FM Diversion Plan B Transportation Master Plan

To: HEI Project Number 7438-0027

From: Adam Ruud, P.E.
Houston Engineering, Inc.

Subject: FM Diversion Plan B Transportation Master Plan

Date: June 7, 2018

Project: 7438-0027

INTRODUCTION

The Plan B dam/southern embankment alignment was developed based on the recommendations of the Task Force that was established by North Dakota Governor Doug Burgum and Minnesota Governor Mark Dayton along with the evaluations that were done by the Technical Advisory Group (TAG) that was established to support the Task Force. Additional alignment micro-siting was performed to refine the alignment following the completion of the Task Force and TAG meetings. The major changes to the dam/southern embankment alignment for Plan B versus the Pre-Task Force alignment include:

- The western tie-back alignment shifts the Limited Service Spillway for the dam/southern embankment to the west along an existing natural ridge that runs south and west from Horace.
- The eastern tie-back alignment turns the dam/southern embankment south at the Red River Control Structure and follows an alignment between Wolverton Creek, US 75 and the Red River.
- The dam/southern embankment is shifted north for approximately 2 miles between the City of Horace and Interstate 29.

Due to the modified line of protection within the dam/southern embankment extents for Plan B, the existing transportation network will be impacted. See Figure 1 for the proposed transportation modification locations. Existing roadways that have been identified for realignment or raising to maintain connectivity are:

Cass County
- 168th Avenue South East
- County Road 16 & 17
- Interstate 29
- County Road 81

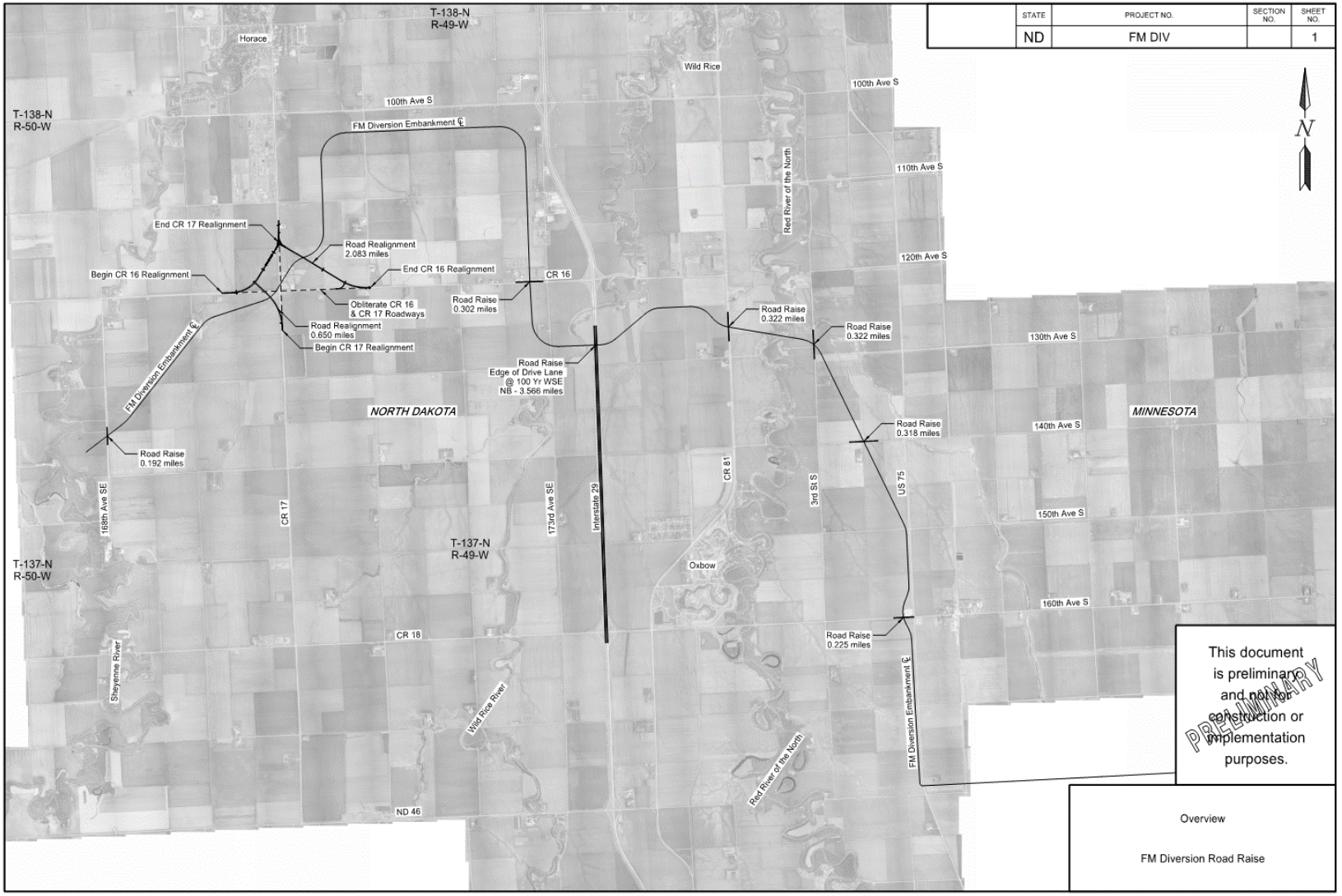
Clay County
- 3rd Street South
- 140th Avenue South
- 160th Avenue South

Existing roadways that will be cutoff by the dam/southern embankment are:

Cass County
- 169th Avenue South East
- 112th Ave South East
- 57th Street South
- 172nd Avenue South East
- 173rd Avenue South East
- 174th Avenue South East

Clay County
- 130th Avenue South
- 150th Avenue South
- 170th Avenue South

Figure 1 – Project Location Map



ANALYSIS

168TH AVENUE SOUTH EAST

The western tie back levee will cross 168th Avenue South East, south of County Road 16. In order to maintain north-south connectivity east of the Sheyenne River, 168th Avenue South East will be raised to cross over the tie back levee. The preliminary design utilizes a top of levee elevation of 929. The proposed roadway will maintain a finished roadway elevation 1.5 foot, above the levee (finished grade elevation of 930.5).

The road raise is designed to meet a 55 mph design speed. Sag vertical curves have been designed following comfort criteria while the crest vertical curves have been designed meeting stopping sight distance. This approach follows ND DOT and Cass County design practices. To meet a 55 mph design speed the estimated reconstruction length is 0.19 miles with a maximum grade raise of approximately 4 feet.

The existing gravel roadway will be reconstructed with a 24 feet wide finished roadway width and 4 inches of gravel, following the standards for a two-lane township gravel section. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $150,000.

COUNTY ROAD 16 & 17

Construction of the Diversion Inlet structure was started in the northeast quadrant of the County Road 16 and County Road 17 intersection. Due to the location of the inlet structure and pool needed upstream of the structure, County Road 16 and 17 will be realigned as shown in Figure 1 to maintain connectivity. Where the realigned County Road 17 crosses the dam/southern embankment, the roadway will be raised to cross over the dam/southern embankment. During the preliminary design phase, a finished road elevation of 930.5 was utilized to maintain 18” of overbuild from the top of dam/southern embankment elevation of 929 to allow for consolidation. The realigned roadway results in one bridge crossing the Diversion channel downstream of the inlet structure. However, it maintains eastbound County Road 16 to northbound County Road 17 connectivity during flood events, while upstream of the dam/southern embankment, County Road 16 and County Road 17 will be inundated with water.

The roadway realignments and raises will be designed to meet a 55 mph design speed. Sag vertical curves have been designed following comfort criteria while the crest vertical curves have been designed meeting stopping sight distance. This approach follows ND DOT and Cass County design practices. The horizontal alignment utilizes 1,890 feet radii, resulting in a superelevation of 5.0%. It is estimated 2.73 miles of roadway will be reconstructed to maintain connectivity. The maximum grade raise is approximately 17 feet.

The existing County Road network will be reconstructed following standards for a two-lane rural paved section, utilizing 32 feet, finished roadway width. The cost estimate was developed utilizing 7 inches, hot mix asphalt (HMA) on 12 inches of salvaged base course. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $12,250,000.

In addition to the realignment near County Road 17, County Road 16 will be raised west of 173rd Avenue South East to maintain east-west connectivity to Interstate 29. At this location, County Road 16 will be raised to a minimum elevation of 930.5 to maintain 18 inches of overbuild over the top of dam/southern embankment elevation of 929 to account for consolidation.

The road raise is designed to meet a 55 mph design speed based comfort criteria for sag curves and stopping sight distance for crest curves. This approach follows ND DOT and Cass County design practices. The road raise will reconstruct approximately 0.30 miles of paved roadway, with a maximum fill height of 16 feet.

County Road 16 will be reconstructed meeting two-lane rural paved section standards. The finished roadway width will be 32 feet and the pavement was estimated at 7 inches HMA on 12 inches salvaged base course. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $1,290,000.

INTERSTATE 29

The dam/southern embankment crosses Interstate 29 approximately 0.75 miles south of the County Road 16 (Hickson) Interchange or approximately 0.25 miles south of the Wild Rice River Crossing. Due to the increased water surface elevation within the staging area, Interstate 29 will be raised to maintain the edge of lane at or above the 100-year with the project water surface elevation. This results in a grade raise from approximately the County Road 18 (Hickson) interchange to the County Road 16 (Davenport) Interchange. At the Hickson interchange, the roadway will be raised approximately 0.75 feet. Additional survey will be required to determine the full extent the grade raise will have on the existing overpass structure. For this estimate we have included costs to replace the overpass structure in order to maintain 16.5 inches vertical clearance.

South of the dam/southern embankment a connecting channel will be constructed from the Wild Rice River to the Red River. Two separate interstate bridge structures have been included in the estimate to cross the connecting channel. In order to maintain 18 inches of overbuild over the dam/southern embankment, a maximum of 14' road raise is anticipated based on a top of dam/southern embankment elevation of 929.

All proposed improvements will be designed to meet a 75 mph design speed and ND DOT design standards. Sag curves will be designed meeting comfort criteria and crest curves will be designed meeting stopping sight distance. It is anticipated that roadway improvements will reconstruct a total of approximately 7.13 miles of interstate roadway.

The reconstructed roadway will consist of two 38 feet wide roadways (two 12 feet driving lanes, 10 feet outside shoulder, and 4 feet inside shoulder) with 104 feet separation from centerline of the southbound roadway to the centerline of the northbound roadway. For estimating purposes, a 12 inches concrete mainline pavement with a 6 inches concrete shoulder on 8 inches salvaged base course was utilized. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $51,416,000.

COUNTY ROAD 81

County Road 81 will be raised to cross over the dam/southern embankment approximately 0.5 miles south of County Road 16. At this location the top of dam/southern embankment was preliminarily designed at 929. In order to maintain 18 inches of overbuild above the top of dam/southern embankment elevation of 929 to account for consolidation, a minimum roadway elevation of 930.5 was utilized.

The road raise is designed meeting ND DOT and Cass County standards. The roadway meets a 55 mph design speed, with the sag vertical curves following comfort criteria and the crest vertical curves meeting stopping sight distance. The anticipated length of reconstruction is 0.32 miles with a maximum fill height of 18 feet. The limits of the reconstructed roadway are not anticipated to impact the existing cemetery south of County Road 16 on the east side of County Road 81.

The typical section will the County standards for a two-lane rural paved section. The roadway top width will be 32 feet. For cost estimating purposes, 7 inches HMA on 12 inches salvaged base course was utilized. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $1,061,000.

3RD STREET SOUTH

In order to maintain north-south connectivity east of the Red River, 3rd Street South will be raised to cross over the dam/southern embankment approximately 1.75 miles south of Clay County Road 8. In order to maintain 18 inches of overbuild above the top of dam/southern embankment (elevation 929), the roadway will be raised to a minimum elevation of 930.5 at the top of dam/southern embankment.

The road raise is designed meeting MN DOT and Clay County standards for a 55 mph roadway. All vertical curvature is based on requirements published by MN DOT. The anticipated length of reconstruction is 0.32 miles with a maximum fill height of 15 feet.

The typical section will meet the standard for a two-lane rural gravel section with a 36 feet wide finished roadway. For cost estimating purposes a 6 inches gravel section was utilized. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $676,000.

140TH AVENUE SOUTH

The dam/southern embankment will cross 140th Avenue South approximately 0.5 miles west of US 75. In order to maintain east-west connectivity within Clay County, 140th Avenue South will be raised to pass over the dam/southern embankment. At this location the top of dam/southern embankment is approximately 929.5. To maintain 18 inches of overbuild at the top of dam/southern embankment for consolidation, the minimum roadway elevation is 931.

The road raise is designed meeting MN DOT and Clay County standards. The roadway meets a 55 mph design based on vertical curvature requirements published by MN DOT. The anticipated length of reconstruction is 0.32 miles with a maximum fill height of 17 feet.

The typical section will follow two-lane rural gravel section standards with a 36 feet wide road surface. For cost estimating purposes, a 6 inches gravel section was utilized. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $810,000.

160TH AVENUE SOUTH

160th Avenue South crosses the dam/southern embankment approximately 0.15 miles west of US 75. The roadway will be raised to pass over the dam/southern embankment in order to maintain east-west connectivity. In order to maintain 18 inches of overbuild over the top of dam/southern embankment for consolidation, the minimum roadway elevation is 931.8 (top of dam/southern embankment elevation of 930.3).

The roadway is designed to maintain a 55-mph design speed. Vertical curvature was determined based on standards published by MN DOT. The length of reconstruction is anticipated to be 0.23 miles with a maximum fill height of 12 feet.

The typical section consists of 32 feet, wide finished road surface meeting standards for a two-lane rural paved section. For cost estimating purposes, a 6 inches HMA on 12 inches salvaged base course section was utilized. New roadway ditches and centerline culverts will be installed to reestablish local drainage patterns impacted by the road raise.

The estimated cost to construct the roadway improvement is $565,000.

See Table for a summary of roadway improvements.

Alternative	Cost	Design Speed	Road Standard Section	Length of Reconstruction (Miles)
168th Avenue South East	$150,000.	55 mph	Two-Lane Rural Gravel Section	0.192 Miles
County Road 16/17	$12,250,000.	55 mph	Two-Lane Rural Paved Section	2.733 Miles
County Road 16	$1,290,000.	55 mph	Two-Lane Rural Paved Section	0.302 Miles
Interstate 29	$51,416,000.	75 mph	Interstate	3.566 Miles
County Road 81	$1,061,000.	55 mph	Two-Lane Rural Paved Section	0.322 Miles
3rd Street South	$676,000.	55 mph	Two-Lane Rural Gravel Section	0.322 Miles
140th Ave S	$810,000.	55 mph	Two-Lane Rural Gravel Section	0.318 Miles
160th Ave S	$565,000.	55 mph	Two-Lane Rural Paved Section	0.225 Miles

Appendix A
Preliminary Road Improvement Plan & Profile

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	FM DIV		1

T-138-N
R-49-W

Horace

Wild Rice

100th Ave S

T-138-N
R-50-W

FM Diversion Embankment ℄

100th Ave S

110th Ave S

Red River of the North

End CR 17 Realignment

Road Realignment
2.083 miles

End CR 16 Realignment

Begin CR 16 Realignment

CR 16

Road Raise
0.302 miles

Obliterate CR 16
& CR 17 Roadways

Road Realignment
0.650 miles

Begin CR 17 Realignment

120th Ave S

Road Raise
0.322 miles

Road Raise
0.322 miles

130th Ave S

FM Diversion Embankment ℄

Road Raise
Edge of Drive Lane
@ 100 Yr WSE
NB - 3.566 miles

NORTH DAKOTA

MINNESOTA

Road Raise
0.318 miles

140th Ave S

Road Raise
0.192 miles

168th Ave SE

CR 17

173rd Ave SE

Interstate 29

CR 81

3rd St S

US 75

150th Ave S

T-137-N
R-49-W

T-137-N
R-50-W

Oxbow

160th Ave S

CR 18

Road Raise
0.225 miles

Sheyenne River

Wild Rice River

FM Diversion Embankment ℄

Red River of the North

ND 46

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PRELIMINARY

Overview

FM Diversion Road Raise

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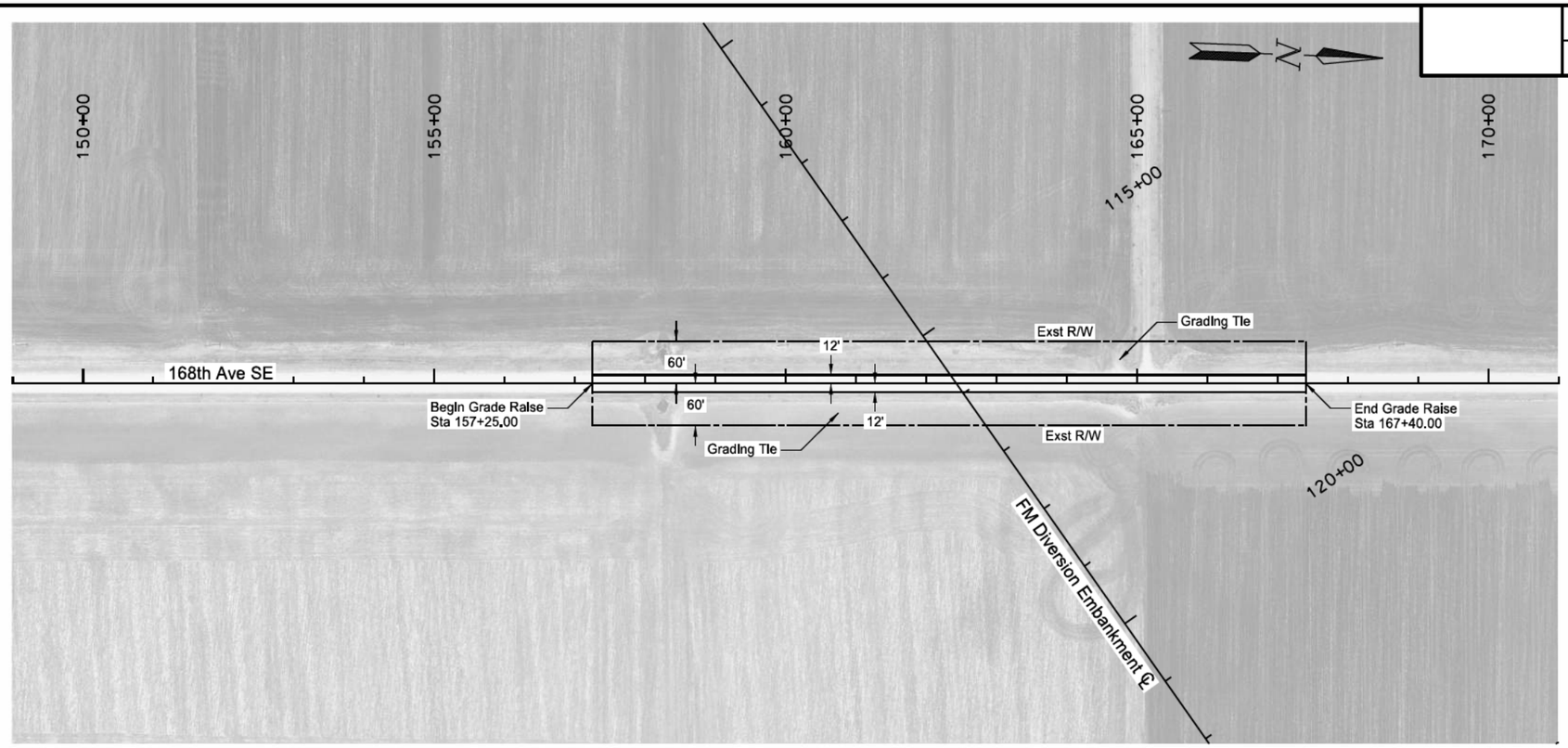

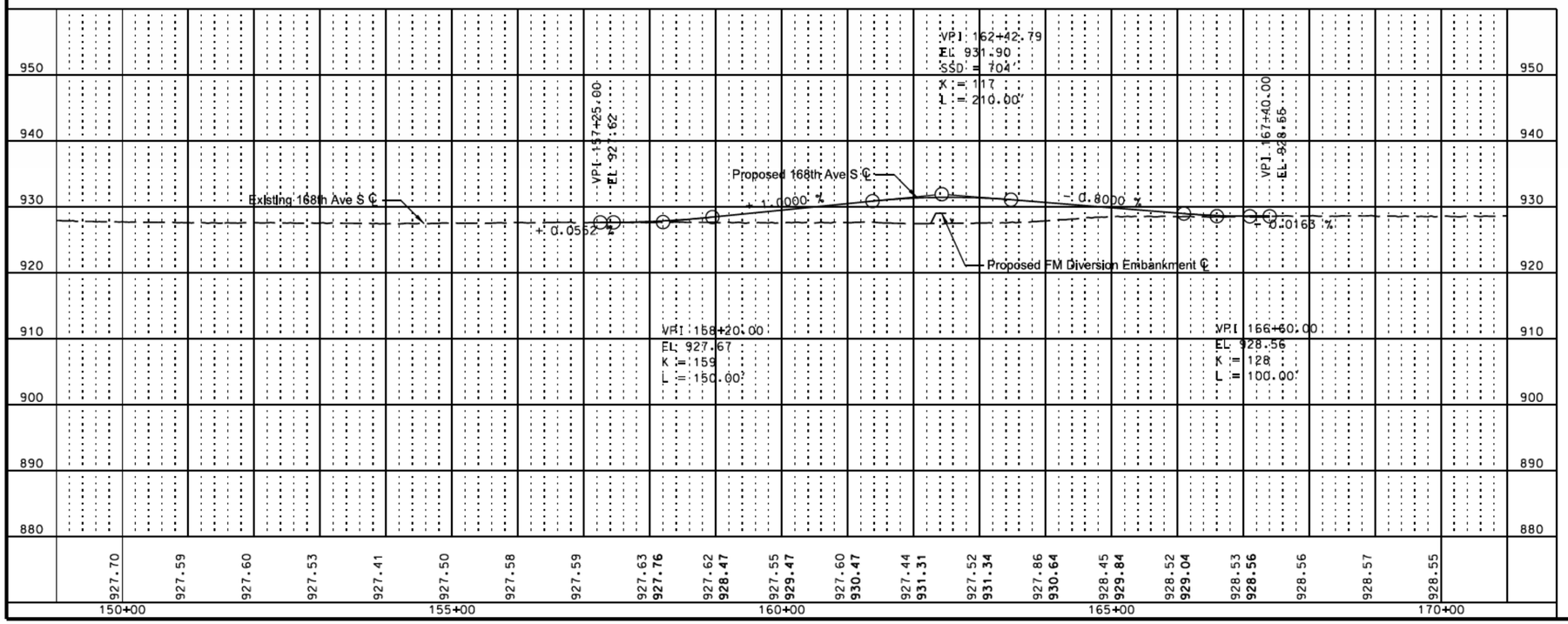

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PRELIMINARY

Plan & Profile
168th Ave SE

Plan B - Road Raises
Sta 157+25 to Sta 167+40

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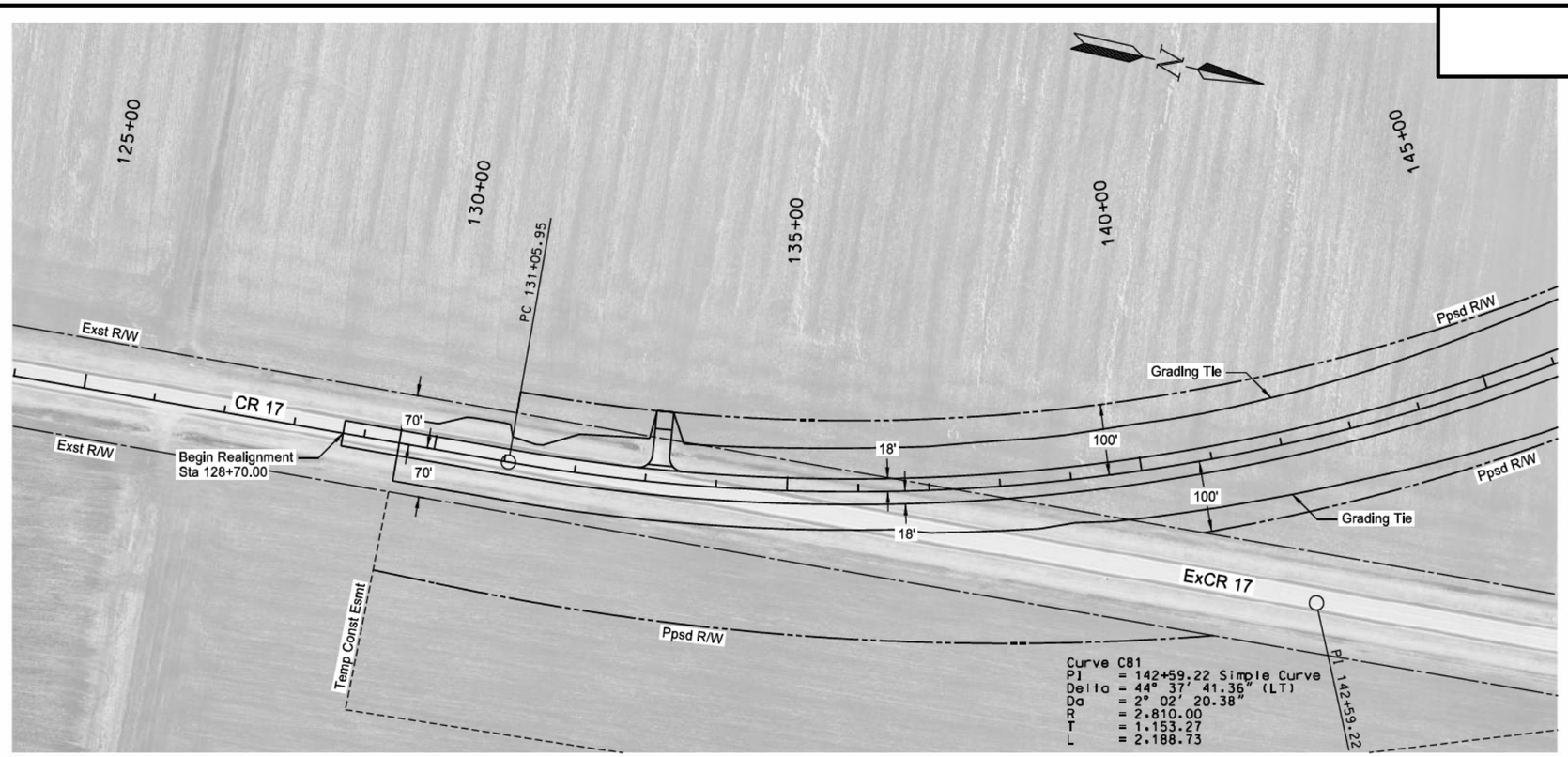

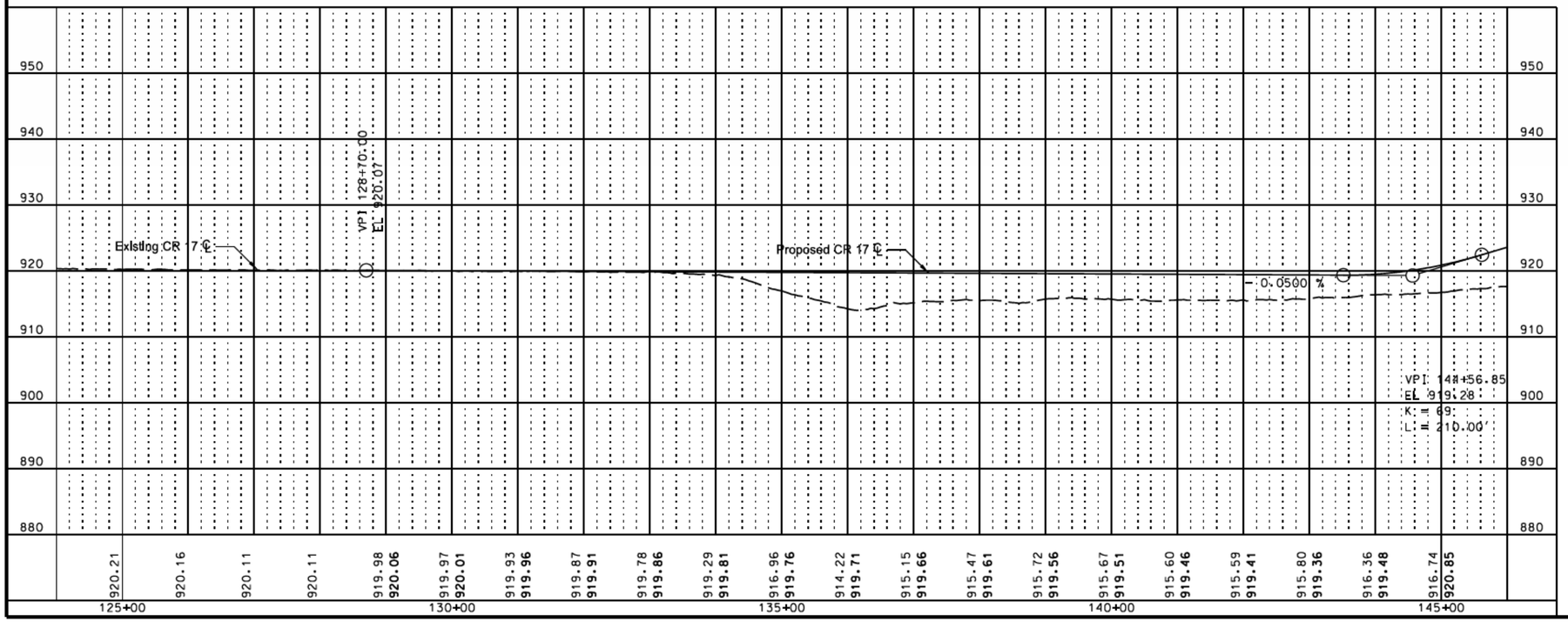

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PRELIMINARY

Plan & Profile
CR 17

Plan B - Road Raises
Sta 128+70 to Sta 145+00

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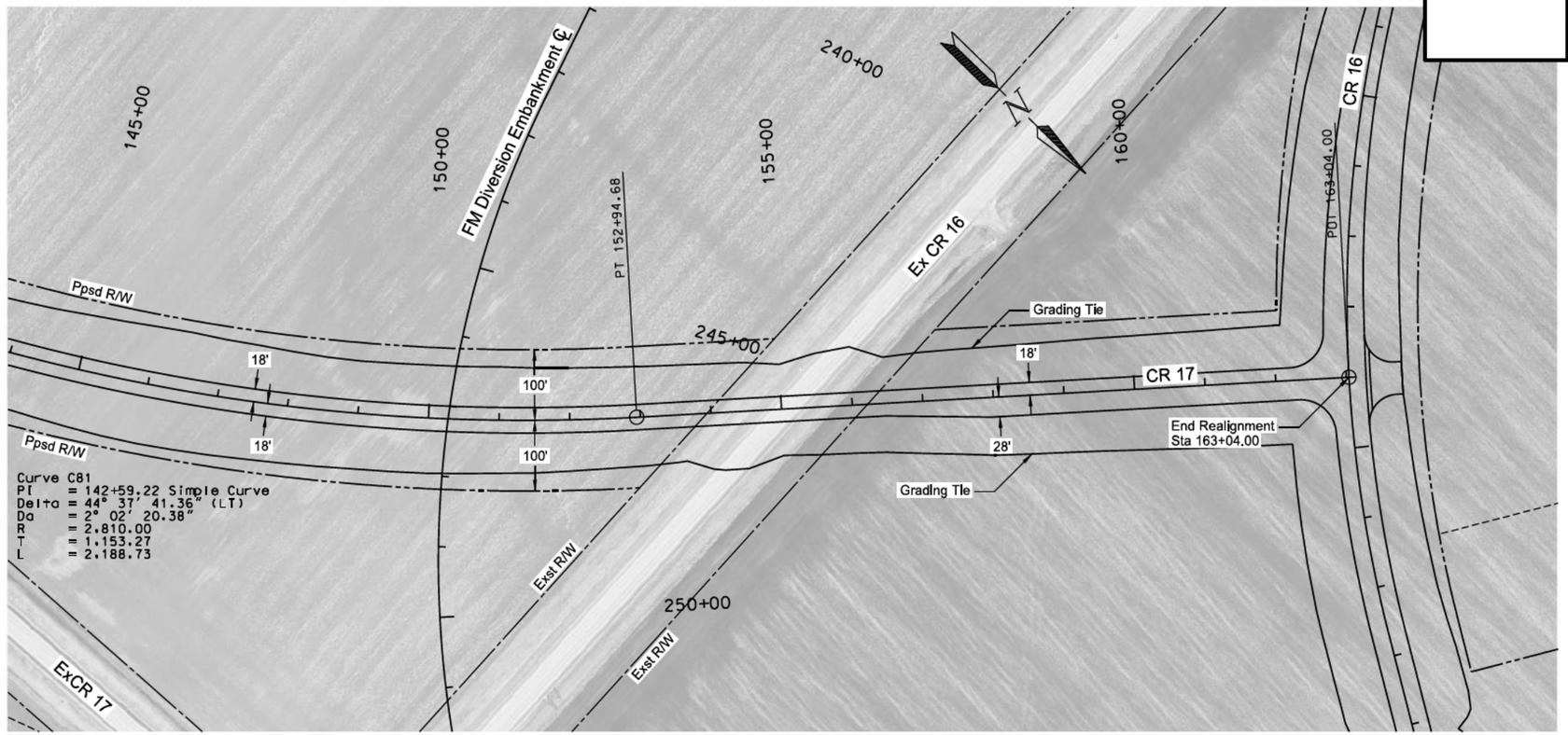

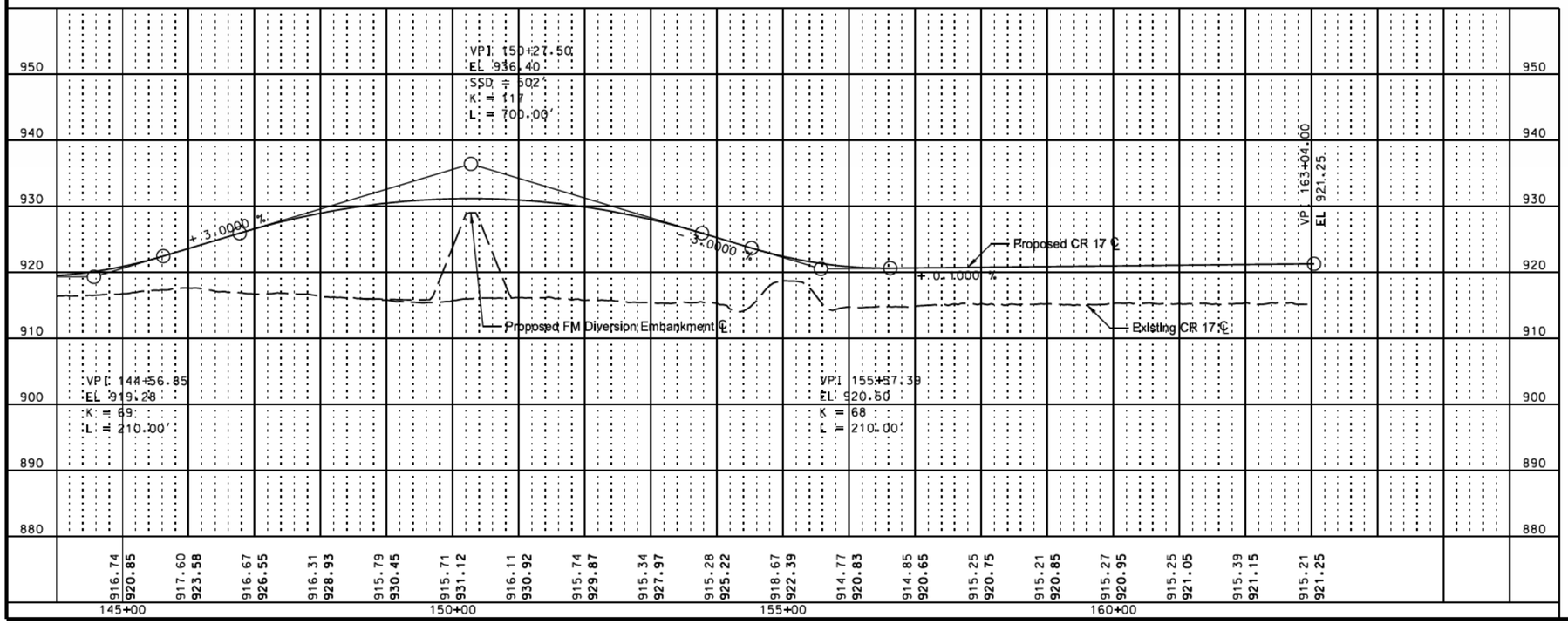

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PRELIMINARY

Plan & Profile
CR 17

Plan B - Road Raises
Sta 145+00 to Sta 163+04

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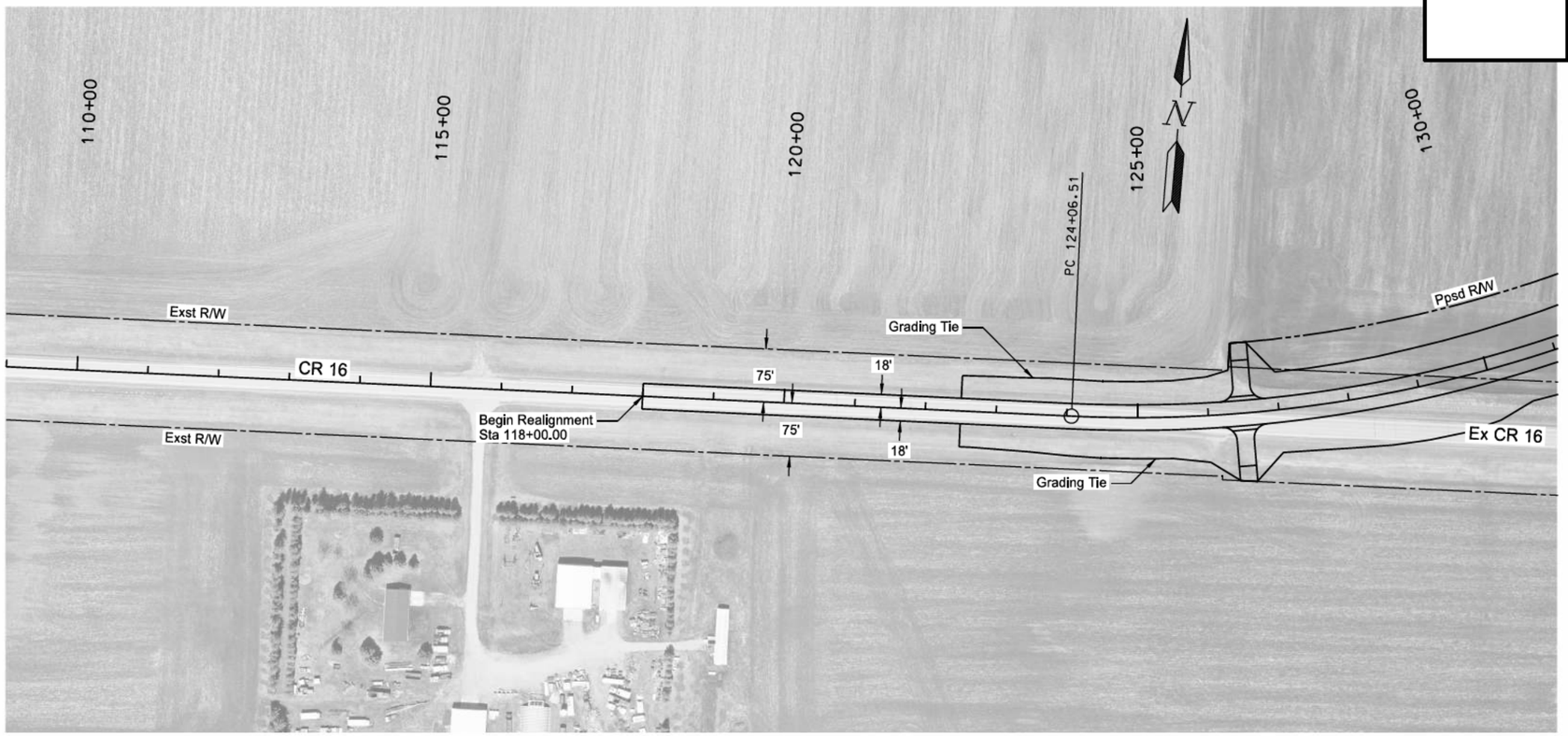

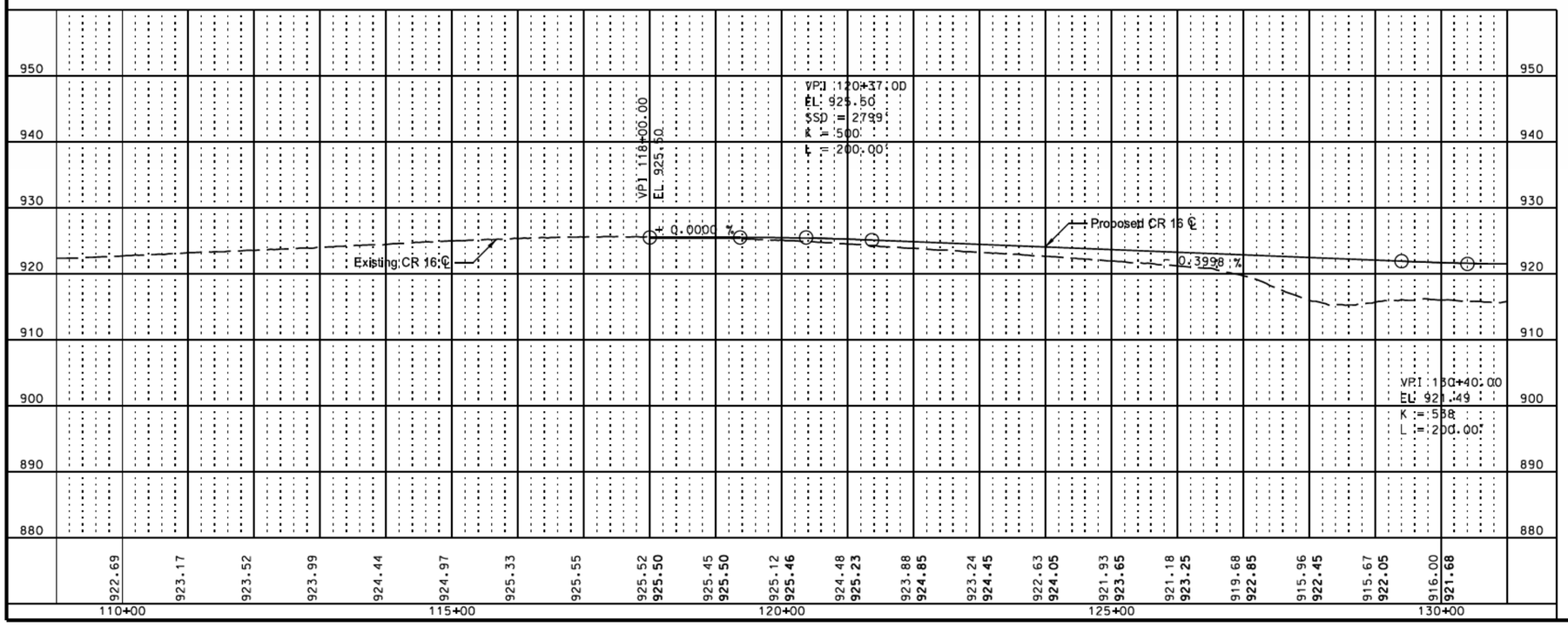

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PRELIMINARY

Plan & Profile
CR 16

Plan B - Road Raises
Sta 118+00 to Sta 130+00

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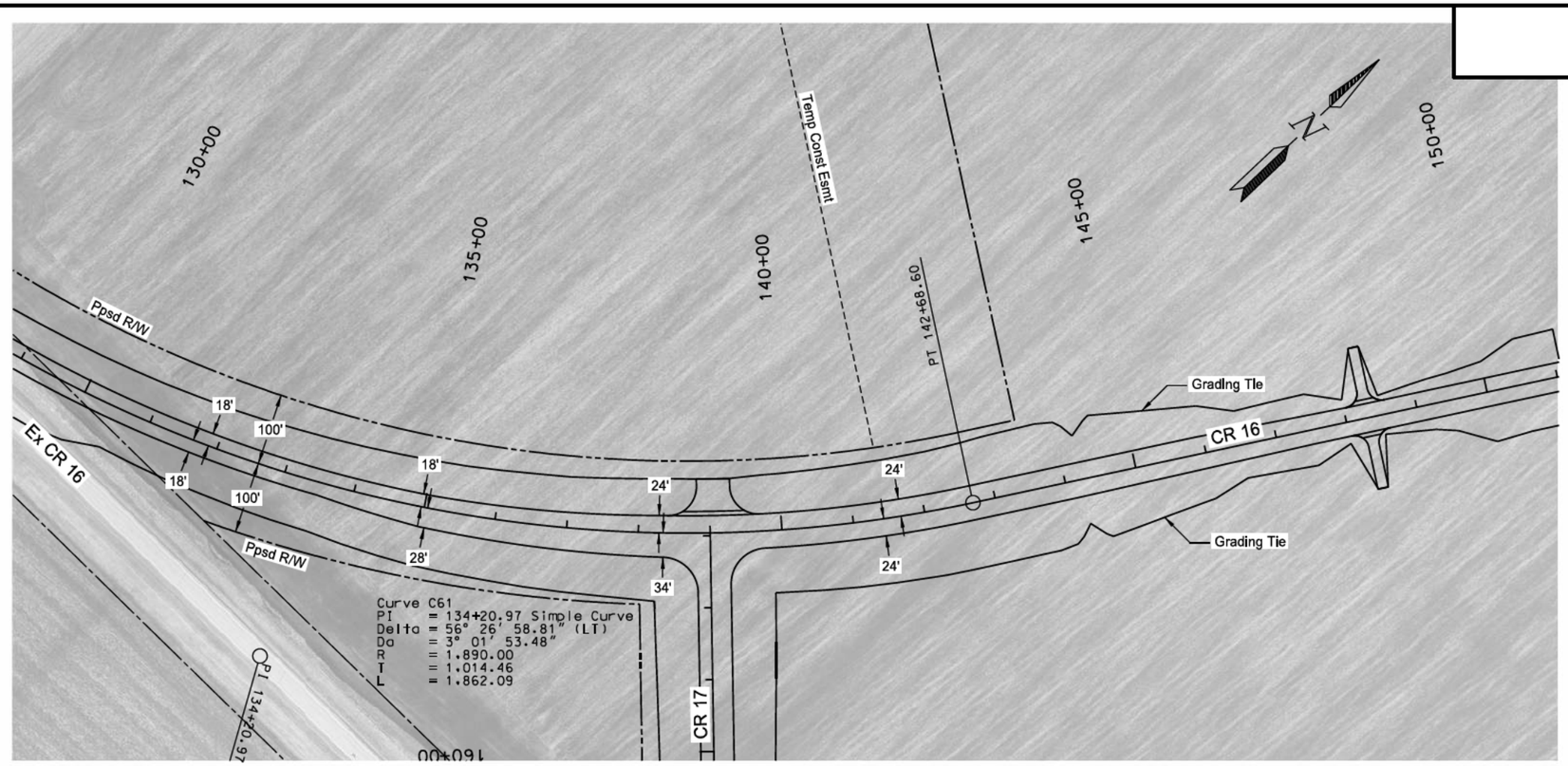

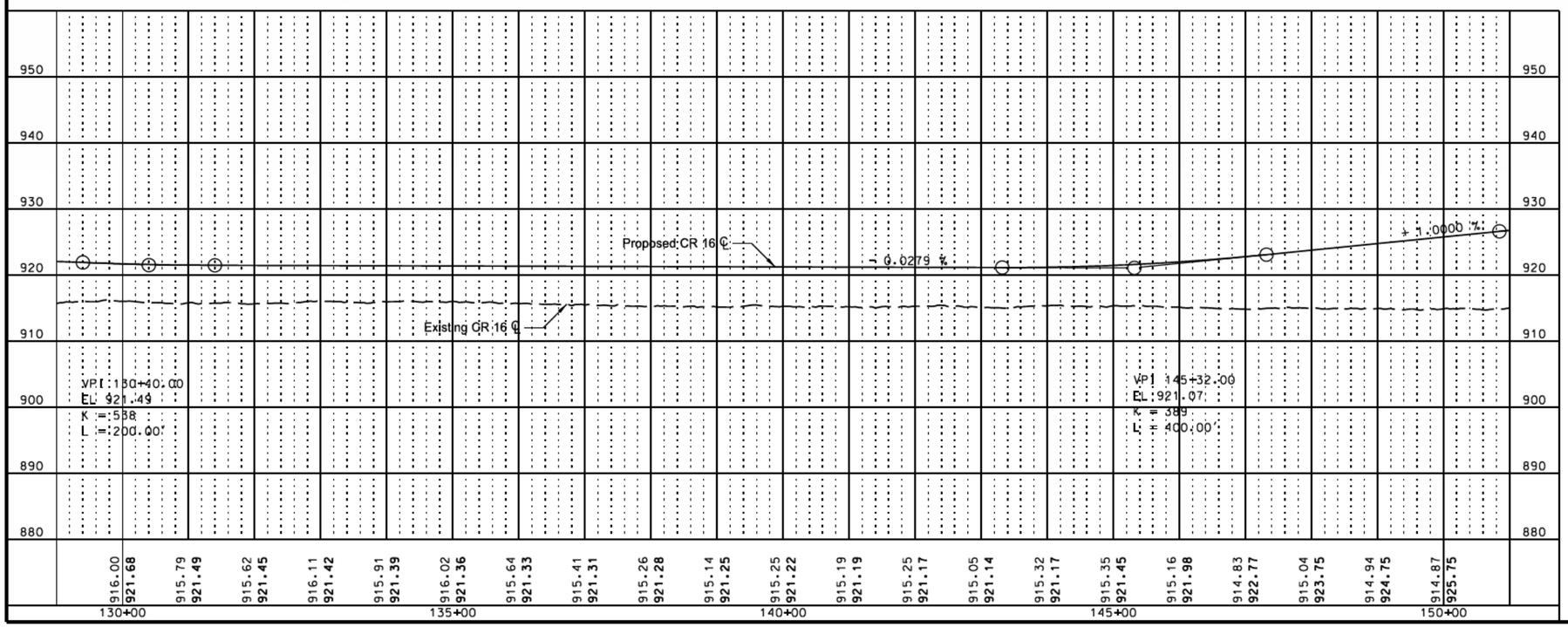

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Plan & Profile
CR 16

Plan B - Road Raises
Sta 130+00 to Sta 150+00

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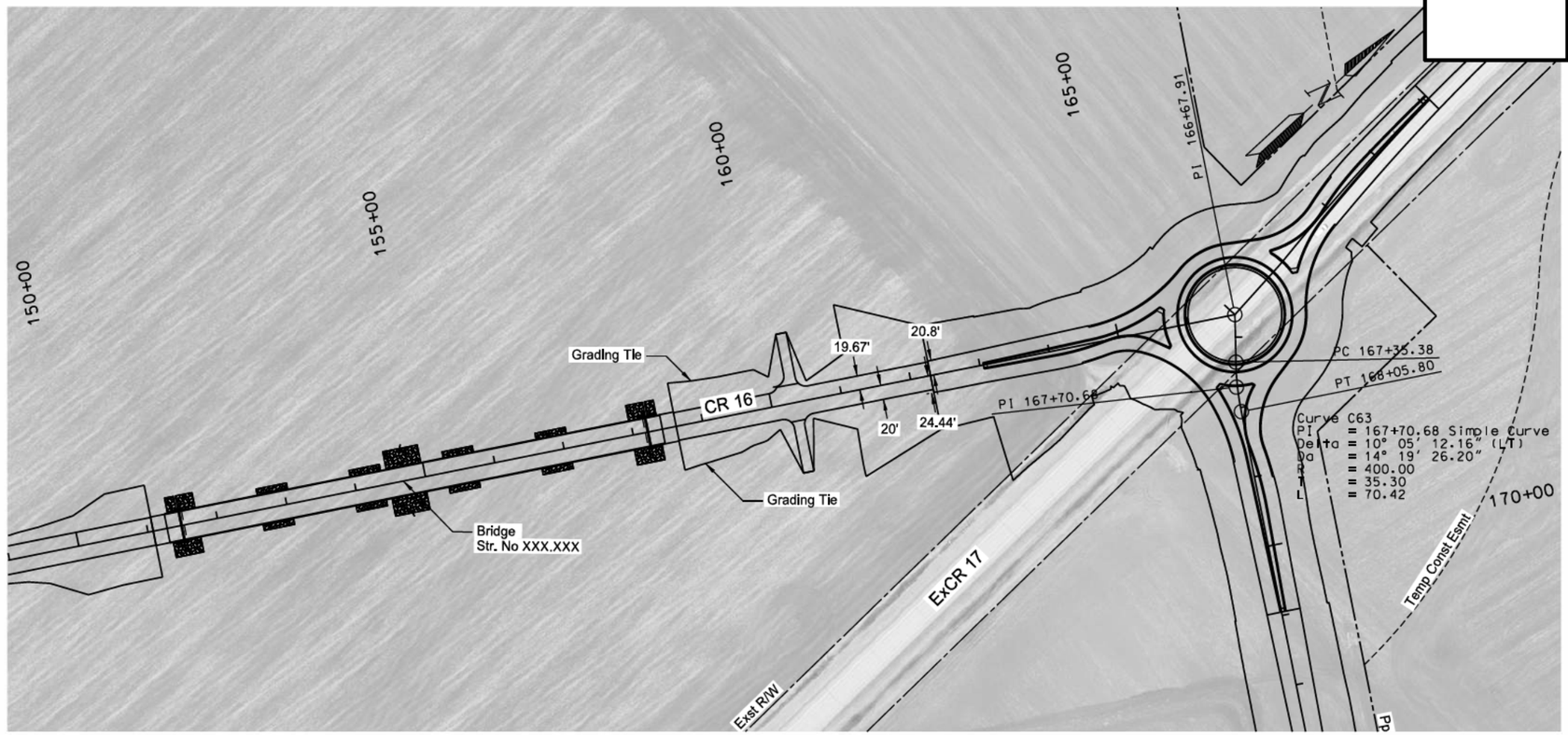

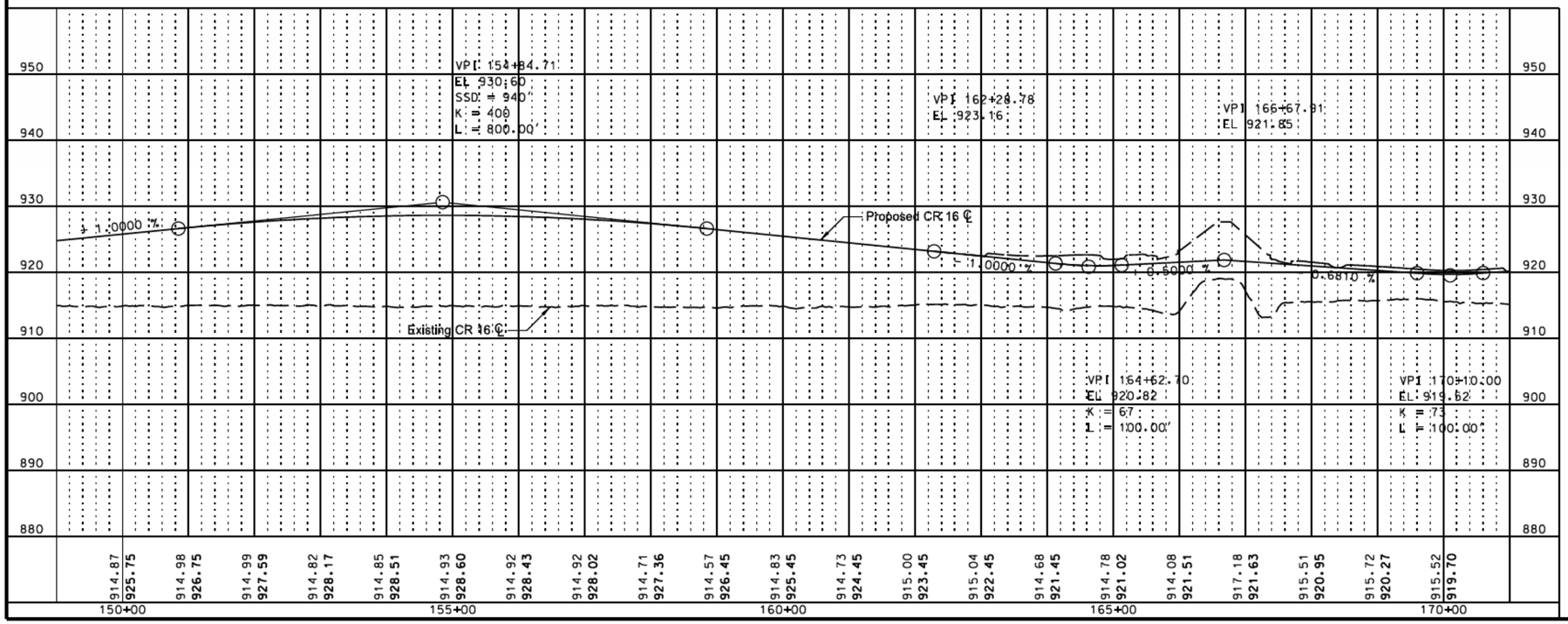

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Plan & Profile
CR 16

Plan B - Road Raises
Sta 150+00 to Sta 170+00

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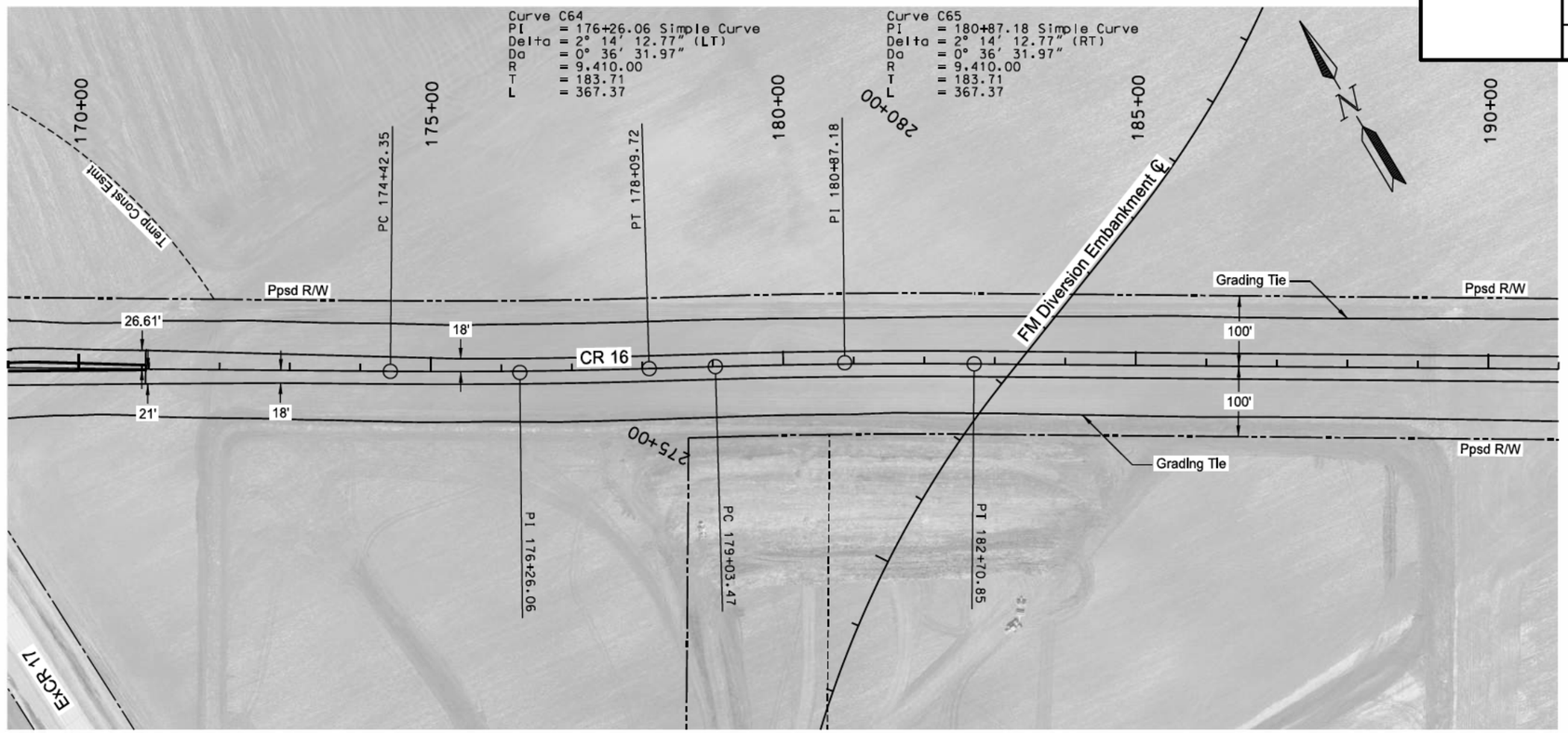

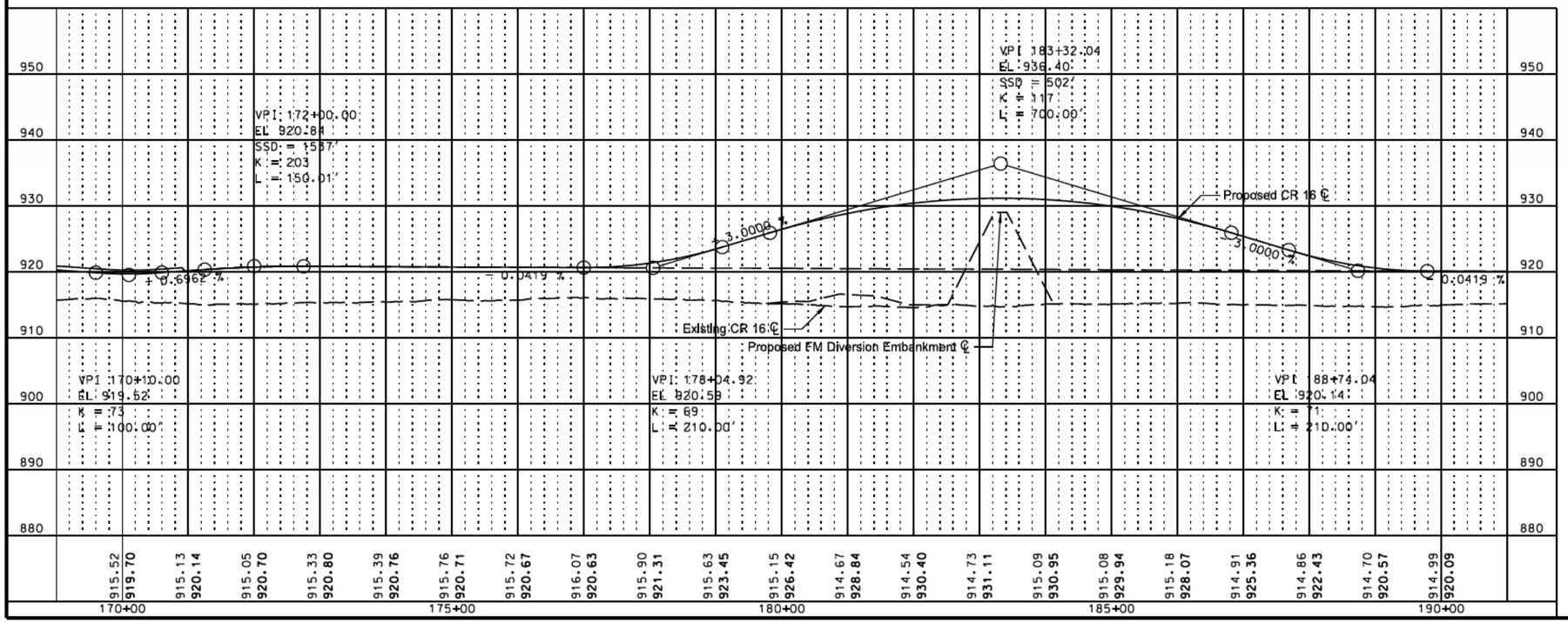

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Plan & Profile
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Plan B - Road Raises
Sta 170+00 to Sta 190+00

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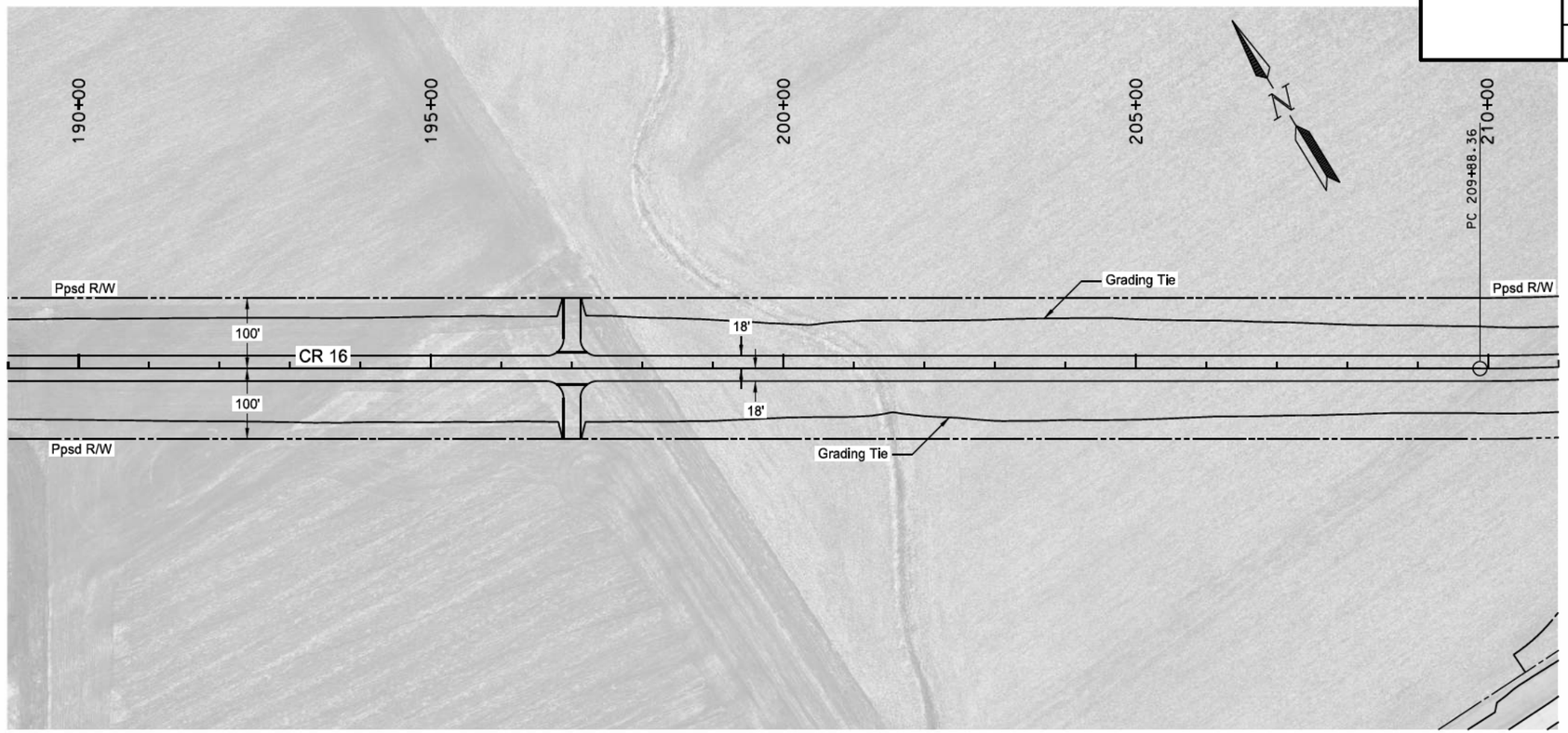

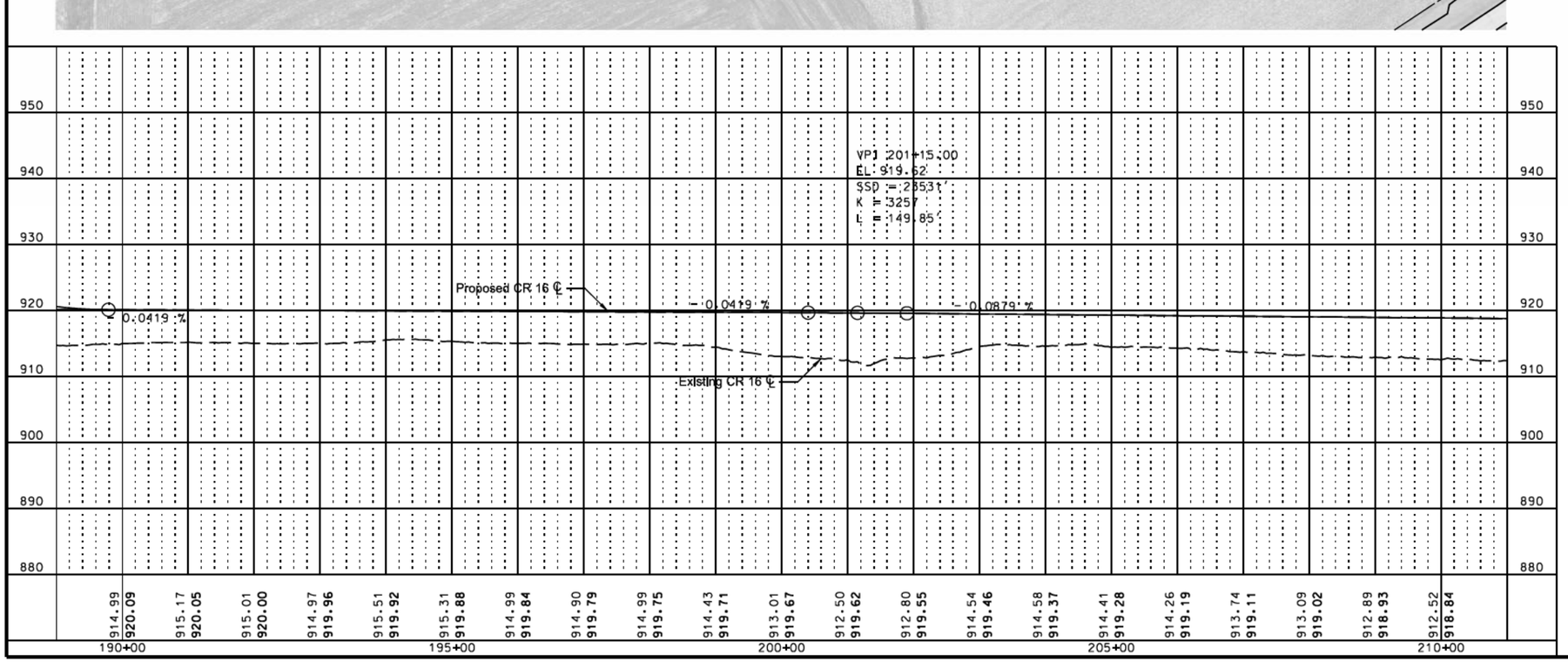

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Plan & Profile
CR 16

Plan B - Road Raises
Sta 190+00 to Sta 210+00

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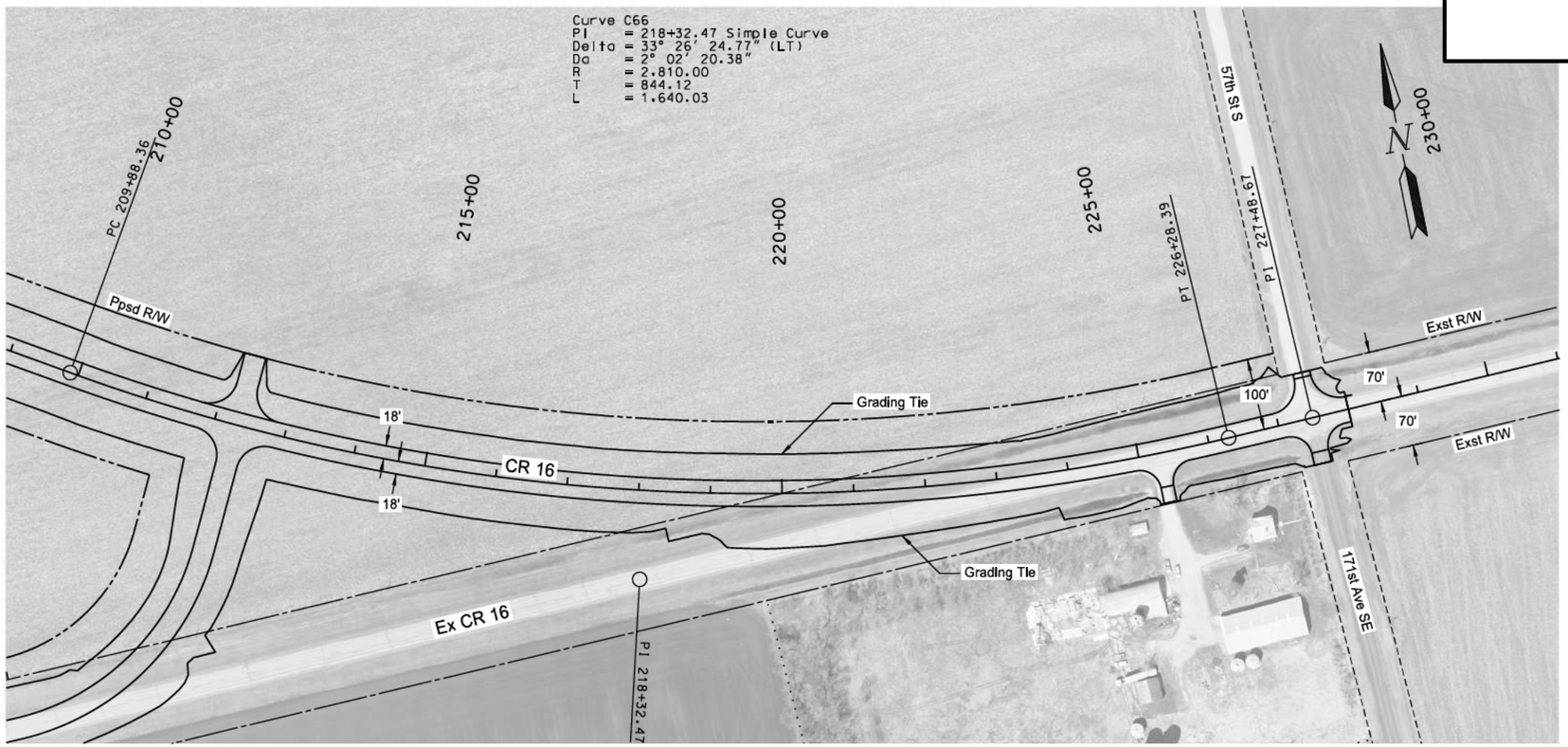

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Plan & Profile
CR 16

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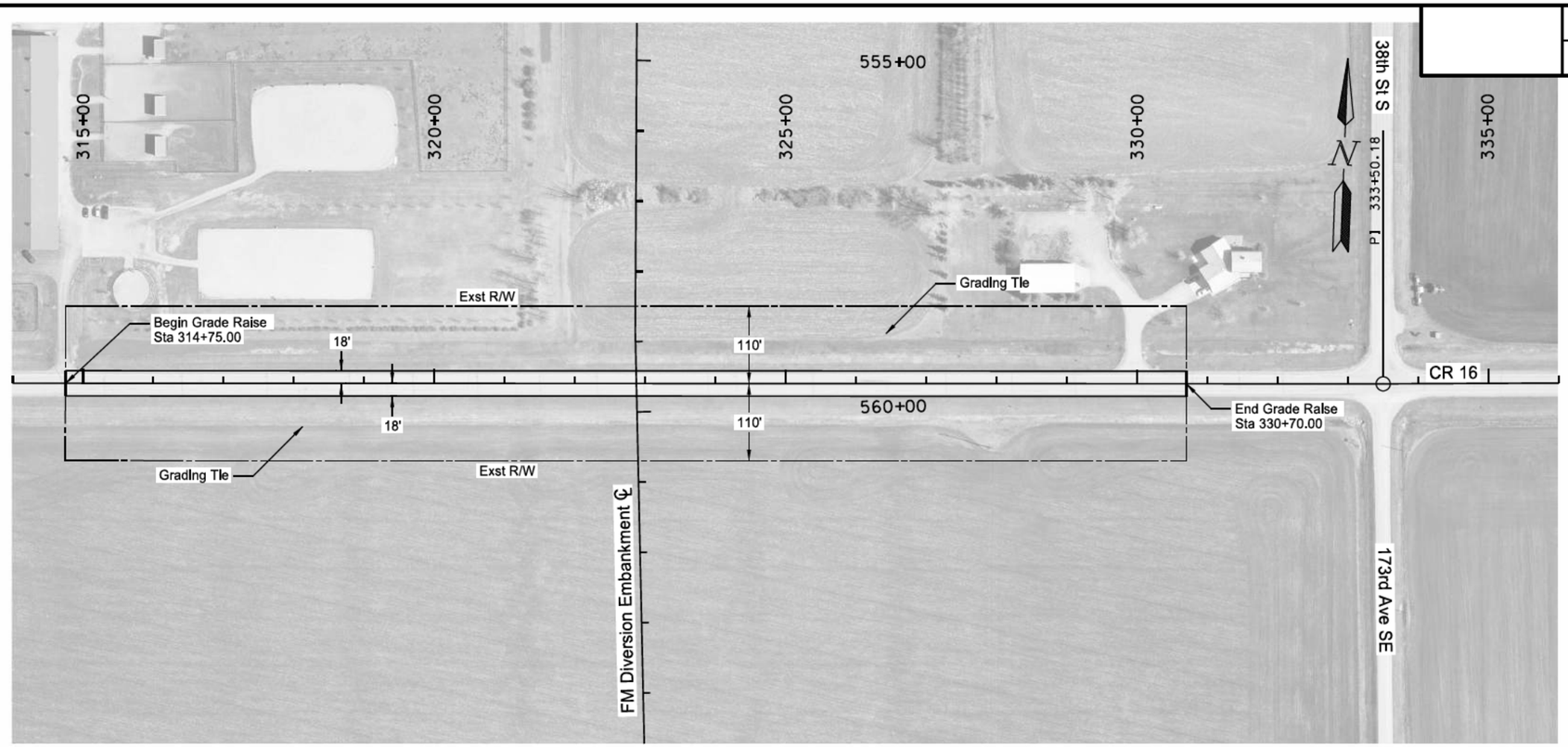

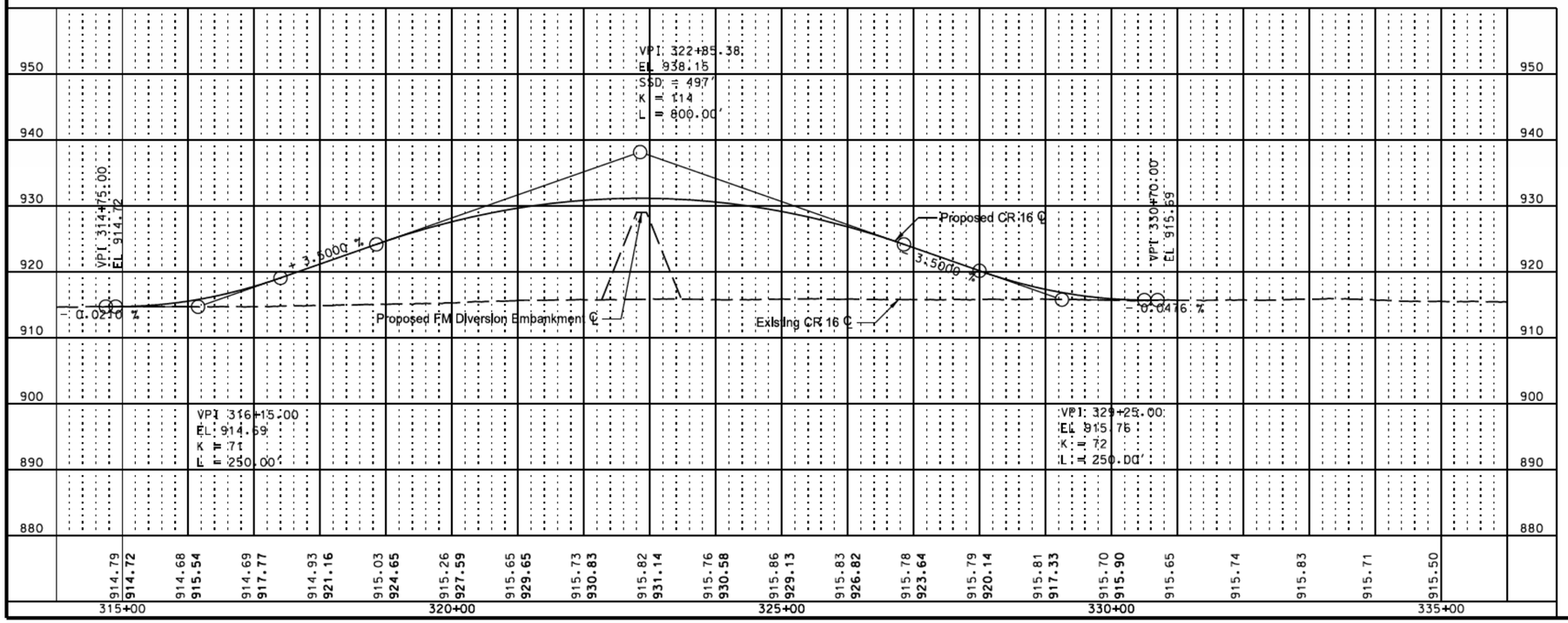

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PRELIMINARY

Plan & Profile
CR 16

Plan B - Road Raises
Sta 314+75 to Sta 330+70

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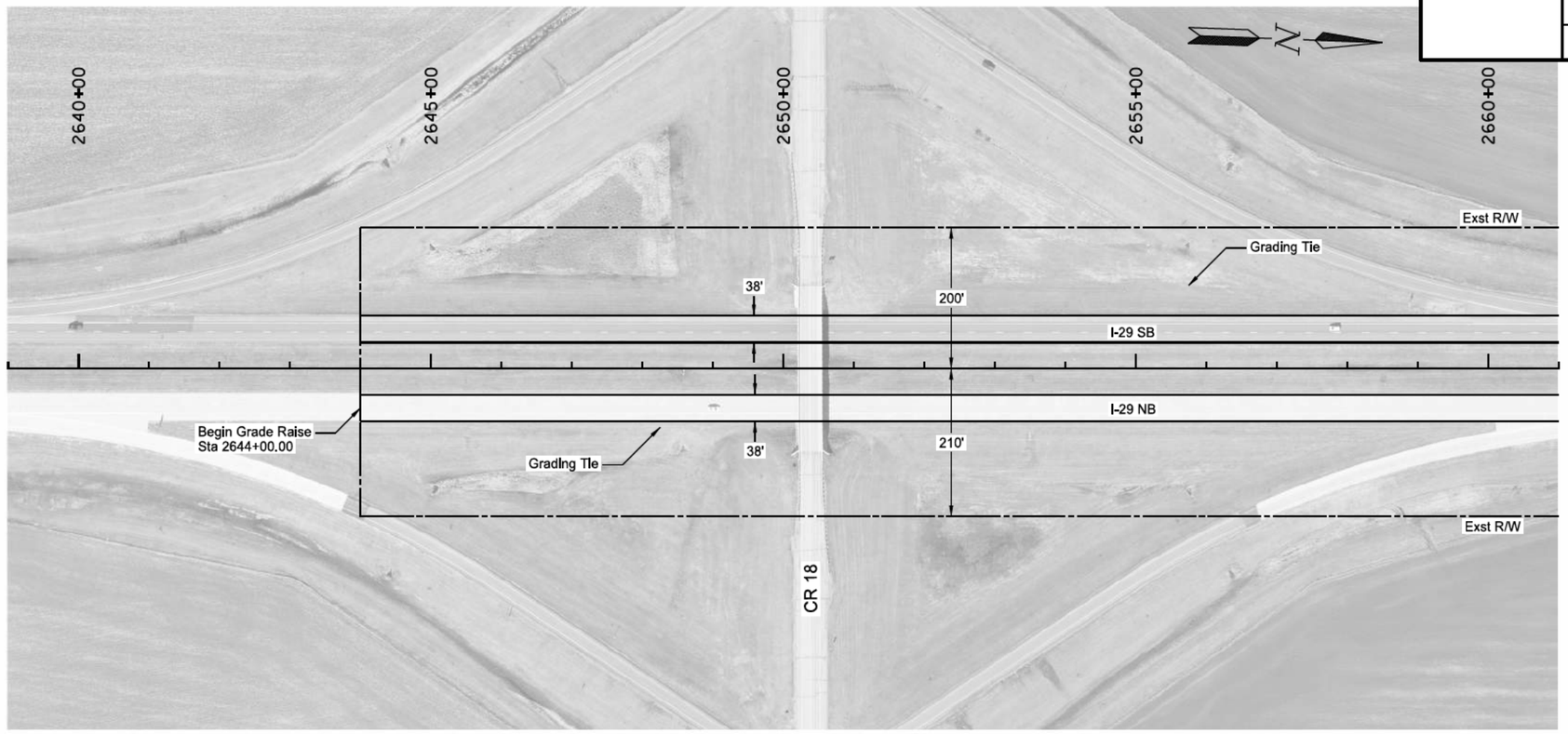

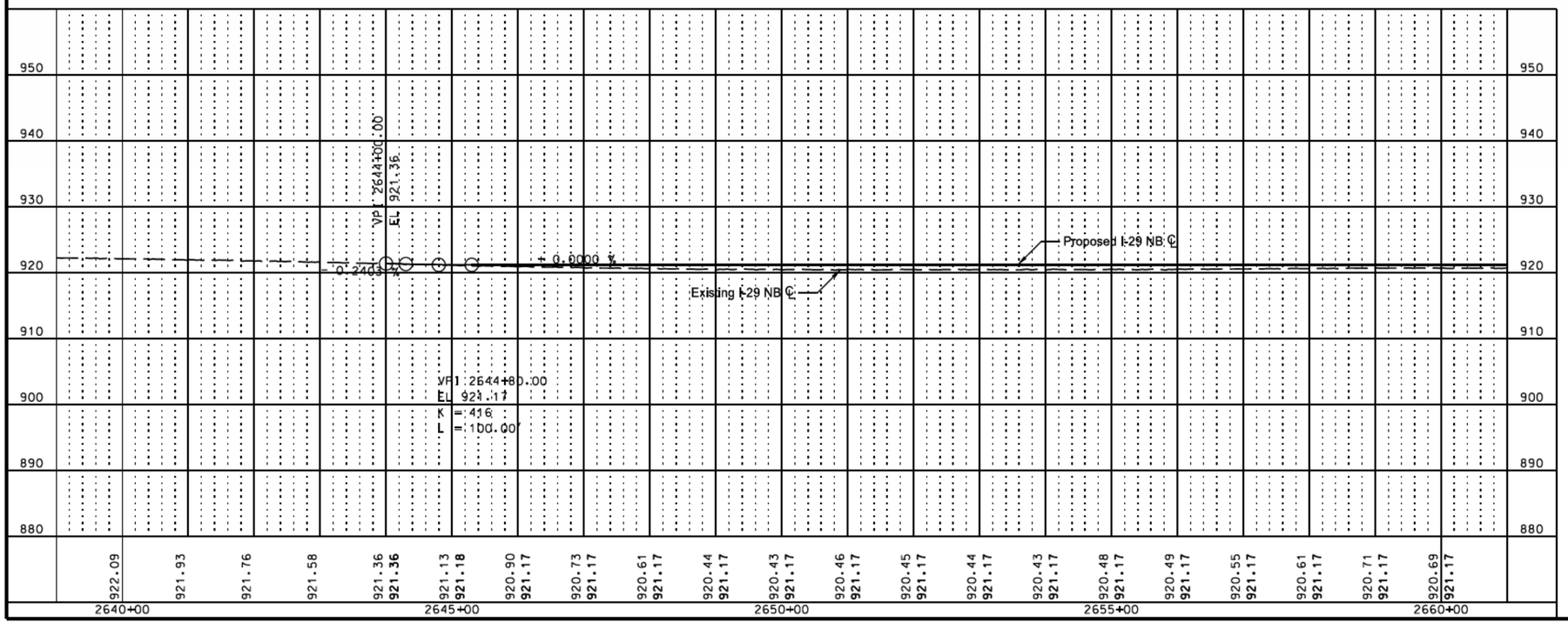

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2644+00 to Sta 2660+00

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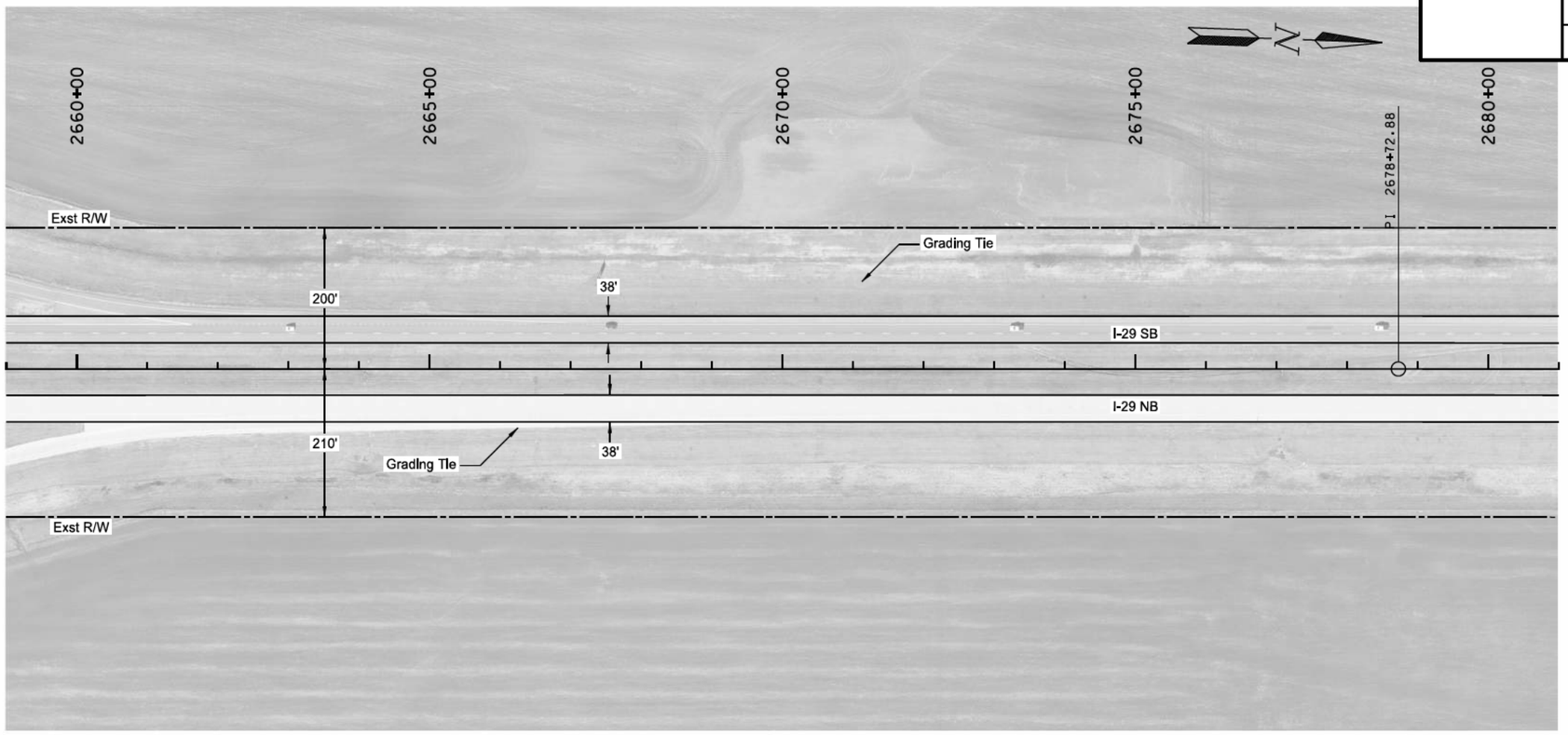

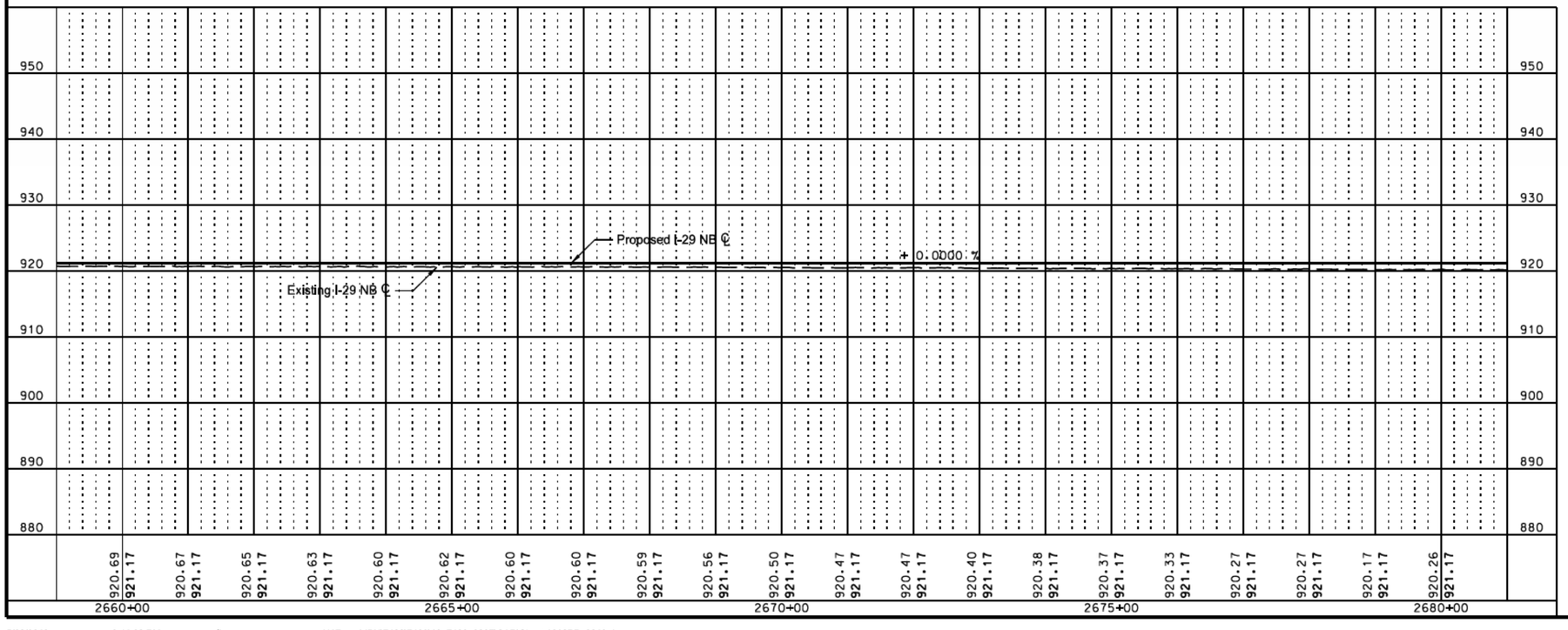

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2660+00 to Sta 2680+00

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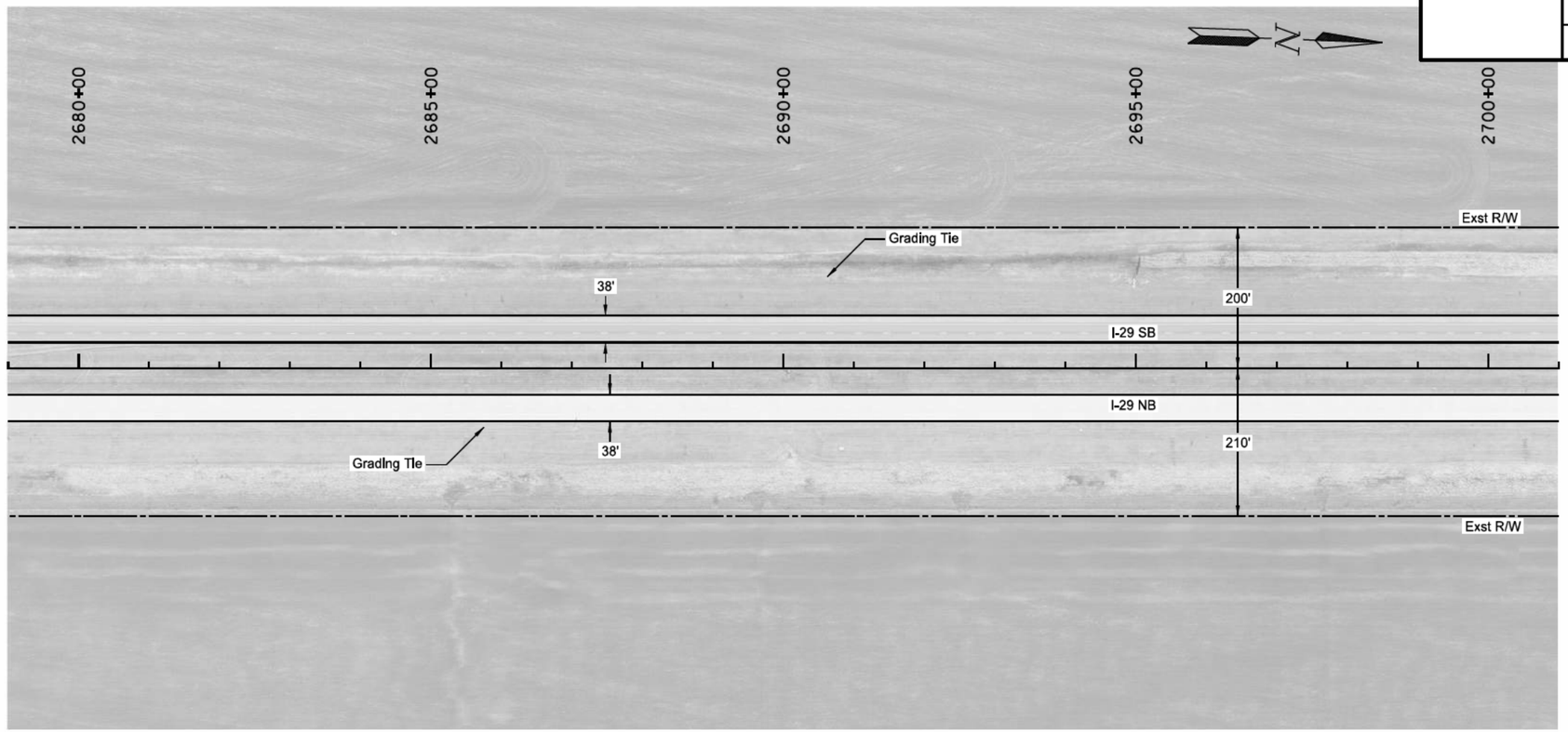

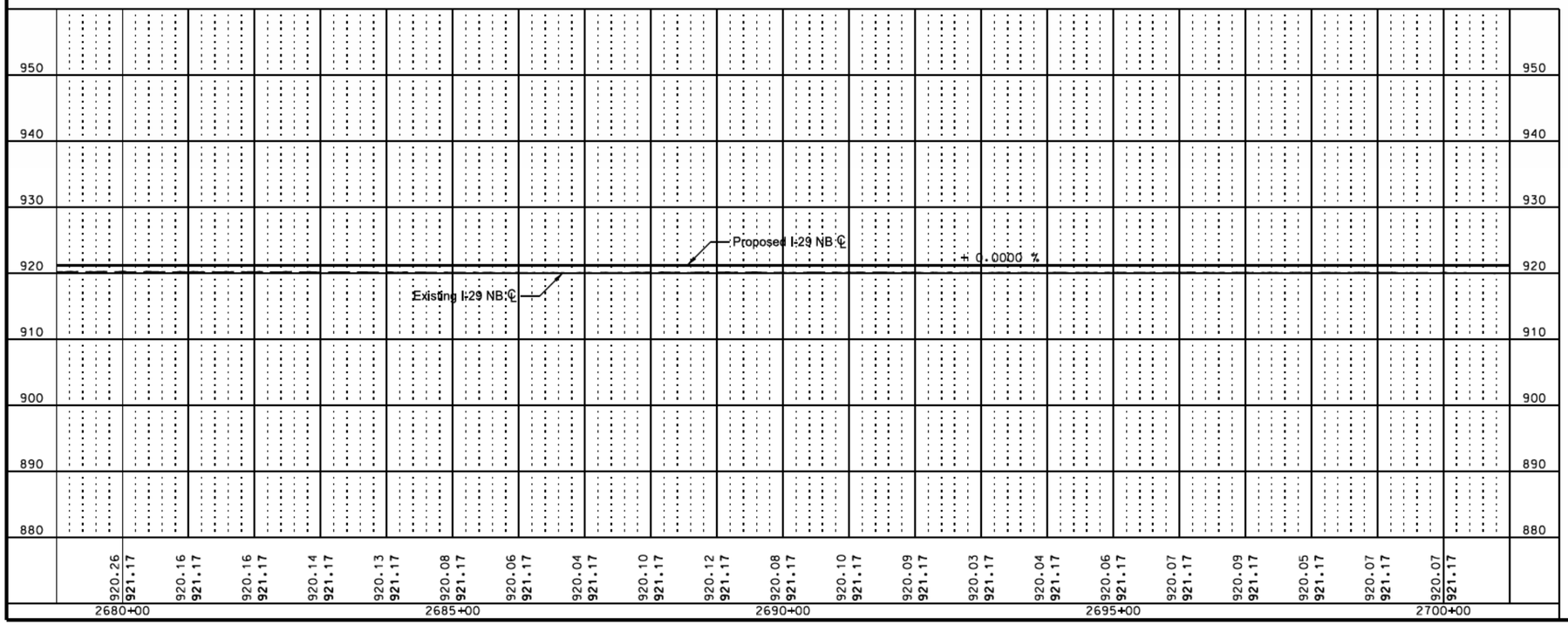

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2680+00 to Sta 2700+00

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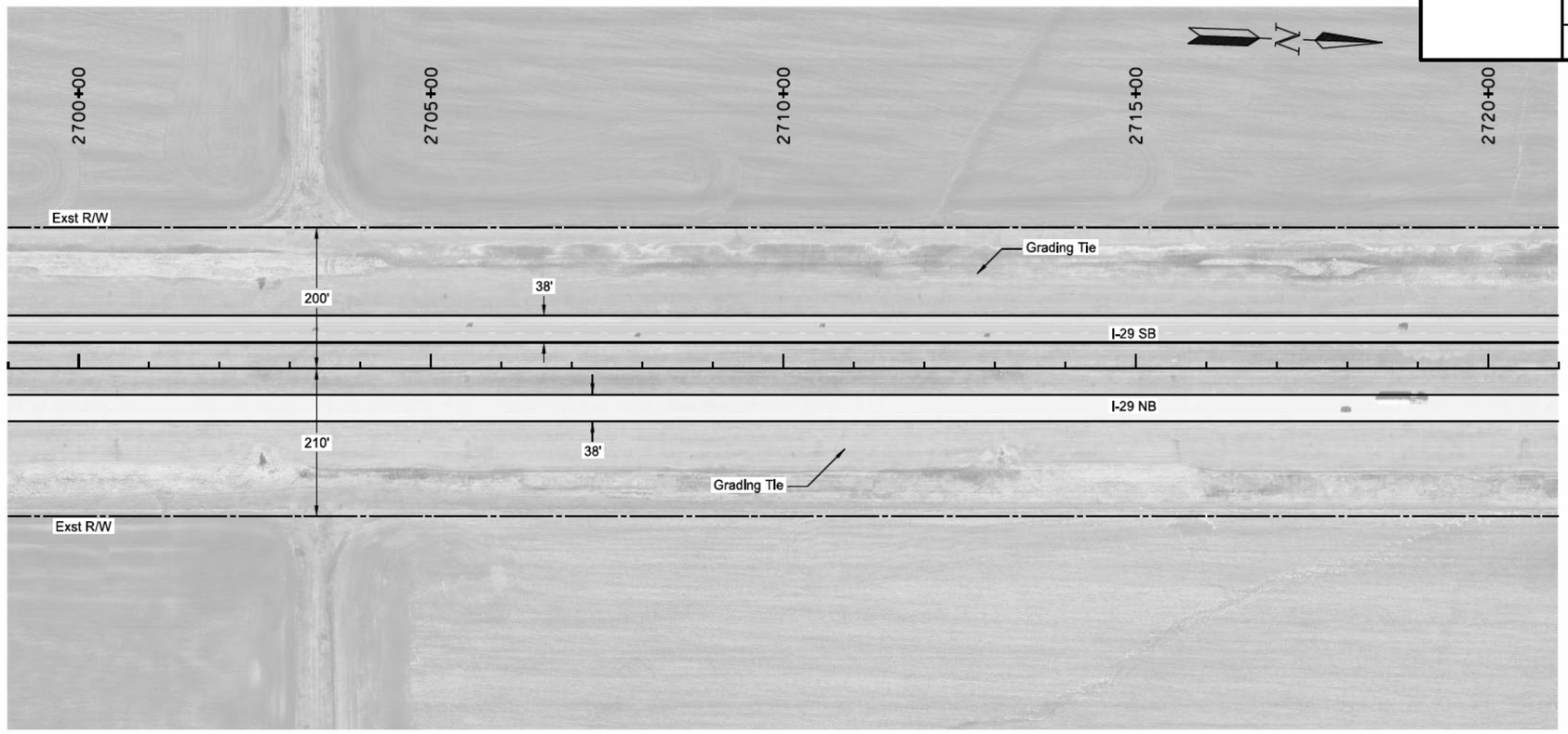

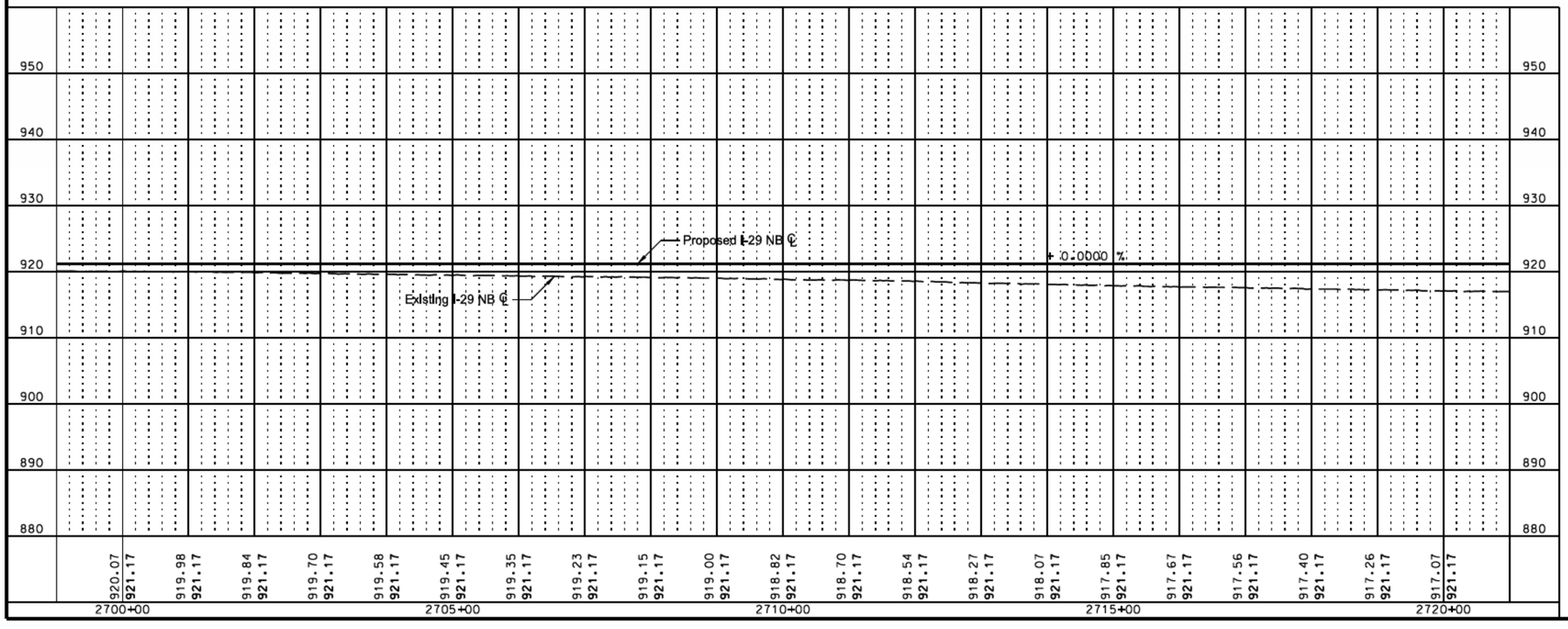

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2700+00 to Sta 2720+00

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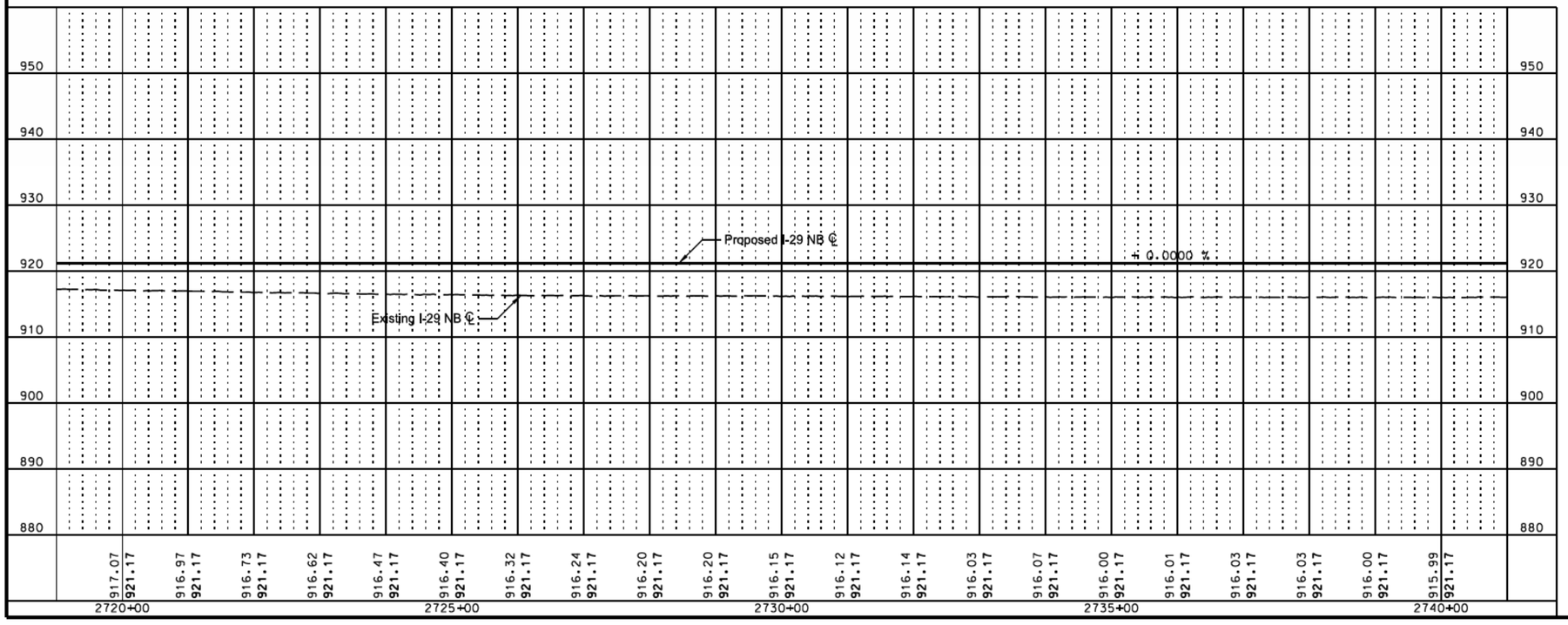
ND	FM DIV	60	15



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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2720+00 to Sta 2740+00

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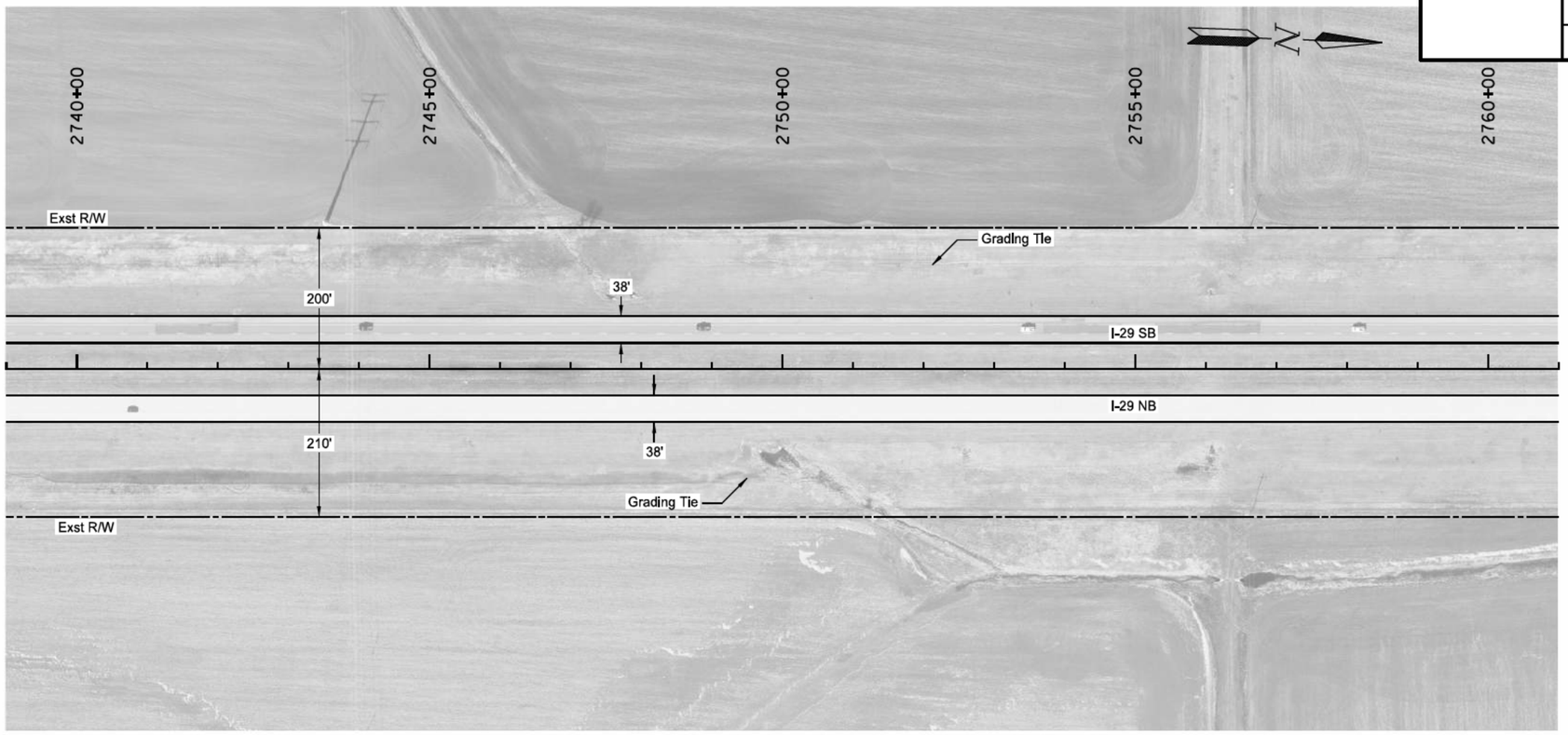

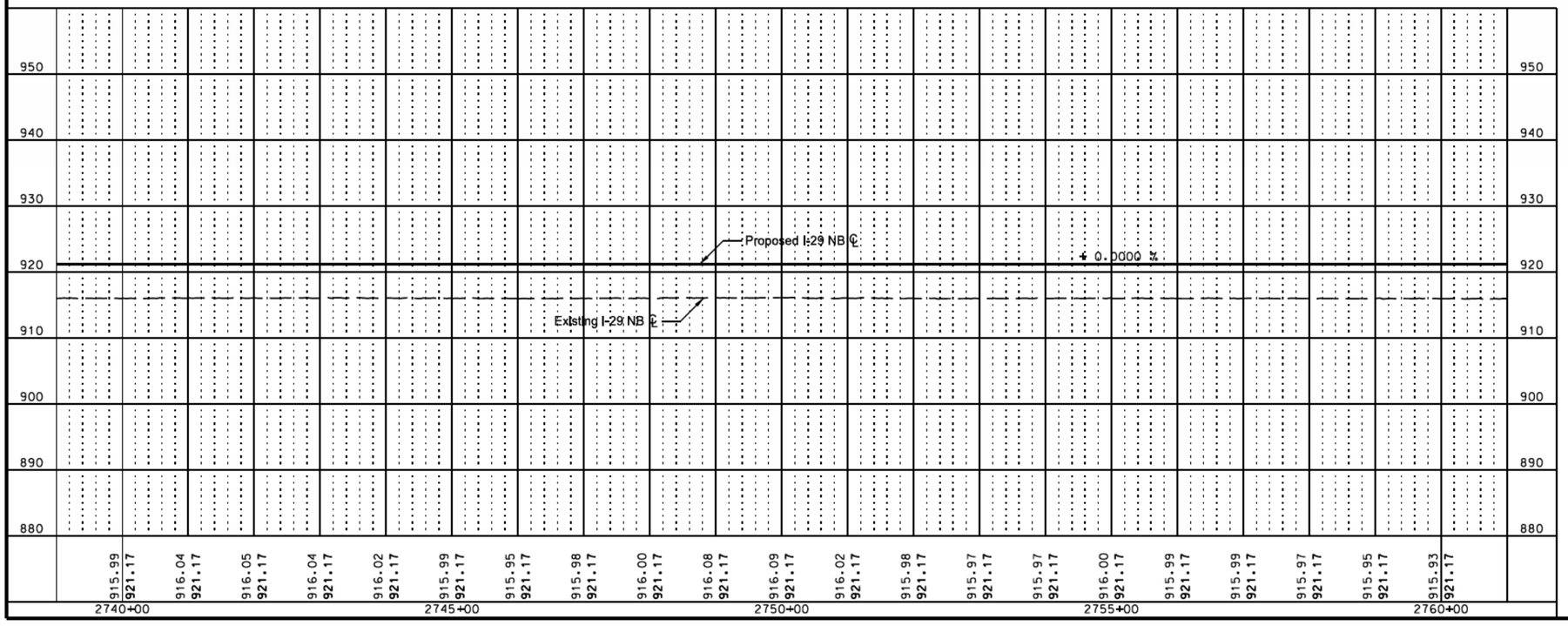

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2740+00 to Sta 2760+00

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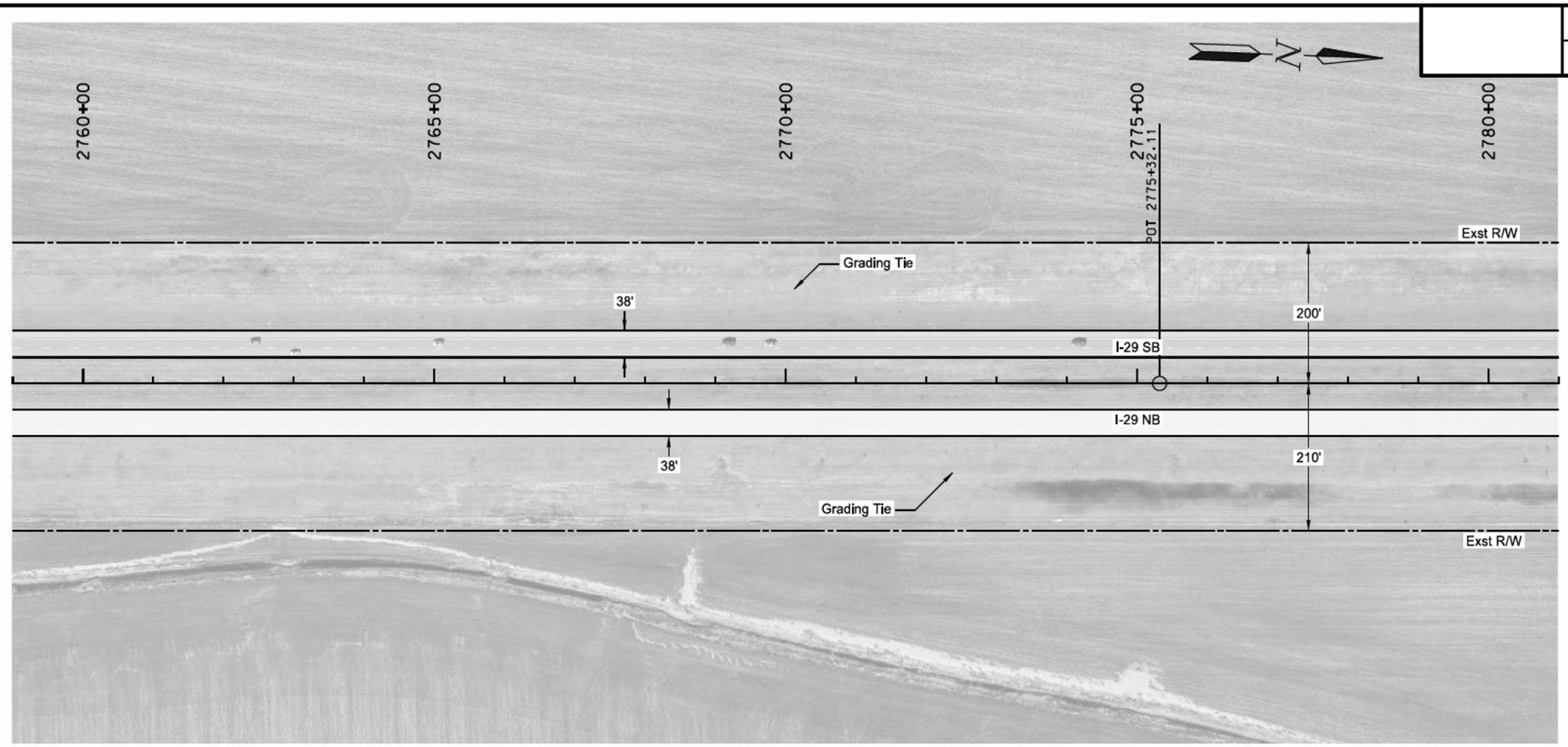
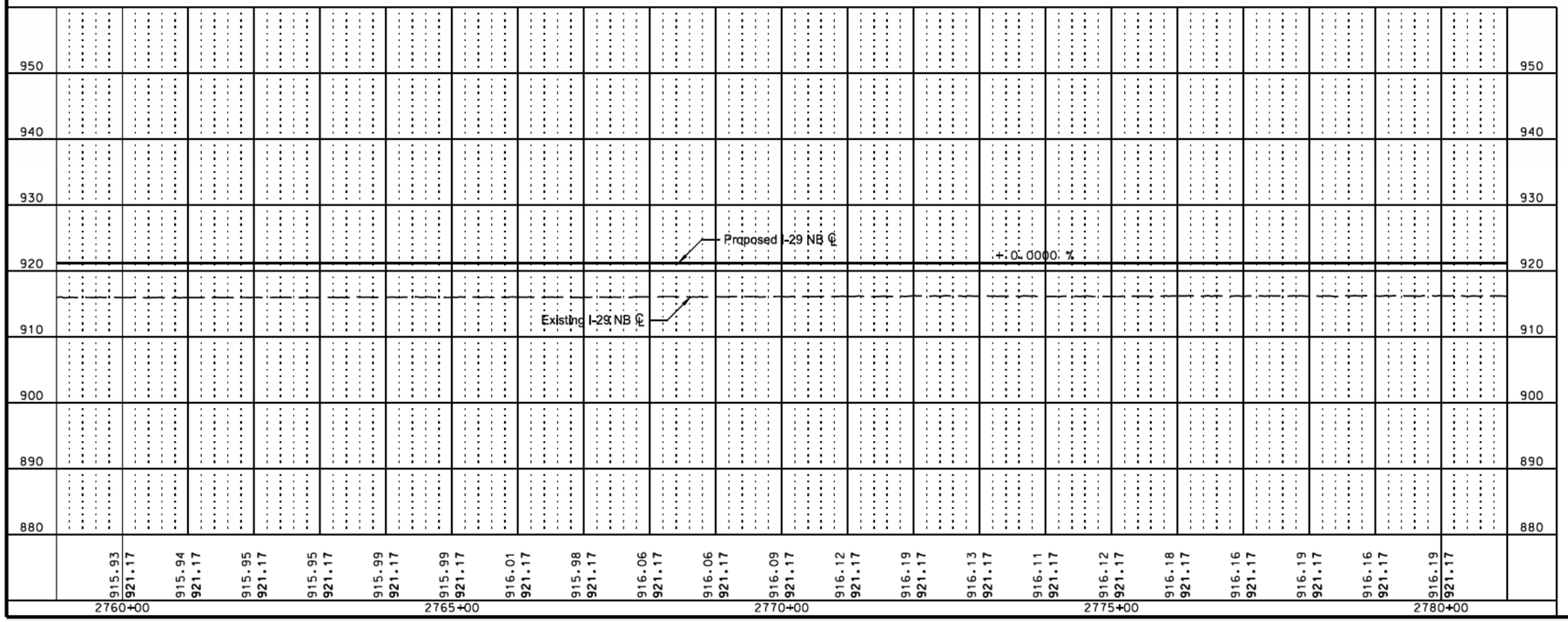
ND	FM DIV	60	17





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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2760+00 to Sta 2780+00

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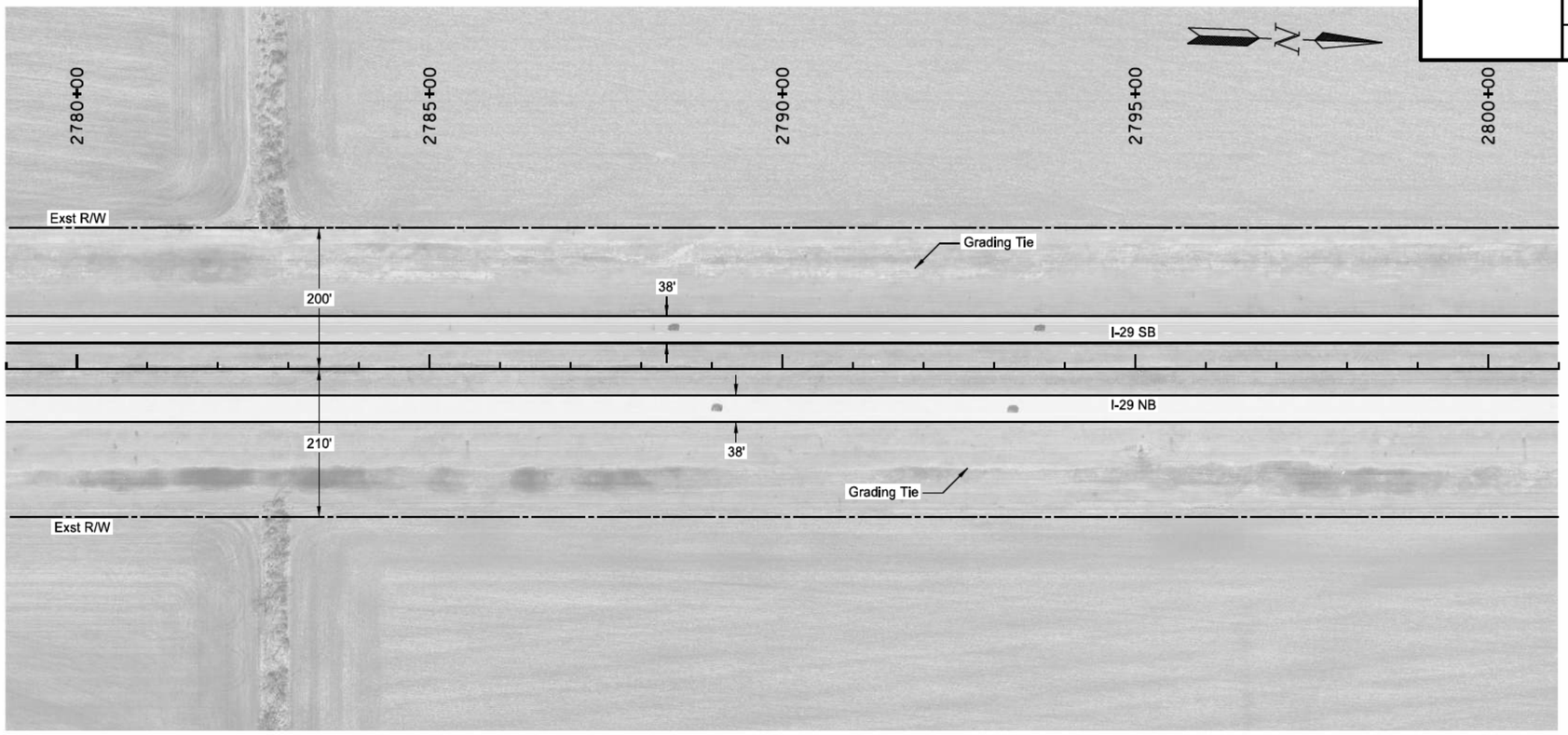

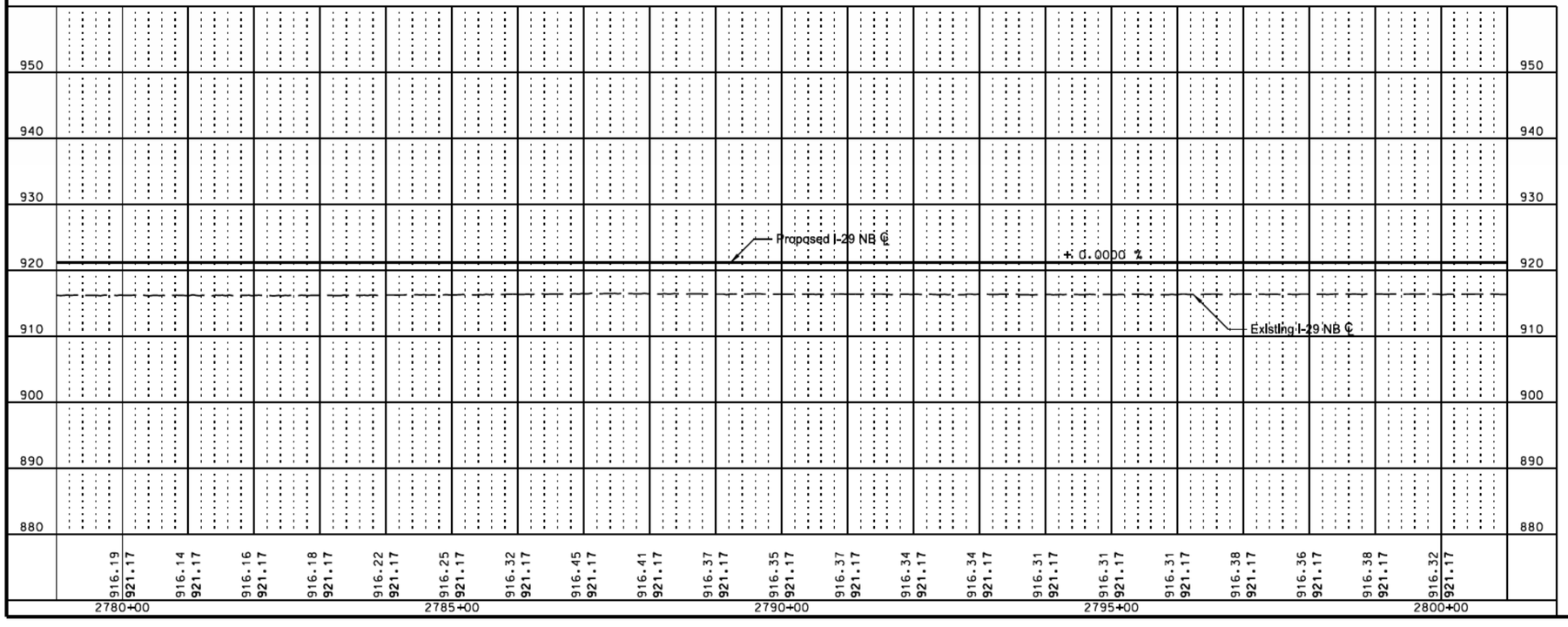

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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2780+00 to Sta 2800+00

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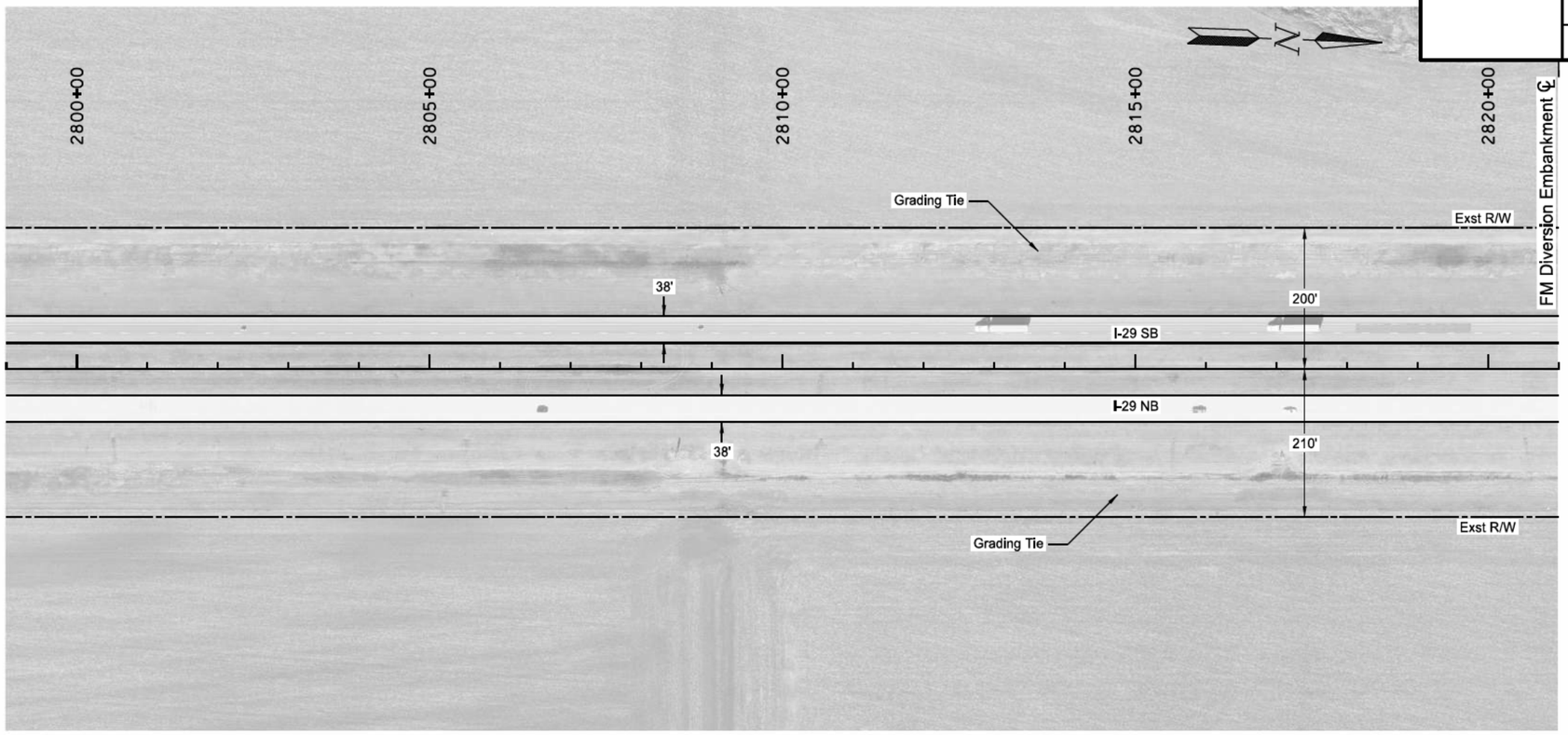
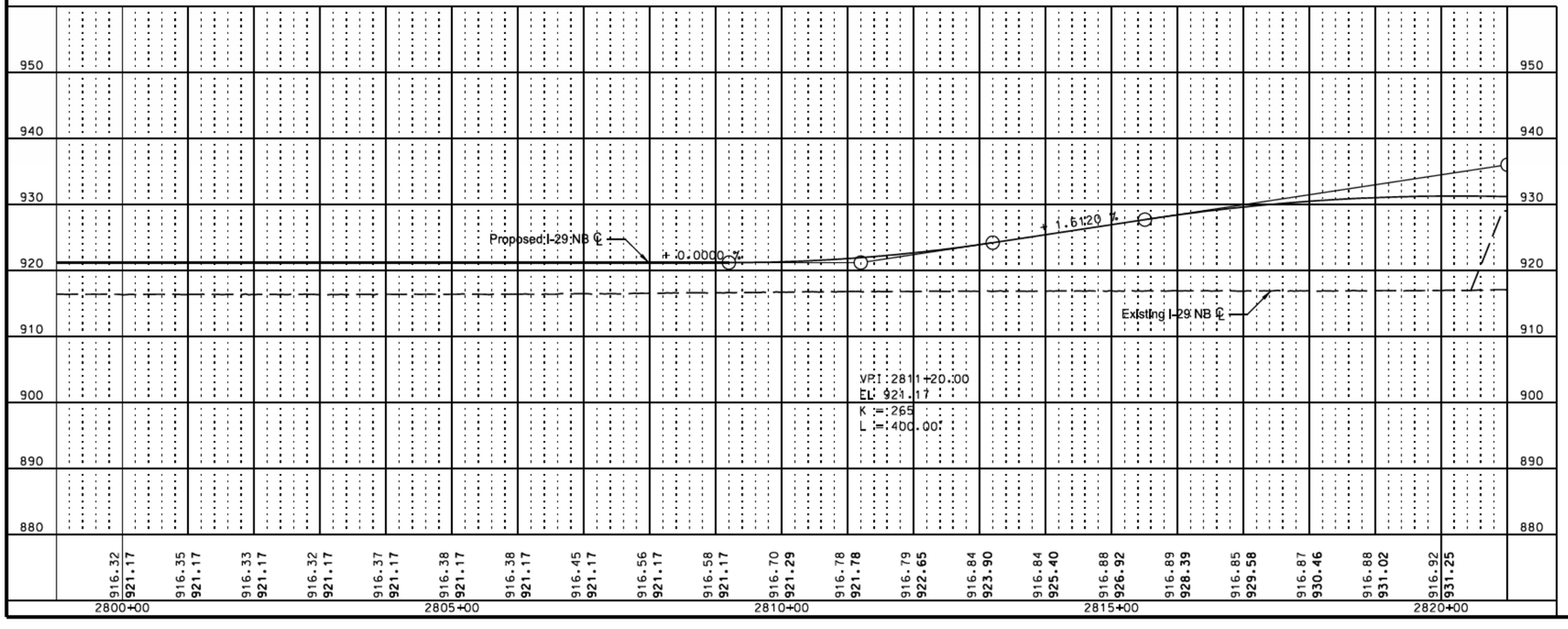
ND	FM DIV	60	19





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PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2800+00 to Sta 2820+00

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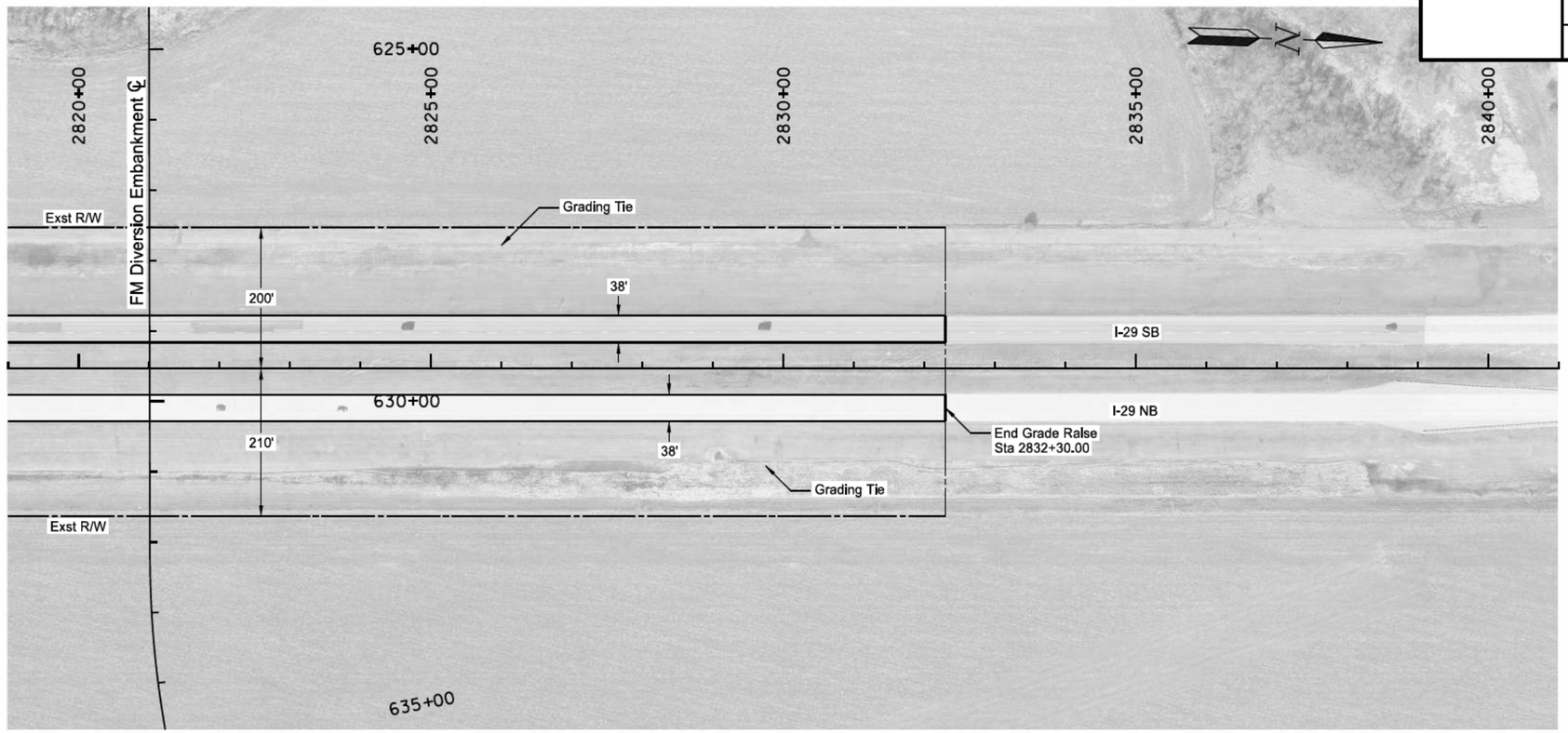
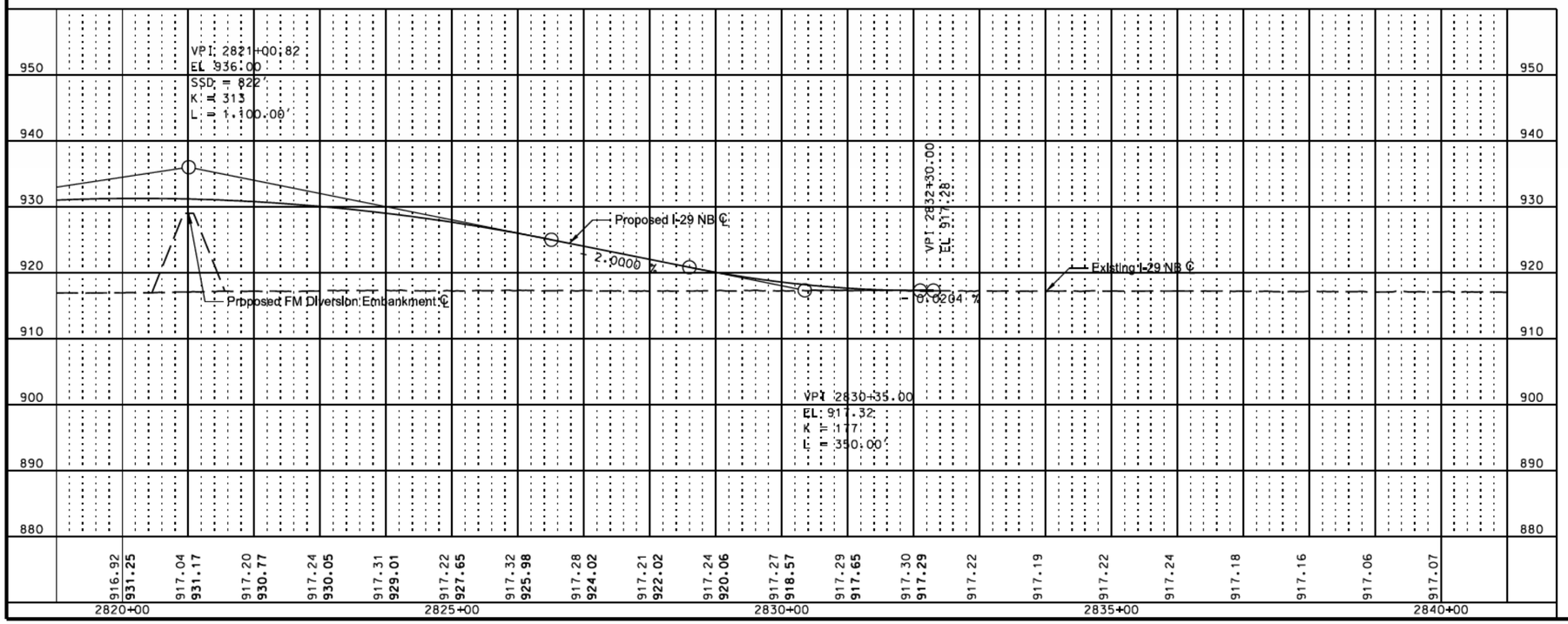
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	FM DIV	60	20





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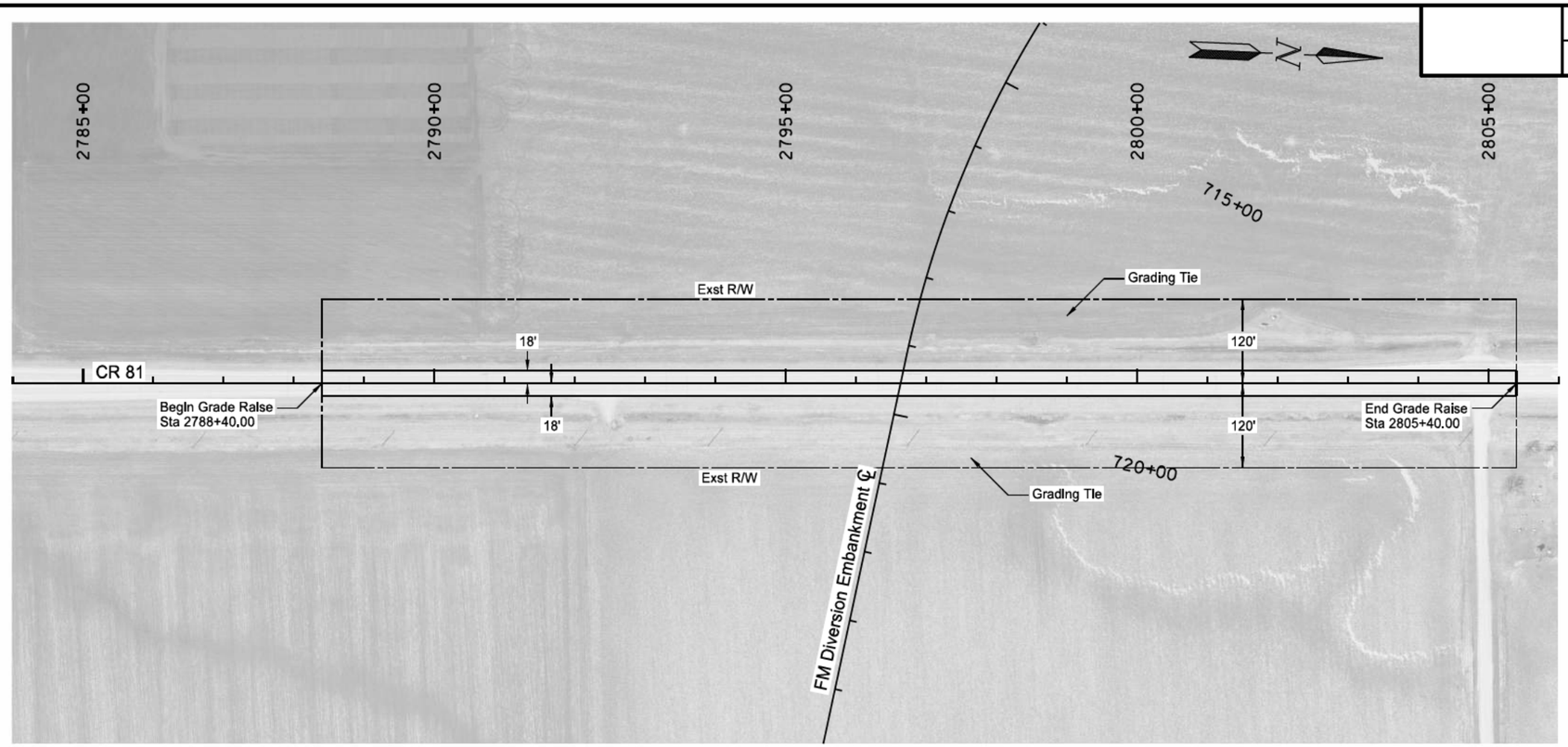
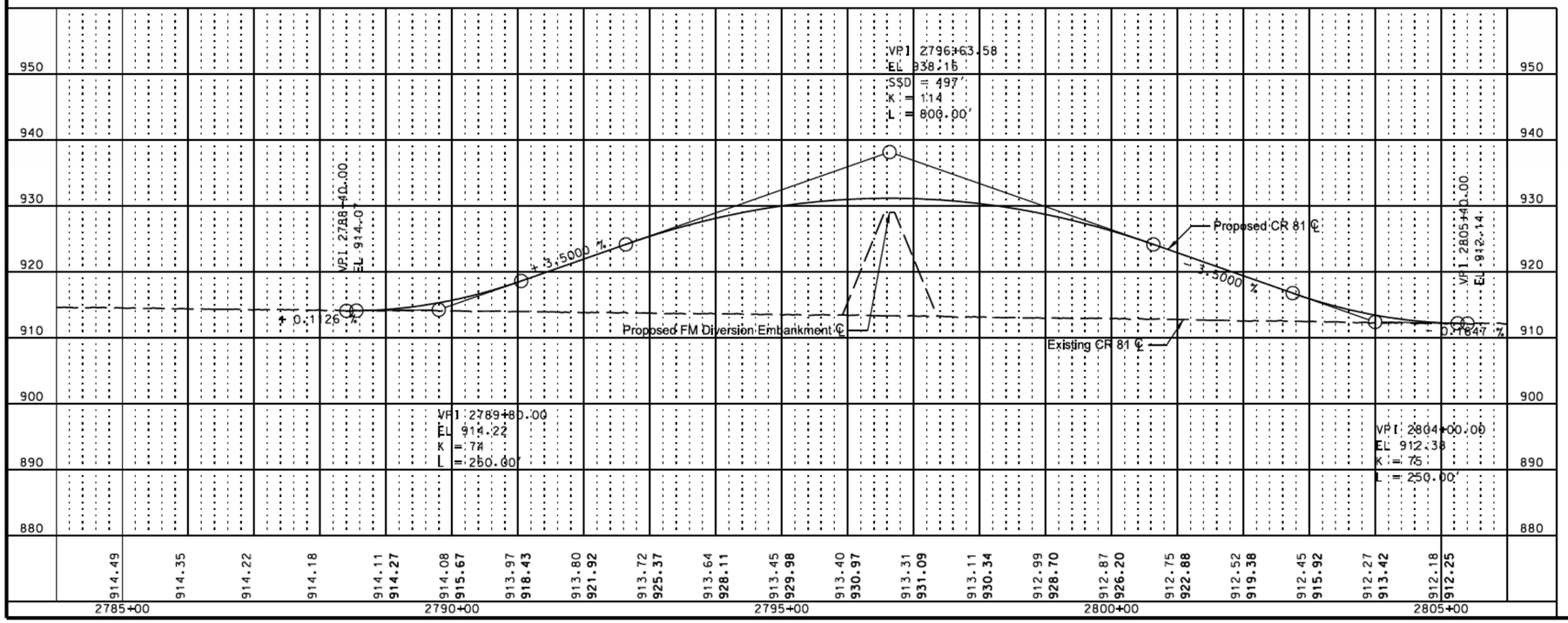
PRELIMINARY

Plan & Profile
Interstate 29

Plan B - Road Raises
Sta 2820+00 to Sta 2832+30

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	FM DIV	60	21





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PRELIMINARY

Plan & Profile
CR 81

Plan B - Road Raises
Sta 2788+40 to Sta 2805+40

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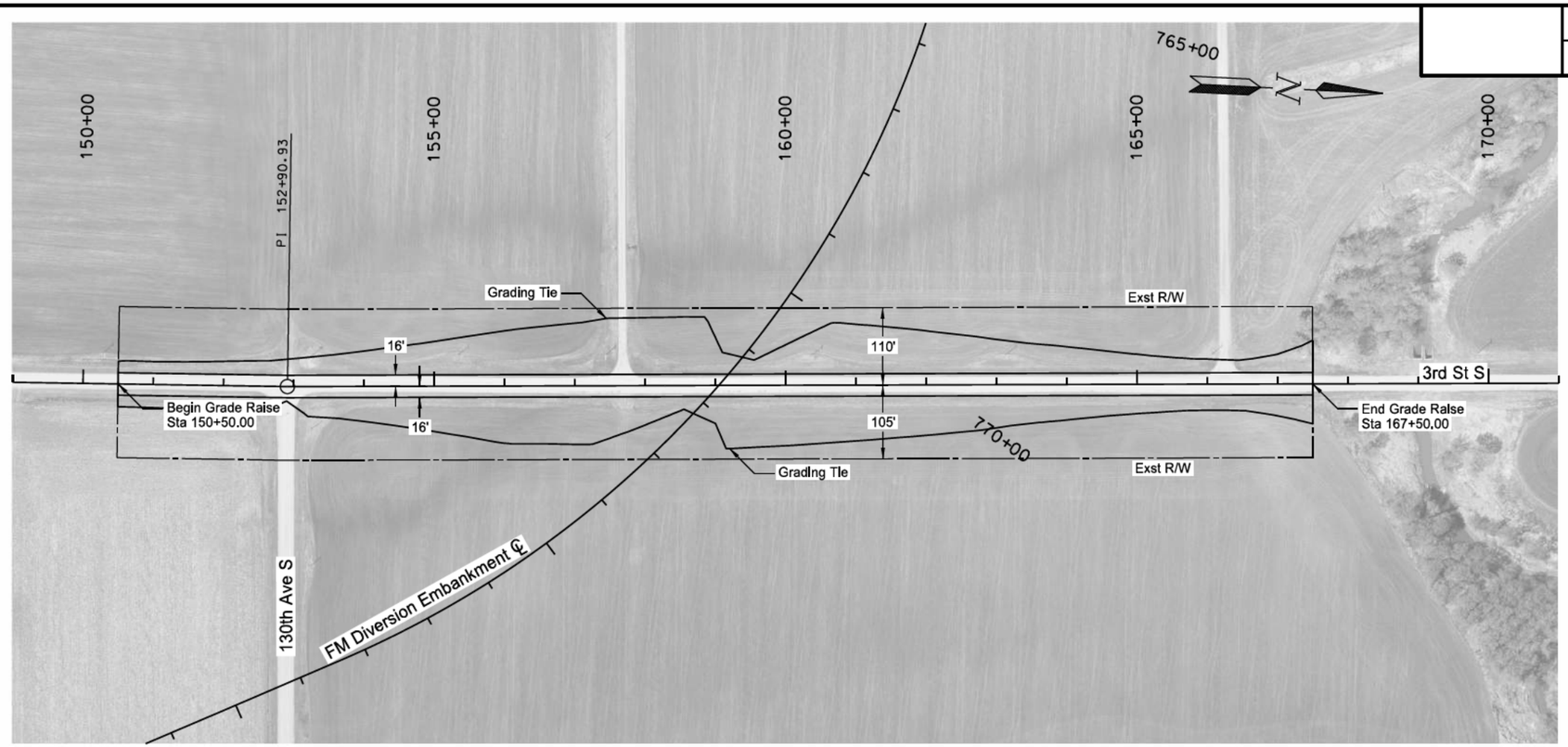
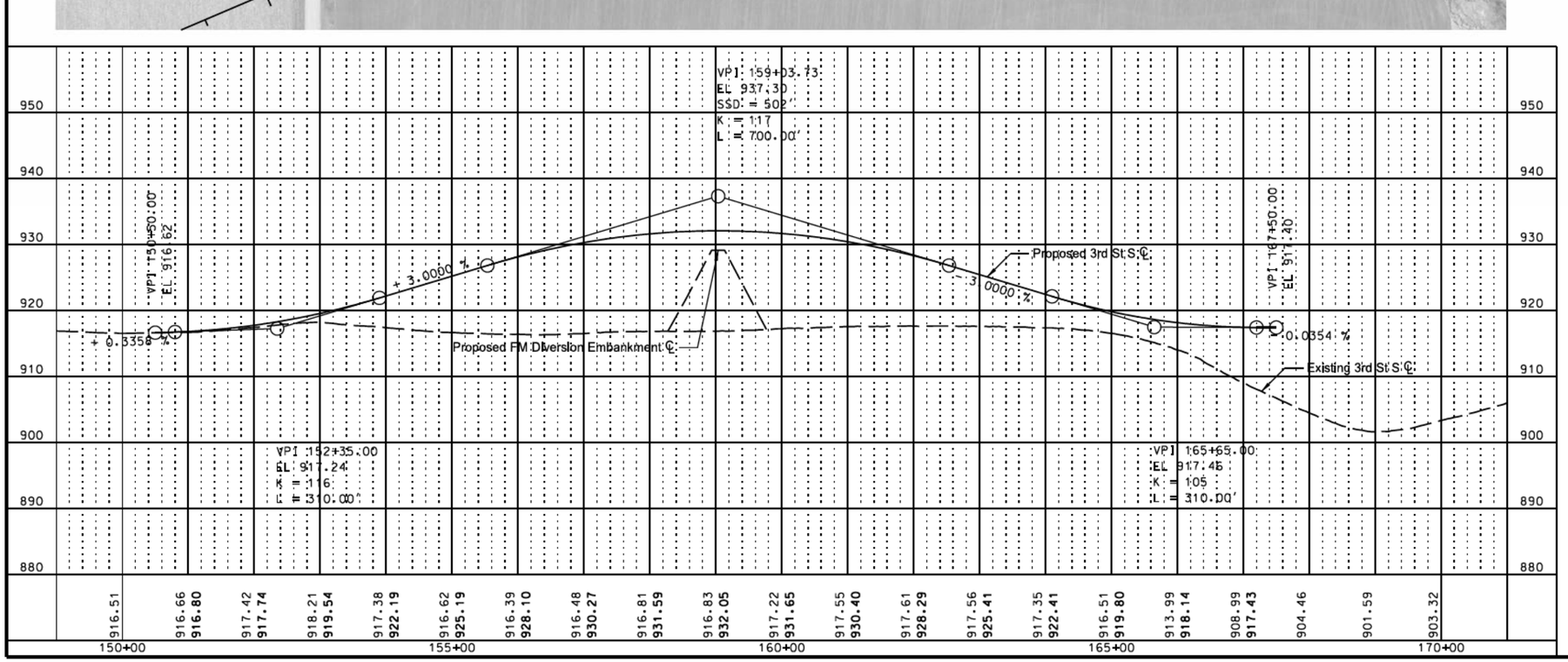
	ND	FM DIV	60	22





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PRELIMINARY

Plan & Profile
3rd St S

Plan B - Road Raises
Sta 150+50 to Sta 167+50

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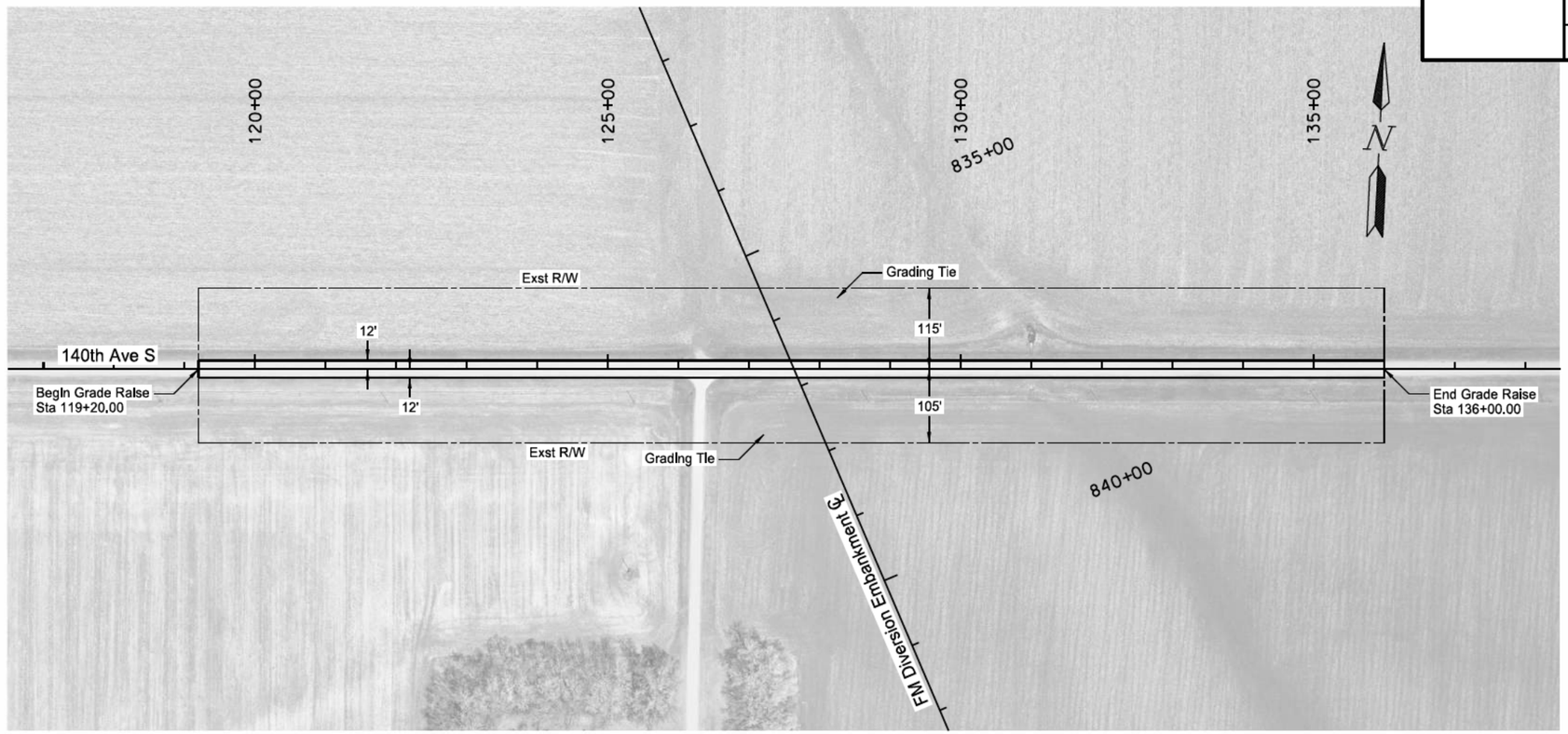
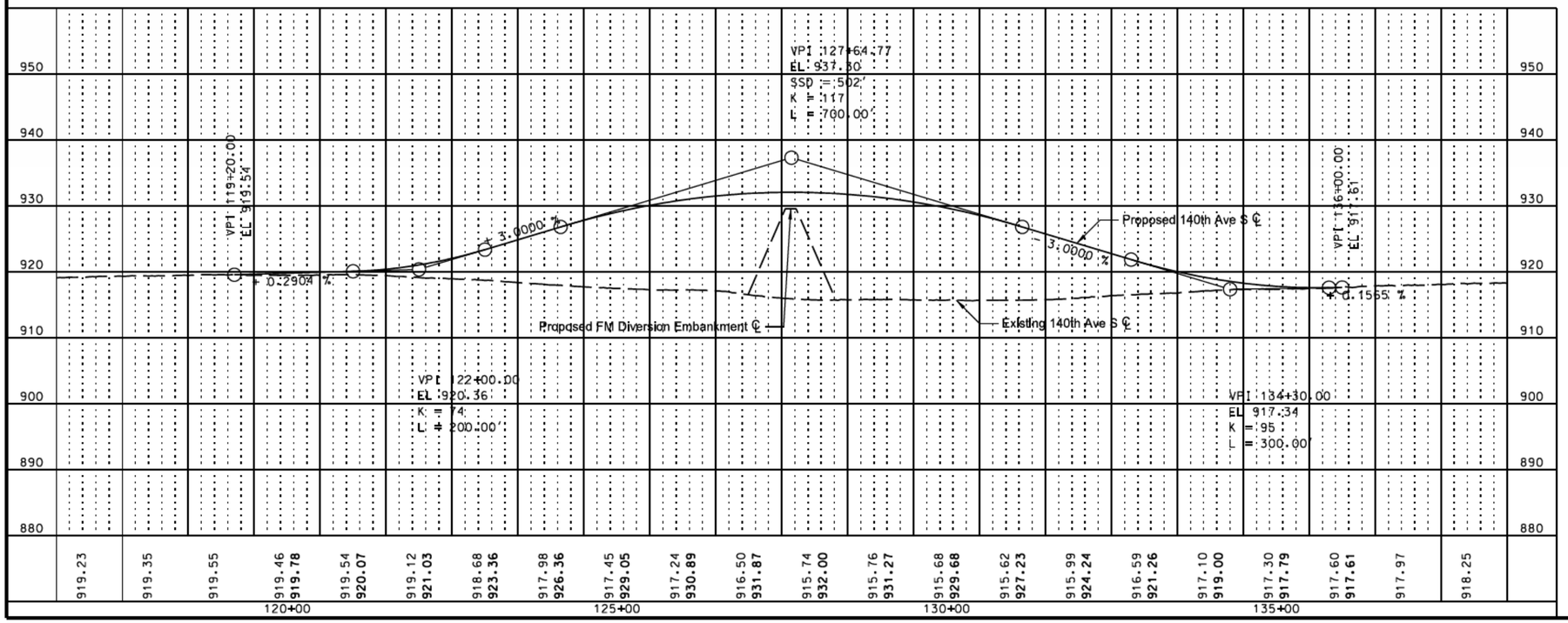
	ND	FM DIV	60	23





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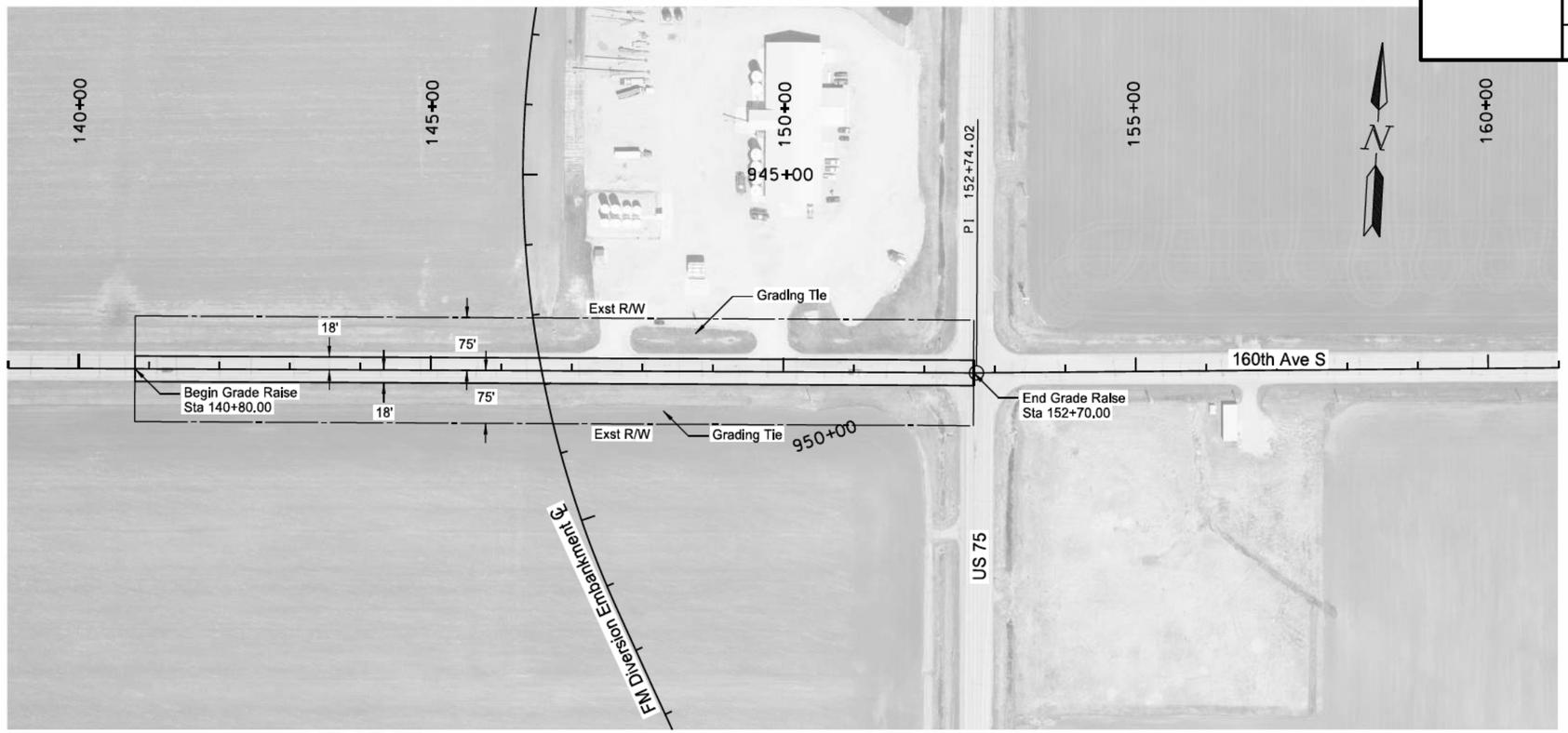
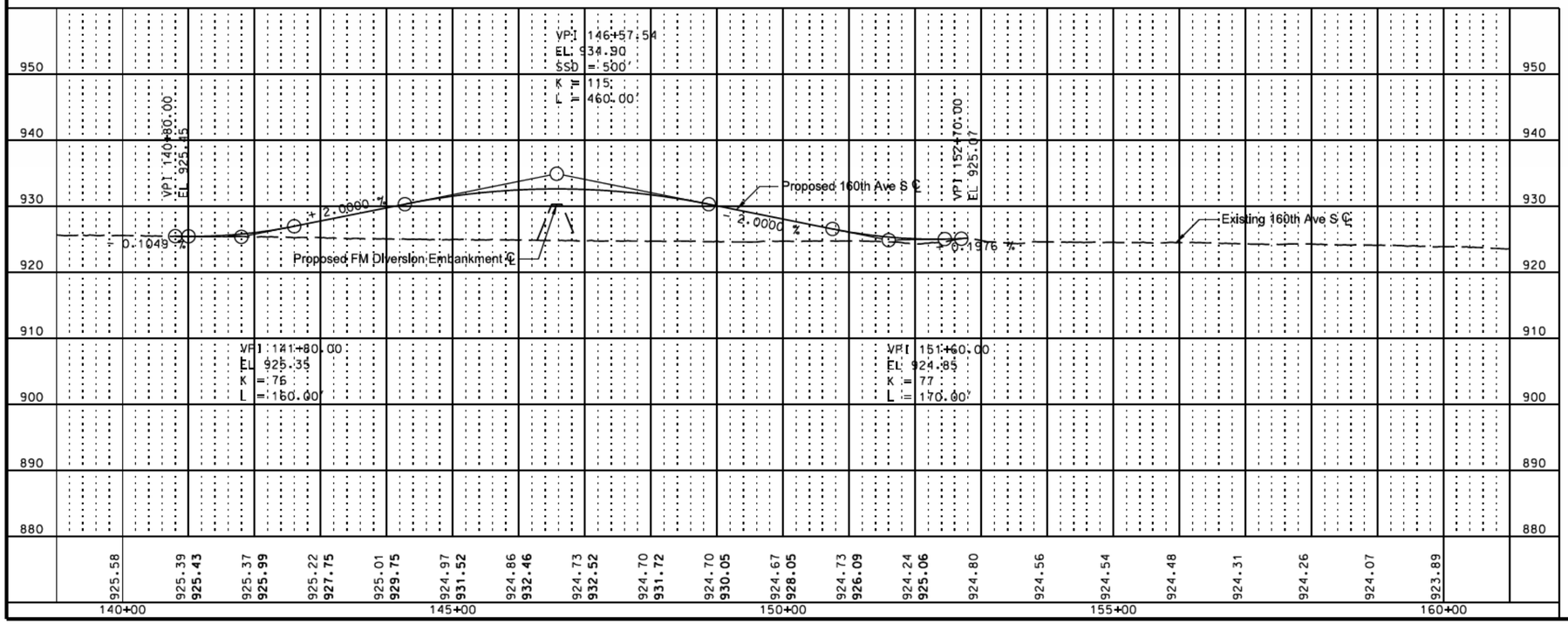
PRELIMINARY

Plan & Profile
140th Ave S

Plan B - Road Raises
Sta 119+20 to Sta 136+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	FM DIV	60	24





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PRELIMINARY

Plan & Profile
160th Ave S

Plan B - Road Raises
Sta 140+80 to Sta 152+70

Appendix B
Detailed Cost Estimate

FM DIV
Plan B - Road Raises

168th Avenue South East

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 3,000.00	L SUM	1	$ 3,000.00
201	0330	CLEARING & GURUBBING	$ 300.00	L SUM	1	$ 300.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	601	$ 6,010.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	28	$ 112.00
203	0109	TOPSOIL	$ 4.00	C Y	928	$ 3,712.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	7,175	$ 43,050.00
203	9999	APPROACH ROADWAY GRADING	$ 1,000.00	L SUM	1	$ 1,000.00
216	0100	WATER	$ 22.00	M GAL	75	$ 1,650.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	1.15	$ 402.50
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	1.15	$ 115.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	2.30	$ 3,680.00
260	9999	EROSION CONTROL	$ 5,000.00	L SUM	1	$ 5,000.00
302	0129	AGGREGATE BASE COURSE CL 7	$ 40.00	TON	601	$ 24,040.00
702	0100	MOBILIZATION	$ 15,000.00	L SUM	1	$ 15,000.00
704	9999	TRAFFIC CONTROL	$ 5,000.00	L SUM	1	$ 5,000.00
714	9999	LOCAL DRAINAGE (24" CULVERT)	$ 200.00	L F	60	$ 12,000.00
754	9999	PERMANENT SIGNING	$ 1,000.00	L SUM	1	$ 1,000.00
					Subtotal	$ 125,071.50
					Contingency (20%)	$ 25,014.00
					Total	$ 150,085.50

County Road 16/17

103	0100	CONTRACT BOND	$ 50,000.00	L SUM	1	$ 50,000.00
201	0330	CLEARING & GRUBBING	$ 5,000.00	L SUM	1	$ 5,000.00
203	0109	TOPSOIL	$ 4.00	C Y	11,350	$ 45,400.00
203	0140	BORROW-EXCAVATION	$ 6.00	C Y	261,000	$ 1,566,000.00
203	0180	ROADWAY OBLITERATION	$ 10.00	L F	13,200	$ 132,000.00
203	9999	APPROACH ROADWAY GRADING	$ 13,000.00	L SUM	1	$ 13,000.00
216	0100	WATER	$ 22.00	M GAL	3,680	$ 80,960.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	14	$ 4,900.00
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	14	$ 1,400.00
253	0101	STRAW MULCH	$ 350.00	ACRE	28	$ 9,800.00
260	9999	EROSION CONTROL	$ 15,000.00	L SUM	1	$ 15,000.00
302	0100	SALVAGED BASE COURSE	$ 10.00	TON	50,200	$ 502,000.00
401	0050	TACK COAT	$ 2.00	GAL	5,415	$ 10,830.00
430	0042	SUPERPAVE FAA 43	$ 30.00	TON	24,200	$ 726,000.00
430	5828	PG 58-28 ASPHALT CEMENT	$ 350.00	S Y	1,450	$ 507,500.00
550	0305	9IN NON-REINF CONCRETE PVMT CL AE-DOWELED	$ 75.00	S Y	5,983	$ 448,725.00
602	9999	BRIDGE	$ 4,950,000.00	L SUM	1	$ 4,950,000.00
702	0100	MOBILIZATION	$ 500,000.00	L SUM	1	$ 500,000.00
704	9999	TRAFFIC CONTROL	$ 15,000.00	L SUM	1	$ 15,000.00
714	9995	LOCAL DRAINAGE (36" CULVERT)	$ 300.00	L F	136	$ 40,800.00
714	9996	LOCAL DRAINAGE (48" CULVERT)	$ 350.00	L F	80	$ 28,000.00
714	9997	LOCAL DRAINAGE (60" CULVERT)	$ 450.00	L F	80	$ 36,000.00
714	9998	LOCAL DRAINAGE (10FT X 10FT RCBC)	$ 1,000.00	L F	80	$ 80,000.00
714	9999	LOCAL DRAINAGE (10FT X 10FT RCBC END SECTION)	$ 20,000.00	EA	2	$ 40,000.00
748	0120	CURB & GUTTER MOUNTABLE-TYPE I	$ 35.00	L F	3,534	$ 123,690.00
748	0140	CURB & GUTTER-TYPE I	$ 30.00	L F	440	$ 13,200.00
750	0200	CONCRETE MEDIAN PAVING	$ 70.00	S Y	1,188	$ 83,160.00
754	9999	PERMANENT SIGNING	$ 35,000.00	L SUM	1	$ 35,000.00
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	$ 800.00	MILE	5.4	$ 4,320.00
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	$ 800.00	MILE	2.7	$ 2,160.00
760	0010	RUMBLE STRIPS - INTERSECTION	$ 3,000.00	SET	2	$ 6,000.00
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	$ 0.50	L F	65,000	$ 32,500.00
770	0001	LIGHTING SYSTEM	$ 100,000.00	EA	1	$ 100,000.00
					Subtotal	$ 10,208,345.00
					Contingency (20%)	$ 2,041,669.00
					Total	$ 12,250,014.00

FM DIV
Plan B - Road Raises

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL

County Road 16 (East)

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 5,000.00	L SUM	1	$ 5,000.00
201	0330	CLEARING & GURUBBING	$ 500.00	L SUM	1	$ 500.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	7,211	$ 72,110.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	4	$ 16.00
203	0109	TOPSOIL	$ 4.00	C Y	2,613	$ 10,452.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	67,500	$ 405,000.00
203	9999	APPROACH ROADWAY GRADING	$ 1,000.00	L SUM	1	$ 1,000.00
216	0100	WATER	$ 22.00	M GAL	647	$ 14,234.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	3.24	$ 1,134.00
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	3.24	$ 324.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	6.48	$ 10,368.00
260	9999	EROSION CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
302	0100	SALVAGED BASE COURSE	$ 10.00	TON	4,955	$ 49,550.00
401	0050	TACK COAT	$ 2.00	GAL	606	$ 1,212.00
401	0060	PRIME COAT	$ 3.50	GAL	1,612	$ 5,642.00
430	0043	SUPERPAVE FAA 43	$ 30.00	TON	2,600	$ 78,000.00
430	5828	PG 58-28 ASPHALT CEMENT	$ 350.00	TON	155	$ 54,250.00
702	0100	MOBILIZATION	$ 20,000.00	L SUM	1	$ 20,000.00
704	9999	TRAFFIC CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	$ 2.00	S Y	8,702	$ 17,404.00
714	9997	LOCAL DRAINAGE (48" CULVERT)	$ 350.00	L F	232	$ 81,200.00
714	9998	LOCAL DRAINAGE (10FT X 10FT RCBC)	$ 1,000.00	L F	184	$ 184,000.00
714	9999	LOCAL DRAINAGE (10FT X 10FT RCBC END SECTION)	$ 20,000.00	EA	2	$ 40,000.00
754	9999	PERMANENT SIGNING	$ 1,500.00	L SUM	1	$ 1,500.00
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	$ 800.00	MILE	0.6	$ 480.00
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	$ 0.50	L F	3,589	$ 1,794.50
					Subtotal	$ 1,075,170.50
					Contingency (20%)	$ 215,034.00
					Total	$ 1,290,204.50

I-29

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 70,600.00	L SUM	1	$ 70,600.00
201	0330	CLEARING & GURUBBING	$ 3,900.00	L SUM	1	$ 3,900.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	183,684	$ 1,836,840.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	2,633	$ 10,532.00
203	0109	TOPSOIL	$ 4.00	C Y	63,688	$ 254,752.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	650,000	$ 3,900,000.00
216	0100	WATER	$ 22.00	M GAL	8,009	$ 176,198.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	78.95	$ 27,632.50
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	78.95	$ 7,895.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	157.90	$ 252,640.00
260	9999	EROSION CONTROL	$ 138,400.00	L SUM	1	$ 138,400.00
302	0100	SALVAGED BASE COURSE	$ 10.00	TON	88,836	$ 888,360.00
550	0105	6IN NON-REINF CONCRETE PAVEMENT CL AE	$ 60.00	S Y	11,159	$ 669,540.00
550	0320	12IN NON-REINF CONCRETE PVMT CL AE-DOWELED	$ 75.00	S Y	83,689	$ 6,276,675.00
602	9999	BRIDGE	$ 4,500,000.00	EA	3	$ 13,500,000.00
702	0100	MOBILIZATION	$ 172,300.00	L SUM	1	$ 172,300.00
704	9998	TEMPORARY BYPASS	$ 14,000,000.00	L SUM	1	$ 14,000,000.00
704	9999	TRAFFIC CONTROL	$ 102,400.00	L SUM	1	$ 102,400.00
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	$ 2.00	S Y	187,578	$ 375,156.00
754	9999	PERMANENT SIGNING	$ 37,800.00	L SUM	1	$ 37,800.00
760	0001	RUMBLE STRIPS - CONCRETE SHOULDER	$ 1,600.00	MILE	14.3	$ 22,880.00
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	$ 0.50	L F	84,735	$ 42,367.50
764	0131	W-BEAM GUARDRAIL	$ 45.00	L F	1,440	$ 64,800.00
764	0145	W-BEAM GUARDRAIL END TERMINAL	$ 2,500.00	EA	6	$ 15,000.00
					Subtotal	$ 42,846,668.00
					Contingency (20%)	$ 8,569,334.00
					Total	$ 51,416,002.00

FM DIV

Plan B - Road Raises

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL

CR 81

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 5,300.00	L SUM	1	$ 5,300.00
201	0330	CLEARING & GURUBBING	$ 500.00	L SUM	1	$ 500.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	7,685	$ 76,850.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	14	$ 56.00
203	0109	TOPSOIL	$ 4.00	C Y	2,846	$ 11,384.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	82,000	$ 492,000.00
203	9999	APPROACH ROADWAY GRADING	$ 1,000.00	L SUM	1	$ 1,000.00
216	0100	WATER	$ 22.00	M GAL	770	$ 16,940.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	3.53	$ 1,235.50
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	3.53	$ 353.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	7.06	$ 11,296.00
260	9999	EROSION CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
302	0100	SALVAGED BASE COURSE	$ 10.00	TON	5,281	$ 52,810.00
401	0050	TACK COAT	$ 2.00	GAL	646	$ 1,292.00
401	0060	PRIME COAT	$ 3.50	GAL	1,718	$ 6,013.00
430	0043	SUPERPAVE FAA 43	$ 30.00	TON	2,780	$ 83,400.00
430	5828	PG 58-28 ASPHALT CEMENT	$ 350.00	TON	170	$ 59,500.00
702	0100	MOBILIZATION	$ 20,000.00	L SUM	1	$ 20,000.00
704	9999	TRAFFIC CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	$ 2.00	S Y	9,275	$ 18,550.00
754	9999	PERMANENT SIGNING	$ 1,500.00	L SUM	1	$ 1,500.00
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	$ 800.00	MILE	0.6	$ 480.00
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	$ 0.50	L F	6,800	$ 3,400.00
					Subtotal	$ 883,859.50
					Contingency (20%)	$ 176,772.00
					Total	$ 1,060,631.50

3rd St S

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 10,000.00	L SUM	1	$ 10,000.00
201	0330	CLEARING & GURUBBING	$ 1,500.00	L SUM	1	$ 1,500.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	1,950	$ 19,500.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	19	$ 76.00
203	0109	TOPSOIL	$ 4.00	C Y	2,676	$ 10,704.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	68,000	$ 408,000.00
203	9999	APPROACH ROADWAY GRADING	$ 1,000.00	L SUM	1	$ 1,000.00
216	0100	WATER	$ 22.00	M GAL	715	$ 15,730.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	3.32	$ 1,162.00
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	3.32	$ 332.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	6.64	$ 10,624.00
260	9999	EROSION CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
302	0129	AGGREGATE BASE COURSE CL 7	$ 40.00	TON	1,950	$ 78,000.00
702	0100	MOBILIZATION	$ 20,000.00	L SUM	1	$ 20,000.00
704	9999	TRAFFIC CONTROL	$ 5,000.00	L SUM	1	$ 5,000.00
714	9999	LOCAL DRAINAGE (60" CULVERT)	$ 450.00	L F	184	$ 82,800.00
754	9999	PERMANENT SIGNING	$ 1,500.00	L SUM	1	$ 1,500.00
					Subtotal	$ 675,928.00

FM DIV
Plan B - Road Raises

140th Ave S

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 5,300.00	L SUM	1	$ 5,300.00
201	0330	CLEARING & GURUBBING	$ 500.00	L SUM	1	$ 500.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	995	$ 9,950.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	16	$ 64.00
203	0109	TOPSOIL	$ 4.00	C Y	2,898	$ 11,592.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	67,000	$ 402,000.00
216	0100	WATER	$ 22.00	M GAL	562	$ 12,364.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	3.59	$ 1,256.50
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	3.59	$ 359.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	7.18	$ 11,488.00
260	9999	EROSION CONTROL	$ 10,000.00	L SUM	1	$ 10,000.00
302	0129	AGGREGATE BASE COURSE CL 7	$ 40.00	TON	995	$ 39,800.00
702	0100	MOBILIZATION	$ 20,000.00	L SUM	1	$ 20,000.00
704	9999	TRAFFIC CONTROL	$ 5,000.00	L SUM	1	$ 5,000.00
714	9999	LOCAL DRAINAGE (60" CULVERT)	$ 450.00	L F	320	$ 144,000.00
754	9999	PERMANENT SIGNING	$ 1,500.00	L SUM	1	$ 1,500.00
					Subtotal	$ 675,173.50
					Contingency (20%)	$ 135,035.00
					Total	$ 810,208.50

160th Ave S

SPEC	CODE	ITEM DESCRIPTION	UNIT COST	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	$ 3,700.00	L SUM	1	$ 3,700.00
201	0330	CLEARING & GURUBBING	$ 400.00	L SUM	1	$ 400.00
202	0136	REMOVAL OF PAVEMENT	$ 10.00	TON	5,380	$ 53,800.00
203	0101	COMMON EXCAVATION - TYPE A	$ 4.00	C Y	34	$ 136.00
203	0109	TOPSOIL	$ 4.00	C Y	1,125	$ 4,500.00
203	0140	BORROW - EXCAVATION	$ 6.00	C Y	17,500	$ 105,000.00
203	9999	APPROACH ROADWAY GRADING	$ 2,000.00	L SUM	1	$ 2,000.00
216	0100	WATER	$ 22.00	M GAL	220	$ 4,840.00
251	0200	SEEDING CLASS II	$ 350.00	ACRE	1.39	$ 486.50
251	2000	TEMPORARY COVER CROP	$ 100.00	ACRE	1.39	$ 139.00
253	0201	HYDRAULIC MULCH	$ 1,600.00	ACRE	2.78	$ 4,448.00
260	9999	EROSION CONTROL	$ 15,400.00	L SUM	1	$ 15,400.00
302	0100	SALVAGED BASE COURSE	$ 10.00	TON	3,698	$ 36,980.00
401	0050	TACK COAT	$ 2.00	GAL	505	$ 1,010.00
401	0060	PRIME COAT	$ 3.50	GAL	1,335	$ 4,672.50
430	0043	SUPERPAVE FAA 43	$ 30.00	TON	1,683	$ 50,490.00
430	5828	PG 58-28 ASPHALT CEMENT	$ 350.00	TON	101	$ 35,350.00
702	0100	MOBILIZATION	$ 17,400.00	L SUM	1	$ 17,400.00
704	9999	TRAFFIC CONTROL	$ 6,800.00	L SUM	1	$ 6,800.00
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	$ 2.00	S Y	6,492	$ 12,984.00
714	9999	LOCAL DRAINAGE (48" CULVERT)	$ 350.00	L F	304	$ 106,400.00
754	9999	PERMANENT SIGNING	$ 1,300.00	L SUM	1	$ 1,300.00
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	$ 800.00	MILE	0.5	$ 400.00
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	$ 0.50	L F	4,760	$ 2,380.00
					Subtotal	$ 471,016.00
					Contingency (20%)	$ 94,203.00
					Total	$ 565,219.00

Unit Legend
L SUM - Lump Sum
C Y – Cubic Yards
M Gal - Thousand Gallons
L F – Lineal Foot
S F – Square Foot