

DESIGN DATA			
Traffic	Average Daily		
Current 2013	Pass: 7320	Trucks: 770	Total: 8090
Forecast 2033	Pass: 11001	Trucks: 1255	Total: 12256
Clear Zone Distance: 32'		Design Speed: 70	
Minimum Sight Dist. for Stopping: 1616'		Bridges:	
Limited Access Control			
Pavement Design Life 20 (years)			
Design Accumulated One-way Flexible ESALs: 576455			

JOB # 27
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

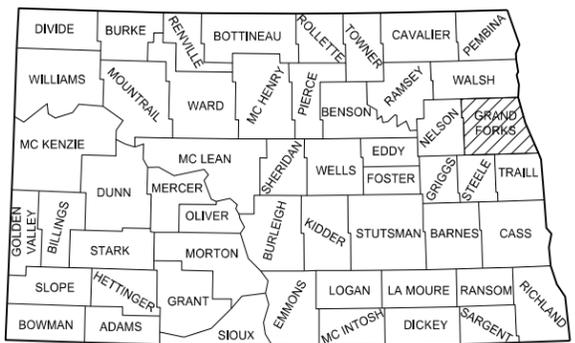
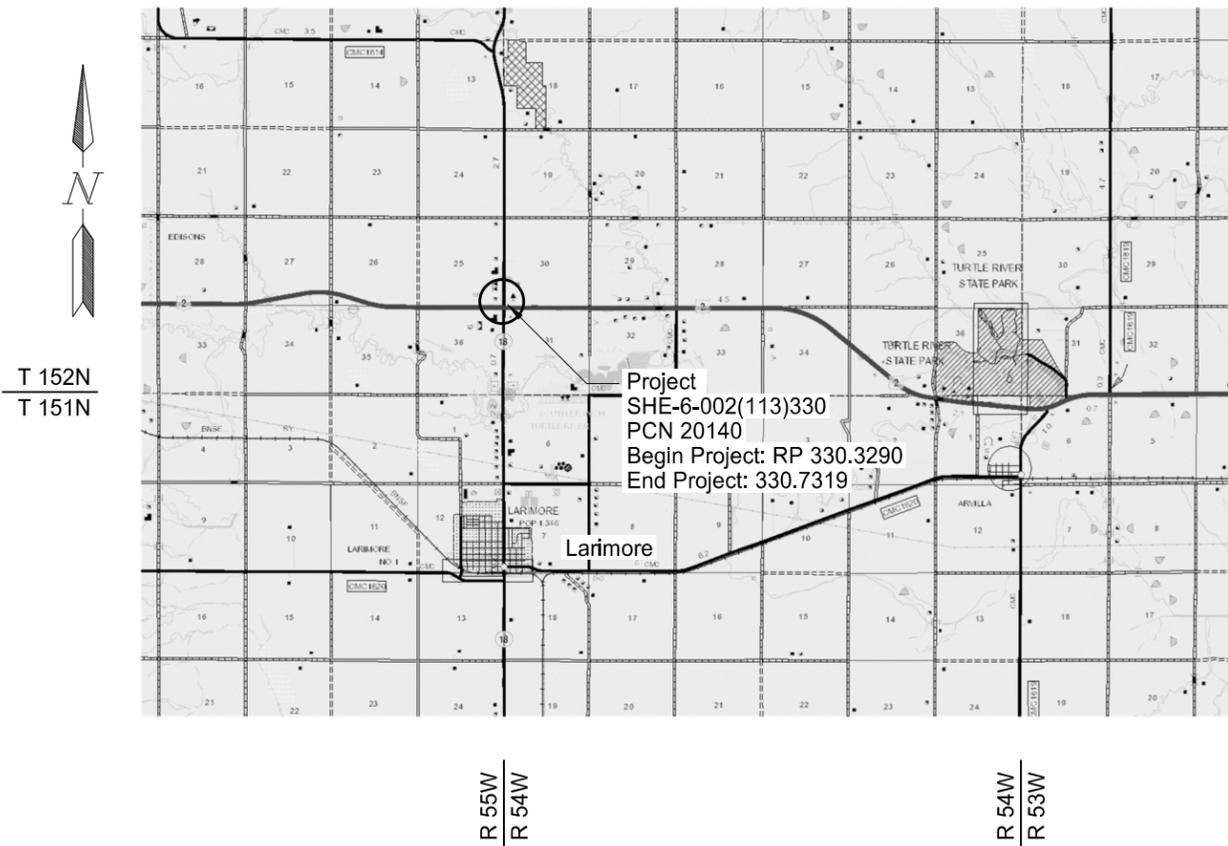
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	20140	1	1

SHE-6-002(113)330

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

Grand Forks County
Intersection of US 2 with ND 18
RP 330.300 to RP 330.750
Rest Area & Intersection Improvements

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SHE-6-002(133)330	0.40	0.40



STATE COUNTY MAP

DESIGNERS
Aaron Murra /s/
Luis Blanco Seguerit /s/

APPROVED DATE 03/18/16
Roger Weigel /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.
APPROVED DATE 03/18/16
James Rath /s/
NDDOT DESIGN DIVISION

This document was originally issued and sealed by
James Rath
Registration Number
PE- 4288,
on 03/18/16 and the original document is stored at the North Dakota Department of Transportation

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Number	Description
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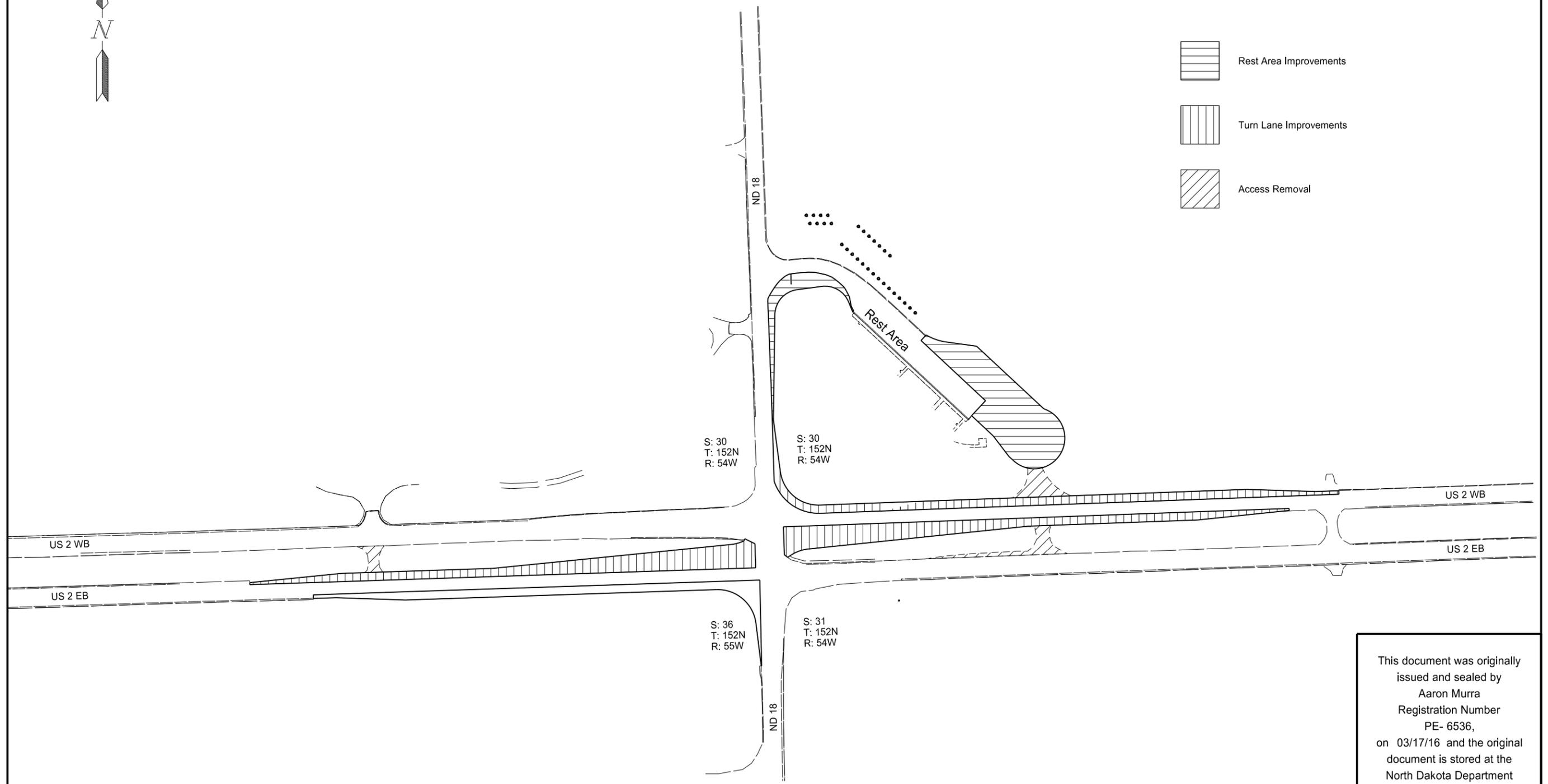
Number	Description
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D-704-9	Construction Sign Details - Terminal and Guide Signs
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-  Rest Area Improvements
-  Turn Lane Improvements
-  Access Removal



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Scope of Work
 US 2 & ND 18
 Rest Area & Intersection Improvements

NOTES

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

107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

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

202-P01 REMOVAL OF PAVEMENT: Include the cost of the full depth vertical saw cuts adjacent to pavement removal areas, specified in Section 202.04 A "General", in the contract unit price for "Removal of Pavement."

202-P02 REMOVAL OF PAVEMENT: Include the cost for removing aggregate base below the pavement in the contract unit price for "Removal of Pavement."

202-P03 REMOVAL OF PIPE ALL TYPES AND SIZES: Deliver the removed pipes to the Grand Forks Section yard: 1524 Towner Avenue, Larimore ND, 58251

The existing pipe under the median at US 2 and ND 18 will be abandoned in place. Remove the existing end sections and enough pipe to complete the grading. Plug the pipe with concrete pipe plugs according to Standard Drawing D-714-1. Include all costs associated with this work in the price bid for "Removal of Pipe all Types and Sizes."

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

203-P01 TOPSOIL: Topsoil will be paid as plan quantity.

230-P01 SUBGRADE PREPARATION: Perform Subgrade Preparation – Type A - 12" in the area where the rest area parking lot is being improved.

401-P01 FOG SEAL: Fog seal after final rolling with a minimum mat temperature of 125 degrees F.

430-P01 MILLED MATERIAL: Obtain approximately 910 tons of millings from Project NH-6-002(121)329 for the production of RAP Superpave FAA 45 on this project.

430-P02 LONGITUDINAL JOINT: Construct joints in a manner to provide a continuous bond between the old and new surfaces. When constructing longitudinal joints adjacent to existing HMA pavements; overlap the existing pavement 1 inch to 1.5 inches. Perform the initial longitudinal roller pass on the uncompacted hot mat 6 inches to 1 foot from the joint. Compact the overlapped material and the 6 inch to 1 foot material simultaneously with the successive roller pass.

704-255 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. W8-9a-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52-54 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."

704-P01 TRAFFIC CONTROL DEVICES: Temporary traffic control for this project consists of temporary single lane closures with times of flagging. The traffic control devices list was developed using the following layouts shown on the Standard Drawings.

Provide Traffic Control Devices that comply with the following Standard Drawings:

- D-704-20 Type G: For terminal signs
- D-704-22 Layouts Type K and L: For construction trucks entering from a borrow site, aggregate source, or a Contractor jobsite.
- D-704-24 Type R: For shoulder closure on ND 18 and Rest Area closure.
- D-704-26, Layout FF
- D-704-34: For lane closures.
- D-704-50: For portable sign support assembly

The required traffic control signs and devices are included in the "Traffic Control Devices List" and will be measured and paid for at the Contract Unit price for each device. Include the cost for additional devices required to accommodate the Contractor's operation in the unit price bid for "Traffic Control Signs."

704-P02 PROJECT PHASING: Temporary traffic control details were developed on the basis that this project will be constructed in two phases.

Phase 1: Construct the right turn lanes with single lane closures in each direction on the outside lanes. Perform work at the rest area with a shoulder closure on ND 18 and closing the rest area access.

Phase 2: Construct the left turn lanes with single lane closures in each direction on the inside lanes.

706-P01 BITUMINOUS LABORATORY: Provide cellular internet service with Wi-Fi capabilities. Also provide a cell phone signal booster that boosts 3G and 4G frequencies and allows for the reliable use of cellular voice and data services throughout the lab.

Include all costs for installation and monthly fees for the cellular internet service and cell phone signal booster in the contract price bid for "Bituminous Laboratory."

970-P01 REPLANT TREE: This work consists of removing and replanting existing trees located east of the rest area parking lot. Remove and replant the trees as shown in the Removals and Plan and Profile layouts of the plans to allow for the construction of the parking lot improvements.

Remove the trees with a solid ball of earth around the roots. Provide a ball with a diameter not less than 10 times the diameter of the trunk of the tree measured 1 ft above the surface of the ground. Provide a ball depth not less than 60% of its diameter for balls up to 48 in diameter. For balls over 48 in diameter provide a ball with sufficient depth to maintain a solid structure and to encompass all the feeding roots under the ball area. Use a mechanical tree spade to replant the trees.

Prior to placing topsoil within the tree pits rototill the bottom of the tree pit to a minimum 6" depth within. Break up large clumps, remove any extraneous material, and re-shape the subgrade prior to placing topsoil.

Water the root ball of the tree thoroughly prior to removal to keep the root ball intact and reduce as much soil loss as possible during transports. Maintain the ball as a solid unit when moving the tree. Keep the ball moist at all times during transplanting operations.

Take care to prevent injury to the tree during the transplanting operation. Protect all parts of the tree. Tie branches out of the way of possible injury.

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Do not attach chains, cables, or heavy ropes to the trunk or branches without protective padding adequate to prevent bruising or other injury.

Replant the trees so the new spacing matches the existing tree spacing of the remaining trees. When positioning the tree in the new hole, place it 2-3" higher than the original grade to allow for settling. Water the newly transplanted trees so the original soil ball and surrounding soil is saturated to a depth of 12". Apply water slowly to entire area, allowing adequate penetration.

Stake the trees with 2" x 2" pressure treated tree stakes or painted T-shaped steel posts securely inserted to a 3' depth and outside the root system. Extend a galvanized guy wire from the tree stake to a polypropylene strap (or equal) around the tree trunk.

Provide mulch materials that are free of all foreign debris. Keep mulch 6" away from the tree trunks. Provide mulch samples to the Project Engineer for approval. Obtain approval for mulch material prior to mulch installation. Mulch material installed without prior approval will be removed from the project. Cover the disturbed surface area of plant beds and pits evenly and uniformly to a 4" depth with bark mulch or as directed by the Engineer. Insure that all plant pits and beds are entirely free of weed or grass growth and free of live roots at the time mulch is applied.

Protect and care for the trees until November 1st 2016. Water them weekly during dry weather or as otherwise directed. Protect the trees from damage and from diseases and insect pests. Replace any trees that die or become damaged at no additional cost. Trees are considered dead when the main leader dies back, or 25% of the crown is dead. Remove the designated dead plant material immediately; replace the trees as soon as possible in accordance with the planting dates and weather conditions.

Include the cost for all equipment, fertilizer, topsoil, mulch, materials, and labor required to remove and replant, maintain and water the trees in the unit price "Replant Trees."

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NOTES

Section 140

770-100 CONCRETE FOUNDATIONS: Install and tighten anchor bolts as specified in section 754.04 D.5, "Overhead Sign Structures".

770-P01 LED LUMINAIRE: Provide luminaires that meet the following:

Light Source	LED
Light Output	16,000 lm to 20,000 lm
Driver	500 mA to 1050 mA
Wattage	130W to 175W
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 housing, wiring, and drivers	ANSI C136.25 IP-65
Photo Control on each luminaire	No
Tool-less Access	Yes
Qualified with DesignLights Consortium	Yes

Ensure the Effective Projective Area of the luminaire does not exceed the capacity of the light standard.

The lighting system was designed using these values:

Roadway Classification	Principal Arterial–Residential/Rural
Average Maintained Illuminance	0.8 foot-candles
Illuminance Uniformity Ratio (avg/min)	3.0:1
Minimum Illuminance	As uniformity ratio allows
Light Loss Factor	0.69

Provide one of the luminaires listed or an approved equal.

Company	Catalog Number
American Electric Lighting	ATB2 60BLEDE85 MVOLT R3
Philips	RFM-160W48LED4K-T-R3M

Include all cost associated with the LED lighting system in the contract unit price for "Lighting System".

770-P02 LIGHT STANDARD: Design the light standard base with a minimum of 4 anchor bolts. Install davit type galvanized light standards with 10' mast arms.

770-P03 MULTIPLE UNDERGROUND CABLE: The plans call for using Multiple Underground Cable and Conduit in various locations. In lieu of the Multiple Underground Cable, the contractor may furnish and install rigid conduit and single RHW conductors of the same size as shown in the plans for the Multiple Underground Cable.

Install conduit size as specified by the National Electric Code. If the contractor chooses to use the conduit and single conductors, the cost to furnish conduit and conductors shall be included in the item Multiple Underground Cable. The cost of installing conduit with single conductors shall be included in the bid price for the "Lighting System".

The conduit shown in the plans under roadways for installing Multiple Underground Cable will be included in the item "Lighting System".

This document was originally issued and sealed by Douglas A Schumaker, Registration Number PE-5047, on 3/21/16 and the original document is stored at the North Dakota Department of Transportation.

ENVIRONMENTAL COMMITMENTS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL COMMITMENTS (EC): The North Dakota Department of Transportation have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable permanent impacts will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank in accordance with the mitigation guidance^{2,3}.

ACTION REQUIRED /TAKEN: 0.00 acres of permanent USACE impacts to jurisdictional waters and 0.00 acres of permanent impacts to EO11990 wetlands will require mitigation.

Wetland Impact Table															
Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts (acres)		USFWS Easement Impacts (acres)		Wetland Mitigation				
							Temp.	Perm.	Temp.	Perm.	Mitigation Required			Onsite	
											EO 11990	USACE	USFWS	Mitigation Location; Ratio	Onsite Mitigation Acres
3	Sec.30, T152N, R54W	PEMCx	Ditch	0.02	Artificial	No	0.0	0.005	-	-	N	N	N	-	-
Totals				0.02			0.0	0.005	0.00	0.00					0.00

¹ A wetland Jurisdictional Determination was issued by the USACE on 4/07/2015; NWO-2015-0352-BIS.

² All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

³ All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.00	Temporary JD	0.00
Natural/Non-JD	0.00	Non-JD Temporary	0.00
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial /Non-JD	0.005	Permanent OW	0.00
Total	0.005	Temporary OW	0.00

ESTIMATE OF QUANTITIES

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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.36	0.36
202	0136 REMOVAL OF PAVEMENT	TON	6,580	6,580
202	0169 REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	6	6
202	0174 REMOVAL OF PIPE ALL TYPES AND SIZES	LF	191	191
203	0101 COMMON EXCAVATION-TYPE A	CY	2,347	2,347
203	0109 TOPSOIL	CY	3,631	3,631
203	0140 BORROW-EXCAVATION	CY	7,423	7,423
216	0100 WATER	M GAL	332	332
230	0300 SUBGRADE PREPARATION-TYPE A	STA	3.5	3.5
251	0200 SEEDING CLASS II	ACRE	4.92	4.92
251	2000 TEMPORARY COVER CROP	ACRE	4.92	4.92
253	0101 STRAW MULCH	ACRE	9.84	9.84
255	0101 ECB TYPE 1	SY	121	121
260	0200 SILT FENCE SUPPORTED	LF	101	101
260	0201 REMOVE SILT FENCE SUPPORTED	LF	101	101
261	0112 FIBER ROLLS 12IN	LF	120	120
261	0113 REMOVE FIBER ROLLS 12IN	LF	120	120
302	0120 AGGREGATE BASE COURSE CL 5	TON	12,906	12,906
401	0050 TACK COAT	GAL	1,179	1,179
401	0060 PRIME COAT	GAL	4,951	4,951
401	0070 FOG SEAL	GAL	630	630
430	0145 RAP - SUPERPAVE FAA 45	TON	3,638	3,638
430	1000 CORED SAMPLE	EA	14	14
430	6428 PG 64-28 ASPHALT CEMENT	TON	178	178
702	0100 MOBILIZATION	L SUM	0.36	0.36
704	0100 FLAGGING	MHR	250	250
704	1000 TRAFFIC CONTROL SIGNS	UNIT	2,549	2,549
704	1052 TYPE III BARRICADE	EA	7	7
704	1060 DELINEATOR DRUMS	EA	42	42
704	1067 TUBULAR MARKERS	EA	64	64
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	2	2
706	0500 AGGREGATE LABORATORY	EA	0.36	0.36
706	0550 BITUMINOUS LABORATORY	EA	0.36	0.36

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
706	0600 CONTRACTOR'S LABORATORY	EA	0.36	0.36
714	0615 PIPE CONC REINF 24IN CL III	LF	38	38
714	3020 END SECT-CONC REINF 24IN	EA	1	1
714	4105 PIPE CONDUIT 24IN	LF	28	28
714	4165 PIPE CONDUIT 24IN-JACKED OR BORED	LF	142	142
714	5015 PIPE CORR STEEL .064IN 18IN	LF	24	24
714	5810 END SECT CORR STEEL .064IN 18IN	EA	1	1
754	0110 FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	22	22
754	0112 FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	156	156
754	0150 DELINEATORS-TYPE A	EA	7	7
754	0206 STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	797	797
754	0592 RESET SIGN PANEL	EA	15	15
754	0593 RESET SIGN SUPPORT	EA	1	1
762	0103 PVMT MK PAINTED-MESSAGE	SF	192	192
762	1104 PVMT MK PAINTED 4IN LINE	LF	10,082	10,082
762	1108 PVMT MK PAINTED 8IN LINE	LF	2,239	2,239
762	1112 PVMT MK PAINTED 12IN LINE	LF	618	618
762	1124 PVMT MK PAINTED 24IN LINE	LF	32	32
762	1140 PVMT MK PAINTED CURB TOP & FACE	LF	49	49
770	0001 LIGHTING SYSTEM	EA	1	1
970	1025 REPLANT TREES	EA	30	30

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Spec	Code	Description	Qty	Unit
Use or Location	Rate or Station			
202	136	Removal of Pavement	6623	TON
		Removal of Aggregates	4281	TON
		Removal of Bituminous Surfacing	2342	TON
216	100	Water	332.4	MGAL
		Aggregate	258.13	MGAL
		Borrow Material	74.23	MGAL
		Dust Palliative	0.01	MGAL
302	120	Aggregate Base Course CI 5	12906	TON
		Aggregate	12906	TON
401	50	Tack Coat	1179	GAL
		2nd and 3rd Bituminous Lifts	1179	GAL
401	60	Prime Coat	4951	GAL
		1st Bituminous Lift	4951	GAL
401	70	Fog Seal	630	GAL
		Final Bituminous Lift	630	GAL
430	145	RAP - Superpave FAA 45	3638	TON
		Hot Mix Asphalt	3638	TON
430	6428	PG 64-28 Asphalt Cement	178	TON
		Asphalt Cement	178	TON
762	1104	PVMT MK Painted 4IN Line	10082	LF
		Yellow Passing Zone	0.25	LF/LF
		Yellow 1 Way No-Passing Zone	1.25	LF/LF
		Yellow 2 Way No-Passing Zone	2	LF/LF
		White Edge Line	1	LF/LF

HMA Cored Samples							
Specification Section	A	B	C	D	Quantity (D x 2)	Quantity	Unit
	Distance (Ft) + 2000	Lanes	Lifts	Sublots (A x B x C)			
430.04 I.2.b(1), "General"	2	1	3	6	12		EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"						2	EA
Total					12	2	EA

Salvaged Bituminous Needed:	
25% RAP for RAP - Superpave FAA 45	*910 Tons

*Obtain salvaged material from tied Project NH-6-002(121)329

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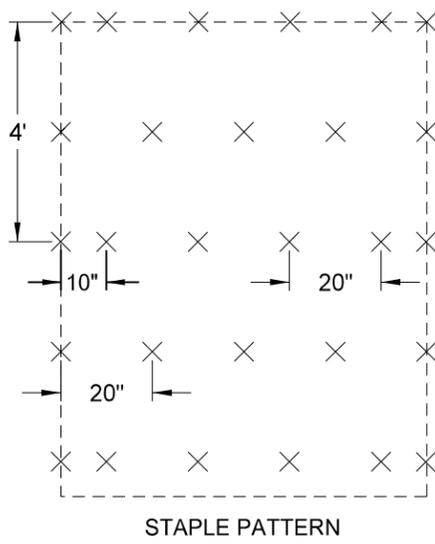
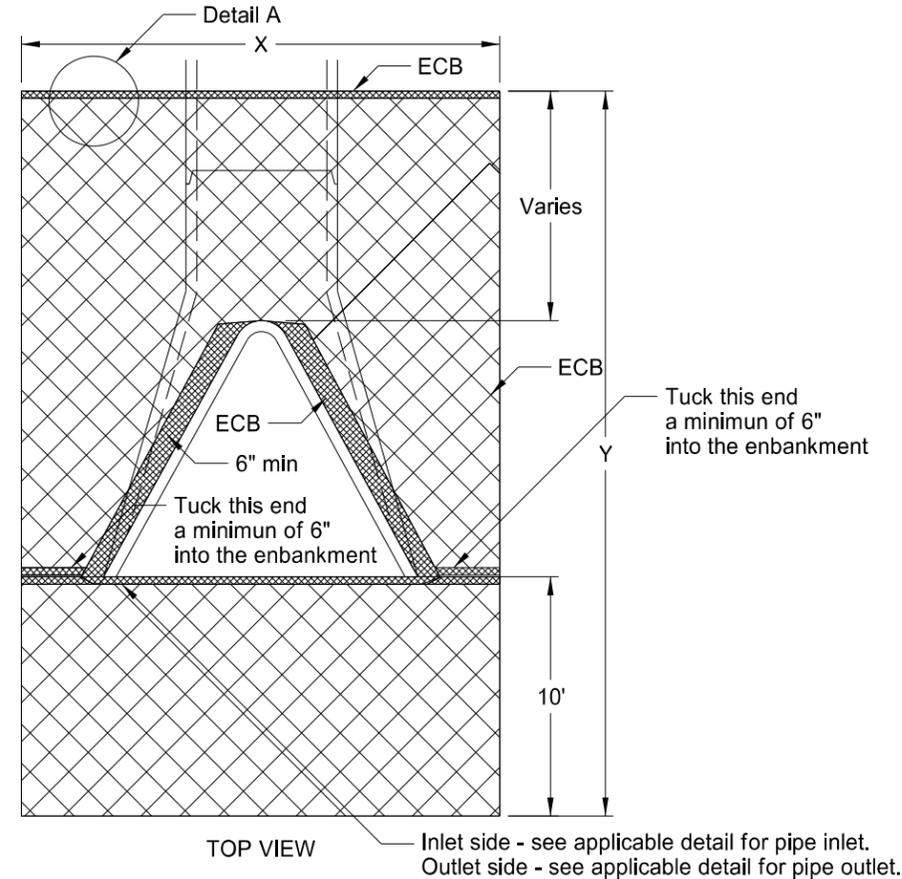
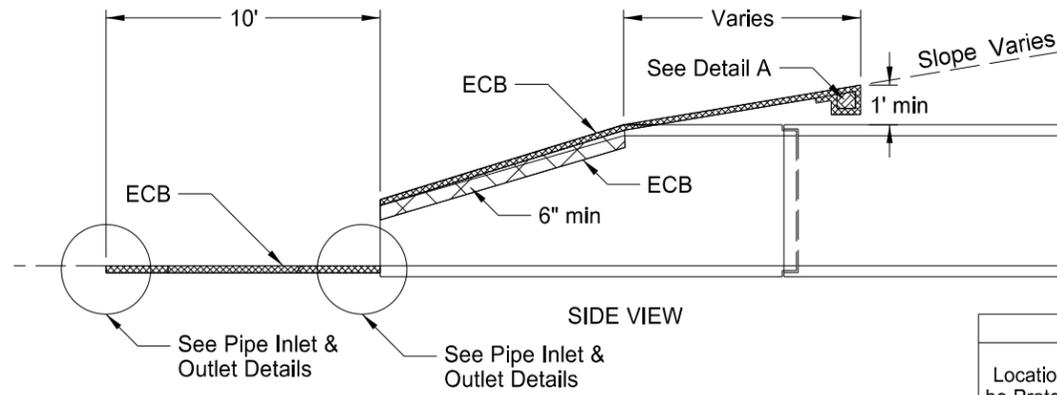
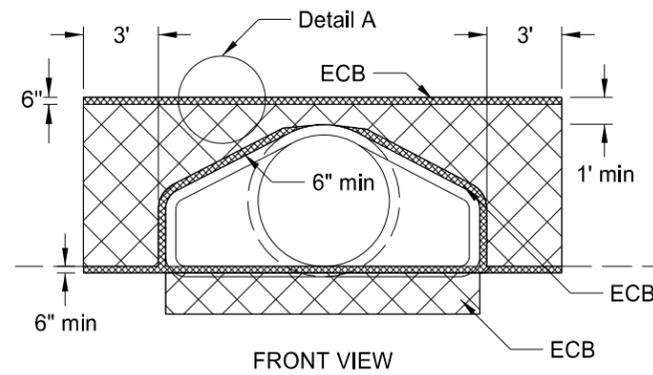
Basis of Estimate
 US 2 & ND 18
 Rest Area & Intersection Improvements

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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	Common Excavation Type A (Pay Item)	Embankment*	Borrow Excavation (Pay Item)	Topsoil (Pay Item)	Topsoil Excess (To be Spread Evenly)
Location	CY	CY	CY	CY	CY
US 2 EB Turn Lanes	560	4323	3763	1498	373
US 2 WB Turn Lanes	909	5145	4236	1478	156
N Rest Area Access	113	79	-34	154	76
Rest Area Parking	765	223	-542	501	358
	2347	9770	7423	3631	963

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Earthwork Summary & Tabulation
 US 2 & ND 18
 Rest Area & Intersection Improvements



Erosion Control Blanket (ECB)								
Location to be Protected	Culvert Type Appr / CL	Pipe Dia. (IN)	No.	Unit Quantity (SY)	Total Quantity			
					Type 1 (SY)	Type 2 (SY)	Type 3 (SY)	Type 4 (SY)
SCL02 Station								
*17448+1	CL	24	2	20	40	-	-	-
*17450+7	CL	24	1	20	20	-	-	-
*17454+26	CL	24	2	20	40	-	-	-
SCL18 Station								
8781+79	Appr	18	1	21	21	-	-	-
Total (SY)					121	0	0	0

NOTE: Stationing is based on SCL02 and SCL18
 * Indicates Traversable End Section

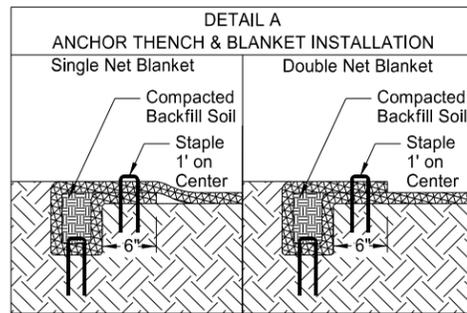
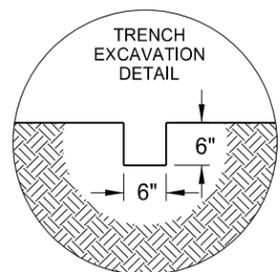
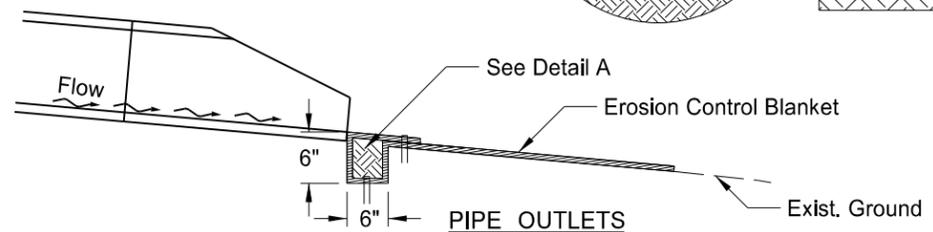
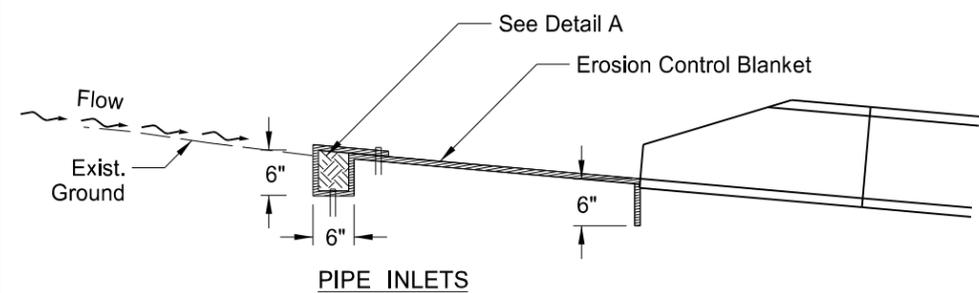
CENTERLINE CULVERTS					
Type	Dia. (IN)	X (FT)	Y (FT)	Surface Area to be Protected (SF)	ECB (SY)
TES	24	8.50	23.00	178.00	20

Note: Quantities based on 6:1 slope.

APPROACH CULVERTS					
Type	Dia. (IN)	X (FT)	Y (FT)	Surface Area to be Protected (SF)	ECB (SY)
FES	18	10.33	18.58	184.4	21

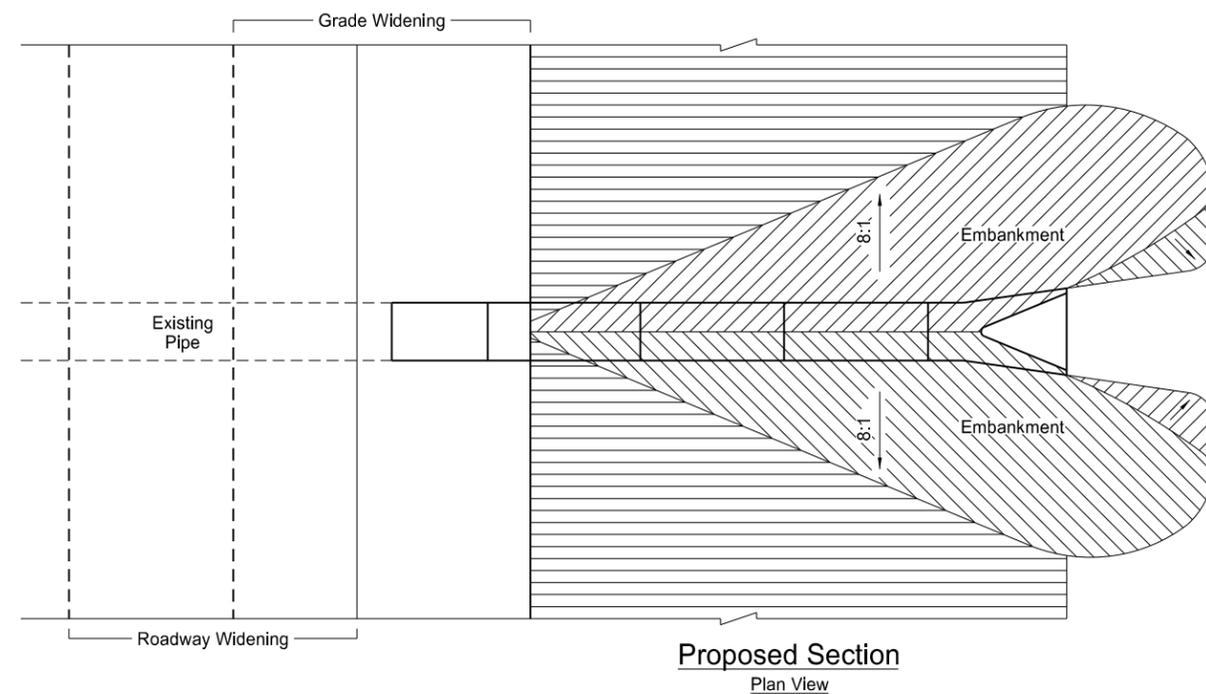
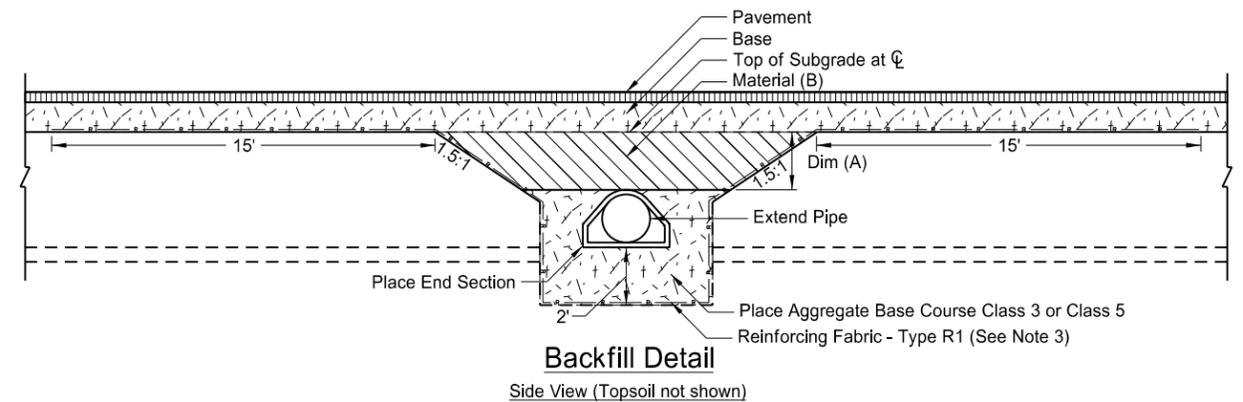
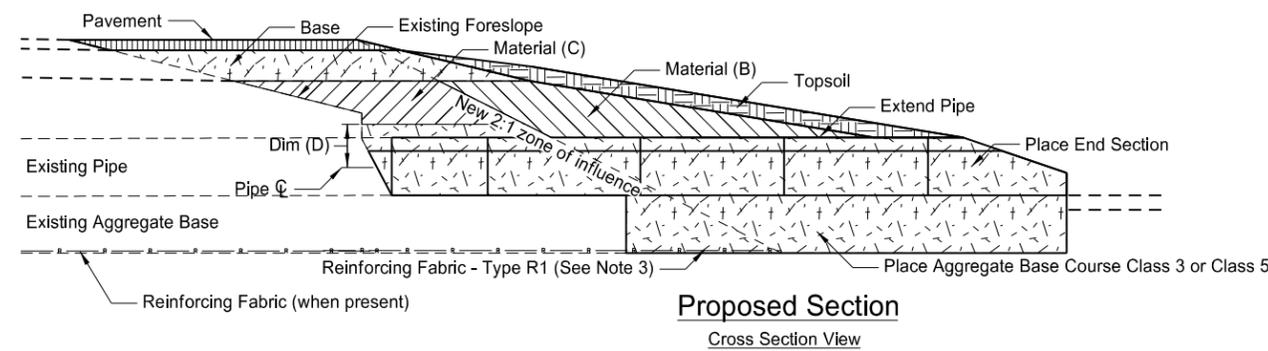
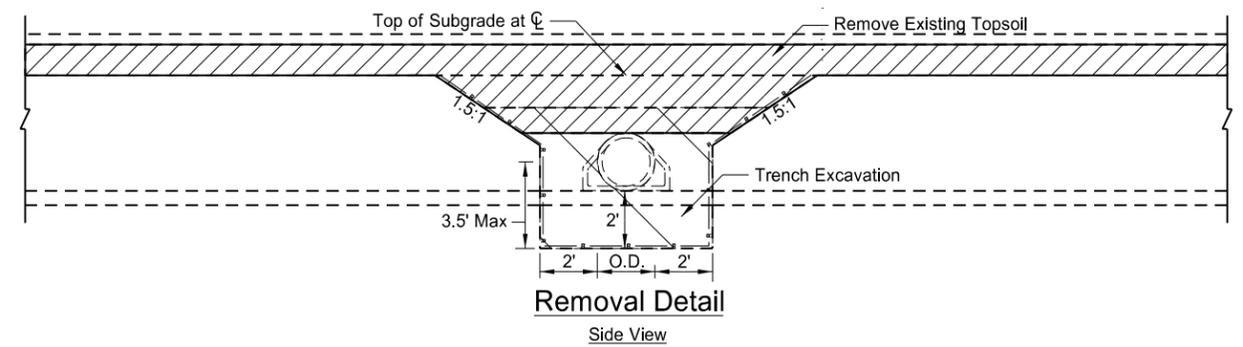
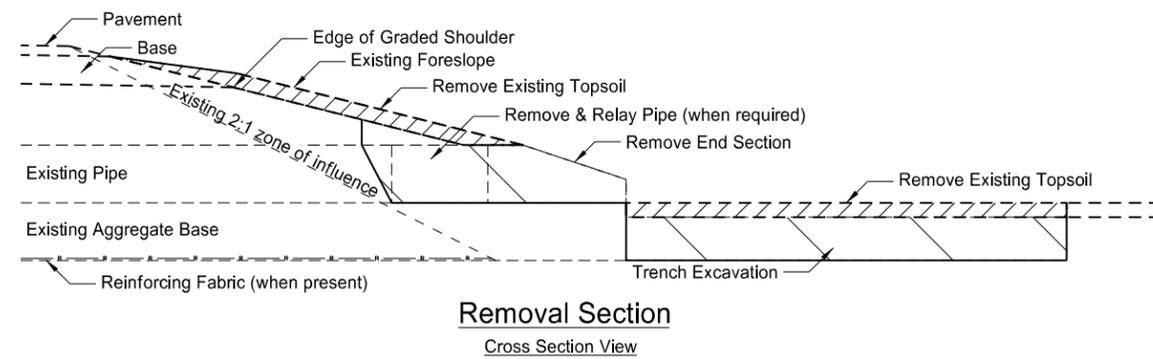
Note: Quantities based on 6:1 slope.

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



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Erosion Control at Culvert Flared End Sections
 US 2 & ND 18
 Rest Area & Intersection Improvements



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) Reinforcement Fabric - Type R1
- 5) Borrow Excavation (Compaction Control Type A) or Common Excavation-Type A
- 6) Topsoil
- 7) Seeding
- 8) 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		Dim (A) > 4 Feet		Backfill Dimension Dim (D)
	Material (B)	Material (C)	Material (B)	Material (C)	
Concrete	Embank or Aggr	Aggr	Embank or Aggr	Embank	0.5 O.D.
Metal	Embank or Aggr	Aggr	Embank or Aggr	Embank	0.5 O.D. + 1 Foot

NOTES:

1. Embankment may be either Borrow Excavation (Compaction Control - Type A) or Common Excavation - Type A
2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.
3. When Reinforcing Fabric is provided in the plans at pipe extensions, expose the edge of the existing fabric and connect the new fabric. This may require the removal and resetting of additional sections of pipe. Reinforcing Fabric is not required outside the 2:1 zone of influence.

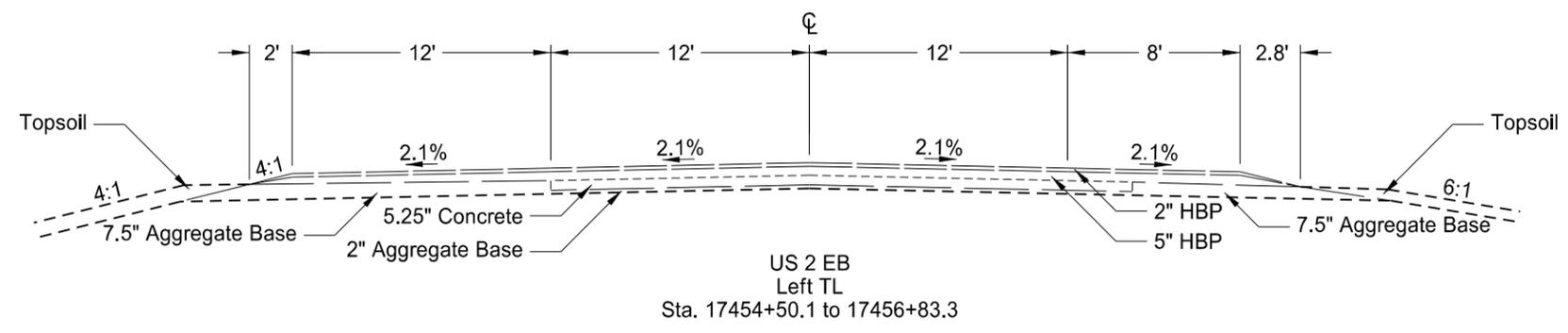
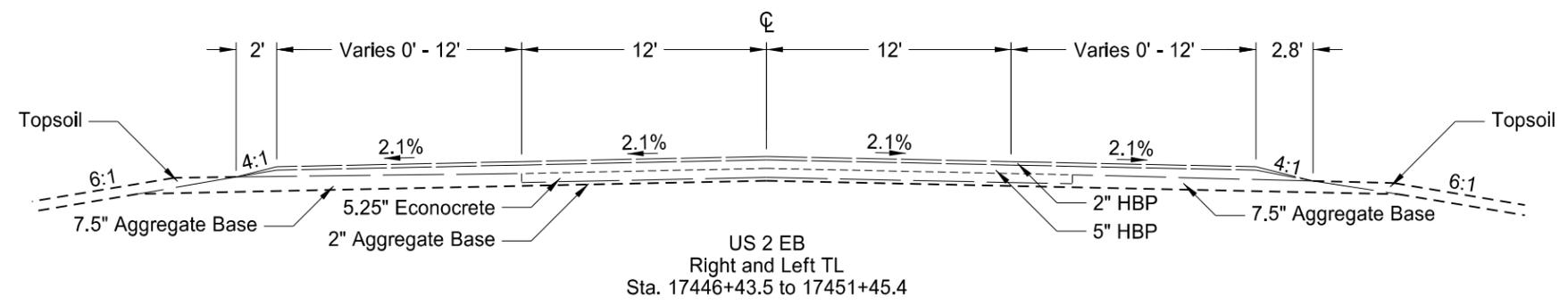
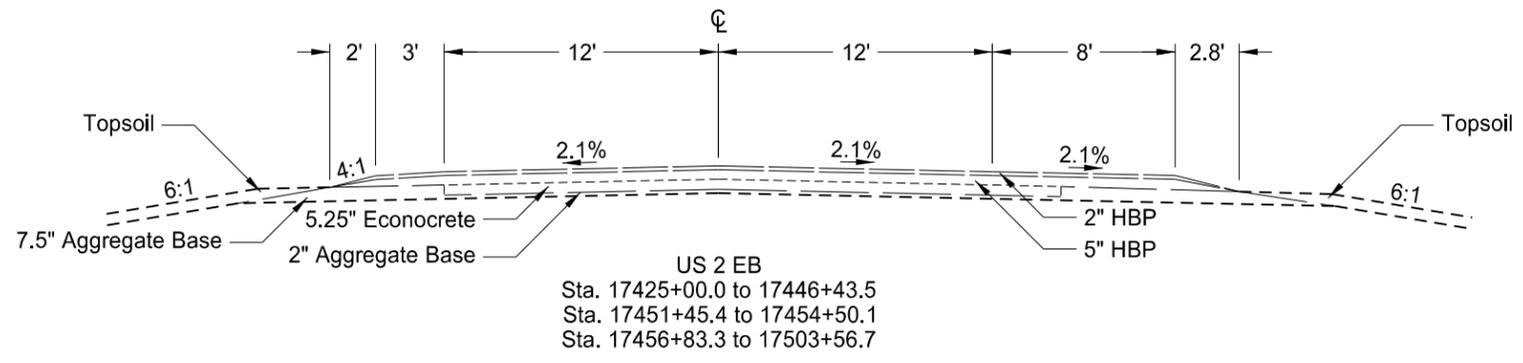
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Mainline \varnothing Pipe Extension Detail For Adding a Lane

US 2 & ND 18

Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	30	1

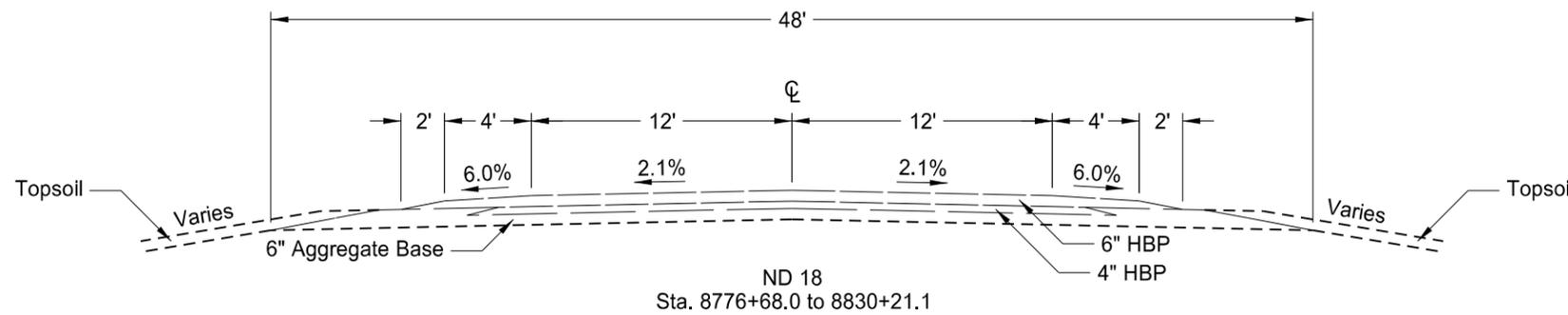
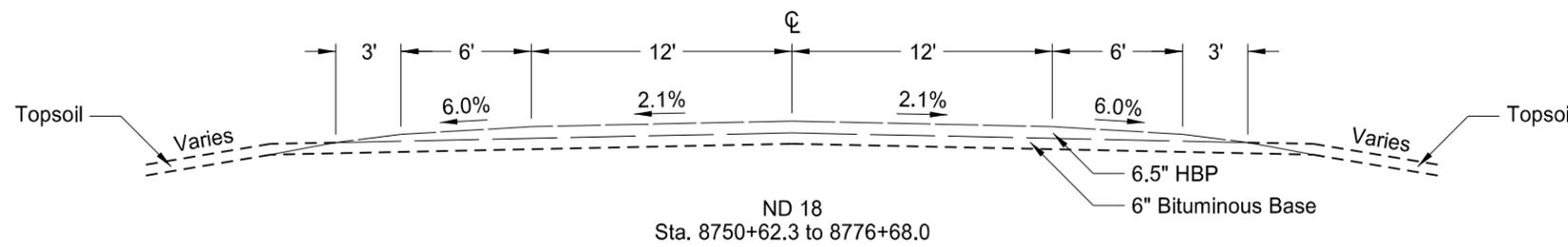
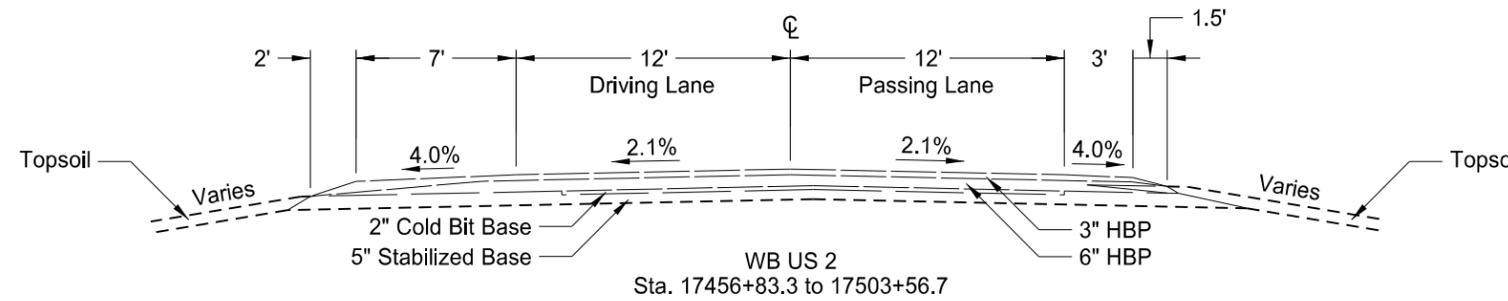
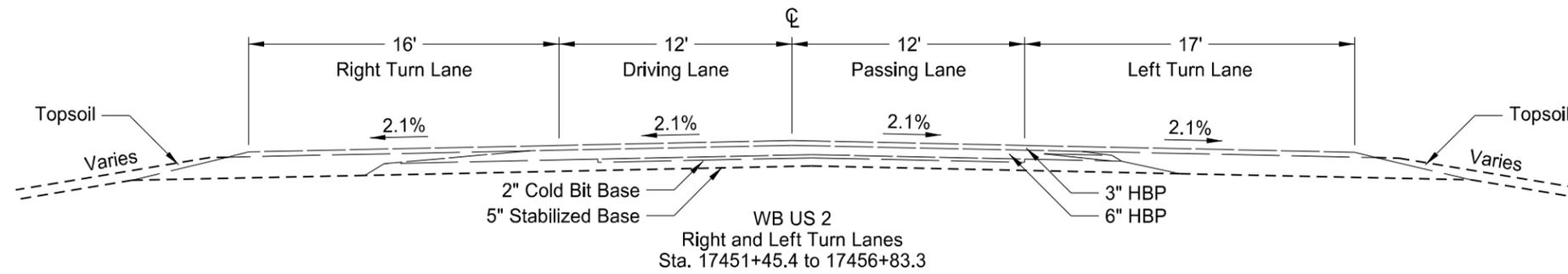


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Existing Typical Sections
 US 2 EB
 US 2 & ND 18
 Rest Area & Intersection Improvements

Surfacing thickness was drawn from old plans. Actual thickness may vary.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	30	2



Surfacing thickness was drawn from old plans. Actual thickness may vary.

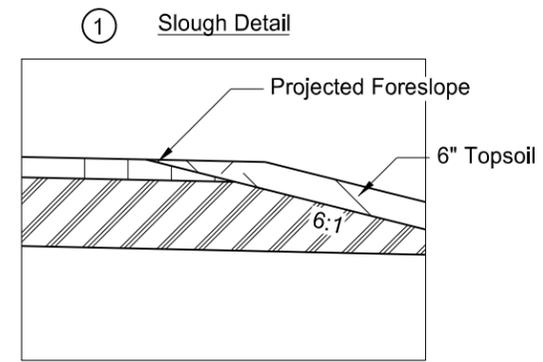
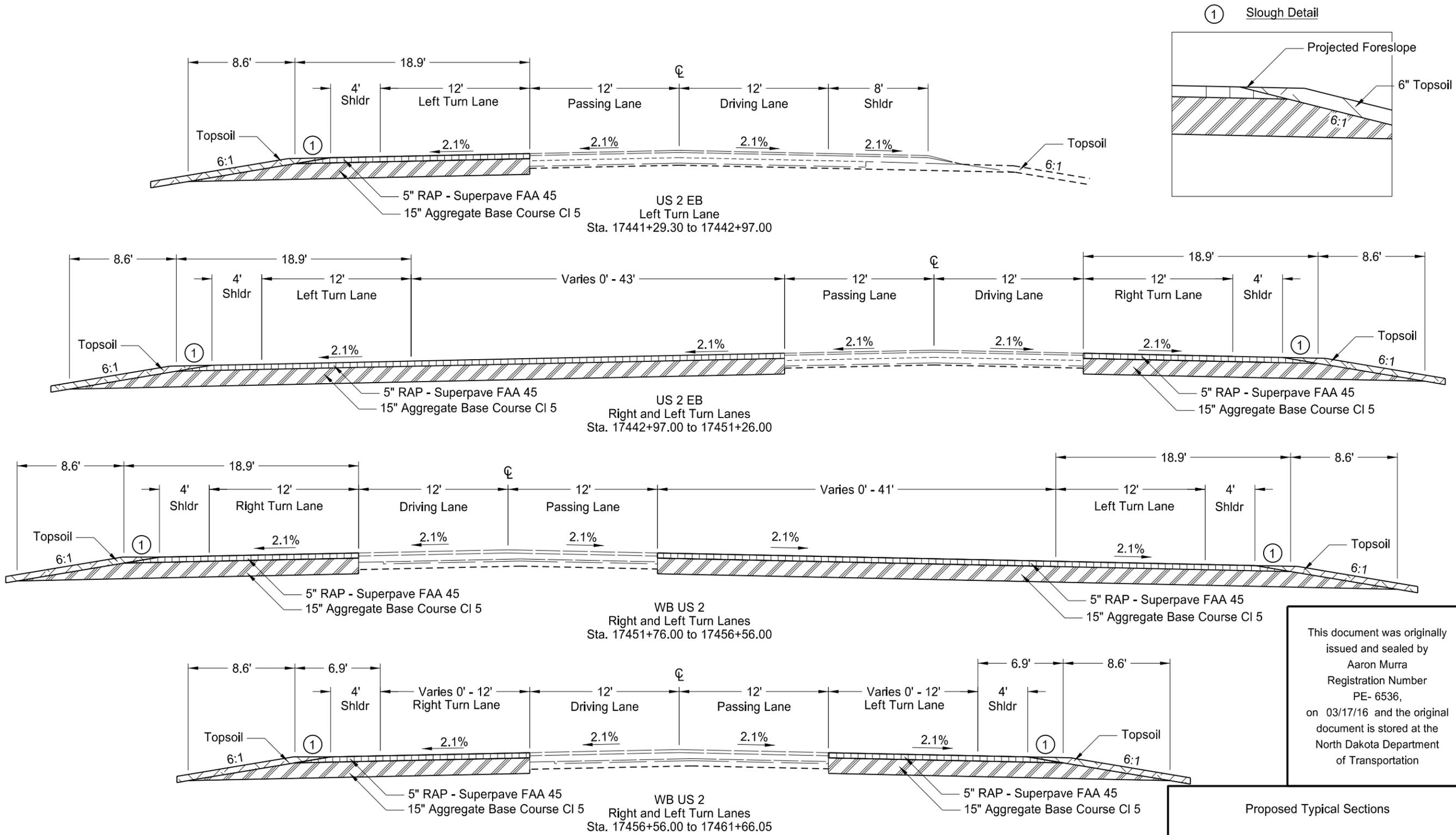
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Existing Typical Sections
US 2 WB & ND 18

US 2 & ND 18

Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	30	3



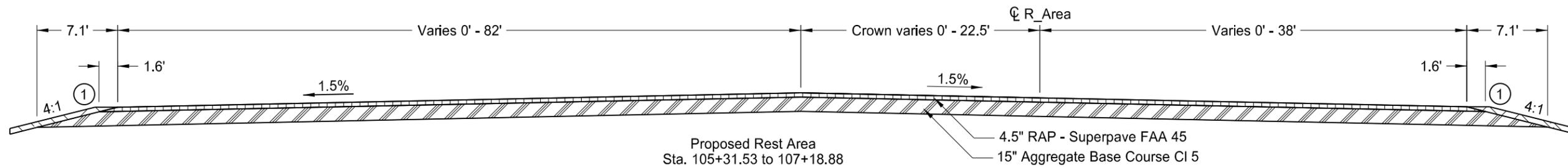
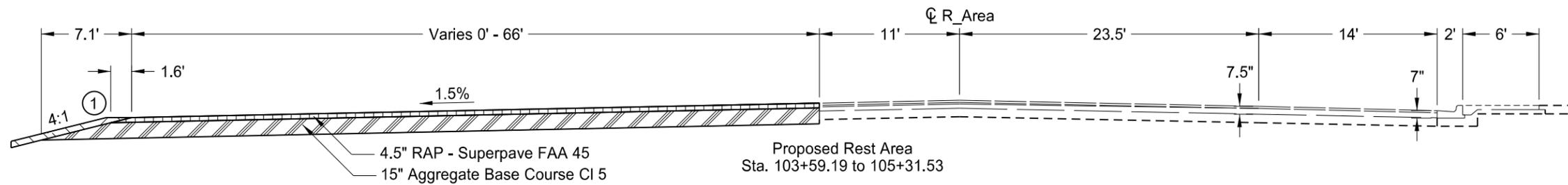
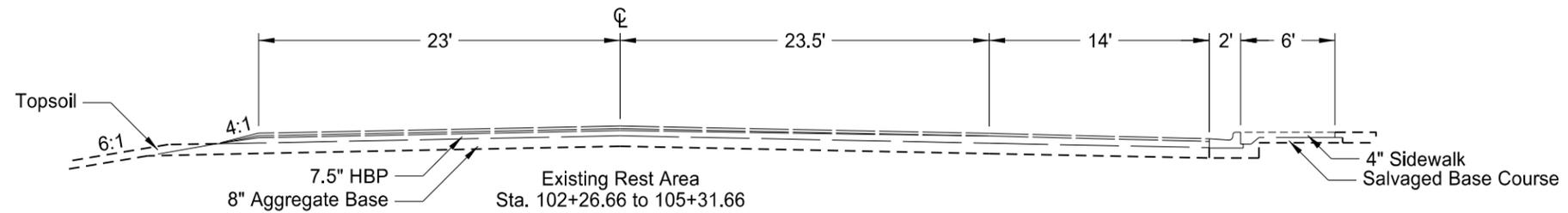
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Proposed Typical Sections

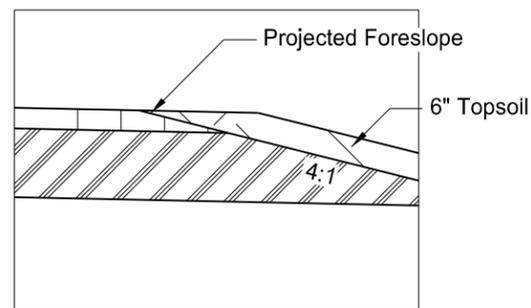
US 2 & ND 18

Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	30	4



① Slough Detail

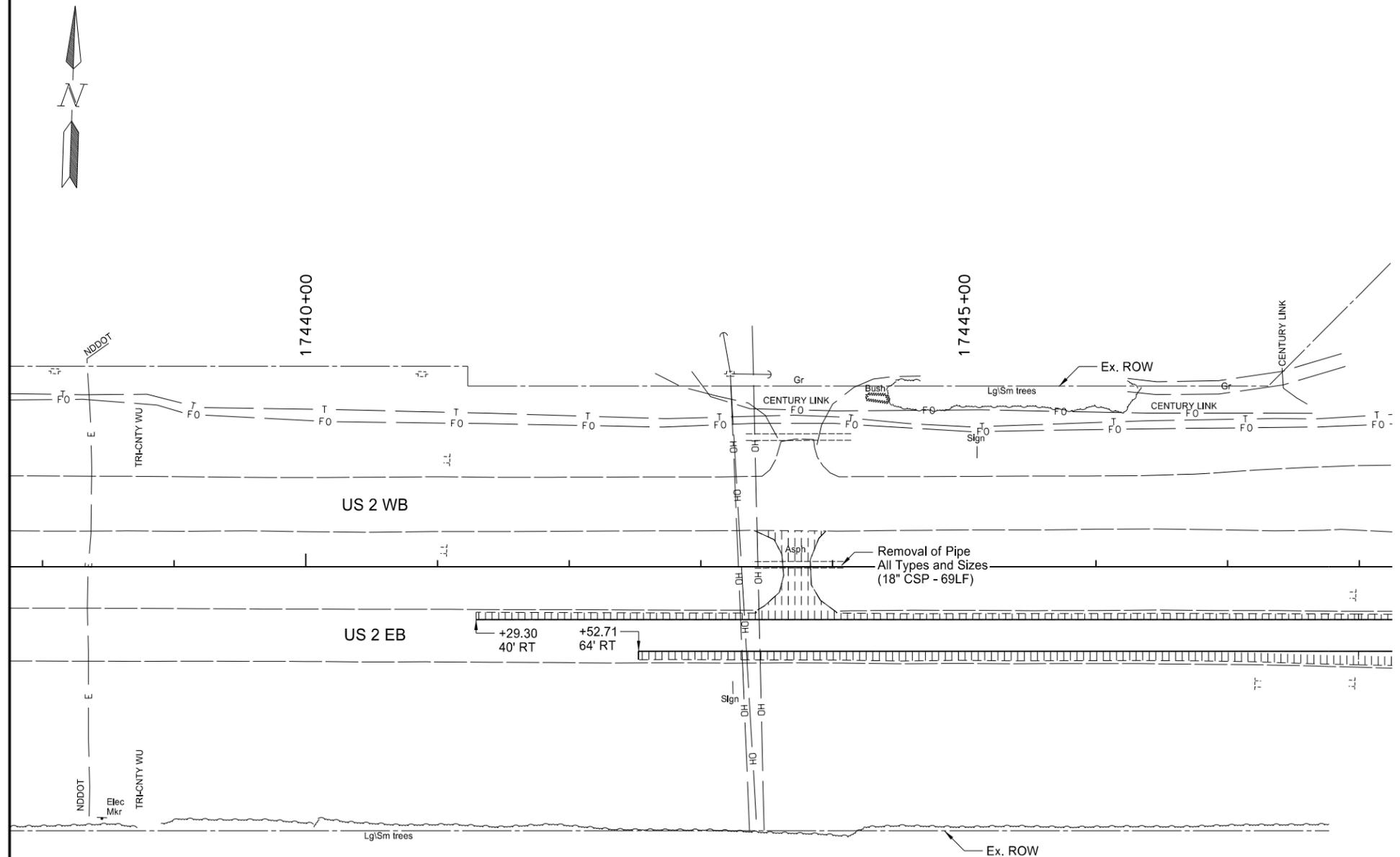


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Rest Area Typical Sections
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	40	1

Spec	Code	Description	Quantity
202	136	Removal of Pavement	1231 Ton
202	174	Removal of Pipe All Types and Sizes	69 LF



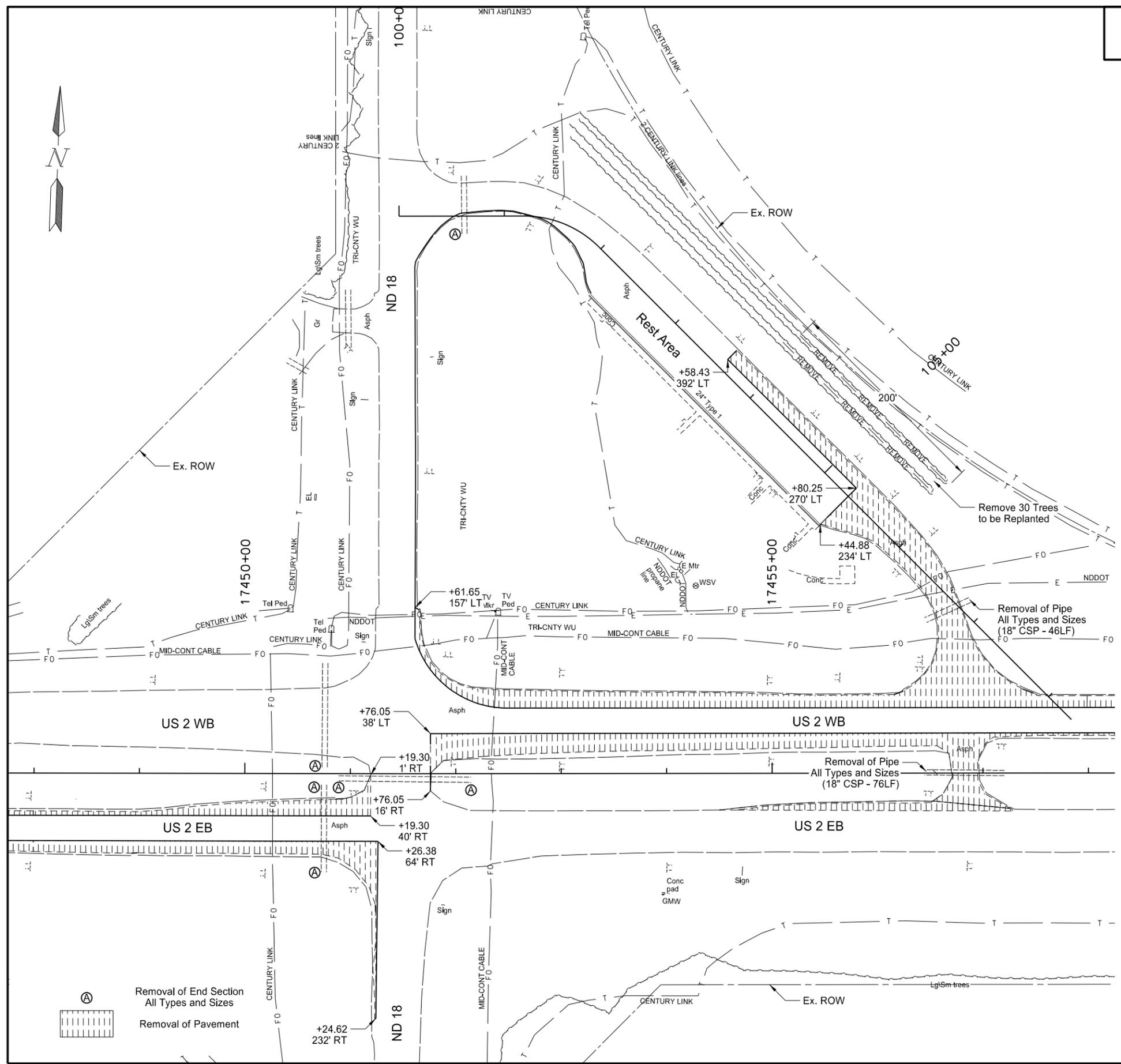
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Removals
 Sta 17440+00 to 17448+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

 Removal of Pavement

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	40	2

Spec	Code	Description	Quantity
201	295	Clearing & Grubbing	200 LF
202	136	Removal of Pavement	4608 Ton
202	169	Removal of End Section-All Types and Size	6 EA
202	174	Removal of Pipe All Types and Sizes	122 LF

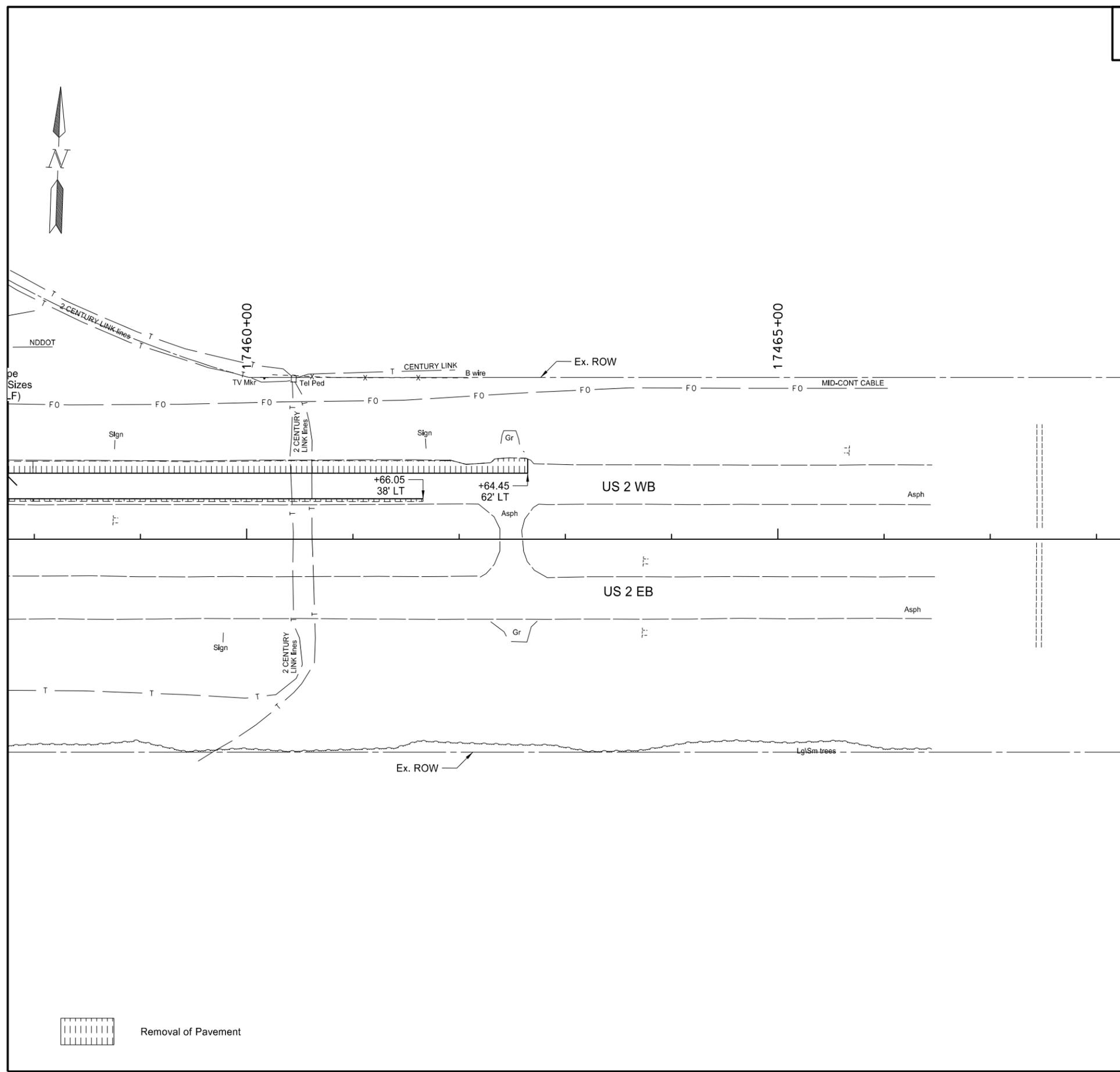


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Removals
 Sta 17448+00 to 17458+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

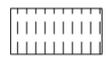
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	40	3

Spec	Code	Description	Quantity
202	136	Removal of Pavement	741 Ton



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Removals
 Sta 17458+00 to 17465+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

 Removal of Pavement

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SHE-6-002(113)330	50	1

HYDRAULIC DATA FOR SHE-6-002(113)330 (A)									
STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
17448+14		24"	3.1	8.8	1.56	8.40	1128.16	10.9	1128.38
17454+26		24"	2.6	3.3	0.87	5.81	1126.17	4.0	1126.26

(A) Hydraulic data provided is for smooth-walled (Manning's n=0.012) type conduits.

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Culvert Hydraulic Data

Rest Area & Intersection Improvements

US 2 and ND 18

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)		Allowable Material	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Required Diameter	Minimum Thickness	R1 Fabric (Pay Item)	(A) End Sections		Applicable Backfill Detail
				In	LF							Begin EA	End EA	
17448+14	86.7 Lt	17448+14	19.7' Lt	24	Pipe Conduit - Jacked or Bored	64	Reinforced Concrete Pipe - Class III (Barrel Length = 62 LF)		24	3		TES	TES	D-714-16
17450+76	6.0' Lt	17450+75	10.6' Rt	24	Pipe Conc. Reinf. CL III (Extension)	16	Reinforced Concrete Pipe - Class III		24	3				D 714-26
17450+75	93.3' Rt	17450+75	116.3' Rt	24	Pipe Conc. Reinf. CL III (Extension)	22	Reinforced Concrete Pipe - Class III		24	3			TES	Section 20
17454+26	102.4' Lt	17454+26	6.6' Rt	24	Pipe Conduit - Jacked or Bored	78	Reinforced Concrete Pipe - Class III (Barrel Length Jacked or Bored= 78 LF) (Barrel Length Pipe Conduit= 26 LF)		24	3		TES	TES	D-714-16
					Pipe Conduit	28								
*8781+79	62.1' Rt	8781+55	62.4' Rt	18	Pipe Corr Steel .064IN 18IN (Extension)	24	Corrugated Steel Pipe .064IN 18IN		18	0.064			FES	Section 20

*Stationing based on SCL18

Coatings: Z = Zinc
A = Aluminum
P = Polymeric

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"

(A) The price bid for "Pipe Conduit" and "Pipe Conduit - Jacked or Bored" bid items includes end sections. Pipe Extensions pay for end sections separately.

FES = Flared End Section
TES = Traversable End Section

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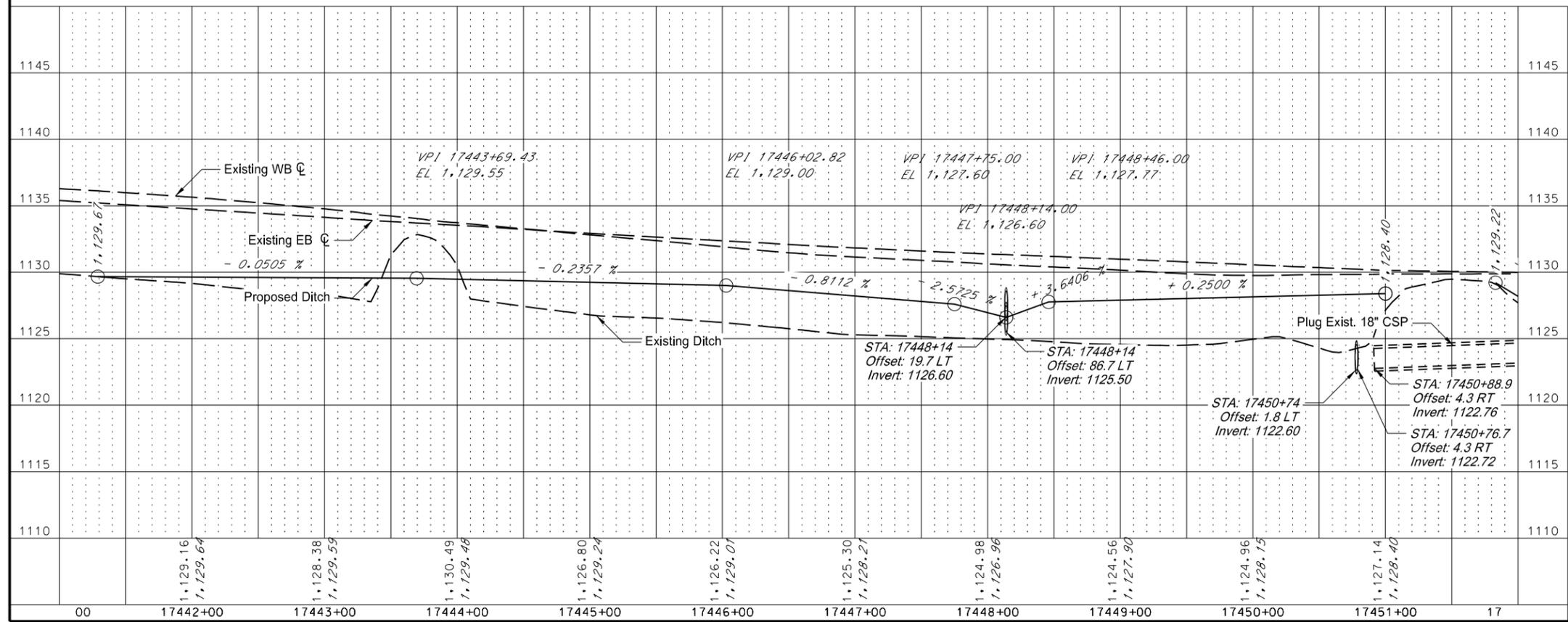
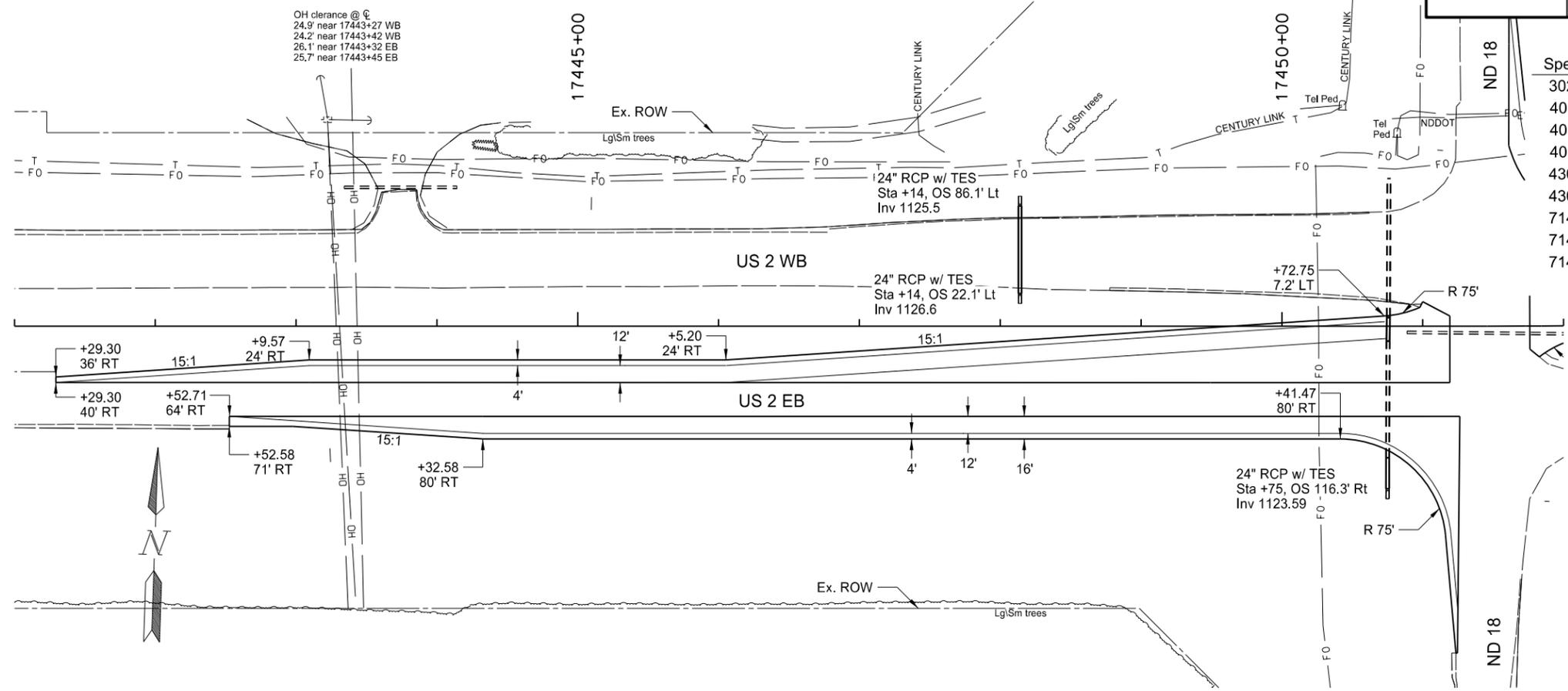
Allowable Pipe List

US 2 & ND 18

Rest Area & Intersection Improvements

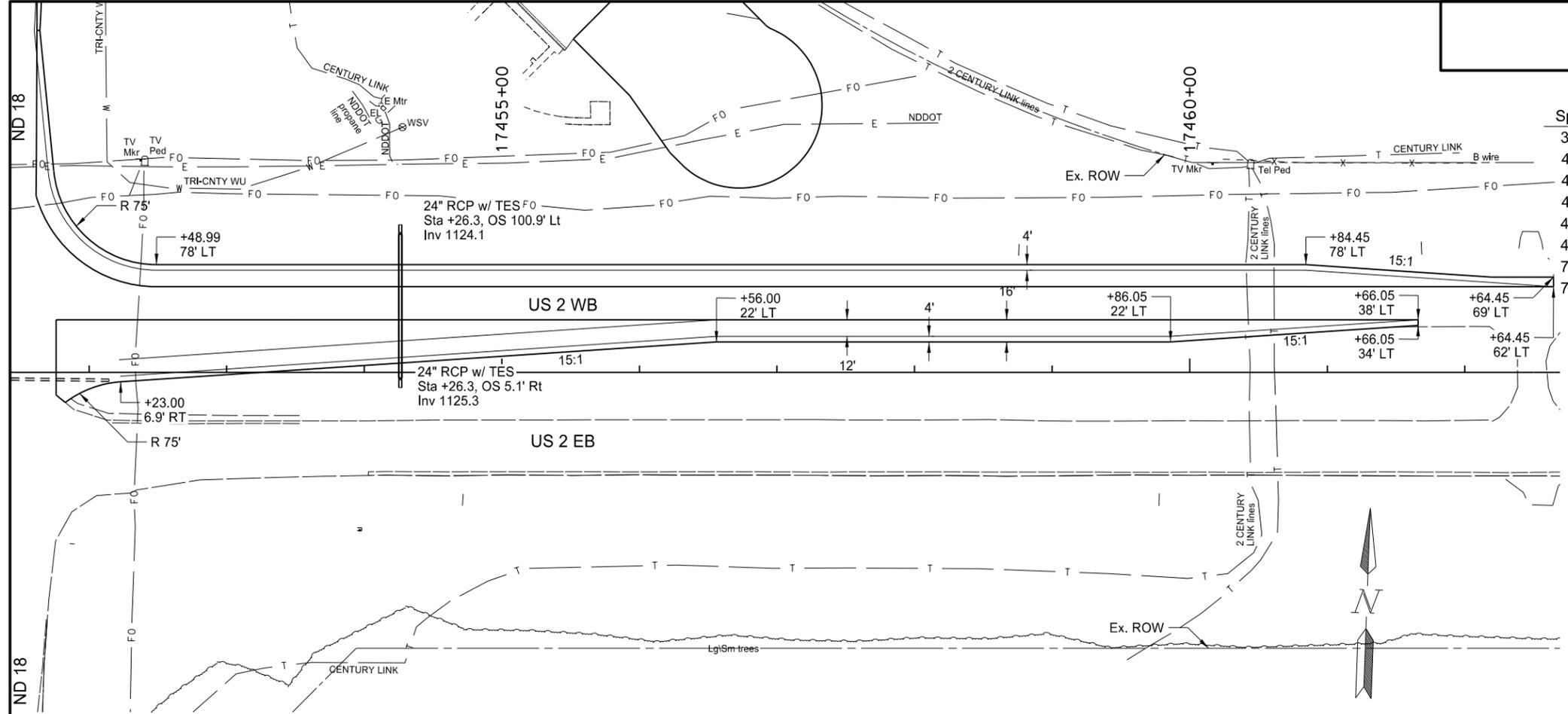
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	60	1

Spec	Code	Description	Quantity
302	120	Aggregate Base Course CI 5	4594 TON
401	50	Tack Coat	463 GAL
401	60	Prime Coat	1731 GAL
401	70	Fog Seal	217 GAL
430	145	RAP - Superpave FAA 45	1288 TON
430	6428	PG 64-28 Asphalt Cement	63 TON
714	615	Pipe Concrete Reinforced 24IN CI III	38 LF
714	3020	End Section - Concrete Reinforced 24IN	1EA
714	4165	Pipe Conduit 24IN-Jacked or Bored	64 LF

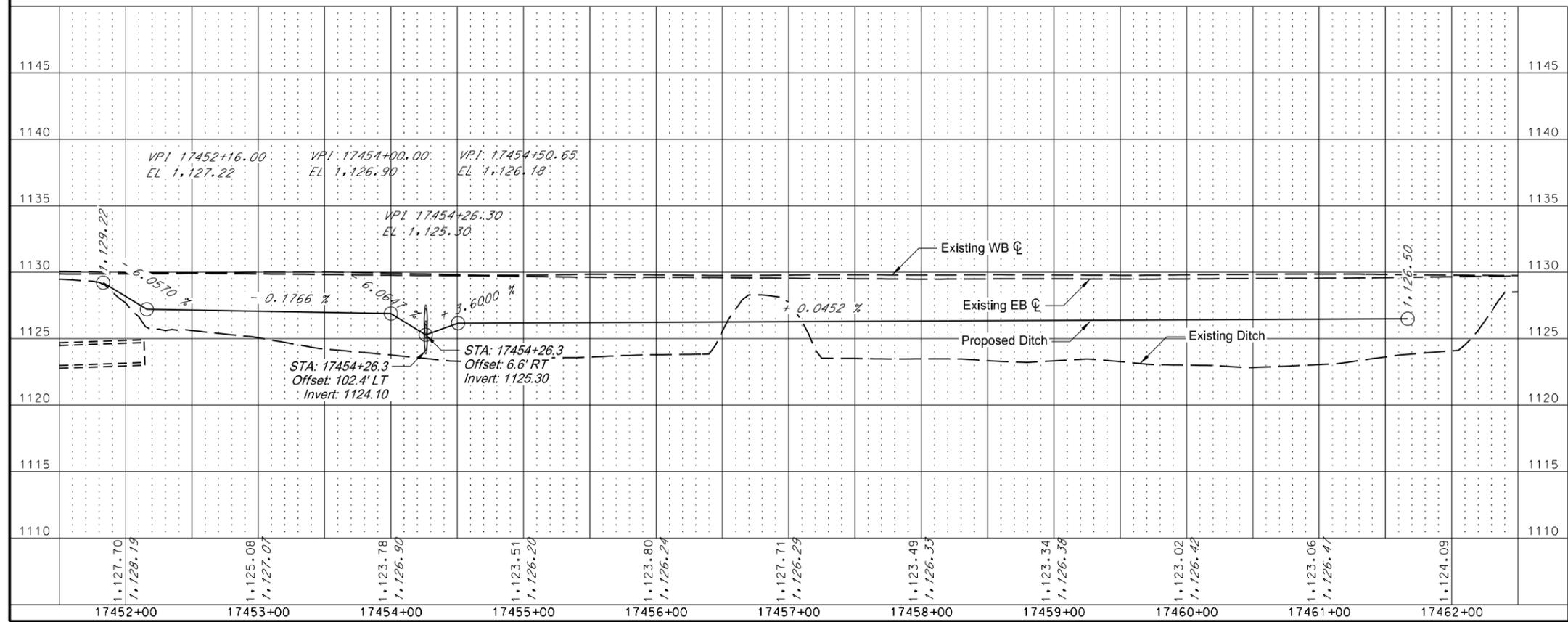


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Plan & Profile
 Sta 17441+00 to 17452+00
 US 2 & ND 18
 Rest Area & Intersection Improvements



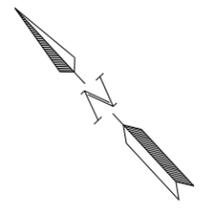
Spec	Code	Description	Quantity
302	120	Aggregate Base Course CI 5	4900 TON
401	50	Tack Coat	486 GAL
401	60	Prime Coat	1825 GAL
401	70	Fog Seal	226 GAL
430	145	RAP - Superpave FAA 45	1351 TON
430	6428	PG 64-28 Asphalt Cement	66 TON
714	4105	Pipe Conduit 24IN	28 LF
714	4165	Pipe Conduit 24IN-Jacked or Bored	78 LF



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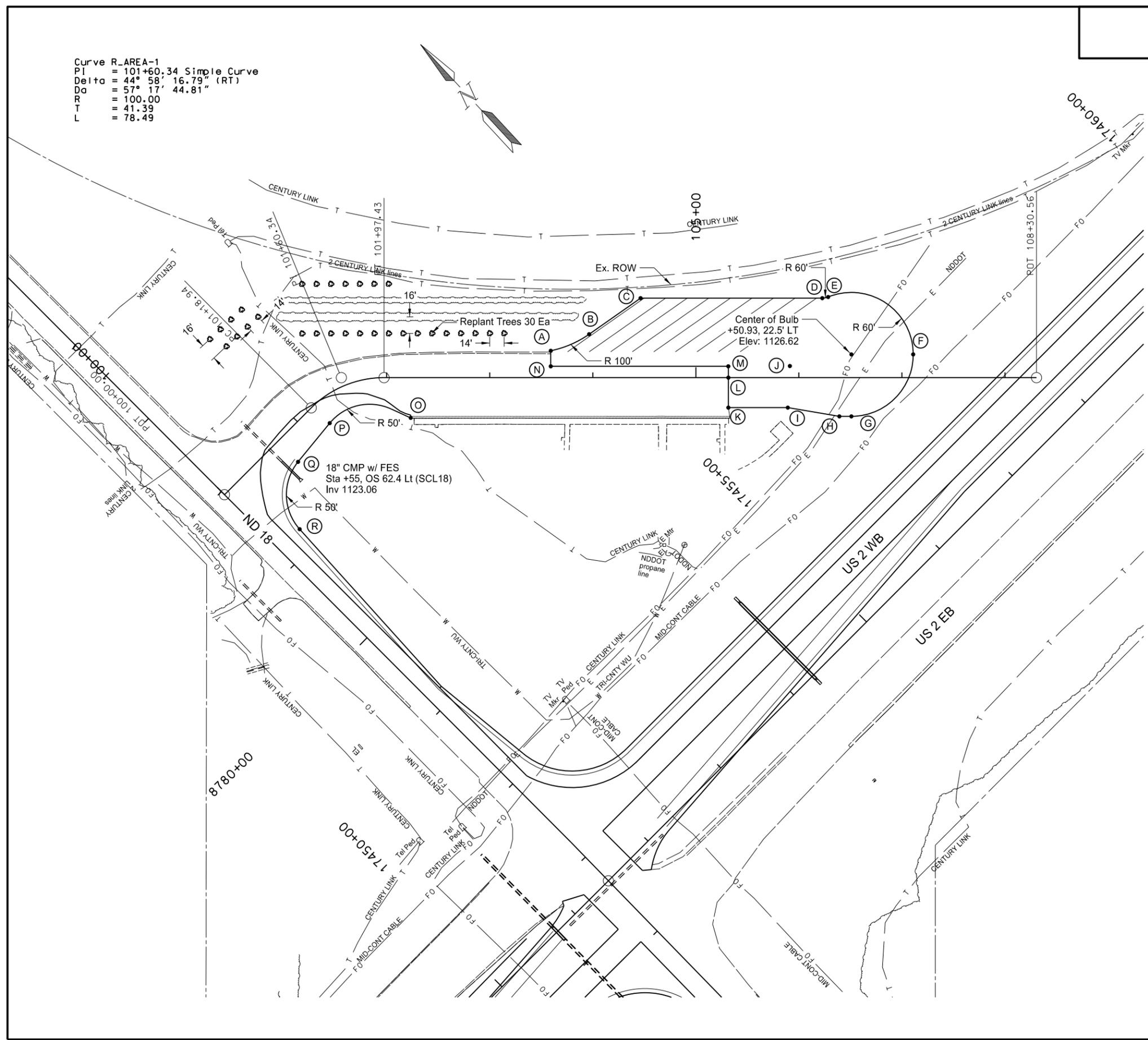
Plan & Profile
 Sta 17452+00 to 17462+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

Curve R_AREA-1
 PI = 101+60.34 Simple Curve
 Delta = 44° 58' 16.79" (RT)
 Dd = 57° 17' 44.81"
 R = 100.00
 T = 41.39
 L = 78.49



Spec	Code	Description	Quantity
302	120	Aggregate Base Course CI 5	3412 TON
401	50	Tack Coat	230 GAL
401	60	Prime Coat	1395 GAL
401	70	Fog Seal	187 GAL
430	145	RAP - Superpave FAA 45	999 TON
430	6428	PG 64-28 Asphalt Cement	49 TON
714	5015	Pipe Corrugated Steel .064IN 18IN	24 LF
714	5810	End Section Corrugated Steel .064IN 18IN	1 EA
970	1025	Replant Trees	30 EA

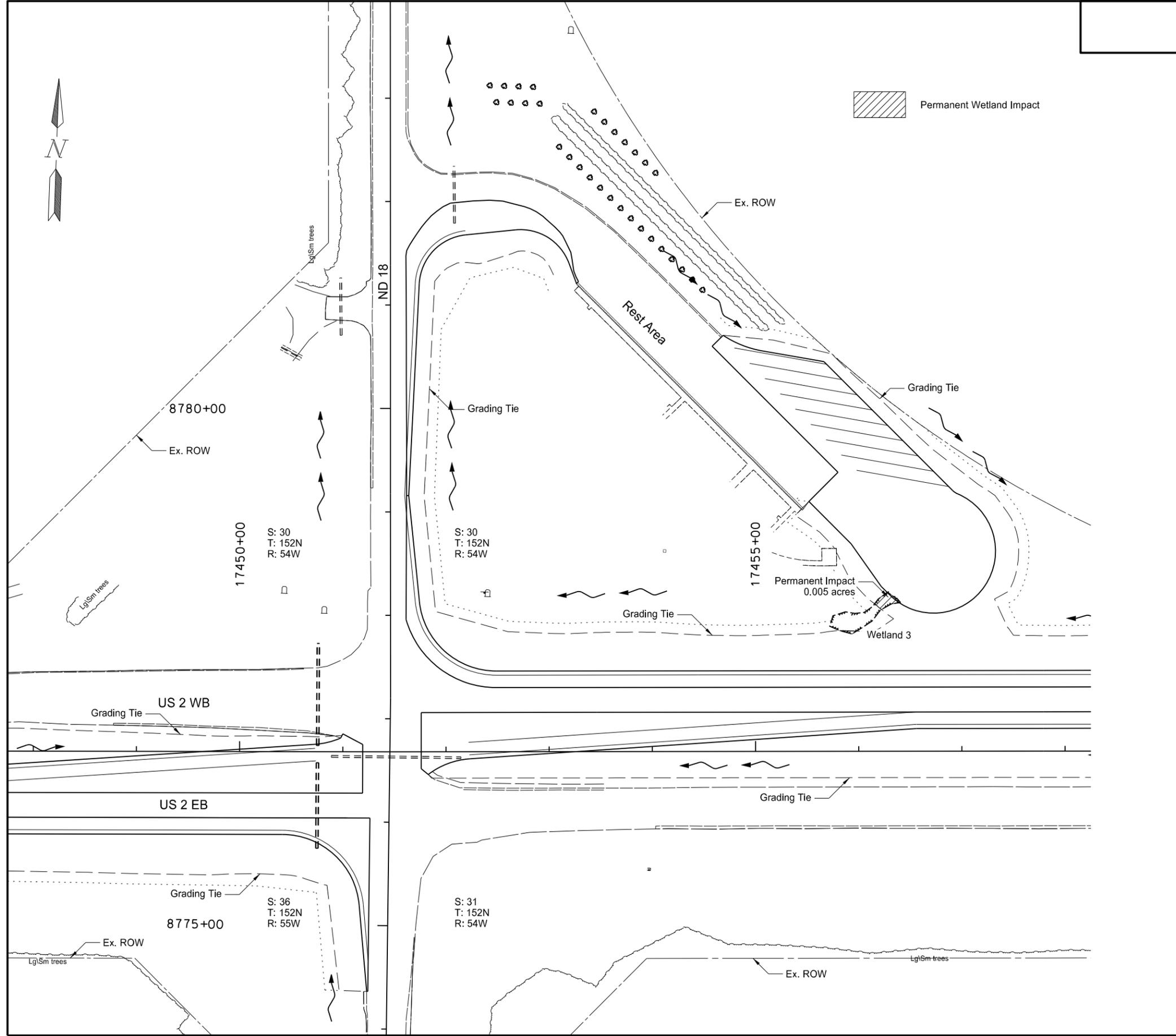
Item	Sta.	Offset	Elev. (ft)
A	103+59.19	26' LT	1125.17
B	103+69.43	42' LT	1124.08
C	104+46.35	77' LT	1124.69
D	106+22.74	77' LT	1124.95
E	106+28.37	78' LT	1124.94
F	107+10.93	22' LT	1125.18
G	106+50.93	38' RT	1125.36
H	106+39.27	38' RT	1125.34
I	105+89.25	29' RT	1125.44
J	105+91.23	11' LT	1126.29
K	105+31.53	29' RT	1125.35
L	105+31.53	0'	1125.96
M	105+31.53	11' LT	1125.81
N	103+59.19	11' LT	1125.56
O	102+23.30	39' RT	1123.77
P	101+21.84	23' RT	1125.23
Q	100+72.96	28' RT	1126.11
R	100+28.00	75' RT	1126.72



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Plan & Profile
 Sta 100+00 to 108+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	75	1

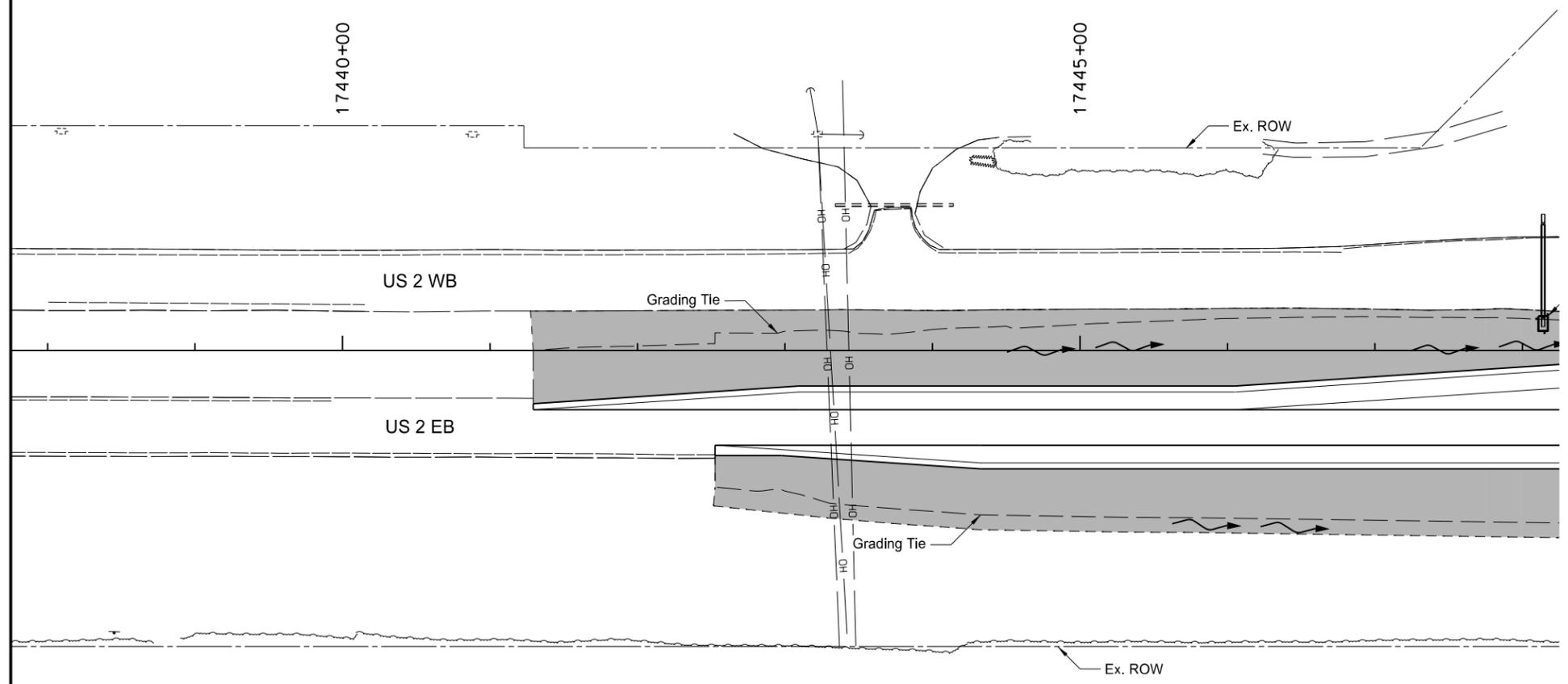


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Wetland Impacts
 Sta 17448+00 to 17458+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	76	1

Spec	Code	Description	Quantity
251	200	Temporary Cover Crop	1.321 ACRE
253	101	Straw Mulch	1.321 ACRE



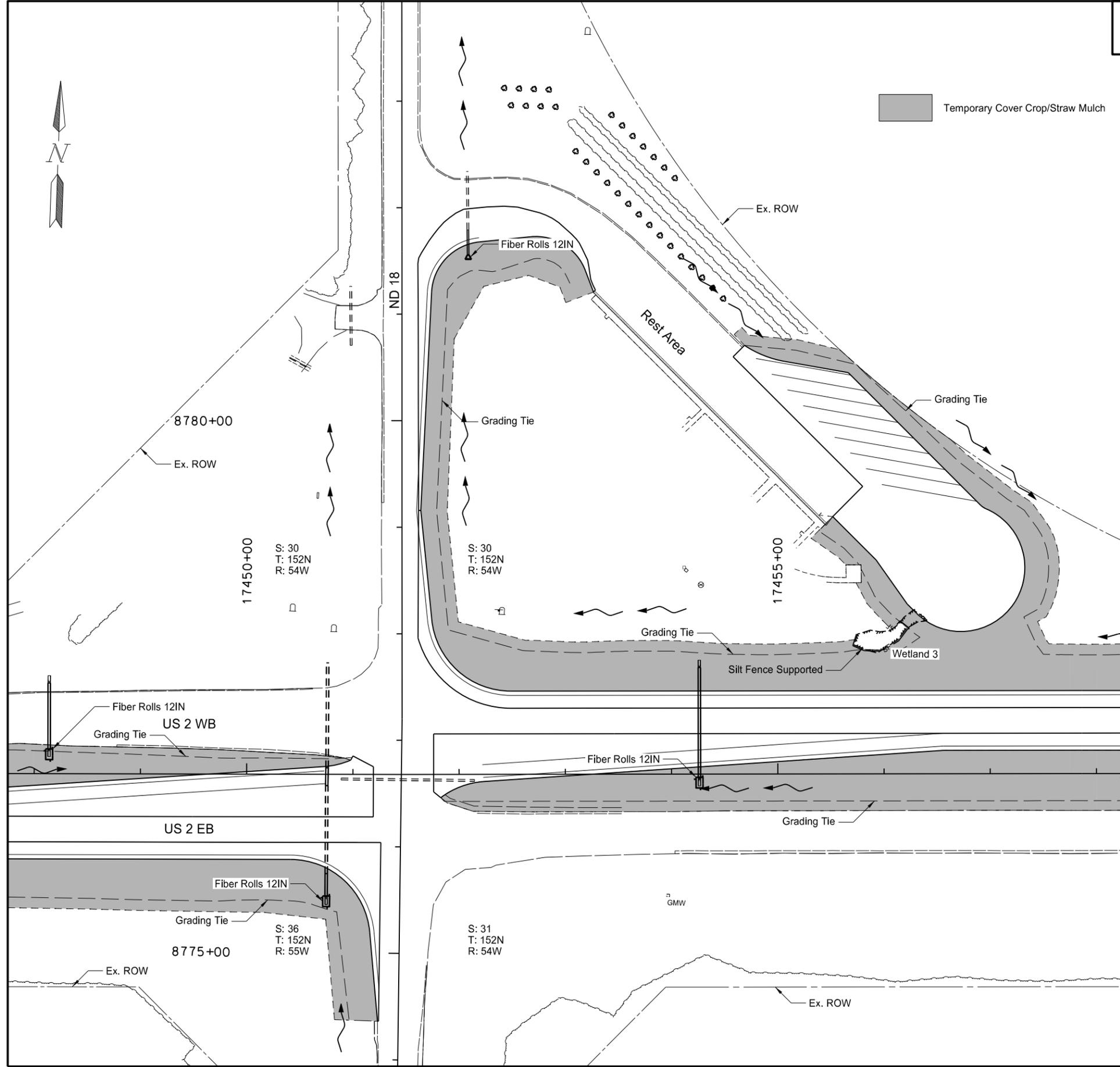
 Temporary Cover Crop/Straw Mulch

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Temporary Erosion Control
 Sta 17438+00 to 17448+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	76	2

Spec	Code	Description	Quantity
251	200	Temporary Cover Crop	2.530 ACRE
253	101	Straw Mulch	2.530 ACRE
260	200	Silt Fence Supported	101LF
260	201	Remove Silt Fence Supported	101LF
261	112	Fiber Roll 12IN	120 LF
261	113	Remove Fiber Rolls 12IN	120 LF

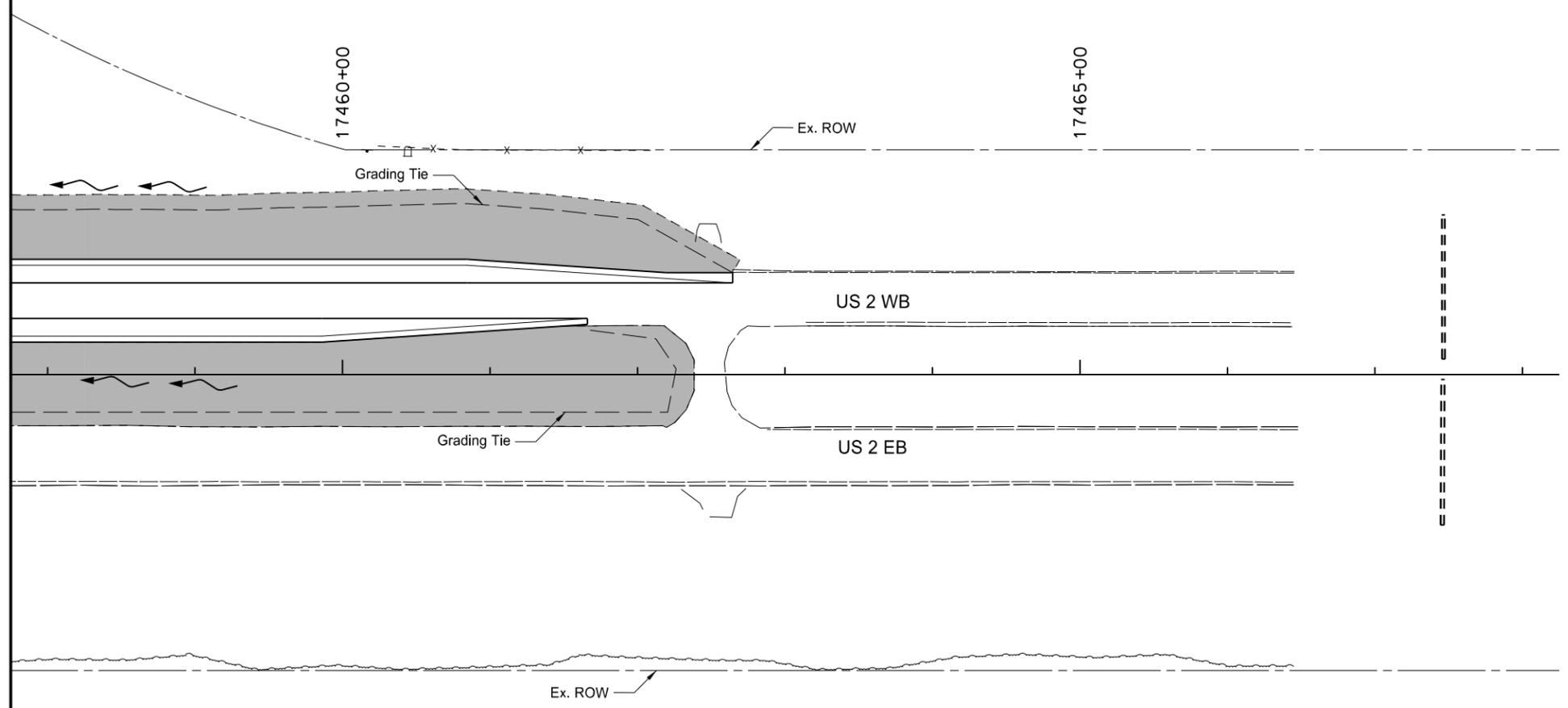


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Temporary Erosion Control
 Sta 17448+00 to 17458+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	76	3

Spec	Code	Description	Quantity
251	200	Temporary Cover Crop	1.069 ACRE
253	101	Straw Mulch	1.069 ACRE

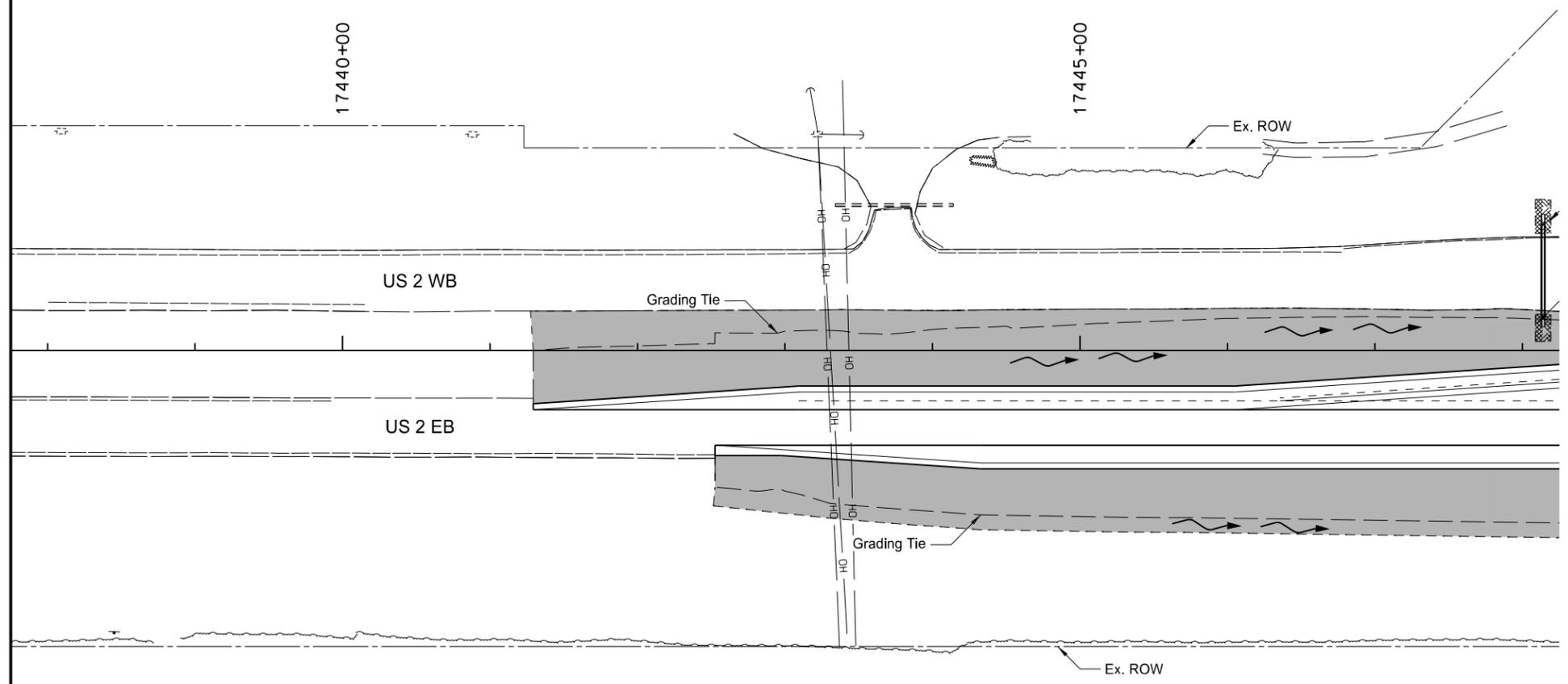


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Temporary Erosion Control
 Sta 17458+00 to 17468+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	77	1

Spec	Code	Description	Quantity
251	200	Seeding Class II	1.321 ACRE
253	101	Straw Mulch	1.321 ACRE



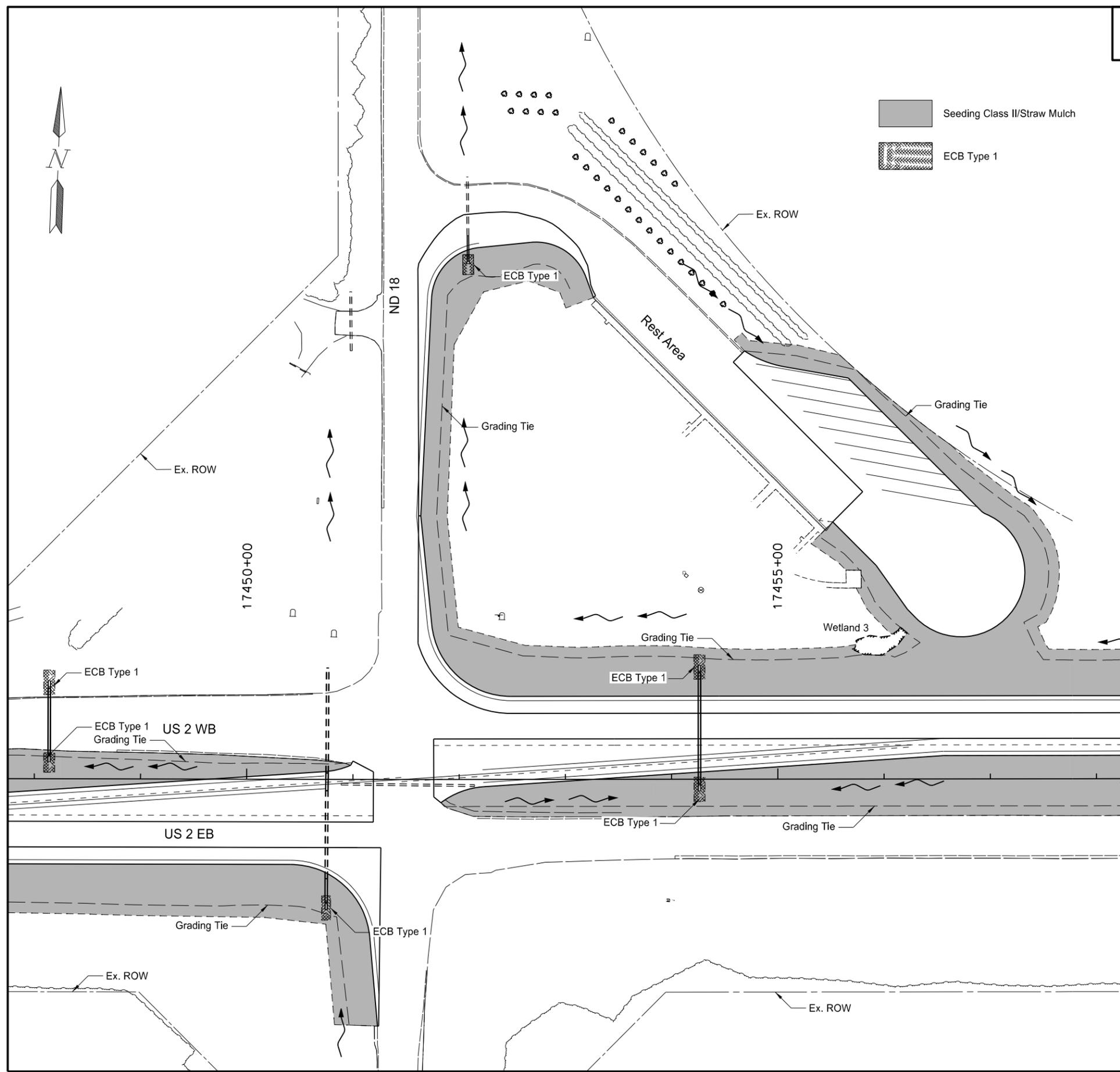
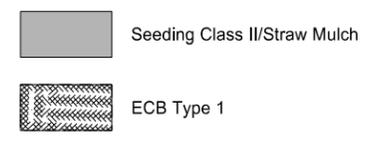
-  Seeding Class II/Straw Mulch
-  ECB Type 1

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Permanent Erosion Control
 Sta 17438+00 to 17448+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	77	2

Spec	Code	Description	Quantity
251	200	Seeding Class II	2.530 ACRE
253	101	Straw Mulch	2.530 ACRE
255	101	ECB Type 1	121 SY

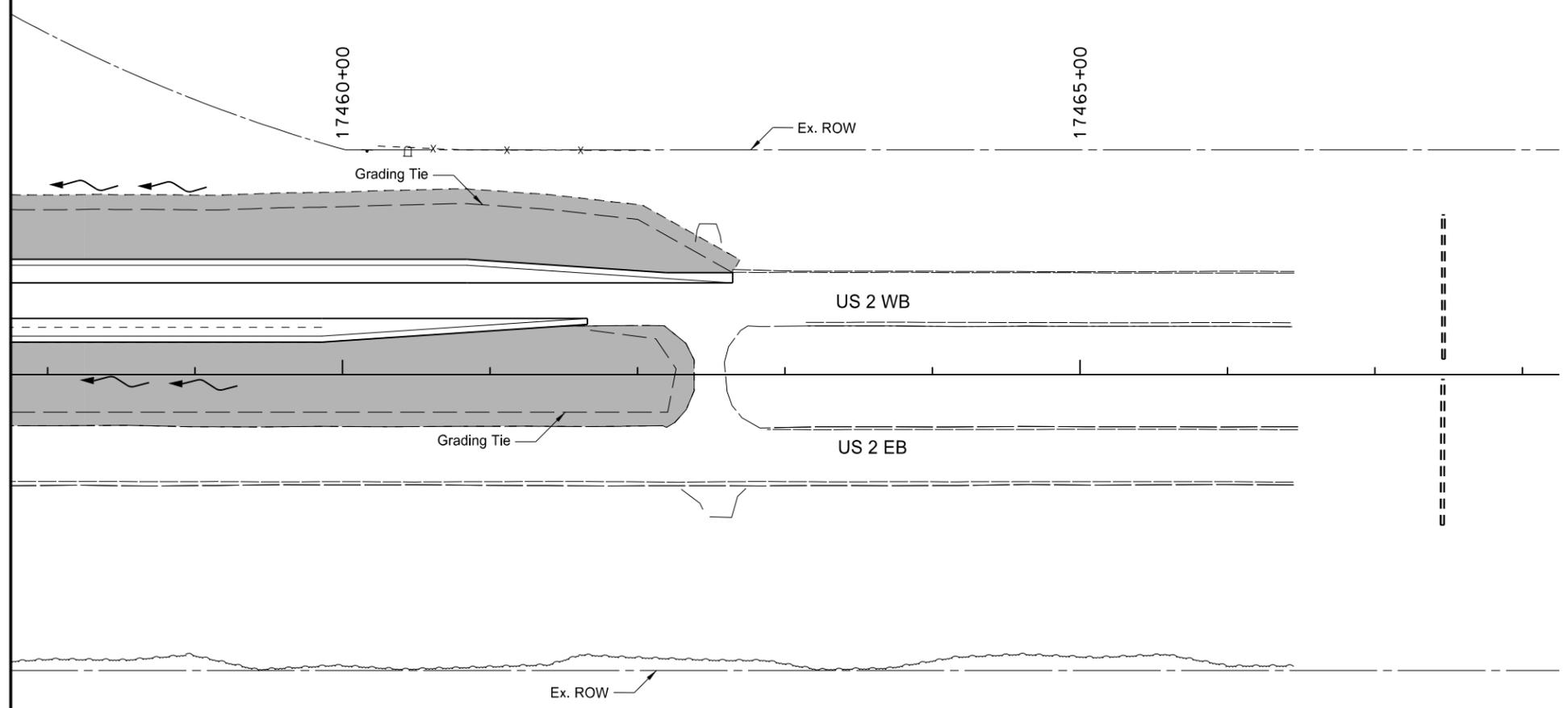


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Permanent Erosion Control
 Sta 17448+00 to 17458+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	77	3

Spec	Code	Description	Quantity
251	200	Seeding Class II	1.069 ACRE
253	101	Straw Mulch	1.069 ACRE



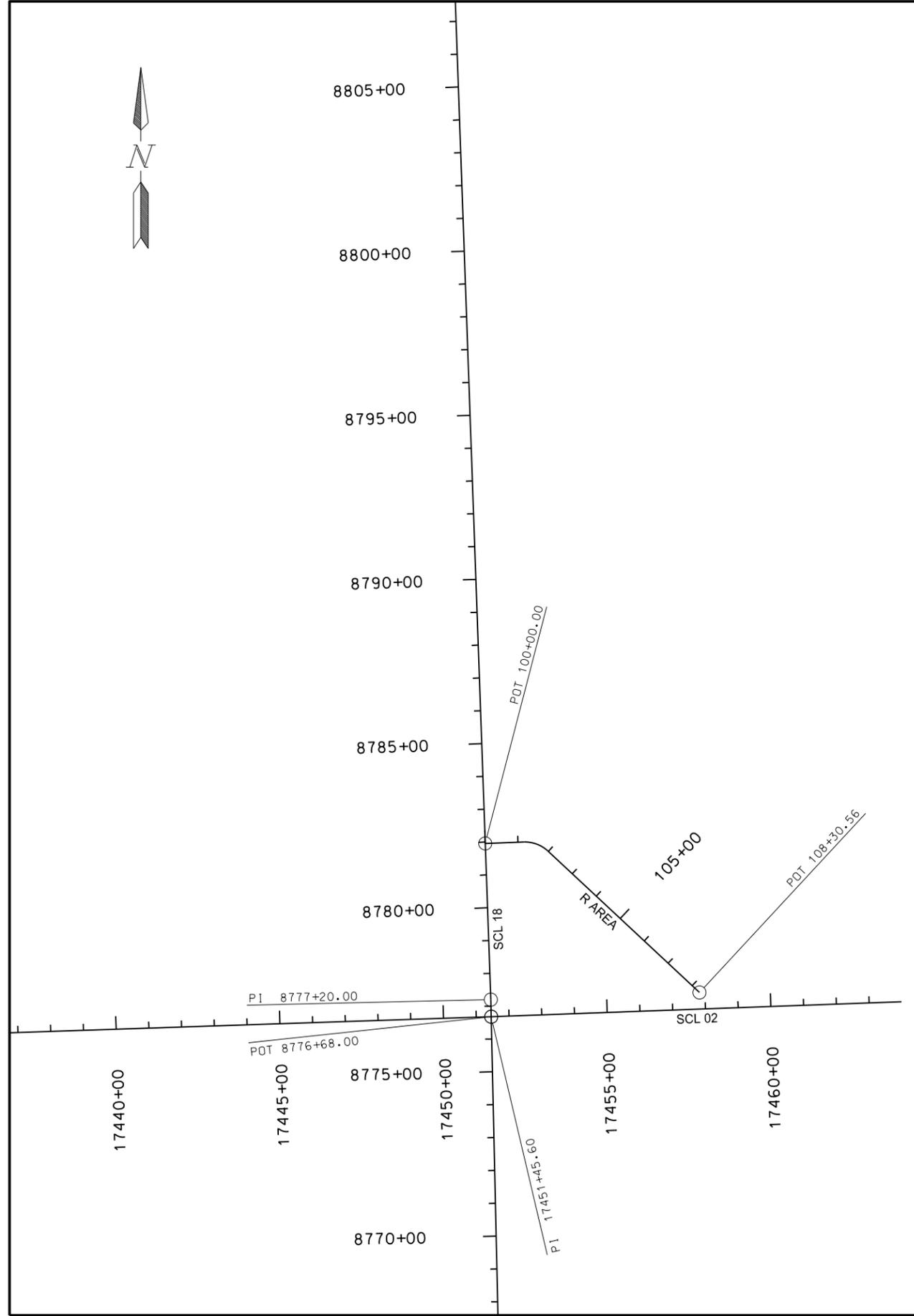
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Permanent Erosion Control
 Sta 17458+00 to 17468+00
 US 2 & ND 18
 Rest Area & Intersection Improvements

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - US 2 and ND 18 Rest Area

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	81	1

HORIZONTAL ALIGNMENT				CURVE DATA	US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS						
PNT	STATION	NORTHING	EASTING	ARC DEFINITION	DESC.	SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	
US 2 (Chain: SCL02)					SW Cor Sec 31 T-152-N R-54-W		353425.79	2673740.89		CONTROL POINT DESCRIPTION					
BEG 17424+99.97 358569.48 2670904.33					W 1/4 Cor Sec 31 T-152-N R-54-W		356052.95	2673642.62		PRIMARY CONTROL					
Station equation: US 2 & ND 18					N 1/4 Cor Sec 36 T-152-N R-55-W		358621.46	2670902.60	GPS 1	358468.29	2670917.53	1123.17	17425+10	102' Rt	
US 2 17451+45.60 358657.20 2673548.51					NW Cor Sec 31 T-152-N R-54-W		358709.19	2673547.33	18" #5 Rebar with 1 1/2" Alum cap stamped "ND DOT GPS Control"						
ND 18 8776+68.00 358657.20 2673548.51					NE Cor Sec 31 T-152-N R-54-W		358899.23	2678754.27	GPS 2	358908.48	2676701.30	1127.35	17483+05	136' Lt	
END 17503+56.73 358847.26 2678756.17					NW Cor Sec 30 T-152-N R-54-W		364006.95	2673358.37	1 1/2" Alum cap						
ND 18 (Chain: SCL18)									SECONDARY CONTROL						
BEG 8750+62.28 356052.16 2673607.63									RTK 1463	358552.52	2673800.97	1123.94	17453+94	114' Rt	
Intscn US 2 8776+68.00 358657.20 2673548.51															
Sec Cor 8777+20.00 358709.19 2673547.33															
Sec Cor 8830+21.12 364006.95 2673358.37															
REFERENCE MARKERS															
					R Mkr #	NORTHING	EASTING	STATION	OFFSET						
					330	358649.02	2670802.45	N/A	N/A						
					330	358490.98	2670808.84	N/A	N/A						
					331	358666.04	2676085.12	17476+80.84	84' Rt						
					331	358825.97	2676075.11	17476+76.68	77' Lt						
NOTES: Sheet 1 of 1				Date Survey Completed 09/24/15	<input type="checkbox"/> Assumed Coordinates <input checked="" type="checkbox"/> All coordinates on this sheet are Grand Forks County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998805				All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK <input checked="" type="checkbox"/> NAVD-88 <input type="checkbox"/> NGVD-29 <input type="checkbox"/> GEOID 09 <input type="checkbox"/> _____ <input checked="" type="checkbox"/> GEOID 12A			This document was originally issued and sealed by Robert D. Zahn Registration Number LS- 3659 , on 09/24/15 and the original document is stored at the North Dakota Department of Transportation			



Beginning chain SCL02 description
 =====
 Point 307 N 358,569.4845 E 2,670,904.3286 Sta 17424+99.97
 Course from 307 to 304 N 88° 05' 59.74" E Dist 2,645.6342
 Point 304 N 358,657.2043 E 2,673,548.5082 Sta 17451+45.60
 Course from 304 to 308 N 87° 54' 35.47" E Dist 5,211.1254
 Point 308 N 358,847.2637 E 2,678,756.1665 Sta 17503+56.73
 =====
 Ending chain SCL02 description

Beginning chain SCL18 description
 =====
 Point 303 N 356,052.1553 E 2,673,607.6336 Sta 8750+62.28
 Course from 303 to 309 N 1° 18' 00.68" W Dist 2,605.7198
 Point 309 N 358,657.2043 E 2,673,548.5082 Sta 8776+68.00
 Course from 309 to 301 N 1° 18' 00.68" W Dist 52.0029
 Point 301 N 358,709.1938 E 2,673,547.3282 Sta 8777+20.00
 Course from 301 to 1703 N 2° 02' 33.94" W Dist 5,301.1220
 Point 1703 N 364,006.9469 E 2,673,358.3679 Sta 8830+21.12
 =====
 Ending chain SCL18 description

Beginning chain R AREA description
 =====
 Point 8116 N 359,184.6651 E 2,673,530.3691 Sta 100+00.00
 Course from 8116 to PC R AREA-1 N 87° 57' 26.06" E Dist 118.9443

Curve Data

Curve R AREA-1
 P.I. Station 101+60.34 N 359,190.3803 E 2,673,690.6035
 Delta = 44° 58' 16.79" (RT)
 Degree = 57° 17' 44.81"
 Tangent = 41.3920
 Length = 78.4898
 Radius = 100.0000
 External = 8.2280
 Long Chord = 76.4905
 Mid. Ord. = 7.6025
 P.C. Station 101+18.94 N 359,188.9049 E 2,673,649.2378
 P.T. Station 101+97.43 N 359,162.1888 E 2,673,720.9109
 C.C. N 359,088.9684 E 2,673,652.8023
 Back = N 87° 57' 26.06" E
 Ahead = S 47° 04' 17.15" E
 Chord Bear = S 69° 33' 25.54" E

Course from PT R AREA-1 to 8117 S 47° 04' 17.15" E Dist 633.1215
 Point 8117 N 358,730.9786 E 2,674,184.4846 Sta 108+30.56
 =====
 Ending chain R AREA description

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Survey Data Layout

US 2 & ND 18

Rest Area & Intersection Improvements

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO. 1	2			
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)				6	
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES				34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)				26	
G20-2-48	48"x24"	END ROAD WORK	6	4	6	19	114
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)				18	
G20-10-108	108"x48"	CONTRACTOR SIGN	1		1	64	64
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS	2		2	37	74
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW				30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	6	4	6	59	354
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)				10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)				10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)				10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)				7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)				7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)				7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)				7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)				7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT				15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT				23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT (Mounted on route marker post)				7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)				7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)				7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)				7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)				7	
R1-1-48	48"x48"	STOP	6	2	6	32	192
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back	2	2	2	5	10
R1-2-60	60"x60"	YIELD				29	
R2-1-48	48"x60"	SPEED LIMIT ___	16	10	16	39	624
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	4	6	6	10	60
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT				35	
R4-1-48	48"x60"	DO NOT PASS				39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL				39	
R5-1-48	48"x48"	DO NOT ENTER				35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT				13	
R7-1-12	12"x18"	NO PARKING				11	
R10-6-24	24"x36"	STOP HERE ON RED				16	
R11-2-48	48"x30"	ROAD CLOSED				28	
R11-2a-48	48"x30"	STREET CLOSED				28	
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY				31	
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY				31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC				31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW				35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW				35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW				35	
W1-6-48	48"x24"	LARGE ARROW				26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL				35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL				35	
W3-4-48	48"x48"	BE PREPARED TO STOP				35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	7	4	7	35	245
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL	4	4	4	35	140
W5-1-48	48"x48"	ROAD NARROWS				35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE				35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW				35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL				35	
W8-1-48	48"x48"	BUMP				35	
W8-3-48	48"x48"	PAVEMENT ENDS				35	
W8-7-48	48"x48"	LOOSE GRAVEL				35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF				35	
W8-11-48	48"x48"	UNEVEN LANES				35	
W8-12-48	48"x48"	NO CENTER STRIPE				35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY				35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT.	2		2	35	70
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT.	2		2	35	70
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY				35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL				35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL				35	
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)				11	
W13-4-48	48"x60"	RAMP ARROW				39	
W14-3-48	48"x36"	NO PASSING ZONE				23	
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	8	4	8	35	280
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT				35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT.				35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.				35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.	4	4	4	35	140
W20-7a-48	48"x48"	FLAGGING SYMBOL	2	2	2	35	70
W20-7k-24	24"x18"	___ FEET (Mounted on warning sign post)				10	
W20-8-48	48"x48"	STREET CLOSED				35	
W20-51-48	48"x48"	EQUIPMENT WORKING				35	
W20-52-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)				12	
W21-1a-48	48"x48"	WORKERS SYMBOL				35	
W21-2-48	48"x48"	FRESH OIL				35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT				35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO. 1	2			
W21-5-48	48"x48"	SHOULDER WORK			1	35	35
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED				35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.				35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD				35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.				35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY				35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK				35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)				11	

SPECIAL SIGNS							
SIGN NUMBER	SIGN SIZE	DESCRIPTION	BY PHASE NO. 1	2	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
1	48"x18"	Closed	1		1	7	7

SPEC & CODE		TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS	2549

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO.		TOTAL QUANTITY
			1	2	
704-0100	FLAGGING	MHR	125	125	250
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH			
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH			
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH			
704-1050	TYPE I BARRICADES	EACH			
704-1051	TYPE II BARRICADES	EACH			
704-1052	TYPE III BARRICADES	EACH	7	2	7
704-1060	DELINEATOR DRUMS	EACH	34	42	42
704-1065	TRAFFIC CONES	EACH	10		10
704-1067	TUBULAR MARKERS	EACH	46	64	64
704-1070	DELINEATOR	EACH			
704-1072	FLEXIBLE DELINEATORS	EACH			
704-1081	VERTICAL PANELS - BACK TO BACK	EACH			
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH			
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH			
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	2	2	2
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH			
704-1095	TYPE B FLASHERS	EACH			
704-1500	OBLITERATION OF PVMT MK	SF			
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF			
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH			
762-0200	RAISED PAVEMENT MARKERS	EACH			
762-0420	SHORT TERM 4IN LINE - TYPE R	LF			
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF			
772-2110	FLASHING BEACON - POST MOUNTED	EACH			

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
<http://www.dot.nd.gov/>

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Traffic Control Devices List
Work Zone Traffic Control

US 2 & ND 18
Rest Area & Intersection Improvements

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SHE-6-002(113)330	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
					1st LF	2nd LF	3rd LF	4th LF		LF	1st LF	2nd LF	3rd LF	4th LF								
US Hwy 2																						
17431+24 Rt		19		6.3	13.5				2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
17435+24 Rt	SA A		13.4		14.7				2.5 x 2.5 10 ga	16.5	4.2				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	
17439+24 Rt					12.5	13.3			2.5 x 2.5 10 ga	14.1	4.0	4.9			2.19 x 2.19 10 ga	2	4	3 x 3 7 ga	1		2	
17447+21 Rt	SA B		26.8		14.8	15.3			2.5 x 2.5 10 ga	15.7	4.9	5.4			2.19 x 2.19 10 ga	2	4	3 x 3 7 ga			2	
17447+97 Rt		33			12.6				2.5 x 2.5 12 ga	14.8						1	4	3 x 3 7 ga	1			
17447+97 Rt mdn		33			12.9				2.5 x 2.5 12 ga	14.8						1	4	3 x 3 7 ga	1			
17450+20 Rt		16			12.8				2.25 x 2.25 12 ga	13.8	4.4				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
17450+20 Rt mdn		16			13.5				2.5 x 2.5 12 ga	14.4	4.8				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
17451+03 Rt	SA B		26.8		14.8	15.3			2.5 x 2.5 10 ga	15.7	4.9	5.4			2.19 x 2.19 10 ga	2	4	3 x 3 7 ga			2	
17451+93 Lt	SA C		26.8		16.0	16.3	16.4		2.5 x 2.5 12 ga	18.9	4.3	4.6	4.7		2.25 x 2.25 12 ga	3	4	3 x 3 7 ga			3	
17452+99 Lt		16			14.1				2.5 x 2.5 10 ga	17.0	3.9				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga	1		1	
17452+99 Lt mdn		16			14.8				2.5 x 2.5 10 ga	17.0	4.5				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga	1		1	
17454+96 Lt		33			13.9				2.5 x 2.5 12 ga	14.8						1	4	3 x 3 7 ga	1			
17454+96 Lt mdn		33			14.2				2.5 x 2.5 12 ga	14.8						1	4	3 x 3 7 ga	1			
17455+64 Lt	SA C		26.8		16.0	16.3	16.4		2.5 x 2.5 12 ga	18.9	4.3	4.6	4.7		2.25 x 2.25 12 ga	3	4	3 x 3 7 ga			3	
17458+76 Lt					13.6	14.1	14.2	14.3	2.5 x 2.5 10 ga	15.9						4	4	3 x 3 7 ga	1		4	
17469+75 Lt		19		6.3	14.5				2.25 x 2.25 12 ga	19.3	2.9				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
Sub Total			120.6	12.6		Total	391.2									Total	108		10	0	22	
ND Hwy 18																						
8775+44 Rt					16.0	16.3			2.5 x 2.5 12 ga	18.3	4.2	4.5			2.25 x 2.25 12 ga	2	4	3 x 3 7 ga	1		2	
8777+91 Rt	SNS																		1	1		
8777+93 Lt					16.0	16.3			2.5 x 2.5 12 ga	18.3	4.2	4.5			2.25 x 2.25 12 ga	2	4	3 x 3 7 ga	1		2	
8779+52 Rt		371	6.0		12.5				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
8780+63 Rt	SA D		14.0		13.2				2.5 x 2.5 10 ga	15.5	3.5				2.19 x 2.19 10 ga	1	4	3 x 3 7 ga			1	
Sub Total			20.0	0.0		Total	90.4									Total	24		3	1	5	

Basis of Estimate
Sign Support Lengths

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

- Areas where parking and/or pedestrian movement will occur - 84"
- Urban/rural expressway and freeway - 84" (Offset - 60")
- Rural Roadway - 60"

This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE-5047, on 3/18/2016 and the original document is stored at the North Dakota Department of Transportation

Sign Summary
Perforated Tube

Intersection of US 2 and ND Hwy 18
Grand Forks County

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SHE-6-002(113)330	110	2

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF		LF	1st LF	2nd LF	3rd LF	4th LF								
Rest Area																						
101+00 Rt	SA E				16.8	17.1			2.5 x 2.5 12 ga	17.7					2	4	3 x 3 7 ga	1		2		
101+80 Lt	SN 2	9		5.0	14.0				2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga					
101+88 Rt		399	6.2		14.8				2.5 x 2.5 12 ga	15.9					1	4	3 x 3 7 ga					
103+00 Lt	SN 1	8	3.0		13.4				2 x 2 12 ga	14.6					1	4	2.25 x 2.25 12 ga					
103+58 Lt		9			14.0				2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga	1				
105+33 Rt		7		1.5	12.8				2 x 2 12 ga	25.5					1	4	2.25 x 2.25 12 ga					
106+34 Lt	SA F		6.0		14.5				2.5 x 2.5 12 ga	16.2					1	4	3 x 3 7 ga					
106+77 Lt		7		1.5	12.8				2 x 2 12 ga	25.5					1	4	2.25 x 2.25 12 ga					
107+19 Lt		7		1.5	12.8				2 x 2 12 ga	25.5					1	4	2.25 x 2.25 12 ga					
Sub Total			15.2	9.5				Total 143.0							Total 40			2	0	2		
Grand Total			155.8	22.1				Total 624.5							Total 172			15	1	29		

Basis of Estimate
Sign Support Lengths

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

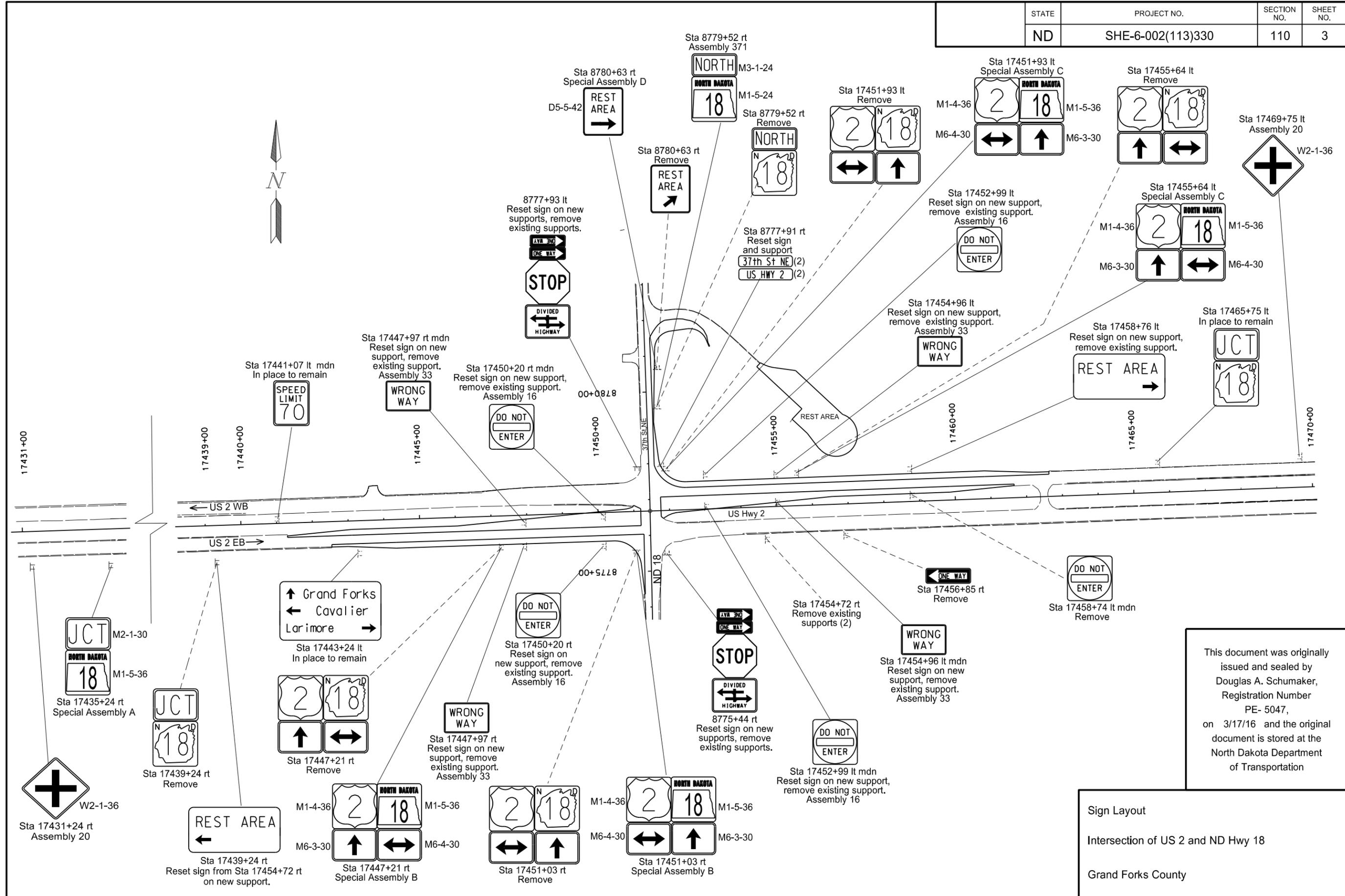
- Areas where parking and/or pedestrian movement will occur - 84"
- Urban/rural expressway and freeway - 84" (Offset - 60")
- Rural Roadway - 60"

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Sign Summary
Perforated Tube

Intersection of US 2 and ND Hwy 18
Grand Forks County

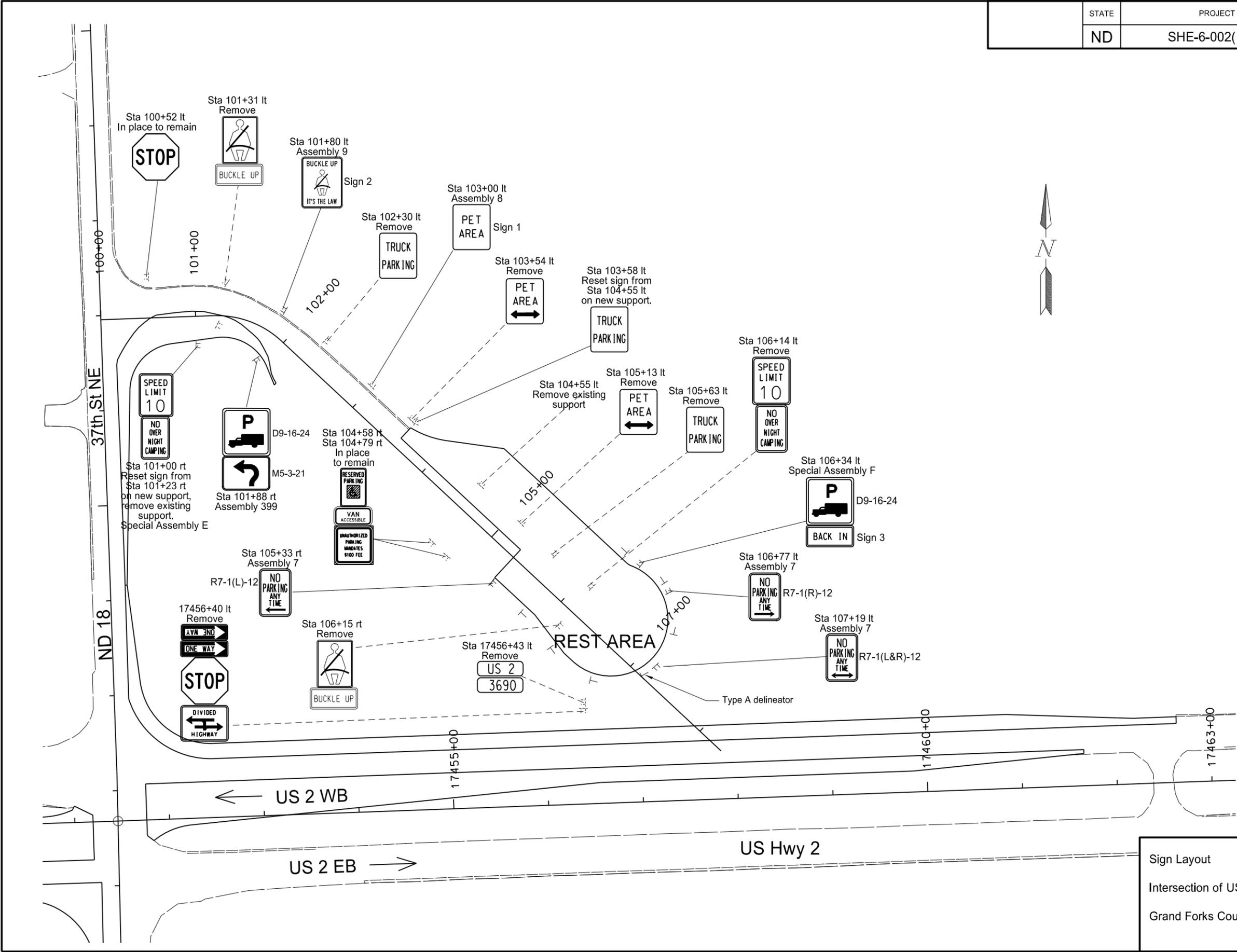
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	110	3



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Sign Layout
 Intersection of US 2 and ND Hwy 18
 Grand Forks County

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	110	4

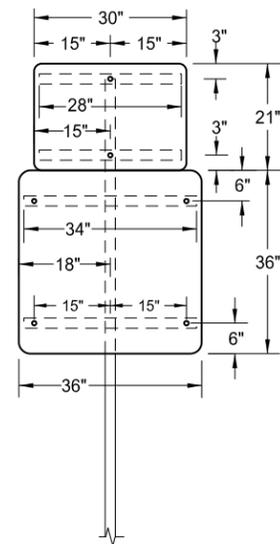


Delineators-type A
Rest area (50' spacing) 7 EA

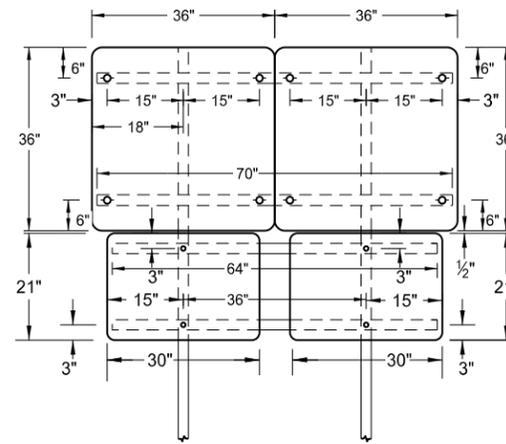
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Sign Layout
Intersection of US 2 and ND Hwy 18
Grand Forks County

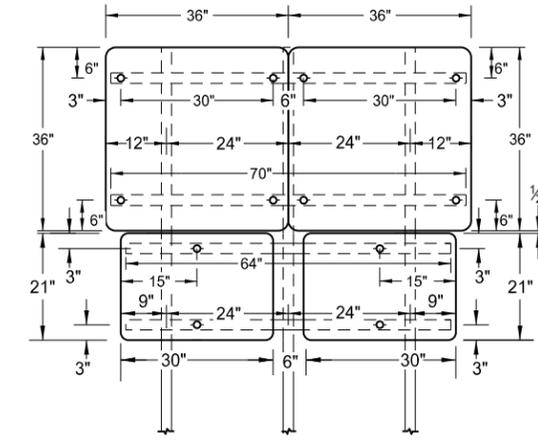
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	110	6



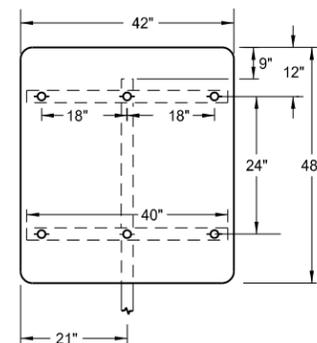
Special Assembly A
Sta 17435+24 rt
Pay Area: 13.38 SF



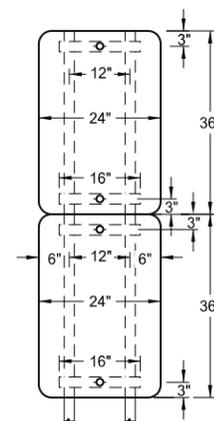
Special Assembly B
Sta 17447+21 rt
Sta 17451+03 rt
Pay Area: 26.75 SF



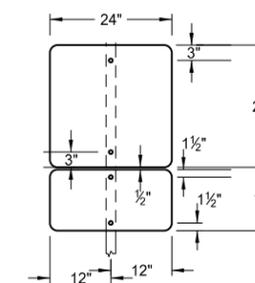
Special Assembly C
Sta 17451+93 lt
Sta 17455+64 lt
Pay Area: 26.75 SF



Special Assembly D
Sta 8780+63 rt
Pay Area: 14.0 SF



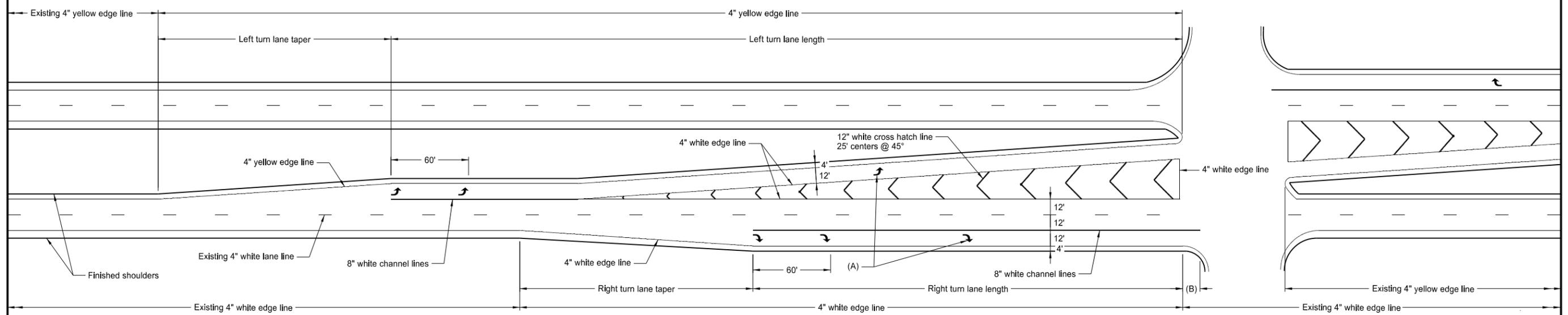
Special Assembly E
RP 101+00 rt
Pay Area: 12 SF



Special Assembly F
RP 106+34 lt
Pay Area: 6 SF

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Special Assembly Details
Intersection of US 2 and ND Hwy 18
Grand Forks County



RP 330.520 (Sta 17451+45.60)
 ND Hwy 18 - 37th St NE

Paint pvmt mk message	
Right arrow (x3)	48 SF
Left arrow (x3)	48 SF
Total	96 SF

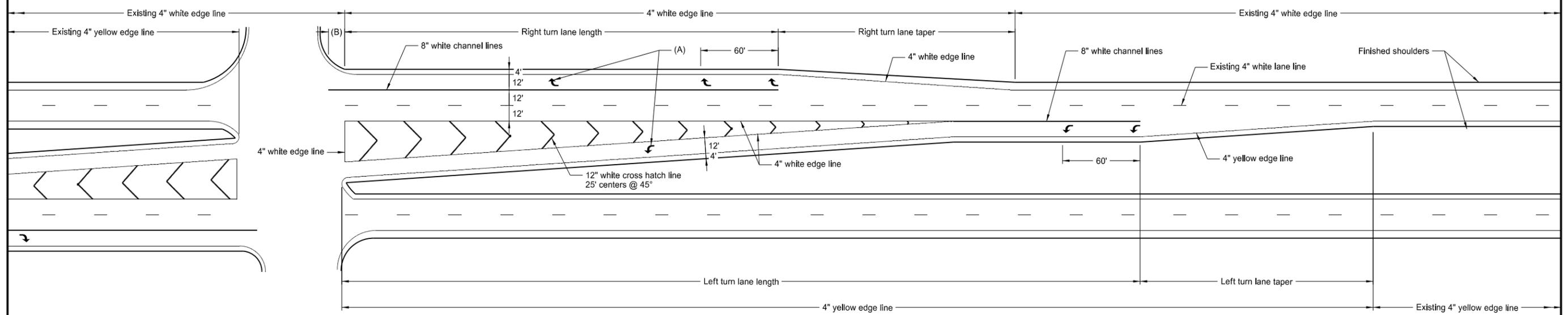
Paint pvmt mk 4in line	
4" white edge line (right)	907 LF
4" white edge line (left)	1033 LF
4" yellow edge line	980 LF
Total	2920 LF

Paint pvmt mk 8in line	
8" white channel line (right)	690 LF
8" white channel line (left)	297 LF
Total	987 LF

Paint pvmt mk 12in line	
12" white cross hatch line (25' centers @ 45°)	308 LF

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Pavement Marking Layout
 Turn Lanes with Angled Offset Left Turn
 Eastbound Roadway
 US Hwy 2 & ND Hwy 18 (37th St NE)



RP 330.520 (Sta 17451+45.60)
 ND Hwy 18 - 37th St NE

Paint pvmt mk message	
Right arrow (x3)	48 SF
Left arrow (x3)	48 SF
Total	96 SF

Paint pvmt mk 4in line	
4" white edge line (right)	1132 LF
4" white edge line (left)	980 LF
4" yellow edge line	996 LF
Total	3108 LF

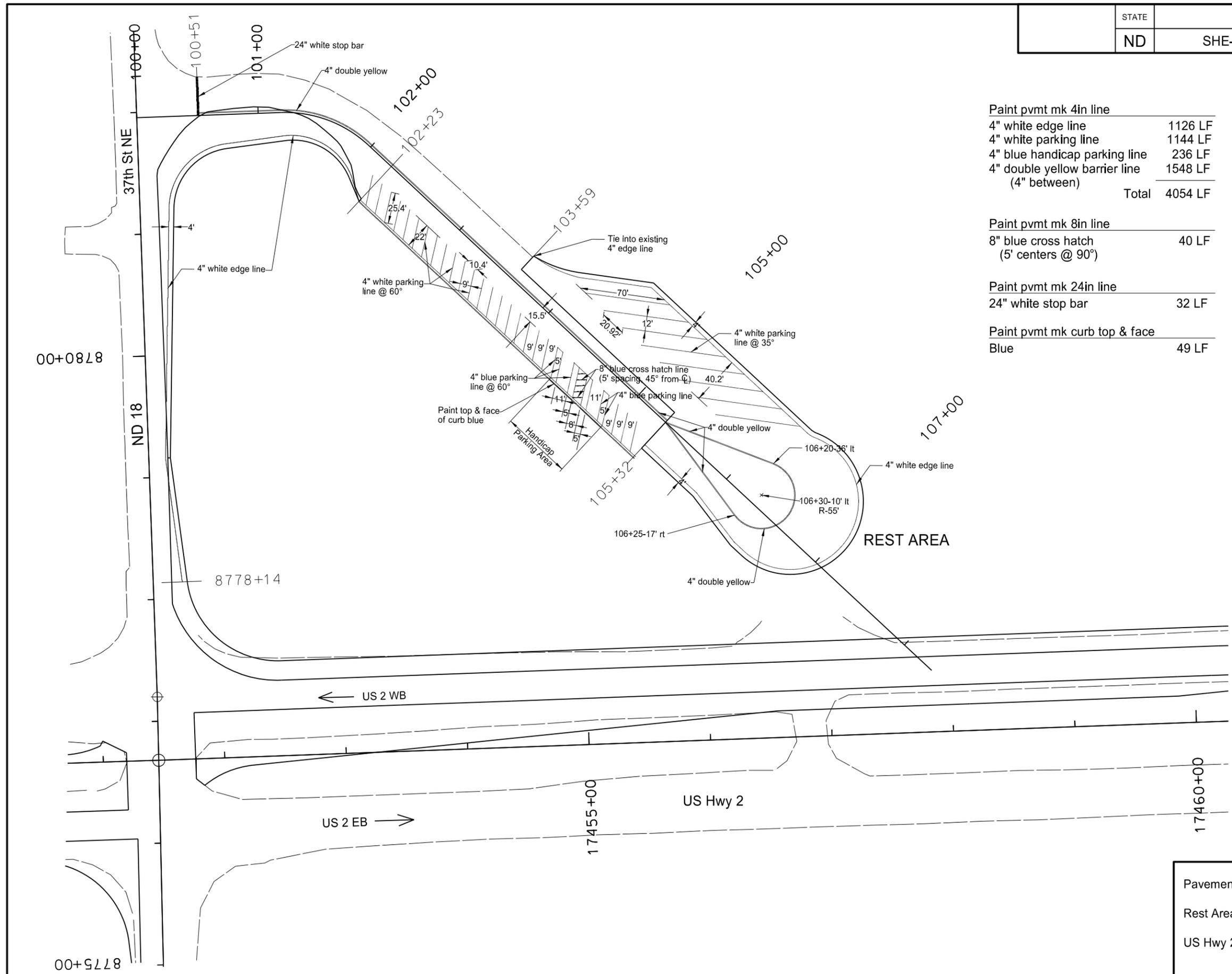
Paint pvmt mk 8in line	
8" white channel line (right)	881 LF
8" white channel line (left)	331 LF
Total	1212 LF

Paint pvmt mk 12in line	
12" white cross hatch line (25' centers @ 45°)	310 LF

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Pavement Marking Layout
 Turn Lanes with Angled Offset Left Turn
 Westbound Roadway
 US Hwy 2 & ND Hwy 18 (37th St NE)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	120	3



Paint pvmt mk 4in line	
4" white edge line	1126 LF
4" white parking line	1144 LF
4" blue handicap parking line	236 LF
4" double yellow barrier line (4" between)	1548 LF
Total	4054 LF

Paint pvmt mk 8in line	
8" blue cross hatch (5' centers @ 90°)	40 LF

Paint pvmt mk 24in line	
24" white stop bar	32 LF

Paint pvmt mk curb top & face	
Blue	49 LF



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Pavement Marking Layout
 Rest Area
 US Hwy 2 & ND Hwy 18 (37th St NE)



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SHE-6-002(113)330	140	1

17440+00

17445+00

US 2 WB

US 2 EB

1

2

3

4

Sta 17441+54-80' rt
Light std

Sta 17443+24-80' rt
Light std

Sta 17444+96-88' rt
Light std

Sta 17446+65-88' rt
Light std

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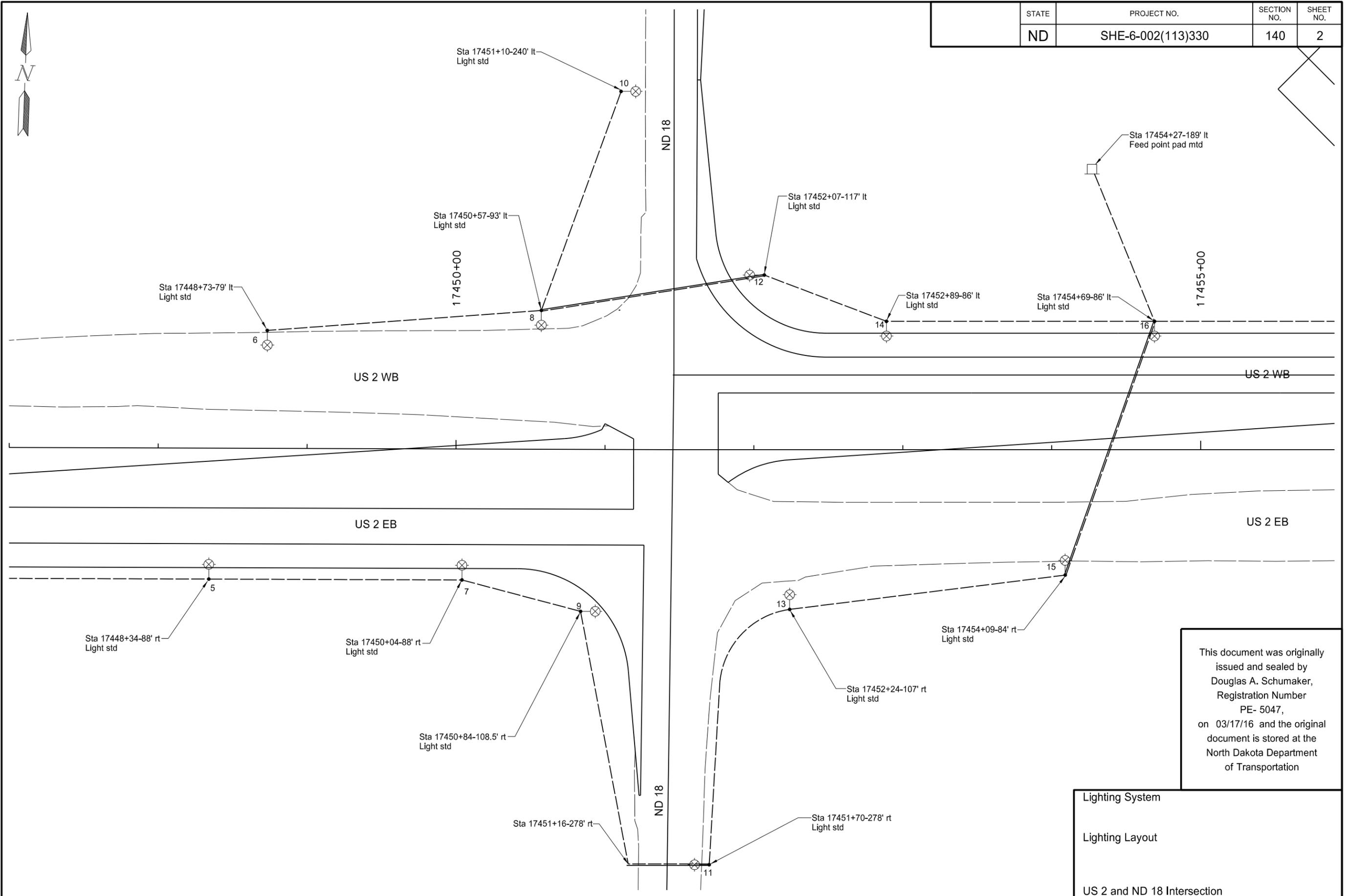
Lighting System

Lighting Layout

US 2 and ND 18 Intersection

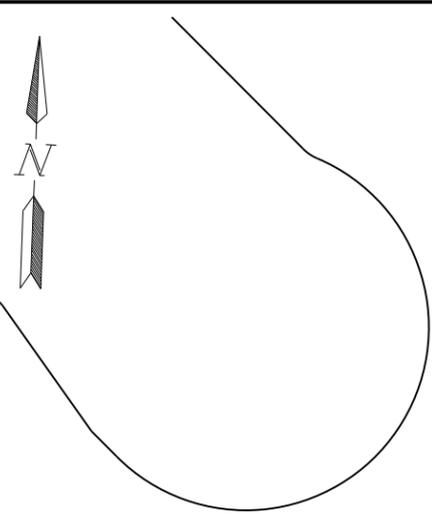


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	140	2

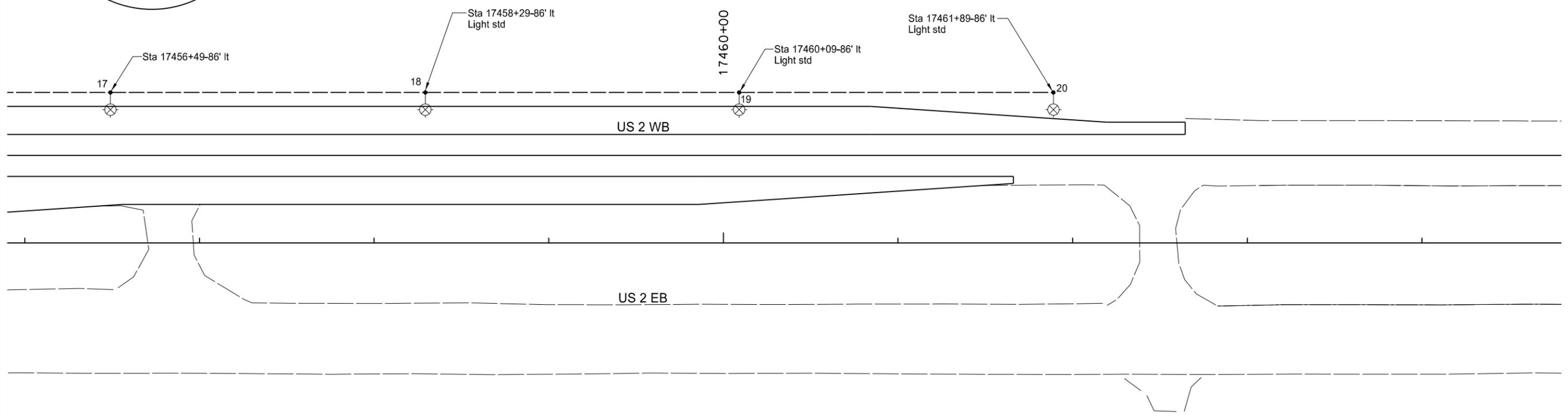


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Lighting System
Lighting Layout
US 2 and ND 18 Intersection



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SHE-6-002(113)330	140	3



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Lighting System
Lighting Layout
US 2 and ND 18 Intersection

Light Std Number	Station	Cable Trench	Conduit Runs		Cable Runs	
		LF	LF	Dia	LF	Type
1 2	17441+54-80' rt to 17443+24-80' rt	168			178	3 No. 6 USE
2 3	17443+24-80' rt to 17444+96-88' rt	170			180	3 No. 6 USE
3 4	17444+96-88' rt to 17446+65-88' rt	167			177	3 No. 6 USE
4 5	17446+65-88' rt to 17448+34-88' rt	167			177	3 No. 6 USE
5 7	17448+34-88' rt to 17450+04-88' rt	168			178	3 No. 6 USE
7 9	17450+04-88' rt to 17450+84-108.5' rt	81			91	3 No. 6 USE
9 11	17450+16-108.5' rt to 17451+16-278' rt to 17451+70-278' rt	172	53	2"	235	3 No. 6 USE
11 13	17451+70-278' lt to 17452+24-107' rt	170			233	3 No. 6 USE
13 15	17452+24-107' rt to 17454+09-84' rt	185			195	3 No. 6 USE
15 16	17454+09-84' rt to 17454+69-86' lt		178	2"	188	3 No. 6 USE
20 19	17561+89-86' lt to 17460+09-86' lt	178			188	3 No. 6 USE
19 18	17460+09-86' lt to 17458+29-86' lt	178			188	3 No. 6 USE
18 17	17458+29-86' lt to 17456+49-86' lt	178			188	3 No. 6 USE
17 16	17456+49-86' lt to 17454+69-86' lt	178			188	3 No. 6 USE
16 14	17454+69-86' lt to 17452+89-86' lt to	178			188	3 No. 6 USE
14 12	17452+89-86' lt to 17452+07-117' lt	86			96	3 No. 6 USE
6 8	17448+73-79' lt to 17450+57-93' lt	183			193	3 No. 6 USE
10 8	17451+10-240' lt to 17450+57-93' lt	154			164	3 No. 6 USE
8 12	17450+57-93' lt to 17452+07-117' lt		150	2"	160	3 No. 6 USE
16 FP	17454+69-86' lt to 17452+27-89' lt	105			115	3 No. 6 USE

Lighting Quantities (A)									
Concrete Foundation - Highway Lighting	Concrete Foundation - Feed Point - Type B	Cable Trench - Type II	2" Dia Rigid Conduit	Multiple Underground Cable 3 No. 6 Style USE	Feed Point - Type I - Pad Mounted	Light Std 10' MA 42' Pole Breakaway	LED Luminaire		Lighting System
EA	EA	LF	LF	LF	EA	EA	EA		EA
20	1	2866	381	3500	1	20	20		1

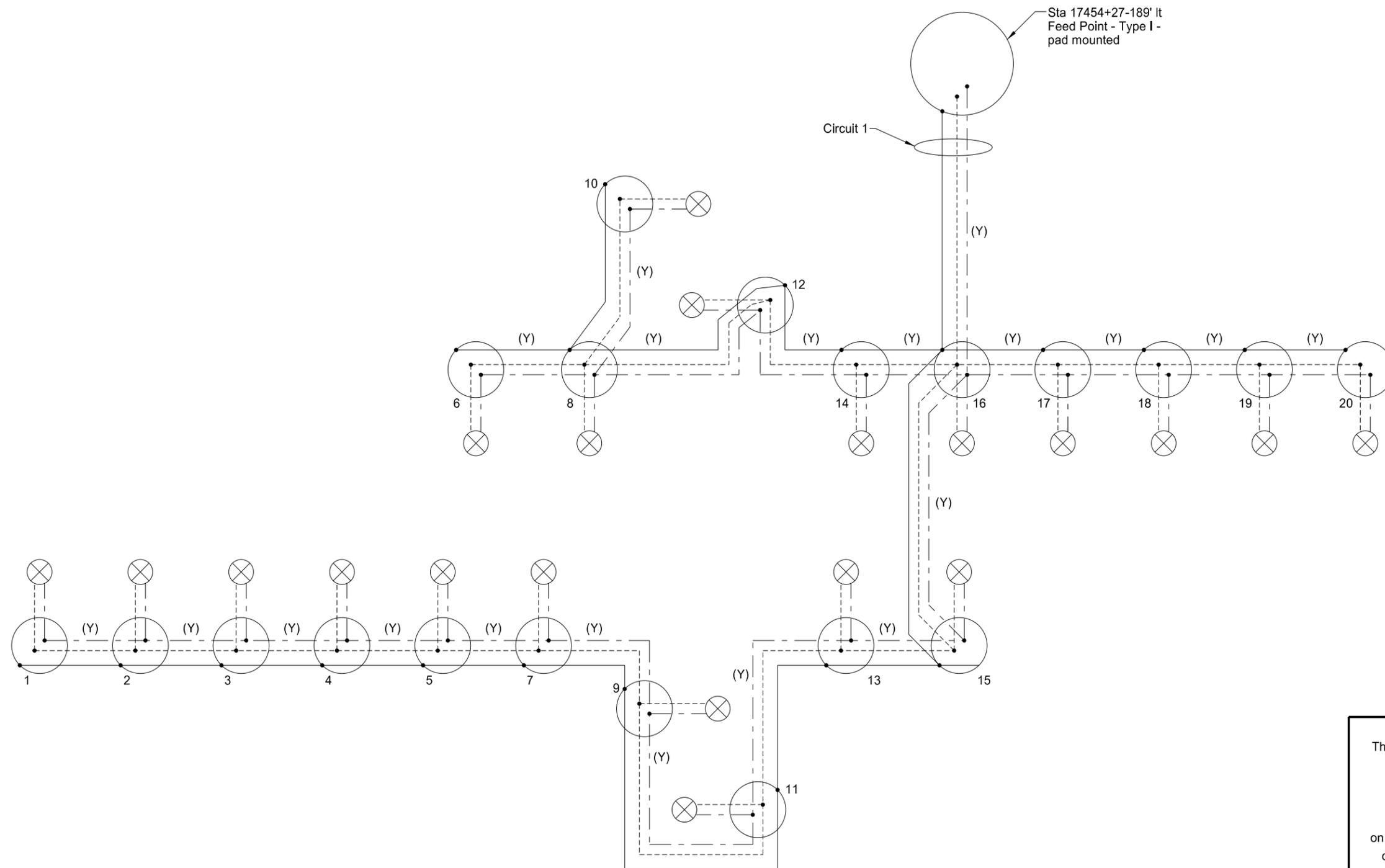
(A) Do not bid separately but included in the item "Lighting System".

Light Standards						
No.	Station	Wattage	Circuit	Distribution	Pole Ht.	Mast Arm
1	1741+54-80' rt	130 - 175	1	3	42' (B)	10'
2	17443+24-80' rt	130 - 175	1	3	42' (B)	10'
3	17444+96-88' rt	130 - 175	1	3	42' (B)	10'
4	17446+65-88' rt	130 - 175	1	3	42' (B)	10'
5	17448+34-88' rt	130 - 175	1	3	42' (B)	10'
6	17448+73-79' lt	130 - 175	1	3	42' (B)	10'
7	17450+04-88' rt	130 - 175	1	3	42' (B)	10'
8	17450+57-93' lt	130 - 175	1	3	42' (B)	10'
9	17450+84-108.5' rt	130 - 175	1	3	42' (B)	10'
10	17451+10-240' lt	130 - 175	1	3	42' (B)	10'
11	17451+70-278' lt	130 -175	1	3	42' (B)	10'
12	17452+24-107' rt	130 - 175	1	3	42' (B)	10'
13	17452+07-117' lt	130 - 175	1	3	42' (B)	10'
14	17452+69-86' lt	130 - 175	1	3	42' (B)	10'
15	17454+09-84' rt	130 - 175	1	3	42' (B)	10'
16	17454+69-86' lt	130 - 175	1	3	42' (B)	10'
17	17456+49-86' lt	130 - 175	1	3	42' (B)	10'
18	17458+29-86' lt	130 - 175	1	3	42' (B)	10'
19	17460+09-86' lt	130 - 175	1	3	42' (B)	10'
20	17461+89-86' lt	130 - 175	1	3	42' (B)	10'

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Lighting System
Light Standards, Cable Runs, and quantities
US 2 and ND 18 Intersection

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	140	5



LEGEND

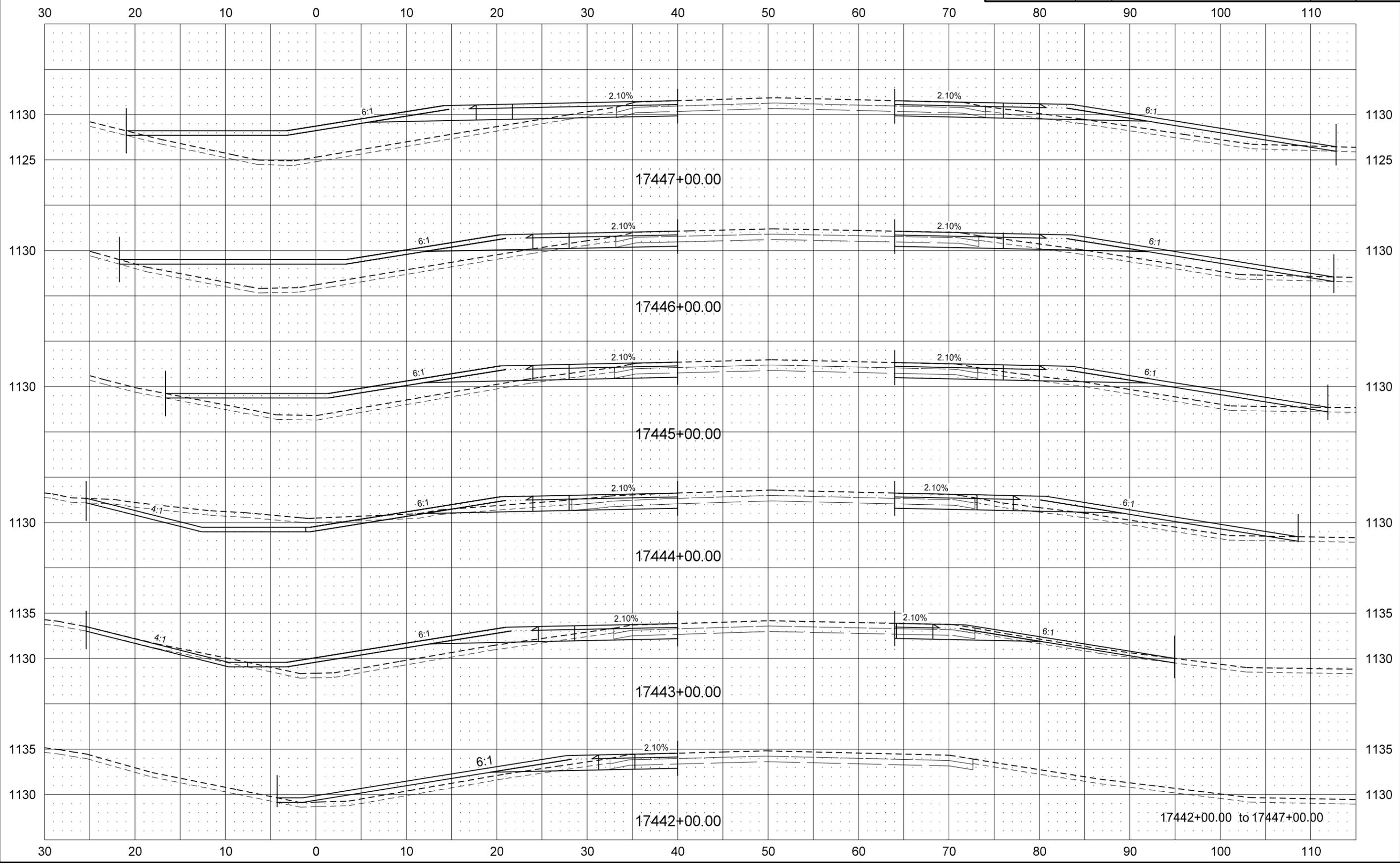
- Phase conductor
- Phase conductor
- Ground conductor
- (Y) Multiple Underground Cable 3 No. 6 USE
-  LED luminaire 120v x 240v operated on 240v
-  Light standard
- 8 Light standard number

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Lighting System
Lighting Schematic
US 2 and ND 18 Intersection

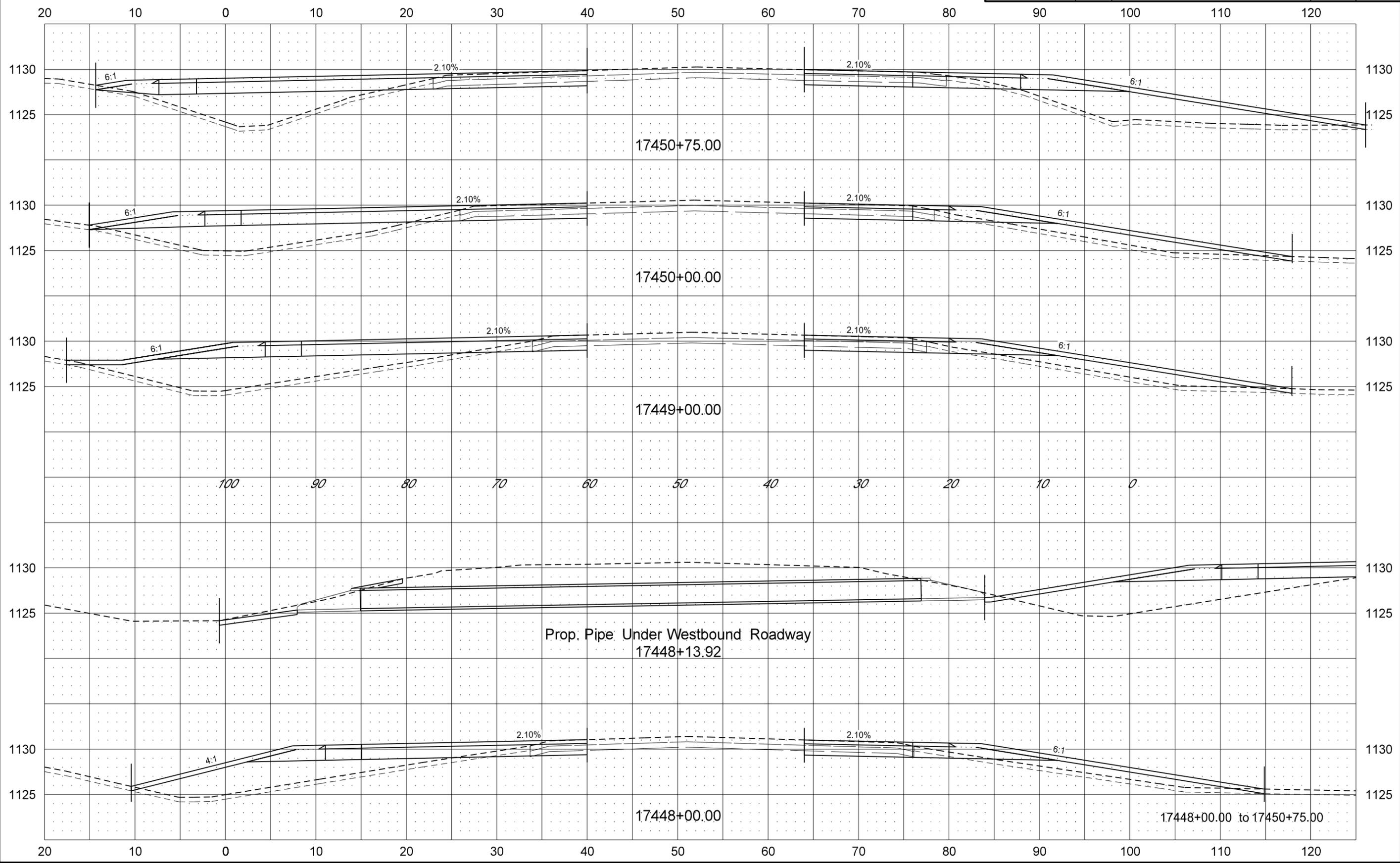
SCL02

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	1



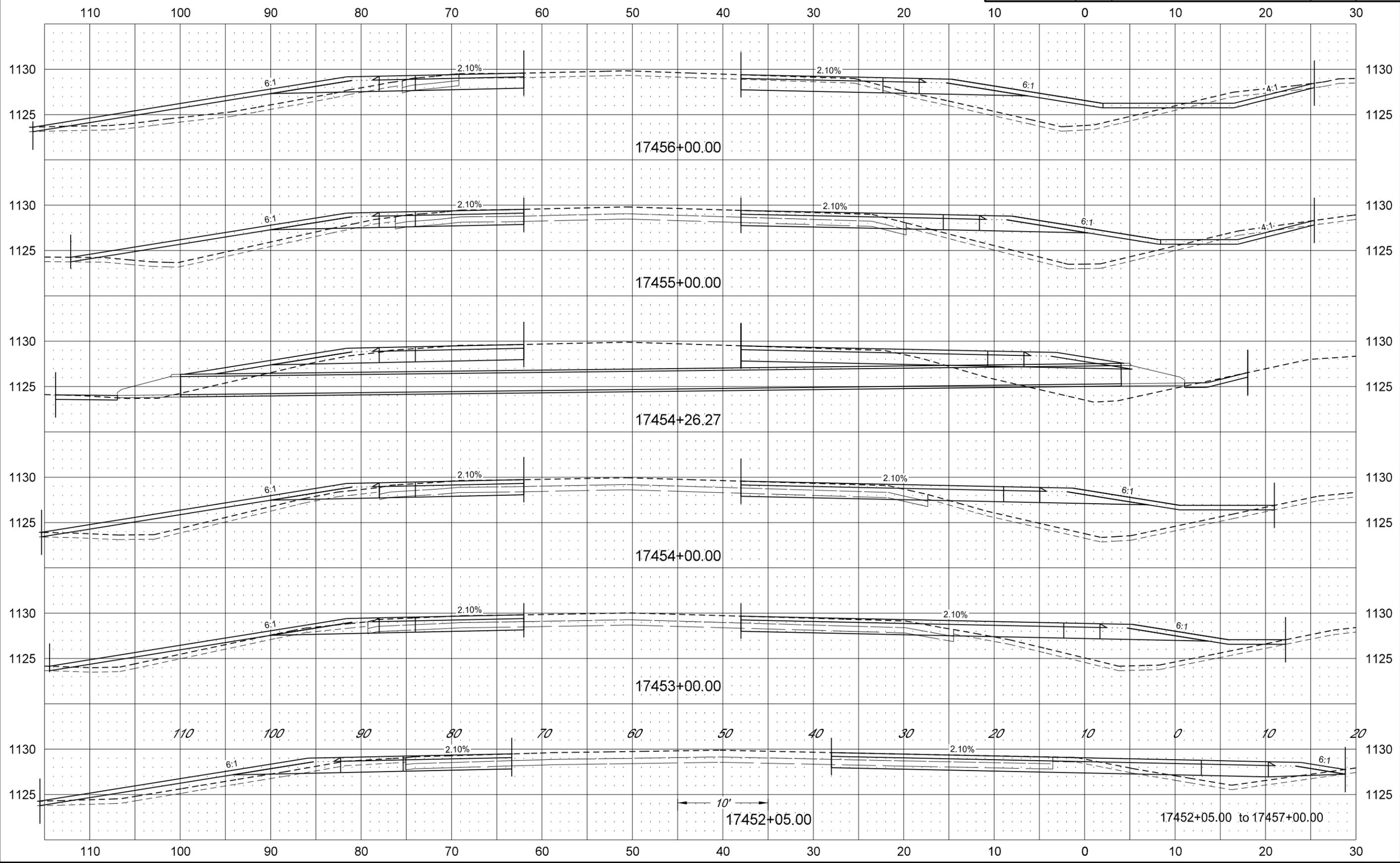
SCL02

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	2



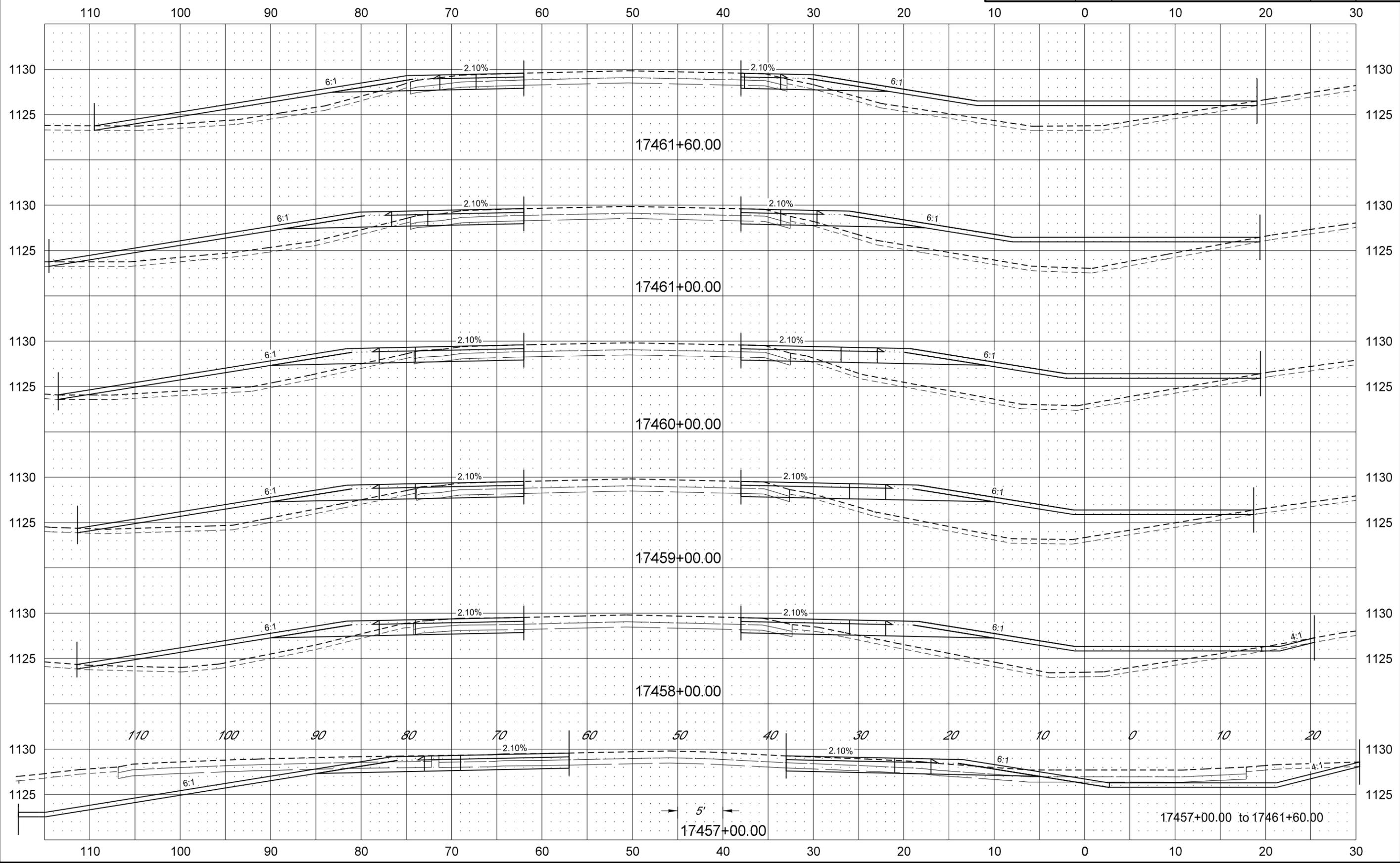
SCL02

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	3



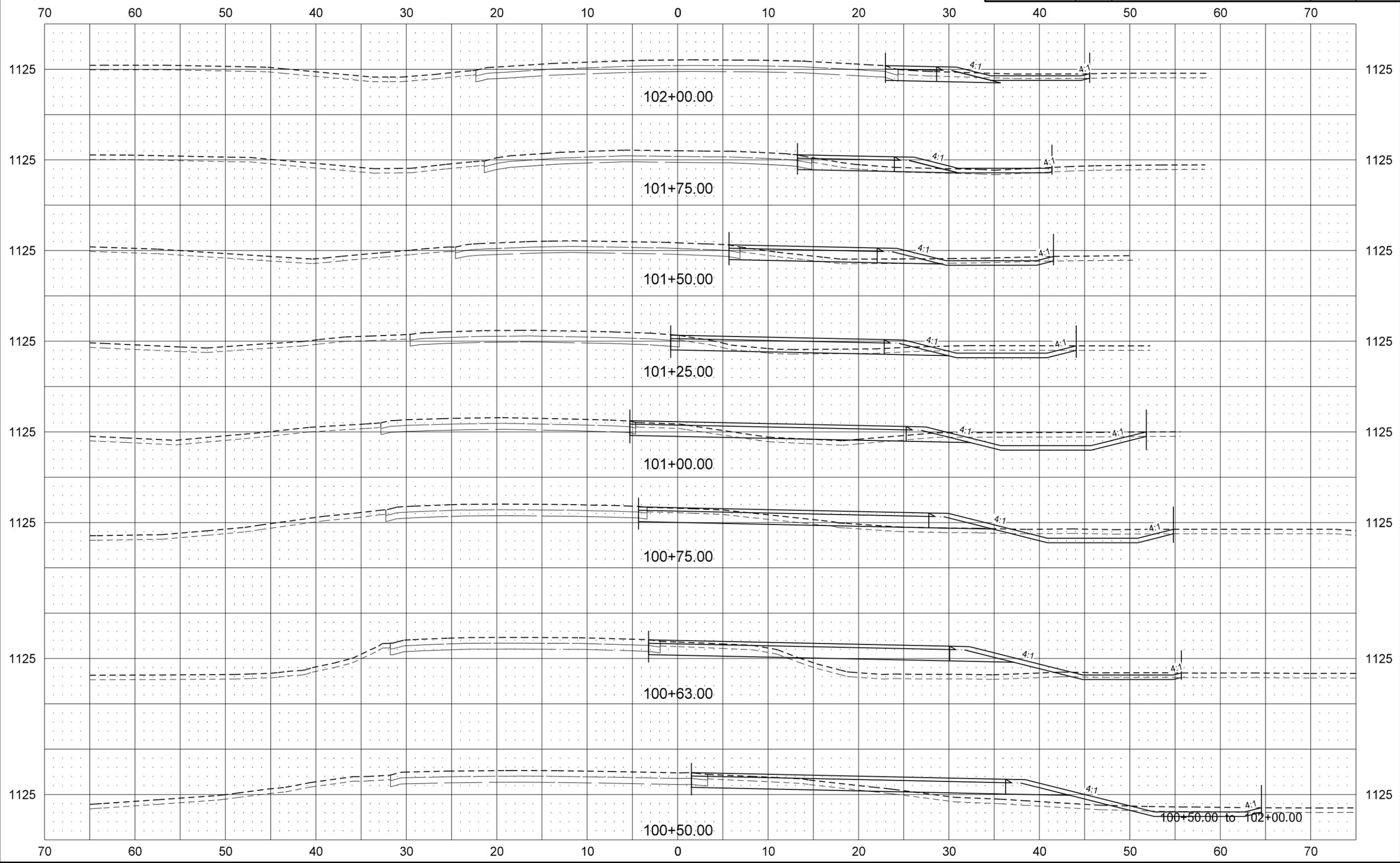
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	4



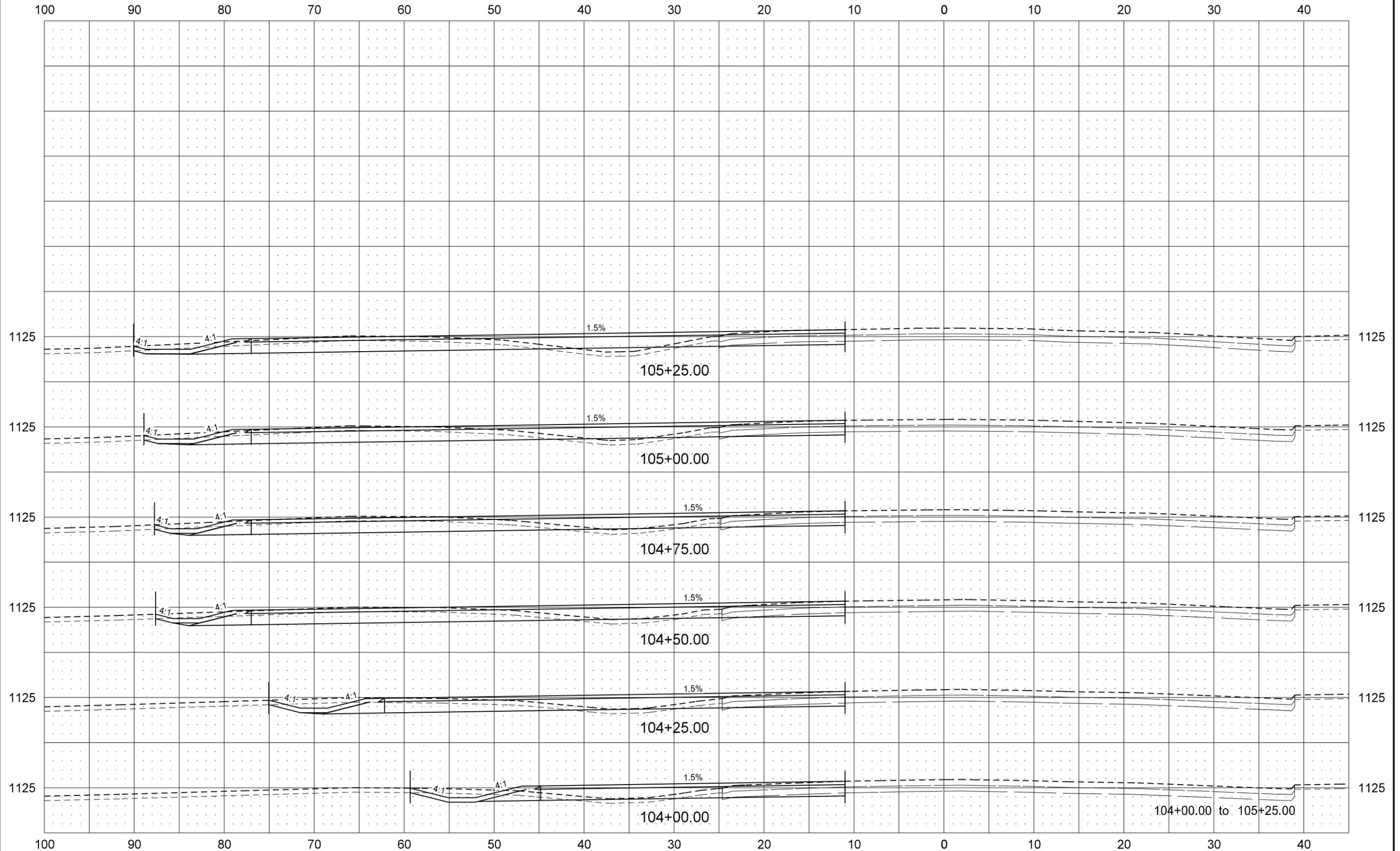
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	5

R_Area



R_Area

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SHE-6-002(113)330	200	6



R_Area

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SHE-6-002(113)330	200	7

