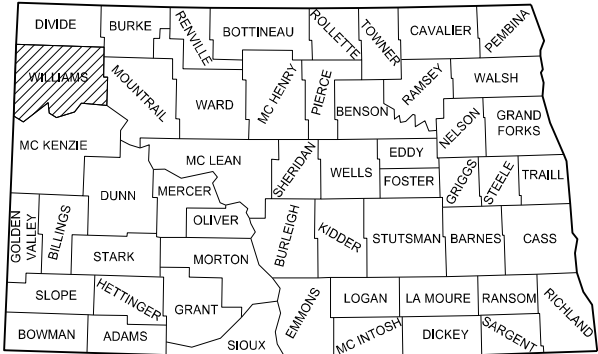


DESIGN DATA (RP 330.489 to RP 330.745 RP 332.640 to RP 333.201)				
Traffic	Average Daily			
Current 2024	Pass: 4126	Trucks: 904	Total: 5030	
Forecast 2044	Pass: 5321	Trucks: 1292	Total: 6613	
Clear Zone Distance: 32'		Design Speed: 55 mph		
Minimum Sight Dist. for Stopping: 495'		Bridges: N/A		
Sight Dist. for No Passing Zone: 900'				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 4,900,896				
DESIGN DATA (RP 331.046 to RP 331.711)				
Traffic	Average Daily			
Current 2024	Pass: 4047	Trucks: 909	Total: 4956	
Forecast 2044	Pass: 5220	Trucks: 1299	Total: 6519	
Clear Zone Distance: 18'		Design Speed: 25 mph		
Minimum Sight Dist. for Stopping: 155'		Bridges: N/A		
Sight Dist. for No Passing Zone: 450'				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 4,900,896				
DESIGN DATA (RP 335.807 to RP 336.097)				
Traffic	Average Daily			
Current 2024	Pass: 2902	Trucks: 1025	Total: 3927	
Forecast 2044	Pass: 3743	Trucks: 1466	Total: 5209	
Clear Zone Distance: 26'		Design Speed: 50 mph		
Minimum Sight Dist. for Stopping: 425'		Bridges: N/A		
Sight Dist. for No Passing Zone: 800'				
Pavement Design Life N/A				
Design Accumulated One-way Flexible ESALs: N/A				

Full Street Lighting
(school north of 1st Ave to 8th Ave)
End Exception 17479+16 (RP 331.046) to
Begin Exception 17514+26 (RP 331.711)

Turn Lanes: EB Lt, WB Rt
Destination Light
End Exception 17563+32.36 (RP 332.640)

End Project HES-7-804(075)330
Sta 17745+86
RP 336.097



STATE COUNTY MAP

DESIGNER Austin Becker
DESIGNER Stacy Flaten
DESIGNER Dylan Weber

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

HES-7-804(075)330
Williams County
Marley Crossing to 0.5 Miles N of Trenton
Turn Lanes & Lighting
Grading, HMA, Aggregate Base,
Signing, Pavement Marking, and Incidentals

GOVERNING SPECIFICATIONS

Date Published and Adopted
by the North Dakota
Department of Transportation

Standard Specifications

7/1/2024

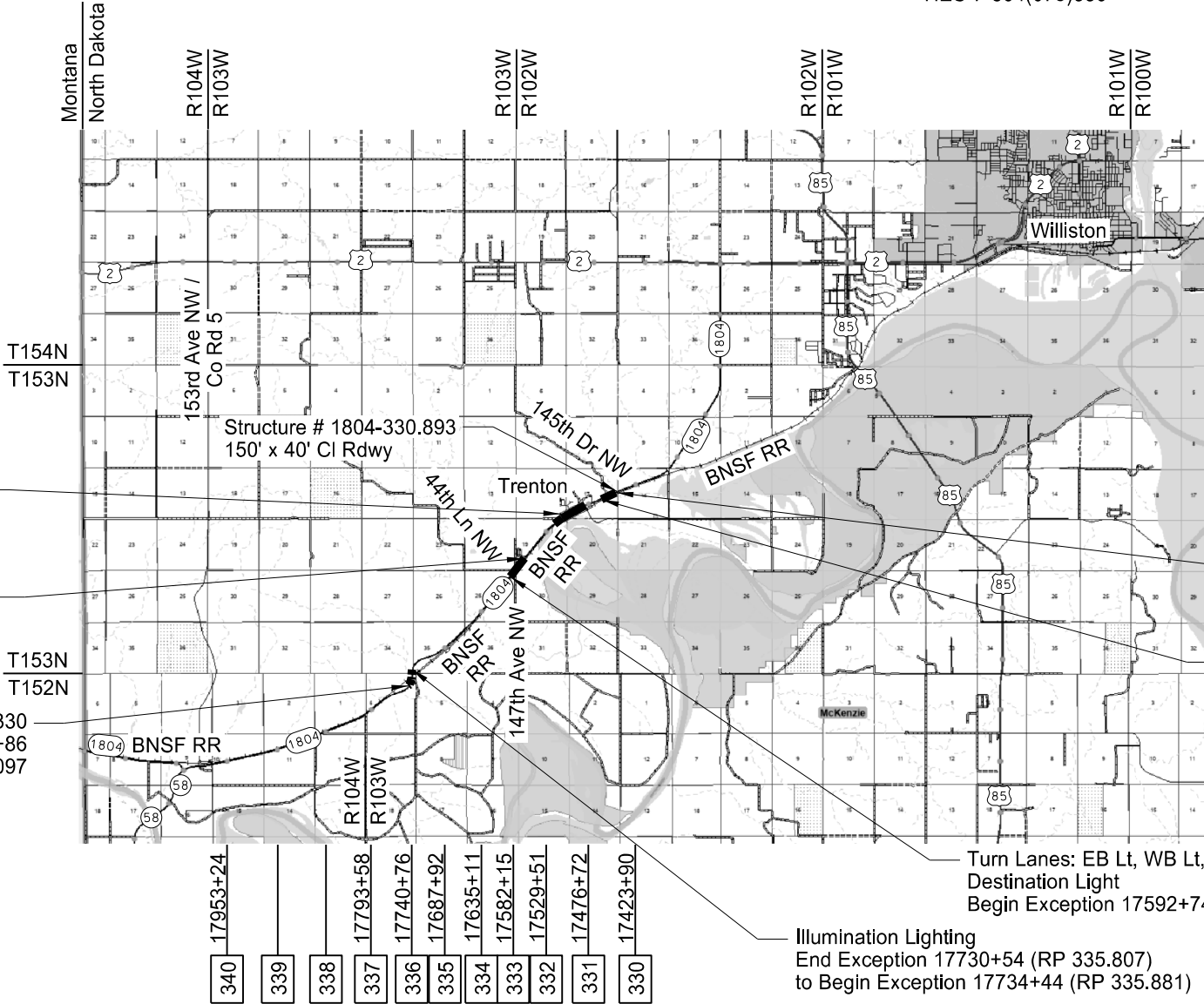
Supplemental Specifications

NONE

PROJECT NUMBER \ DESCRIPTION
HES-7-804(075)330

NET MILES
1.724

GROSS MILES
5.609



Begin Project HES-7-804(075)330
Sta 17449+69.72
RP 330.489

Turn Lane: EB Lt
17449+69.72 (RP 330.489) to
Begin Exception
17463+25.15 (RP 330.745)

Turn Lanes: EB Lt, WB Lt, WB Rt
Destination Light
Begin Exception 17592+74.36 (RP 333.201)

Illumination Lighting
End Exception 17730+54 (RP 335.807)
to Begin Exception 17734+44 (RP 335.881)

End Exception 17736+81 (RP 335.926)
to 17745+86 (RP 336.097)

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Chad Frisinger
05/22/25



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	2	1

Section	Page(s)	Description
1	1	Title Sheet
2	1 - 2	Table of Contents
4	1	Scope of Work
6	1 - 3	Notes
6	4	Environmental Notes
8	1 - 2	Quantities
10	1	Basis of Estimate
11	1	Earthwork Summary
20	1 - 6	Details
30	1 - 4	Typical Sections
40	1 - 3	Removals
50	1	Hydraulic Data
50	2	Manhole Summary
51	1 - 2	Allowable Pipe List
60	1 - 11	Plan & Profile
75	1 - 7	Wetland Impacts
76	1 - 3	Temporary Erosion Control
77	1 - 3	Permanent Erosion Control
80	1	Fencing Layout
81	1 - 3	Survey Coordinate and Curve Data
82	1 - 4	Survey Data Layout
90	1	Paving Layouts
100	1 - 3	Work Zone Traffic Control
110	1 - 4	Signing & Pavement Marking
140	1 - 12	Lighting
200	1 - 17	Cross Sections

Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 10	E-Ticketing
SP 548(24)	Utility Coordination

TABLE OF CONTENTS
LIST OF STANDARD DRAWINGS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	2	2

Number	Description
D-101-1, 2, 3, 4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31, 32, 33	Symbols
D-101-40	Cross Section Legend
D-203-8	Standard Rural Approaches
D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation
D-260-1	Erosion And Siltation Controls - Silt Fence
D-261-1	Erosion Control - Fiber Roll Placement Details
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-550-5	Transverse Construction Joint
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-25	Lane Closures On Urban Streets Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Mobile Operation (Pavement Marking)
D-704-30	Windrow Marking
D-704-33	Two-Lane Roadway Portable Rumble Strips
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties
D-714-25	Transverse Mainline Pipe Installation Detail - Pipes More Than 4 Feet Below Top of Subgrade
D-714-26	Transverse Mainline Pipe Installation Detail - Pipes 4 Feet or Less Below Top of Subgrade
D-720-1	Standard Monuments And Right Of Way Markers
D-722-5	Manhole Details
D-754-19	(Conventional Use) Reference Markers
D-754-23	Perforated Tube Assembly Details

Number	Description
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-26, 27, 29	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-83	Object Markers - Culverts
D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)
D-770-2	Feed Points (Roadway Lighting)
D-770-4	Lighting And Signal Details
D-770-5	Light Standard Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	6	1

NOTES

107-P01 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the BNSF Railway Company at RP 333.009. The type of work that will be performed near the railroad right of way is reconstruction of 147th Ave NW. Direct inquiries regarding protective liability insurance to:

Rosa Martinez
Marsh USA Inc.
4400 Comerica Bank Tower
1717 Main Street
Dallas, TX 75201-7357, USA
214-303-8519
Rosa.M.Martinez@marsh.com

Obtain information regarding crossing number 081554A from the Federal Railroad Administration website: <http://safetydata.fra.dot.gov/Officeofsafety/>

Contractor is to remain at least 25 feet away from the nearest railroad track. Place type III barricades on both approaches to the crossing to prevent vehicles getting trapped or having to back up on the crossing. Be on the lookout for trains. Contact BNSF at 1-(800)832-5452 for emergencies.

107-P02 MAINTAINING TRAFFIC – UNEVEN SHOULDER: If a shoulder and the adjacent lane are uneven due to milling or paving operations, the requirements of Section 704.04 O, "Traffic Control for Uneven Pavement" apply. If the uneven shoulder and adjacent lane are due to other circumstance, the contents of this note apply. If, at the end of the work-day, drop-offs greater than 2 inches and less than 18 inches or slopes steeper than 4:1 exist between the edge of a traffic lane and the outside edge of the proposed roadway, perform one of the following actions:

- Construct a traversable wedge in the area of the drop-off or steep slope; or
- Close the lane adjacent to the drop-off or steep slope and provide 24-hour flagging or pilot car operations.

When constructing a wedge, construct a wedge composed of aggregate or earthen materials with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type C compaction, as specified in 203.04 G.4, "Compaction Control Type C".

Install stackable vertical panels that meet the requirements of Section 704.03 H, "Stackable Vertical Panel", along the edge of the driving lane closest to the wedge.

The Engineer will measure stackable vertical panels as specified in Section 704.05, "Method of Measurement" and will pay for panels as specified in Section 704.06, "Basis of Payment".

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for "Aggregate Base Course CL 5"

If a 4:1 or flatter wedge is not installed, provide 24 hour flagging or pilot car operations and associated traffic control at no additional cost to the Department.

- 107-P03 RIGHT OF WAY: Complete all work from within the existing right of way. No easements outside of the existing right of way have been acquired to construct this project.
- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.
- 203-385 AVERAGE HAUL: No average haul has been computed for this project.
- 203-P01 COMMON EXCAVATION-TYPE B: Common excavation will not be measured on the project and will be paid as plan quantity.
- 302-P01 TEMPORARY TRAFFIC SURFACE AGGREGATE: 300 Tons of Temporary Traffic Surface Aggregate have been provided for maintaining traffic during construction of the approaches. Include all costs to install, maintain, and remove the temporary traffic surface aggregate in the contract unit price bid for "TEMPORARY TRAFFIC SURFACE AGGREGATE".
- 704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

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

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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

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

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

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining,



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	6	2

NOTES

and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary shoulder closure and flagging.

The Department will pay for all necessary deployed devices, regardless of the length of the lane closure.

- 1. Standard D-704-15, Type A: To be used any time conditions exist.
- 2. Standard D-704-20, Type G: Basis of the terminal signing.
- 3. Standard D-704-22, Type K and L: For construction trucks hauling material.
- 4. Standard D-704-24, Type R and U: For shoulder work.
- 5. Standard D-704-25, Type W and X: For urban street work.
- 6. Standard D-704-26, Type CC, EE, and GG: For paving operations.

714-P01 PIPE CLEANOUT: Remove all silt and debris from each mainline pipe to be extended. Dewater, remove the silt, flush or clean the pipe to re-establish drainage. Include all costs associated with cleaning in the price bid for "Pipe Conc Reinf _IN CL III".

894-050 ALUMINUM HARDWARE FOR SIGNS: The chromate seal specified in Section 894.03 A.1, "General" for aluminum hardware is not required.



NOTES

770-P01 LED LUMINAIRE LIGHTING SYSTEM A: Provide luminaries listed below:

Conventional Luminaire	Catalog Number
American Electric Autobahn ATB2	ATB2-P602-MVOLT-R2-4K-NL-BAA-NR
GE Current Evolve Series	ERL2-O-27-B5-40-D-GRAY-L-T

The lighting system was designed using these values:

IESNA Photometric Requirements	
IES Roadway Classification	Expressway
Road Surface	R3 - Asphalt
Average Maintained Illuminance	0.9 foot-candles
Illuminance Uniformity Ratio	3.0 : 1
Minimum Illuminance	As uniformity allows
Light Loss Factor	0.81

Luminaries must meet the requirements below:

Conventional Lighting Luminaire Requirements	
Light Source	LED
Light Output	26,000lm to 28,000lm
Wattage	195W to 220W
Color Temperature	4000K ±300K
Operating Temperature Range	-40°C to +40°C
Luminaire Housing	Die Cast Aluminum
Vibration Testing	ANSI/NEMA C136.31 Level 2, 3 G
Surge Suppression Rating	ANSI/IEEE C62.41 Cat C
Outdoor rating for luminaire	ANSI C136.25 IP-65
Photo Control on each luminaire	No
Tool-less Access	Yes
Buy America Compliant	Yes
NEMA Label	Yes
Qualified with DesignLights Consortium	Yes

Provide a NEMA label with black letters on a white background. Size of label is 3in x 3in and 1.25in letter height. Label should be two lines with the input wattage “XXX” on the top line and “LED” as the bottom line.

770-P02 LED LUMINAIRE LIGHTING SYSTEM B: Provide luminaries listed below:

Conventional Luminaire	Catalog Number
American Electric Autobahn ATB2	ATB2-P602-MVOLT-R3-4K-NL-BAA-NR
GE Current Evolve Series	ERL2-O-27-C5-40-D-GRAY-L-T

The lighting system was designed using these values:

IESNA Photometric Requirements	
IES Roadway Classification	Freeway B
Road Surface	R3 - Asphalt
Average Maintained Illuminance	0.6 foot-candles
Illuminance Uniformity Ratio	3.0 : 1
Minimum Illuminance	As uniformity allows
Light Loss Factor	0.81

Luminaries must meet the requirements below:

Conventional Lighting Luminaire Requirements	
Light Source	LED
Light Output	26,000lm to 28,000lm
Wattage	195W to 220W
Color Temperature	4000K ±300K
Operating Temperature Range	-40°C to +40°C
Luminaire Housing	Die Cast Aluminum
Vibration Testing	ANSI/NEMA C136.31 Level 2, 3 G
Surge Suppression Rating	ANSI/IEEE C62.41 Cat C
Outdoor rating for luminaire	ANSI C136.25 IP-65
Photo Control on each luminaire	No
Tool-less Access	Yes
Buy America Compliant	Yes
NEMA Label	Yes
Qualified with DesignLights Consortium	Yes

Provide a NEMA label with black letters on a white background. Size of label is 3in x 3in and 1.25in letter height. Label should be two lines with the input wattage “XXX” on the top line and “LED” as the bottom line.

770-P03 LIGHT STANDARDS: Round or octagonal steel with long radius-davit type mast arm. Pole to have galvanized finish (inside and outside surfaces). Pole mounting height and mast length as indicated. Include transformer type base whether indicated as breakaway or not.

770-P04 FEED POINT: Cost for supplying and installing copper underground/direct bury 100 amp 3 wire service entrance conductor cable from the feed point to the meter socket is incidental to the price for each feed point.



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	6	4

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have 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 Project Engineer will contact Reilly Lembo of the Environmental and Transportation Services Division to coordinate any meetings needed to identify the limits of the avoidance area. The site is at Marley Crossing approximate 17730+65 to 17732+25 Rt. This avoidance area 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 208 LF of Temporary Safety Fence has been included for this purpose. All costs to provide, place, maintain, and remove the fence shall be included in the price bid for “Temporary Safety Fence.”

EN-2 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.



Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	HES-7-804(075)330	8	1
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL				
103	0100	CONTRACT BOND	L SUM	1	1				
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1	1				
201	0330	CLEARING & GRUBBING	L SUM	1	1				
202	0136	REMOVAL OF PAVEMENT	TON	574	574				
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1	1				
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	223	223				
202	0400	REMOVAL OF RIPRAP - LOOSE ROCK	CY	3	3				
203	0102	COMMON EXCAVATION-TYPE B	CY	3347	3347				
203	0109	TOPSOIL	CY	5351	5351				
203	0140	BORROW-EXCAVATION	CY	782	782				
216	0100	WATER	M GAL	305	305				
251	0200	SEEDING CLASS II	ACRE	5.8	5.8				
251	2000	TEMPORARY COVER CROP	ACRE	5.8	5.8				
253	0101	STRAW MULCH	ACRE	11.6	11.6				
255	0102	ECB TYPE 2	SY	518	518				
260	0200	SILT FENCE SUPPORTED	LF	3385	3385				
260	0201	REMOVE SILT FENCE SUPPORTED	LF	3385	3385				
261	0112	FIBER ROLLS 12IN	LF	3619	3619				
261	0113	REMOVE FIBER ROLLS 12IN	LF	619	619				
302	0120	AGGREGATE BASE COURSE CL 5	TON	12151	12151				
302	0314	TEMPORARY TRAFFIC SURFACE AGGREGATE	TON	300	300				
401	0050	TACK COAT	GAL	1144	1144				
401	0060	PRIME COAT	GAL	2874	2874				
401	0160	BLOTTER MATERIAL CL 44	TON	67	67				
411	0100	MILLING PAVEMENT SURFACE	TON	602	602				
430	0045	SUPERPAVE FAA 45	TON	4116	4116				
430	1000	CORED SAMPLE	EA	28	28				
430	5818	PG 58H-34 ASPHALT CEMENT	TON	248	248				
550	0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	227	227				
702	0100	MOBILIZATION	L SUM	1	1				
704	0100	FLAGGING	MHR	1000	1000				
704	1000	TRAFFIC CONTROL SIGNS	UNIT	5282	5282				
704	1048	PORTABLE RUMBLE STRIPS	EA	4	4				
704	1052	TYPE III BARRICADE	EA	17	17				
704	1060	DELINEATOR DRUMS	EA	130	130				
704	1067	TUBULAR MARKERS	EA	55	55				
704	1080	STACKABLE VERTICAL PANELS	EA	221	221				
704	1185	PILOT CAR	HR	300	300				
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	3531	3531				
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	13518	13518				
714	0615	PIPE CONC REINF 24IN CL III	LF	8	8				
714	0820	PIPE CONC REINF 30IN CL III	LF	10	10				
714	3033	END SECT-TRAVERSABLE REINF. CONC.30IN	EA	1	1				
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	414	414				

Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	HES-7-804(075)330	8	2
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL				
714	4120	PIPE CONDUIT 42IN	LF	16	16				
714	4122	PIPE CONDUIT 42IN-APPROACH	LF	65	65				
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	1	1				
720	0110	RIGHT OF WAY MARKERS	EA	11	11				
720	0125	ALIGNMENT MONUMENTS	EA	4	4				
720	0130	IRON PIN R/W MONUMENTS	EA	7	7				
720	0135	IRON PIN REFERENCE MONUMENTS	EA	4	4				
722	0120	MANHOLE 72IN	EA	1	1				
722	1120	MANHOLE RISER 72IN	LF	6	6				
752	0911	TEMPORARY SAFETY FENCE	LF	208	208				
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	49	49				
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	227	227				
754	0563	REFERENCE MARKER-TYPE C	EA	1	1				
754	0592	RESET SIGN PANEL	EA	8	8				
754	0805	OBJECT MARKERS - CULVERTS	EA	3	3				
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	1.12	1.12				
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	0.56	0.56				
762	0103	PVMT MK PAINTED-MESSAGE	SF	288	288				
762	1106	PVMT MK PAINTED 6IN LINE	LF	21446	21446				
762	1112	PVMT MK PAINTED 12IN LINE	LF	2582	2582				
770	0003	LIGHTING SYSTEM A	EA	1	1				
770	0004	LIGHTING SYSTEM B	EA	1	1				
770	0008	DESTINATION LIGHTING (TWO OR MORE POLES)	EA	1	1				

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	10	1

Water
25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Pavement
Temporary Traffic Surface Aggregate @ 1.875 Ton/CY
Aggregate Base Course CL 5 @ 1.875 Ton/CY
Prime Coat @ 0.35 Gal/SY
Blotter Material CI 44 @ 15 lbs/SY
Superpave FAA 45 @ 2 Ton/CY
PG 58H-34 Asphalt Cement @ 6.0%
Tack Coat @ 0.05 Gal/SY

Removal of Pavement
Aggregate Base @ 1.875 Ton/CY
Bituminous Pavement @ 2 Ton/CY
Concrete Pavement @ 2 Ton/CY

Rumble Strips
ND 1804 17563+32 to 17592+74 = 2942' (0.56 Miles)

Asphalt Shoulder (2 sides) 1.12 Miles
Asphalt Centerline 0.56 Miles

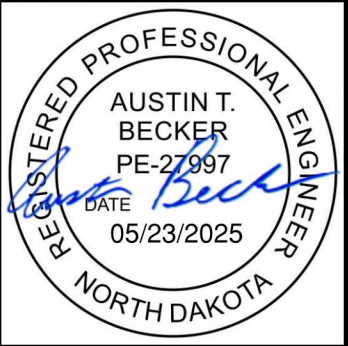
HMA Cored Samples							
	A	B	C				
Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(2), "Pavement Density Cores"							
ND 1804 Lt	4,084 / 1000 = 4	1	N/A	3	12	N/A	EA
ND 1804 Rt	4,139 / 1000 = 4	1	N/A	3	12	N/A	EA
ND 1804 Rt turn lanes	1	1	N/A	3	3	N/A	EA
430.04 I.2.b(3), "Pavement Thickness Determination Cores"							
ND 1804					N/A	1	EA
				Total	27	1	EA



Earthwork Summary

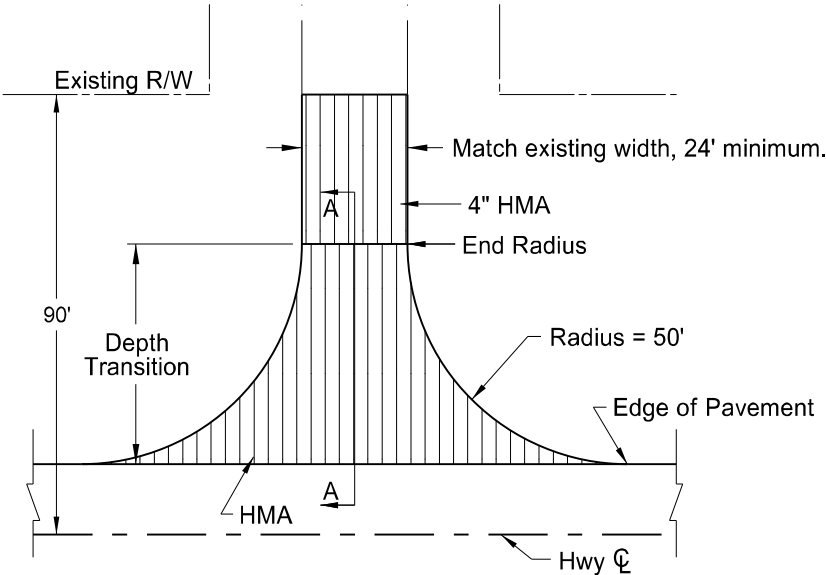
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	11	1

Location	Excavation Volume	Embankment Volume	Compacted Volume	Common Excavation – Type B (Pay Item)	Borrow-Excavation (Pay Item)	Topsoil (Pay Item)
	(CY)	(CY)	(CY)	(CY)	(CY)	(CY)
	A	B	C = B * 1.25	D = A	E = C - A	
ND 1804 & 145 th Dr NW Intersection 17449+69.72 to 17463+25.15	1,164	381	476	1,164	-688	1,400
ND 1804 & Casino Approach Intersection ND 1804 & 44 th Ln NW / 147 th Ave NW Intersection 17563+32.36 to 17592+74.36	2,183	2,923	3,653	2,183	1,470	3,951
			Total	3,347	782	5,351

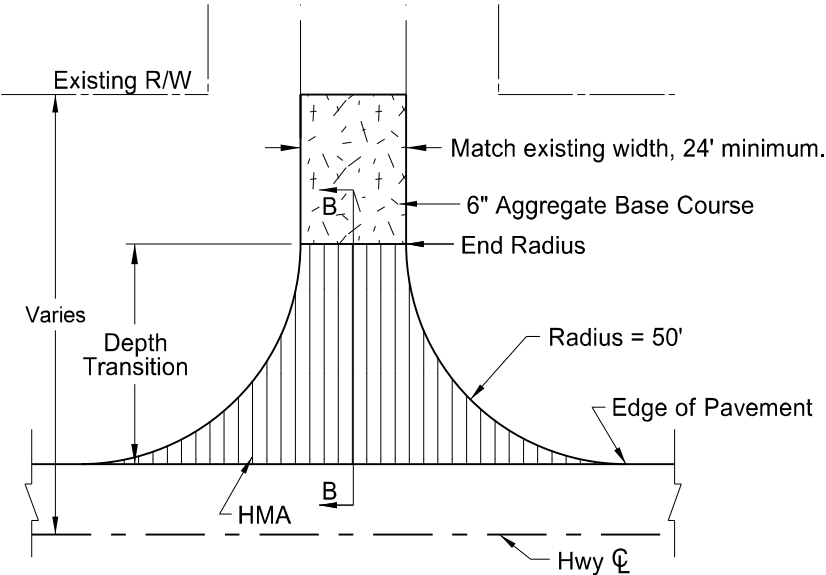


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	20	1

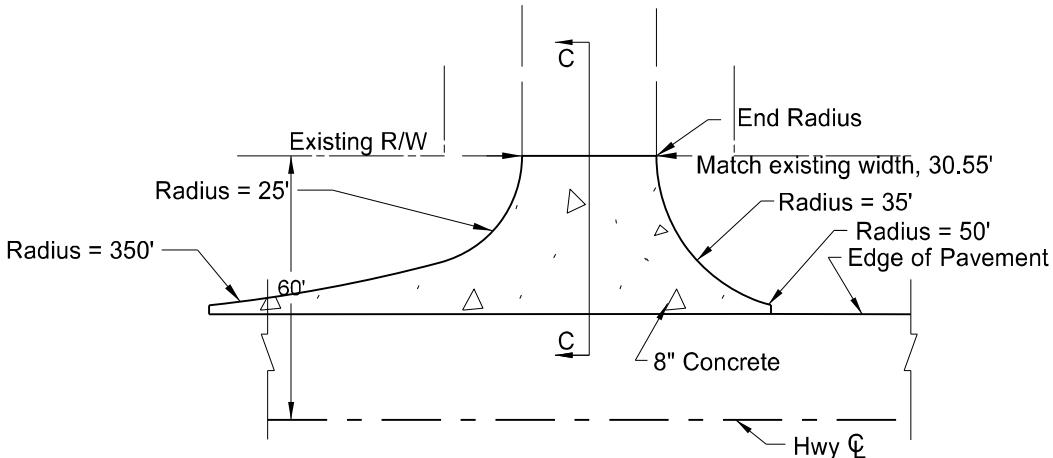
- Notes:
- Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
 - Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans. See section 60 for quantities for each approach.



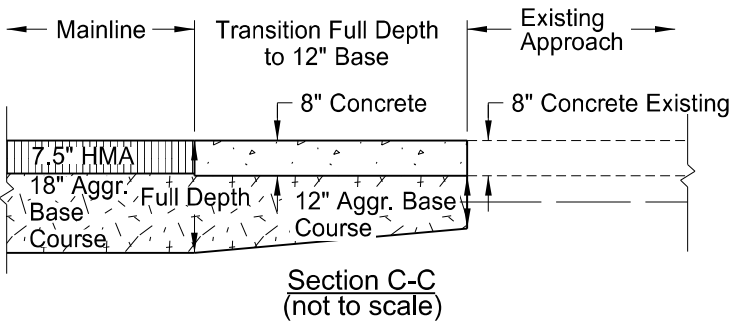
(1) Paved Section Line, County Road, or Street Approach
Shouvreu Dr, 17563+94.36 Rt



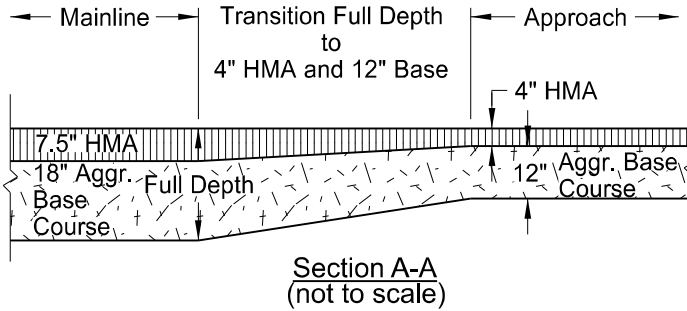
(2) Gravel Section Line, County Road, or Street Approach
145th Dr NW, 17453+33.9 Rt
Casino Driveway, 17569+44.12 Rt
147th Ave NW, 17576+27.75 Rt
44th Ln NW, 17582+62.36 Rt



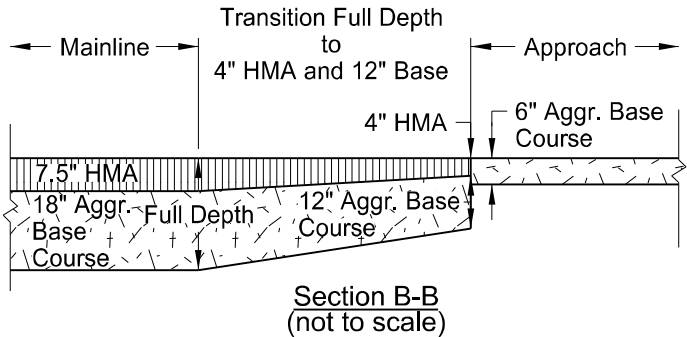
(3) Concrete Section Line, County Road, or Street Approach
147th Ave NW, 17582+60.89 Lt



Section C-C
(not to scale)



Section A-A
(not to scale)



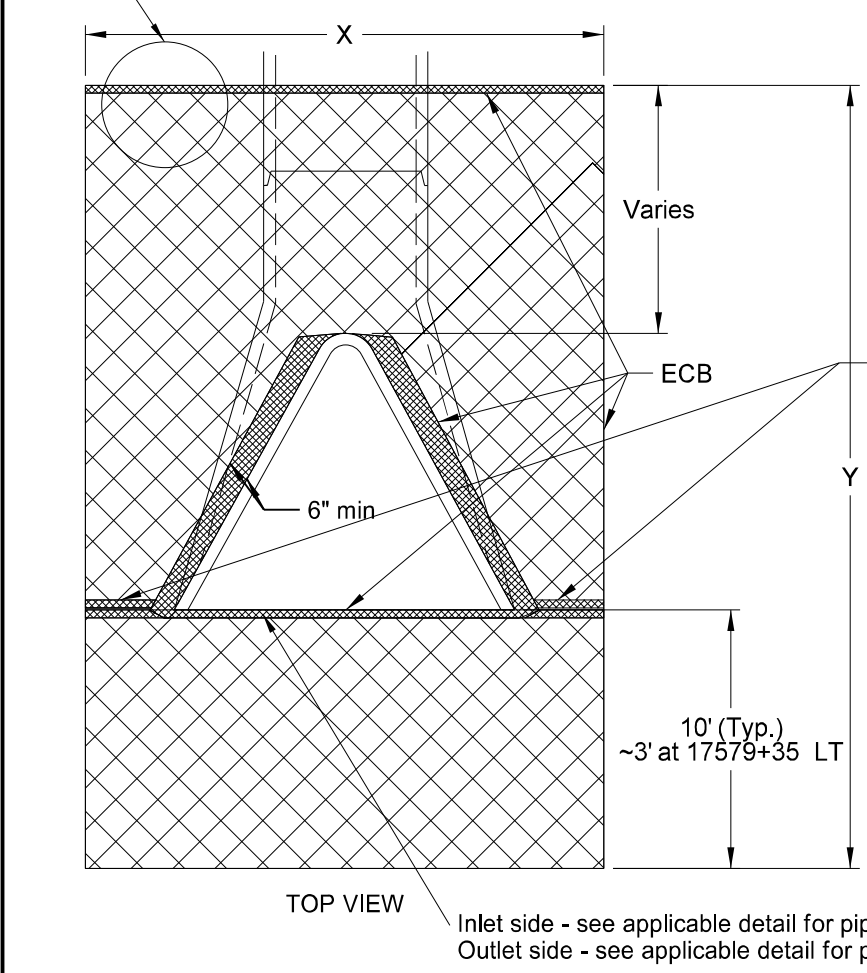
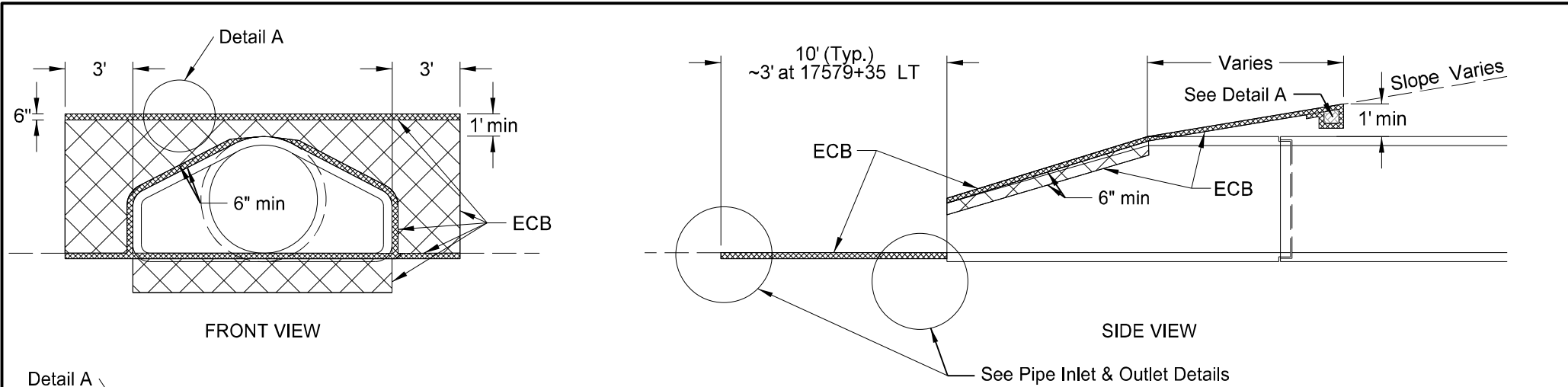
Section B-B
(not to scale)



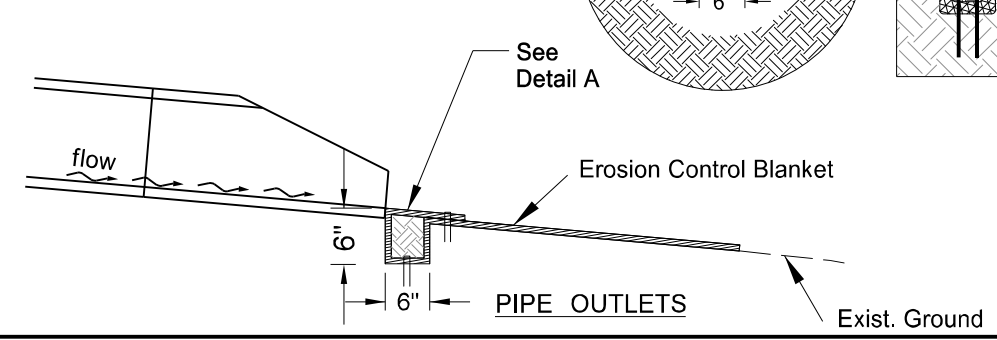
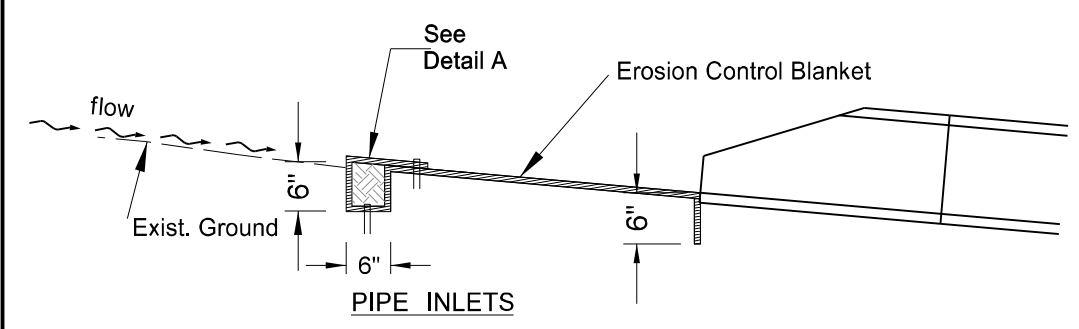
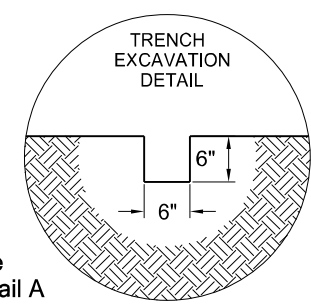
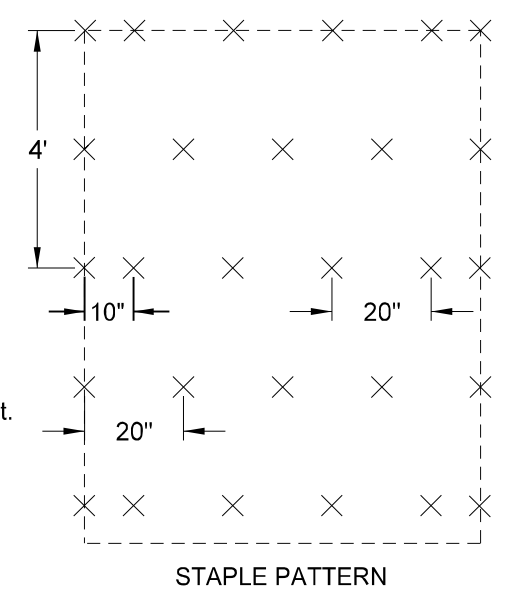
Details

ND 1804
Marley Xing to 0.5 Miles N of Trenton

Approach Paving Details for
New or Regrading Rural Approaches
(Approach Grading)



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

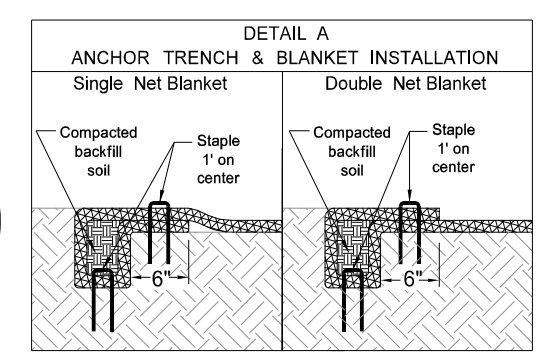


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	20	2

Erosion Control Blanket (ECB)					
Location to be Protected Station	Culvert Type Appr/CL	Pipe Diam (Inch)	No	Unit Quantity (SY)	Total Quantity Type 2 (SY)
17563+55 Rt	Appr	Dbl 36	1	53	53
17564+31 Rt	Appr	Dbl 36	1	53	53
17569+01 Rt	Appr	Dbl 36	1	53	53
17569+85 Rt	Appr	Dbl 36	1	53	53
17575+95 Rt	Appr	Dbl 36	1	53	53
17576+64 Rt	Appr	Dbl 36	1	53	53
17579+35 LT	CL	42	1	15	15
17579+40 Rt	CL	30	1	22	22
17580+92 Rt	CL	24	1	20	20
17582+23 Rt	Appr	42	1	31	31
17582+97 Rt	Appr	42	1	31	31
Total (SYs)					437

APPROACH CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
Dbl 36	22.6	23.3	469.1	53
42	13.3	23.3	279.7	31
Note: Quantities based on 8:1 slope.				

CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	17.6	172.1	20
30	11.6	18.5	195.1	22
42	13.3	12.3	132.9	15
Note: Quantities based on 4:1 slope.				



Details

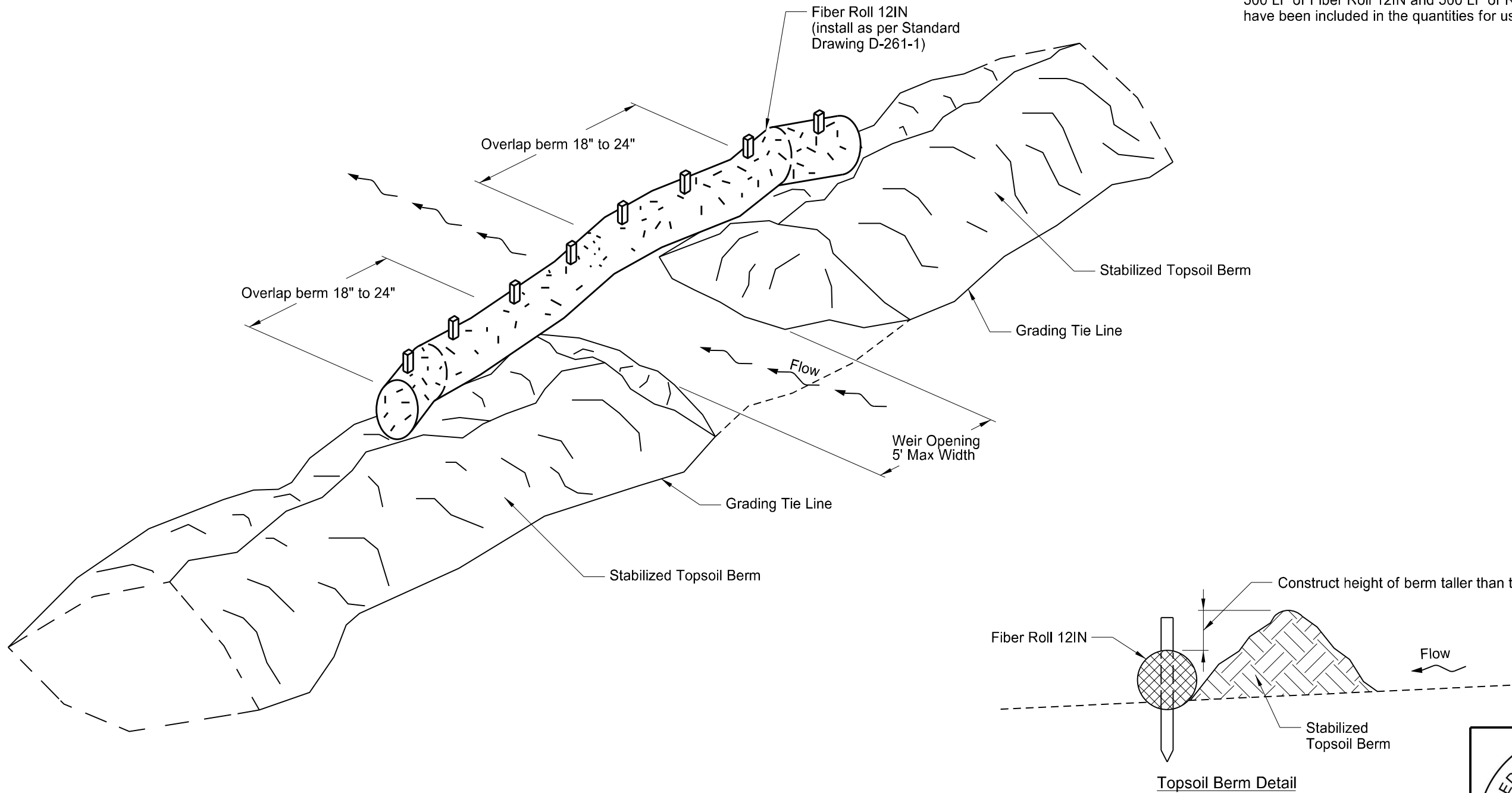
ND 1804

Marley Xing to 0.5 Miles N of Trenton

Erosion Control at Culvert Flared End Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	20	3

500 LF of Fiber Roll 12IN and 500 LF of Remove Fiber Roll 12IN have been included in the quantities for use at weirs.



- 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. The Engineer will measure and pay for straw mulch and temporary cover crop separately.
 9. Include the costs to create, maintain, and dismantle the berm in the unit price bid for "Topsoil".

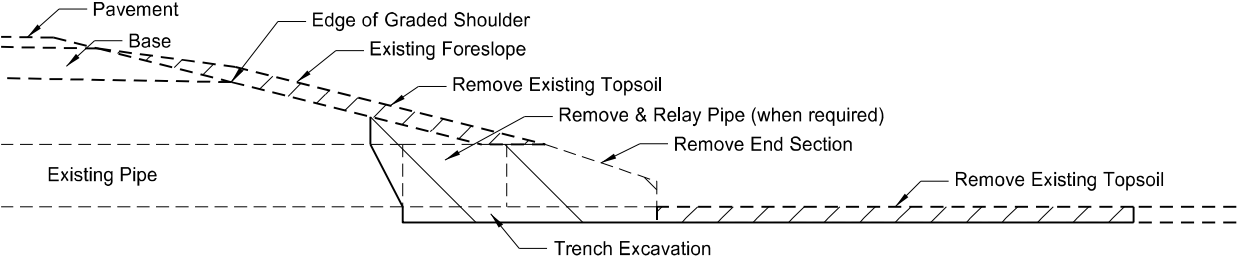


Details

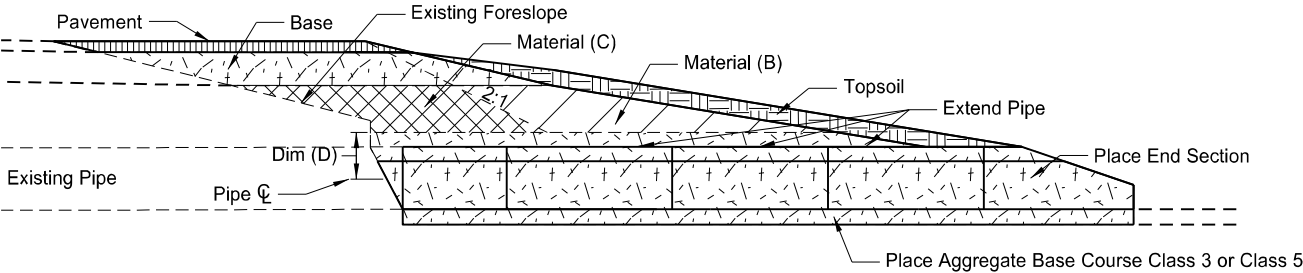
ND 1804

Marley Xing to 0.5 Miles N of Trenton

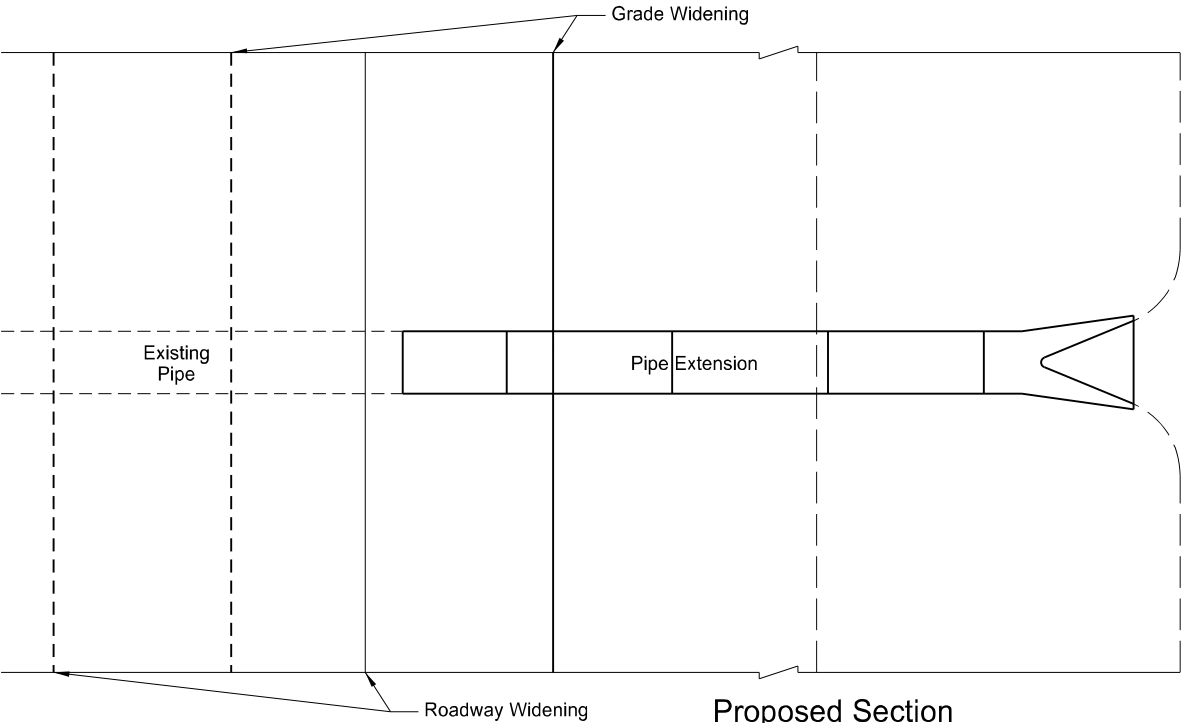
Temporary Topsoil Berm and Weir Detail



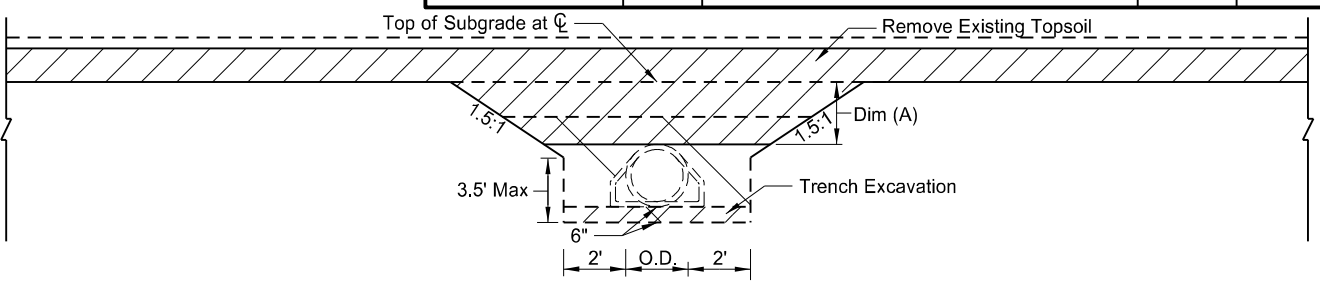
Removal Section
Cross Section View



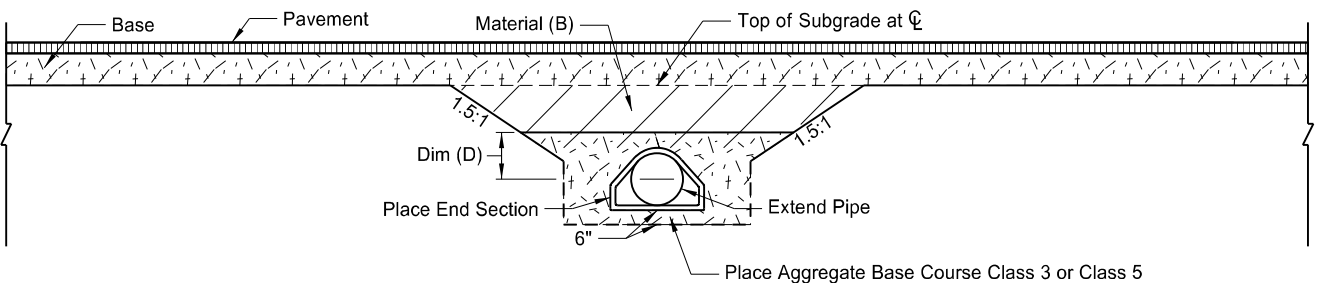
Proposed Section
Cross Section View



Proposed Section
Plan View



Removal Detail
Side View



Backfill Detail
Side View (Topsoil not shown)

Pay Items

- 1) Pipe*
- 2) Remove & Relay Pipe - All Types & Sizes (when required)
- 3) Remove & Reset End Section or
Remove End Section and Place New End Section
- 4) Borrow Excavation or Common Excavation
- 5) Topsoil
- 6) Seeding
- 7) Mulching

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate Base Course Class 3 or Class 5

Pipe Materials	Dim (A) <= 4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embank or Aggr	Aggregate	0.5 O.D.
Metal	Embank or Aggr	Aggregate	0.5 O.D. + 1 Foot

Pipe Materials	Dim (A) > 4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embankment	Embankment	0.5 O.D.

NOTES:

1. Embankment may be either Borrow Excavation or Common Excavation
2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.

LOCATIONS:

17579+38 RT - 30" Extension
17579+38 LT - See Plans
17580+89 RT - 24" Extension

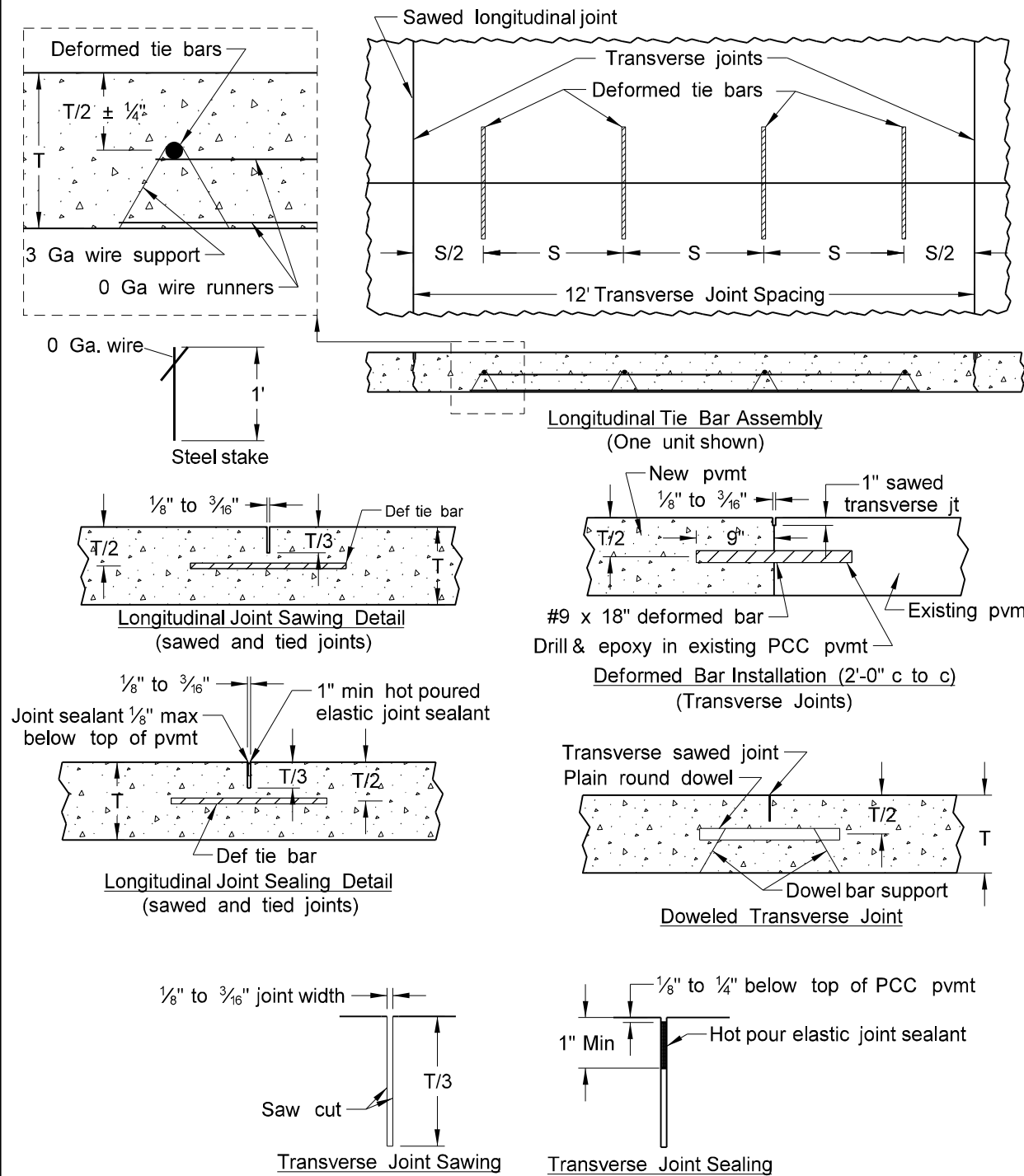


Details

ND 1804
Marley Xing to 0.5 Miles N of Trenton

Mainline Widening CL Pipe Extension Detail

Pavement Reinforcement Details

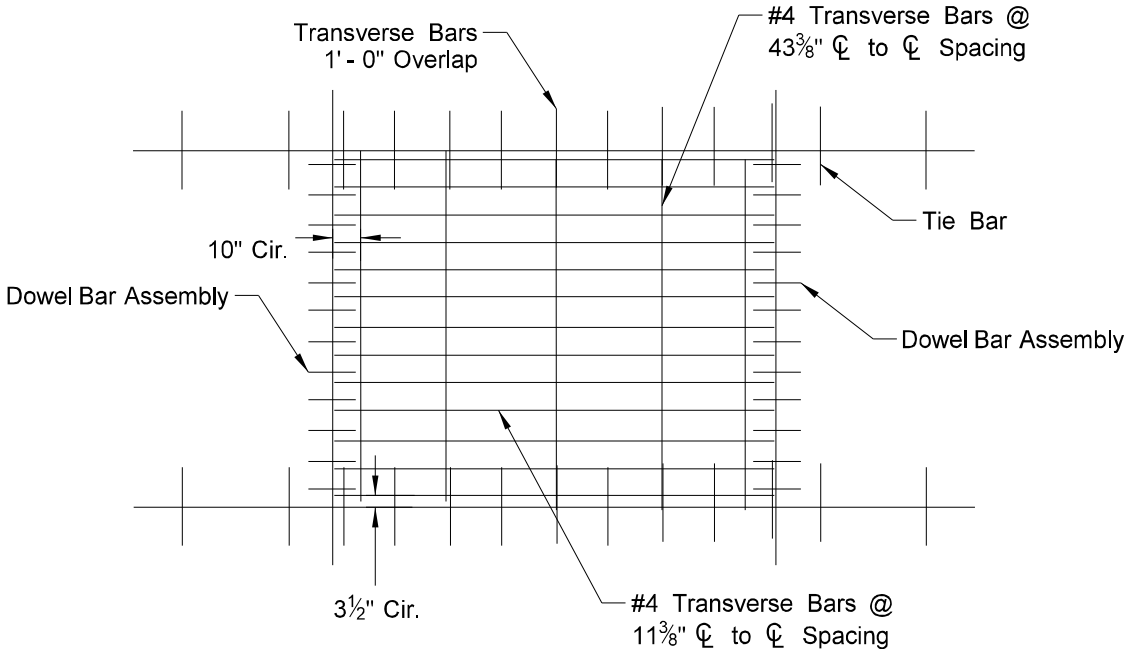


Location	Pavement Thickness	Bar Depth	Steel Grade	Bar Size and Length	Spacing
147th Ave NW	8"	4"	40	#5 Bar x 30"	30"
				#6 Bar x 36"	45"
			60	#4 Bar x 36"	30"
				#5 Bar x 42"	45"

- Notes:
1. S = Tiebar spacing
 2. T = Pavement thickness
 3. Place no tie bar within 15" of a transverse joint.
 4. See Section 90 for locations of transverse and longitudinal Joints.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	20	5

Full Pavement Reinforcement Layout



- Notes:
1. Place Reinforcing Steel Above Dowel Bars and Above Longitudinal Tie Bars.
 2. Provide a 1-Foot Minimum Overlap of Transverse Reinforcing Steel Across the Longitudinal Tied Joints.
 3. Transverse Reinforcing Steel must be Gapped Across Keyed Joints a Minimum of 6 Inches (3 Inches on Each Side of Joint).
 4. Reinforce the Complete Panels as shown in Section 90.
 5. Include all Costs to Furnish and Install the Reinforcing Steel as Shown in the Price Bid Items "8IN NON-REINF CONCRETE PVMT CL AE-DOWELED".

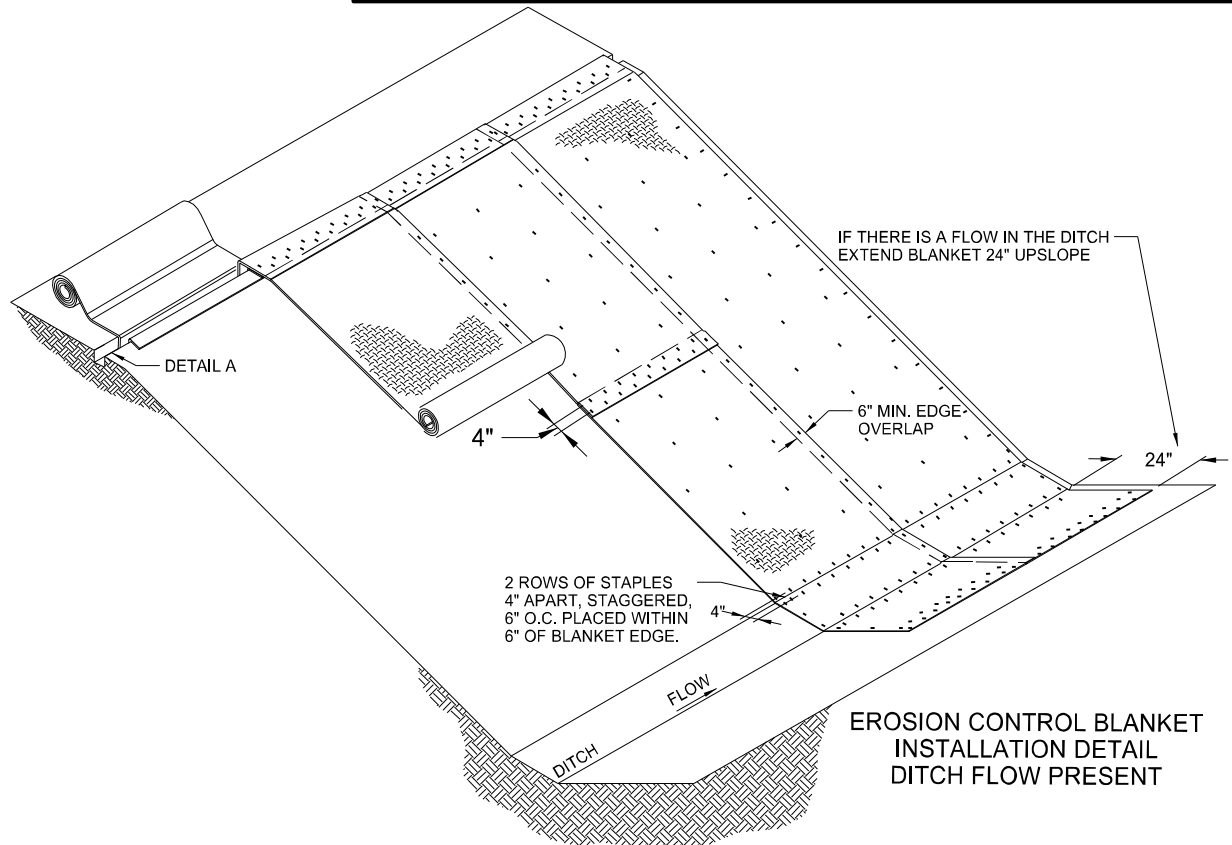
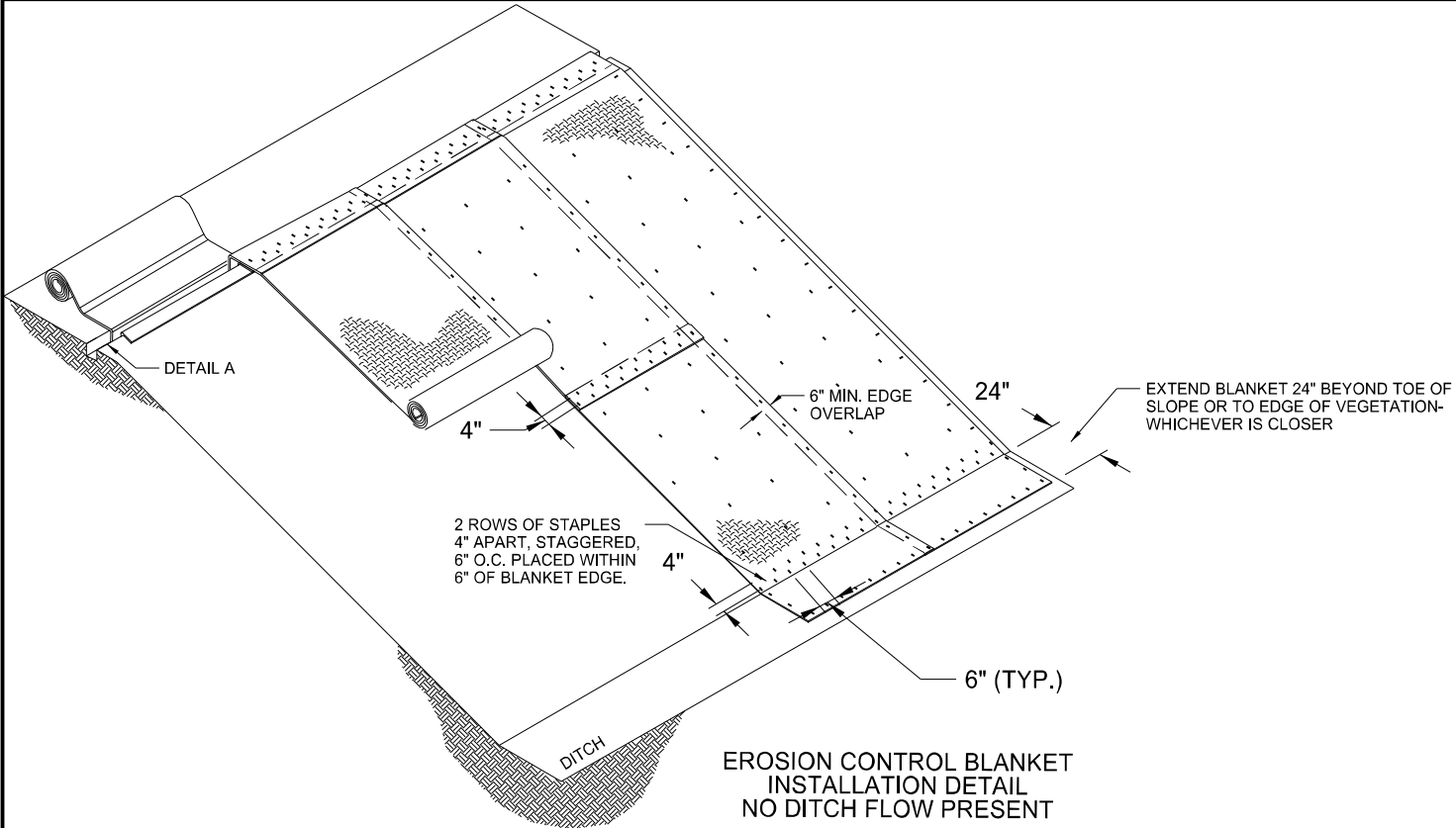
Details

ND 1804
Marley Xing to 0.5 Miles N of Trenton

PCC Pavement & Joint Details

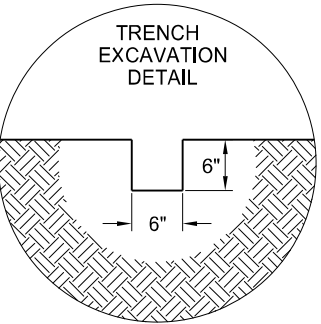
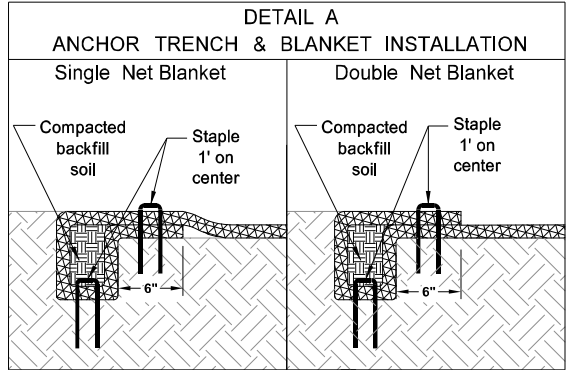
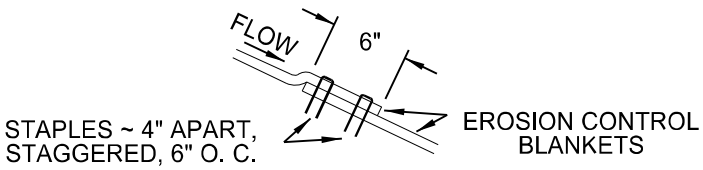


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	20	6

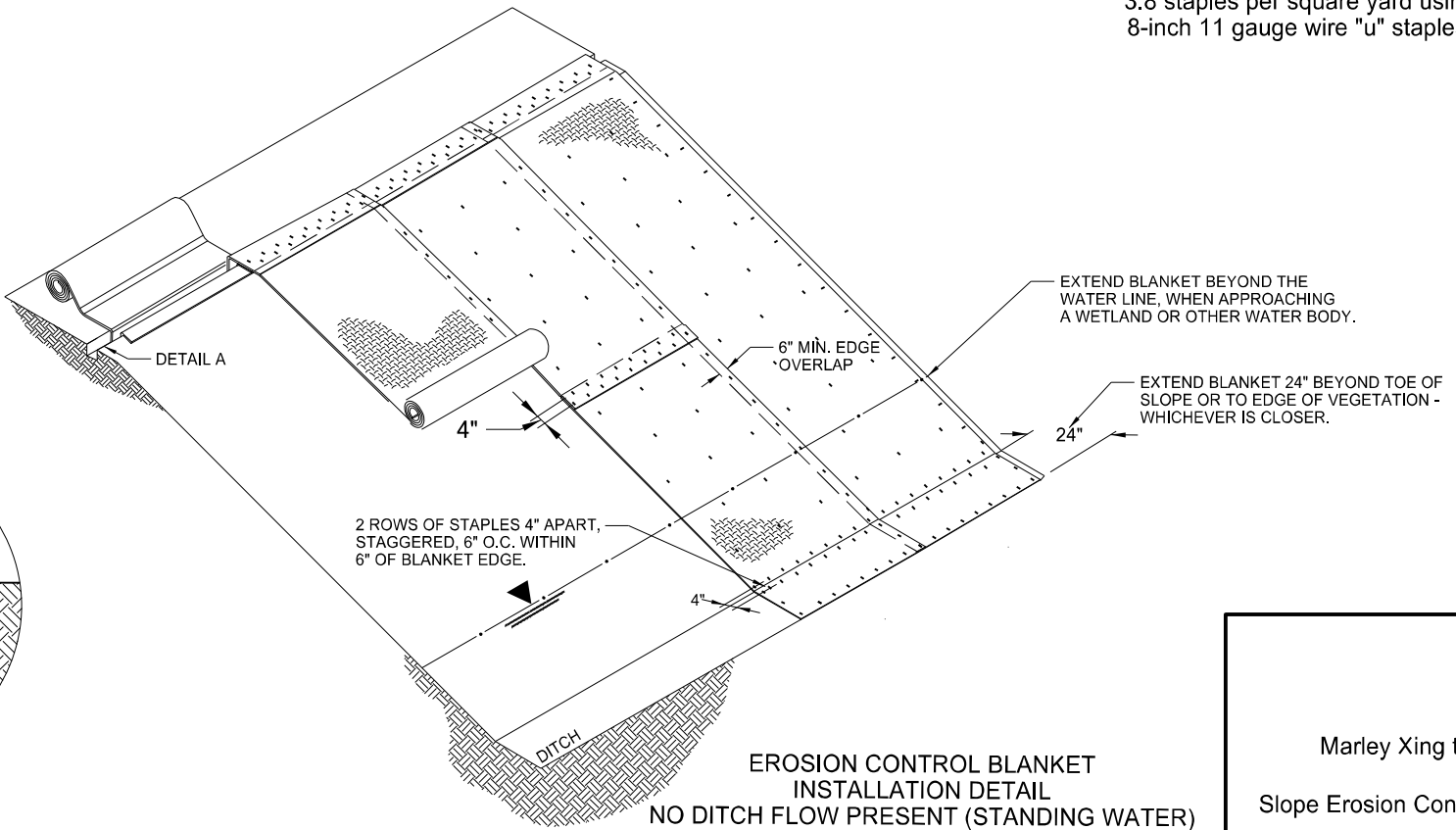
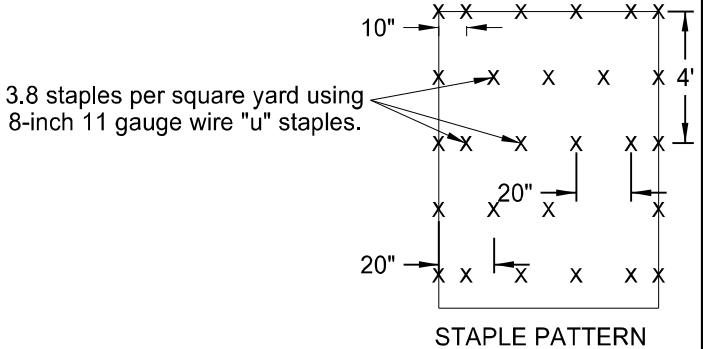


INSTALLATION STEPS:

1. Prepare smooth slope per spec. section 255
2. Amend soil and seed, as specified.
3. Dig anchor trench. Set aside native soil removed from trench.
4. Secure blanket in anchor trench, staking or stapling blanket as shown.
5. Replace native soil previously removed from trench.
6. Staple blanket as shown so there are no gaps between the blanket and the soil.
Staple while unrolling blanket to minimize walking on blanket.
7. Install splices a minimum 24 inches prior to toe of slope.

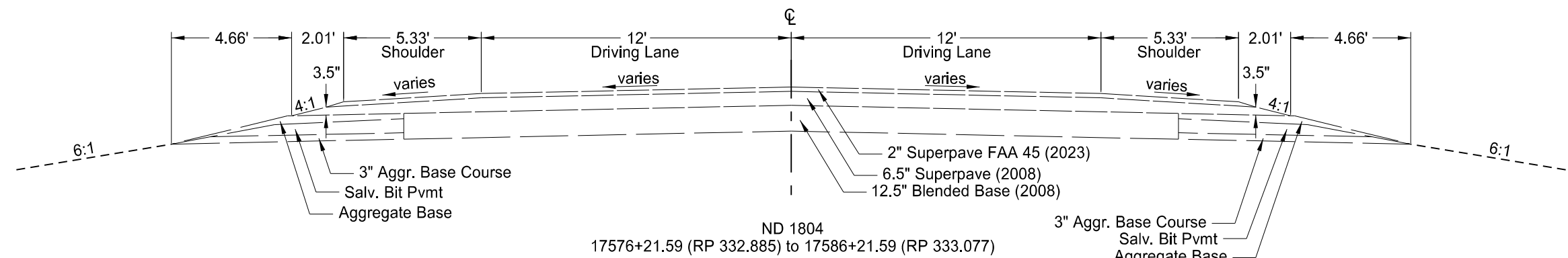
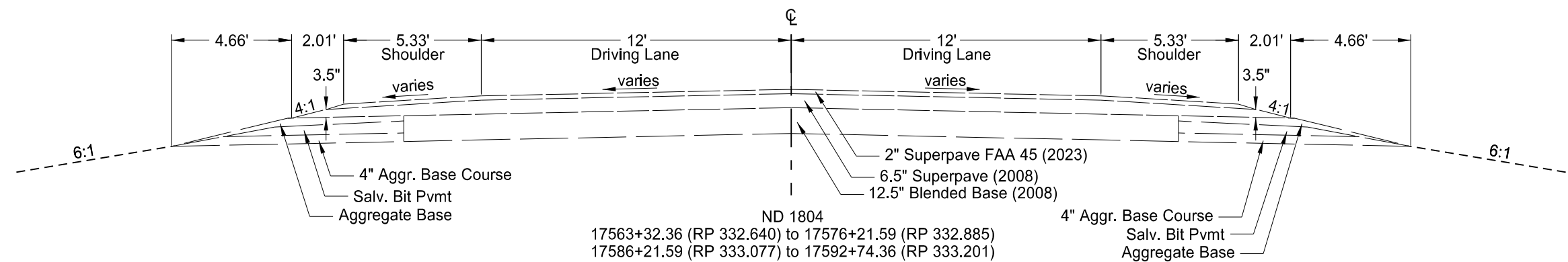
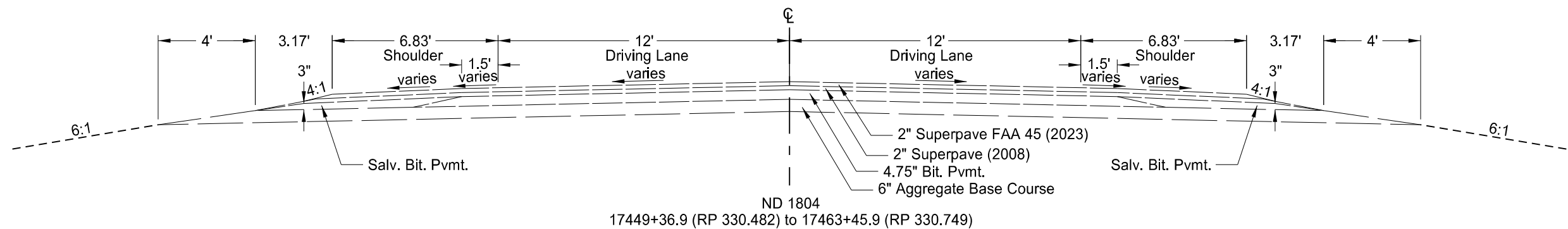


NOTE:
Install Single Net Blanket with netting on top of installed blanket.



Details
ND 1804
Marley Xing to 0.5 Miles N of Trenton
Slope Erosion Control Blanket Installation Details

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	30	1



Existing Typical Sections

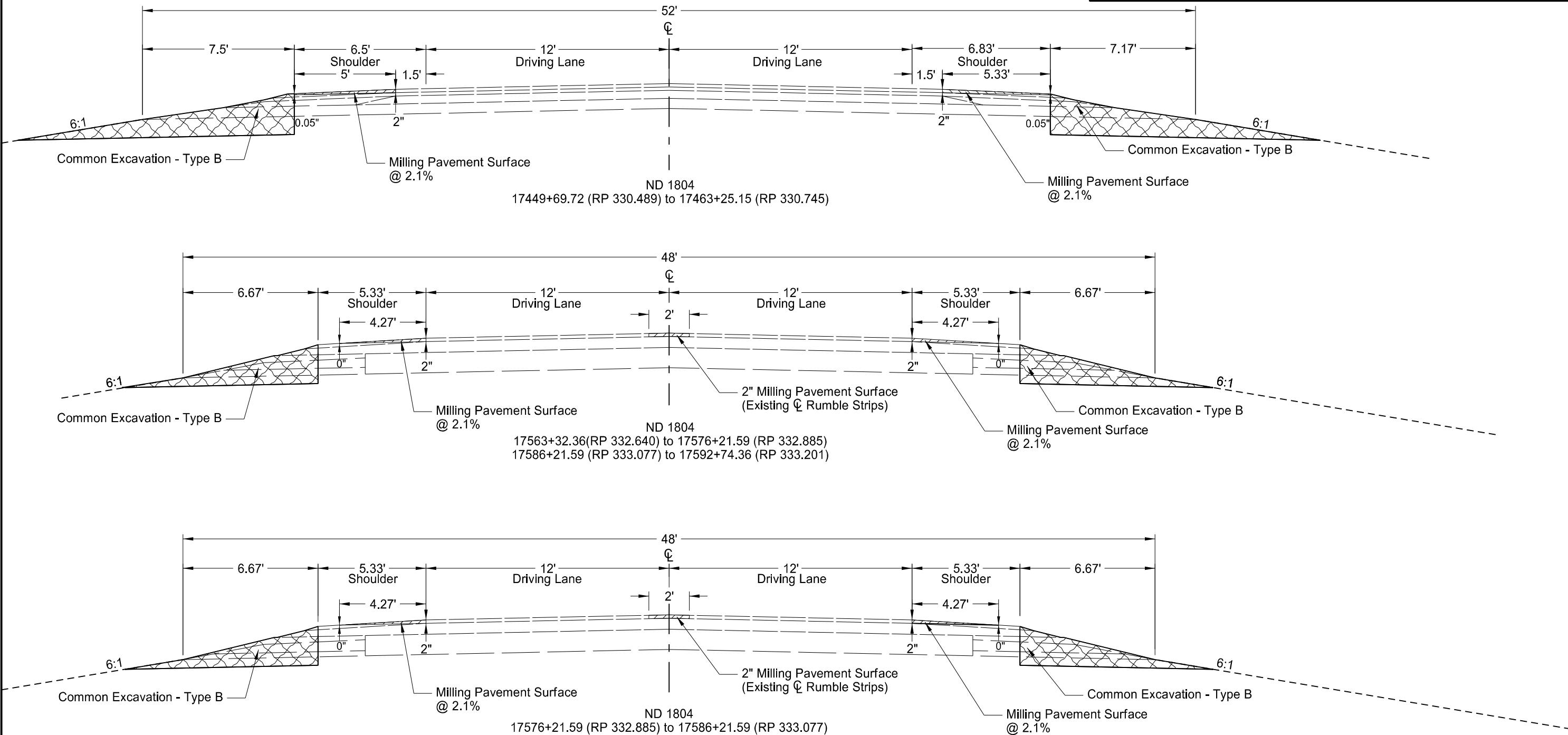
ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17449+36.9 to 17463+45.9

ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17563+32.36 to 17592+74.36



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	30	2



Removal Typical Sections

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17449+69.72 to 17463+25.15

ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17563+32.36 to 17592+74.36

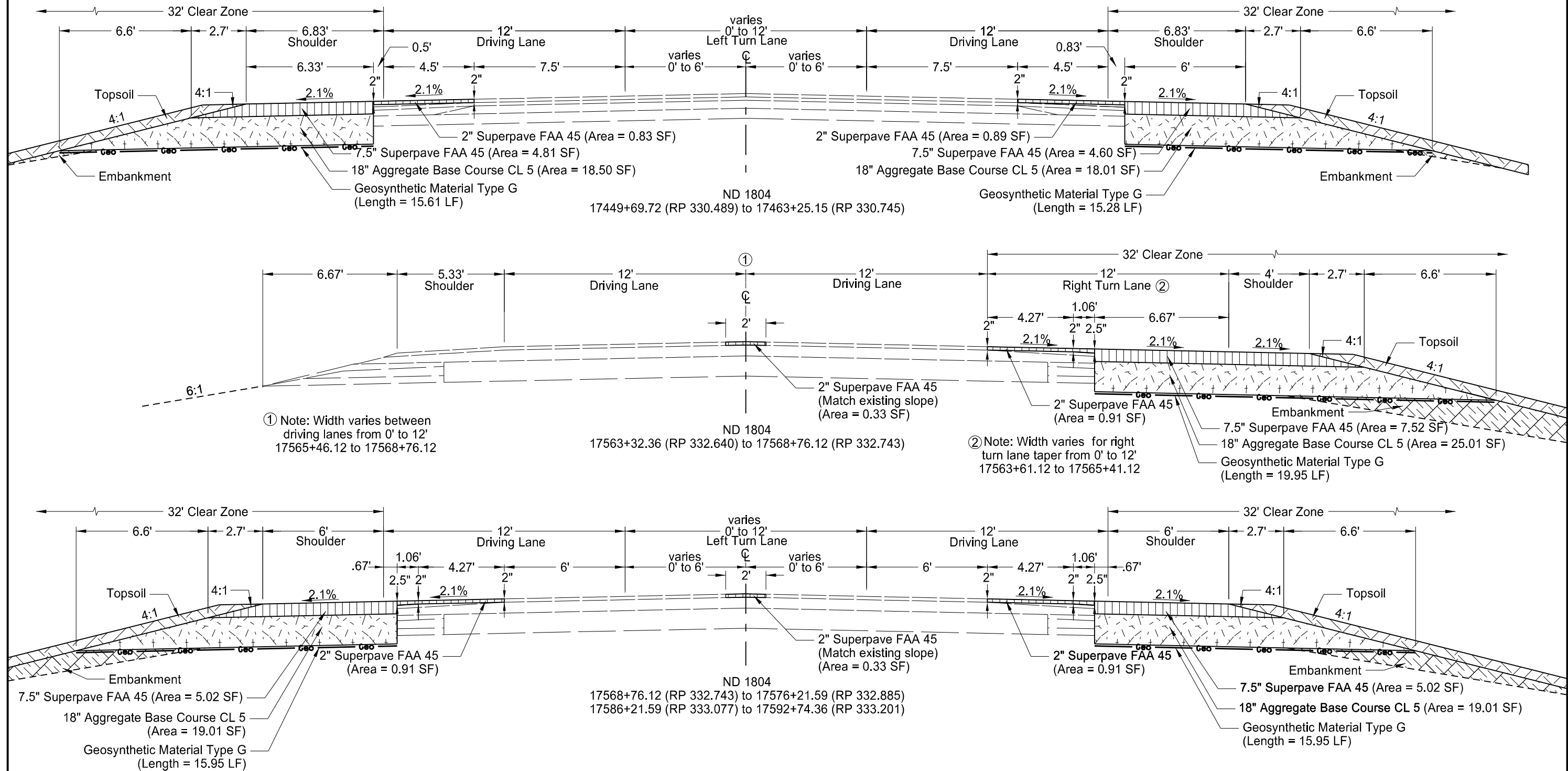
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772

DATE 5/21/25

NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	30	3



Proposed Typical Sections

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17449+69.72 to 17463+25.15

ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17563+32.36 to 17576+21.59
17586+21.59 to 17592+74.36

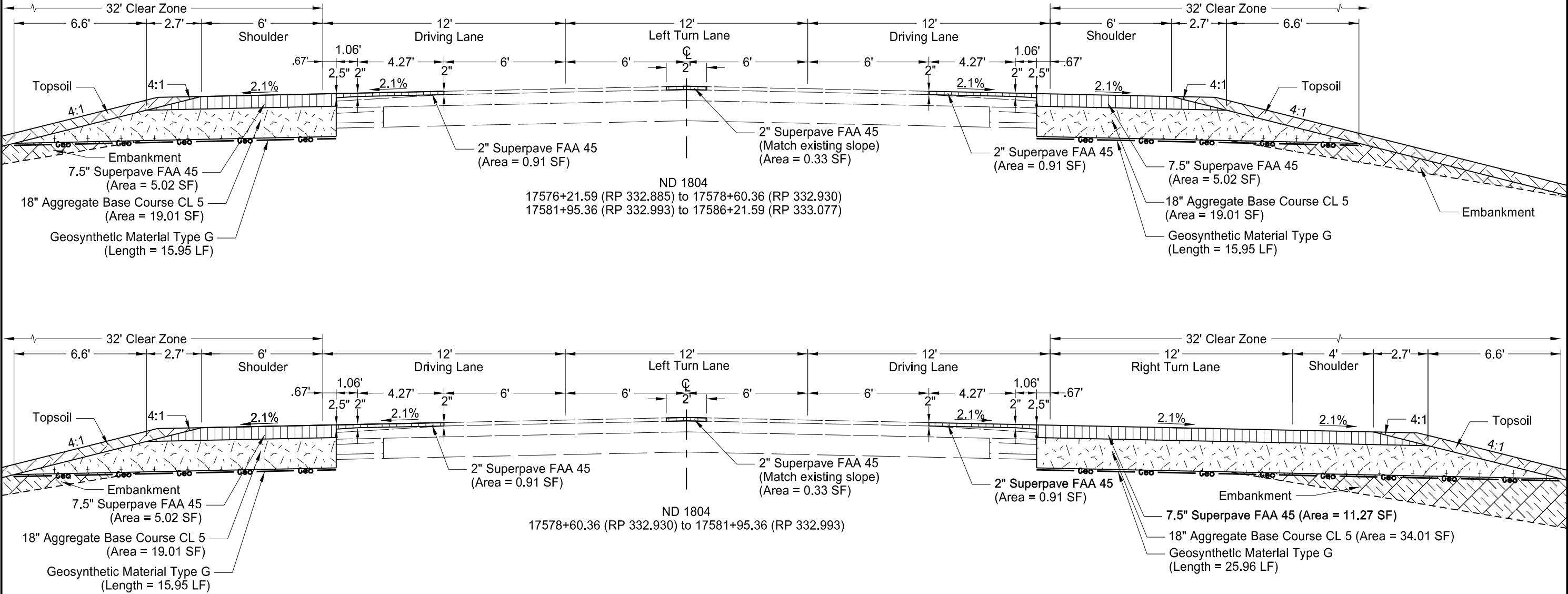
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772

DATE 5/21/25

NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	30	4

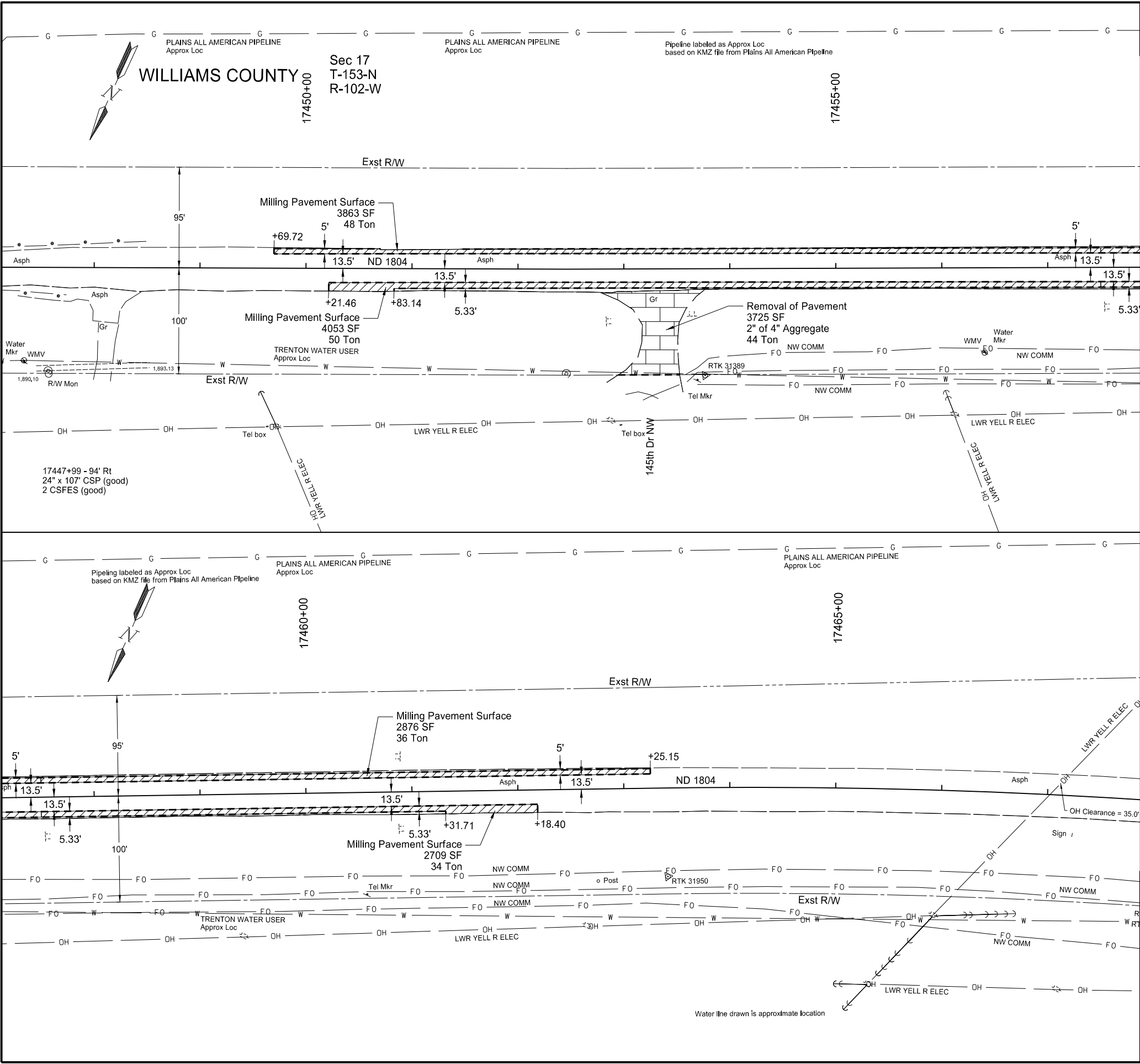


Proposed Typical Sections

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17576+21.59 to 17586+21.59

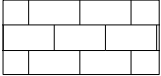




		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	40	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	136	REMOVAL OF PAVEMENT		
		145th Dr NW	TON	44
411	100	MILLING PAVEMENT SURFACE		
		17449+69.72 to 17457+50 Lt	TON	48
		17450+21.46 to 17457+50 Rt	TON	51
		17457+50 to 17463+25.15 Lt	TON	36
		17457+50 to 17462+18.40 Rt	TON	34

LEGEND



Removal of Pavement



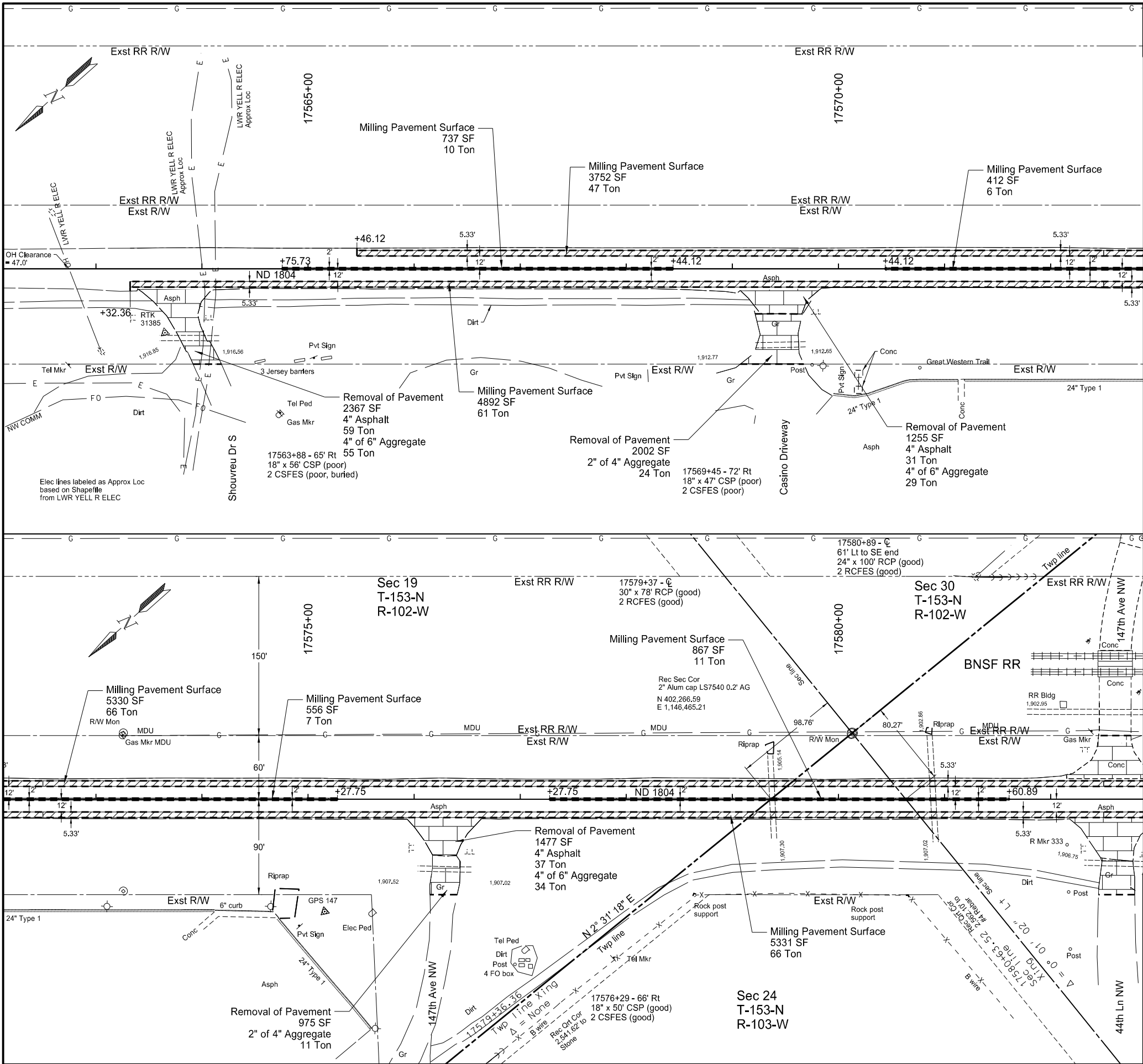
Milling Pavement Surface

Removals

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17449+69.72 to 17463+25.15

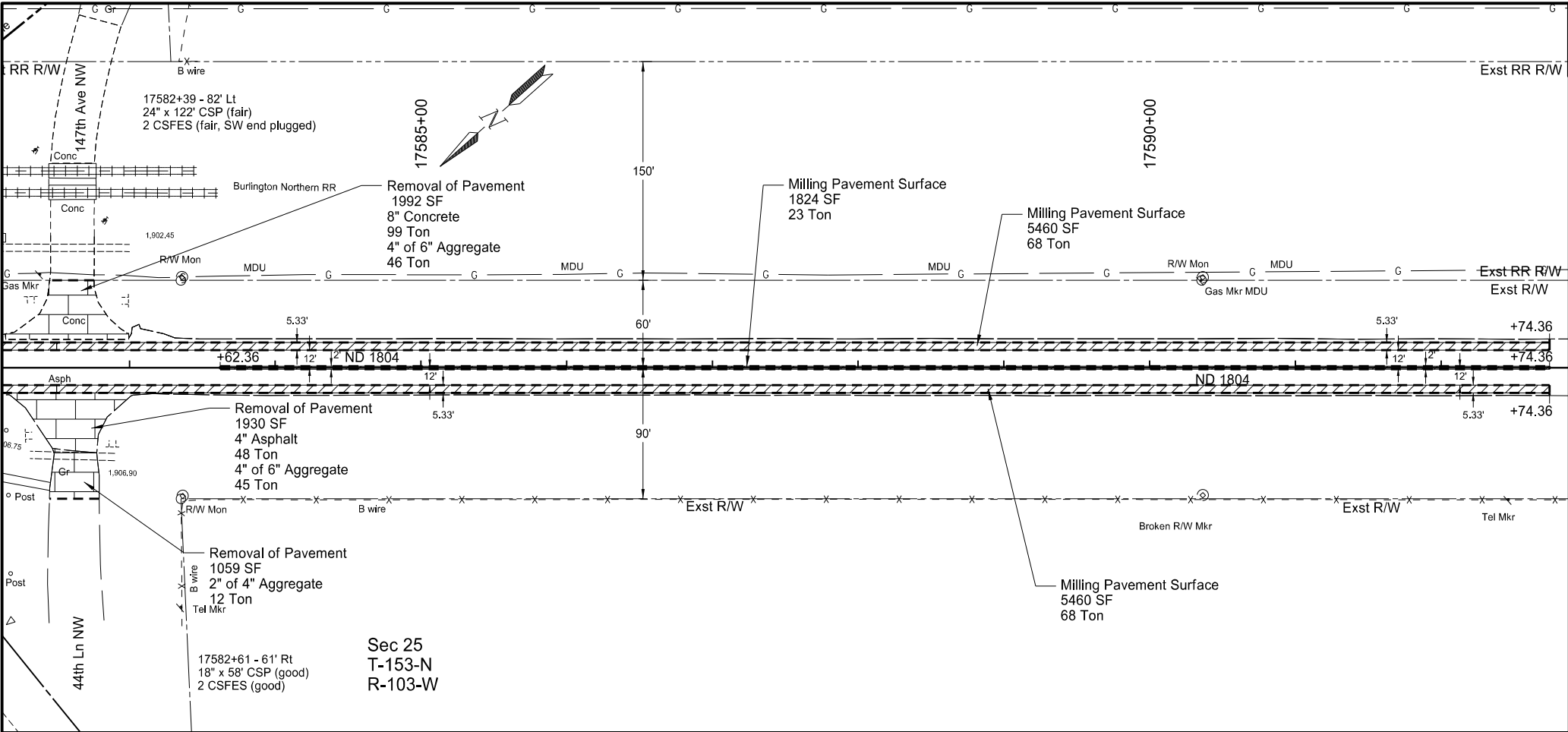




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	40	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	136	REMOVAL OF PAVEMENT		
		Shouveau Dr	TON	114
		Casino Driveway	TON	84
		147th Ave NW (Rt)	TON	82
411	100	MILLING PAVEMENT SURFACE		
		17563+32.36 to 17572+50 Rt	TON	61
		17564+75.73 to 17568+44.12 CL	TON	10
		17565+46.12 to 17572+50 Lt	TON	47
		17570+44.12 to 17572+50 CL	TON	6
		17572+50 to 17582+50 Rt	TON	66
		17572+50 to 17582+50 Lt	TON	66
		17572+50 to 17575+27.75 CL	TON	7
		17577+27.75 to 1781+60.89 CL	TON	11

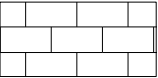
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	40	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	136	REMOVAL OF PAVEMENT		
		44th Ln NW	TON	105
		147th Ave NW (Lt)	TON	145
411	100	MILLING PAVEMENT SURFACE		
		17582+50 to 17592+74.36 Rt	TON	68
		17582+50 to 17592+74.36 Lt	TON	68
		17583+62.36 to 17592+74.36 CL	TON	23

LEGEND



Removal of Pavement



Milling Pavement Surface

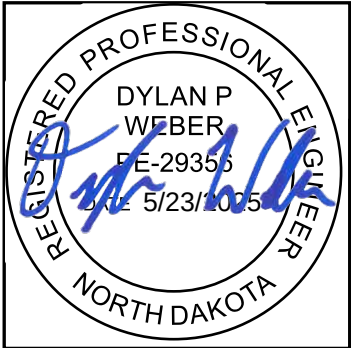
Removals

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW/147th Ave NW Intersection
17582+50 to 17592+74.36



HYDRAULIC DATA FOR PROJECT HES-7-804(075)330										
CHAIN	STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA	25-YEAR DATA				100-YEAR DATA	
					DESIGN DISCHARGE	DESIGN HEADWATER	DESIGN VELOCITY	DESIGN STAGE	100-YEAR DISCHARGE	100-YEAR STAGE
				(ACRES)	(CFS)	(FT)	(FPS)	(NAVD 88)	(CFS)	(NAVD 88)
SCL1804	17579+38 CL	30" RCP (A)	-	342.9	164	5.70	7.76	1913.38	265	1913.52
	17580+89 CL	24" RCP (B)	-			5.90	18.65			
(A) Existing culvert to be extended with 42" RCP. Connect existing 30" RCP to the Proposed 42" RCP with 72" Manhole (B) Existing culvert to be extended on upstream end.										



Culvert Hydraulic Data

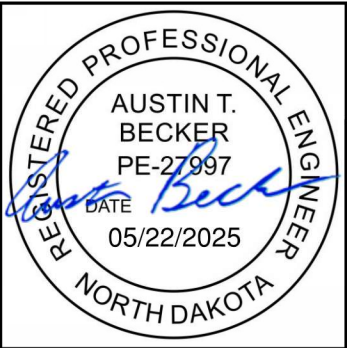
ND 1804
Marley Xing to 0.5 Miles N of Trenton

MANHOLE SUMMARY

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	50	2

Manhole No. 1 – 72 In.
Sta 17579+36.1 – 32.2’ Lt
Top Elev. 1911.89
Base Elev. 1904.22
Invert Elev. 1904.73
Riser 6.0 ft

30 In RCP N (existing) 1905.54
42 In Conduit S 1904.73



Manhole Summary
ND 1804
Marley Xing to 0.5 Miles N of Trenton

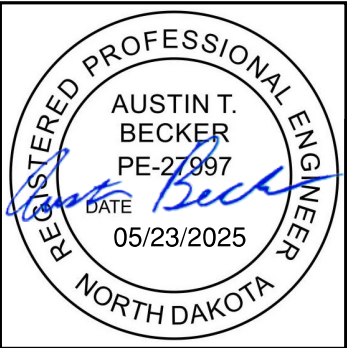
Chain	Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill	
					In	Bid Item	LF		In	Type		In		SY	EA		EA
OCL_Shouvreu	4+19	29' Rt	4+40	36' Lt	36	Pipe Conduit-Approach	68	Reinforced Concrete Pipe - Class III (barrel length = 64 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								
	4+40	33' Rt	4+45	35' Lt	36	Pipe Conduit-Approach	68	Reinforced Concrete Pipe - Class III (barrel length = 64 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								
OCL_Casino	3+80	40' Lt	3+80	37' Rt	36	Pipe Conduit-Approach	77	Reinforced Concrete Pipe - Class III (barrel length = 72 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								
	3+90	40' Lt	3+90	37' Rt	36	Pipe Conduit-Approach	77	Reinforced Concrete Pipe - Class III (barrel length = 72 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								
OCL_147W	3+30	30' Lt	3+30	33' Rt	36	Pipe Conduit-Approach	62	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								
	3+40	30' Lt	3+40	33' Rt	36	Pipe Conduit-Approach	62	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	36					FES	FES	Specification 714.04 A	
								Corrugated Steel Pipe	36	A, P	2	0.064					
								Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064					
								High-Density Polyethylene	36								
								Polypropylene Pipe (AASHTO M330, Type S)	36								

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

Coatings: 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 1804
Marley Xing to 0.5 Miles N of Trenton

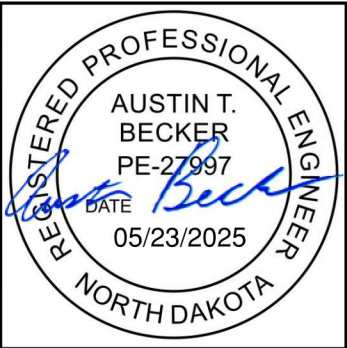
Chain	Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill
					In	Bid Item	LF		In	Type		In		SY	EA	EA
SCL1804	17579+36	35' Lt	17579+35	52' Lt	42	Pipe Conduit	16	Reinforced Concrete Pipe - Class III (barrel length = 14 LF)	42					FES		See Section 20
								Corrugated Steel Pipe	42	A	2	0.138				
								Corrugated Steel Pipe	42	P	2	0.064				
								Spiral Rib Steel Pipe	42	A, P	3/4, 1	0.064				
								High-Density Polyethylene	42							
OCL_44	6+35	35' Lt	6+35	30' Rt	42	Pipe Conc. Reinf. CL III (Extension)	10	Reinforced Concrete Pipe - Class III (barrel length = 10 LF)	30					TES		See Section 20
								Reinforced Concrete Pipe - Class III (barrel length = 8 LF)	24							
								Reinforced Concrete Pipe - Class III (barrel length = 60 LF)	42							
								Corrugated Steel Pipe	42	A, P	2	0.064				
						Pipe Conc. Reinf. CL III (Extension)	8	Spiral Rib Steel Pipe	42	A, P	3/4, 1	0.064		FES	FES	Specification 714.04 A
								High-Density Polyethylene	42							

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

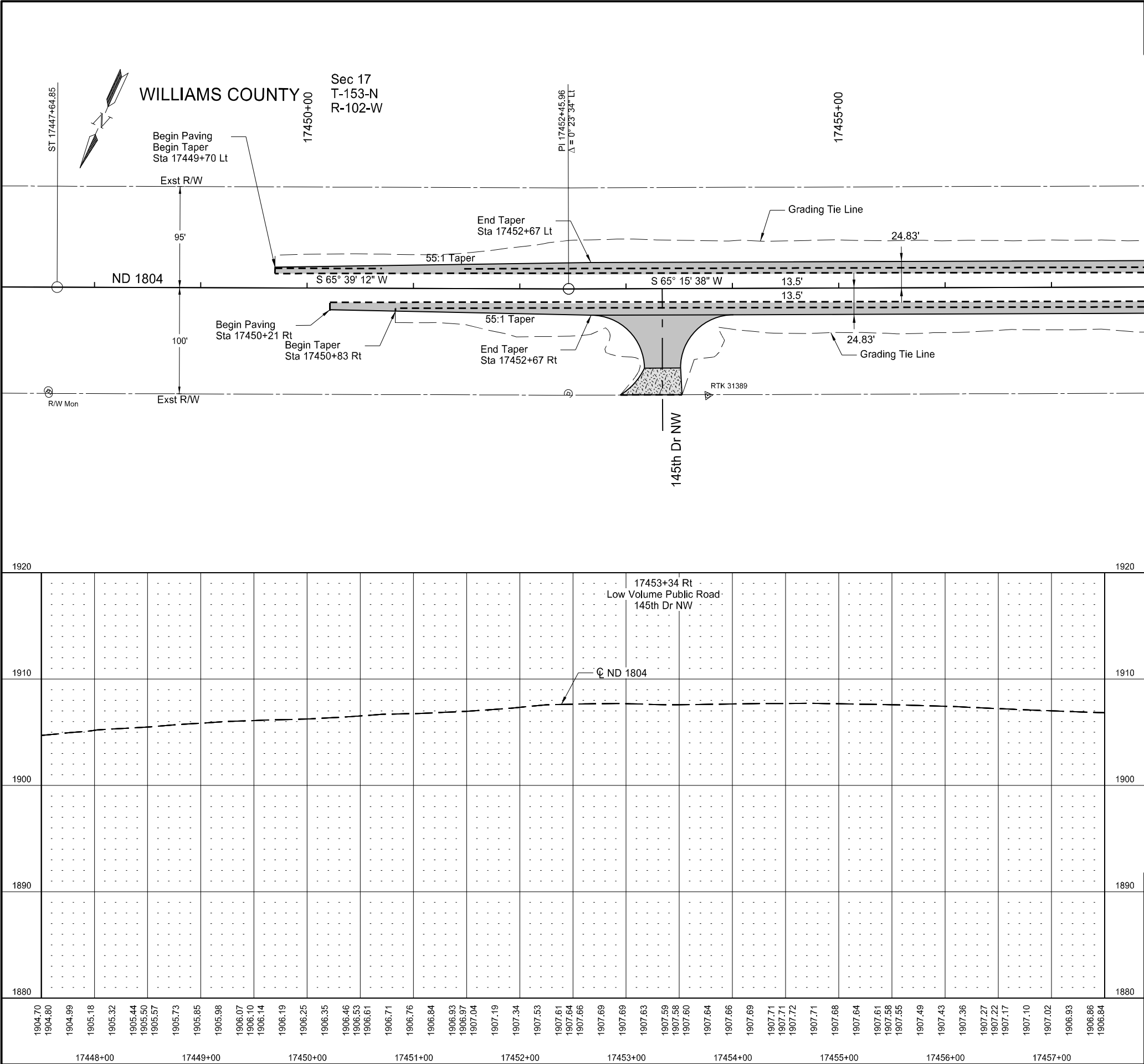
Coatings: Z = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

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 1804
Marley Xing to 0.5 Miles N of Trenton



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	60	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	0120	AGGREGATE BASE COURSE CL 5		
		17449+70 to 17457+50 Lt	TON	922
		17450+83 to 17457+50 Rt	TON	717
401	0050	TACK COAT		
		17449+70 to 17457+50 Lt - 1st Lift	GAL	31.0
		17450+83 to 17457+50 Rt - 1st Lift	GAL	25.8
		17449+70 to 17457+50 Lt - 2nd Lift	GAL	27.1
		17450+83 to 17457+50 Rt - 2nd Lift	GAL	23.1
		17449+70 to 17457+50 Lt - Milling	GAL	24.6
		17450+21 to 17457+50 Rt - Milling	GAL	25.3
401	0060	PRIME COAT		
		17449+70 to 17457+50 Lt	GAL	244.6
		17450+83 to 17457+50 Rt	GAL	199.7
401	0160	BLOTTER MATERIAL CL 44		
		17449+70 to 17457+50 Lt	TON	6
		17450+83 to 17457+50 Rt	TON	5
430	0045	SUPERPAVE FAA 45		
		17449+70 to 17457+50 Lt	TON	279
		17450+21 to 17457+50 Rt	TON	254
430	5818	PG 58H-34 ASPHALT CEMENT		
		17449+70 to 17457+50 Lt	TON	16.8
		17450+21 to 17457+50 Rt	TON	15.3
709	0100	GEOSYNTHETIC MATERIAL TYPE G		
		17449+70 to 17457+50 Lt	SY	1267
		17450+83 to 17457+50 Rt	SY	958

LEGEND

Superpave FAA 45

Aggregate Base Course CL 5
(See Section 60 Sheet 3)

Grading Tie Line

Plan & Profile

ND 1804
Marley Xing to 0.5 Miles N of Trenton

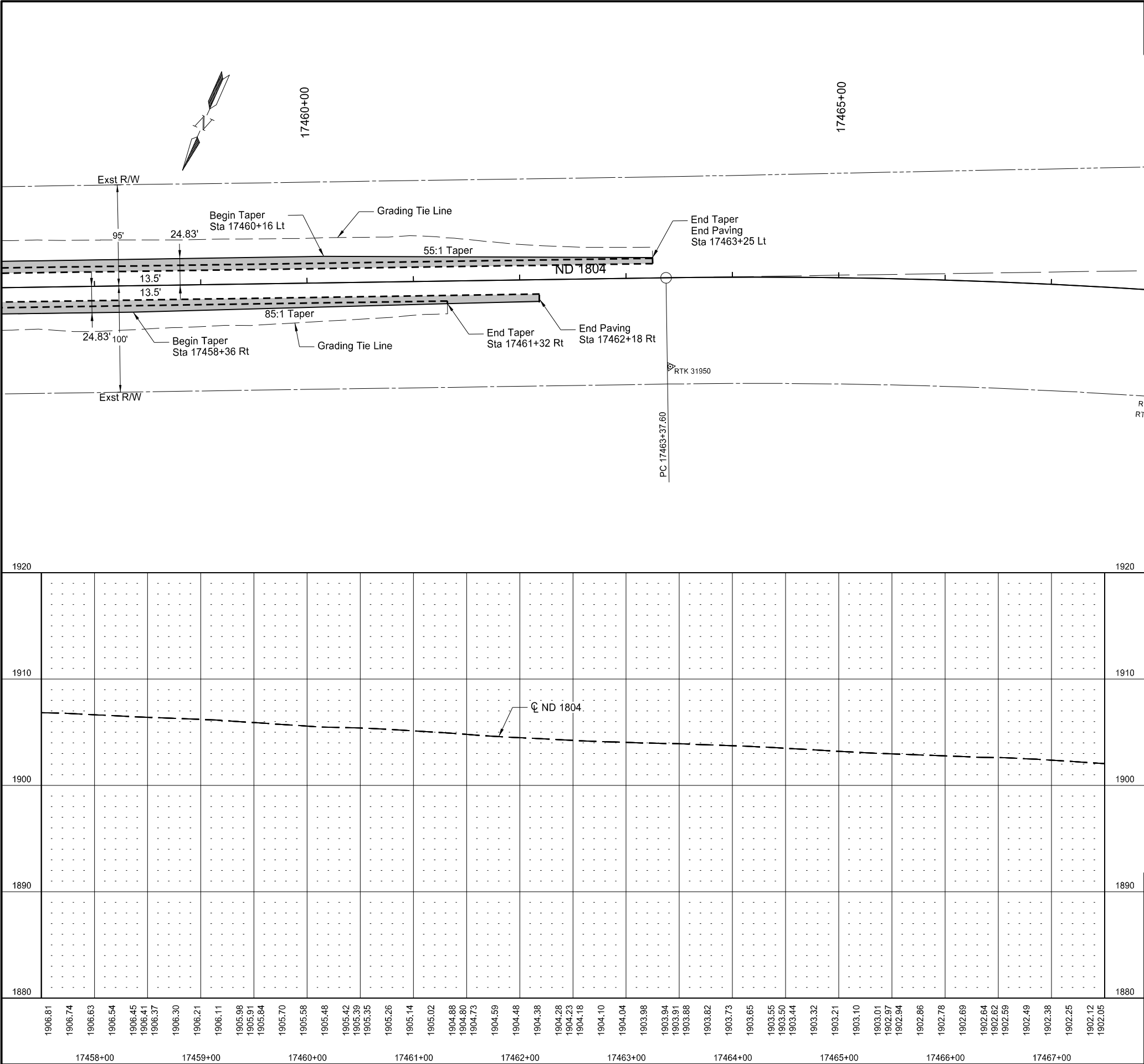
ND 1804 & 145th Dr NW Intersection
17449+70 to 17457+50

REGISTERED PROFESSIONAL ENGINEER

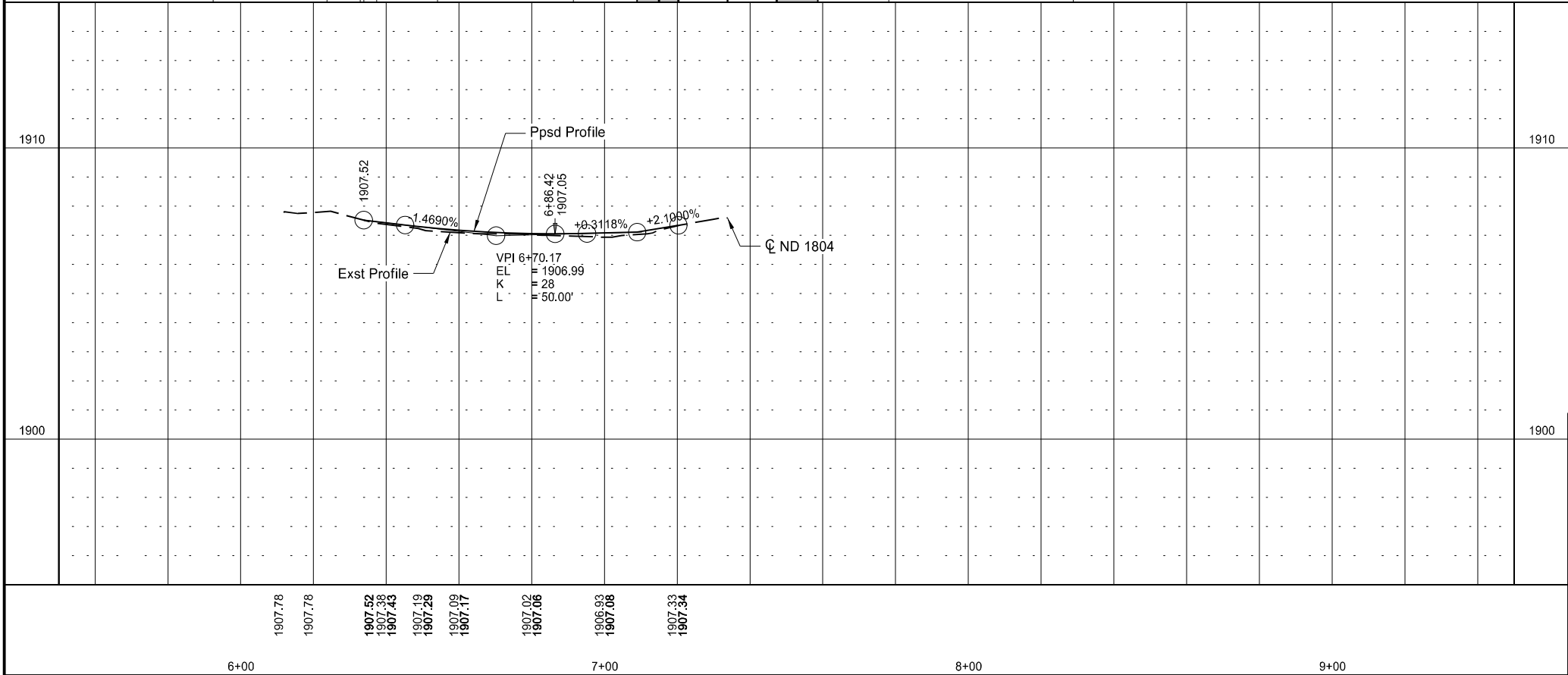
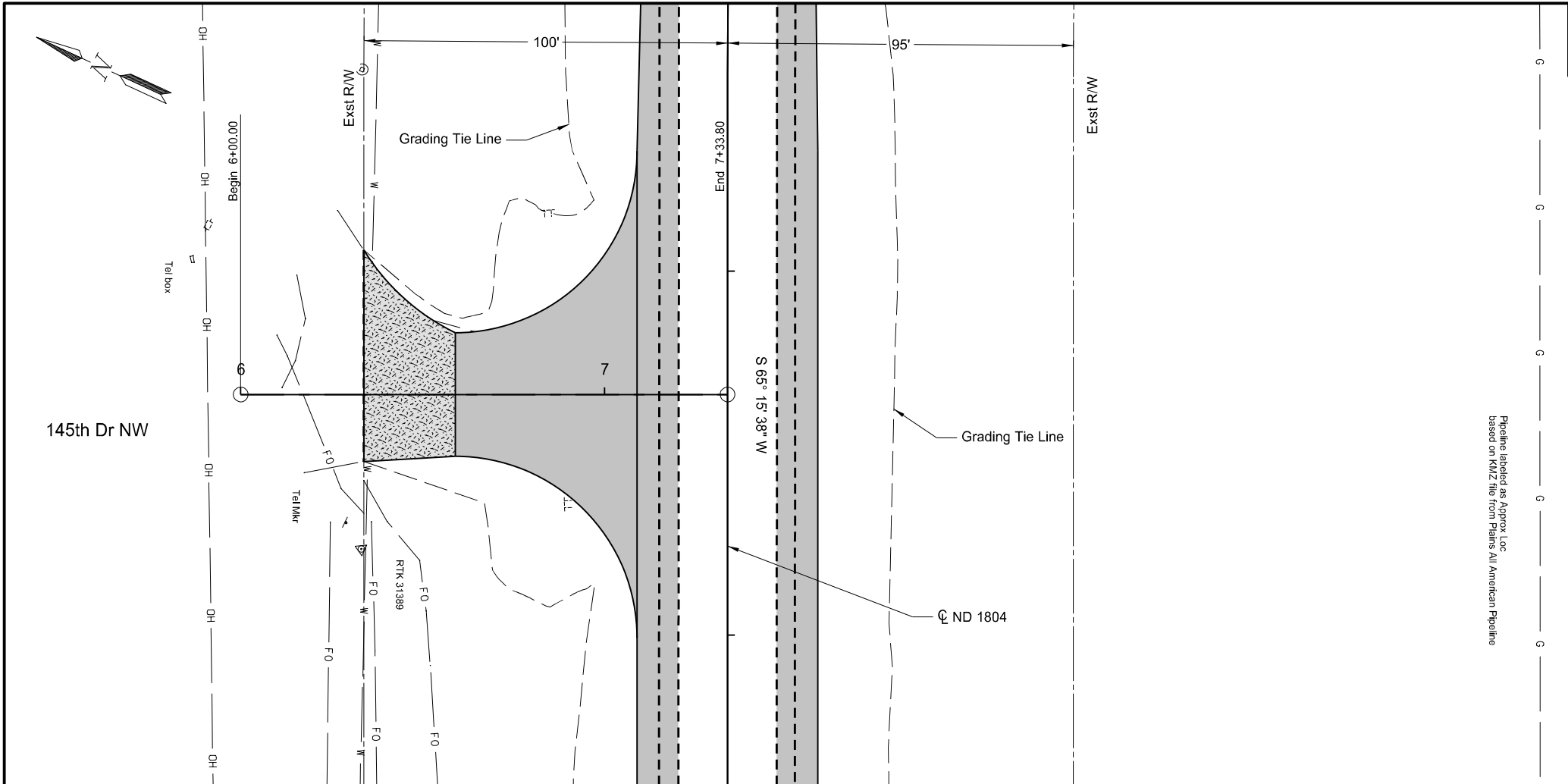
AUSTIN T. BECKER
PE-27997

DATE 05/23/2025

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
			60	2
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	0120	AGGREGATE BASE COURSE CL 5		
		17457+50 to 17461+32 Rt	TON	424
		17457+50 to 17463+25 Lt	TON	649
401	0050	TACK COAT		
		17457+50 to 17461+32 Rt - 1st Lift	GAL	13.7
		17457+50 to 17463+25 Lt - 1st Lift	GAL	21.2
		17457+50 to 17461+32 Rt - 2nd Lift	GAL	11.8
		17457+50 to 17463+25 Lt - 2nd Lift	GAL	18.3
		17457+50 to 17462+18 Rt - Milling	GAL	16.9
		17457+50 to 17463+25 Lt - Milling	GAL	18.2
401	0060	PRIME COAT		
		17457+50 to 17461+32 Rt	GAL	109.5
		17457+50 to 17463+25 Lt	GAL	168.8
401	0160	BLOTTER MATERIAL CL 44		
		17457+50 to 17461+32 Rt	TON	3
		17457+50 to 17463+25 Lt	TON	4
430	0045	SUPERPAVE FAA 45		
		17457+50 to 17462+18 Rt	TON	140
		17457+50 to 17463+25 Lt	TON	201
430	5818	PG 58H-34 ASPHALT CEMENT		
		17457+50 to 17462+18 Rt	TON	8.4
		17457+50 to 17463+25 Lt	TON	12.1
709	0100	GEOSYNTHETIC MATERIAL TYPE G		
		17457+50 to 17461+32 Rt	SY	591
		17457+50 to 17463+25 Lt	SY	902
LEGEND				
			Superpave FAA 45	
---			Grading Tie Line	
Plan & Profile				
ND 1804				
Marley Xing to 0.5 Miles N of Trenton				
ND 1804 & 145th Dr NW Intersection				
17457+50 to 17463+25				
			AUSTIN T. BECKER	
			PE-27997	
			DATE 05/23/2025	
			REGISTERED PROFESSIONAL ENGINEER	
			NORTH DAKOTA	



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	60	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	0120	AGGREGATE BASE COURSE CL 5		
		6+34 to 6+59	TON	43
		6+59 to 7+09	TON	317
401	0050	TACK COAT		
		6+59 to 7+09 - 1st Lift	GAL	15.5
		6+59 to 7+09 - 2nd Lift	GAL	7.8
430	0045	SUPERPAVE FAA 45		
		6+59 to 7+09	TON	111
430	5818	PG 58H-34 ASPHALT CEMENT		
		6+59 to 7+09	TON	6.7

LEGEND

Superpave FAA 45

Aggregate Base Course CL 5

Grading Tie Line

Plan & Profile

ND 1804
Marley Xing to 0.5 Miles N of Trenton

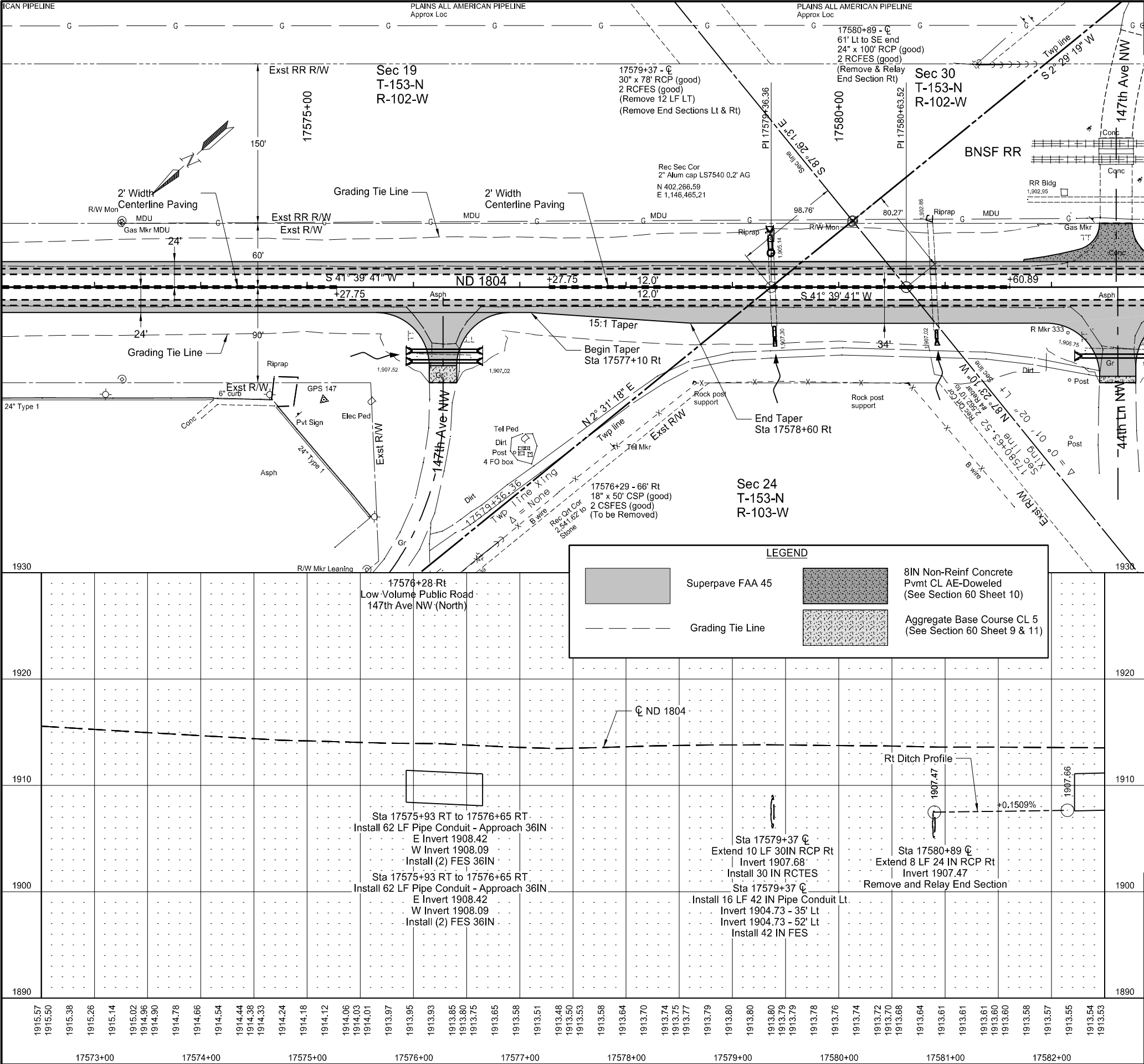
145th Dr NW & ND 1804 Intersection
6+00 to 7+33.80

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PE-27997

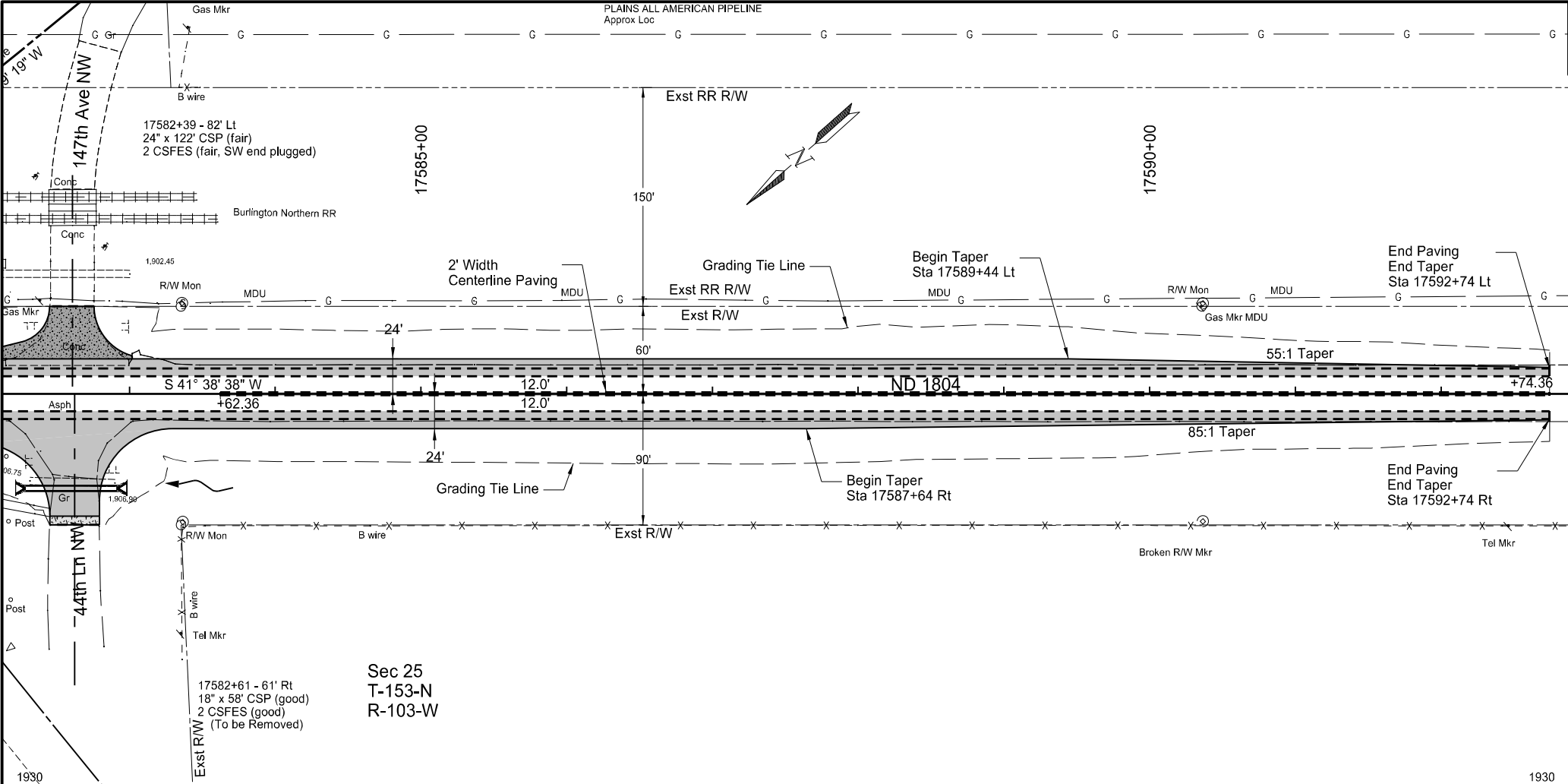
DATE 05/23/2025

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	60	5
SPEC	CODE	BID ITEM	UNIT	QUANTITY	
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES			
		17579+37 Rt	EA	1	
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES			
		17576+29 Rt	LF	50	
		17579+36 - 29.5' Lt to 17579+36 - 41.5' Lt	LF	12	
302	0120	AGGREGATE BASE COURSE CL 5			
		17572+50 to 17582+50 Lt	TON	1273	
		17572+50 to 17582+50 Rt	TON	1680	
401	0050	TACK COAT			
		17572+50 to 17582+50 Lt - 1st Lift	GAL	46.4	
		17572+50 to 17582+50 Rt - 1st Lift	GAL	70.5	
		17572+50 to 17582+50 Lt - 2nd Lift	GAL	41.7	
		17572+50 to 17582+50 Rt - 2nd Lift	GAL	66.4	
		17572+50 to 17582+50 Lt - Milling	GAL	33.4	
		17572+50 to 17582+50 Rt - Milling	GAL	33.4	
		17572+50 to 17575+27.75 CL - Milling	GAL	5.2	
		17577+27.75 to 17581+60.89 CL - Milling	GAL	8.1	
401	0060	PRIME COAT			
		17572+50 to 17582+50 Lt	GAL	357.5	
		17572+50 to 17582+50 Rt	GAL	522.8	
401	0160	BLOTTER MATERIAL CL 44			
		17572+50 to 17582+50 Lt	TON	8	
		17572+50 to 17582+50 Rt	TON	12	
430	0045	SUPERPAVE FAA 45			
		17572+50 to 17582+50 Lt	TON	433	
		17572+50 to 17582+50 Rt	TON	637	
		17572+50 to 17575+27.75 CL	TON	7	
		17577+27.75 to 17581+60.89 CL	TON	11	
430	5818	PG 58H-34 ASPHALT CEMENT			
		17572+50 to 17582+50 Lt	TON	26	
		17572+50 to 17582+50 Rt	TON	38.3	
		17572+50 to 17575+27.75 CL	TON	0.5	
		17577+27.75 to 17581+60.89 CL	TON	0.7	
709	0100	GEOSYNTHETIC MATERIAL TYPE G			
		17572+50 to 17582+50 Lt	SY	1694	
		17572+50 to 17582+50 Rt	SY	2091	
714	0615	PIPE CONC REINF 24IN CL III			
		17580+92 - 40' Rt to 17580+92 - 48' Rt	LF	8	
714	0820	PIPE CONC REINF 30IN CL III			
		17579+39 - 37' Rt to 17579+40 - 47' Rt	LF	10	
714	3033	END SECT-TRAVERSABLE REINF. CONC.30IN			
		17579+40 - 47' Rt	EA	1	
714	4120	PIPE CONDUIT 42IN			
		17579+36 - 35' Lt to 17579+35 - 52' Lt	LF	16	
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES			
		17580+89 Rt	EA	1	
722	0120	MANHOLE 72IN			
		17579+36.1 - 32.2' Lt	EA	1	
722	1120	MANHOLE RISER 72IN			
		17579+36 - 32' Lt	LF	6	
754	0805	OBJECT MARKERS - CULVERTS			
		17579+37 Rt & Lt	EA	2	
		17580+89 Rt	EA	1	

Plan & Profile ND 1804 Marley Xing to 0.5 Miles N of Trenton ND 1804 & Casino Approach Intersection ND 1804 & 44th Ln NW/147th Ave NW Intersection 17572+50 to 17582+50	REGISTERED PROFESSIONAL ENGINEER AUSTIN T. BECKER PE-27997 DATE 05/23/2025 NORTH DAKOTA
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1920	17582+61 Lt Low Volume Public Road 147th Ave NW (South)																1920																																									
	17582+62 Rt Low Volume Public Road 44th Lane NW (Co Rd 2)																																																									
1910	C ND 1804																1910																																									
1900	Sta 17582+22 RT to 17582+98 RT Install 65 LF Pipe Conduit - Approach 42IN E Invert 1907.58 W Invert 1907.82 Install (2) FES 42IN																1900																																									
1890																	1890																																									
1913.53	1913.53	1913.53	1913.53	1913.53	1913.53	1913.54	1913.54	1913.55	1913.57	1913.60	1913.61	1913.62	1913.62	1913.67	1913.73	1913.80	1913.84	1913.87	1913.95	1914.02	1914.07	1914.13	1914.15	1914.17	1914.20	1914.24	1914.28	1914.32	1914.33	1914.33	1914.35	1914.37	1914.41	1914.45	1914.47	1914.49	1914.53	1914.57	1914.58	1914.59	1914.61	1914.63	1914.66	1914.71	1914.76	1914.82	1914.84	1914.85	1914.89	1914.95	1915.03	1915.11	1915.13	1915.14	1915.18	1915.22	1915.26	1915.31
17583+00				17584+00				17585+00				17586+00				17587+00				17588+00				17589+00				17590+00				17591+00				17592+00																						

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	60	6

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES		
		17582+61 Rt	LF	58
302	0120	AGGREGATE BASE COURSE CL 5		
		17582+50 to 17592+74 Lt	TON	1218
		17582+50 to 17592+74 Rt	TON	1169
401	0050	TACK COAT		
		17582+50 to 17592+74 Lt - 1st Lift	GAL	42.3
		17582+50 to 17592+74 Rt - 1st Lift	GAL	40.3
		17582+50 to 17592+74 Lt - 2nd Lift	GAL	37.4
		17582+50 to 17592+74 Rt - 2nd Lift	GAL	35.5
		17582+50 to 17592+74 Lt - Milling	GAL	34.2
		17582+50 to 17592+74 Rt - Milling	GAL	34.2
		17583+62.36 to 17592+74.36 CL - Milling	GAL	17.0
401	0060	PRIME COAT		
		17582+50 to 17592+74 Lt	GAL	330.5
		17582+50 to 17592+74 Rt	GAL	315.7
401	0160	BLOTTER MATERIAL CL 44		
		17582+50 to 17592+74 Lt	TON	8
		17582+50 to 17592+74 Rt	TON	7
430	0045	SUPERPAVE FAA 45		
		17582+50 to 17592+74 Lt	TON	400
		17582+50 to 17592+74 Rt	TON	384
		17583+62.36 to 17592+74 CL	TON	23
430	5818	PG 58H-34 ASPHALT CEMENT		
		17582+50 to 17592+74 Lt	TON	24.0
		17582+50 to 17592+74 Rt	TON	23.1
		17583+62.36 to 17592+74 CL	TON	1.4
709	0100	GEOSYNTHETIC MATERIAL TYPE G		
		17582+50 to 17592+74 Lt	SY	1653
		17582+50 to 17592+74 Rt	SY	1590

LEGEND

Superpave FAA 45

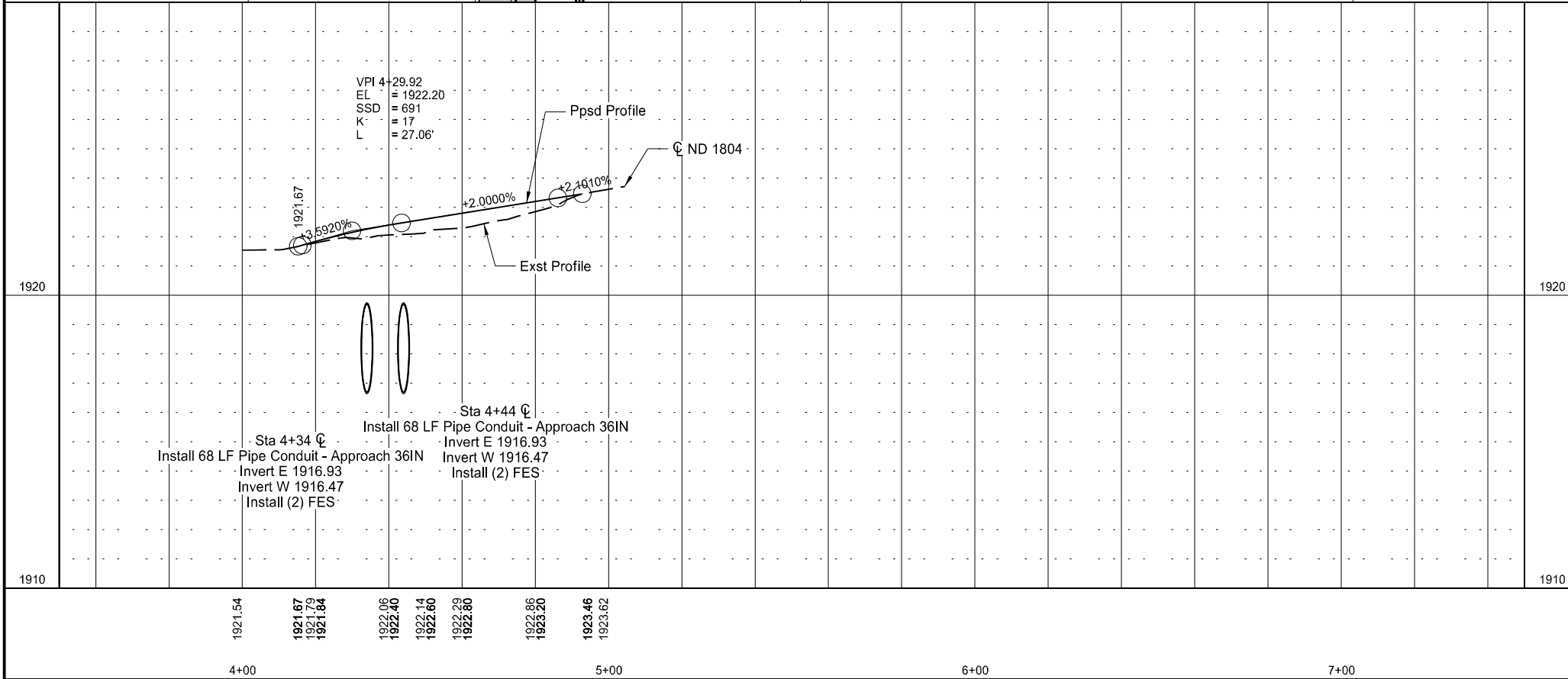
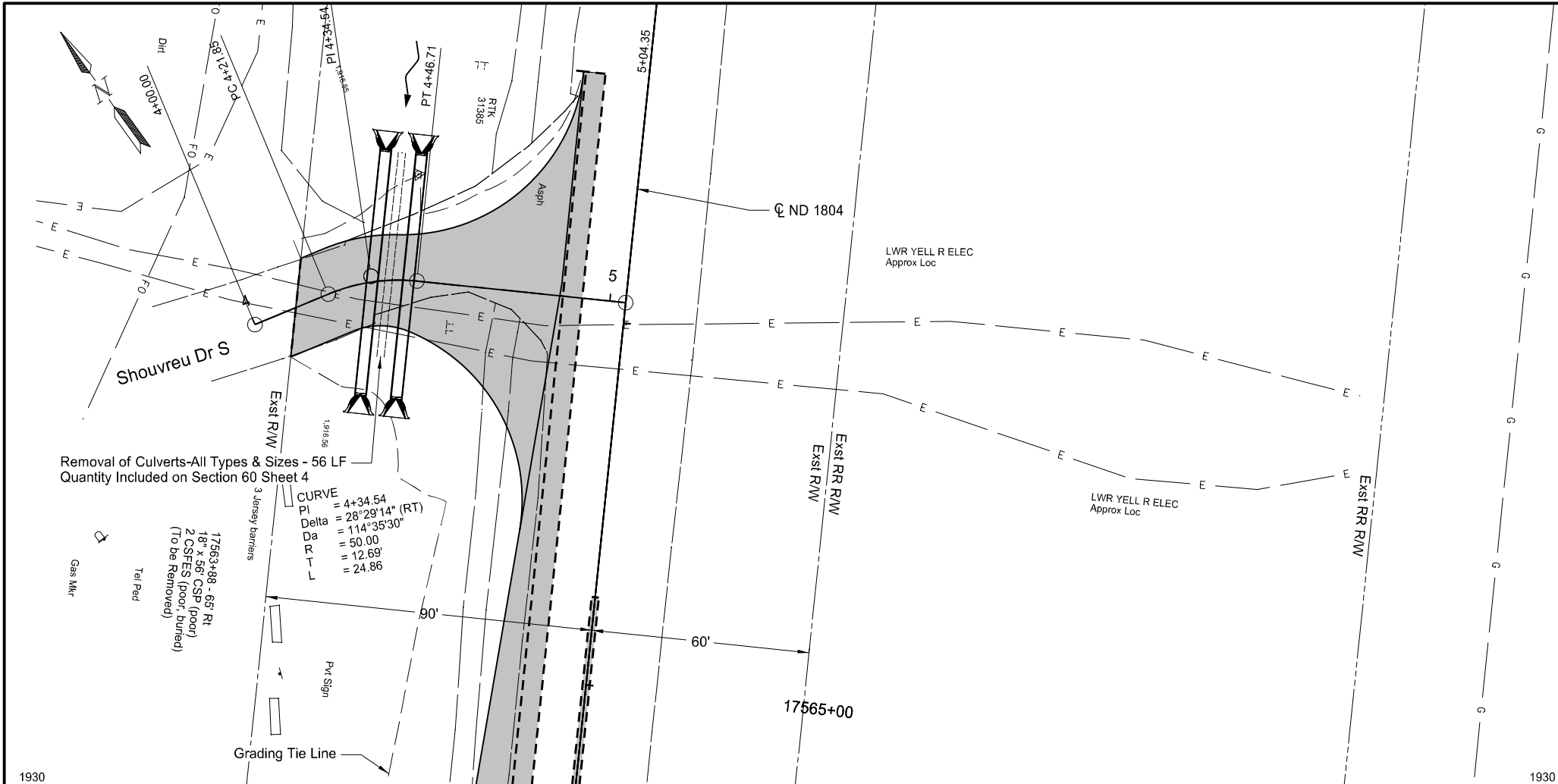
Aggregate Base Course CL 5
(See Section 60 Sheet 11)

8IN Non-Reinf Concrete
Pvmt CL AE-Doweled
(See Section 60 Sheet 10)

— — — — —

Grading Tie Line

Plan & Profile	REGISTERED PROFESSIONAL ENGINEER AUSTIN T. BECKER PE-27997 DATE 05/23/2025 Becker REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA
ND 1804	
Marley Xing to 0.5 Miles N of Trenton	
ND 1804 & 44th Ln NW/147th Ave NW Intersection	
17582+50 to 17592+74	



STATE		PROJECT NO.		SECTION NO.	SHEET NO.
ND		HES-7-804(075)330		60	7
SPEC	CODE	BID ITEM	UNIT	QUANTITY	
302	0120	AGGREGATE BASE COURSE CL 5	TON	341	
		4+12 to 4+86			
401	0050	TACK COAT	GAL	16.4	
		4+12 to 4+86 - 1st Lift			
		4+12 to 4+86 - 2nd Lift	GAL	8.2	
430	0045	SUPERPAVE FAA 45	TON	112	
		4+12 to 4+86			
430	5818	PG 58H-34 ASPHALT CEMENT	TON	6.8	
		4+12 to 4+86			
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	68	
		4+19 - 29' Rt to 4+40 - 36' Lt			
		4+40 - 33' Rt to 4+45 - 35' Lt	LF	68	

Plan & Profile

ND 1804
Marley Xing to 0.5 Miles N of Trenton

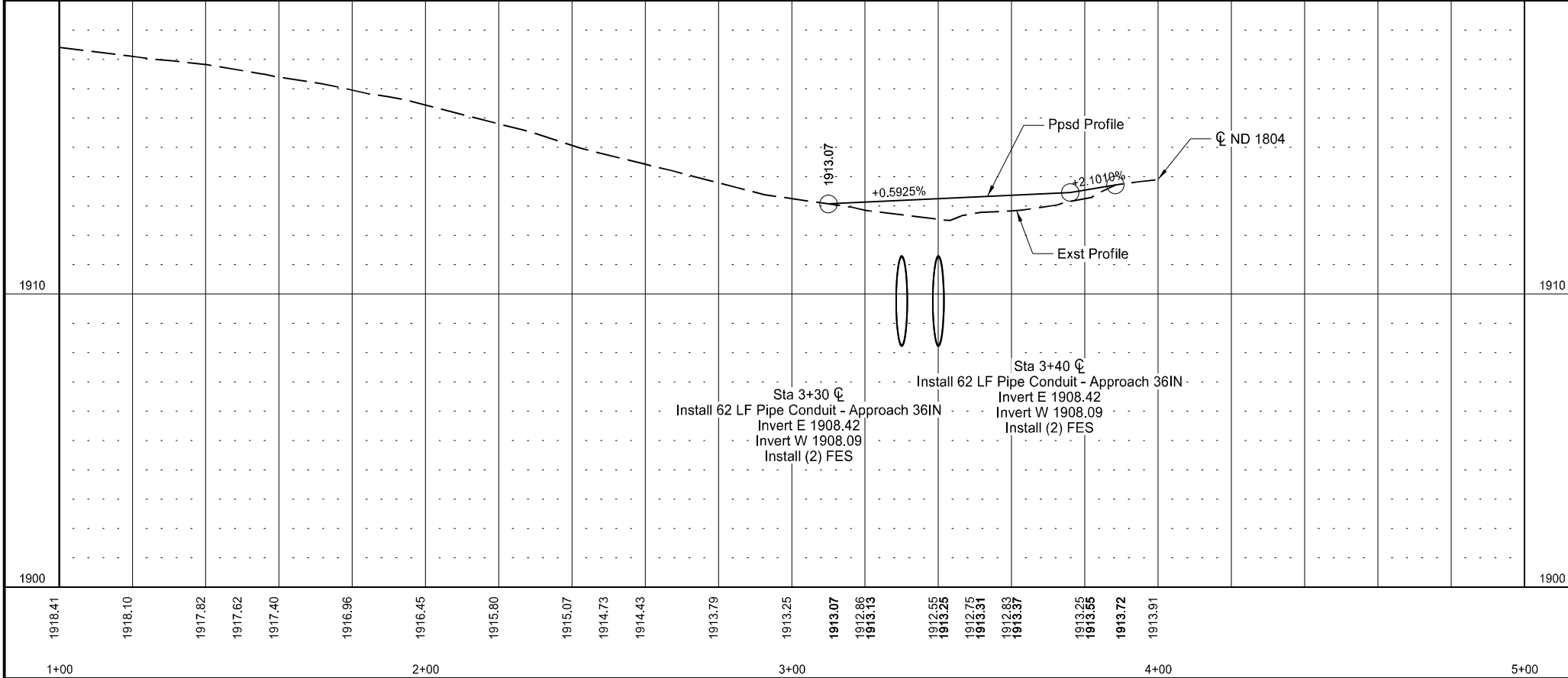
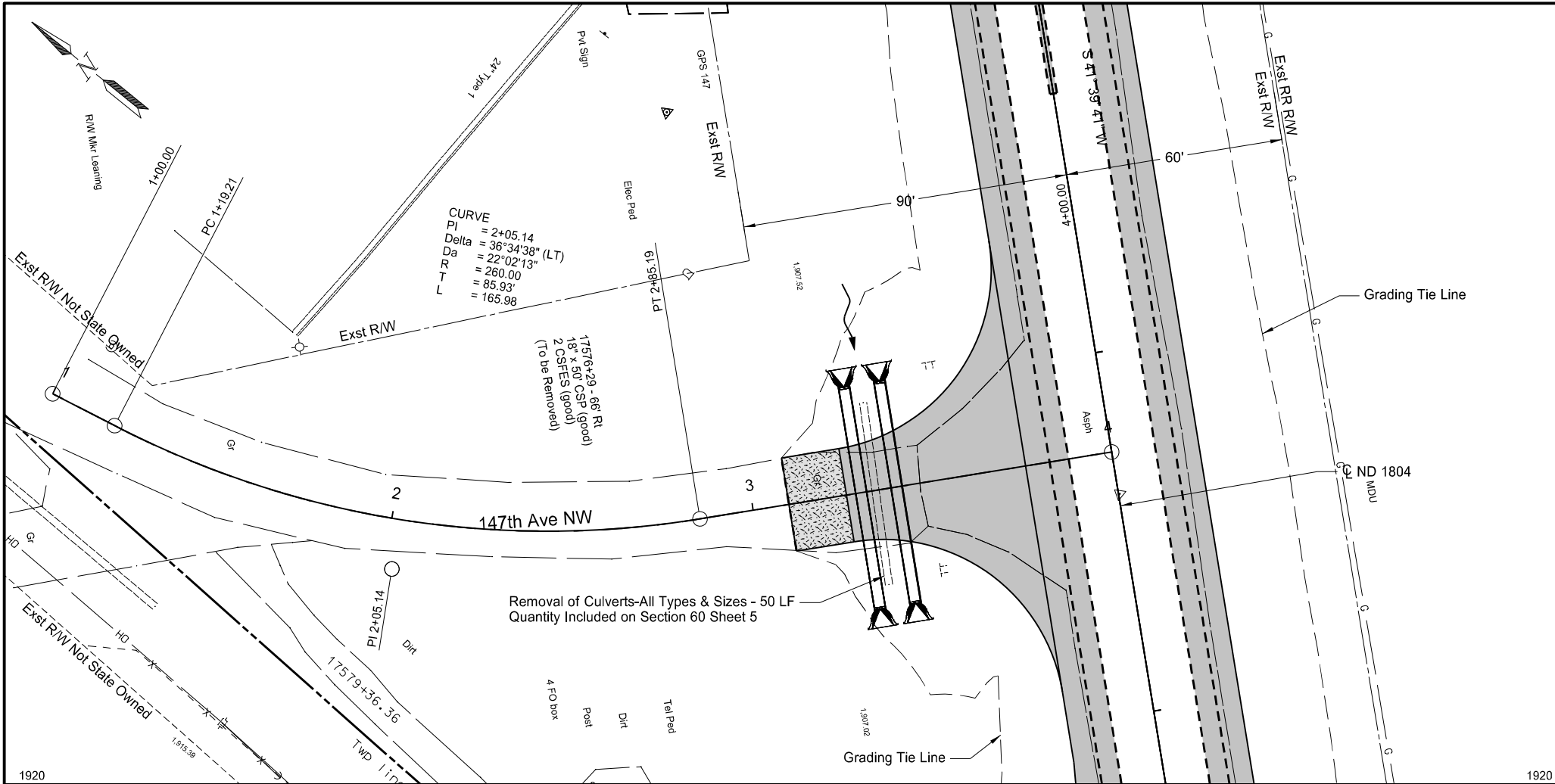
Shouvreu Drive & ND 1804 Intersection
Low Volume Public Road
4+00 to 5+04.35

REGISTERED PROFESSIONAL ENGINEER

AUSTIN T. BECKER
PE-27997

DATE 05/23/2025

NORTH DAKOTA



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		HES-7-804(075)330	60	9

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	0120	AGGREGATE BASE COURSE CL 5		
		3+10 to 3+26	TON	16
		3+26 to 3+76	TON	283
401	0050	TACK COAT		
		3+26 to 3+76 - 1st Lift	GAL	13.2
		3+26 to 3+76 - 2nd Lift	GAL	6.6
430	0045	SUPERPAVE FAA 45		
		3+26 to 3+76	TON	97
430	5818	PG 58H-34 ASPHALT CEMENT		
		3+26 to 3+76	TON	6
714	4116	PIPE CONDUIT 36IN-APPROACH		
		3+30 - 30' Lt to 3+30 - 33' Rt	LF	62
		3+40 - 30' Lt to 3+40 - 33' Rt	LF	62

LEGEND

- Superpave FAA 45
- Aggregate Base Course CL 5
- Grading Tie Line

Plan & Profile

ND 1804
Marley Xing to 0.5 Miles N of Trenton

147th Ave NW & ND 1804 Intersection
Low Volume Public Road
1+00 to 4+00

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 05/23/2025
NORTH DAKOTA

Wetland Impact Table												
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impact					Wetland Mitigation		
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS
1	Sec 19 T-153-N R-102-W	Ditch	Created	N	0.010	0.006	0	0	0	N	N	N
2	Sec 19 T-153-N R-102-W	Ditch	Created	N	0.018	0.027	0	0	0	N	N	N
3	Sec 19 T-153-N R-102-W	Ditch	Created	N	0.008	0.005	0	0	0	N	N	N
4	Sec 19 T-153-N R-102-W	Ditch	Created	N	0.016	0.003	0	0	0	N	N	N
6	Sec 6 T-152-N R-103-W	Ditch	Created	Y	0	0	0	0	0	N	N	N
7	Sec 34 T-153-N R-103-W	Adjacent Basin	Natural	Y	0	0	0	0	0	N	N	N
8	Sec 34 T-153-N R-103-W	Ditch	Natural	N	0	0	0	0	0	N	N	N
9	Sec 35 T-153-N R-103-W	Ditch	Created	N	0	0	0	0	0	N	N	N
10	Sec 35 T-153-N R-103-W	Ditch	Created	N	0	0	0	0	0	N	N	N
11	Sec 35 T-153-N R-103-W	Ditch	Created	N	0	0	0	0	0	N	N	N
12	Sec 19 T-153-N R-102-W	Basin	Created	N	0	0	0	0	0	N	N	N
13	Sec 19 T-153-N R-102-W	Ditch	Created	N	0	0	0	0	0	N	N	N
14	Sec 17 T-153-N R-102-W	Basin	Natural	N	0	0	0	0	0	N	N	N
15	Sec 17 T-153-N R-102-W	Ditch	Created	N	0	0	0	0	0	N	N	N
16	Sec 17 T-153-N R-102-W	Ditch	Created	N	0	0	0	0	0	N	N	N
Totals					0.052	0.041	0.000	0.000	0.000			

¹ A preliminary wetland Jurisdictional Determination was issued by the USACE on 3/6/2025; NWO-2011-02035-BIS.



Wetlands Mitigation and Environmental
ND 1804
Marley Xing to 0.5 Miles N of Trenton

Other Waters and Streams Impact Table													
				USACE Jurisdictional ¹	Impacts to Other Waters						Other Water Mitigation		
					Acres			Linear Feet			Mitigation Proposed		
Number	Location	Type	Feature		Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS
OW-1a	Sec 6 T-152-N R-103-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
OW-1b	Sec 6 T-152-N R-103-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
OW-2a	Sec 6 T-152-N R-103-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
OW-2b	Sec 6 T-152-N R-103-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
OW-3a	Sec 19 T-153-N R-102-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
OW-3b	Sec 19 T-153-N R-102-W	Intermittent Stream	Natural	Y	0	0	0	0	0	0	N	N	N
Totals					0.000	0.000	0.000	0.000	0.000	0.000			

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	Water Type	Total Acre(s)
Natural/JD (Fill/Drain)	0.000	Temporary Wetland JD	0.000
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.052
Created/JD (Fill/Drain)	0.000		
Created /Non-JD (Fill/Drain)	0.041	Permanent OW	0.000
Total	0.041	Temporary OW	0.000
JD Natural (Cut)	0.000	Permanent OW-d	0.000
JD Created (Cut)	0.000	Temporary OW-d	0.000
Non-JD Natural (Cut)	0.000		
Non-JD Created (Cut)	0.000		
Total	0.000		

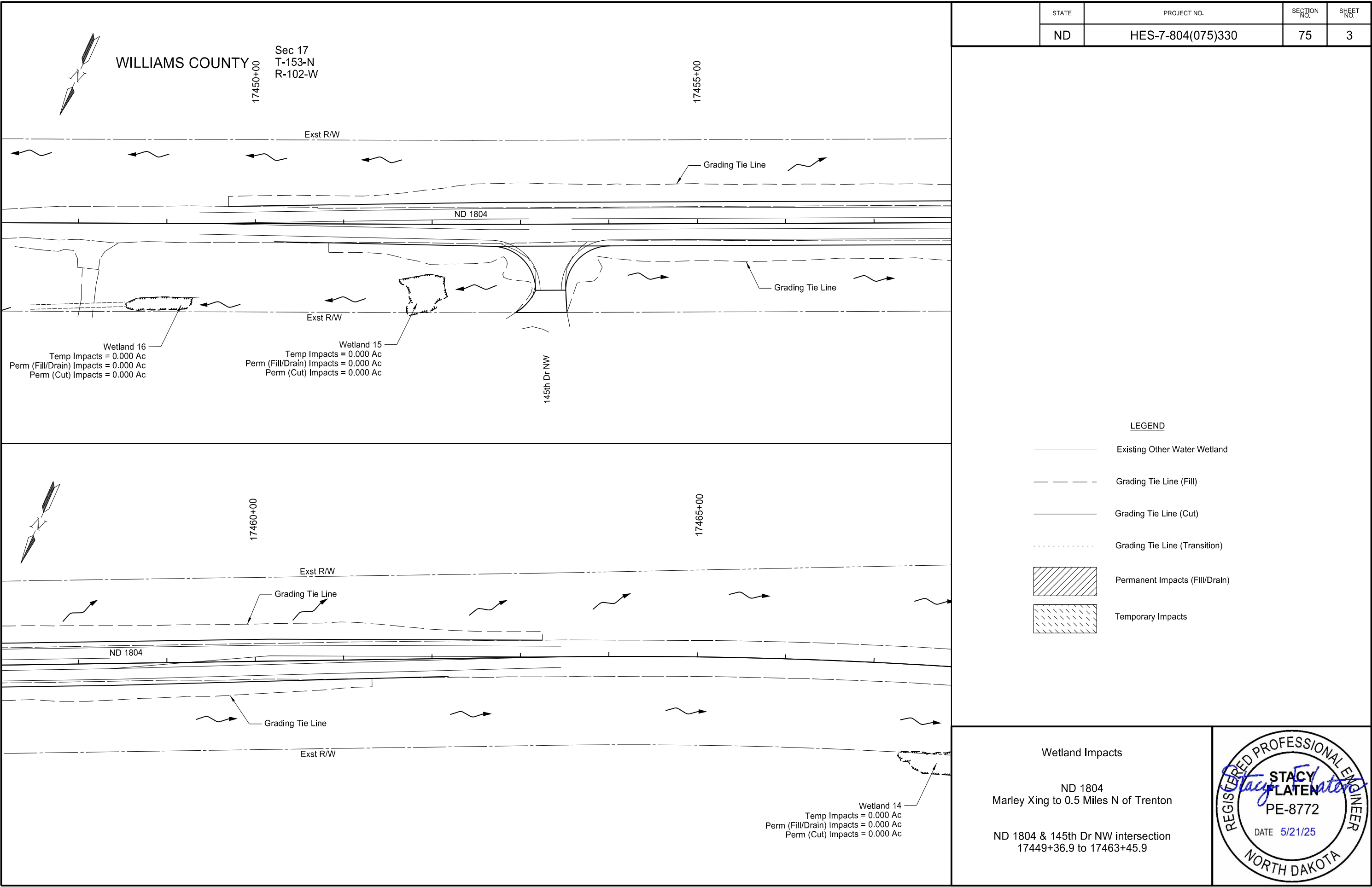
Mitigation Summary Table						
	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only						
EO 11990 Only						
USACE/11990						
USFWS						
Total		0	0	0	0	0

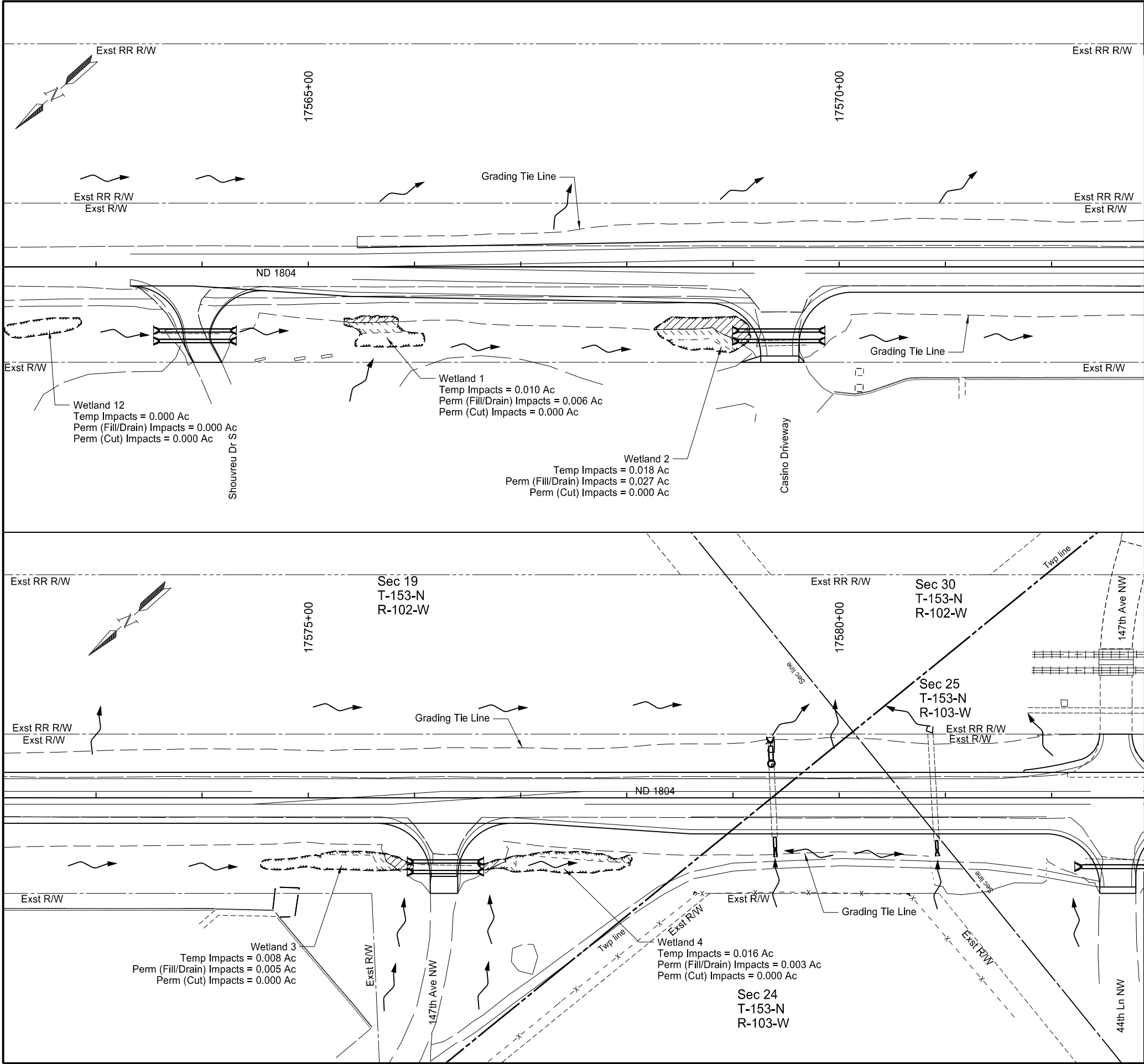


Wetlands Mitigation and Environmental

ND 1804

Marley Xing to 0.5 Miles N of Trenton





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	75	5

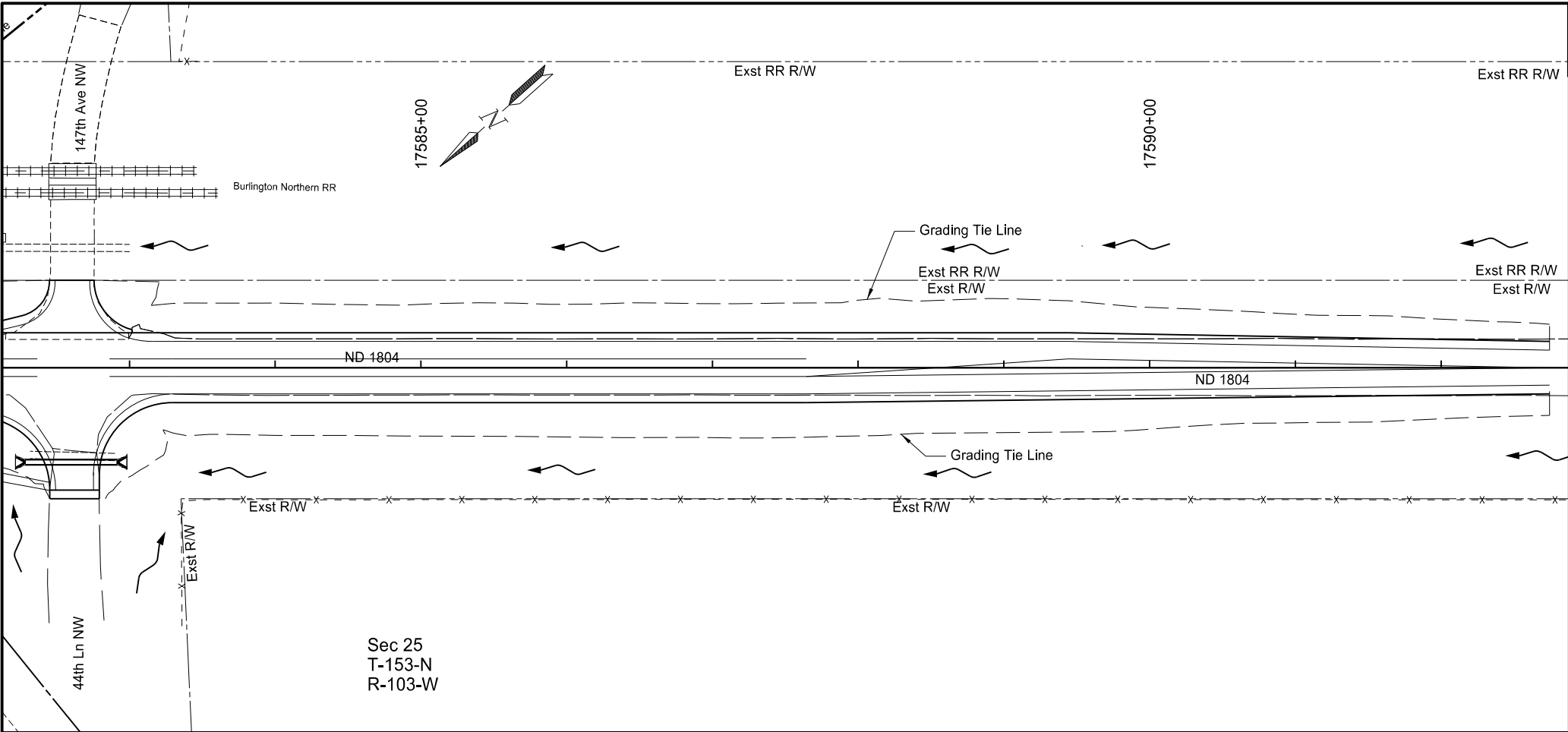
LEGEND

- Existing Other Water Wetland
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Permanent Impacts (Fill/Drain)
- Temporary Impacts

Wetland Impacts

ND 1804
Marley Xing to 0.5 Miles N of Trenton
ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17563+32.36 to 17582+50





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	75	6

LEGEND

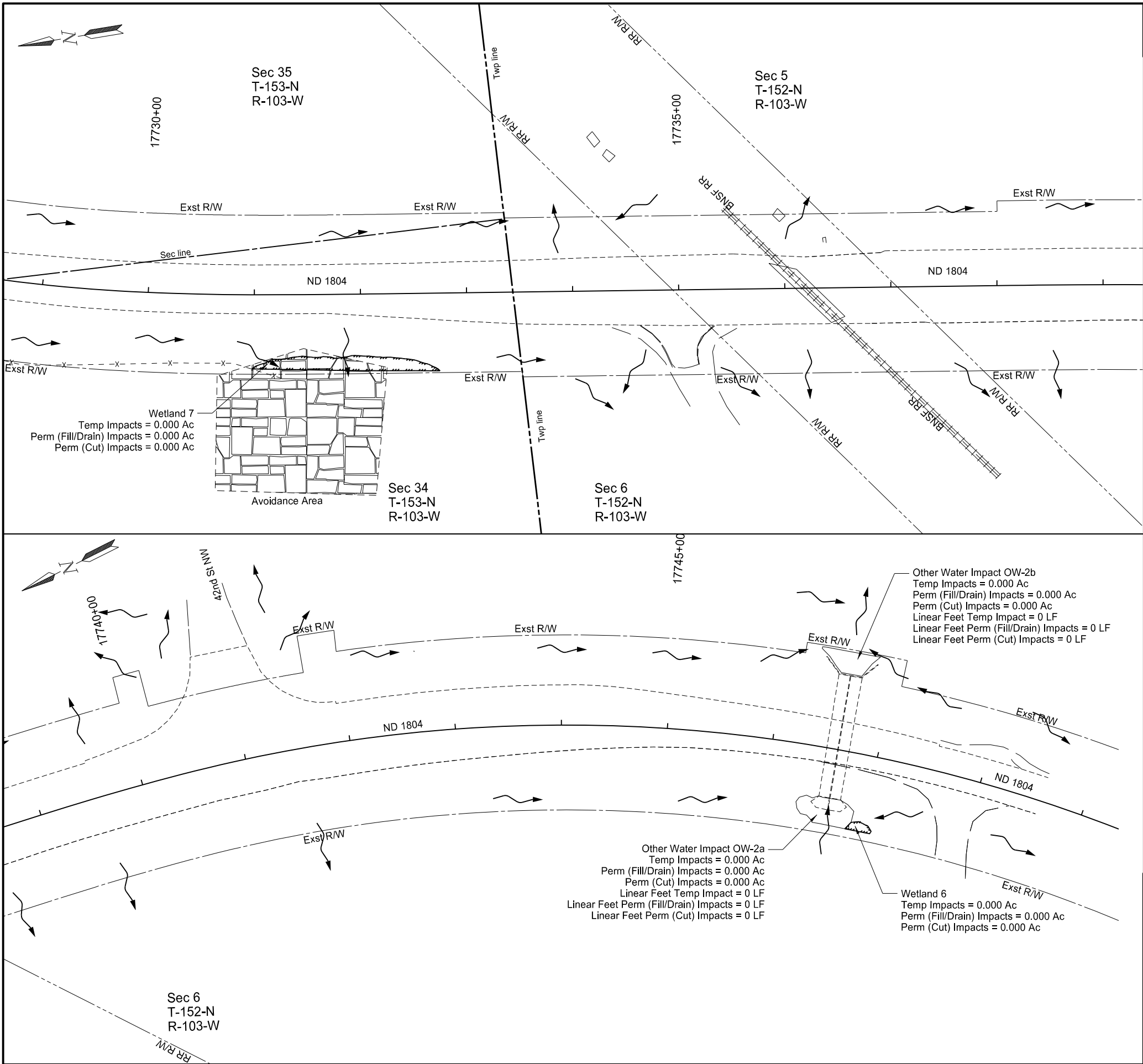
- Existing Other Water Wetland
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Permanent Impacts (Fill/Drain)
- Temporary Impacts

Wetland Impacts

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17582+50 to 17592+74.36





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	75	7

LEGEND

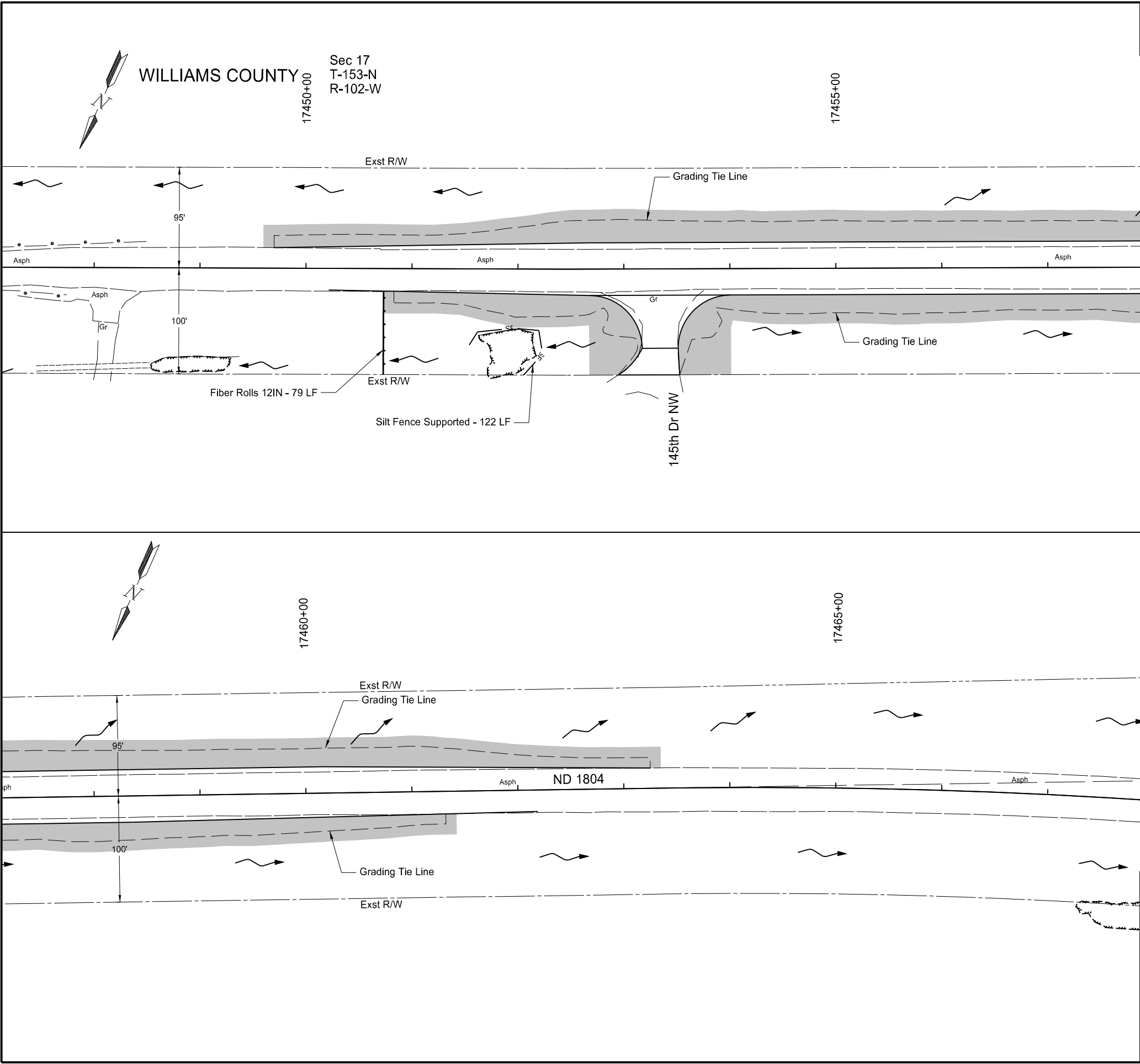
- Existing Other Water Wetland
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Permanent Impacts (Fill/Drain)
- Temporary Impacts
- Avoidance Area

Wetland Impacts

ND 1804
Marley Xing to 0.5 Miles N of Trenton

NDDOT & Marley Xing Intersection
17730+54 to 17745+86





	STATE	PROJECT NO.		SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330		76	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		17449+60 to 17457+50 Lt	ACRE	0.5
		17450+73 to 17457+50 Rt	ACRE	0.48
		17457+50 to 17463+35 Lt	ACRE	0.35
		17457+50 to 17461+42 Rt	ACRE	0.22
253	0101	STRAW MULCH		
		17449+60 to 17457+50 Lt	ACRE	0.5
		17450+73 to 17457+50 Rt	ACRE	0.48
		17457+50 to 17463+35 Lt	ACRE	0.35
		17457+50 to 17461+42 Rt	ACRE	0.22
260	0200	SILT FENCE SUPPORTED		
		17451+54 to 17452+23 Rt	LF	122
260	0201	REMOVE SILT FENCE SUPPORTED		
		17451+54 to 17452+23 Rt	LF	122
261	0112	FIBER ROLLS 12IN		
		17450+73 Rt	LF	79
261	0113	REMOVE FIBER ROLLS 12IN		
		17450+73 Rt	LF	79

LEGEND

Temporary Cover Crop
Straw Mulch

Fiber Rolls 12IN

— SF —

Silt Fence Supported

— — — —

Grading Tie Line (Fill)

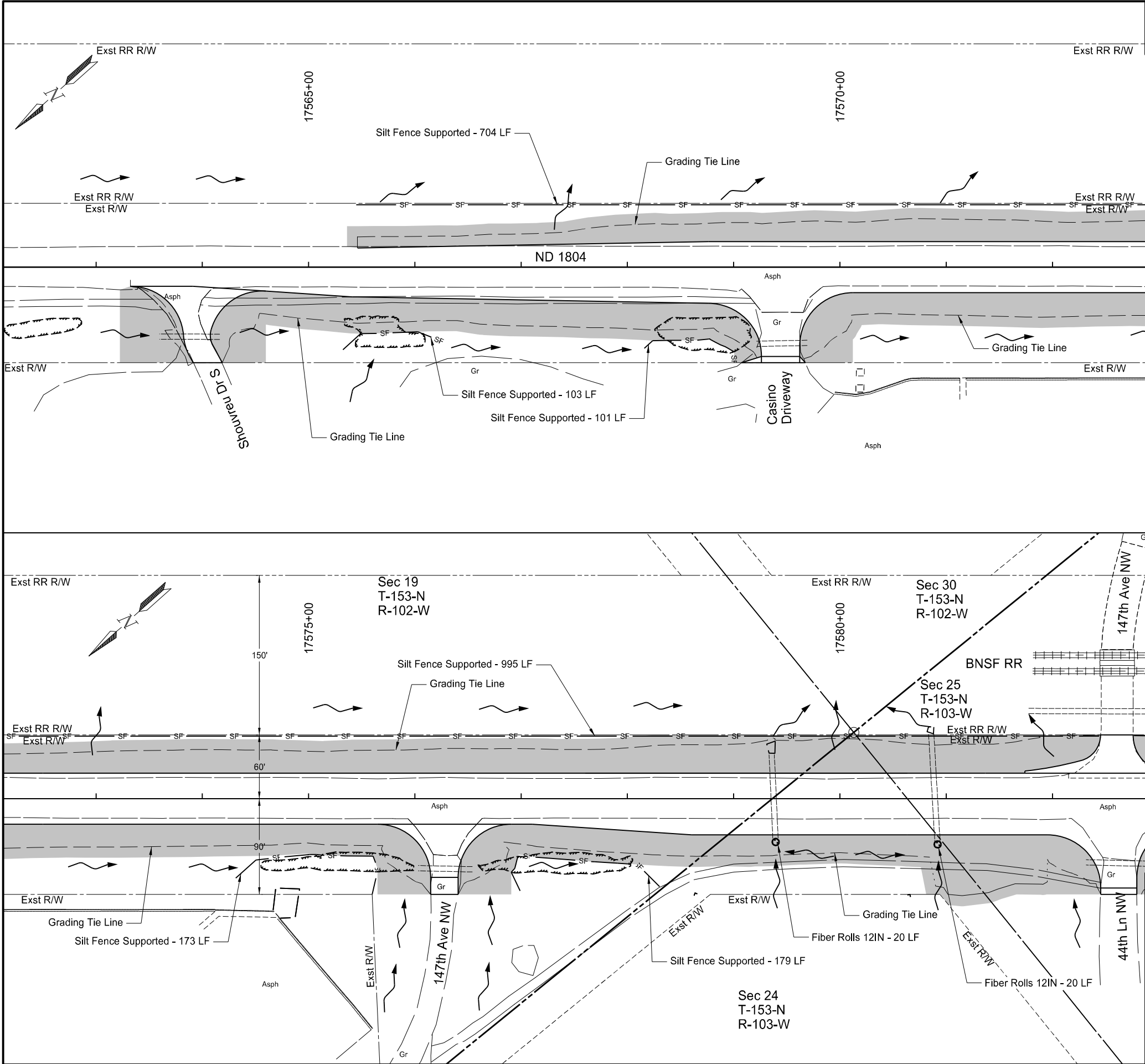
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Grading Tie Line (Cut)

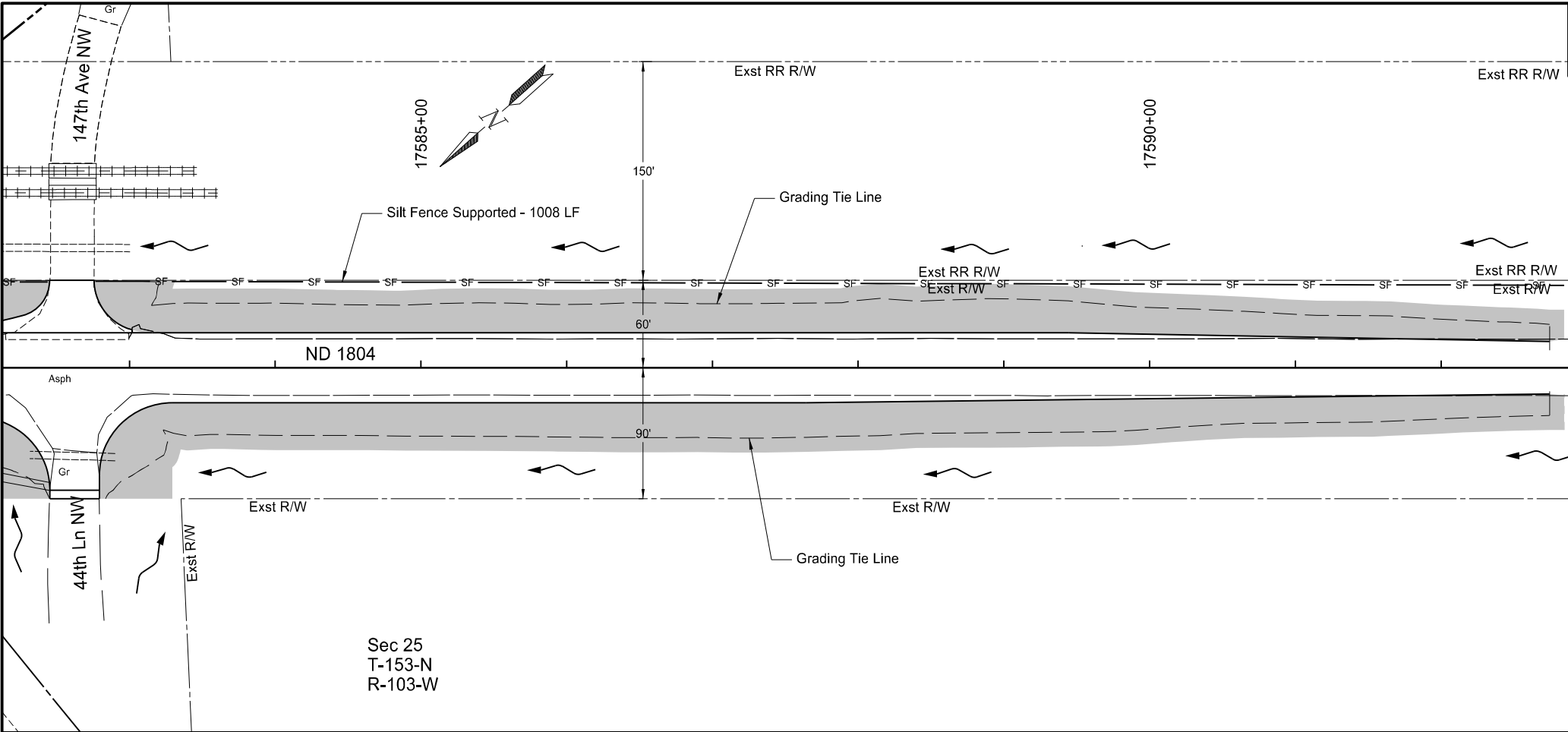
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Grading Tie Line (Transition)

Temporary Erosion Control ND 1804 Marley Xing to 0.5 Miles N of Trenton ND 1804 & 145th Dr NW Intersection 17449+70 to 17463+25	REGISTERED PROFESSIONAL ENGINEER AUSTIN T. BECKER PE-27997 DATE 05/23/2025 NORTH DAKOTA
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		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	76	2
SPEC	CODE	BID ITEM		UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP			
		17565+36 to 17572+50 Lt		ACRE	0.43
		17563+22 to 17572+50 Rt		ACRE	0.77
		17572+50 to 17582+50 Lt		ACRE	0.76
		17572+50 to 17582+50 Rt		ACRE	0.83
253	0101	STRAW MULCH			
		17565+36 to 17572+50 Lt		ACRE	0.43
		17563+22 to 17572+50 Rt		ACRE	0.77
		17572+50 to 17582+50 Lt		ACRE	0.76
		17572+50 to 17582+50 Rt		ACRE	0.83
260	0200	SILT FENCE SUPPORTED			
		17565+32 to 17566+27 Rt		LF	103
		17565+46 to 17572+50 Lt		LF	704
		17568+15 to 17569+00 Rt		LF	101
		17572+50 to 17582+44 Lt		LF	995
		17574+31 to 17575+65 Rt		LF	173
		17576+91 to 17578+30 Rt		LF	179
260	0201	REMOVE SILT FENCE SUPPORTED			
		17565+32 to 17566+27 Rt		LF	103
		17565+46 to 17572+50 Lt		LF	704
		17568+15 to 17569+00 Rt		LF	101
		17572+50 to 17582+44 Lt		LF	995
261	0112	FIBER ROLLS 12IN			
		17579+39 Rt - Inlet Protection		LF	20
		17580+92 Rt - Inlet Protection		LF	20
261	0113	REMOVE FIBER ROLLS 12IN			
		17579+39 Rt - Inlet Protection		LF	20
		17580+92 Rt - Inlet Protection		LF	20
LEGEND Temporary Cover Crop Straw Mulch SF Silt Fence Supported ————— Fiber Rolls 12IN — — — — — Grading Tie Line (Fill) ————— Grading Tie Line (Cut) Grading Tie Line (Transition)					
Temporary Erosion Control				REGISTERED PROFESSIONAL ENGINEER AUSTIN T. BECKER PE-27997 DATE 05/23/2025 NORTH DAKOTA	
ND 1804					
Marley Xing to 0.5 Miles N of Trenton					
ND 1804 & Casino Approach Intersection					
ND 1804 & 44th Ln NW/147th Ave NW Intersection					
17563+32 to 17582+50					



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	76	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		17582+50 to 17592+84 Lt	ACRE	0.68
		17582+50 to 17592+84 Rt	ACRE	0.75
253	101	STRAW MULCH		
		17582+50 to 17592+84 Lt	ACRE	0.68
		17582+50 to 17592+84 Rt	ACRE	0.75
260	200	SILT FENCE SUPPORTED		
		17582+76 to 17592+84 Lt	LF	1008
260	201	REMOVE SILT FENCE SUPPORTED		
		17582+76 to 17592+84 Lt	LF	1008

LEGEND

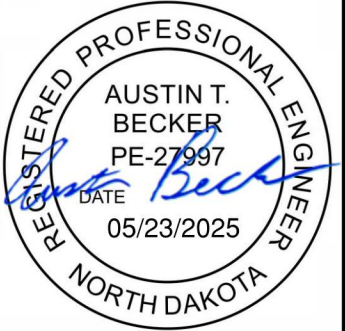
- Temporary Cover Crop
Straw Mulch
- SF

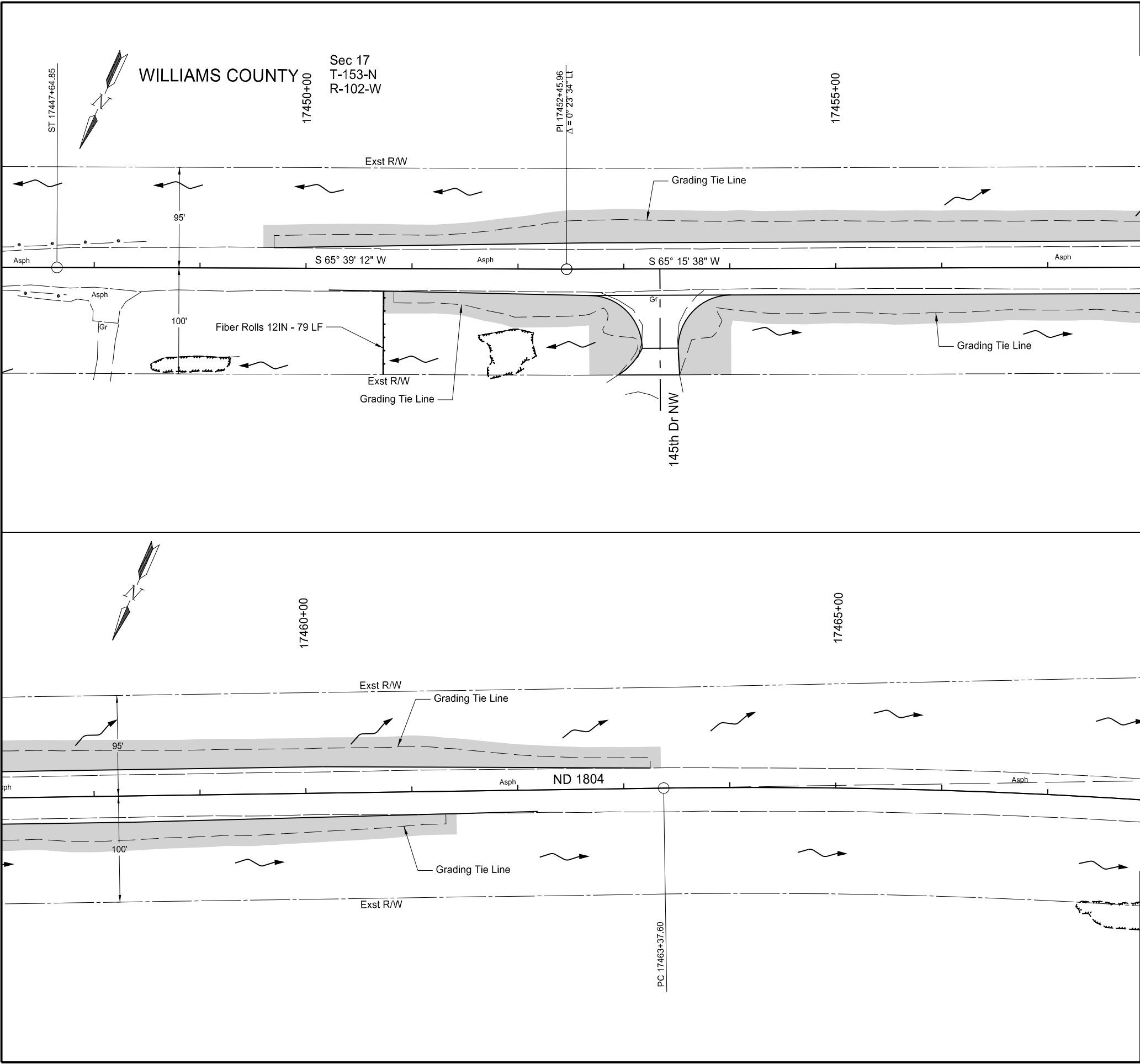
Silt Fence Supported
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)

Temporary Erosion Control

ND 1804
Marley Xing to 0.5 Miles N of Trenton

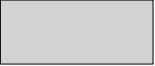
ND 1804 & 44th Ln NW/147th Ave NW Intersection
17582+50 to 17592+74





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	77	1
SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	0200	SEEDING CLASS II		
		17449+60 to 17457+50 Lt	ACRE	0.5
		17450+73 to 17457+50 Rt	ACRE	0.48
		17457+50 to 17463+35 Lt	ACRE	0.35
		17457+50 to 17461+42 Rt	ACRE	0.22
253	0101	STRAW MULCH		
		17449+60 to 17457+50 Lt	ACRE	0.5
		17450+73 to 17457+50 Rt	ACRE	0.48
		17457+50 to 17463+35 Lt	ACRE	0.35
		17457+50 to 17461+42 Rt	ACRE	0.22
261	0112	FIBER ROLLS 12IN		
		17450+73 Rt	LF	79

LEGEND

 Seeding Class II
Straw Mulch

 Grading Tie Line (Fill)

 Grading Tie Line (Cut)

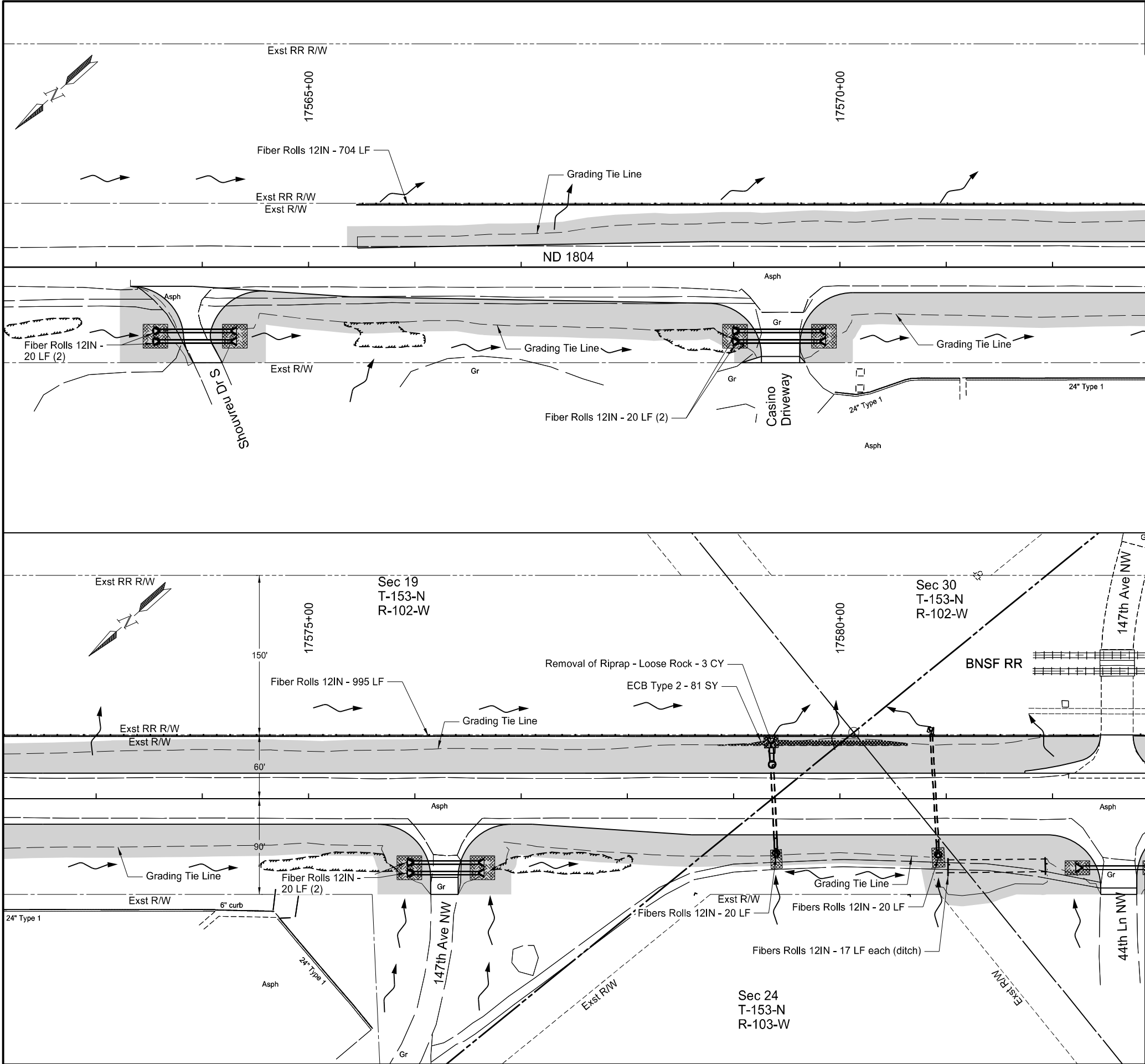
 Grading Tie Line (Transition)

Permanent Erosion Control

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17448+00 to 17467+00





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	77	2
SPEC	CODE	BID ITEM		UNIT	QUANTITY
202	0400	REMOVAL OF RIPRAP - LOOSE ROCK			
		17579+36 Lt		CY	3
251	0200	SEEDING CLASS II			
		17565+36 to 17572+50 Lt		ACRE	0.43
		17563+22 to 17572+50 Rt		ACRE	0.77
		17572+50 to 17582+50 Lt		ACRE	0.76
		17572+50 to 17582+50 Rt		ACRE	0.83
253	0101	STRAW MULCH			
		17565+36 to 17572+50 Lt		ACRE	0.43
		17563+22 to 17572+50 Rt		ACRE	0.77
		17572+50 to 17582+50 Lt		ACRE	0.76
		17572+50 to 17582+50 Rt		ACRE	0.83
261	0112	FIBER ROLLS 12IN			
		17565+46 to 17572+50 Lt		LF	704
		17572+50 to 17582+44 Lt		LF	995
		17563+56 Rt - Inlet Protection (2)		LF	40
		17569+02 Rt - Inlet Protection (2)		LF	40
		17575+96 Rt - Inlet Protection (2)		LF	40
		17579+39 Rt - Inlet Protection		LF	20
		17580+92 Rt - Inlet Protection		LF	20
		17581+01 to 17581+91 - Ditch Checks		LF	34
255	0102	ECB TYPE 2			
		17578+85 - 50' Lt to 17580+63 - 50' Lt		SY	81
Seeding Class II Straw Mulch ECB Type 2 (See Section 20 for Culvert Quantity) Fiber Rolls 12IN Grading Tie Line (Fill) Grading Tie Line (Cut) Grading Tie Line (Transition) Ditch					

Permanent Erosion Control

ND 1804

Marley Xing to 0.5 Miles N of Trenton

ND 1804 & Casino Approach Intersection

ND 1804 & 44th Ln NW/147th Ave NW Intersection

17563+32 to 17582+50

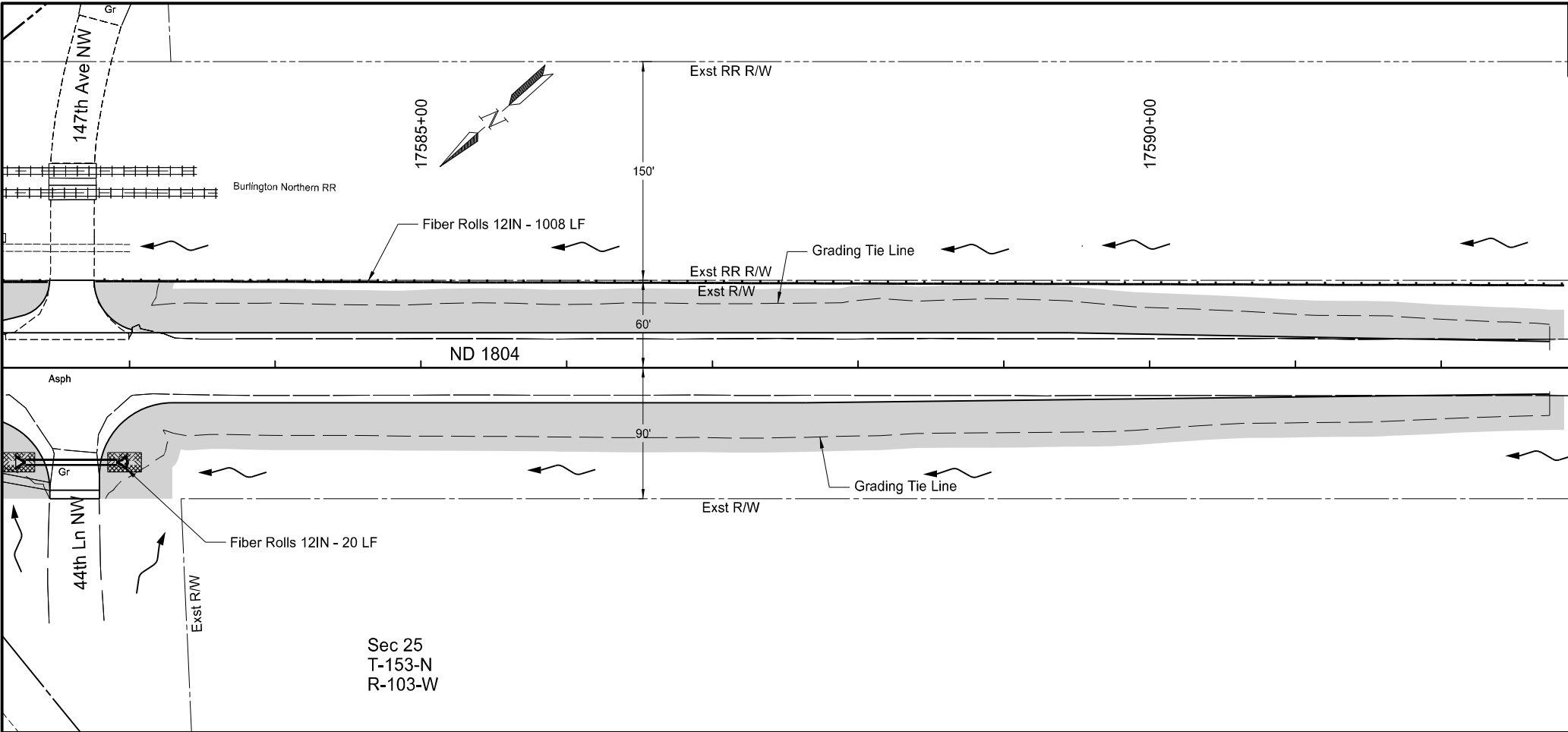
REGISTERED PROFESSIONAL ENGINEER

AUSTIN T. BECKER

PE-27997

DATE 05/23/2025

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	77	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	0200	SEEDING CLASS II		
		17582+50 to 17592+84 Lt	ACRE	0.68
		17582+50 to 17592+84 Rt	ACRE	0.75
253	0101	STRAW MULCH		
		17582+50 to 17592+84 Lt	ACRE	0.68
		17582+50 to 17592+84 Rt	ACRE	0.75
261	0112	FIBER ROLLS 12IN		
		17582+76 to 17592+84 Lt	LF	1008
		17582+92 Rt - Inlet Protection	LF	20

LEGEND



Seeding Class II
Straw Mulch



ECB Type 2
See Section 20 Sheet 2



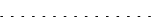
Fiber Rolls 12IN



Grading Tie Line (Fill)



Grading Tie Line (Cut)

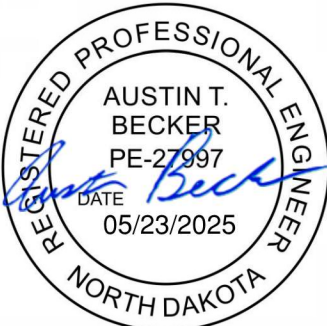


Grading Tie Line (Transition)

Permanent Erosion Control

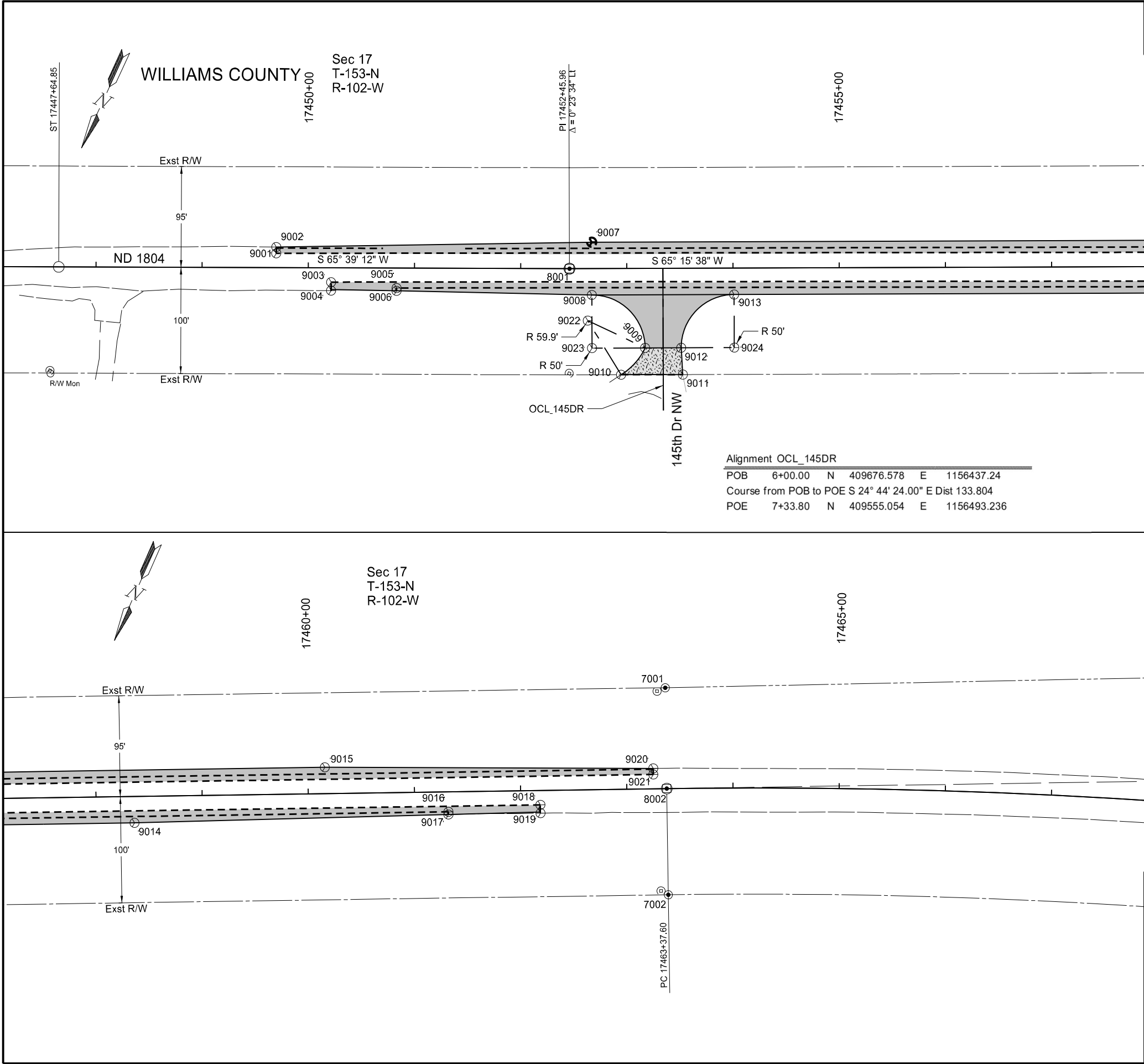
ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW/147th Ave NW Intersection
17582+50 to 17592+74



PRELIMINARY SURVEY COORDINATE AND CURVE DATA - MARLEY XING TO .5 MILE N OF TRENTON											STATE	PROJECT NO.	SECTION NO.	SHEET NO.
										ND		HES-7-804(075)330	81	1
HORIZONTAL ALIGNMENT				CURVE DATA		HORIZONTAL ALIGNMENT				CURVE DATA				
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		PNT	STATION	NORTHING	EASTING	ARC DEFINITION				
ND 1804 to Intscn w/ ND58 (Chain:SCL1804)				Curve Combination		CURVE		ND 1804 (SCL1804) definition continued from sheet 1				Curve Combination		
Begin	17374+49.12	412,924.32	1,163,424.32	PI = 17390+86.72		PI = 17477+88.36		1/4 line Xing 17537+95.44 405,458.88 1,149,222.14				PI = 17644+81.99 PI = 17723+43.99		
TS	17380+12.09	412,470.76	1,163,090.81	Delta = 35°45'38" (RT)		Delta = 11°10'13" (LT)		Twp line Xing 17579+36.36 402,365.25 1,146,469.56				Delta = 07°09'40" (RT) Delta = 67°20'17" (LT)		
SC	17383+12.09	412,232.24	1,162,908.92	Da = 02°00'00"		Da = 02°01'52"		Sec line Xing 17580+63.52 402,270.25 1,146,385.03				Da = 01°00'00" Da = 03°59'57"		
PI	17390+86.72	411,605.00	1,162,454.20	R = 2864.79'		R = 2820.87		PI 17611+49.84 399,963.88 1,144,334.17				R = 5729.58' R = 1432.69'		
CS	17398+00.13	411,371.72	1,161,715.43	Ts = 1074.62'		T = 275.85'		TS 17640+23.45 397,812.43 1,142,429.20				Ts = 458.54' Ts = 1106.06'		
ST	17401+00.13	411,274.50	1,161,431.66	L = 1488.03'		L = 549.96		SC 17642+23.45 397,663.47 1,142,295.75				L = 516.11' L = 1383.80'		
TS	17438+21.34	410,130.04	1,157,890.81	Ls = 300.00'				PI 17644+81.99 397,469.13 1,142,125.22				Ls = 200.00' Ls = 300.00'		
SC	17441+21.34	410,035.29	1,157,606.17	Sc = 03°00'00"		Curve Combination		CS 17647+39.57 397,299.31 1,141,930.26				Sc = 01°00'00" Sc = 05°59'56"		
PI	17442+93.47	409,984.84	1,157,441.56			PI = 17505+92.60		ST 17649+39.57 397,166.40 1,141,780.82						
CS	17444+64.85	409,911.48	1,157,285.81	Curve Combination		Delta = 10°40'56" (LT)		PI 17660+86.36 396,409.27 1,140,919.49				CURVE Curve Combination		
ST	17447+64.85	409,790.20	1,157,011.43	PI = 17442+93.47		Da = 02°00'00"		PC 17675+60.09 395,436.41 1,139,812.49				PI = 17678+00.17 PI = 17748+57.01		
PI	17452+45.96	409,591.86	1,156,573.10	Delta = 06°26'06" (LT)		R = 2864.79'		PI 17678+00.17 395,277.93 1,139,632.16				Delta = 04°47'55" (RT) Delta = 64°31'25" (RT)		
PC	17463+37.60	409,135.01	1,155,581.66	Da = 01°00'00"		Ts = 417.94'		PT 17680+39.96 395,135.09 1,139,439.21				Da = 01°00'00" Da = 03°59'57"		
PI	17469+03.07	408,898.37	1,155,068.08	R = 5729.58'		L = 234.11'		PC 17691+95.85 394,447.35 1,138,510.18				R = 5729.65 R = 1432.69'		
PT	17474+64.89	408,766.68	1,154,518.16	Ts = 472.12'		Ls = 300.00'		PI 17699+51.55 393,997.72 1,137,902.79				T = 240.07' Ts = 1055.97'		
PC	17475+12.51	408,755.59	1,154,471.85	L = 343.51'		Sc = 03°00'00"		PT 17706+87.98 393,813.24 1,137,169.96				L = 479.87 L = 1313.42'		
PI	17477+88.36	408,691.35	1,154,203.58	Ls = 300.00'				TS 17712+37.93 393,678.98 1,136,636.64				Ls = 300.00'		
PT	17480+62.47	408,576.35	1,153,952.84	Sc = 01°30'00"		Curve Combination		SC 17715+37.93 393,595.68 1,136,348.59				CURVE Sc = 05°59'56"		
TS	17501+74.66	407,695.84	1,152,032.93			PI = 17525+65.87		PI 17723+43.99 393,408.96 1,135,564.06				PI = 17699+51.55		
SC	17504+74.66	407,566.06	1,151,762.50	CURVE		Delta = 13°01'10" (LT)		CS 17729+21.73 392,609.95 1,135,454.77				Delta = 22°22'53" (RT)		
PI	17505+92.60	407,521.62	1,151,653.04	PI = 17469+03.07		Da = 02°00'00"		ST 17732+21.73 392,315.14 1,135,399.96				Da = 01°30'00"		
CS	17507+08.76	407,449.11	1,151,559.77	Delta = 11°16'22" (RT)		R = 2864.79'		TS 17738+01.04 391,742.25 1,135,314.02				R = 3819.83		
ST	17510+08.76	407,279.99	1,151,312.02	Da = 01°00'00"		Ts = 477.03'		SC 17741+01.04 391,447.45 1,135,259.22				T = 755.70'		
TS	17520+88.84	406,655.57	1,150,430.75	R = 5729.65		L = 350.97'		PI 17748+57.01 390,697.97 1,135,157.36				L = 1492.13		
SC	17523+88.84	406,477.91	1,150,189.06	T = 565.47'		Ls = 300.00'		CS 17754+14.46 390,487.55 1,134,430.85						
PI	17525+65.87	406,379.78	1,150,041.52	L = 1127.29		Sc = 03°00'00"		ST 17757+14.46 390,390.20 1,134,147.23						
CS	17527+39.81	406,243.98	1,149,927.70											
ST	17530+39.81	406,023.40	1,149,724.42											
										All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Stations (OPUS) ☒ NAVD-88 ☐ _____ ☐ GEOID12B ☒ GEOID18 Date Survey Completed 03/13/2025 ☐ Assumed Coordinates ☒ All coordinates on this sheet are Williams County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998445				
NOTES: Sheet 1 of 3 ALIGNMENTS PER: NDDOT Project 7-1804(041)334 2013 NDDOT ROW RS-7-804(017)324 1988 and SS-7-058(007)000 1994										REGISTERED PROFESSIONAL LAND SURVEYOR Kristofer Johnson LS-10169 DATE 04/17/25 NORTH DAKOTA				

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - MARLEY XING TO .5 MILE N OF TRENTON											STATE	PROJECT NO.			SECTION NO.	SHEET NO.		
										ND	HES-7-804(075)330					81	2	
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS								
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGN	MONUMENT	
ND 1804 (SCL1804) definition continued from sheet 1				CURVE	CURVE	T-152-N R-103-W				PRIMARY CONTROL								
PC	17759+52.52	390,320.82	1,133,919.51	PI	= 17769+35.89	PI	= 17906+10.53	S Qtr Cor Sec 6	2-C	386,043.99	1,132,816.37	GPS 331	408,535.00	1,154,046.21	1,902.16	17479+93	76' Lt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PI	17769+35.89	390,034.22	1,132,978.83	Delta = 19°28'39" (LT)		Delta = 05°58'09" (RT)		NE Cor Sec 6	3-A	392,191.39	1,135,451.25	GPS 147	402,749.89	1,146,670.08	1,912.01	17575+16	106' Rt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PT	17779+00.28	389,450.37	1,132,187.55	Da	= 01°00'00"	Da	= 01°00'00"	E Qtr Cor Sec 6	3-B	388,570.51	1,135,569.71	GPS 333	399,634.30	1,143,924.53	1,905.12	17616+68	88' Rt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PC	17800+22.59	388,190.29	1,130,479.80	R	= 5729.65	R	= 5729.65	SE Cor Sec 6	3-C	385,932.56	1,135,455.72	GPS 335	393,842.60	1,136,988.34	1,939.90	17708+57	73' Rt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PI	17806+13.87	387,839.23	1,130,004.02	T	= 983.37'	T	= 298.73'	T-152-N R-104-W				GPS 337	388,299.66	1,130,520.81	1951.33	17799+25	64' Rt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PT	17811+95.84	387,648.45	1,129,444.36	L	= 1947.76	L	= 596.92	NW Cor Sec 7	1-C	387,463.26	1,101,464.39	GPS 341	383,940.44	1,111,074.44	1938.47	17997+74	790' Rt	SCL1804 1 1/2" Alum cap stamped NDDOT CONTROL
PC	17872+80.06	385,685.33	1,123,685.55					SW Cor Sec 7	1-E	382,197.66	1,101,247.73							
PI	17875+91.31	385,584.90	1,123,390.95	CURVE		CURVE		NE Cor Sec 7	3-C	387,351.47	1,104,024.53							
PT	17879+02.41	385,500.61	1,123,091.33	PI	= 17806+13.87	PI	= 17977+33.42	E Qtr Cor Sec 18	3-F	379,445.41	1,103,666.87							
PC	17903+11.80	384,848.14	1,120,771.96	Delta = 17°35'54" (RT)		Delta = 12°01'40" (RT)		N Qtr Cor Sec 8	4-C	387,229.56	1,106,657.34							
PI	17906+10.53	384,767.25	1,120,484.40	Da	= 01°30'00"	Da	= 02°00'00"	NE Cor Sec 8	5-C	387,108.49	1,109,297.33							
PT	17909+08.72	384,716.69	1,120,189.97	R	= 3819.83	R	= 2864.93	W Qtr Cor Sec 9	5-D	384,473.15	1,109,174.70							
PC	17974+31.60	383,612.84	1,113,761.17	T	= 591.28'	T	= 301.82'	SW Cor Sec 9	5-E	381,839.07	1,109,053.28							
PI	17977+33.42	383,561.76	1,113,463.71	L	= 1173.25	L	= 601.42	N Qtr Cor Sec 9	6-C	386,987.43	1,111,929.82							
PT	17980+33.02	383,573.80	1,113,162.13					S Qtr Cor Sec 9	6-E	381,716.58	1,111,682.51							
PC	17984+38.64	383,589.97	1,112,756.83	CURVE		CURVE		NE Cor Sec 9	7-C	386,866.68	1,114,562.23							
PI	17991+37.95	383,617.85	1,112,058.07	PI	= 17875+91.31	PI	= 17991+37.95	E Qtr Cor Sec 9	7-D	384,228.08	1,114,445.58							
End/PT/ND 58	17997+96.41	383,252.06	1,111,462.06	Delta = 03°06'42" (RT)		Delta = 33°49'25" (LT)		NE Cor Sec 16	7-E	381,592.00	1,114,325.43							
				Da	= 00°30'00"	Da	= 02°29'28"	N Qtr Cor Sec 10	8-C	386,740.15	1,117,211.92							
				R	= 11459.19	R	= 2300.00	S Qtr Cor Sec 10	8-E	381,471.23	1,116,962.14							
				T	= 311.25'	T	= 699.31'	NE Cor Sec 10	9-C	386,616.93	1,119,828.35							
				L	= 622.35	L	= 1357.76	SE Cor Sec 10	9-E	381,344.77	1,119,590.81							
								N Qtr Cor Sec 11	10-C	386,497.32	1,122,470.01							
ND 58 (Chain: SCL58)				CURVE COMBINATION		CURVE		S Qtr Cor Sec 11	10-E	381,229.72	1,122,230.20							
Begin	463+96.26	378,979.57	1,108,624.17	PI	= 482+26.19	PI	= 508+12.37	NE Cor Sec 2	11-A	392,643.93	1,125,380.41							
TS	466+92.11	379,135.21	1,108,875.78	Delta = 46°36'30" (LT)		Delta = 49°48'35" (RT)		E Qtr Cor Sec 2	11-B	389,019.60	1,125,219.19							
SC	469+92.11	379,297.44	1,109,128.09	Da	= 02°00'00"	Da	= 02°29'28"	SE Cor Sec 2	11-C	386,384.42	1,125,102.91							
PI	481+65.01	379,910.05	1,110,128.40	R	= 2864.93	R	= 2299.99	E Qtr Cor Sec 11	11-D	383,746.98	1,124,983.87							
PT	493+22.64	381,220.71	1,110,327.84	Ts	= 1472.91' (In)	T	= 1067.85'	SE Cor Sec 11	11-E	381,111.42	1,124,866.81	All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Stations (OPUS) ☒ NAVD-88 ☐ _____ ☐ GEOID12B ☒ GEOID18						
PC	497+44.52	381,637.79	1,110,391.30	T	= 1234.08' (Out)	L	= 1999.48	NE Cor Sec 1	13-A	392,406.61	1,130,667.56							
PI	508+12.37	382,693.50	1,110,551.94	L	= 2330.53			E Qtr Cor Sec 1	13-B	388,783.76	1,130,494.81	Date Survey Completed 03/13/25 ☐ Assumed Coordinates ☒ All coordinates on this sheet are Williams County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998445						
End/PT /ND 1804	517+44.00	383,252.06	1,111,462.06	Ls	= 300.00 (In)			SE Cor Sec 1	13-C	386,145.47	1,130,376.35							
				Sc	= 02°59'59" (In)													
NOTES: Sheet 2 of 3																		



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	82	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS		
		17449+69 to 17463+25	EA	2
720	0125	ALIGNMENT MONUMENTS		
		17449+69 to 17463+25	EA	2
720	0130	IRON PIN R/W MONUMENTS		
		17449+69 to 17463+25	EA	2

Station & Offsets based on SCL1804

POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
7001	409048.73	1155621.41	17463+37.60	-95.00	I.P. RW MON & RW MKR
7002	409225.83	1155539.81	17463+37.60	100.00	I.P. RW MON & RW MKR

POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
8001	409591.86	1156573.10	17452+45.96	0.00	ALIGN MON
8002	409135.01	1155581.66	17463+37.60	0.00	ALIGN MON

POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
9001	409693.44	1156830.34	17449+69.72	-13.50	MILL EDGE
9002	409688.03	1156832.79	17449+69.72	-19.44	ASP*BEGIN TAPER
9003	409696.71	1156772.07	17450+21.46	13.50	MILL EDGE
9004	409703.91	1156768.81	17450+21.46	21.41	MILL EDGE
9005	409676.13	1156713.68	17450+83.14	18.83	MILL EDGE
9006	409678.50	1156712.61	17450+83.14	21.42	ASP*BEGIN TAPER
9007	409560.54	1156564.48	17452+66.90	-24.83	ASP*END TAPER
9008	409605.65	1156543.70	17452+66.90	24.83	ASP*END TAPER*PC
9009	409630.13	1156477.36	17453+16.90	74.83	ASP*GRV*PT
9010	409662.50	1156487.46	17452+94.18	100.00	GRV
9011	409638.17	1156434.66	17453+52.31	100.00	GRV
9012	409615.90	1156446.48	17453+50.90	74.83	ASP*GRV*PT
9013	409549.57	1156421.99	17454+00.90	24.83	ASP*PC
9014	409367.52	1156026.92	17458+35.90	24.83	ASP*BEGIN TAPER
9015	409247.09	1155884.22	17460+15.90	-24.83	ASP*BEGIN TAPER
9016	409238.28	115576.77	17461+31.71	18.83	MILL EDGE
9017	409240.57	1155759.71	17461+31.71	21.35	ASP*END TAPER
9018	409197.16	1155684.27	17462+18.40	13.50	MILL EDGE
9019	409204.28	1155680.99	17462+18.40	21.34	MILL EDGE
9020	409122.78	1155601.00	17463+25.15	-19.21	ASP*END TAPER
9021	409127.96	1155598.61	17463+25.15	-13.50	MILL EDGE
9022	409629.21	1156537.22	17452+62.91	48.94	RAD
9023	409651.06	1156522.77	17452+66.90	74.83	RAD
9024	409594.98	1156401.07	17454+00.90	74.83	RAD

LEGEND

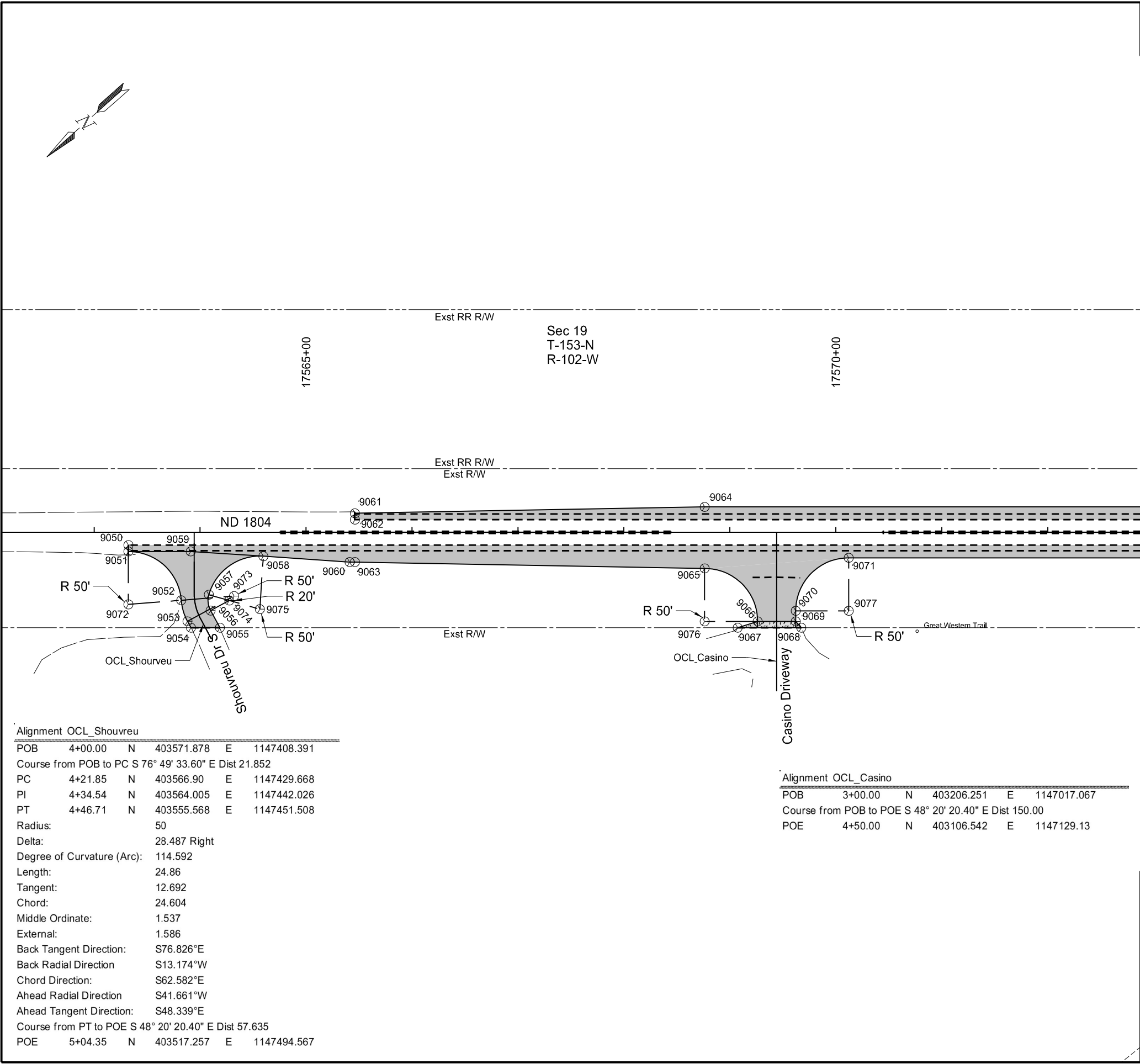
- Iron Pin R/W Monument
- Alignment Monument
- R/W Markers
- Found R/W Marker

Survey Data Layout

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
17449+69.72 to 17463+25.15

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 05/23/2025
NORTH DAKOTA



Station & Offsets based on SCL1804					
POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
9050	403571.55	1147526.82	17563+32.36	12.00	MILL EDGE
9051	403575.54	1147522.33	17563+32.36	18.00	ASP*PC
9052	403568.92	1147454.79	17563+82.20	64.05	ASP*PCC
9053	403577.74	1147436.01	17563+88.10	83.95	ASP*PT
9054	403579.31	1147429.31	17563+91.38	90.00	ASP
9055	403558.91	1147411.16	17564+18.69	90.00	ASP
9056	403554.71	1147429.07	17564+09.92	73.83	ASP*PT
9057	403546.00	1147441.37	17564+08.25	58.85	ASP*PCC
9058	403483.46	1147434.28	17564+59.69	22.57	ASP*PC
9059	403531.65	1147483.28	17563+91.12	18.00	ASP*BEGIN TAPER
9060	403426.23	1147376.10	17565+41.12	28.00	ASP*END TAPER
9061	403391.92	1147407.14	17565+46.12	-18.00	ASP*BEGIN TAPER
9062	403395.91	1147402.66	17565+46.12	-12.00	MILL EDGE
9063	403422.50	1147372.77	17565+46.12	28.00	ASP*BEGIN TAPER
9064	403141.39	1147192.26	17568+76.12	-24.00	ASP*END TAPER
9065	403179.94	1147148.93	17568+76.12	34.00	ASP*END TAPER*PC
9066	403175.83	1147078.34	17569+26.12	84.00	ASP*GRV*PT
9067	403193.86	1147086.36	17569+07.31	90.00	GRV
9068	403148.98	1147046.42	17569+67.39	90.00	GRV
9069	403148.93	1147054.41	17569+62.12	84.00	ASP*GRV
9070	403142.28	1147061.88	17569+62.12	74.00	ASP*PT
9071	403071.69	1147066.00	17570+12.12	24.00	ASP*PC
9072	403608.78	1147484.98	17563+32.36	68.00	RAD
9073	403529.06	1147424.61	17564+32.05	60.11	RAD
9074	403535.24	1147424.51	17564+27.49	64.29	RAD
9075	403519.10	1147399.22	17564+56.36	72.46	RAD
9076	403213.18	1147111.58	17568+76.12	84.00	RAD
9077	403104.93	1147028.64	17570+12.12	74.00	RAD

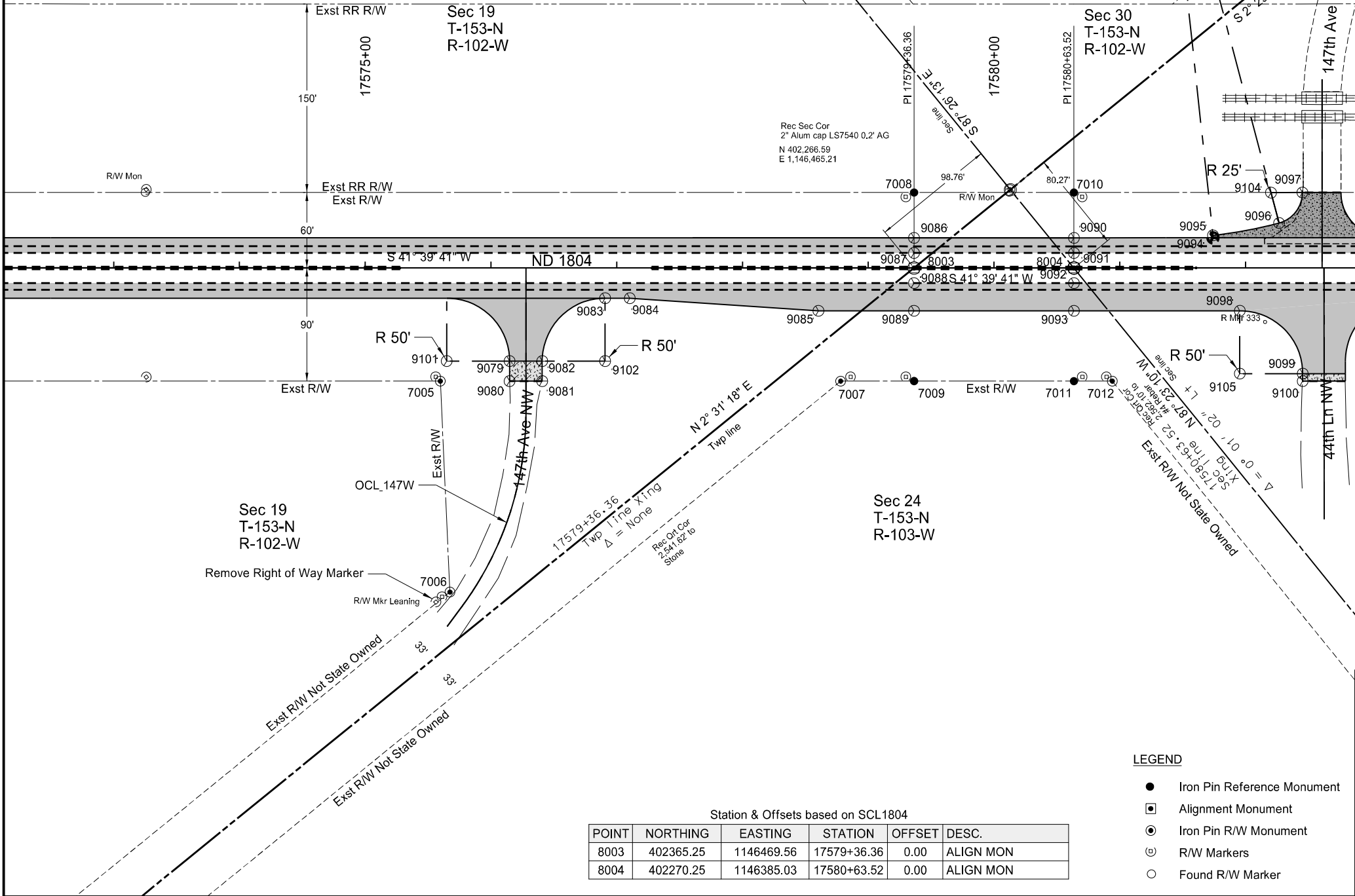
Survey Data Layout

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & Casino Approach Intersection
17563+32.36 to 17572+50



Alignment OCL_147W					
POB	1+00.00	N	402832.176	E	1146503.301
Course from POB to PC S 11° 45' 43.20" E Dist 19.206					
PC	1+19.21	N	402813.373	E	1146507.216
PI	2+05.14	N	402729.248	E	1146524.732
PT	2+85.19	N	402672.128	E	1146588.928
Radius:	260				
Delta:	36.577 Left				
Degree of Curvature (Arc):	22.037				
Length:	165.982				
Tangent:	85.929				
Chord:	163.178				
Middle Ordinate:	13.133				
External:	13.832				
Back Tangent Direction:	S11.762"E				
Back Radial Direction	S78.238"W				
Chord Direction:	S30.050"E				
Ahead Radial Direction	S41.661"W				
Ahead Tangent Direction:	S48.339"E				
Course from PT to POE S 48° 20' 20.40" E Dist 114.812					
POE	4+00.00	N	402595.81	E	1146674.703



SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS		
		17572+50 to 17582+50	EA	8
720	0125	ALIGNMENT MONUMENTS		
		17572+50 to 17582+50	EA	2
720	0130	IRON PIN R/W MONUMENTS		
		17572+50 to 17582+50	EA	4
720	0135	IRON PIN REFERENCE MONUMENTS		
		17572+50 to 17582+50	EA	4

Station & Offsets based on SCL1804					
POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
7005	402706.48	1146652.70	17575+59.69	90.00	I.P. RW MON & RW MKR
7006	402812.28	1146522.28	17575+67.35	257.77	I.P. RW MON & RW MKR
7007	402468.63	1146441.08	17578+78.05	90.00	I.P. RW MON & RW MKR
7008	402325.36	1146514.38	17579+36.36	-60.00	I.P. REF MON & RW MKR
7009	402425.07	1146402.32	17579+36.36	90.00	I.P. REF MON & RW MKR
7010	402230.37	1146429.86	17580+63.53	-60.00	I.P. REF MON & RW MKR
7011	402330.06	1146317.78	17580+63.52	90.00	I.P. REF MON & RW MKR
7012	402307.27	1146297.52	17580+94.00	90.00	I.P. RW MON & RW MKR

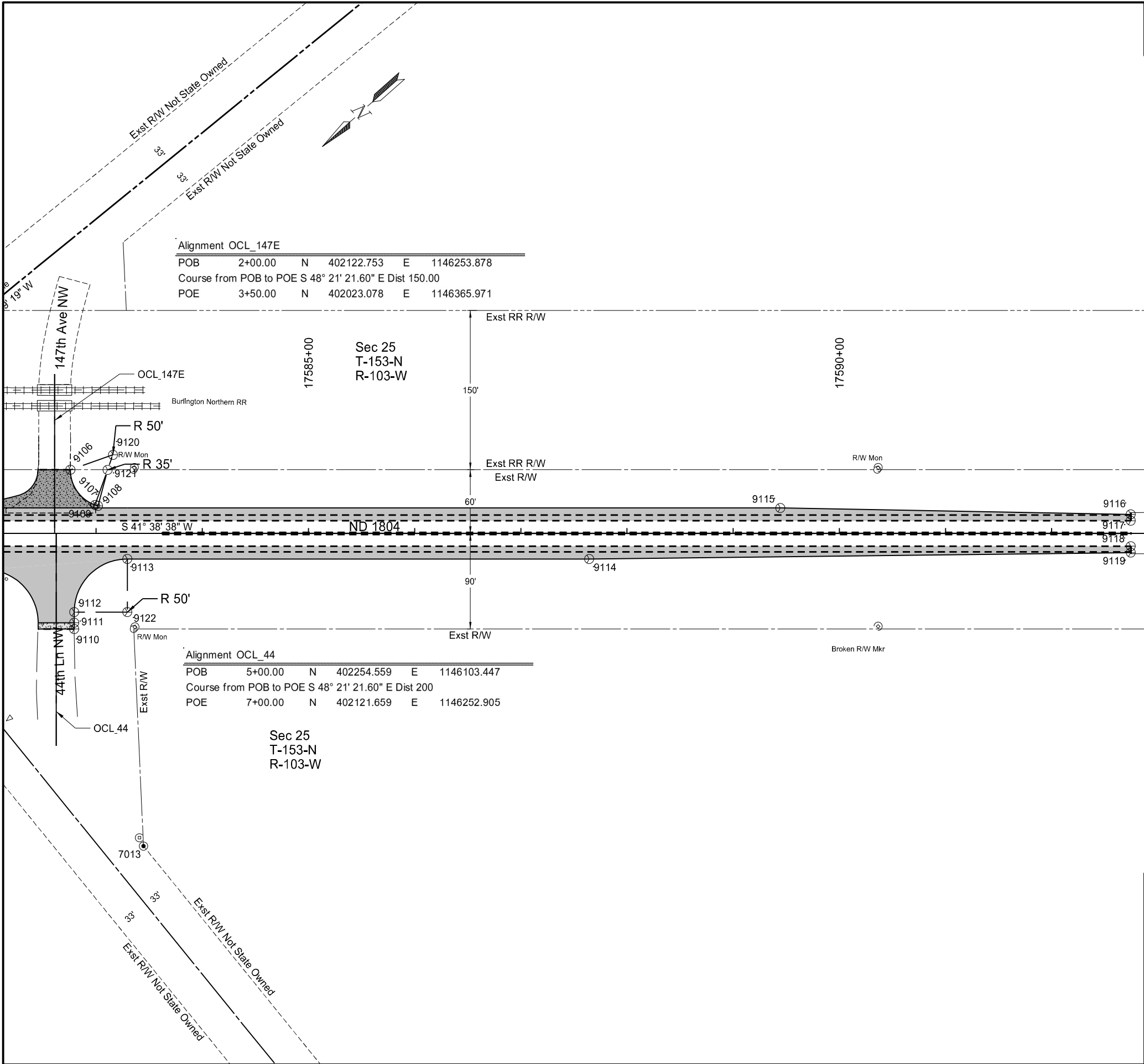
POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
9078	402658.83	1146698.65	17575+64.75	24.00	ASP*PC
9079	402654.71	1146628.06	17576+14.75	74.00	ASP*GRV*PT
9080	402665.35	1146616.11	17576+14.75	90.00	GRV
9081	402645.92	1146598.82	17576+40.75	90.00	GRV
9082	402635.29	1146610.78	17576+40.75	74.00	ASP*GRV*PT
9083	402564.70	1146614.90	17576+90.75	24.00	ASP*PC
9084	402550.04	1146601.85	17577+10.37	24.00	ASP*BEGIN TAPER
9085	402444.62	1146494.67	17578+60.37	34.00	ASP*END TAPER
9086	402349.29	1146487.49	17579+36.36	-24.00	ASP
9087	402357.27	1146478.52	17579+36.36	-12.00	MILL EDGE
9088	402373.22	1146460.59	17579+36.36	12.00	MILL EDGE
9089	402387.85	1146444.16	17579+36.36	34.00	ASP
9090	402254.30	1146402.97	17580+63.52	-24.00	ASP
9091	402262.27	1146394.00	17580+63.52	-12.00	MILL EDGE
9092	402278.22	1146376.06	17580+63.52	12.00	MILL EDGE
9093	402292.84	1146359.62	17580+63.52	34.00	ASP
9094	402171.72	1146329.54	17581+74.02	-24.00	ASP*CONC
9095	402170.39	1146331.03	17581+74.02	-26.00	CONC*PC
9096	402124.58	1146303.36	17582+26.64	-35.76	CONC*PCC
9097	402094.60	1146309.13	17582+45.22	-60.00	CONC*PT
9098	402194.32	1146272.02	17581+95.36	34.00	ASP*PC
9099	402190.18	1146201.43	17582+45.36	84.00	ASP*GRV*PT
9100	402194.17	1146196.95	17582+45.36	90.00	GRV
9101	402692.07	1146661.30	17575+64.75	74.00	RAD
9102	402597.93	1146577.54	17576+90.75	74.00	RAD
9103	401967.06	1146615.91	17581+36.67	-374.00	RAD
9104	402113.33	1146325.69	17582+20.22	-59.92	RAD
9105	402227.55	1146234.65	17581+95.36	84.00	RAD

Survey Data Layout

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW/147th Ave NW Intersection
17572+50 to 17582+50





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	82	4

SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS		
17582+50 to 17592+74			EA	1
720	0130	IRON PIN R/W MONUMENTS		
17582+50 to 17592+74			EA	1

Station & Offsets based on SCL1804

POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
7013	402255.78	1145978.29	17583+44.62	294.34	I.P. RW MON & RW MKR

POINT	NORTHING	EASTING	STATION	OFFSET	DESC.
9106	402071.77	1146288.83	17582+75.77	-60.00	CONC*PT
9107	402076.38	1146248.64	17582+99.03	-26.90	CONC*PCC
9108	402074.90	1146246.12	17583+01.81	-26.00	CONC*PC
9109	402076.23	1146244.63	17583+01.81	-24.00	ASP*CONC
9110	402168.76	1146174.35	17582+79.36	90.00	GRV
9111	402164.77	1146178.84	17582+79.36	84.00	ASP*GRV
9112	402158.13	1146186.31	17582+79.36	74.00	ASP*PT
9113	402087.54	1146190.45	17583+29.36	24.00	ASP*PC
9114	401762.47	1145901.39	17587+64.36	24.00	ASP*BEGIN TAPER
9115	401596.06	1145817.65	17589+44.36	-24.00	ASP*BEGIN TAPER
9116	401353.44	1145593.88	17592+74.36	-18.00	ASP*END TAPER
9117	401357.43	1145589.40	17592+74.36	-12.00	MILL EDGE
9118	401373.38	1145571.46	17592+74.36	12.00	MILL EDGE
9119	401377.36	1145566.98	17592+74.36	18.00	ASP*END TAPER
9120	402032.55	1146272.69	17583+15.81	-74.00	RAD
9121	402045.70	1146265.47	17583+10.77	-59.87	RAD
9122	402120.76	1146153.08	17583+29.36	74.00	RAD

LEGEND

- Iron Pin Reference Monument
- ▣ Alignment Monument
- ⊙ Iron Pin R/W Monument
- ⊕ R/W Markers
- Found R/W Marker

Survey Data Layout

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW/147th Ave NW Intersection
17582+50 to 17592+74.36

REGISTERED PROFESSIONAL ENGINEER

AUSTIN T. BECKER
PE-27997

DATE 05/23/2025

NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.			
			1			
E5-1-48	48"x48"	EXIT GORE			35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES	2	2	28	56
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)			18	
G20-2-48	48"x24"	END ROAD WORK	2	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)	1	1	18	18
G20-4b-36	36"x30"	WAIT FOR PILOT CAR			18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS	20	20	43	860
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW			36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	2	59	118
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	6	6	32	192
R1-2-60	60"x60"	YIELD			29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)	4	4	30	120
R2-1-48	48"x60"	SPEED LIMIT __	7	7	39	273
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	8	8	10	80
R3-2-48	48"x48"	NO LEFT TURN			35	
R4-1-48	48"x60"	DO NOT PASS	4	4	39	156
R4-7-48	48"x60"	KEEP RIGHT			39	
R5-1-48	48"x48"	DO NOT ENTER			35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)			14	
R7-1-12	12"x18"	NO PARKING ANY TIME			11	
R10-6-24	24"x36"	STOP HERE ON RED			16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)	4	4	12	48
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)			12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)			15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)	1	1	15	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	8	8	35	280
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT			35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW	4	4	26	104
W3-1-48	48"x48"	STOP AHEAD			35	
W3-3-48	48"x48"	SIGNAL AHEAD			35	
W3-4-48	48"x48"	BE PREPARED TO STOP	4	4	35	140
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	8	8	35	280
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT			35	
W5-1-48	48"x48"	ROAD NARROWS	7	7	35	245
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE			35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW			35	
W6-3-48	48"x48"	TWO WAY TRAFFIC			35	
W8-1-48	48"x48"	BUMP	12	12	35	420
W8-3-48	48"x48"	PAVEMENT ENDS			35	
W8-7-48	48"x48"	LOOSE GRAVEL			35	
W8-11-48	48"x48"	UNEVEN LANES	4	4	35	140
W8-12-48	48"x48"	NO CENTER LINE			35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL			35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY			35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE	2	2	35	70
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE	2	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)	8	8	14	112
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	3	3	35	105
W20-2-48	48"x48"	DETOUR AHEAD or _ FT or _ MILE			35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE			35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE			35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE			35	
W20-7-48	48"x48"	FLAGGER	4	4	35	140
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	4	4	5	20
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)	4	4	12	48
W21-1-48	48"x48"	WORKERS	1	1	35	35
W21-2-48	48"x48"	FRESH OIL	12	12	35	420
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE			35	
W21-5-48	48"x48"	SHOULDER WORK	7	7	35	245
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	

[illegible]

SPECIAL SIGNS

[illegible]

SPEC & CODE

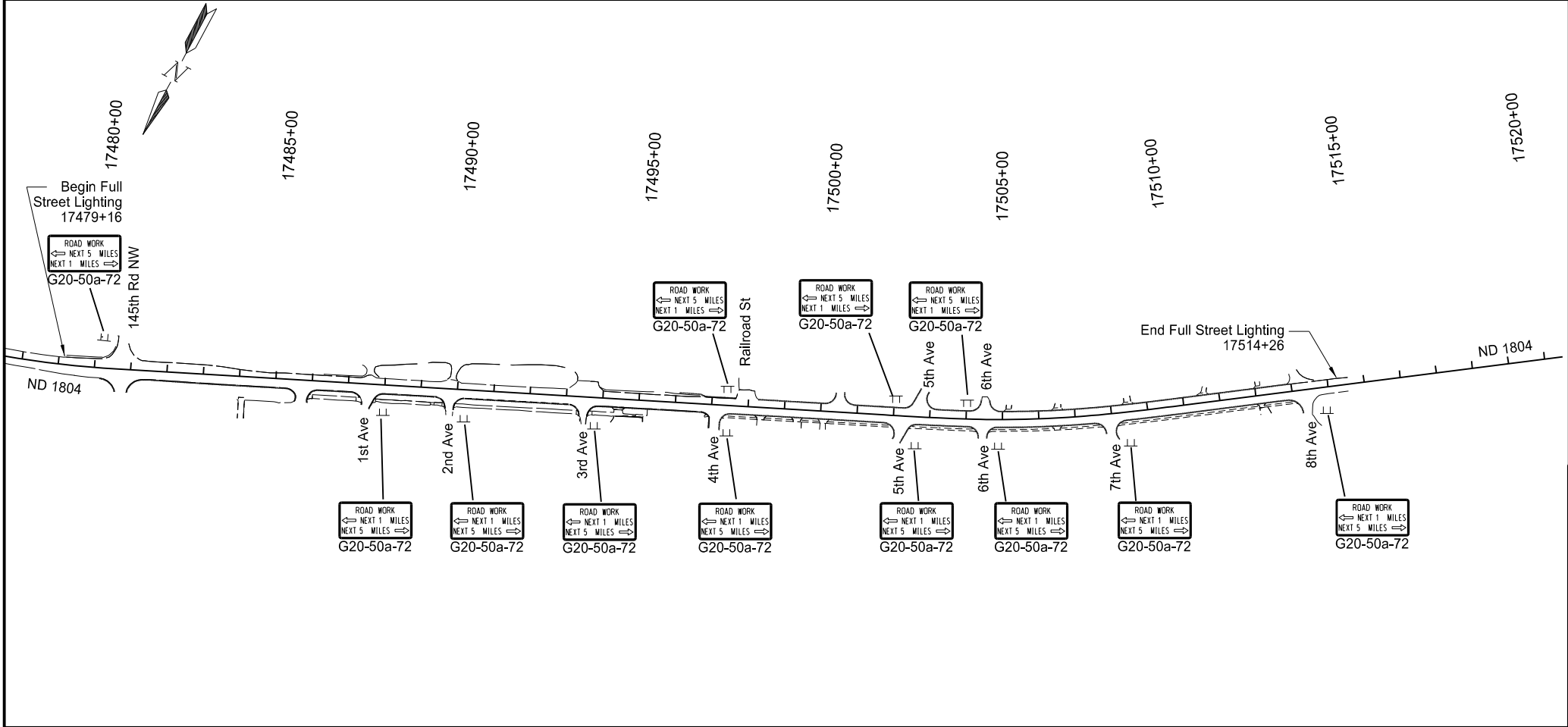
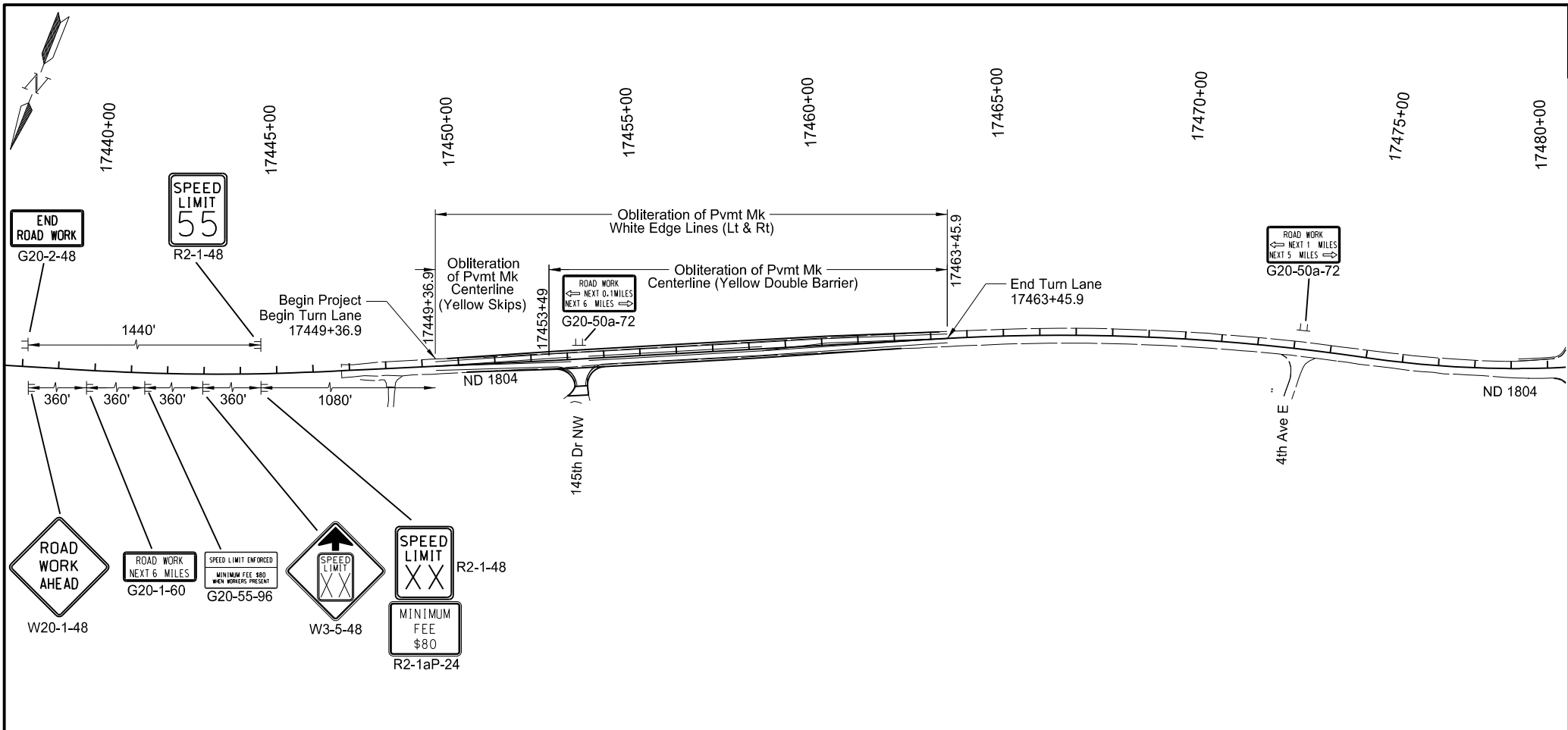
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	5282
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[illegible]

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/>



Traffic Control Devices List
ND 1804
Marley Xing to 0.5 Miles N of Trenton



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	100	2
SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1500	OBLITERATION OF PAVEMENT MARKING		
		White Edge Lines		
		17449+37 to 17463+46 Lt	SF	470
		17449+37 to 17463+46 Rt	SF	470
		Yellow Skips		
		17449+37 to 17453+49 CL	SF	35
		Yellow Double Barrier		
		17453+49 to 17463+46 CL	SF	665

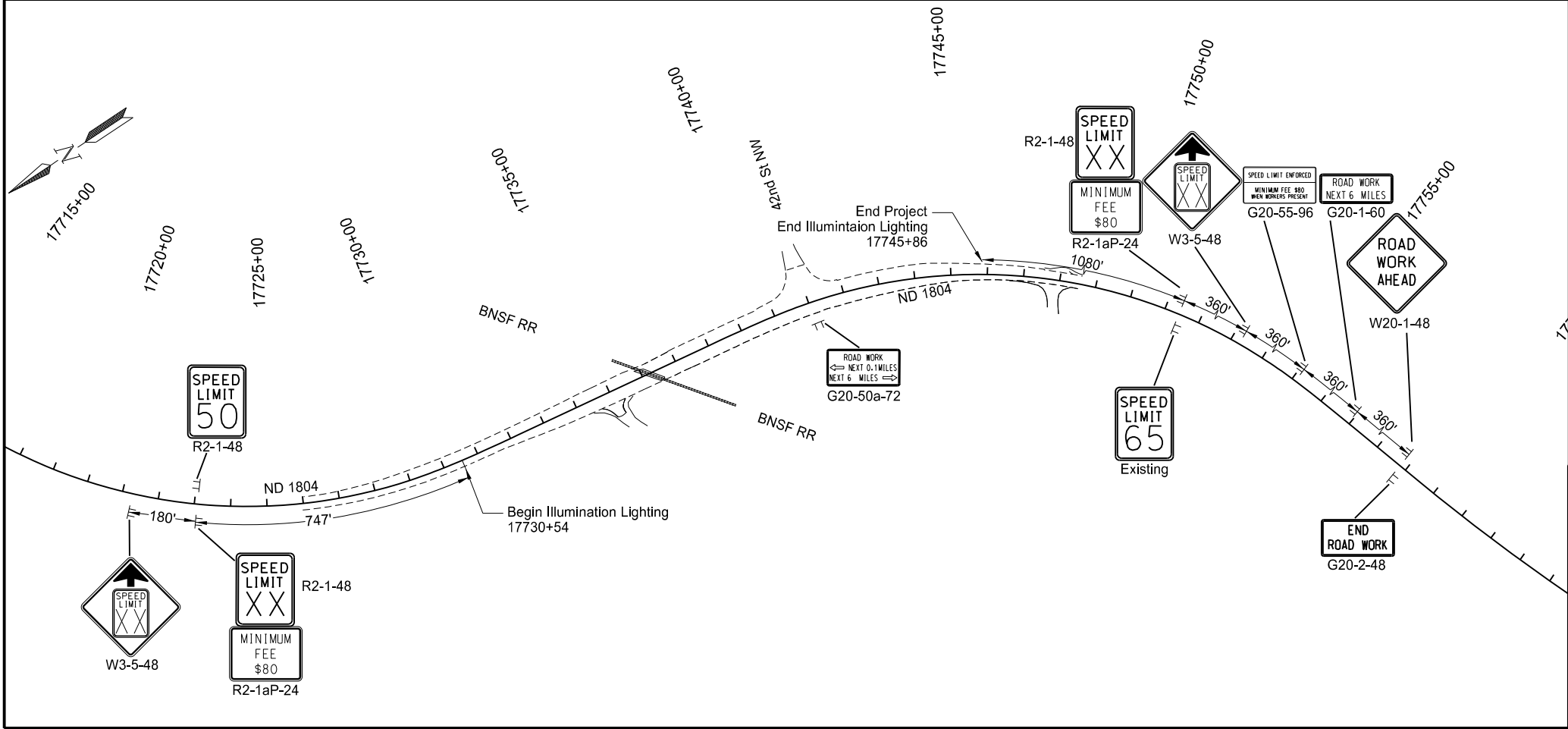
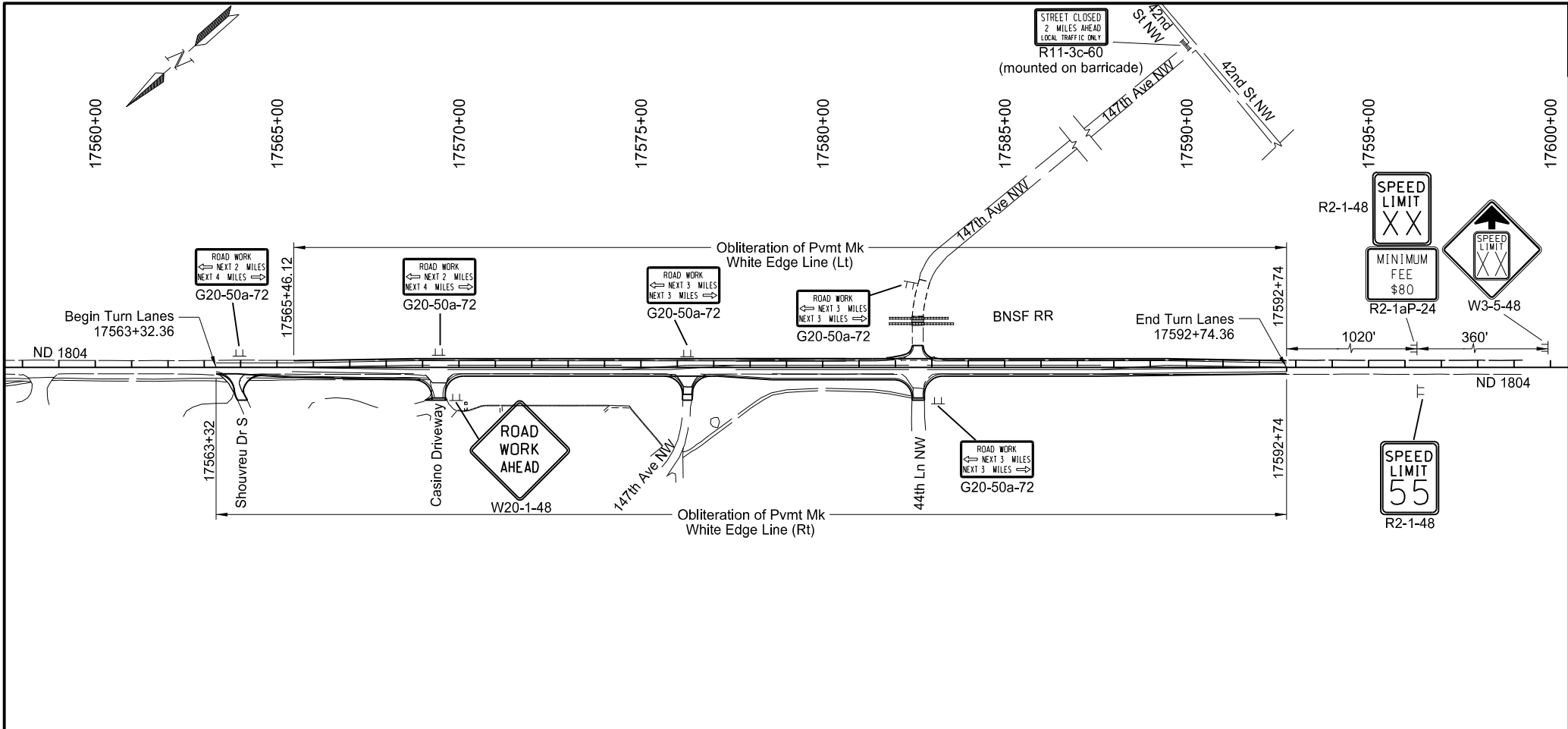
Work Zone Traffic Control

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 145th Dr NW Intersection
ND 1804, City of Trenton
17438+00 to 17520+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772
DATE 5/21/25
NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	100	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1500	OBLITERATION OF PAVEMENT MARKING		
		White Edge Lines		
		17563+32 to 17592+74 Rt	SF	981
		17565+46 to 17592+74 Lt	SF	910

Work Zone Traffic Control

ND 1804
Marley Xing to 0.5 Miles N of Trenton

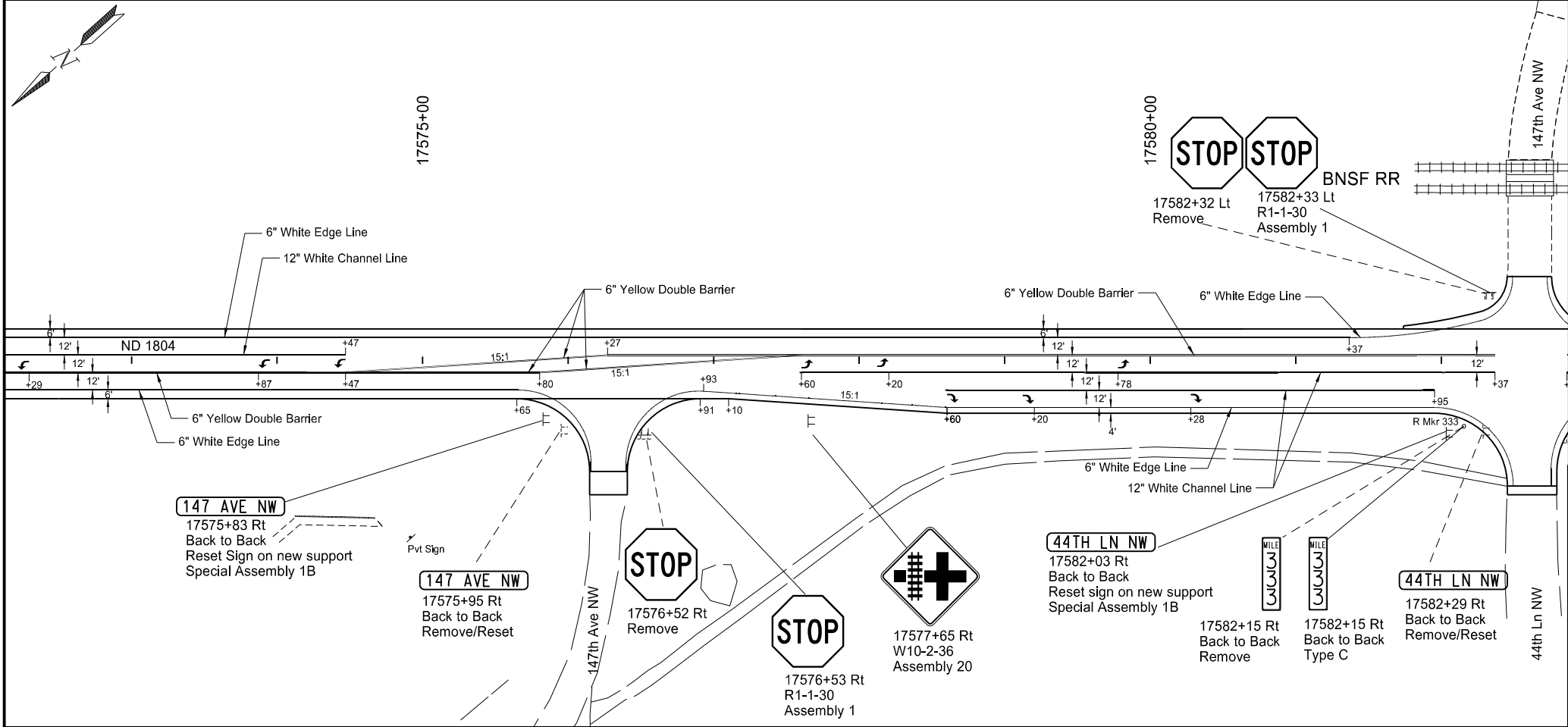
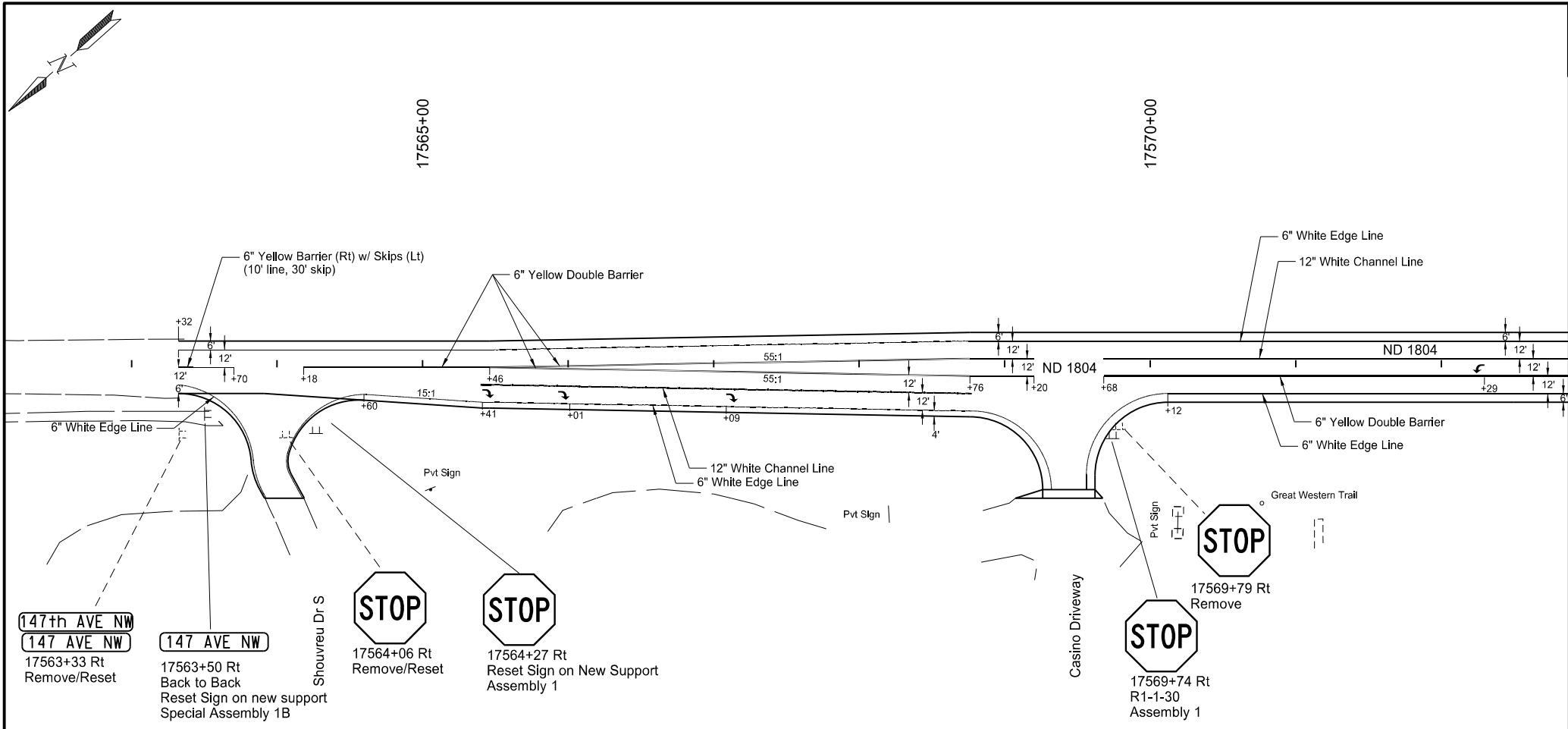
ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17558+00 to 17600+00
ND 1804 & Marley Xing Intersection
17718+00 to 17764+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772
DATE 5/21/25

NORTH DAKOTA

																		STATE	PROJECT NO.			SECTION NO.	SHEET NO.	
																	N.D.	HES-7-804(075)330			110	1		
Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF 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	
17452+83 Rt	S.A. 1B				8.5				5.0	2 x 2 12 ga	61.3						1	4	2.25 x 2.25 12 ga	1				
17453+63 Rt		1		5.2	9.0				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga					
17457+54 Rt		19			12.7				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga	1				
17460+87 Rt		9			11.8				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1				
17460+89 Lt		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					
17563+50 Rt	S.A. 1B				8.5				5.0	2 x 2 12 ga	35.0						1	4	2.25 x 2.25 12 ga	1				
17564+27 Rt		1			9.8				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga	1				
17569+74 Rt		1		5.2	9.1				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga					
17575+83 Rt	S.A. 1B				8.5				5.0	2 x 2 12 ga	35.0						1	4	2.25 x 2.25 12 ga	1				
17576+53 Rt		1		5.2	8.9				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga					
17577+65 Rt		20		9.0	12.7				5.0	2.25 x 2.25 12 ga	14.7	3.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1		
17582+03 Rt	S.A. 1B				10.2				5.0	2 x 2 12 ga	18.6						1	4	2.25 x 2.25 12 ga	1				
17582+33 Lt		1		5.2	9.4				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga					
17582+91 Rt		1		5.2	9.0				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga					
17583+08 Lt	S.A. 1B				9.3				5.0	2 x 2 12 ga	35.0						1	4	2.25 x 2.25 12 ga	1				
17587+58 Lt		20		9.0	12.7				5.0	2.25 x 2.25 12 ga	14.7	3.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1		
Sub Total			0.0	49.0	Total		162.1										Total	64.0		8	0	2		
Grand Total			0.0	49.0	Total		162.1										Total	64	0	8	0	2		
																				Sign Summary Perforated Tube ND 1804 Marley Xing to 0.5 Miles N of Trenton				
4/28/25 4:51:21PM Page 1 of 1																								



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	HES-7-804(075)330	110	3
SPEC	CODE	BID ITEM		UNIT	QUANTITY
754	563	REFERENCE MARKER-TYPE C		EA	1
		17582+15 Rt			
762	103	PVMT MK PAINTED-MESSAGE			
		Arrow (Lt)	16 SF x 6 EA	SF	96
		Arrow (Rt)	16 SF x 6 EA	SF	96
762	1106	PVMT MK PAINTED 6IN LINE			
		White Edge Line		LF	4062
		Yellow Double Barrier		LF	4918
		Yellow Barrier w/ Skips		LF	48
762	1112	PVMT MK PAINTED 12IN LINE			
		White Channel Line		LF	1626

Signing & Pavement Marking

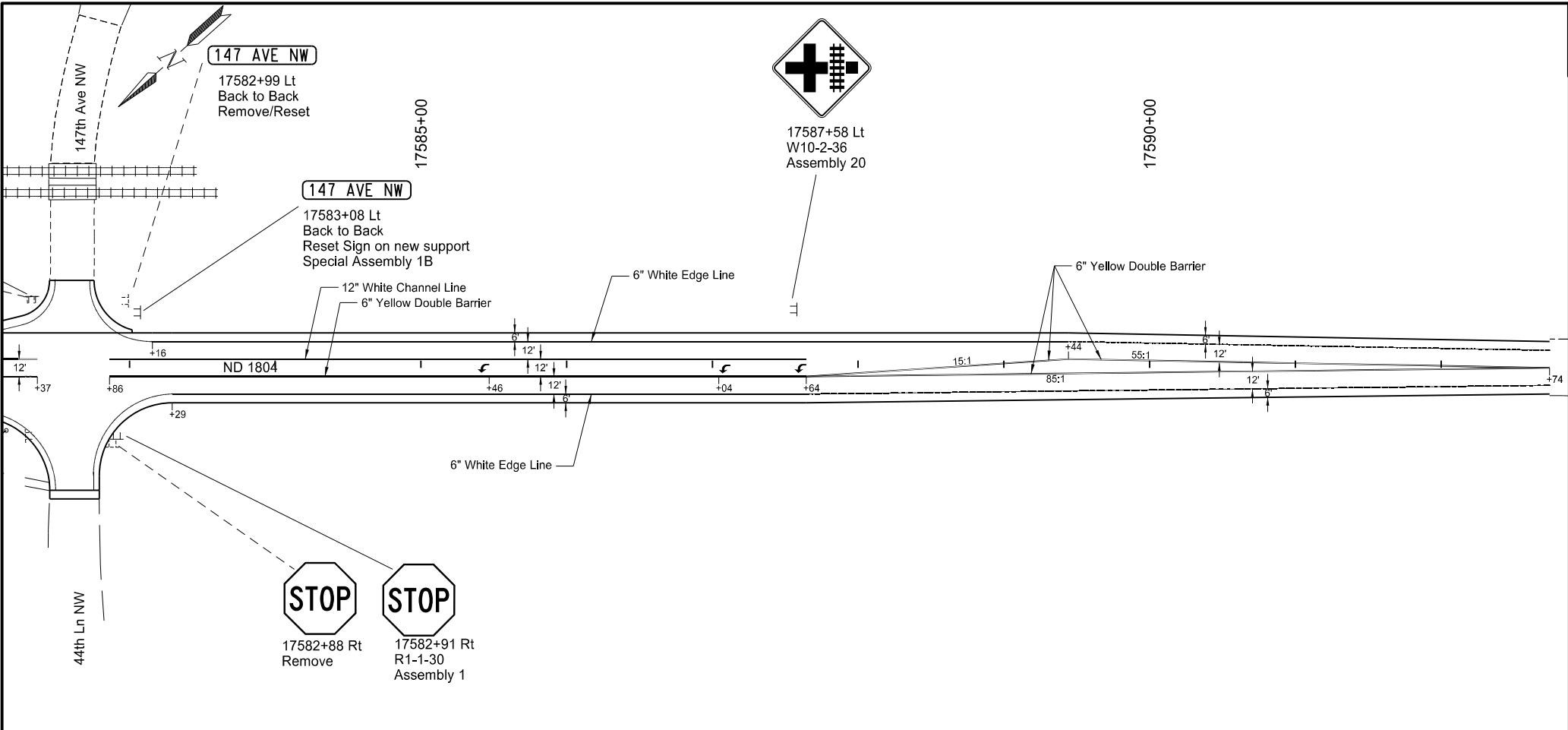
ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & Casino Approach Intersection
ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17563+32.36 to 17582+50

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772
DATE 5/21/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	110	4

SPEC	CODE	BID ITEM	UNIT	QUANTITY
762	103	PVMT MK PAINTED-MESSAGE Arrow (Lt) 16 SF x 3 EA	SF	48
762	1106	PVMT MK PAINTED 6IN LINE White Edge Line	LF	2070
		Yellow Double Barrier	LF	2998
762	1112	PVMT MK PAINTED 12IN LINE White Channel Line	LF	478

Signing & Pavement Marking

ND 1804
Marley Xing to 0.5 Miles N of Trenton

ND 1804 & 44th Ln NW / 147th Ave NW Intersection
17582+50 to 17592+74.36



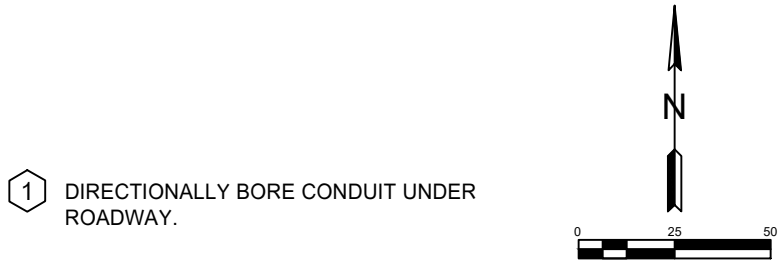
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	140	1

QUANTITIES INCLUDED IN PAY ITEM "LIGHTING SYSTEM A "	
CONCRETE FOUNDATION - HIGHWAY LIGHTING	15 EA
CONCRETE FOUNDATION - FEED POINT - TYPE B	1 EA
CABLE TRENCH - TYPE II	2770 LF
2IN DIAMETER RIGID CONDUIT	794 LF
MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE	3758 LF
FEED POINT - TYPE II - PAD MOUNTED	1 EA
LT STD 6FT MA 40FT MT HT BREAKAWAY	15 EA
LED LUMINAIRE	15 EA

LIGHTING & TRAFFIC SIGNAL FOUNDATION TABLE (USE FOR SINGLE MAST ARMS ONLY)		
Description	Footing Depth, "D" 24" & 30" Ø (ft)	Footing Depth, "D" 36" & 42" Ø (ft)
Light Standard		
30'-35' Mounting Height	6	5
36'-44' Mounting Height	6	5
45'-50' Mounting Height	8	7

DESCRIPTION	CABLE TRENCH-TYPE II	2 IN RIGID CONDUIT	MULTIPLE UNDERGROUND CABLE 2N04-1N06 STYLE USE
LIGHT #10 TO LIGHT #11	152 LF	98 LF	258 LF
LIGHT #11 TO LIGHT #12	220 LF	30 LF	258 LF
LIGHT #12 TO LIGHT #13	225 LF	25 LF	258 LF
LIGHT #13 TO LIGHT #14	145 LF	120 LF	273 LF
LIGHT #14 TO LIGHT #15	179 LF	66 LF	253 LF
LIGHT #15 TO LIGHT #16	190 LF	60 LF	258 LF
LIGHT #16 TO LIGHT #17	190 LF	60 LF	258 LF
LIGHT #17 TO LIGHT #18	250 LF		258 LF
LIGHT #18 TO FEEDPOINT C		54 LF	136 LF
LIGHT #18 TO LIGHT #19	154 LF	96 LF	258 LF
LIGHT #19 TO LIGHT #20	204 LF	46 LF	258 LF
LIGHT #20 TO LIGHT #21	201 LF	49 LF	258 LF
LIGHT #21 TO LIGHT #22	250 LF		258 LF
LIGHT #22 TO LIGHT #23	250 LF		258 LF
LIGHT #23 TO LIGHT #24	160 LF	90 LF	258 LF

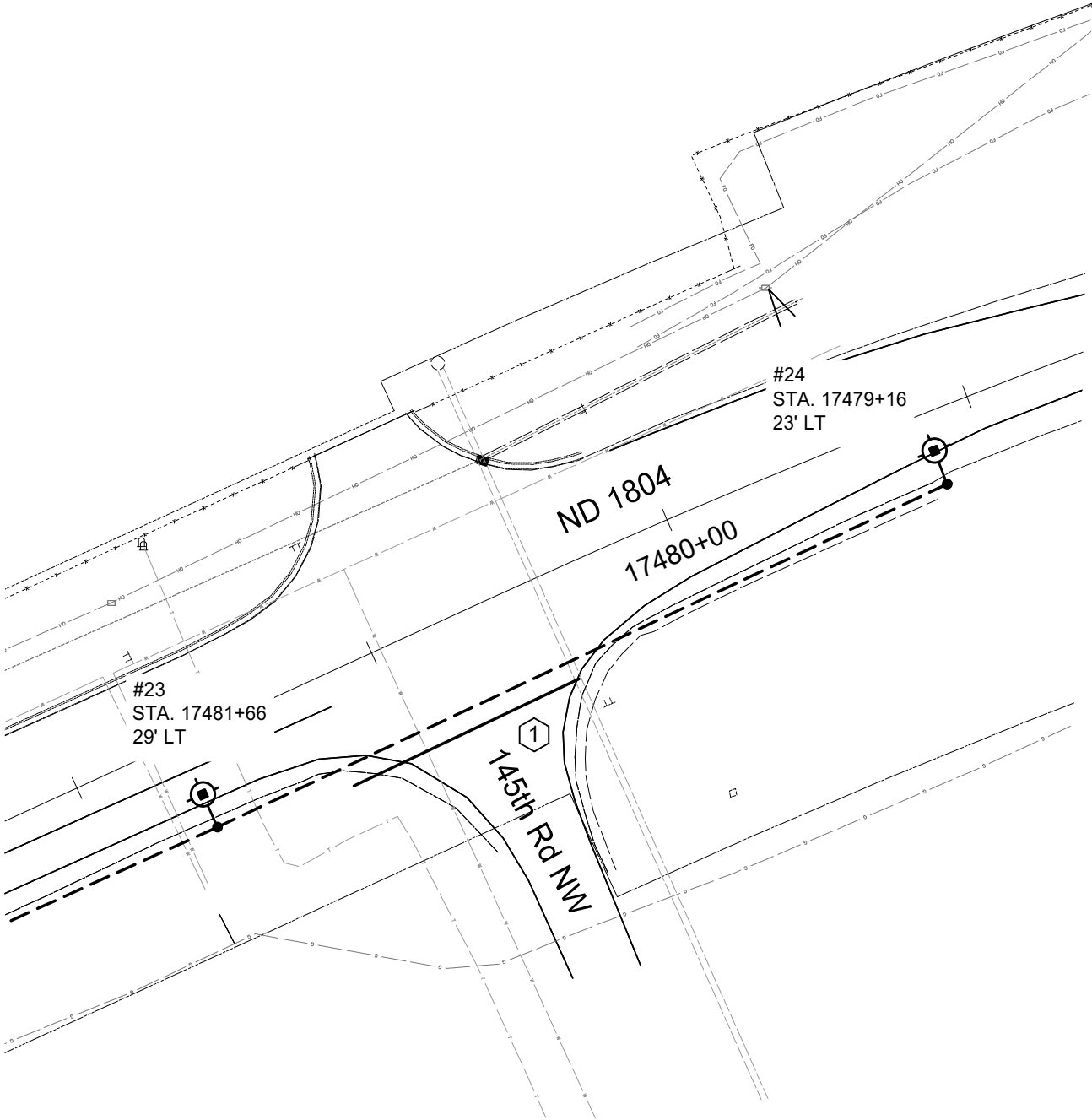
STANDARD NUMBER	STATION & OFFSET	DELIVERED LUMENS	LUMINAIRE DISTRIBUTION
10	17514+26 23'LT	27,800	R2
11	17511+76 24'LT	27,800	R2
12	17509+26 24'LT	27,800	R2
13	17506+74 25'LT	27,800	R2
14	17504+11 25'LT	27,800	R2
15	17501+66 25'LT	27,800	R2
16	17499+16 25'LT	27,800	R2
17	17496+66 23'LT	27,800	R2
18	17494+16 22'LT	27,800	R2
19	17491+66 21'LT	27,800	R2
20	17489+16 21'LT	27,800	R2
21	17486+66 21'LT	27,800	R2
22	17484+16 21'LT	27,800	R2
23	17481+66 29'LT	27,800	R2
24	17479+16 23'LT	27,800	R2



1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.

LIGHTING SYSTEM A
LIGHTING LAYOUT
STA. 17479+00 TO 17482+50

ND 1804
Marley Xing to 0.5 Miles N of Trenton



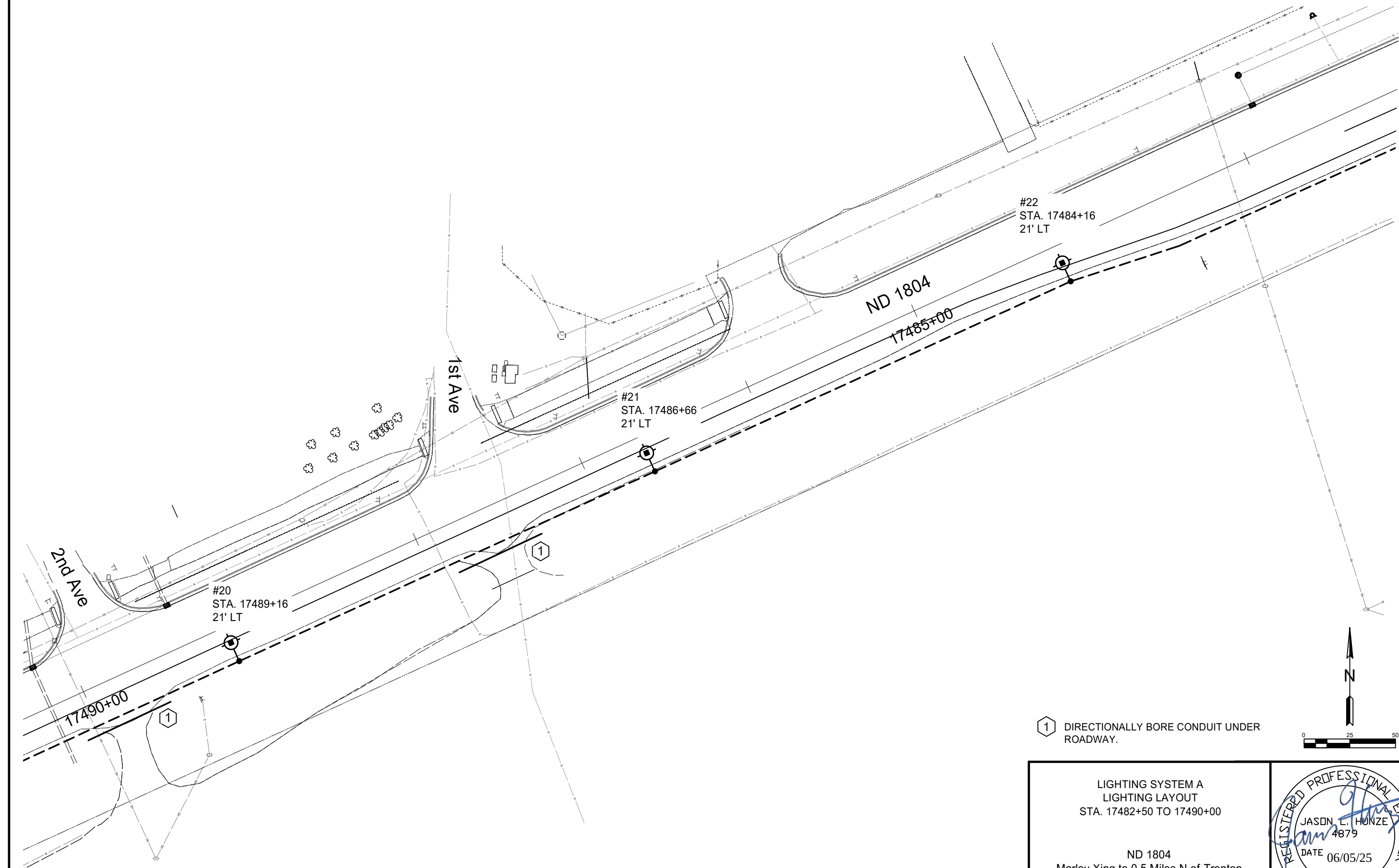
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		140	2

ND

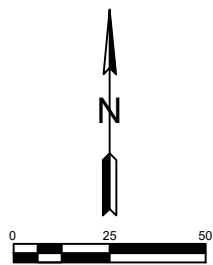
HES-7-804(075)330

140

2



1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.



LIGHTING SYSTEM A
LIGHTING LAYOUT
STA. 17482+50 TO 17490+00

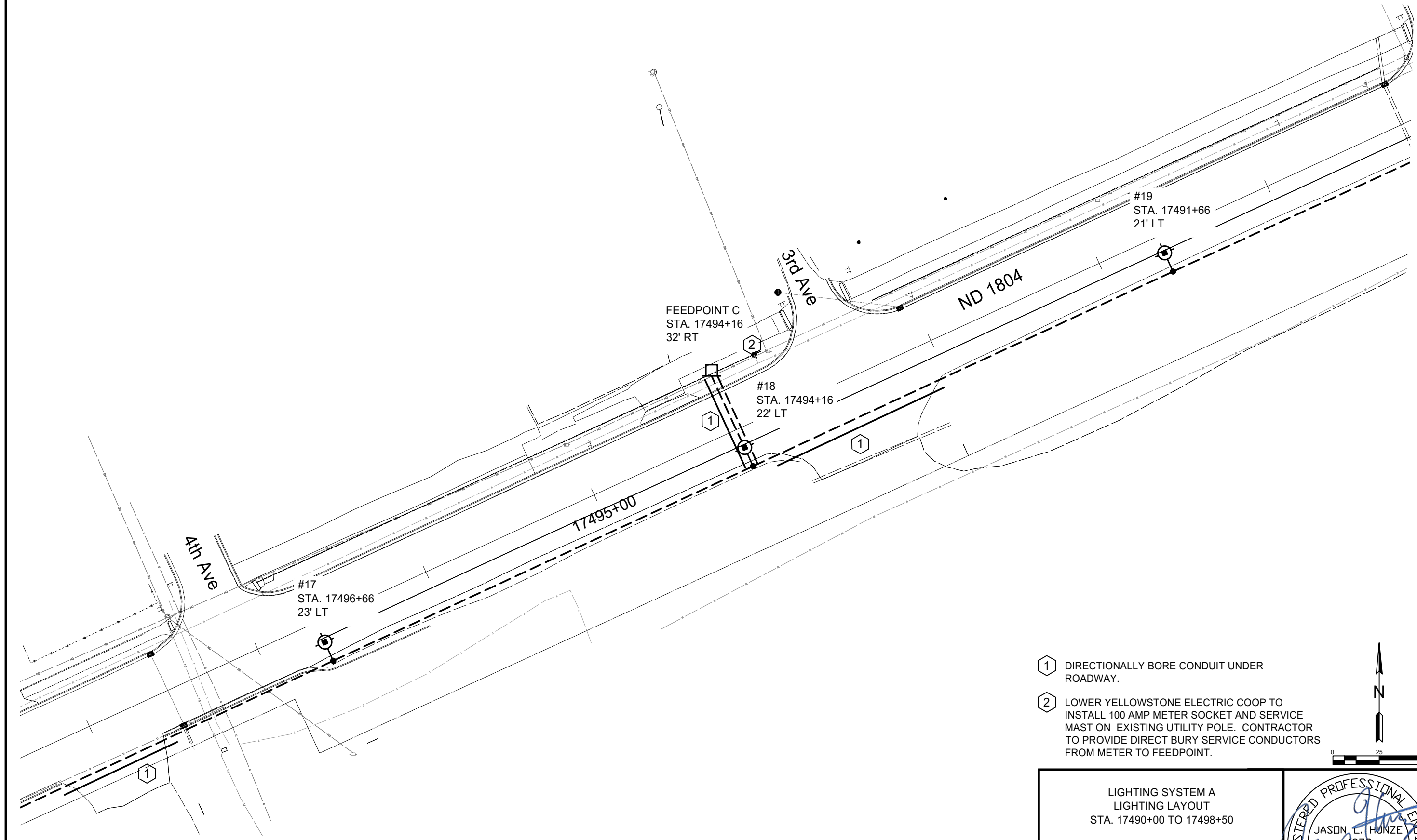
ND 1804
Marley Xing to 0.5 Miles N of Trenton



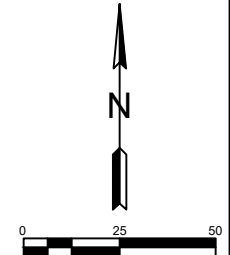
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		140	3

ND

HES-7-804(075)330

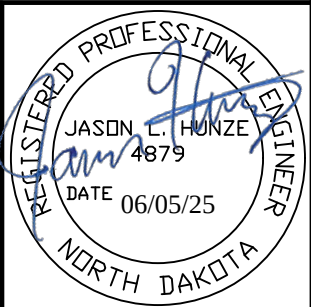


- 1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.
- 2 LOWER YELLOWSTONE ELECTRIC COOP TO INSTALL 100 AMP METER SOCKET AND SERVICE MAST ON EXISTING UTILITY POLE. CONTRACTOR TO PROVIDE DIRECT BURY SERVICE CONDUCTORS FROM METER TO FEEDPOINT.



LIGHTING SYSTEM A
LIGHTING LAYOUT
STA. 17490+00 TO 17498+50

ND 1804
Marley Xing to 0.5 Miles N of Trenton



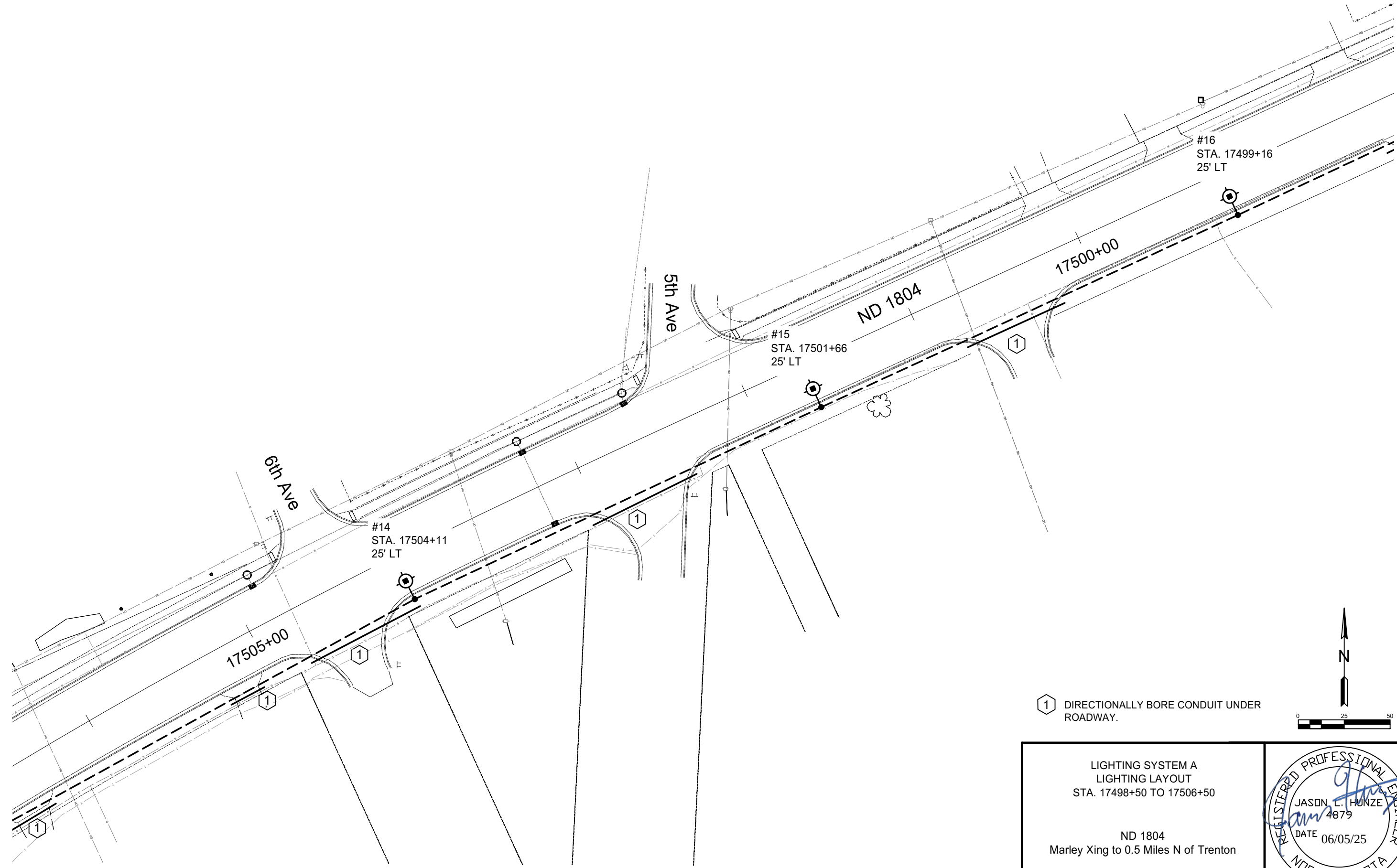
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		140	4

ND

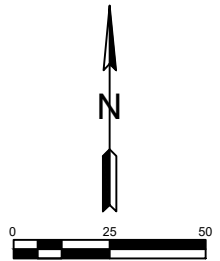
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140

4

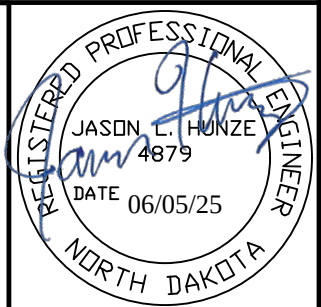


1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.



LIGHTING SYSTEM A
LIGHTING LAYOUT
STA. 17498+50 TO 17506+50

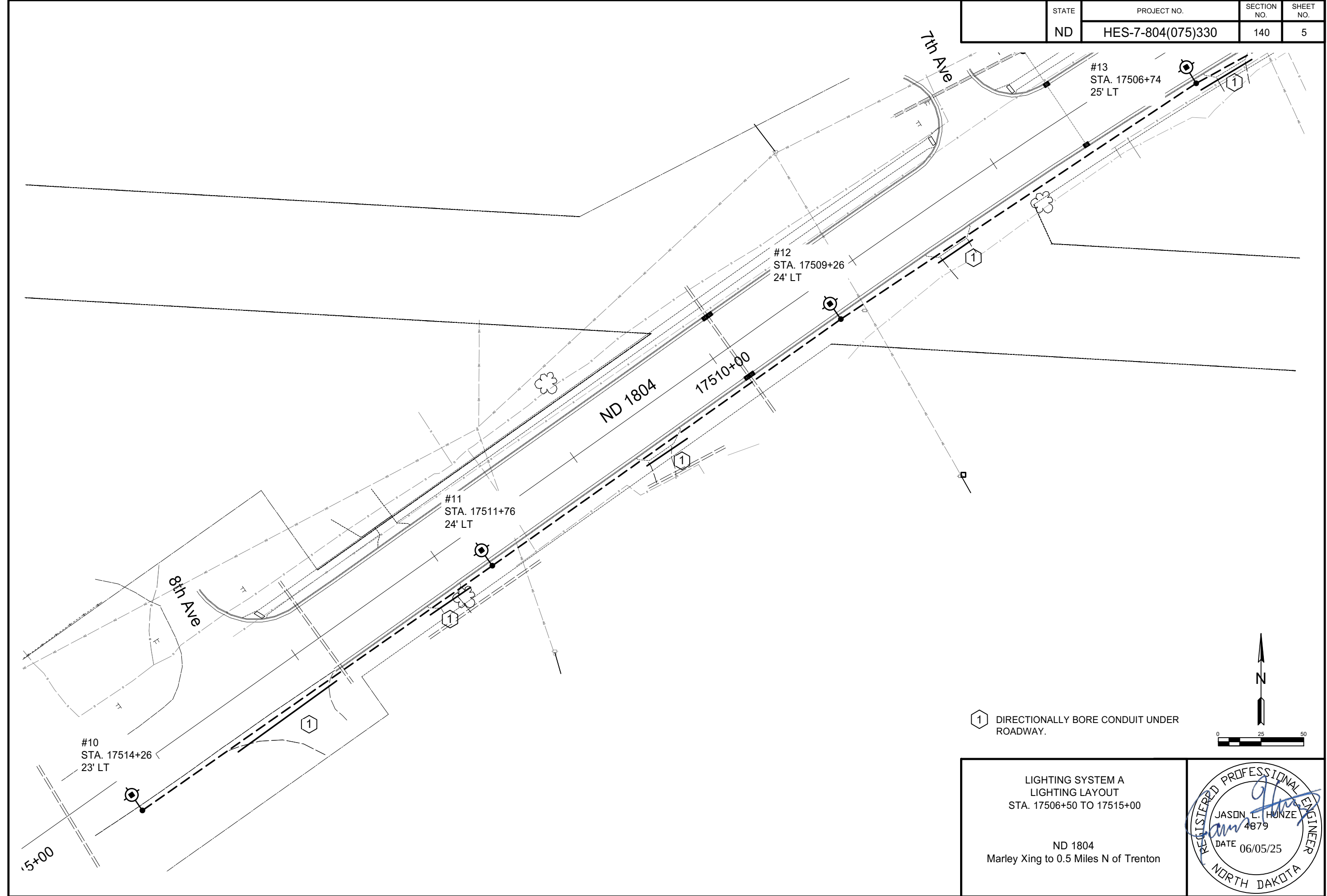
ND 1804
Marley Xing to 0.5 Miles N of Trenton



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		140	5

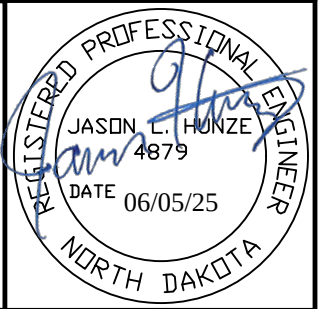
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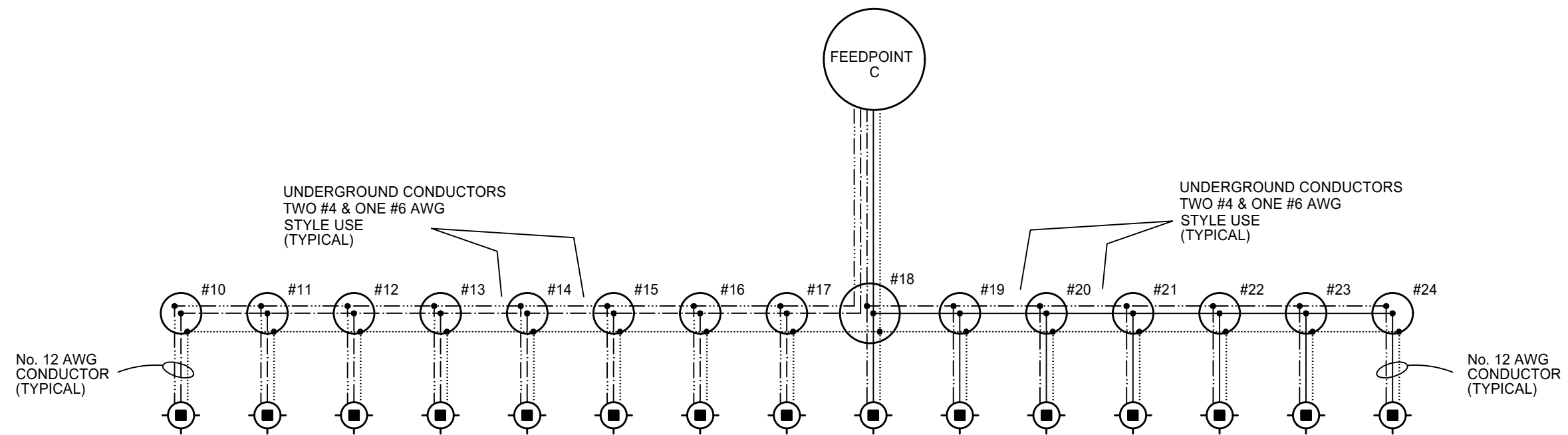
HES-7-804(075)330



LIGHTING SYSTEM A
LIGHTING LAYOUT
STA. 17506+50 TO 17515+00

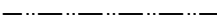
ND 1804
Marley Xing to 0.5 Miles N of Trenton



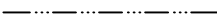


SCHEMATIC LEGEND

 LIGHT STANDARD

 LIGHTING CIRCUIT #1 PHASE "A" CONDUCTOR

 LIGHTING CIRCUIT #1 PHASE "B" CONDUCTOR

 LIGHTING CIRCUIT #2 PHASE "A" CONDUCTOR

 LIGHTING CIRCUIT #2 PHASE "B" CONDUCTOR

 #6 AWG GROUND CONDUCTOR

LIGHTING SYSTEM A
SCHEMATIC

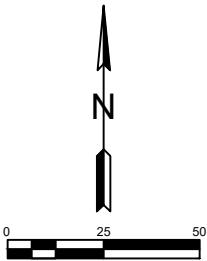
ND 1804
Marley Xing to 0.5 Miles N of Trenton



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	140	7

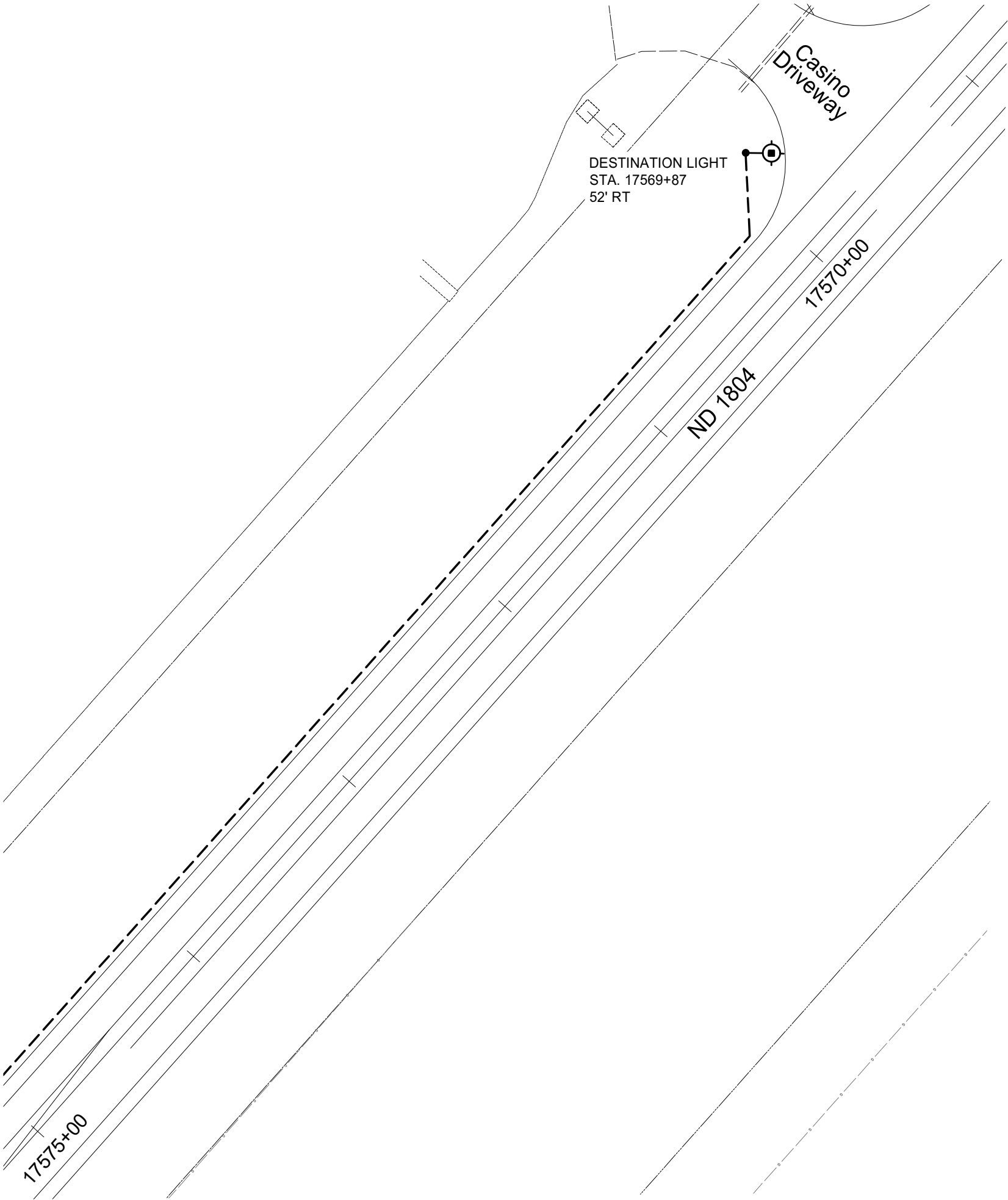
QUANTITIES INCLUDED IN PAY ITEM "DESTINATION LIGHTING (TWO OR MORE POLES) "	
50 FT WOOD POLE - CLASS II	2 EA
20 FT WOOD POLE - CLASS VII	1 EA
JUNCTION BOX (POLE MOUNTED)	2 EA
CABLE TRENCH - TYPE II	1305 LF
1IN DIAMETER RIGID CONDUIT (POLE MOUNTED)	78 LF
2IN DIAMETER RIGID CONDUIT	40 LF
2IN DIAMETER RIGID CONDUIT (POLE MOUNTED)	10 LF
MULTIPLE UNDERGROUND CABLE 2NO6-1NO8 STYLE USE	1383 LF
UNDERGROUND CONDUCTOR NO12 AWG STYLE THW	360 LF
FEED POINT - TYPE I - POLE MOUNTED	1 EA
12 FT MAST ARM - WOOD POLE MOUNTED	2 EA
LED LUMINAIRE	2 EA

DESCRIPTION	CABLE TRENCH TYPE II	2 IN RIGID CONDUIT	MULTIPLE UNDERGROUND CABLE 2NO6-1NO8 STYLE USE
FEED POINT TO WEST LIGHTING POLE	609 LF		628 LF
FEED POINT TO EAST LIGHTING POLE	696 LF	40 LF	755 LF



DESTINATION LIGHTING
LIGHTING LAYOUT
STA. 17569+00 TO 17575+00

ND 1804
Marley Xing to 0.5 Miles N of Trenton



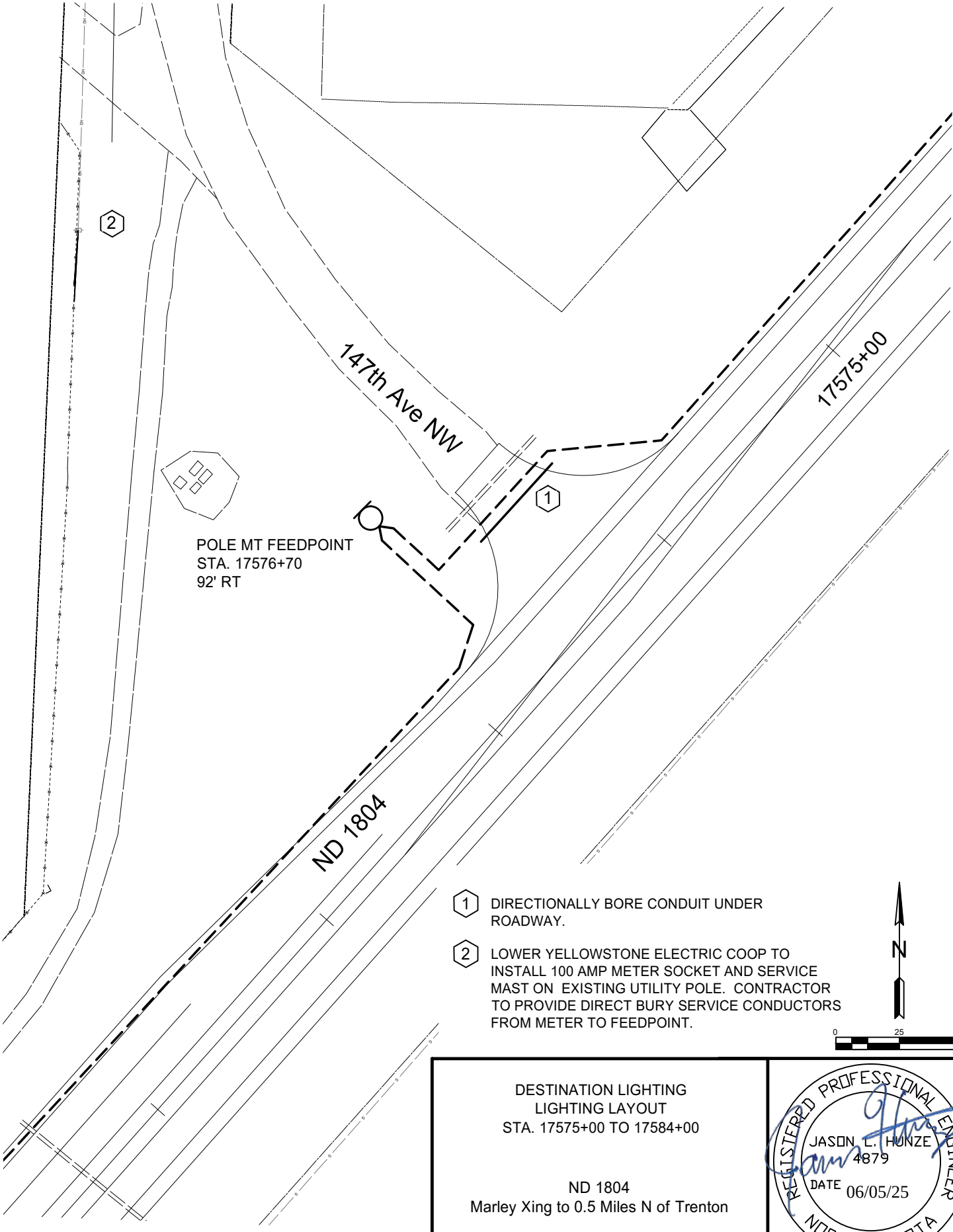
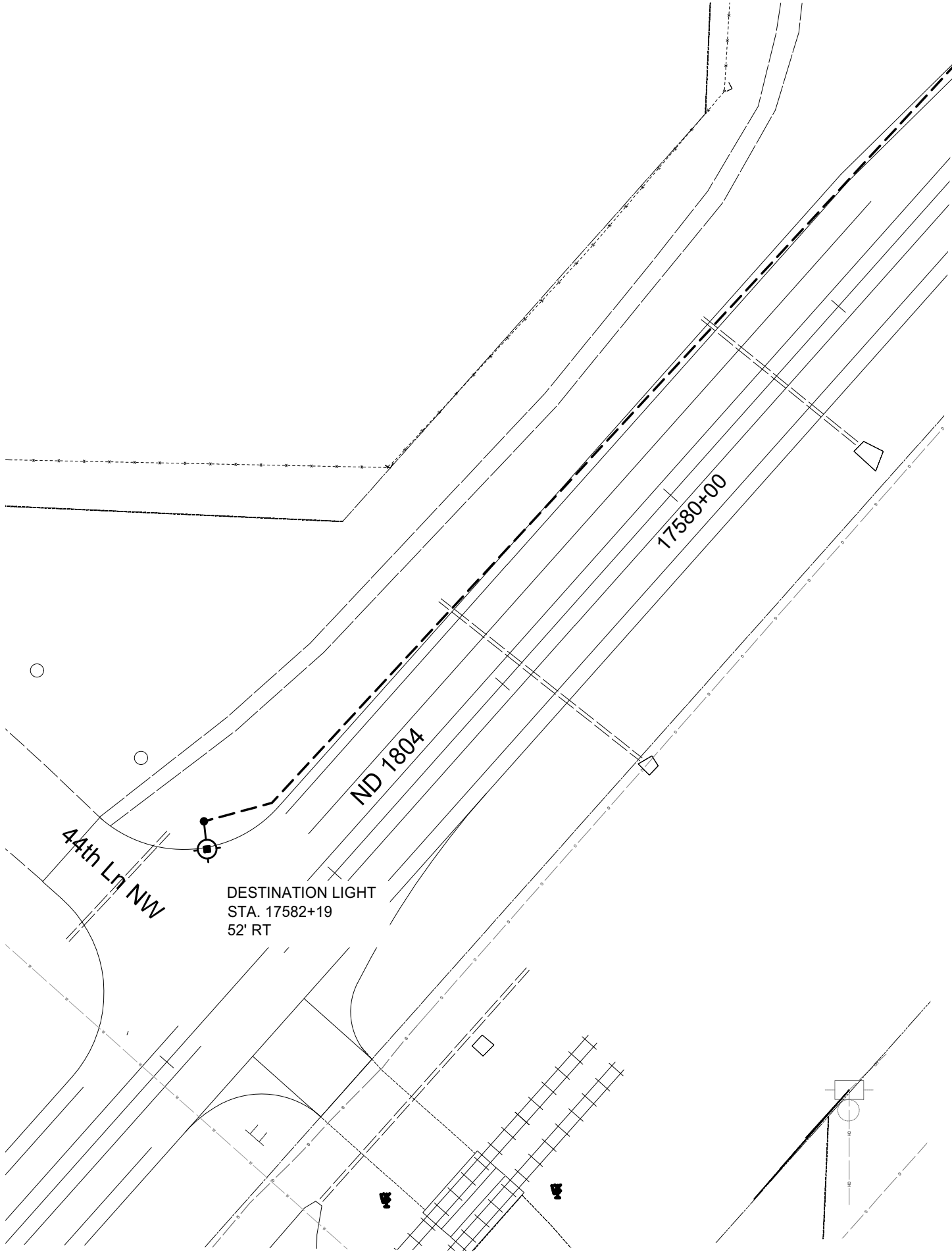
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		140	8

ND

HES-7-804(075)330

140

8



- 1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.
- 2 LOWER YELLOWSTONE ELECTRIC COOP TO INSTALL 100 AMP METER SOCKET AND SERVICE MAST ON EXISTING UTILITY POLE. CONTRACTOR TO PROVIDE DIRECT BURY SERVICE CONDUCTORS FROM METER TO FEEDPOINT.

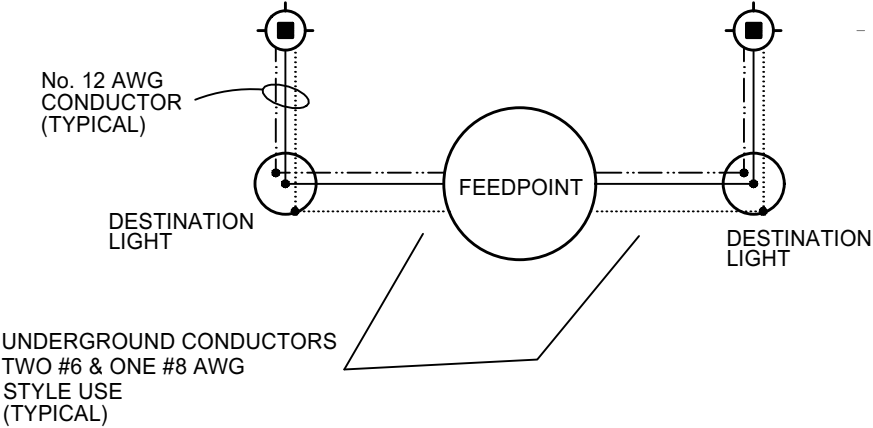


DESTINATION LIGHTING
LIGHTING LAYOUT
STA. 17575+00 TO 17584+00

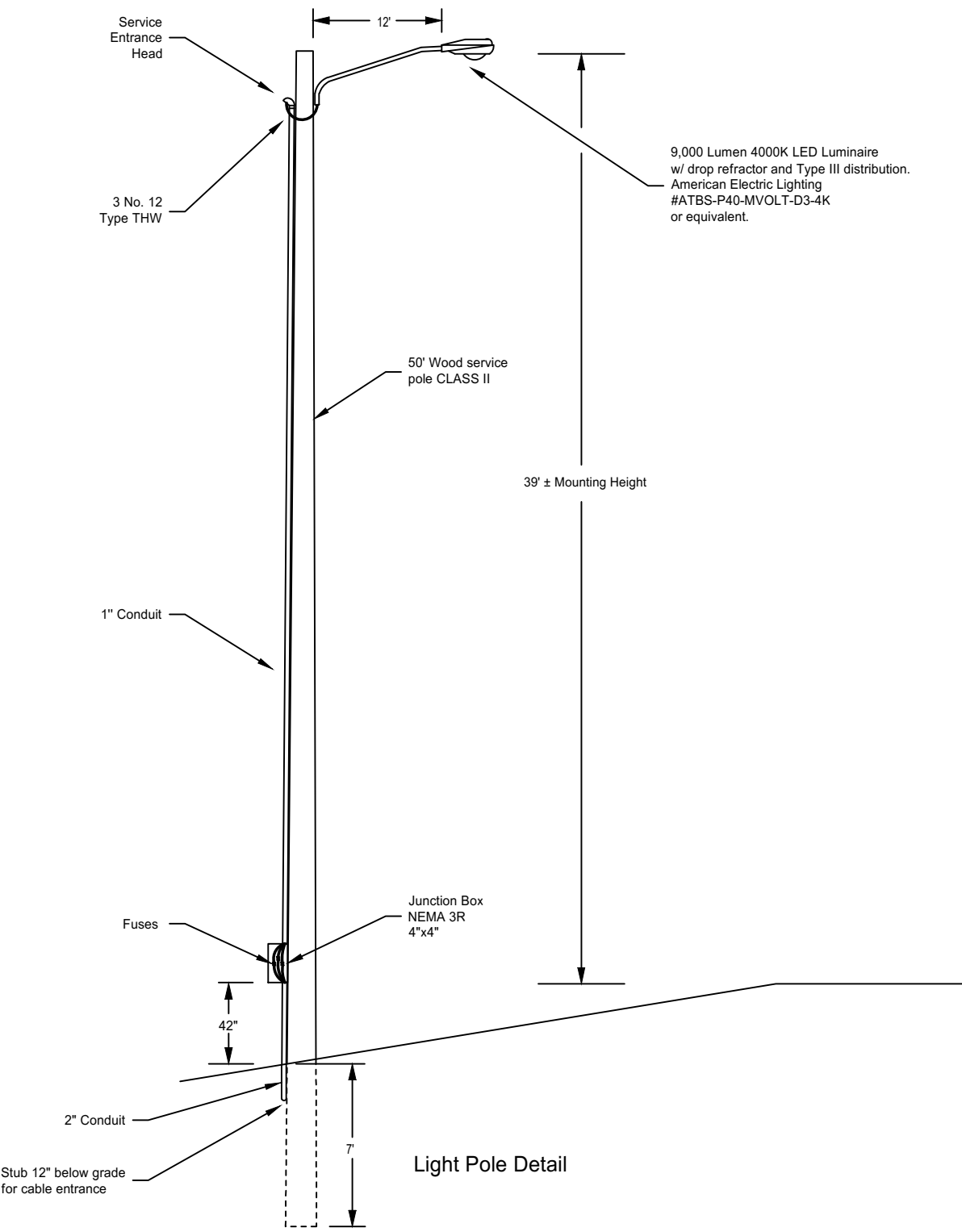
ND 1804
Marley Xing to 0.5 Miles N of Trenton



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	HES-7-804(075)330	140	9



SCHEMATIC LEGEND	
	LIGHT STANDARD
	LIGHTING CIRCUIT #1 PHASE "A" CONDUCTOR
	LIGHTING CIRCUIT #1 PHASE "B" CONDUCTOR
	#6 AWG GROUND CONDUCTOR



Destination Lighting
Utility Powered Lighting Detail
and Schematic

ND 1804
Marley Xing to 0.5 Miles N of Trenton

REGISTERED PROFESSIONAL ENGINEER

JASON L. HUNZE
4879

DATE 06/05/25

NORTH DAKOTA

QUANTITIES INCLUDED IN PAY ITEM
"LIGHTING SYSTEM B "

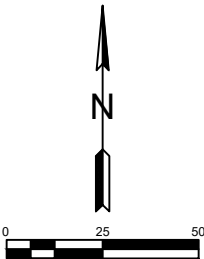
CONCRETE FOUNDATION - HIGHWAY LIGHTING	9 EA
CONCRETE FOUNDATION - FEED POINT - TYPE B	2 EA
CABLE TRENCH - TYPE II	1360 LF
2IN DIAMETER RIGID CONDUIT	229 LF
MULTIPLE UNDERGROUND CABLE 2NO4-1NO6 STYLE USE	1739LF
FEED POINT - TYPE I - PAD MOUNTED	2 EA
LT STD 9FT MA 42FT POLE BREAKAWAY	9 EA
LED LUMINAIRE	9 EA

STANDARD NUMBER	STATION & OFFSET	DELIVERED LUMENS	LUMINAIRE DISTRIBUTION
1	17745+86 38.5'LT	27,800	R3
2	17743+91 44'LT	27,800	R3
3	17741+96 42.5'LT	27,800	R3
4	17740+41 45'RT	27,800	R3
5	17738+81 40.5'LT	27,800	R3
6	17736+81 38'LT	27,800	R3
7	17734+44 38'LT	27,800	R3
8	17732+49 34.5'RT	27,800	R3
9	17730+54 30'RT	27,800	R3

LIGHTING & TRAFFIC SIGNAL FOUNDATION
TABLE
(USE FOR SINGLE MAST ARMS ONLY)

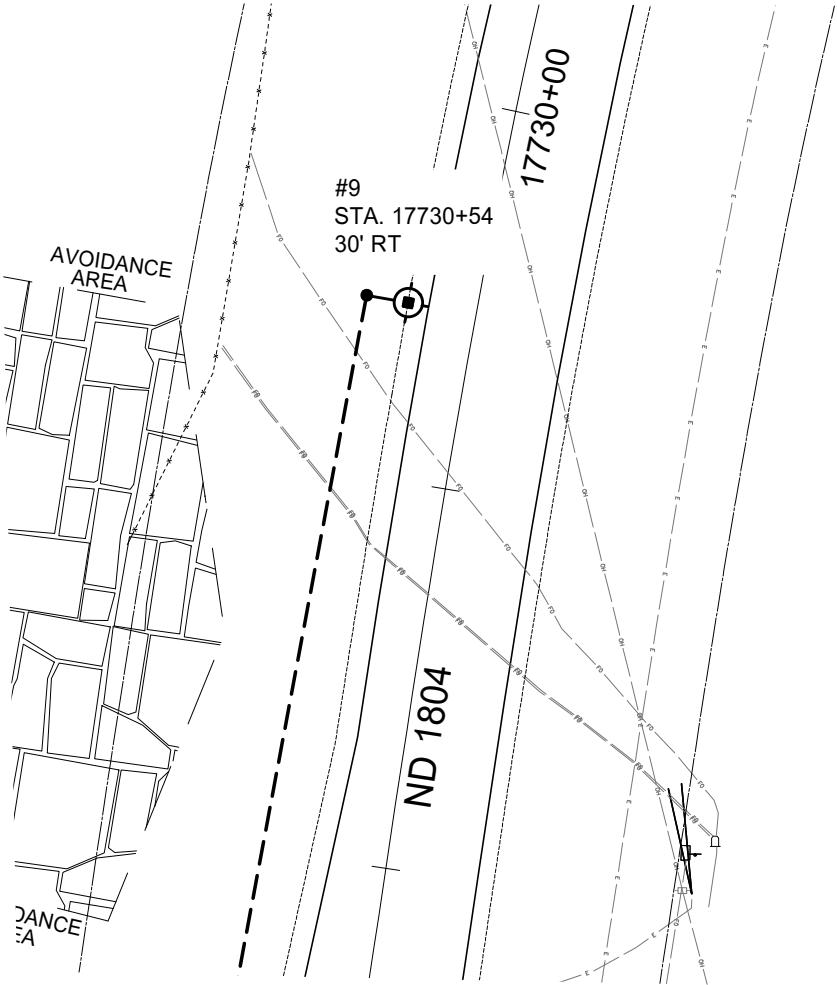
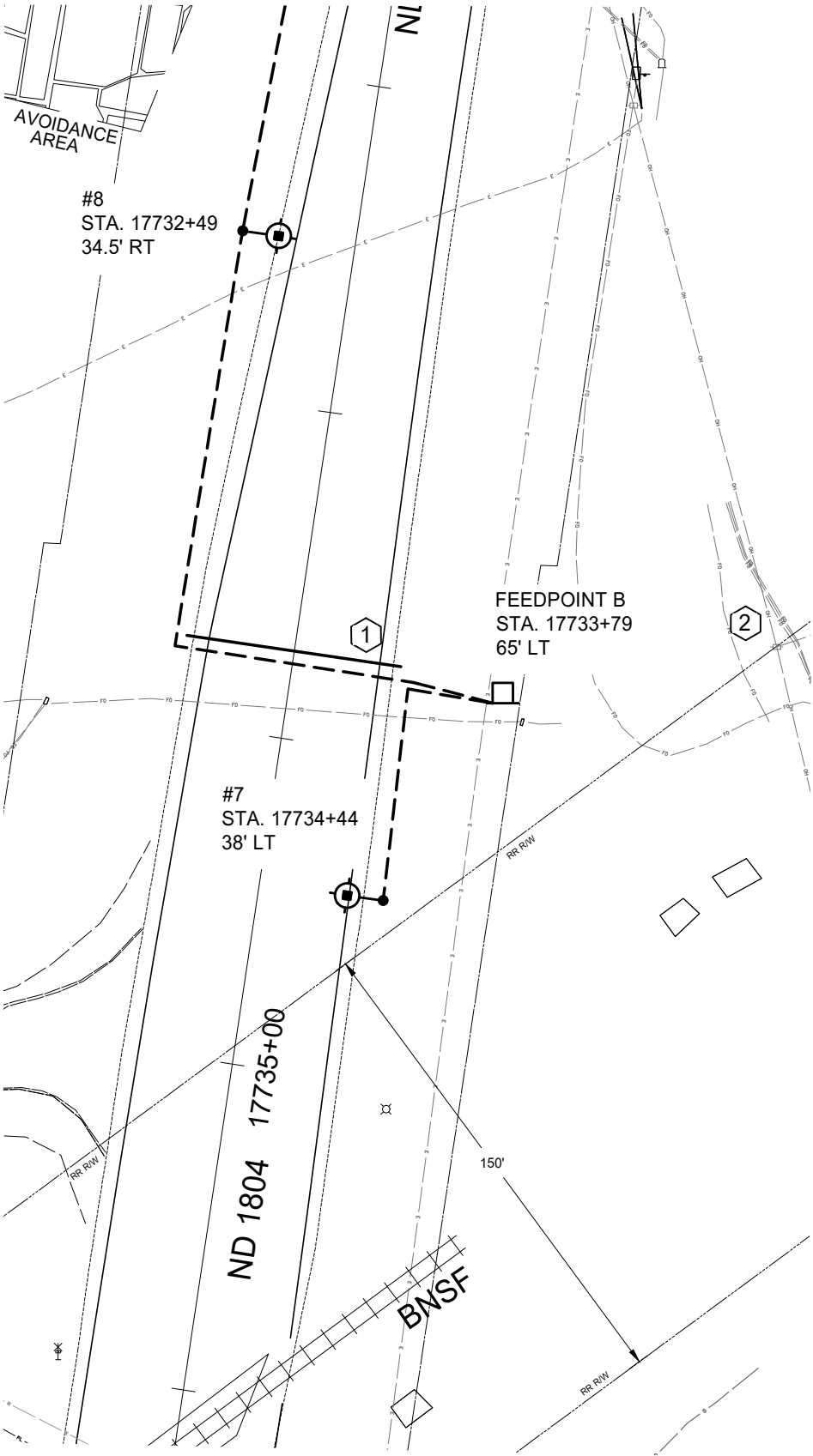
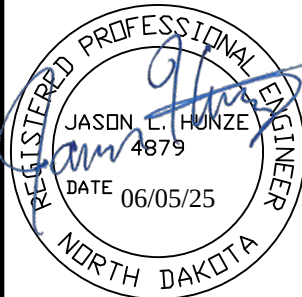
Description	Footing Depth, "D" 24" & 30" Ø (ft)	Footing Depth, "D" 36" & 42" Ø (ft)
	Light Standard	
30'-35' Mounting Height	6	5
36'-44' Mounting Height	6	5
45'-50' Mounting Height	8	7

- 1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.
- 2 LOWER YELLOWSTONE ELECTRIC COOP TO INSTALL 100 AMP METER SOCKET AND SERVICE MAST ON EXISTING UTILITY POLE. CONTRACTOR TO PROVIDE DIRECT BURY SERVICE CONDUCTORS FROM METER TO FEEDPOINT.



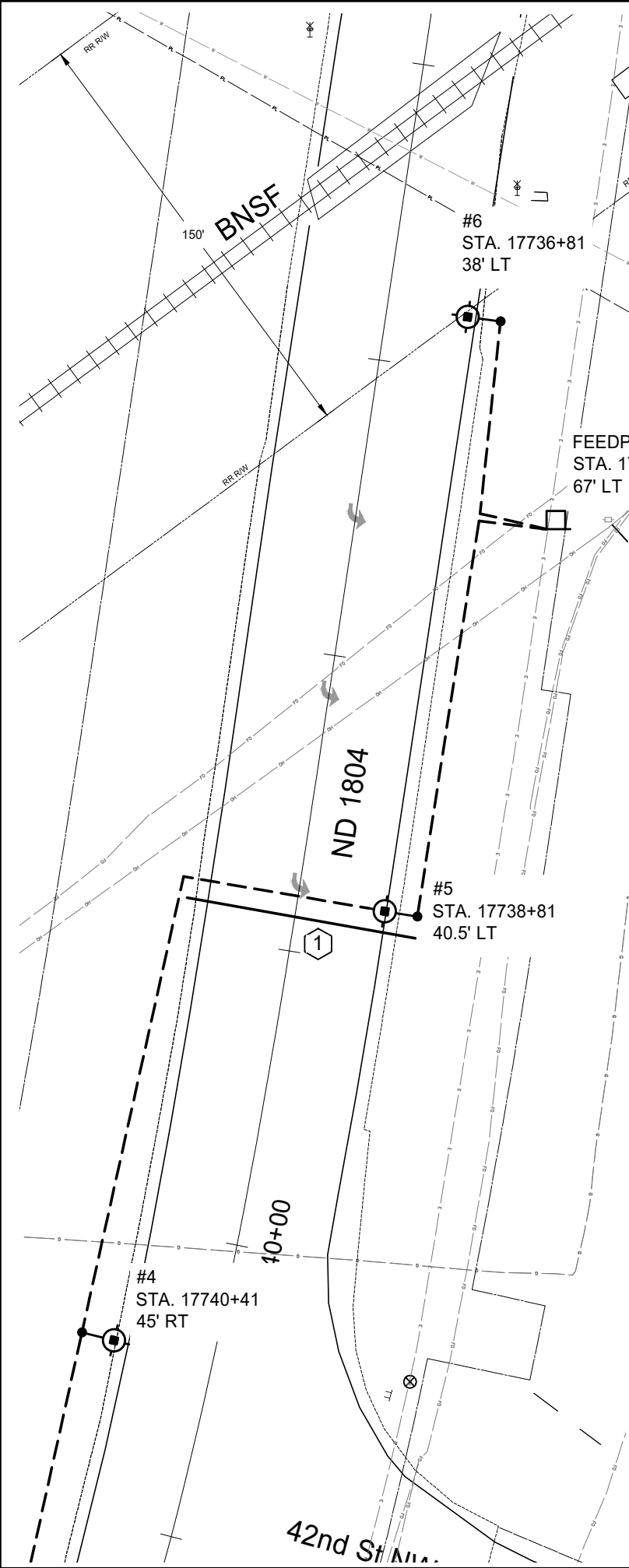
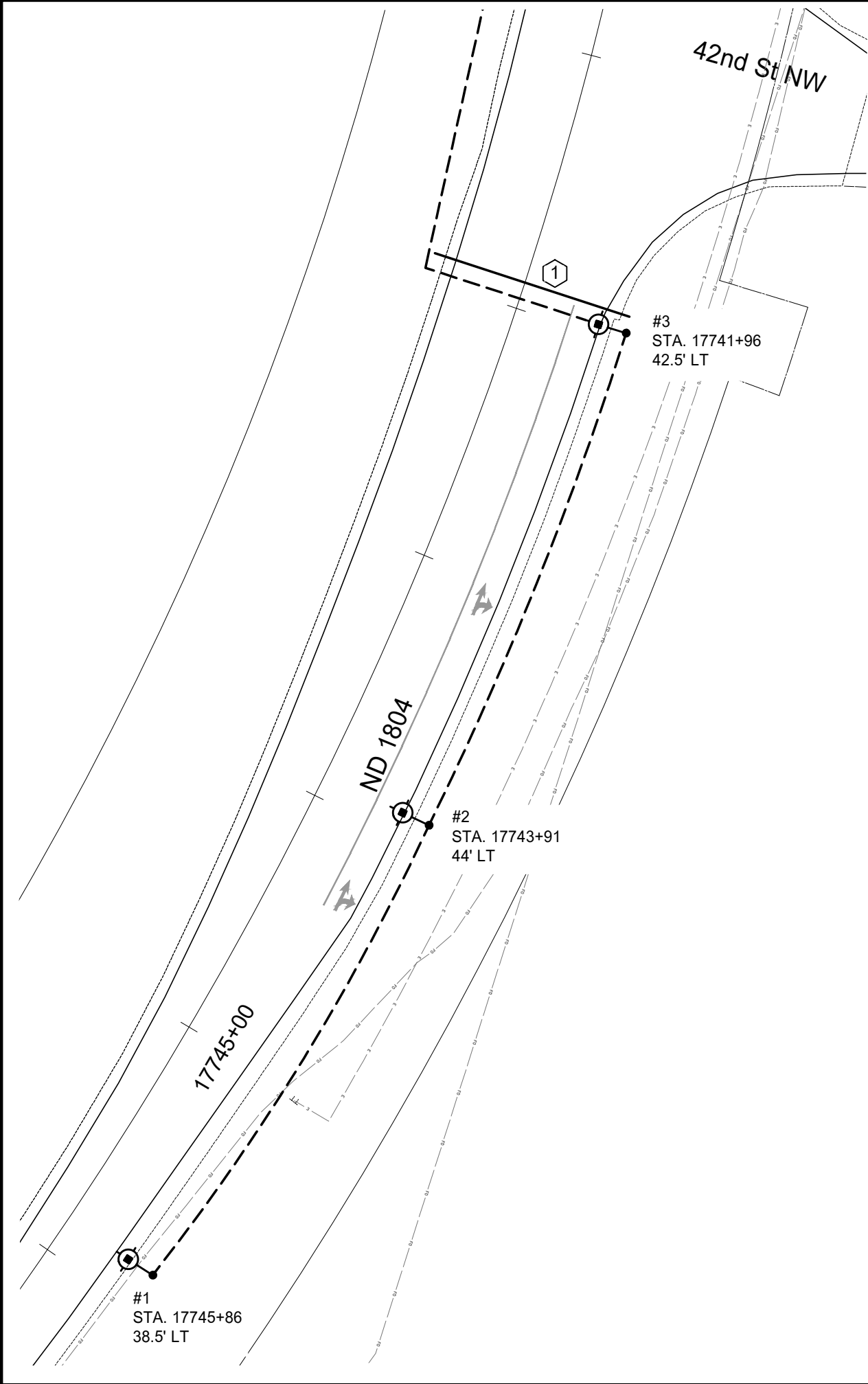
LIGHTING SYSTEM B
LIGHTING LAYOUT
STA. 17730+00 TO 17736+00

ND 1804
Marley Xing to 0.5 Miles N of Trenton



DESCRIPTION	CABLE TRENCH-TYPE II	2 IN RIGID CONDUIT	MULTIPLE UNDERGROUND CABLE 2NO4-1NO6 STYLE USE
LIGHT #1 TO LIGHT #2	200 LF		208 LF
LIGHT #2 TO LIGHT #3	201 LF		209 LF
LIGHT #3 TO LIGHT #4	155 LF	80 LF	243 LF
LIGHT #4 TO LIGHT #5	160 LF	79 LF	247 LF
LIGHT #5 TO FEEDPOINT A	161 LF		175 LF
LIGHT #6 TO FEEDPOINT A	66 LF		107 LF
LIGHT #7 TO FEEDPOINT B	92 LF		106 LF
LIGHT #8 TO FEEDPOINT B	130 LF	70 LF	241 LF
LIGHT #8 TO LIGHT #9	195 LF		203 LF

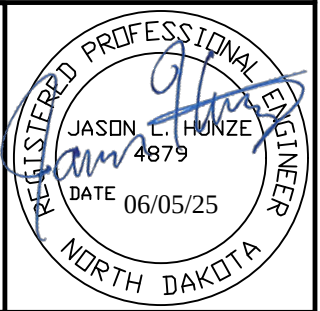
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	HES-7-804(075)330	140	11



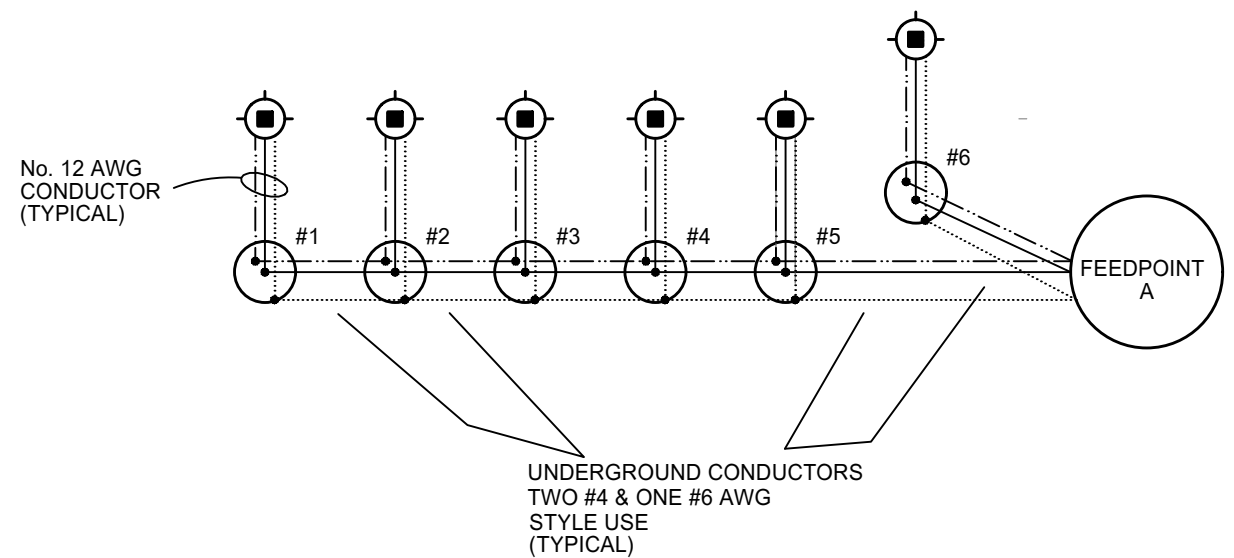
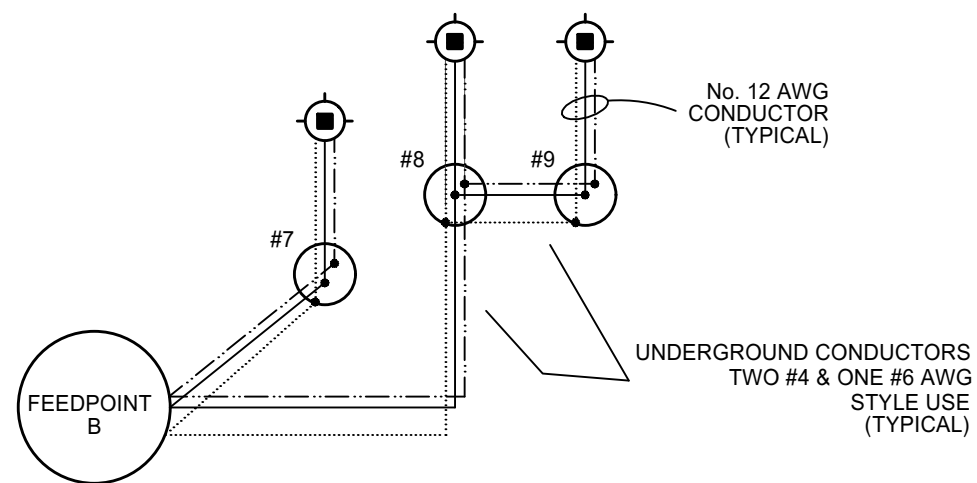
- 1 DIRECTIONALLY BORE CONDUIT UNDER ROADWAY.
- 2 LOWER YELLOWSTONE ELECTRIC COOP TO INSTALL 100 AMP METER SOCKET AND SERVICE MAST ON EXISTING UTILITY POLE. CONTRACTOR TO PROVIDE DIRECT BURY SERVICE CONDUCTORS FROM METER TO FEEDPOINT.
- 0 25 50

LIGHTING SYSTEM B
LIGHTING LAYOUT
STA. 17736+00 TO 17746+00

ND 1804
Marley Xing to 0.5 Miles N of Trenton



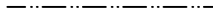
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	140	12



SCHEMATIC LEGEND



LIGHT STANDARD



LIGHTING CIRCUIT #1 PHASE "A" CONDUCTOR



LIGHTING CIRCUIT #1 PHASE "B" CONDUCTOR



#6 AWG GROUND CONDUCTOR

LIGHTING SYSTEM B
SCHEMATIC

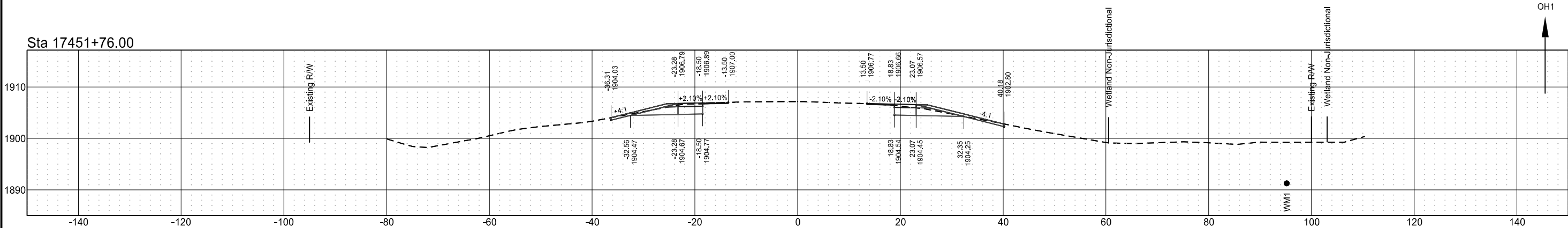
ND 1804
Marley Xing to 0.5 Miles N of Trenton



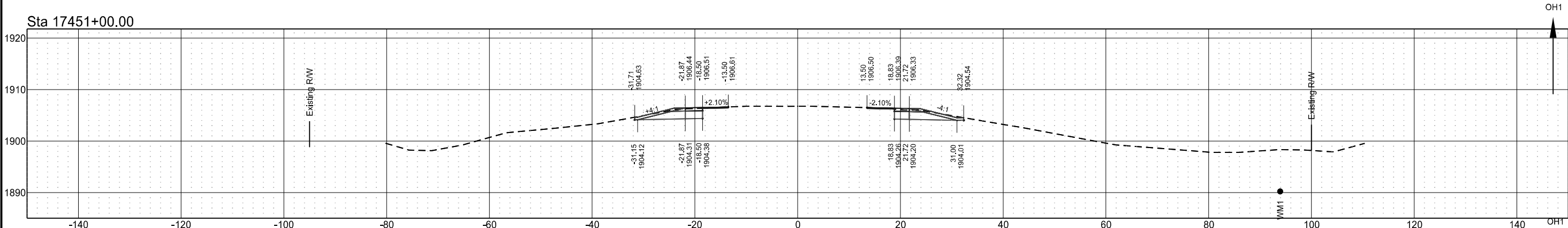
SCL1804
ND 1804 & 145th Dr NW
Intersection

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	200	1

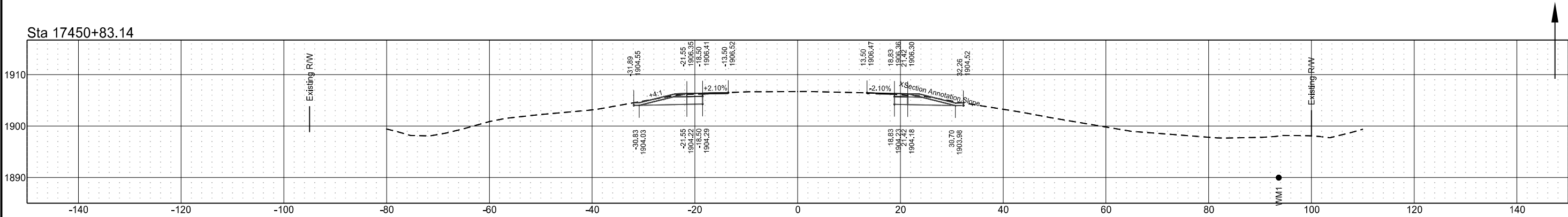
Sta 17451+76.00



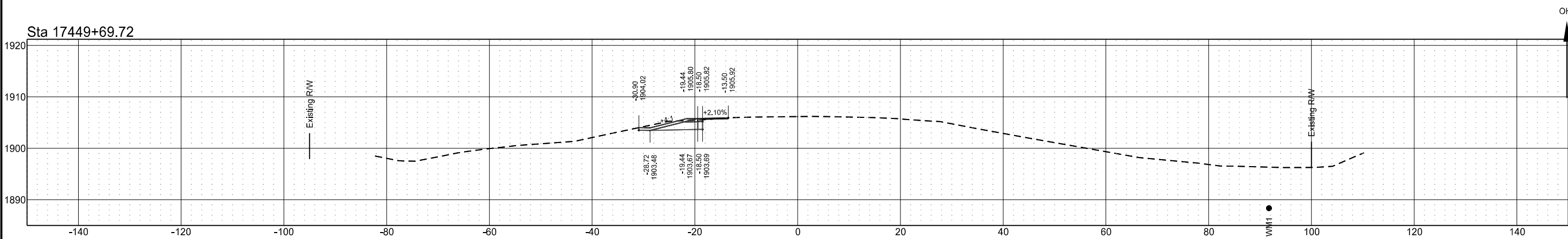
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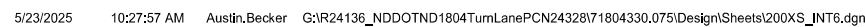
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Sta 17449+69.72



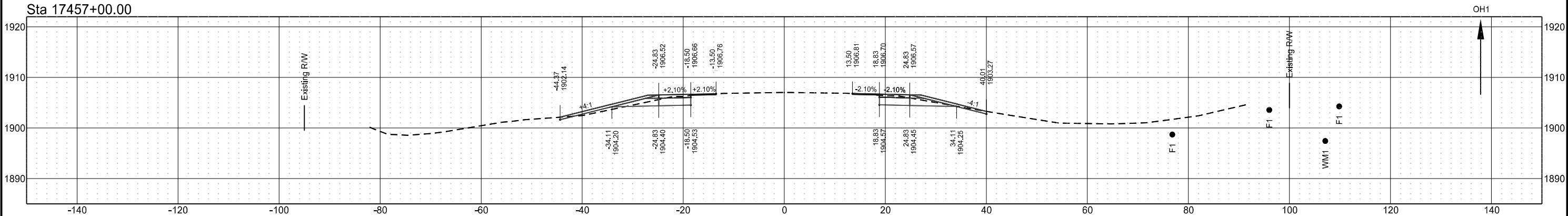
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	ND	HES-7-804(075)330	200	2



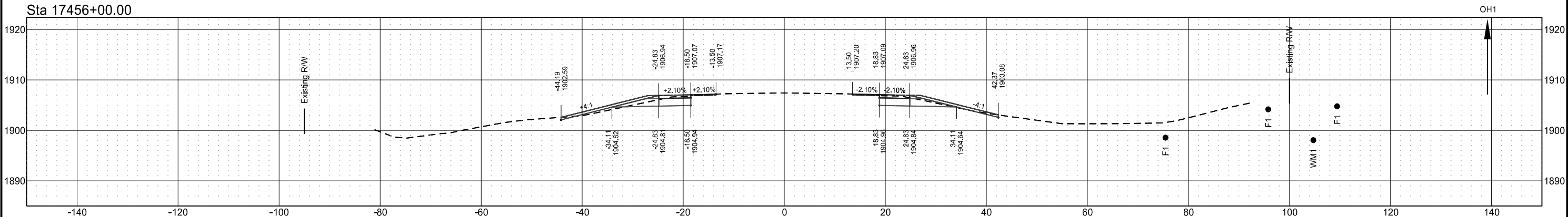
SCL1804
ND 1804 & 145th Dr NW
Intersection

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	200	3

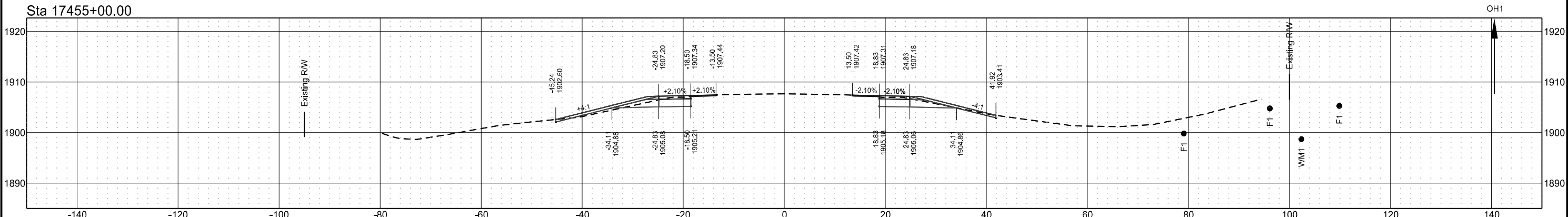
Sta 17457+00.00



Sta 17456+00.00

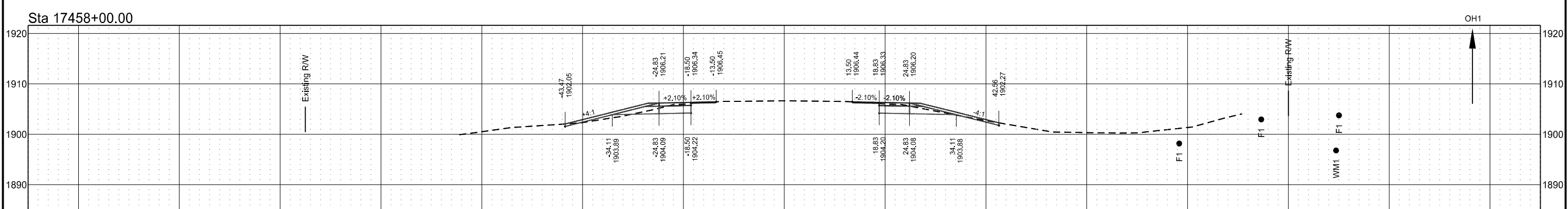
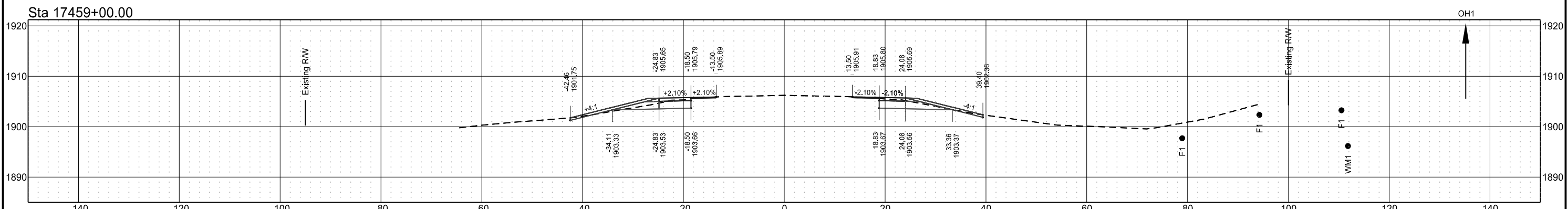
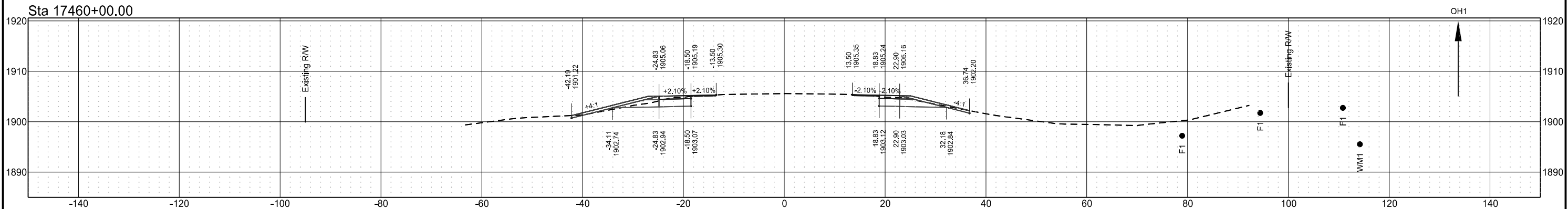
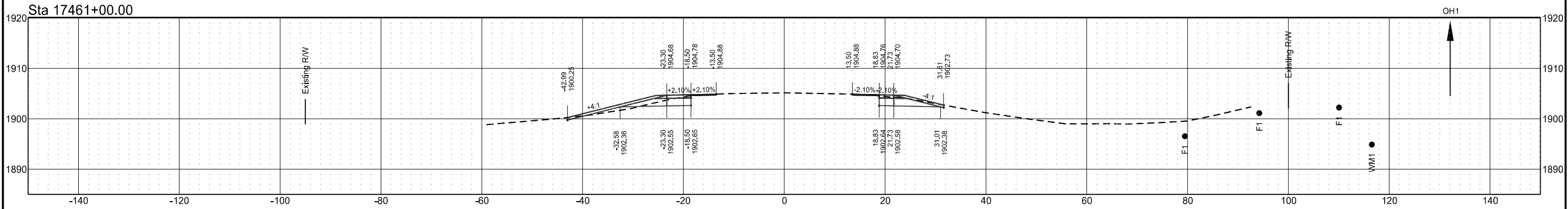


Sta 17455+00.00



SCL1804
ND 1804 & 145th Dr NW
Intersection

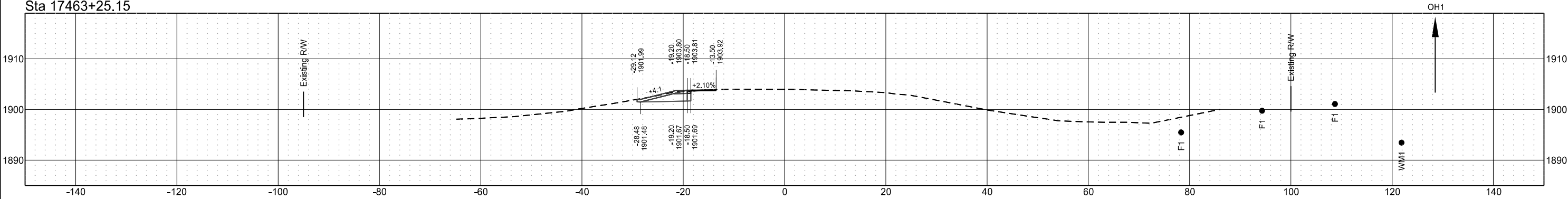
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ND	HES-7-804(075)330	200	4



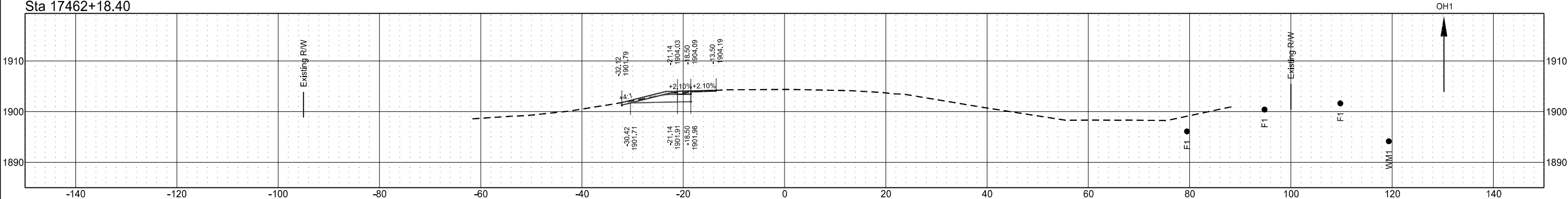
SCL1804
ND 1804 & 145th Dr NW
Intersection

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	200	5

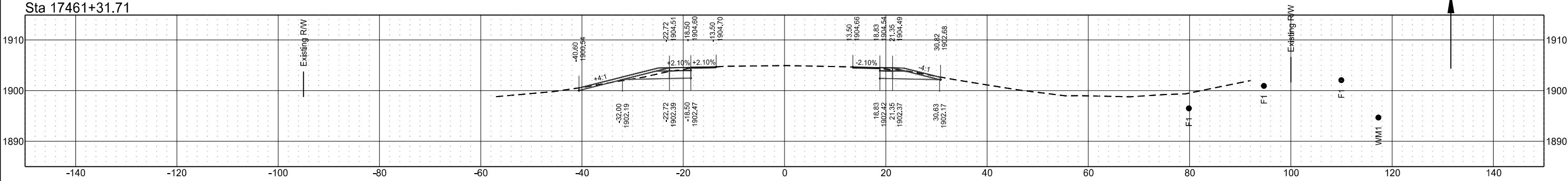
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Sta 17462+18.40



Sta 17461+31.71



SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

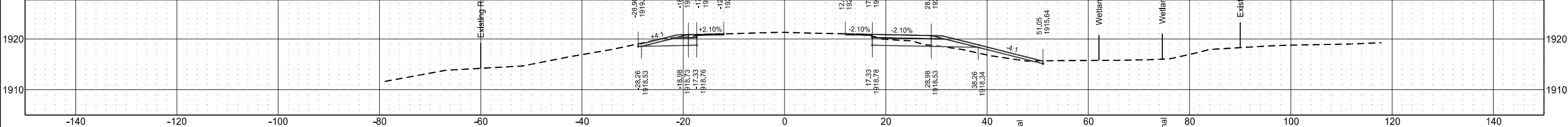
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HES-7-804(075)330

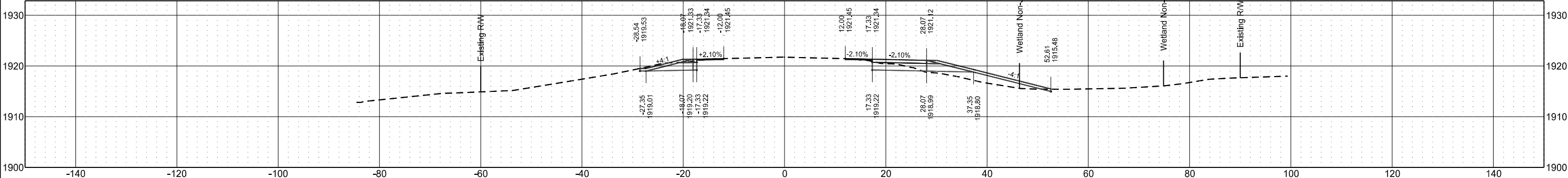
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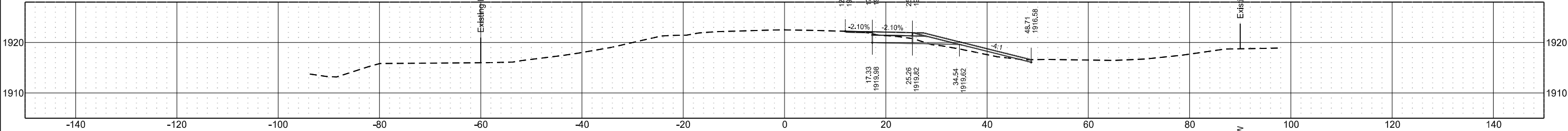
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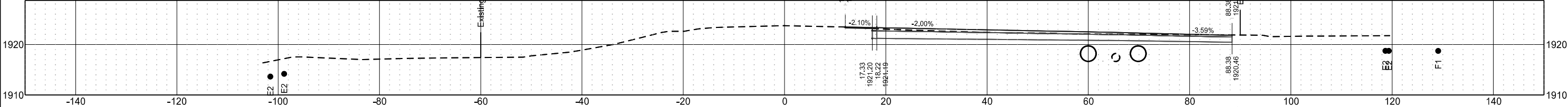
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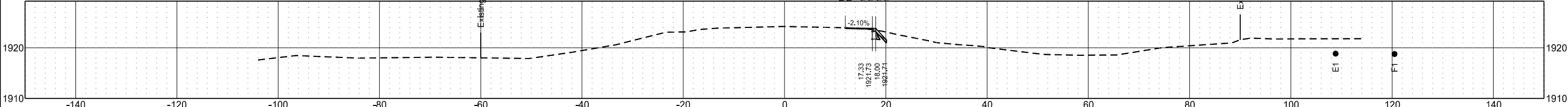
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Sta 17563+94.36



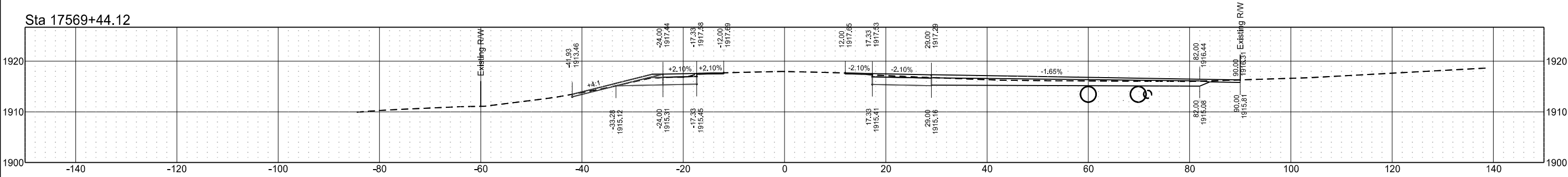
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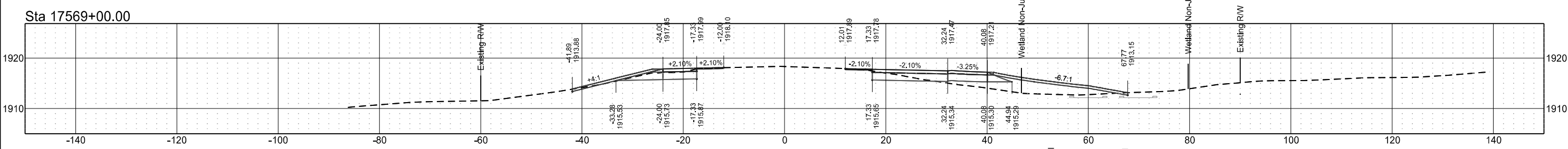
SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HES-7-804(075)330	200	7

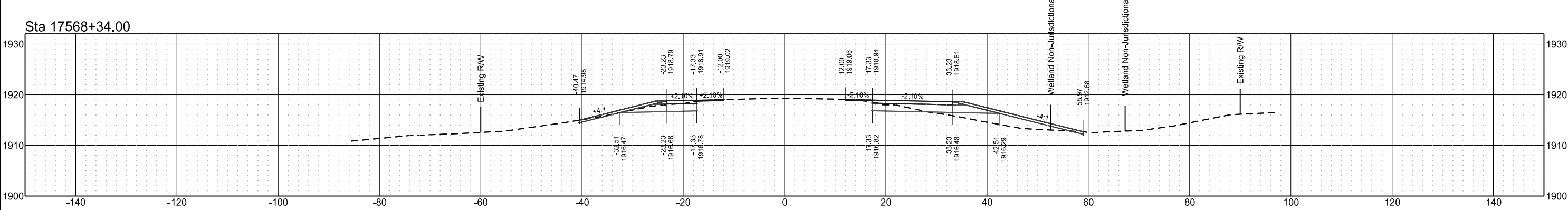
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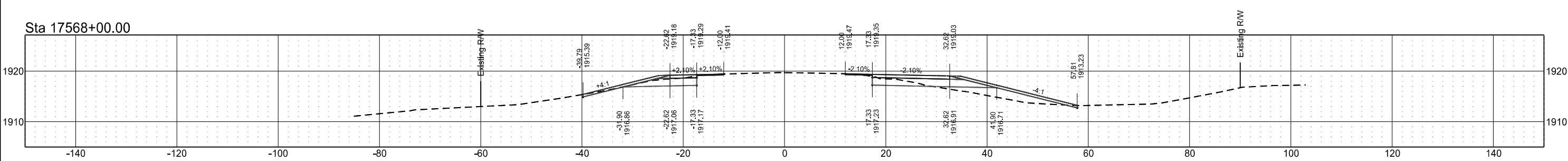
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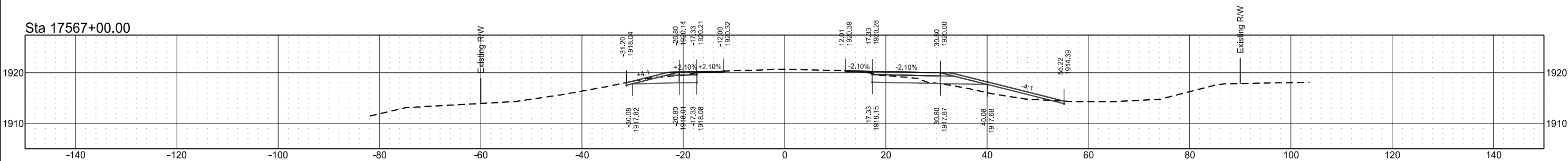
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Sta 17568+00.00



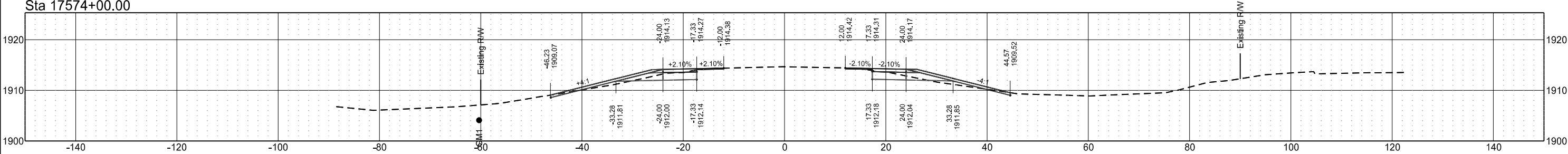
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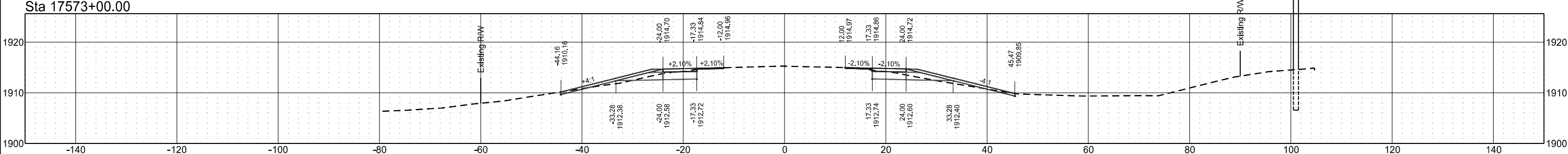
SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	200	8

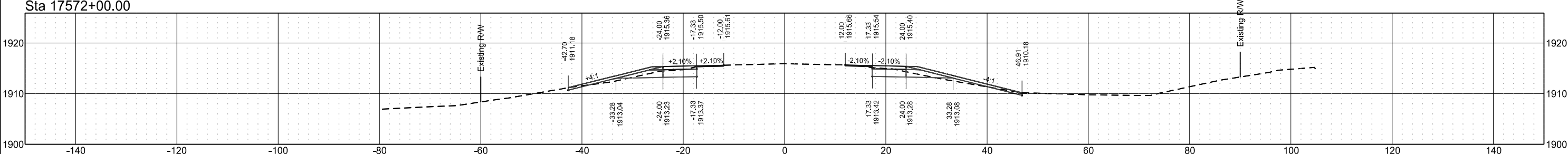
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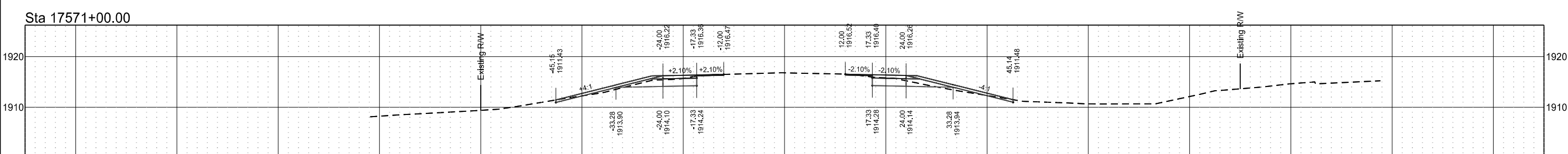
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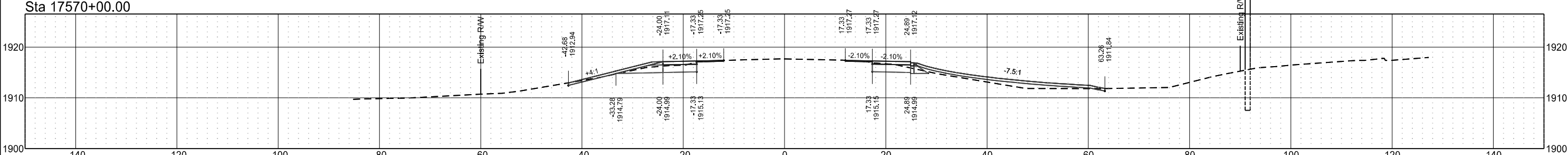
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Sta 17571+00.00



Sta 17570+00.00



SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

STATE

PROJECT NO.

SECTION
NO.

SHEET
NO.

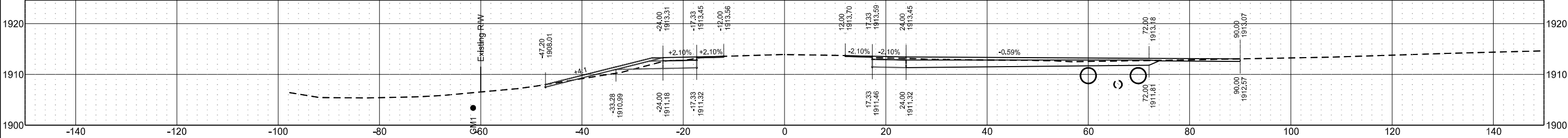
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HES-7-804(075)330

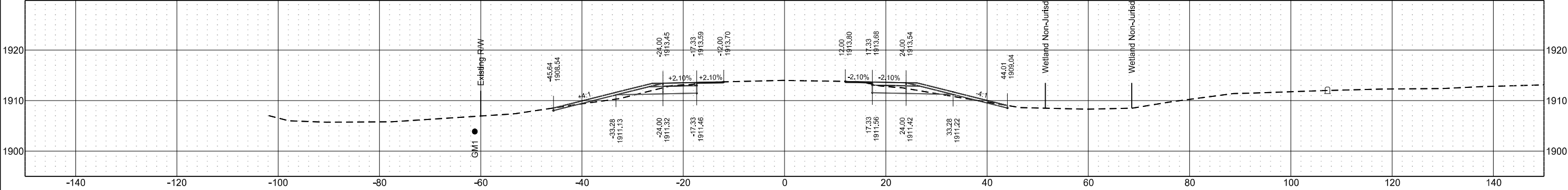
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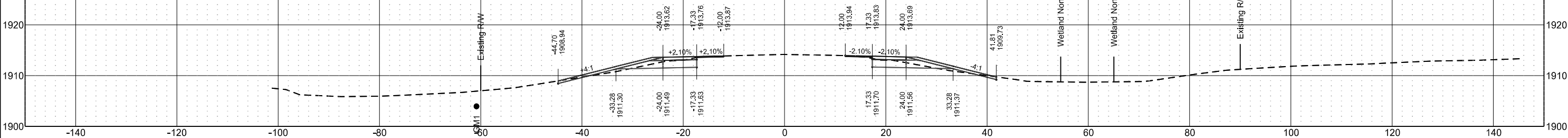
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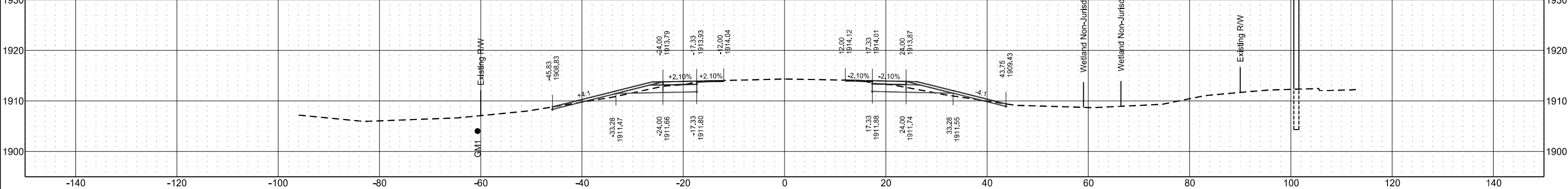
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Sta 17575+00.00



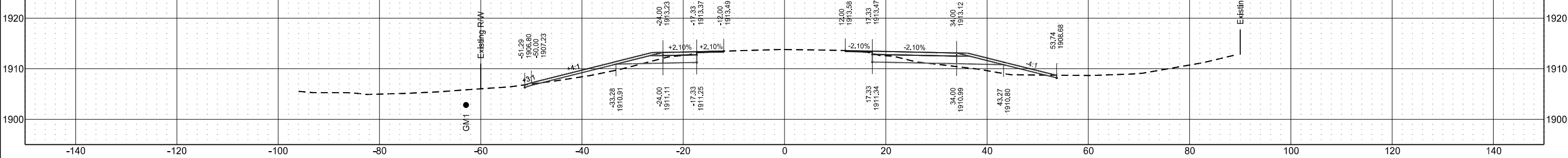
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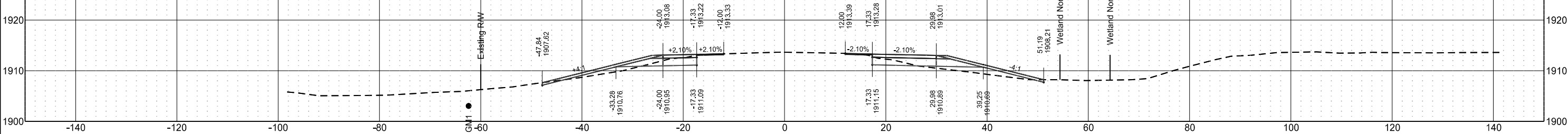
SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)330	200	10

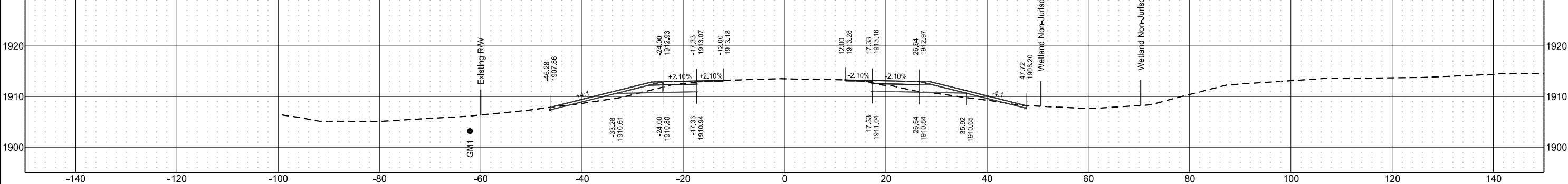
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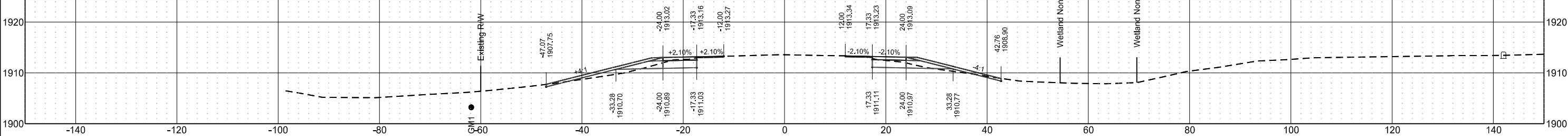
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Sta 17577+50.00



Sta 17577+00.00



SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

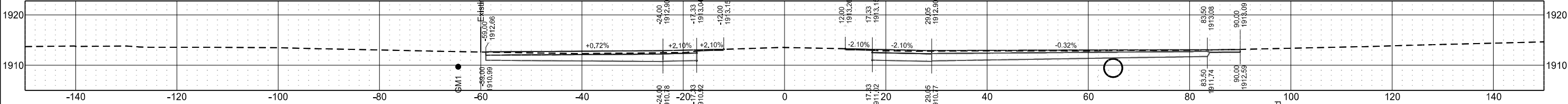
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HES-7-804(075)330

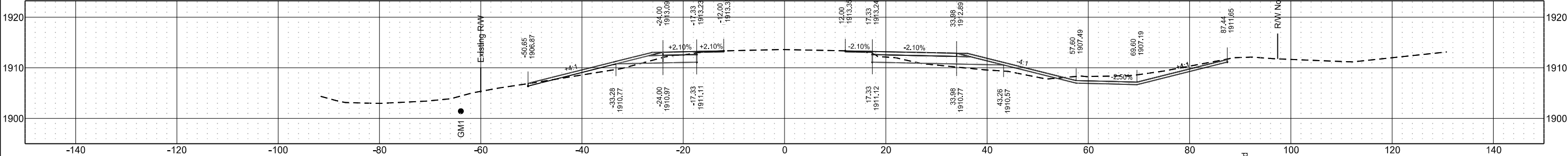
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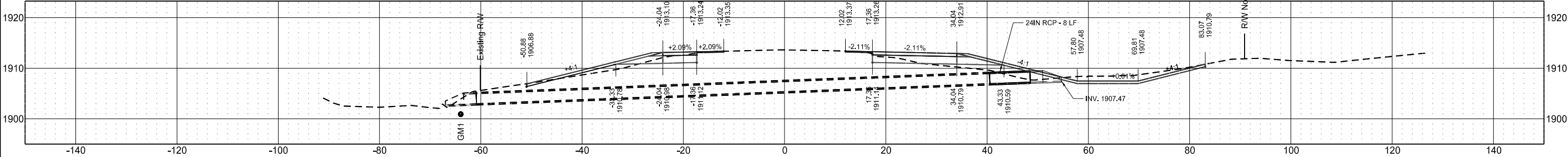
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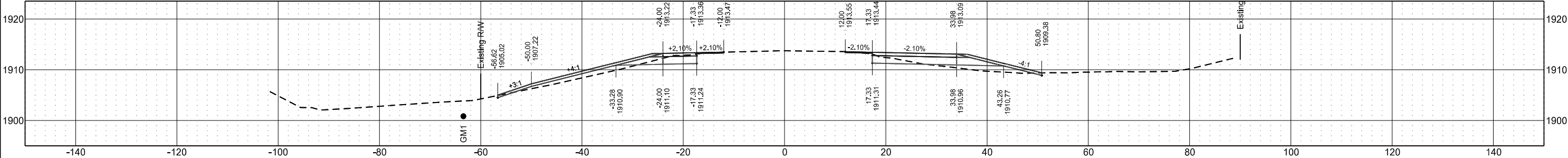
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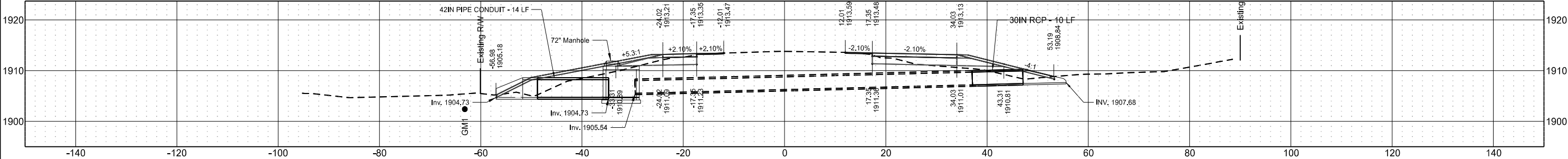
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Sta 17580+00.00



Sta 17579+37.59



SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

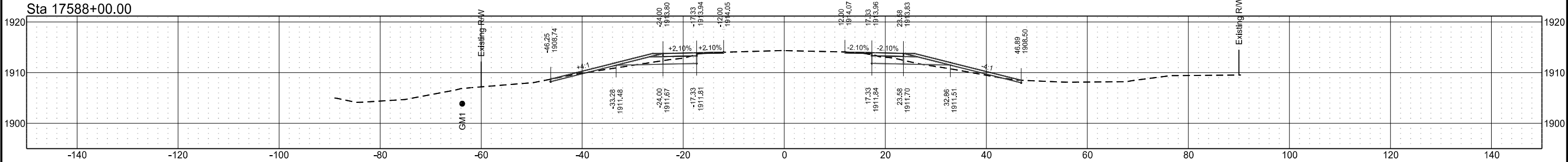
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HES-7-804(075)330

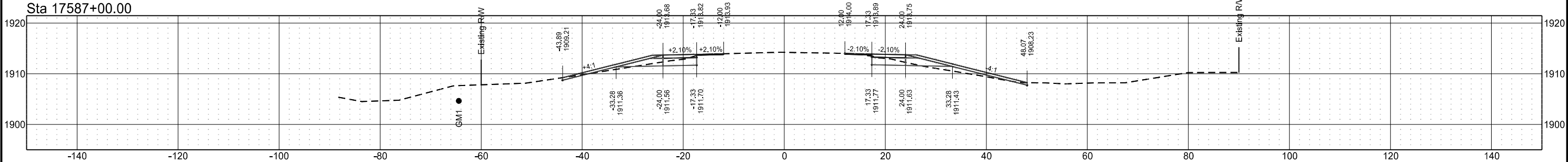
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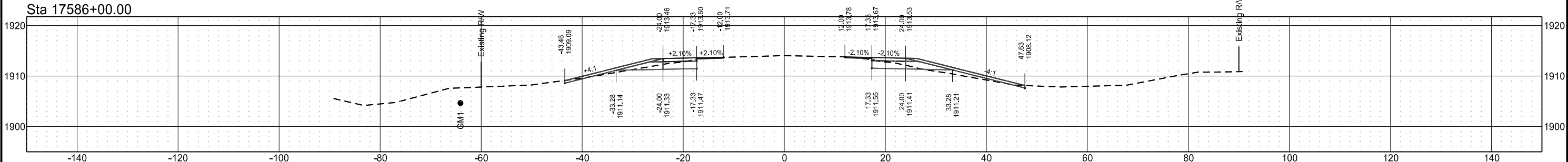
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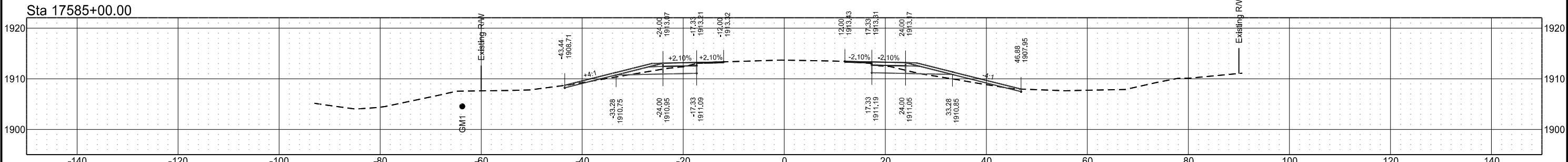
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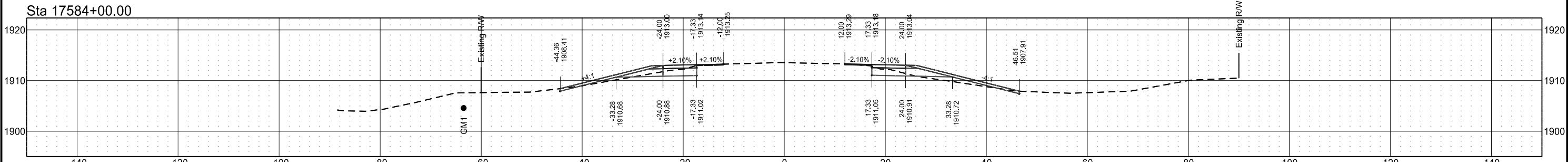
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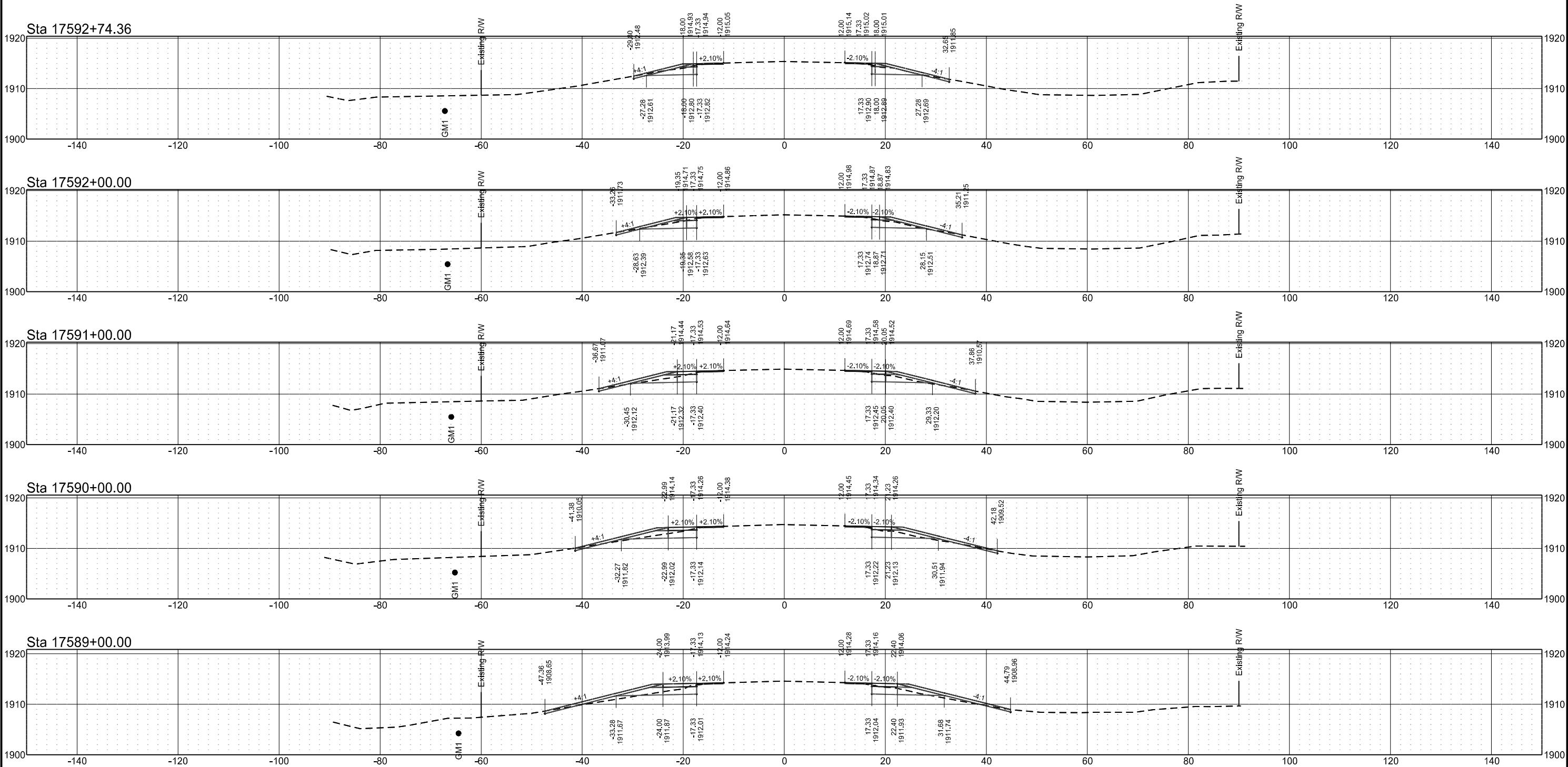


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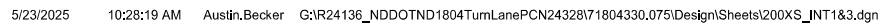


SCL1804
Casino Approach &
147th Ave NW / 44th LN NW (Co Rd 2) Intersections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)333	200	13



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)333	200	14



OCL_Casino
Casino Approach

STATE

PROJECT NO.

SECTION
NO.

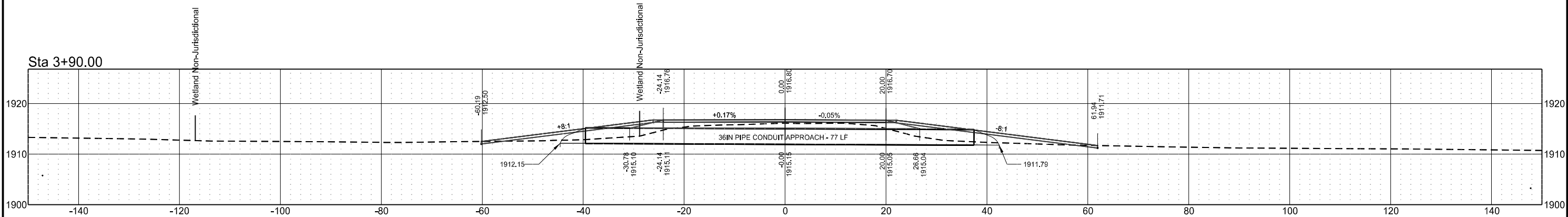
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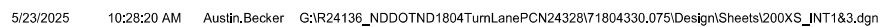
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200

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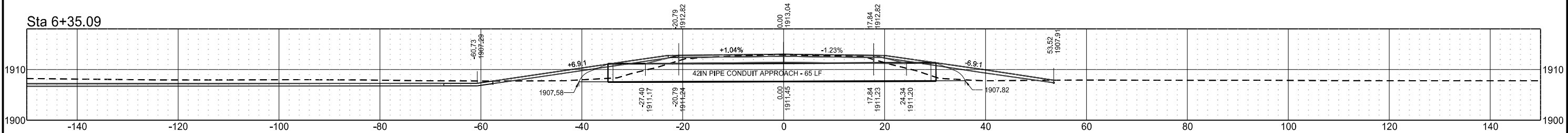


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)333	200	16



OCL_44
44th LN NW (Co Rd 2)

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HES-7-804(075)333	200	17



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions

08/16/22

NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	South East	TERO	tribal employment rights ordinance
SW	South West	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike		
SB	split barrel sample	VG	valley gutter
SH	sprinkler head	Vap	vapor
SV	sprinkler valve	Vert	vertical
Sq	square	VCP	vitrified clay pipe
Stk	stake	Vol	volume
Std	standard	VSFS	vehicle speed feedback sign
N	standard penetration test		
Std Specs	standard specifications	Wkwy	walkway
Stm L	steam line	W	water content
SEC	steel encased concrete	WGV	water gate valve
SMA	stone matrix asphalt	WL	water line
SSD	stopping sight distance	WM	water main
SD	storm drain	WMV	water main valve
St	street	W Mtr	water meter
SPP	structural plate pipe	WSV	water service valve
SPPA	structural plate pipe arch	WW	water well
Str	structure	Wrng	wearing
Subd	subdivision	WIM	weigh in motion
Sub	subgrade	W	west
Sub Prep	subgrade preparation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing	WC	witness corner
Surv	survey		
Sym	symmetrical		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

MEASUREMENTS

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

T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-10-20	General Revisions
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08/16/22

LINE STYLES

D-101-20

Existing Topography

	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	Existing Guardrail Metal
	Existing Edge of Water
	Existing Fence
	Existing Railroad
	Existing Field Line
	Exst Flow
	Existing Curb
	Existing Valley Gutter
	Existing Driveway Gutter
	Existing Curb and Gutter
	Existing Mountable Curb and Gutter

	Existing 3-Cable w Posts
	Site Boundary
	Existing Berm, Dike, Pit, or Earth Dam
	Existing Ditch Block
	Existing Tree Boundary
	Existing Brush or Shrub Boundary
	Existing Retaining Wall
	Existing Planter or Wall
	Existing W-Beam Guardrail with Posts
	Existing Railroad Switch
	Gravel Pit - Borrow Area
	Existing Wet Area-Vegetation Break
	Existing High Tension Cable Guardrail
	Existing High Tension Cable Guardrail with Posts

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

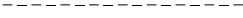
DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups
12-18-20	General Revisions

12 18 2020

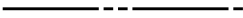
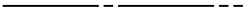
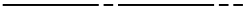
LINE STYLES

D-101-21

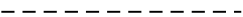
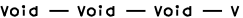
Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

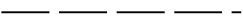
	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

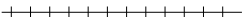
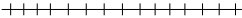
Profile

	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

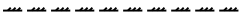
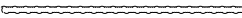
Bridge Details

	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
	Silt Fence
	Excavation Limits
	Fiber Rolls

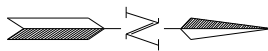
Environmental

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

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

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

 Continuous Split Barrel Sample

 Flight Auger Sample

 Split Barrel Sample

 Thinwall Tube Sample

 Standard Penetration Test

 Inclinometer Tube

 Excavation Unit

 Existing Ground Water Well Bore Hole

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-31

	Flexible Delineator		Highway Sign (Exst, Ppsd)
	Flexible Delineator Type A (Exst, Ppsd)		Mile Post Type A (Exst-Ppsd-Reset)
	Flexible Delineator Type B (Exst, Ppsd)		Mile Post Type B (Exst, Ppsd)
	Flexible Delineator Type C (Exst, Ppsd)		Mile Post Type C (Exst, Ppsd)
	Flexible Delineator Type D (Exst, Ppsd)		Object Marker Type I (Exst, Ppsd)
	Flexible Delineator Type E (Exst, Ppsd)		Object Marker Type II (Exst, Ppsd)
	Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)		Object Marker Type III (Exst, Ppsd)
	Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)		Existing Reference Marker
	Delineator Type C (Exst, Ppsd, Diamond Grade)		Road Closure Gate 18 Ft (Exst, Ppsd)
	Delineator Type D (Exst, Ppsd, Diamond Grade)		Road Closure Gate 28 Ft (Exst, Ppsd)
	Delineator Type E (Exst, Ppsd, Diamond Grade)		Road Closure Gate 40 Ft (Exst, Ppsd)
	Barricade (Type I, Type II, Type III)		Existing Railroad Battery Box
	Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)		Existing RR Profile Spot
	Attenuation Device		Existing Railroad Crossbuck
	Truck Mounted Attenuator		Existing Railroad Frog
	Delineator Drums		Existing Mailbox (Private, Federal)
	Flagger		
	Tubular Marker		
	Traffic Cone		
	Back to Back Vertical Panel Sign		

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



12 18 2020

SYMBOLS

D-101-32

	Existing Luminaire			High Mast Light Standard 3 Luminaire (Exst, Ppsd)		Existing Traffic Signal Standard			
	Luminaire LED			High Mast Light Standard 4 Luminaire (Exst, Ppsd)				Pull Box (Exst-Ppsd-Undefined)	
	Existing Light Standard Luminaire			High Mast Light Standard 5 Luminaire (Exst, Ppsd)				Intelligent Transportation Pull Box (Exst, Ppsd)	
	Relocate Light Standard			High Mast Light Standard 6 Luminaire (Exst, Ppsd)				Transformer (Exst, Ppsd)	
	Light Standard Light LED Luminaire			High Mast Light Standard 7 Luminaire (Exst, Ppsd)				Power Pole (Exst-Ppsd-with Transformer)	
	Light Standard 35 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 8 Luminaire (Exst, Ppsd)				Wood Pole (Exst, Ppsd)	
	Light Standard 50 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 9 Luminaire (Exst, Ppsd)				Pedestrian Push Button Post (Exst, Ppsd)	
	Light Standard 70 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 10 Luminaire (Exst, Ppsd)				Existing Pole	
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire			Overhead Sign Structure Load Center (Exst, Ppsd)				Existing Telephone Pole	
	Light Standard 150 Watt High Pressure Sodium Vapor Luminaire			Traffic Signal Controller (Exst, Ppsd)				Existing Post	
	Light Standard 200 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Traffic Signal Controller (Exst, Ppsd)					Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
	Light Standard 250 Watt High Pressure Sodium Vapor Luminaire			Flashing Beacon (Exst, Ppsd)					
	Light Standard 310 Watt High Pressure Sodium Vapor Luminaire			Concrete Foundation (Exst, Ppsd)					
	Light Standard 400 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Flasher (Exst, Ppsd)					
	Light Standard 700 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Feed Point (Exst, Ppsd)					
	Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Feed Point with Pad (Exst, Ppsd)					
	Emergency Vehicle Detector			Pole Mounted Feed Point (Exst, Ppsd)					
	Video Detection Camera			Junction Box (Exst, Ppsd)					
				Existing Pedestrian Head with Number					
				Existing Signal Head					
				Pole Mounted Head					
				Existing Lighting Standard Pole					

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



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



12 18 2020

SYMBOLS

D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			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 Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

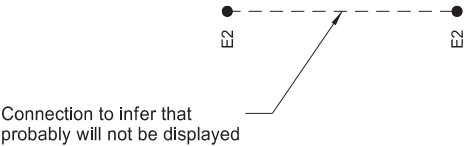
Cross Section Legend

D-101-40

Description	Longitudinal Parallel to Roadway	Transverse Perpendicular to Roadway*
Cable Line	● CBL1	● CBL2
Conduit Line	● CDU1	● CDU2
Electric Line	● E1	● E2
Fiber Optic Line	● F1	● F2
Gas Main Line	● GM1	● GM2
Gas Service Line	● GS1	● GS2
Gas Transmission Line	● GT1	● GT2
Fuel Pipeline	● PL1	● PL2
Sanitary Sewer Force Main	● SSF1	● SSF2
Sanitary Sewer	● SS1	● SS2
Steam Line	● STE1	● STE2
Storm Drain (Assumed Depth)	● SD1	● SD2
Telephone Line	● T1	● T2
TV Line	● TV1	● TV2
Water Main Line	● WM1	● WM2
Water Service Line	● WS1	● WS2

Description	Longitudinal Parallel to Roadway	Transverse Perpendicular to Roadway*
Overhead Power Transmission Line	↑ OHT1	↑ OHT2
Overhead Line	↑ OH1	↑ OH2

* Usually the transverse utilities are shown on a cross section with 2 or more symbols. The utility runs from one symbol to the other, but the connection may not be shown.



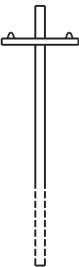
When storm drain invert elevations are NOT used to draw pipe, they will appear as shown to the left. When invert elevations are used to draw pipe, they will be a cross section similar to the graphics shown below.



Light Standard - Multiple Variations
Concrete
Steel
Wood
with Traffic Signal



Pole - Multiple Variations
Utility
Brace
Feed Point
Guy
Power
Power Structure
Power with Light
Power with Transformer



Manhole - Multiple Variations
Electric
Fiber Optic
Gas
Inlet
Sanitary Force Main
Sanitary
Sanitary with Valve
Steam
Storm
Storm Force Main
Storm with Valve
Telephone
Water
Water with Meter
Water with Valve
Water with Air Release Valve



Anchor



High Tension Cable Guardrail



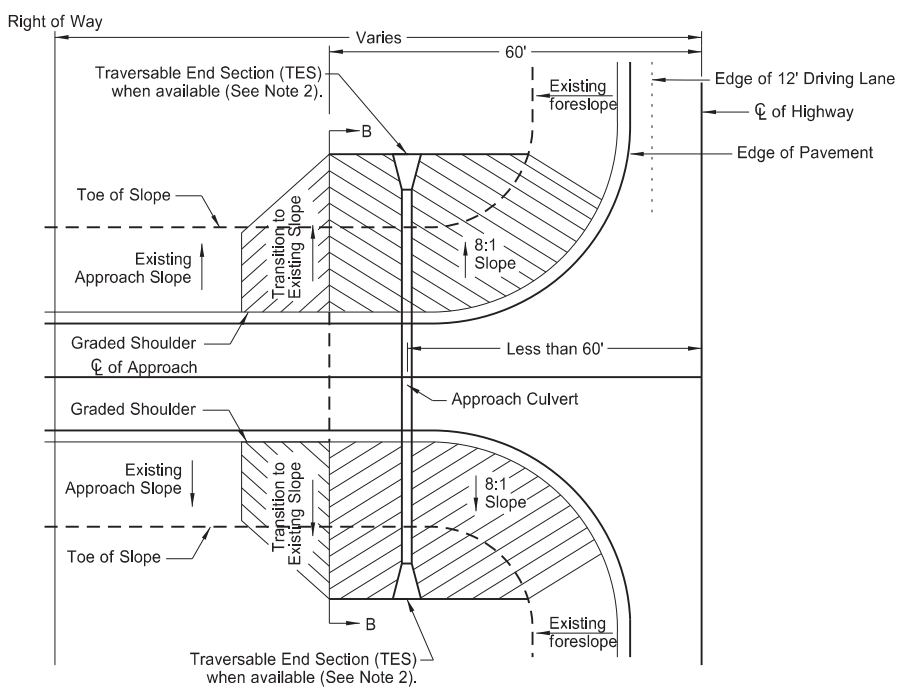
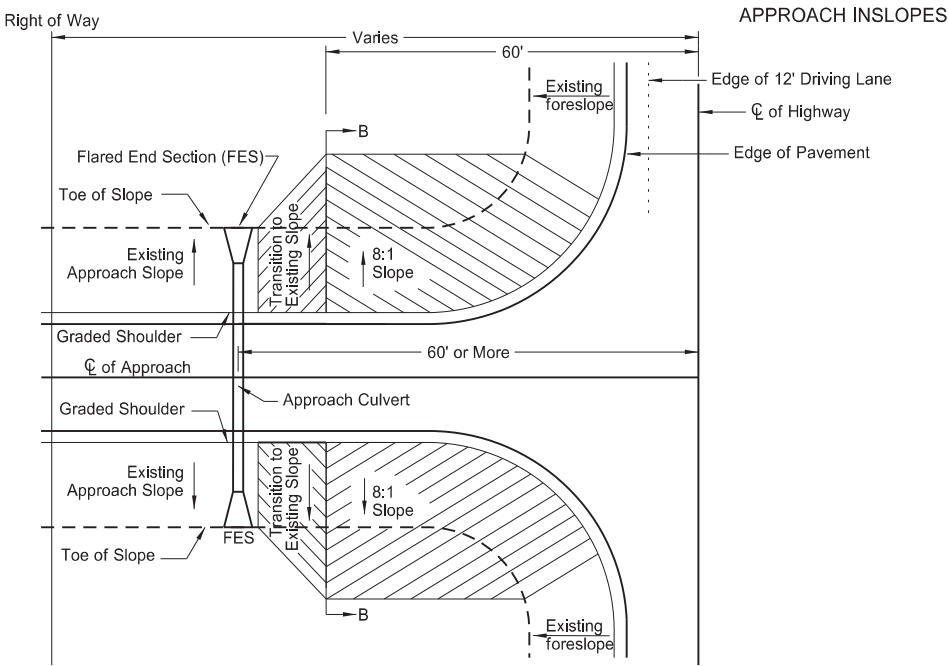
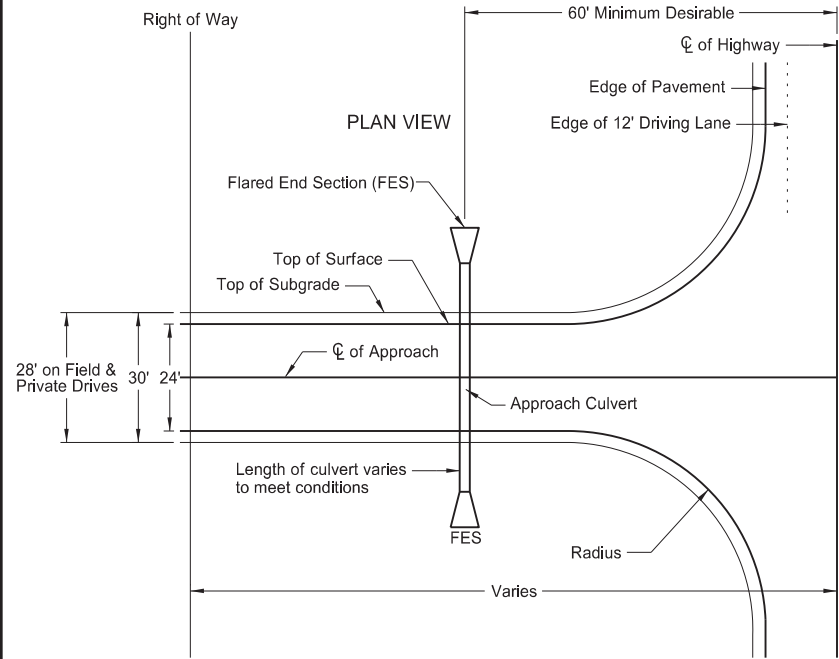
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update



06/14/23

STANDARD RURAL APPROACHES

D-203-8



CASE 1
APPROACH PIPE LOCATED
60' OR MORE FROM C

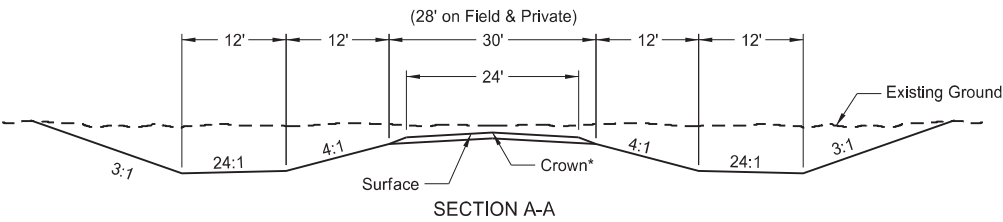
CASE 2
APPROACH PIPE LOCATED
LESS THAN 60' FROM C

Approach Pipe Traversable End Sections (TES)

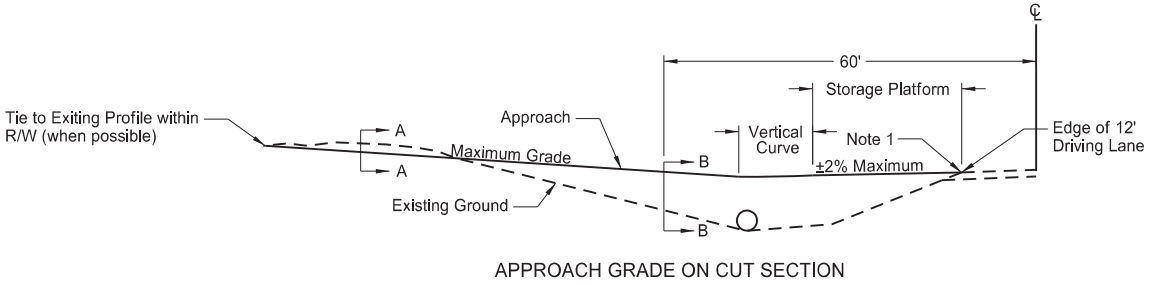
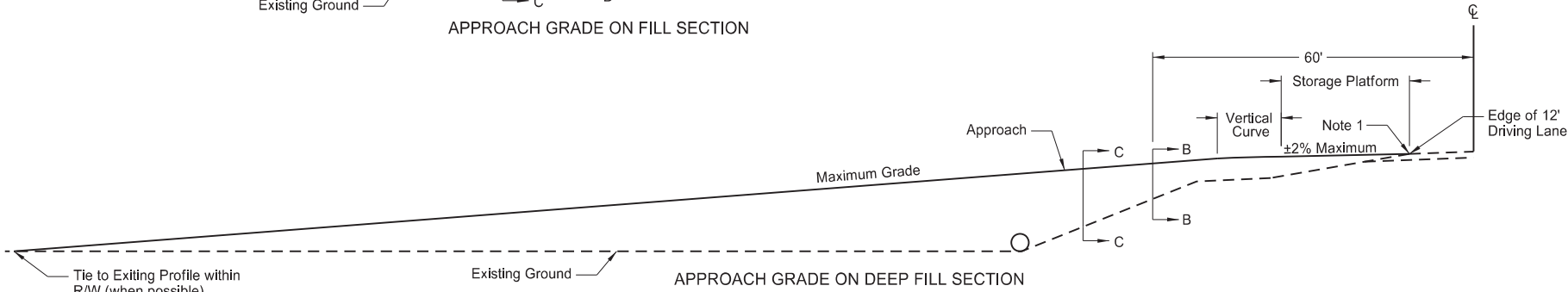
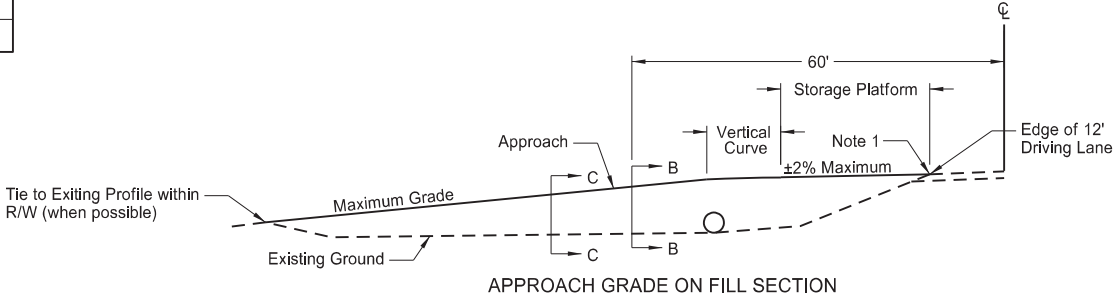
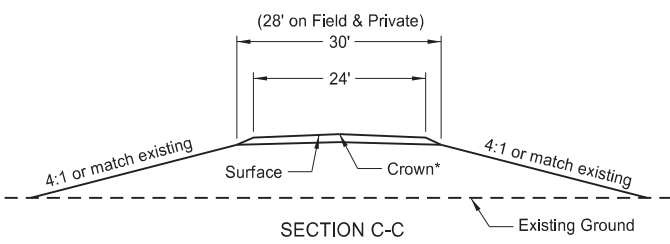
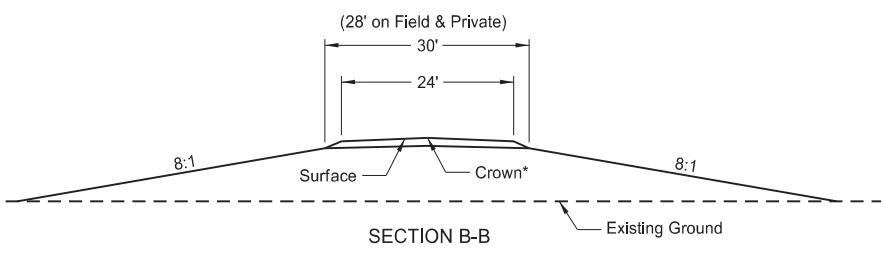
RCP	CSP	CSP Arch
15"	15"	
18"	18"	21"x15"
		24"x18"
24"	24"	28"x20"

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)



*2.1% crown for paved surface
*3.0% crown for gravel surface



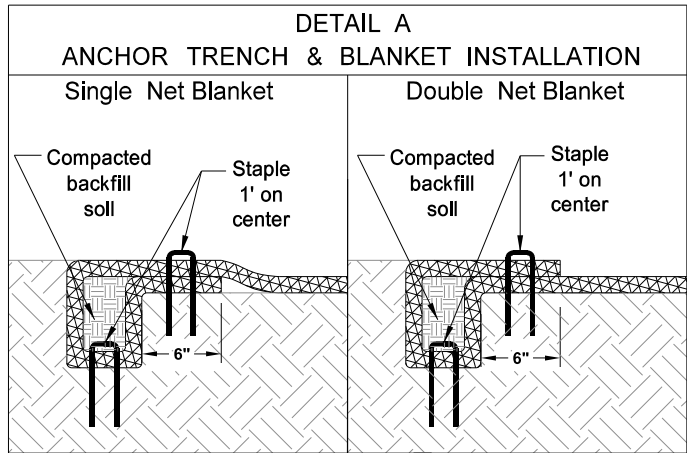
- NOTES:
- 5% Max Rollover between approach storage platform and highway.
 - Approach pipes up to 24" diameter are acceptable (with traversable end sections) for Case 2. Install approach pipes larger than 24" diameter in accordance with Case 1.

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

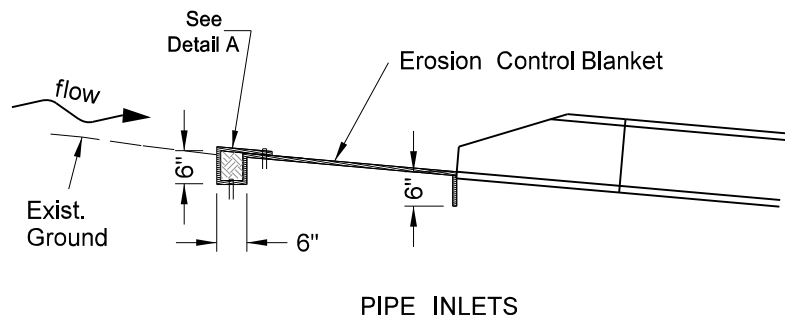
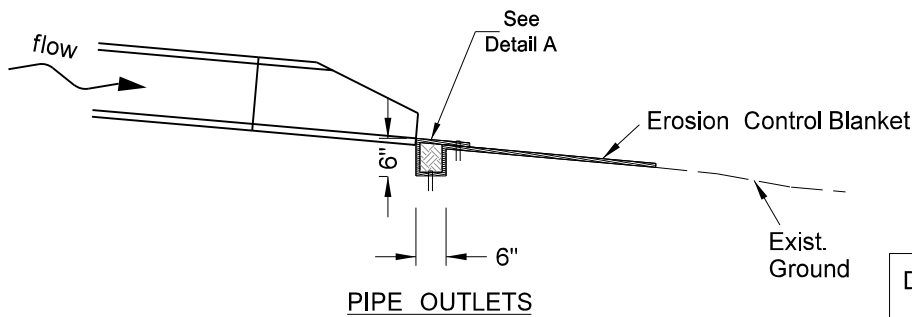


06/29/22

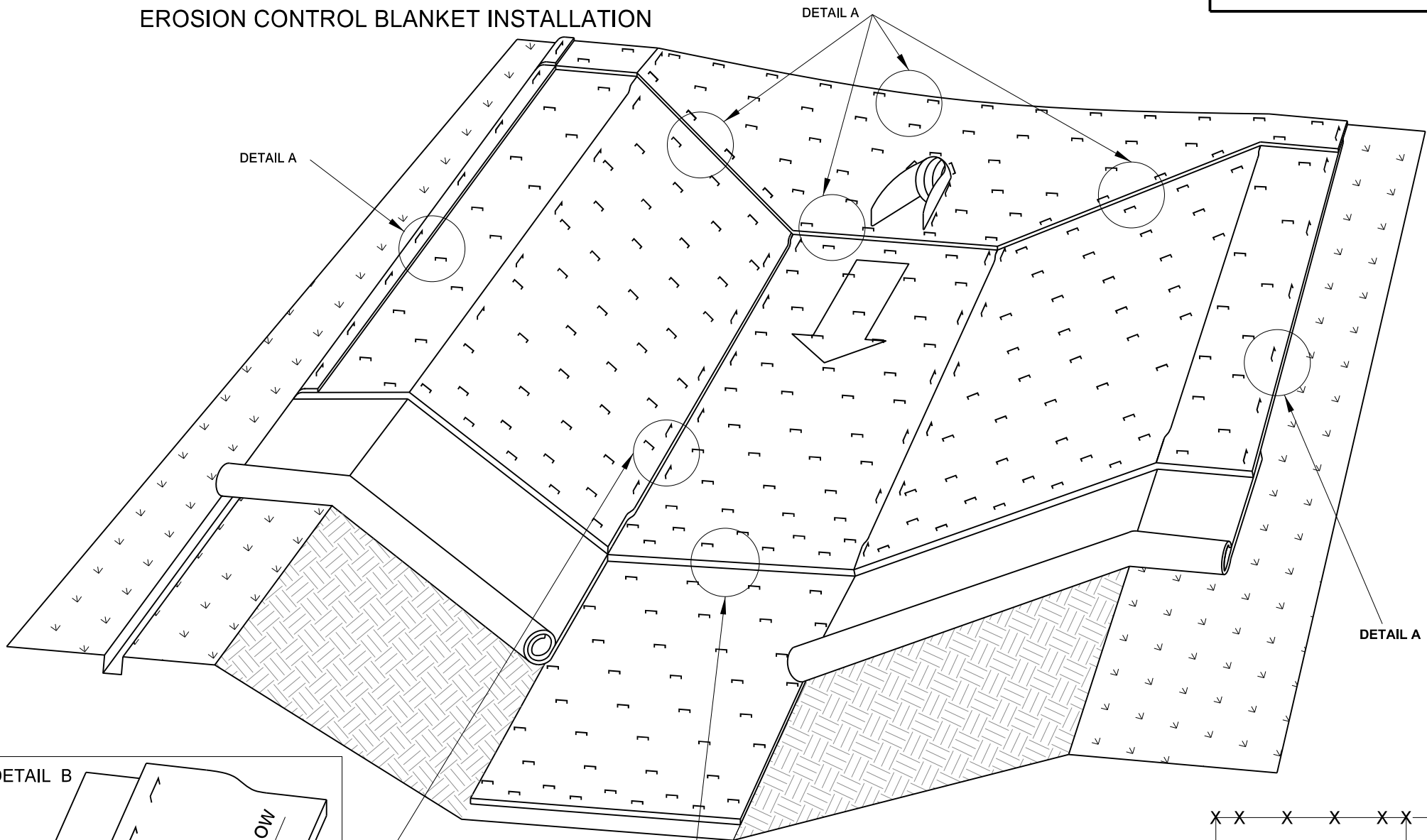
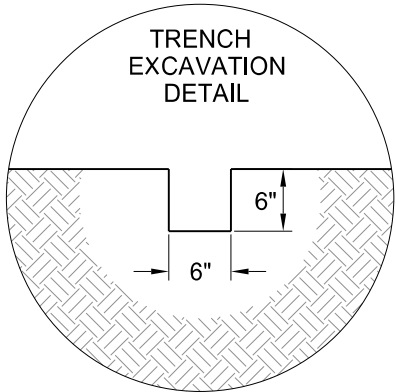
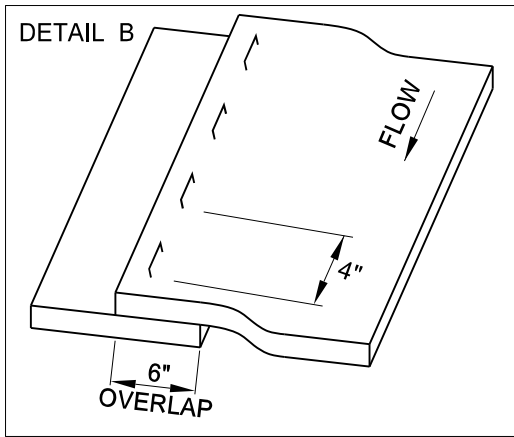
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



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

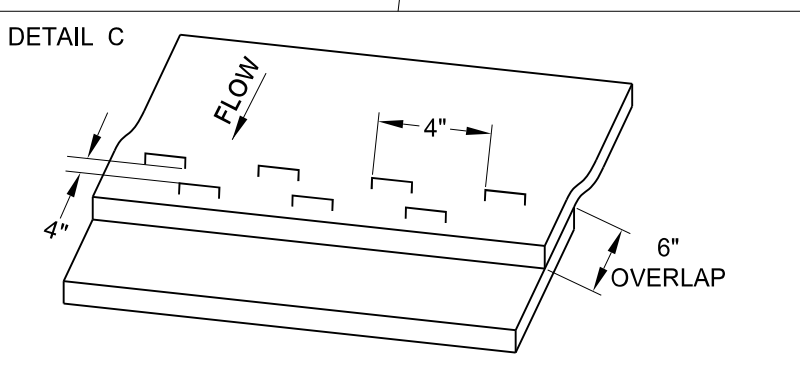
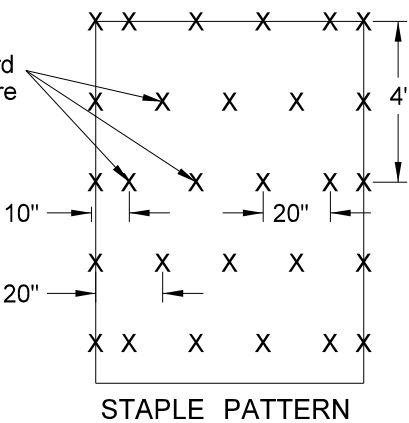


INSTALLATION AT PIPE ENDS



BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION

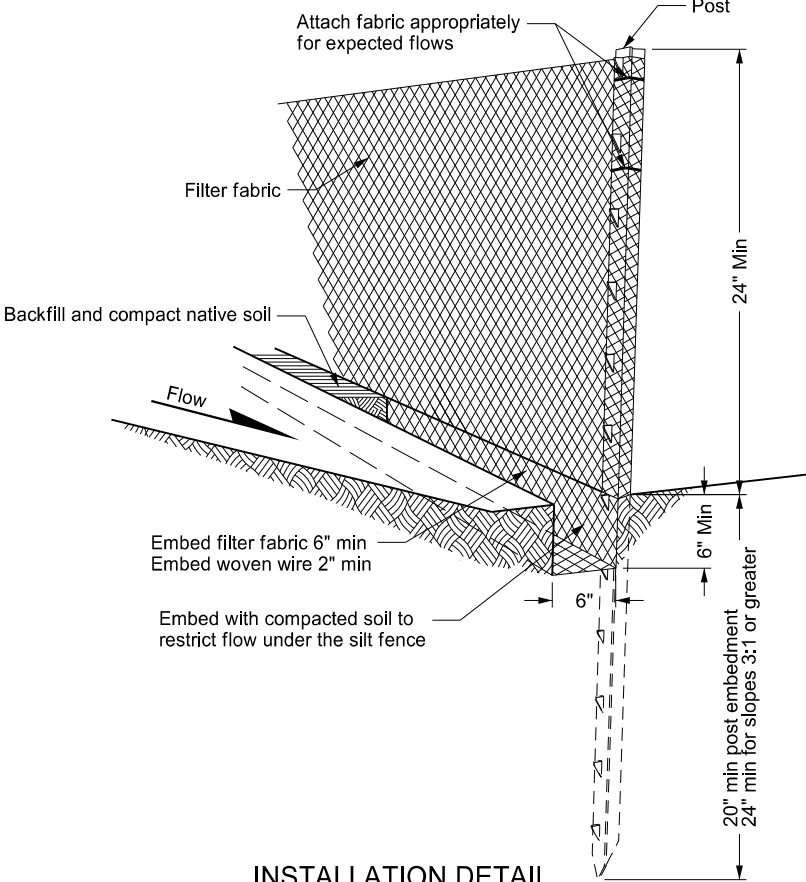
3.8 staples per square yard
using 8-inch 11 gauge wire
"u" staples.



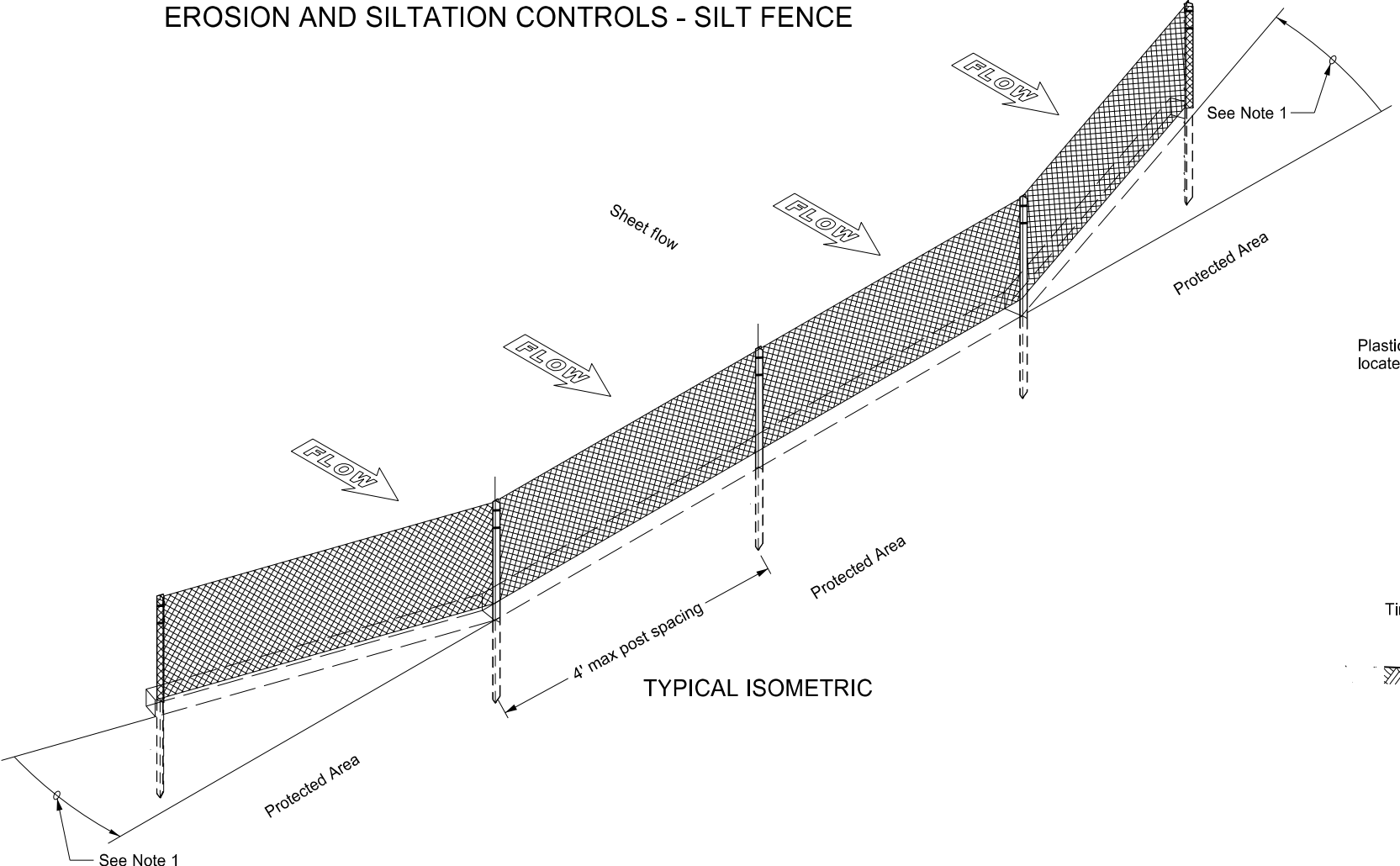
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-S to D-255-2.
07-27-15	Changed installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

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

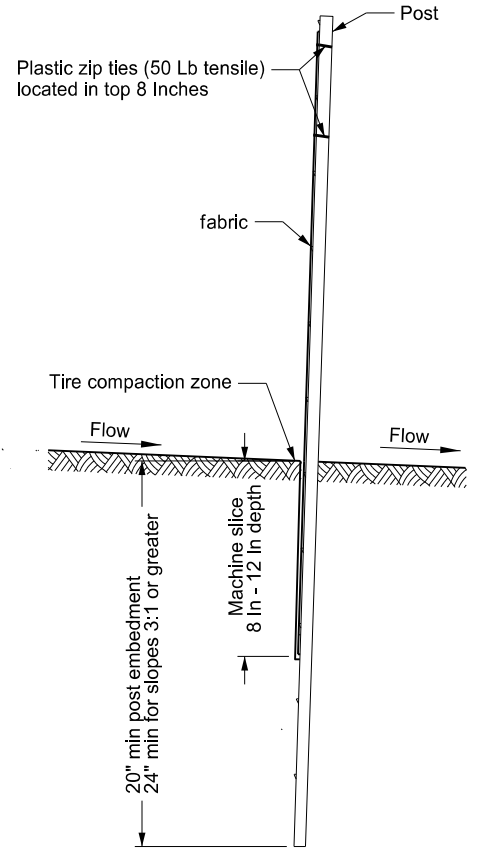
EROSION AND SILTATION CONTROLS - SILT FENCE



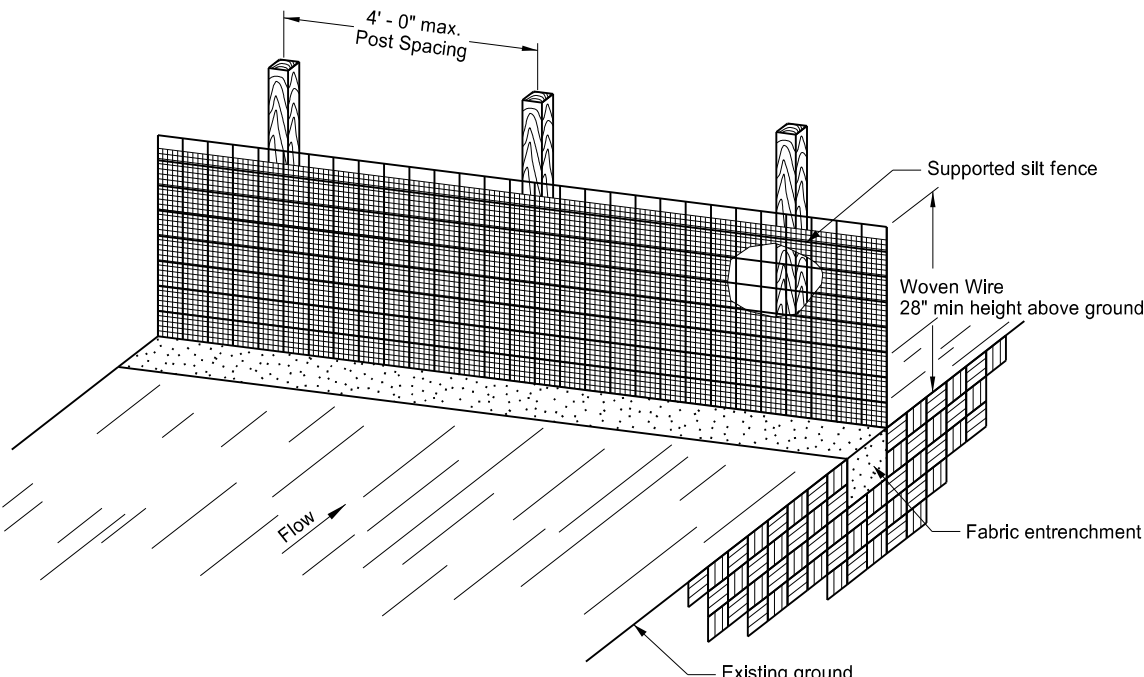
INSTALLATION DETAIL



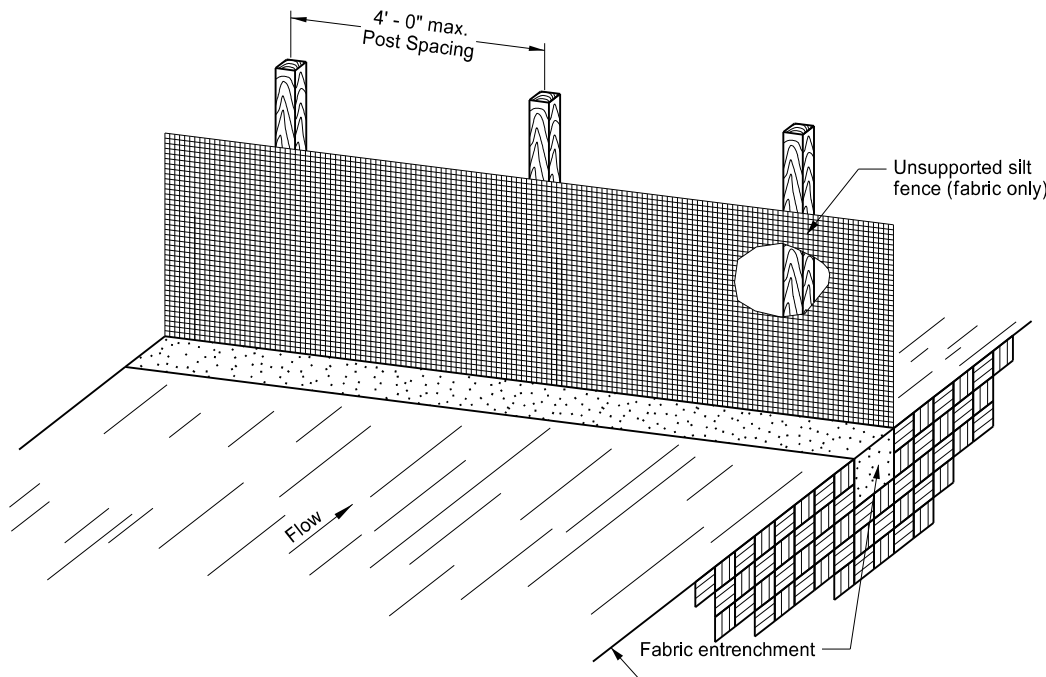
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



SILT FENCE UNSUPPORTED

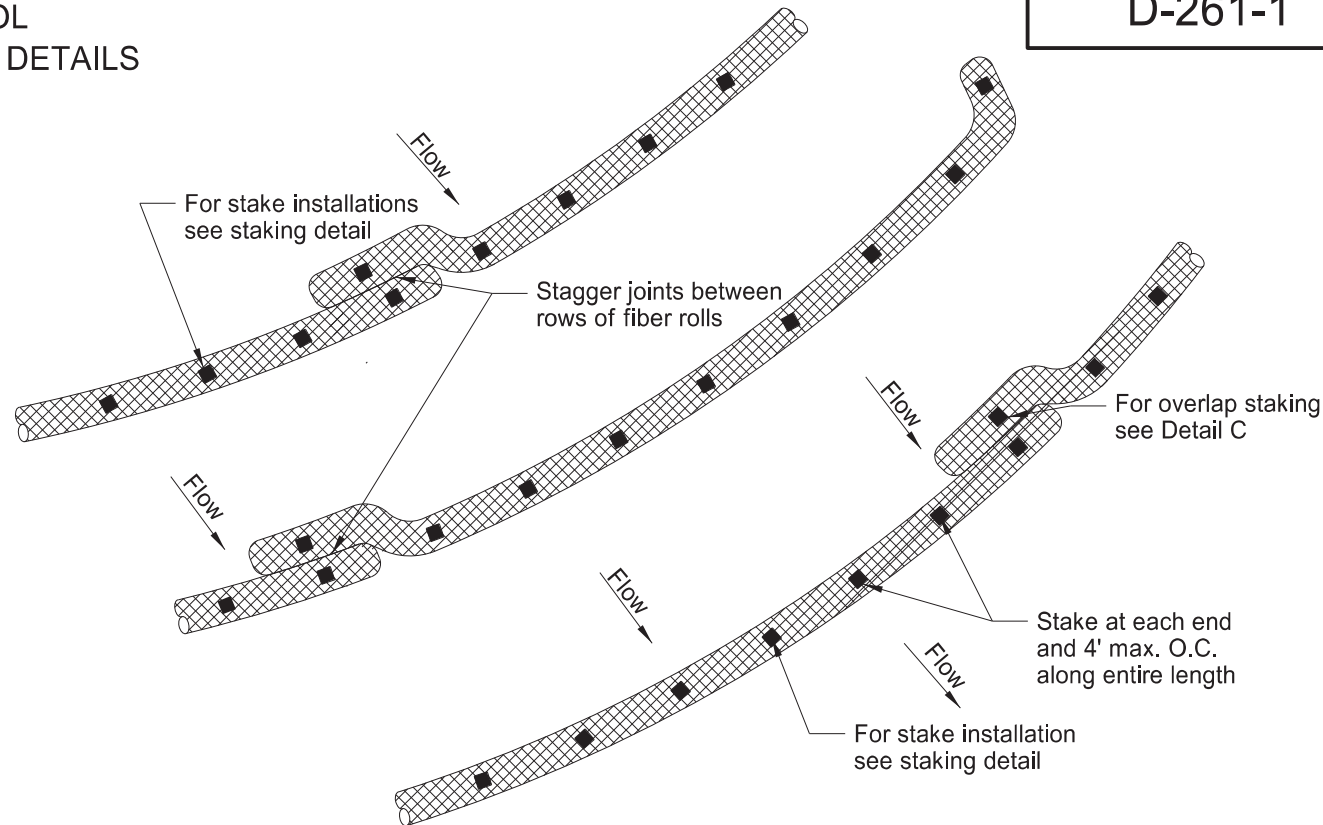
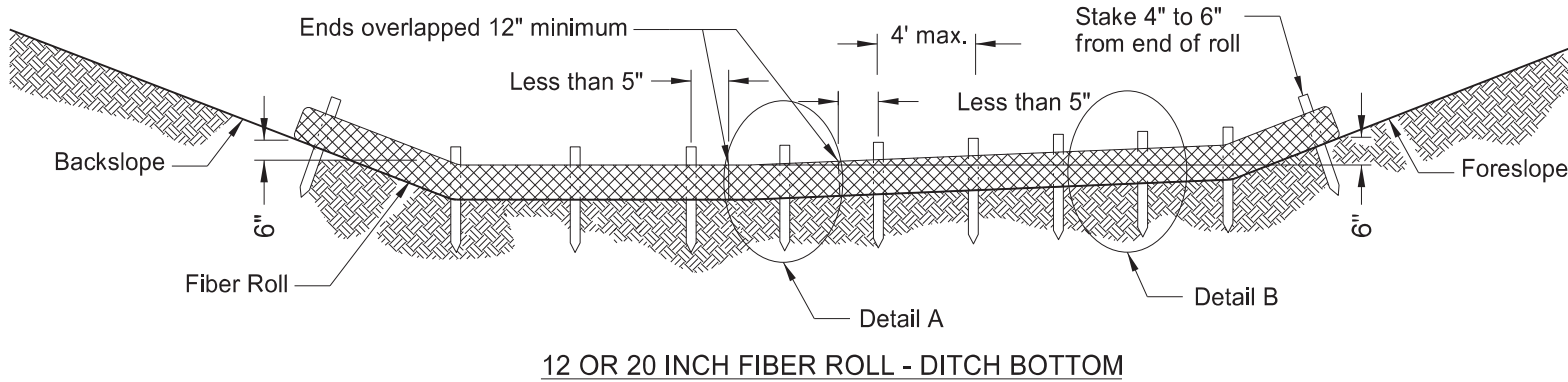
- NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
 2. Place splices outside low spots.
 3. Install silt fencing parallel to contour lines.
 4. Do not embed silt fence when placed in standing water.
 5. Silt fence material does not need to reach the top of woven wire support.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.
06-27-16 08-27-19	Revised details & added new ones. New Design Engineer PE Stamp.

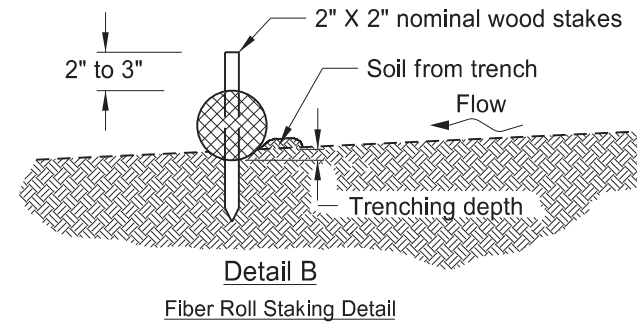
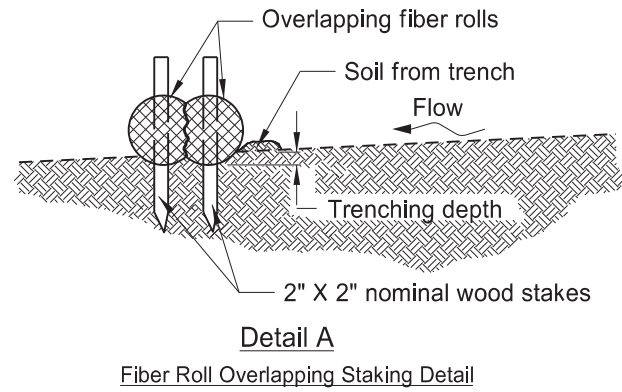
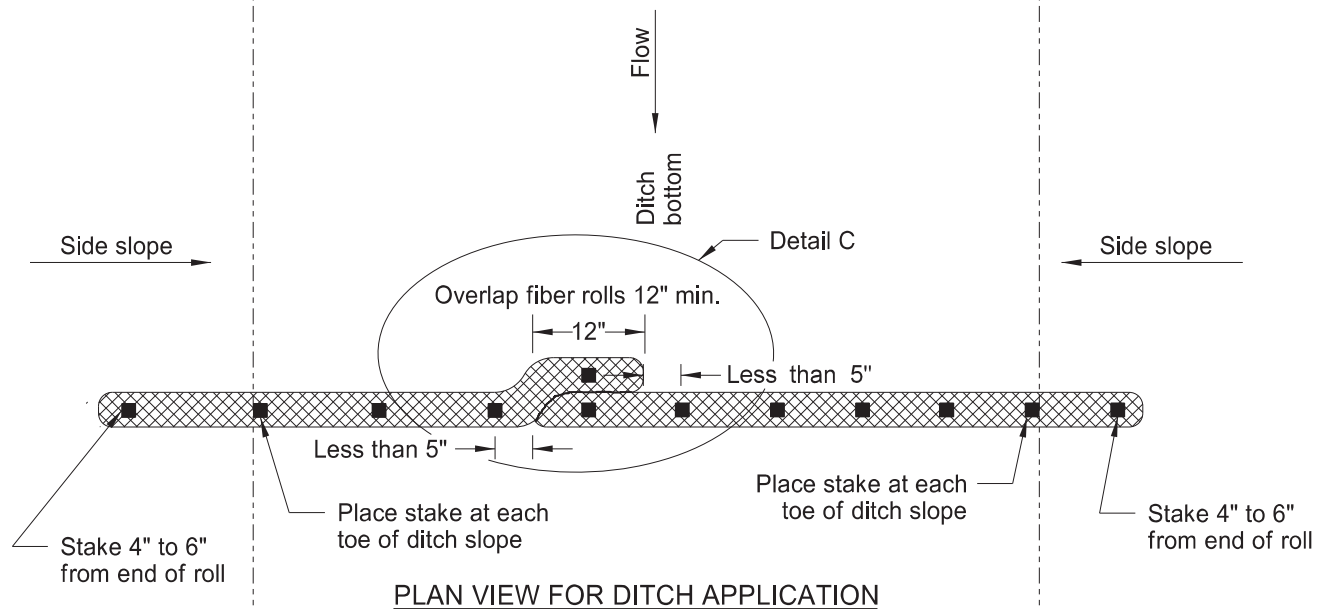
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Kirk J Hoff,
Registration Number
PE- 4683,
on 08/27/19 and the original document is stored at the
North Dakota Department
of Transportation

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1



PLAN VIEW FOR SLOPE APPLICATION
Ensure fiber rolls are placed along the contours of the slope.



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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp
04-22-24	Slope Plan View-Overlap Change.

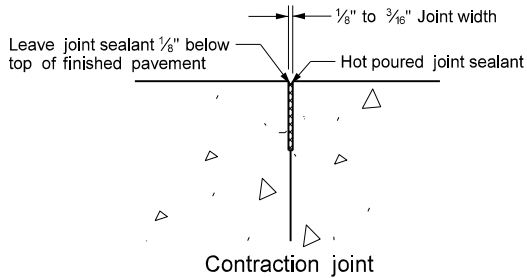
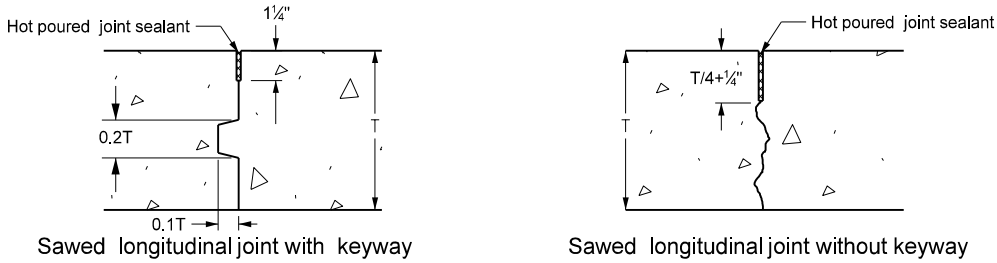


04/22/24

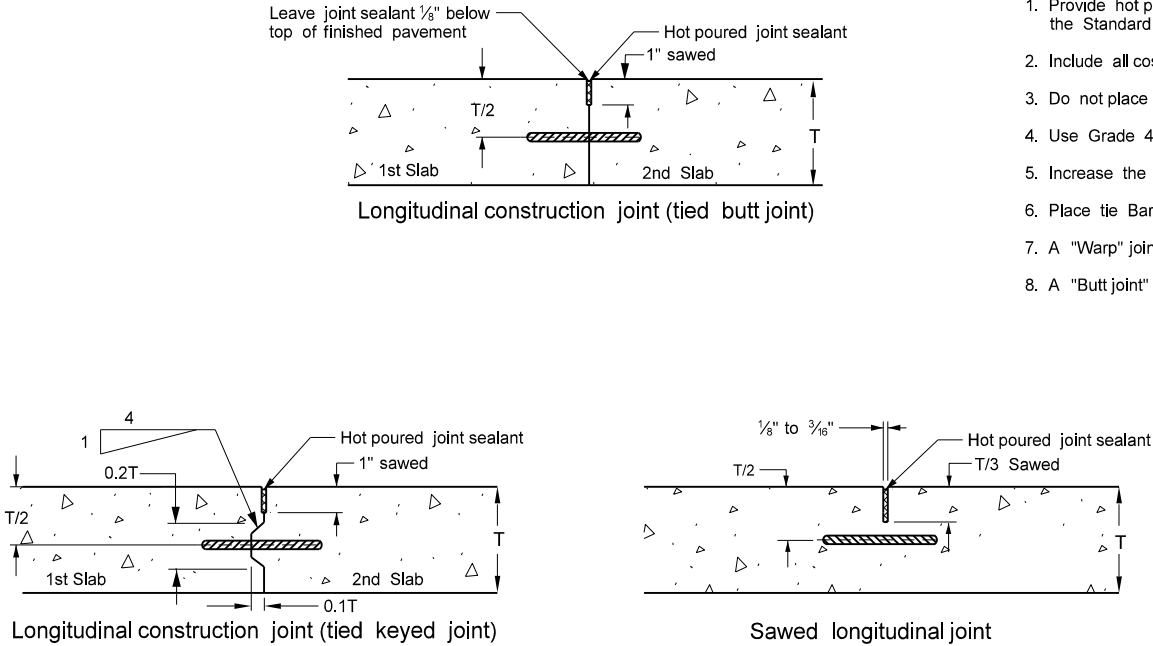
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS



TIED JOINTS



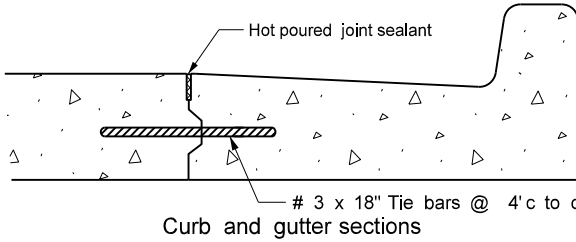
Notes:

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

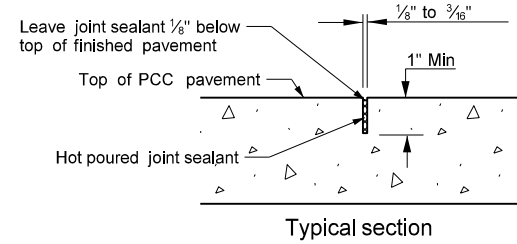
BAR SIZE
GRADE STEEL
BAR LENGTH
DIST TO FREE EDGE
JOINT TYPE
PVTM THICKNESS

TIEBAR SPACINGS (In)

SPE E LENGTH E EDGE (FT)		# 3 BAR										# 4 BAR										# 5 BAR										# 6 BAR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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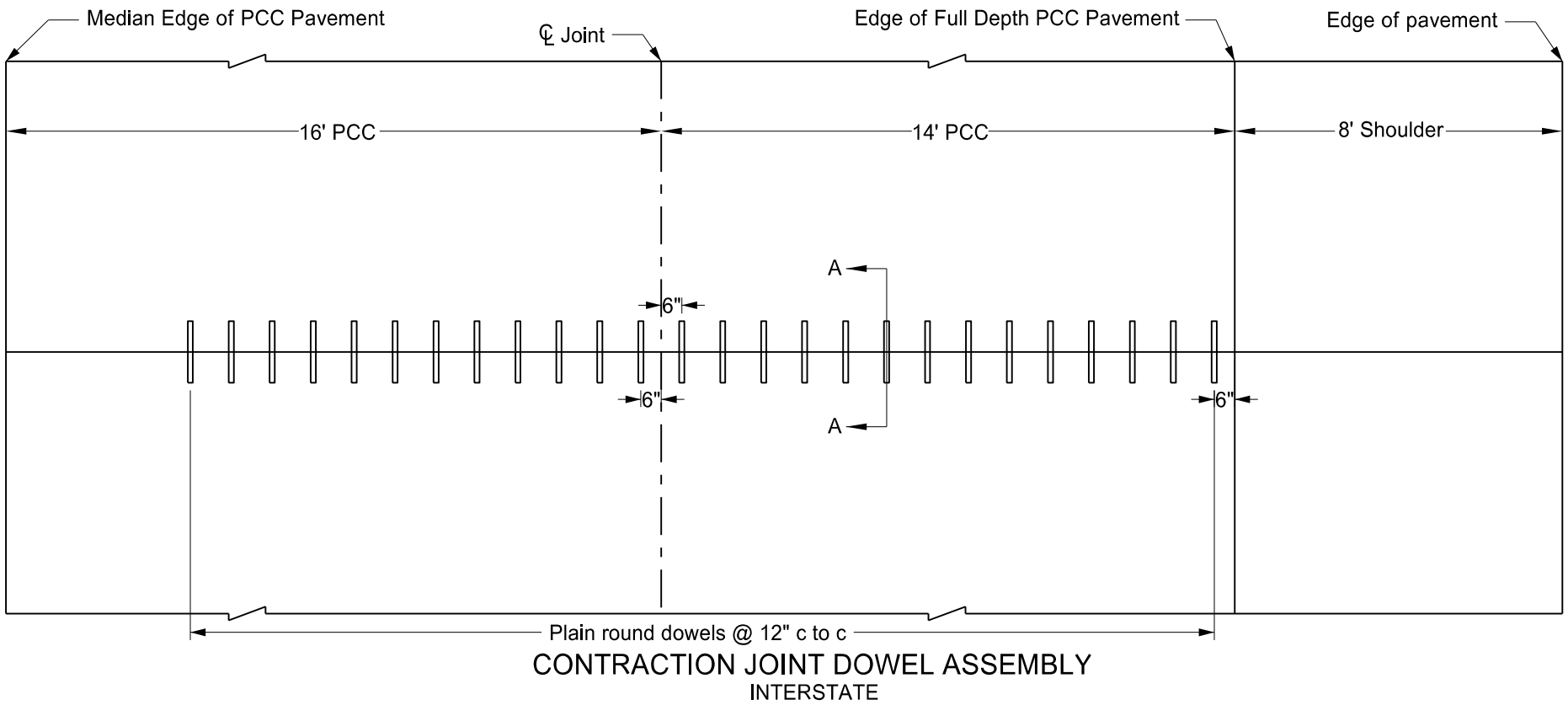
JOINT SEALER DETAILS



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
10/23/2012	Expanded Tie Bar Table
03/16/2016	Updated Jt Details & notes
10/25/2019	Corrected "Typo" in Note 3

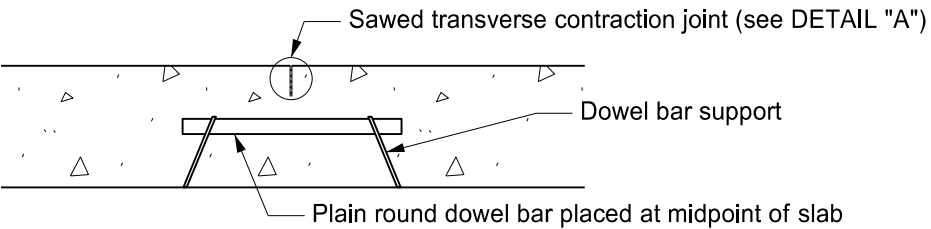
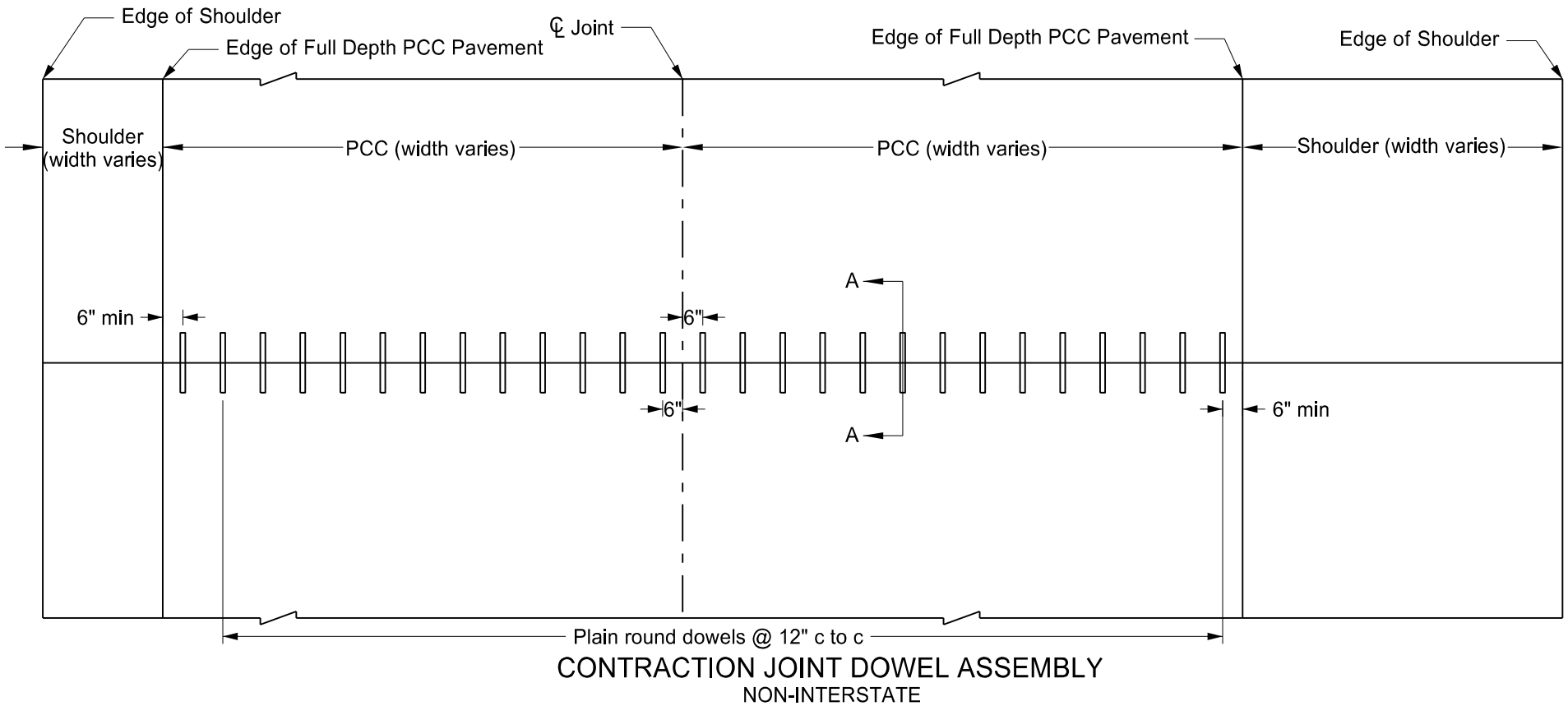
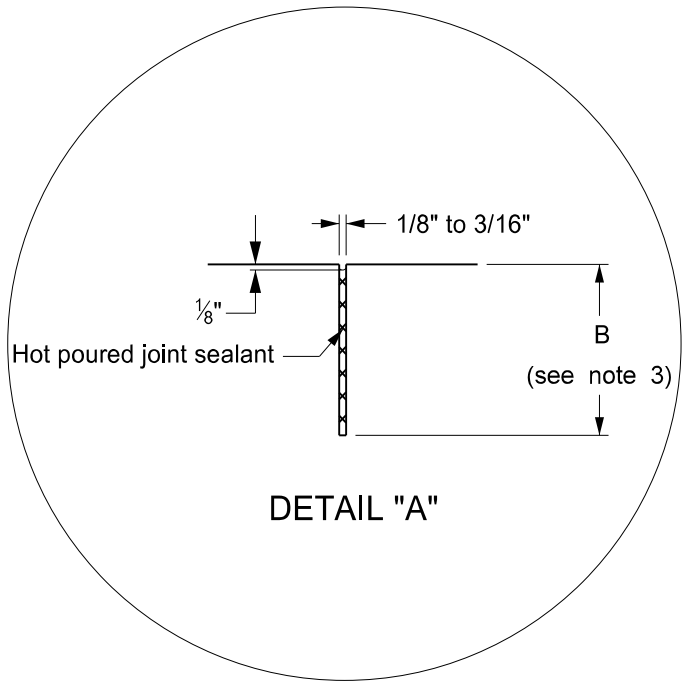
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TRANSVERSE CONTRACTION JOINT DETAILS



Notes

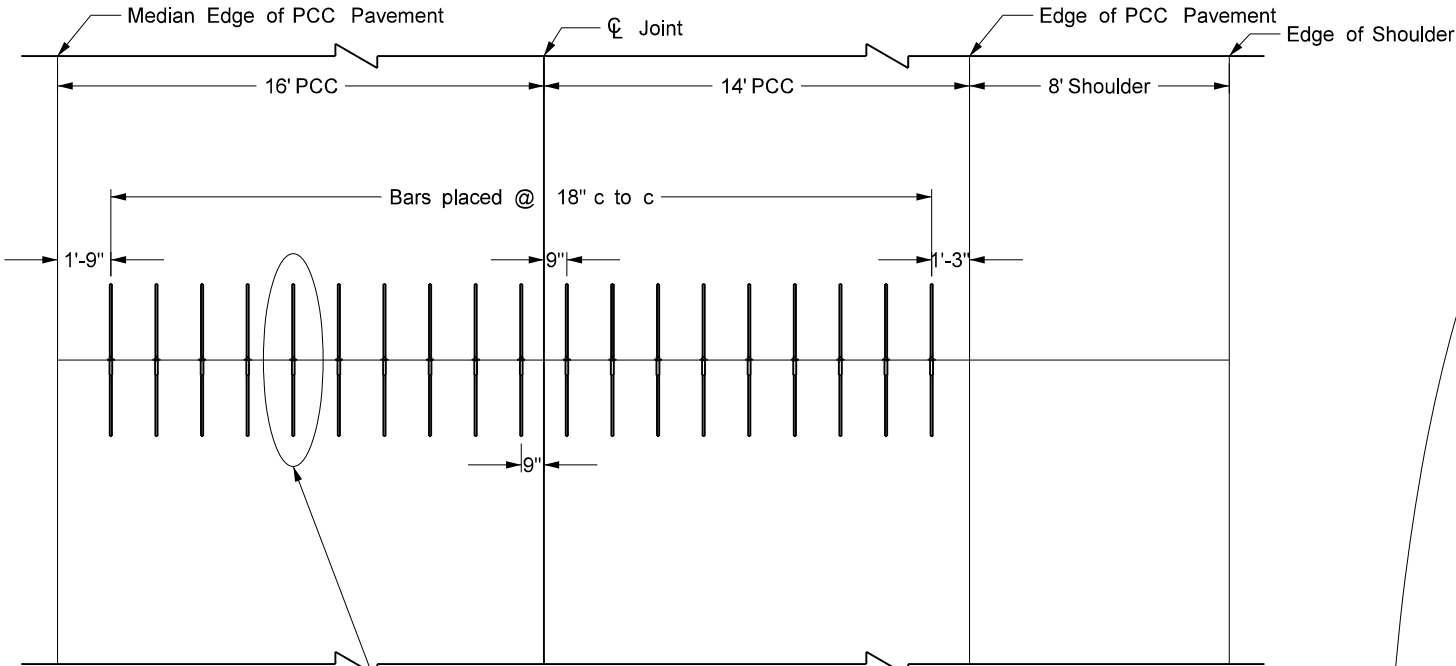
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. $B = T/4 + 1/4"$ for AE or YE for non-doweled concrete pavement or $B = T/3$ for AAE or doweled concrete pavement



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity

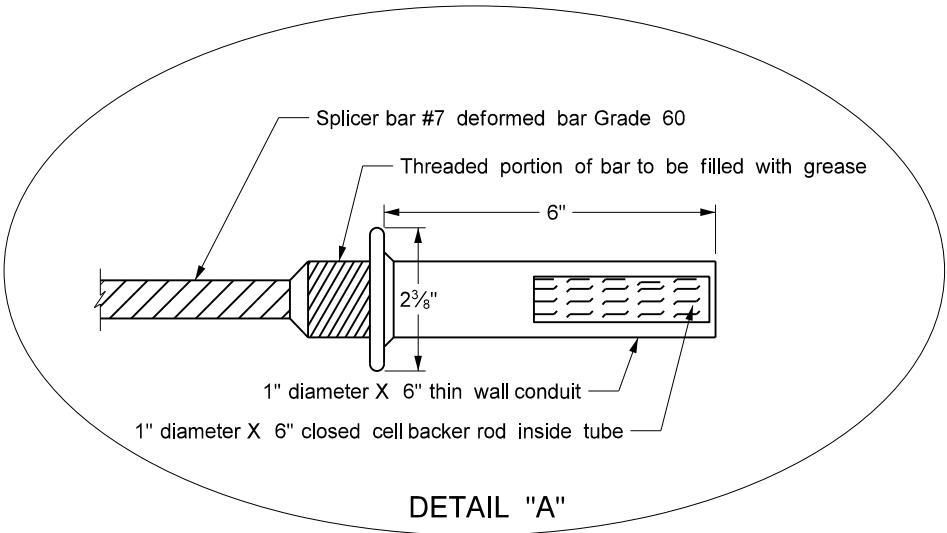
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TRANSVERSE CONSTRUCTION JOINT

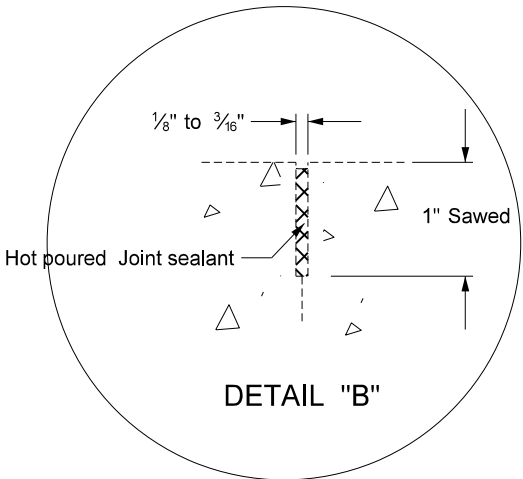


See "DEFORMED SPLICER BAR", "DETAIL A", "DETAIL B" and "STAGES OF CONSTRUCTION" drawings, this standard

PLAN VIEW

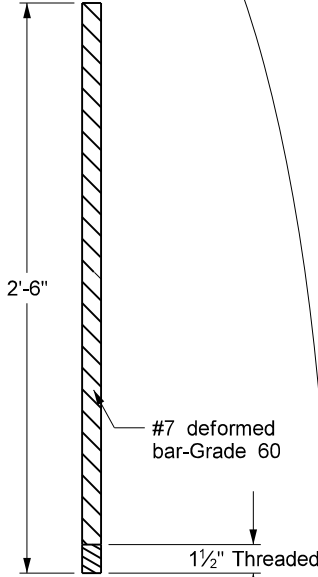


DETAIL "A"

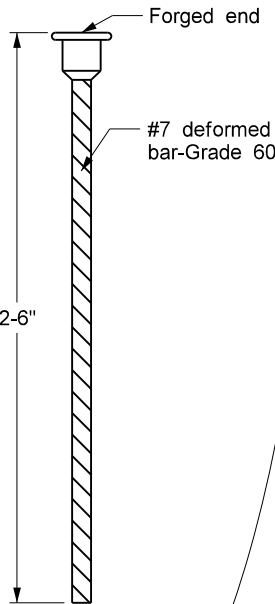


DETAIL "B"

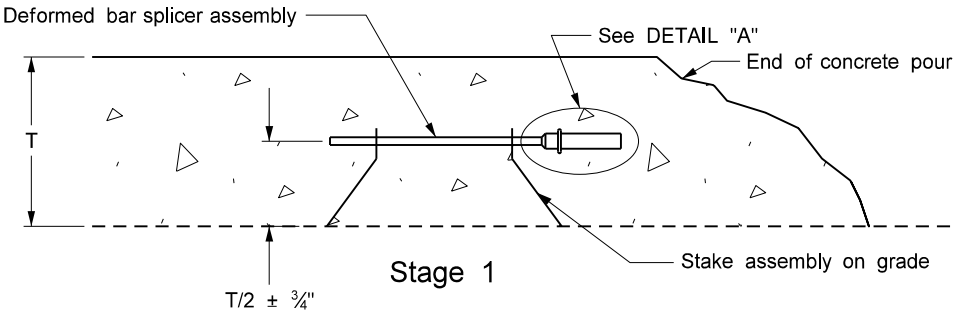
DEFORMED INSERT



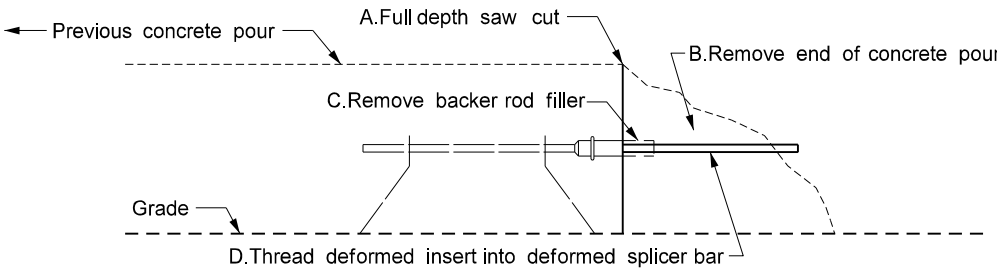
DEFORMED SPLICER BAR



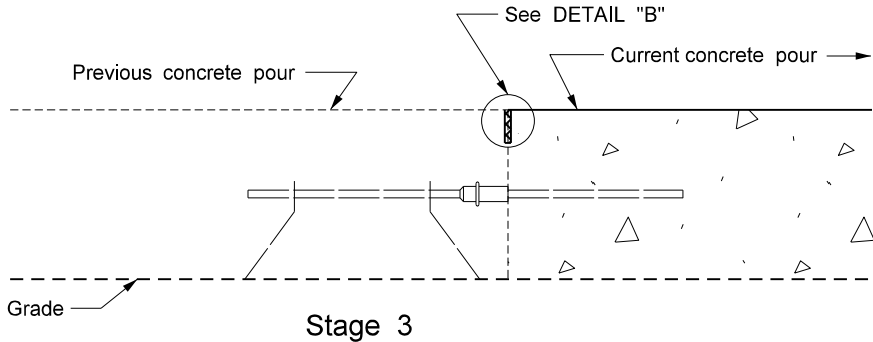
STAGES OF CONSTRUCTION



Stage 1



Stage 2



Stage 3

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

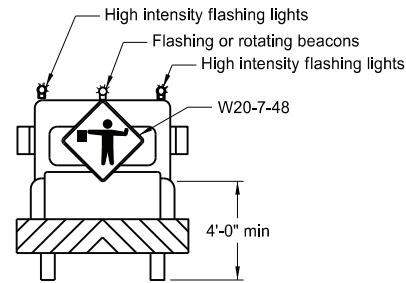
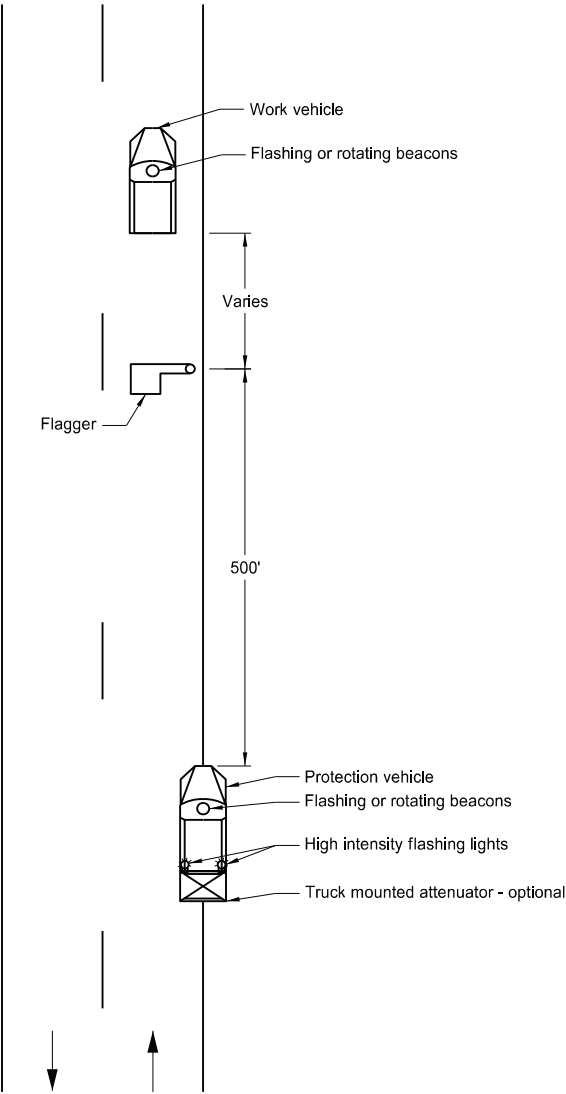
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
3-16-16 8-27-19	Revised Joint Details & notes. New Design Engr PE Stamp.

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of Transportation

TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

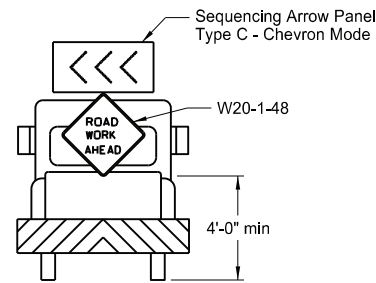
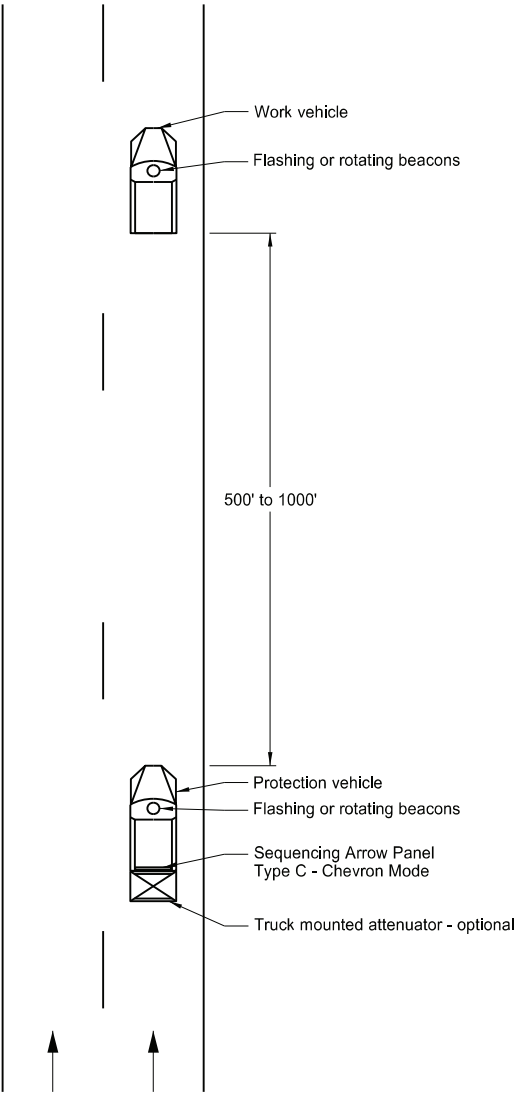
D-704-2

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways

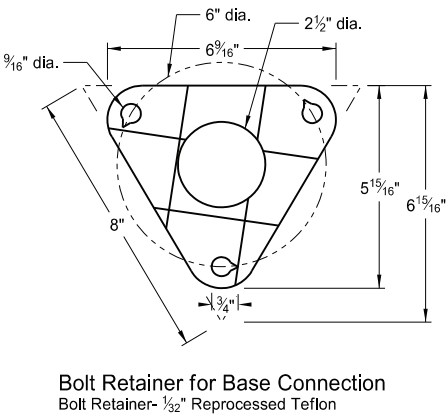


Typical Protection Vehicle

- 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

08/01/24



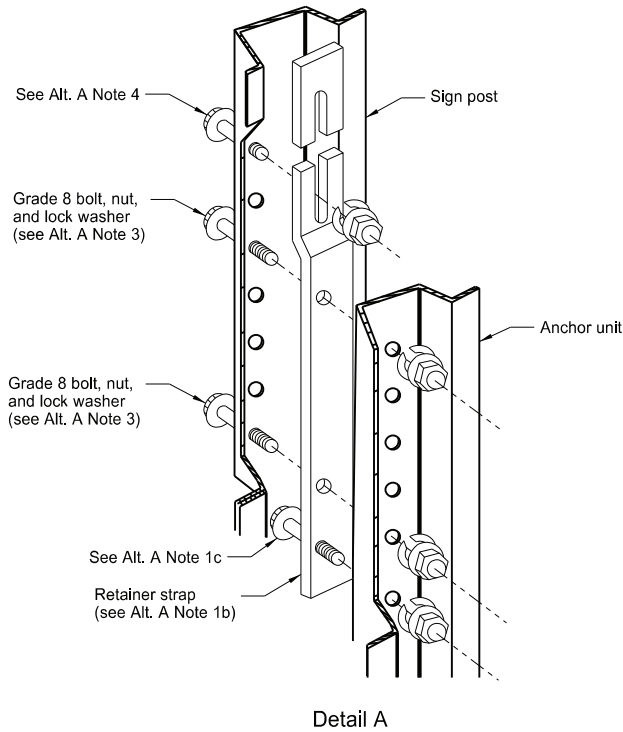
08/01/24



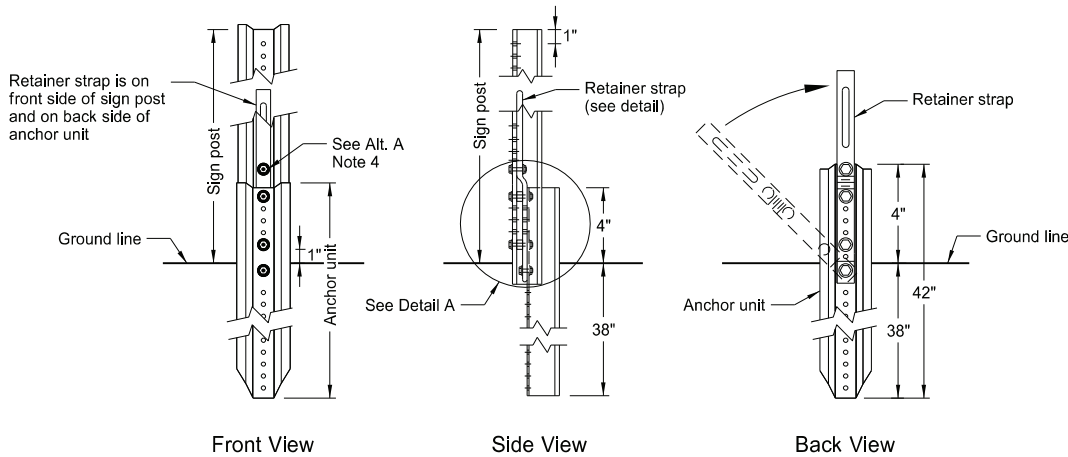
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Detail A



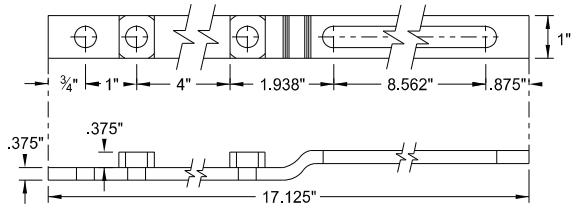
Front View

Side View

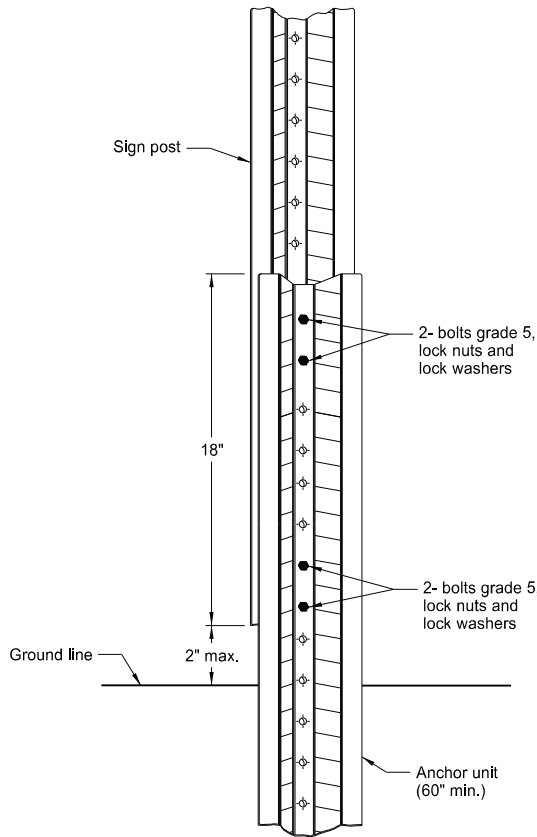
Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

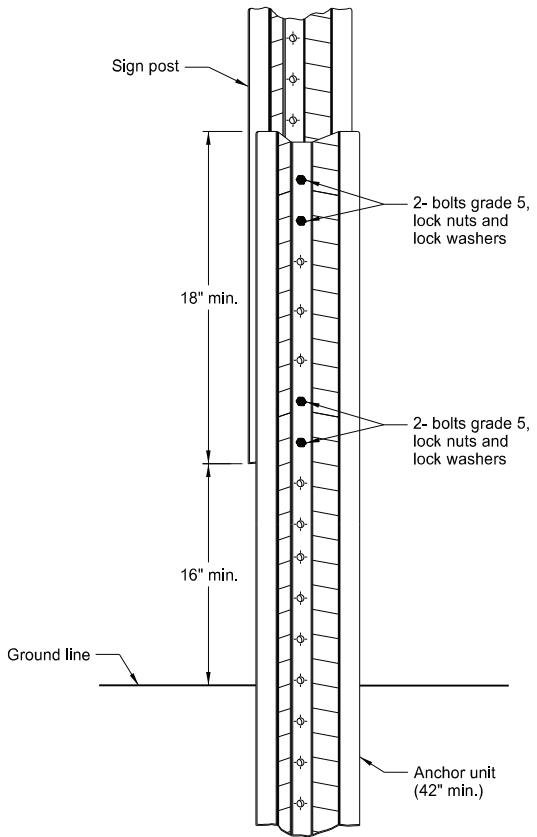


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

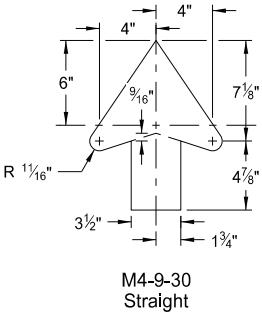
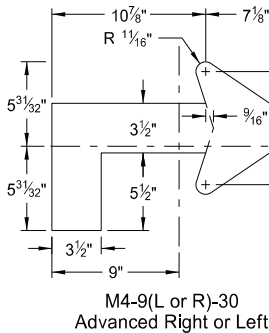
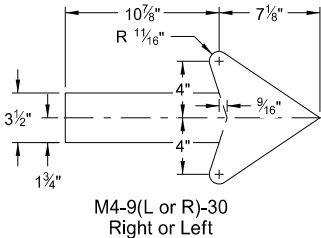
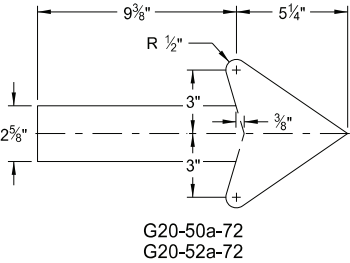
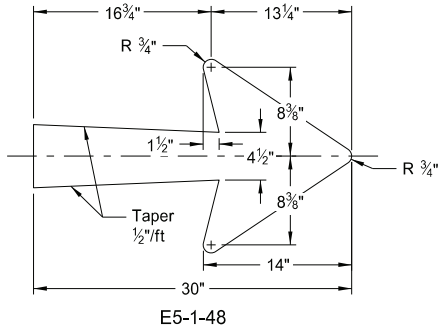
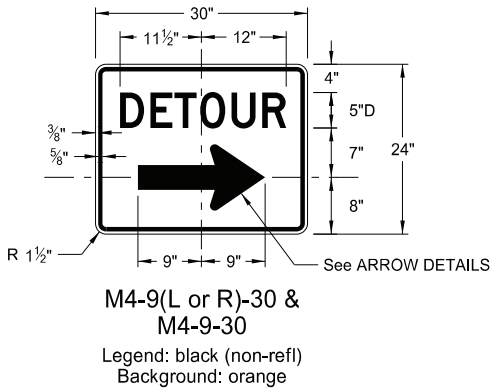
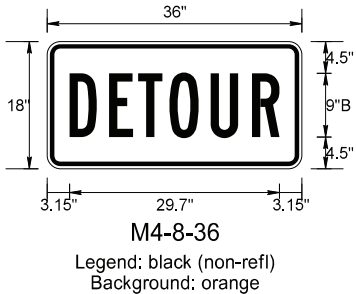
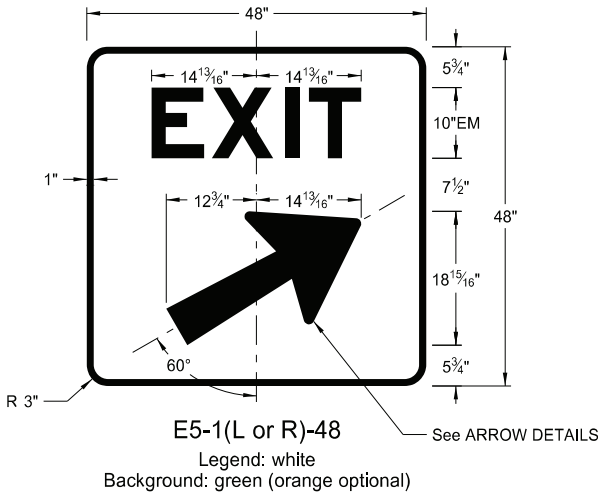
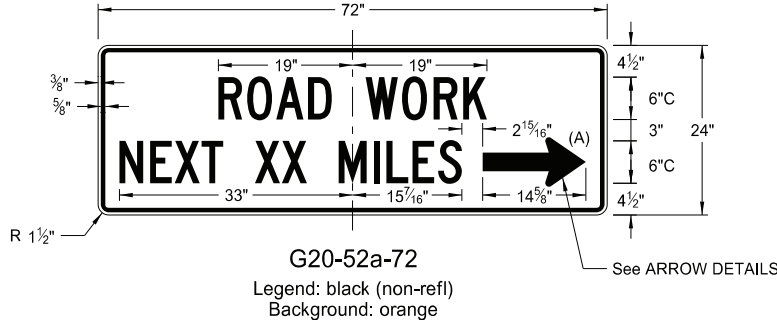
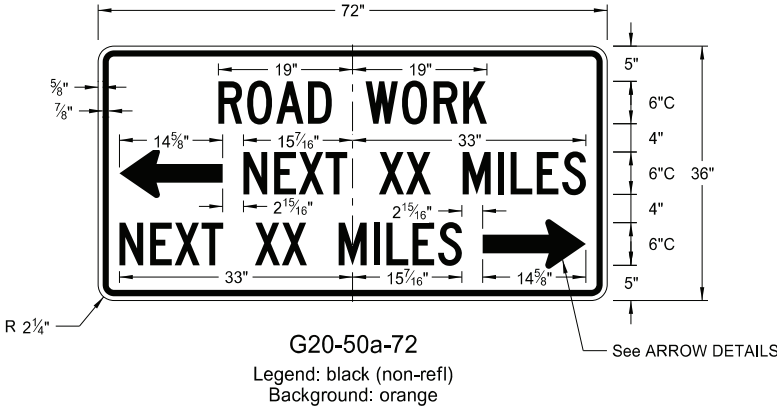
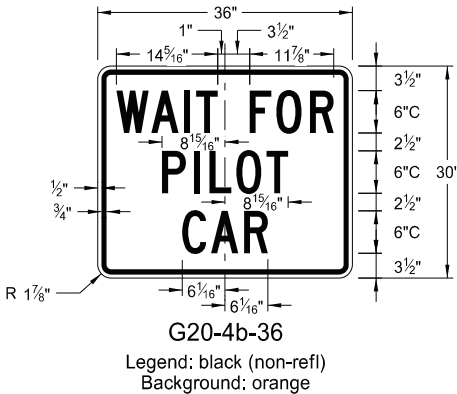
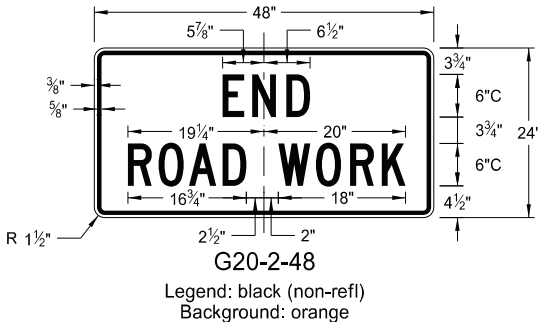
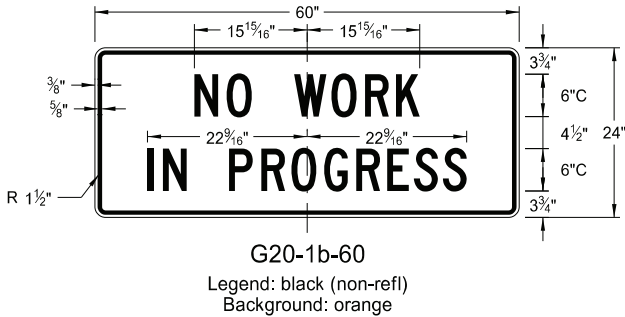
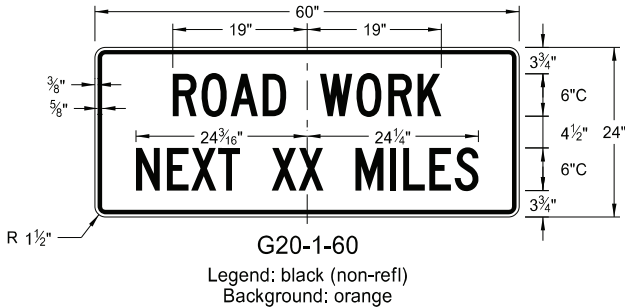
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- 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.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- 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



08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



ARROW DETAILS

NOTES:

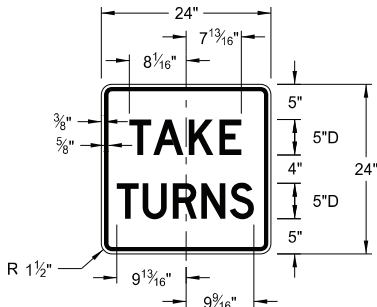
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

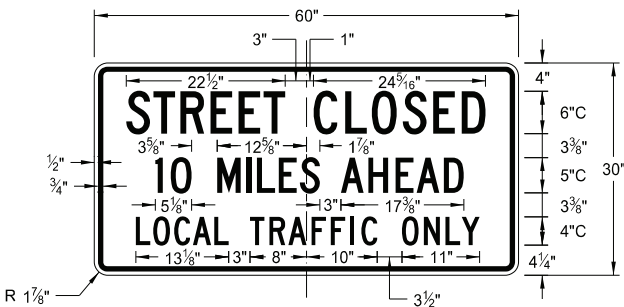


08/01/24

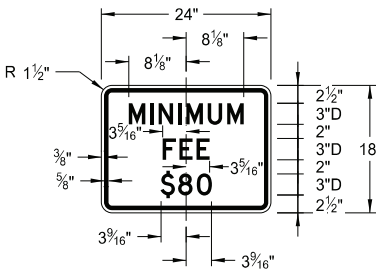
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



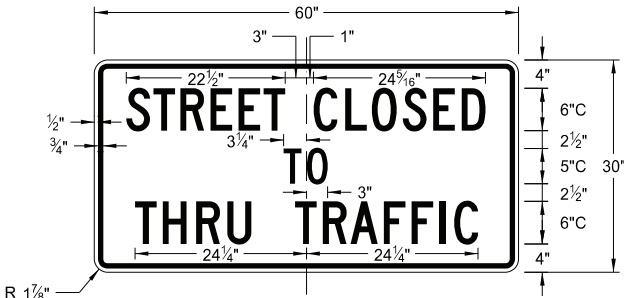
R1-50P-24
Legend: black (non-refl)
Background: white



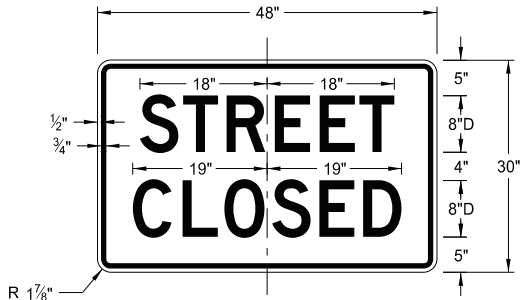
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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

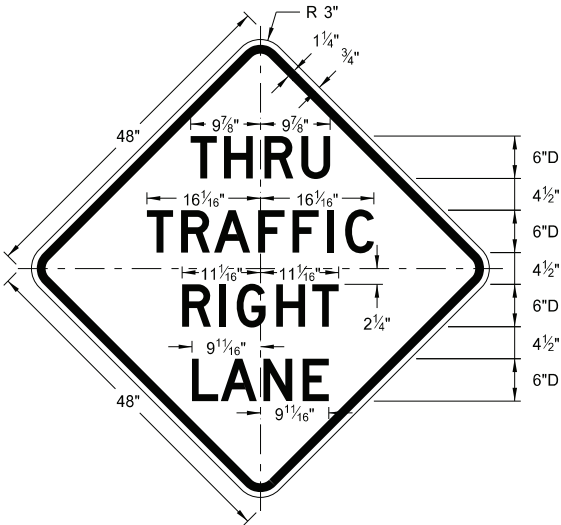


08/01/24

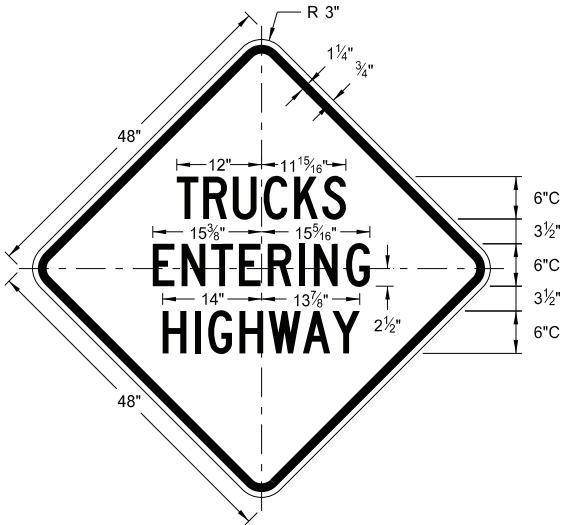
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

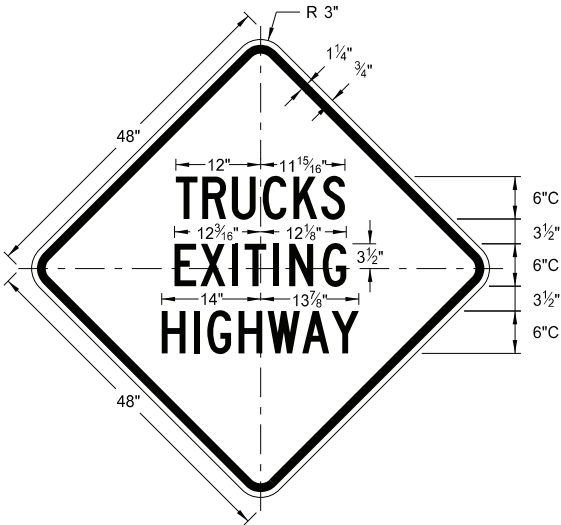
* DISTANCE MESSAGES



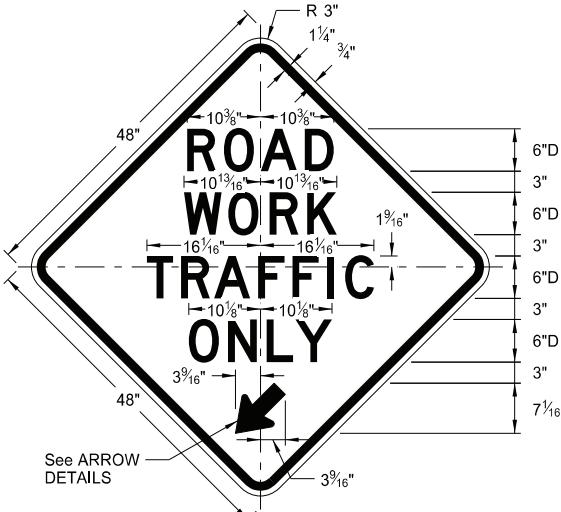
W5-8-48
Legend: black (non-refl)
Background: orange



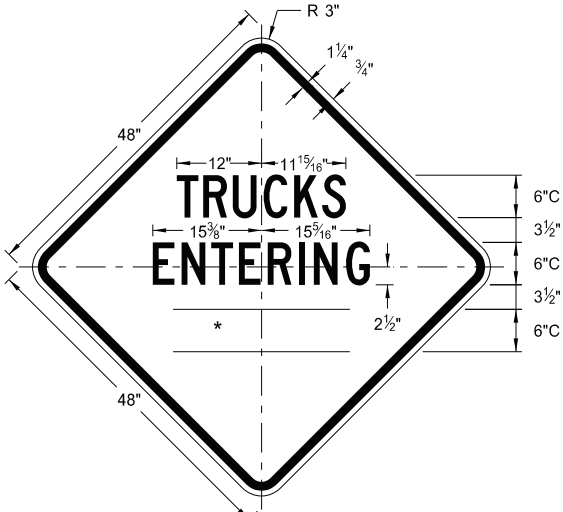
W8-53-48
Legend: black (non-refl)
Background: orange



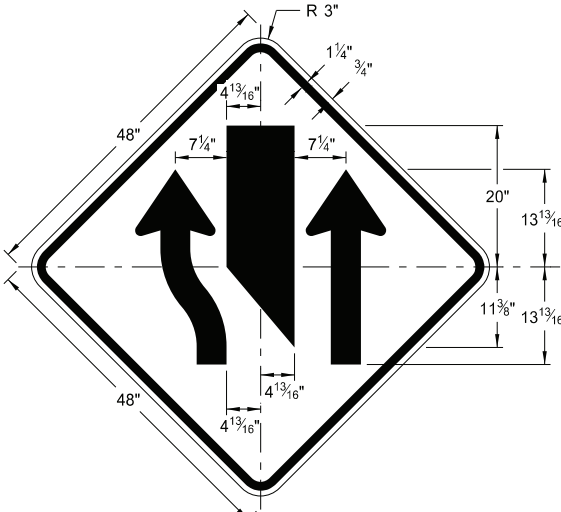
W8-56-48
Legend: black (non-refl)
Background: orange



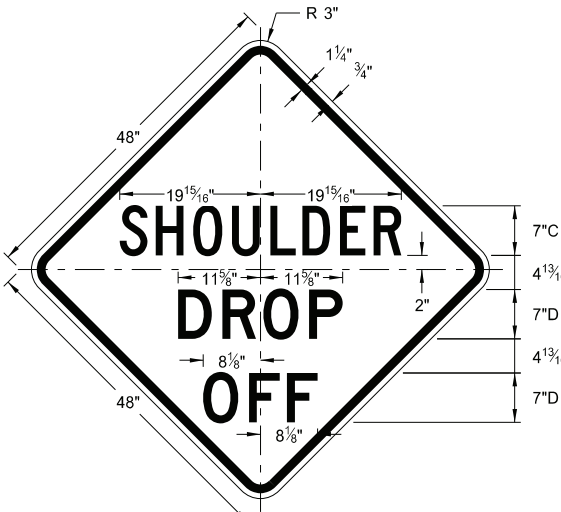
W5-9-48
Legend: black (non-refl)
Background: orange



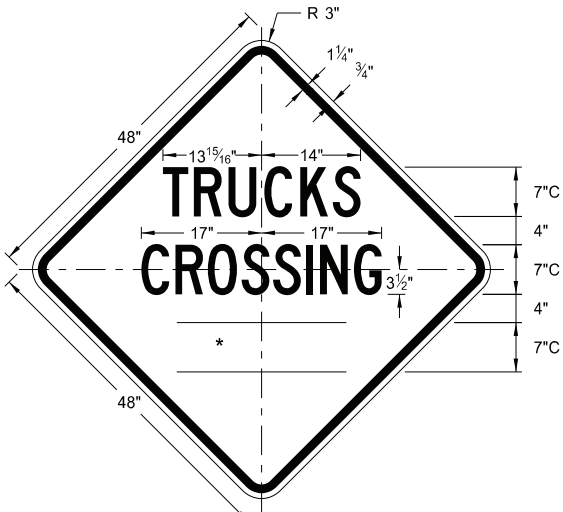
W8-54-48
Legend: black (non-refl)
Background: orange



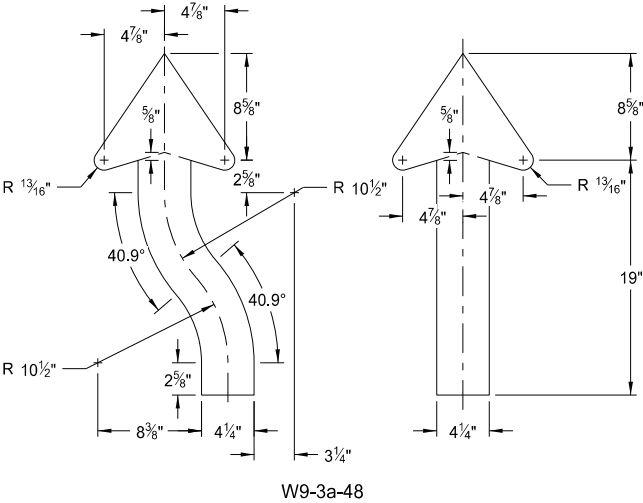
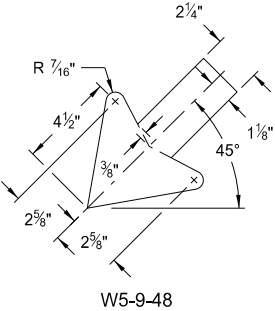
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



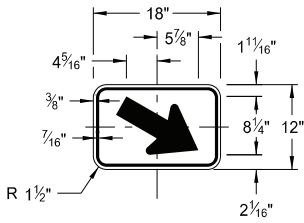
ARROW DETAILS

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

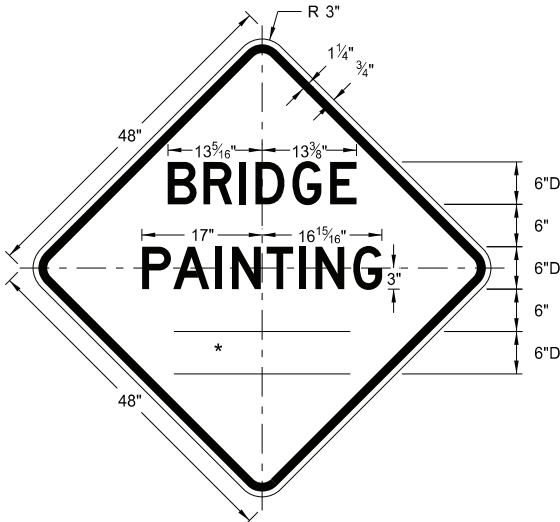


08/01/24

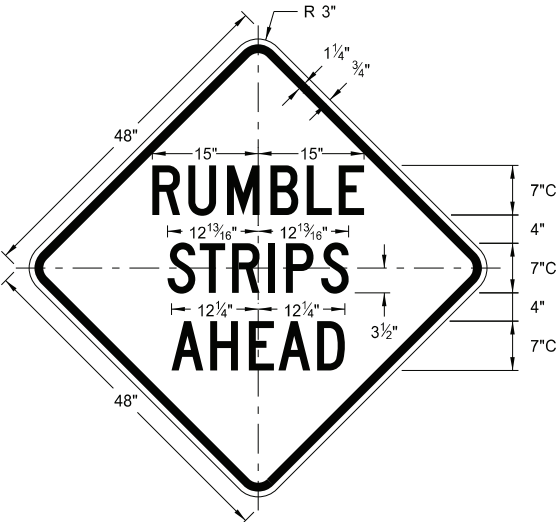
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



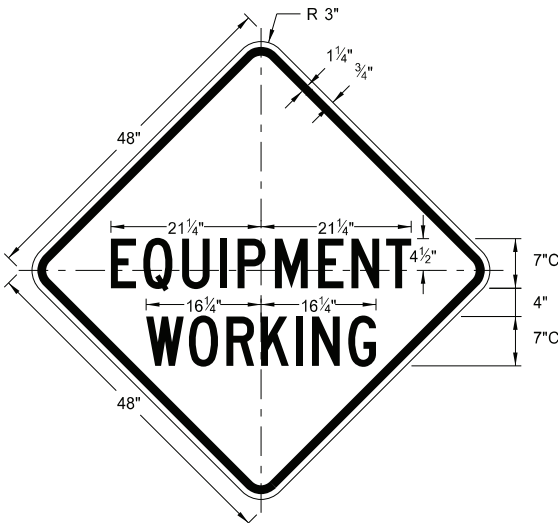
W21-50-48
Legend: black (non-refl)
Background: orange



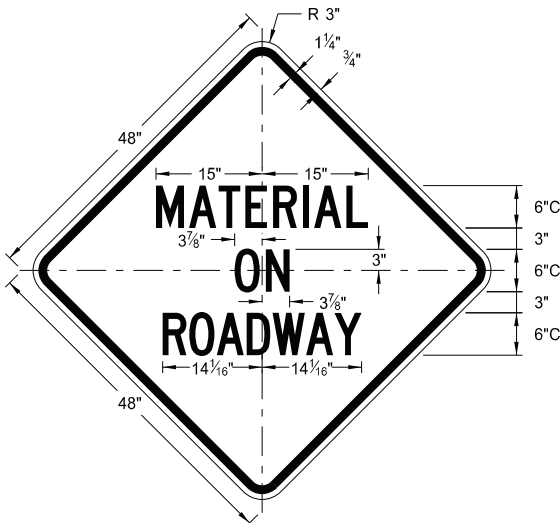
W21-53-48
Legend: black (non-refl)
Background: orange

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

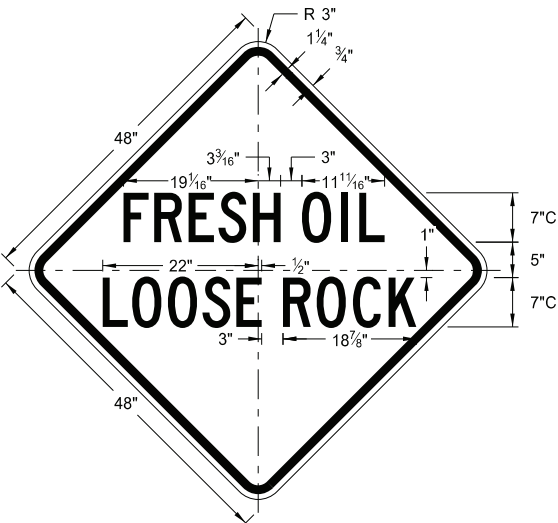
* DISTANCE MESSAGES



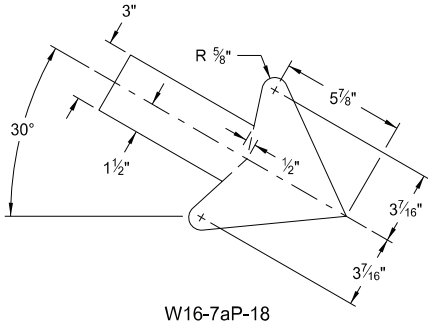
W20-51-48
Legend: black (non-refl)
Background: orange



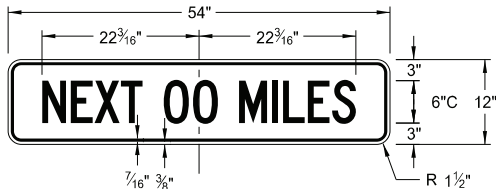
W21-51-48
Legend: black (non-refl)
Background: orange



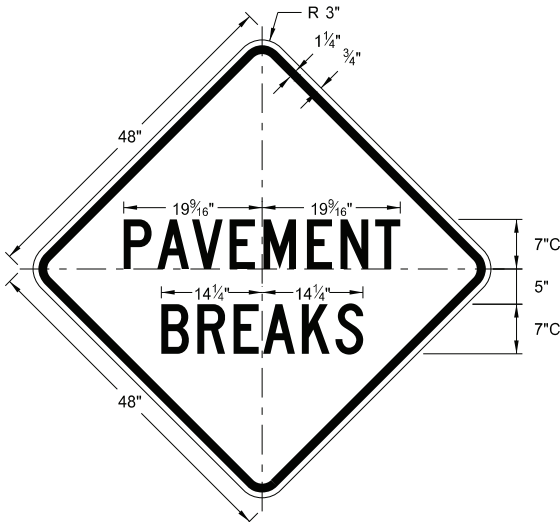
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



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

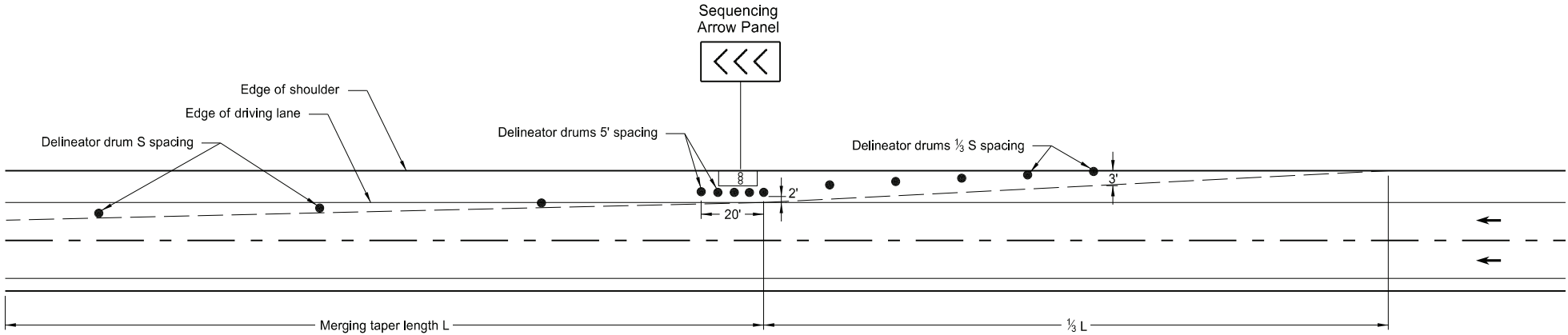
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.



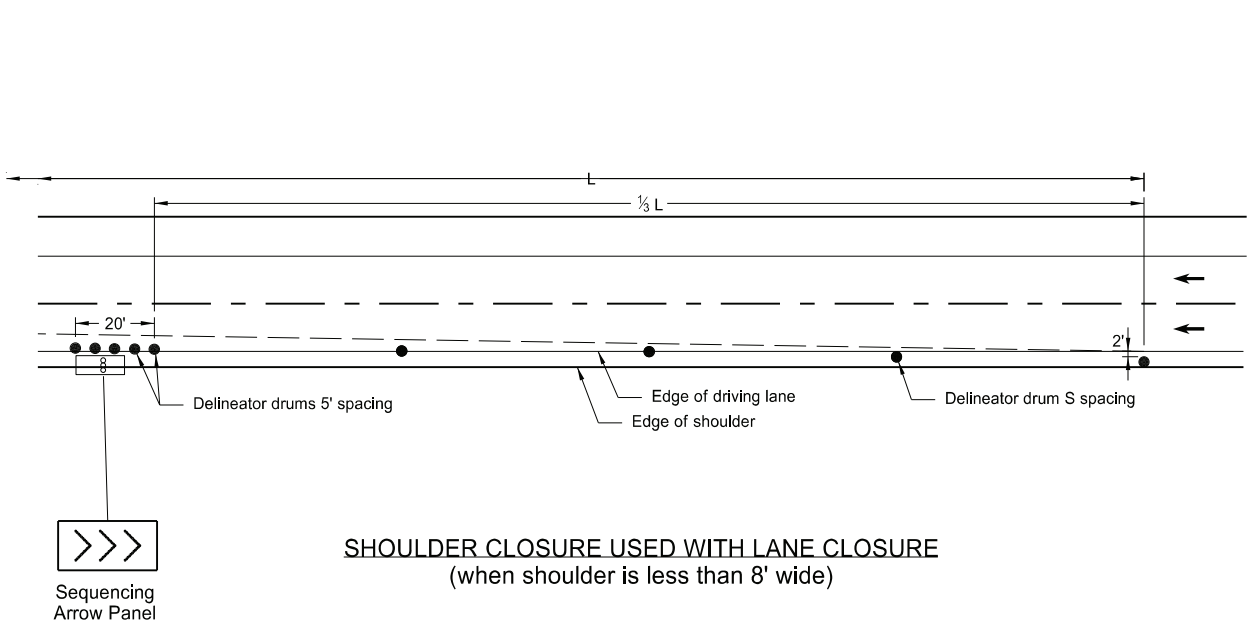
08/01/24

SHOULDER CLOSURE TAPERS

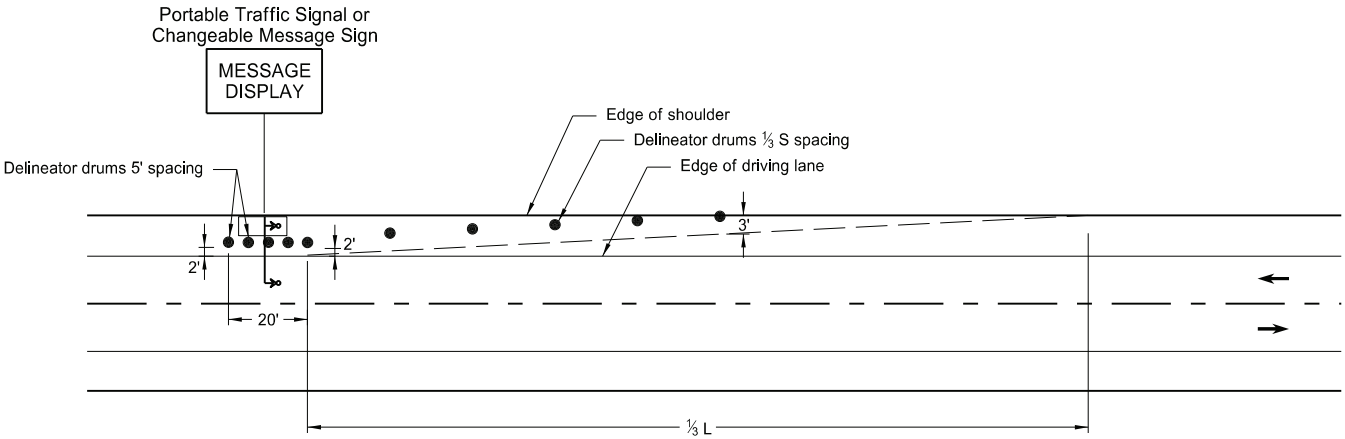
D-704-12



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
- Message Display
- ∞ Sequencing Arrow Panel
- ↳ Portable Traffic Signal

Notes:

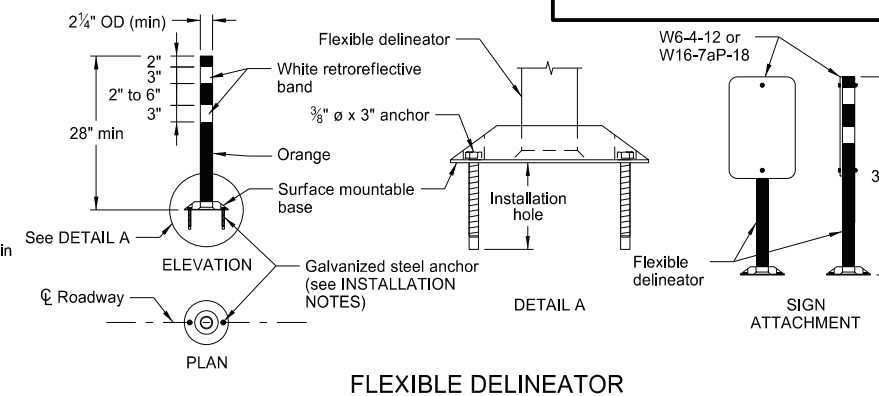
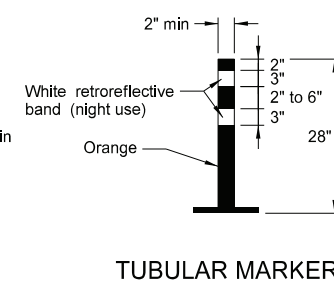
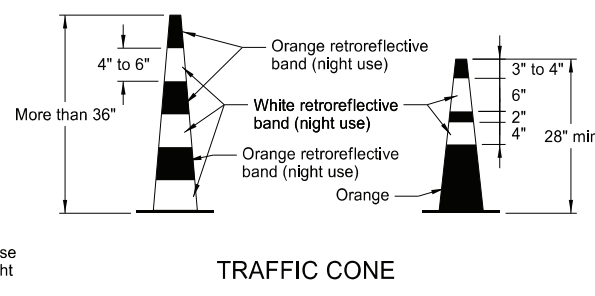
- S = Posted Speed Limit in mph
 W = Width of offset in feet
 L = Taper length in feet
 $L = WS^2/60$ (40mph or less)
 $L = WS$ (45mph or more)
- If a shoulder taper is used, use a length of approximately $\frac{1}{3}L$. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
- 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 voice
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature



08/01/24

D-704-13



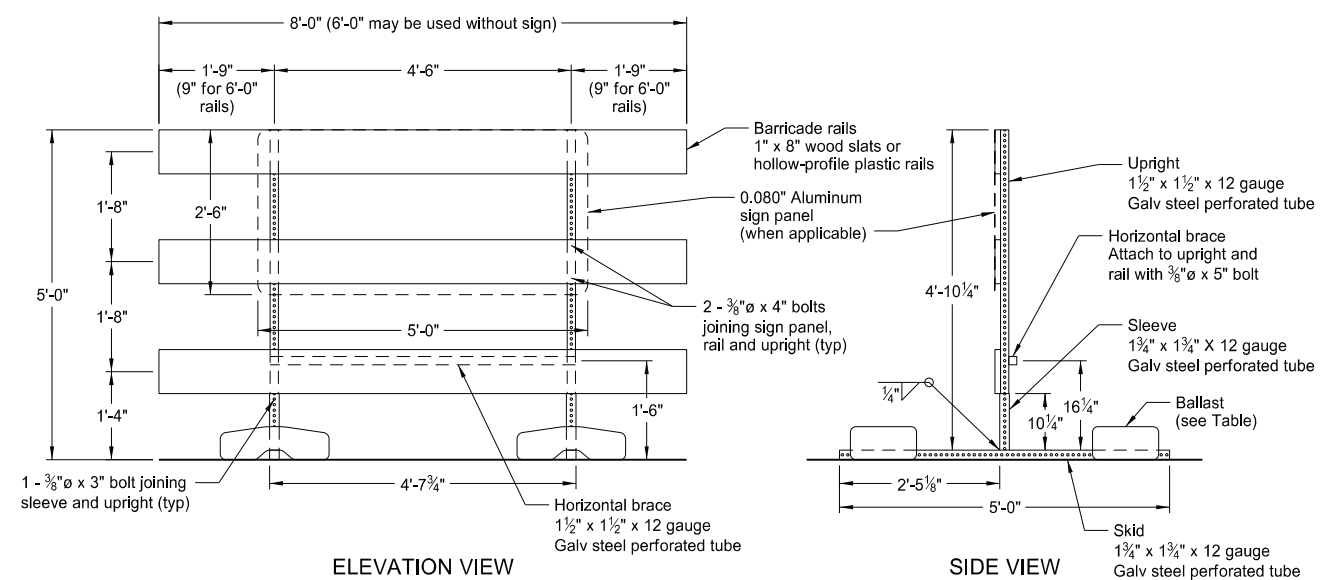
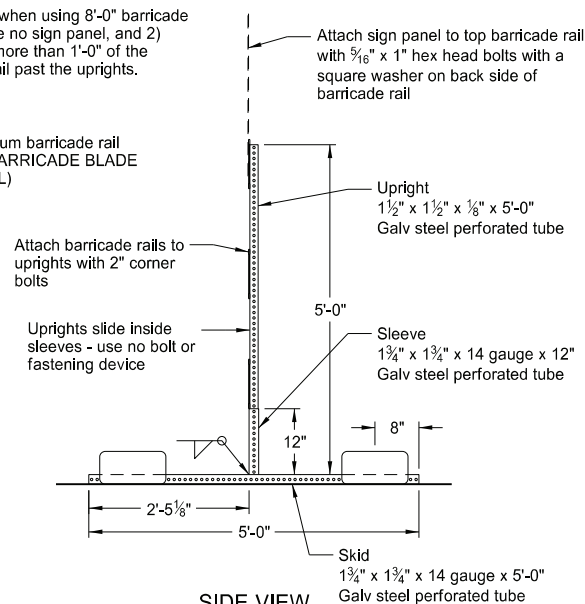
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

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.

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.

INSTALLATION NOTES:

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

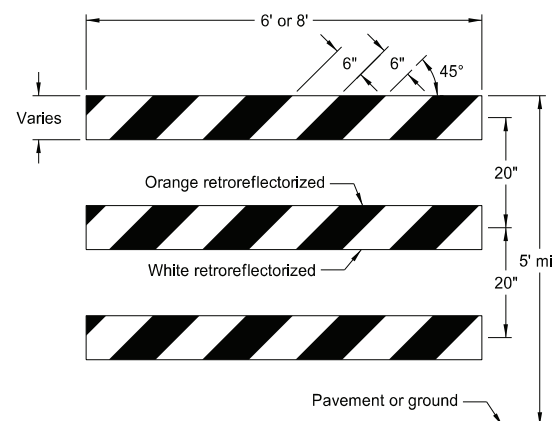


BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

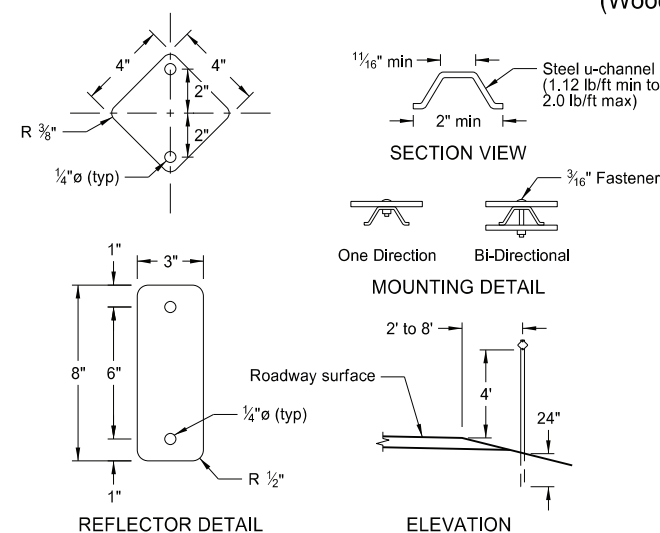
Diagram illustrating the standard crosswalk dimensions and materials:

- Length: 6' to 10'
- Width: 8"
- Stripe Angle: 45°
- Stripe Width: 6"
- Stripe Spacing: 6"
- Materials: Orange retroreflectORIZED, White retroreflectORIZED
- Height: 3'-0" to 3'-6"
- Surface: Pavement or ground

BARRICADE RAIL DETAILS



TYPE III BARRICADE



DELINEATORS

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

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.

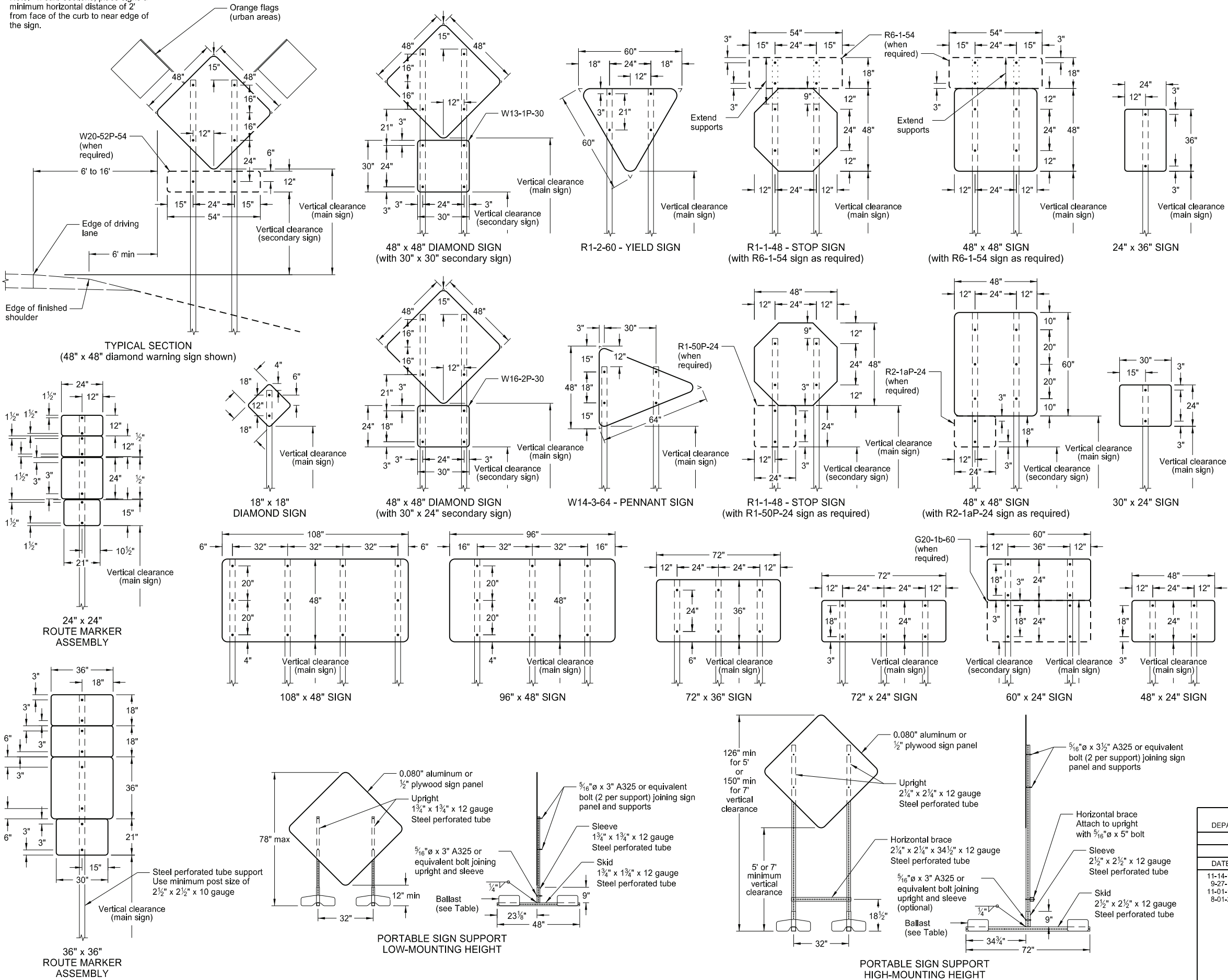
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



08/01/24

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

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



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 unforeseen 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

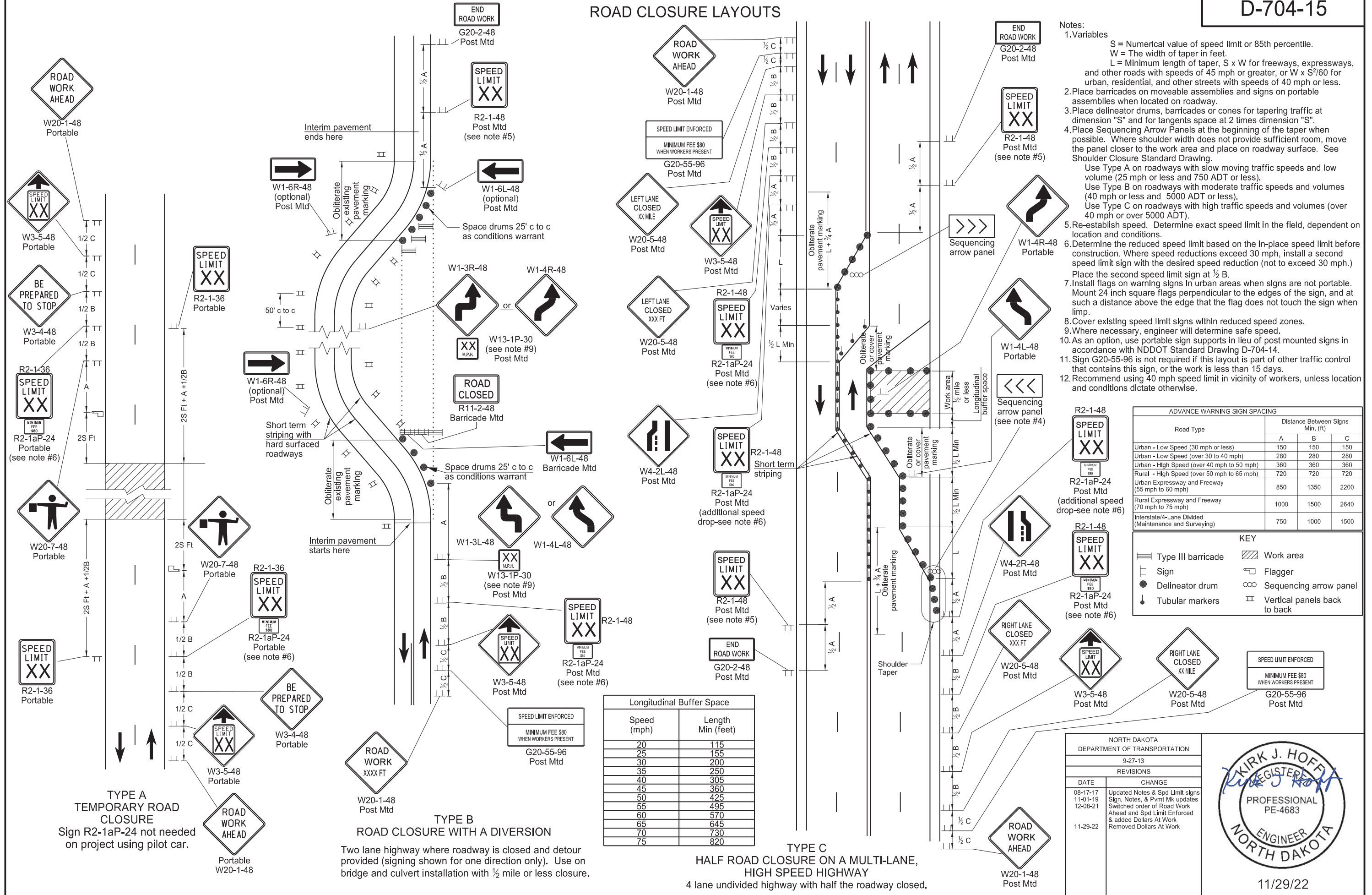
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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



08/01/24

ROAD CLOSURE LAYOUTS



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmt 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

KIRK J. HOFF

REGISTERED

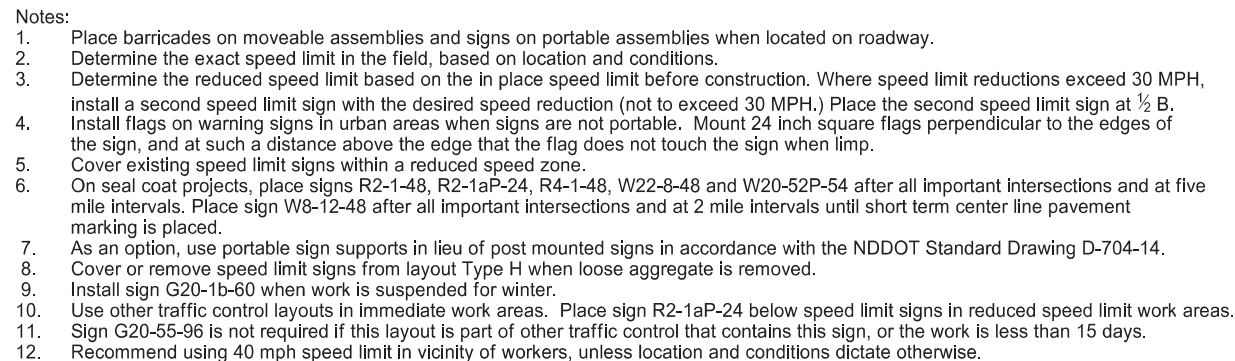
PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

11/29/22

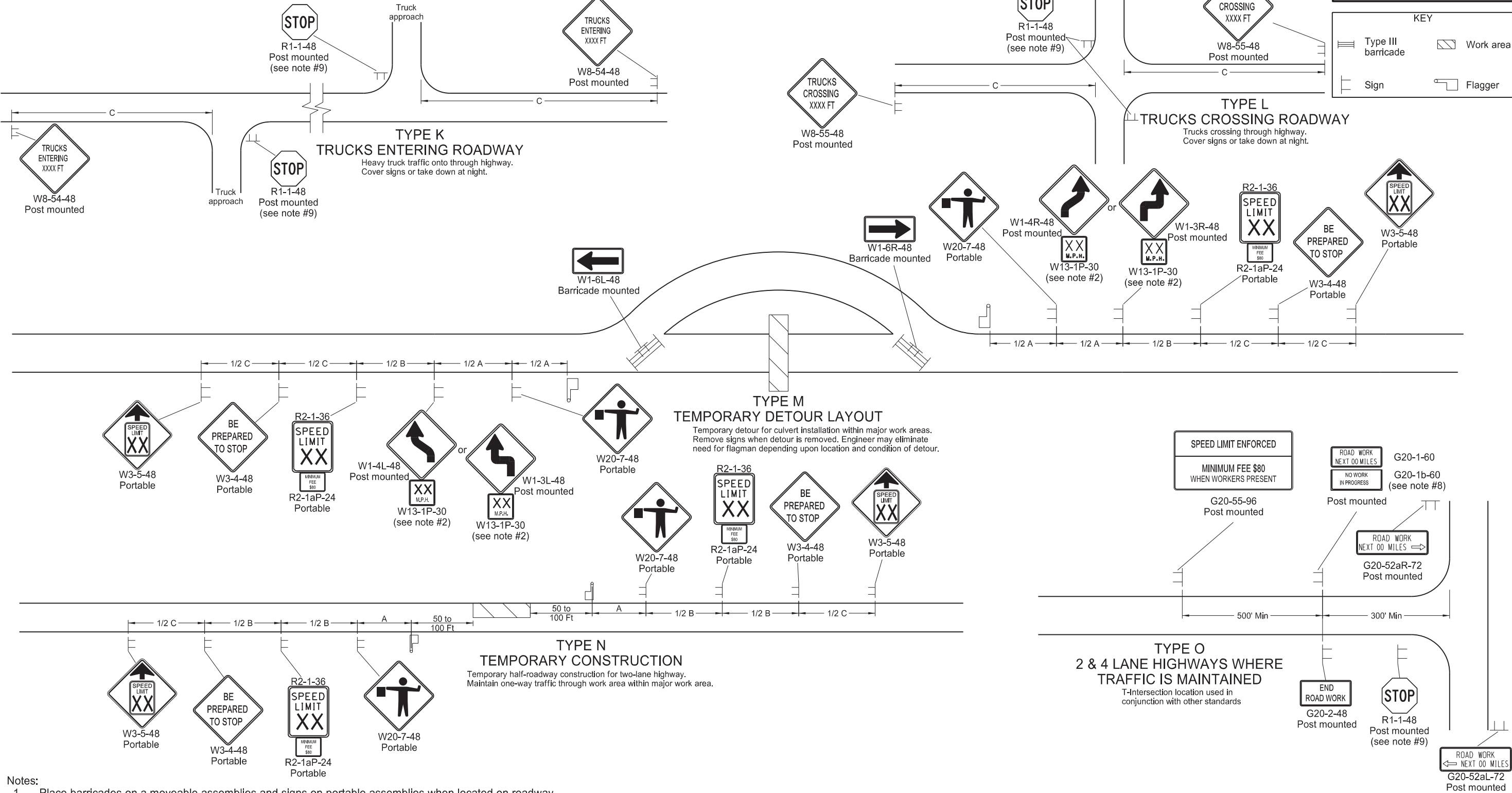


ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign number
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

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes:

- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- 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 1/2 B.
- 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.
- Cover existing speed limit signs within a reduced speed zone.
- Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Install sign G20-1b-60 when work is suspended for winter.
- If existing stop sign is in place, a 48" stop sign is not required.
- 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.
- 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 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

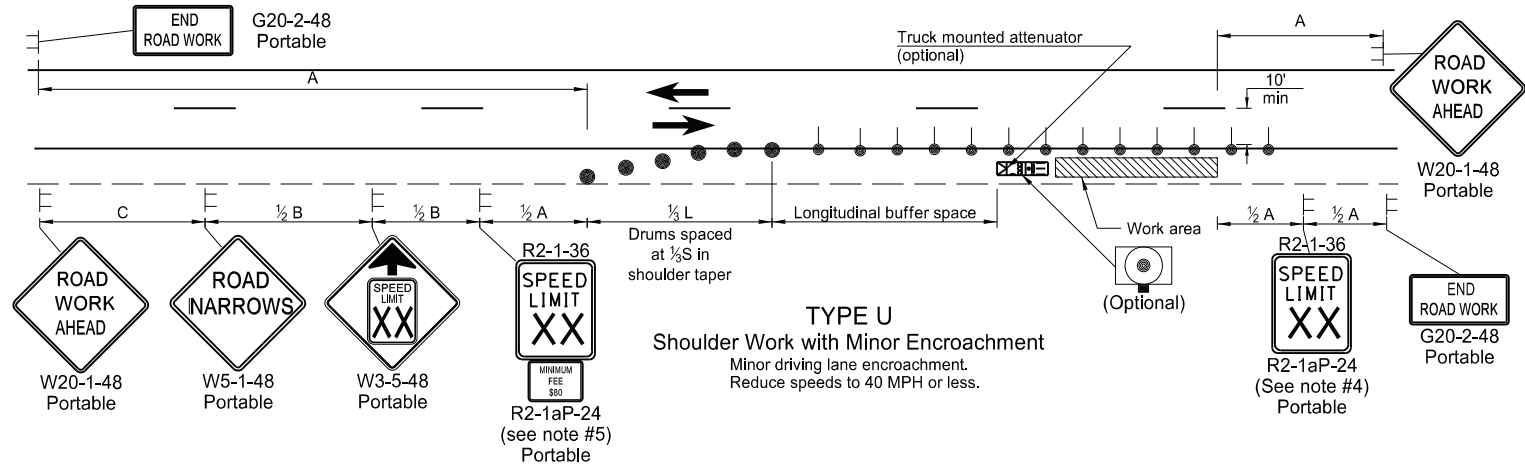
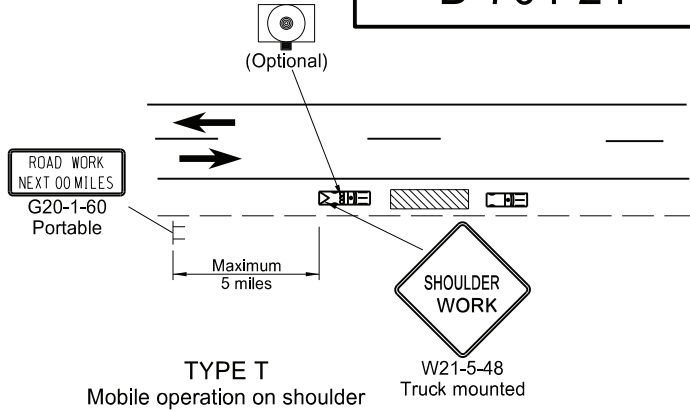
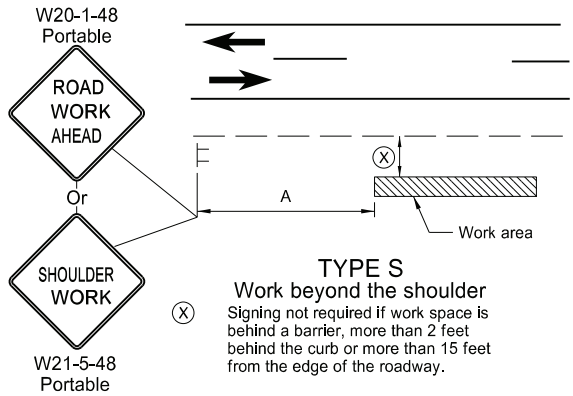
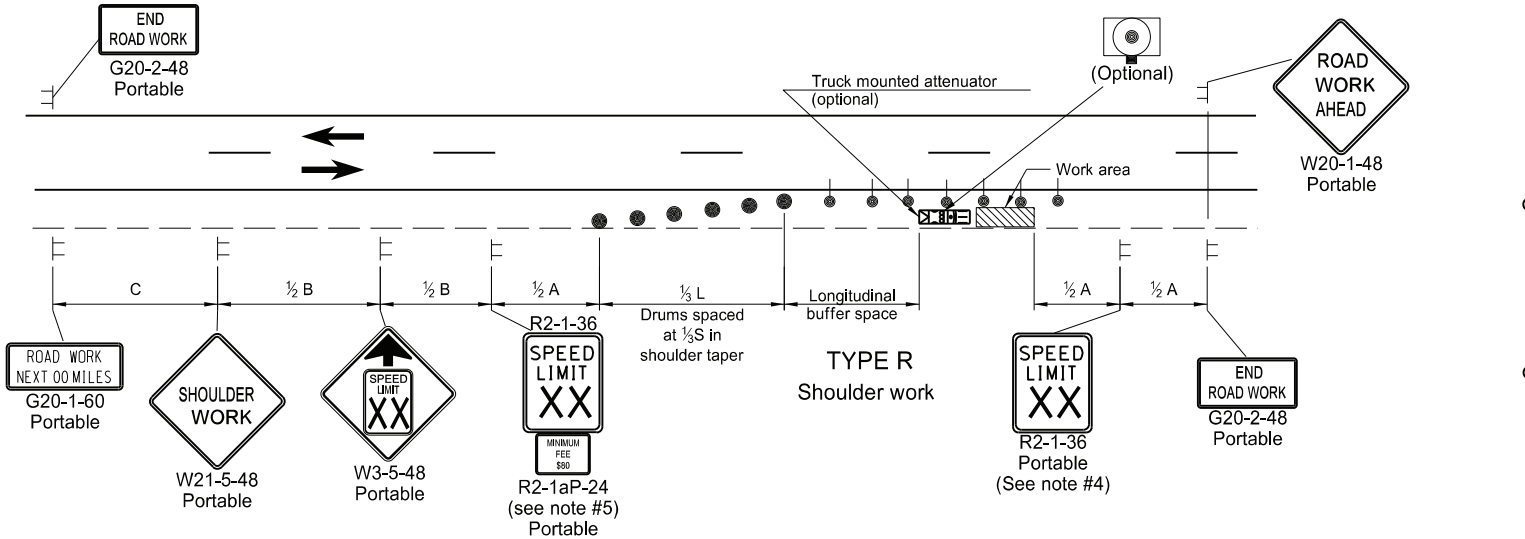
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work



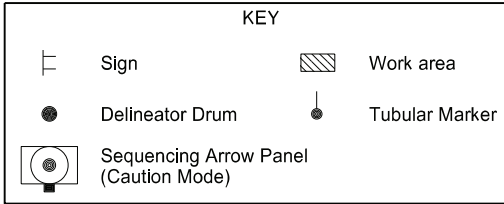
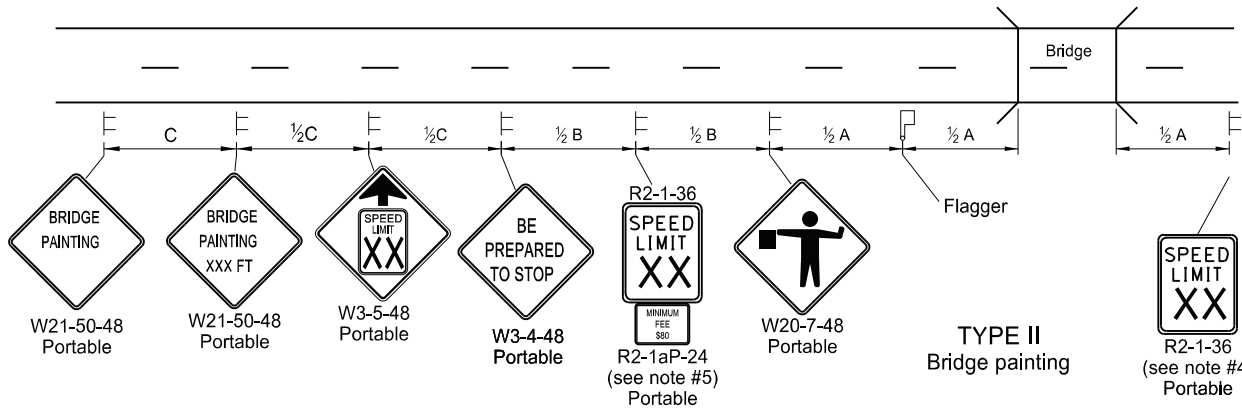
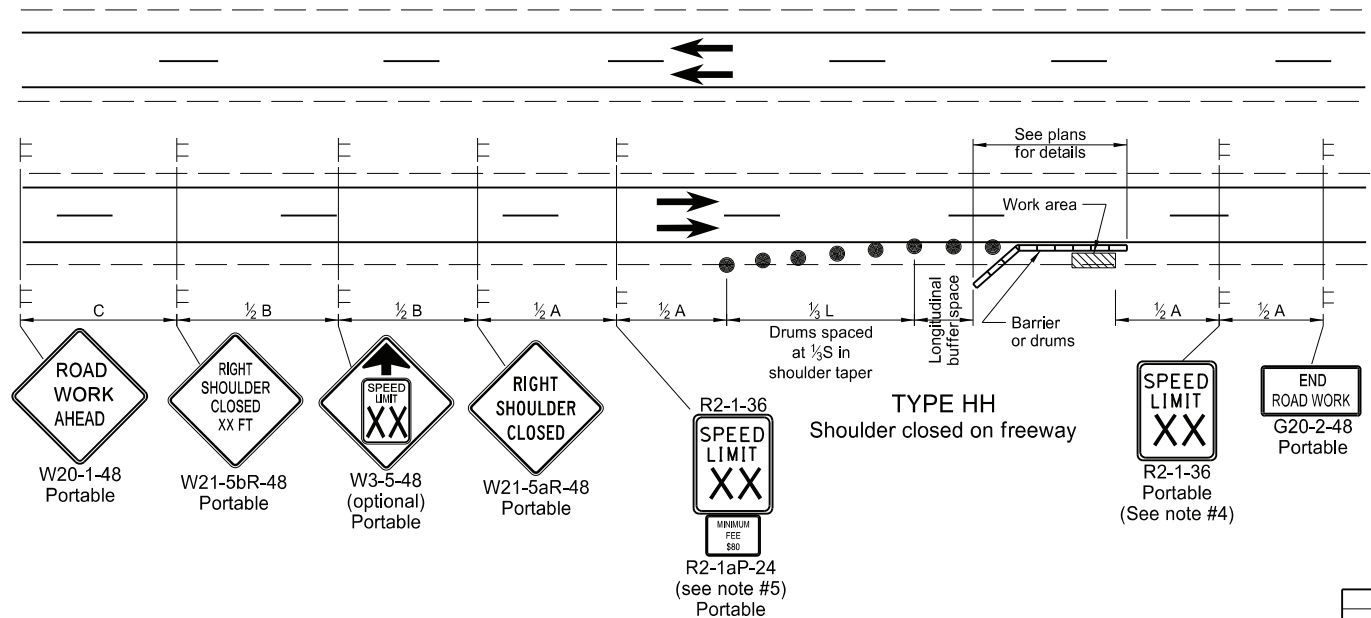
11/29/22

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



- Notes
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of the taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
 - Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
 - Sequencing Arrow Panels
 - 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).
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - 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 1/2 B.
 - 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.
 - Cover existing speed limit signs within a reduced speed zone.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Recommend 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 75 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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos.
8-01-24	Electronic Stamp/Signature



08/01/24

LANE CLOSURES ON URBAN STREETS LAYOUTS

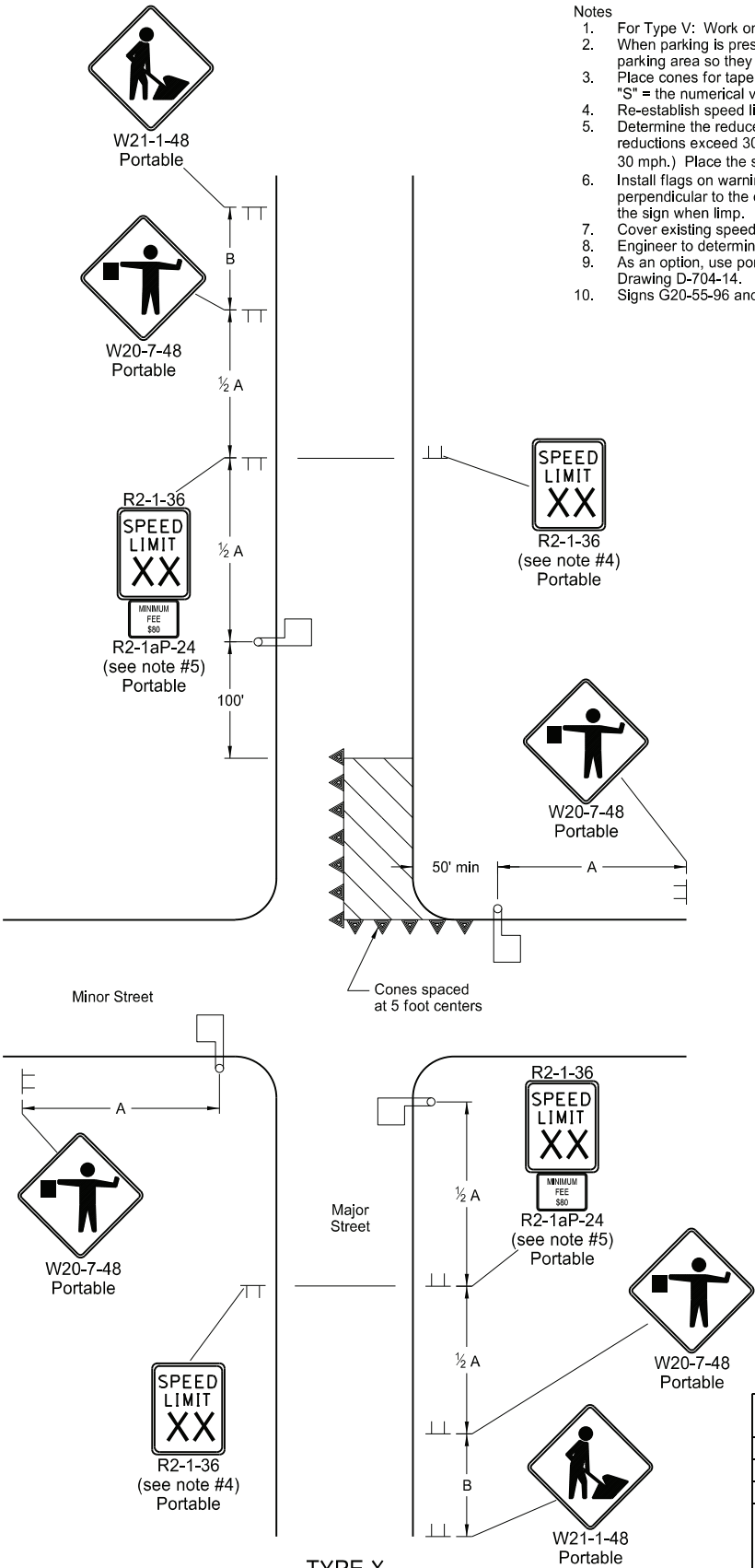
D-704-25

- Notes
- For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
 - When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
 - Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S". "S" = the numerical value of speed limit.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - 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.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches 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.
 - Cover existing speed limit signs within reduced speed zones.
 - Engineer to determine safe speed, when necessary.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

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

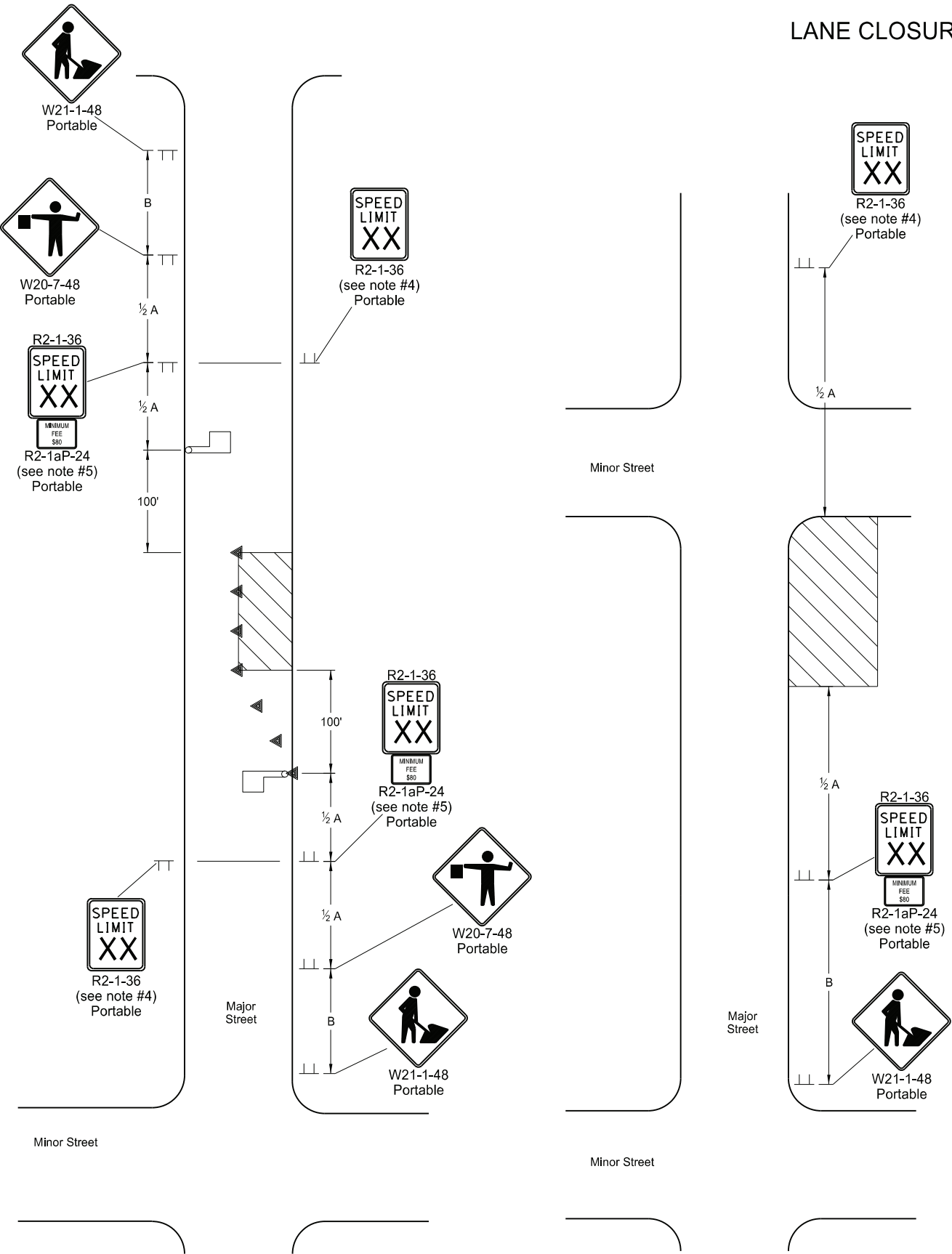
KEY	
	Sign
	Cones
	Work area
	Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & removed signs
11-01-19	Revised note & added Min Fee sign
8-01-24	Electronic Stamp/Signature



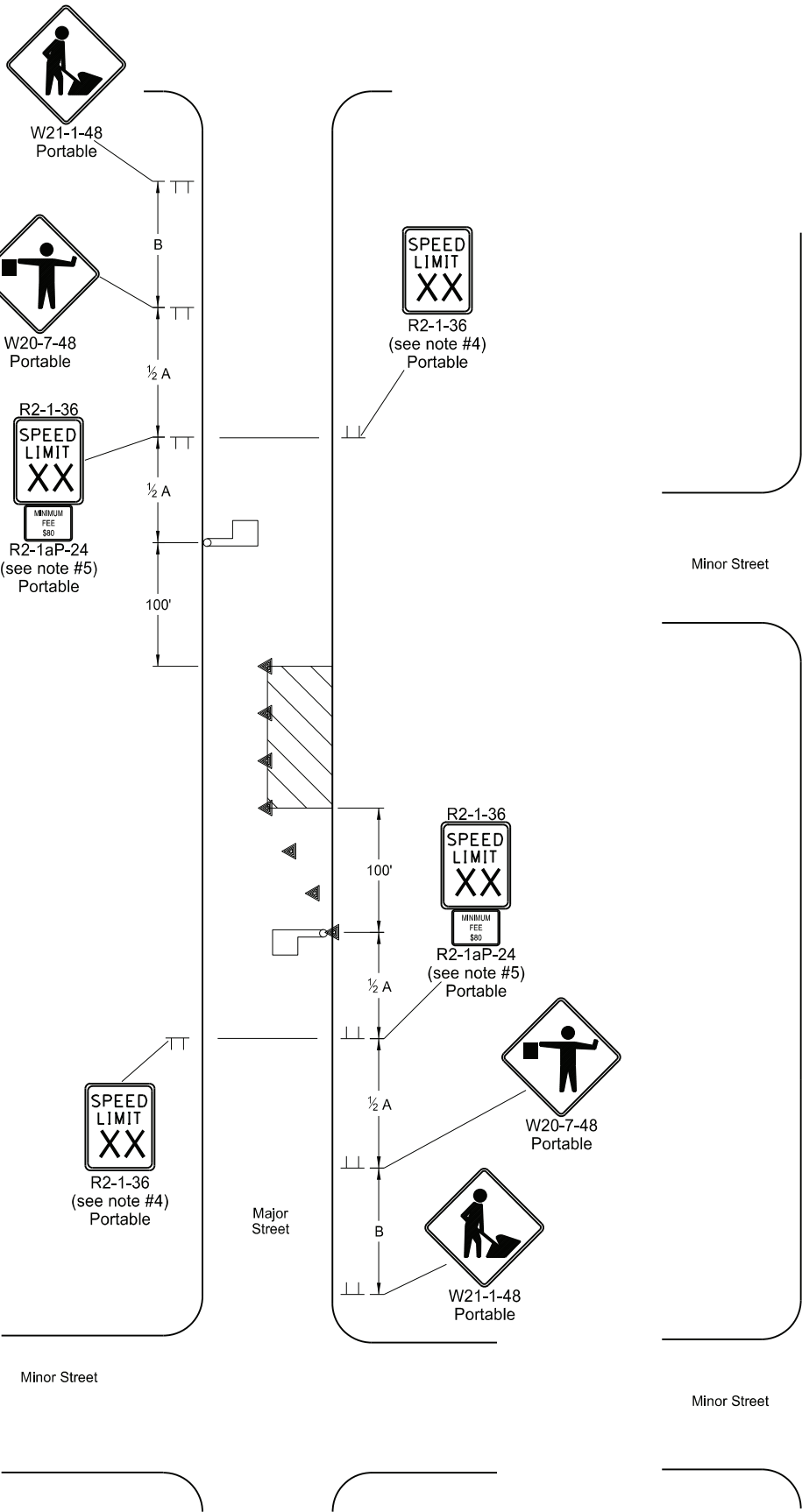
TYPE X
LANE CLOSURE NEAR INTERSECTION ON URBAN STREET

Portion of roadway closed to traffic only during daylight hours (end block location).



TYPE W
WORK BEYOND CURB ON URBAN STREET

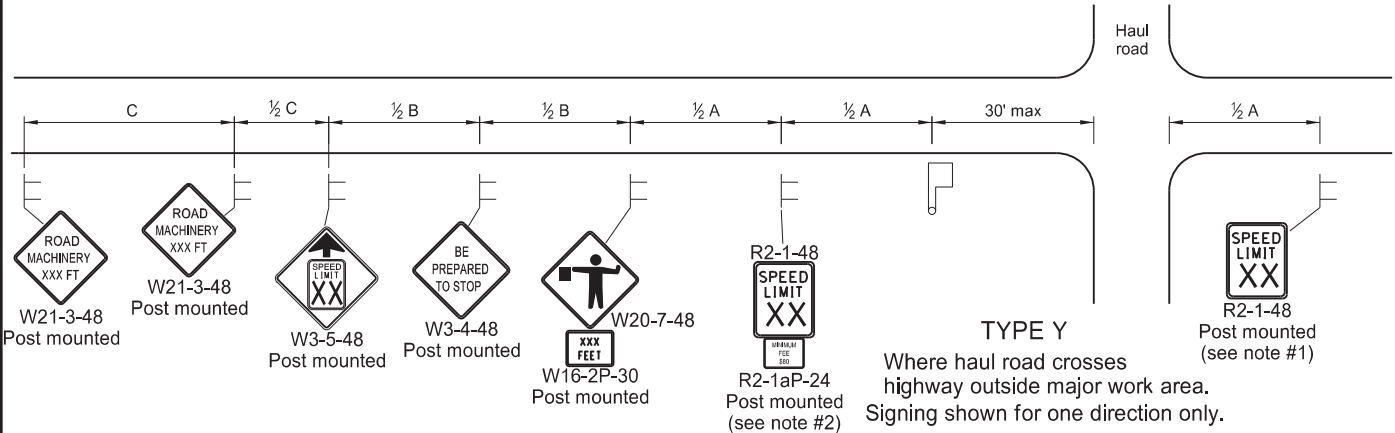
Work area outside driving lane and no closure necessary.



TYPE V
LANE CLOSURE ON URBAN STREET

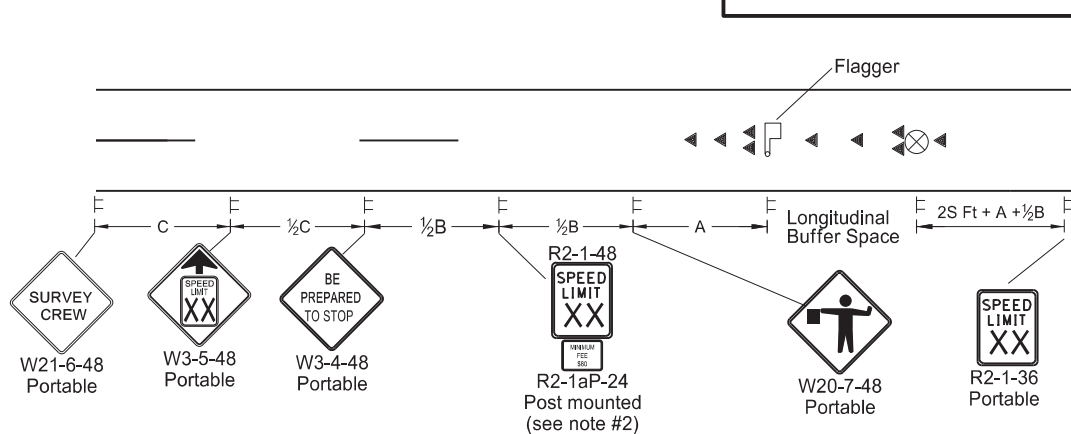
Portion of roadway closed to traffic only during daylight hours (mid block location).

MISCELLANEOUS SIGN LAYOUTS

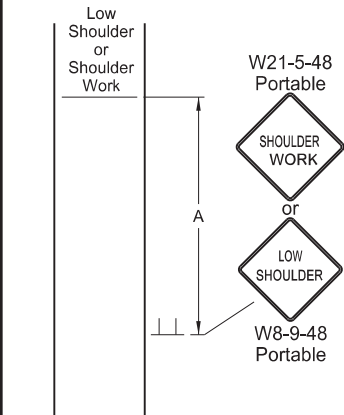


TYPE Y
Where haul road crosses
highway outside major work area.
Signing shown for one direction only.

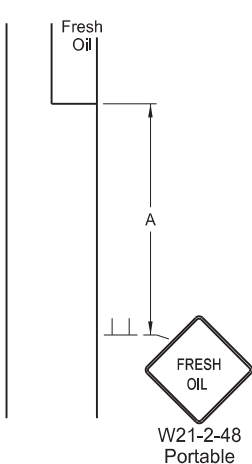
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



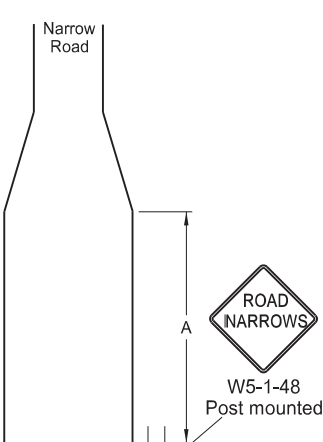
TYPE AA
Where survey crew is used
Signing shown for one direction only.



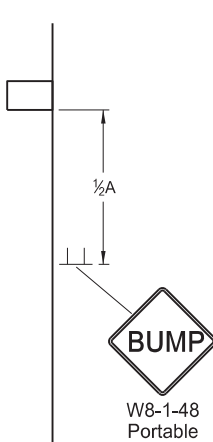
TYPE BB
Within major work area
where sign conditions exist



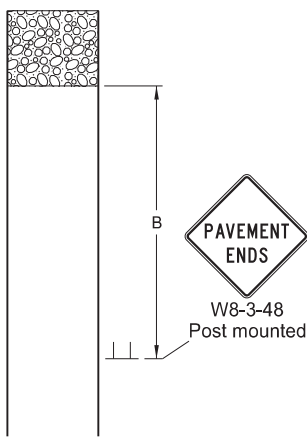
TYPE CC
Where sign conditions exist



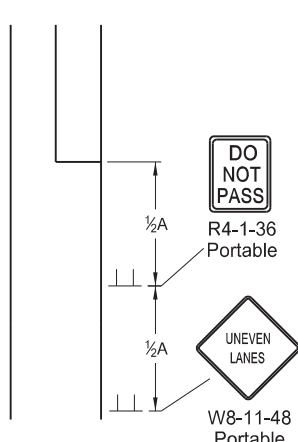
TYPE DD
Where sign conditions exist



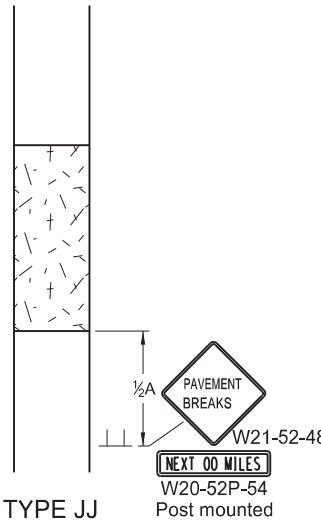
TYPE EE
Where sign conditions exist



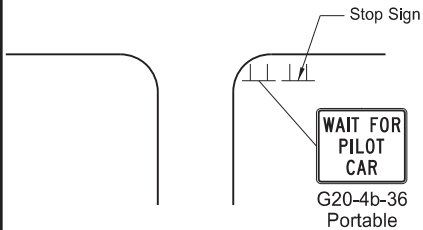
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



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.



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 1/2 B.
 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 75 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

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

KEY

Flagger Sign

Cones Survey Equipment

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

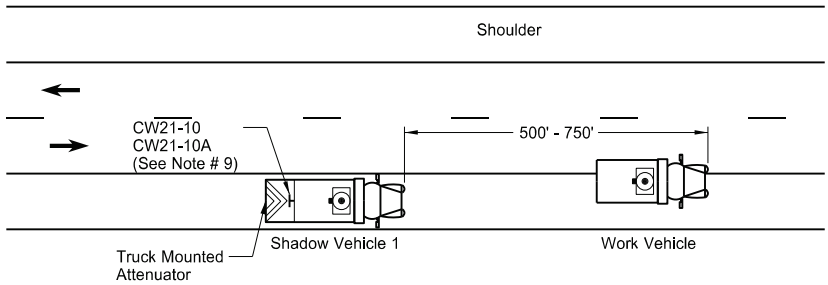
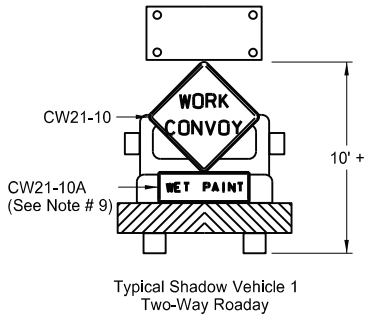
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.



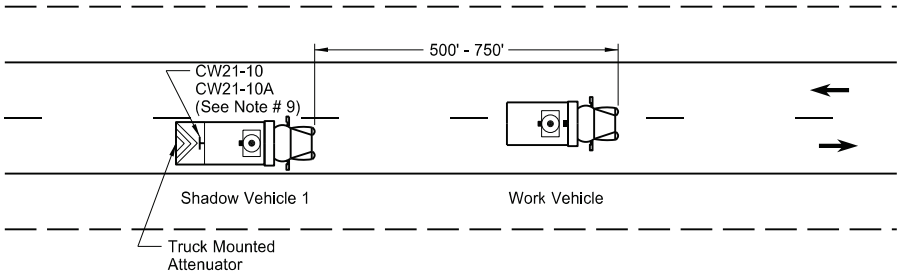
02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

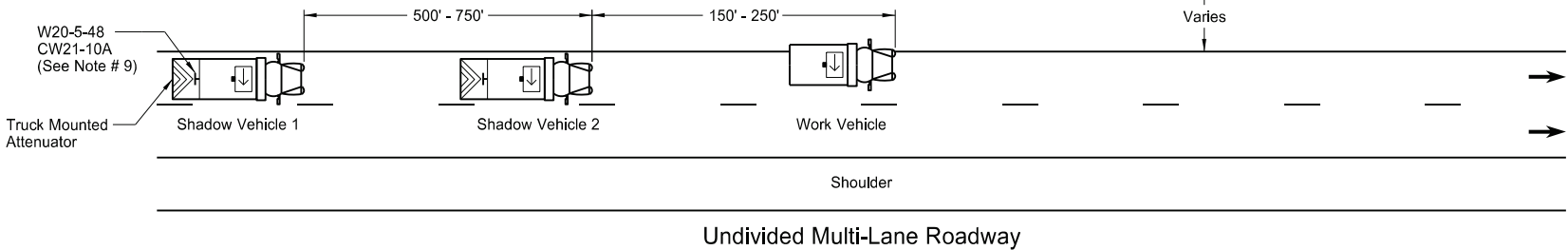
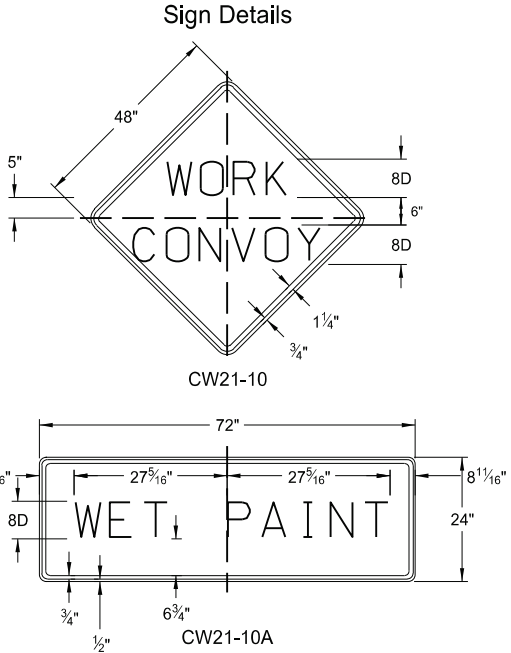
D-704-27



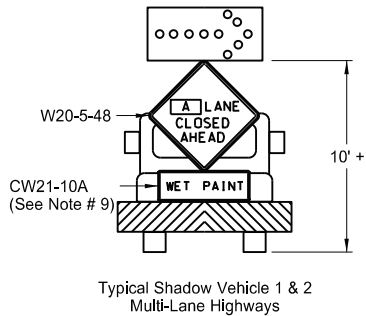
Two-Way Roadway with Paved Shoulders



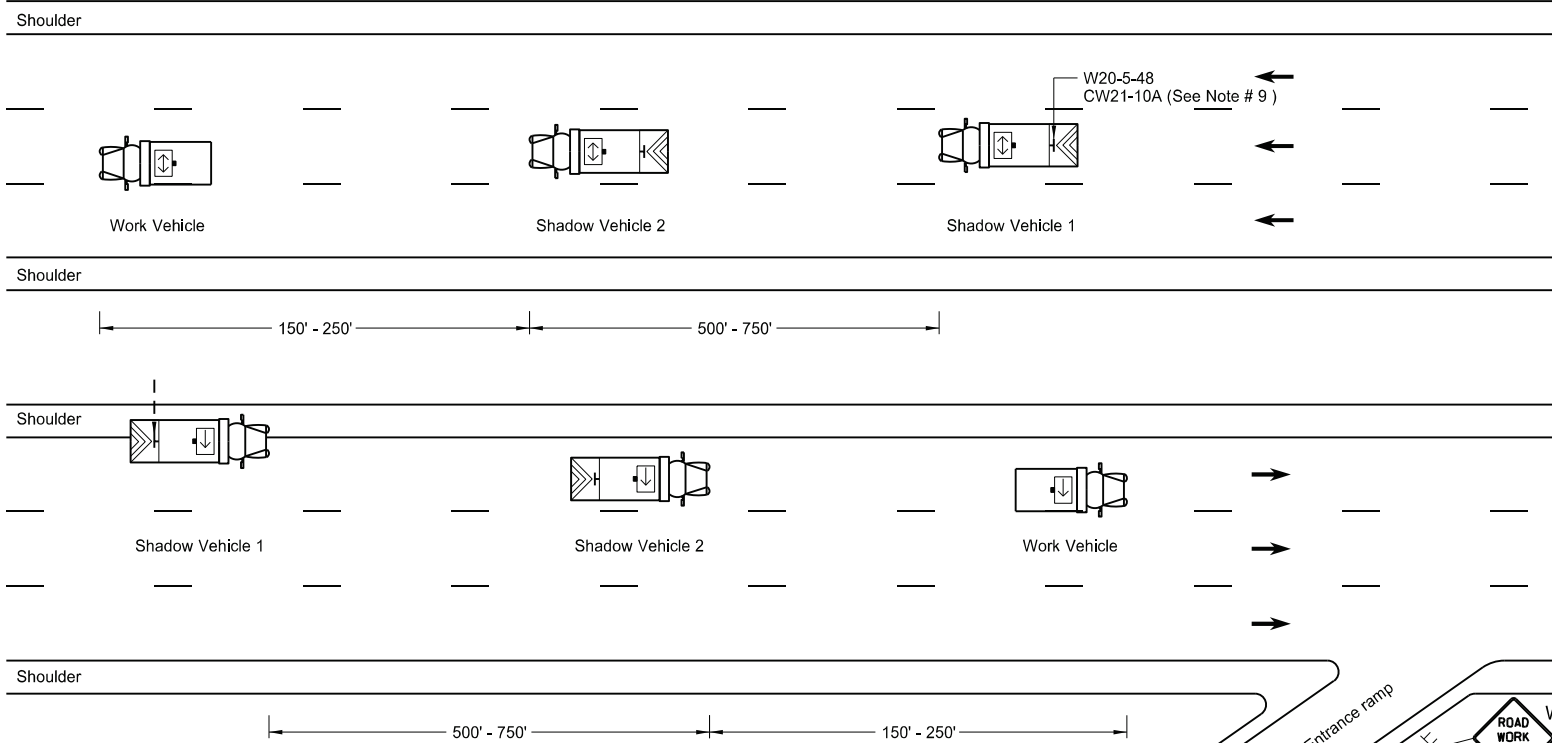
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

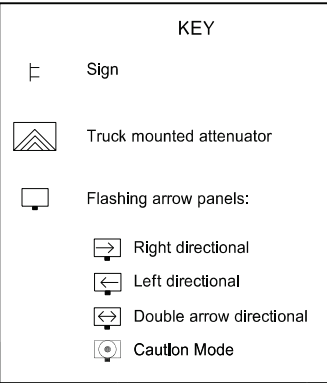


A = ☐ Left ☐ Right ☐ Center



Divided Multi-Lane Highway

- 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 strobe 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.



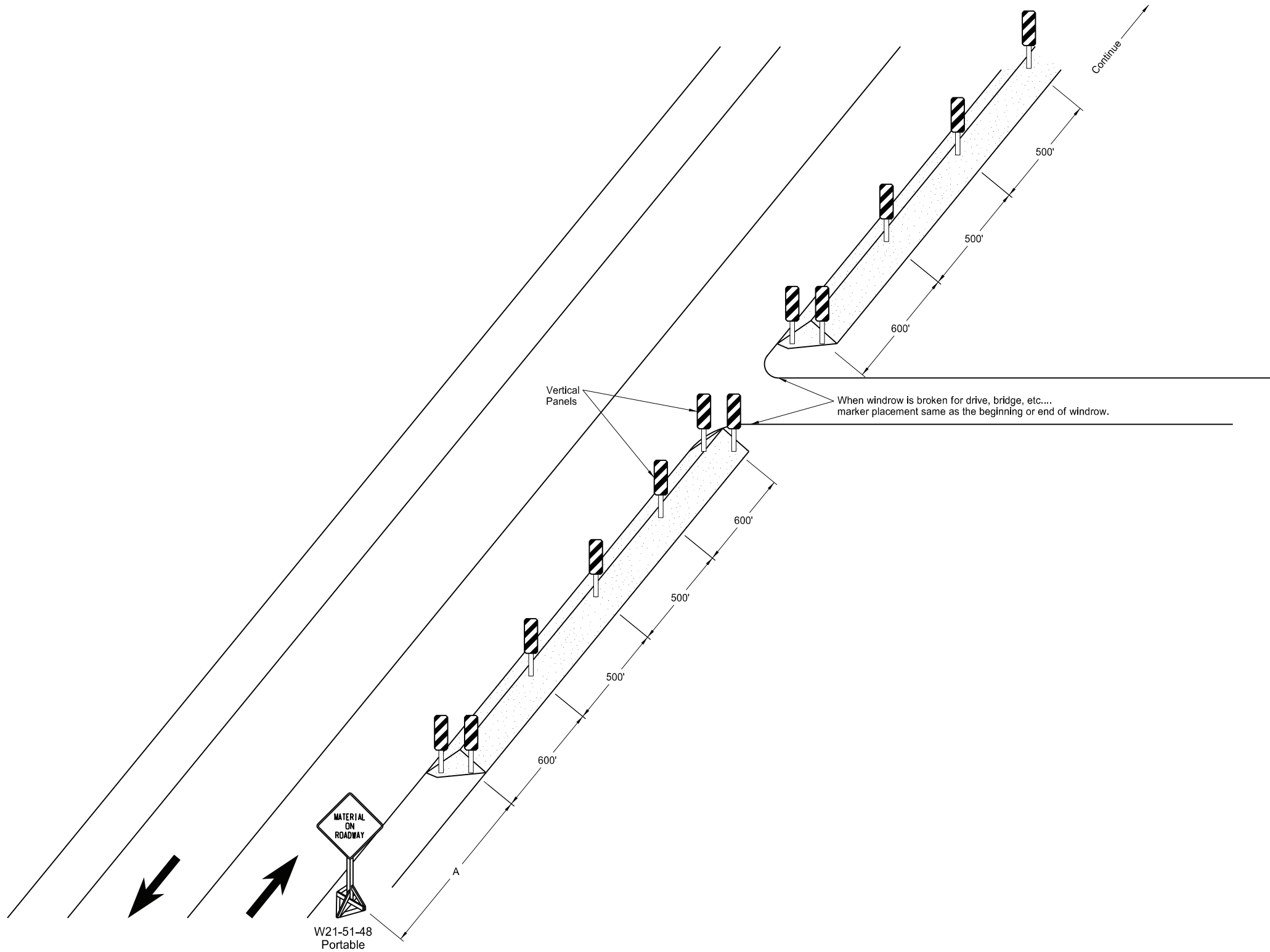
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
6-02-24	Electronic Stamp/Signature.



08/02/24

WINDROW MARKING

D-704-30



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 (55 mph to 60 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-24-14	Revised Note
8-17-17	Updated notes & sign support
11-01-19	Revised note
8-02-24	Electronic Stamp/Signature



08/02/24

Notes:
As an option, use portable sign supports in lieu of post mounted sign in accordance with NDDOT Standard Drawing D-704-14.

Work area

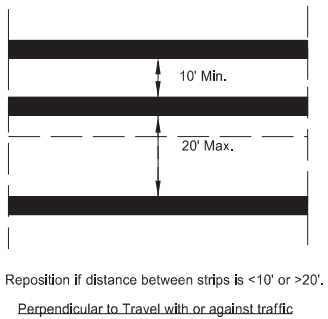
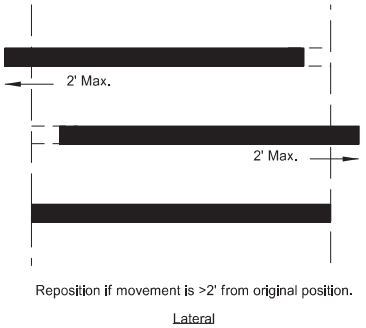
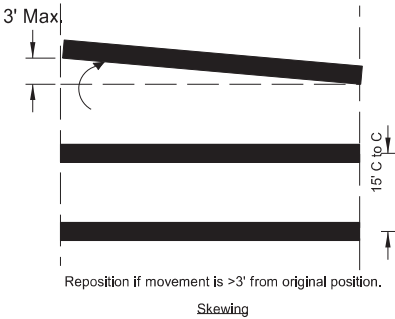
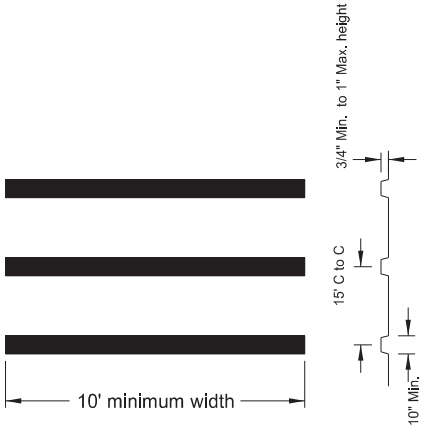
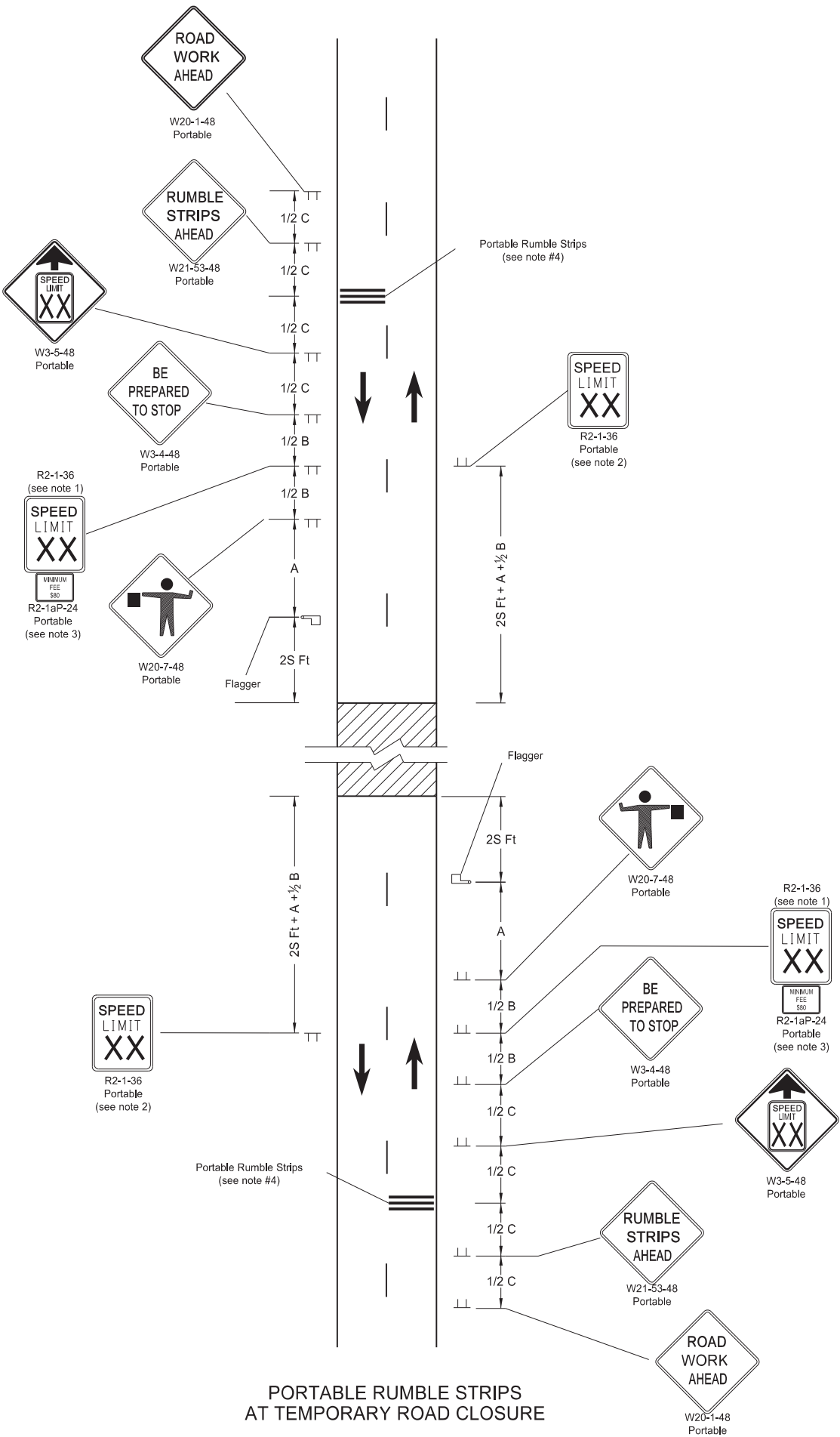
Flagger

Sign

KEY

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

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 ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

- Notes:
- Determine speed in the field based on location and conditions.
 - Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 - Sign R2-1aP-24 is not required when pilot car operation is used.
 - Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.

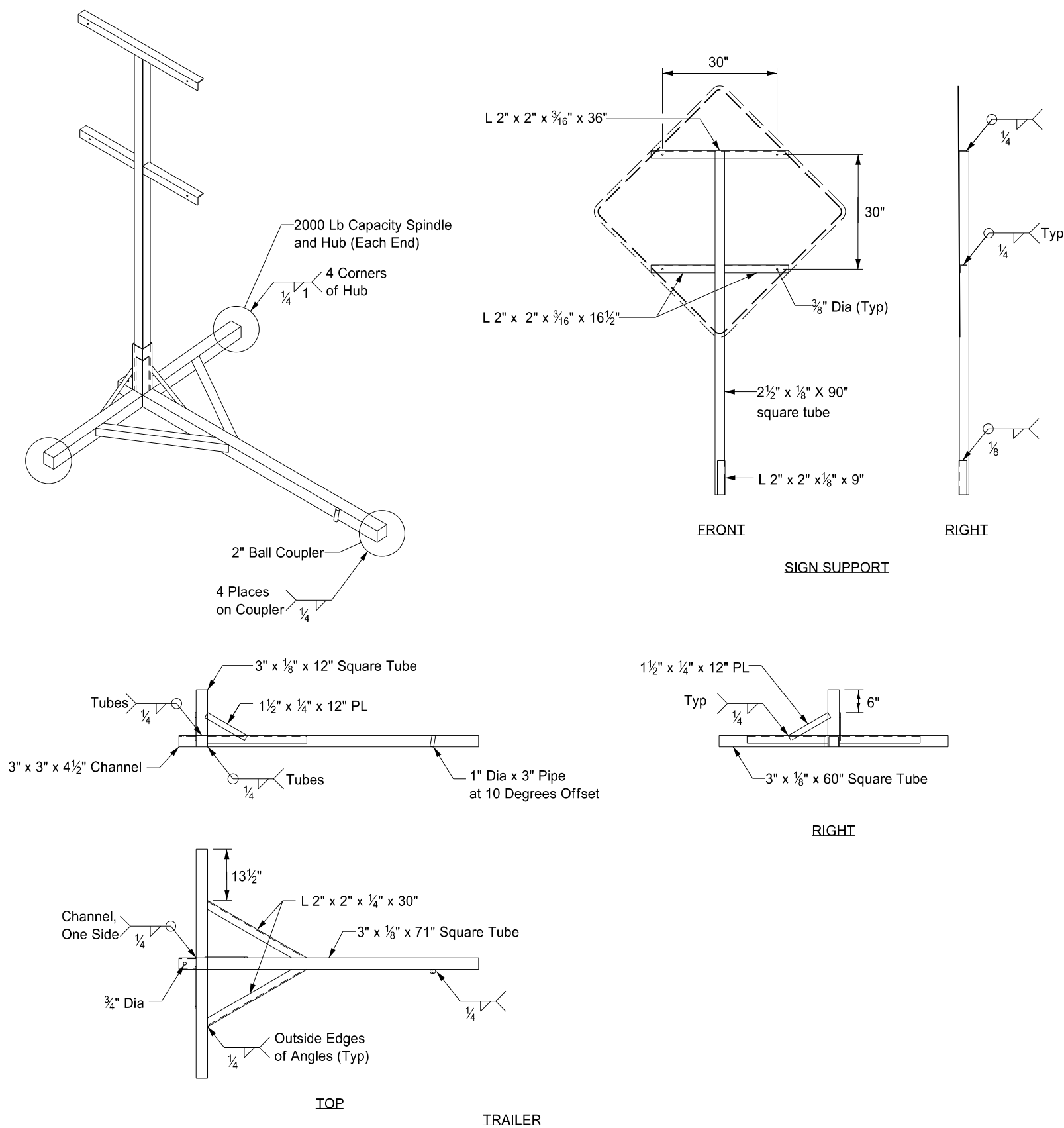
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03/07/23	Use changed to min 45 mph.



03/07/23

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



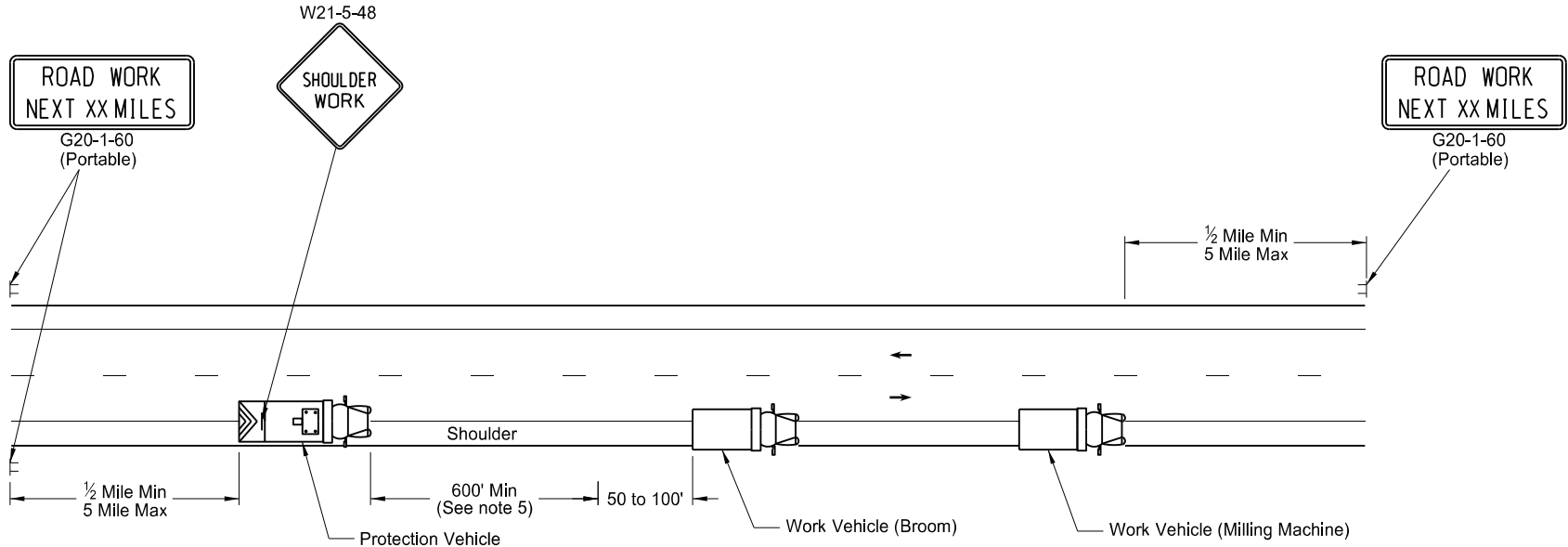
- Notes:
- 1. Maximum 250 pound weight of assembly.
 - 2. Use a 14" wheel and tire.
 - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

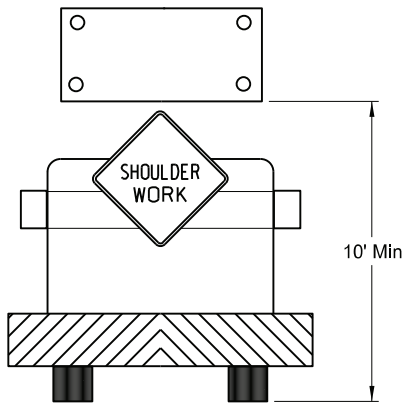


MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56

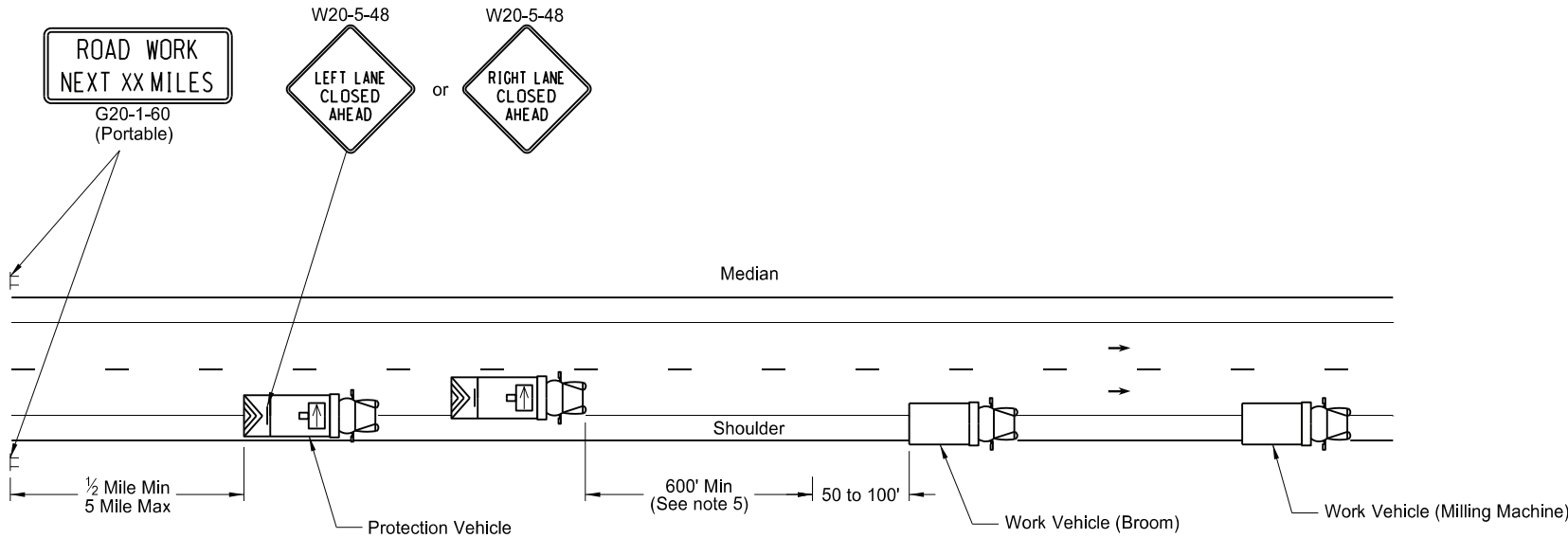


TWO LANE - TWO WAY ROADWAY

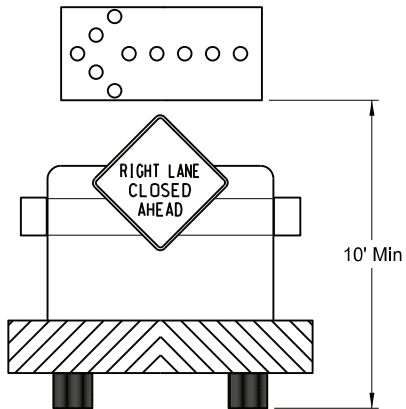


TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode



INTERSTATE & 4 LANE DIVIDED HIGHWAY

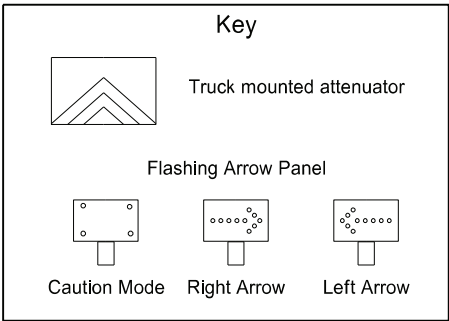


INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow 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.

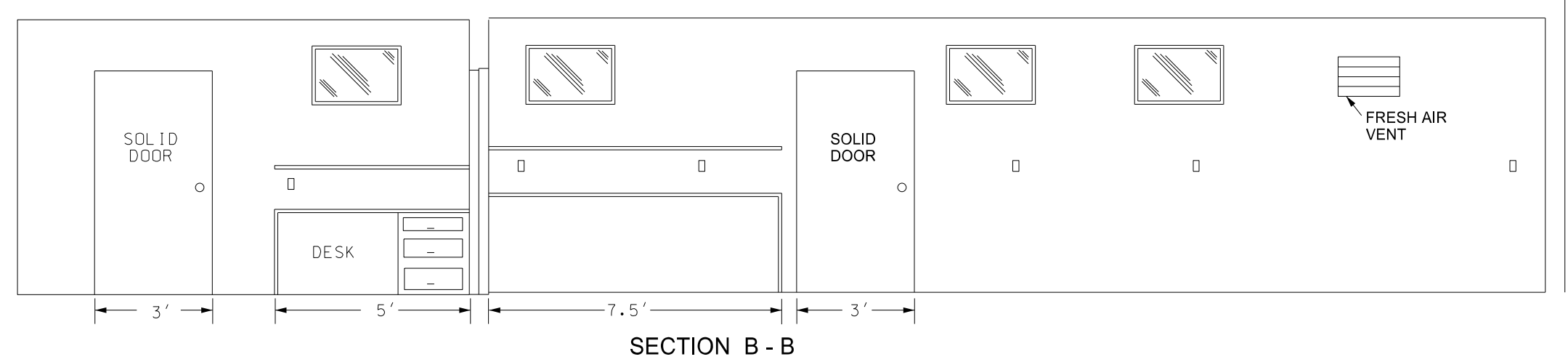
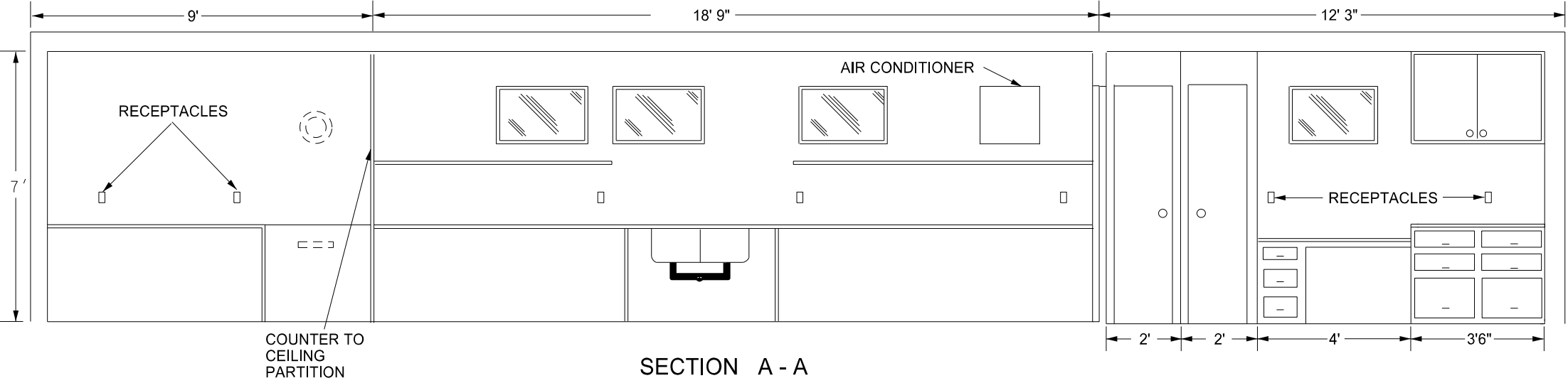
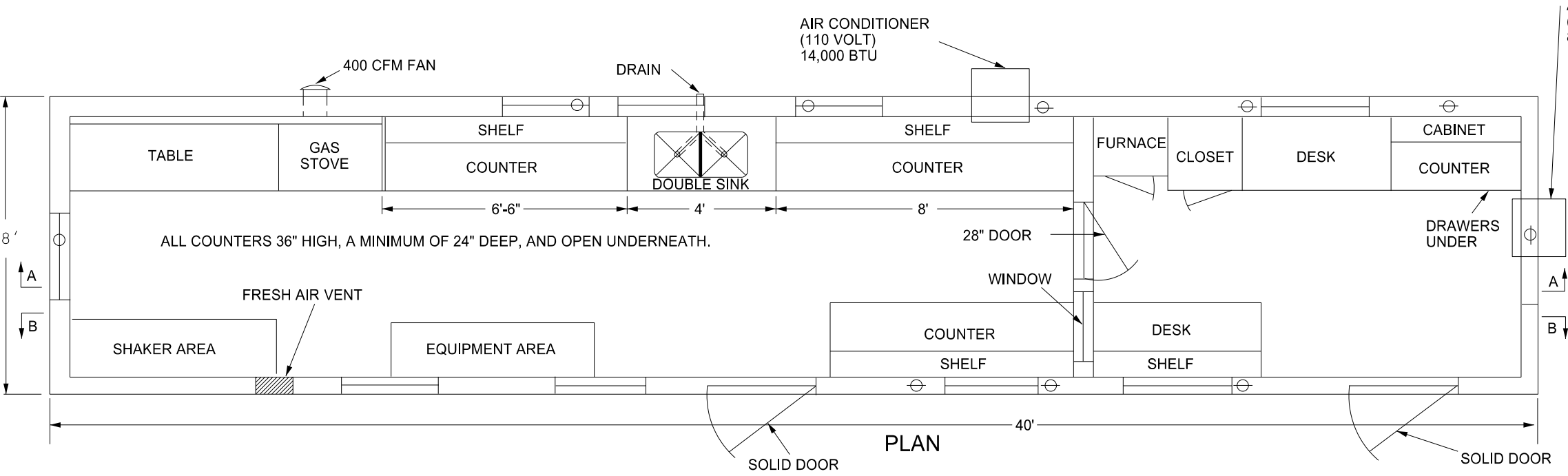


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp
8-02-24	Electronic Stamp/Signature



BITUMINOUS LABORATORY

D-706-1



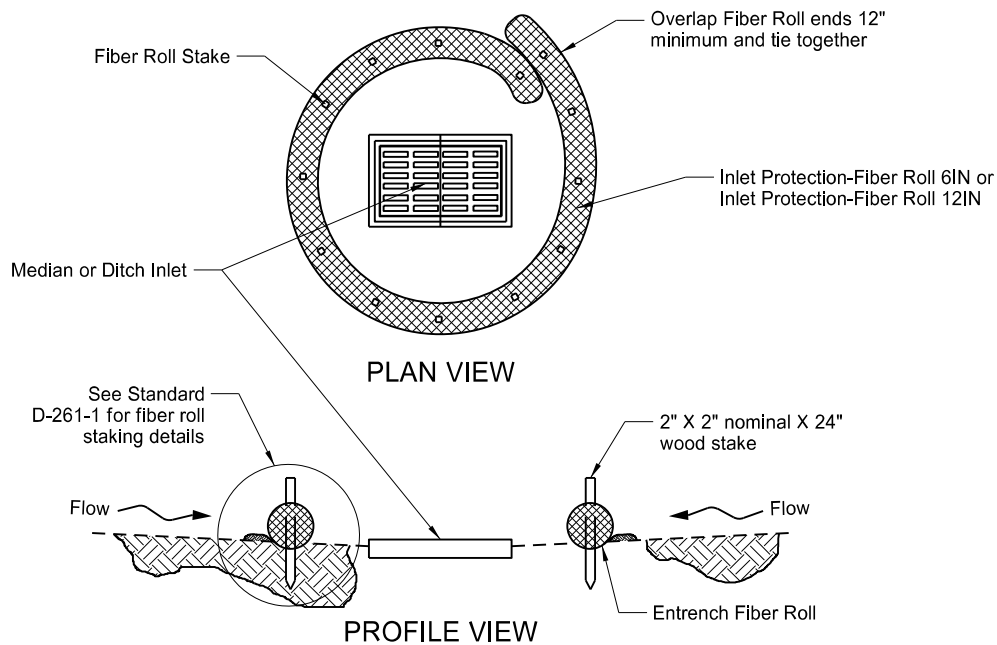
Provide a laboratory with the following:

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.

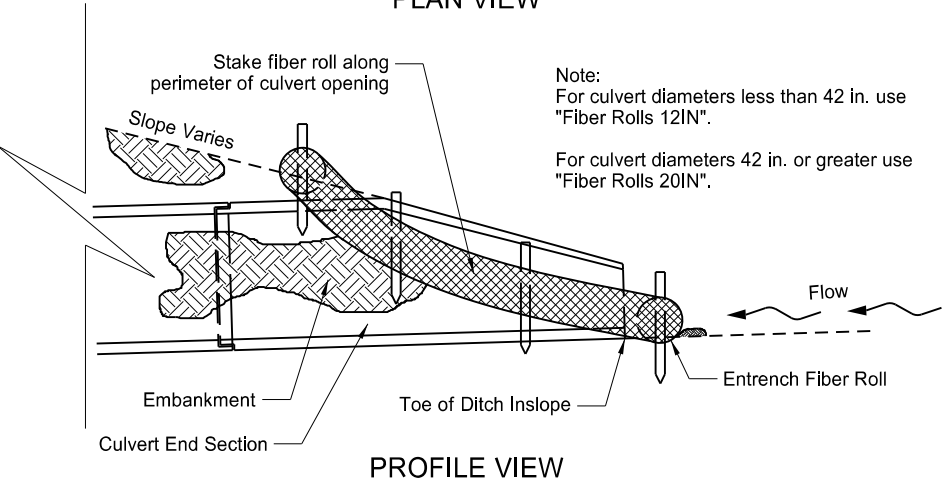
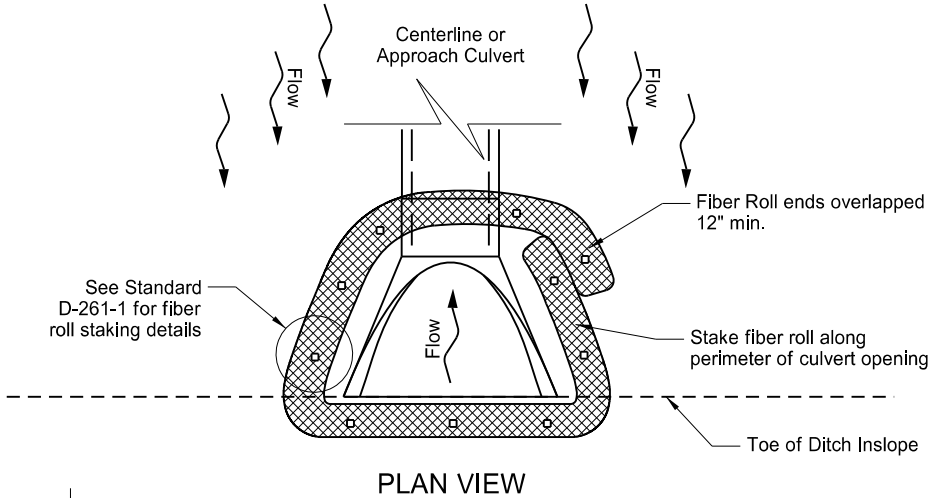
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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

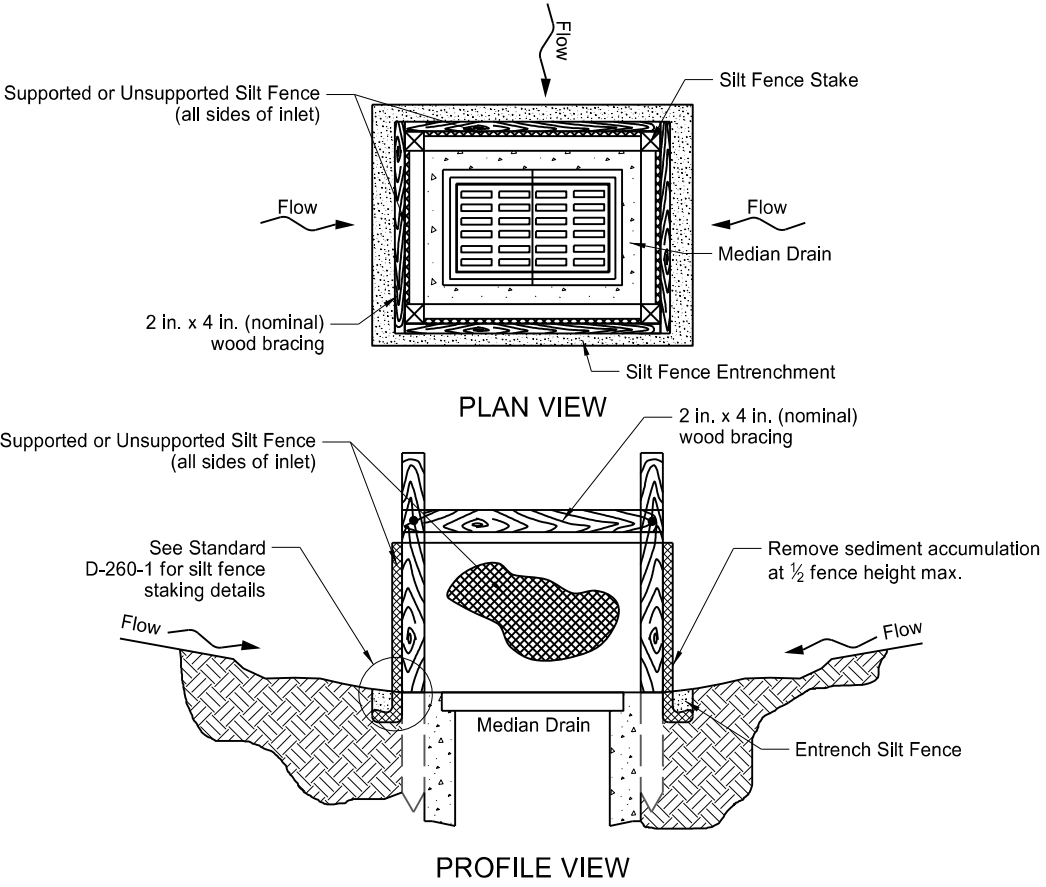
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



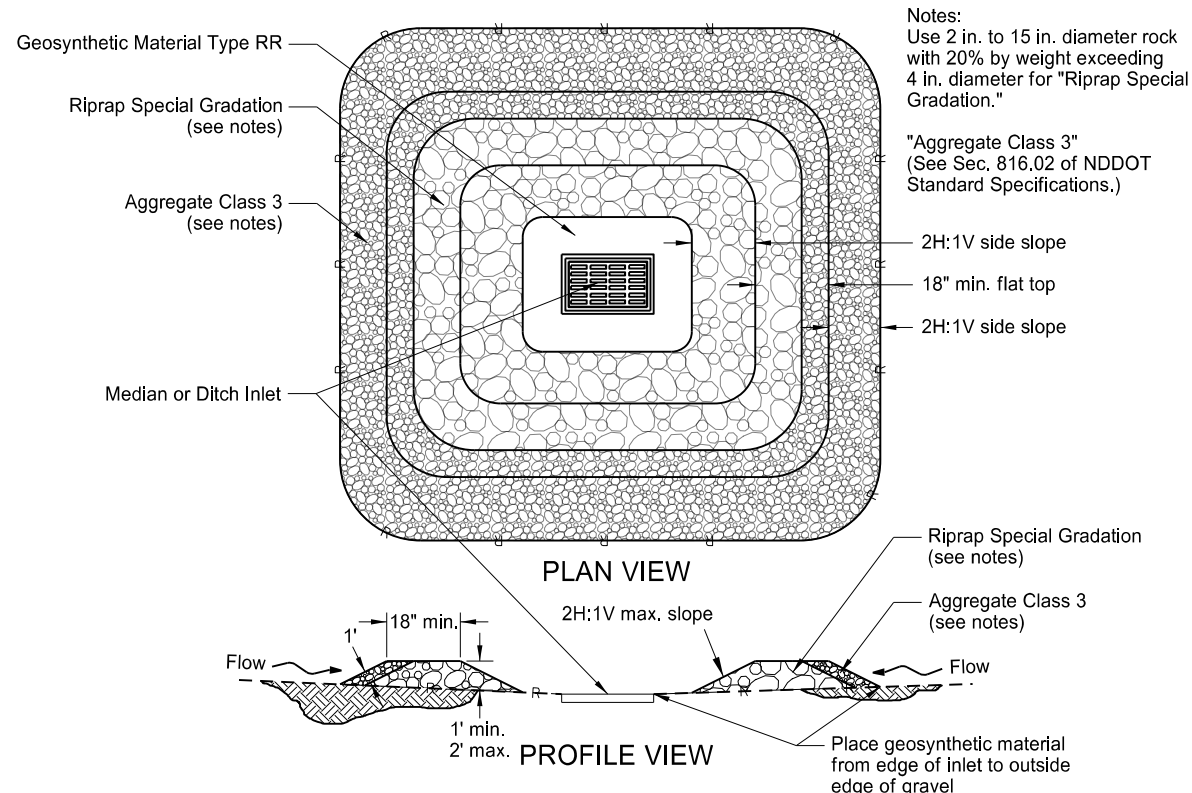
FIBER ROLL PROTECTION
(MEDIAN OR DITCH INLET)



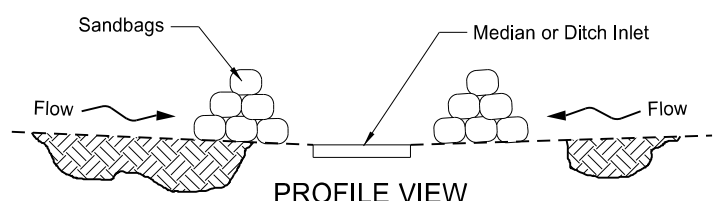
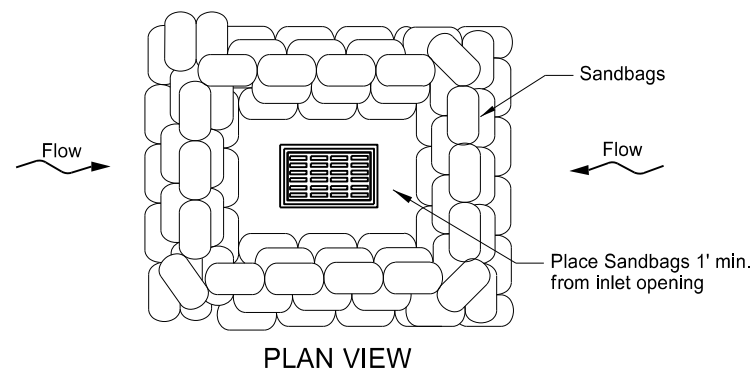
FIBER ROLL PROTECTION
(INLET OF CULVERT)



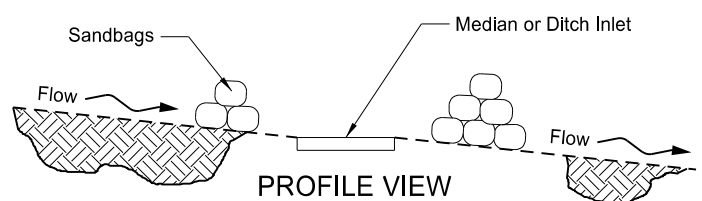
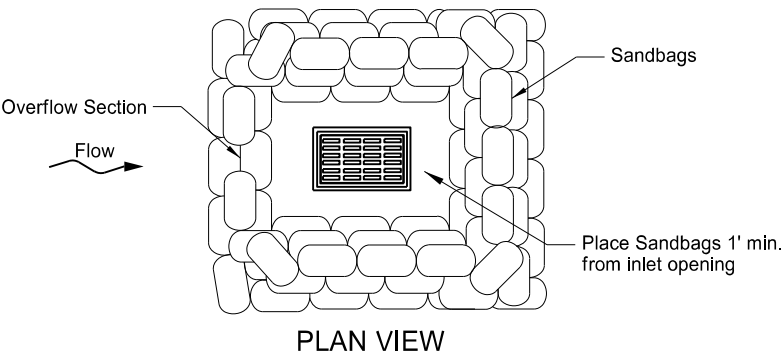
SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION
(MEDIAN OR DITCH INLET)



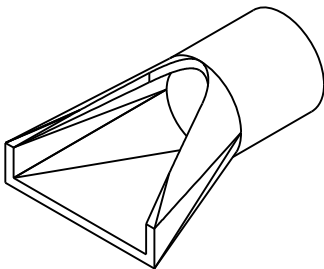
SANDBAG PROTECTION
(LOW POINT)



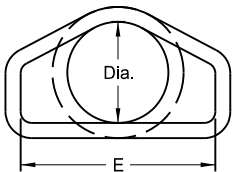
SANDBAG PROTECTION
(ON SLOPE)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8-27-19 and the original document is stored at the North Dakota Department of Transportation
10-03-13		
REVISIONS		
DATE	CHANGE	
06-26-14	Updated reference to standard drawing number for fiber roll staking details.	
10-01-14	Updated reference to standard drawing number for silt fence.	
10-17-17	Updated to active voice.	
08-27-19	New Design Engineer PE Stamp.	

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0 ⁷ / ₈ "	6'-0 ⁷ / ₈ "	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2 ¹ / ₂ "
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2 ³ / ₄ "
24	0'-9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"
27	0'-10 ¹ / ₂ "	4'-0"	2'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	4'-6"	3 ¹ / ₂ "
30	1'-0"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9 ¹ / ₂ "	8'-2 ¹ / ₄ "	7'-6"	5 ¹ / ₂ "
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5 ¹ / ₂ "
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "
84	3'-0"	7'-6 ¹ / ₂ "	1'-9"	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "
90	3'-5"	7'-3 ¹ / ₂ "	2'-0"	9'-3 ¹ / ₄ "	11'-0"	6 ¹ / ₂ "

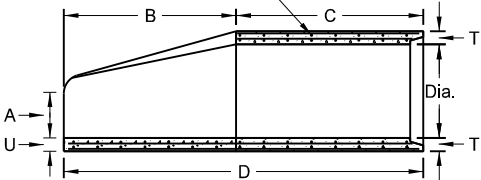


PERSPECTIVE

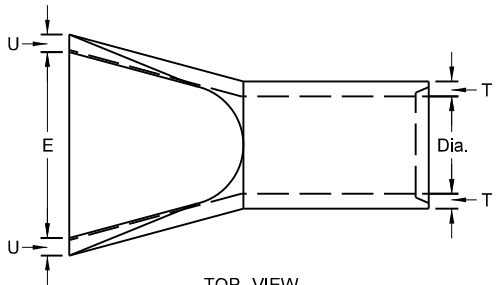


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

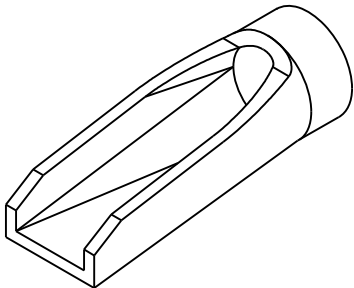
NOTES:

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.

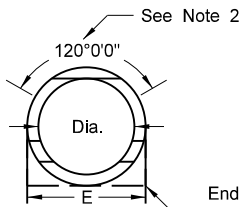
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

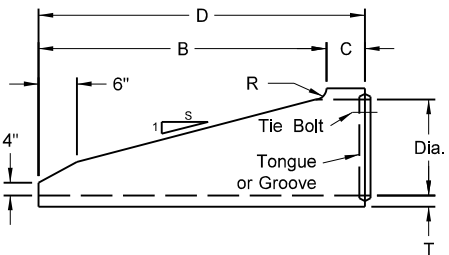
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



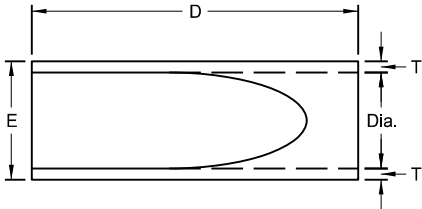
PERSPECTIVE



END VIEW



SIDE VIEW



TOP VIEW

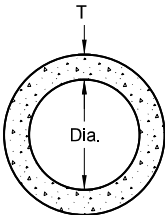
NOTES (Traversable End Section):

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.

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

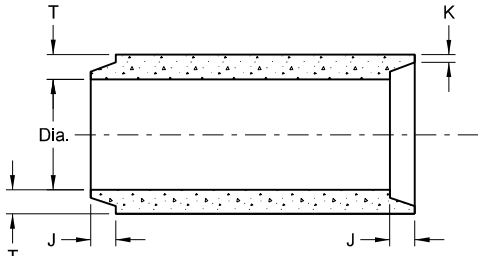
Reinforcement to be equivalent to Class III RCP

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 Min.	Minimum Wall Thickness (T)	
Dia	Sq. ft.	Lbs.	In.	In.	In.	
12	0.79	92	1 ⁵ / ₈ -2 ³ / ₈	3/4	2	
15	1.23	127	1 ³ / ₄ -2 ¹ / ₄	7/8	2 ¹ / ₄	
18	1.77	168	1 ¹ / ₂ -2 ¹ / ₂	1	2 ¹ / ₂	
21	2.40	214	1 ¹ / ₂ -3 ¹ / ₈	1 ¹ / ₈	2 ³ / ₄	
24	3.14	265	2 ³ / ₄ -3 ¹ / ₄	1 ¹ / ₈	3	
27	3.98	322	2 ³ / ₄ -4	1 ¹ / ₄	3 ¹ / ₄	
30	4.91	384	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₄	3 ¹ / ₂	
33	5.94	452	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	3 ³ / ₄	
36	7.07	524	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	4	
42	9.62	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	5	
54	15.90	1070	4 ¹ / ₂ -5 ¹ / ₄	2	5 ¹ / ₂	
60	19.63	1296	4 ¹ / ₂ -5 ¹ / ₂	2 ¹ / ₄	6	
66	23.76	1542	5-6	2 ³ / ₈	6 ¹ / ₂	
72	28.27	1810	5 ⁵ / ₈ -6 ³ / ₄	2 ³ / ₈	7	
78	33.18	2098	6 ¹ / ₄ -7 ¹ / ₄	2 ³ / ₈	7 ¹ / ₂	
84	38.48	2410	5 ⁵ / ₈ -7 ³ / ₄	3 ³ / ₈	8	
90	44.18	2793	6 ³ / ₄ -8 ¹ / ₂	3 ³ / ₈	8 ¹ / ₂	
96	50.27	3092	7-8 ¹ / ₄	3 ¹ / ₂	9	
102	56.75	3466	7-8 ¹ / ₄	3 ¹ / ₂	9 ¹ / ₂	
108	63.62	3864	7 ¹ / ₄ -8 ¹ / ₂	3 ³ / ₄	10	

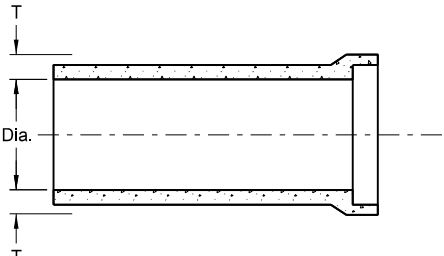


END VIEW

CIRCULAR PIPE

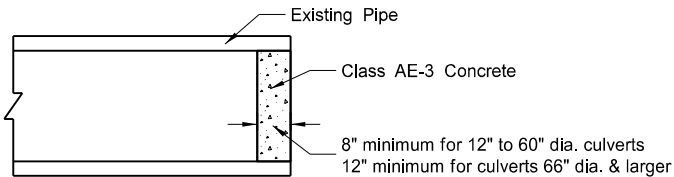


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

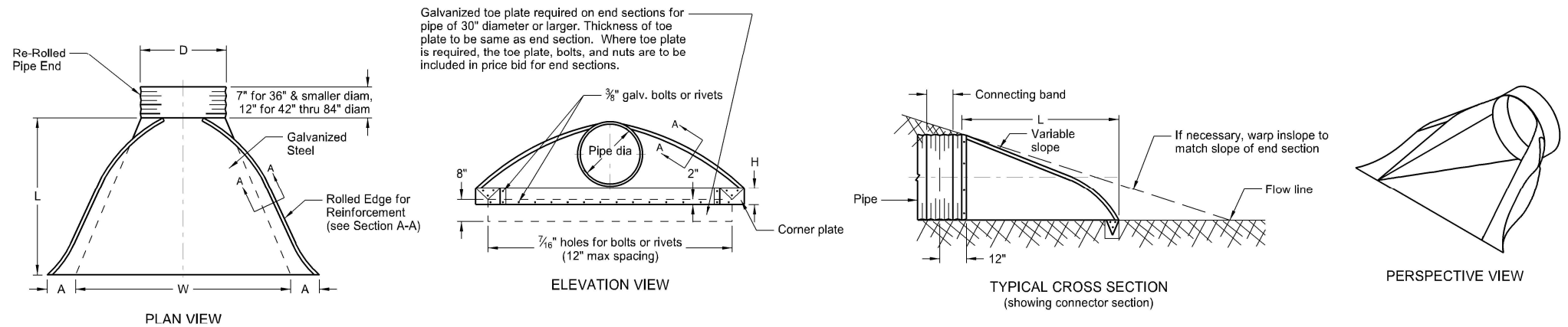
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

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



* * PIPE DIA. IN	GALVANIZED THICKNESS IN	END SECTION DIMENSIONS						APPROX. SLOPE RATE	BODY PIECE
		A	B	H	L	W	IN		
15	0.064 - 0.079	7	8	6	26	30	2 1/2:1		1
18	0.064 - 0.109	8	10	6	31	36	2 1/2:1		1
24	0.064 - 0.109	10	13	6	41	48	2 1/2:1		1
30	0.064 - 0.109	12	16	8	51	60	2 1/2:1		1 or 2
36	0.064 - 0.109	14	19	9	60	72	2 1/2:1		2
42	0.064 - 0.138	16	22	11	69	84	2 1/2:1		2
48	0.064 - 0.168	18	27	12	78	90	2 1/2:1		2
54	0.064 - 0.168	18	30	12	84	102	2:1		2
* 60	0.064 - 0.168	18	33	12	87	114	1 1/2:1		3
* 66	0.064 - 0.168	18	36	12	87	120	1 1/2:1		3
* 72	0.064 - 0.168	18	39	12	87	126	1 1/2:1		3
* 78	0.064 - 0.168	18	42	12	87	132	1 1/2:1		3
* 84	0.064 - 0.168	18	45	12	87	138	1 1/2:1		3

* These sizes have 0.109" sides and 0.138" center panels.

* * Pipe diameter is equal to dimension "D" of end section.

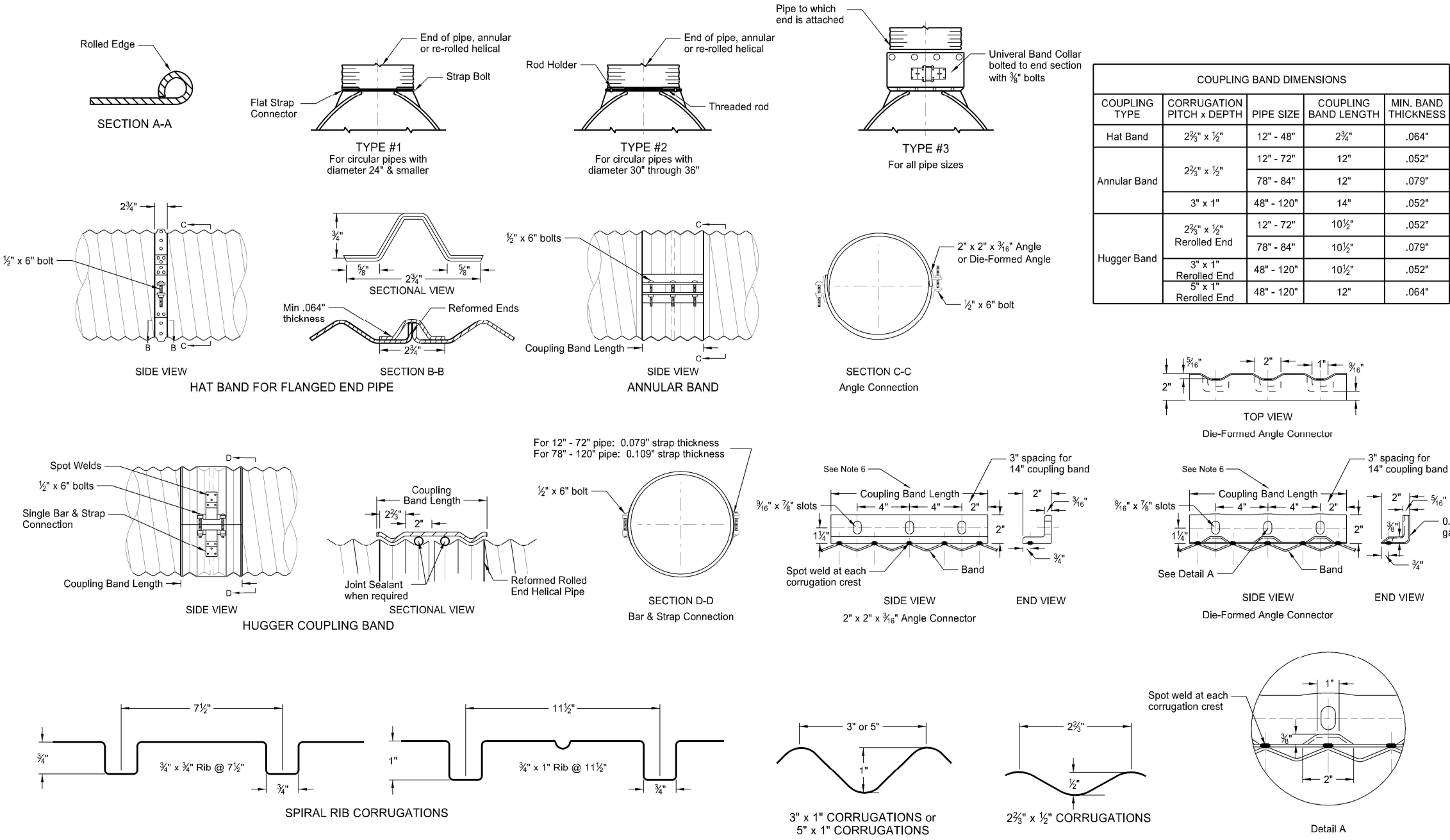
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

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

NOTES:

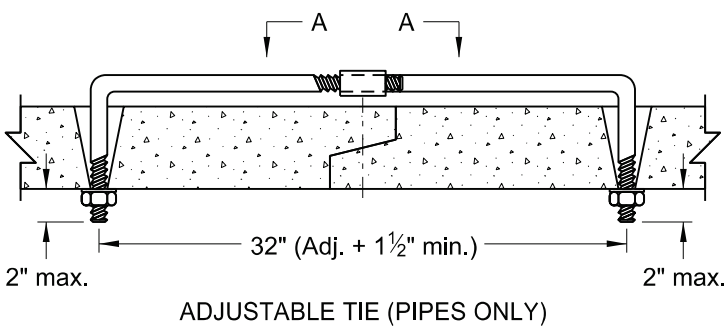
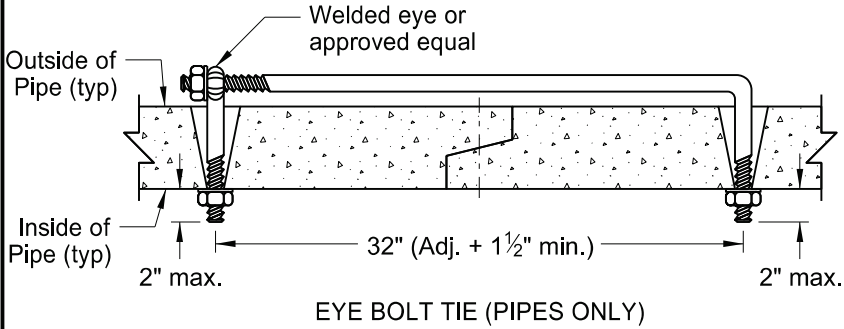
- Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- 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.
- 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.
- 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
- Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
- Length of spot welds shall be minimum 1/2".



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

THAN D KETTER
PROFESSIONAL
PE-4684
ENGINEER
NORTH DAKOTA
09/23/22

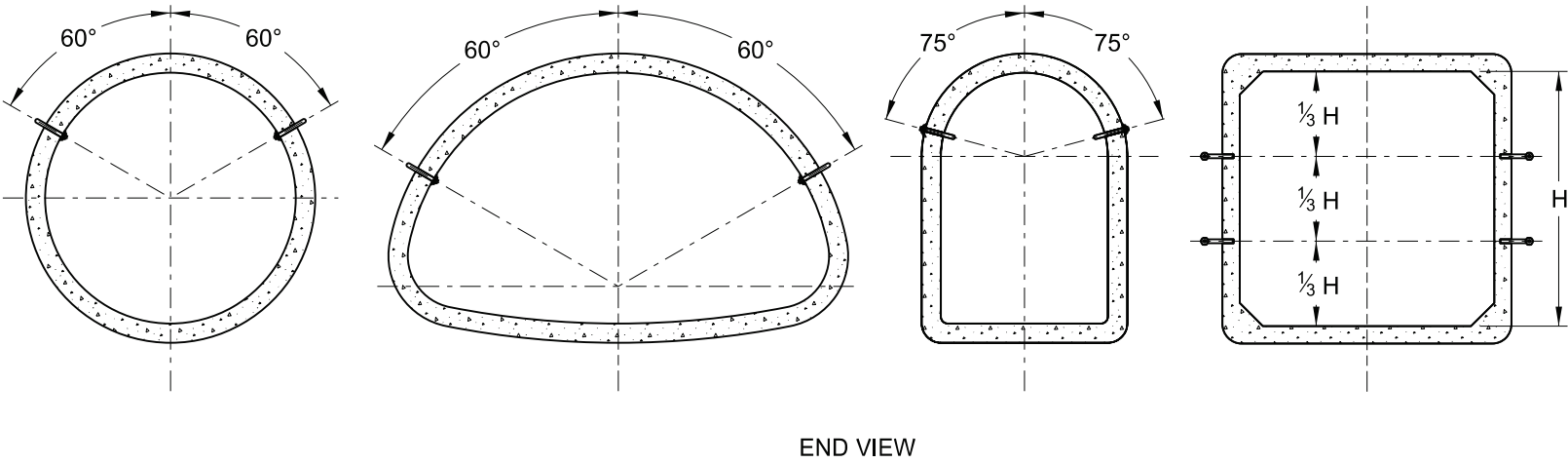
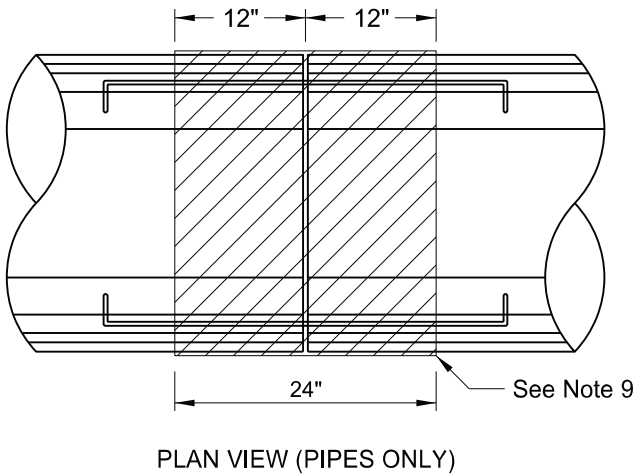
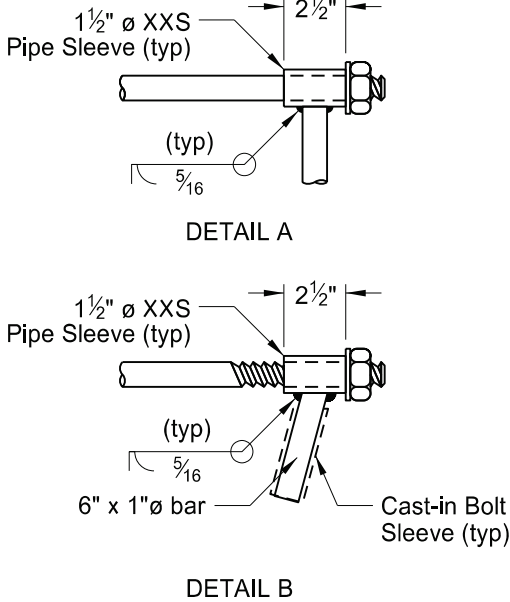
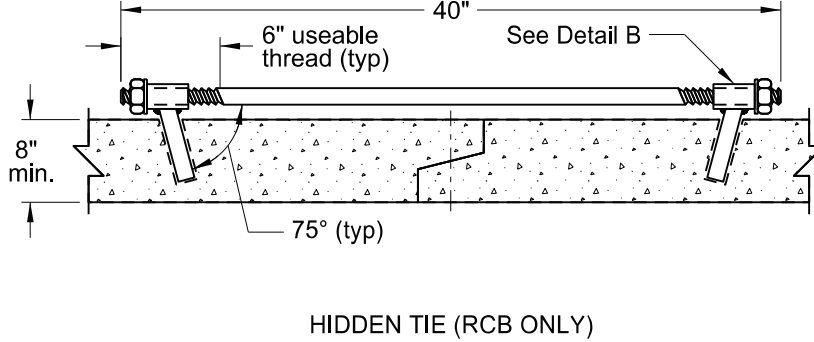
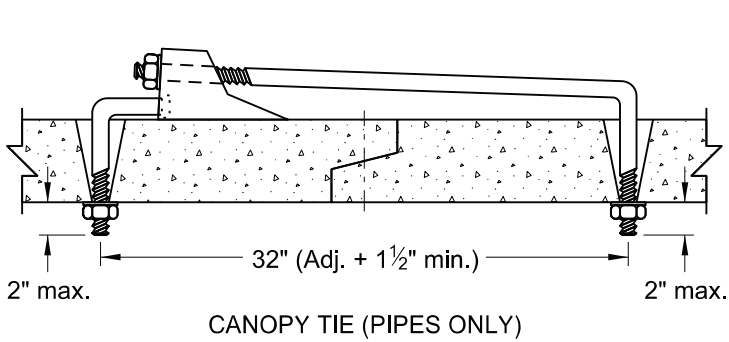
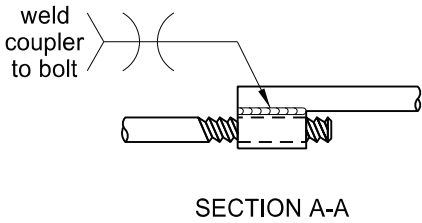
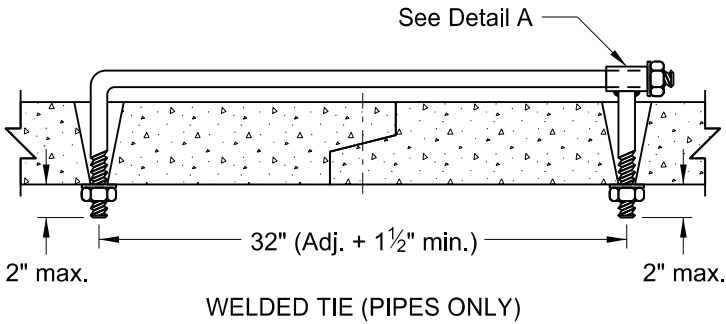
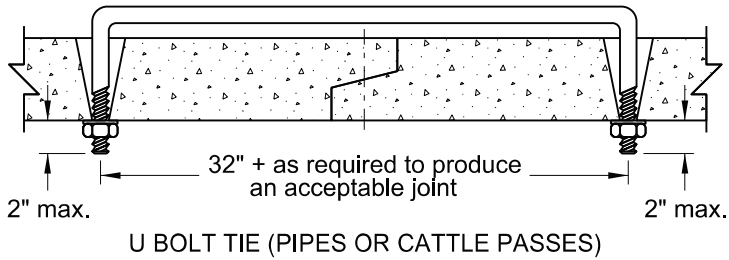
CONCRETE PIPE, CATTLE PASS, OR
PRECAST CONCRETE BOX CULVERT TIES



REQUIRED SIZE OF TIE BOLTS		
PIPE SIZE	THREAD Ø	XXS PIPE SLEEVE INNER Ø
18" - 24"	5/8"	3/4"
30" - 66"	3/4"	1"
72" - 120"	1"	1 1/4"
RCB/CATTLE PASS	1"	1 1/4"

NOTES:

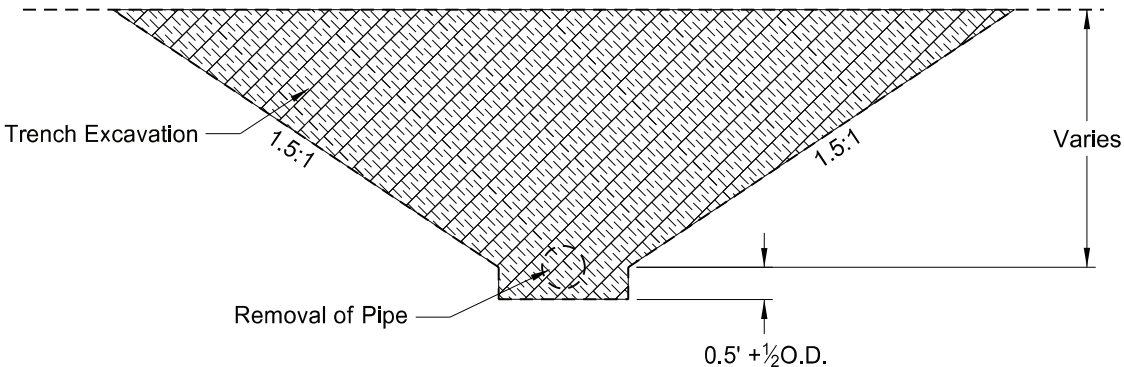
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts 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 1/4" larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1 1/4".
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.



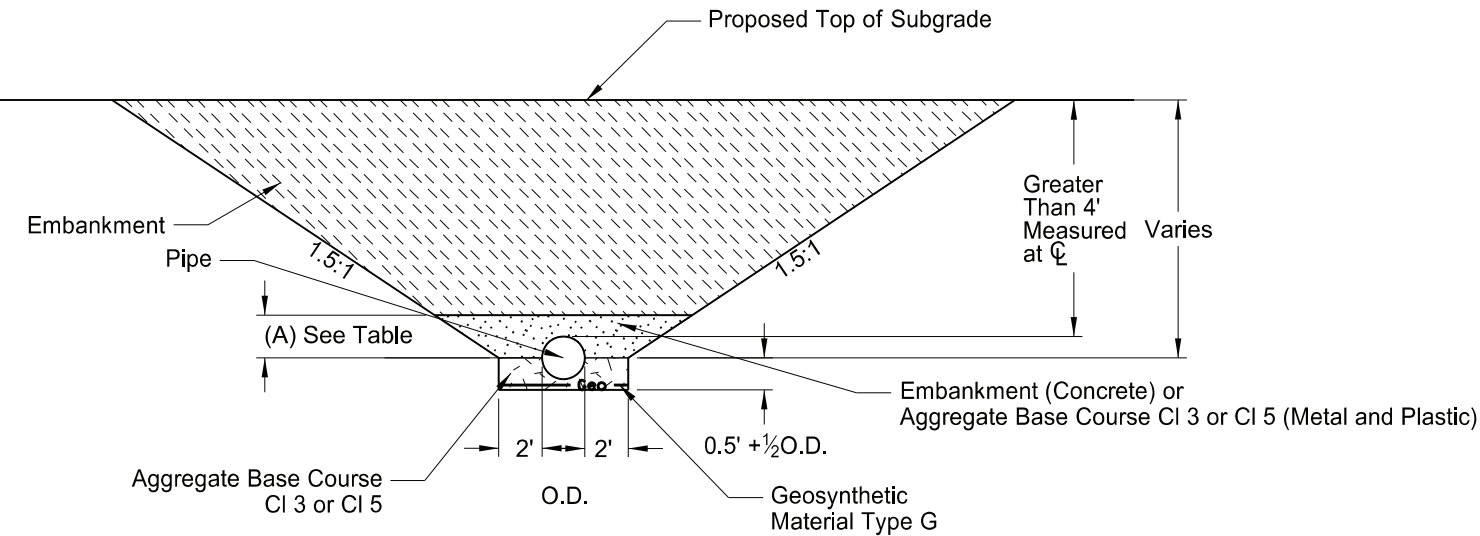
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View



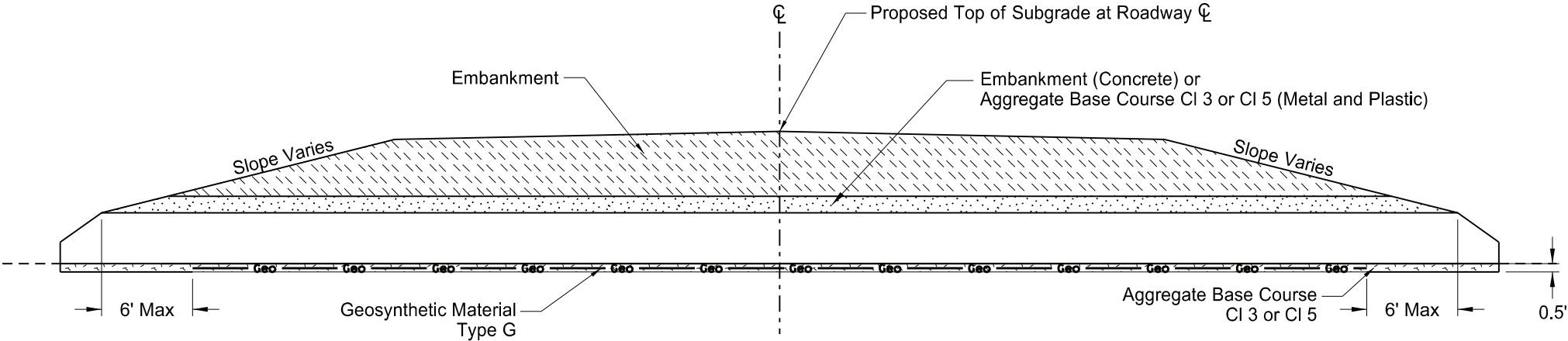
TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items

- 1) Pipe*
- 2) Geosynthetic Material Type G
- 3) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate Base Course CI 3 or CI 5
- 4) Embankment

NOTES:

- 1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.
- 2) Embankment may be either Borrow Excavation or Common Excavation - Type A.

Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe
5-27-20	Replaced R1 Fabric with Geogrid Changed bedding depth



TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE

Pay Items

- 1) Pipe*
- 2) Geosynthetic Material Type G
- 3) Removal of Pipe (if required)

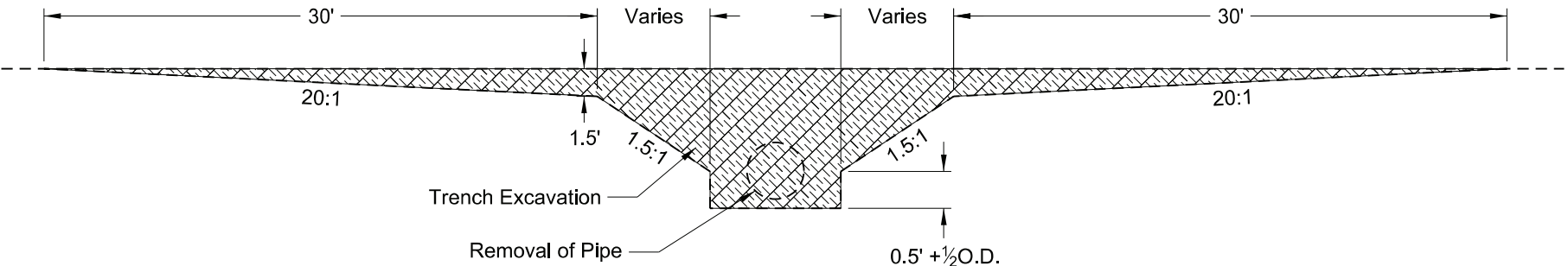
*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench Excavation
- 3) Aggregate Base Course CI 3 or CI 5
- 4) Embankment

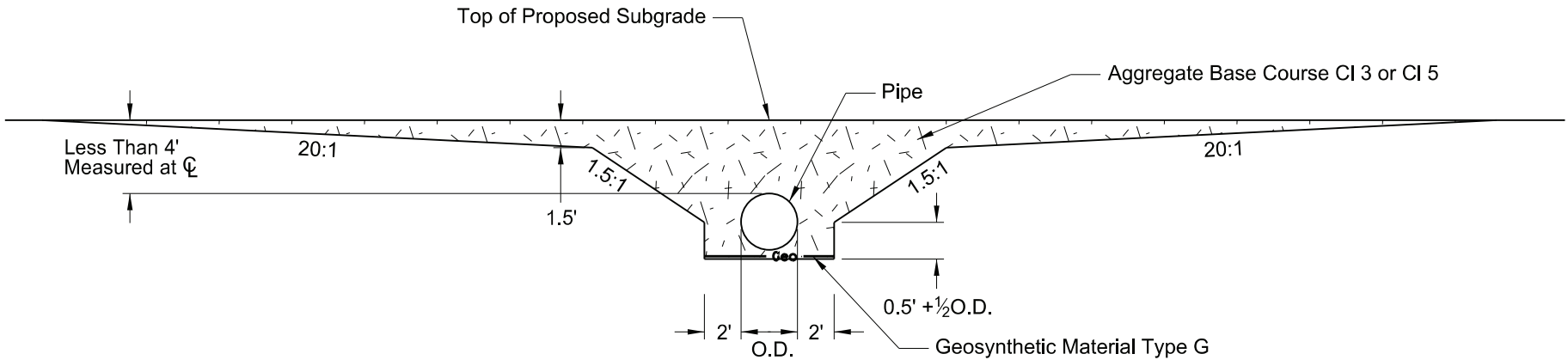
NOTES:

- 1) This drawing applies to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
- 2) Embankment may be either borrow Excavation or Common Excavation - Type A

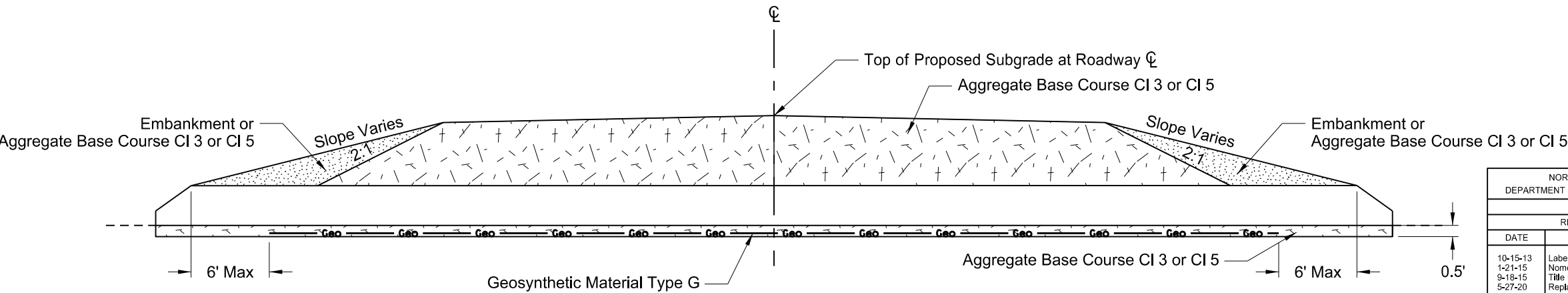
EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
9-18-15	Title Rewording
5-27-20	Replaced R1 Fabric with Geogrid Changed bedding depth



STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

D-720-1

NOTES:

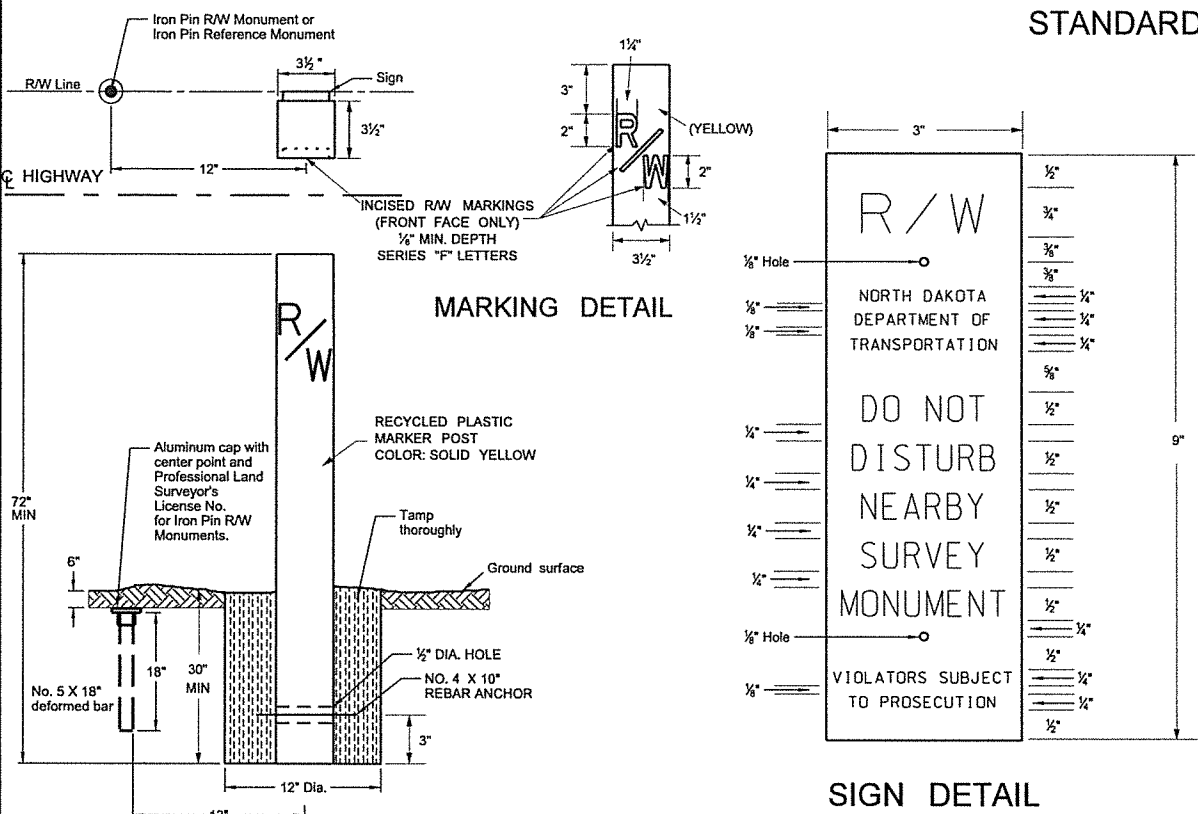
Construct and install Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) according to Section 720 of the Standard Specifications.

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.

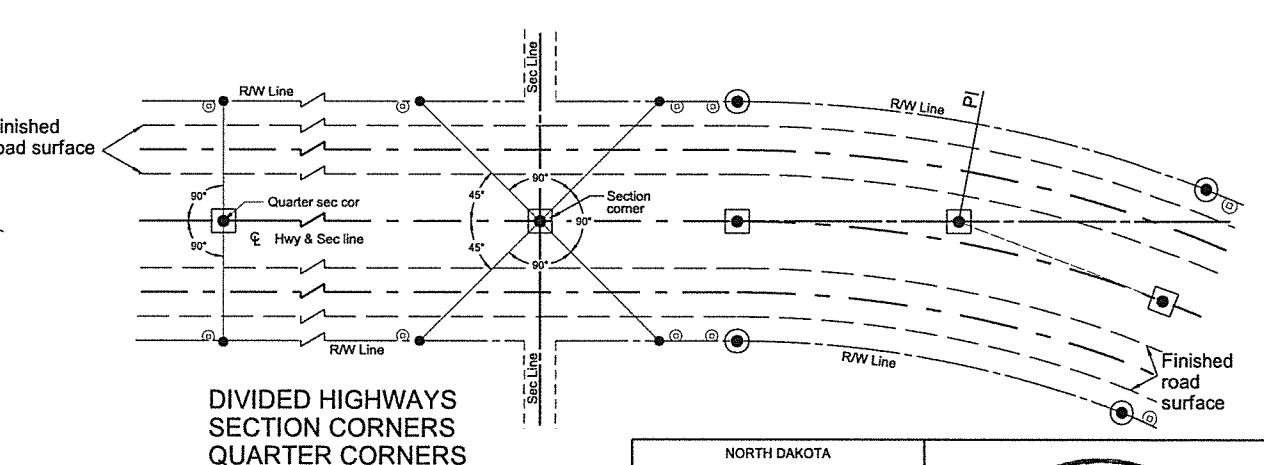
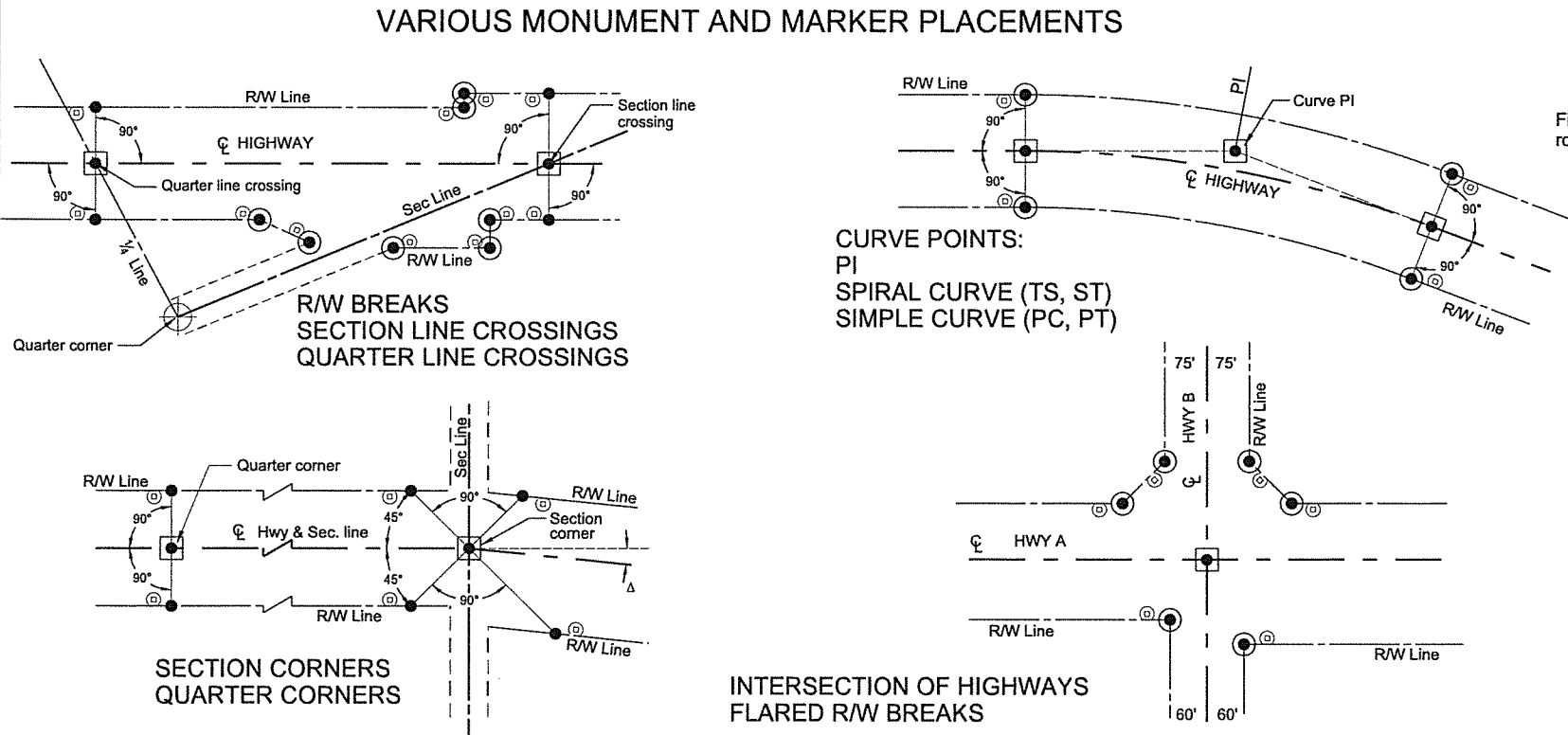
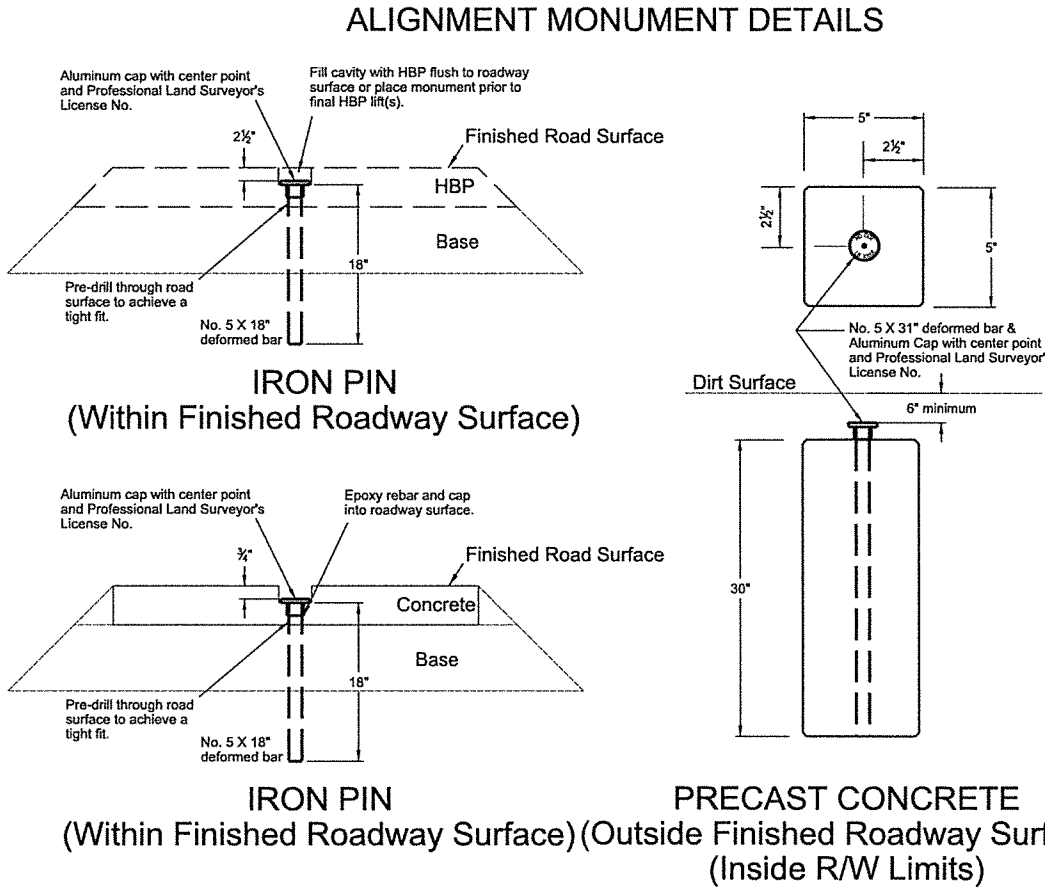
IRON PIN R/W MONUMENT: Place Iron Pins with aluminum caps (No. 5 X 18") at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

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.



RECYCLED PLASTIC RIGHT OF WAY MARKER (WITNESS POST) DETAILS & IRON PIN REFERENCE AND R/W MONUMENT DETAILS



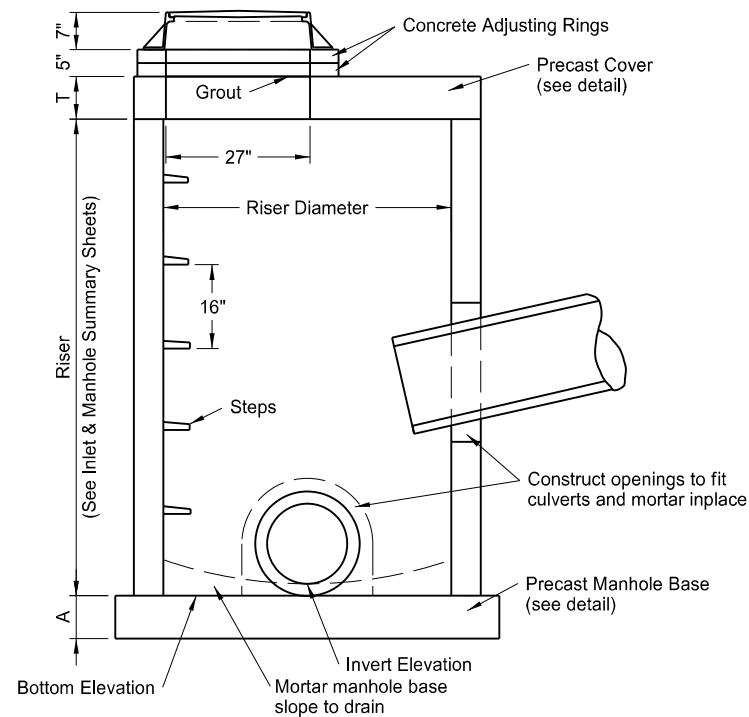
- LEGEND**
- Iron Pin Reference Monument
 - ⊙ R/W Marker (witness post)
 - Alignment Monument
 - Iron Pin R/W Monument

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.

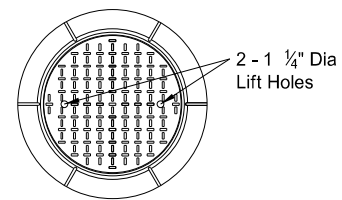


MANHOLE DETAILS

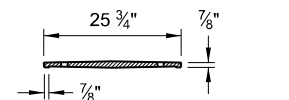
D-722-5



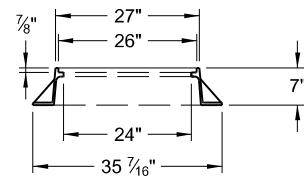
ELEVATION



TOP

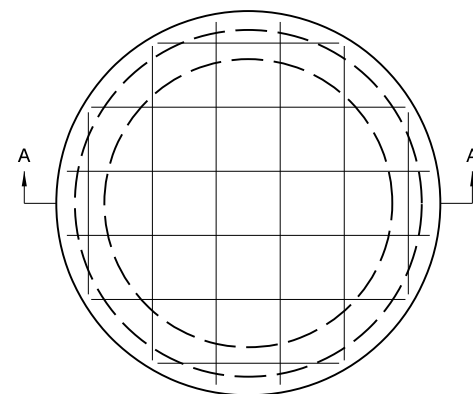


LID

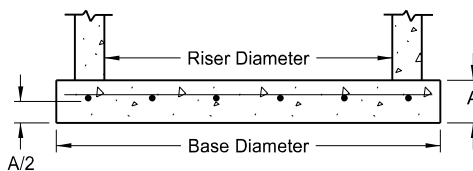


FRAME

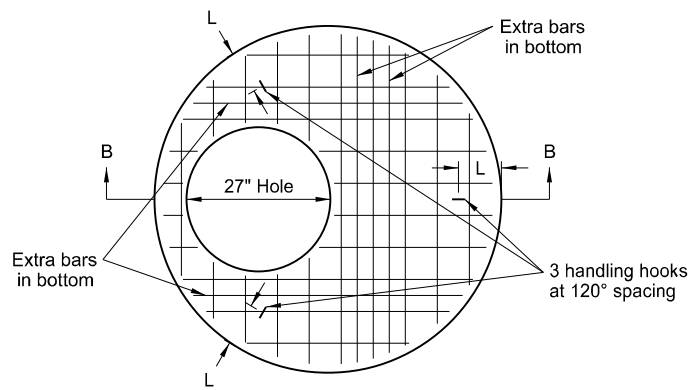
MANHOLE CAST IRON RING & COVER



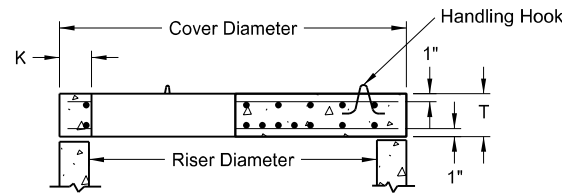
TOP VIEW



SECTION A-A
PRECAST MANHOLE BASE



TOP VIEW



SECTION B-B
PRECAST COVER

PRECAST MANHOLE COVERS

RISER DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM * BARS	TOP * BARS
48"	58"	1,080 Lb	6"	6"	8"	#4 at 6"	-----
54"	65"	1,910 Lb	8"	6"	8"	#4 at 6"	-----
60"	72"	2,430 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
66"	79"	3,010 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
72"	86"	3,640 Lb	8"	8"	10"	#4 at 6"	#4 at 11"
84"	100"	5,060 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
96"	114"	6,695 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
108"	128"	12,810 Lb	12"	10"	12"	#5 at 6"	#5 at 11"
120"	142"	15,900 Lb	12"	11"	13"	#5 at 6"	#5 at 11"

* - Place reinforcement listed in each direction.

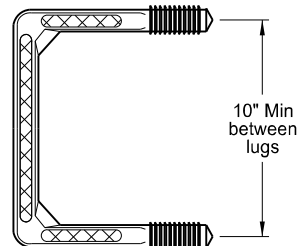
MANHOLE BASES

RISER DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS *
48"	66"	1,785 Lb	6"	#4 at 12"
54"	72"	2,830 Lb	8"	#4 at 12"
60"	78"	3,320 Lb	8"	#4 at 12"
66"	86"	4,035 Lb	8"	#4 at 12"
72"	92"	4,620 Lb	8"	#4 at 12"
84"	107"	6,245 Lb	8"	#4 at 12"
96"	120"	7,855 Lb	8"	#4 at 12"
108"	132"	14,255 Lb	12"	#4 at 8"
120"	148"	17,925 Lb	12"	#4 at 8"

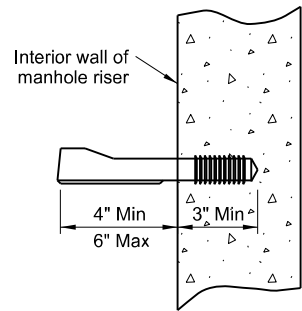
* - Place reinforcement listed in each direction.

NOTES:

1. Use class AE concrete precast or cast-in-place bases constructed in accordance with NDDOT Standard Specifications. Use aggregate size approved by the engineer.
2. Use precast concrete manholes, risers and steps conforming to AASHTO M199.
3. Reinforce precast concrete bases and covers as shown in the table for the corresponding riser diameter.
4. Use Grade 60 reinforcing steel.
5. Cut or Precast manhole riser bottoms square to fit the manhole base. Grout joint between base and riser with cement mortar.
6. The manhole riser length listed in the plans is based on a 7" manhole casting, plus 2 concrete adjusting rings (5"), plus the "T" dimension shown in the Precast Manhole Covers table.
7. Use corrosion resistant manhole steps with a minimum 800 pound vertical load resistance and a minimum 400 pound horizontal pull-out resistance. Use configuration of steps approved by the Engineer.
8. Precast concrete manhole covers shown are designed for an HS-20 wheel load and maximum fill height of 15'-0". Special design is required for heavier wheel loads and/or greater fill heights.
9. Use of other castings, similar in dimension, is allowed if the casting conforms to the manhole cover and has a lid style specified in the plans. Modifications to the manhole cover to facilitate similar castings are only allowed with written approval from the Engineer.
10. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35B in the manufacture of castings.



TOP VIEW

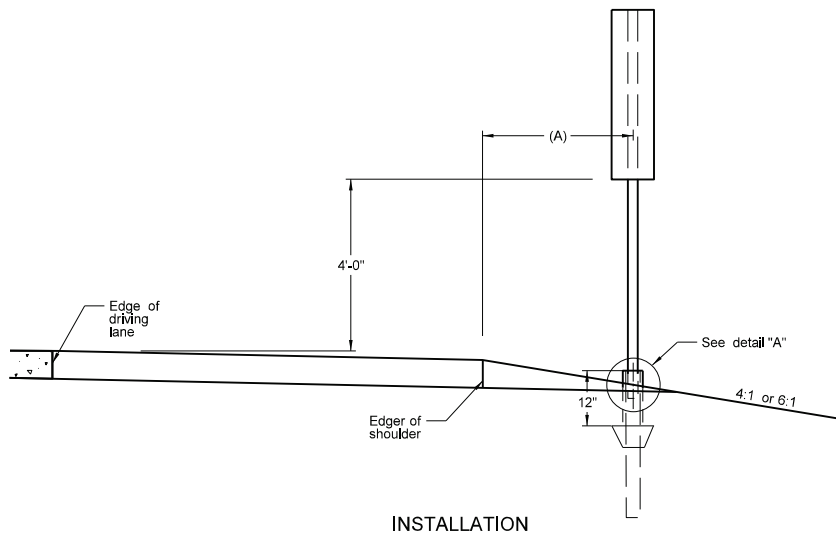
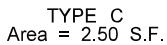
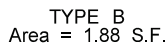
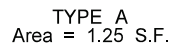


STEP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-14-2013	
REVISIONS	
DATE	CHANGE
6-24-14	Revised notes 1 & 6, added dimensions to Elev. drawing.
10-17-17	Updated to active voice.
12-02-20	Updated PE stamp and signature.



D-754-19



(A) 8' Clearance to finished shoulder or in line with existing delineator posts.

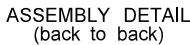
NOTES:
Installation: Install posts along right shoulder.

Sign: Fabricate backing of 0.080 aluminum.

Fasteners: Attach signs to post with tension pin type fastener or other suitable vandal resistant non-rust fastener.

Reflective Sheeting: Use Type IV sheeting.

Numbers: Use screened or applied copy numbers of the series shown.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-8-14	Revised post and reflective sheeting notes
8-30-18	Updated to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

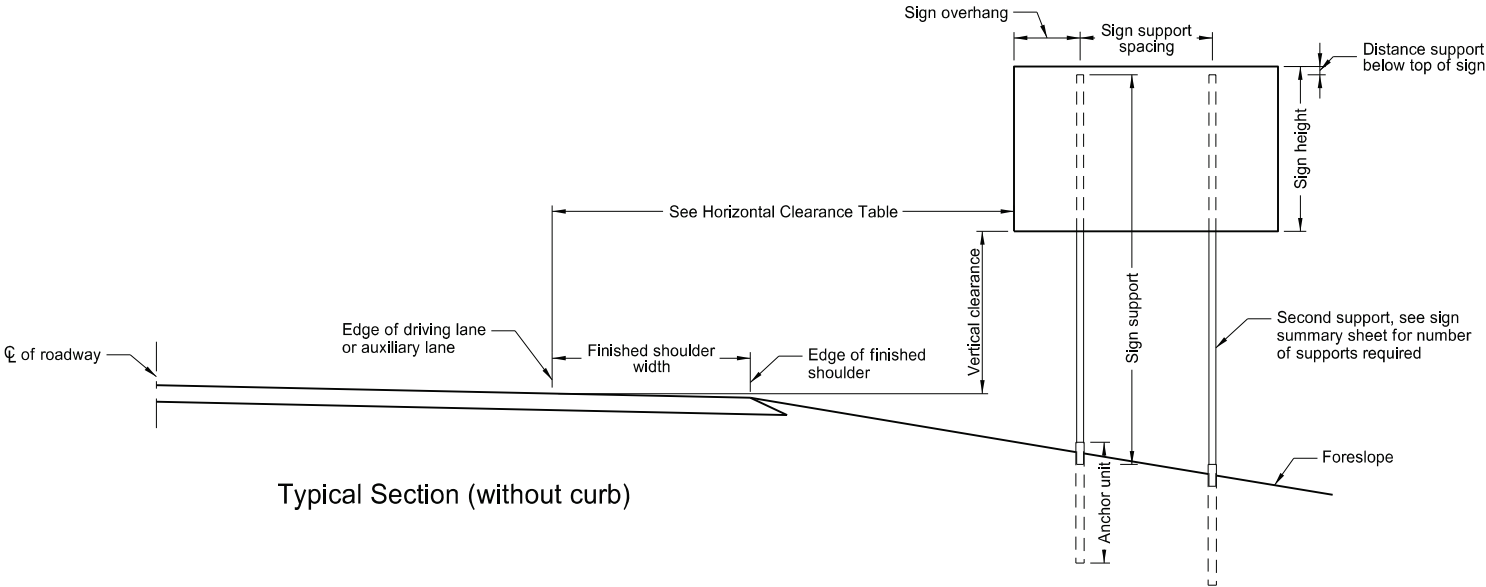
08/05/24

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

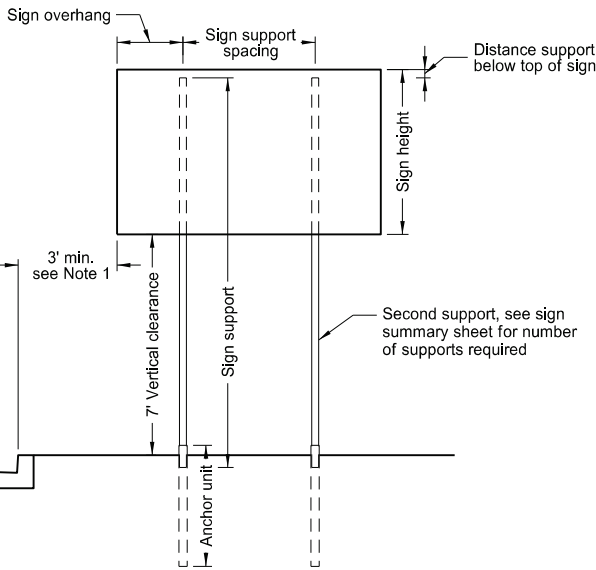
Notes:

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'.

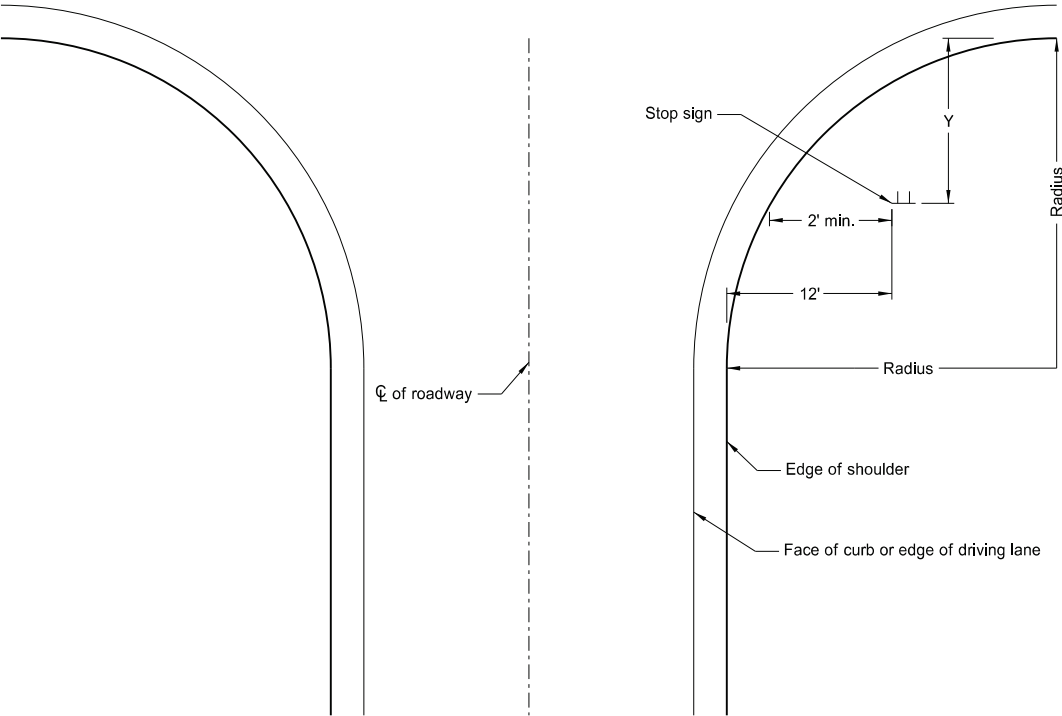


Typical Section (without curb)

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

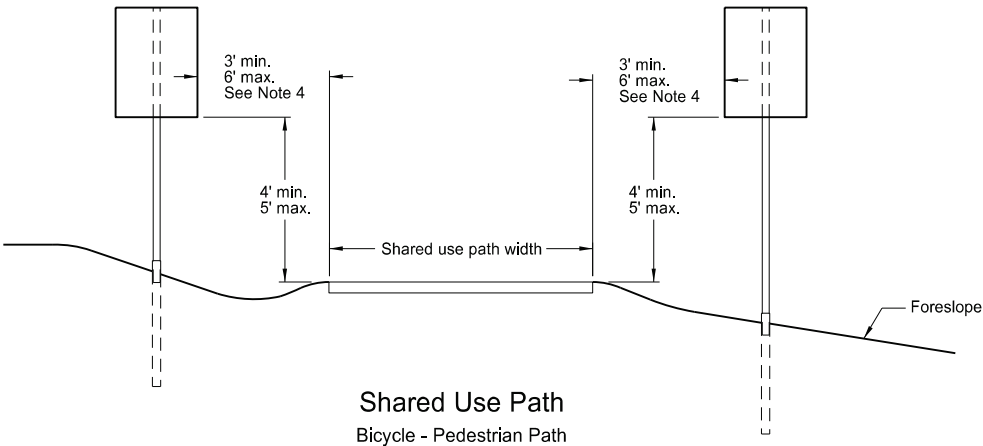


Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection
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



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.



08/05/24

Notes:

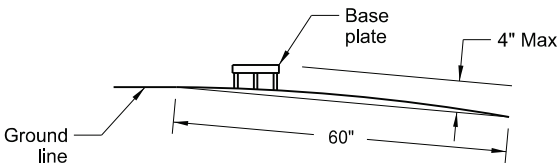
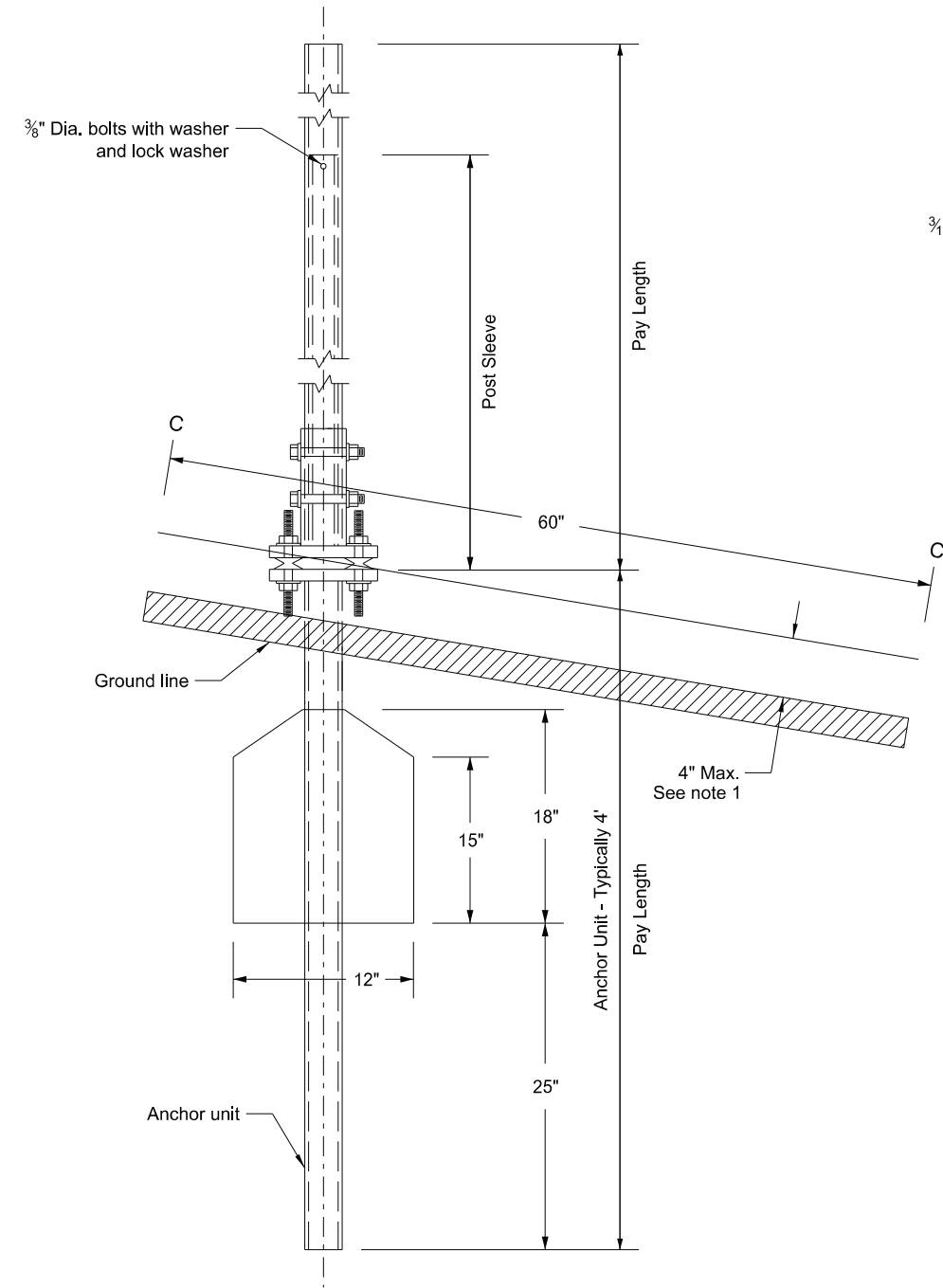
1.
- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2.
- Use anchor unit of the same size and specification as the post.
3.
- Provide a minimum 8' distance between the first and fourth post on four post signs.
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	2¾	10	Yes		7

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

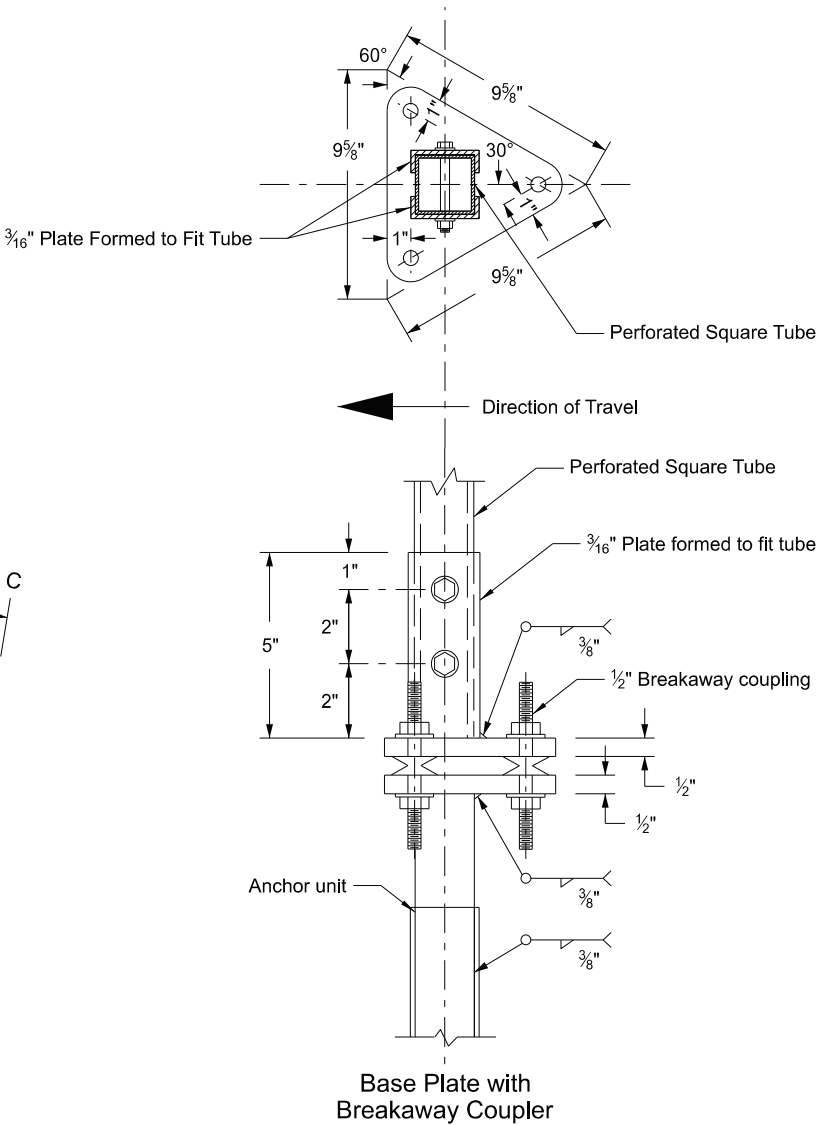
(C) - 3" anchor unit

Breakaway Coupler System for Perforated Tubes



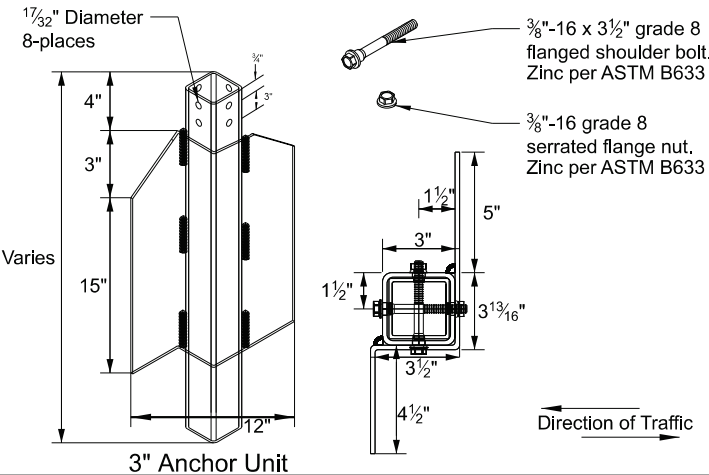
Section C-C

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



Shoulder Bolt

Shimming agent to reduce tolerance between 3" anchor unit with 2½" post. (use of standard ¾" diameter grade 8 bolt allowed with proper shim)

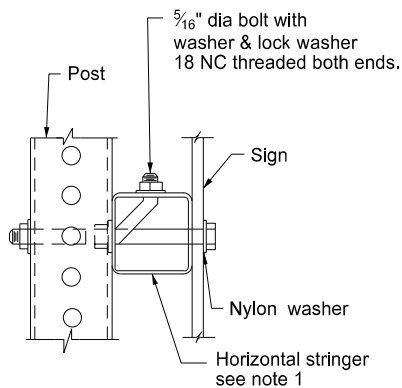


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature,

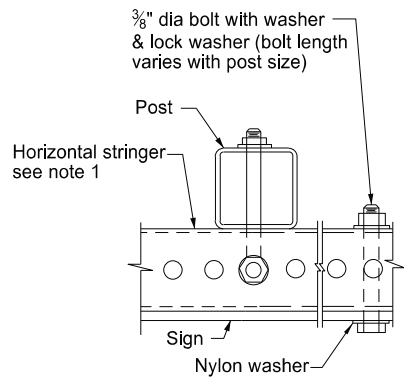


08/05/24

Mounting Details Perforated Tube

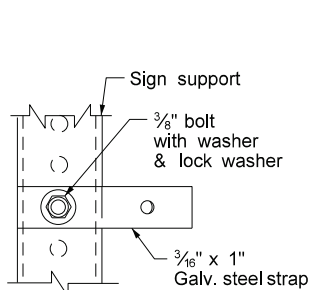


Side View

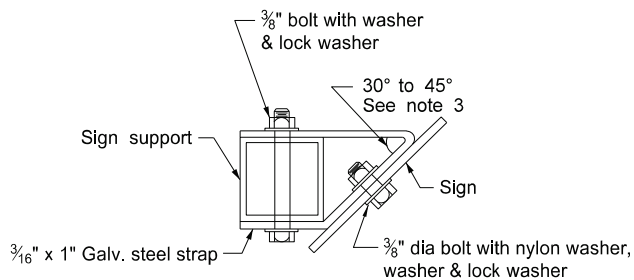


Top View

STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

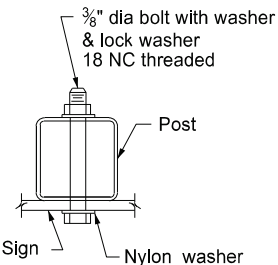


Side View

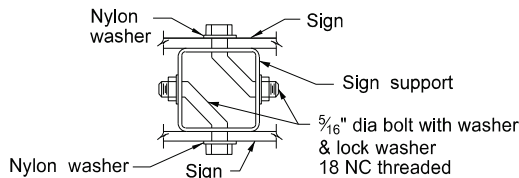


Top View

STRAP DETAIL

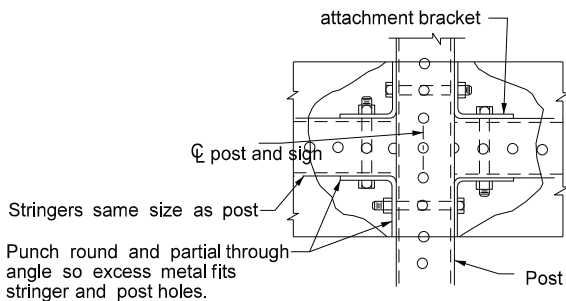


BOLT MOUNTING



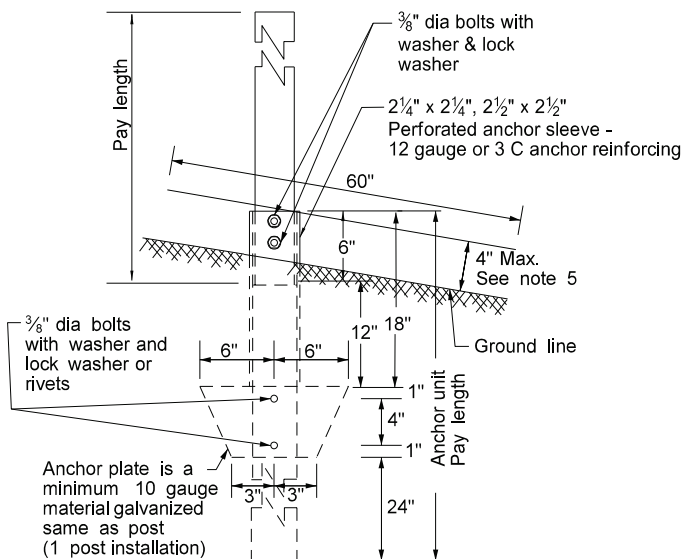
Top View

BACK TO BACK MOUNTING

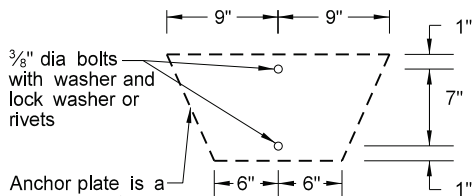


Stringers same size as post—
Punch round and partial through
angle so excess metal fits
stringer and post holes.

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



ANCHOR UNIT AND POST ASSEMBLY



Anchor plate is a minimum 10 gauge material galvanized same as post (2 post installation)

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
2⅝ x 2⅝	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 $\frac{3}{16}$ " size 10 gauge is shown as 2.19" size on the plans.
The 2 $\frac{1}{2}$ " size is shown as 2.51" size on the plans.

Note:

1. Horizontal stringers - Use perforated tubes or $1\frac{3}{4}$ " x $\frac{3}{16}$ " thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter $\frac{1}{16}$ " $\pm \frac{1}{16}$ " 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.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	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	2¾/16	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.

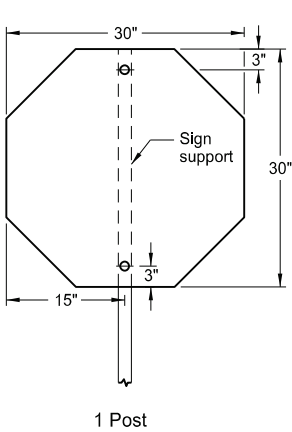
NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.



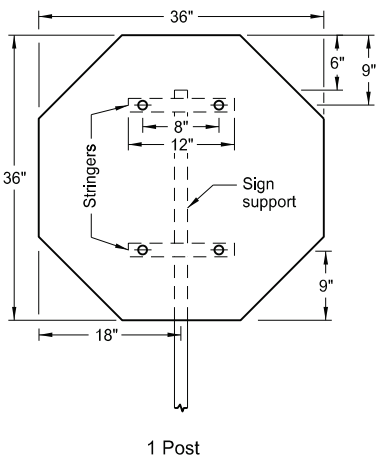
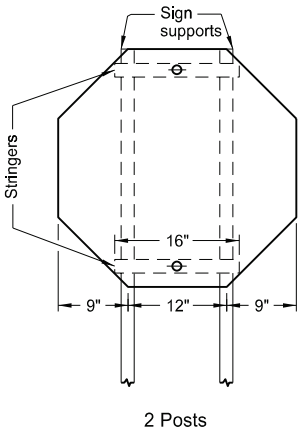
08/05/24

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

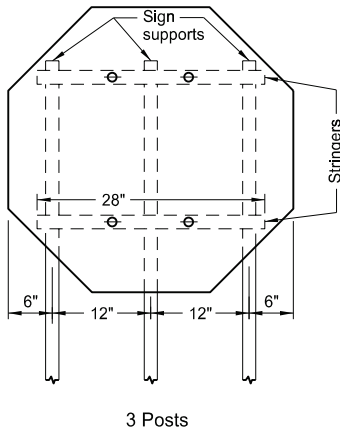
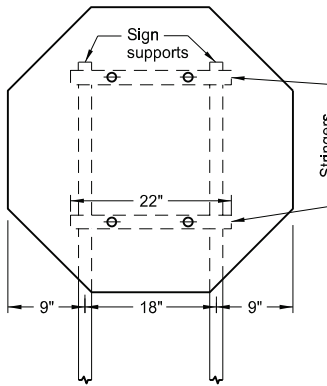
D-754-26



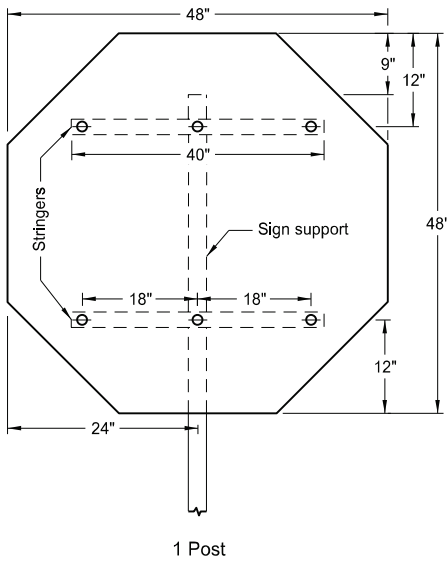
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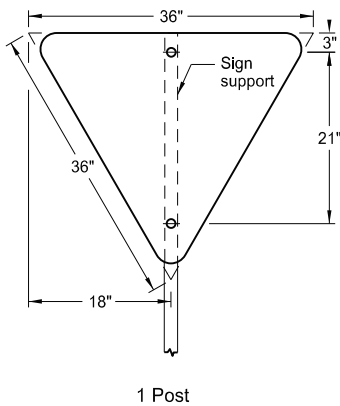
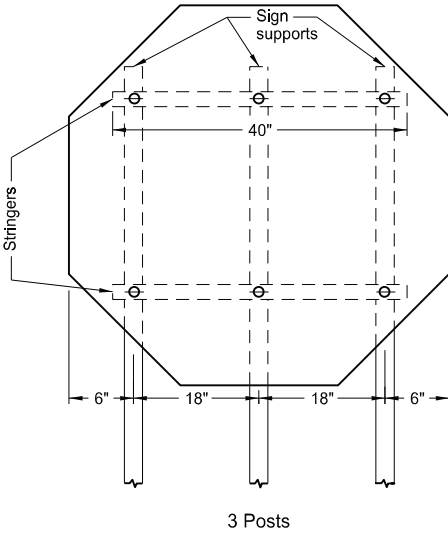
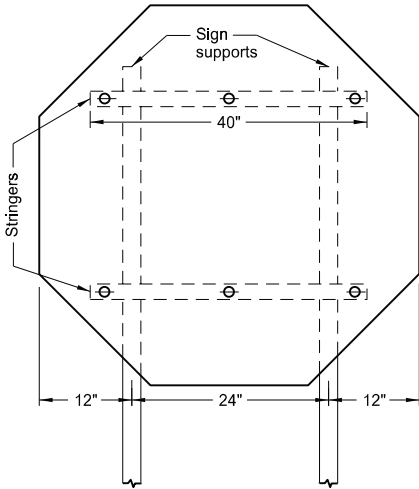
Assembly No. 2



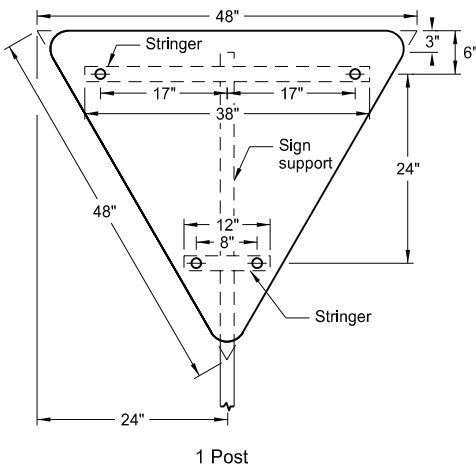
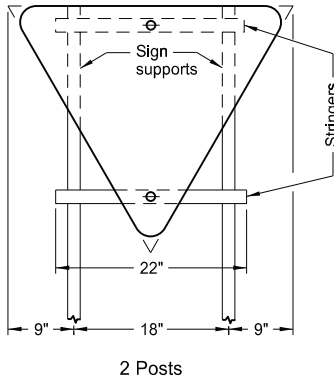
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ¾" bolt.



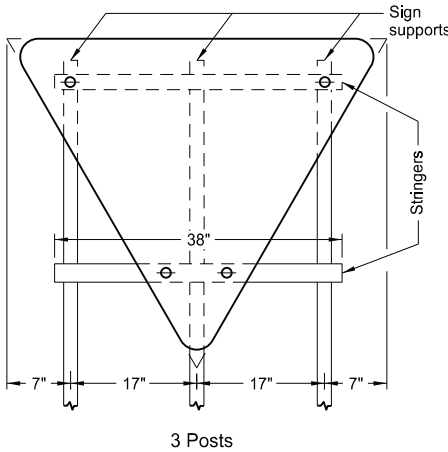
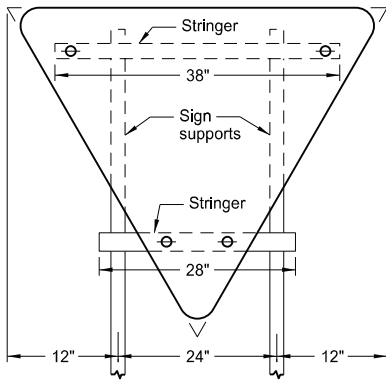
Assembly No. 3



Assembly No. 4



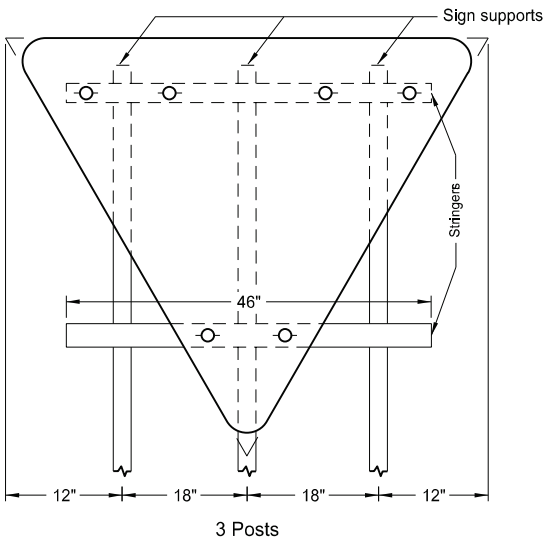
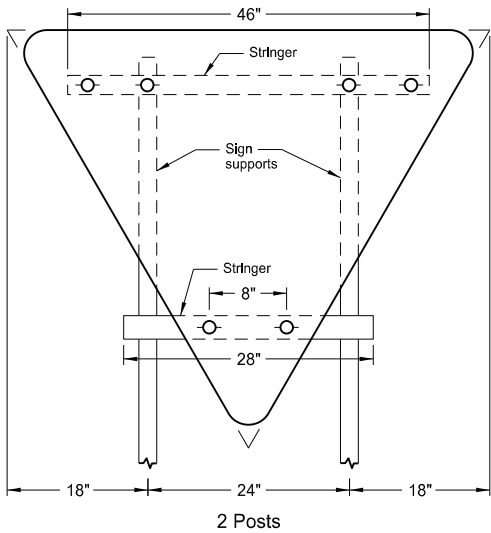
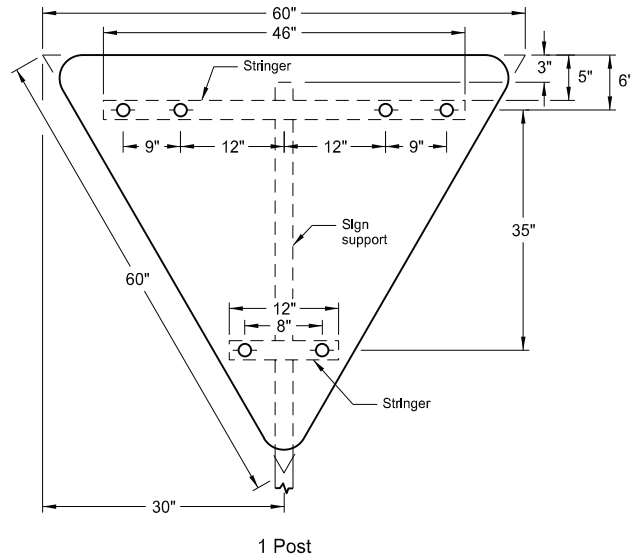
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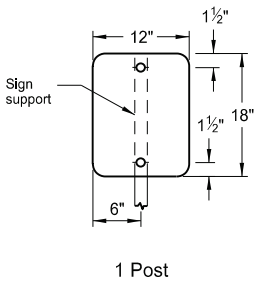
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.



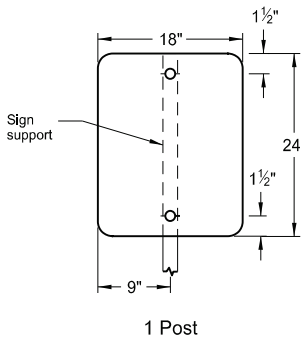
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



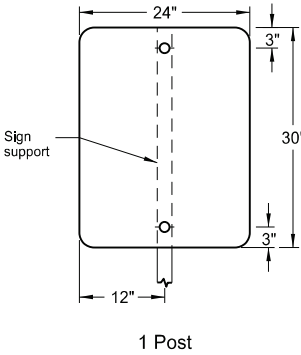
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅝" bolt.



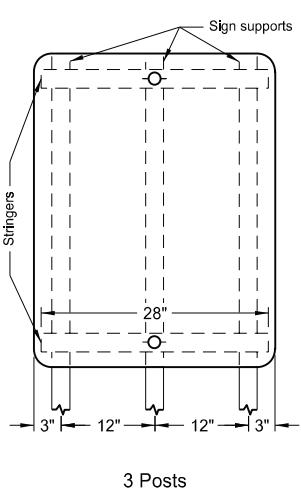
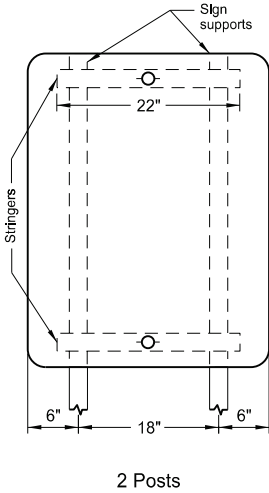
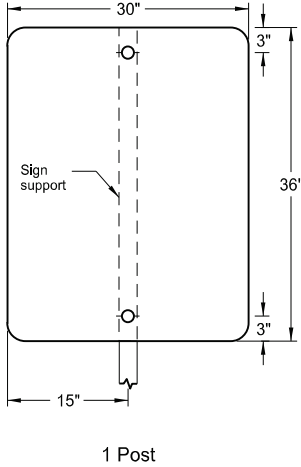
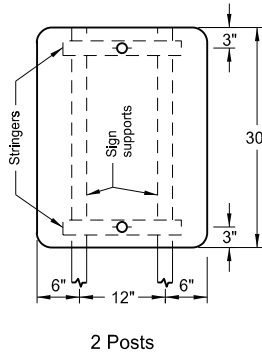
Assembly No. 7



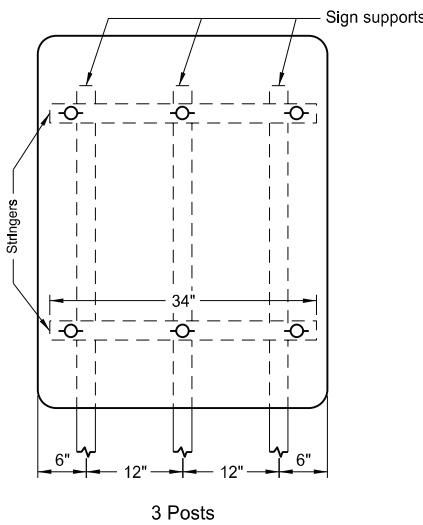
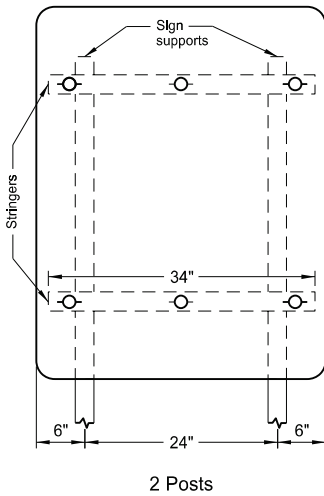
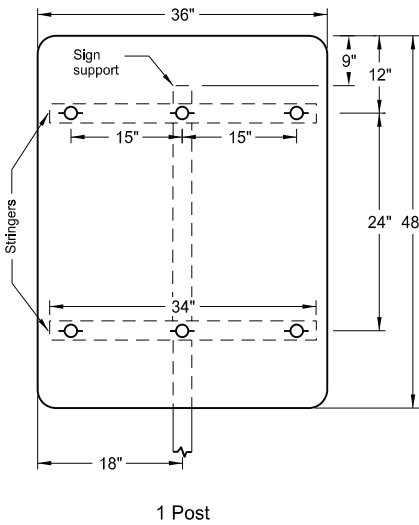
Assembly No. 8



Assembly No. 9



Assembly No. 10



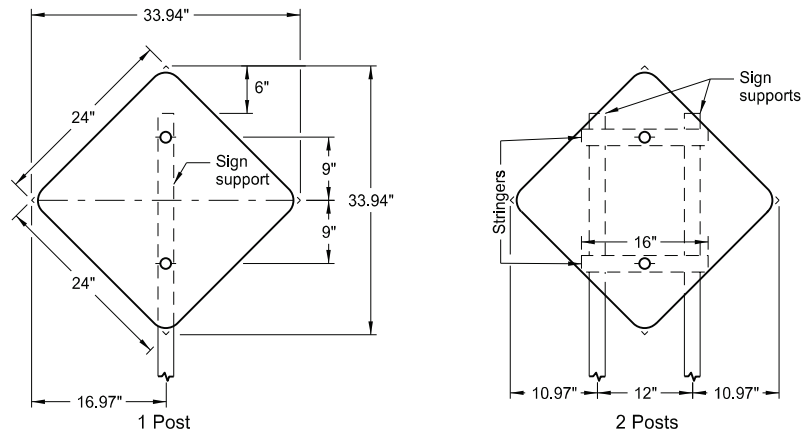
Assembly No. 11

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

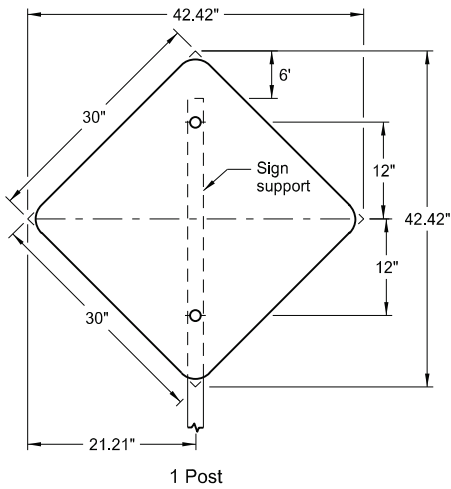


08/06/24

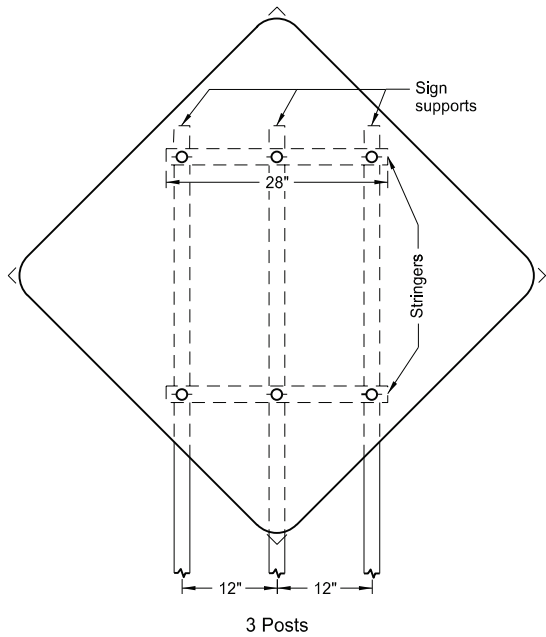
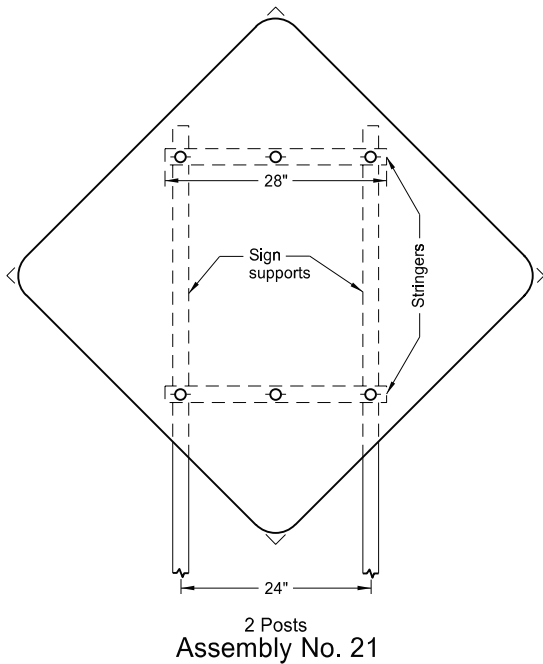
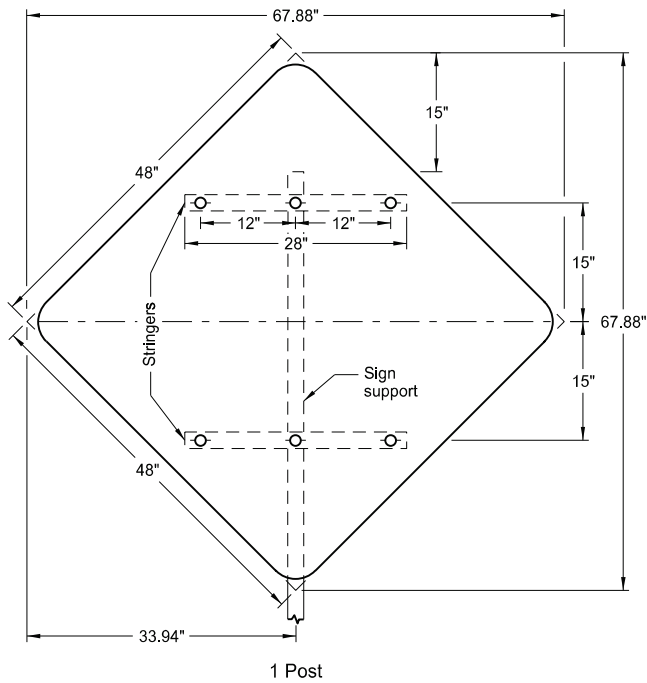
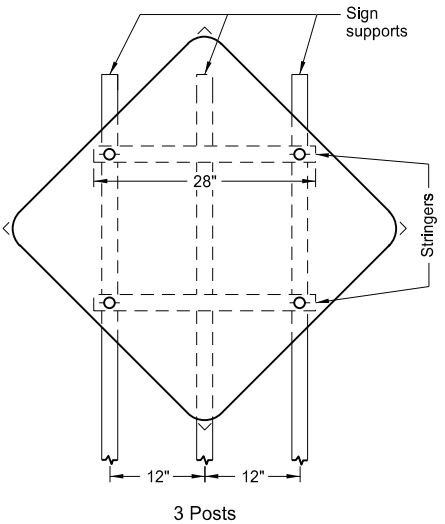
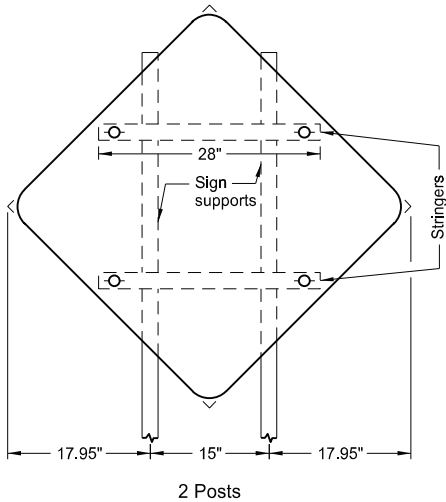
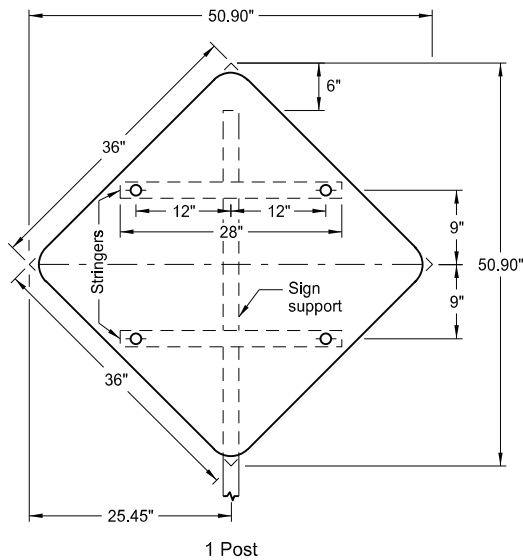
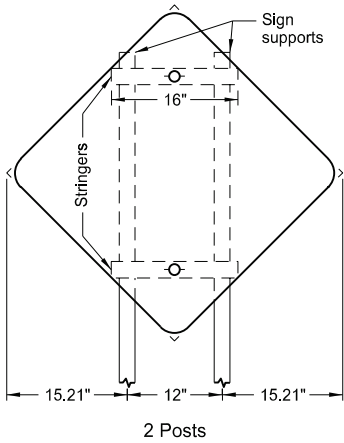
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



Assembly No. 18



Assembly No. 19



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

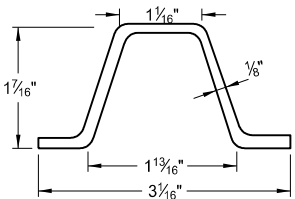
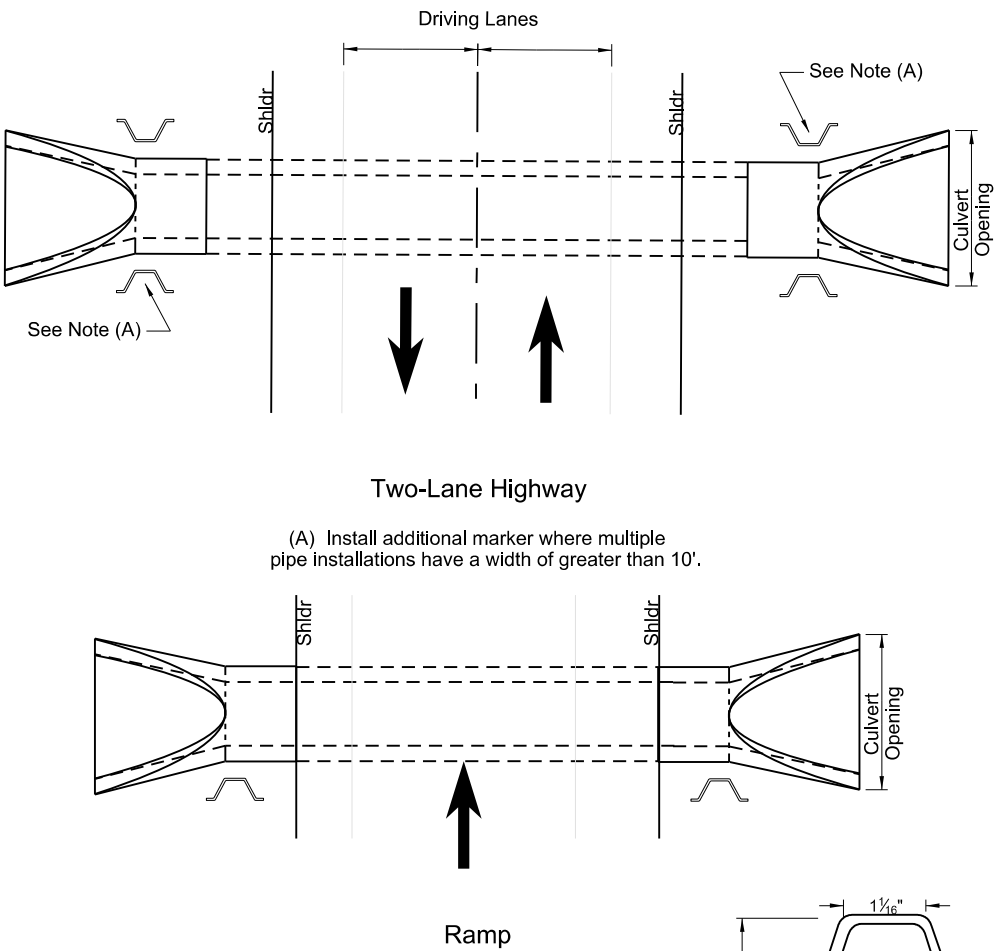
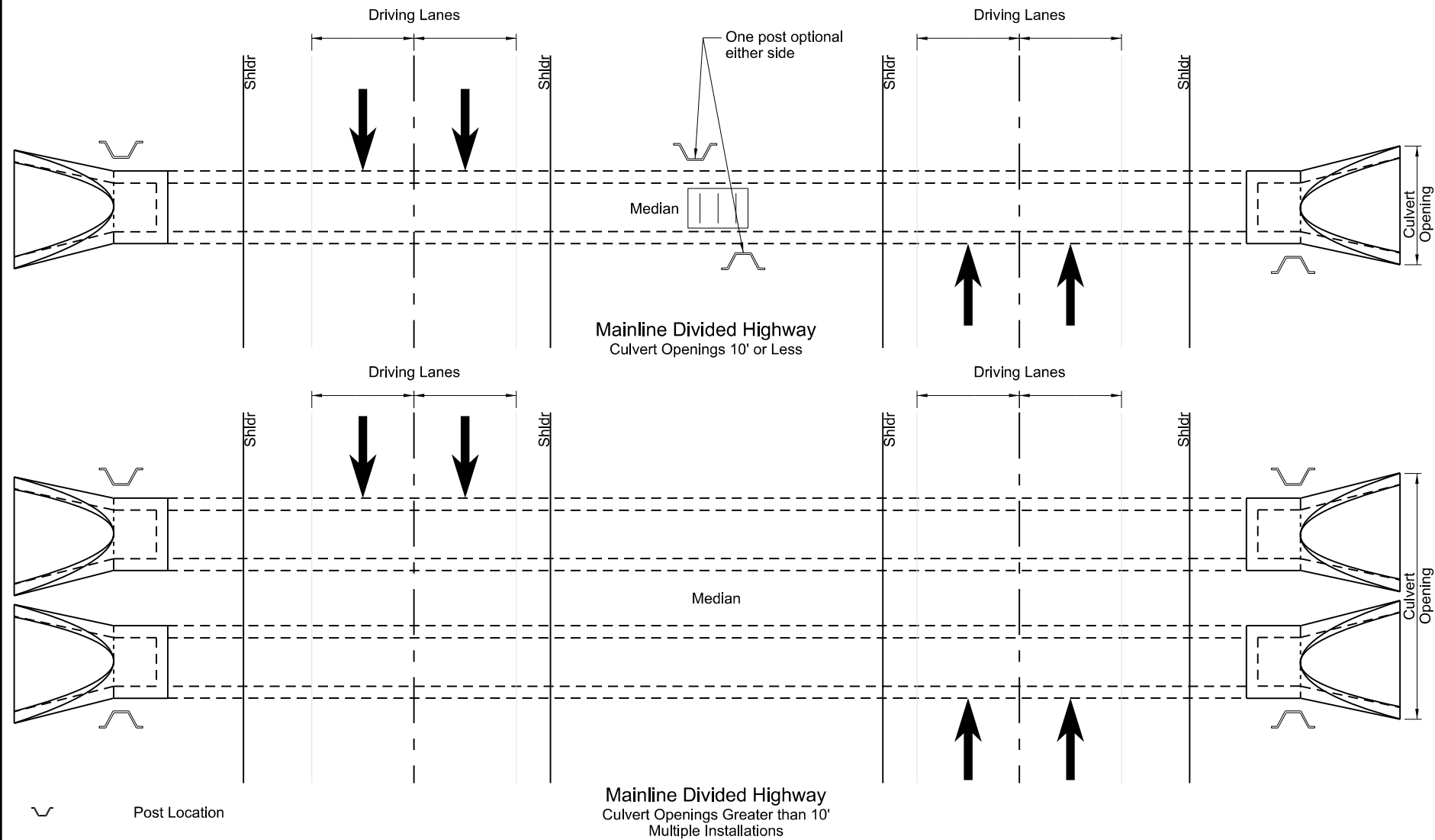
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.



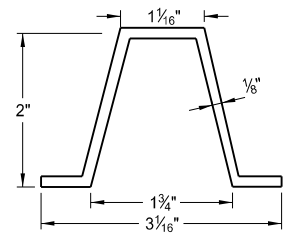
08/06/24

OBJECT MARKERS - CULVERTS

D-754-83



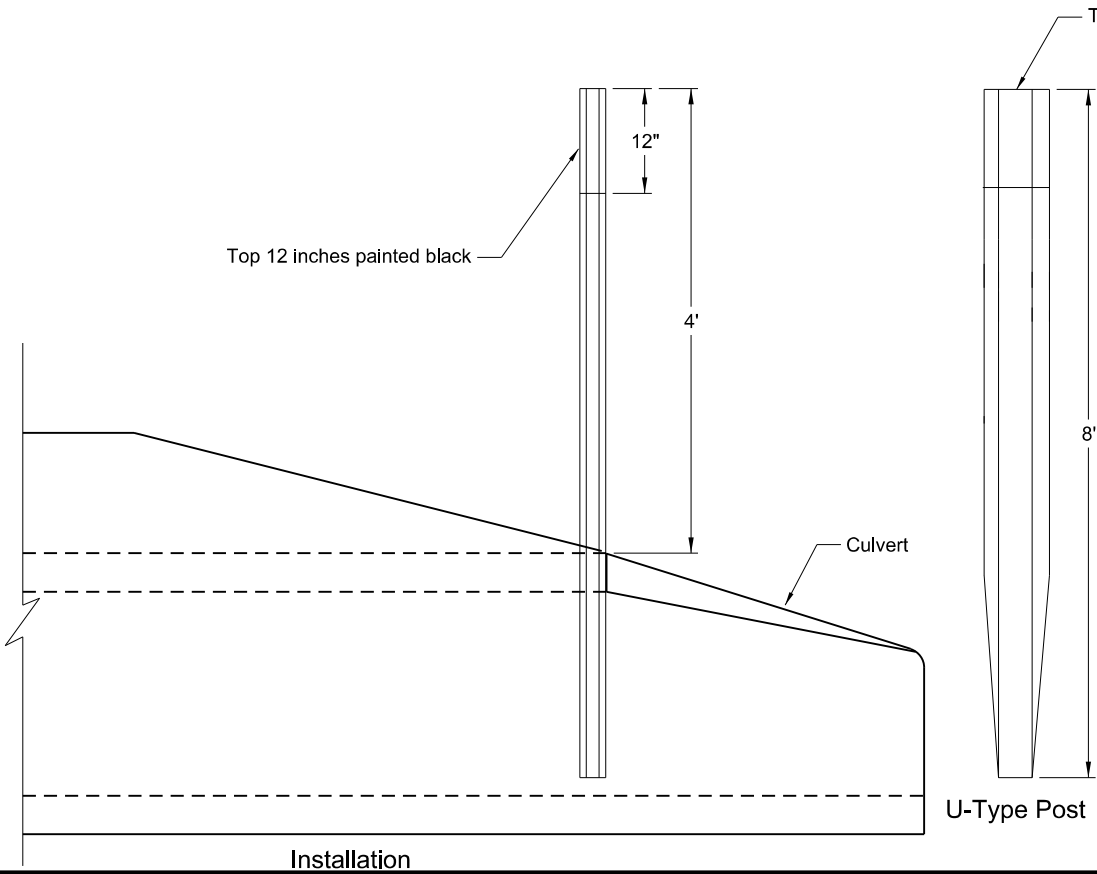
Approx. 2.0 lbs/ft



Approx. 0.88 lbs/ft

Notes:

Mark each end of culverts crossing the roadway 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.

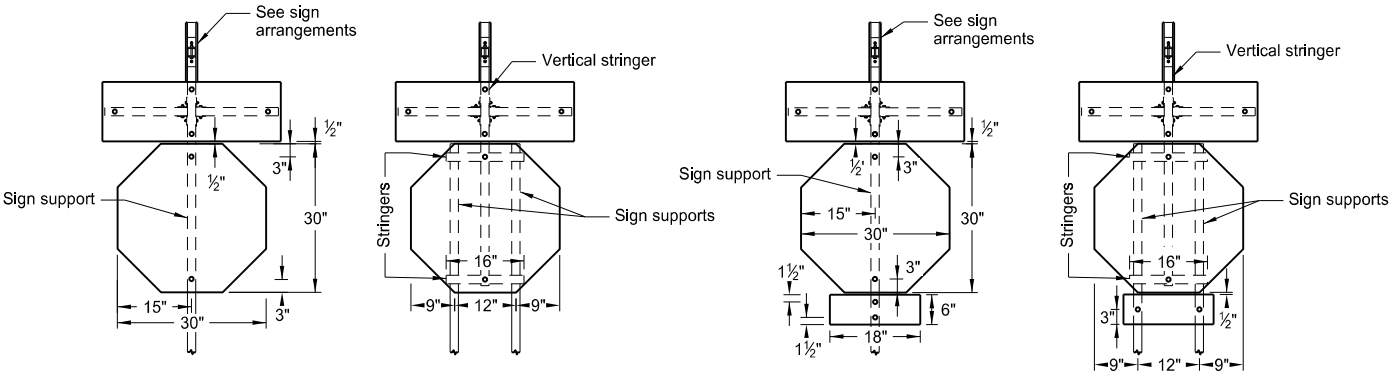


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

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

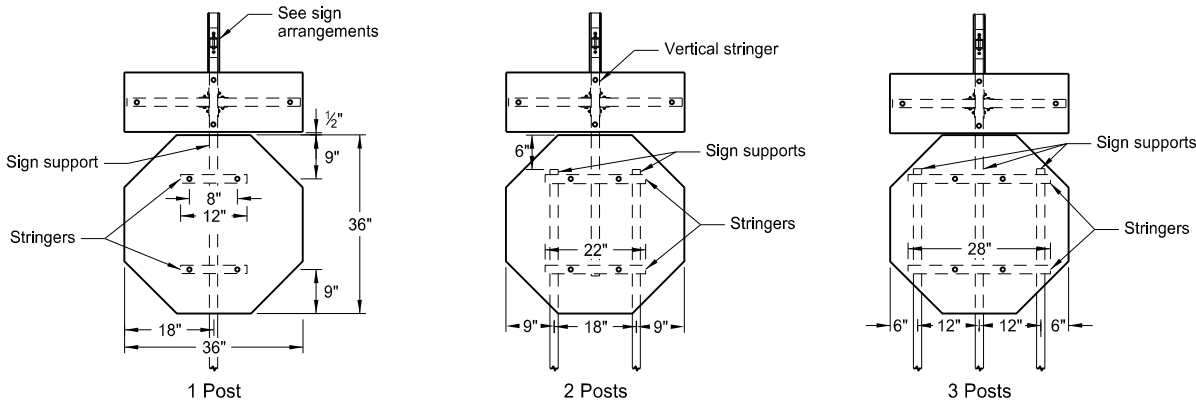
The diagram illustrates two methods for placing rectangular signs. On the left, a single post supports a sign. Labels indicate the 'Sign with least area' at the top, 'See sign arrangements' for the top section, 'Sign with greatest area' for the main body, and 'Sign support' for the post. A horizontal dimension line below the sign is labeled 'Varies'. Below this is the label '1 Post'. On the right, two posts support a sign. Labels indicate the 'Sign with least area' at the top, 'See sign arrangements' for the top section, 'Sign with greatest area' for the main body, and 'Sign support' for the right post. A horizontal dimension line between the posts is labeled 'Varies'. A label 'Sign support nearest roadway' points to the left post. Below this is the label '2 Posts'.

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

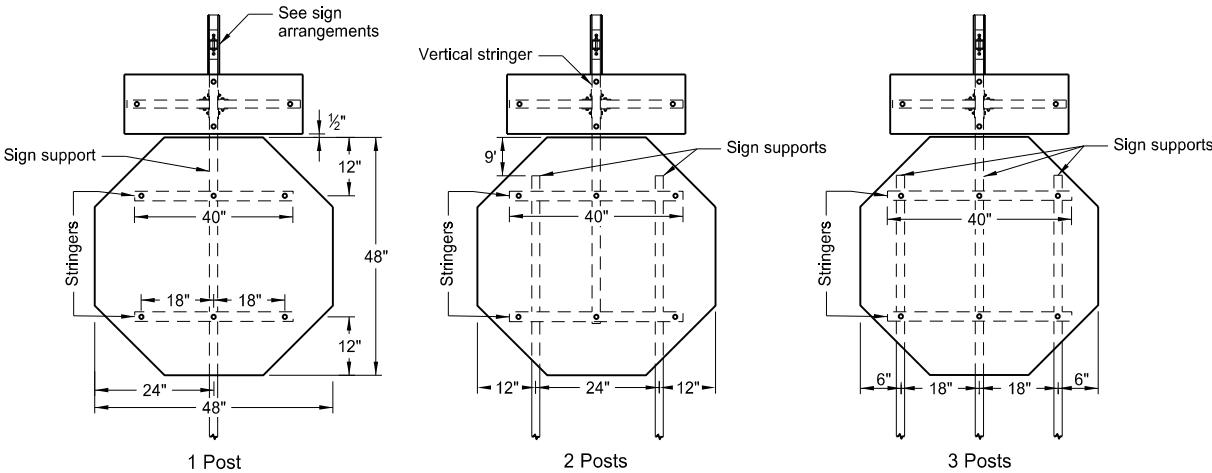


Special Assembly 2 (A, B, C, D or E)

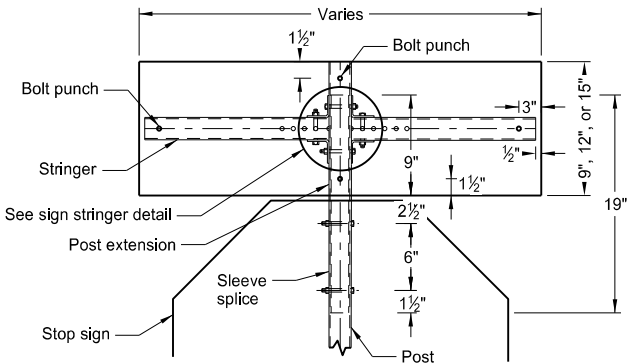
Special Assembly 3 (A, B, C, D or E)



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



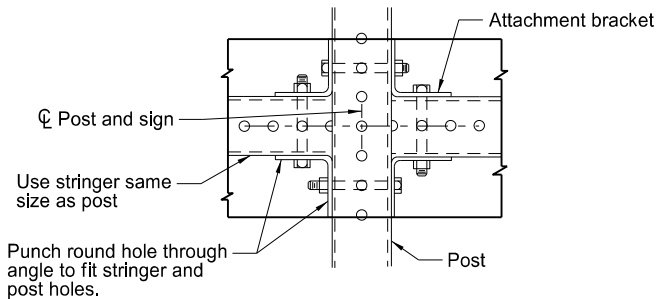
Special Assembly 5 (A, B, C, D or E)



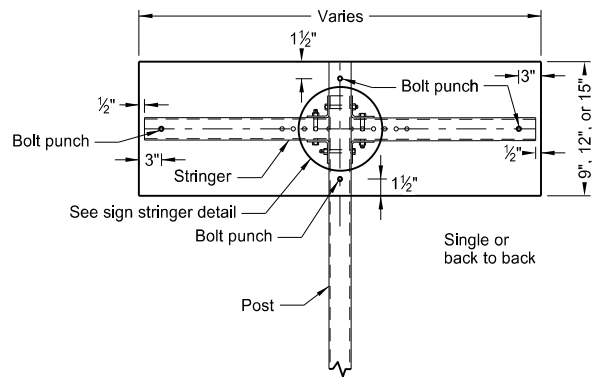
Front View

Sleeve Splice Detail

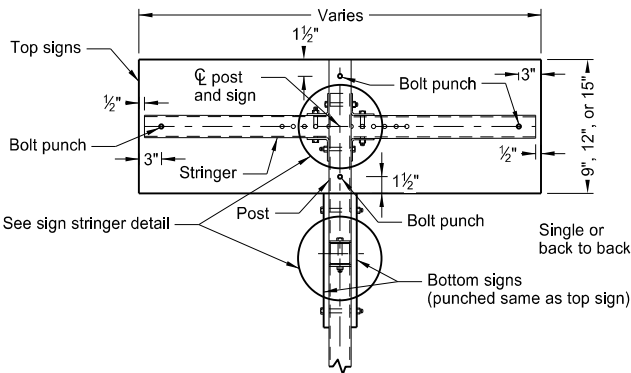
Note: Only use splice method with approval of engineer.



Sign Stringer Detail



Detail A or B



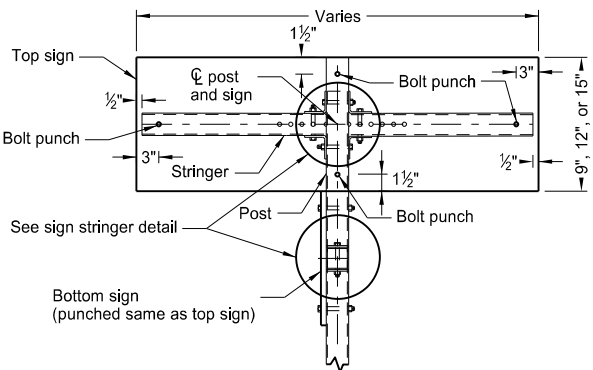
Detail D or E

Diagram illustrating the layout of a road curb and shoulder, showing dimensions and labels:

- Face of curb or edge of driving lane
- Edge of finished shoulder
- 14'
- 20' min. 30' max.
- Stop sign
- Street Name or 911 Signs
- Q. of roadway

Intersection Layout

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



Detail C

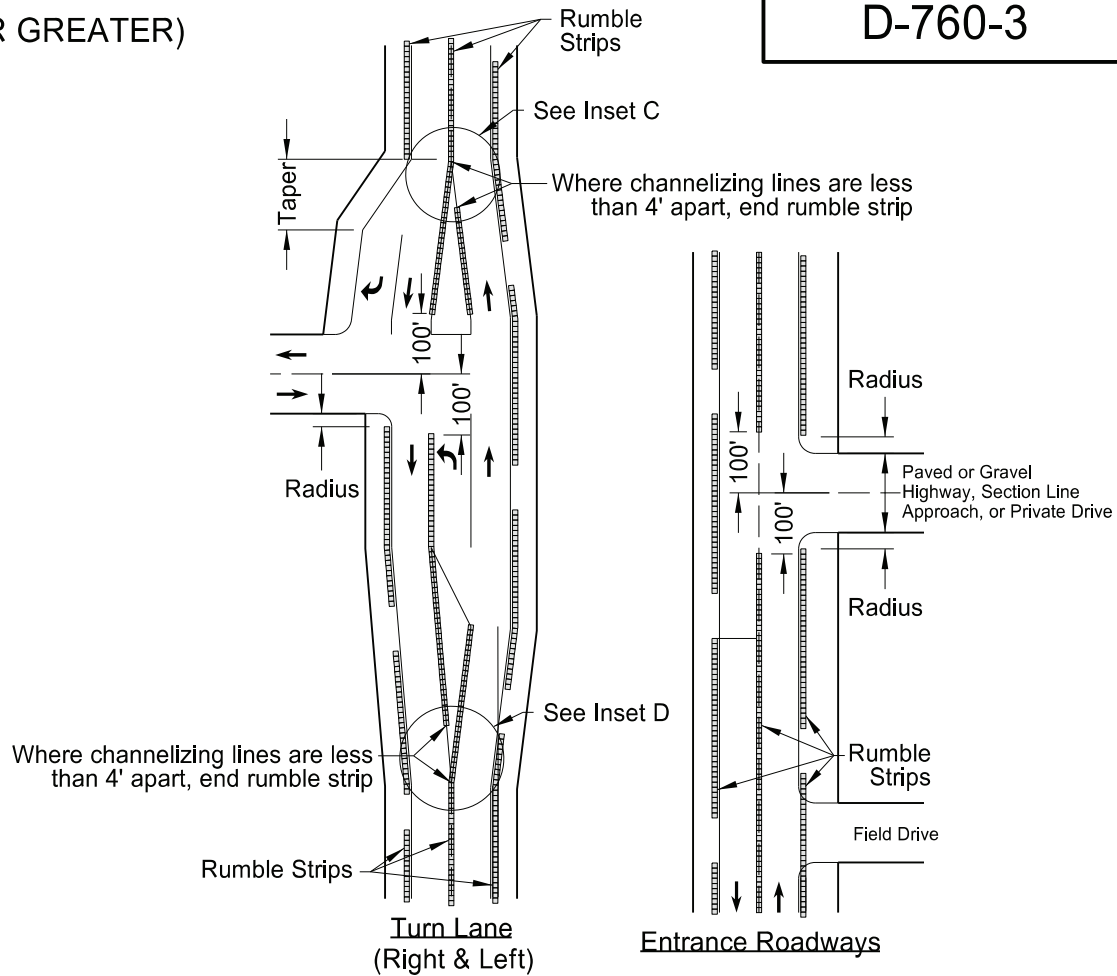
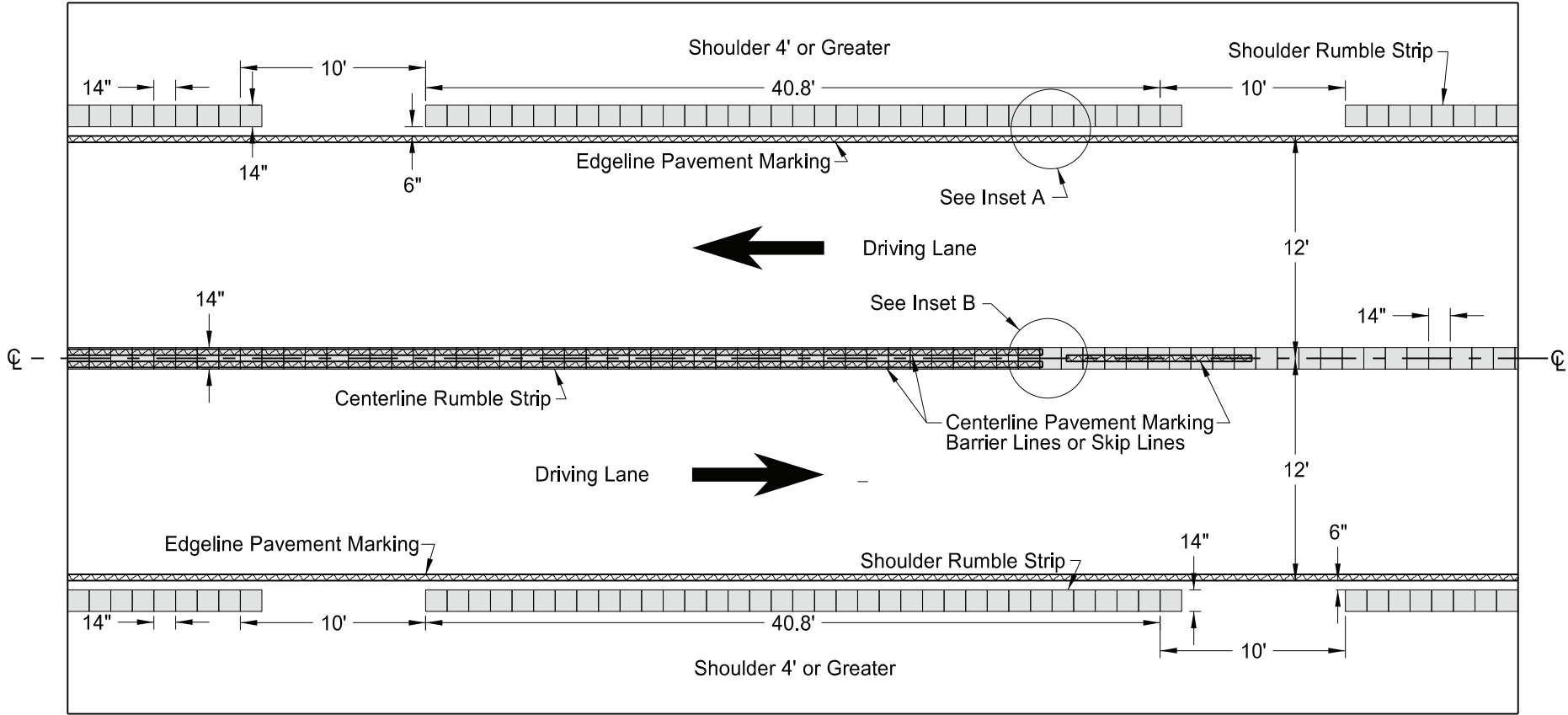
Sign Arrangements

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

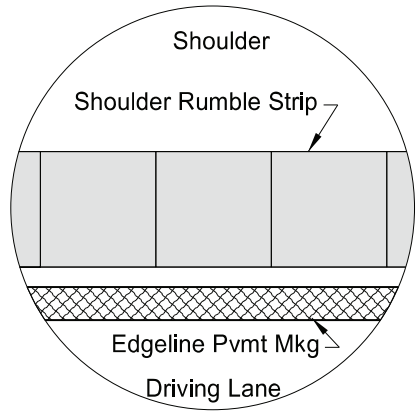
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 9/05/19 and the original document is stored at the
North Dakota Department
of Transportation

RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDER 4' OR GREATER)

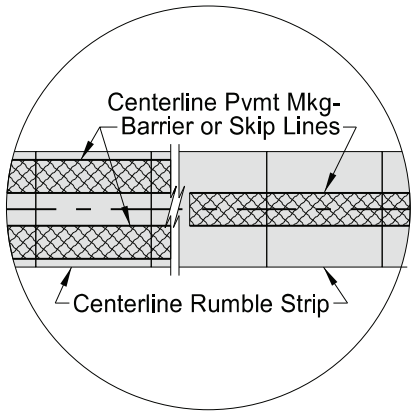
D-760-3



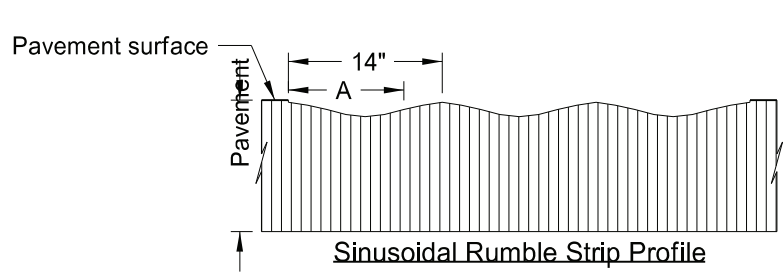
Undivided Highways (Shoulders 4' or Greater)



Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

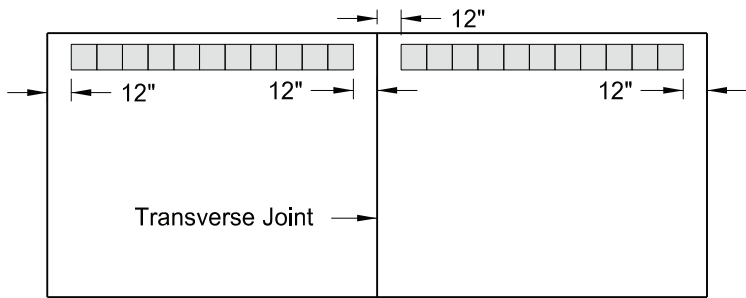


Inset B - Centerline Rumble Strip

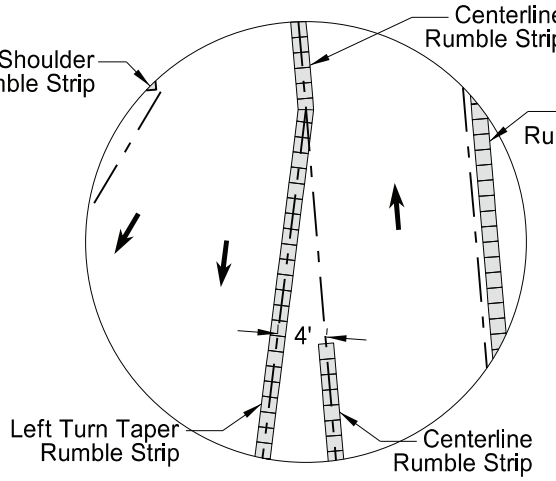


Milling Depths		
Location A (in)	MIL	Depth in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16

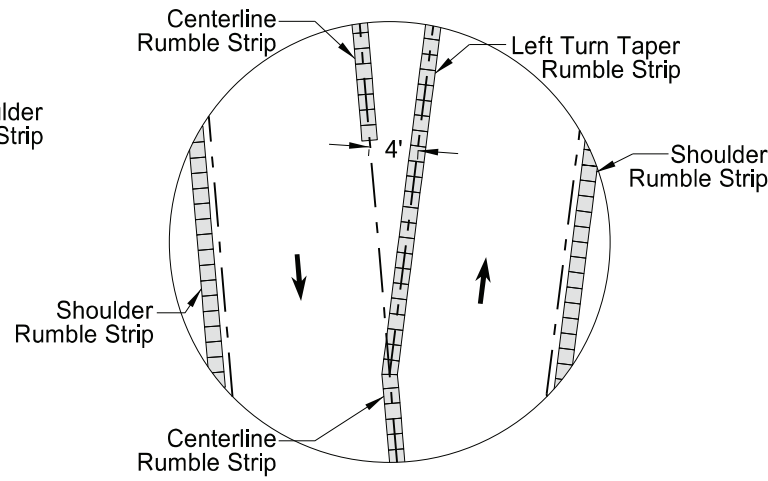
- NOTES:
- 1) Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of paved or gravel highways, section line approaches, or private drives.
 - 2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line 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".



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



Inset C



Inset D

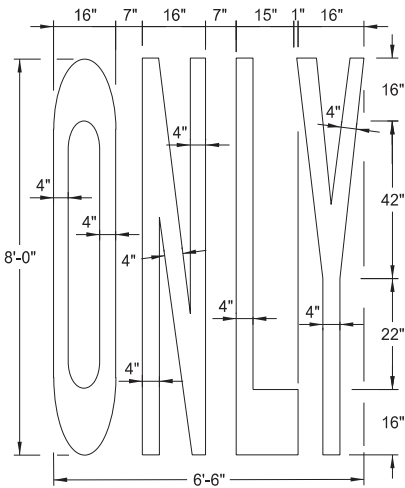
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.
11-16-21	Changed turn lane rumble layouts.
3-07-23	Added Note 3.
5-26-23	Made rumble strips sinusoidal.



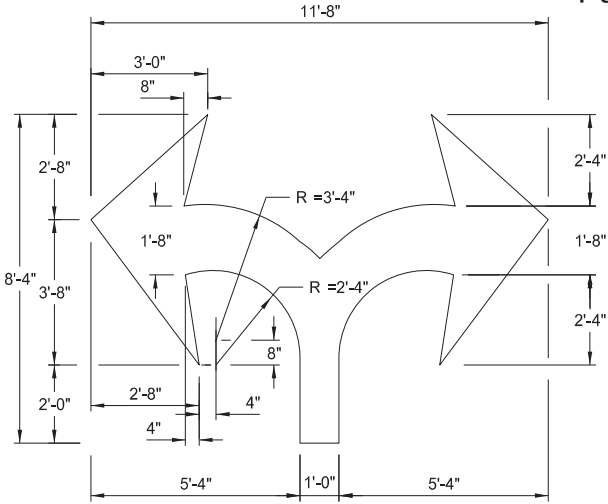
05/26/23

Pavement Marking Message Details

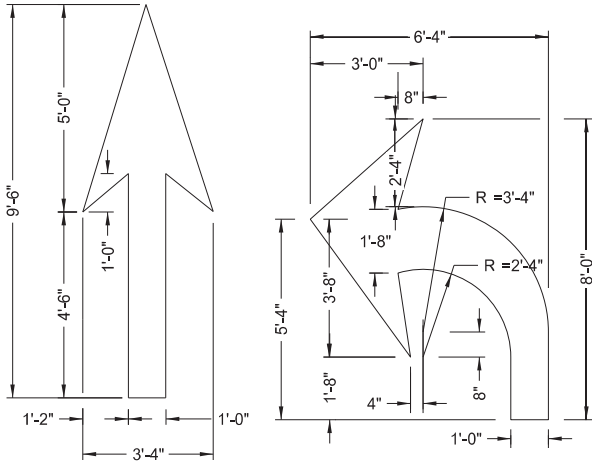
D-762-1



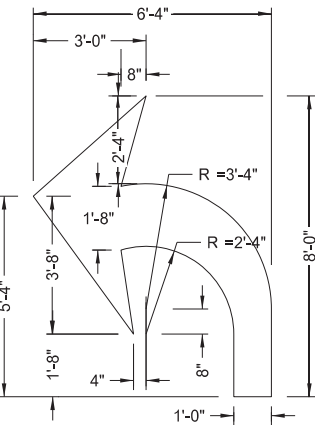
22 S. F.



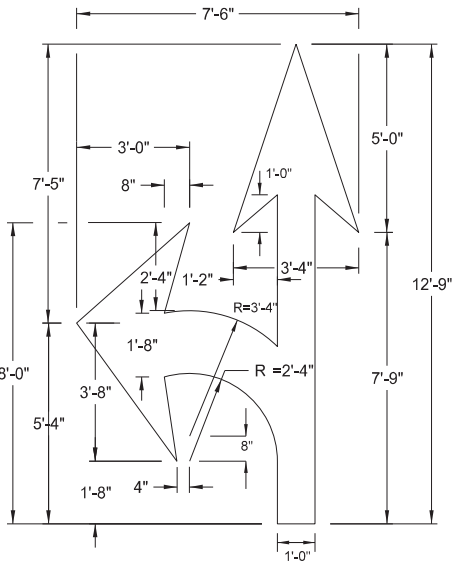
29 S. F.



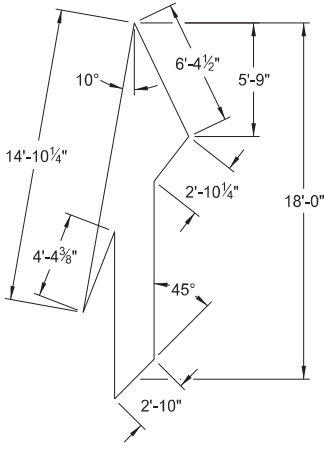
12 S. F.



16 S. F.

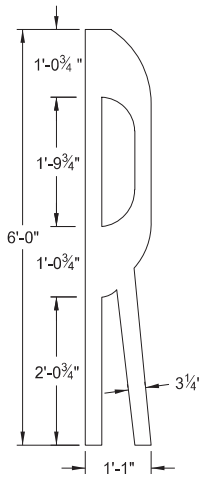


27 S. F.

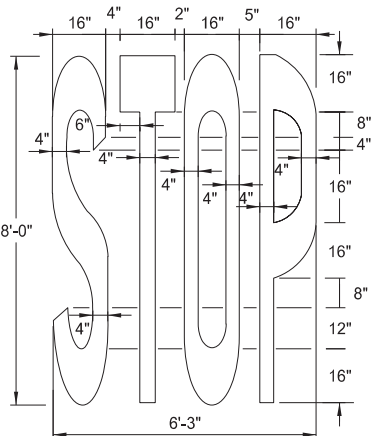


41 S. F.

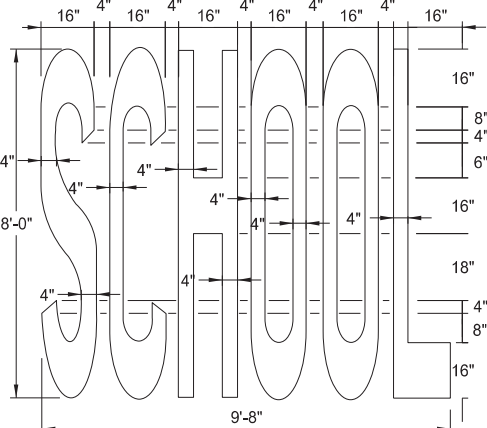
Note: Rotate merge arrow 20° from edge of roadway.



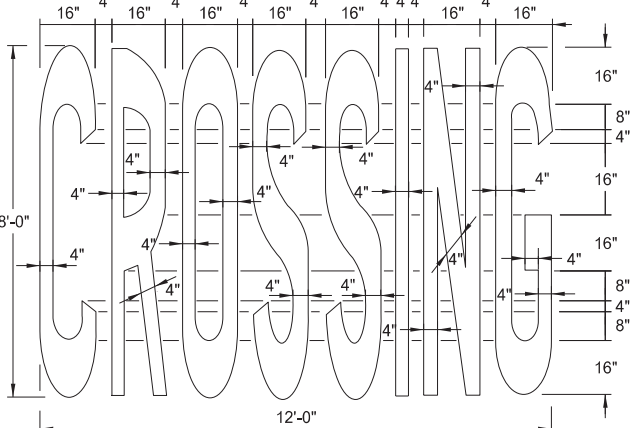
4 S. F.



22 S. F.



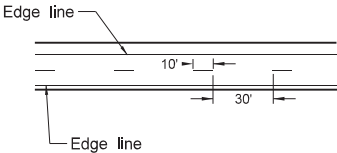
34.5 S. F.



46 S. F.

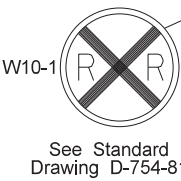
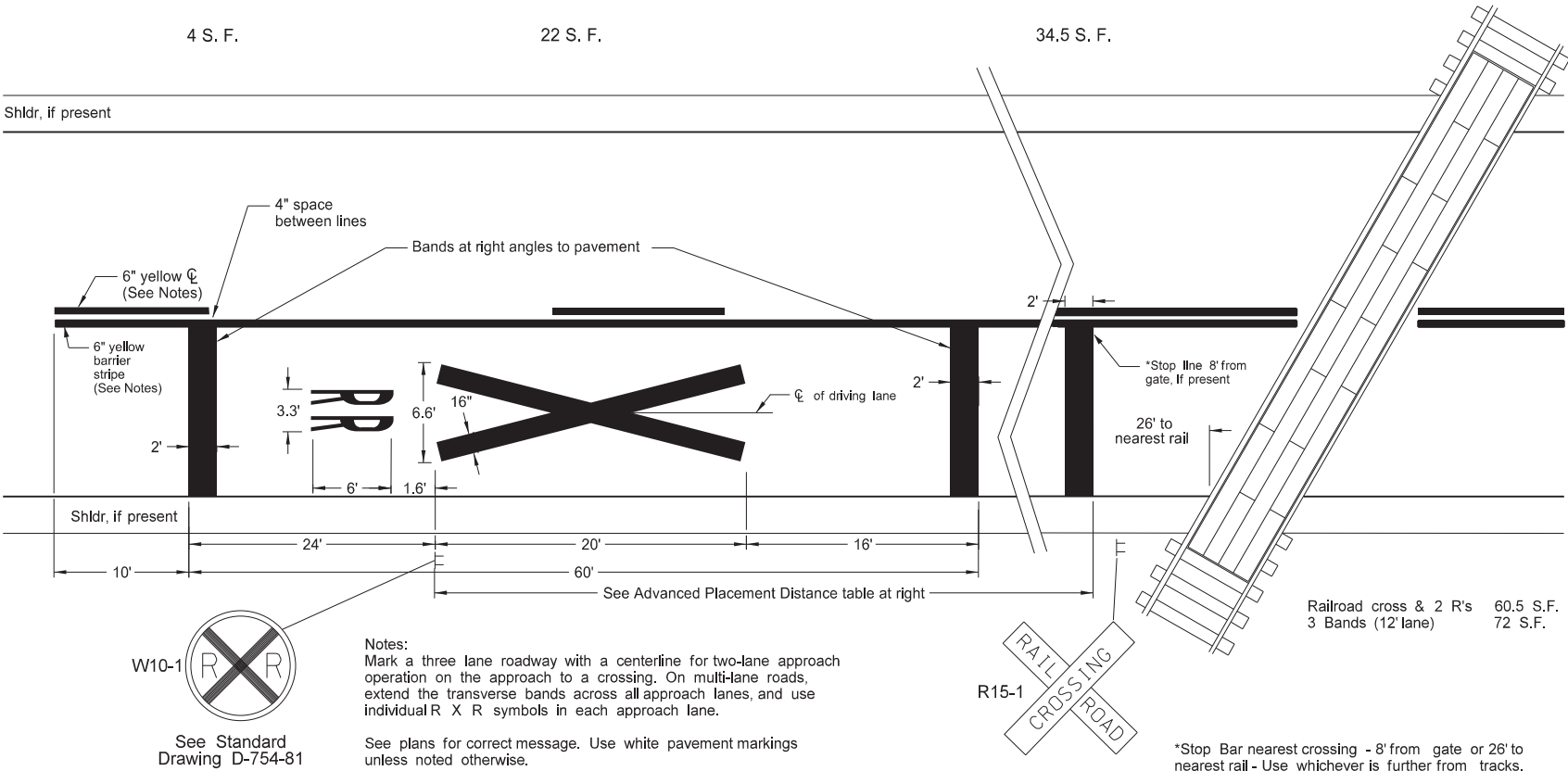
Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



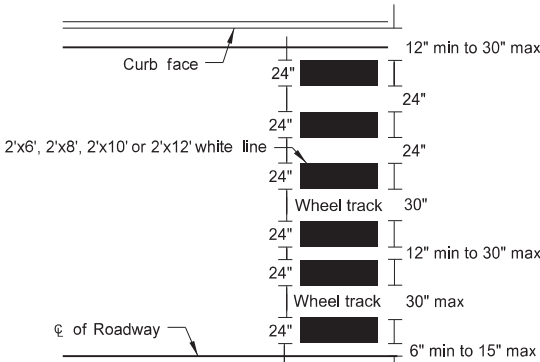
Centerline Pavement Marking Skip Spacing Detail

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



Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.
See plans for correct message. Use white pavement markings unless noted otherwise.

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



Continental Crosswalk Detail

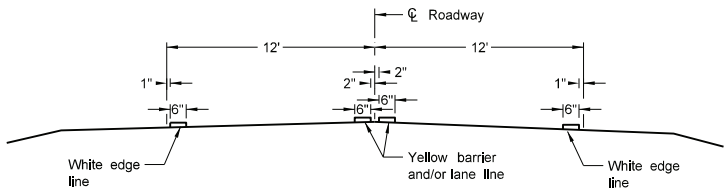
- NOTES:
1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
06-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.

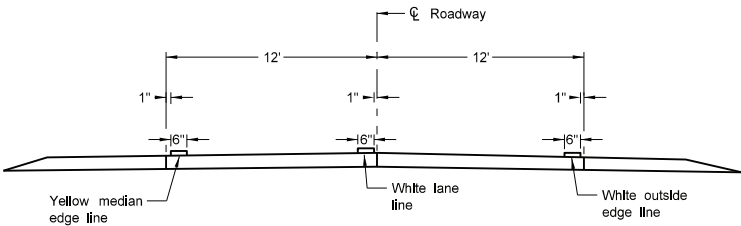


PAVEMENT MARKING

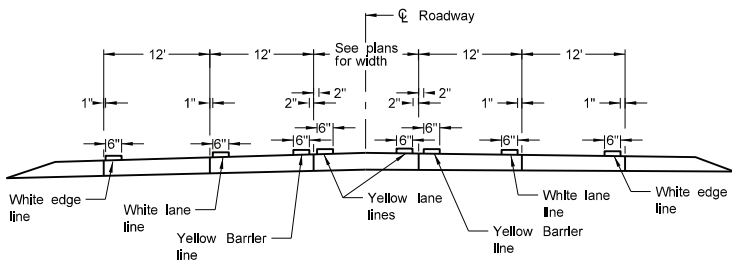
D-762-4



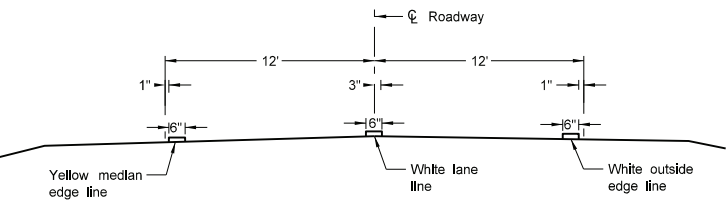
Two Lane Two Way
RURAL ROADWAY



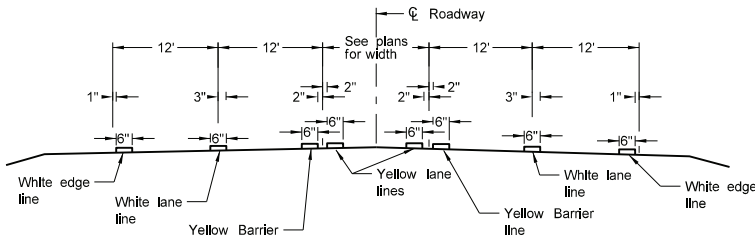
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



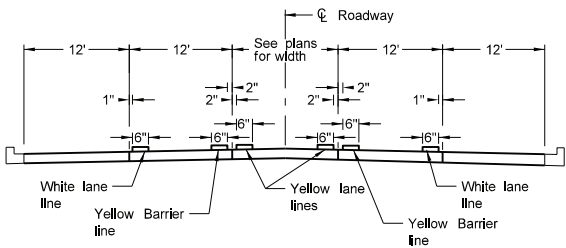
RURAL FIVE LANE ROADWAY
Concrete Section



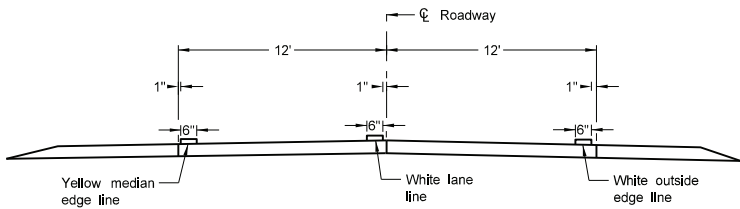
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



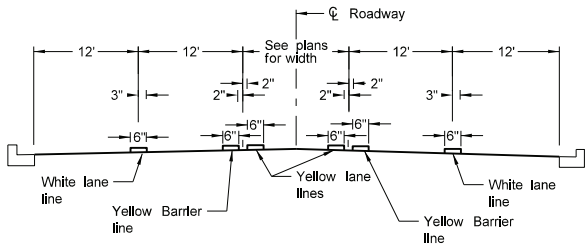
RURAL FIVE LANE ROADWAY
Asphalt Section



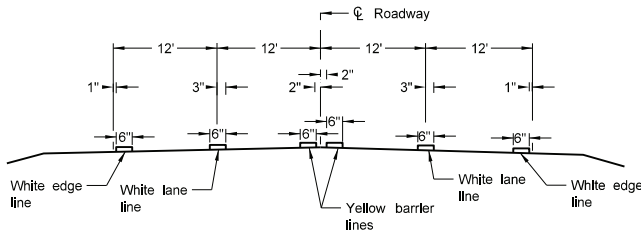
URBAN FIVE LANE SECTION
Concrete Section



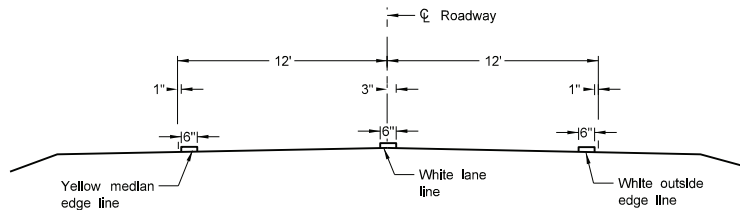
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



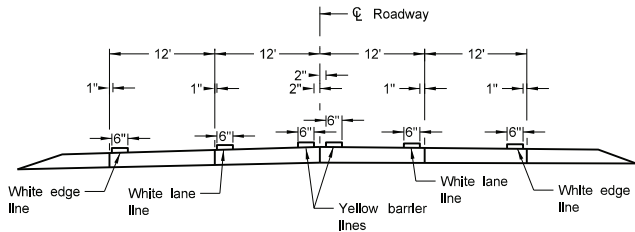
URBAN FIVE LANE SECTION
Asphalt Section



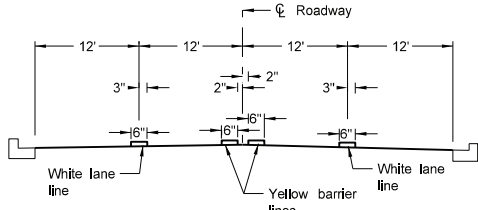
RURAL FOUR LANE ROADWAY
Asphalt Section



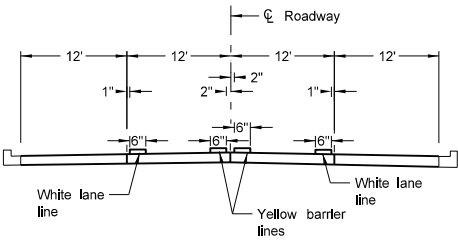
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



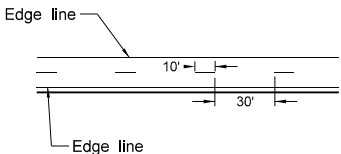
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

- 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.

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.



CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

NOTES:

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

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

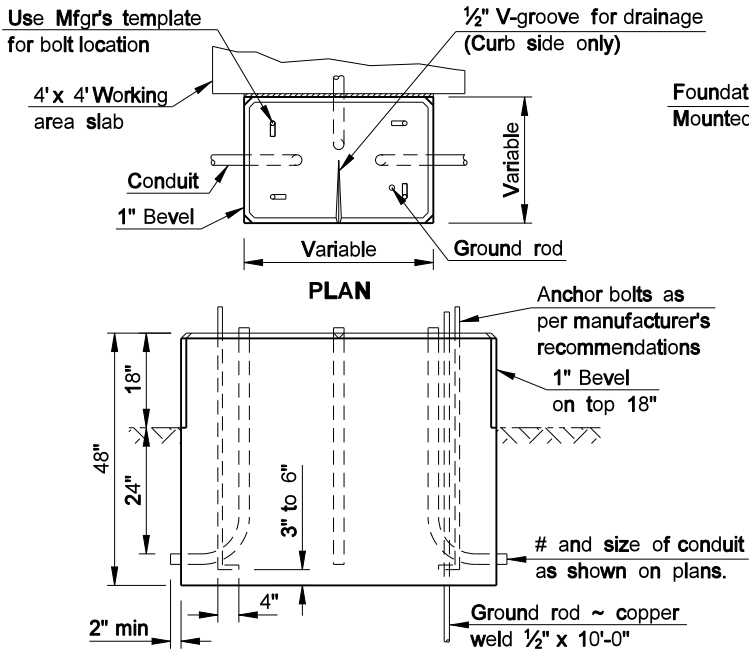
WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

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

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

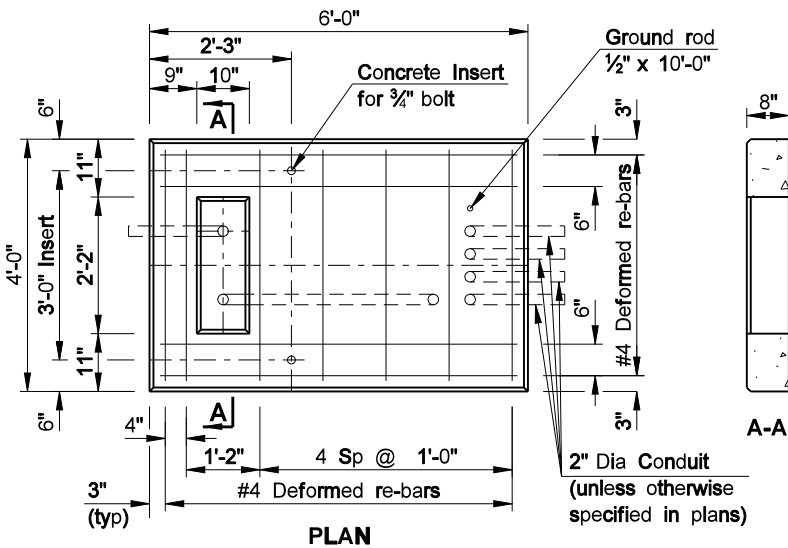
LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

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



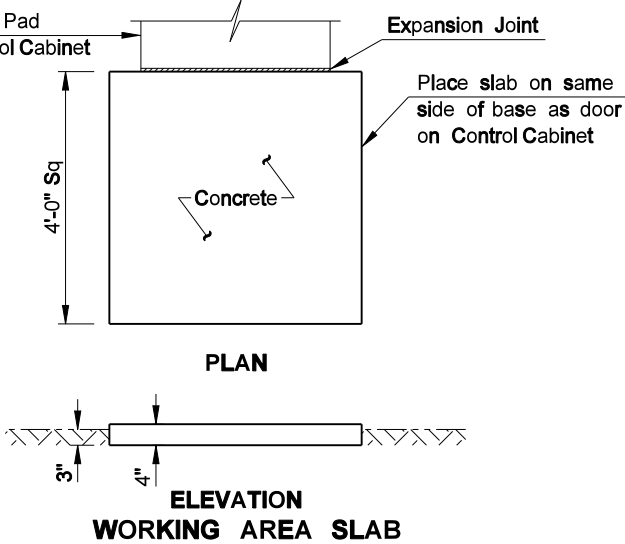
CONTROLLER CABINET FOUNDATION PAD MOUNT

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

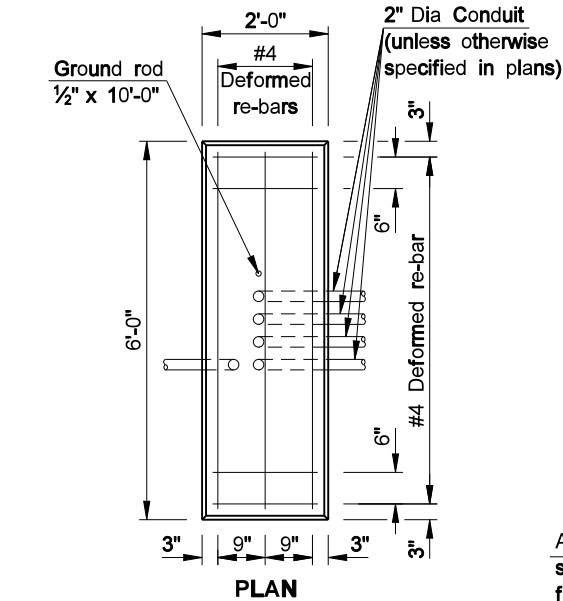


TRANSFORMER & FEED POINT
CABINET FOUNDATION PAD MOUNT

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

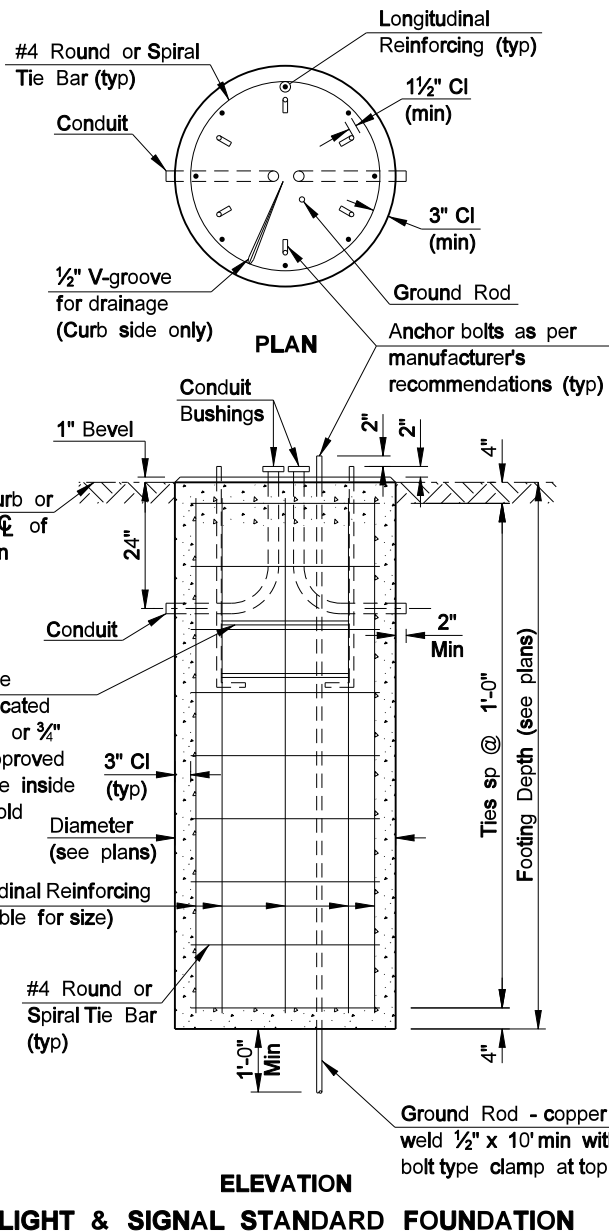
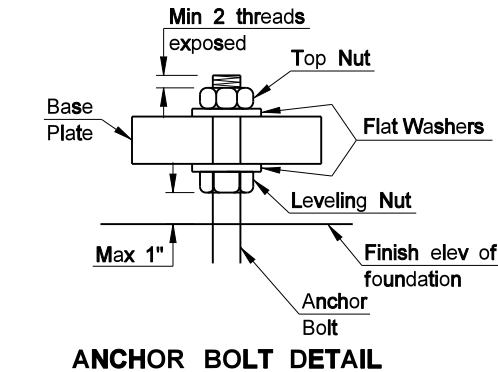


The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



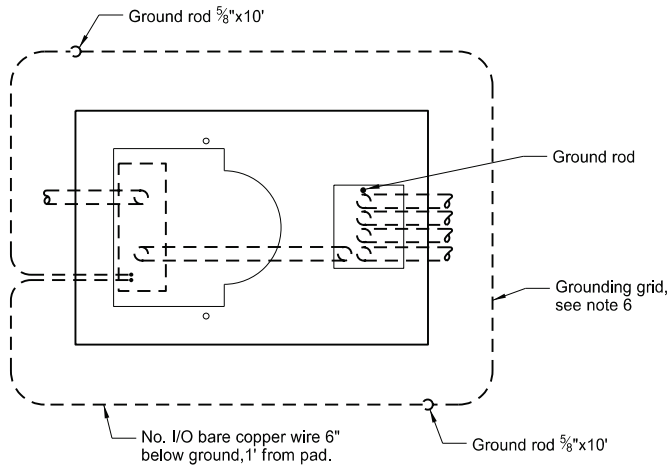
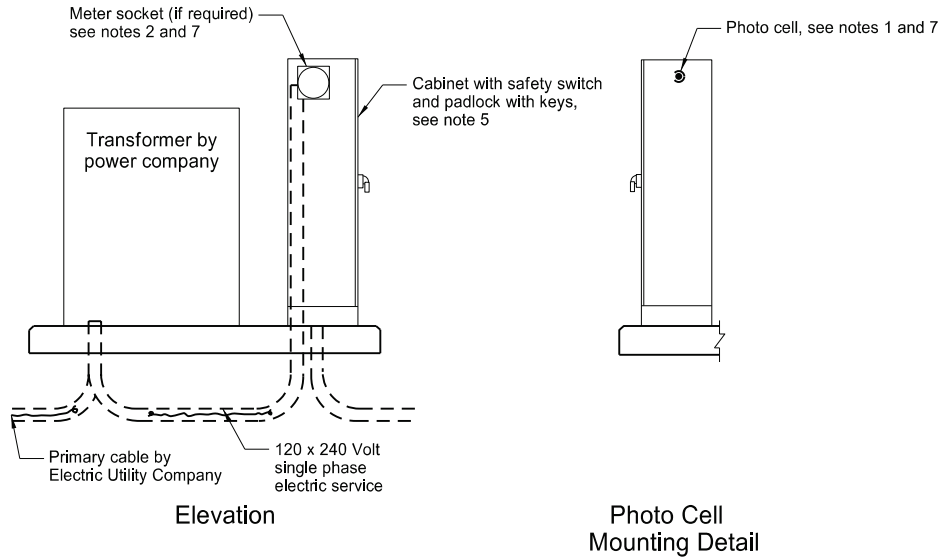
FEED POINT CABINET
FOUNDATION PAD MOUNT

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

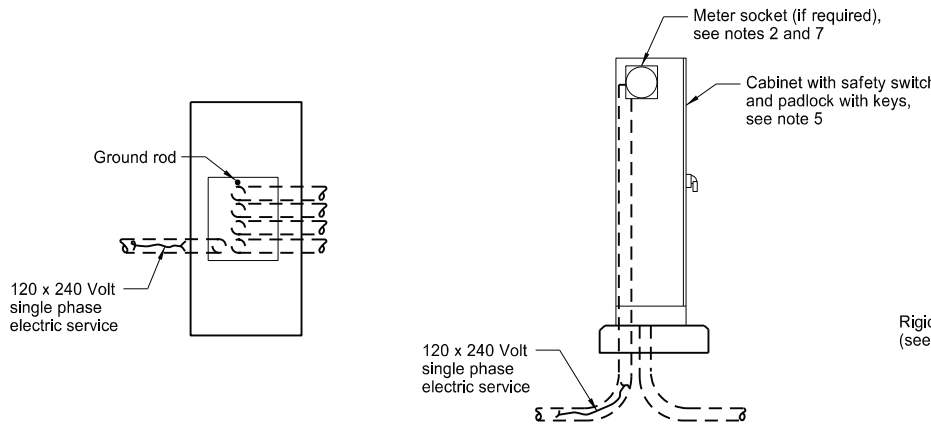


LIGHT & SIGNAL STANDARD FOUNDATION

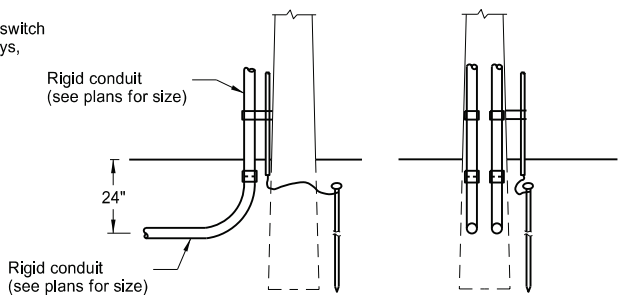
FEED POINTS
(ROADWAY LIGHTING)



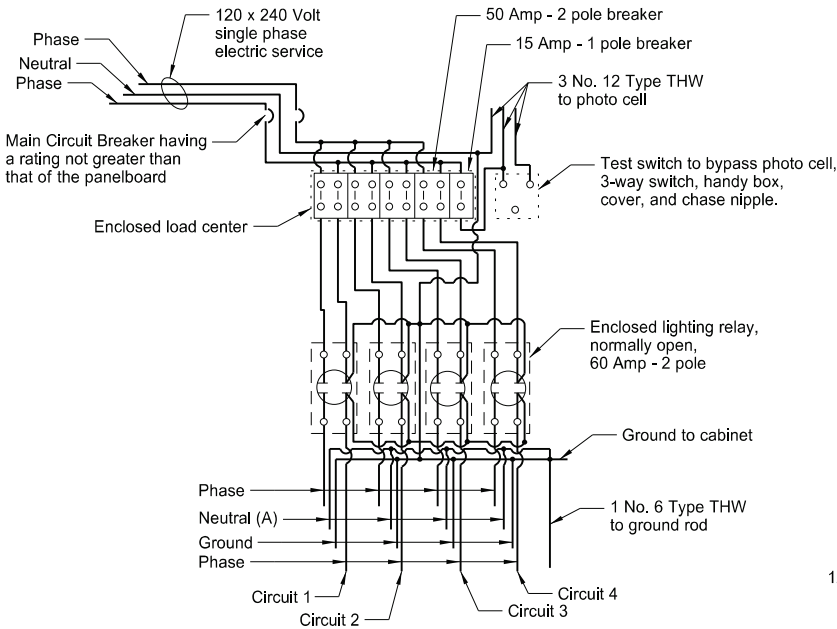
Plan
Transformer and Feed Point Cabinet Pad Mounted



Plan
Elevation
Feed Point Cabinet Pad Mounted



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



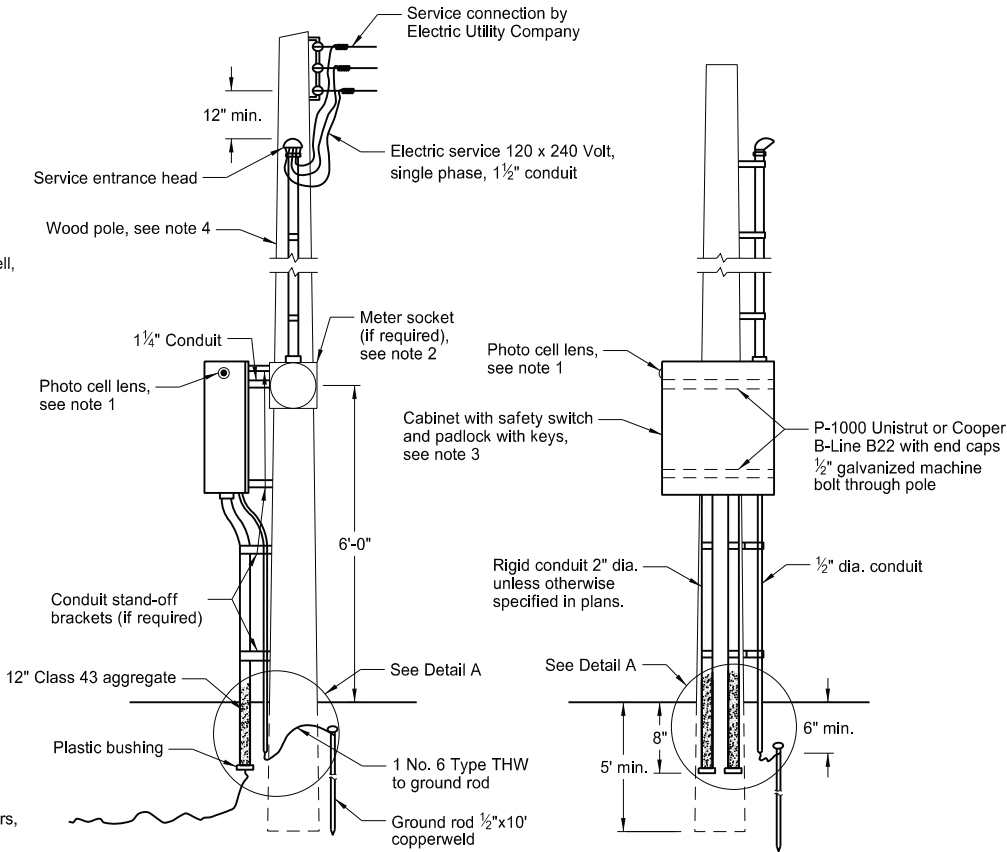
Feed Point Type IV

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

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

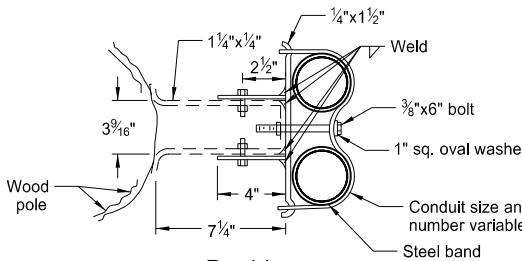
Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.

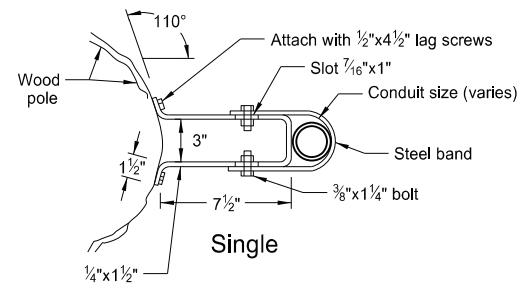


Feed Point Pole Mounted

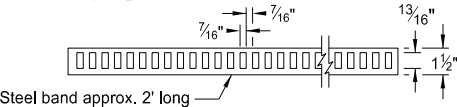
- Notes:
- Photo Cell: Furnish and install the photoelectric cell. Face photo lens north.
 - Meter Socket: Install meter socket and trim if the meter is required by local Utility Company. Meter furnished and installed by Utility Company.
 - Pole Mounted Cabinet: Provide cabinet with lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Shop coat cabinet with one coat of primer and two coats of exterior gray enamel.
- Provide 30" high x 24" wide x 8" deep Type I and II feed points. Provide 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep Type III and IV feed points.
- Wood Pole: Provide minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
 - Pad Mounted Cabinet: Provide 56" high x 26" wide x 14" deep weatherproof cabinet. Minimum 12 gauge steel or aluminum with provisions for padlock.
 - Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more 5/8"x10' copperweld ground rods in parallel or series at two corners. Provide a minimum distance between ground unit assemblies of 6'0".
 - Meter Location: Do not mount the meter (if required) on the same side of the cabinet as the photo cell.



Double



Single



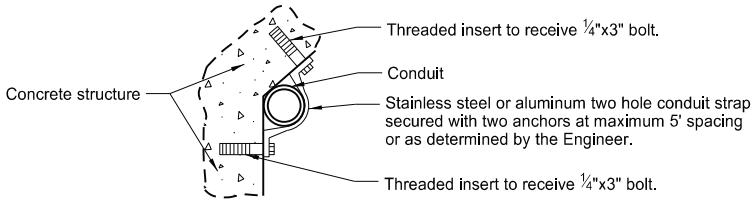
Conduit Standoff Bracket

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

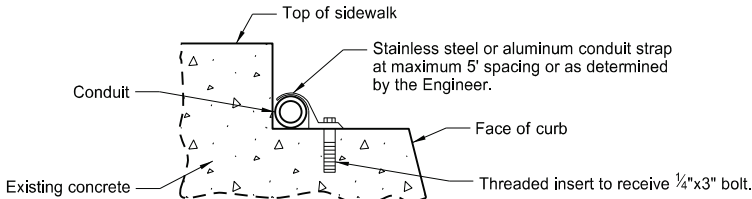
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
07-08-14	Revised note 3.
10-17-17	Updated to active voice.
08-28-19	New Design Engineer PE Stamp.
11-01-24	Revised note 5.



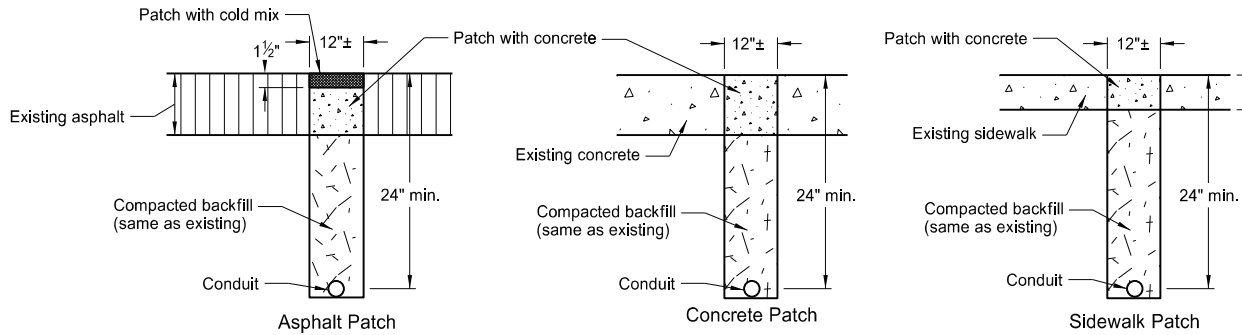
LIGHTING AND SIGNAL DETAILS



Bridge Mounted Conduit Hanger

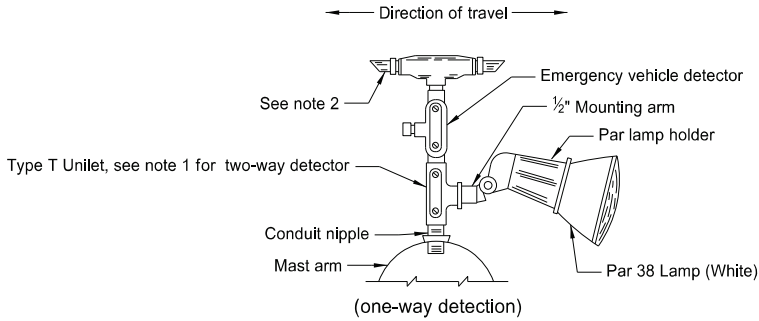


Bridge Curb Mounted Conduit

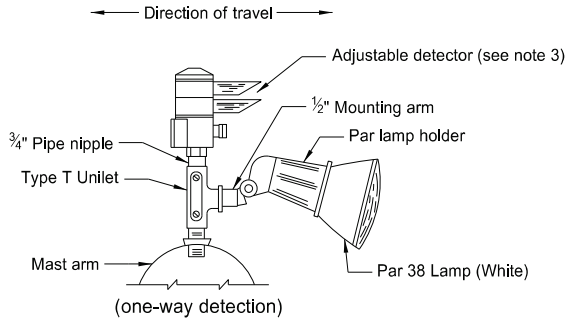


Surface Patch Details

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

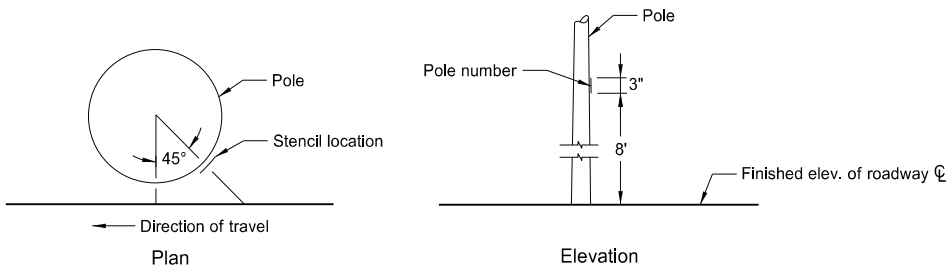


Emergency Vehicle Detector Detail



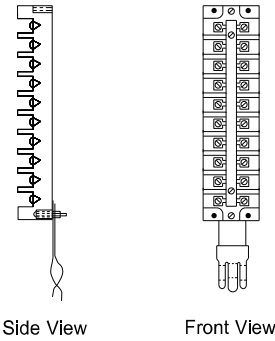
Alternate Emergency Vehicle Detector Detail (adjustable)

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

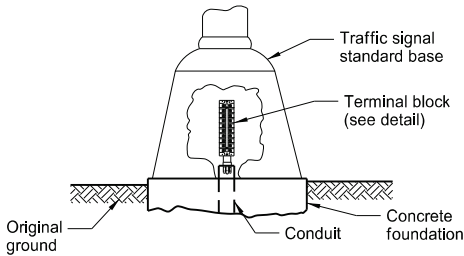


Light Standard Numbering

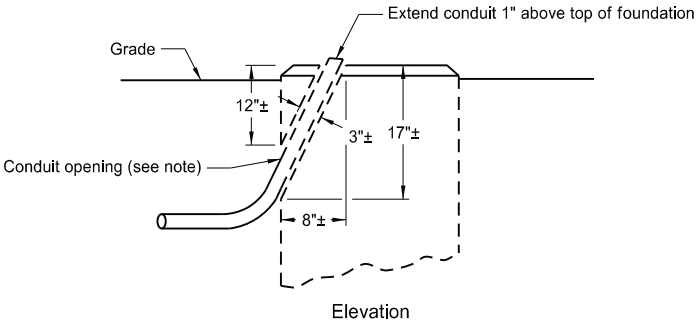
Note: On the roadway side of each light standard, stencil the pole number using contrasting color paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.



Terminal Block Detail

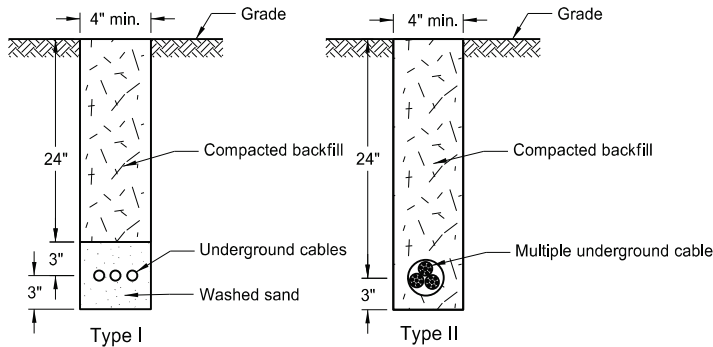


Terminal Block (rigid mounted)



Revise Concrete Foundation

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



Cable Trench

Note: Seed entire area disturbed by trenching.

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

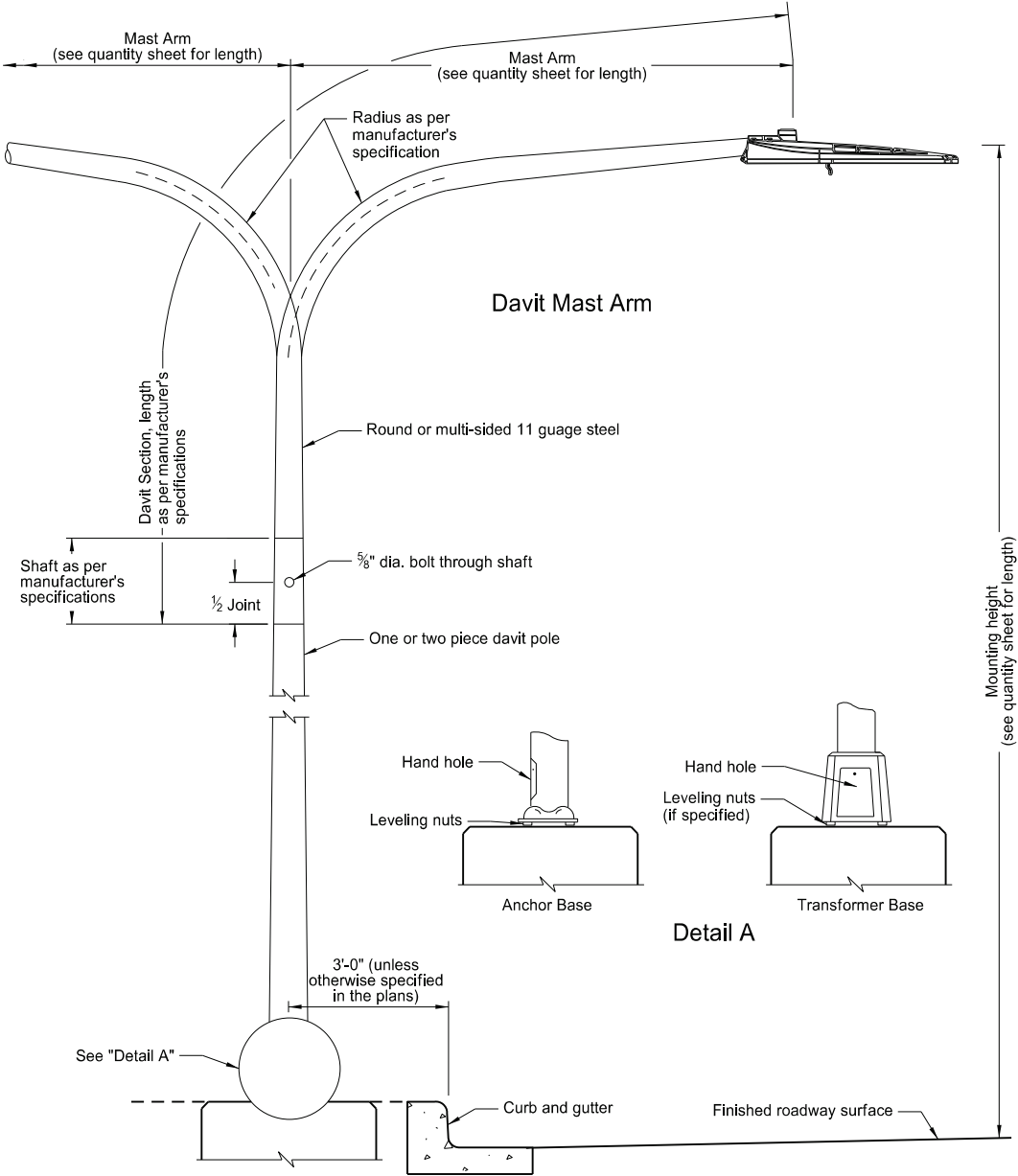
PE-4683

12/06/24

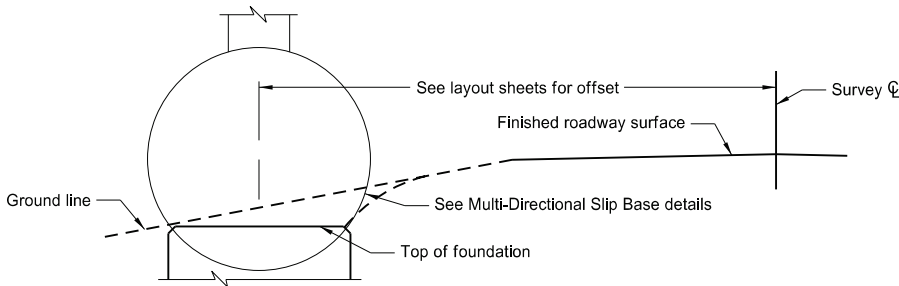
ENGINEER

NORTH DAKOTA

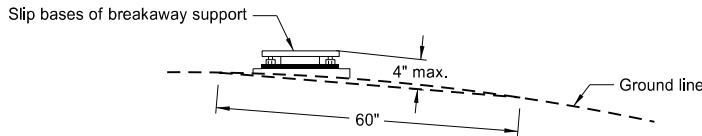
LIGHT STANDARD DETAILS



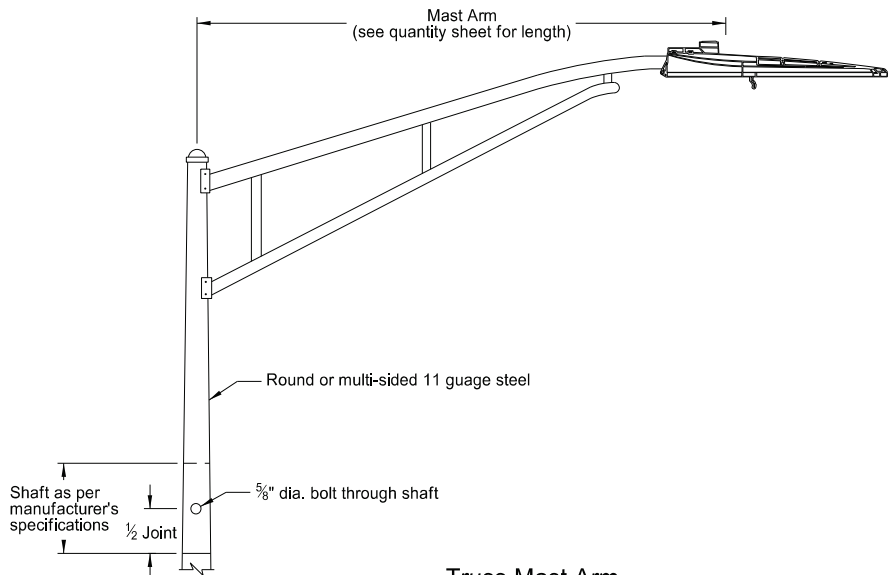
Light Standard Details



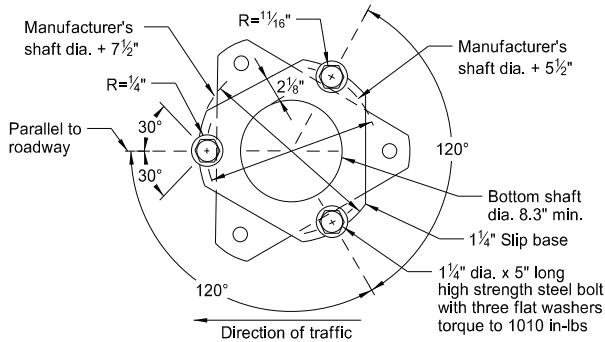
Concrete Foundation Location



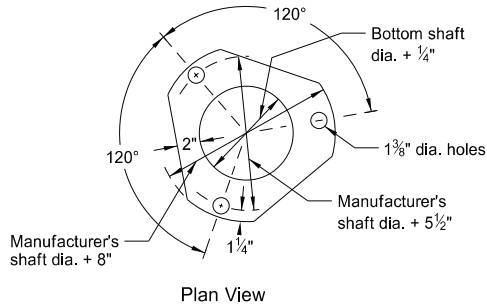
Breakaway Support Stub Clearance Diagram



Truss Mast Arm



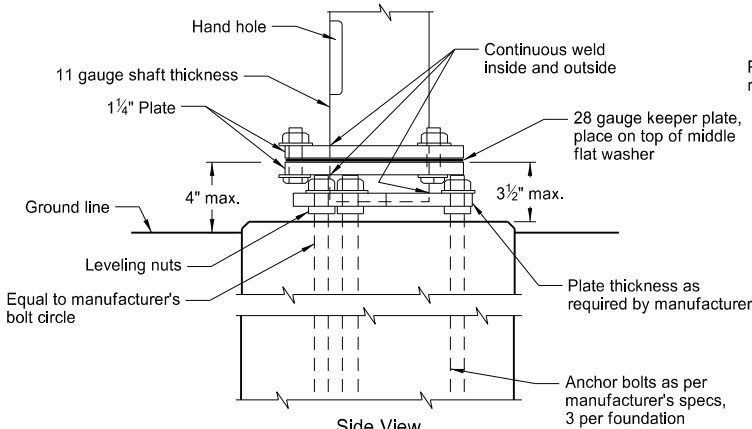
Top View



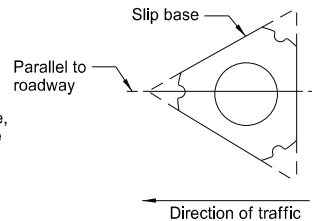
Plan View

Keeper Plate Detail (A)

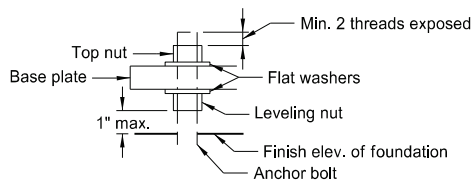
(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. Galvanize Keeper plate after fabrication.



Steel Base Detail

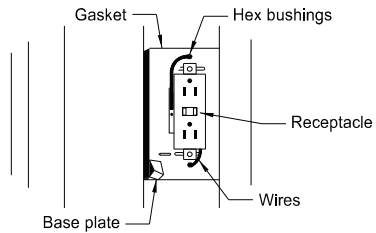


Slip Base Placement Detail

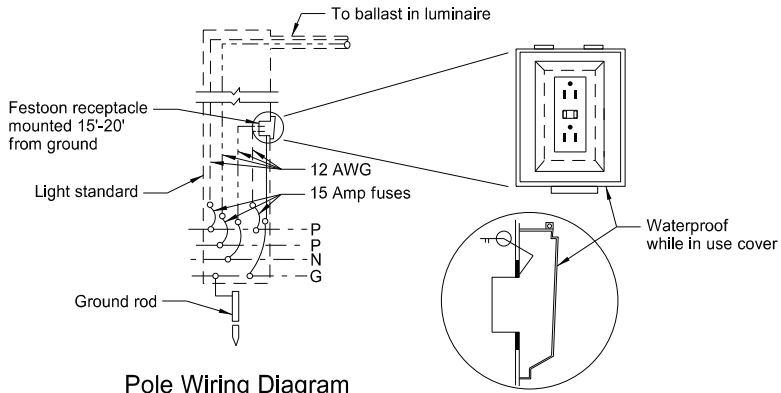


Anchor Bolt Detail

Multi-Directional Slip Base



Optional: Festoon receptacle mounted on multi-sided pole.



Receptacle Mounting Detail (B)

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

Notes:

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

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

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

Fusing: Fusing in base, see specifications.

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

