed at each outside corner and top and bottom of center wall. Protect prestressing cables against corrosion and grout their ends. If tie bolts are used, the joints will require two ties per exterior wall located at the third points of the wall clear height.

The "DBL 11FT X 11FT PRECAST RCB END SECTION" bid item consists of the cutoff wall, parapet, and wingwalls. Attach the wingwalls to the last barrel section. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates, or another approved method so the inside corner surface is smooth. After backfilling, wingwall sections are to be in line. If the wingwall sections are not in line or not installed to the angles shown in the plans, remove and reset the wingwalls to be in proper alignment. Any foundation fill not shown in the plans that is required to facilitate the installation of the wingwalls is to be included in price bid for "DBL 11FTx11FT PRECAST RCB END SECTION."

Install seven 3/4" diameter threaded inserts and steel eye bolts (28 total) along top and end faces of each wingwall to provide anchorage for fencing. A 3"x3"x3/8" hot dipped galvanized angle, as shown in Section 170 sheet 3 of the plans, is to also be included at each wingwall. Anchorage locations and specifications are to be shown on the work drawings for approval by the Engineer. All costs associated with the threaded inserts, steel eye bolts, and galvanized angles are to be included in the price bid for "DBL 11FTx11FT PRECAST RCB END SECTION."

All bolts, plates, angles, and studs are to meet ASTM A36. Nuts are to be a heavy hex in conformance with ASTM A563 and washers shall be ASTM F436, Type 1. Welded pipe sleeves are to conform to ASTM A53, Grade B. Welders are required to be properly certified for all shop and field welds. Coat all field welds with galvanizing paint. Galvanize all hardware according to AASHTO M 232. Galvanize structural steel after fabrication according to AASHTO M 111.

Cast holes at 3'-0" centers through the last barrel section and into the cutoff walls to receive 3/4" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for 1/2" diameter reinforcing bars to attach the parapet. Cast the parapet against the section. Install the bars according to the manufacturer's recommendation, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02 of the NDDOT Standard Specifications.

DESIGN LOADS:

- A. HL-93 Loading
- B. Maximum Fill Height = 15'

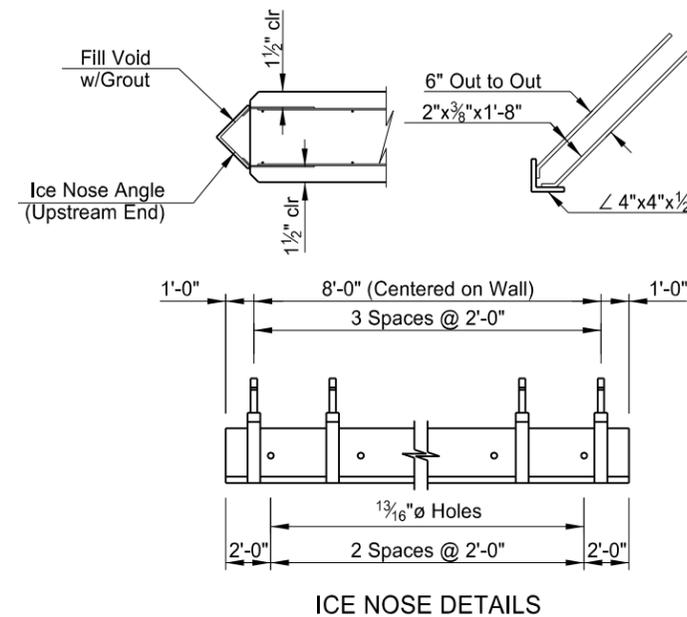
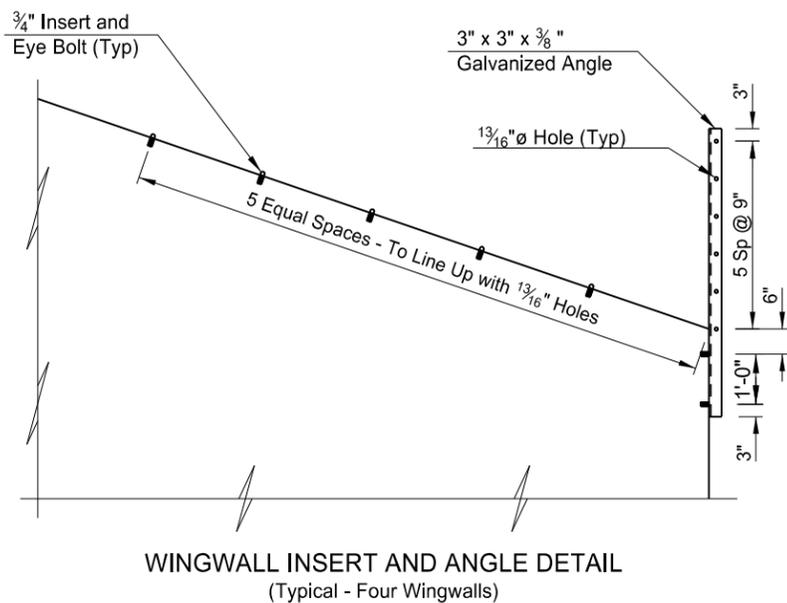
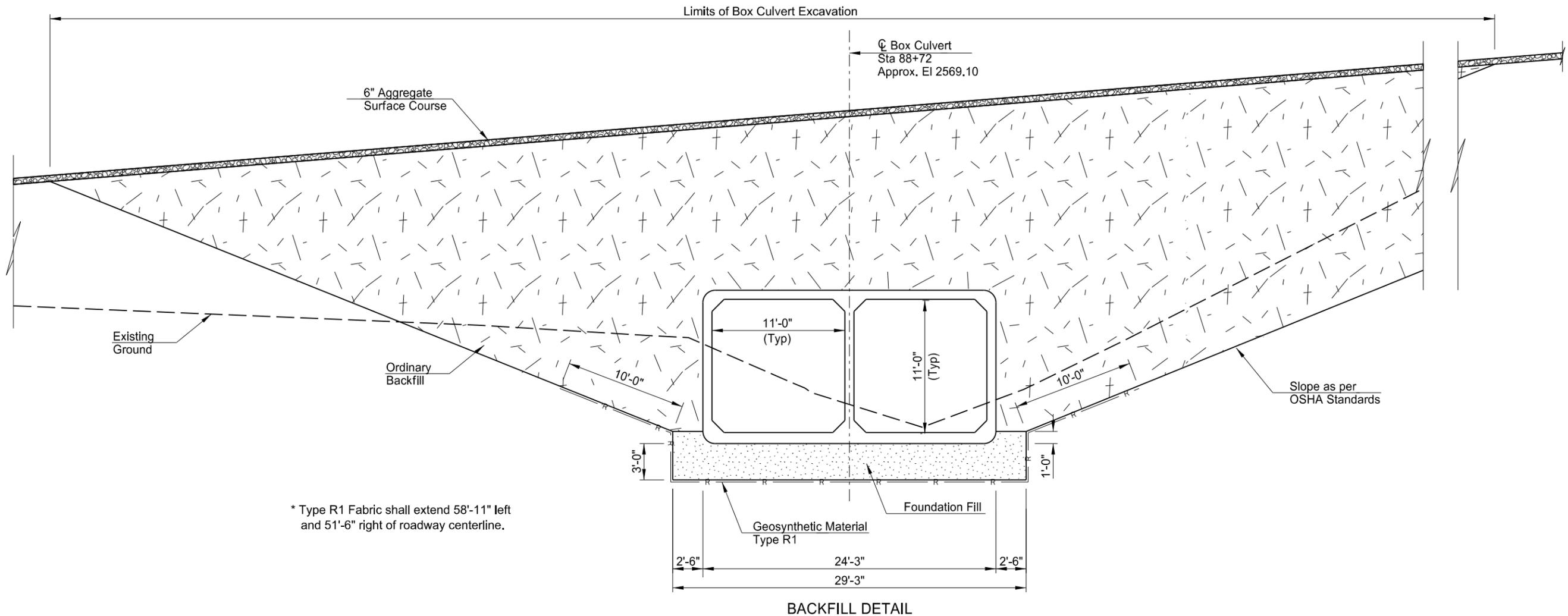
WORK DRAWINGS: The contractor shall submit the following work drawings to the Engineer of Record:

PRECAST RCB CULVERT

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Dustin Kinnischtzke
Registration Number
PE-6530,
on 08/25/15,
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SC-COIB-0427(051)		
Structure #04-127-19.0		
		
Structural Notes		
Billings County, ND		
DRWN BY BJJ	CHKD BY CLT	PROJECT NO. 3313119

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-COIB-0427(051)	170	3



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SC-COIB-0427(051)	
Structure #04-127-19.0	
KLJ	
Backfill Details	
Billings County, ND	
DRWN: BY BJJ	CHKD: BY CLT
PROJECT NO. 3313119	

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

BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 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
 CSP corrugated steel pipe
 C coulomb
 Co County
 Crse course
 C Gr course gravel
 CS course sand

Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia 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
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fs foresight
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser

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

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NDDOT ABBREVIATIONS

D-101-2

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

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

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NDDOT ABBREVIATIONS

D-101-3

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

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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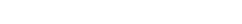
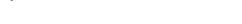
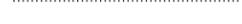
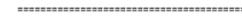
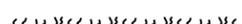
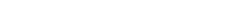
Line Styles

.....	Limits of Const Transition Line	—— s —— s ——	Floating Silt Curtain	—— ——— ———	Existing Aggregate (Cross Section View)	- - - - -	Existing Centerline
.....	Bale Check	—— ——— T ——	Existing Telephone Line	—— ——— ———	Existing Curb and Gutter (Cross Section View)	- - - - -	Supplemental Contour
.....	Rock Check	—— ——— TV ——	Existing TV Line	—— ——— ———	Existing Riprap	—— - - - - -	Right of Way
.....	Sight Distance Triangle Line	Void — void — void — v	Existing Assumed Ground (Not Surveyed)	—— ——— ———	Existing Underground Vault or Lift Station	—— - - - - -	Existing Right of Way
- - - - -	Small Hidden Object	Void — void — void — v	Tentative Ground Line	—— ——— ———	Tangent Line	—— - - - - -	Existing Right of Way Railroad
- - - - -	Dimension Leader	—— ——— w ——	Existing Water or Steam Line	- - - - -	Hidden Object	- - - - -	Failure Line
- - - - -	Existing Ground	=====	Existing Under Drain	—— ——— ———	Existing Dirt Surface	- - - - -	Existing Conditions
- - - - -	Existing Topsoil (Cross Section View)	=====	Under Drain	—— ——— ———	Existing Conduit	- - - - -	Existing Ground (Details)
—— ——— ———	Large Hidden Object	=====	Wall	—— ——— ———	Topsoil Profile	—— - - - - -	Existing Sixteenth Section Line
—— ——— ———	Edge Drain	=====	Existing Slotted Drain	- - - - -	Existing Conductor	- - - - -	Existing Right of Way Not State Owned
—— D —— D ——	Geotextile Fabric Type D	—— + —— + ——	Existing Cemetary Boundary	- - - - -	Conductor	- - - - -	Phantom Object
—— ——— E ——	Existing Electrical	—— ——— ———	Centerline Pavement Marking	- - - - -	Fiber Optic	- - - - -	Centerline Main
—— ——— FO ——	Existing Fiber Optic Line	=====	Barrier with Centerline Pavement Marking	- - - - -	Existing Loop Detector	-	Existing Guardrail Cable
—— ——— FO ——	Existing TV Fiber Optic	=====	Barrier Pavement Marking	- - - - -	Subgrade, Subcut or Ditch Grade	— • — • — • — •	Existing Guardrail Metal
—— ——— G ——	Existing Gas Pipe	- - - - -	Stripe 4 IN Dotted Extension White	—— ——— ———	Existing Asphalt Surface	—— . ——— . ——— . ——— .	Existing Edge of Water
—— ——— Geo —— Geo ——	Geogrid	- - - - -	Stripe 8 IN Dotted Extension White	—— ——— ———	Existing Asphalt (Cross Section View)	- - - - -	Excavation Limits
—— ——— OH ——	Existing Overhead Utility Line	- - - - -	Stripe 8 IN Lane Drop	—— ——— ———	Existing Reinforcement Rebar	——	Existing Government Lot Line
—— ——— P ——	Existing Power	—— ——— ———	Wetland Mitigation	—— ——— ———	Existing Tie Point Line	.....	Existing Adjacent Block Lines
—— ——— PL ——	Existing Fuel Pipeline	- - - - -	Existing Box Culvert Bridge	—— ——— ———	Existing State or International Line	.....	Existing Adjacent Lot Lines
—— ——— PL ——	Existing Undefined Above Ground Pipe Line	- - - - -	Existing Concrete Surface	—— ——— ———	Existing Quarter Section Line	.....	Existing Adjacent Property Line
—— ——— R —— R ——	Geotextile Fabric Type R	- - - - -	Existing Drainage Structure	—— ——— ———	Existing County	.....	Existing Adjacent Subdivision Lines
—— ——— R —— R ——	Geotextile Fabric Type R1	- - - - -	Easement	—— ——— ———	Existing Section Line	.....
—— REMOVE —— REMOVE ——	Remove Line	- - - - -	Existing Concrete	—— ——— ———	Existing Township	.....
—— ——— RR —— RR ——	Geotextile Fabric Type RR	- - - - -	Existing Easement	—— ——— ———	Existing Railroad Centerline	
—— ——— S —— S ——	Geotextile Fabric Type S	—— ——— ———	Existing Gravel Surface	—— ——— ———	Centerline	

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Line Styles

	Subgrade Reinforcement		Existing Railroad Switch		Sheet Piling
	Existing Down Guy Wire Down Guy		Overhead Sign Structure Cantilever		W-Beam w Posts
	Existing Fence		24 Inch Pipe		Existing W-Beam Guardrail with Posts
	Existing Railroad		Reinforced Concrete Pipe		Exst Wet Area-Vegetation Break
	Existing Sanitary Sewer		Signal Head with Mast Arm		Existing Wetland Delineated
	Existing Sanitary Force Main		Existing Signal Head with Mast Arm		
	Existing Storm Drain		Tie Bar at Random Spacing		
	Existing Storm Drain Force Main		3-Cable w Posts		
	Fence		Existing 3-Cable w Posts		
	Silt Fence		Site Boundary		
	Existing Field Line		Fiber Rolls		
	Exst Flow		Doweled Joint		
	Flow		Tie Bar 30 Inch 4 Foot Center to Center		
	Existing Culvert		Tie Bar 18 Inch 3 Foot Center to Center		
	Existing Curb		Existing Berm, Dike, Pit, or Earth Dam		
	Existing Valley Gutter		Existing Ditch Block		
	Existing Driveway Gutter		Depression Contours		
	Existing Curb and Gutter		Existing City Corporate Limits or Reservation Boundary		
	Existing Mountable Curb and Gutter		Gravel Pit - Borrow Area		
	Existing Double Micro Loop Detector		Existing Tree Boundary		
	Micro Loop Detector Double		Tree Row		
	Existing Overhead Sign Structure		Existing Brush or Shrub Boundary		
	Existing Micro Loop Detector		Existing Retaining Wall		
	Micro Loop Detector		Existing Planter or Wall		
	Existing Overhead Sign Structure Cantilever		Retaining Wall (Plan View)		

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Symbols

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

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Symbols

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

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Symbols

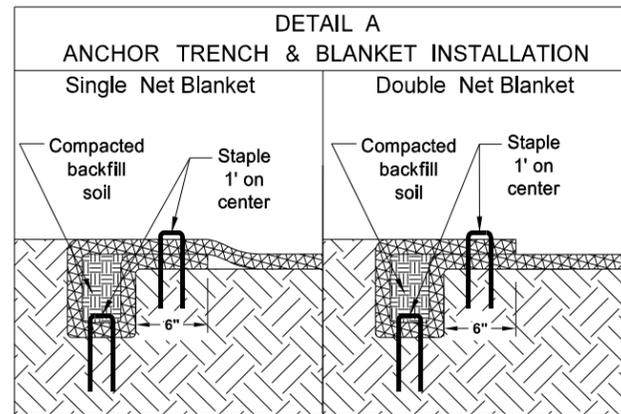
D-101-32

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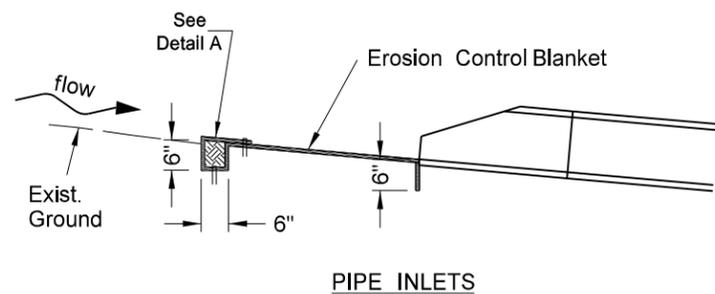
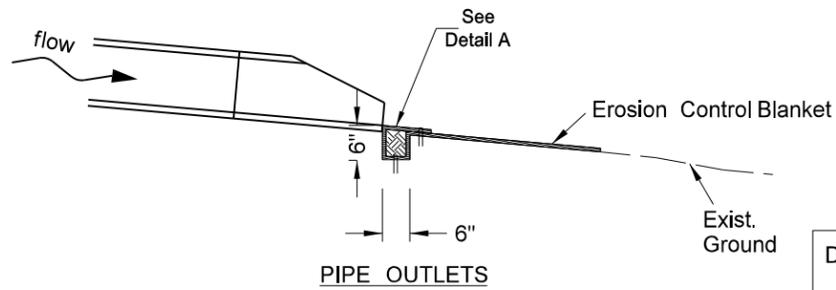
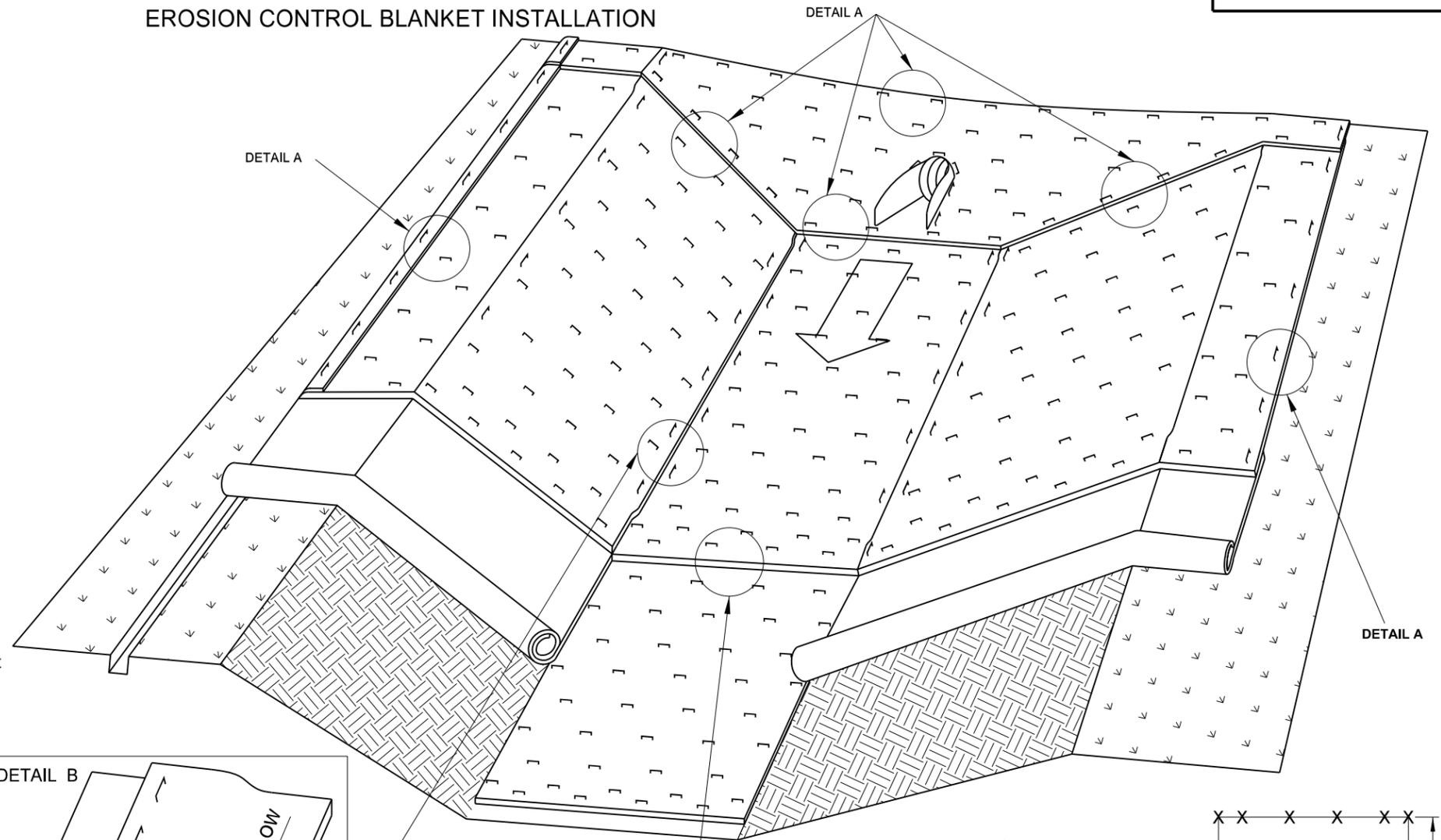
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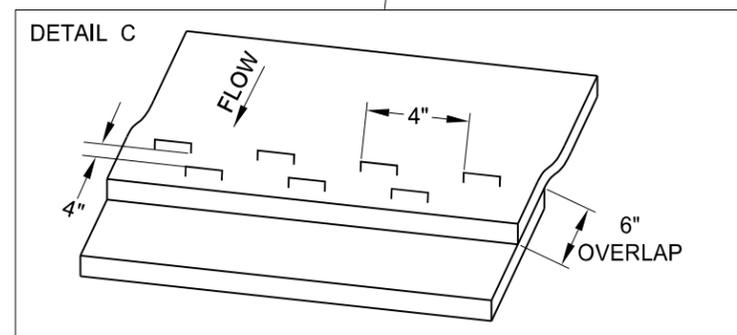
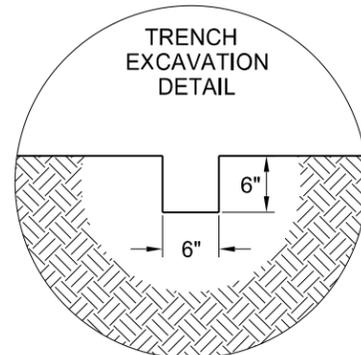
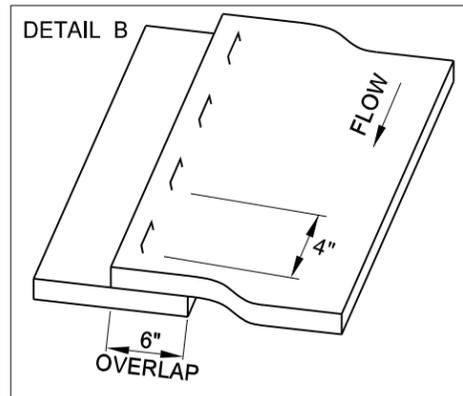
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



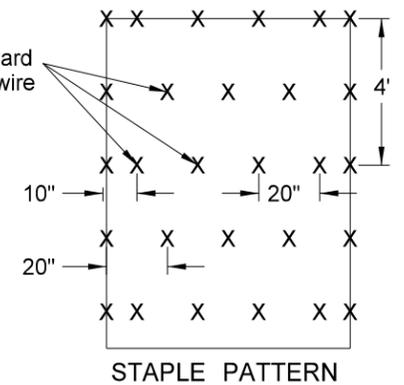
NOTE:
If a Single Net Blanket is used the side with the netting should be on the top once the blanket is installed.



PIPE INLETS
INSTALLATION AT PIPE ENDS



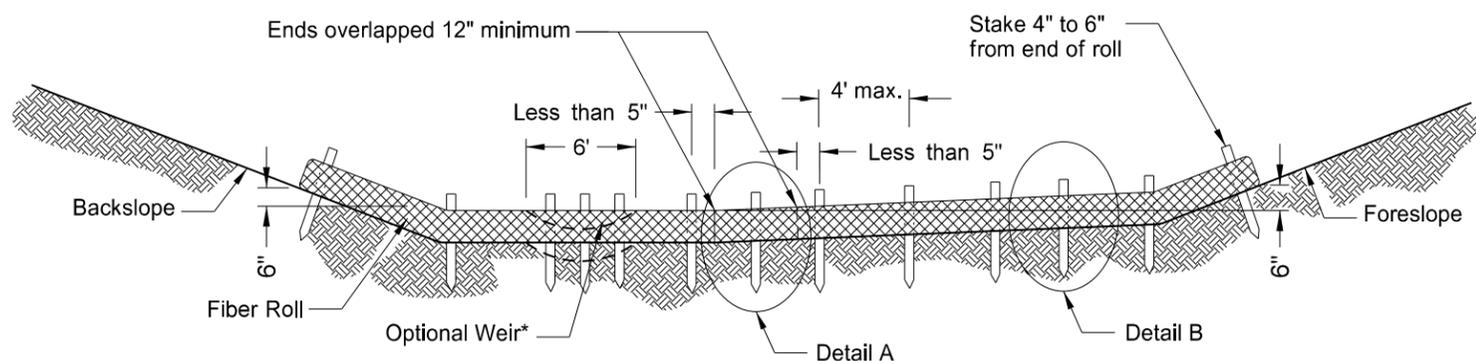
3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed installation details such as trench depth and overlap dimensions.

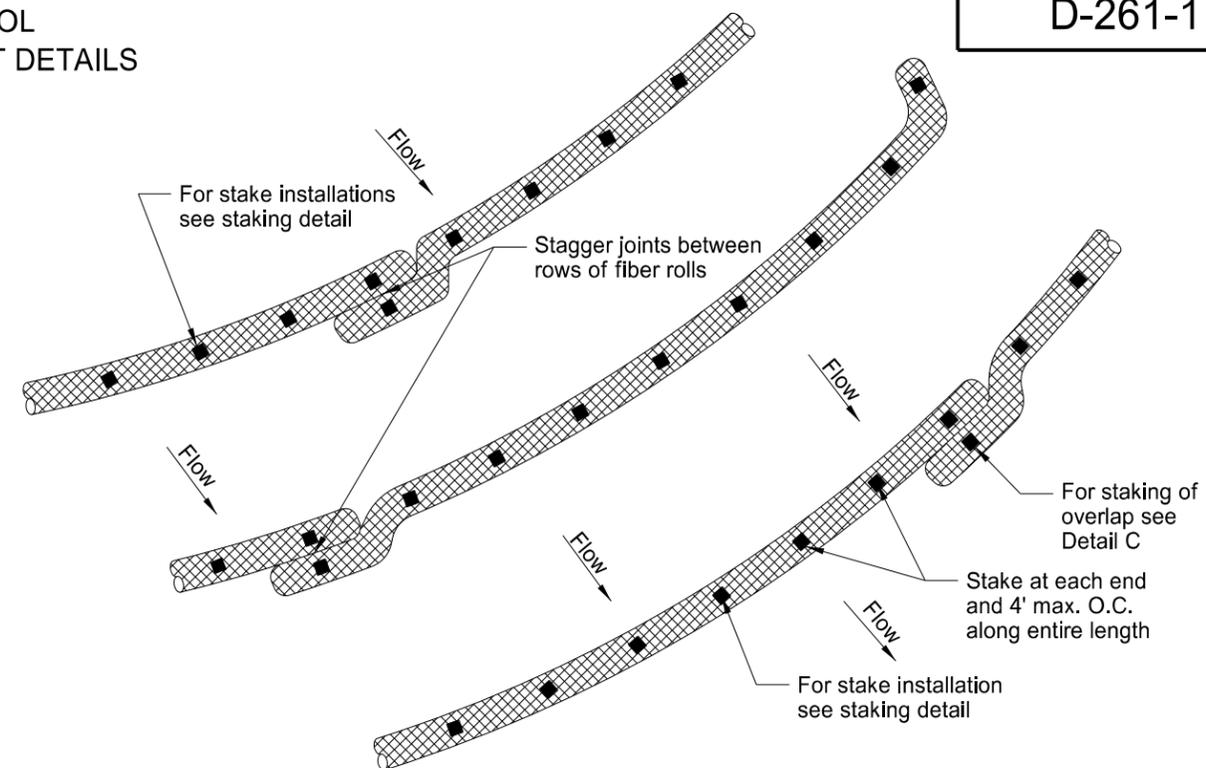
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

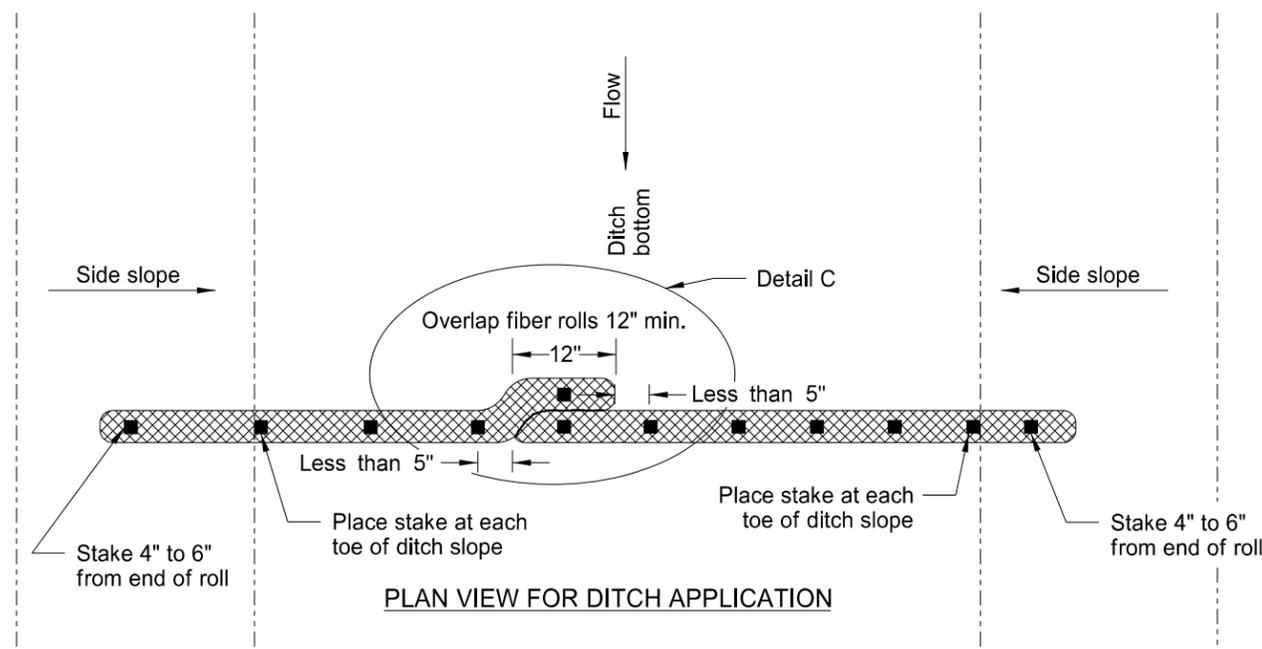


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

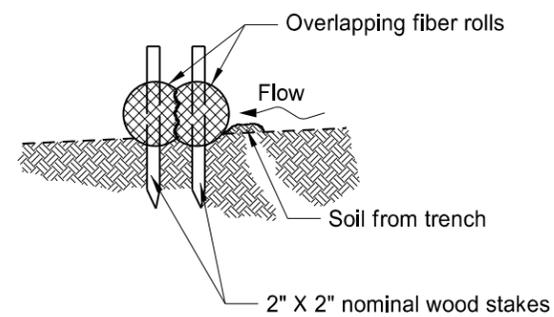
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



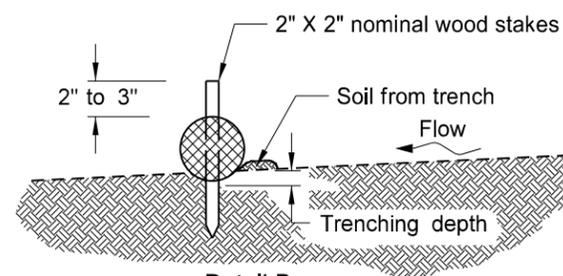
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A
Fiber Roll Overlapping Staking Detail



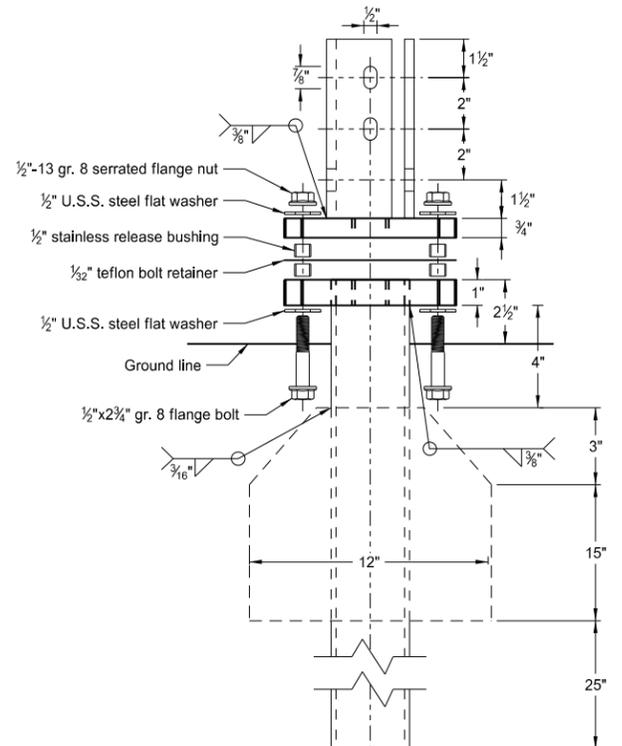
Detail B
Fiber Roll Staking Detail

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.

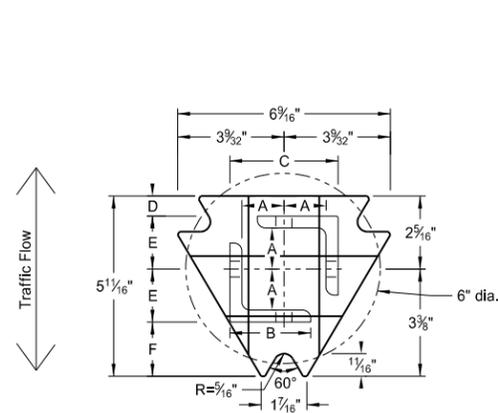
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application, Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1

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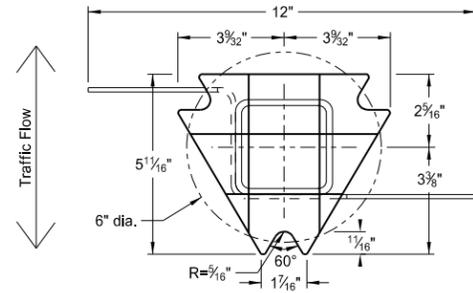


Multi-Directional Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2"x2 1/2"x3/8" 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

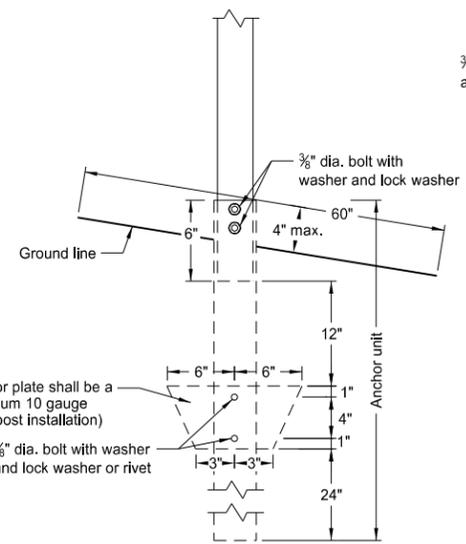
Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

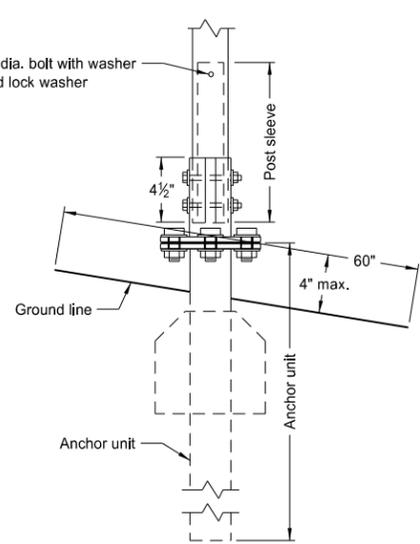
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No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

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

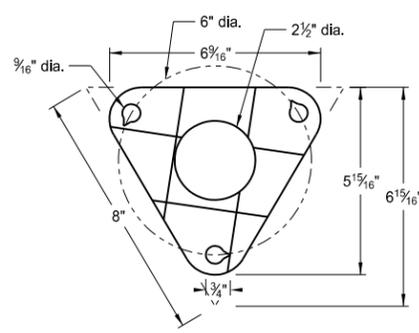
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"



Anchor Unit and Post Assembly

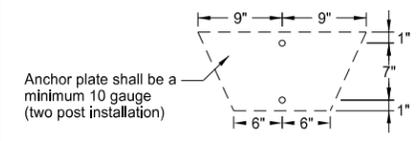


Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



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

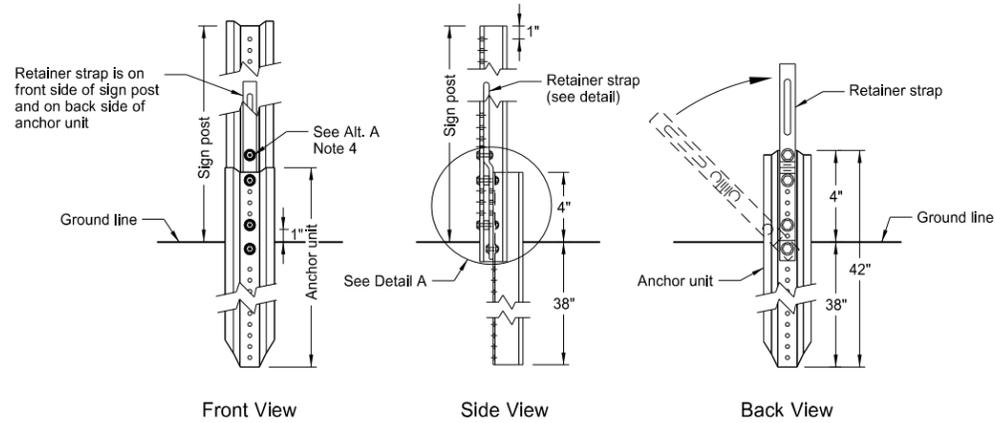
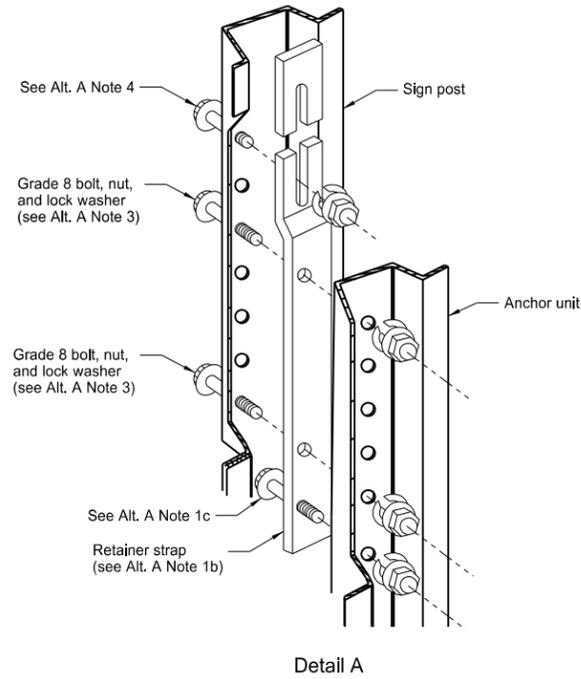
- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
- (B) The 2 3/16"x10 ga. may be inserted into 2 1/2"x10 ga. for additional wind load.



Anchor plate shall be a minimum 10 gauge (two post installation)

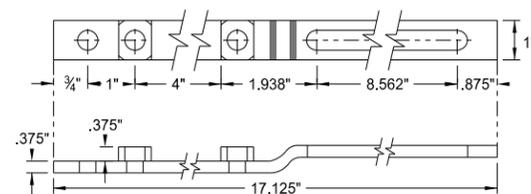
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2-28-14		
REVISIONS		
DATE	CHANGE	

U-Channel Post

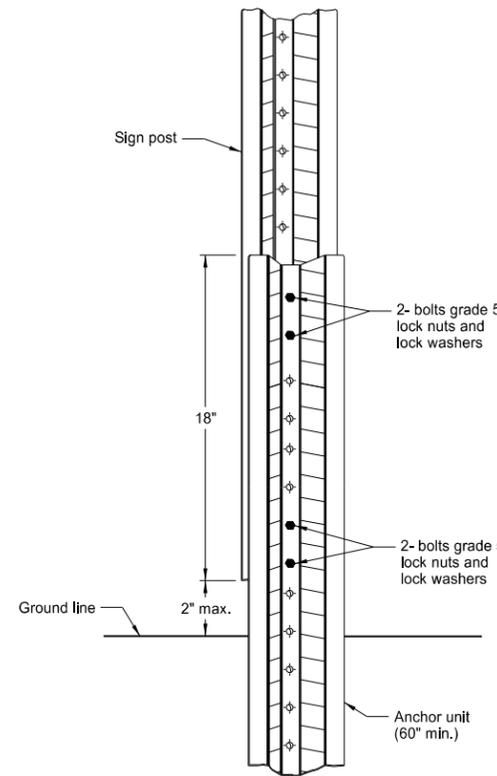


Breakaway U-Channel Detail Alternate A

A maximum of 2 posts shall be installed within 7'.

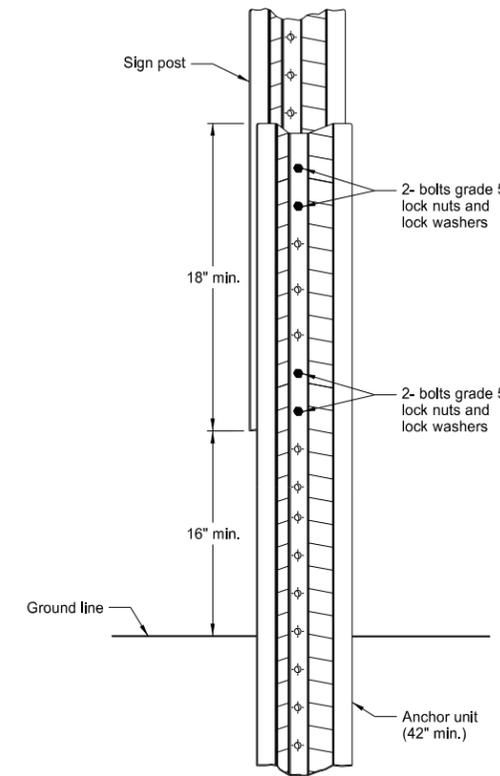


Retainer Strap Detail



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

A maximum of 3 posts shall be installed within 7'.



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

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

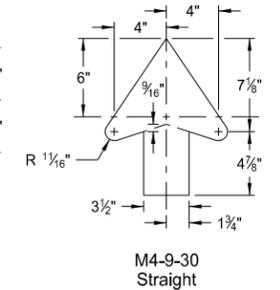
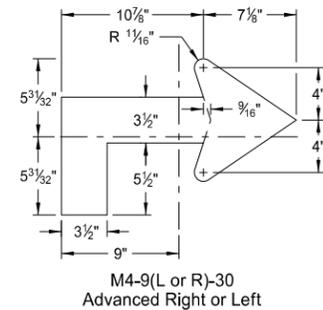
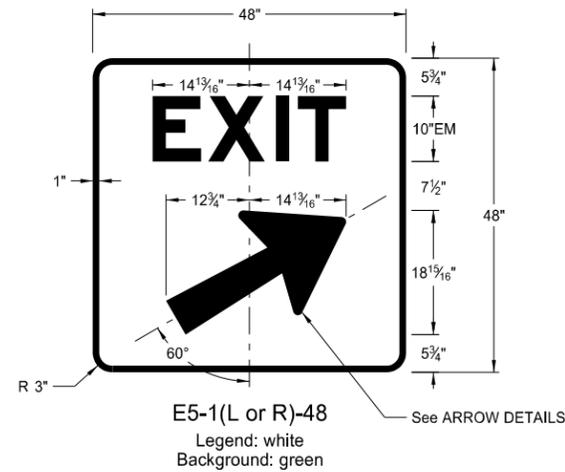
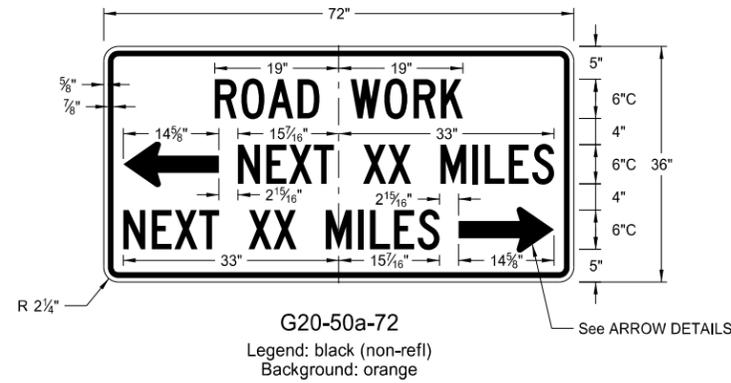
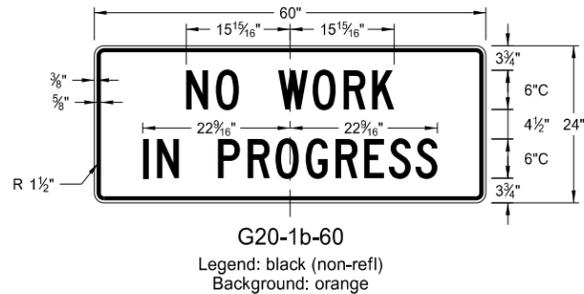
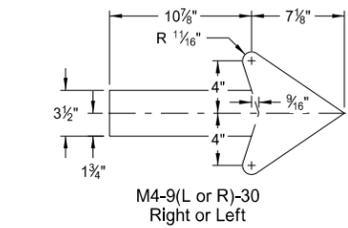
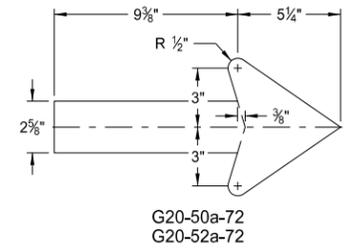
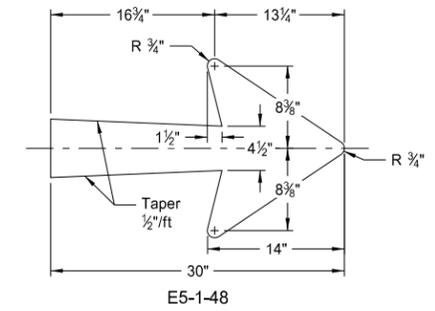
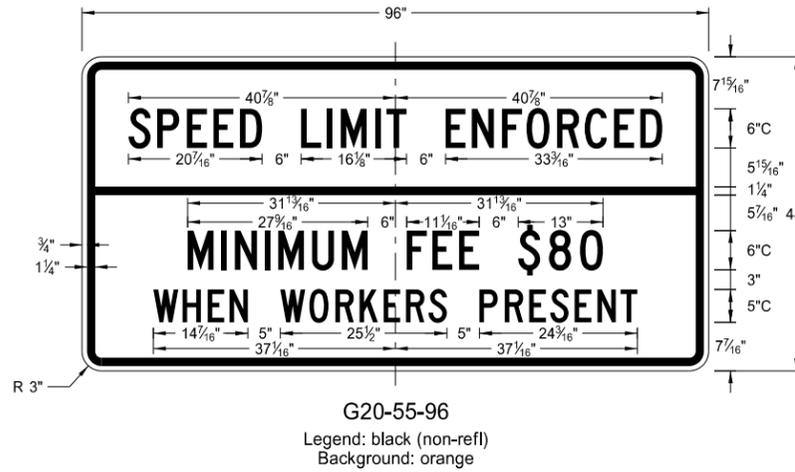
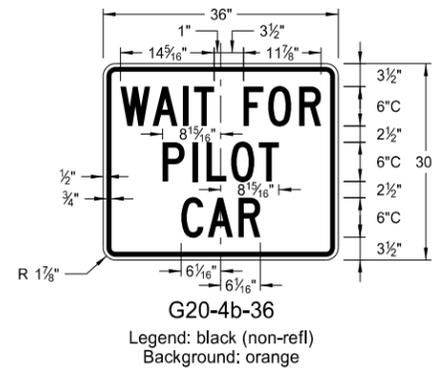
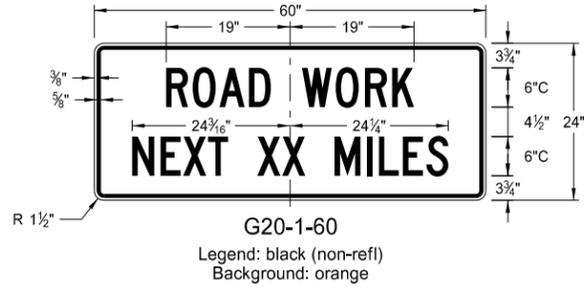
1. a) Drive anchor unit to within 12" of ground level.
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) 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. The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

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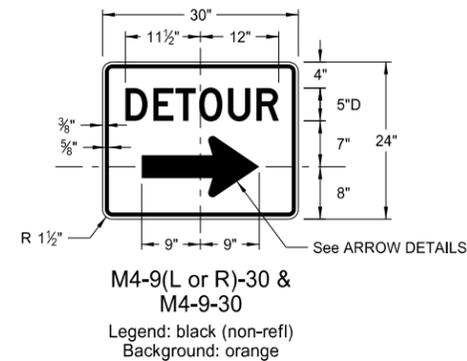
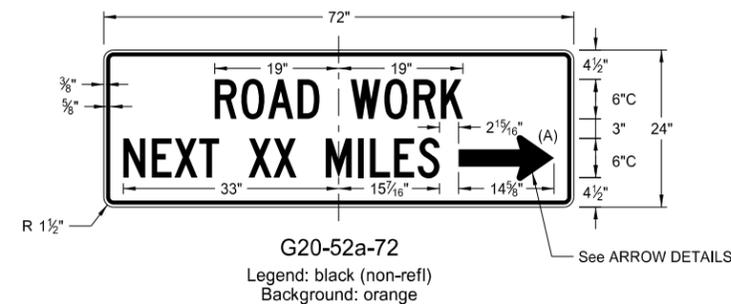
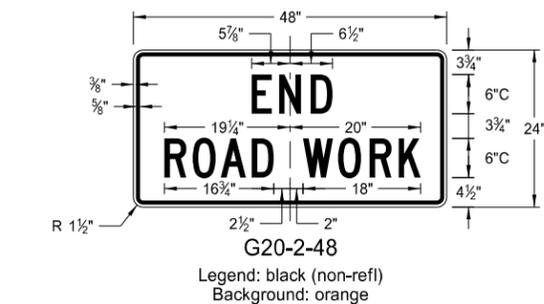
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

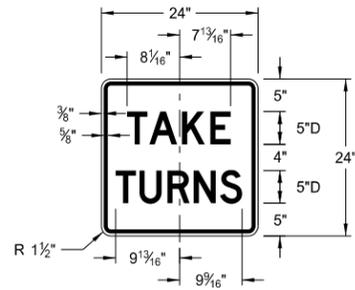
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

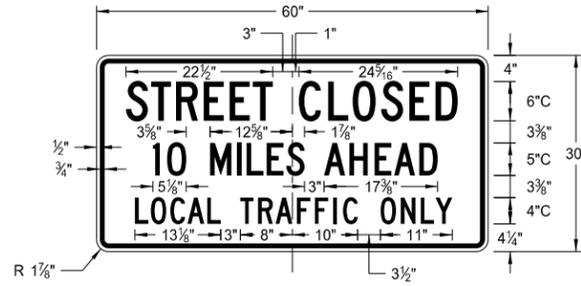
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

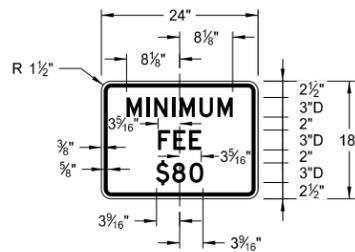
D-704-10



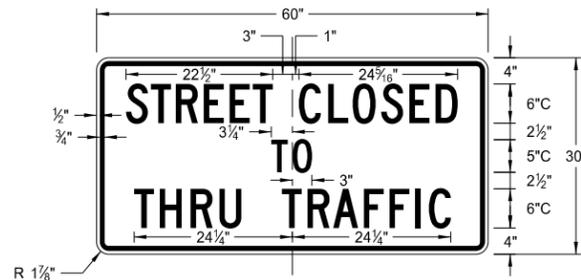
R1-50-24
Legend: black (non-refl)
Background: white



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



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



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



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

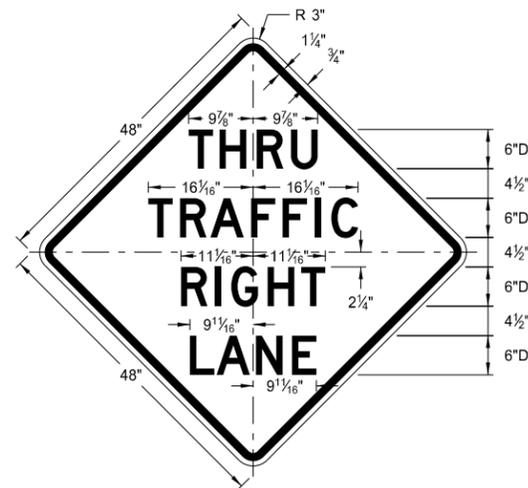
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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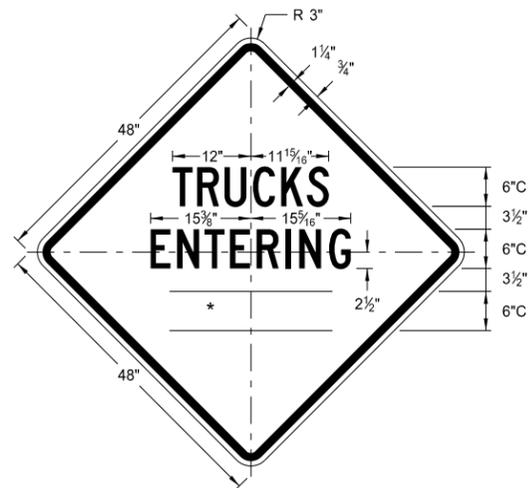
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

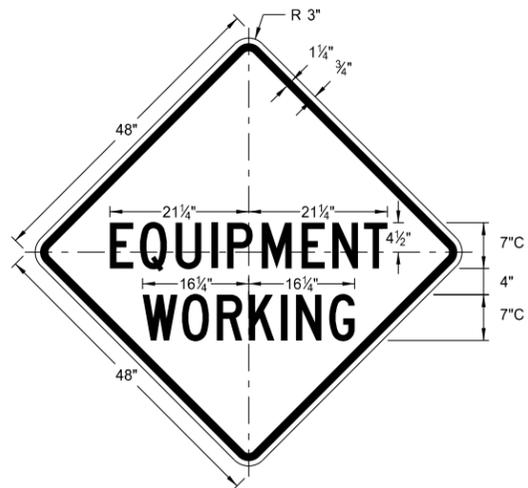
* DISTANCE MESSAGES



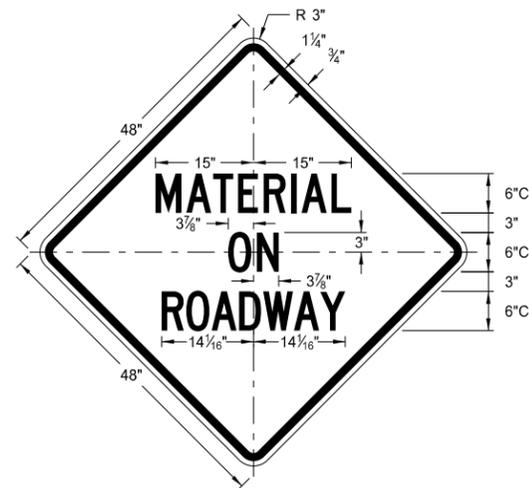
W5-8-48
Legend: black (non-refl)
Background: orange



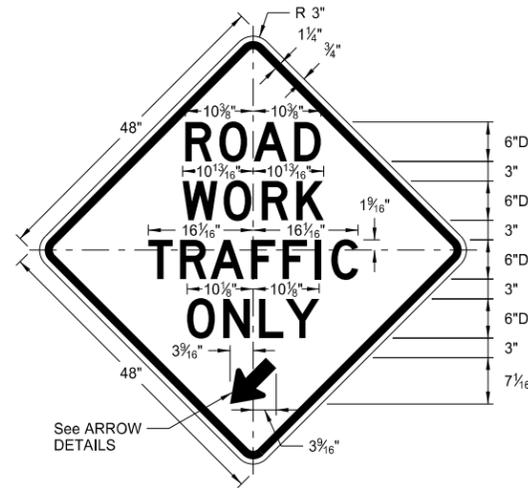
W8-54-48
Legend: black (non-refl)
Background: orange



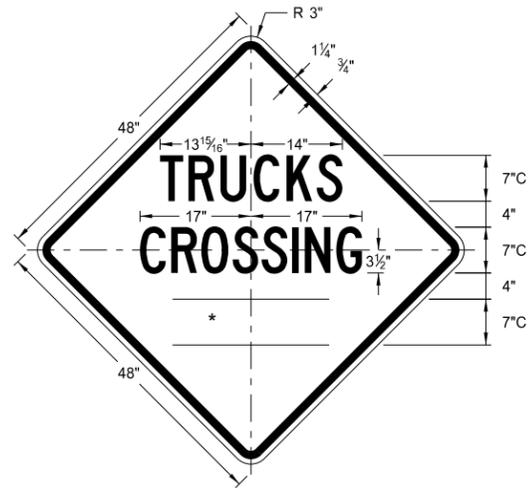
W20-51-48
Legend: black (non-refl)
Background: orange



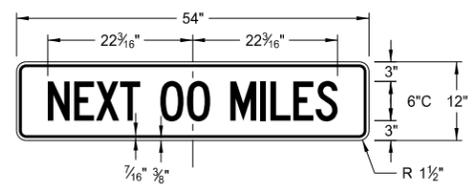
W21-51-48
Legend: black (non-refl)
Background: orange



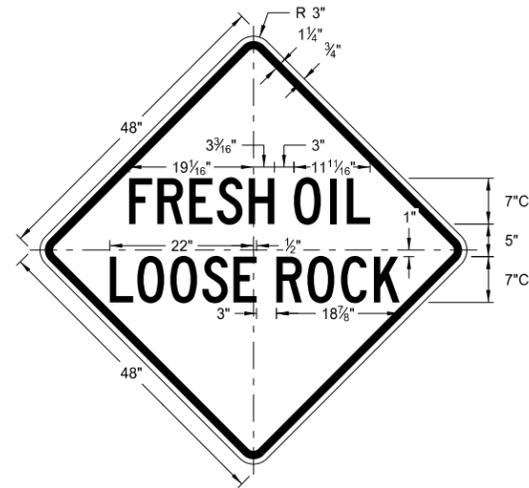
W5-9-48
Legend: black (non-refl)
Background: orange



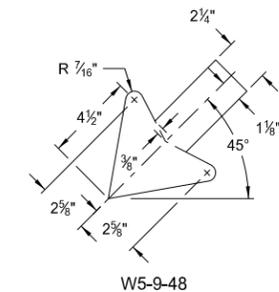
W8-55-48
Legend: black (non-refl)
Background: orange



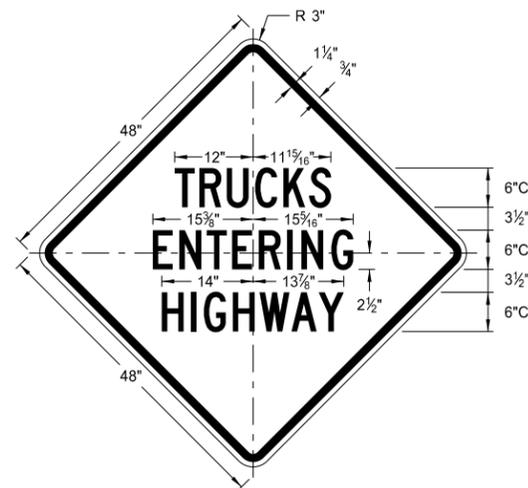
W20-52-54
Legend: black (non-refl)
Background: orange



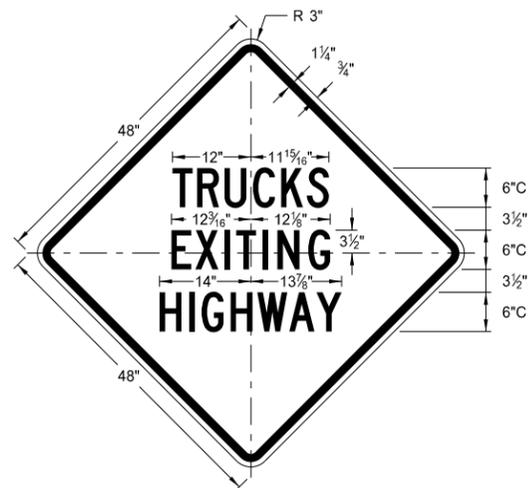
W22-8-48
Legend: black (non-refl)
Background: orange



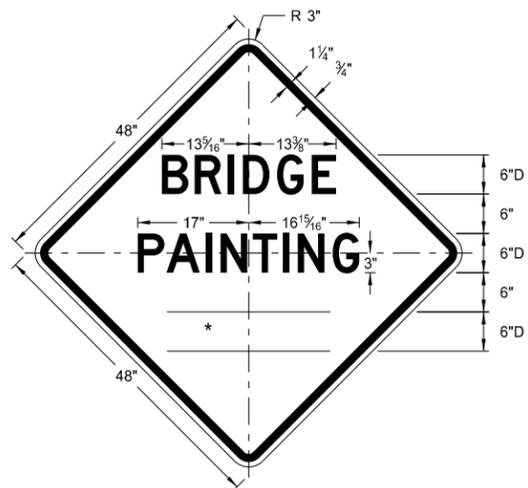
W5-9-48
ARROW DETAILS



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



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

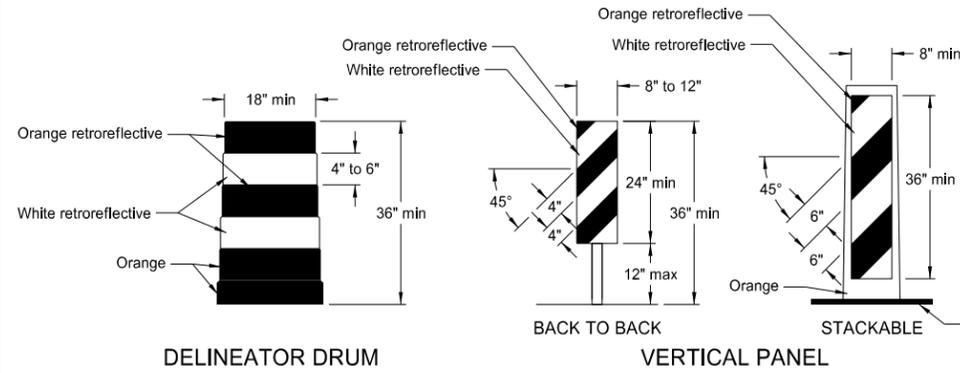


W21-50-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
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DATE	CHANGE

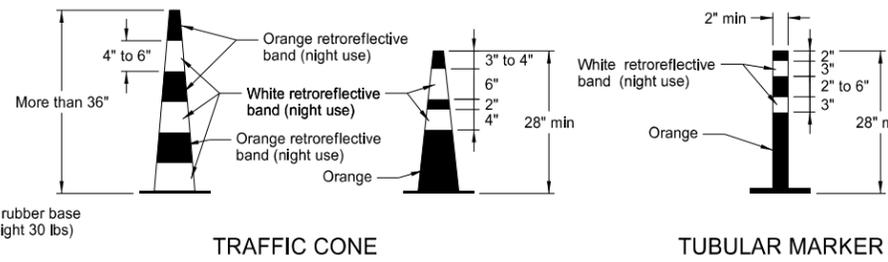
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BARRICADE AND CHANNELIZING DEVICE DETAILS



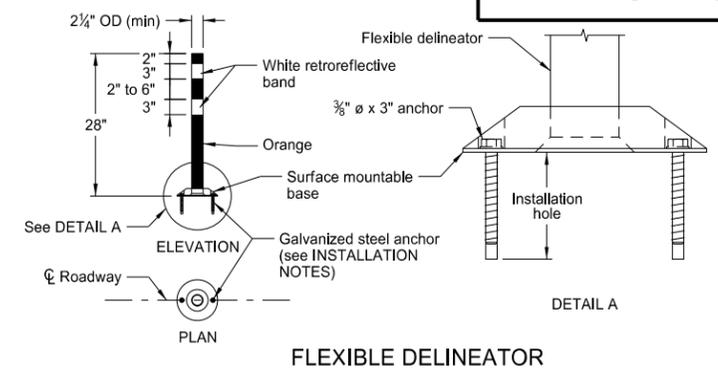
The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have 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, a stripe width of 6 inches shall be used.



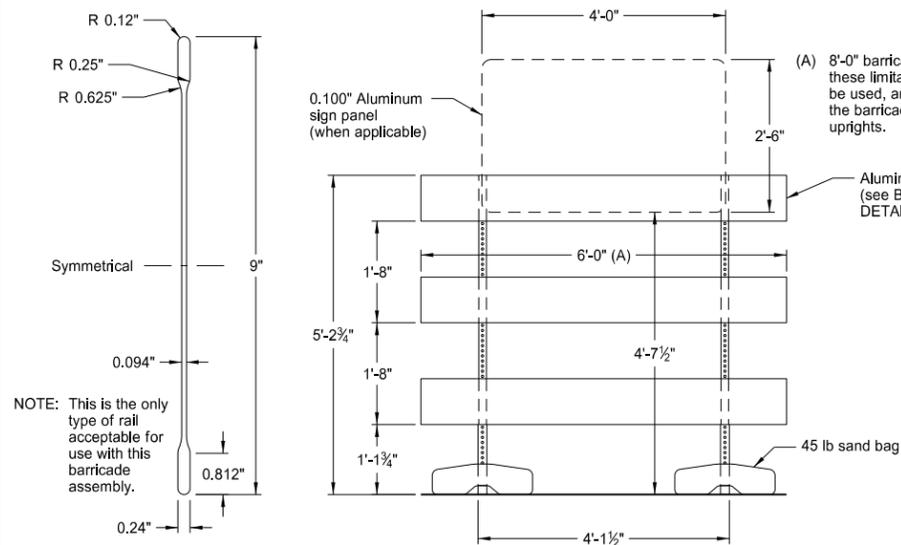
RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.

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



INSTALLATION NOTES:

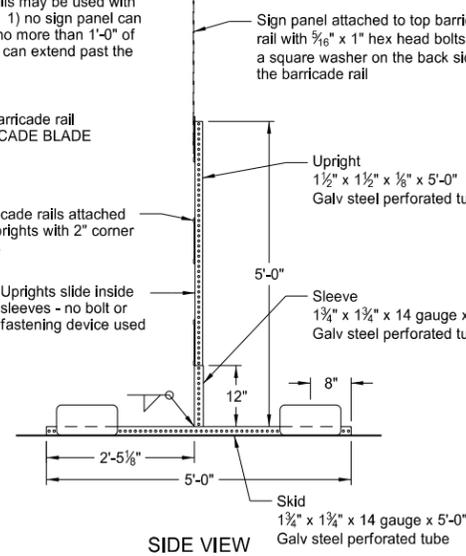
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl.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



BARRICADE BLADE DETAIL

ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

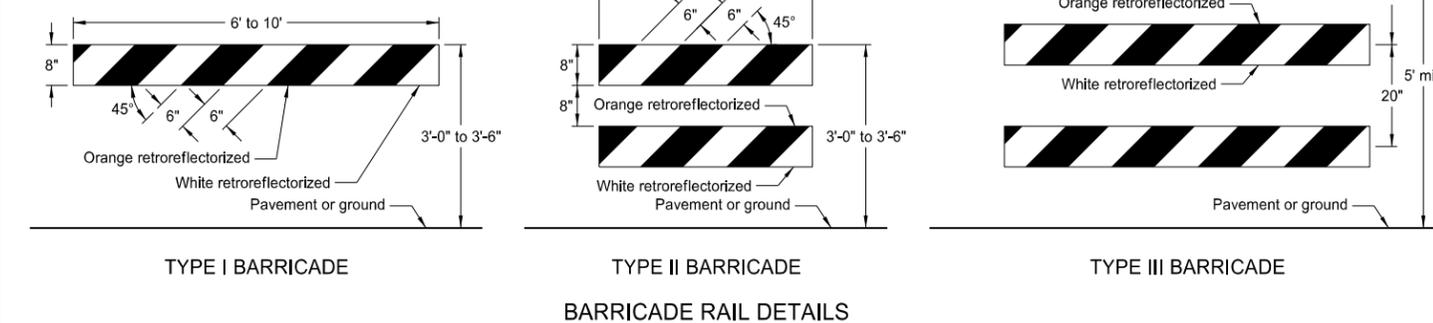


ELEVATION VIEW

SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".

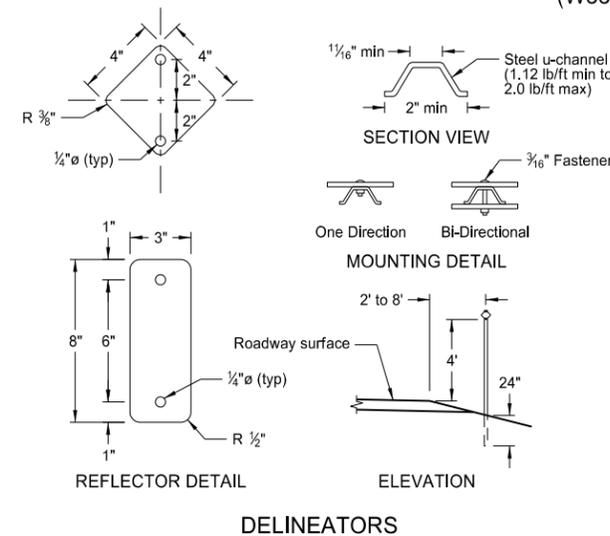


TYPE I BARRICADE

TYPE II BARRICADE

TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

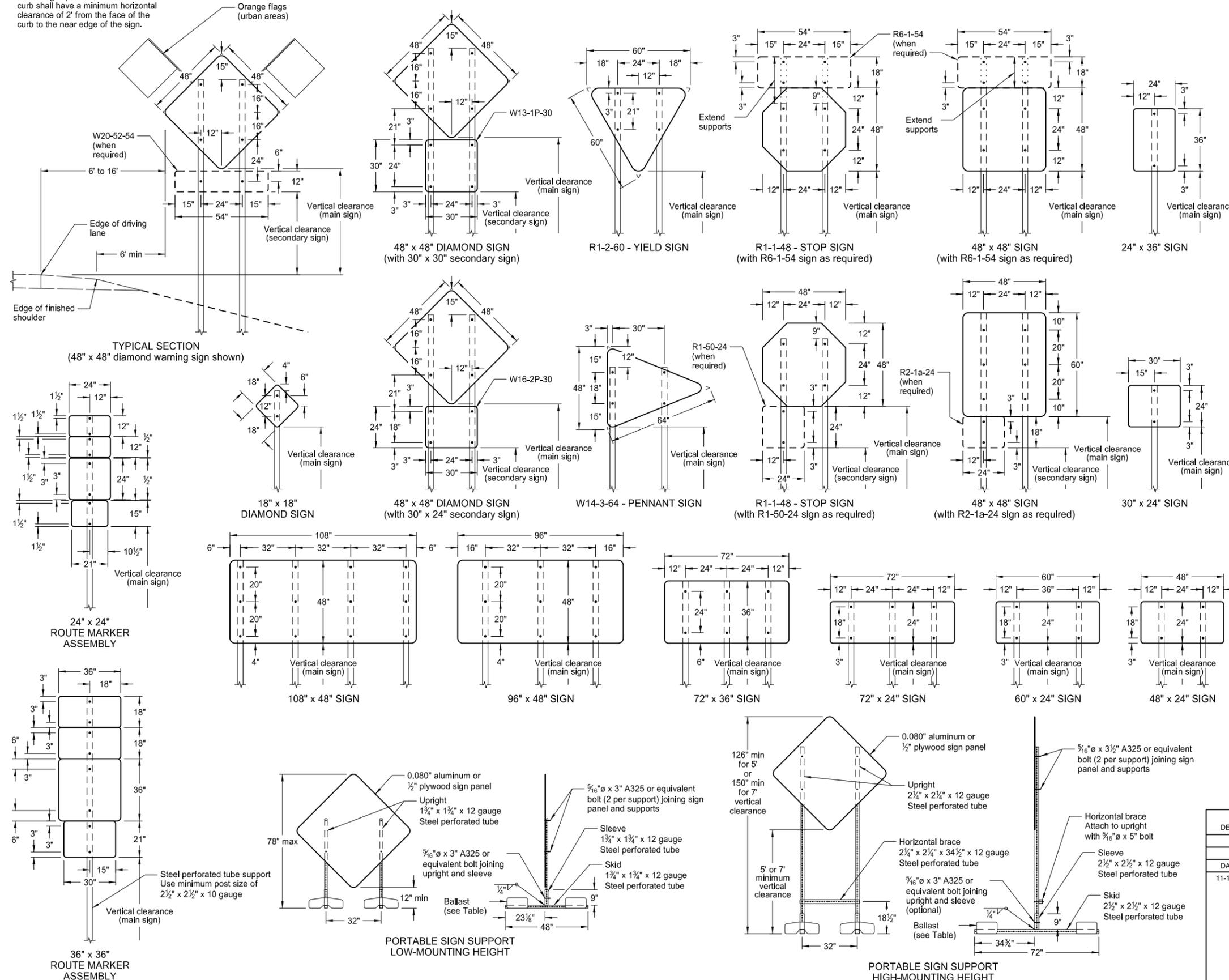
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



NOTES:

1. Sign Supports: Supports shall be galvanized or painted. 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, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a 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 as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

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

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

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have 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. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

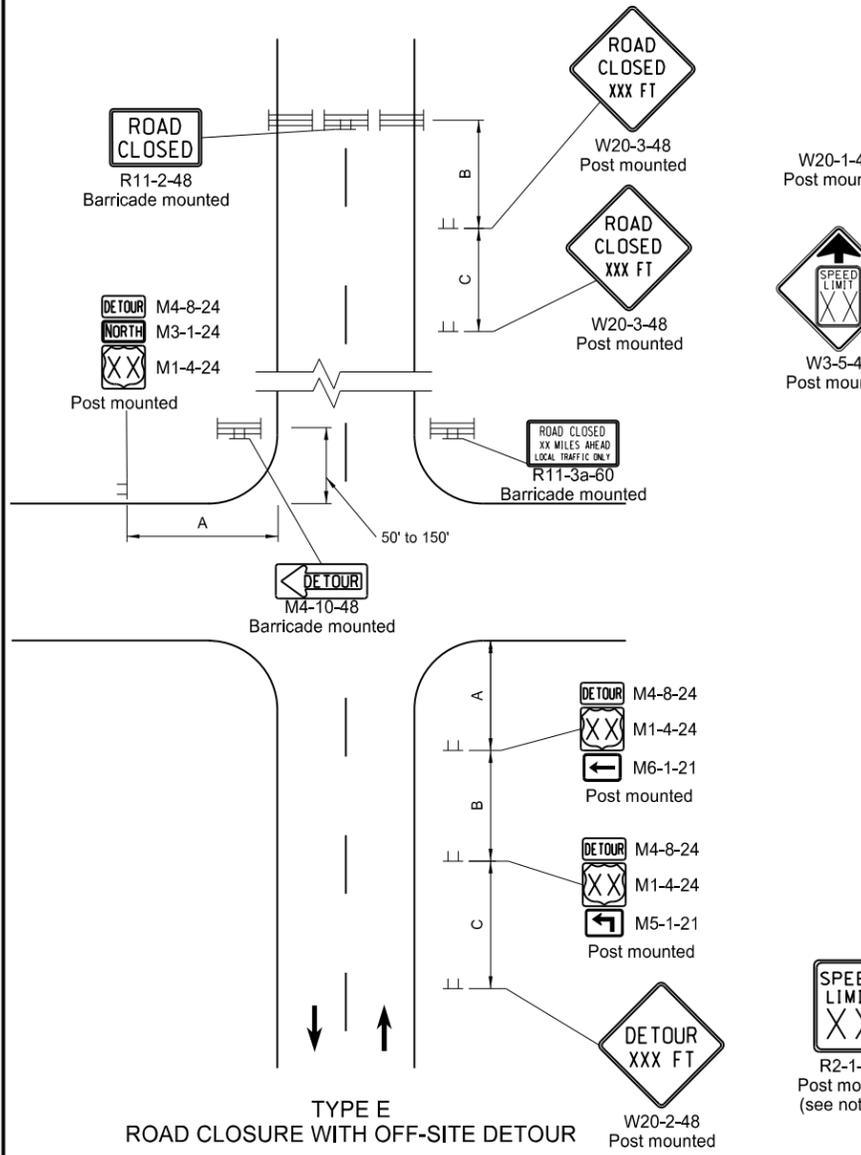
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ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

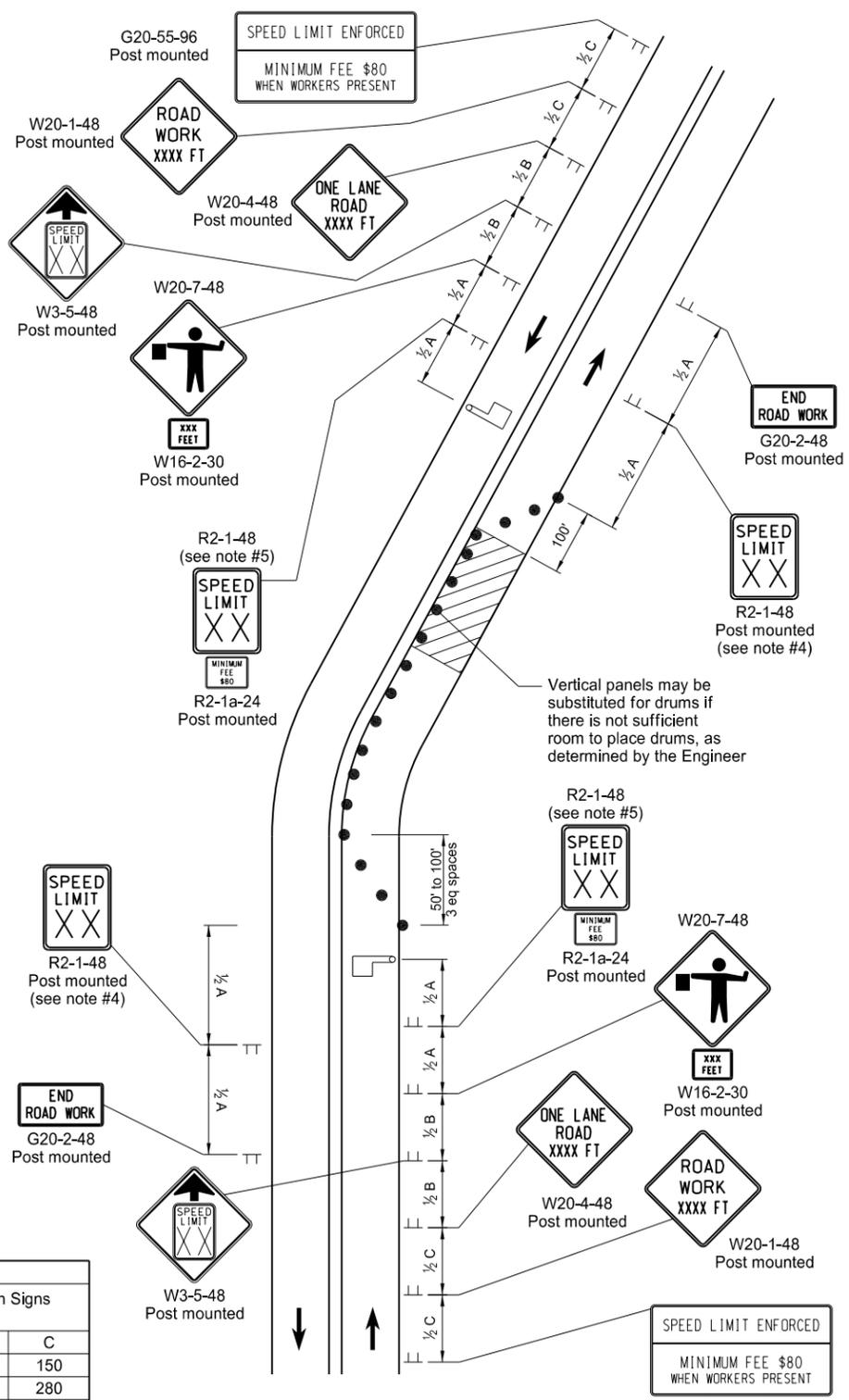
D-704-19

Notes

- Variables
 S = Numerical value of speed limit or 85th percentile.
 W = The width of taper
 L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- Delineator drums used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at 2 times dimension "S".
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- G20-55-96 or R2-1a-24 sign are not required when a pilot car operation is used, if this standard is part of other traffic control layouts, or the work is less than 15 days.
- When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - A "Do Not Stop on Tracks" sign (R8-8-24) should be placed near the cross buck in each direction while the lane closure is in the vicinity of the tracks.
 - A buffer space between the work zone and the lane closure transition should be extended upstream of the highway-rail grade crossing so a queue created by the flagging operation will not extend across the highway-rail grade crossing.
 - If the queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.



**TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR**
Used where a road is closed beyond a detour point. Signing shown for one direction only. Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.



**TYPE F
LANE CLOSURE ON A TWO WAY ROAD USING FLAGGERS**
Two lane highway with one lane closed. Flagger is at a point where it is visible to approaching traffic.

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

KEY

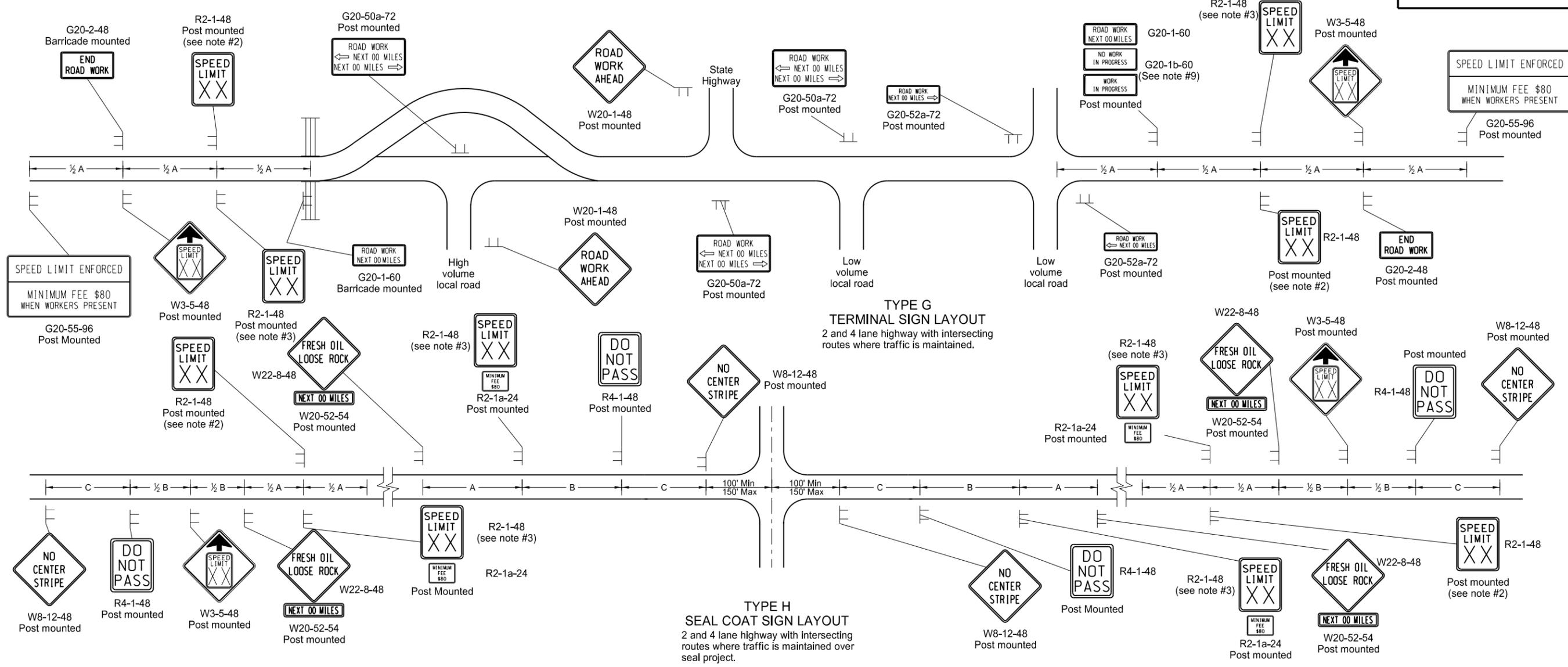
- Delineator Drum
- ▬ Sign
- ▬ Type III Barricade
- ▨ Work/Hazard Area
- ☞ Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT"

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Roger Weigel
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TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.

- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
- The contractor shall install the G20-1b-60 sign when work is suspended for winter.
- Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
- G20-55-96 sign is not required if work is less than 15 days.

KEY

≡ Type III barricade

┌ Sign

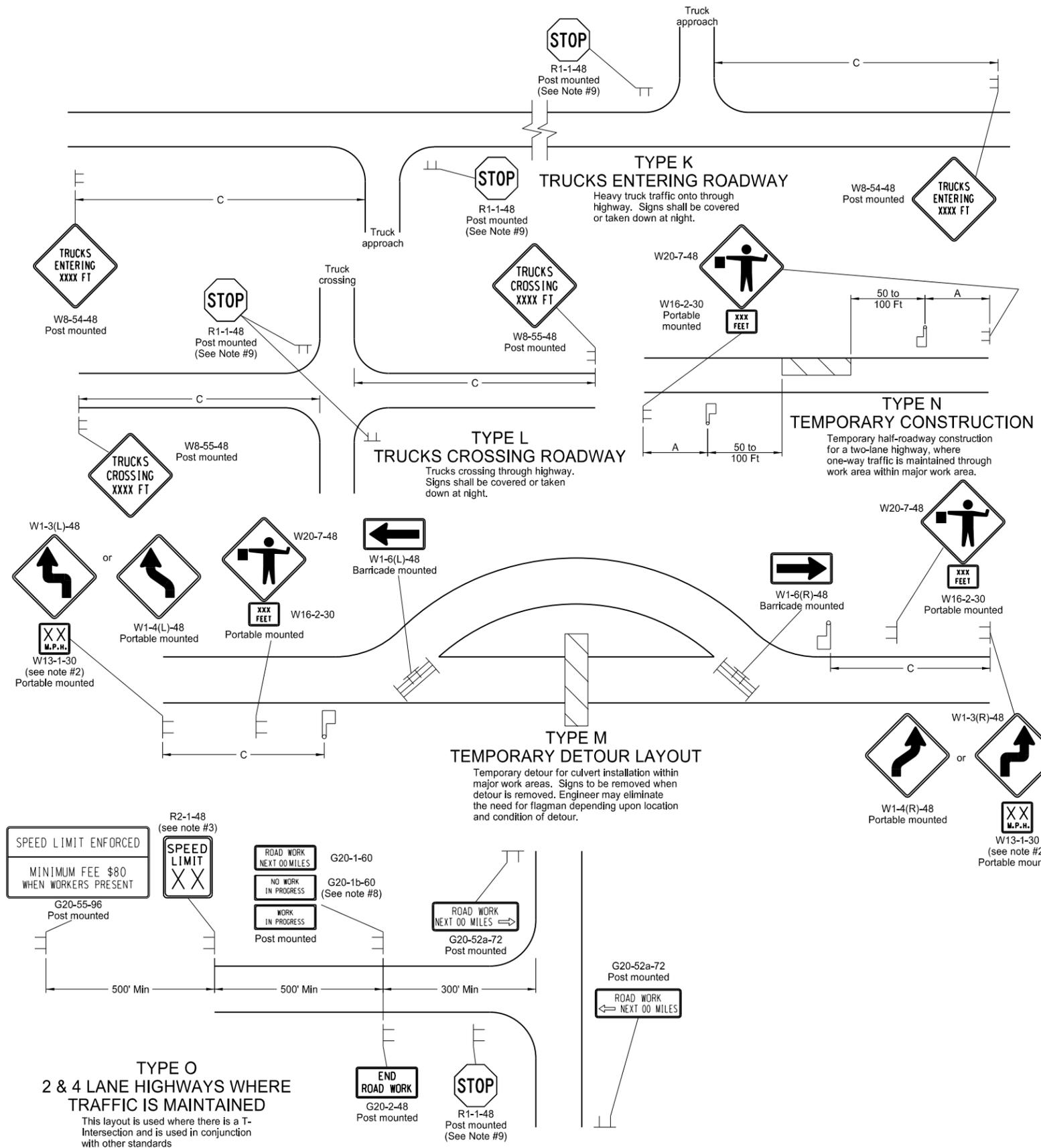
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

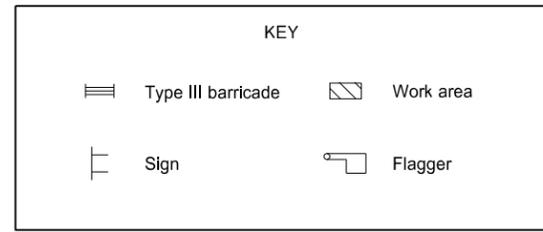
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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



- Notes
1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies. Where necessary, safe speed to be determined by the Engineer.
 2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
 3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
 4. Existing speed limit signs within a reduced speed zone shall be covered. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
 5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
 6. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
 7. If existing stop sign is in place, a 48" stop sign is not required.
 8. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.



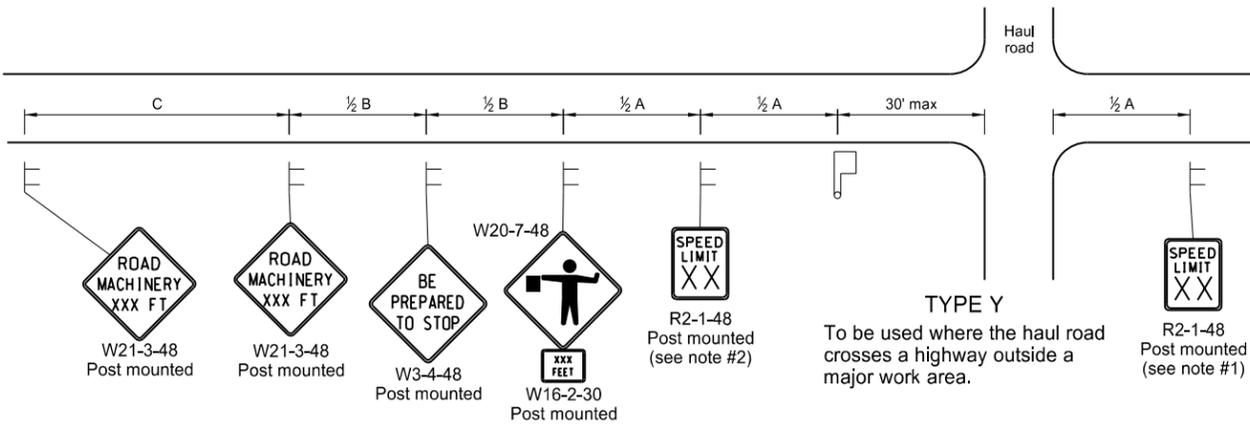
Road Type	ADVANCE WARNING SIGN SPACING		
	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

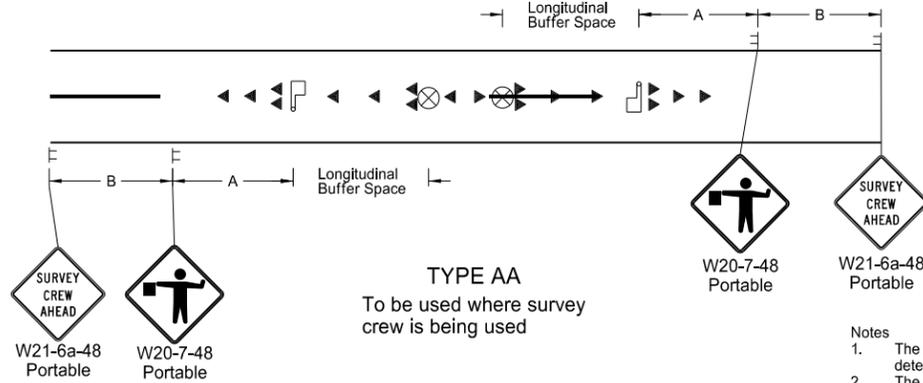
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MISCELLANEOUS SIGN LAYOUTS

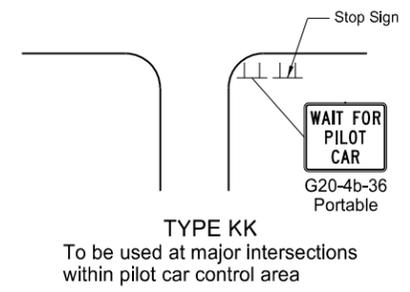
D-704-26



TYPE Y
To be used where the haul road crosses a highway outside a major work area.

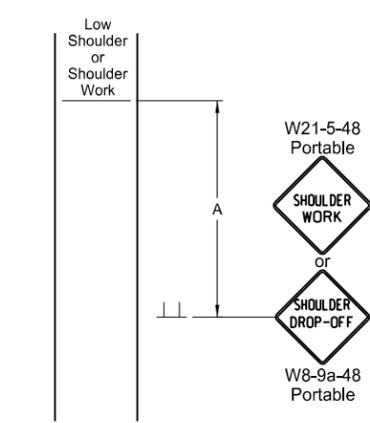


TYPE AA
To be used where survey crew is being used

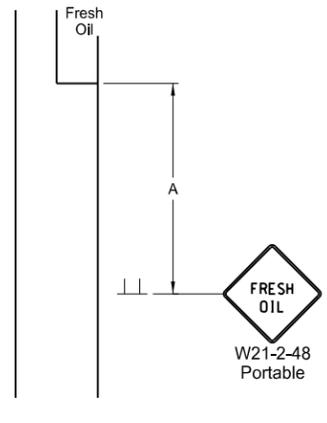


TYPE KK
To be used at major intersections within pilot car control area

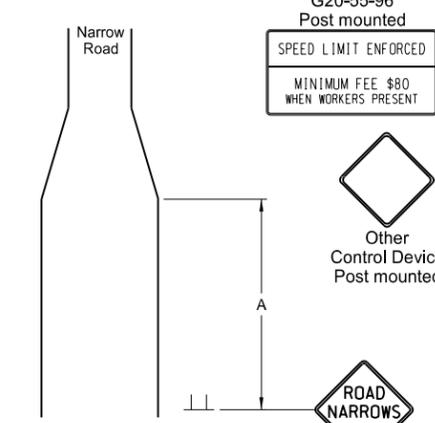
- Notes
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
 - The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
 - When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
 - Existing speed limit signs within a reduced speed zone shall be covered.
 - The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
 - G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
 - When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



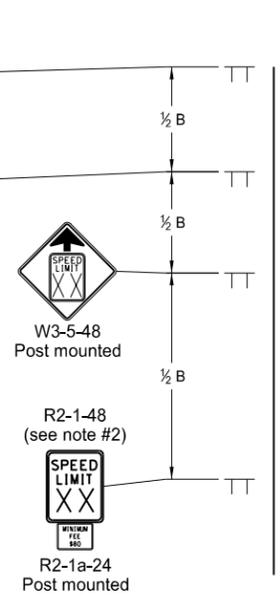
TYPE BB
To be used within a major work area where the sign conditions exist



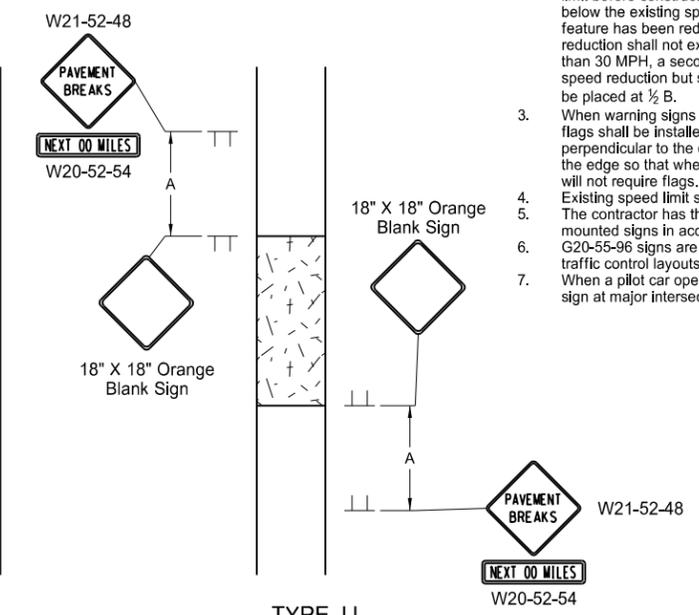
TYPE CC
To be used where the sign conditions exist



TYPE DD
To be used where the sign conditions exist



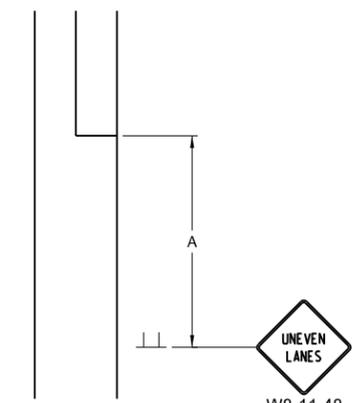
TYPE Z
To be used where speed zone is needed



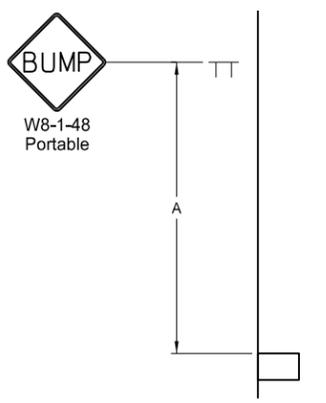
TYPE JJ
To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

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

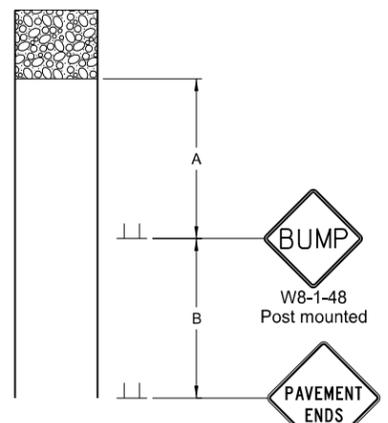
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.



TYPE GG
To be used where a difference of elevation between lanes exist



TYPE EE
To be used where the sign conditions exist



TYPE FF
To be used where the sign conditions exist

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

KEY

Sign (represented by a vertical line with a horizontal bar)

Flagger (represented by a square with a diagonal line)

Cones (represented by a triangle)

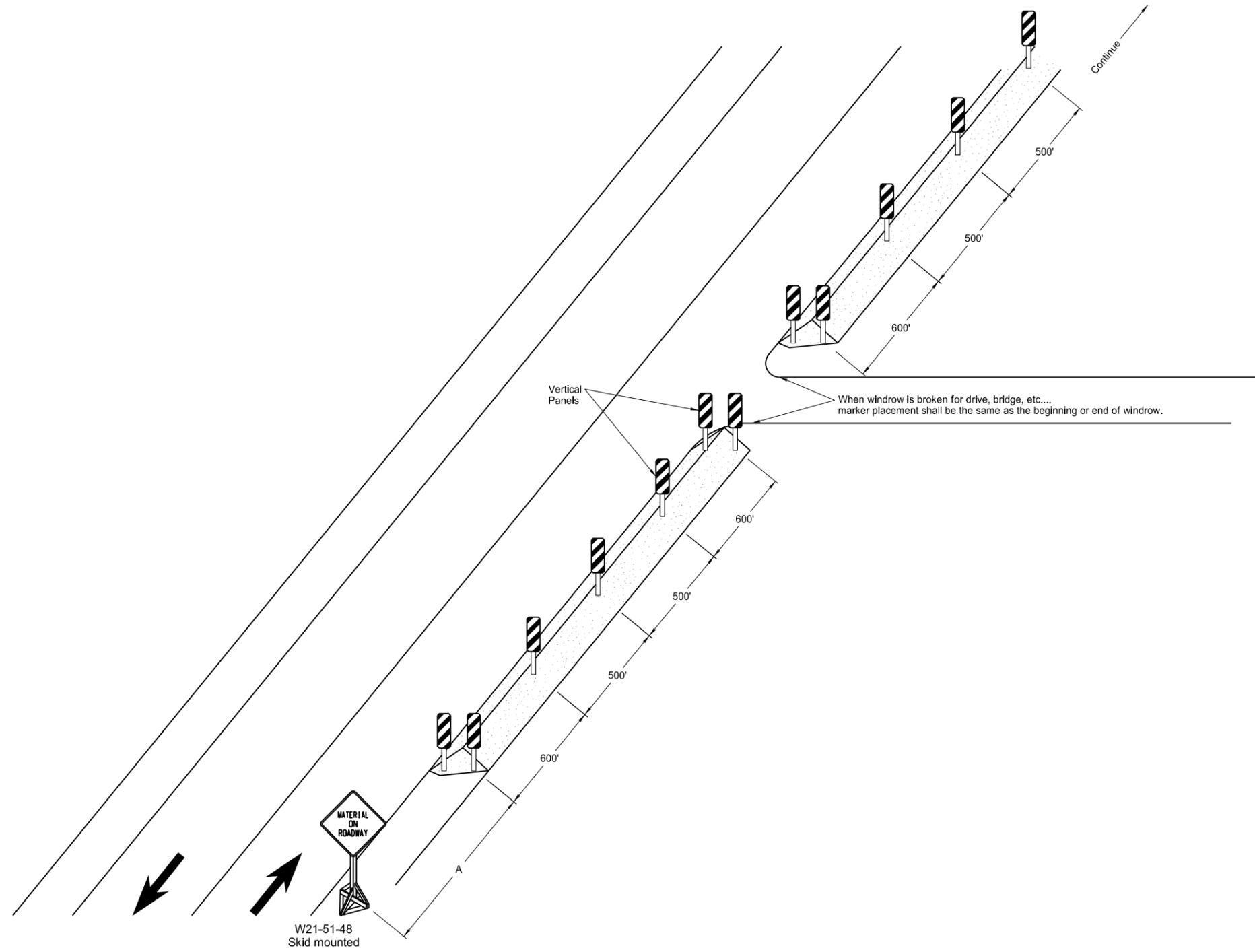
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

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WINDROW MARKING

D-704-30

Notes:
The contractor has the option of using portable sign supports in lieu of post mounted sign in accordance with the NDDOT Standard Specifications.



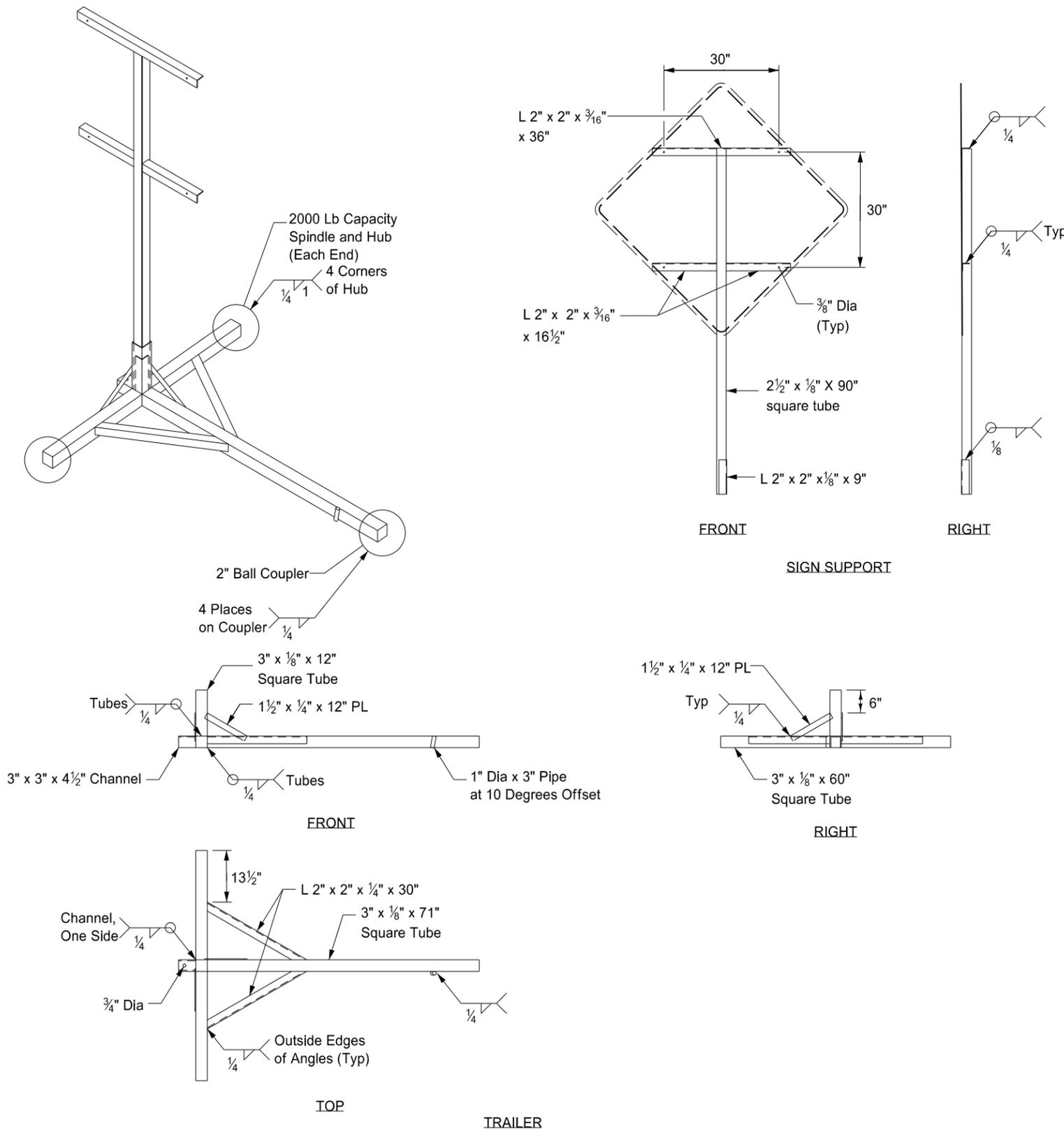
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
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Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (55 mph to 60 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
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DATE	CHANGE
6-24-14	Revised Note

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

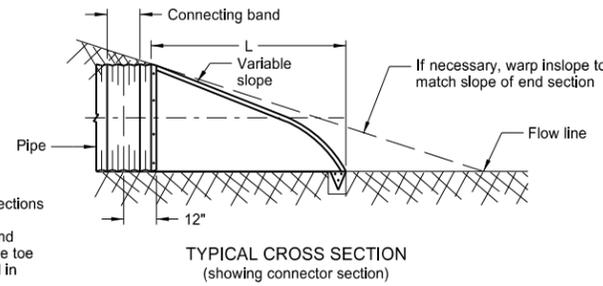
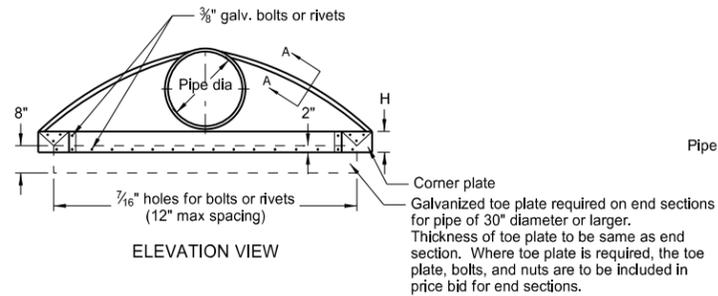
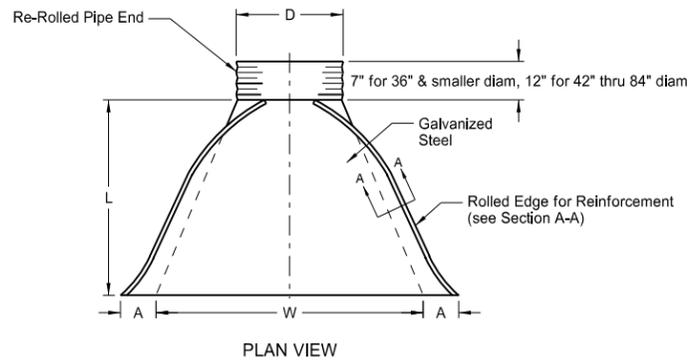
- ① The maximum weight of the assembly is 250 pounds.
- ② Use a 14" wheel and tire.
- ③ Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
- ④ Other NCHRP 350 crash tested assemblies are acceptable.

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

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ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



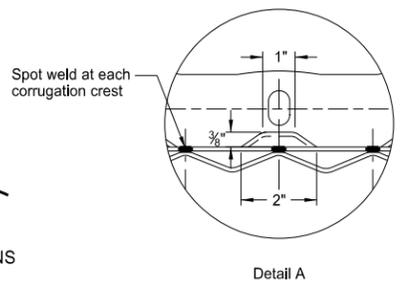
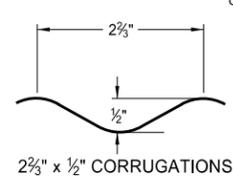
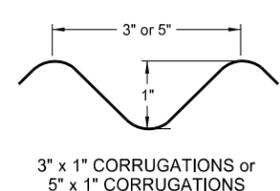
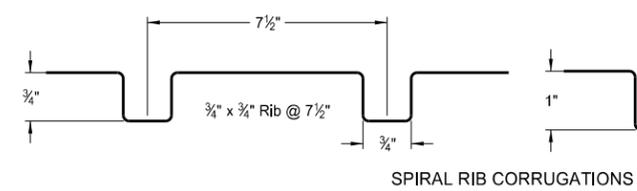
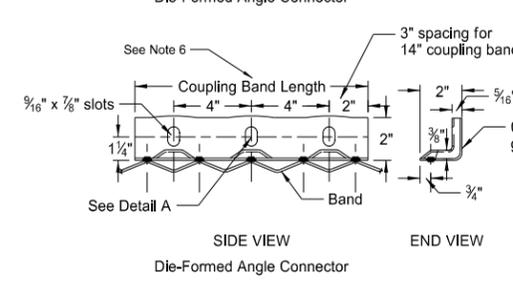
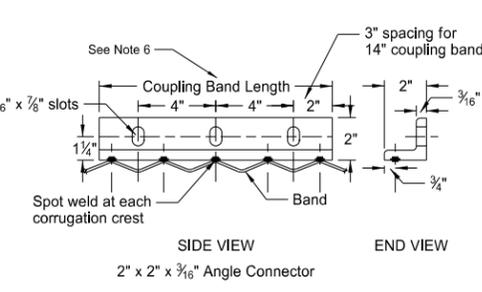
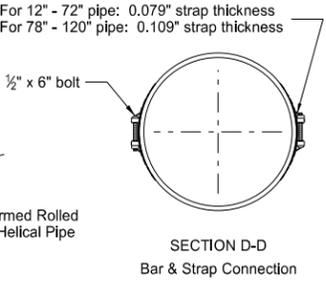
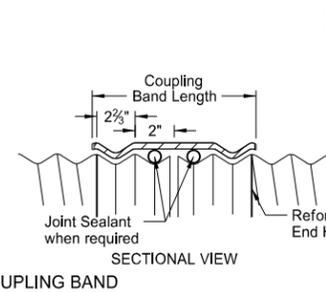
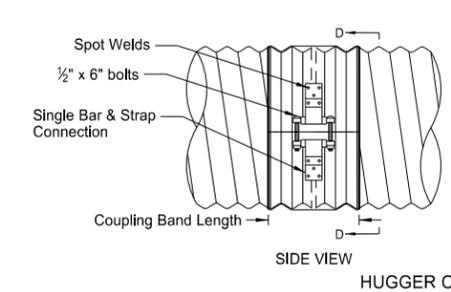
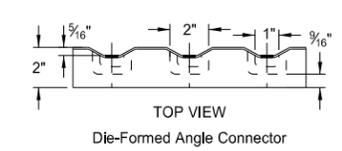
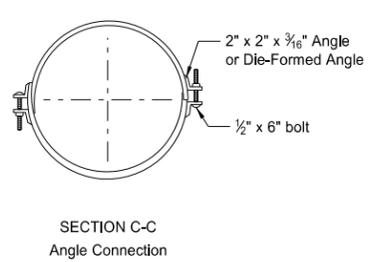
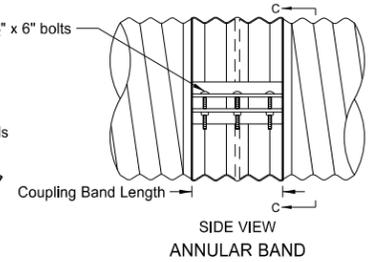
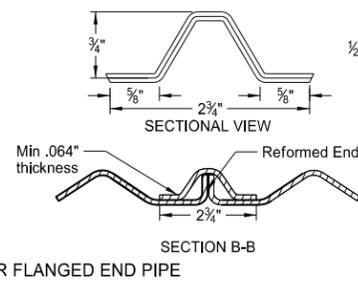
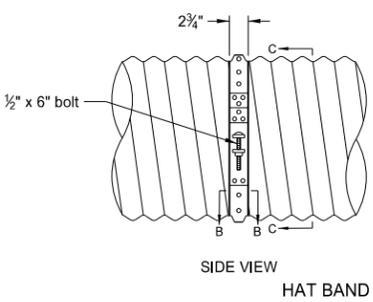
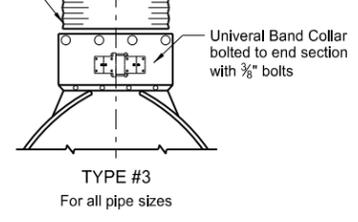
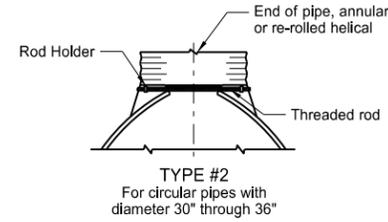
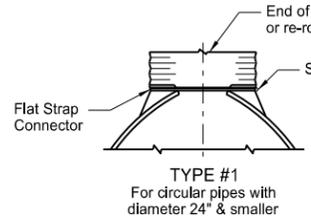
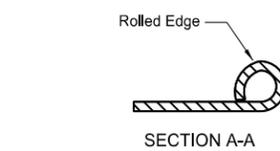
PIPE DIA. IN	GALV. THICK.	END SECTION DIMENSIONS					APPROX. SLOPE	BODY PIECE
		A IN	B IN	H IN	L IN	W IN		
15	0.064	7	8	6	26	30	2 1/2:1	1
18	0.064	8	10	6	31	36	2 1/2:1	1
24	0.064	10	13	6	41	48	2 1/2:1	1
30	0.079	12	16	8	51	60	2 1/2:1	1 or 2
36	0.079	14	19	9	60	72	2 1/2:1	2
42	0.109	16	22	11	69	84	2 1/2:1	2
48	0.109	18	27	12	78	90	2 1/2:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1 1/2:1	3
* 66	0.109	18	36	12	87	120	1 1/2:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1 1/2:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3

- These sizes have 0.109" sides and 0.138" center panels.
 - Pipe diameter is equal to dimension "D" of end section.
- Manufacturers tolerances of above dimensions will be allowed.
- Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

- NOTES:
1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
 2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles are to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
 3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
 4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
 5. 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
 6. Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
 7. Length of spot welds shall be minimum 1/2".

COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
Annular Band	2 3/8" x 1/2"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
Hugger Band	2 5/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

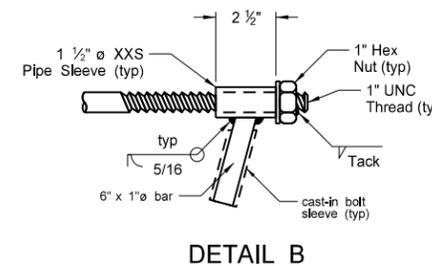
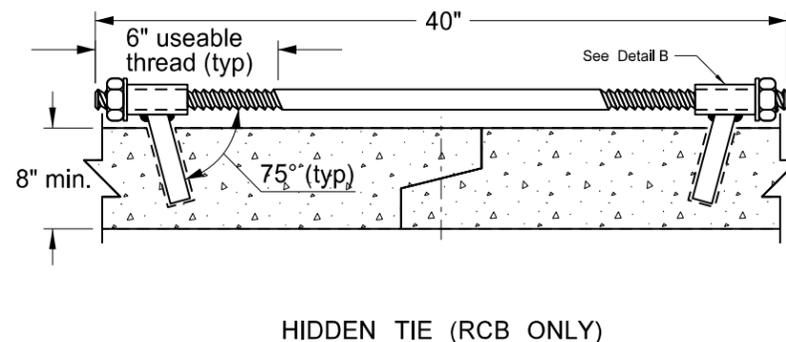
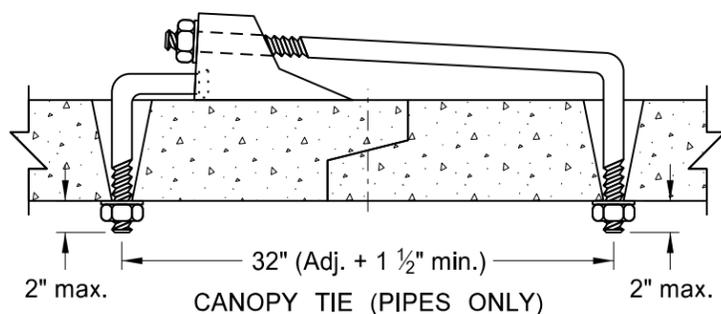
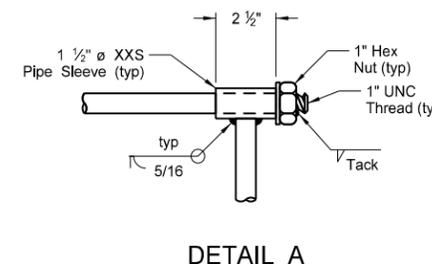
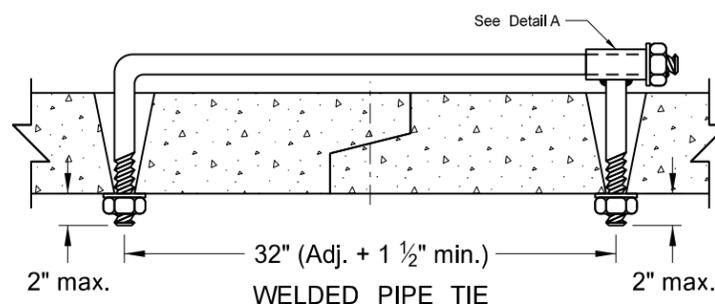
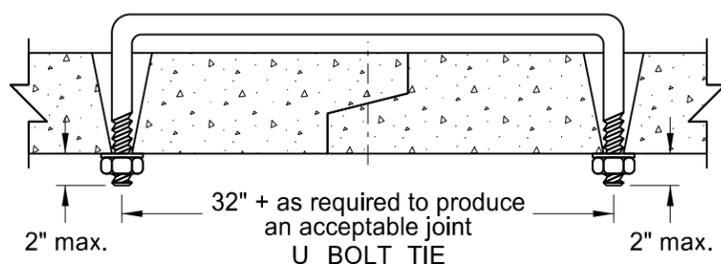
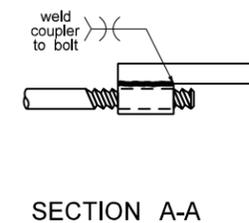
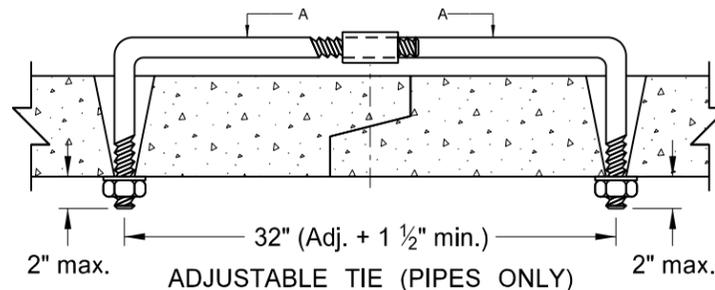
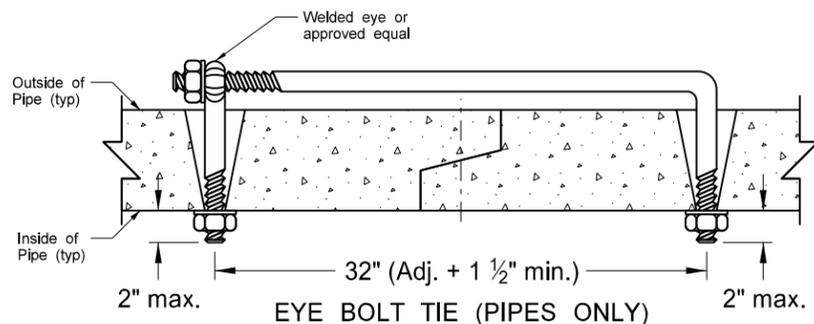


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-06-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail

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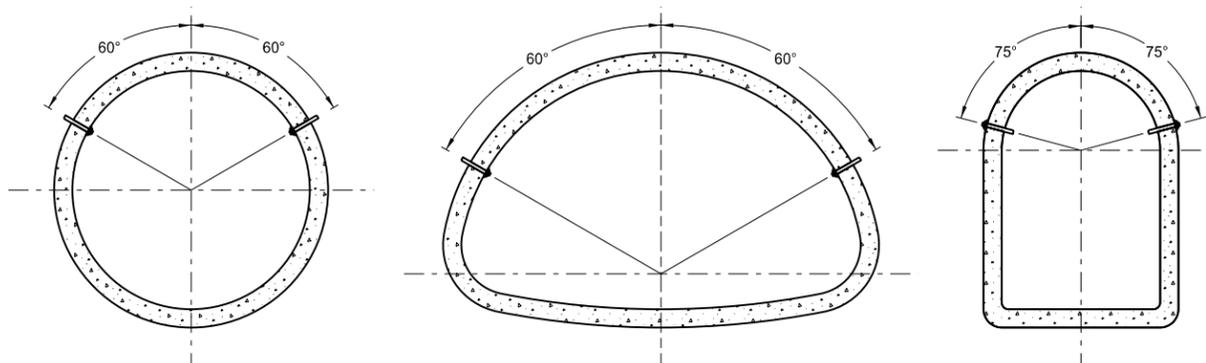
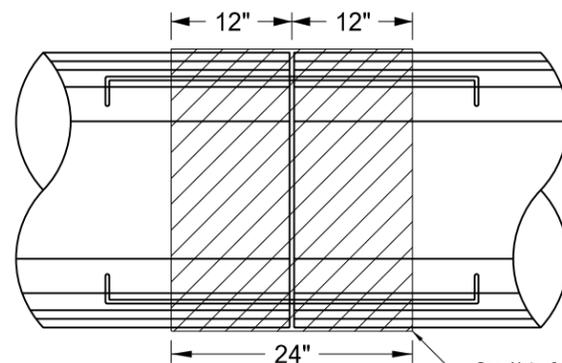
CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ϕ	XXS Pipe Sleeve Inner ϕ
18" - 24"	$\frac{5}{8}$ " See note 2	$\frac{3}{4}$ "
30" - 66"	$\frac{3}{4}$ "	1"
72" - 78"	1"	1 $\frac{1}{4}$ "
RCB		



NOTES:

- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
- Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
- Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
- Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
- Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter $\frac{1}{4}$ " larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 $\frac{1}{4}$ ".
- The contractor has the option of selecting the type of tie bolt used from those shown.
- The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
- All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
- When joint wrap is specified in the plans, place wrap beneath ties. Overlap the joint by 12" in both directions.
- Tie bolts shall conform to ASTM A 36. Nuts shall be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
- Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
- RCB tie locations shall be as shown on the plans.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8

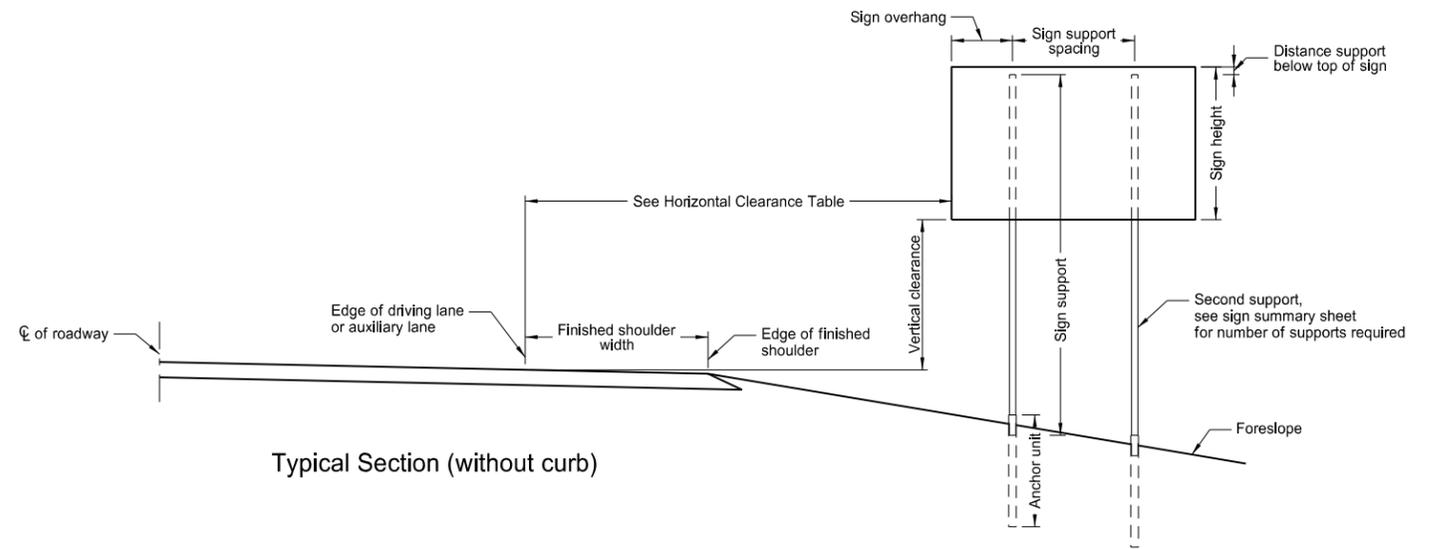
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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

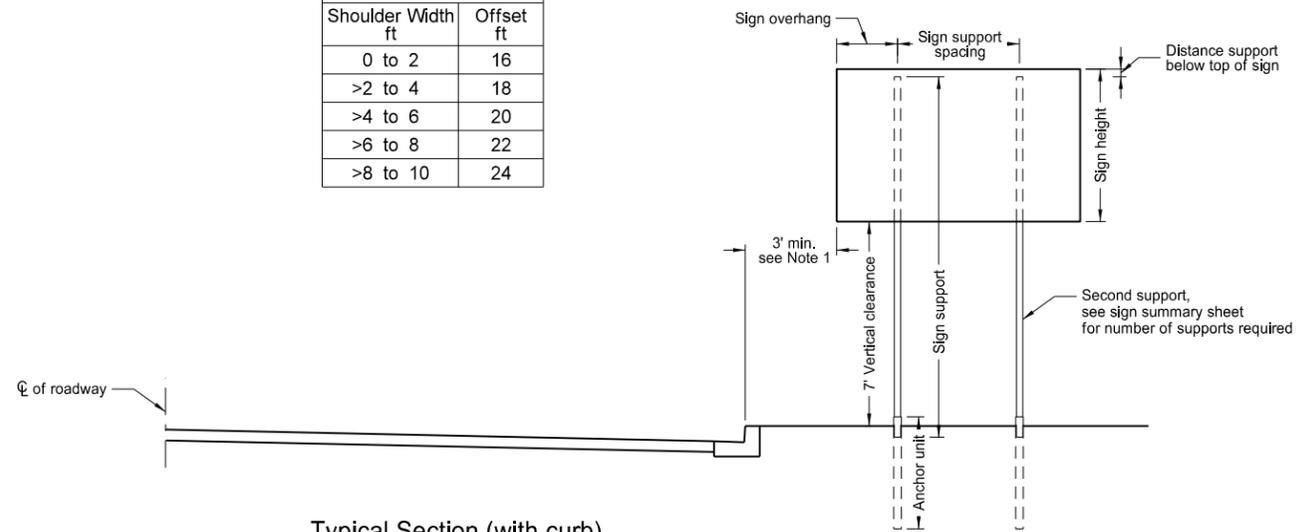
Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.
- Signs on expressways shall be installed with a minimum height of 7'.
- Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.
- The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.
3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.

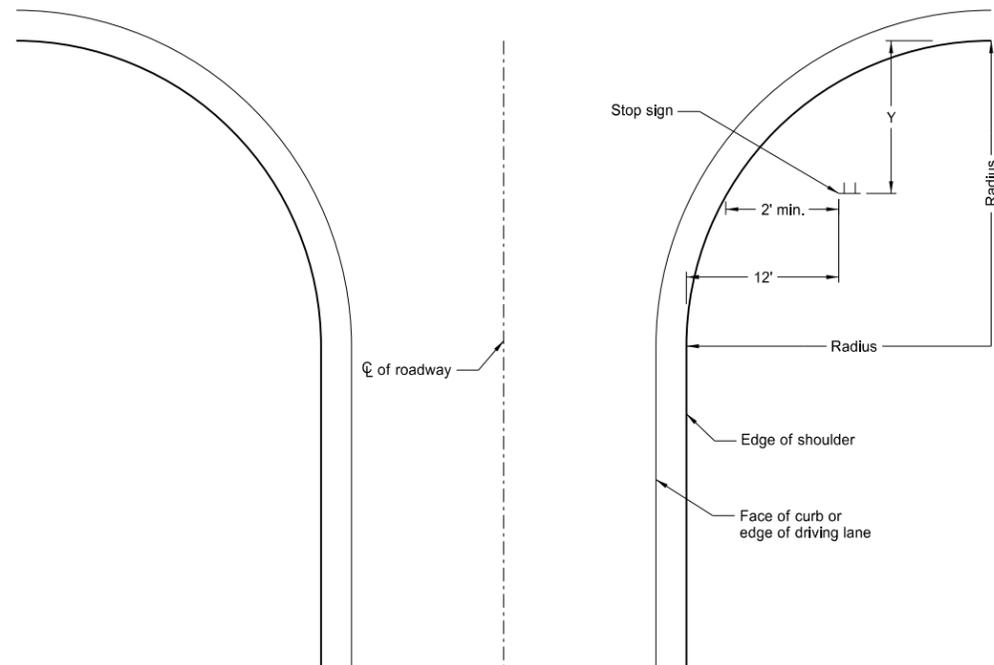


Typical Section (without curb)

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



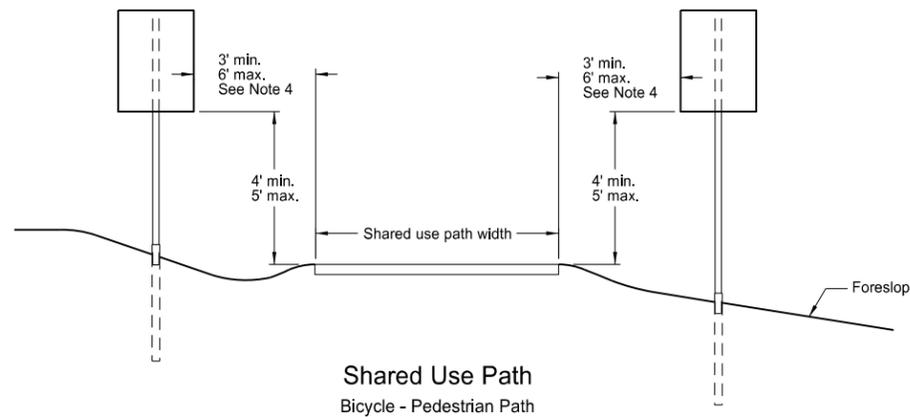
Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection

This layout is to be used 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



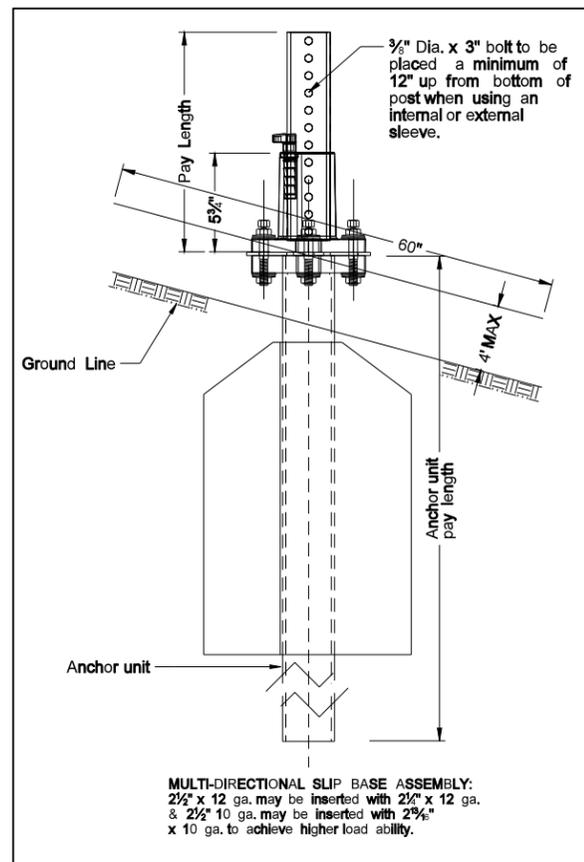
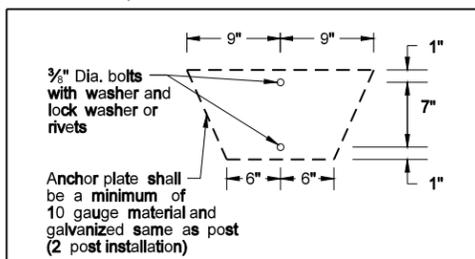
Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

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 PE-2930,
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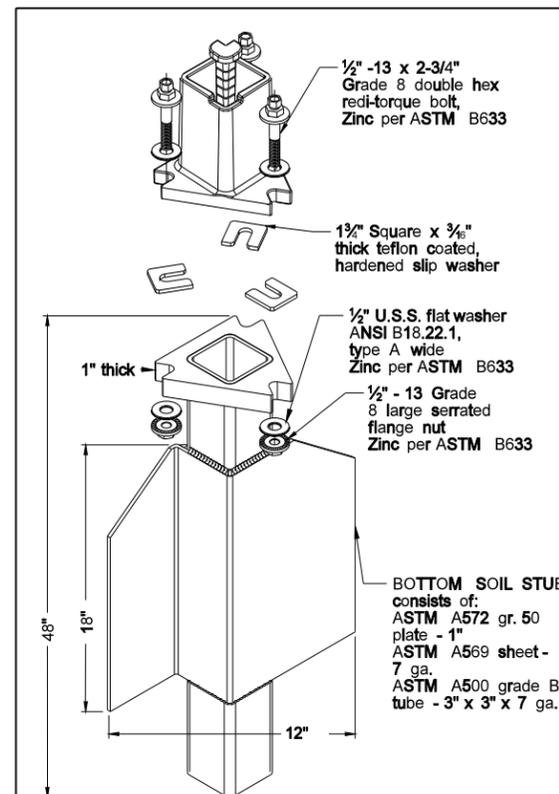
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/2	12
1	2 1/2	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/2	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/2	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/2	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/2	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/2	12	Yes		7
3 & 4	2 1/2	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 1/2	10	Yes		7

(B) - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
 (C) - 3" anchor unit
 (D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

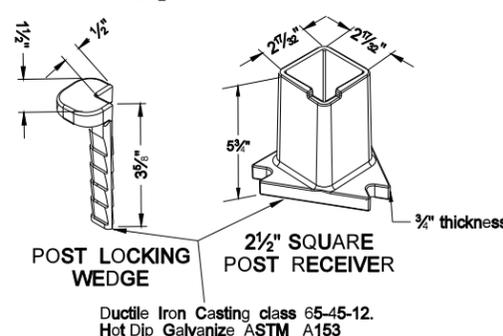


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
 2 1/2" x 12 ga. may be inserted with 2 1/2" x 12 ga. & 2 1/2" 10 ga. may be inserted with 2 3/8" x 10 ga. to achieve higher load ability.

Mounting Details Perforated Tube



SLIP BASE FOR 2 1/2" POST



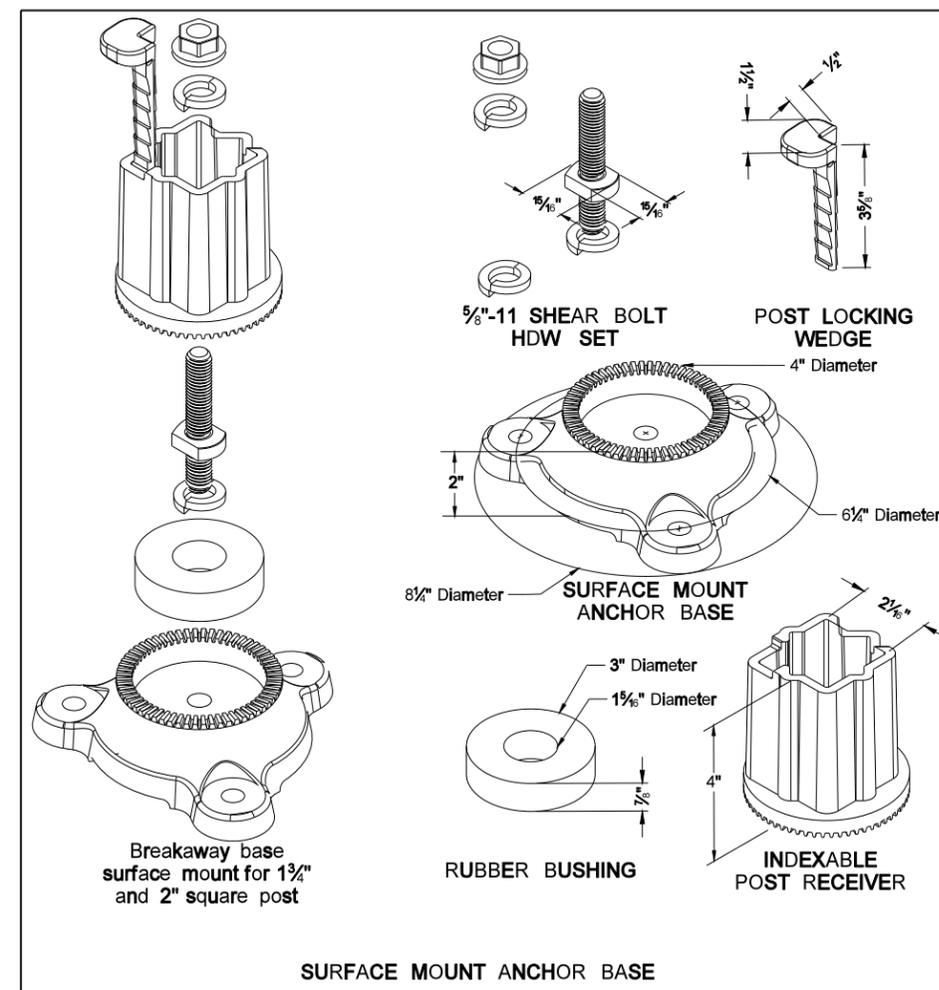
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/2 x 2 1/2	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans; The 2 1/2" size is shown as 2.51" size on the plans.

NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
- Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- When used in concrete sidewalk, anchor shall be the same concept without the wings.
- Four post signs shall have over 8" between the first and fourth posts.
- Installation procedures as per manufacturers recommendation.
- Concrete fasteners for surface mount breakaway base shall be a minimum 1/2" diameter x 4" grade 8.



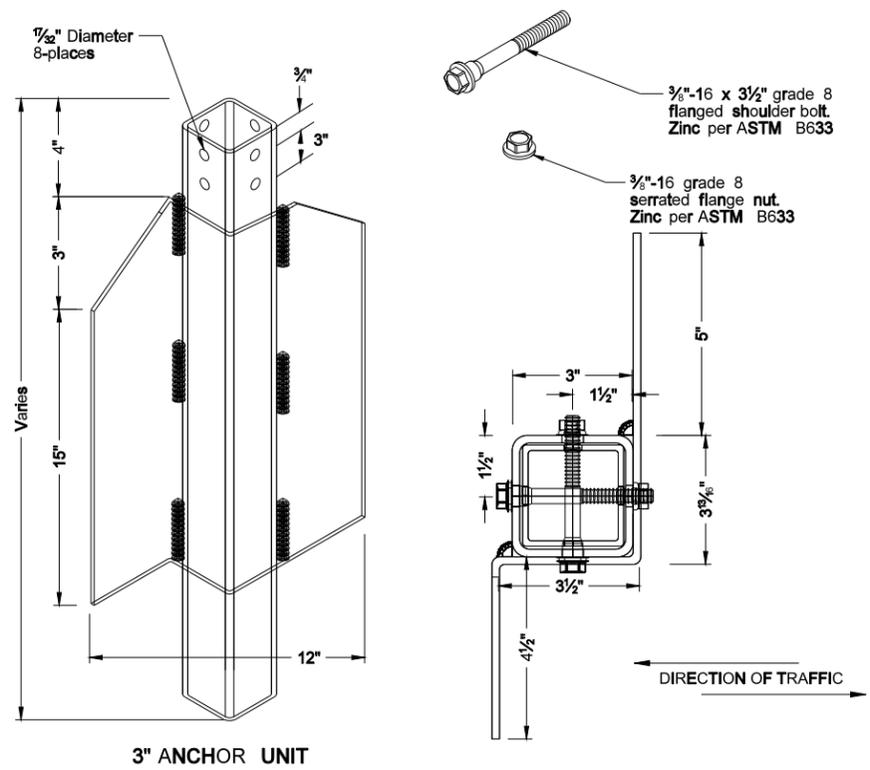
SURFACE MOUNT ANCHOR BASE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2 1/2" post. (standard 3/8" diameter grade 8 bolt may be used with proper shim)

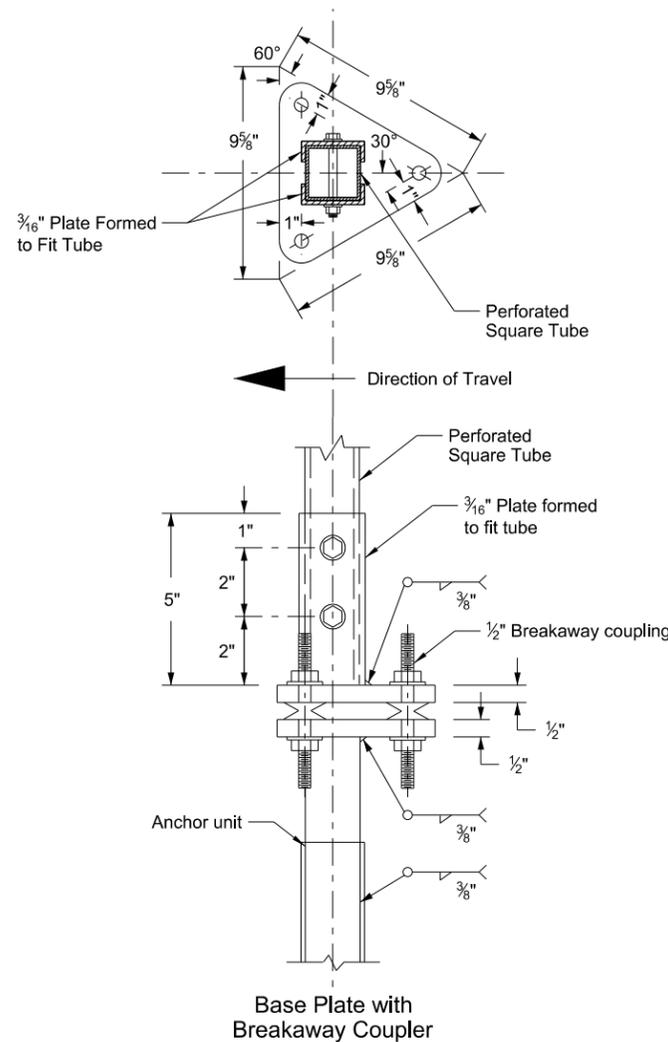
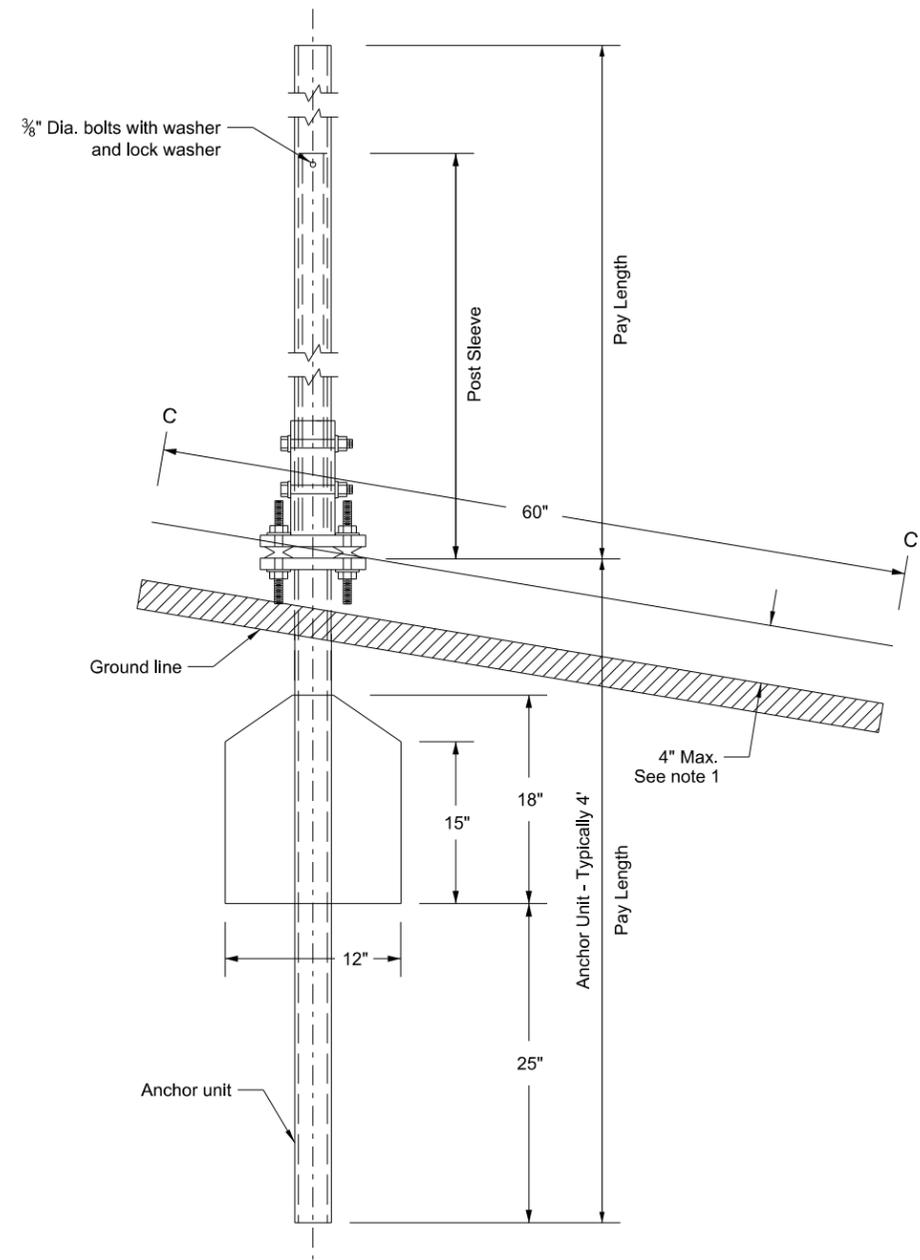


3" ANCHOR UNIT

Breakaway Coupler System for Perforated Tubes

Notes:

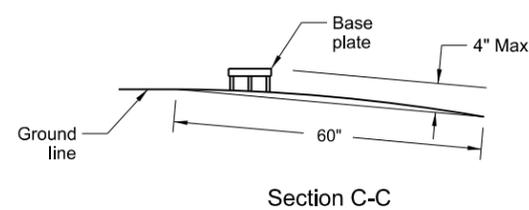
- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
- Anchor unit shall be the same size as the post and shall have the same specification as the post.
- Four post signs shall have over 8' between the first and fourth post.
- In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.



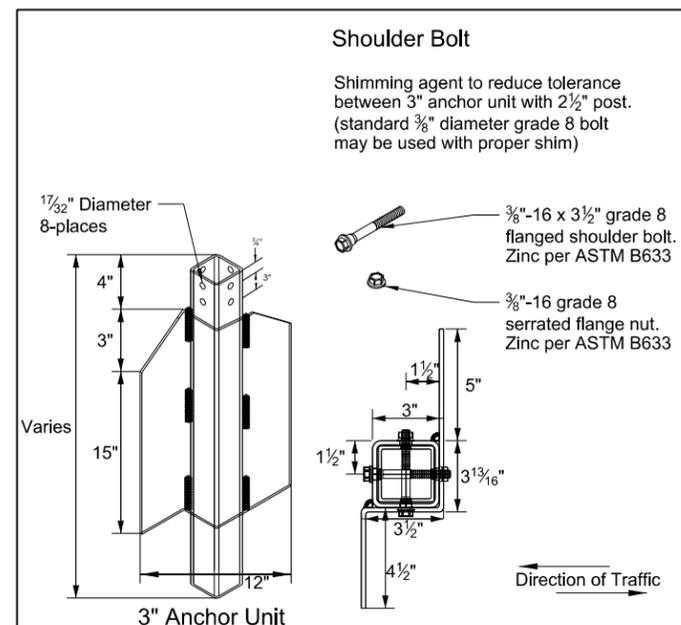
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2	12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

(B) - The 2 1/2" 12 gauge posts do not need breakaway bases when placed in standard soils. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

(C) - 3" anchor unit



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.



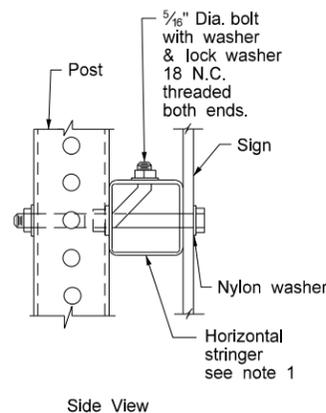
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE

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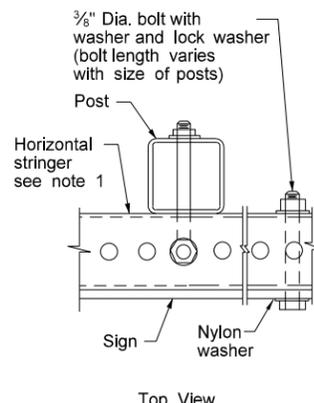
Mounting Details Perforated Tube

Note:

- Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1 1/2" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
- Metal washers used on sign face shall have a minimum outside diameter of 5/16" ± 1/65" and 10 gauge thickness.
- No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
- In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

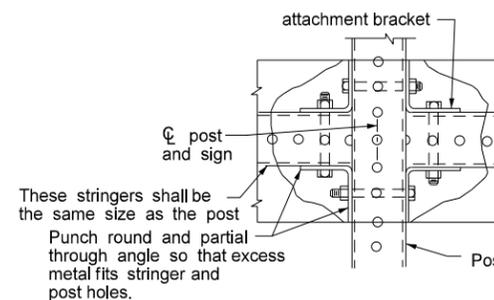


Side View



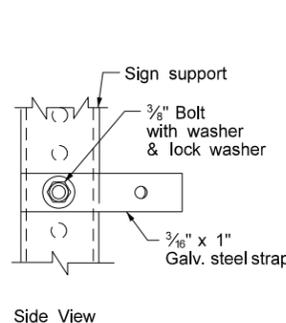
Top View

STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)

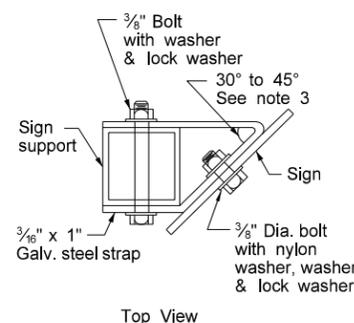


These stringers shall be the same size as the post. Punch round and partial through angle so that excess metal fits stringer and post holes.

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

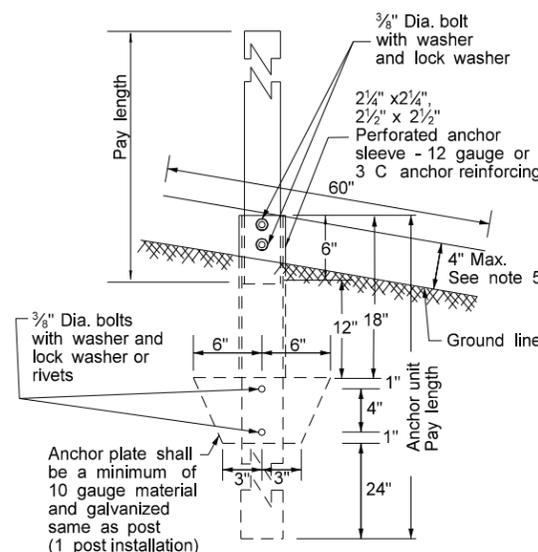


Side View

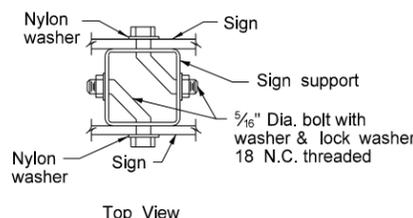
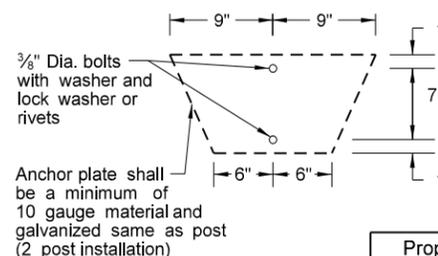


Top View

STRAP DETAIL

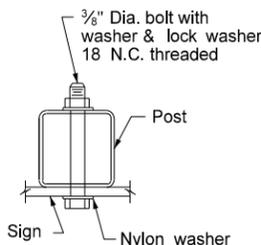


ANCHOR UNIT AND
POST ASSEMBLY



Top View

BACK TO BACK
MOUNTING



BOLT 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
1 1/2" x 1 1/2"	0.105	12	1.702	0.129	0.380	0.172
2" x 2"	0.105	12	2.416	0.372	0.590	0.372
2 1/4" x 2 1/4"	0.105	12	2.773	0.561	0.695	0.499
2 3/8" x 2 3/8"	0.135	10	3.432	0.605	0.841	0.590
2 1/2" x 2 1/2"	0.105	12	3.141	0.804	0.803	0.643
2 1/2" x 2 1/2"	0.135	10	4.006	0.979	1.010	0.783

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size is shown as 2.51" size on the plans.

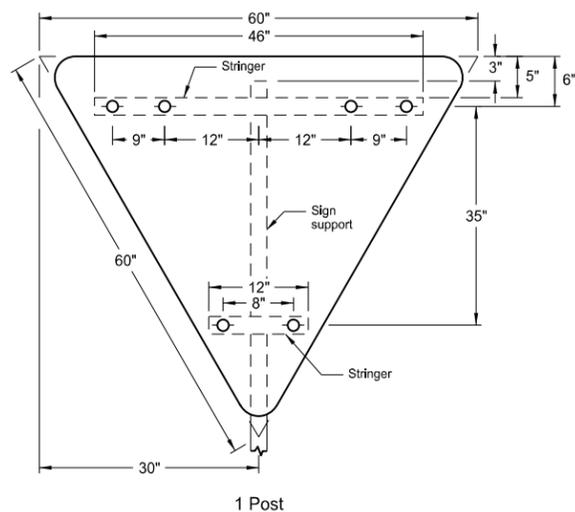
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/8	10	Yes		7

(B) - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

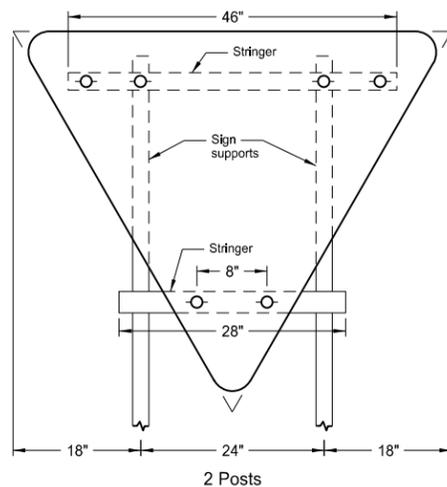
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3

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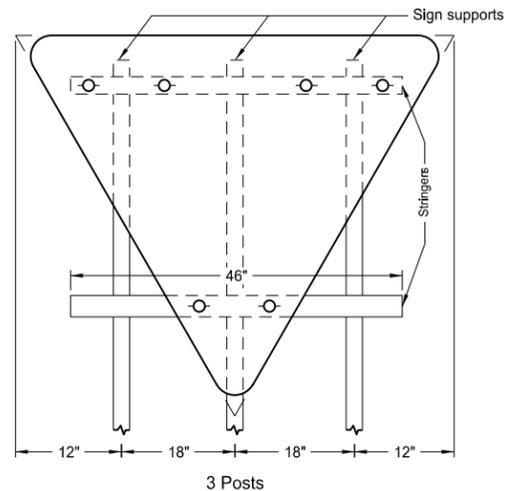
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

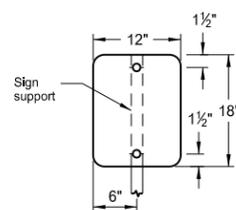


3 Posts

Assembly No. 6

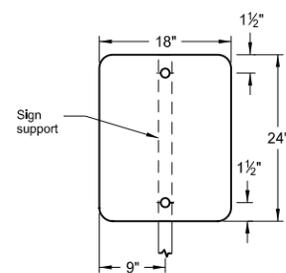
Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.



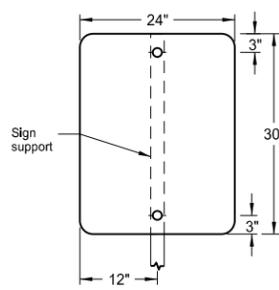
1 Post

Assembly No. 7



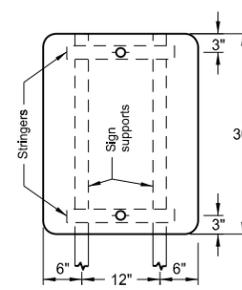
1 Post

Assembly No. 8

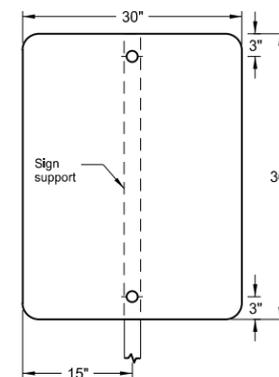


1 Post

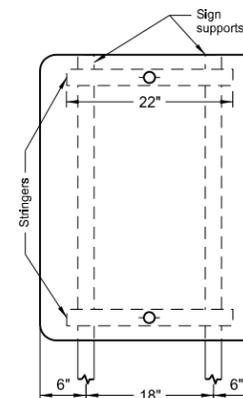
Assembly No. 9



2 Posts

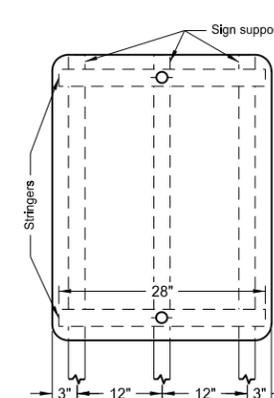


1 Post

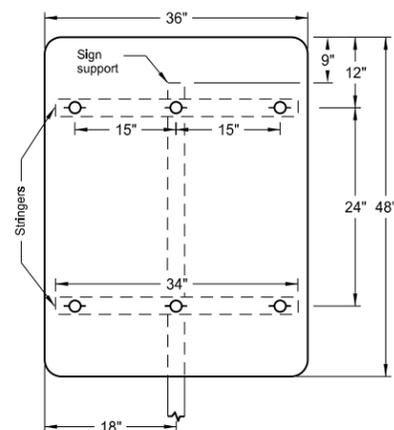


2 Posts

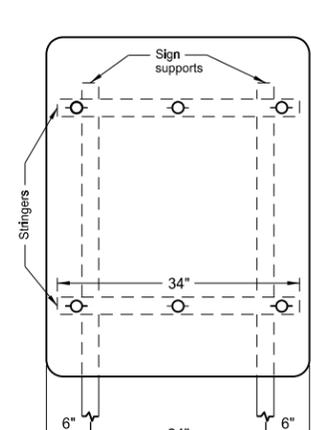
Assembly No. 10



3 Posts

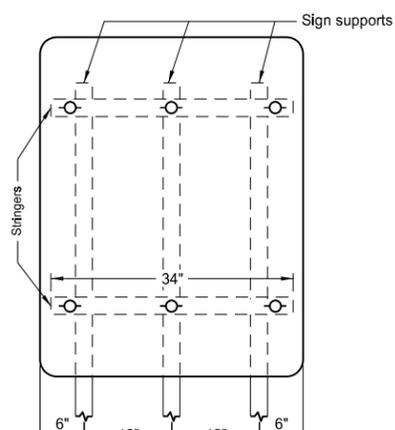


1 Post



2 Posts

Assembly No. 11

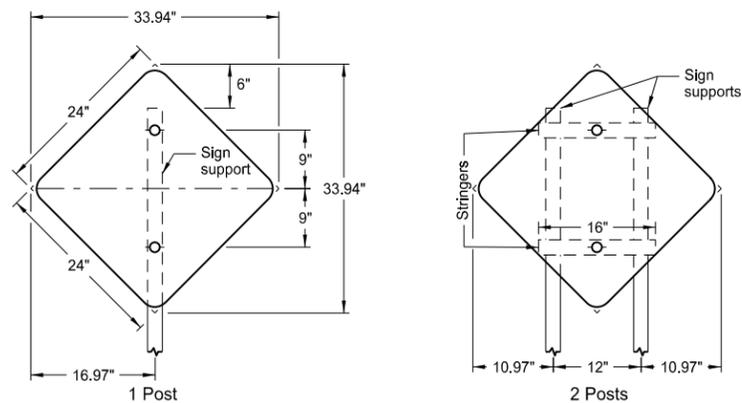


3 Posts

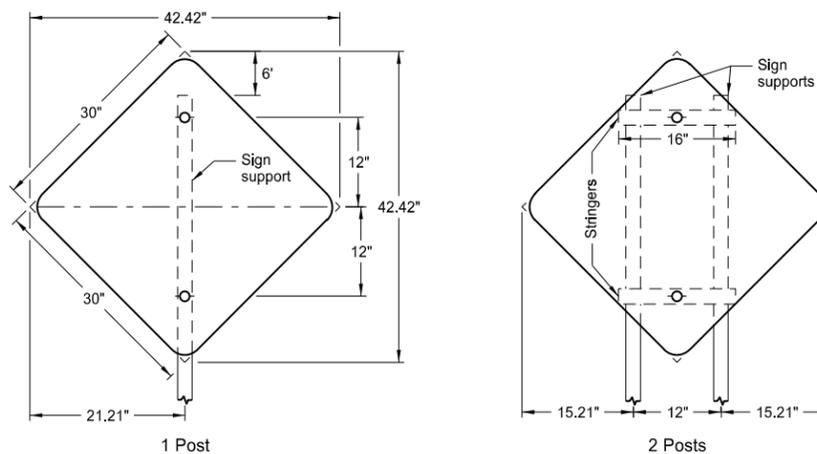
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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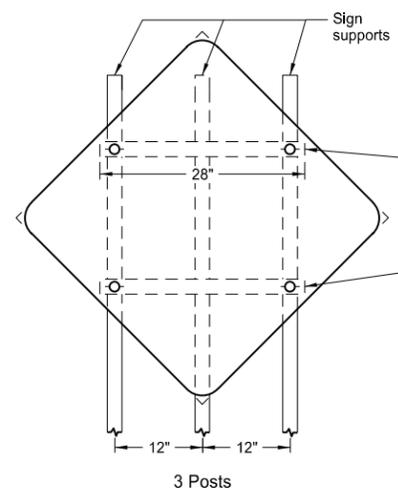
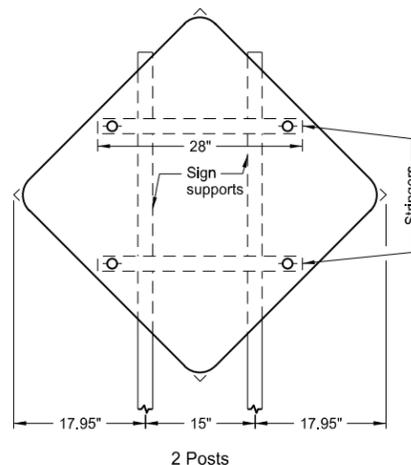
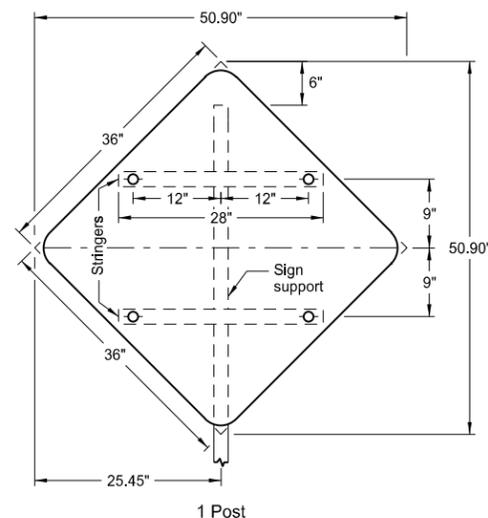
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



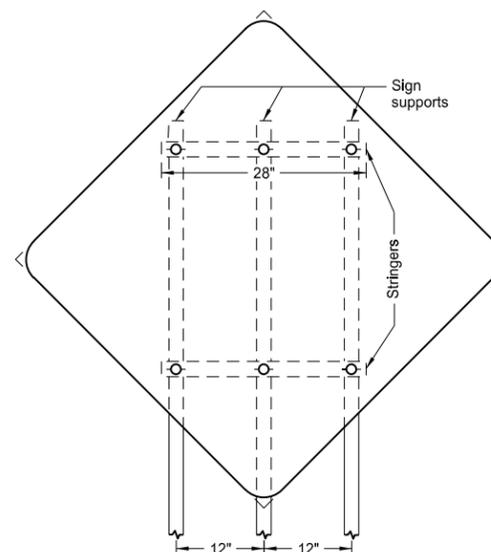
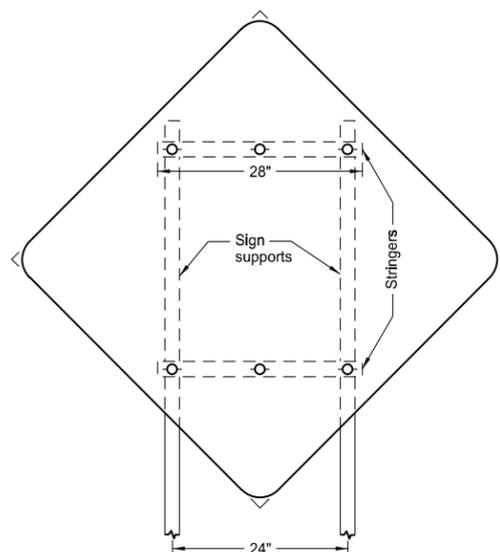
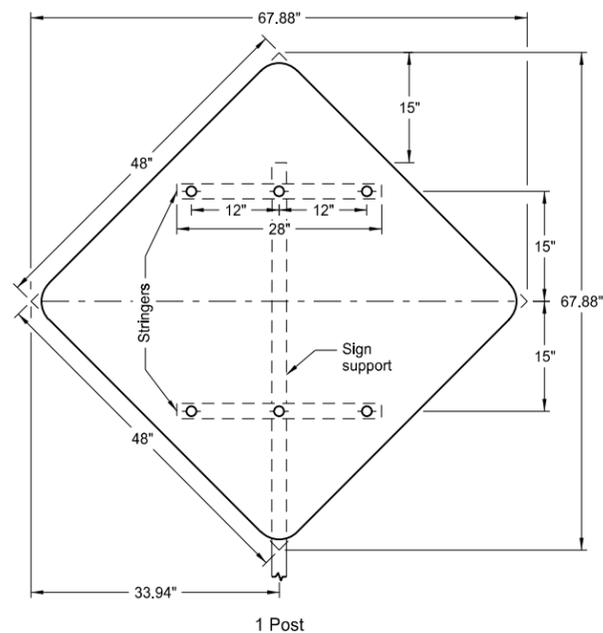
Assembly No. 18



Assembly No. 19



Assembly No. 20



Assembly No. 21

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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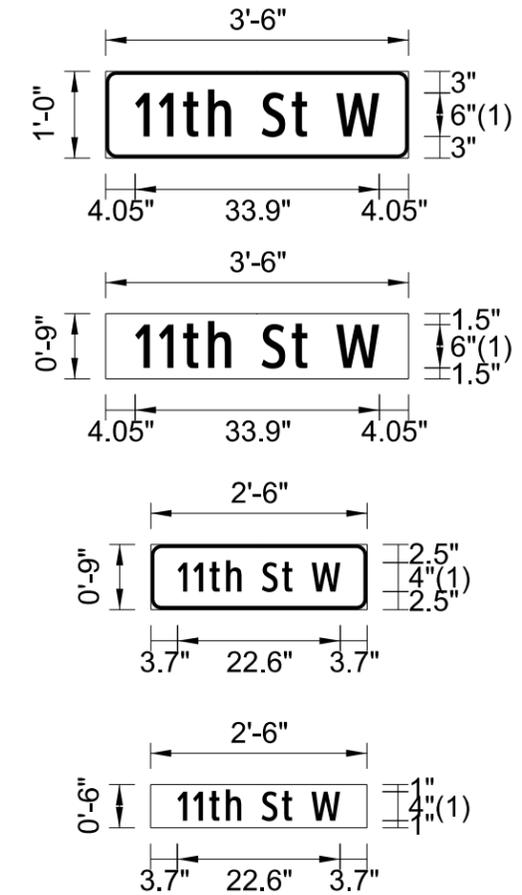
911 SIGN SUPPORT INFORMATION AND SIGN DETAILS

D-754-86

THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS (60 INCH VERTICAL CLEARANCE)													
ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR		BREAK-AWAY	
						1st LF	2nd LF	3rd LF		NUMBER	LENGTH		SIZE
						Inches	SF	LF					
SA 1	24"x12"	8.00	20.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x12"	10.00	16.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x12"	12.00	13.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x12"	14.00	14.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x12"	16.00	12.9	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x12"	18.00	15.2	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	60"x12"	20.00	13.7	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	24"x9"	6.00	24.1	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x9"	7.50	21.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x9"	9.00	17.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x9"	10.50	15.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x9"	12.00	13.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x9"	13.50	14.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	60"x9"	15.00	13.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	24"x6"	4.00	35.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x6"	5.00	28.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x6"	6.00	23.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x6"	7.00	22.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x6"	8.00	19.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x6"	9.00	17.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
60"x6"	10.00	15.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga		
SA 2	24"x12"	13.2	14.6	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x12"	15.2	16.3	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x12"	19.2	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x12"	21.2	15.3	1	2.25x2.25 12 ga	4.5			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x12"	23.2	20.6	1	2.5x2.5 10 ga	1.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.2	16.7	1	2.5x2.5 12 ga	3.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.2	15.2	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x9"	12.7	14.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x9"	14.2	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	15.7	15.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.2	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x9"	18.7	15.1	1	2.25x2.25 12 ga	4.2			2x2 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.2	14.6	1	2.25x2.25 12 ga	4.6			2x2 12 ga	1	4.0	3x3 7 ga	1
	24"x6"	9.2	16.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.2	15.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.2	15.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	42"x6"	12.2	13.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	48"x6"	13.2	15.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
60"x6"	15.2	14.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1	
SA 3	24"x12"	13.9	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x12"	15.9	15.3	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.9	15.9	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x12"	19.9	15.2	1	2.25x2.25 12 ga	4.8			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x12"	21.9	15.1	1	2.5x2.5 12 ga	5.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	23.9	20.6	1	2.5x2.5 10 ga	1.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.9	16.0	1	2.5x2.5 12 ga	4.7			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.9	16.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	13.4	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x9"	14.9	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	16.4	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.9	15.6	1	2.25x2.25 12 ga	4.3			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x9"	19.4	14.9	1	2.5x2.5 12 ga	4.8			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.9	20.6	1	2.5x2.5 10 ga	1.6			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x6"	9.9	14.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.9	14.3	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.9	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	12.9	16.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x6"	13.9	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.9	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
60"x6"	15.9	15.3	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1	

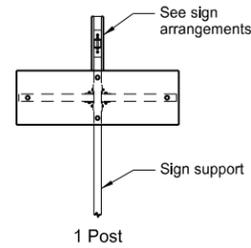
THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS (60 INCH VERTICAL CLEARANCE)													
ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A)			SLEEVE SIZE	ANCHOR		BREAK-AWAY	
						1st LF	2nd LF	3rd LF		NUMBER	LENGTH		SIZE
						Inches	SF	LF					
SA 4	24"x12"	15.5	15.1	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	30"x12"	17.5	15.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	36"x12"	19.5	17.5	1	2.5x2.5 12 ga	3.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	42"x12"	21.5	16.8	1	2.5x2.5 12 ga	4.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	48"x12"	23.5	16.2	1	2.5x2.5 12 ga	4.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	25.5	15.6	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x12"	27.5	16.7	1	2.5x2.5 10 ga	4.2			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x9"	13.5	14.3	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	15.0	15.1	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	36"x9"	16.5	14.6	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x9"	18.0	14.7	1	2.5x2.5 12 ga	4.9			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	48"x9"	19.5	17.2	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x9"	21.0	15.8	1	2.5x2.5 12 ga	4.3			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	22.5	15.4	1	2.5x2.5 12 ga	4.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x6"	11.5	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x6"	12.5	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x6"	13.5	14.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	14.5	15.0	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x6"	15.5	14.5	1	2.5x2.5 12 ga	4.6			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	54"x6"	16.5	14.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
60"x6"	17.5	16.8	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1	
SA 5	24"x12"	21.3	17.2	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	30"x12"	23.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x12"	25.3	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x12"	27.3	17.3	2	2.25x2.25 12 ga	4.2	4.6		2x2 12ga	2	4.0	3x3 7 ga	2
	48"x12"	29.3	16.9	2	2.25x2.25 12 ga	4.5	5.0		2x2 12 ga	2	4.0	3x3 7 ga	2
	54"x12"	31.3	16.5	2	2.25x2.25 12 ga	4.7	5.3		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x12"	33.3	17.5	3	2.5x2.5 12 ga					3	4.0	3x3 7 ga	3
	24"x9"	19.3	15.6	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x9"	20.8	17.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x9"	22.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x9"	23.8	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	48"x9"	25.3	16.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x9"	26.8	17.2	2	2.25x2.25 12 ga	3.9	4.5		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x9"	28.3	16.8	2	2.25x2.25 12 ga	4.2	4.8		2x2 12 ga	2	4.0	3x3 7 ga	2
	24"x6"	17.3	15.8	1	2.5x2.5 10 ga	4.4			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x6"	18.3	15.5	1	2.5x2.5 10 ga	4.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	36"x6"	19.3	15.3	1	2.5x2.5 10 ga	4.7			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	42"x6"	20.3	15.1	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	48"x6"	21.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x6"	22.3	16.4	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
60"x6"	23.3	16.8	2	2.25x2.25 12 ga	3.8	4.4		2x2 12 ga	2	4.0	3x3 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.

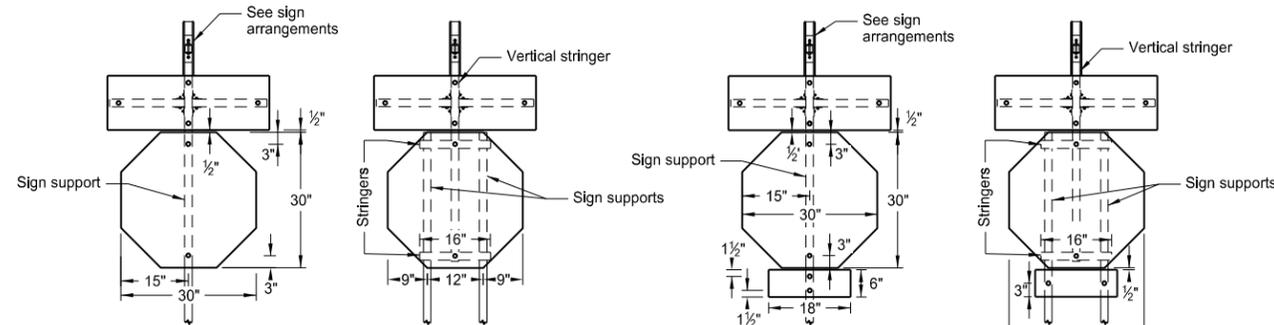


SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

- 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

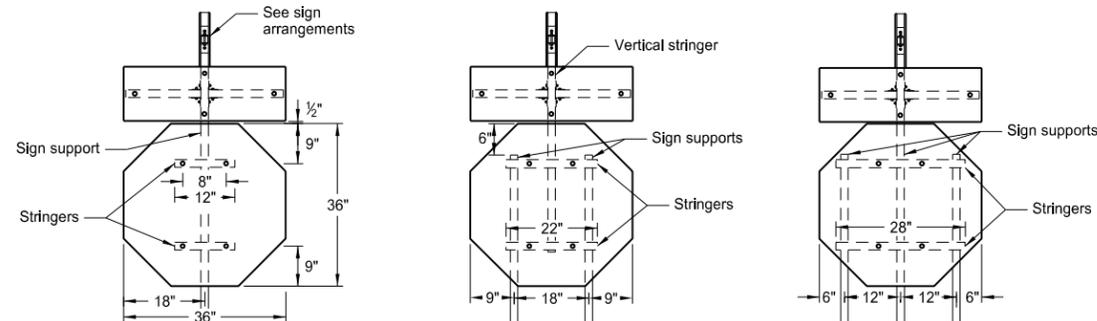


Special Assembly 1 (A, B, C, D or E)

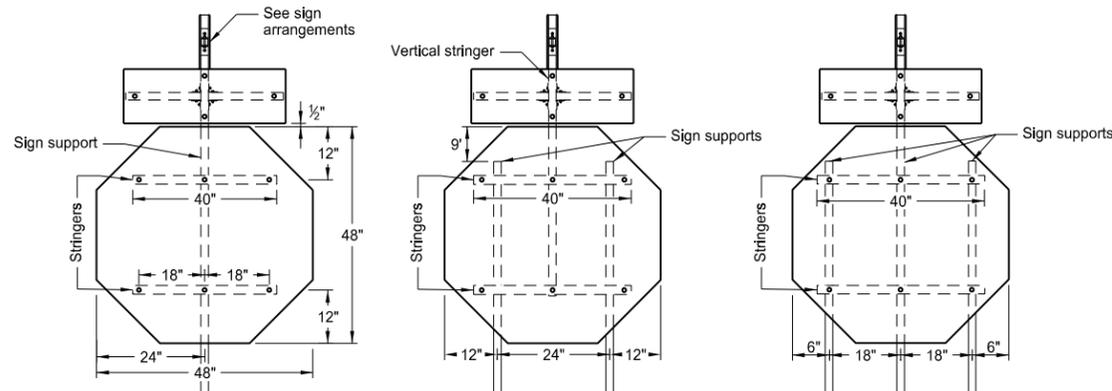


Special Assembly 2 (A, B, C, D or E)

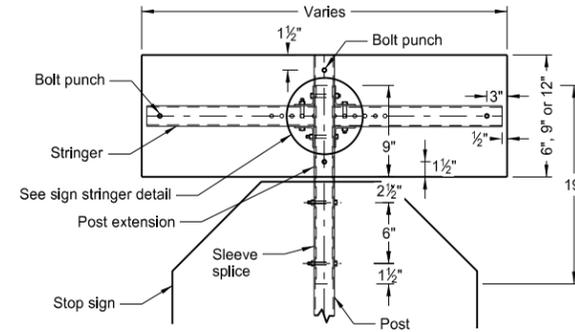
Special Assembly 3 (A, B, C, D or E)



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

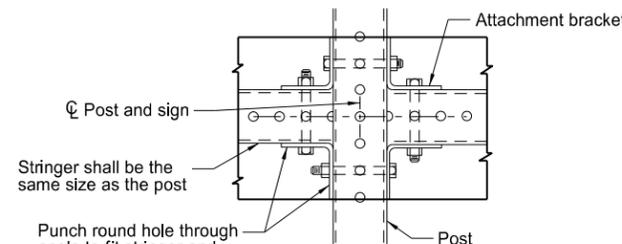


Special Assembly 5 (A, B, C, D or E)



Front View Sleeve Splice Detail

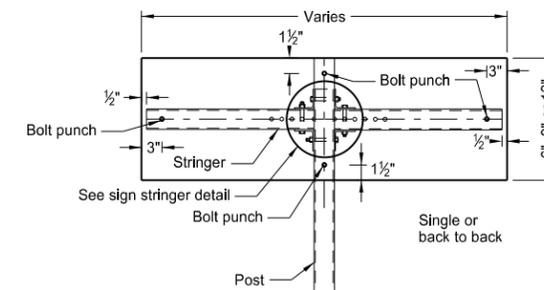
Note: The splice method may be used upon approval of the engineer.



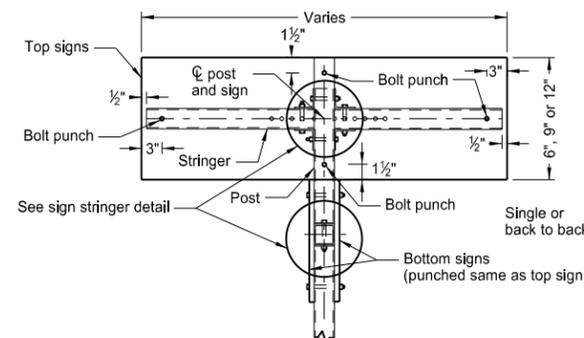
Sign Stringer Detail

Stringer shall be the same size as the post

Punch round hole through angle to fit stringer and post holes.

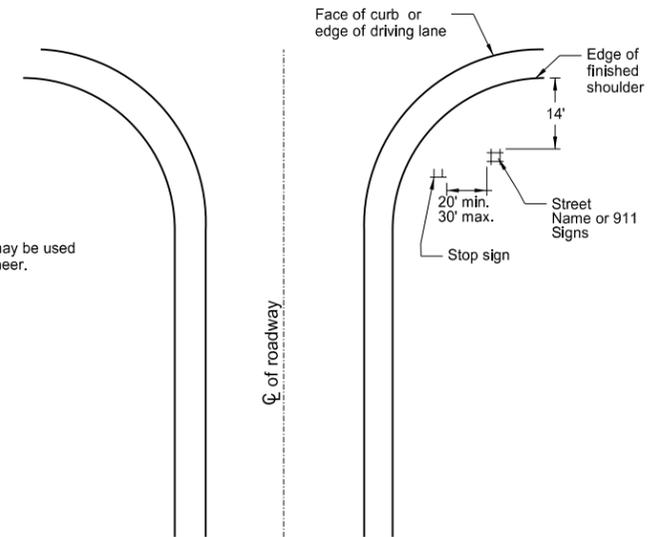


Detail A or B



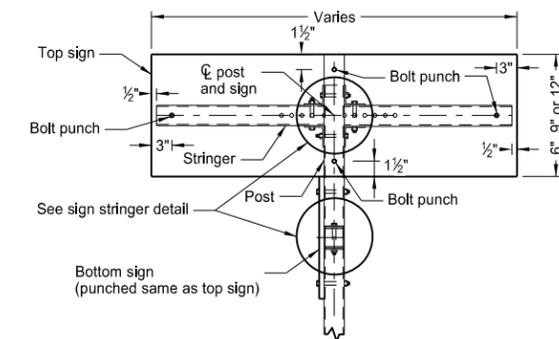
Detail D or E

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



Intersection Layout

Note: This layout is to be used for street name signs or 911 signs that are used with Special Assembly 1.



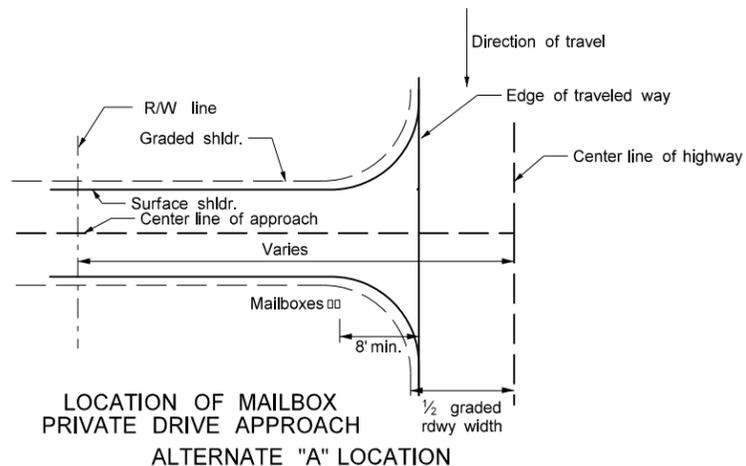
Detail C

Sign Arrangements

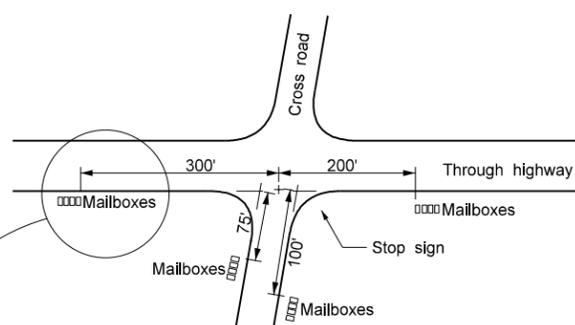
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by
 Roger Weigel
 Registration Number
 PE-2930,
 on 10/3/13 and the original document is stored at the
 North Dakota Department
 of Transportation

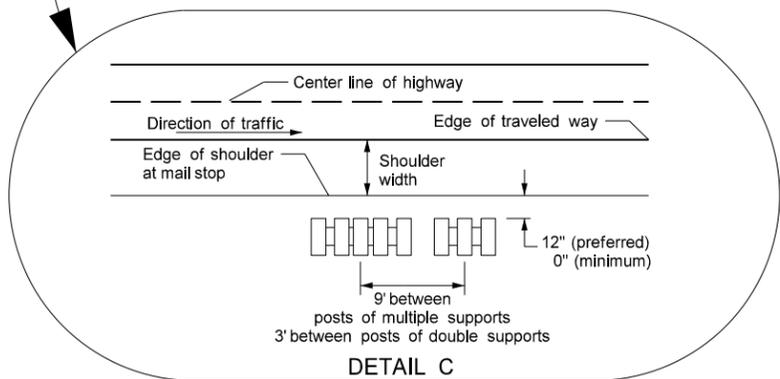
MAILBOX LOCATION DETAILS



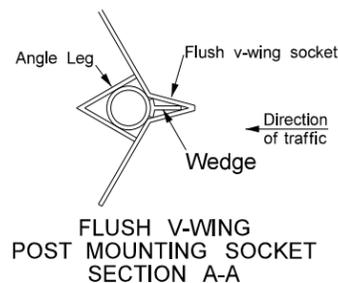
LOCATION OF MAILBOX PRIVATE DRIVE APPROACH ALTERNATE "A" LOCATION



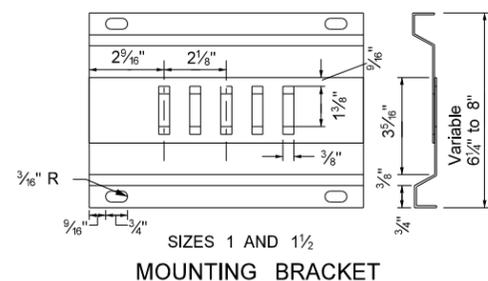
MINIMUM CLEARANCE DISTANCE TO NEAREST MAILBOX ALONG ROADWAY AT INTERSECTIONS ALTERNATE "B" LOCATION



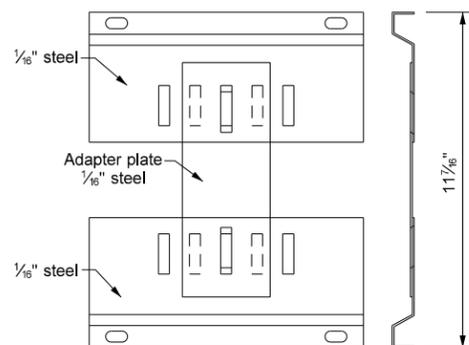
DETAIL C



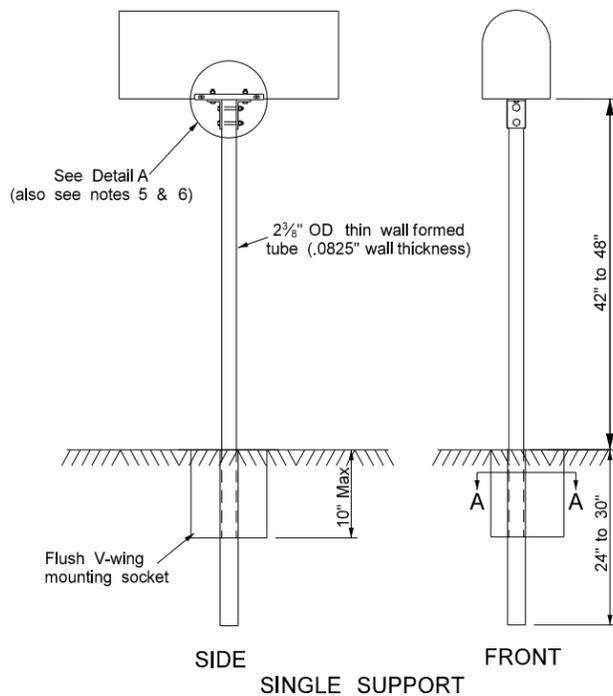
FLUSH V-WING POST MOUNTING SOCKET SECTION A-A



SIZES 1 AND 1 1/2 MOUNTING BRACKET



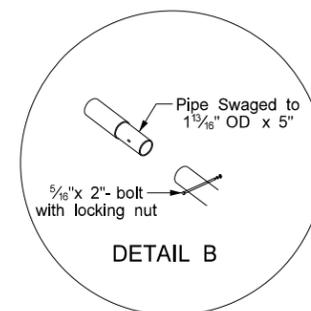
SIZE 2 WITH ADAPTOR PLATE MOUNTING BRACKET



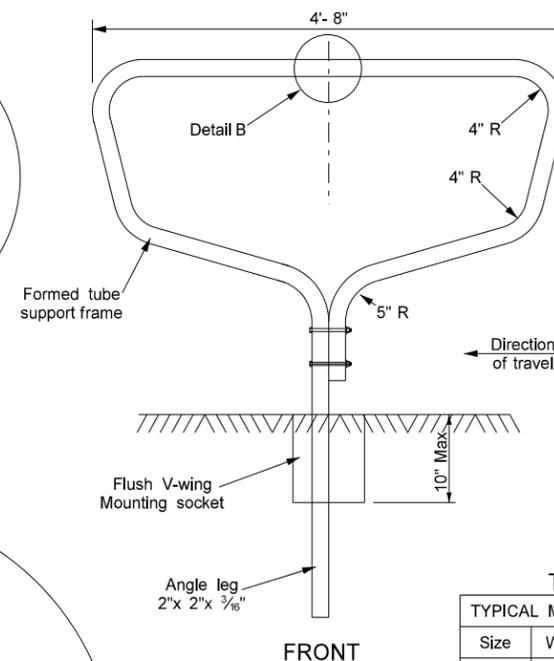
SIDE FRONT SINGLE SUPPORT

Notes:

- The mailbox support and hardware details shall consist of the "V-Loc Mailbox Support System" manufactured by: Tapco Traffic & Parking Control Co. Inc. Any other equal support system meeting the requirements of NCHRP Report 350, which has been crash tested, and approved by the Federal Highway Administration may be used. Approved alternate mailbox assemblies shall be installed in the manner and arrangement crash tested.
- The preferred location for all mailboxes is the Alternate "A" location. However, the Engineer may approve the Alternate "B" location if warranted by existing field conditions.
- Postal regulations require that mailboxes must be located on the right-hand side of the road in the direction traveled by the carrier. Therefore, the Engineer shall contact the local carrier or postmaster before installing new mailboxes to verify the direction of travel.
- Mailboxes installed on private drive approaches must always be located on the downstream side of the approach.
- Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.
- Size 2 mailbox mounted on multiple support requires 2 each, 3/8" by 3/8" bolts with lock washers and nuts to attach the adaptor plate to mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.
- Space multiple support frames a minimum of 4 feet apart. Space single support frames a minimum of 3 ft apart. Do not place more than five No. 1 mailboxes, three No. 2 mailboxes, or any combination of four No. 1-A and No. 2 mailboxes on multiple support frames.



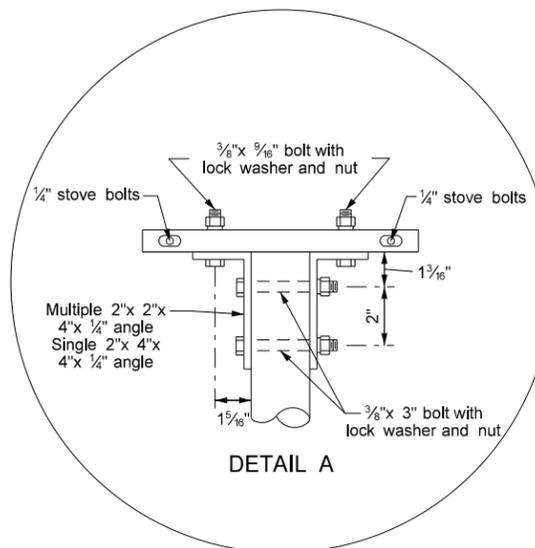
DETAIL B



FRONT

TABLE A

TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6.5"	8.5"	19"
1A	8"	10.5"	21"
2	11.5"	13.5"	23.5"



DETAIL A

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