Docusign Envelope ID: F4410309-7F5D-8FE5-8296-D5035A3238DC

DESIGN DATA				
Traffic	Average Daily			
Current 2020	Pass: 210	Trucks: 65	Total: 275	
Forecast 2040	Pass: 275	Trucks: 95	Total: 370	
Clear Zone Distance: 20 FT		Design Speed: 65 MPH		
Minimum Sight Dist. for Stopping: 645 FT		Bridges:		
Sight Dist. for No Passing Zone: 1100 FT				
Pavement Design Life 20 (years)				
Design Accumulated One-way flexible ESALs: 195,616				

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NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

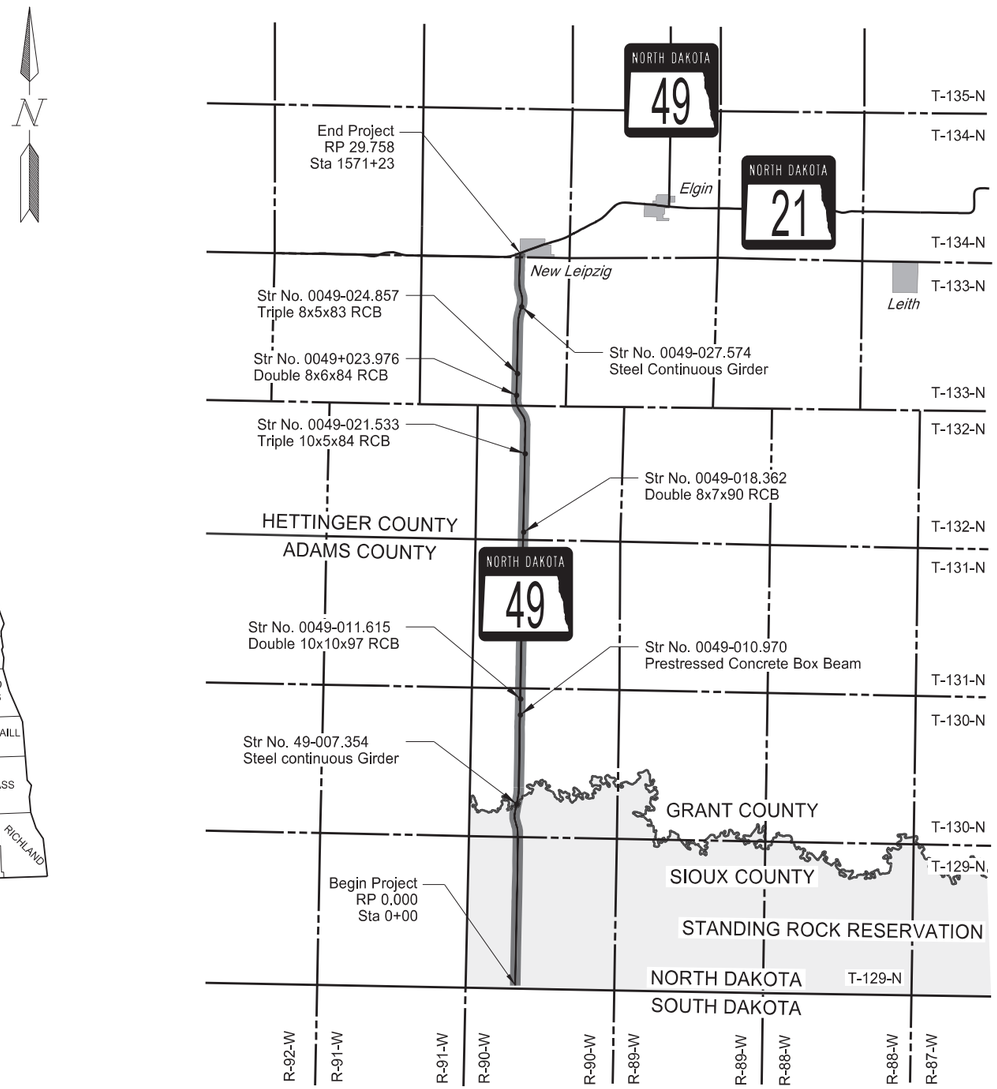
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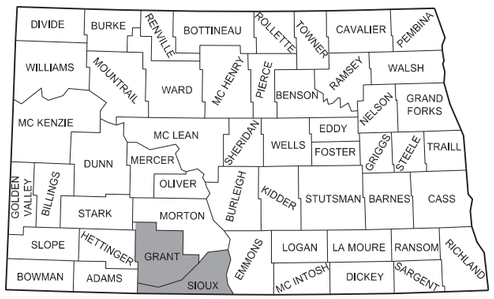
Sioux & Grant Counties
State Line to Jct ND 21

Cement Stabilized Full Depth Reclamation, HMA Overlay, Concrete Deck Overlay,
Bridge Rail Retrofit & Guardrail

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
X-FTFA-5-049(020)000	29.758	29.758





STATE COUNTY MAP

DESIGNER
Brent Muscha
DESIGNER
Matt Mohagen
DESIGNER
Zack Waln

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Kirk Hoff
08/26/26

Apex Engineering Group

REGISTERED PROFESSIONAL ENGINEER
JASON P GULLICKS
PE-4792
DATE
08/26/26
NORTH DAKOTA

8/25/2026 9:51:09 AM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\001\001TS.dgn

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SSP 2	Federal Migratory Bird Treaty Act
SSP 4	Longitudinal Joint Density
SP 504(25)	Tribal Employment Rights Ordinance (TERO)
SP 505(25)	E-Ticketing (Mandatory)
SP 507(25)	Cement Stabilized Full Depth Reclamation
SP 508(25)	Soil Stabilization
SP 509(25)	Flexible Pavement Surface Tolerance
SP 510(25)	Cured in Place Pipe (CIPP)
SP 566(25)	Hydrodemolition and Overlay of Concrete Bridge Decks
PSP 101(25)	Permits and Environmental Considerations

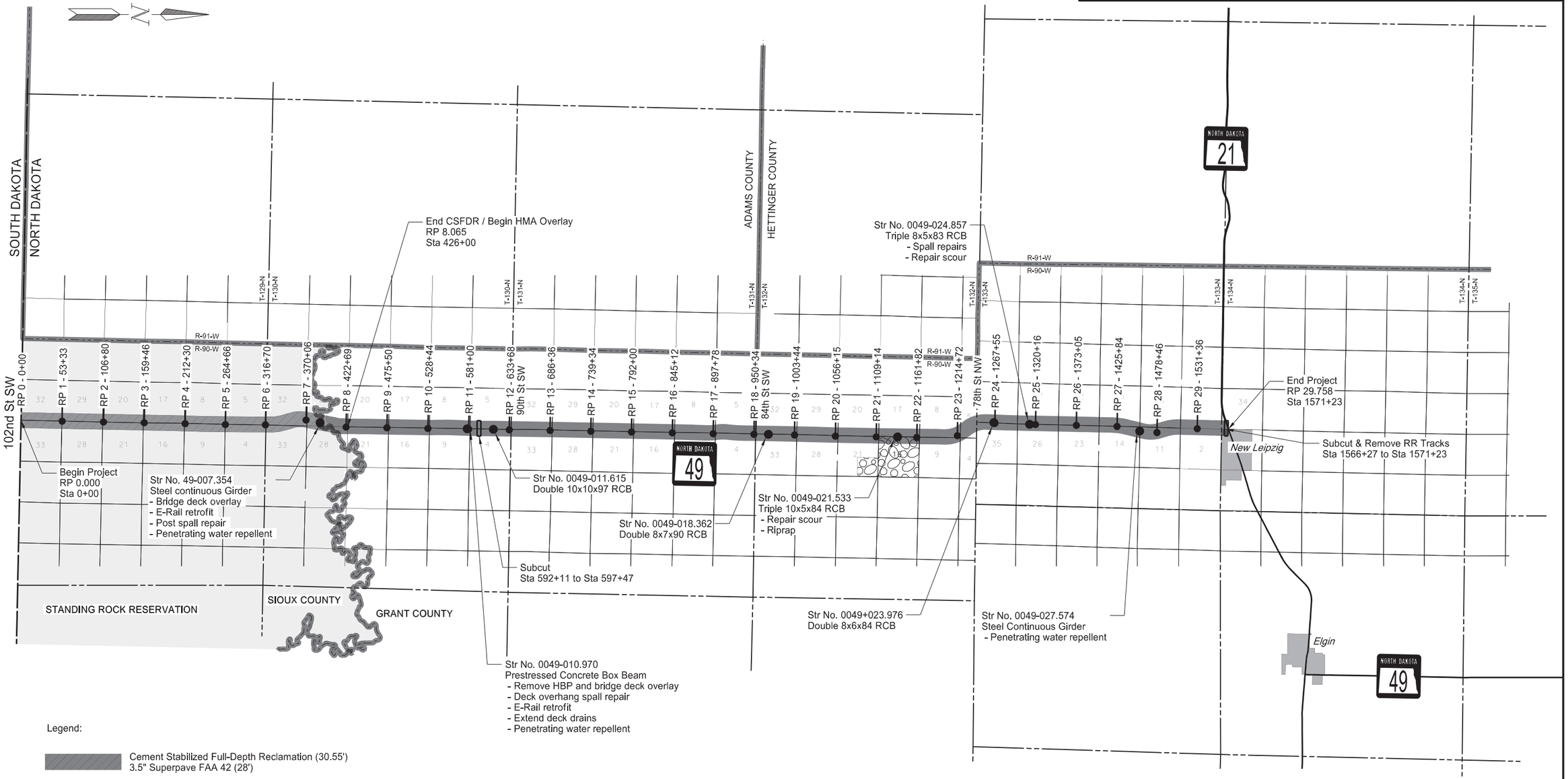
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Legend:

- Cement Stabilized Full-Depth Reclamation (30.55')
  3.5" Superpave FAA 42 (28')
- 3" Superpave FAA 42 Overlay (28')
- National Wildlife Refuge
- State Line
- County Line
- Township Line
- Section Line

Scope of Work

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
JASON P GULLICKS
PE-4792
DATE 2026.08.26
10:52:59 -05'00'
NORTH DAKOTA

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NOTES

GENERAL NOTES

105-P01 PROFILE ELEVATION: Adjust the resulting centerline profile elevation up or down as needed to achieve the specified roadway dimensions, and to blend and balance materials following the full depth reclamation.

107-100 LAWS TO BE OBSERVED: All or a portion of this project lies within the exterior boundaries of an Indian Reservation. Review laws and ordinances pertaining to the work contained within the boundaries of the reservation.

107-P01 MAINTAIN ACCESS: Before starting any work, coordinate the details and locations of access points to farmsteads affected by the project with the landowners.

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

108-500 TERO COORDINATION: Invite the Tribal TERO Office to the Preconstruction Conference.

203-P01 COMMON EXCAVATION-SUBCUT: Two existing abandoned railroad embankments cross ND 49 within the subcut area between Sta 1566+30 to Sta 1571+22. Include the costs to remove any remaining railroad tracks, ties, spikes, and related items from the roadbed in the price bid for “Common Excavation-Subcut”.

203-P02 APPROACH FORESLOPE RECONSTRUCTION: Include the costs to strip and replace topsoil and to supply and construct embankment material in the price bid for “Approach Foreslope Reconstruction”. Seeding and soil stabilization will be measured and paid separately.

230-P01 FORESLOPE RESHAPING: Except in guardrail embankment areas, till the foreslope to a minimum 4” depth and a 10’ minimum width. Blade away the tilled material from the existing slough before completing the full-depth reclamation with cement-treated base or overlay.

After final surfacing is in place, reshape the foreslope using the tilled material to provide a smooth transition between the finished shoulder and the existing foreslope. Remove all rock and chunks of asphalt, sod, or dirt to allow a smooth transition.

Include the cost to strip topsoil into a berm, stabilize and maintain the berm, reshape the embankment to a 4:1 minimum slope, and replace the topsoil in the price bid for "Foreslope Reshaping". Seeding and soil stabilization will be measured and paid separately after topsoil is replaced.

430-P01 ASPHALT CEMENT: Aggregates in the vicinity of this project have shown rutting and stripping material characteristics during previous mechanical testing. Test the proposed mix on the Hamburg Wheel tracker using the AASHTO T 324-23 test procedure during mix design. Modify test procedure AASHTO T 324-23 for the Hamburg Wheel Tracker to a 46 degrees Celsius water bath. Results of the Hamburg wheel tracking test must show a Stripping Number (SN) of ≥ 2000 and a Corrected Rut Depth (CRD) of ≤ 6.0 mm. Calculation of CRD and SN can be found here: Standardization of SIP Calculation for Hamburg Wheel Tracking Test. If unable to meet the SN and CRD requirements, the contractor has the option to use one or more of the following changes to the mix design and then re-test the mix:

- Use PG58V-34 Asphalt Cement in place of the PG58H-34 Asphalt Cement bid item.
- Add hydrated lime to the mix at a rate of 1% of the aggregate by weight.
- Add a liquid anti-strip at a rate recommended by the manufacturer.

Any changes shown above to the proposed mix design will be incidental to the bid item for PG58H-34 Asphalt Cement. If the contractor is unable to meet the minimum test requirements after using the options shown above, then a different aggregate source may be needed to meet the test requirements. After meeting the test requirements, provide 150 pounds of loose mix asphalt for verification testing to be completed by the Engineer. Allow 7 days for testing by the Engineer once the mix is received. Mix tested by the Engineer must meet the same SN and CRD requirements before the mix design is accepted.

430-P02 BLADE LEVELING: Perform blade leveling on the overlay portion of the project. Place the blade leveling lift up to ½” thick in a single motor grader pass across the full width of the driving surface in each lane. Compact the material using a pneumatic roller. Include all costs to perform blade leveling in the price bid for “Superpave FAA 42”.

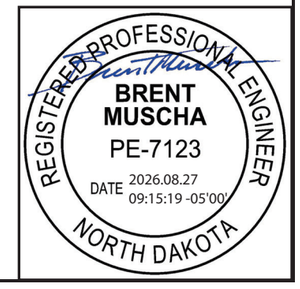
430-P03 PAVING: In the FDR/cement stabilized section, place the 3.5” Superpave FAA 42 pavement in two lifts. Place a 2” lift within 21 calendar days of completing a section of cement stabilization. Time will begin on the day that the cement is incorporated into each section. A section is considered one day’s worth of cement stabilization. If the 2” lift is not placed within 21 calendar days, re-blend and cement stabilize each section that has gone beyond 21 days at the expense of the Contractor.

In the overlay section, place the 3.0” Superpave FAA 42 pavement in one lift, after placing and compacting the blade leveling.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (33) 22.5” x 12.5’ concrete barriers. They can be picked up and returned to the Minot District yard at 1305 Hwy 2 Bypass E in Minot ND 58701. Contact the Minot District office at 701-857-6925 to facilitate the exchanges.

If returning barriers with connection components, coordinate the delivery location for the connecting components with the Engineer. Some 4 inch x 4 inch boards are available at the return location. Provide any additional 4 inch x 4 inch boards necessary to stack barriers. The boards will become property of the Department.

Include all costs associated with median barriers in the contract unit price for “State Furnished Median Barrier”.



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NOTES

704-450 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install either the signal controlled lane closure on Standard D-704-16 or the flagging controlled lane closure on Standard D-704-17.

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

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

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

Include the cost of either a traffic signal system or flaggers in the contract unit price for "Lane Closure-Signal Control/Flagging Control".

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

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control setup:

- “Be Prepared to Stop” (W3-4), and
- “Flagger” symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement,
- Have a manufacturer's speed rating that meets or exceeds the posted speed limit, and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece,
- Interlocking segments, or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

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

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-900 ATTENUATION DEVICE Type B: Install either of the following attenuation devices:

- The barrel type shown on standard D-704-01; or
- The liquid filled attenuation device described in this note.

Install liquid filled attenuation devices that are 2.5 feet wide.

Before installing devices, provide the Engineer a Certificate of Compliance stating that the devices meet NCHRP Report 350, MASH 2009, or MASH 2016, and a copy of an eligibility letter from FHWA.

Use devices rated for the MPH designation used in the item description.

Install devices according to the manufacturer’s specifications.

Liquid filled attenuators may not be deployed in any portion of the months of January, February, and December, nor before the 15th of March.

If liquid filled attenuation devices are deployed after the 15th of March or in any portion of the months of April, October or November, include calcium magnesium acetate or potassium acetate in the liquid filled barrier solution. Mix the anti-icing chemicals with water as recommended by the anti-icing chemical manufacturer to protect the barrier from freezing to a temperature of 0°F. Contact the Engineer and the NDDOT Environmental and Transportation Services Division in the case of a spill leaving the roadway. Dispose of the mixture inside the device as specified in Section 107.17, “Removed Material”.

Provide a full replacement set of attenuators available to the project. If the replacement devices are installed, have a set of replacement devices available to the project within 3 calendar days.

Immediately replace any damaged pieces. The Department will reimburse the Contractor for damaged pieces based on the module invoice price plus 10 percent. All other costs associated with installing and maintaining replacement pieces will be at no additional cost to the Department.

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 09:15:47 -05'00'
NORTH DAKOTA

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NOTES

704-P01 TEMPORARY TRAFFIC CONTROL: Provide traffic control for the bituminous paving, full depth reclamation, and cement stabilization operations consisting of a temporary road closure, flagging, and a pilot car.

Limit pilot car operations to a maximum of two zones no less than 2 miles apart. The maximum length of a single pilot car zone is 5 miles between flaggers. The maximum combined length of both pilot car zones is 6 miles. The maximum delay at any pilot car zone is 15 minutes.

Traffic control device quantities are based on a 6-mile limitation.

1. Standard D-704-12 for shoulder and approach flattening
2. Standard D-704-15, layout A for work on the roadway and bridge deck penetrating water repellent application.
3. Standard D-704-16 or 17 for bridge deck overlay and guardrail work.
4. Standard D-704-20, layout G terminal signing layout
5. Standard D-704-22, layouts K and L for trucks hauling material
6. Standard D-704-26, layouts BB, CC, DD, EE, FF, and GG
7. Standard D-704-33 for installing concrete barriers and subcut locations
7. Standard D-704-37, layout 2-lane for maintaining traffic through an area already full-depth reclaimed and for subcuts

Place flaggers and traffic control devices as shown on Standard D-704-15, layout A at 72nd Street SW and at Railway Street when the lane closure spans across them.

The limitations of this note do not apply to the closures required for the subcuts and bridge work.

704-P02 TRAFFIC CONTROL FOR SUBCUT OPERATIONS: Perform subcut on one half of the roadway while maintaining traffic on a single 12’ minimum width lane on the adjacent half. In the work zone half of the roadway, remove pavement surfacing and base, excavate subcut material, install subcut aggregate base to finished grade, and construct a 4:1 traversable wedge between the top edge of existing pavement and top of subcut aggregate base. Then, place traffic on the subcut aggregate base and shift the work zone to the other half of the roadway.

Use a maximum longitudinal slope of 7% if carrying traffic. Do not load trucks on the lane used to maintain one-lane traffic. It is allowable to dump aggregate base course directly into the repair area with side dumps from the travel lane, provided the trucks stay in the pilot line and travel through the work zone with the public traffic. Public traffic is not allowed on the repair area until the base section is at finished grade. Use only low ground pressure construction equipment in the repair area until the first lift of material is placed.

Complete the subcut excavation and aggregate placement across both lanes in one day, during daylight, and restore two-lane two-way traffic before sunset. If unable to complete the subgrade repair work in one day, install temporary fill to make the area traversable for two lanes of traffic or flag 24 hours per day. To maintain 24-hour traffic, provide a 15’ wide driving surface with the use of flaggers or a 28’ wide driving surface with the use of traffic control devices (D- 704-15 Type B). Remove the temporary fill before resuming subcut operations. No payment will be made for placement or removal of temporary fill, or for additional traffic control devices required to maintain 24-hour traffic. Payment for flagging will only be made while the contractor is actively working in the repair area.

704-P03 TRAFFIC CONTROL FOR UNEVEN LANES: The contents of this note replace Section 704.04 O.2, “Two Lane Roadways” in the Standard Specifications.

If the pavement in adjacent lanes is uneven after a day’s work, install traffic control as described in this note. For the purposes of this note, use of a notched wedge during asphalt paving is considered greater than 1 inch and less than 2 inches.

If the difference in elevation between the lanes is 1 inch or less, install the following signs:

- “Uneven Lanes” sign (Sign W8-11-48) and a supplementary plaque identifying the length of the uneven pavement (Sign W20-52-54). Place this assembly on the right shoulder, in both directions, in advance of the uneven pavement.

If the difference in elevation between the lanes is greater than 1 inch and less than 2 inches, install the following signs:

- “Uneven Lanes” sign (Sign W8-11-48) and a supplementary plaque identifying the length of the uneven pavement (Sign W20-52-54). Place this assembly on the right shoulder, in both directions, in advance of the uneven pavement.
- Between the “Uneven Lanes” sign and the beginning of the uneven pavement, install a “Do Not Pass” sign (Sign R4-1-48) on the right shoulder in both directions.

If the difference in elevation between the lanes is 2 inches or greater install the following traffic control devices:

- “Uneven Lanes” sign (Sign W8-11-48) and a supplementary plaque identifying the length of the uneven pavement (Sign W20-52-54). Place this assembly on the right shoulder, in both directions, in advance of the uneven pavement.
- Between the “Uneven Lanes” sign and the beginning of the uneven pavement, install a “Do Not Pass” sign (Sign R4-1-48) on the right shoulder in both directions.
- Install tubular markers spaced at 2 times the posted speed limit through the uneven lane area.

In all instances, install “Uneven Lanes” signs and a supplementary plaque identifying the length of the uneven pavement at County Major Collectors and State Highways.



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NOTES

706-P01 FIELD OFFICE: Provide a field office which meets the following requirements:

1. Be completely insulated and weather-tight.
2. Minimum total area of 450 square feet.
3. Bathroom facilities, which include sewer, potable water, and weekly cleaning or weekly service of a porta-potty.
4. Have a dependable source of electricity for power and lights with a minimum of 6 electrical outlets spaced throughout the building and light fixtures spaced to uniformly light the entire interior (lumens required 110 foot-candles).
5. Be wired for DSL Broadband internet with wireless Wi-Fi and have the capability to allow for hard wiring the computer. Include the cost of the installation and monthly fees.
6. A heating and cooling system that is capable of maintaining the temperature between 65°F and 78°F year around.
7. A minimum of 3 desks and 3 desk chairs, 3 extra chairs, a drawer file cabinet with at least two drawers, and one table minimum of 2.5 ft x 5 ft.
8. Photocopy machine/Printer capable of 11x17 photocopies/prints and toner to last the duration of the project. The Engineer will provide paper. Other features include digital copying & scanning. (Fax capabilities can be included but not necessary).
9. The location of the field office will be on, or as close to the project as possible and approved by the Engineer. Any rental fees will be paid by the Contractor.
10. Make the field office available for occupancy one week before the start of the project and remain through project completion. Provide a field office that is separate or independent from the contractor's field office.
11. Heat, electric, internet service, sewer, water hookups, and porta-potty service to be furnished by the Contractor, Contractor to pay utility bills.

    All requirements of the Field Office are subject to approval by the Engineer. Include the costs for the field office in the bid item "Field Office" and the schedule for payment is as follows:
    - 25% when set up on site.
    - 50% when 30% of the work is complete.
    - 75% when 60% of the work is complete.
    - 100% when the project is complete.

714-P01 CONCRETE PIPE TIES: Tie all relayed concrete pipe joints including the end sections. Include the cost of all labor and material to tie the joints in the unit price bid for “Remove & Relay End Section – All Type & Sizes”.

754-P01 OBJECT MARKERS - CULVERTS: Remove existing object markers located at culvert end sections that are impacted by earthwork activities and pipe work. Include the cost for removal and disposal in the price bid for “Object Markers – Culverts”.

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



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NOTES

SECTION 130

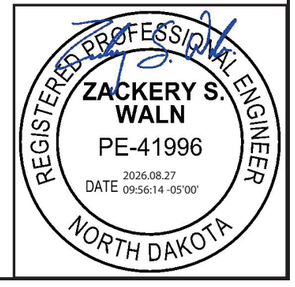
203-P01 GUARDRAIL EMBANKMENT: The embankment material required for guardrail installation is not available within the highway right of way. It will be the contractor's responsibility to obtain embankment material. Include all costs to locate the embankment material in the contract unit price bid for "Guardrail Embankment."

203-P02 REMOVE AGGREGATE BASE: Include the cost of the labor and equipment to remove the aggregate base from underneath the existing guardrail pavement in the contract unit price bid for "Guardrail Embankment."

764-P01 REMOVED W-BEAM GUARDRAIL MATERIAL: Deliver the removed guardrail materials that are not reset to the NDDOT Maintenance Storage Yard in Mott and neatly stack them at a location designated by the Engineer. The address of the NDDOT Maintenance Storage Yard is:

NDDOT Mott Section
9108 71st St SW
Mott, ND 58646

Include all costs for delivery of the removed guardrail materials in the contract unit prices bid for the items "Remove W-Beam Guardrail & Posts," and "Remove End Treatment & Transition."



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ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation has made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 AVOIDANCE AREAS: The avoidance areas and required fence are at:

From	To	Temporary Safety Fence (LF)
Sta 235+75 Lt	Sta 237+15 Lt	140
Sta 314+50 Rt	Sta 315+30 Rt	80
Sta 532+00 Rt	Sta 535+00 Rt	300
Sta 591+40 Lt	Sta 593+60 Lt	220
Sta 655+20 Rt	Sta 656+80 Rt	160
Sta 693+50 Rt	Sta 694+30 Rt	80
Sta 885+65 Lt	Sta 891+50 Lt	695
Sta 1187+00 Rt	Sta 1191+60 Rt	460
Sta 1308+30 Rt	Sta 1310+85 Rt	215
Sta 1318+00 Rt	Sta 1320+00 Rt	200
Sta 1361+90 Rt	Sta 1363+90 Rt	200
Sta 1499+70 Rt	Sta 1502+30 Rt	400
Sta 1562+90 Rt	Sta 1565+40 Rt	250
Sta 1562+90 Lt	Sta 1565+40 Lt	250

The avoidance areas within the right-of-way must not be disturbed and will be fenced prior to commencement of any construction. Provide the fence and fence posts, install the fence in the location designated in the plans, maintain the fence, and remove the fence upon completion of the project. A quantity of 3,650 LF of safety fence been included for this purpose. Include all costs to provide, place, maintain, and remove the fence in the price bid for “Temporary Safety Fence”.

EN-2 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-3 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 09:17:34 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	8	1

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
109	1000	E-TICKETING	L SUM	1	1
202	0136	REMOVAL OF PAVEMENT	TON	8808	8808
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	527	527
203	0138	COMMON EXCAVATION-SUBCUT	CY	1558	1558
203	0215	APPROACH FORESLOPE RECONSTRUCTION	EA	20	20
203	0218	GUARDRAIL EMBANKMENT	EA	8	8
203	0237	SUBCUT AGGREGATE	TON	4067	4067
216	0100	WATER	M GAL	1937	1937
230	0111	FORESLOPE RESHAPING	STA	3128.5	3128.5
230	0125	SHOULDER PREPARATION	MILE	59.26	59.26
251	0200	SEEDING CLASS II	ACRE	99.28	99.28
251	2000	TEMPORARY COVER CROP	ACRE	99.24	99.24
253	0061	SOIL STABILIZATION	ACRE	198.52	198.52
255	0103	ECB TYPE 3	SY	732	732
256	0200	RIPRAP GRADE II	CY	235	235
260	0200	SILT FENCE SUPPORTED	LF	188	188
260	0201	REMOVE SILT FENCE SUPPORTED	LF	188	188
261	0112	FIBER ROLLS 12IN	LF	27936	27936
261	0113	REMOVE FIBER ROLLS 12IN	LF	27936	27936
302	0050	TRAFFIC SERVICE AGGREGATE	TON	500	500
302	0120	AGGREGATE BASE COURSE CL 5	TON	29791	29791
306	0510	FULL DEPTH RECLAMATION	SY	148295	148295
320	0100	CEMENT STABILIZED BASE COURSE	SY	148295	148295
320	0200	PORTLAND CEMENT	TON	2892	2892
401	0050	TACK COAT	GAL	35616	35616
401	0060	PRIME COAT	GAL	42825	42825
401	0160	BLOTTER MATERIAL CL 44	TON	913	913
411	0100	MILLING PAVEMENT SURFACE	TON	753	753
430	0042	SUPERPAVE FAA 42	TON	104197	104197
430	1000	CORED SAMPLE	EA	599	599
430	5818	PG 58H-34 ASPHALT CEMENT	TON	6247	6247
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	2927	2927
602	1300	BRIDGE DECK GROOVING	SF	11840	11840
602	7000	SPECIAL SURFACE FINISH	SF	5075	5075
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	747.8	747.8
650	0704	OVERLAY CONCRETE	CY	73.1	73.1
650	0707	DECK CONCRETE	CY	16.1	16.1
650	0710	CLASS 1-H REMOVAL	SY	1316	1316
650	0720	CLASS 1 REMOVAL	SY	1316	1316
650	0723	CLASS 3 REMOVAL	SY	66	66
650	0724	CLASS 4 REMOVAL	SY	13	13
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	5000	5000
704	1000	TRAFFIC CONTROL SIGNS	UNIT	5901	5901
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	2	2
704	1043	ATTENUATION DEVICE-TYPE B-65	EA	4	4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	8	2

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
704	1048	PORTABLE RUMBLE STRIPS	EA	6	6
704	1052	TYPE III BARRICADE	EA	8	8
704	1060	DELINEATOR DRUMS	EA	140	140
704	1067	TUBULAR MARKERS	EA	350	350
704	1080	STACKABLE VERTICAL PANELS	EA	180	180
704	1185	PILOT CAR	HR	2000	2000
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	80	80
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	413	413
706	0400	FIELD OFFICE	EA	1	1
706	0500	AGGREGATE LABORATORY	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	5136	5136
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	350	350
714	0820	PIPE CONC REINF 30IN CL III	LF	8	8
714	2524	CURED-IN-PLACE PIPE-24IN	LF	84	84
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	65	65
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	456	456
714	4113	PIPE CONDUIT 30IN-APPROACH	LF	202	202
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	4	4
720	0110	RIGHT OF WAY MARKERS	EA	66	66
720	0125	ALIGNMENT MONUMENTS	EA	60	60
720	0130	IRON PIN R/W MONUMENTS	EA	25	25
720	0135	IRON PIN REFERENCE MONUMENTS	EA	26	26
752	0911	TEMPORARY SAFETY FENCE	LF	3650	3650
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	169	169
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	185	185
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	1007	1007
754	0592	RESET SIGN PANEL	EA	22	22
754	0596	RESET MILE POST	EA	29	29
754	0805	OBJECT MARKERS - CULVERTS	EA	24	24
760	0010	RUMBLE STRIPS - INTERSECTION	SET	1	1
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	59.516	59.516
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	29.758	29.758
762	0422	SHORT TERM 6IN LINE-TYPE R	LF	5540	5540
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	96	96
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	221912	221912
762	1106	PVMT MK PAINTED 6IN LINE	LF	408760	408760
762	1124	PVMT MK PAINTED 24IN LINE	LF	20	20
764	0131	W-BEAM GUARDRAIL	LF	666	666
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	8	8
764	0150	REMOVE & RESET GUARDRAIL	LF	533	533
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	350	350
764	2081	REMOVE END TREATMENT & TRANSITION	EA	8	8
766	0100	MAILBOX-ALL TYPES	EA	9	9
930	9534	MODIFY DECK DRAIN	EA	32	32
930	9612	SPALL REPAIR	SF	11	11

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	8	3

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE						TOTAL
990	0400	PIPE CLEANOUT	EA	1						1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	10	1

PAVING TABLE - MAINLINE

		RP 0.000 to RP 7.335		RP 7.378 to RP 8.065		RP 8.065 to RP 10.960		RP 10.987 to RP 11.205		Mainline Totals
		Sta 0+00 to Sta 387+27.25		Sta 389+57.36 to Sta 426+00		Sta 426+00 to Sta 578+69.16		Sta 580+09.15 to Sta 592+11		
		387.27 Stations		36.43 Stations		152.69 Stations		12.02 Stations		
		Full Depth Reclamation				HMA Overlay				
Material	Unit	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station	
302-0120 Aggregate Base Course Cl 5 @ 1.875 Ton/CY *	Ton	2.00	13.89	2.00	13.89	2.80	19.44	2.80	19.44	6,887
306-0510 Full Depth Reclamation	SY	31.50	350.00	31.50	350.00	-	-	-	-	148,295
320-0100 Cement Stabilized Base Course	SY	31.50	350.00	31.50	350.00	-	-	-	-	148,295
320-0200 Portland Cement (39 LB/SY)	Ton	31.50	6.83	31.50	6.83	-	-	-	-	2,892
401-0050 Tack Coat @ 0.05 Gal/SY (Blade Level Course)	Gal	-	-	-	-	31.31	17.39	31.31	17.39	2,865
401-0050 Tack Coat @ 0.05 Gal/SY (Top Lift)	Gal	29.42	16.34	29.42	16.34	30.84	17.13	30.84	17.13	9,747
401-0060 Prime Coat @ 0.25 Gal/SY (Bottom Lift)	Gal	31.50	87.50	31.50	87.50	-	-	-	-	37,074
401-0160 Blotter Material CL 44 @ 12 LB/SY	Ton	31.50	2.10	31.50	2.10	-	-	-	-	890
430-0042 Superpave FAA 42 @ 2 Ton/CY (Blade Level Course)	Ton	-	-	-	-	1.29	9.56	1.29	9.56	1,574
430-0042 Superpave FAA 42 @ 2 Ton/CY (Bottom Lift)	Ton	5.06	37.48	5.06	37.48		-		-	15,881
430-0042 Superpave FAA 42 @ 2 Ton/CY (Top Lift)	Ton	3.59	26.59	3.59	26.59	7.35	54.44	7.35	54.44	20,235
430-5818 58H-34 Asphalt Cement @ 6% (Blade Level Course)	Ton	-	-	-	-	-	0.57	-	0.57	94
430-5818 58H-34 Asphalt Cement @ 6% (Bottom Lift)	Ton	-	2.25	-	2.25	-	-	-	-	953
430-5818 58H-34 Asphalt Cement @ 6% (Top Lift)	Ton	-	1.60	-	1.60	-	3.27	-	3.27	1,214

* Quantity excludes superelevation correction locations. See Section 30 for additional quantities.

		RP 11.205 to RP 11.308		RP 11.308 to RP 27.543		RP 27.604 to RP 29.665		RP 29.665 to RP 29.758		Mainline Totals	Mainline Grand Totals
		Sta 592+11 to Sta 597+47		Sta 597+47 to Sta 1454+26.66		Sta 1457+51.37 to Sta 1566+27		Sta 1566+27 to Sta 1571+23			
		5.36 Stations		856.8 Stations		108.76 Stations		4.96 Stations			
		Subcut		HMA Overlay				Subcut			
Material	Unit	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station	Area (SF) or Width (LF)	Quantity per Station		
302-0120 Aggregate Base Course Cl 5 @ 1.875 Ton/CY *	Ton	-	-	2.80	19.44	2.80	19.44	-	-	18,775	**25,662**
306-0510 Full Depth Reclamation	SY	-	-	-	-	-	-	-	-	-	**148,295**
320-0100 Cement Stabilized Base Course	SY	-	-	-	-	-	-	-	-	-	**148,295**
320-0200 Portland Cement (39 LB/SY)	Ton	-	-	-	-	-	-	-	-	-	**2,892**
401-0050 Tack Coat @ 0.05 Gal/SY (Blade Level Course)	Gal	-	-	31.31	17.39	31.31	17.39	-	-	16,795	**16,795**
401-0050 Tack Coat @ 0.05 Gal/SY (Top Lift)	Gal	31.01	17.23	30.48	16.93	30.48	16.93	31.01	17.23	16,528	**16,528**
401-0060 Prime Coat @ 0.25 Gal/SY (Bottom Lift)	Gal	34.01	94.47	-	-	-	-	34.01	94.47	975	**38,049**
401-0160 Blotter Material CL 44 @ 12 LB/SY	Ton	34.01	2.27	-	-	-	-	34.01	2.27	23	**913**
430-0042 Superpave FAA 42 @ 2 Ton/CY (Blade Level Course)	Ton	-	-	1.29	9.56	1.29	9.56	-	-	9,226	**10,800**
430-0042 Superpave FAA 42 @ 2 Ton/CY (Bottom Lift)	Ton	8.13	60.22	-	-	-	-	8.13	60.22	621	**16,502**
430-0042 Superpave FAA 42 @ 2 Ton/CY (Top Lift)	Ton	7.37	54.59	7.35	54.44	7.35	54.44	7.37	54.59	53,133	**73,368**
430-5818 58H-34 Asphalt Cement @ 6% (Blade Level Course)	Ton	-	-	-	0.57	-	0.57	-	-	554	**648**
430-5818 58H-34 Asphalt Cement @ 6% (Bottom Lift)	Ton	-	3.61	-	-	-	-	-	3.61	37	**990**
430-5818 58H-34 Asphalt Cement @ 6% (Top Lift)	Ton	-	3.28	-	3.27	-	3.27	-	3.28	3,188	**4,402**

* Quantity excludes superelevation correction locations. See Section 30 for additional quantities.

PAVING TABLE - GUARDRAIL WIDENING

Material	Unit	Cedar Creek RP 7.354 (South)	Cedar Creek RP 7.354 (North)	Timber Creek RP 10.970 (South)	Timber Creek RP 10.970 (North)	Cannonball RP 27.574 (South)	Cannonball RP 27.574 (North)	Totals
302-0120 Aggregate Base Course Cl 5 @ 1.875 Ton/CY	Ton	120.00	120.00	120.00	120.00	60.01	60.01	**600.02**
401-0060 Prime Coat @ 0.25 Gal/SY	Gal	71.66	71.66	71.66	71.66	71.66	71.66	**429.96**
430-0042 Superpave FAA 42 @ 2 Ton/CY	Ton	33.48	33.48	33.48	33.48	33.48	33.48	**200.88**
430-5818 58H-34 Asphalt Cement @ 6%	Ton	2.01	2.01	2.01	2.01	2.01	2.01	**12.05**

EARTHWORK

		RP 0.000 to RP 7.335	RP 7.378 to RP 8.065	RP 8.065 to RP 10.960	RP 10.987 to RP 11.205	Mainline Totals
		Sta 0+00 to Sta 387+27.25	Sta 389+57.36 to Sta 426+00	Sta 426+00 to Sta 578+69.16	Sta 580+09.15 to Sta 592+11	
		387.27 Stations	36.43 Stations	152.69 Stations	12.02 Stations	
Material	Unit	Length	Length	Length	Length	
230-0111 Foreslope	Sta	774.5	72.9	305.4	24.0	1,176.80
230-0125 Shoulder	Mile	14.67	1.37	5.79	0.44	22.27

		RP 11.205 to RP 11.308	RP 11.308 to RP 27.543	RP 27.604 to RP 29.665	RP 29.665 to RP 29.758	Mainline Totals	Mainline Grand Totals
		Sta 592+11 to Sta 597+47	Sta 597+47 to Sta 1454+26.66	Sta 1457+51.37 to Sta 1566+27	Sta 1566+27 to Sta 1571+23		
		5.36 Stations	856.8 Stations	108.76 Stations	4.96 Stations		
Material	Unit	Length	Length	Length	Length		
230-0111 Foreslope	Sta	10.7	1,713.6	217.5	9.9	1,951.7	**3,128.5**
230-0125 Shoulder	Mile	0.21	32.47	4.12	0.19	36.99	**59.26**

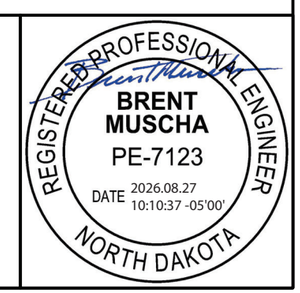
REMOVAL OF PAVEMENT

202-0136 REMOVAL OF PAVEMENT			
Location	Length (LF)	Area (SF)	Total (Ton)
Sta 426+00 to Sta 578+69.16	15,269.16	0.8	905
Sta 580+09.15 to Sta 592+11	1,201.85	0.8	71
Sta 597+47 to Sta 1454+26.66	85,679.66	0.8	5,077
Sta 1457+51.37 to Sta 1566+27	10,875.63	0.8	644
		Total	6,697

Basis of Estimate

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	10	2

CORED SAMPLES

430-1000 CORED SAMPLE							
Specification Section	Start Station	End Station	A	B		C	Quantity (EA)	Quantity (EA)
			Distance (Ft) / 1000	Lanes	Joints	Lifts	(A x B x C)	(1 per mile)
430.04 I.2.b(1), "General"	0+00	426+00	43	2	-	2	171	N/A
	426+00	1571+23	114	2	-	1	228	N/A
SSP 4 Longitudinal Joint Density in HMA Pavments (Centerline)	0+00	426+00	43	-	1	2	86	N/A
	426+00	1571+23	114	-	1	1	114	N/A
430.04 I.2.b(3), "Pavement Thickness Determination Cores"	-	-	-	-	-	-	-	N/A
						Total	599	EA

RUMBLE STRIPS - SHOULDERS

760-0025 SINUSOIDAL RUMBLE STRIPS - ASPHALT SHOULDER			
Begin Station	End Station	Basis	Quantity (Mile)
0+00	1571+23	10,560 LF/Mile	59.516

RUMBLE STRIPS - CENTERLINE

760-0027 SINUSOIDAL RUMBLE STRIPS - ASPHALT CENTERLINE			
Begin Station	End Station	Basis	Quantity (Mile)
0+00	1571+23	5,280 LF/Mile	29.758

RUMBLE STRIPS - INTERSECTION

760-0010 RUMBLE STRIPS - INTERSECTION		
Intersection Location	Basis	Quantity (SET)
ND 21	set	1

PAVEMENT MARKINGS - SHORT TERM

762-0432 SHORT TERM 6IN LINE-TYPE NR		
Location - Type	Basis	Quantity (LF)
Centerline FDR - 6in Line - Type NR (Primed Surface)	Yellow Passing Zone	11,561
	Yellow 1 way no-passing Zone	4,245
	Yellow 2 way no-passing Zone	390
Centerline FDR - 6in Line - Type NR (Bottom and Top Lifts)	Yellow Passing Zone	23,122
	Yellow 1 way no-passing Zone	8,490
	Yellow 2 way no-passing Zone	780
Centerline Overlay- 6in Line - Type NR	Yellow Passing Zone	26,249
	Yellow 1 way no-passing Zone	40,985
	Yellow 2 way no-passing Zone	11,330
Centerline FDR & Overlay - 6in Line - Type NR (2nd Application)	Yellow Passing Zone	37,810
	Yellow 1 way no-passing Zone	45,230
	Yellow 2 way no-passing Zone	11,720
	Total	221,912

PAVEMENT MARKINGS - PERMANENT

762-1106 PVMT MK PAINTED 6IN LINE		
Location - Type	Basis	Quantity (LF)
Centerline - PVMT MK painted 6in line	Centerline Skips	37,810
	Barrier Stripes	45,230
	Dbl Barrier Stripes	11,720
Edge Line - PVMT MK painted 6in line	White Edge Left & Right Lane	314,000
	Total	408,760

762-1124 PVMT MK PAINTED 24IN LINE		
Location - Type	Basis	Quantity (LF)
Stop Bar - PVMT MK painted 24in line	White Right Lane Stop Bar	20

WATER

216-0100 WATER			
Material	Basis	Basis Quantity	Quantity (Mgal)
Dust Palliative	25 Mgal/Mile	29.758 Miles	744
Aggregates	20 gal/Ton	29,791 Ton	596
Cement Stabilization	3 gal/SY	148,295 SY	445
		Total	1,785

OBJECT MARKERS

754-0805 OBJECT MARKERS - CULVERTS		
Station	Location	Quantity (EA)
96+47	Rt	2
123+60	Rt	2
164+37	Lt	2
184+86	Rt	2
220+69	Lt	2
264+33	Rt	2
322+78	Rt	2
409+18	Rt	2
424+46	Lt	2
424+71	Rt	2
	Total	20

MAILBOXES

766-0100 MAILBOX-ALL TYPES			
Station	Location	Type	Quantity (EA)
0+00	Rt	Single	1
52+66	Rt	Single	1
87+61	Rt	Single	1
237+19	Rt	Single	1
237+90	Rt	Double	1
371+53	Lt	Single	1
409+33	Rt	Single	1
424+02	Rt	Single	1
425+05	Rt	Single	1
		Total	9

Basis of Estimate

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:11:15 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	10	3

				Subtotal Description						Cumulative Totals
Spec	Code	Item Description	Unit	Mainline	Mainline - Superelevation Correcitons	Mainline - Subcut Areas	Mainline - Transition Areas	Guardrail Widening	Approaches	
202	0136	Removal of Pavement	Ton	6,697	-	1,910	-	201	-	8,808
203	0138	Common Excavation-Subcut	CY	-	-	1,558	-	-	-	1,558
203	0237	Subcut Aggregate @ 1.875 Ton/CY	Ton	-	-	4,067	-	-	-	4,067
216	0100	Water	Mgal	1,785	44	81	-	-	27	1,937
302	0120	Aggregate Base Course CL 5 @ 1.875 Ton/CY	Ton	25,662	2,200	-	-	600	1,329	29,791
306	0510	Full Depth Reclamation	SY	148,295	-	-	-	-	-	148,295
320	0100	Cement Stabilized Base Course	SY	148,295	-	-	-	-	-	148,295
320	0200	Portland Cement @ 43 LB/SY	Ton	2,892	-	-	-	-	-	2,892
401	0050	Tack Coat @ 0.05 Gal/SY	Gal	33,323	-	-	29	-	2,264	35,616
401	0060	Prime Coat @ 0.25 Gal/SY	Gal	38,049	-	-	-	430	4,346	42,825
401	0160	Blotter Material CL 44 @ 12 LB/SY	Gal	913	-	-	-	-	-	913
411	0100	Milling Pavement Surface @ 2 Ton/CY	Ton	-	-	-	753	-	-	753
430	0042	Superpave FAA 42 @ 2 Ton/CY	Ton	100,670	-	-	57	201	3,269	104,197
430	5818	PG 58H-34 Asphalt Cement @ 6%	Ton	6,040	-	-	4	12	191	6,247
709	0100	Geosyntheitc Material Type G	SY	-	-	5,136	-	-	-	5,136

Note
* Removal of Pavement quantity includes full depth of existing asphalt pavement and aggregate base course in the guardrail widening and subcut areas.

Basis of Estimate
Cumulative Summary

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:11:55 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	11	1

Roadway Cores		
Station	Location	Thickness* (inches)
0+00	Rt	5.50
10+56	Lt	6.00
21+12	Rt	5.50
31+68	Lt	5.50
42+24	Rt	5.50
52+80	Lt	5.50
63+36	Rt	6.00
73+92	Lt	5.50
84+48	Rt	6.00
95+04	Lt	5.50
105+60	Rt	8.00
116+16	Lt	5.50
126+72	Rt	6.00
137+28	Lt	6.50
147+84	Rt	5.50
158+40	Lt	6.50
168+96	Rt	5.00
179+52	Lt	5.50
190+08	Rt	7.50
200+64	Lt	7.50
211+20	Rt	5.50
221+76	Lt	5.00
232+32	Rt	5.25
242+88	Lt	5.50
253+44	Rt	6.00
264+00	Lt	6.00
274+56	Rt	7.00
285+12	Lt	5.75
295+68	Rt	4.50
306+24	Lt	5.50
316+80	Rt	5.50
327+36	Lt	5.50
337+92	Rt	6.50
348+48	Lt	5.50
359+04	Rt	6.50
369+60	Lt	6.50
380+16	Rt	5.50
390+72	Lt	7.00
401+28	Rt	6.25
411+84	Lt	7.00
422+40	Rt	7.50

* The bottom 2.5 inches of the cores were reported as gravel base with oil added. This is included in the total thickness above.

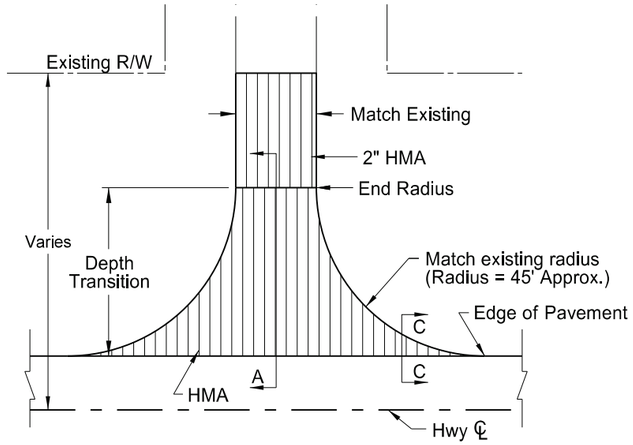
Existing Core Data

ND 49 - State Line to Jct ND 21

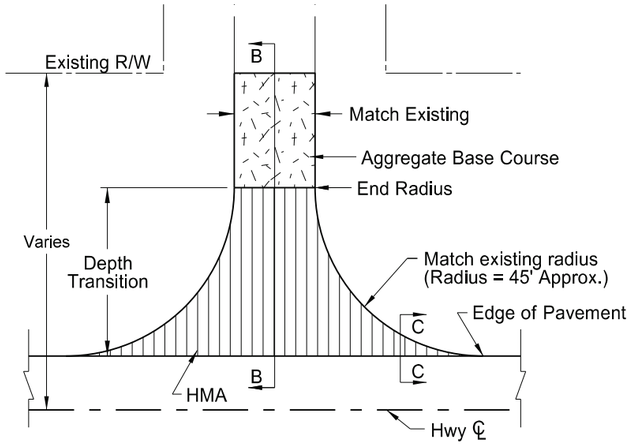
Full Depth Reclamation

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:26:51 -05'00'
NORTH DAKOTA

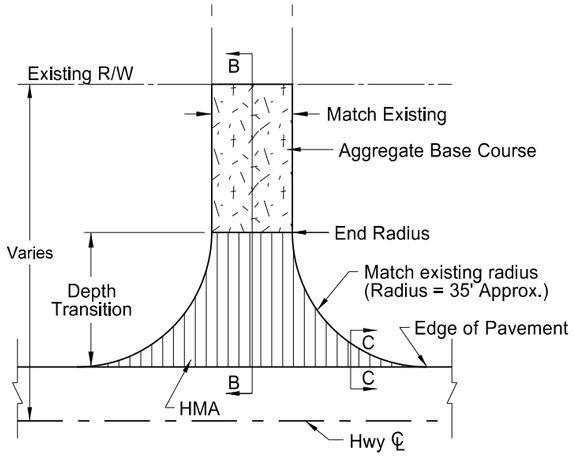
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	1



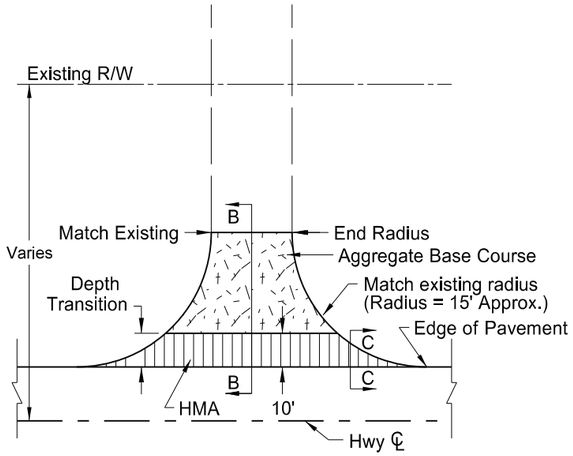
(1) Paved Section Line, County Road, or Street Approach



(2) Gravel Section Line, County Road, or Street Approach



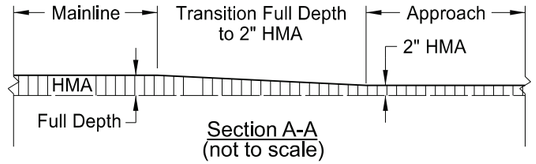
(3) Gravel Private Drive Approach



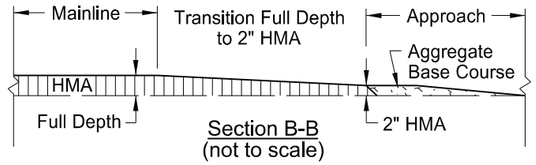
(4) Field Drive Approach

Notes:

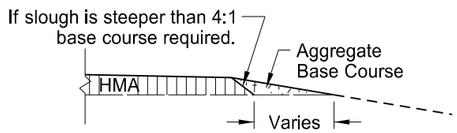
1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



Section A-A
(not to scale)



Section B-B
(not to scale)



Section C-C
(not to scale)

BASIS OF ESTIMATE				(1)	(2)	(3)	(4)	
SPEC	CODE	ITEM	UNIT	Paved Street	Gravel Section Line	Gravel Private Drive	Field Drive	TOTALS
		Number of Locations	#	1	46	26	84	157
216	0100	WATER	MGAL	N/A	0.21	0.26	0.23	36
302	0120	AGGREGATE BASE COURSE CL 5	TON	N/A	10.3	13.1	11.5	1780
401	0050	TACK COAT	GAL	18.5	13.4	9.8	4.1	1234
401	0060	PRIME COAT	GAL	N/A	67.1	48.9	20.3	6063
430	0042	SUPERPAVE FAA 42	TON	50.8	39.8	28.9	11.9	3633
430	5818	PG 58H-34 ASPHALT CEMENT	TON	3.1	2.4	1.7	0.7	217

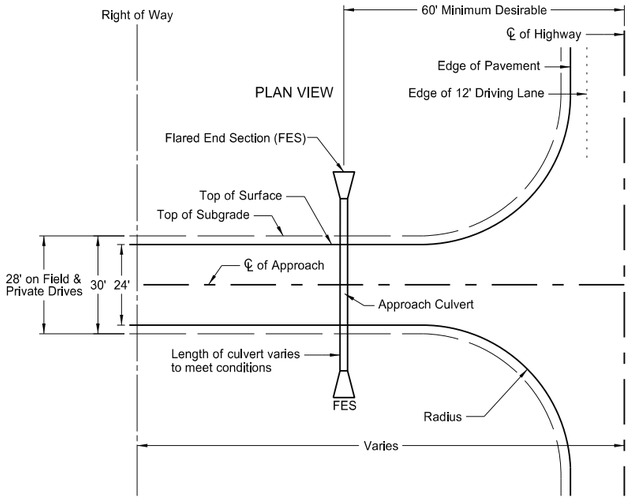
Approach Paving Details
for Existing Rural Approaches
(No Approach Grading)

ND 49 - State Line to Jct ND 21

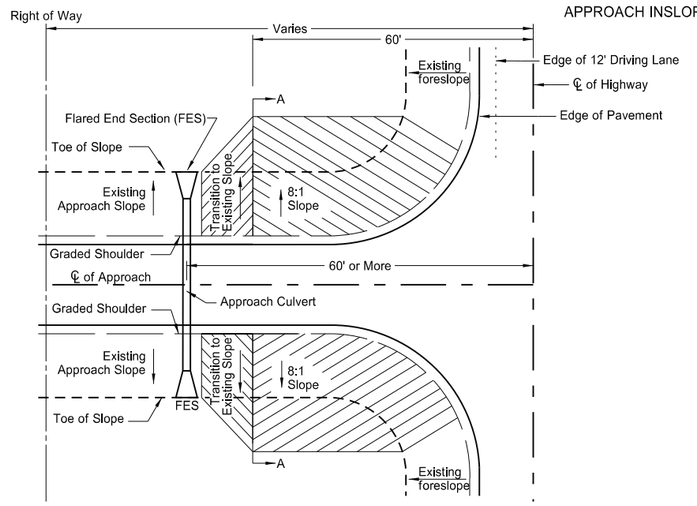
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:45:01 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	2

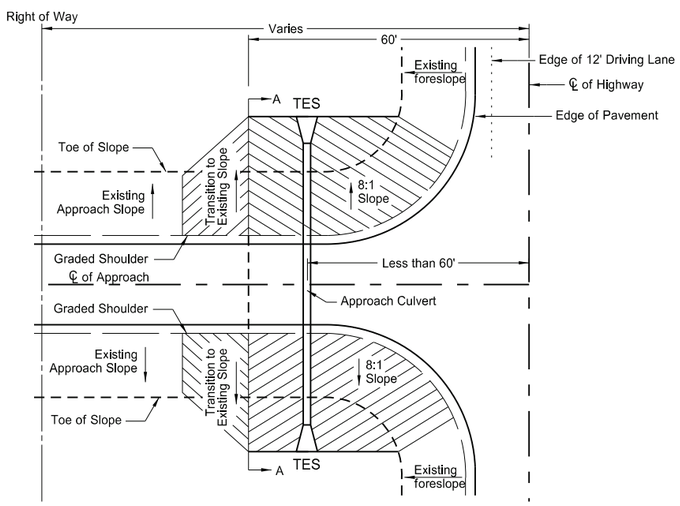


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄

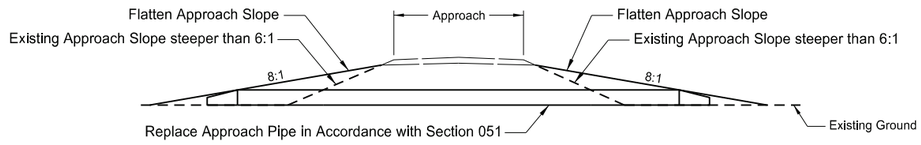


CASE 2

APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

203 0215 - APPROACH FORESLOPE RECONSTRUCTION								
Location (RP)	Location (Sta)	Direction	Quantity (EA)		Existing Slope		Estimated Fill Volume* (CY)	
			BK	AHD	BK	AHD	BK	AHD
1.818	96+47	Rt	1	1	4.7	4.8	29	23
2.318	123+60	Rt	1	1	8.3	5.9	35	54
3.092	164+37	Lt	1	1	5.8	4.3	16	33
3.481	184+86	Rt	1	1	5.3	5.4	14	27
4.156	220+69	Lt	1	1	3.7	3.2	60	39
4.983	264+33	Rt	-	1	8.8	5.1	0	50
6.116	322+78	Rt	1	1	4.6	5.0	27	39
7.086	374+68	Lt	-	1	6.6	5.1	0	20
7.263	384+05	Lt	-	1	10.2	4.9	0	12
7.739	409+18	Rt	1	1	4.9	5.2	12	35
8.036	424+46	Lt	1	1	4.9	5.2	35	35
8.040	424+71	Rt	-	1	7.5	5.7	0	29
Total			20		Total		625	

*Estimated Fill Volume is included in "Approach Foreslope Reconstruction" bid item. A 35% Shrinkage Factor was used for estimated quantity.



SECTION A-A

Approach Slope Flattening Detail

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:46:30 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	3

Approach Description			
RP	Station	Type	Location
0.000	0+00	Gravel Section Line (State Line)	Rt
0.000	0+00	Gravel Section Line (State Line)	Lt
0.196	10+44	Field Drive	Rt
0.196	10+44	Field Drive	Lt
0.284	15+02	Gravel Private	Lt
0.438	23+13	Field Drive	Rt
0.438	23+13	Field Drive	Lt
0.784	41+42	Field Drive	Rt
0.784	41+45	Field Drive	Lt
1.001	52+89	Gravel Section Line (101st St SW)	Lt
1.001	52+89	Gravel Section Line (101st St SW)	Rt
1.250	66+44	Field Drive	Rt
1.644	87+25	Field Drive	Rt
1.644	87+30	Gravel Private	Lt
1.818	96+47	Field Drive	Rt
1.994	105+76	Gravel Section Line (100th St SW)	Rt
1.994	105+75	Gravel Section Line (100th St SW)	Lt
2.318	123+60	Field Drive	Rt
2.318	123+64	Field Drive	Lt
2.479	132+08	Field Drive	Lt
2.981	158+59	Gravel Section Line (99th St SW)	Rt
2.981	158+54	Gravel Section Line (99th St SW)	Lt
3.092	164+37	Field Drive	Lt
3.481	184+86	Field Drive	Rt
3.543	188+15	Field Drive	Lt
3.790	201+13	Field Drive	Lt
3.985	211+39	Gravel Section Line (98th St SW)	Rt
3.985	211+49	Gravel Section Line (98th St SW)	Lt
4.156	220+69	Field Drive	Lt
4.209	223+55	Field Drive	Rt
4.209	223+55	Gravel Private	Lt
4.275	227+08	Field Drive	Lt
4.473	237+50	Gravel Private	Lt
4.476	237+66	Gravel Private	Rt
4.780	253+64	Field Drive	Rt
4.780	253+65	Gravel Private	Lt
4.983	264+33	Gravel Section Line (97th St SW)	Rt
4.983	264+32	Gravel Section Line (97th St SW)	Lt
5.487	290+32	Field Drive	Rt
5.495	290+75	Field Drive	Lt
5.856	309+76	Field Drive	Rt
6.020	317+67	Gravel Section Line	Lt
6.116	322+78	Gravel Private	Rt
7.016	371+10	Gravel Section Line (95th St SW)	Lt
7.019	371+23	Gravel Section Line (95th St SW)	Rt
7.086	374+68	Field Drive	Lt
7.263	384+05	Field Drive	Rt
7.263	384+05	Field Drive	Lt

Approach Description			
RP	Station	Type	Location
7.510	397+07	Field Drive	Rt
7.519	397+57	Field Drive	Lt
7.739	409+18	Gravel Private	Rt
7.777	411+21	Field Drive	Lt
8.036	424+46	Gravel Section Line (94th St SW)	Lt
8.040	424+71	Gravel Section Line (94th St SW)	Rt
8.281	437+45	Gravel Private	Lt
8.513	449+72	Field Drive	Lt
9.037	477+45	Field Drive	Rt
9.037	477+45	Field Drive	Lt
9.720	513+61	Field Drive	Rt
9.720	513+61	Field Drive	Lt
10.038	530+42	Gravel Section Line (92nd St SW)	Lt
10.431	551+19	Field Drive	Rt
10.535	556+72	Field Drive	Lt
10.721	566+61	Field Drive	Rt
10.721	566+60	Field Drive	Lt
10.911	576+61	Field Drive	Rt
10.911	576+59	Field Drive	Lt
11.038	583+30	Gravel Section Line (91st St SW)	Rt
11.038	583+27	Field Drive	Lt
11.530	609+13	Field Drive	Rt
11.666	616+60	Gravel Private	Lt
11.793	623+00	Gravel Private	Rt
11.793	623+00	Gravel Private	Lt
12.041	636+04	Gravel Section Line (90th St SW)	Rt
12.041	636+08	Field Drive	Lt
12.542	662+54	Field Drive	Lt
13.041	688+95	Field Drive	Rt
13.110	692+58	Field Drive	Rt
13.233	699+06	Field Drive	Lt
14.042	741+82	Gravel Section Line (88th St SW)	Rt
14.042	741+82	Gravel Section Line (88th St SW)	Lt
14.628	772+62	Field Drive	Rt
14.800	781+65	Field Drive	Lt
15.047	794+71	Field Drive	Rt
15.047	794+71	Field Drive	Lt
15.552	821+40	Field Drive	Rt
15.552	821+39	Field Drive	Lt
16.048	847+63	Gravel Section Line	Rt
16.048	847+61	Gravel Section Line	Lt
16.845	889+73	Gravel Private	Lt
17.045	900+28	Gravel Section Line (85th St SW)	Rt
17.050	900+59	Gravel Section Line (85th St SW)	Lt
17.372	917+59	Field Drive	Lt
17.573	928+20	Field Drive	Lt
18.052	953+61	Gravel Section Line (84th St SW)	Lt
18.052	953+67	Gravel Section Line (84th St SW)	Rt

Approach Description			
RP	Station	Type	Location
19.054	1006+26	Gravel Section Line (83rd St SW)	Lt
19.054	1006+26	Gravel Section Line (83rd St SW)	Rt
19.447	1027+03	Field Drive	Lt
19.447	1027+03	Gravel Private	Rt
20.057	1059+36	Gravel Section Line (82nd St SW)	Lt
20.057	1059+35	Gravel Section Line (82nd St SW)	Rt
20.251	1069+59	Field Drive	Rt
20.467	1081+05	Field Drive	Lt
20.724	1094+61	Field Drive	Lt
20.810	1099+03	Gravel Private	Rt
21.057	1112+22	Field Drive	Lt
21.057	1112+22	Field Drive	Rt
21.246	1122+24	Field Drive	Lt
21.246	1122+23	Field Drive	Rt
22.063	1165+08	Gravel Section Line (80th St SW)	Lt
22.063	1165+07	Gravel Section Line (80th St SW)	Rt
22.310	1178+14	Field Drive	Lt
22.474	1186+80	Field Drive	Rt
22.670	1197+12	Field Drive	Rt
22.782	1203+17	Field Drive	Rt
22.785	1203+05	Gravel Private	Lt
23.076	1218+60	Gravel Section Line (79th St SW)	Rt
23.088	1219+27	Gravel Section Line (79th St SW)	Lt
23.225	1226+51	Field Drive	Lt
23.225	1226+47	Field Drive	Rt
23.548	1243+54	Gravel Section Line (78th St SW)	Rt
23.551	1243+69	Field Drive	Lt
23.841	1259+01	Field Drive	Rt
23.846	1259+31	Field Drive	Lt
24.548	1296+45	Gravel Section Line (77th St SW)	Rt
24.548	1296+42	Gravel Section Line (77th St SW)	Lt
24.815	1310+54	Field Drive	Rt
25.318	1336+95	Field Drive	Rt
25.349	1338+60	Gravel Private	Lt
25.551	1349+30	Gravel Section Line (76th St SW)	Lt
25.551	1349+29	Field Drive	Rt
25.994	1372+65	Field Drive	Rt
26.001	1373+09	Gravel Private	Lt
26.052	1375+75	Gravel Private	Rt
26.552	1402+29	Gravel Section Line (75th St SW)	Rt
26.552	1402+21	Gravel Section Line (75th St SW)	Lt
26.832	1416+96	Field Drive	Lt
27.135	1432+97	Field Drive	Lt
27.135	1432+94	Field Drive	Rt
27.303	1441+75	Gravel Private	Rt
27.836	1469+75	Field Drive	Lt
27.930	1474+70	Gravel Private	Rt
28.190	1488+43	Gravel Private	Lt

Approach Description			
RP	Station	Type	Location
28.584	1509+25	Gravel Section Line (73rd St SW)	Rt
28.584	1509+27	Gravel Section Line (73rd St SW)	Lt
28.866	1524+10	Gravel Private	Rt
28.961	1529+15	Gravel Private	Lt
29.087	1535+79	Field Drive	Rt
29.373	1550+89	Field Drive	Rt
29.599	1562+84	Field Drive	Lt
29.599	1562+84	Gravel Section Line (5th St)	Rt
29.624	1564+17	Gravel Private (Cemetary)	Rt
29.624	1564+21	Gravel Private (Cemetary)	Lt
29.670	1566+43	Paved Public Road (Railway St)	Rt
29.677	1566+95	Field Drive	Lt

Approach Descriptions

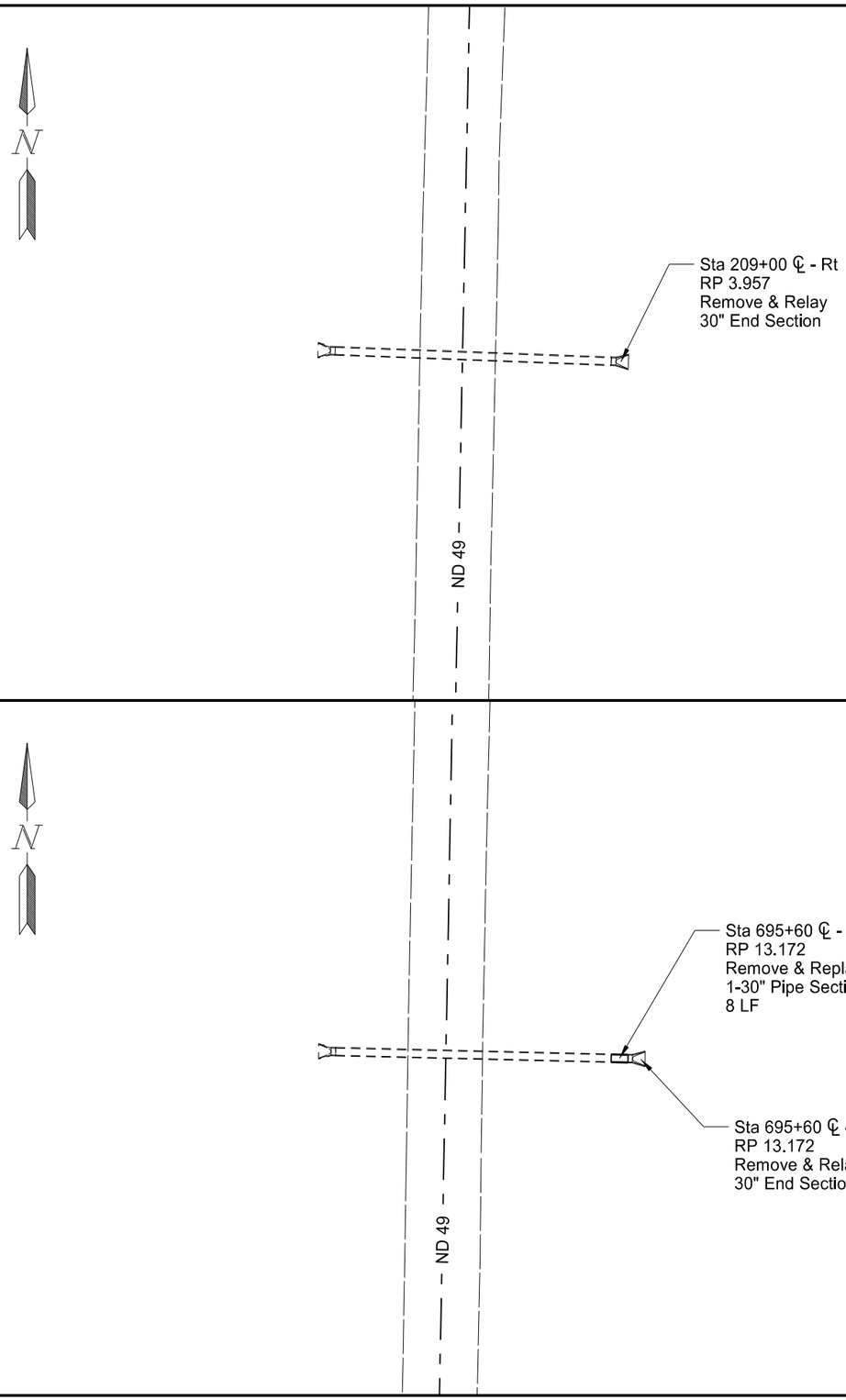
ND 49 - State Line to Jct ND 21

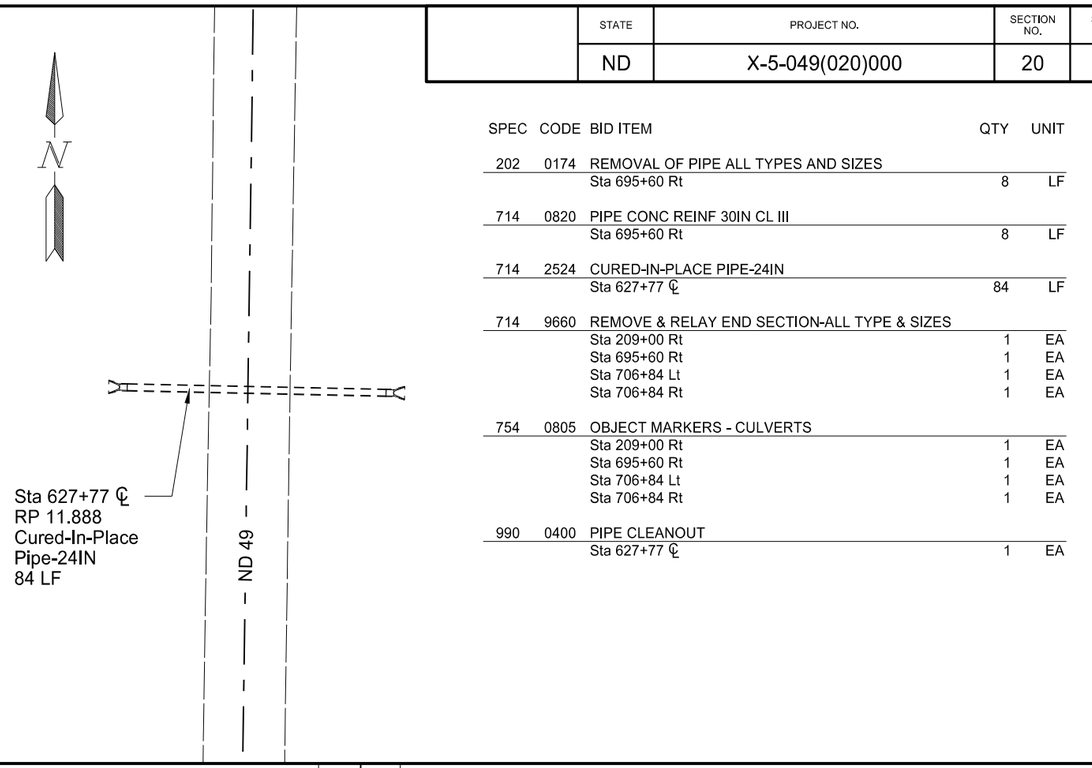
Full Depth Reclamation & HMA Overlay

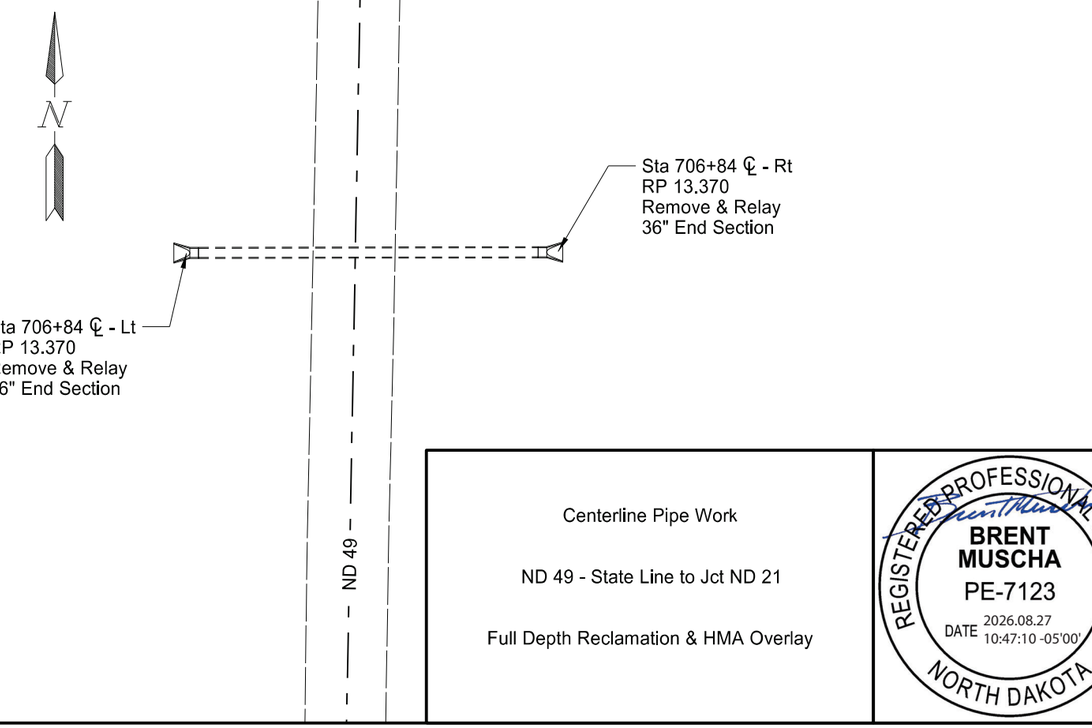
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:46:54 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	4

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		Sta 695+60 Rt	8	LF
714	0820	PIPE CONC REINF 30IN CL III		
		Sta 695+60 Rt	8	LF
714	2524	CURED-IN-PLACE PIPE-24IN		
		Sta 627+77 ℄	84	LF
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES		
		Sta 209+00 Rt	1	EA
		Sta 695+60 Rt	1	EA
		Sta 706+84 Lt	1	EA
		Sta 706+84 Rt	1	EA
754	0805	OBJECT MARKERS - CULVERTS		
		Sta 209+00 Rt	1	EA
		Sta 695+60 Rt	1	EA
		Sta 706+84 Lt	1	EA
		Sta 706+84 Rt	1	EA
990	0400	PIPE CLEANOUT		
		Sta 627+77 ℄	1	EA







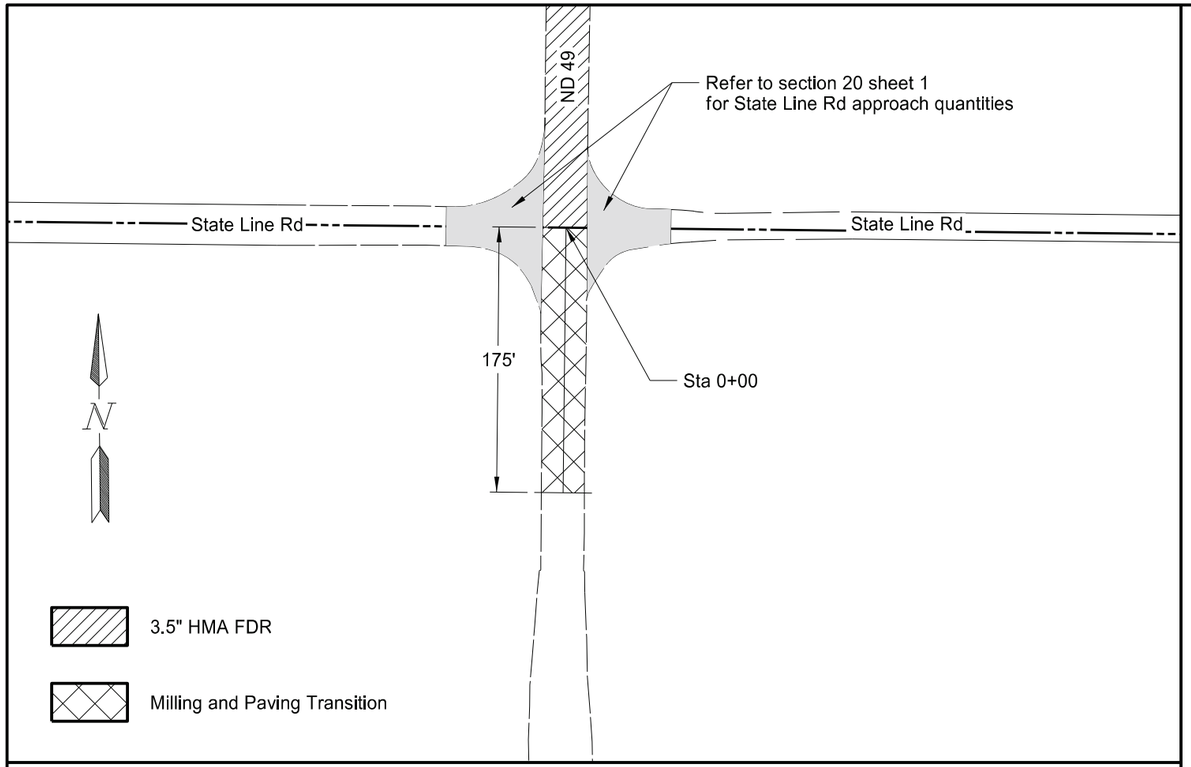
Centerline Pipe Work

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:47:10 -05'00'
NORTH DAKOTA

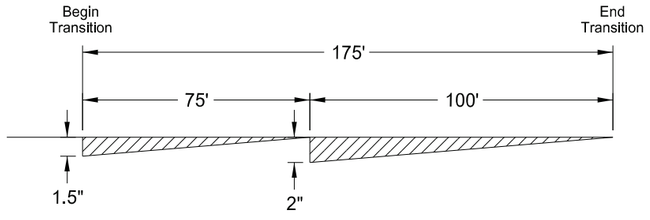
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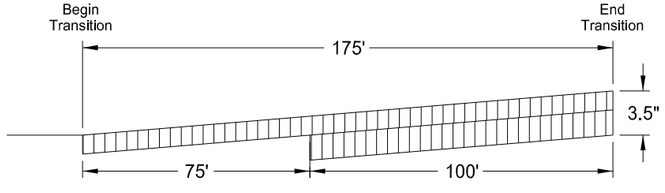
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	5

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		Milling and Paving Transition	29	GAL
411	0100	MILLING PAVEMENT SURFACE		
		Milling and Paving Transition	29	TON
430	0042	SUPERPAVE FAA 42		
		Milling and Paving Transition	57	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		Milling and Paving Transition	4	TON

Profile View



Milling Transition



Paving Transition

Note - Profile View is not to scale

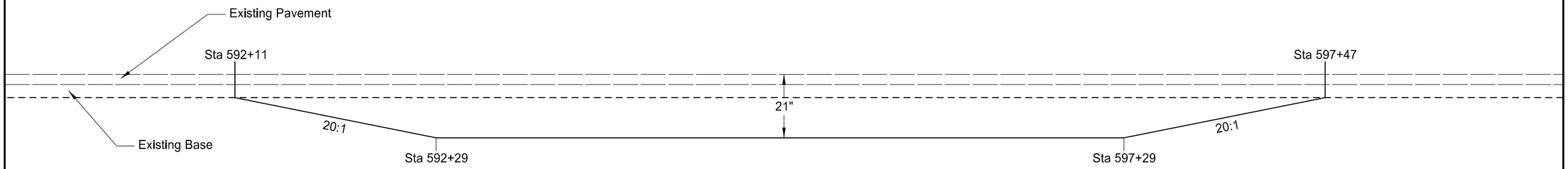
Paving Transition Detail
State Line Road Intersection

ND 49 - State Line to Jct ND 21

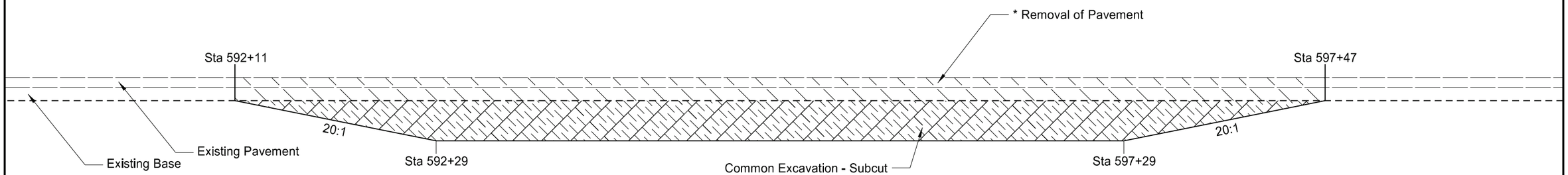
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:47:23 -05'00'
NORTH DAKOTA

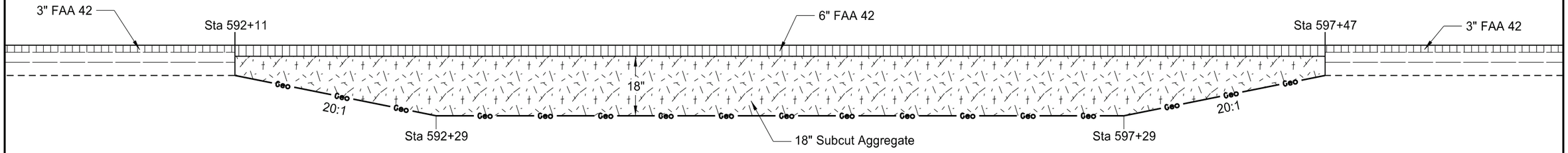
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	20	6



Existing Detail



Removal Detail



Note
* Removal of Pavement quantity includes full depth of existing asphalt pavement and aggregate base course.

Proposed Detail

BASIS OF ESTIMATE				
SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	136	REMOVAL OF PAVEMENT	TON	992
203	138	COMMON EXCAVATION-SUBCUT	CY	761
203	237	SUBCUT AGGREGATE	TON	2,126
216	100	WATER	MGAL	43
709	100	GEOSYNTHETIC MATERIAL TYPE G	SY	2,677

Note - Not to scale

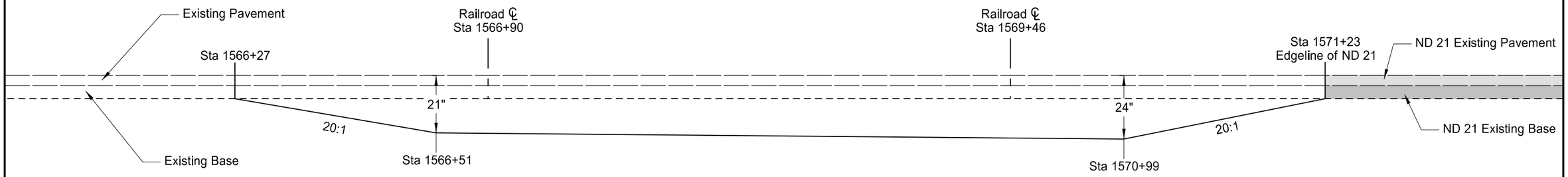
Subcut Detail

ND 49 - State Line to Jct ND 21

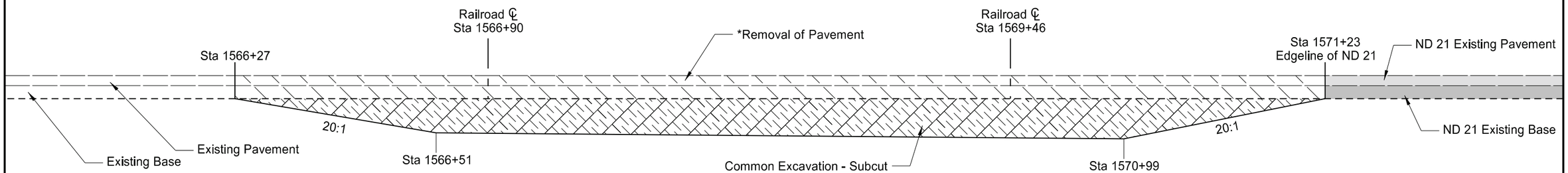
Sta 592+11 to Sta 597+47
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:47:37 -05'00'
NORTH DAKOTA

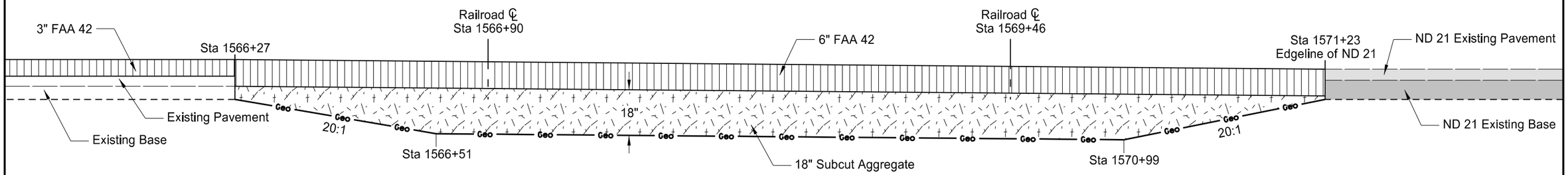
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	20	7



Existing Detail



Removal Detail



Proposed Detail

BASIS OF ESTIMATE				
SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	136	REMOVAL OF PAVEMENT	TON	918
203	138	COMMON EXCAVATION-SUBCUT	CY	797
203	237	SUBCUT AGGREGATE	TON	1,941
216	100	WATER	MGAL	39
709	100	GEOSYNTHETIC MATERIAL TYPE G	SY	2,459

Note - Not to scale

Note
* Removal of Pavement quantity includes full depth of existing asphalt pavement and aggregate base course.

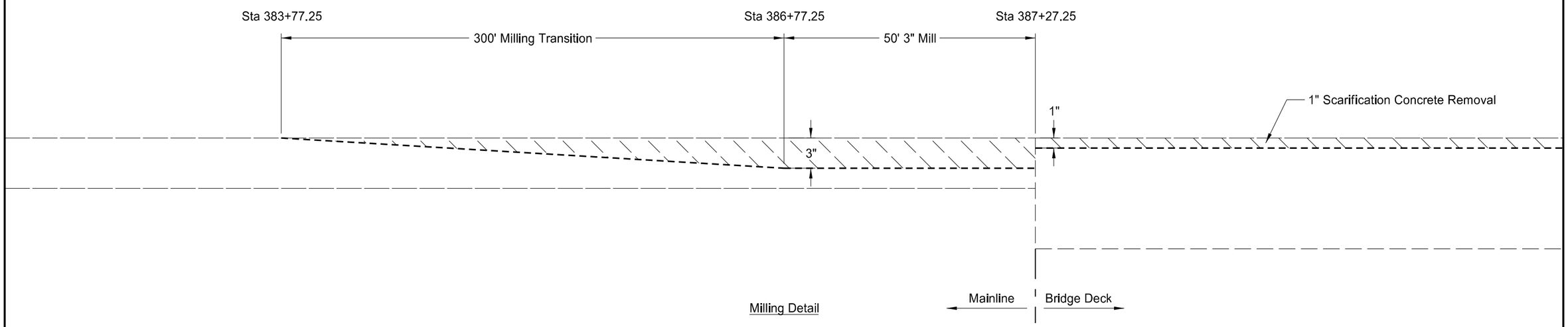
Subcut and Railroad Removal Detail

ND 49 - State Line to Jct ND 21

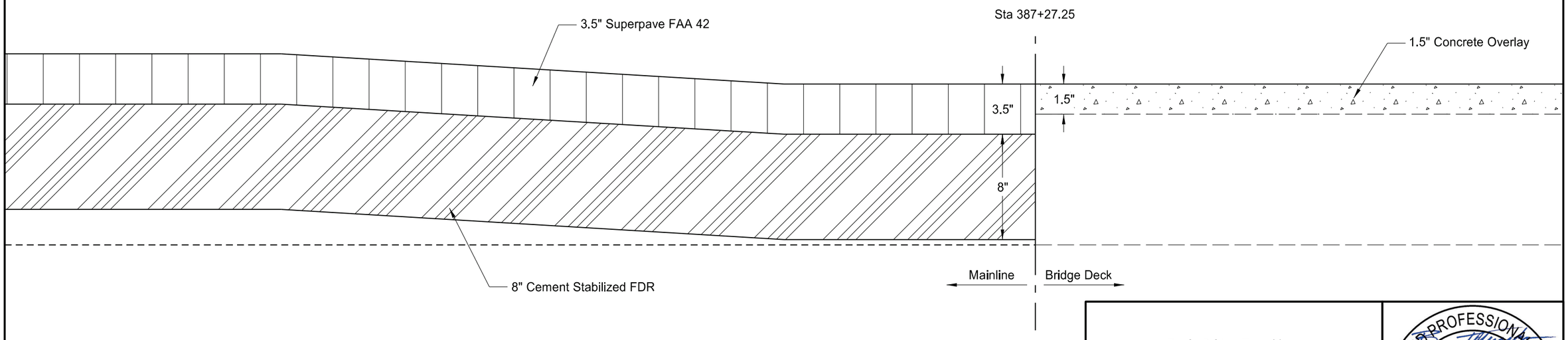
Sta 1566+27 to Sta 1571+23
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:47:48 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	8



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 383+77.25 to Sta 387+27.25	89	TON

Note - Not to scale

Begin Bridge Transitions

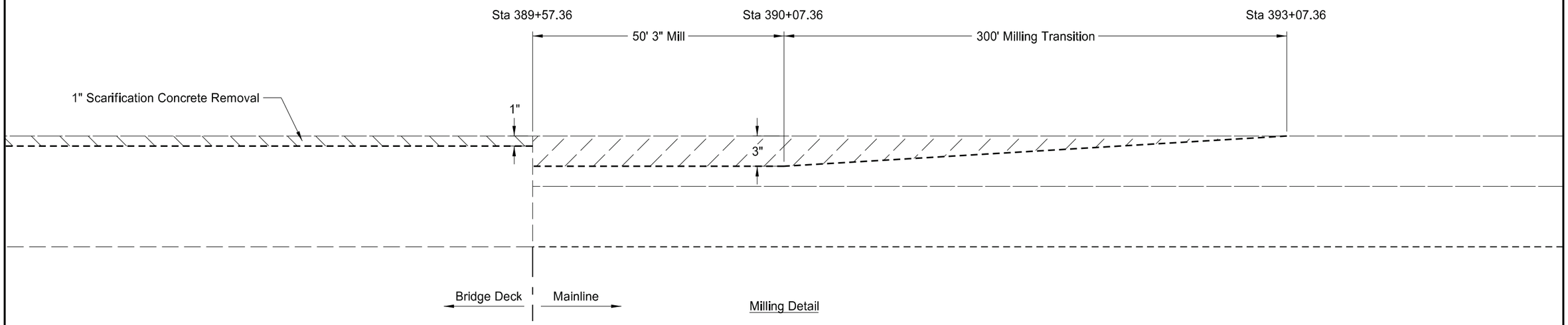
ND 49 - State Line to Jct ND 21

Cedar Creek Bridge
RP 7.278 to RP 7.335

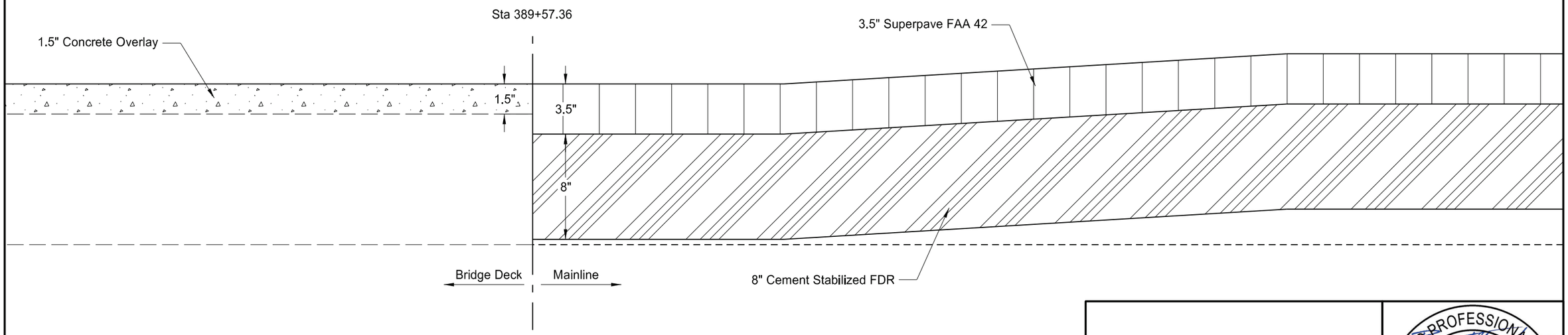
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:48:02 -05'00'
NORTH DAKOTA

8/26/2026 12:32:29 PM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\020\020GD_008-013_Bridge Transitions.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	9



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 389+57.36 to Sta 393+07.36	89	TON

Note - Not to scale

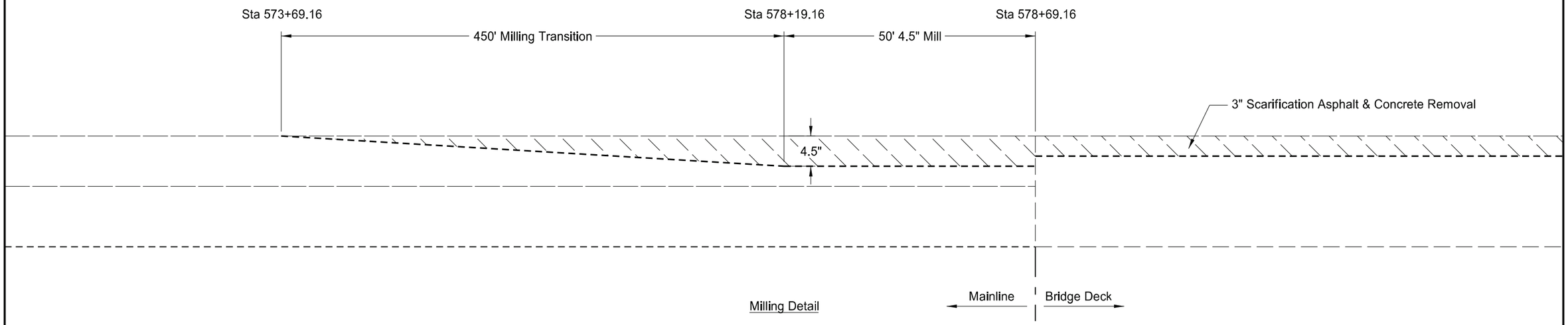
End Bridge Transitions

ND 49 - State Line to Jct ND 21

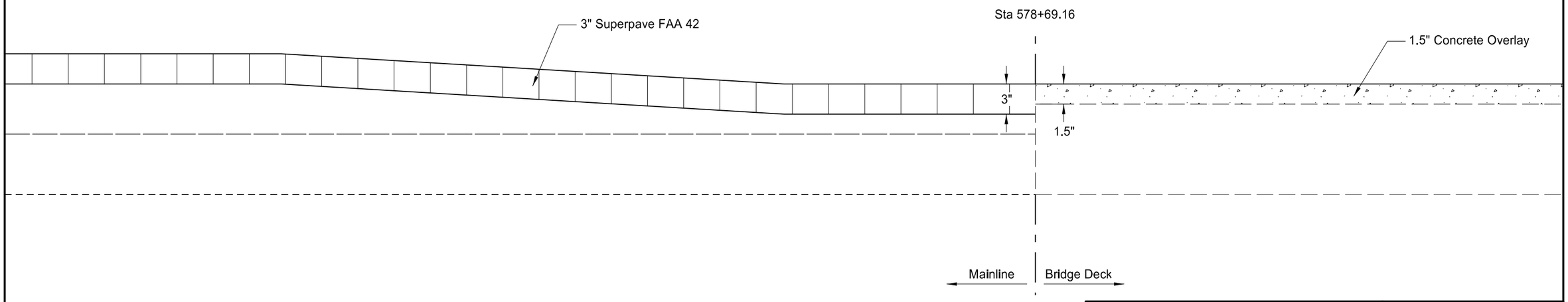
Cedar Creek Bridge
RP 7.378 to RP 7.435

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:48:21 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	10



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 573+69.16 to Sta 578+69.16	184	TON

Note - Not to scale

Begin Bridge Transition

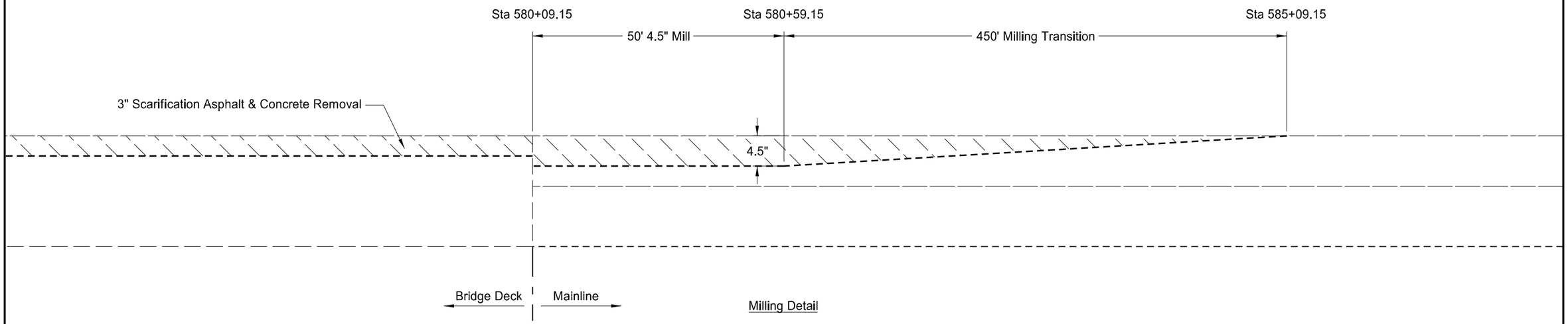
ND 49 - State Line to Jct ND 21

Timber Creek Bridge
RP 10.884 to RP 10.960

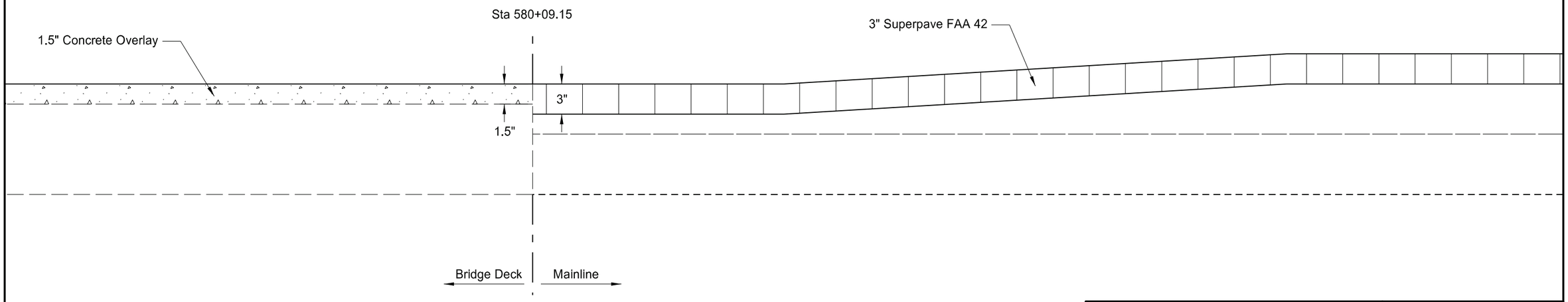
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:48:37 -05'00'
NORTH DAKOTA

8/26/2026 12:32:30 PM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\020\020GD_008-013_Bridge Transitions.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	11



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 580+09.15 to Sta 585+09.15	184	TON

Note - Not to scale

End Bridge Transition

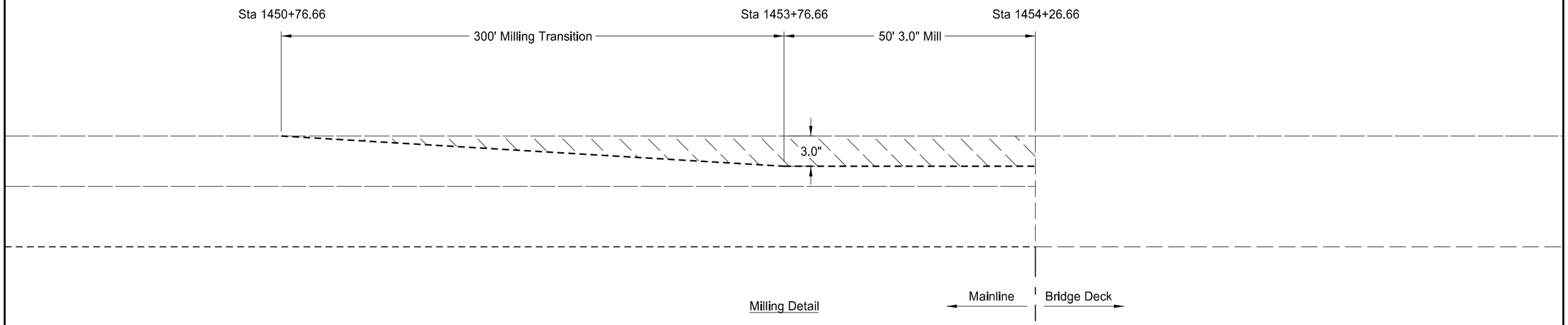
ND 49 - State Line to Jct ND 21

Timber Creek Bridge
RP 10.987 to RP 11.062

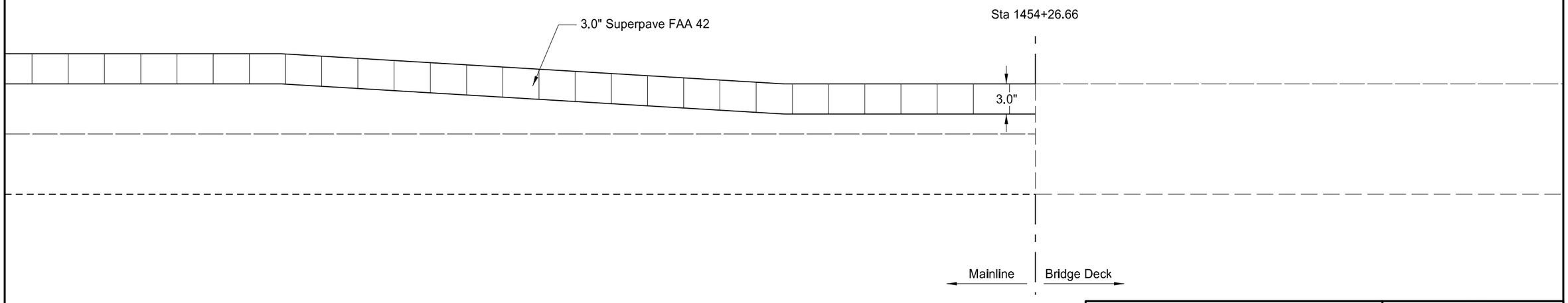
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BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:48:50 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	12



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 1450+76.66 to Sta 1454+26.66	89	TON

Note - Not to scale

Begin Bridge Transition

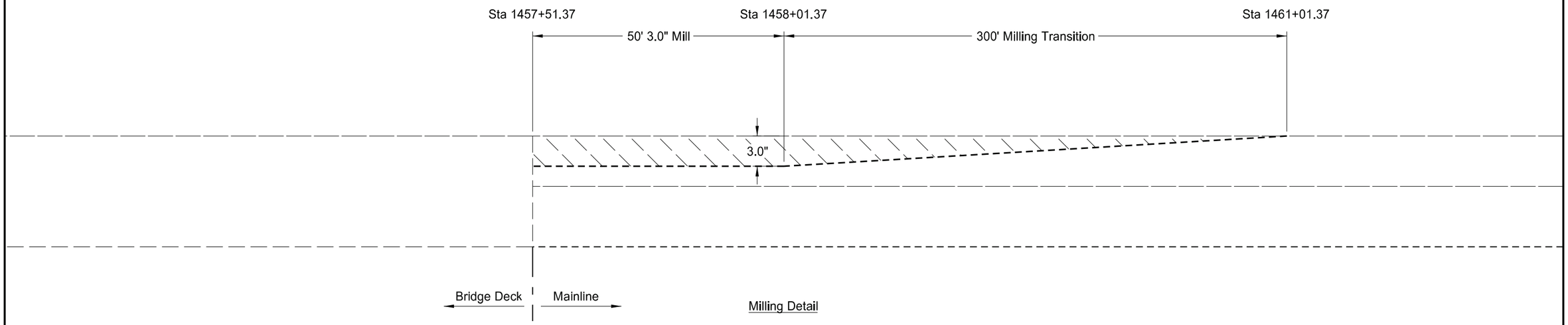
ND 49 - State Line to Jct ND 21

Cannonball River Bridge
RP 27.475 to RP 27.543

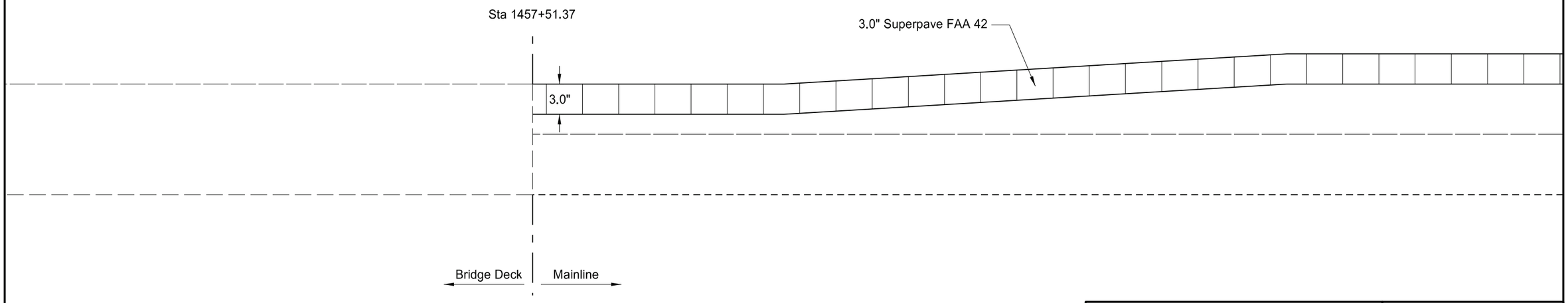
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:49:03 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	13



Milling Detail



Paving Detail

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE Sta 1457+51.37 to Sta 1461+01.37	89	TON

Note - Not to scale

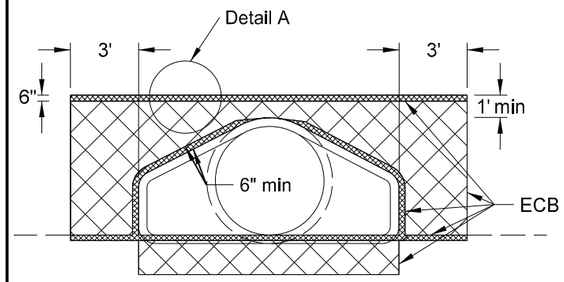
Begin Bridge Transition

ND 49 - State Line to Jct ND 21

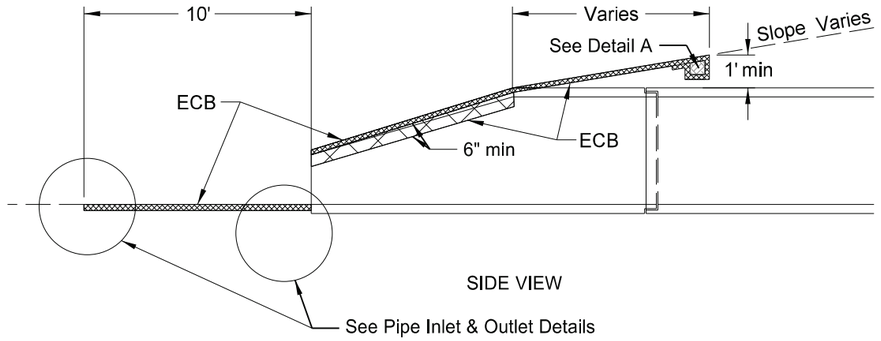
Cannonball River Bridge
RP 27.604 to RP 27.670

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:49:17 -05'00'
NORTH DAKOTA

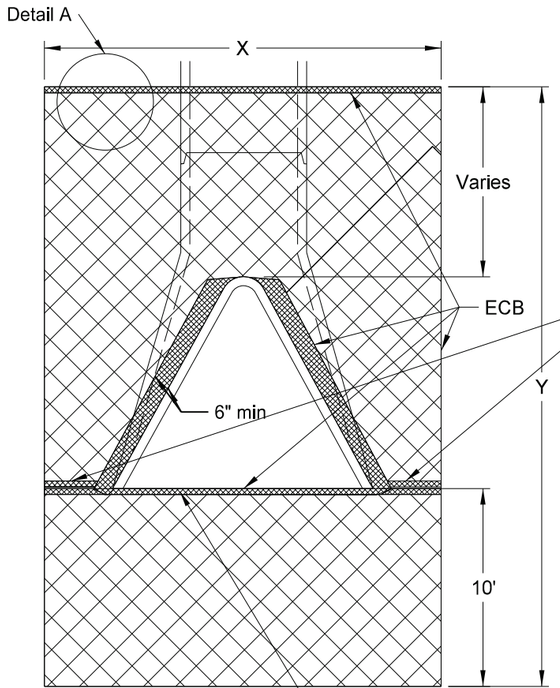
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	14



FRONT VIEW



SIDE VIEW



TOP VIEW

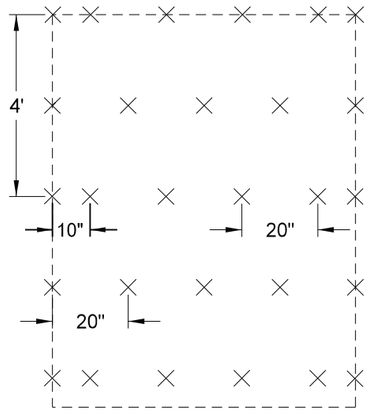
Tuck this end a minimum of 6" into the embankment.

Inlet side - see applicable detail for pipe inlet.
Outlet side - see applicable detail for pipe outlet.

NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.

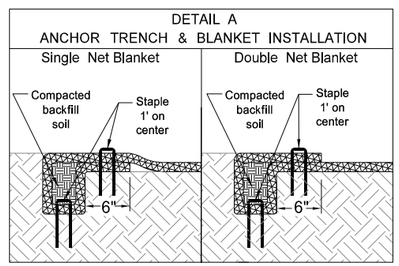
APPROACH CULVERTS - TES				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
18	9.5	20.7	190.7	22
24	10.5	21.6	214.1	24
30	11.6	22.5	241.5	27
Note: Quantities based on 8:1 slope.				

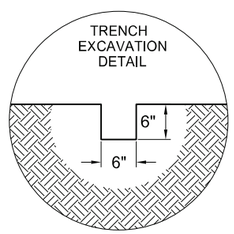
CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
Note: Quantities based on 4:1 slope.				

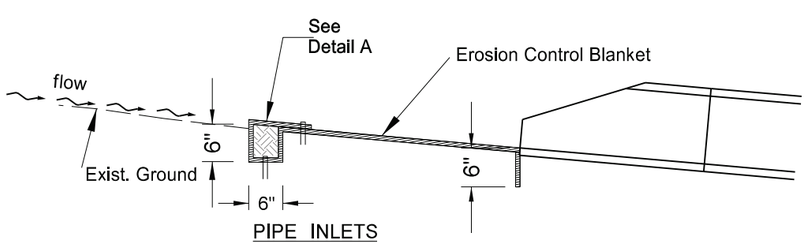


STAPLE PATTERN

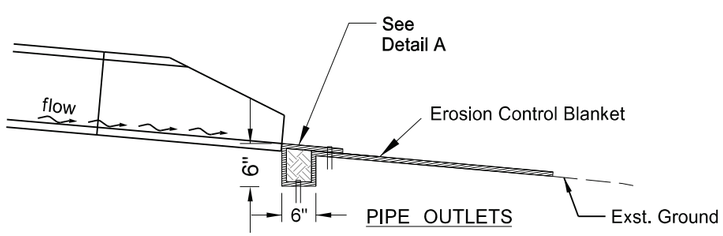
255 0103 ECB TYPE 3 APPROACH/CL CULVERTS							
Location to be Protected	Culvert Type	Pipe Diam	No.	X	Y	Unit Quantity	Total Quantity
Station	Appr/CL	(IN)		(FT)	(FT)	(SY)	(SY)
96+47 Rt	Appr	24	2	10.5	21.6	24	48
96+47 Rt	Appr	24	2	10.5	21.6	24	48
123+87 Rt	Appr	30	2	11.6	22.5	27	54
123+88 Rt	Appr	30	2	11.6	22.5	27	54
164+37 Lt	Appr	30	2	11.6	22.5	27	54
184+86 Rt	Appr	30	2	11.6	22.5	27	54
209+00 Rt	CL	30	1	11.6	18.5	22	22
220+69 Lt	Appr	18	2	9.5	20.7	22	44
264+62 Rt	Appr	24	2	10.5	21.6	24	48
322+78 Rt	Appr	24	2	10.5	21.6	24	48
409+18 Rt	Appr	24	2	10.5	21.6	24	48
424+46 Lt	Appr	24	2	10.5	21.6	24	48
424+47 Lt	Appr	24	2	10.5	21.6	24	48
424+99 Rt	Appr	18	2	9.5	20.7	22	44
695+60 Rt	CL	30	1	11.6	18.5	22	22
706+84 Lt	CL	36	1	12.7	19.2	24	24
706+84 Rt	CL	36	1	12.7	19.2	24	24
					TOTALS		732







PIPE INLETS



PIPE OUTLETS

Erosion Control at Culvert Flared End Sections

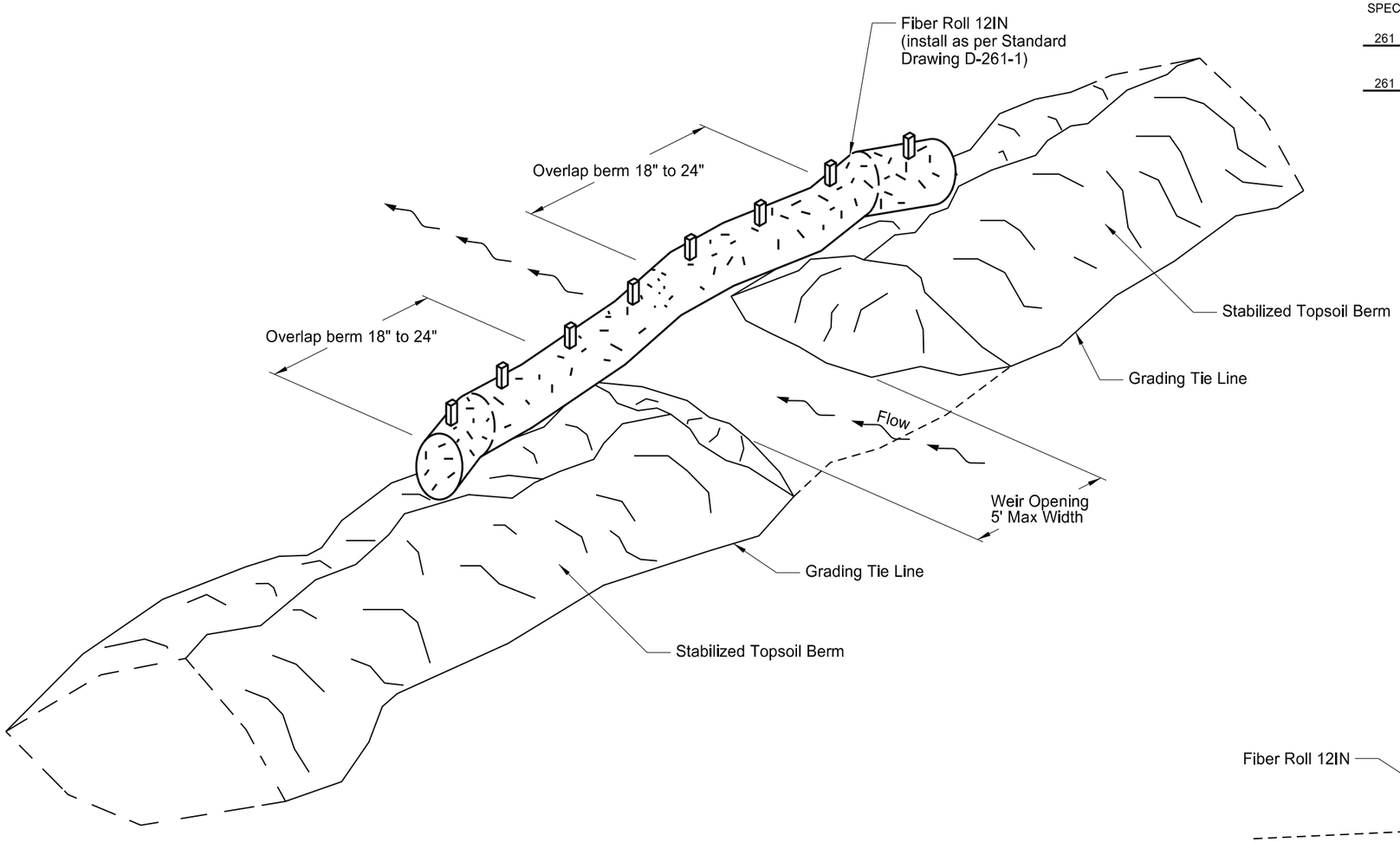
ND 49 - State Line to Jct ND 21

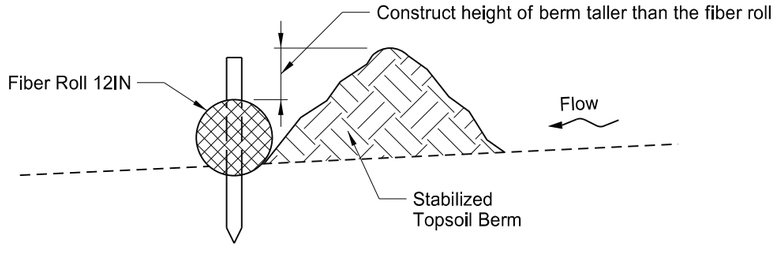
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:49:33 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	20	15

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		Weir Locations	1,500	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Weir Locations	1,500	LF





Topsoil Berm Detail

Notes:

1. Windrow the existing topsoil from the foreslope to create a berm at the grading tie line.
2. Stabilize berms in accordance with the Construction General Permit.
3. Place weirs intermittently throughout the length of the berm to allow stormwater to drain through the berm.
4. Avoid placing weirs adjacent to waterbodies.
5. Install fiber rolls as the weirs are created in the topsoil berm.
6. The Engineer will measure and pay for fiber rolls separately.
7. The Engineer will measure and pay for removal of fiber rolls separately when required by the specifications.
8. Include the costs to create, stabilize, install temporary cover crop, maintain, and dismantle the berm in the unit price bid for "Foreslope Reshaping".

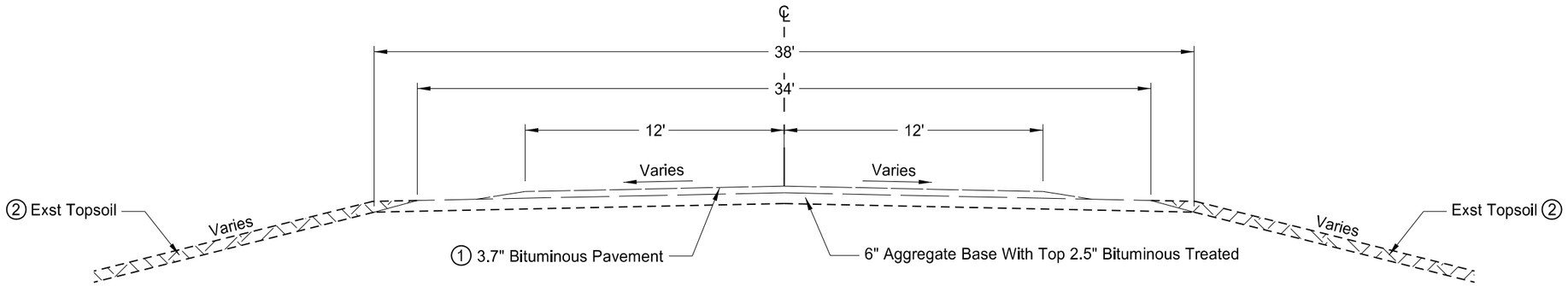
Temporary Topsoil Berm and Weir Detail

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 10:49:53 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	1



Existing Typical Section
Sta 0+00 to Sta 387+27 (RP 0.000 to RP 7.335)
Sta 389+57 to Sta 578+69 (RP 7.378 to RP 10.960)
Sta 580+09 to Sta 1454+27 (RP 10.987 to RP 27.543)
Sta 1457+51 to Sta 1571+23 (RP 27.604 to RP 29.758)

① Existing pavement thickness varies due to multiple chip seal and intermittent HBP patching projects. Refer to Section 11 for additional pavement depth information.

② Topsoil is included in the "Foreslope Reshaping" bid item. Refer to Section 76 for topsoil stripping limits.

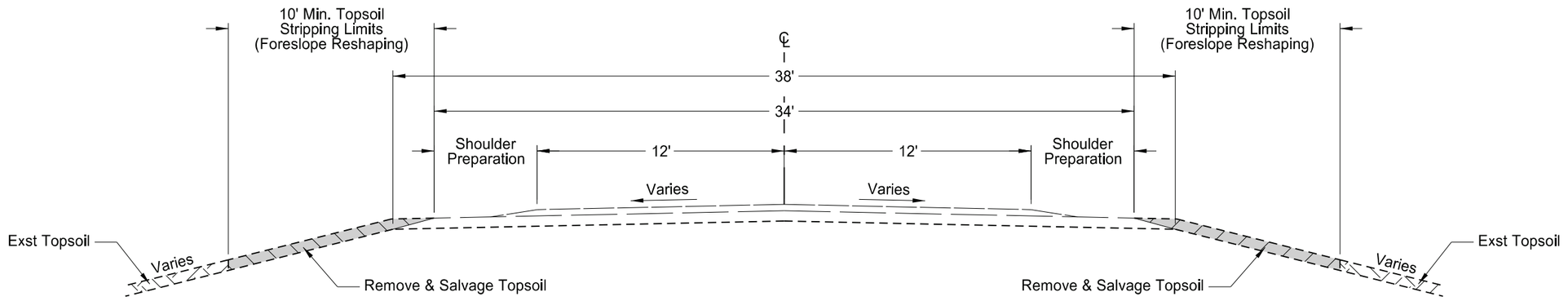
Existing Typical Section

ND 49 - State Line to Jct ND 21

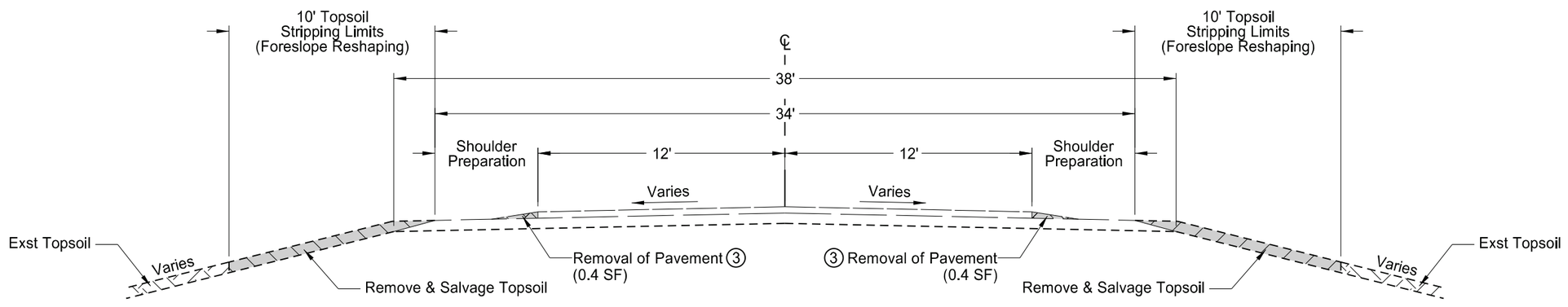
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:31:14 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	2



Removal Typical Section - Full Depth Reclamation
Sta 0+00 to Sta 387+27 (RP 0.000 to RP 7.335)
Sta 389+57 to Sta 426+00 (RP 7.378 to RP 8.065)



Removal Typical Section - HMA Overlay
Sta 426+00 to Sta 578+69 (RP 8.065 to RP 10.960)
Sta 580+09 to Sta 592+11 (RP 10.987 to RP 11.205)
Sta 597+47 to Sta 1454+27 (RP 11.308 to RP 27.543)
Sta 1457+51 to Sta 1566+27 (RP 27.604 to RP 29.664)

Removal Typical Sections

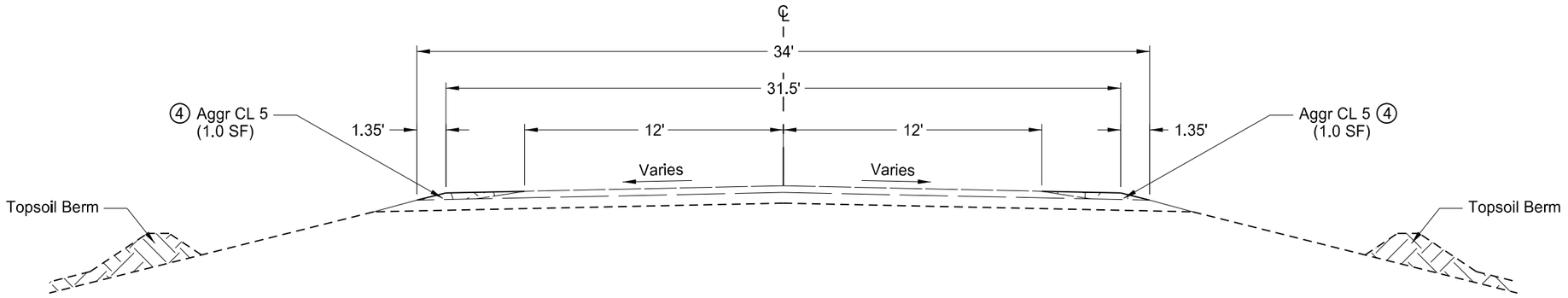
ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

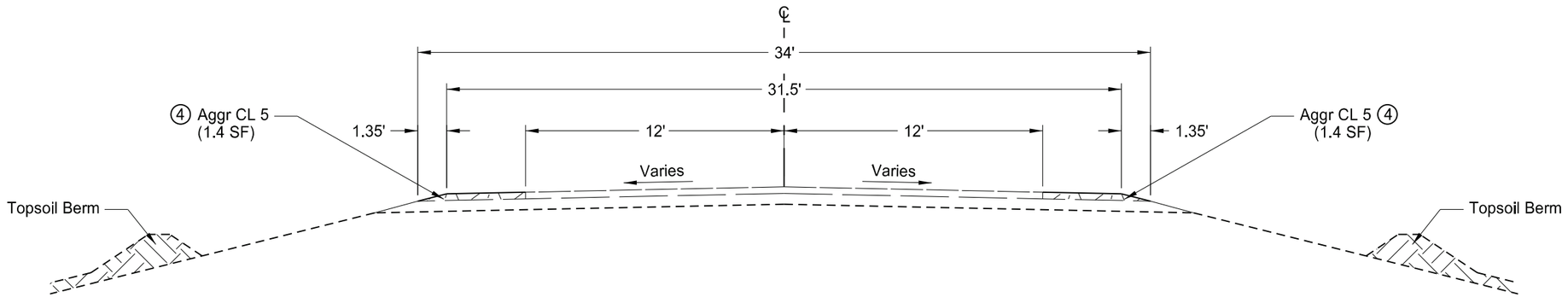
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:33:04 -05'00'
NORTH DAKOTA

③ Sawing and removing existing asphalt slough is included in the 202-0136 REMOVAL OF PAVEMENT bid item.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	3



Addition of Virgin Aggregate - Full Depth Reclamation
Sta 0+00 to Sta 387+27 (RP 0.000 to RP 7.335)
Sta 389+57 to Sta 426+00 (RP 7.378 to RP 8.065)



Addition of Virgin Aggregate - HMA Overlay
Sta 426+00 to Sta 578+69 (RP 8.065 to RP 10.960)
Sta 580+09 to Sta 592+11 (RP 10.987 to RP 11.205)
Sta 597+47 to Sta 1454+27 (RP 11.308 to RP 27.543)
Sta 1457+51 to Sta 1566+27 (RP 27.604 to RP 29.664)

Proposed Typical Sections

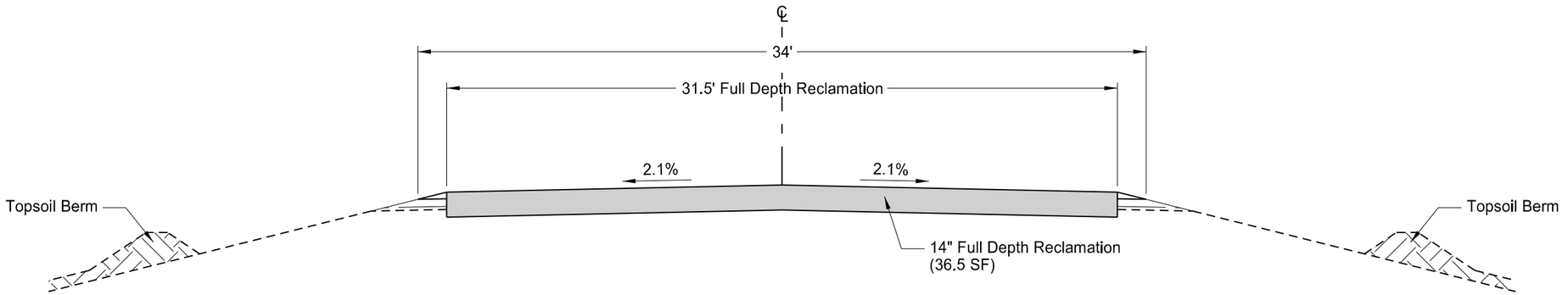
ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

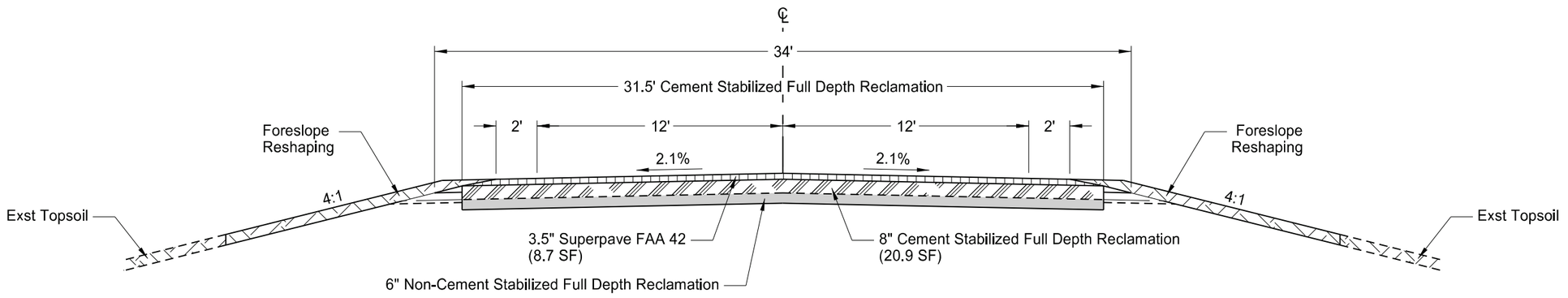
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:36:15 -05'00'
NORTH DAKOTA

④ Addition of Virgin Aggregate varies through superelevation sections. See Section 30 Sheet 6 for quantities and further details.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	4



Full Depth Reclamation (1st Pass)
Sta 0+00 to Sta 387+27 (RP 0.000 to RP 7.335) ⑤
Sta 389+57 to 426+00 (RP 7.378 to RP 8.065)



Cement Stabilized Full Depth Reclamation (2nd Pass)
Sta 0+00 to Sta 387+27 (RP 0.000 to RP 7.335) ⑤
Sta 389+57 to 426+00 (RP 7.378 to RP 8.065)

Proposed Typical Sections

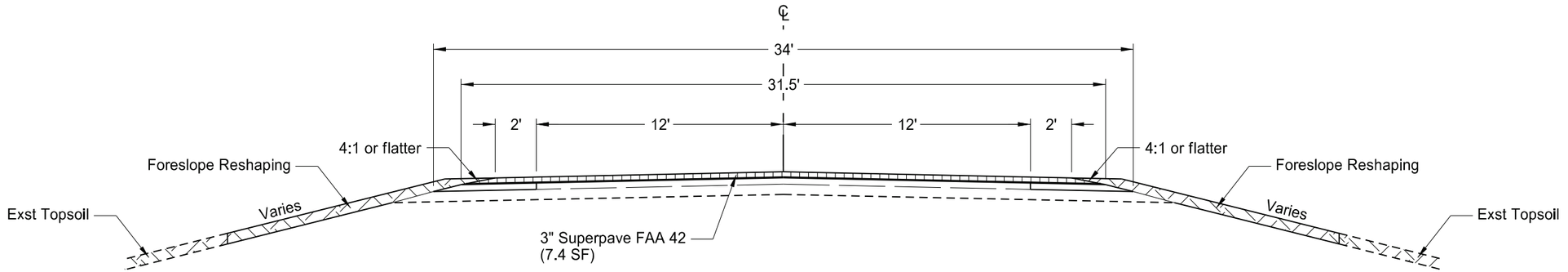
ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

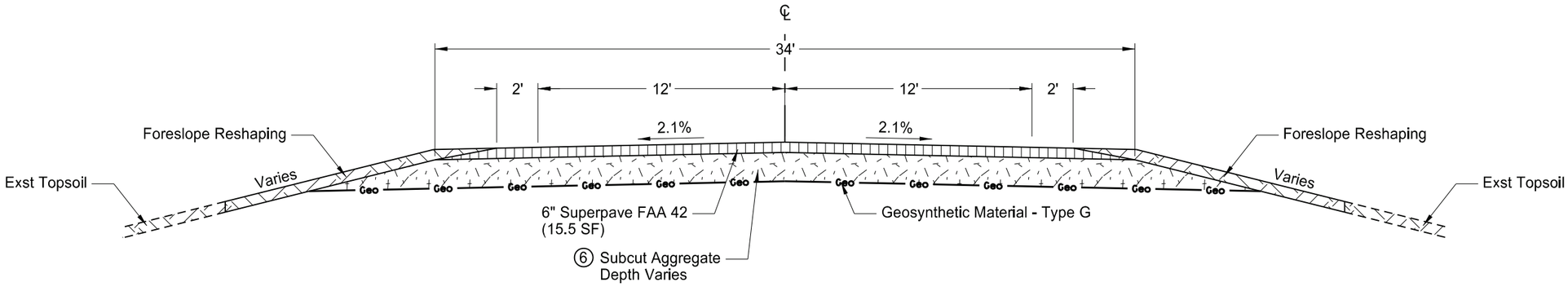
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:37:18 -05'00'
NORTH DAKOTA

⑤ Refer to Section 30 Sheet 6 for superelevated sections and station ranges.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	5



HMA Overlay
Sta 426+00 to Sta 578+69 (RP 8.065 to RP 10.960)
Sta 580+09 to Sta 592+11 (RP 10.987 to RP 11.205)
Sta 597+47 to Sta 1454+27 (RP 11.308 to RP 27.543)
Sta 1457+51 to Sta 1566+27 (RP 27.604 to RP 29.665)



Subcut
Sta 592+11 to Sta 597+47 (RP 11.205 to RP 11.308)
Sta 1566+27 to Sta 1571+23 (RP 29.665 to RP 29.758)

Proposed Typical Sections

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

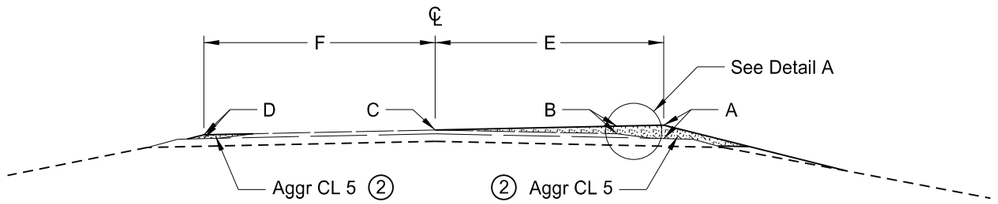
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:37:48 -05'00'
NORTH DAKOTA

⑥ Subcut aggregate depth varies through transitions. Refer to Section 20 Sheets 6 & 7 for additional depth information.

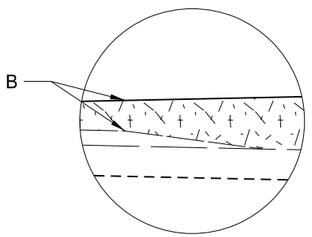
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	30	6

Left Curve												
Station	Curve #	Superelevation (%)				Total CL 5 Depth ①				CL 5 Width		Additional Quantities ②	
		Existing Slope		Proposed Slope									
		Left	Right	Left	Right	A (in)	B (in)	C (in)	D (in)	E (ft)	F (ft)	Aggr CL 5 (ton)	Water (Mgal)
234+70.65		-	-	-2.1	-2.1	-	-	-	-	-	-		
235+52.77		-2.1	-1.5	-2.1	0.0	5.8	2.2	0.0	3.0	15.2	15.3		
236+34.89	2	-2.1	-1.4	-2.1	2.1	9.4	5.0	0.0	3.0	15.1	15.3	247.0	4.9
239+44.14		-2.1	-1.4	-2.1	2.1	9.4	5.0	0.0	3.0	15.1	15.3		
240+26.26		-2.1	-1.5	-2.1	0.0	5.8	2.2	0.0	3.0	15.2	15.3		
241+08.38		-	-	-2.1	-2.1	-	-	-	-	-	-		
321+91.15		-	-	-2.1	-2.1	-	-	-	-	-	-		
322+73.27		-2.1	0.0	-2.1	0.0	3.5	0.0	0.0	3.5	15.2	15.3		
323+55.39		-2.1	1.0	-2.1	2.1	5.5	1.6	0.0	3.5	15.1	15.3		
323+90.59	3	-3.0	1.0	-3.0	3.0	7.1	2.9	0.0	3.5	15.0	15.3	545.9	10.9
339+43.20		-3.0	1.0	-3.0	3.0	7.1	2.9	0.0	3.5	15.0	15.3		
339+78.40		-2.1	1.0	-2.1	2.1	5.5	1.6	0.0	3.5	15.1	15.3		
340+60.52		-2.1	0.0	-2.1	0.0	3.5	0.0	0.0	3.5	15.2	15.3		
341+42.64		-	-	-2.1	-2.1	-	-	-	-	-	-		
407+17.59		-	-	-2.1	-2.1	-	-	-	-	-	-		
407+99.71		-2.1	0.0	-2.1	0.0	4.8	0.0	0.0	4.3	15.2	15.3		
408+81.83		-2.1	-0.4	-2.1	2.1	9.2	3.6	0.0	4.3	15.1	15.3		
409+17.03	5	-2.1	0.6	-3.0	3.0	9.1	3.5	0.0	2.8	15.0	15.3	388.7	7.8
418+41.56		-2.1	0.6	-3.0	3.0	9.1	3.5	0.0	2.8	15.0	15.3		
418+76.76		-2.1	-0.4	-2.1	2.1	9.2	3.6	0.0	4.3	15.1	15.3		
419+58.88		-2.1	0.0	-2.1	0.0	4.8	0.0	0.0	4.3	15.2	15.3		
420+41.00		-	-	-2.1	-2.1	-	-	-	-	-	-		
										Subtotals		1181.6	23.6

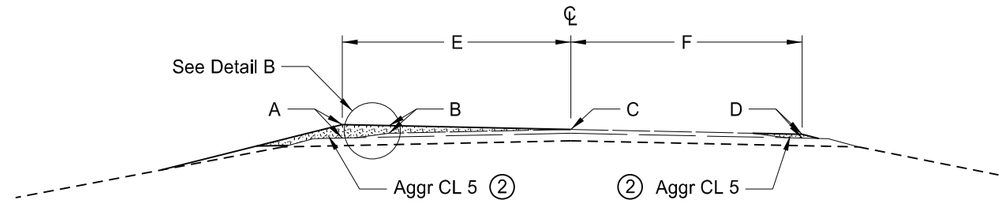
Right Curve													
Station	Curve #	Superelevation (%)				Total CL 5 Depth ①				CL 5 Width		Additional Quantities ②	
		Existing Slope		Proposed Slope									
		Left	Right	Left	Right	A (in)	B (in)	C (in)	D (in)	E (ft)	F (ft)	Aggr CL 5 (ton)	Water (Mgal)
208+95.65		-	-	-2.1	-2.1	-	-	-	-	-	-		
209+77.77		-2.1	-2.1	0.0	-2.1	6.8	3.0	0.0	3.0	15.2	15.3		
210+59.89	1	-2.1	-2.1	2.1	-2.1	10.6	6.0	0.0	3.0	15.1	15.3	196.1	3.9
212+21.78		-2.1	-2.1	2.1	-2.1	10.6	6.0	0.0	3.0	15.1	15.3		
213+03.90		-2.1	-2.1	0.0	-2.1	6.8	3.0	0.0	3.0	15.2	15.3		
213+86.02		-	-	-2.1	-2.1	-	-	-	-	-	-		
351+04.87		-	-	-2.1	-2.1	-	-	-	-	-	-		
351+86.99		0.0	-2.1	0.0	-2.1	3.0	0.0	0.0	3.0	15.2	15.3		
352+69.12		1.6	-2.1	2.1	-2.1	4.8	0.7	0.0	3.0	15.1	15.3		
353+47.33	4	2.5	-4.1	4.1	-4.1	8.2	2.3	0.0	3.0	15.0	15.4	822.3	16.4
368+37.85		2.5	-4.1	4.1	-4.1	8.2	2.3	0.0	3.0	15.0	15.4		
369+16.07		1.6	-2.1	2.1	-2.1	4.8	0.7	0.0	3.0	15.1	15.3		
369+98.19		0.0	-2.1	0.0	-2.1	3.0	0.0	0.0	3.0	15.2	15.3		
370+80.32		-	-	-2.1	-2.1	-	-	-	-	-	-		
										Subtotals		1018.4	20.4



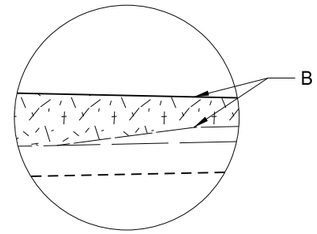
Left Curve



Detail A



Right Curve



Detail B

① The "Total CL 5 Depth" columns represent the depth required on curve sections.

② The "Additional Quantities" columns represent the quantities required to correct the superelevations (these quantities are separate from the overlay basis of estimate).

Proposed Superelevation Correction
Typical Sections

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 11:38:35 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	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	Geosythetic Material - Type G (Pay Item)	(*) End Sections		Backfill Specifications
													Begin	End	
				IN	Bid Item	LF		IN	Type		IN	SY	EA	EA	
96+23	46' Rt	96+73	46' Rt	24	Pipe Conduit - Approach	50	Reinforced Concrete Pipe - Class III (barrel length = 48)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
96+23	52' Rt	96+73	52' Rt	24	Pipe Conduit - Approach	50	Reinforced Concrete Pipe - Class III (barrel length = 48)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
123+35	52' Rt	123+91	52' Rt	30	Pipe Conduit - Approach	56	Reinforced Concrete Pipe - Class III (barrel length = 54)	30					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
123+35	60' Rt	123+91	60' Rt	30	Pipe Conduit - Approach	56	Reinforced Concrete Pipe - Class III (barrel length = 54)	30					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
164+14	49' Lt	164+61	49' Lt	30	Pipe Conduit - Approach	47	Reinforced Concrete Pipe - Class III (barrel length = 46)	30					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
184+65	49' Rt	185+08	49' Rt	30	Pipe Conduit - Approach	43	Reinforced Concrete Pipe - Class III (barrel length = 42)	30					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
220+34	49' Lt	220+99	49' Lt	18	Pipe Conduit - Approach	65	Reinforced Concrete Pipe - Class III (barrel length = 64)	18					TES (6:1)	TES (6:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064				
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								

Corrugations: 2 = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

Coatin Z = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

Spiral Ribs: 3/4 = 3/4"x3/4"@7-1/2"
1= 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
LEVI L CLAGETT
PE-40749
DATE 2026.08.26 11:15:08-05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	51	2

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	Geosythetic Material - Type G (Pay Item)	(*) End Sections		Backfill Specifications
													Begin	End	
				IN	Bid Item	LF		IN	Type		IN	SY	EA	EA	
264+10	53' Rt	264+61	53' Rt	24	Pipe Conduit - Approach	51	Reinforced Concrete Pipe - Class III (barrel length = 50)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064			TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
322+46	53' Rt	323+14	53' Rt	24	Pipe Conduit - Approach	68	Reinforced Concrete Pipe - Class III (barrel length = 66)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
408+85	51' Rt	409+51	51' Rt	24	Pipe Conduit - Approach	66	Reinforced Concrete Pipe - Class III (barrel length = 64)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
424+18	54' Lt	424+78	54' Lt	24	Pipe Conduit - Approach	60	Reinforced Concrete Pipe - Class III (barrel length = 58)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
424+18	48' Lt	424+78	48' Lt	24	Pipe Conduit - Approach	60	Reinforced Concrete Pipe - Class III (barrel length = 58)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								
424+48	54' Rt	424+99	54' Rt	24	Pipe Conduit - Approach	51	Reinforced Concrete Pipe - Class III (barrel length = 50)	24					TES (4:1)	TES (4:1)	714.04A
							Corrugated Steel Pipe		Z, A, P	2	0.064		TES (6:1)	TES (6:1)	
							Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064				
							High-Density Polyethylene								
							Polypropylene Pipe (AASHTO M330, Type S)								

Corrugations: 2 = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

Coatin Z = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

Spiral Ribs: 3/4 = 3/4"x3/4"@7-1/2"
1= 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
LEVI L CLAGETT
PE-40749
DATE 2026.08.26 11:15:21-05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	51	3

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		Sheet Quantity	519	LF
714	4099	PIPE CONDUIT 18IN-APPROACH		
		Sheet Quantity	65	LF
714	4106	PIPE CONDUIT 24IN-APPROACH		
		Sheet Quantity	456	LF
714	4113	PIPE CONDUIT 30IN-APPROACH		
		Sheet Quantity	202	LF

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Begin Invert	End Invert
96+23	46' Rt	96+73	46' Rt	2546.66	2546.45
96+23	52' Rt	96+73	52' Rt	2546.66	2546.45
123+35	52' Rt	123+91	52' Rt	2539.25	2539.05
123+35	60' Rt	123+91	60' Rt	2539.25	2539.05
164+14	49' Lt	164+61	49' Lt	2511.8	2511.09
184+65	49' Rt	185+08	49' Rt	2487.08	2486.93
220+34	49' Lt	220+99	49' Lt	2494.7	2495.17
264+10	53' Rt	264+61	53' Rt	2484.85	2484.62
322+46	53' Rt	323+14	53' Rt	2461.78	2460.79
408+85	51' Rt	409+51	51' Rt	2267.4	2267.89
424+18	54' Lt	424+78	54' Lt	2269.9	2270.44
424+18	48' Lt	424+78	48' Lt	2269.9	2270.44
424+48	54' Rt	424+99	54' Rt	2269.9	2270.35

Pipe Inverts & Quantities

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
LEVI L CLAGETT
PE-40749
DATE 2026.08.26 11:15:35-05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands	Wetland Impact		Wetland Mitigation	
					Wetland Impacts Acre(s)		Mitigation Required	
					Temp.	Perm.	EO 11990	USACE
WL 1	Sec. 33, T129N, R90W	Ditch	Created	N			N	N
WL 2	Sec. 33, T129N, R90W	Basin	Natural	N			N	N
WL 3	Sec. 28, T129N, R90W	Ditch	Created	Y			N	N
WL 4	Sec. 29, T129N, R90W	Ditch	Created	Y			N	N
WL 5	Sec. 16, T129N, R90W	Drainage	Natural	Y			N	N
WL 6	Sec. 17, T129N, R90W	Drainage	Natural	Y			N	N
WL 7a	Sec. 29, T130N, R90W	Fringe	Natural	Y			N	N
WL 7b	Sec. 29, T130N, R90W	Fringe	Natural	Y			N	N
WL 8	Sec. 29, T130N, R90W	Drainage	Natural	Y			N	N
WL 9a	Sec. 8, T130N, R90W	Fringe	Natural	Y			N	N
WL 9b	Sec. 8, T130N, R90W	Fringe	Natural	Y			N	N
WL10	Sec. 5, T130N, R90W	Drainage	Natural	Y			N	N
WL 11	Sec. 5, T130N, R90W	Drainage	Natural	Y			N	N
WL 12a	Sec. 29, T131N, R90W	Drainage	Natural	Y			N	N
WL 12b	Sec. 28, T131N, R90W	Drainage	Natural	Y			N	N
WL 13	Sec. 28, T131N, R90W	Drainage	Natural	Y			N	N
WL 14	Sec. 29, T131N, R90W	Drainage	Natural	Y			N	N
WL 15	Sec. 29, T131N, R90W	Drainage	Natural	Y			N	N
WL 16	Sec. 28, T131N, R90W	Ditch	Created	N			N	N
WL 17	Sec. 20, T132N, R90W	Ditch	Created	N			N	N
WL 18	Sec. 20, T132N, R90W	Ditch	Created	Y			N	N
WL 20a	Sec. 20, T132N, R90W	Basin	Natural	Y			N	N
WL 20b	Sec. 21, T132N, R90W	Basin	Natural	Y			N	N
WL 20c	Sec. 20, T132N, R90W	Ditch	Created	Y			N	N
WL 20d	Sec. 20, T132N, R90W	Ditch	Created	Y			N	N
WL 20e	Sec. 21, T132N, R90W	Ditch	Created	Y			N	N
WL 20f	Sec. 21, T132N, R90W	Ditch	Created	Y			N	N
WL 22a	Sec. 17, T132N, R90W	Basin	Natural	Y	0.033		N	N
WL 22b	Sec. 16, T132N, R90W	Basin	Natural	Y			N	N
WL 23a	Sec. 5 T132N, R90W	Drainage	Natural	Y			N	N
WL 23b	Sec. 5 T132N, R90W	Drainage	Natural	Y			N	N
WL 24	Sec. 35 T133N, R90W	Drainage	Natural	Y			N	N
WL 25	Sec. 34 T133N, R90W	Drainage	Natural	Y			N	N
WL 26	Sec. 35 T133N, R90W	Ditch	Created	Y			N	N
WL 27	Sec. 35 T133N, R90W	Ditch	Created	N			N	N
WL 29a	Sec. 34 T133N, R90W	Ditch	Created	Y			N	N
WL 29b	Sec. 26 T133N, R90W	Ditch	Created	Y			N	N
WL 29c	Sec. 27 T133N, R90W	Ditch	Created	Y			N	N
WL 29d	Sec. 26 T133N, R90W	Ditch	Created	Y			N	N
WL 29e	Sec. 26 T133N, R90W	Basin	Natural	Y			N	N
WL 29f	Sec. 26 T133N, R90W	Ditch	Created	Y			N	N
WL 29h	Sec. 26 T133N, R90W	Basin	Natural	Y			N	N
WL 29i	Sec. 26 T133N, R90W	Ditch	Created	Y			N	N
WL 30a	Sec 26, T133N, R90W	Drainage	Natural	Y			N	N
WL 30b	Sec 26, T133N, R90W	Drainage	Natural	Y			N	N
WL 32a	Sec 26, T133N, R90W	Drainage	Natural	Y			N	N
WL 32b	Sec 26, T133N, R90W	Drainage	Natural	Y			N	N
WL 33a	Sec 11, T133N, R90W	Fringe	Natural	Y			N	N
WL 33b	Sec 11, T133N, R90W	Fringe	Natural	Y			N	N
WL 34	Sec 11, T133N, R90W	Ditch	Created	N			N	N
WL 35a	Sec 34, T134N, R90W	Ditch	Created	Y			N	N
WL 35b	Sec 34, T134N, R90W	Drainage	Natural	Y			N	N
WL 36	Sec 34, T134N, R90W	Ditch/Seep	Created	Y			N	N
WL 37	Sec 35, T134N, R90W	Ditch	Created	Y			N	N
WL 38	Sec 35, T134N, R90W	Ditch	Created	Y			N	N
					0.033	0.000		

Wetland Impact Table

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:06:25 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	75	2

Other Waters Impact Table

Number	Location	Other Water Type	Other Water Feature	USACE Jurisdictional	Impacts to Other Waters						Other Water Mitigation		
					Acres			Linear Feet			Mitigation Required		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS
OW 1	Sec. 29, T130N, R90W	Stream	Natural	Y							N	N	N
OW 2	Secs. 8-9, T130N, R90W	Stream	Natural	Y							N	N	N
OW 3	Sec. 4, T130N, R90W	Stream	Natural	Y							N	N	N
OW 4	Sec. 34, T133N, R90W	Drainage	Natural	Y							N	N	N
OW 5	Sec. 11, T133N, R90W	River	Natural	Y							N	N	N
				Totals	0.000	0.000	0.000	0.000	0.000	0.000			

Other Waters - D Impact Table

Number	Location	Other Water Type	Other Water Feature	USACE Jurisdictional	Impacts to Other Waters						Other Water Mitigation		
					Acres			Linear Feet			Mitigation Required		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS
OW-D 1	Sec. 17, T129N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 2	Sec. 16, T129N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 3	Sec. 4, T129N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 4	Sec. 5, T129N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 5	Sec. 32, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 6	Sec. 32, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 7	Sec. 28, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 8	Sec. 21, T130N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 9	Sec. 20, T130N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 10	Sec. 21, T130N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 11	Sec. 16, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 12	Sec. 16, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 13	Sec. 17, T130N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 14	Sec. 17, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 15	Sec. 17, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 16	Sec. 4, T130N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 17	Sec. 38, T131N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 18	Sec. 28, T131N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 19	Sec. 16, T131N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 20	Sec. 17, T131N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 21	Sec. 17, T131N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 22	Sec. 16, T131N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 23	Sec. 4, T131N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 24	Sec. 33, T132N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 25	Sec. 32, T132N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 26	Sec. 33, T132N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 27	Sec. 32, T132N, R90W	Ephemeral Swale	Natural	Y							N	N	N
OW-D 28	Sec. 9, T132N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 29	Sec. 26, T132N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 30	Sec. 27, T132N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 31	Sec. 23, T133N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 32	Sec. 23, T133N, R90W	Ephemeral Swale	Natural	N							N	N	N
OW-D 33	Sec. 14, T133N, R90W	Ephemeral Swale	Natural	N							N	N	N
				Totals	0.000	0.000	0.000	0.000	0.000	0.000			

[1] Jurisdictional Determination was issued by USACE on 01/18/2023; NWO-2022-01712-BIS.

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	-	Temporary Wetland JD	0.033
Natural/Non-JD (Fill/Drain)	-	Temporary Wetland Non-JD	-
Artificial/JD (Fill/Drain)	-		
Artificial /Non-JD (Fill/Drain)	-	Permanent OW	-
Total	0.000	Temporary OW	-

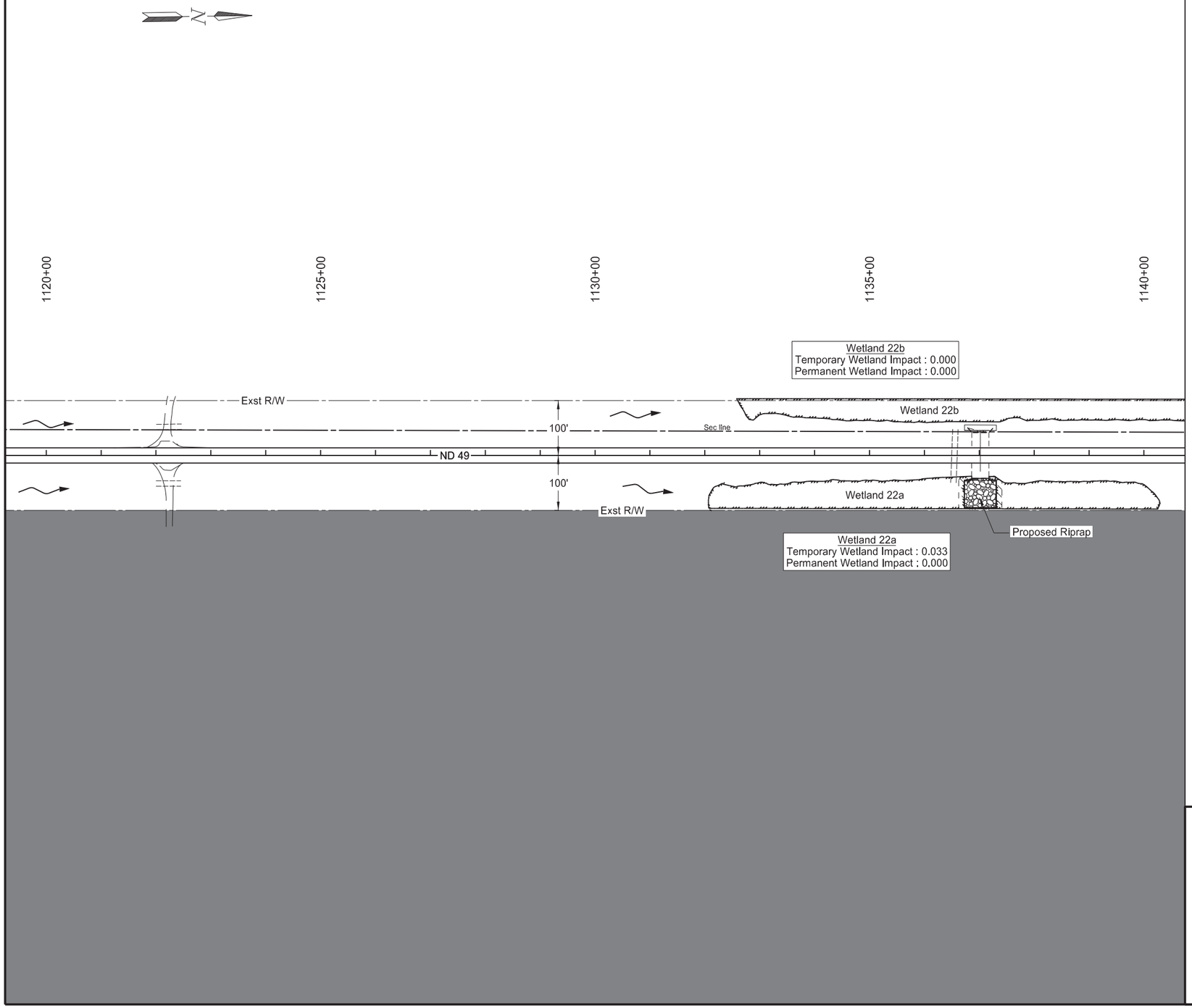
Other Water/Other Water-d Tables
Impact Summary Table

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:06:58 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	75	3



Notes:
Wetland 22a is the only impacted Wetland on the project. No impacts to Other Waters.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Permanent Wetland Impacts
- Other Waters Line
- Temporary Wetland Impacts
- Flow Direction
- Pretty Rock National Wildlife Refuge

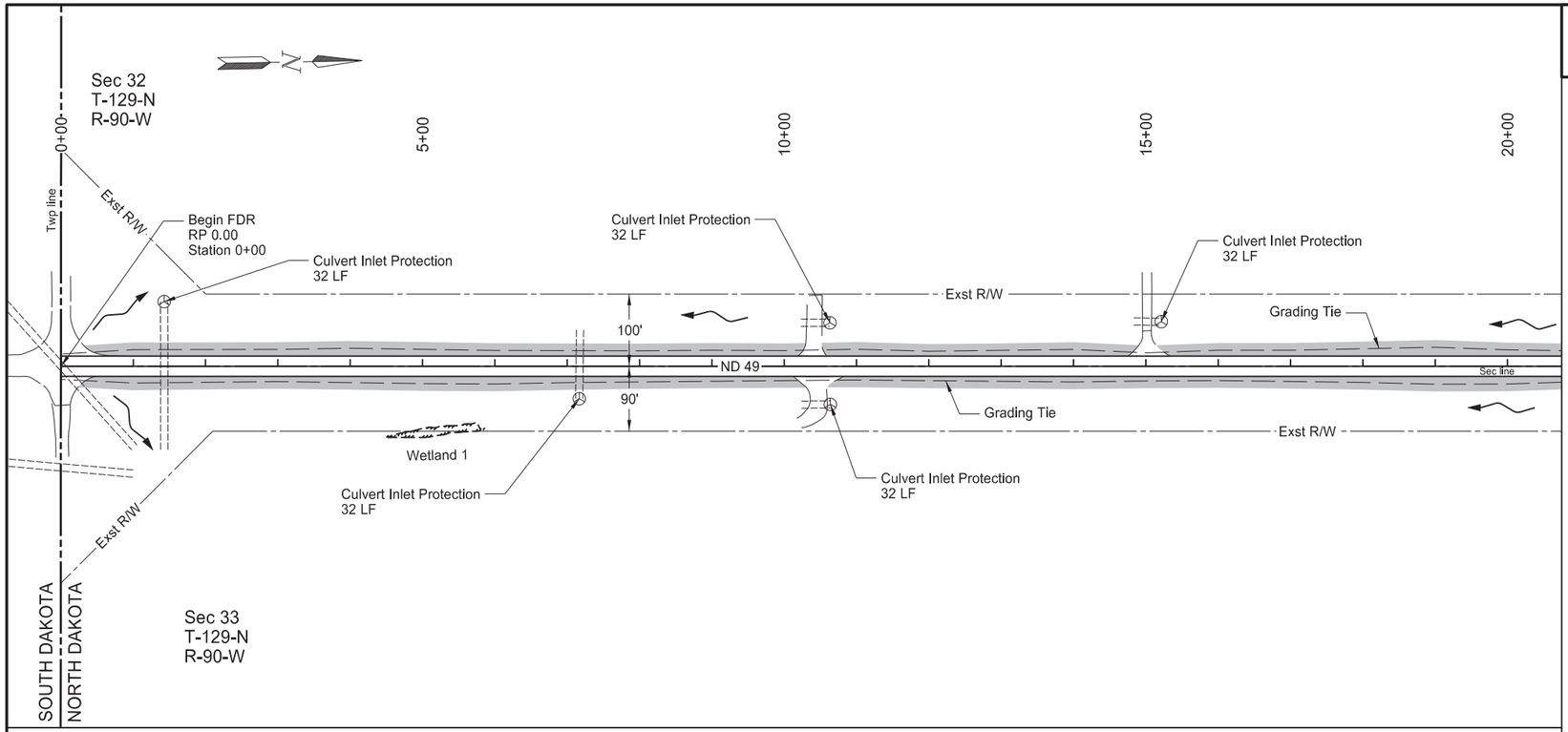
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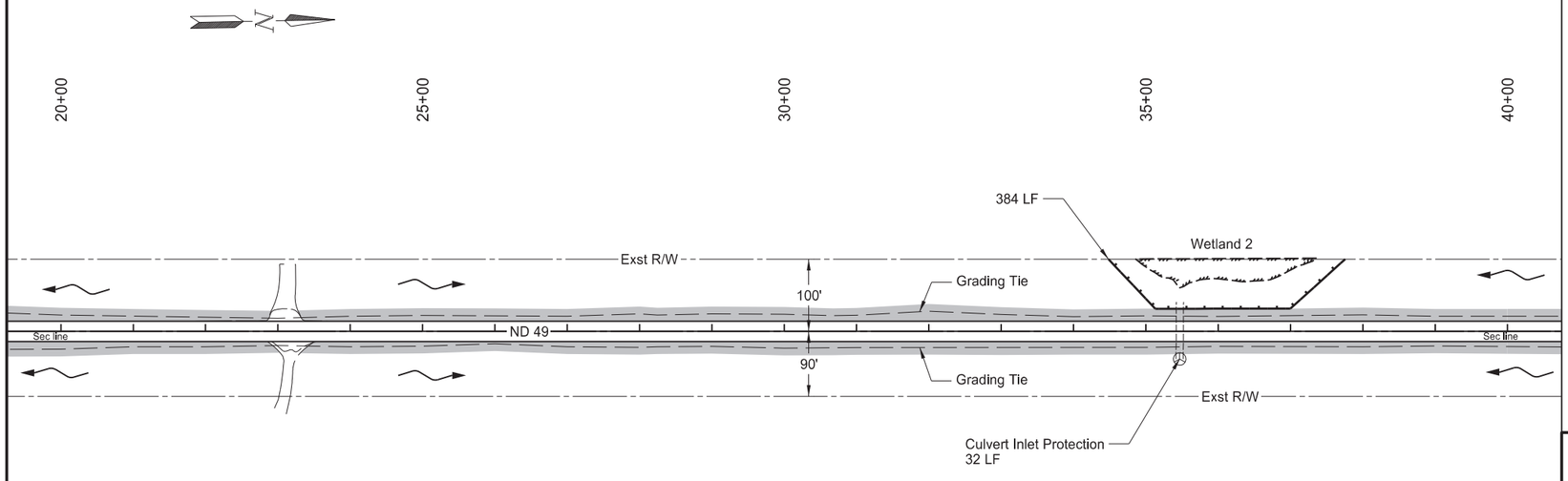
ND 49 - State Line to Jct ND 21

Sta 1120+00 to Sta 1140+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:07:23 -05'00'
NORTH DAKOTA

8/20/2026 4:36:17 PM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\075\075WL_G.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.17	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.17	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	384	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	384	LF

LEGEND

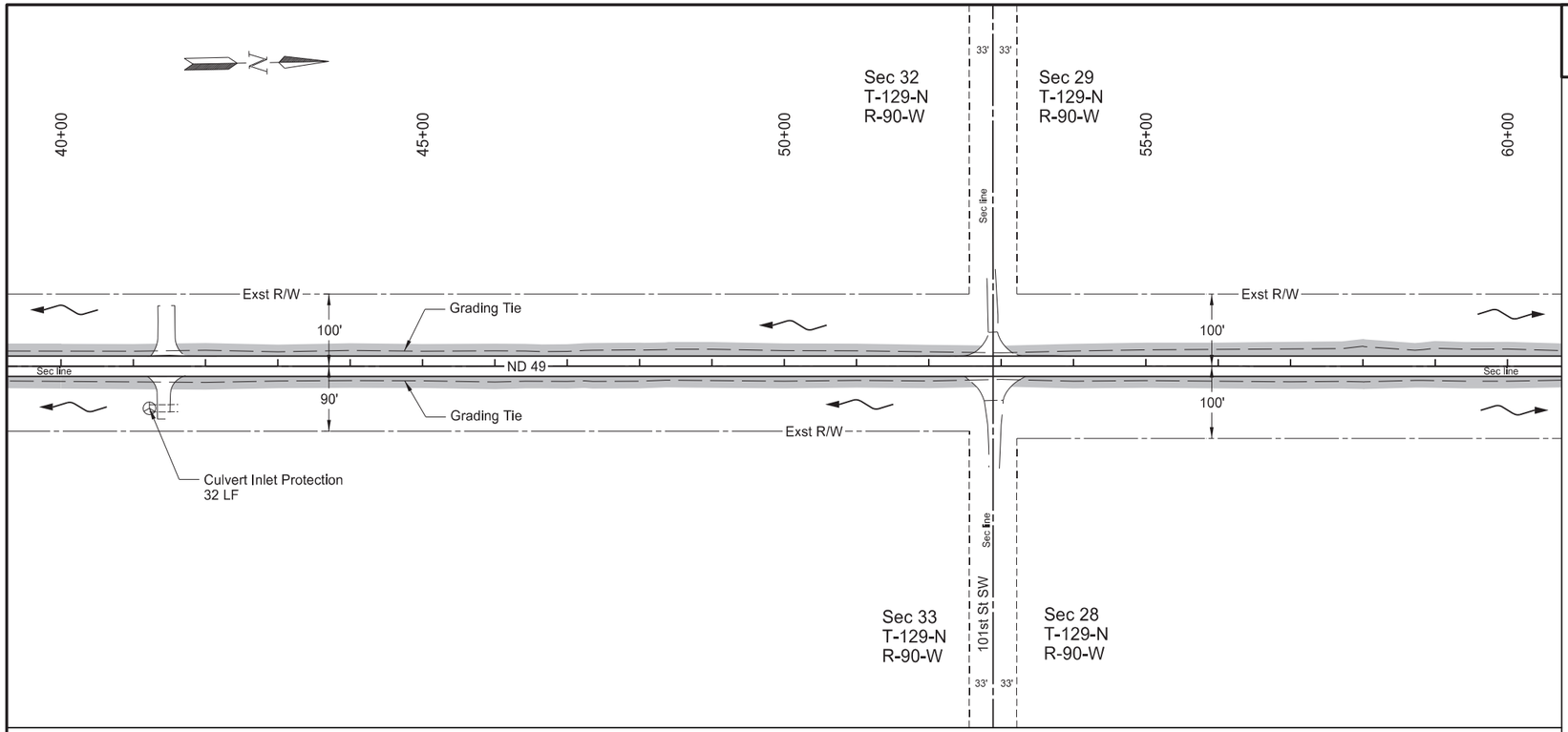
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

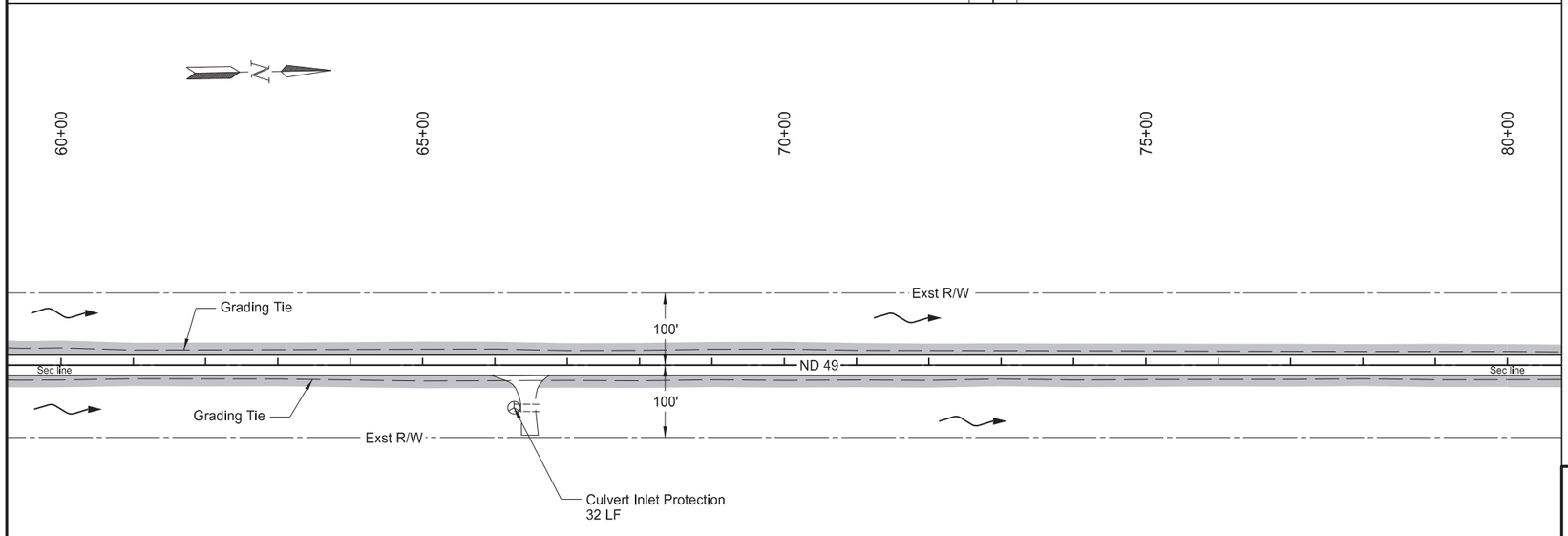
Temporary Erosion Control

ND 49 - State Line to Jct ND 21

Sta 0+00 to Sta 40+00
(SCL49_S)

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ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:28:33 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.01	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.01	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

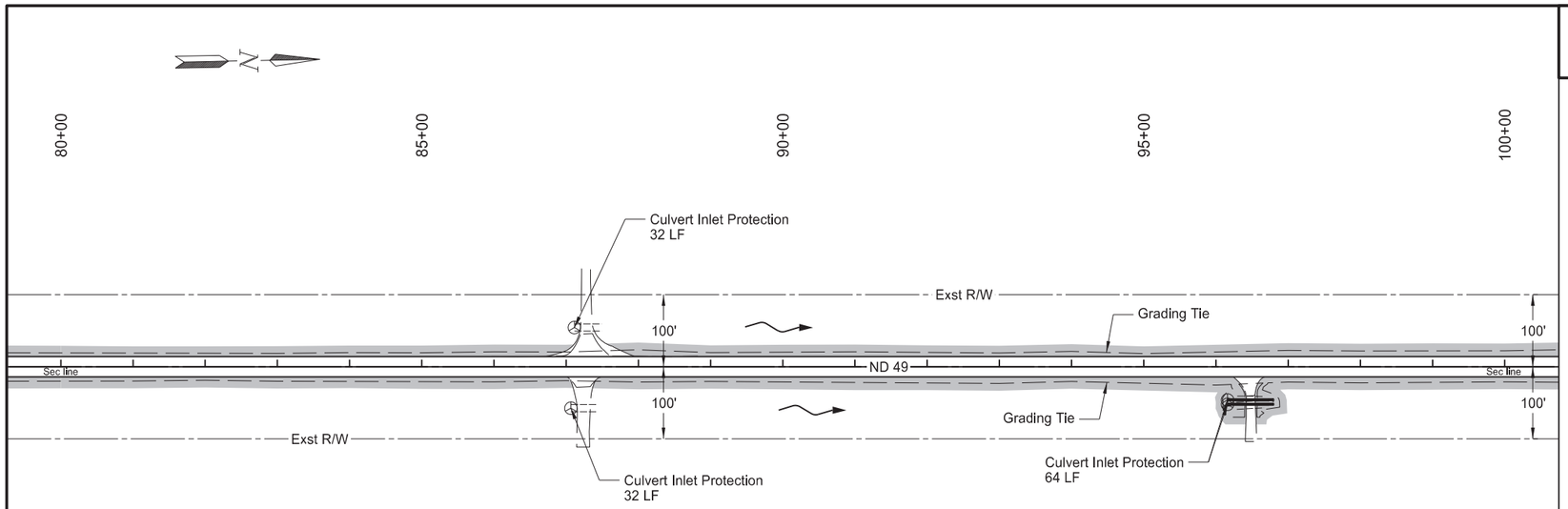
Temporary Erosion Control

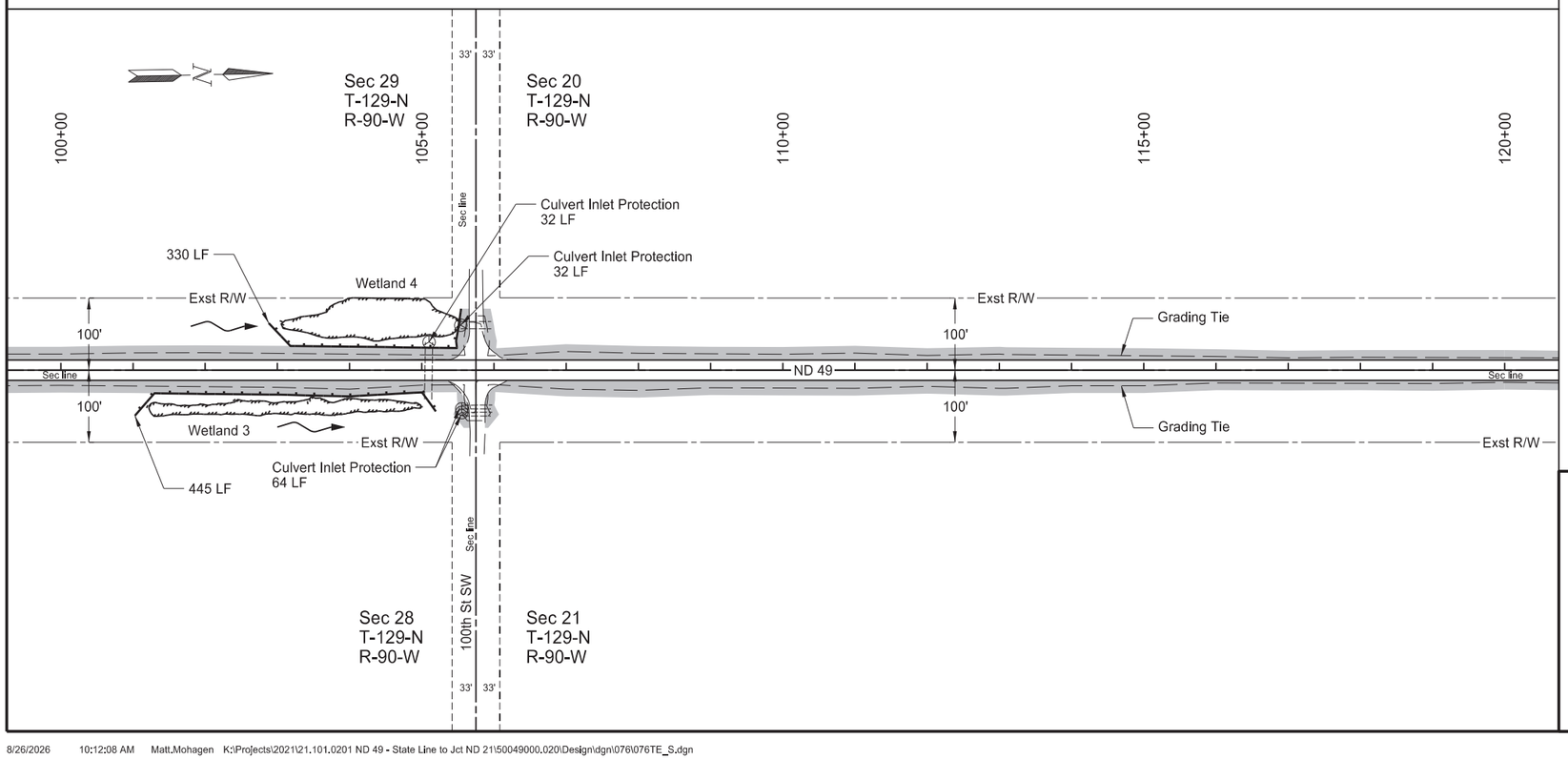
ND 49 - State Line to Jct ND 21

Sta 40+00 to Sta 80+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:29:03 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	3





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.22	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.22	ACRE
261	112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	775	LF
261	113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	775	LF

LEGEND

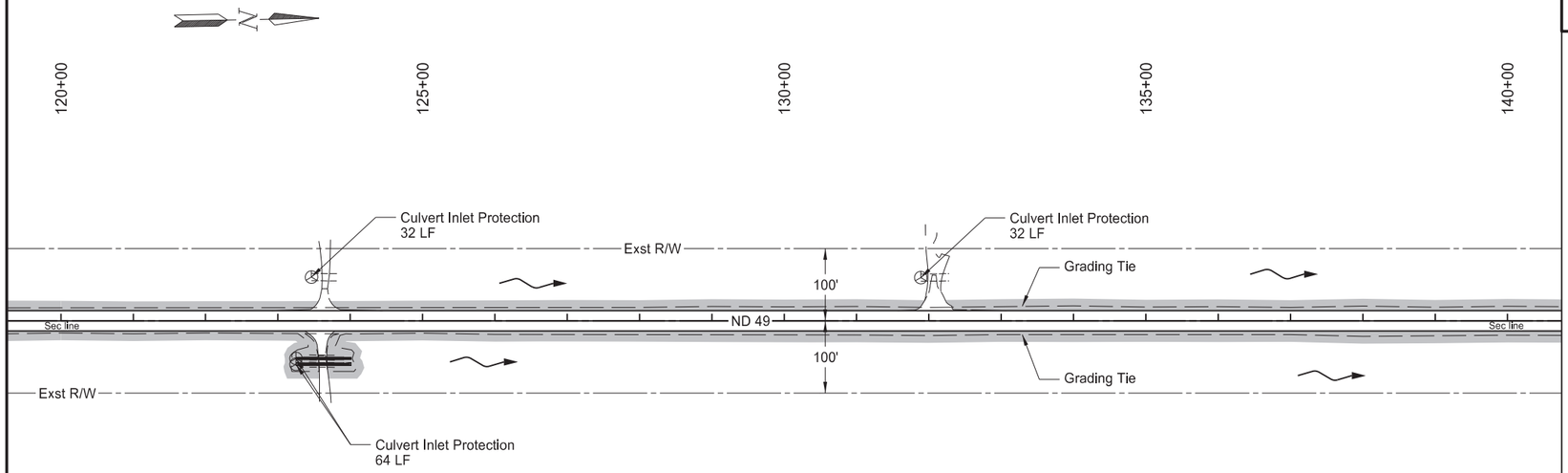
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

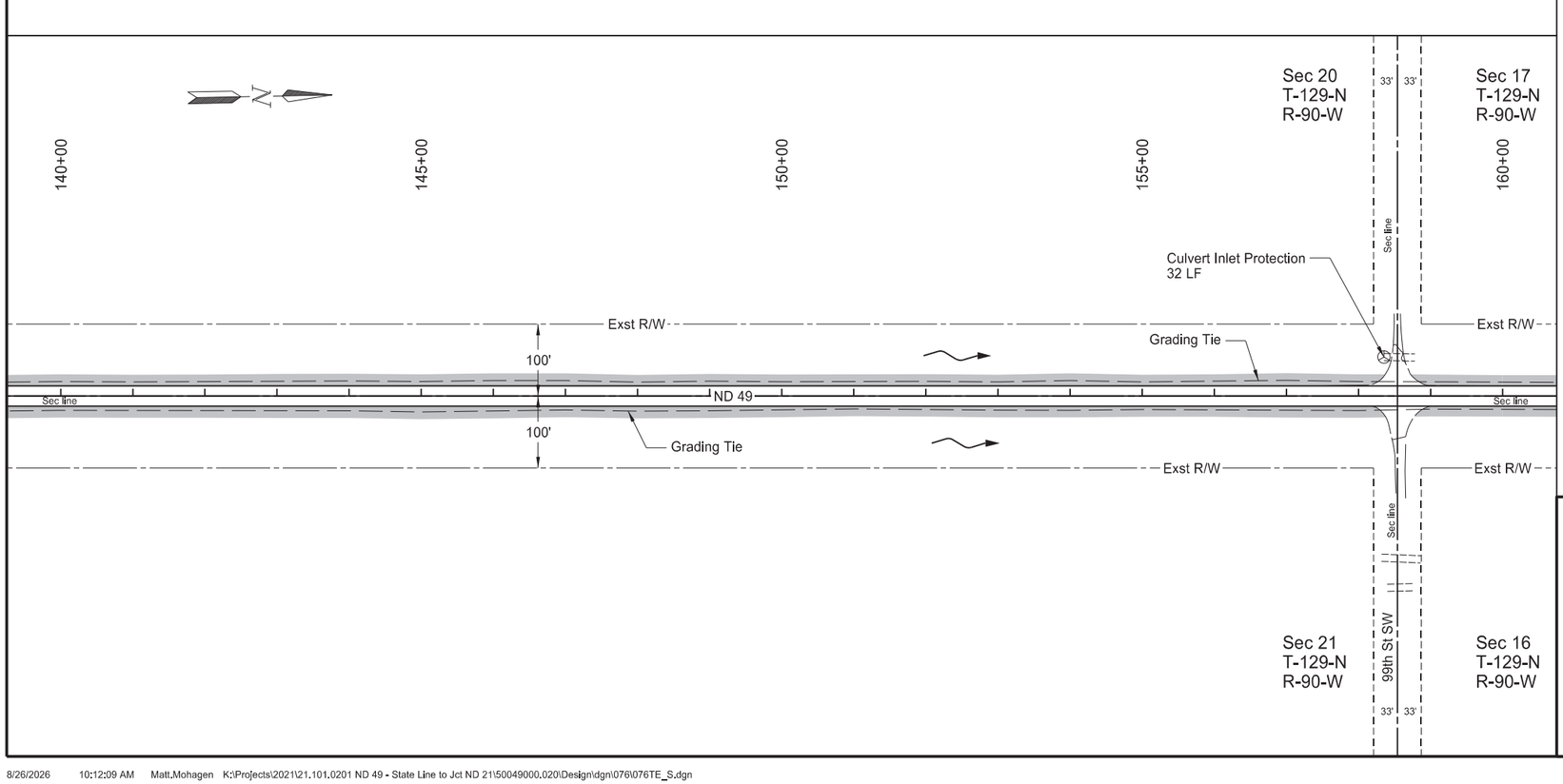
Temporary Erosion Control

ND 49 - State Line to Jct ND 21

Sta 80+00 to Sta 120+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:29:31 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	4

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.87	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.87	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

ND 49 - State Line to Jct ND 21

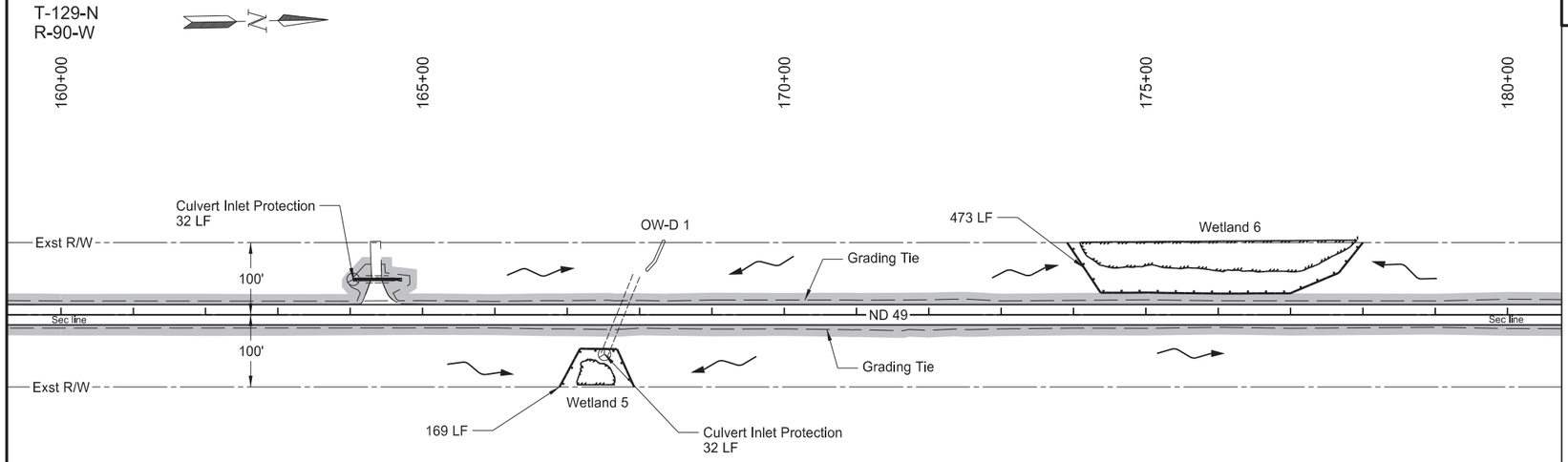
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(SCL49_S)

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ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:30:18 -05'00'
NORTH DAKOTA

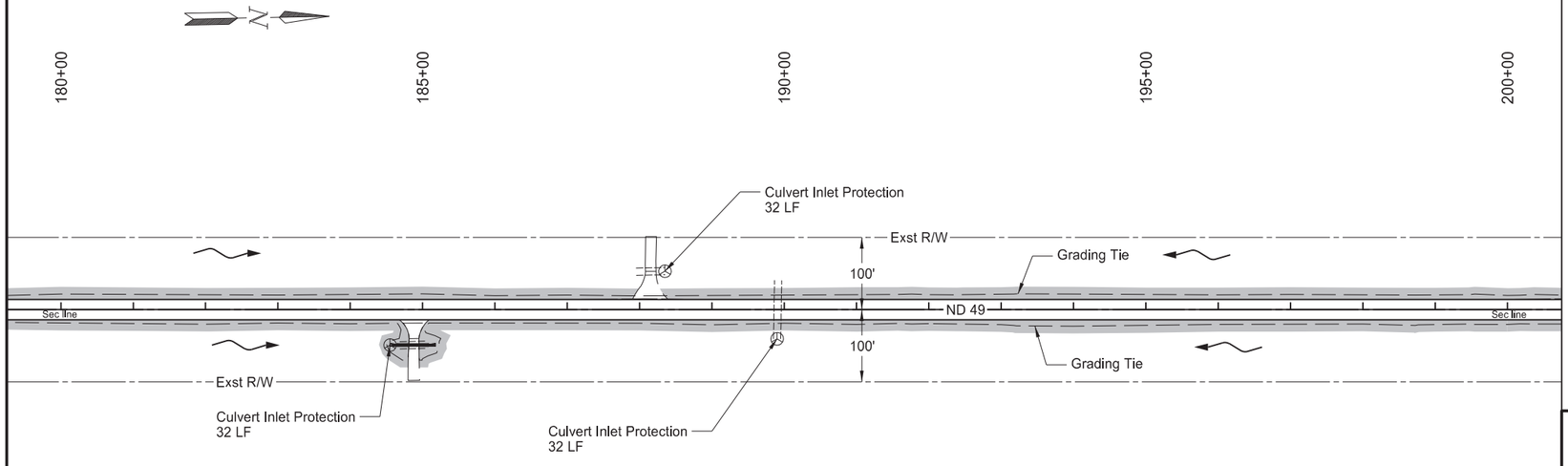
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	5

Sec 17
T-129-N
R-90-W



Sec 16
T-129-N
R-90-W



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.01	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.01	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	642	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	642	LF

LEGEND

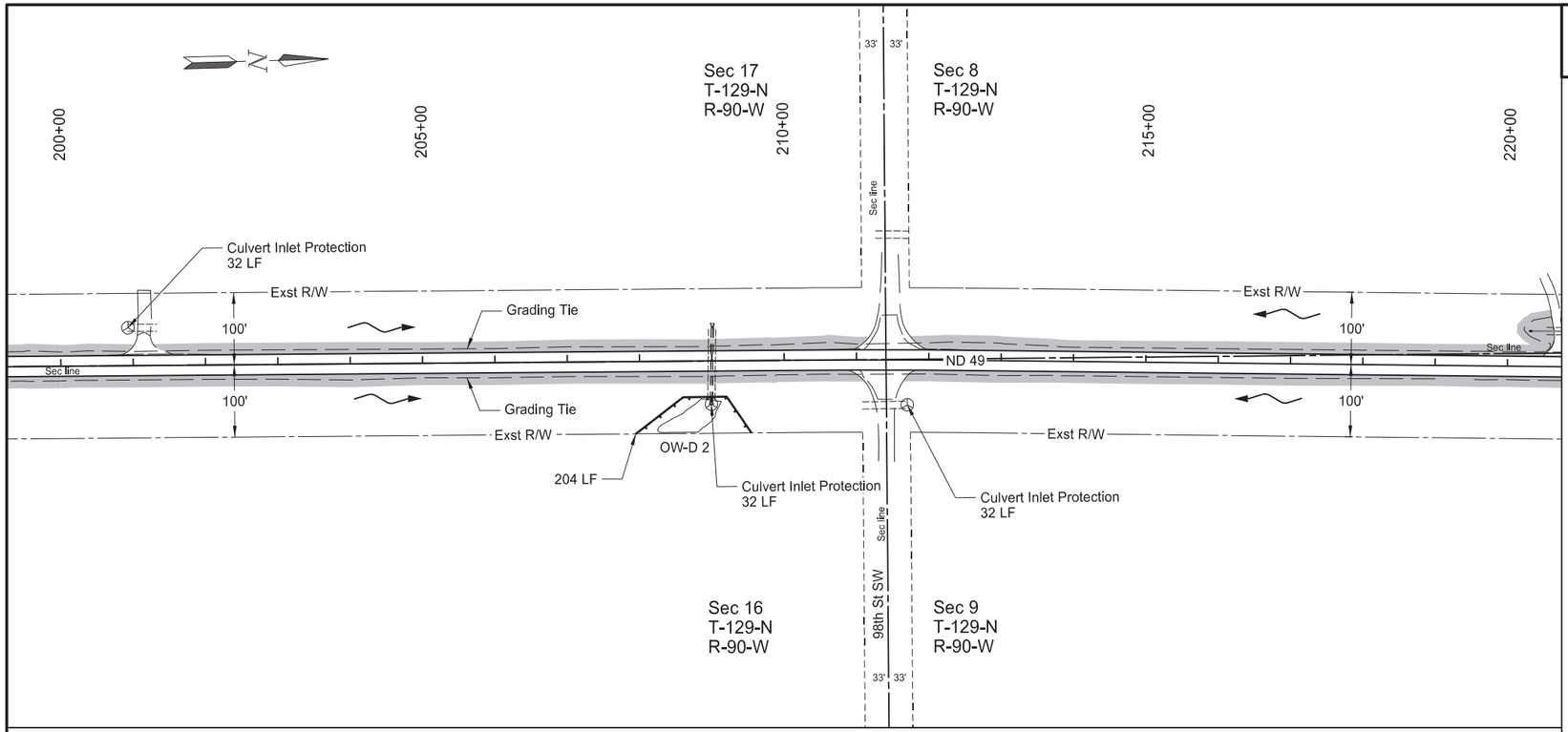
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

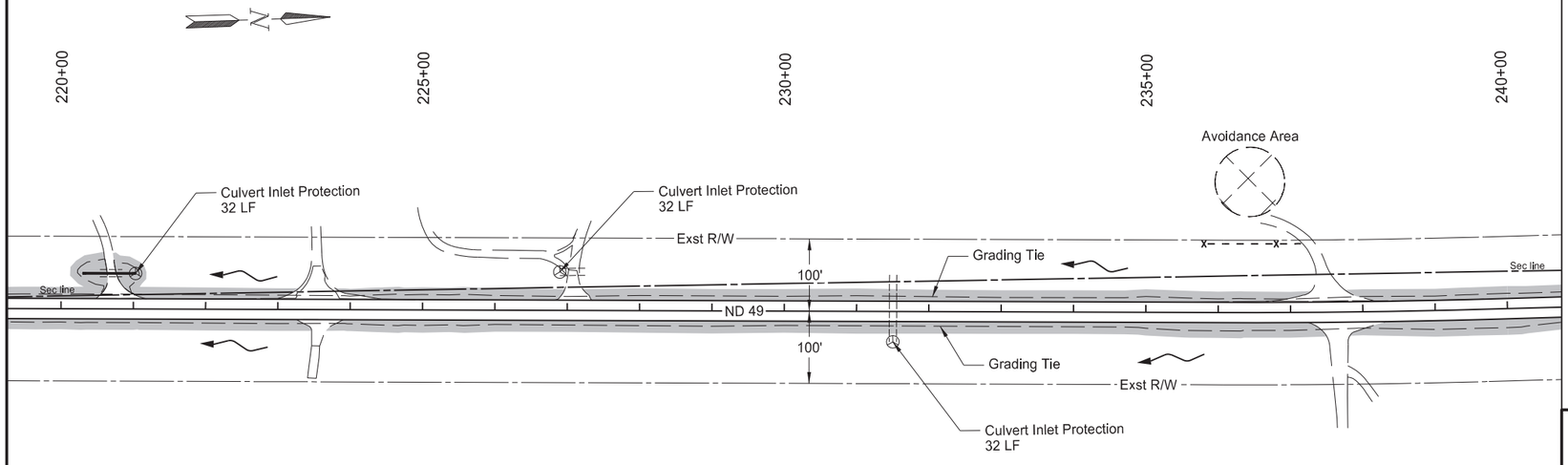
Temporary Erosion Control

ND 49 - State Line to Jct ND 21

Sta 160+00 to Sta 200+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:31:03 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	6

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.91	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.91	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	204	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	204	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

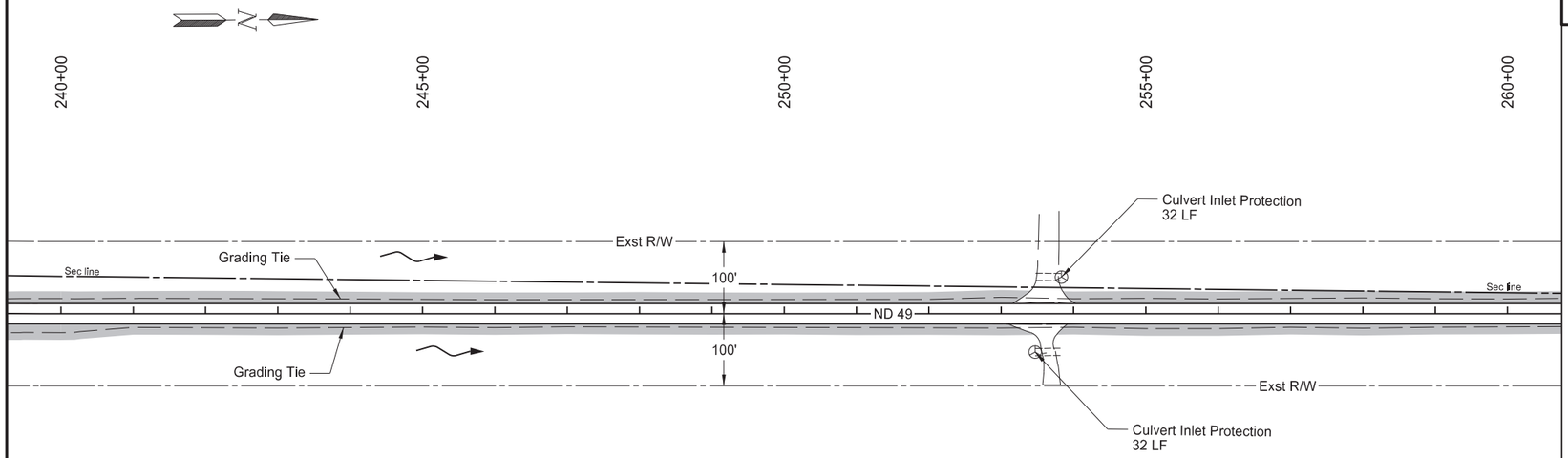
Temporary Erosion Control

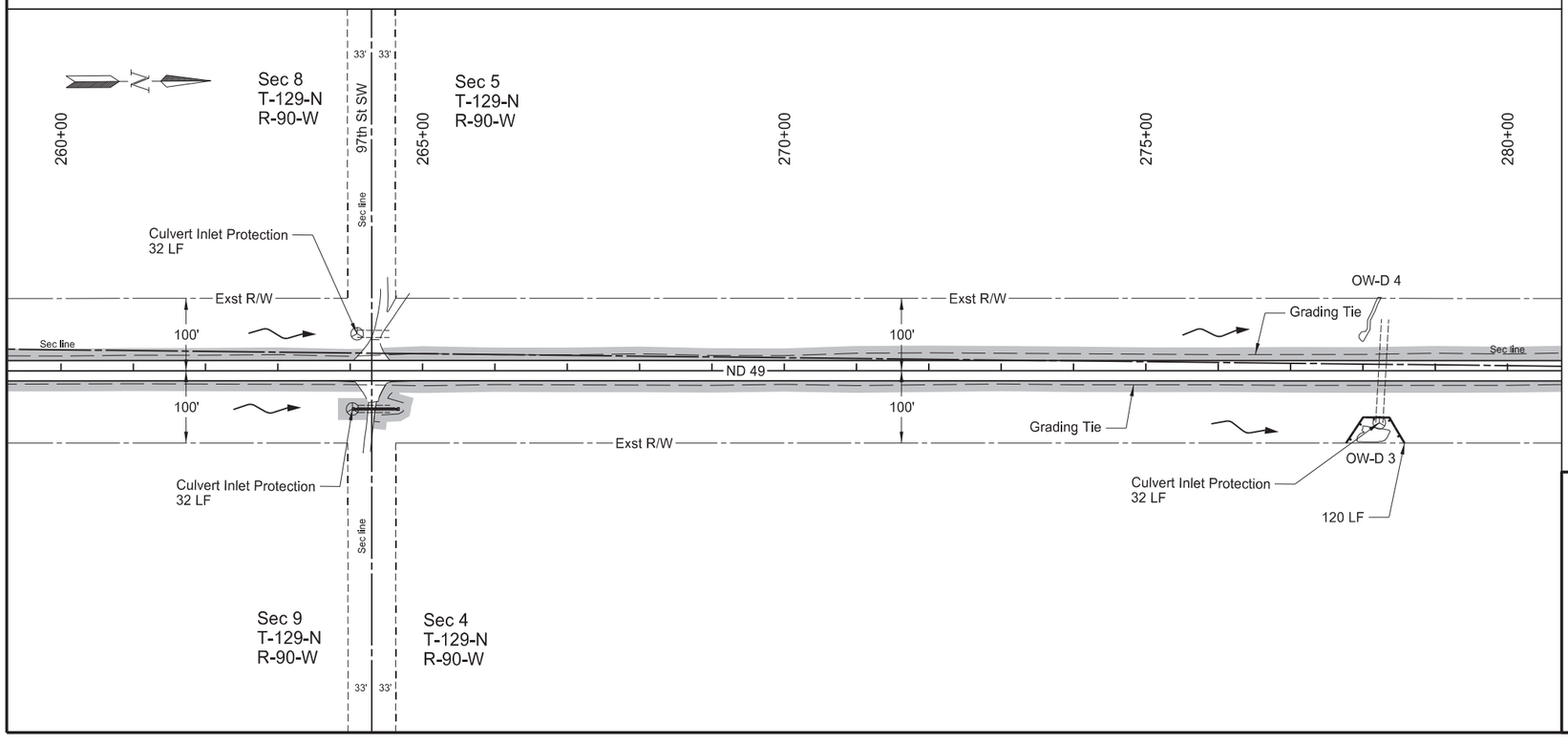
ND 49 - State Line to Jct ND 21

Sta 200+00 to Sta 240+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:31:32 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	7





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.03	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.03	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	120	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	120	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

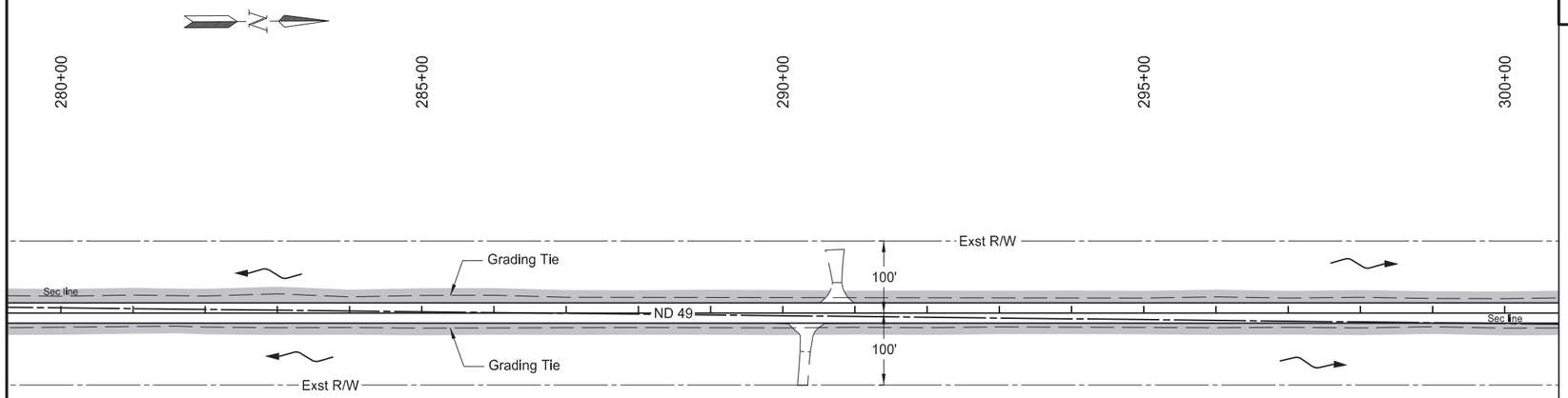
Temporary Erosion Control

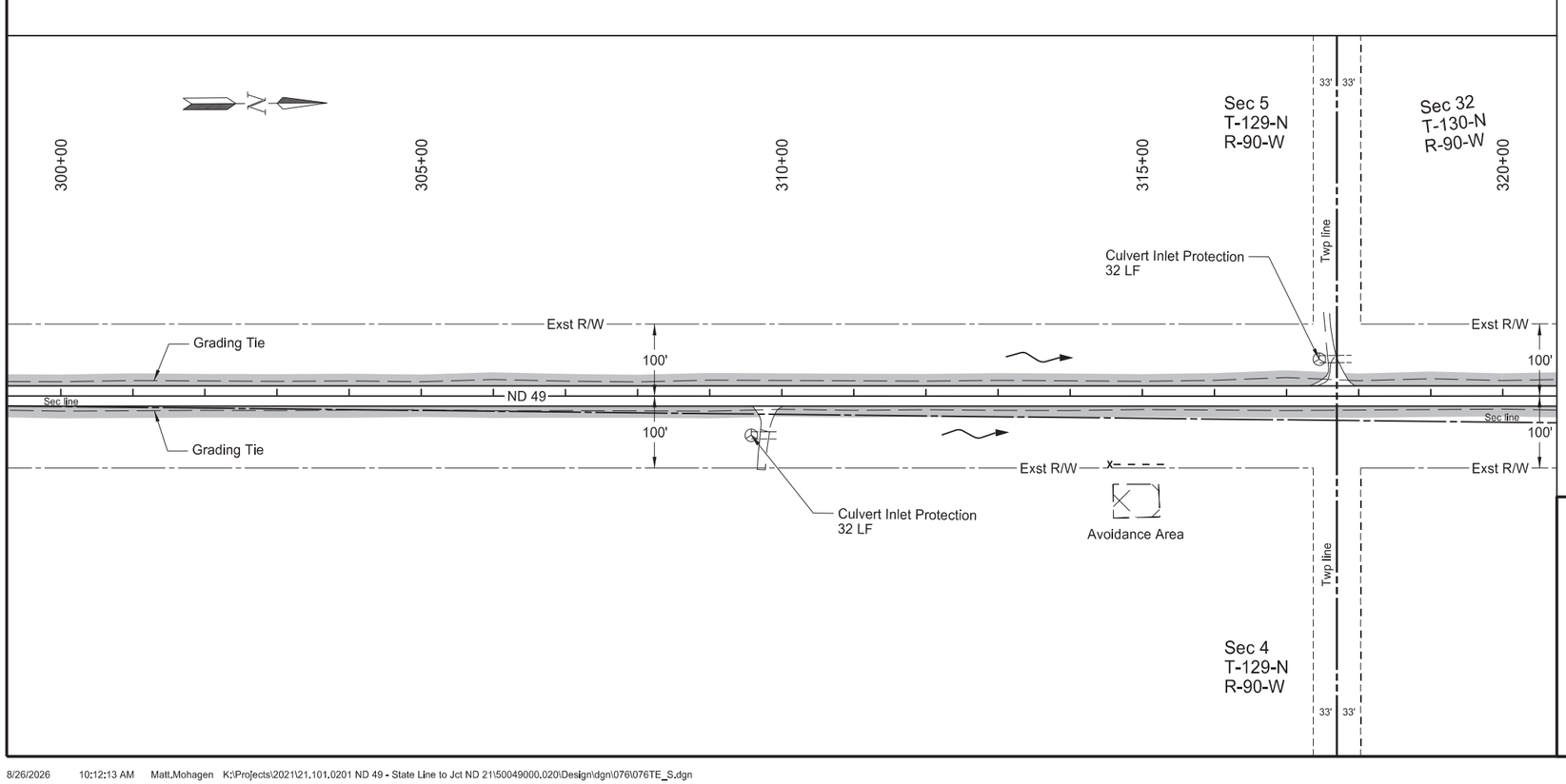
ND 49 - State Line to Jct ND 21

Sta 240+00 to Sta 280+00
(SCL49_S)

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ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:32:08 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	8





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.05	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.05	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

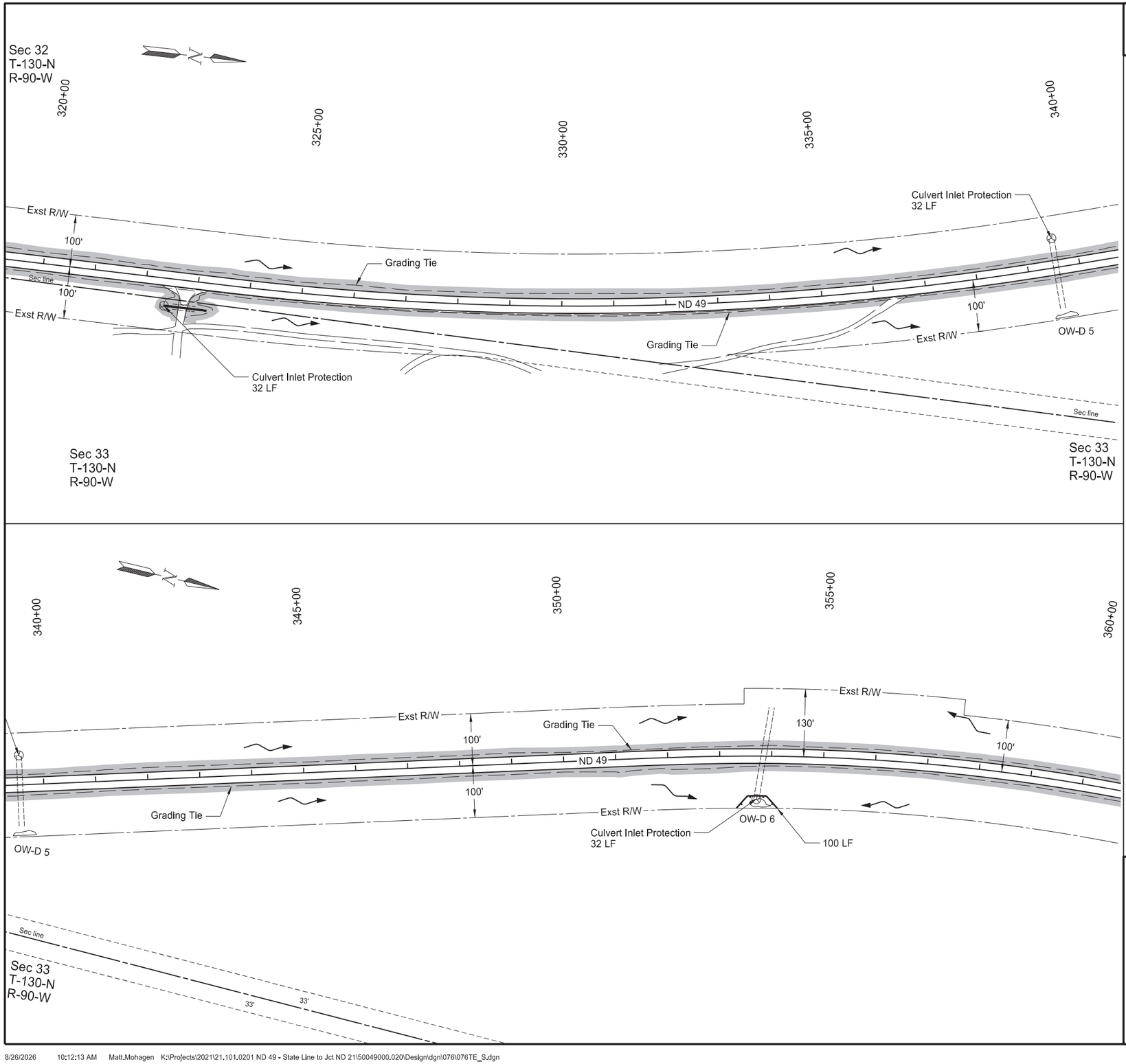
Temporary Erosion Control

ND 49 - State Line to Jct ND 21

Sta 280+00 to Sta 320+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:32:36 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	9



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.99	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.99	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	100	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	100	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

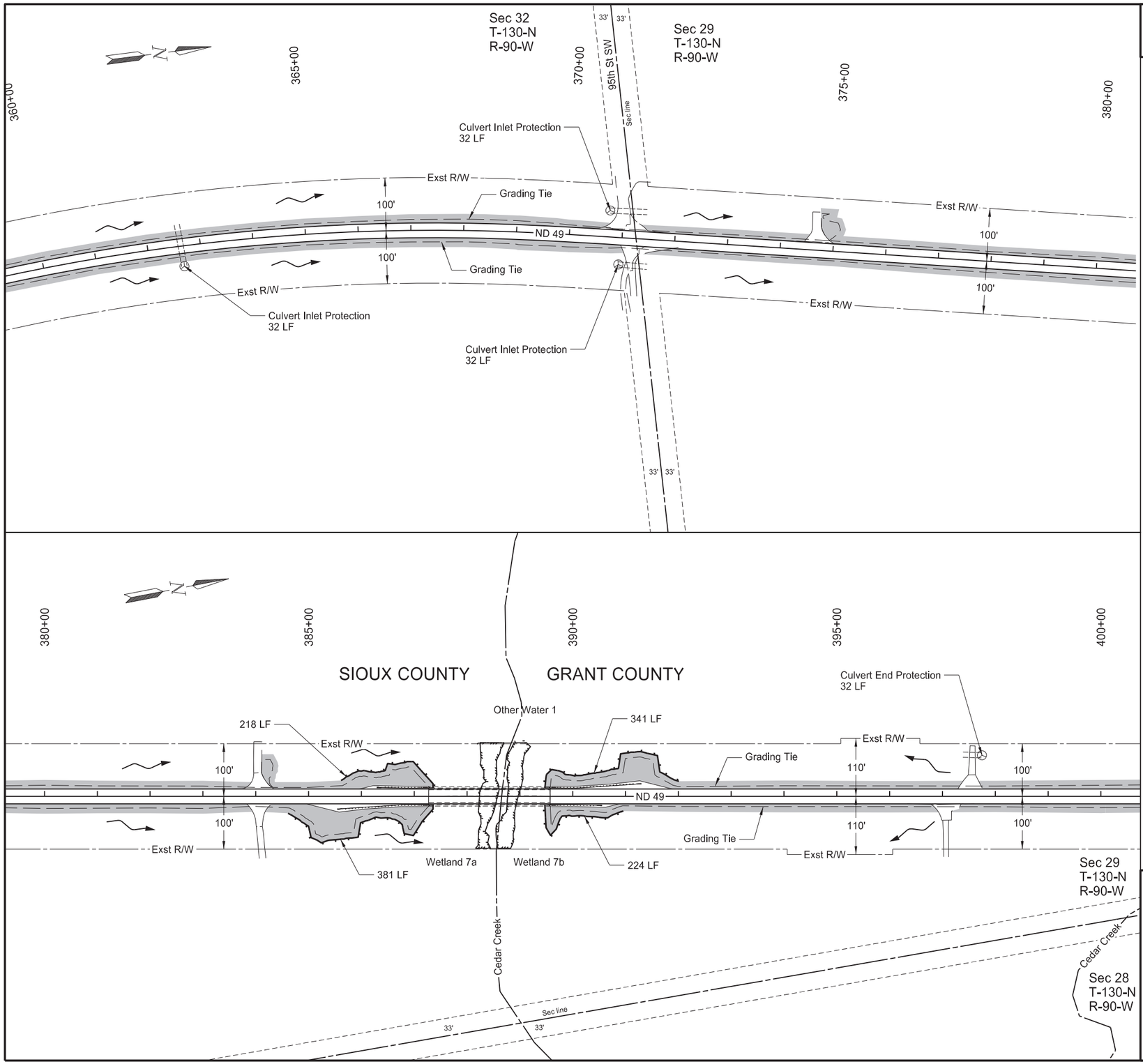
Temporary Erosion Control

ND 49 - State Line to Jct ND 21

Sta 320+00 to Sta 360+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:33:09 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	10



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.08	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.08	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	1,164	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	1,164	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

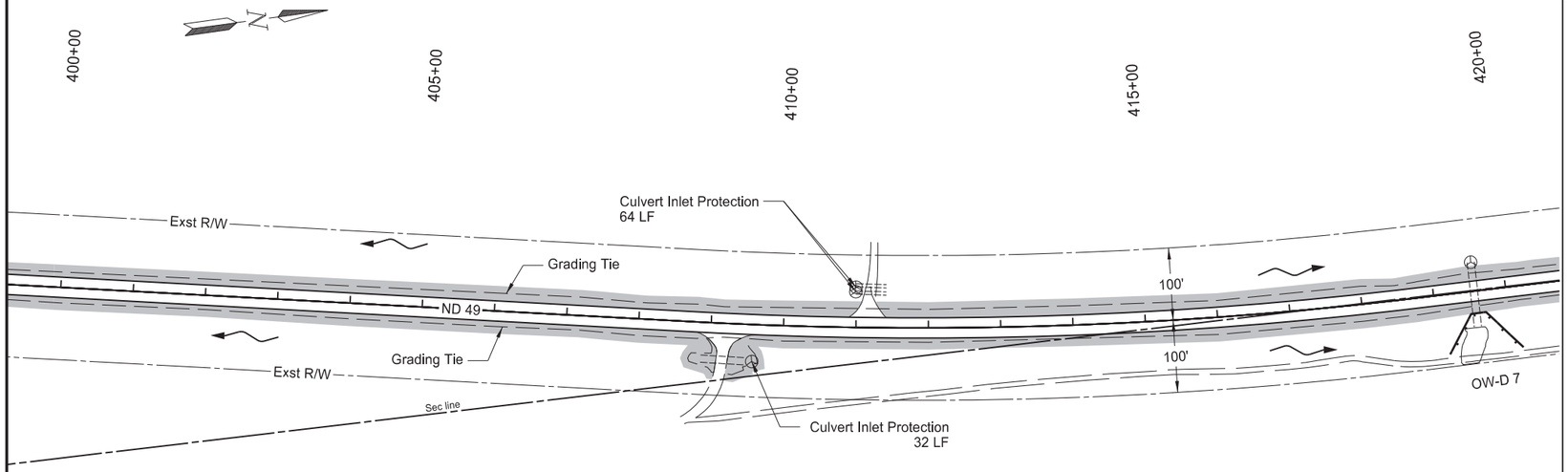
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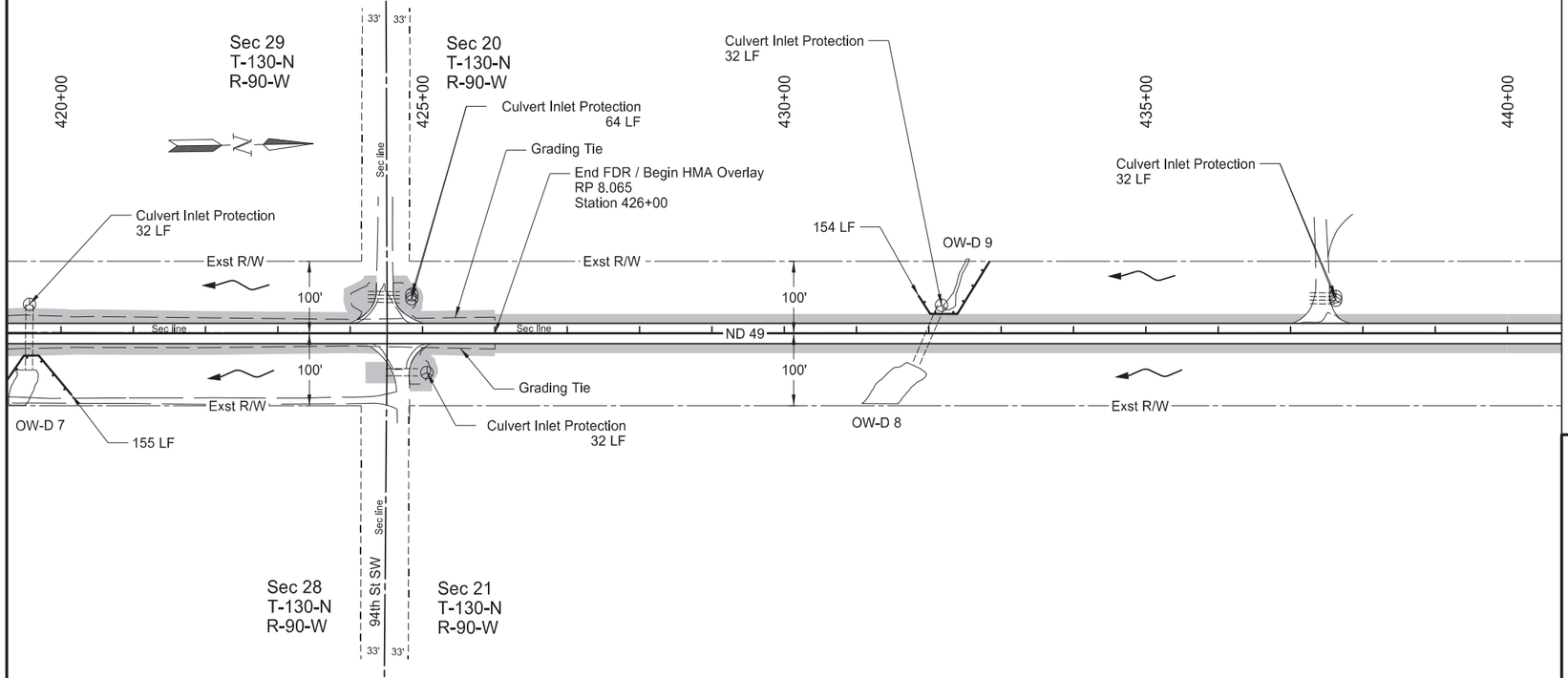
ND 49 - State Line to Jct ND 21

Sta 360+00 to Sta 388+65
(SCL49_S)
Sta 388+65 to Sta 400+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:33:40 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	11





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	3.14	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.14	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	288	LF
		Perimeter Control	309	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	288	LF
		Perimeter Control	309	LF

LEGEND

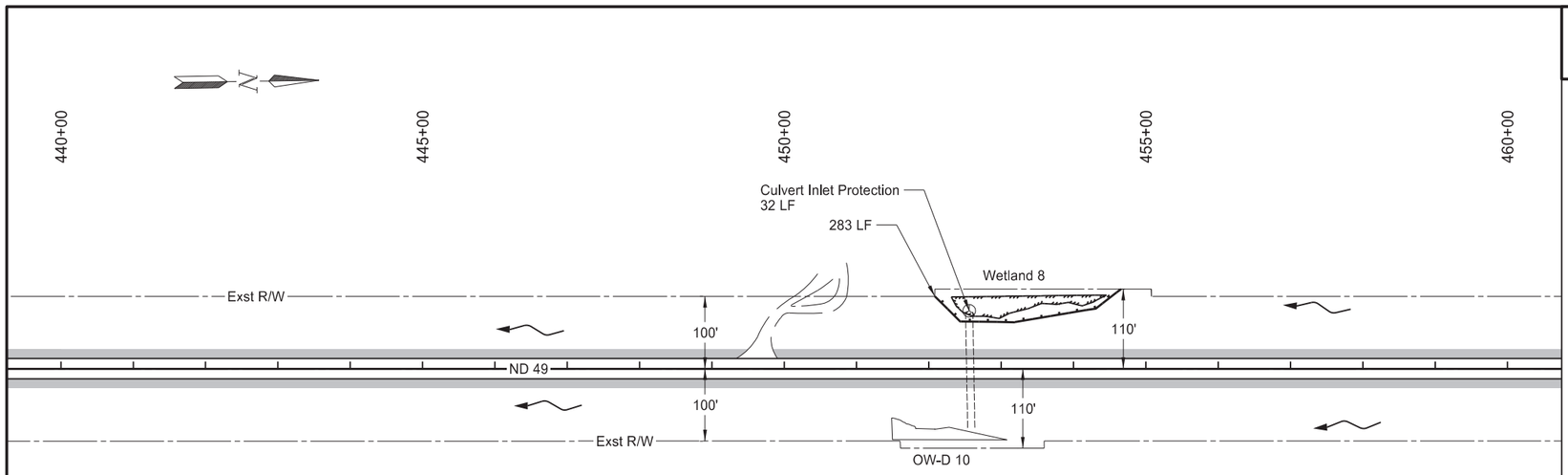
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- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

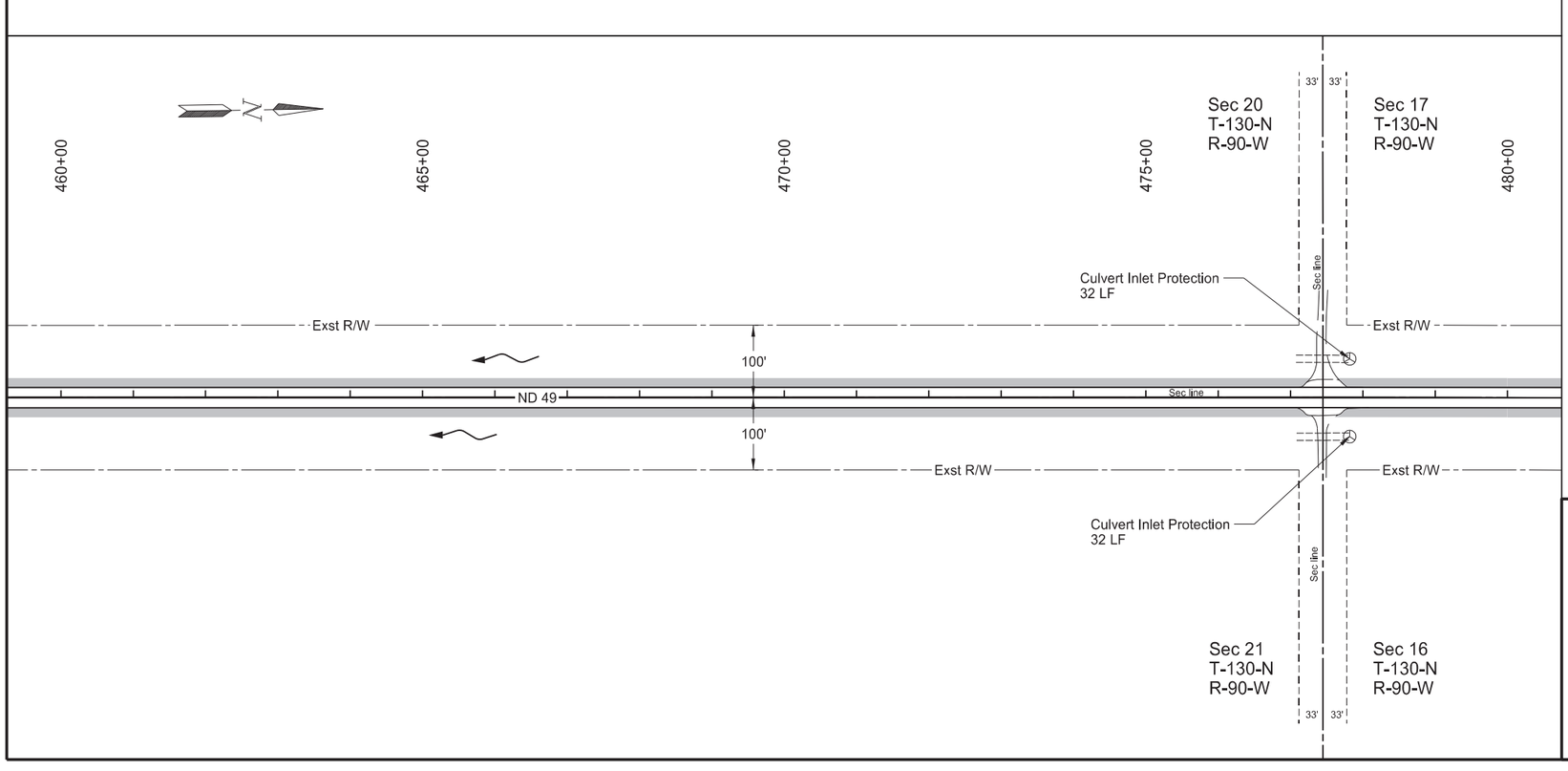
Temporary Erosion Control

Sta 400+00 to Sta 440+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:34:08 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	12

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	283	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	283	LF

LEGEND

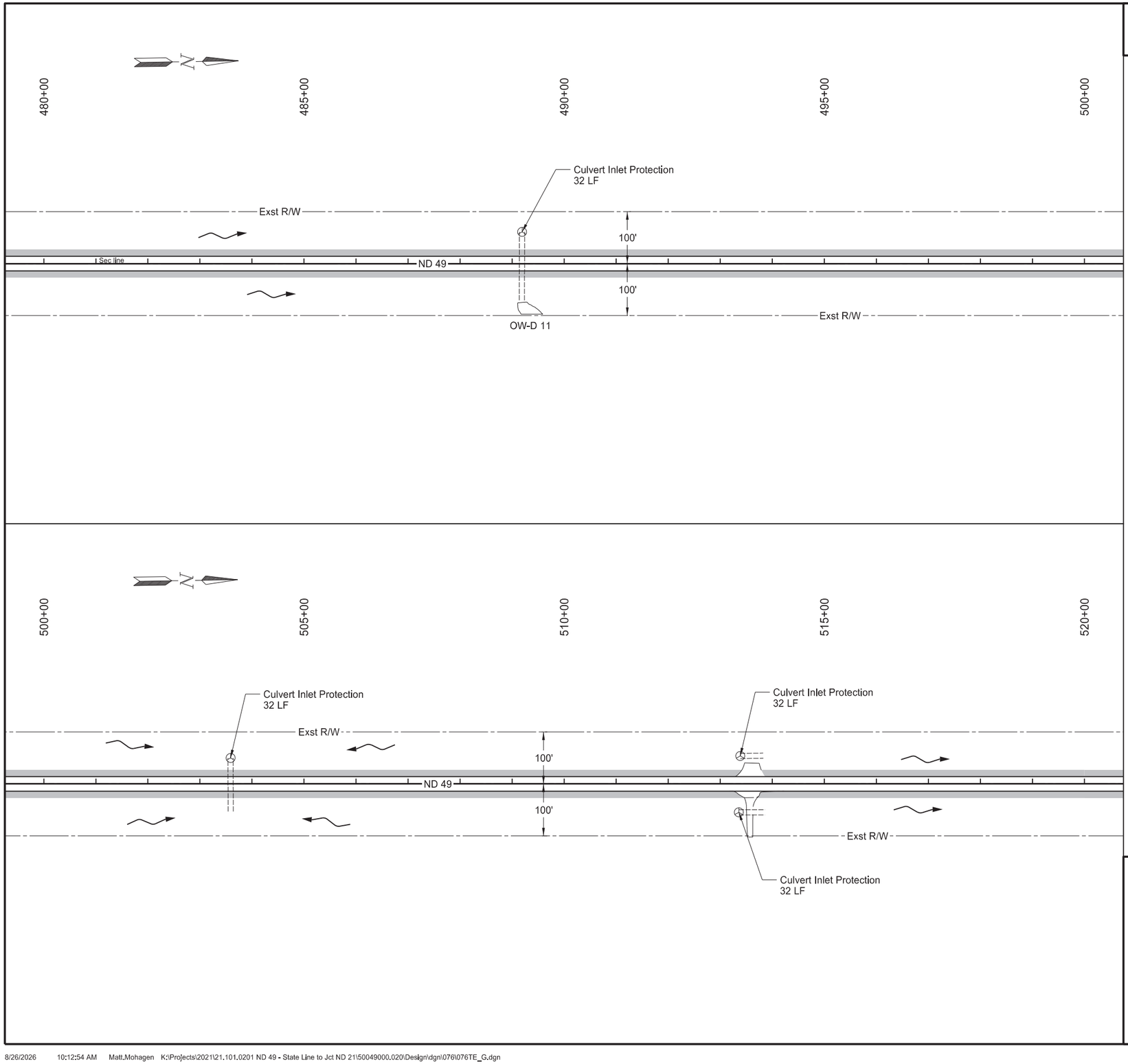
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 440+00 to Sta 480+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:35:11 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	13

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.36	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.36	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

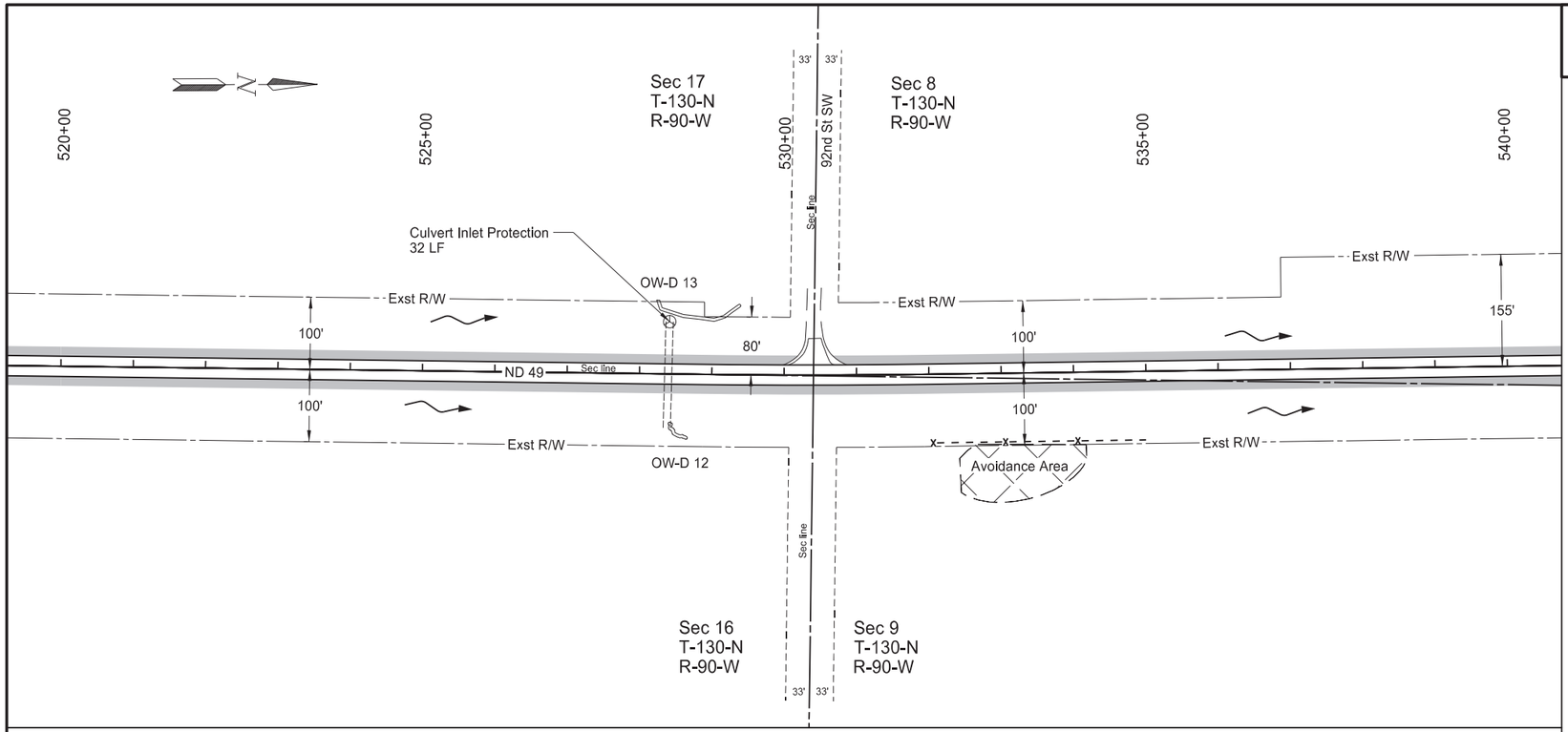
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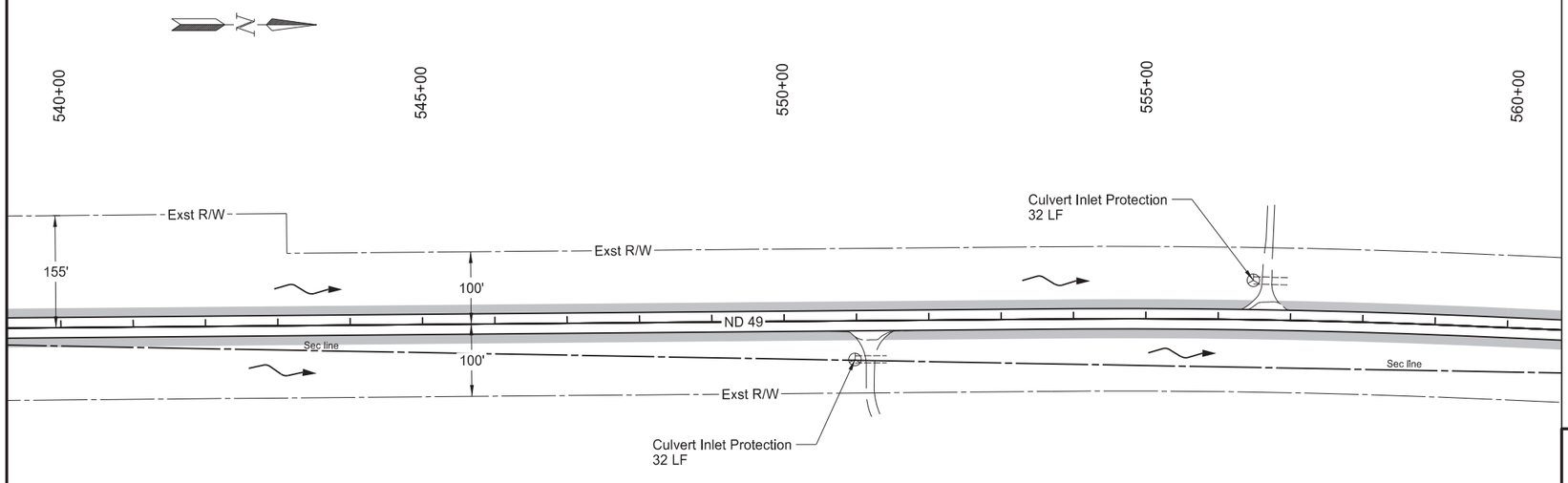
Sta 480+00 to Sta 520+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:35:41 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	14





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

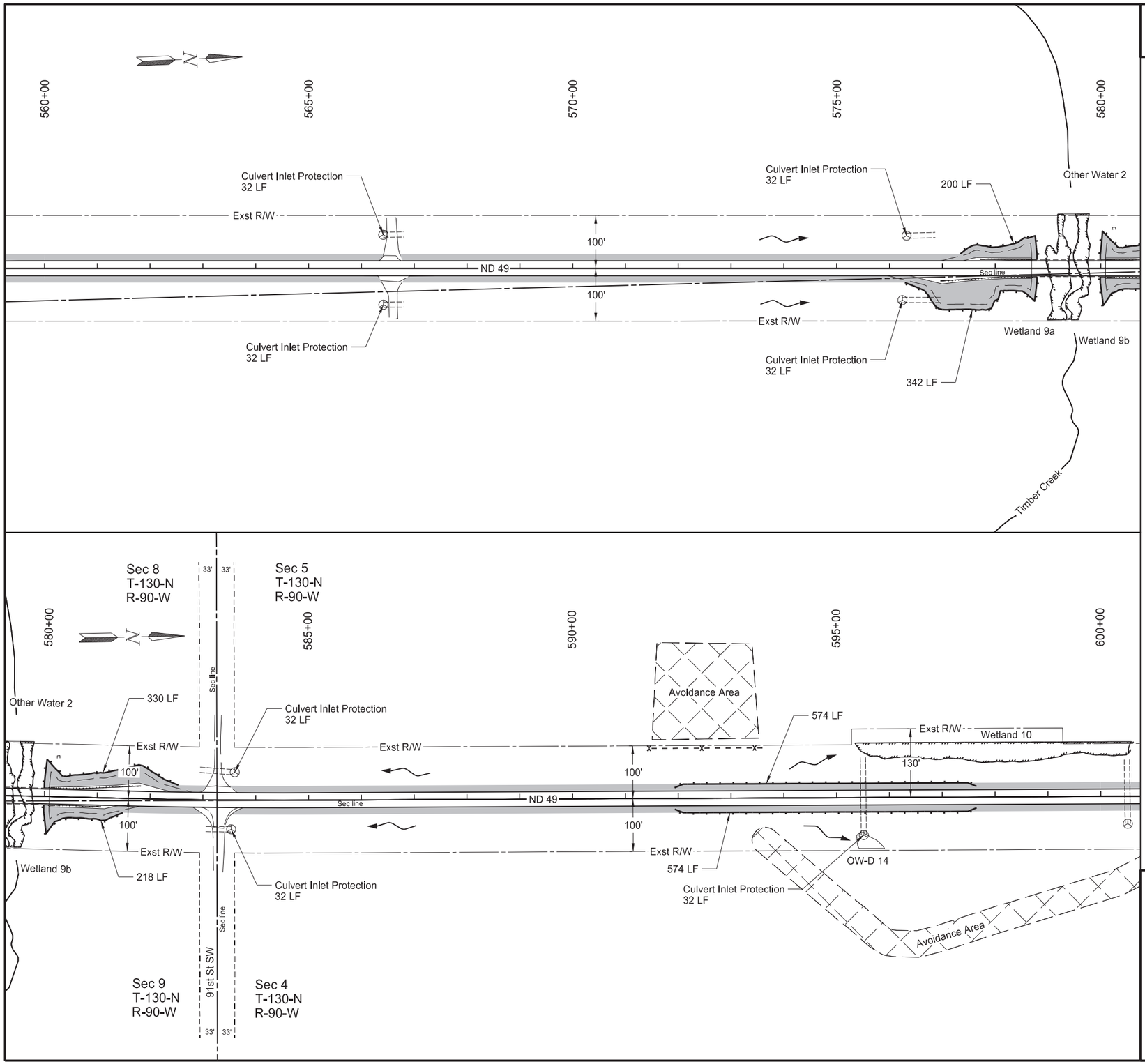
Sta 520+00 to Sta 560+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:36:15 -05'00'
NORTH DAKOTA

8/26/2026 10:12:55 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	15



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.55	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.55	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	224	LF
		Perimeter Control	2,238	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	224	LF
		Perimeter Control	2,238	LF

LEGEND

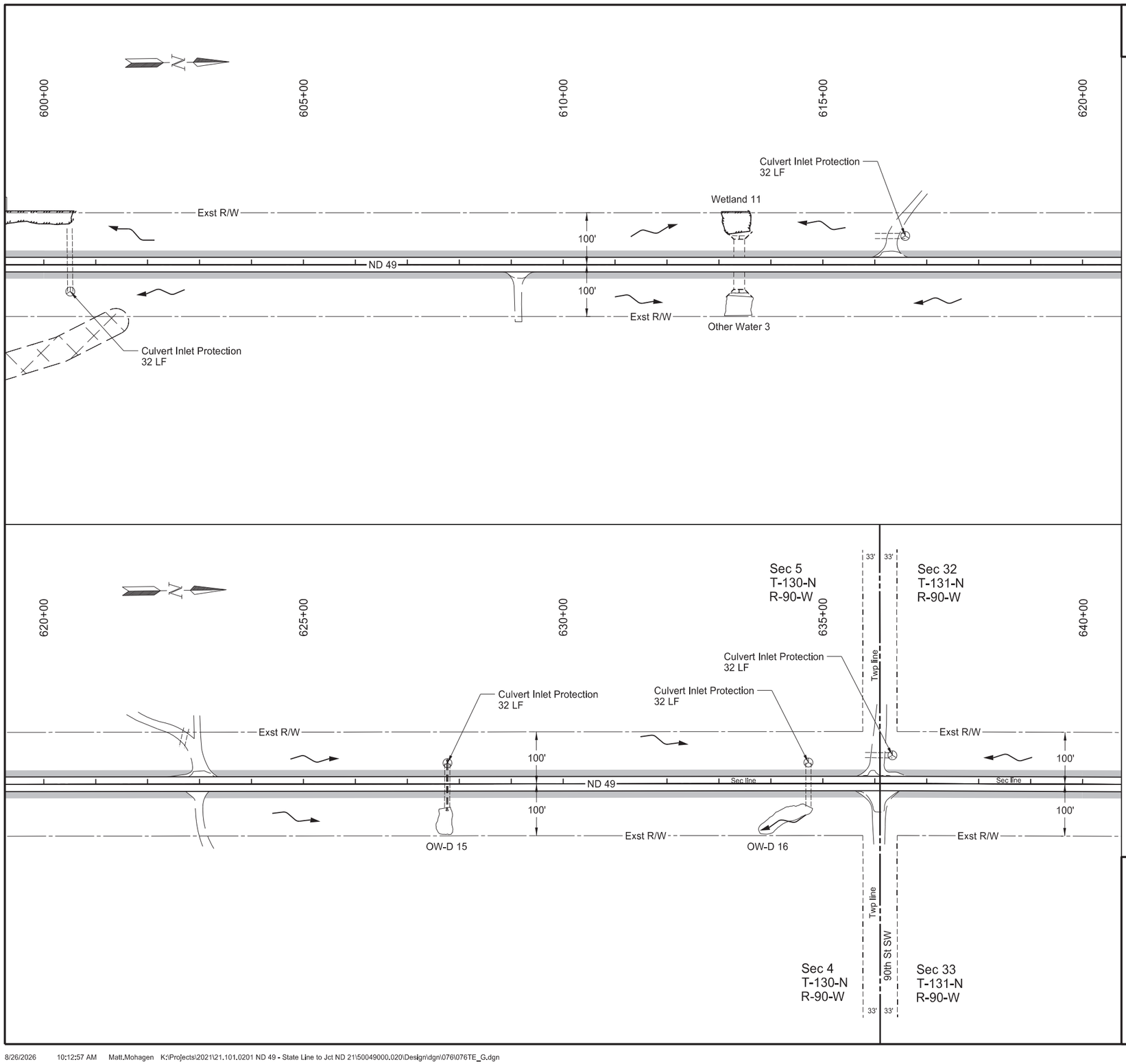
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 560+00 to Sta 600+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:36:44 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	16

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.30	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.30	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF

LEGEND

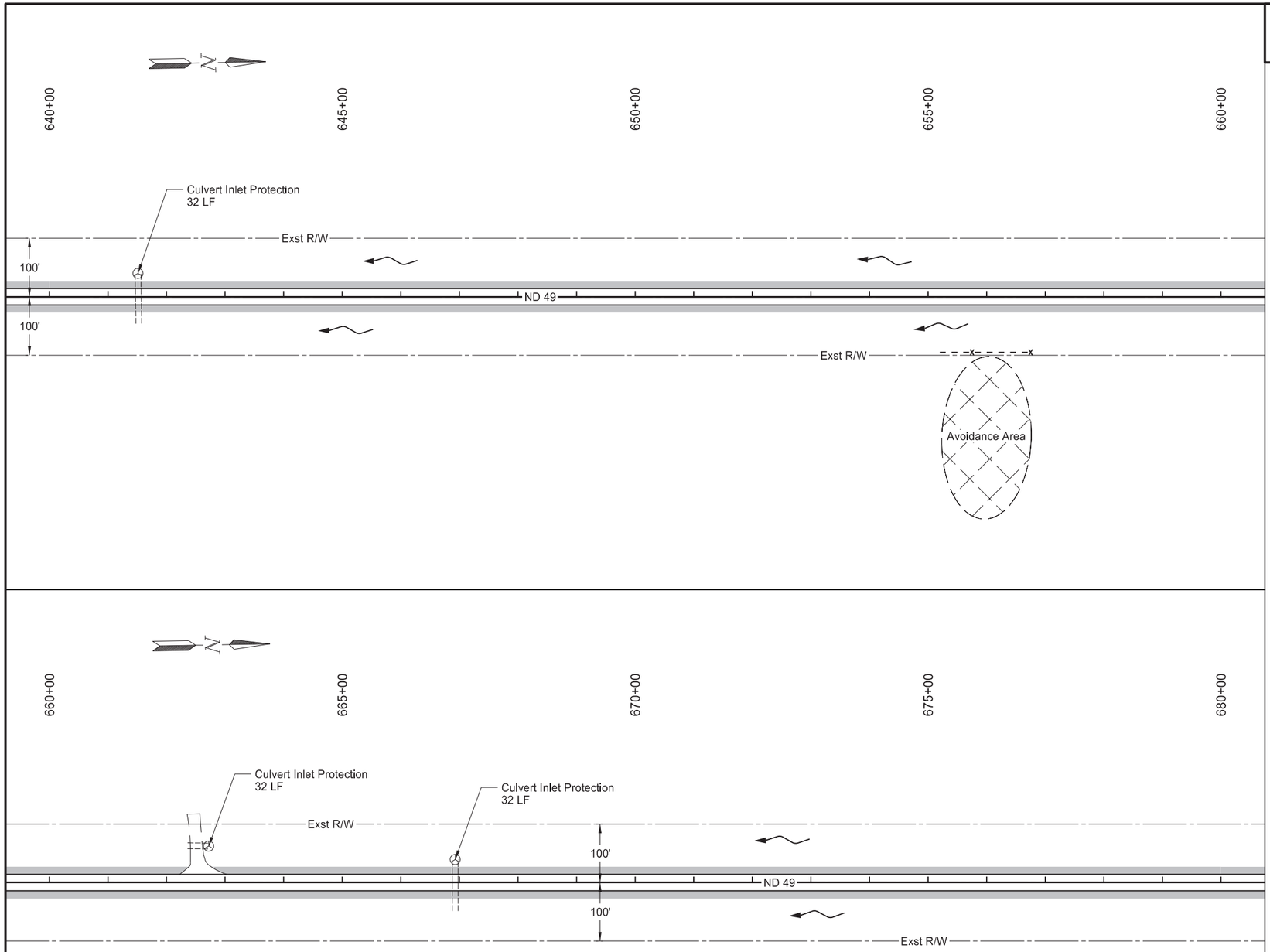
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 600+00 to Sta 640+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:37:16 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	17

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.37	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.37	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

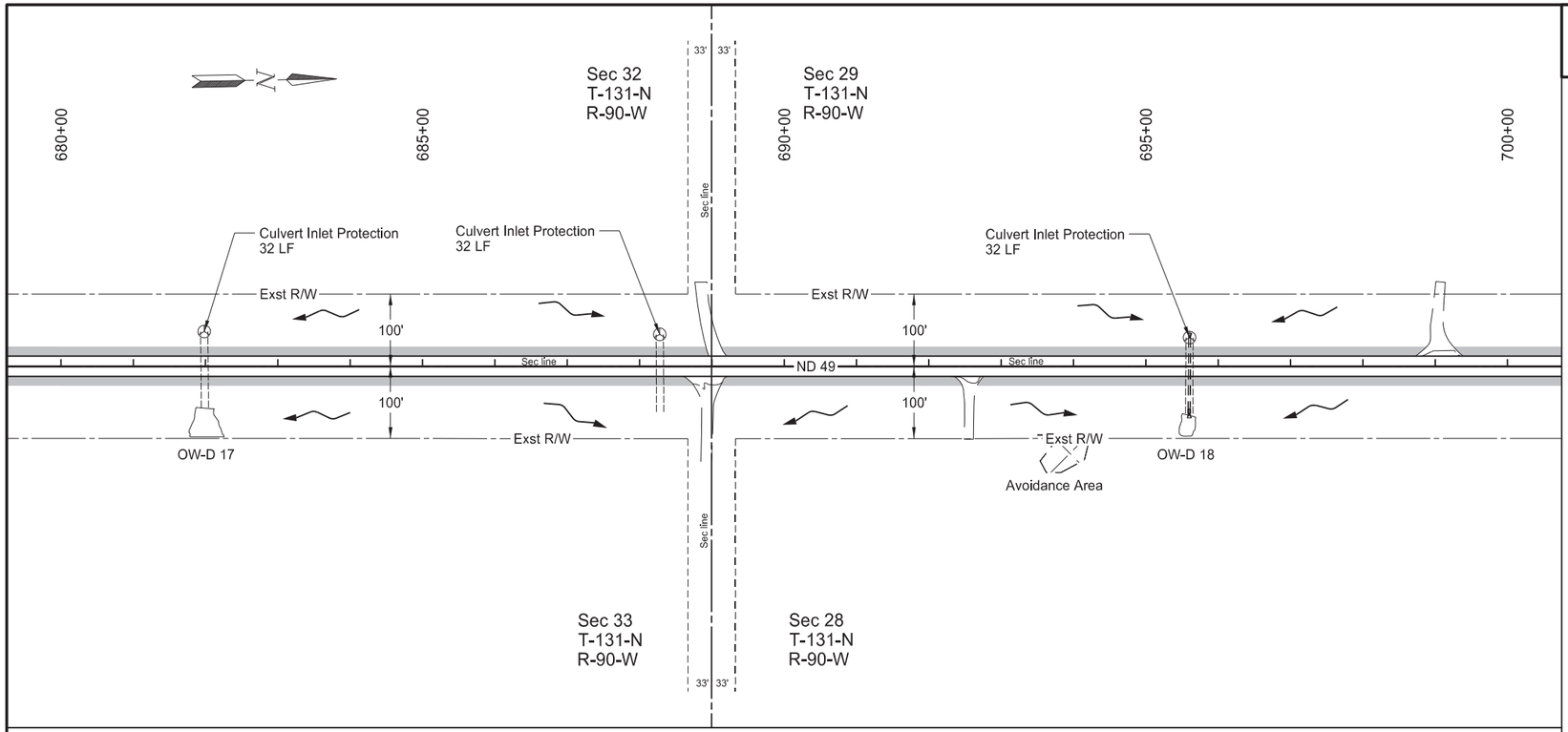
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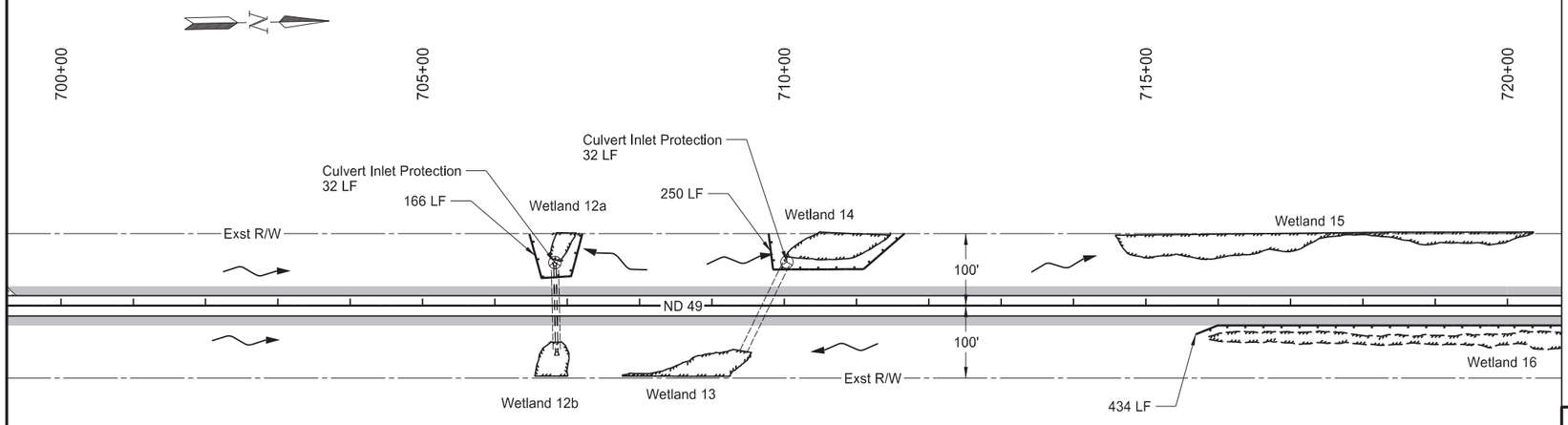
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(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:37:47 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	18





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	850	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	850	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

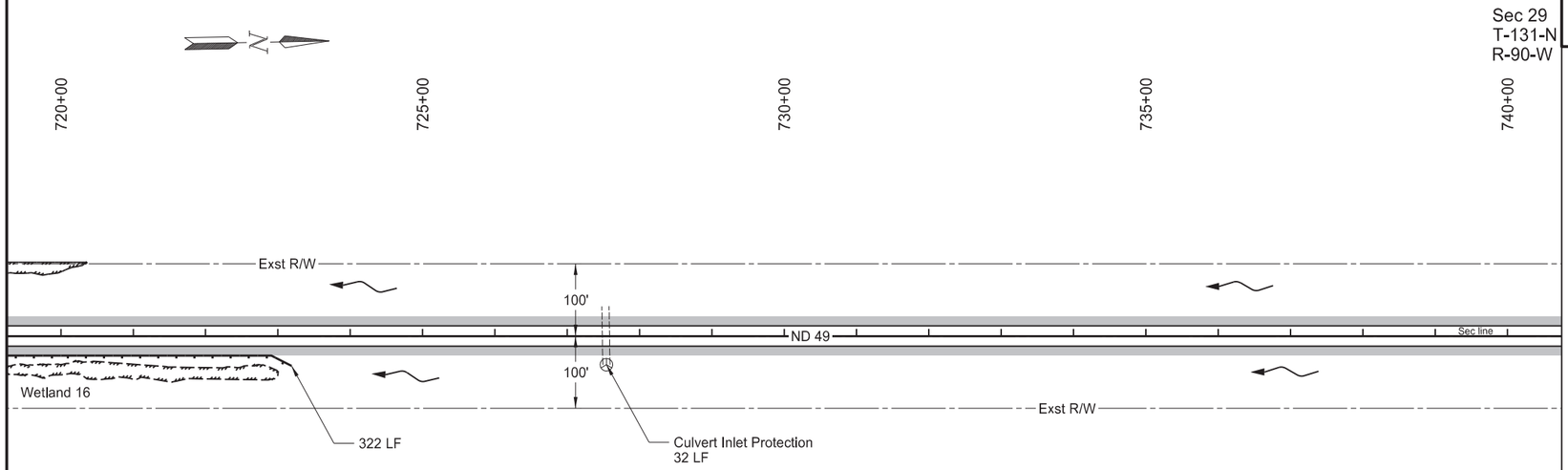
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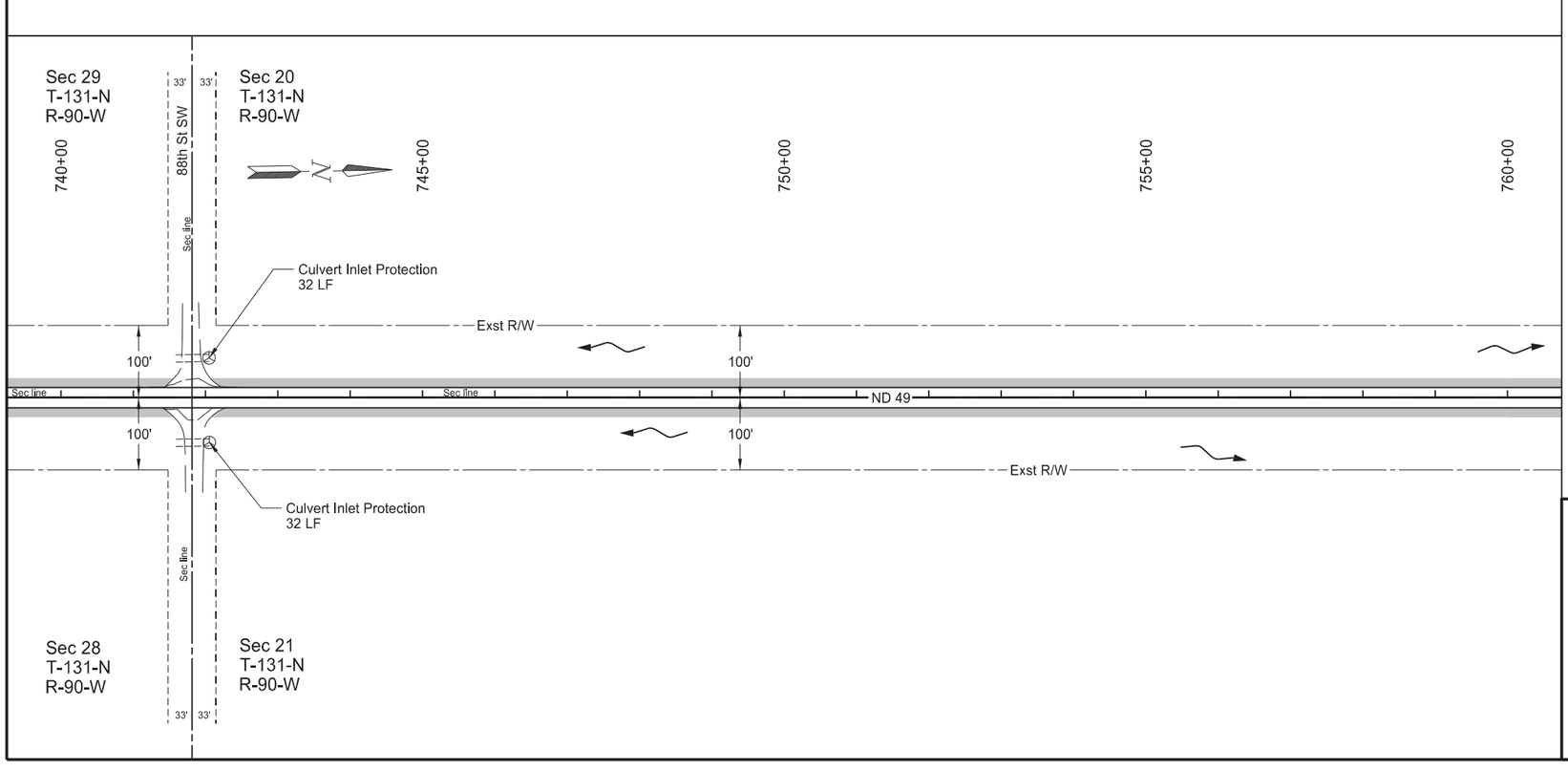
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:38:18 -05'00'
NORTH DAKOTA

8/26/2026 10:12:59 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	19





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	322	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	322	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

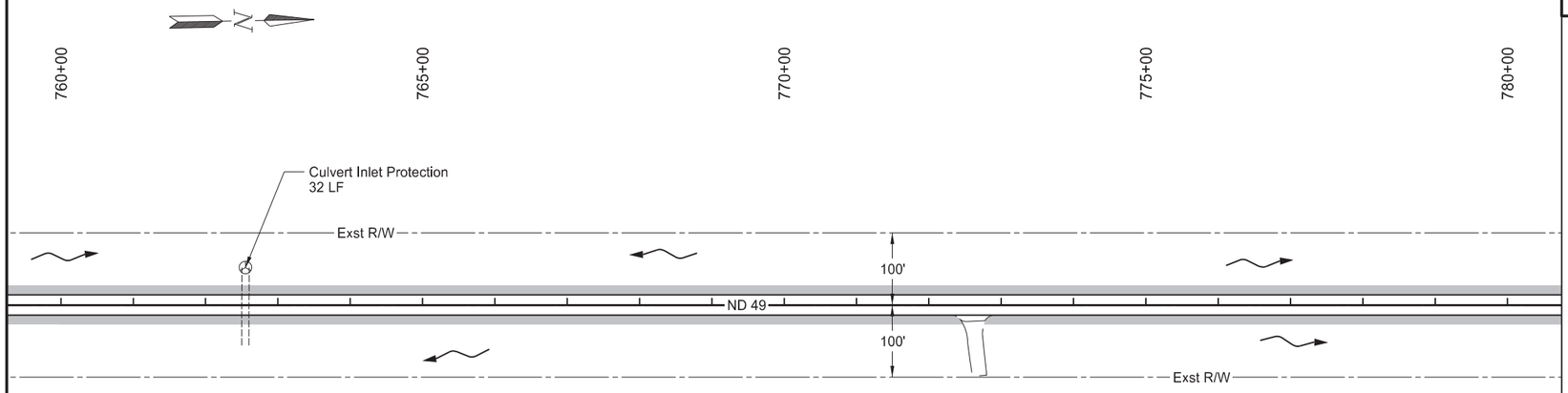
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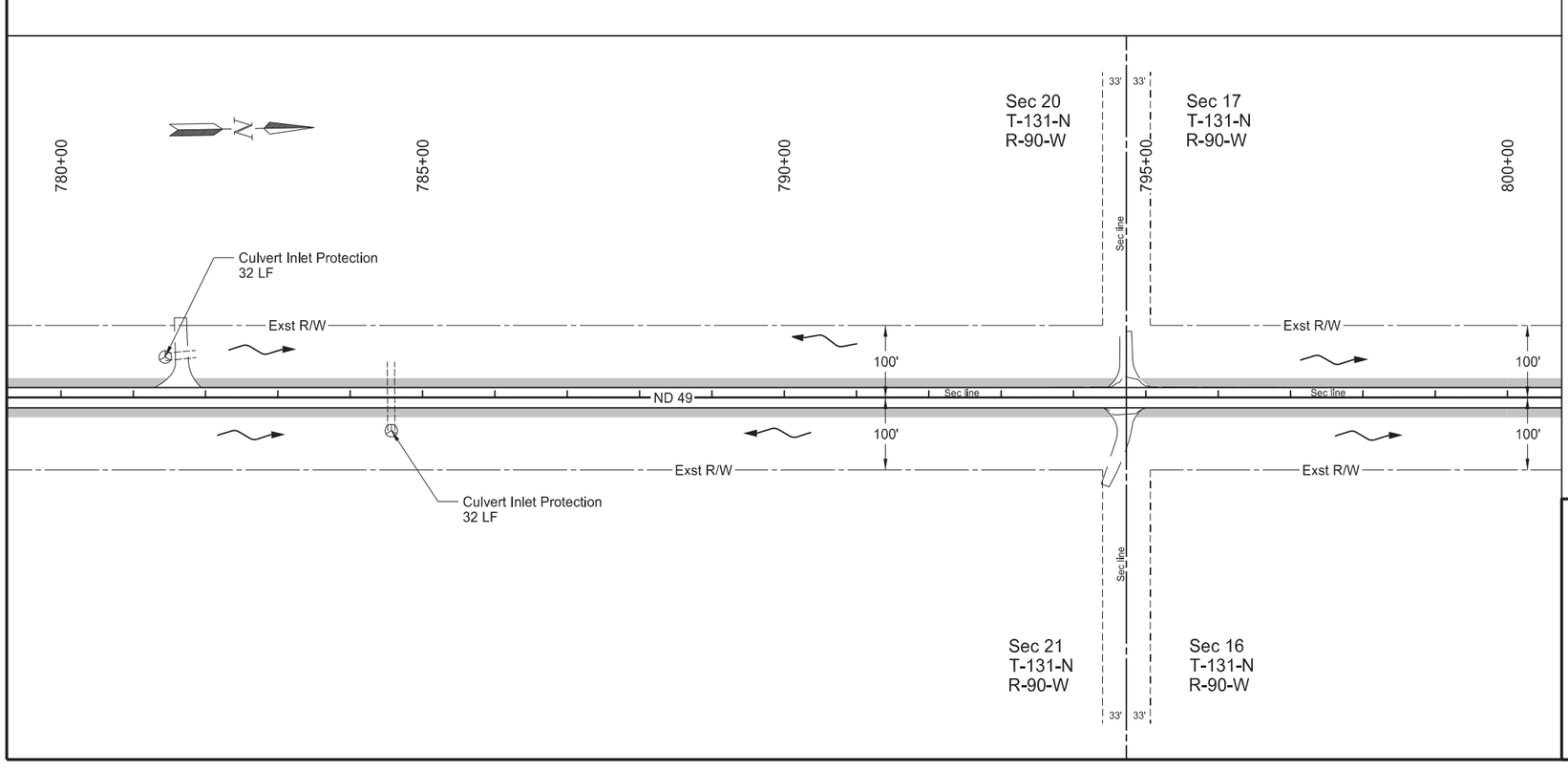
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:38:49 -05'00'
NORTH DAKOTA

8/26/2026 10:12:59 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	20





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

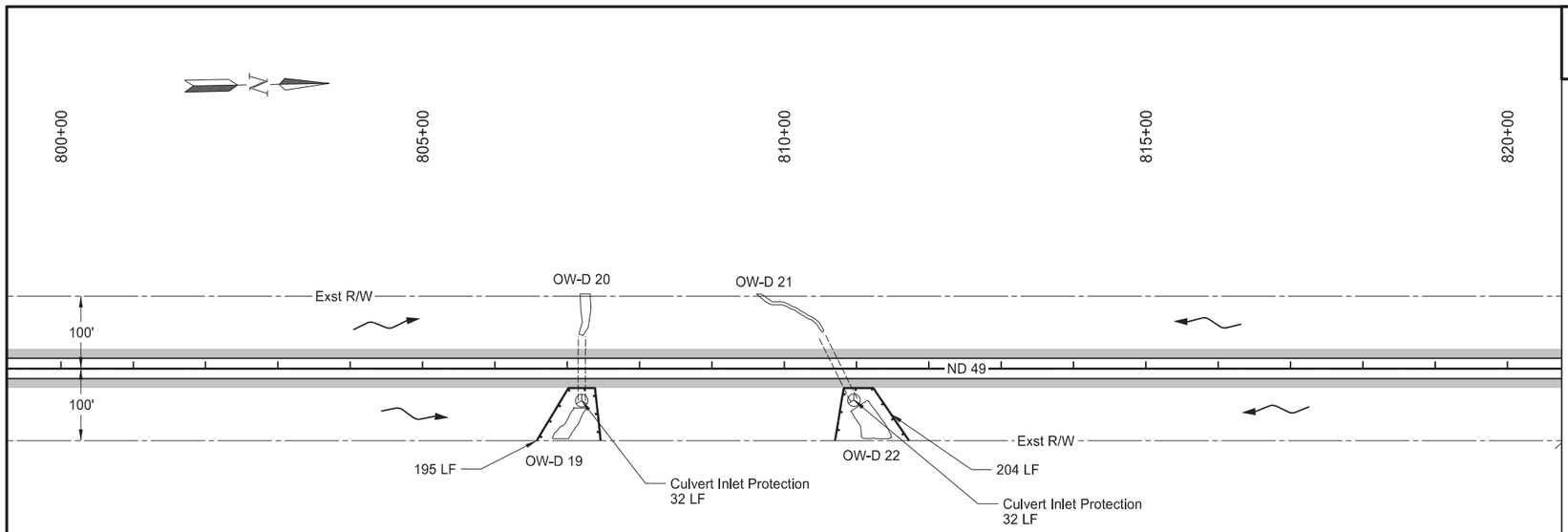
Temporary Erosion Control

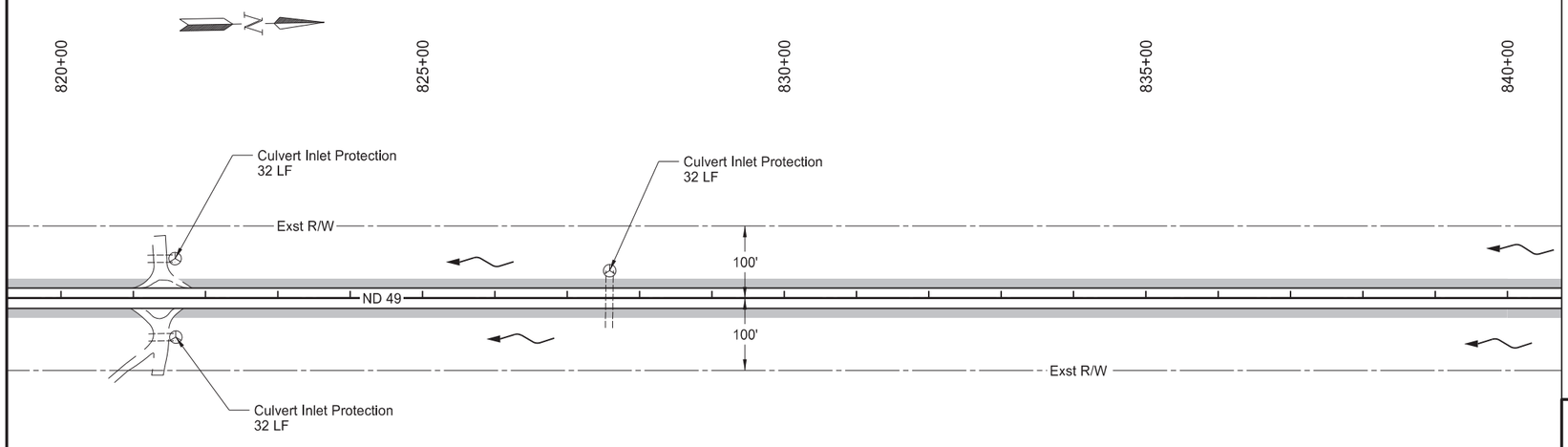
Sta 760+00 to Sta 800+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:39:23 -05'00'
NORTH DAKOTA

8/26/2026 10:13:00 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	21

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	399	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	399	LF

LEGEND

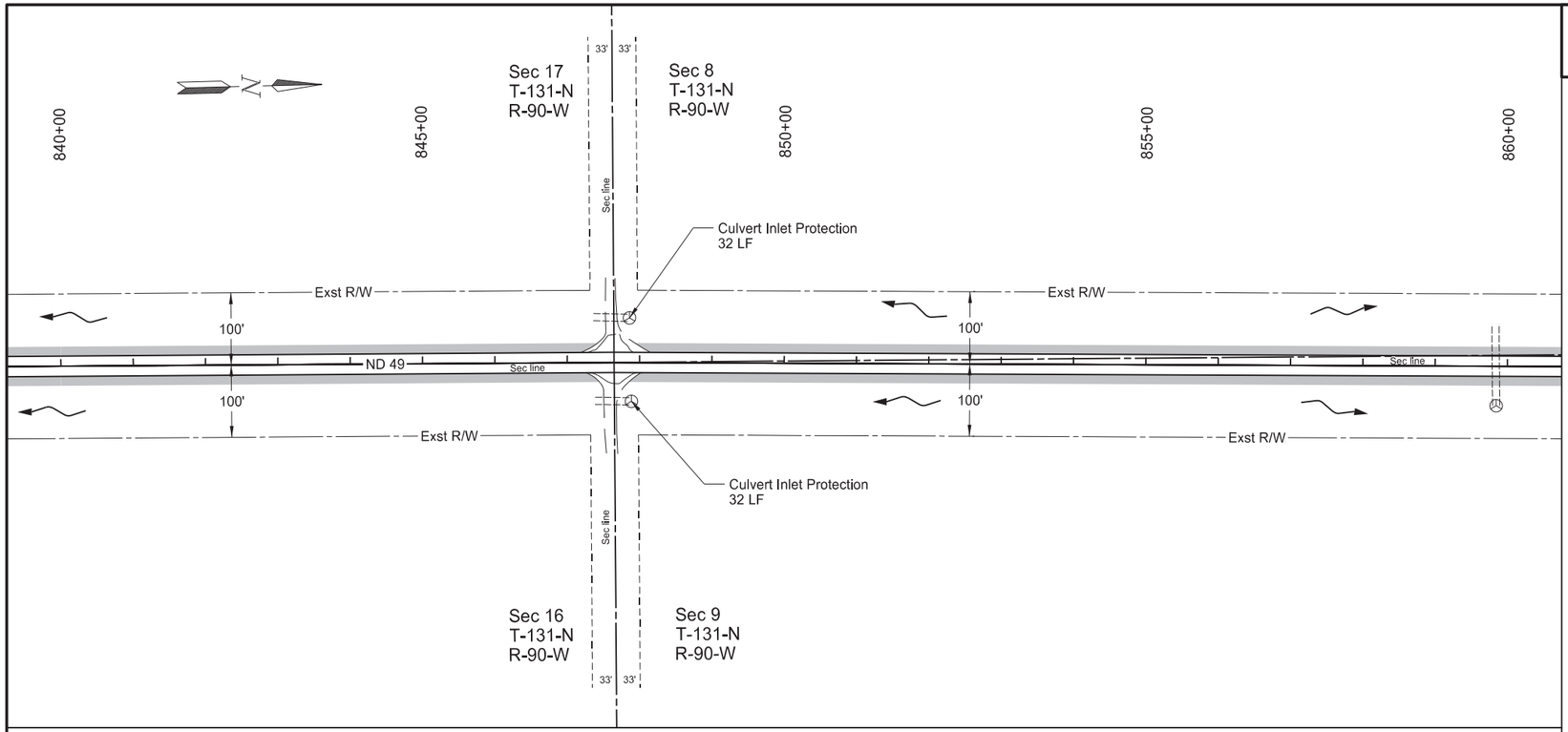
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

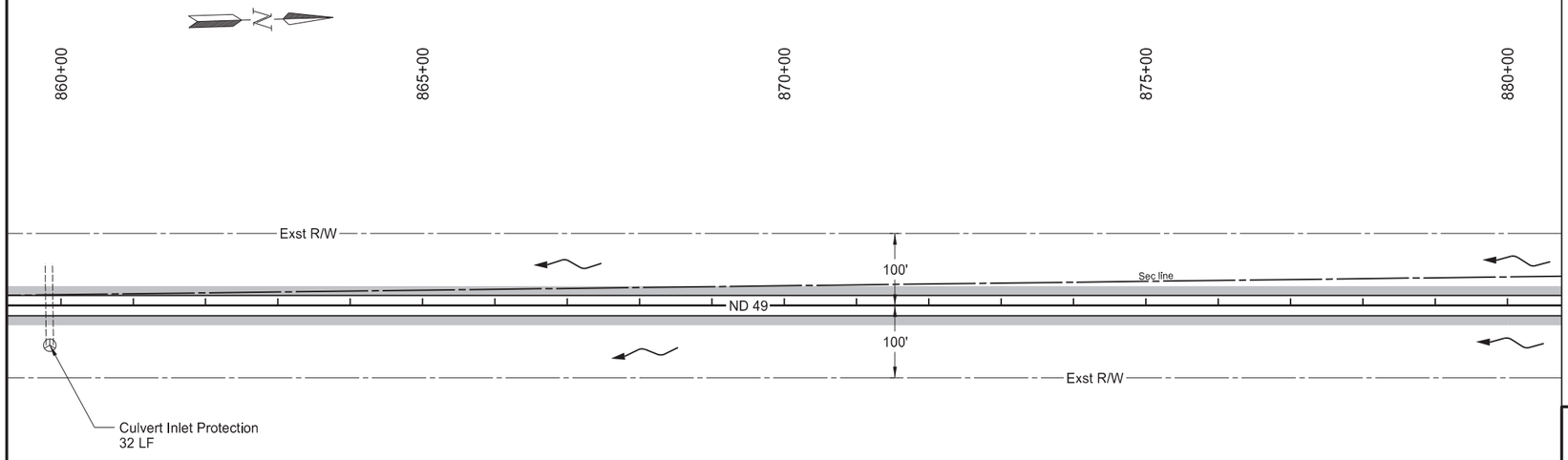
Temporary Erosion Control

Sta 800+00 to Sta 840+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:39:52 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	22

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

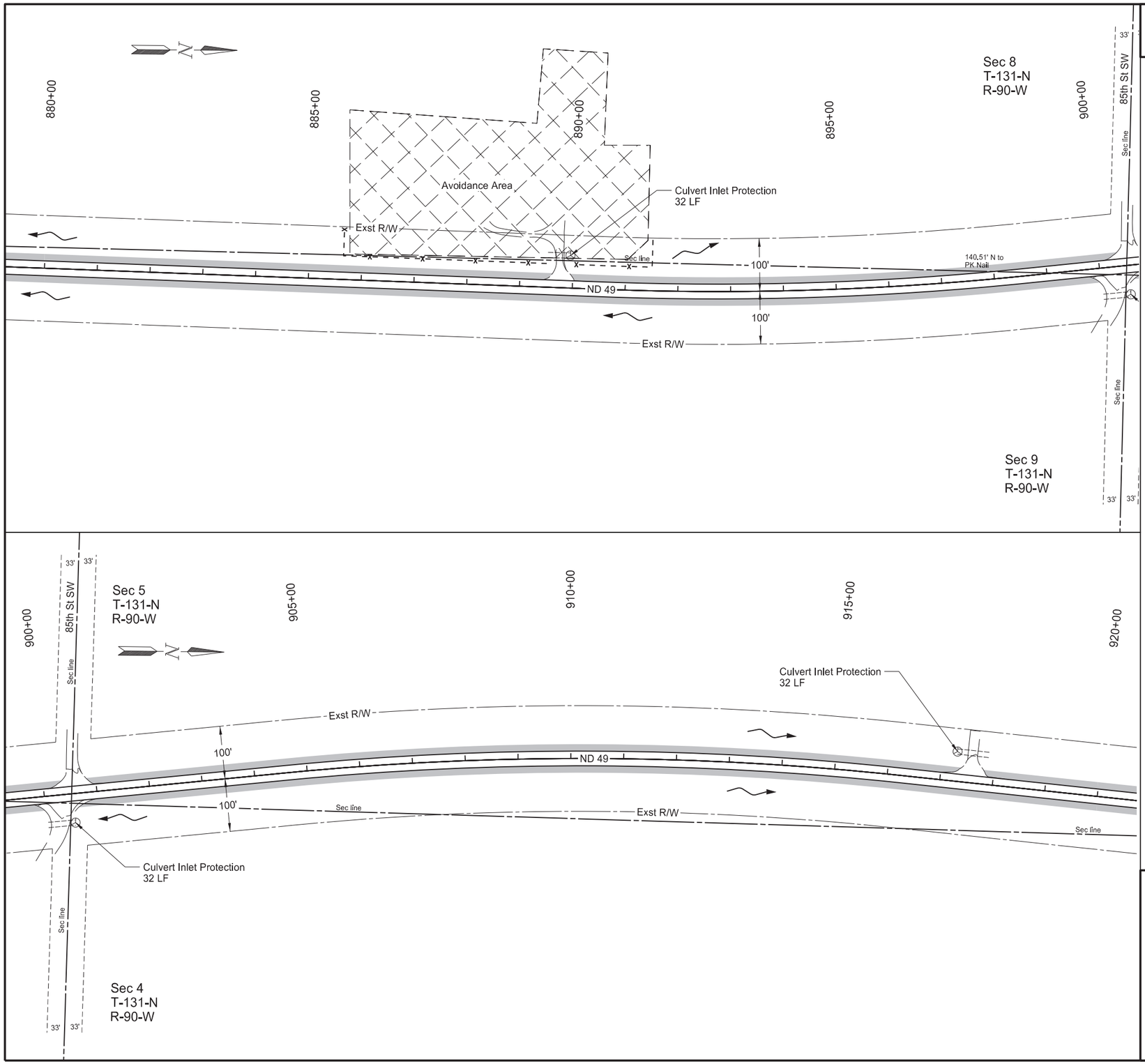
Temporary Erosion Control

Sta 840+00 to Sta 880+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
DATE 2026.08.27 09:40:25 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	23



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

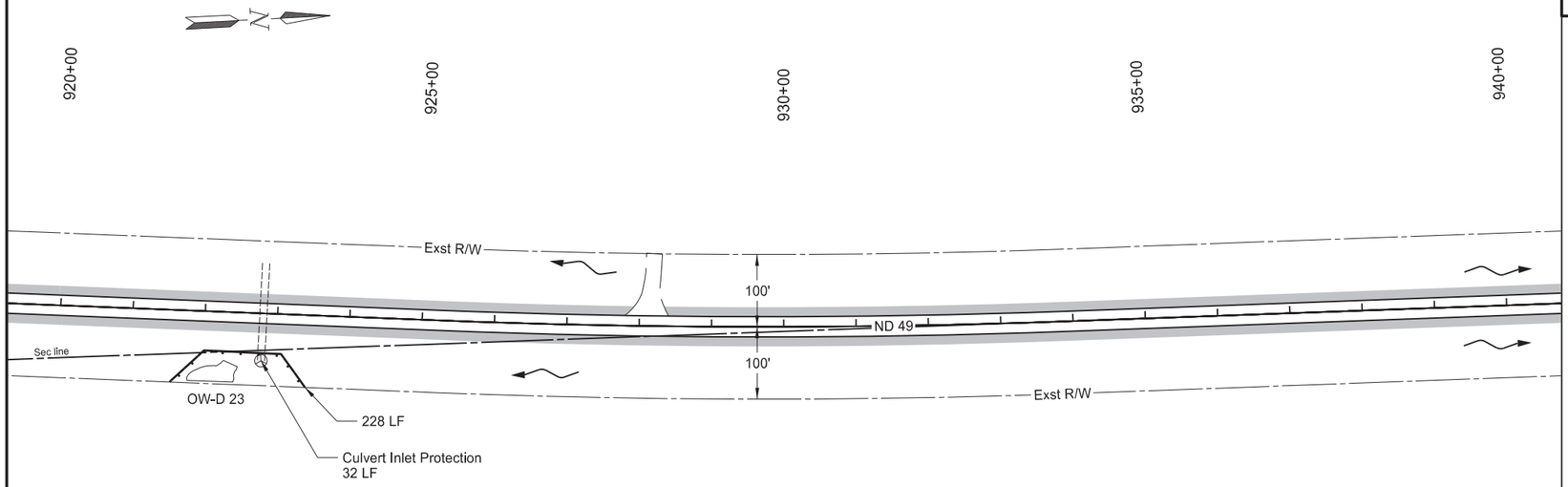
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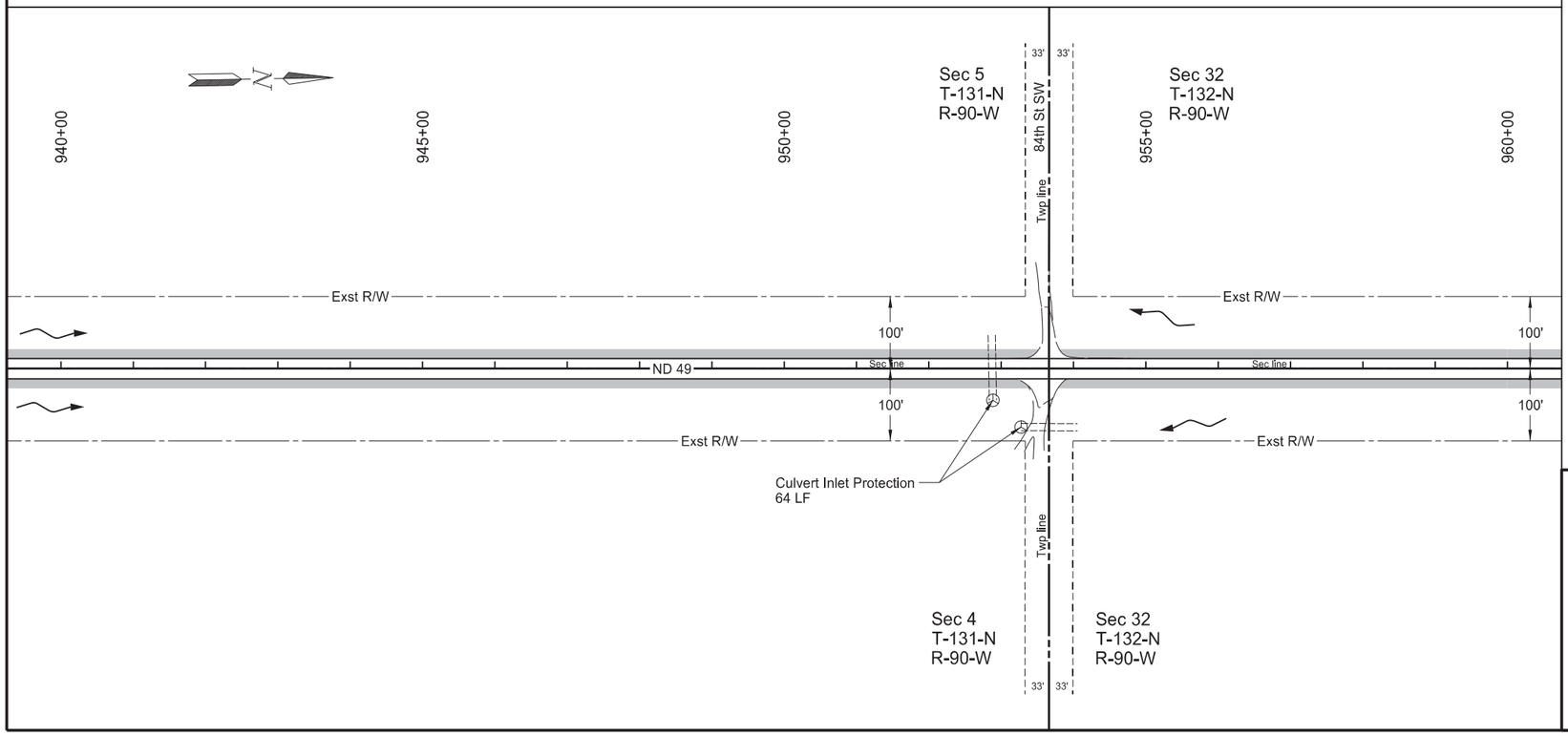
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ND 49 - State Line to Jct ND 21

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PE-41996
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NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	24

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	228	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	228	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

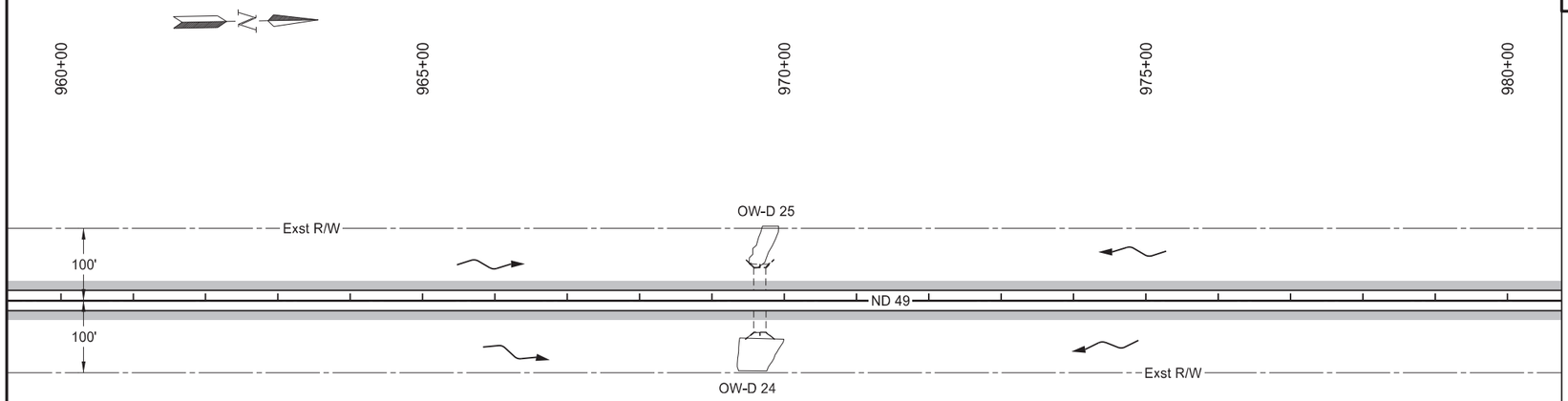
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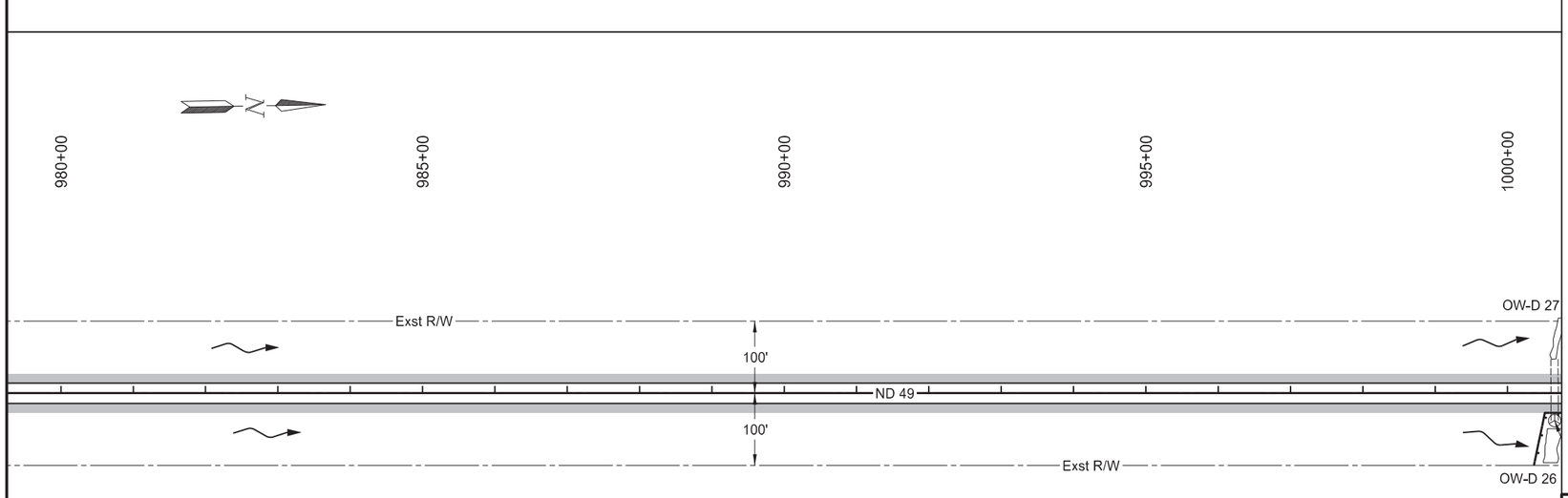
Sta 920+00 to Sta 960+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
DATE 2026.08.27 09:41:35 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	25





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.39	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.39	ACRE

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

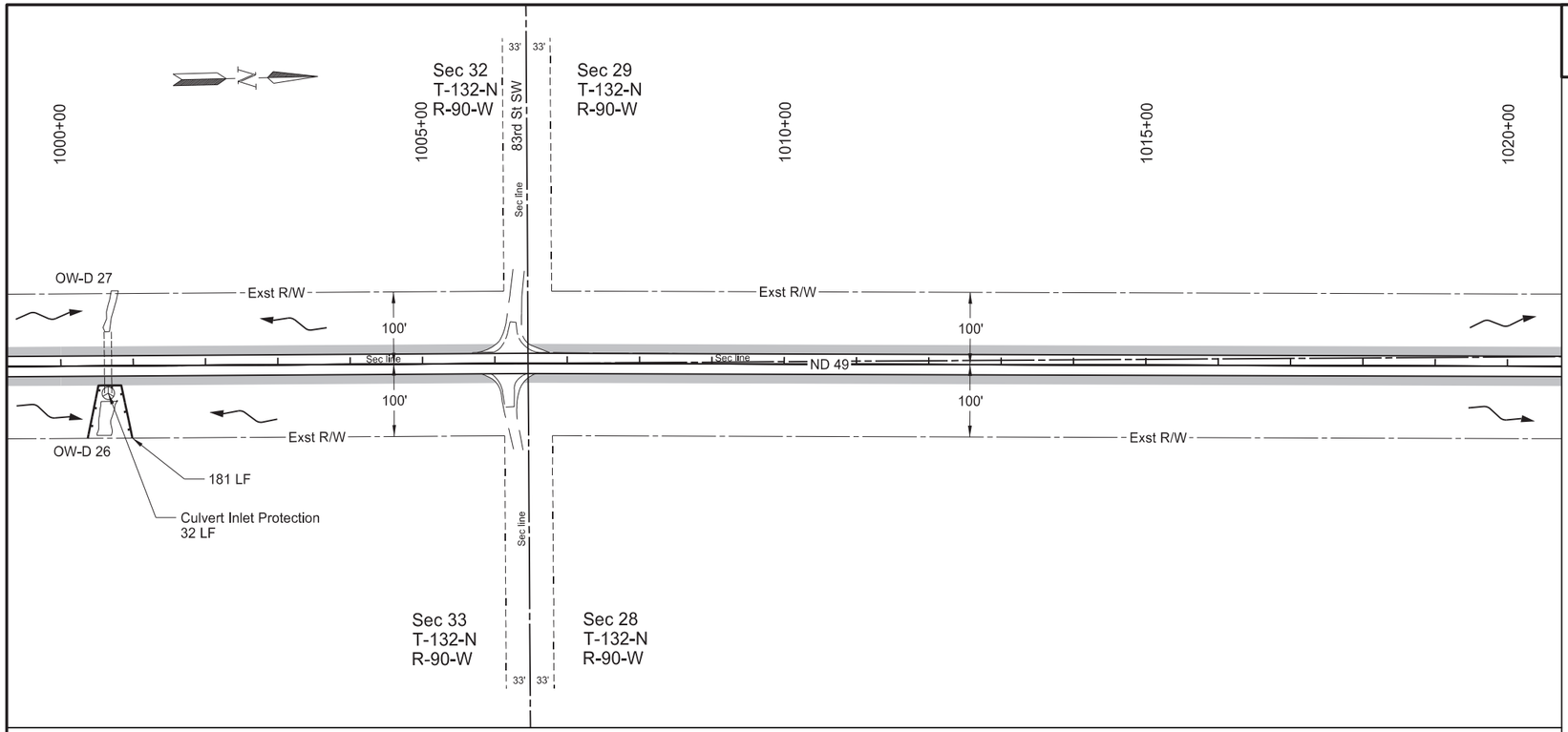
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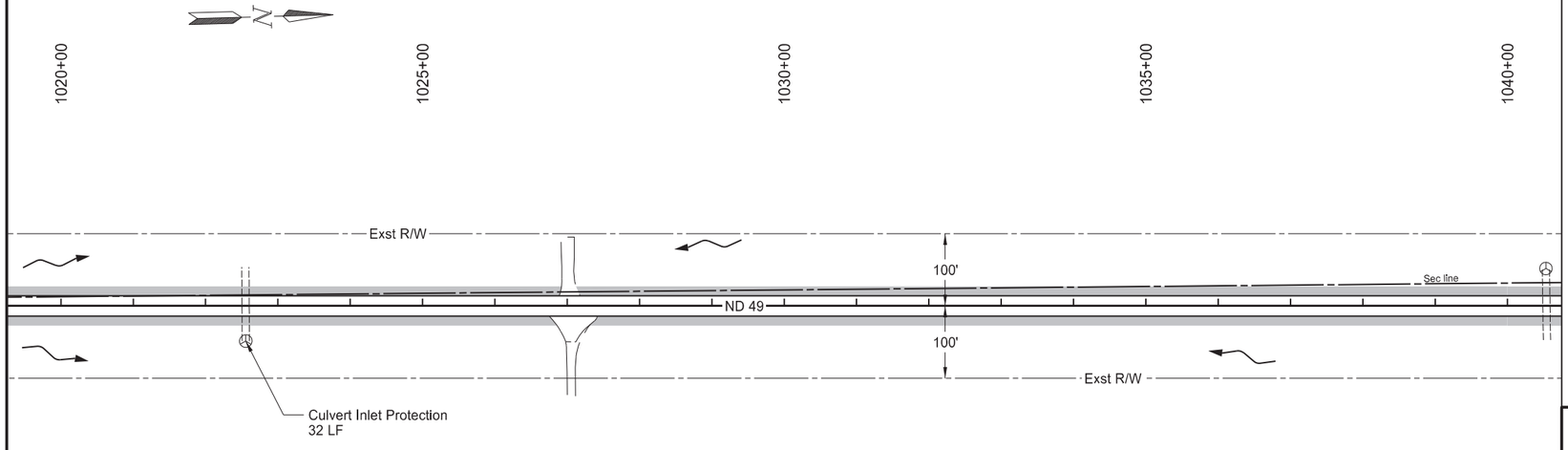
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:42:10 -05'00'
NORTH DAKOTA

8/26/2026 10:13:04 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	26





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	181	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	181	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

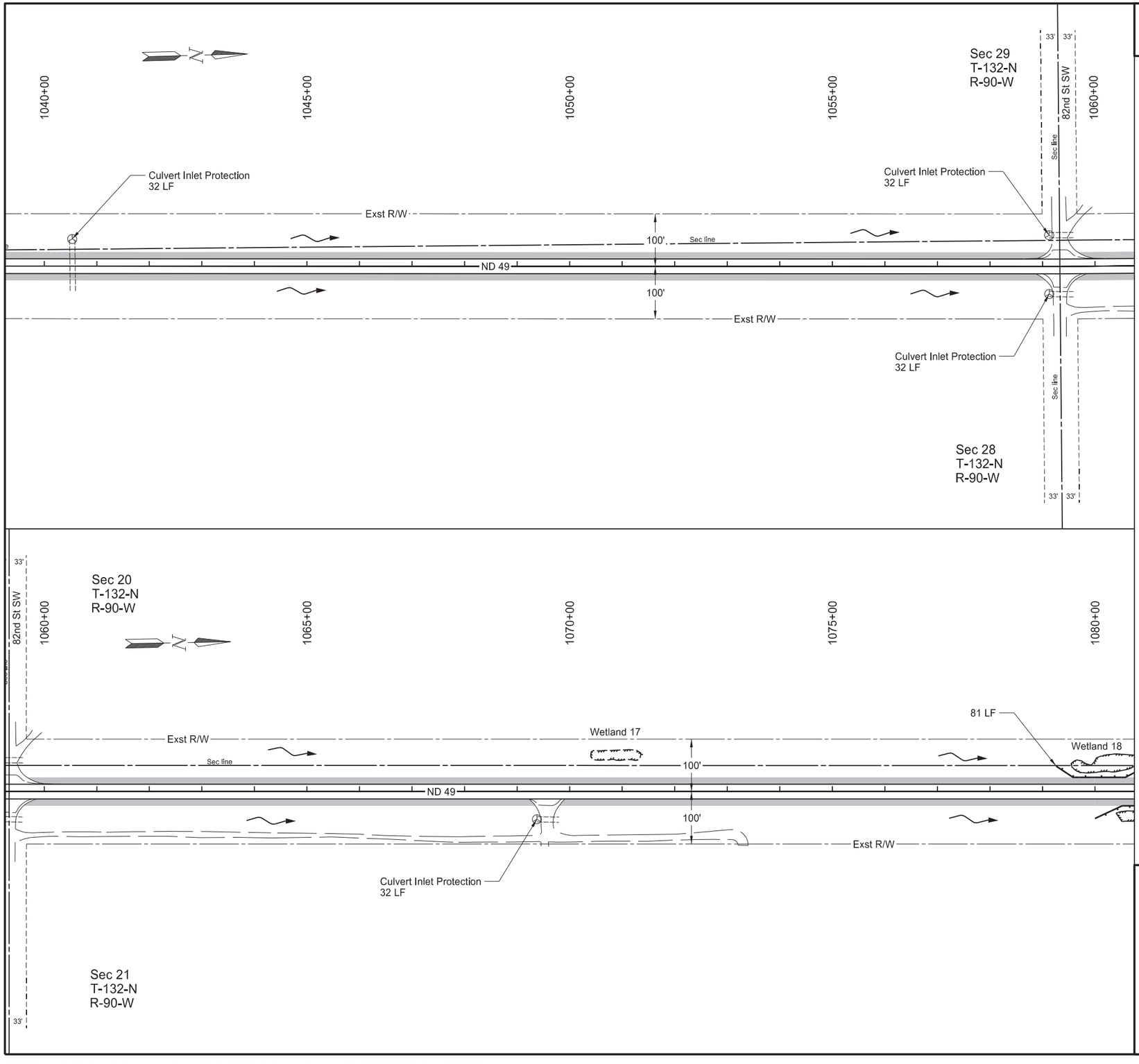
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(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
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NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	27



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	81	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	81	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

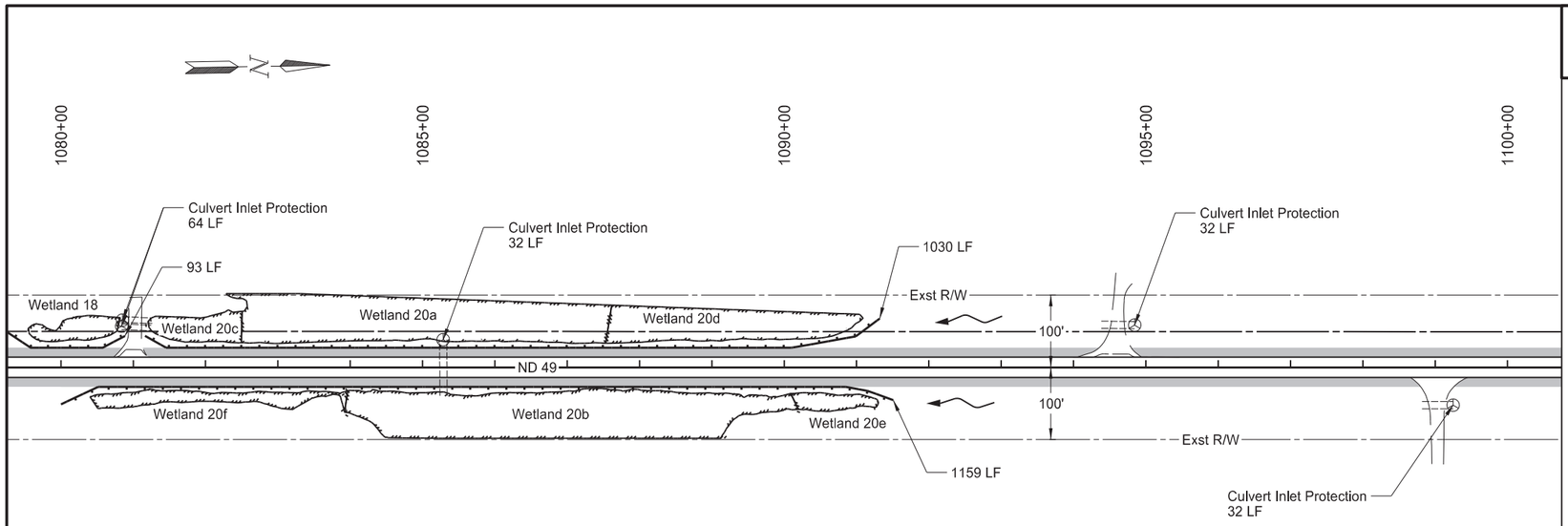
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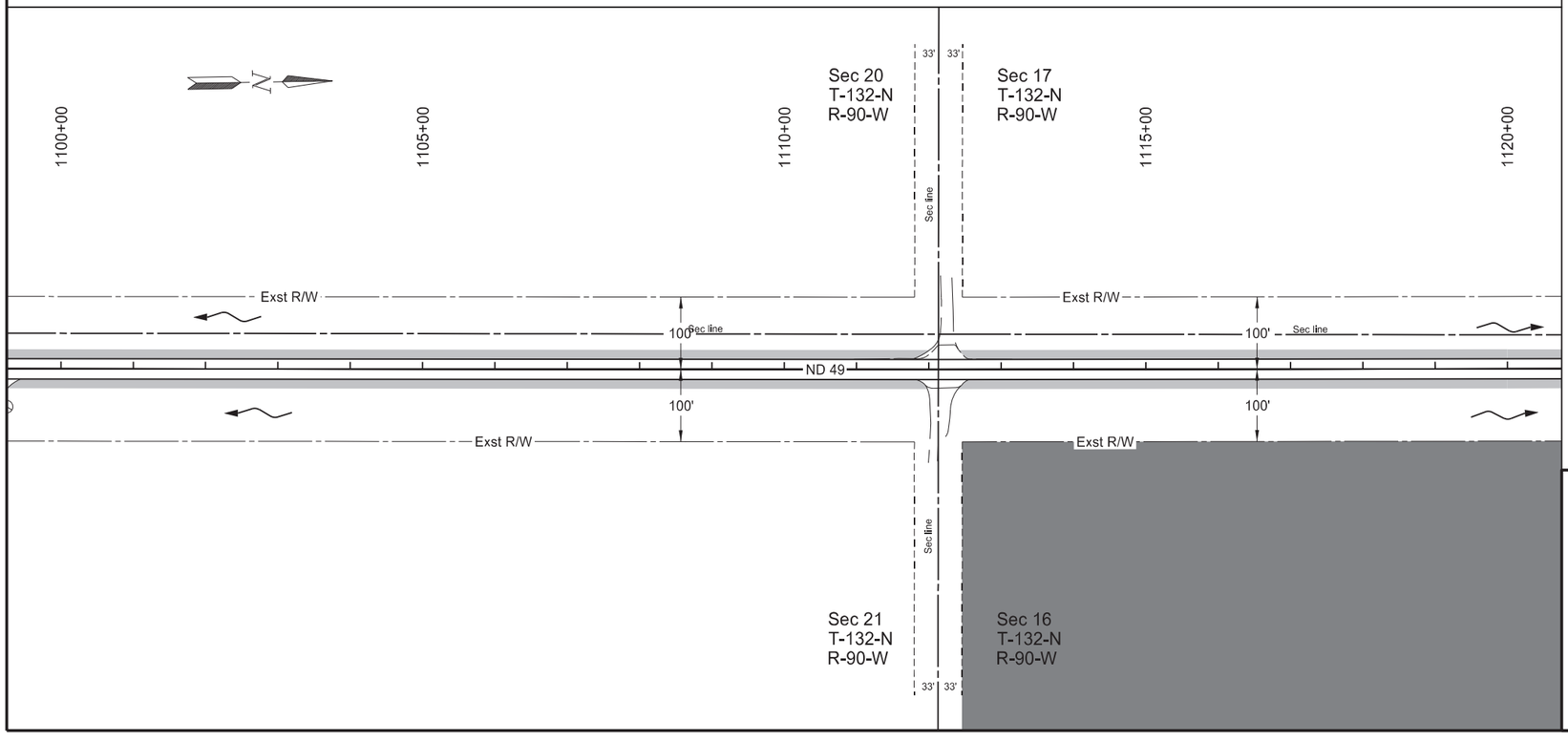
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(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
DATE 2026.08.27 09:43:41 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	28





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	2,282	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
		Perimeter Control	2,282	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

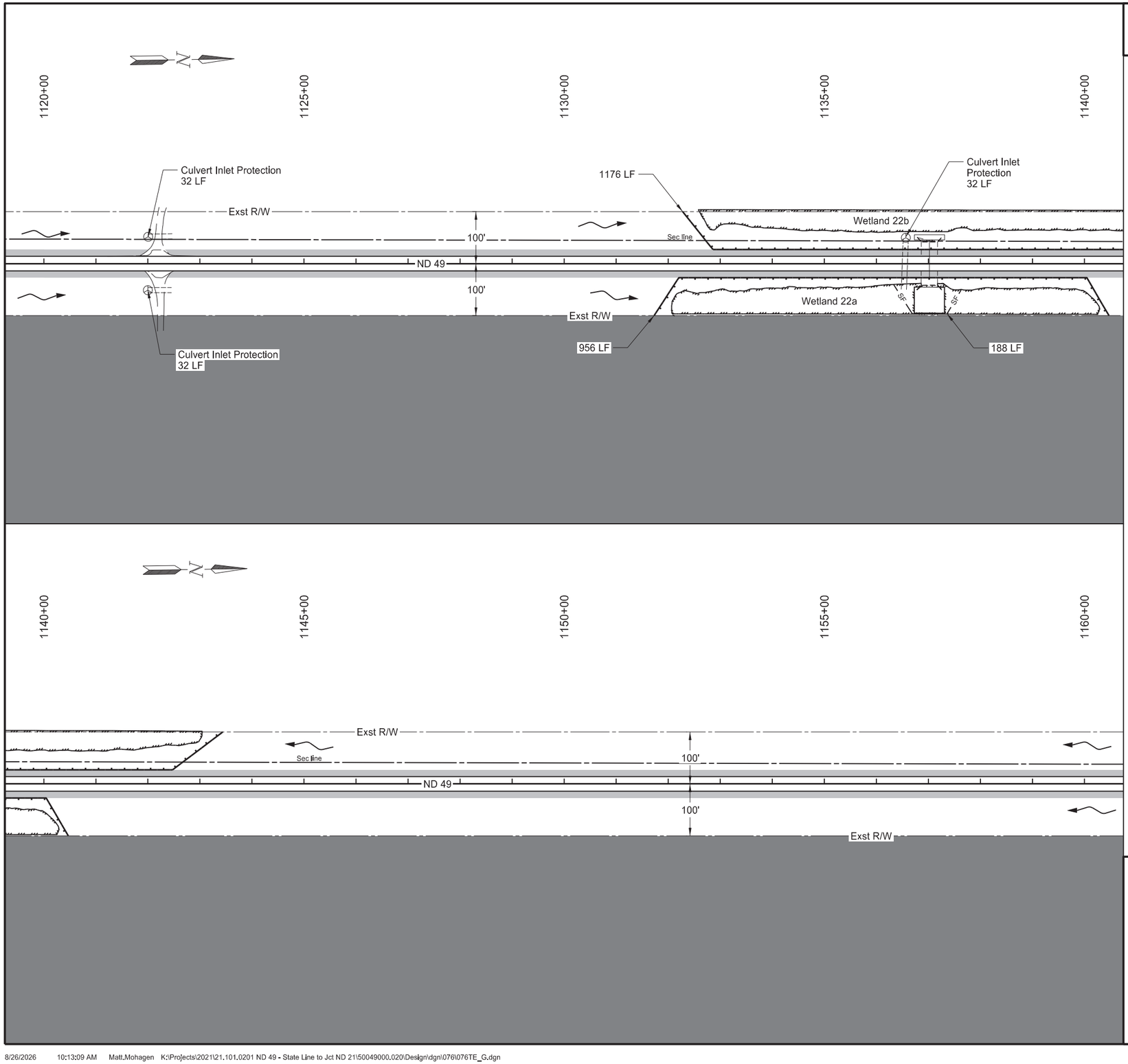
Temporary Erosion Control

Sta 1080+00 to Sta 1120+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:44:30 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	29

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.36	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.36	ACRE
260	0200	SILT FENCE SUPPORTED		
		Perimeter Control	188	LF
260	0201	REMOVE SILT FENCE SUPPORTED		
		Perimeter Control	188	LF
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	2,132	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	2,132	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

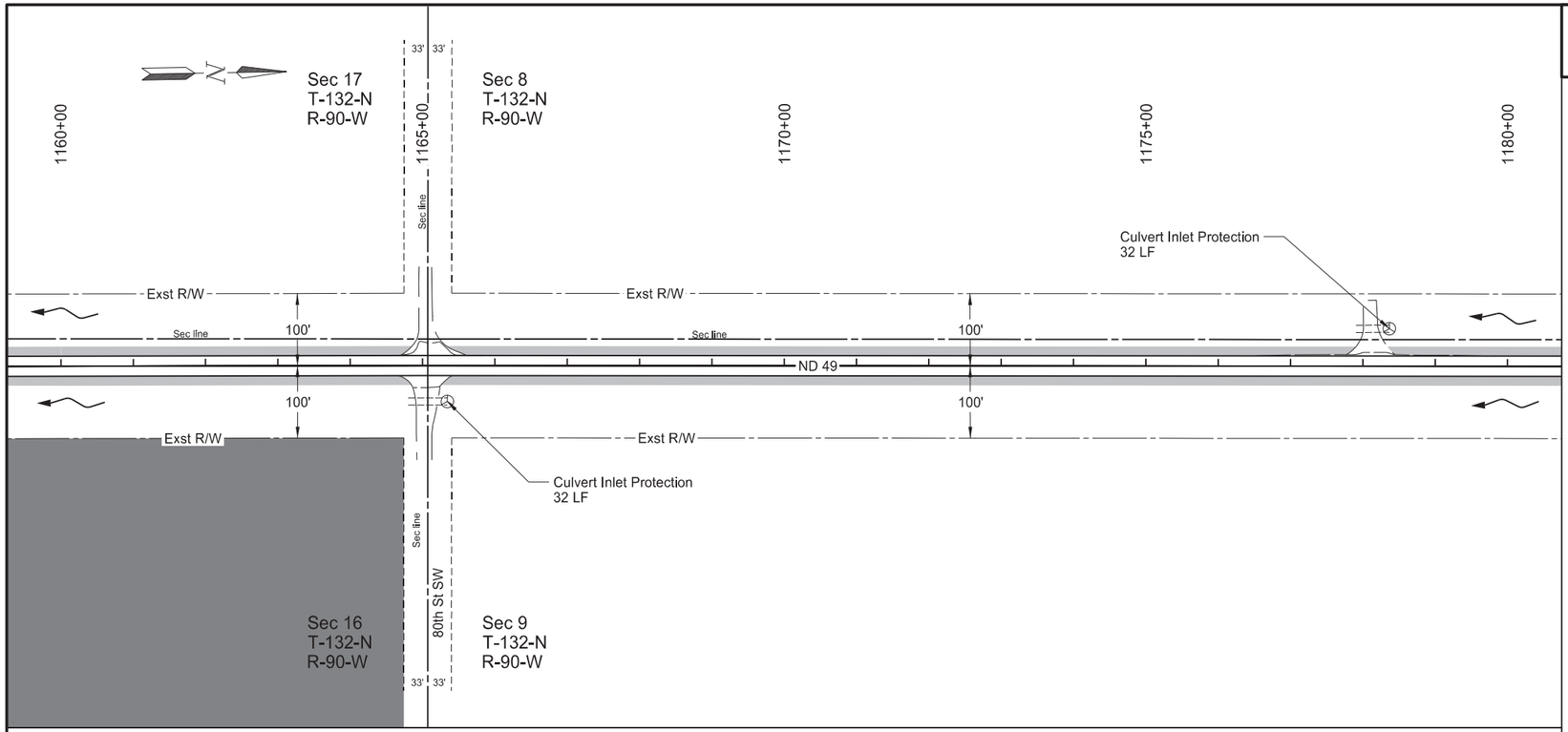
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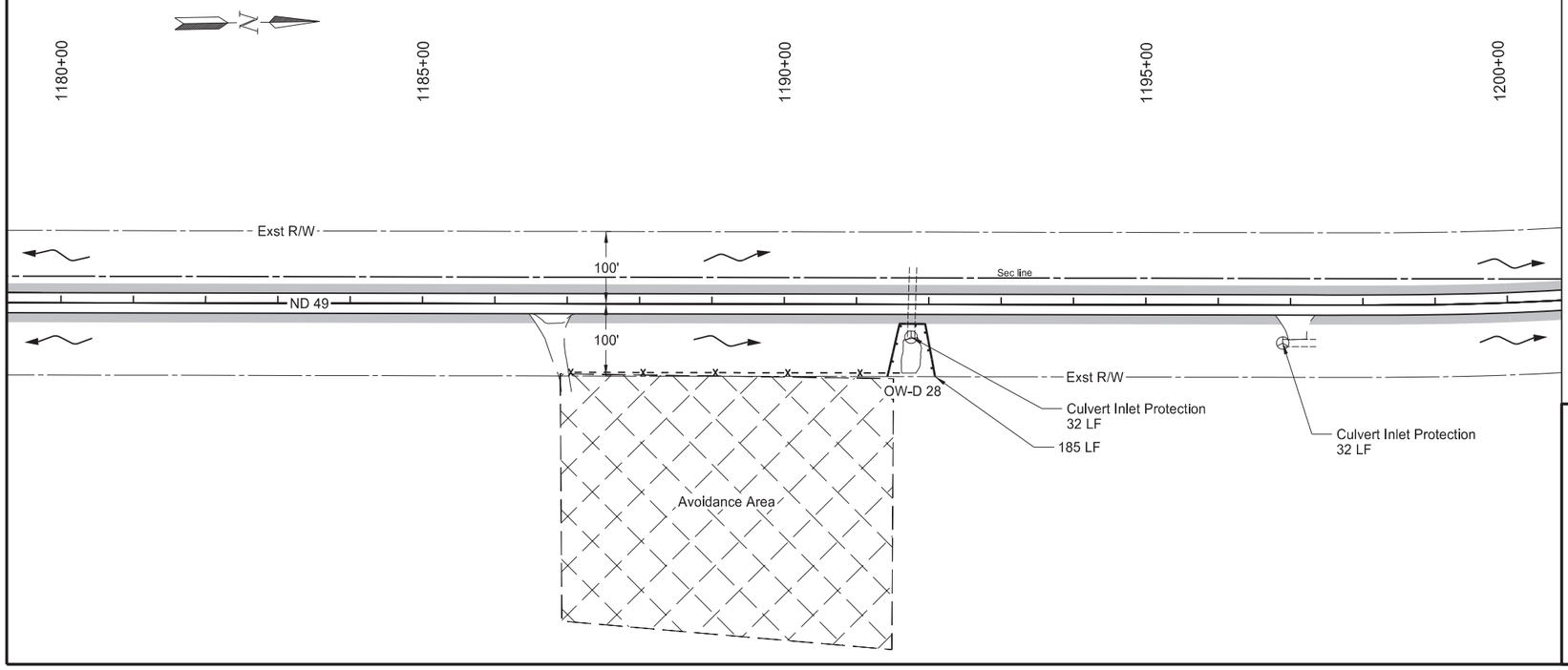
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
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NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	30





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.30	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.30	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	185	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
		Perimeter Control	185	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

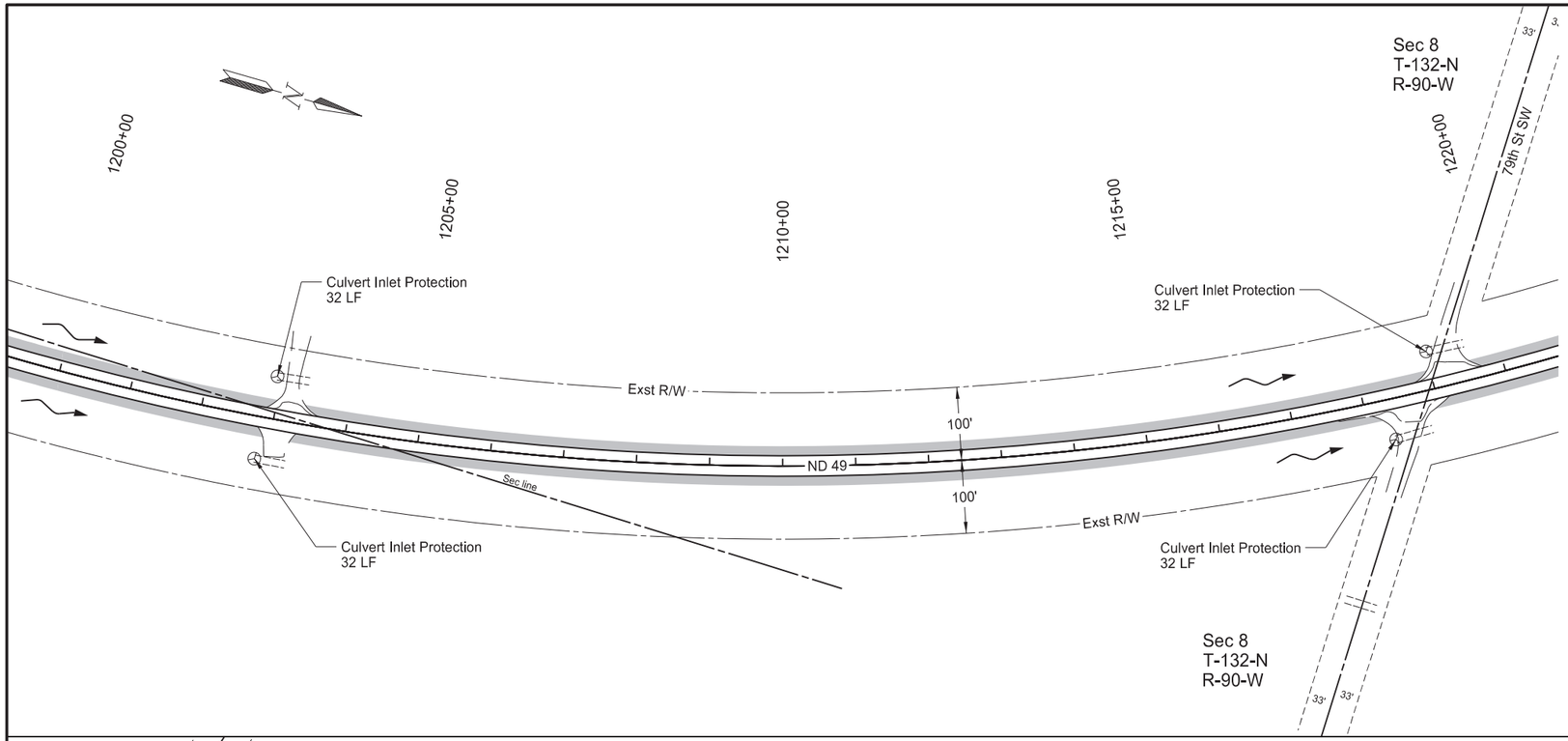
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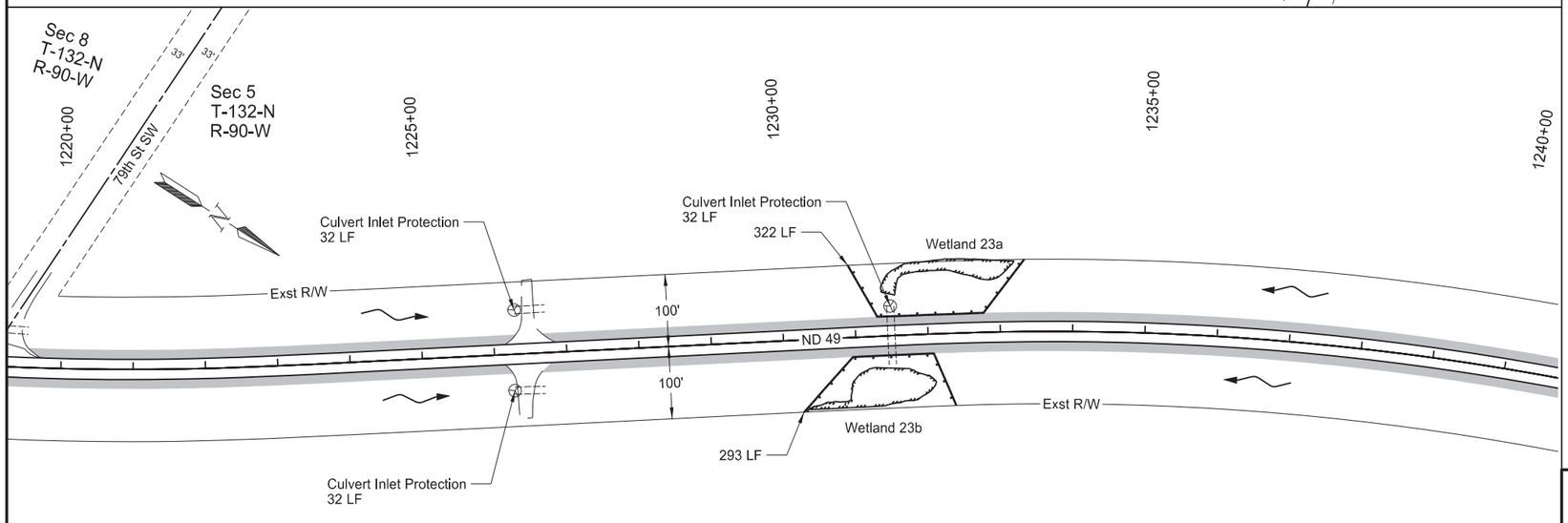
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
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NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	31





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.28	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.28	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	224	LF
		Perimeter Control	615	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	224	LF
		Perimeter Control	615	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

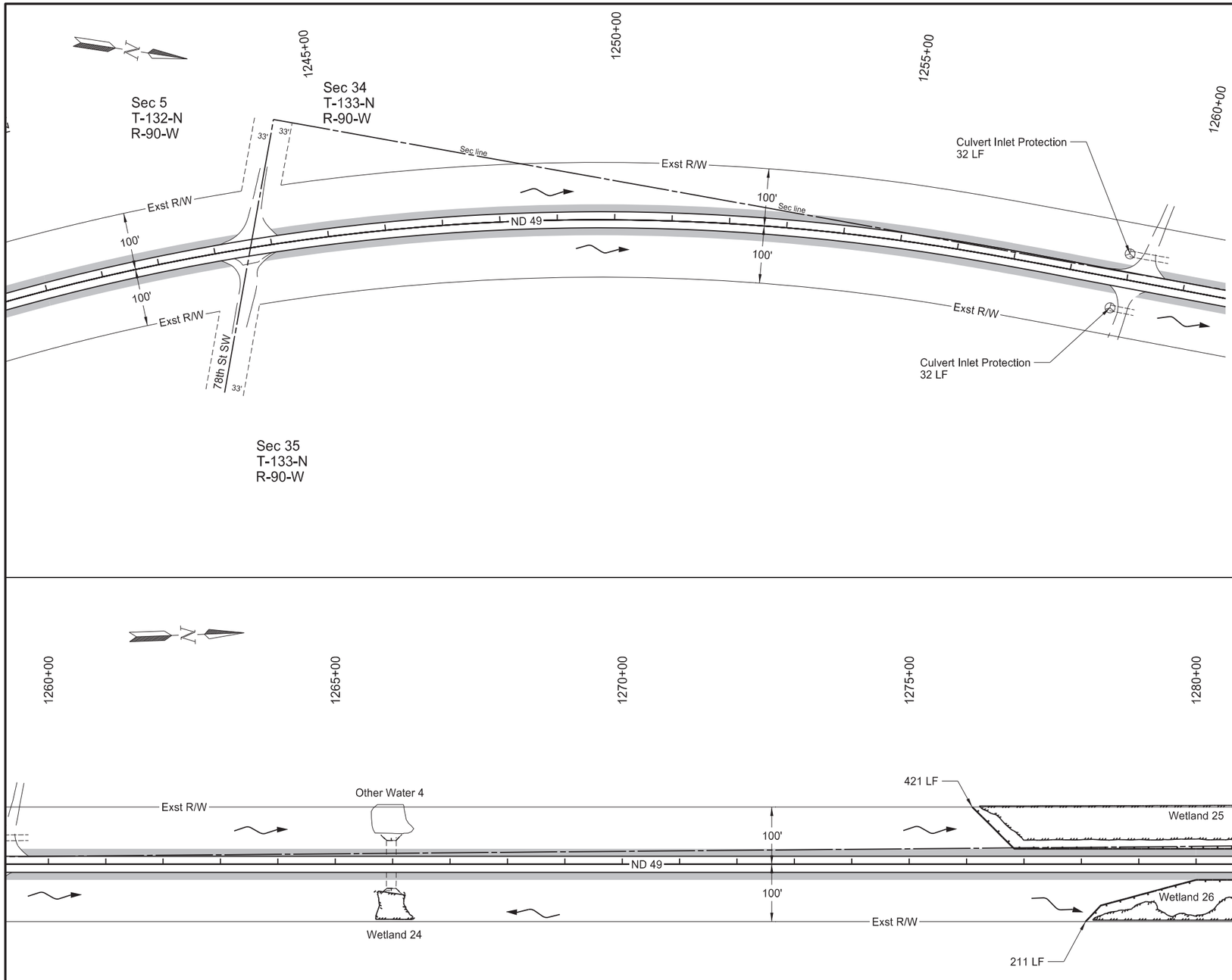
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ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
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PE-41996
DATE 2026.08.27 09:46:28 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	32



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	632	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	632	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

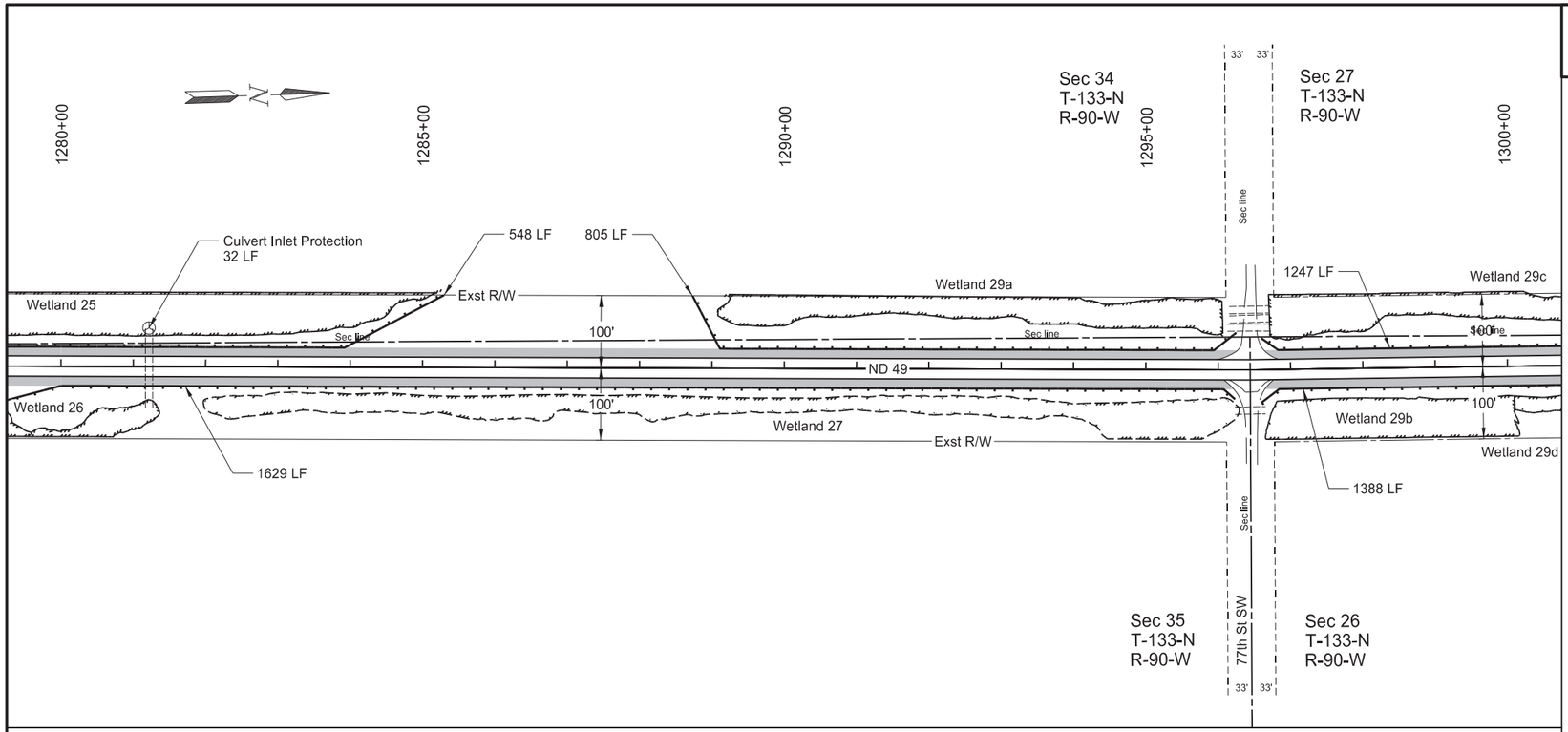
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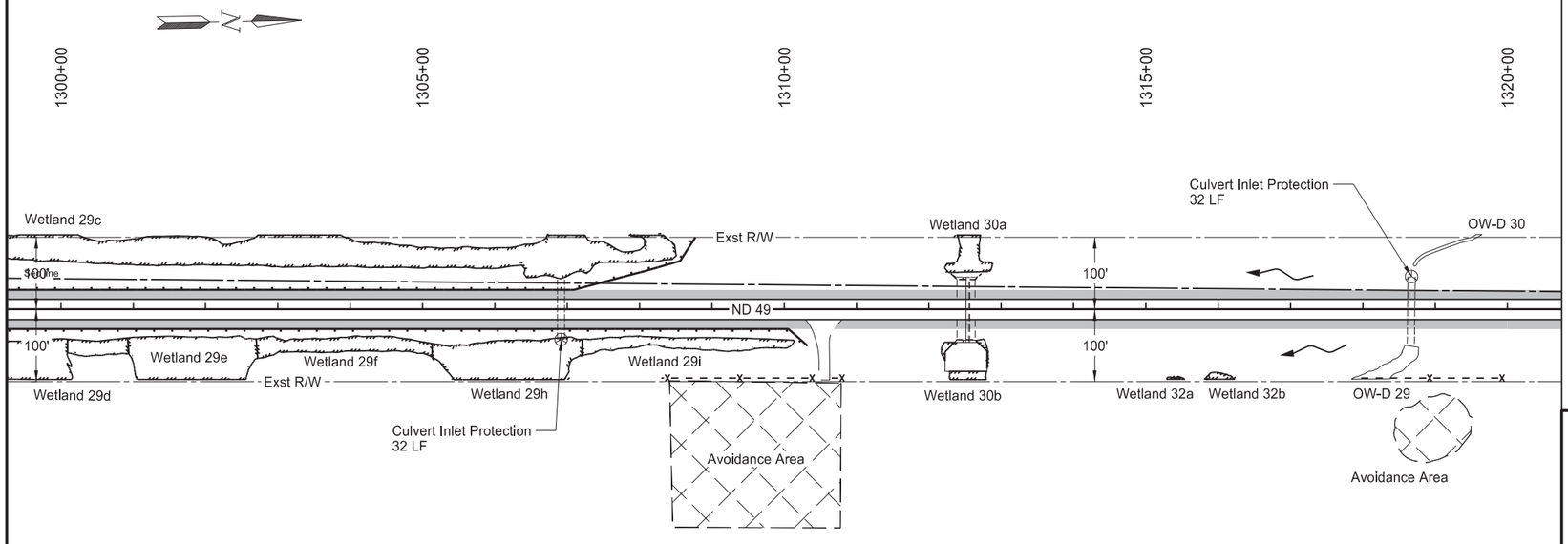
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ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:47:10 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	33





SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	5,617	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
		Perimeter Control	5,617	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

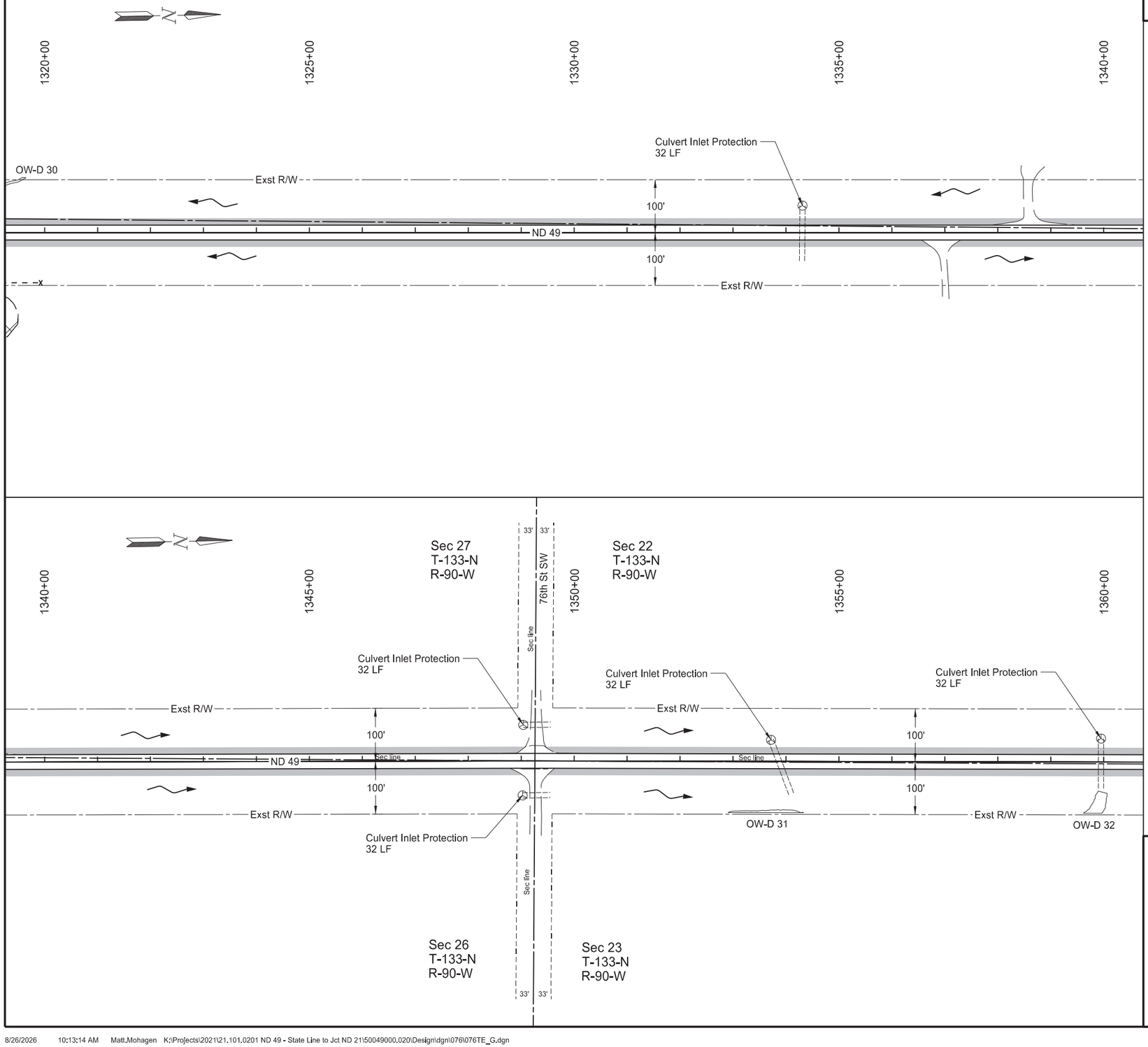
Temporary Erosion Control

Sta 1280+00 to Sta 1320+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:47:55 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	34



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	160	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

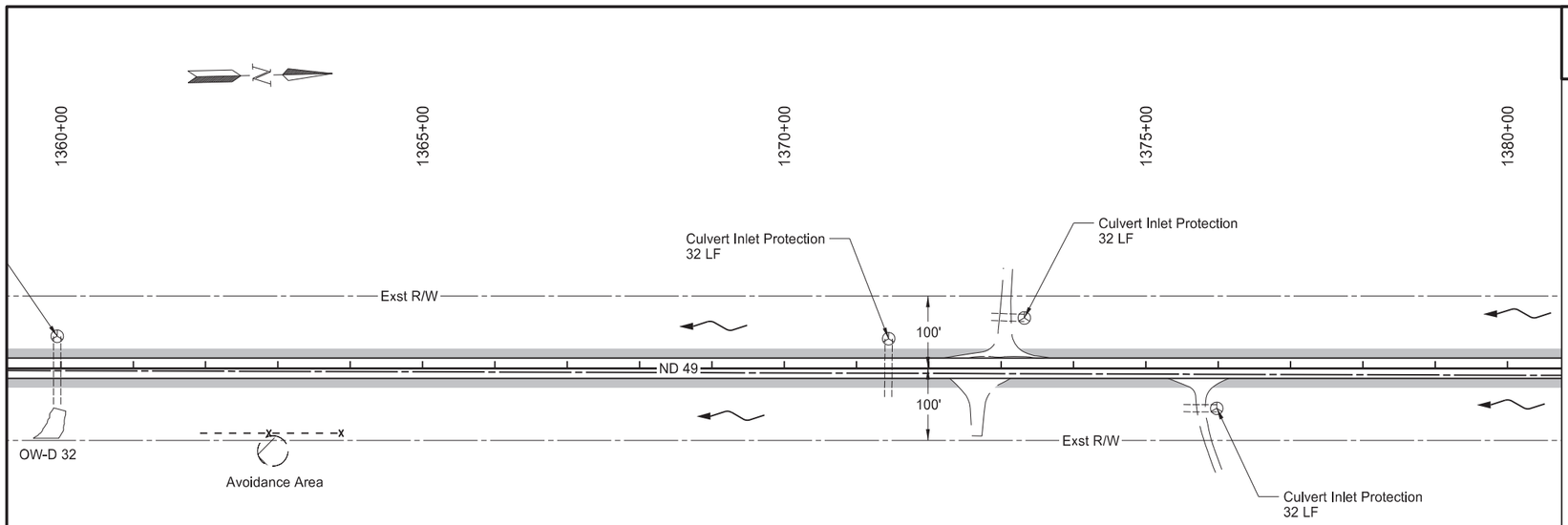
Temporary Erosion Control

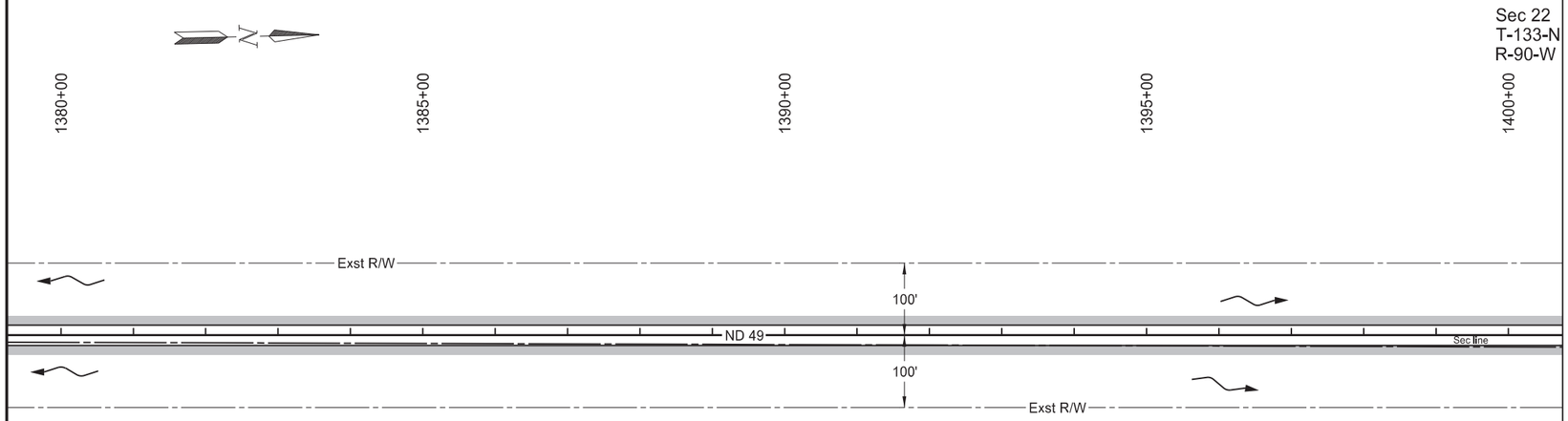
Sta 1320+00 to Sta 1360+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:49:01 -05'00'
NORTH DAKOTA

8/26/2026 10:13:14 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	35

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

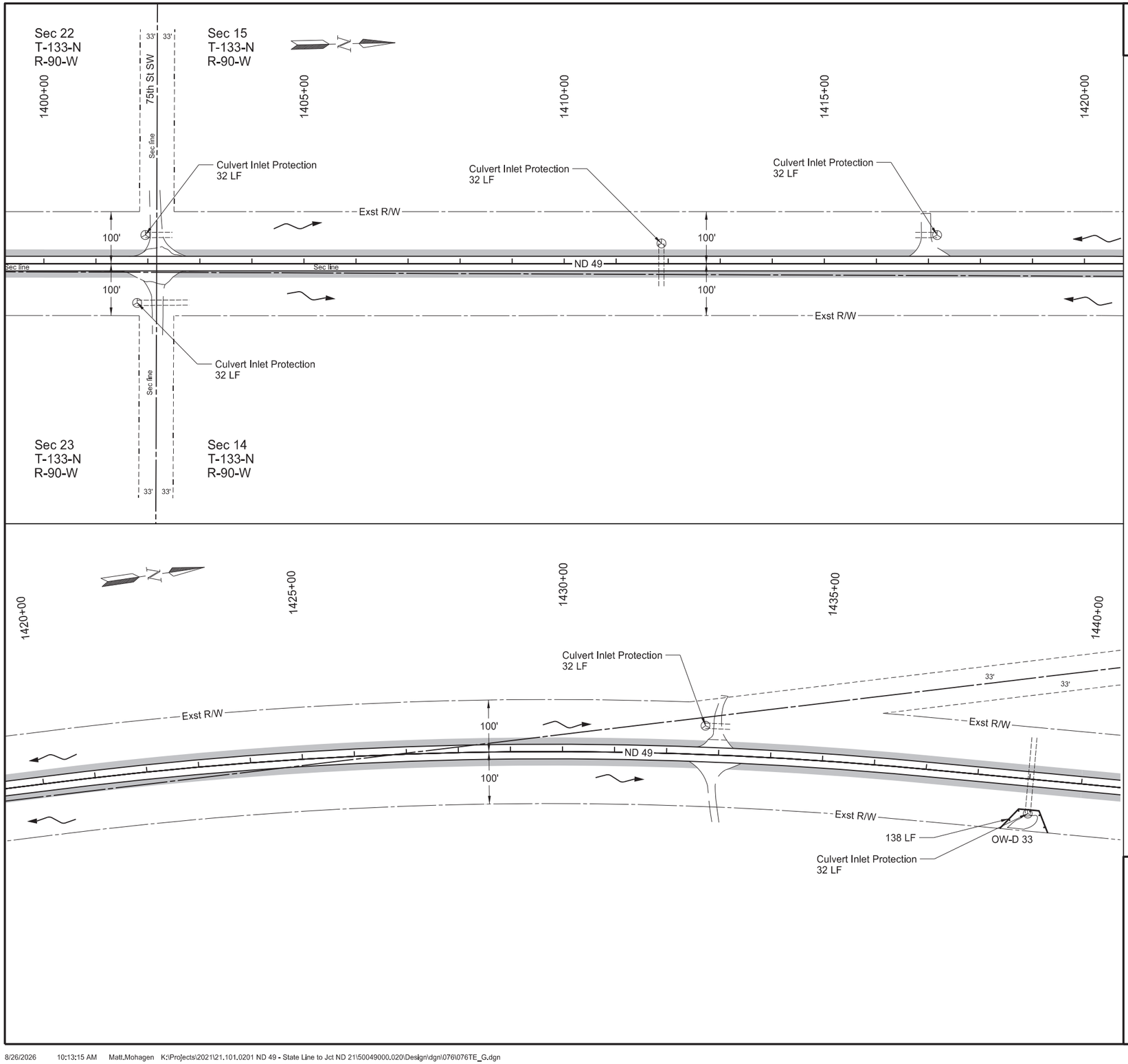
Temporary Erosion Control

Sta 1360+00 to Sta 1400+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:49:43 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	76	36



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.28	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.28	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	138	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	138	LF

LEGEND

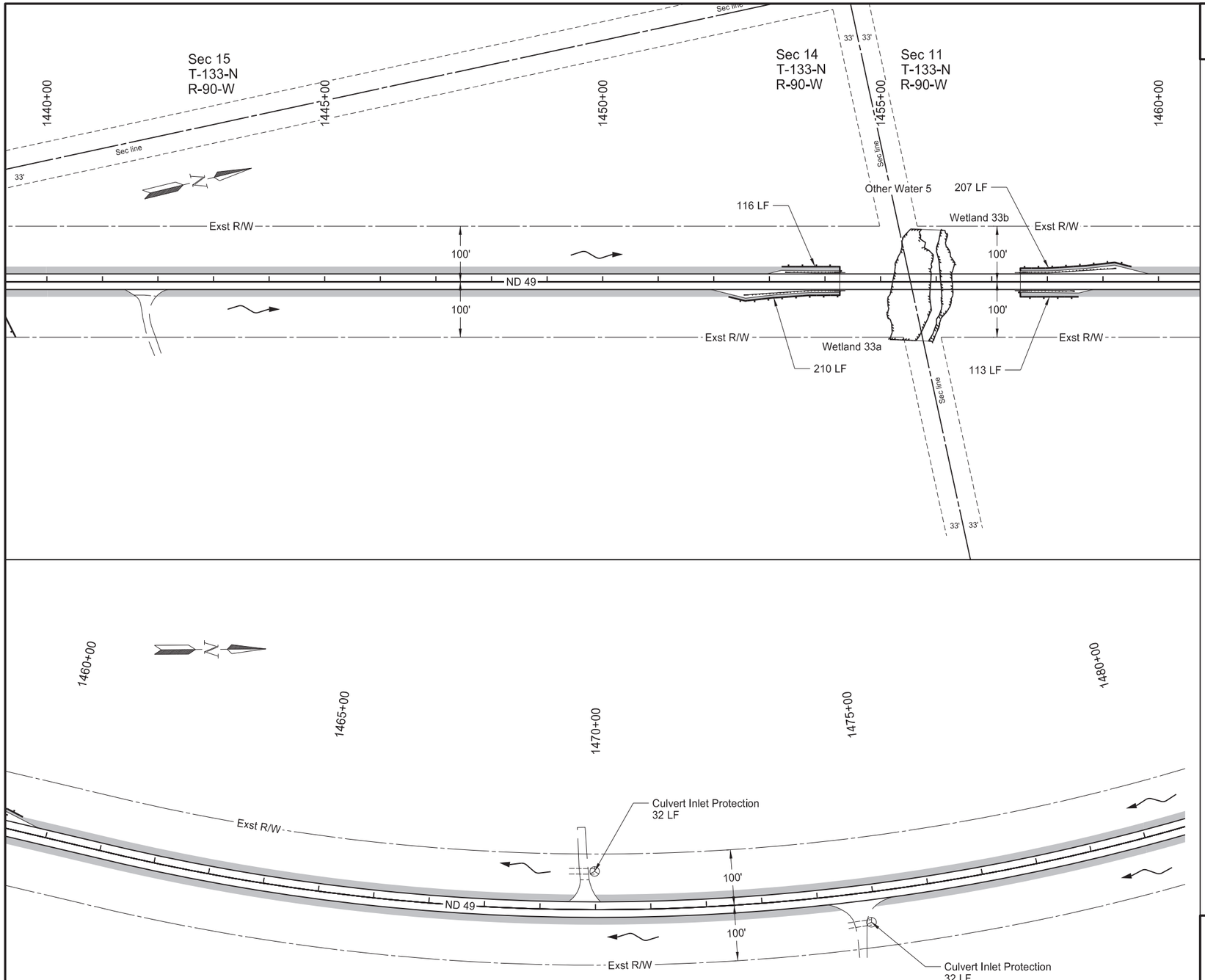
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- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 1400+00 to Sta 1440+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:50:30 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	37

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.03	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.03	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	646	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	64	LF
		Perimeter Control	646	LF

LEGEND

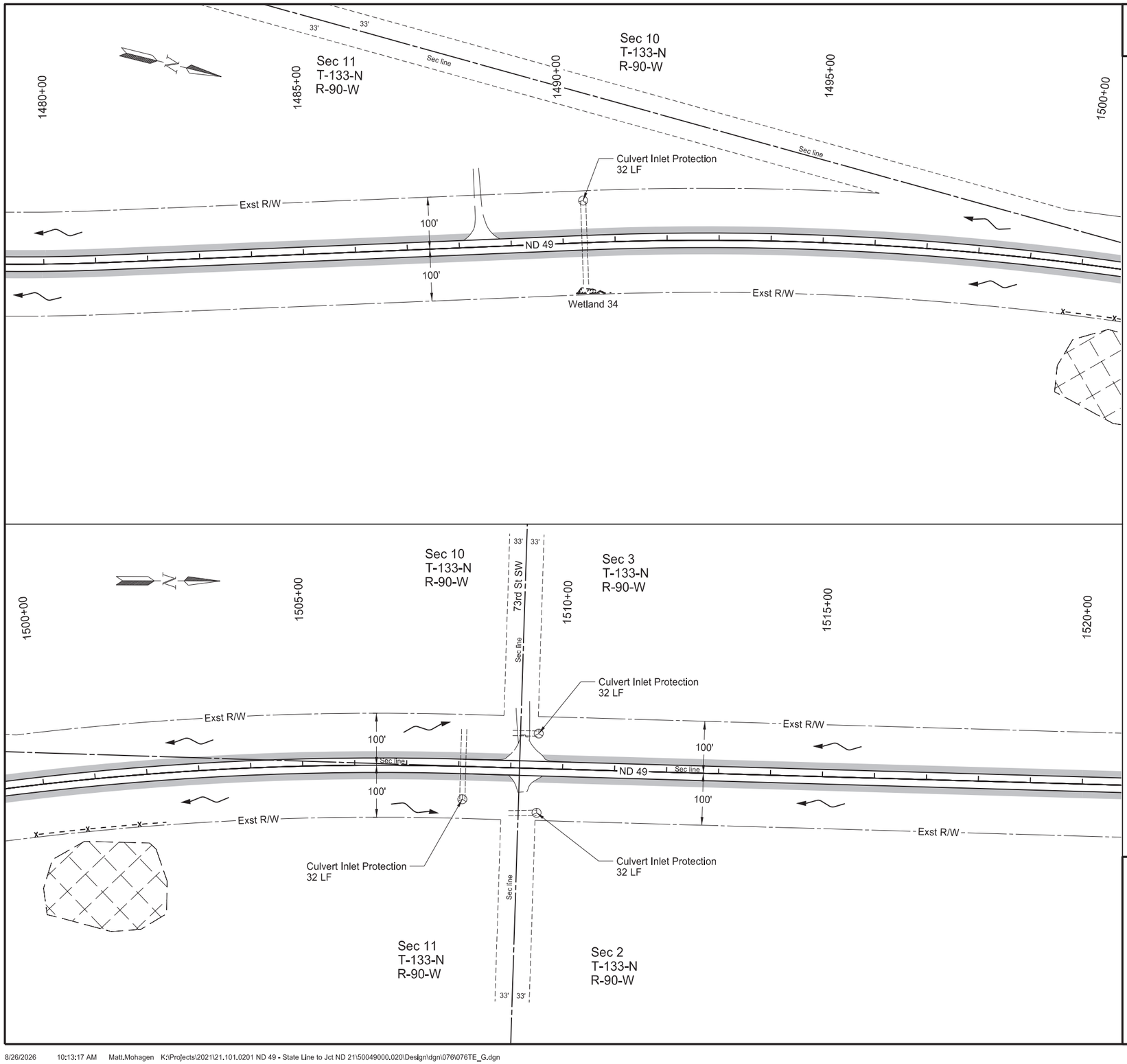
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 1440+00 to Sta 1480+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:51:08 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	38

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	128	LF

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain (S)
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence (x– – – –x–)
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

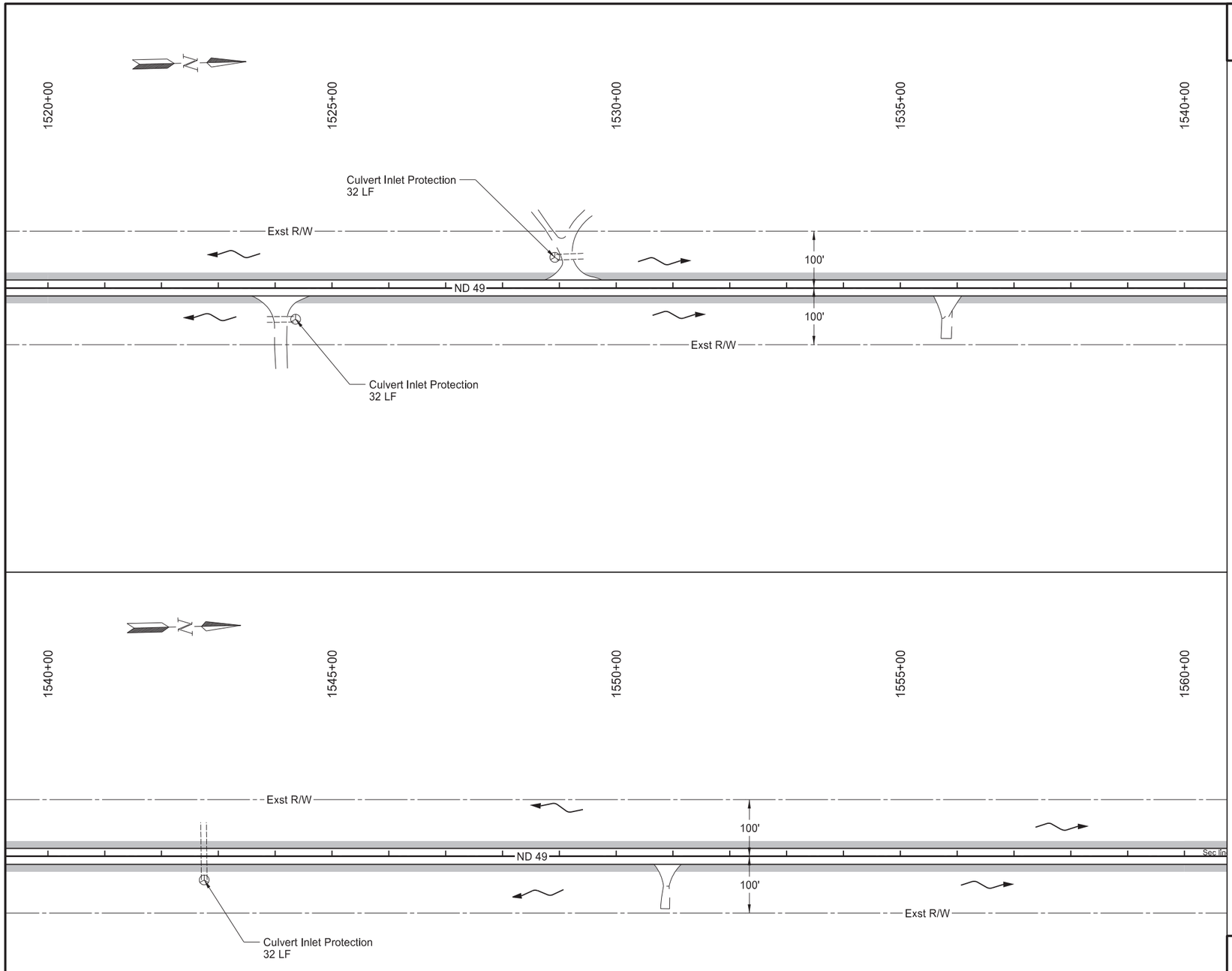
Temporary Erosion Control

Sta 1480+00 to Sta 1520+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:51:44 -05'00'
NORTH DAKOTA

8/26/2026 10:13:17 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\076\076TE_G.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	39

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	96	LF

LEGEND

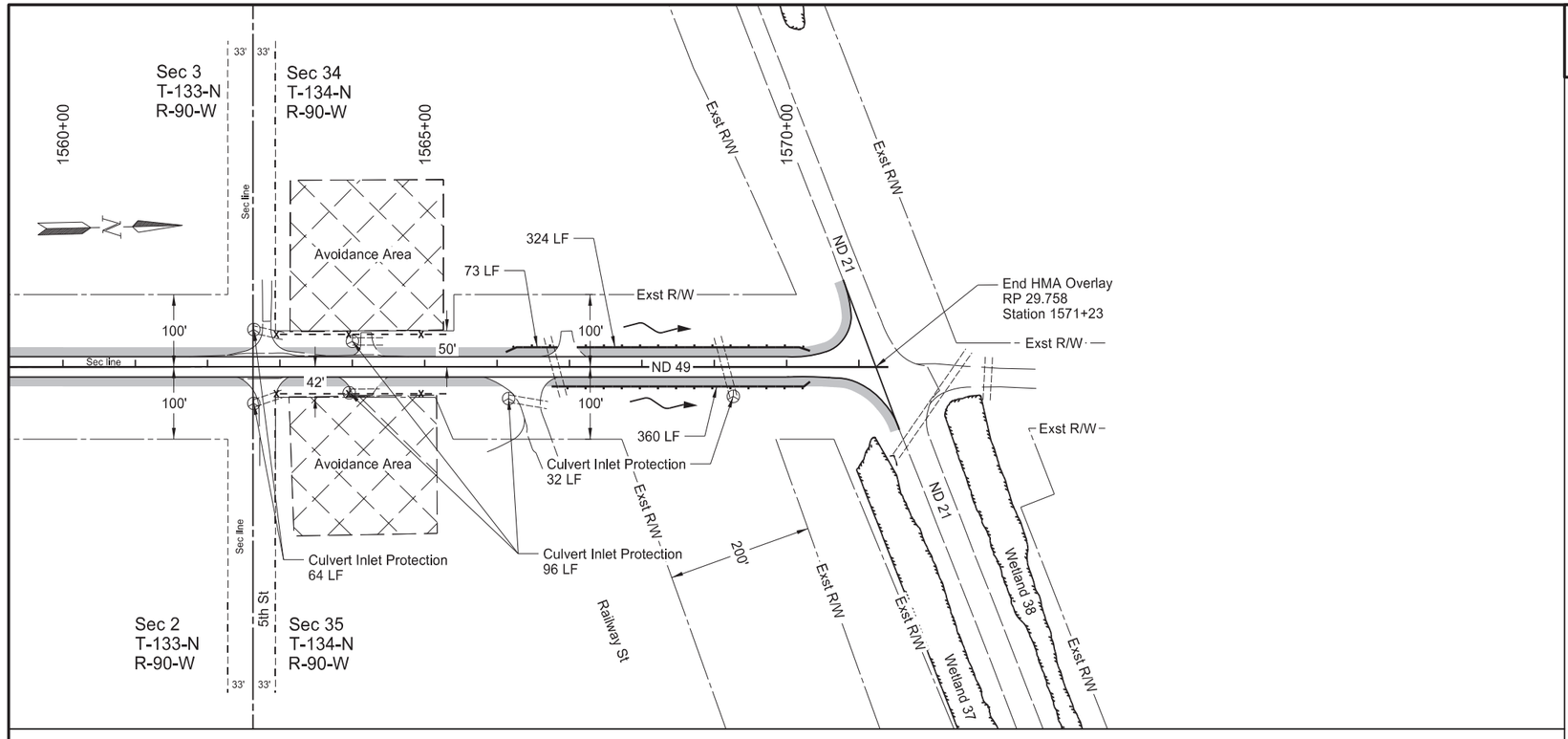
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

Temporary Erosion Control

Sta 1520+00 to Sta 1560+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:52:22 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	76	40

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sheet Quantity	0.60	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	0.60	ACRE
261	0112	FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	757	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Culvert Inlet Locations (32 LF EA)	192	LF
		Perimeter Control	757	LF

LEGEND

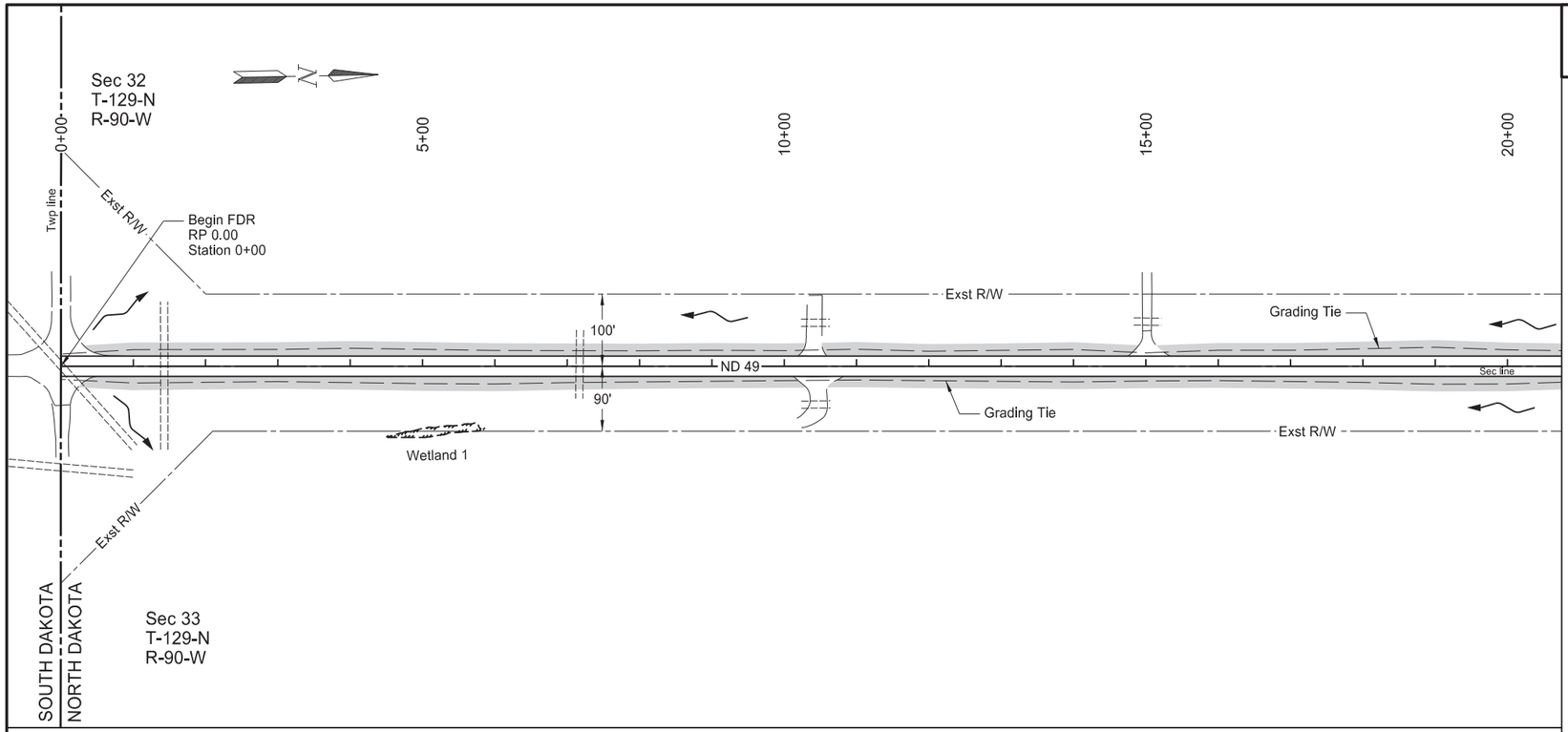
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Fiber Rolls 12 IN
- Other Waters Line
- Flotation Silt Curtain
- Flow Direction
- Temp Cover Crop / Soil Stabilization
- Safety Fence
- Pretty Rock National Wildlife Refuge
- Cultural Avoidance Area

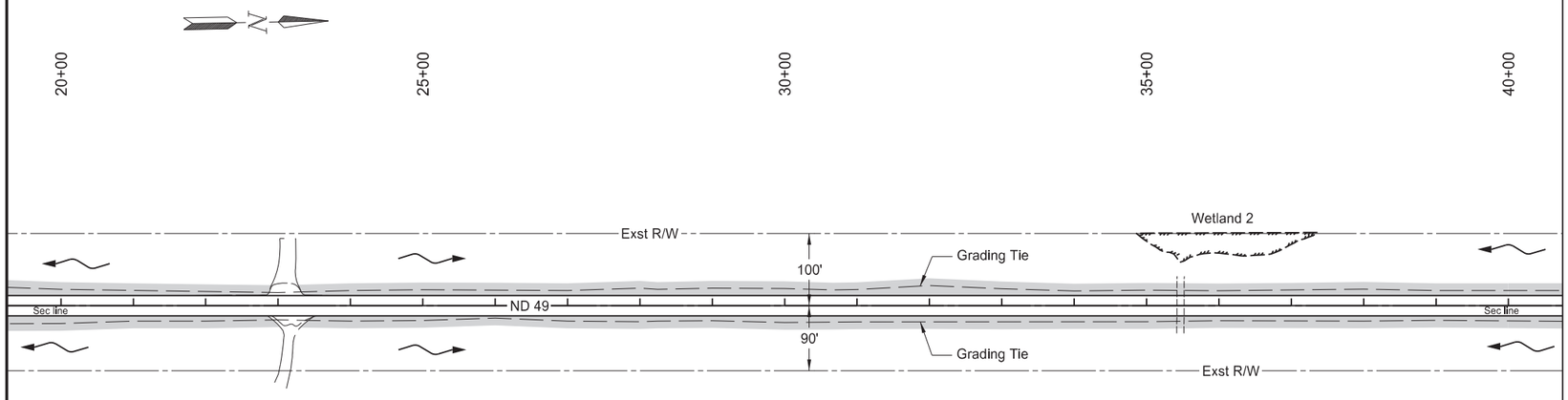
Temporary Erosion Control

Sta 1560+00 to Sta 1571+23
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:52:58 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.17	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.17	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

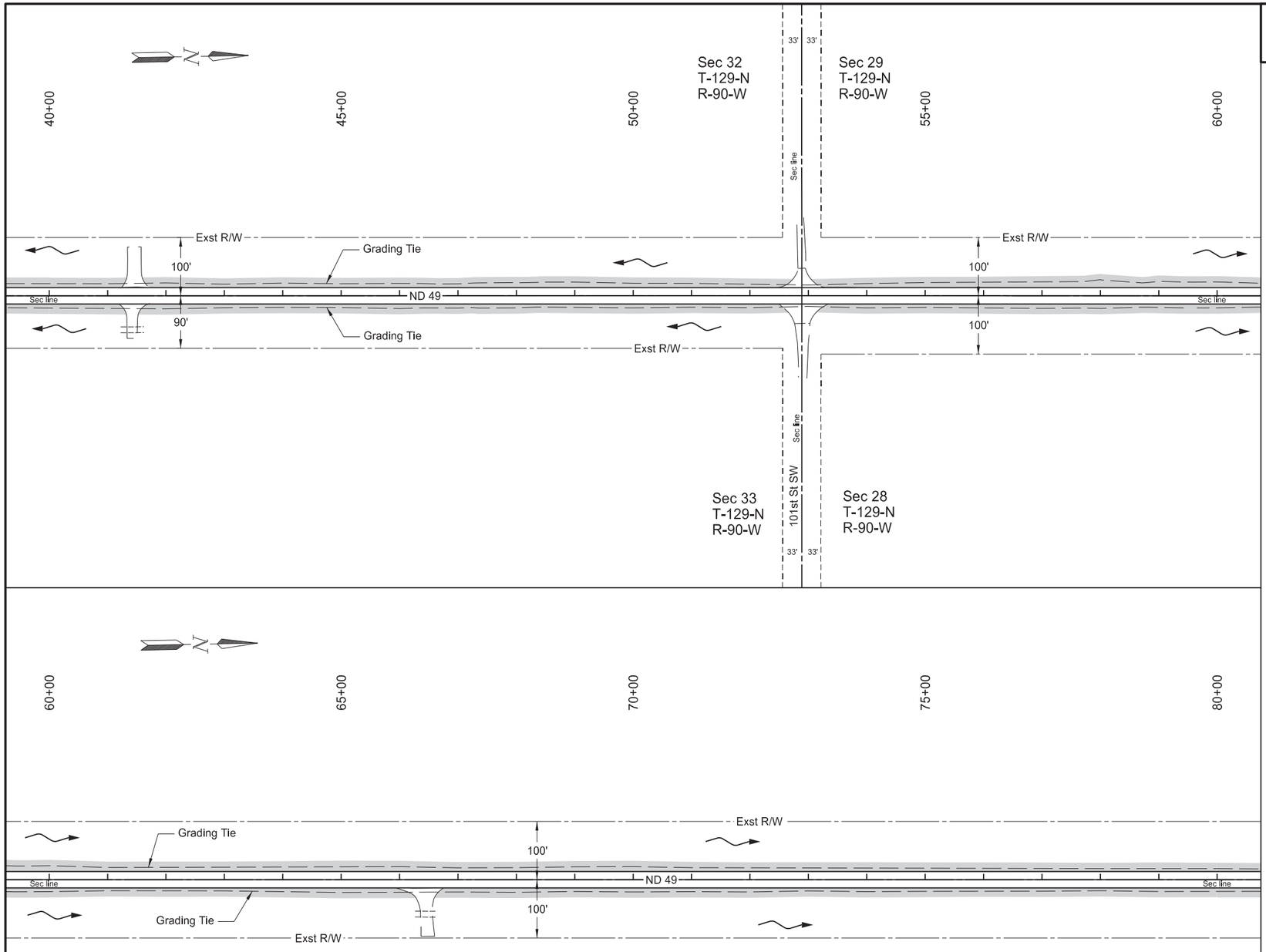
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

ND 49 - State Line to Jct ND 21

Sta 0+00 to Sta 40+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:38:12 -05'00'
NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.01	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.01	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

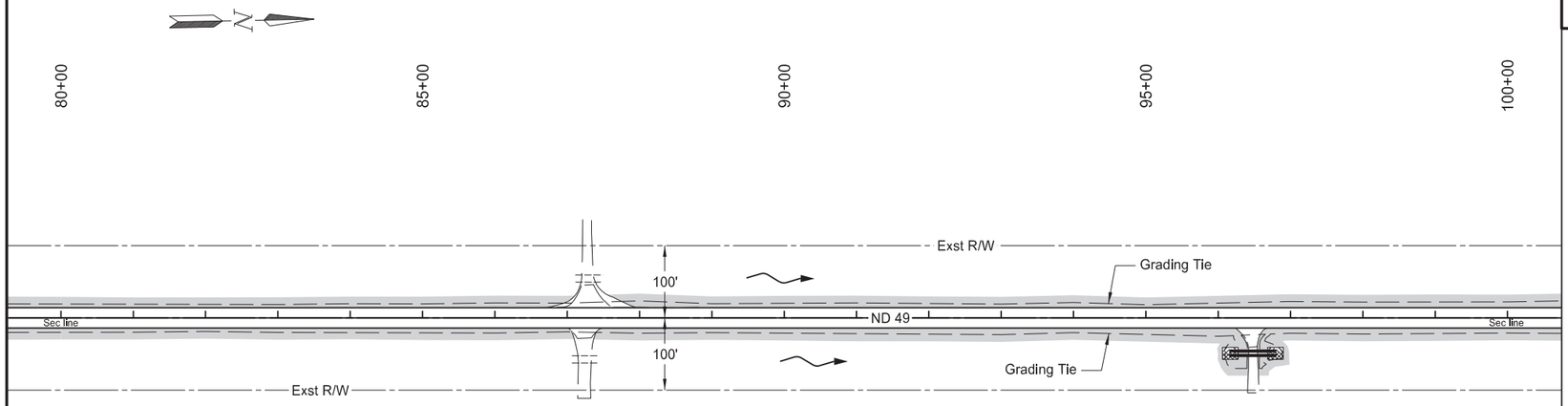
Permanent Erosion Control

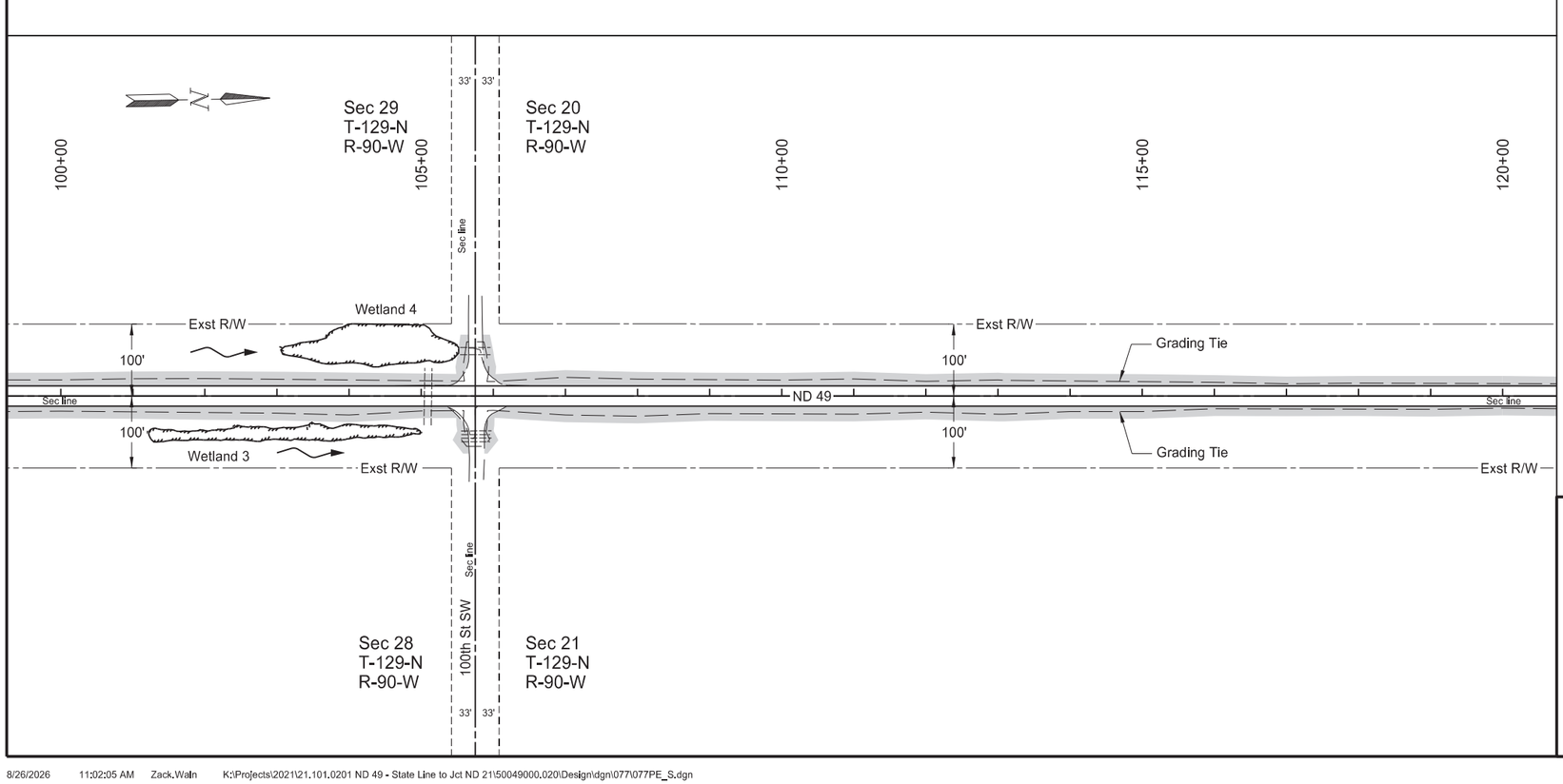
ND 49 - State Line to Jct ND 21

Sta 40+00 to Sta 80+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 08:41:09 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	3





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.21	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.21	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

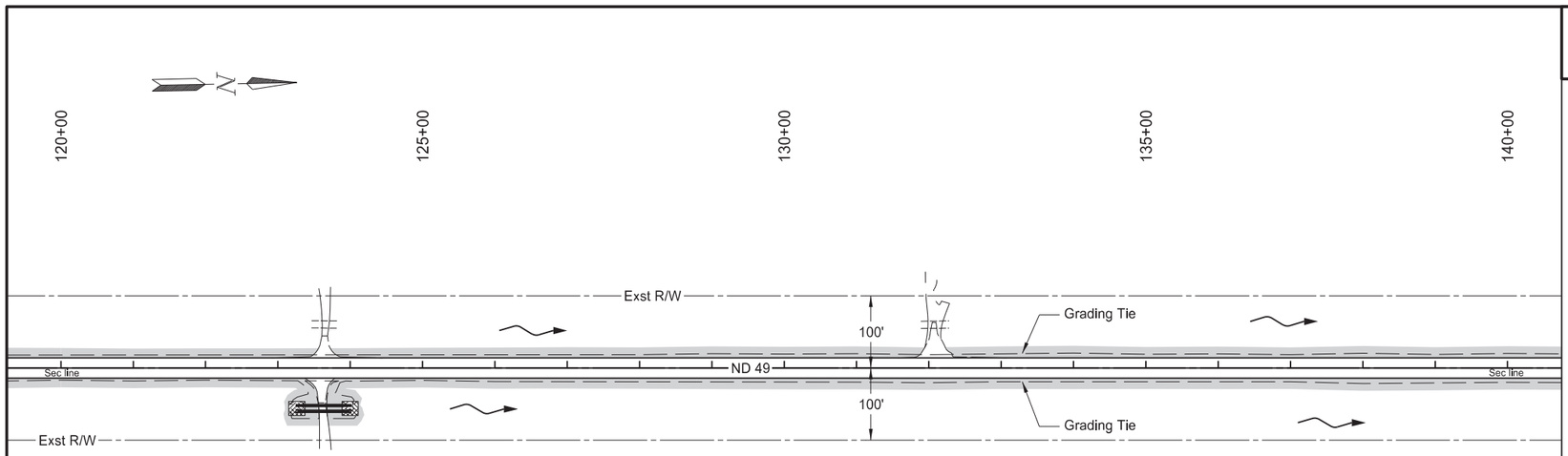
Permanent Erosion Control

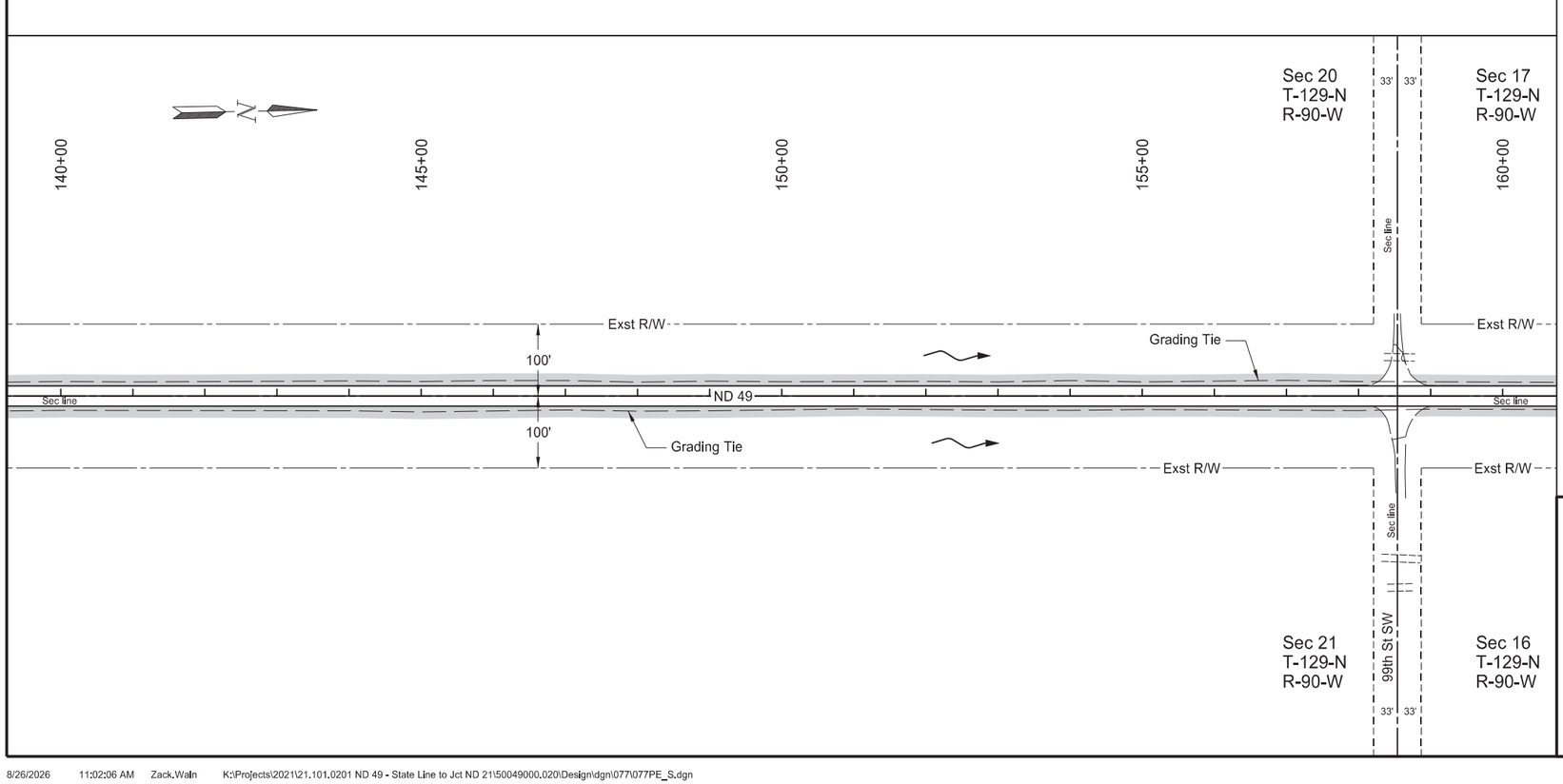
ND 49 - State Line to Jct ND 21

Sta 80+00 to Sta 120+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 08:41:43 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	4





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.85	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.85	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

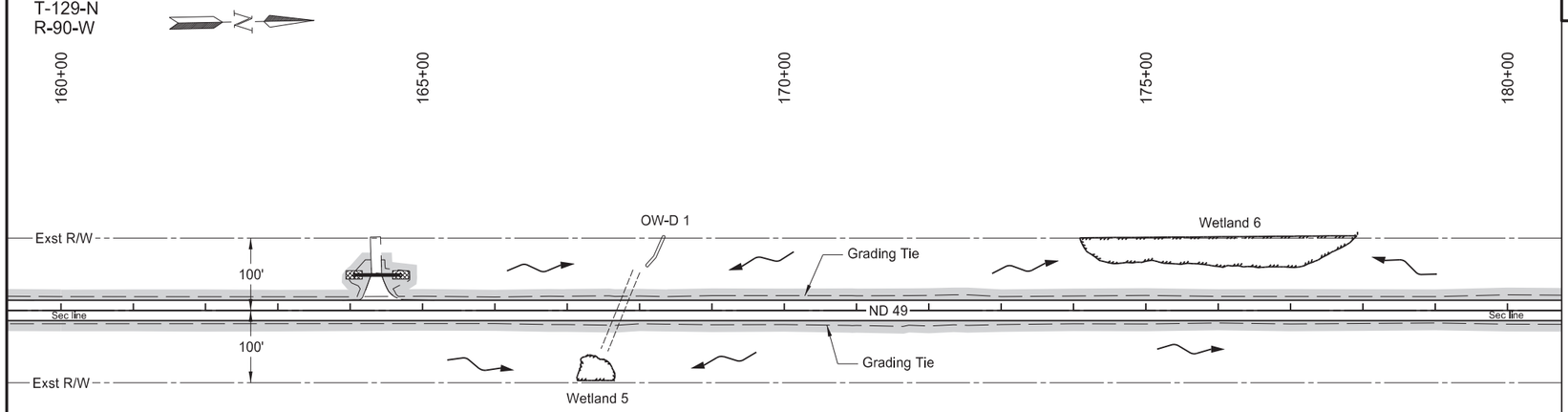
ND 49 - State Line to Jct ND 21

Sta 120+00 to Sta 160+00
(SCL49_S)

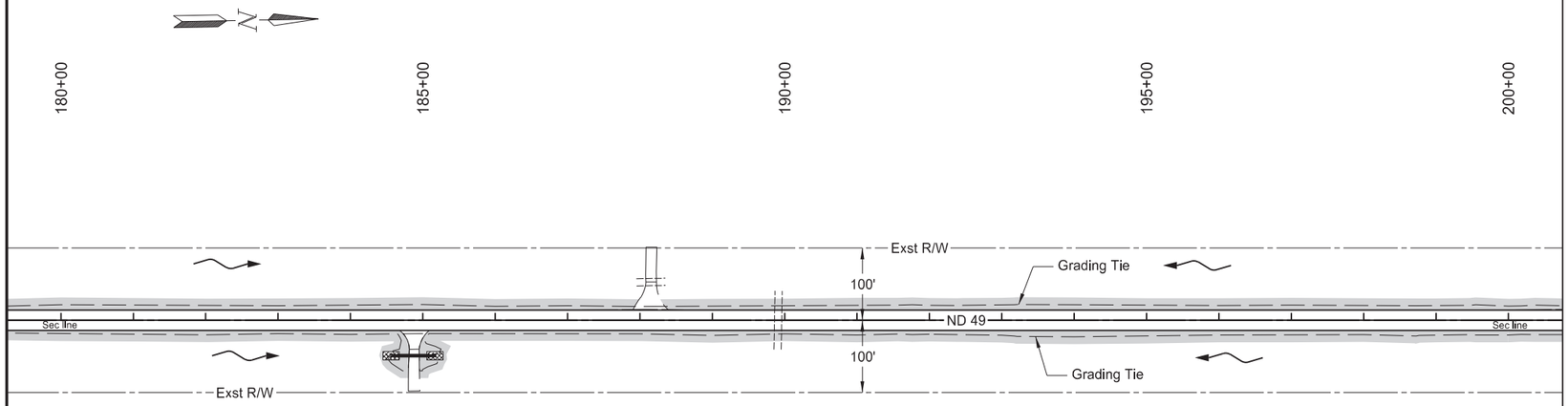
REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:42:27 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	5

Sec 17
T-129-N
R-90-W



Sec 16
T-129-N
R-90-W



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.98	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.98	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (FIll)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

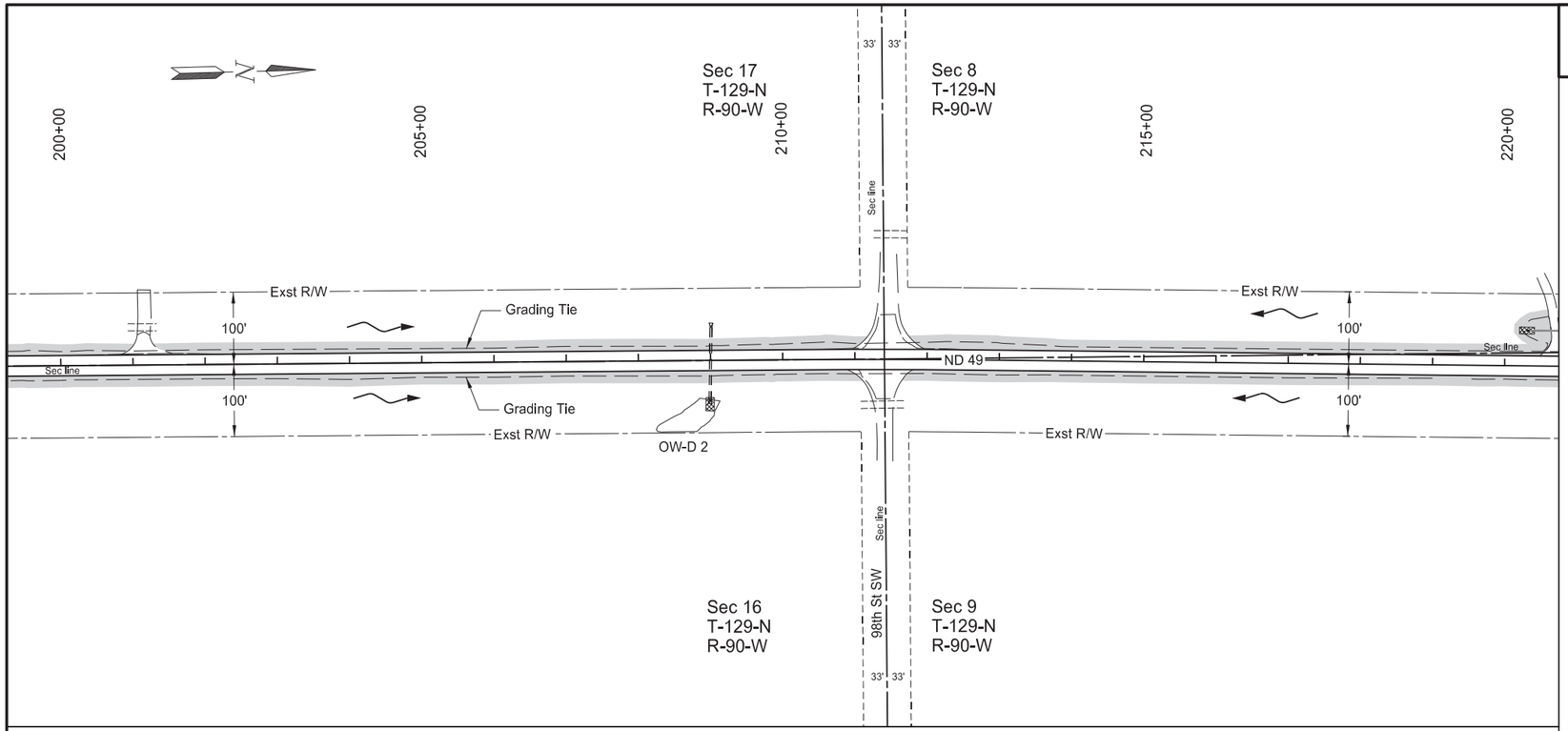
ND 49 - State Line to Jct ND 21

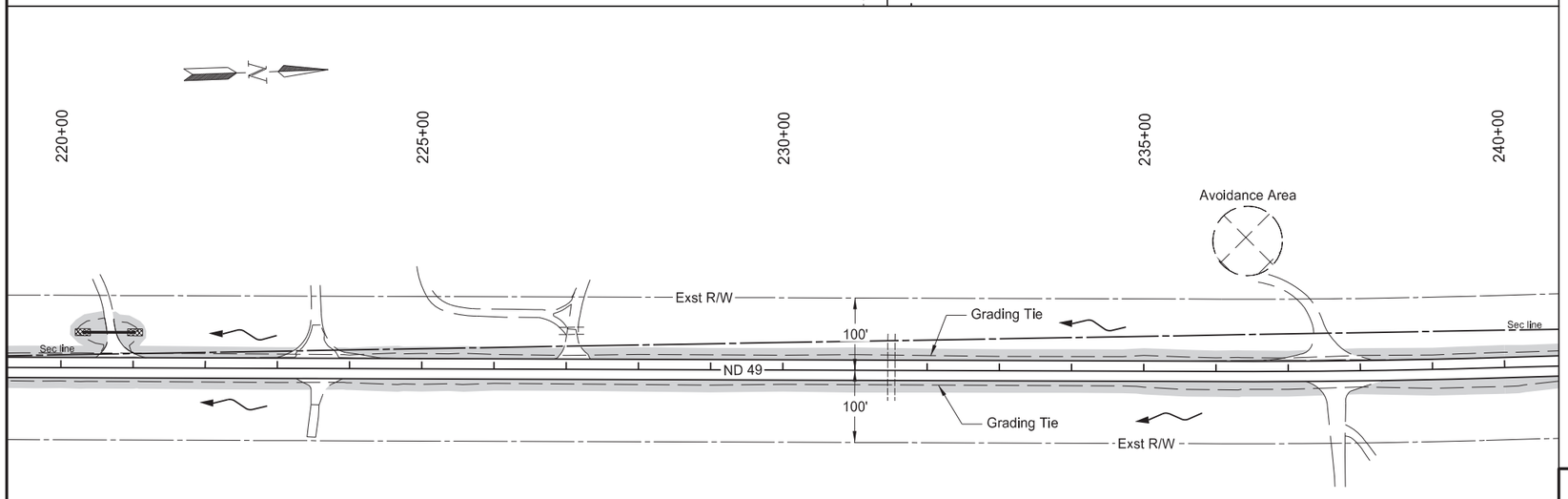
Sta 160+00 to Sta 200+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:42:54 -05'00'
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	6





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.90	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.90	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

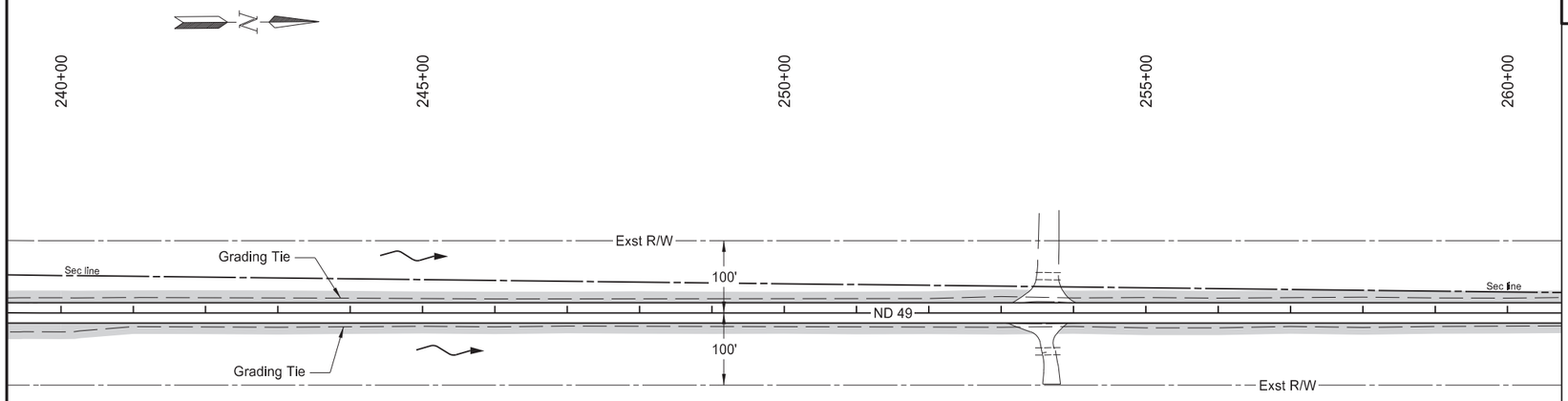
Permanent Erosion Control

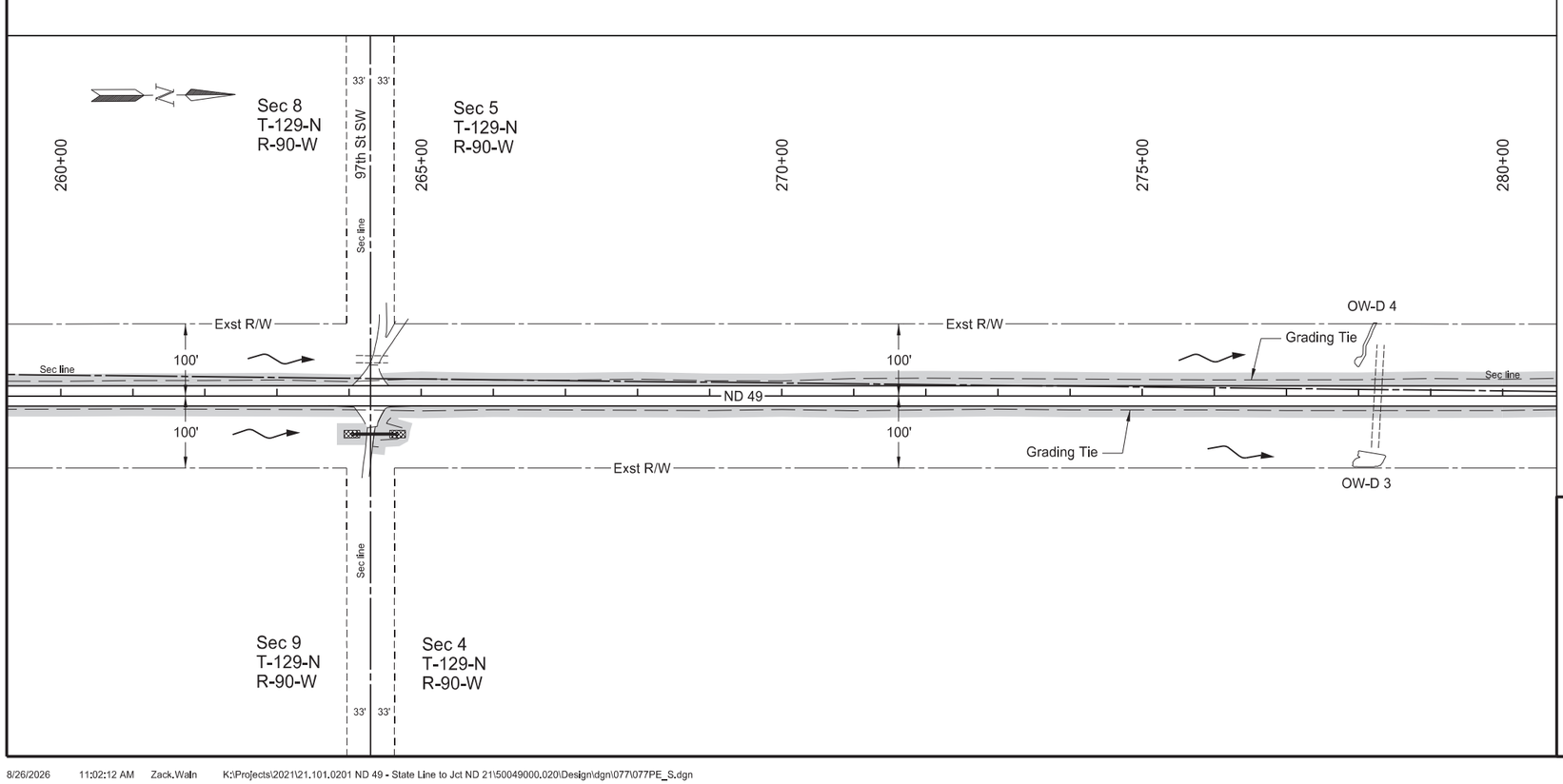
ND 49 - State Line to Jct ND 21

Sta 200+00 to Sta 240+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 08:43:22 -05'00'
DATE
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	7





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.02	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.02	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

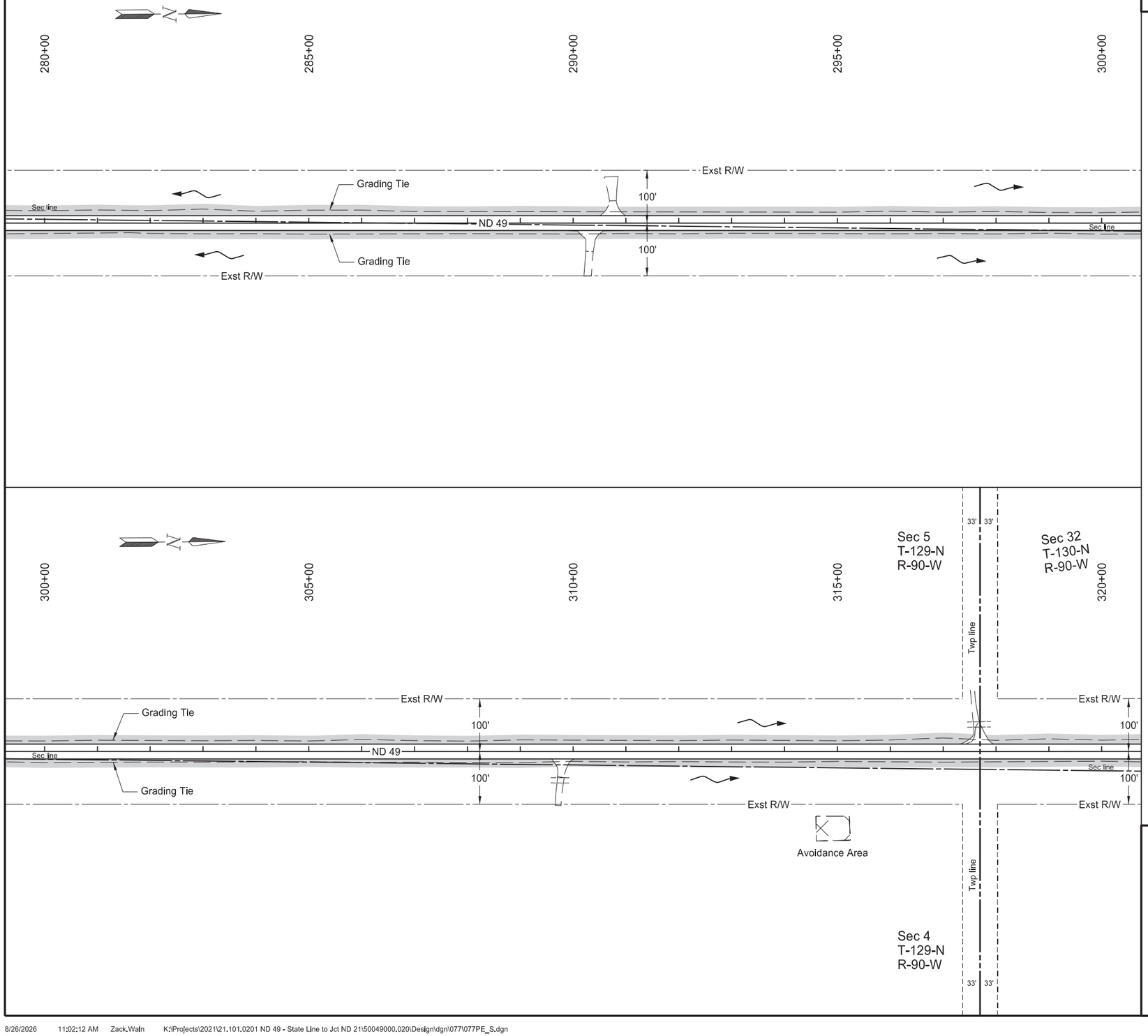
Permanent Erosion Control

ND 49 - State Line to Jct ND 21

Sta 240+00 to Sta 280+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:44:01 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	8

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.05	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.05	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

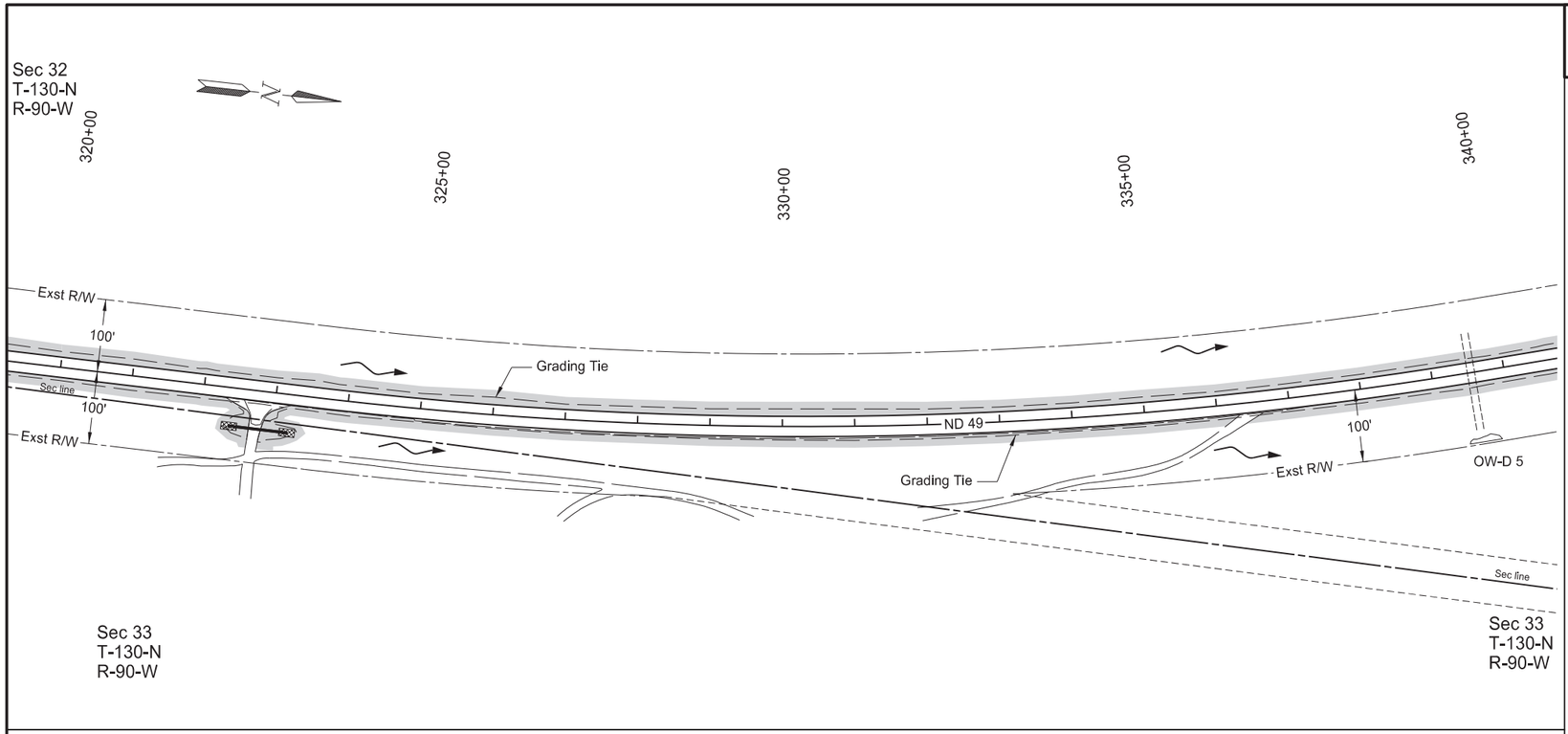
Permanent Erosion Control

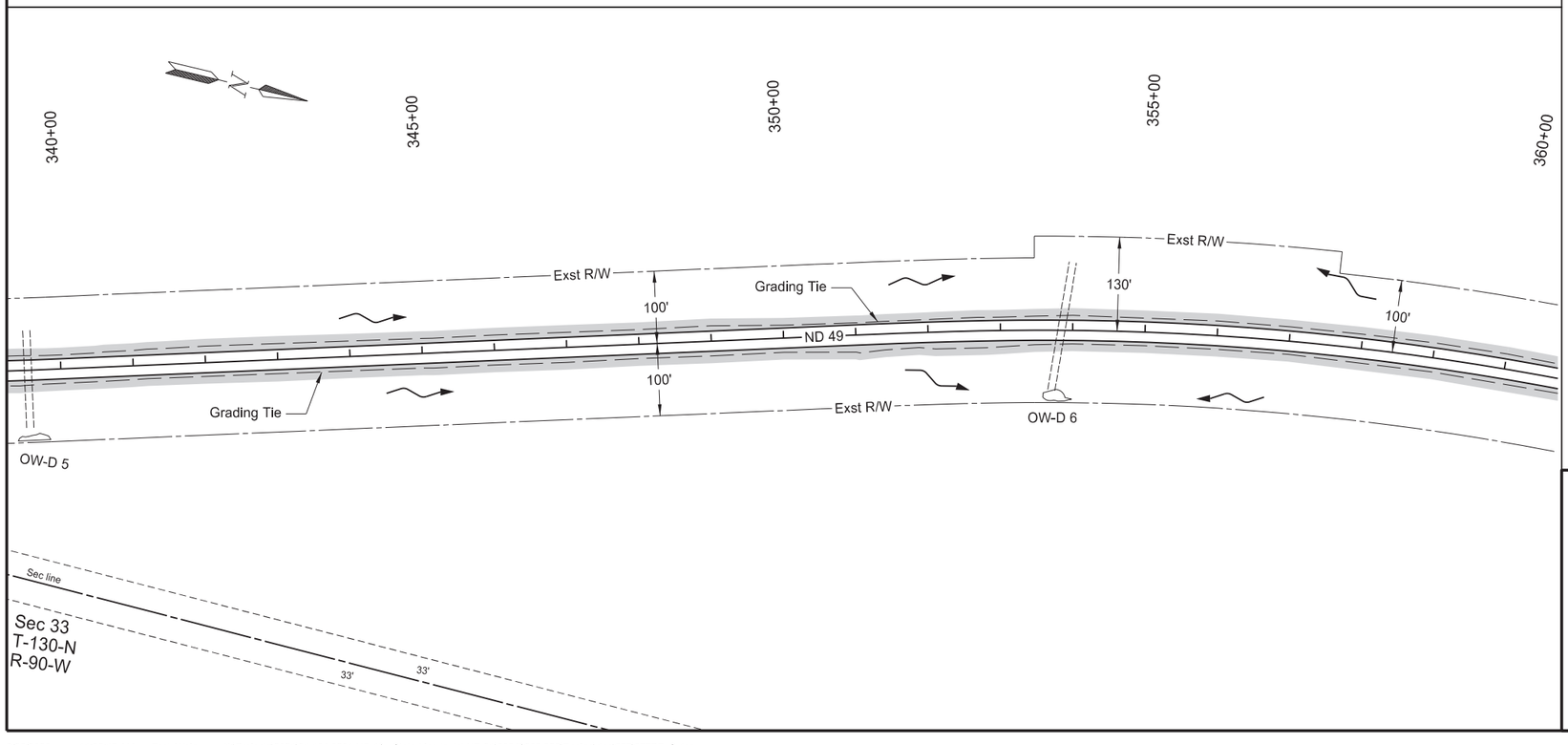
ND 49 - State Line to Jct ND 21

Sta 280+00 to Sta 320+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:44:38 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	9





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.98	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.98	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

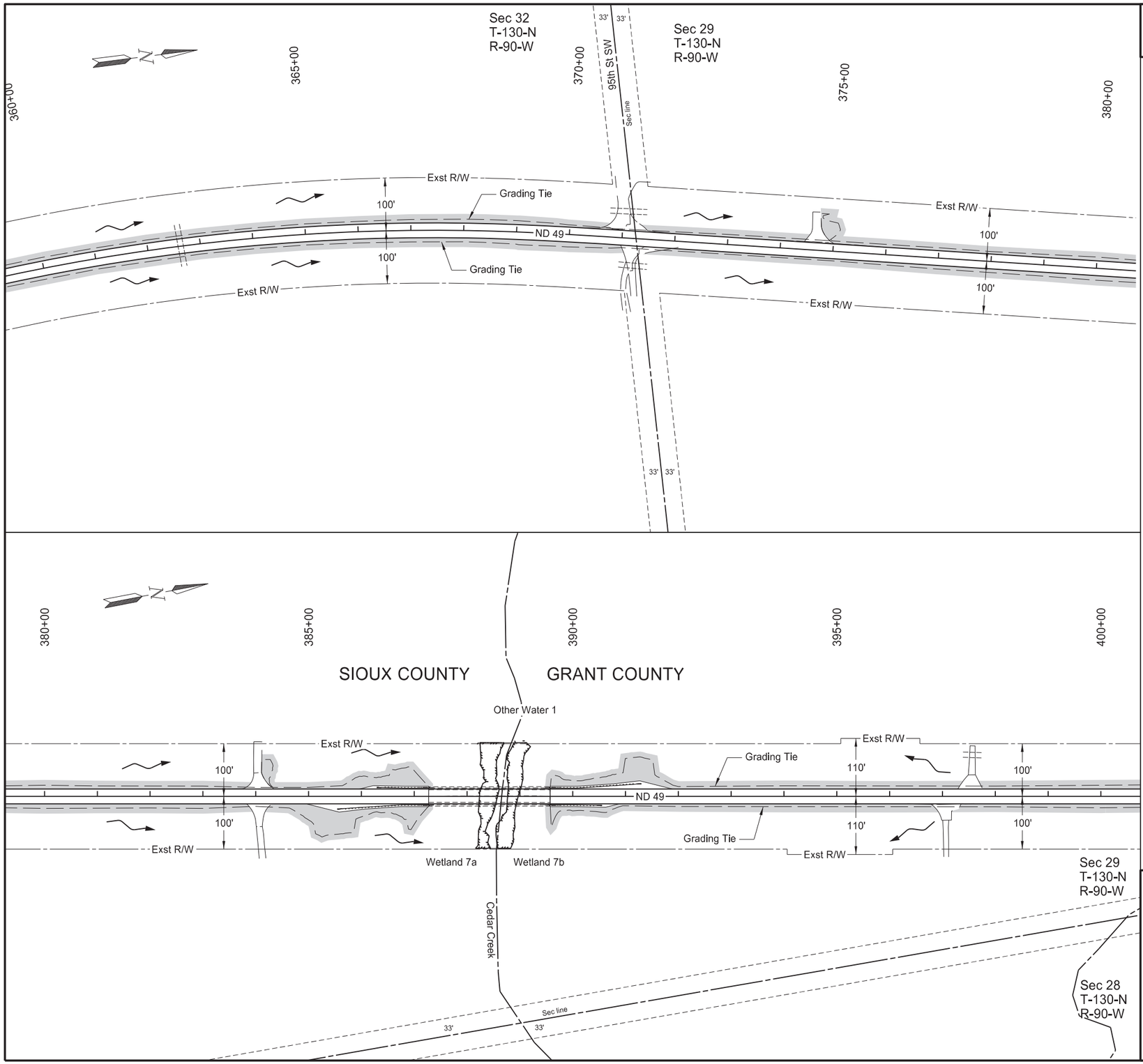
ND 49 - State Line to Jct ND 21

Sta 320+00 to Sta 360+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 08:45:02 -05'00'
DATE
NORTH DAKOTA

8/26/2026 11:02:13 AM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\077\077PE_S.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	10



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.13	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.13	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

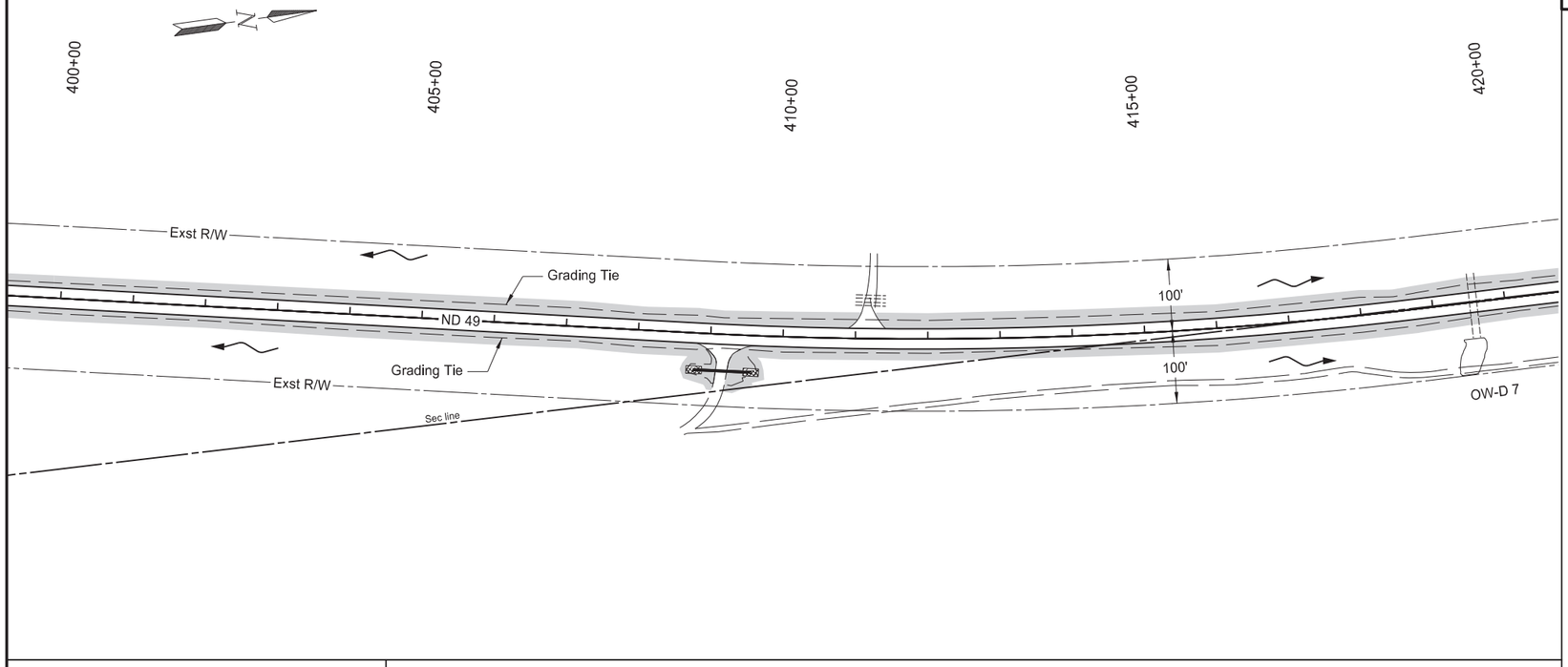
Permanent Erosion Control

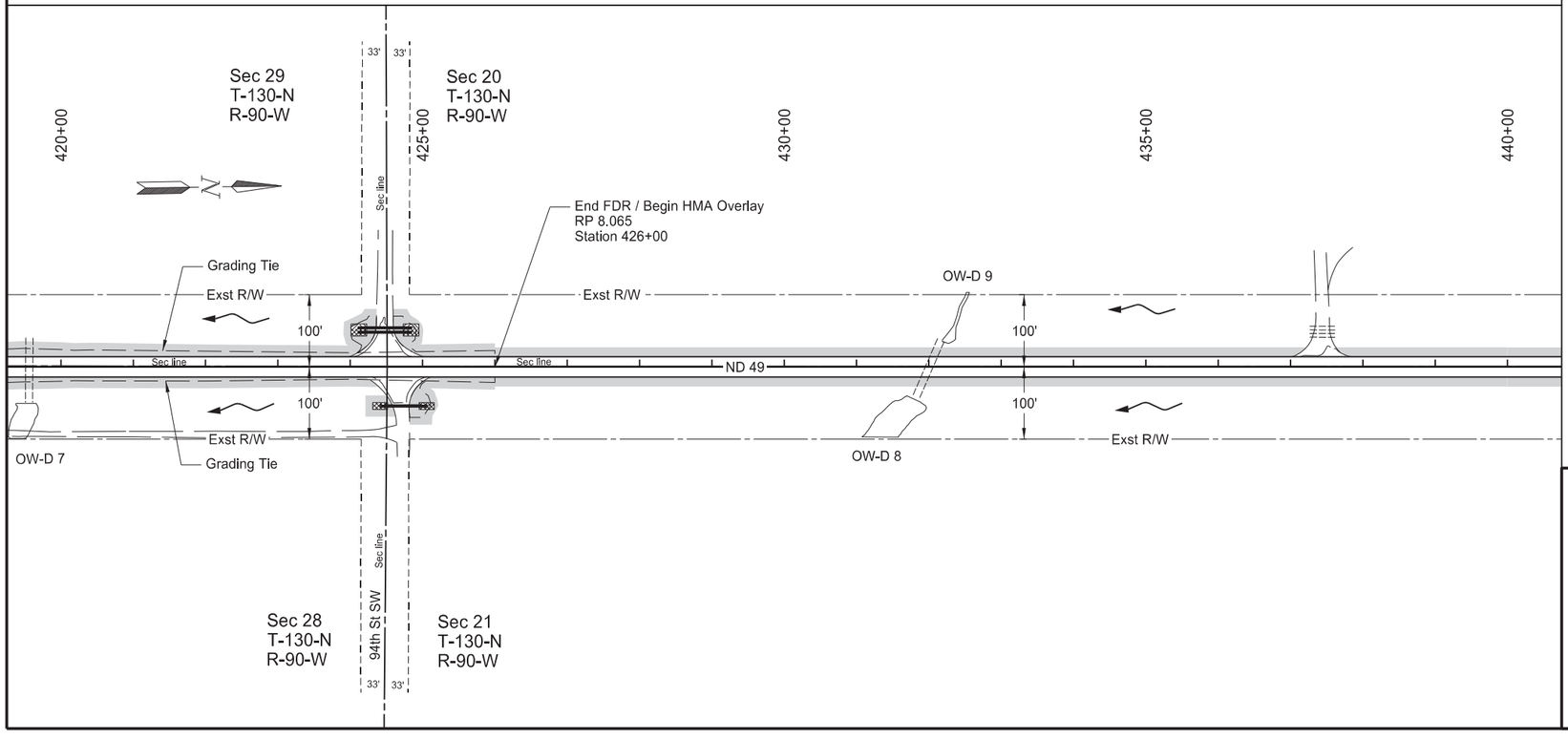
ND 49 - State Line to Jct ND 21

Sta 360+00 to Sta 388+65
(SCL49_S)
Sta 388+65 to Sta 400+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:45:37 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	11





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	3.10	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	3.10	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

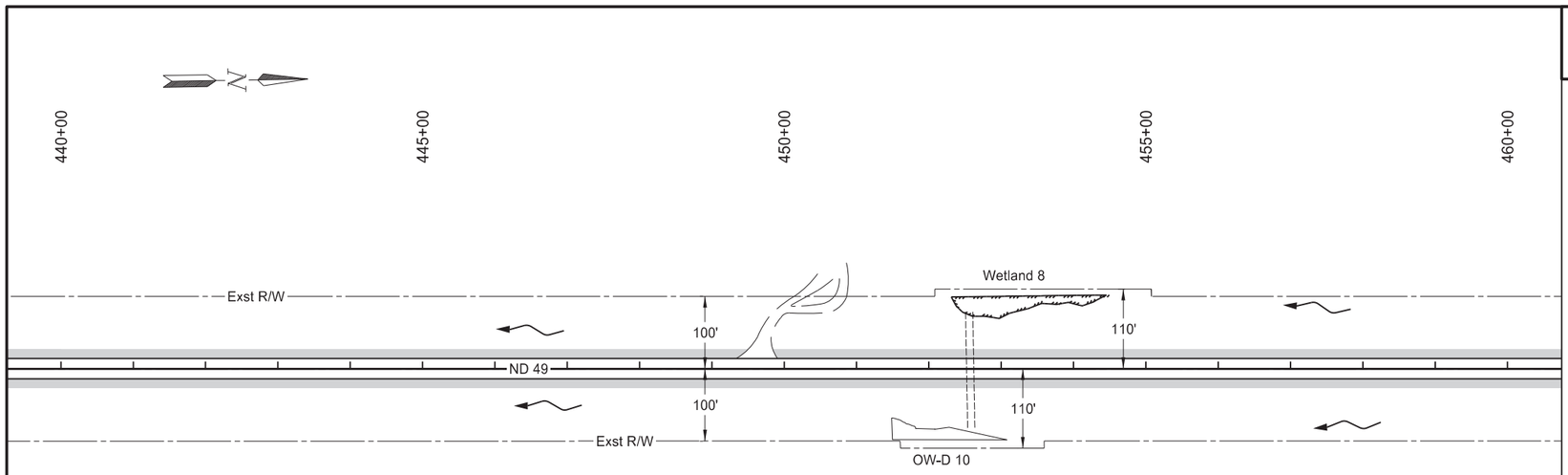
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

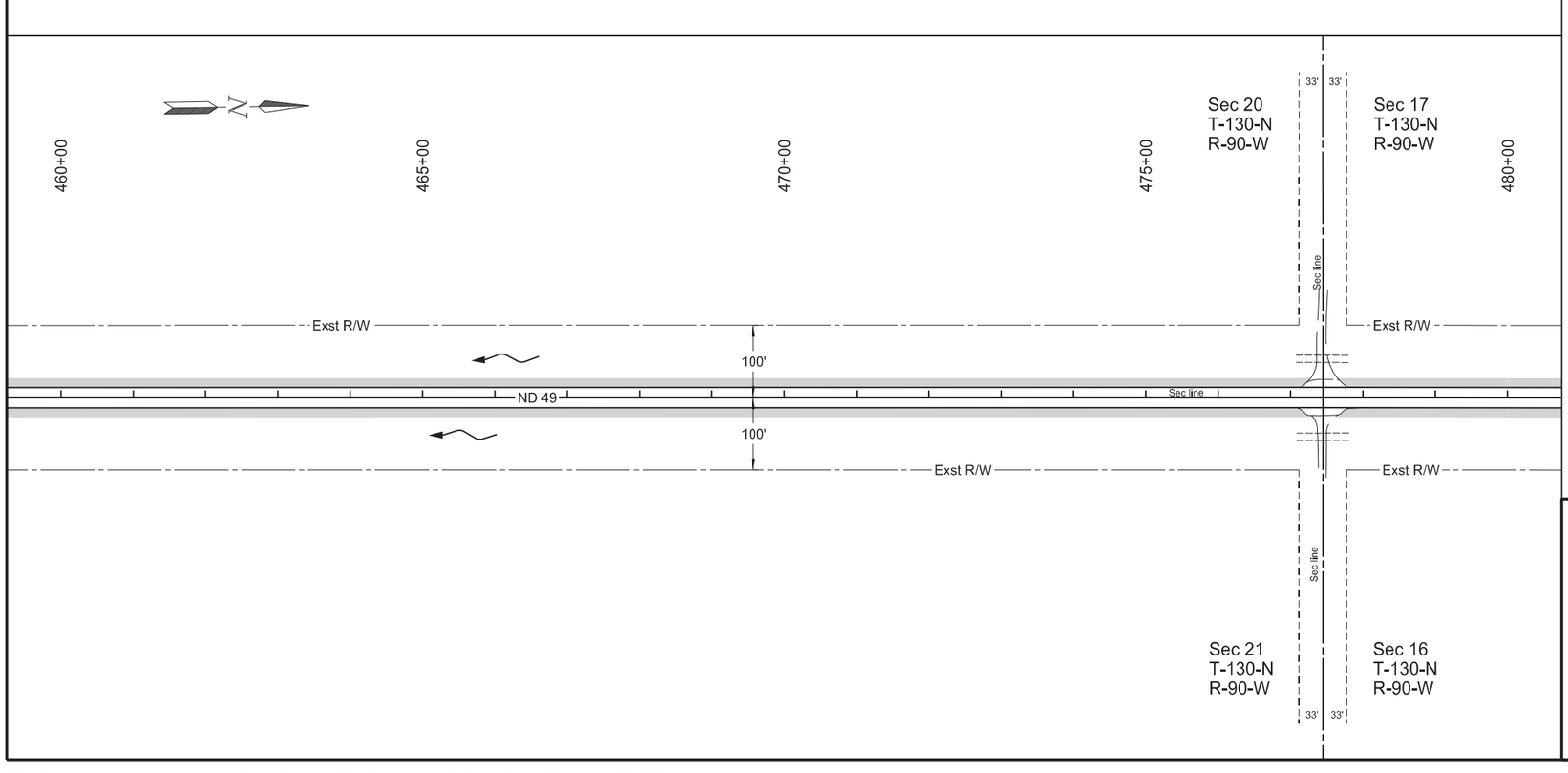
Permanent Erosion Control

Sta 400+00 to Sta 440+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:46:07 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	12

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

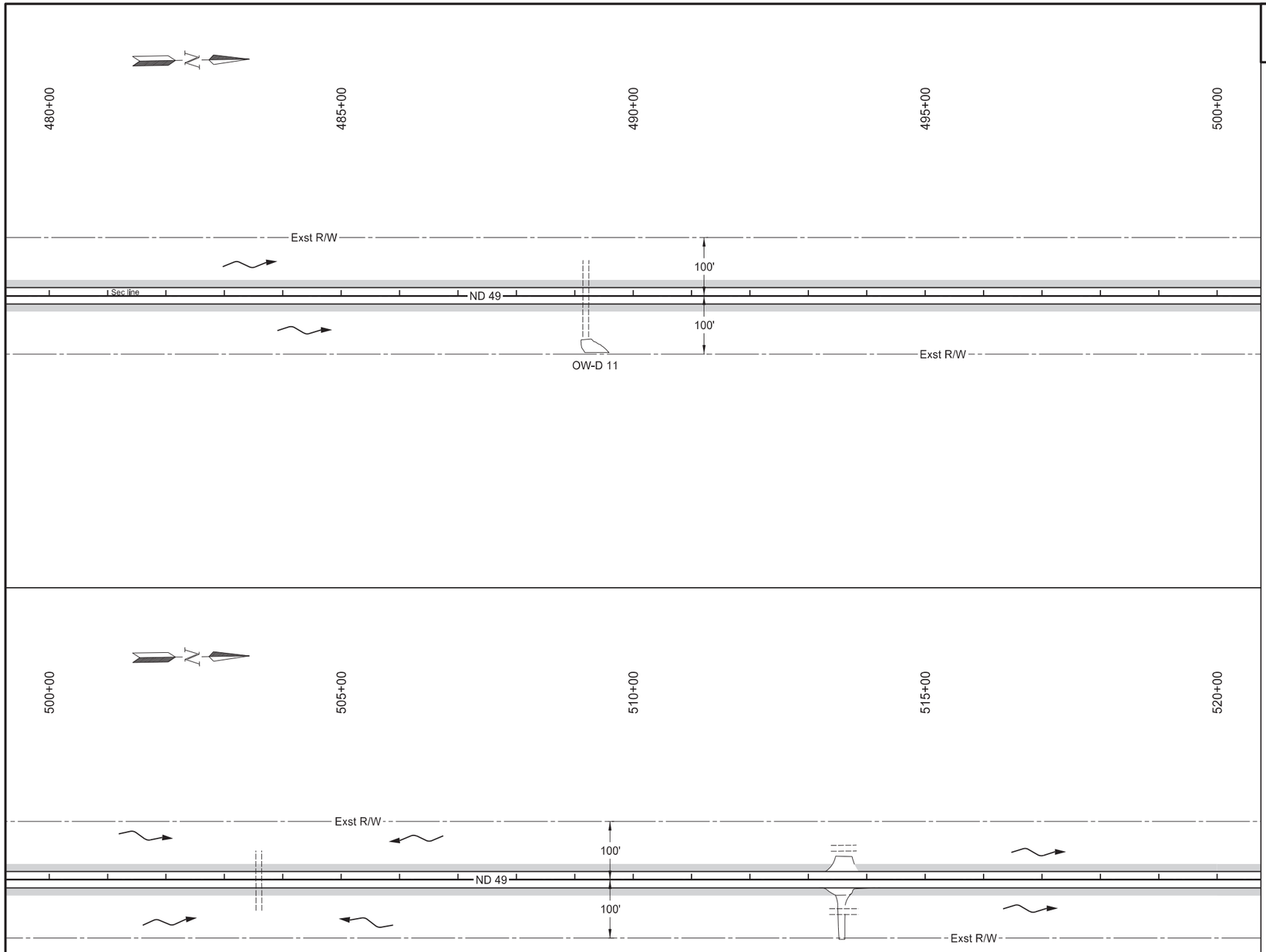
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 440+00 to Sta 480+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:46:39 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	13

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.36	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.36	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

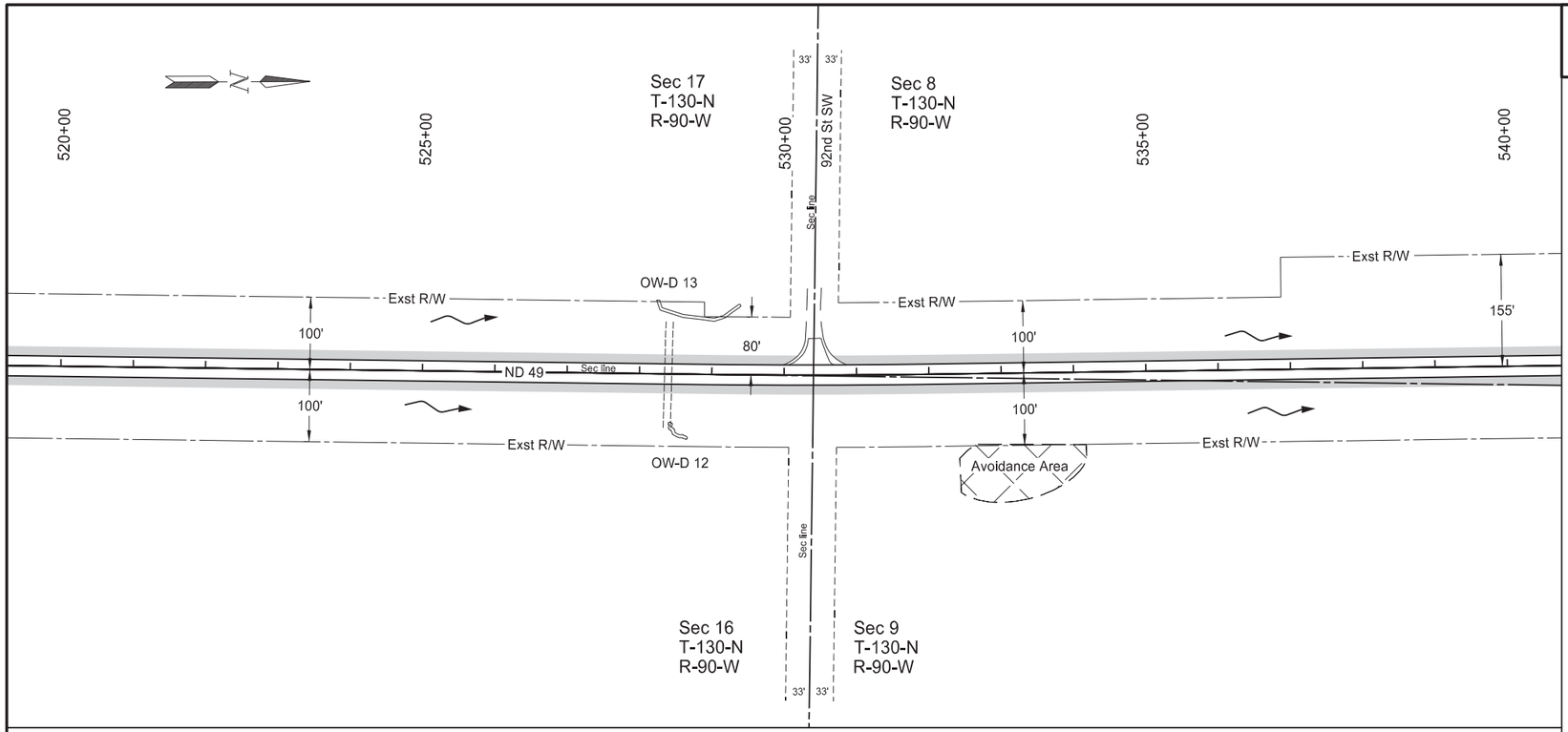
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

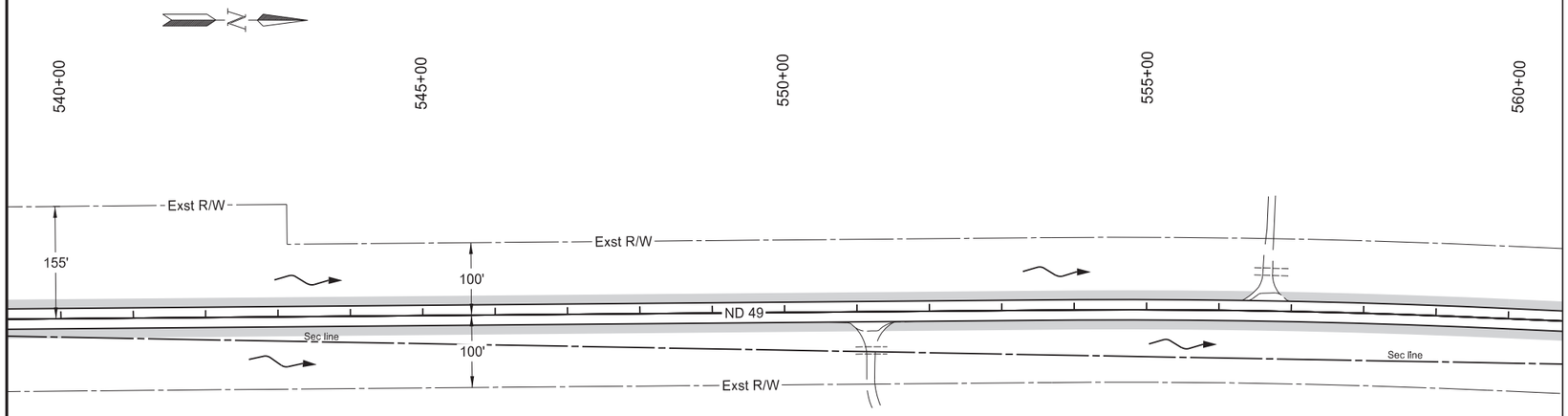
Permanent Erosion Control

Sta 480+00 to Sta 520+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 08:47:06 -05'00'
DATE
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	14

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

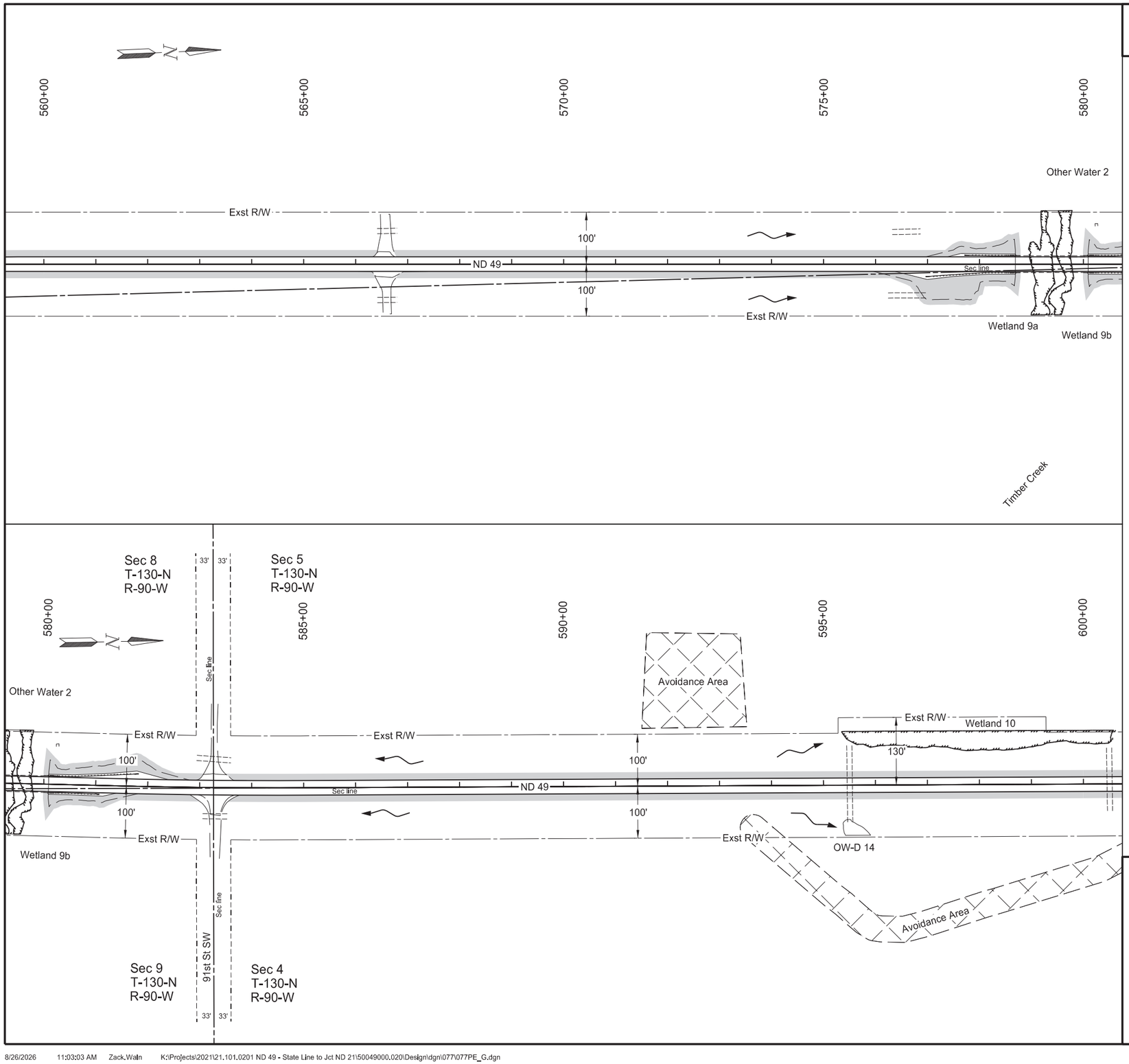
Permanent Erosion Control

Sta 520+00 to Sta 560+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:47:32 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	15



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.67	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.67	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Exst Delineated Wetland
- Edge of Water Line
- Flow Direction
- Riprap
- Grading Tie Line (Cut)
- Seeding Class II / Soil Stabilization
- Erosion Control Blanket
- Pretty Rock National Wildlife Refuge

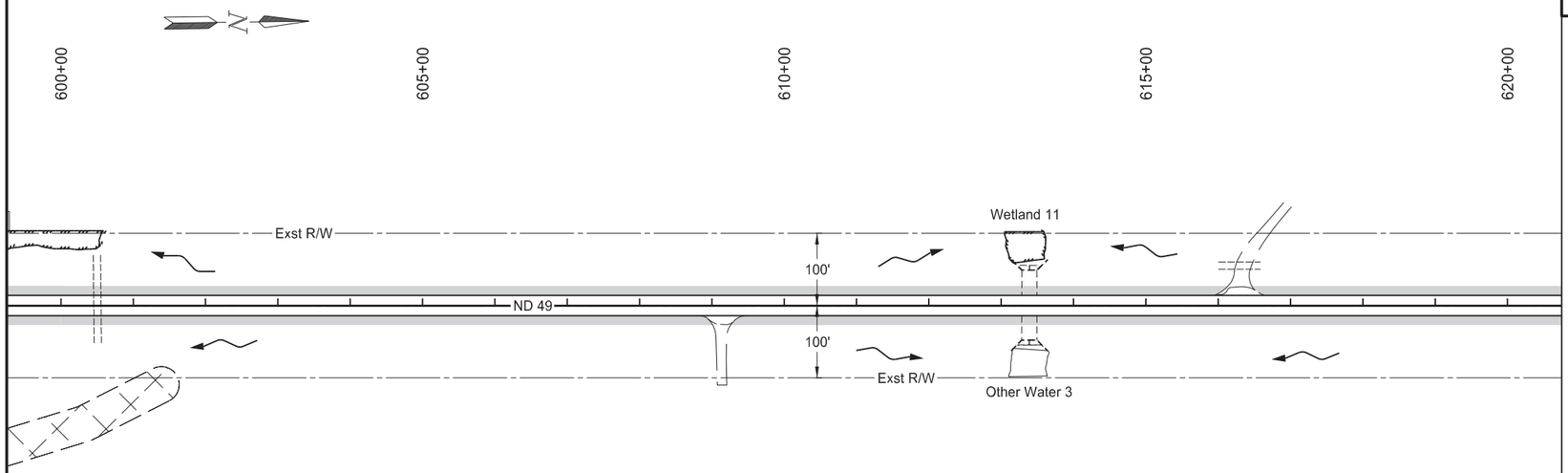
Permanent Erosion Control

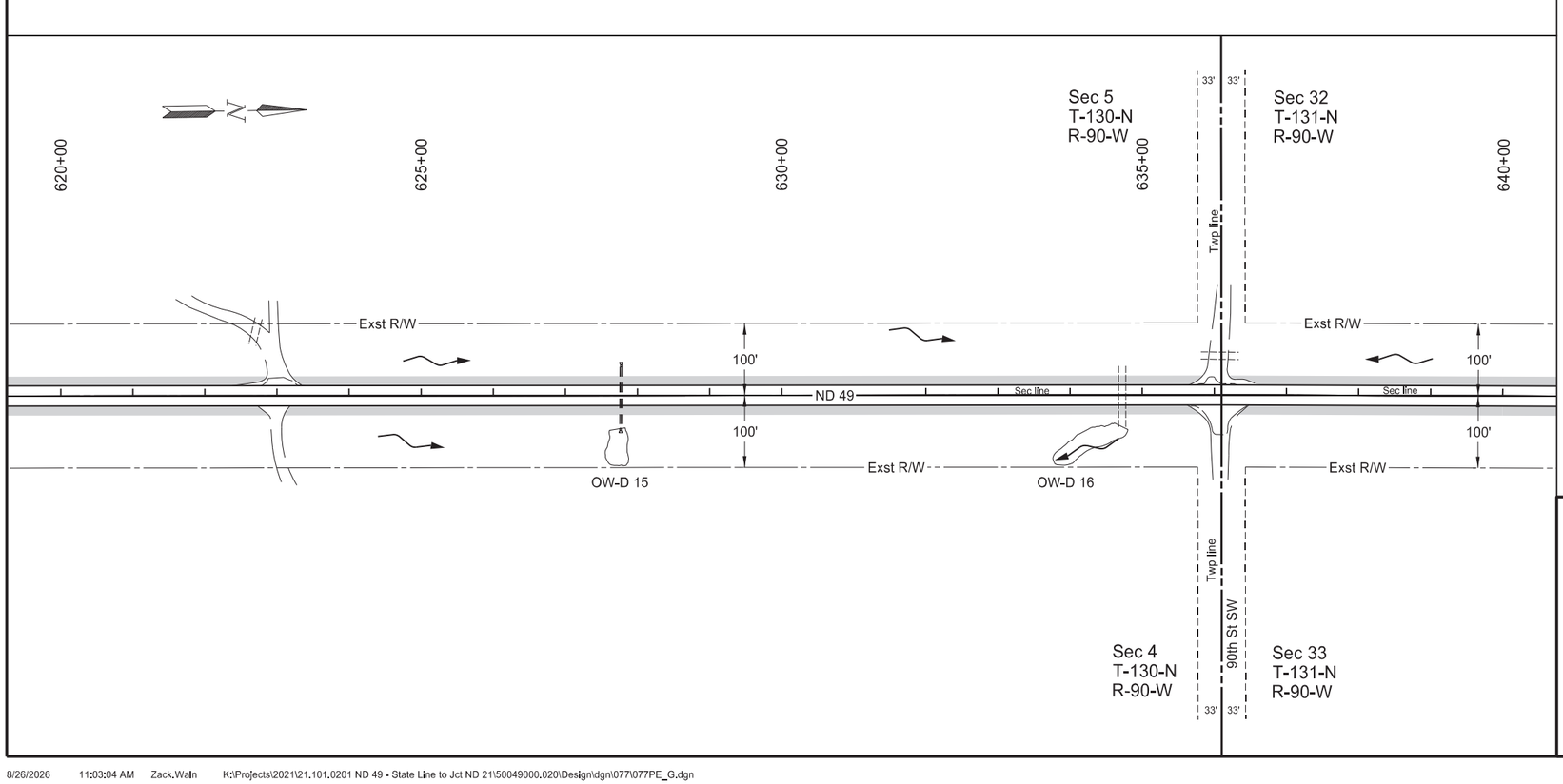
Sta 560+00 to Sta 600+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:47:59 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	16





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.30	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.30	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

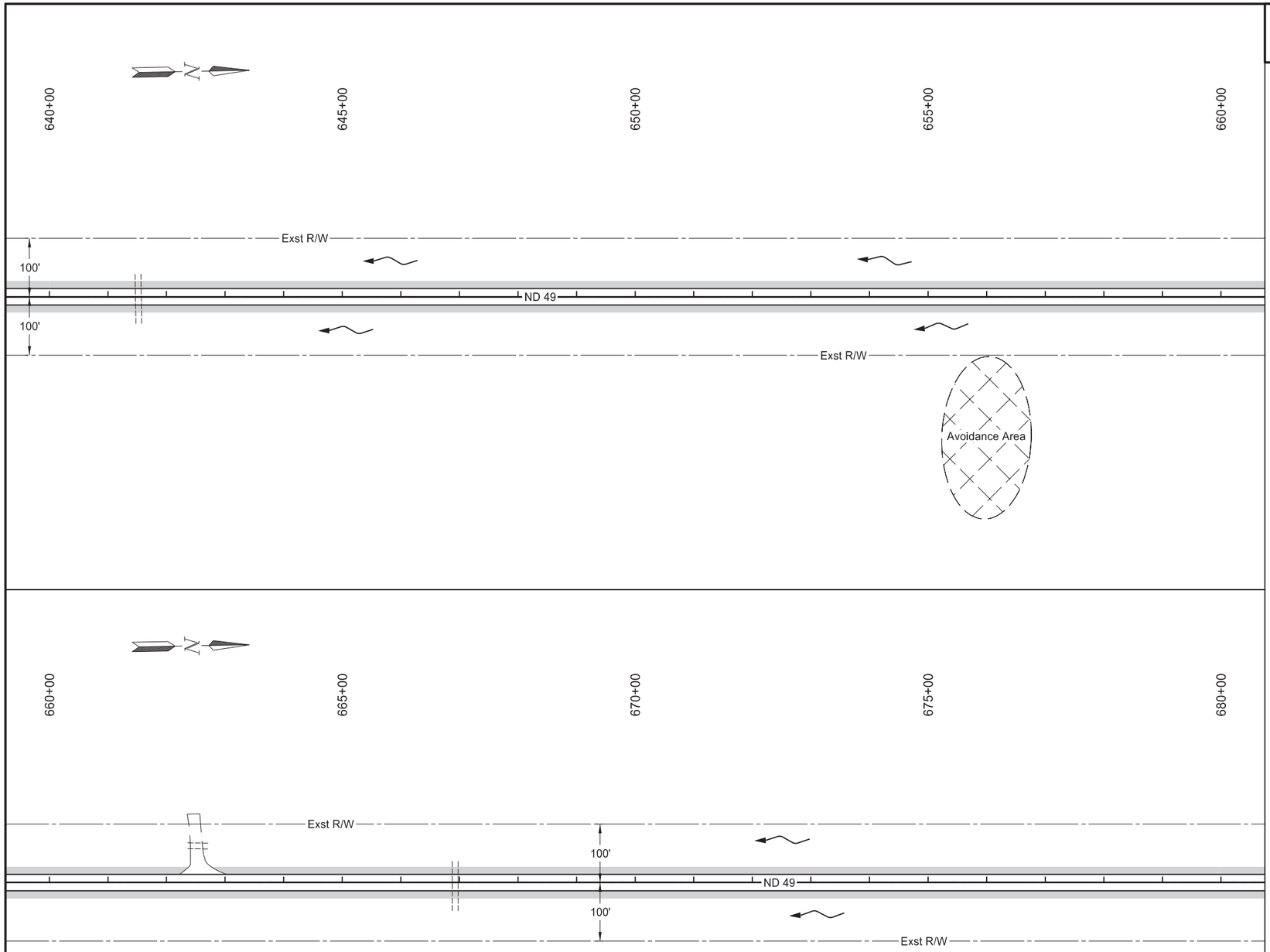
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 600+00 to Sta 640+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 08:48:29 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	17

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.37	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.37	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

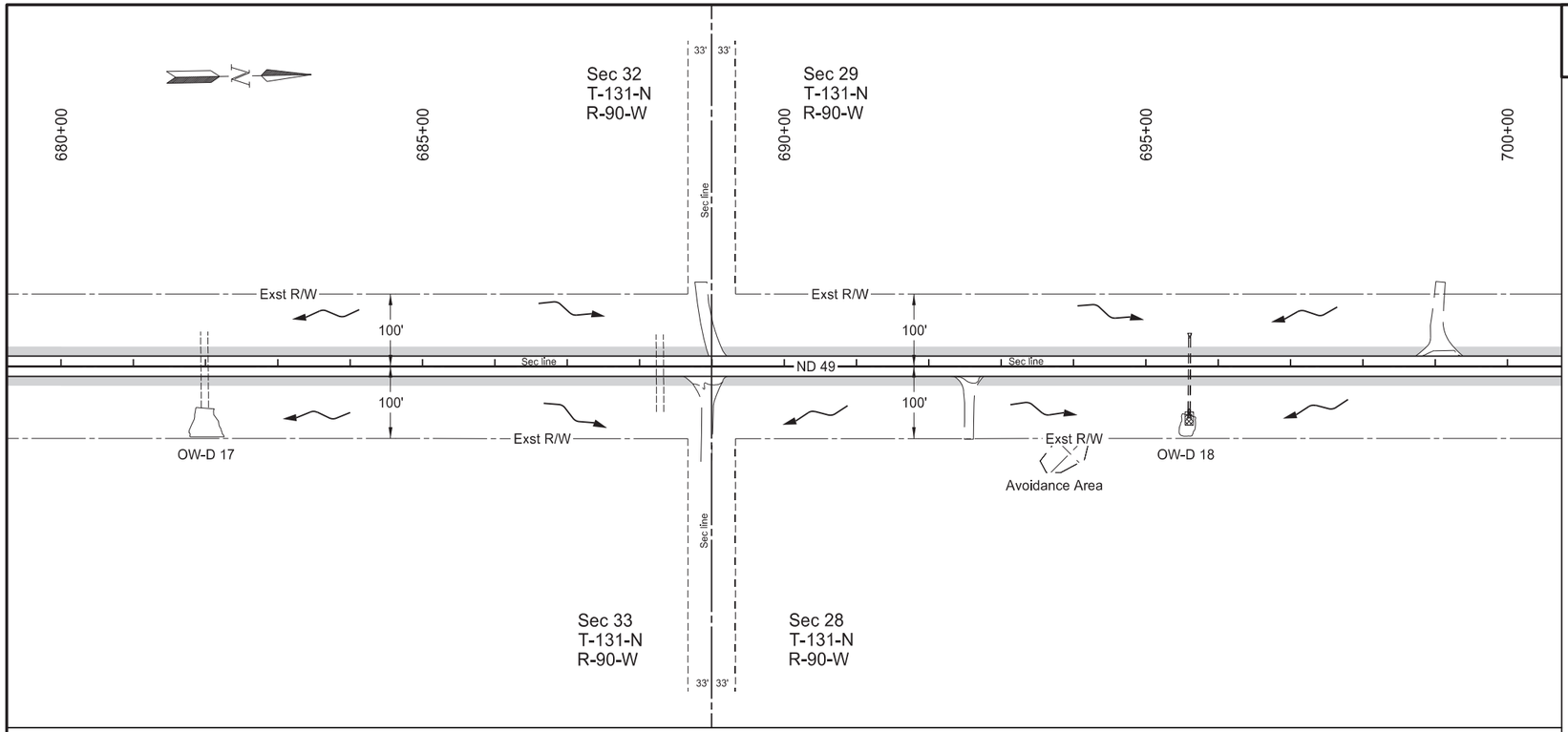
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- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

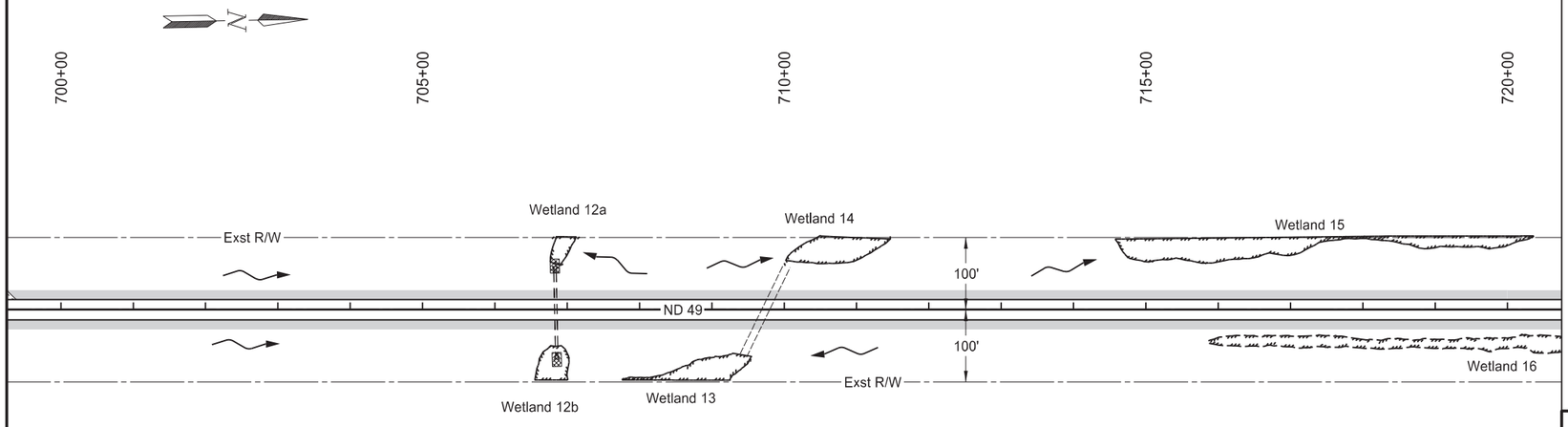
Permanent Erosion Control

Sta 640+00 to Sta 680+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:48:57 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	18

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

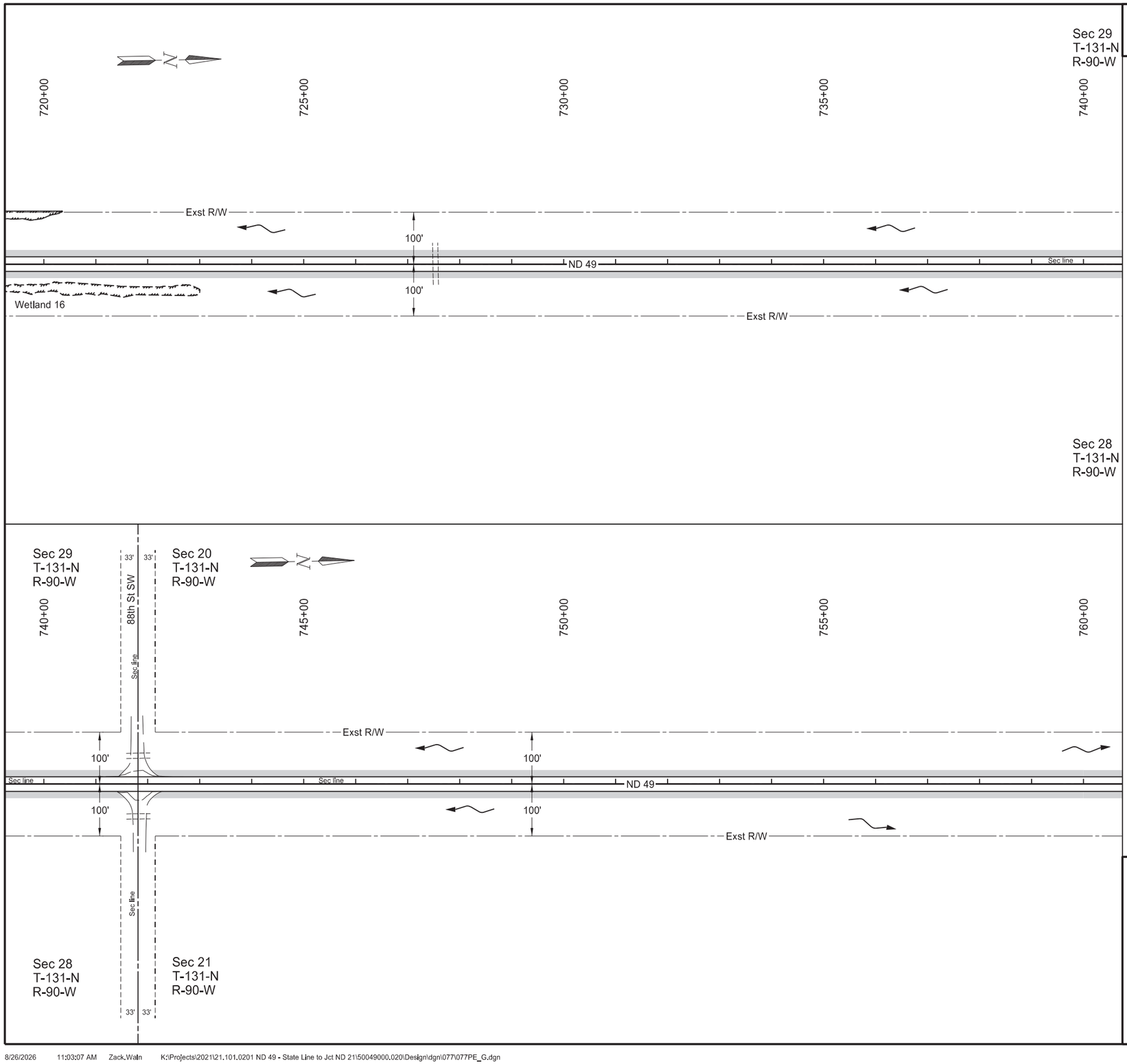
Permanent Erosion Control

Sta 680+00 to Sta 720+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:49:27 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	19



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

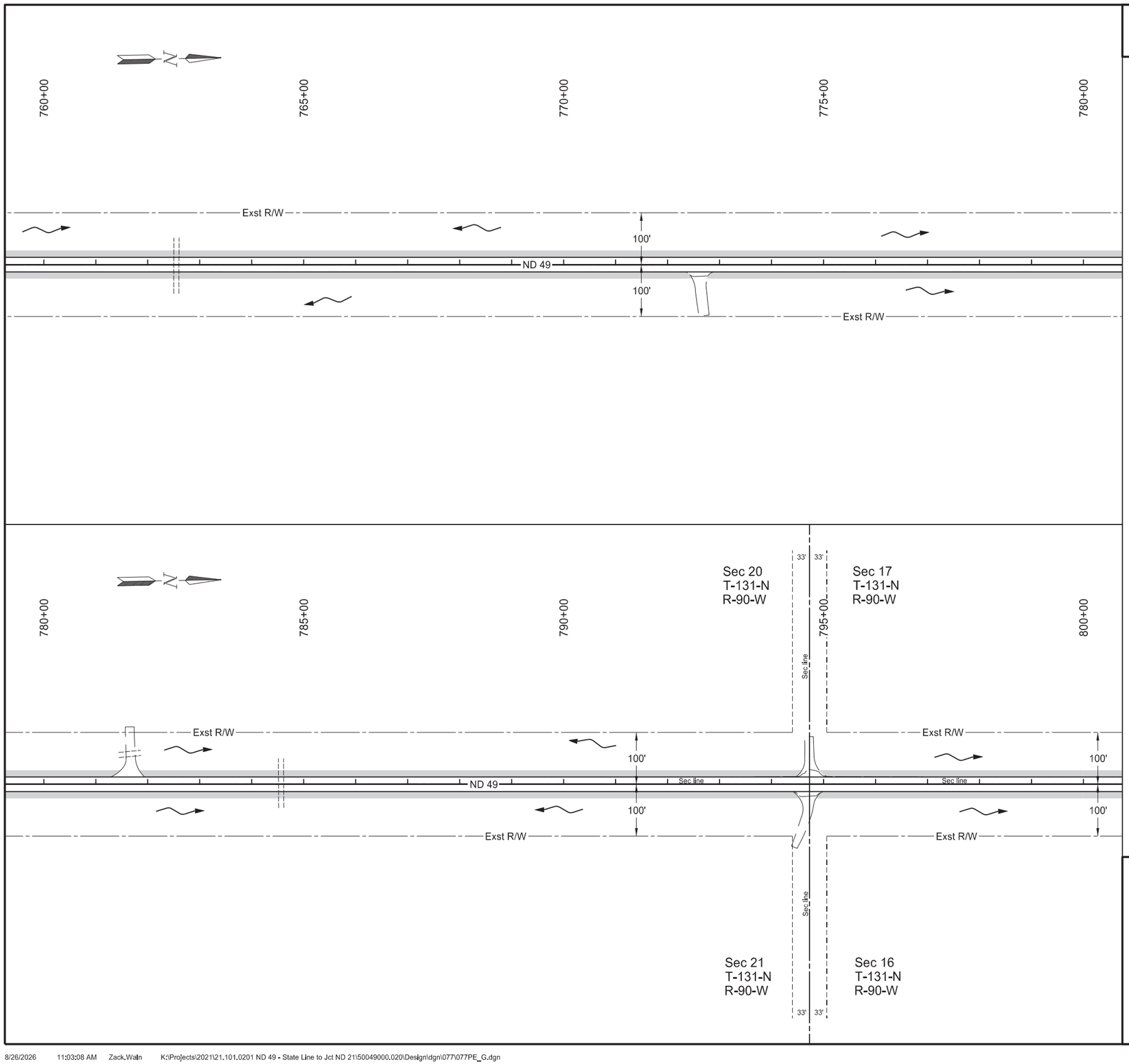
Permanent Erosion Control

Sta 720+00 to Sta 760+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:49:54 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	20



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

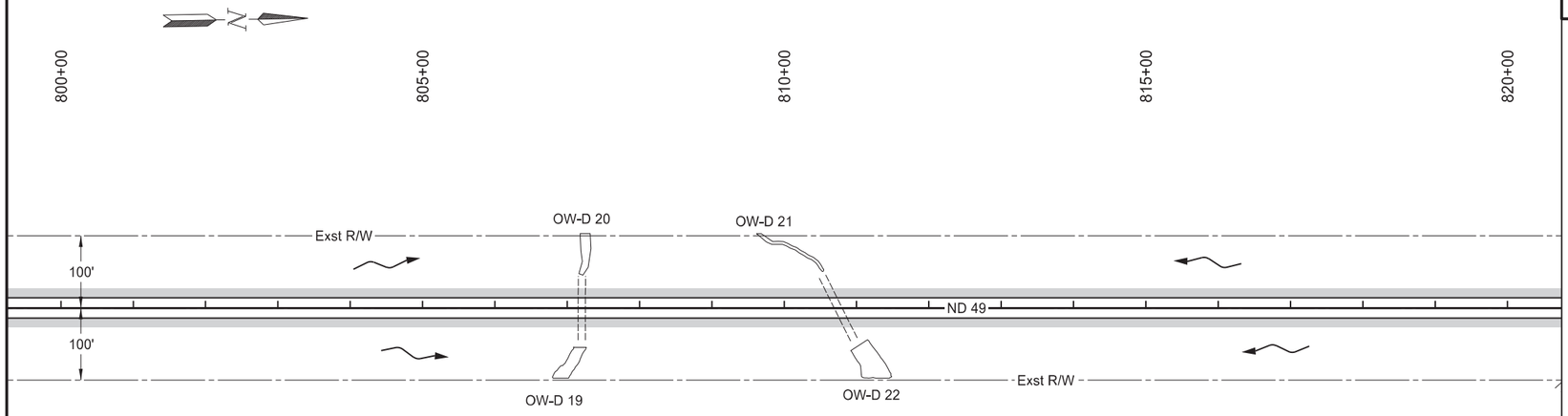
Permanent Erosion Control

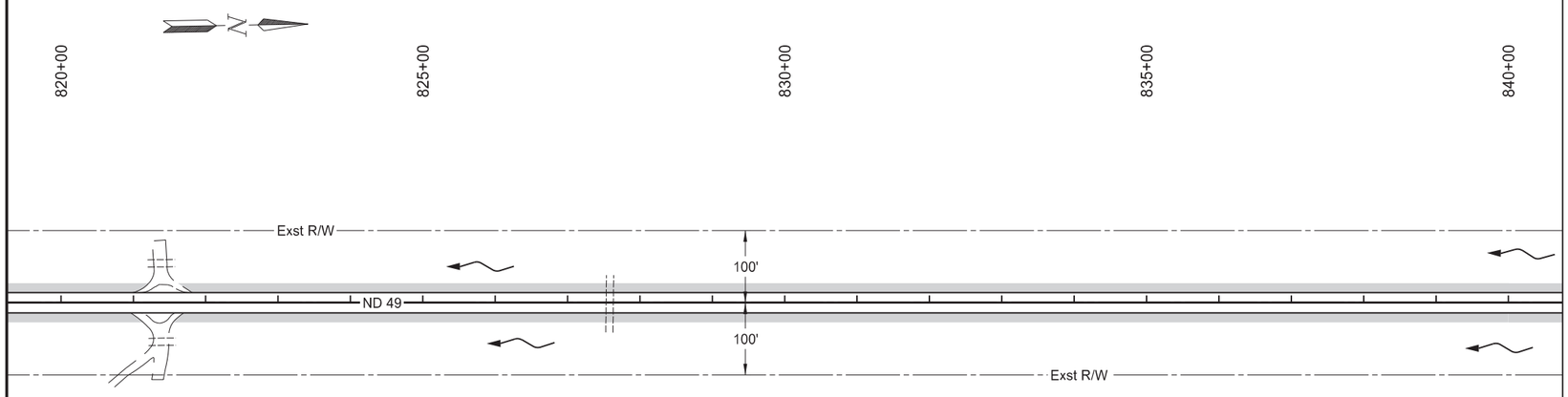
Sta 760+00 to Sta 800+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 08:50:23 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	21





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

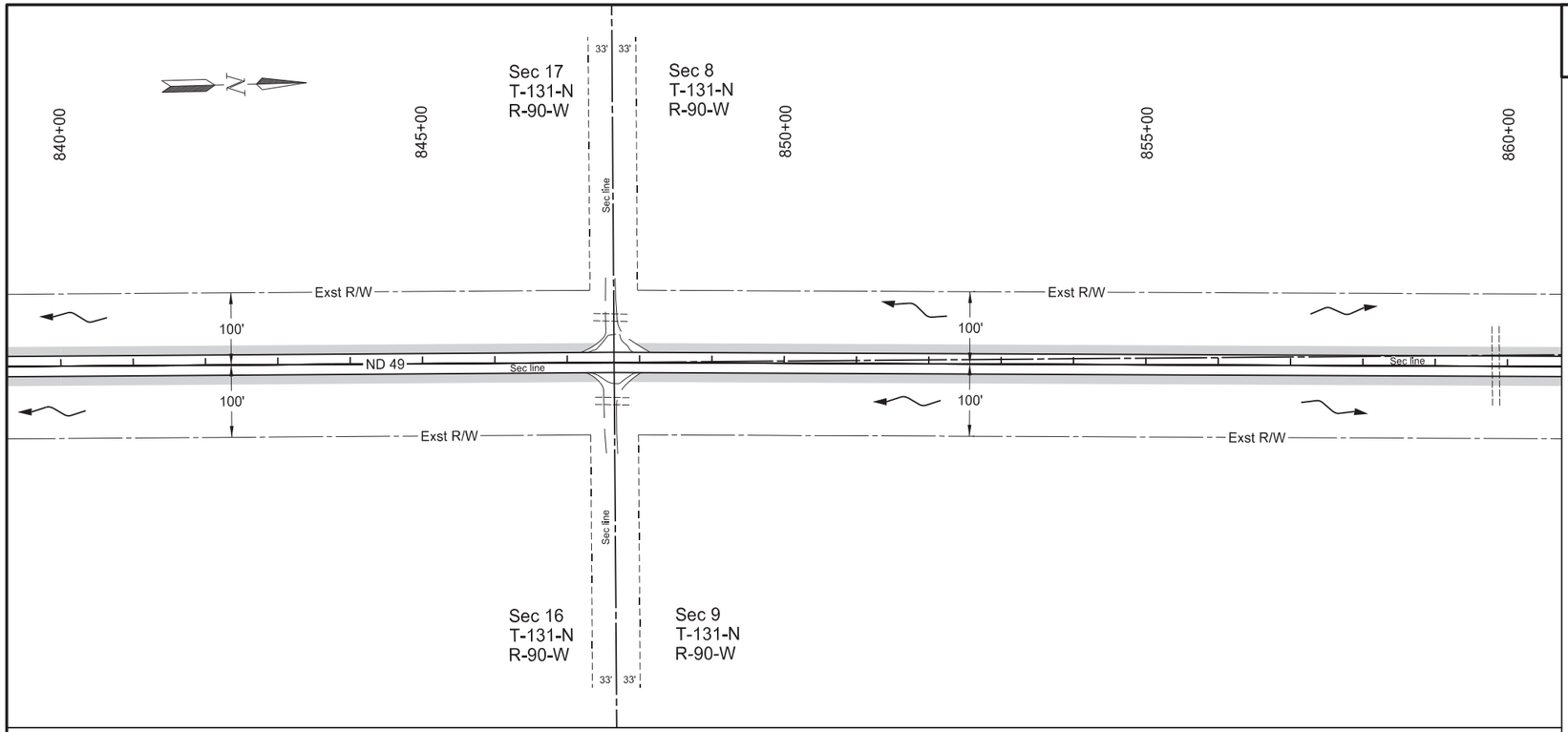
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

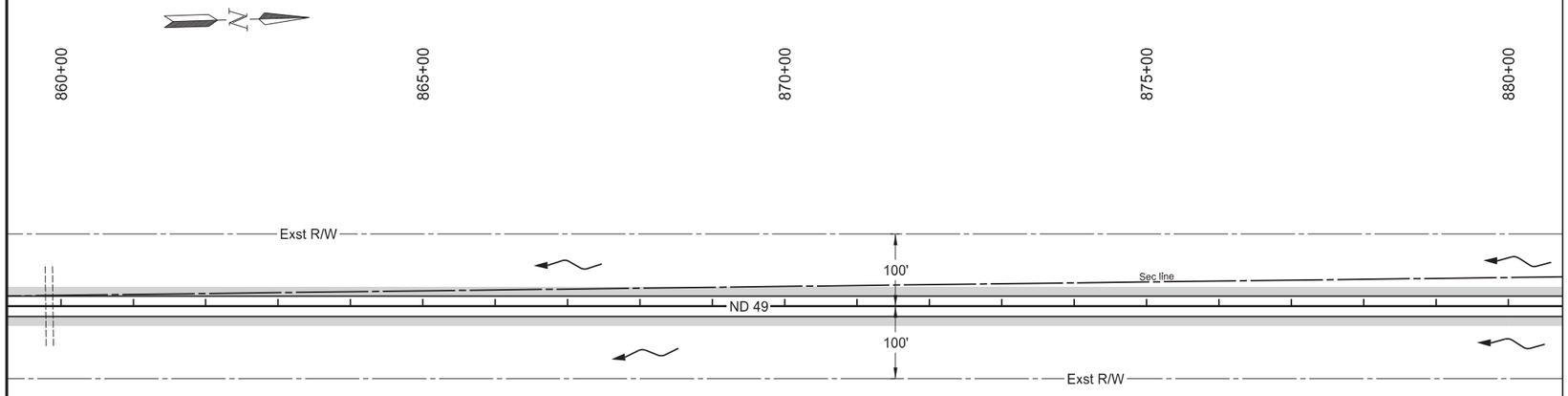
Permanent Erosion Control

Sta 800+00 to Sta 840+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 08:50:51 -05'00'
DATE
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	22

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.35	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.35	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

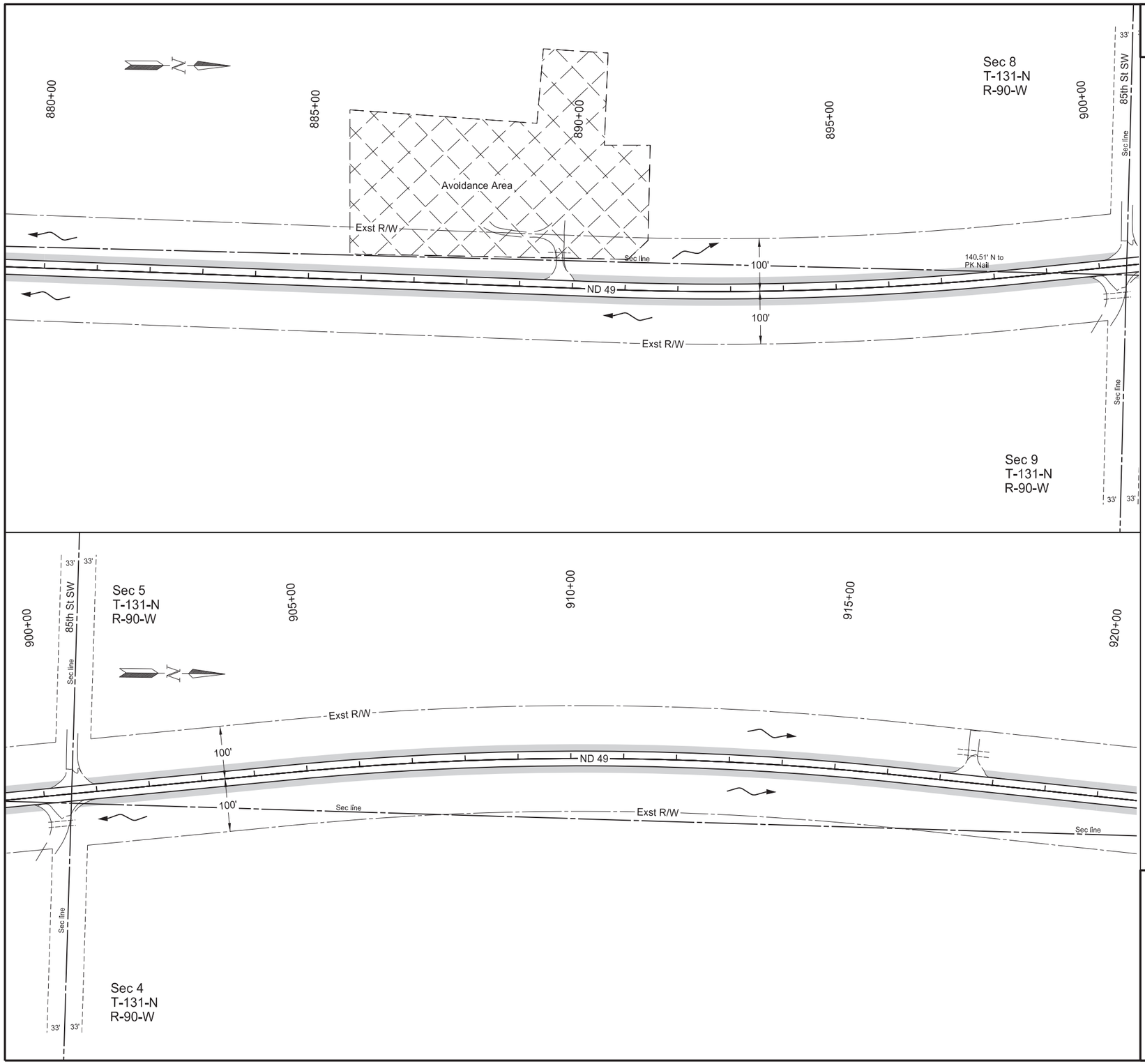
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 840+00 to Sta 880+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:51:17 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	23

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

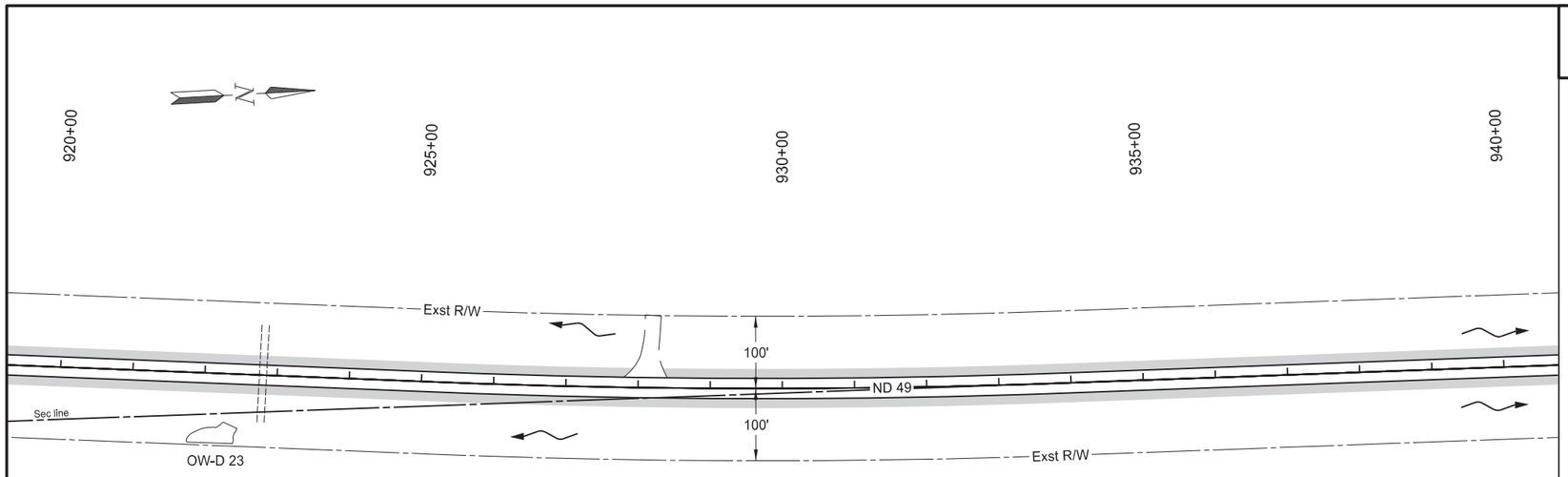
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

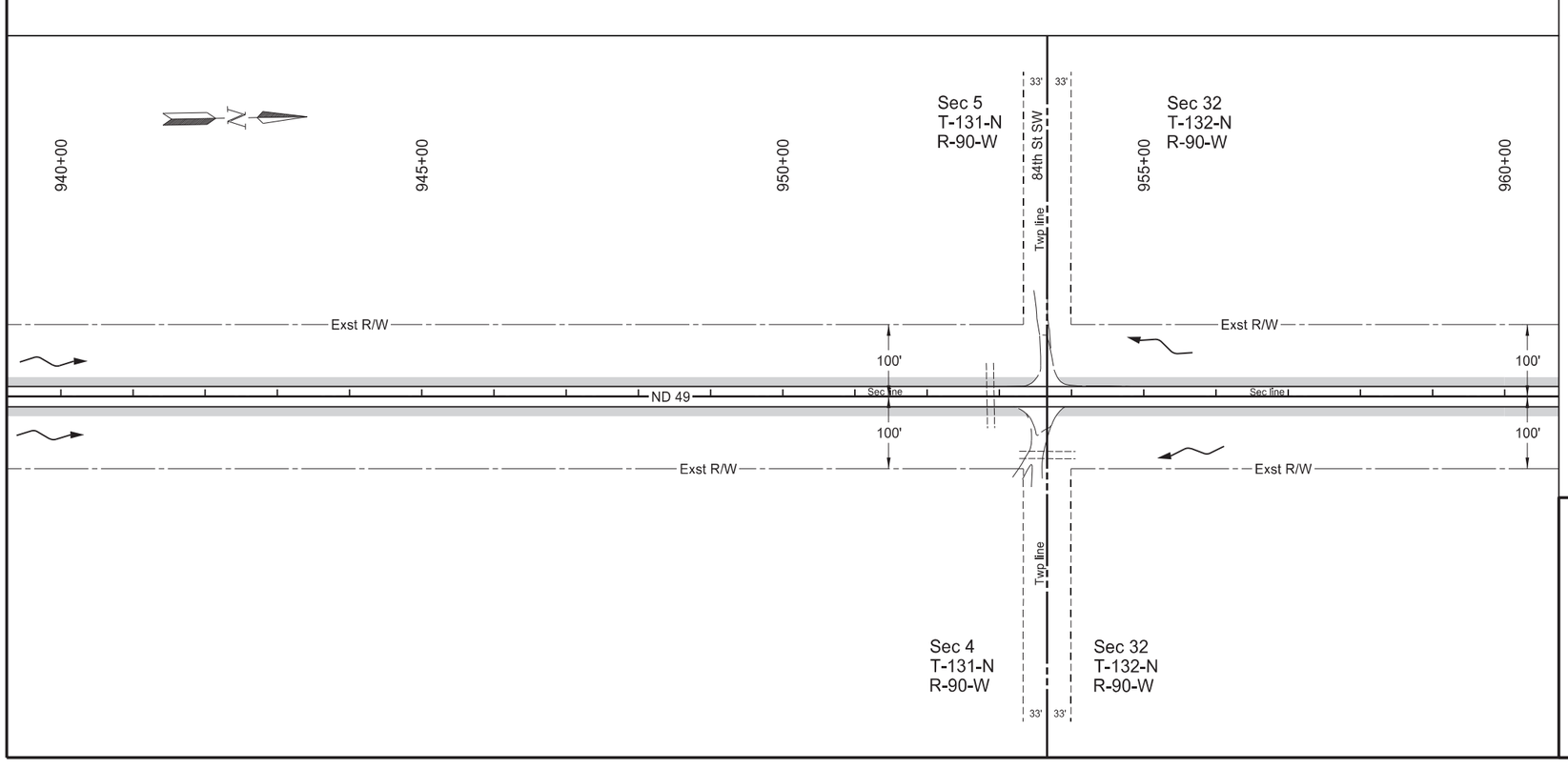
Permanent Erosion Control

Sta 880+00 to Sta 920+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:51:48 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	24

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

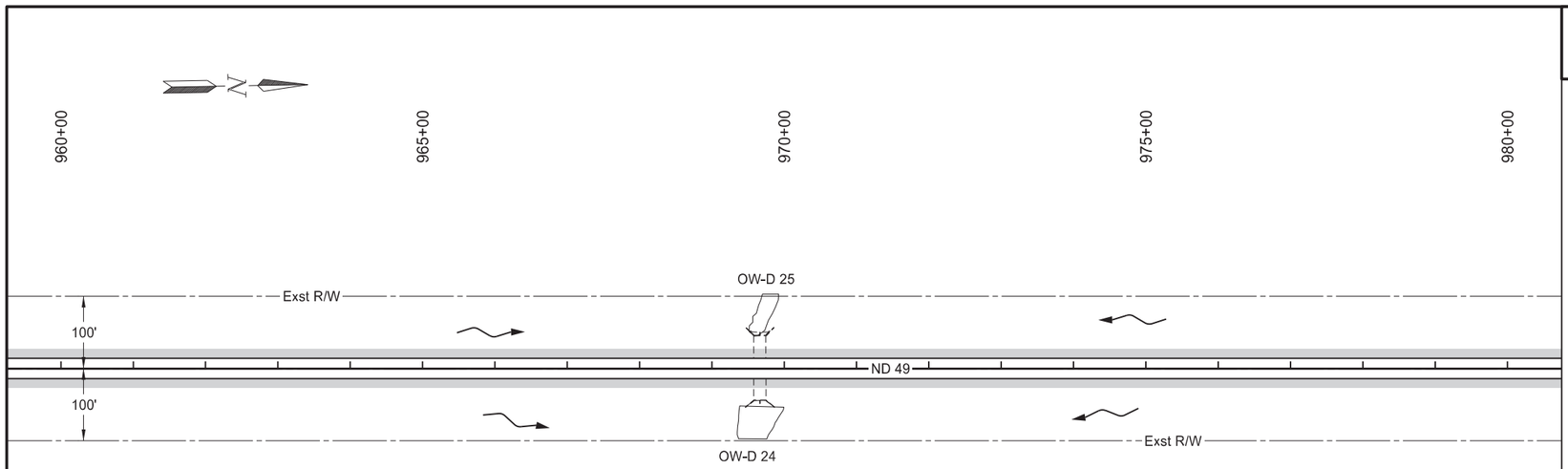
Permanent Erosion Control

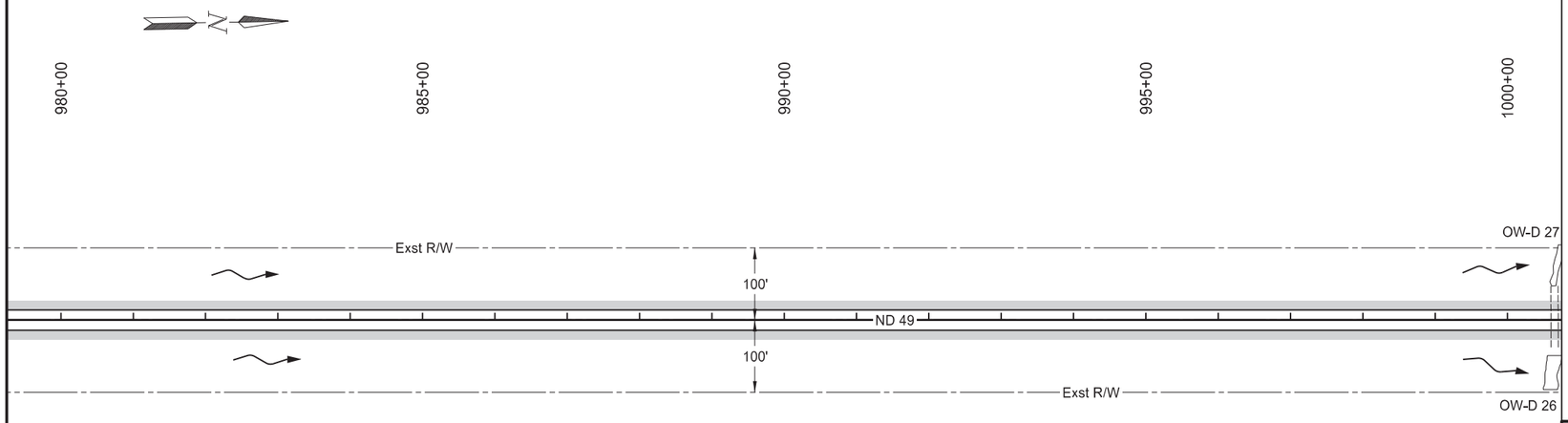
Sta 920+00 to Sta 960+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:52:17 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	25





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.39	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.39	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

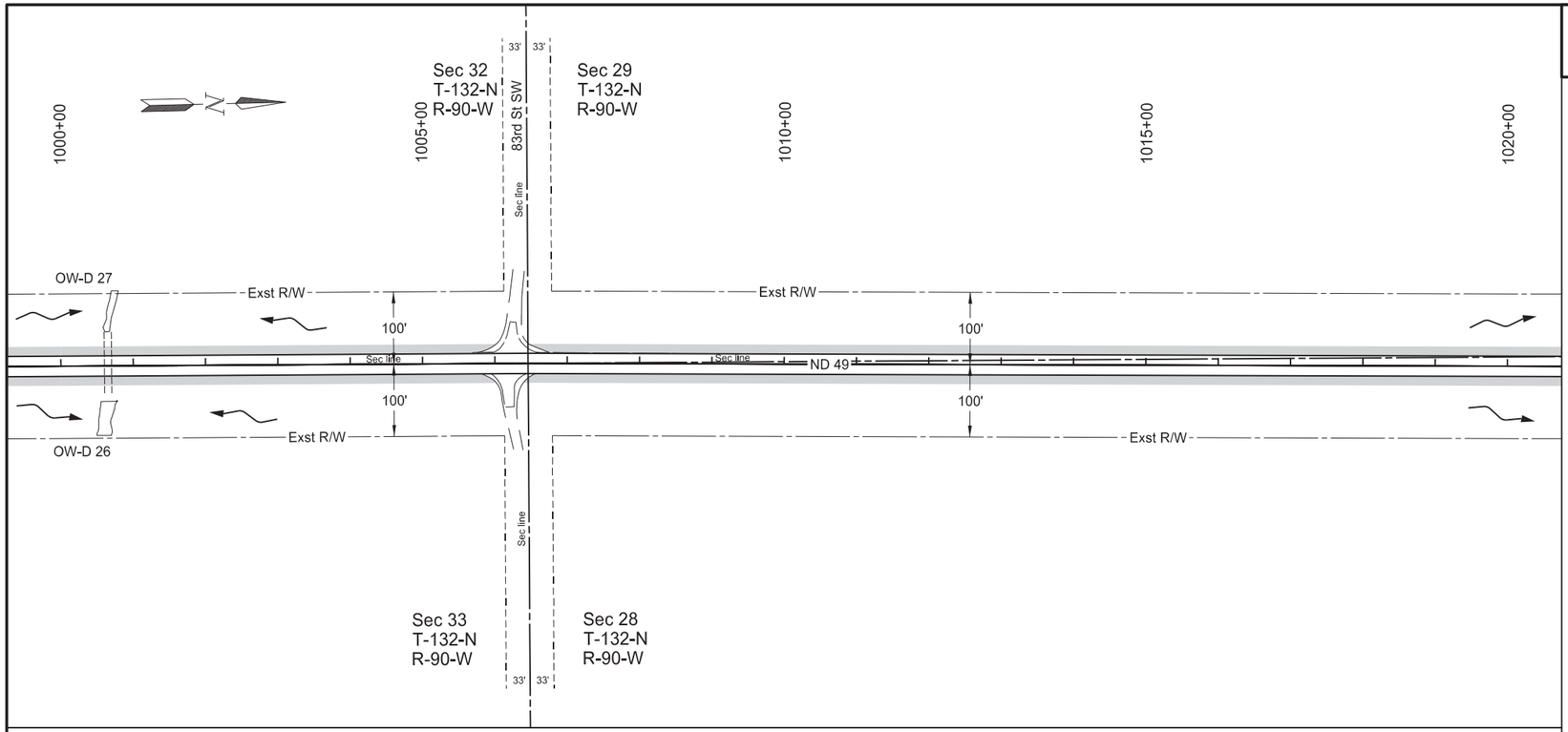
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

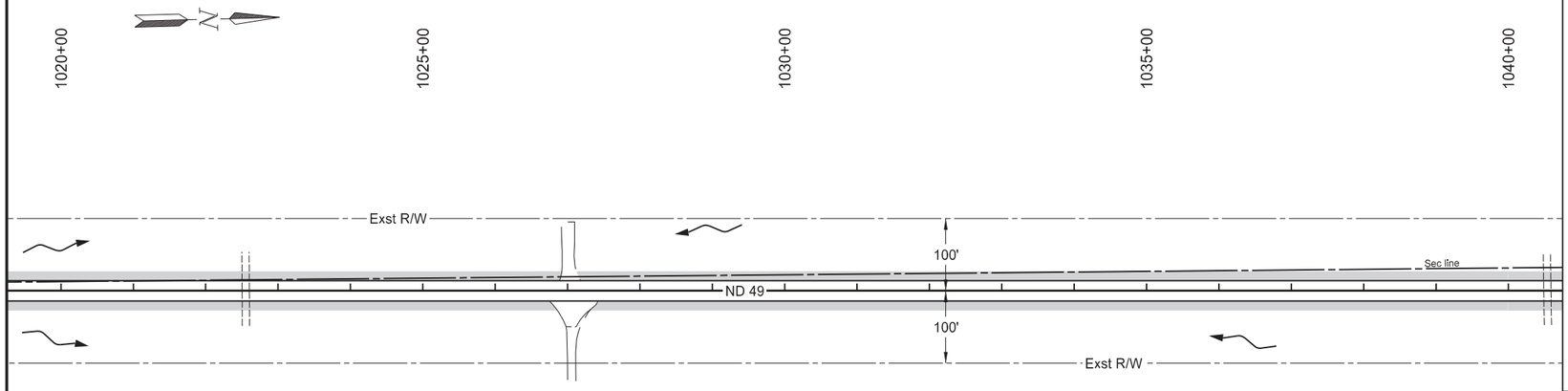
Permanent Erosion Control

Sta 960+00 to Sta 1000+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:52:49 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	26

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

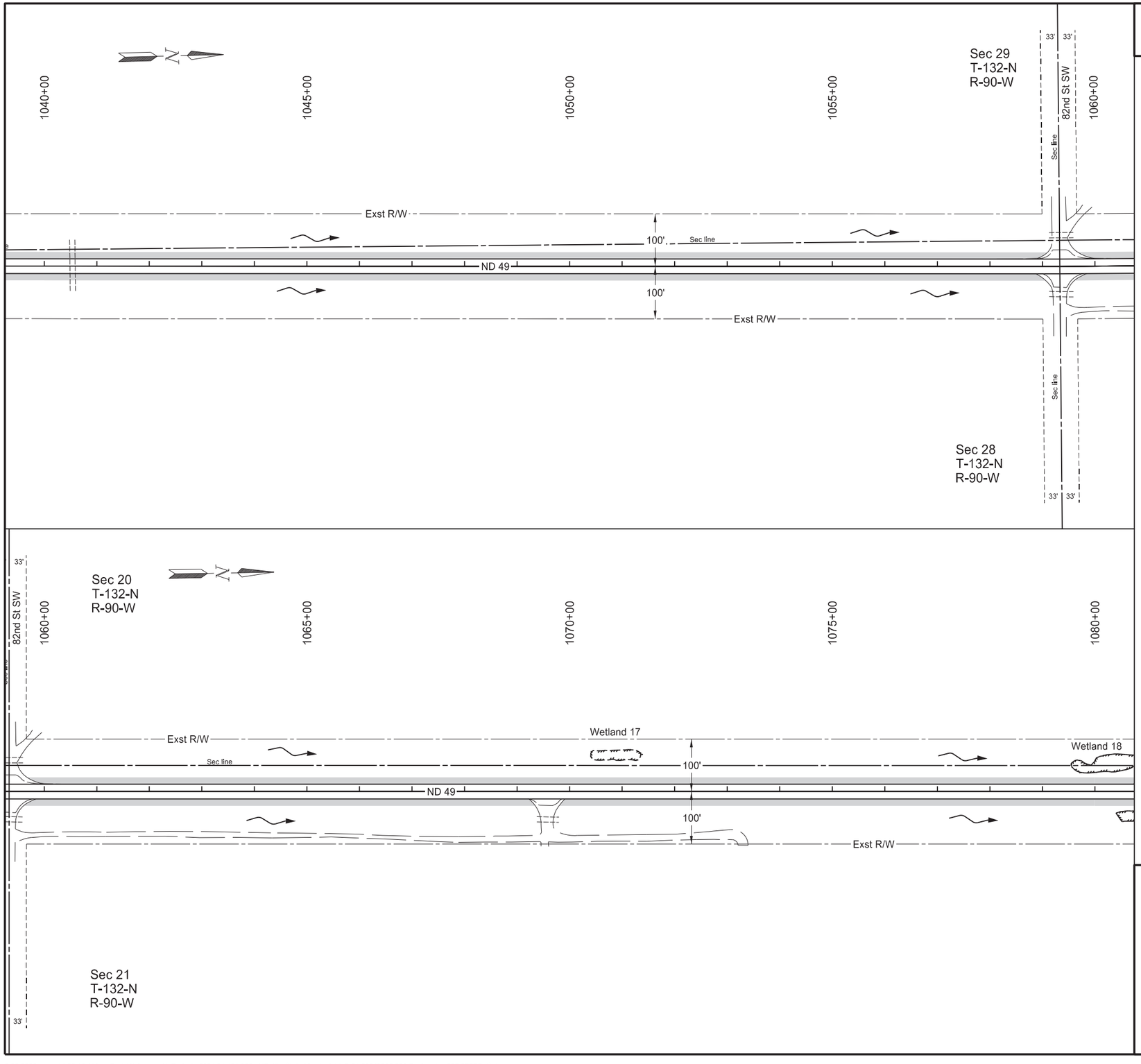
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1000+00 to Sta 1040+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:53:21 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	27

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (FIll)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

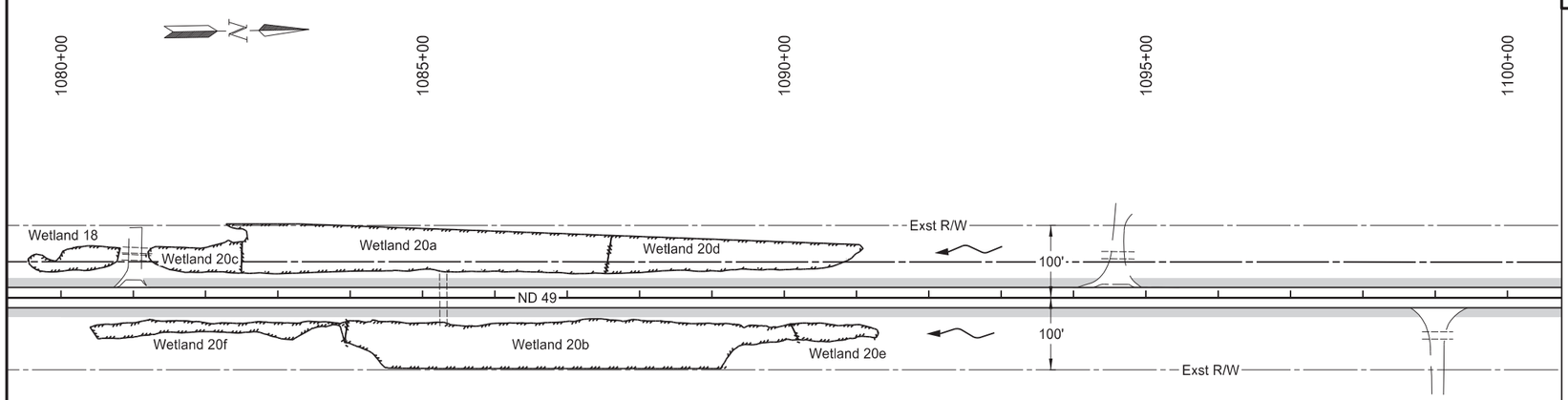
Permanent Erosion Control

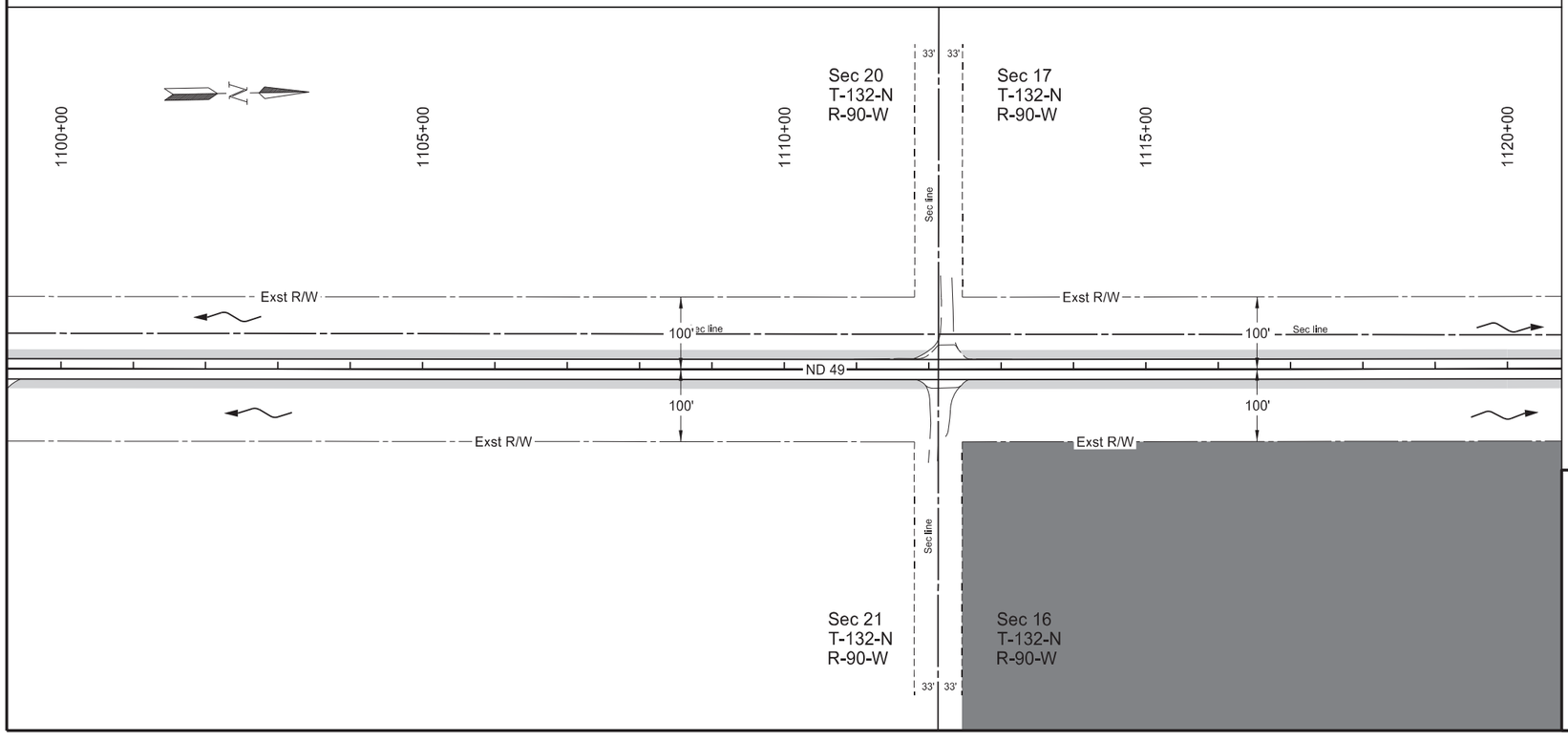
Sta 1040+00 to Sta 1080+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:54:01 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	28





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

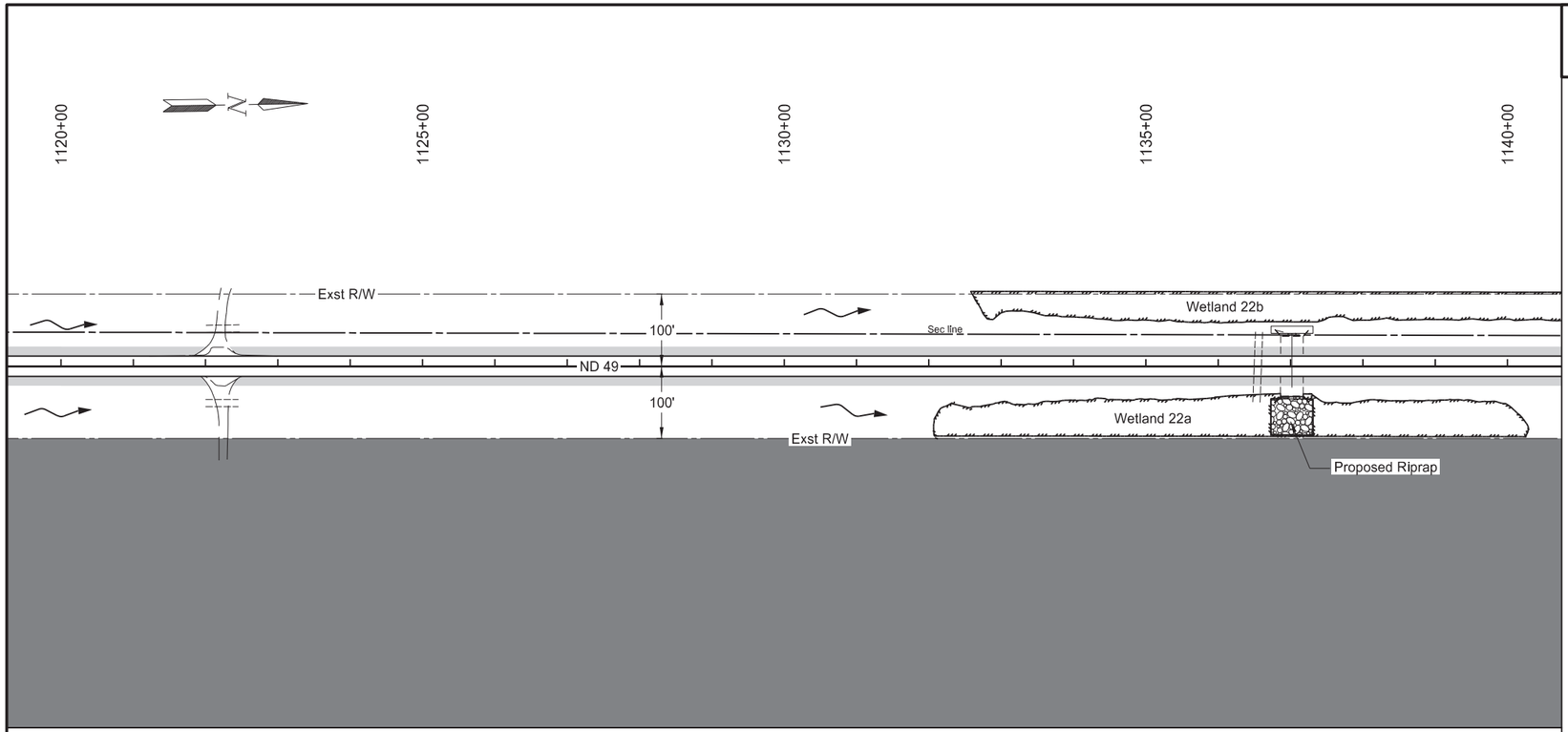
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

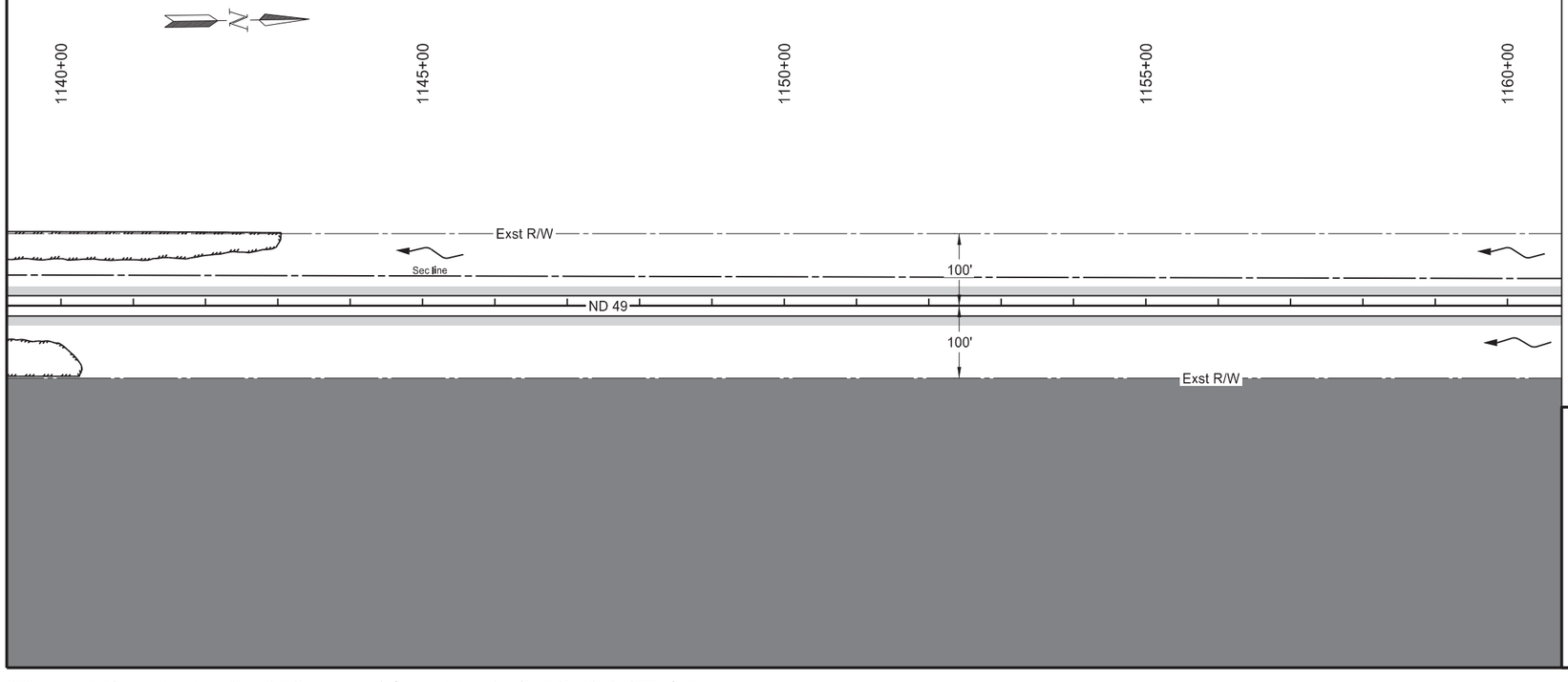
Permanent Erosion Control

Sta 1080+00 to Sta 1120+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:54:33 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	29

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.36	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.36	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

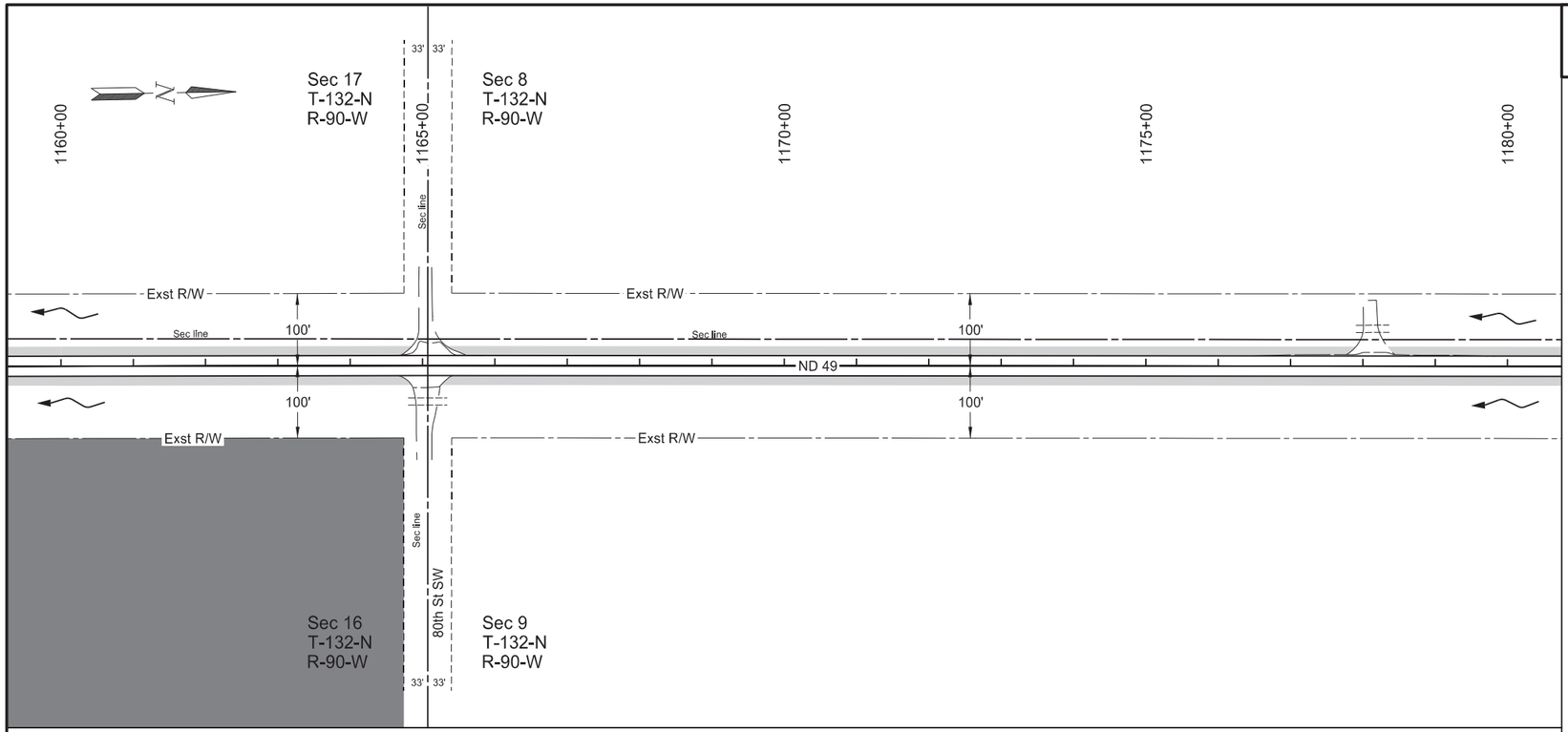
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

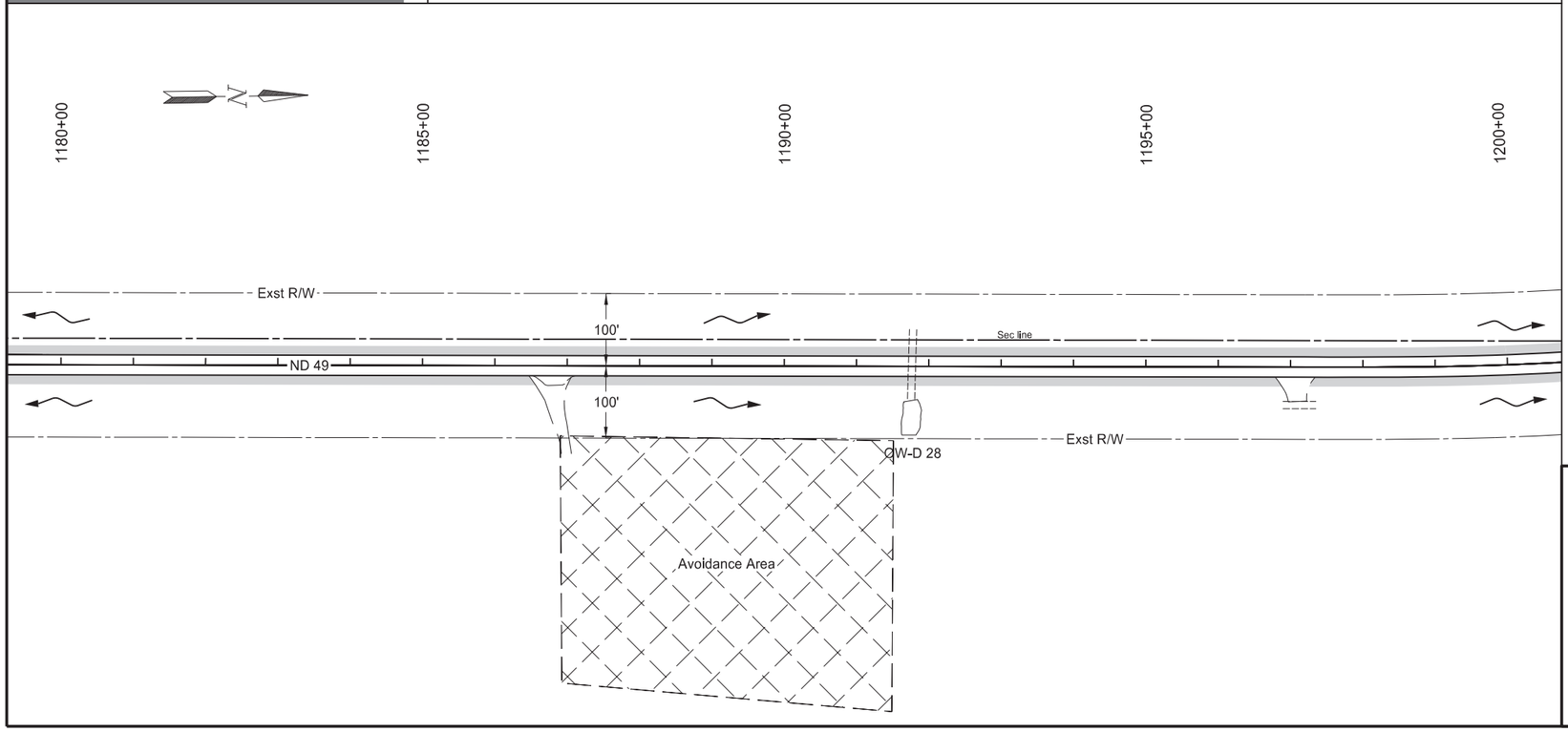
Permanent Erosion Control

Sta 1120+00 to Sta 1160+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:55:04 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	30

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.30	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.30	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

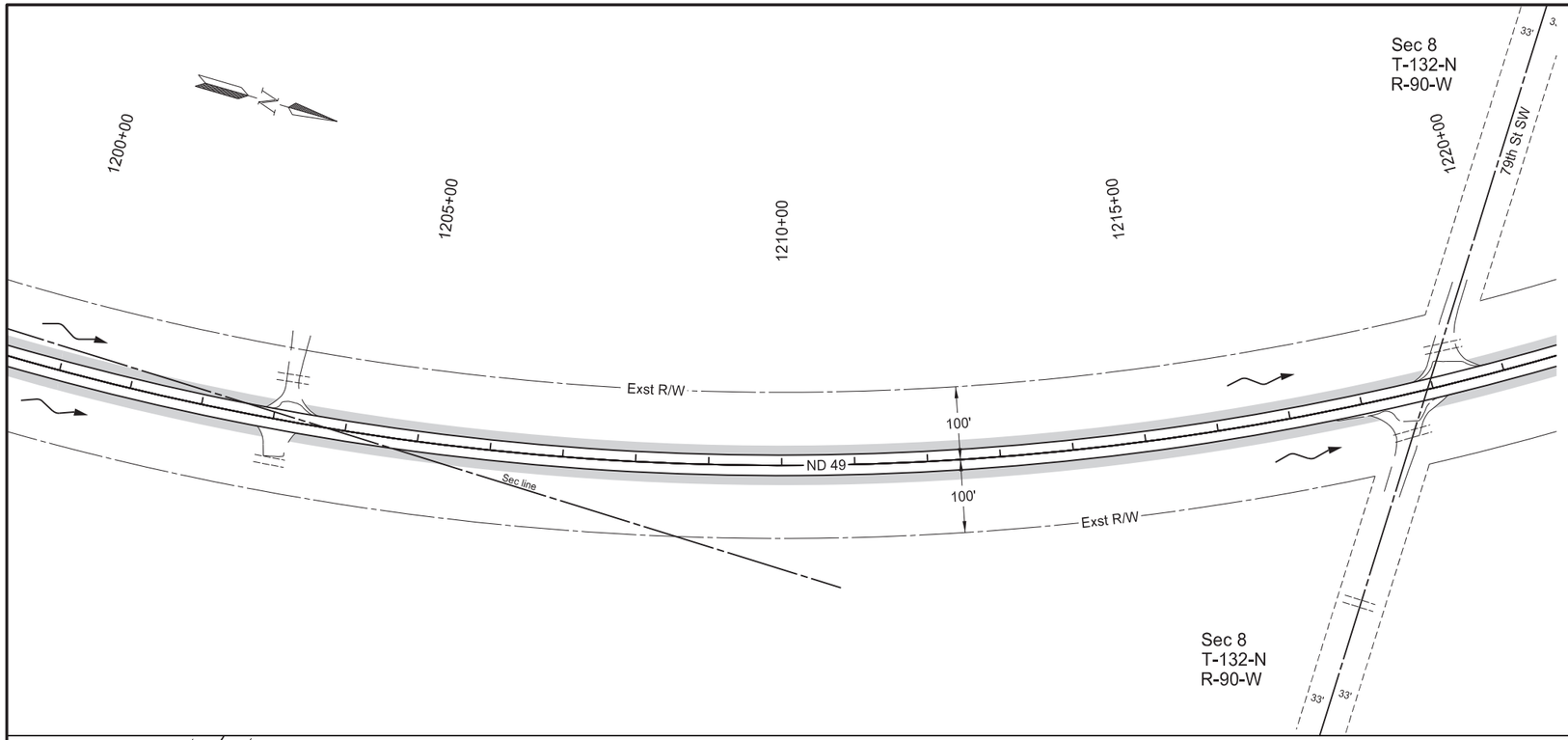
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

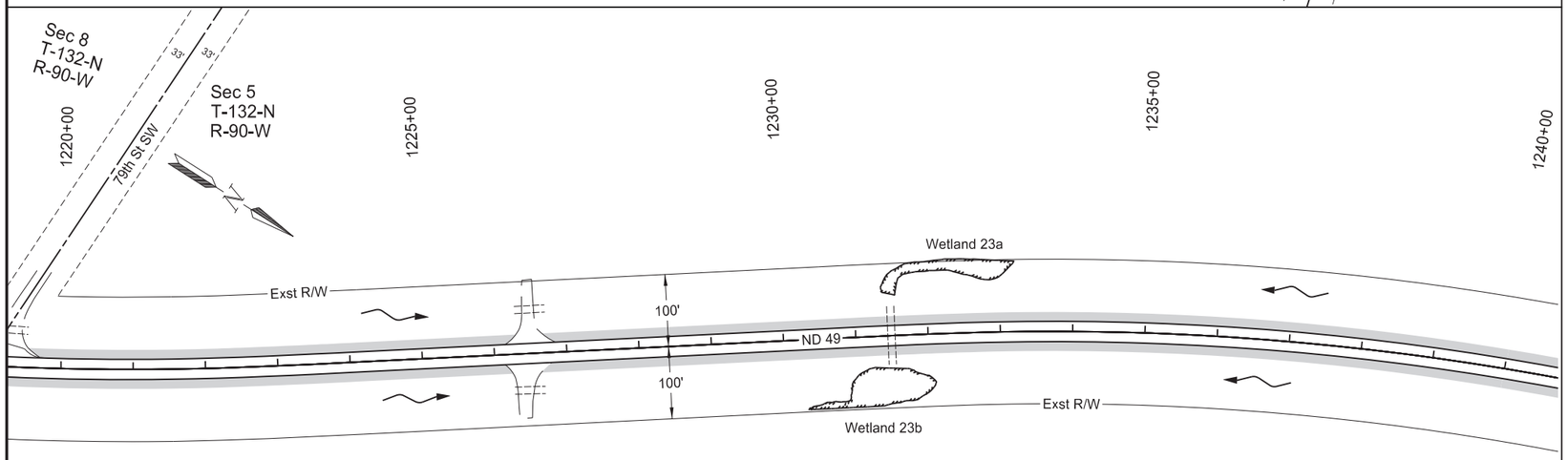
Permanent Erosion Control

Sta 1160+00 to Sta 1200+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:55:38 -05'00'
NORTH DAKOTA





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	31

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.28	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.28	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

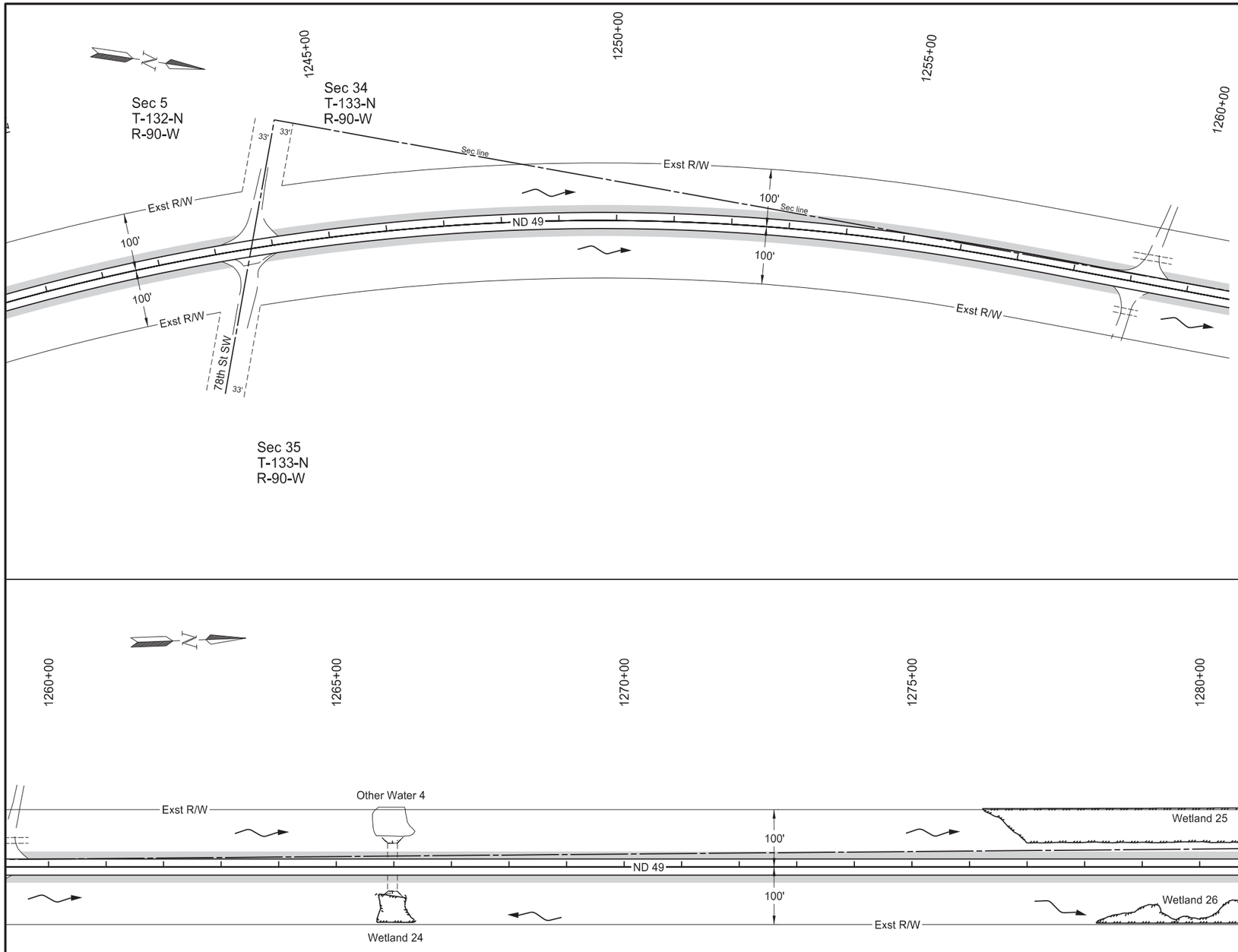
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1200+00 to Sta 1240+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:56:18 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	32

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

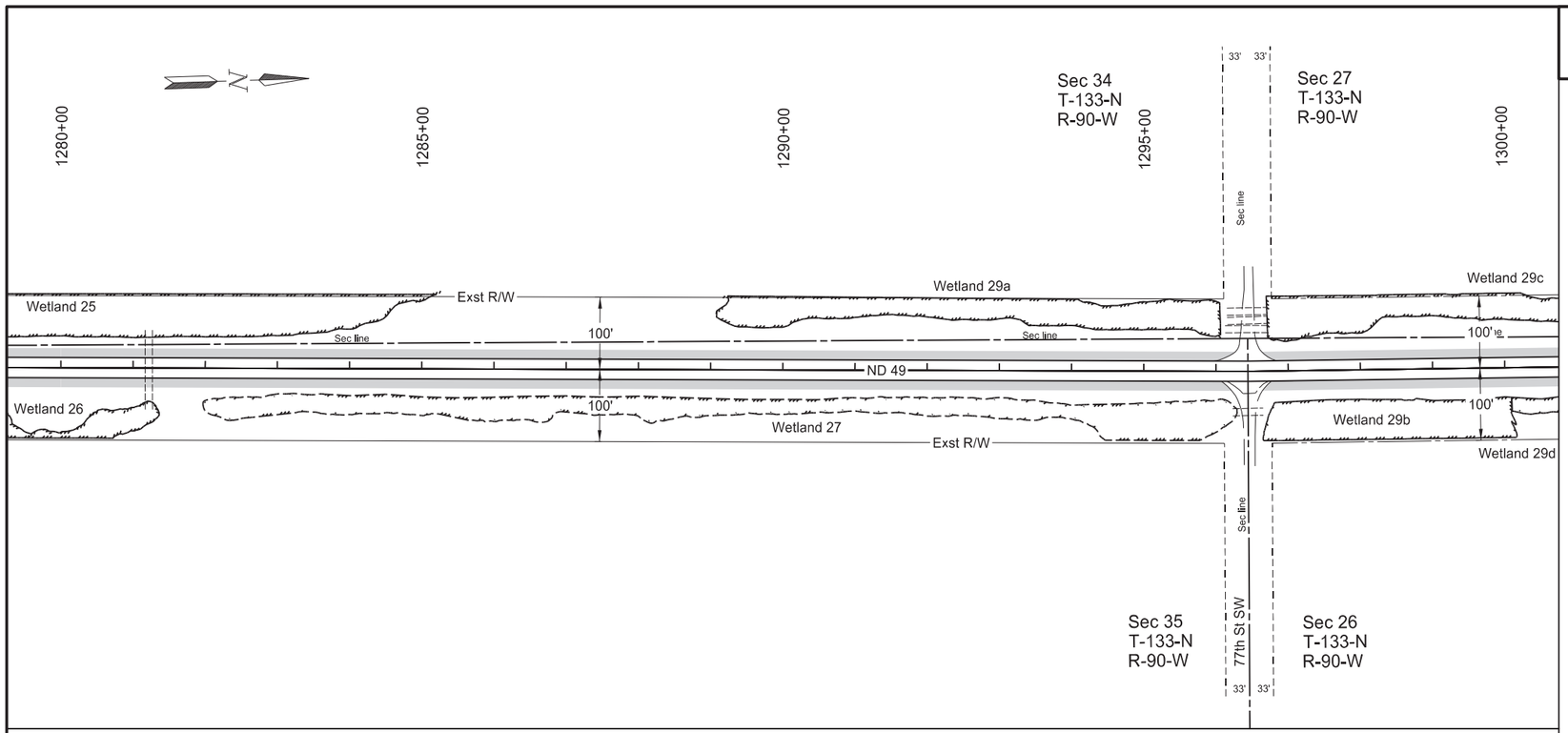
Permanent Erosion Control

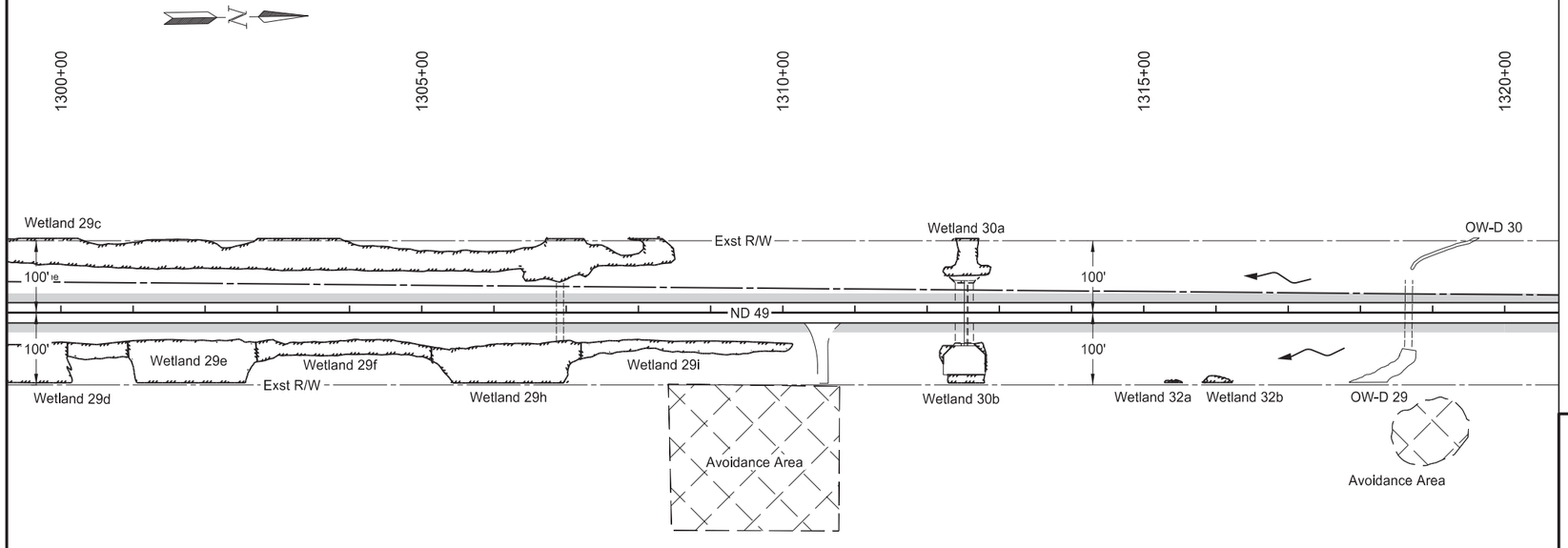
Sta 1240+00 to Sta 1280+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:56:49 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	33





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.34	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.34	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (FIll)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1280+00 to Sta 1320+00
(SCL49_G)

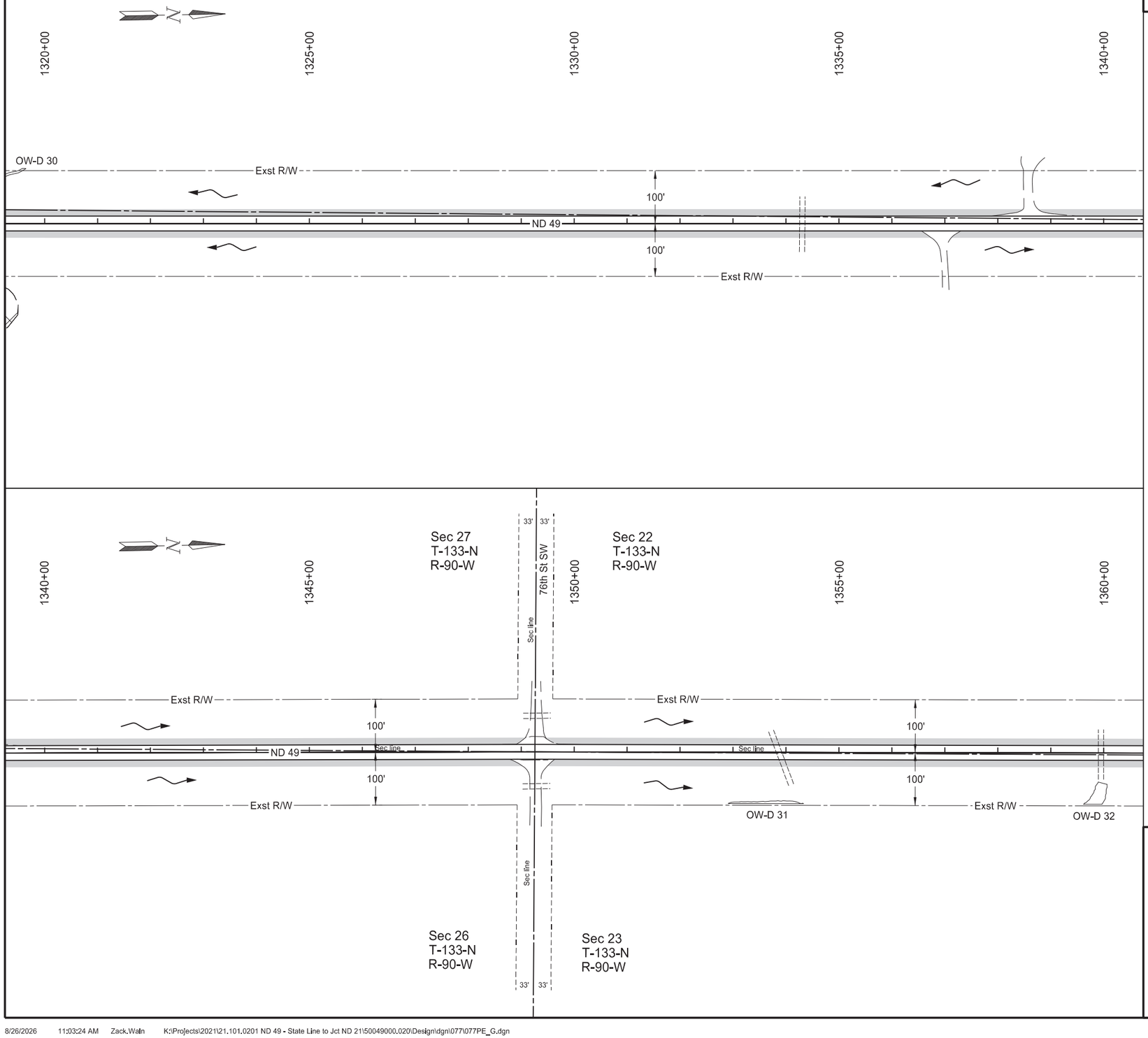
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:57:19 -05'00'
NORTH DAKOTA

8/26/2026 11:03:23 AM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\077\077PE_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	77	34

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.31	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.31	ACRE



Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

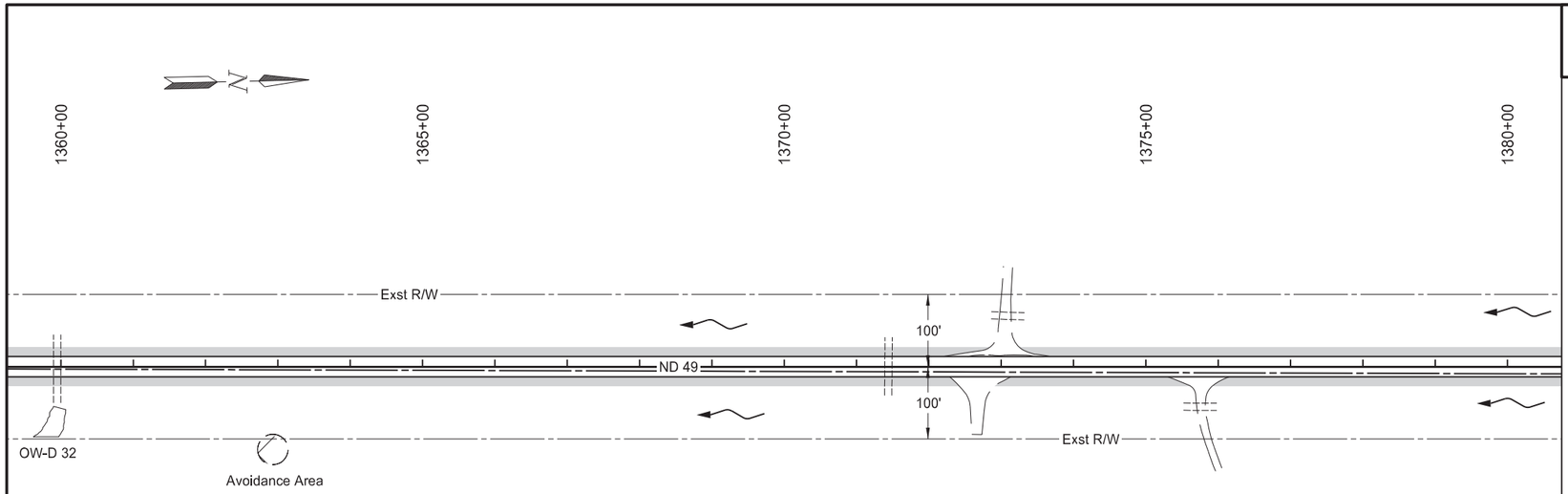
Permanent Erosion Control

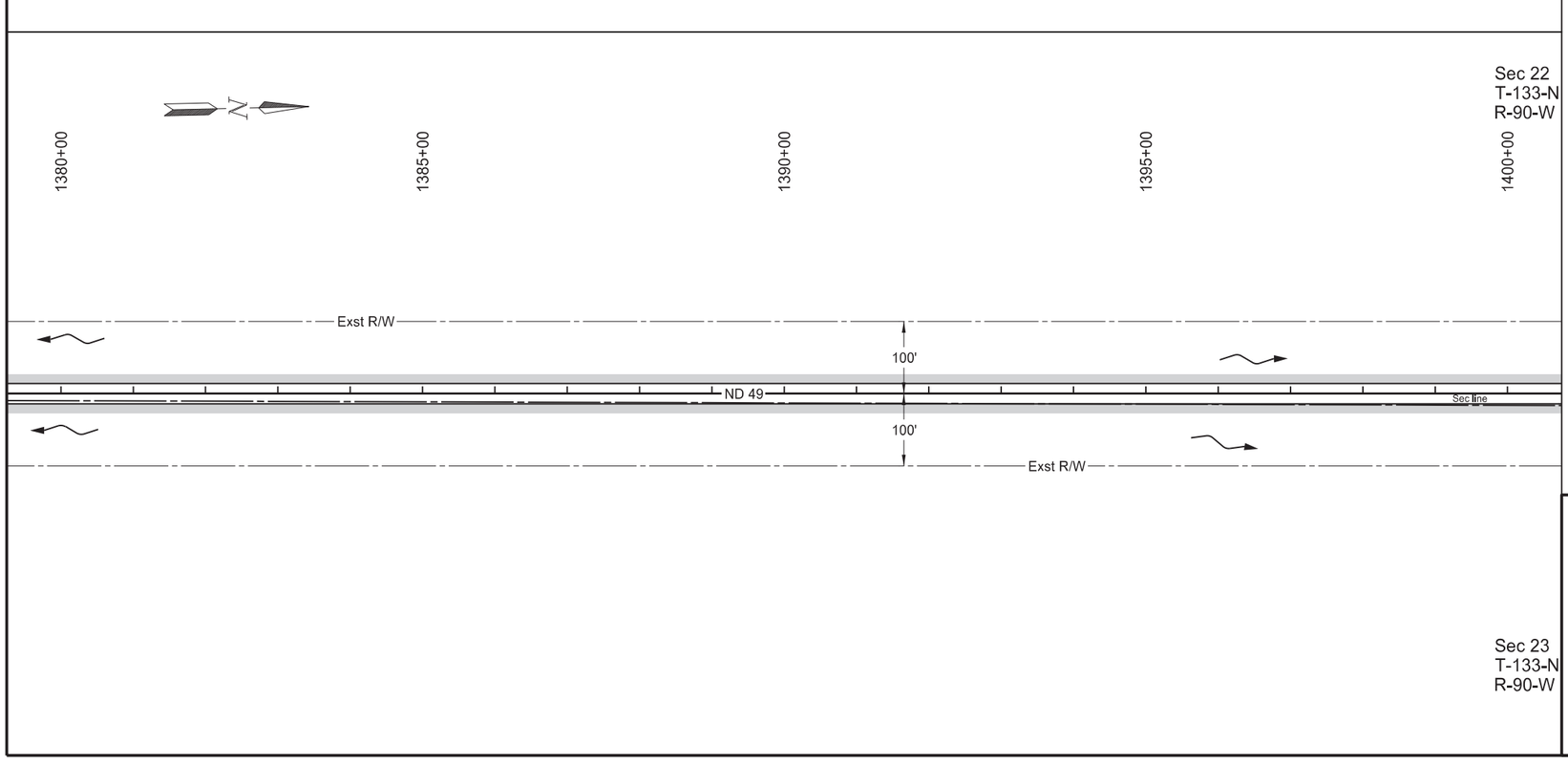
Sta 1320+00 to Sta 1360+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 08:57:56 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	35





SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

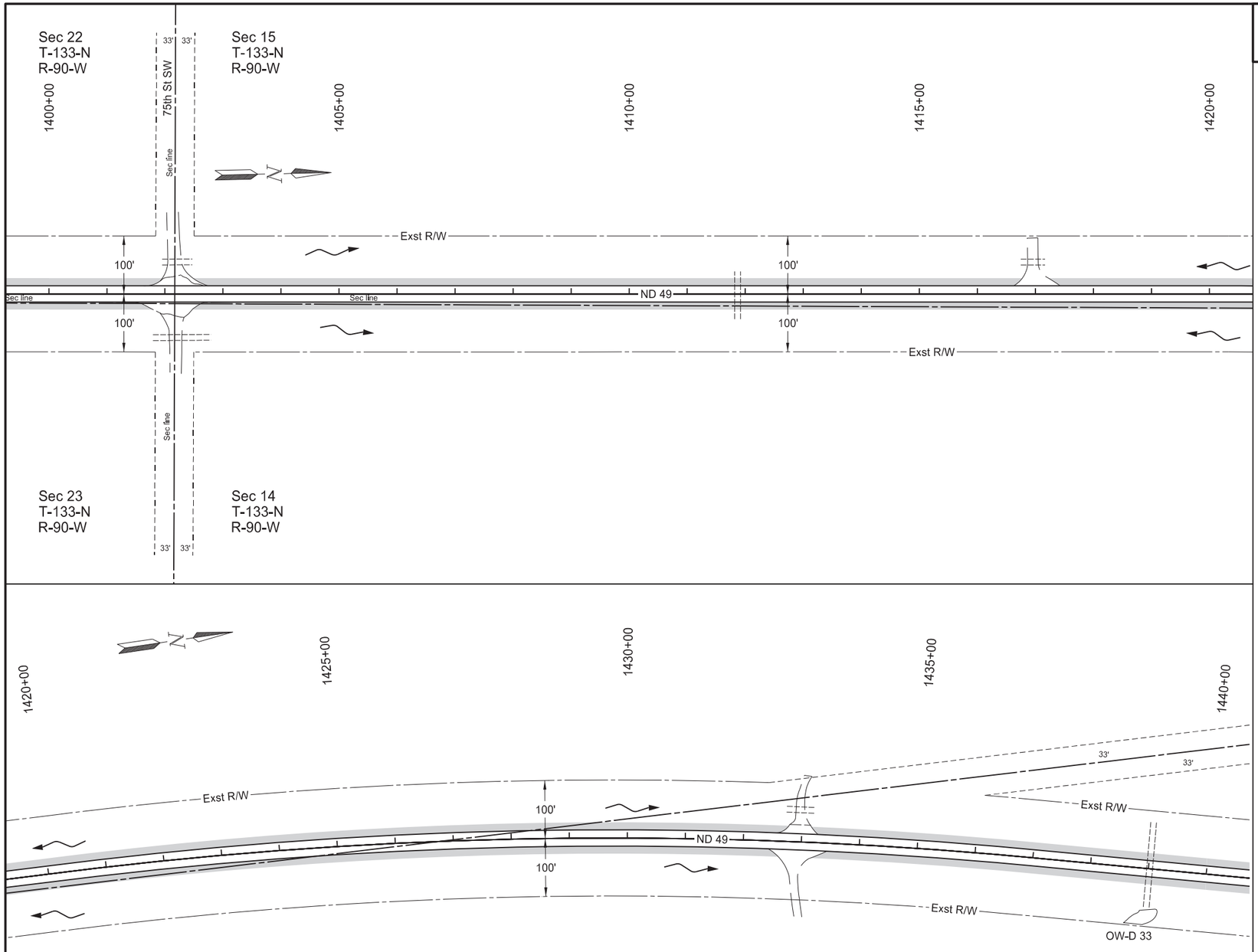
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1360+00 to Sta 1400+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:58:25 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	36

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.28	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.28	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

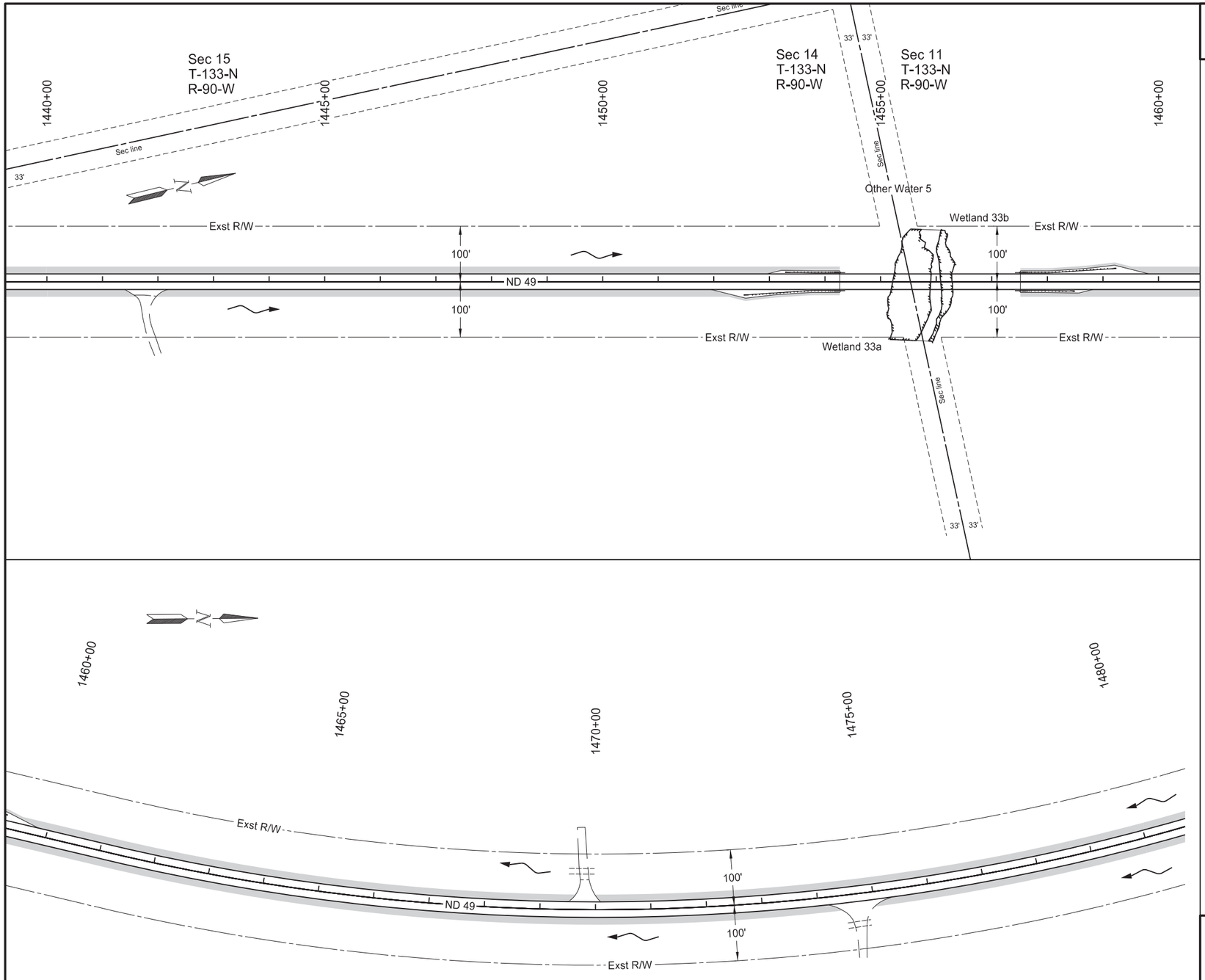
- Grading Tie Line (FIll)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1400+00 to Sta 1440+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:58:56 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	37

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.03	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.03	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

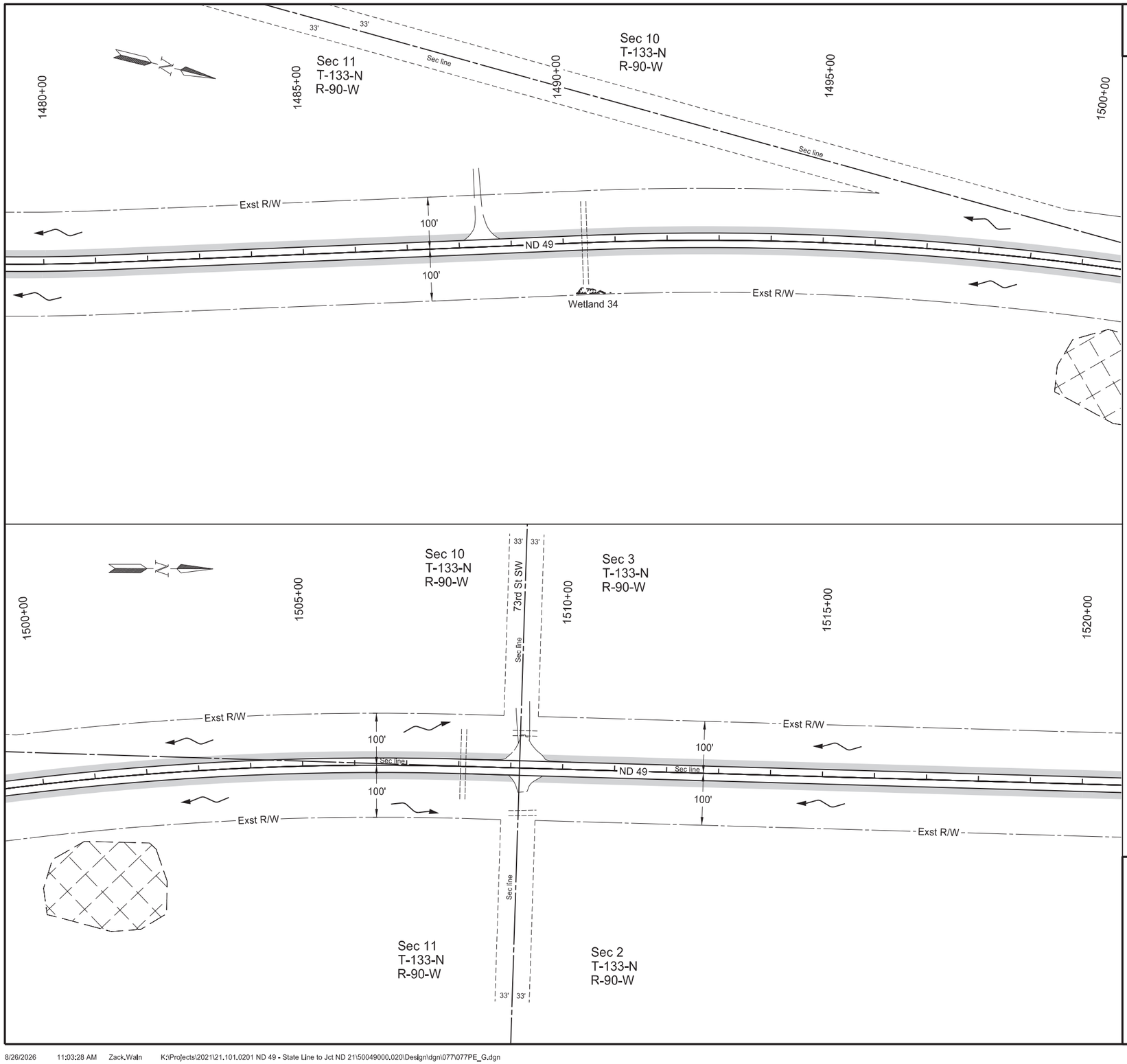
- Grading Tie Line (FIll)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1440+00 to Sta 1480+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 08:59:29 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	38

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.33	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.33	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

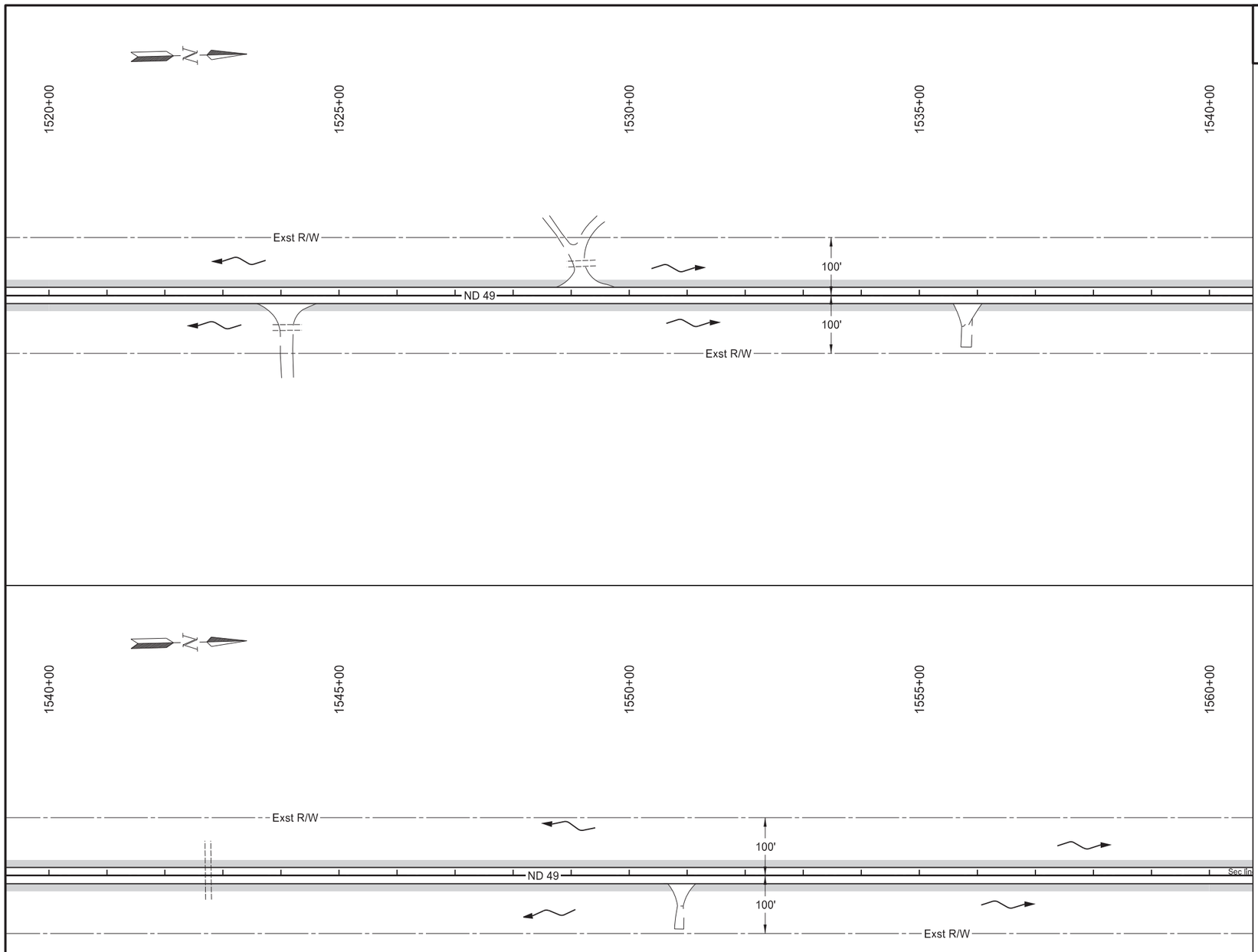
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1480+00 to Sta 1520+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 09:00:04 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	39

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	2.32	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	2.32	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

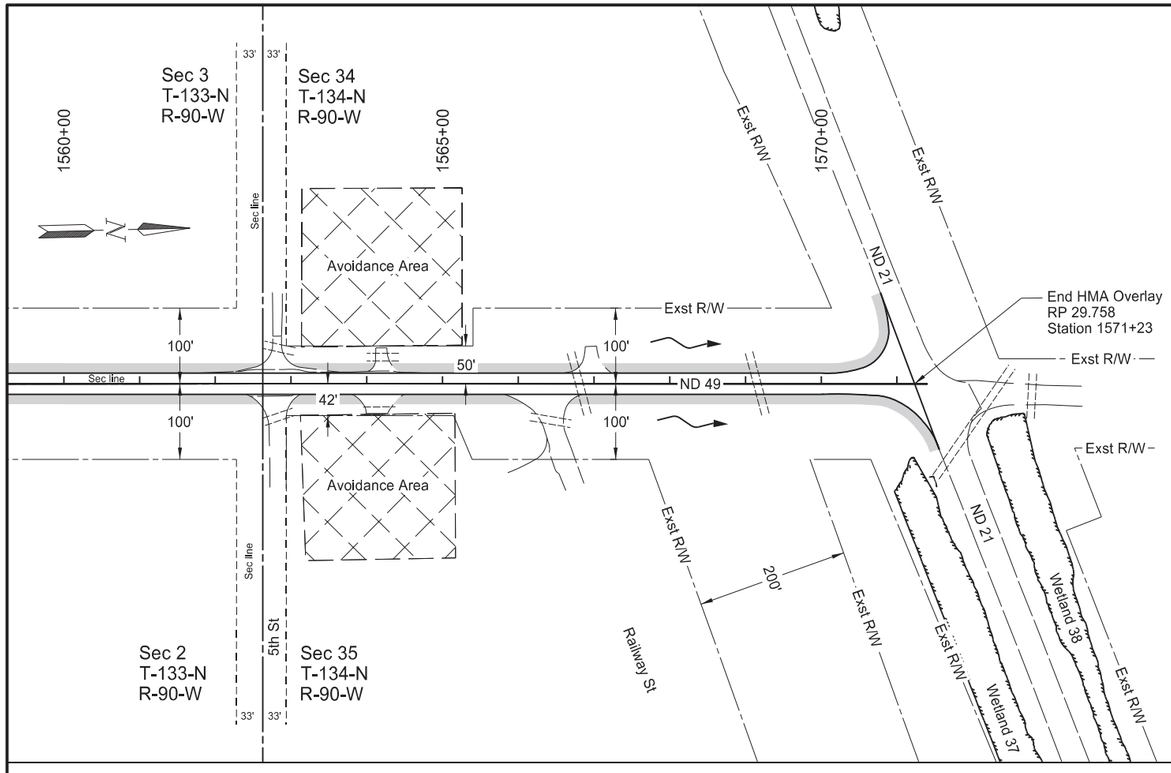
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1520+00 to Sta 1560+00
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:00:42 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	77	40

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sheet Quantity	0.60	ACRE
253	0061	SOIL STABILIZATION		
		Sheet Quantity	0.60	ACRE

Notes:
Refer to section 20 for information on erosion control blankets located at culvert end sections.

Refer to section 170 for information on riprap located at culvert end sections.

LEGEND

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Exst Delineated Wetland
- Seeding Class II / Soil Stabilization
- Edge of Water Line
- Erosion Control Blanket
- Flow Direction
- Pretty Rock National Wildlife Refuge
- Riprap

Permanent Erosion Control

Sta 1560+00 to Sta 1571+23
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 09:01:18 -05'00'
DATE
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 49 - State Line to Jct ND 21

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Begin ND 49 Chain (SCL49_S)			
Beg	0+00	104776.02	1597959.67
Rec Sec Cor	52+88.70	110063.72	1598062.66
Rec Sec Cor	105+75.04	115349.05	1598166.04
Rec Sec Cor	158+54.00	120626.99	1598269.48
PC	210+32.52	125804.53	1598370.97
PI - C2307	211+40.84	125912.82	1598373.10
PT	212+49.16	126021.06	1598377.27
PC	236+07.52	128377.68	1598468.05
PI - C8000	237+89.53	128559.56	1598475.06
PT	239+71.51	128741.56	1598476.29
PC	323+51.49	137121.33	1598535.53
PI - C8003	331+72.45	137942.27	1598541.28
PT	339+82.30	138731.79	1598316.29
TS	350+47.33	139756.04	1598024.40
SC	353+47.33	140045.58	1597945.97
PI - SCS8004	361+09.58	140777.61	1597733.28
CS	368+37.85	141525.28	1597881.94
ST	371+37.85	141820.52	1597935.07
PC	408+77.81	145492.37	1598645.52
PI - C2096	413+80.46	145985.87	1598741.01
PT	418+80.54	146488.45	1598749.11
End	424+50.86	147058.70	1598758.30

CURVE DATA

ARC DEFINITION

CURVE C2307			CURVE SCS8004		
PI	=	211+40.84	PI	=	361+09.58
Delta	=	01°04'59" (RT)	Delta	=	26°51'25" (Rt)
Da	=	00°30'00"	Da	=	01°30'00"
R	=	11459.19'	R	=	3819.83'
T	=	108.32'	L	=	1490.52'
L	=	216.63'	Ls	=	300.00'
			Sc	=	02°15'00"
CURVE C8000			Ts	=	1062.25'
PI	=	237+89.53			
Delta	=	01°49'12" (LT)	CURVE C2096		
Da	=	00°30'00"	PI	=	413+80.46
R	=	11459.19'	Delta	=	10°01'38" (LT)
T	=	182.01'	Da	=	01°00'00"
L	=	363.99'	R	=	5729.65'
			T	=	502.65'
CURVE C8003			L	=	1002.73'
PI	=	331+72.45			
Delta	=	16°18'28" (LT)			
Da	=	01°00'00"			
R	=	5729.65'			
T	=	820.95'			
L	=	1630.81'			

US PUBLIC LAND SURVEY DATA

CORNER		IRN	NORTHING	EASTING
T-129-N R-90-W				
SW Cor	Sec 33	5-N	104776.02	1597959.67
NW Cor	Sec 33	5-L	110063.72	1598062.66
SW Cor	Sec 21	5-J	115349.05	1598166.04
NW Cor	Sec 21	5-G	120626.99	1598269.48
SW Cor	Sec 9	5-E	125912.82	1598373.10
T-130-N R-90-W				
SE Cor	Sec 29	5-L	141795.91	1598660.26

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	MONUMENT DESCRIPTION
GPS 5	131164.12	1598592.12	2490.52	263+94.79	100' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 5"
GPS 9	152332.10	1598946.80	2411.39	Off Chain	Off Chain	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 9"
RTK 40000	117111.81	1598297.96	2545.63	123+40.04	97' Rt	# 5 Rebar
RTK 40001	141830.13	1597835.81	2330.21	371+28.43	99' Lt	# 5 Rebar

NOTES: Sheet 1 of 3

Date Survey Completed 04/08/22

☐ Assumed Coordinates

☒ All coordinates on this sheet are Sioux County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9999065

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88

☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

GREGG ORVIK
REGISTERED LAND SURVEYOR
LS. -3881
2024.06.12 11:10:11 -05'00'
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 49 - State Line to Jct ND 21

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	81	2

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Begin ND 49 Chain (SCL49_G)			
Begin	389+00.00	143557.04	1598341.74
PC	408+77.92	145498.95	1598717.48
PI - C2096	413+80.57	145992.44	1598812.96
PT	418+80.66	146495.03	1598821.06
Rec Sec Cor	424+51.02	147065.32	1598830.26
Rec Sec Cor	477+44.70	152358.31	1598915.70
PC	528+88.32	157501.18	1599003.45
PI - C1702	530+40.58	157653.42	1599006.05
PT	531+92.82	157805.67	1599004.60
PC	553+69.11	159981.86	1598983.90
PI - C9028	556+72.42	160285.16	1598981.02
PT	559+75.60	160588.19	1598994.18
PC	581+57.97	162768.51	1599088.90
PI - C1703	583+26.54	162936.92	1599096.21
PT	584+95.08	163105.47	1599098.57
Rec Sec Cor	636+09.96	168219.85	1599170.15
Rec Sec Cor	688+99.65	173508.60	1599269.53
Rec Sec Cor	741+81.30	178789.33	1599368.54
Rec Sec Cor	794+73.16	184080.25	1599467.59
Rec Sec Cor	847+64.85	189371.02	1599566.62
PC	890+58.24	193662.50	1599694.72
PI - C9032	894+58.42	194062.50	1599706.66
PT	898+57.30	194460.27	1599662.88
PC	904+62.43	195061.78	1599596.68
PI - C9033	910+48.17	195644.00	1599532.61
PT	916+29.86	196227.15	1599587.66
PC	925+20.04	197113.39	1599671.34
PI - C9034	929+56.80	197548.21	1599712.39
PT	933+93.13	197984.90	1599720.23
Rec Sec Cor	953+66.19	199957.64	1599755.63
Rec Sec Cor	1006+45.99	205236.58	1599850.50
PI	1059+33.11	210521.77	1599993.79

Chain description continued on sheet 3

NOTES: Sheet 2 of 3

CURVE DATA

ARC DEFINITION			
CURVE C2096		CURVE C9032	
PI =	413+80.57	PI =	894+58.42
Delta =	10° 01' 38" Lt	Delta =	07° 59' 25" Lt
Da =	01° 00' 00"	Da =	01° 00' 00"
R =	5729.65'	R =	5729.65'
T =	502.65'	T =	400.18'
L =	1002.74'	L =	799.06'
CURVE C1702		CURVE C9033	
PI =	530+40.58	PI =	910+48.17
Delta =	01° 31' 21" Lt	Delta =	11° 40' 27" Rt
Da =	00° 30' 00"	Da =	01° 00' 00"
R =	11459.19'	R =	5729.65'
T =	152.26'	T =	585.74'
L =	304.50'	L =	1167.43'
CURVE C9028		CURVE C9034	
PI =	556+72.42	PI =	929+56.80
Delta =	03° 01' 57" Rt	Delta =	04° 21' 56" Lt
Da =	00° 30' 00"	Da =	00° 30' 00"
R =	11459.19'	R =	11459.19'
T =	303.31'	T =	436.75'
L =	606.48'	L =	873.09'
CURVE C1703			
PI =	583+26.54		
Delta =	01° 41' 08" Lt		
Da =	00° 30' 00"		
R =	11459.19'		
T =	168.57'		
L =	337.11'		

Date Survey Completed 04/08/22

US PUBLIC LAND SURVEY DATA

CORNER		IRN	NORTHING	EASTING
T-133-N R-90-W				
NW Cor	Sec 2	9-A	260211.37	1599097.58
NW Cor	Sec 11	9-C	254867.32	1598964.39
SW Cor	Sec 11	9-E	249616.77	1598816.67
W Qtr Cor	Sec 14	9-F	246976.30	1598745.27
NW Cor	Sec 23	9-G	244336.03	1598673.92
NW Cor	Sec 26	9-J	239046.91	1598536.03
SW Cor	Sec 35	9-N	228512.30	1598248.90
T-132-N R-90-W				
NW Cor	Sec 16	5-E	221095.08	1600133.68
NW Cor	Sec 21	5-G	215801.86	1600038.57
E Qtr Cor	Sec 20	5-H	213162.19	1599991.08
NW Cor	Sec 33	5-L	205236.58	1599850.50
T-131-N R-90-W				
NW Cor	Sec 4	5-A	199957.64	1599755.53
NW Cor	Sec 9	5-C	194653.45	1599659.56
W Qtr Cor	Sec 9	5-D	192009.77	1599612.94
NW Cor	Sec 16	5-E	189371.02	1599566.62
NE Cor	Sec 20	5-G	184080.25	1599467.59
NW Cor	Sec 28	5-J	178789.33	1599368.54
NW Cor	Sec 33	5-L	173508.60	1599269.53
T-130-N R-90-W				
NW Cor	Sec 4	5-A	168219.85	1599170.15
NW Cor	Sec 9	5-C	162936.99	1599096.21
W Qtr Cor	Sec 9	5-D	160296.01	1599051.22
NW Cor	Sec 16	5-E	157653.42	1599006.05
NW Cor	Sec 21	5-G	152358.31	1598915.70
SW Cor	Sec 21	5-J	147065.32	1598830.26

☐ Assumed Coordinates

☒ All coordinates on this sheet are Grant County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998615

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	MONUMENT DESCRIPTION
GPS 9	152338.96	1599018.76	2411.39	477+27.01	103' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 9"
GPS 14	181923.53	1599526.43	2507.39	773+17.91	99' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 14"
GPS 19	205276.83	1599949.75	2500.02	1006+88.91	98' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 19"
GPS 22	223314.44	1600312.91	2457.33	1187+29.49	102' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 22"
GPS 25	238999.35	1598634.58	2367.70	1348+80.18	99' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 25"
GPS 28	256325.37	1599099.63	2367.50	1523+78.01	99' Rt	# 5 Rebar w/ 1.5" Alum Cap Stamped "GPS 28"
40001 RTK	141836.51	1597907.72	2330.21	371+28.35	1774' Lt	# 5 Rebar
40003 RTK	168204.69	1599063.22	2346.01	635+93.31	10t' Lt	# 5 Rebar
40007 RTK	189385.93	1599476.87	2524.16	847+77.08	90' Lt	# 5 Rebar
40010 RTK	260753.58	1599204.16	2326.07	1568+07.46	93' Lt	# 5 Rebar

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88

☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

GREGG ORVIK
REGISTERED LAND SURVEYOR
LS. -3881
2024.06.12 11:10:50 -05'00'
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 49 - State Line to Jct ND 21

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	81	3

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Chain (SCL49_G) description continued from Sheet 2			
PI	1112+13.32	215801.14	1600087.42
PI	1165+07.23	221094.40	1600170.50
TS	1197+20.10	224306.73	1600229.15
SC	1199+80.10	224566.71	1600230.95
PI - SCS9041	1211+10.03	225696.43	1600254.53
CS	1221+53.66	226615.09	1599596.58
ST	1224+13.66	226828.55	1599448.16
TS	1230+53.26	227349.51	1599077.11
SC	1233+13.26	227562.97	1598928.69
PI - SCS1726	1244+80.85	228512.30	1598248.89
CS	1255+54.57	229679.07	1598293.77
ST	1258+14.57	229938.98	1598300.16
PI	1296+44.63	233766.57	1598437.69
Rec Sec Cor	1349+25.89	239046.91	1598536.03
PI	1402+16.53	244336.16	1598657.20
PC	1420+33.07	246152.23	1598698.61
PI - C9045	1428+64.66	246983.60	1598717.57
PT	1436+89.73	247791.43	1598914.97
PC	1461+18.13	250150.43	1599491.39
PI - C9046	1471+42.12	251145.15	1599734.46
PT	1481+19.06	252128.06	1599447.37
PC	1490+38.06	253010.21	1599189.72
PI - C9047	1499+30.46	253866.82	1598939.53
PT	1508+08.63	254758.93	1598961.70
PI	1509+17.04	254867.32	1598964.39
Rec Sec Cor	1562+62.75	260211.37	1599097.58
Station Equation ND 49 (SCL49_G) and ND 21 (SCL21)			
End	1571+40.39	261088.73	1599119.55
ND 21	3679+10.40	261088.73	1599119.55

CURVE DATA

ARC DEFINITION

CURVE SCS9041		CURVE C9046	
PI =	1211+10.03	PI =	1471+42.12
Delta =	36° 30' 25" Lt	Delta =	30° 00' 47" Lt
Da =	01° 30' 00"	Da =	01° 30' 00"
R =	3819.83'	R =	3819.83'
L =	2173.57'	T =	1023.98'
Ls =	260.00'	L =	2000.92'
Sc =	01° 57' 00"		
Ts =	1389.93	CURVE C9047	
		PI =	1499+30.46
CURVE SCS1726		Delta =	17° 42' 20" Rt
PI =	1244+80.85	Da =	01° 00' 00"
Delta =	37° 31' 08" Rt	R =	5729.65'
Da =	01° 30' 00"	T =	892.39'
R =	3819.83'	L =	1770.56'
L =	2241.31'		
Ls =	260.00'		
Sc =	01° 57' 00"		
Ts =	1427.59'		
CURVE C9045			
PI =	1428+64.66		
Delta =	12° 25' 30" Rt		
Da =	00° 45' 00"		
R =	7639.49'		
T =	831.59'		
L =	1656.66'		

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Begin ND 21 (SCL21)			
Begin	3667+62.91	260697.19	1598040.92
Station Equation ND 49 (SCL49) and ND 21 (SCL21)			
ND 21	3679+10.40	261088.73	1599119.55
ND 49	1571+40.39	261088.73	1599119.55
End	3702+54.43	261887.72	1601323.21

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	MONUMENT DESCRIPTION

NOTES: Sheet 3 of 3

Date Survey Completed 04/08/22

☐ Assumed Coordinates

☒ All coordinates on this sheet are Grant County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998615

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

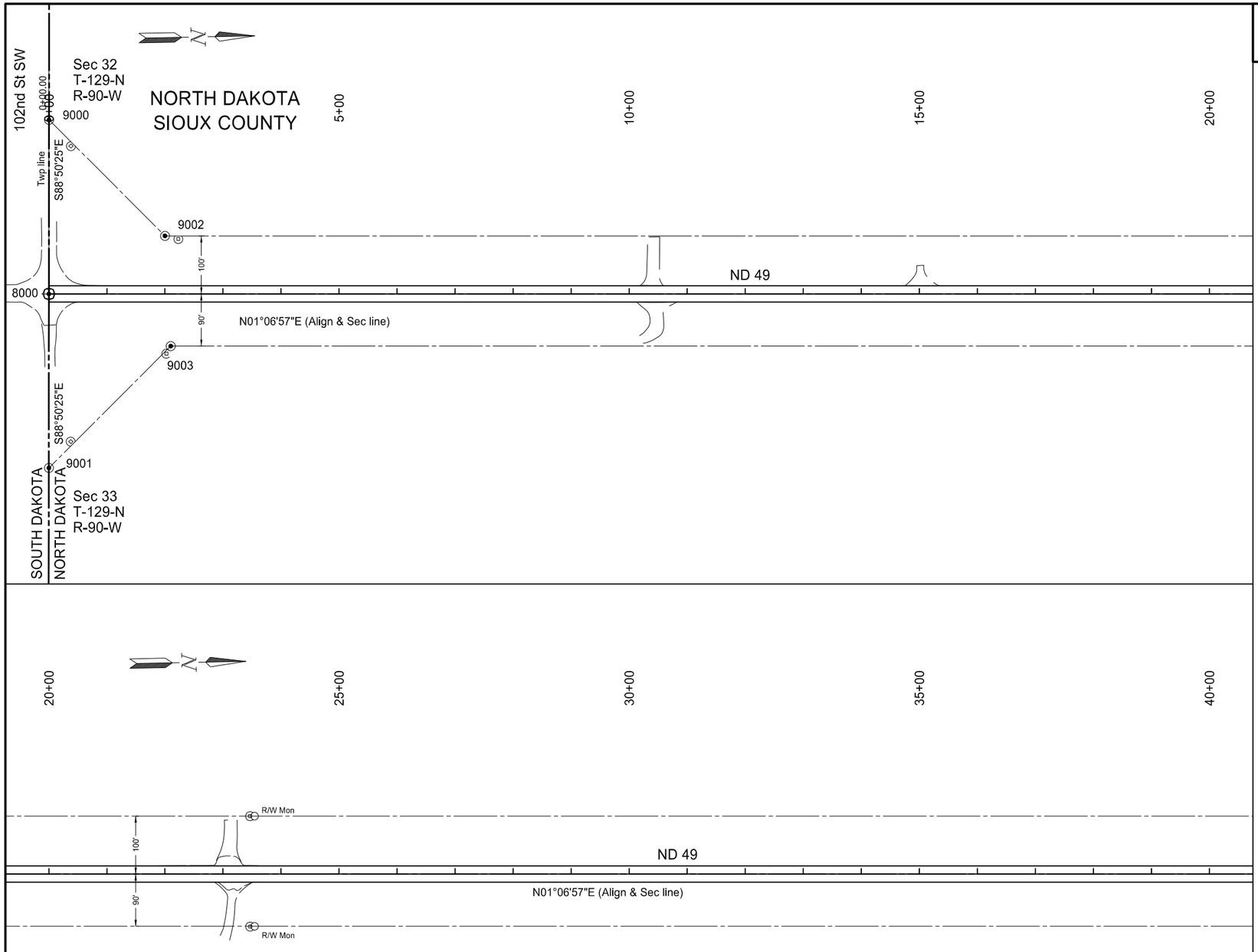
☒ NAVD-88

☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

GREGG ORVIK
REGISTERED LAND SURVEYOR
LS. -3881
2024.06.12 11:11:19 -05'00'
NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	1

POINT	NORTHING	EASTING	STATION	OFFSET
8000	104776.024	1597959.67	0+00.00	0.00
9000	104782.097	1597659.731	0+00.23	-300.00
9001	104770.182	1598259.613	0+00.00	300.00
9002	104978.01	1597863.585	2+00.08	-100.00
9003	104984.232	1598053.742	2+10.00	90.00

Notes:
1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

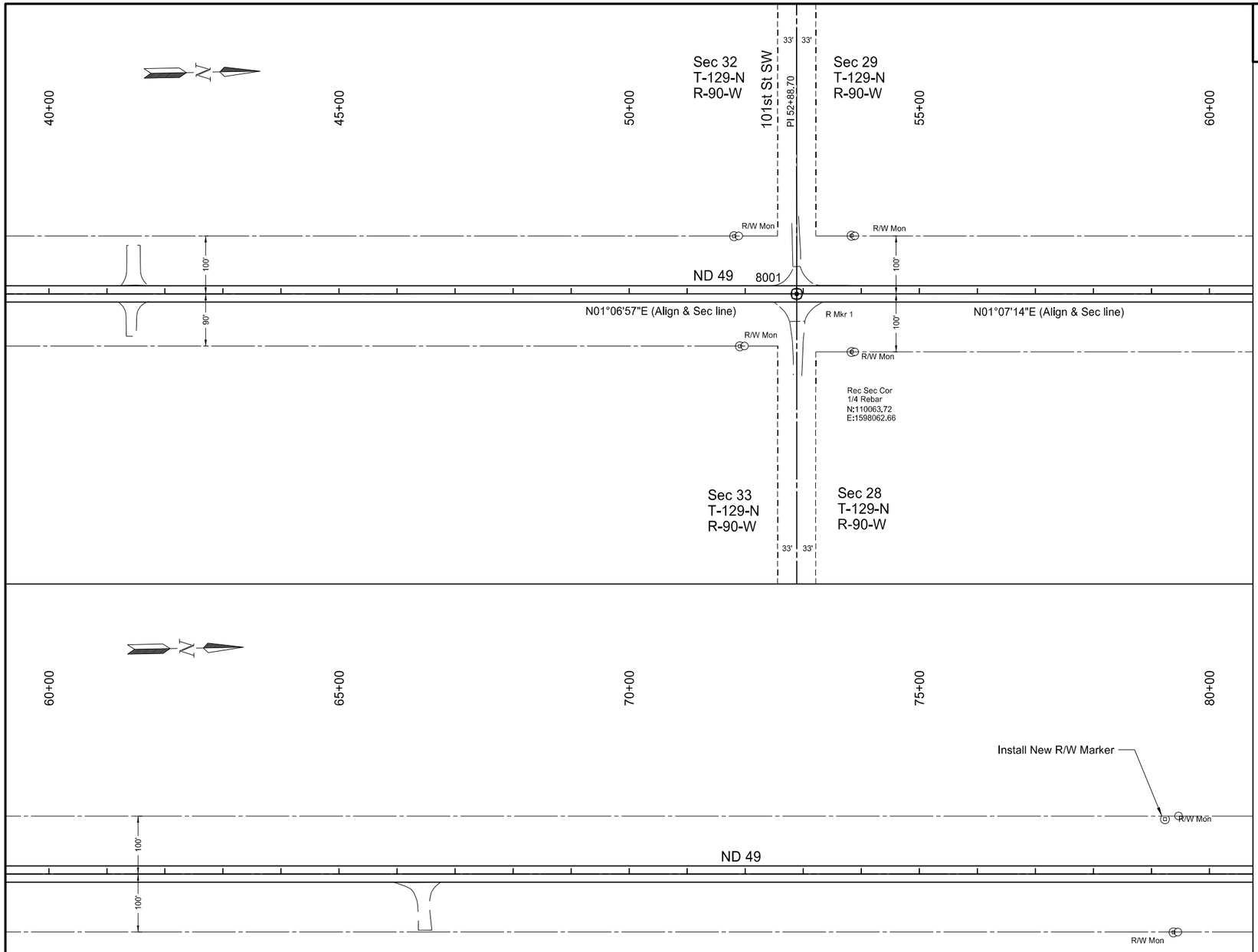
Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 0+00 to Sta 40+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:52:03 -05'00'
NORTH DAKOTA

8/26/2026 10:26:56 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	2

POINT	NORTHING	EASTING	STATION	OFFSET
8001	110063.718	1598062.656	52+88.70	0.00

Notes:
1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

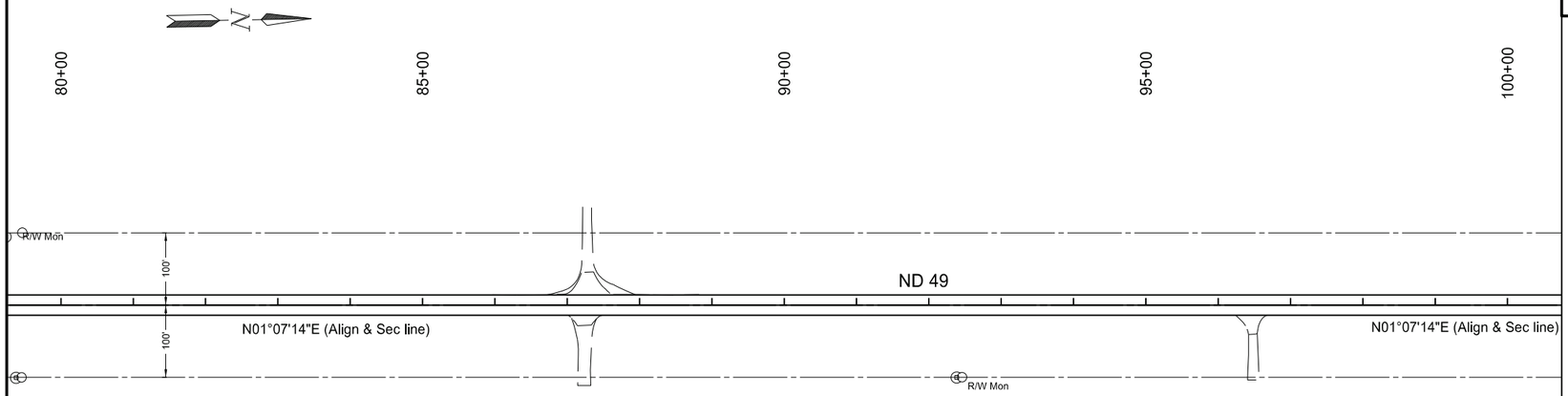
Sta 40+00 to Sta 80+00
(SCL49_S)

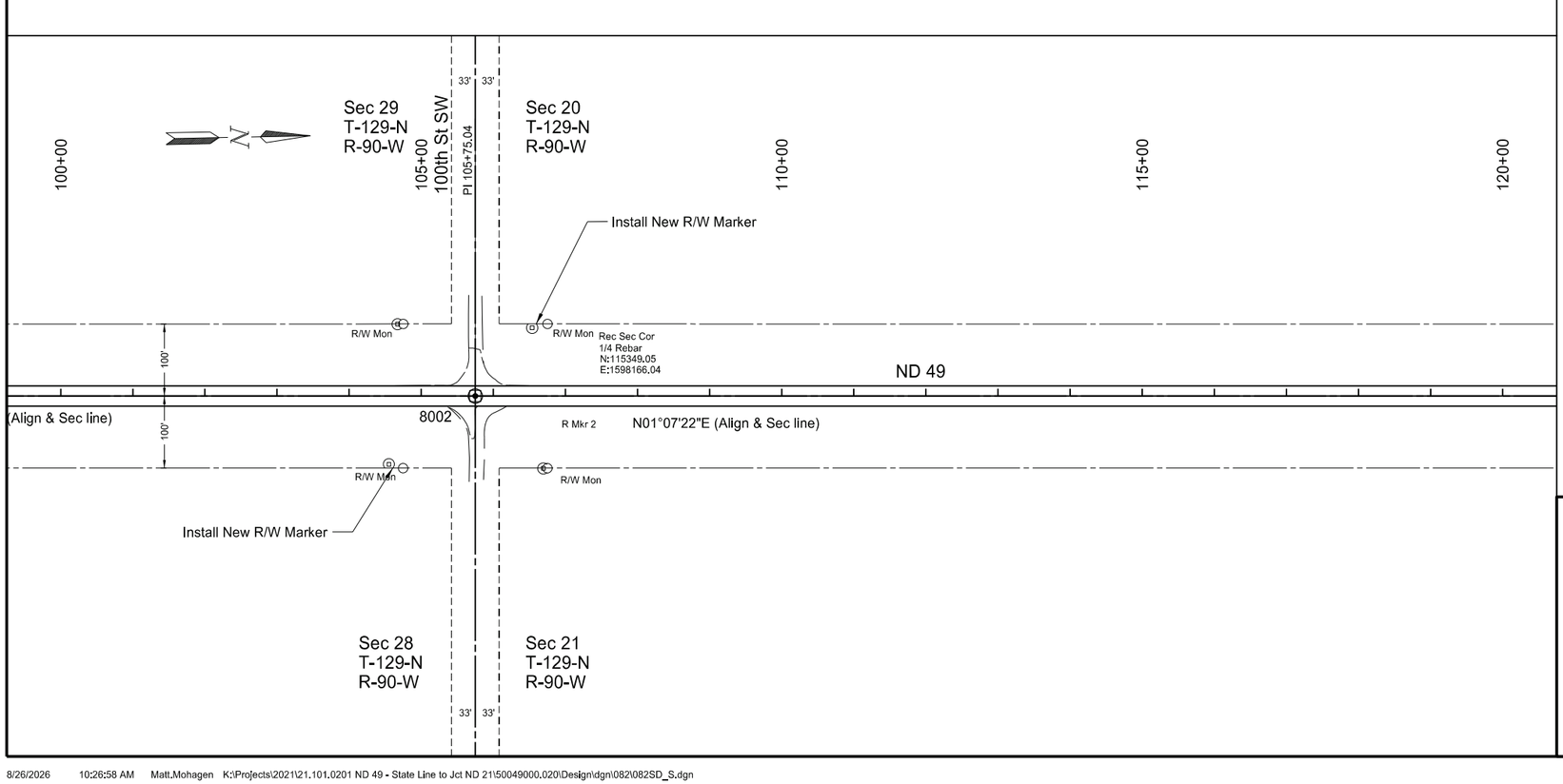
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:52:16 -05'00'
NORTH DAKOTA

8/26/2026 10:26:57 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	3

POINT	NORTHING	EASTING	STATION	OFFSET
8002	115349.056	1598166.044	105+75.05	0.00





Notes:

1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

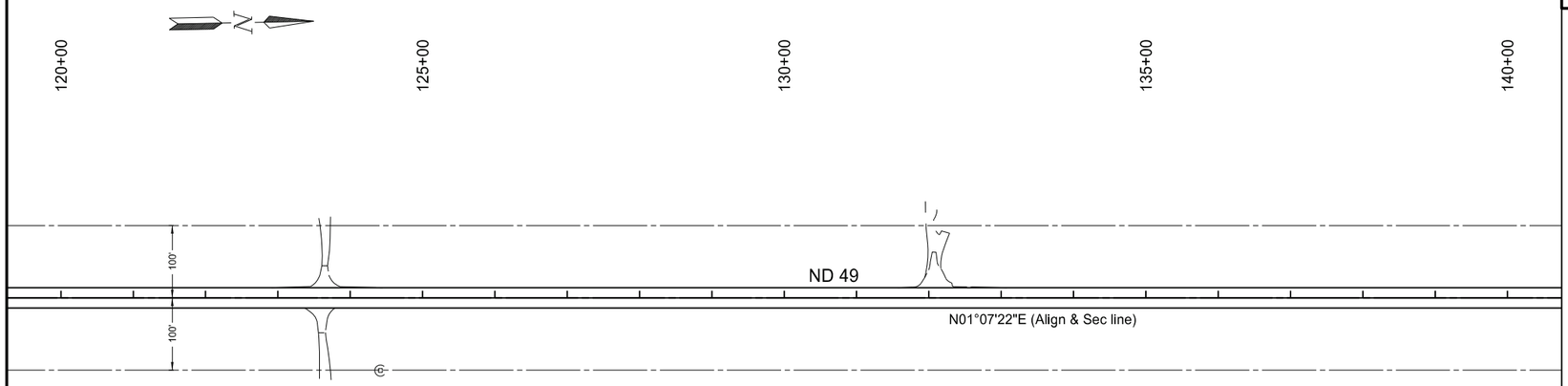
Sta 80+00 to Sta 120+00
(SCL49_S)

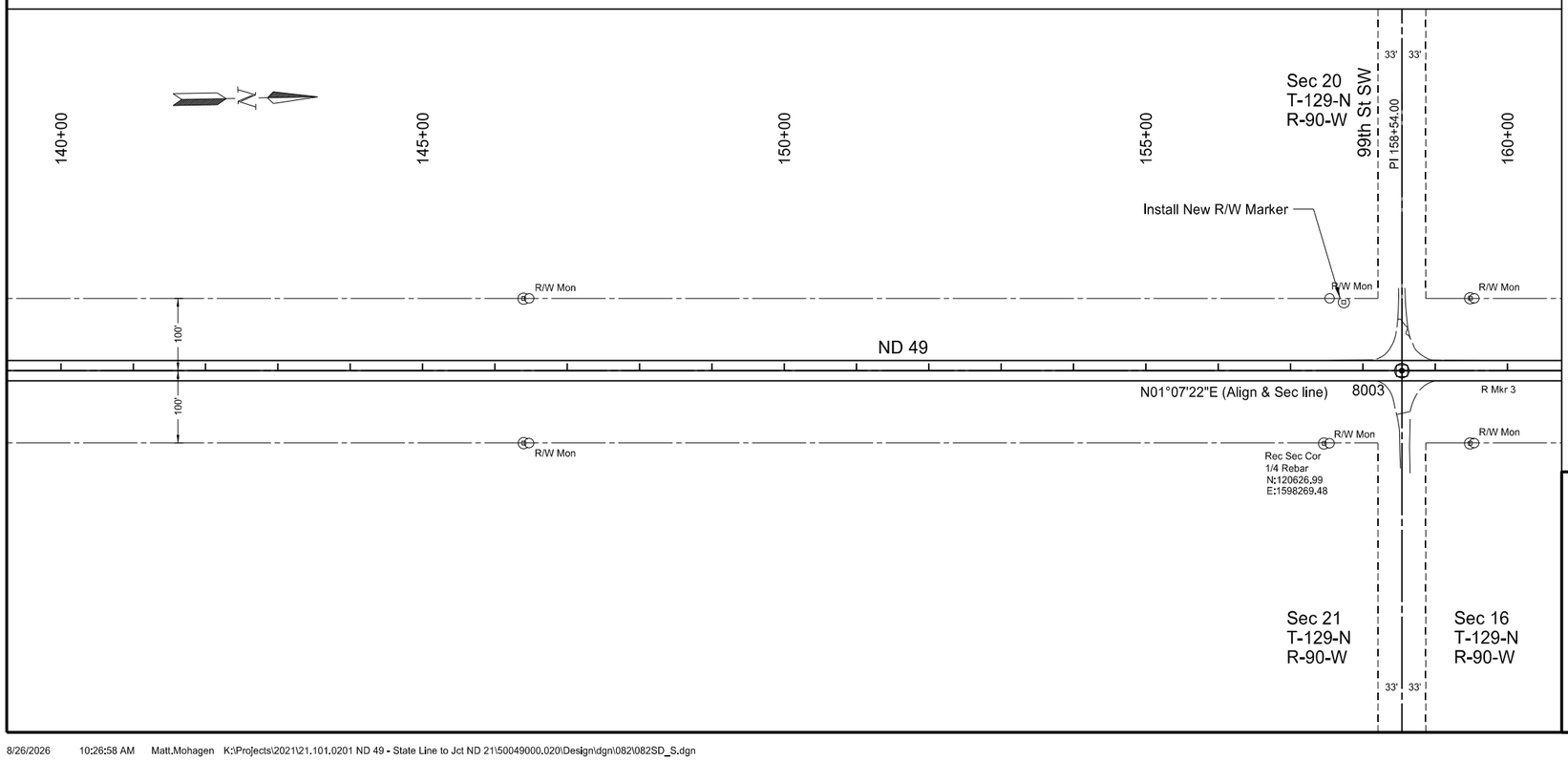
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:52:37 -05'00'
NORTH DAKOTA

8/26/2026 10:26:58 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	4

POINT	NORTHING	EASTING	STATION	OFFSET
8003	120626.993	1598269.482	158+54.00	0.00





Notes:

1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

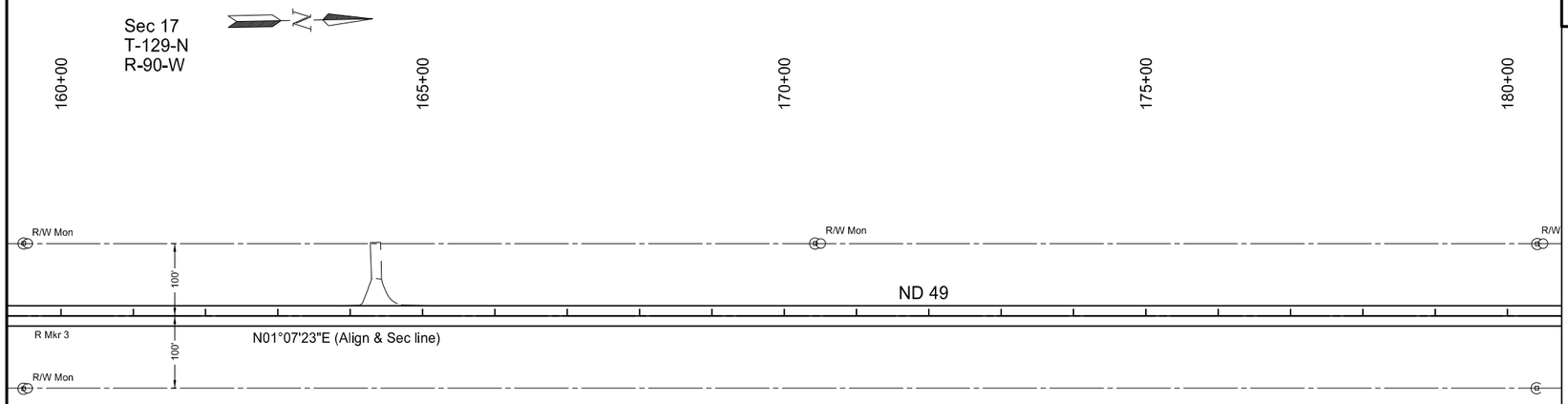
ND 49 - State Line to Jct ND 21

Sta 120+00 to Sta 160+00
(SCL49_S)

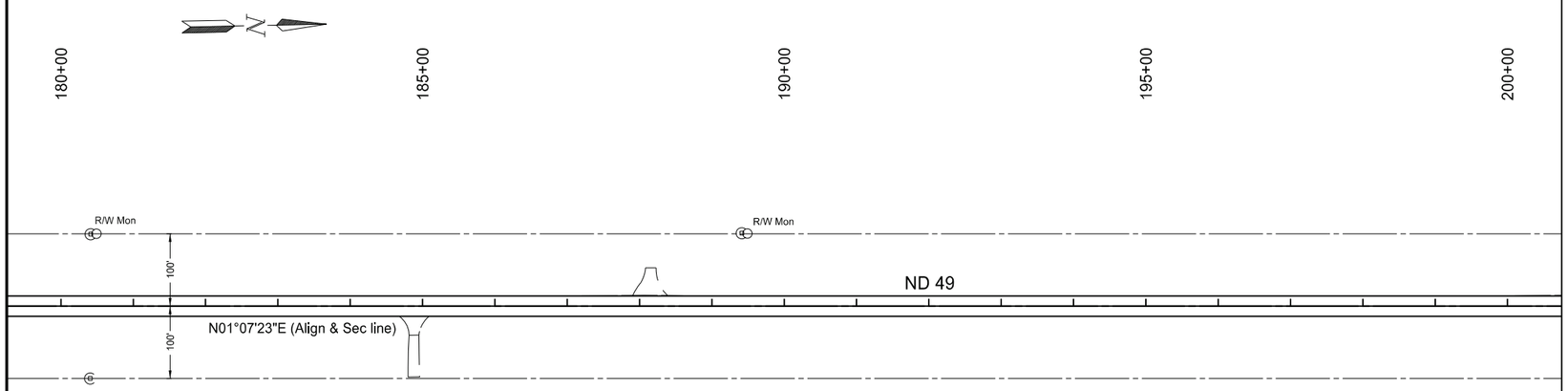
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:52:49 -05'00'
NORTH DAKOTA

8/26/2026 10:26:58 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	5



Sec 16
T-129-N
R-90-W



Notes:
1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

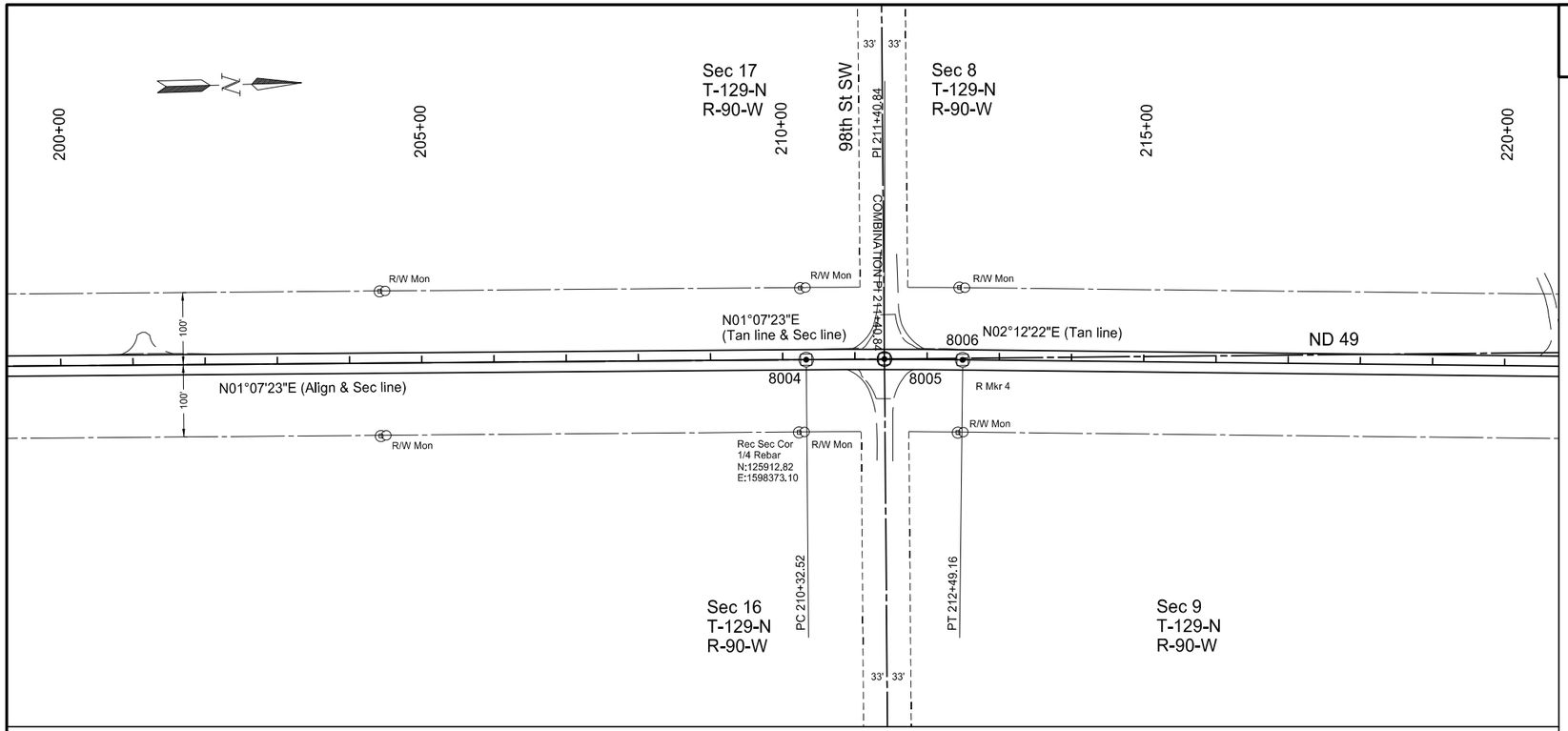
ND 49 - State Line to Jct ND 21

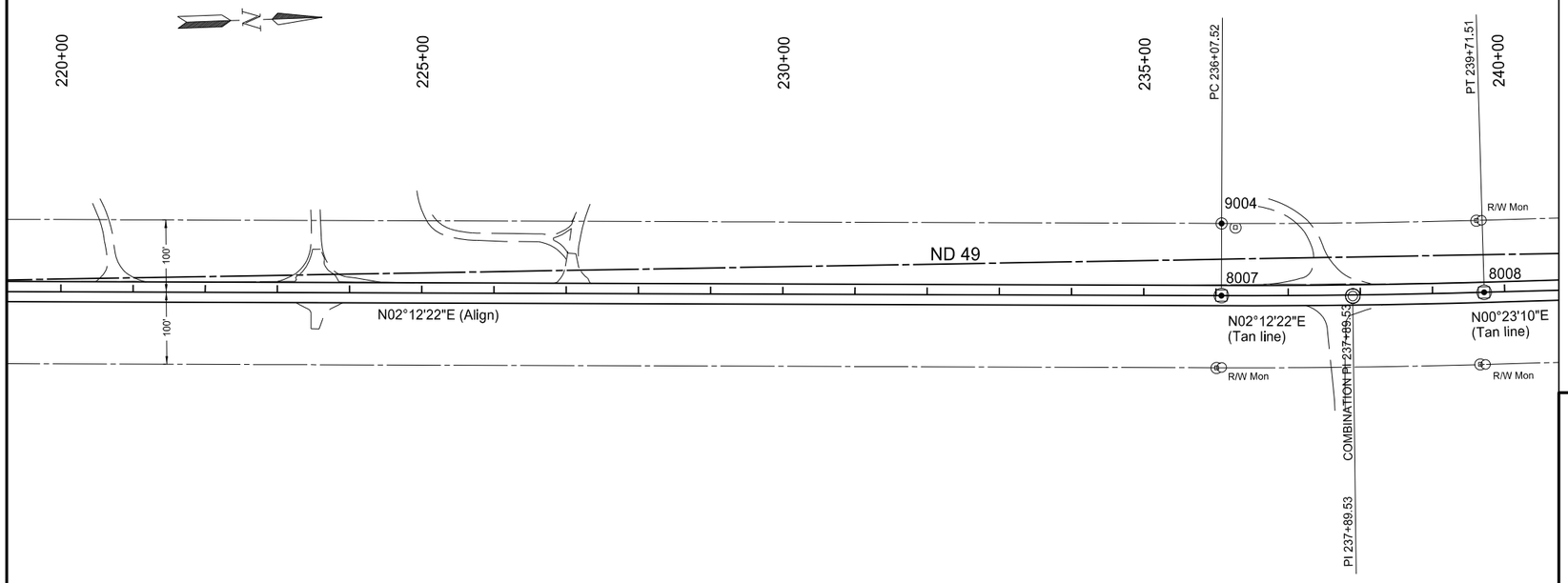
Sta 160+00 to Sta 200+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:53:02 -05'00'
NORTH DAKOTA

8/26/2026 10:26:59 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	6





POINT	NORTHING	EASTING	STATION	OFFSET
8004	125804.526	1598370.975	210+32.52	0.00
8005	125912.824	1598373.097	211+40.84	-0.51
8006	126021.063	1598377.267	212+49.16	0.00
8007	128377.678	1598468.053	236+07.52	0.00
8008	128741.565	1598476.286	239+71.51	0.00
9004	128381.528	1598368.127	236+07.52	-100.00

Notes:

1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

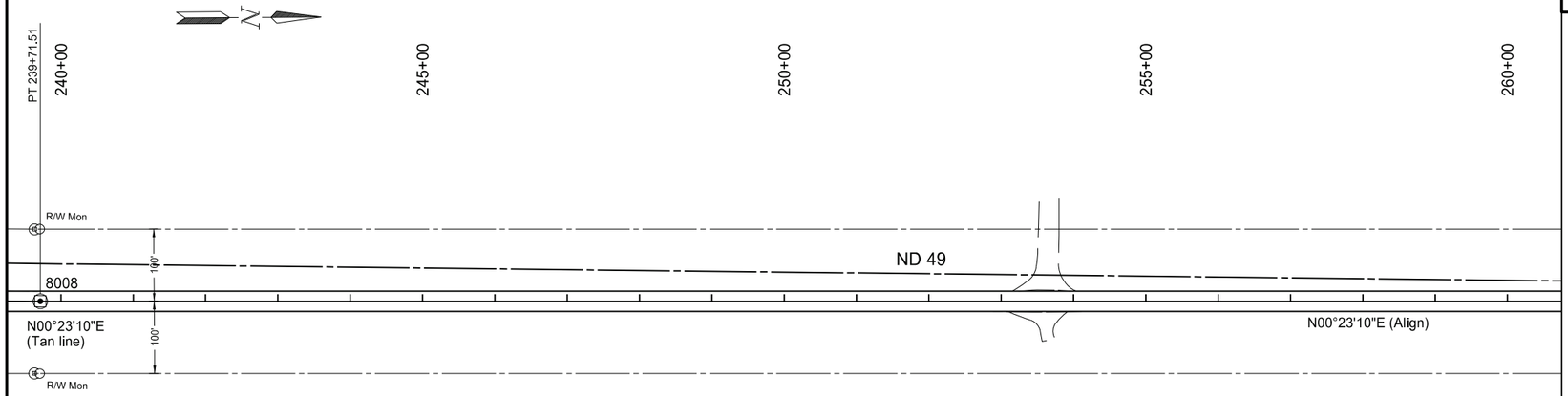
ND 49 - State Line to Jct ND 21

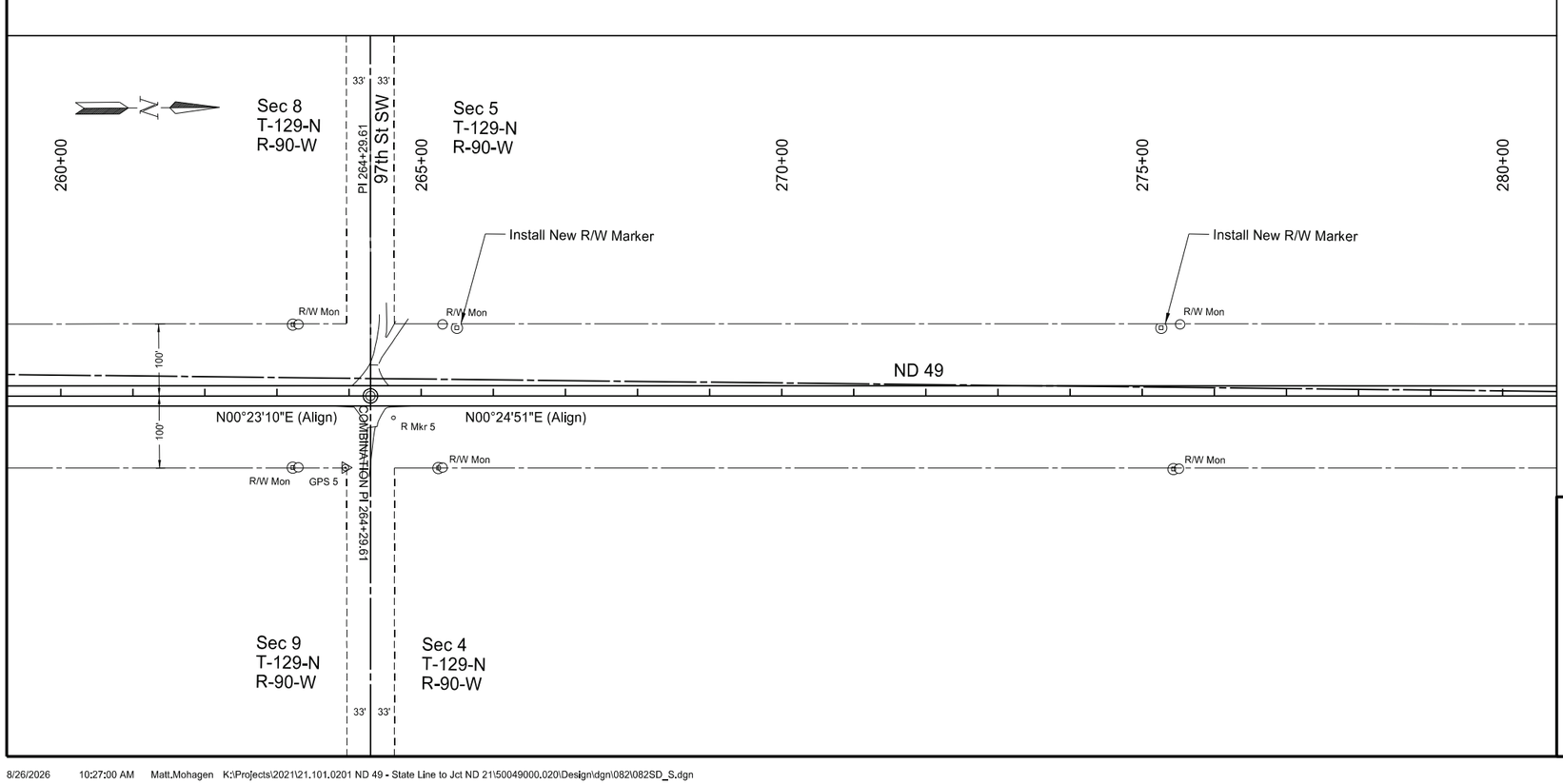
Sta 200+00 to Sta 240+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:53:17 -05'00'
NORTH DAKOTA

8/26/2026 10:26:59 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	7





Notes:

1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

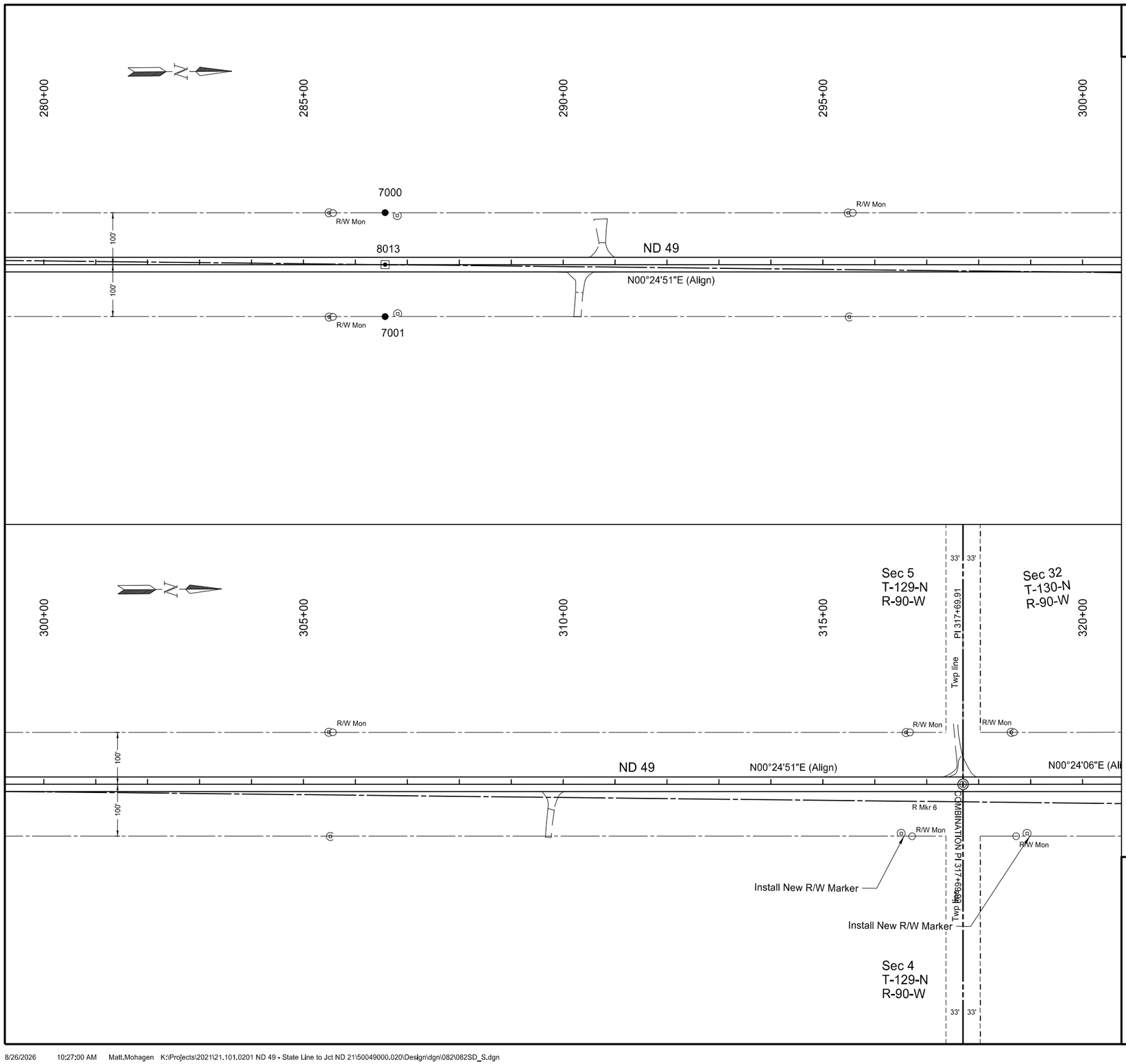
ND 49 - State Line to Jct ND 21

Sta 240+00 to Sta 280+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:53:34 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	8

POINT	NORTHING	EASTING	STATION	OFFSET
7000	133427.838	1598408.958	286+57.18	-100.00
7001	133426.392	1598608.952	286+57.18	100.00
8013	133427.115	1598508.955	286+57.18	0.00



Notes:

1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

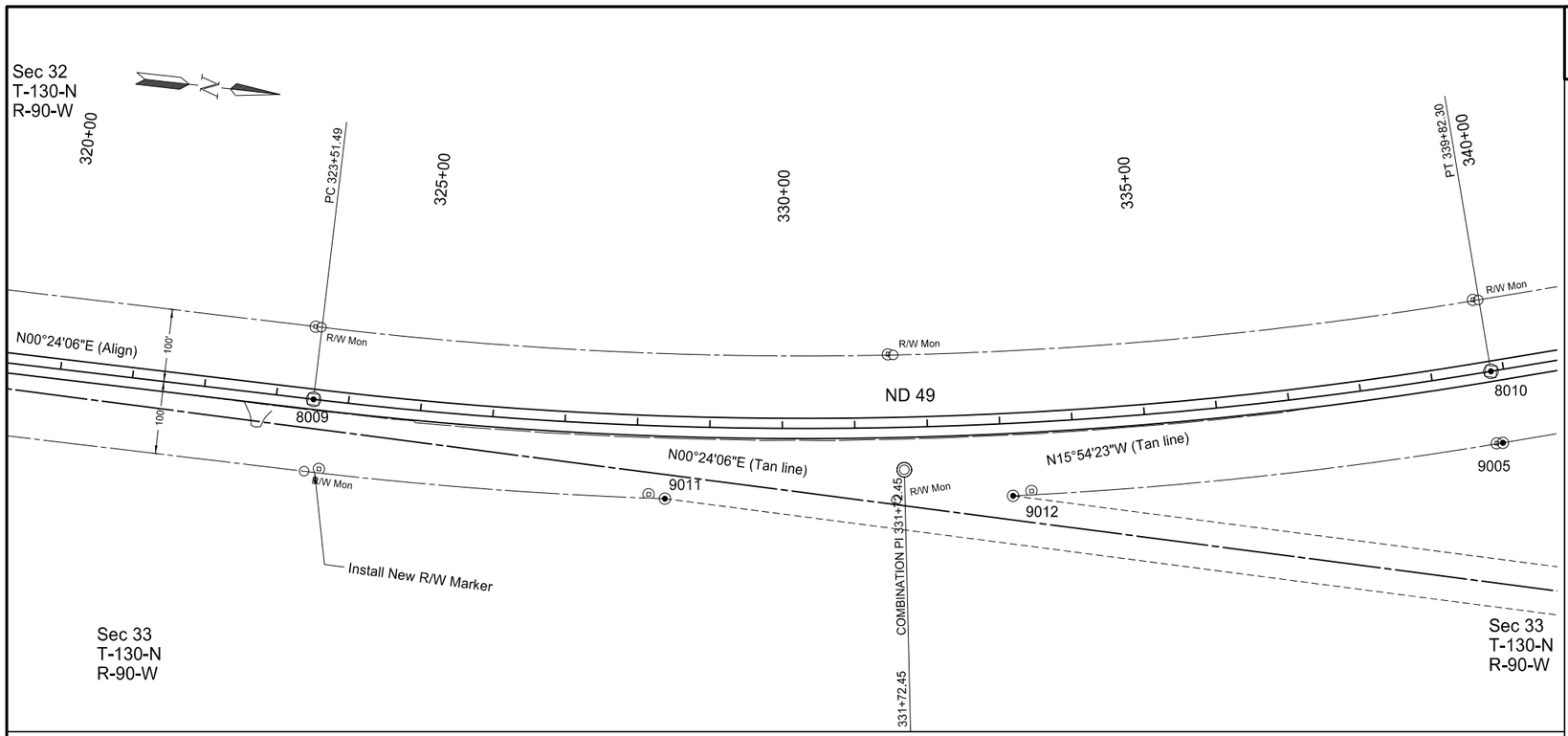
ND 49 - State Line to Jct ND 21

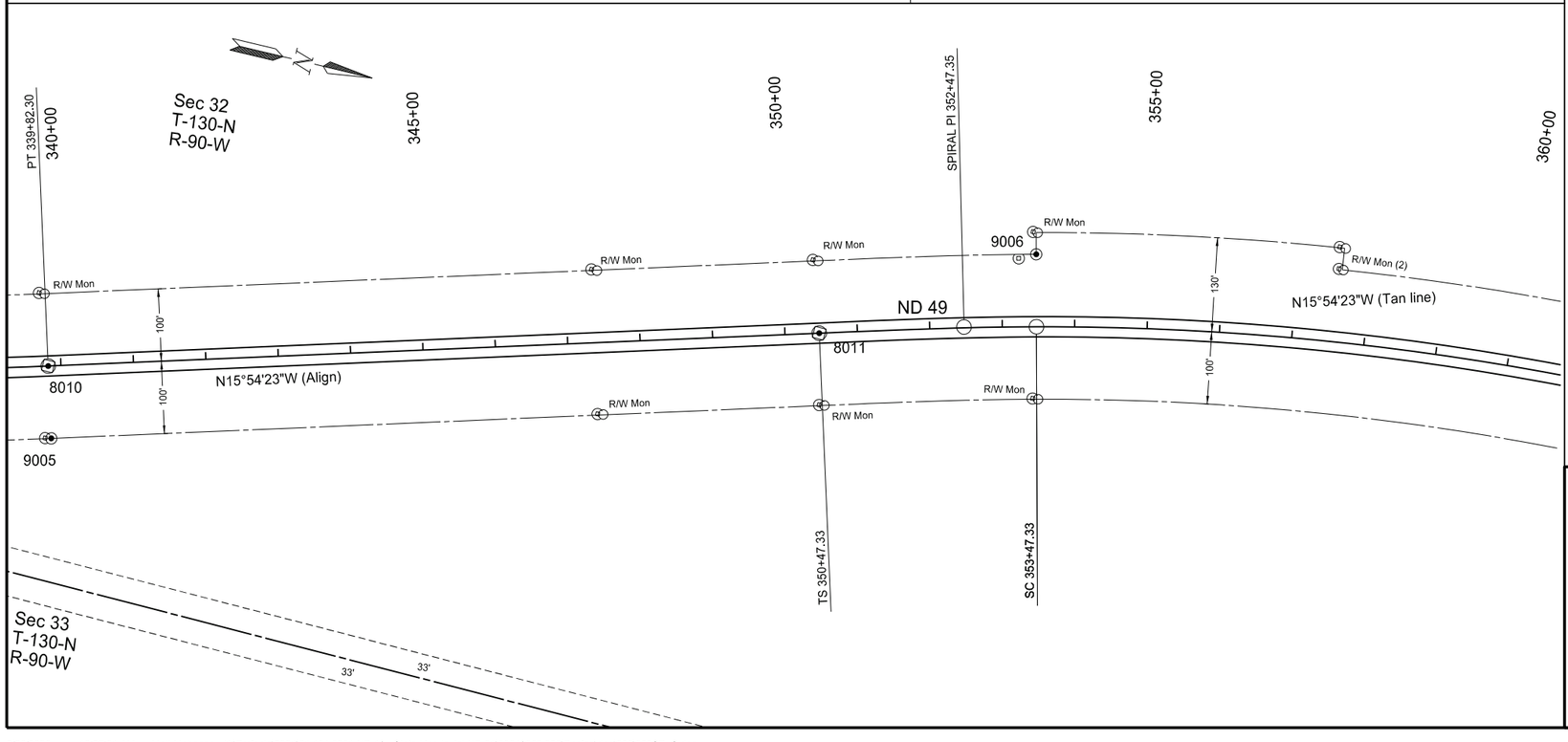
Sta 280+00 to Sta 320+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:53:54 -05'00'
NORTH DAKOTA

8/26/2026 10:27:00 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	9





POINT	NORTHING	EASTING	STATION	OFFSET
8009	137121.333	1598535.530	323+51.49	0.00
8010	138731.787	1598316.289	339+82.30	0.00
8011	139756.040	1598024.401	350+47.33	0.00
9005	138759.193	1598412.460	339+82.30	100.00
9006	140021.975	1597848.797	353+47.33	-100.00
9011	137618.392	1598617.738	328+41.18	100.00
9012	138095.547	1598560.354	333+13.66	100.00

Notes:
1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

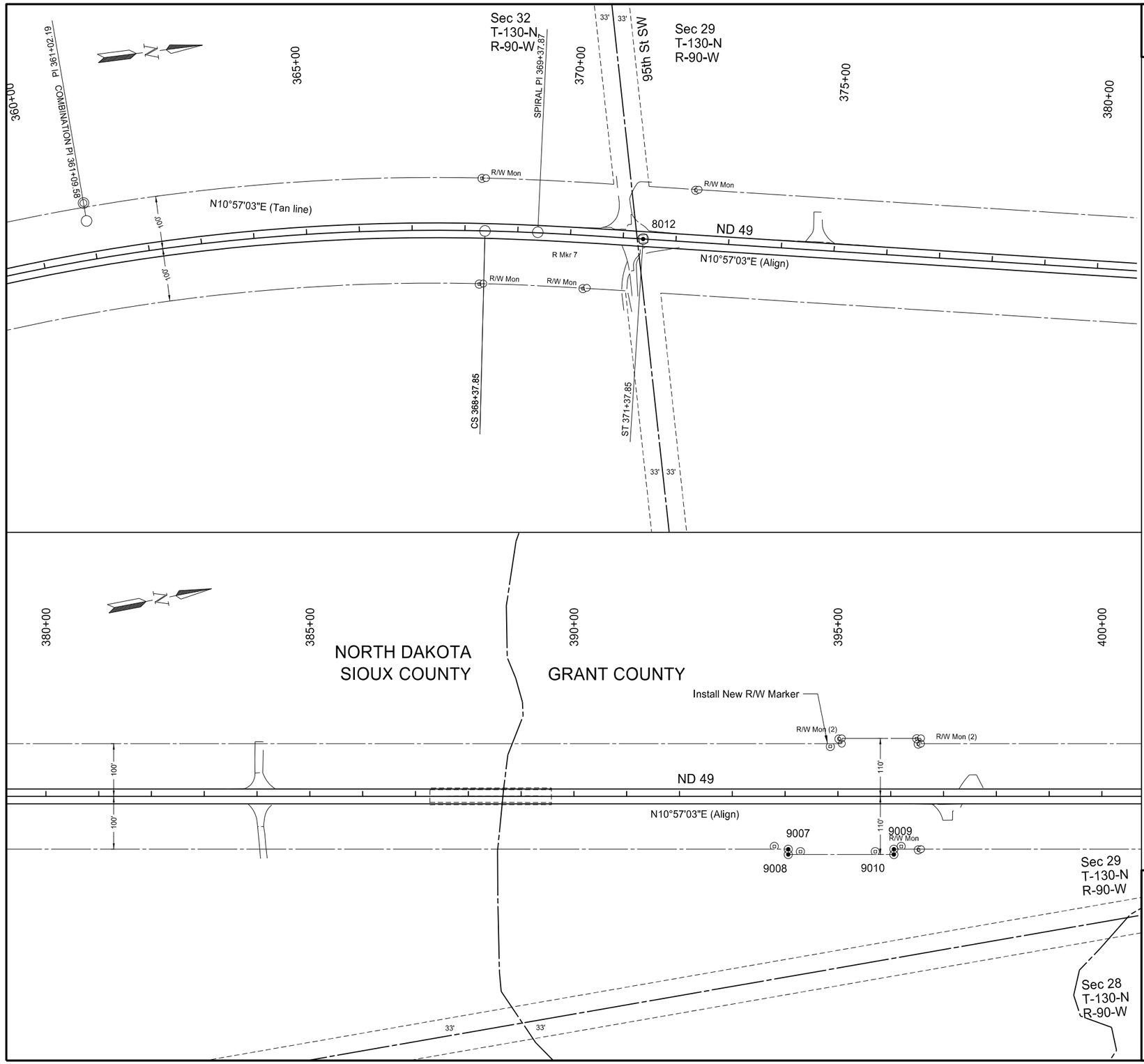
Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 320+00 to Sta 360+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:54:16 -05'00'
NORTH DAKOTA

8/26/2026 10:27:01 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_S.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	10

POINT	NORTHING	EASTING	STATION	OFFSET
8012	141820.52	1597935.065	371+37.85	0.00
9007	144028.323	1598464.102	394+05.95	100.00
9008	144026.424	1598473.92	394+05.95	110.00
9009	144224.681	1598502.095	396+05.95	100.00
9010	144222.782	1598511.913	396+05.95	110.00

Notes:
1. Stationing is based on the alignment "SCL49_S" unless otherwise noted.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

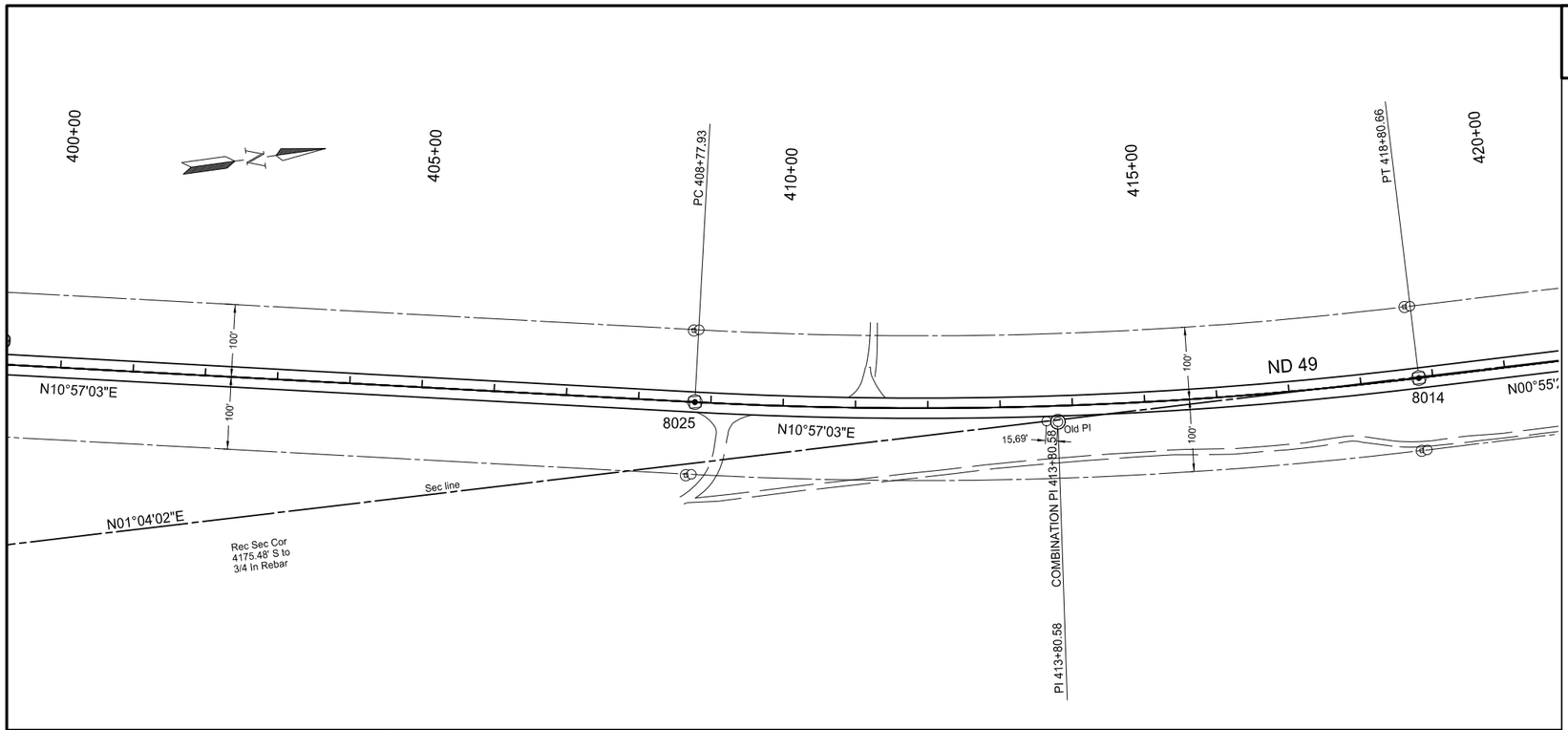
Survey Data Layout

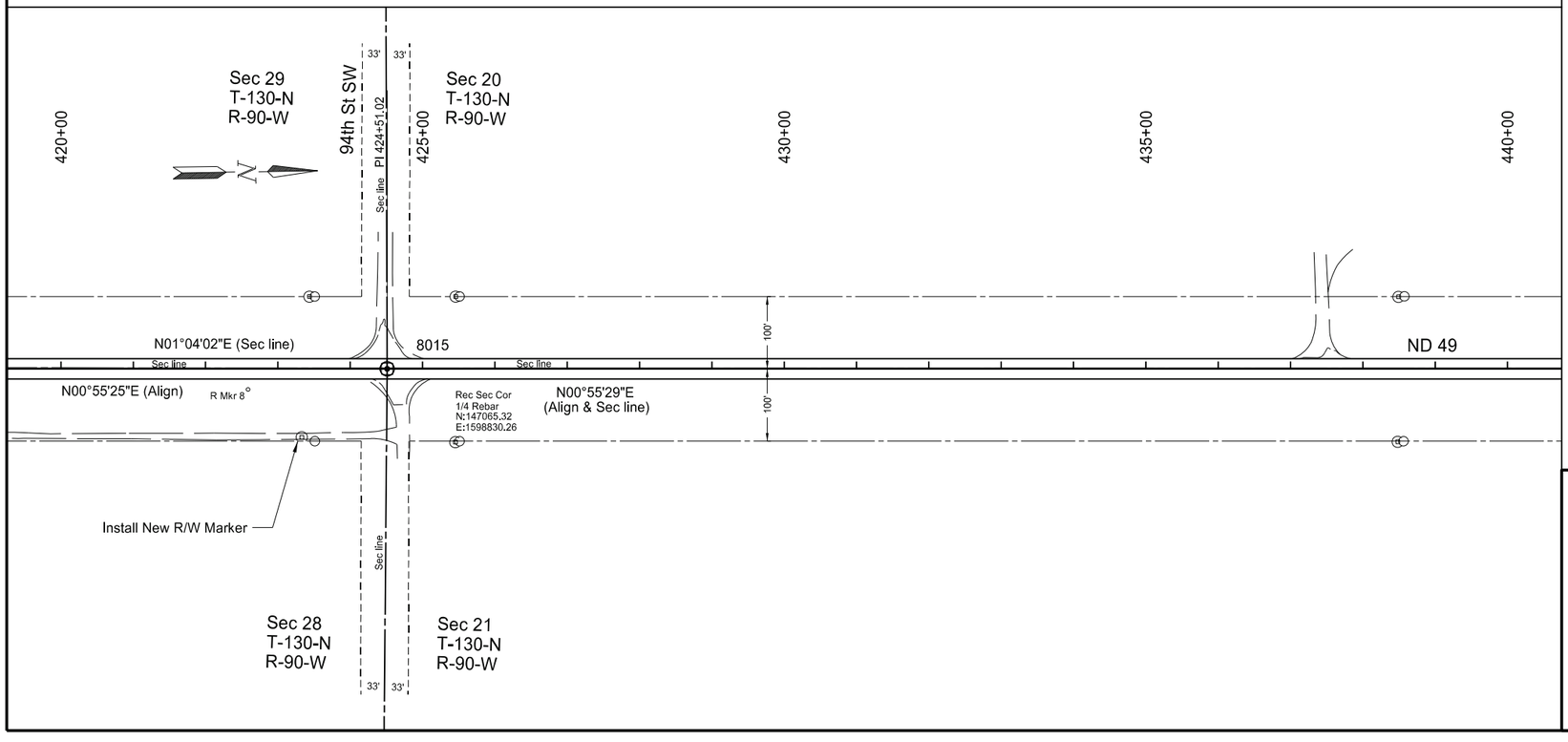
ND 49 - State Line to Jct ND 21

Sta 360+00 to Sta 388+65
(SCL49_S)
Sta 388+65 to Sta 400+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:54:30 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	11





POINT	NORTHING	EASTING	STATION	OFFSET
8014	146495.032	1598821.065	418+80.66	0.00
8015	147065.318	1598830.257	424+51.02	0.00
8025	145498.948	1598717.477	408+77.93	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

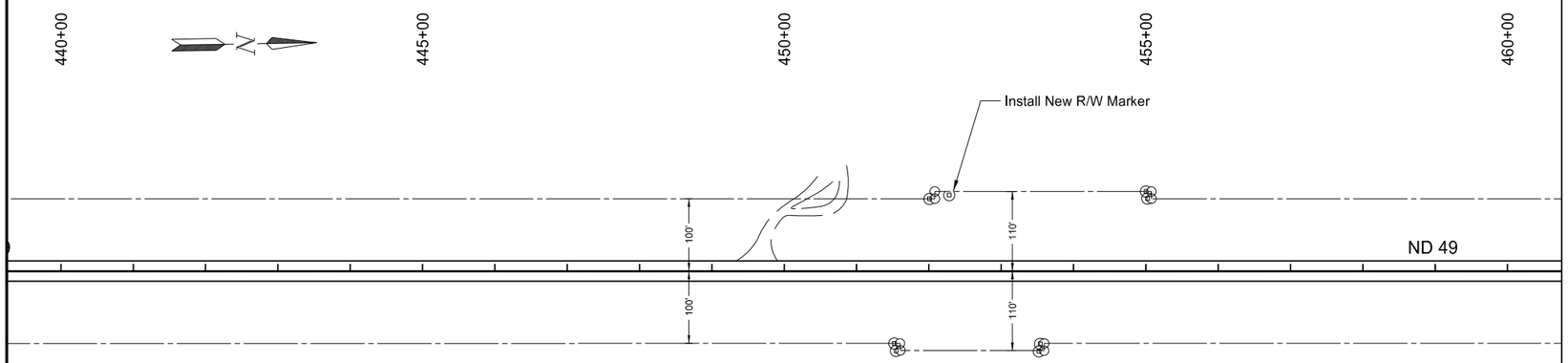
Survey Data Layout

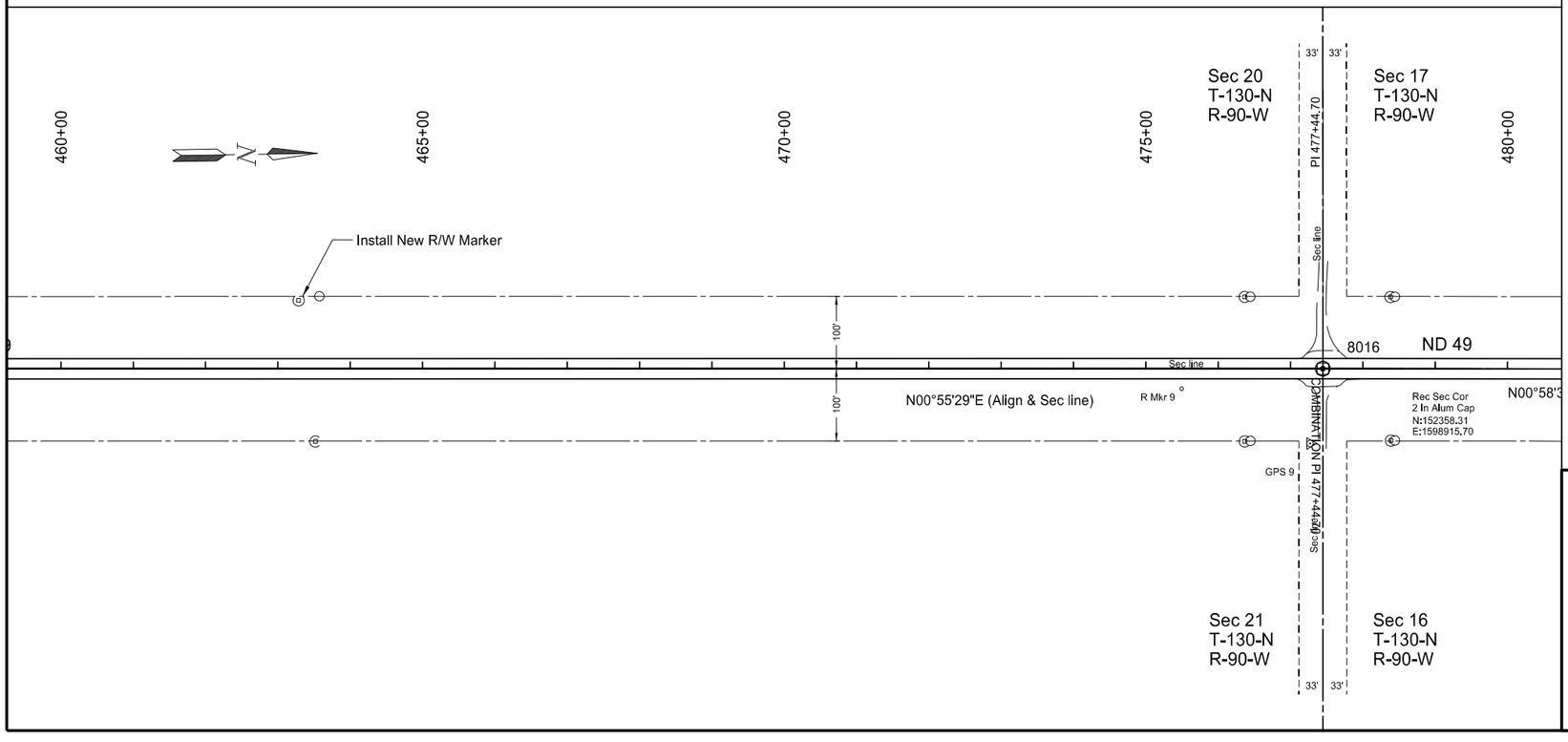
ND 49 - State Line to Jct ND 21

Sta 400+00 to Sta 440+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:54:46 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	12





POINT	NORTHING	EASTING	STATION	OFFSET
8016	152358.312	1598915.704	477+44.70	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

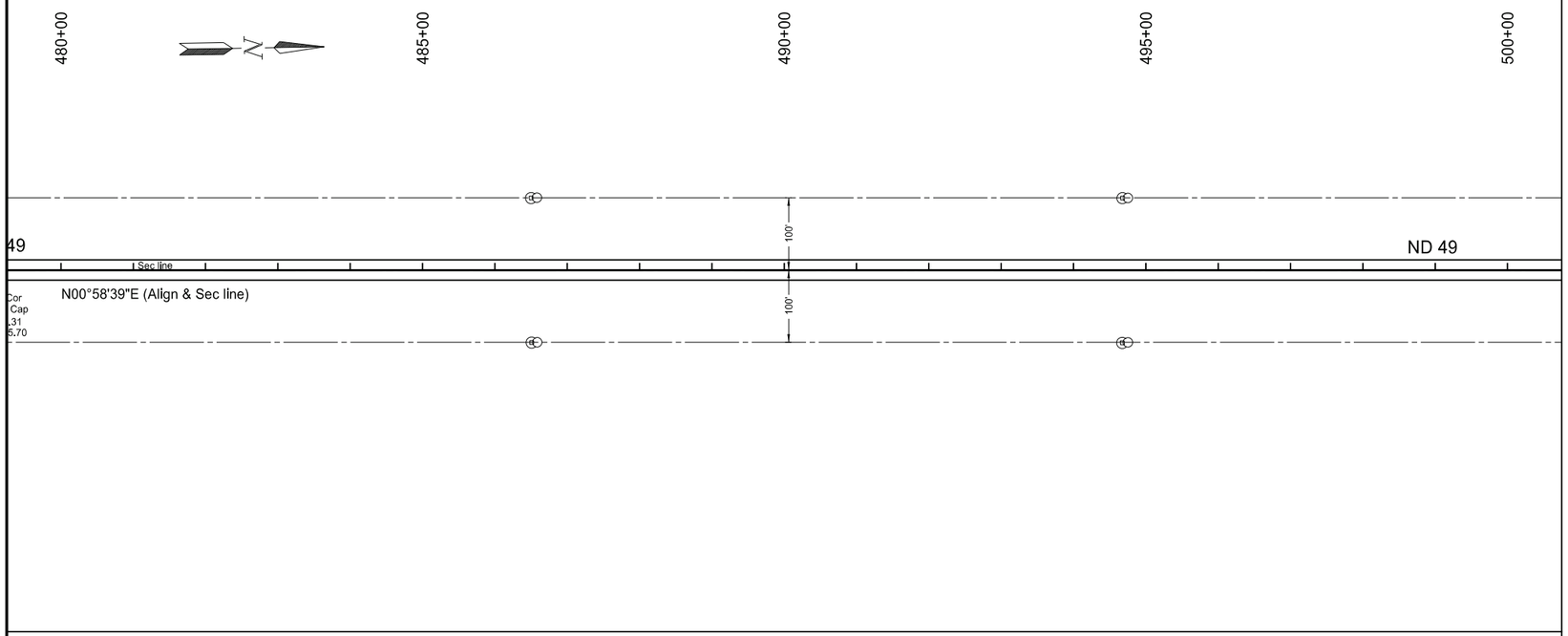
ND 49 - State Line to Jct ND 21

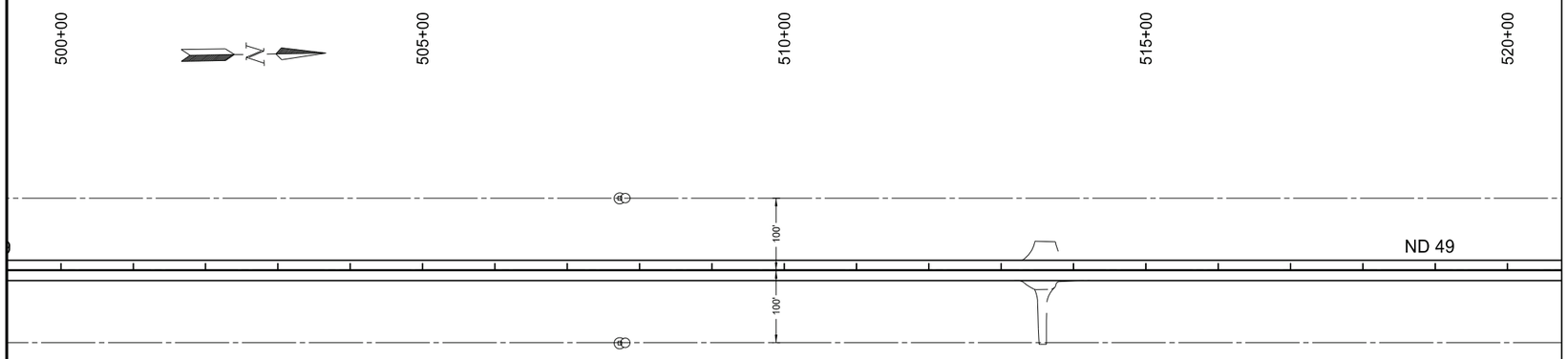
Sta 440+00 to Sta 480+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:55:04 -05'00'
NORTH DAKOTA

8/26/2026 10:27:17 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	13





Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

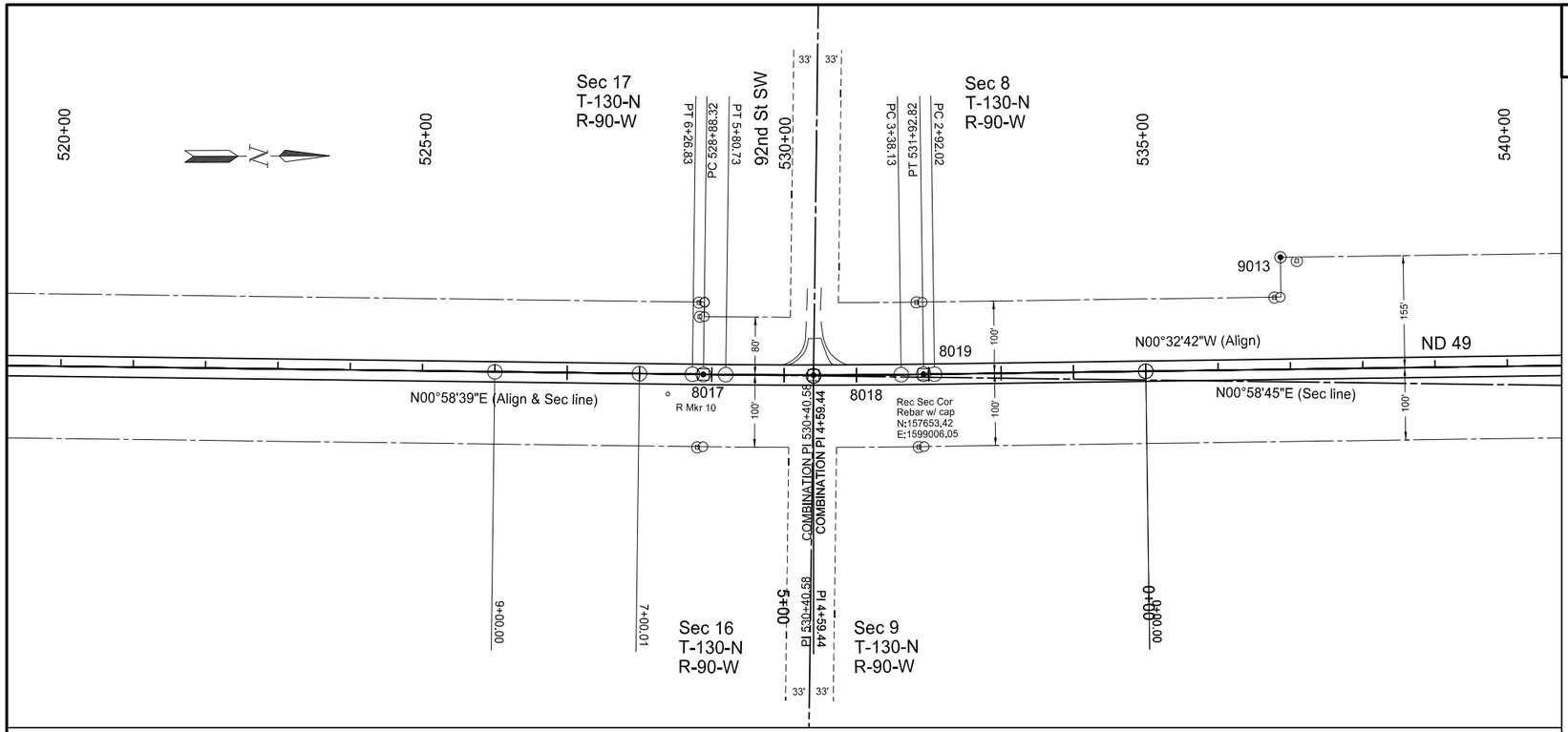
ND 49 - State Line to Jct ND 21

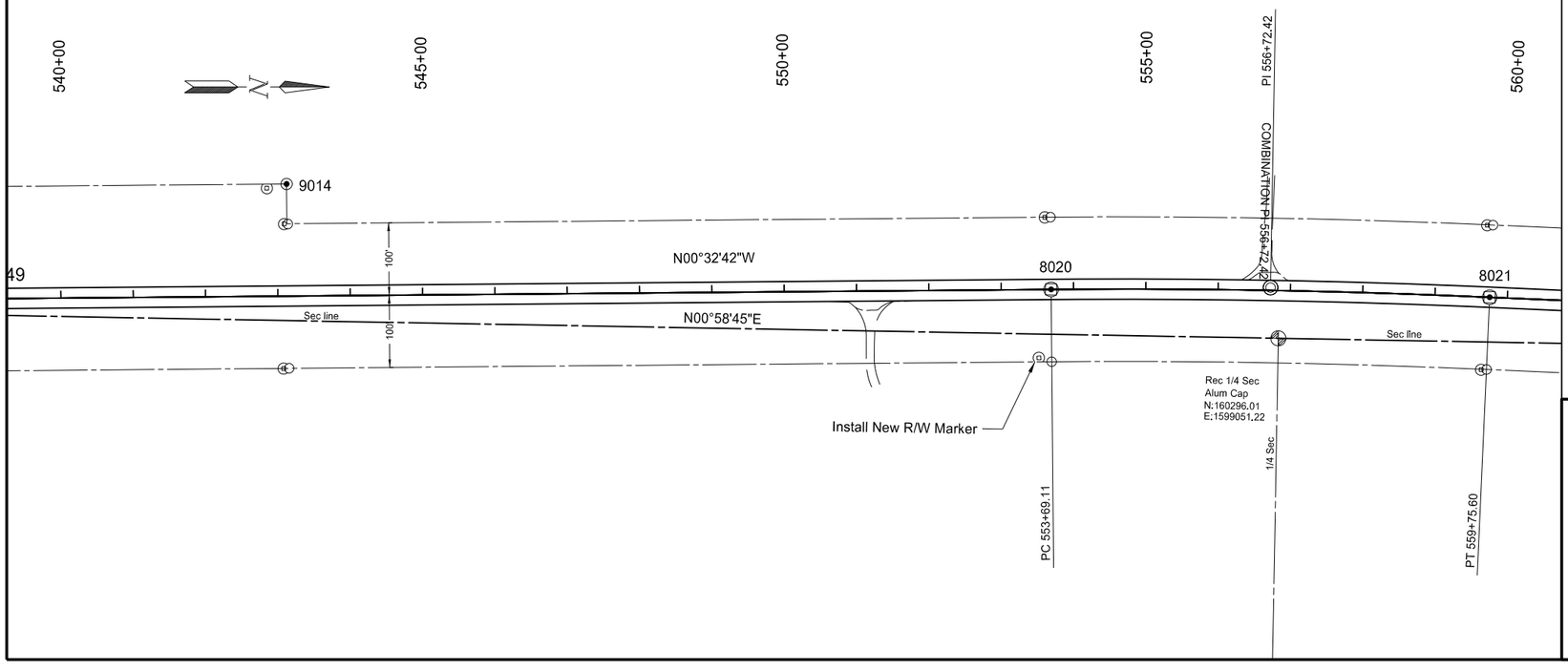
Sta 480+00 to Sta 520+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:55:21 -05'00'
NORTH DAKOTA

8/26/2026 10:27:17 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	14





POINT	NORTHING	EASTING	STATION	OFFSET
8017	157501.183	1599003.452	528+88.32	0.00
8018	157653.437	1599005.039	530+40.59	0.00
8019	157805.672	1599004.602	531+92.82	0.00
8020	159981.861	1598983.901	553+69.11	0.00
8021	160588.188	1598994.180	559+75.60	0.00
9013	158299.686	1598844.896	536+88.34	-155.00
9014	158924.658	1598838.951	543+13.34	-155.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

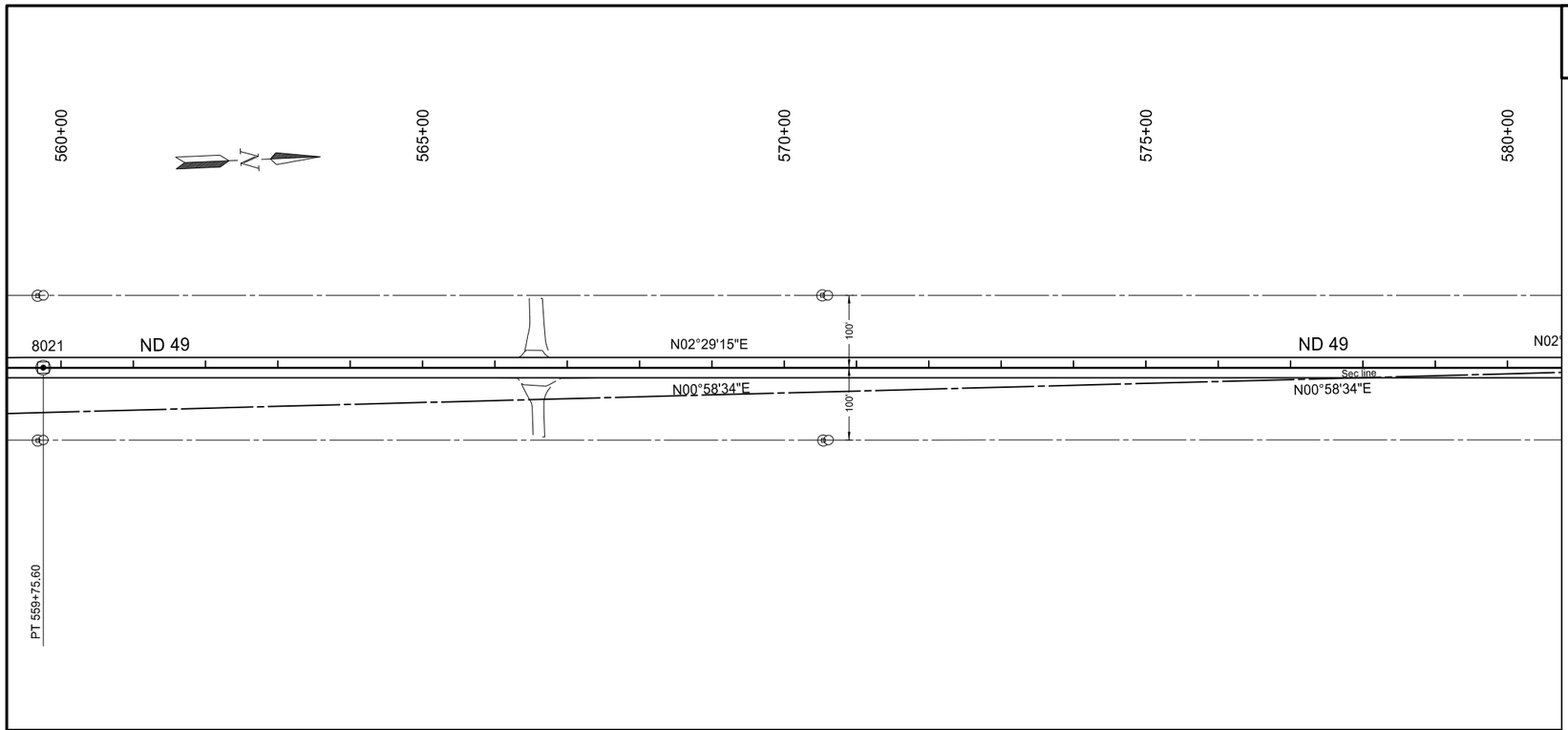
ND 49 - State Line to Jct ND 21

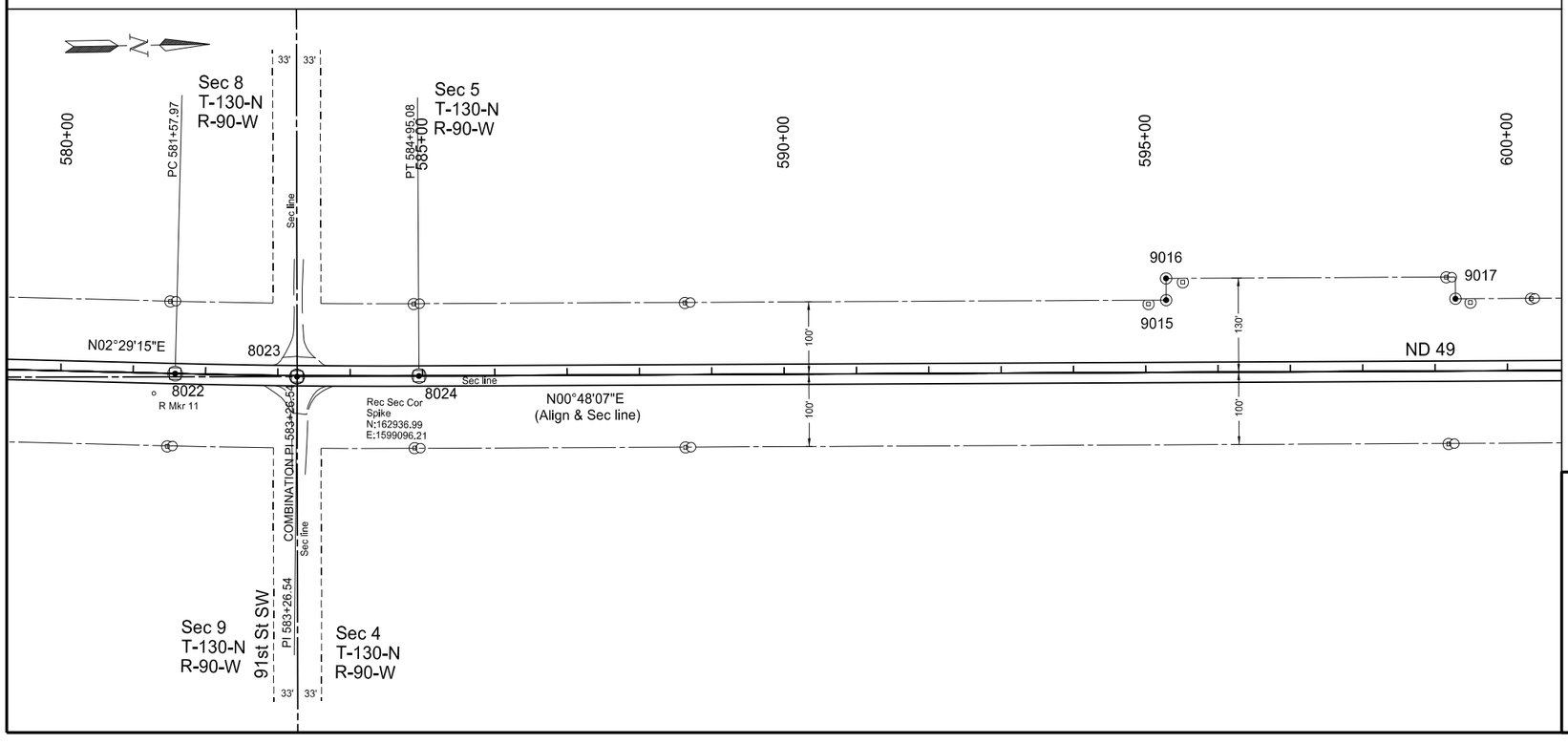
Sta 520+00 to Sta 560+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:55:38 -05'00'
NORTH DAKOTA

8/26/2026 10:27:18 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	15





POINT	NORTHING	EASTING	STATION	OFFSET
8022	162768.507	1599088.895	581+57.97	0.00
8023	162936.916	1599096.211	583+26.53	1.24
8024	163105.468	1599098.57	584+95.08	0.00
9015	164140.362	1599013.045	595+28.68	-100.00
9016	164140.782	1598983.048	595+28.68	-130.00
9017	164540.323	1599018.642	599+28.68	-100.00

Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

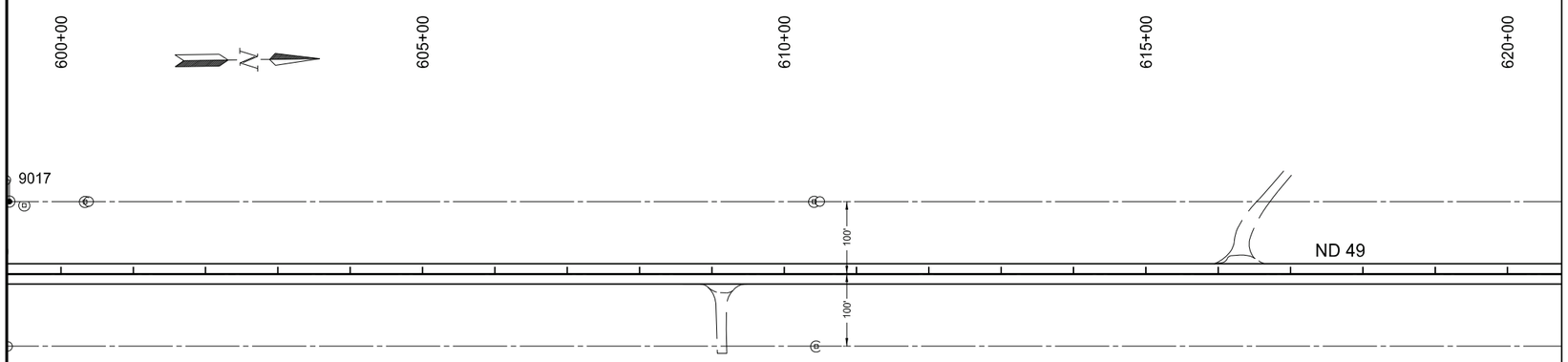
Sta 560+00 to Sta 600+00
(SCL49_G)

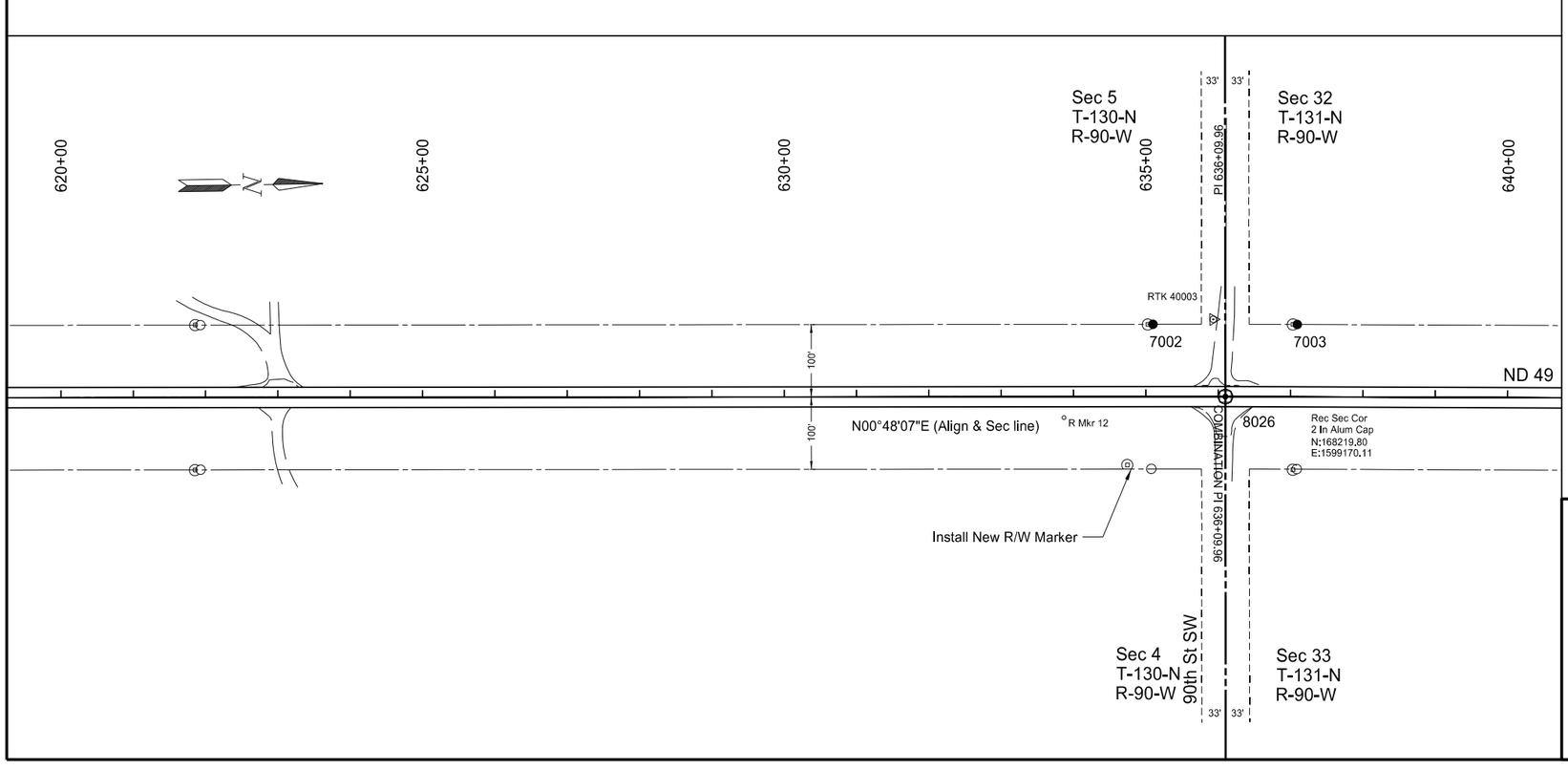
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:55:56 -05'00'
NORTH DAKOTA

8/26/2026 10:27:19 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	16

POINT	NORTHING	EASTING	STATION	OFFSET
7002	168121.256	1599068.761	635+09.96	-100.00
7003	168320.753	1599072.029	637+09.01	-100.00
8026	168219.846	1599170.151	636+09.96	0.00





Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

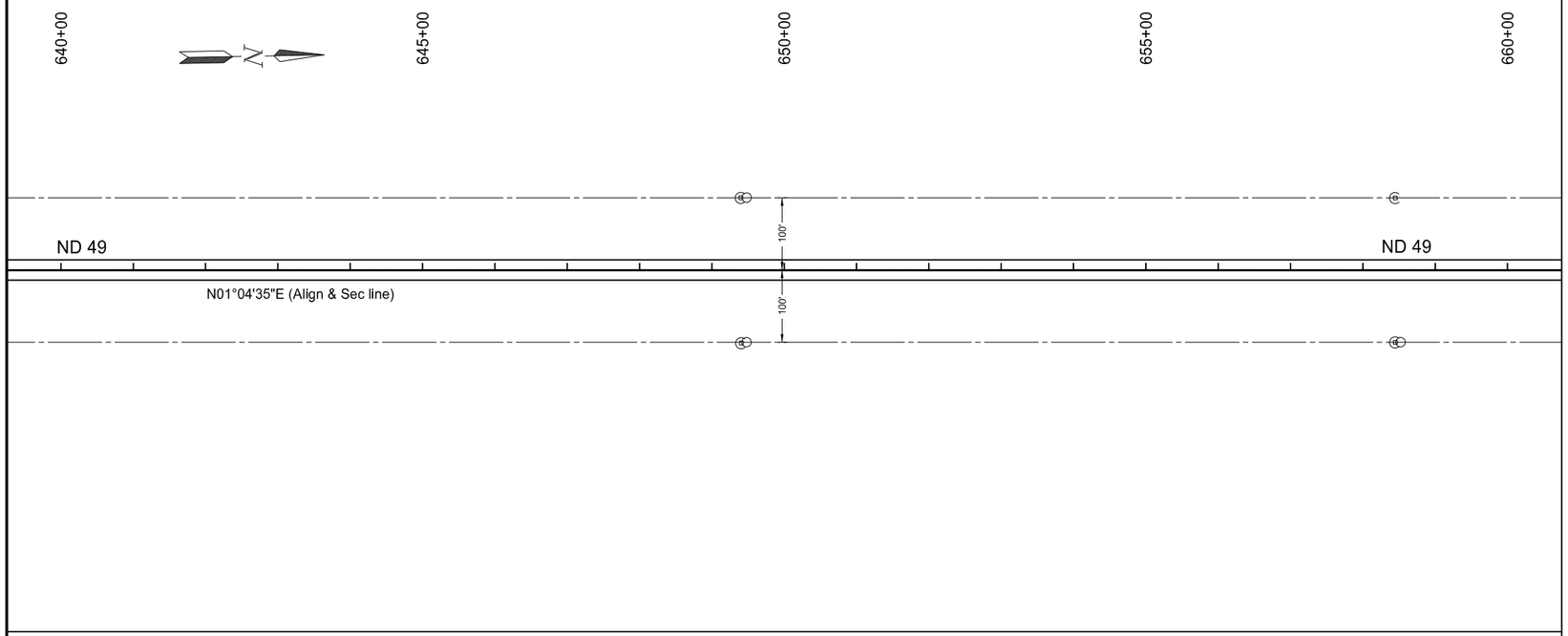
Survey Data Layout

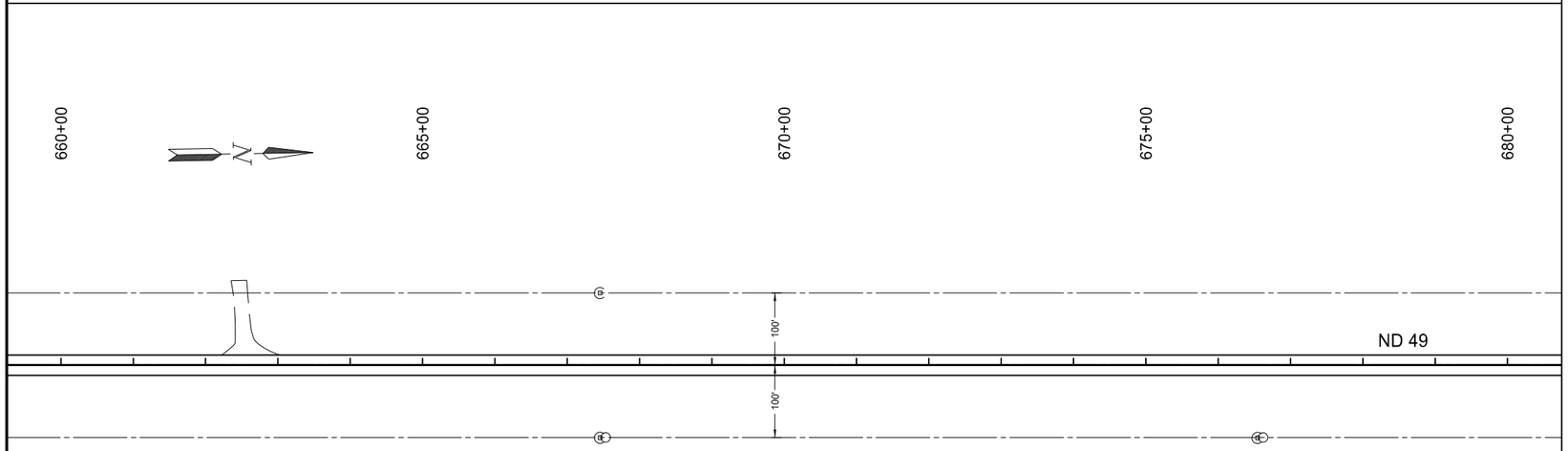
ND 49 - State Line to Jct ND 21

Sta 600+00 to Sta 640+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:56:12 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	17





Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

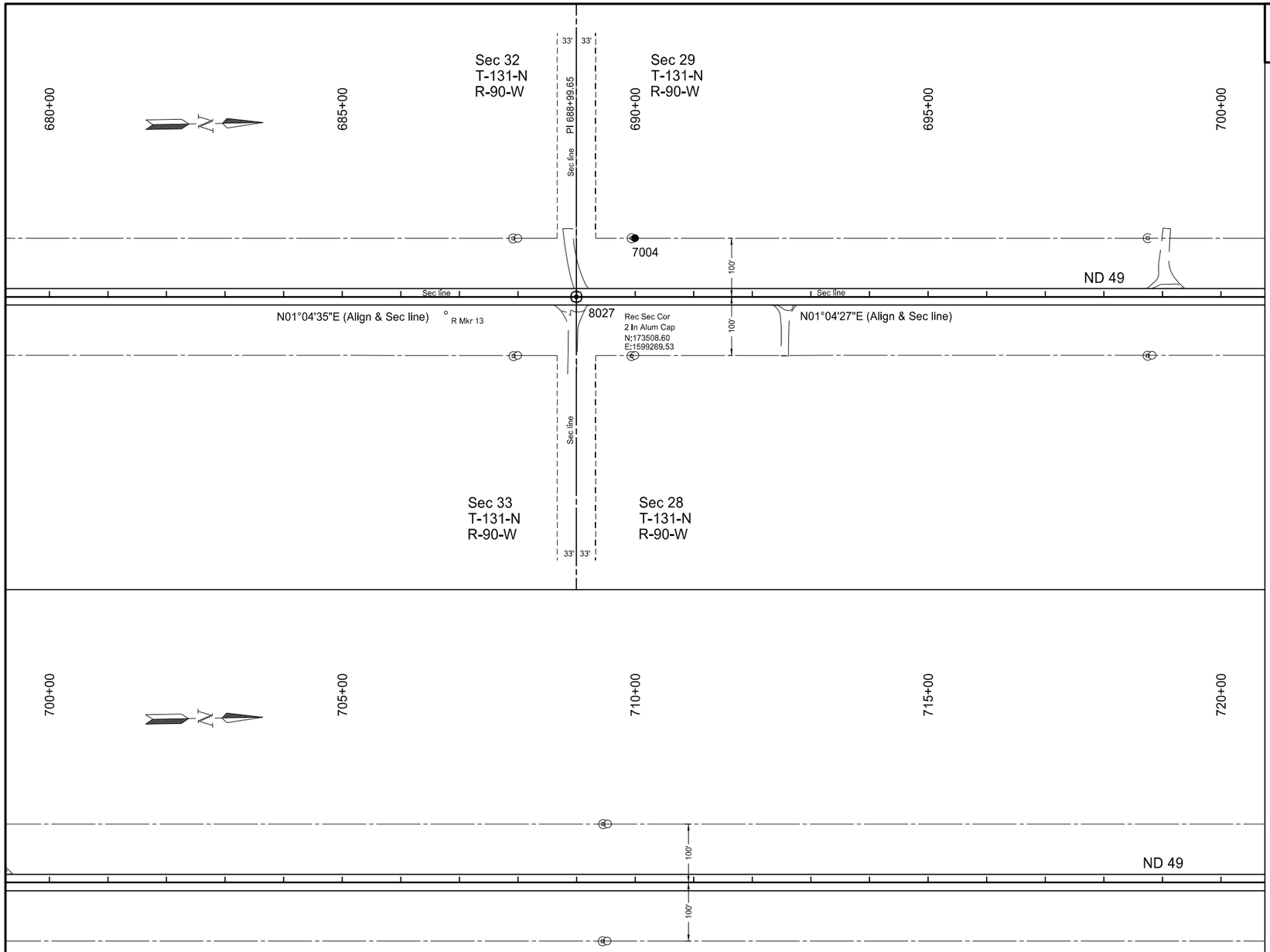
ND 49 - State Line to Jct ND 21

Sta 640+00 to Sta 680+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:56:28 -05'00'
NORTH DAKOTA

8/26/2026 10:27:20 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	18



POINT	NORTHING	EASTING	STATION	OFFSET
7004	173610.466	1599171.419	689+99.66	-100.00
8027	173508.601	1599269.527	688+99.65	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

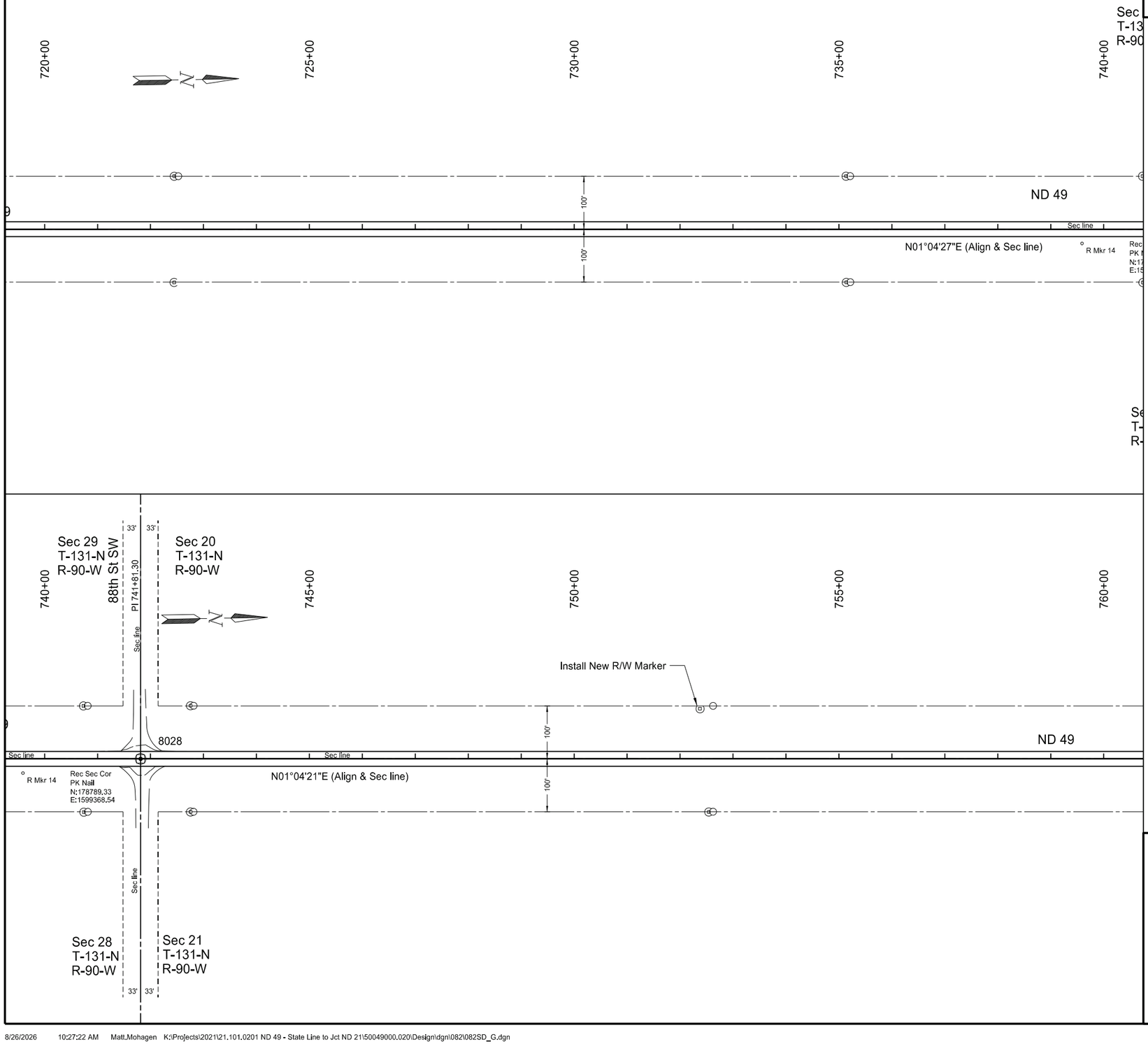
ND 49 - State Line to Jct ND 21

Sta 680+00 to Sta 720+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:56:51 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	19

POINT	NORTHING	EASTING	STATION	OFFSET
8028	178789.327	1599368.54	741+81.31	0.00



Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

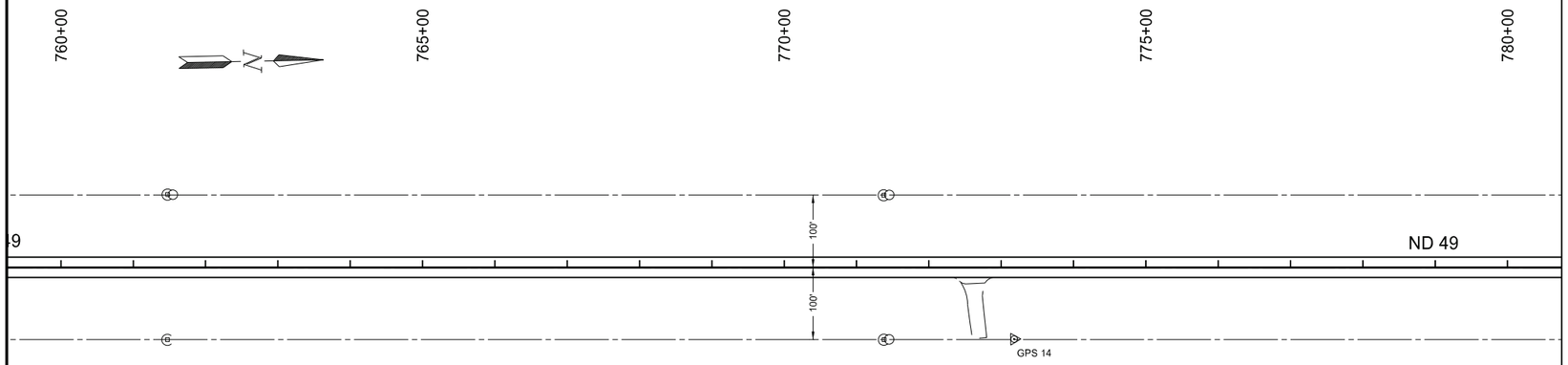
Sta 720+00 to Sta 760+00
(SCL49_G)

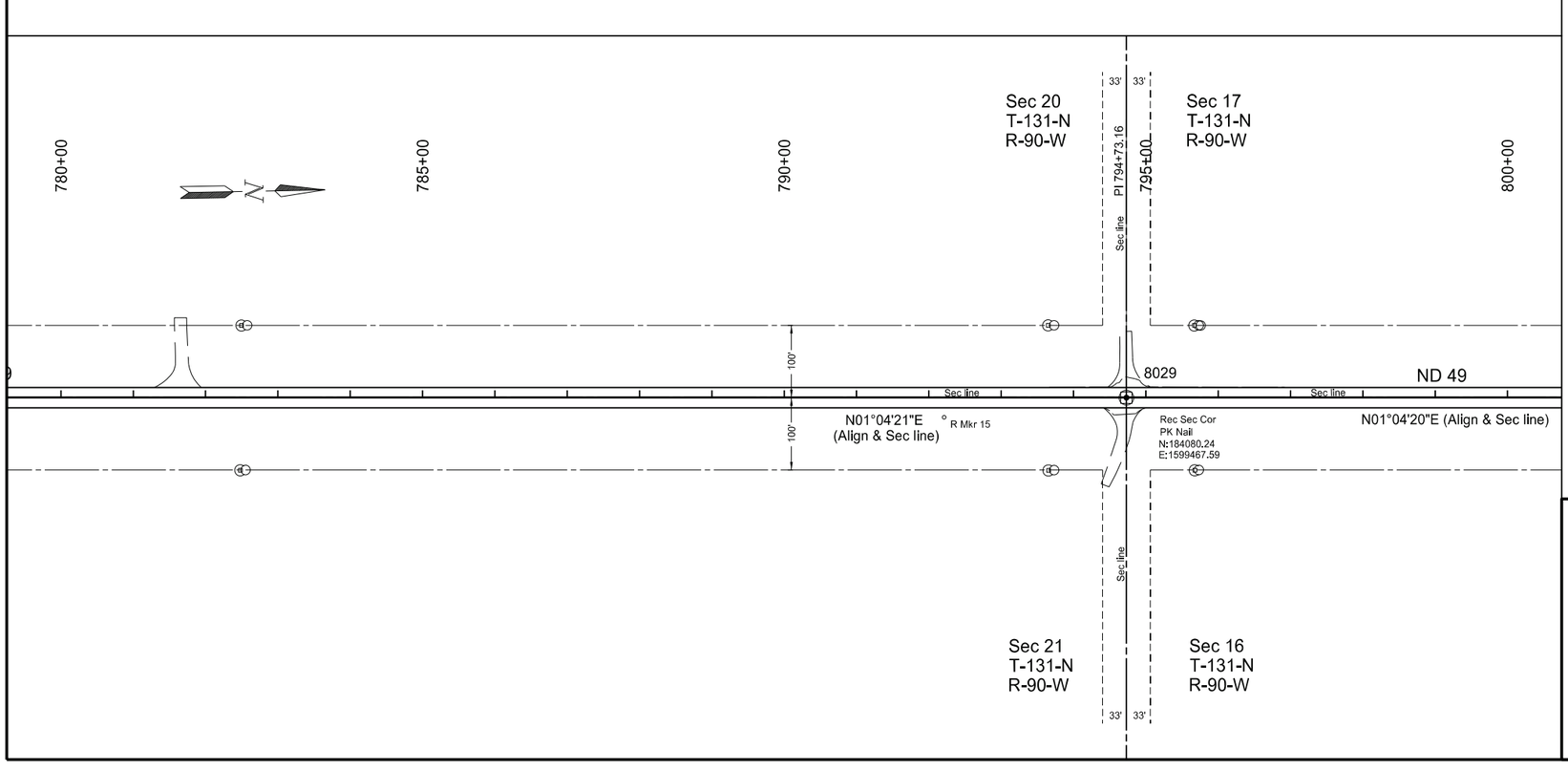
REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:57:17 -05'00'
NORTH DAKOTA

8/26/2026 10:27:22 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	20

POINT	NORTHING	EASTING	STATION	OFFSET
8029	184080.254	1599467.588	794+73.16	0.00





Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

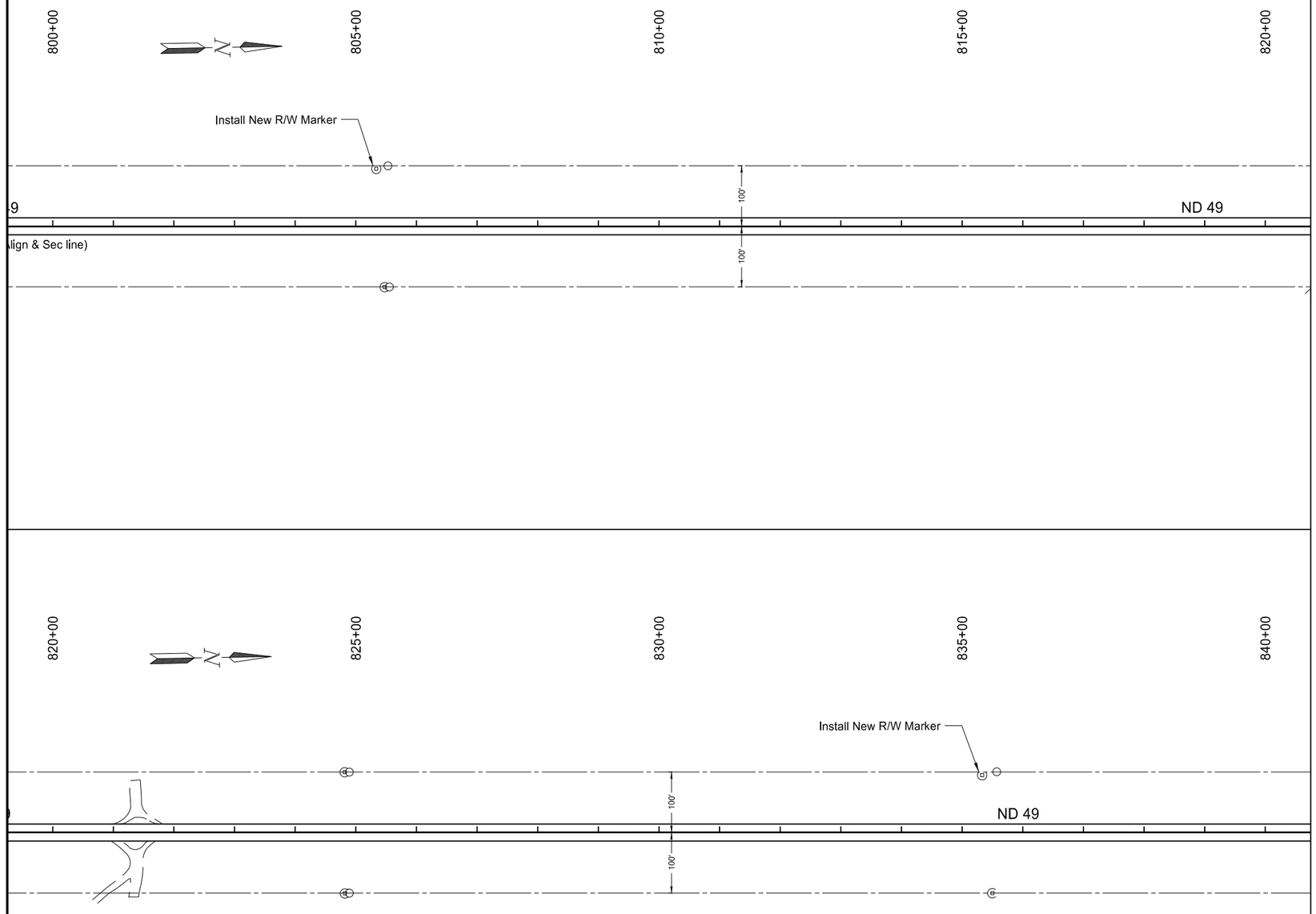
ND 49 - State Line to Jct ND 21

Sta 760+00 to Sta 800+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:57:48 -05'00'
NORTH DAKOTA

8/26/2026 10:27:22 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	21



Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

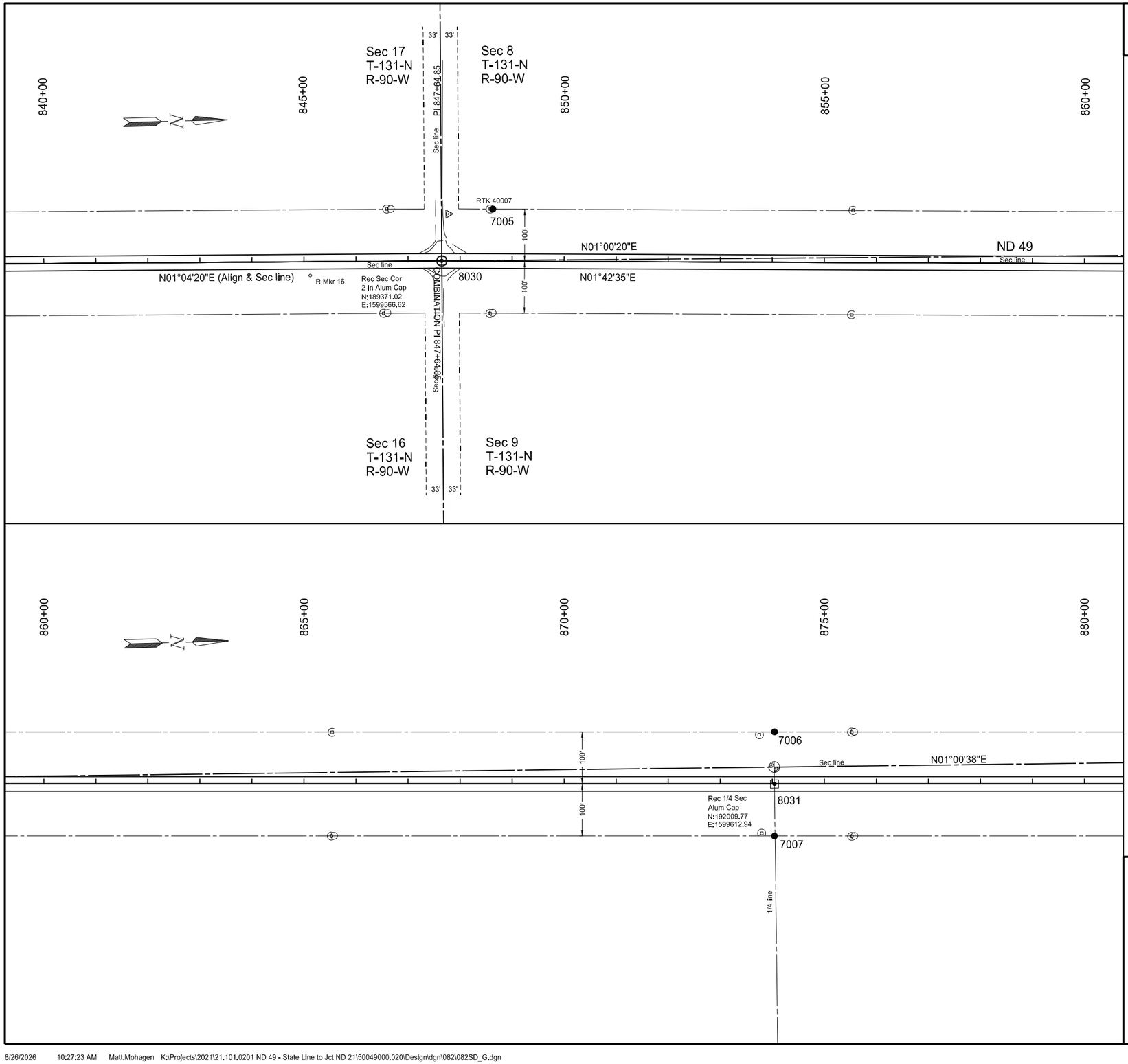
ND 49 - State Line to Jct ND 21

Sta 800+00 to Sta 840+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:58:19 -05'00'
NORTH DAKOTA

8/26/2026 10:27:23 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	22



POINT	NORTHING	EASTING	STATION	OFFSET
7005	189471.756	1599469.579	848+62.65	-100.00
7006	192012.188	1599545.414	874+04.21	-100.00
7007	192006.221	1599745.325	874+04.21	100.00
8030	189371.017	1599566.617	847+64.85	0.00
8031	192009.205	1599645.37	874+04.21	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

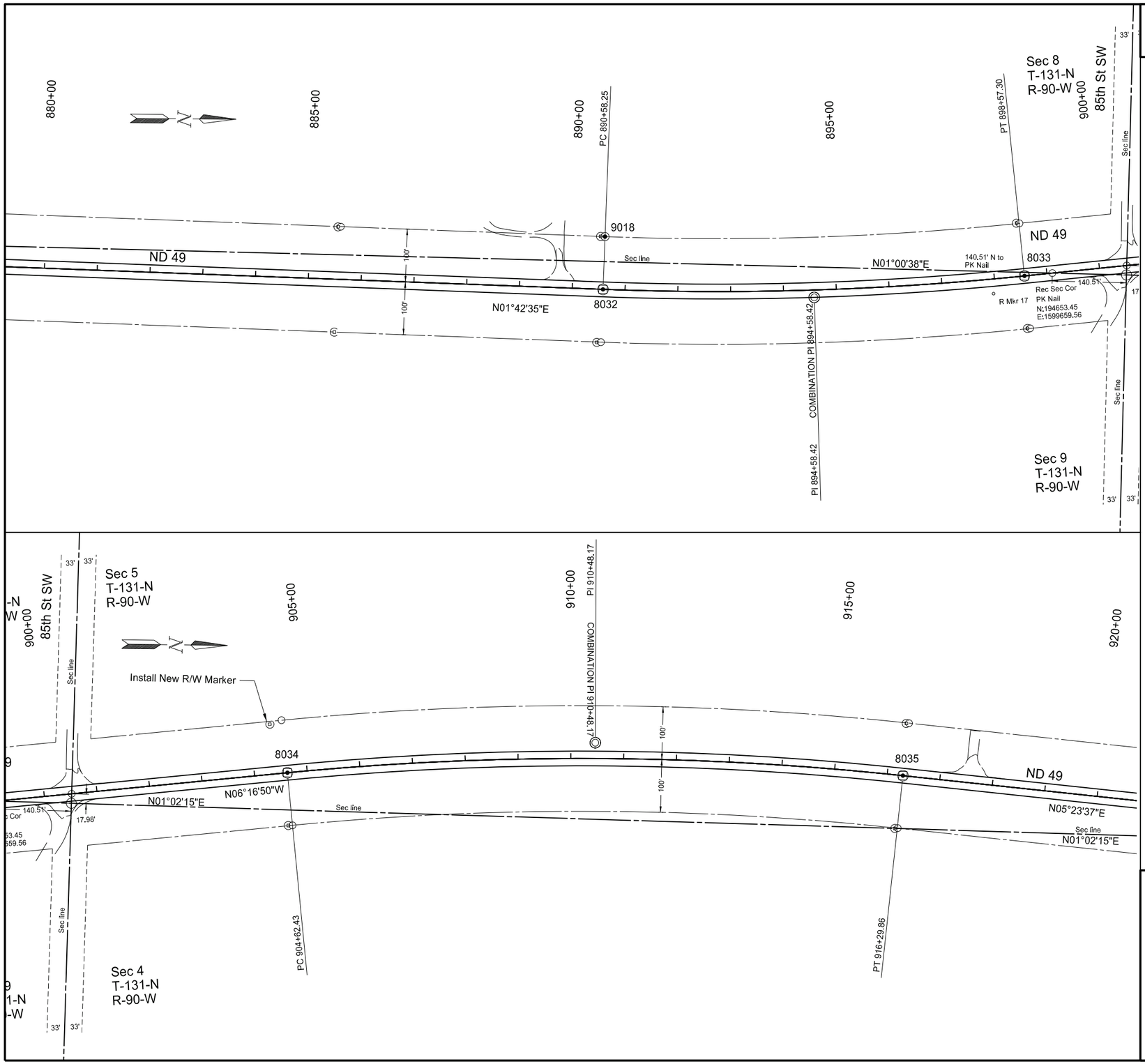
Sta 840+00 to Sta 880+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:58:38 -05'00'
NORTH DAKOTA

8/26/2026 10:27:23 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	23

POINT	NORTHING	EASTING	STATION	OFFSET
8032	193662.502	1599694.723	890+58.25	0.00
8033	194460.274	1599662.885	898+57.30	0.00
8034	195061.775	1599596.685	904+62.43	0.00
8035	196227.149	1599587.663	916+29.86	0.00
9018	193665.486	1599594.767	890+58.25	-100.00



Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

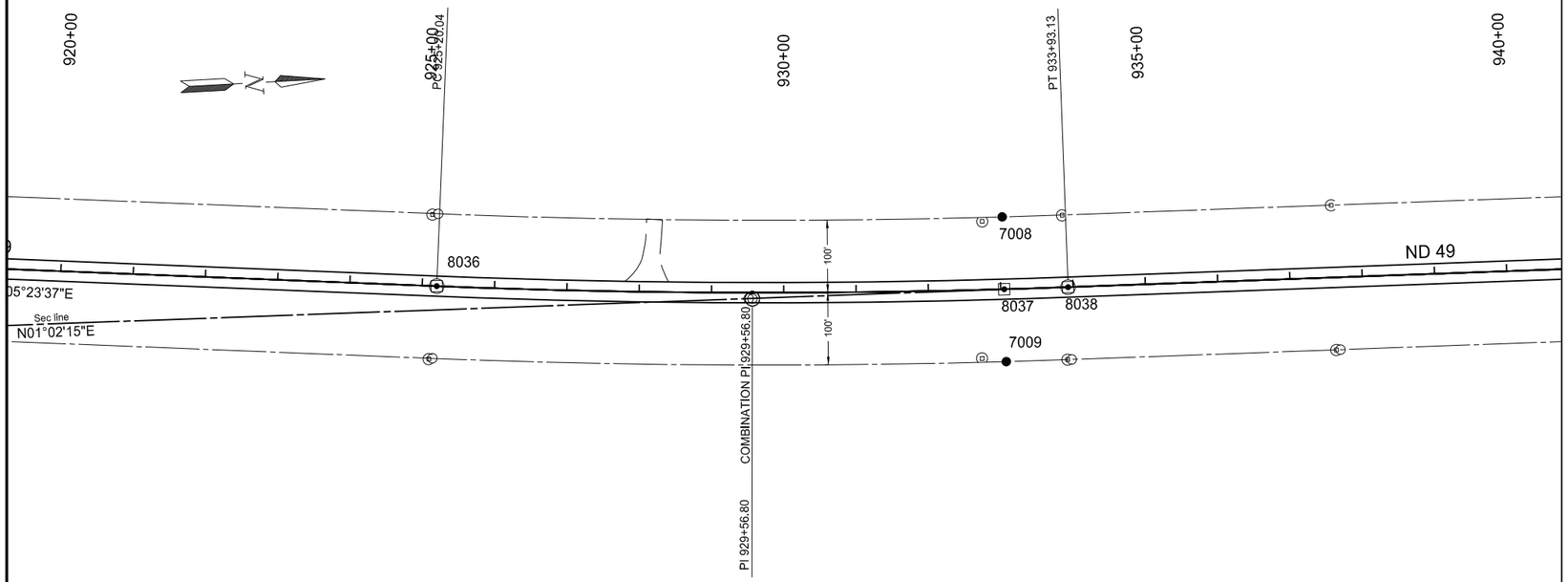
ND 49 - State Line to Jct ND 21

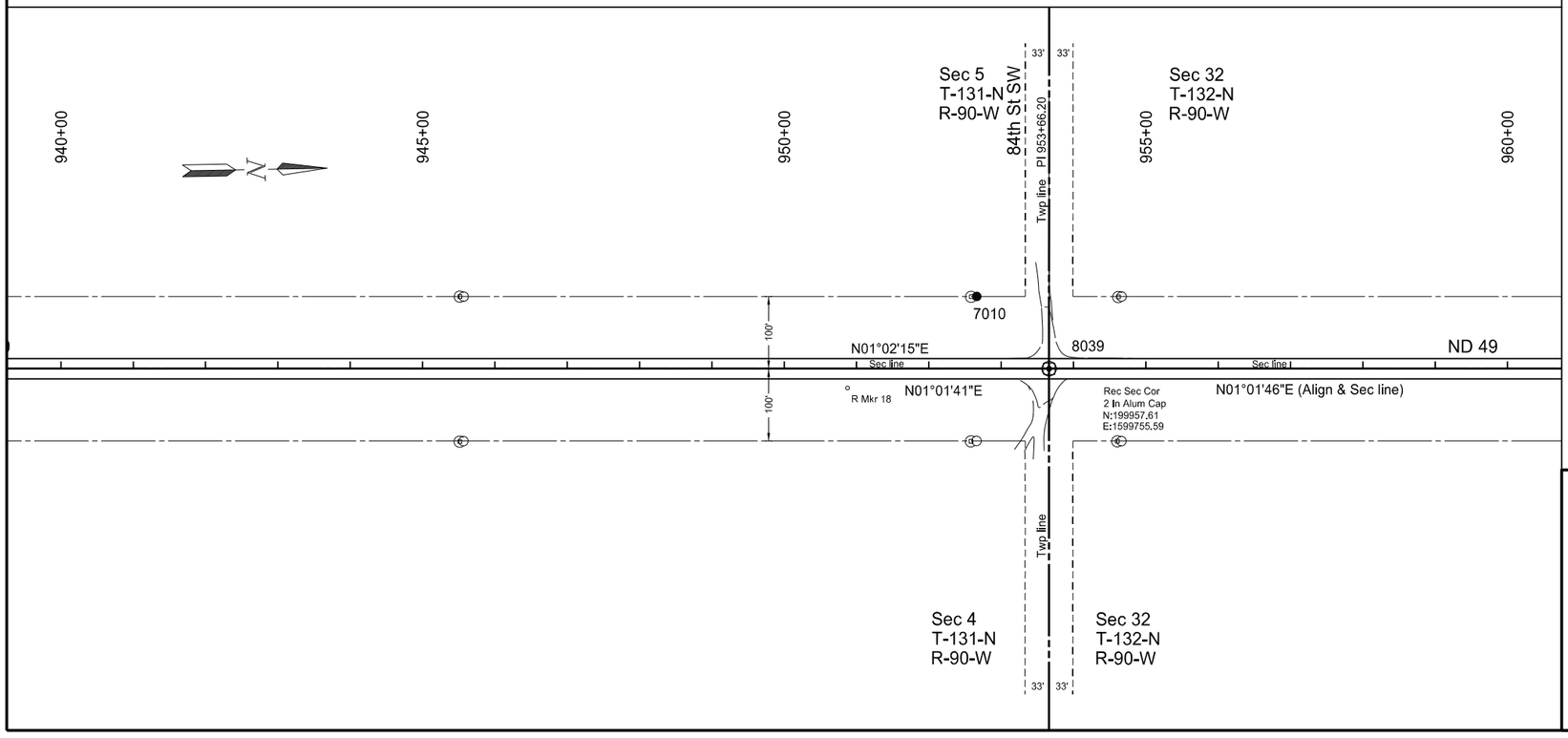
Sta 880+00 to Sta 920+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:59:02 -05'00'
NORTH DAKOTA

8/26/2026 10:27:24 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	24





POINT	NORTHING	EASTING	STATION	OFFSET
7008	197899.175	1599618.334	933+04.82	-100.00
7009	197894.045	1599818.269	933+04.82	100.00
7010	199859.452	1599653.85	952+66.19	-100.00
8036	197113.391	1599671.336	925+20.04	0.00
8037	197896.61	1599718.301	933+04.82	0.00
8038	197984.896	1599720.226	933+93.13	0.00
8039	199957.642	1599755.628	953+66.19	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

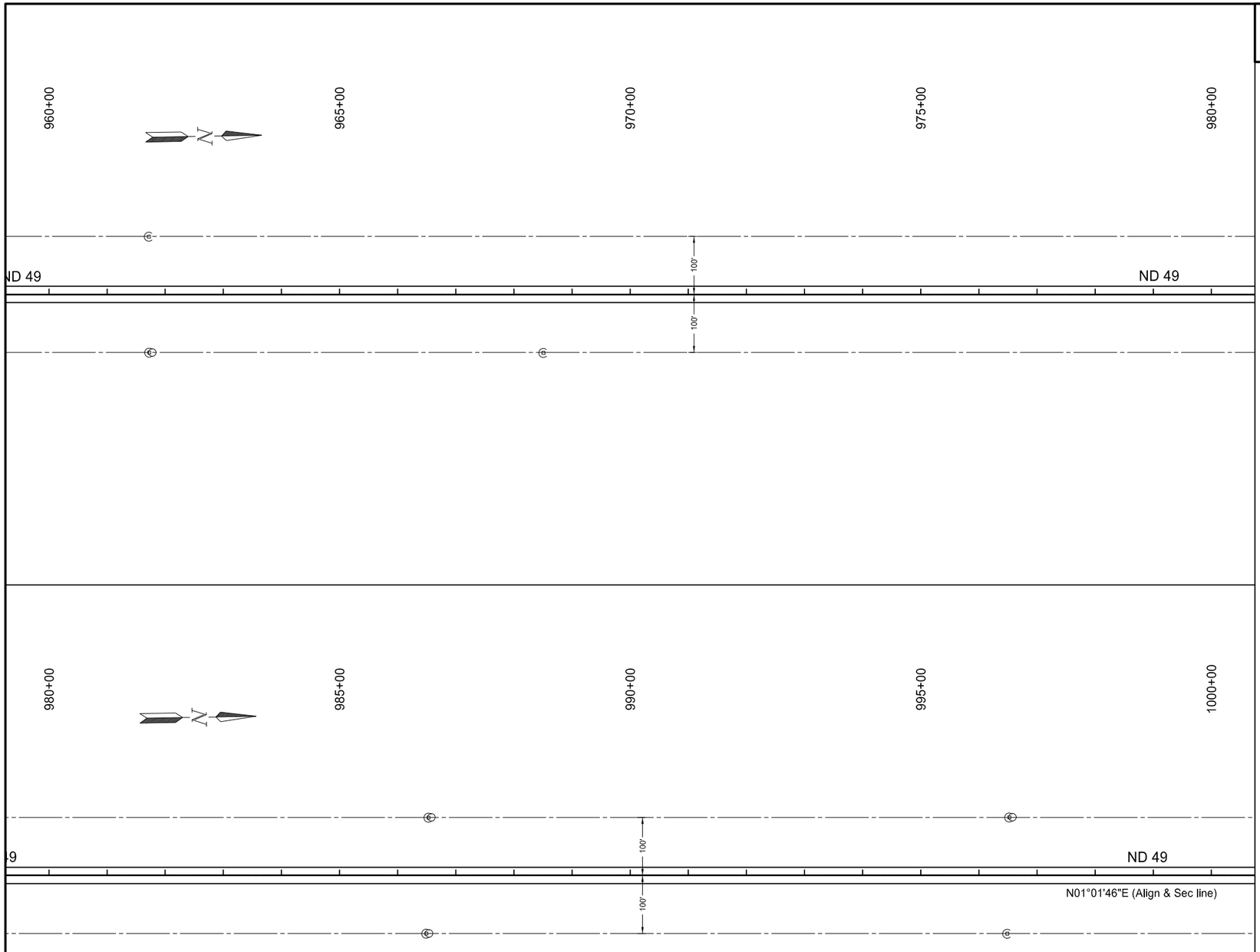
ND 49 - State Line to Jct ND 21

Sta 920+00 to Sta 960+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 12:59:31 -05'00'
NORTH DAKOTA

8/26/2026 10:27:25 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	25



Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

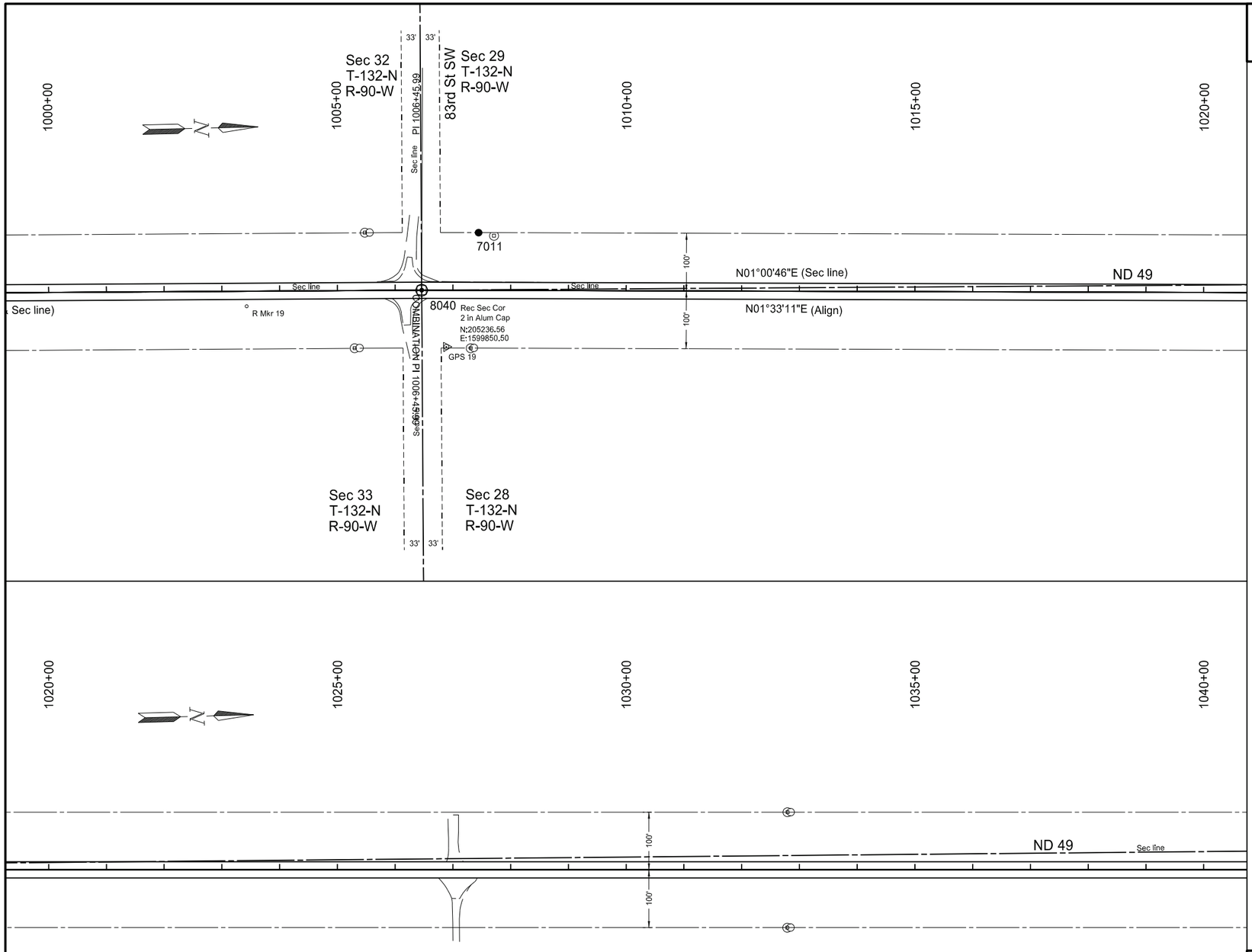
- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 960+00 to Sta 1000+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:00:06 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	26

POINT	NORTHING	EASTING	STATION	OFFSET
7011	205337.448	1599753.195	1007+44.18	-100.00
8040	205236.584	1599850.497	1006+45.99	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

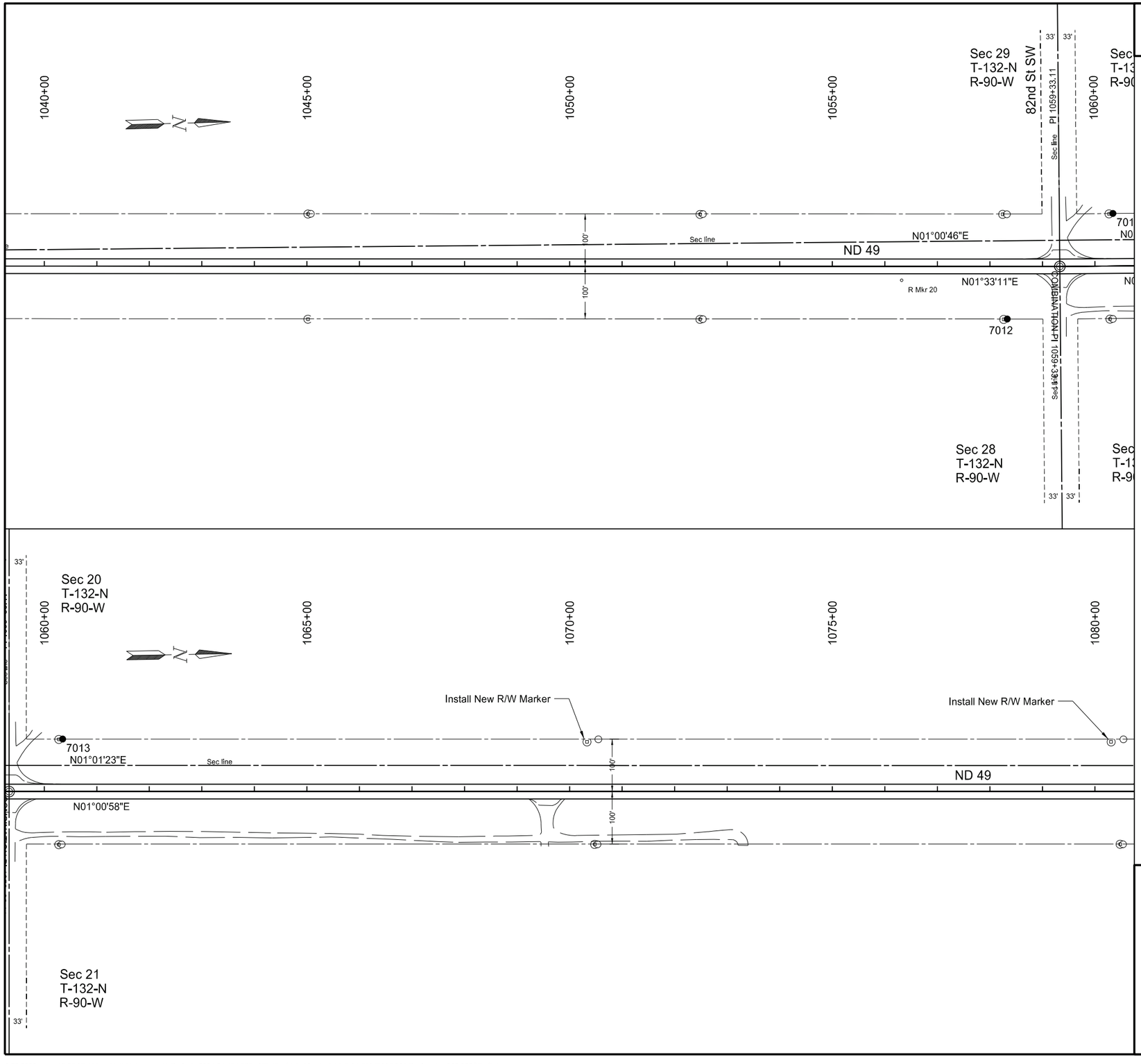
ND 49 - State Line to Jct ND 21

Sta 1000+00 to Sta 1040+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:01:08 -05'00'
NORTH DAKOTA

8/26/2026 10:27:26 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	27



POINT	NORTHING	EASTING	STATION	OFFSET
7012	210419.092	1600091.042	1058+33.11	100.00
7013	210625.414	1599895.612	1060+35.00	-100.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

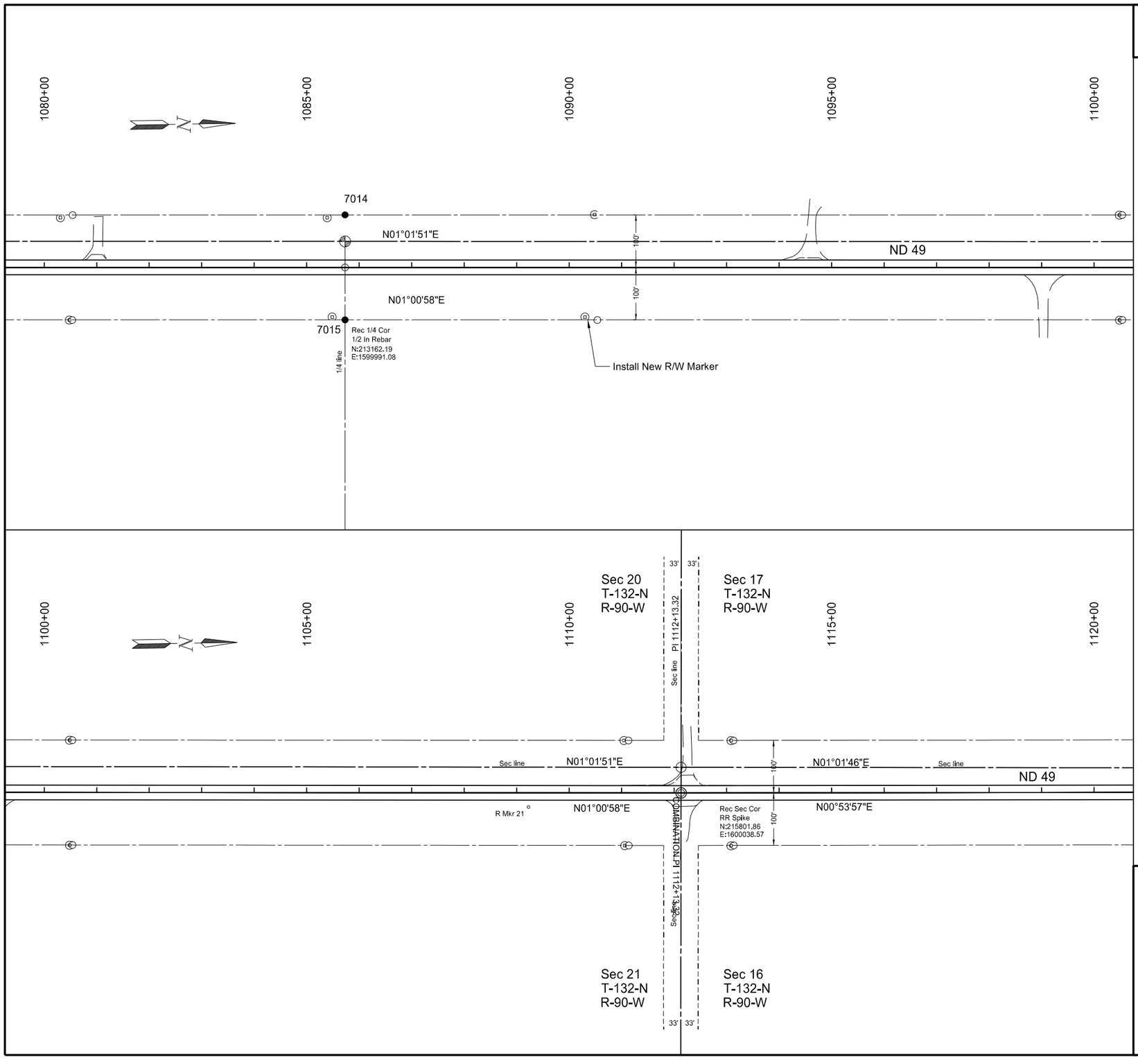
Sta 1040+00 to Sta 1080+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:01:53 -05'00'
NORTH DAKOTA

8/26/2026 10:27:27 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	28

POINT	NORTHING	EASTING	STATION	OFFSET
7014	213163.079	1599940.619	1085+73.07	-100.00
7015	213159.532	1600140.588	1085+73.07	100.00



Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

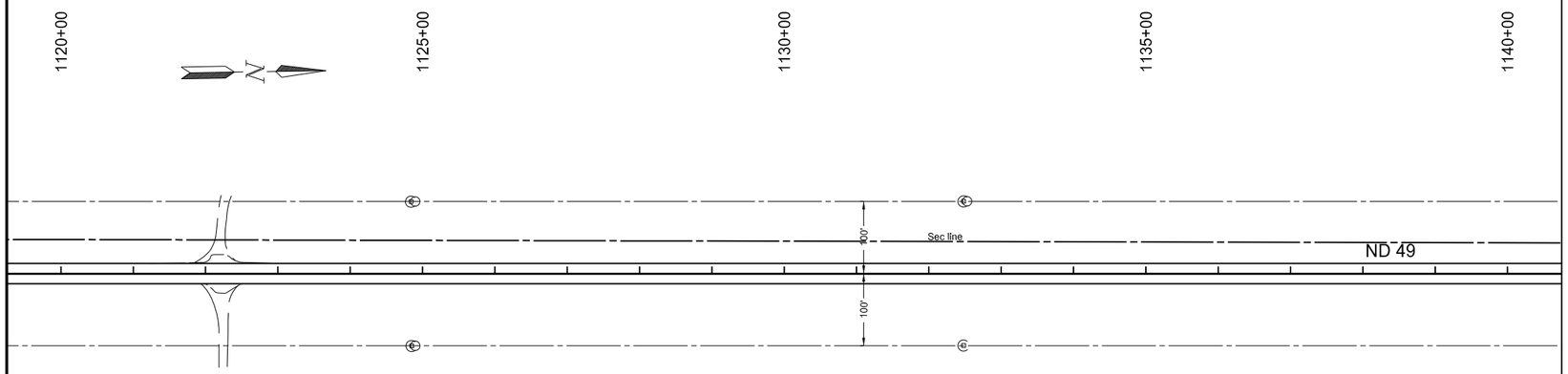
ND 49 - State Line to Jct ND 21

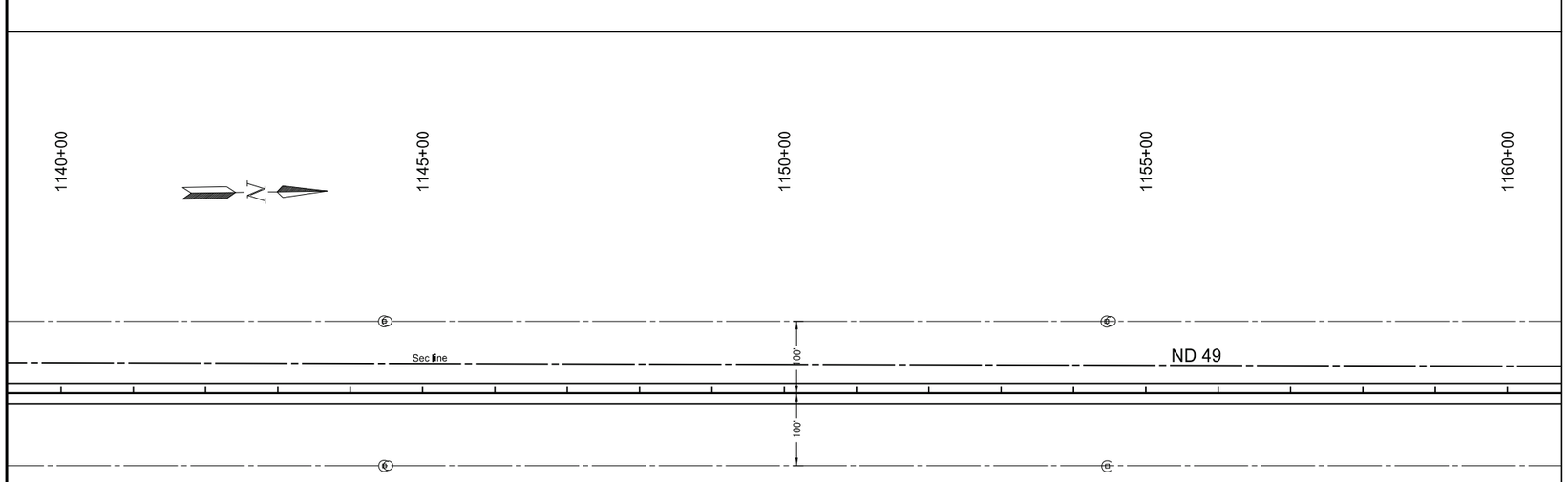
Sta 1080+00 to Sta 1120+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:03:15 -05'00'
NORTH DAKOTA

8/26/2026 10:27:28 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	29





Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

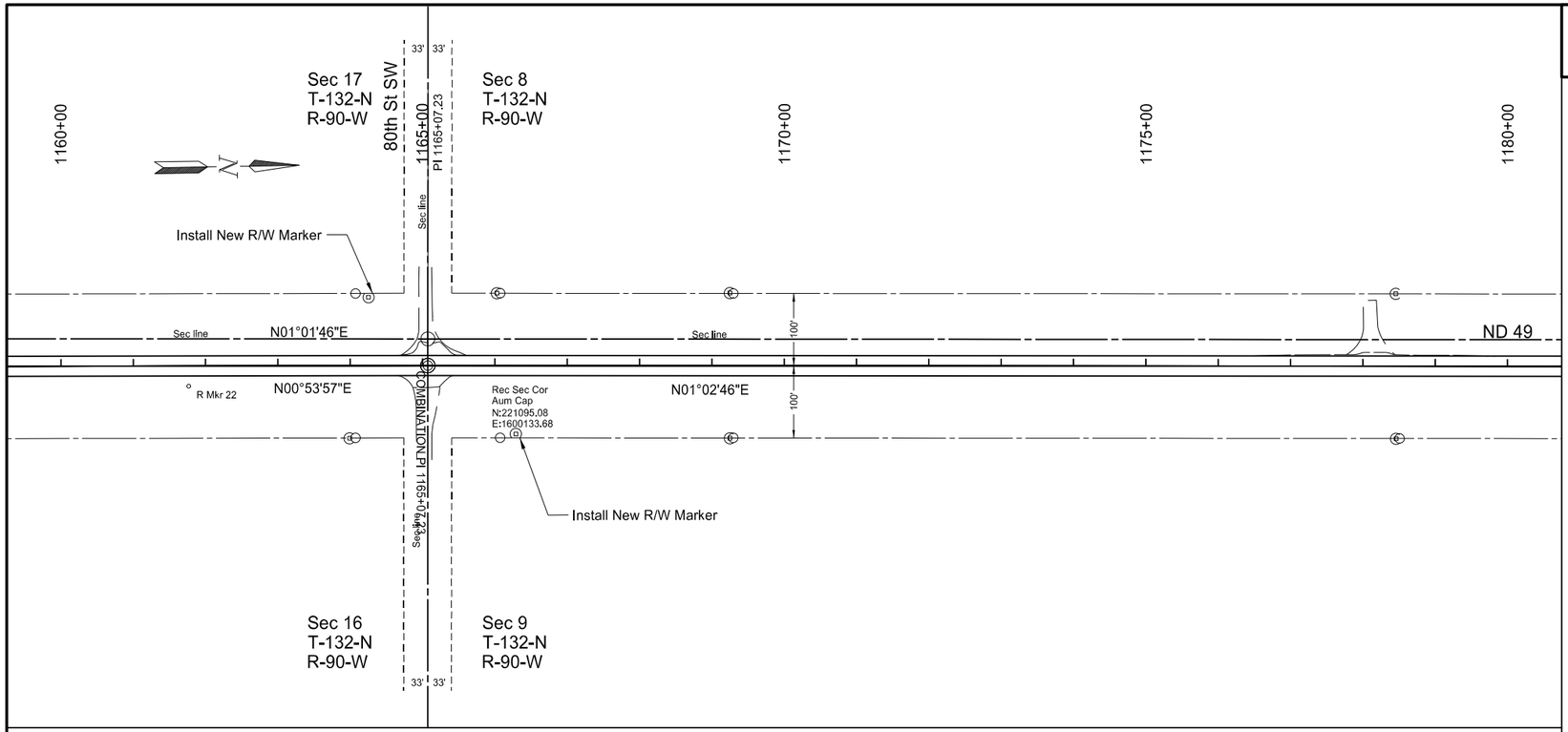
Survey Data Layout

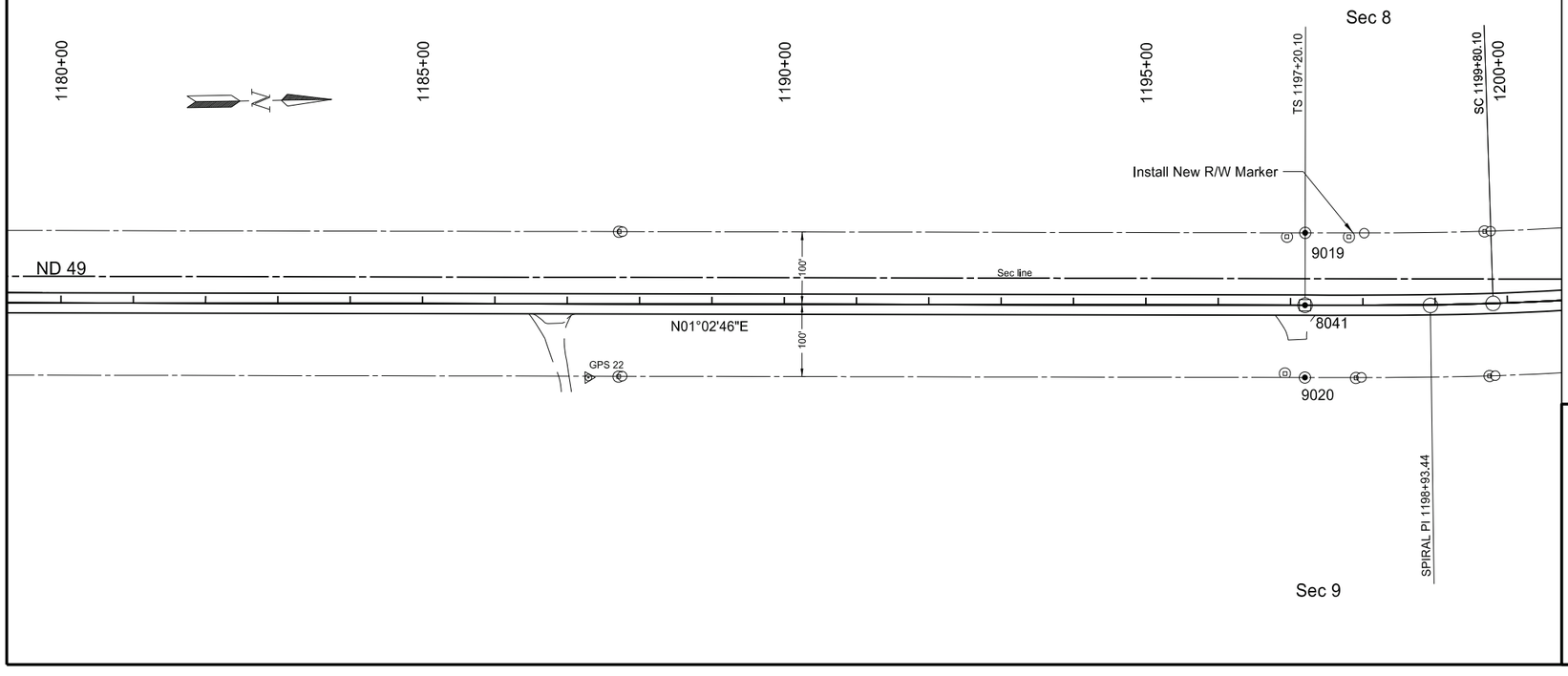
ND 49 - State Line to Jct ND 21

Sta 1120+00 to Sta 1160+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:03:36 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	30





POINT	NORTHING	EASTING	STATION	OFFSET
8041	224306.735	1600229.151	1197+20.10	0.00
9019	224308.56	1600129.167	1197+20.10	-100.00
9020	224304.909	1600329.134	1197+20.10	100.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 1160+00 to Sta 1200+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:03:54 -05'00'
NORTH DAKOTA

8/26/2026 10:27:29 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	31

POINT	NORTHING	EASTING	STATION	OFFSET
7017	224947.948	1600105.126	1203+74.27	-100.00
7018	224971.689	1600303.712	1203+74.27	100.00
7019	226342.857	1599646.45	1218+92.10	-100.00
7020	226441.605	1599820.371	1218+92.10	100.00
8042	224959.818	1600204.419	1203+74.27	0.00
8043	226392.231	1599733.411	1218+92.10	0.00
8044	226828.55	1599448.164	1224+13.67	0.00
8045	227349.51	1599077.106	1230+53.26	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

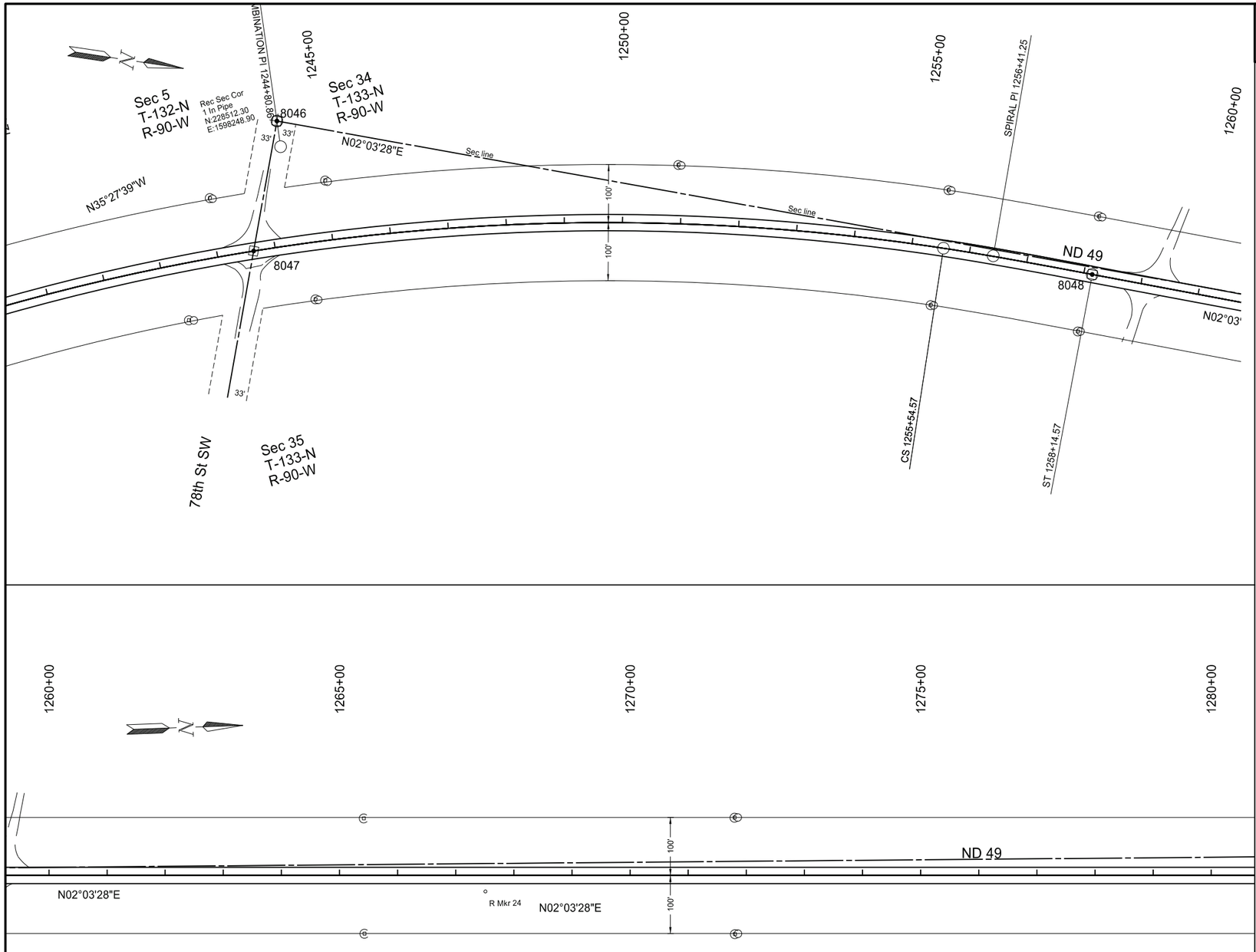
Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 1200+00 to Sta 1240+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:04:17 -05'00'
NORTH DAKOTA

8/26/2026 10:27:30 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	32

POINT	NORTHING	EASTING	STATION	OFFSET
8046	228512.304	1598248.895	1244+33.92	-215.08
8047	228506.187	1598475.974	1243+62.80	0.00
8048	229938.976	1598300.158	1258+14.57	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

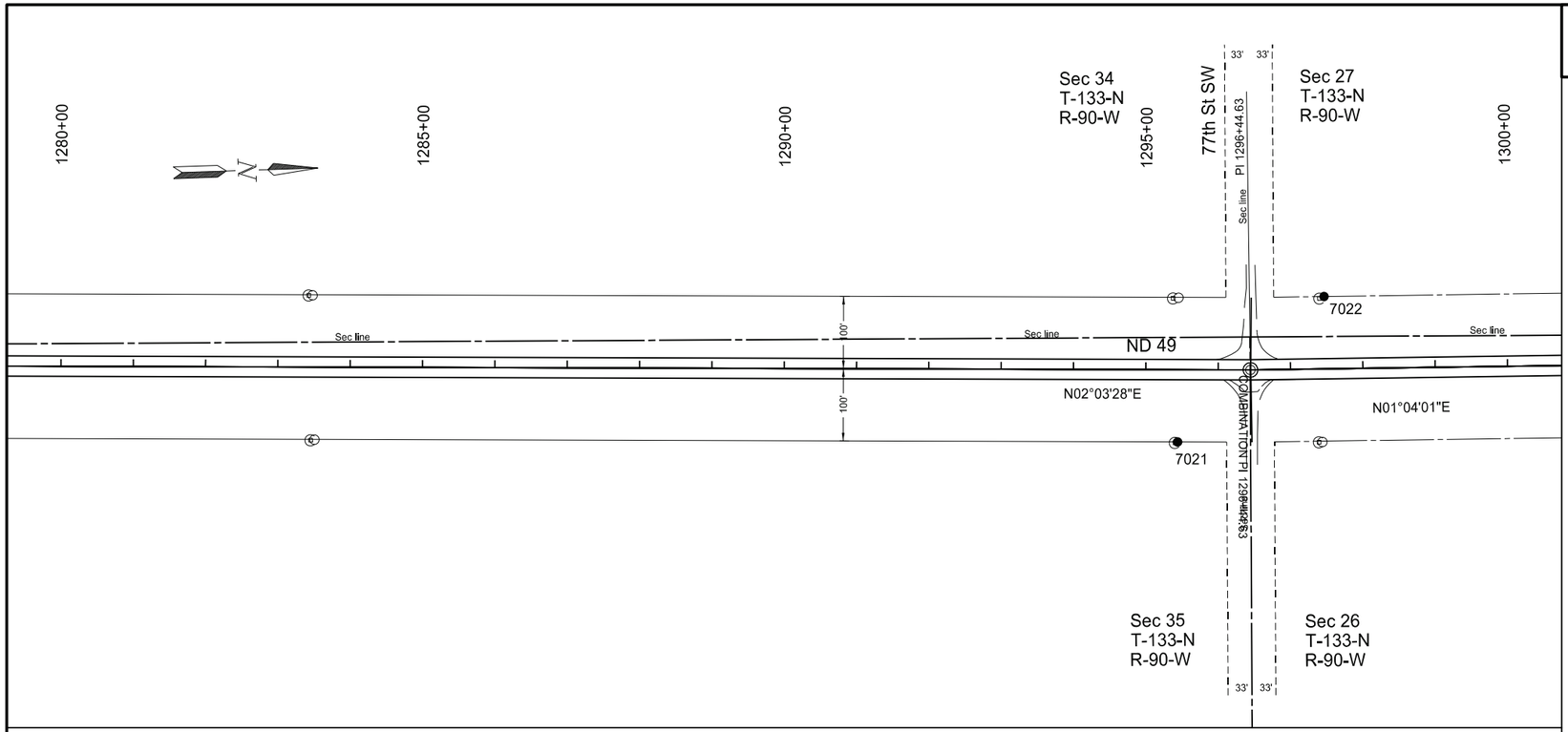
ND 49 - State Line to Jct ND 21

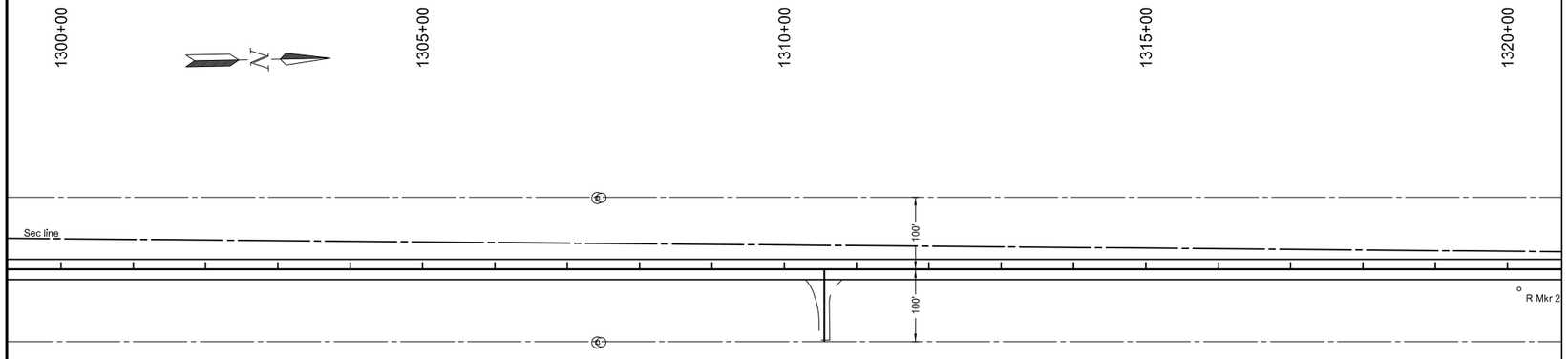
Sta 1240+00 to Sta 1280+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:04:39 -05'00'
NORTH DAKOTA

8/26/2026 10:27:30 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	33





POINT	NORTHING	EASTING	STATION	OFFSET
7021	233662.643	1598534.019	1295+44.24	100.00
7022	233871.527	1598339.626	1297+47.75	-100.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

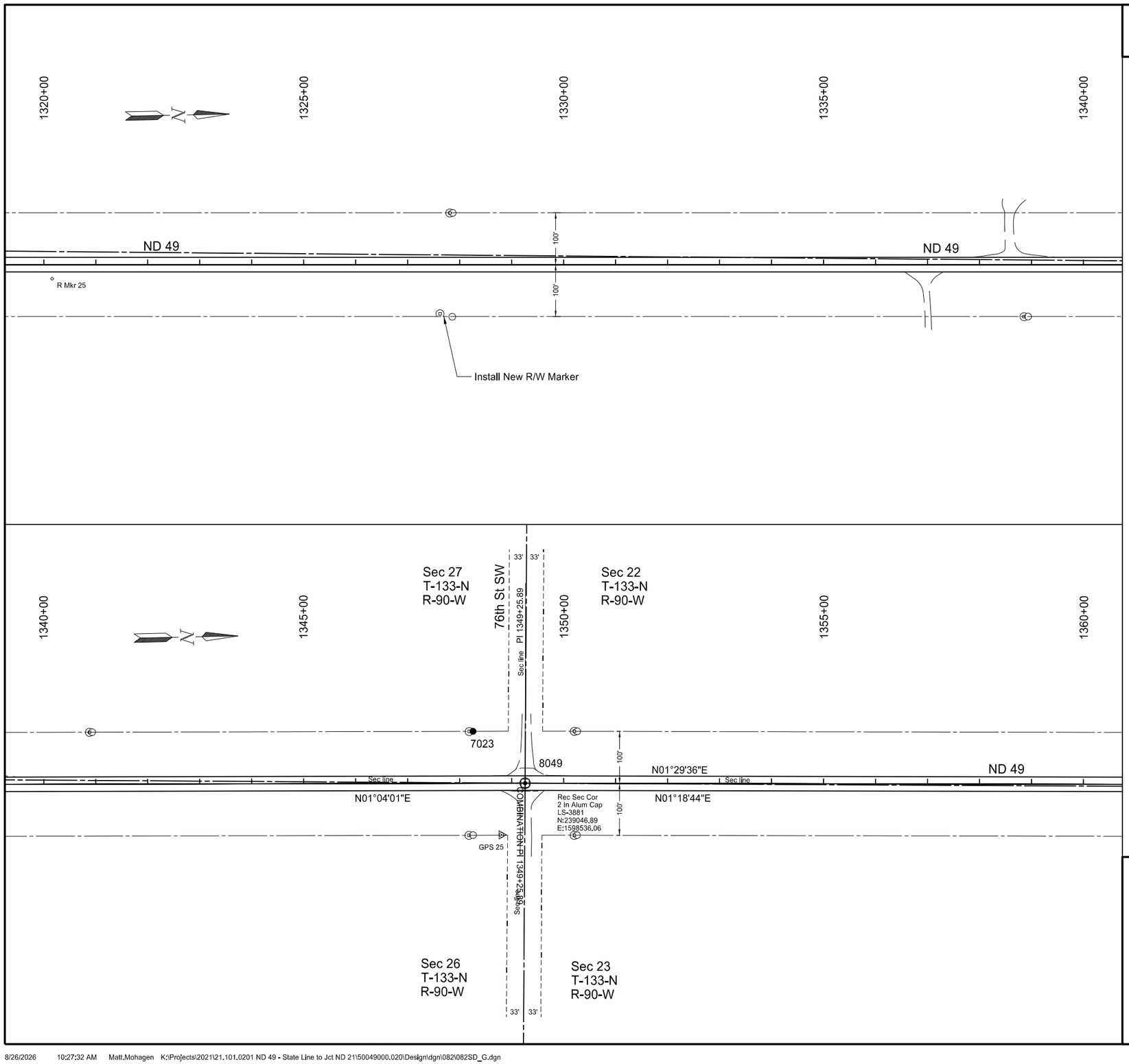
Sta 1280+00 to Sta 1320+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:04:58 -05'00'
NORTH DAKOTA

8/26/2026 10:27:31 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	34

POINT	NORTHING	EASTING	STATION	OFFSET
7023	238948.792	1598434.185	1348+25.90	-100.00
8049	239046.913	1598536.03	1349+25.90	0.00



Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

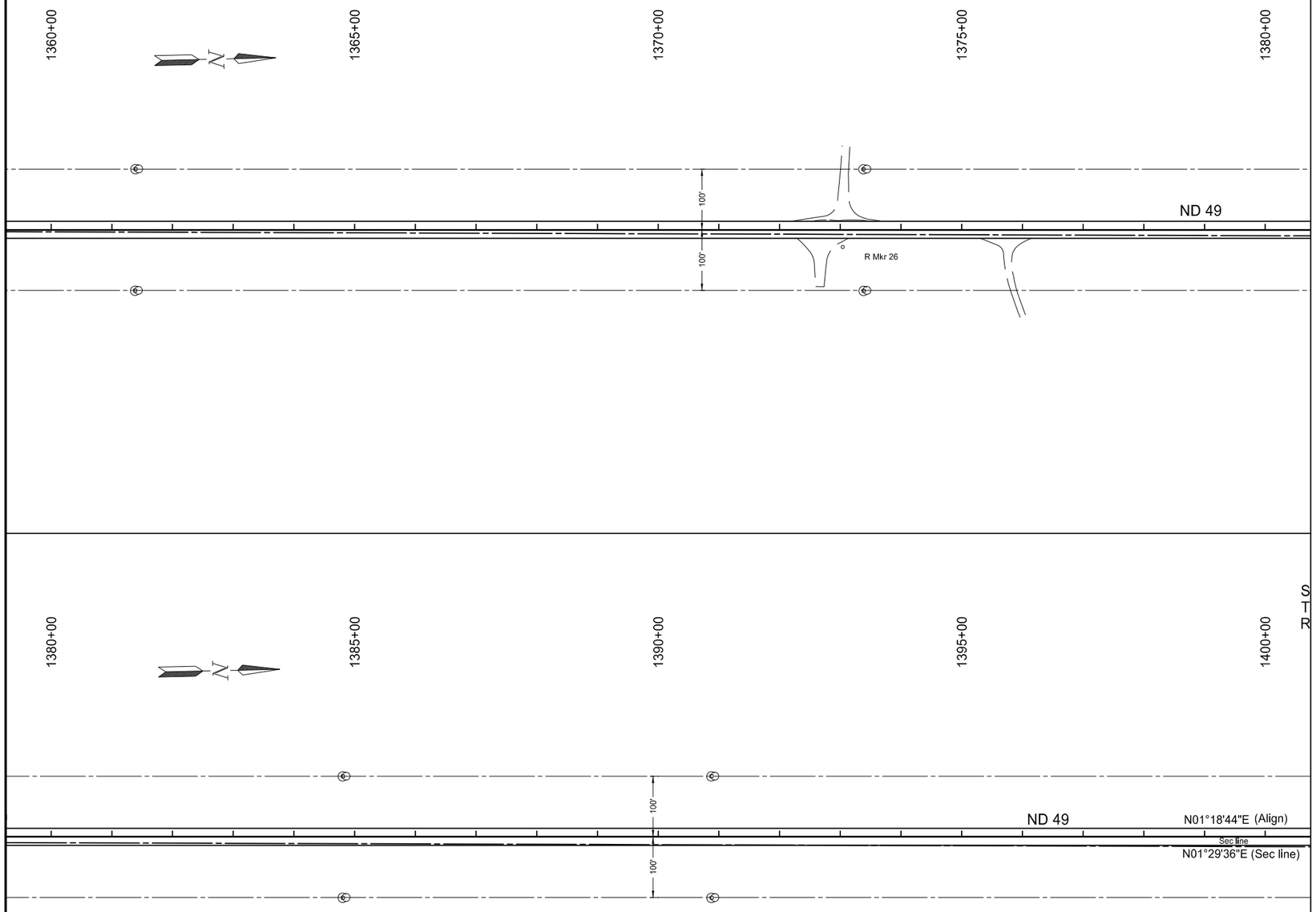
ND 49 - State Line to Jct ND 21

Sta 1320+00 to Sta 1360+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:05:25 -05'00'
NORTH DAKOTA

8/26/2026 10:27:32 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	35



Notes:

1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

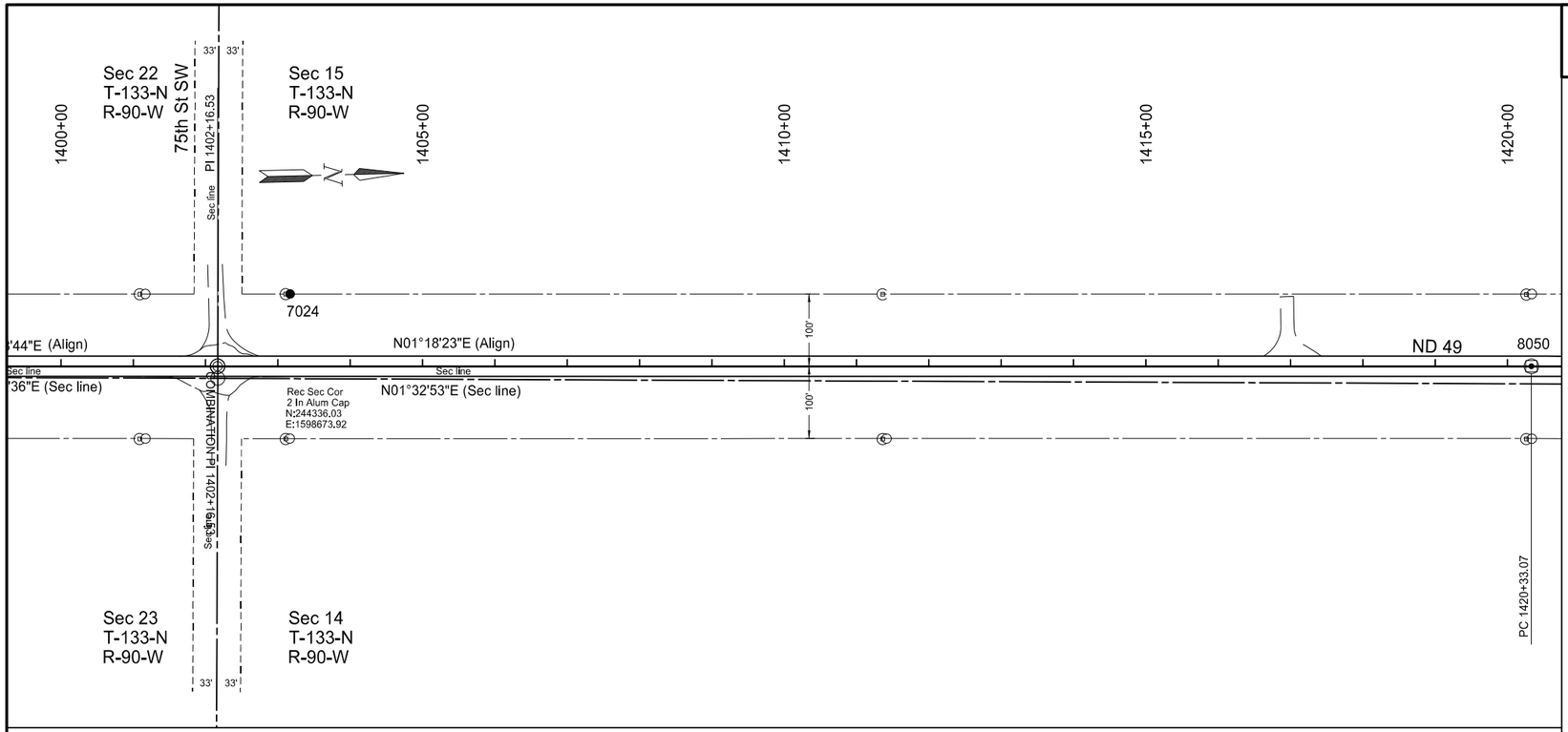
ND 49 - State Line to Jct ND 21

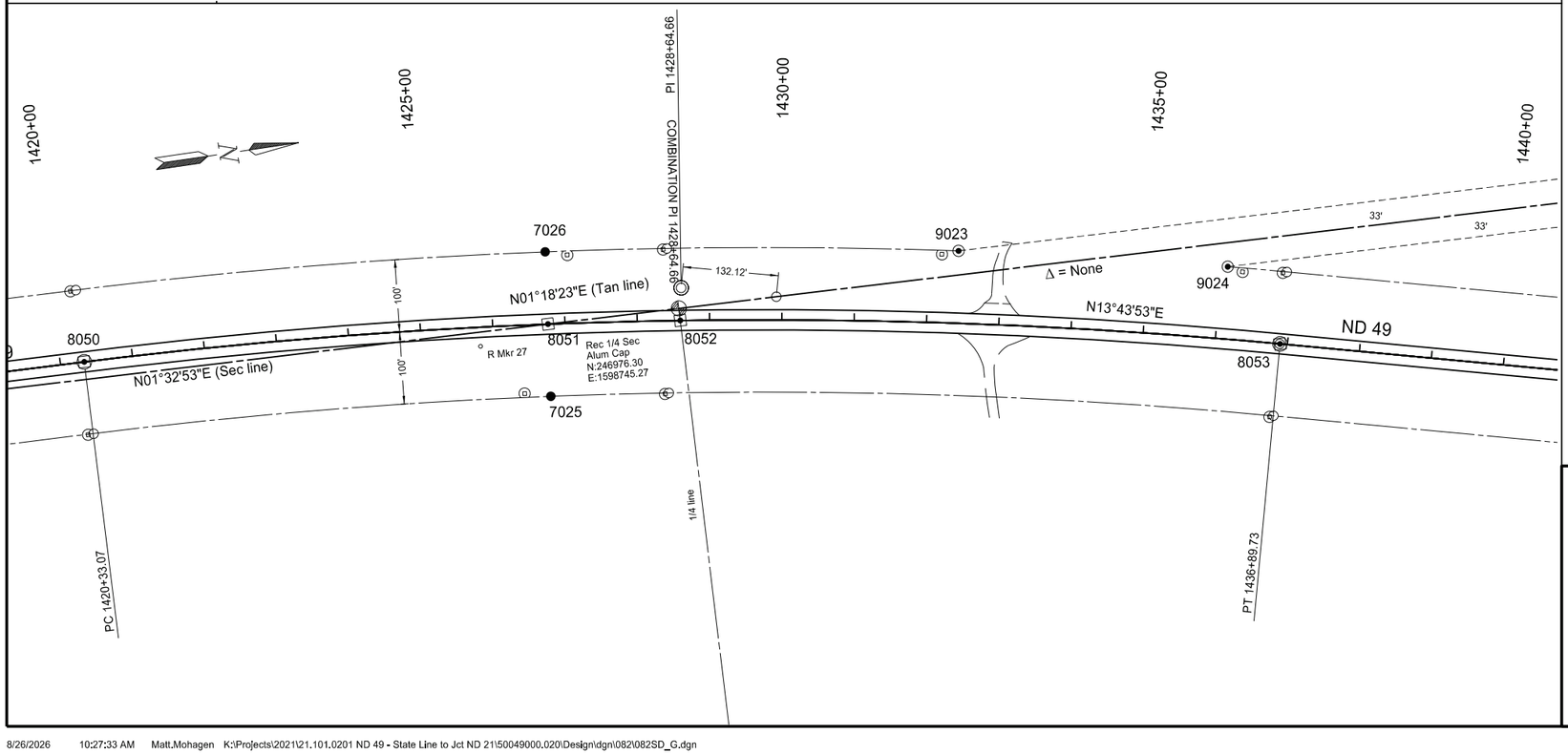
Sta 1360+00 to Sta 1400+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:05:45 -05'00'
NORTH DAKOTA

8/26/2026 10:27:32 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	36





POINT	NORTHING	EASTING	STATION	OFFSET
7024	244438.74	1598559.511	1403+16.86	-100.00
7025	246783.471	1598839.772	1426+76.54	100.00
7026	246804.836	1598640.916	1426+76.54	-100.00
8050	246152.228	1598698.614	1420+33.07	0.00
8051	246794.154	1598740.344	1426+76.54	0.00
8052	246975.842	1598762.069	1428+59.53	0.00
8053	247791.428	1598914.967	1436+89.73	0.00
9023	247370.468	1598722.913	1432+40.83	-100.00
9024	247735.518	1598798.809	1436+08.90	-100.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

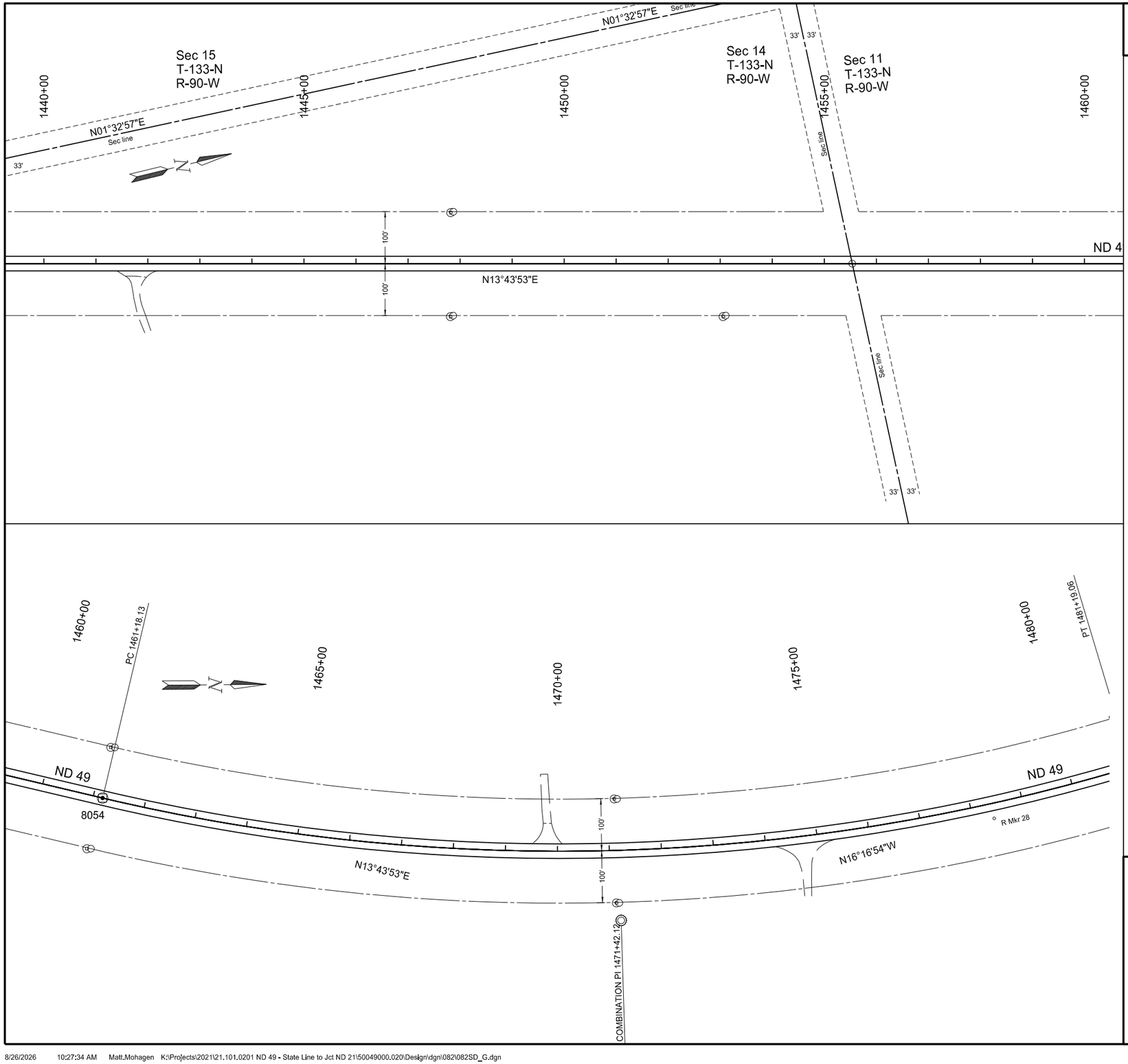
Sta 1400+00 to Sta 1440+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:06:08 -05'00'
NORTH DAKOTA

8/26/2026 10:27:33 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	37

POINT	NORTHING	EASTING	STATION	OFFSET
8054	250150.427	1599491.394	1461+18.13	0.00



Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

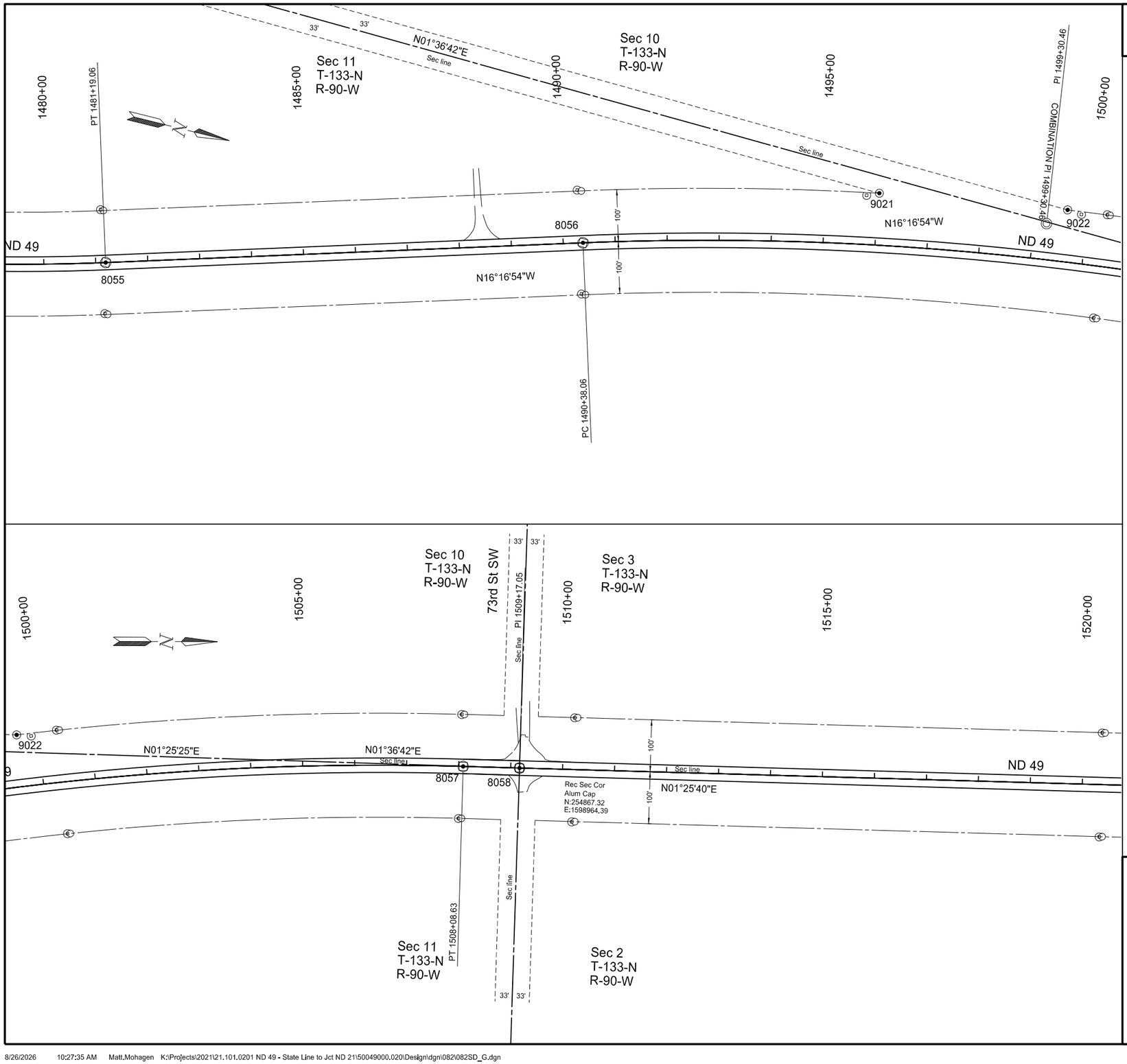
ND 49 - State Line to Jct ND 21

Sta 1440+00 to Sta 1480+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:06:31 -05'00'
NORTH DAKOTA

8/26/2026 10:27:34 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	38



POINT	NORTHING	EASTING	STATION	OFFSET
8055	252128.062	1599447.372	1481+19.06	0.00
8056	253010.21	1599189.719	1490+38.06	0.00
8057	254758.935	1598961.7	1508+08.63	0.00
8058	254867.321	1598964.394	1509+17.05	0.00
9021	253540.635	1598960.081	1496+02.67	-100.00
9022	253899.827	1598904.161	1499+60.01	-100.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

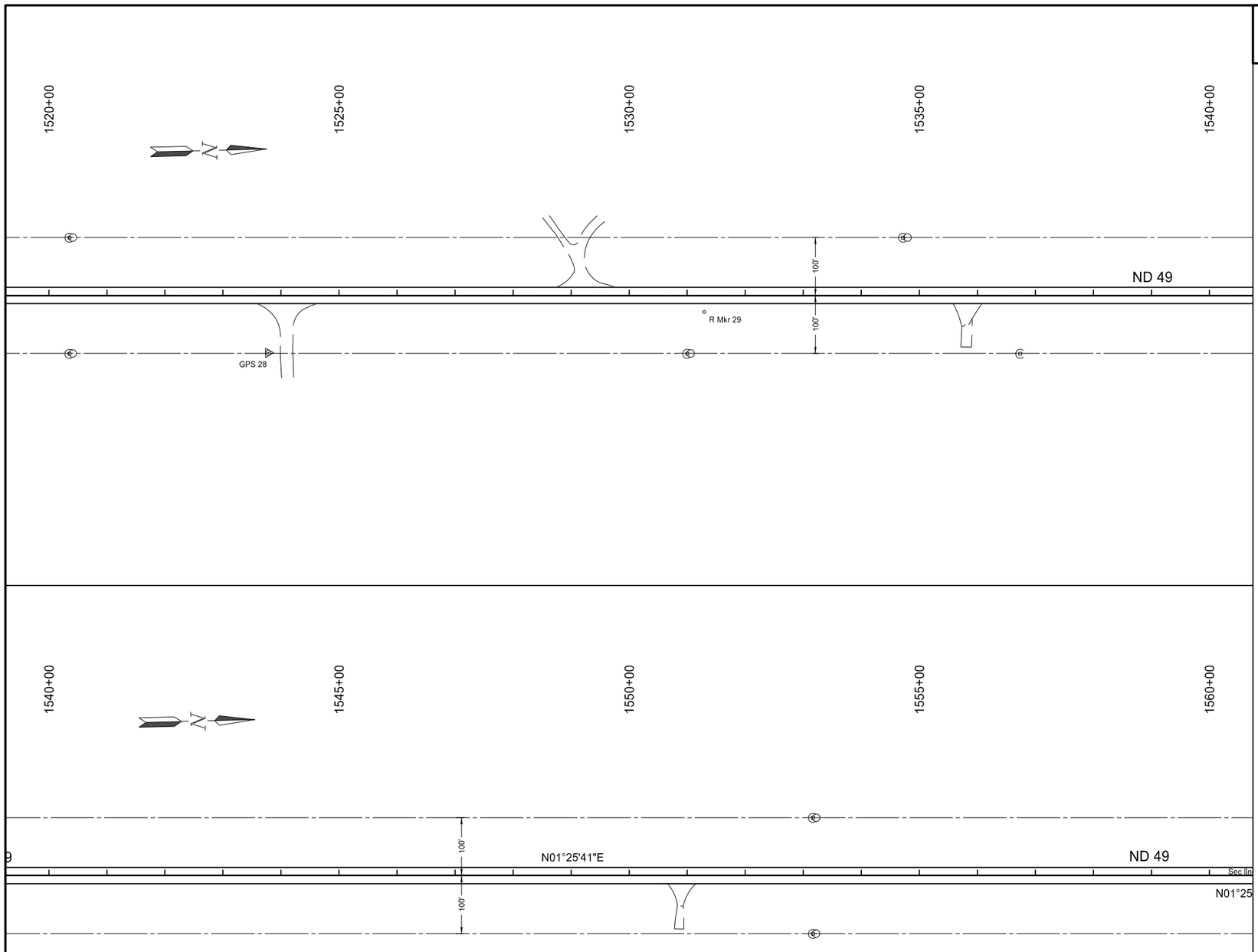
ND 49 - State Line to Jct ND 21

Sta 1480+00 to Sta 1520+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:06:52 -05'00'
NORTH DAKOTA

8/26/2026 10:27:35 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	82	39



Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

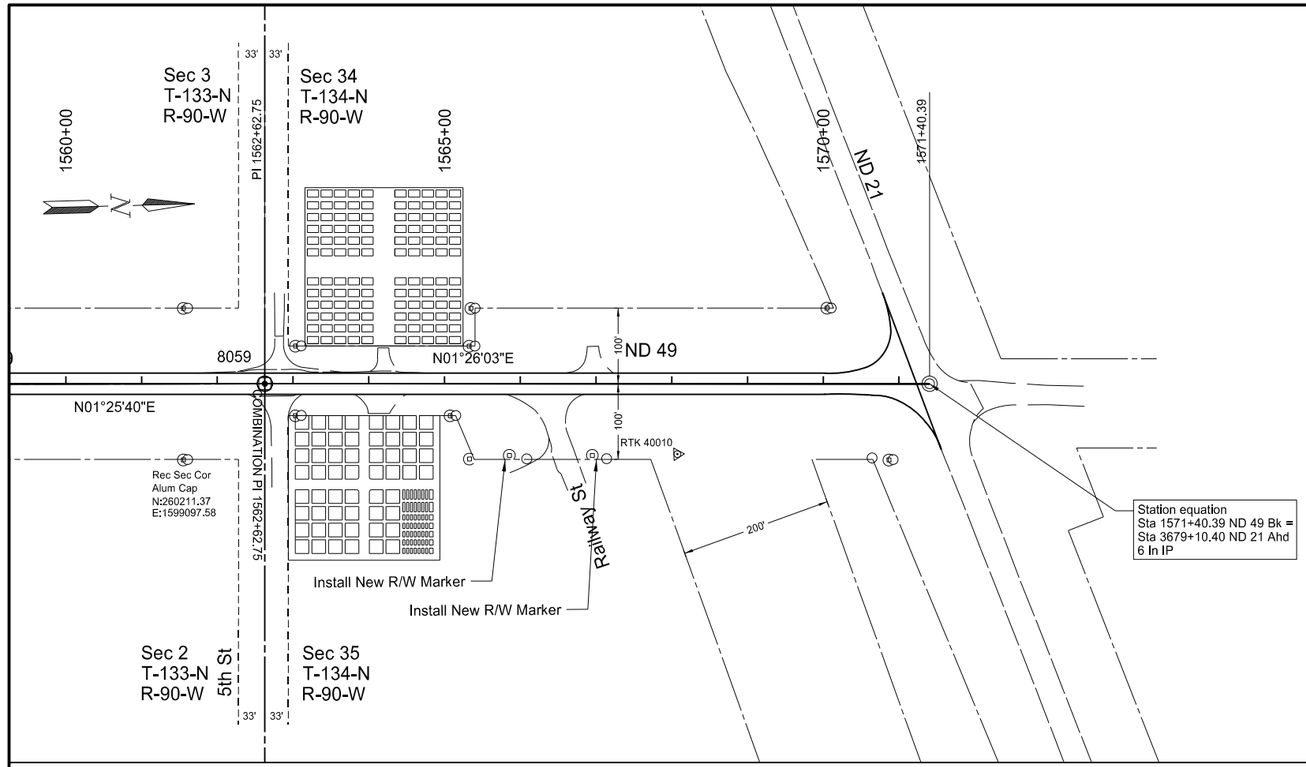
Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 1520+00 to Sta 1560+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:07:20 -05'00'
NORTH DAKOTA

8/26/2026 10:27:35 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Design\dgn\082\082SD_G.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	40

POINT	NORTHING	EASTING	STATION	OFFSET
8059	260211.366	1599097.583	1562+62.75	0.00

Notes:
1. Stationing is based on the alignment "SCL49_G" unless otherwise noted.
2. Survey data related items will only be installed from Sta 0+00 to Sta 426+00.

LEGEND

- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Monument Found
- Iron Pin R/W Monument

Survey Data Layout

ND 49 - State Line to Jct ND 21

Sta 1560+00 to Sta 1571+23
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:07:41 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	82	41

SCL49S - Sioux County

Point	North	East	Station	Offset	Alignment Monument
8000	104776.02	1597959.67	0.00	0.00	X
8001	110063.72	1598062.66	52+88.70	0.00	X
8002	115349.06	1598166.04	105+75.05	0.00	X
8003	120626.99	1598269.48	158+54.00	0.00	X
8004	125804.53	1598370.98	210+32.52	0.00	X
8005	125912.82	1598373.10	211+40.84	-0.51	X
8006	126021.06	1598377.27	212+49.16	0.00	X
8007	128377.68	1598468.05	236+07.52	0.00	X
8008	128741.57	1598476.29	239+71.51	0.00	X
8009	137121.33	1598535.53	323+51.49	0.00	X
8010	138731.79	1598316.29	339+82.30	0.00	X
8011	139756.04	1598024.40	350+47.33	0.00	X
8012	141820.52	1597935.07	371+37.85	0.00	X
8013	133427.12	1598508.96	286+57.18	0.00	X
Alignment Monument Total:					14

SCL49G - Grant County

Point	North	East	Station	Offset	Alignment Monument
8014	146495.03	1598821.07	418+80.66	0.00	X
8015	147065.32	1598830.26	424+51.02	0.00	X
8016	152358.31	1598915.70	477+44.70	0.00	X
8017	157501.18	1599003.45	528+88.32	0.00	X
8018	157653.44	1599005.04	530+40.59	0.00	X
8019	157805.67	1599004.60	531+92.82	0.00	X
8020	159981.86	1598983.90	553+69.11	0.00	X
8021	160588.19	1598994.18	559+75.60	0.00	X
8022	162768.51	1599088.90	581+57.97	0.00	X
8023	162936.92	1599096.21	583+26.53	1.24	X
8024	163105.47	1599098.57	584+95.08	0.00	X
8025	145498.95	1598717.48	408+77.93	0.00	X
8026	168219.85	1599170.15	636+09.96	0.00	X
8027	173508.60	1599269.53	688+99.65	0.00	X
8028	178789.33	1599368.54	741+81.31	0.00	X
8029	184080.25	1599467.59	794+73.16	0.00	X
8030	189371.02	1599566.62	847+64.85	0.00	X
8031	192009.21	1599645.37	874+04.21	0.00	X
8032	193662.50	1599694.72	890+58.25	0.00	X
8033	194460.27	1599662.89	898+57.30	0.00	X
8034	195061.78	1599596.69	904+62.43	0.00	X
8035	196227.15	1599587.66	916+29.86	0.00	X
8036	197113.39	1599671.34	925+20.04	0.00	X
8037	197896.61	1599718.30	933+04.82	0.00	X
8038	197984.90	1599720.23	933+93.13	0.00	X
8039	199957.64	1599755.63	953+66.19	0.00	X
8040	205236.58	1599850.50	1006+45.99	0.00	X
8041	224306.74	1600229.15	1197+20.10	0.00	X
8042	224959.82	1600204.42	1203+74.27	0.00	X
8043	226392.23	1599733.41	1218+92.10	0.00	X
8044	226828.55	1599448.16	1224+13.67	0.00	X
8045	227349.51	1599077.11	1230+53.26	0.00	X
8046	228512.30	1598248.90	1244+33.92	-215.08	X
8047	228506.19	1598475.97	1243+62.80	0.00	X
8048	229938.98	1598300.16	1258+14.57	0.00	X
8049	239046.91	1598536.03	1349+25.90	0.00	X
8050	246152.23	1598698.61	1420+33.07	0.00	X
8051	246794.15	1598740.34	1426+76.54	0.00	X
8052	246975.84	1598762.07	1428+59.53	0.00	X
8053	247791.43	1598914.97	1436+89.73	0.00	X
8054	250150.43	1599491.39	1461+18.13	0.00	X
8055	252128.06	1599447.37	1481+19.06	0.00	X
8056	253010.21	1599189.72	1490+38.06	0.00	X
8057	254758.94	1598961.70	1508+08.63	0.00	X
8058	254867.32	1598964.39	1509+17.05	0.00	X
8059	260211.37	1599097.58	1562+62.75	0.00	X
Alignment Monument Total:					46

SCL49S - Sioux County

Point	North	East	Station	Offset	R/W Marker (Witness Post)	Iron Pin R/W Monument	Iron Pin Reference Monument
7000	133427.84	1598408.96	286+57.18	-100.00	X		X
7001	133426.39	1598608.95	286+57.18	100.00	X		X
9000	104782.10	1597659.73	0+00.23	-300.00	X	X	
9001	104770.18	1598259.61	0+00.00	300.00	X	X	
9002	104978.01	1597863.59	2+00.08	-100.00	X	X	
9003	104984.23	1598053.74	2+10.00	90.00	X	X	
9004	128381.53	1598368.13	236+07.52	-100.00	X	X	
9005	138759.19	1598412.46	339+82.30	100.00		X	
9006	140021.98	1597848.80	353+47.33	-100.00	X	X	
9007	144028.32	1598464.10	394+05.95	100.00	X	X	
9008	144026.42	1598473.92	394+05.95	110.00	X	X	
9009	144224.68	1598502.10	396+05.95	100.00	X	X	
9010	144222.78	1598511.91	396+05.95	110.00	X	X	
9011	137618.39	1598617.74	328+41.18	100.00	X	X	
9012	138095.55	1598560.35	333+13.66	100.00	X	X	
R/W Marker Total:					14		
Iron Pin R/W Monument Total:						13	
Iron Pin Reference Monument:							2

SCL49G - Grant County

Point	North	East	Station	Offset	R/W Marker (Witness Post)	Iron Pin R/W Monument	Iron Pin Reference Monument
7002	168121.26	1599068.76	635+09.96	-100.00			X
7003	168320.75	1599072.03	637+09.01	-100.00			X
7004	173610.47	1599171.42	689+99.66	-100.00			X
7005	189471.76	1599469.58	848+62.65	-100.00			X
7006	192012.19	1599545.41	874+04.21	-100.00	X		X
7007	192006.22	1599745.33	874+04.21	100.00	X		X
7008	197899.18	1599618.33	933+04.82	-100.00	X		X
7009	197894.05	1599818.27	933+04.82	100.00	X		X
7010	199859.45	1599653.85	952+66.19	-100.00			X
7011	205337.45	1599753.20	1007+44.18	-100.00	X		X
7012	210419.09	1600091.04	1058+33.11	100.00			X
7013	210625.41	1599895.61	1060+35.00	-100.00			X
7014	213163.08	1599940.62	1085+73.07	-100.00	X		X
7015	213159.53	1600140.59	1085+73.07	100.00	X		X
7017	224947.95	1600105.13	1203+74.27	-100.00	X		X
7018	224971.69	1600303.71	1203+74.27	100.00	X		X
7019	226342.86	1599646.45	1218+92.10	-100.00	X		X
7020	226441.61	1599820.37	1218+92.10	100.00	X		X
7021	233662.64	1598534.02	1295+44.24	100.00			X
7022	233871.53	1598339.63	1297+47.75	-100.00			X
7023	238948.79	1598434.19	1348+25.90	-100.00			X
7024	244438.74	1598559.51	1403+16.86	-100.00			X
7025	246783.47	1598839.77	1426+76.54	100.00	X		X
7026	246804.84	1598640.92	1426+76.54	-100.00	X		X
9013	158299.69	1598844.90	536+88.34	-155.00	X	X	
9014	158924.66	1598838.95	543+13.34	-155.00	X	X	
9015	164140.36	1599013.05	595+28.68	-100.00	X	X	
9016	164140.78	1598983.05	595+28.68	-130.00	X	X	
9017	164540.32	1599018.64	599+28.68	-100.00	X	X	
9018	193665.49	1599594.77	890+58.25	-100.00		X	
9019	224308.56	1600129.17	1197+20.10	-100.00	X	X	
9020	224304.91	1600329.13	1197+20.10	100.00	X	X	
9021	253540.64	1598960.08	1496+02.67	-100.00	X	X	
9022	253899.83	1598904.16	1499+60.01	-100.00	X	X	
9023	247370.47	1598722.91	1432+40.83	-100.00	X	X	
9024	247735.52	1598798.81	1436+08.90	-100.00	X	X	
R/W Marker Total:					24		
Iron Pin R/W Monument Total:						12	
Iron Pin Reference Monument:							24

SPEC	CODE	BID ITEM	QTY	UNIT
720	0110	RIGHT OF WAY MARKERS		
		ND 49	66	EA
720	0125	ALIGNMENT MONUMENTS		
		ND 49	60	EA
720	0130	IRON PIN R/W MONUMENTS		
		ND 49	25	EA
720	0135	IRON PIN REFERENCE MONUMENTS		
		ND 49	26	EA

Survey Data Layout

ND 49 - State Line to Jct ND 21

Quantities

REGISTERED PROFESSIONAL ENGINEER
BRENT MUSCHA
PE-7123
DATE 2026.08.27 13:08:14 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**4**	**28**	**112**
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**8**	**26**	**208**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**2**	**18**	**36**
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**19**	**43**	**817**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**36**	**72**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**59**	**236**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**4**	**32**	**128**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**12**	**30**	**360**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**12**	**39**	**468**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**10**	**10**	**100**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-36	**36"x48"**	**DO NOT PASS (Portable only)**	**2**	**30**	**60**
R4-1-48	**48"x60"**	**DO NOT PASS**	**8**	**39**	**312**
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**	**4**	**16**	**64**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**2**	**35**	**70**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**4**	**35**	**140**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**6**	**35**	**210**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**6**	**35**	**210**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	**48"x48"**	**ROAD NARROWS**	**1**	**35**	**35**
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**2**	**35**	**70**
W8-3-48	**48"x48"**	**PAVEMENT ENDS**	**6**	**35**	**210**
W8-7-48	**48"x48"**	**LOOSE GRAVEL**	**8**	**35**	**280**
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	**48"x48"**	**NO CENTER LINE**	**8**	**35**	**280**
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**6**	**35**	**210**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE (Portable only)**	**6**	**35**	**210**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**4**	**35**	**140**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**6**	**35**	**210**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**6**	**5**	**30**
W20-52P-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**	**8**	**12**	**96**
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**2**	**35**	**70**
W21-3-48	**48"x48"**	**ROAD MACHINERY AHEAD or __ FT or _ MILE**	**1**	**35**	**35**
W21-5-48	48"x48"	SHOULDER WORK		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**4**	**35**	**140**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

NPDES Perm	**36"x30"**	**NPDES PERMIT**	**2**	**18**	**36**
EPA Permit	**36"x24"**	**EPA PERMIT NOTIFICATION**	**2**	**18**	**36**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**5901**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**5000**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**2**
704-1043	**ATTENUATION DEVICE-TYPE B-65**	**EACH**	**4**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**6**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**8**
704-1060	**DELINEATOR DRUMS**	**EACH**	**140**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**350**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**180**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1185	**PILOT CAR**	**HR**	**2000**
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**80**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**413**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE - TYPE R**	**LF**	**5540**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**96**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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

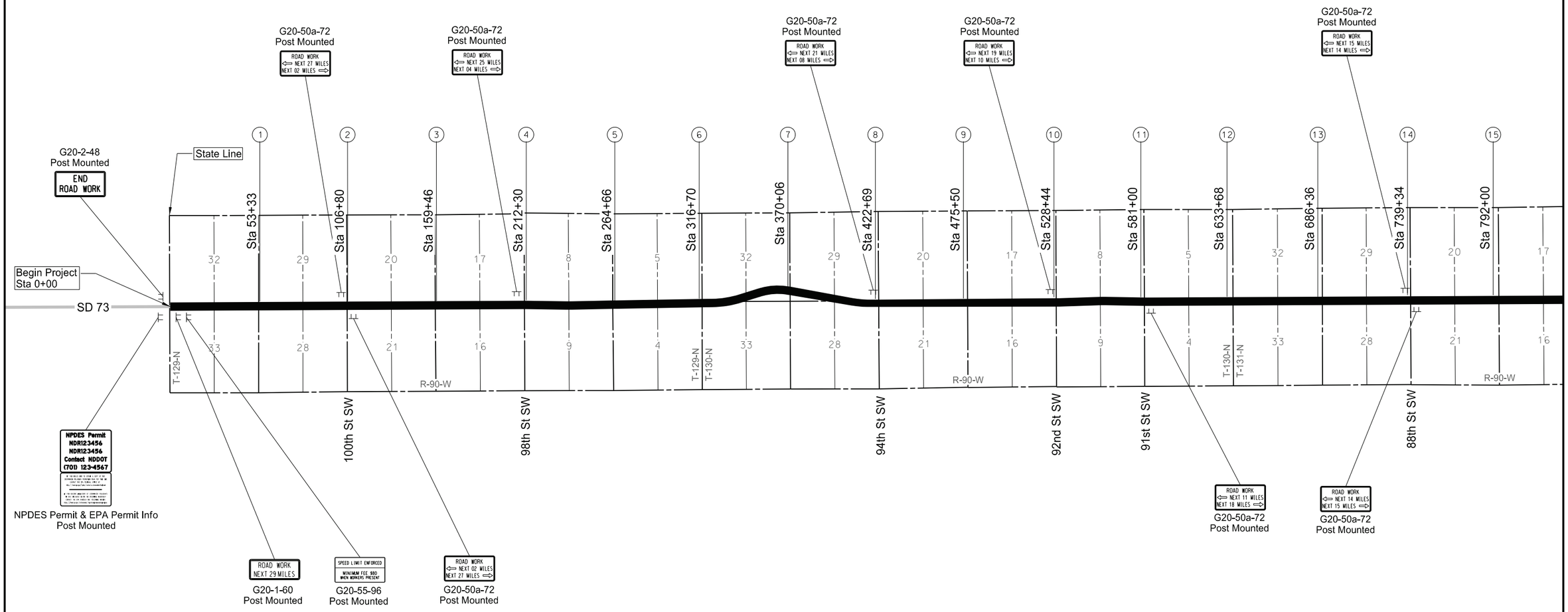
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ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:14:26 -05'00'
NORTH DAKOTA

Traffic Control Devices List

ND 49 - State Line to JCT ND 21

Full Depth Reclamation & HMA Overlay

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	100	2



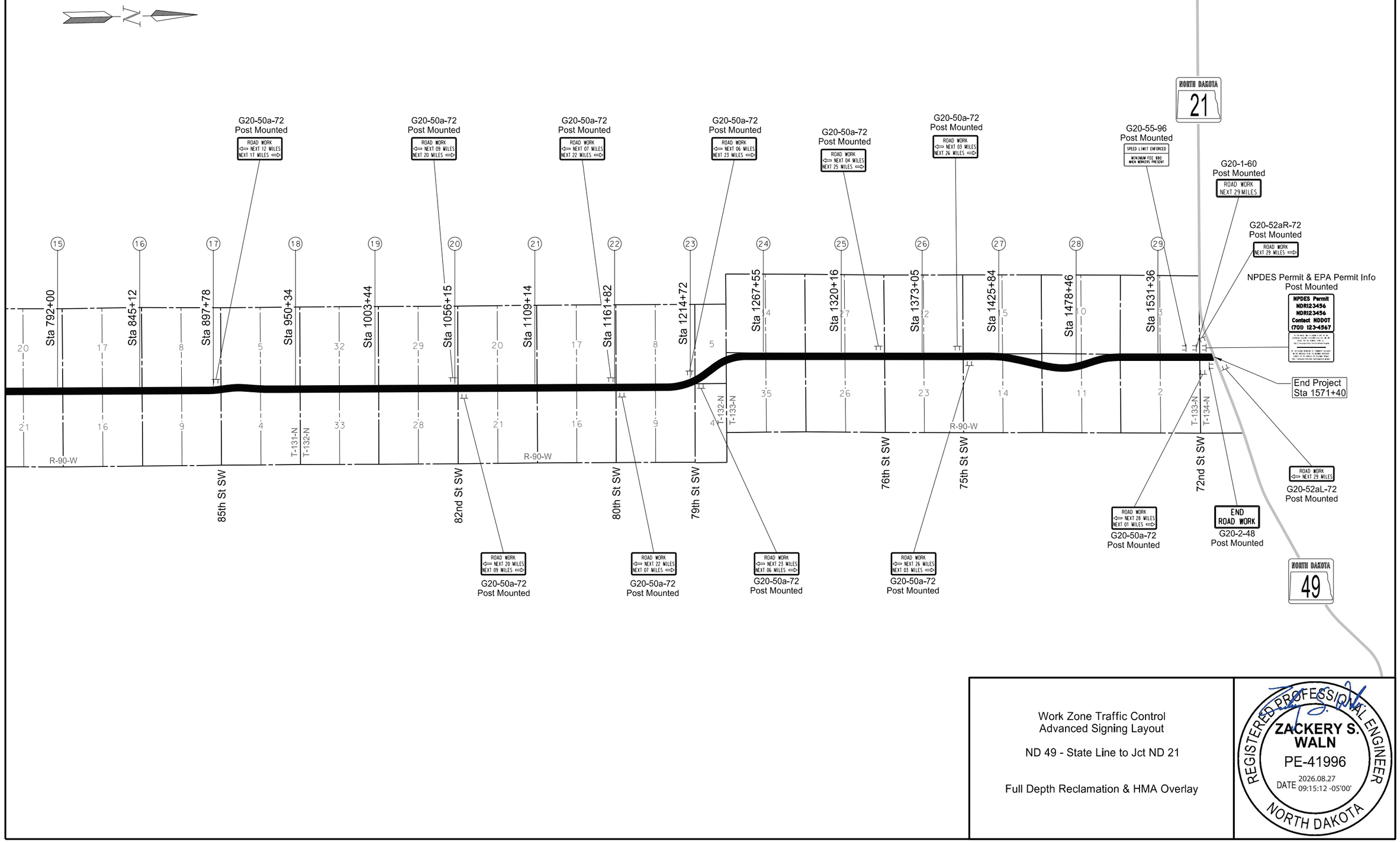
Work Zone Traffic Control
Advanced Signing Layout

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:14:49 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	100	3



Work Zone Traffic Control
Advanced Signing Layout

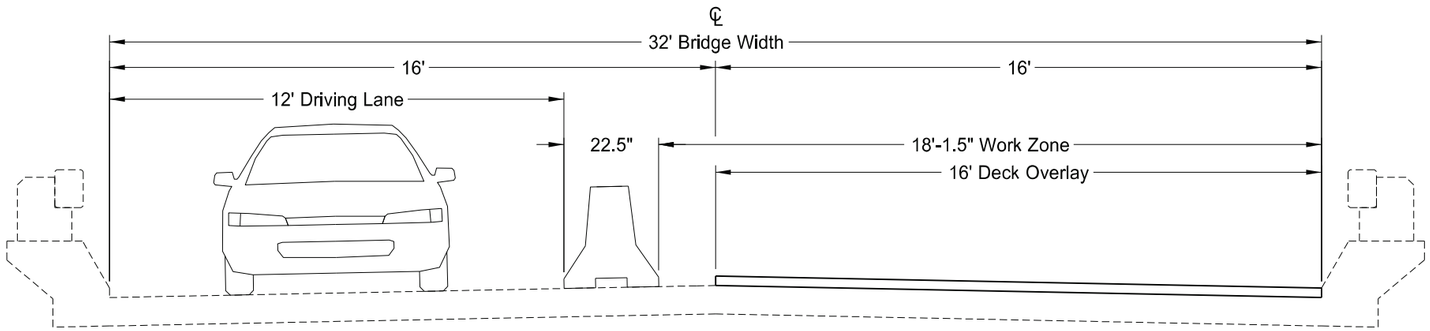
ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

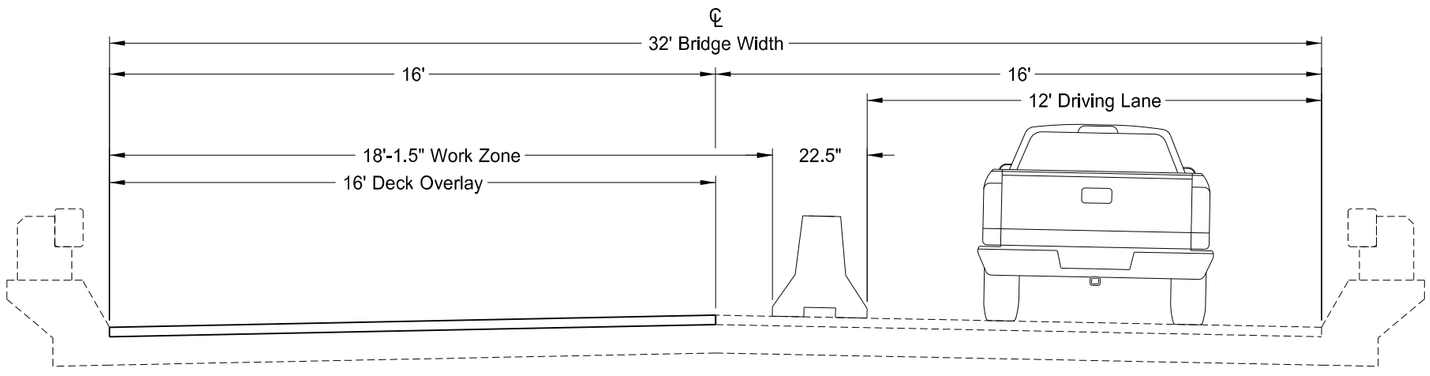
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ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:15:12 -05'00'
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	100	4



Phase 1



Phase 2

Work Zone Traffic Control
Bridge Work Zone Phasing

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:15:42 -05'00'
NORTH DAKOTA

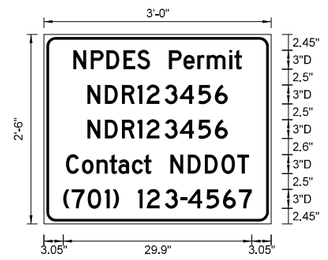
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	100	5

SIGN NUMBER	NPDES Permit
WIDTH X HEIGHT	3'-0" x 2'-6"
BORDER WIDTH	0.44" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

AREA: 7.5 Sq.Ft.



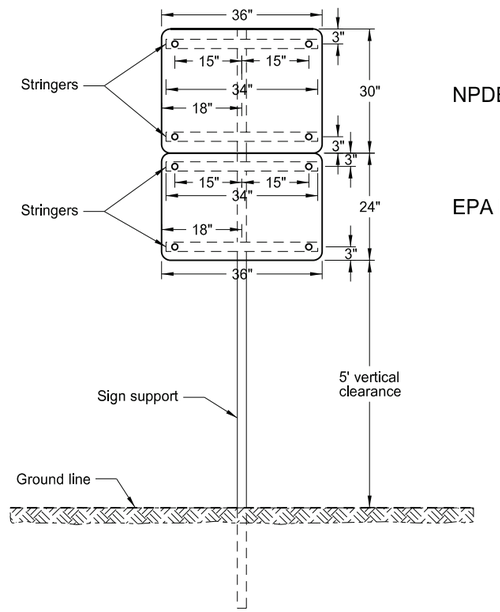
Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
N	P	D	E	S		P	e	r	m	i	t								26.7	3/2.3	D 2000
4.7	7.4	9.9	12.6	14.8	16.8	19.8	22.1	24.3	25.8	29.3	30.2										
N	D	R	1	2	3	4	5	6		(A)									22.2	3	D 2000
6.9	9.6	12.3	14.8	16.2	19.1	21.5	24.4	27.1													
N	D	R	1	2	3	4	5	6		(A)									22.2	3	D 2000
6.9	9.6	12.3	14.8	16.2	19.1	21.5	24.4	27.1													
C	o	n	t	a	c	t		N	D	D	O	T							29	3/2.3	D 2000
3.5	6	8.3	10.4	11.8	13.9	15.8	17	20	22.8	25.5	28.1	30.6									
(	7	0	1	)		1	2	3	-	4	5	6	7		(B)				29.9	3	D 2000
3.1	4.4	6.9	9.7	10.9	11.9	14.9	16.3	19.2	21.6	22.8	25.7	28.4	30.9								

(A) Obtain NPDES Permit tracking numbers from the EPA Notice of Permit Coverage received by the Contractor and the NDDOT District.

(B) Obtain appropriate NDDOT-district phone number from project engineer.



NPDES Permit

EPA Permit Notification

NPDES Permit Sign
at construction site

Place one sign at each end of the project. Place sign 60' from roadway centerline, on the right hand side visible to traffic entering the project. Maximum of 2 signs per project.

Work Zone Traffic Control
NPDES Permit Sign

ND 49 - State Line to Jct ND 21

Full Depth Reclamation & HMA Overlay

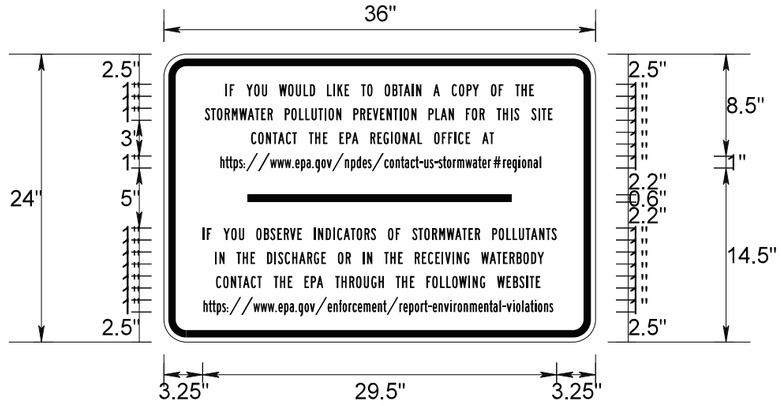
REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:16:29 -05'00'
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	100	6

SIGN NUMBER	EPA Permit Notification
WIDTH X HEIGHT	3'-0" x 2'-0"
BORDER WIDTH	0.63" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE XI Reflective
	COLOR Fluorescent Orange
LEGEND/BORDER	TYPE Non-reflective
	COLOR Black

SYMBOL	X	Y	WID	HT	ANGLE
HASHTAG	27.5	14.5	0.6	1	0

AREA 6.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE ND_Misc_Warning.esi

LETTER POSITION (X)																																	LENGTH	SIZE	SERIES
I	F		Y	O	U		W	O	U	L	D		L	I	K	E		T	O																
5.2	5.5	5.9	6.9	7.5	8.2	8.6	9.6	10.4	11	11.7	12.2	12.6	13.6	14.1	14.5	15.1	15.5	16.5	17															12.3	1	B 2000
O	B	T	A	I	N		A		C	O	P	Y		O	F		T	H	E																
18.4	19.1	19.6	20	20.7	21	21.5	22.5	23	24	24.6	25.3	25.7	26.3	27.3	27.9	28.3	29.3	29.8	30.5															12.5	1	B 2000
S	T	O	R	M	W	A	T	E	R		P	O	L	L	U	T	I	O	N		P	R	E	V	E	N	T	I	O	N				
3.4	3.9	4.4	5.1	5.7	6.3	7	7.6	8.1	8.7	9.1	10.1	10.6	11.3	11.8	12.3	12.9	13.4	13.7	14.4	14.8	15.8	16.4	17	17.4	18	18.6	19.1	19.7	20	20.6				17.6	1	B 2000
P	L	A	N		F	O	R		T	H	I	S		S	I	T	E																		
22.1	22.6	23.1	23.8	24.2	25.2	25.7	26.3	26.8	27.8	28.3	28.9	29.2	29.6	30.6	31.2	31.5	32																	10.3	1	B 2000
C	O	N	T	A	C	T		T	H	E		E	P	A		R	E	G	I	O	N	A	L		O	F	F	I	C	E		A	T	
7.3	7.9	8.5	9.1	9.5	10.2	10.7	11.1	12.1	12.6	13.3	13.6	14.6	15.2	15.7	16.2	17.2	17.8	18.3	18.9	19.3	19.9	20.5	21.2	21.5	22.5	23.2	23.7	24.2	24.5	25.2	25.5	26.5	27.1	20.3	1	B 2000
h	t	t	p	s	:	/	/	w	w	w	.	e	p	a	.	g	o	v	/	n	p	d	e	s	/	c	o	n	t	a	c	t			
4.7	5.1	5.4	5.8	6.3	6.6	6.9	7.9	8.9	9.5	10.1	10.7	11	11.4	11.9	12.4	12.6	13.1	13.6	14	15.1	15.6	16.1	16.6	17	17.3	18.4	18.8	19.3	19.8	20.1	20.6	21		16.6	1/0.8	B 2000
-	u	s	-	s	t	o	r	m	w	a	t	e	r		r	e	g	i	o	n	a	l													
21.3	21.7	22.2	22.5	22.9	23.3	23.6	24.1	24.5	25.1	25.8	26.2	26.5	27	27.3	28.3	28.6	29.1	29.6	29.9	30.4	30.8	31.3													10.2	1/0.8	B 2000
I	F		Y	O	U		O	B	S	E	R	V	E		I	N	D	I	C	A	T	O	R	S										
3.2	3.6	4	5	5.6	6.3	6.7	7.7	8.4	8.9	9.5	10	10.5	11.1	11.5	12.5	12.9	13.5	14.1	14.5	15	15.6	16.1	16.7	17.3											14.5	1	B 2000
O	F		S	T	O	R	M	W	A	T	E	R		P	O	L	L	U	T	A	N	T	S												
18.7	19.3	19.7	20.7	21.2	21.7	22.4	23	23.6	24.3	24.9	25.4	25.9	26.4	27.4	27.9	28.6	29.1	29.6	30.2	30.6	31.3	31.9	32.3												14.1	1	B 2000
I	N		T	H	E		D	I	S	C	H	A	R	G	E		O	R		I	N														
4.3	4.6	5.1	6.1	6.6	7.2	7.6	8.6	9.2	9.5	10.1	10.7	11.3	12	12.5	13.1	13.5	14.5	15.2	15.6	16.6	16.9	17.4													14.1	1	B 2000
T	H	E		R	E	C	E	I	V	I	N	G		W	A	T	E	R	B	O	D	Y													
18.4	18.9	19.5	19.9	20.9	21.5	22	22.6	23.2	23.5	24.1	24.4	25	25.5	26.5	27.2	27.8	28.3	28.8	29.4	30	30.6	31.2													13.3	1	B 2000
C	O	N	T	A	C	T		T	H	E		E	P	A		T	H	R	O	U	G	H													
4.4	4.9	5.6	6.2	6.6	7.3	7.8	8.2	9.2	9.7	10.3	10.7	11.7	12.3	12.8	13.3	14.3	14.8	15.5	16	16.7	17.3	17.9	18.3												15	1	B 2000
T	H	E		F	O	L	L	O	W	I	N	G		W	E	B	S	I	T	E															
19.3	19.9	20.5	20.9	21.9	22.4	23	23.6	24	24.6	25.4	25.7	26.4	26.8	27.8	28.6	29.1	29.6	30.2	30.5	31															12.1	1	B 2000
h	t	t	p	s	:	/	/	w	w	w	.	e	p	a	.	g	o	v	/	e	n	f	o	r	c	e	m	e	n	t	/			
3.3	3.7	4	4.4	4.9	5.2	5.5	6.5	7.5	8.1	8.7	9.3	9.6	10	10.5	11	11.2	11.7	12.2	12.6	13.7	14.1	14.6	14.9	15.4	15.7	16.2	16.7	17.4	17.8	18.3	18.6			16.3	1/0.8	B 2000
r	e	p	o	r	t	-	e	n	v	i	r	o	n	m	e	n	t	a	l	-	v	i	o	l	a	t	i	o	n	s				
19.6	20	20.5	20.9	21.4	21.7	22	22.4	22.9	23.4	23.9	24.2	24.5	25	25.5	26.2	26.7	27.1	27.5	28	28.2	28.6	29.1	29.4	29.9	30.1	30.6	30.9	31.2	31.7	32.2				12.8	1/0.8	B 2000

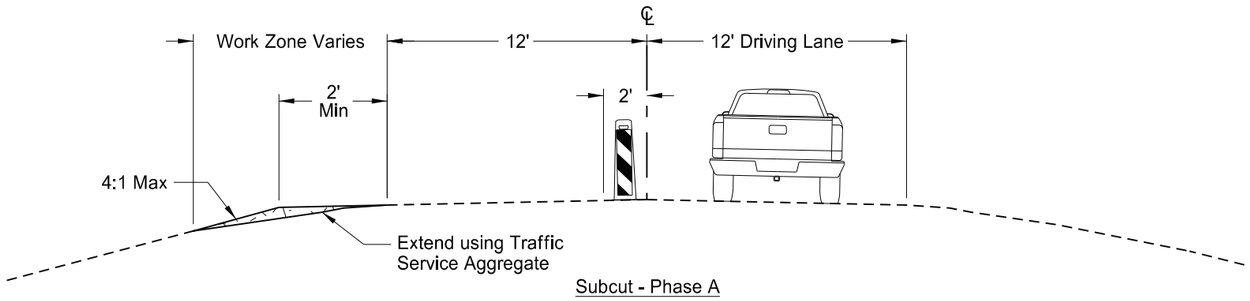
Work Zone Traffic Control
EPA Permit Notification Sign

ND 49 - State Line to Jct ND 21

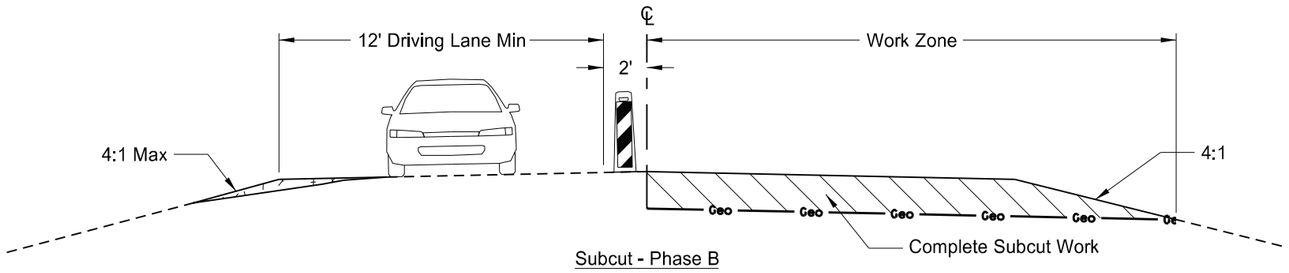
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:26:33 -05'00'
NORTH DAKOTA

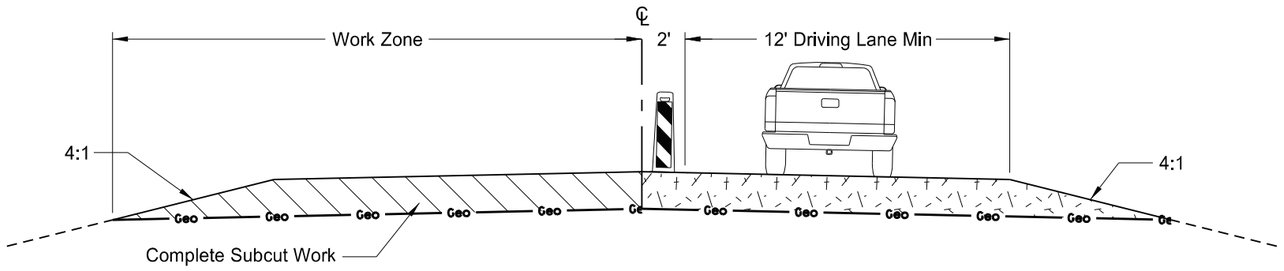
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	100	7



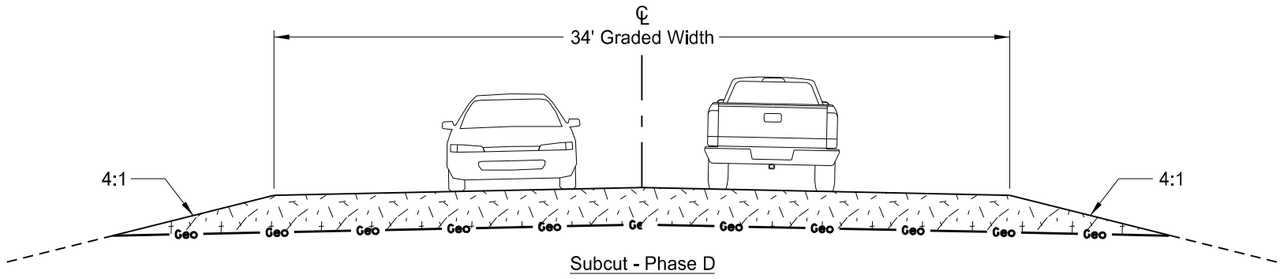
Subcut - Phase A



Subcut - Phase B



Subcut - Phase C



Subcut - Phase D

Work Zone Traffic Control
Subcut Phasing

ND 49 - State Line to Jct ND 21

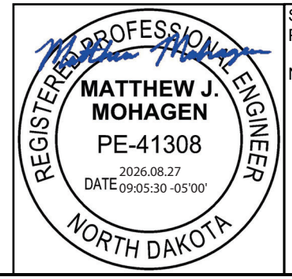
Full Depth Reclamation & HMA Overlay

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:26:55 -05'00'
NORTH DAKOTA

8/27/2026 8:22:46 AM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\100WZ\100WZ_007_Subcut Phasing.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	X-5-049(020)000	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
SCL49_S																							
1+38 Lt	M1-5	383	14.2		13.5				5.0	2.5 x 2.5 10 ga	15.5	3.8				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	Mount with M1-5, M1-4, M4-5P, M4-6P, and M6-3P
4+70 Rt	M1-5	371	6.0		12.5				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				Mount with M1-5 and M3-1P
8+01 Rt	SS1		17.5		11.3	12.3			5.0	2.25 x 2.25 12 ga	14.4	2.8	3.8			2.5 x 2.5 12 ga	2	4	3 x 3 7 ga			2	D-754-48
11+51 Rt	R2-1	9		5.0	12.0				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
15+70 Rt	Var Sign 1				12.1	12.8			5.0	2.25 x 2.25 12 ga	15.3	2.9	3.7			2.5 x 2.5 12 ga	2	4	3 x 3 7 ga	1		2	Seat Belt Sign
105+50 Rt	SA A				15.5				5.0	2.5 x 2.5 10 ga	17.8	3.9				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga	1		1	Mount with M1-6, R2-2, and R12-2
105+55 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
105+94 Rt	SA 2B	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
105+97 Rt	SA B				13.2				5.0	2.5 x 2.5 10 ga	14.0						1	4	3 x 3 7 ga	1		1	Mount with M1-6 and R12-2
206+50 Rt	SS2		16.3		11.3	12.3			5.0	2.5 x 2.5 10 ga	13.4						2	4	3 x 3 7 ga			2	D-754-48
211+06 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
211+72 Rt	SA 2B	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
216+05 Lt	SS3		16.3		11.3	12.3			5.0	2.5 x 2.5 10 ga	13.4						2	4	3 x 3 7 ga			2	D-754-48
382+00 Lt	Var Sign 1				12.1	12.8			5.0	2.25 x 2.25 12 ga	15.3	2.9	3.7			2.5 x 2.5 12 ga	2	4	3 x 3 7 ga	1		2	Seat Belt Sign
386+74 Lt	SS4	36	8.8		11.7				5.0	2.5 x 2.5 10 ga	12.8						1	4	3 x 3 7 ga			1	
389+94 Rt	Var Sign 2	36			11.7				5.0	2.5 x 2.5 10 ga	12.8						1	4	3 x 3 7 ga	1		1	
390+77 Lt	SS6		26.3		12.1	12.7	13.2		5.0	2.25 x 2.25 12 ga	14.6	3.3	3.9	4.4		2.5 x 2.5 12 ga	3	4	3 x 3 7 ga			3	D-754-49
390+77 Lt	SS7		26.3		12.1	12.7	13.2		5.0	2.25 x 2.25 12 ga	14.6	3.3	3.9	4.4		2.5 x 2.5 12 ga	3	4	3 x 3 7 ga			3	D-754-49
Sub Total			131.7	25.8		**Total**	334.7										**Total**	108.0		7	0	21	



Sign Summary
Perforated Tube

ND 49 - State Line to Jct ND 21

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	X-5-049(020)000	110	2

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
SCL49_G																							
423+77 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
424+93 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
530+22 Lt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
583+62 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
741+54 Lt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
742+16 Rt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
900+20 Lt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
900+74 Rt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1059+05 Lt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
1059+65 Rt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1164+74 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1165+38 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
1187+98 Rt	W1-2L	19		6.3	12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
1218+87 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1218+97 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
1221+70 Rt	W1-2R	19		6.3	12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
1230+49 Lt	W1-2R	19		6.3	12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
1265+38 Lt	W1-2L	19		6.3	12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
1348+94 Lt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
1401+86 Lt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1402+53 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs
1453+23 Rt	SS8		12.5		11.6				5.0	2.25 x 2.25 12 ga	12.7	4.0				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga		1		D-754-47
1458+53 Lt	SS8		12.5		11.6				5.0	2.25 x 2.25 12 ga	12.7	4.0				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga		1		D-754-47
1508+98 Lt	SA 1E				10.2				5.0	2 x 2 12 ga	23.5						1	4	2.25 x 2.25 12 ga	1			Mount Street Signs
1555+19 Rt	W3-1a	19		6.3	12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
1559+20 Rt	M1-5	391			12.8				5.0	2.5 x 2.5 12 ga	15.9						1	4	3 x 3 7 ga	1			
1563+06 Rt	SA 2E	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			Mount with R1-1 and Street Signs

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:05:52 -05'00'
NORTH DAKOTA

Sign Summary
Perforated Tube

ND 49 - State Line to Jct ND 21

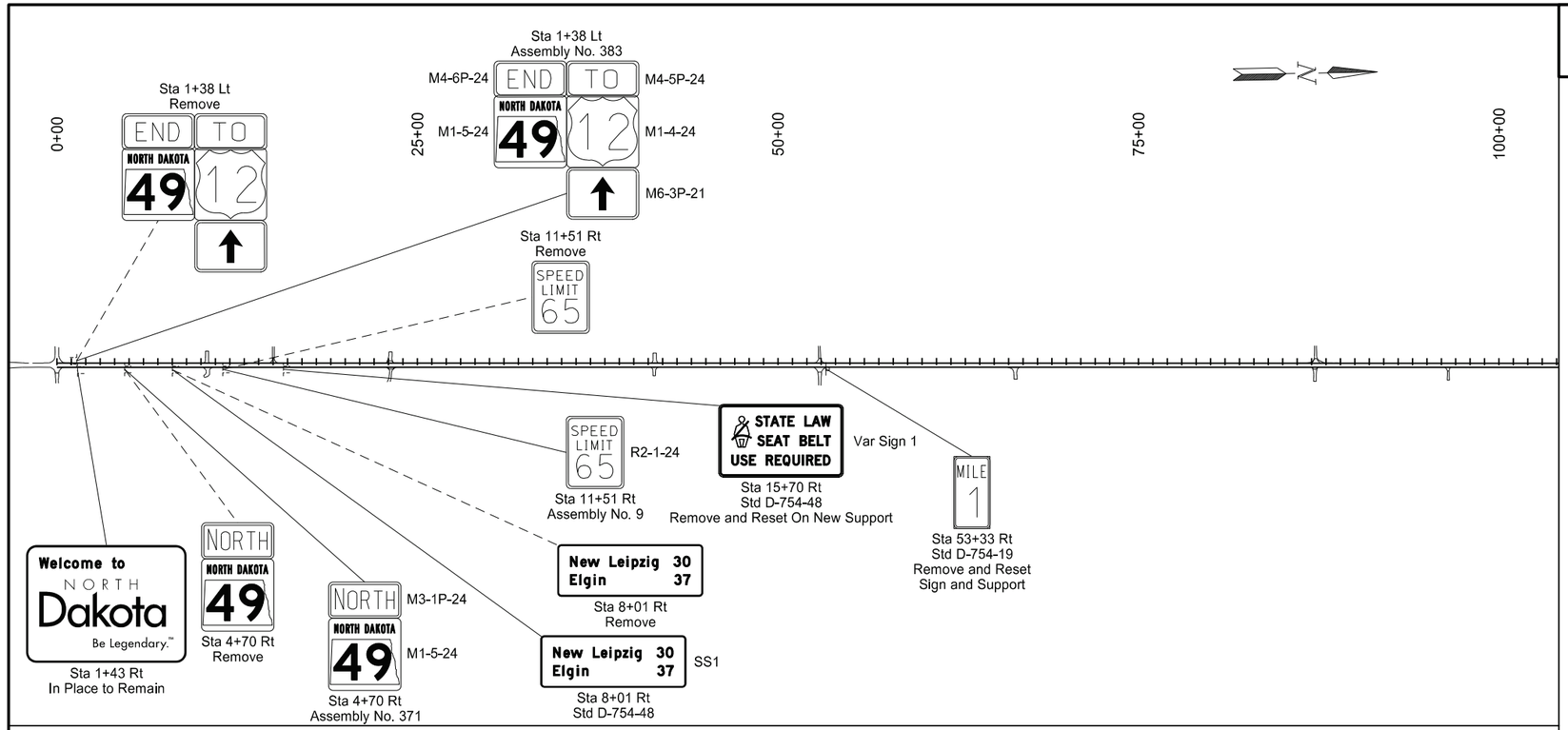
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	N.D.	X-5-049(020)000	110	3

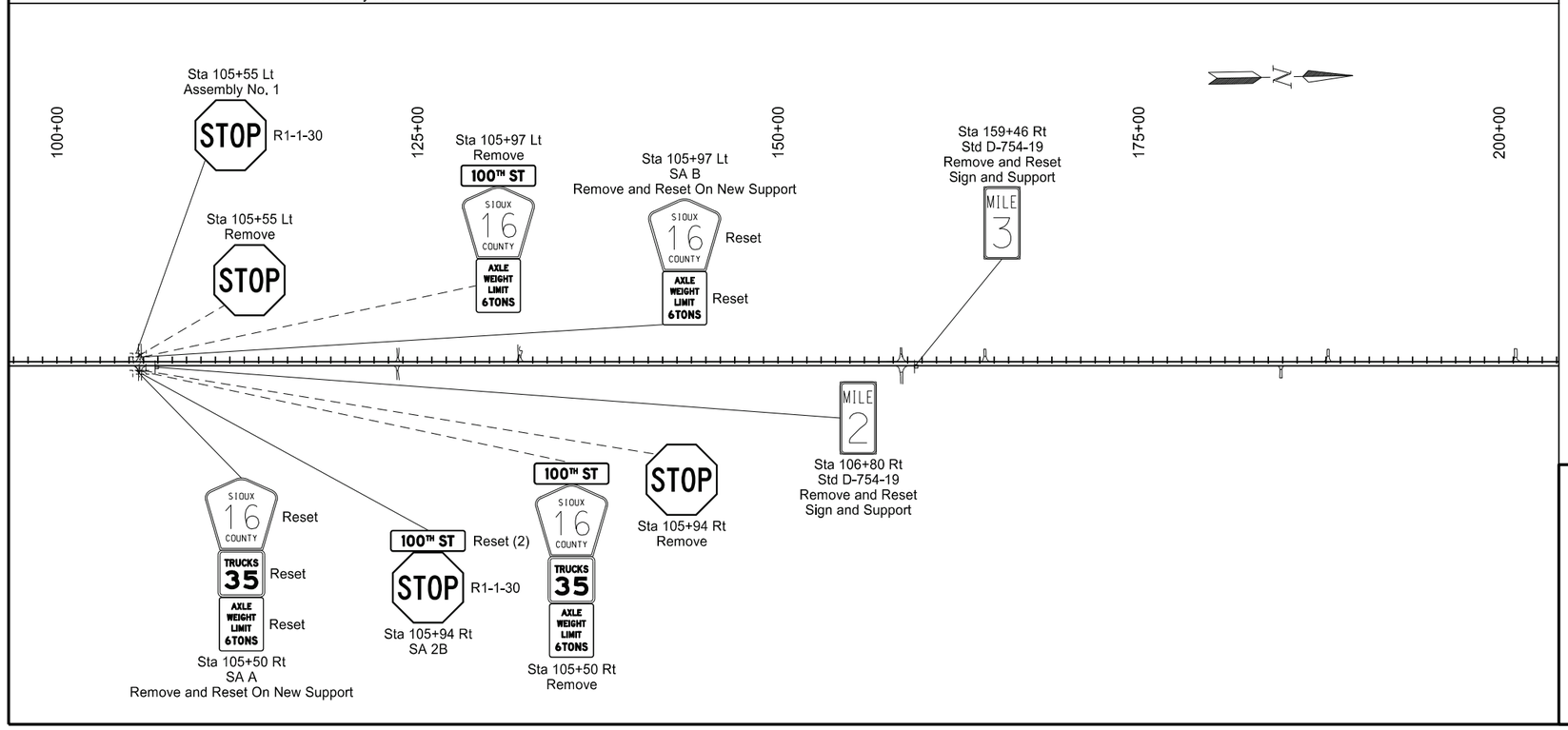
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
1563+43 Rt	M1-5	399			12.8				5.0	2.5 x 2.5 12 ga	15.9						1	4	3 x 3 7 ga	1			Mount with M1-5 and M5-1P
1564+64 Lt	R2-1	9		5.0	12.0				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
1566+25 Lt	W1-7	34		8.0	11.2				5.0	2.5 x 2.5 10 ga	13.6						1	4	3 x 3 7 ga			1	
1566+77 Rt	R1-1	1		5.2	12.0				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
1567+61 Rt	SS5		28.0		12.2	12.7	13.3		5.0	2.25 x 2.25 12 ga	13.8	3.8	4.4	5.0		2.5 x 2.5 12 ga	3	4	3 x 3 7 ga			3	D-754-49
1570+73 Lt	M1-5	406			12.6				5.0	2.5 x 2.5 10 ga	14.9	3.4				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga	1		1	Mount with M1-5 (2), M6-4P, and M6-6P
Sub Total			53.0	143.3		**Total**	424.5										**Total**	140.0		15	0	7	
Grand Total			**184.7**	**169.1**		**Total**	**759.2**										**Total**	**248**	**0**	**22**	**0**	**28**	

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:06:14 -05'00'
NORTH DAKOTA

Sign Summary
Perforated Tube

ND 49 - State Line to Jct ND 21





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	4

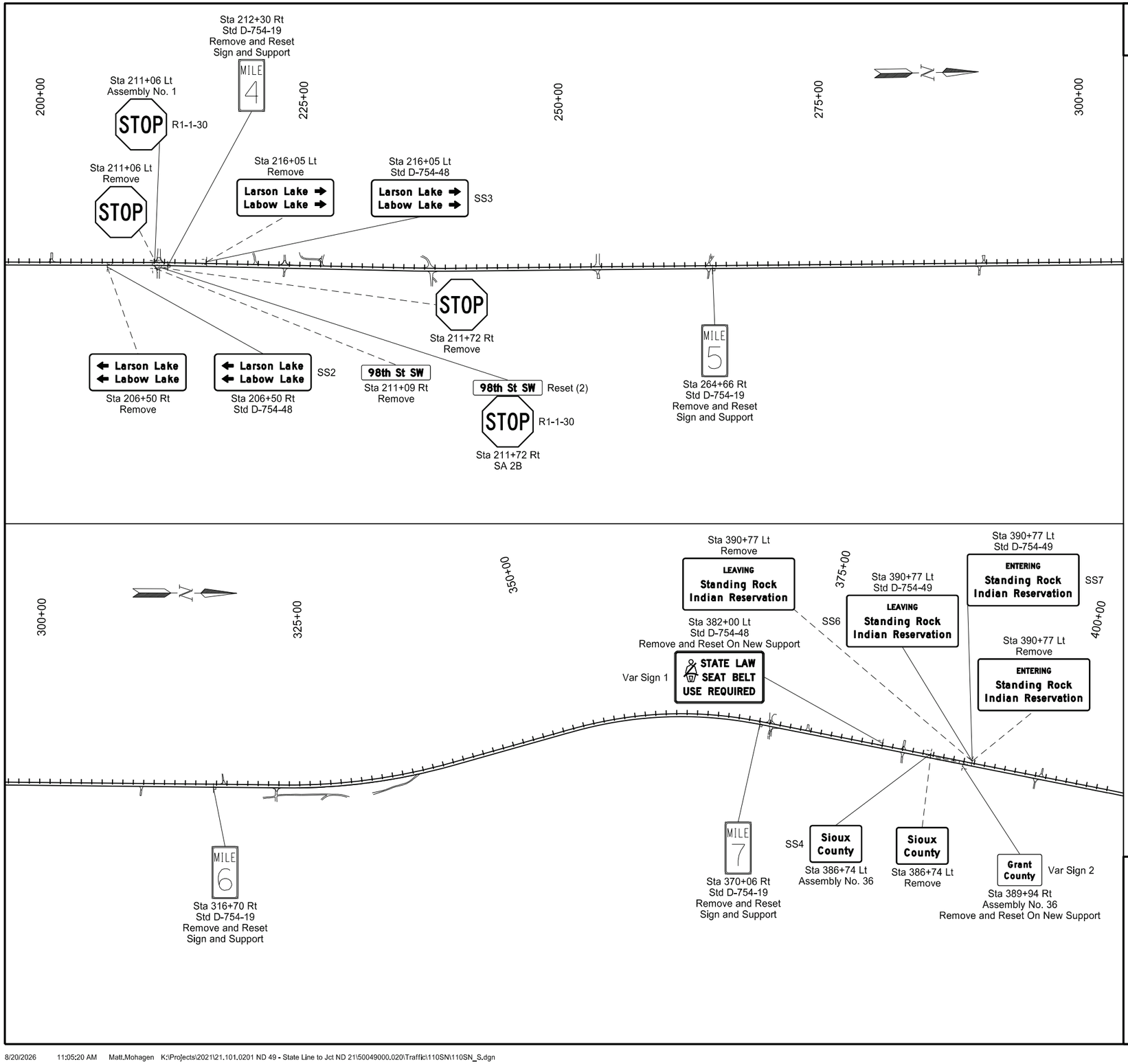
SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 53+33 Rt	1	EA
		Sta 106+80 Rt	1	EA
		Sta 159+46 Rt	1	EA

Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 0+00 to Sta 200+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:06:42 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	5

SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 212+30 Rt	1	EA
		Sta 264+66 Rt	1	EA
		Sta 316+70 Rt	1	EA
		Sta 370+06 Rt	1	EA

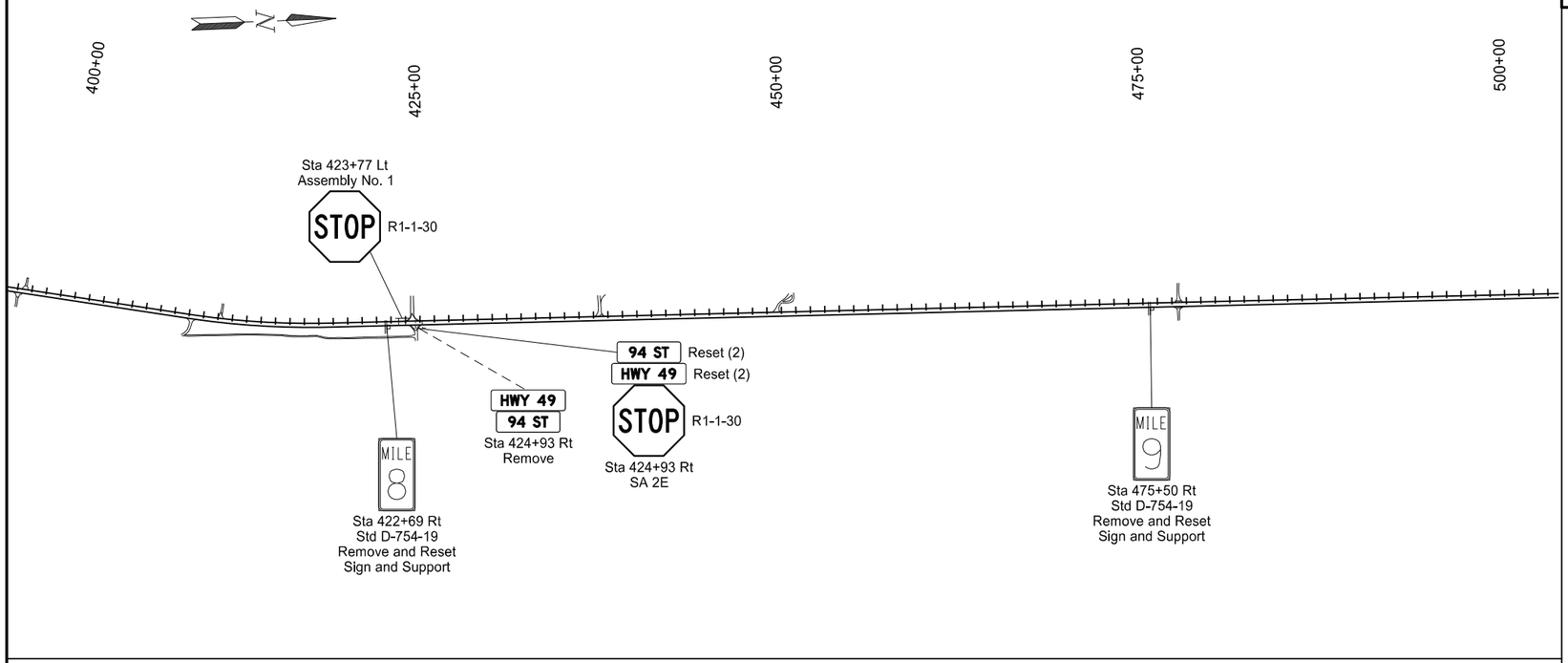
Permanent Signing

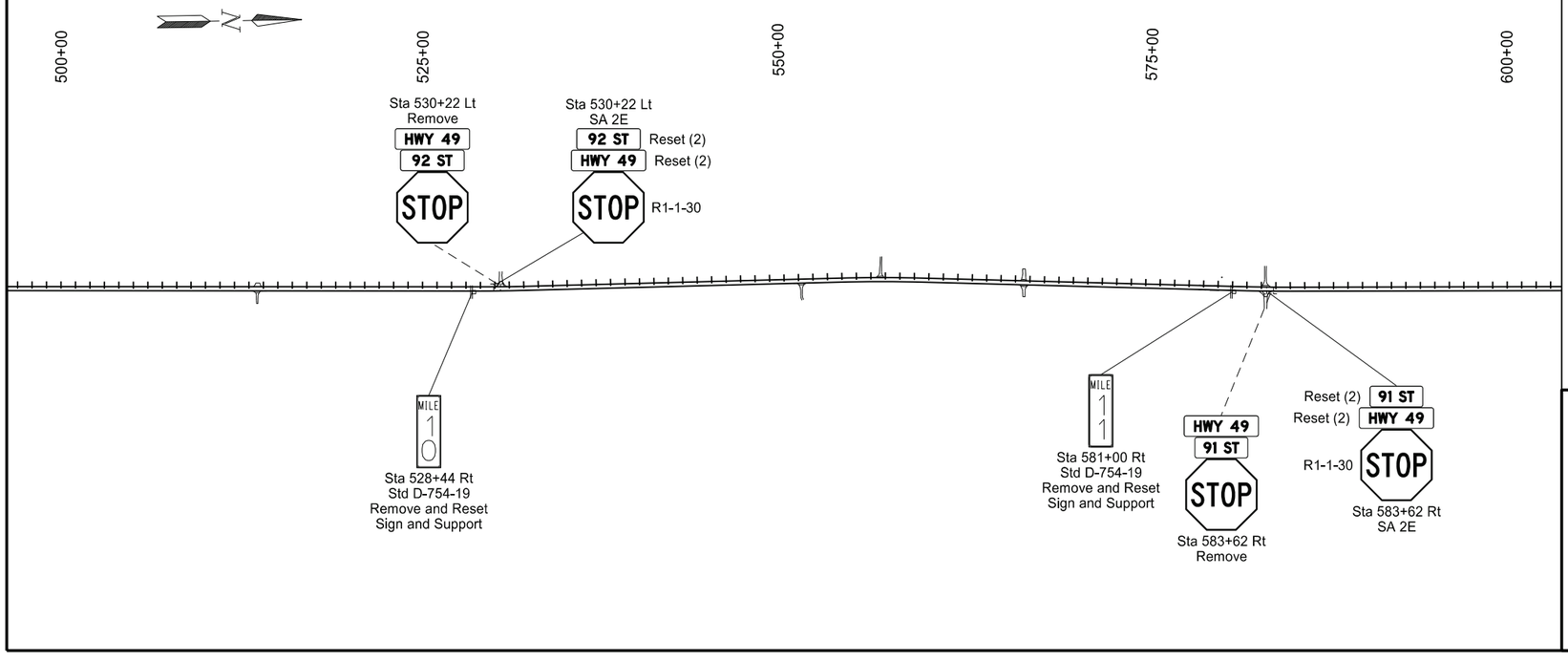
ND 49 - State Line to Jct ND 21

Sta 200+00 to Sta 400+00
(SCL49_S)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:07:03 -05'00'
NORTH DAKOTA

8/20/2026 11:05:20 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\110SN\110SN_S.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	6

SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 422+69 Rt	1	EA
		Sta 475+50 Rt	1	EA
		Sta 528+44 Rt	1	EA
		Sta 581+00 Rt	1	EA

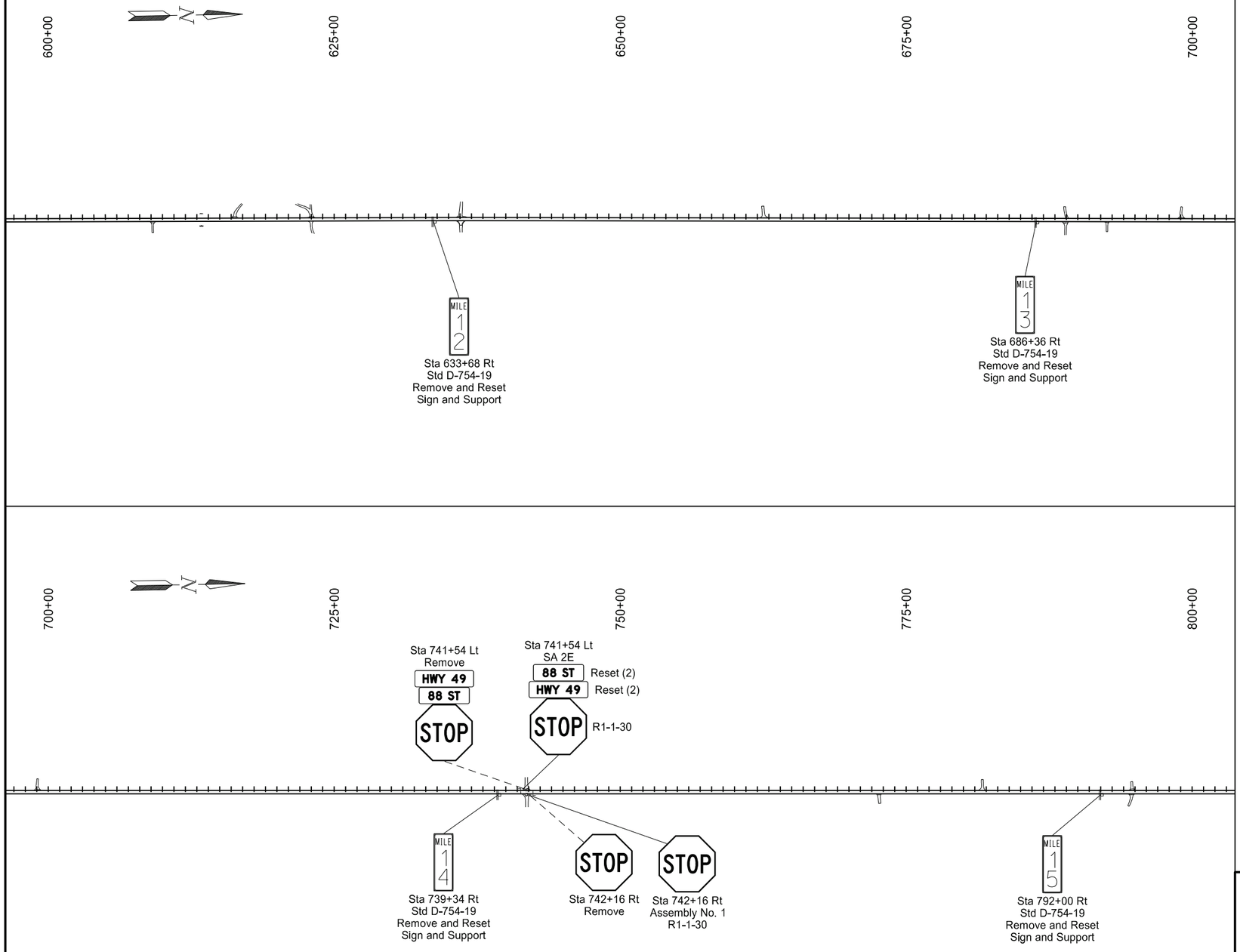
Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 400+00 to Sta 600+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:07:25 -05'00'
NORTH DAKOTA

8/20/2026 11:05:30 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\110SN\110SN_G.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	7

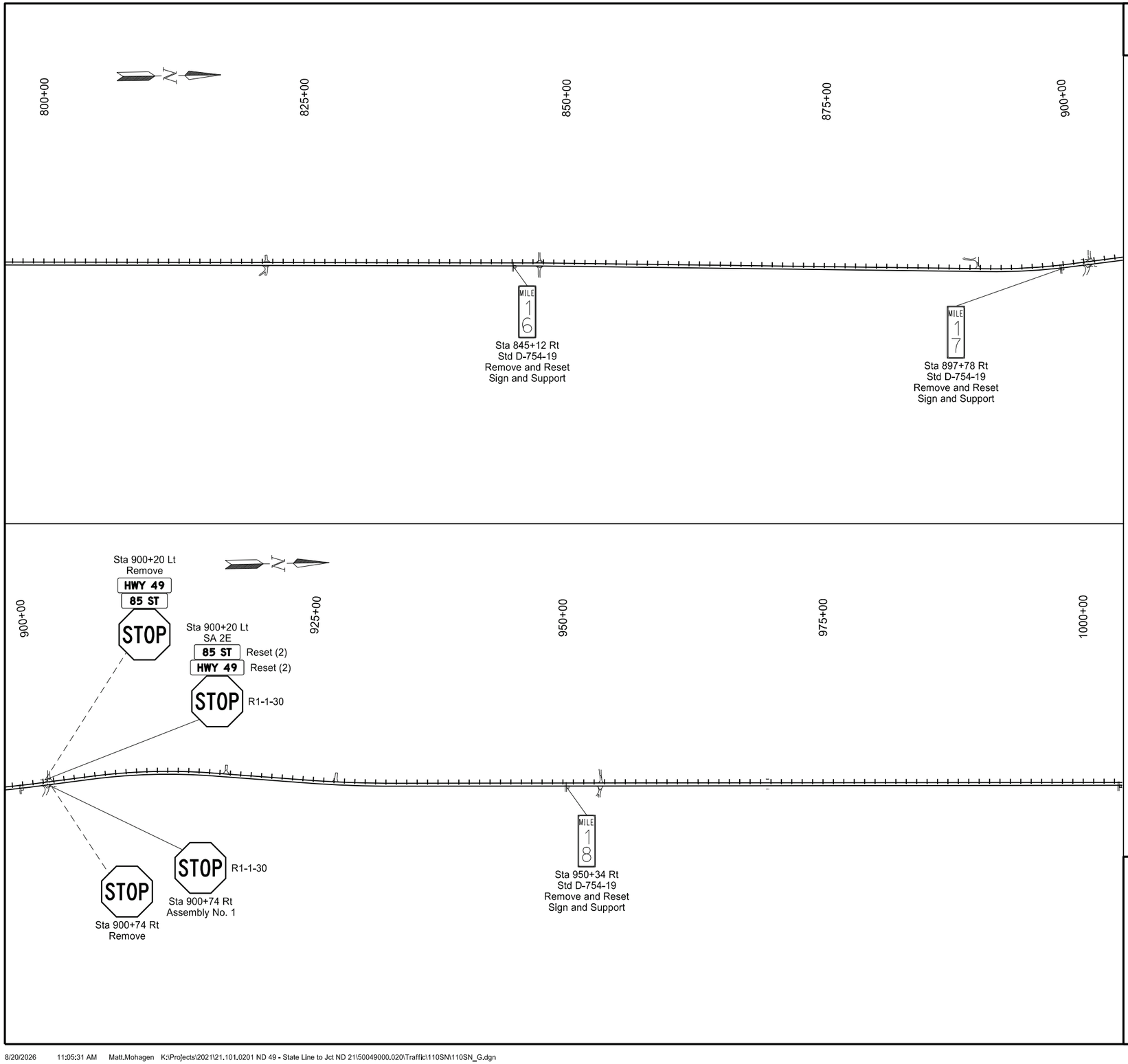
SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 633+68 Rt	1	EA
		Sta 686+36 Rt	1	EA
		Sta 739+34 Rt	1	EA
		Sta 792+00 Rt	1	EA

Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 600+00 to Sta 800+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:07:50 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	8

SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 845+12 Rt	1	EA
		Sta 897+78 Rt	1	EA
		Sta 950+34 Rt	1	EA

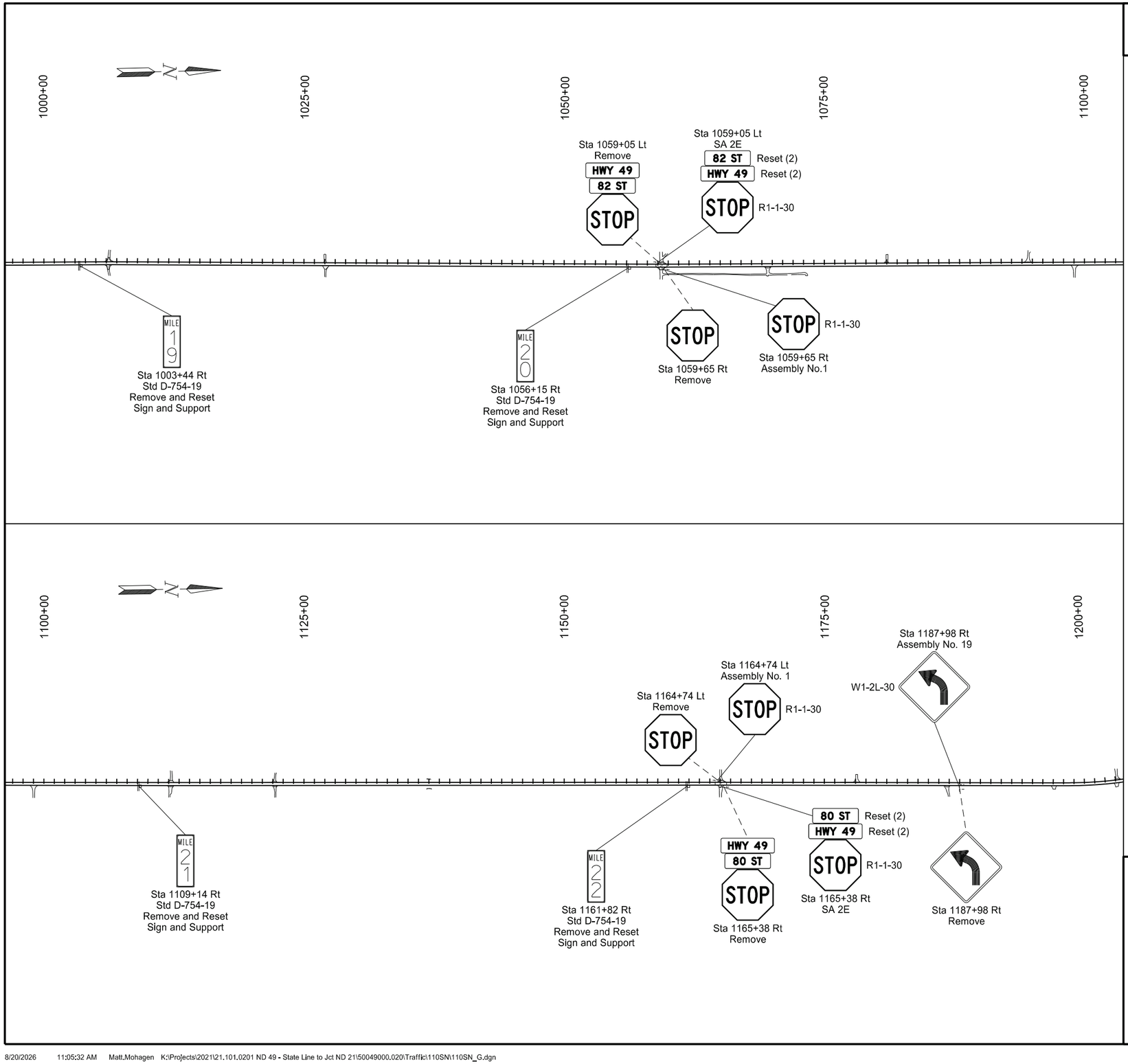
Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 800+00 to Sta 1000+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 09:08:14 -05'00'
NORTH DAKOTA

8/20/2026 11:05:31 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\110SN\110SN_G.dgn



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	9

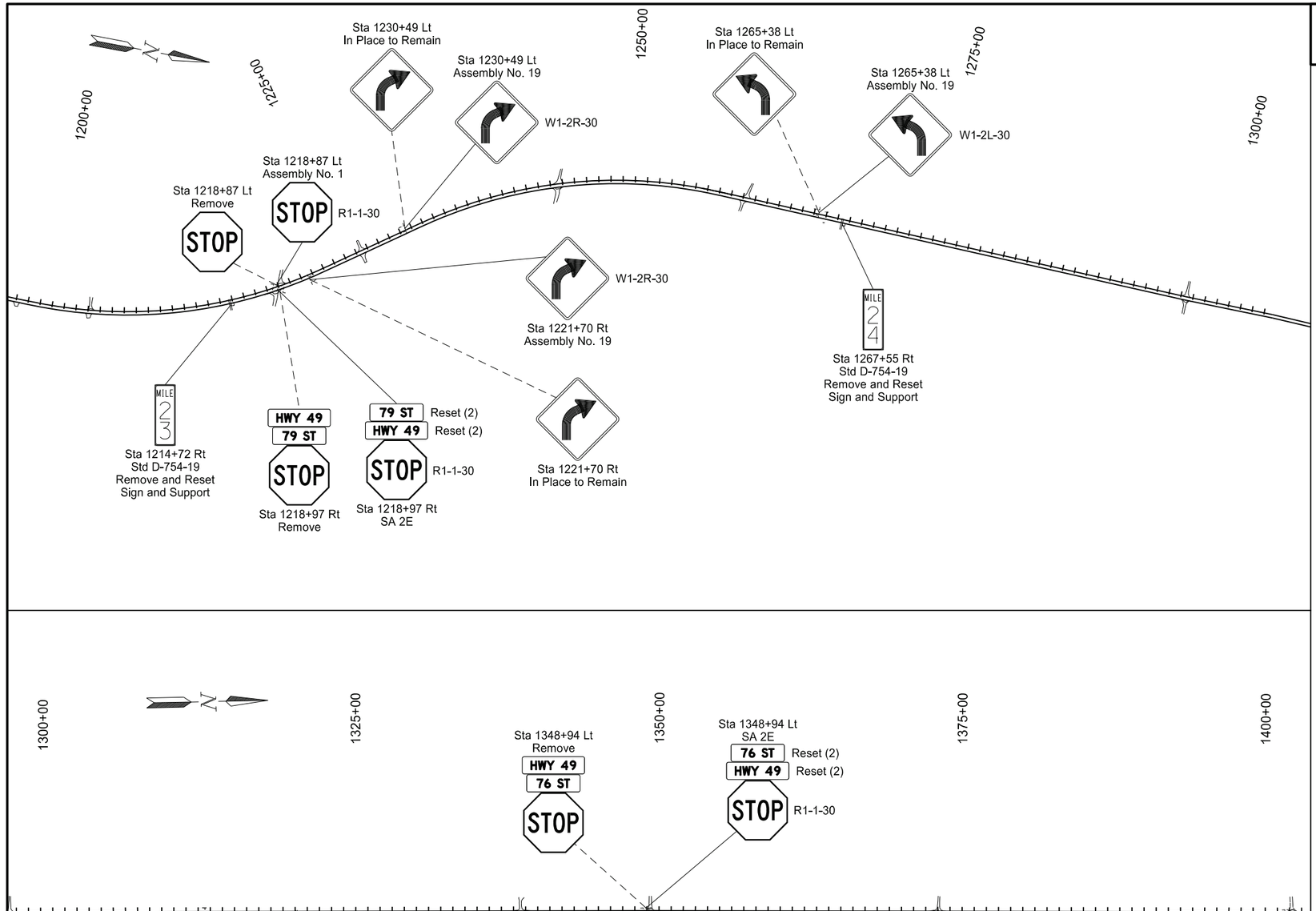
SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 1003+44 Rt	1	EA
		Sta 1056+15 Rt	1	EA
		Sta 1109+14 Rt	1	EA
		Sta 1161+82 Rt	1	EA

Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 1000+00 to Sta 1200+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 09:08:36 -05'00'
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	10

SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 1214+72 Rt	1	EA
		Sta 1267+55 Rt	1	EA
		Sta 1320+16 Rt	1	EA
		Sta 1373+05 Rt	1	EA

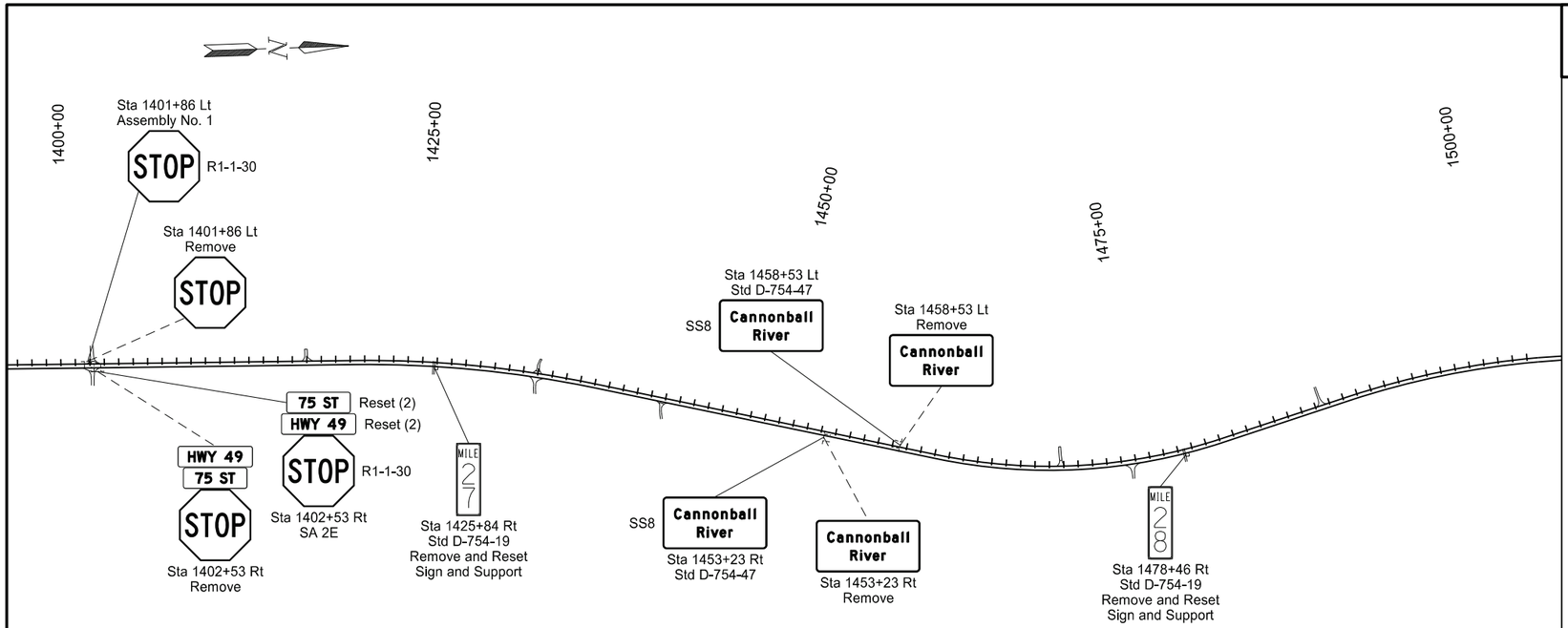
Permanent Signing

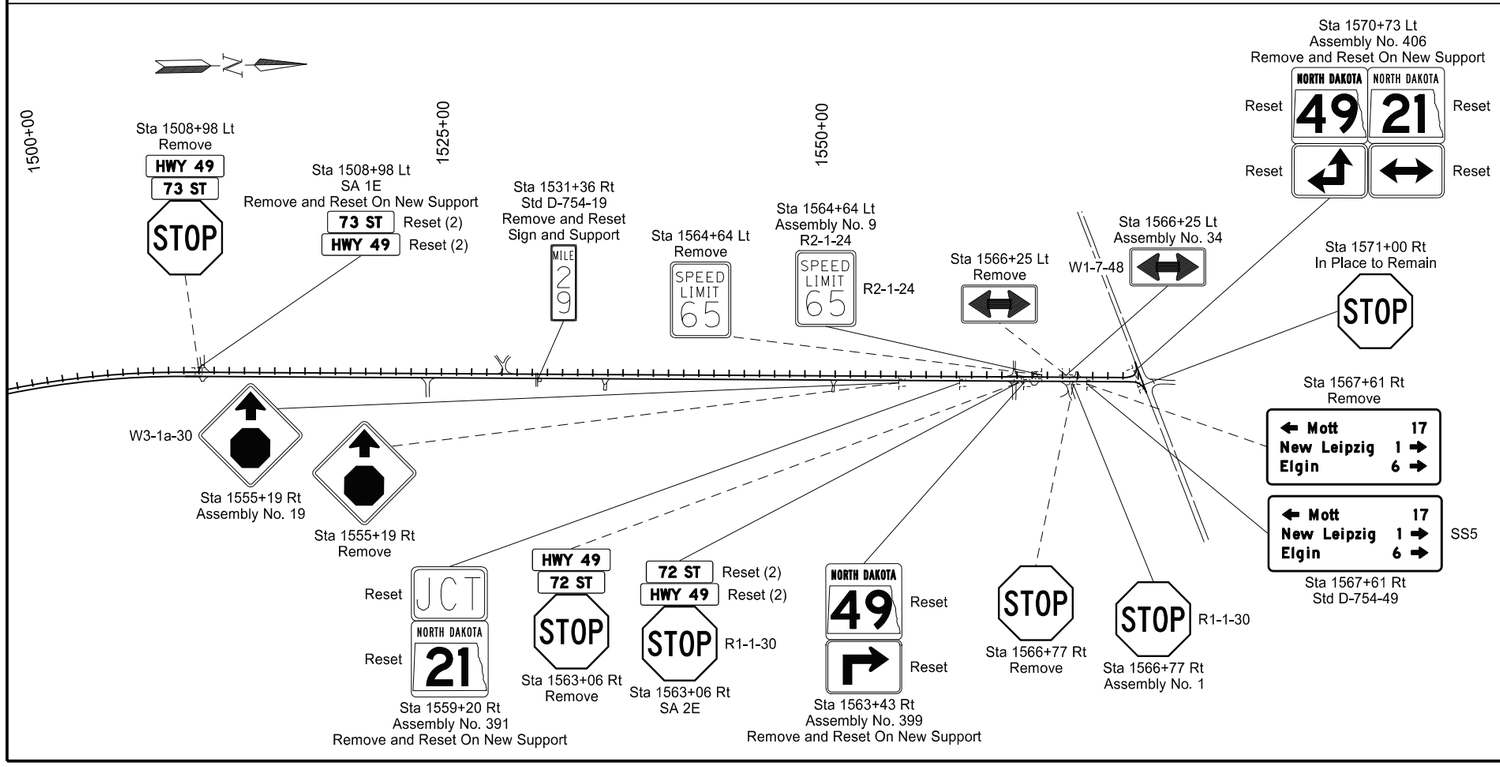
ND 49 - State Line to Jct ND 21

Sta 1200+00 to Sta 1400+00
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
DATE 2026.08.27 09:08:56 -05'00'
NORTH DAKOTA

8/20/2026 11:05:32 AM Matt.Mohagen K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\110SN\110SN_G.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	11

SPEC	CODE	BID ITEM	QTY	UNIT
754	0596	RESET MILE POST		
		Sta 1425+84 Rt	1	EA
		Sta 1478+46 Rt	1	EA
		Sta 1531+36 Rt	1	EA

Permanent Signing

ND 49 - State Line to Jct ND 21

Sta 1400+00 to Sta 1571+23
(SCL49_G)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 09:09:18 -05'00'
NORTH DAKOTA

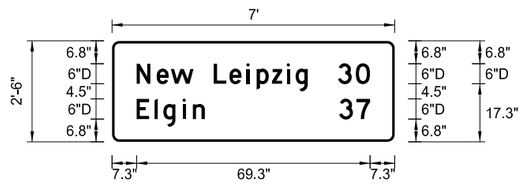
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	12

SIGN NUMBER	SS1
WIDTH X HEIGHT	7' x 2'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	2.3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): 8+01 Rt (SCL49_S)

AREA: 17.5" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_DIstance.ssl

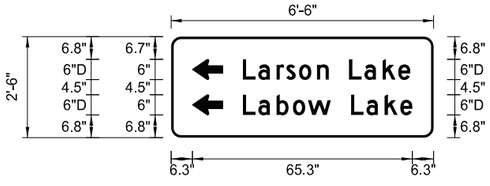
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
N	e	w	L	e	i	p	z	i	g											50.8"	6"/4.5"	D 2000
7.3"	13.3"	17.5"	30.2"	35"	40"	43"	47.5"	51.9"	54.5"													
3	0																			9.5"	6"	D 2000
67.1"	72.4"																					
E	l	g	i	n																20.2"	6"/4.5"	D 2000
7.3"	12.6"	15.3"	21"	24"																		
3	7																			9.2"	6"	D 2000
67.5"	72.6"																					

SIGN NUMBER	SS2
WIDTH X HEIGHT	6'-6" x 2'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	6.3"	17.3"	6"	9"	270"
ND_6IN_TYPE D	6.3"	6.8"	6"	9"	270"

STATION(S): 206+50 Rt (SCL49_S)

AREA: 16.3" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

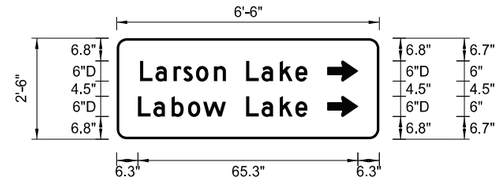
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
L	a	r	s	o	n	L	a	k	e											49.7"	6"/4.5"	D 2000
21.3"	26"	31.3"	34.2"	38"	43.3"	52.9"	57.4"	62.9"	67.5"													
L	a	b	o	w	L	a	k	e												50.3"	6"/4.5"	D 2000
21.3"	26"	31.3"	36.2"	40.7"	53.5"	58"	63.4"	68.1"														

SIGN NUMBER	SS3
WIDTH X HEIGHT	6'-6" x 2'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	62.7"	17.3"	6"	9"	270"
ND_6IN_TYPE D	62.7"	6.7"	6"	9"	270"

STATION(S): 216+05 Lt (SCL49_S)

AREA: 16.3" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

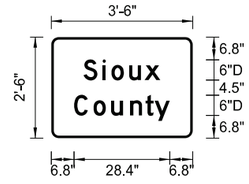
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
L	a	r	s	o	n	L	a	k	e											49.7"	6"/4.5"	D 2000
7"	11.5"	17"	19.8"	23.6"	29"	38.5"	43"	48.4"	53.1"													
L	a	r	s	o	n	L	a	k	e											50.3"	6"/4.5"	D 2000
6.3"	11"	16.3"	21.2"	25.7"	38.5"	43"	48.4"	53.1"														

SIGN NUMBER	SS4
WIDTH X HEIGHT	3'-6" x 2'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	2.3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): 386+74 Lt (SCL49_S)

AREA: 8.8" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Boundary.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
S	i	o	u	x																22.8"	6"/4.5"	D 2000
9.6"	15.3"	17.9"	23.1"	27.7"																		
C	o	u	n	t	y															28.4"	6"/4.5"	D 2000
6.8"	12.5"	17.8"	23.4"	28"	30.7"																	

Permanent Signing

ND 49 - State Line to Jct ND 21

Special Sign Details

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 09:09:41 -05'00'
NORTH DAKOTA

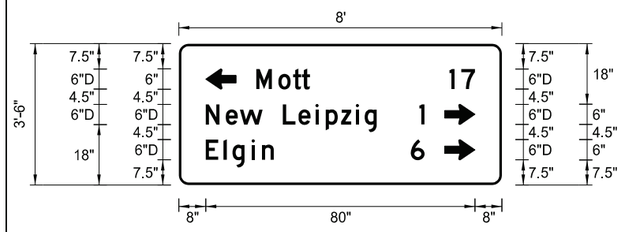
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	13

SIGN NUMBER	SS5
WIDTH X HEIGHT	8' x 3'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	8"	28.5"	6"	9"	90"
ND_6IN_TYPE D	79"	18"	6"	9"	270"
ND_6IN_TYPE D	79"	7.5"	6"	9"	270"

STATION(S):
1567+61 Rt (SCL49_G)

AREA: 28" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
M	o	t	t																	16"	6"/4.5"	D 2000
23"	29.6"	34"	36.6"																			
1	7																			7.6"	6"	D 2000
80.4"	84"																					
N	e	w	L	e	i	p	z	i	g											50.8"	6"/4.5"	D 2000
8"	14"	18.1"	31"	35.6"	40.6"	43.7"	48.2"	52.6"	55.2"													
1																				1.5"	6"	D 2000
71.5"																						
E	l	g	i	n																20.2"	6"/4.5"	D 2000
8"	13.3"	16"	21.6"	24.7"																		
6																				4.1"	6"	D 2000
69"																						

SIGN NUMBER	SS6
WIDTH X HEIGHT	7'-6" x 3'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	2.3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
390+77 Lt (SCL49_S)

AREA: 26.3" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Boundary.ssl

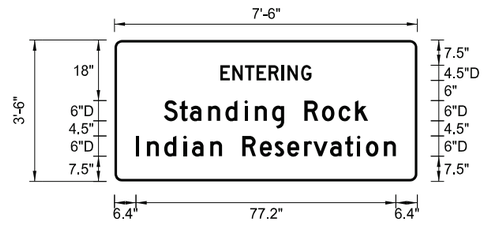
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
L	E	A	V	I	N	G														23.7"	4.5"	D 2000
33.1"	36.6"	39.8"	43.9"	48"	49.7"	53.8"																
S	t	a	n	d	i	n	g	R	o	c	k									60.6"	6"/4.5"	D 2000
14.7"	19.4"	22.4"	27.8"	33"	38.6"	41.7"	46.8"	56.4"	61.7"	66.6"	71.5"											
I	n	d	i	a	n	R	e	s	e	r	v	a	t	i	o	n				77.2"	6"/4.5"	D 2000
6.4"	9.7"	14.8"	20.5"	23"	28.4"	38"	43.2"	47.6"	51.4"	56.4"	59.1"	64.1"	68.5"	72.1"	74.7"	80.1"						

SIGN NUMBER	SS7
WIDTH X HEIGHT	7'-6" x 3'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	2.3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
390+77 Lt (SCL49_S)

AREA: 26.3" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Boundary.ssl

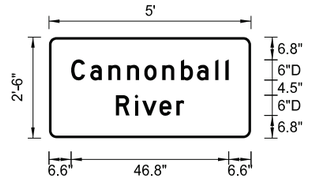
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
E	N	T	E	R	I	N	G													27"	4.5"	D 2000
31.5"	35"	38.8"	42.2"	45.8"	49.6"	51.4"	55.5"															
S	t	a	n	d	i	n	g	R	o	c	k									60.6"	6"/4.5"	D 2000
14.7"	19.4"	22.4"	27.8"	33"	38.6"	41.7"	46.8"	56.4"	61.7"	66.6"	71.5"											
I	n	d	i	a	n	R	e	s	e	r	v	a	t	i	o	n				77.2"	6"/4.5"	D 2000
6.4"	9.7"	14.8"	20.5"	23"	28.4"	38"	43.2"	47.6"	51.4"	56.4"	59.1"	64.1"	68.5"	72.1"	74.7"	80.1"						

SIGN NUMBER	SS8
WIDTH X HEIGHT	5' x 2'-6"
BORDER WIDTH	0.8" (inset)
CORNER RADIUS	2.3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
1453+23 Rt (SCL49_G)
1458+53 Lt (SCL49_G)

AREA: 12.5" Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Geographic Feature.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
C	a	n	n	o	n	b	a	l	l											46.8"	6"/4.5"	D 2000
6.6"	12.3"	17.7"	23.2"	28.3"	33.7"	39.2"	44"	49.4"	52.4"													
R	i	v	e	r																20.3"	6"/4.5"	D 2000
19.9"	25.5"	27.7"	32.8"	37.9"																		

Permanent Signing

ND 49 - State Line to Jct ND 21

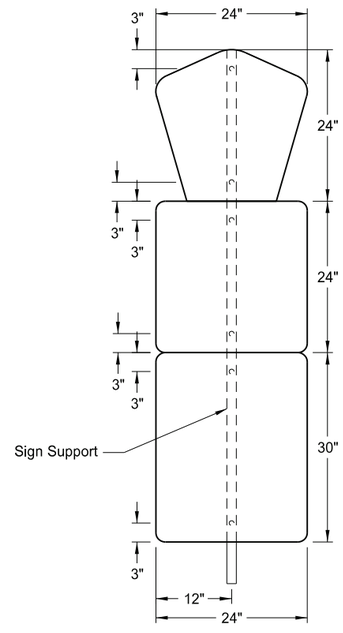
Special Sign Details

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27
DATE 09:10:09 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	110	14

Notes:

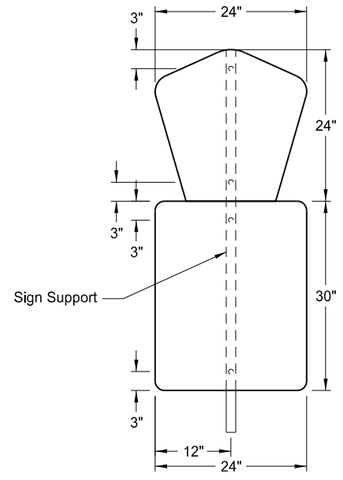
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



Special Assembly A
(Perforated Tube)

Sta 105+50 Rt

Area: 12.0 SF



Special Assembly B
(Perforated Tube)

Sta 105+97 Lt

Area: 8.0 SF

Permanent Signing

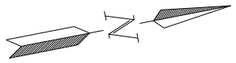
ND 49 - State Line to Jct ND 21

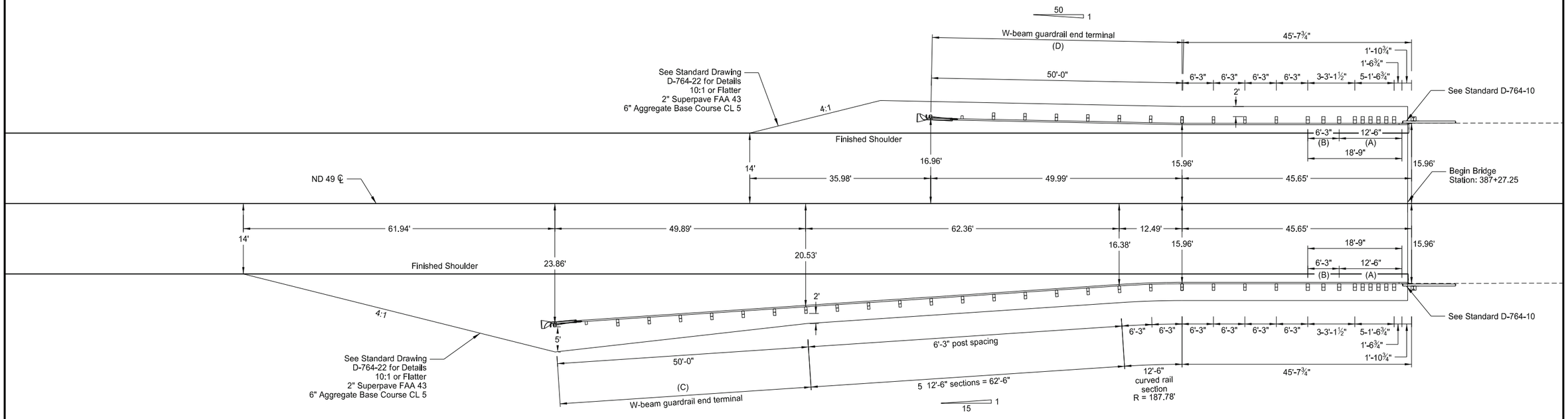
Special Assemblies

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. MOHAGEN
PE-41308
2026.08.27 09:10:32 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	1

23 USC § 407 Documents
NDDOT Reserves All Objections





(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Install a FLEAT Terminal at this location.
See Standard Drawing D-764-06.

(D) Install a SKT Terminal at this location.
See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
At Beginning of Bridge

Cedar Creek Bridge
RP 7.354
(SCL49_G)

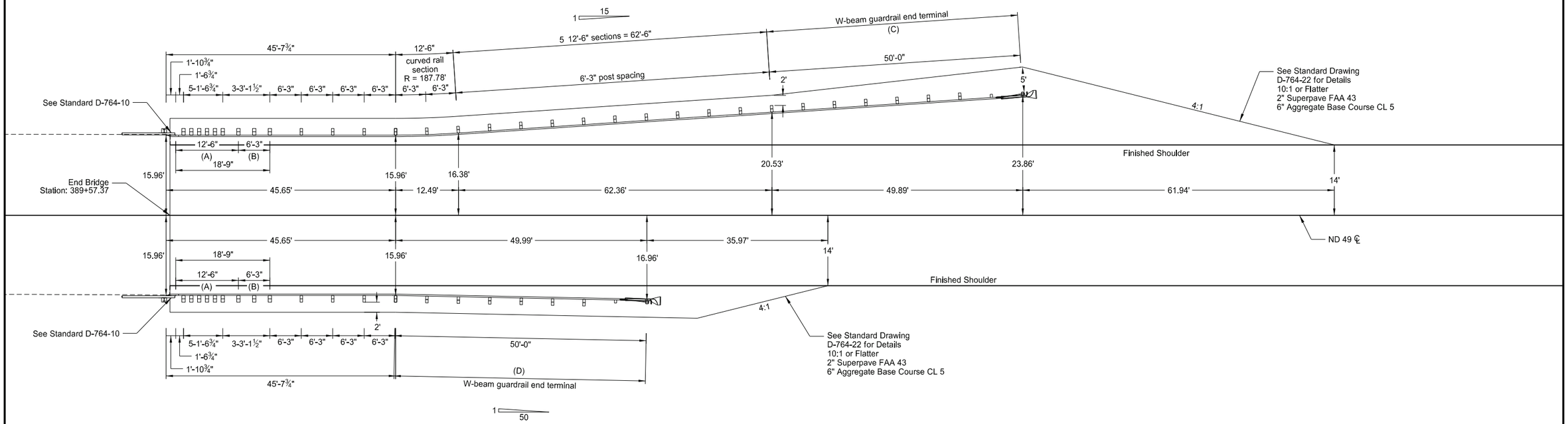
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:09:25 -05'00'
NORTH DAKOTA

8/24/2026 5:02:46 PM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\130GR\130GR_001-008.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	2

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Install a FLEAT Terminal at this location. See Standard Drawing D-764-06.

(D) Install a SKT Terminal at this location. See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
At End of Bridge

Cedar Creek Bridge
RP 7.354
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:09:53 -05'00'
NORTH DAKOTA

8/24/2026 5:02:48 PM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\130GR\130GR_001-008.dgn

23 USC § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	3

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" [6] x 18" LONG GUARDRAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" [6] x 1 1/4" LONG GUARDRAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFLECT-ORIZED PLATES	(A) 8"x 8" x 6' WOOD POST	(A) 8"x 8" x 22" WOOD OFFSET BLOCK	(A) 8"x 8" x 18" WOOD OFFSET BLOCK	(A) 8"x 8" x 14" WOOD OFFSET BLOCK	(A) 6'-3" DOUBLE W-THRIE BEAM TRANSITION SECTION	(A) 12'-6" DOUBLE THICKNESS THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERMINAL CONNECTOR	(A) 7/8" [6] x VARIABLE LONG BOLT	(A) 3/4" [6] x 2-1/2" LONG POST BOLT	(B) EMBANKMENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 386+07.52 to 387+28.02 Rt	33	16	16	96	7	1	8	9	7	1	1	1	1	1	5	2	310
Sta 386+82.37 to 387+28.02 Lt	21	4	4	48	2		5	9	7	1	1	1	1	1	5	2	80
Sta 389+56.60 to 390+02.25 Rt	21	4	4	48	2		8	9	7	1	1	1	1	1	5	2	43
Sta 389+56.60 to 390+77.10 Lt	33	16	16	96	7	1	5	9	7	1	1	1	1	1	5	2	329
TOTAL	108	40	40	288	18	2	26	36	28	4	4	4	4	4	20	8	762

SPEC	CODE	BID ITEM	QTY	UNIT
203	0218	GUARDRAIL EMBANKMENT		
		Sta 384+95.69 to 387+27.25 Rt	1	EA
		Sta 385+96.41 to 387+27.25 Lt	1	EA
		Sta 389+57.37 to 390+88.21 Rt	1	EA
		Sta 389+57.37 to 391+88.93 Lt	1	EA
		Total	4	EA
764	0131	W-BEAM GUARDRAIL		
		Sta 386+07.52 to 387+28.02 Rt	120.7	LF
		Sta 386+82.37 to 387+28.02 Lt	45.7	LF
		Sta 389+56.60 to 390+02.25 Rt	45.7	LF
		Sta 389+56.60 to 390+77.10 Lt	120.7	LF
		Total	332.8	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 385+57.64 to 386+07.52 Rt	1	EA
		Sta 386+32.38 to 386+82.37 Lt	1	EA
		Sta 390+02.25 to 390+52.24 Rt	1	EA
		Sta 390+77.10 to 391+26.99 Lt	1	EA
		Total	4	EA

SPEC	CODE	BID ITEM	QTY	UNIT
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 386+66.92 to 387+29.42 Rt	62.5	LF
		Sta 387+04.42 to 287+29.42 Lt	25	LF
		Sta 389+55.20 to 389+80.20 Rt	25	LF
		Sta 389+55.20 to 390+17.70 Lt	62.5	LF
		Total	175	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 386+29.42 to 386+66.92 Rt	1	EA
		Sta 386+66.92 to 387+04.42 Lt	1	EA
		Sta 389+80.20 to 390+17.70 Rt	1	EA
		Sta 390+17.70 to 390+55.20 Lt	1	EA
		Total	4	EA

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

(B) The volume of embankment (cubic yards) is for informational purposes only.

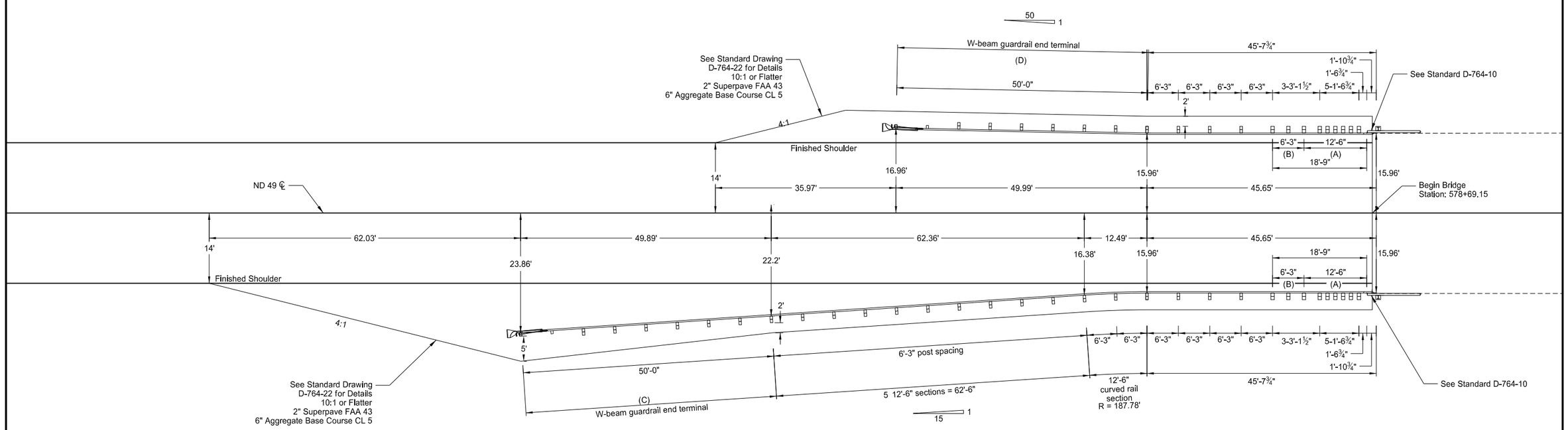
Thrie/W-Beam Guardrail Quantities
Cedar Creek Bridge
RP 7.354
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:10:25 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	4

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Install a FLEAT Terminal at this location.
See Standard Drawing D-764-06.

(D) Install a SKT Terminal at this location.
See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
At Beginning of Bridge

Timber Creek Bridge
RP 10.970
(SCL49_G)

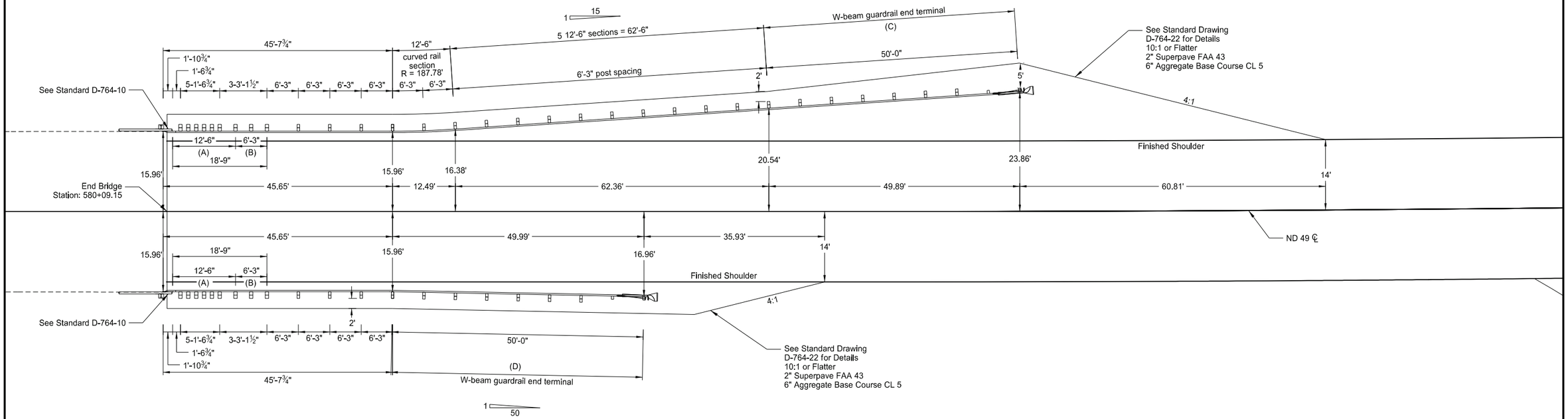
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:10:50 -05'00'
NORTH DAKOTA

8/24/2026 5:02:49 PM Zack.Waln K:\Projects\2021\21.101.0201 ND 49 - State Line to Jct ND 21\50049000.020\Traffic\130GR\130GR_001-008.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	5

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Install a FLEAT Terminal at this location. See Standard Drawing D-764-06.

(D) Install a SKT Terminal at this location. See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
At Eng of Bridge

Timber Creek Bridge
RP 10.970
(SCL49_G)

ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:11:15 -05'00'
NORTH DAKOTA

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23 USC § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	130	6

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" [6] x 18" LONG GUARDRAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" [6] x 1 1/4" LONG GUARDRAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFLECT-ORIZED PLATES	(A) 8"x 8" x 6' WOOD POST	(A) 8"x 8" x 22" WOOD OFFSET BLOCK	(A) 8"x 8" x 18" WOOD OFFSET BLOCK	(A) 8"x 8" x 14" WOOD OFFSET BLOCK	(A) 6'-3" DOUBLE W-THRIE BEAM TRANSITION SECTION	(A) 12'-6" DOUBLE THICKNESS THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERMINAL CONNECTOR	(A) 7/8" [6] x VARIABLE LONG BOLT	(A) 3/4" [6] x 2-1/2" LONG POST BOLT	(B) EMBANKMENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 577+49.42 to 578+69.92 Rt	33	16	16	96	7	1	8	9	7	1	1	1	1	1	5	2	424
Sta 578+24.27 to 578+69.92 Lt	21	4	4	48	2		5	9	7	1	1	1	1	1	5	2	71
Sta 580+08.38 to 580+54.03 Rt	21	4	4	48	2		8	9	7	1	1	1	1	1	5	2	53
Sta 580+08.38 to 581+28.88 Lt	33	16	16	96	7	1	5	9	7	1	1	1	1	1	5	2	193
TOTAL	108	40	40	288	18	2	26	36	28	4	4	4	4	4	20	8	741

SPEC	CODE	BID ITEM	QTY	UNIT
203	0218	GUARDRAIL EMBANKMENT		
		Sta 576+37.50 to 578+67.82 Rt	1	EA
		Sta 577+38.31 to 578+67.82 Lt	1	EA
		Sta 580+10.48 to 581+39.94 Rt	1	EA
		Sta 580+10.48 to 582+39.67 Lt	1	EA
		Total	4	EA
764	0131	W-BEAM GUARDRAIL		
		Sta 577+49.42 to 578+69.92 Rt	120.7	LF
		Sta 578+24.27 to 578+69.92 Lt	45.7	LF
		Sta 580+08.38 to 580+54.03 Rt	45.7	LF
		Sta 580+08.38 to 581+28.88 Lt	120.7	LF
		Total	332.8	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 576+99.53 to 577+49.42 Rt	1	EA
		Sta 577+74.28 to 578+24.27 Lt	1	EA
		Sta 580+54.03 to 581+04.02 Rt	1	EA
		Sta 581+28.88 to 581+78.77 Lt	1	EA
		Total	4	EA

SPEC	CODE	BID ITEM	QTY	UNIT
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 578+08.85 to 578+71.32 Rt	62.5	LF
		Sta 578+46.32 to 578+71.32 Lt	25	LF
		Sta 580+31.98 to 580+06.98 Rt	25	LF
		Sta 580+69.48 to 580+06.98 Lt	62.5	LF
		Total	175	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 577+71.32 to 578+08.82 Rt	1	EA
		Sta 578+08.82 to 578+46.32 Lt	1	EA
		Sta 580+69.48 to 580+31.98 Rt	1	EA
		Sta 581+06.98 to 580+69.48 Lt	1	EA
		Total	4	EA

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

(B) The volume of embankment (cubic yards) is for informational purposes only.

Thrie/W-Beam Guardrail Quantities
Timber Creek Bridge
RP 10.970
(SCL49_G)

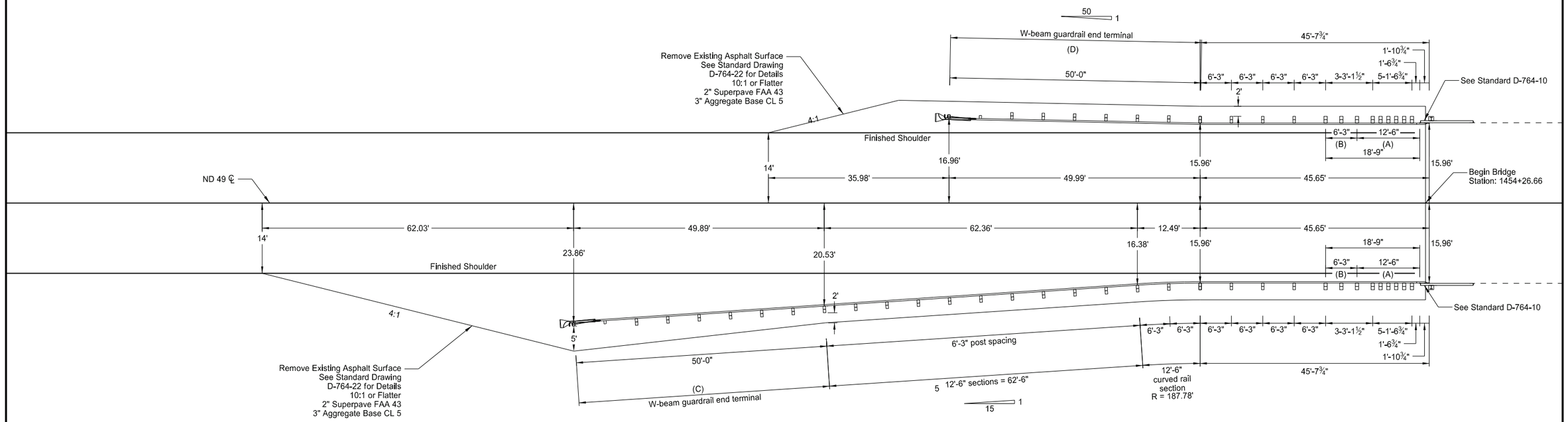
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
DATE 2026.08.27 09:11:39 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	7

23 USC § 407 Documents
NDDOT Reserves All Objections

SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 1452+57.04 to Sta 1454+27.43 Rt	170.7	LF
		Sta 1453+31.79 to Sta 1454+27.43 Lt	95.7	LF



(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Reset existing FLEAT Terminal at this location.
See Standard Drawing D-764-06.

(D) Reset existing SKT Terminal at this location.
See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
Cannonball River Bridge
RP 27.574
(SCL49_G)

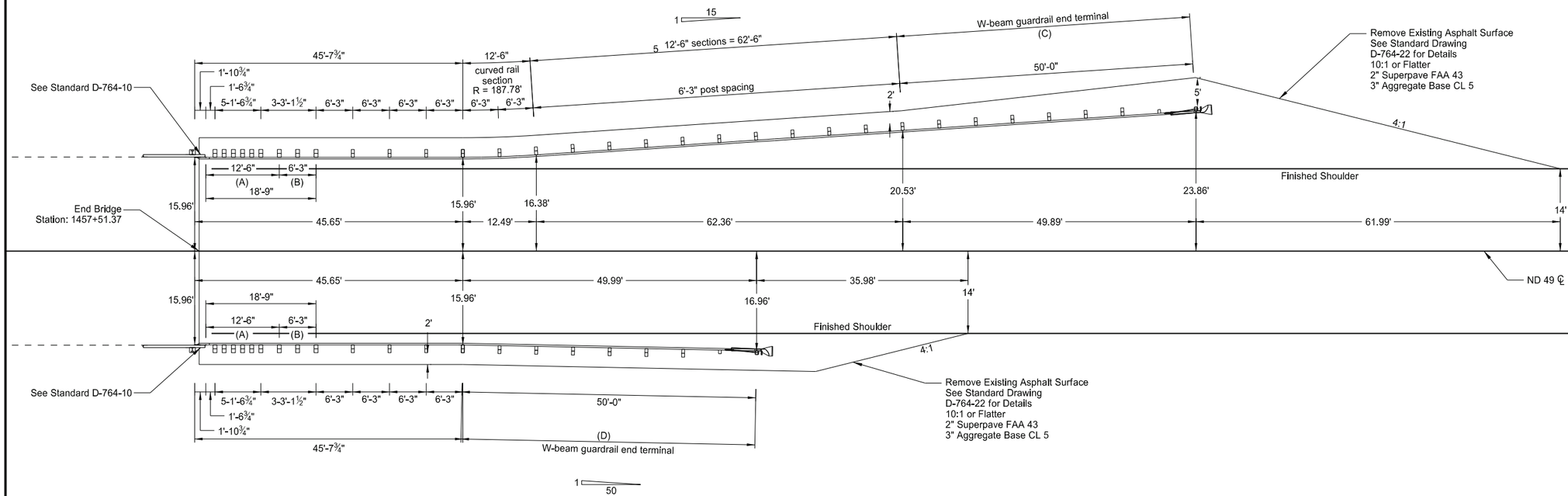
ND 49 - State Line to Jct ND 21

REGISTERED PROFESSIONAL ENGINEER
ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:12:06 -05'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	X-5-049(020)000	130	8

23 USC § 407 Documents
NDDOT Reserves All Objections

SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 1457+50.60 to Sta 1458+46.24 Rt	95.7	LF
		Sta 1457+50.60 to Sta 1459+20.99 Lt	170.7	LF



(A) Thrie beam rail section (Double Thickness).

(B) W-Thrie beam transition section (Double Thickness).

(C) Reset existing FLEAT Terminal at this location. See Standard Drawing D-764-06.

(D) Reset existingSKT Terminal at this location. See Standard Drawing D-764-05.

Thrie/W-Beam Guardrail Layout
Cannonball River Bridge
RP 27.574
(SCL49_G)

ND 49 - State Line to Jct ND 21

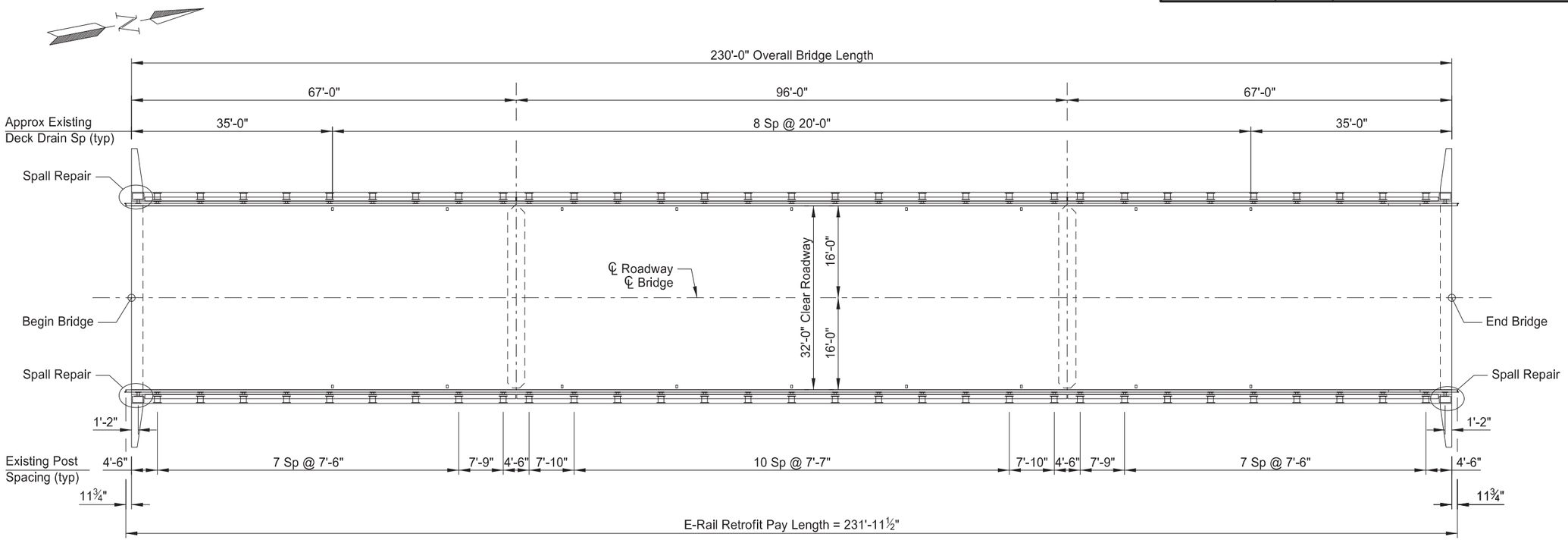
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ZACKERY S. WALN
PE-41996
2026.08.27
DATE 09:13:26 -05'00'
NORTH DAKOTA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	1



PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	818
602	1300	BRIDGE DECK GROOVING	SF	7,360
602	7000	SPECIAL SURFACE FINISH	SF	3,150
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - ERAIL	LF	463.9
650	0704	OVERLAY CONCRETE	CY	45.4
650	0707	DECK CONCRETE	CY	10.4
650	0710	CLASS 1-H REMOVAL	SY	818
650	0720	CLASS 1 REMOVAL	SY	818
650	0723	CLASS 3 REMOVAL	SY	41
650	0724	CLASS 4 REMOVAL	SY	8
930	9534	MODIFY DECK DRAIN	EA	18
930	9612	SPALL REPAIR	SF	4

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-9691
DATE: 08/13/26
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 566(25)	HYDRODEMO & DECK OVERLAY

7 NORTH OF SD BORDER
CEDAR CREEK

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
08/13/26

8/9/2026 1:00:21 PM rrykowsky c:\srf-pw\d0224535\170BR_001_BRLO.dgn

ERJ ESH

49-007.354-1

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NOTES

100 SCOPE OF WORK: Work at this site consists of extending existing deck drains; bridge end post spall repairs; placing a deck overlay; installing a double box beam rail retrofit; and applying special surface finish and crack sealing the curbs, posts, and rails.

602 WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 SPECIAL SURFACE FINISH: Before the installation of the rail retrofit, clean the exposed surfaces of the posts and rails, as well as the top and inside surfaces of the curbs, using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.02” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL Bridge Cote.

Apply Tex-Cote XL 70 Bridge Cote with Silane to the exposed surfaces of the concrete posts and rails, and to the top and inside surfaces of the curb. Use gray surface finish color 36424 meeting AMS-STD-595 with a medium textured finish.

602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent solution to the top of the bridge deck overlay. Do not apply crack sealant, pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 OVERLAY CONCRETE: An additional ½” depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all material, labor, and equipment required to crack seal in the price bid for "Overlay Concrete."

930 MODIFY DECK DRAIN: Extend the existing deck drains in accordance with Section 616. Provide HSS tubing meeting ASTM A500 Grade B. Galvanize the deck drain extensions after fabrication. Prep the locations to be welded by removing the galvanized coating prior to welding. After completion of welding, paint the weld areas using a zinc-rich paint meeting ASTM A780.

Include all labor, equipment, and materials required to extend the deck drains as shown in the plans in the bid item “Modify Deck Drain.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table.

Remove all unsound concrete and replace it with new concrete to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of ¼" plus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sandblast clean the existing concrete and exposed reinforcing steel. Repair any damaged epoxy coating on the reinforcing steel with a patching material that meets ASTM A775 and ASTM D3963. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), or an approved equal repair mortar. Cure the material as recommended by the manufacturer.

The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See supplemental bid information for photos.

Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

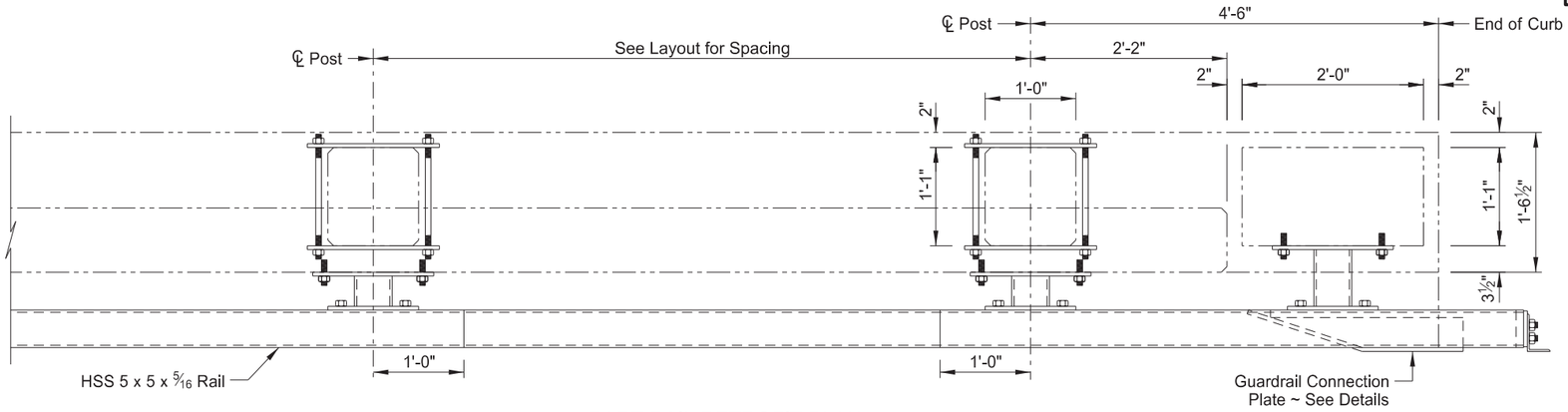
SPALL REPAIR (SF)		
PICTURE	LOCATION	TOTAL (SF)
#1	END POST SW CORNER	1
#2	END POST SE CORNER	1
#3	END POST NE CORNER	2

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-9691
DATE: 08/13/26
NORTH DAKOTA

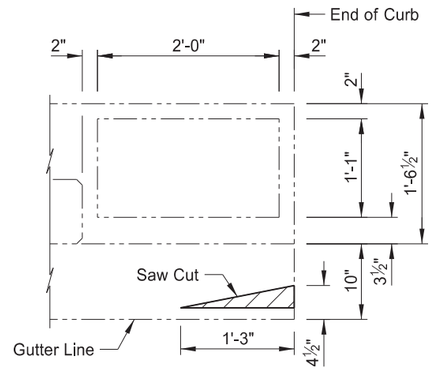
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23 U.S.C. 407
NDDOT Reserves All Objections

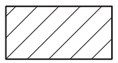
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	3



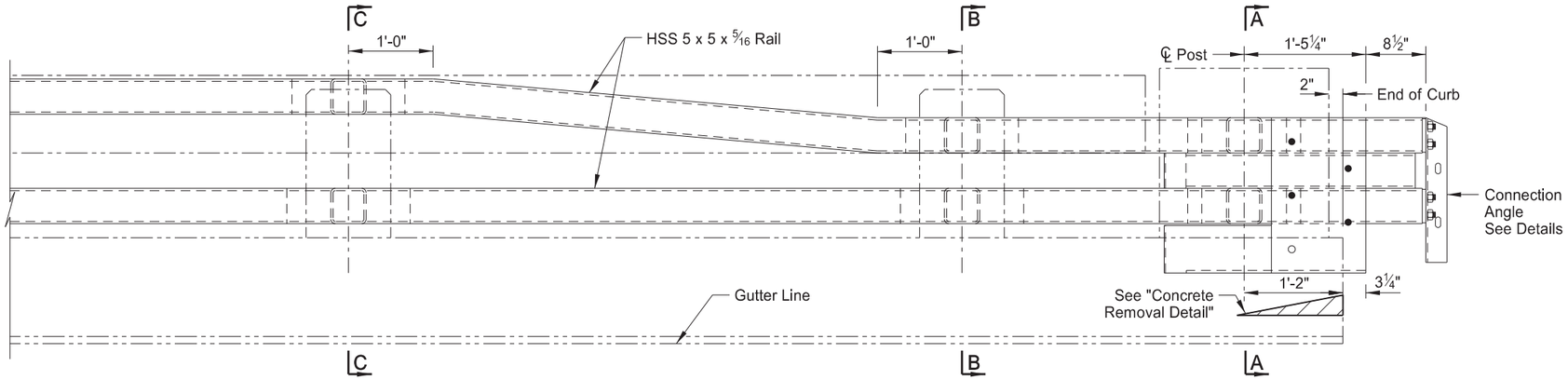
PART RAIL RETROFIT PLAN



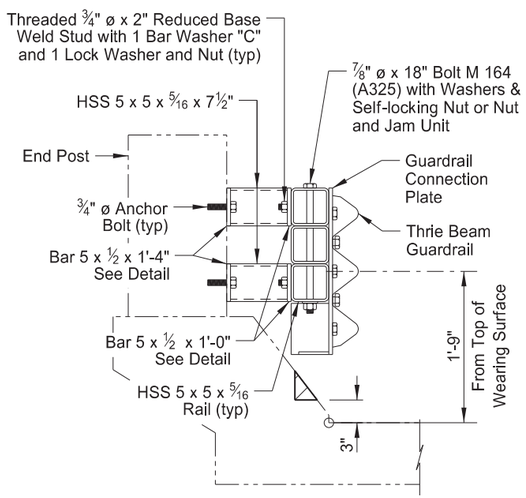
PLAN
CONCRETE REMOVAL DETAIL



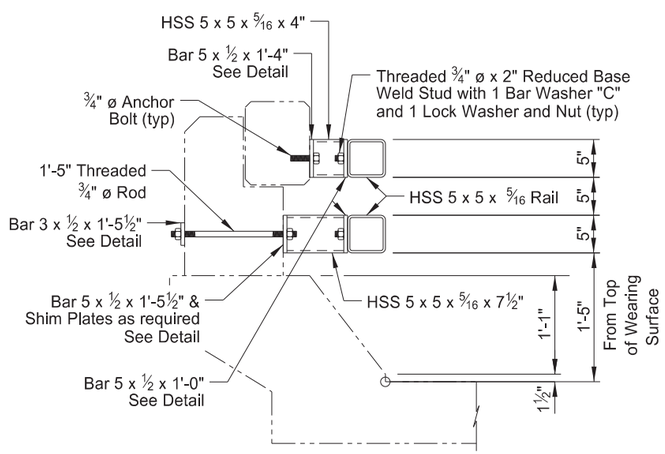
Indicates Concrete Removal



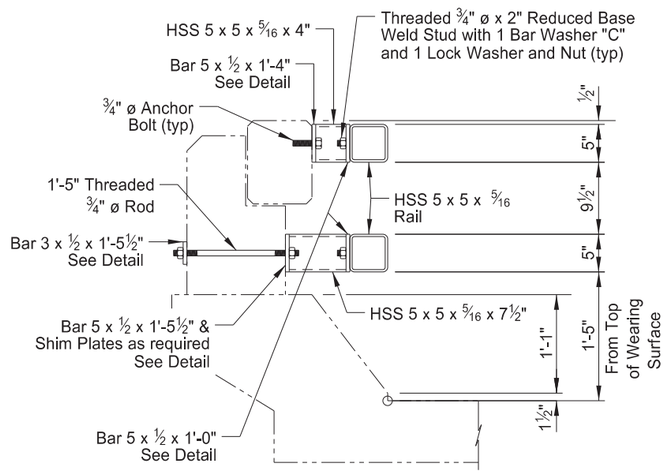
PART RAIL RETROFIT ELEVATION



A-A



B-B



C-C

QUANTITIES

SEE DWG 49-007.354-4

7 NORTH OF SD BORDER
CEDAR CREEK

DOUBLE BOX BEAM
E-RAIL RETROFIT DETAILS

NOTE:

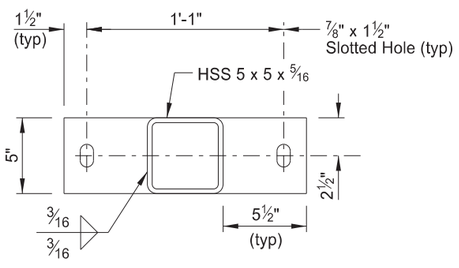
See Dwg 49-007.354-4 for notes and details not shown on this drawing.



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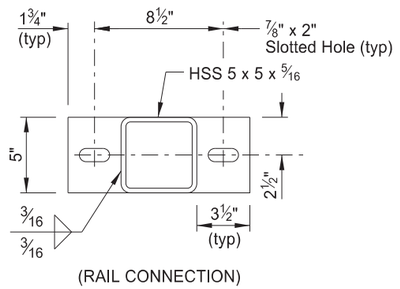
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	4



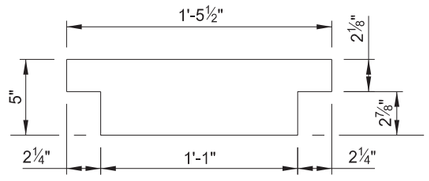
(CONCRETE RAIL CONNECTION)

BAR 5 X ½ X 1'-4" DETAIL



(RAIL CONNECTION)

BAR 5 X ½ X 1'-0" DETAIL

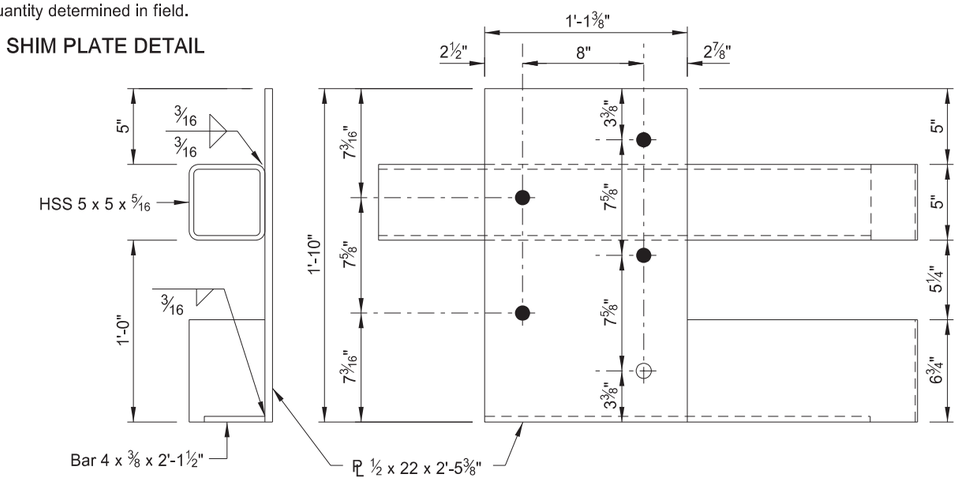


¼" & ⅛" Thickness
Quantity determined in field.

SHIM PLATE DETAIL

The filled circles indicate drilled and tapped holes for ⅞" ø bolts M 164 (A325). See Detail "B."

The open circle indicates a drilled hole through the ½" plate for a ⅞" ø bolt M 164 (A325).



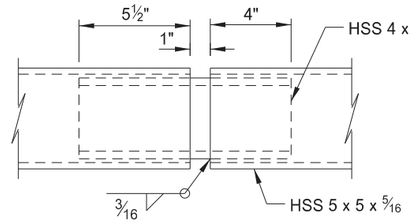
NOTES:

Galvanize all steel components after fabrication according to Section 854.

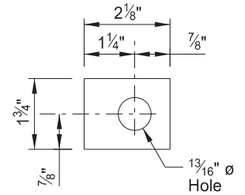
Provide reduced base studs in accordance with ASTM A108.

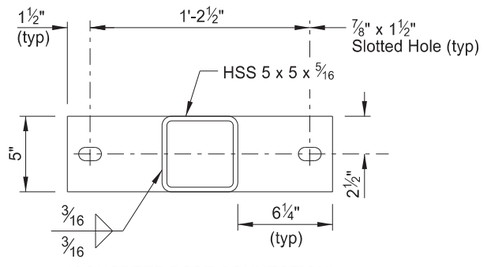
Tighten the threaded rods to provide a minimum tensile force of 2,500 lbs and a maximum tensile force of 2,700 lbs.

Embed anchor bolts into the concrete using a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.



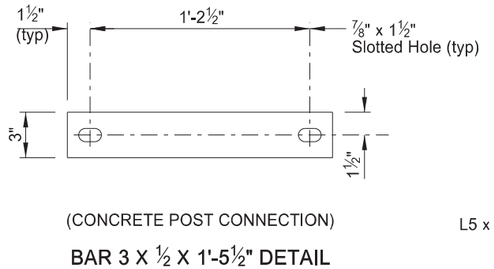
RAIL SPLICE DETAIL





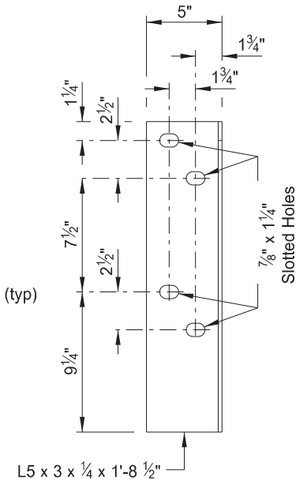
(CONCRETE POST CONNECTION)

BAR 5 X ½ X 1'-5½" DETAIL



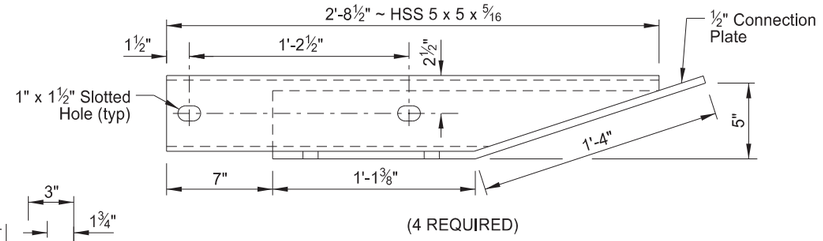
(CONCRETE POST CONNECTION)

BAR 3 X ½ X 1'-5½" DETAIL



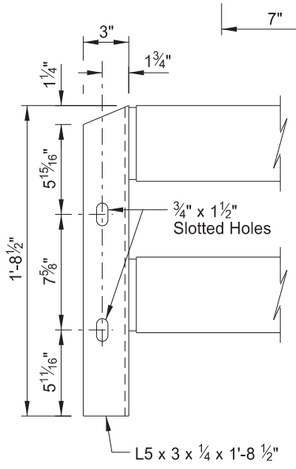
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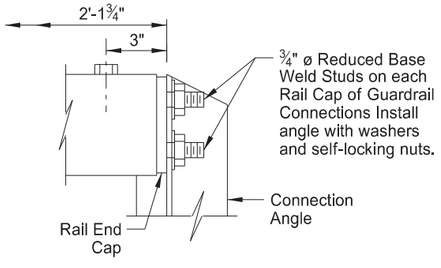
CONNECTION ANGLE DETAILS



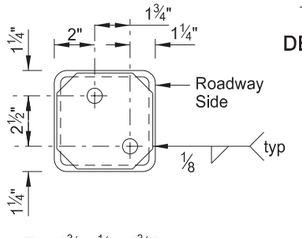
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GUARDRAIL CONNECTION PLATE DETAILS





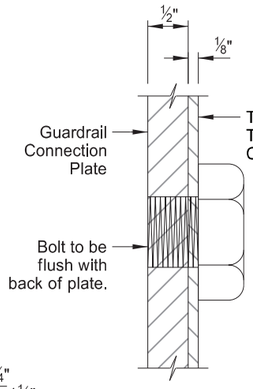
RAIL CAP DETAIL



(Bar 4¾ x ½ x 4¾")

Cope corners 1" to provide zinc drains.

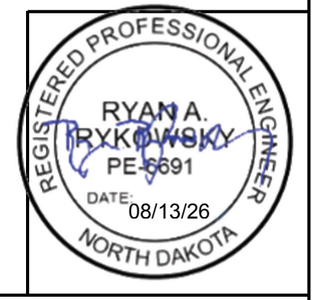
RAIL CAP END VIEW



DETAIL "B"

Position washers to completely cover slotted holes.

¼" BAR WASHER "C"



QUANTITIES	
E-RAIL RETROFIT	463.9 LF

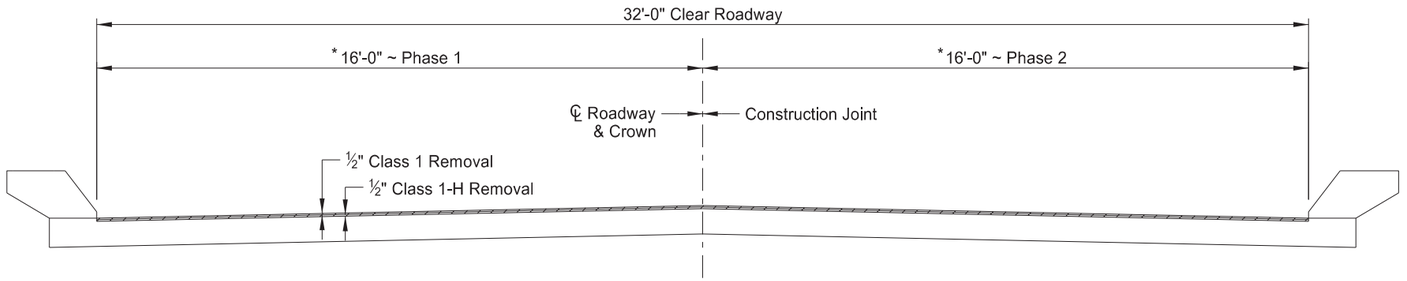
7 NORTH OF SD BORDER
CEDAR CREEK

DOUBLE BOX BEAM
E-RAIL RETROFIT DETAILS

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NDDOT Reserves All Objections

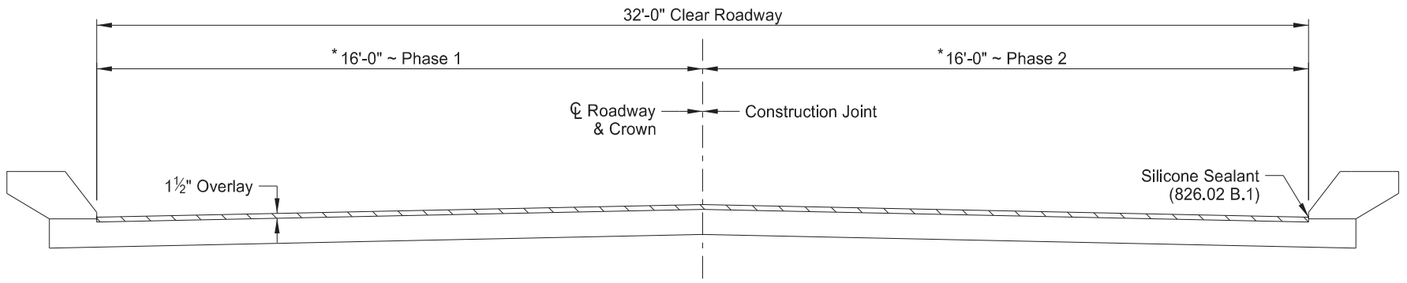
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	5



* Match existing deck cross slope.

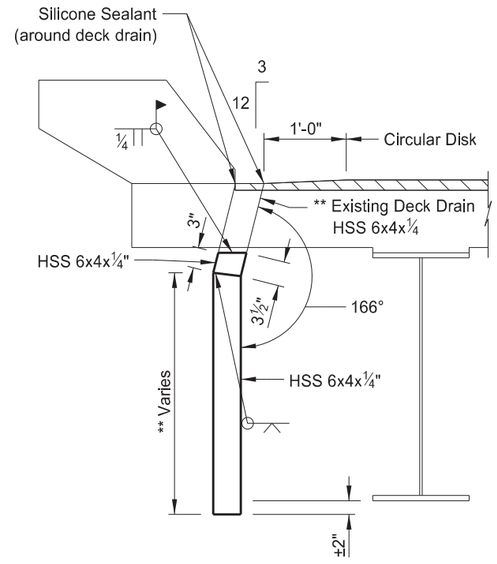
(SHOWING REMOVAL)

TYPICAL DECK SECTION



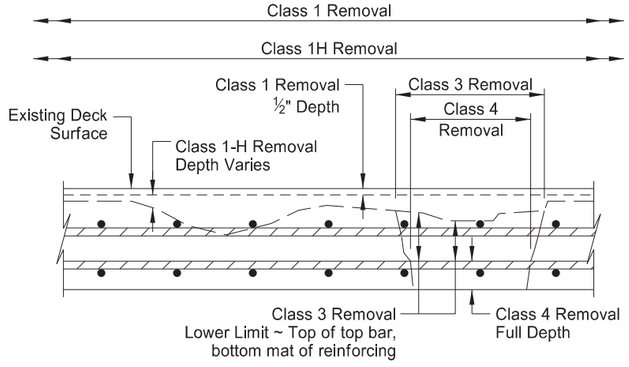
(SHOWING OVERLAY)

TYPICAL DECK SECTION



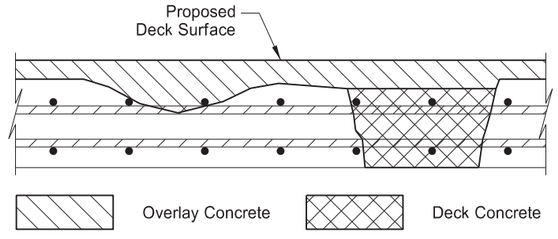
MODIFY DECK DRAIN DETAIL

** Verify the existing deck drain HSS section type, spacing, and orientation in the field. Determine the required length of deck drain extensions based on field measurements and submit work drawings to the Engineer for review. If modifications to the deck drain details are required based on field reconnaissance, show the proposed modifications in the work drawings.



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

QUANTITIES	
OVERLAY CONCRETE	45.4 CY
DECK CONCRETE	10.4 CY
CLASS 1-H REMOVAL	818 SY
CLASS 1 REMOVAL	818 SY
CLASS 3 REMOVAL	41 SY
CLASS 4 REMOVAL	8 SY
MODIFY DECK DRAINS	18 EA

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 08/13/26
NORTH DAKOTA

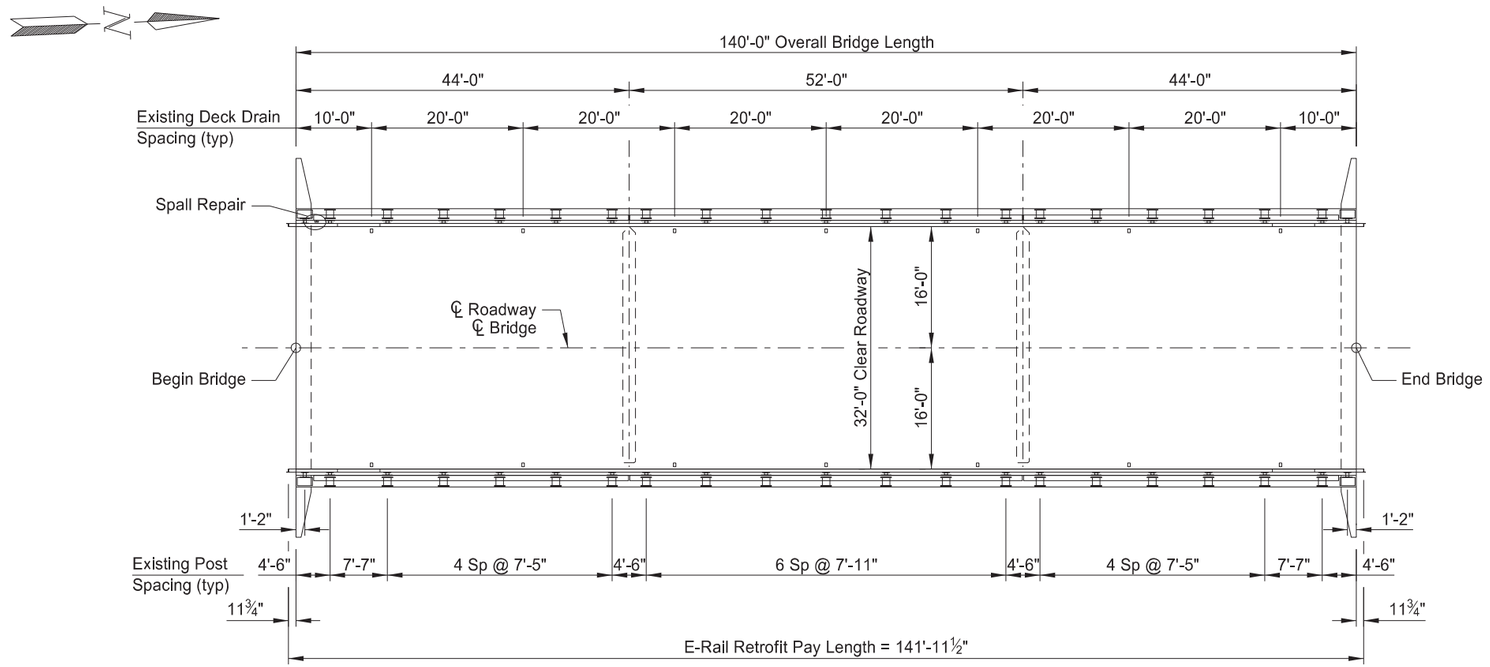
7 NORTH OF SD BORDER
CEDAR CREEK

DECK OVERLAY DETAILS

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NDDOT Reserves All Objections

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PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	498
602	1300	BRIDGE DECK GROOVING	SF	4,480
602	7000	SPECIAL SURFACE FINISH	SF	1,925
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - ERAIL	LF	283.9
650	0704	OVERLAY CONCRETE	CY	27.7
650	0707	DECK CONCRETE	CY	5.7
650	0710	CLASS 1-H REMOVAL	SY	498
650	0720	CLASS 1 REMOVAL	SY	498
650	0723	CLASS 3 REMOVAL	SY	25
650	0724	CLASS 4 REMOVAL	SY	5
930	9534	MODIFY DECK DRAIN	EA	14
930	9612	SPALL REPAIR	SF	1

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 08/13/26
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 566(25)	HYDRODEMO & DECK OVERLAY

11 NORTH OF SD BORDER
TIMBER CREEK

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION
Jason Thorenson
08/13/26

Docusign Envelope ID: 8A5DDA0D-FAE0-80F0-81E0-D88B58D40274

NOTES

100 SCOPE OF WORK: Work at this site consists of deck overhang spall repair; extending existing deck drains; placing a deck overlay; installing a double box beam rail retrofit; and applying special surface finish and crack sealing the curbs, posts, and rails.

602 WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 SPECIAL SURFACE FINISH: Before the installation of the rail retrofit, clean the exposed surfaces of the posts and rails, as well as the top and inside surfaces of the curbs, using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.02” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL Bridge Cote.

Apply Tex-Cote XL 70 Bridge Cote with Silane to the exposed surfaces of the concrete posts and rails, and to the top and inside surfaces of the curb. Use gray surface finish color 36424 meeting AMS-STD-595 with a medium textured finish.

602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent solution to the top of the bridge deck overlay. Do not apply crack sealant, pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 CLASS 1 REMOVAL: Remove asphalt overlay before performing concrete removals.

650 OVERLAY CONCRETE: An additional ½” depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all material, labor, and equipment required to crack seal in the price bid for "Overlay Concrete."

930 MODIFY DECK DRAIN: Extend the existing deck drains in accordance with Section 616. Provide HSS tubing meeting ASTM A500 Grade B. Galvanize the deck drain extensions after fabrication. Prep the locations to be welded by removing the galvanized coating prior to welding. After completion of welding, paint the weld areas using a zinc-rich paint meeting ASTM A780.

Include all labor, equipment, and materials required to extend the deck drains as shown in the plans in the bid item “Modify Deck Drain.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table.

Remove all unsound concrete and replace it with new concrete to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of ¼" plus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sandblast clean the existing concrete and exposed reinforcing steel. Repair any damaged epoxy coating on the reinforcing steel with a patching material that meets ASTM A775 and ASTM D3963. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), or an approved equal repair mortar. Cure the material as recommended by the manufacturer.

The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See supplemental bid information for photos.

Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

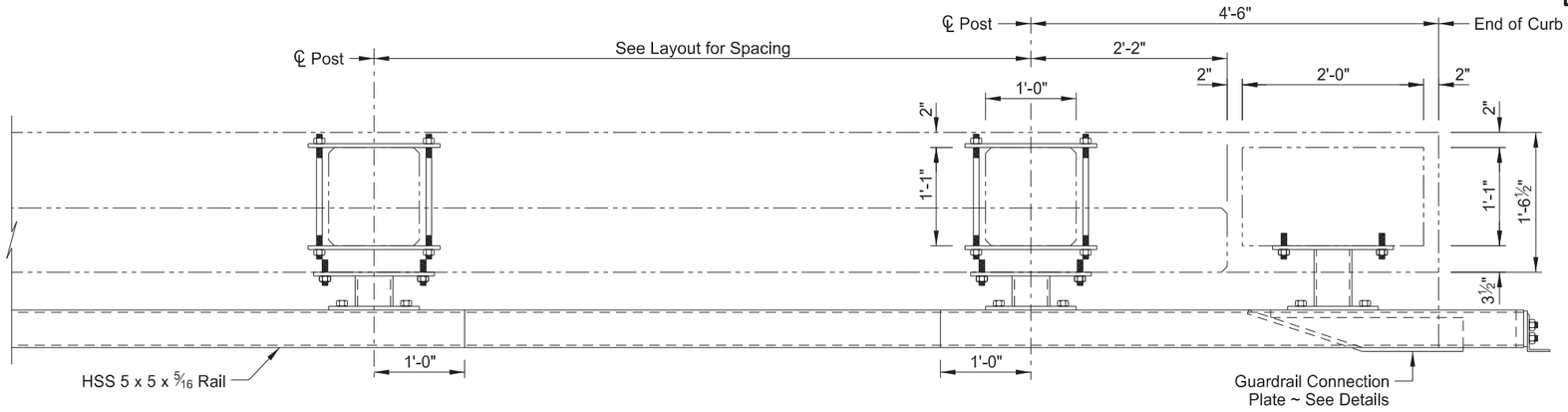
SPALL REPAIR (SF)		
PICTURE	LOCATION	TOTAL (SF)
#1	DECK OVERHANG SW CORNER	1

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 08/13/26
NORTH DAKOTA

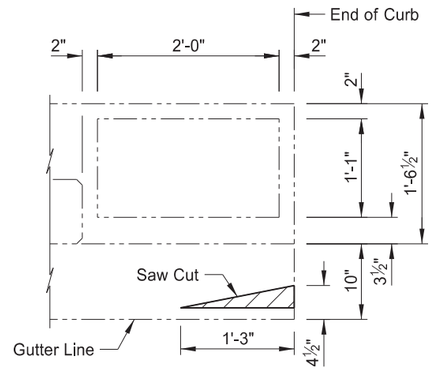
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23 U.S.C. 407
NDDOT Reserves All Objections

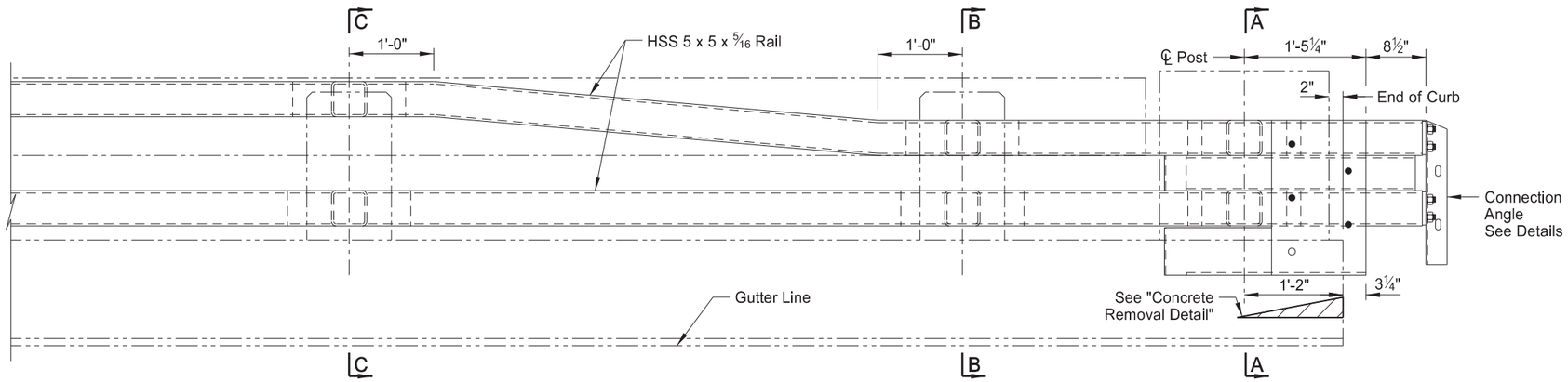
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	8



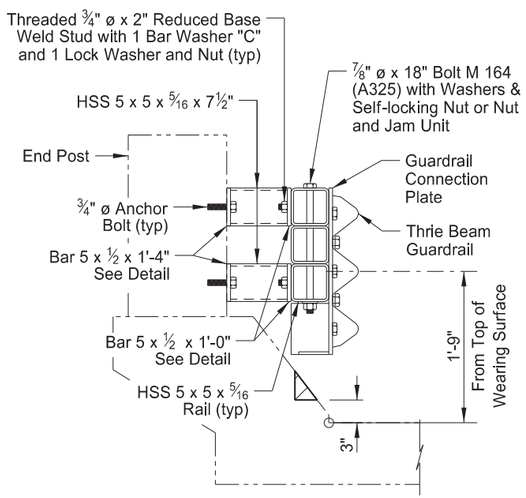
PART RAIL RETROFIT PLAN



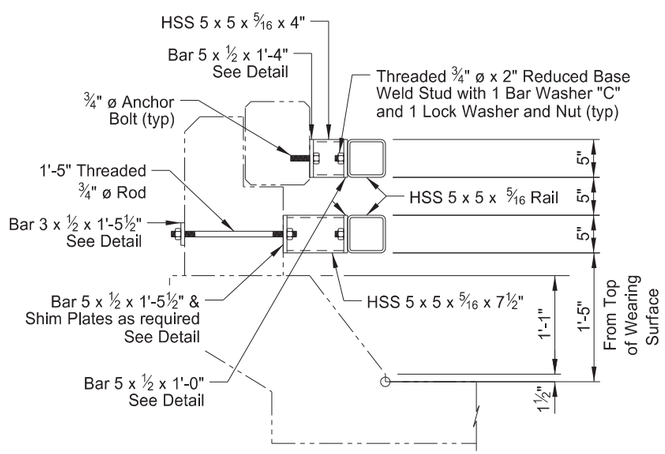
PLAN
CONCRETE REMOVAL DETAIL



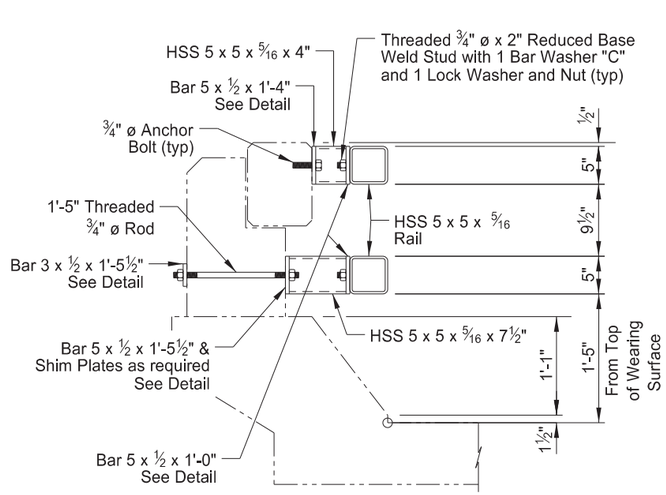
PART RAIL RETROFIT ELEVATION



A-A



B-B



C-C

Indicates Concrete Removal

NOTE:

See Dwg 49-010.970-4 for notes and details not shown on this drawing.



QUANTITIES

SEE DWG 49-010.970-4

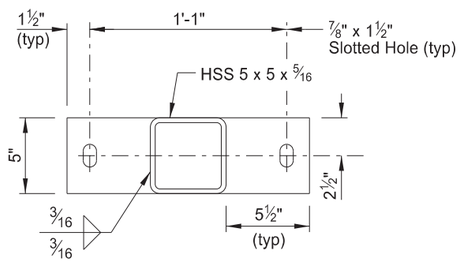
11 NORTH OF SD BORDER
TIMBER CREEK

DOUBLE BOX BEAM
E-RAIL RETROFIT DETAILS

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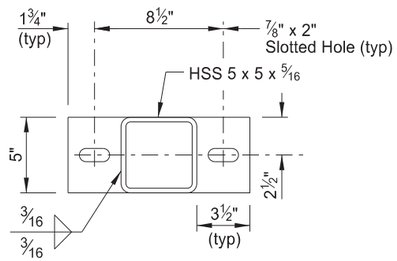
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	9



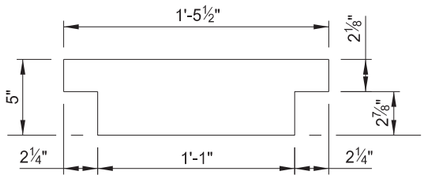
(CONCRETE RAIL CONNECTION)

BAR 5 X ½ X 1'-4" DETAIL



(RAIL CONNECTION)

BAR 5 X ½ X 1'-0" DETAIL

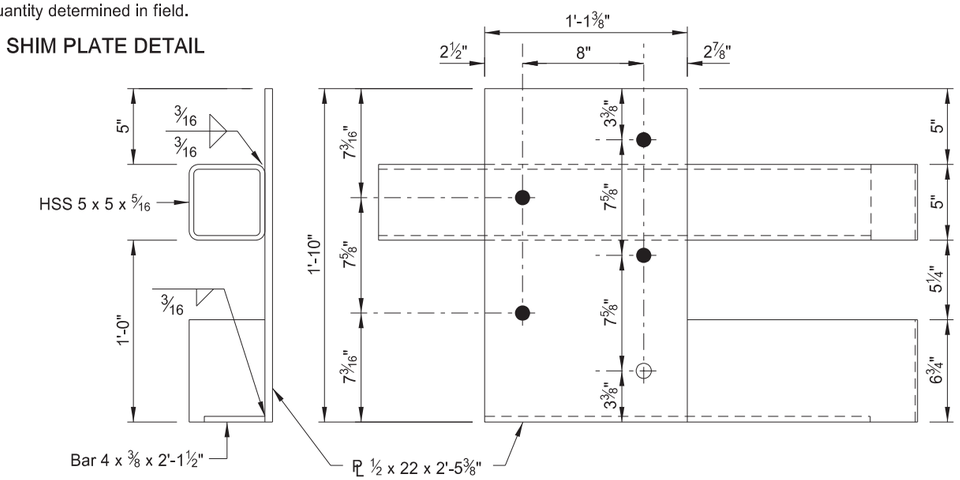


¼" & ⅛" Thickness
Quantity determined in field.

SHIM PLATE DETAIL

The filled circles indicate drilled and tapped holes for ⅞" ø bolts M 164 (A325). See Detail "B."

The open circle indicates a drilled hole through the ½" plate for a ⅞" ø bolt M 164 (A325).



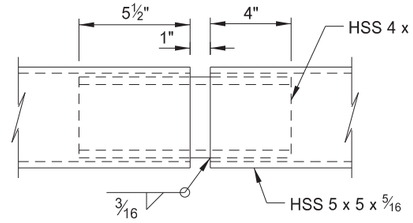
NOTES:

Galvanize all steel components after fabrication according to Section 854.

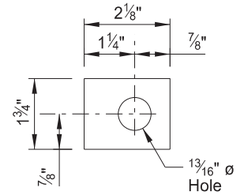
Provide reduced base studs in accordance with ASTM A108.

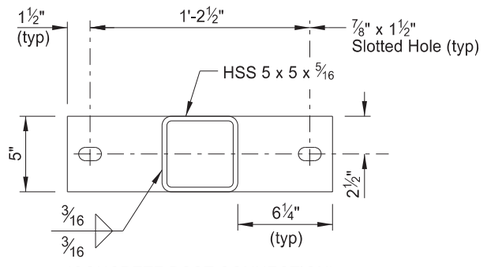
Tighten the threaded rods to provide a minimum tensile force of 2,500 lbs and a maximum tensile force of 2,700 lbs.

Embed anchor bolts into the concrete using a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.



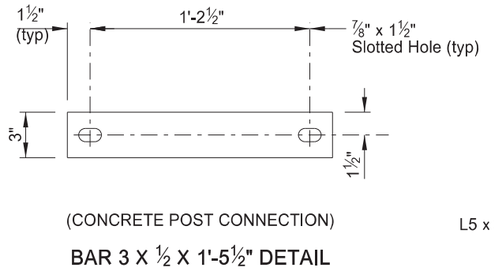
RAIL SPLICE DETAIL





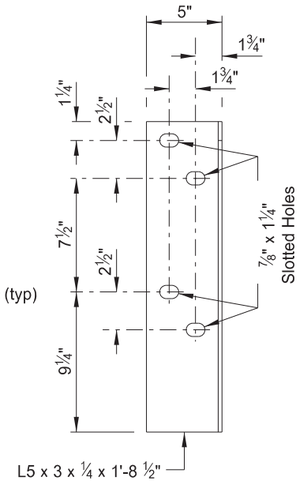
(CONCRETE POST CONNECTION)

BAR 5 X ½ X 1'-5½" DETAIL



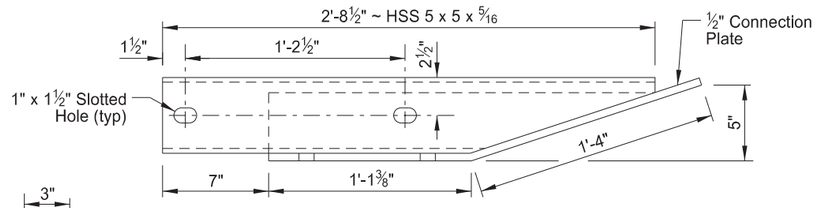
(CONCRETE POST CONNECTION)

BAR 3 X ½ X 1'-5½" DETAIL



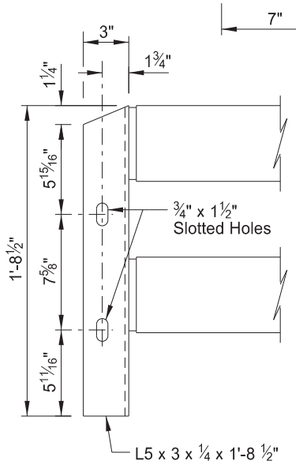
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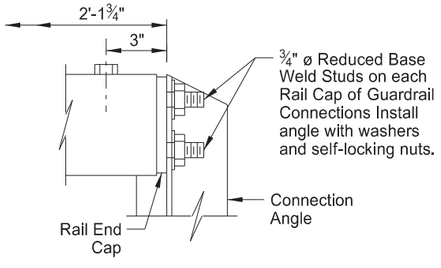
CONNECTION ANGLE DETAILS



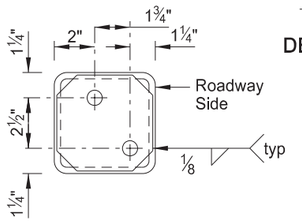
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GUARDRAIL CONNECTION PLATE DETAILS





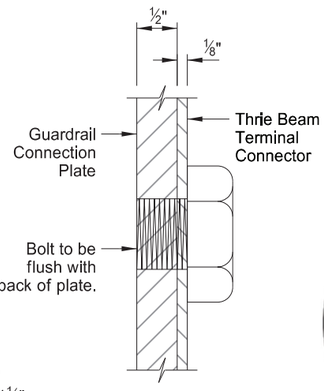
RAIL CAP DETAIL



(Bar 4¾ x ½ x 4¾")

Cope corners 1" to provide zinc drains.

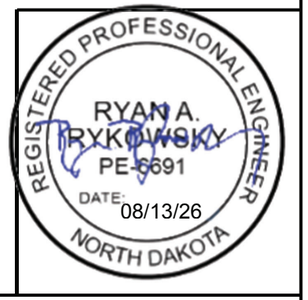
RAIL CAP END VIEW



DETAIL "B"

Position washers to completely cover slotted holes.

¼" BAR WASHER "C"



QUANTITIES	
E-RAIL RETROFIT	283.9 LF

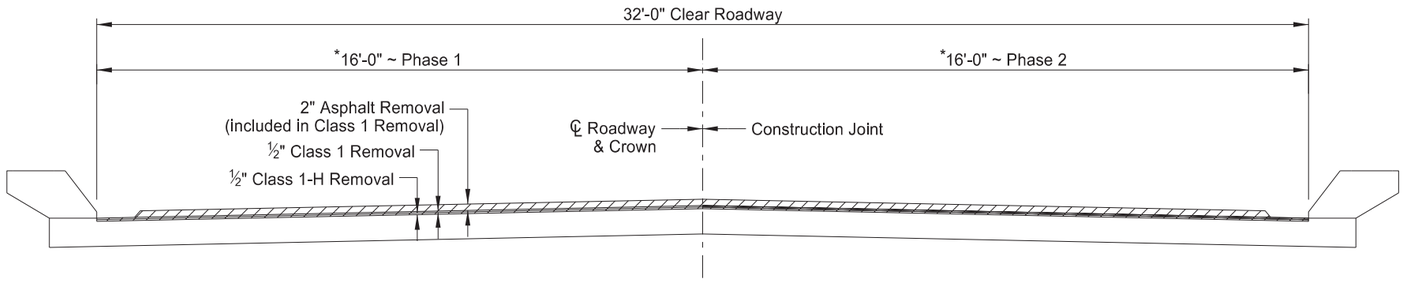
11 NORTH OF SD BORDER
TIMBER CREEK

DOUBLE BOX BEAM
E-RAIL RETROFIT DETAILS

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

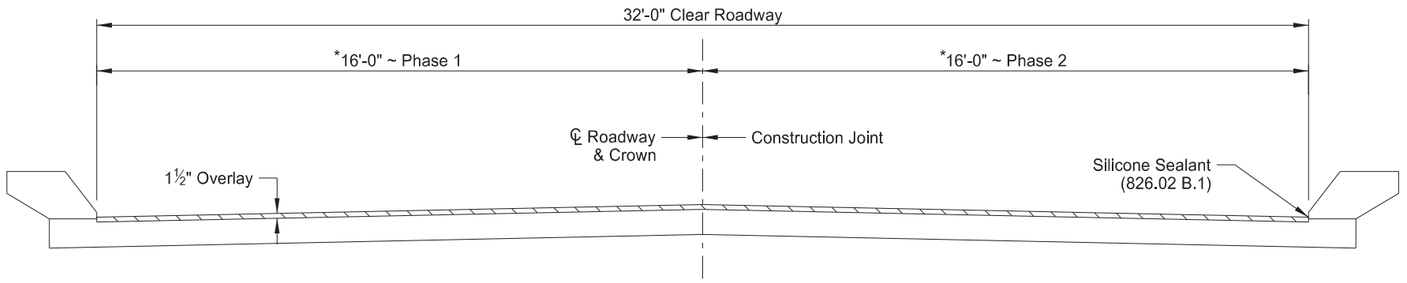
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	10



* Match existing deck cross slope

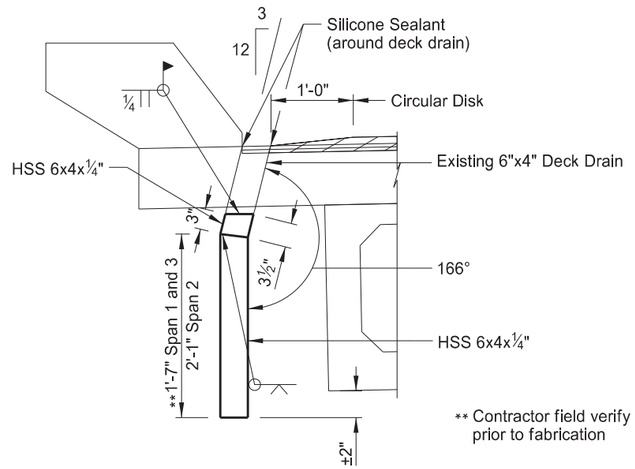
(SHOWING REMOVAL)

TYPICAL DECK SECTION



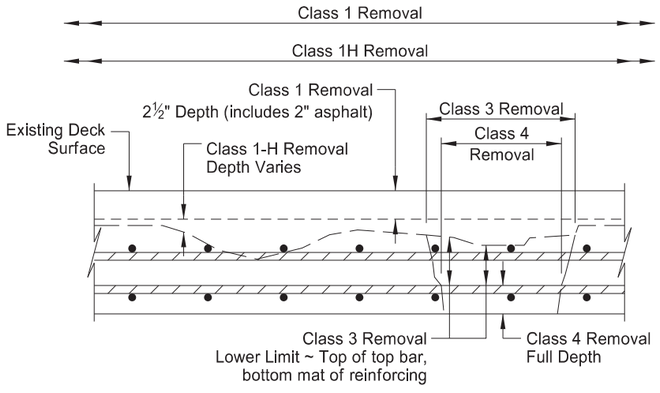
(SHOWING OVERLAY)

TYPICAL DECK SECTION



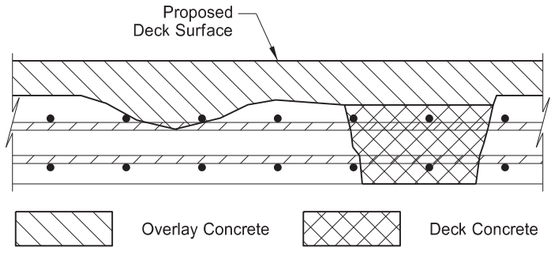
** Contractor field verify prior to fabrication

MODIFY DECK DRAIN DETAILS



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

QUANTITIES	
OVERLAY CONCRETE	27.7 CY
DECK CONCRETE	5.7 CY
CLASS 1-H REMOVAL	498 SY
CLASS 1 REMOVAL	498 SY
CLASS 3 REMOVAL	25 SY
CLASS 4 REMOVAL	5 SY
MODIFY DECK DRAINS	14 EA

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 08/13/26
NORTH DAKOTA

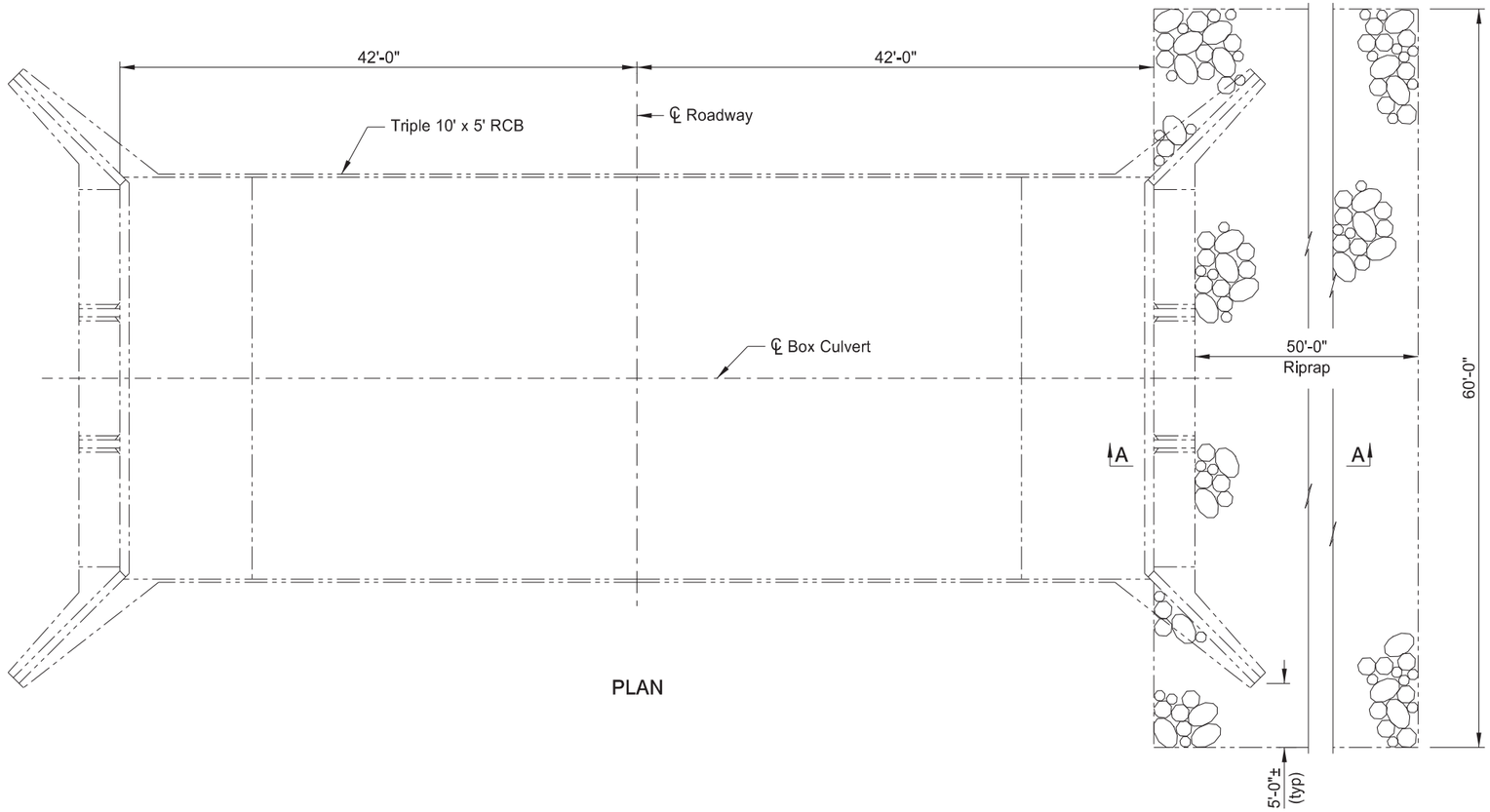
11 NORTH OF SD BORDER
TIMBER CREEK

DECK OVERLAY DETAILS

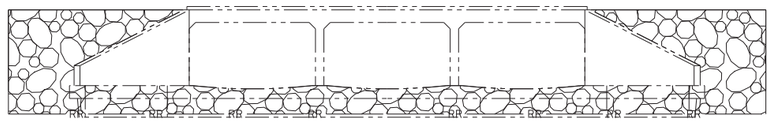
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	11

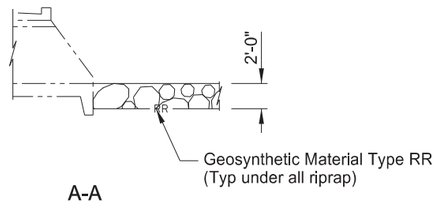


PLAN



(SHOWING FINISHED SECTION)

EAST END VIEW



A-A

100 SCOPE OF WORK: Work at this site consists of placing riprap.

Complete the work at this site without the use of a temporary stream diversion.

256 RIPRAP: Place riprap as shown to fill the scour hole on the east end of the box culvert. Dewatering of the scour repair area is not required to complete this work.

Locate and remove debris within the scour hole, if present, before placing riprap. Adjust the riprap extents as needed to prevent the top of placed riprap from protruding above the original channel section.

Use a clam-bucket or backhoe to place the riprap. Do not cast the riprap.

Prior to placing riprap, fill the void behind the wingwalls with foundation fill. Place the material in layers not exceeding 6 inches loose and compact with a jumping jack.

Include all labor, equipment and materials to place the foundation fill and riprap in the bid item "Riprap Grade II."

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
256	0200	RIPRAP GRADE II	CY	235
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	350

REGISTERED PROFESSIONAL ENGINEER
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8 SOUTH OF JCT ND 21
CREEK

BOX CULVERT LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION
Jason Thorenson
08/13/26

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23 U.S.C. 407
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	12

100 SCOPE OF WORK: Work at this site consists of repairing a spall on a triple 8' x 5' x 84' reinforced concrete box culvert.

It is anticipated that the work at this site can be completed without the use of a temporary stream diversion. No payment will be made for a temporary stream diversion at this site unless the Contractor and Engineer agree a stream diversion is needed to complete the work.

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table below.

Remove all unsound concrete and replace it with new concrete to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of ¼" plus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sandblast clean the existing concrete and exposed reinforcing steel. Repair any damaged epoxy coating on the reinforcing steel with a patching material that meets ASTM A775 and ASTM D3963. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), or an approved equal repair mortar. Cure the material as recommended by the manufacturer.

The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See supplemental bid information for photos.

Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

SPALL REPAIR (SF)		
PICTURE	LOCATION	TOTAL (SF)
#1	WEST PARAPET	6

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
930	9612	SPALL REPAIR	SF	6

REGISTERED PROFESSIONAL ENGINEER
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PE-6691
DATE: 08/13/26
NORTH DAKOTA

5 SOUTH OF JCT ND 21
CREEK

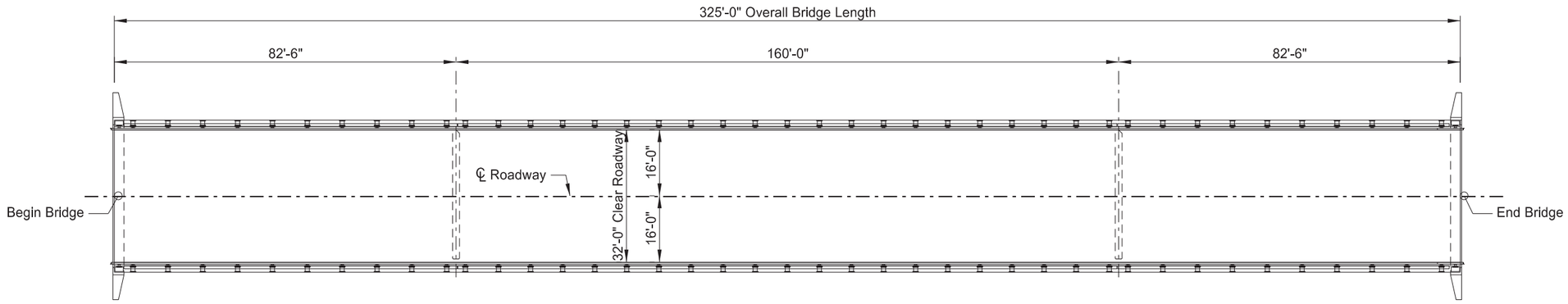
NOTES

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION
Jason Thorenson
08/13/26

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	X-5-049(020)000	170	13



PLAN

100 SCOPE OF WORK: Work at this site consists of applying penetrating water repellent treatment to the bridge deck and curbs.

602 WATER WASHING EQUIPMENT: In addition to water-washing equipment listed in Section 602.02 D, a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent solution to the top of the bridge deck, as well as the front face and top of curbs, and all exposed surfaces of the concrete posts and rails. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1611

REGISTERED PROFESSIONAL ENGINEER
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PE-6691
DATE: 08/13/26
NORTH DAKOTA

2 SOUTH OF JCT ND 21
CANNONBALL RIVER

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
08/13/26

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ERJ ESH

49-027.574-1

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NDDOT ABBREVIATIONS

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

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

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

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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08-03-15	General Revisions
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ENGINEER
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NDDOT ABBREVIATIONS

D-101-3

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
07-01-14

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NORTH DAKOTA

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3
4-14-25	General Revisions

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

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LINE STYLES

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions

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SYMBOLS

D-101-31

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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12-18-20	General Revisions

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12 18 2020

SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12 18 2020

SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

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

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

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

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

Median Drain

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

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

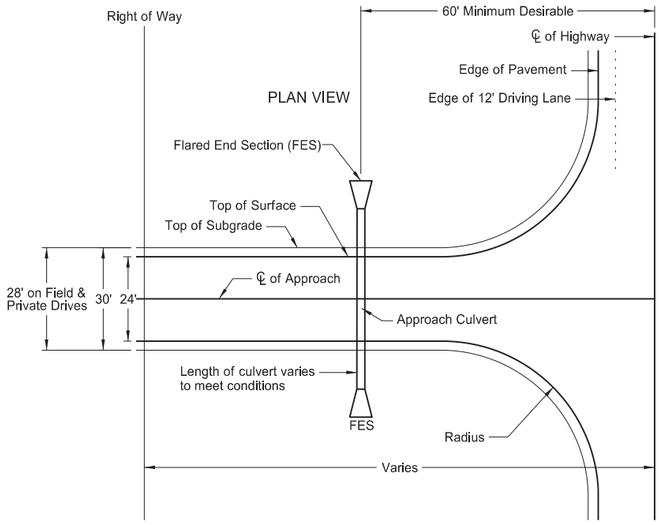
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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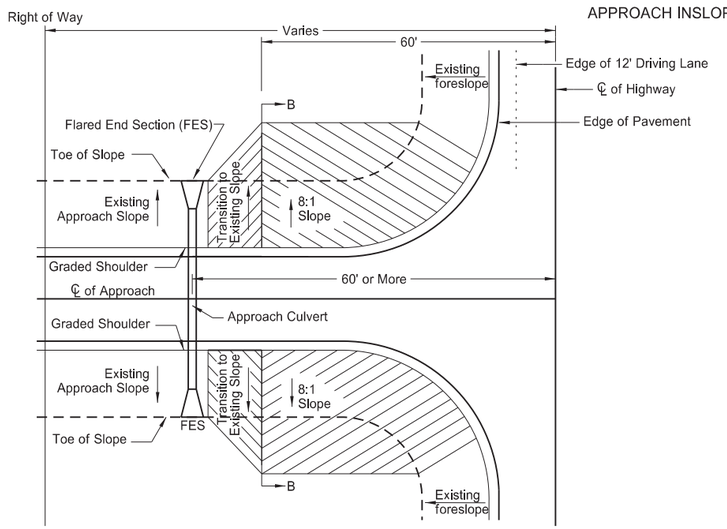
12 18 2020

STANDARD RURAL APPROACHES

D-203-8

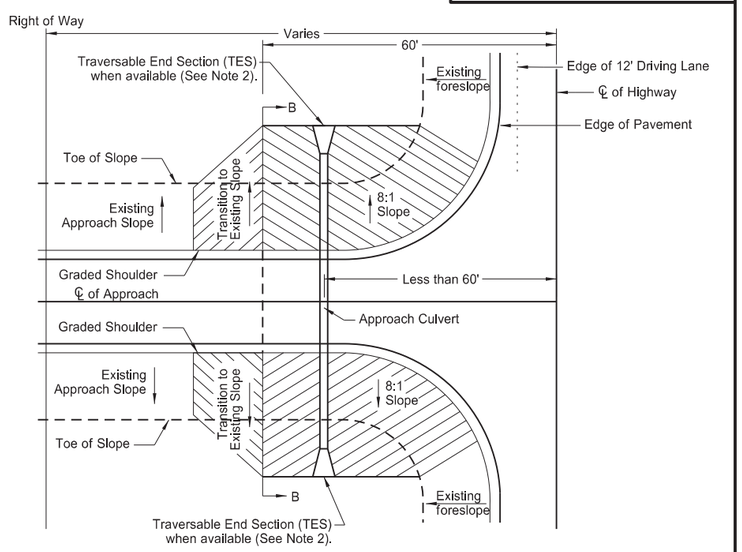


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄



CASE 2

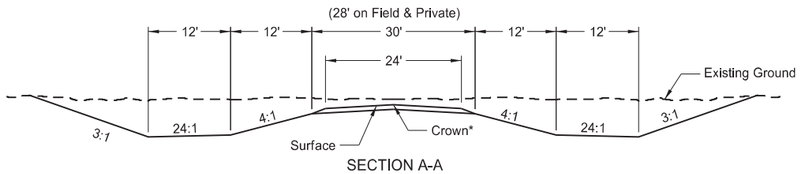
APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

Approach Pipe Traversable End Sections (TES)

RCP	CSP	CSP Arch
15"	15"	
18"	18"	21"x15"
		24"x18"
24"	24"	28"x20"

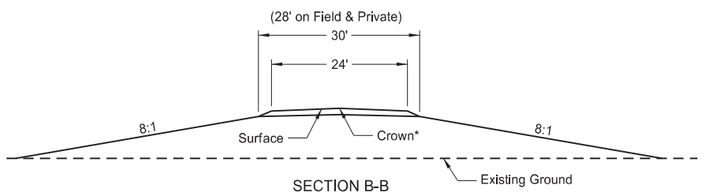
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=40 ft	R=40 ft	R=50 ft
Maximum Grade	10%	7%	7%
Storage Platform	24 ft	24 ft	50 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

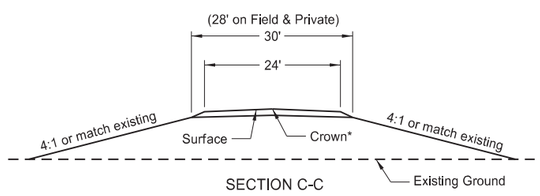


SECTION A-A

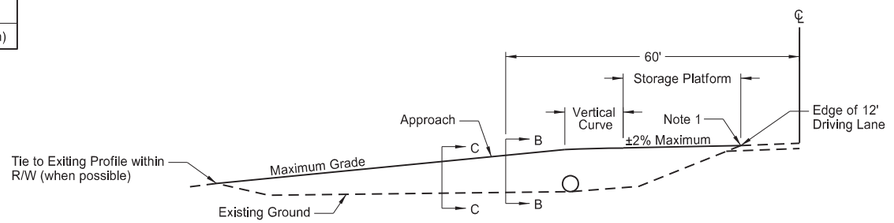
*2.1% crown for paved surface
*3.0% crown for gravel surface



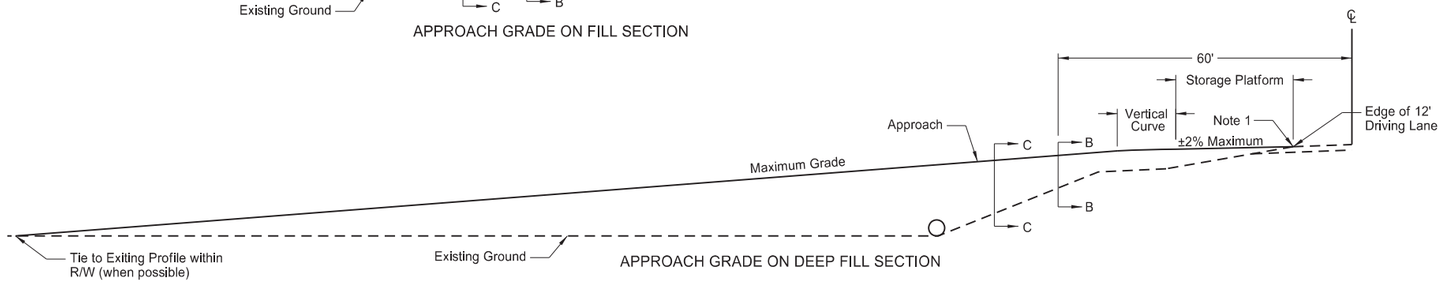
SECTION B-B



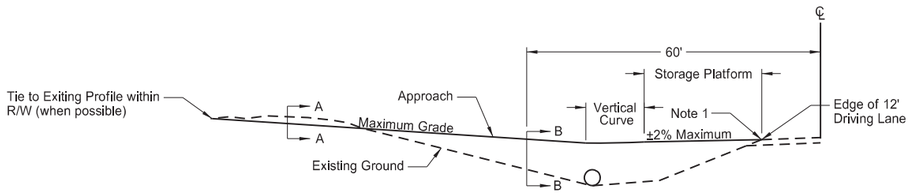
SECTION C-C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

NOTES:

1. 5% Max Rollover between approach storage platform and highway.
2. Approach pipes up to 24" diameter are acceptable (with traversable end sections) for Case 2. Install approach pipes larger than 24" diameter in accordance with Case 1.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
06-30-17	Revised Radius, Storage Platform, Inslope dimensions, and Note 1
10-25-19 06-29-22	Changed "Inslope" to "Foreslope" Added "TES", Table, and Note 2

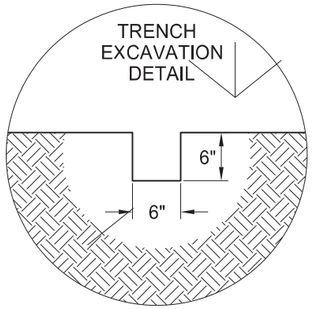
KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

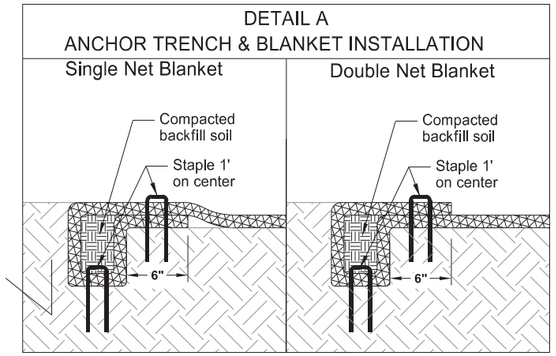
06/29/22

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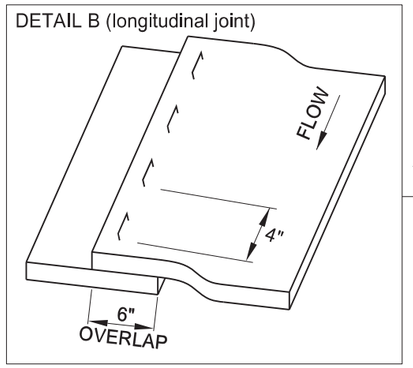
D-255-2

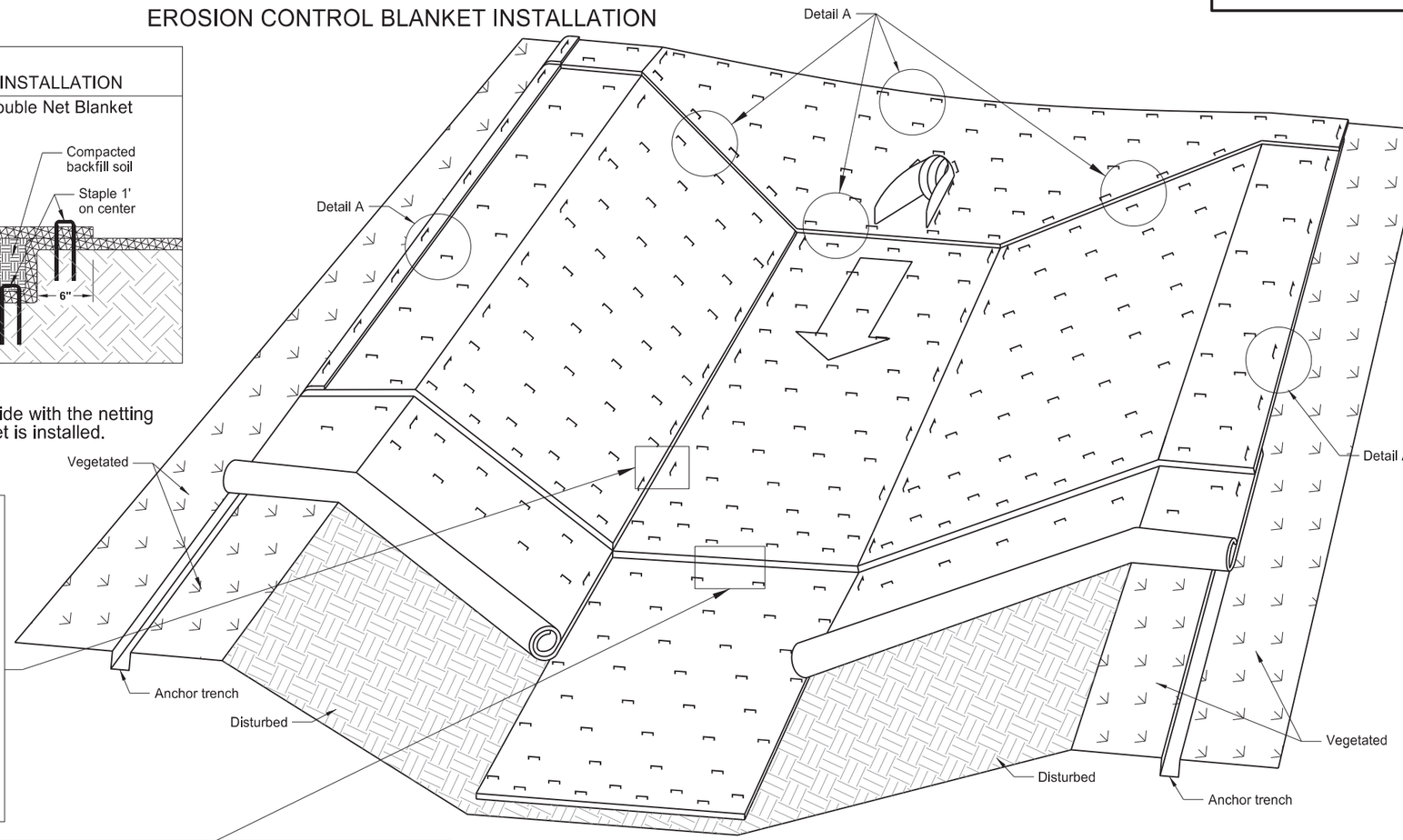
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



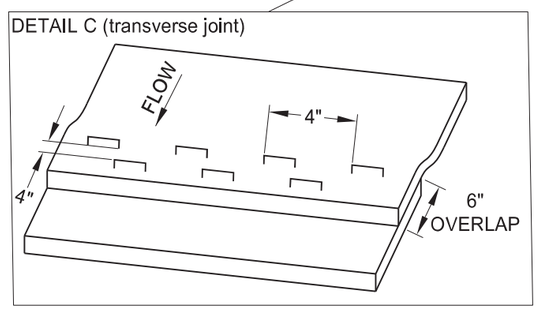


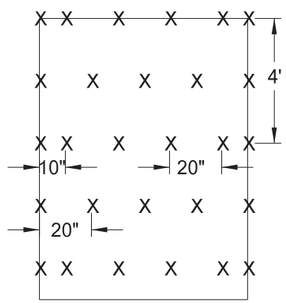
NOTE:
If a Single Net Blanket is used, the side with the netting should be on the top once the blanket is installed.



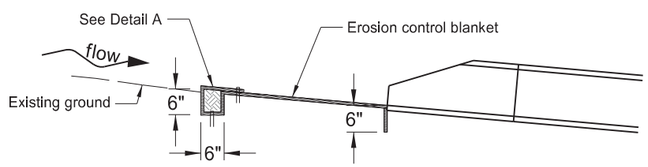


BLANKET LAYOUT
CHANNEL INSTALLATION

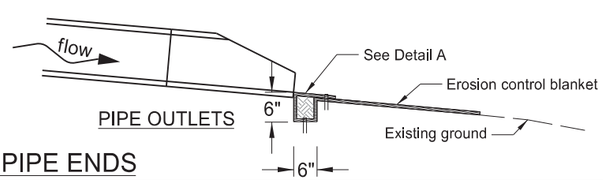




STAPLE PATTERN
(3.8 staples per square yard)



PIPE INLETS



PIPE OUTLETS

INSTALLATION AT PIPE ENDS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-6 to D-255-2
07-27-15	Changed Installation details such as trench depth and overlap dimensions
08-27-19	New Design Engineer PE Stamp
08-27-25	Revised minor details for clarity

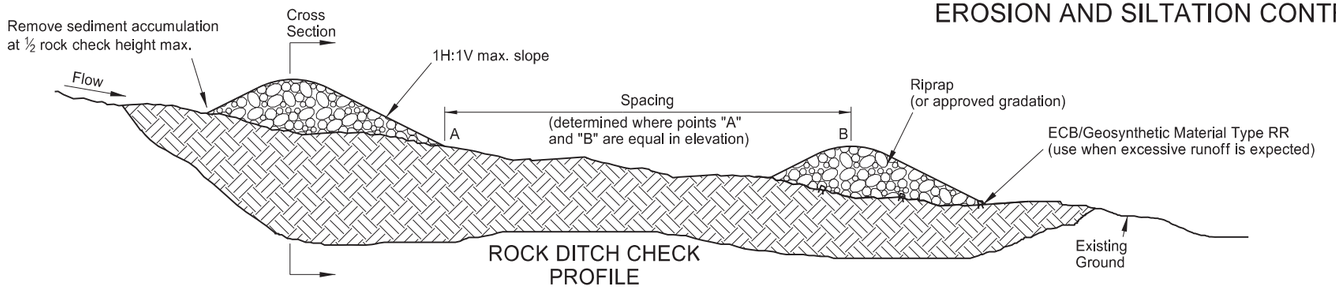
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ENGINEER
NORTH DAKOTA

08/27/25

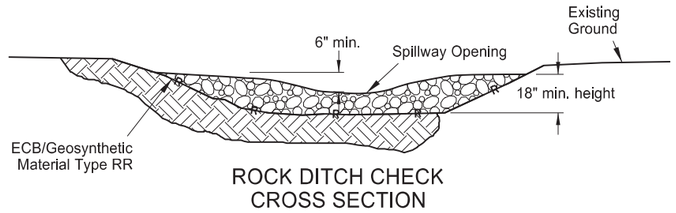
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EROSION AND SILTATION CONTROLS

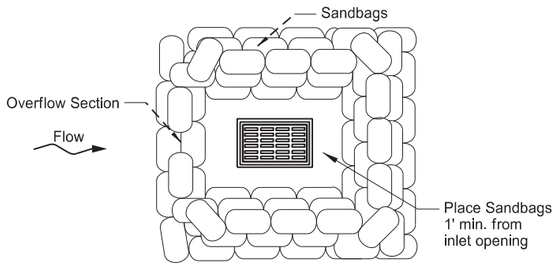
D-256-1



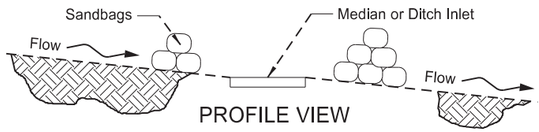
ROCK DITCH CHECK
PROFILE



ROCK DITCH CHECK
CROSS SECTION

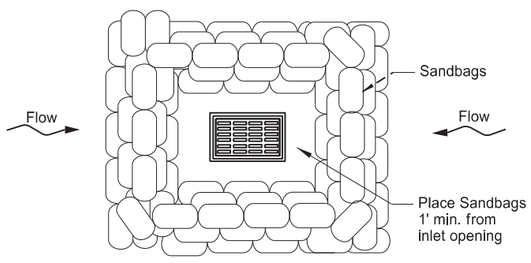


PLAN VIEW

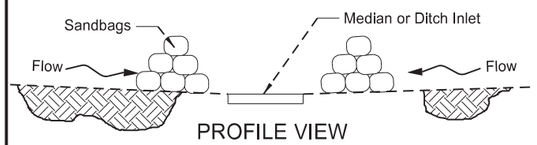


PROFILE VIEW

SANDBAG PROTECTION
(ON SLOPE)

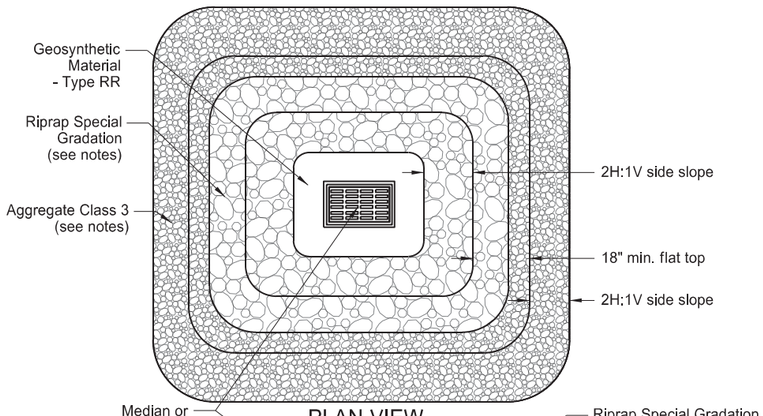


PLAN VIEW

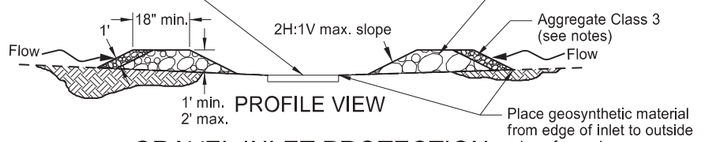


PROFILE VIEW

SANDBAG PROTECTION
(LOW POINT)



PLAN VIEW

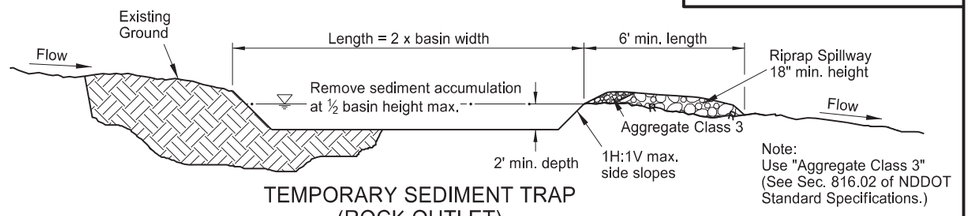


PROFILE VIEW

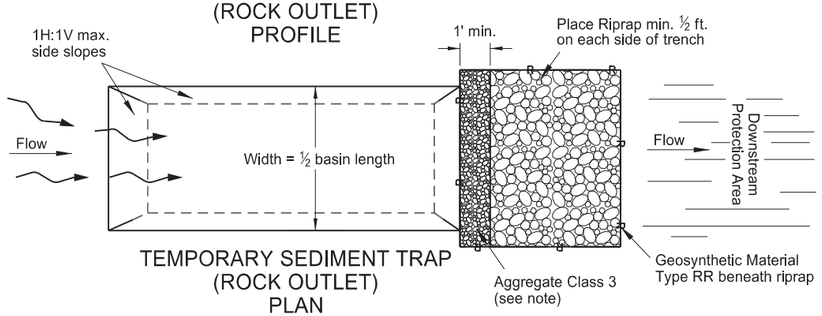
GRAVEL INLET PROTECTION
(MEDIAN OR DITCH INLET)

Notes:
Use 2 in. to 15 in. diameter rock with 20% by weight exceeding 4 in. diameter for "Riprap Special Gradation."

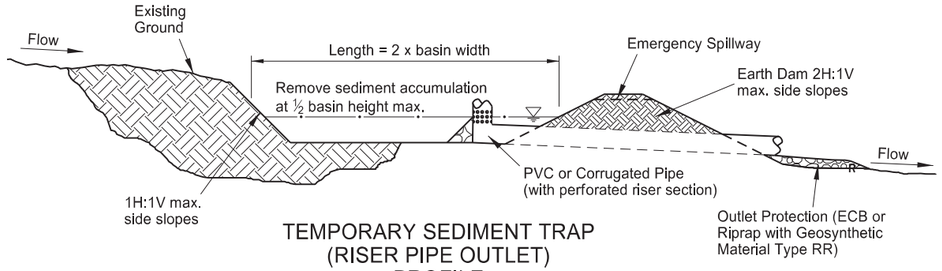
"Aggregate Class 3" (See Sec. 816.02 of NDDOT Standard Specifications.)



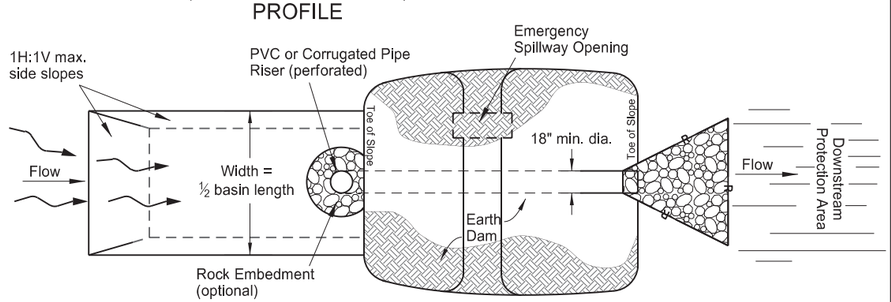
TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PROFILE



TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PLAN



TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PROFILE



TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PLAN

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-2 to D-256-1
	Deleted silt fence details
10-17-17	Updated to active voice
08-27-19	New Design Engineer PE Stamp
09-02-25	Added Median Drain Protection

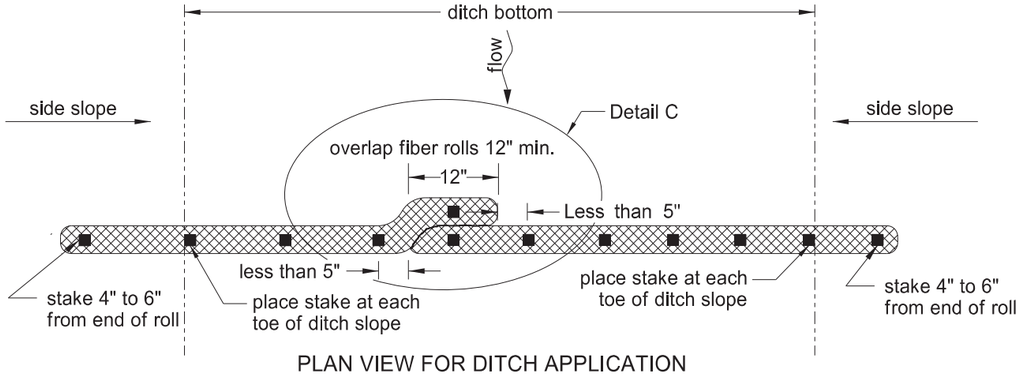
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

09/02/25

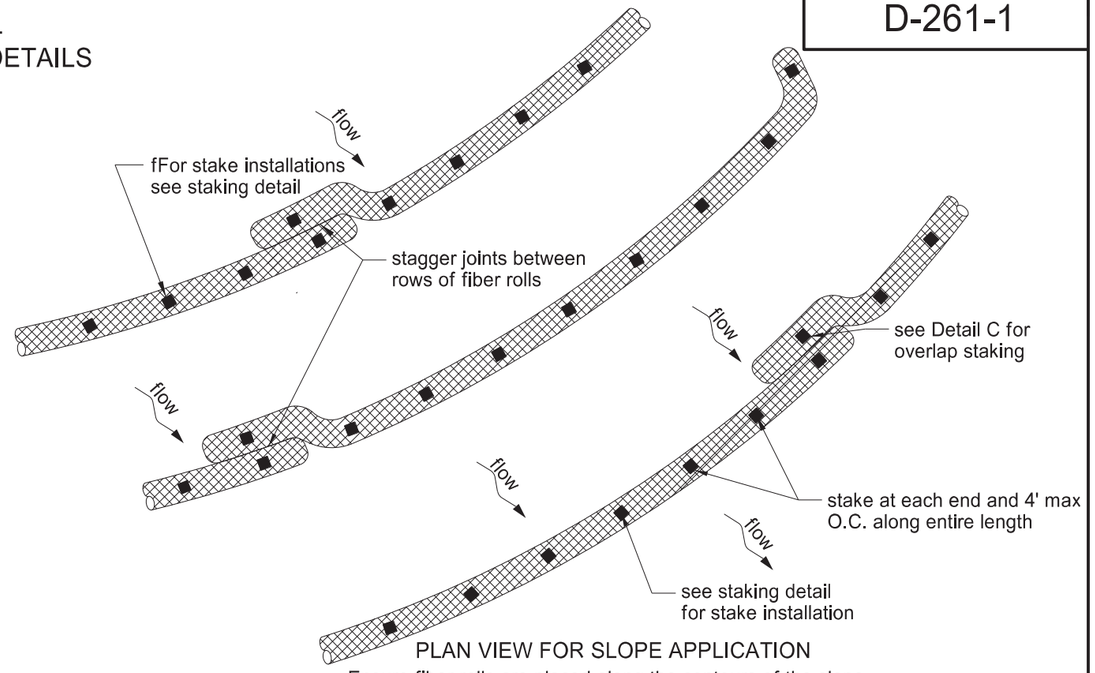
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1

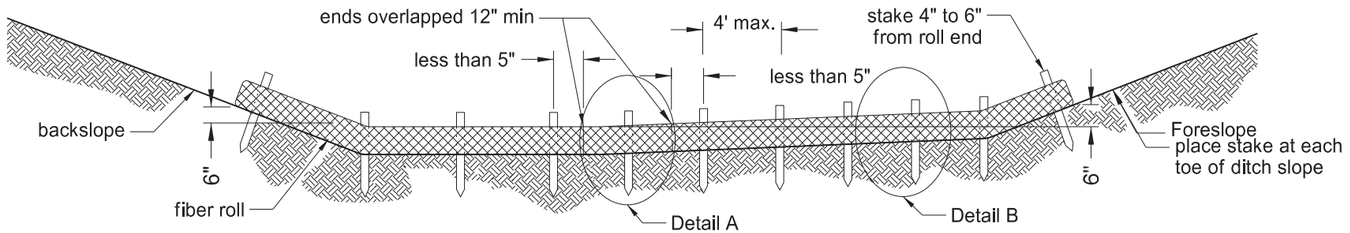


PLAN VIEW FOR DITCH APPLICATION

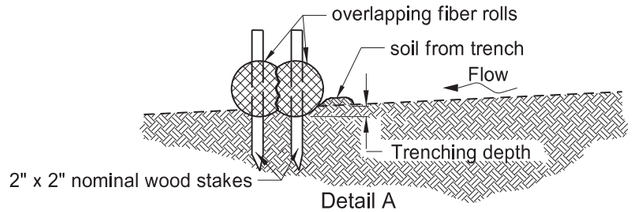


PLAN VIEW FOR SLOPE APPLICATION

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

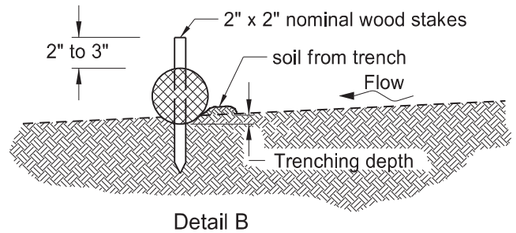


12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



Detail A

FIBER ROLL OVERLAPPING STAKING DETAIL

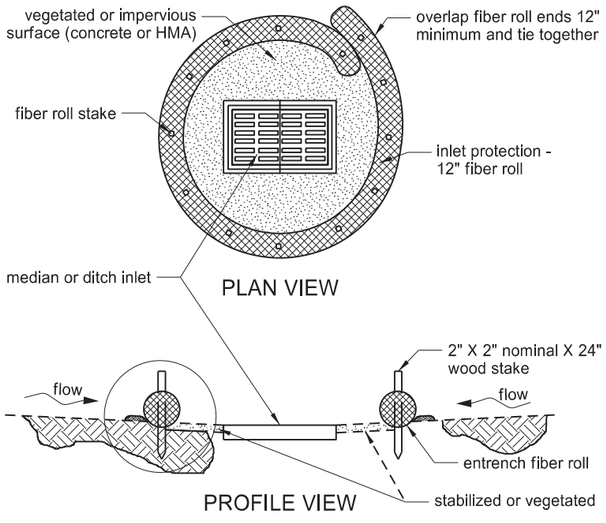


Detail B

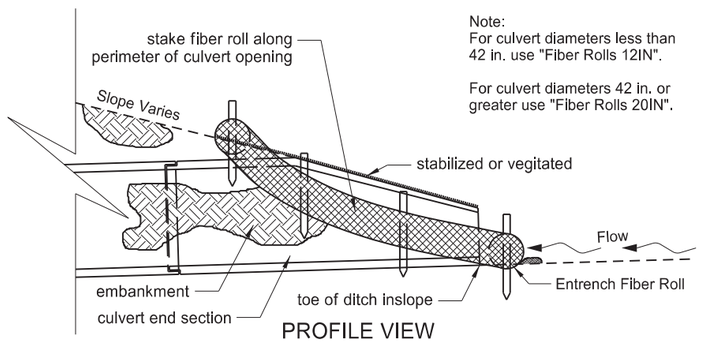
FIBER ROLL STAKING DETAIL

NOTE: Do not allow runoff to run under or around roll.

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

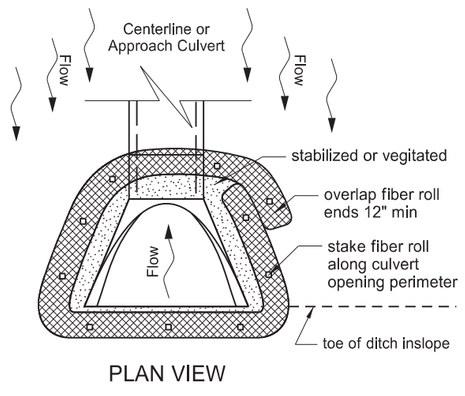


FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



Note:
For culvert diameters less than 42 in. use "Fiber Rolls 12IN".

For culvert diameters 42 in. or greater use "Fiber Rolls 20IN".



FIBER ROLL PROTECTION (INLET OF CULVERT)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions
10-04-13	Revised fiber roll overlap detail
06-26-14	Changed standard drawing number from D-708-7 to D-261-1
08-27-19	New Design Engineer PE Stamp
04-22-24	Slope Plan View-overlap change
03-13-25	Added D-708-6 Culvert Inlet detail
09-02-25	Added D-708-6 Inlet detail

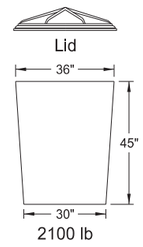
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ENGINEER
NORTH DAKOTA

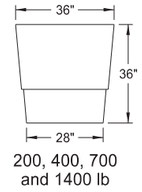
09/02/25

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ATTENUATION DEVICE

D-704-1

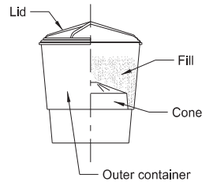




Outer Containers

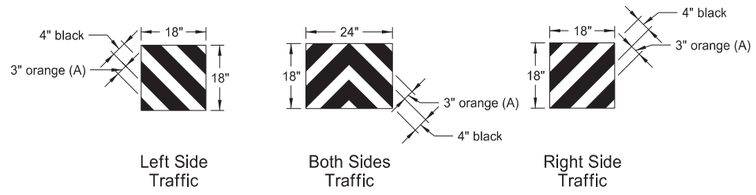


Cones



Typical Assembly

Typical Module
Construction Detail

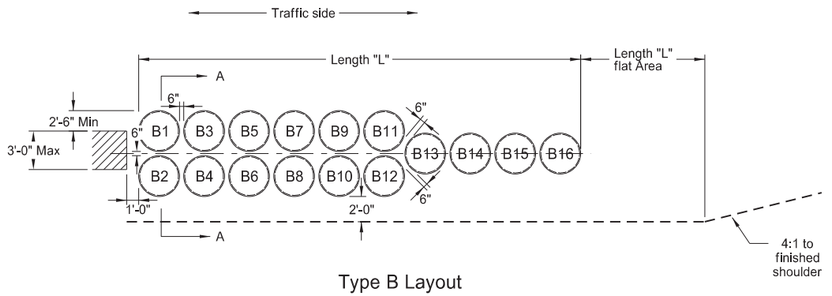


Reflective Sheet Detail

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

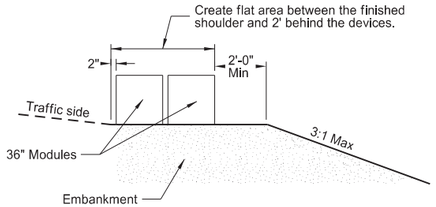
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

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



Type B Layout

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



Section A-A
(Type B Layout)

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

Notes:

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

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

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

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

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

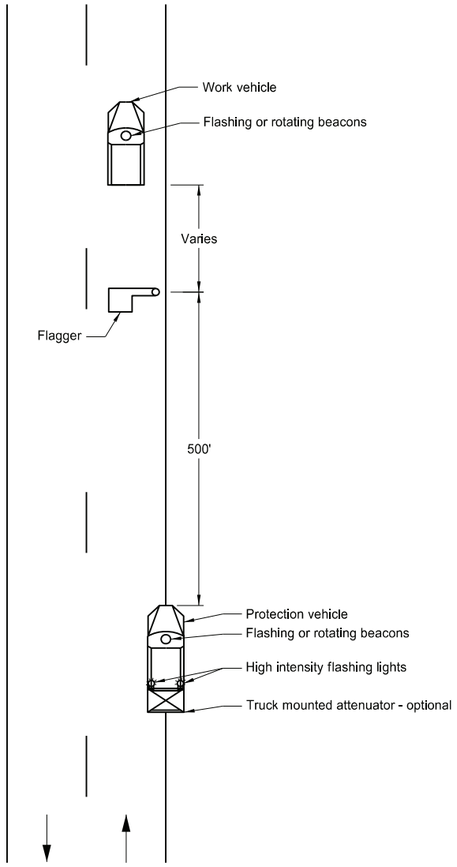
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PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

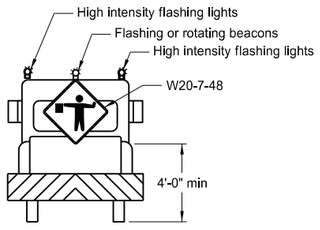
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TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

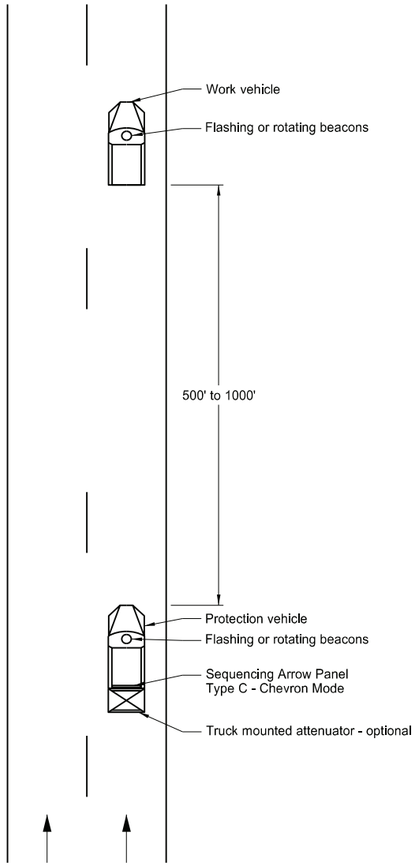
Two Lane, Two Way Roadways

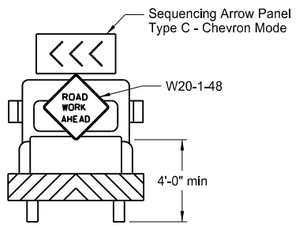




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

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

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

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

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

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

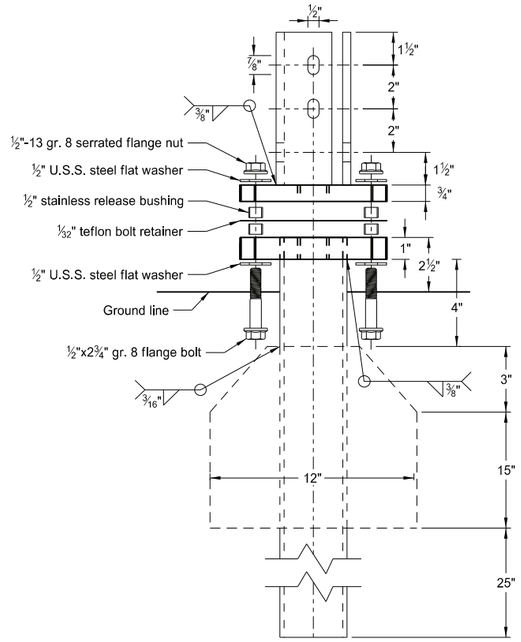
KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

DocuSign Envelope ID: B6D1C72A-6E5E-4E5C-A02F-4D3D1C582775

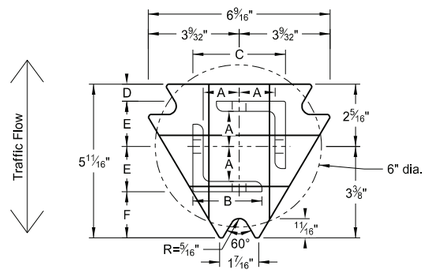
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

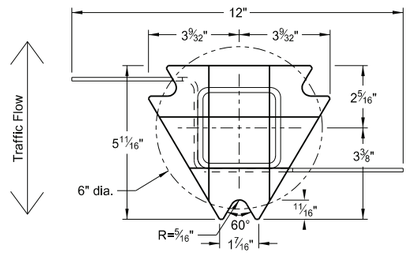


Multi-Directional
Slip Base Assembly

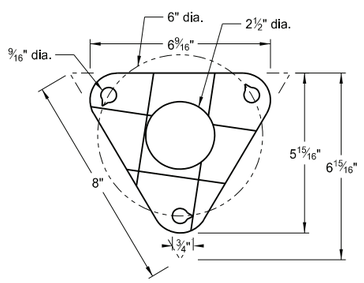
Perforated Tube



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



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



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

Notes:

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

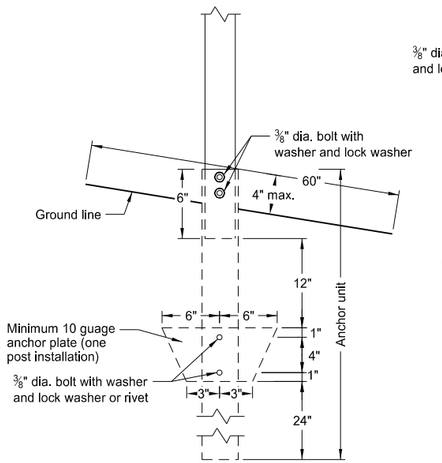
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

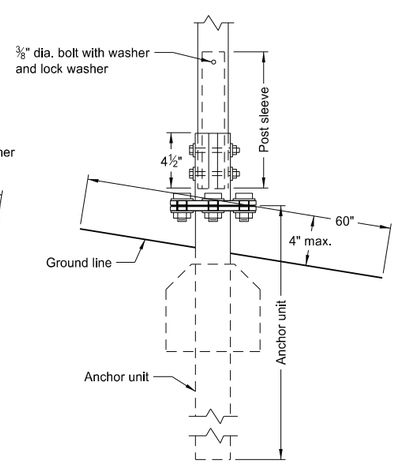
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

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

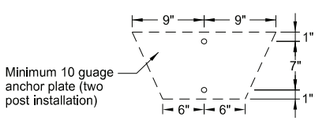
(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



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

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ENGINEER
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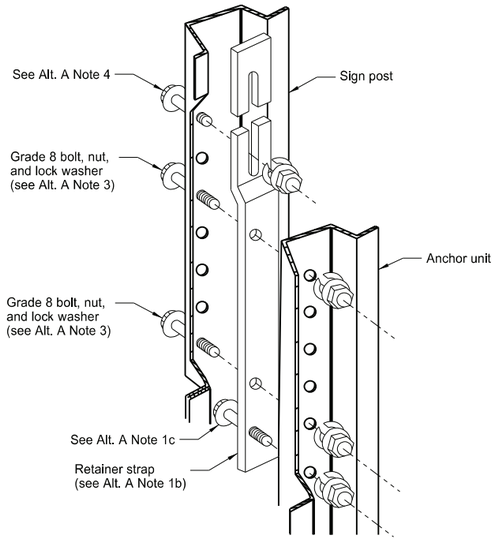
08/01/24

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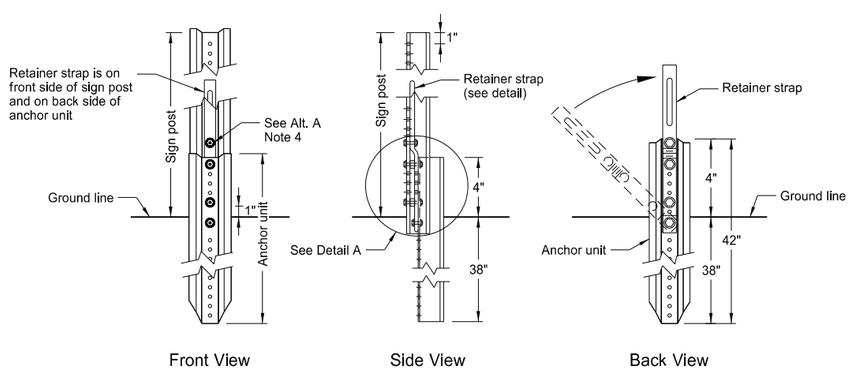
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



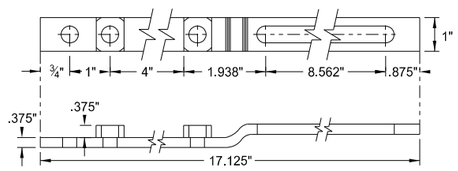
Detail A



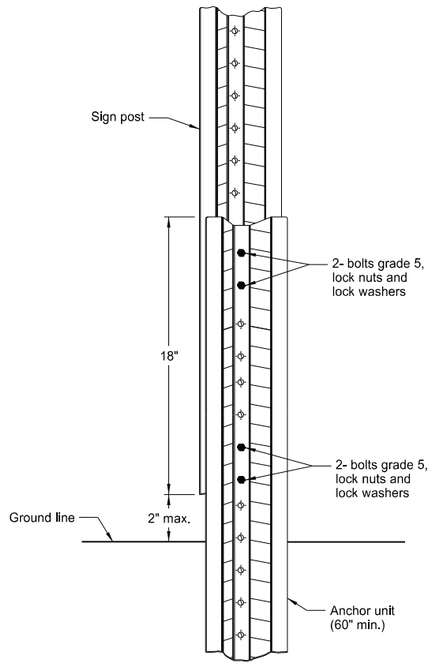
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

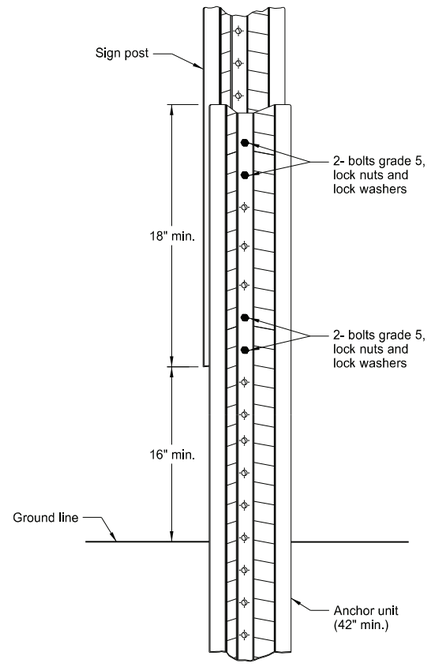


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

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

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

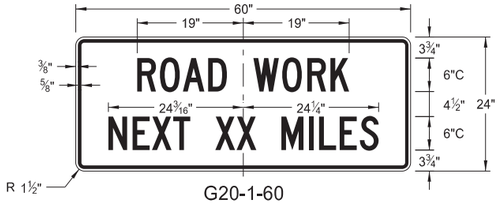
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PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

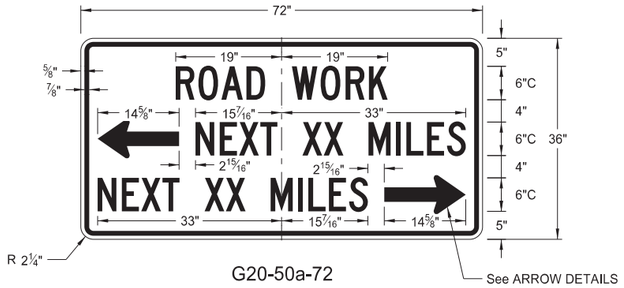
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

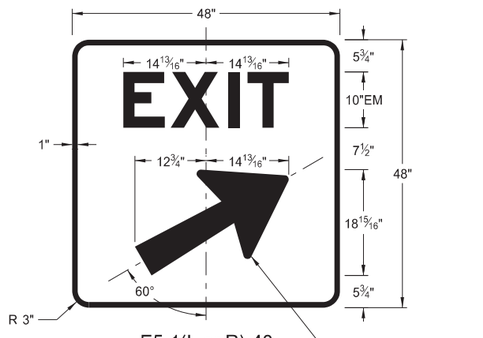
D-704-9



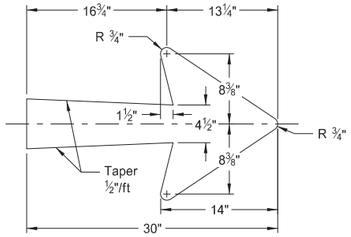
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Background: orange



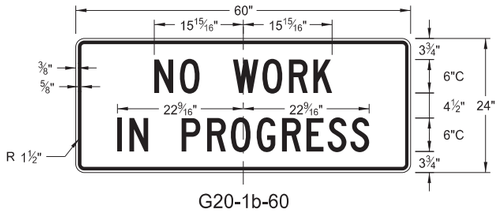
G20-50a-72
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Background: orange



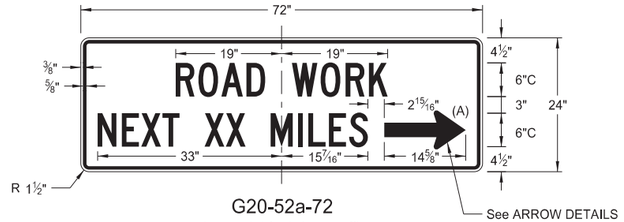
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



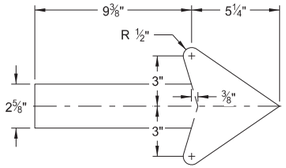
E5-1-48



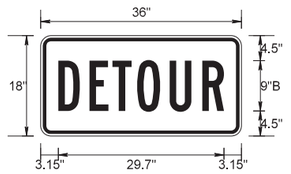
G20-1b-60
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Background: orange



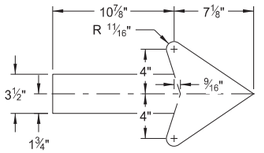
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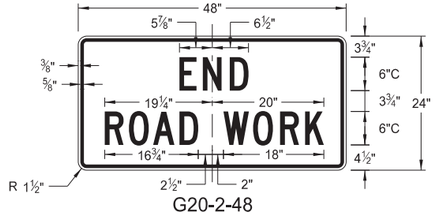
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G20-52a-72



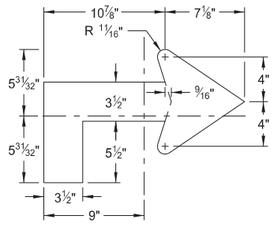
M4-8-36
Legend: black (non-refl)
Background: orange



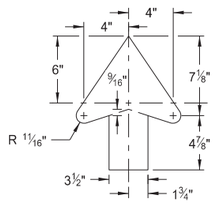
M4-9(L or R)-30
Right or Left



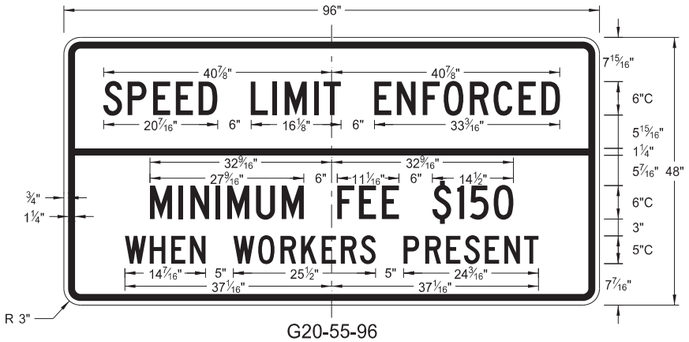
G20-2-48
Legend: black (non-refl)
Background: orange



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



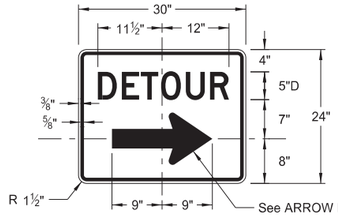
M4-9-30
Straight



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



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



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

ARROW DETAILS

NOTES:

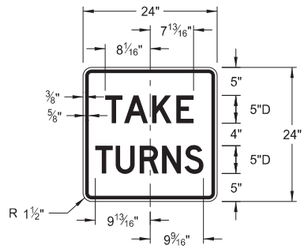
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

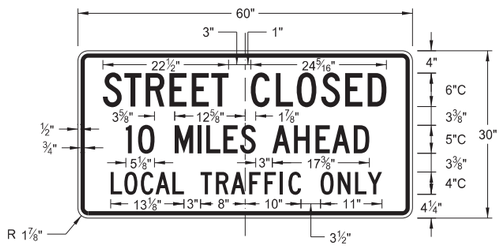
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

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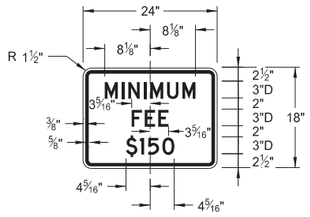
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



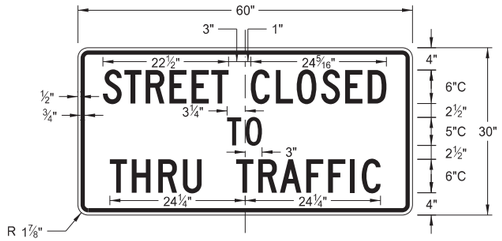
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Background: white



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



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



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



R11-2a-48
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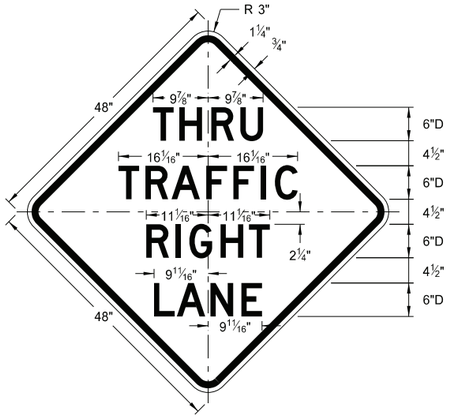
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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06/30/25
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NORTH DAKOTA

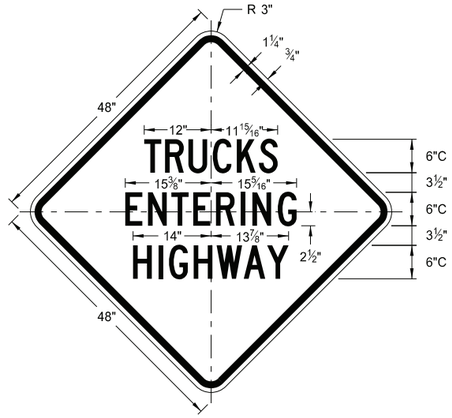
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

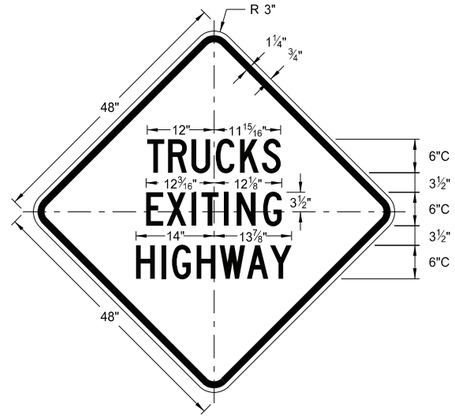
D-704-11



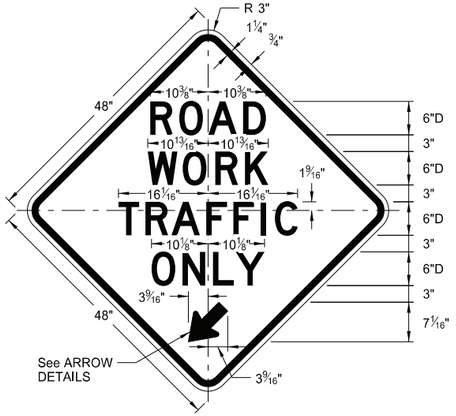
W5-8-48
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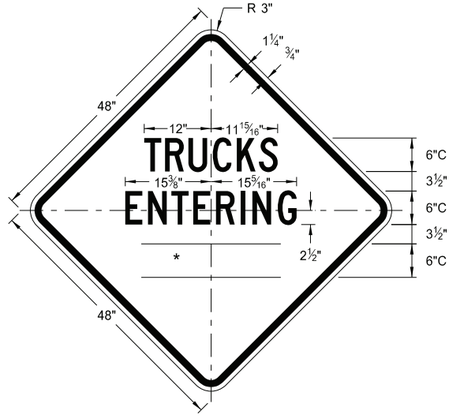
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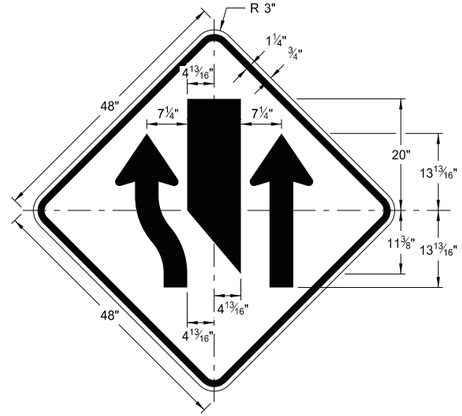
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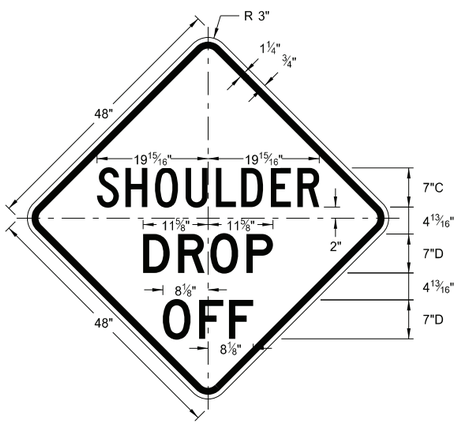
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Legend; black (non-refl)
Background: orange



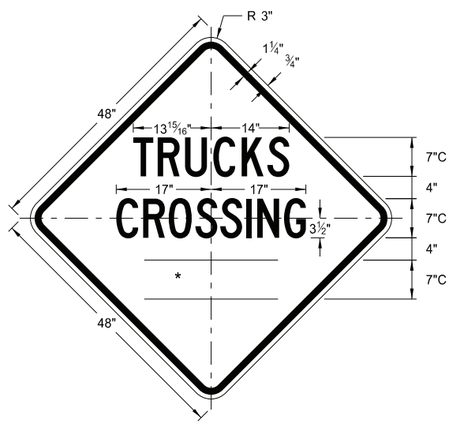
W8-54-48
Legend; black (non-refl)
Background: orange



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



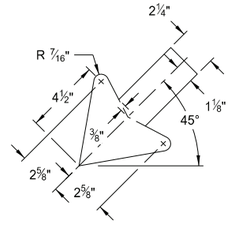
W8-9a-48
Legend: black (non-refl)
Background: orange



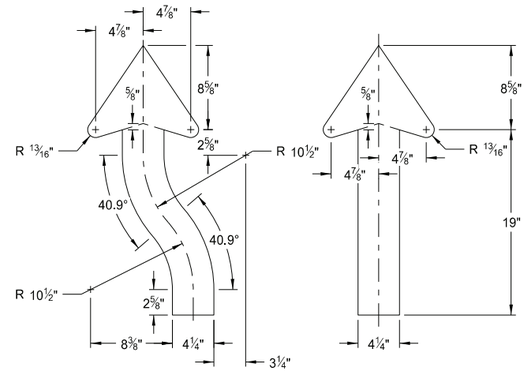
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

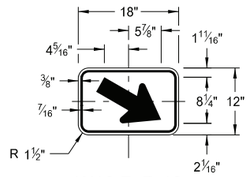
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

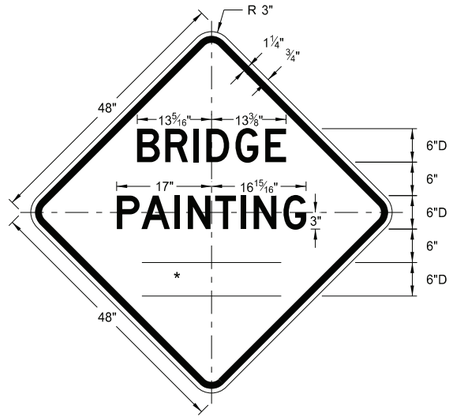
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

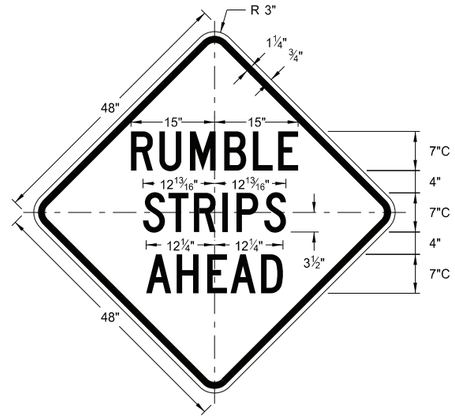
D-704-11A



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



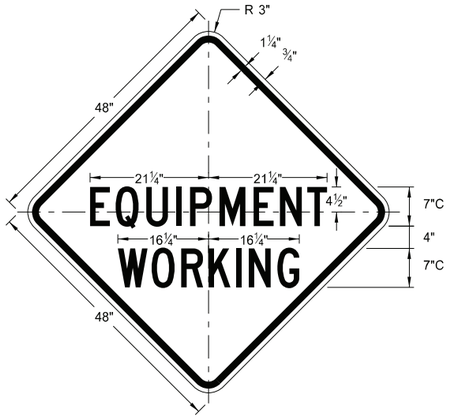
W21-50-48
Legend: black (non-refl)
Background: orange



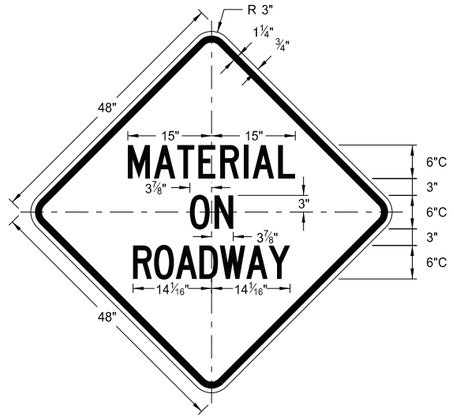
W21-53-48
Legend: black (non-refl)
Background: orange

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

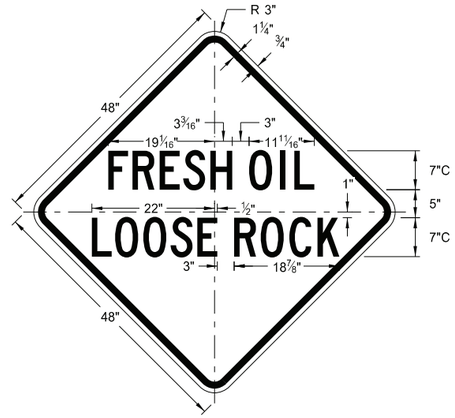
* DISTANCE MESSAGES



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

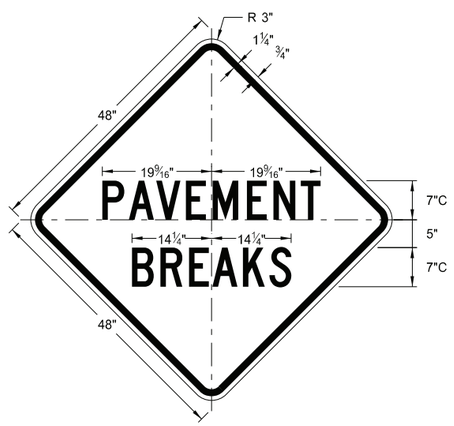


W21-51-48
Legend: black (non-refl)
Background: orange

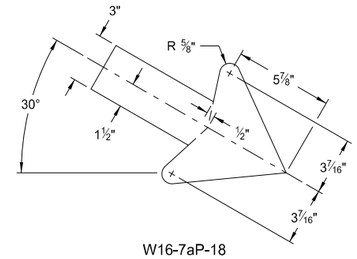


W22-8-48
Legend: black (non-refl)
Background: orange

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



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



W16-7aP-18

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

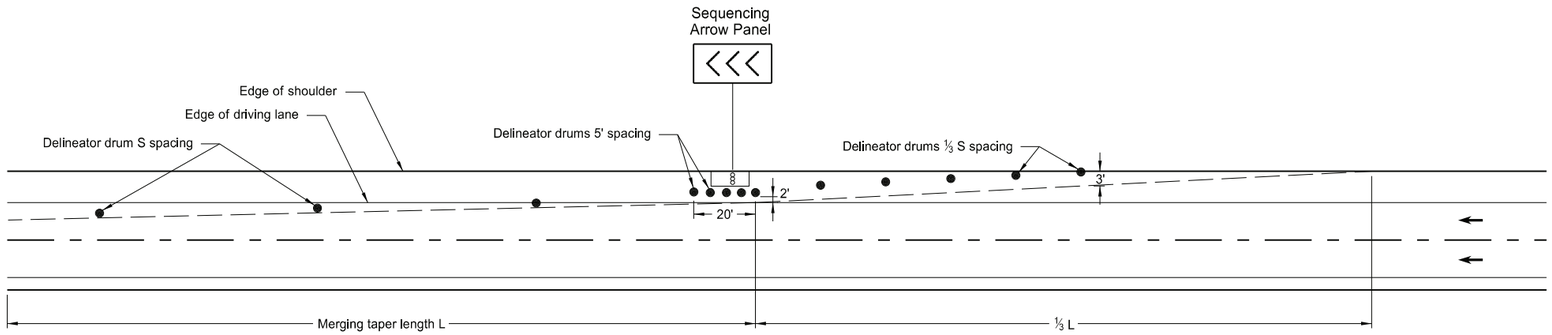
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

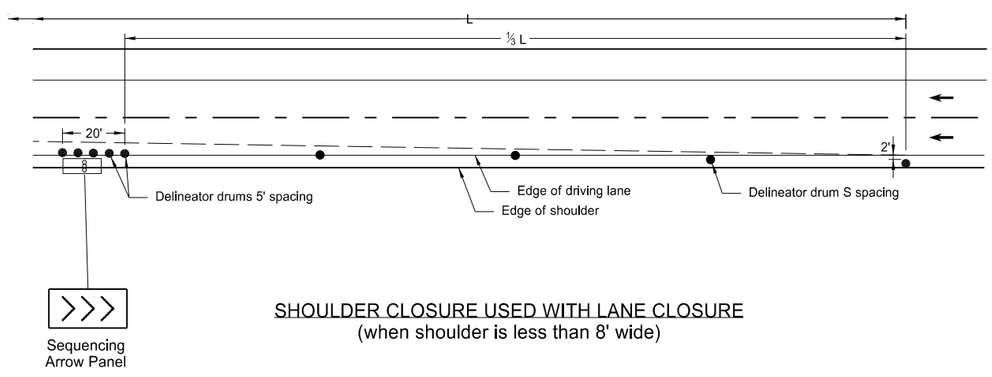
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SHOULDER CLOSURE TAPERS

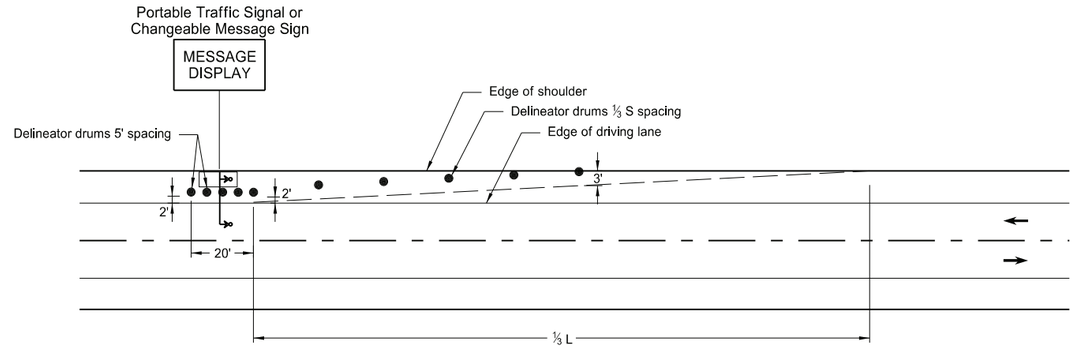
D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

● Delineator Drum	∞ Sequencing Arrow Panel
° Message Display	Portable Traffic Signal

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   $L = WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, use a length of approximately ⅓L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
3. When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active volce
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature

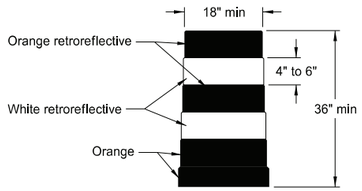
KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

DocuSign Envelope ID: B6D1C72A-6E5E-4E5C-A02F-4D3D1C582775

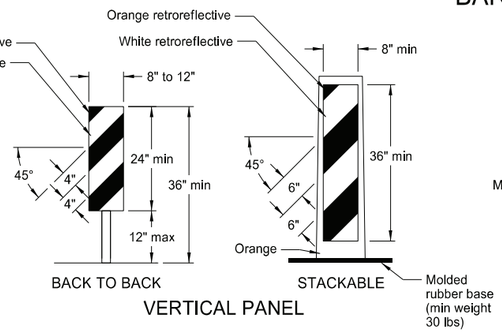
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



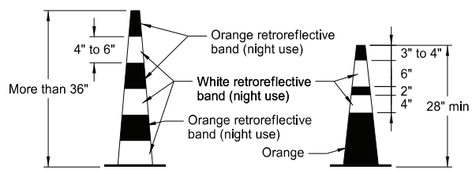
DELINEATOR DRUM

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



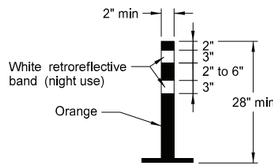
VERTICAL PANEL

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



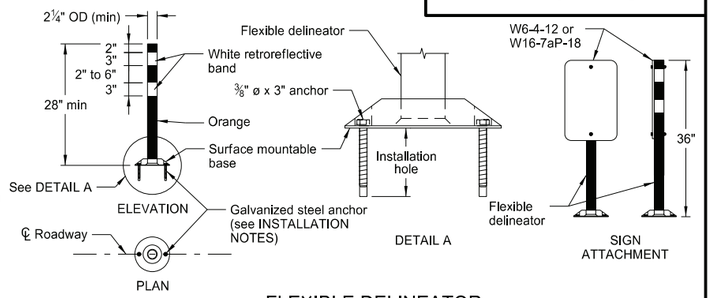
TRAFFIC CONE

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



TUBULAR MARKER

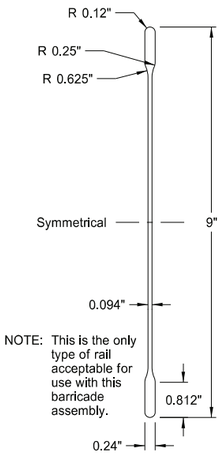
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

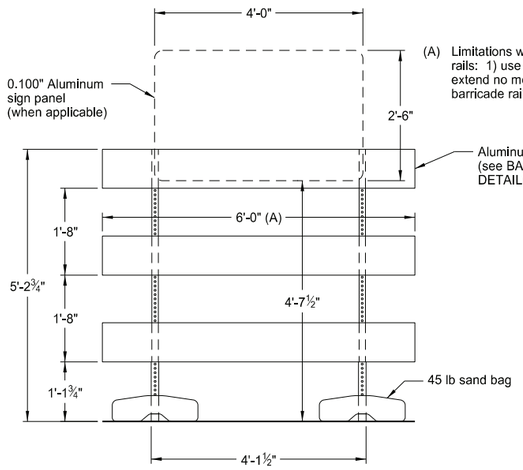
INSTALLATION NOTES:

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



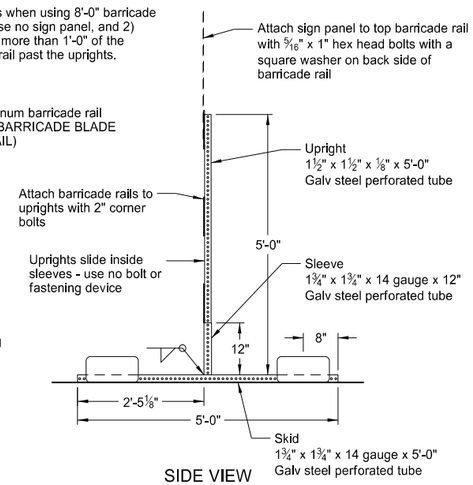
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



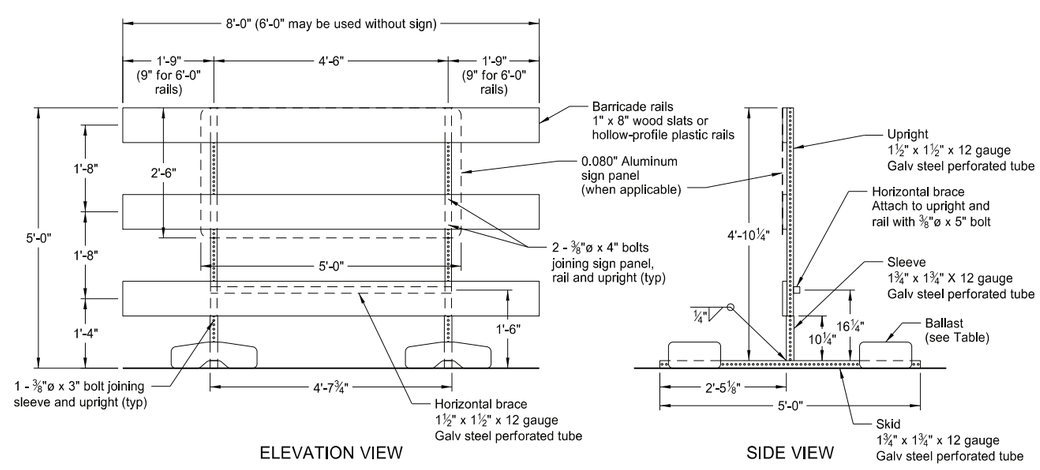
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



SIDE VIEW

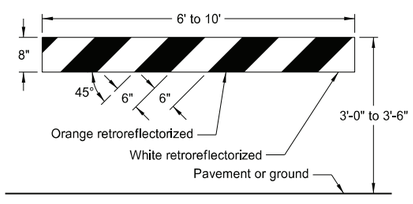
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



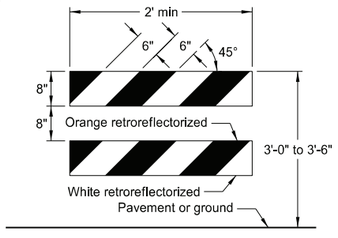
ELEVATION VIEW — SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

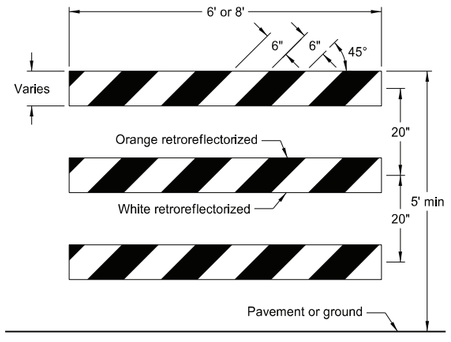
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

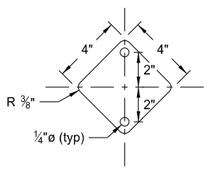


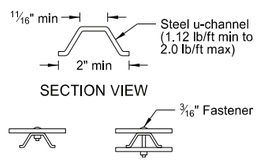
TYPE II BARRICADE

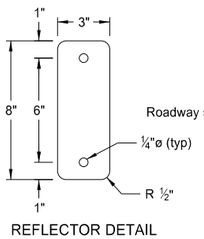


TYPE III BARRICADE

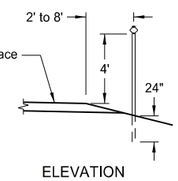
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

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

KIRK J. HOFF
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PE-4683
ENGINEER
NORTH DAKOTA

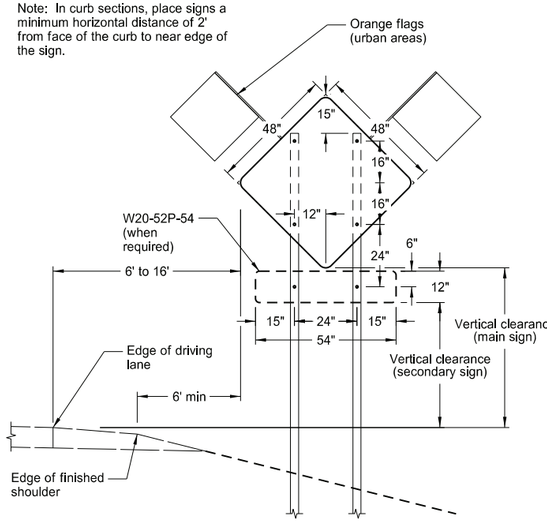
08/01/24

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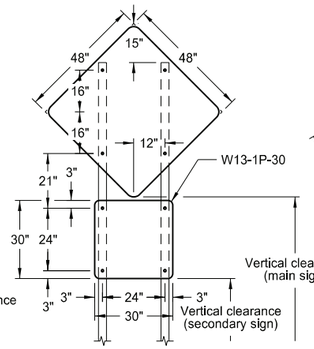
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

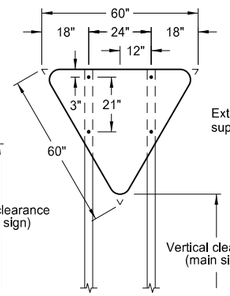
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



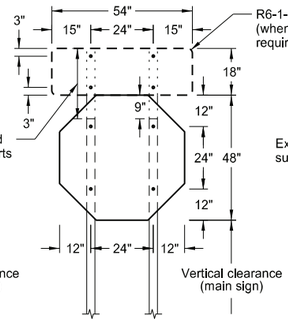
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



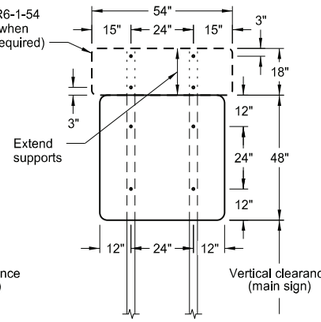
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



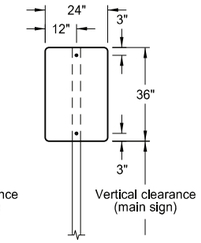
R1-2-60 - YIELD SIGN



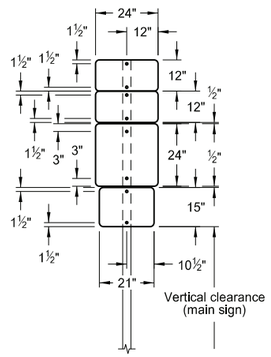
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



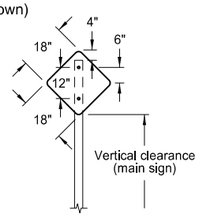
48" x 48" SIGN
(with R6-1-54 sign as required)



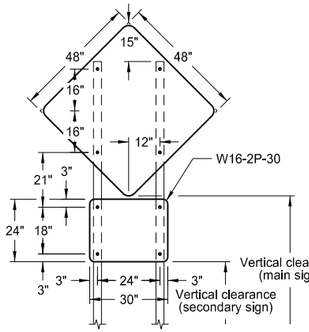
24" x 36" SIGN



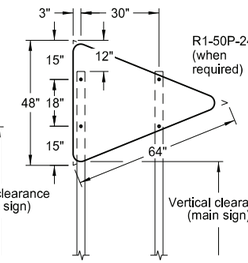
24" x 24"
ROUTE MARKER
ASSEMBLY



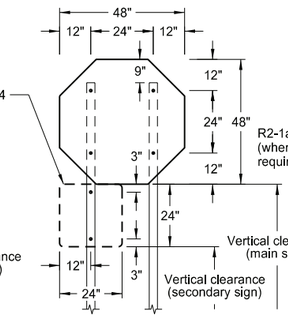
18" x 18"
DIAMOND SIGN



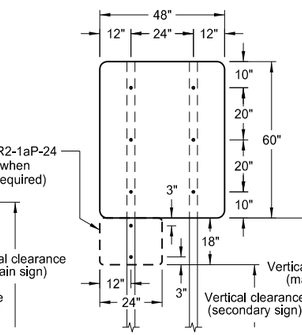
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



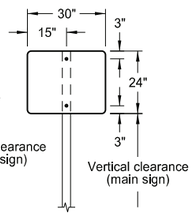
W14-3-64 - PENNANT SIGN



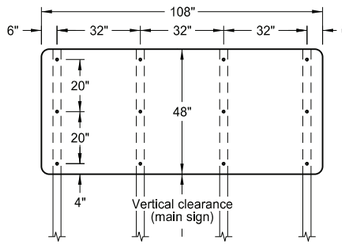
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



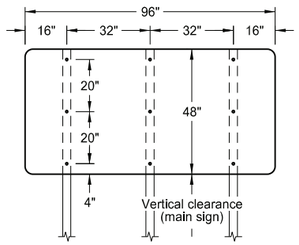
48" x 48" SIGN
(with R2-1aP-24 sign as required)



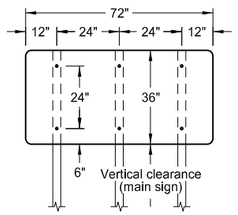
30" x 24" SIGN



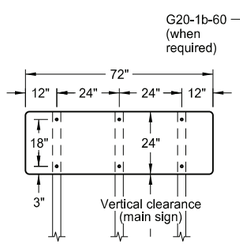
108" x 48" SIGN



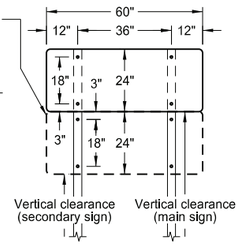
96" x 48" SIGN



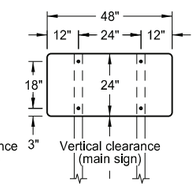
72" x 36" SIGN



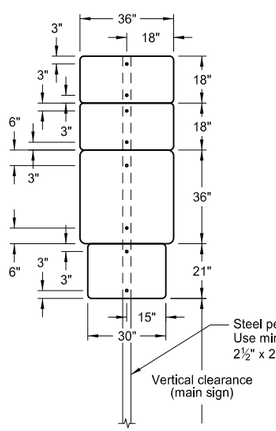
72" x 24" SIGN



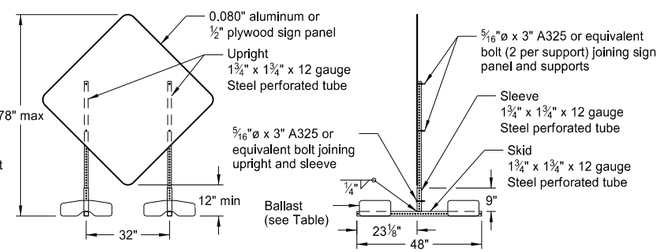
60" x 24" SIGN



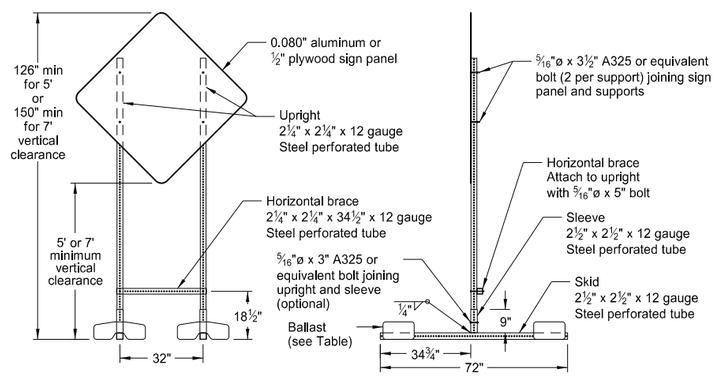
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-4-13

REVISIONS

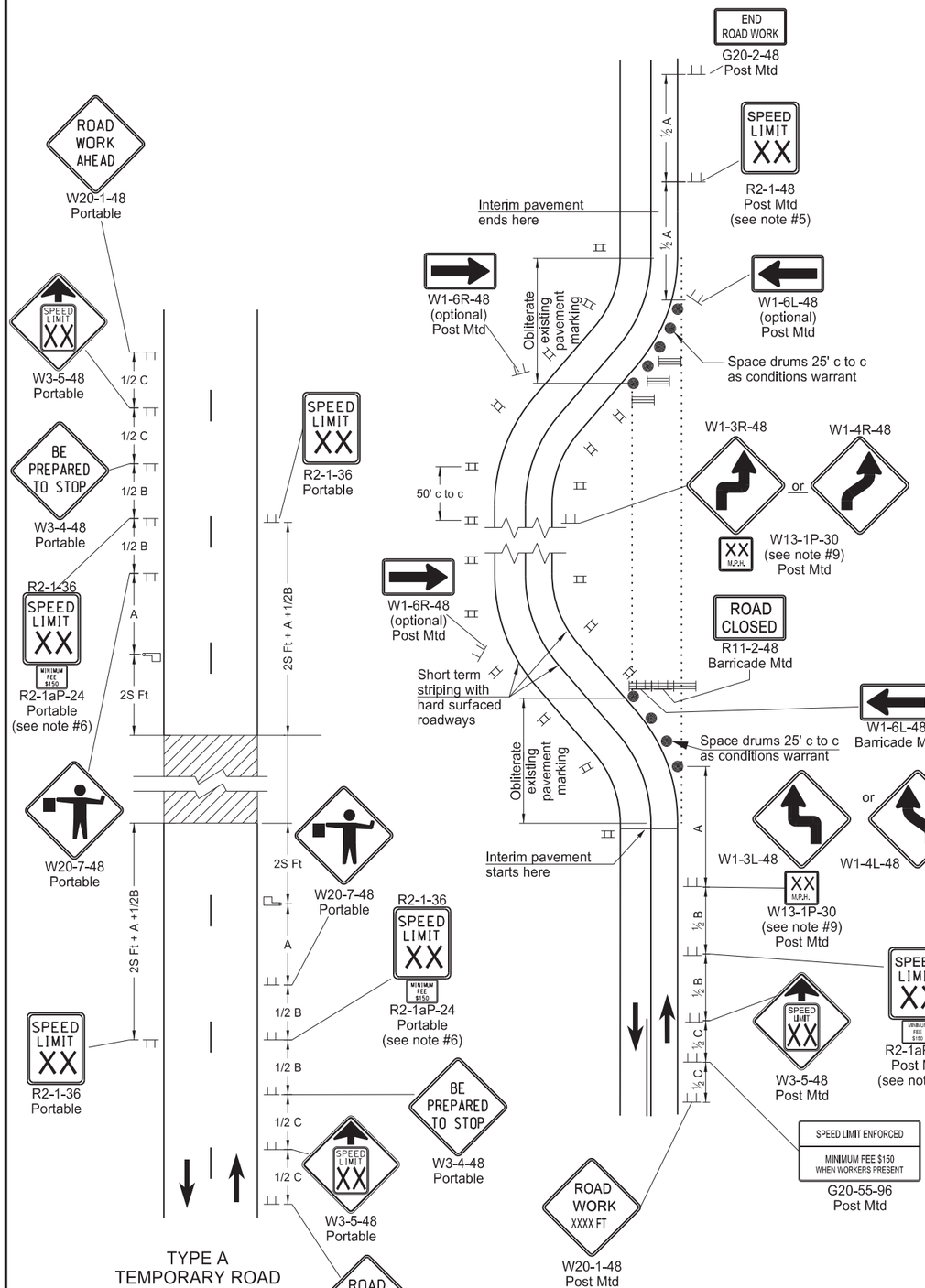
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature

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

08/01/24

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

ROAD CLOSURE LAYOUTS

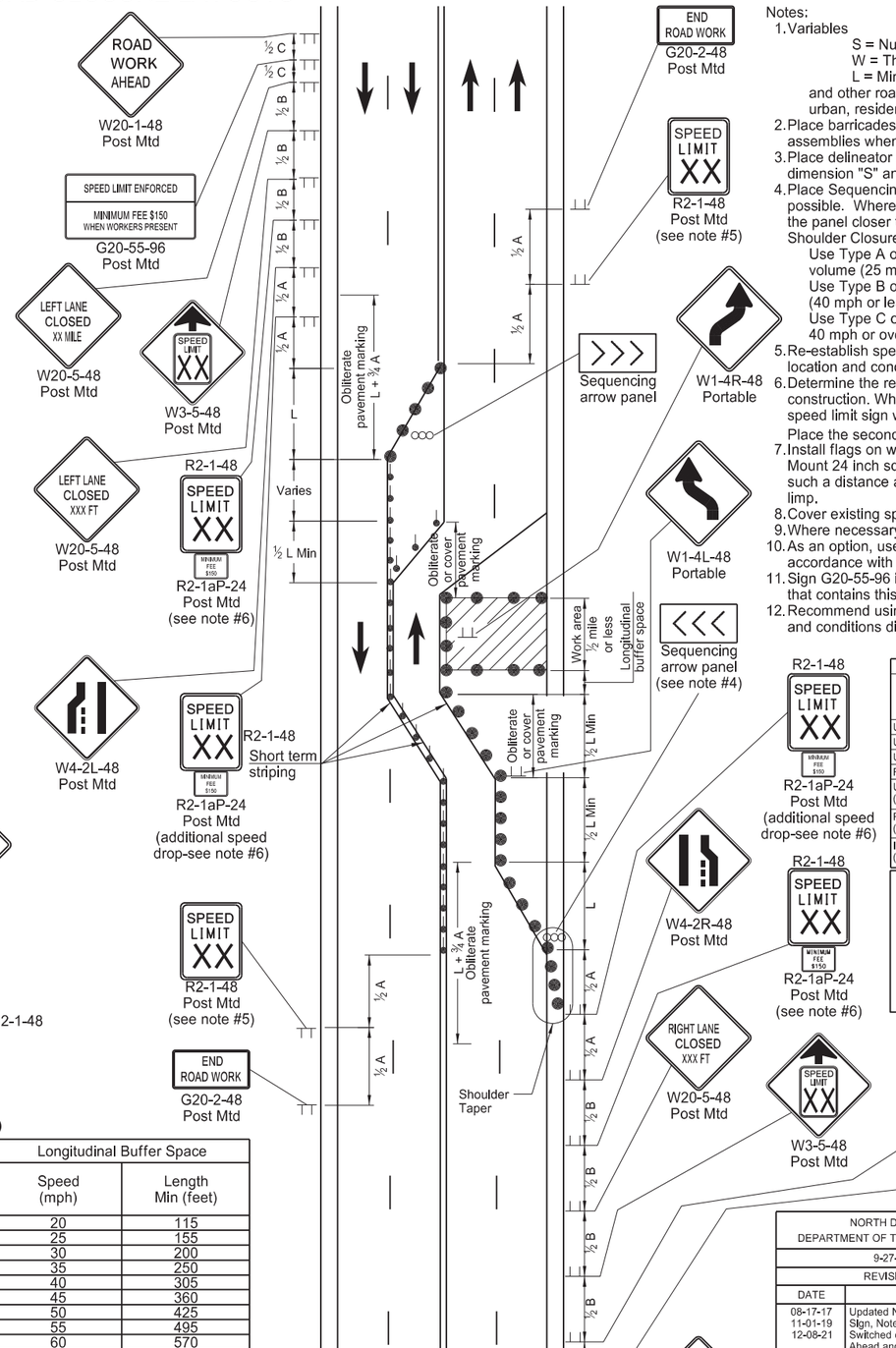


TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.

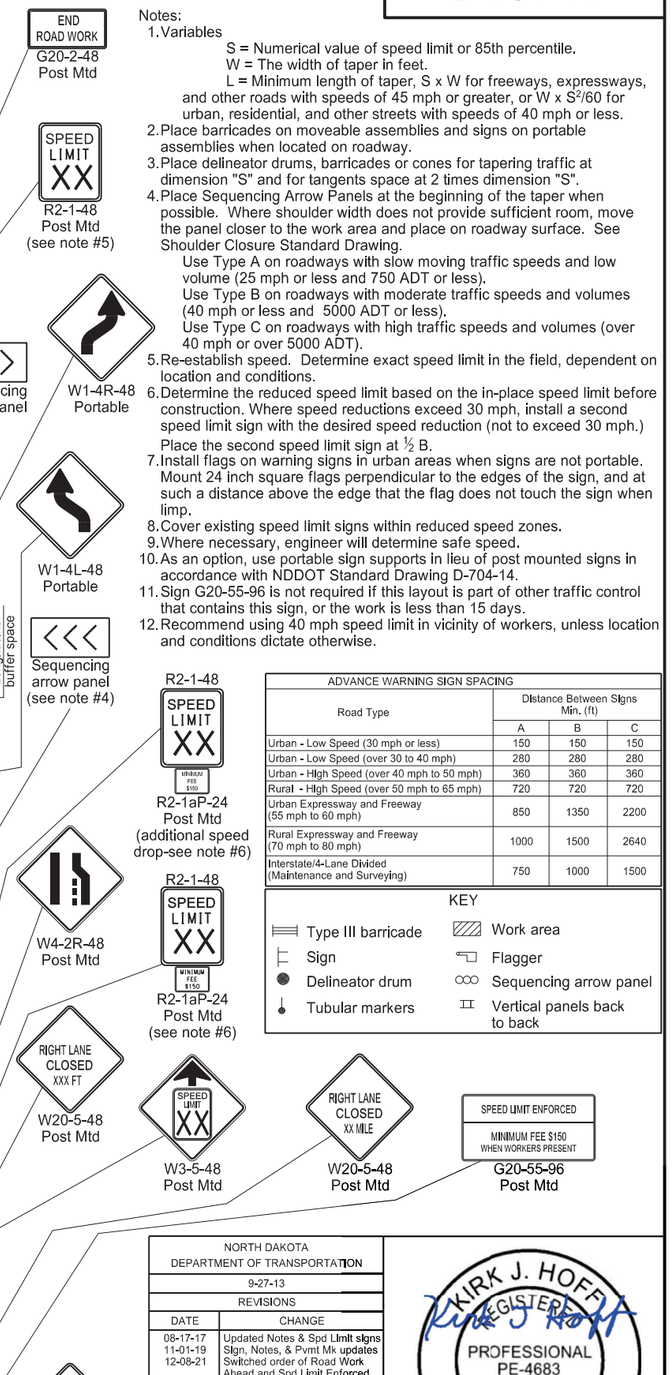
TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

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



TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane undivided highway with half the roadway closed.



Notes:

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

KEY

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

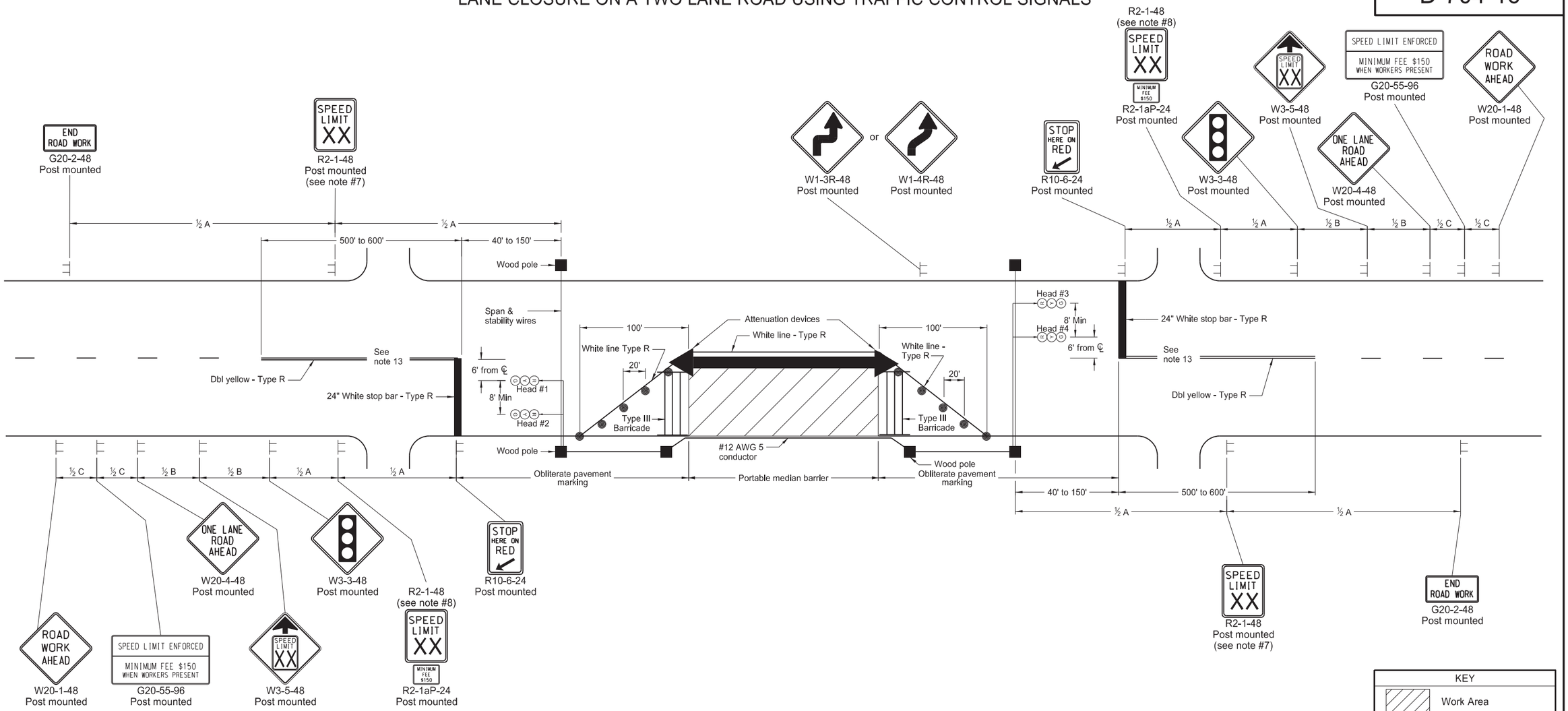
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pvmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



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

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

KEY

- Work Area
- Type III Barricade
- Sign
- Delineator Drum
- Wood Pole

Notes:

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

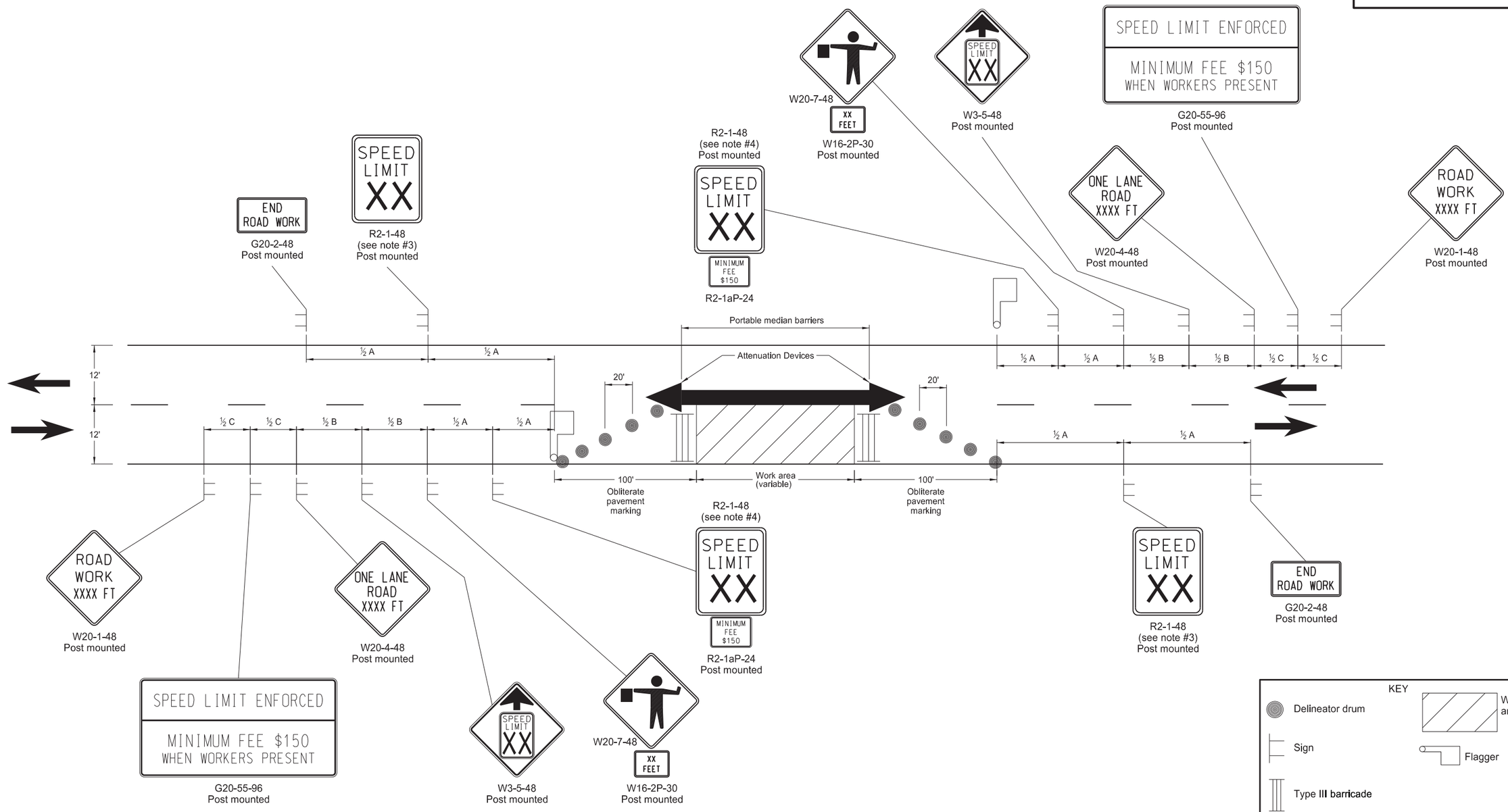
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered
	Minimum Fee plaque
08-17-17	Revised notes & added note
11-01-19	Revise sign #s & pvmt mk type
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-31-23	Corrected Note 14 grammar
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

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

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



KEY

- Delineator drum
- Work area
- Sign
- Flagger
- Type III barricade

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

Notes:

1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½B.
5. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

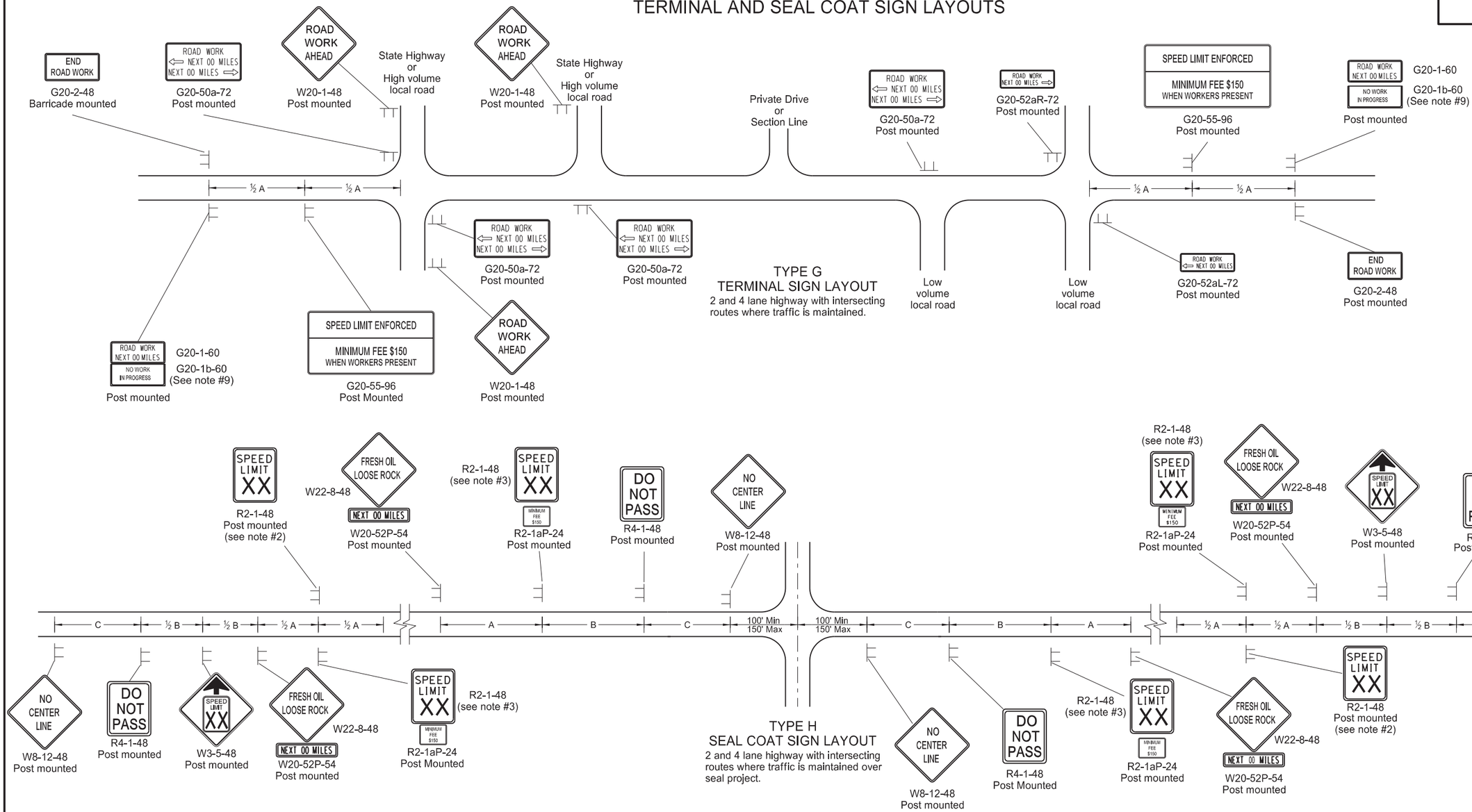
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

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TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

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

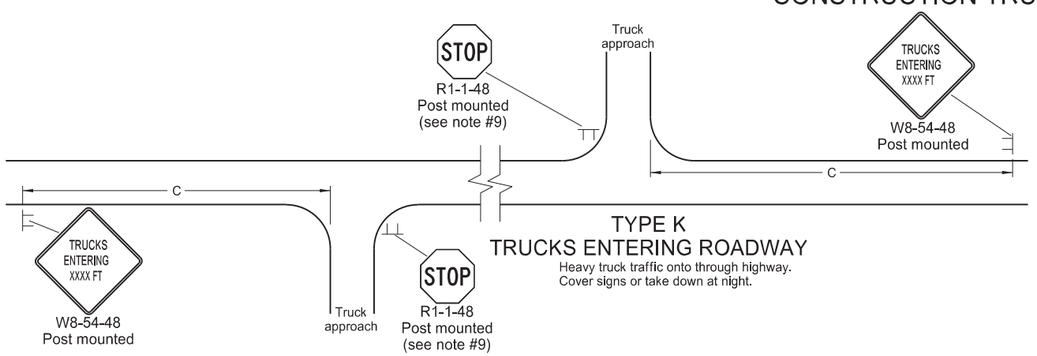
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06/30/25
ENGINEER
NORTH DAKOTA

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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

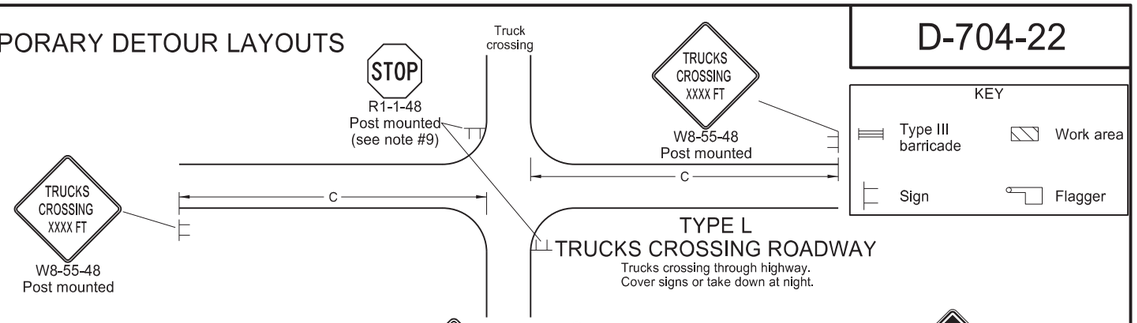
D-704-22

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



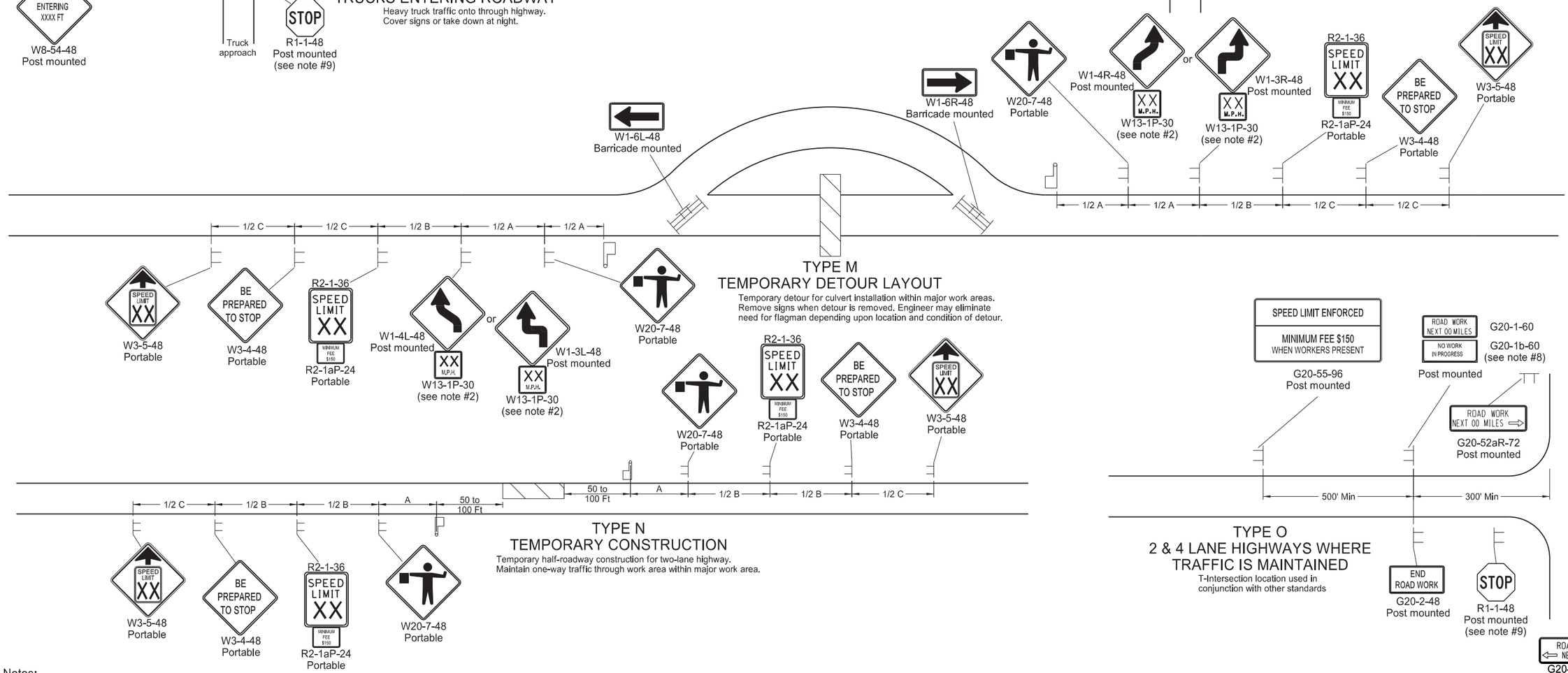
TYPE K
TRUCKS ENTERING ROADWAY

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



TYPE L
TRUCKS CROSSING ROADWAY

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



TYPE M
TEMPORARY DETOUR LAYOUT

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

TYPE N
TEMPORARY CONSTRUCTION

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

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

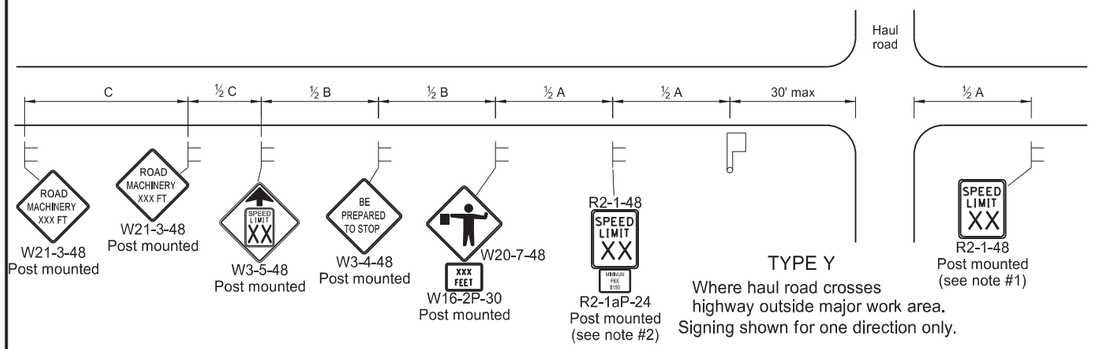
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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

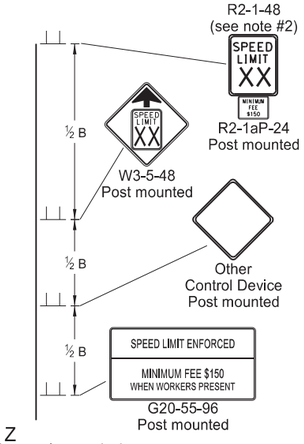
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MISCELLANEOUS SIGN LAYOUTS

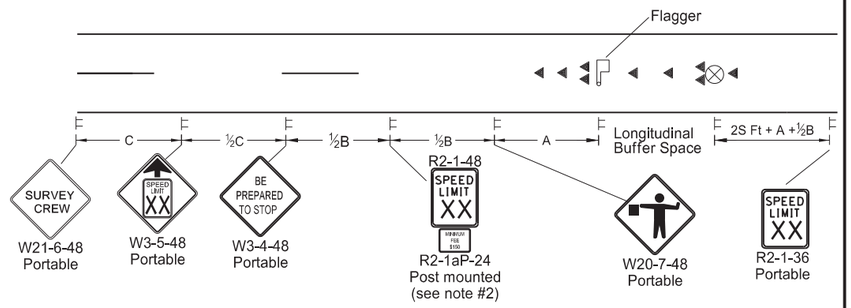
D-704-26



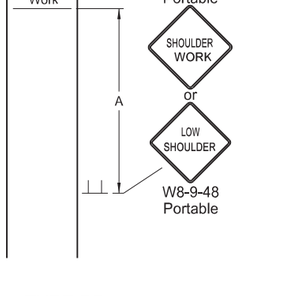
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



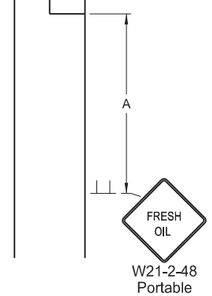
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



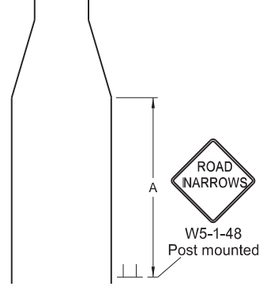
TYPE AA
Where survey crew is used
Signing shown for one direction only.



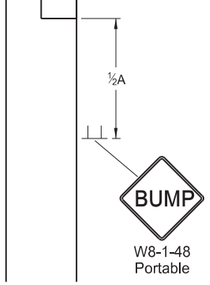
TYPE BB
Within major work area where sign conditions exist



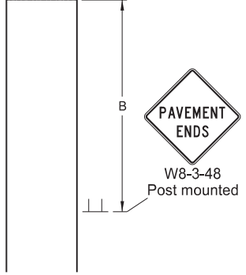
TYPE CC
Where sign conditions exist



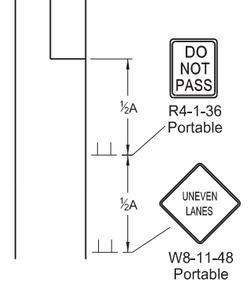
TYPE DD
Where sign conditions exist



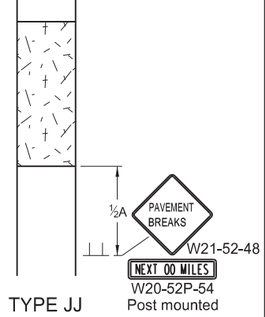
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

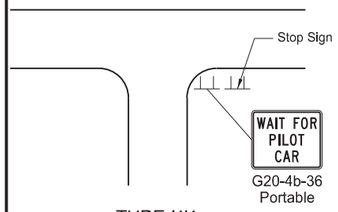


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

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

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

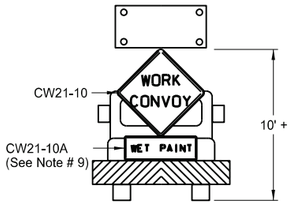
DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

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

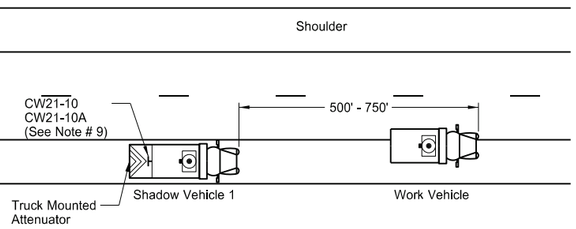
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MOBILE OPERATION
(PAVEMENT MARKING)

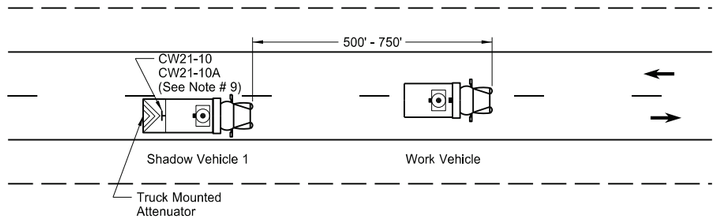
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

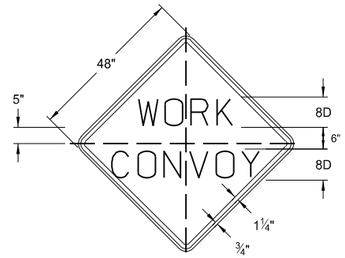


Two-Way Roadway with Paved Shoulders

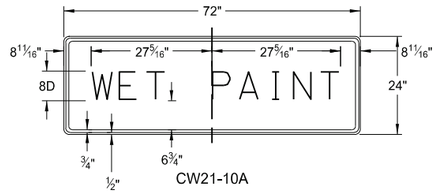


Two-Way Roadway without Paved Shoulders

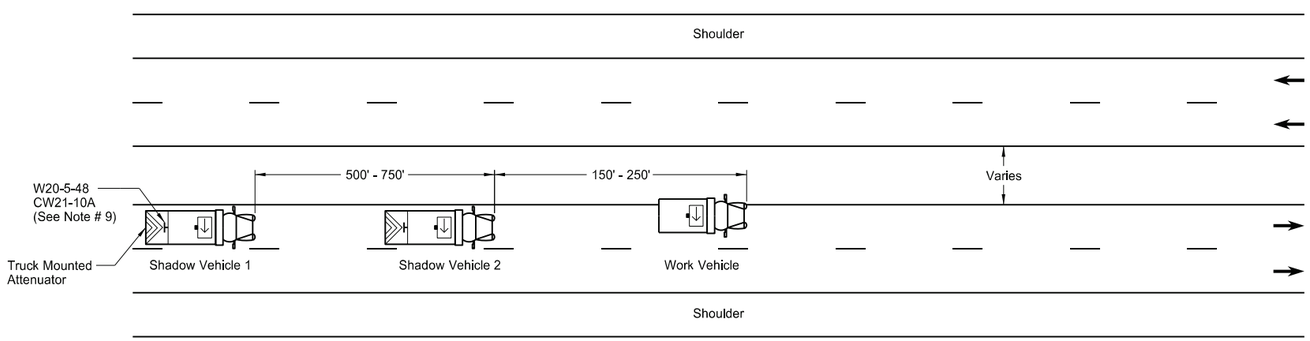
Sign Details



CW21-10

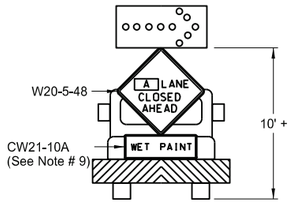


CW21-10A



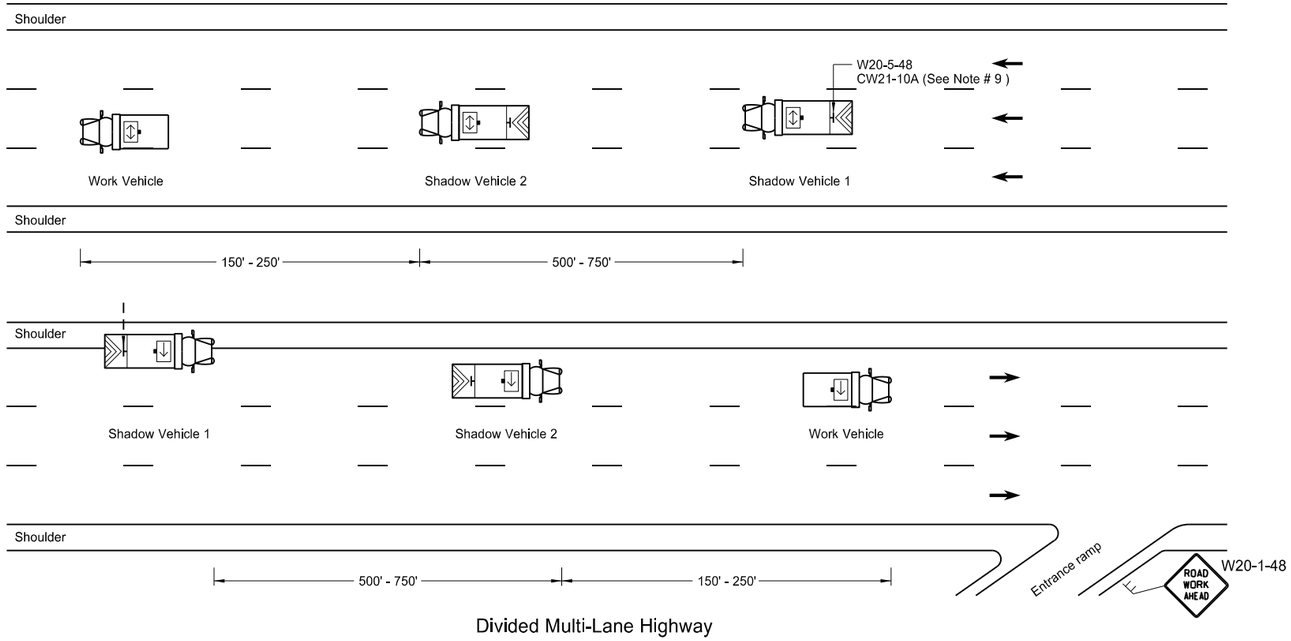
Undivided Multi-Lane Roadway

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



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
8-02-24	Electronic Stamp/Signature.

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

08/02/24

Docusign Envelope ID: E17899F0-B912-4482-BF85-7148763D5F5D

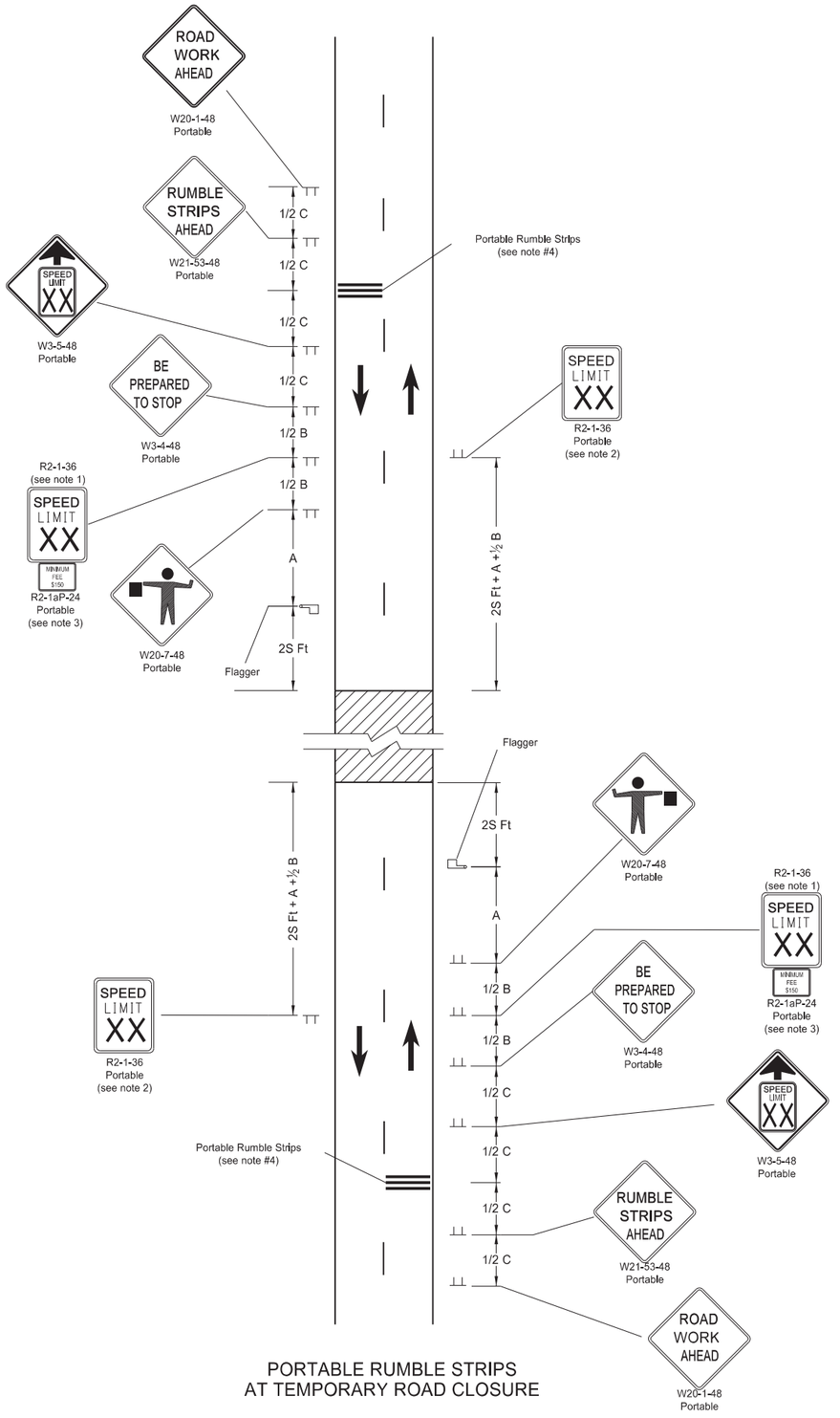
Two-Lane Roadway Portable Rumble Strips

KEY

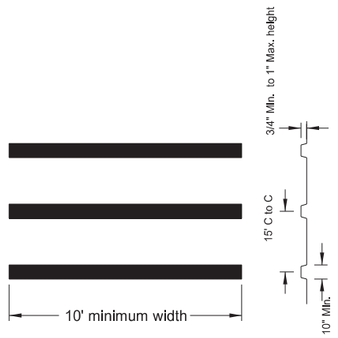
- Work area
- Flagger
- Sign

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

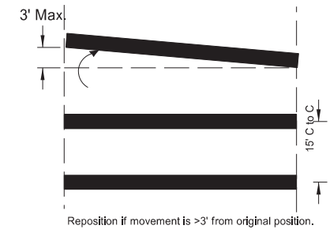
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE

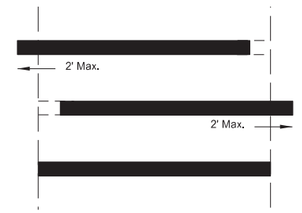


PORTABLE RUMBLE STRIPS ARRAY DETAIL



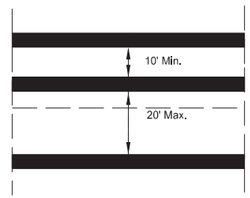
Reposition if movement is >3' from original position.

Skewing



Reposition if movement is >2' from original position.

Lateral



Reposition if distance between strips is <10' or >20'.

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

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

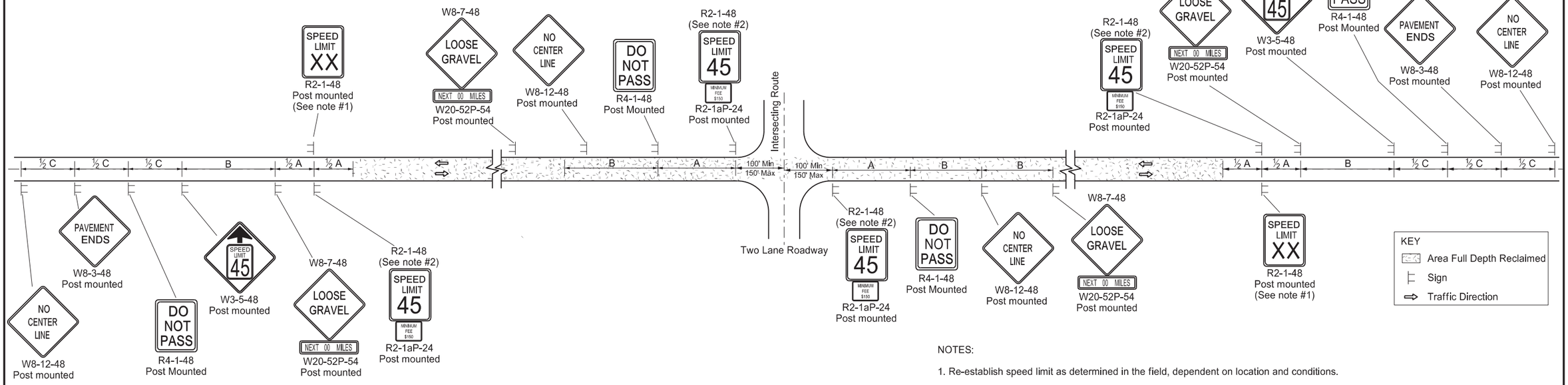
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23	Use changed to min 45 mph
06-30-25	Legislative Changes

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

Docusign Envelope ID: E17899F0-B912-4482-BF85-7148763D5F5D

MAINTAINING TRAFFIC THROUGH AREA ALREADY FULL DEPTH RECLAIMED

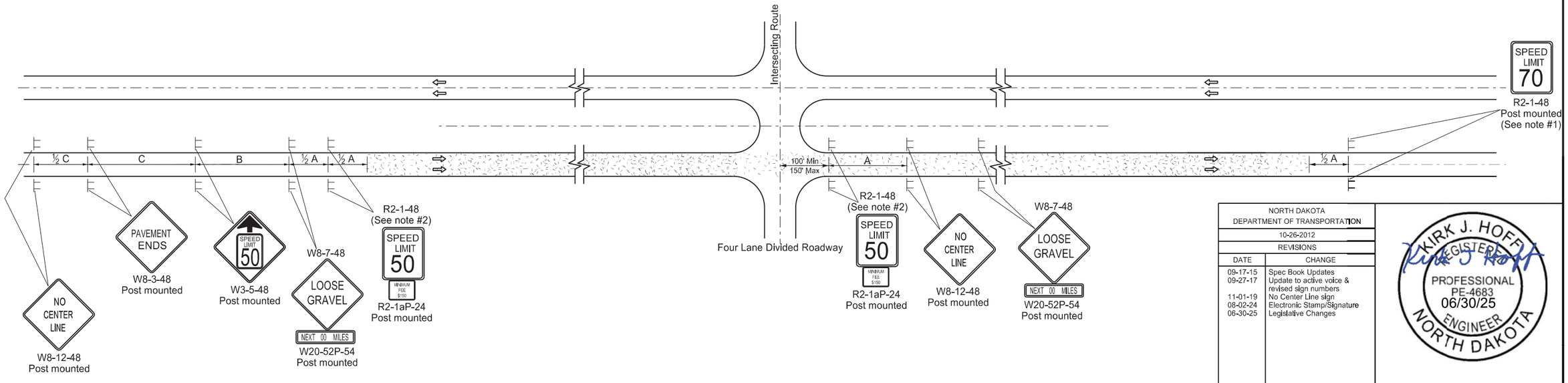
D-704-37



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

NOTES:

1. Re-establish speed limit as determined in the field, dependent on location and conditions.
2. Determine the reduced speed limit based on the in-place speed limit before construction. When speed limits are reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B after the first speed limit sign and ½A before the end of the pavement.
3. Install flags on non-portable warning signs in urban areas. Mount the 24 inch square flags, perpendicular to the edges of the diamond sign, above the edge so the limp flag will not touch the sign. Rural areas will not require flags.
4. Cover existing speed limit signs within reduced speed zone.
5. Place signs R2-1-48, R2-1aP-24, W8-7-48, W20-52P-54 and R4-1-48 for two lane, two way operation just after all important intersections and at 5 mile intervals thereafter. Place sign W8-12-48 just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. Place no short term pavement markings after the mine and blend operation until after the prime operation.
6. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Use other traffic control layouts as required in immediate work areas. Install sign R2-1aP-24 below speed limit signs when the speed limit is reduced in the work area.

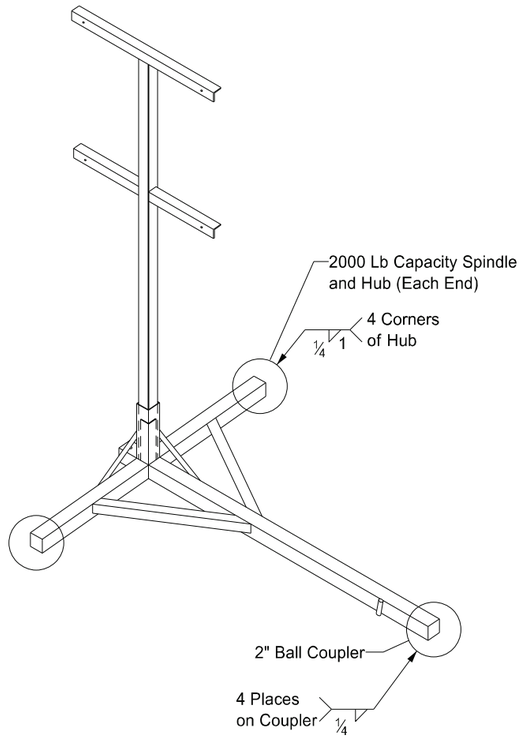


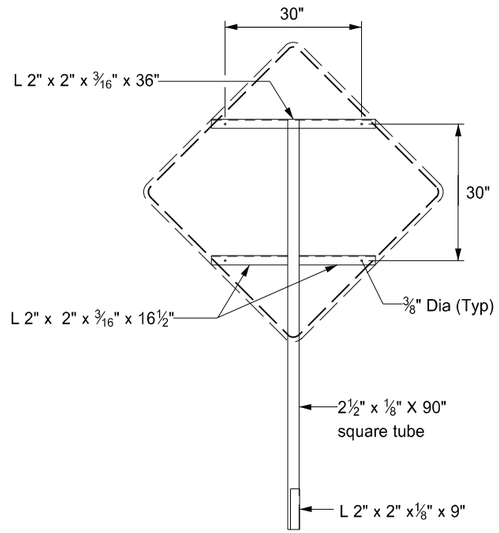
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-26-2012	
REVISIONS	
DATE	CHANGE
09-17-15	Spec Book Updates
09-27-17	Update to active voice & revised sign numbers
11-01-19	No Center Line sign
08-02-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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

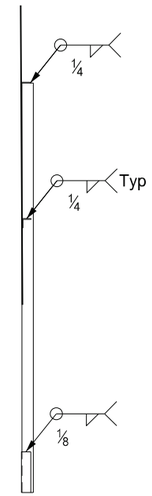
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

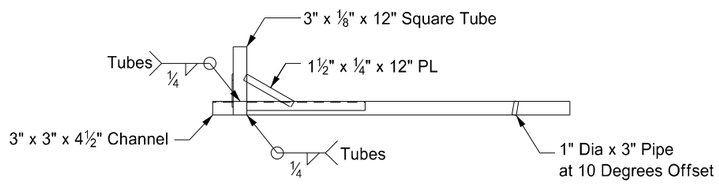


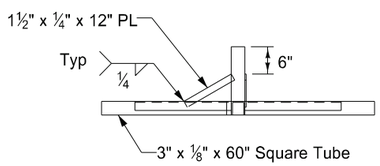
RIGHT

SIGN SUPPORT

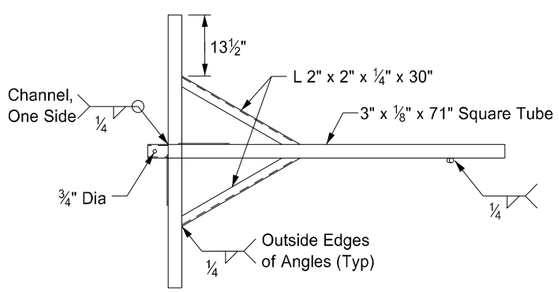
Notes:

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





RIGHT



TOP

TRAILER

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

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

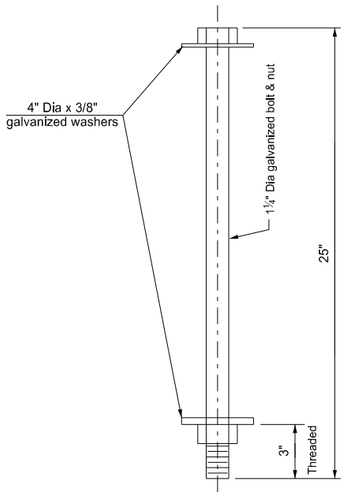
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CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

D-704-51

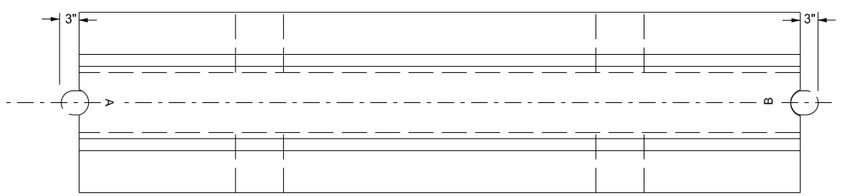
Notes:

1. Barrier ends imprinted with 4 inch letters A and B. Field match A end with B end.
2. Place barrier markers at the center of the barrier at 20' centers.
3. Connect barrier sections with 1 ¼" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
4. Place barrier to minimize openings between individual sections.

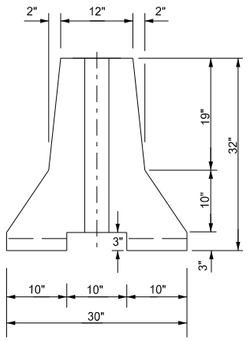


Connecting Bolt Detail

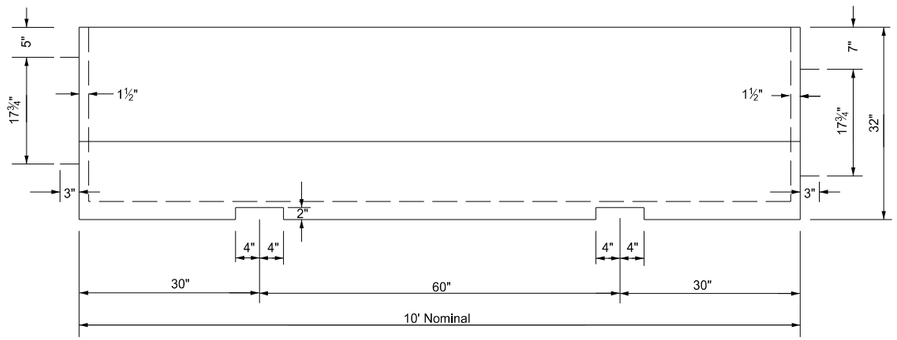
(One per 10 Ft section)



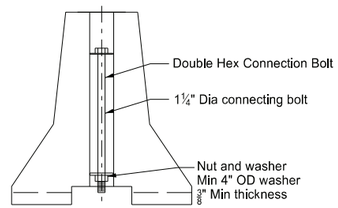
Plan View



End View



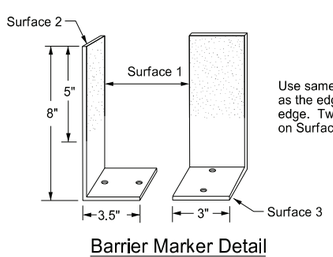
Side View



Bolt Connection Detail

Marker Body
Use high impact,weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	——
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI ¼" @ 73°F	8,000	D790
Flexural modulus, PSI ¼" @ 73°F	300,000	D790
Elongation @ yield	30%	D638



Use same color reflective faces as the edge line along barrier edge. Two way reflective on Surface 1 & 2.

Barrier Marker Detail

Reflective Tape
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

Adhesive
Use factory applied solid butyl rubber ⅛" thick, 2" wide on 2¼" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp
8-21-24	Removed Fabrication Info

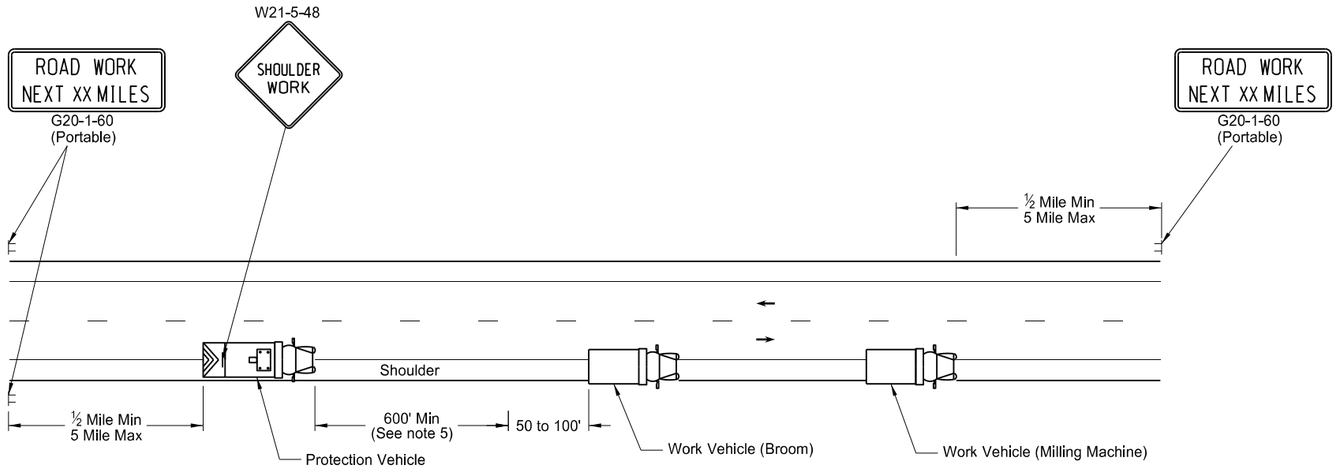
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/21/24

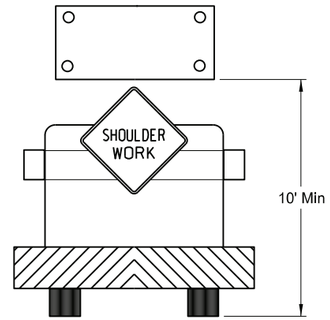
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MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



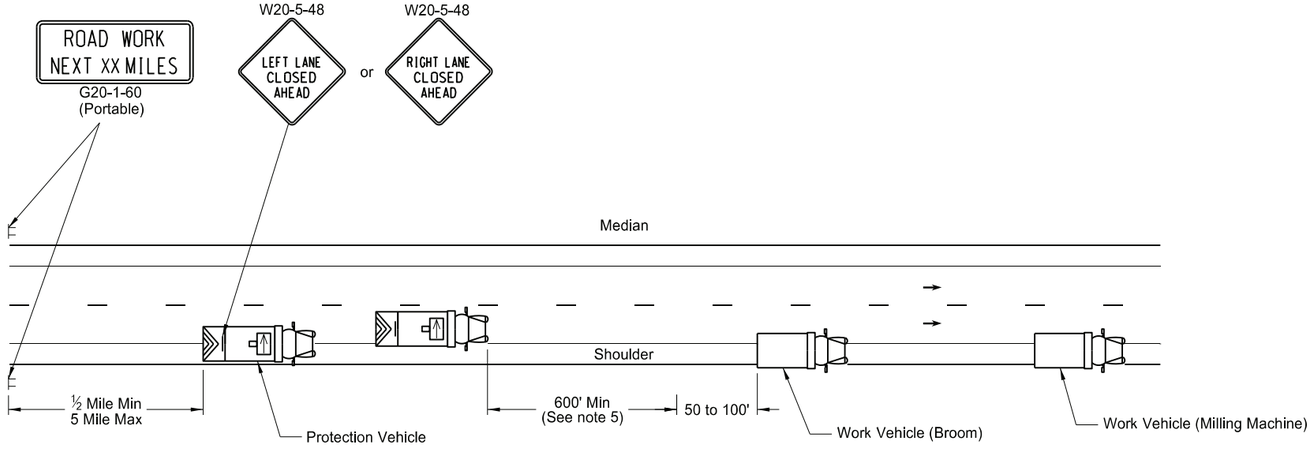
TWO LANE - TWO WAY ROADWAY



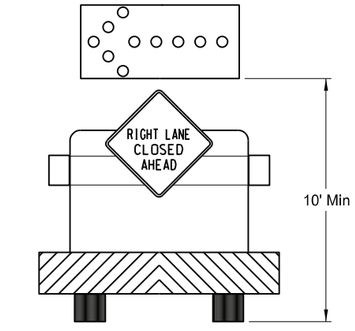
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with Flashing Arrow Panel In Caution Mode

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

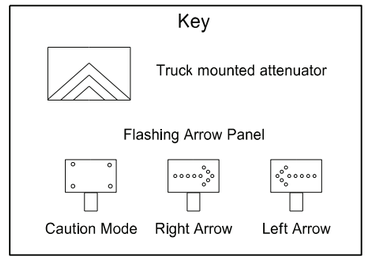


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow Panel In Flashing Arrow Mode



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp
8-02-24	Electronic Stamp/Signature

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

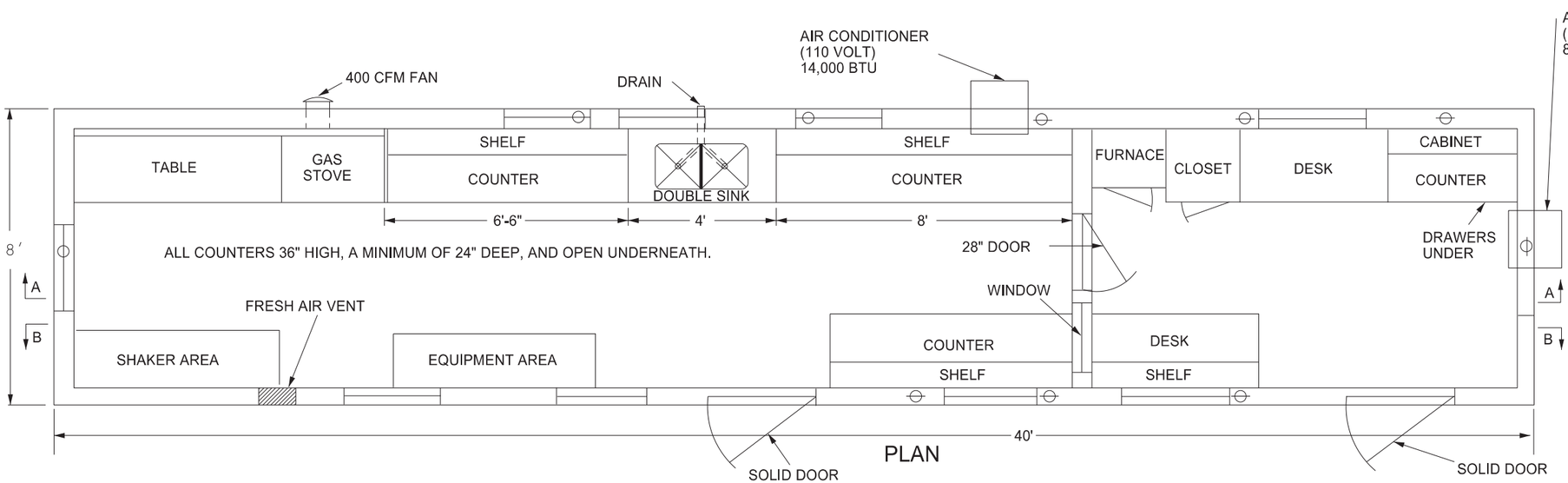
Kirk J Hoff

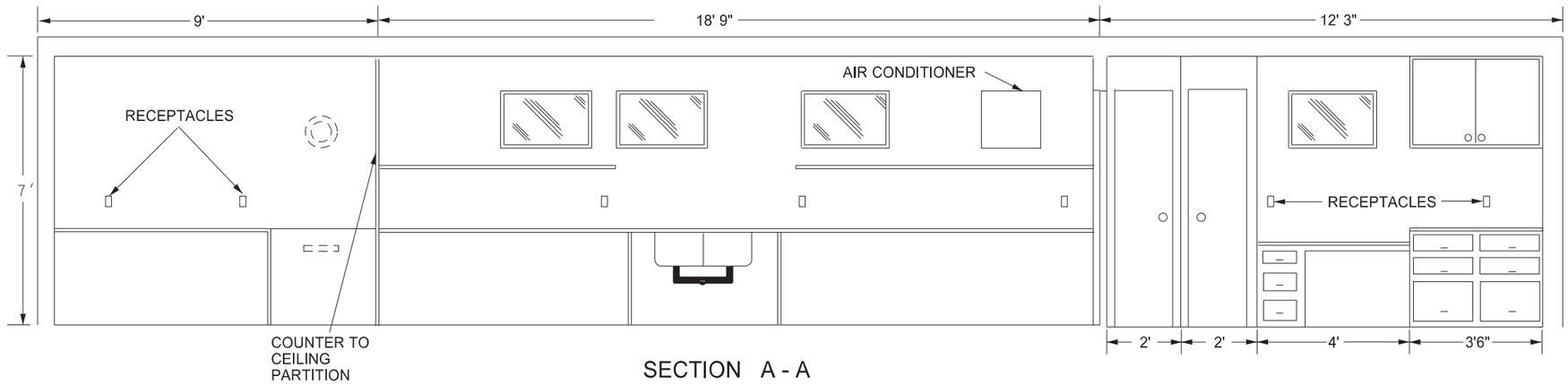
08/02/24

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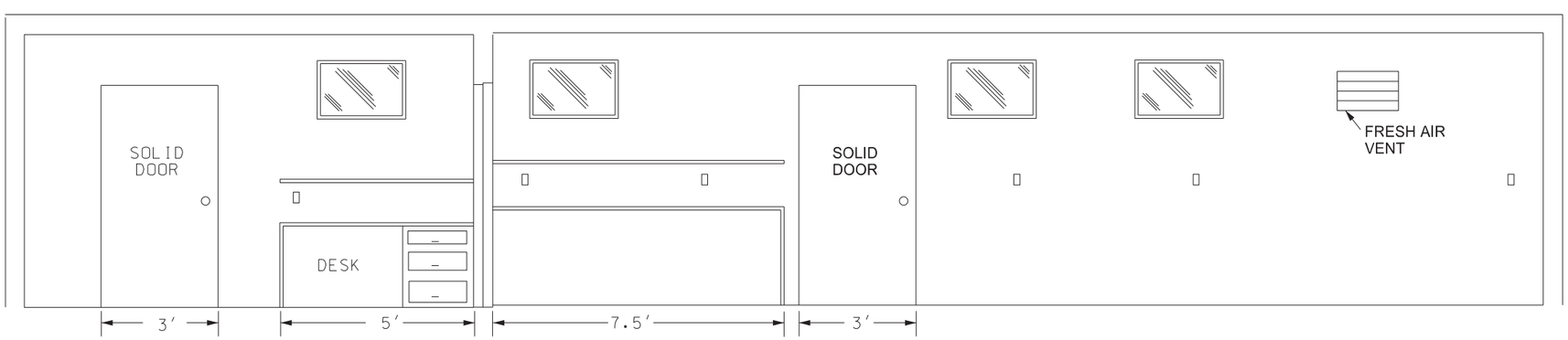
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

Provide a laboratory with the following:

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-03-13

REVISIONS

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

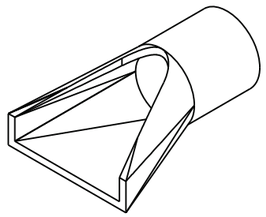
KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/09/24

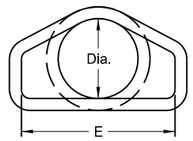
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)

D-714-1

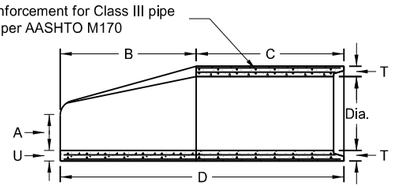
FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"



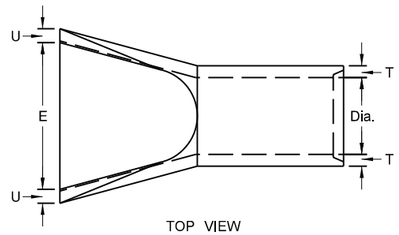
PERSPECTIVE



END VIEW



SIDE VIEW



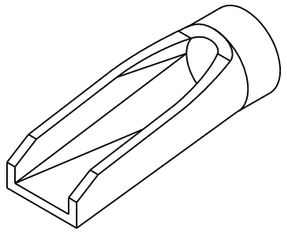
TOP VIEW

REINFORCED CONCRETE PIPE - FLARED END SECTION
Reinforcement to be equivalent to Class III RCP

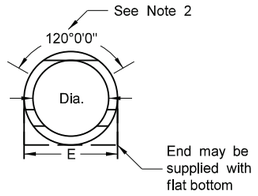
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
   66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

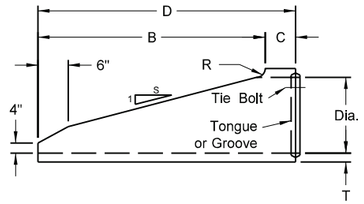
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7½"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



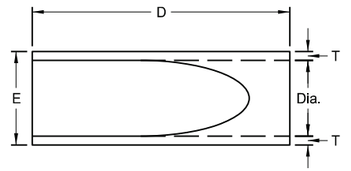
PERSPECTIVE



END VIEW



SIDE VIEW



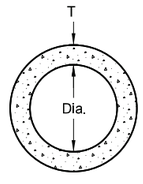
TOP VIEW

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION
Reinforcement to be equivalent to Class III RCP

NOTES (Traversable End Section):

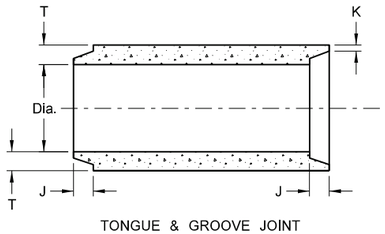
1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

All Classifications of Round Concrete Pipe					
Internal Dia. of pipe in inches	Cross-Sectional Water Area	Weight per lin. foot of Pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅛-2⅛	¾	2
15	1.23	127	1⅜-2¼	⅞	2¼
18	1.77	168	1⅞-2⅞	1	2½
21	2.40	214	1⅞-3⅛	1⅛	2¾
24	3.14	265	2¼-3¼	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3¼-4¼	1¼	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3¼-4¼	1½	4
42	9.62	685	3¾-4¾	1¾	4½
48	12.57	685	3⅞-4¾	1⅞	5
54	15.90	1070	4⅛-5¼	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5⅛-6¾	2⅞	7
78	33.18	2098	6¼-7¼	2⅞	7½
84	38.48	2410	5⅛-7¾	3⅜	8
90	44.18	2793	6¾-8½	3¼	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

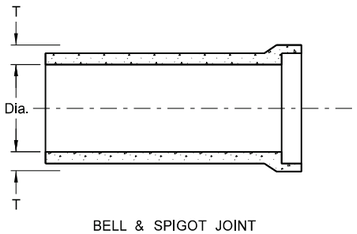


END VIEW

CIRCULAR PIPE

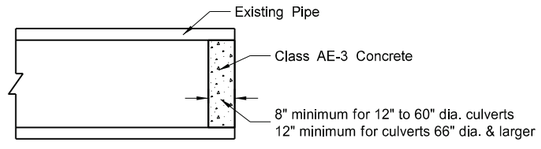


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

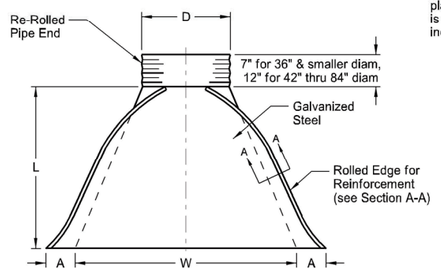
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

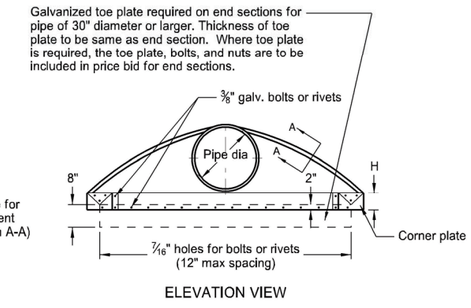
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

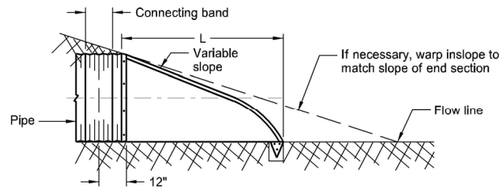
D-714-4



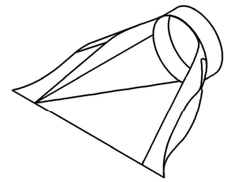
PLAN VIEW



ELEVATION VIEW



TYPICAL CROSS SECTION
(showing connector section)



PERSPECTIVE VIEW

* * PIPE DIA.	GALVANIZED THICKNESS	END SECTION DIMENSIONS A	B	H	L	W	APPROX. SLOPE	BODY
IN	IN	IN	IN	IN	IN	IN	RATE	PIECE
15	0.064 - 0.079	7	8	6	26	30	2½:1	1
18	0.064 - 0.109	8	10	6	31	36	2½:1	1
24	0.064 - 0.109	10	13	6	41	48	2½:1	1
30	0.064 - 0.109	12	16	8	51	60	2½:1	1 or 2
36	0.064 - 0.109	14	19	9	60	72	2½:1	2
42	0.064 - 0.138	16	22	11	69	84	2½:1	2
48	0.064 - 0.168	18	27	12	78	90	2¼:1	2
54	0.064 - 0.168	18	30	12	84	102	2:1	2
* 60	0.064 - 0.168	18	33	12	87	114	1¾:1	3
* 66	0.064 - 0.168	18	36	12	87	120	1½:1	3
* 72	0.064 - 0.168	18	39	12	87	126	1½:1	3
* 78	0.064 - 0.168	18	42	12	87	132	1¼:1	3
* 84	0.064 - 0.168	18	45	12	87	138	1⅛:1	3

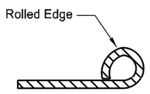
* These sizes have 0.109" sides and 0.138" center panels.

* * Pipe diameter is equal to dimension "D" of end section.

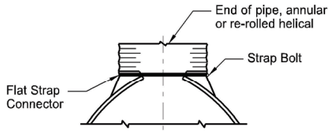
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

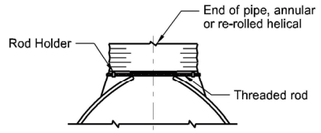
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



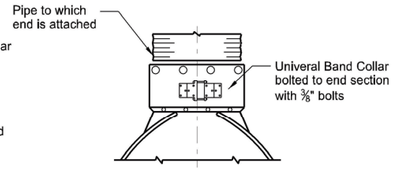
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

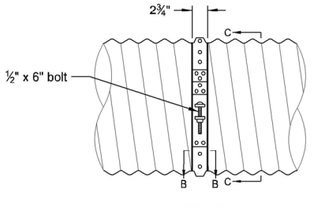


TYPE #3
For all pipe sizes

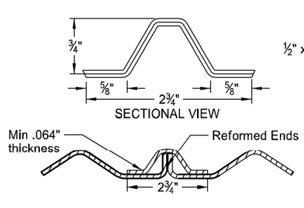
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

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 ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" 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. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".



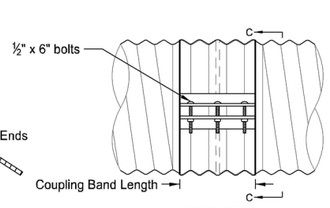
SIDE VIEW



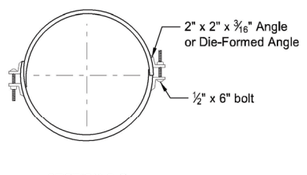
SECTIONAL VIEW

SECTION B-B

HAT BAND FOR FLANGED END PIPE

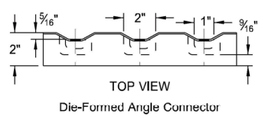


SIDE VIEW

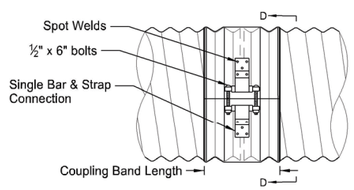


SECTION C-C
Angle Connection

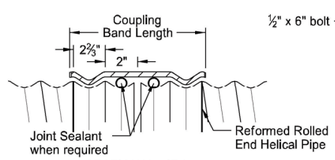
ANNULAR BAND



TOP VIEW
Die-Formed Angle Connector

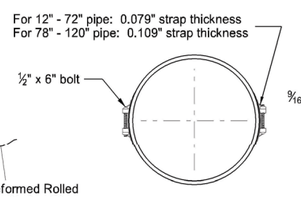


SIDE VIEW

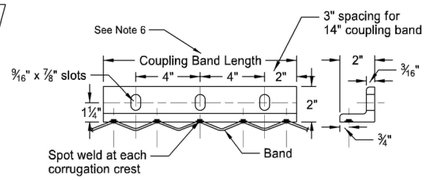


SECTIONAL VIEW

HUGGER COUPLING BAND



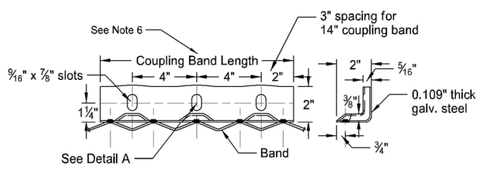
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

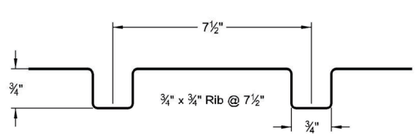
2" x 2" x 3/16" Angle Connector

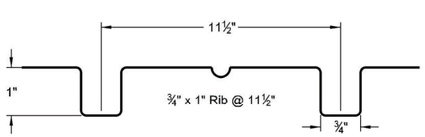


SIDE VIEW

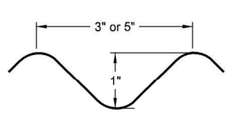
END VIEW

Die-Formed Angle Connector

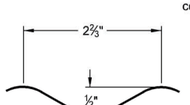




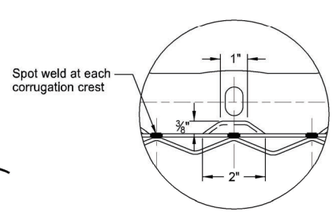
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS



Detail A

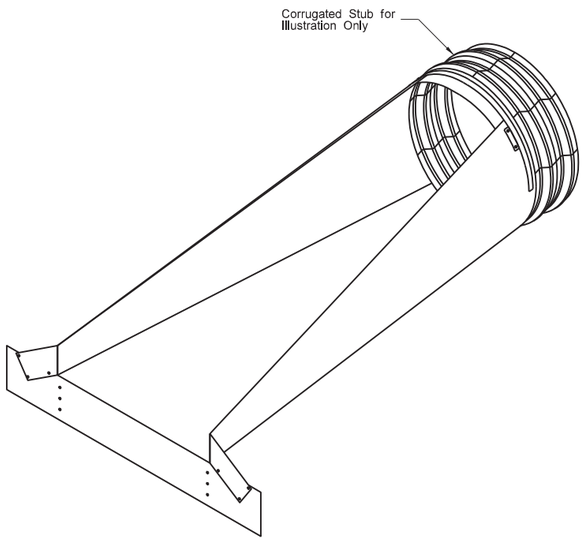
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table



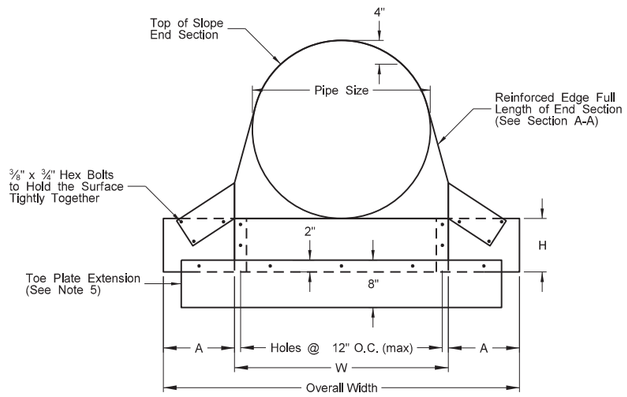
09/23/22

DocuSign

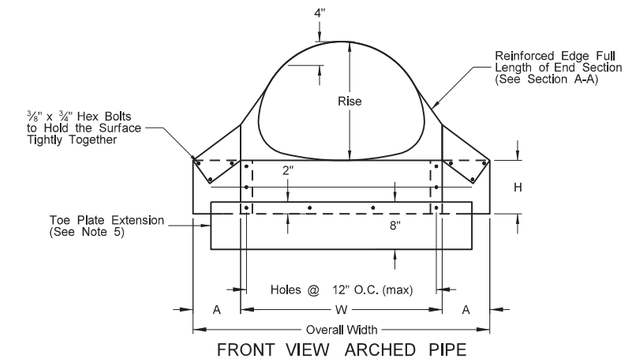
TRAVERSABLE END SECTIONS FOR CORRUGATED STEEL PIPE CULVERTS



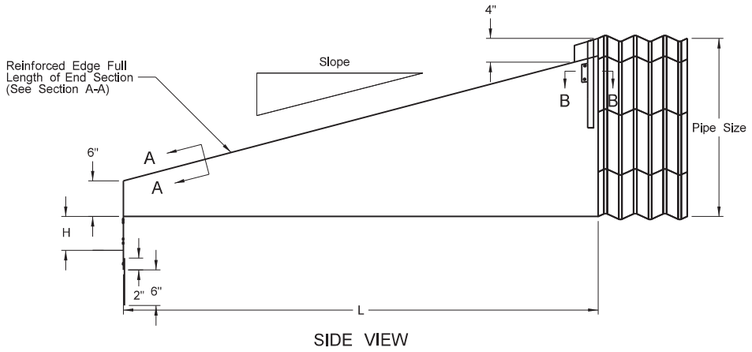
ISOMETRIC VIEW



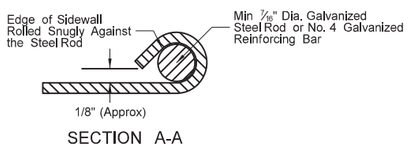
FRONT VIEW CIRCULAR PIPE



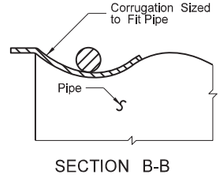
FRONT VIEW ARCHED PIPE



SIDE VIEW



SECTION A-A



SECTION B-B

TRAVERSABLE END SECTIONS FOR CIRCULAR PIPES										
Pipe Dia. (in.)	Min. Thick.		Dimensions (inches)				L Dimensions			
	in.	Gauge	A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
15	.064	16	8	6	21	37	4:1	20	6:1	30
18	.064	16	8	6	24	40	4:1	32	6:1	48
24	.064	16	8	6	30	46	4:1	56	6:1	84
30	.109	12	12	9	36	60	4:1	80	6:1	120

TRAVERSABLE END SECTIONS FOR ARCHED PIPES												
Equiv. Dia. (in.)	(inches)		Min. Thick.		Dimensions (inches)				L Dimensions			
	Span	Rise	in.	Gauge	A	H	W	Overall Width	Slope	Length (in.)	Slope	Length (in.)
18	21	15	.064	16	8	6	27	43	4:1	20	6:1	30
21	24	18	.064	16	8	6	30	46	4:1	32	6:1	48
24	28	20	.064	16	8	6	34	50	4:1	40	6:1	60

NOTES:

1. See Standard Drawing D-714-04 for end section to pipe details.
2. Use a ½" diameter rod or strap type connection for 15", 18", and 24" diameter end sections to attach to corrugated steel pipe.
3. Use a ⅝" diameter rod type connection for 30" diameter round end sections to attach to corrugated steel pipe.
4. Use a ½" diameter rod type connection for all sizes of arched pipe end sections to attach to corrugated steel pipe.
5. Use the same gauge material for the toe plate extension as the end section. Use a dimension with a width 6" less than the overall width.
6. For centerline crossings, use end sections with a dimension "W" of 36" or less where a single culvert is required to convey the flow and a dimension "W" of 30" or less where multiple culverts are required to convey the flow.
7. For approach crossings, use end sections with a dimension "W" of 24" or less where a single culvert is required to convey the flow and a dimension "W" of 21" where multiple culverts are required to convey the flow.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-23-09	
REVISIONS	
DATE	CHANGE
8-6-21	Notes 2-7, Lables

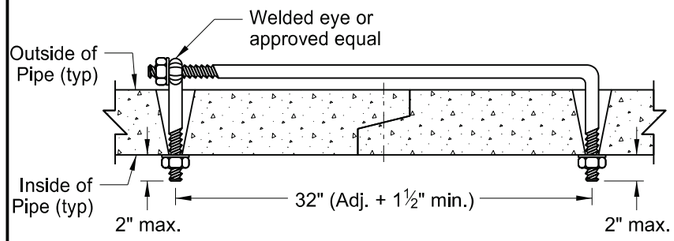
JONATHAN D KETTERING
REGISTERED
PROFESSIONAL
PE-4684
ENGINEER
NORTH DAKOTA
08/06/21

DocuSign

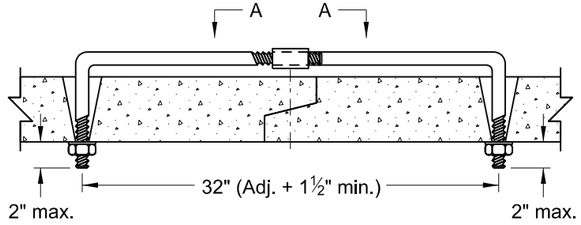
Docusign Envelope ID: 183A3561-9FCE-4D1A-975A-207779A0B2A0

CONCRETE PIPE, CATTLE PASS, OR PRECAST CONCRETE BOX CULVERT TIES

D-714-22

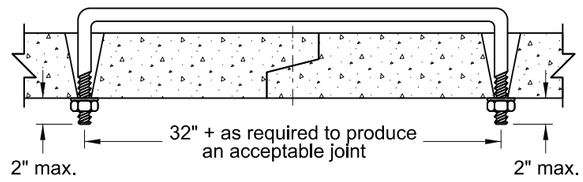


EYE BOLT TIE (PIPES ONLY)

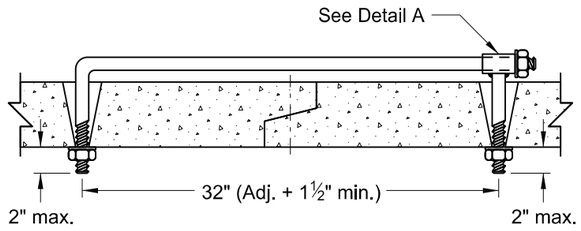


ADJUSTABLE TIE (PIPES ONLY)

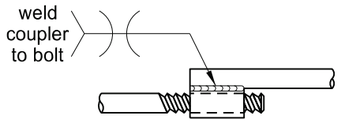
REQUIRED SIZE OF TIE BOLTS		
PIPE SIZE	THREAD ø	XXS PIPE SLEEVE INNER ø
18" - 24"	⅝" SEE NOTE 3	¾"
30" - 66"	¾"	1"
72" - 120"	1"	1¼"
RCB/CATTLE PASS		



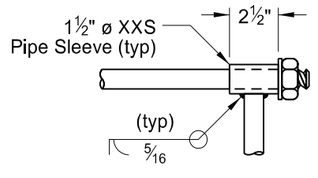
U BOLT TIE (PIPES OR CATTLE PASSES)



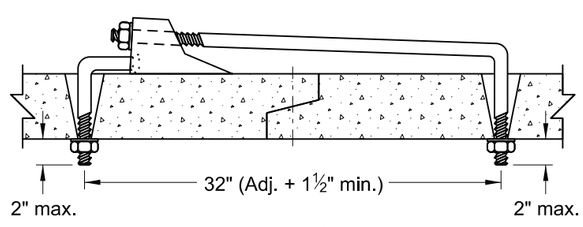
WELDED TIE (PIPES ONLY)



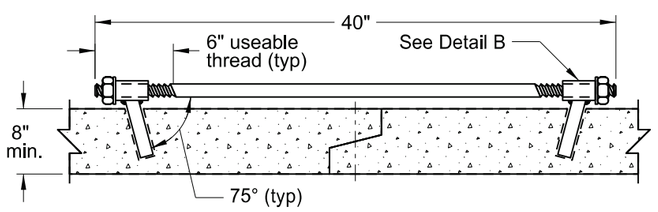
SECTION A-A



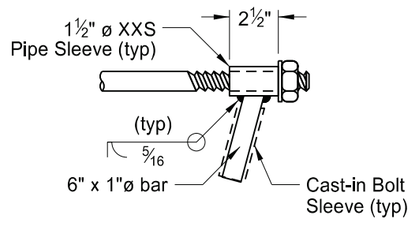
DETAIL A



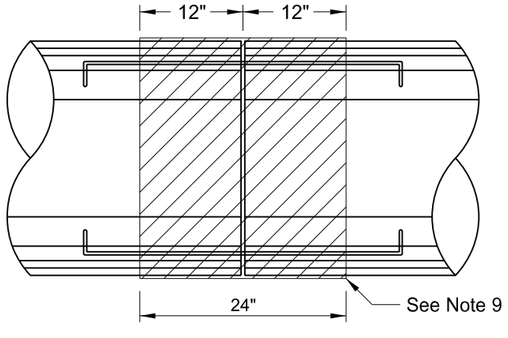
CANOPY TIE (PIPES ONLY)



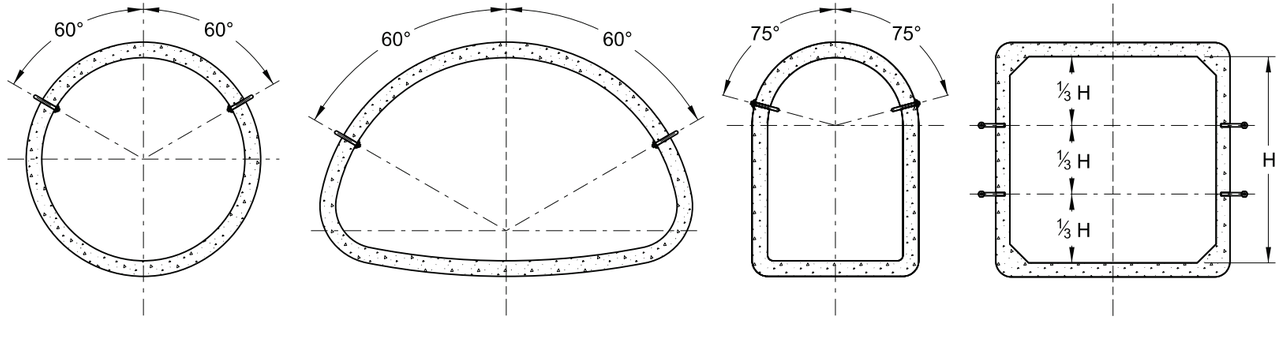
HIDDEN TIE (RCB ONLY)



DETAIL B



PLAN VIEW (PIPES ONLY)



END VIEW

NOTES:

1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
4. Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
5. Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
6. Holes in pipes to accommodate tie bolts will be precast. Tapered holes are permitted. Use holes that have a diameter ¼" larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1¼".
7. Include the cost of precasting the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
8. Tie all centerline and approach RCP culvert joints. Tie all joints including the end sections of all free ends of storm drain systems. 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.
9. Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, use Type S2 geotextile fabric and overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C990. Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
10. Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
11. Provide lock washers or burr threads of concrete box ties after installation and tightening to prevent nut rotation.
12. Tie RCB's as noted in the plans.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

3-18-14

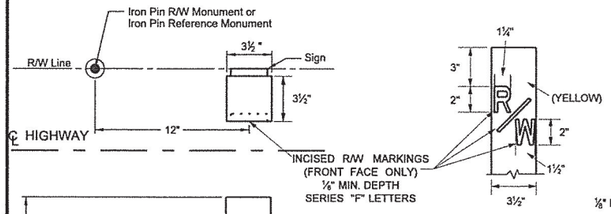
REVISIONS

DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View

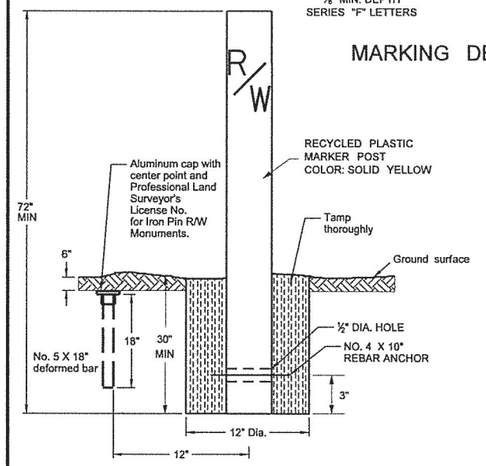
REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE 01/17/25
NORTH DAKOTA

STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

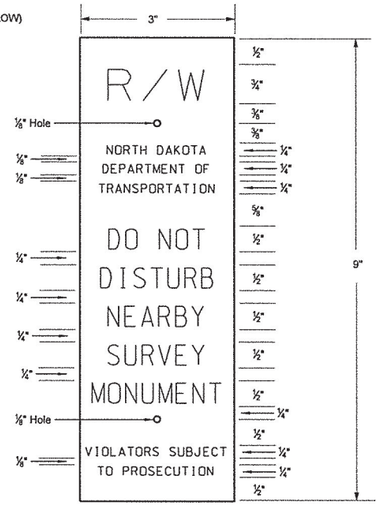
D-720-1



MARKING DETAIL



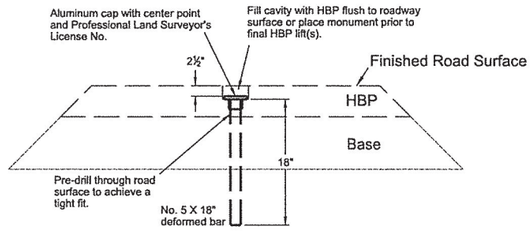
RECYCLED PLASTIC
RIGHT OF WAY MARKER
(WITNESS POST) DETAILS
&
IRON PIN REFERENCE AND R/W
MONUMENT DETAILS



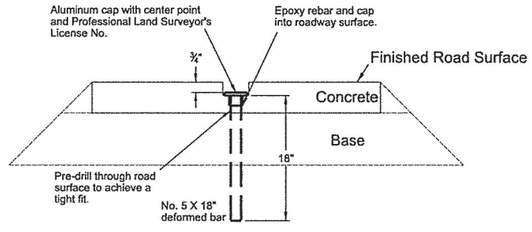
SIGN DETAIL

Black letters on orange high intensity background sheeting meeting ASTM D-4956 Type III or higher on 80 gauge 5052-H38 aluminum. Silk screen graphics. One color print. Attach sign by drilling two holes in the face of the post (side facing the private owner, away from the Department of Transportation right of way). Put inserts into the holes and mount the sign with #4 vandal proof screws. Install sign 2" from top of post.

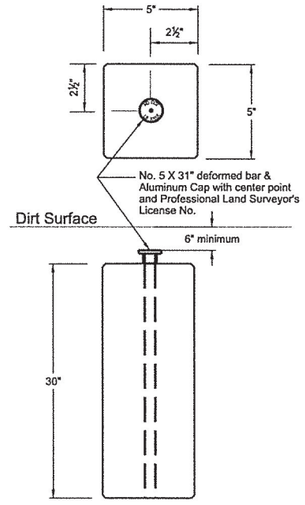
ALIGNMENT MONUMENT DETAILS



IRON PIN
(Within Finished Roadway Surface)



IRON PIN
(Within Finished Roadway Surface)



PRECAST CONCRETE
(Outside Finished Roadway Surface)
(Inside R/W Limits)

NOTES:

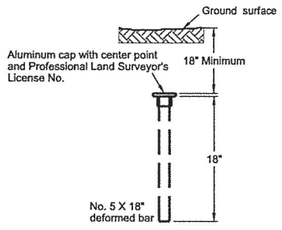
Construct and install Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) according to Section 720 of the Standard Specifications.

ALIGNMENT MONUMENTS: Place Iron Pin or Precast Concrete Alignment Monuments with aluminum caps on the centerline alignment PI's, section corners, quarter corners, section line crossings, quarter line crossings, and at curve points (PC's, PT's, TS's, and ST's) on the centerline.

IRON PIN R/W MONUMENT: Place Iron Pns with aluminum caps (No. 5 X 18") at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

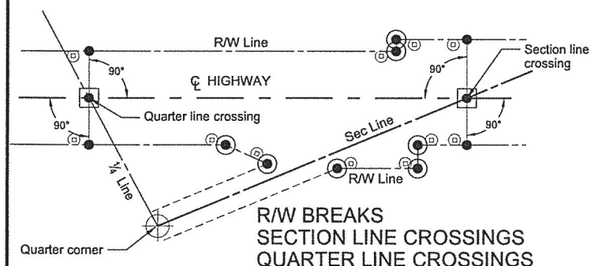
IRON PIN REFERENCE MONUMENT: Place Iron Pins without aluminum caps (No. 5 X 18") as reference monuments on the Right of Way line at section corners, quarter corners, section line crossings, and quarter line crossings.

R/W MARKERS (WITNESS POST) WITHIN DRIVEWAYS: If a single iron Pin R/W or Reference Monument is within a driveway, place right of way marker (witness post) 50 feet back, in stationing, from the Iron Pin Monument along the R/W line. If R/W break is within a driveway, place right of way markers (witness posts) 50 feet back, or ahead from respective Iron Pin R/W Monuments along the R/W lines. Maintain Iron Pin R/W or Reference Monument original position within driveway.

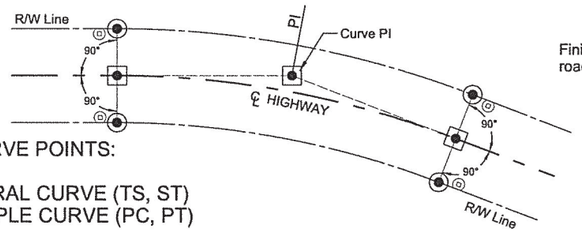


IRON PIN
(Outside Finished Roadway Surface)
(Outside R/W Limits)

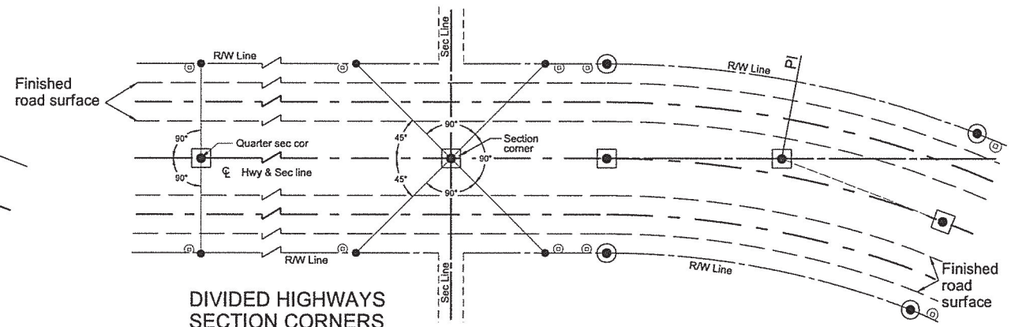
VARIOUS MONUMENT AND MARKER PLACEMENTS



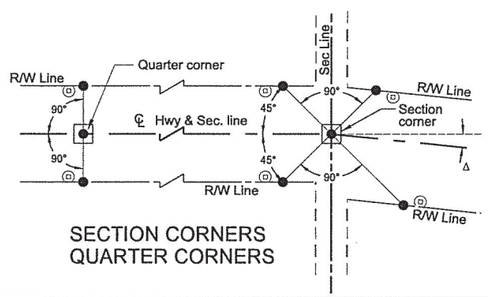
R/W BREAKS
SECTION LINE CROSSINGS
QUARTER LINE CROSSINGS



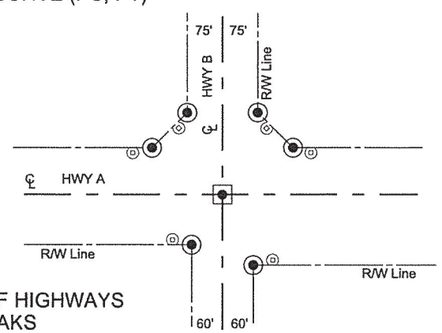
CURVE POINTS:
PI
SPIRAL CURVE (TS, ST)
SIMPLE CURVE (PC, PT)



DIVIDED HIGHWAYS
SECTION CORNERS
QUARTER CORNERS



SECTION CORNERS
QUARTER CORNERS



INTERSECTION OF HIGHWAYS
FLARED R/W BREAKS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
11/12/13	Note for SIGN DETAIL modified to meet ASTM D-4956 Type III or higher on 80 gauge 5052-H38
10/17/17	Updated to active voice.
08/27/19	New Design Engr PE Stamp.

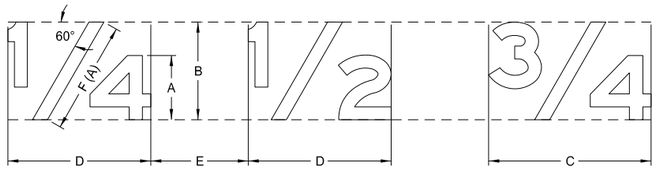
LEGEND
- Iron Pin Reference Monument
- R/W Marker (witness post)
- Alignment Monument
- Iron Pin R/W Monument

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REGISTERED
PROFESSIONAL
PE 4683
8/27/19
ENGINEER
NORTH DAKOTA

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

LETTER AND ARROW DETAILS

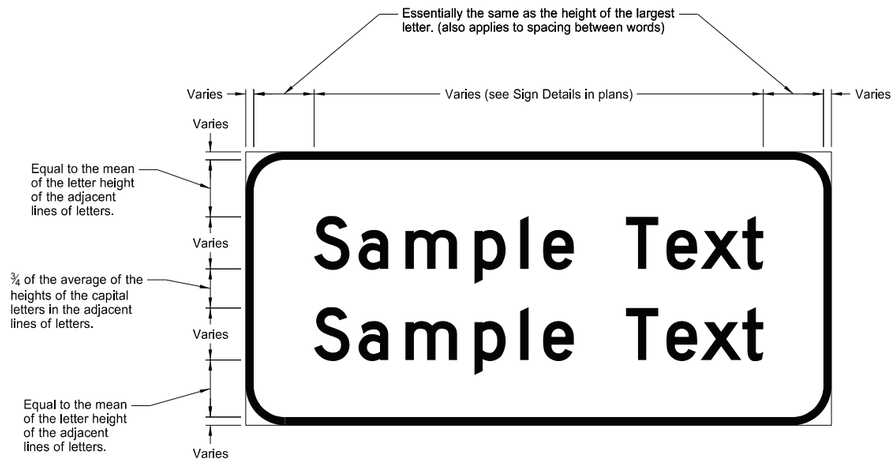
D-754-9



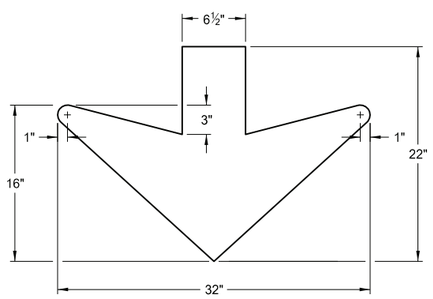
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

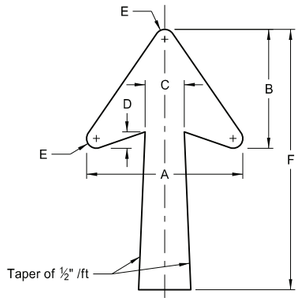
(A) Center diagonal stroke of fraction optically.



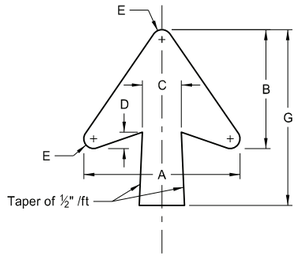
TYPICAL SPACING



DOWN ARROW



TYPE A

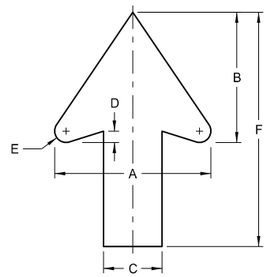


TYPE B

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G
ND_6IN	6"	12"	9.125"	3"	1"	0.625"	20"	13.5"
ND_8IN	8"	15.125"	11.563"	3.75"	1.313"	0.813"	25"	17"
ND_10IN	10"	18.25"	14"	4.5"	1.5"	0.75"	30"	20"
ND_12IN	12"							
ND_13IN	13.3"							
ND_16IN	16"	22.25"	17"	5.375"	1.75"	1"	35"	25"
ND_20IN	20"							

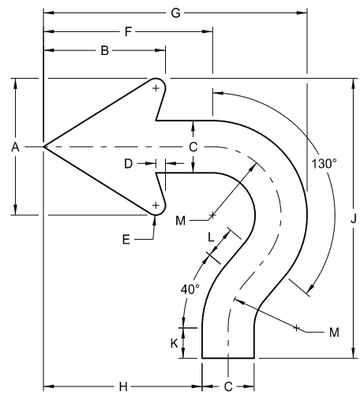
NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

NOTE: Measure rotation angle of arrows counterclockwise from positions shown in details.



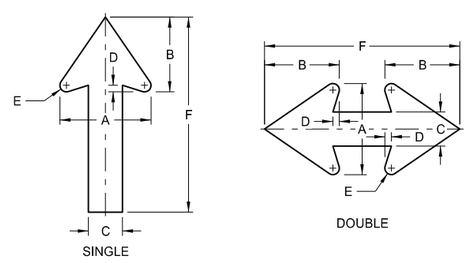
TYPE D

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F
ND_2IN	2"	2"	1.625"	0.75"	0.125"	0.125"	3"
ND_4IN	4"	4"	3.313"	1.5"	0.25"	0.25"	6"
ND_6IN	6"	6"	4.875"	2.25"	0.375"	0.375"	9"
ND_8IN	8"	8"	6.625"	3"	0.5"	0.5"	12"
ND_10IN	10"	10"	8.375"	3.75"	0.75"	0.75"	15"
ND_12IN	12"	12"	10"	4.5"	0.875"	0.875"	18"



ROUNDABOUT

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G	H	J	K	L	M
ND_6IN	6"	5.25"	4.688"	2"	0.375"	0.375"	6.5"	10.125"	6.094"	10.75"	1.168"	1.25"	2.625"
ND_8IN	8"	7"	5.75"	2.625"	0.5"	0.5"	8.688"	13.5"	8.166"	14.333"	1.557"	1.667"	3.5"



SPECIAL

DESIGNATION	A	B	C	D	E	F	USES
ND_0.75IN	2"	1.625"	0.75"	0.125"	0.125"	7.75"	Parking Signs (Regulatory)
ND_2.625IN	7"	5.75"	2.625"	0.5"	0.5"	15"	Frontage Road Signs

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-3-11

REVISIONS

DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow
5-4-16	Revised Distance & Destination and Typical Spacing details
4-23-18	Revised arrow details
8-30-18	Updated notes to active voice.
8-29-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

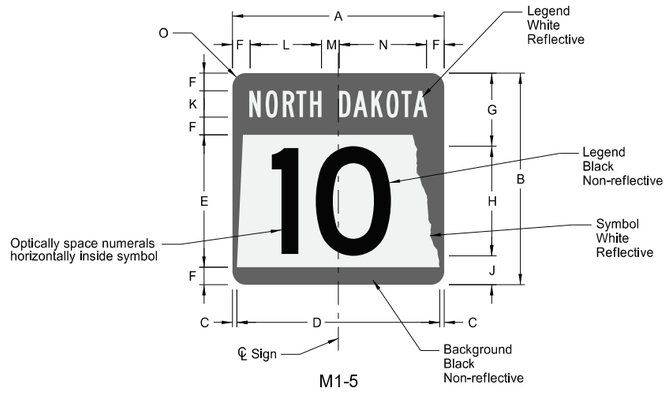
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

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STATE HIGHWAY ROUTE SHIELD DETAIL

D-754-11

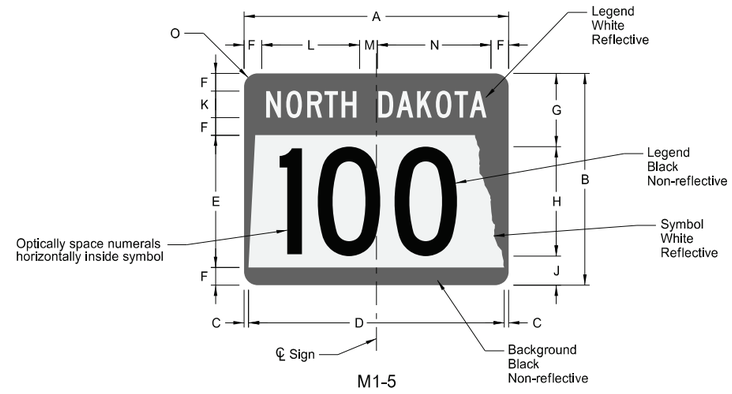


M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
1, 2 digits	18*	18*	0.38	17.25	11.25	1.5	6.38	9 D**	2.63	2.25 B	6.1	1.5	7.4	1.5
1, 2 digits	24	24	0.5	23	15	2	8.5	12 D**	3.5	3 B	8.1	2	9.9	1.5
1, 2 digits	36	36	0.75	34.5	22.5	3	12.75	18 D**	5.25	4.5 B	12.1	3	14.9	2.25
1, 2 digits	48*	48*	1	46	30	4	17	24 D**	7	6 B	16.2	4	19.8	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%

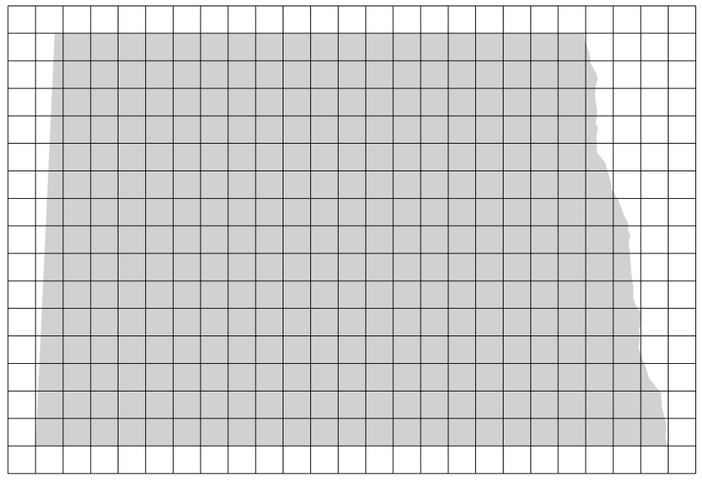


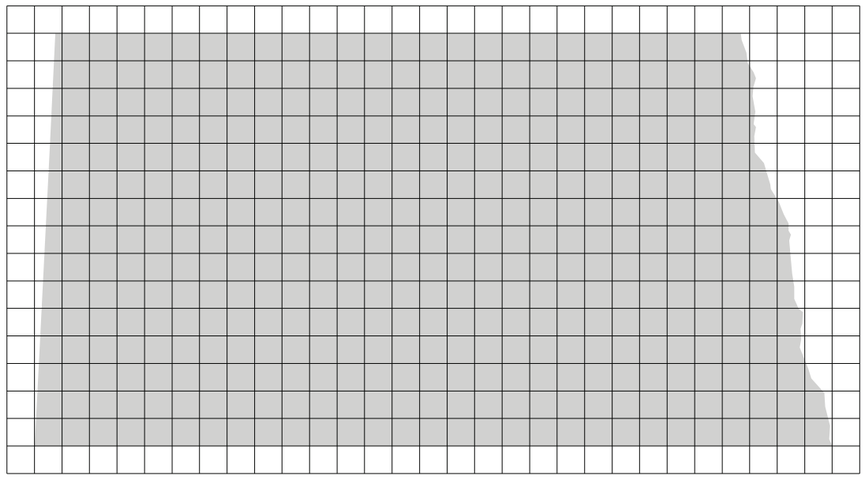
M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
3 digits	24*	18*	1,13	21,75	11,25	1,5	6,38	9 C**	2,63	2,25 C	8,8	2	10,2	1,5
3 digits	30	24	0.5	29	15	2	8.5	12 C**	3.5	3 C	10.7	2.5	12.8	1.5
3 digits	45	36	0.75	43.5	22.5	3	12.75	18 C**	5.25	4.5 C	16.1	3.8	19.1	2.25
3 digits	60*	48*	1	58	30	4	17	24 C**	7	6 C	21.5	5	25.5	3
4 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 B***	2.63	2.25 C	8.8	2	10.2	1.5
4 digits	30	24	0.5	29	15	2	8.5	12 B***	3.5	3 C	10.7	2.5	12.8	1.5
4 digits	45	36	0.75	43.5	22.5	3	12.75	18 B***	5.25	4.5 C	16.1	3.8	19.1	2.25
4 digits	60*	48*	1	58	30	4	17	24 B***	7	6 C	21.5	5	25.5	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%
*** Reduce numeral spacing by 50%





Note: North Dakota symbol graphics file may be obtained from the Design Division of North Dakota Department of Transportation.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

4-23-18

REVISIONS

DATE	CHANGE
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

08/05/24

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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

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

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

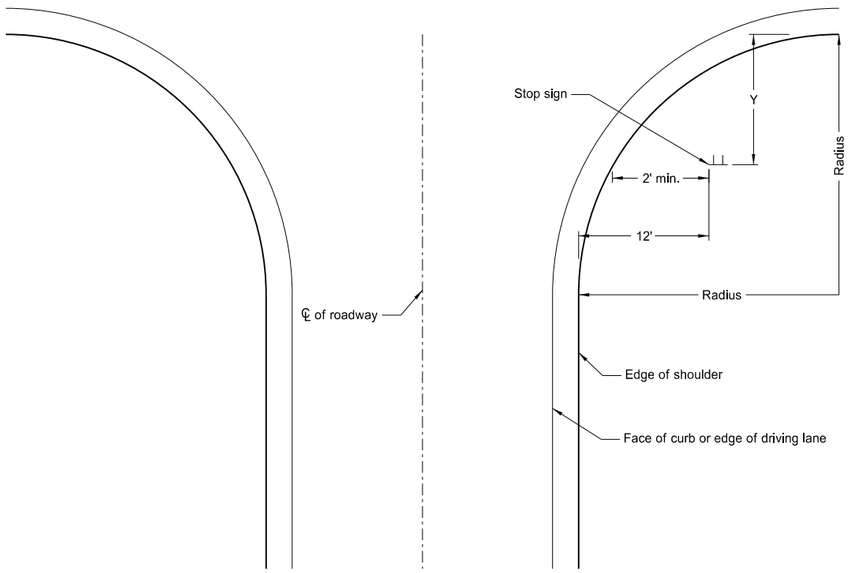
   Install signs on expressways a minimum height of 7'.

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

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

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

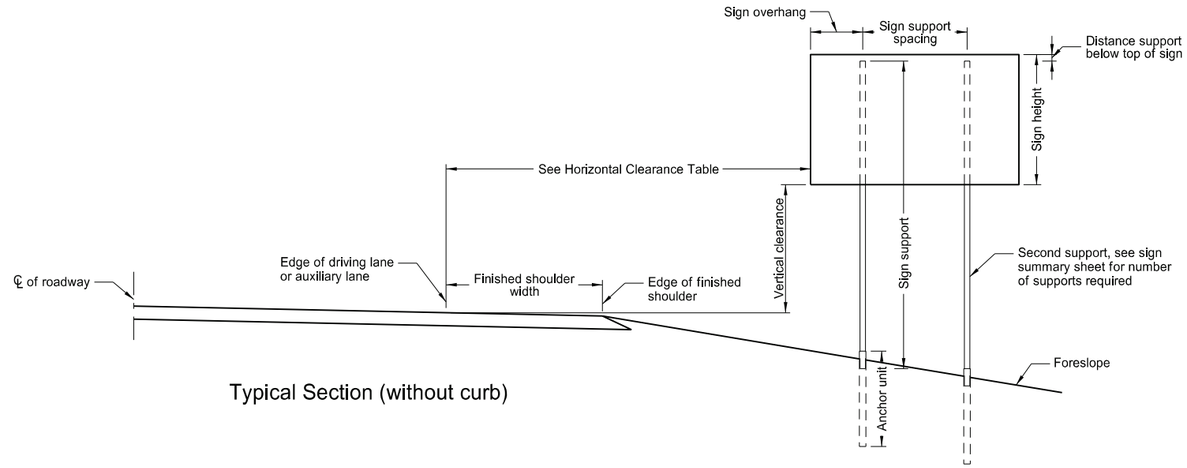
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

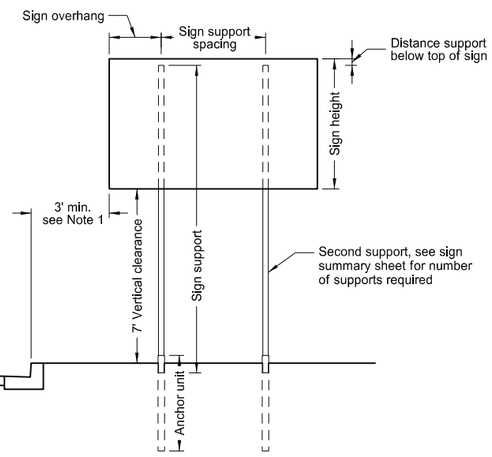
Use layout for the placement of "Stop" signs.

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



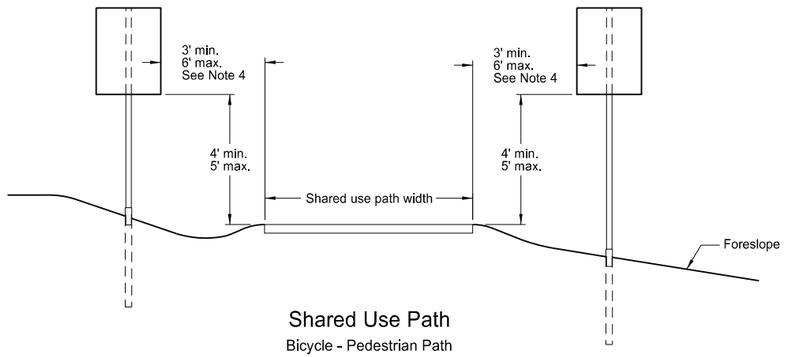
Typical Section (without curb)

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



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

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

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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

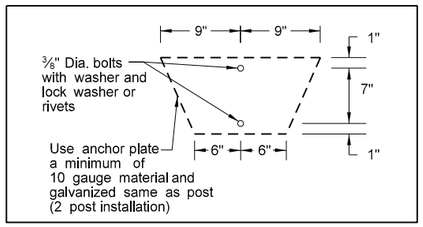
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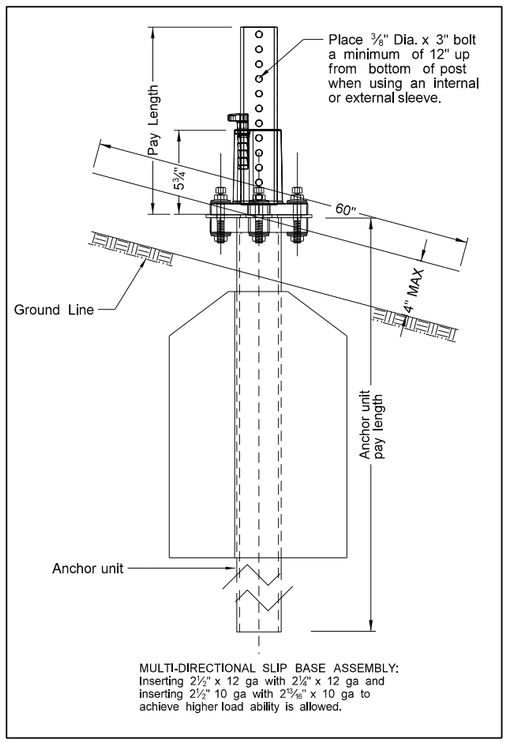
Mounting Details Perforated Tube

D-754-24

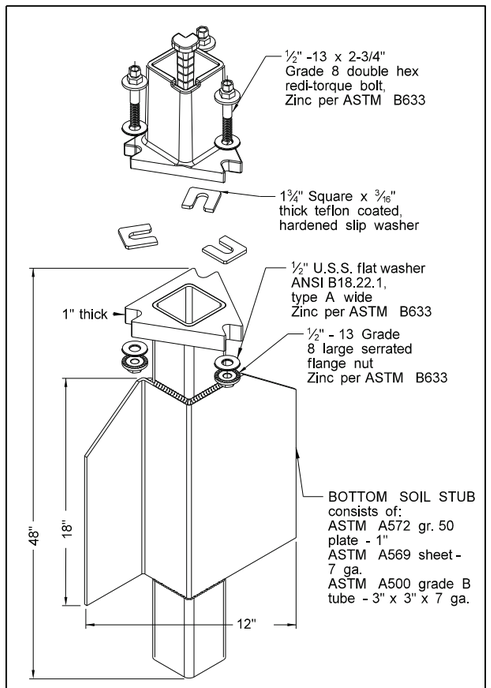
Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2⁹⁄₁₆	10	Yes		7

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

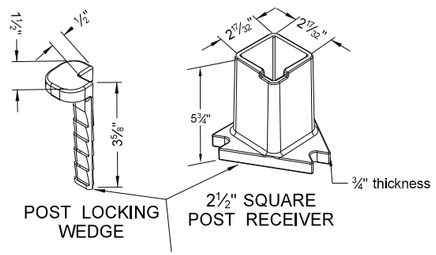


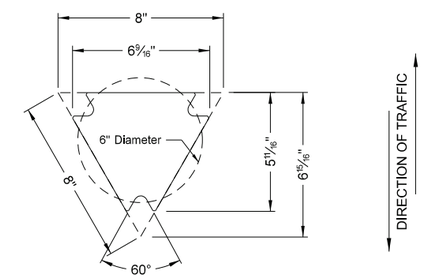


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY: Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2¹⁵⁄₁₆" x 10 ga to achieve higher load ability is allowed.



SLIP BASE FOR 2½" POST





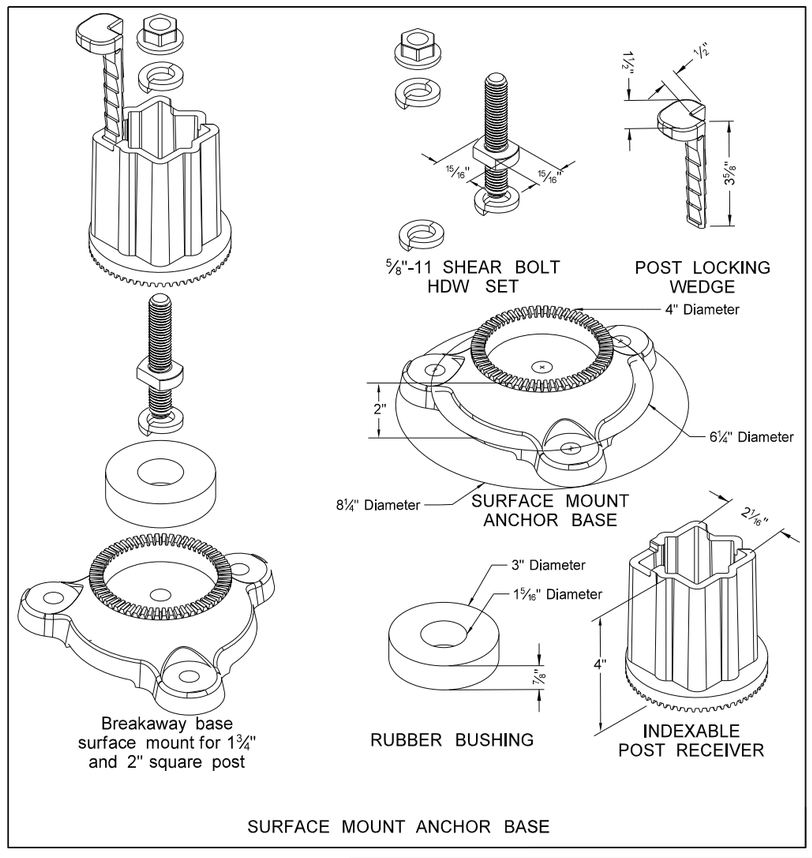
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes: Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulud In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2³⁄₁₆ x 2³⁄₁₆	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

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

NOTE:

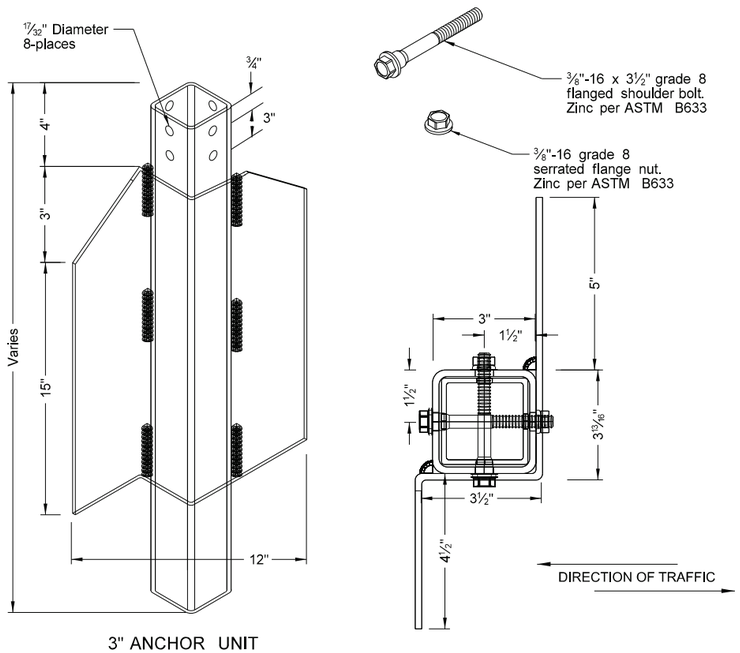
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile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



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

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



3" ANCHOR UNIT

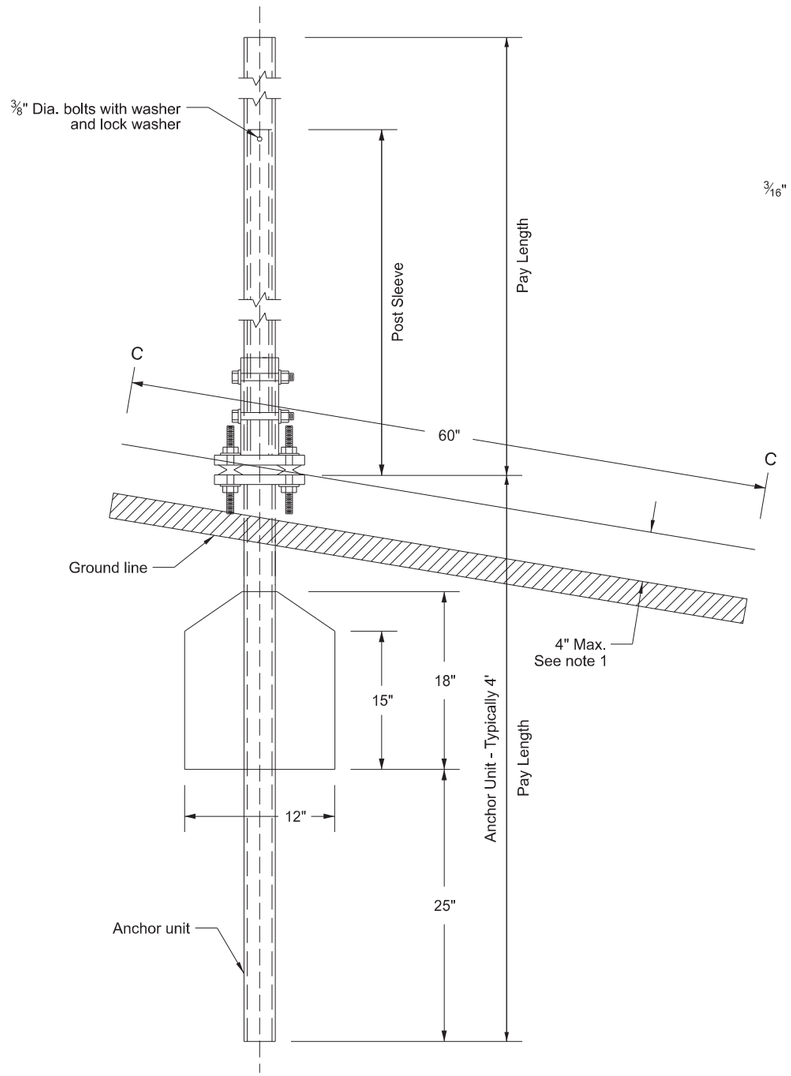
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

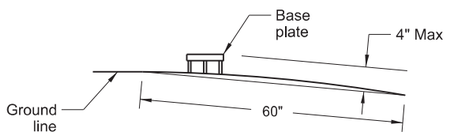
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/05/24

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D-754-24A

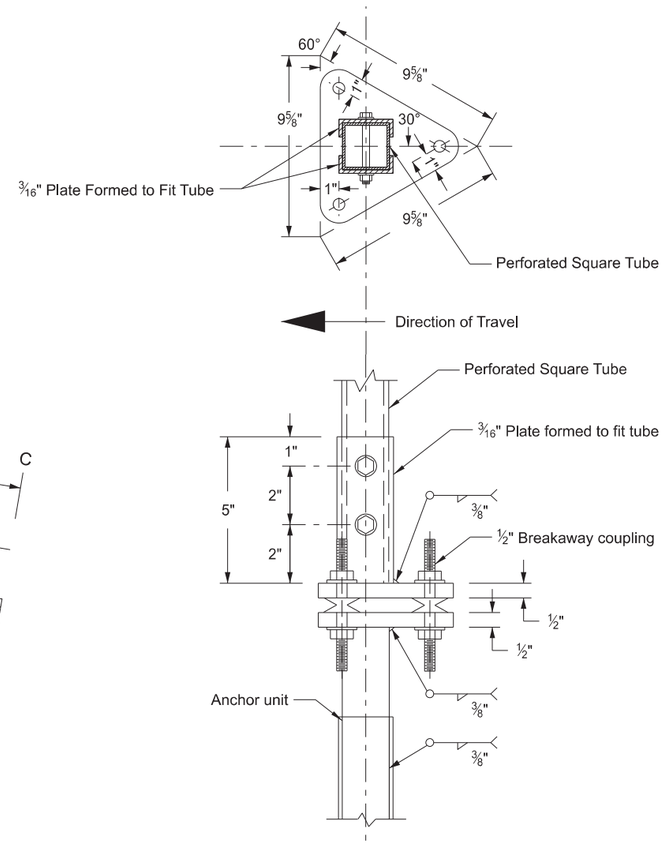




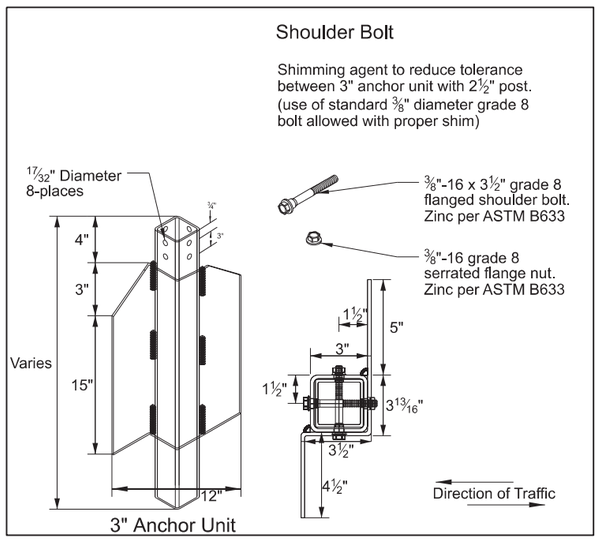
Section C-C

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

Breakaway Coupler System for Perforated Tubes



Base Plate with Breakaway Coupler



3" Anchor Unit

Notes:

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

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

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

(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-2013

REVISIONS

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

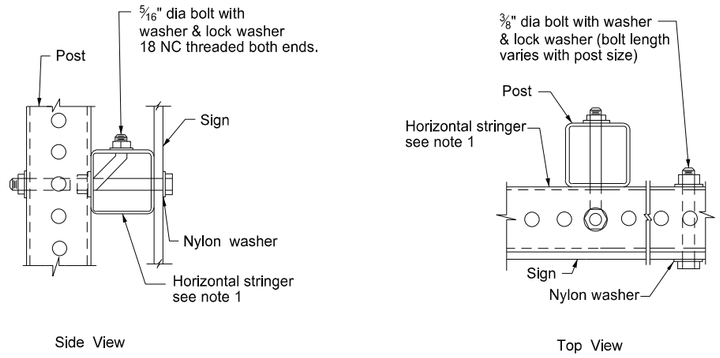
KIRK J. HOFFT REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

07/22/25

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

Mounting Details Perforated Tube

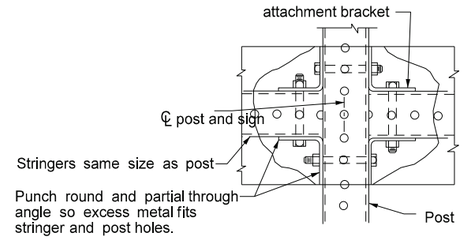
D-754-25



Side View

Top View

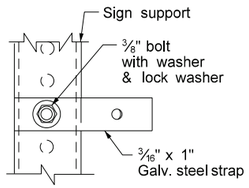
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



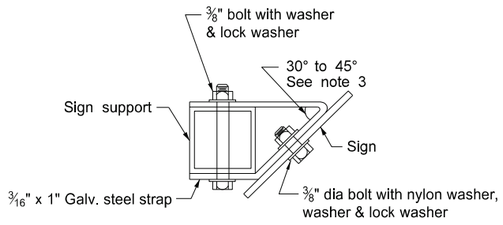
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

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

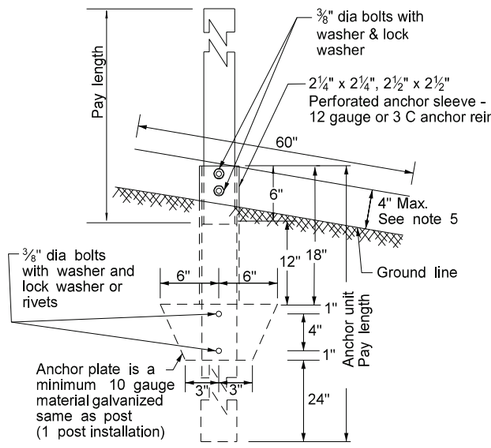


Side View



Top View

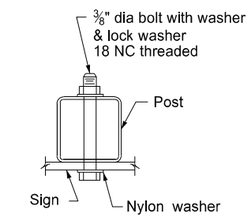
STRAP DETAIL



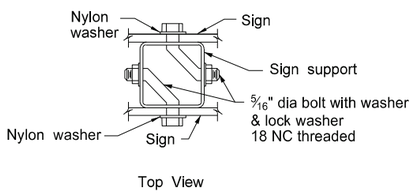
ANCHOR UNIT AND POST ASSEMBLY

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

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

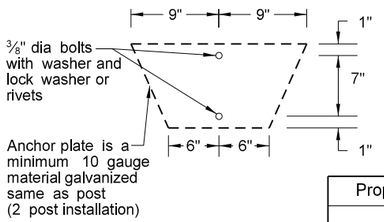


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. area $In.^2$	Section Modulus $In.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

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

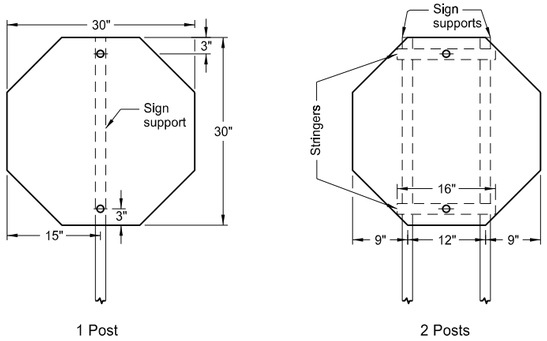
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

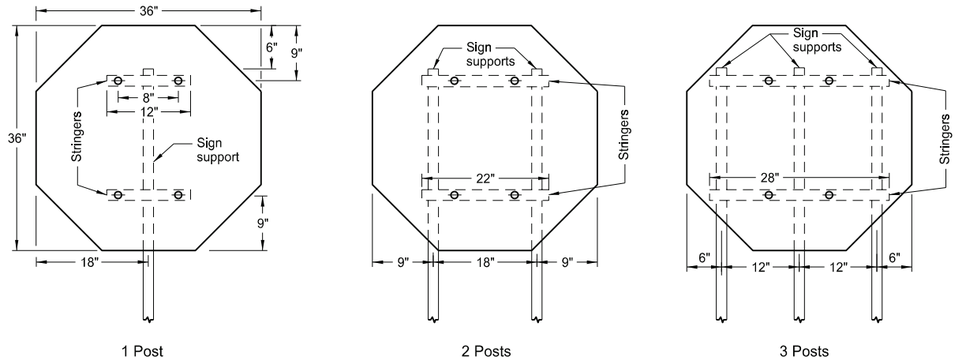
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



1 Post 2 Posts

Assembly No. 1

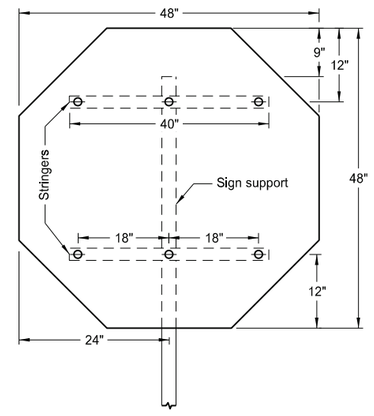


1 Post 2 Posts 3 Posts

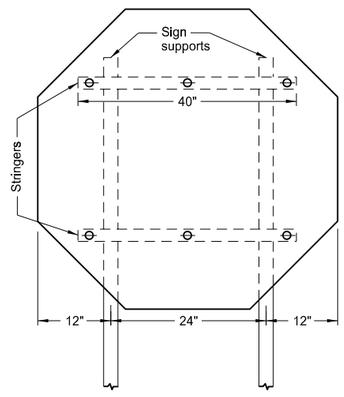
Assembly No. 2

Notes:

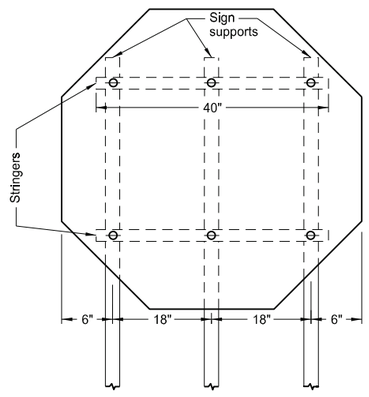
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

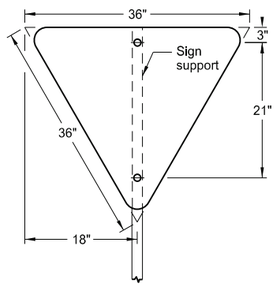


2 Posts

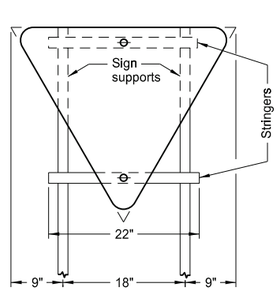


3 Posts

Assembly No. 3

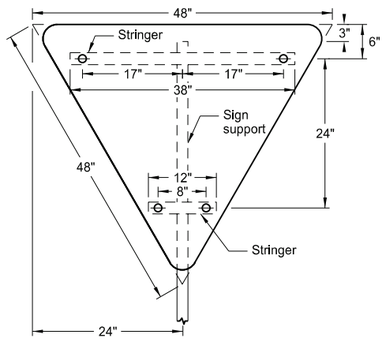


1 Post

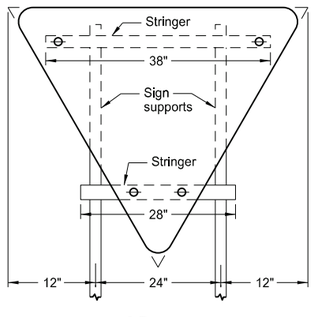


2 Posts

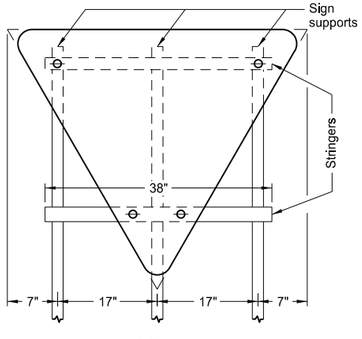
Assembly No. 4



1 Post



2 Posts



3 Posts

Assembly No. 5

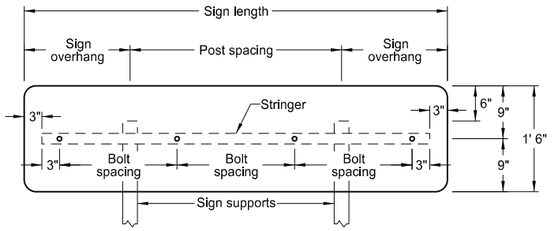
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19 8-05-24	Updated notes to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

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

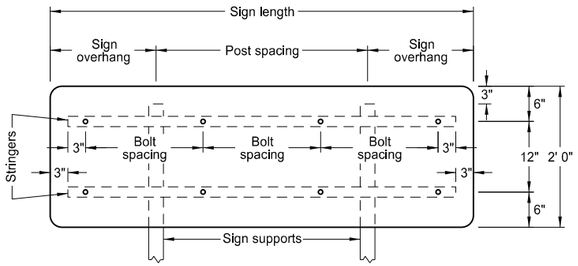
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

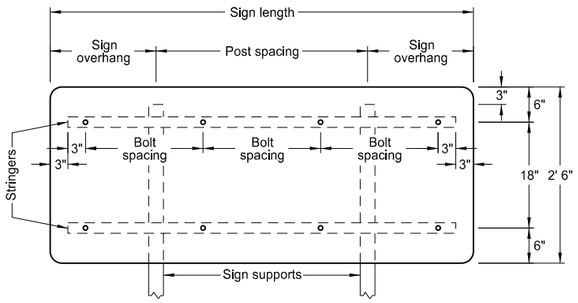
D-754-48



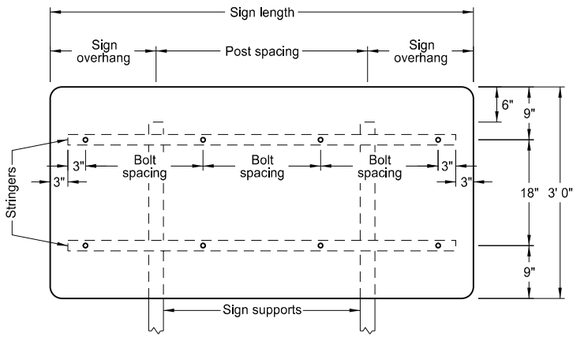
VARIES X 1'-6"



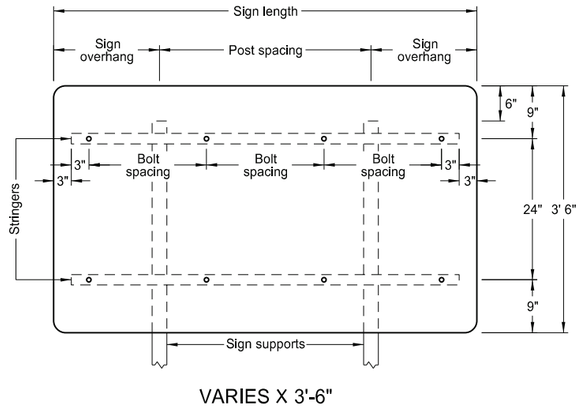
VARIES X 2'-0"



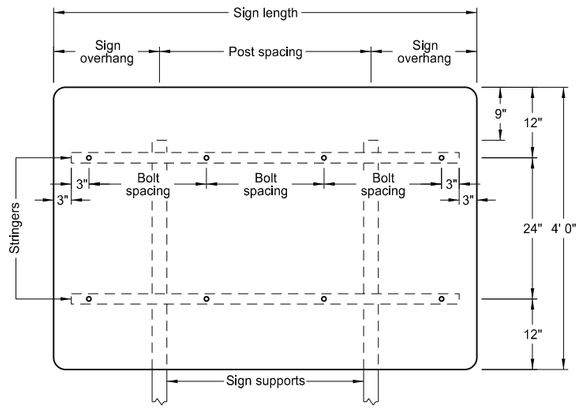
VARIES X 2'-6"



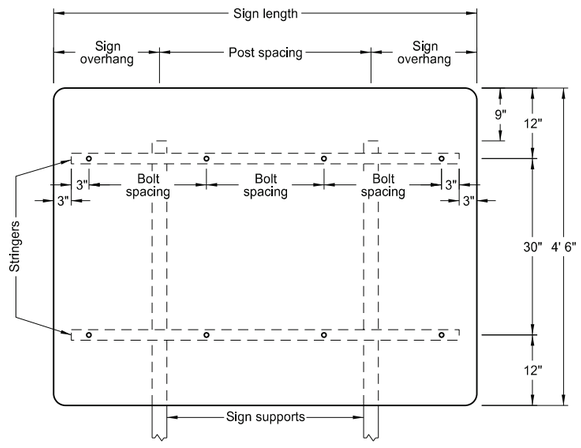
VARIES X 3'-0"



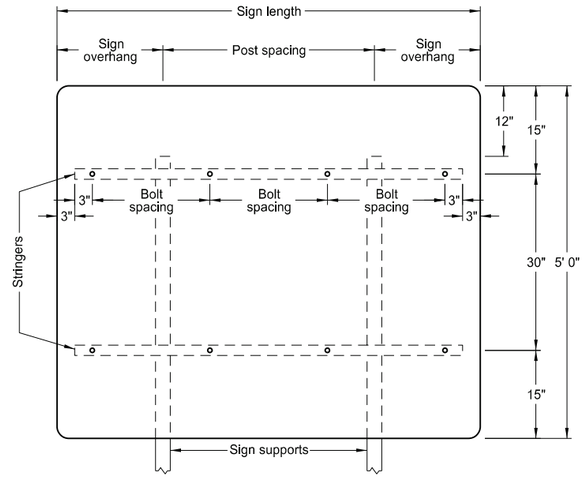
VARIES X 3'-6"



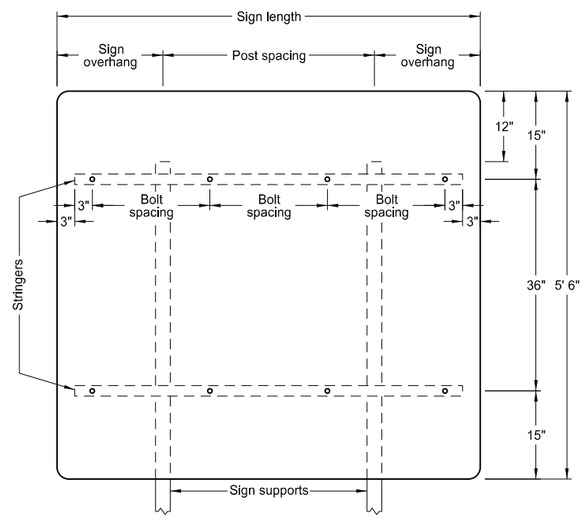
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

2 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	1'-0"	2'-0"	18"
4'-6"	1'-3"	2'-0"	21"
5'-0"	1'-0"	3'-0"	24"
5'-6"	1'-3"	3'-0"	18"
6'-0"	1'-6"	3'-0"	20"
6'-6"	1'-3"	4'-0"	22"
7'-0"	1'-6"	4'-0"	24"
7'-6"	1'-9"	4'-0"	2-20" & 2-19"
8'-0"	2'-0"	4'-0"	21"
8'-6"	1'-9"	5'-0"	2-22" & 2-23"
9'-0"	2'-0"	5'-0"	24"
9'-6"	1'-9"	6'-0"	4-20" & 1-22"
10'-0"	2'-0"	6'-0"	2-21" & 3-22"
10'-6"	2'-3"	6'-0"	4-23" & 1-22"
11'-0"	2'-6"	6'-0"	24"
11'-6"	2'-9"	6'-0"	21"
12'-0"	2'-0"	8'-0"	22"
12'-6"	2'-3"	8'-0"	23"
13'-0"	2'-6"	8'-0"	24"
13'-6"	2'-9"	8'-0"	3-22" & 4-21"
14'-0'	3'-0"	8'-0"	2-23" & 5-22"
14'-6"	3'-3"	8'-0"	6-23" & 1-24"
15'-0"	3'-6"	8'-0"	24"
15'-6"	2'-9"	10'-0"	6-22" & 2-21"
16'-0"	3'-0"	10'-0"	4-23" & 4-22"
16'-6"	3'-3"	10'-0"	6-23" & 2-24"
17'-0"	3'-6"	10'-0"	24"
17'-6"	3'-9"	10'-0"	22"
18'-0"	3'-0"	12'-0"	6-23" & 3-22"
18'-6"	3'-3"	12'-0"	6-23" & 3-24"
19'-0"	3'-6"	12'-0"	24"
19'-6"	3'-9"	12'-0"	8-22" & 2-23"
20'-0"	4'-0"	12'-0"	8-23" & 2-22"

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.
8-07-24	Electronic Stamp/Signature.

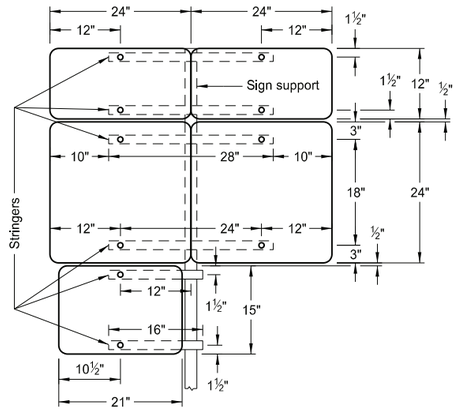
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

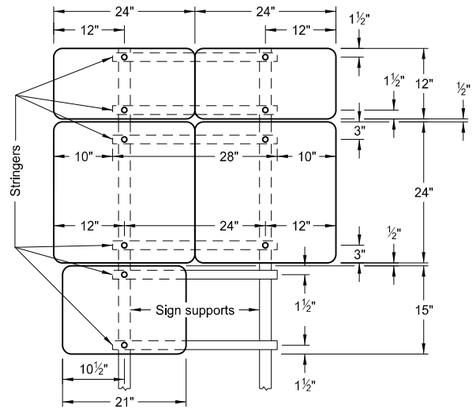
08/07/24

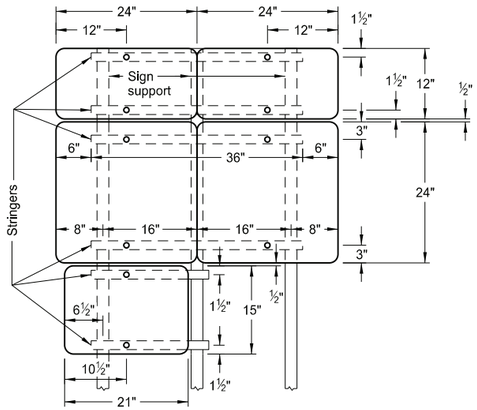
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

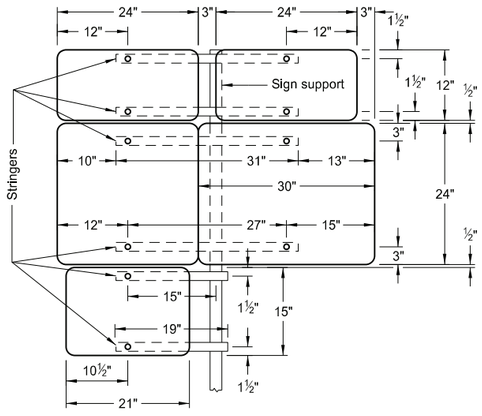
D-754-54

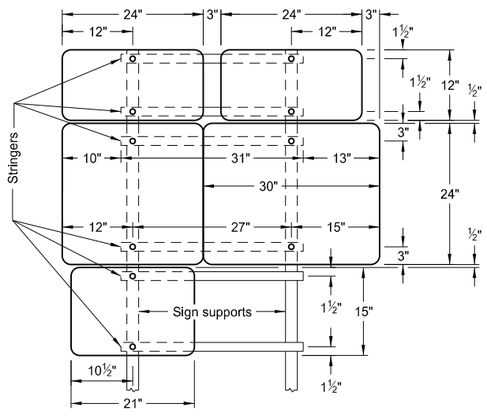


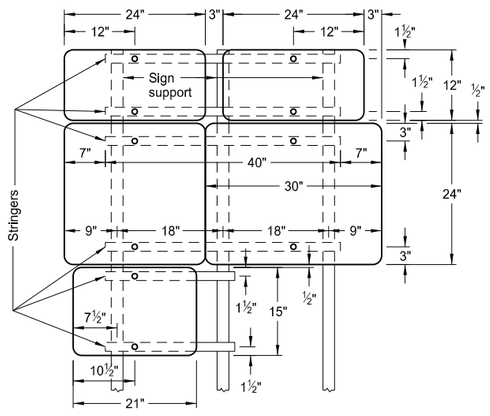




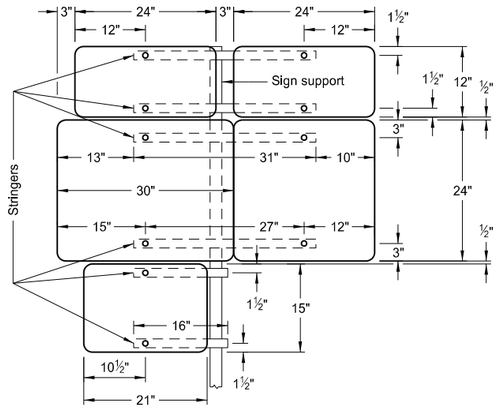
ASSEMBLY 383

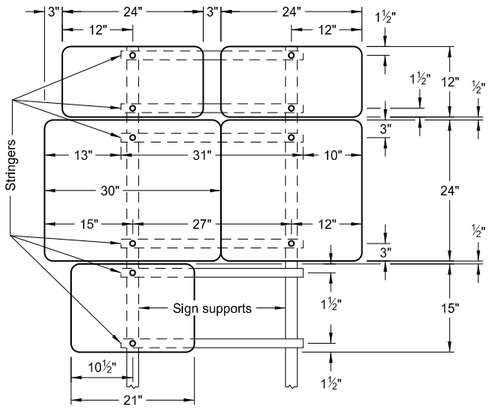


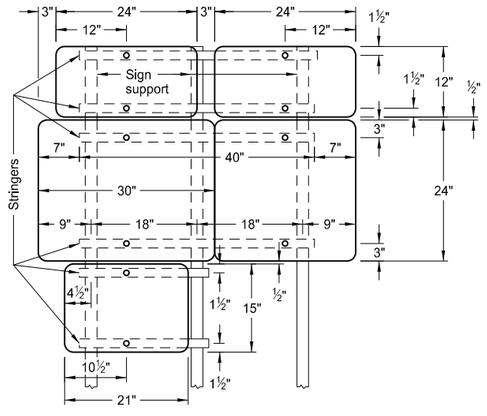




ASSEMBLY 384







ASSEMBLY 385

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.
8-07-24	Electronic Stamp/Signature.

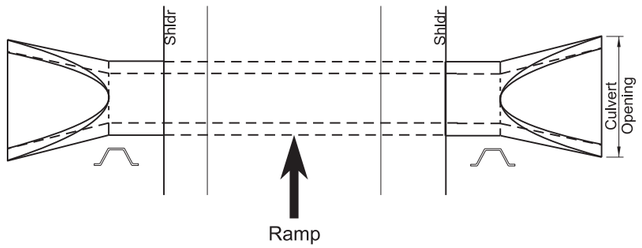
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

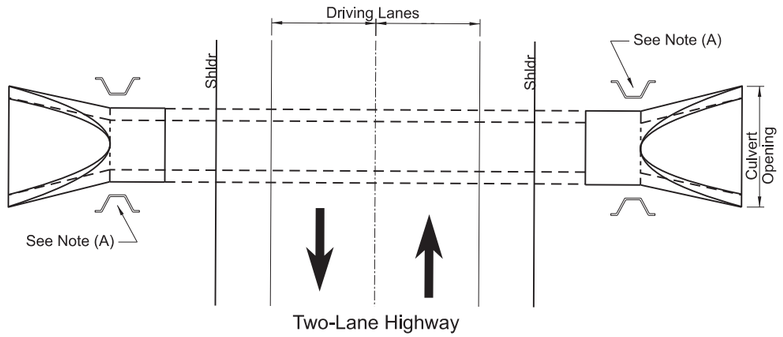
08/07/24

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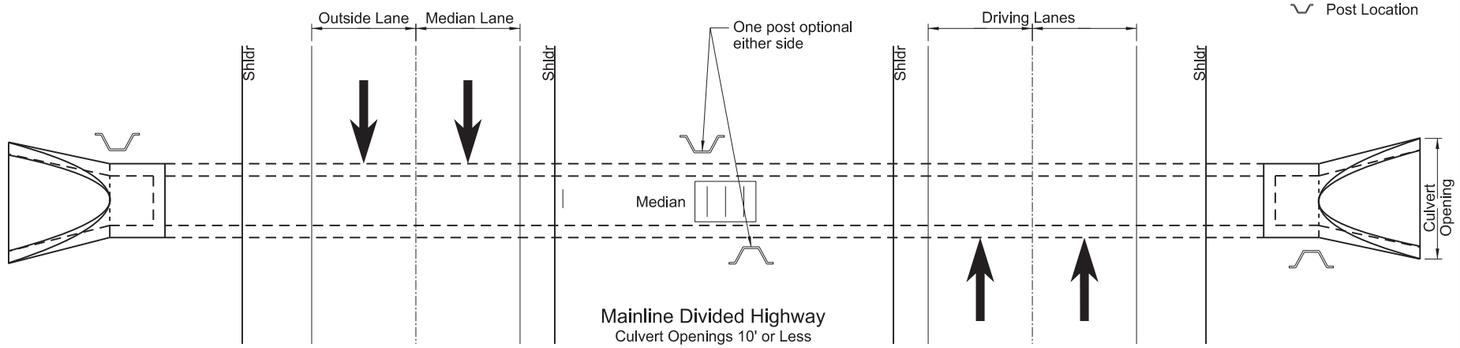
OBJECT MARKERS - CULVERTS

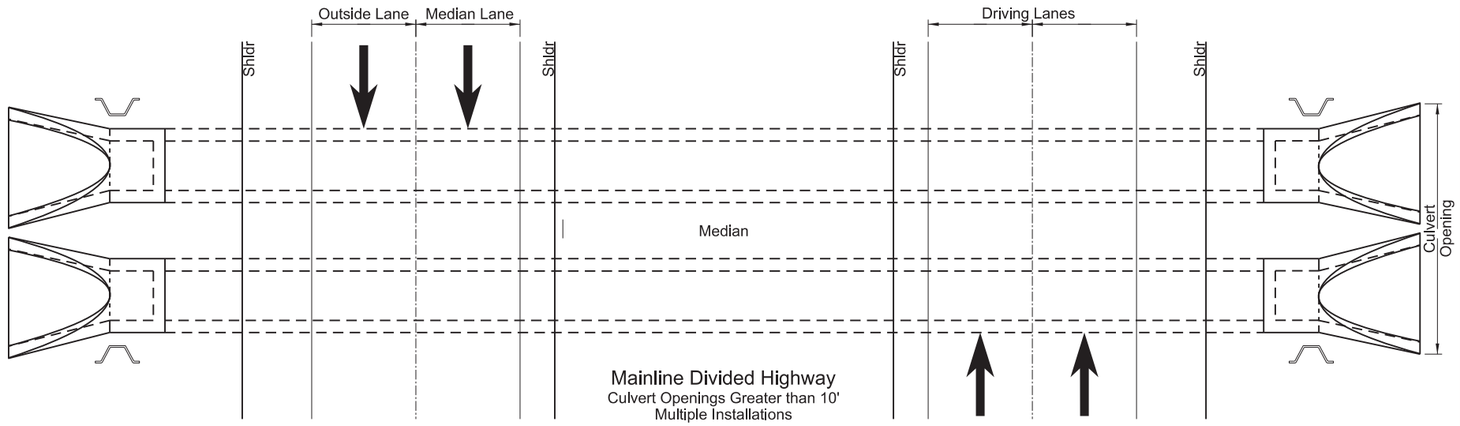
D-754-83

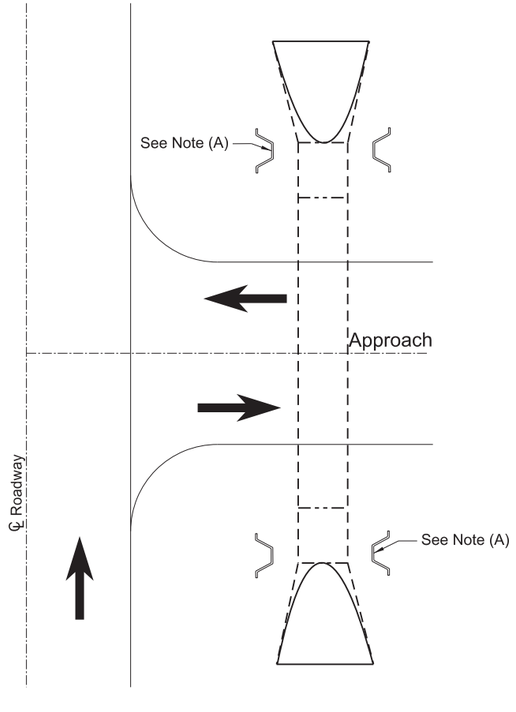


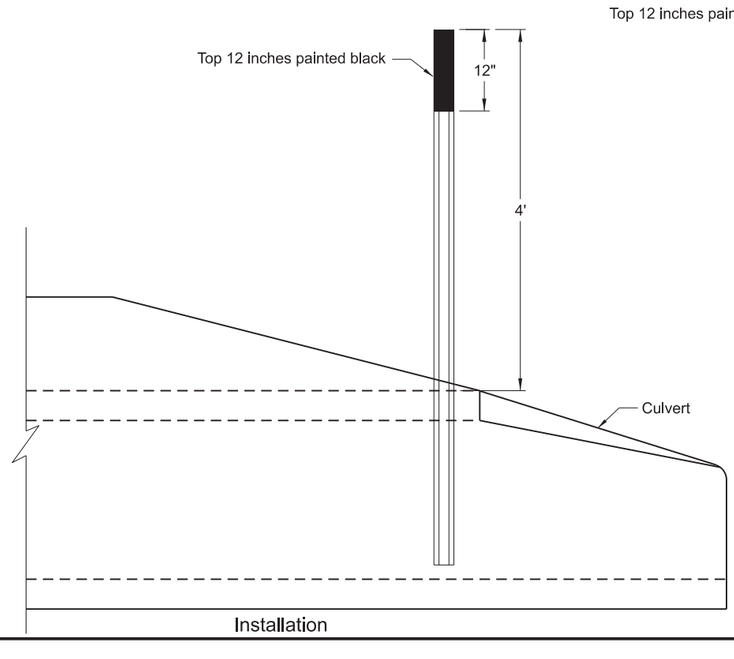


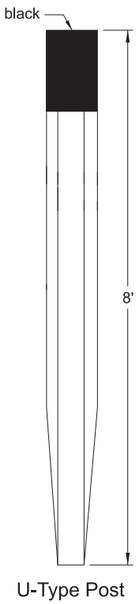
(A) Install additional marker where multiple pipe installations have a width greater than 10'.





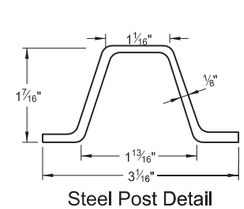




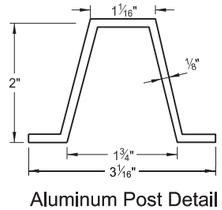


Note:

Mark each end of culverts within the right-of-way with a post. Install posts in front of culvert in direction of travel along the side of culvert and one foot from culvert opening unless shown otherwise in plans.



Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
3-13-25	Added Approach Pipe Detail.

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

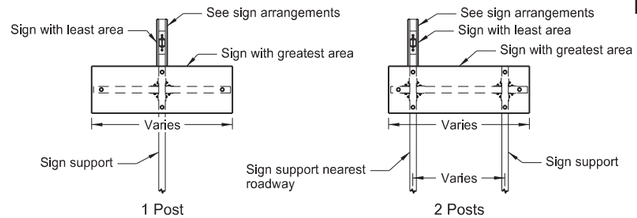
03/13/25

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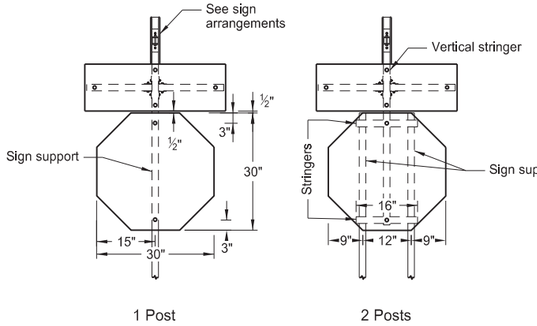
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

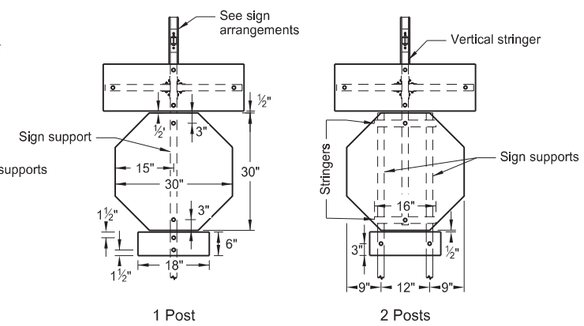
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



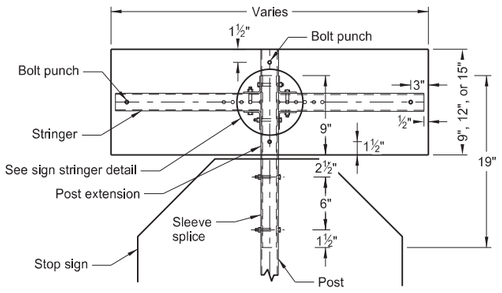
Special Assembly 1 (A, B, C, D or E)



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

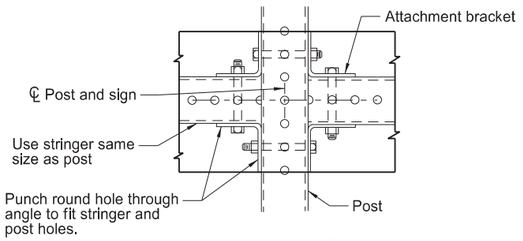


Special Assembly 3 (A, B, C, D or E)



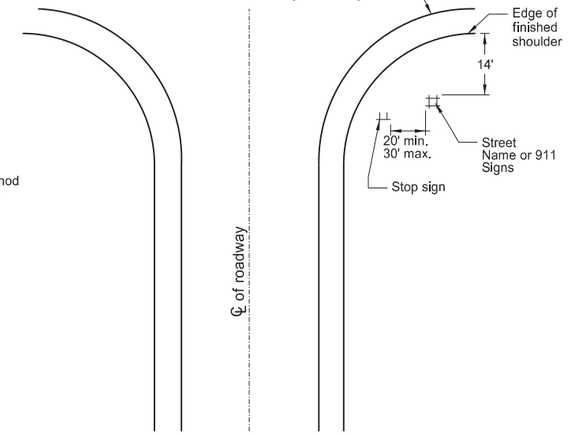
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



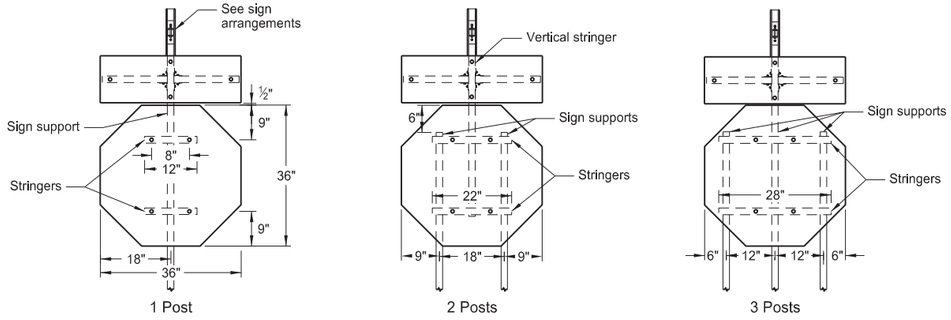
Sign Stringer Detail

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

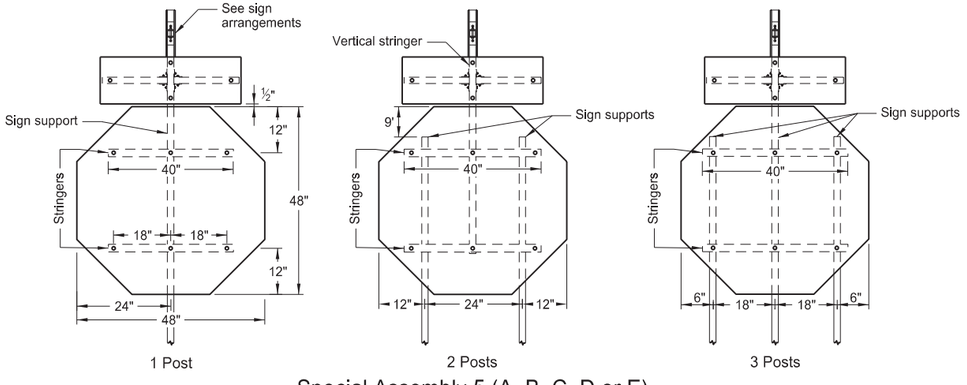


Intersection Layout

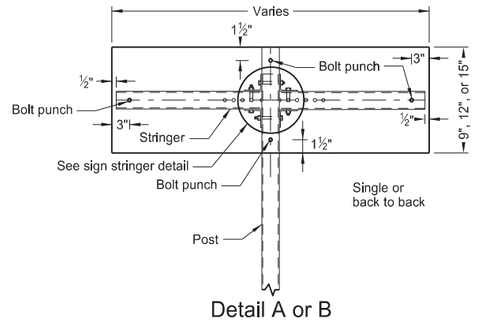
Note: Use layout for street name signs or 911 signs with Special Assembly 1 .



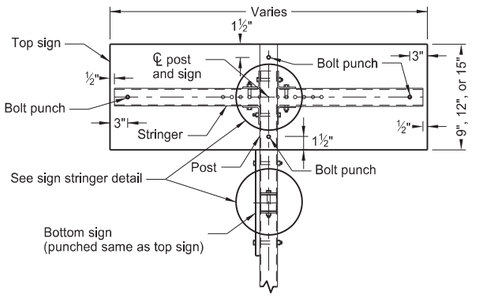
Special Assembly 4 (A, B, C, D or E)



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

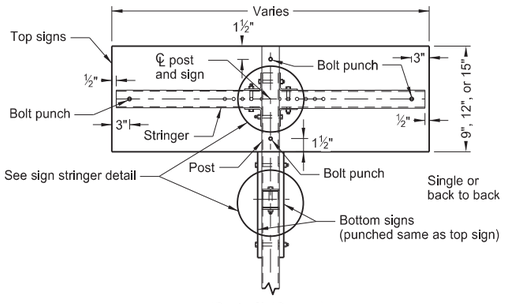


Detail A or B



Detail C

Sign Arrangements



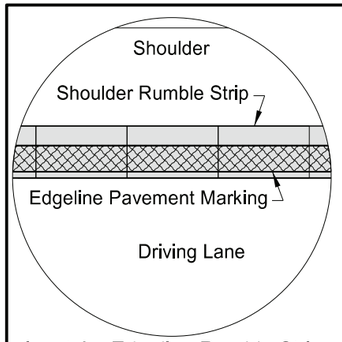
Detail D or E

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

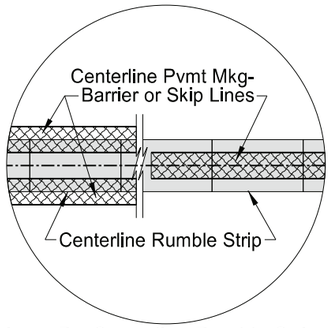
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/08/24

RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')

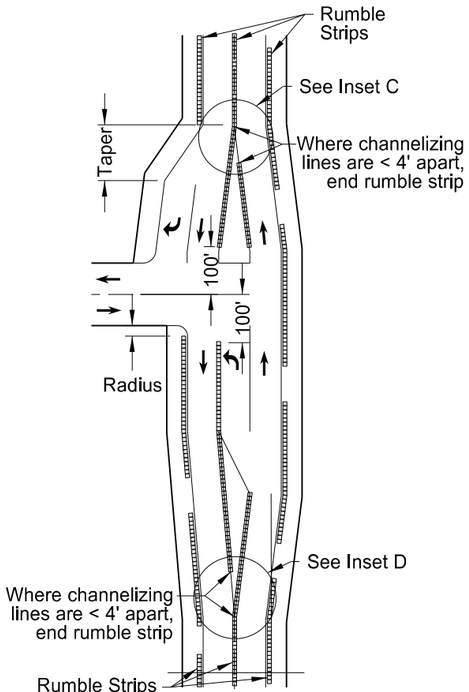
D-760-4



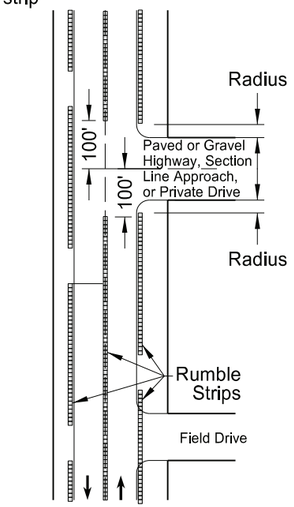
Inset A - Edgeline Rumble Strip
(Layout for opposite shoulder reversed)



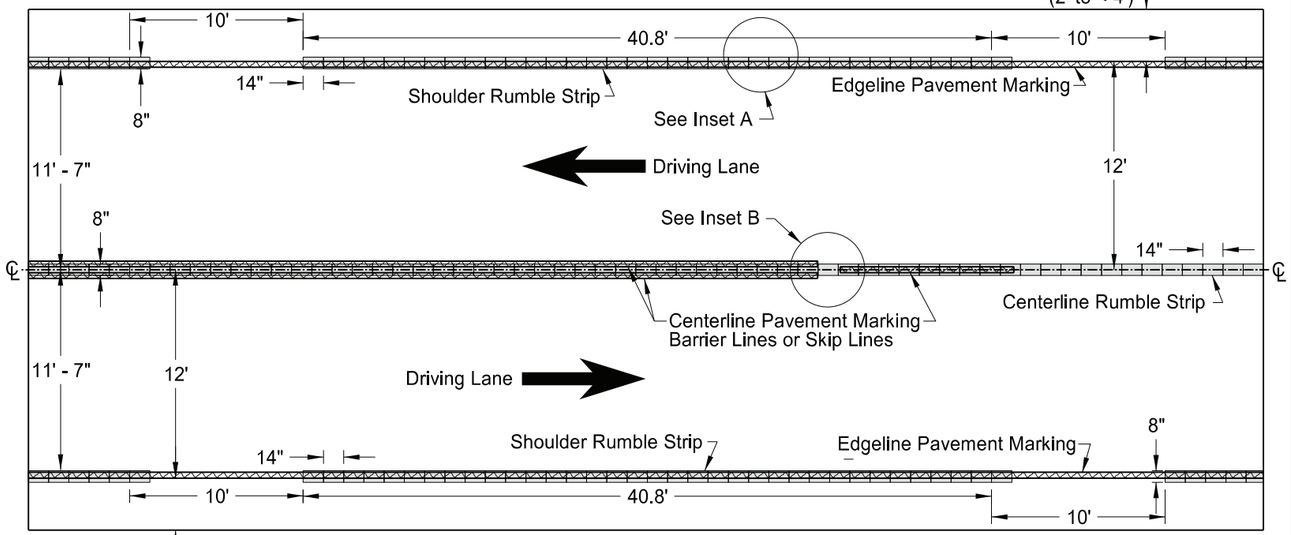
Inset B - Centerline Rumble Strip



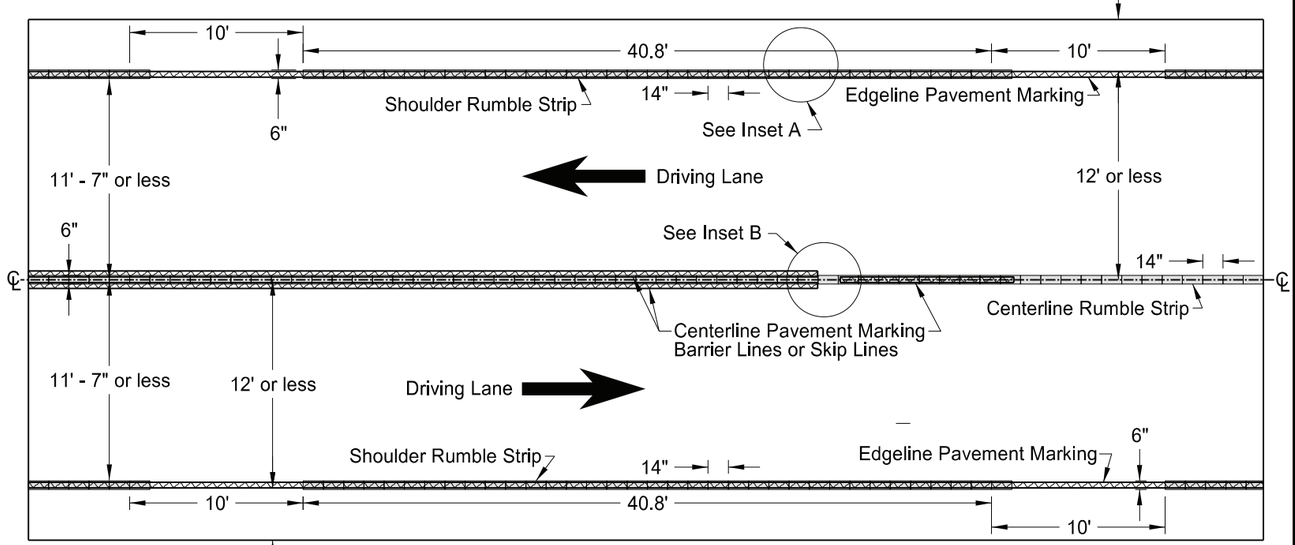
Turn Lane
(Right & Left)



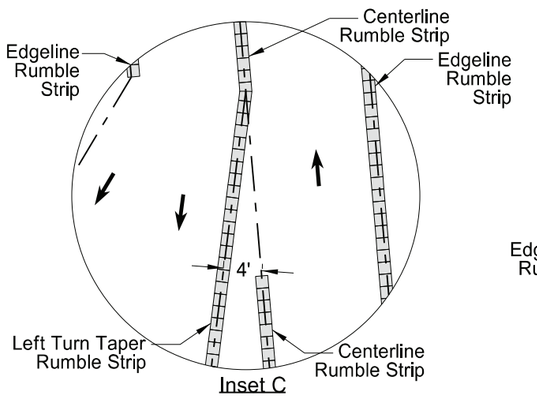
Entrance Roadways



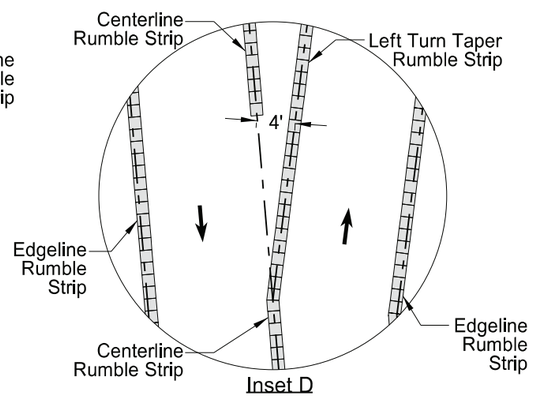
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



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



Inset C



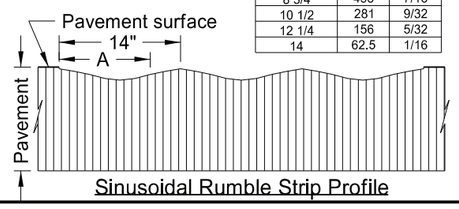
Inset D

NOTES:
1) Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of paved or gravel highways, section line approaches, or private drives.

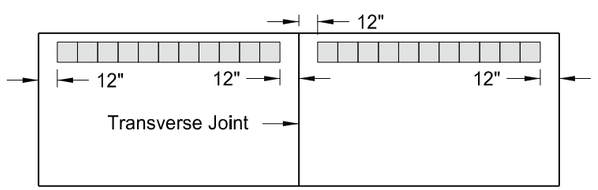
2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.

3) No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".

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



Sinusoidal Rumble Strip Profile



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

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

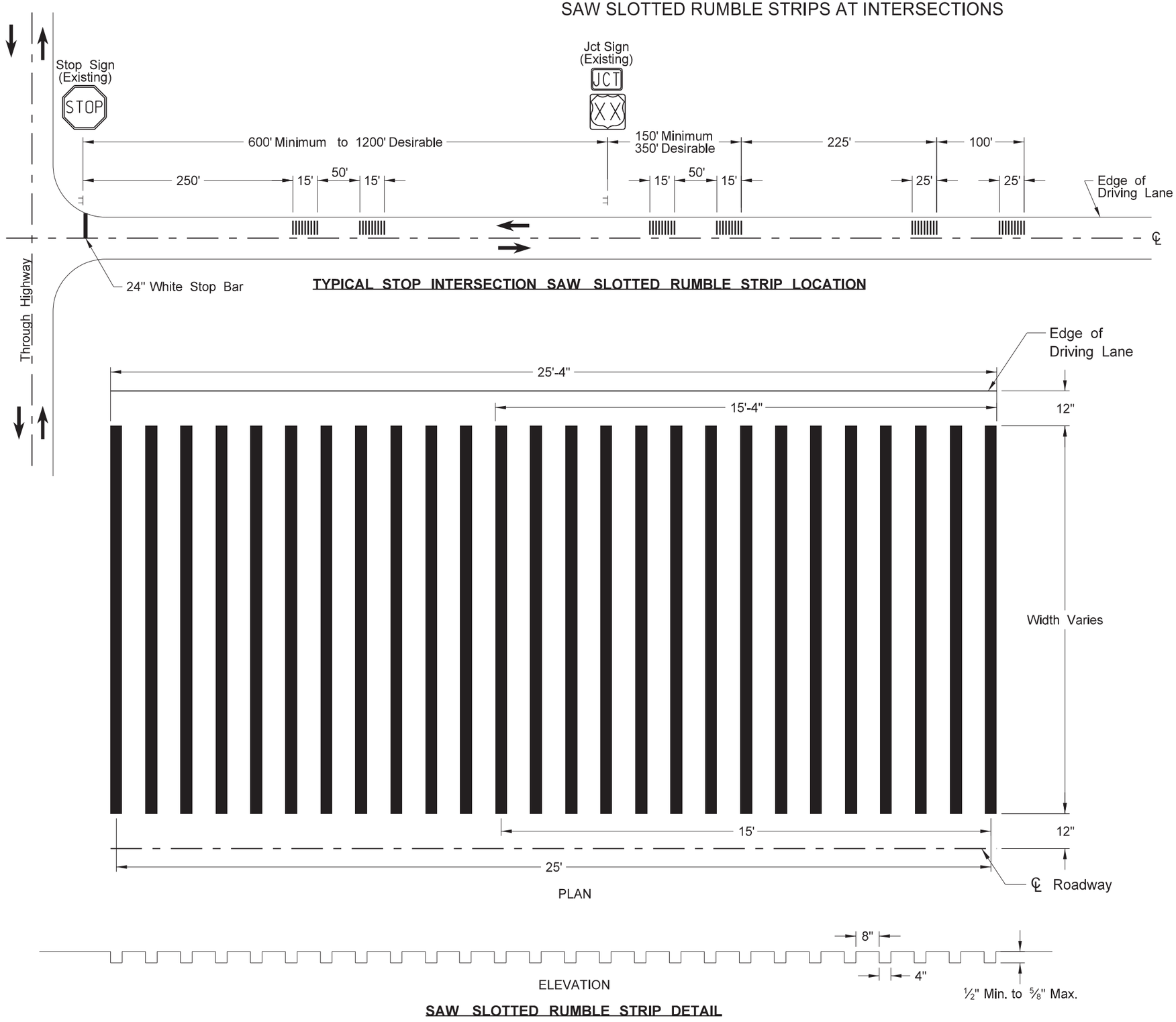
KIRK J. HOFFT
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

05/26/23

DocuSign Envelope ID: C174DEDF-0A0D-4A6A-B116-79082F516368

SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS

D-760-5



SAW SLOTTED RUMBLE STRIP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-08-11	Revised Notes and D-760-5.
7-07-14	Deleted Notes.
8-27-19	New Design Engr PE Stamp.
8-09-24	Electronic Stamp/Signature.

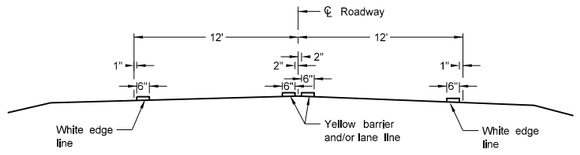
KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/09/24

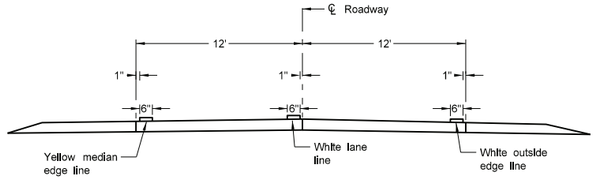
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PAVEMENT MARKING

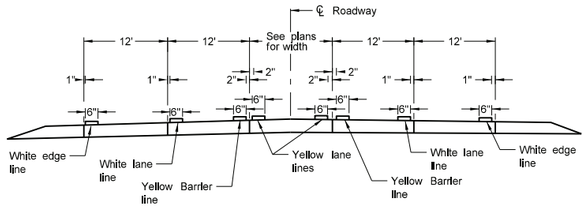
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

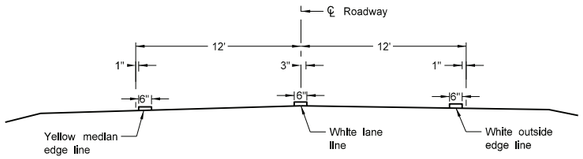
NOTES:

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

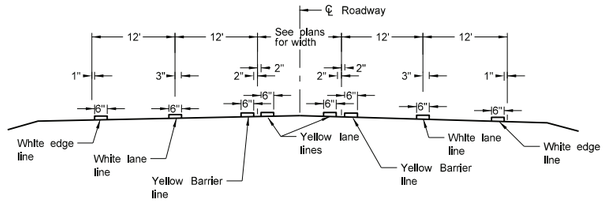
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

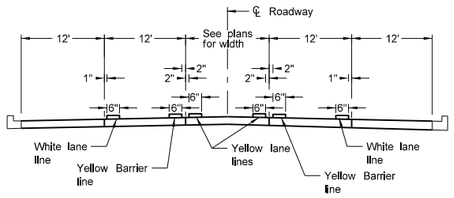
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



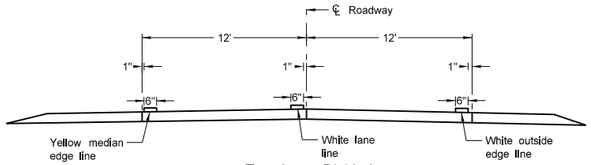
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



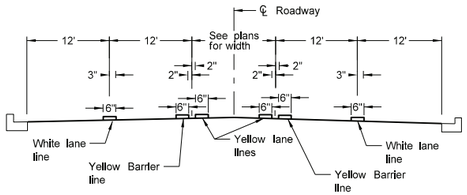
RURAL FIVE LANE ROADWAY
Asphalt Section



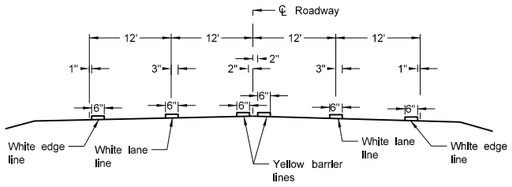
URBAN FIVE LANE SECTION
Concrete Section



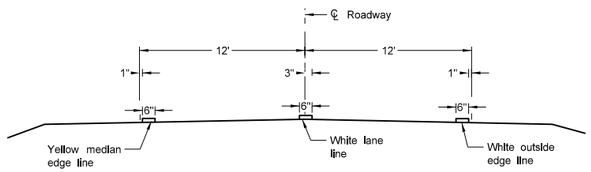
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



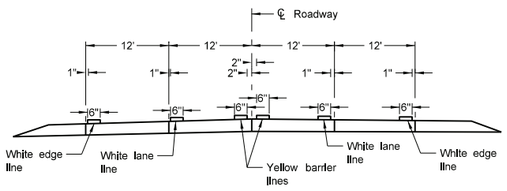
URBAN FIVE LANE SECTION
Asphalt Section



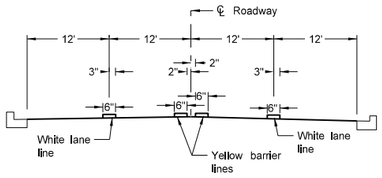
RURAL FOUR LANE ROADWAY
Asphalt Section



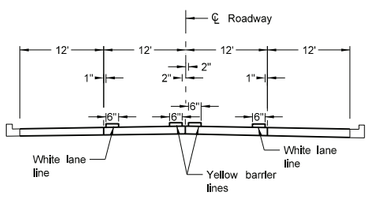
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



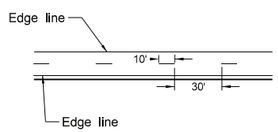
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

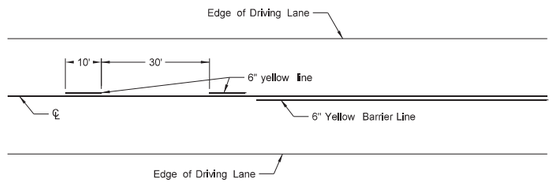
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

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REGISTERED
PROFESSIONAL
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07/09/24
ENGINEER
NORTH DAKOTA

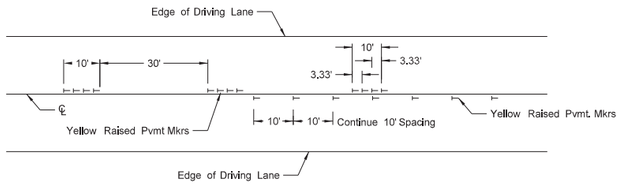
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SHORT-TERM PAVEMENT MARKING

D-762-11

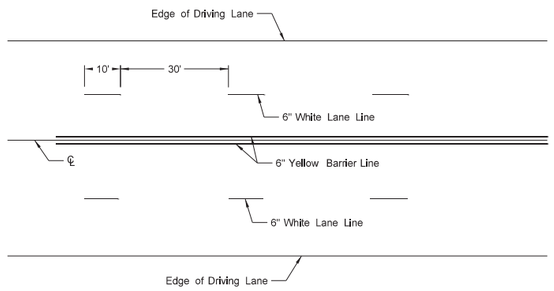


Painted or Tape Lines

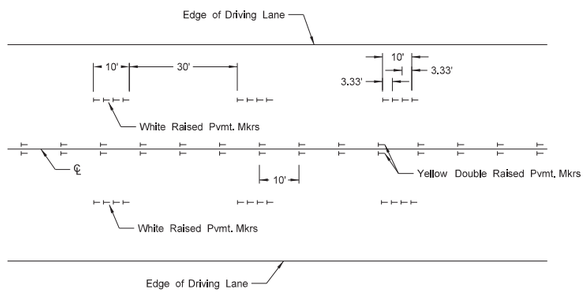


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

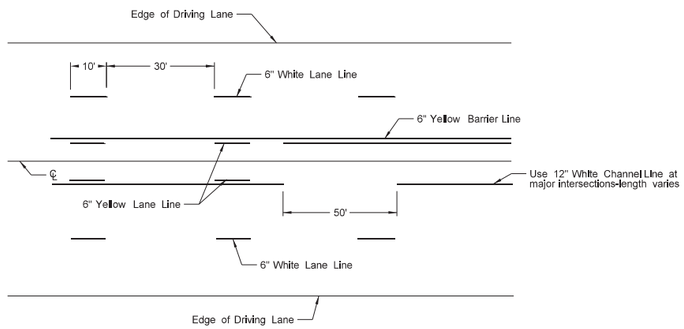


Painted or Tape Lines

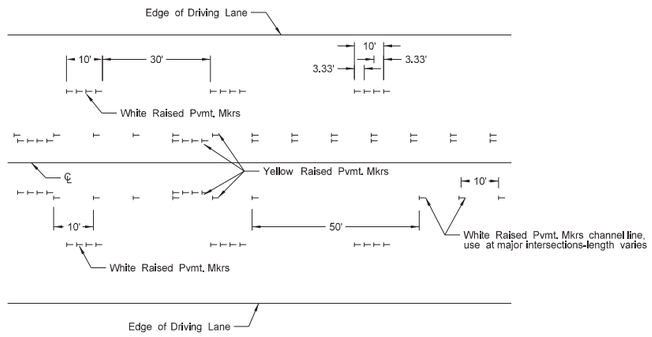


Raised Pavement Markers

FOUR LANE ROADWAY

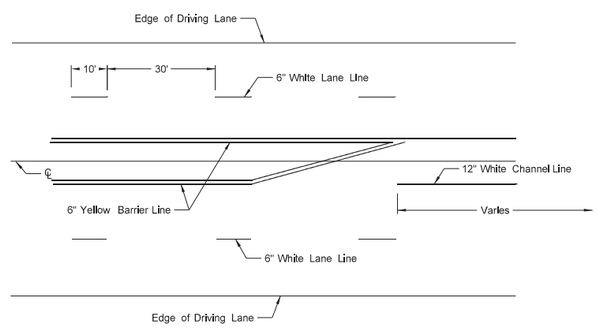


Painted or Tape Lines

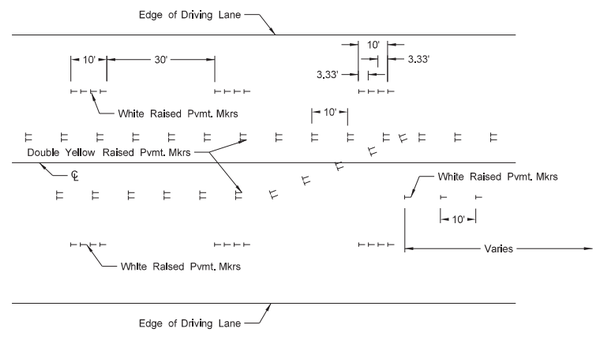


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

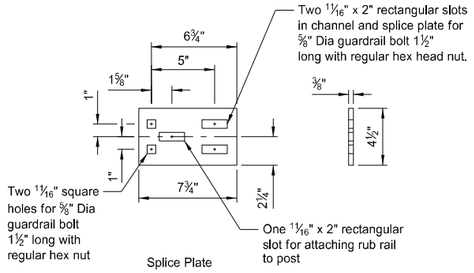
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt marking width.

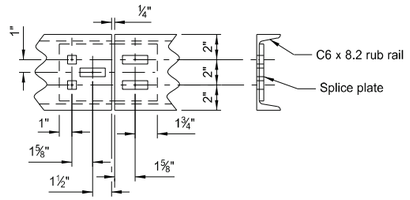
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01/17/24
ENGINEER
NORTH DAKOTA

W-BEAM GUARDRAIL GENERAL DETAILS

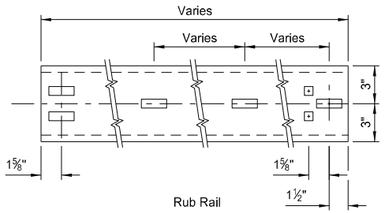
D-764-1



Splice Plate

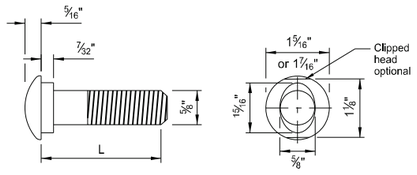


Splice Detail

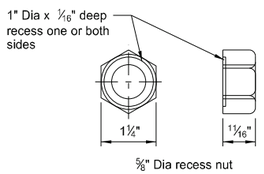


Rub Rail

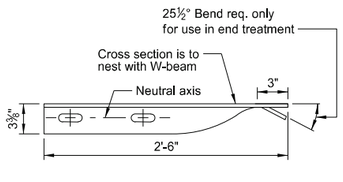
C6x8 RUB RAIL AND SPLICE PLATE

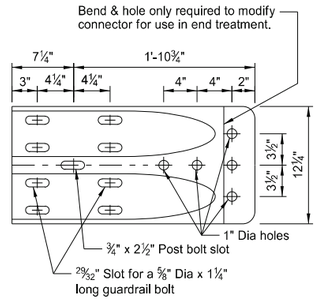


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length

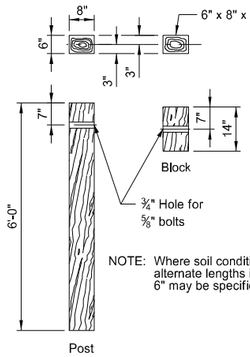


5/8" GUARDRAIL BOLT & RECESS NUT



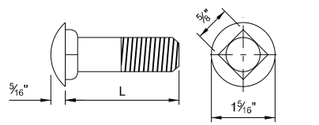


W BEAM TERMINAL CONNECTOR



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

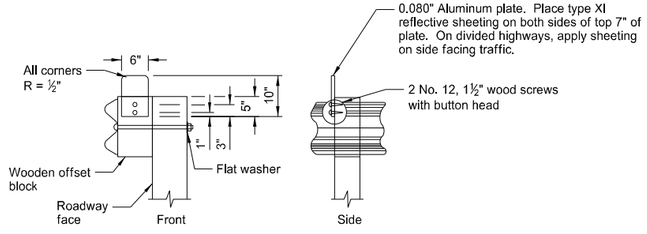
6"x8" TIMBER POST & BLOCK



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

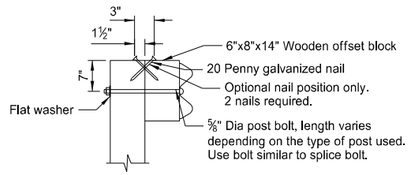


5/8" CARRIAGE BOLT & NUT

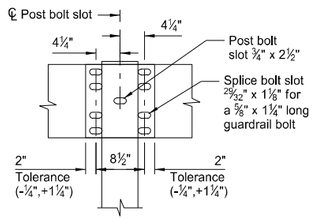


REFLECTORIZED PLATE DETAIL

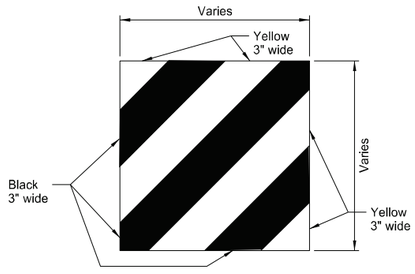
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



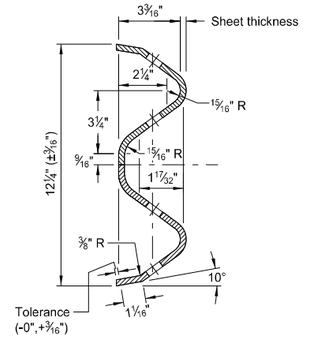
TYPICAL POST ATTACHMENT DETAIL



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

1. Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
3. Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
4. Guardrail installation height tolerance = - ¼" , + 1".
5. Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1½" is acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-11-13

REVISIONS

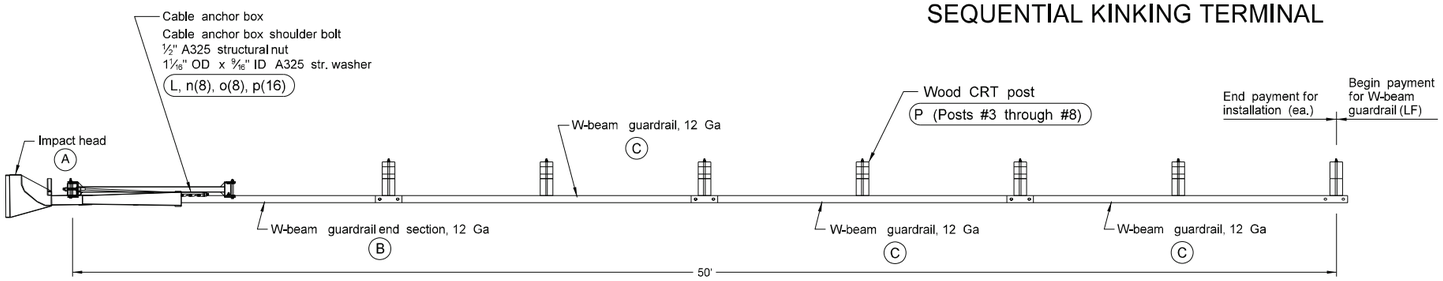
DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

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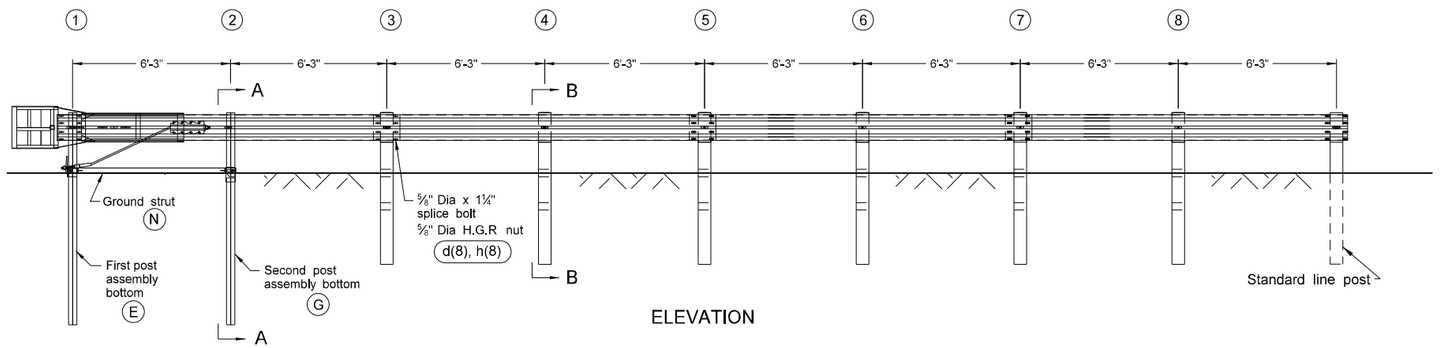
12 02 2020

SEQUENTIAL KINKING TERMINAL

D-764-5



PLAN

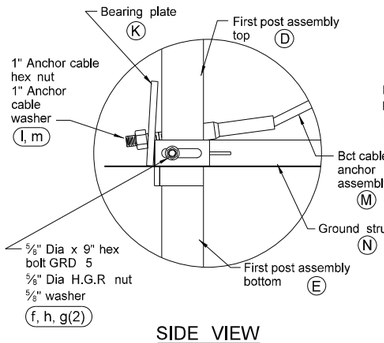


ELEVATION

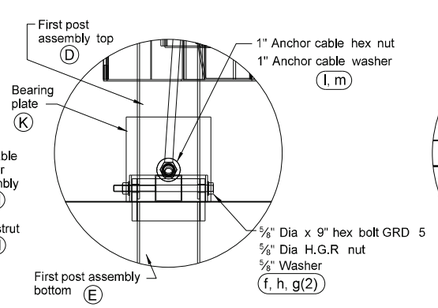
ITEM	QTY	BILL OF MATERIALS
A	1	IMPACT HEAD
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga
C	3	W-BEAM GUARDRAIL, 12 Ga
D	1	FIRST POST ASSEMBLY TOP
E	1	FIRST POST ASSEMBLY BOTTOM
F	1	SECOND POST ASSEMBLY TOP
G	1	SECOND POST ASSEMBLY BOTTOM
K	1	BEARING PLATE
L	1	CABLE ANCHOR BOX
M	1	BCT CABLE ANCHOR ASSEMBLY
N	1	GROUND STRUT HINGED POST
P	6	WOOD CRT POST
R	6	TIMBER BLOCKOUT/RCY EQUIVALENT
		HARDWARE
a	2	1/4 " x 4" HEX BOLT Grade 5
b	4	¼" WASHER
c	2	¼" HEX NUT
d	25	⅝" Dia X 1¼" SPLICE BOLT, POST #2
e	6	⅝" Dia X 18" H.G.R. BOLT (POSTS 3 THRU 8)
f	1	⅝" Dia X 9" HEX BOLT GRD 5
g	8	⅝" WASHER
h	32	⅝" Dia H.G.R. NUT
j	1	¾" Dia X 8½" HEX BOLT GRD A449
k	1	¾" Dia HEX NUT
l	2	1" ANCHOR CABLE HEX NUT
m	2	1" ANCHOR CABLE WASHER
n	8	GROUND STRUT HINGED POST
o	8	½" A325 STRUCTURAL NUT
p	16	1⅛" OD X ⅜" ID A325 STR. WASHER

GENERAL NOTES:

1. Use breakaway posts with the SKT.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Flare the SKT at a rate of up to 25:1 to prevent shoulder encroachment by the impact head.
4. Grade site as needed to prevent lower sections of the posts from protruding more than 4" above ground (measured along a 5' cord).
5. Drive the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
6. When rock is encountered during excavation, use a 10" diameter post hole, 20" into the rock surface, if approved by the engineer. Place granular material in the bottom of the hole, approximately 2½" deep to provide drainage. Field cut posts 1 & 2 to length, place in the hole, and backfill with adequately compacted material excavated from the hole.
7. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
8. "Toe nail" the wood blockouts on post #3 through post #8 with two 20 penny galvanized nails in each rectangular post, to prevent them from turning when the wood shrinks.

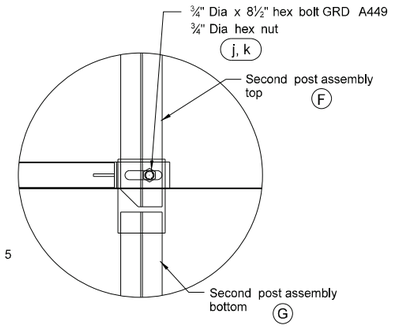


SIDE VIEW

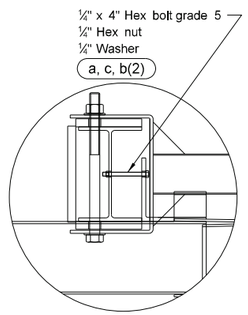


FRONT VIEW

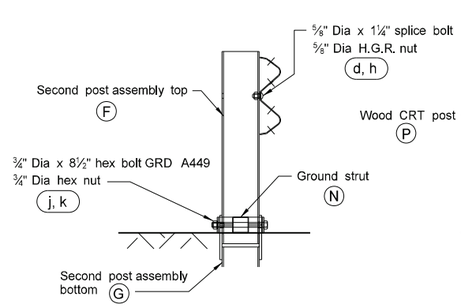
POST #1 CONNECTION DETAILS



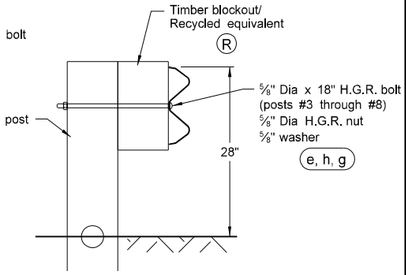
SIDE VIEW DETAIL OF POST #2



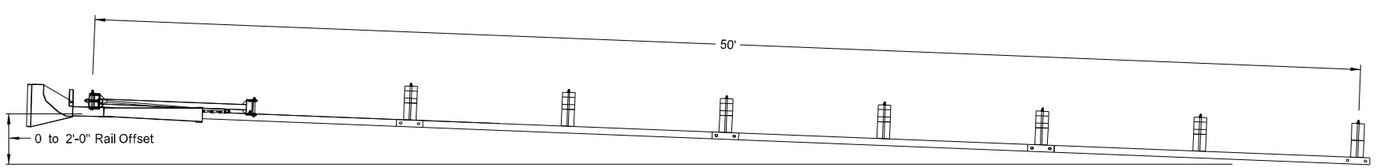
IMPACT HEAD CONNECTION DETAIL



SECTION A-A
Post #2



SECTION B-B
Posts #3 through #8



FLARED INSTALLATION
25:1 maximum flare rate

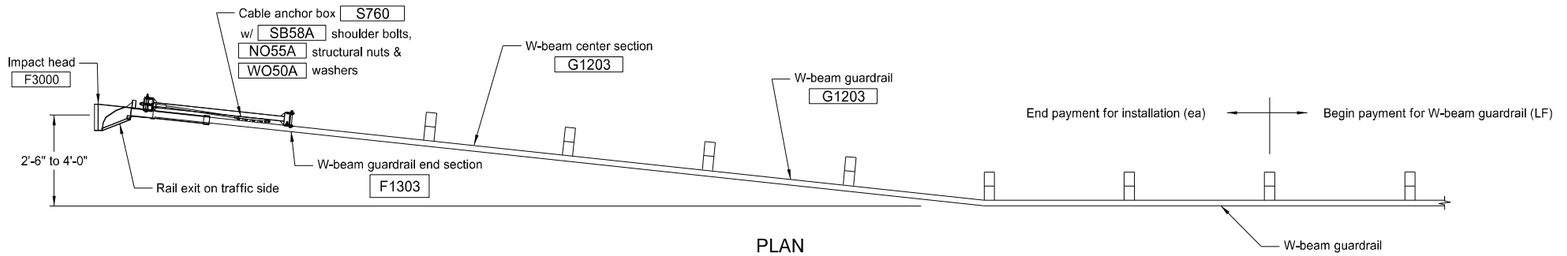
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

KIRK J. HOFF
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ENGINEER
NORTH DAKOTA

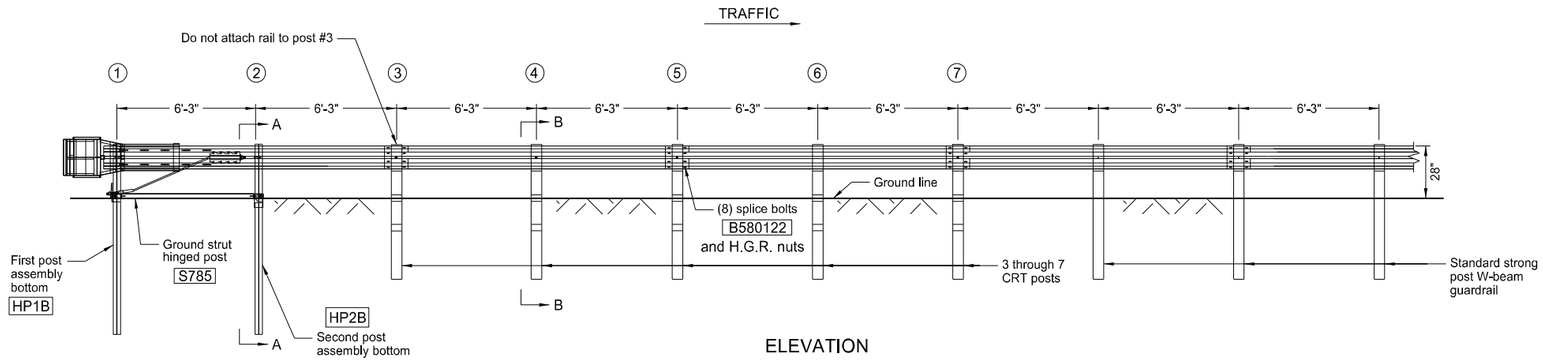
12 02 2020

FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

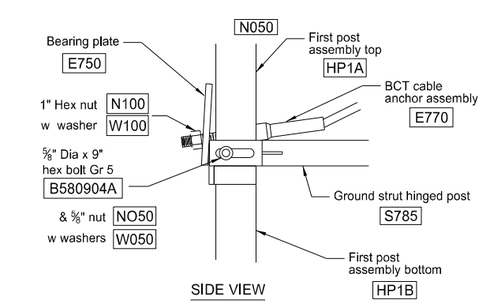


ELEVATION

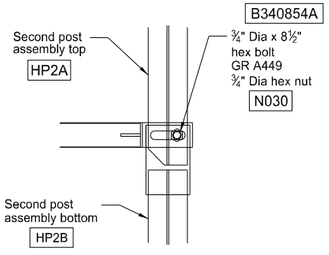
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT OR RECYCLED EQUIVALENT
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
		HARDWARE
B140404	2	¼" Dia x 4" HEX BOLT
WO14	4	¼" WASHER
N014	2	¼" HEX NUT
B580122	17	⅝" Dia x 1¼" SPLICE BOLT
B581802	4	⅝ Dia x 10" H.G.R. BOLT (POSTS 3 THRU 6)
B580904A	1	⅝" Dia x 9" HEX BOLT GR 5
W050	5	⅝" WASHER
N050	22	⅝" Dia H.G.R. NUT
B340854A	1	¾" Dia x 8½" HEX BOLT GR A449
NO30	1	¾" Dia HEX NUT
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	½" A325 STRUCTURAL NUT
W050A	16	1 1/16" OD x 3/16" ID A325 STR. WASHER

GENERAL NOTES

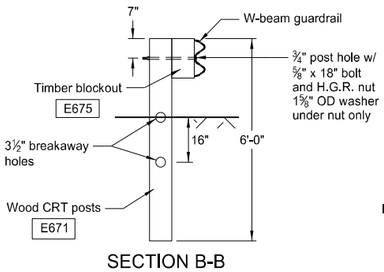
1. Use wood posts with the Flared Energy Absorbing Terminal except posts #1 and #2.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Grade site as needed to prevent lower sections of the posts from protruding more than 4 inches above the ground (measured along a 60 inch cord).
4. Drive the lower section without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
5. When rock is encountered during excavation, use a 12" diameter post hole 20" into the rock surface, if approved by the Engineer. Place granular material in the bottom of hole approximately 2½" deep to provide drainage. Field cut soil tubes to length, place in hole, and back fill with adequately compacted material excavated from hole.
6. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
7. "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails in each post to prevent them from turning when the wood shrinks.
8. Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, flare the Flared Energy Absorbing Terminal at the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, turn the Flared Energy Absorbing Terminal parallel to the roadway.



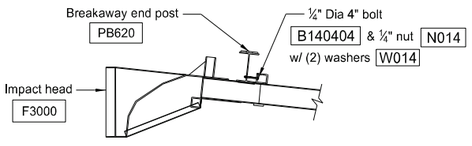
SIDE VIEW



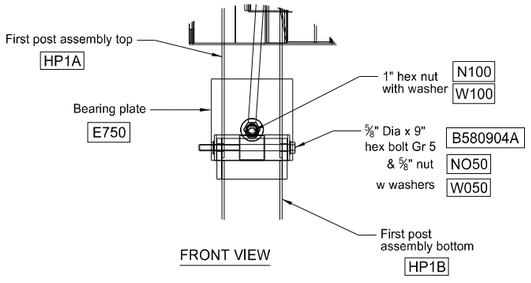
SIDE VIEW DETAIL OF POST #2



SECTION B-B
POST 3 THRU 7

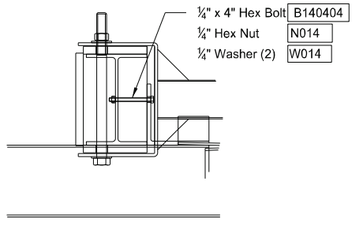


IMPACT HEAD CONNECTING DETAIL

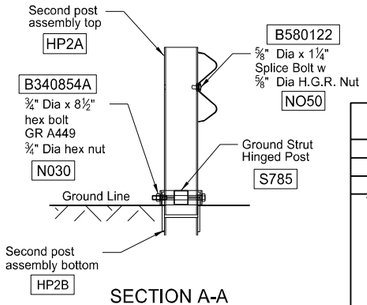


FRONT VIEW

POST #1 CONNECTION DETAILS



IMPACT HEAD CONNECTION DETAIL



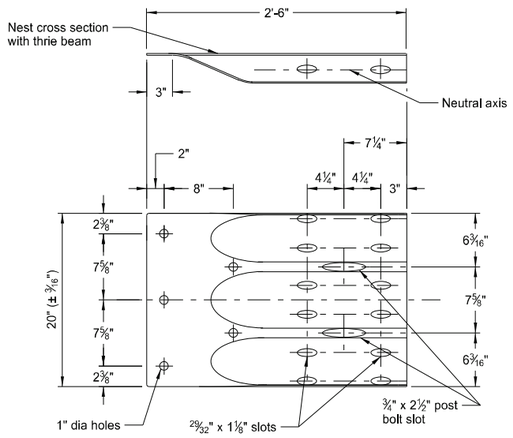
SECTION A-A
at Post #2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Update notes to active voice.

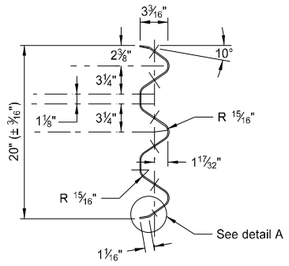
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

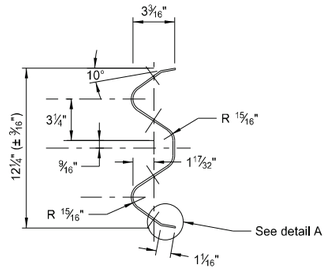
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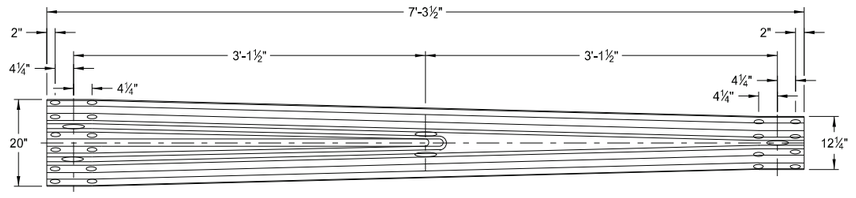
THRIE BEAM TERMINAL CONNECTOR



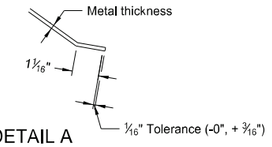
THRIE BEAM END VIEW



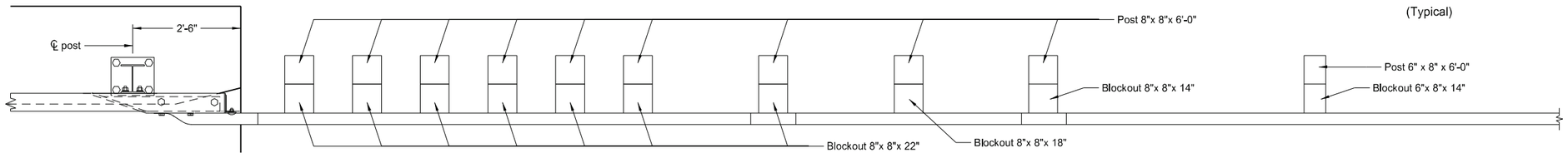
W-BEAM END VIEW



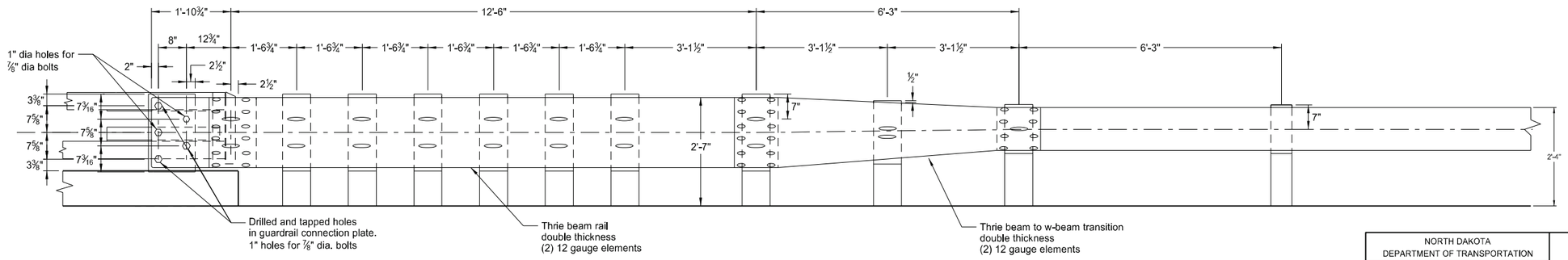
THRIE BEAM TO W-BEAM TRANSITION SECTION



DETAIL A
(Typical)



PLAN



ELEVATION

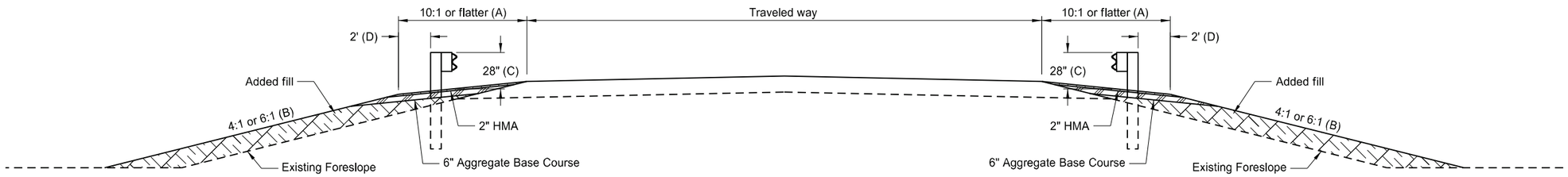
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12/02/20	Updated text to active voice.

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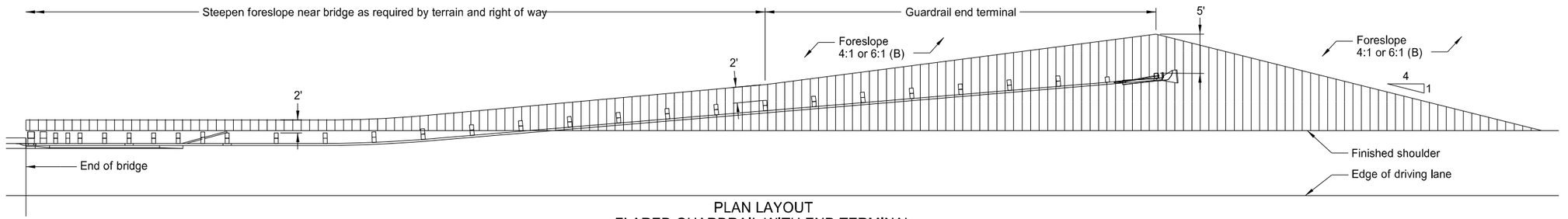
12 02 2020

TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL

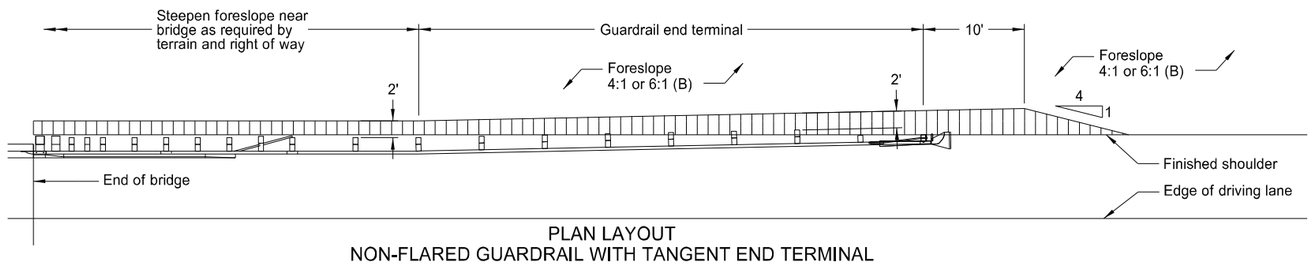
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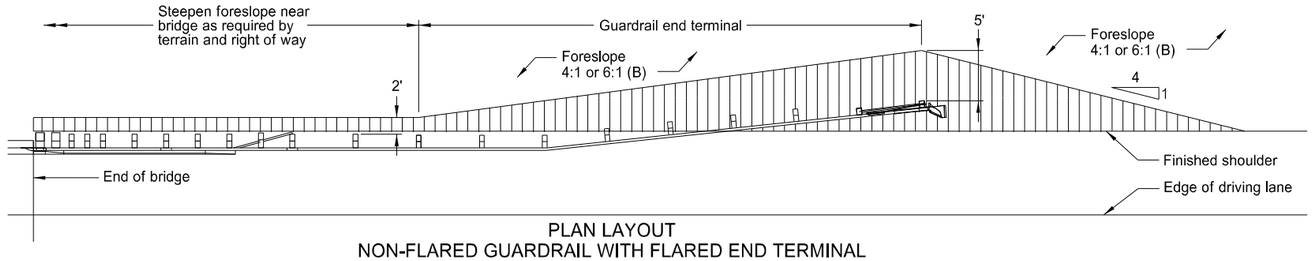
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

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

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

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

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

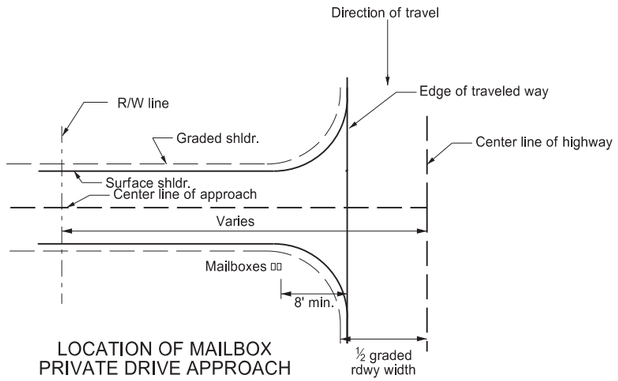
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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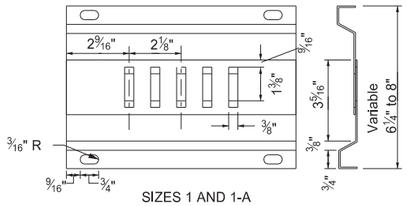
12 02 2020

MAILBOX LOCATION DETAILS

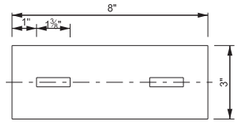
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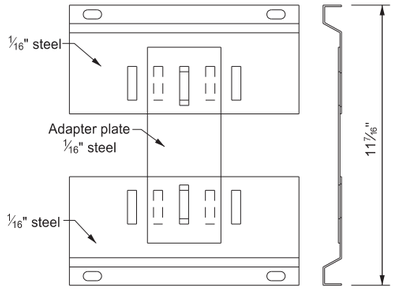
LOCATION OF MAILBOX
PRIVATE DRIVE APPROACH
ALTERNATE "A" LOCATION



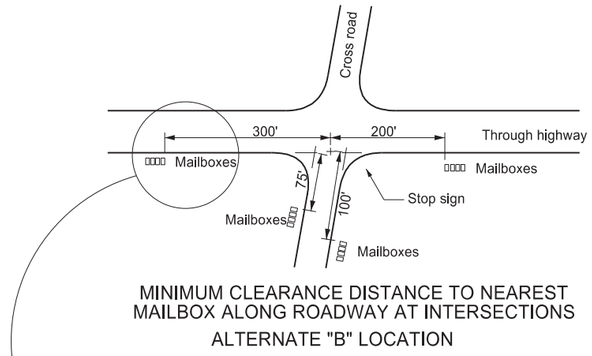
SIZES 1 AND 1-A
MOUNTING BRACKET



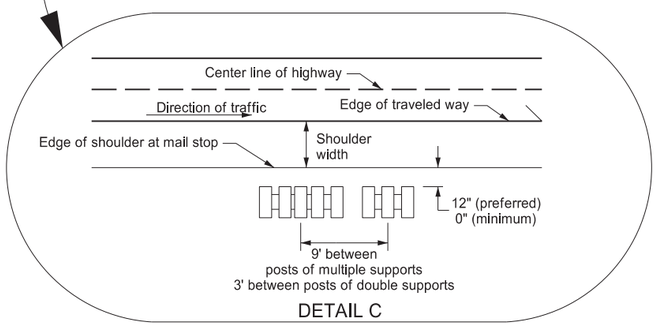
ADAPTOR PLATE



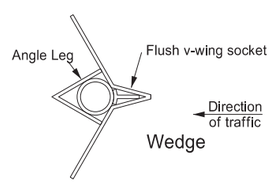
SIZE 2 WITH ADAPTOR PLATE
MOUNTING BRACKET



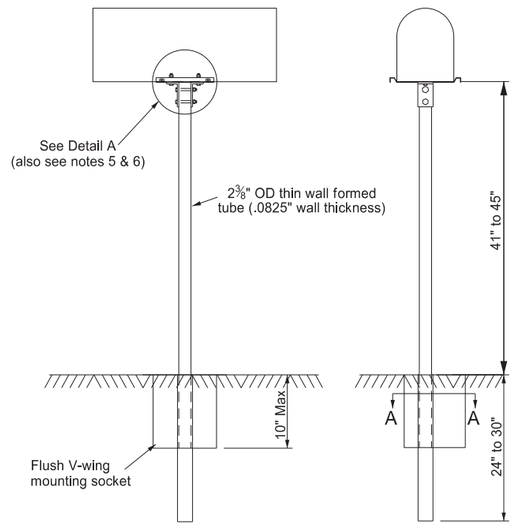
MINIMUM CLEARANCE DISTANCE TO NEAREST
MAILBOX ALONG ROADWAY AT INTERSECTIONS
ALTERNATE "B" LOCATION



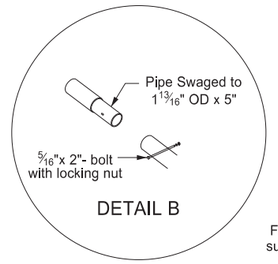
DETAIL C



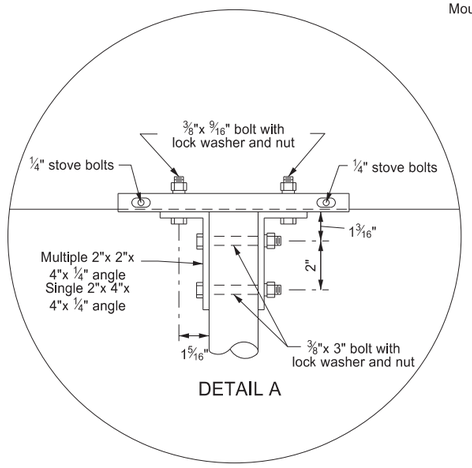
FLUSH V-WING
POST MOUNTING SOCKET
SECTION A-A



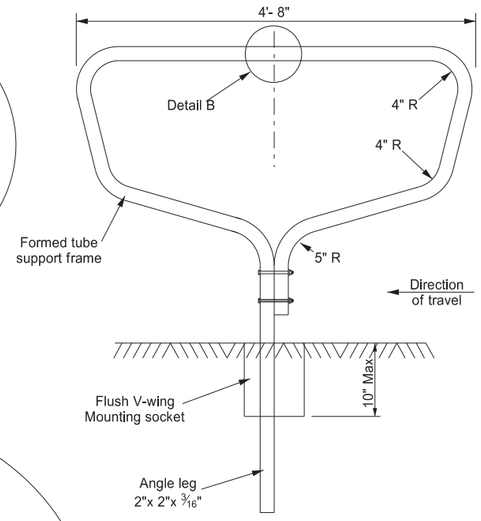
SIDE FRONT
SINGLE SUPPORT



DETAIL B



DETAIL A



FRONT

Notes:

1. The mailbox support and hardware details consist of the "V-Loc Mailbox Support System" manufactured by:

   Tapco Traffic & Parking Control Co. Inc.

   Use any equal crash tested and Federal Highway Administration approved support system meeting the requirements of NCHRP Report 350 or MASH. Install approved alternate mailbox assemblies in the manner and arrangement crash tested.

2. Install mailboxes in Alternate "A" locations when possible. Install mailboxes in Alternate "B" locations when warranted by existing field conditions.

3. Locate mailboxes on the right-hand side of the road in the direction traveled by the carrier. The Engineer will verify the correct direction with the postmaster before installion.

4. Install mailboxes on private drive approaches on the downstream side of the approach.

5. Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.

6. For Size 2 mailbox mounted on multiple supports, attach the adapter plate to mounting bracket with 2 each, 3/8" by 9/16" bolts with lock washers and nuts. Then attach the unit to the formed tube support frame using 4 angle connections as shown in Detail A.

7. 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.

TABLE A

TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6½"	8½"	19"
1-A	8"	10½"	21"
2	11½"	13½"	23½"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
08-25-2023	Dsn Engr stamp/signature update

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08/25/23