

DESIGN DATA				
Traffic	Average Daily			
Current 2019	Pass: 10,610	Trucks: 365	Total: 10,975	
Forecast 2039	Pass: 10,770	Trucks: 270	Total: 11,040	
Clear Zone Dist. Existing		Design Speed: 55 mph		
Minimum Sight Dist. for Stopping:		Bridges: NA		
Full Control of Access, No Point of Access Other Than at Interchange Ramps				
Pavement Design Life 20 (years)				
Design Accumulated One-way Rigid ESALs:				

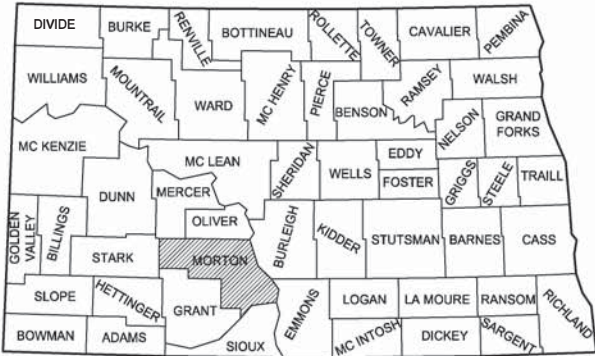
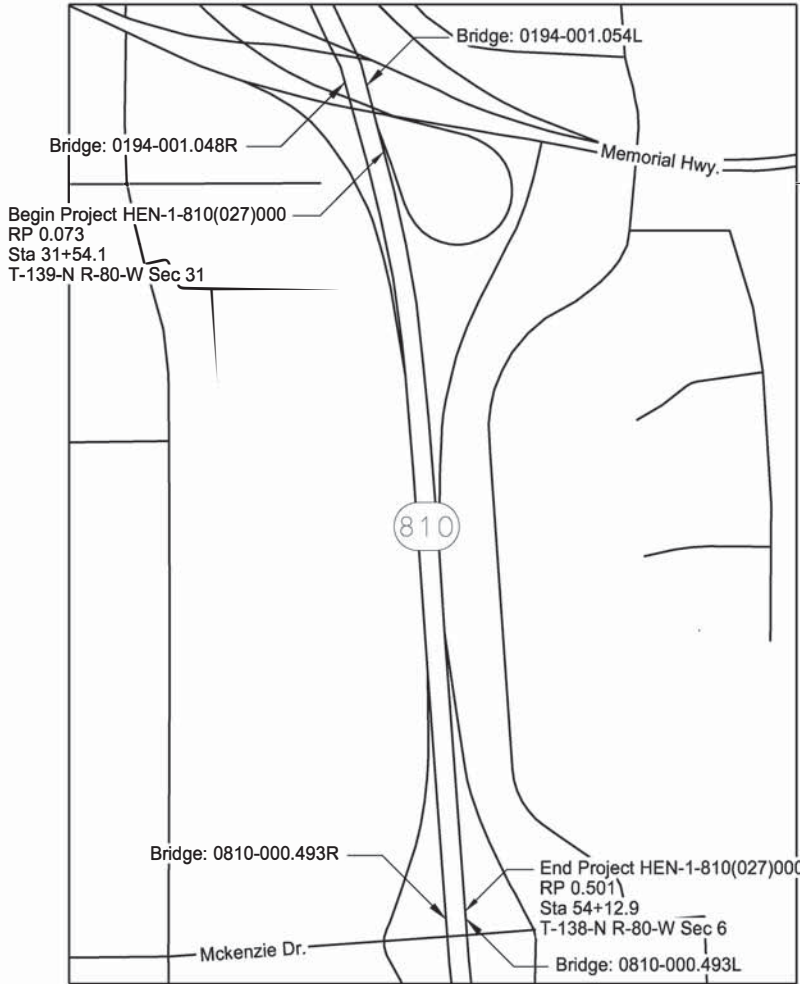
JOB #22
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

HEN-1-810(027)000
Morton County
ND 810 from Memorial Hwy to Mckenzie Dr
PCC Pavement & Concrete Median Barrier

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	22441	1	1

GOVERNING SPECIFICATIONS:
2020 Standard Specifications adopted by the North Dakota
Department of Transportation and the Supplemental Specifications
effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
HEN-1-810(027)000	0.428 mi	0.428 mi



STATE COUNTY MAP

DESIGNER Aaron Murra P.E.
DESIGNER Brady Haussler P.E.
DESIGNER Jakob Ebinger
DESIGNER Mackenzie Holkesvig

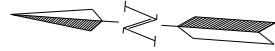
ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
 Orn, Chad M.
09 04 2020

Design Division

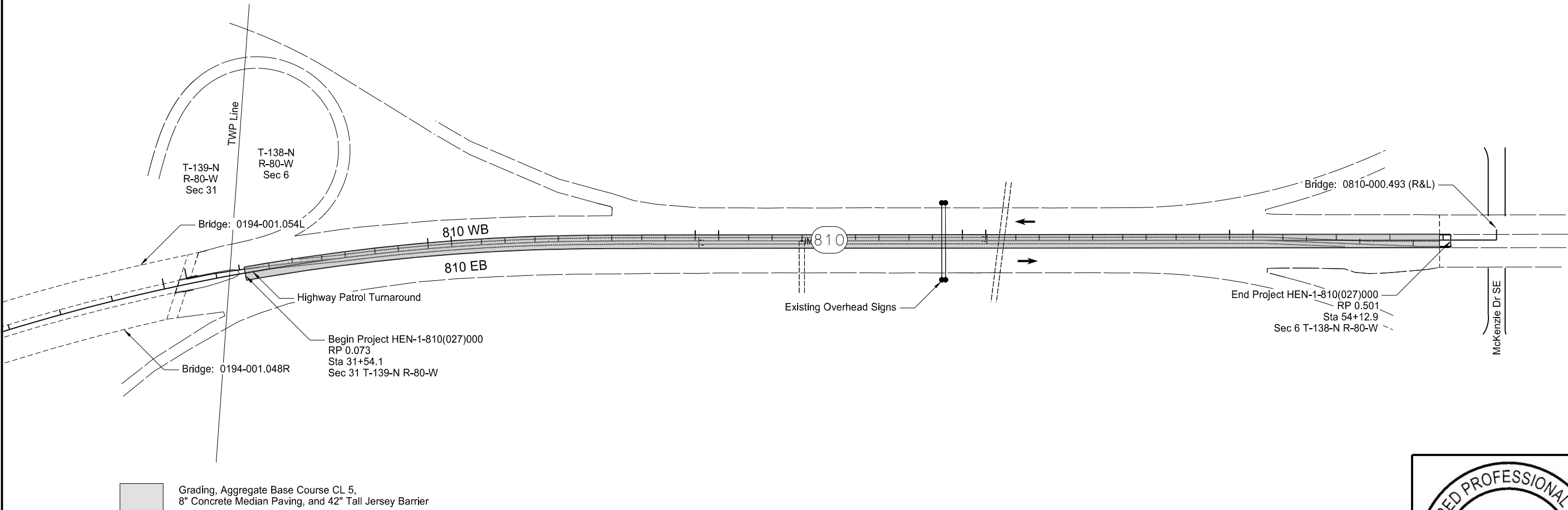


09/04/20

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2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
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8	1	Quantities	D-101-40	Cross Section Legend					
10	1	Basis of Estimate	D-261-1	Erosion Control - Fiber Roll Placement Details					
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Scope of Work

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

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NOTES

- 100-P01 COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2021 construction season. This project is on the Expressway Bridge and is located at RP 0.501
- 202-P01 REMOVAL OF BITUMINOUS SURFACING: Removal of the existing hot bituminous pavement includes the aggregate base beneath it. Removal is based on the area between edge of proposed pavement and bottom of existing aggregate sluff.
- 203-P01 EXCESS TOPSOIL & EXCAVATION: Haul excess material to an approved location outside of NDDOT right-of-way. Include costs related to hauling excess excavation and topsoil off the project in the unit price bid for "COMMON EXCAVATION-WASTE" and "TOPSOIL."
- 550-P01 REMOVAL OF SIGNS: Remove signs in the median at Sta 40+06 and Sta 45+46 as shown in the plans. Include all costs in the unit price bid for "CONCRETE MEDIAN PAVEMENT."
- 550-P02 STORM SEWER CASTINGS: Install storm sewer castings while the concrete is still in a plastic state and in a manner that does not create additional joints in the pavement, which were not part of the designed joint layout. Install inlet castings that are adjacent to the concrete roadway concurrently with the driving surface paving operation. Install manhole castings that lie within the limits of the concrete pavement with the paving operation. Install castings 1/4 inch to 3/8 inch below the finished pavement surface.

If installing a casting after the paving machine has passed, use vibratory methods to consolidate concrete placed or disturbed as part of the casting installation.

Include all costs in the unit price bid for "CONCRETE MEDIAN PAVEMENT."
- 602-P01 JERSEY BARRIER FORMED OR SLIP FORMED: Measure the ND 810 mainline jersey median barrier walls from the beginning to the end of each wall segment installed, including overlapping portions.

Construct the barriers according to the provisions of Section 602.04, but do not use deflection joints. Make 3/4" V-grooves in all faces of the barriers at 15 foot spacings to match transverse joints in median slab.

Finish the jersey barrier walls with surface finish "D." Provide a surface finish color to match the color of the existing permanent concrete median barrier on ND 810 at the beginning and end of the project limits.

Install vertical steel reinforcement spaced at 8" C to C. Use grade 60 steel for the reinforcing. Include the costs for all labor, equipment, and materials required to install the A1, A2, and longitudinal bars in the unit price bid for "JERSEY BARRIER FORMED OR SLIP FORMED."

Construct the barriers using Class AAE-3 concrete.

Include furnishing and installing Class AAE-3 concrete, grade 60 reinforcing steel, chemical adhesive, mastic, joint sealant materials, and all other materials, equipment, and labor required to complete the installation as shown in the plans in the unit price bid for "JERSEY BARRIER FORMED OR SLIP FORMED."

Include all costs associated with the saw cutting, removal, and disposal of concrete in the unit price bid for "JERSEY BARRIER FORMED OR SLIP FORMED."

- 704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.
- 704-P01 TRAFFIC CONTROL: Provide temporary traffic control consisting of inside shoulder closures and flagging as described. Close the inside lane and shoulder on EB and WB and maintain existing lane widths. Take down lane closures and open all lanes to traffic when work is not anticipated on this project for the following day. The traffic control device list was developed using the following standard drawings:

D-704-12 for 1 shoulder closures
D-704-35 for 2 single lane closures

To operate in a manner different than what is described, provide a complete traffic control layout to the Engineer for review and approval prior to work being performed.
- 704-P02 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: If the shoulder and adjacent driving lane are not even at the end of the day, the following criteria will apply:

Place the following sign assembly at the locations listed below.

Sign Assembly: Sign No. W8-17-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52P-54 to identify the distance.

Locations:
 - In advance of the drop off;
 - Spaced at each mile from the advance sign; and
 - At major intersections (CMC routes, state and US highways, and Interstate Ramps).
If the difference in elevation between the shoulder and the driving lane is 2" or greater, construct a slough on the driving lane that is 4:1 or flatter.

If the difference in elevation between the shoulder and driving lane is less than 2", no slough is required.

Sign assemblies will be measured and paid for according to Section 704 "TEMPORARY TRAFFIC CONTROL."
- 708-P01 INLET PROTECTION: Include all costs for installing, cleaning, removing sediment, maintaining, removing, and replacing damaged inlet protection devices in the unit price bid for "INLET PROTECTION-SPECIAL."
- 714-P01 PIPE CONDUIT JACKED OR BORED: Supply pipe meeting Section 830.02 F, "Smooth Wall Steel Pipe"; pipe meeting ASTM A 252, Grade 2; or pipe meeting ASTM A 53, Grade B.

Provide pipes with a minimum wall thickness as specified in Table 830-01 of the Standard Specifications.
- 714-P02 PIPE CONDUIT JACKED OR BORED: The culvert consists of separate bid items for each portion: "PIPE CONC REINF 30IN CL III-STORM DRAIN" and "PIPE CONDUIT 30IN – JACKED OR BORED". The pay lengths of the pipe bid items are as shown for the type and size specified per linear foot.



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Include all costs for required materials, labor, and equipment (including connecting bands or Couplers), and restoring bore pits to pre-construction conditions in the unit price bid for "PIPE CONDUIT 30IN – JACKED OR BORED."

722-P01 REMOVE INLETS: Remove the existing drain frames, grates, and risers, and modify the ends of the existing reinforced concrete outlet pipe to fit the new inlets.

Backfill the remaining hole with CI 5 aggregate base course. Place and compact the backfill in 6-inch layers using a mechanical tamper with an appropriate sized tamping head.

Include the costs for all labor, equipment and materials required to remove the inlets as described above in the unit price bid for "REMOVAL OF INLETS."

Include the costs for all labor, equipment, and materials required to install the inlets, including modifying the outlet pipe to connect to the new inlets, edge drain modification, and backfilling the remaining hole as described above in the unit price bid for "INLET - TYPE 2 DOUBLE."

722-P02 INLETS AND MANHOLES: All new inlets except 11A have been specified with a minimum 4-foot riser height. At inlets 10A, 11A, and 12A, base elevations have been set deeper than required for the outlet storm drain conduit. Fill void between inlet base and bottom of lowest pipe with Class AE-3 concrete, and then slope the inlet bottom to drain using either Class AE-3 concrete or mortar in accordance with the details shown on standard drawings D-722-1B and D-722-2. Include the costs to accomplish this work in the unit price bid for the respective inlet pay item.

764-P01 REMOVE W-BEAM GUARDRAIL & POSTS: Deliver the removed W-beam guardrail materials to the Bismarck District back lot:

Bismarck District Office
218 Airport Road
Bismarck, ND 58504-6003

Neatly stack the materials at a location designated by the Engineer.

Include the cost for delivery and stacking of the removed W-beam guardrail materials in the unit price bid for "REMOVE W-BEAM GUARDRAIL & POSTS."



ESTIMATE OF QUANTITIES

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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.3	0.3
202	0132 REMOVAL OF BITUMINOUS SURFACING	SY	3,895	3,895
202	0230 REMOVAL OF INLETS	EA	1	1
203	0109 TOPSOIL	CY	788	788
203	0113 COMMON EXCAVATION-WASTE	CY	634	634
216	0100 WATER	M GAL	81	81
230	0320 SUBGRADE PREPARATION-TYPE C-12IN	STA	23	23
255	0102 ECB TYPE 2	SY	75	75
261	0112 FIBER ROLLS 12IN	LF	15	15
302	0120 AGGREGATE BASE COURSE CL 5	TON	2,933	2,933
550	3005 CONCRETE MEDIAN PAVEMENT	SY	6,273	6,273
602	1200 JERSEY BARRIER FORMED OR SLIP FORMED	LF	2,212	2,212
602	1208 CONCRETE BRIDGE BARRIER	LF	20	20
702	0100 MOBILIZATION	L SUM	0.3	0.3
704	0100 FLAGGING	MHR	500	500
704	1000 TRAFFIC CONTROL SIGNS	UNIT	433	433
704	1052 TYPE III BARRICADE	EA	2	2
704	1067 TUBULAR MARKERS	EA	142	142
708	1540 INLET PROTECTION-SPECIAL	EA	18	18
714	0825 PIPE CONC REINF 30IN CL III-STORM DRAIN	LF	20	20
714	4097 PIPE CONDUIT 15IN-STORM DRAIN	LF	114	114
714	4166 PIPE CONDUIT 30IN-JACKED OR BORED	LF	247	247
722	3520 INLET-TYPE 2 DOUBLE	EA	9	9
722	3761 INLET SPECIAL-TYPE 2 60IN	EA	2	2
764	0151 REMOVE W-BEAM GUARDRAIL & POSTS	LF	200	200

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SPEC	CODE	BID ITEM	QTY	UNIT
Use or Location		Rate or Station		
202	0132	REMOVAL OF BITUMINOUS SURFACING		
Mainline Pavement		Thickness varies 0"-15" (Sta 31+60 to 52+87)	3567	SY
Existing Median Pavement		6" Thickness (Sta 31+54 to 31+60)	7	SY
		- 2" HBP		
		- 4" Aggregate		
		6" Thickness (Sta 52+87 to 54+13)	320	SY
		- 2" HBP		
		- 4" Aggregate		
216	0100	WATER		
ND 810 EB & WB Median		25 MGal/Mile for Dust Palliative	11	MGAL
		20 Gal/Ton for Aggregates	59	MGAL
		25 MGal/CY for Subgrade prep	11	MGAL
230	0320	SUBGRADE PREPARATION-TYPE C-12IN		
ND 810 EB & WB Median		Sta 31+54 to 54+13	23	Sta
261	0112	FIBER ROLLS 12 IN		
ND 810 EB & WB Median		Sta 41+99.5	15	LF
302	0120	AGGREGATE BASE COURSE CL 5		
ND 810 EB & WB Median		8" Thickness	2614	TON
		Aggregate Fill	319	TON
550	3005	CONCRETE MEDIAN PAVEMENT		
ND 810 EB & WB Median		8" Pavement Thickness	6273	SY
602	1200	JERSEY BARRIER FORMED OR SLIP FORMED		
ND 810 EB & WB Median		Sta 31+82 to 53+94	2212	LF



Basis of Estimate

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

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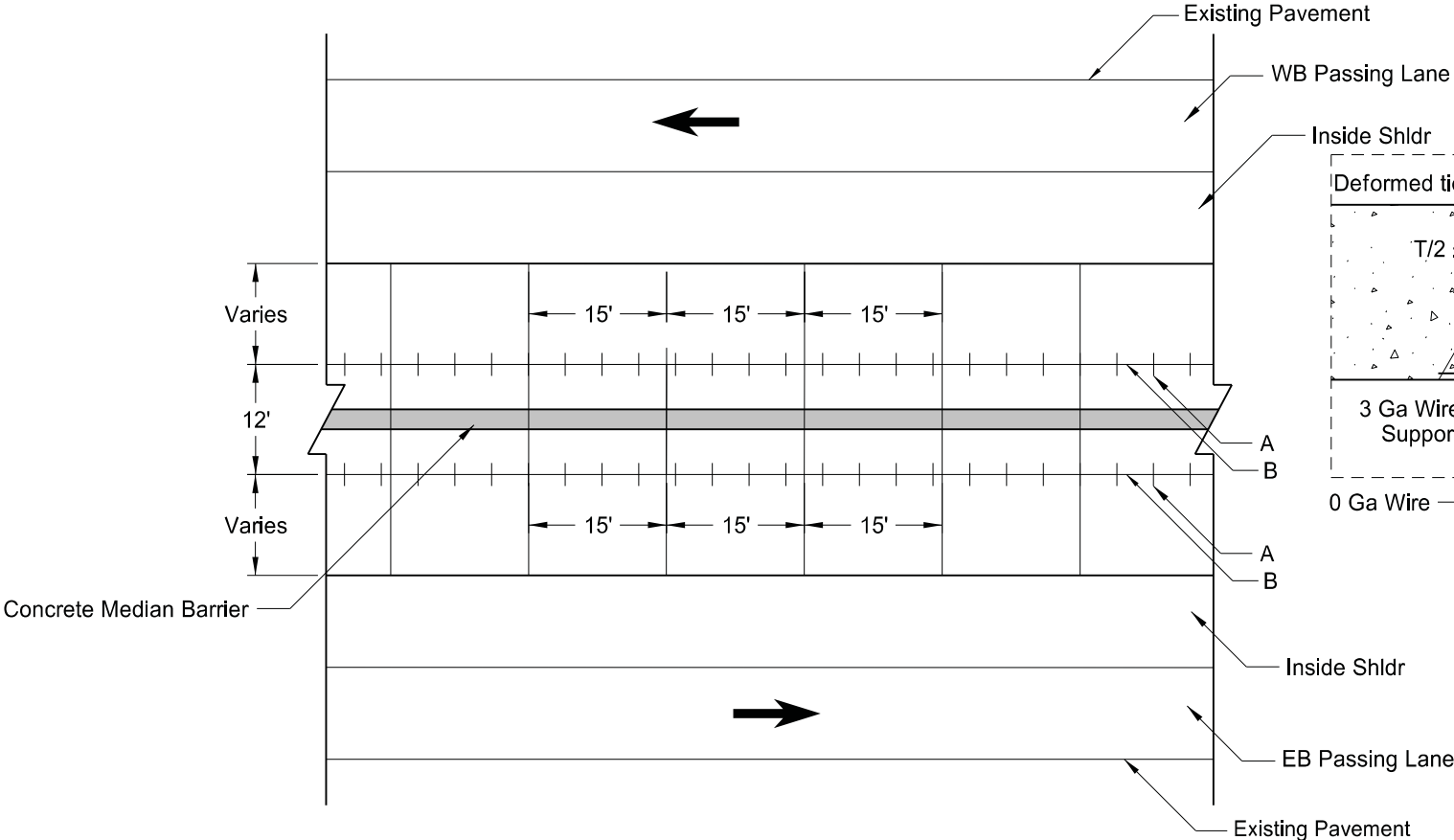
Common Excavation Waste (Pay Item)	Topsoil (Pay Item)
CY	CY
634	788



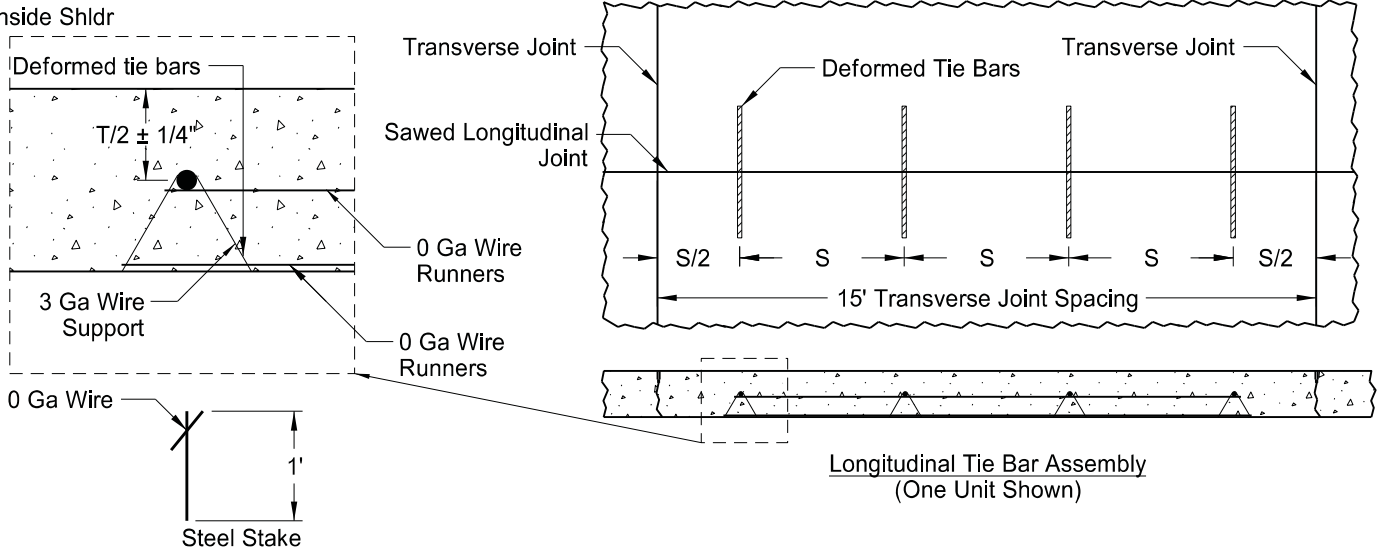
Earthwork Summary

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

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ND 810 - Proposed Median with Concrete Median Barrier
Sta 31+54.1 to Sta 54+12.9 (194_CL)

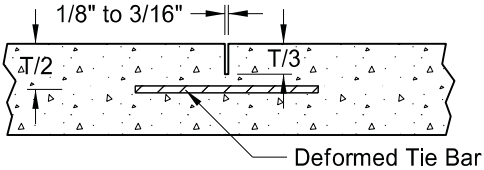


Longitudinal Tie Bar Assembly
(One Unit Shown)

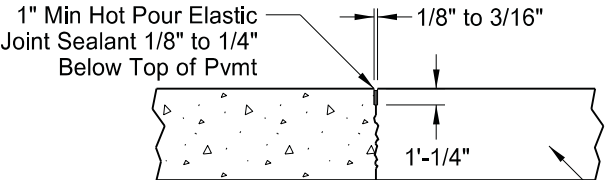
Longitudinal Joint Tie Bar Size, Length, and Spacing				
Location	Pvmt Thickness "T"	Steel Grade	Bar Size & Length	Spacing "S"
Sta 31+54.1 to 54+12.9	8"	60	# 6 Bar x 48"	45"
		60	# 5 Bar x 42"	45"

Notes:

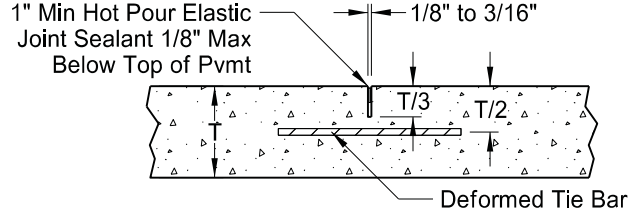
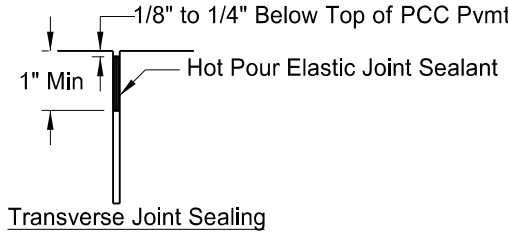
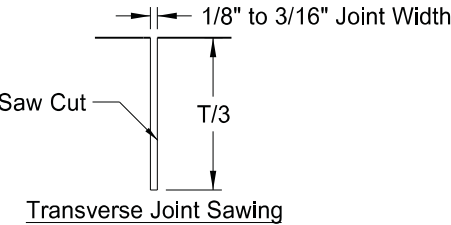
- A = XX" Deformed Tie Bars @ X'-X" C to C Spacing.
- B = Sawed & Sealed Longitudinal Joints.
- S = Tie Bar Spacing.
- T = Pavement Thickness.
- Do not place a tie bar within 15" of a transverse joint.
- See Standard Drawing D-550-2 for more details.
- "194_CL" is the proposed centerline alignment.
- Provide hot poured joint sealant meeting the requirements of section 826.02A.2 of the Standard Specifications:
- Include all costs of the longitudinal joint and seal in the price bid for the PCC pavement.
- Use Grade 60 steel for tie Bars installed bent and later straightened.
- Increase the tie bar spacing up to 10% when necessary to facilitate construction.
- Place tie bars at a 48" maximum spacing.



Longitudinal Joint Sawing Detail
(Sawed and Tied Joints)



Longitudinal Joint Sealing Detail
(Non-Tied Joints)



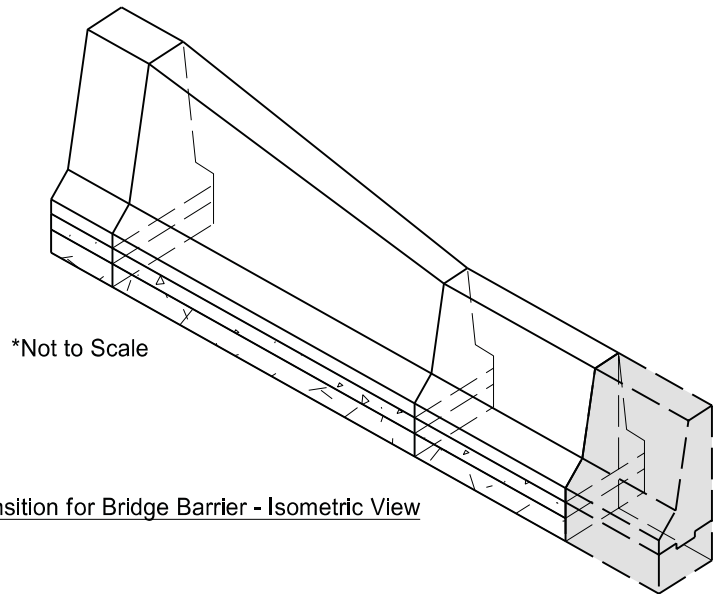
Longitudinal Joint Sealing Detail
(Sawed and Tied Joints)



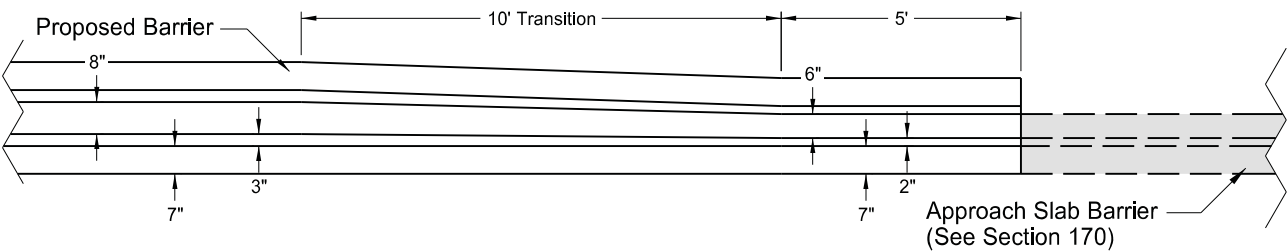
Transverse and Longitudinal Joint Detail

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

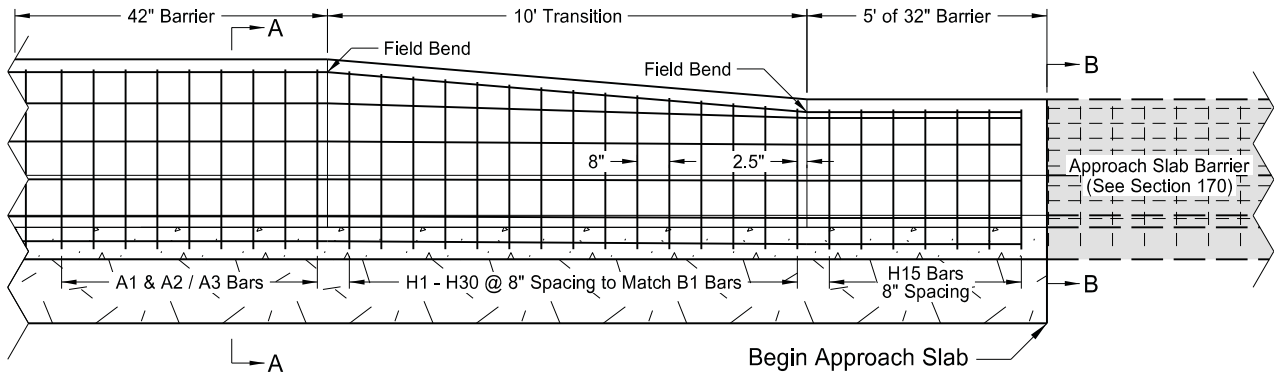
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Transition for Bridge Barrier - Isometric View

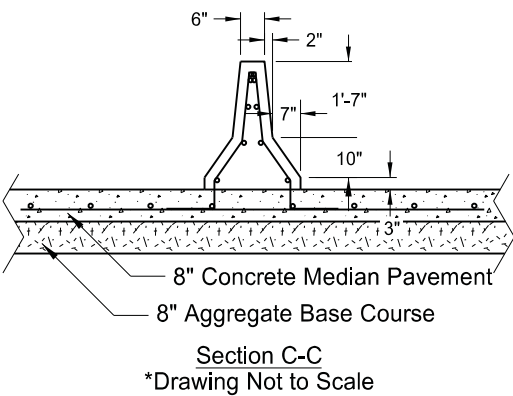
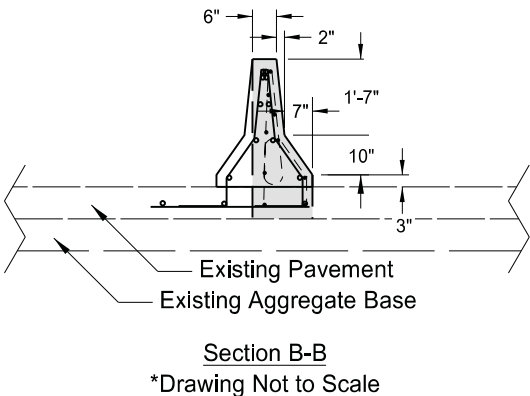
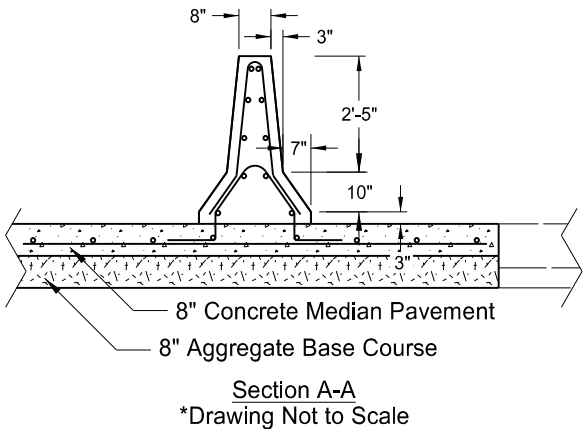


Transition for Bridge Barrier - Plan View



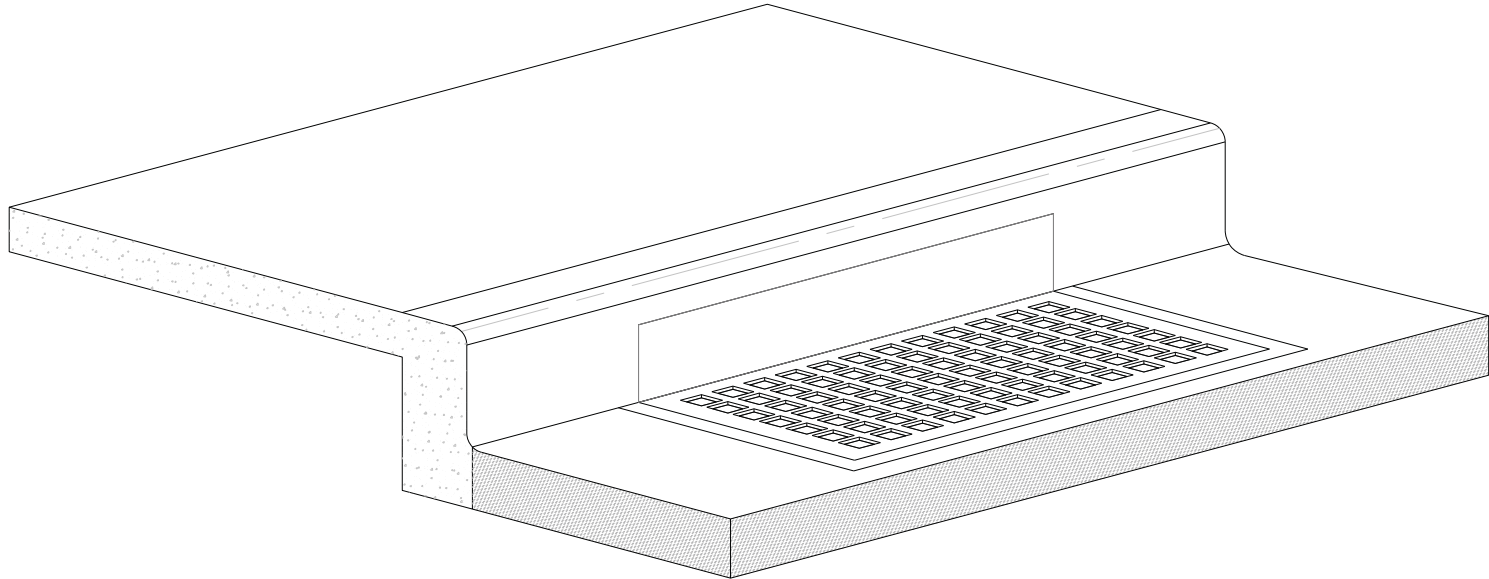
Transition for Bridge Barrier - Elevation View

- Notes:
1. See Section 130 for the proposed barrier bar list.
 2. See Section 170 for approach slab barrier details.



Jersey Barrier Details
Crash Cushion & Bridge Barrier Transitions
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

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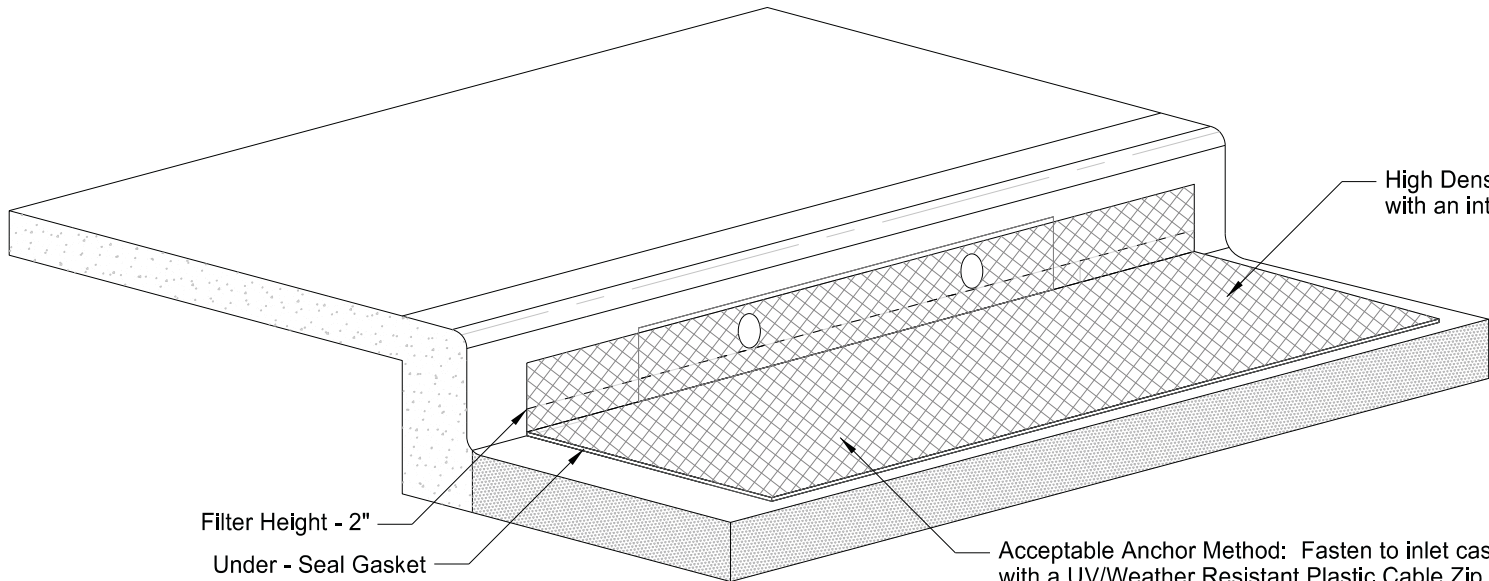
Inlet Protection - Special

Installation Notes:

1. Place device tightly against drain opening and cover entire grate. Extend the device at least 2 inches past the grate toward the street.
2. Overlap the segments at longer openings.
3. Anchor the device so that water cannot flow behind it.

General Notes:

1. Remove material that falls into the inlet during maintenance or removal of the device.



High Density Polyethylene (HDPE) high flow jacket filter (8,000 opening per SY) with an integrated 425 um (micron meter) fine filter particle mesh

Acceptable Anchor Method: Fasten to inlet casting grate with a UV/Weather Resistant Plastic Cable Zip Ties - 16 to 24 in. Install zip ties at each corner of the inlet near the perimeter and two additional zip ties near the middle of the casting. Punch hole through filter and run cable tie downward around grate and back up to fasten.



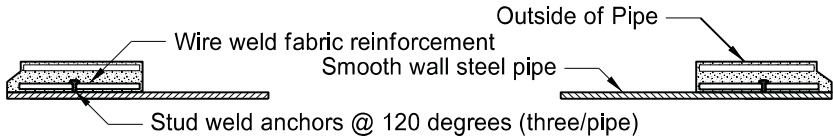
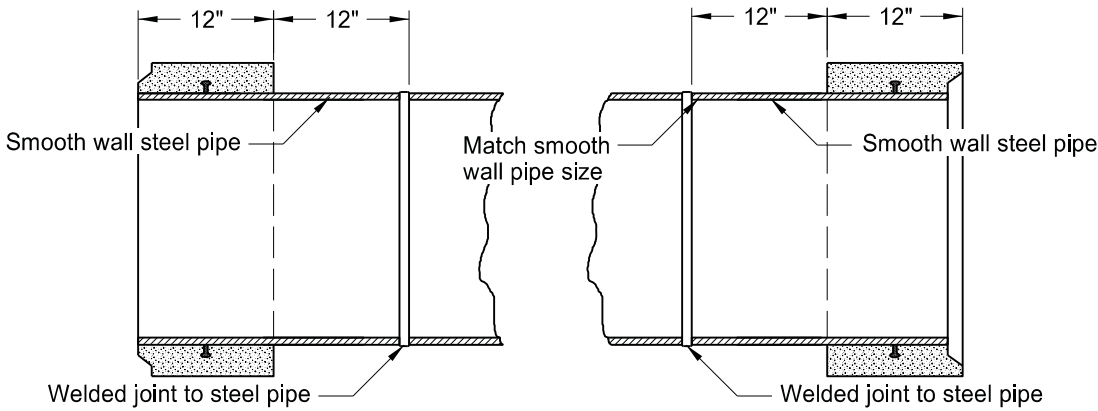
Inlet Protection - Special

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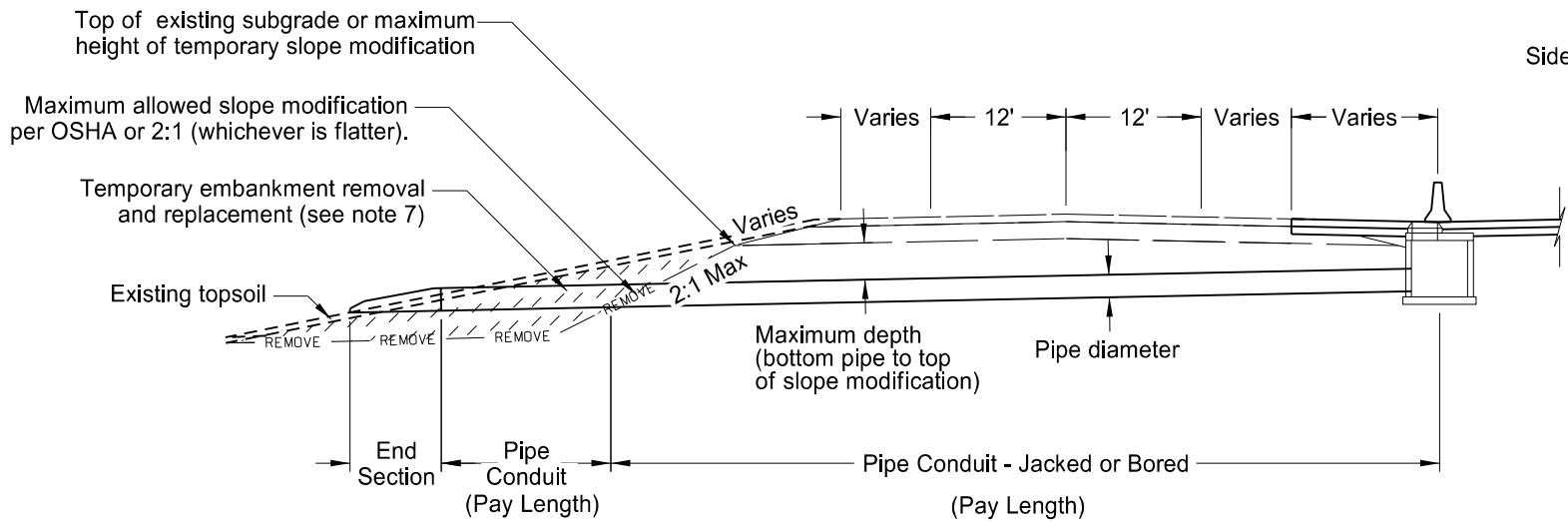
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NOTES:

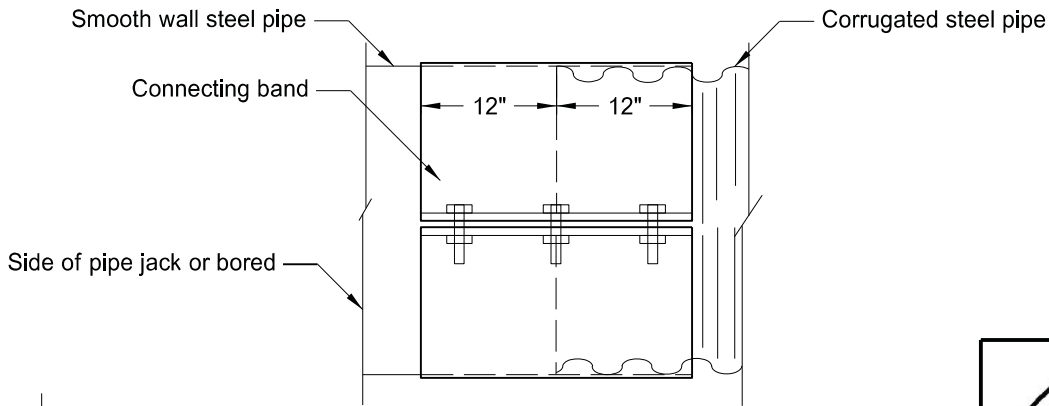
1. Bore or jack pipe indicated as jacked on the plans. If the boring method is used, use of smooth wall steel pipe in lieu of RCP is acceptable. For jacked concrete pipe sections, use the class required for the height of fill, but with a minimum concrete compressive strength of 6,000 psi.
2. Install bored or jacked pipe culverts in accordance with section 714 and section 830 of the standard specifications.
3. Bore or jack pipe culverts with equipment that encases the hole as the earth is removed and installs the pipe concurrently
4. Protect the traveling public with proper traffic control and traffic safety measures during the jacking or boring process (while extending the pipe through the undisturbed fill) without disrupting traffic, or damaging roadway grade and surface.
5. Use an encased hole a maximum of 0.1 foot greater than the outside diameter of the pipe.
6. Do not use water in the boring or jacking process.
7. Include temporary removal and replacement of embankment in price bid for: "PIPE CONDUIT 30IN-JACKED OR BORED." Use a maximum 2:1 slope beyond the existing pavement section (base, pavement, etc) for any temporary removal of embankment. Protect and stabilize the slope throughout the jacking or boring process.
8. Use proper cushioning material between the jack and pipe. Remove damaged sections with an unsatisfactory joint and install a new section.
9. Start the boring or jacking from the low or downstream end and proceed in straight lines to the grade and alignment as shown on the plans. Maintain flow line elevation at the starting point for boring or jacking within 0.1 ft. of staked grade; do not reverse the flow line at any point; and do not vary the line and grade at any point within the pipe more than 0.5 ft. from the designated line and grade.
10. Fill openings greater than 1/4 inch (5 mm) in width between adjacent sections of concrete pipe with 1:2 cement/sand mortar. Tie all concrete pipe sections and end sections in accordance with standard drawing D-714-22. Weld all steel sections continuously around their periphery.
11. Once the pipe jacking has begun, proceed with the operation without interruption to prevent the pipe from becoming firmly set in the embankment.



STANDARD DETAIL FOR JOINING SMOOTH WALL STEEL PIPE TO REINFORCED CONCRETE PIPE



JACKED AND BORED PAY LENGTH



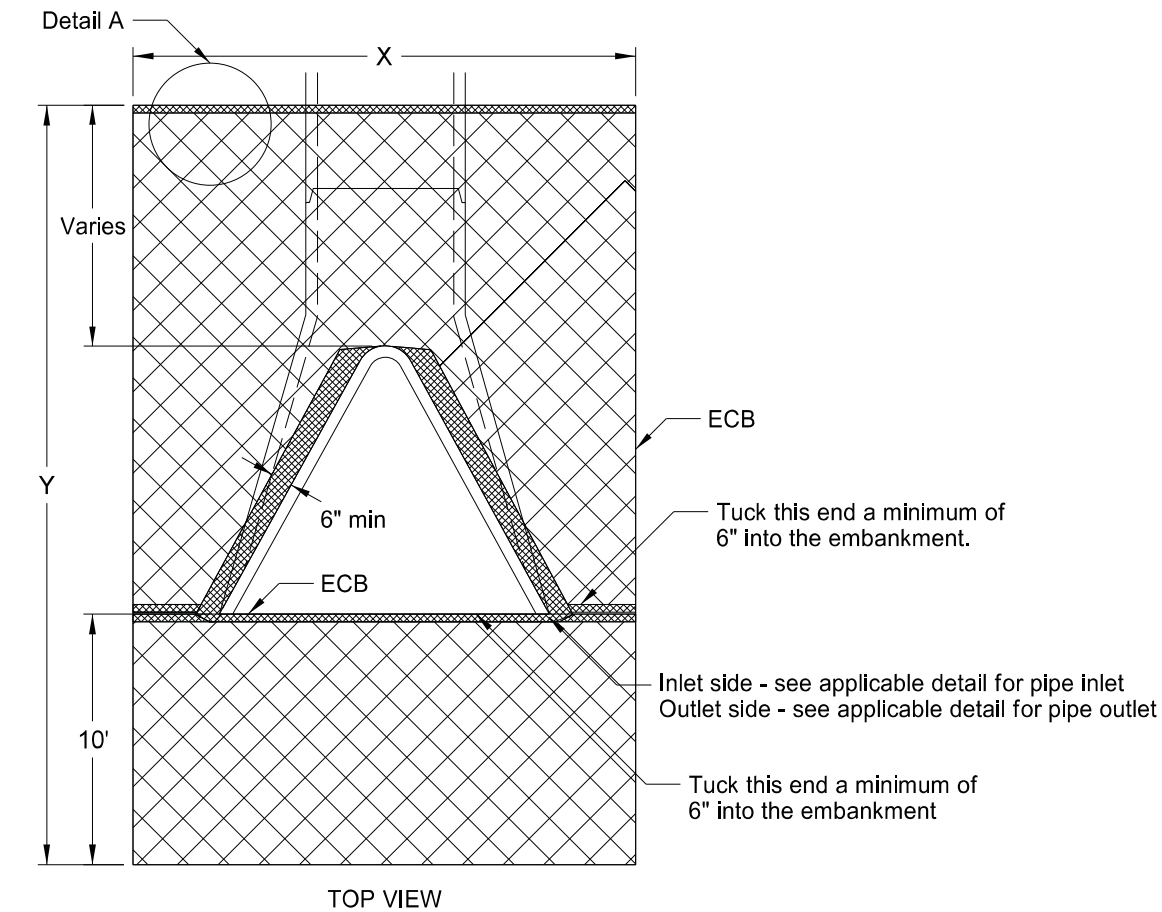
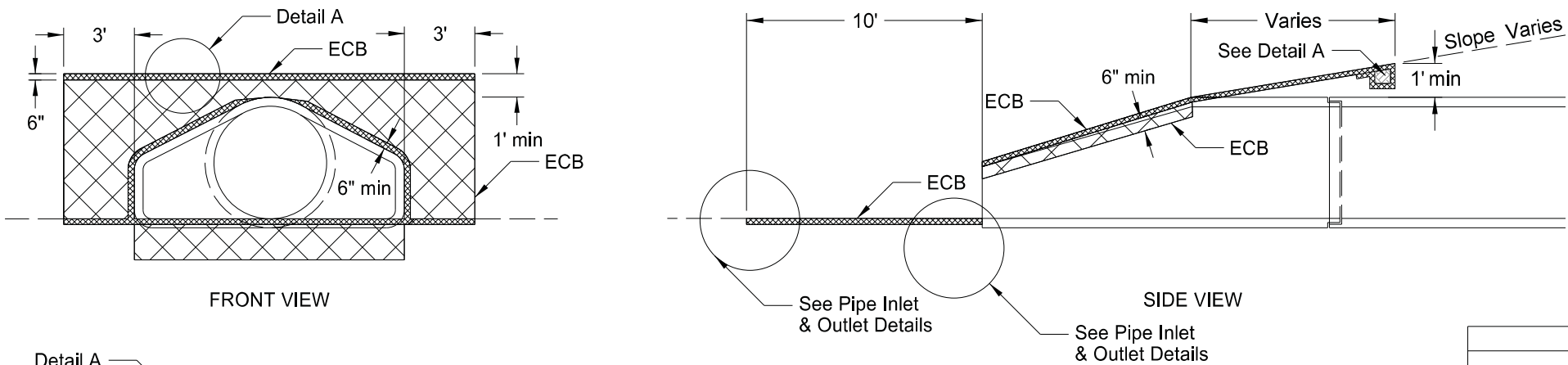
STANDARD CONNECTING BAND FOR JOINING SMOOTH WALL STEEL PIPE TO CORRUGATED PIPE



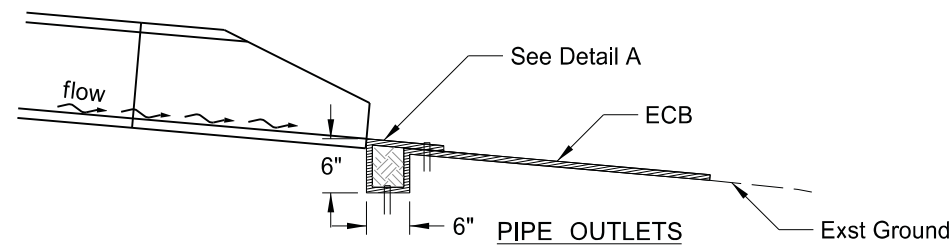
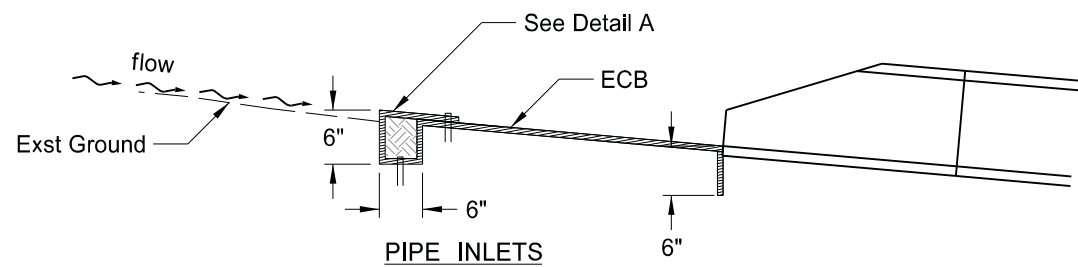
Jacked or Bored Pipe Detail

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

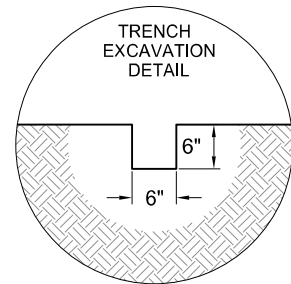
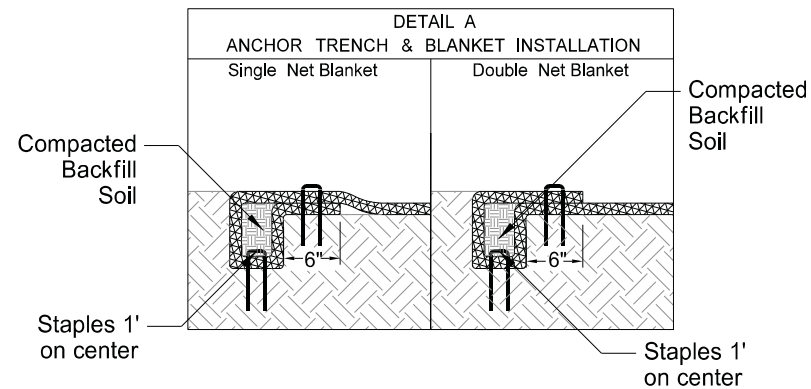
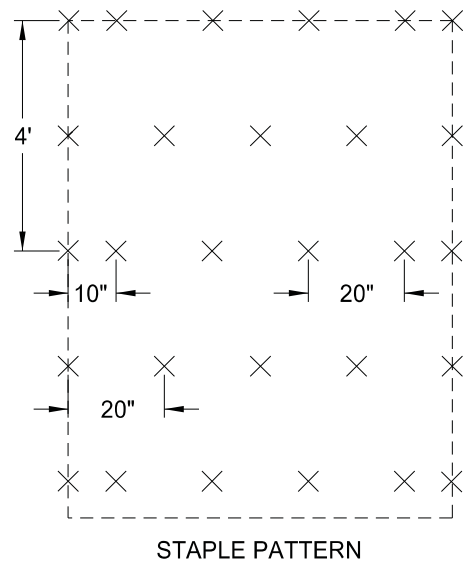
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	20	5



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



Erosion Control Blanket (ECB)							
Alignment	Location to be Protected	Culvert Type Appr/CL	Pipe Diam (Inch)	ECB Type 2			
				X Ft	Y Ft	Unit Quantity SF	SY
194_CL	Sta 38+07.4 Rt	CL	30	11.6	20.5	218.3	25
	Sta 44+28.9 Lt	CL	30	11.6	20.5	218.3	25
	Sta 46+43.8 Lt	CL	30	11.6	20.5	218.3	25

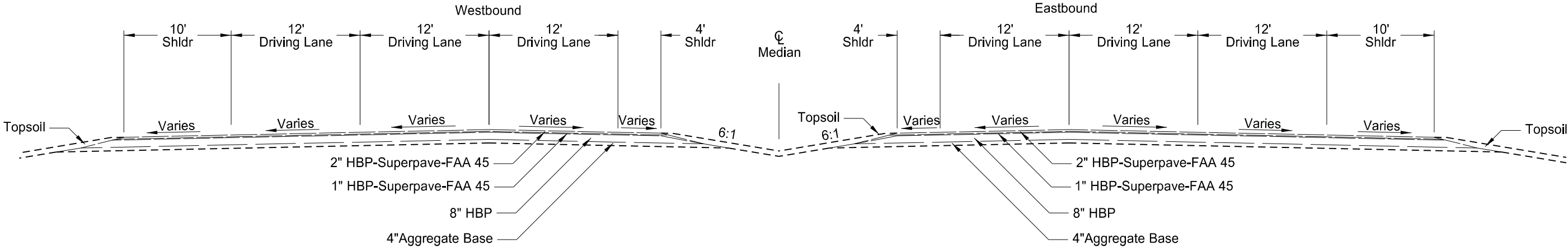


Erosion Control at Culvert Flared End Sections

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	30	1

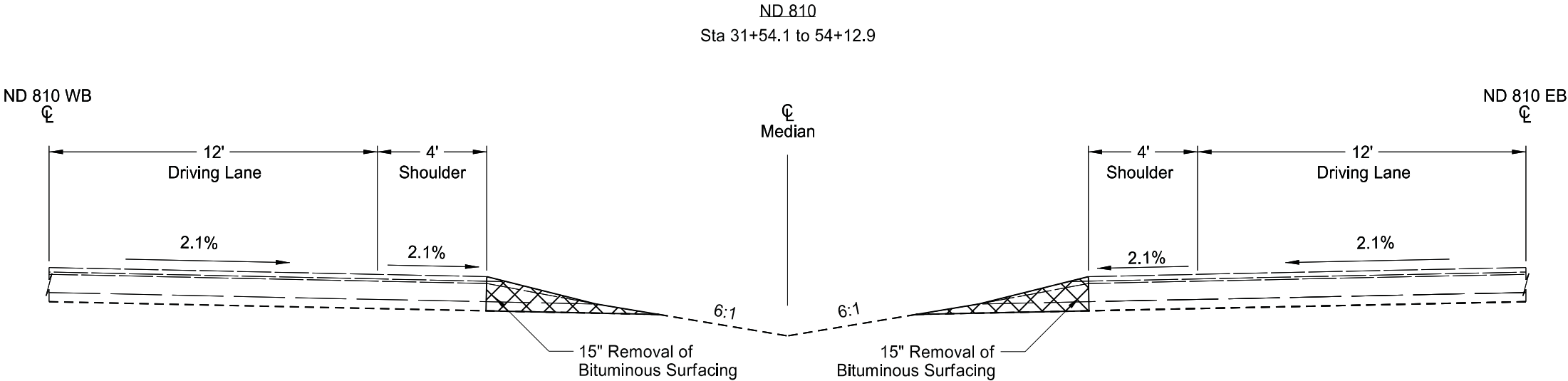
ND 810
Sta 31+54.1 to 54+12.9



Existing Typical Section

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

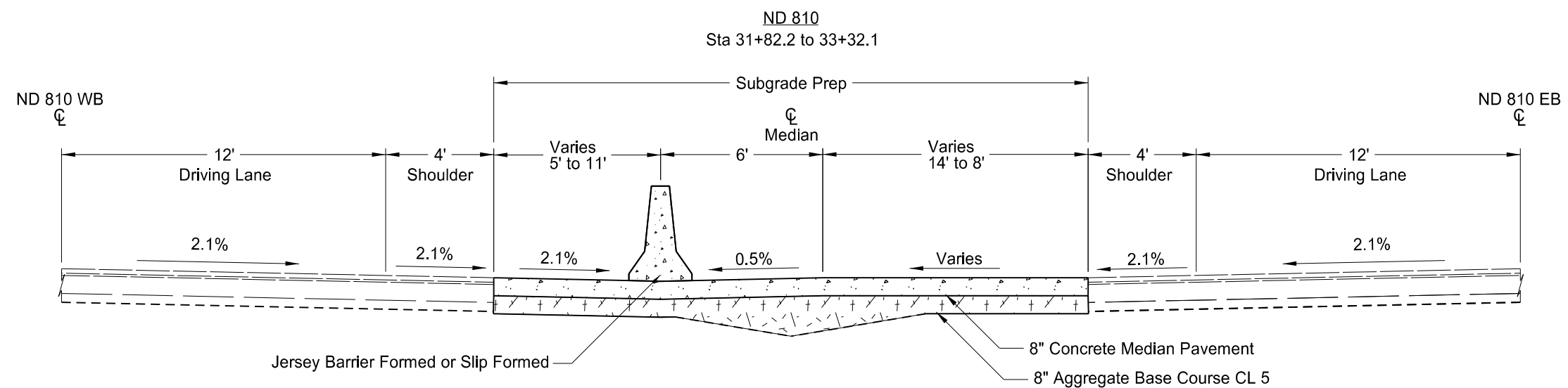
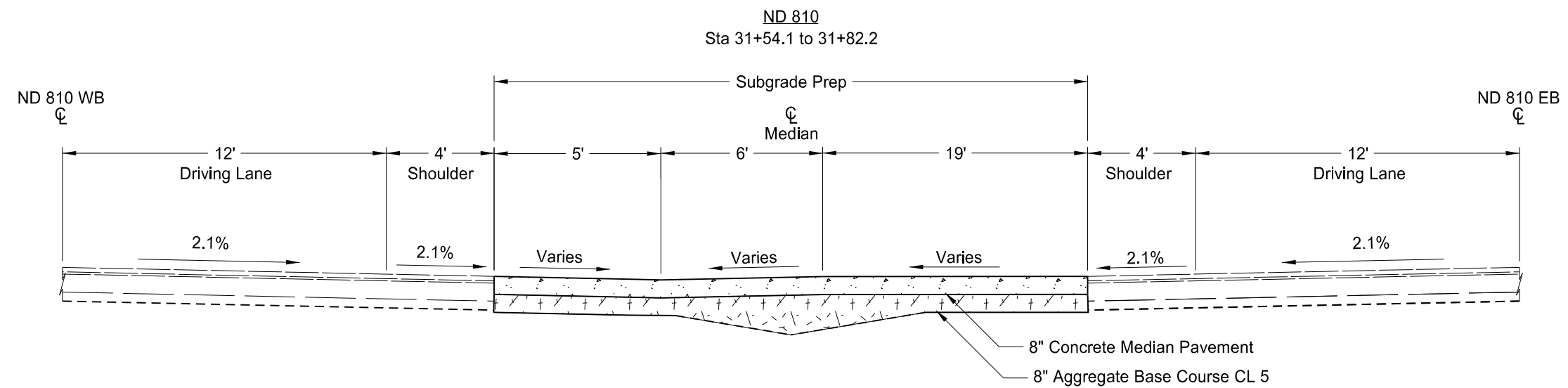
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	30	2



Removal Typical Section

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

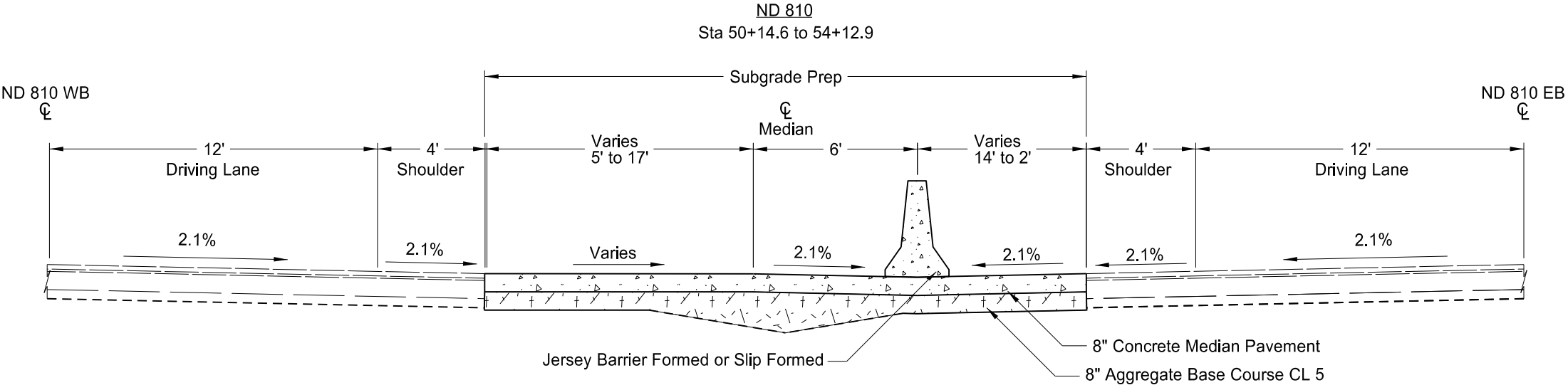
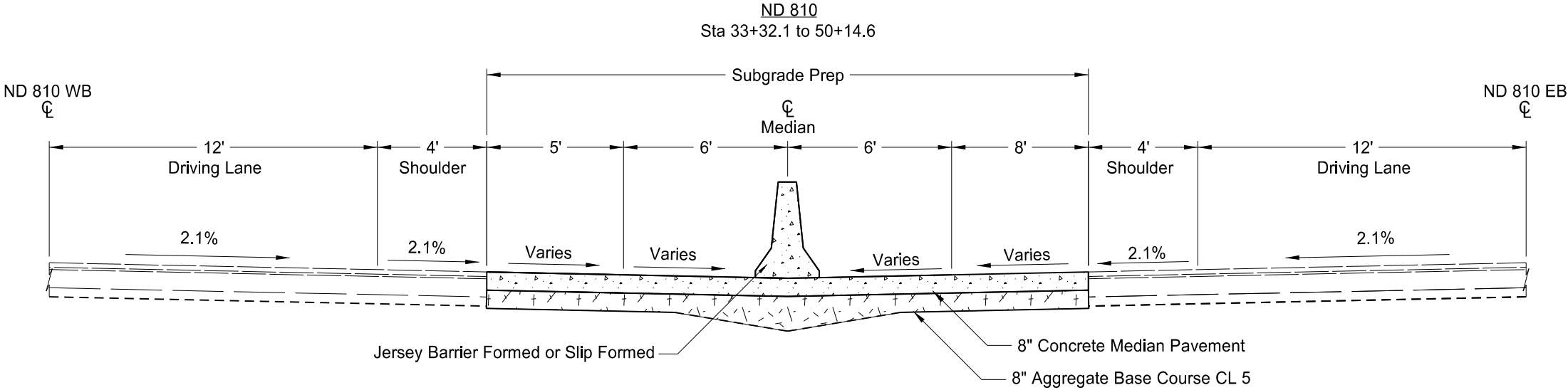
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	ND	HEN-1-810(027)000	30	3



Proposed Typical Sections

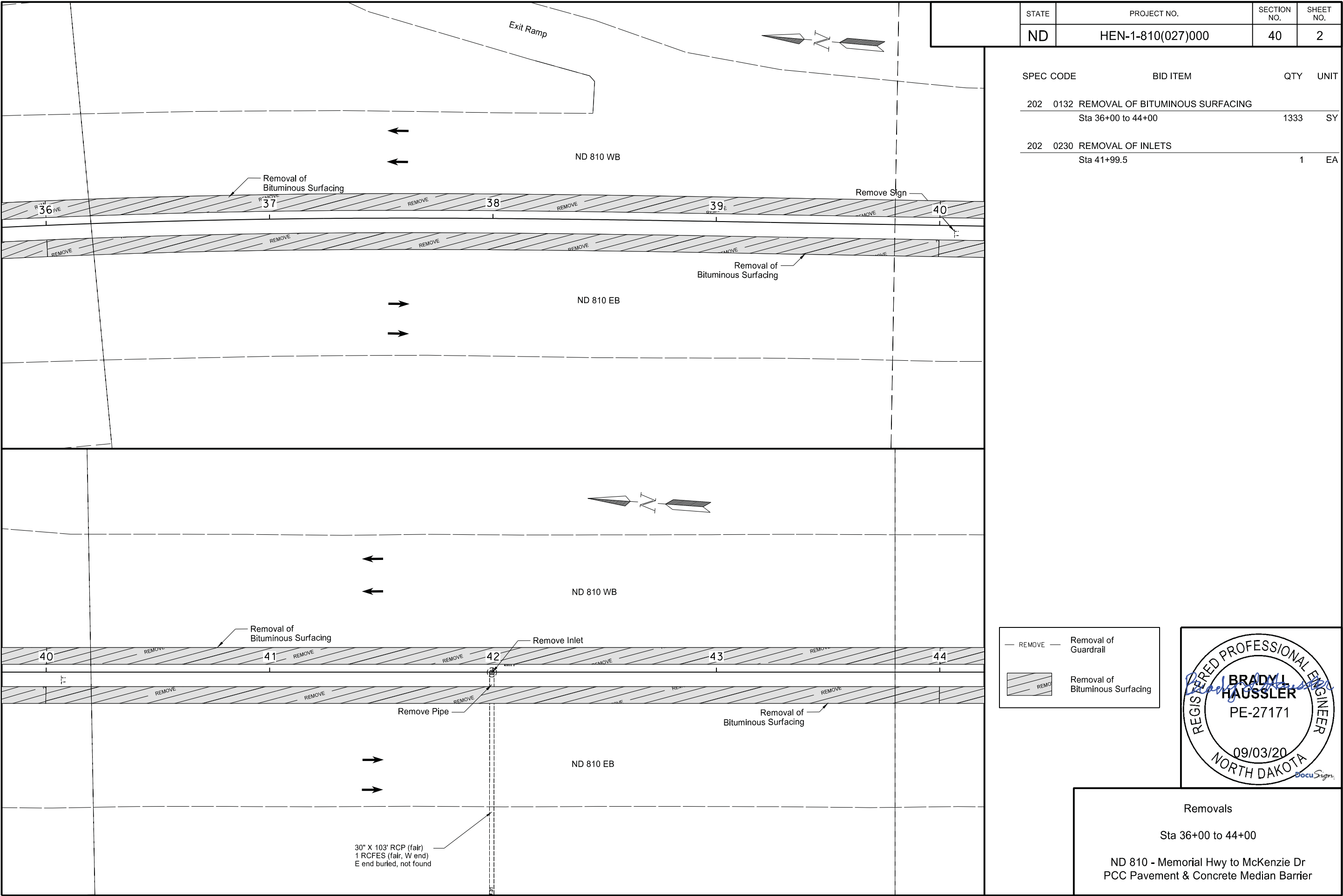
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

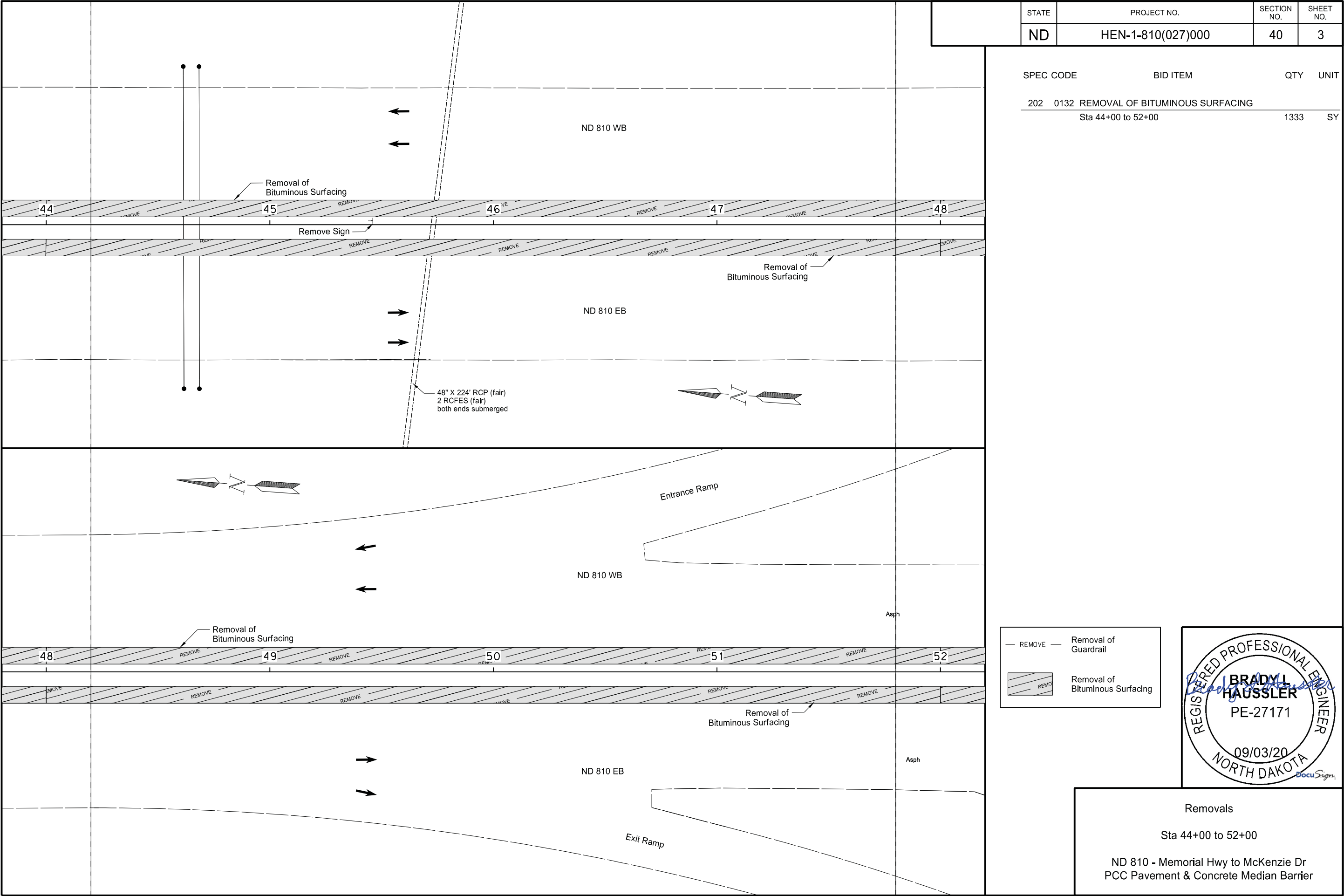
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	ND	HEN-1-810(027)000	30	4

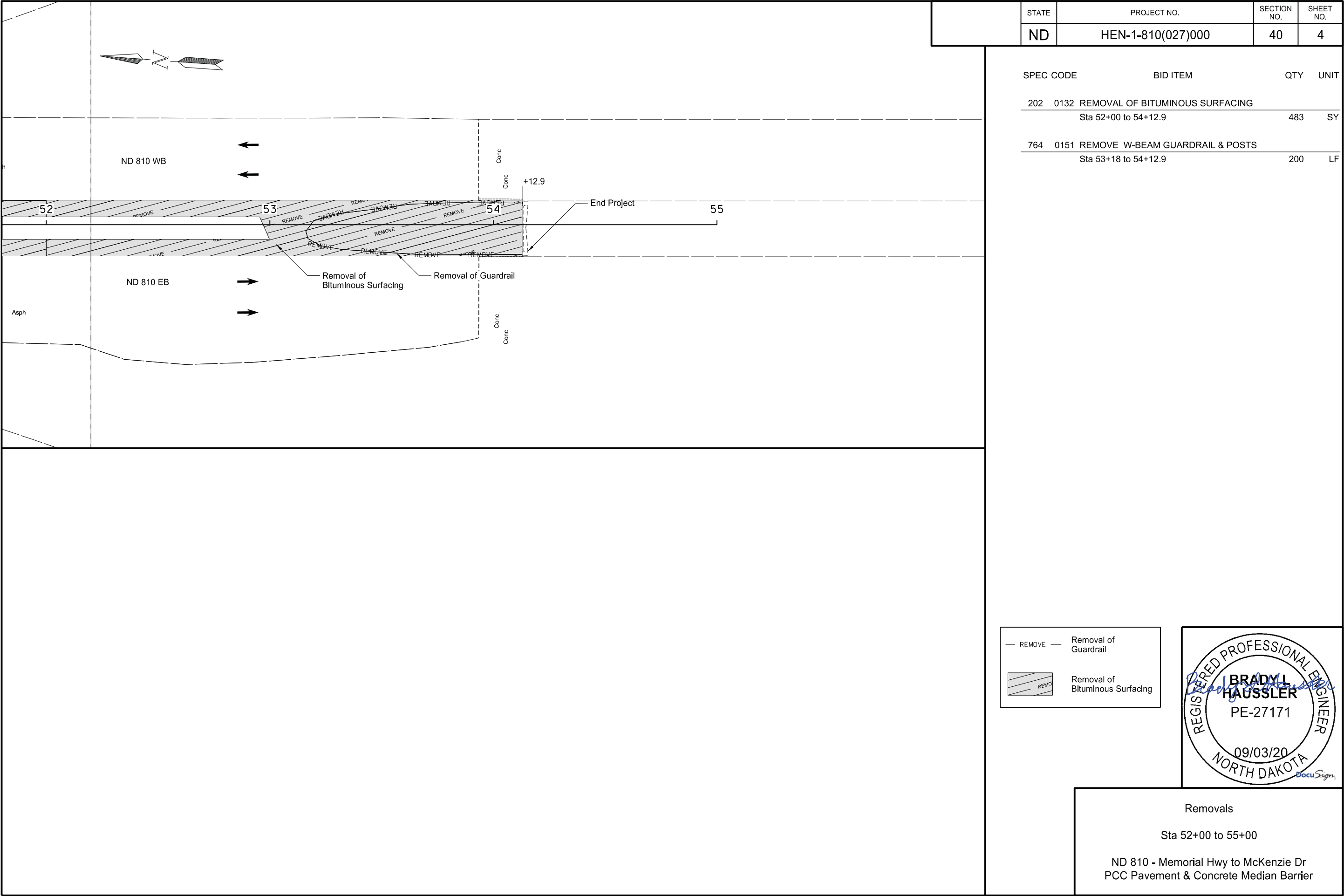


Proposed Typical Sections

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier







INLET AND MANHOLE SUMMARY

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	50	1

Inlet No. 10A
Type Inlet - Special - Type 2 - 60 In.
Grate Style V
Sta. 7+61.7 - 2.9' Rt. (OCL810BA)
Grate Elev. 1642.18
Base Elev. 1636.76
Invert Elev. 1637.05
H' Dist. 4.00 Ft.

30 In. Conduit W 1637.05
15 In. Conduit N 1637.78

Inlet No. 10B
Type Inlet - Type 2 - Double
Grate Style V
Sta. 7+47.5 - 1.7' Lt. (OCL810BA)
Grate Elev. 1642.51
Base Elev. 1637.76
Invert Elev. 1637.95
H' Dist. 4.00 Ft.

Inlet No. 10C
Type Inlet - Type 2 - Double
Grate Style V
Sta. 7+33.5 - 1.7' Lt. (OCL810BA)
Grate Elev. 1642.73
Base Elev. 1637.98
Invert Elev. 1638.17
H' Dist. 4.00 Ft.

Inlet No. 11A
Type Inlet - Special - Type 2 - 60 In.
Grate Style D
Sta. 11+55.3 - 3.0' Rt. (OCL810BA)
Grate Elev. 1639.06
Base Elev. 1631.46
Invert Elev. 1631.75
H' Dist. 6.18 Ft.

Existing 30 In. Conduit W 1631.75
15 In. Conduit N 1634.32
15 In. Conduit S 1634.38

Inlet No. 11B
Type Inlet - Type 2 - Double
Grate Style DR/DL
Sta. 11+40.3 - 1.7' Lt. (OCL810BA)
Grate Elev. 1639.06
Base Elev. 1634.31
Invert Elev. 1634.50
H' Dist. 4.00 Ft.

Inlet No. 11C
Type Inlet - Type 2 - Double
Grate Style V
Sta. 11+26.3 - 1.7' Lt. (OCL810BA)
Grate Elev. 1639.06
Base Elev. 1634.31
Invert Elev. 1634.67
H' Dist. 4.00 Ft.

Inlet No. 11D
Type Inlet - Type 2 - Double
Grate Style V
Sta. 11+68.2 - 1.7' Rt. (OCL810BA)
Grate Elev. 1639.08
Base Elev. 1634.33
Invert Elev. 1634.52
H' Dist. 4.00 Ft.

Inlet No. 12A
Type Inlet - Type 2 - Double
Grate Style V
Sta. 13+82.4 - 1.7' Lt. (OCL810BA)
Grate Elev. 1639.78
Base Elev. 1635.03
Invert Elev. 1635.32
H' Dist. 4.00 Ft.

Inlet No. 12B
Type Inlet - Type 2 - Double
Grate Style V
Sta. 14+02.5 - 1.7' Rt. (OCL810BA)
Grate Elev. 1639.94
Base Elev. 1635.19
Invert Elev. 1635.52
H' Dist. 4.00 Ft.

Inlet No. 13A
Type Inlet - Type 2 - Double
Grate Style V
Sta. 15+94.4 - 1.7' Lt. (OCL810BA)
Grate Elev. 1642.43
Base Elev. 1637.68
Invert Elev. 1637.97
H' Dist. 4.00 Ft.

Inlet No. 13B
Type Inlet - Type 2 - Double
Grate Style V
Sta. 16+14.5 - 1.7' Rt. (OCL810BA)
Grate Elev. 1642.72
Base Elev. 1637.97
Invert Elev. 1638.20
H' Dist. 4.00 Ft.



Begin Station / Location	End Station / Location	Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	G Fabric (Pay Item)	(*) End Sections		Applicable Backfill
												Begin	End	
			In	Bid Item	LF		In	Type		In	SY	EA	EA	
10C	10B		15	PIPE CONDUIT 15IN - STORM DRAIN	14	Reinforced Concrete Pipe - Class III (barrel length = 14 LF)	15					-	-	Standard D-714-26
						Polymeric Coated Corrugated Steel (2-2/3" x 1/2" Corrugations)	15	P	1/2	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 3/4" Rib @ 7-1/2")	15	P	3/4	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 1" Rib @ 11-1/2")	15	P	1	0.064				
10B	10A		15	PIPE CONDUIT 15IN - STORM DRAIN	15	Reinforced Concrete Pipe - Class III (barrel length = 15 LF)	15					-	-	Standard D-714-26
						Polymeric Coated Corrugated Steel (2-2/3" x 1/2" Corrugations)	15	P	1/2	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 3/4" Rib @ 7-1/2")	15	P	3/4	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 1" Rib @ 11-1/2")	15	P	1	0.064				
10A	Sta 38+07.16	93.8' Rt	30	PIPE CONDUIT 30IN - JACKED AND BORED	86	Reinforced Concrete Pipe - Class III (barrel length = 86 LF)	30					-	-	Standard D-714-26
						Smooth Wall Steel Pipe	30							
Sta 38+05.47	Sta 38+07.16	93.8' Rt	30	PIPE CONC REINF 30IN CLIII - STORM DRAIN	6	Reinforced Concrete Pipe - Class III (barrel length = 4 LF)	30						FES	Standard D-714-26
11C	11B		15	PIPE CONDUIT 15IN - STORM DRAIN	14	Reinforced Concrete Pipe - Class III (barrel length = 14 LF)	15					-	-	Standard D-714-26
						Polymeric Coated Corrugated Steel (2-2/3" x 1/2" Corrugations)	15	P	1/2	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 3/4" Rib @ 7-1/2")	15	P	3/4	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 1" Rib @ 11-1/2")	15	P	1	0.064				
11B	11A		15	PIPE CONDUIT 15IN - STORM DRAIN	16	Reinforced Concrete Pipe - Class III (barrel length = 16 LF)	15					-	-	Standard D-714-26
						Polymeric Coated Corrugated Steel (2-2/3" x 1/2" Corrugations)	15	P	1/2	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 3/4" Rib @ 7-1/2")	15	P	3/4	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 1" Rib @ 11-1/2")	15	P	1	0.064				
11A	11D		15	PIPE CONDUIT 15IN - STORM DRAIN	13	Reinforced Concrete Pipe - Class III (barrel length = 13 LF)	15					-	-	Standard D-714-26
						Polymeric Coated Corrugated Steel (2-2/3" x 1/2" Corrugations)	15	P	1/2	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 3/4" Rib @ 7-1/2")	15	P	3/4	0.064				
						Polymeric Coated Spiral Rib Steel (3/4" x 1" Rib @ 11-1/2")	15	P	1	0.064				

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

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

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

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

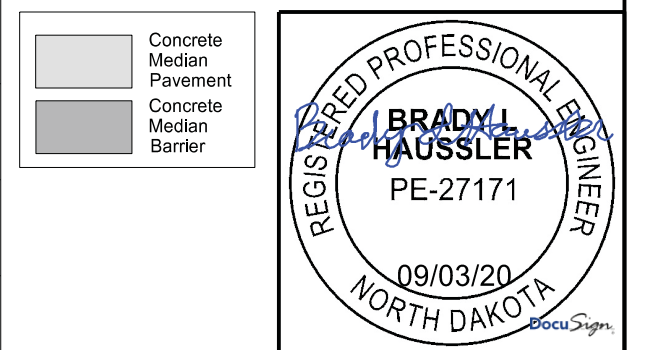
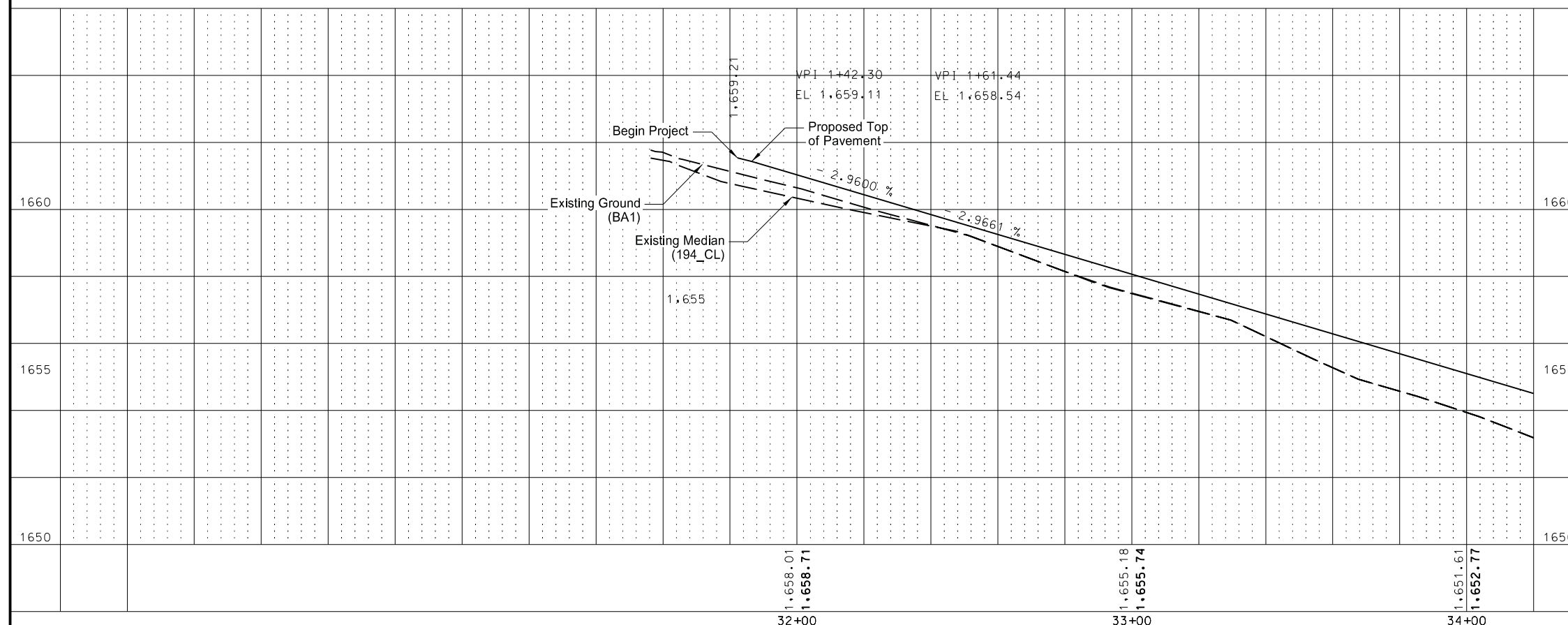
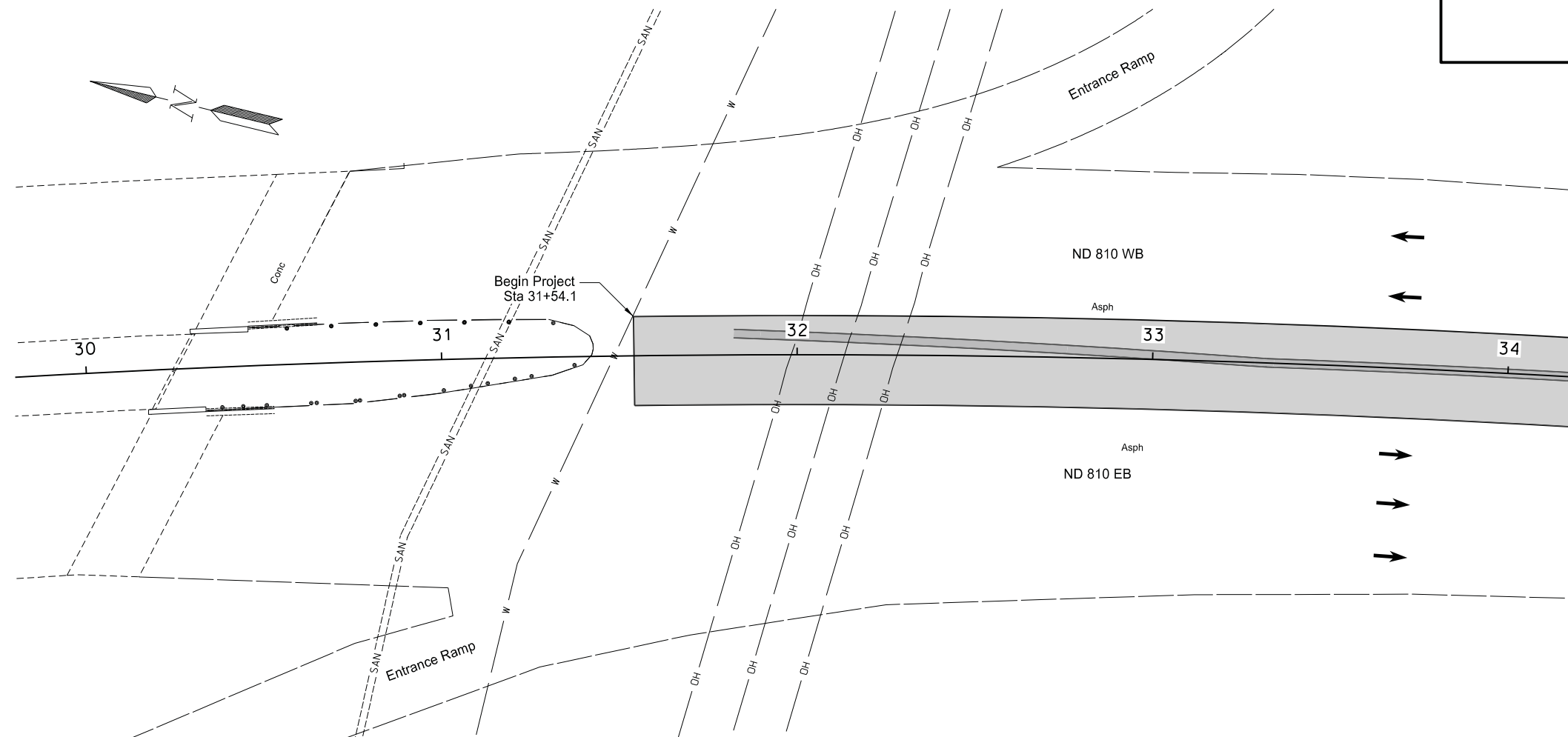


Allowable Pipe List

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	60	1

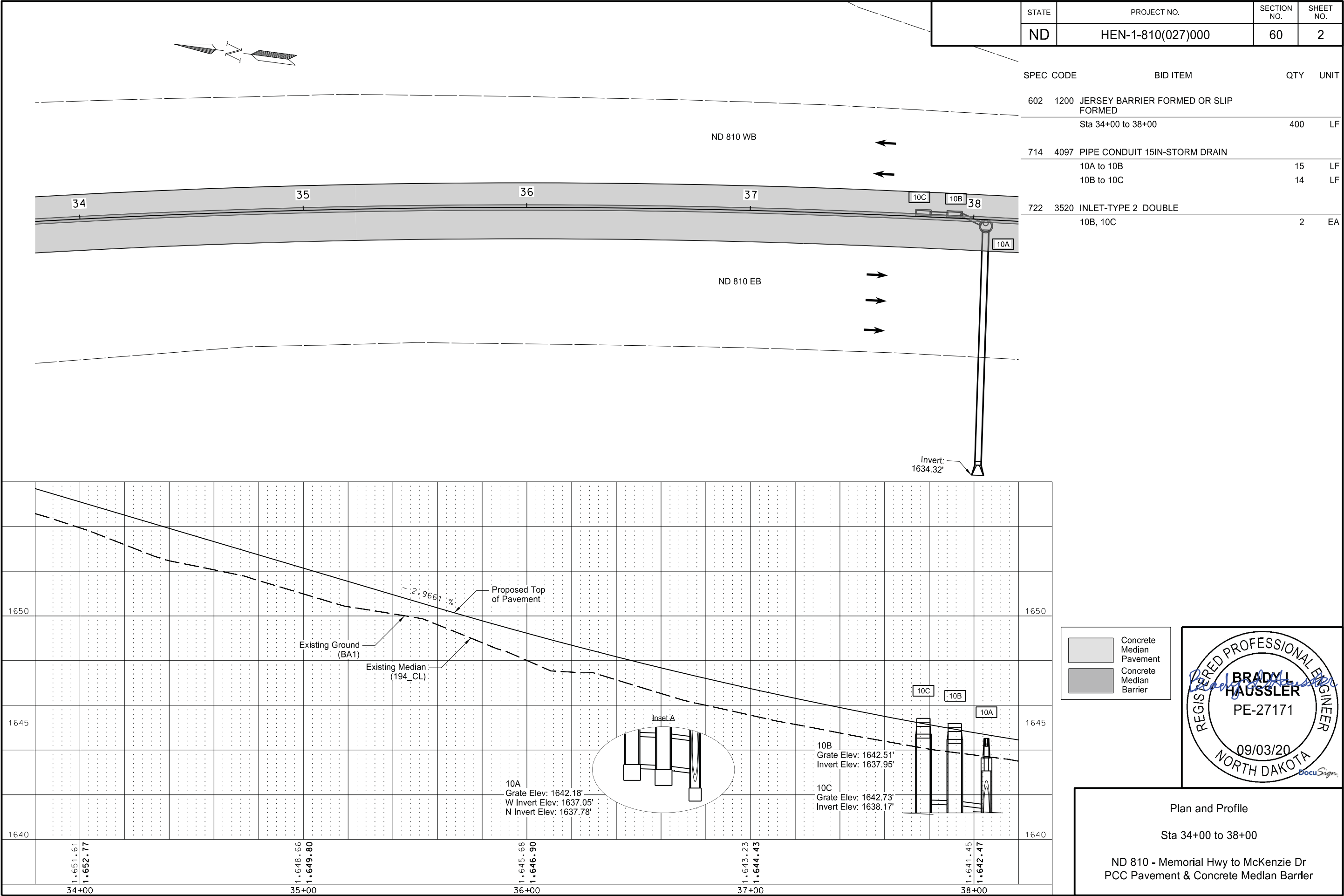
SPEC CODE		BID ITEM	QTY	UNIT
602	1200	JERSEY BARRIER FORMED OR SLIP FORMED		
		Sta 31+82.2 to 34+00	218	LF

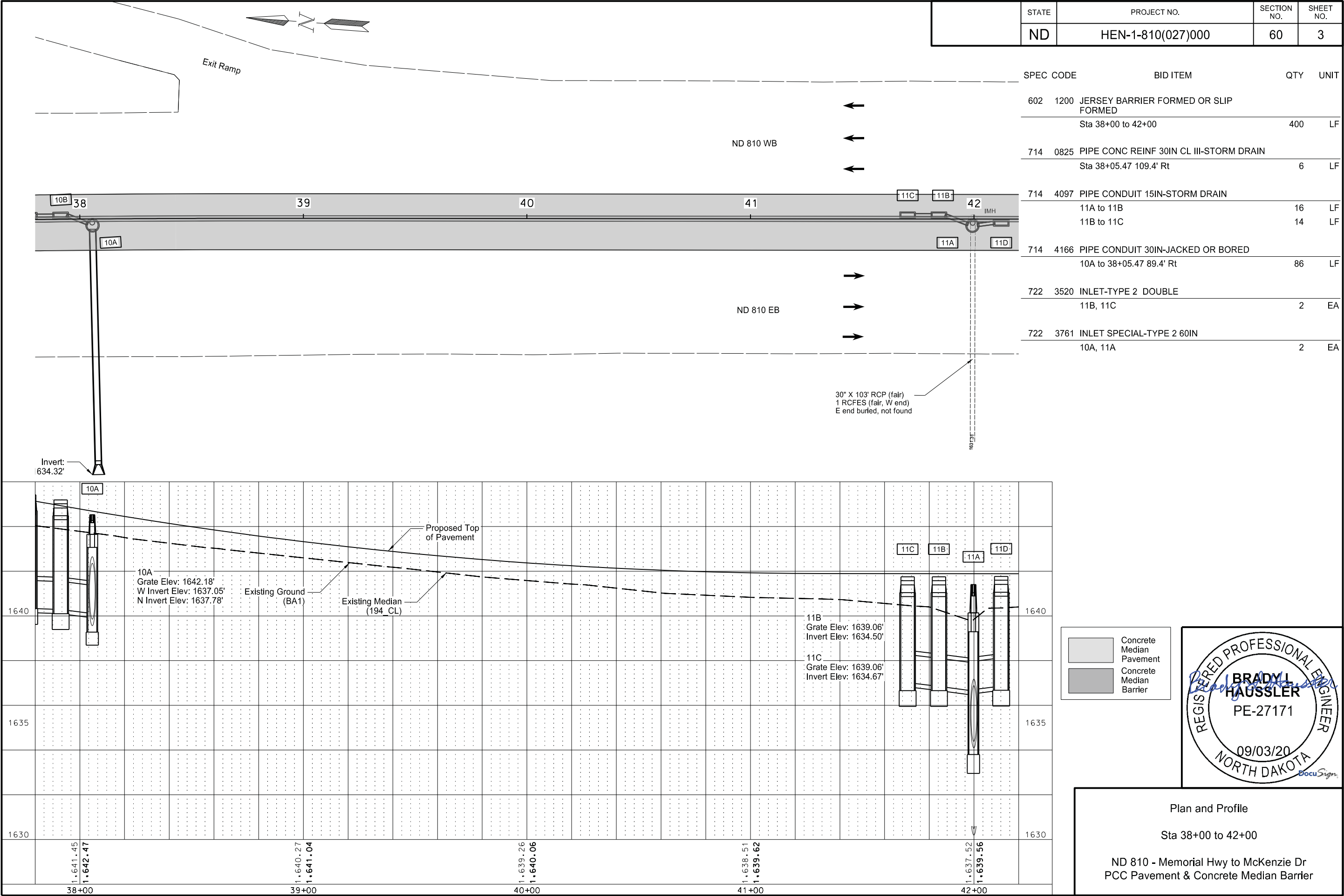


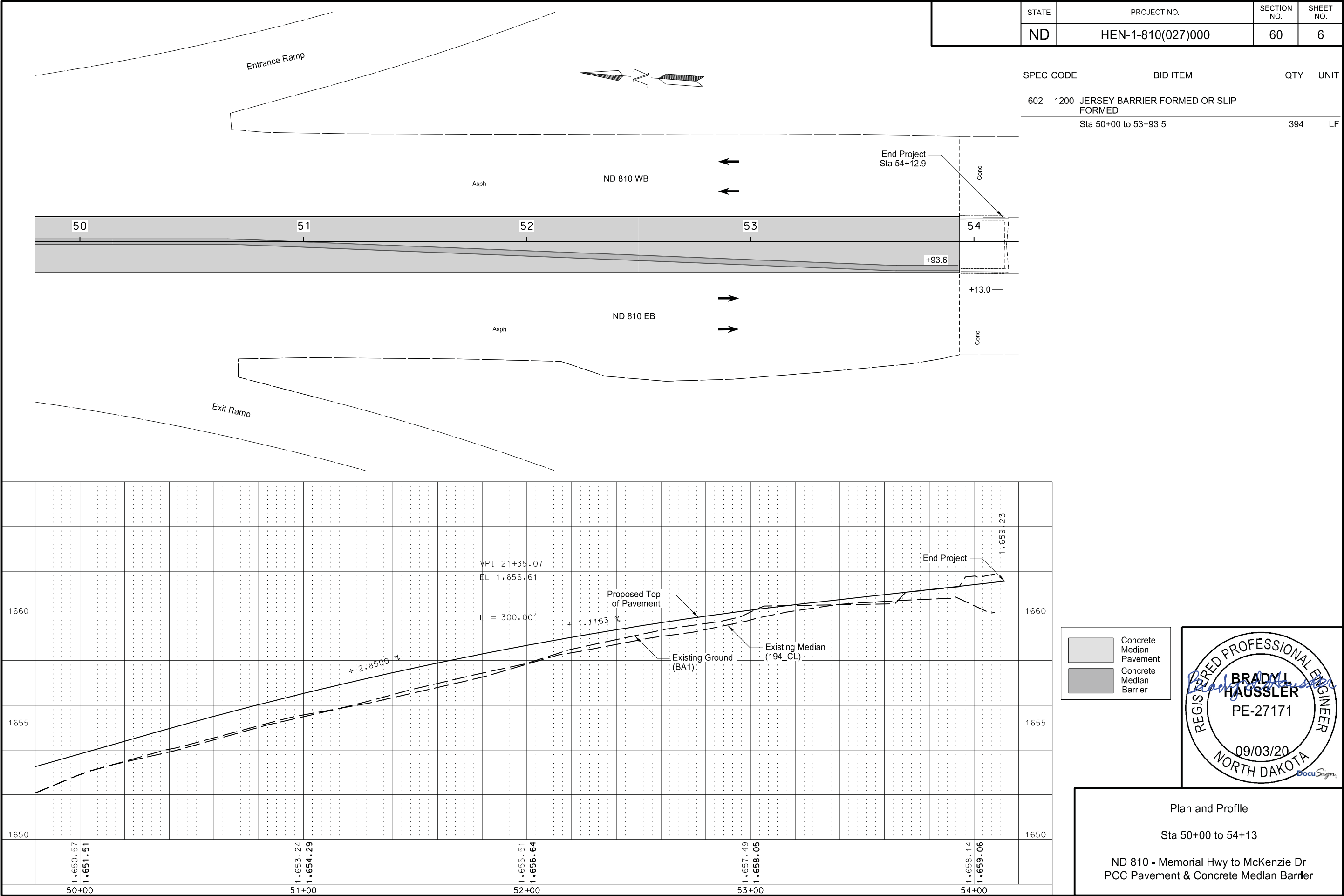
Plan and Profile

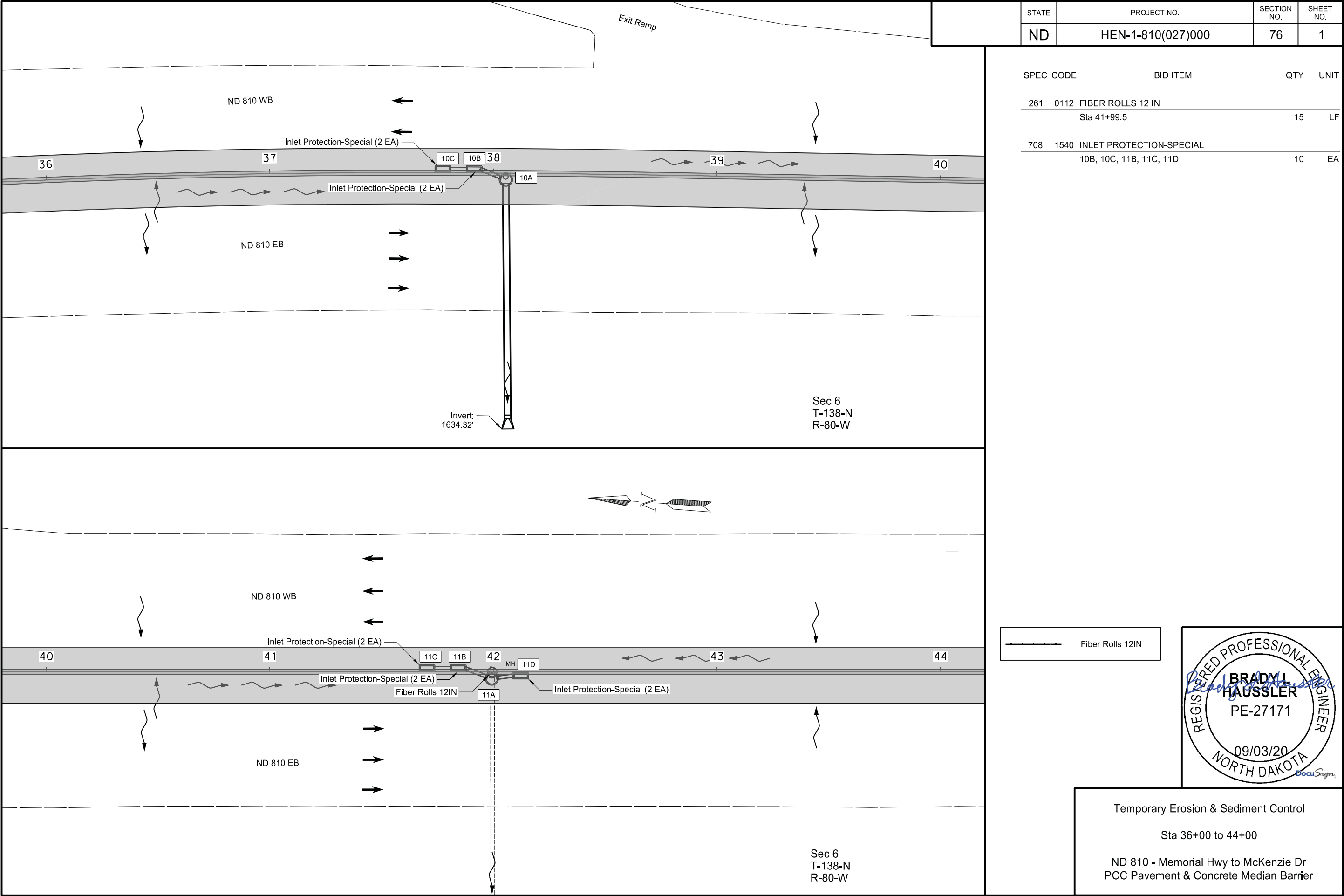
Sta 30+00 to 34+00

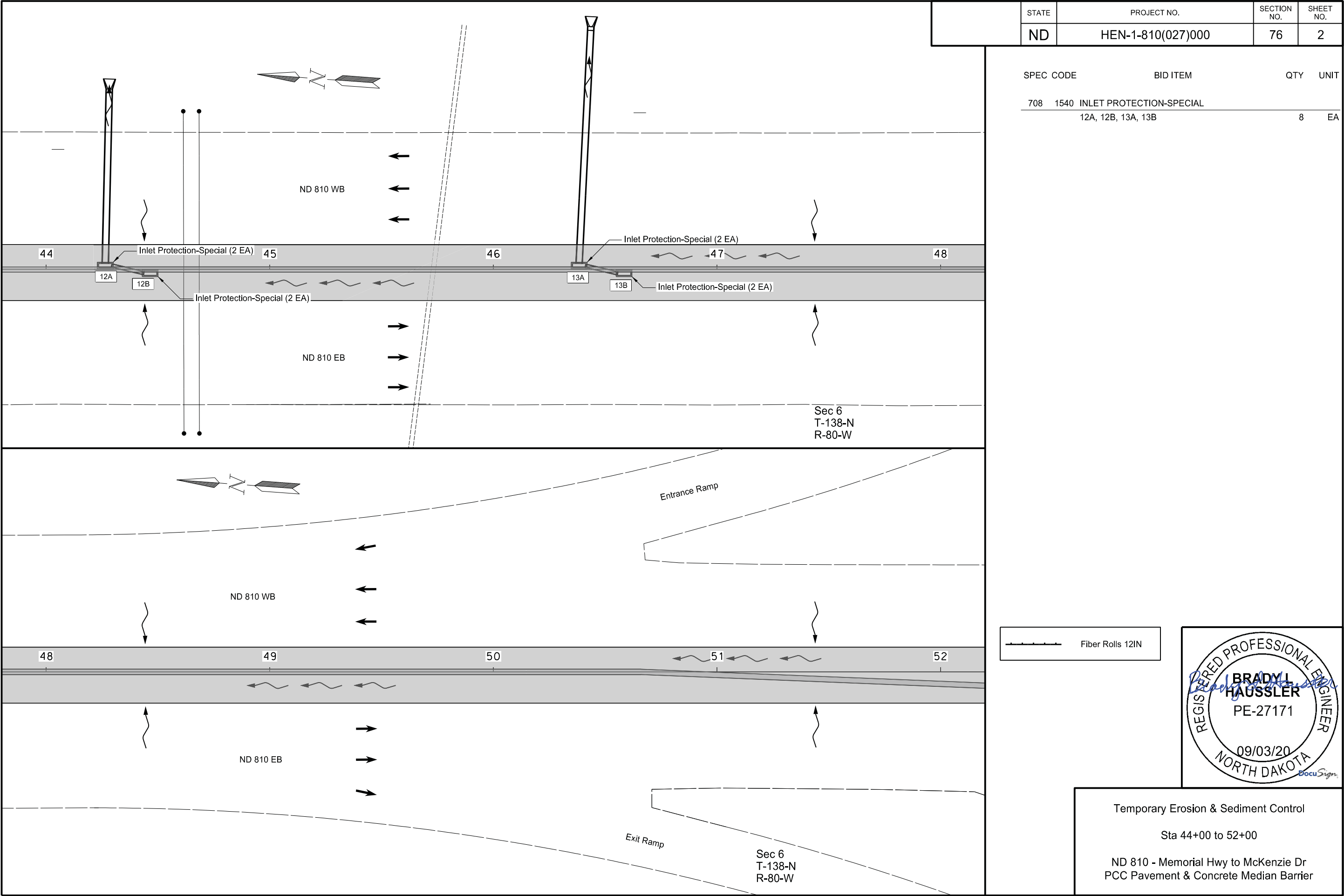
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier





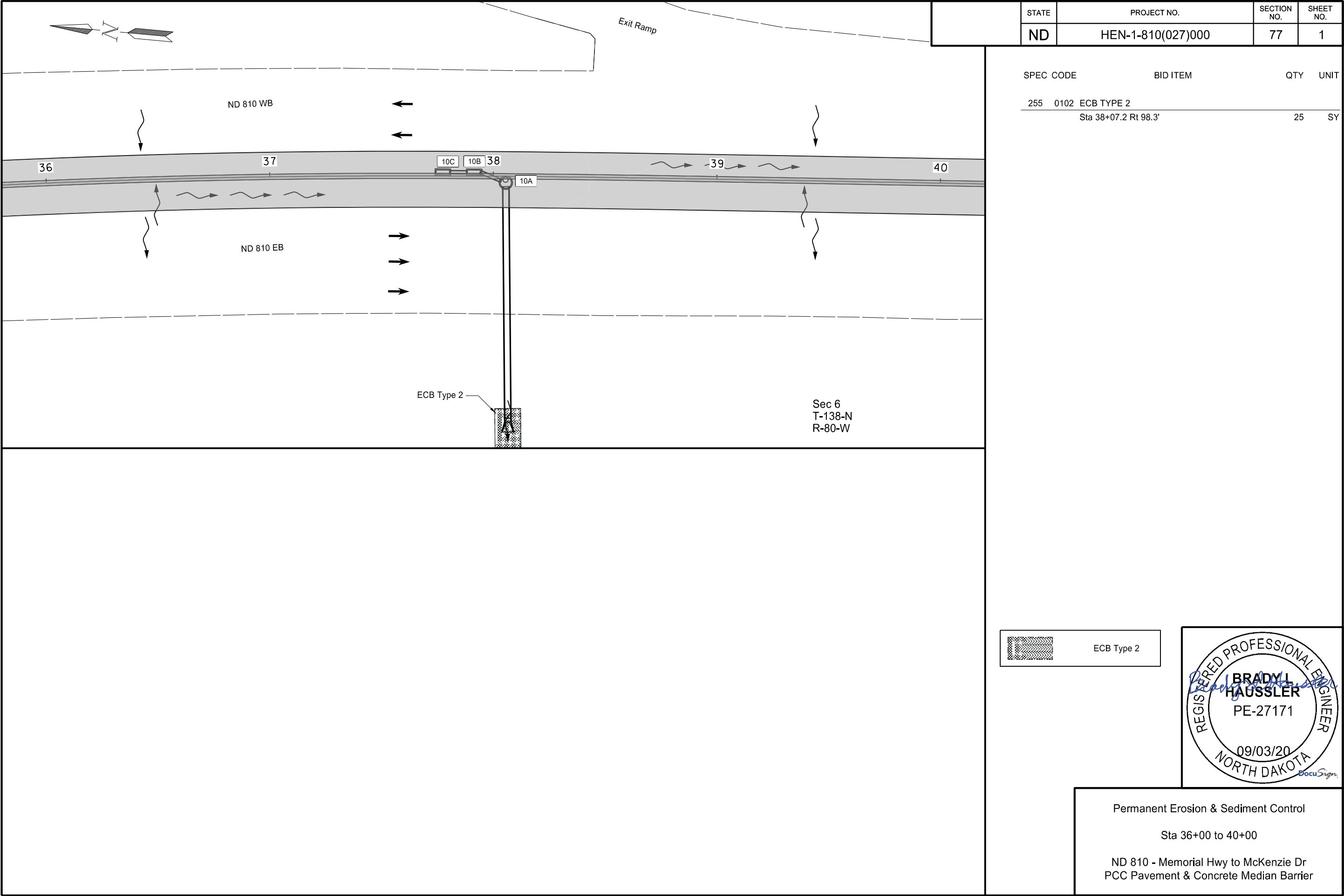






STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	76	2

SPEC CODE	BID ITEM	QTY	UNIT
708 1540	INLET PROTECTION-SPECIAL		
	12A, 12B, 13A, 13B	8	EA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	77	1

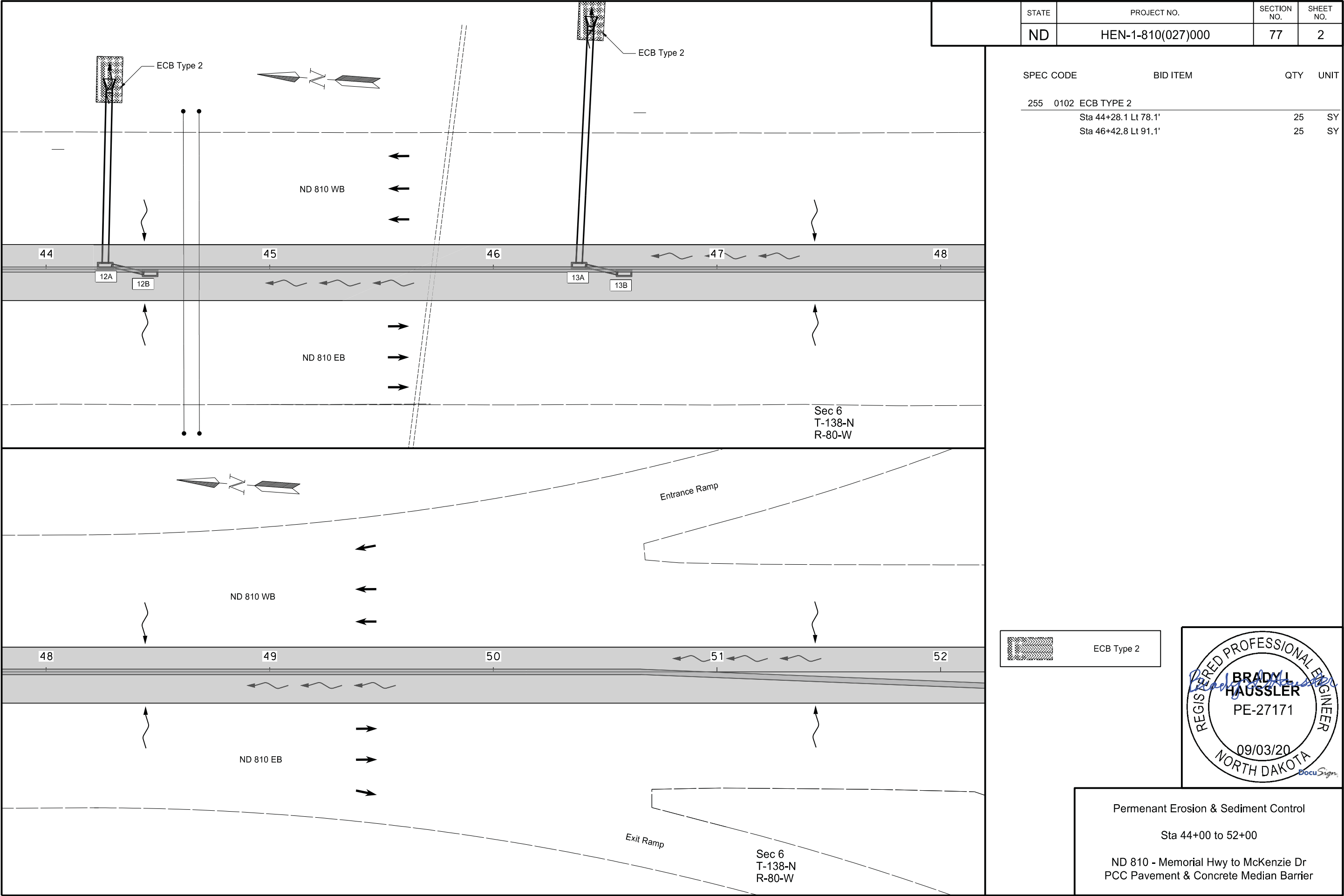
SPEC CODE	BID ITEM	QTY	UNIT
255 0102	ECB TYPE 2		
	Sta 38+07.2 Rt 98.3'	25	SY



Permanent Erosion & Sediment Control

Sta 36+00 to 40+00

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

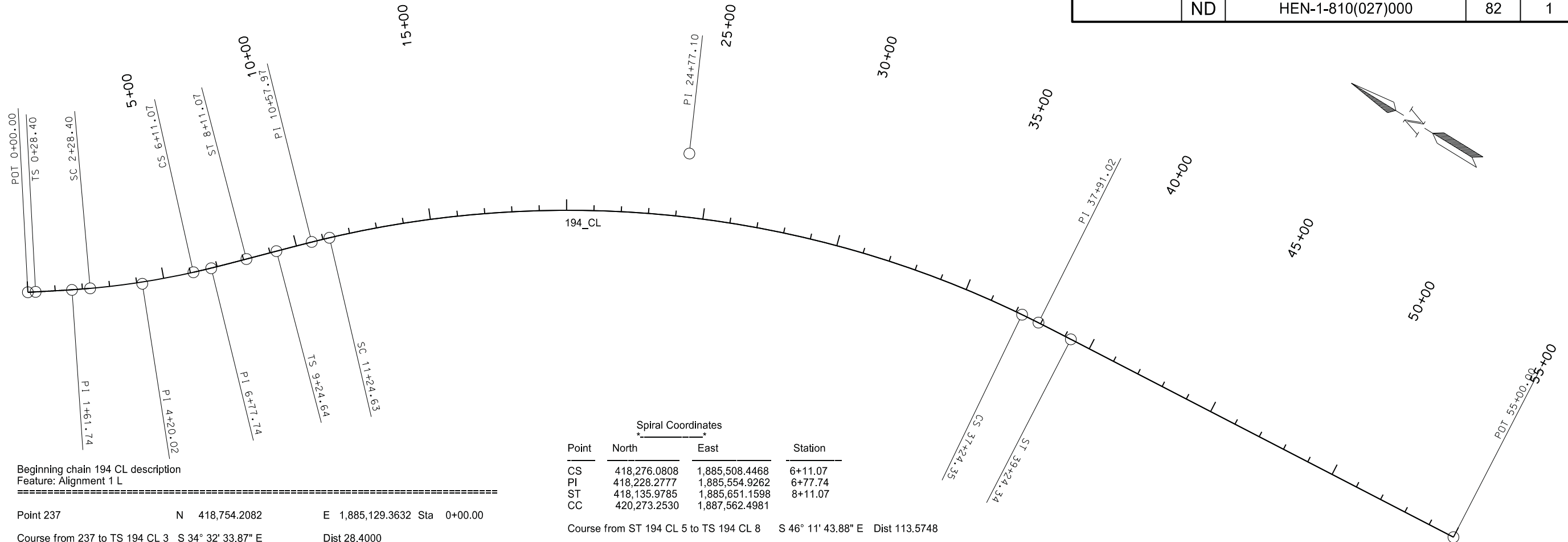


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	77	2

SPEC CODE	BID ITEM	QTY	UNIT
255 0102	ECB TYPE 2		
	Sta 44+28.1 Lt 78.1'	25	SY
	Sta 46+42.8 Lt 91.1'	25	SY

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - HWY 810, MEMORIAL HWY TO MCKENZIE DR-EB/WB											STATE	PROJECT NO.		SECTION NO.	SHEET NO.
										ND	HEN-1-810(027)000		81	1	
HORIZONTAL ALIGNMENT				CURVE DATA		REFERENCE MARKERS				SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		R MKR #	NORTHING	EASTING	EB/WB	PNT	NORTHING	EASTING	ELEV	EB/WB	
						151	433873.60	1861001.47	WB	MONUMENT DESCRIPTION					
						151	433749.87	1860917.30	EB	PRIMARY CONTROL					
						152	430861.94	1865343.55	WB						
						152	430721.99	1865262.92	EB						
						153	428816.35	1870162.21	WB	GPS 1	431287.25	1864324.95	1952.35	EB	
						153	428678.34	1870108.96	EB	2" Alum cap stamped - NDDOT GPS-1					
						154	427487.43	1874982.50	WB	GPS 2	426799.84	1877081.76	1666.63	WB	
						154	427344.26	1874947.85	EB	2" Alum cap stamped - NDDOT GPS-2					
										GPS 3	418051.27	1885935.09	1635.14	WB	
										2" Alum cap stamped - NDDOT GPS-3					
										SECONDARY CONTROL					
						SECONDARY CONTROL				SECONDARY CONTROL					
						PNT	NORTHING	EASTING	ELEV	EB/WB	PNT	NORTHING	EASTING	ELEV	EB/WB
						RTK 100	432642.11	1862533.57	1973.39	EB	RTK 114	417565.47	1886259.65	1644.35	WB
						RTK 101	432500.29	1862735.37	1976.59	EB	RTK 116	415761.92	1886864.98	1643.51	EB
						RTK 102	428466.57	1870772.49	1776.52	EB	RTK 117	415115.90	1886927.79	1638.57	EB
						RTK 103	428276.38	1871454.80	1758.09	EB	RTK 118	414362.64	1887128.89	1649.53	WB
						RTK 104	427930.49	1873455.34	1714.22	WB	RTK 124	420157.51	1884053.63	1655.11	EB
						RTK 105	428097.56	1872806.55	1721.12	WB	RTK 125	419805.85	1884337.42	1654.25	EB
						RTK 106	428461.76	1870693.46	1772.94	EB	RTK 126	419591.88	1884690.08	1652.73	WB
						RTK 107	427046.28	1876290.26	1686.50	MEDIAN	RTK 127	419969.84	1884384.35	1654.70	WB
						RTK 108	426902.87	1876725.98	1675.82	MEDIAN	CP 119	414740.16	1887096.63	1641.28	WB
						RTK 109	426601.09	1877163.43	1664.08	MEDIAN	CP 120	414000.71	1887138.96	1657.80	WB
						RTK 110	426537.67	1876270.58	1662.56	EB	CP 121	419380.20	1884574.56	1649.99	EB
						RTK 111	432579.86	1862574.13	1968.08	EB	CP 122	419437.20	1884758.82	1650.98	WB
						RTK 112	419001.24	1884889.74	1645.08	EB	CP 123	416046.25	1886814.02	1653.04	EB
						RTK 113	418491.49	1885389.58	1638.24	WB	CP 128	419564.00	1884496.40	1652.18	EB
										All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Station (OPUS) ☒ NAVD-88 ☐ _____ ☒ GEOID12B ☐ _____ ☐ GEOID18					
NOTES: Sheet 1 of 1				Date Survey Completed 11/22/2019		☐ Assumed Coordinates ☒ All coordinates on this sheet are Morton County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998485									

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	82	1



Beginning chain 194 CL description
Feature: Alignment 1 L

Point 237	N	418,754.2082	E	1,885,129.3632	Sta	0+00.00
-----------	---	--------------	---	----------------	-----	---------

Course from 237 to TS 194 CL 3 S 34° 32' 33.87" E Dist 28.4000

Spiral 194 CL 3	Type 1	Spiral Element				
Angle	1° 59' 59.65" (LT) P	0.5817	BK	S	34° 32' 33.87" E	
LS	200.0000	K	99.9959	AH	S 36° 32' 33.52" E	
R	2,864.9300	LT	133.3418	CB	S 35° 12' 33.73" E	
YS	2.3268	ST	66.6744	Defl	0° 39' 59.86"	
XS	199.9756	LC	199.9892	Deg	1° 59' 59.65"	

Point	Spiral Coordinates		Station
	North	East	
TS	418,730.8151	1,885,145.4666	0+28.40
PI	418,620.9809	1,885,221.0742	1+61.74
SC	418,567.4138	1,885,260.7735	2+28.40
CC	420,273.2530	1,887,562.4981	

		Curve Data			

Curve 194 CL 4					
P.I. Station	=	4+20.02	N	418,413.4646	E 1,885,374.8673
Delta	=	7° 39' 10.72"	(LT)		
Degree	=	1° 59' 59.65"			
Tangent	=	191.6188			
Length	=	382.6677			
Radius	=	2,864.9300			
External	=	6.4010			
Long Chord	=	382.3833			
Mid. Ord.	=	6.3867			
P.C. Station	=	2+28.40	N	418,567.4138	E 1,885,260.7735
P.T. Station	=	6+11.07	N	418,276.0808	E 1,885,508.4468
C.C.	=		N	420,273.2530	E 1,887,562.4981
Back	=	S 36° 32' 33.52" E			
Ahead	=	S 44° 11' 44.24" E			
Chord Bear	=	S 40° 22' 08.88" E			

Spiral 194 CL 5		Type 2	Spiral Element		
Angle	1° 59' 59.65" (LT)	P	0.5817	BK	S 44° 11' 44.24" E
LS	200.0000	K	99.9959	AH	S 46° 11' 43.88" E
R	2,864.9300	LT	133.3418	CB	S 45° 31' 44.03" E
YS	2.3268	ST	66.6744	Defl	0° 39' 59.86"
XS	199.9756	LC	199.9892	Deg	1° 59' 59.65"

Point	Spiral Coordinates		Station
	North	East	
CS	418,276.0808	1,885,508.4468	6+11.07
PI	418,228.2777	1,885,554.9262	6+77.74
ST	418,135.9785	1,885,651.1598	8+11.07
CC	420,273.2530	1,887,562.4981	

Course from ST 194 CL 5 to TS 194 CL 8 S 46° 11' 43.88" E Dist 113.5748

Spiral 194 CL 8		Type 1	Spiral Element					
Angle	1° 29' 59.57" (RT)	P	0.4363	BK	S	46° 11' 43.88"	E	
LS	199.9900	K	99.9927	AH	S	44° 41' 44.31"	E	
R	3,819.8300	LT	133.3315	CB	S	45° 41' 44.04"	E	
YS	1.7450	ST	66.6677	Defl		0° 29' 59.85"		
XS	199.9763	LC	199.9839	Dec		1° 29' 59.84"		

Point	Spiral Coordinates		Station
	North	East	
TS	418,057.3621	1,885,733.1275	9+24.64
PI	417,965.0701	1,885,829.3536	10+57.97
SC	417,917.6792	1,885,876.2437	11+24.63
CC	415,231.0375	1,883,160.9061	

Curve Data					

Curve 194 CL 9					
P.I. Station	=	24+77.10	N	416,956.2718	E 1,886,827.4908
Delta	=	38° 59' 40.55" (RT)			
Degree	=	1° 29' 59.84"			
Tangent	=	1,352.4700			
Length	=	2,599.7155			
Radius	=	3,819.8300			
External	=	232.3640			
Long Chord	=	2,549.8313			
Mid. Ord.	=	219.0396			
P.C. Station		11+24.63	N	417,917.6792	E 1,885,876.2437
P.T. Station		37+24.35	N	415,610.4915	E 1,886,961.8423
C.C.			N	415,231.0375	E 1,883,160.9061
Back	=	S 44° 41' 44.31" E			
Ahead	=	S 5° 42' 03.76" E			
Chord Bear	=	S 25° 11' 54.04" E			

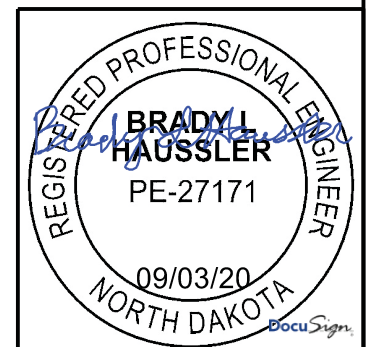
Spiral 194 CL 10		Type 2	Spiral Element			
Angle	1° 29' 59.57" (RT)	P	0.4363	BK	S	5° 42' 03.76" E
LS	199.9900	K	99.9927	AH	S	4° 12' 04.19" E
	3,819.8300	LT	133.3315	CB	S	4° 42' 04.04" E
YS	1.7450	ST	66.6677	Defl		0° 29' 59.85"
XS	199.9763	LC	199.9839	Deg		1° 29' 59.84"

Point	Spiral Coordinates		Station
	North	East	
CS	415,610.4915	1,886,961.8423	37+24.35
PI	415,544.1535	1,886,968.4650	37+91.02
ST	415,411.1803	1,886,978.2326	39+24.34
CC	415,231.0375	1,883,160.9061	

Course from ST 194 CL 10 to 238 S 4° 12' 04.19" E Dist 1,575.6620

Point 238	N	413,839.7521	E	1,887,093.6632	Sta	55+00.00
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Ending chain 194 CL description



Survey Data Layout

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

Beginning chain OCL810BA description
Feature: Alignment 2 L
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Curve Data

Curve OCL810BA 1
P.I. Station 0+25.06 N 416,255.8376 E 1,886,850.6461
Delta = 0° 44' 59.92" (RT)
Degree = 1° 29' 46.45"
Tangent = 25.0625
Length = 50.1244
Radius = 3,829.3300
External = 0.0820
Long Chord = 50.1240
Mid. Ord. = 0.0820
P.C. Station 0+00.00 N 416,279.9416 E 1,886,843.7811
P.T. Station 0+50.12 N 416,231.6459 E 1,886,857.1950
C.C. N 415,231.0375 E 1,883,160.9061
Back = S 15° 53' 50.14" E
Ahead = S 15° 08' 50.22" E
Chord Bear = S 15° 31' 20.18" E

Course from PT OCL810BA 1 to 3163 S 12° 46' 23.34" E Dist 11.9133

Course from 3181 to PC OCL810BA 62 S 9° 23' 00.37" E Dist 11.8852

Curve Data

Curve OCL810BA 62
P.I. Station 4+84.42 N 415,805.8268 E 1,886,942.3417
Delta = 5° 53' 01.84" (RT)
Degree = 1° 29' 59.84"
Tangent = 196.3064
Length = 392.2677
Radius = 3,819.8300
External = 5.0409
Long Chord = 392.0954
Mid. Ord. = 5.0343
P.C. Station 2+88.11 N 415,998.1341 E 1,886,902.9195
P.T. Station 6+80.38 N 415,610.4914 E 1,886,961.8423
C.C. N 415,231.0375 E 1,883,160.9061
Back = S 11° 35' 05.60" E
Ahead = S 5° 42' 03.76" E
Chord Bear = S 8° 38' 34.68" E

Spiral OCL810BA 63 Type 2 Spiral Element

Angle	1° 29' 59.57" (RT) P	0.4363 BK S 5° 42' 03.76" E
LS	199.9900 K	99.9927 AH S 4° 12' 04.19" E
R	3,819.8300 LT	133.3315 CB S 4° 42' 04.04" E
YS	1.7450 ST	66.6677 Defl 0° 29' 59.85"
XS	199.9763 LC	199.9839 Deg 1° 29' 59.84"

Point	Spiral Coordinates		Station
	North	East	
CS	415,610.4914	1,886,961.8423	6+80.38
PI	415,544.1535	1,886,968.4650	7+47.04
ST	415,411.1803	1,886,978.2326	8+80.37
CC	415,231.0375	1,883,160.9061	

Course from ST OCL810BA 63 to 3182 S 4° 12' 04.19" E Dist 1,140.8800

Point 3182 N 414,273.3659 E 1,887,061.8117 Sta 20+21.25

Course from 3182 to 3183 S 1° 54' 38.01" E Dist 299.6014

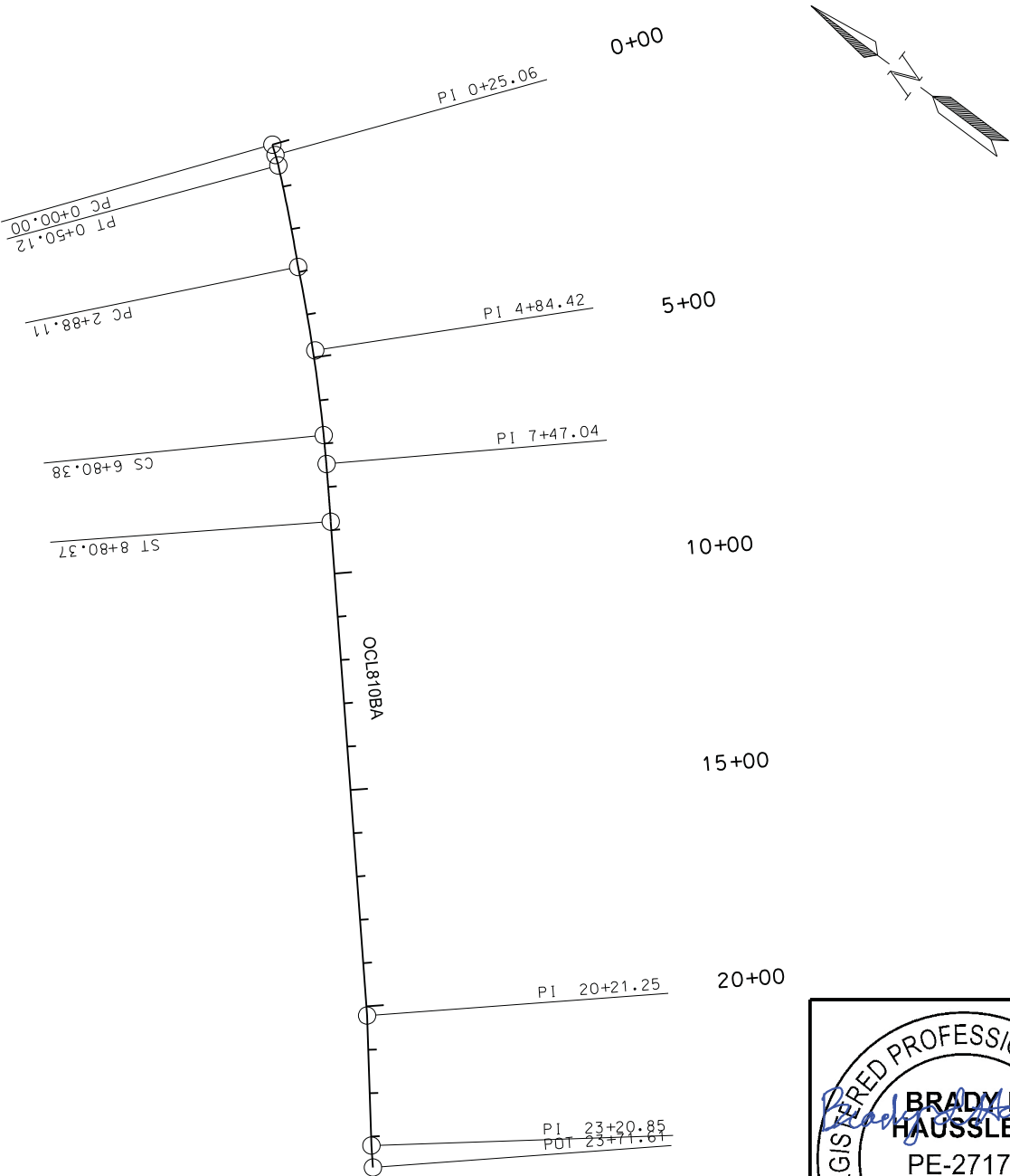
Point 3183 N 413,973.9310 E 1,887,071.8003 Sta 23+20.85

Course from 3183 to 3184 S 4° 12' 04.19" E Dist 50.7600

Point 3184 N 413,923.3074 E 1,887,075.5189 Sta 23+71.61

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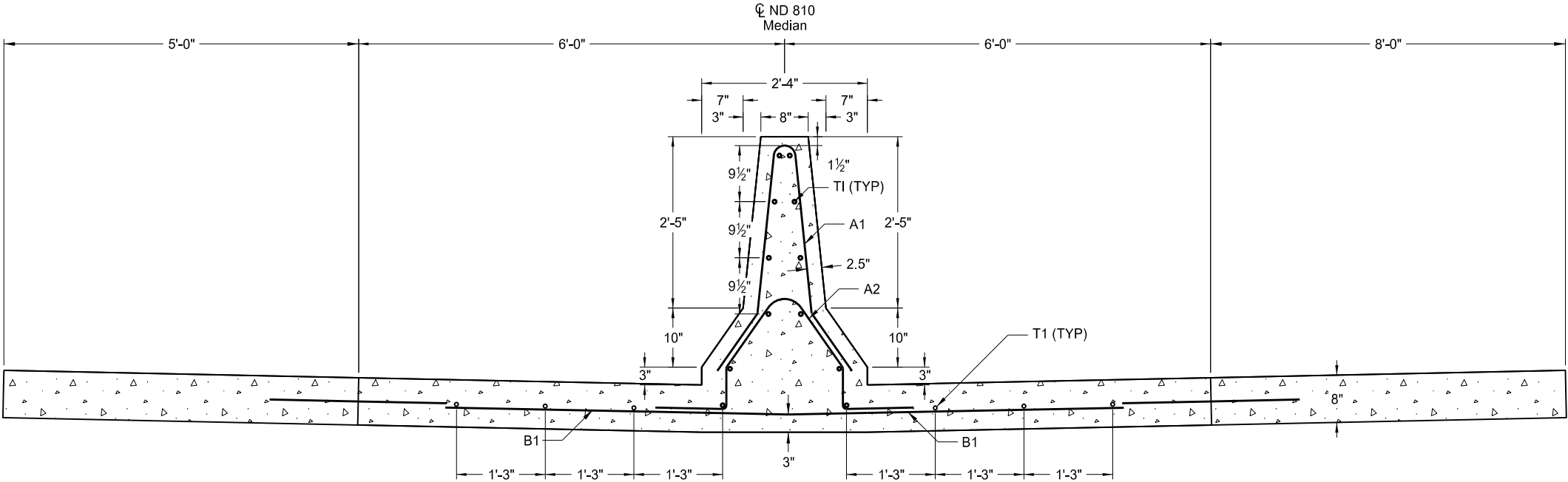
Ending chain OCL810BA description



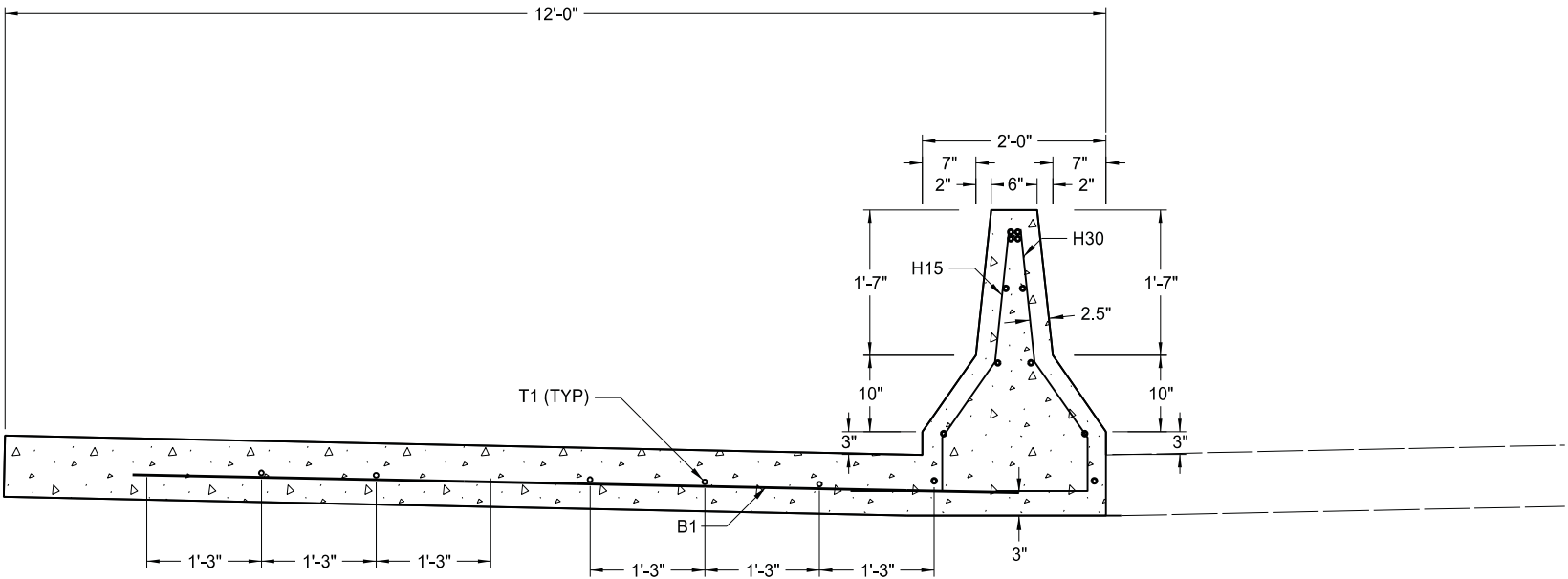
Survey Data Layout

ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	130	1



Proposed Barrier Reinforcement 1
Sta 31+54.1 to 54+12.9



Proposed Barrier Reinforcement 2
32" Barrier at Bridge Transition

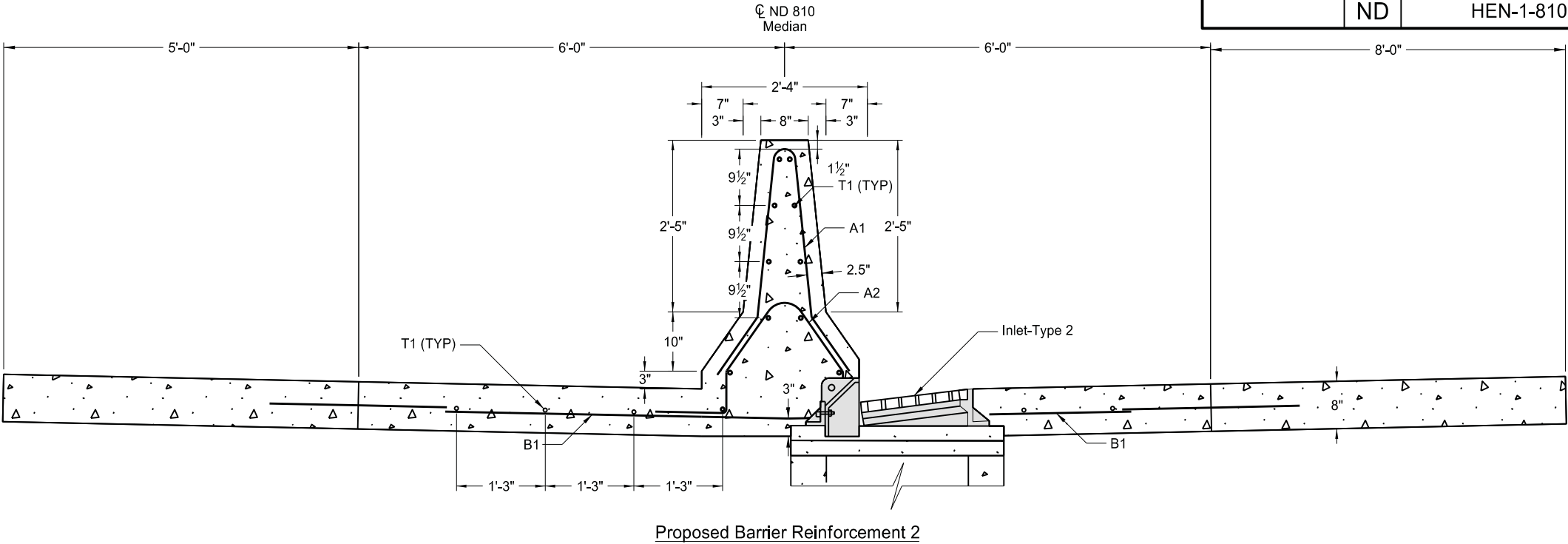


Barrier Details

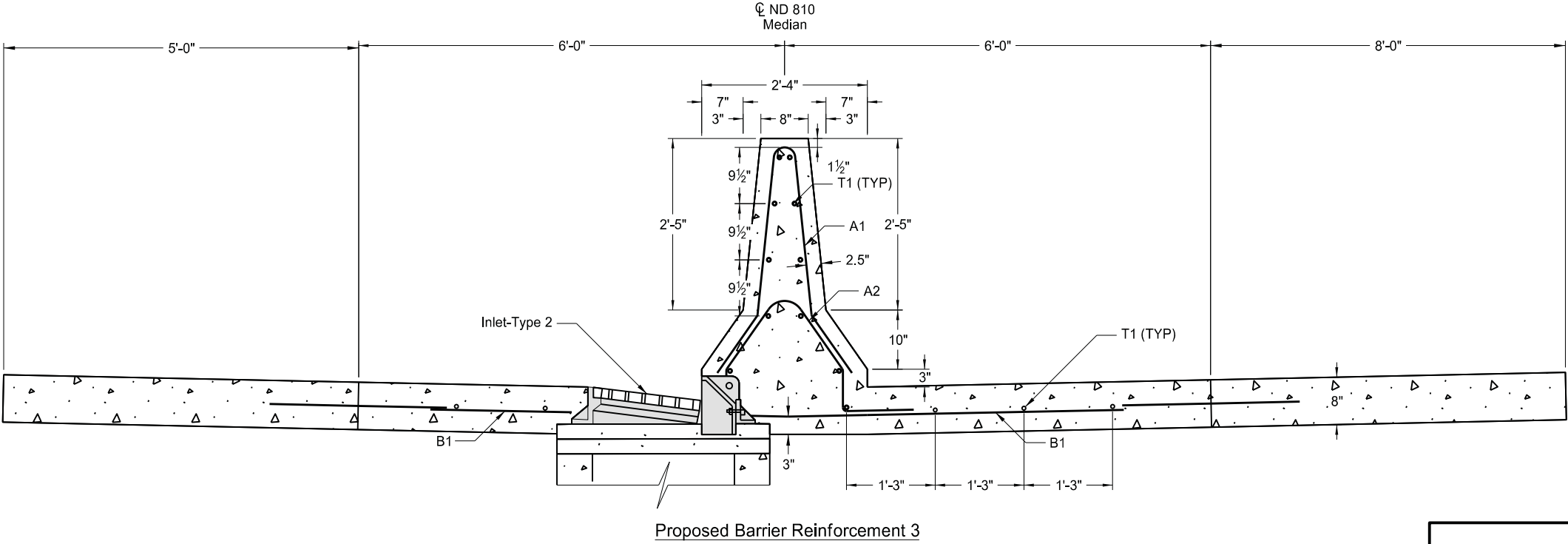
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

23 USC § 409 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	130	2



Inlets:
10A, 11A, 11D, 12B, 13B



Inlets:
10B, 10C, 11B, 11C, 12A, 13A



Barrier Details

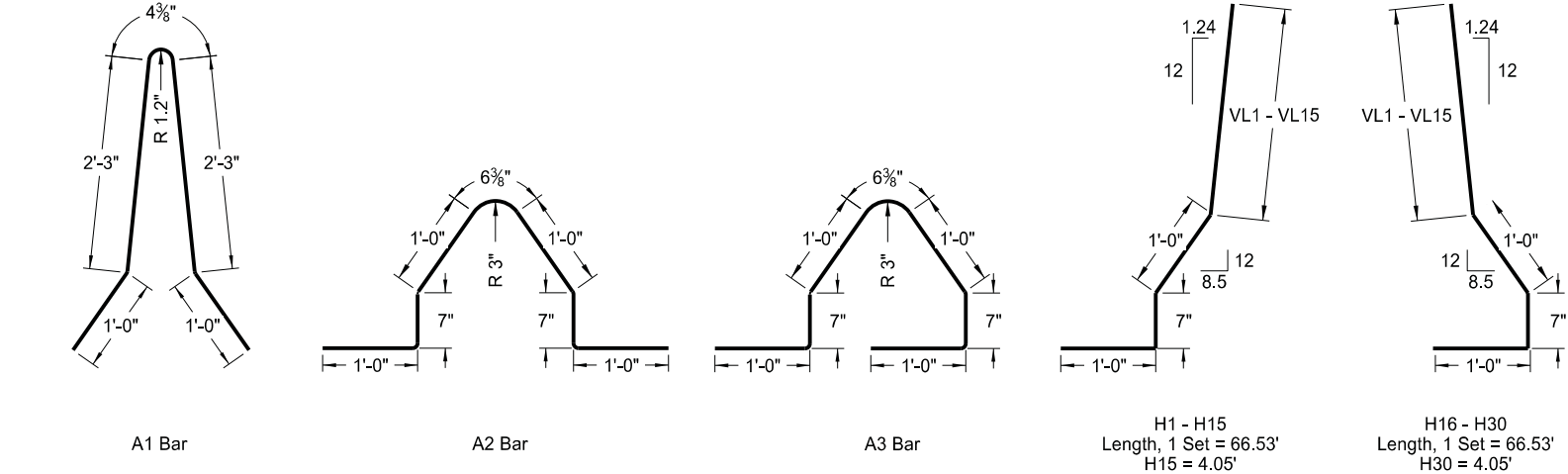
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

23 USC § 409 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	130	3

Notes:

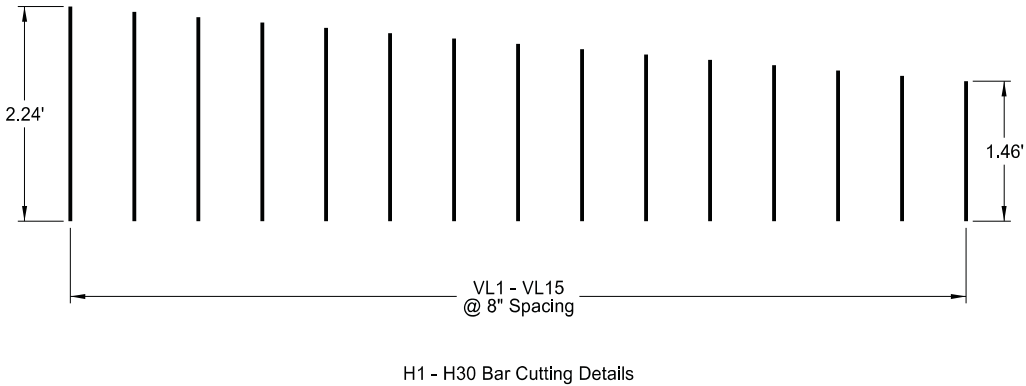
- (A) These quantities are provided for informational purposes only. Include the costs for all materials, equipment, and labor to construct the jersey barrier walls and 8" thick median slab in the prices bid for the items "Concrete Median Pavement" and "Jersey Barrier Formed or Slipformed."
- Field cut T1 bars at the slab and barrier ends, and substitute the remaining bars (5' in length or longer) for T1 bars elsewhere.
 - Dimensions of bent bars are given out to out. The listed length of the bent bars is the sum of the detailing dimensions.



Bar List - Jersey Barrier Walls (A)				
Mark	Size	Number	Length	Shape
		OCL810BA		
A1	5	3326	6'-10 3/8"	Bent
T1	5	380	60'	Straight

Bar List - 8" Concrete Median Slab (A)				
Mark	Size	Number	Length	Shape
		OCL810BA		
A2	5	3177	5'-8 3/8"	Bent
A3	5	149	5'-8 3/8"	Bent
B1	5	3390	10'	Straight
T1	5	304	60'	Straight
H1-H15	5	1 set	66.53'	Bent
H16-H30	5	1 set	66.53'	Bent
H16-H30	5	14	4.05'	Bent

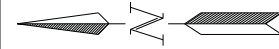
Concrete Volumes (Cubic Yards) (A)				
Location (Sta)	31+54 to 36+00	36+00 to 44+00	44+00 to 52+00	52+00 to 54+13
8" Median Slab	275	494	494	132
Barrier Wall	66	126	126	34
Total	341	620	620	166



Barrier Details

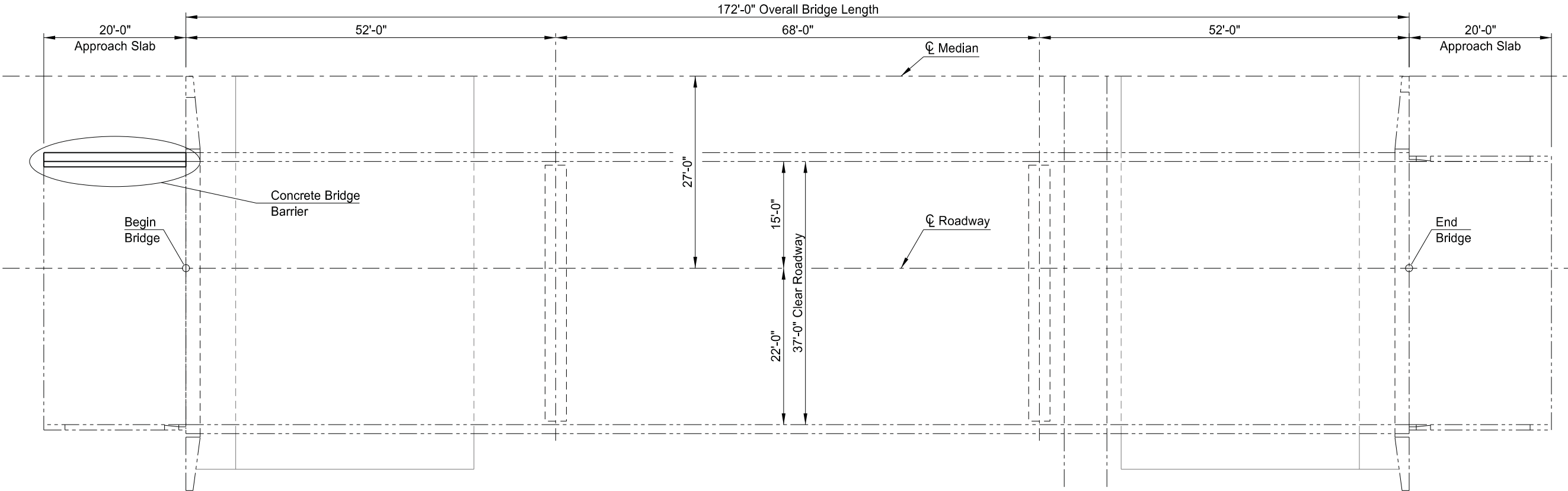
ND 810 - Memorial Hwy to McKenzie Dr
PCC Pavement & Concrete Median Barrier

23 USC § 409 Documents
NDDOT Reserves All Objections



STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	HEN-1-810(027)000	170	1

PLAN



NOTES:

100 SCOPE OF WORK: Work at this site consists of modifying a portion of the entrance end, median side, approach slab and barrier.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1208	CONCRETE BRIDGE BARRIER	LF	20

McKENZIE DRIVE INTERCHANGE
MANDAN

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

08/28/20
Don Ketterling

DocuSign

Diagram illustrating the cross-section of a concrete slab with a saw cut. The slab is 14'-0" long, with 3'-0" sections at each end. A 1'-6" thick section is shown on the left. A saw cut is indicated 1" deep.

3" 20 Eq Sp ~ 5A901 ~ Top & Bot
(Match Existing Reinforcing) 3"

3" 3 Sp @ 6" 7A900 Top & Bot 3"

Existing Reinforcing To remain in place.

20"

A A

4"

29 Sp @ 8" ~ 5XK900 & 5XL900

4"

4XA903

7A900

1 1/2" x 5 1/2"
Kevlar

1/4" Pref Exp Joint

Filler ~ Silicone Sealant (826.02 B.1)
Front Face Only

Diagram A-A shows a cross-section of the bridge deck. The total width is 20'-0". The deck is supported by a foundation and fill. The deck thickness is 3". The distance from the centerline to the edge of the deck is 1'-2". The distance from the centerline to the edge of the foundation is 3" Clr. The distance from the centerline to the edge of the fill is 3" Clr. The diagram also indicates a "See 'Approach Slab Joint Detail'" and a "Foundation Fill" section.

Diagram illustrating the cross-section of a bridge joint, showing the approach slab, bridge deck, and various materials used for sealing and reinforcement.

- Approach Slab:** Labeled "APPROACH SLAB".
- Bridge Deck:** Labeled "BRIDGE".
- Joint Sealer:** Labeled "Silicone Sealant (826.02 B.1)".
- Sealer Dimensions:** "Leave joint sealer 0" to 1/8" below finished surface." and "3/8"
- Reinforcement:** "1" Sawn or Hand Tool Formed" and "Existing Reinforcing To remain in place."
- Joint Filler:** "1/2" x 6" Pref Exp Jt Filler".
- Other Materials:** "1" Polystyrene" and "Polyethylene Film".
- Dimensions:** "1'-2\"", "6\"", "1'", and "3/8"
- Labels:** "Top of Slab" and "Top of Bridge Deck".

Technical drawing of the back of the 826.02 B.1 chair, showing dimensions and assembly details:

- Overall height: 2'-8 $\frac{5}{16}$ "
- Top width: 1'-3"
- Top left width: 6"
- Top right width: 7"
- Right side width: 2"
- Right side height: 1'-7"
- Right side height: 10"
- Right side height: 2'-8"
- Right side width: 3"
- Bottom width: 1'-2" x 5 $\frac{1}{2}$ "
- Bottom width: 10" R
- Bottom width: Optional
- Bottom width: Silicone Sealant
- Bottom width: (826.02 B.1)

4XA903
(typ)

* 5XL900

* 5XK900

Existing Reinforcing
To remain in place.

7A900

Technical drawings of two mechanical parts, labeled 1 and 2, showing their dimensions and tolerances.

Part 1 (Left): A U-shaped component with a 3" top width, 2'-2" height, and a 12" inner width. The bottom has a 2.5" R radius and an 8" width. The side walls are 1.25" thick.

Part 2 (Right): A complex component with a 2.5" R top radius, 8" top width, and 1'-8" height. The bottom has a 1'-0" width. The side walls are 1.25" thick. The bottom right corner has a 2.5" R radius and an 8" width. The bottom left corner has a 1'-0" width.

QUANTITIES	
CONCRETE BRIDGE BARRIER	20 LF

APPROACH SLAB DETAILS

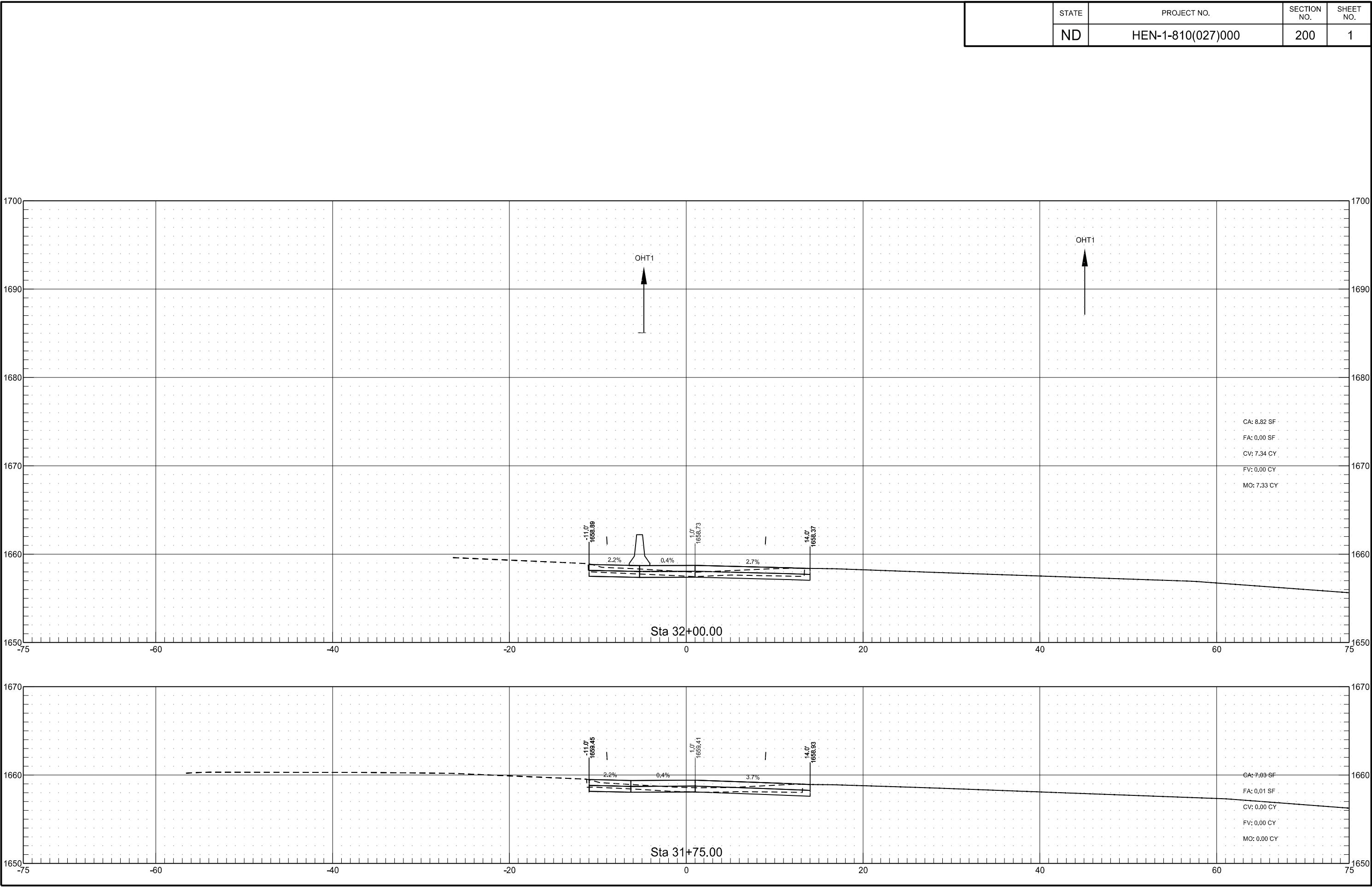
Install 5A904 bars according to manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02.

SKEW ANGLE = 0°			
BAR LIST			
SIZE	MARK	NO.	LENGTH
7	A900	8	19'-8"
5	A901	42	1'-7"
4	XA902	9	19'-8"
5	XK900	30	5'-7"
5	XL900	30	5'-0"

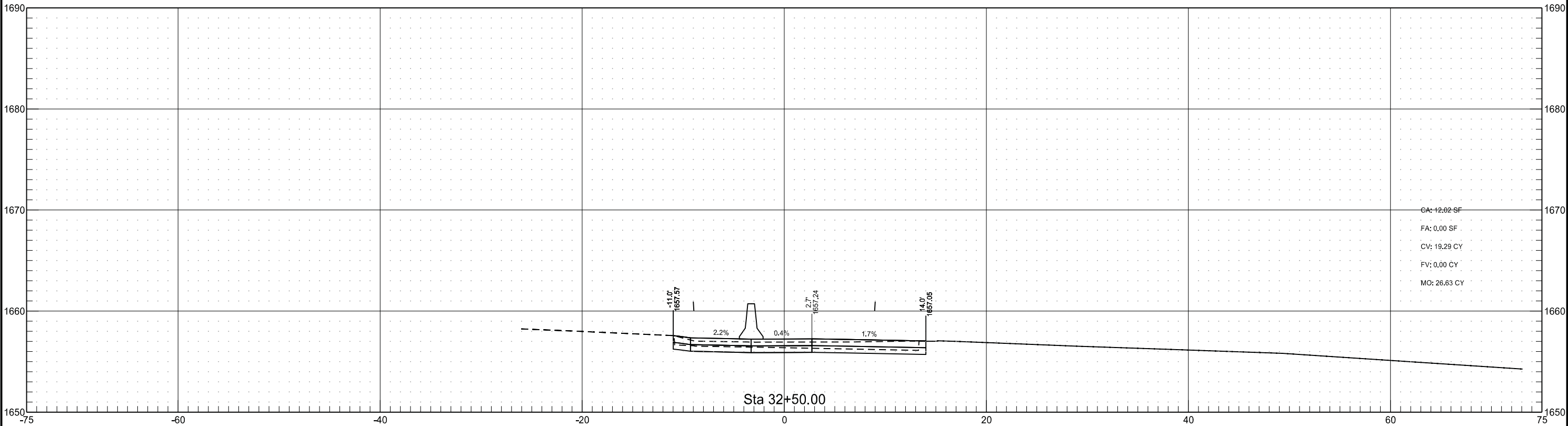
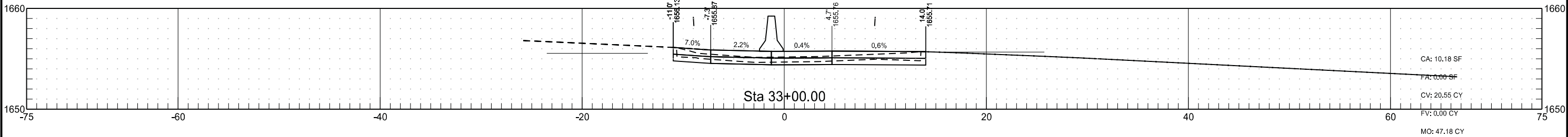
ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
840	3





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	200	2



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEN-1-810(027)000	200	3

