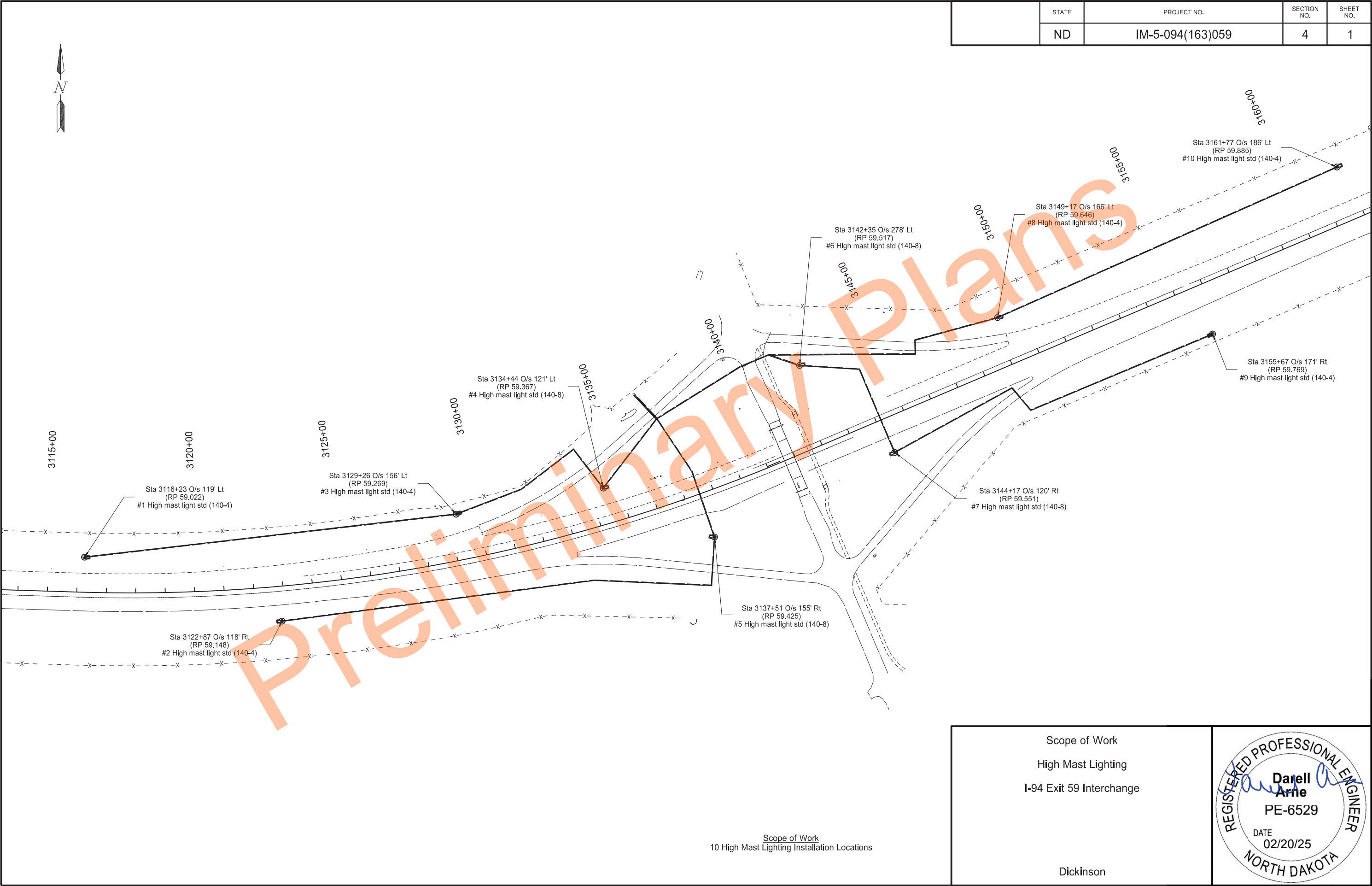
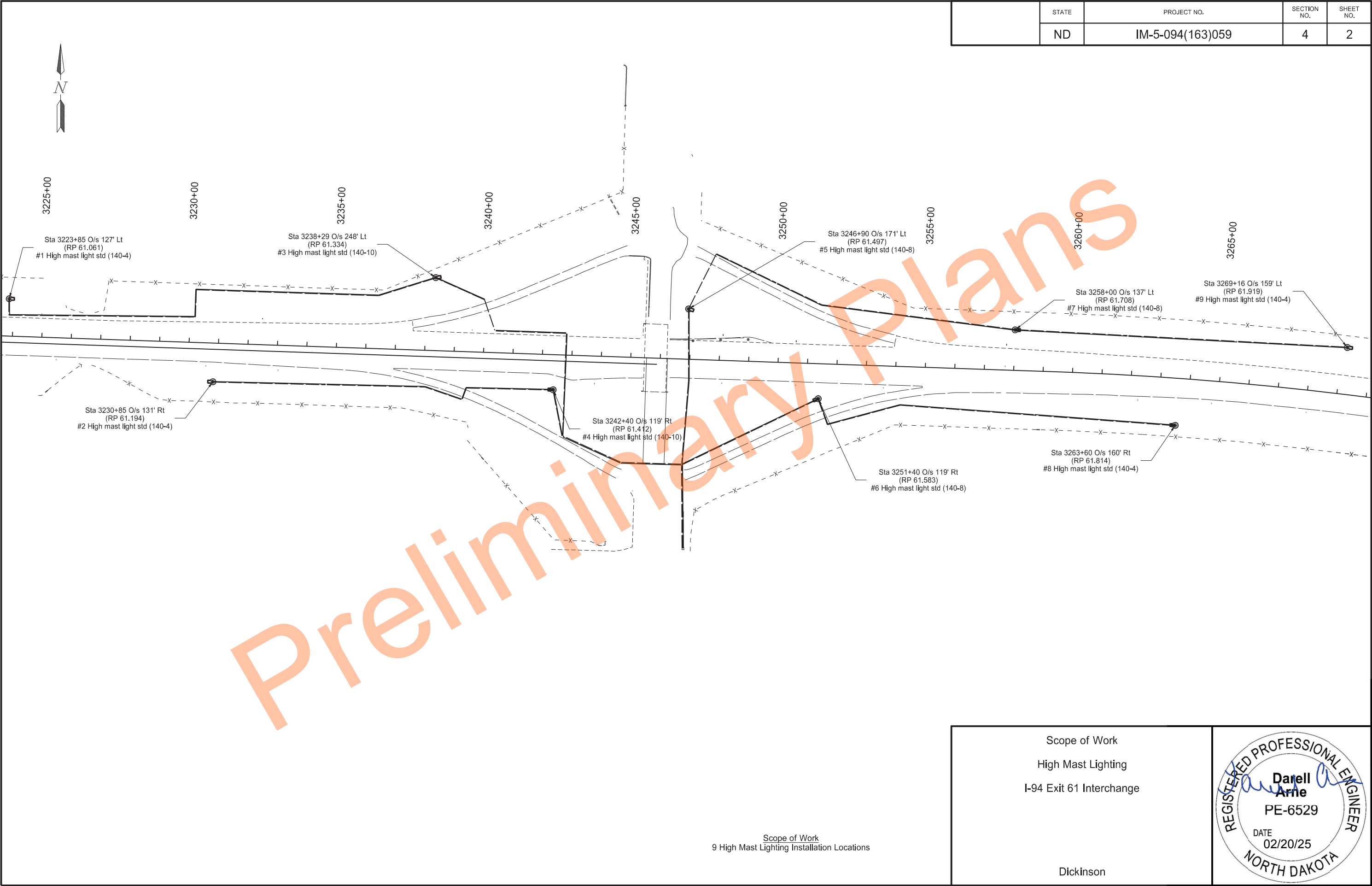


TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	IM-5-094(163)059	2	1
PLAN SECTIONS			LIST OF STANDARD DRAWINGS						
Section	Page(s)	Description	Number	Description					
1	1	Title Sheet	D-101-1, 2, 3, 4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1 - 2	Scope of Work	D-101-20, 21	Line Styles					
6	1	Notes	D-101-30, 31, 32, 33	Symbols					
6	1	Environmental Notes	D-101-40	Cross Section Legend					
8	1	Quantities	D-261-1	Erosion Control - Fiber Roll Placement Details					
10	1	Basis of Estimate	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
20	1	General Details	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
51	1	Allowable Pipe List	D-704-9	Construction Sign Details - Terminal And Guide Signs					
70	1 - 10	Contours	D-704-10	Construction Sign Details - Regulatory Signs					
75	1 - 11	Wetland Impacts	D-704-11	Construction Sign Details - Warning Signs					
77	1 - 10	Permanent Erosion Control	D-704-13	Barricade And Channelizing Device Details					
81	1 - 3	Survey Coordinate and Curve Data	D-704-14	Construction Sign Punching And Mounting Details					
82	1 - 4	Survey Data Layouts	D-704-24	Shoulder Closures And Bridge Painting Layouts					
100	1	Work Zone Traffic Control	D-704-50	Portable Sign Support Assembly					
140	1 - 13	Lighting	D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)					
200	1 - 70	Cross Sections	D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties					
			D-754-83	Object Markers - Culverts					
			D-770-2	Feed Points (Roadway Lighting)					
			D-770-8, 9	High Mast Lighting					
			D-770-10	High Mast Lighting Berm Details					
SPECIAL PROVISIONS									
Number	Description								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
PSP 49(24)	Permits and Environmental Considerations								
SP 364(24)	High Mast Lighting								
SP 365(24)	Drilled Shaft Foundations for High Mast Lights								
SP 452(24)	Hydraulic Mulch								
SP 461(24)	Utility Coordination								





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NOTES

SECTION 11

- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.
- 203-P01 BORROW – EXCAVATION: Include excavation in the price bid for “Borrow – Excavation”.

SECTION 77

- 251-P01 PERMANENT EROSION AND SEDIMENT CONTROL: Permanent erosion and sediment controls are detailed in section 77 of the plans and are expected to be placed immediately following completion of work in any area of the project as practicable. Stabilize each work area within 7 calendar days of completing the grading. Temporary erosion and sediment controls have not been provided due to the nature of the work. Any temporary erosion and sediment control measures required to be installed and maintained due to the contractor’s approach to the work will be at no additional cost to the Department.

SECTION 100

- 704-P01 TRAFFIC CONTROL: The traffic control devices list has been developed using the following standard drawing:
1. D-704-24, Type HH: Shoulder closed on freeway
- Traffic control quantities are based on two shoulder closure sites at a time. Shoulder closure sites consist of Exit 59 Westbound, Exit 59 Eastbound, Exit 61 Westbound and Exit 61 Eastbound. Use delineator drums, not barriers. Flagging is anticipated to be needed for a maximum of one site at a time. The traffic control devices have been based on the speed being reduced from 75mph to 45 mph.
- Take down portable signs when not working at a site for more than one day.

SECTION 140

- 770-P01 REMOVE LUMINAIRE: Remove the luminaire as shown in the plans.
- Deliver the luminaires to:
- City of Dickinson Public Works facility (phone # 701-456-7979)
3411 Public Works Boulevard
Dickinson, ND 58601
- Include all cost associated with removing, transporting, and unloading the luminaires in the item “Remove Light Standard”.

770-P02 REMOVE LIGHT STANDARD: Remove the light standards as shown in the plans. The light standards become property of the Contractor.



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

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

EN-2 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

Preliminary Plans



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
----	----	-----	----	-----	-----
103	0100	CONTRACT BOND	L SUM	1	1
201	0330	CLEARING & GRUBBING	L SUM	1	1
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	8	8
203	0109	TOPSOIL	CY	1,184	1,184
203	0140	BORROW-EXCAVATION	CY	1,772	1,772
216	0100	WATER	M GAL	18	18
251	0200	SEEDING CLASS II	ACRE	1.47	1.47
253	0201	HYDRAULIC MULCH	ACRE	1.47	1.47
261	0112	FIBER ROLLS 12IN	LF	1,873	1,873
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	100	100
704	1000	TRAFFIC CONTROL SIGNS	UNIT	984	984
704	1060	DELINEATOR DRUMS	EA	134	134
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	10	10
714	0615	PIPE CONC REINF 24IN CL III	LF	8	8
714	9659	REMOVE & RELAY PIPE-ALL TYPES & SIZES	LF	6	6
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	1	1
754	0805	OBJECT MARKERS - CULVERTS	EA	1	1
770	0030	CONCRETE FOUNDATION-HIGH MAST LIGHTING	EA	19	19
770	0060	CONCRETE FOUNDATION-FEED POINT-TYPE B	EA	2	2
770	0100	PULL BOX	EA	32	32
770	0330	2IN DIAMETER RIGID CONDUIT	LF	18,967	18,967
770	0503	UNDERGROUND CONDUCTOR NO2-TYPE RHW	LF	22,989	22,989
770	0504	UNDERGROUND CONDUCTOR NO4-TYPE RHW	LF	24,786	24,786
770	0505	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	15,051	15,051
770	0605	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	20,942	20,942
770	0745	FEED POINT-TYPE IV-PAD MOUNTED	EA	2	2
770	3733	HIGH MAST LIGHTING ASSEMBLY TYPE HM-140-4	EA	10	10
770	3736	HIGH MAST LIGHTING ASSEMBLY TYPE HM-140-8	EA	7	7
770	3739	HIGH MAST LIGHTING ASSEMBLY TYPE HM-140-10	EA	2	2
770	4280	LED LUMINAIRE - HIGH MAST	EA	116	116
770	4560	REMOVE LIGHT STANDARD	EA	35	35

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	10	1

SPEC	CODE	BID ITEM	QTY	UNIT
Use or Location		Rate or Station		
201	0330	CLEARING & GRUBBING		
		Exit 59 - High Mast Light 3	1	L SUM
216	0100	WATER		
Embankment		10 Gal/CY	18	MGAL
770	0030	CONCRETE FOUNDATION-HIGH MAST LIGHTING		
*** Concrete for service slab		1.2 CY / LOCATION = 22.8 CY TOTAL		
*** Aggregate CI 5 for service slab		1.875 TONS / CY, 1.2 CY / LOCATION = 42.8 TONS TOTAL		

*** Include the cost for this work in the unit price bid for the corresponding Spec & Code

Earthwork Summary			
Location	Topsoil (Pay Item)	Embankment *	Borrow Excavation (Pay Item)
	CY	CY	CY
	A	B	C
Exit 59			
High Mast Light 1	61	78	78
High Mast Light 2	42	38	38
High Mast Light 3	69	97	97
High Mast Light 4	46	59	59
High Mast Light 5	50	58	58
High Mast Light 6	55	68	68
High Mast Light 7	62	79	79
High Mast Light 8	51	65	65
High Mast Light 9	54	69	69
High Mast Light 10	120	196	196
Subtotal Exit 59	610	807	807
Exit 61			
High Mast Light 1	44	54	54
High Mast Light 2	50	68	68
High Mast Light 3	76	112	112
High Mast Light 4	57	72	72
High Mast Light 5	114	355	355
High Mast Light 6	58	59	59
High Mast Light 7	39	42	42
High Mast Light 8	62	88	88
High Mast Light 9	74	115	115
Subtotal Exit 61	574	965	965
Total	1,184	1,772	1,772

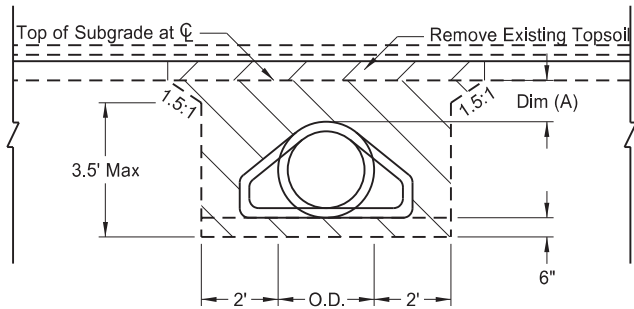
* 25% volume was added to embankment volume to allow for shrinkage

Basis of Estimate

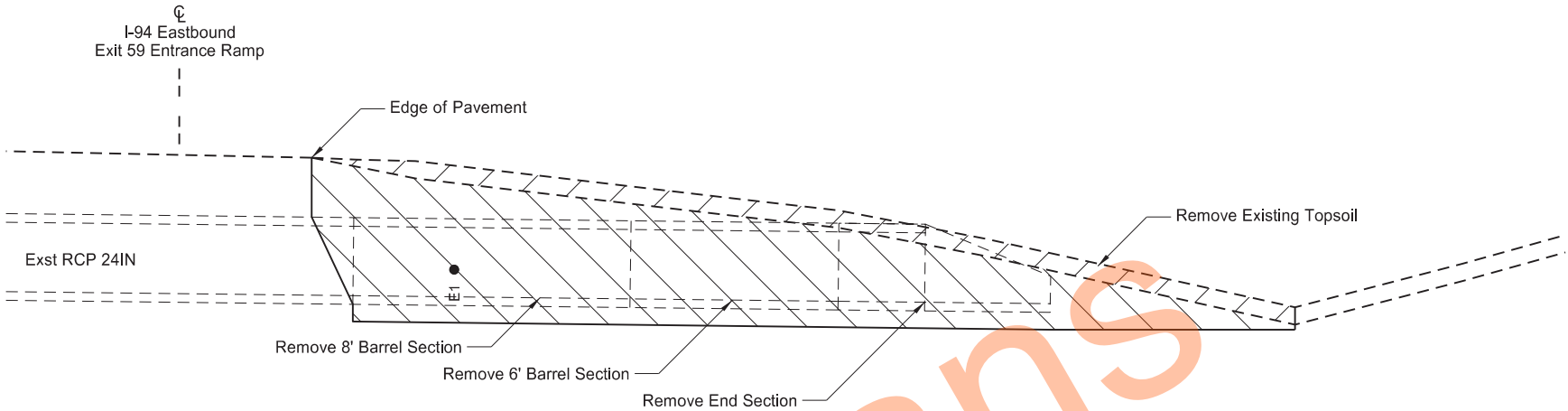
High Mast Lights
I-94



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	20	1



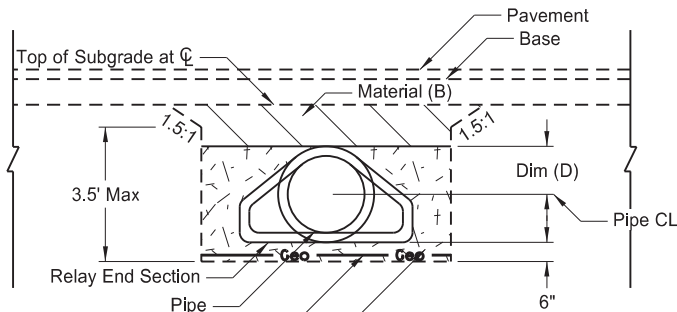
Removal Detail
Side View



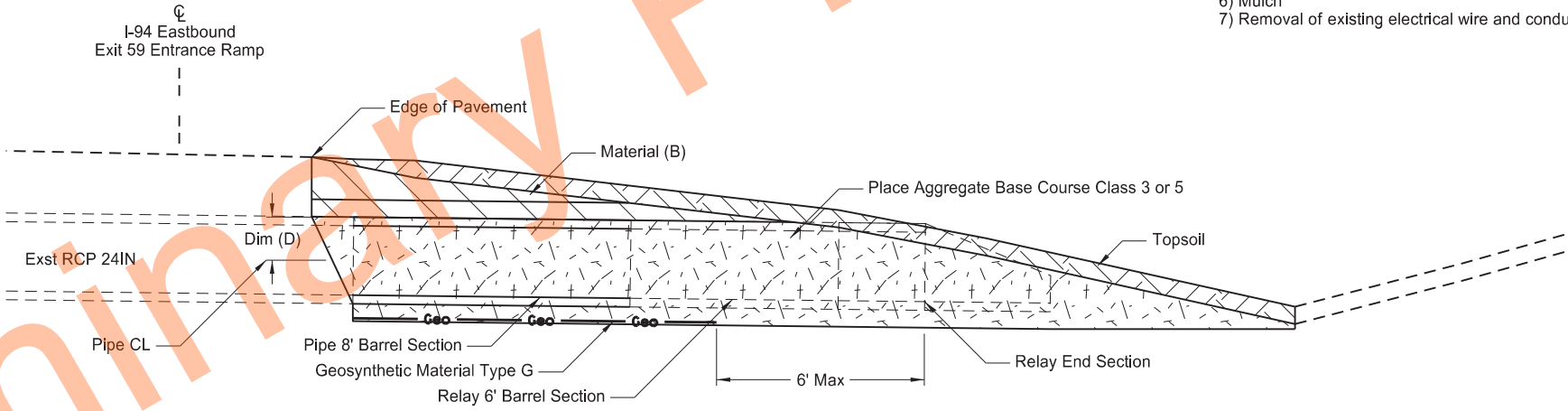
Removal Section
Cross Section View

- Pay Items
- 1) Removal of Pipe
 - 2) Pipe*
 - 3) Remove & Relay Pipe
 - 4) Remove & Relay End Section

- *Included in Pipe Pay Item
- 1) Pipe
 - 2) Aggregate Base Course Class 3 or 5
 - 3) Embankment
 - 4) Topsoil
 - 5) Seeding
 - 6) Mulch
 - 7) Removal of existing electrical wire and conduit



Backfill Detail
Side View (Topsoil not shown)



Proposed Section
Cross Section View

SPEC	CODE	BID ITEM	QTY	UNIT
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
(Chain: EX94) Sta 3151+59 - 81' Rt to Sta 3151+59 - 89' Rt			8	LF
709	0100	GEOSYNTHETIC MATERIAL TYPE G		
(Chain: EX94) Sta 3151+59 - 81' Rt to Sta 3151+59 - 95' Rt			10	SY
714	0615	PIPE CONC REINF 24IN CL III		
(Chain: EX94) Sta 3151+59 - 81' Rt to Sta 3151+59 - 89' Rt			8	LF
714	9659	REMOVE & RELAY PIPE-ALL TYPES & SIZES		
(Chain: EX94) Sta 3151+59 - 89' Rt to Sta 3151+59 - 95' Rt			6	LF
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES		
(Chain: EX94) Sta 3151+59 - 95' Rt			1	EA
754	0805	OBJECT MARKERS - CULVERTS		
(Chain: EX94) Sta 3151+59 - 95' Rt			1	EA

Pipe Materials	Dim (A) ≤ 4 Feet	Backfill Dimension
	Material (B)	Dim (D)
Concrete	Embank or Aggr	0.5 O.D.

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

Mainline Centerline Pipe Repair Detail
RP 59.72

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill
				In	Bid Item	LF							Begin	End	
								In	Type		In	SY	EA	EA	
3151+59	81' Rt	3151+59	89' Rt	24	PIPE CONC REINF CL III	8	Reinforced Concrete Pipe - Class III (barrel length = 8 LF)	24				6			Section 20 Sheet 1
3151+59	89' Rt	3151+59	95' Rt	24	REMOVE & RELAY PIPE (Extension)	6	Reinforced Concrete Pipe - Class III (barrel length = 6 LF)	24				4		Remove & Relay	Section 20 Sheet 1

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

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

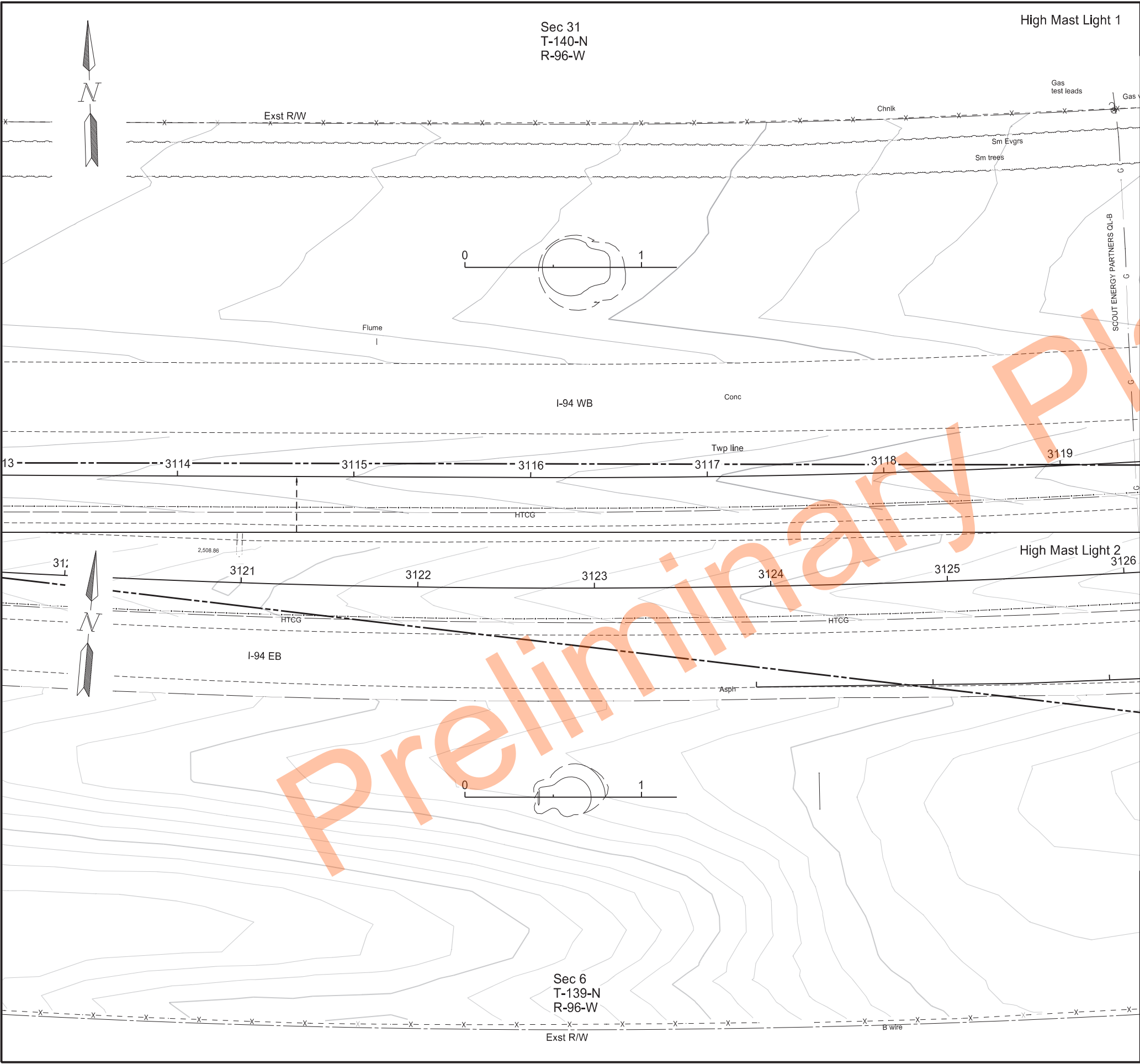
Spiral Ribs: 3/4 = 3/4"x3/4"@7-1/2"
1 = 3/4"x1"@11-1/2"

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

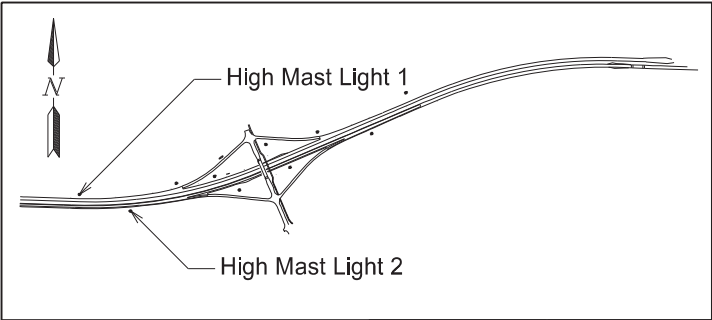
Allowable Pipe List

High Mast Lights
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	ND	IM-5-094(163)059	70	1



Contour Layout
High Mast 1 & 2
Exit 59

High Mast Lights
I-94

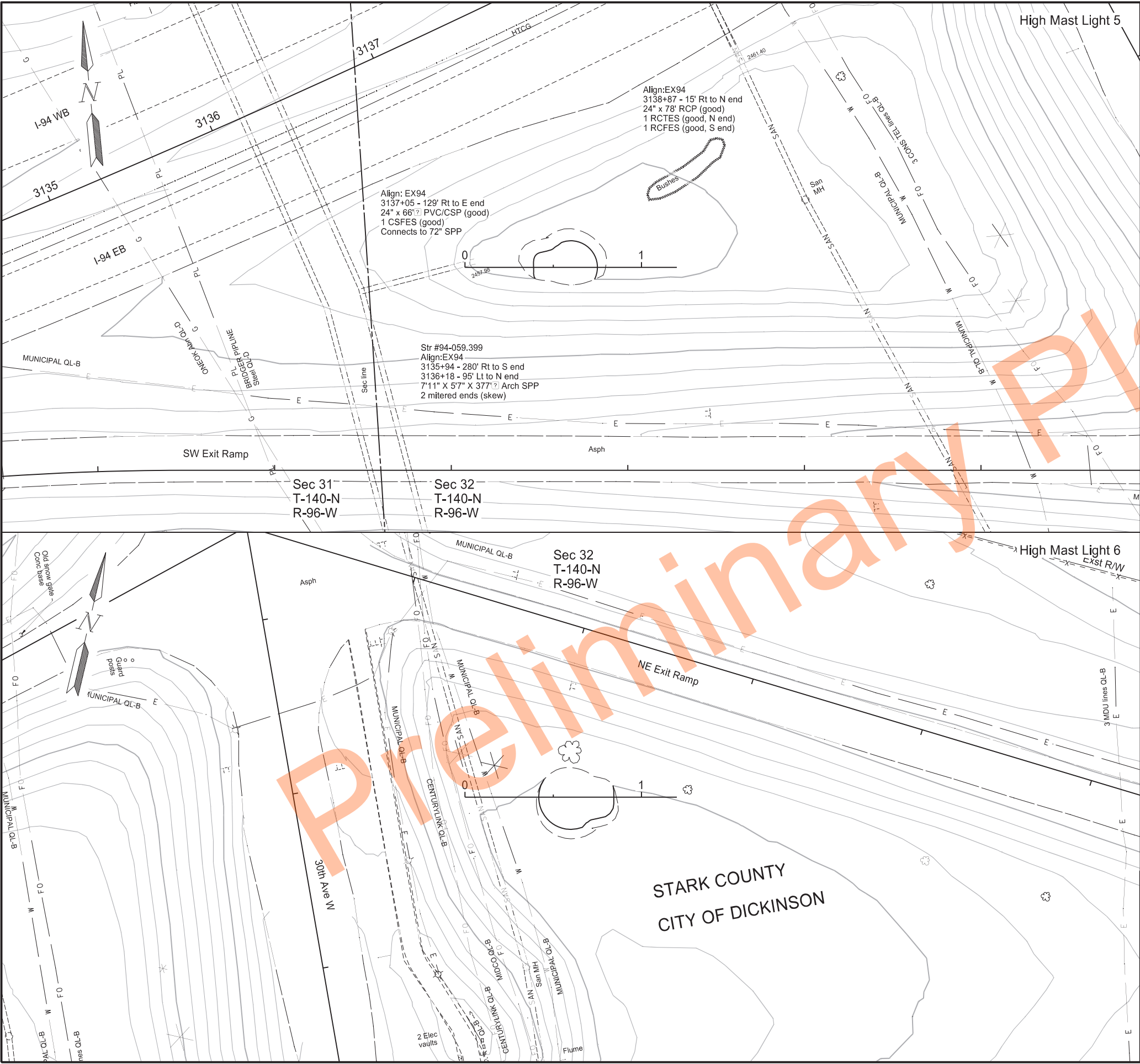


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	ND	IM-5-094(163)059	70	2

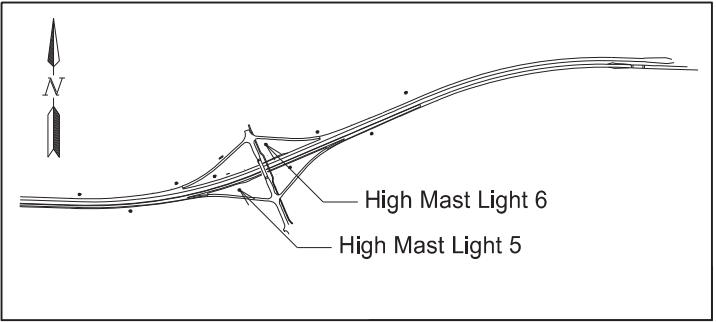
Plans

Contour Layout
High Mast 3 & 4
Exit 59

High Mast Lights
I-94



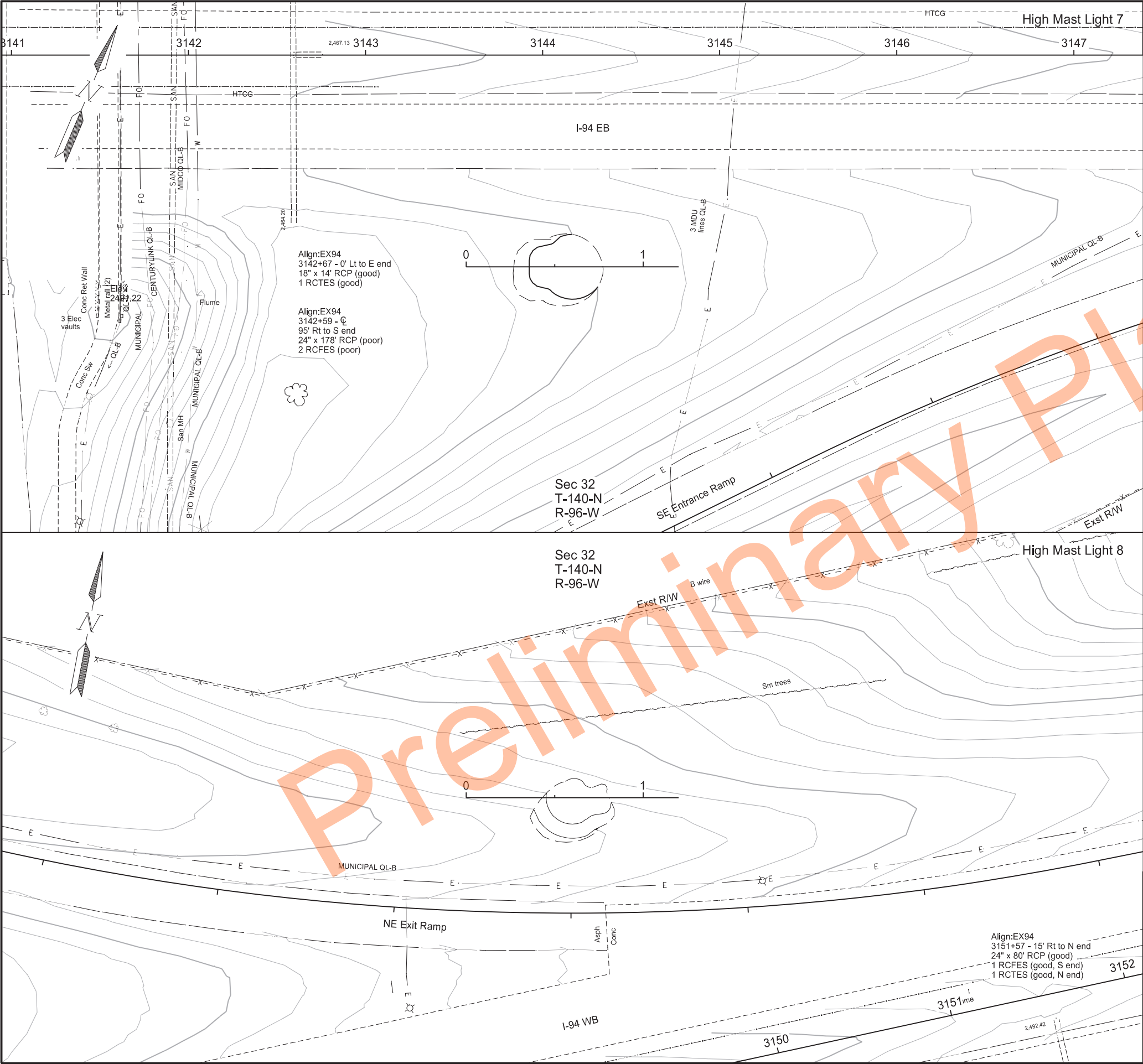
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	ND	IM-5-094(163)059	70	3



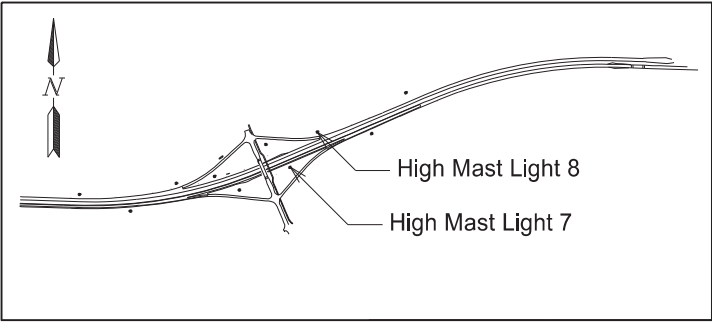
Contour Layout
High Mast 5 & 6
Exit 59

High Mast Lights
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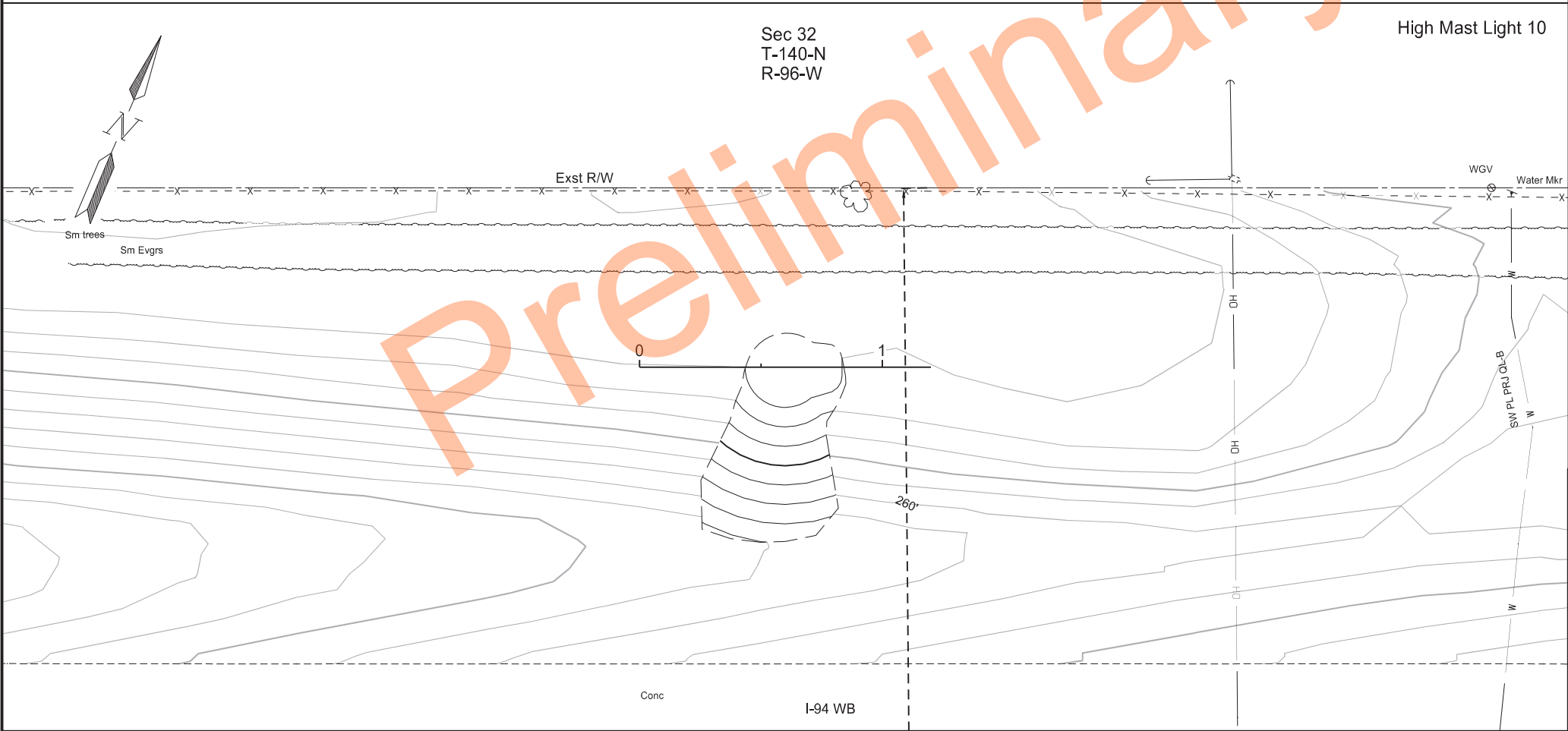
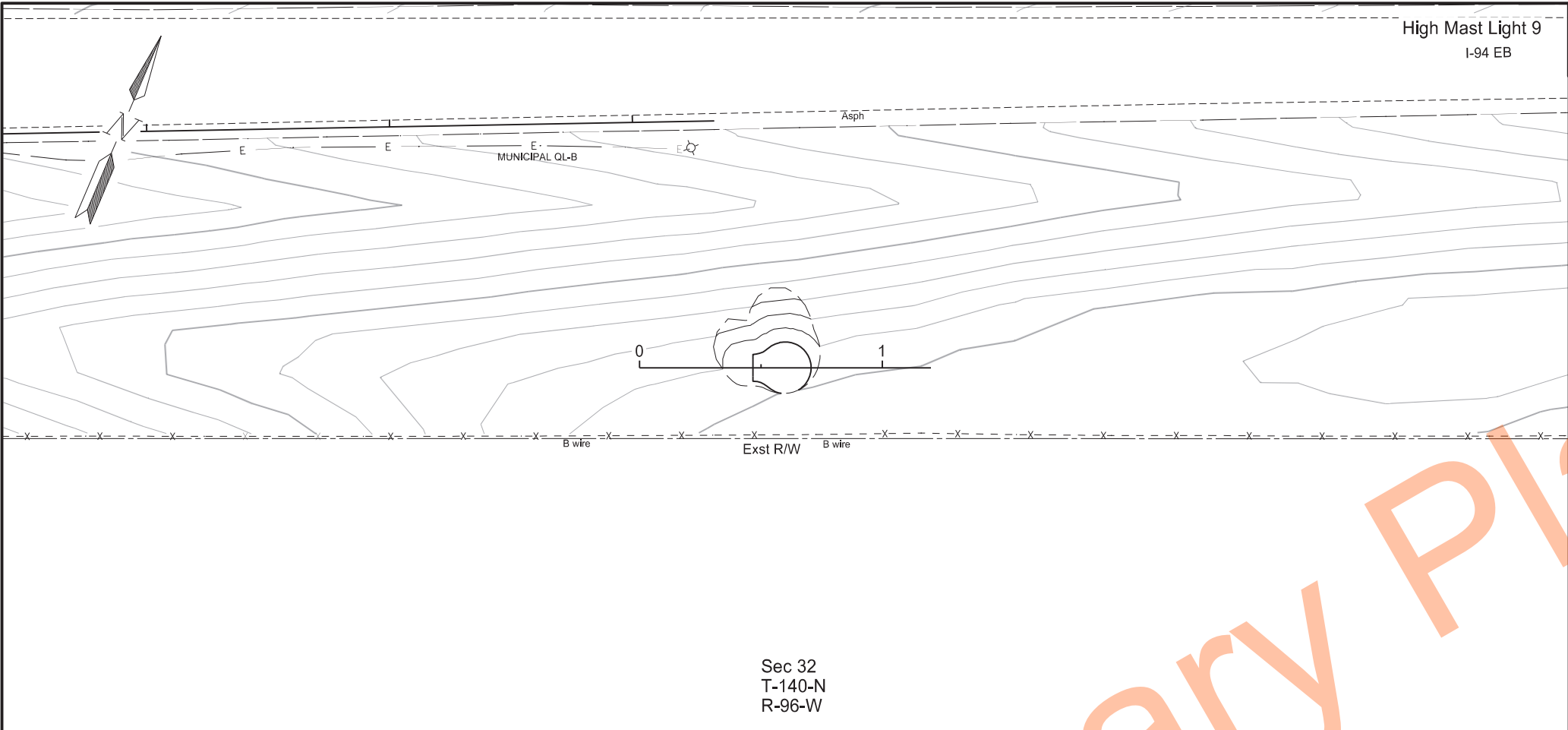
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	70	4



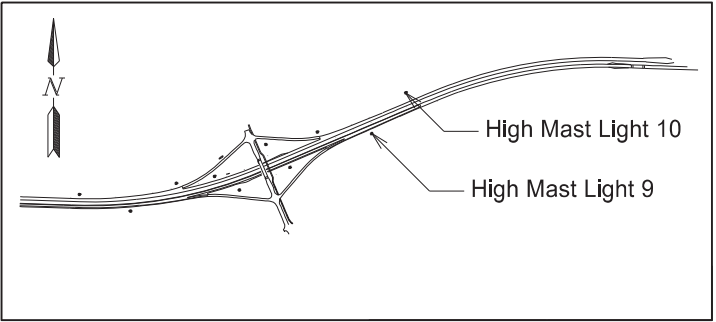
Contour Layout
High Mast 7 & 8
Exit 59

High Mast Lights
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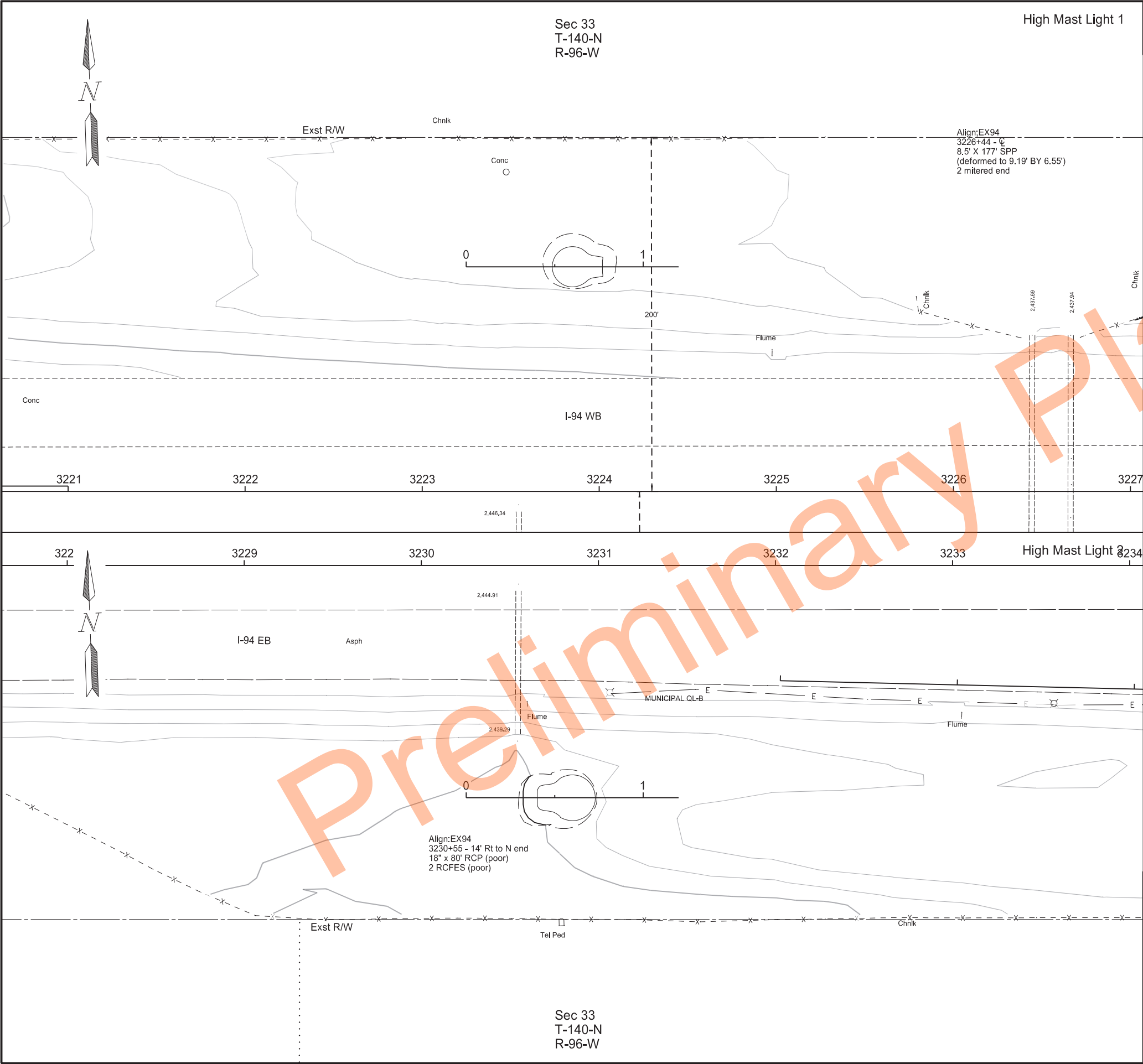
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	ND	IM-5-094(163)059	70	5



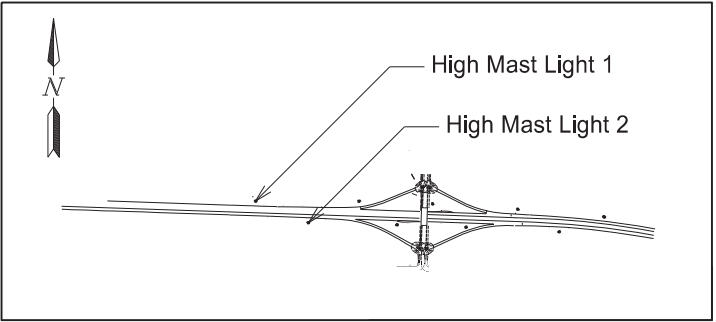
Contour Layout
High Mast 9 & 10
Exit 59

High Mast Lights
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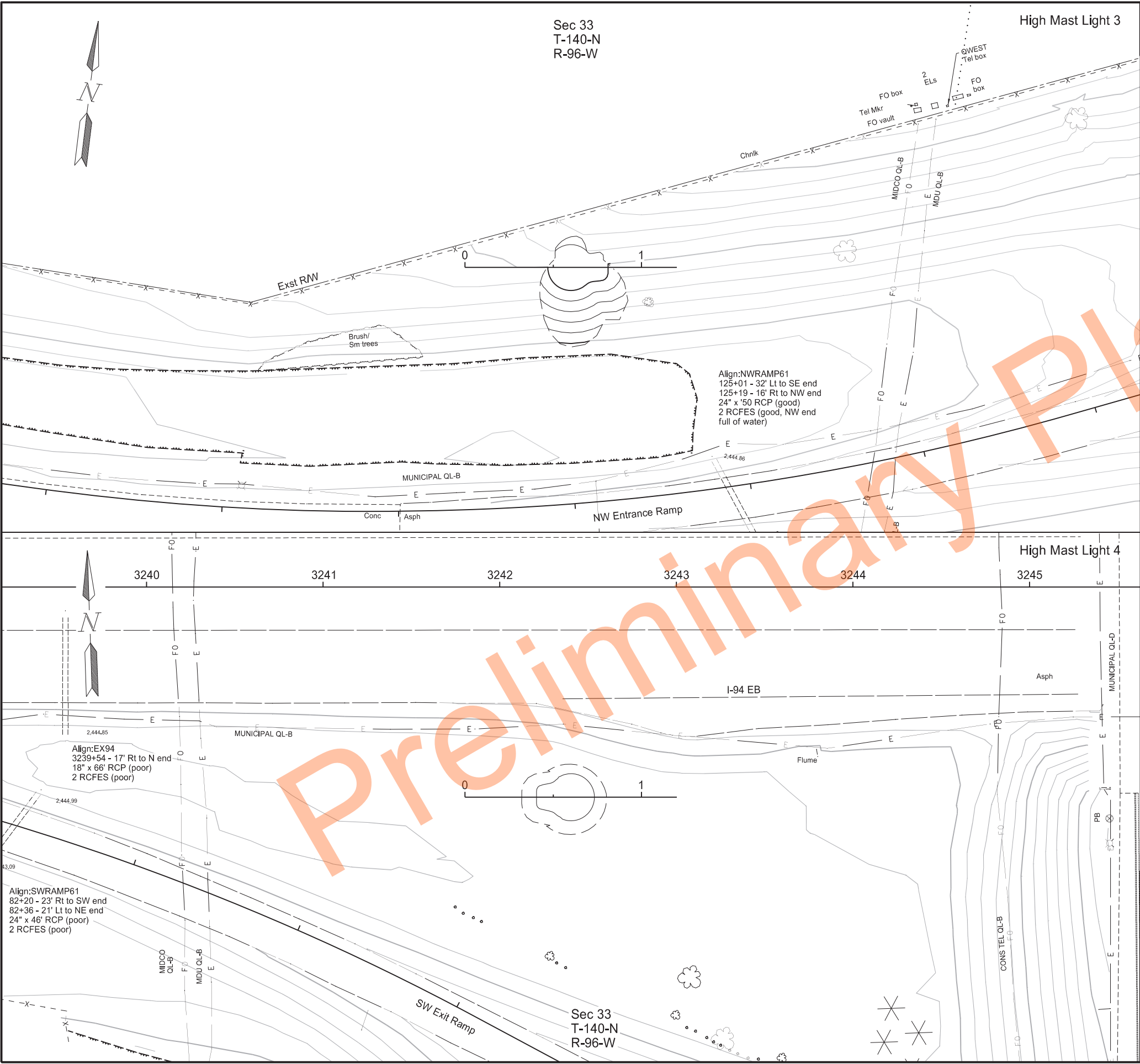
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ND	IM-5-094(163)059	70	6



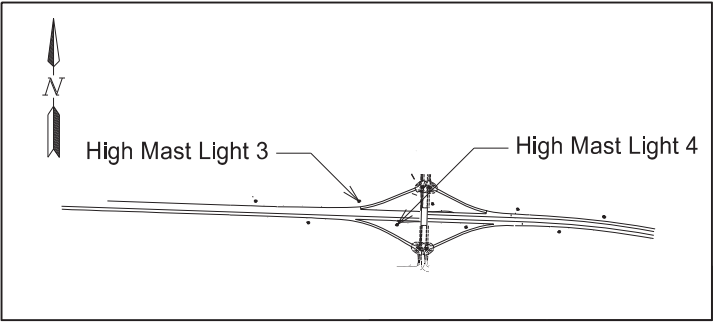
Contour Layout
High Mast 1 & 2
Exit 61

High Mast Lights
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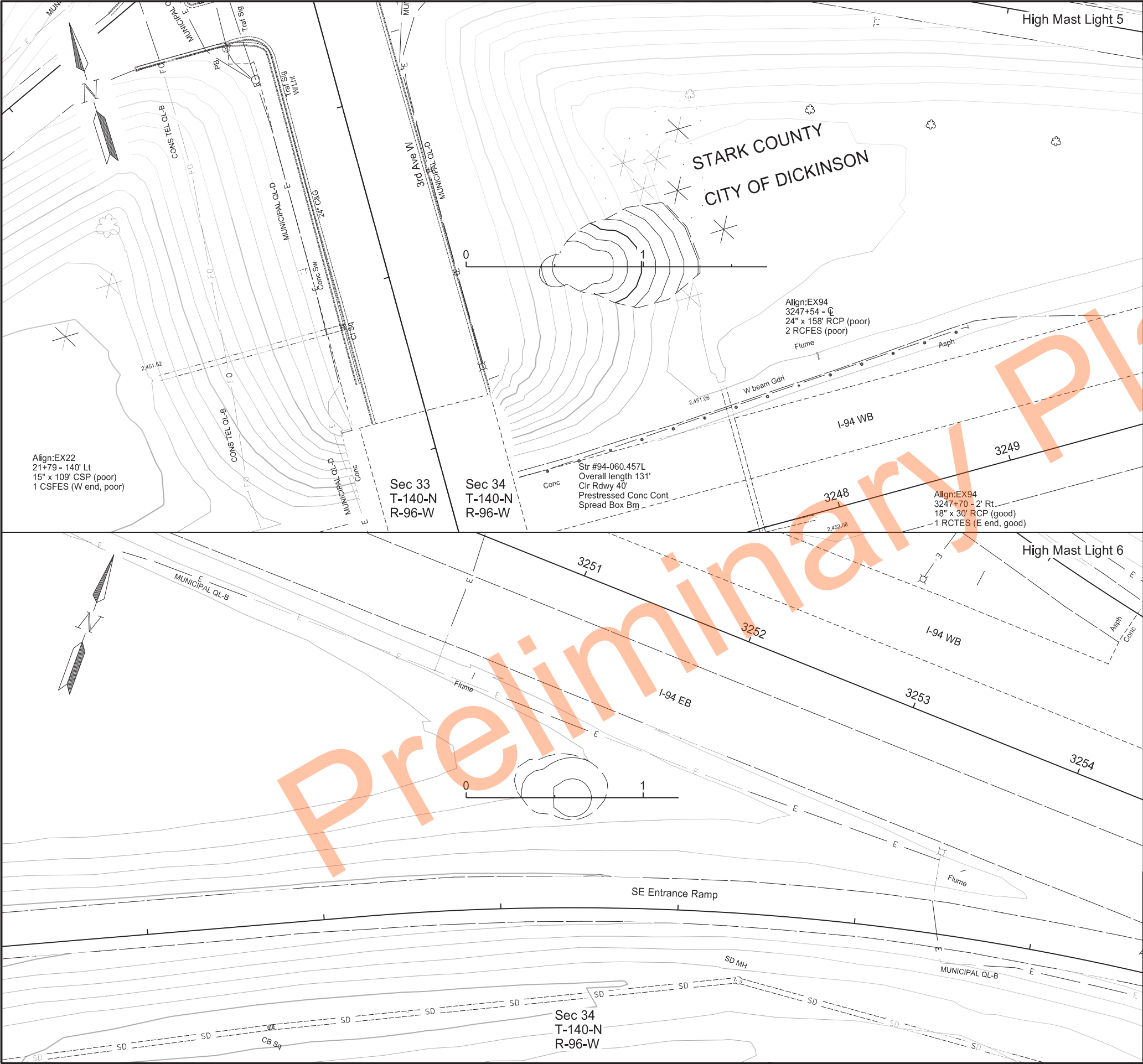
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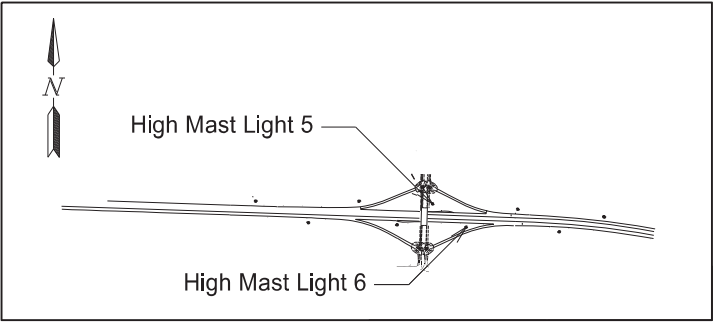
Contour Layout
High Mast 3 & 4
Exit 61

High Mast Lights
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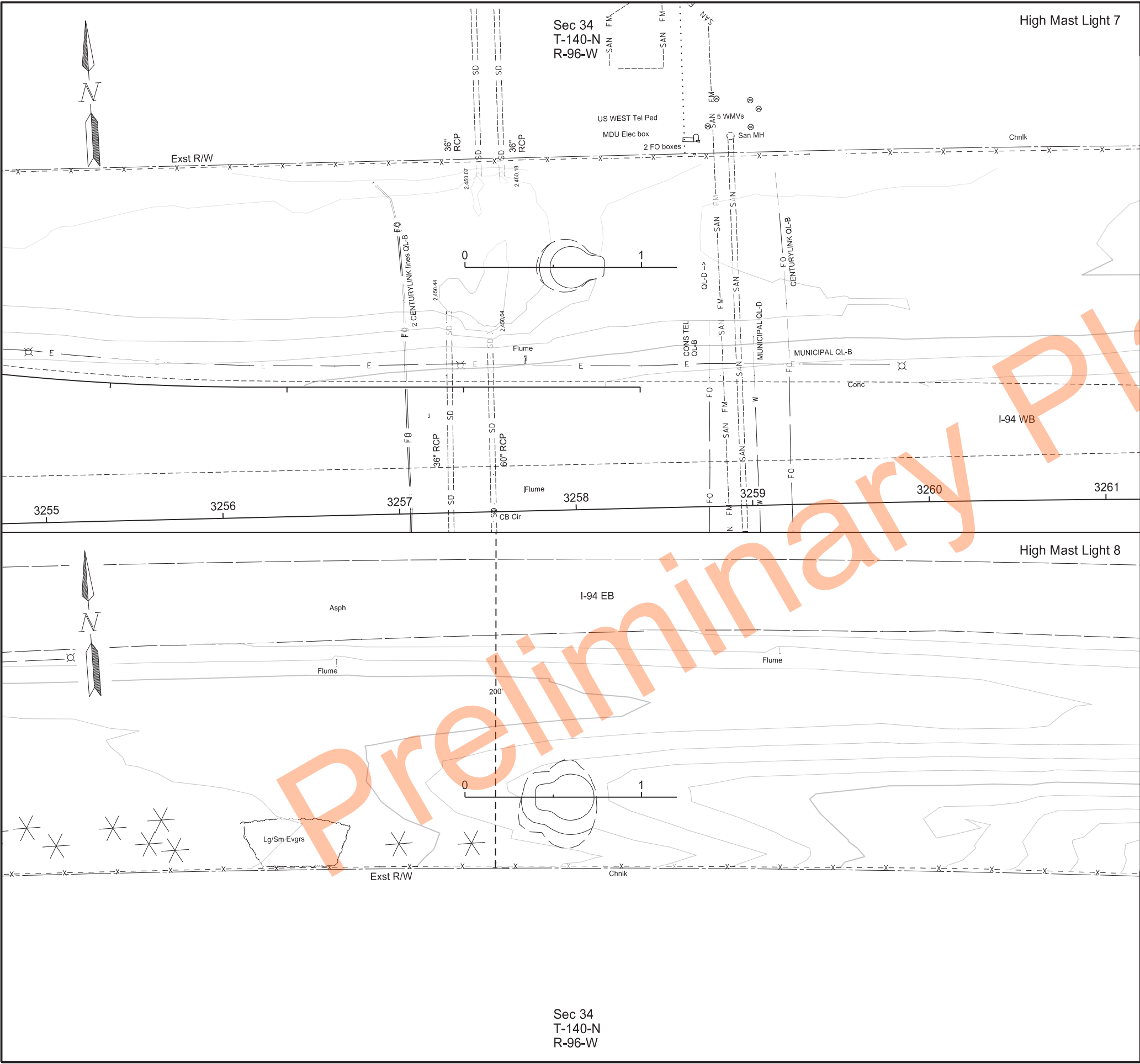
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	70	8



Contour Layout
High Mast 5 & 6
Exit 61

High Mast Lights
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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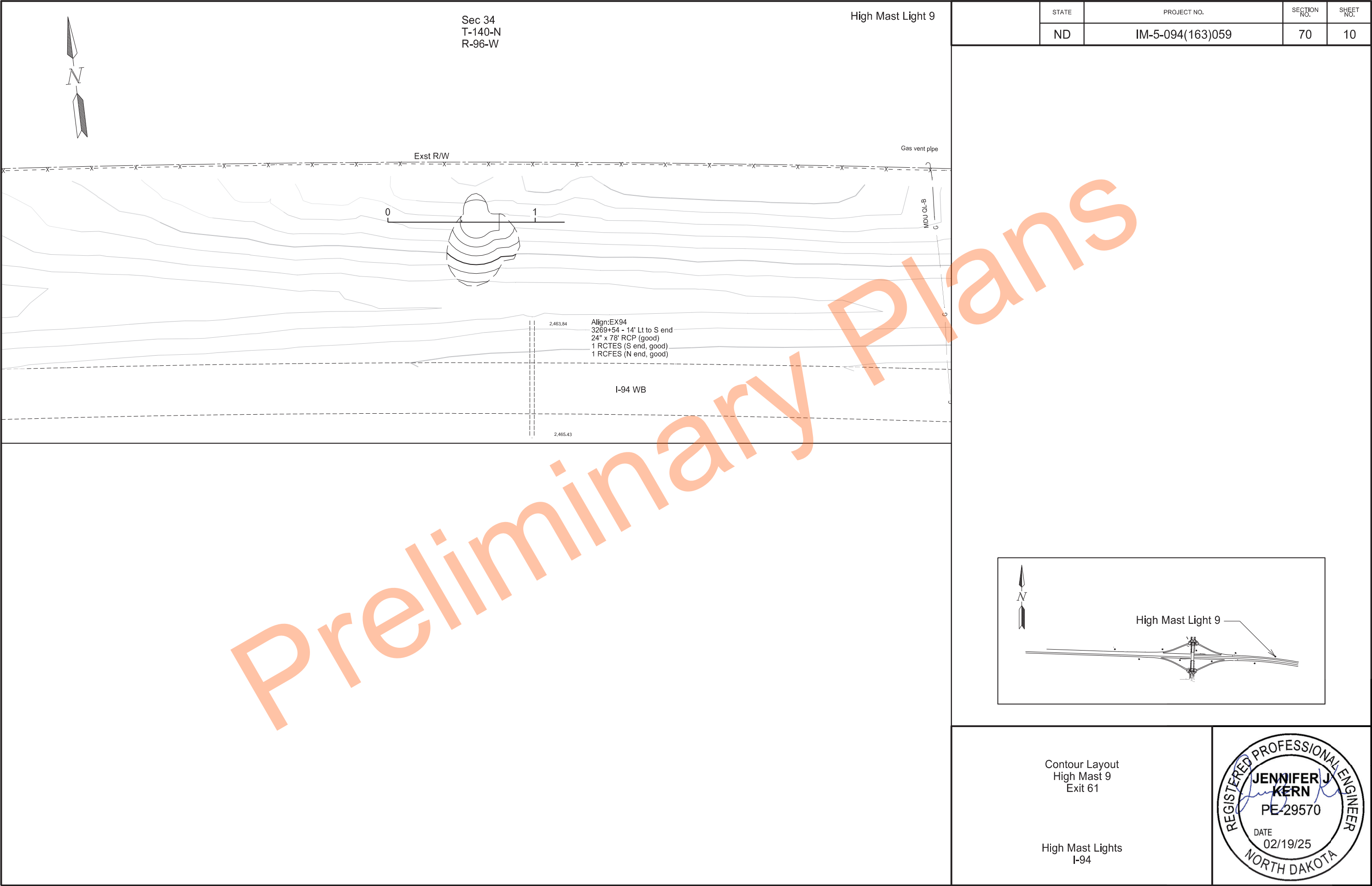
High Mast Light 8
High Mast Light 7

High Mast Light 8
High Mast Light 7

Contour Layout
High Mast 7 & 8
Exit 61

High Mast Lights
I-94

REGISTERED PROFESSIONAL ENGINEER
JENNIFER J. KERN
PE-29570
DATE 02/19/25
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	75	1

Wetland Impact Table									
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands'	Wetland Impact			Wetland Mitigation	
					Wetland Impacts Acre(s)			Mitigation Proposed	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE
1	Sec 31, T-140-N, R-96-W	Ditch	Created	N				N	N
2a	Sec 31, T-140-N, R-96-W	Linear	Natural	Y				N	N
2b	Sec 31, T-140-N, R-96-W	Linear	Natural	Y	0.005	0.000	0.000	N	N
2c	Sec 31 & 32, T-140-N, R-96-W	Linear	Natural	Y				N	N
2d	Sec 31 & 32, T-140-N, R-96-W	Ditch	Created	N				N	N
2e	Sec 31 & 32, T-140-N, R-96-W	Ditch	Created	Y	0.041	0.000	0.000	N	N
5	Sec 32, T-140-N, R-96-W	Ditch	Created	N				N	N
7a	Sec 33, T-140-N, R-96-W	Ditch	Created	N				N	N
7b	Sec 33, T-140-N, R-96-W	Ditch	Created	N				N	N
8a	Sec 33, T-140-N, R-96-W	Ditch	Created	Y				N	N
8b	Sec 33, T-140-N, R-96-W	Ditch	Created	Y				N	N
8d	Sec 33, T-140-N, R-96-W	Ditch	Created	Y	0.037	0.002	0.000	N	N
8e	Sec 33, T-140-N, R-96-W	Ditch	Created	N				N	N
8f	Sec 33, T-140-N, R-96-W	Ditch	Created	Y				N	N
8i	Sec 33, T-140-N, R-96-W	Ditch	Created	Y	0.002	0.000	0.000	N	N
9a	Sec 34, T-140-N, R-96-W	Ditch	Created	Y	0.009	0.000	0.000	N	N
9b	Sec 34, T-140-N, R-96-W	Basin	Natural	Y	0.017	0.000	0.000	N	N
10	Sec 34, T-140-N, R-96-W	Ditch	Created	N				N	N
11a	Sec 34, T-140-N, R-96-W	Ditch	Created	N	0.005	0.000	0.000	N	N
11b	Sec 34, T-140-N, R-96-W	Ditch	Created	N				N	N
12	Sec 34, T-140-N, R-96-W	Ditch	Created	N				N	N
Totals					0.116	0.002	0.000		

Other Waters and Streams Impact Table														
Number	Location	Type	Feature	USACE Jurisdictional	Impacts to Other Waters						Other Water Mitigation			
					Acres			Linear Feet			Mitlgation Proposed		USACE Mitlgation Bank	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	Location; Ratio	Acre(s)
OW 8c	Sec 33, T-140-N, R-96-W	Stream	Natural	Y	0.020	0.018	0.000				Y	N	Anderson Bank; 1:1	0.018
OW 8g	Sec 33, T-140-N, R-96-W	Stream	Natural	Y	0.020	0.014	0.000				Y	N	Anderson Bank; 1:1	0.014
OW 8h	Sec 33, T-140-N, R-96-W	Stream	Natural	Y							N	N		
Totals					0.040	0.032	0.000	0.000	0.000	0.000				0.032

A wetland Jurisdictional Determination was issued by the USACE on 12/01/2023; NWO-2006-60522-BIS.
OW permanent impacts treated as wetland for mitigation

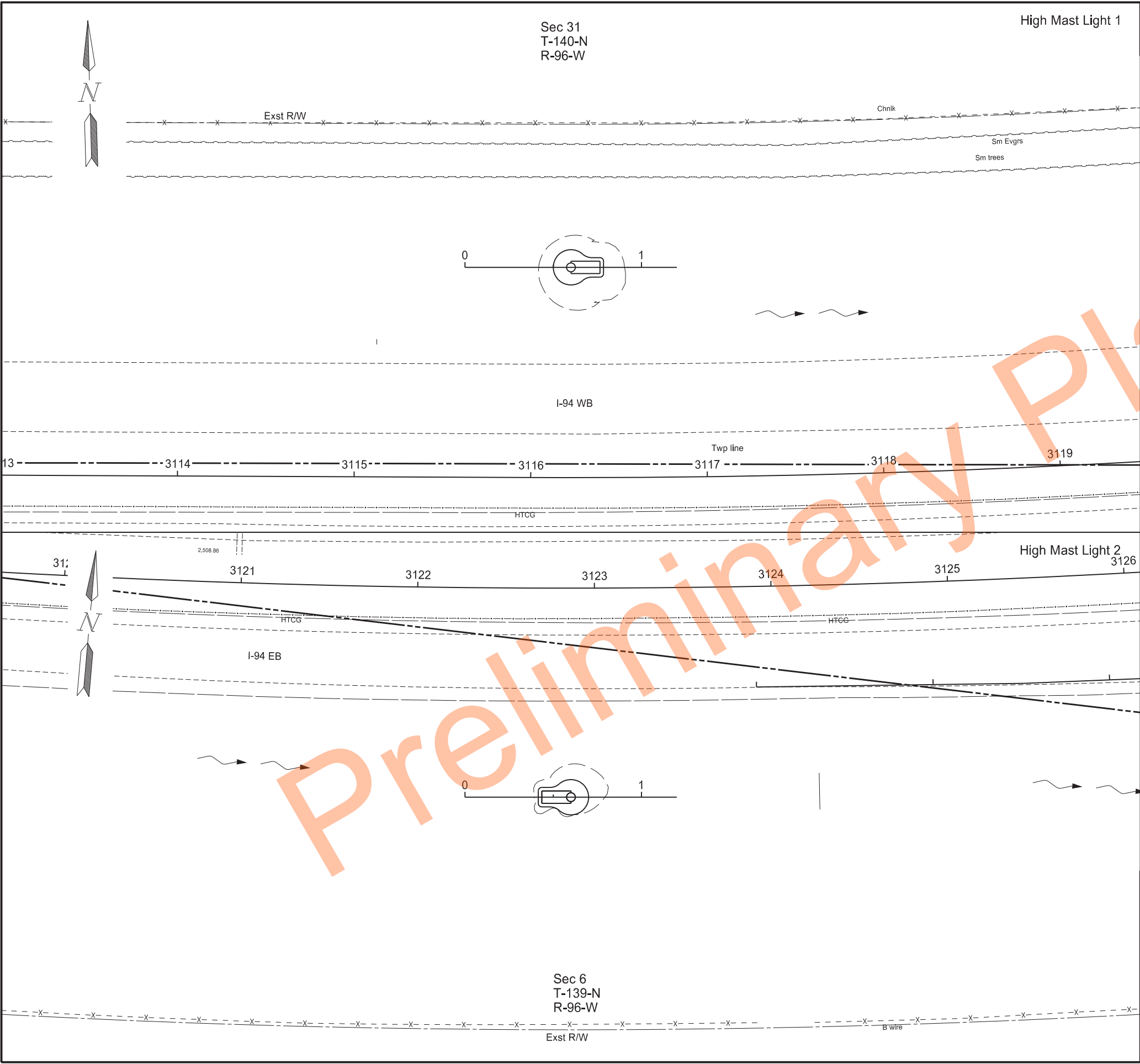
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	Water Type	Total Acre(s)
Natural/JD (Fill/Drain)	0.000	Temporary Wetland JD	0.111
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.005
Artificial/JD (Fill/Drain)	0.002		
Artificial /Non-JD (Fill/Drain))	0.000	Permanent OW	0.032
Total	0.002	Temporary OW	0.040

Mitigation Summary Table			
	Location	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)
USACE Only			
EO 11990 Only	Anderson Bank	0.032	
Total		0.032	0.000

Wetland Impacts

Hlgh Mast Lights
I-94

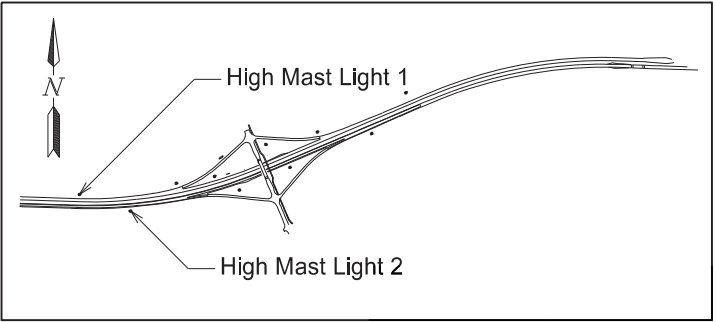




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	75	2

Legend

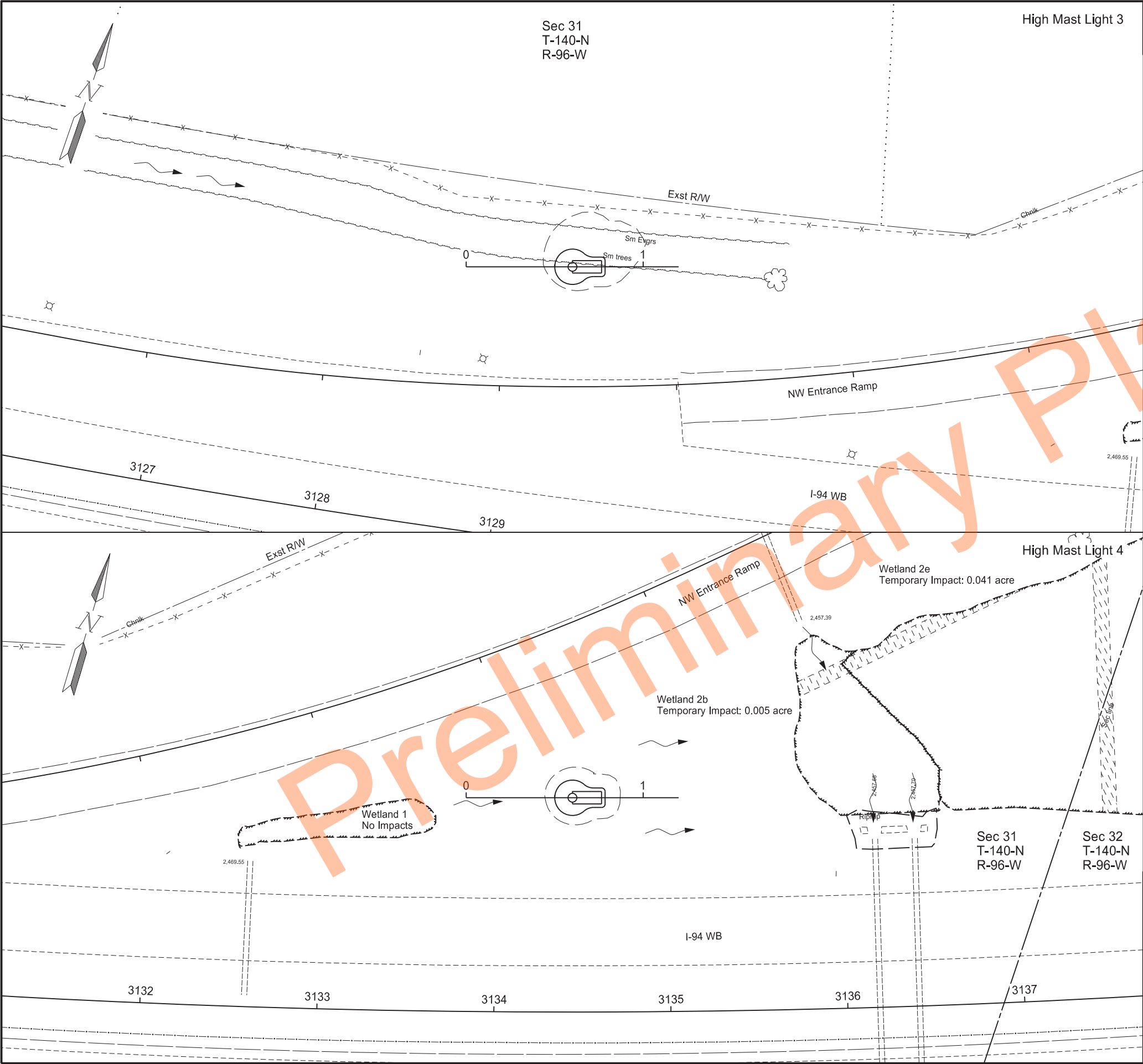
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland



Wetland Impacts
High Mast 1 & 2
Exit 59

High Mast Lights
I-94



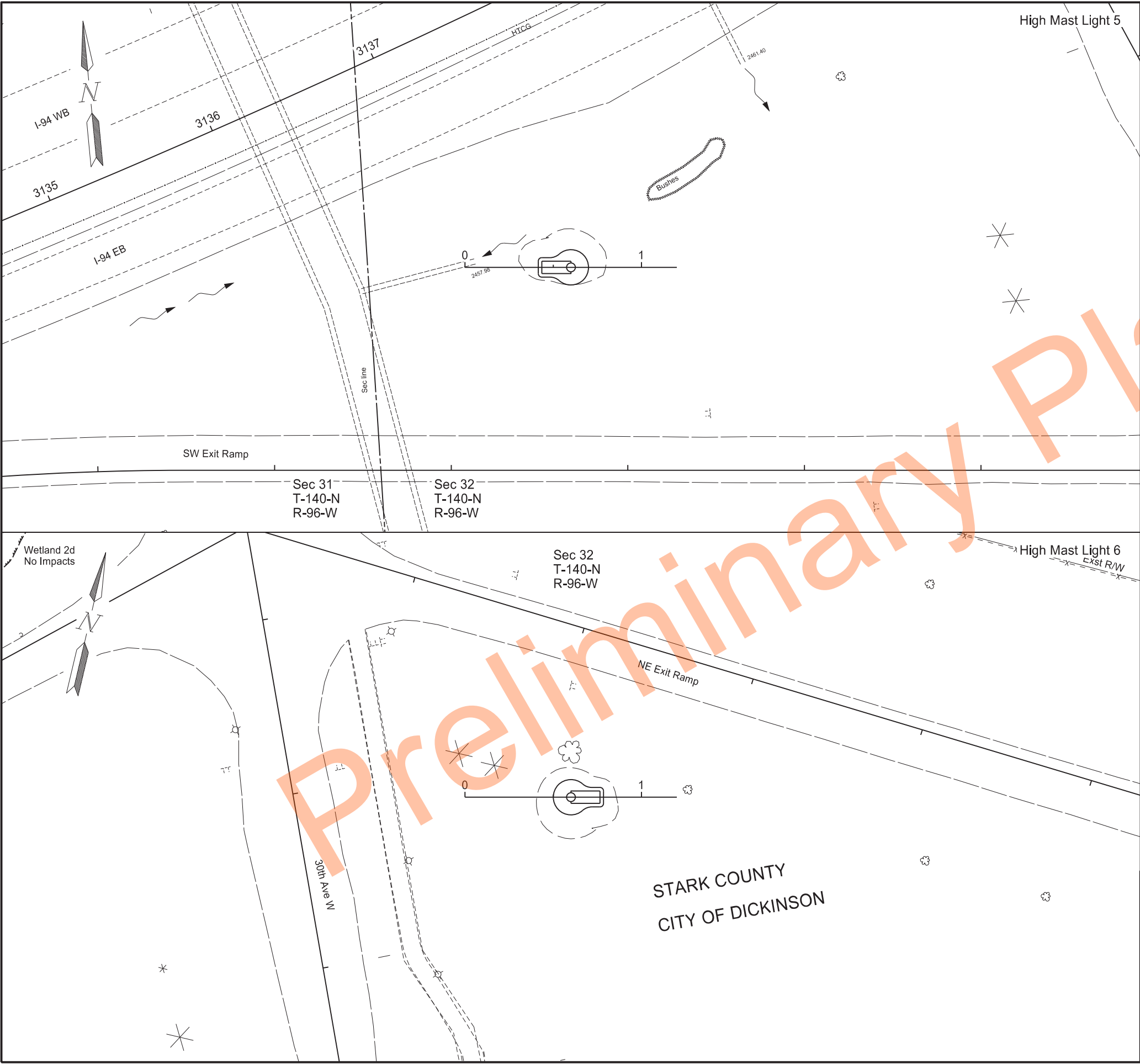


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	75	3

Wetland Impacts
High Mast 3 & 4
Exit 59

High Mast Lights
I-94

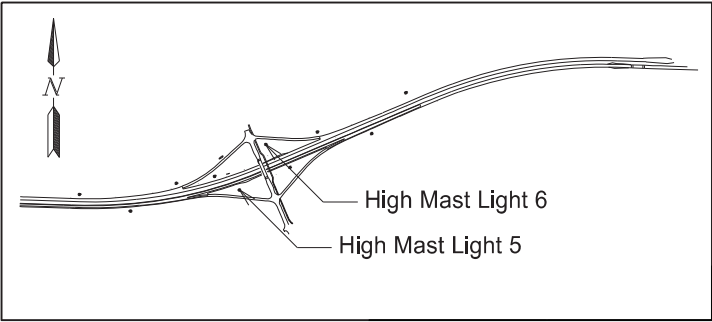
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	75	4

Legend

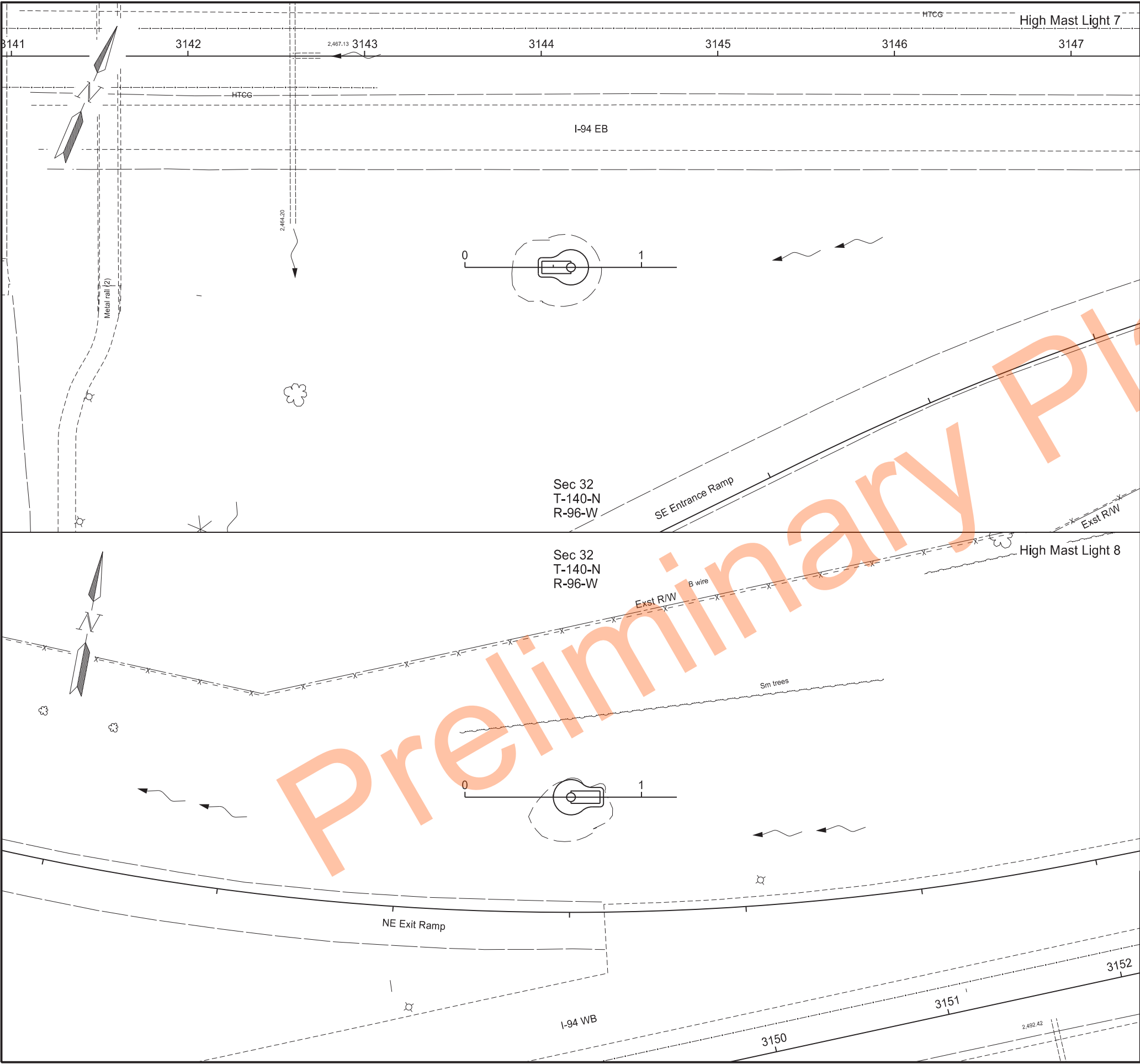
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland



Wetland Impacts
High Mast 5 & 6
Exit 59

High Mast Lights
I-94

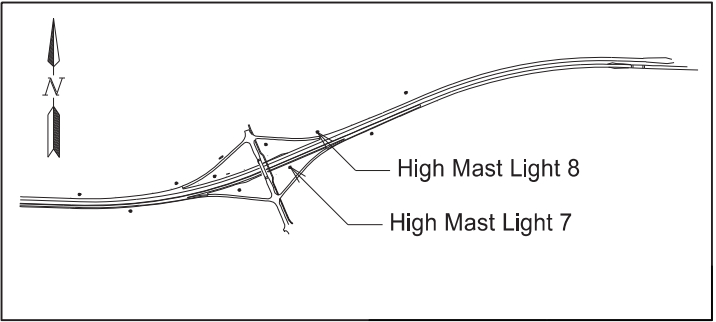




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	75	5

Legend

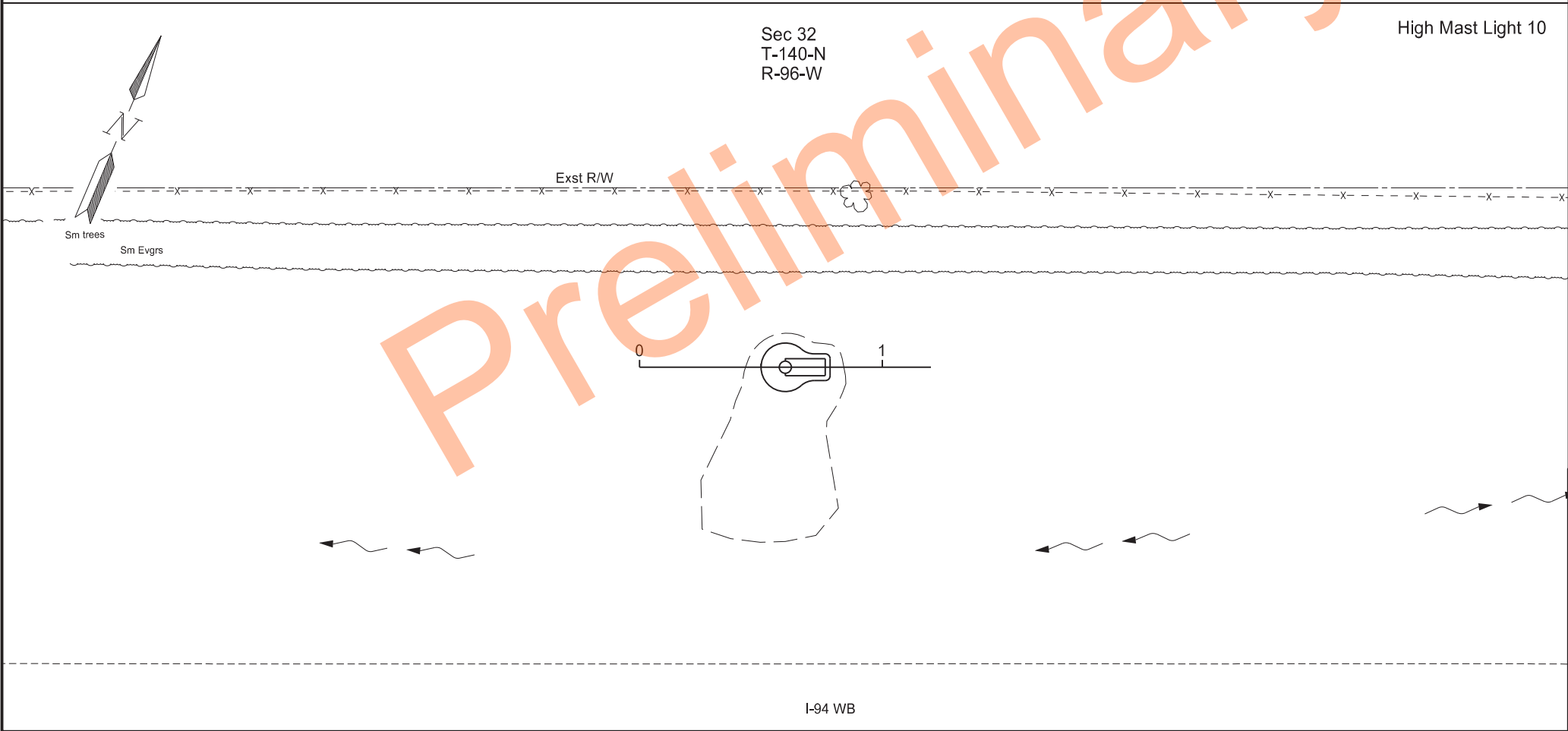
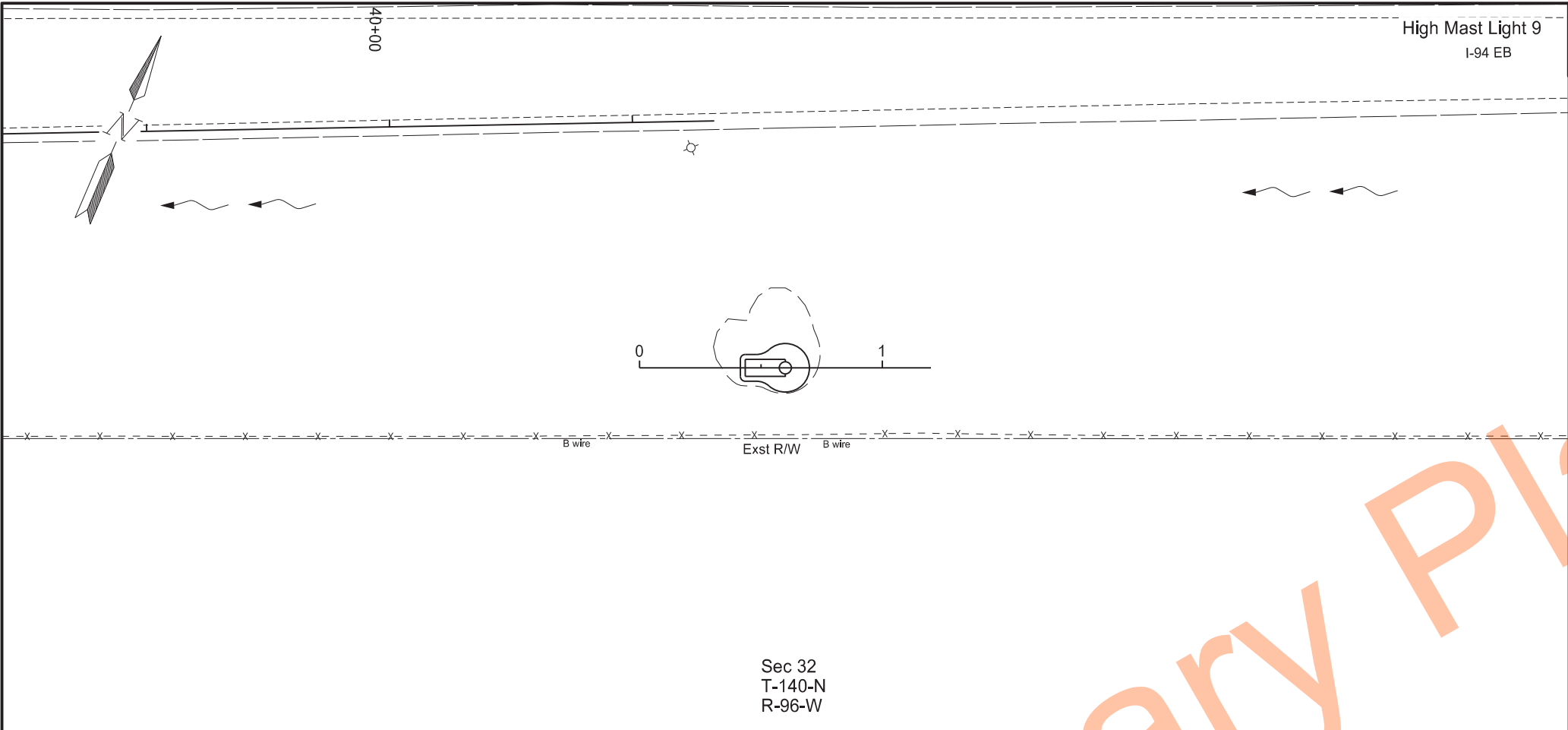
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland



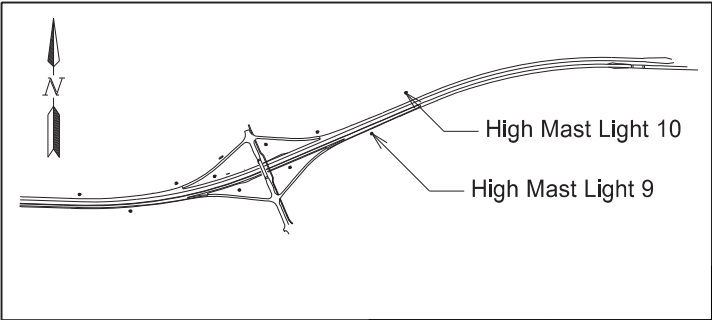
Wetland Impacts
High Mast 7 & 8
Exit 59

High Mast Lights
I-94





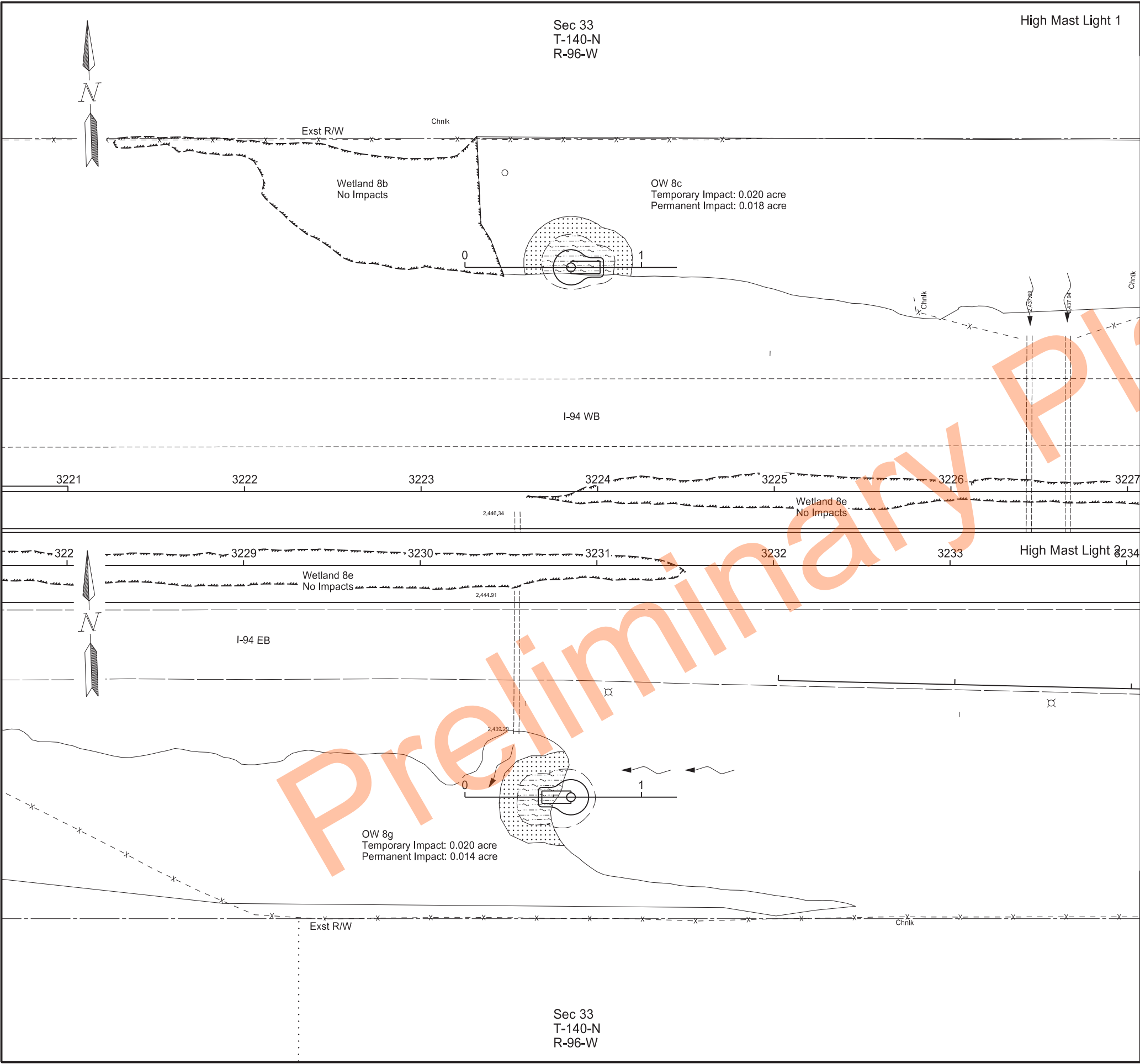
Legend	
	Permanent Wetland Impact
	Temporary Wetland Impact
	Permanent OW Impact
	Temporary OW Impact
	Delineated OW
	Delineated Wetland



Wetland Impacts
High Mast 9 & 10
Exit 59

High Mast Lights
I-94

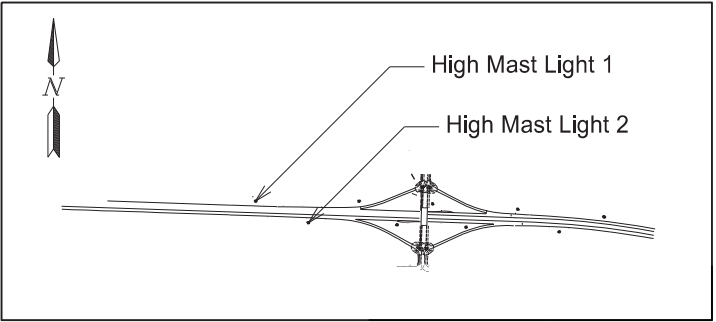




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	75	7

Legend

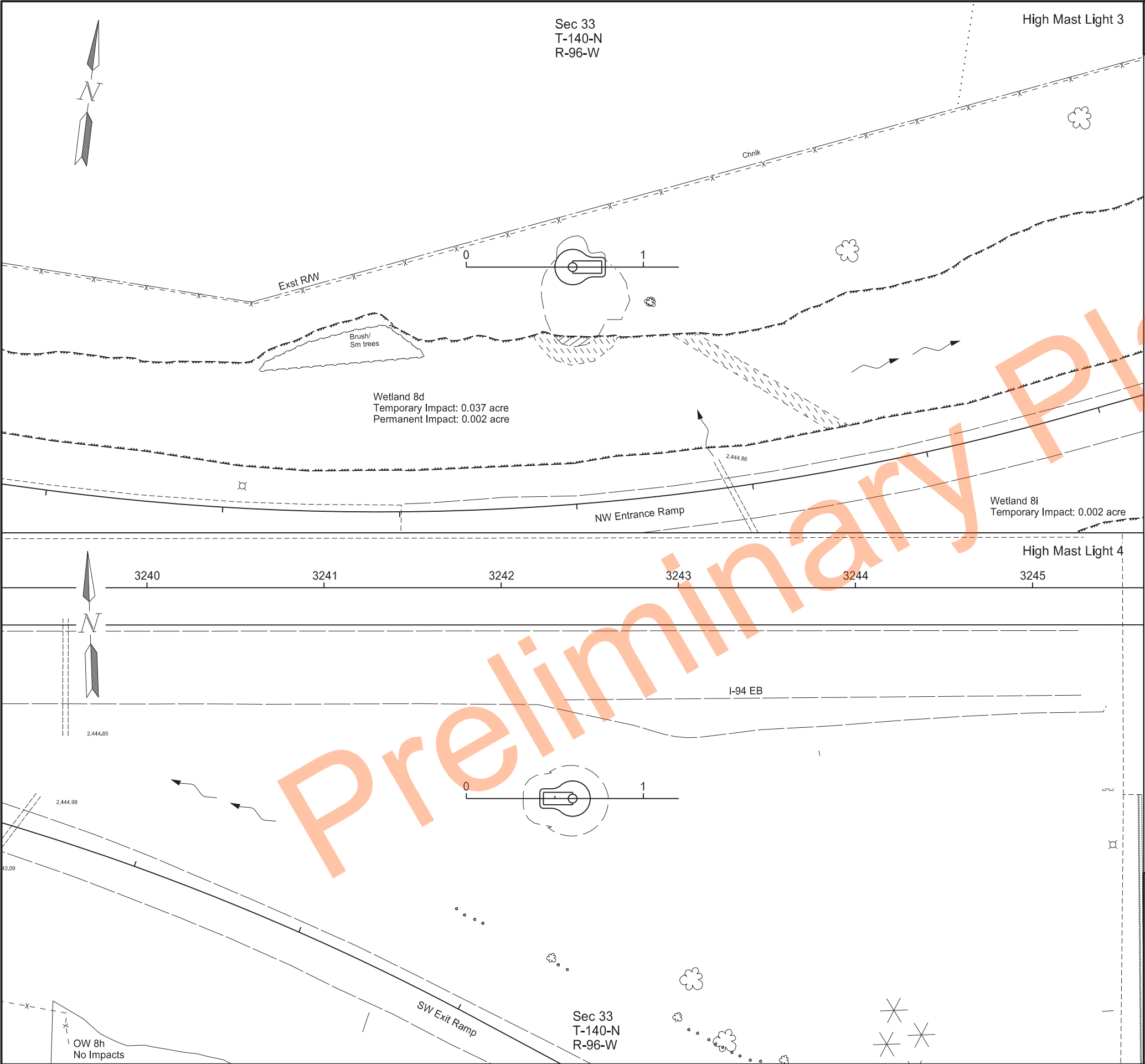
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland



Wetland Impacts
High Mast 1 & 2
Exit 61

High Mast Lights
I-94

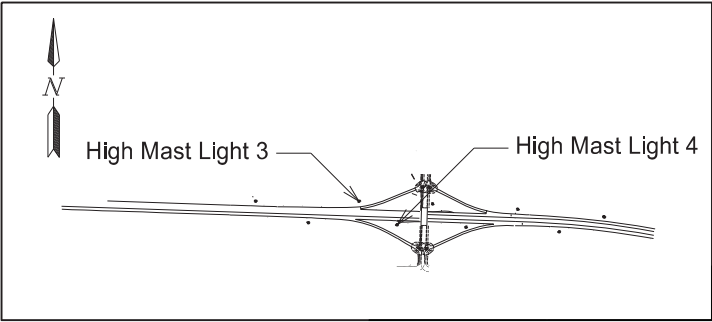




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	75	8

Legend

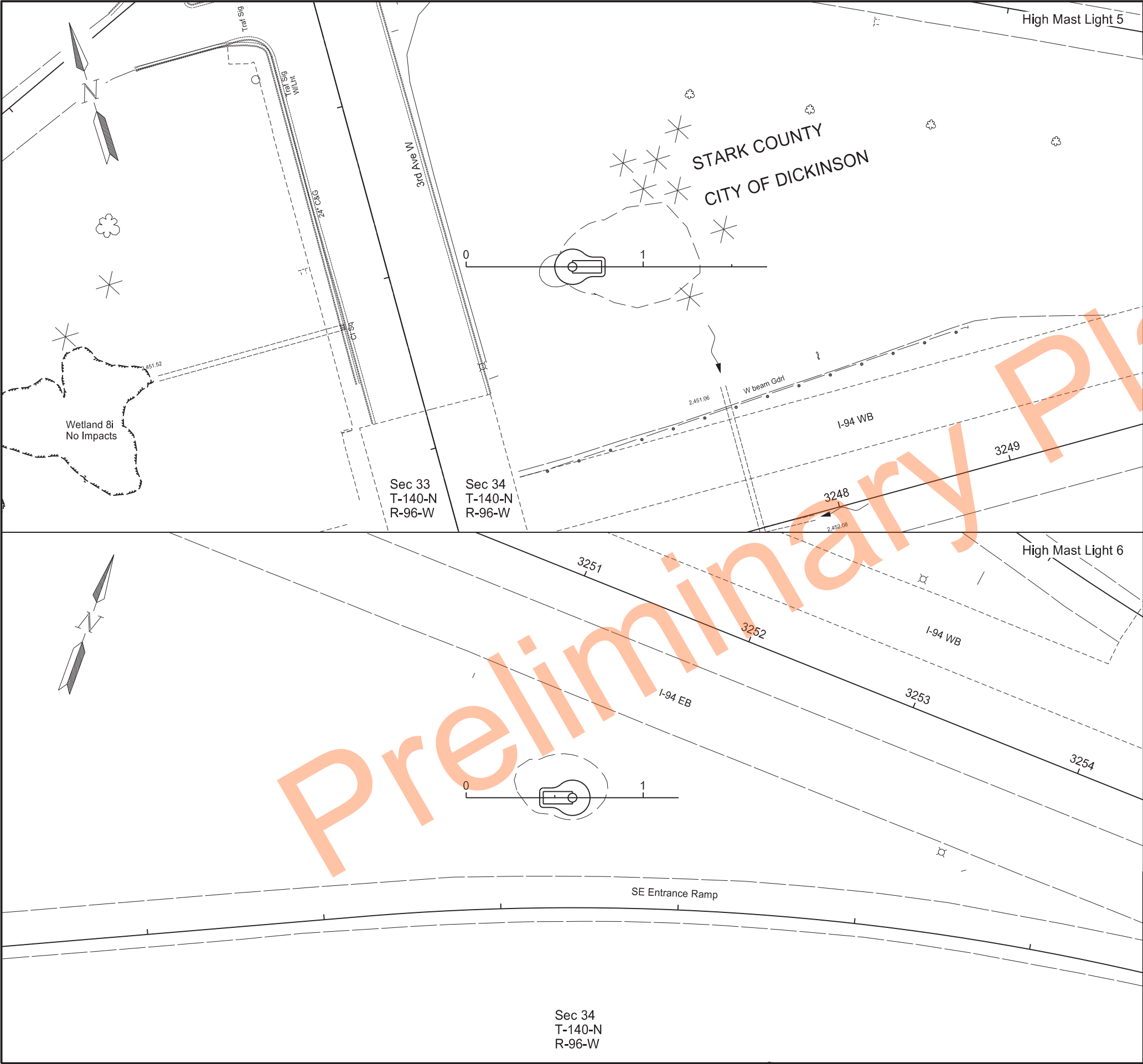
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland



Wetland Impacts
High Mast 3 & 4
Exit 61

High Mast Lights
I-94





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	75	9

Legend

- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland

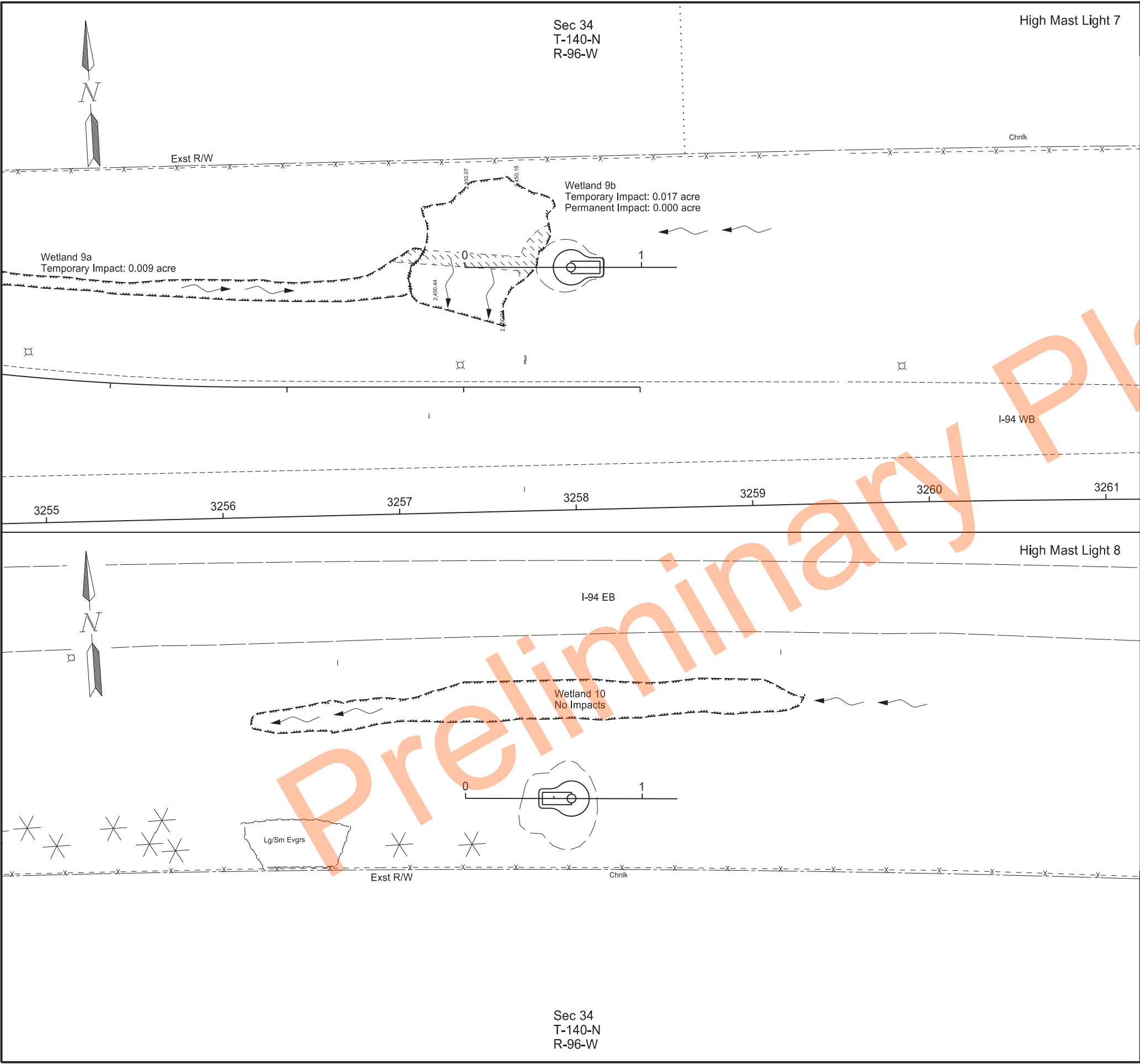
High Mast Light 5

High Mast Light 6

Wetland Impacts
High Mast 5 & 6
Exit 61

High Mast Lights
I-94

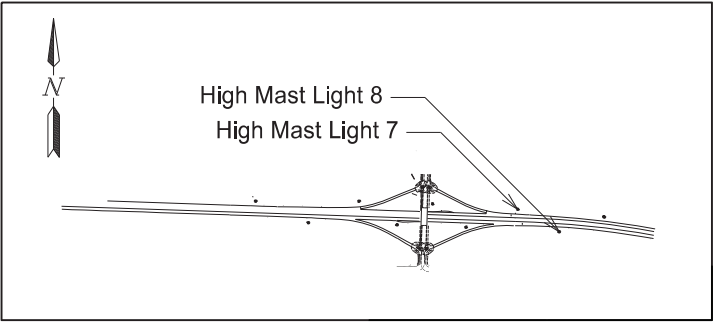
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	75	10

Legend

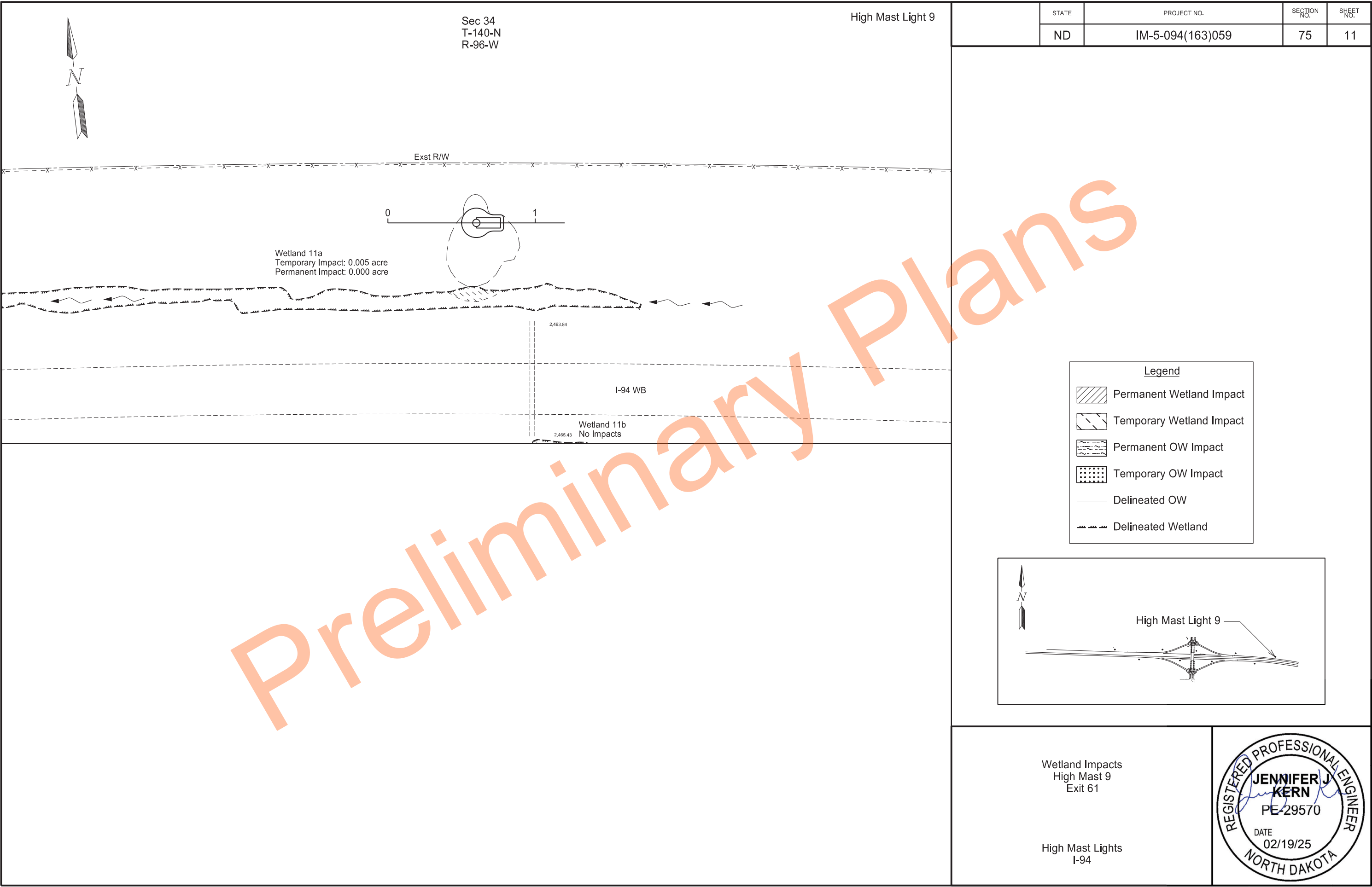
- Permanent Wetland Impact
- Temporary Wetland Impact
- Permanent OW Impact
- Temporary OW Impact
- Delineated OW
- Delineated Wetland

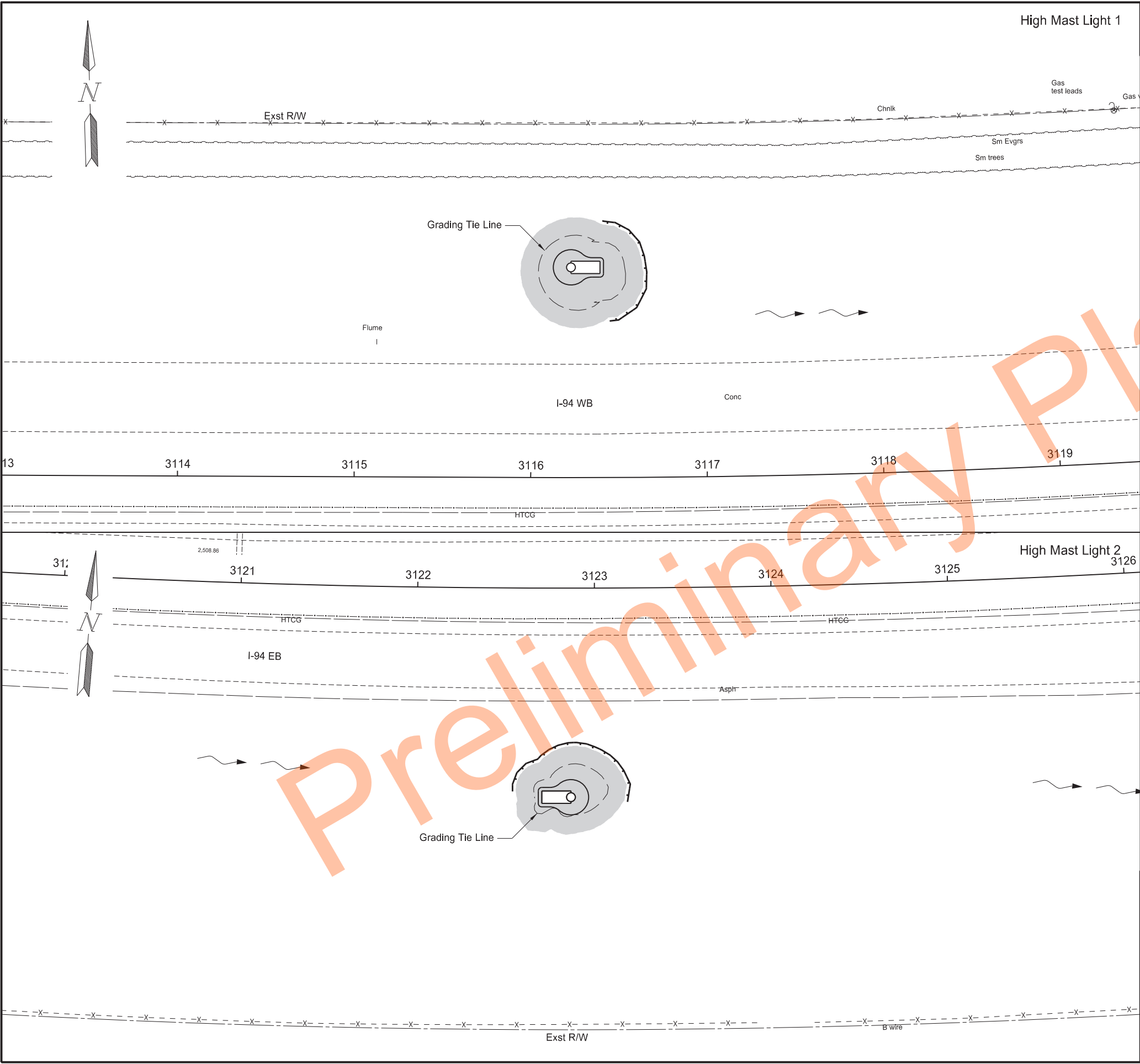


Wetland Impacts
High Mast 7 & 8
Exit 61

High Mast Lights
I-94







		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	IM-5-094(163)059	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 1	0.08	ACRE
		High Mast 2	0.05	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 1	0.08	ACRE
		High Mast 2	0.05	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 1	82	LF
		High Mast 2	101	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

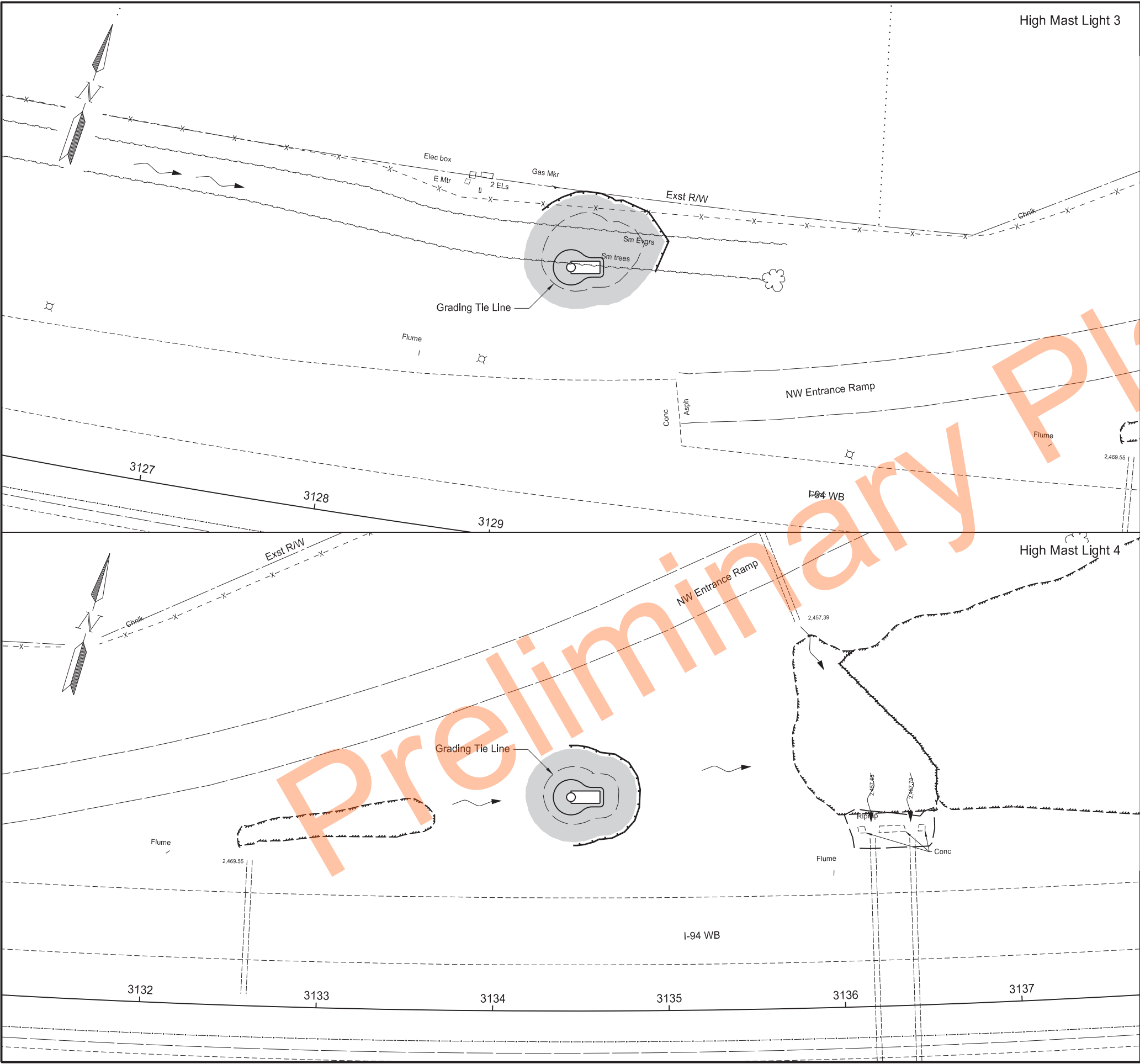
High Mast Light 1

High Mast Light 2

Permanent Erosion Control
High Mast 1 & 2
Exit 59

High Mast Lights
I-94

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STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(163)059	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 3	0.09	ACRE
		High Mast 4	0.06	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 3	0.09	ACRE
		High Mast 4	0.06	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 3	105	LF
		High Mast 4	110	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

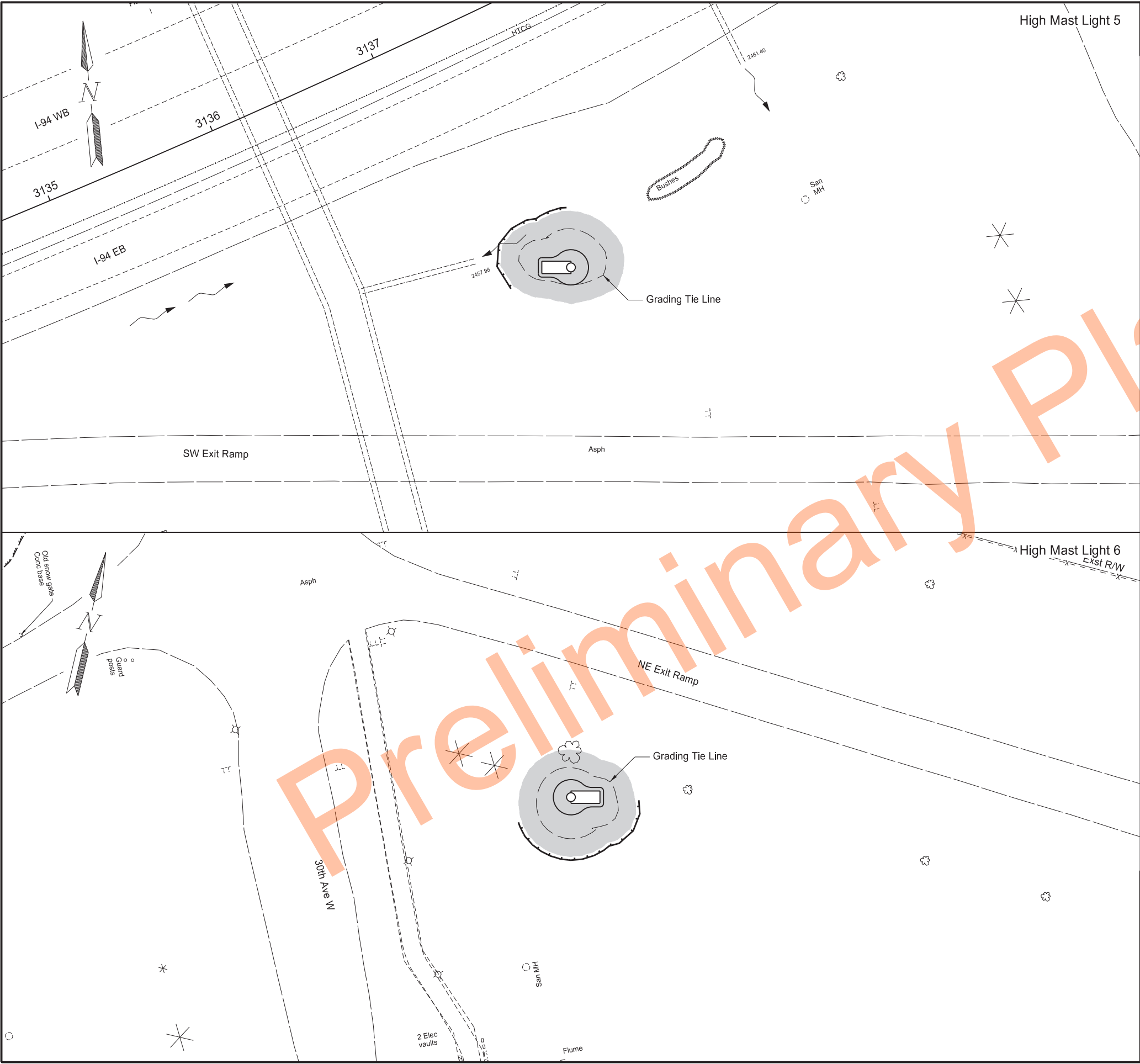
High Mast Light 3

High Mast Light 4

Permanent Erosion Control
High Mast 3 & 4
Exit 59

High Mast Lights
I-94

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STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(163)059	77	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 5	0.06	ACRE
		High Mast 6	0.07	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 5	0.06	ACRE
		High Mast 6	0.07	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 5	73	LF
		High Mast 6	97	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

North Arrow

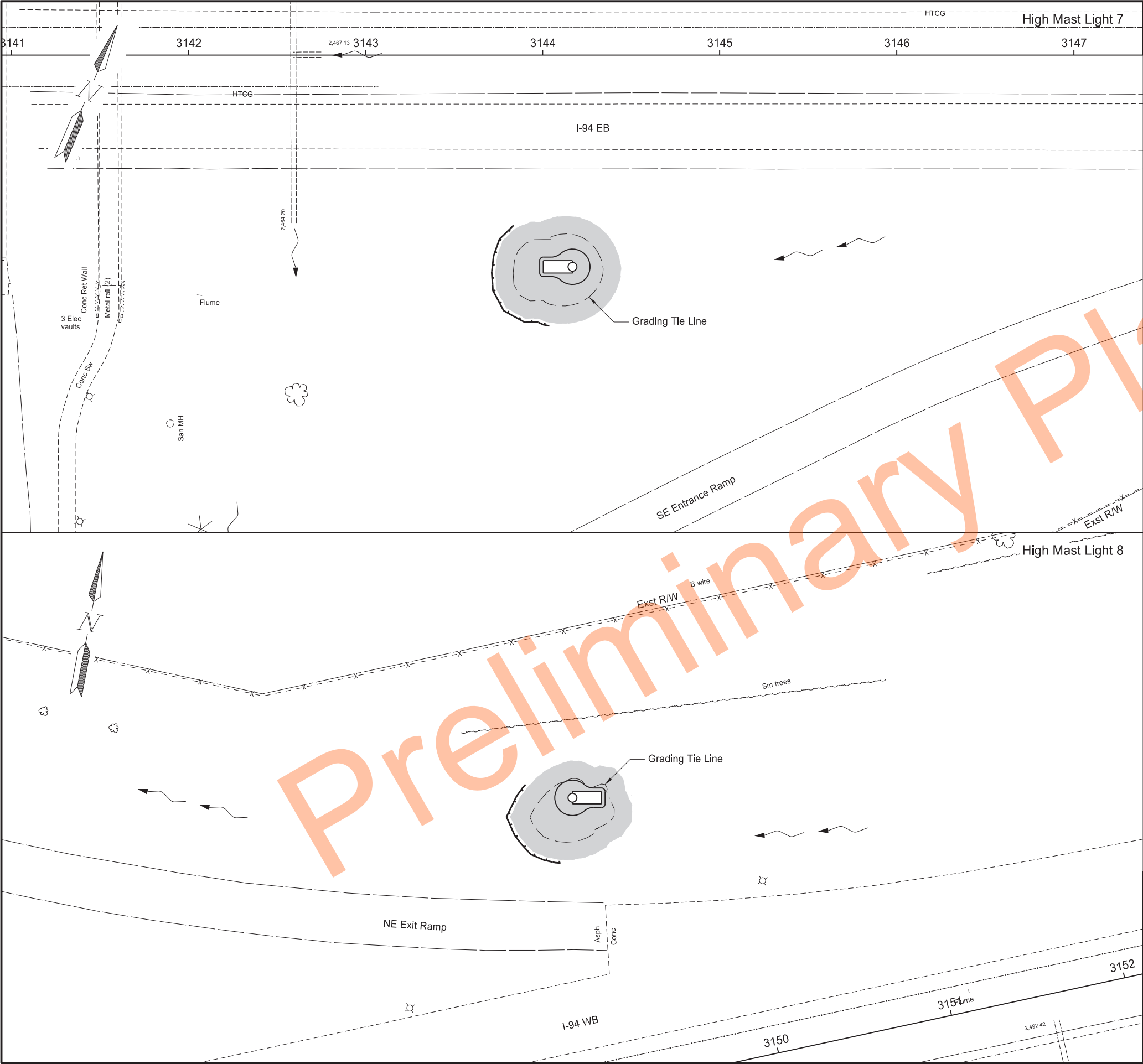
High Mast Light 6

High Mast Light 5

Permanent Erosion Control
High Mast 5 & 6
Exit 59

High Mast Lights
I-94

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NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	IM-5-094(163)059	77	4
SPEC	CODE	BID ITEM	QTY	UNIT	
251	0200	SEEDING CLASS II			
		High Mast 7	0.08	ACRE	
		High Mast 8	0.06	ACRE	
253	0201	HYDRAULIC MULCH			
		High Mast 7	0.08	ACRE	
		High Mast 8	0.06	ACRE	
261	0112	FIBER ROLLS 12IN			
		High Mast 7	82	LF	
		High Mast 8	64	LF	

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

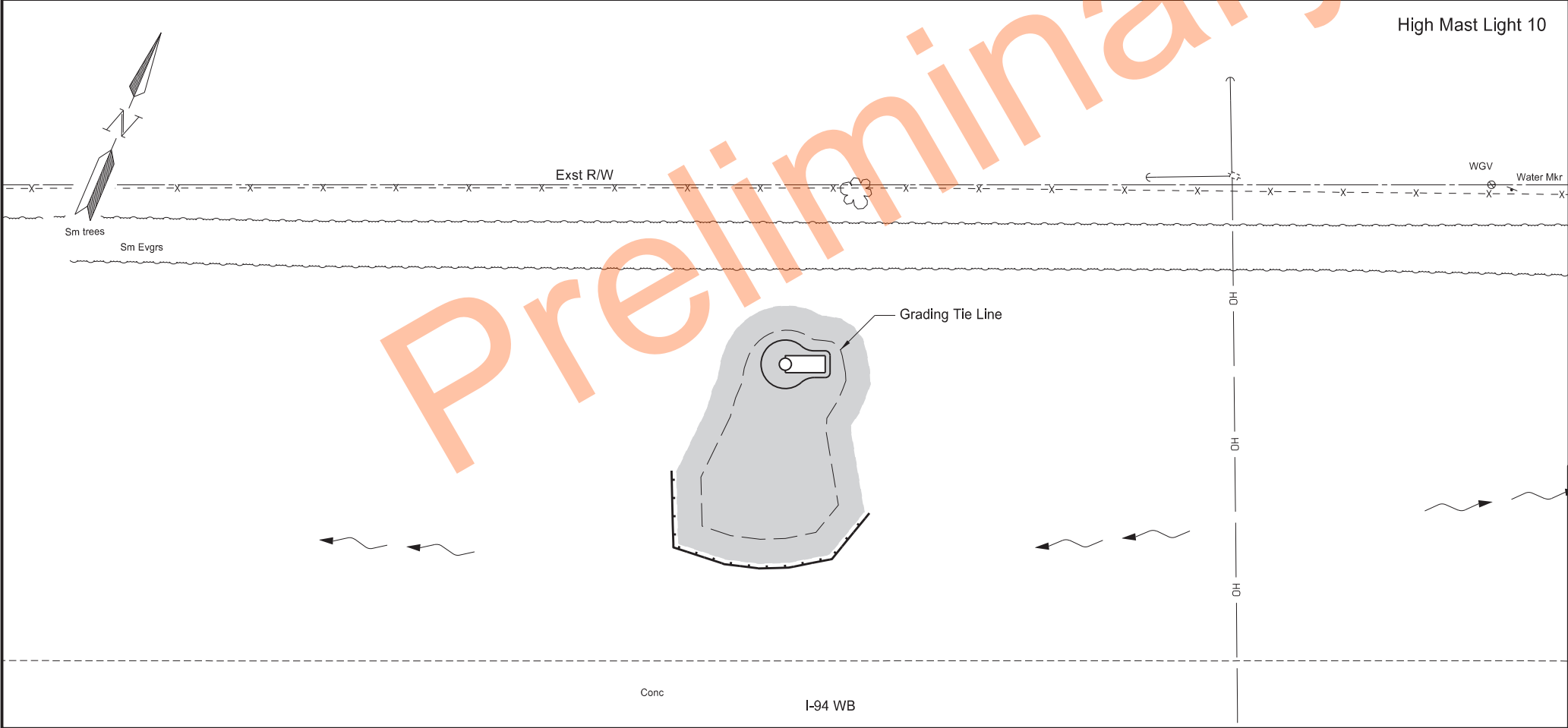
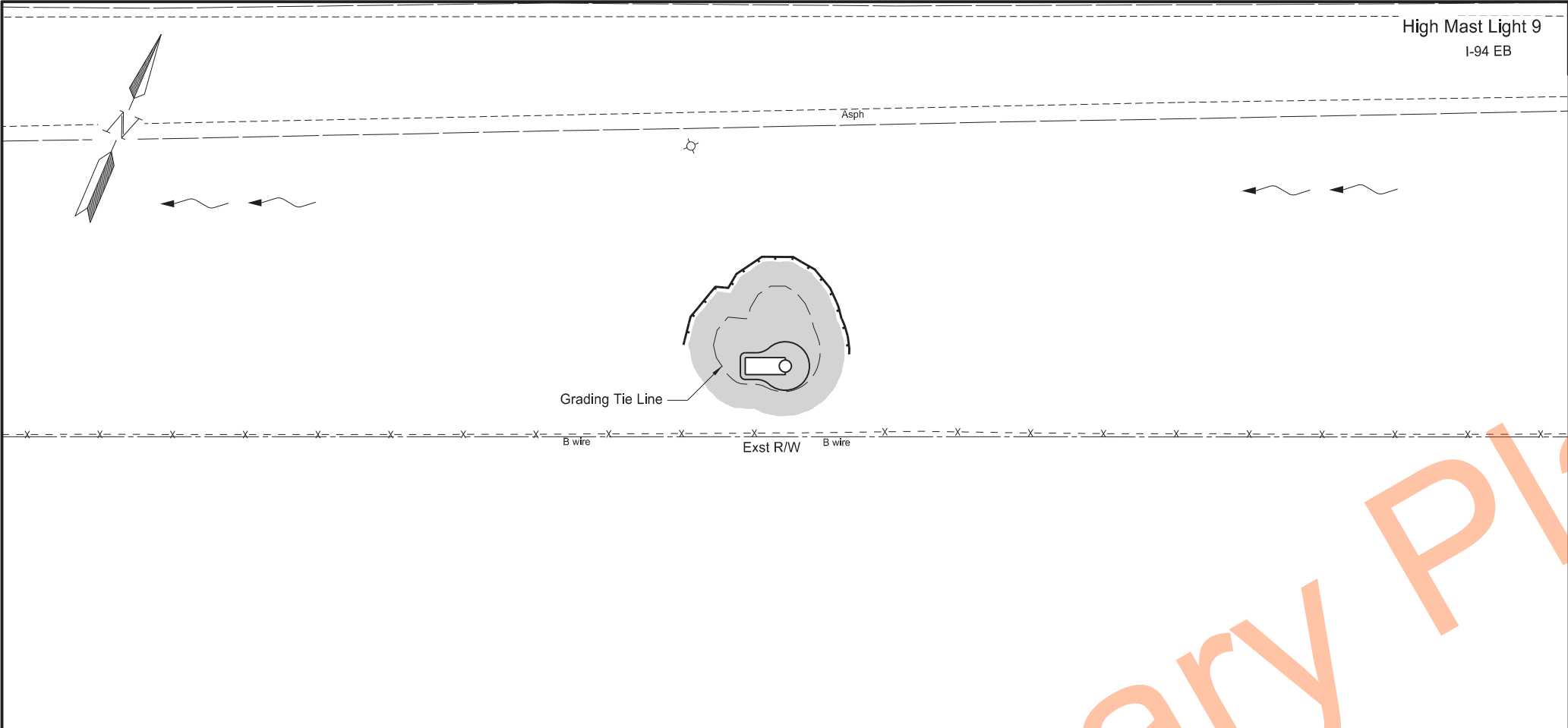
High Mast Light 8

High Mast Light 7

Permanent Erosion Control
High Mast 7 & 8
Exit 59

High Mast Lights
I-94

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		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	IM-5-094(163)059	77	5

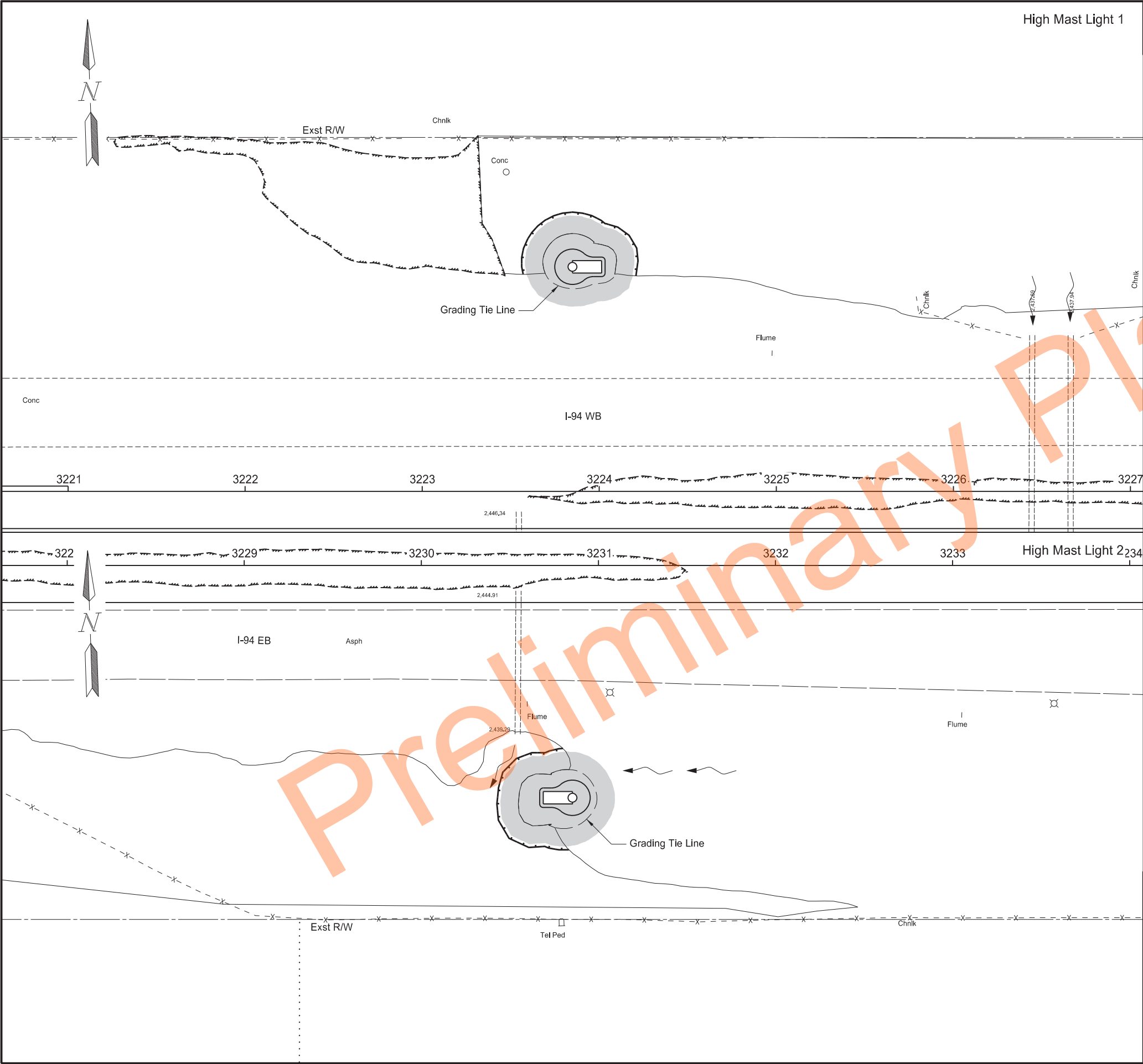
SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 9	0.07	ACRE
		High Mast 10	0.15	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 9	0.07	ACRE
		High Mast 10	0.15	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 9	114	LF
		High Mast 10	123	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

Permanent Erosion Control
High Mast 9 & 10
Exit 59

High Mast Lights
I-94



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(163)059	77	6

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 1	0.05	ACRE
		High Mast 2	0.06	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 1	0.05	ACRE
		High Mast 2	0.06	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 1	111	LF
		High Mast 2	113	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

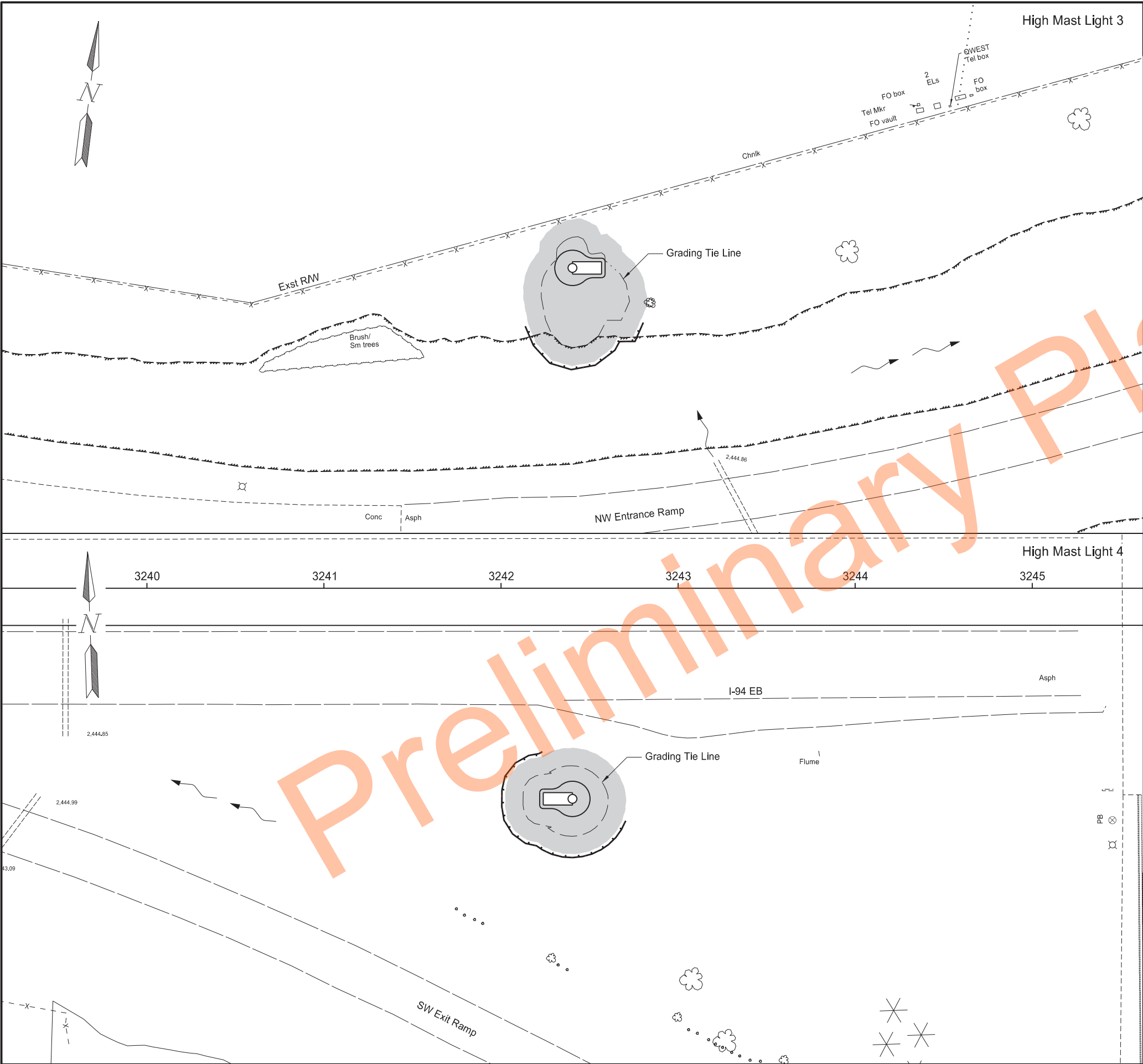
High Mast Light 1

High Mast Light 2

Permanent Erosion Control
High Mast 1 & 2
Exit 61

High Mast Lights
I-94

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STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(163)059	77	7

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 3	0.09	ACRE
		High Mast 4	0.07	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 3	0.09	ACRE
		High Mast 4	0.07	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 3	92	LF
		High Mast 4	136	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

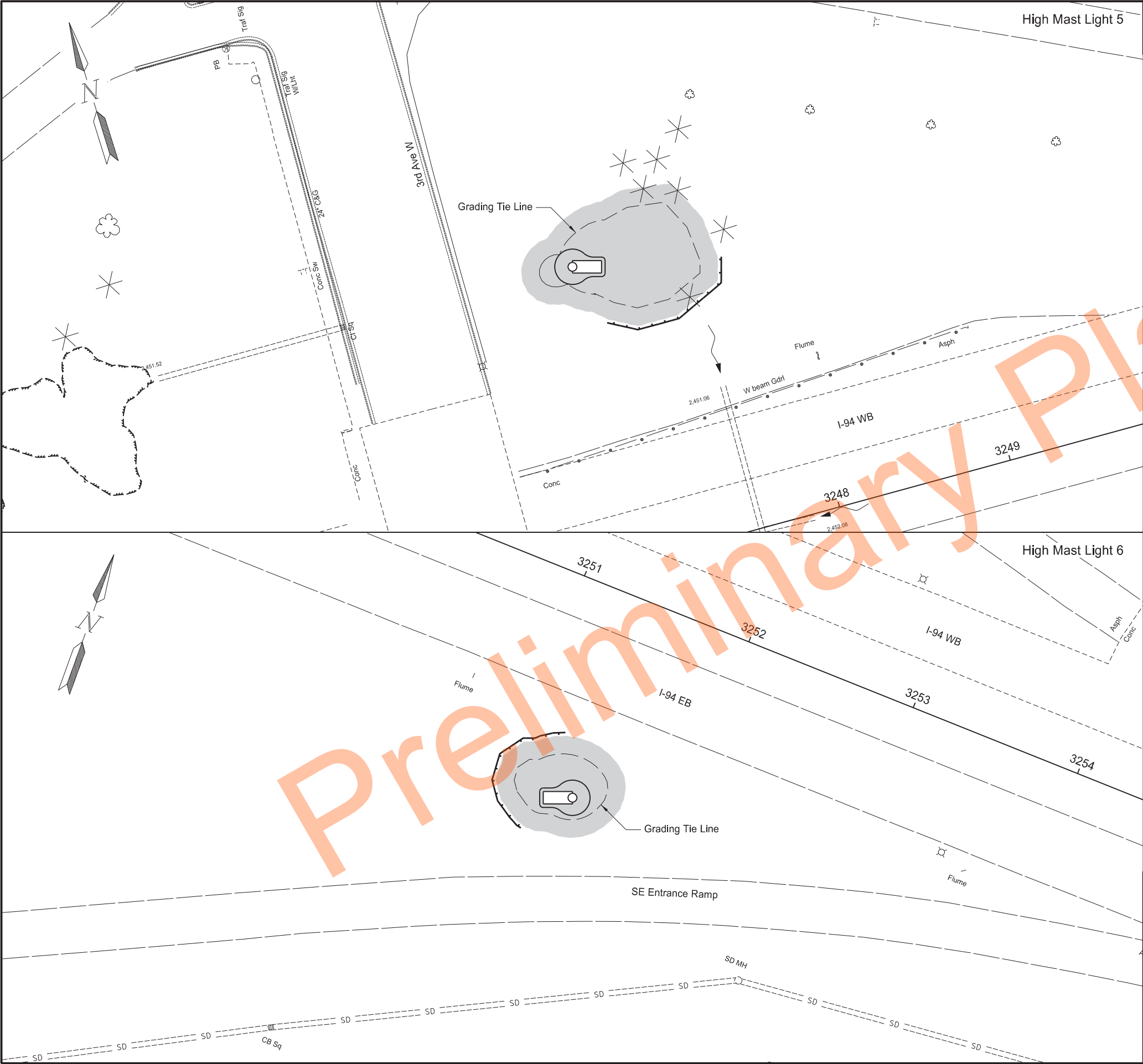
High Mast Light 3

High Mast Light 4

Permanent Erosion Control
High Mast 3 & 4
Exit 61

High Mast Lights
I-94

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		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	IM-5-094(163)059	77	8
SPEC	CODE	BID ITEM	QTY	UNIT	
251	0200	SEEDING CLASS II			
		High Mast 5	0.14	ACRE	
		High Mast 6	0.07	ACRE	
253	0201	HYDRAULIC MULCH			
		High Mast 5	0.14	ACRE	
		High Mast 6	0.07	ACRE	
261	0112	FIBER ROLLS 12IN			
		High Mast 5	88	LF	
		High Mast 6	88	LF	

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

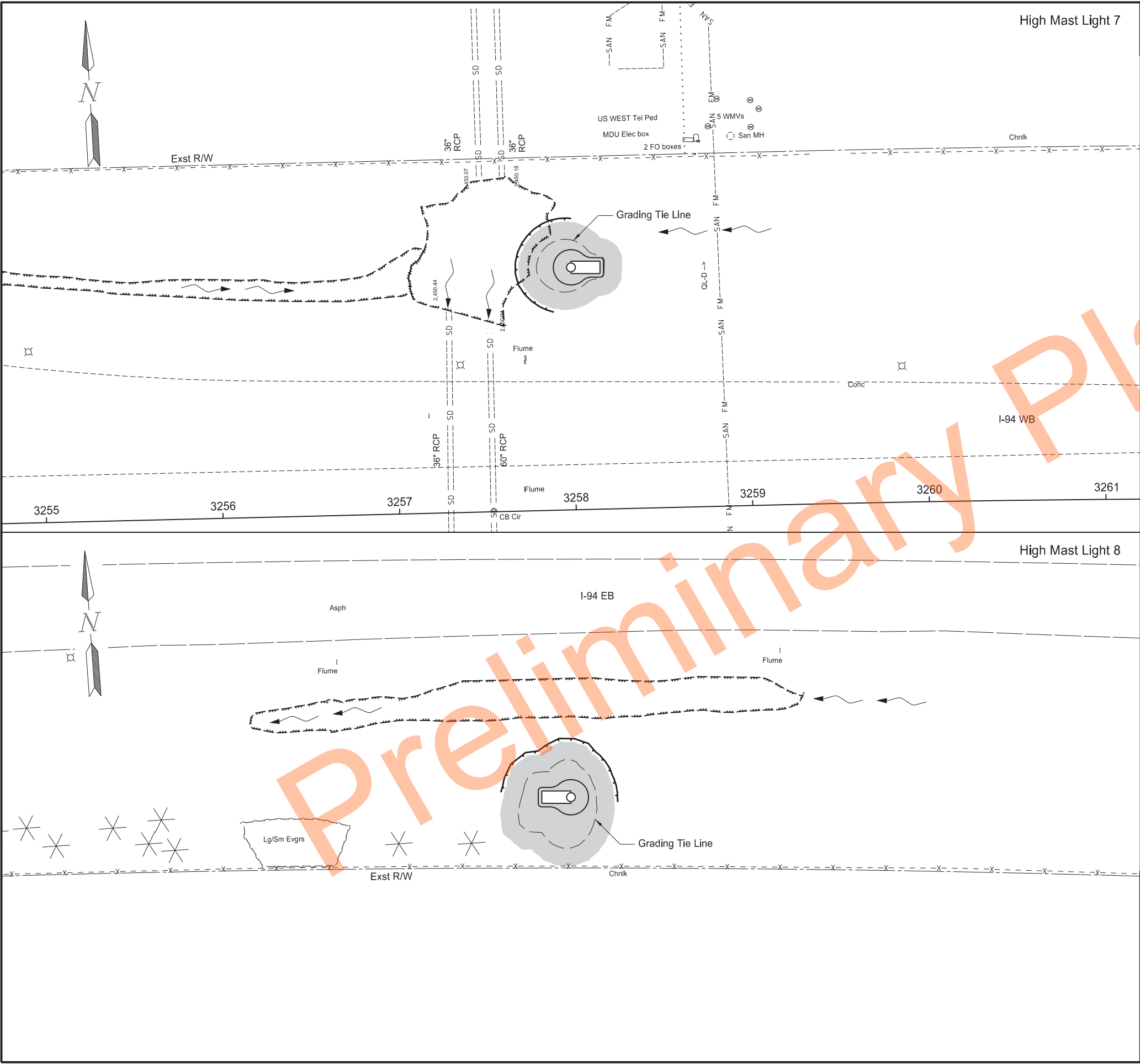
High Mast Light 5

High Mast Light 6

Permanent Erosion Control
High Mast 5 & 6
Exit 61

High Mast Lights
I-94

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STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(163)059	77	9

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 7	0.05	ACRE
		High Mast 8	0.08	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 7	0.05	ACRE
		High Mast 8	0.08	ACRE
261	0112	FIBER ROLLS 12IN		
		High Mast 7	84	LF
		High Mast 8	104	LF

Legend

- Seeding Class II & Hydraulic Mulch
- OW (post-construction)
- Wetland (post-construction)
- Fiber Rolls 12IN

High Mast Light 8

High Mast Light 7

Permanent Erosion Control
High Mast 7 & 8
Exit 61

High Mast Lights
I-94

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		High Mast 9	0.09	ACRE
253	0201	HYDRAULIC MULCH		
		High Mast 9	0.09	ACRE
261	0112	FIBER ROLLS 12"IN		
		High Mast 9	106	LF

High Mast Light 9

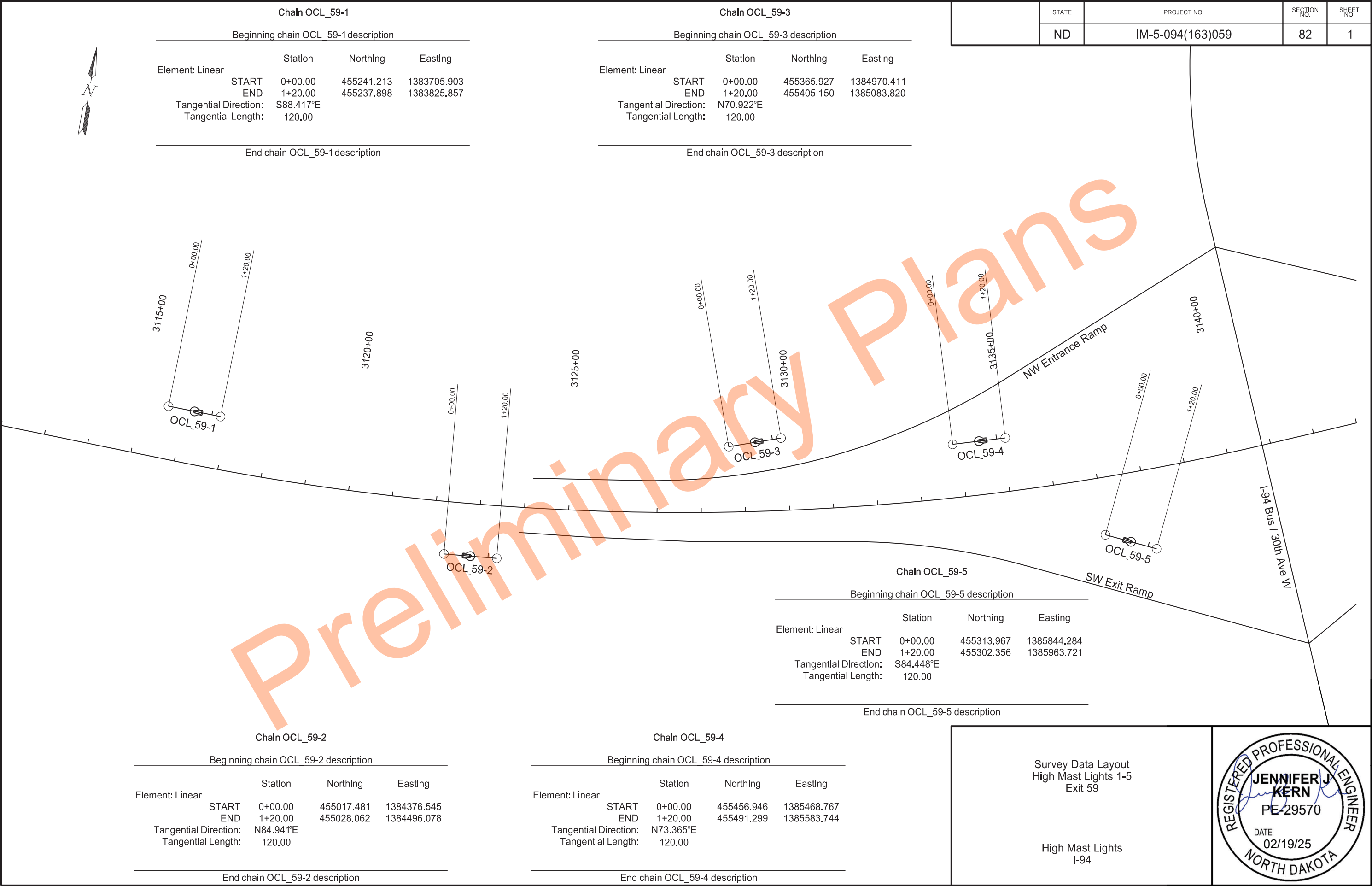
High Mast Lights
I-94

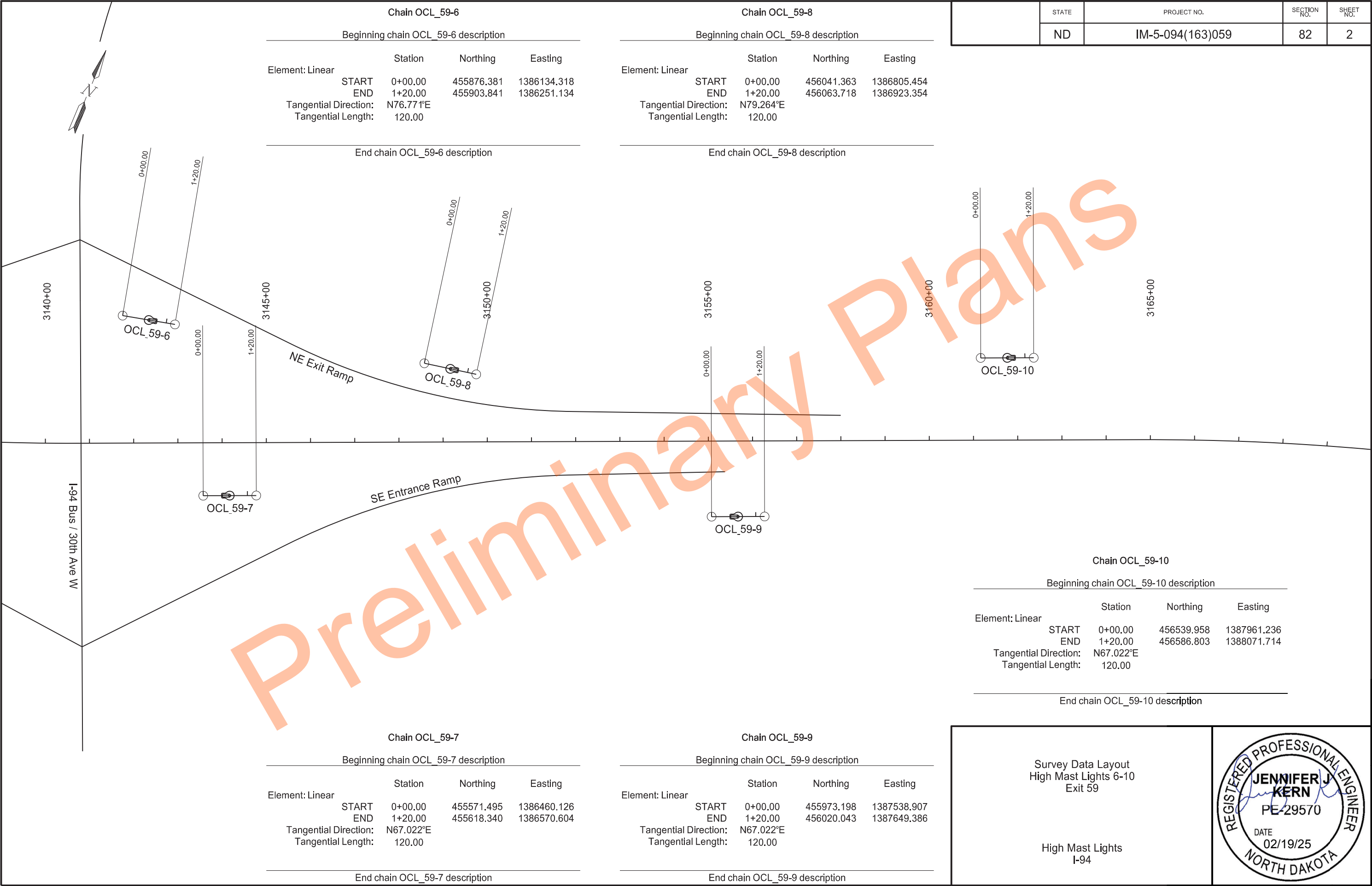


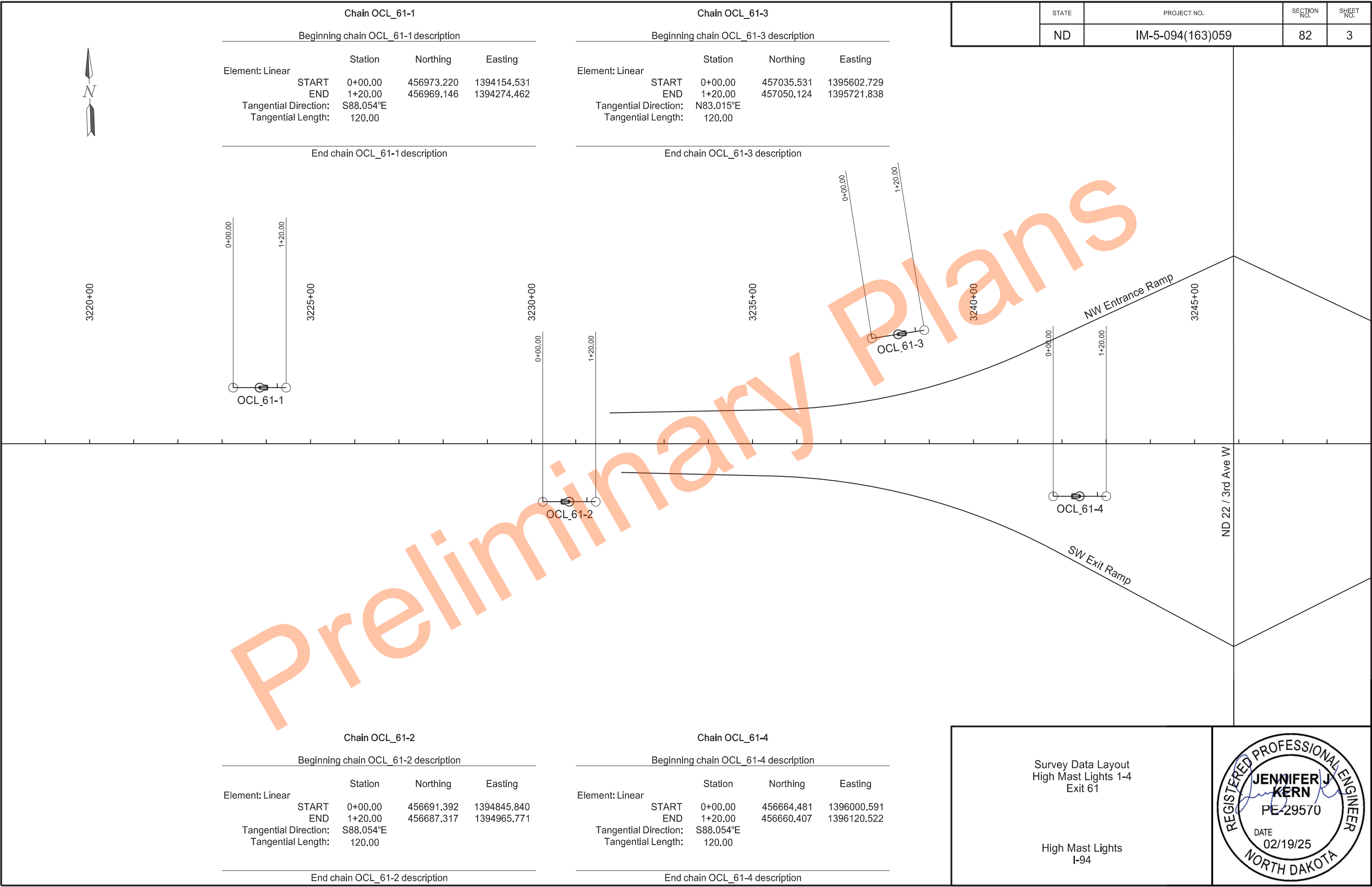
PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Exit 59 and exit 61											STATE	PROJECT NO.		SECTION NO.	SHEET NO.			
										ND	IM-5-094(163)059					81	1	
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS								
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGN	MONUMENT	
I 94 (Align:EX94)				CURVE		T-139-N R-96-W				PRIMARY CONTROL								
Begin	3085+00.00	455,220.80	1,380,641.43	PI	= 3128+57.46	W Qtr Cor Sec 32	3-M	457,706.86	1,385,865.48	GPS 59	455,837.43	1,386,089.40	2,483.72	3141+19	270' Lt	EX94	#5x18" Rebar w/ 1 1/2" Alum Cap stamped NDDOT CONTROL	
PC	3115+96.73	455,121.32	1,383,736.57	Delta	= 24°49'08" (LT)	NW Cor Sec 34	7-L	460,029.14	1,396,517.76									
PI	3128+57.46	455,080.81	1,384,996.65	Da	= 01°00'00"	W Qtr Cor Sec 34	7-M	457,394.39	1,396,434.07	SECONDARY CONTROL								
PT	3140+78.64	455,572.97	1,386,157.35	R	= 5729.65					RTK 30244	450,643.10	1,387,886.80	2,442.29	3139+05	5219' Rt	EX94	#6 Rebar w/Alum cap	
Station equation: I94 (EX94) and I 94 Bus. Lp (EX903)				T	= 1260.73'	T-140-N R-96-W				RTK 50355	454,765.60	1,386,345.84	2,459.30	3139+55	818' Rt	EX94	#5 Rebar	
I 94	3140+80.74	455,573.79	1,386,159.28	L	= 2481.91	NW Cor Sec 6	1-A	455,215.30	1,380,822.48	BM 44488	455,908.02	1,385,931.62	2,478.99	3139+96	396' Lt	EX94	Bridge bench rod	
I 94 Bus. Lp	182+06.68	455,573.79	1,386,159.28			NW Cor Sec 5	3-A	455,068.57	1,385,781.47	RTK 30243	457,711.18	1,385,992.98	2,487.18	3147+62	2033' Lt	EX94	#6 Rebar w/Alum cap	
PC	3164+76.44	456,509.00	1,388,364.89	CURVE		E Qtr Cor Sec 6	3-B	452,386.25	1,385,697.20	RTK 30000	457,769.50	1,385,979.16	2,487.88	3147+72	2092' Lt	EX94	#6 Rebar	
PI	3177+42.66	457,003.30	1,389,530.65	PI	= 3177+42.66	N Qtr Cor Sec 5	5-A	454,992.66	1,388,423.59	RTK 40011	457,592.65	1,396,297.83	2,478.10	3244+46	819' Lt	EX94	Mag nail	
PT	3189+68.82	456,960.31	1,390,796.13	Delta	= 24°55'25" (RT)	NE Cor Sec 4	7-A	454,762.92	1,396,344.85	RTK 1	468,337.52	1,396,836.50	2,567.06	3246+19	11576' Lt	EX94	6 Rebar	
Station equation: I94 (EX94) and ND 22 (EX22), Sec line Xing				Da	= 01°00'00"					RTK 2	458,980.20	1,396,566.32	2,490.57	3246+67	2215' Lt	EX94	#6 Rebar	
I 94	3245+88.81	456,769.49	1,396,412.88	R	= 5729.65													
ND 22	20+07.73	456,769.49	1,396,412.88	T	= 1266.22'													
PC	3259+24.37	456,724.15	1,397,747.67	L	= 2492.38													
PI	3268+80.88	456,691.67	1,398,703.64			REFERENCE MARKERS												
PT	3278+32.98	456,501.16	1,399,640.99	CURVE		#	NORTHING	EASTING	STATION	OFFSET	ALIGN							
End	3346+45.39	455,144.29	1,406,316.91	PI	= 3268+80.88	72	456,436.51	1,396,441.71	16+76	40' Rt	EX22							
				Delta = 09°32'35" (RT)														
I 94 Bus. Lp (Align:EX903)				Da	= 00°30'00"	59	455,052.25	1,383,644.55	3115+07	72' Rt	EX94							
Begin/PC	170+41.83	456,679.75	1,385,832.81	R	= 11459.20	59	455,196.42	1,383,648.88	3115+07	72' Lt	EX94							
PI	173+58.27	456,363.47	1,385,822.73	T	= 956.52'	60	456,551.19	1,388,669.18	3167+77	72' Rt	EX94							
PT	176+64.72	456,072.36	1,385,946.79	L	= 1908.61	60	456,689.19	1,388,626.99	3167+84	72' Lt	EX94							
Station equation: I 94 Bus. Lp (EX903), NE Ramp (NERAMP59), and SW Ramp (SWRAMP59)						61	456,929.89	1,393,890.10	3220+62	75' Lt	EX94							
I 94 Bus. Lp	177+46.52	455,997.11	1,385,978.86	CURVE		62	456,517.02	1,399,149.84	3273+45	72' Rt	EX94							
NE Ramp	53+99.58	455,997.11	1,385,978.86	PI	= 173+58.27													
NW Ramp	55+00.00	455,997.11	1,385,978.86	Delta	= 24°54'31" (LT)													
I 94	182+06.68	455,573.79	1,386,159.28	Da	= 03°59'56"													
Station equation: I 94 Bus. Lp (EX903), SW Ramp (SWRAMP59), and SE Ramp (SERAMP59)				R	= 1432.80					All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Base stations (OPUS) ☒ NAVD-88 ☐ _____ ☐ GEOID12B _____ ☒ GEOID18								
I 94 Bus. Lp	186+67.01	455,150.32	1,386,339.75	T	= 316.44'													
SW Ramp	19+16.75	455,150.32	1,386,339.75	L	= 622.89													
SE Ramp	20+00.00	455,150.32	1,386,339.75							Date Survey Completed 10/02/23 ☐ Assumed Coordinates ☒ All coordinates on this sheet are Stark County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998175								
End	189+03.11	454,933.12	1,386,432.32															
NOTES: Sheet 1 of 3 Alignments per: 5-094(160)903 5-022(069)072 5-094(163)059																		

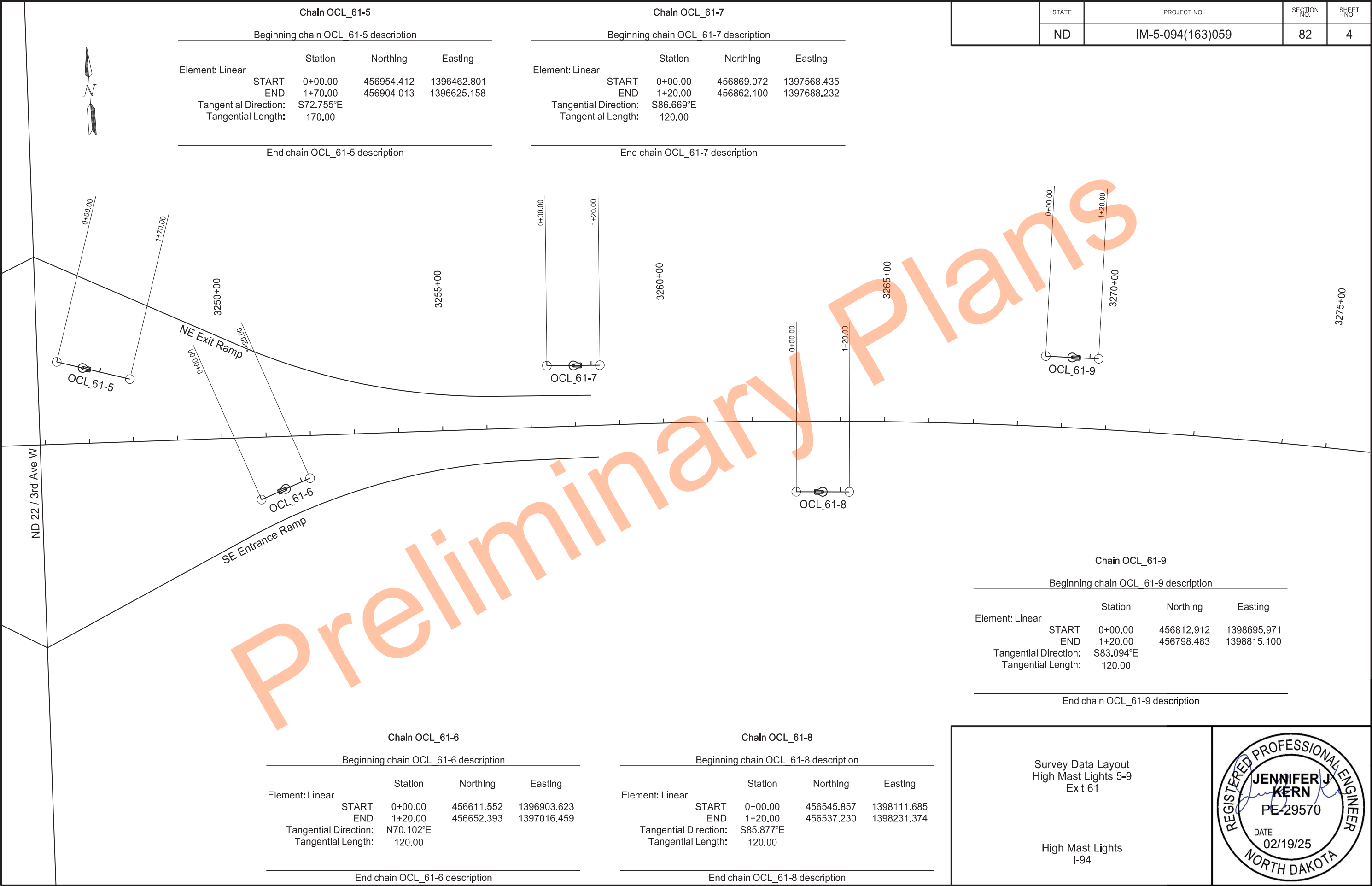
PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Exit 59 and exit 61											STATE	PROJECT NO.		SECTION NO.	SHEET NO.		
										ND	IM-5-094(163)059					81	2
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS							
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGNMENT	MONUMENT
ND 22 (Align:EX22)																	
Begin/ Rec Sec Cor	0+00.00	454,762.92	1,396,344.85														
Station equation: ND22 (EX22), SW Ramp (SWRAMP61), and SE Ramp (SERAMP61)																	
ND 22	15+48.73	456,310.76	1,396,397.33														
SW Ramp	89+68.60	456,310.76	1,396,397.33														
SE Ramp	90+00.00	456,310.76	1,396,397.33														
I 94	20+07.73	456,769.49	1,396,412.88														
Station equation: ND22 (EX22), NE Ramp (NERAMP61), and NW Ramp (NWRAMP61)																	
ND 22	24+32.73	457,194.25	1,396,427.29														
NE Ramp	117+17.59	457,194.25	1,396,427.29														
NW Ramp	118+00.00	457,194.25	1,396,427.29														
Rec Qtr Cor	26+32.98	457,394.39	1,396,434.07														
End/ Rec Qtr Cor	52+69.06	460,029.14	1,396,517.76														
SW Ramp exit 59 (Align:SWRAMP59)																	
Begin	1+00.00	455,094.22	1,384,535.48	CURVE													
PI	2+51.67	455,109.65	1,384,686.36	PI = 10+48.93													
PI	4+85.22	455,139.48	1,384,917.99	Delta = 15°15'29" (RT)													
PC	8+48.01	455,200.64	1,385,275.59	Da = 03°49'11"													
PI	10+48.93	455,234.51	1,385,473.63	R = 1500.00													
PT	12+47.46	455,215.07	1,385,673.61	T = 200.92'													
End/I 94 Bus. Lp/SE Ramp	19+16.75	455,150.32	1,386,339.75	L = 399.46													
Align SE Ramp exit 59 (Align:SERAMP59)																	
Begin/I 94 Bus. Lp/SW Ramp	20+00.00	455,150.32	1,386,339.75	CURVE													
PC	25+16.77	455,542.15	1,386,676.67	PI = 28+53.42													
PI	28+53.42	455,797.42	1,386,896.15	Delta = 25°17'57" (RT)													
PT	31+79.10	455,934.40	1,387,203.67	Da = 03°49'11"													
End	35+33.74	456,078.71	1,387,527.63	R = 1500.00													
				T = 336.65'						All coordinates and measurements on this document derived from the International Foot definition.							
				L = 662.33													
										INITIALIZING BENCH MARK NDGPS Base stations (OPUS)							
										Date Survey Completed 10/02/23							
NOTES: Sheet 2 of 3										☐ Assumed Coordinates ☒ All coordinates on this sheet are Stark County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998175							

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Exit 59 and exit 61											STATE	PROJECT NO.	SECTION NO.	SHEET NO.				
										ND		IM-5-094(163)059	81	3				
HORIZONTAL ALIGNMENT				CURVE DATA		HORIZONTAL ALIGNMENT				SURVEY CONTROL POINTS								
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		PNT	STATION	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGNMENT	MONUMENT	
NE Ramp exit 59 (Align:NERAMP59)				CURVE				CURVE		NW Ramp exit 61 (Align:NWRAMP61)								
Begin	36+00.00	456,297.68	1,387,719.44	PI	= 45+43.76	PI	= 126+15.71	Begin/ND 22/ NE Ramp		118+00.00	457,194.25	1,396,427.29						
PC	42+04.88	456,071.29	1,387,158.53	Delta = 25°27'42" (RT)		Delta = 23°39'39" (RT)		PC	123+15.62	456,994.07	1,395,952.12							
PI	45+43.76	455,944.45	1,386,844.27	Da = 03°49'11"		Da = 03°59'57"		PI	126+15.71	456,877.56	1,395,675.56							
PT	48+71.46	455,965.03	1,386,506.01	R = 1500.00		R = 1432.69		PT	129+07.26	456,881.84	1,395,375.49							
End/I 94 Bus. Lp/NW Ramp	53+99.58	455,997.11	1,385,978.86	T = 338.89'		T = 300.10'		End	132+79.01	456,887.13	1,395,003.77							
				L = 666.59		L = 591.64												
NW Ramp exit 59 (Align:NWRAMP59)																		
Begin/I 94 Bus. Lp/NE Ramp	55+00.00	455,997.11	1,385,978.86	CURVE														
PC	60+62.64	455,621.73	1,385,559.75	PI = 65+12.00														
PI	65+12.00	455,321.93	1,385,225.02	Delta = 33°21'13" (RT)														
PT	69+35.84	455,255.54	1,384,780.59	Da = 03°49'11"														
End	71+72.30	455,220.61	1,384,546.72	R = 1500.00														
				T = 449.36'														
SW Ramp exit 61 (Align:SWRAMP61)				L = 873.20														
Begin	75+00.00	456,751.48	1,395,025.38															
PC	78+39.98	456,731.85	1,395,364.80	CURVE														
PI	81+81.57	456,712.12	1,395,705.81	PI = 81+81.57														
PT	85+10.63	456,540.65	1,396,001.24	Delta = 26°49'13" (RT)														
End/ND 22/ SE Ramp	89+68.60	456,310.76	1,396,397.33	Da = 03°59'57"														
				R = 1432.69														
SE Ramp exit 61 (Align:SERAMP61)				T = 341.58'														
Begin/ND 22/ SW Ramp	90+00.00	456,310.76	1,396,397.33	L = 670.65														
PC	95+20.87	456,528.23	1,396,870.62															
PI	98+48.74	456,665.12	1,397,168.56	CURVE														
PT	101+65.52	456,658.81	1,397,496.37	PI = 98+48.74														
End	103+40.74	456,655.44	1,397,671.56	Delta = 25°46'51" (RT)														
				Da = 03°59'57"		CURVE												
NE Ramp exit 61 (Align:NERAMP61)				R = 1432.69		PI = 109+22.00												
Begin	104+00.00	456,795.65	1,397,663.59	T = 327.88'		Delta = 23°54'53" (RT)		All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Base stations (OPUS) ☒ NAVD-88 ☐ _____ ☐ GEOID12B ☒ GEOID18										
PC	106+18.59	456,808.35	1,397,445.37	L = 644.65		Da = 03°59'57"												
PI	109+22.00	456,825.98	1,397,142.47			R = 1432.69												
PT	112+16.58	456,964.88	1,396,872.71			T = 303.41'		Date Survey Completed 10/02/23				☐ Assumed Coordinates ☒ All coordinates on this sheet are Stark County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998175						
End/ND 22/ NW Ramp	117+17.59	457,194.25	1,396,427.29			L = 597.99												
NOTES: Sheet 3 of 3																		









[illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	984

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>

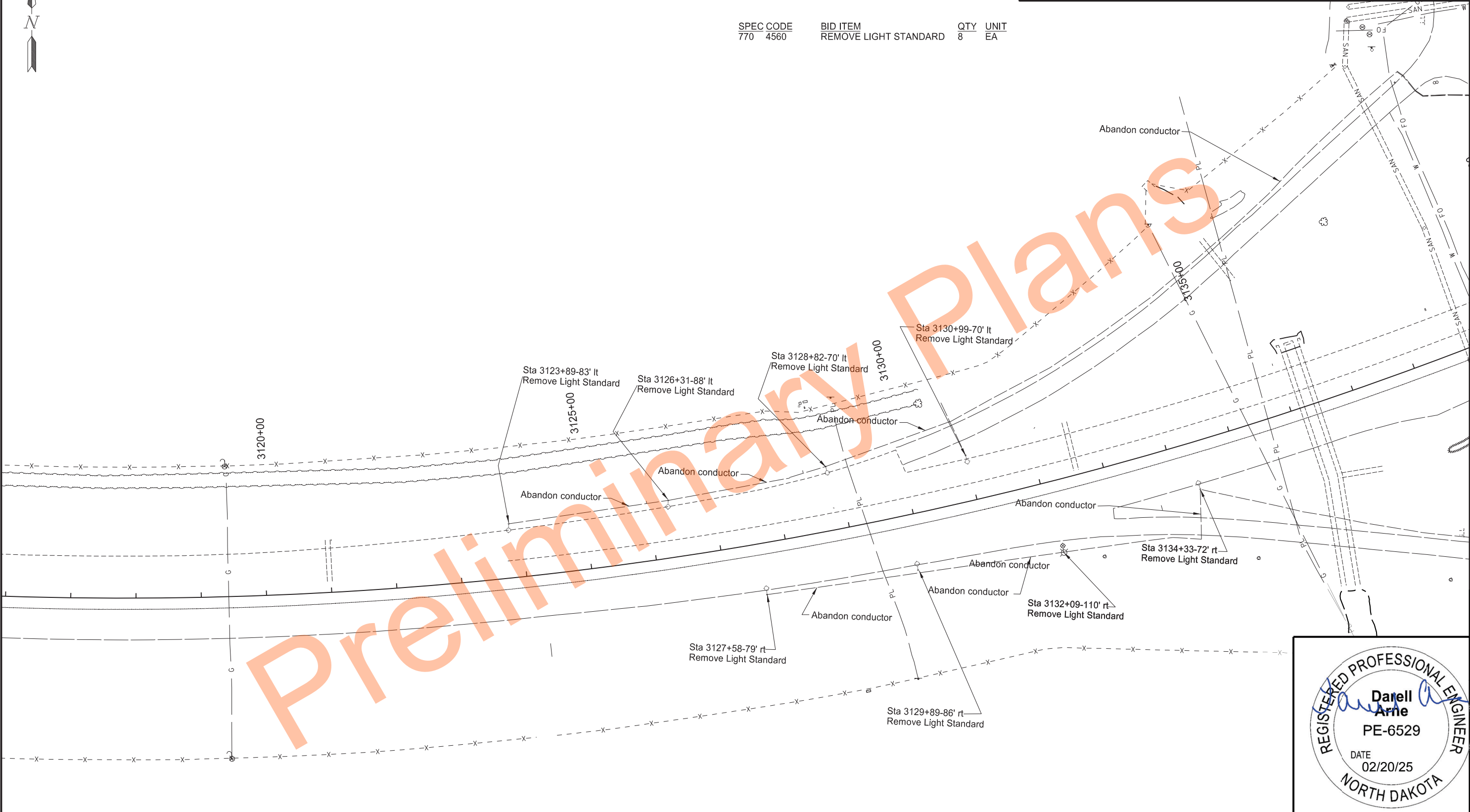


1-94



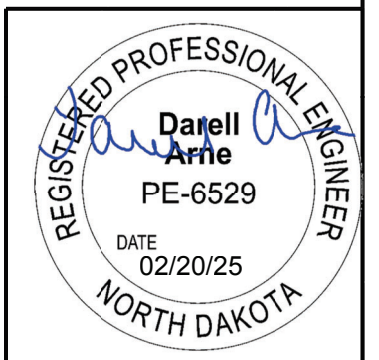
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	1

SPEC CODE	BID ITEM	QTY	UNIT
770 4560	REMOVE LIGHT STANDARD	8	EA



Removals
Existing Lighting System
I-94 Exit 59 Interchange
Dickinson

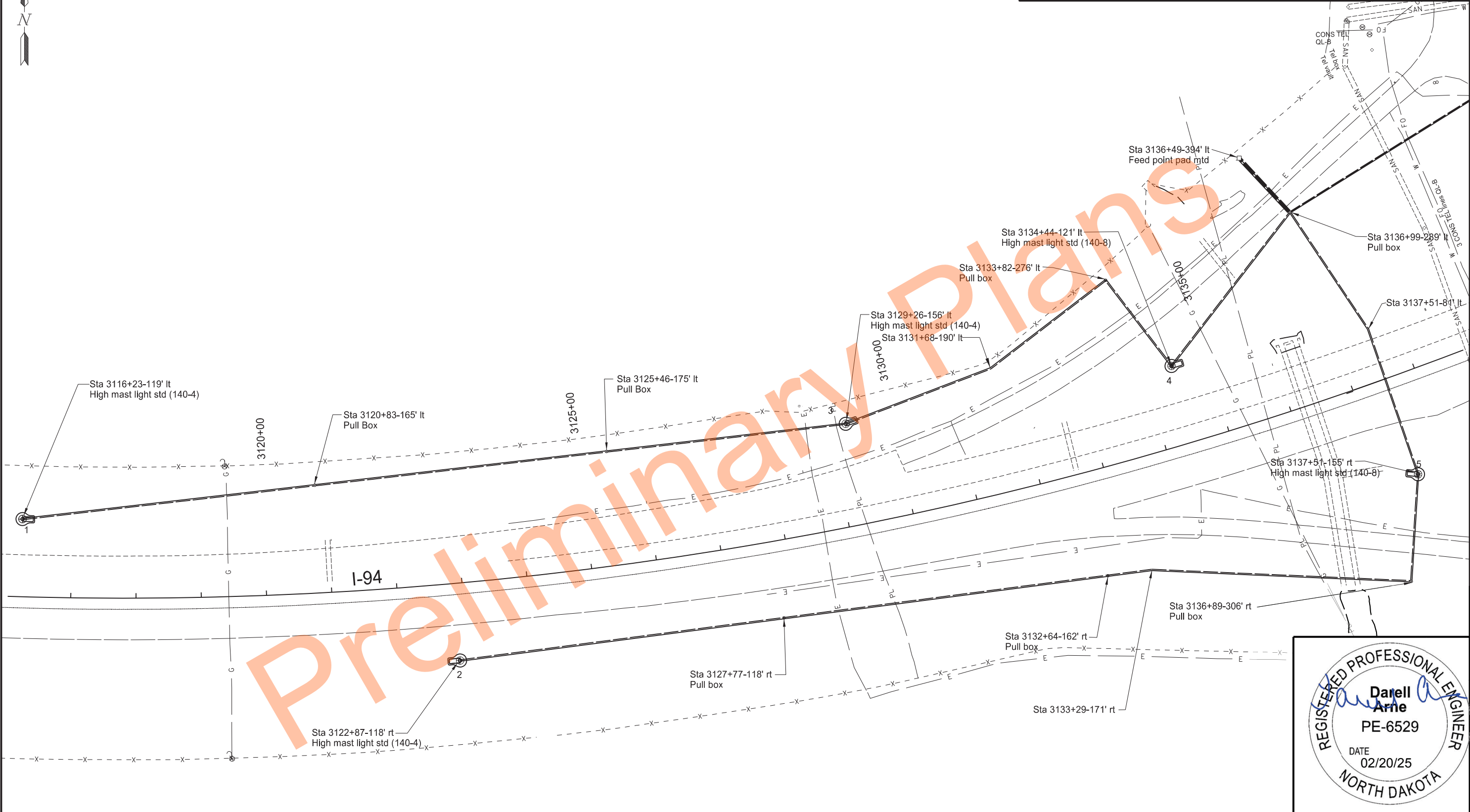
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770	4560	REMOVE LIGHT STANDARD	11	EA



Dickinson



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	3



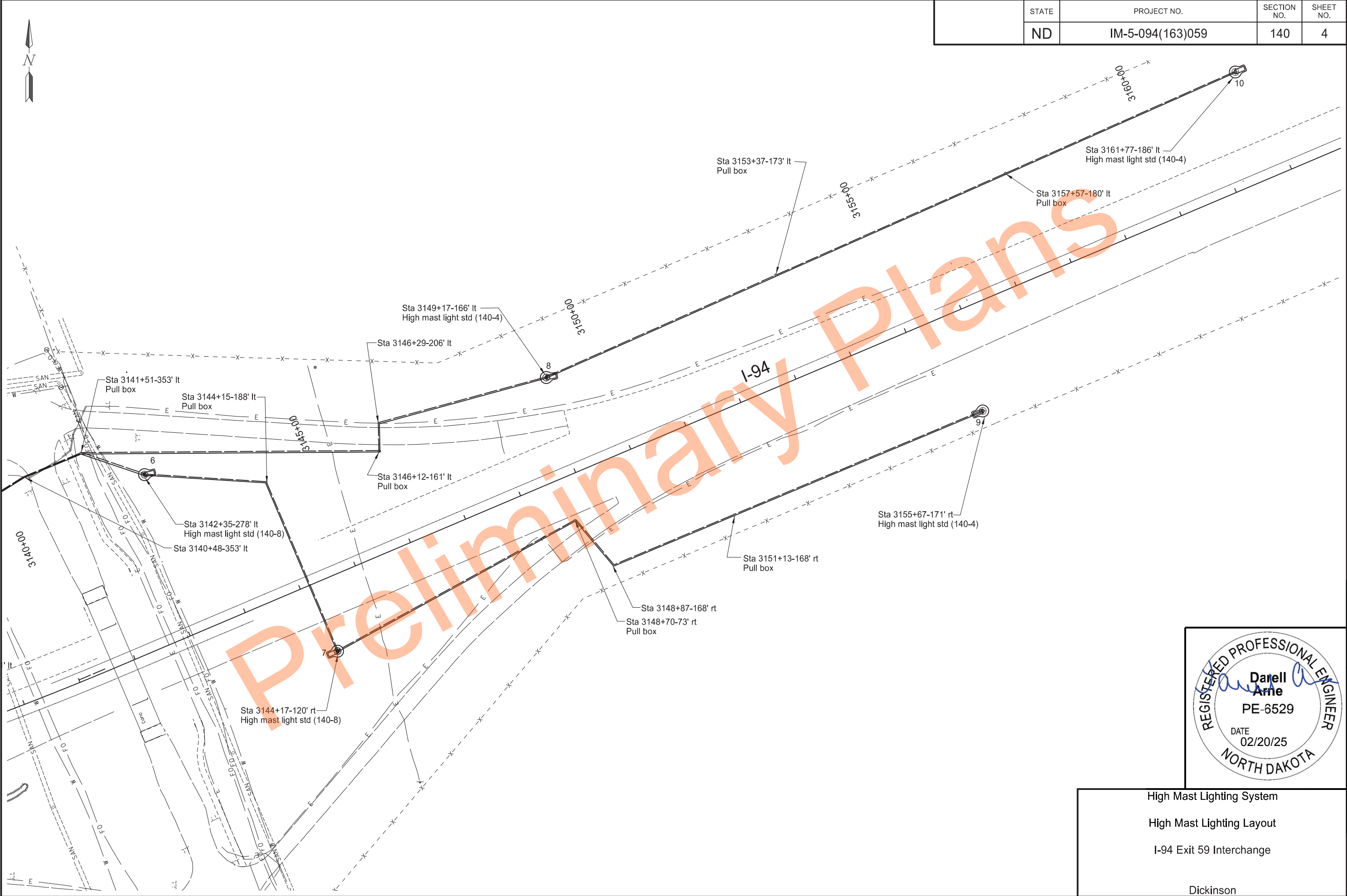
High Mast Lighting System

High Mast Lighting Layout

I-94 Exit 59 Interchange

Dickinson

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	140	4



High Mast Lighting System

High Mast Lighting Layout

I-94 Exit 59 Interchange

Dickinson

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	5

Light Std Number	Station	Conduit Runs		Cable Runs	
		LF	Dia	LF	Type
1 PB PB 3	Sta 3116+23-119' rt to Sta 3120+83-165' lt to Sta 3125+46-175' lt to Sta 3129+26-156' lt	449	2"	3858	3 No. 4 RHW
		450	2"	1286	4 No. 6 THW
		367	2"		
2 PB PB Bend PB 5	Sta 3122+87-118' rt to Sta 3127+77-118' rt to Sta 3132+64-162' rt to Sta 3133+29-171' rt to Sta 3136+89-306' rt to Sta 3137+51-155' rt	498	2"	4938	3 No. 4 RHW
		500	2"	1646	1 No. 6 THW
		398	2"		
		68	2"		
		162	2"		
3 Bend PB 4	Sta 3129+26-156' lt to Sta 3131+68-190' lt to Sta 3133+82-276' lt to Sta 3134+44-121' lt	396	2"	3105	3 No. 4 RHW
		68	2"	1035	1 No. 6 RHW
		551	2"		
4 PB FP	Sta 3134+44-121' lt to Sta 3136+99-289' lt to Sta 3136+49-394' lt	295	2"	1290	3 No. 4 RHW
		115	2"	430	1 No. 6 THW
5 Bend PB FP	Sta 3137+51-155' rt to Sta 3137+51-81' lt to Sta 3136+99-289' lt to Sta 3136+49-394' lt	386	2"	2268	3 No. 4 USE
		235	2"	756	1 No. 6 THW
		115	2" (A)		
10 PB PB 8	Sta 3161+77-186' lt to Sta 3157+57-180' lt Sta 3153+37-173' lt Sta 3149+17-166' lt	418	2"	3828	3 No. 6 RHW
		420	2"	1276	1 No. 6 THW
		418	2"		
9 PB Bend PB 7	Sta 3155+67-171' rt to Sta 3151+13-168' rt to Sta 3148+87-168' rt to Sta 3148+70-73' rt to Sta 3144+17-120' rt	448	2"	3708	3 No. 6 RHW
		218	2"	1236	1 No. 6 THW
		99	2"		
		451	2"		
8 Bend PB PB Bend PB FP	Sta 3149+17-166' lt to Sta 3146+29-206' lt to Sta 3146+12-161' lt to Sta 3141+51-353' lt to Sta 3140+48-353' lt to Sta 3136+99-289' lt to Sta 3136+49-394' lt	288	2"	4215	3 No. 4 RHW
		47	2"	1405	1 No. 6 THW
		499	2"		
		103	2"		
		333	2"		
		115	2"		
7 PB 6	Sta 3144+17-120' rt to Sta 3144+15-188' lt to Sta 3142+35-278' lt	305	2"	1578	3 No. 2 RHW
		201	2"	526	1 No. 6 THW
6 PB Bend PB FP	Sta 3142+35-278' lt to Sta 3141+51-353' lt to Sta 3140+48-353 lt to Sta 3136+99-289' lt to Sta 3136+49-394' lt	110	2"	2121	3 No. 2 RHW
		128	2" (A)	707	1 No. 6 THW
		334	2" (A)		
		115	2" (A)		

(A) Conduit installed on previous run.

High Mast Lighting Quantities											
Concrete Foundation - Feed Point - Type B	2" Dia Rigid Conduit	Underground Coductor No. 2 Type RHW	Underground Coductor No. 4 Type RHW	Underground Coductor No. 6 Type RHW	Underground Coductor No. 6 Type THW	Feed Point - Type IV- Pad Mounted	LED Luminaire - High Mast	High Mast Lighting Assembly Type HM-140-4	High Mast Lighting Assembly Type HM-140-8	Concrete Foundation - High Mast Lighting	Pull Box
EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
1	9501	3699	19674	7536	10303	1	56	6	4	10	14

High Mast Light Standards					
No.	Hwy	Station	Circuit	IES-Type	Pole Ht.
1	I-94	3116+23-119' lt	1	Asym	140'
2	I-94	3122+87-118 rt	2	Asym	140'
3	I-94	3129+26-156' lt	1	Asym	140'
4	I-94	3134+44-121' lt	1	Sym	140'
5	I-94	3137+51-155' rt	2	Sym	140'
6	I-94	3142+35-278' lt	4	Sym	140'
7	I-94	3144+17-120' rt	4	Sym	140'
8	I-94	3149+17-166' lt	3	Asym	140'
9	I-94	3155+67-171' rt	4	Asym	140'
10	I-94	3161+77-186 lt	3	Asym	140'

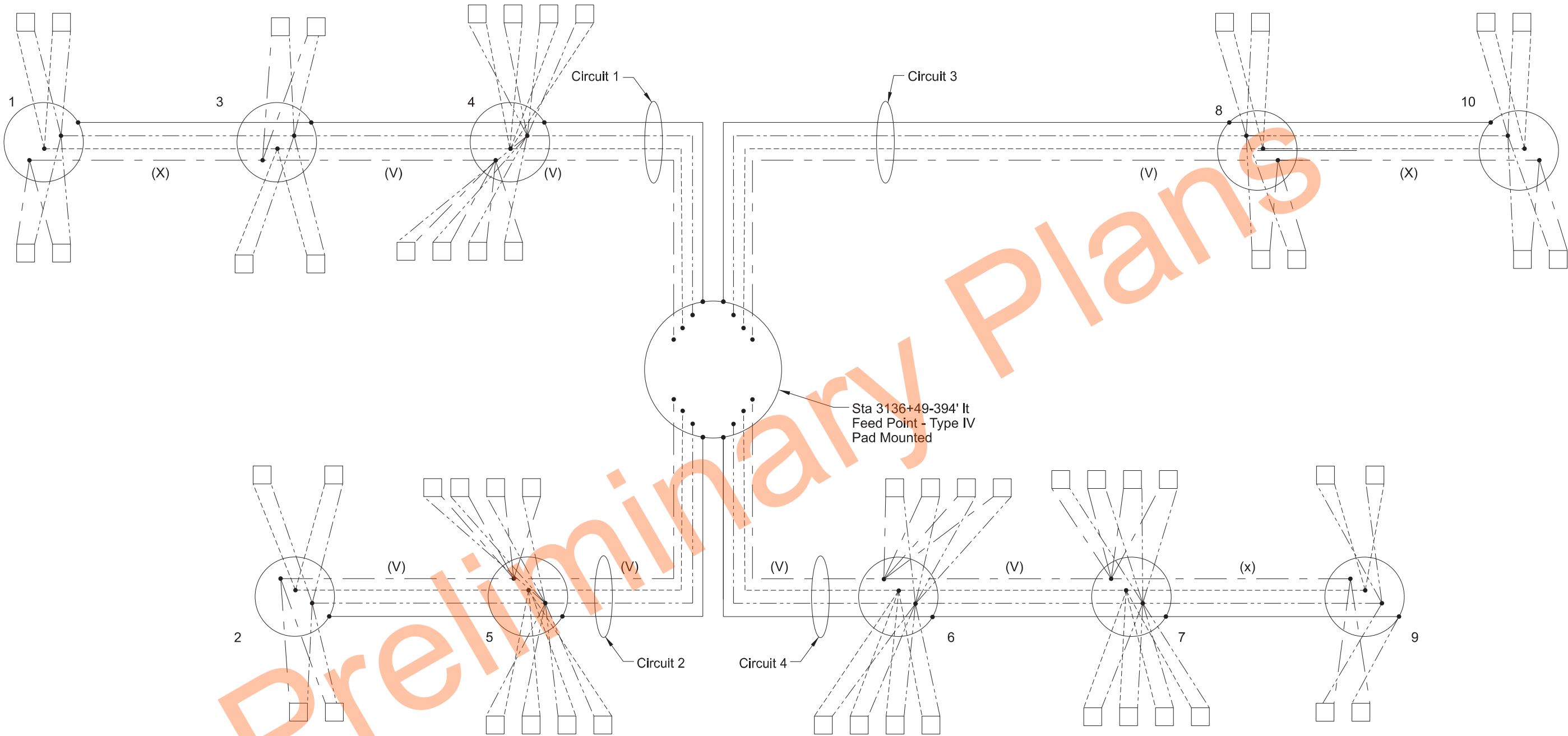
High Mast Lighting Quantities

I-94 - Exit 59

Dickinson



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	6



Sta 3136+49-394' It
Feed Point - Type IV
Pad Mounted

Legend

- Ground Conductor
- Nuetral Conductor
- Phase Conductor
- Phase Conductor
- (V) 3 No. 4 RHW
1 No. 6 THW
- (X) 3 No. 6 RHW
1 No. 6 THW

- LED High Mast Luminaire
240v x 480v operated on 240v
- High Mast Light Standard
- 3 High mast Light Standard Number

High Mast Lighting System

Lighting Schematic - Feed Point

I-94 - Exit 59

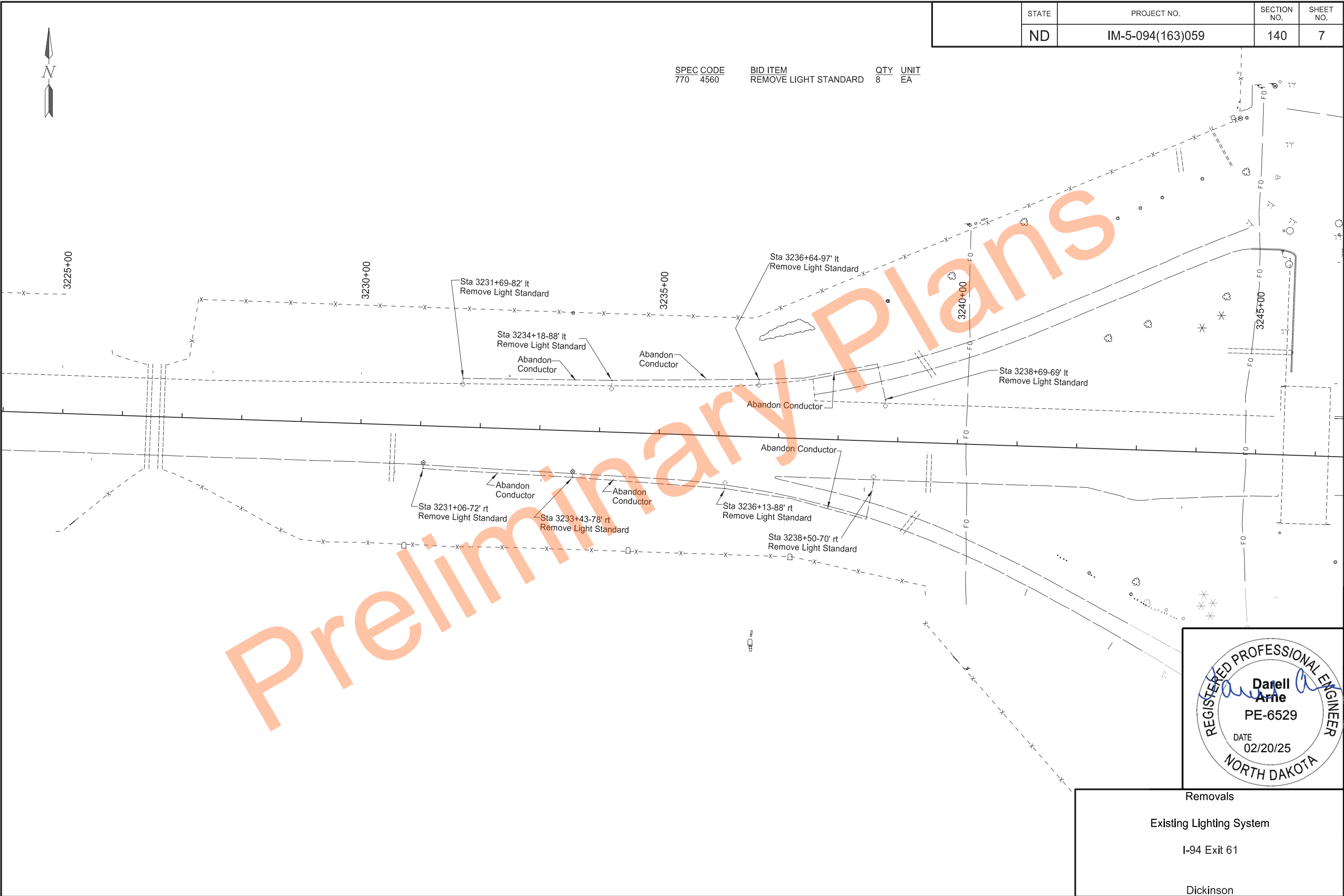
Dickinson





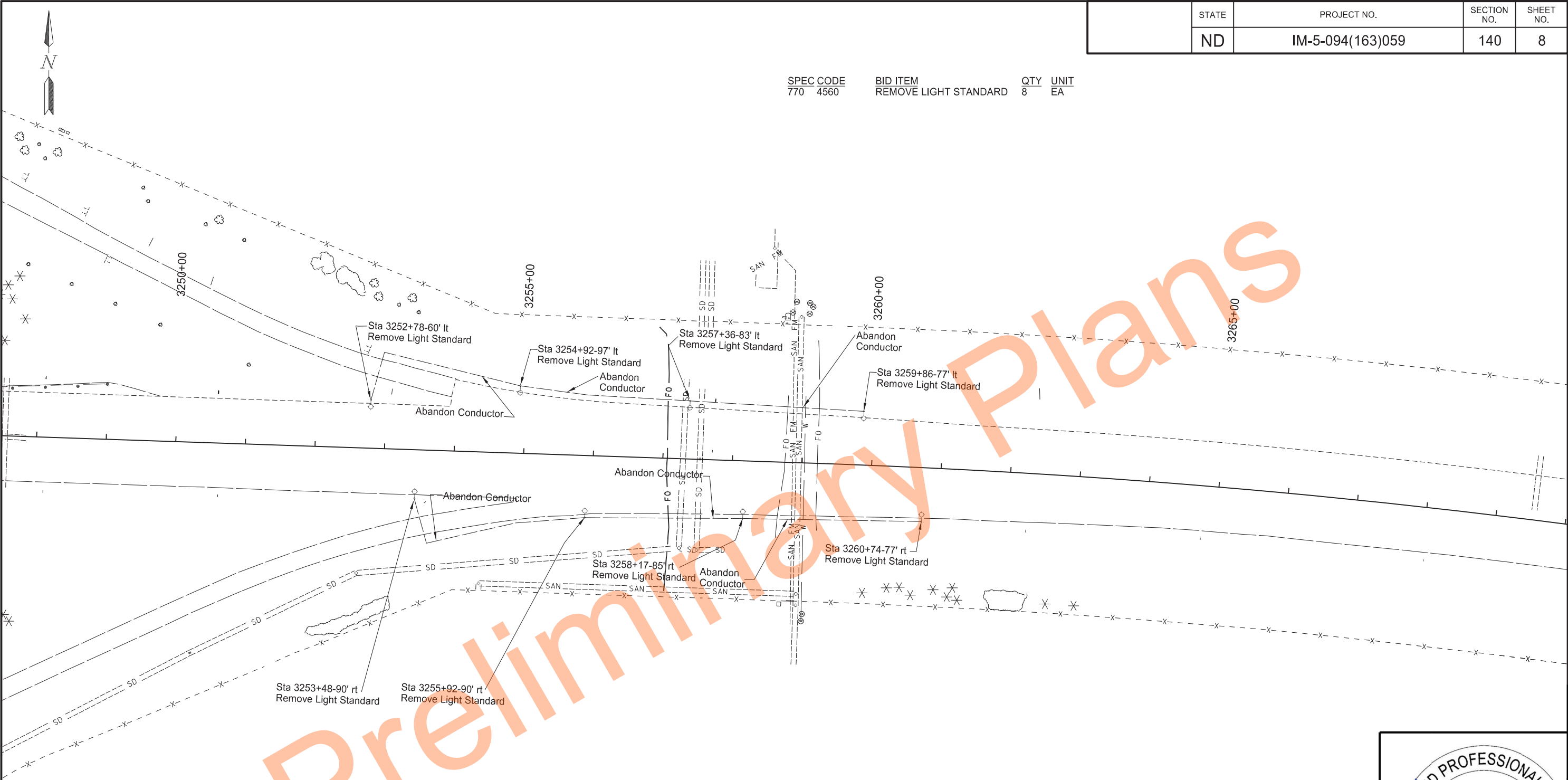
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	140	7

SPEC CODE	BID ITEM	QTY	UNIT
770 4560	REMOVE LIGHT STANDARD	8	EA

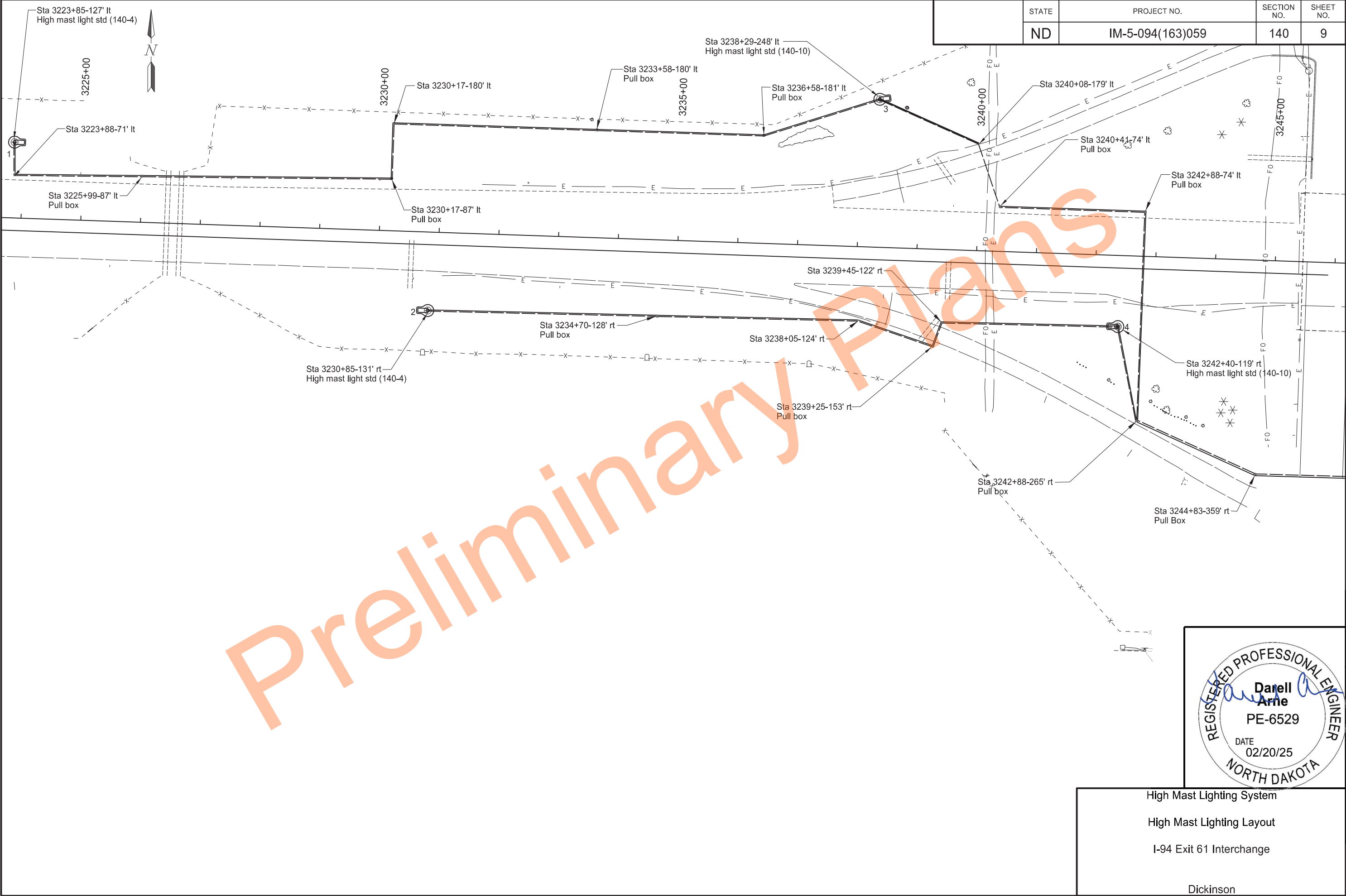


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	8

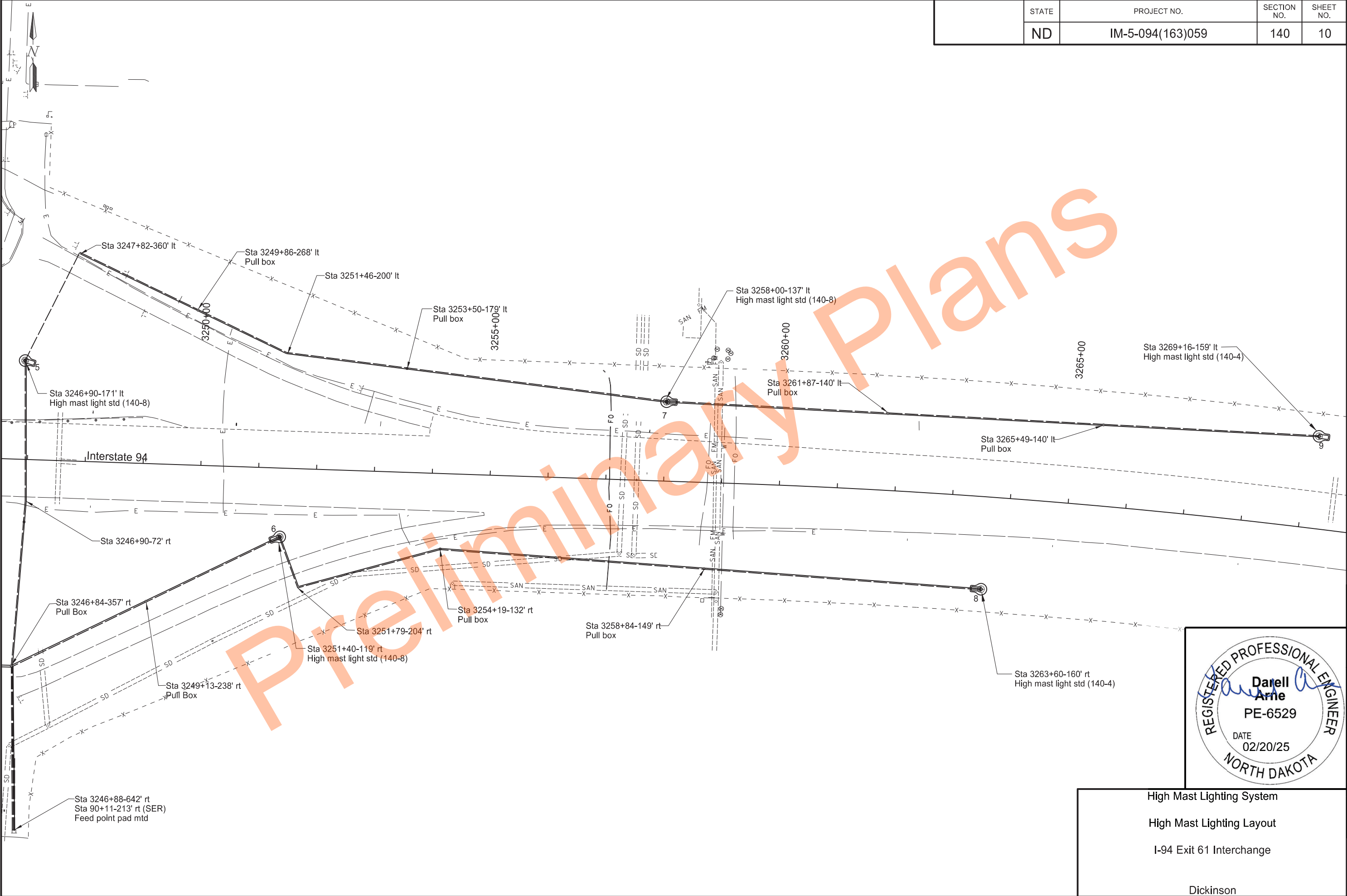
SPEC CODE	BID ITEM	QTY	UNIT
770 4560	REMOVE LIGHT STANDARD	8	EA



Removals
Existing Lighting System
I-94 Exit 61 Interchange
Dickinson



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	10



High Mast Lighting System
High Mast Lighting Layout
I-94 Exit 61 Interchange

Dickinson

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	140	11

Light Std Number	Station	Conduit Runs		Cable Runs	
		LF	Dia	LF	Type
1 Bend PB PB Bend PB PB 3	Sta 3223+85-127' lt to Sta 3223+88-71' lt to Sta 3225+99-87' lt to Sta 3230+-17-87' lt to Sta 3230+-17-180' lt to Sta 3233+-58-180' lt to Sta 3236+-58-181' lt to Sta 3238+-29-248' lt	53 213 418 93 341 280 201	2" 2" 2" 2" 2" 2" 2"	4857 1619	3 No. 2 RHW 1 No. 6 THW
2 PB Bend PB Bend 4	Sta 3230+85-131' rt to Sta 3234+70-128' rt to Sta 3238+05-124' rt to Sta 3239+25-153' rt to Sta 3239+45-122' rt to Sta 3242+40-119' rt	382 336 132 42 293	2" 2" 2" 2" 2"	3615 1205	3 No. 6 RHW 1 No. 6 THW
3 Bend PB PB PB PB PB PB FP	Sta 3238+29-248' lt to Sta 3240+08-179' lt to Sta 3240+41-74' lt to Sta 3242+88-74' lt to Sta 3242+88-265' rt to Sta 3244+83-359' rt to Sta 3246+84-357' rt to Sta 3246+88-642' rt	179 113 243 289 217 206 285	2" 2" 2" 2" 2" 2" 2"	4656 1552	3 No. 2 RHW 1 No. 6 THW
4 PB PB PB PB FP	Sta 3242+40-119' rt to Sta 3242+88-265' rt to Sta 3244+83-359' rt to Sta 3246+84-357' rt to Sta 3246+88-642' rt	159 217 206 285	2" 2" (A) 2" (A) 2" (A)	2661 887	3 No. 4 RHW 1 No. 6 THW
9 PB PB 7	Sta 3269+16-159' lt to Sta 3265+49-140' lt to Sta 3261+87-140' lt to Sta 3258+00-137' lt	371 373 381	2" 2" 2"	3435 1145	3 No. 2 RHW 1 No. 6 THW
8 PB PB Bend 6	Sta 3263+60-160' rt to Sta 3258+84-149' rt to Sta 3254+19-132' rt to Sta 3251+79-204' rt to Sta 3251+40-119' rt	478 457 254 91	2" 2" 2" 2"	3900 1300	3 No. 6 RHW 1 No. 6 THW
7 PB Bend PB Bend 5	Sta 3258+00-137' lt to Sta 3253+50-179' lt to Sta 3251+46-200' lt to Sta 3249+86-268' lt to Sta 3247+82-360' lt to Sta 3246+90-171' lt	450 210 170 227 206	2" 2" 2" 2" 2"	3849 1283	3 No. 2 RHW 1 No. 6 THW
5 Bend PB PB FP	Sta 3246+90-171' lt to Sta 3246+90-72' rt to Sta 3246+84-357' rt to Sta 3246+88-642' rt	241 285 285	2" 2" 2"	2493 831	3 No. 2 RHW 1 No. 6 THW
6 PB PB PB FP	Sta 3251+40-119' rt to Sta 3249+13-238' rt to Sta 3246+84-357' rt to Sta 3246+88-642' rt	255 257 285	2" 2" 2" (A)	2451 817	3 No. 4 RHW 1 No. 6 THW

(A) Conduit installed on previous run.

High Mast Lighting Quantities												
Concrete Foundation - Feed Point - Type B	Pull Box	2" Dia Rigid Conduit	Underground Coducor No. 2 Type RHW	Underground Coducor No. 4 Type RHW	Underground Coductor No. 6 Type RHW	Underground Coductor No. 6 Type THW	Feed Point - Type II- Pad Mounted	LED Luminaire - High Mast	High Mast Lighting Assembly Type HM-140-4	High Mast Lighting Assembly Type HM-140-8	High Mast Lighting Assembly Type HM-140-10	Concrete Foundation - High Mast Lighting
EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
1	18	9466	19290	5112	7515	10639	1	60	4	3	2	9

High Mast Light Standards					
No.	Hwy	Station	Circuit	IES-Type	Pole Ht.
1	I-94	3223+85-127' lt	1	Asym	140'
2	I-94	3230+85-131' rt	2	Asym	140'
3	I-94	3238+29-248' lt	1	Asym	140'
4	I-94	3242+40-119' rt	2	Sym	140'
5	I-94	3246+90-171' lt	3	Sym	140'
6	I-94	3251+40-119' rt	4	Sym	140'
7	I-94	3258+00-137' lt	3	Asym	140'
8	I-94	3263+60-160' rt	4	Asym	140'
9	I-94	3269+16-159' lt	3	Asym	140'

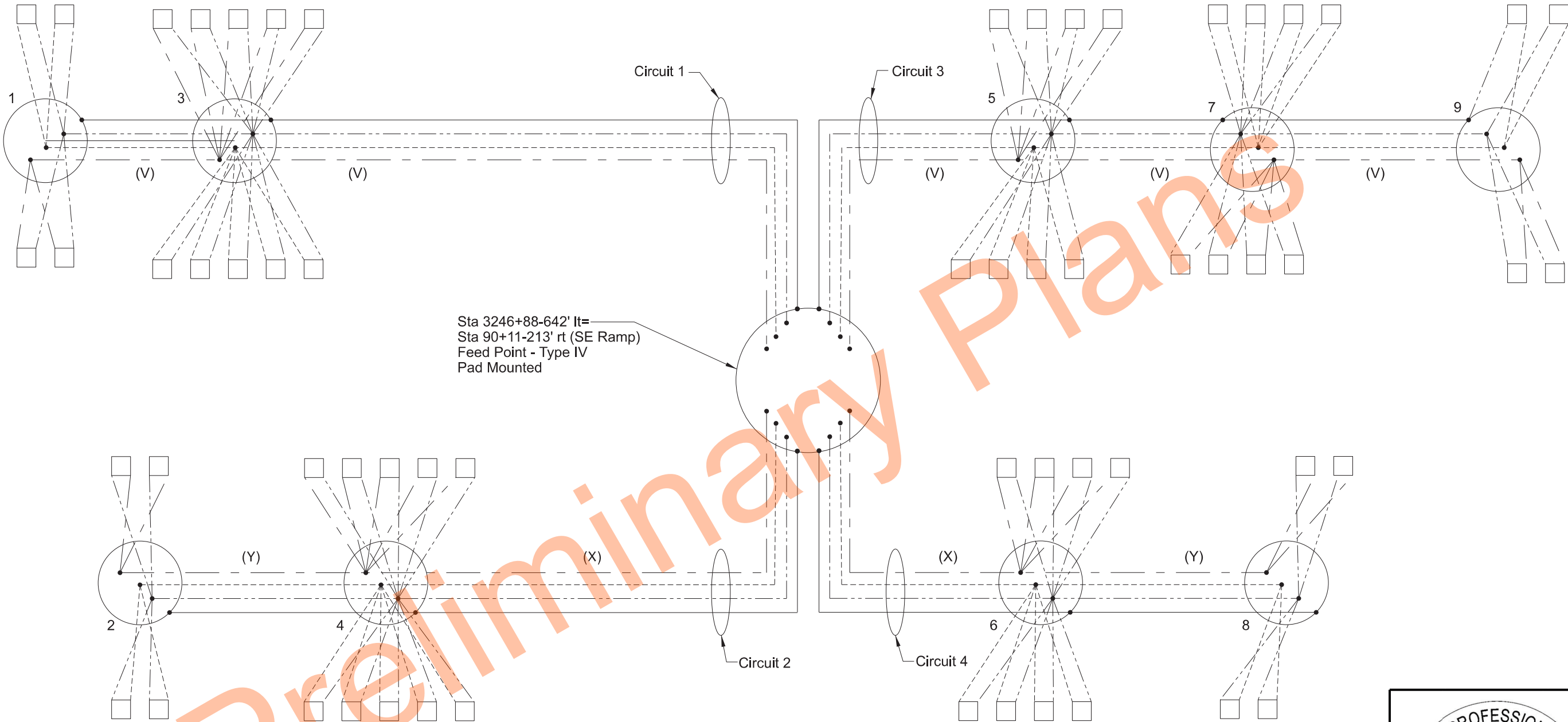
High Mast Lighting Quantities

I-94 - Exit 61

Dickinson



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	140	12



Sta 3246+88-642' It=
Sta 90+11-213' rt (SE Ramp)
Feed Point - Type IV
Pad Mounted

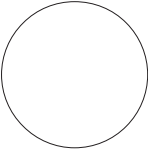
Legend

- Ground Conductor
- Nuetral Conductor
- Phase Conductor
- Phase Conductor

- (V) 3 No. 2 RHW
1 No. 6 THW
- (X) 3 No. 4 RHW
1 No. 6 THW
- (Y) 3 No. 6 RHW
1 No. 6 THW



LED High Mast Luminaire
240v x 480v operated on 240v



High Mast Light Standard

5

High mast Light Standard Number



High Mast Lighting System

Lighting Schematic - Feed Point

I-94 Exit 61 Interchange

Dickinson

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(163)059	140	13

HIGH MAST LIGHT FOUNDATION STANDARD LIST EXIT 59			
NO.	STATION/OFFSET	POLE HEIGHT	ELEV "A"
1	3116+23-119' Lt	140'	2524.03
2	3122+87-118' Rt	140'	2507.38
3	3129+26-156' Lt	140'	2479.47
4	3134+44-121' Lt	140'	2467.60
5	3137+51-155' Rt	140'	2461.84
6	3142+35-278' Lt	140'	2472.37
7	3144+17-120' Rt	140'	2472.39
8	3149+17-166' Lt	140'	2488.22
9	3155+67-171' Rt	140'	2521.22
10	3161+77-186' Lt	140'	2538.63

HIGH MAST LIGHT FOUNDATION STANDARD LIST EXIT 61			
NO.	STATION/OFFSET	POLE HEIGHT	ELEV "A"
1	3223+85-127' Lt	140'	2445.35
2	3230+85-131' Rt	140'	2443.74
3	3238+29-248' Lt	140'	2462.04
4	3242+40-119' Rt	140'	2449.56
5	3246+90-171' Lt	140'	2466.53
6	3251+40-119' Rt	140'	2457.12
7	3258+00-137' Lt	140'	2457.59
8	3263+60-160' Rt	140'	2467.78
9	3269+16-159' Lt	140'	2477.30

NOTES:

Include the concrete, reinforcing steel, wire fabric, preformed joint filler, excavation and labor required to build the foundation and service slab in the bid item "Concrete Foundation-High Mast Lighting."

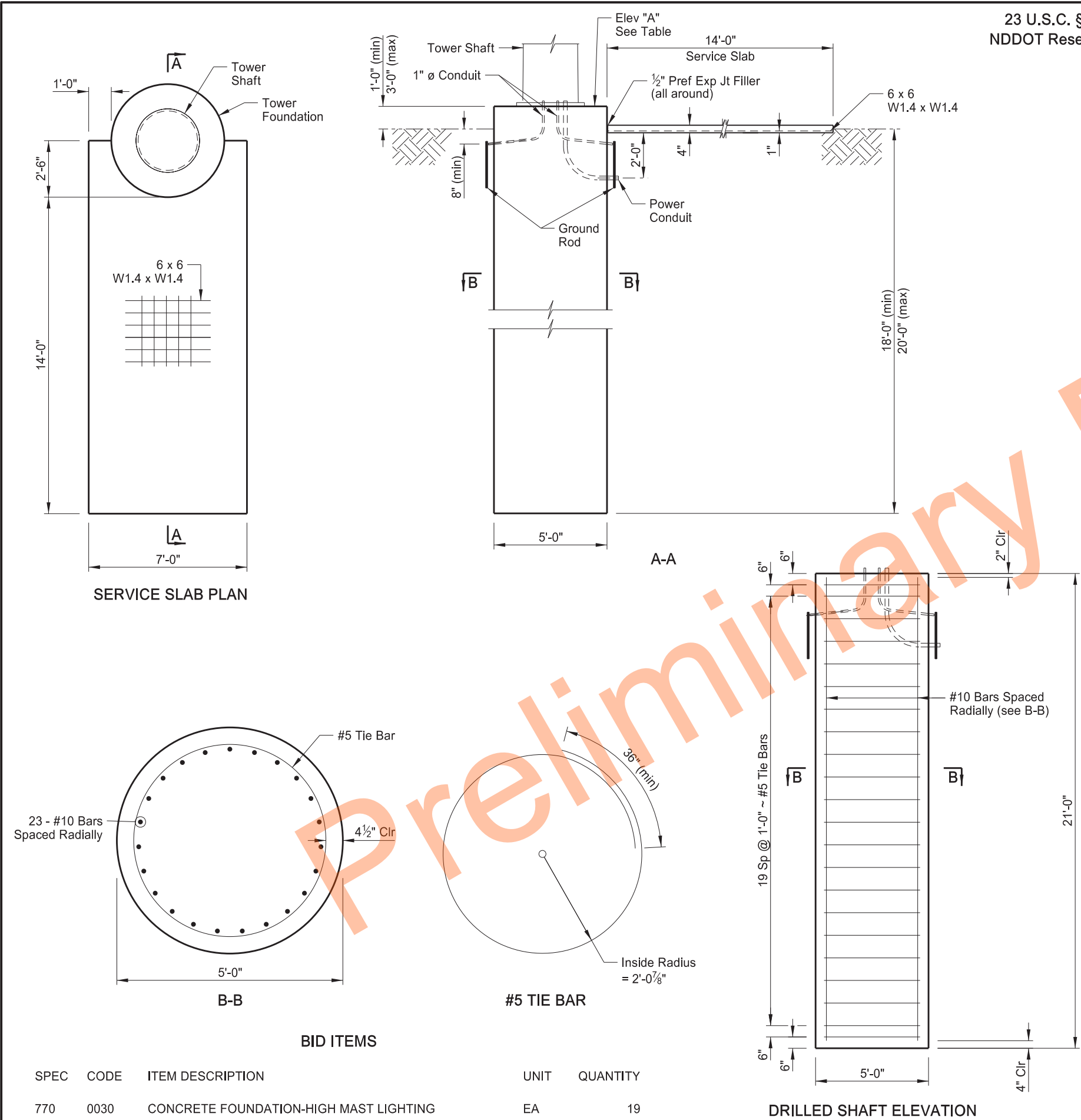
Estimated quantities (one 21'-0" foundation and service slab)
Class AE-3 Concrete 16.5 CY
* Reinforcing Steel 2,428 LBS

See pole shop drawings for anchorage details.

* Includes wire fabric.



SPECIAL PROVISIONS	
SP 365(24)	DRILLED SHAFT FOUNDATIONS
EXIT 59 AND EXIT 61	
CONCRETE FOUNDATION HIGH MAST LIGHTING DETAILS	
DRAWING NO.	



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	1

[illegible]

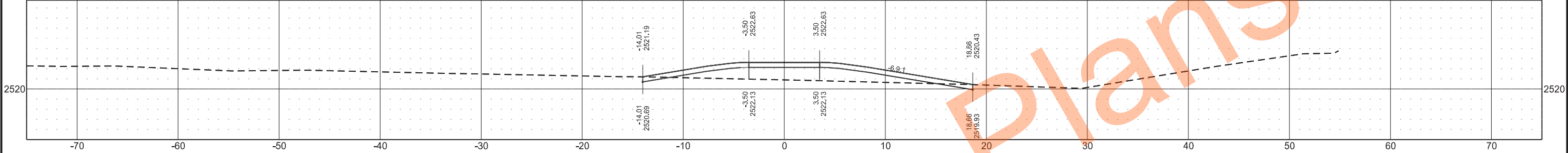
The graph shows the variation of the vertical displacement of the beam (mm) versus the distance from the left support (m). The x-axis ranges from -70 to 70 m, and the y-axis ranges from 2520 to 2520 mm. A dashed line represents the theoretical deflection, and a solid line represents the experimental deflection. The experimental deflection is measured at four points: -17.59 mm at -25.21 m, -9.65 mm at -25.23 m, 9.65 mm at 25.23 m, and 23.35 mm at 25.20 m. The theoretical deflection is shown as a dashed line with a slope of +6.1. The graph also includes a horizontal line at 2520 mm.

The figure shows the variation of the effective mass $m_{eff}^{\pm}$ as a function of the magnetic field B . The x-axis represents the magnetic field B in Tesla (T), ranging from -70 to 70. The y-axis represents the effective mass $m_{eff}^{\pm}$, ranging from 2520 to 2522. Two curves are plotted: a solid line for m_{eff}^{+} and a dashed line for m_{eff}^{-} . Both curves show a slight increase in mass with increasing magnetic field. Data points are labeled with their values and error bars.

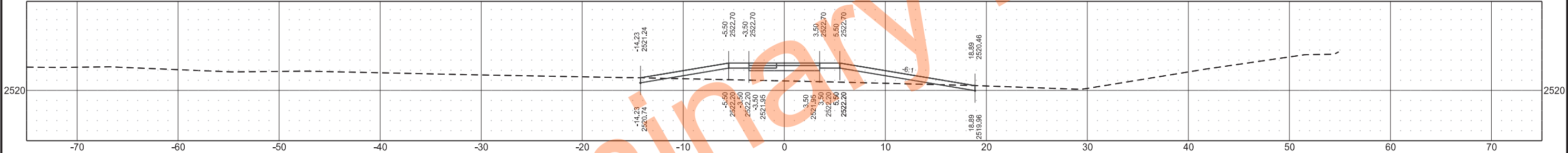
Magnetic Field B (T)	m_{eff}^{+}	m_{eff}^{-}
-14.02	2521.82	2521.32
19.44	2521.05	2520.55

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	2

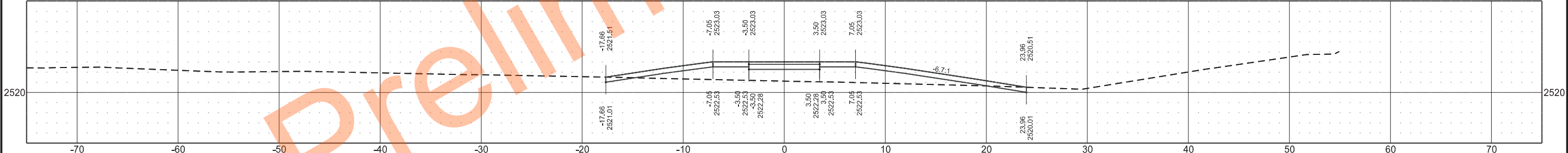
Sta 0+78.50



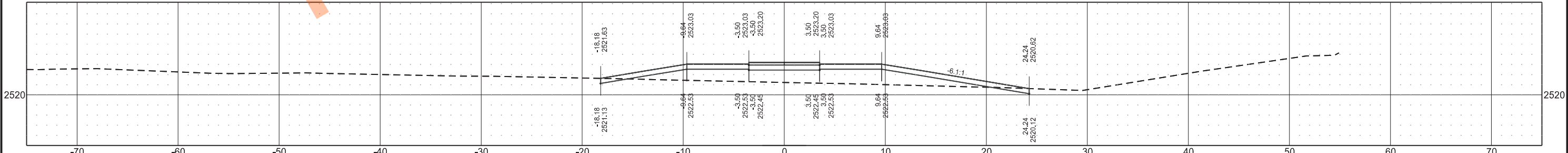
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Sta 0+67.17



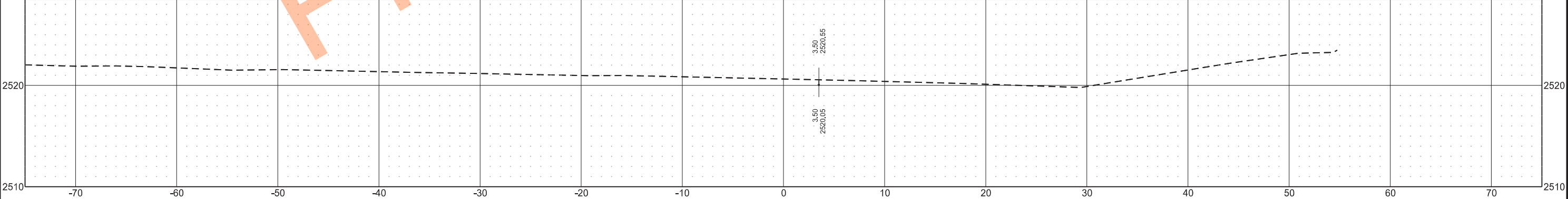
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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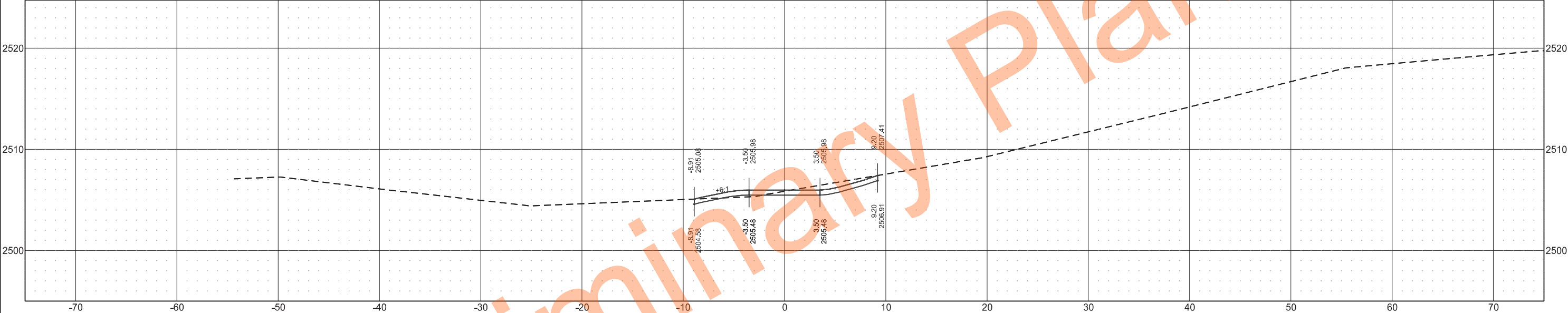
Preliminary Plans

Sta 0+90.92

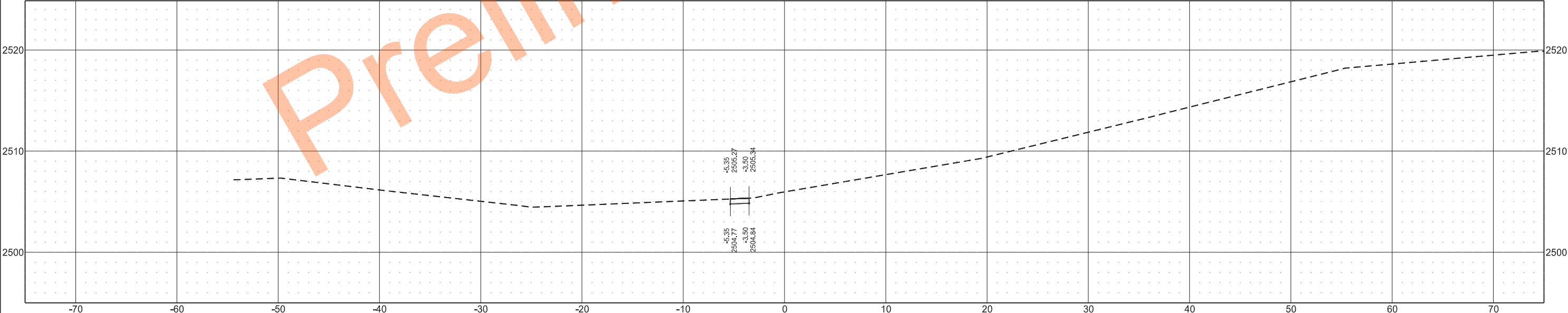


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Sta 0+41.50

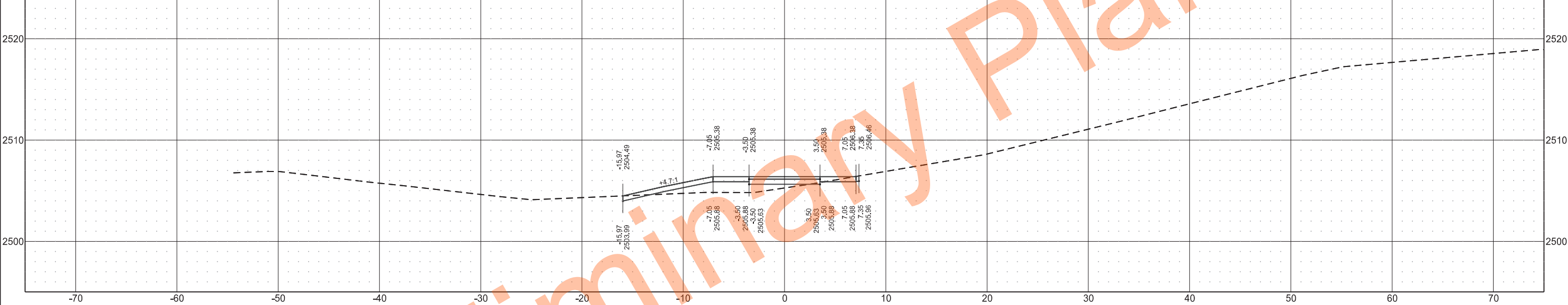


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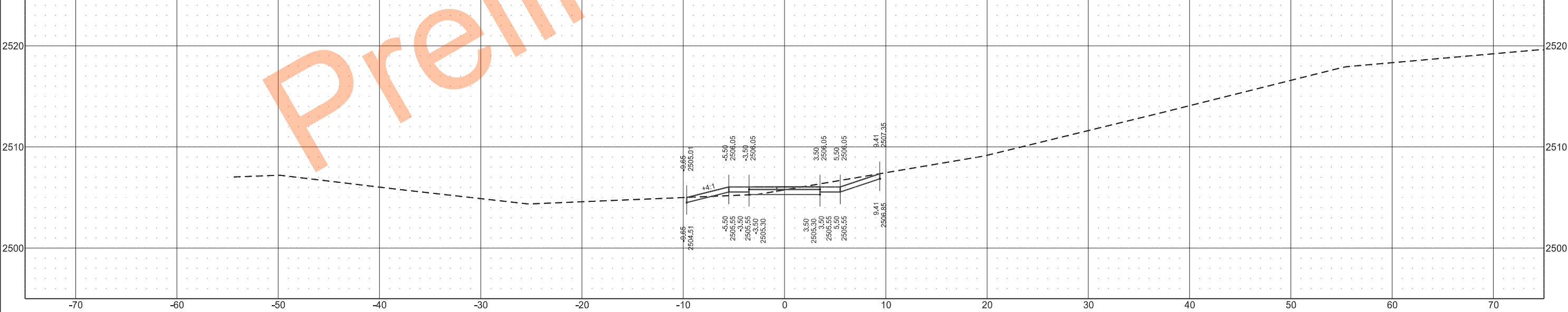


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	5

Sta 0+52.83



Sta 0+43.50



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PROJECT NO.

SHEET
NO.

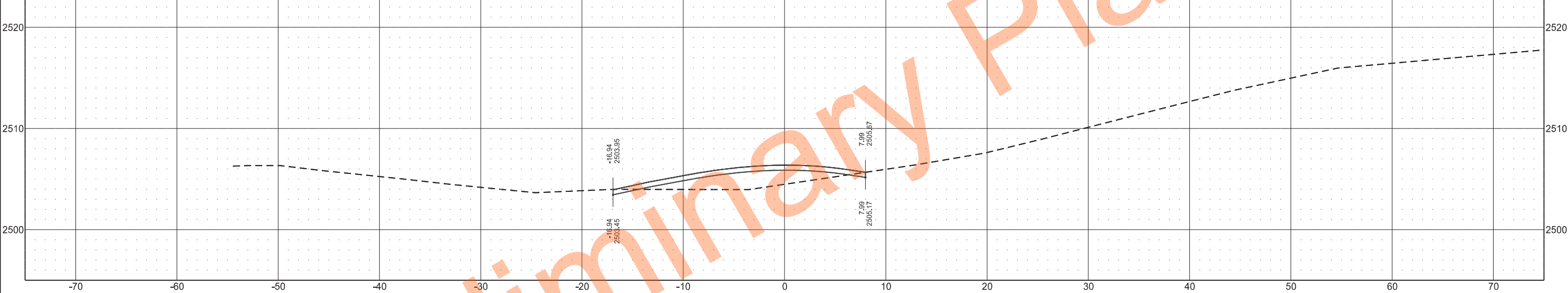
IM-5-094(163)059

200

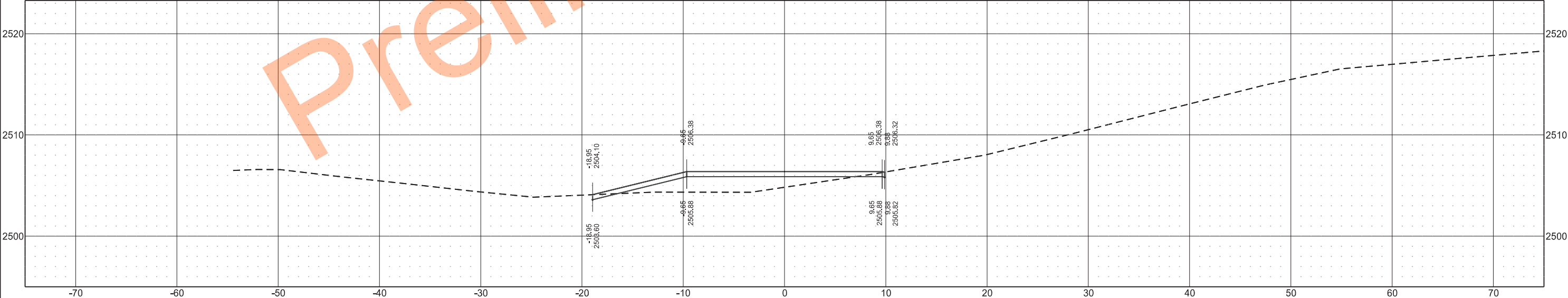
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Sta 0+70.00

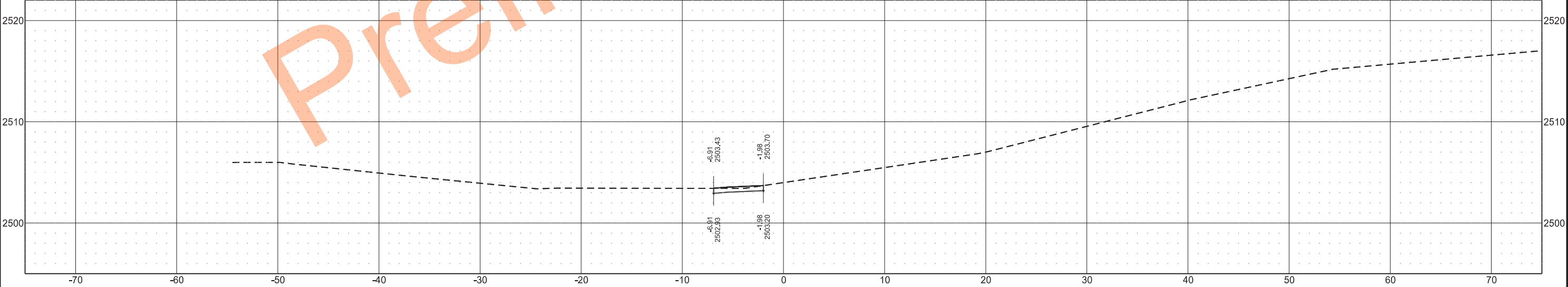


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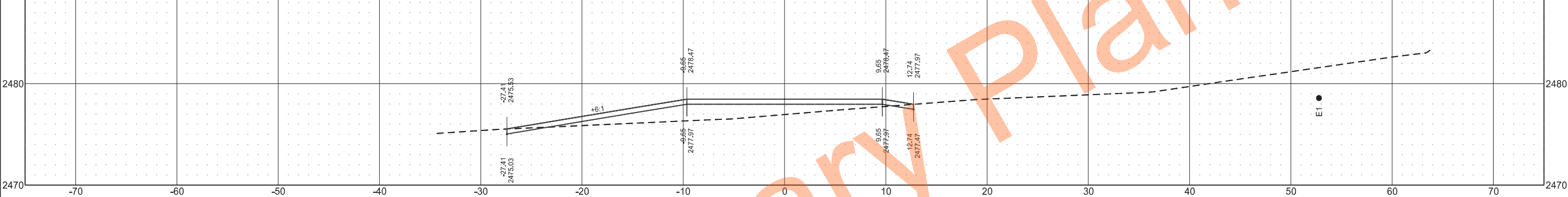
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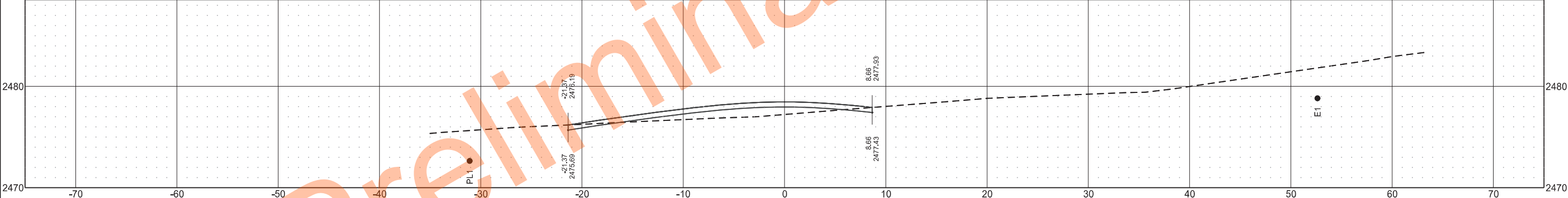


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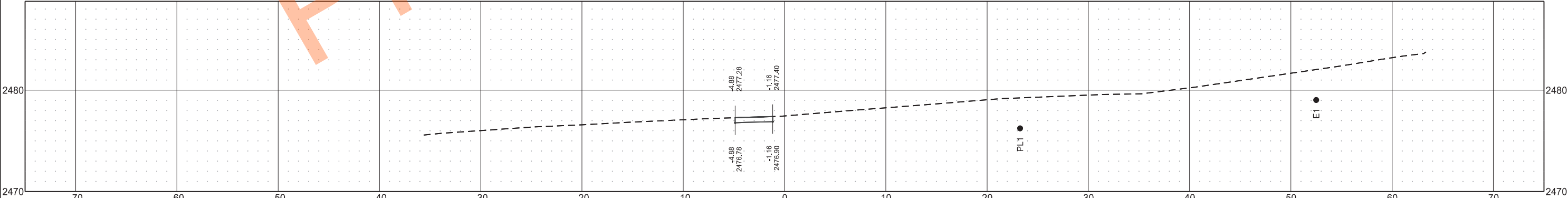
Sta 0+57.50



Sta 0+50.00

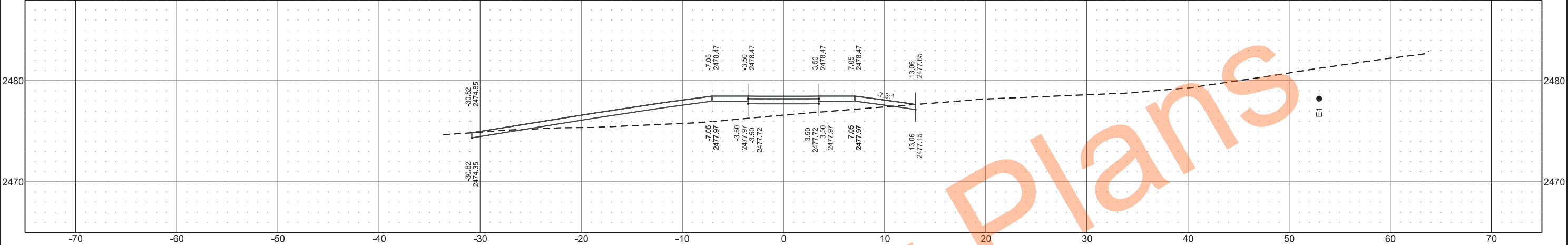


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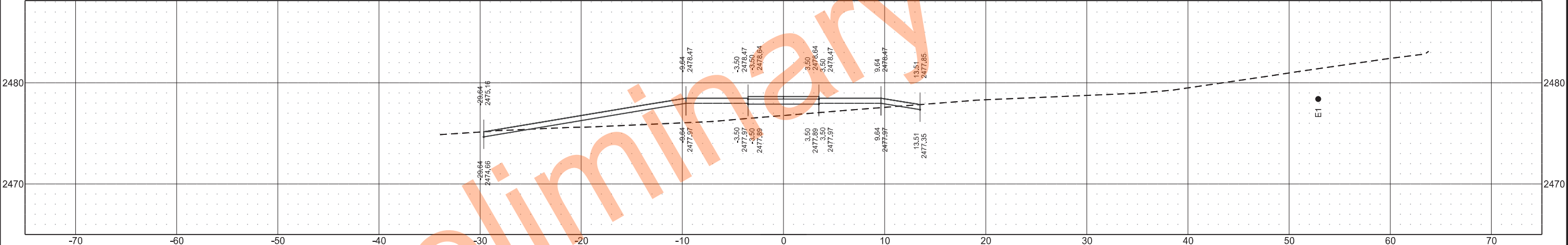


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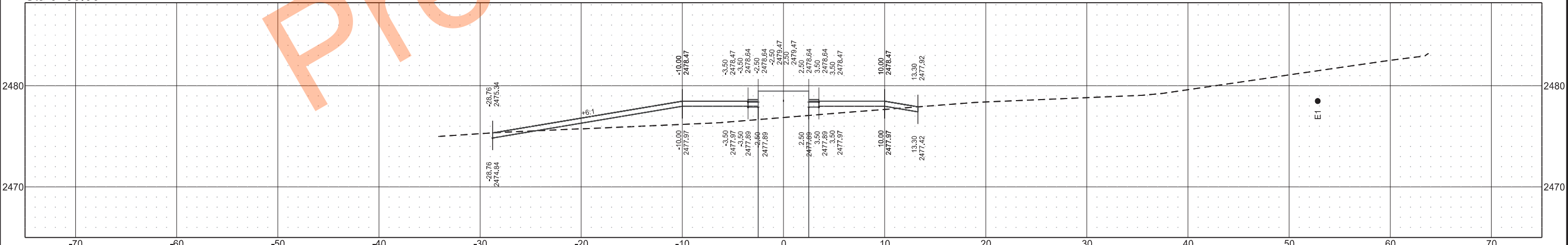
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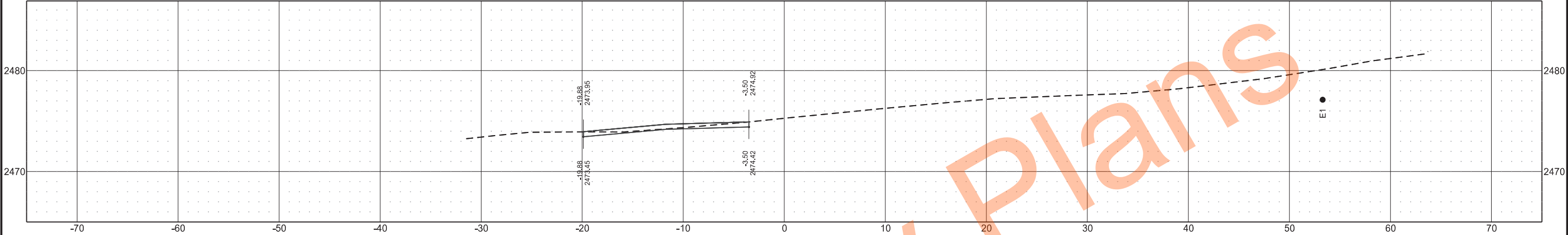


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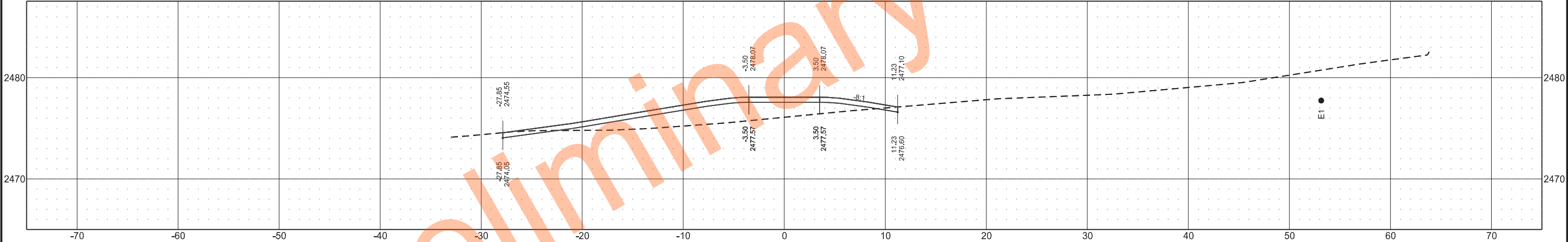


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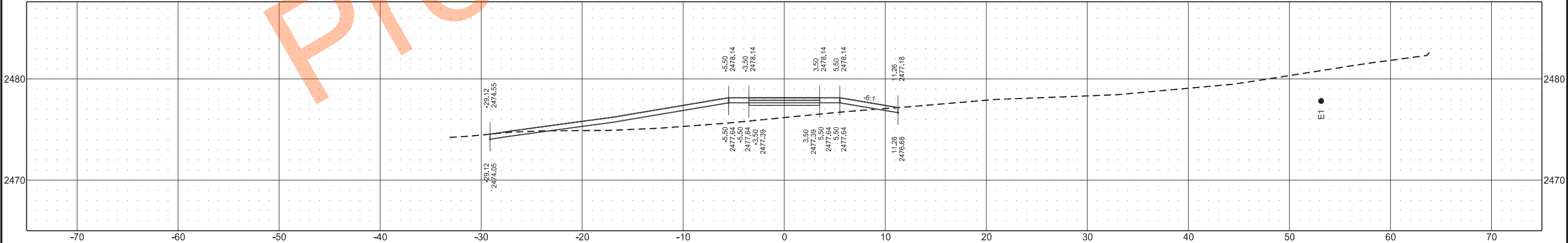
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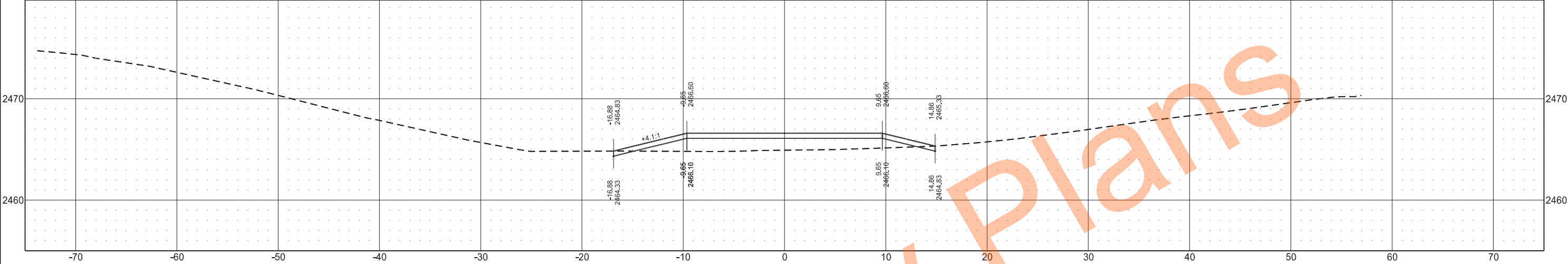


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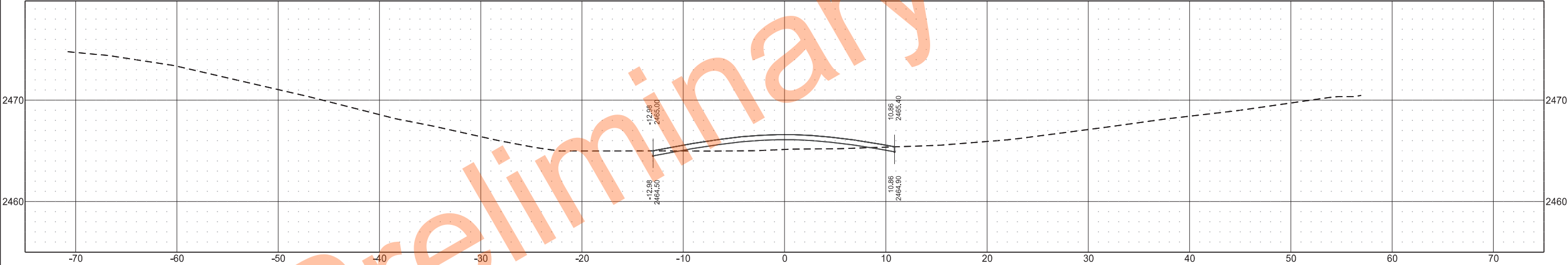


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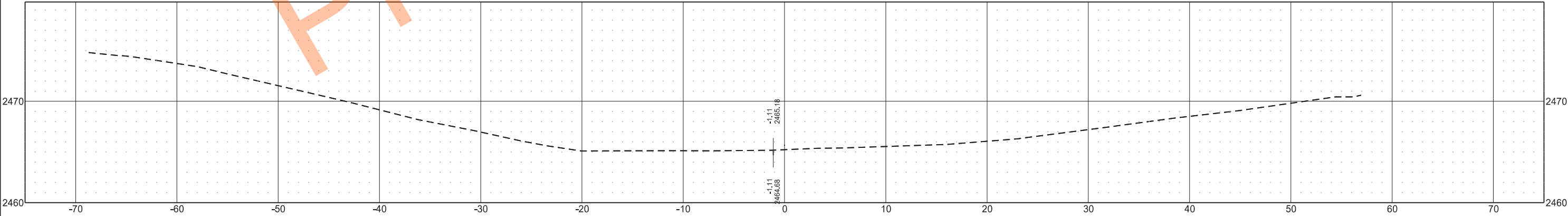
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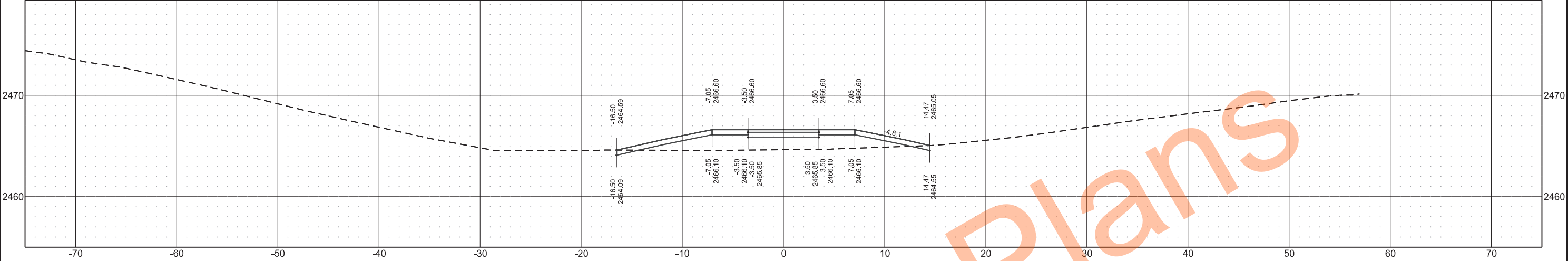


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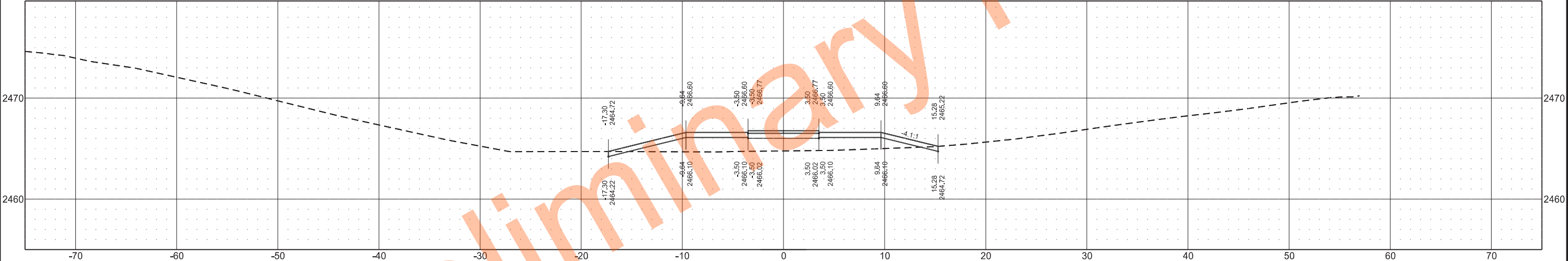


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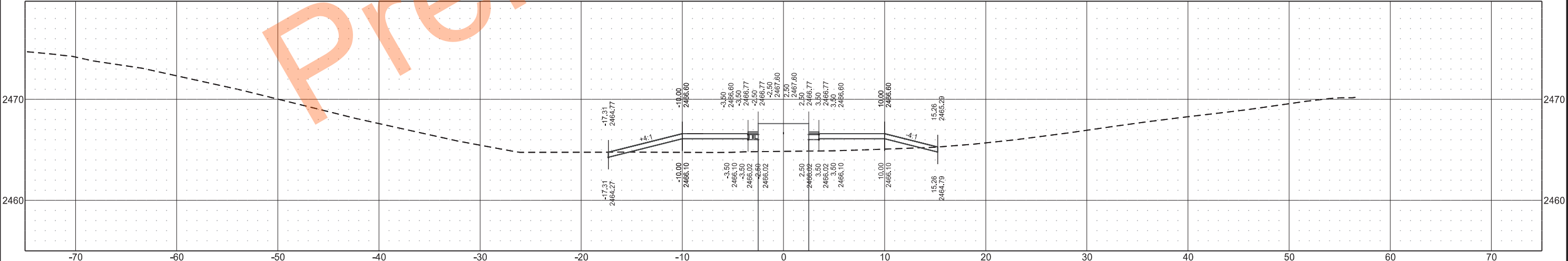
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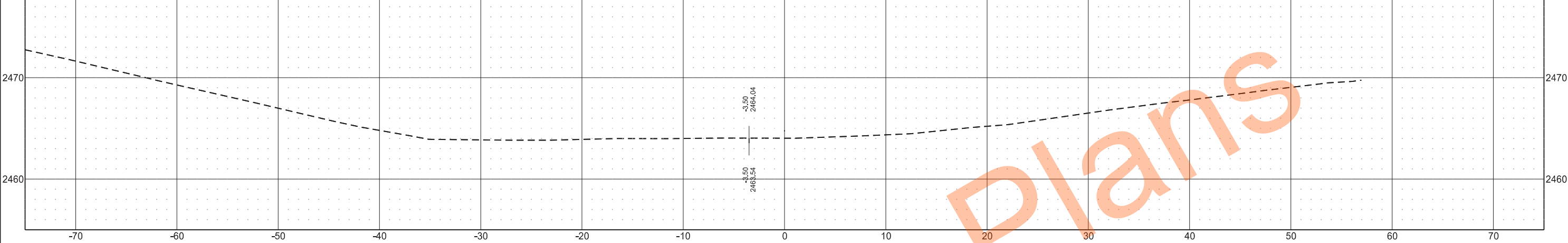


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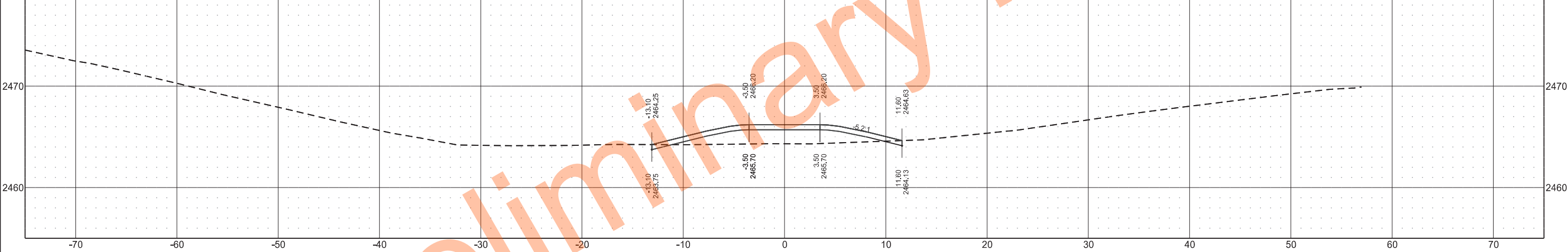


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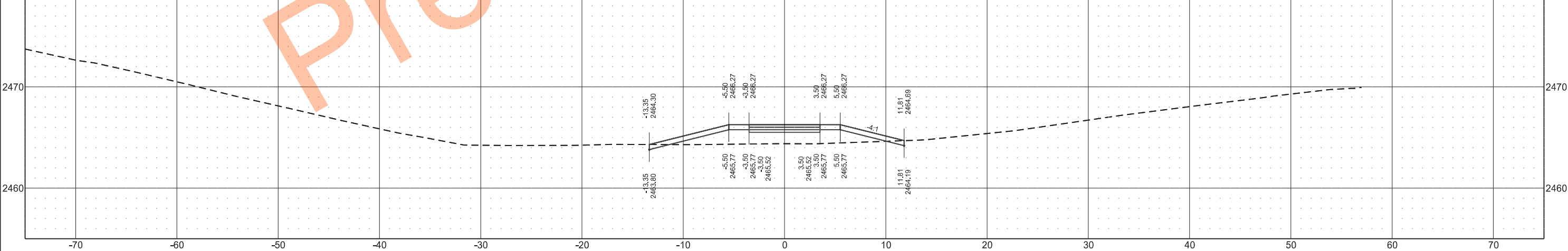
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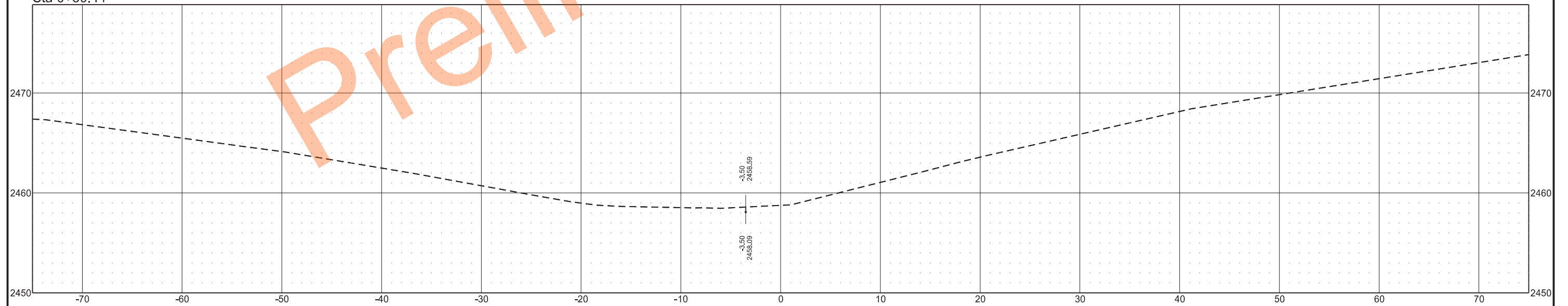
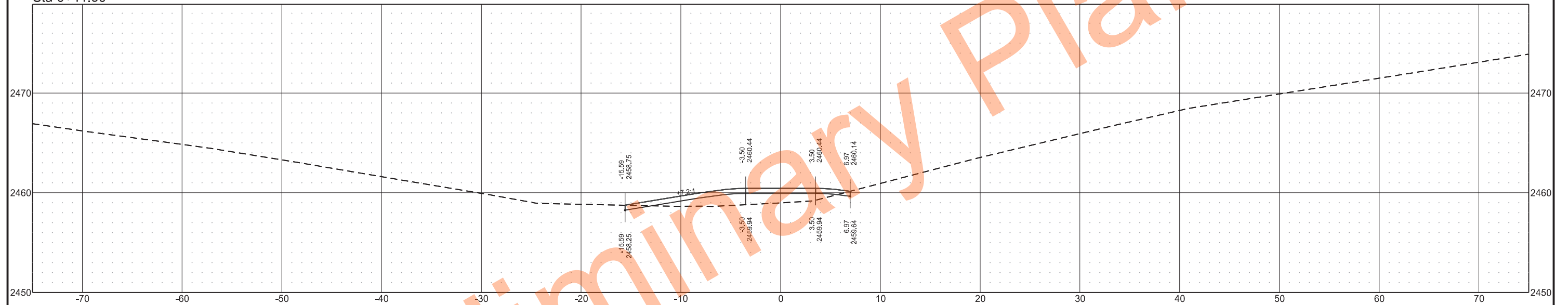
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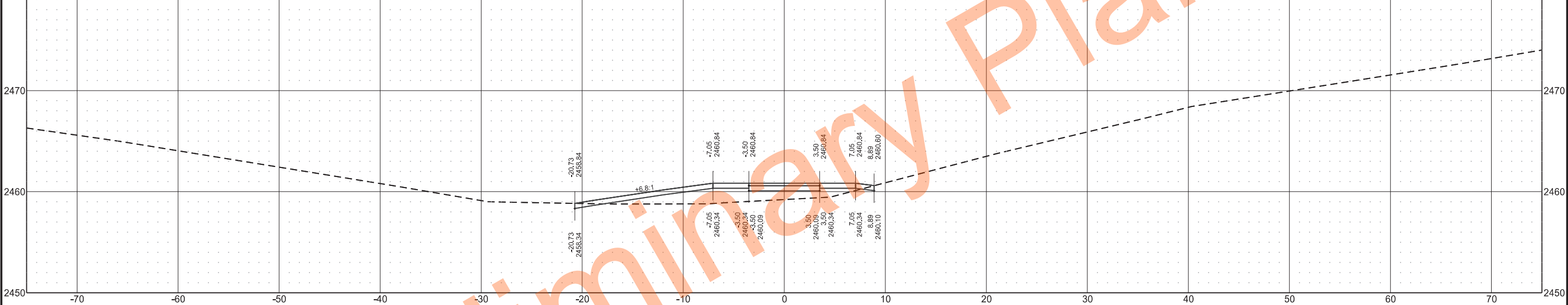
SHEET
NO.

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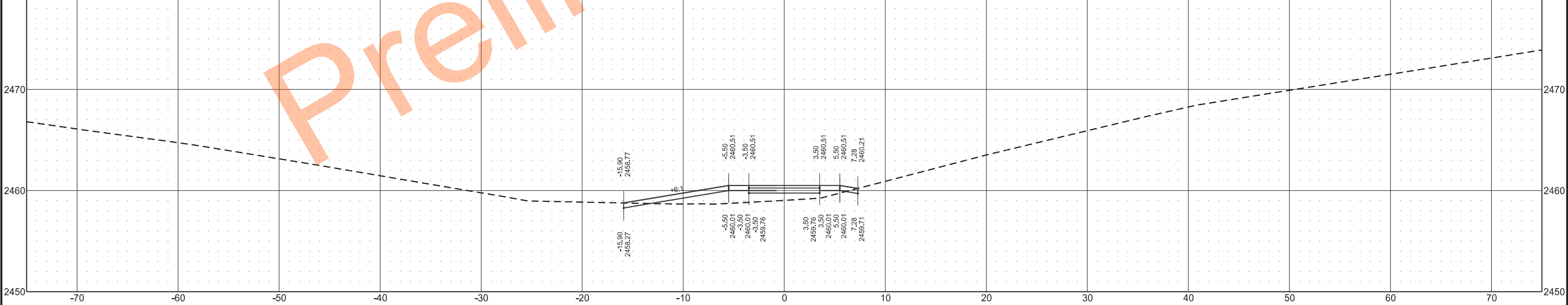


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Sta 0+52.83



Sta 0+43.50



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PROJECT NO.

SHEET
NO.

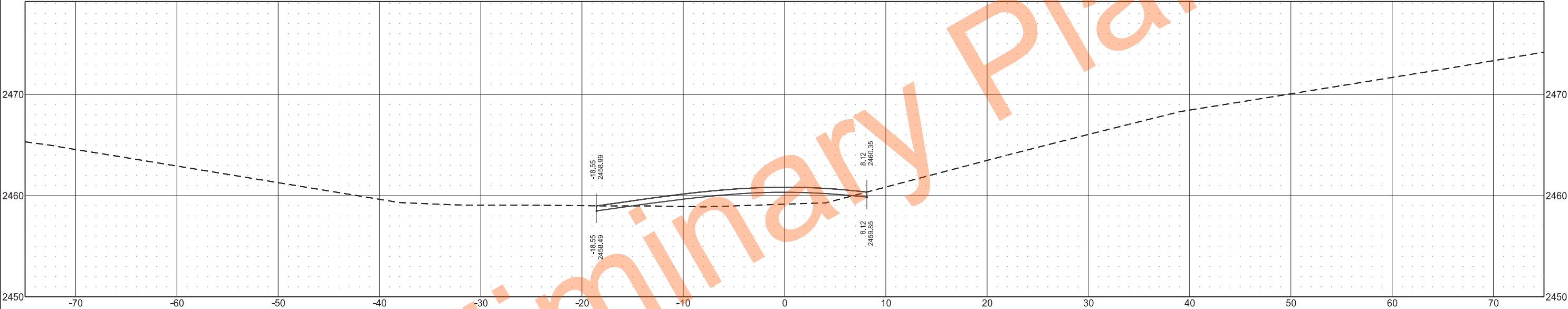
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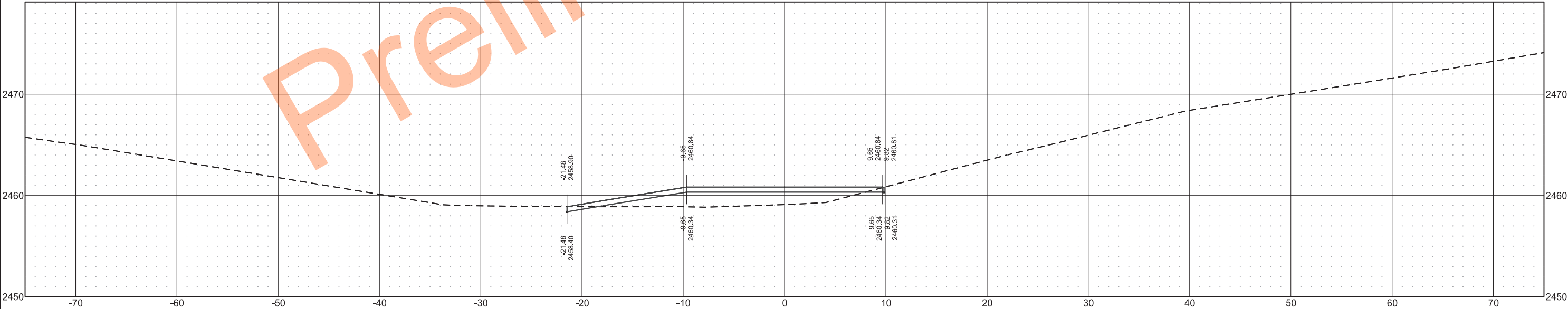
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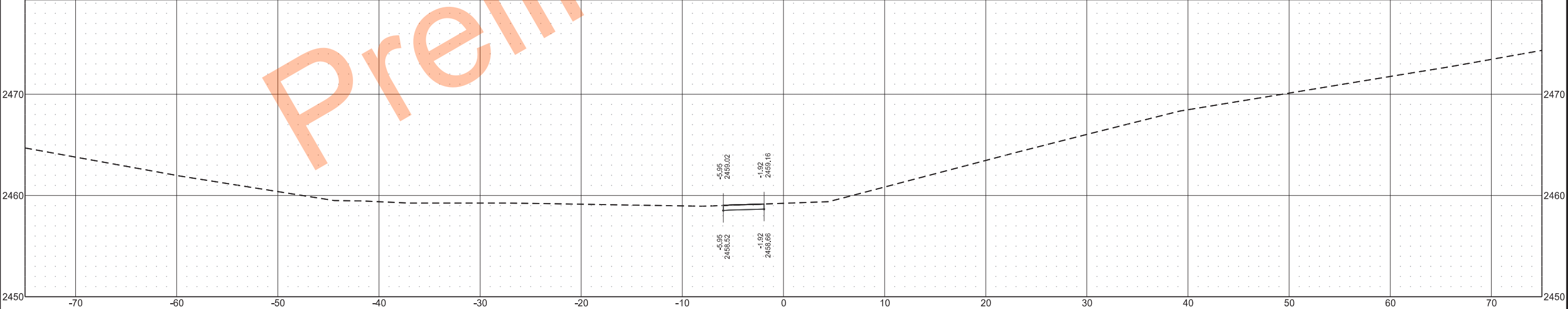


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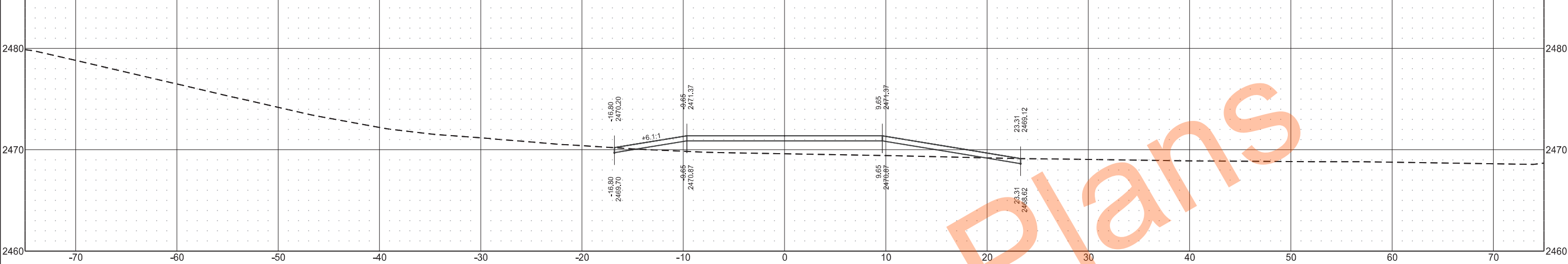
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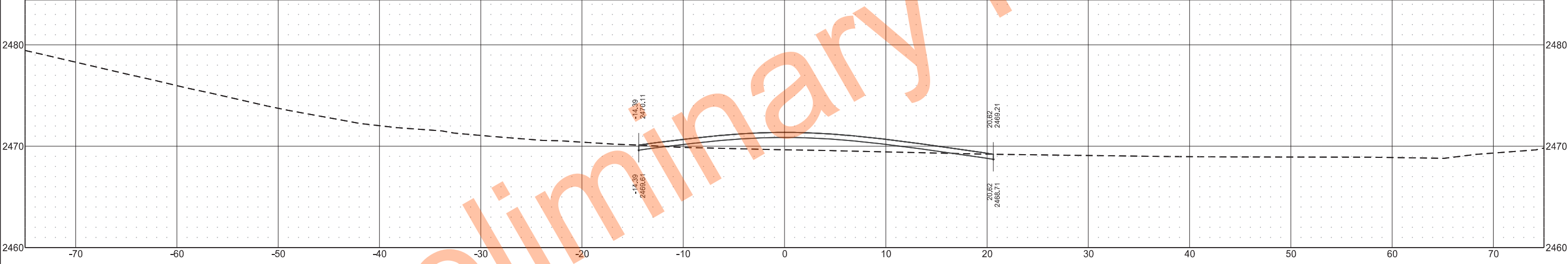


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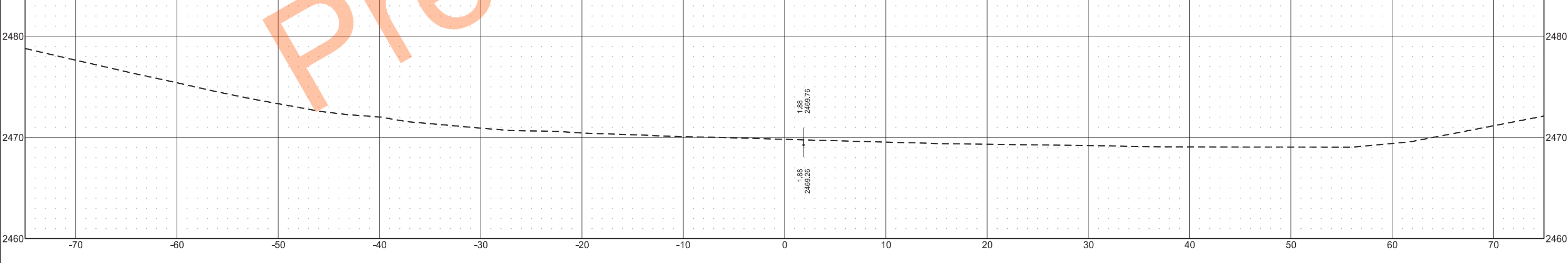
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Sta 0+50.00

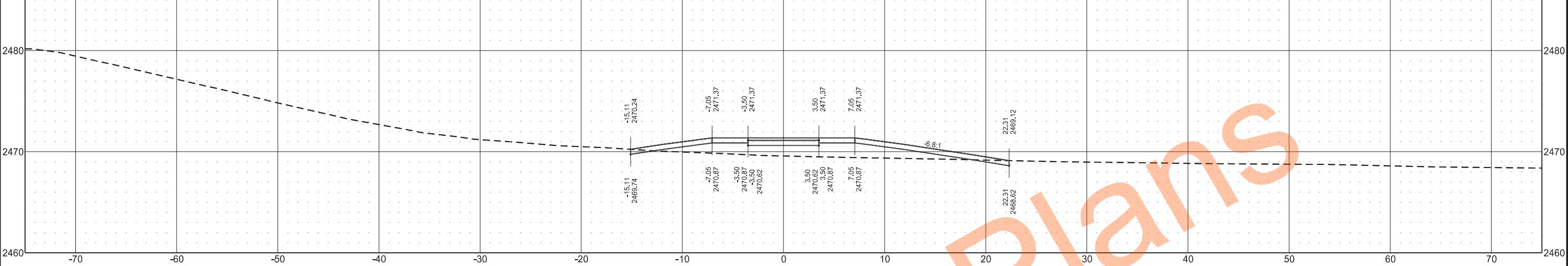


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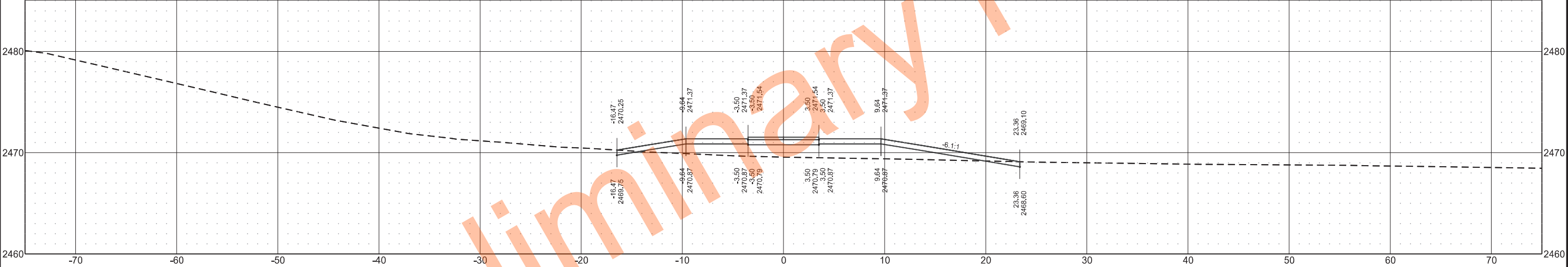


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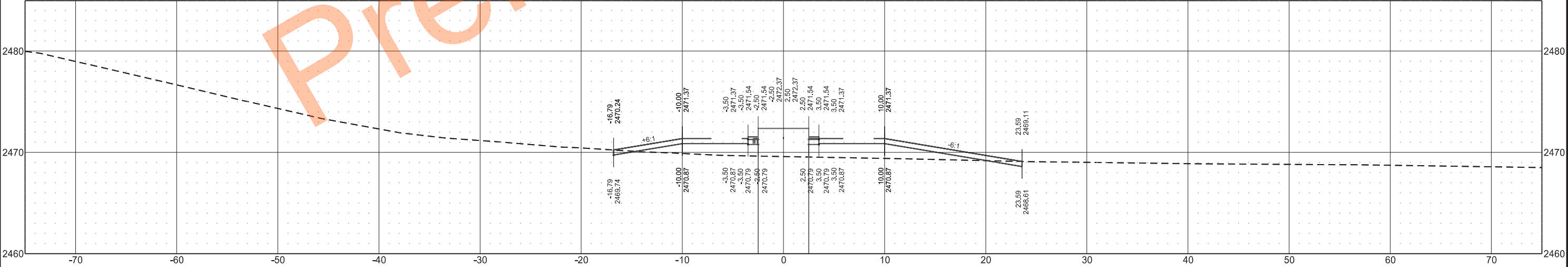
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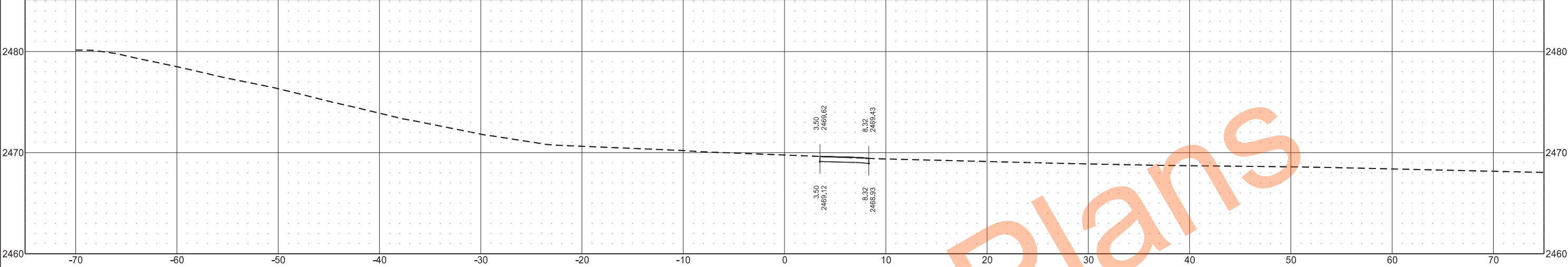


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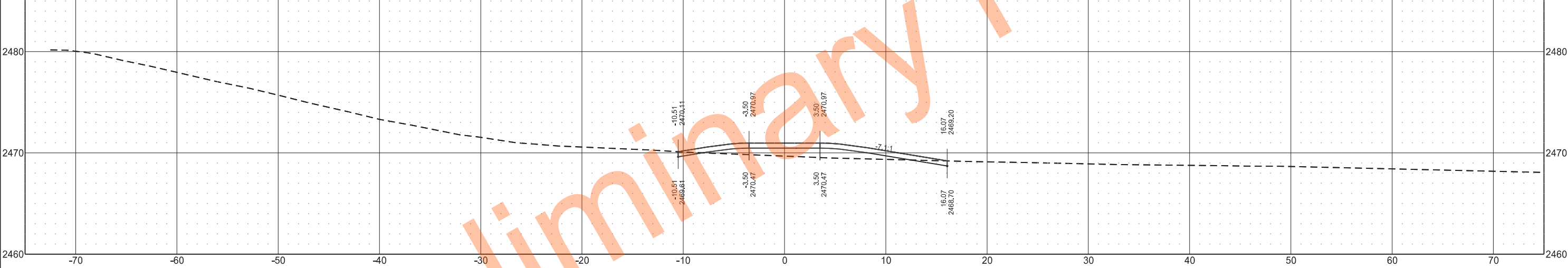


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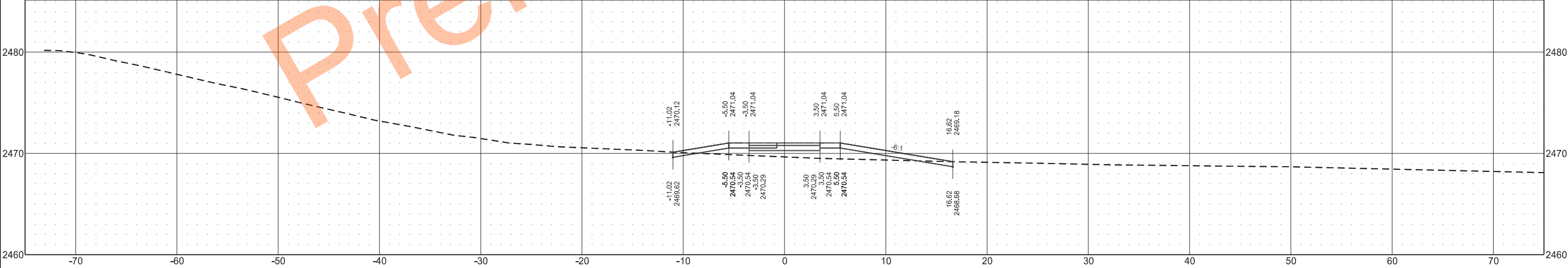
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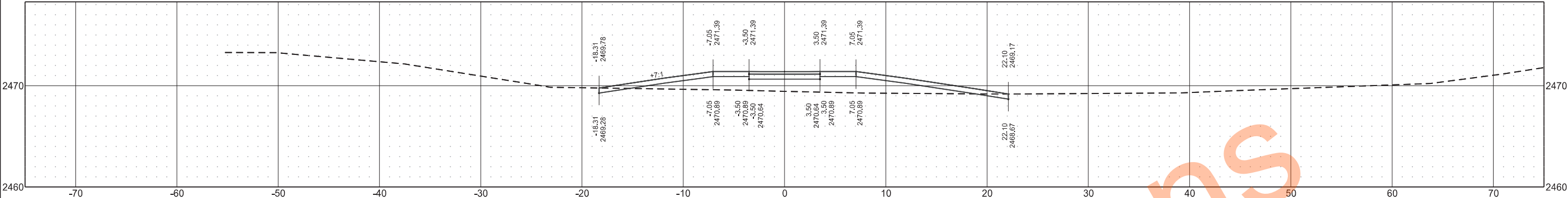
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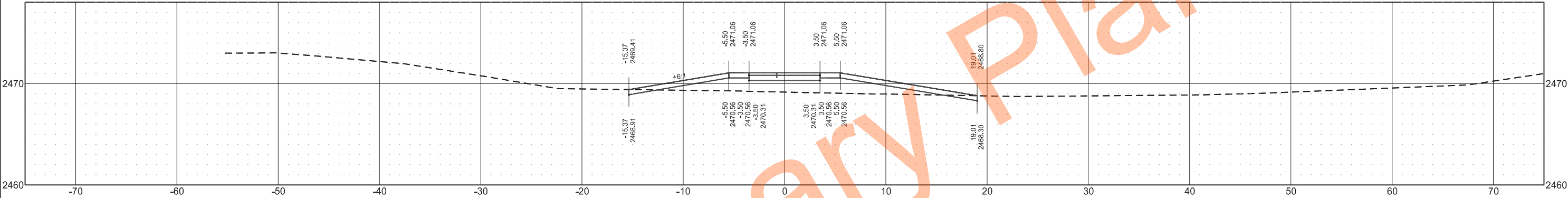
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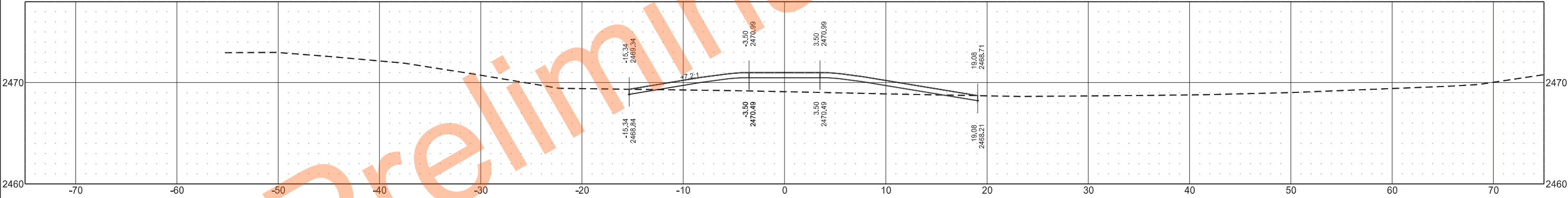
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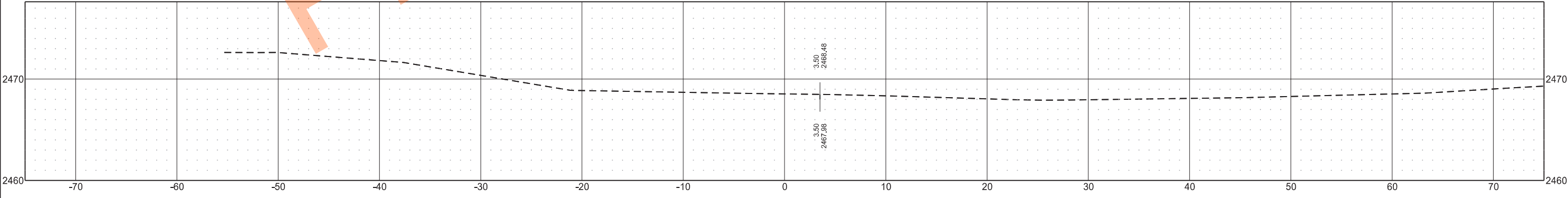
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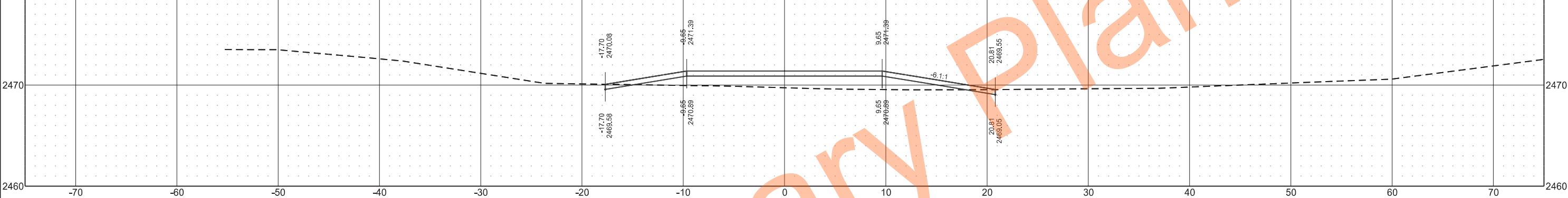


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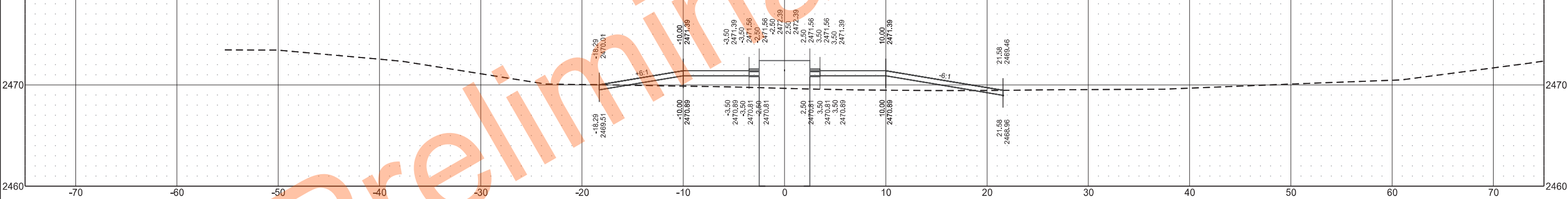


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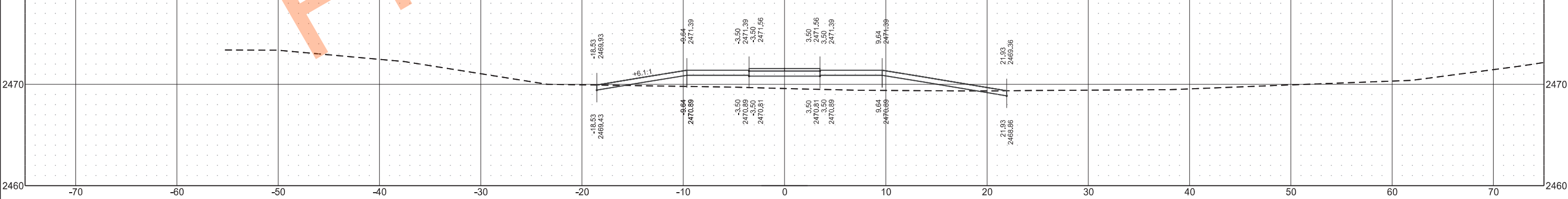
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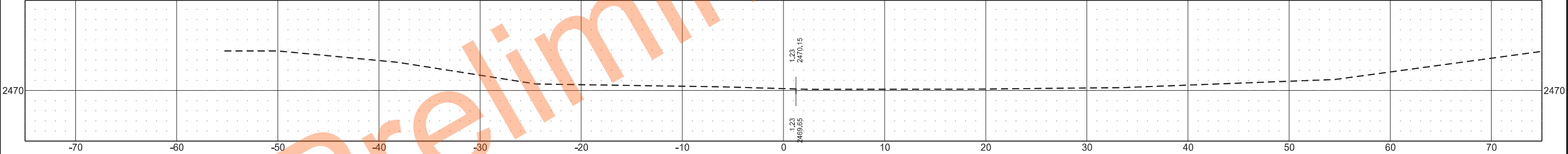


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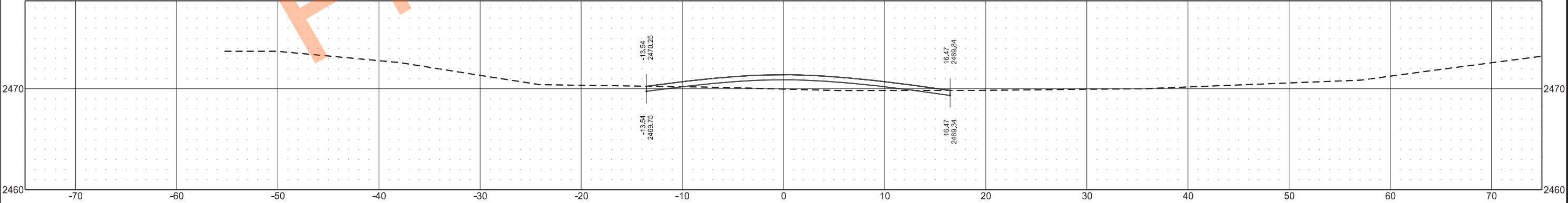


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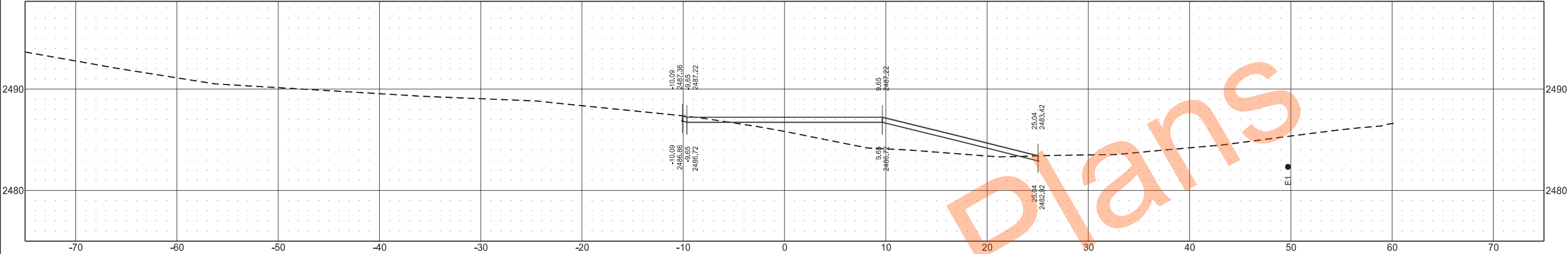


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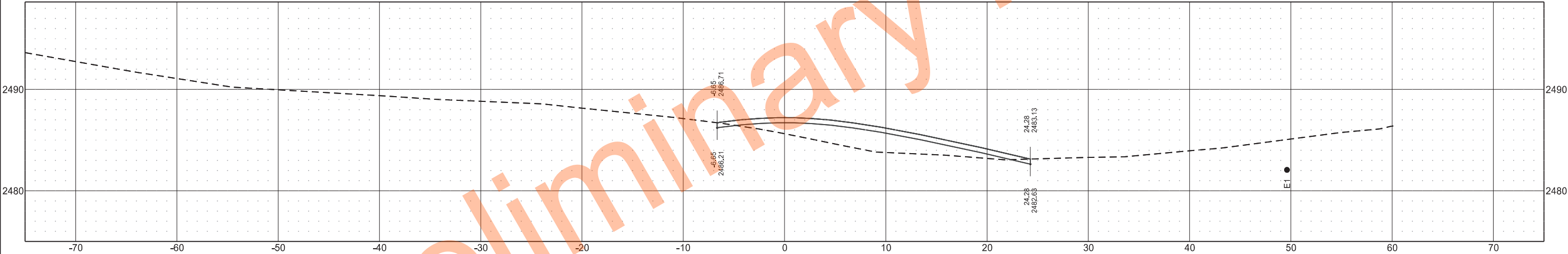


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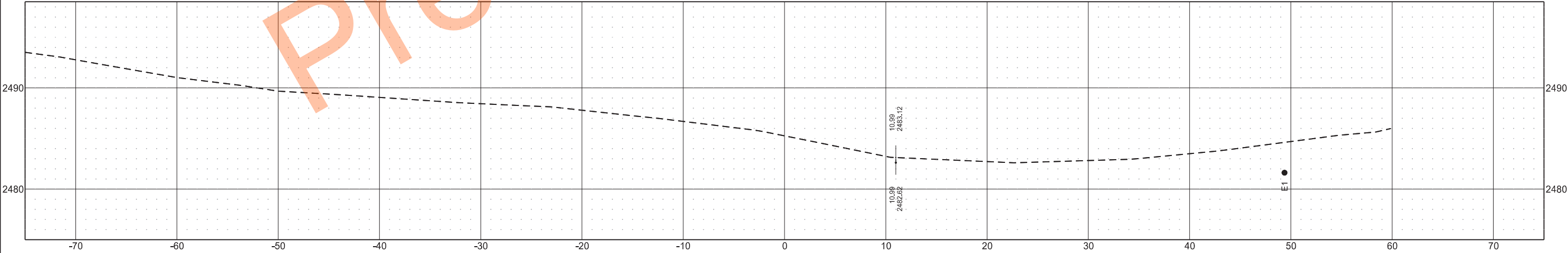
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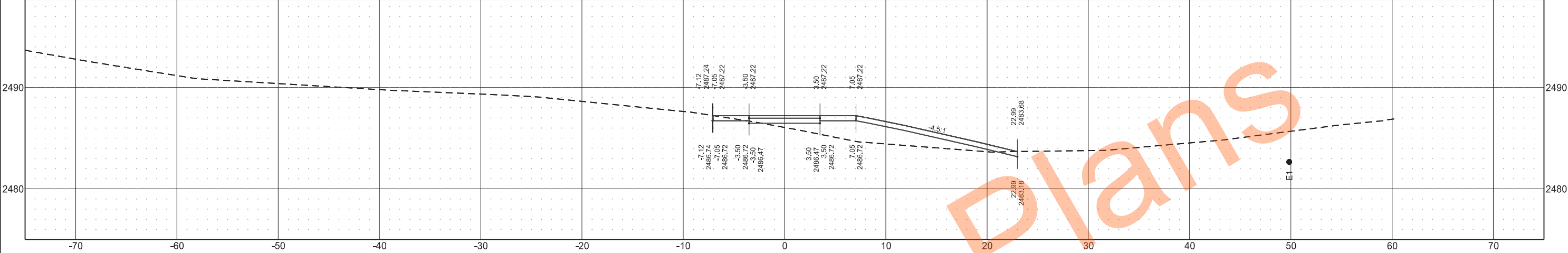


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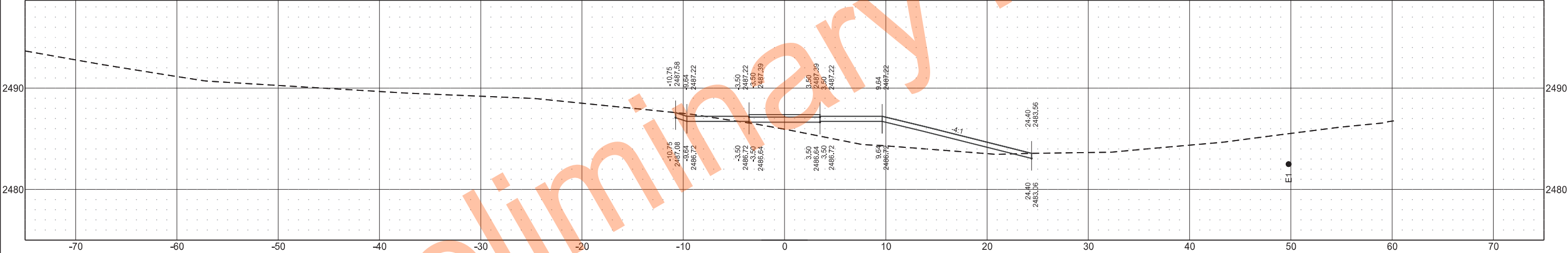


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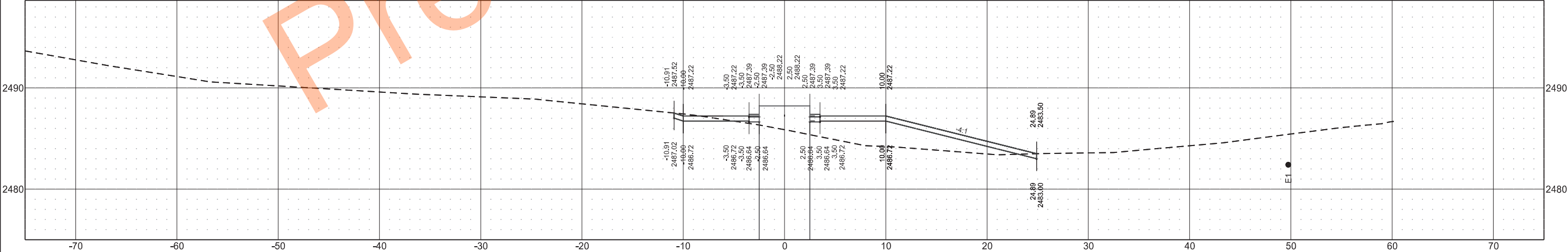
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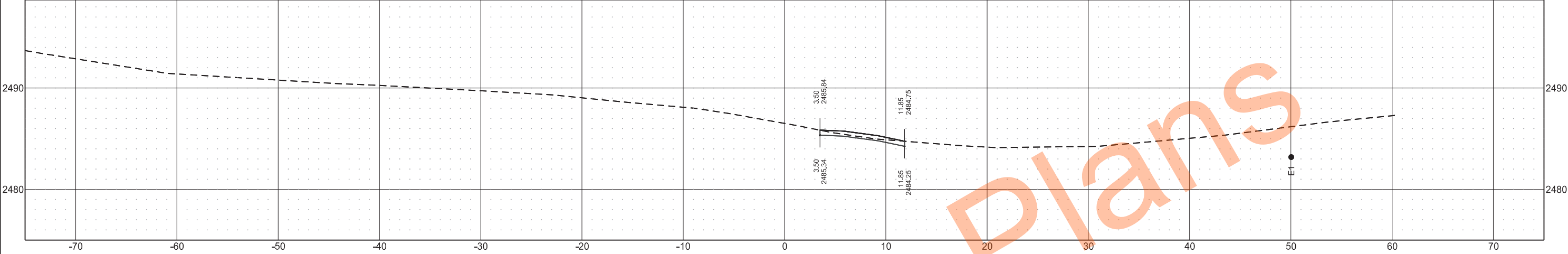


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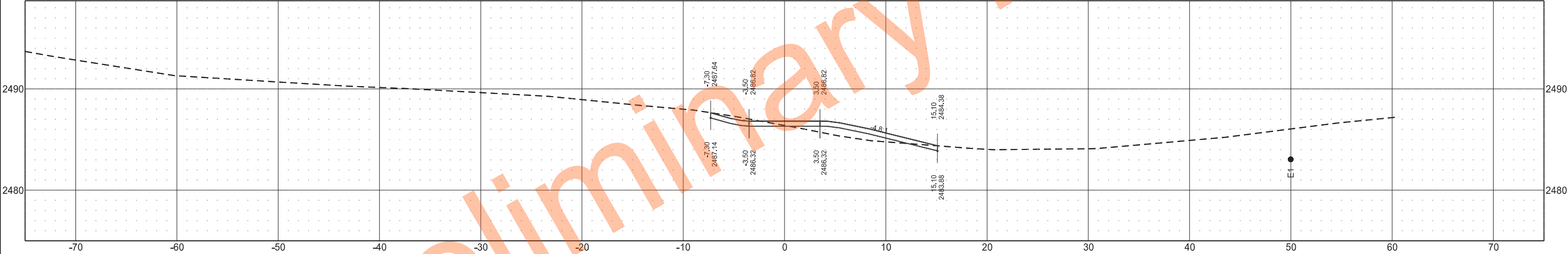


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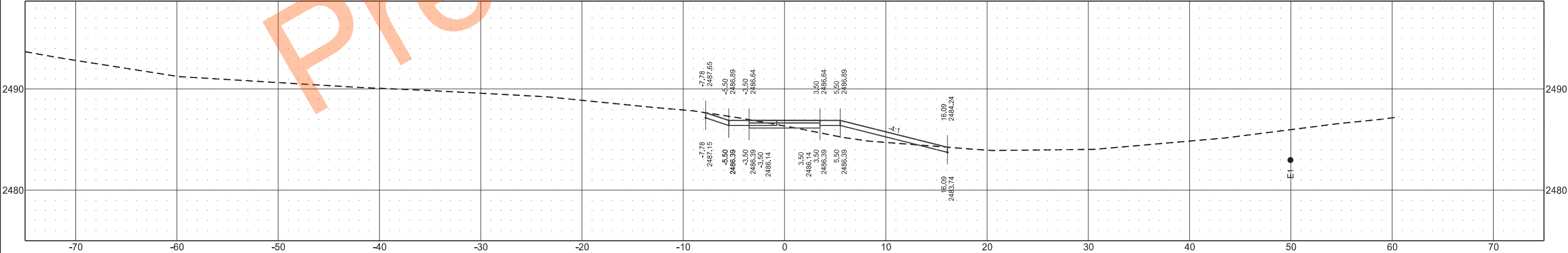
Sta 0+82.40



Sta 0+78.50

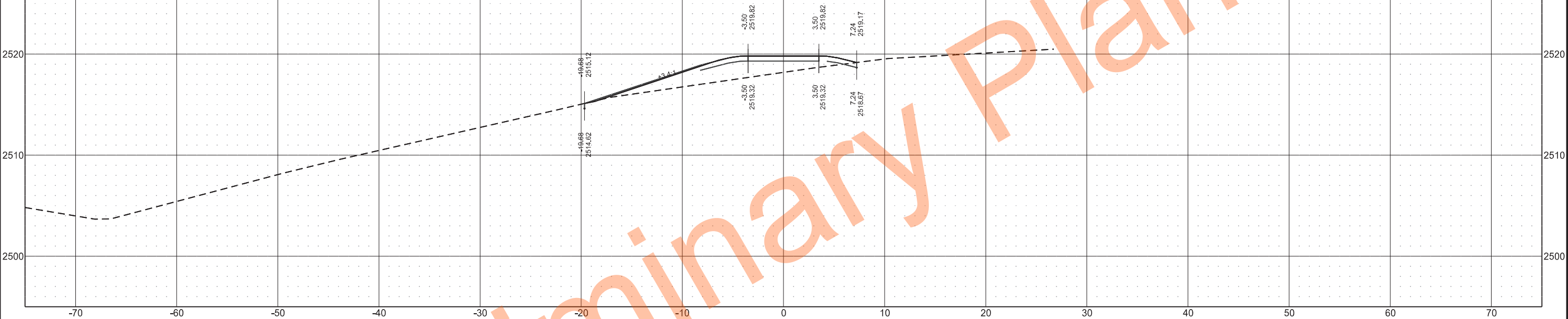


Sta 0+76.50

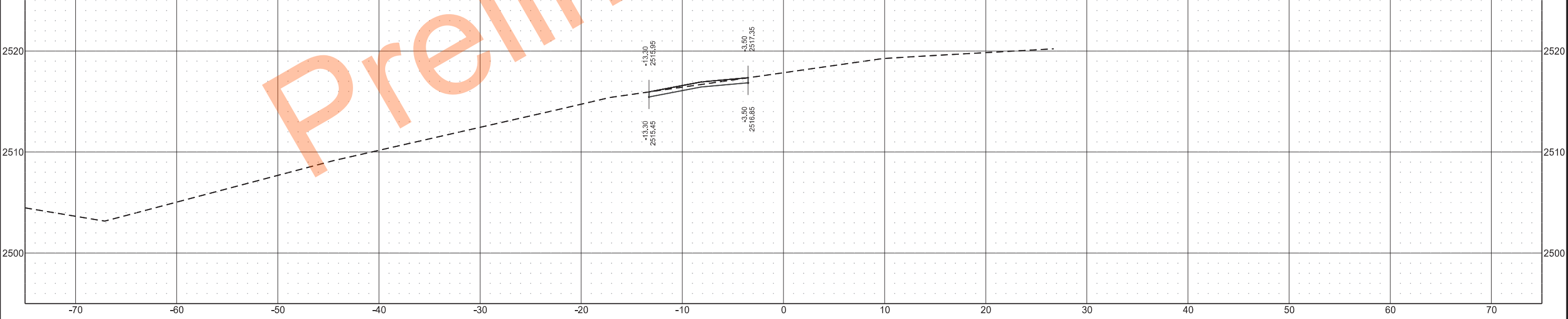


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	29

Sta 0+41.50

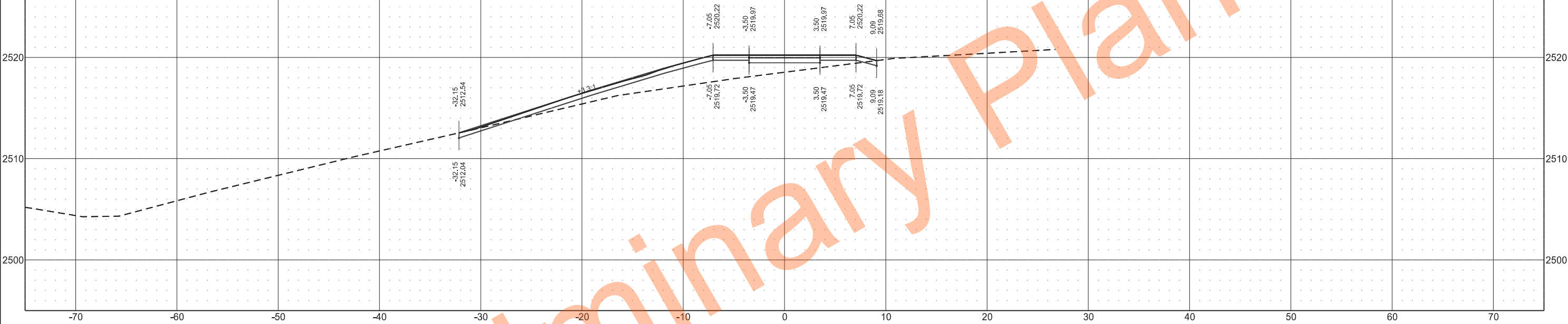


Sta 0+31.63

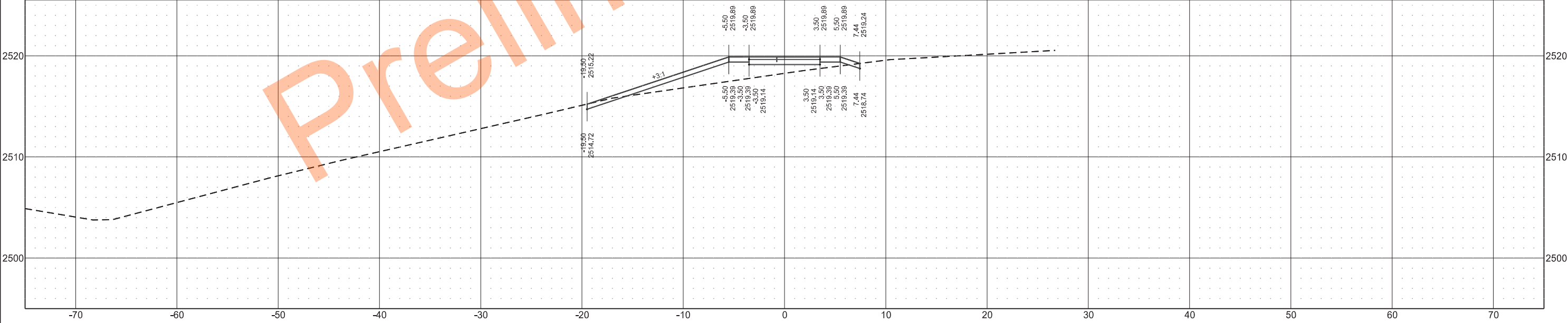


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	30

Sta 0+52.83

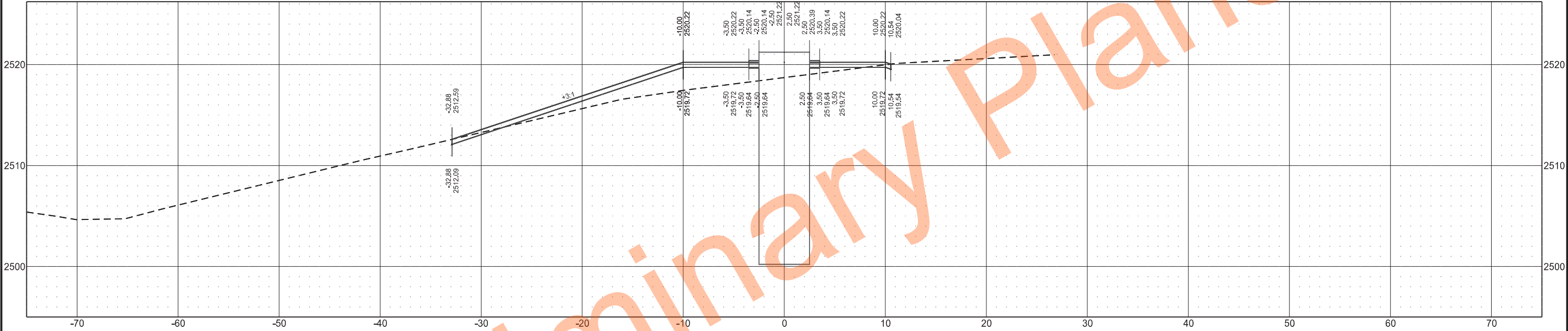


Sta 0+43.50

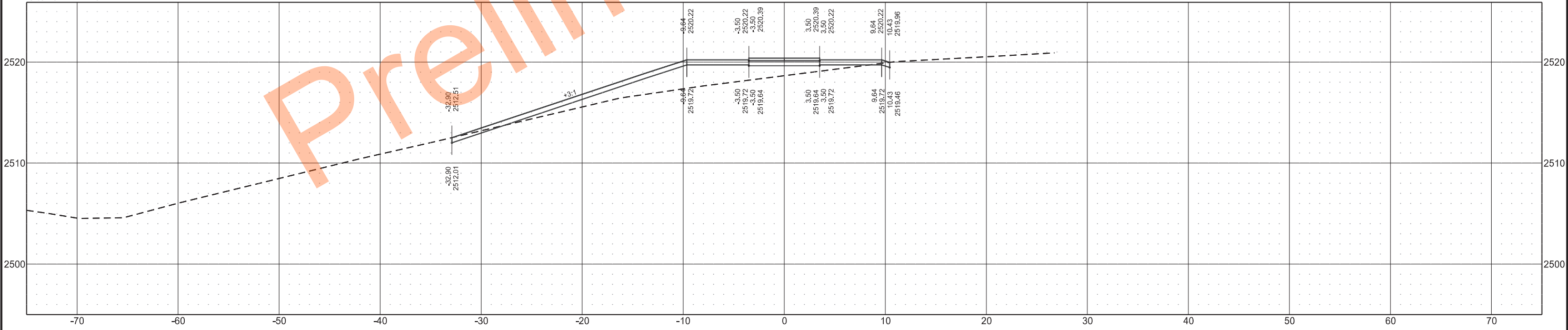


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	31

Sta 0+60.00

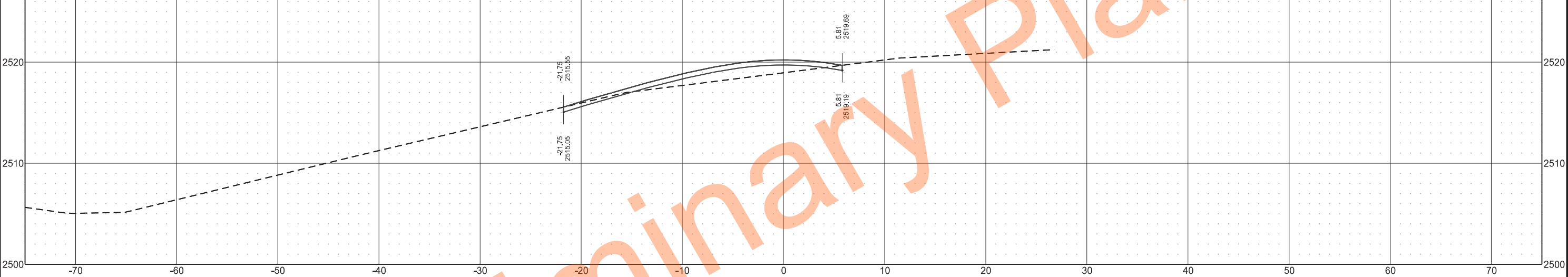


Sta 0+57.50

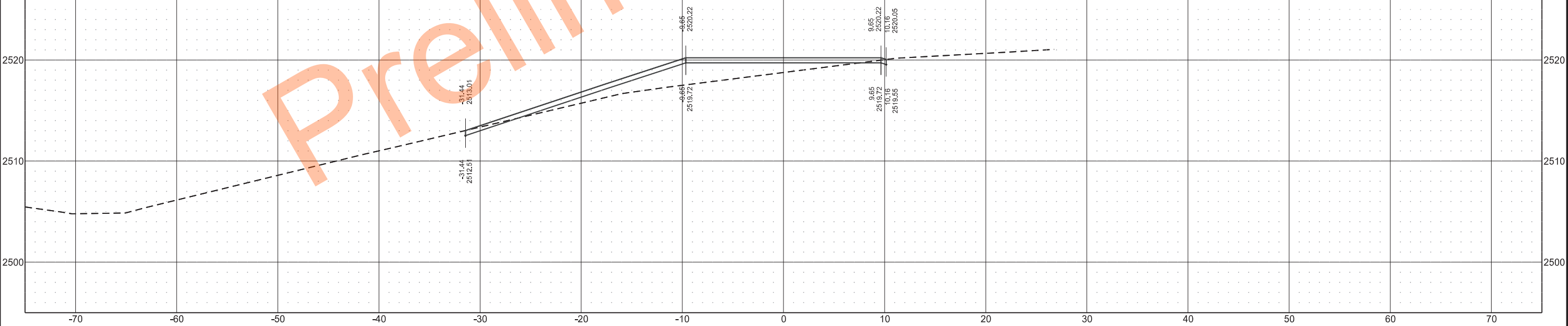


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	32

Sta 0+70.00

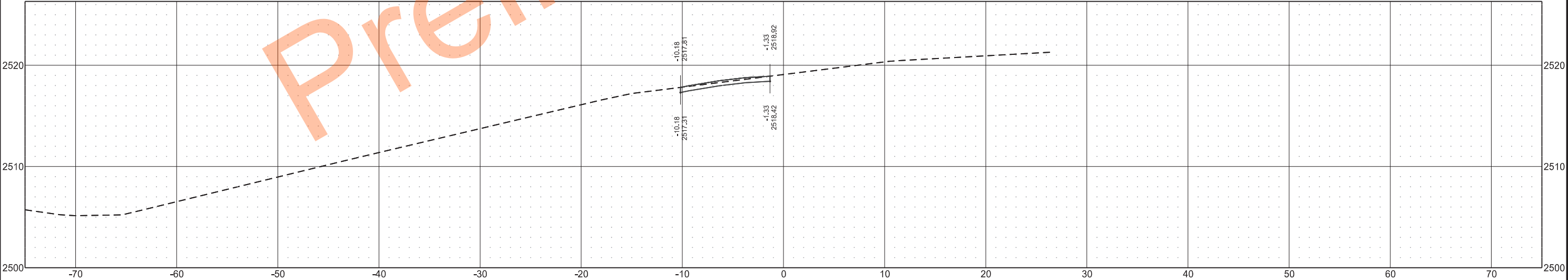


Sta 0+62.50



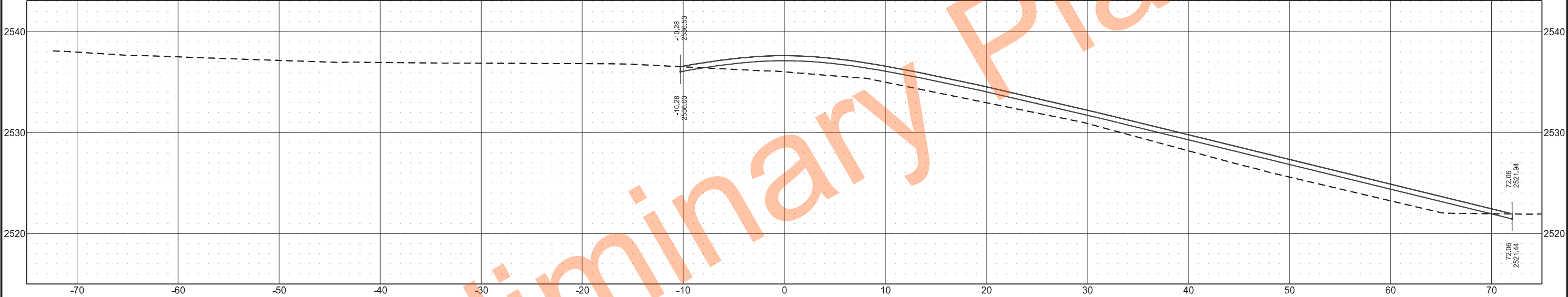
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	33

Sta 0+73.83

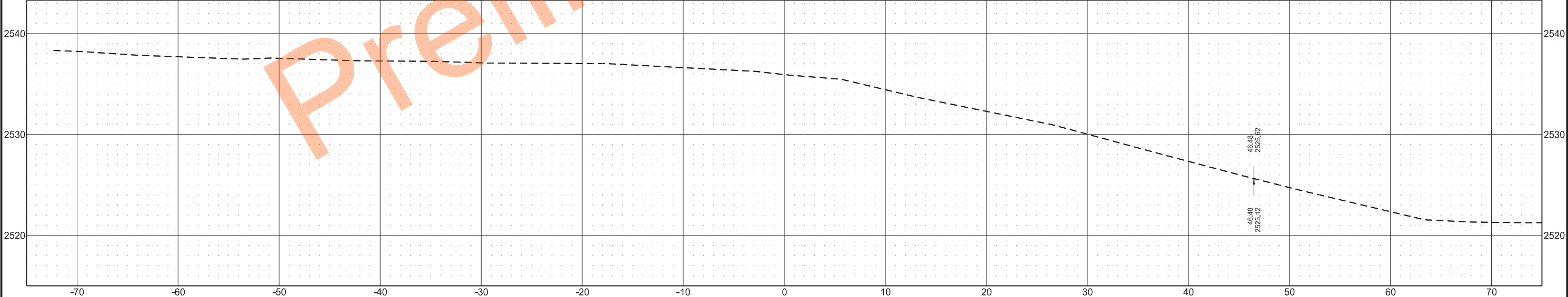


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	34

Sta 0+50.00

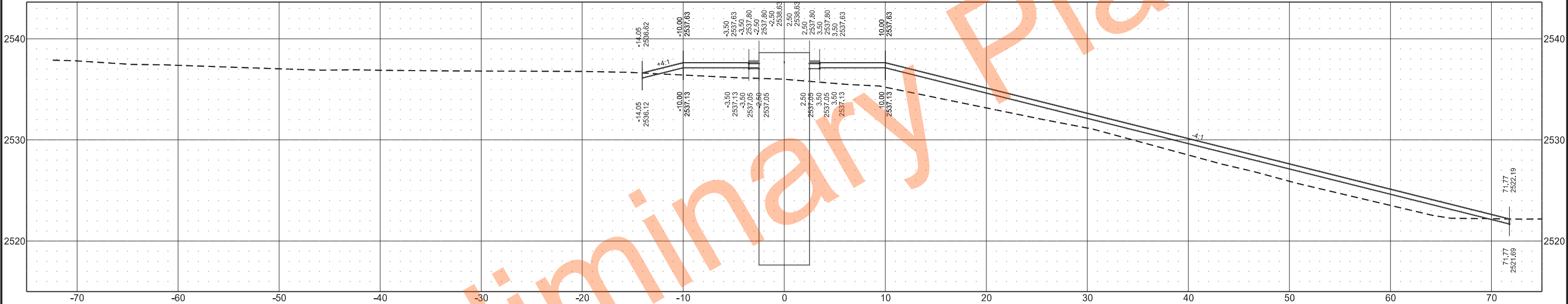


Sta 0+25.28

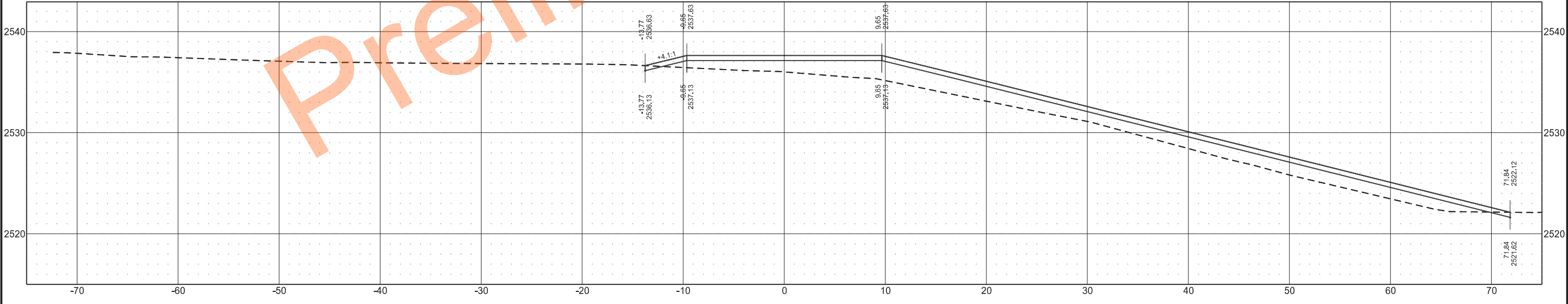


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	35

Sta 0+60.00

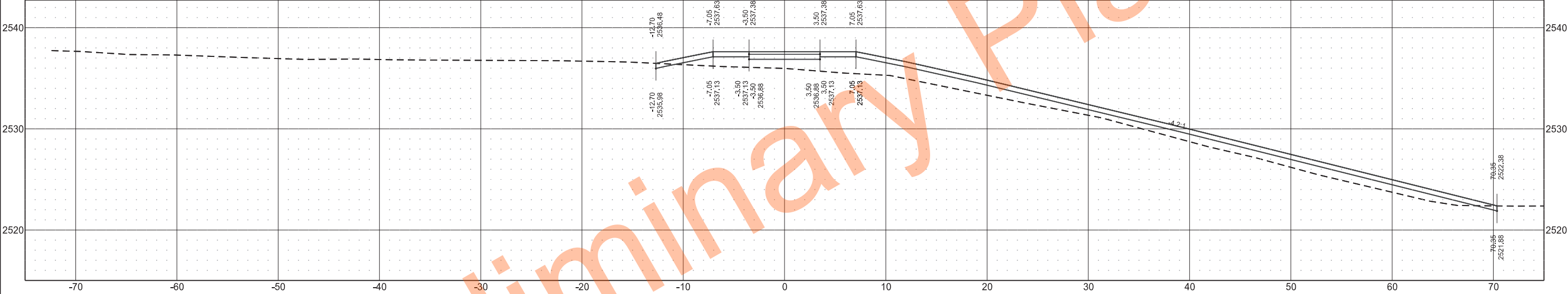


Sta 0+57.50

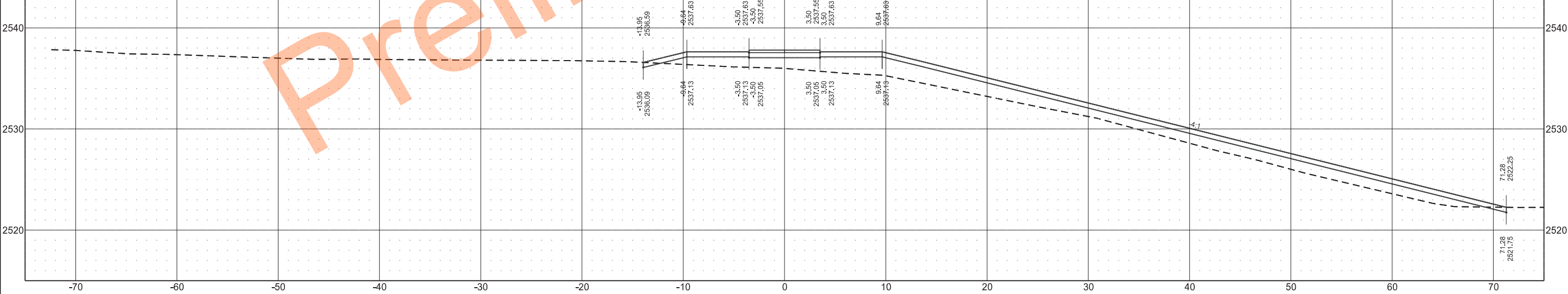


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	36

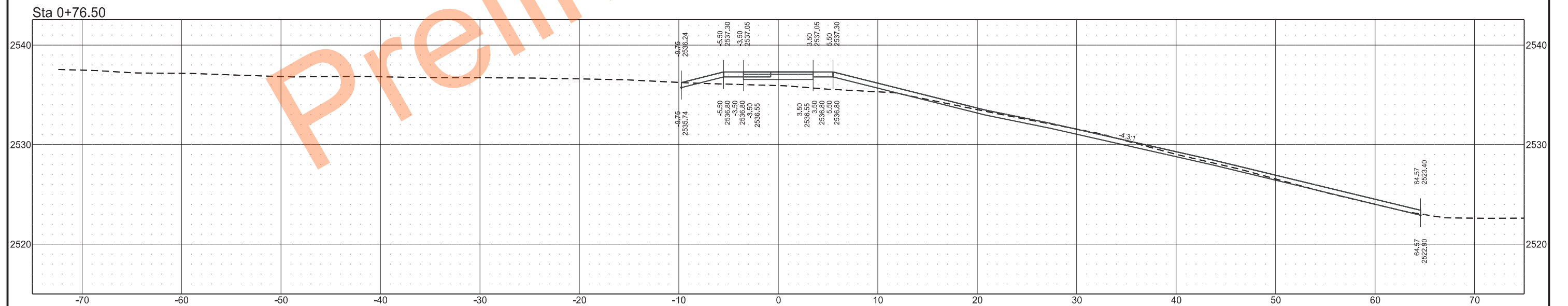
Sta 0+67.17



Sta 0+62.50

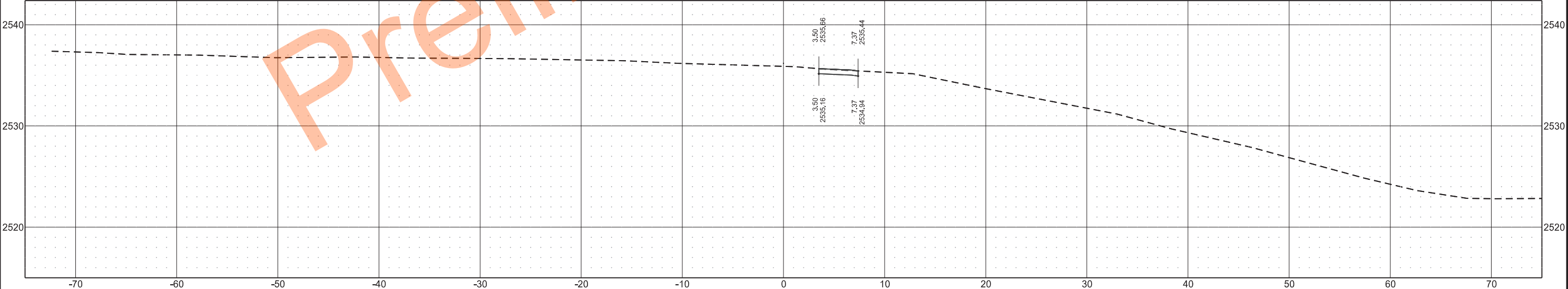


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	37



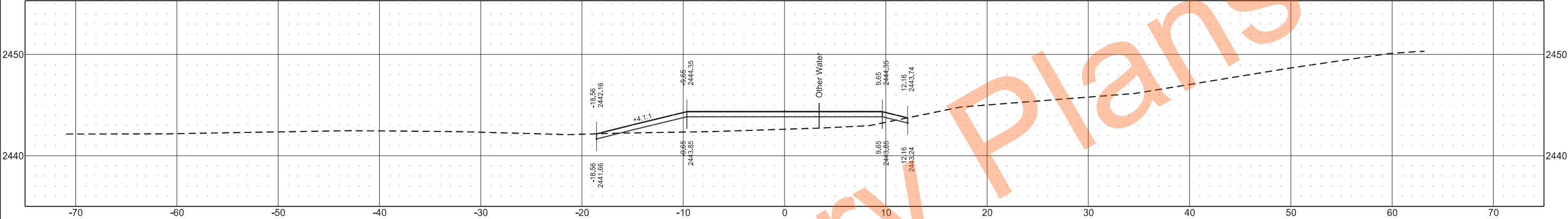
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	38

Sta 0+84.76

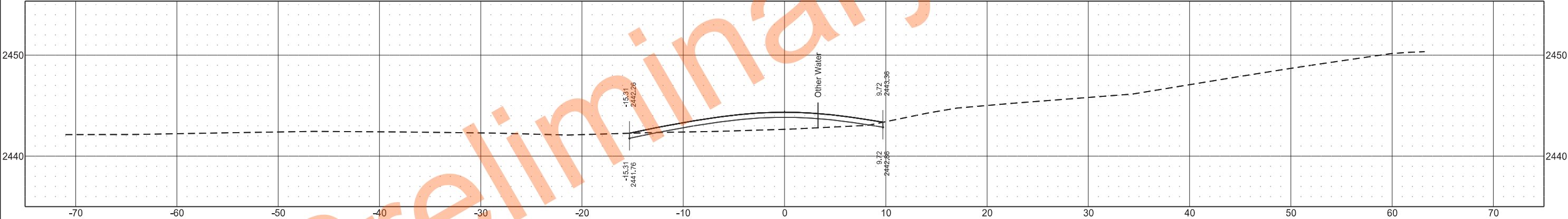


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	39

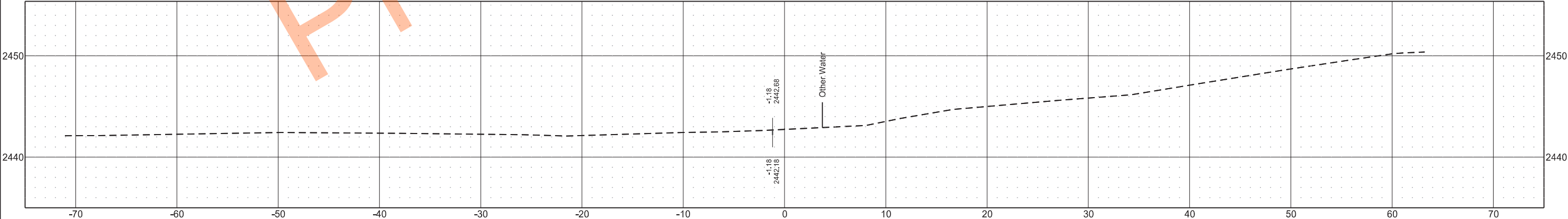
Sta 0+57.50



Sta 0+50.00

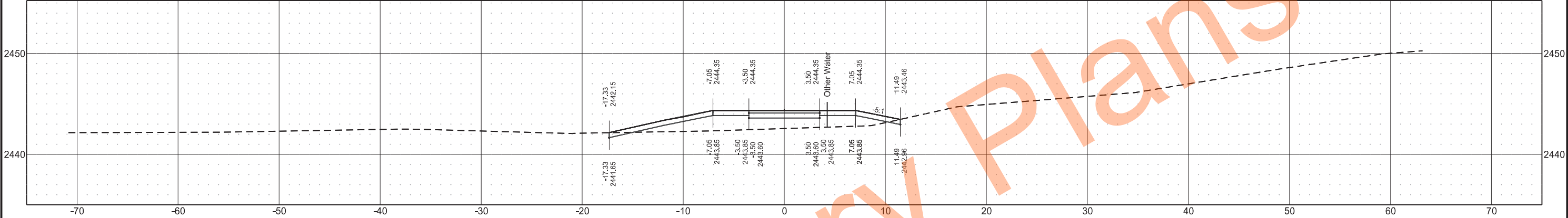


Sta 0+43.35

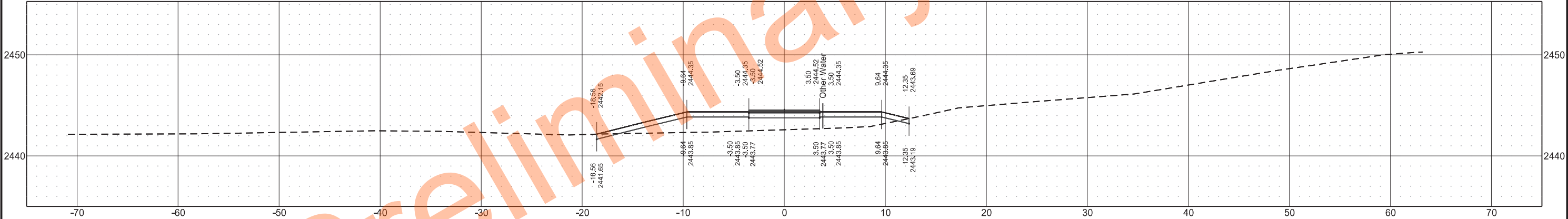


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	40

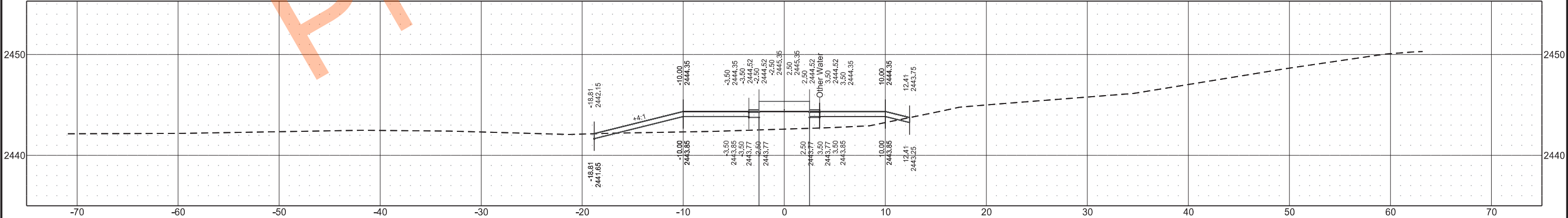
Sta 0+67.17



Sta 0+62.50

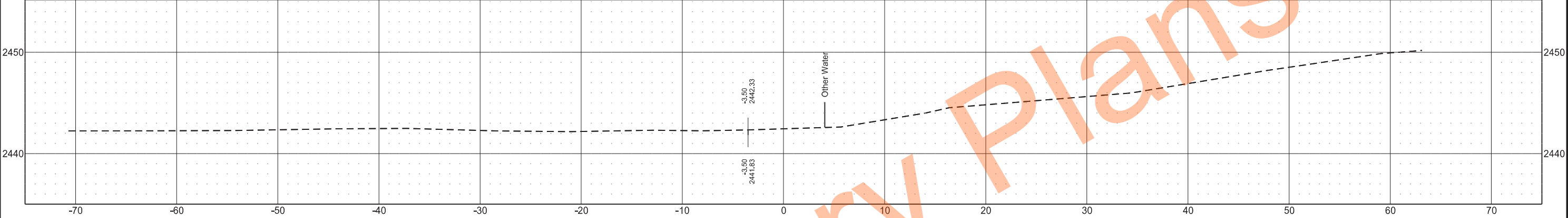


Sta 0+60.00

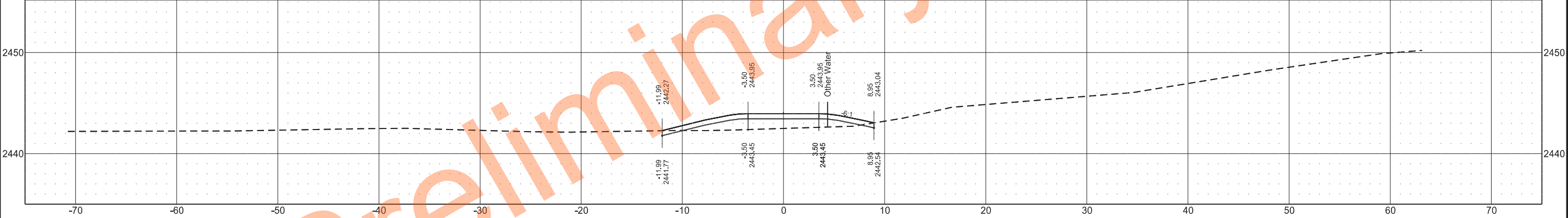


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	41

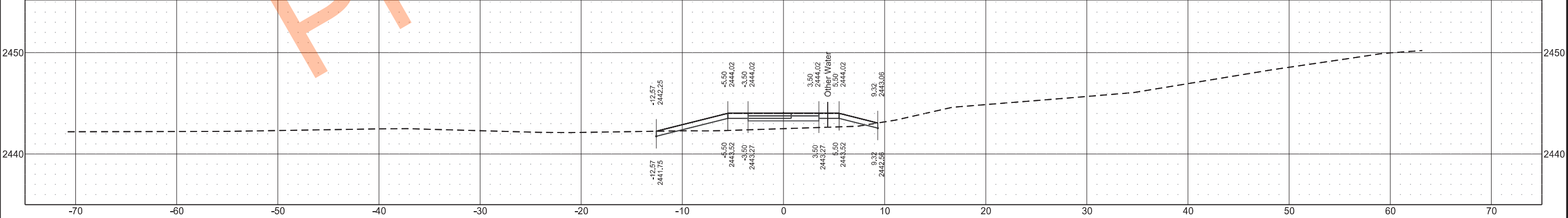
Sta 0+84.96

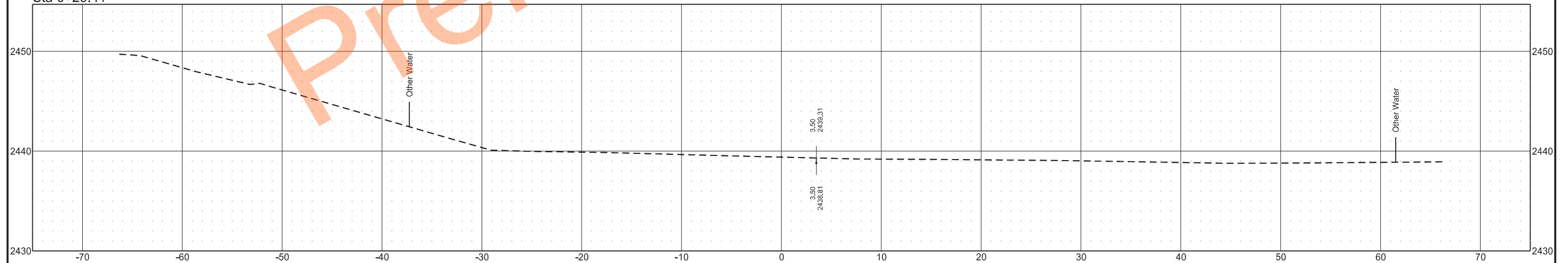
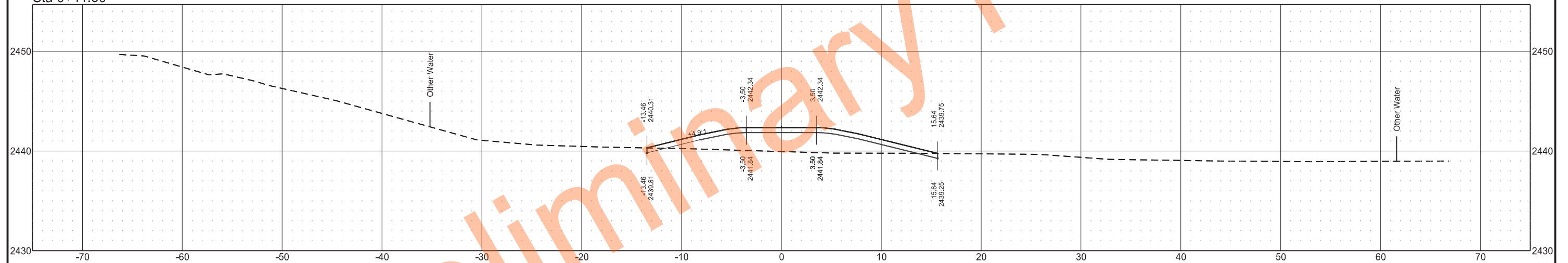
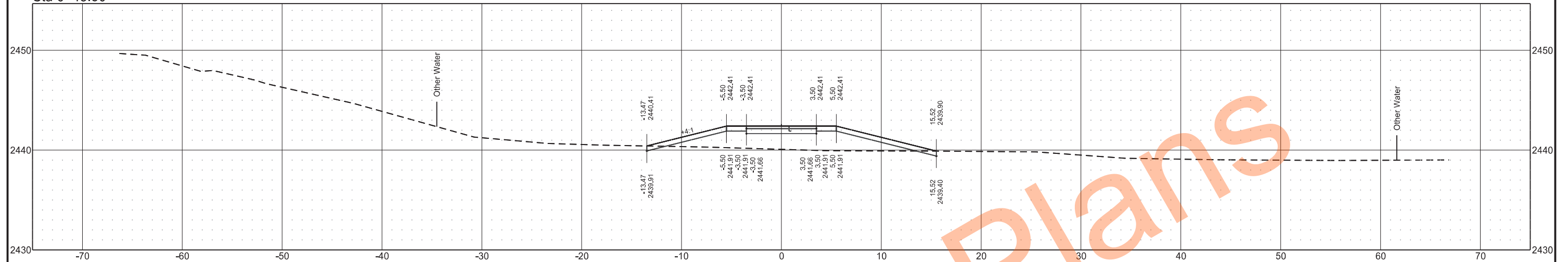


Sta 0+78.50



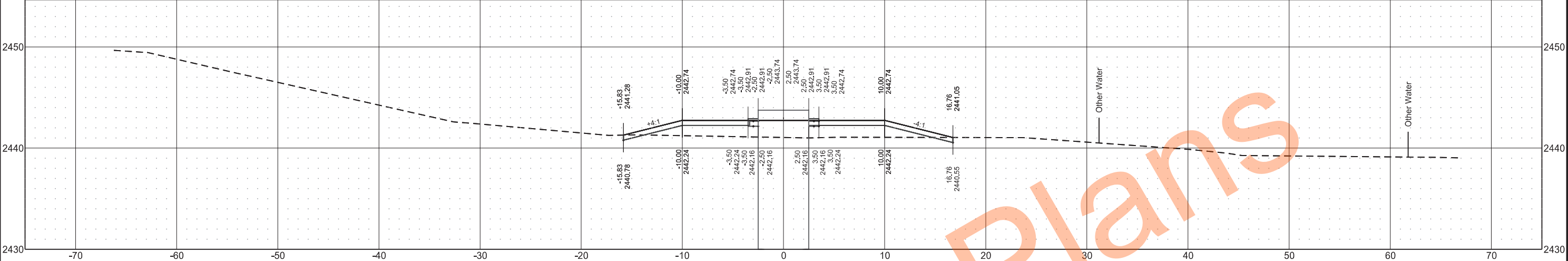
Sta 0+76.50



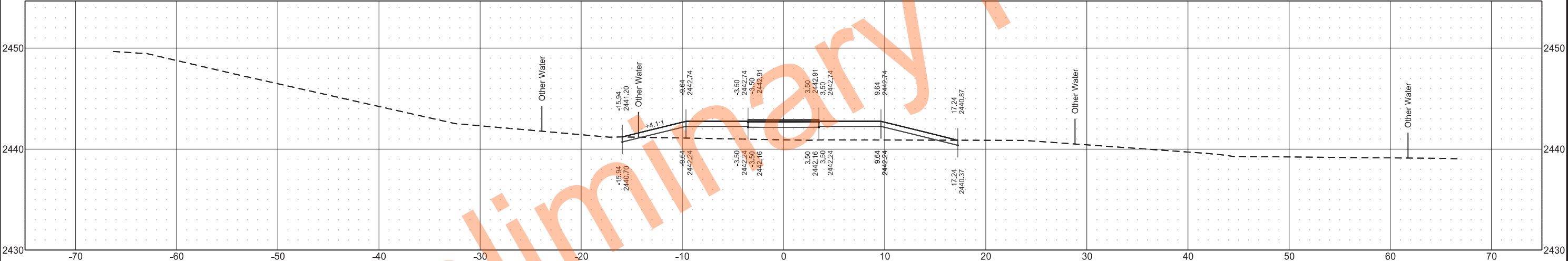


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	43

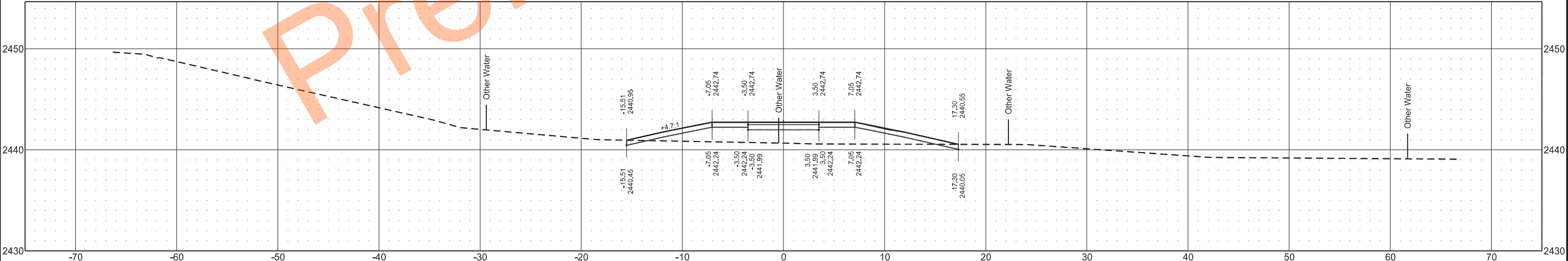
Sta 0+60.00



Sta 0+57.50

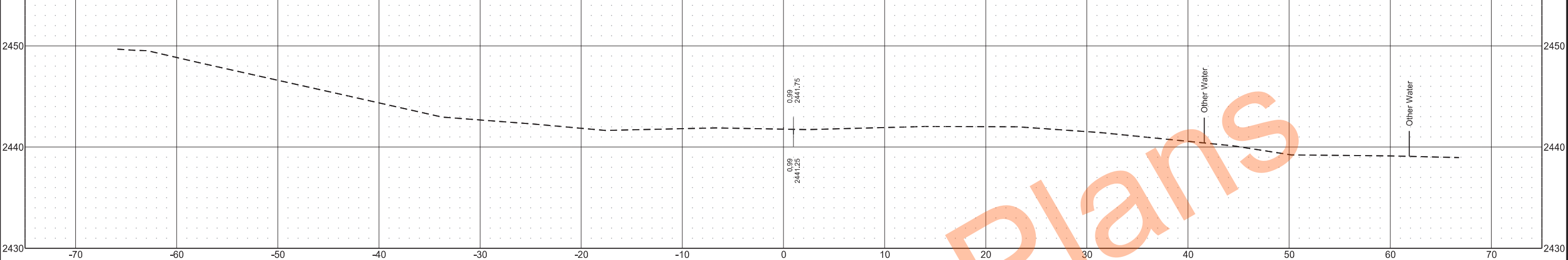


Sta 0+52.83

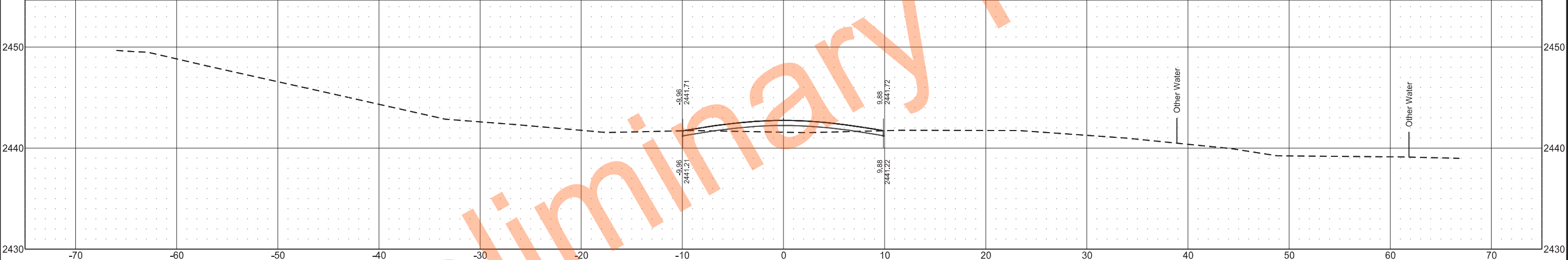


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	44

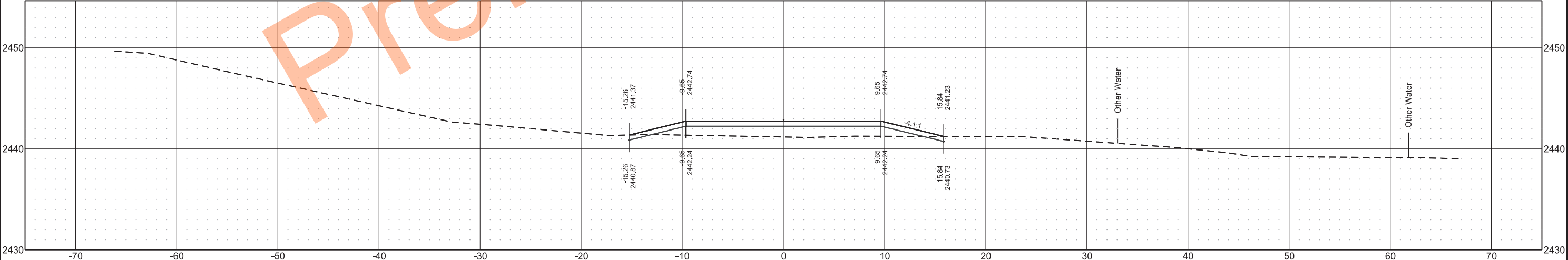
Sta 0+73.92



Sta 0+70.00

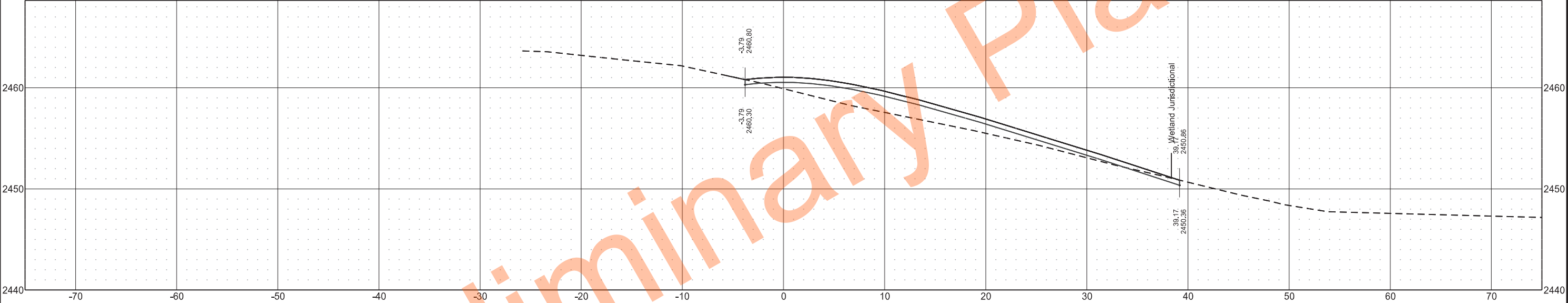


Sta 0+62.50

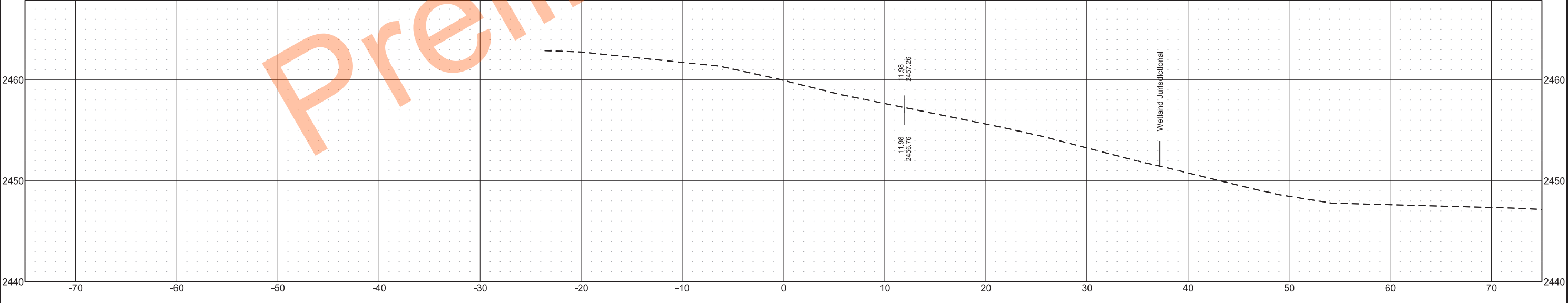


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	45

Sta 0+50.00

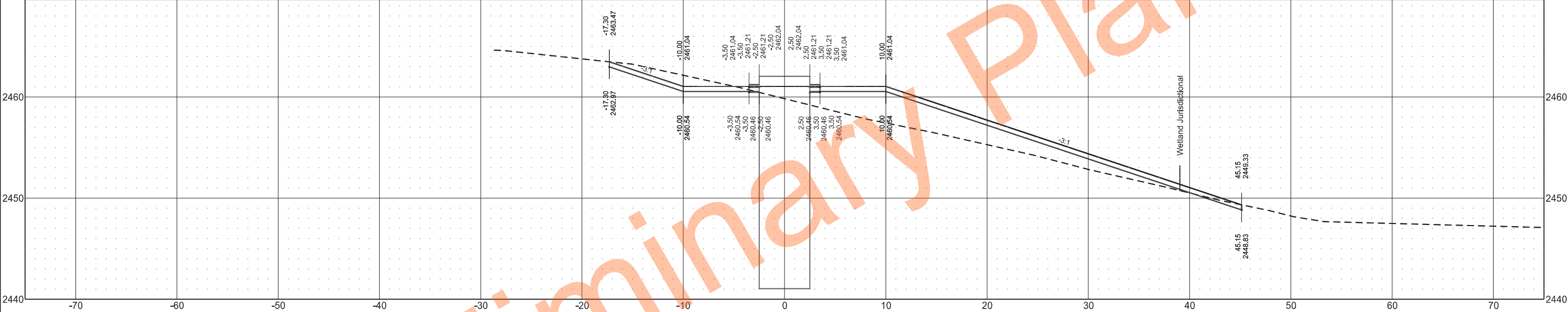


Sta 0+42.33

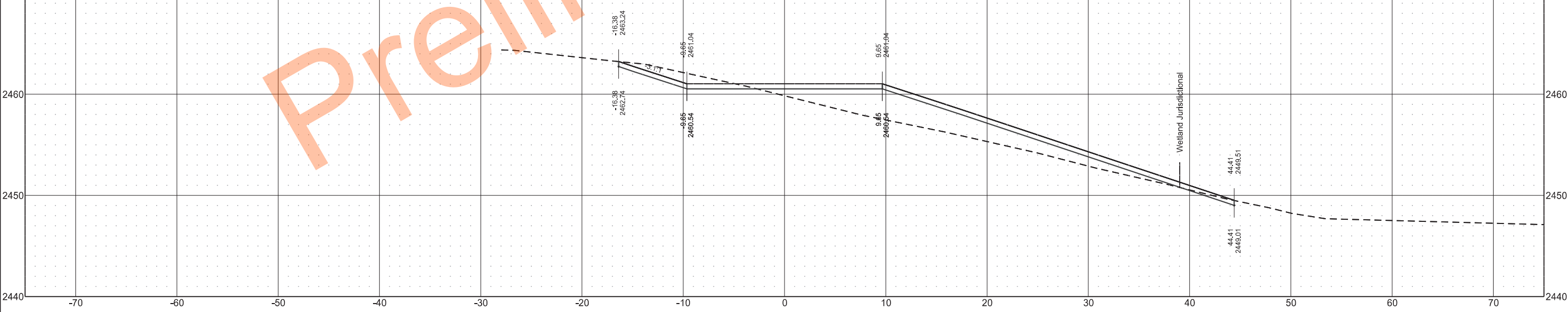


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	46

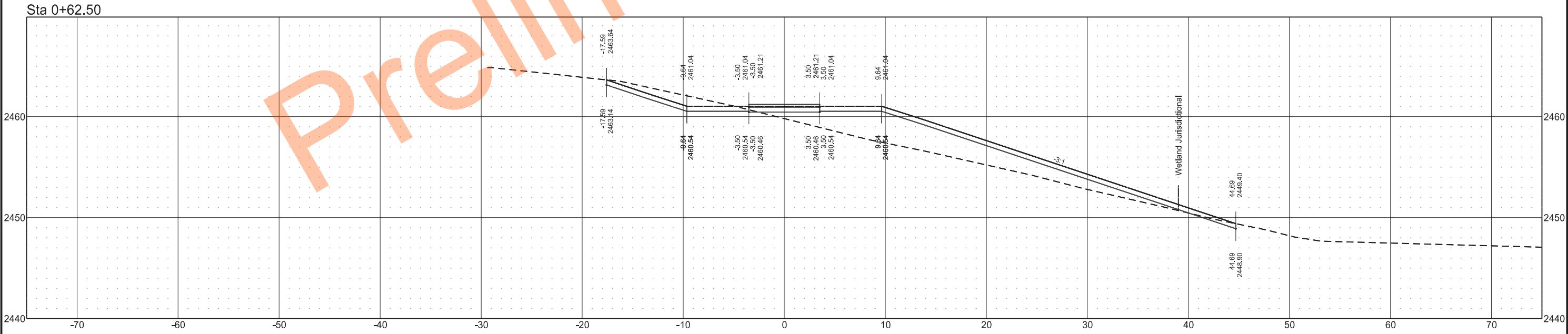
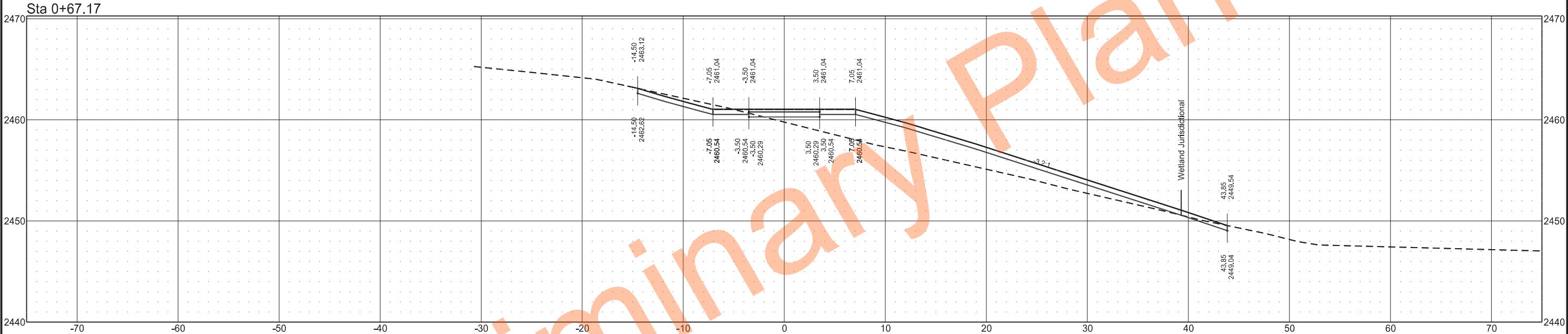
Sta 0+60.00



Sta 0+57.50



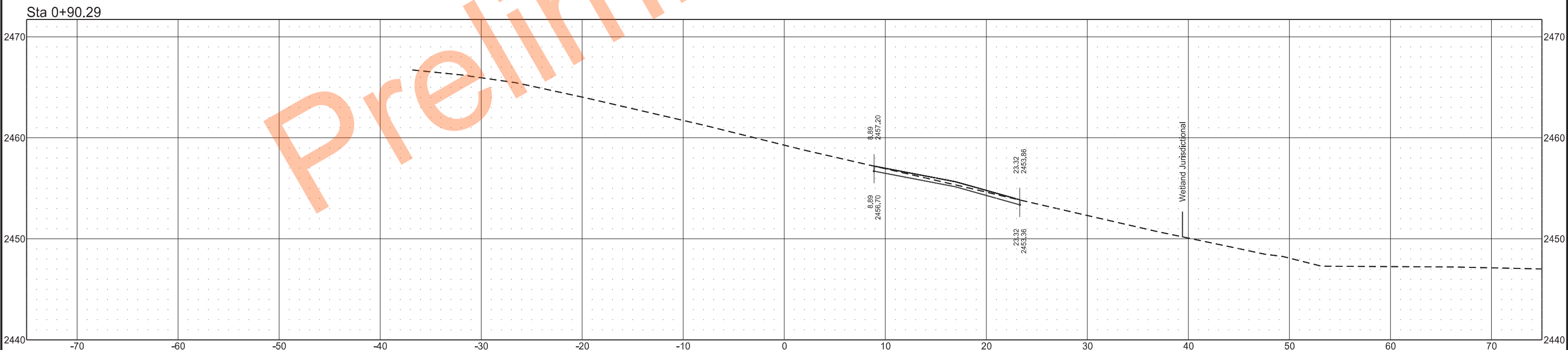
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	47



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	48

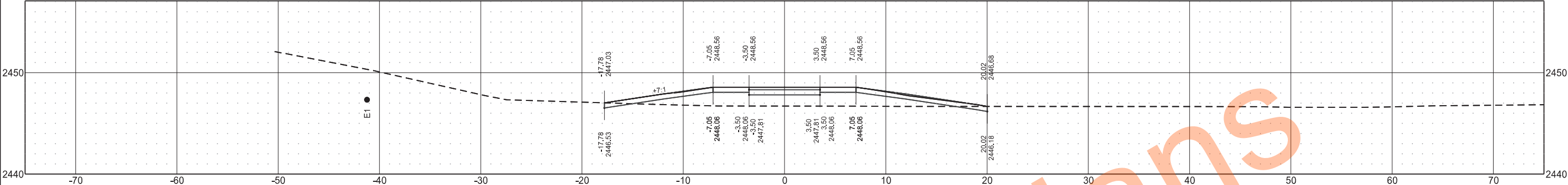


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	49

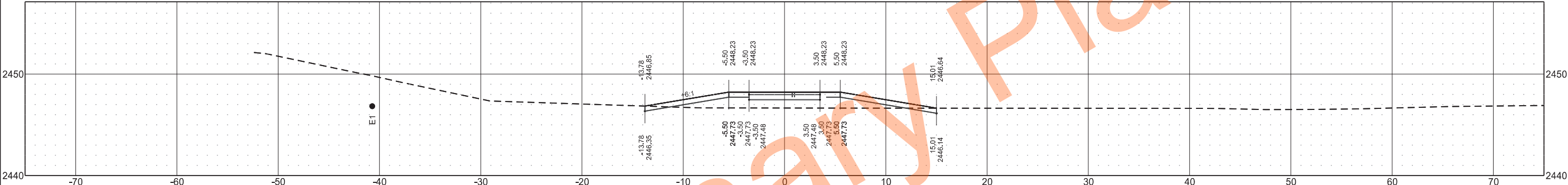


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	50

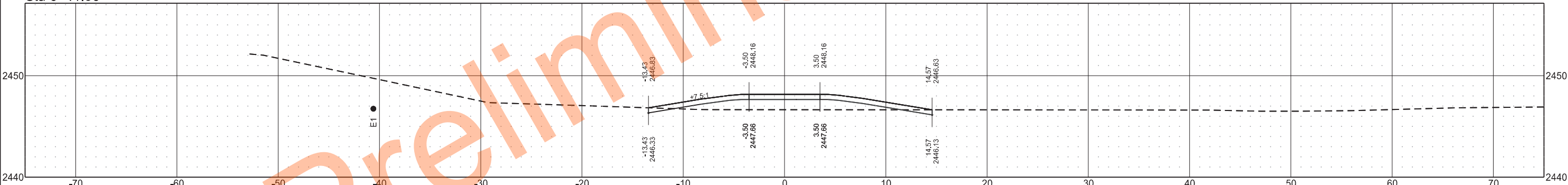
Sta 0+52.83



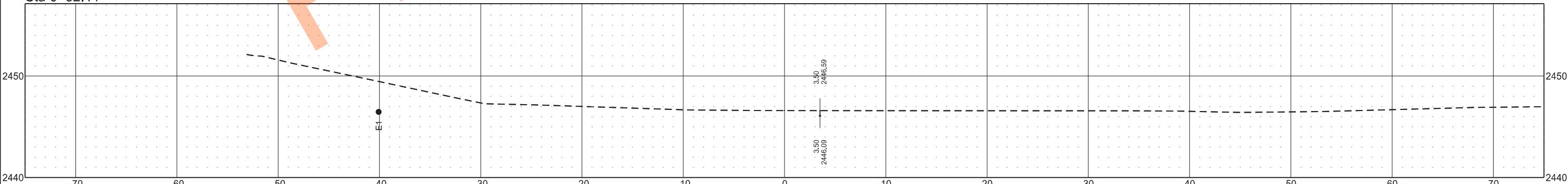
Sta 0+43.50



Sta 0+41.50

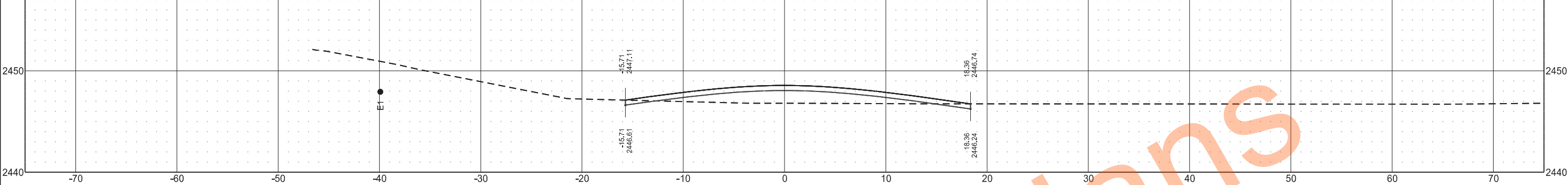


Sta 0+32.11

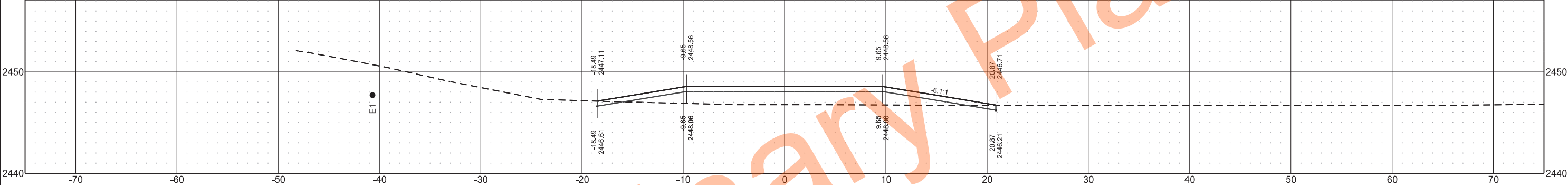


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	51

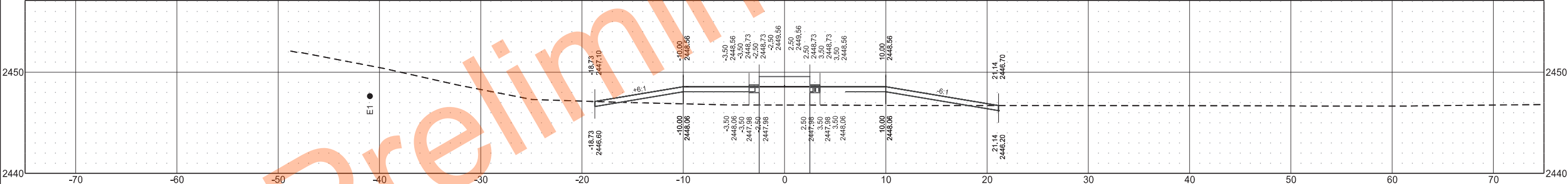
Sta 0+70.00



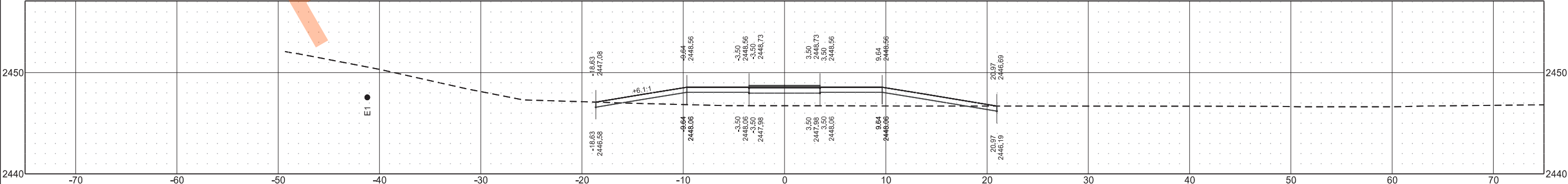
Sta 0+62.50



Sta 0+60.00



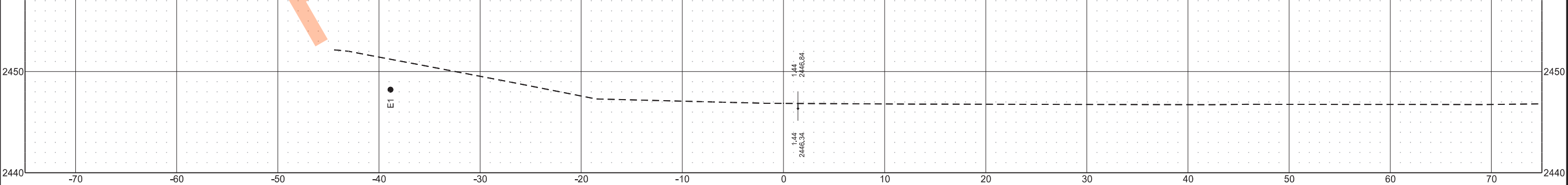
Sta 0+57.50



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	52

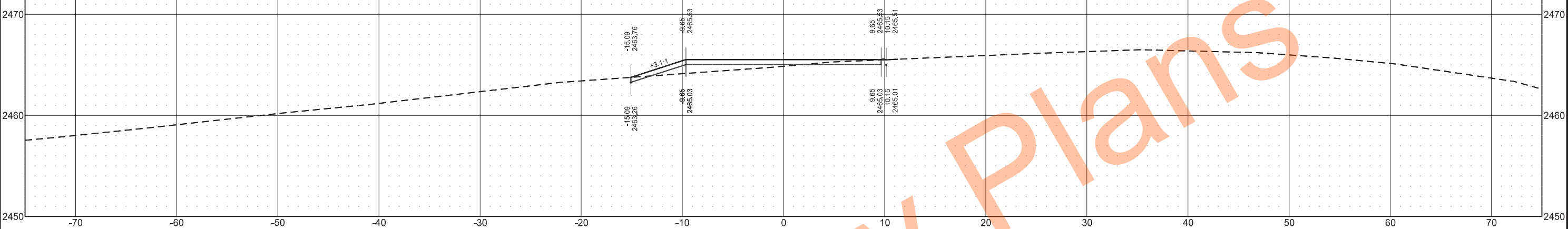
Preliminary Plans

Sta 0+80.24

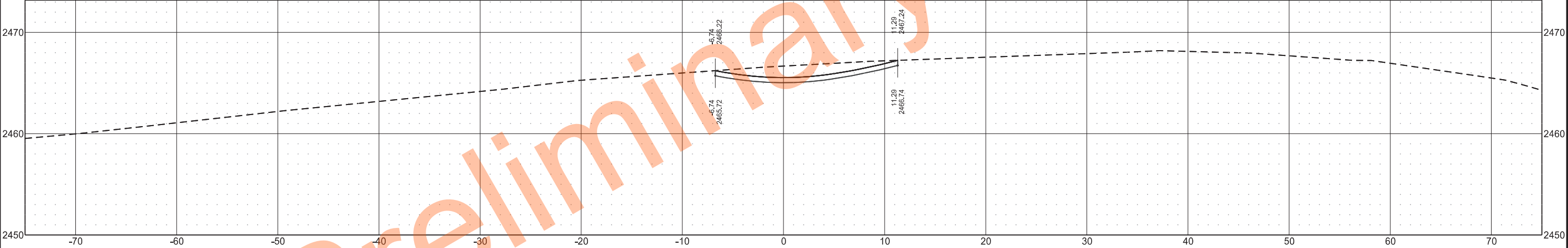


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	53

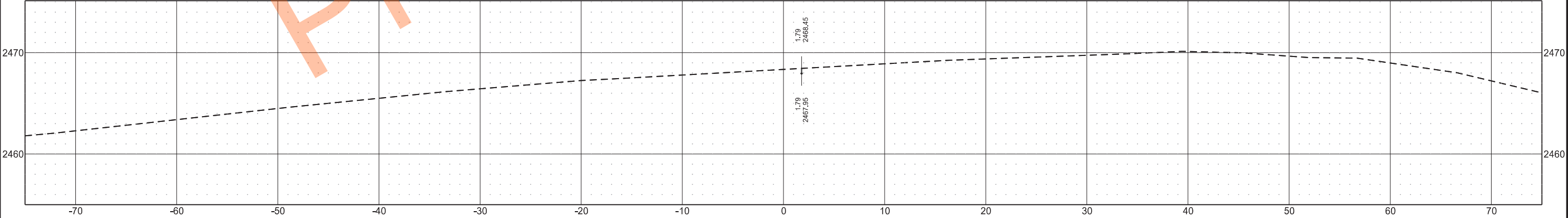
Sta 0+57.50

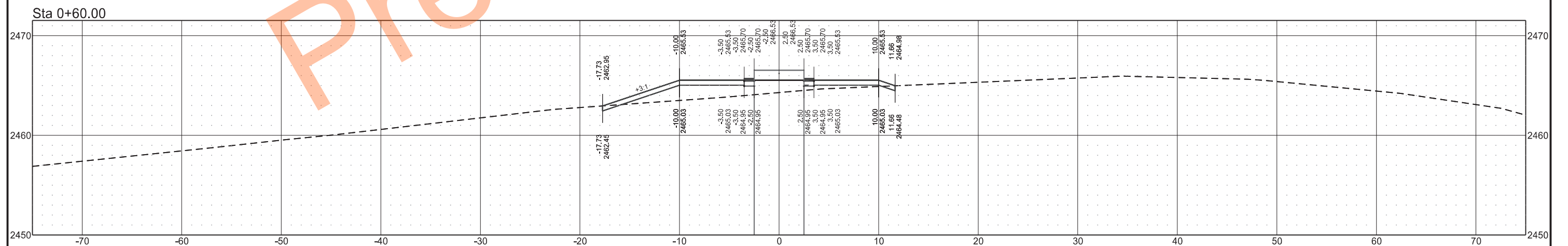


Sta 0+50.00



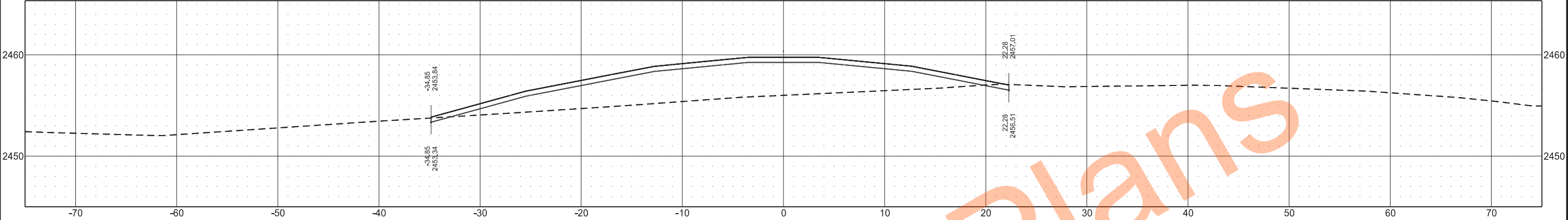
Sta 0+41.34



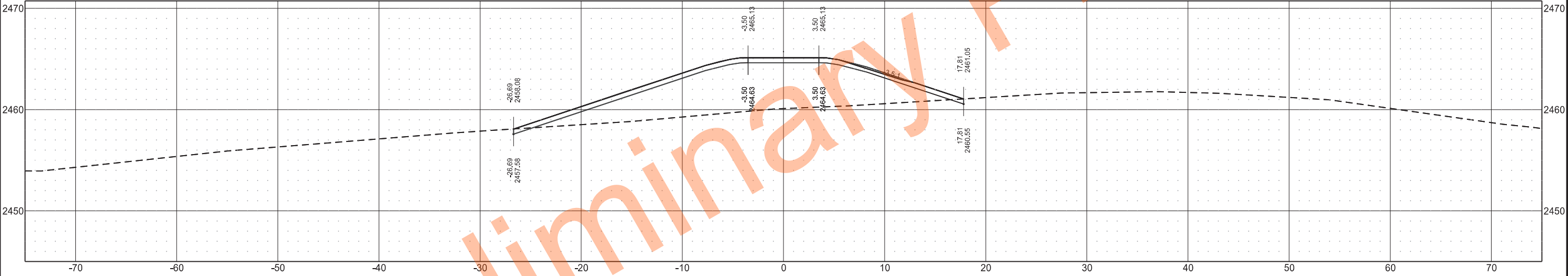


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	55

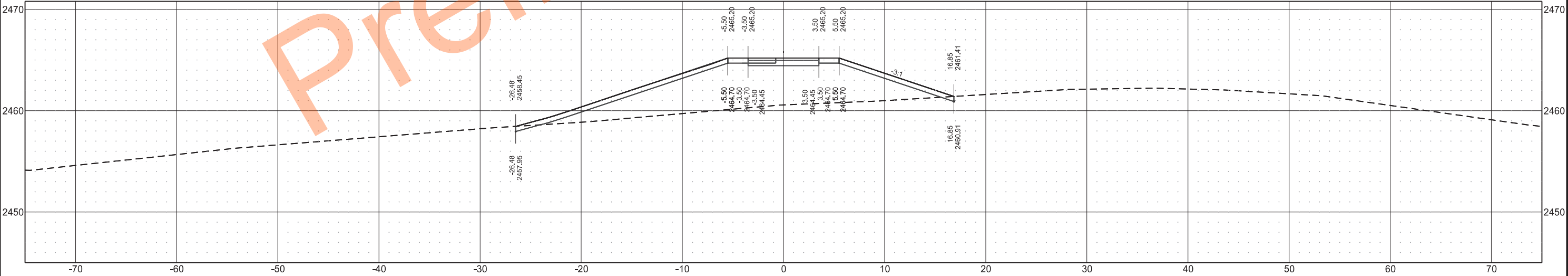
Sta 1+00.00



Sta 0+78.50



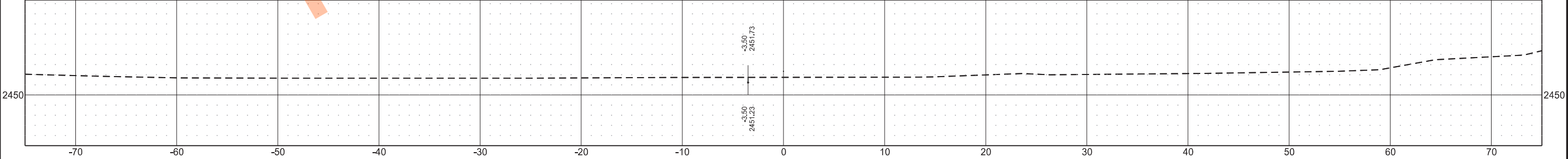
Sta 0+76.50



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	56

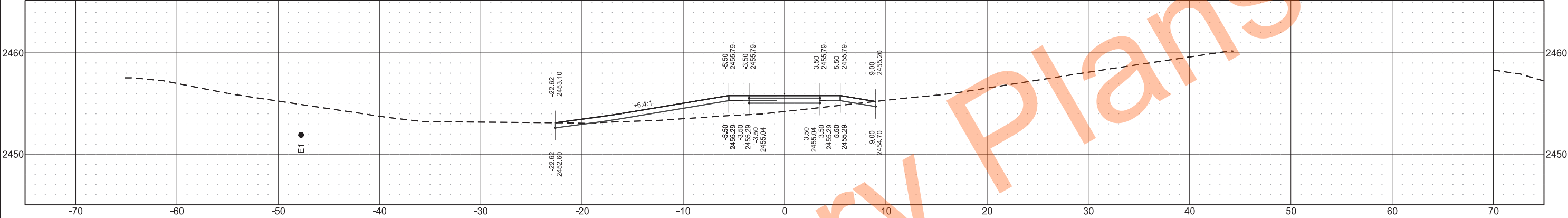
Preliminary Plans

Sta 1+32.07

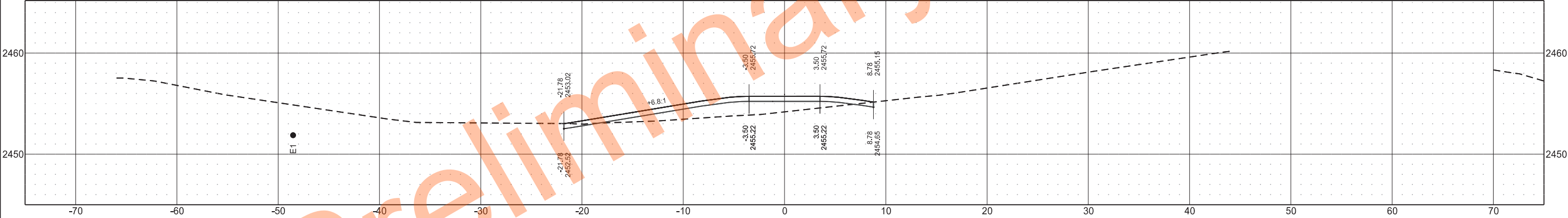


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	57

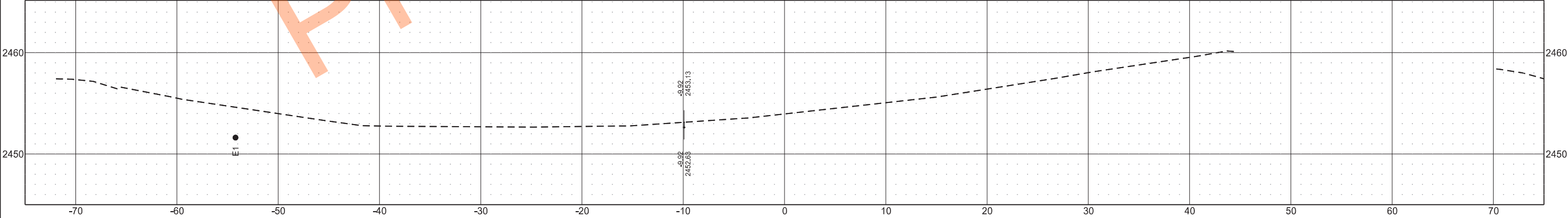
Sta 0+43.50



Sta 0+41.50

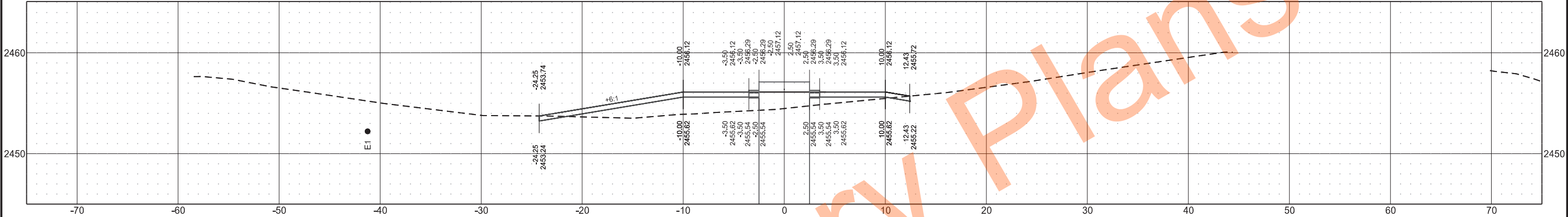


Sta 0+27.08

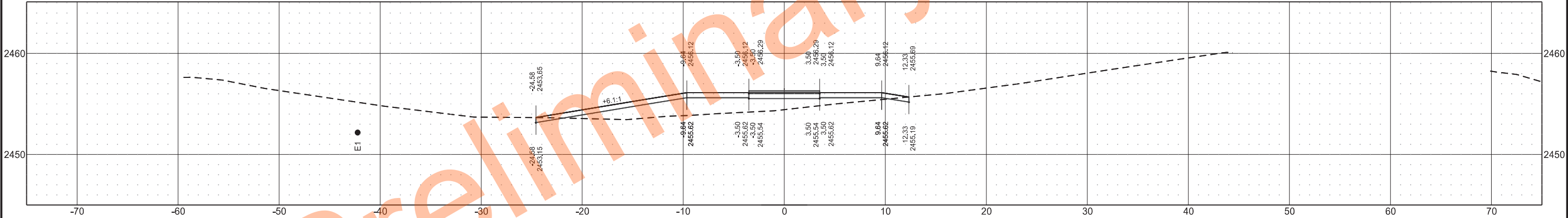


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	58

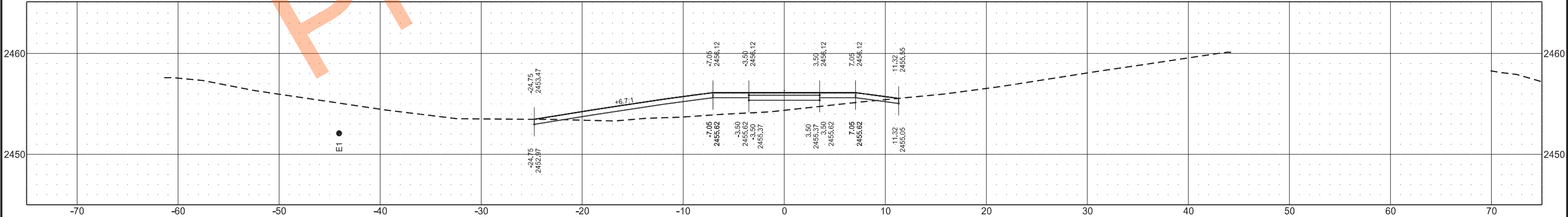
Sta 0+60.00



Sta 0+57.50

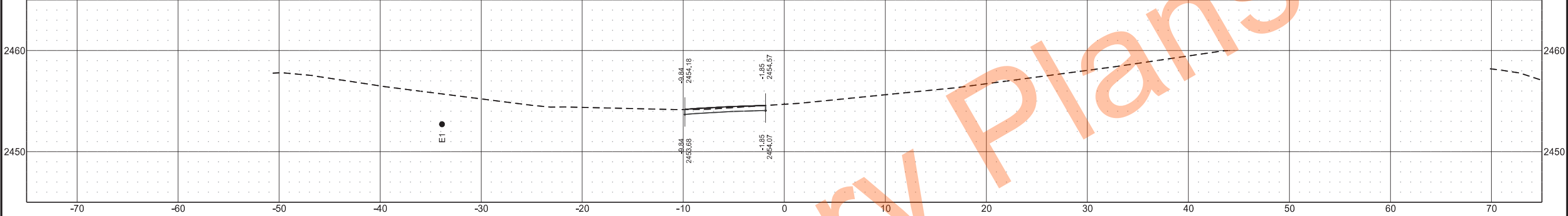


Sta 0+52.83

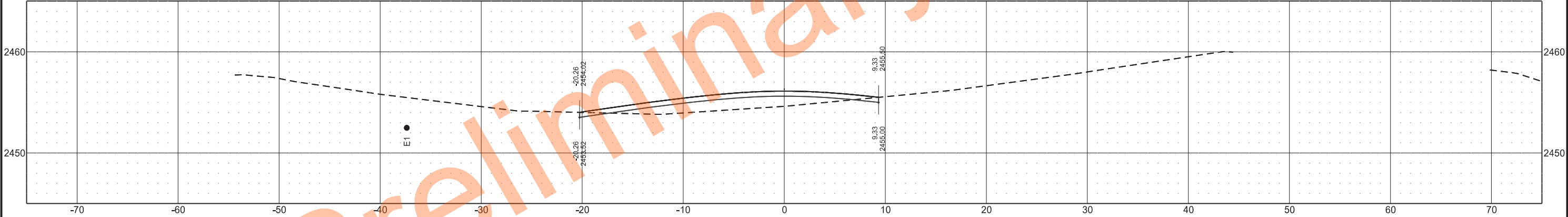


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	59

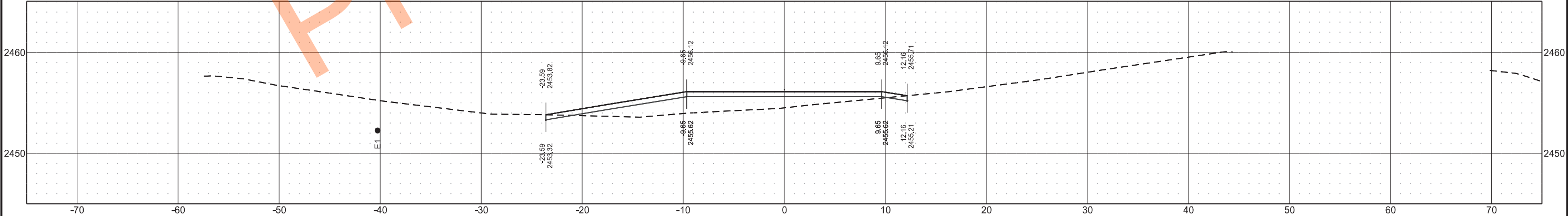
Sta 0+79.23



Sta 0+70.00

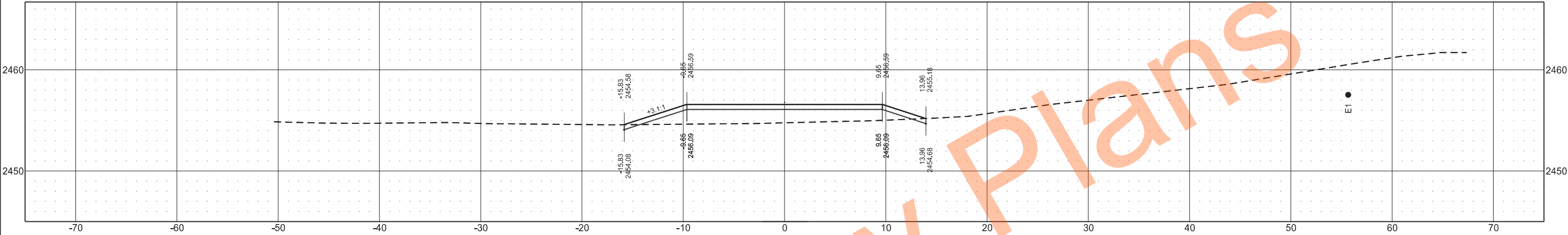


Sta 0+62.50

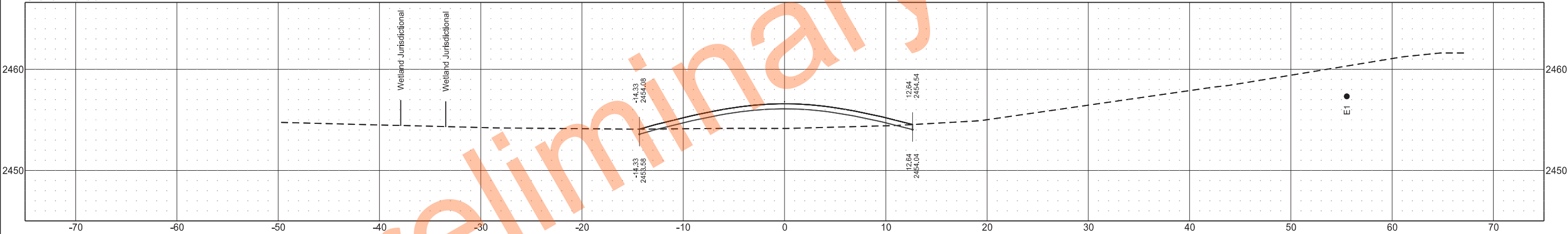


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	60

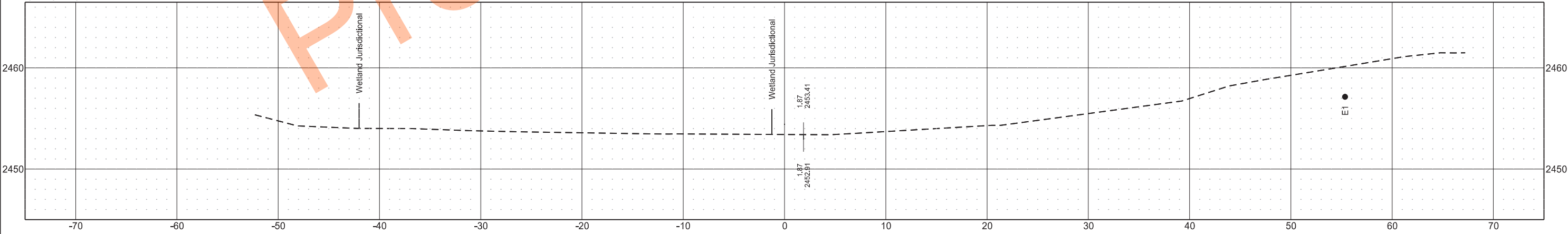
Sta 0+57.50

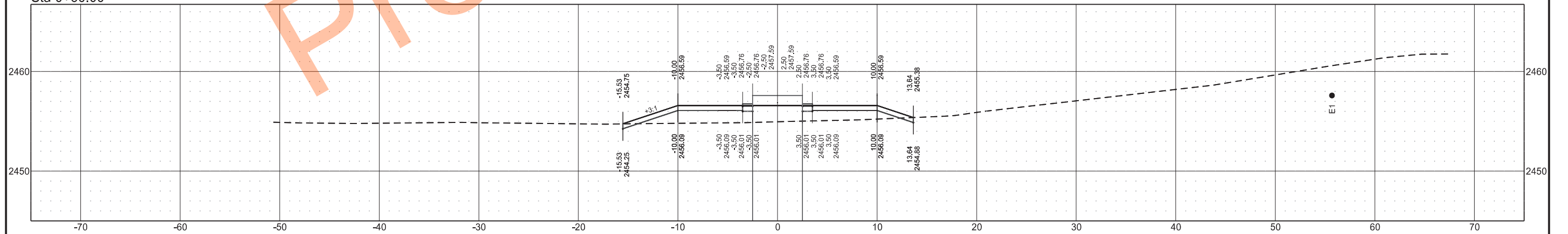
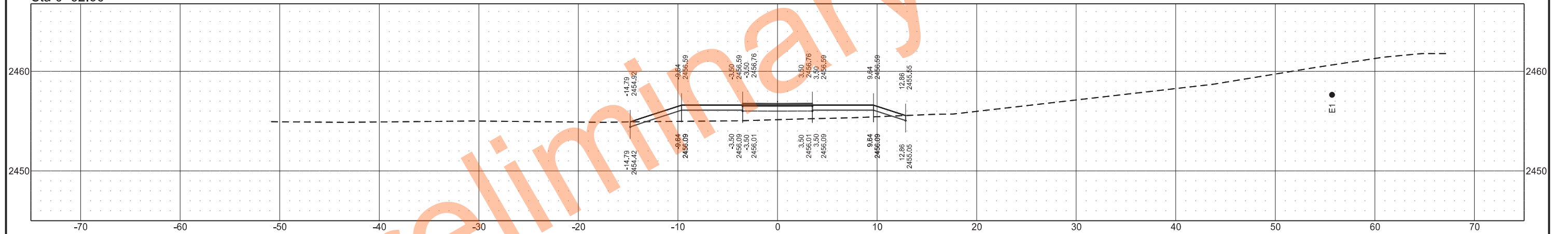
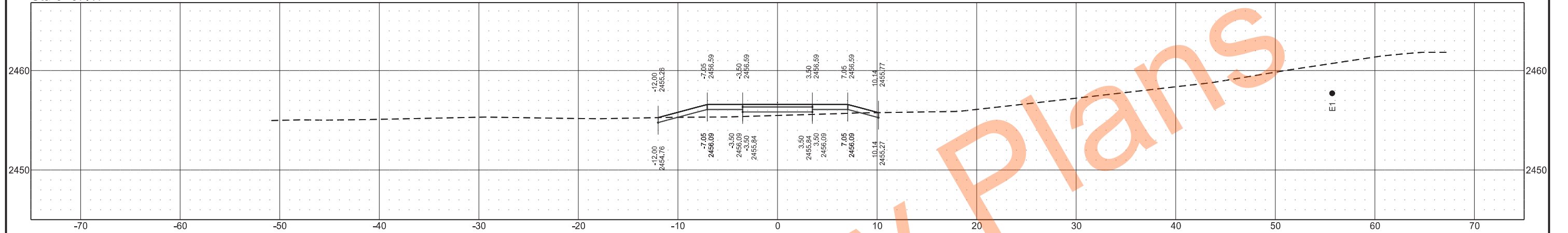


Sta 0+50.00



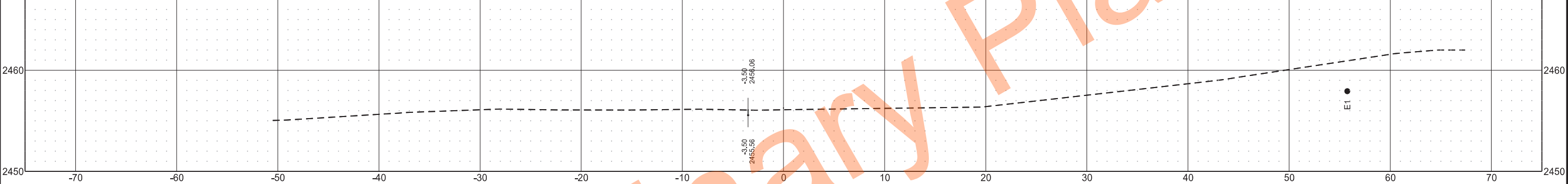
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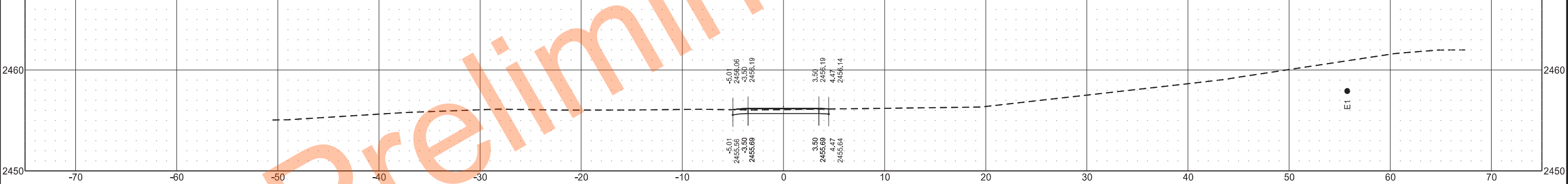


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	62

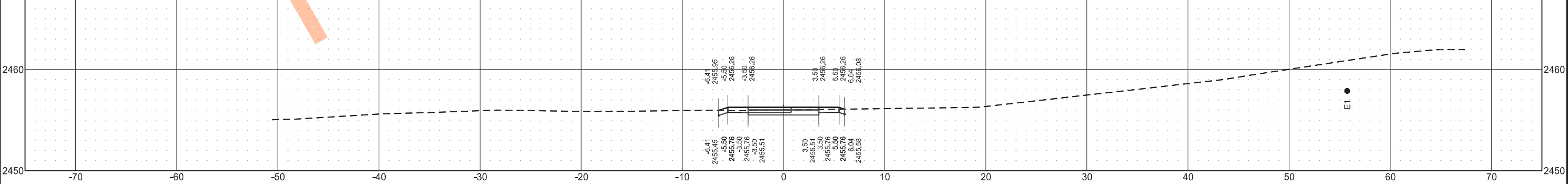
Sta 0+78.98



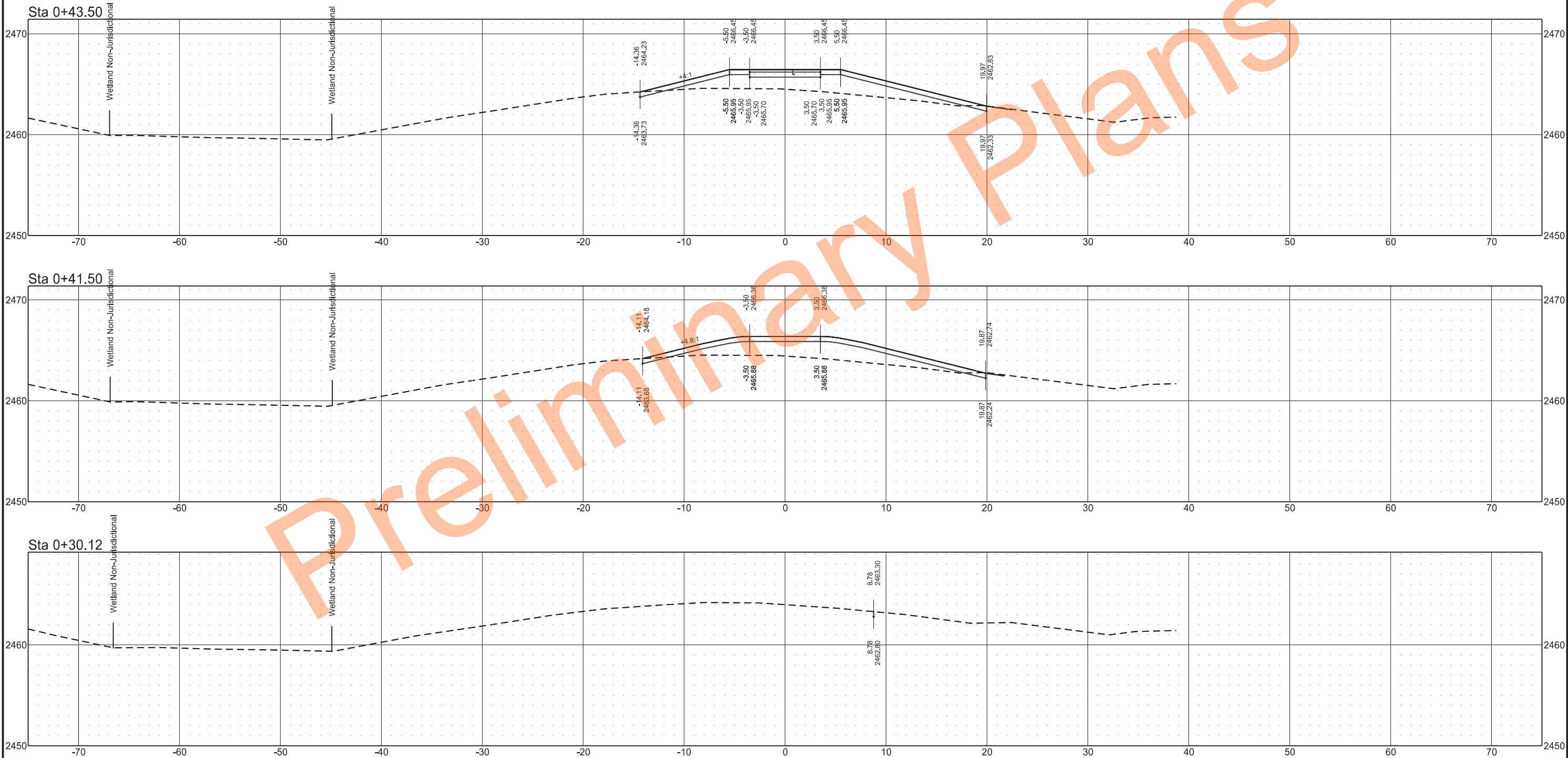
Sta 0+78.50

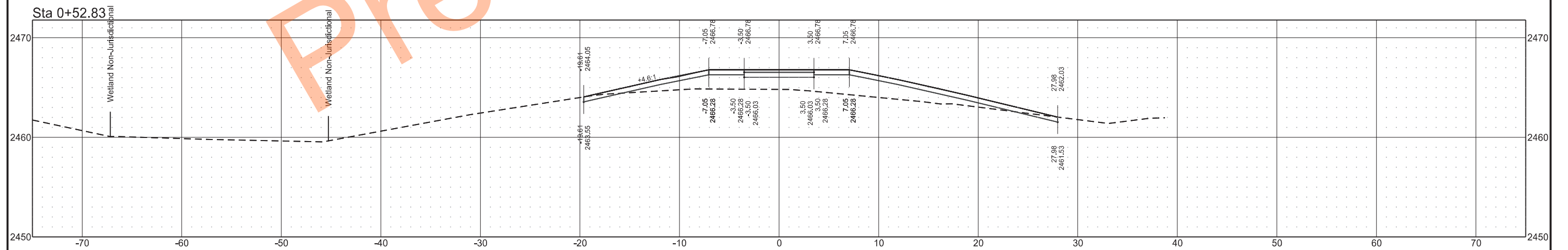


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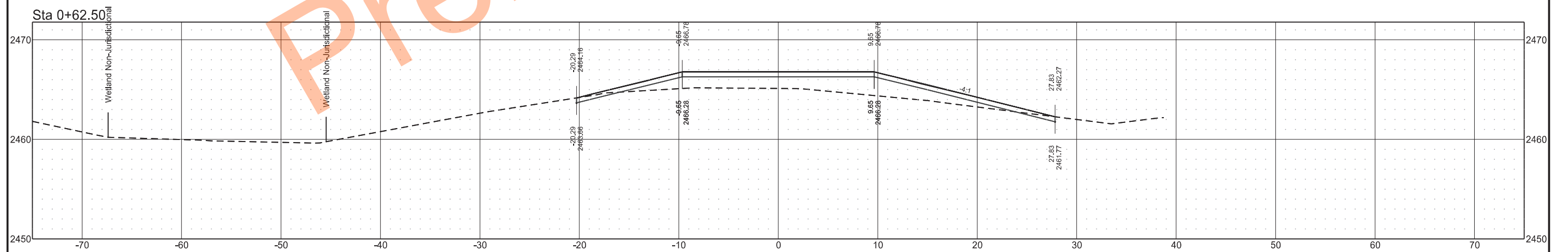


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	ND	IM-5-094(163)059	200	63



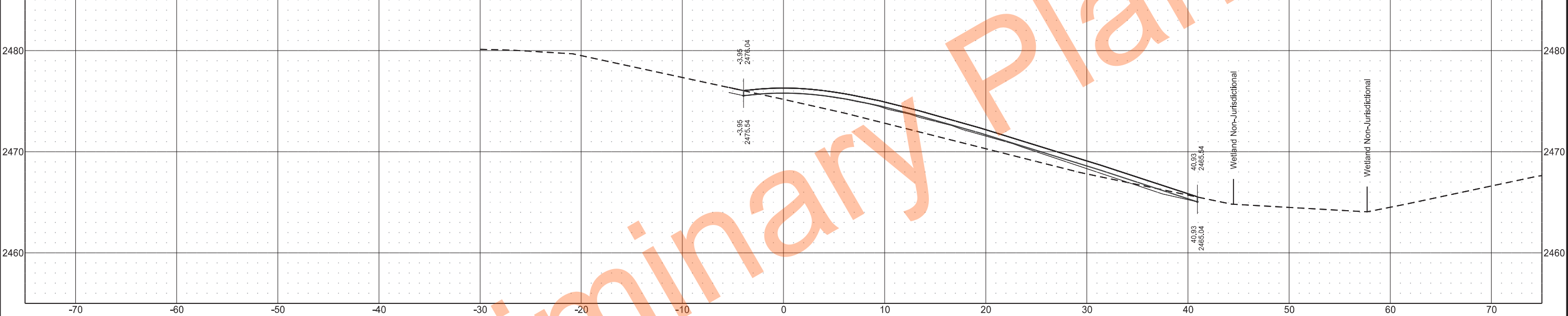


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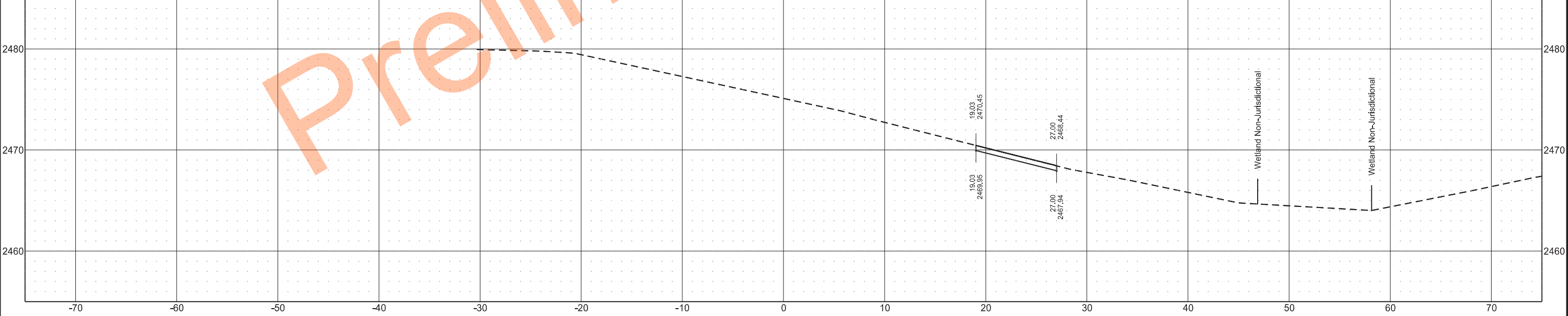


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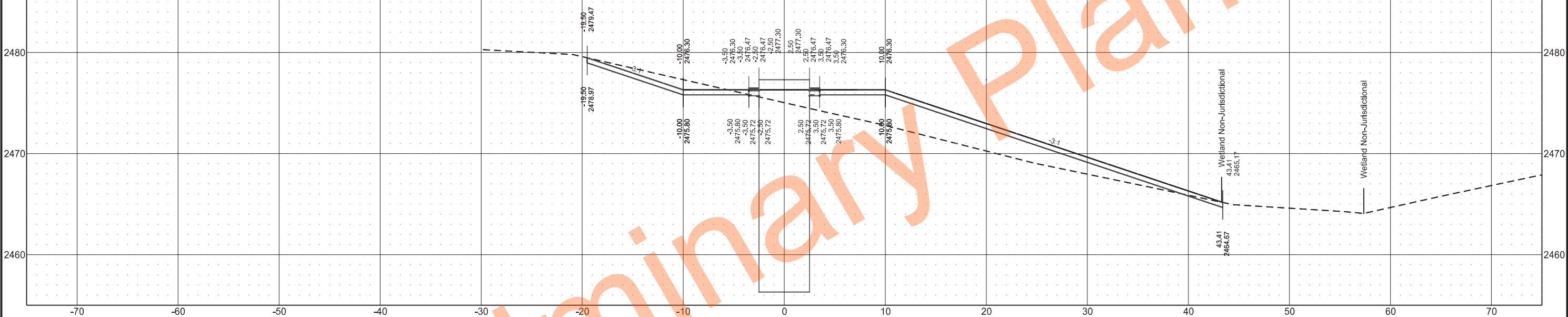


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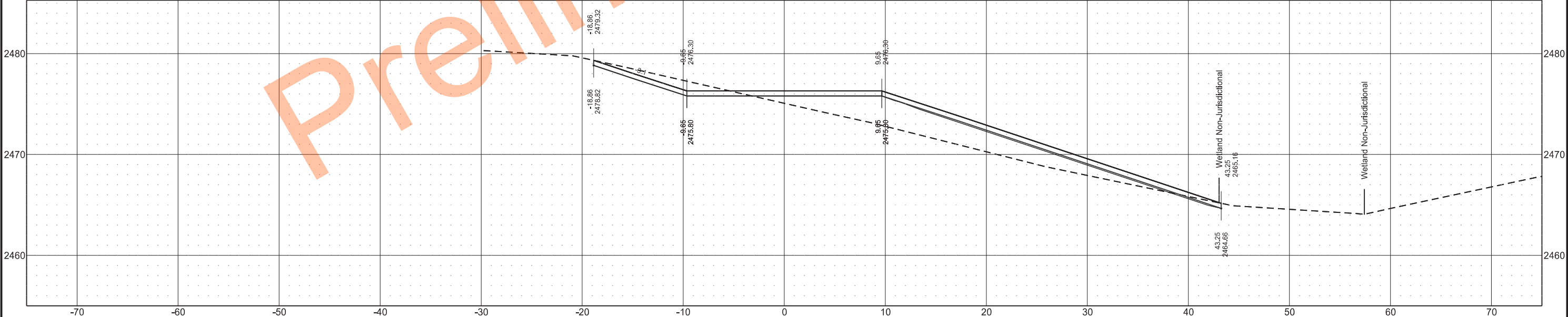


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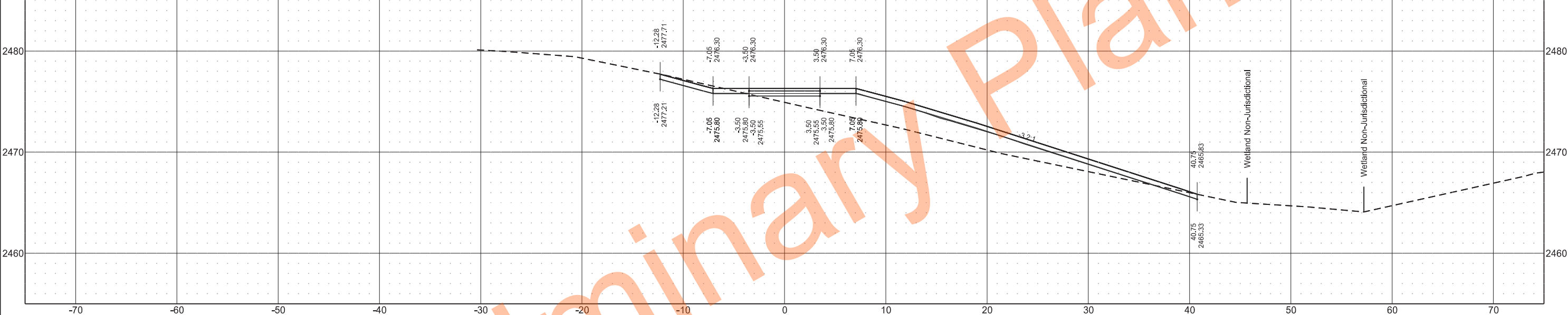


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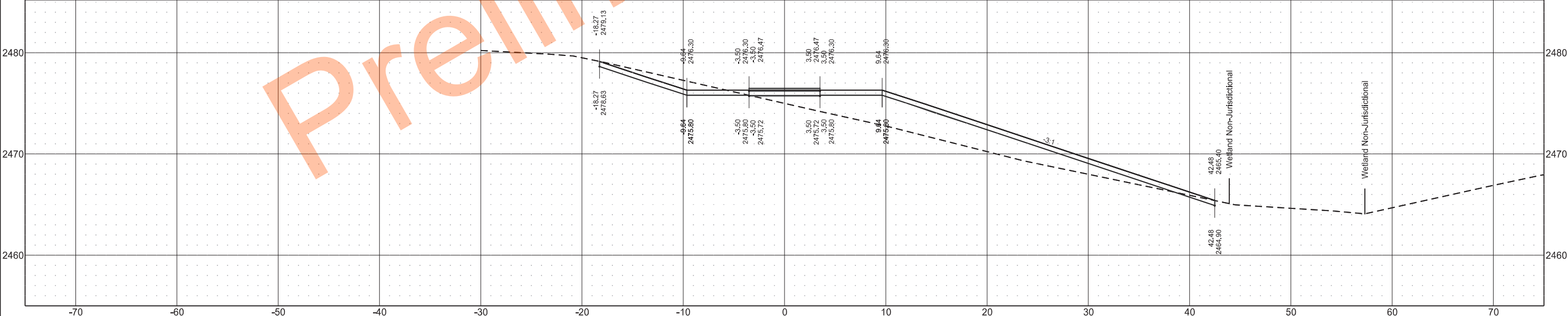


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	ND	IM-5-094(163)059	200	68

Sta 0+67.17

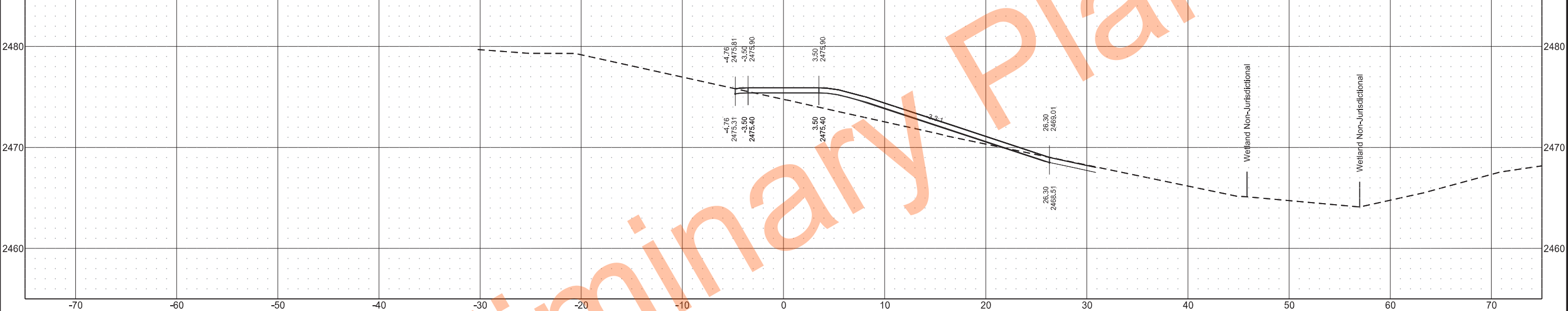


Sta 0+62.50

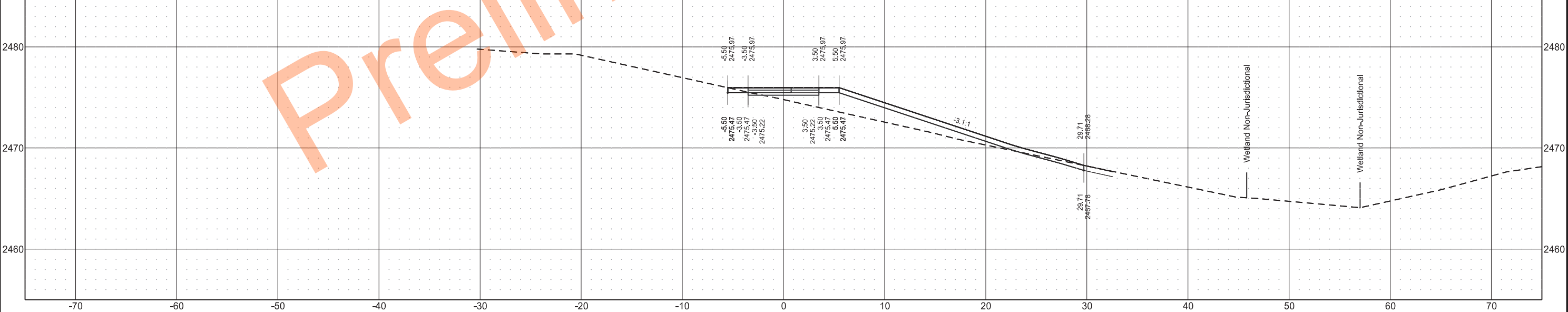


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	ND	IM-5-094(163)059	200	69

Sta 0+78.50

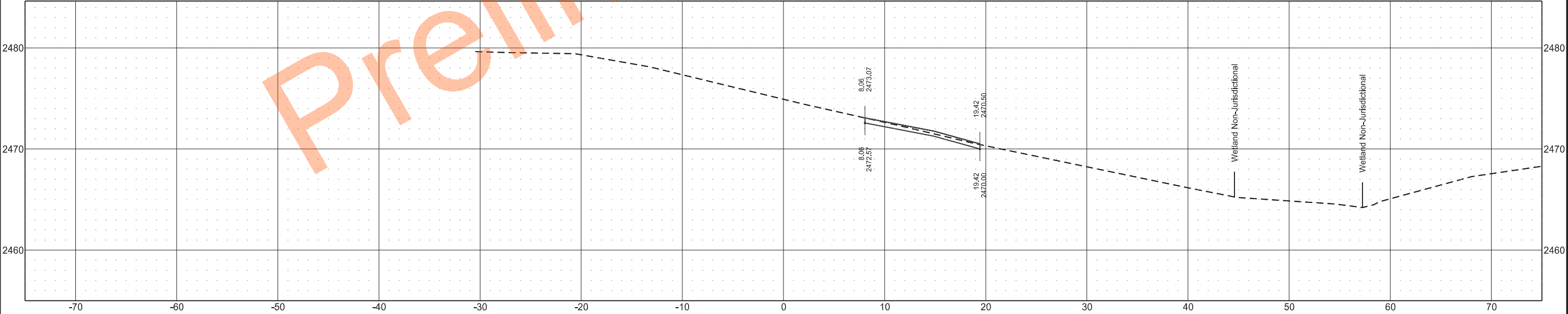


Sta 0+76.50



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(163)059	200	70

Sta 0+88.18



NDDOT ABBREVIATIONS

D-101-1

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

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12-10-20	General Revisions
08-16-22	General Revisions

KIRK J. HOFF

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PROFESSIONAL

PE-4683

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NORTH DAKOTA

08/16/22

NDDOT ABBREVIATIONS

D-101-2

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

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

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MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-28-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

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PE-4683

ENGINEER

NORTH DAKOTA

08/16/22

LINE STYLES

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

	Centerline Pavement Marking
	Barrier with Centerline Pavement Marking
	Barrier Pavement Marking
	Stripe 4 IN Dotted Extension White
	Stripe 8 IN Dotted Extension White
	Stripe 8 IN Lane Drop

Pavement Joints

	Doweled Joint
	Tie Bar 30 Inch 4 Foot Center to Center
	Tie Bar 18 Inch 3 Foot Center to Center
	Tie Bar at Random Spacing

Bridge Details

	Small Hidden Object
	Large Hidden Object
	Phantom Object
	Existing Conditions Object
	Centerline Main
	Centerline Secondary
	Excavation Limits
	Proposed Ground
	Sheet Piling

Erosion Control

	Limits of Const Transition Line
	Bale Check
	Rock Check
	Floating Silt Curtain
	Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

KIRK J. HOFF

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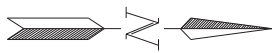
ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30

	North Arrow (Half Scale)		Existing Bush or Shrub		Continuous Split Barrel Sample
	Alignment Data Point		Existing Large Evergreen Tree		Flight Auger Sample
	Alignment Monument		Existing Small Evergreen Tree		Split Barrel Sample
	Spot Elevation		Existing Large Tree		Thinwall Tube Sample
	Existing Miscellaneous Spot		Existing Small Tree		Standard Penetration Test
	Existing Access Control Arrow		Existing Tree Trunk		Inclinometer Tube
	Existing Benchmark		Cairn or Stone Circle		Excavation Unit
	Reset USGS Marker		Existing Artifact		Existing Ground Water Well Bore Hole
	Iron Monument Found		Existing Satellite Dish		
	Iron Pin R/W Monument		Existing Weather Station		
	Property Corner		Existing Windmill or Tower		
	Iron Pin Reference Monument		Reinforced Pavement		
	Right of Way Marker (Exst, Ppsd, Reset)				
	Existing Federal Reference Corner				
	Existing Section Corner (Full, Quarter, Sixteenth, Meander)				
	Existing Witness Corner				
	Existing Control Point (CP, GPS-RTK, TRI)				
	Existing Traverse PI Aerial Panel				
	Existing Reference Marker Point NGS				
	Existing EFB Misc				

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



12 18 2020

SYMBOLS

D-101-31

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

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

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NORTH DAKOTA
12 18 2020

SYMBOLS

D-101-32

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

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

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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	12 18 2020

SYMBOLS

D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			Existing Curb Inlet (Round, Square)		
			Existing Slotted Reinforced Concrete Pipe		
			Catch Basin (Riser 30 Inch, Beehive, Type A)		
			Inlet Mountable Curb (Type A, Type B)		
			Inlet Saddle Base (Type 1, Type 2)		
			Inlet Special (Catch Basin, Type 1, Type A)		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		
			Median Drain		
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

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

12 18 2020

Cross Section Legend

D-101-40

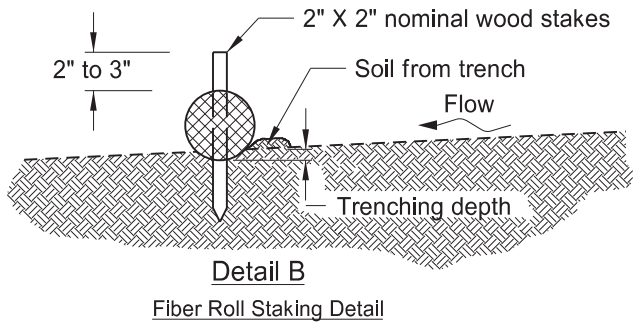
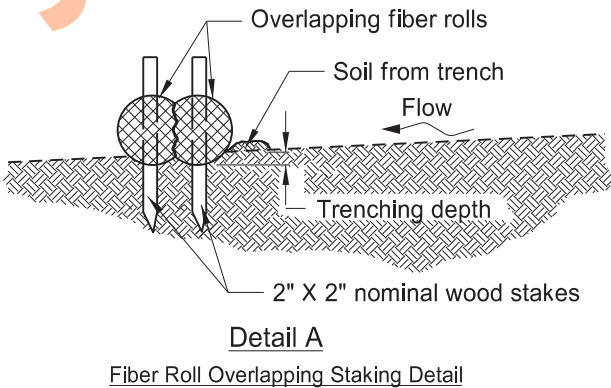
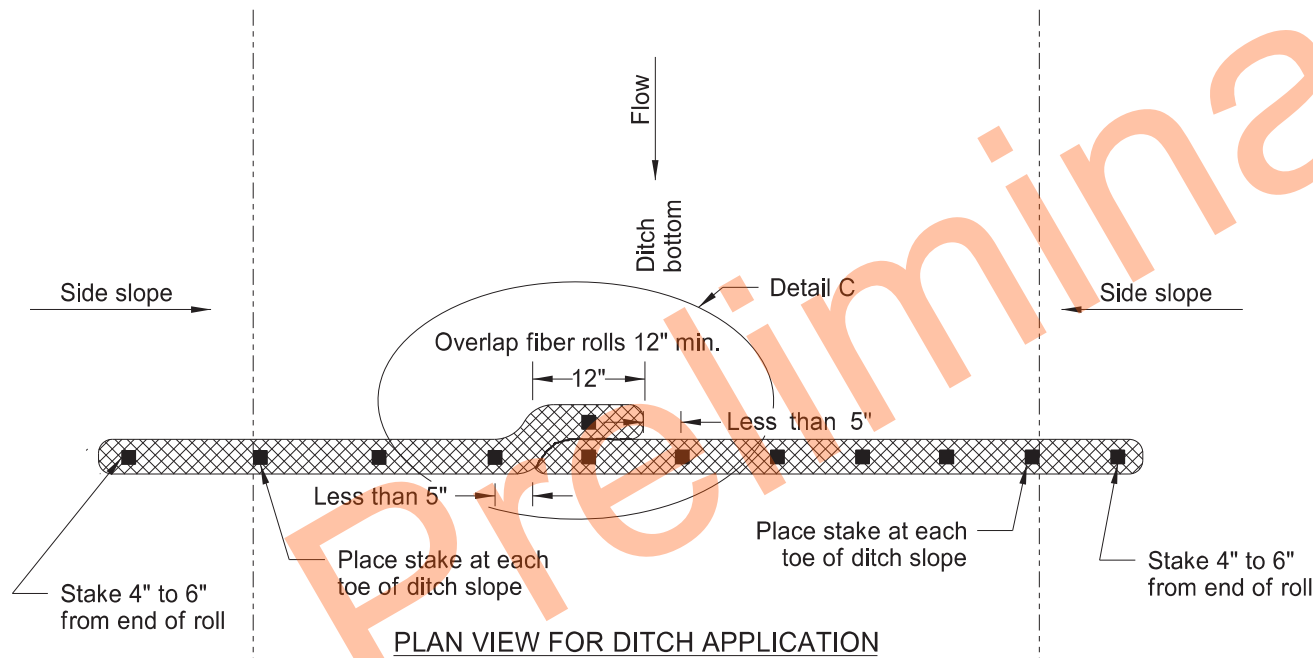
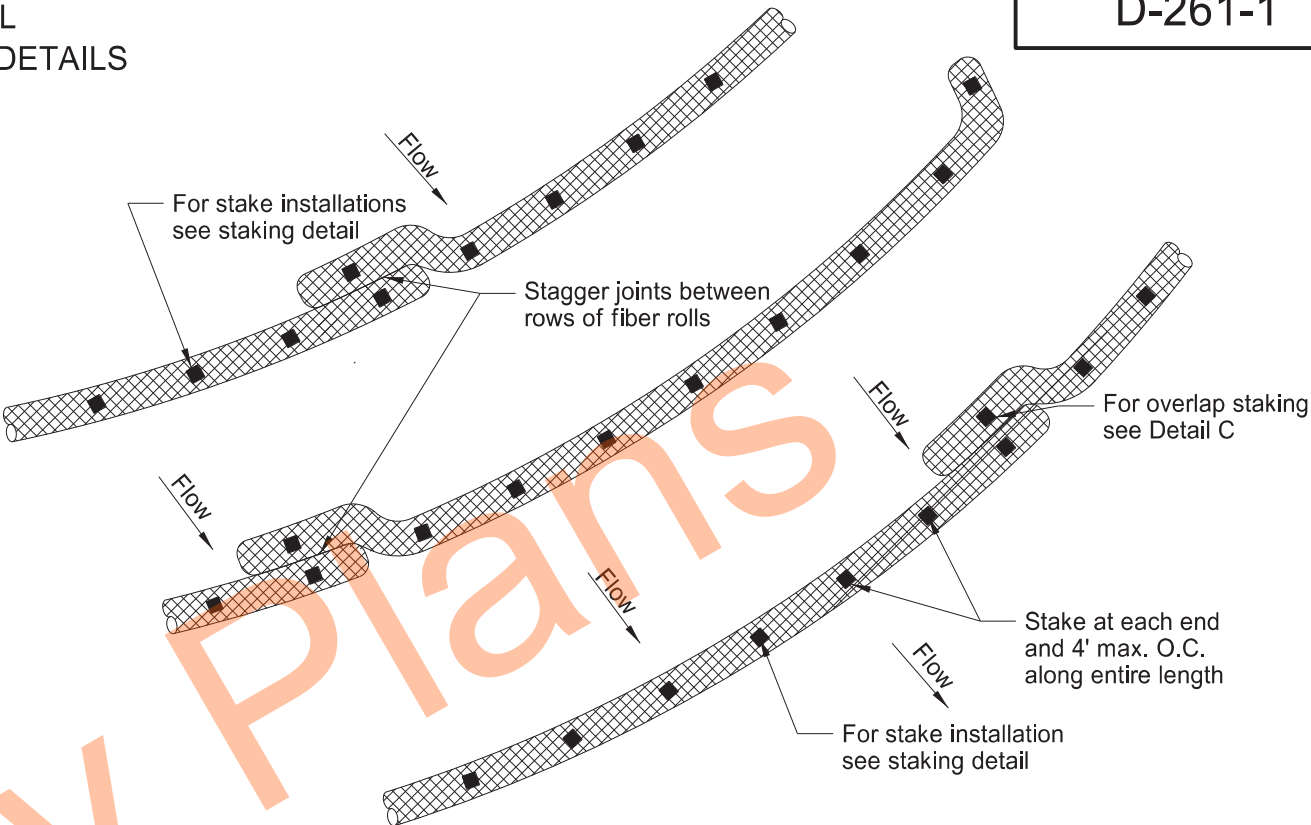
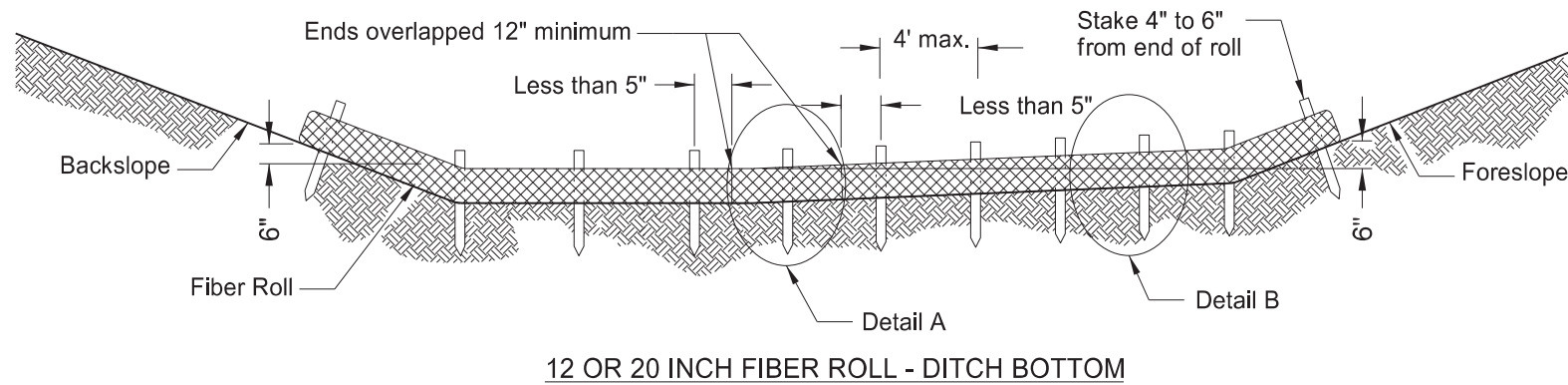


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update

06/14/23

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1



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

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

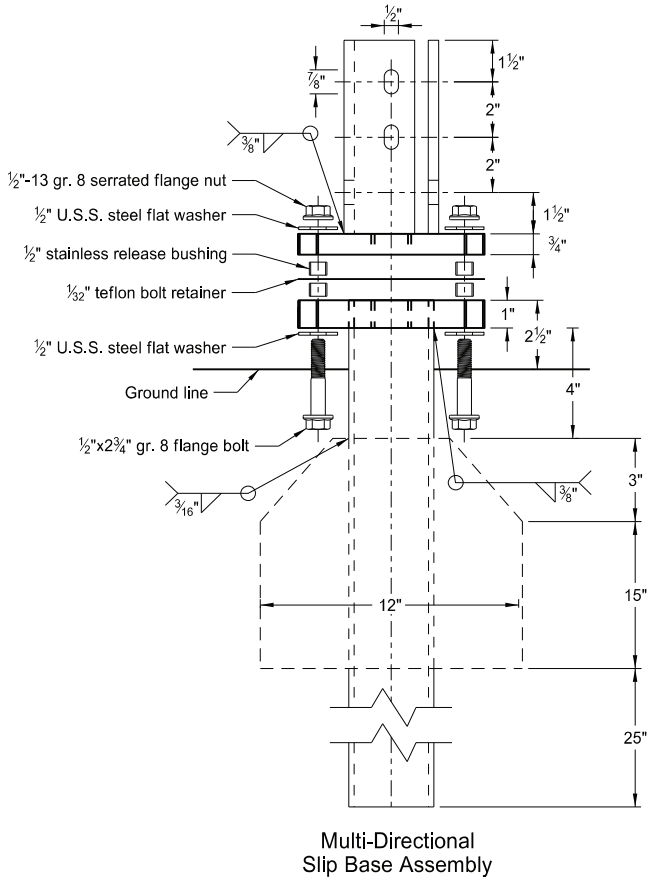
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.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



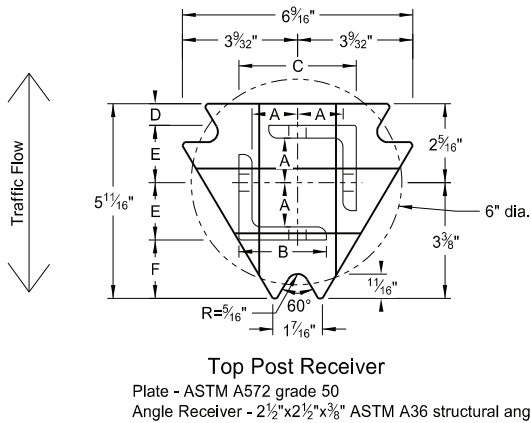
04/22/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



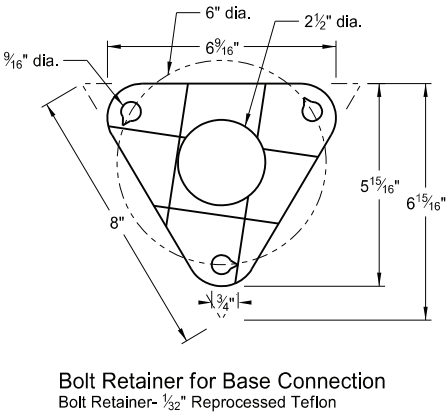
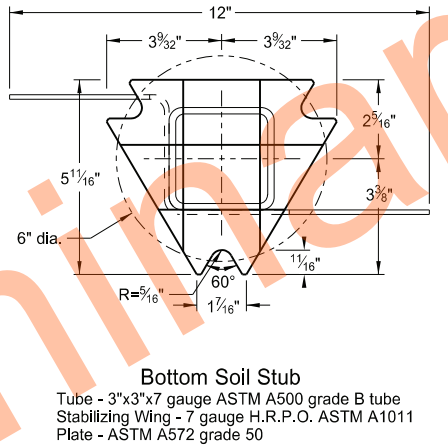
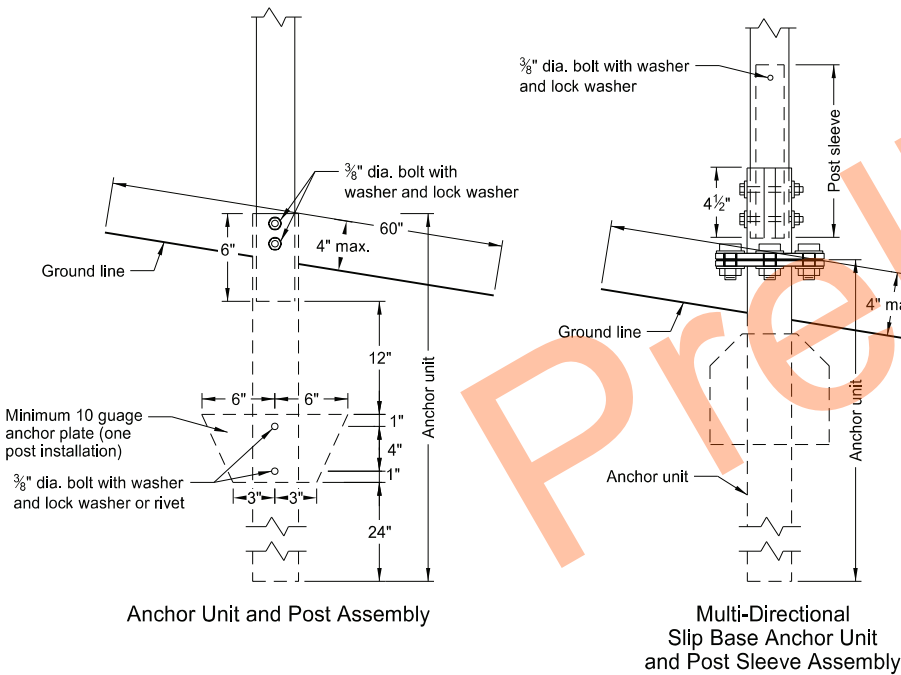
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete sidewalk, use same anchor without wings.
 5. Provide more than 7' between the first and fourth posts of a four post sign.

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

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

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/8"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

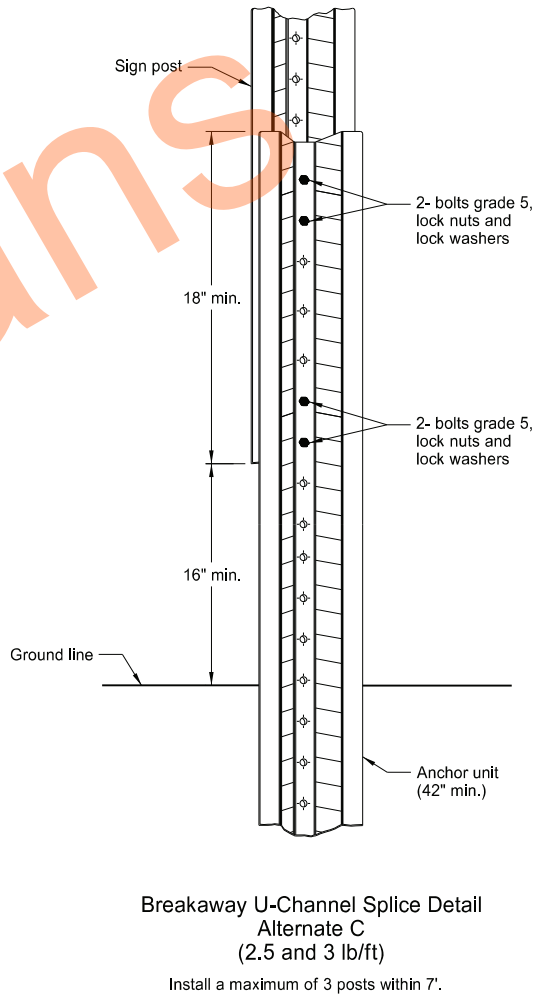
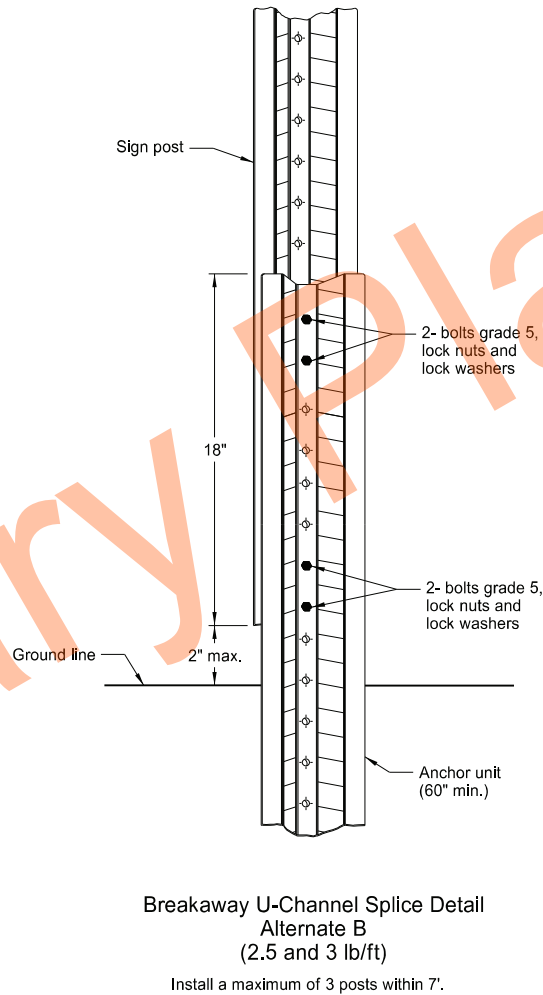
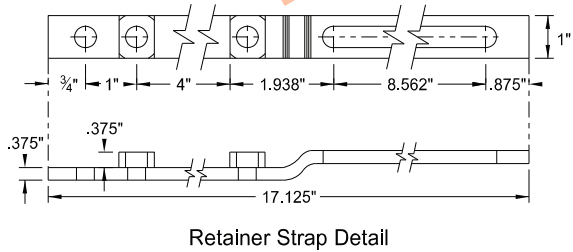
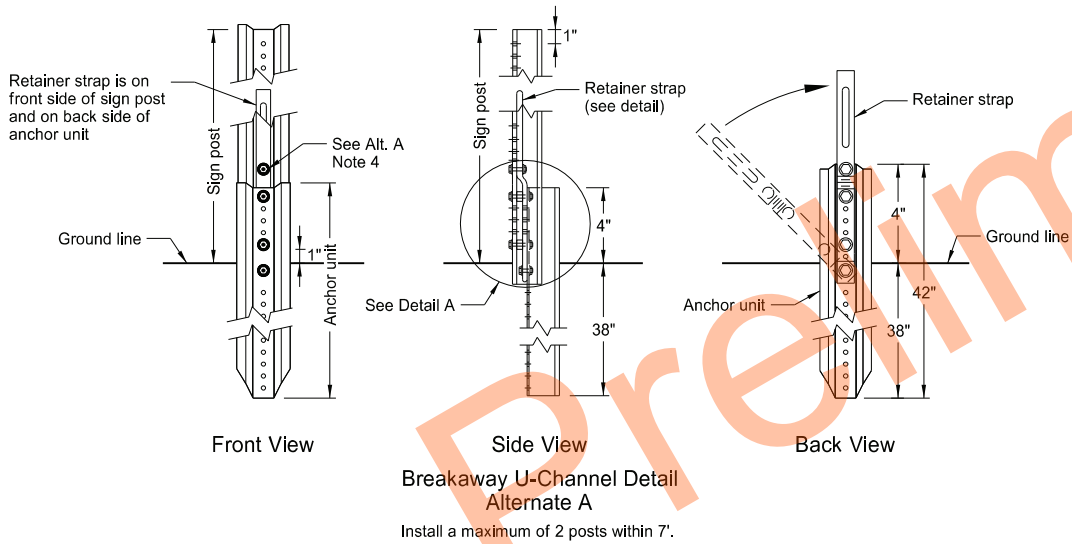
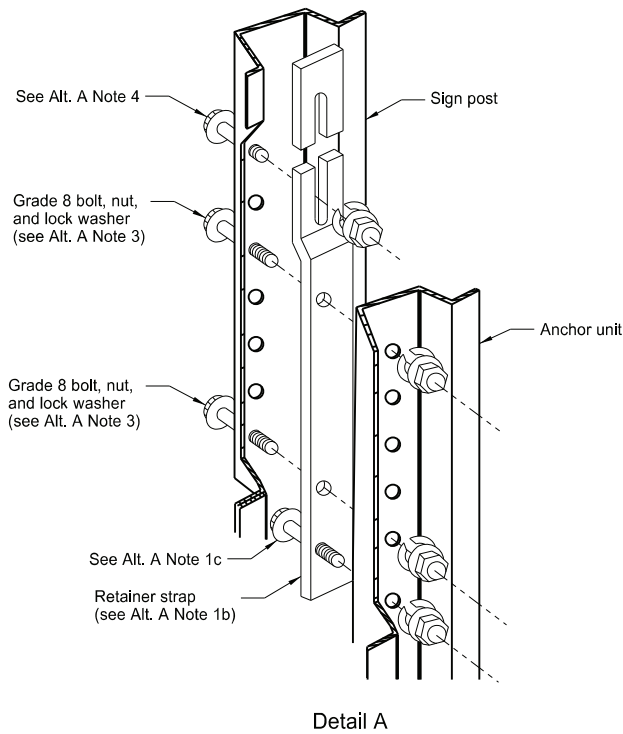


08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
b) Alternately tighten two connector bolts.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

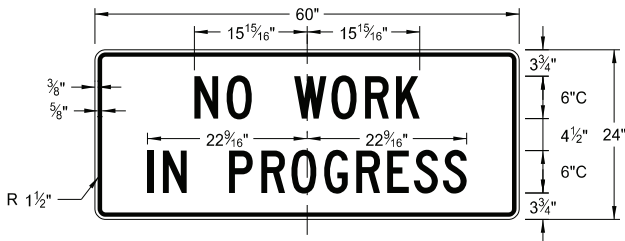


08/01/24

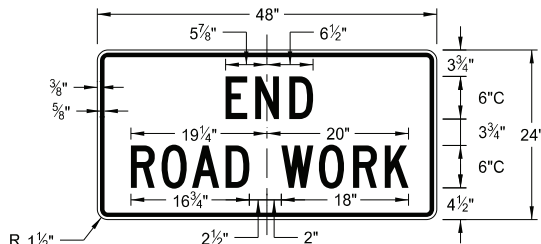
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
Legend: black (non-refl)
Background: orange



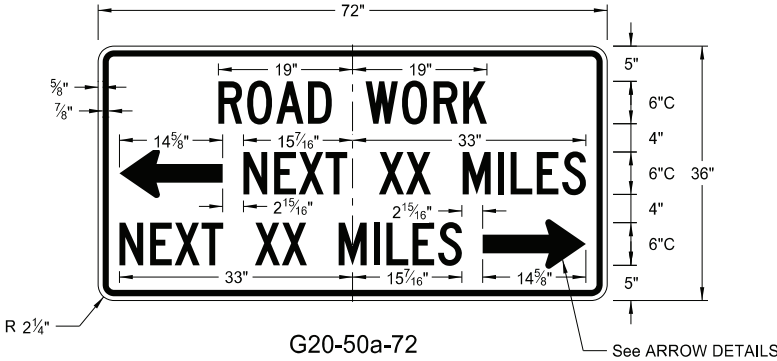
G20-1b-60
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Background: orange



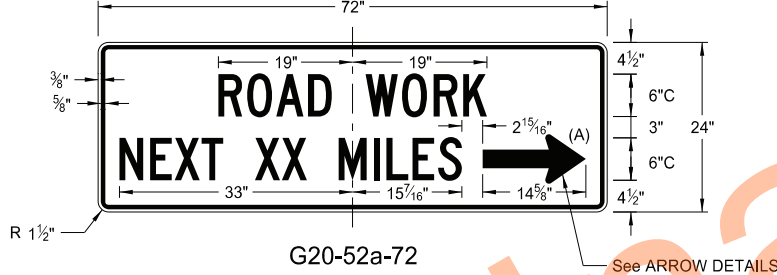
G20-2-48
Legend: black (non-refl)
Background: orange



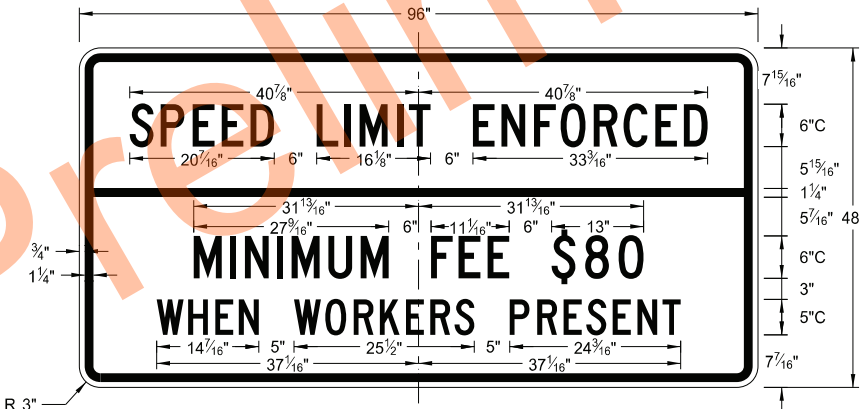
G20-4b-36
Legend: black (non-refl)
Background: orange



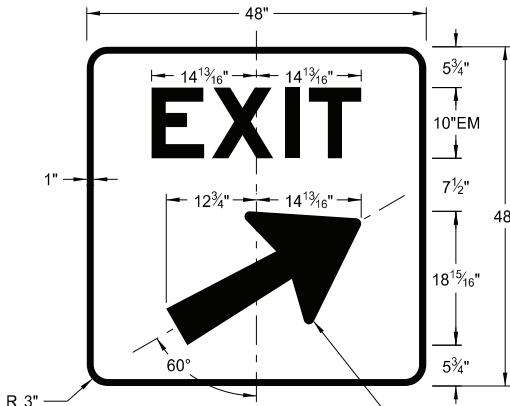
G20-50a-72
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Background: orange



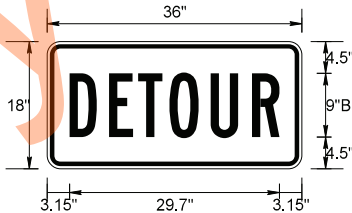
G20-52a-72
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Background: orange



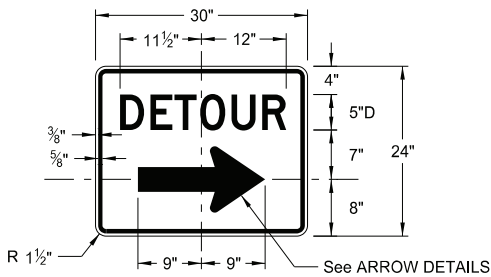
G20-55-96
Legend: black (non-refl)
Background: orange



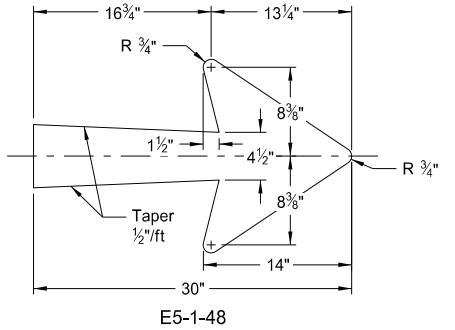
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



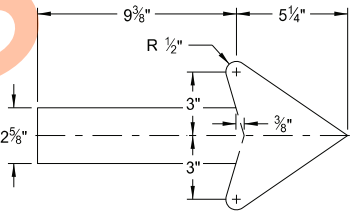
M4-8-36
Legend: black (non-refl)
Background: orange



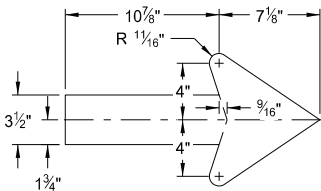
M4-9(L or R)-30 & M4-9-30
Legend: black (non-refl)
Background: orange



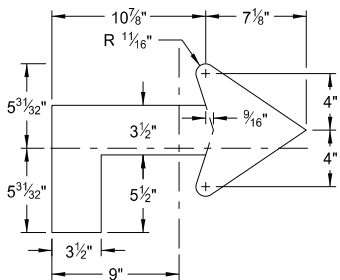
E5-1-48



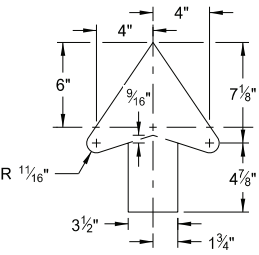
G20-50a-72
G20-52a-72



M4-9(L or R)-30
Right or Left



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS

NOTES:

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

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



08/01/24

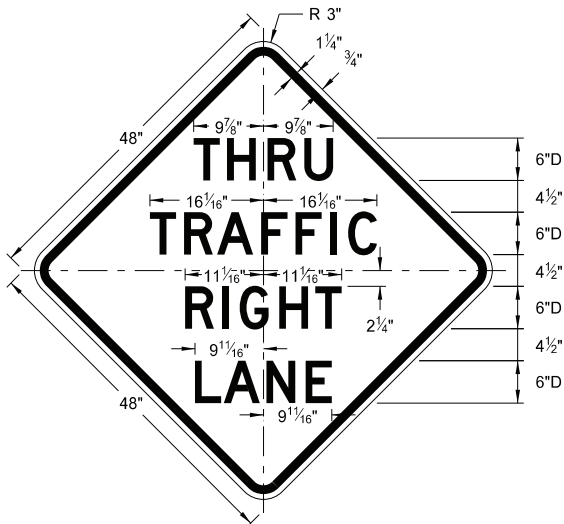


08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

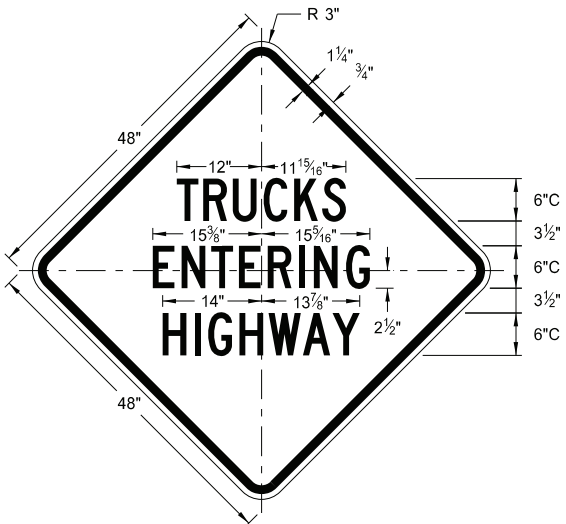
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



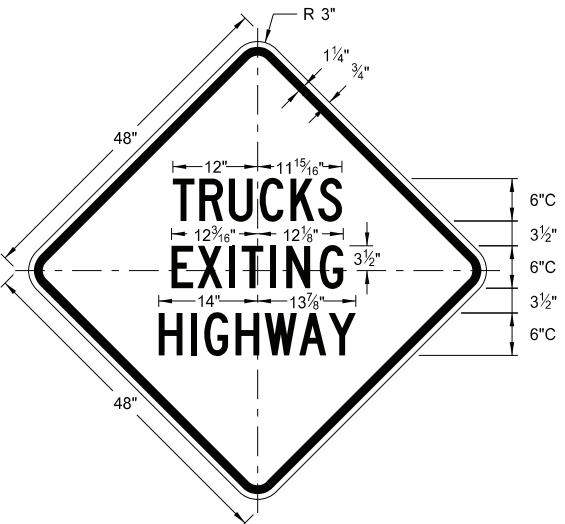
W5-8-48

Legend: black (non-refl)
Background: orange



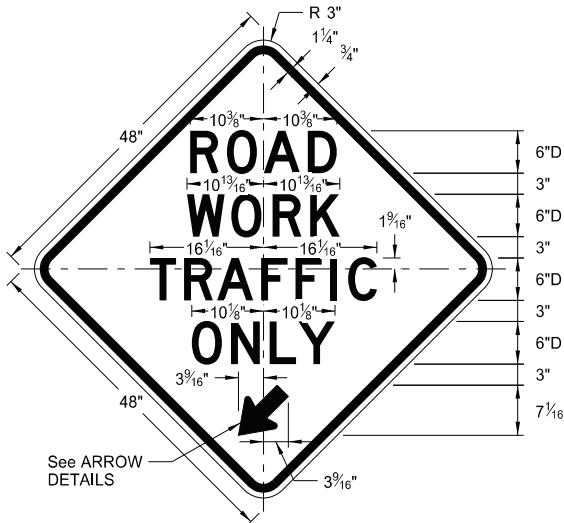
W8-53-48

Legend: black (non-refl)
Background: orange



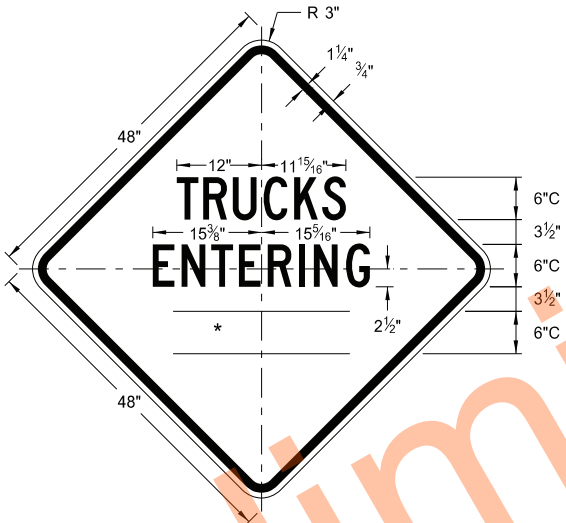
W8-56-48

Legend: black (non-refl)
Background: orange



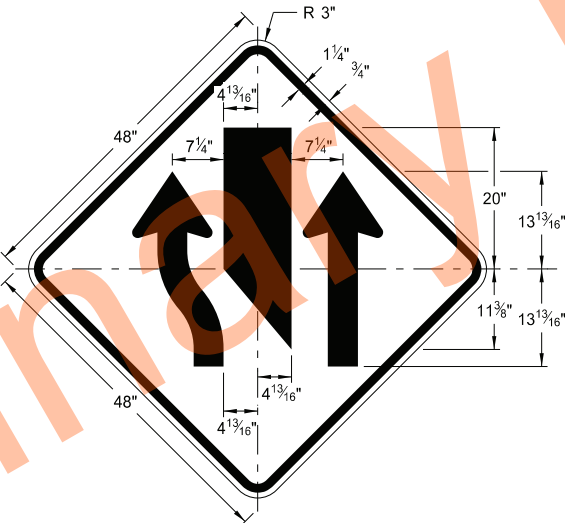
W5-9-48

Legend: black (non-refl)
Background: orange



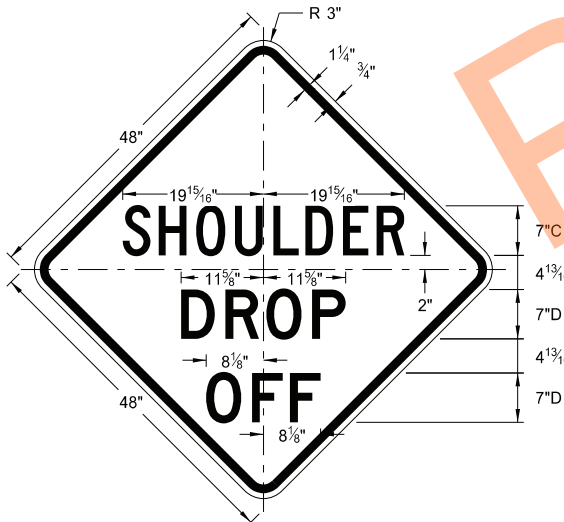
W8-54-48

Legend: black (non-refl)
Background: orange



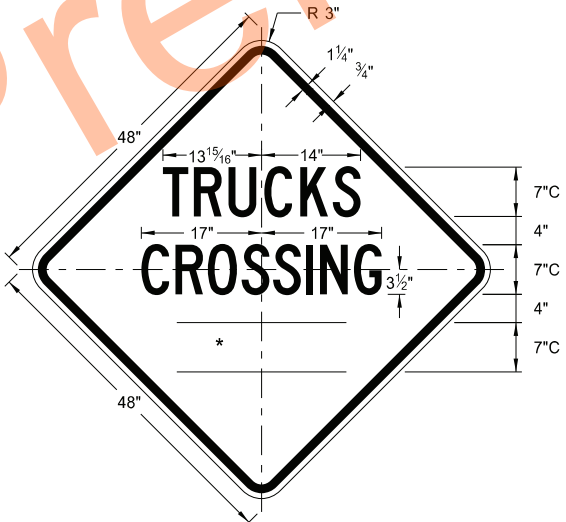
W9-3a-48

Legend: black (non-refl)
Background: orange



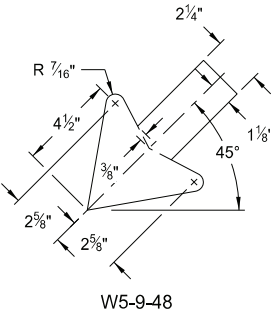
W8-9a-48

Legend: black (non-refl)
Background: orange

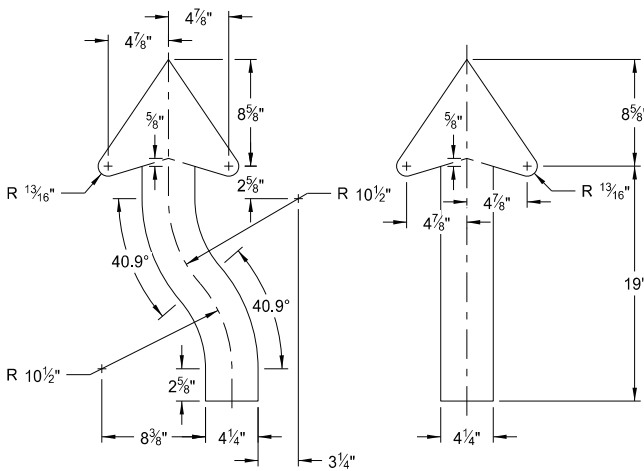


W8-55-48

Legend: black (non-refl)
Background: orange



W5-9-48



W9-3a-48

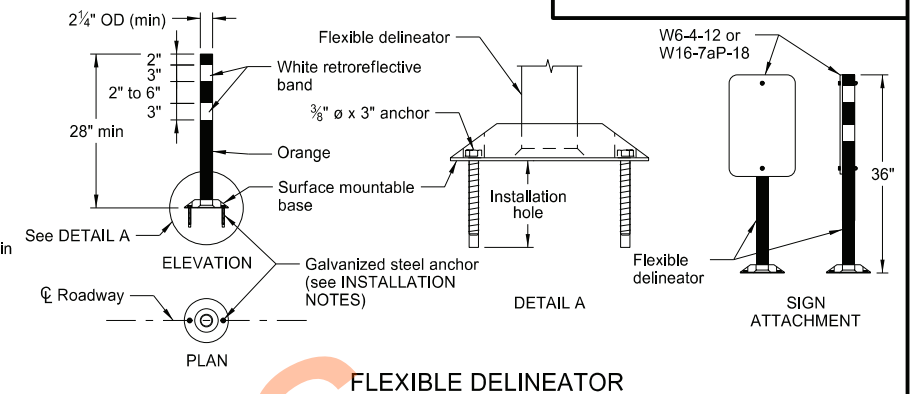
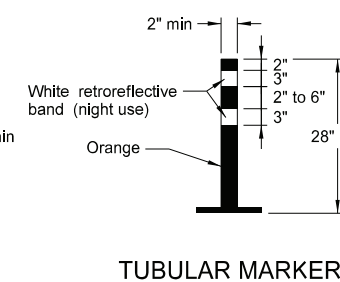
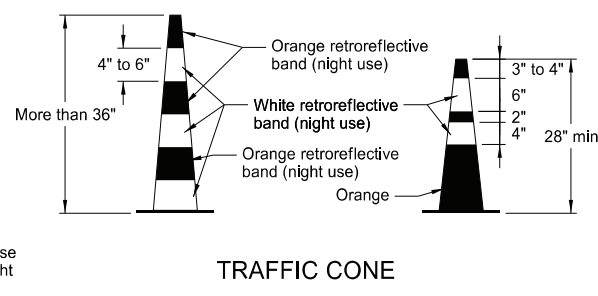
ARROW DETAILS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature



08/01/24

D-704-13



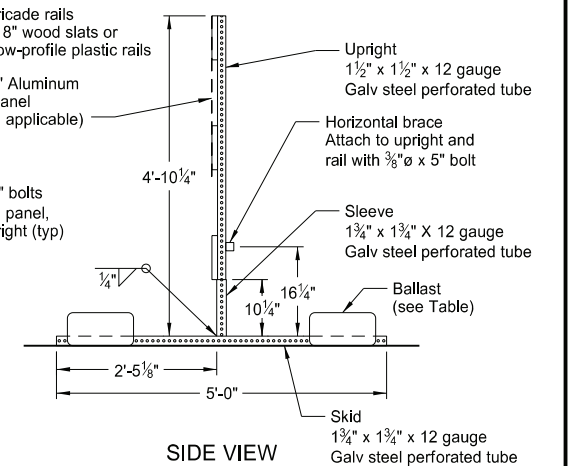
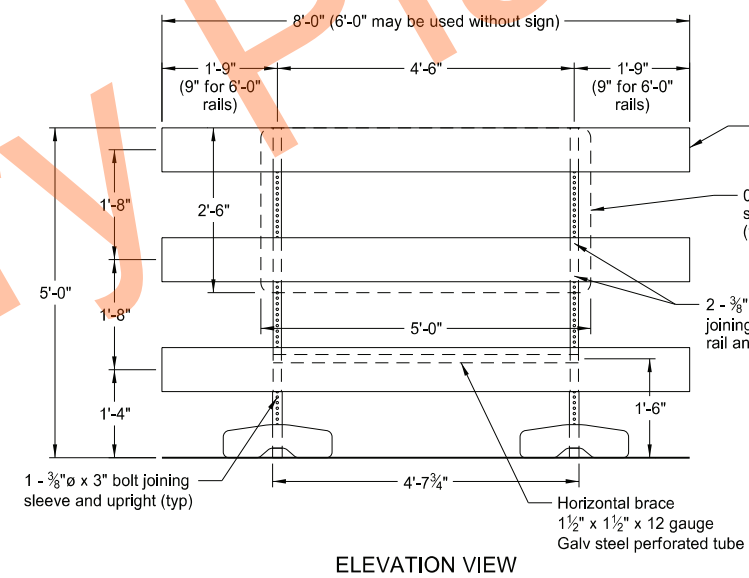
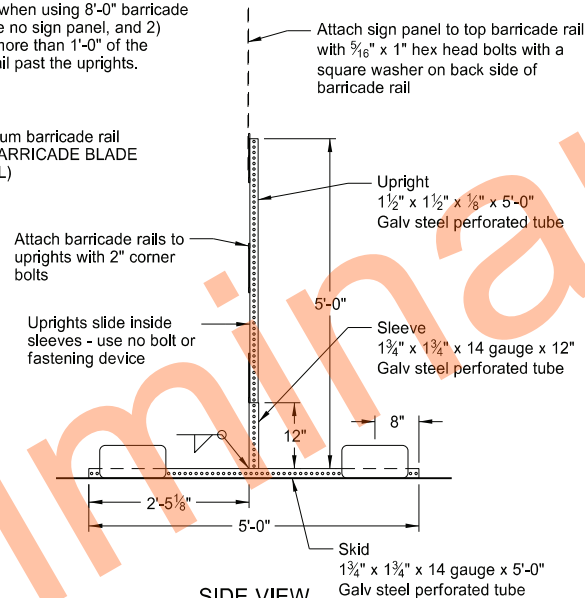
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectorized space between the orange and white stripes.

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

INSTALLATION NOTES:

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

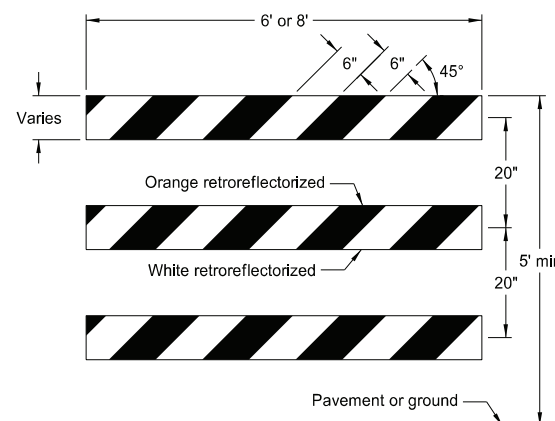


BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

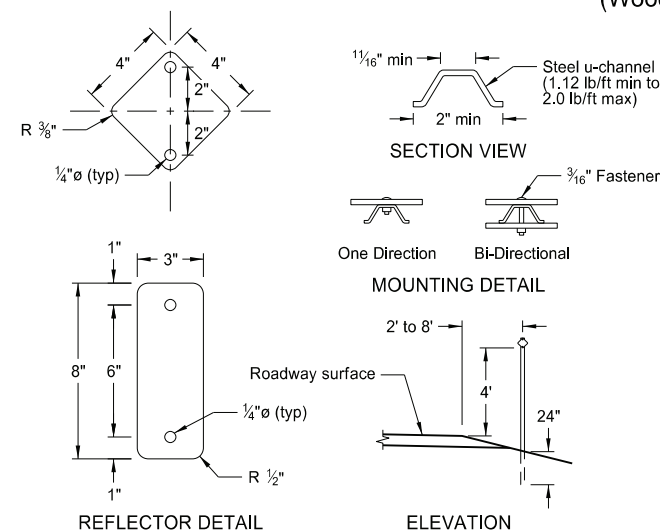
Diagram illustrating the standard crosswalk dimensions and materials:

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

BARRICADE RAIL DETAILS



TYPE III BARRICADE



DELINEATORS

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

MINIMUM BALLAST
(For each side of barricade support)

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

Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the sklds.

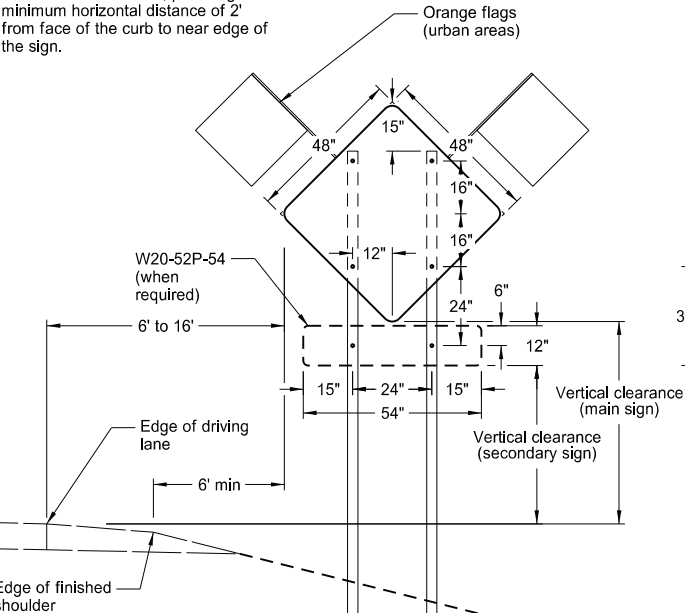
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



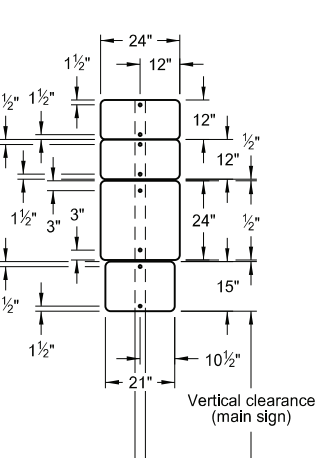
08/01/24

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

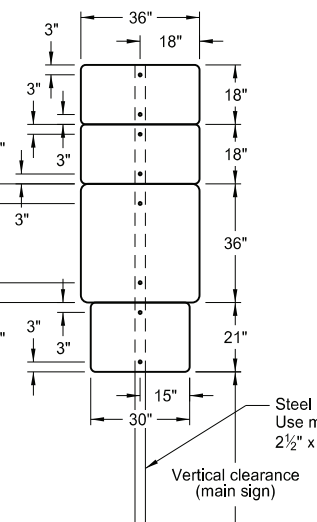
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



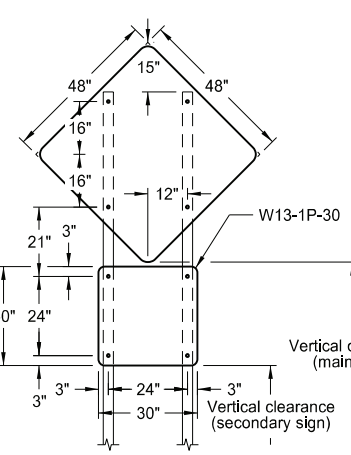
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



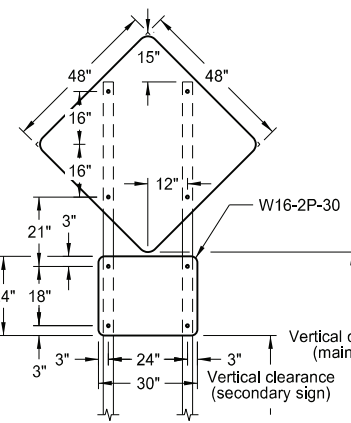
24" x 24"
ROUTE MARKER
ASSEMBLY



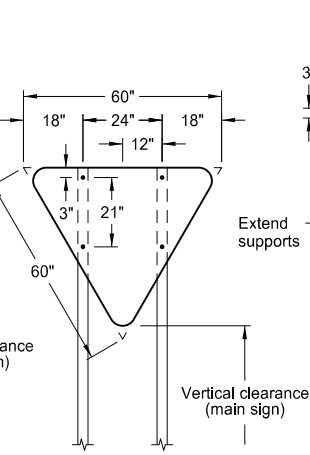
36" x 36"
ROUTE MARKER
ASSEMBLY



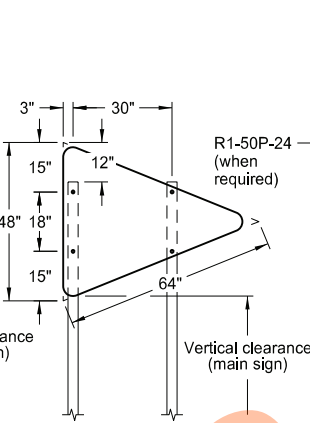
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



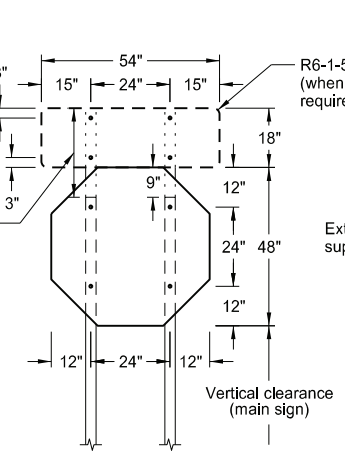
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



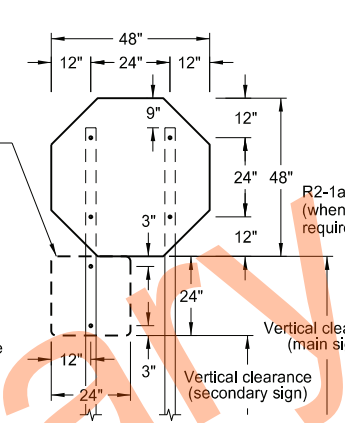
R1-2-60 - YIELD SIGN



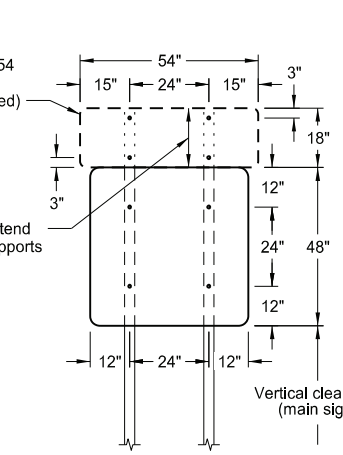
W14-3-64 - PENNANT SIGN



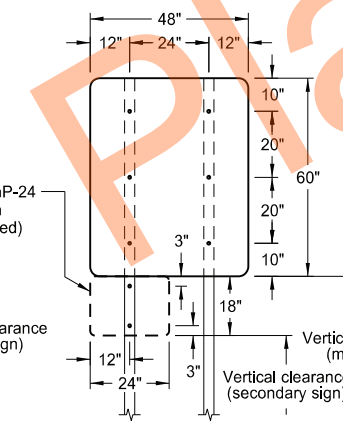
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



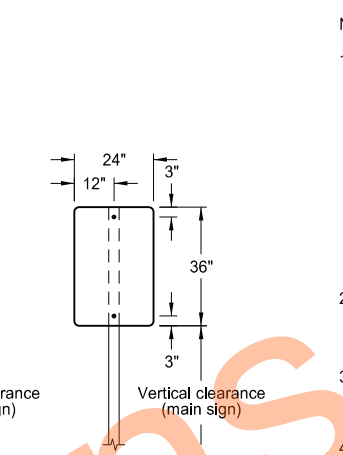
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



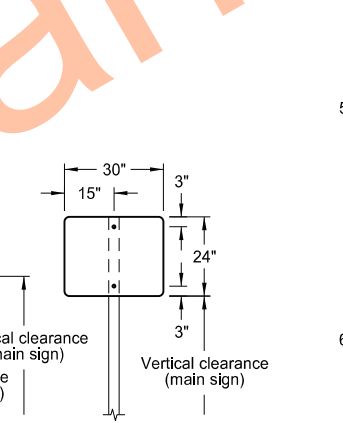
48" x 48" SIGN
(with R6-1-54 sign as required)



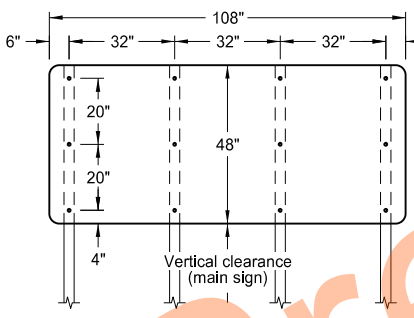
48" x 48" SIGN
(with R2-1aP-24 sign as required)



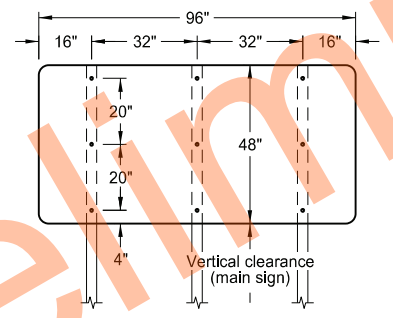
24" x 36" SIGN



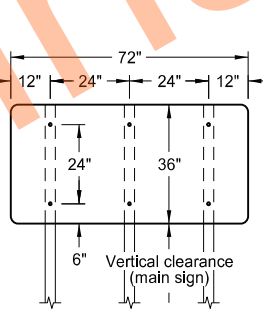
30" x 24" SIGN



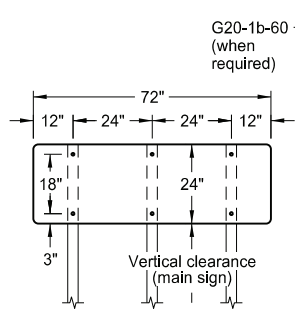
108" x 48" SIGN



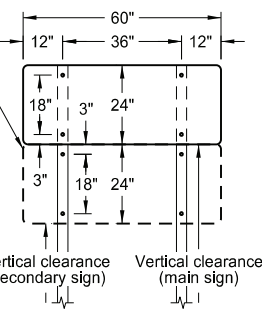
96" x 48" SIGN



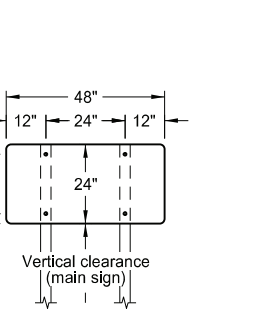
72" x 36" SIGN



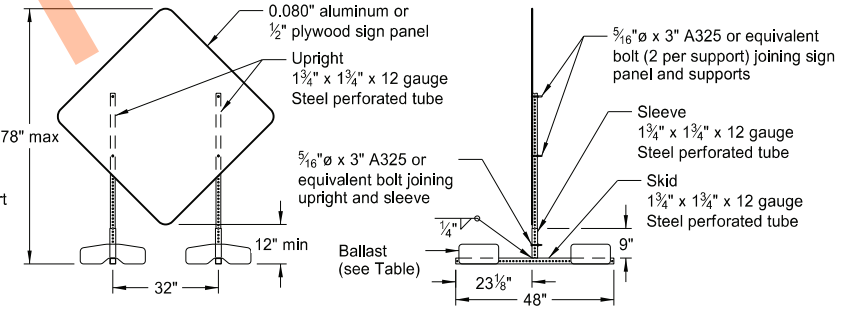
72" x 24" SIGN



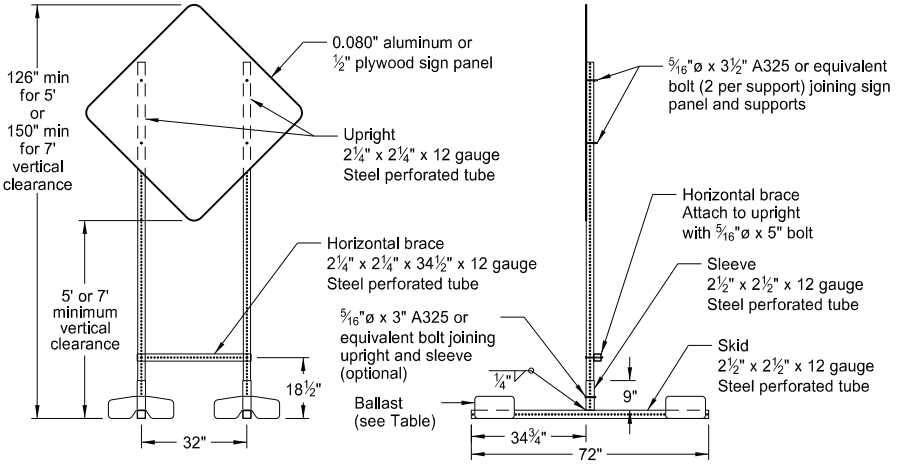
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

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

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

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

Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

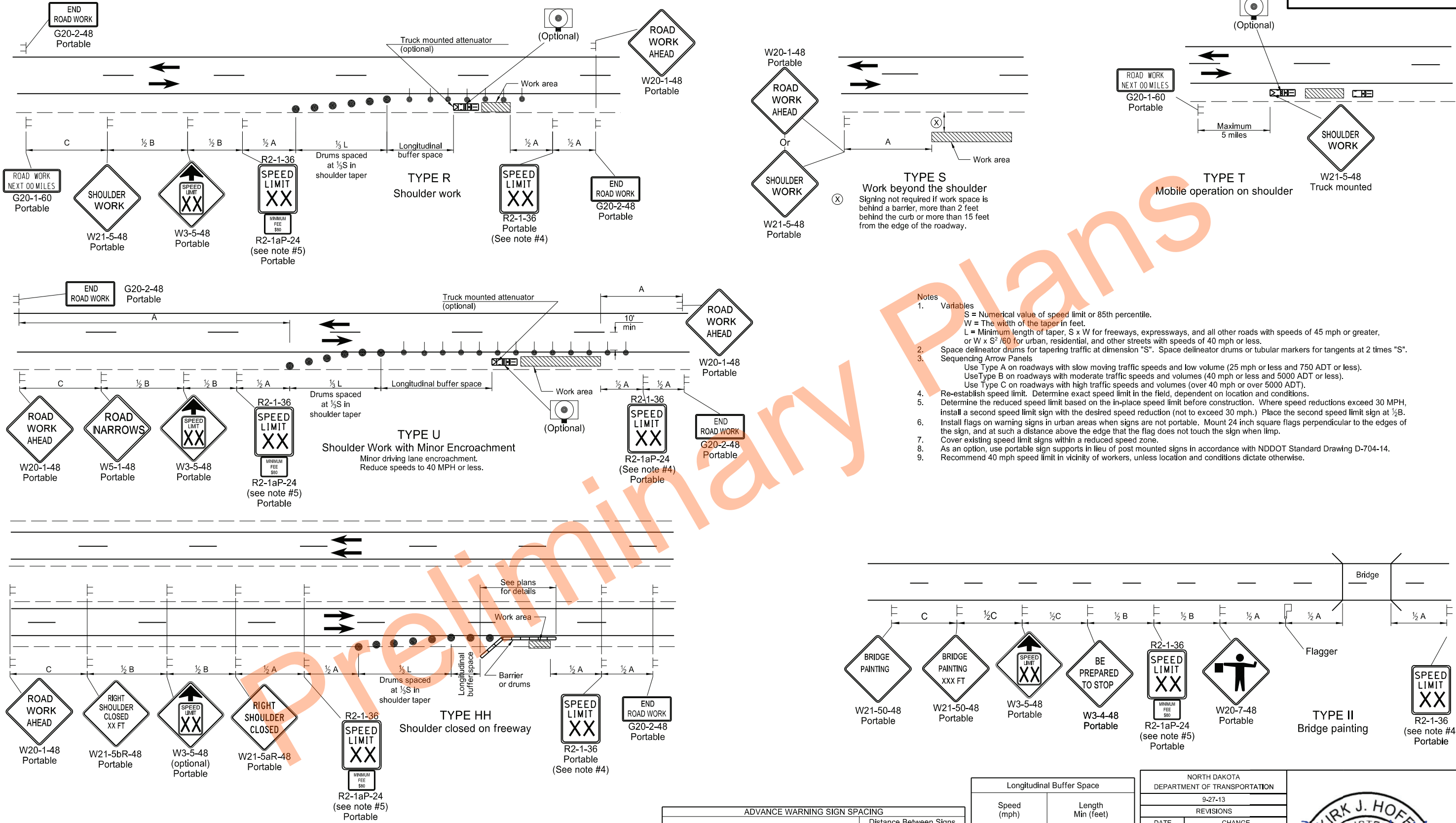
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature



08/01/24

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS



KEY

	Sign		Work area
	Delineator Drum		Tubular Marker
	Sequencing Arrow Panel (Caution Mode)		

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

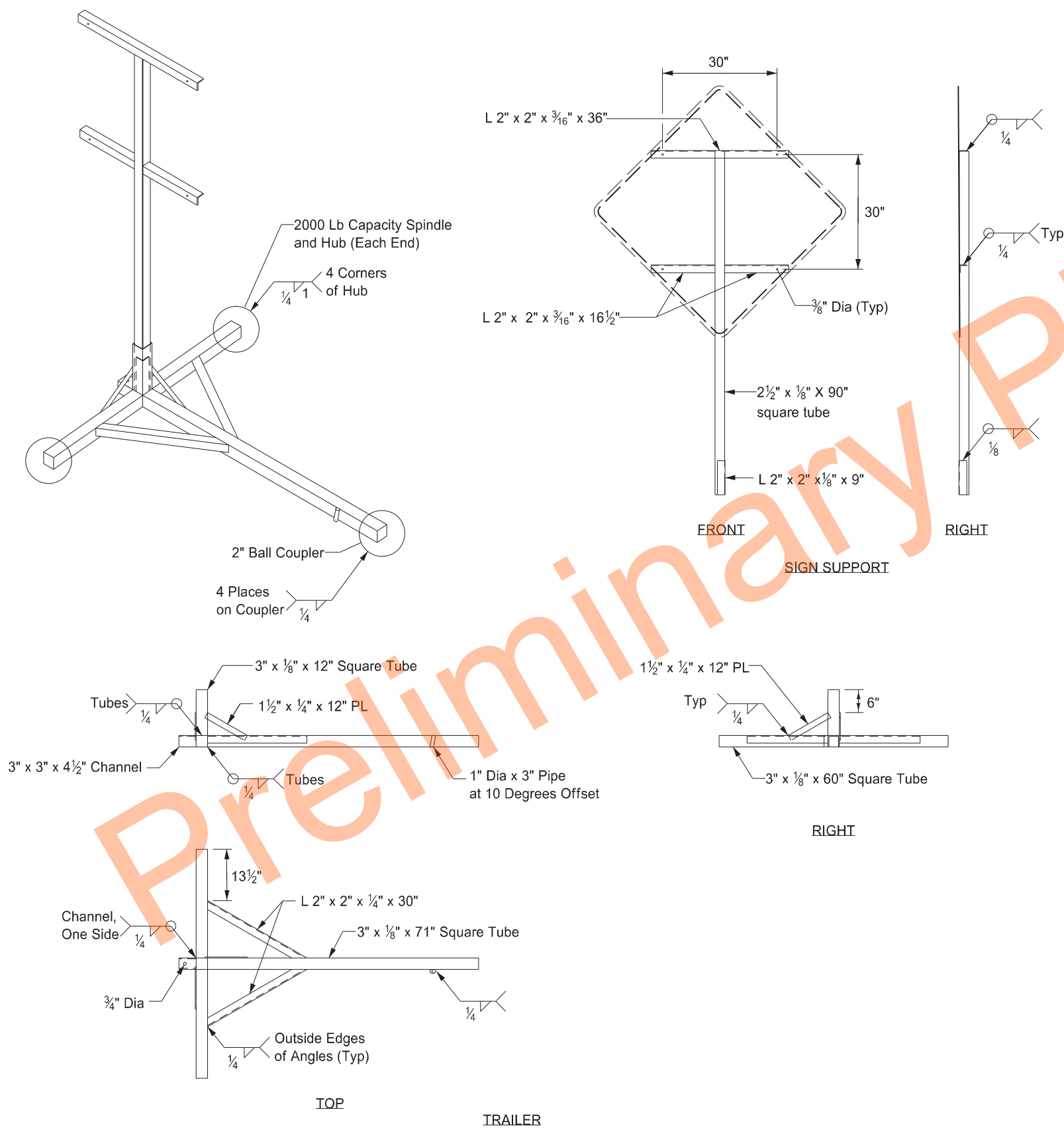
Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

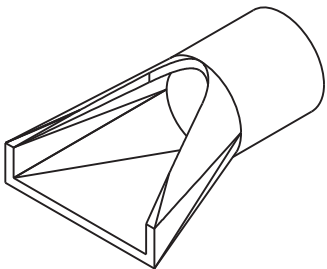


- Notes:
- 1. Maximum 250 pound weight of assembly.
 - 2. Use a 14" wheel and tire.
 - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

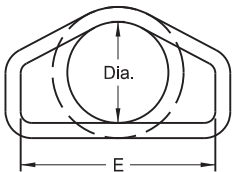
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

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

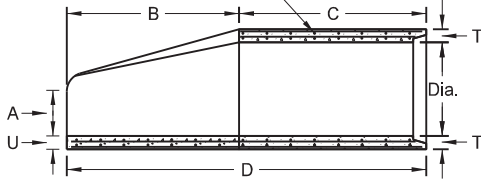


PERSPECTIVE

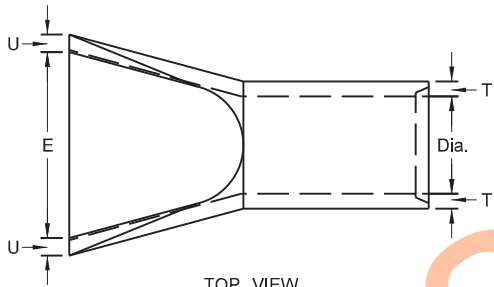


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW

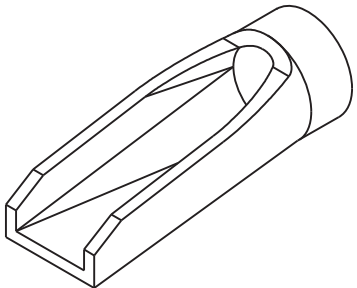


TOP VIEW

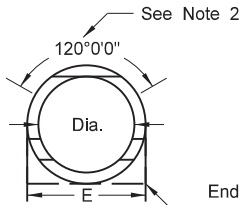
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

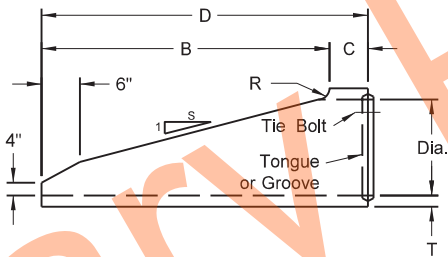
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



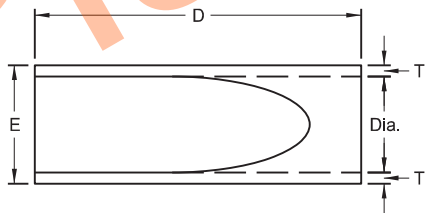
PERSPECTIVE



END VIEW



SIDE VIEW

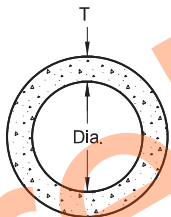


TOP VIEW

NOTES (Traversable End Section):

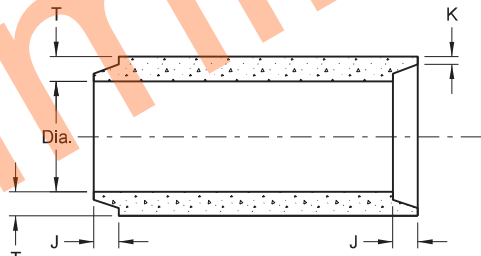
1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

All Classifications of Round Concrete Pipe						
Internal Dia. of pipe in Inches	Cross-Sectional Water Area	Weight per Lin. Foot of pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue Min.	Minimum Wall Thickness (T)	
Dia	Sq. ft.	Lbs.	In.	In.	In.	
12	0.79	92	1 ⁵ / ₈ -2 ³ / ₈	3/4	2	
15	1.23	127	1 ³ / ₄ -2 ¹ / ₄	7/8	2 ¹ / ₄	
18	1.77	168	1 ¹ / ₂ -2 ¹ / ₂	1	2 ¹ / ₂	
21	2.40	214	1 ¹ / ₂ -3 ¹ / ₈	1 ¹ / ₈	2 ³ / ₄	
24	3.14	265	2 ³ / ₄ -3 ¹ / ₄	1 ¹ / ₈	3	
27	3.98	322	2 ³ / ₄ -4	1 ¹ / ₄	3 ¹ / ₄	
30	4.91	384	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₄	3 ¹ / ₂	
33	5.94	452	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	3 ³ / ₄	
36	7.07	524	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	4	
42	9.62	685	3 ¹ / ₄ -4 ¹ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	5	
54	15.90	1070	4 ¹ / ₈ -5 ¹ / ₄	2	5 ¹ / ₂	
60	19.63	1296	4 ¹ / ₂ -5 ¹ / ₂	2 ¹ / ₄	6	
66	23.76	1542	5-6	2 ³ / ₈	6 ¹ / ₂	
72	28.27	1810	5 ⁵ / ₈ -6 ³ / ₄	2 ³ / ₈	7	
78	33.18	2098	6 ¹ / ₄ -7 ¹ / ₄	2 ³ / ₈	7 ¹ / ₂	
84	38.48	2410	5 ⁵ / ₈ -7 ¹ / ₄	3 ³ / ₈	8	
90	44.18	2793	6 ³ / ₄ -8 ¹ / ₂	3 ³ / ₈	8 ¹ / ₂	
96	50.27	3092	7-8 ¹ / ₄	3 ¹ / ₂	9	
102	56.75	3466	7-8 ¹ / ₄	3 ¹ / ₂	9 ¹ / ₂	
108	63.62	3864	7 ¹ / ₄ -8 ¹ / ₂	3 ³ / ₄	10	

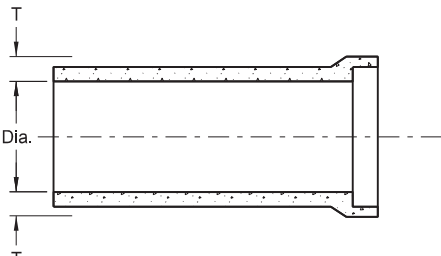


END VIEW

CIRCULAR PIPE

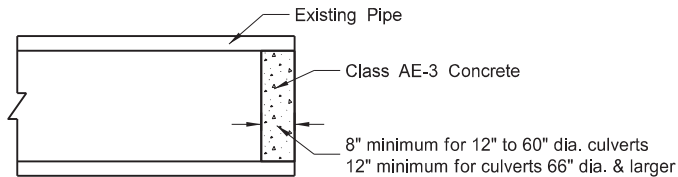


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



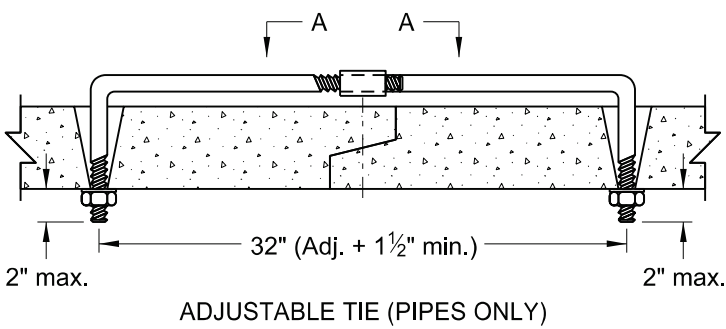
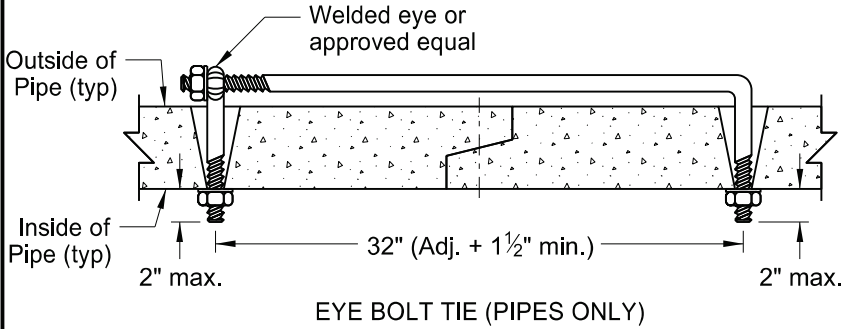
CONCRETE PIPE PLUG

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

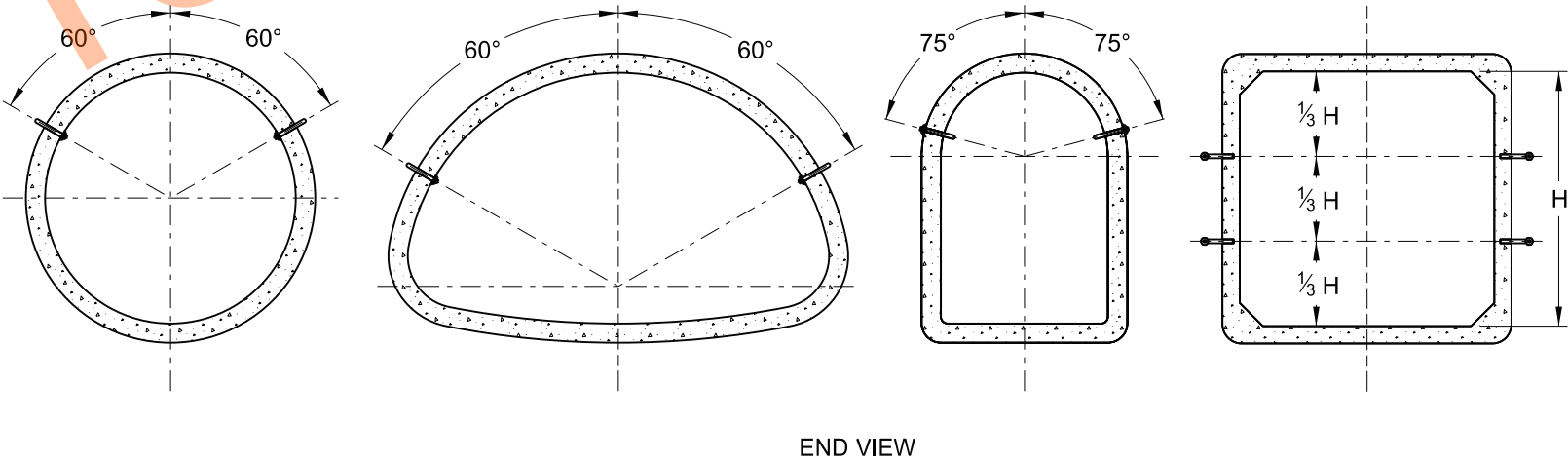
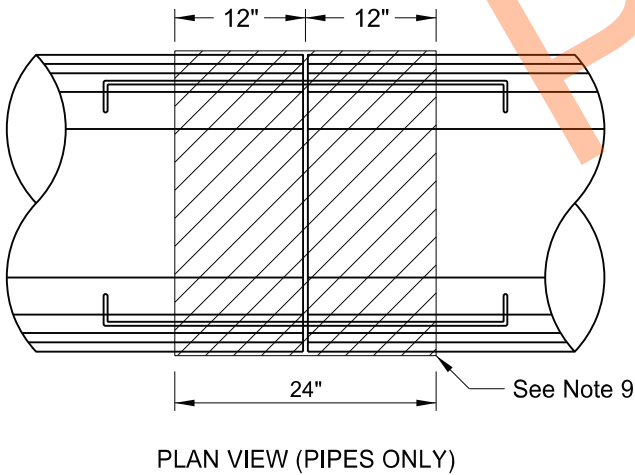
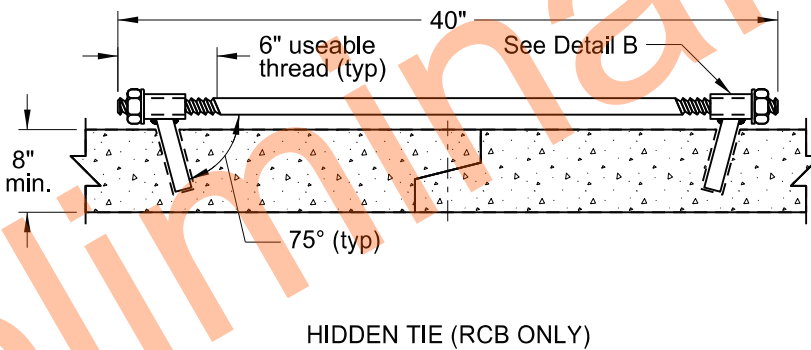
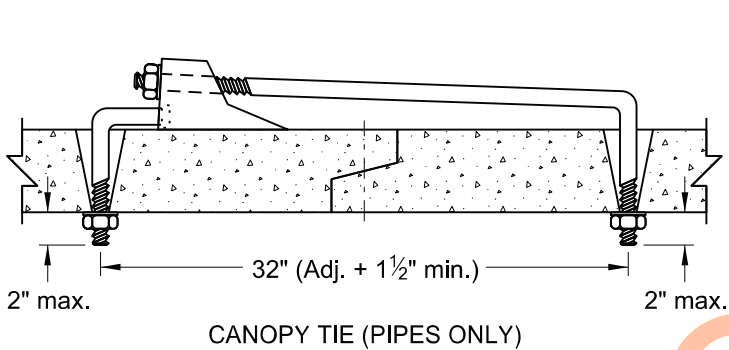
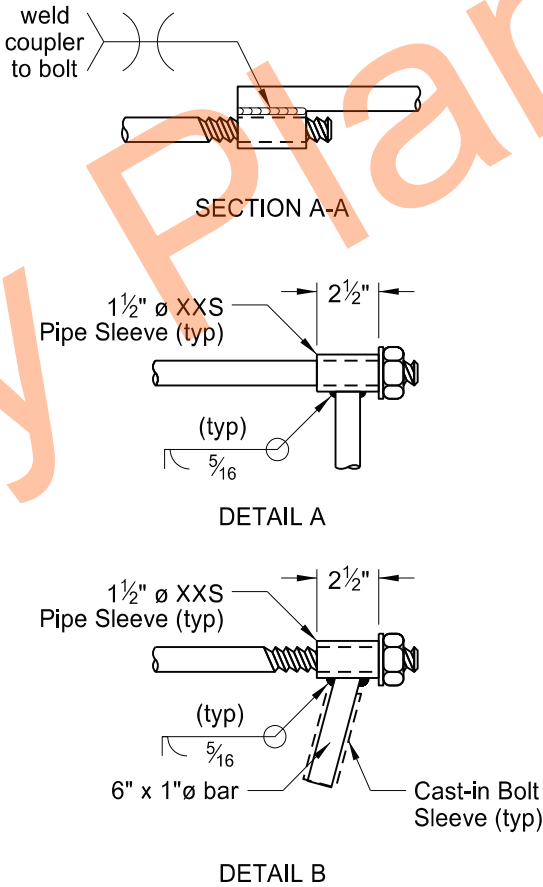
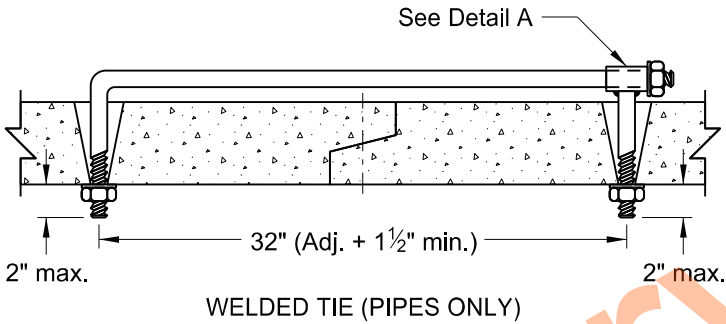
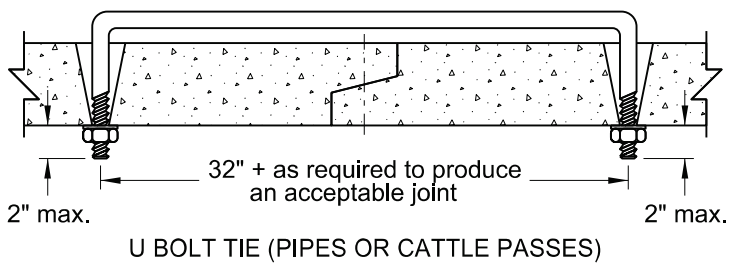
This document was originally issued and sealed by
Jon Ketterling
Registration Number
PE- 4684,
on 9/18/19 and the original document is stored at the
North Dakota Department
of Transportation

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



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

- NOTES:
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
 - Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
 - Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
 - Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
 - Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
 - Holes in pipes to accommodate tie bolts will be precast. Tapered holes are permitted. Use holes that have a diameter 1/4" larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1 1/4".
 - Include the cost of precasting the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
 - Tie all centerline and approach RCP culvert joints. Tie all joints including the end sections of all free ends of storm drain systems. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
 - Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, use Type S2 geotextile fabric and overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C990. Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
 - Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
 - Provide lock washers or burr threads of concrete box ties after installation and tightening to prevent nut rotation.
 - Tie RCB's as noted in the plans.

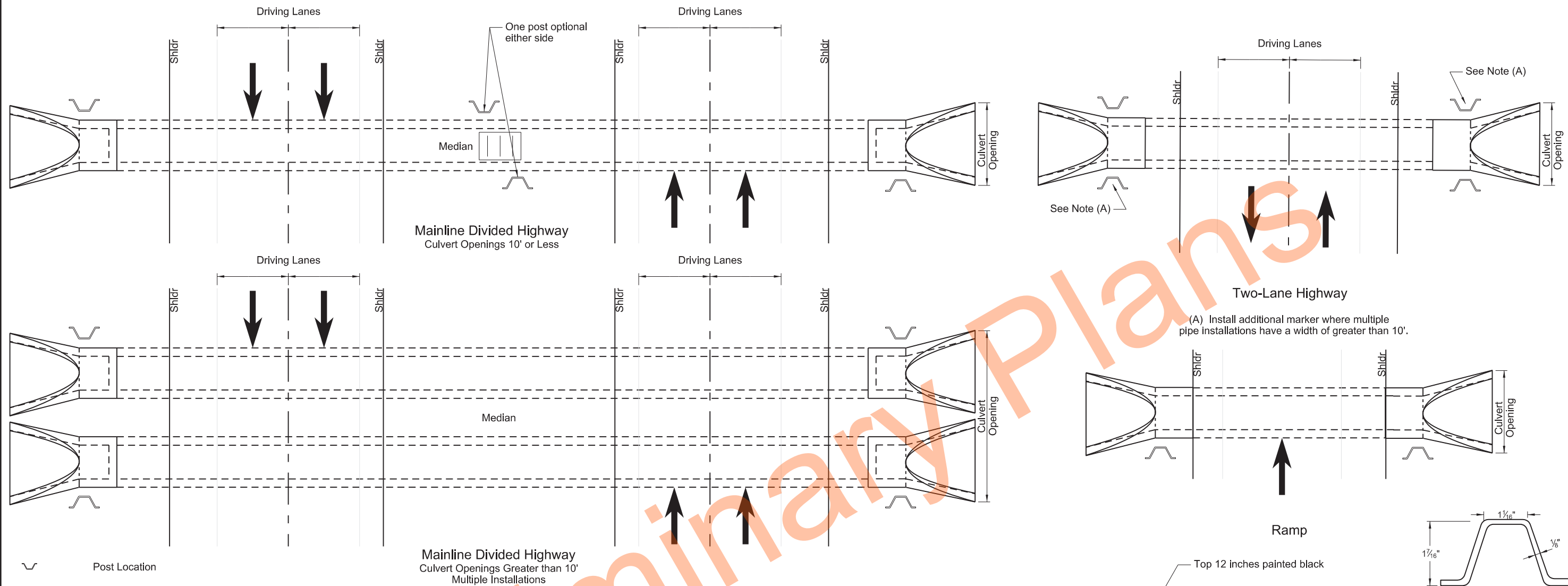


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View



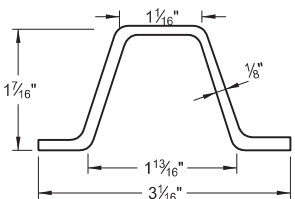
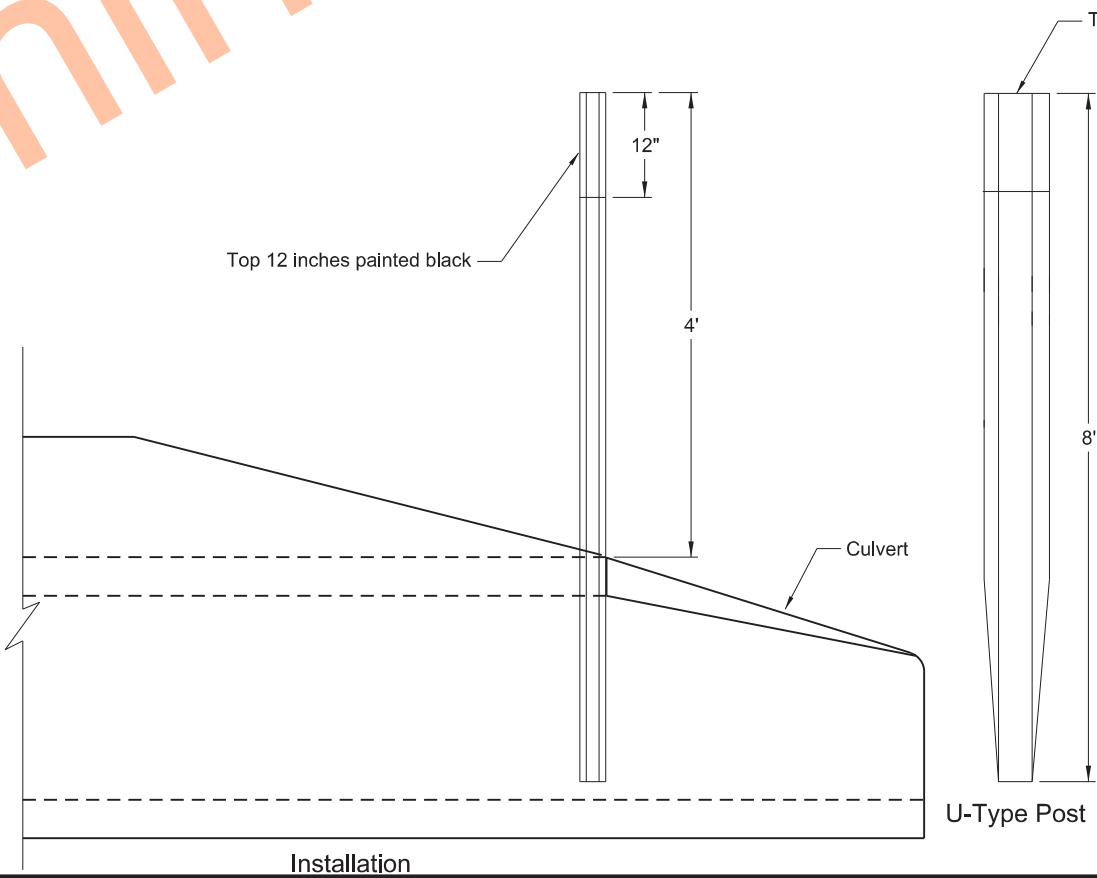
OBJECT MARKERS - CULVERTS

D-754-83

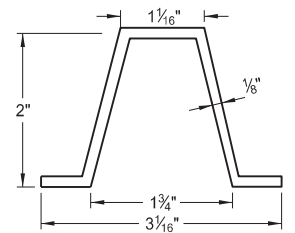


Notes:

Mark each end of culverts crossing the roadway within the right-of-way with a post. Install posts in front of culvert in direction of travel along the side of culvert and one foot from culvert opening unless shown otherwise in plans.



Steel Post Detail
Approx. 2.0 lbs/ft

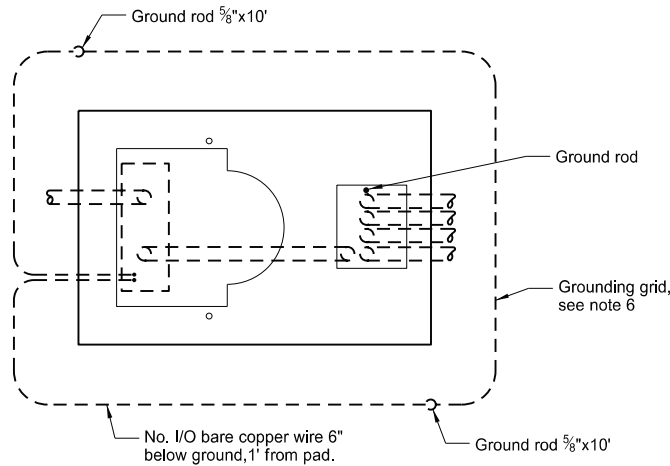
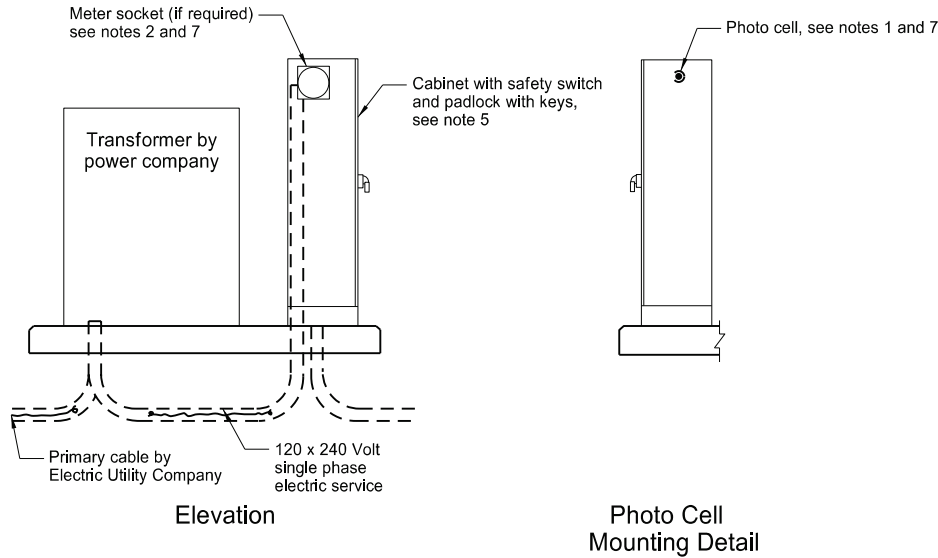


Aluminum Post Detail
Approx. 0.88 lbs/ft

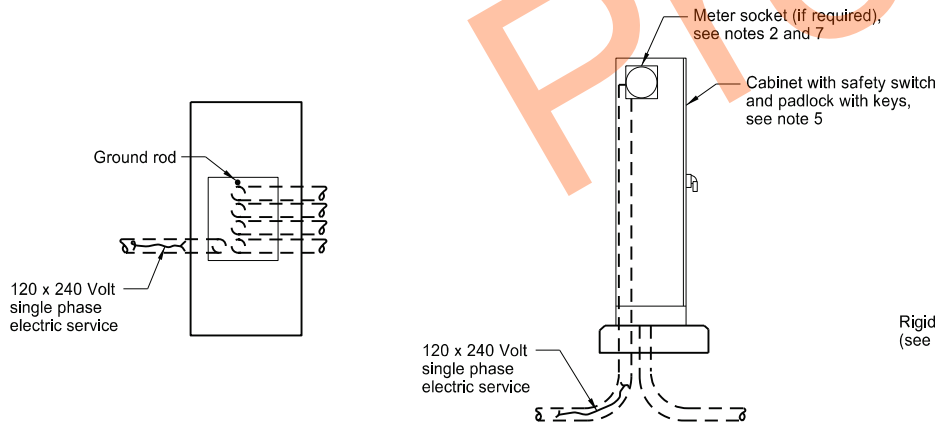
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

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

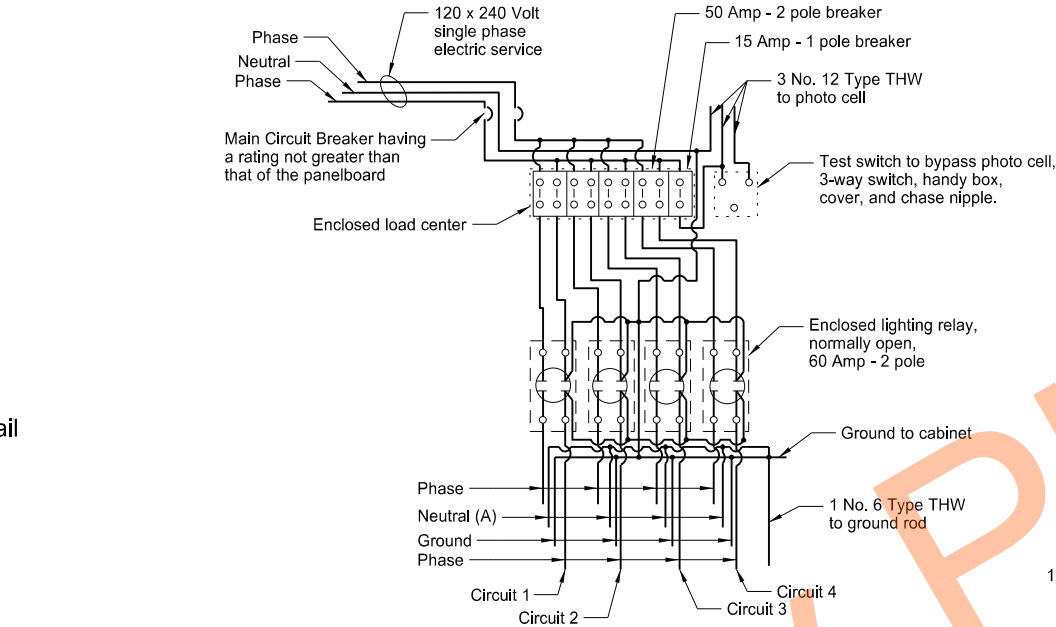
FEED POINTS
(ROADWAY LIGHTING)



Plan
Transformer and Feed Point Cabinet Pad Mounted



Plan
Elevation
Feed Point Cabinet Pad Mounted



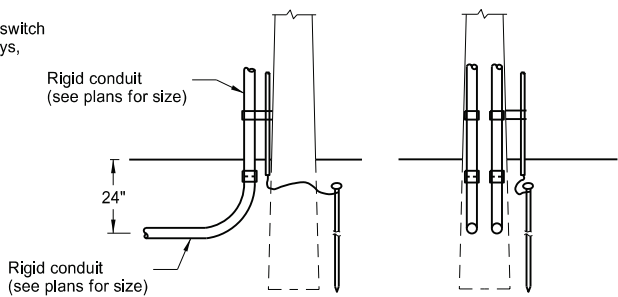
Feed Point Type IV

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

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

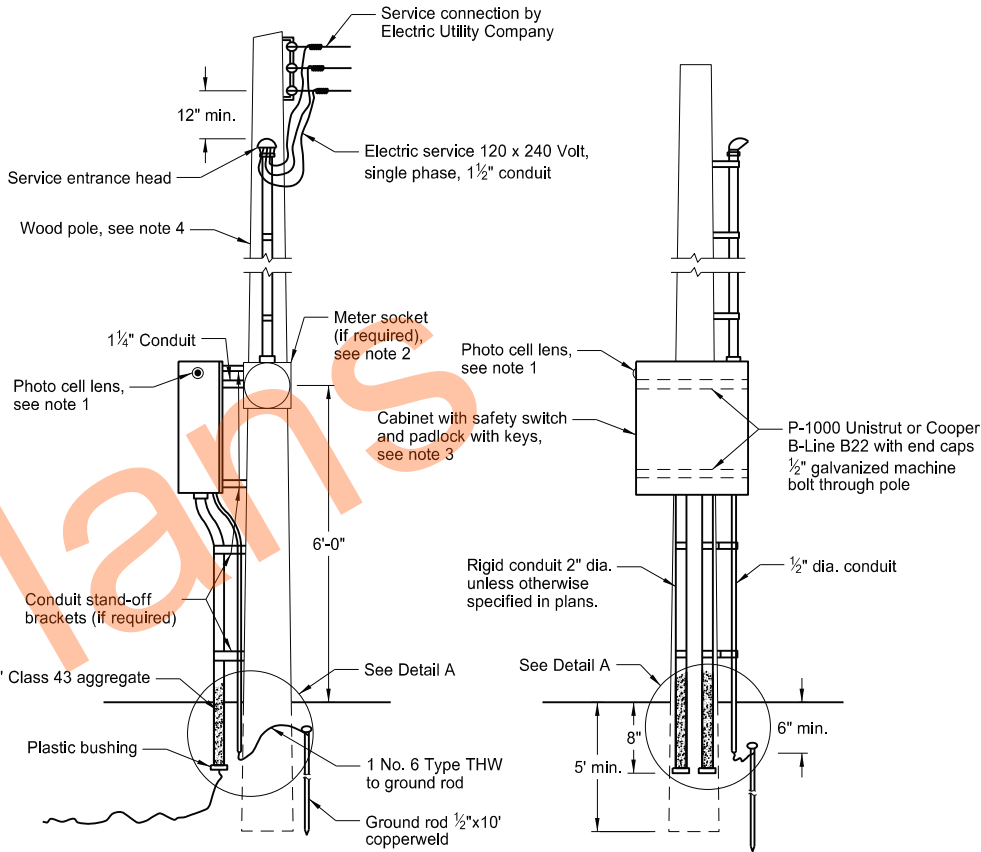
Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.



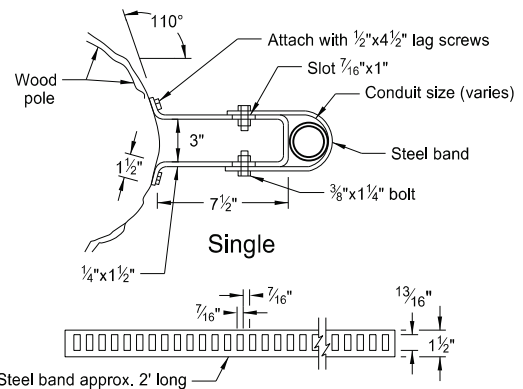
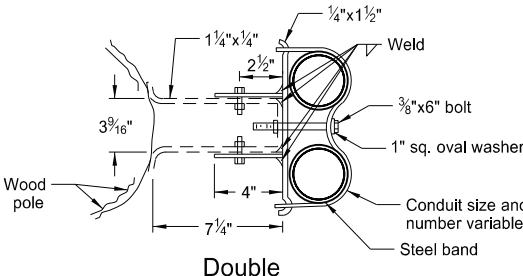
Detail A

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



Feed Point Pole Mounted

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

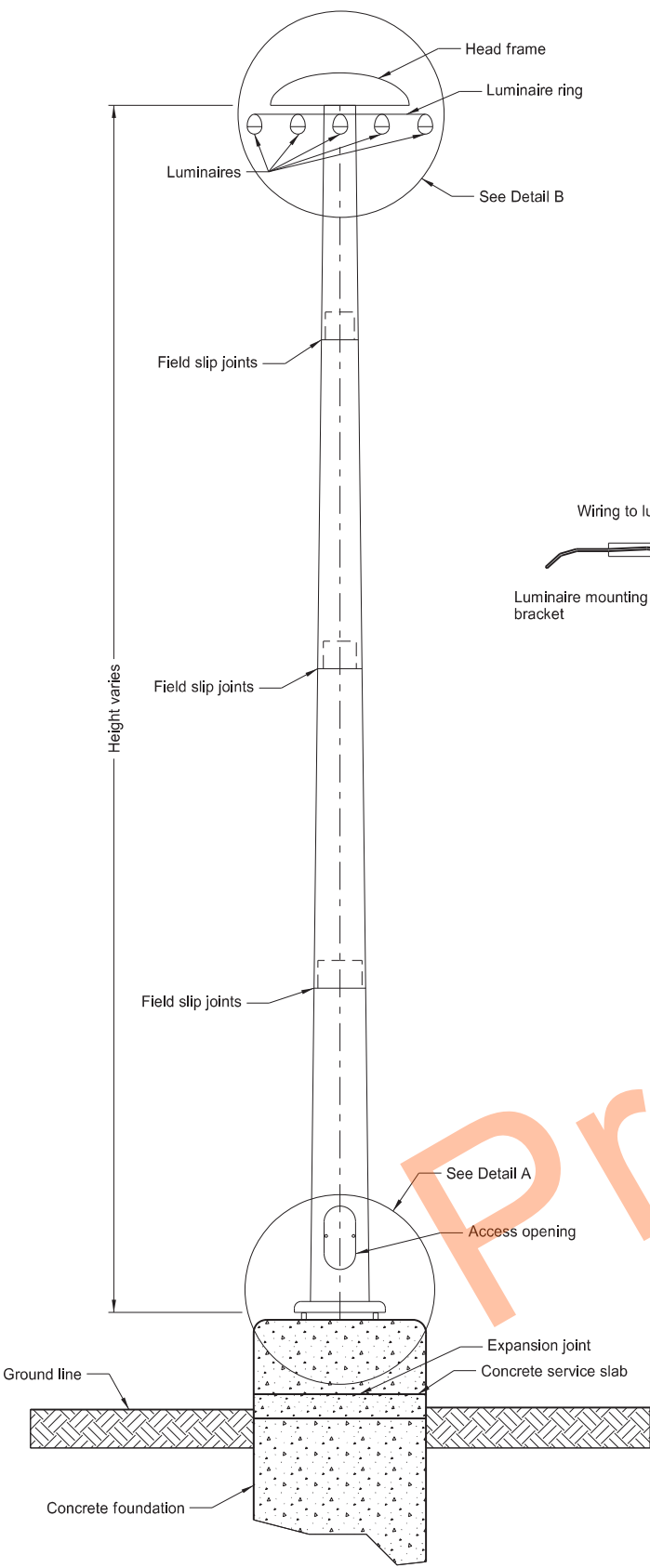


Conduit Standoff Bracket

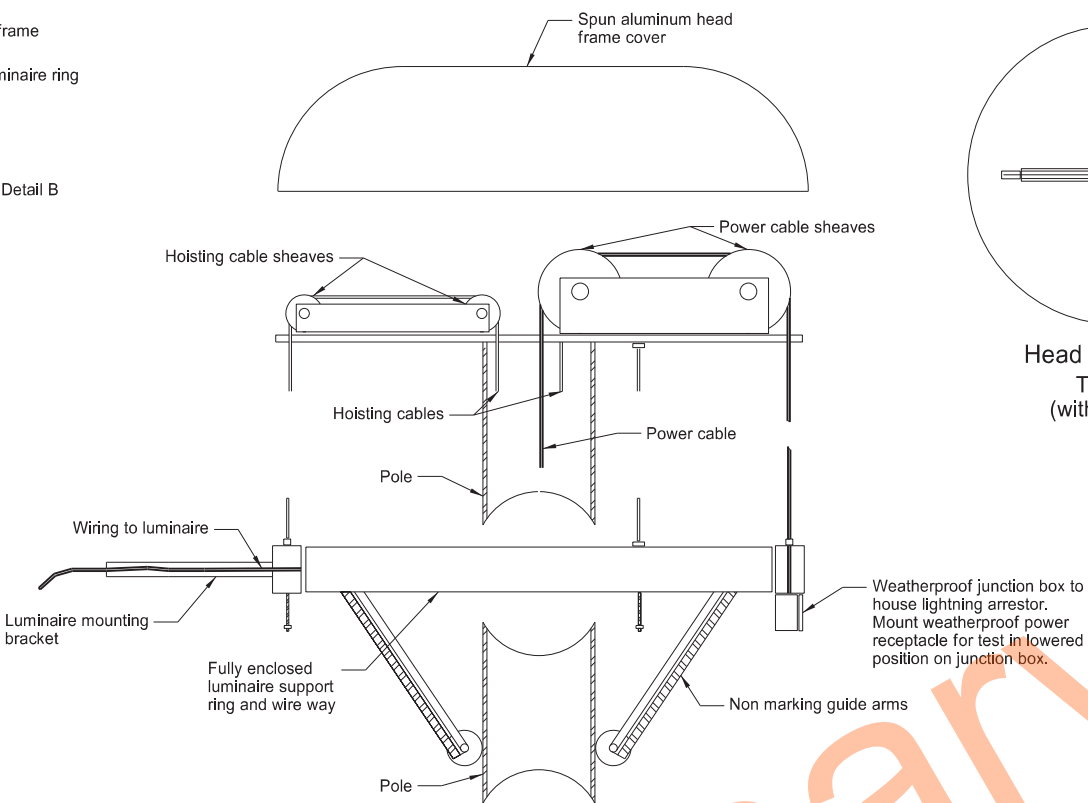
Omission of conduit standoff brackets allowed when not required by local utility company.

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

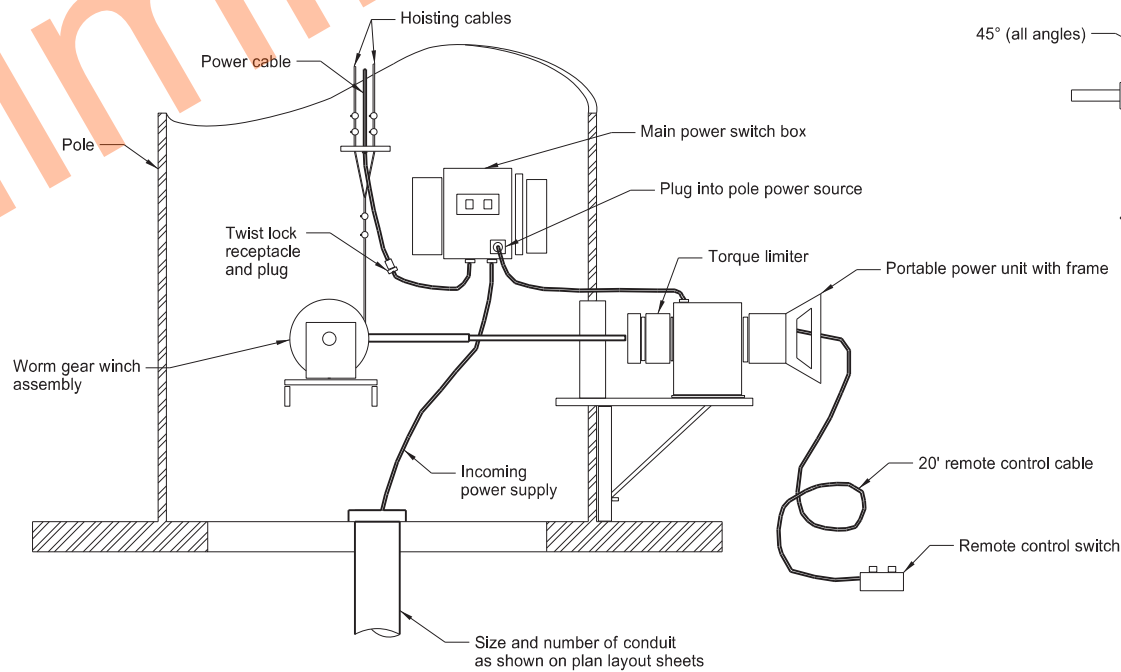




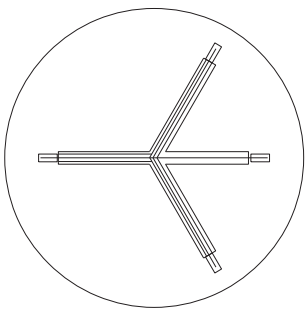
High Mast Lighting Pole Detail



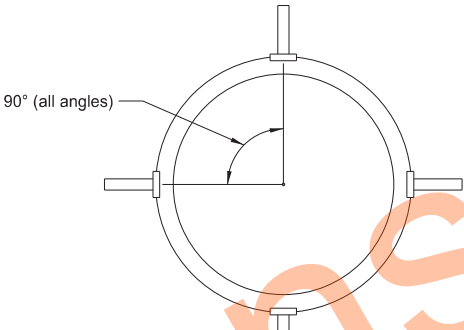
Detail B
Head Frame and Luminaire Ring
(section through pole)



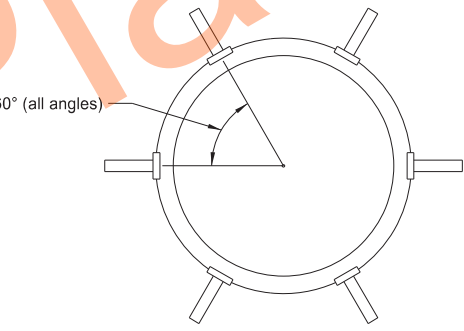
Detail A
Lowering Device
(section through base)



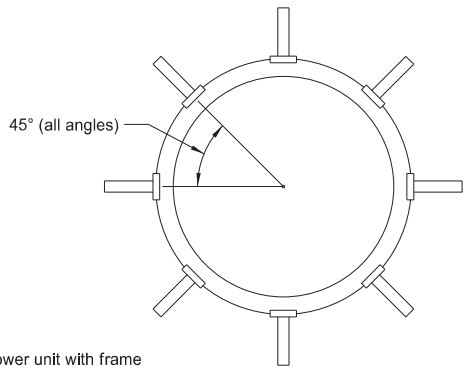
Head Frame Detail
Top View
(without cover)



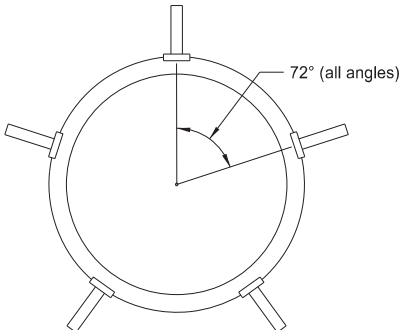
For 4 Luminaires



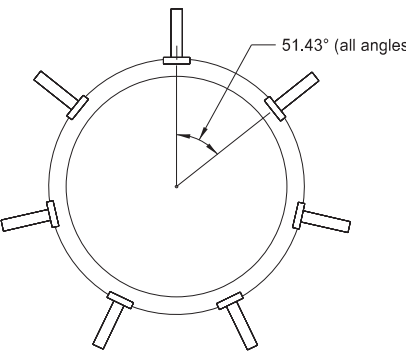
For 6 Luminaires



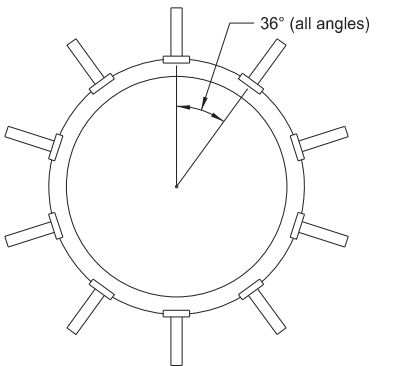
For 8 Luminaires



For 5 Luminaires



For 7 Luminaires



For 10 Luminaires

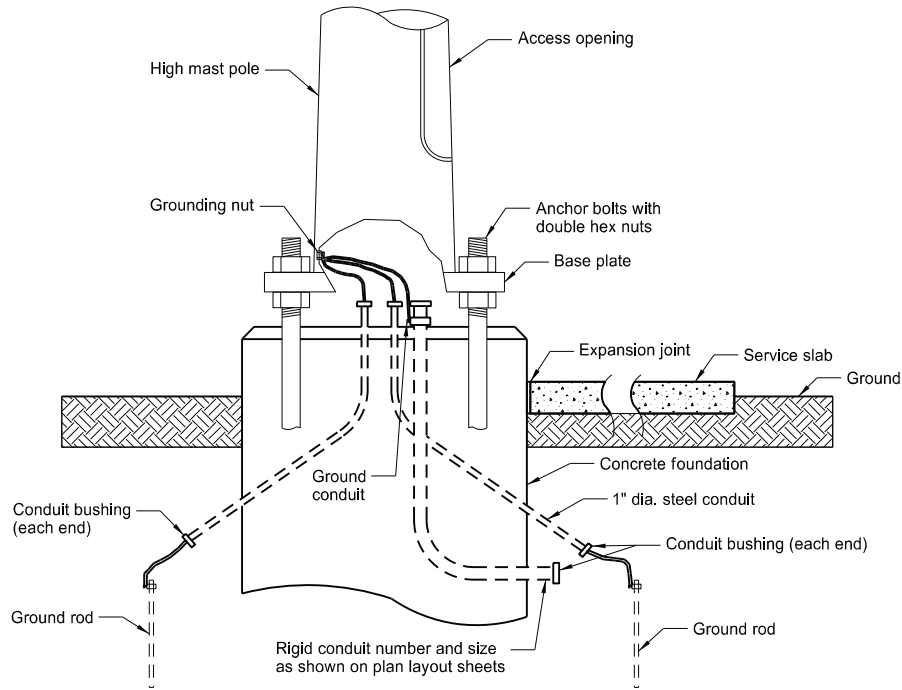
Luminaire Support Ring Details

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17 8-28-19	Updated to active voice. New Design Engineer PE Stamp.

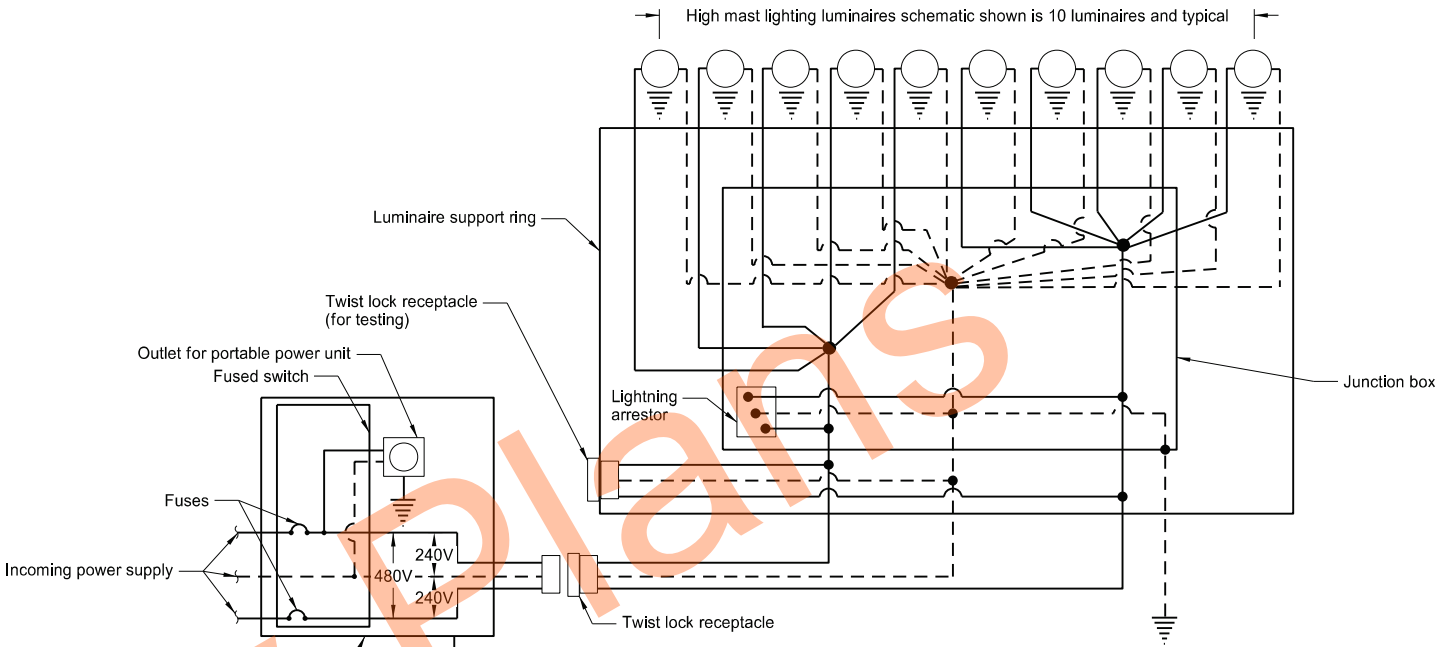
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 8/28/19 and the original document is stored at the
North Dakota Department
of Transportation

HIGH MAST LIGHTING

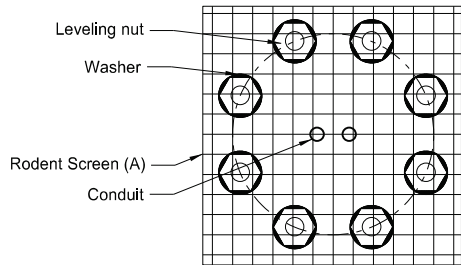
D-770-9



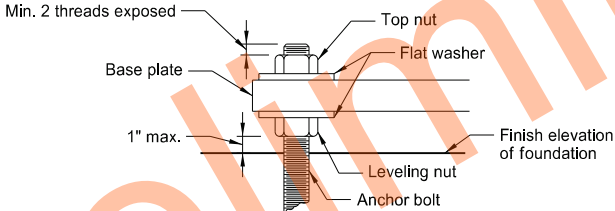
Conduit and Grounding Detail at Base



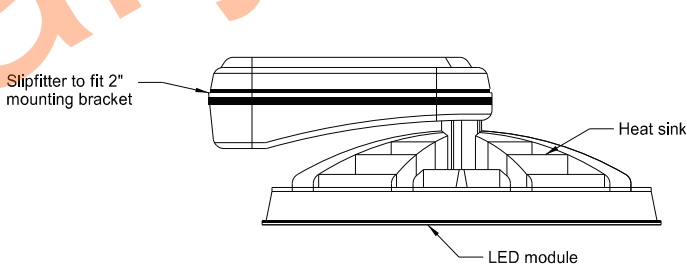
Wiring Diagram



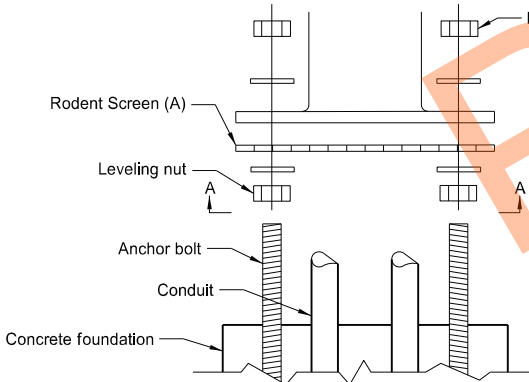
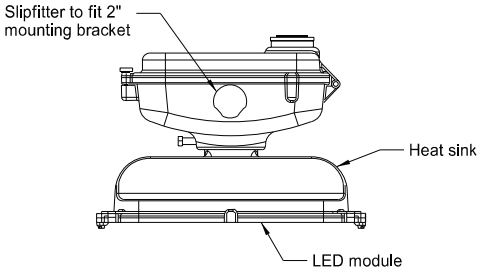
Section A-A



Anchor Bolt Detail



Typical LED Luminaire Details



Elevation View
Rodent Screen

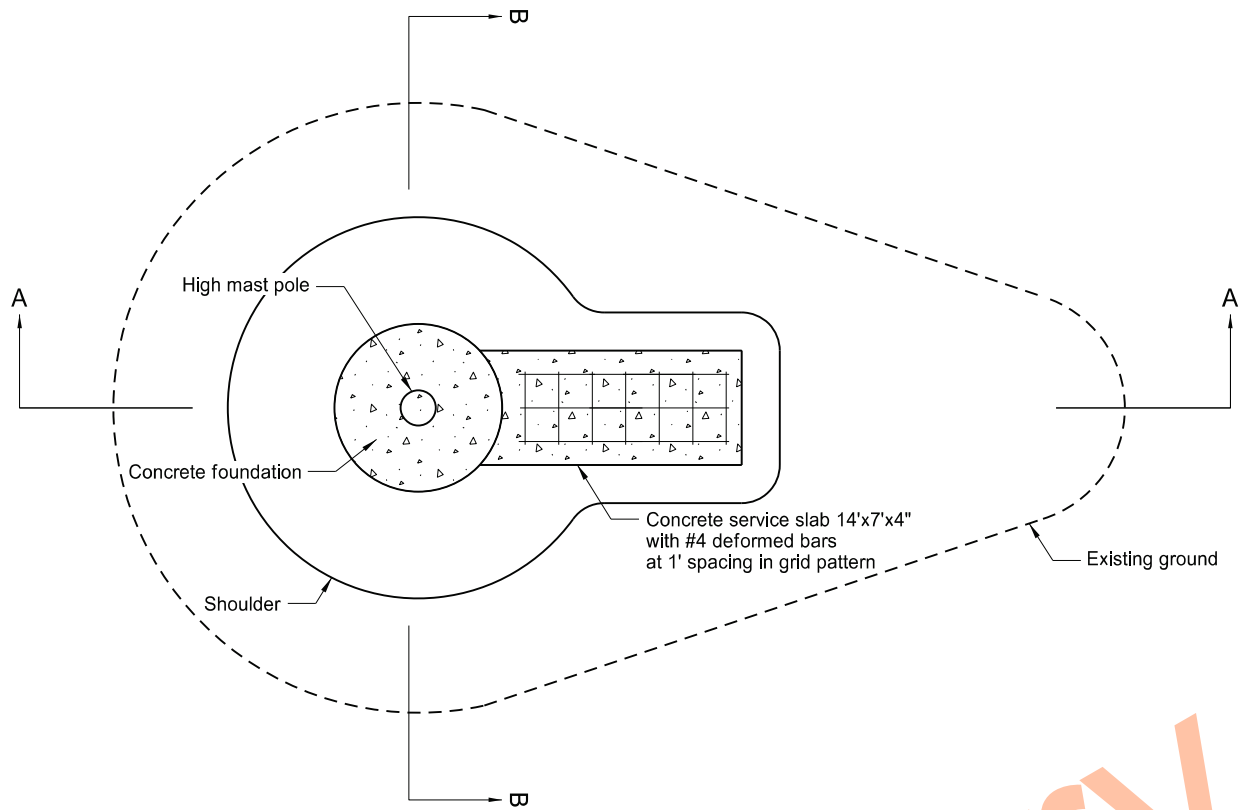
(A) 1/4"x1/4" galvanized steel welded wire fabric (wire dia. 0.025")
cut same size as base plate and form tightly around the conduit.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
11-01-24	Updated to 8 anchor bolts.

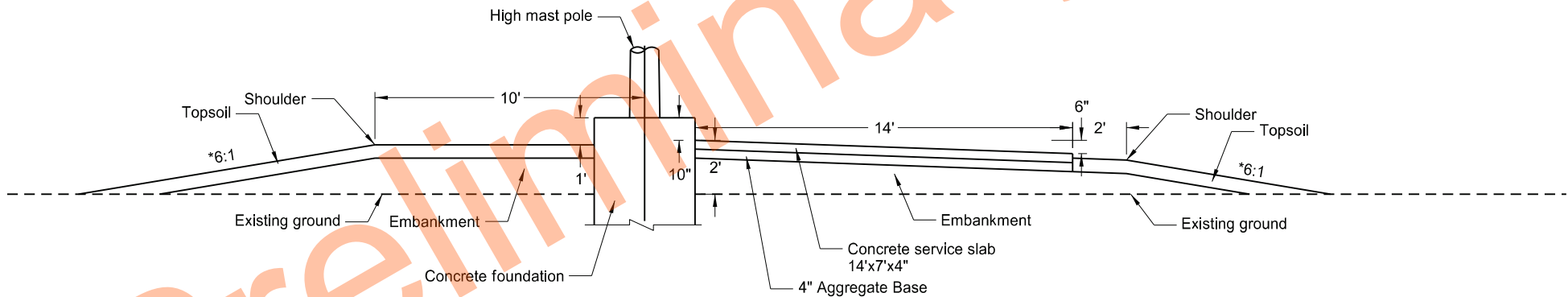


HIGH MAST LIGHTING BERM DETAILS

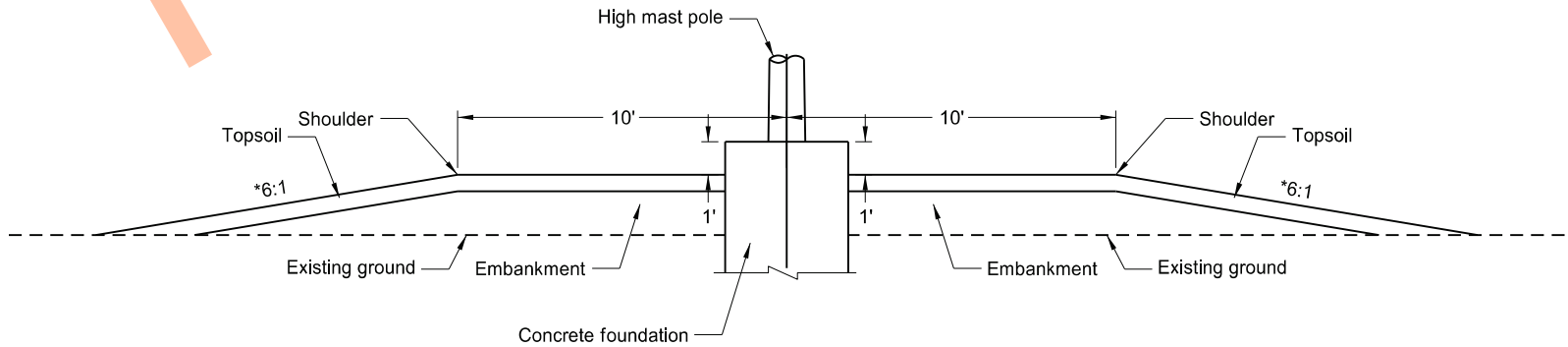
D-770-10



Plan View



Section AA



Section BB

*Use 6:1 if site conditions permit, otherwise 4:1 max slope is permitted.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-01-24	
REVISIONS	
DATE	CHANGE

