

## IOWA DEPARTMENT OF TRANSPORTATION

**TO OFFICE:** District 6  
**DATE:** May 6, 2015  
**ATTENTION:** Jim Schnoebelen  
**REF. :** Dubuque County  
**FROM:** Kevin K. Patel  
STP-052-2(121)--2C-31  
PIN: 10-31-052-020-04  
**OFFICE:** Design  
**SUBJECT:** Field Exam (D2)

A field exam was held on Wednesday, April 22<sup>nd</sup>, 2015 to review the proposed project for the reconstruction of U.S. 52 from Holy Cross to Luxemburg.

Those present for the field exam included the following: Doug McDonald and Art Gourley from District 6; Yan Jia, Dustin Skogerboe, Amy Schleier and Kevin Patel from the Office of Design; Dave Widick and Jeff Larson from the Office of Right of Way, and Mark Sloppy from the Office of Location and Environment.

U.S. 52 is functionally classified as an “area development” route and is a service level “B” roadway. The 2018 and 2038 ADT is estimated to be 2,500 vpd and 2,800 vpd with 11% truck traffic respectively.

The proposed project will extend from Tollgate Road in Holy Cross, west to the east city limits of Luxemburg, a distance of approximately 4.1 miles. The existing mainline pavement will be removed and reconstructed with 28 ft. wide, 9.5 inch thick PCC pavement including a safety edge, over 12 inches of modified subbase. Granular shoulders 4 ft. wide along with 4:1 foreslopes and longitudinal subdrains will be provided. There will be various locations throughout the project corridor that will use 5 ft. wide paved shoulders with a 6” sloped faced curb in order to minimize right of way impacts.

The existing horizontal and vertical alignment will generally be used as constructed. There are 3 crest vertical curves and 3 sag vertical curves that do not meet the acceptable K values. There are also 3 locations where the grades (5.6%, 6.0% and 5.7%) exceed the acceptable maximum grade of 5%. The vertical curves and steep grades will require a design exception for not meeting the department’s minimum acceptable criteria for a 55 mph design speed. The design exception will also include the proposed 6’ effective (2’ paved and 4’ granular) shoulders. The department recommends 10’ wide effective (4’ paved and 6’ granular) shoulders be used for NHS routes.

There are 5 paved side roads that will be impacted by the project. The typical sections for these roadways should be reviewed with the County Engineer.

The entrance at Station 927 +58, left side, was discussed. This entrance has poor sight distance due to the crest vertical curve to the west. This property owner received an additional entrance to the east to improve the safety, with the intent that the west entrance would be eliminated; however, the property owner failed to remove the west entrance. As

part of this project, the removal of the west entrance should be pursued.

There is a horizontal curve at Station 1019+84 that has had 7 crashes within a 3 year period. There is a crest vertical curve just east of the horizontal curve that is thought to restrict westbound motorists' views of the upcoming curve. Although the crest vertical curve does meet current criteria it should be reviewed and flattened to improve the sight distance of the approaching curve.

There are numerous buildings that are very close to the existing right of way line. During the field exam it was discussed that it would be advantageous to have the District survey crew provide a station/offset to the location of these buildings to determine the impacts from the project. After the field exam, it was determined that this information was gathered during the initial survey so therefore, information from the District survey crew will not be necessary.

During construction, traffic will be maintained via an off-site detour. The suggested detour route is IA 136 south from Luxemburg approximately 10 miles to the intersection with U.S. 20, then east on U.S. 20 for approximately 26 miles to the intersection with U.S. 52. The out of distance travel is approximately 10 miles. The contractor will be required to maintain access to property owners during construction.

Right of way will be required.

The field exam plan sheets may be viewed as pdf files at:

PW:\\projectwise.dot.int.lan:PWMMain\Documents\Projects\3105202010\Design\\_ (121)\_Sec4\ Design Events\D2\D2\_31052121\_plan.pdf

This project is currently scheduled for a January 2019 letting. The concept cost for this project was \$7,854,000. The current cost estimate is now estimated to be \$6,353,800.

KKP:lls

M. J. Sankey	S. J. Gent	S. Flockhart
M. J. Kennerly	D. A. Widick	W. Sorenson
D. L. Maifield	T. L. Gettings	E. C. Wright
Y. Jia	J. P. Rost	K. D. Nicholson
D. Skogerboe	S. C. Marler	J. E. Laaser-Webb
T. Crouch	L. C. Funnell	K. Yanna
D. R. Tebben	M. D. Masteller	J. Larson
M. A. Swenson	C. B. Brakke	P.C. Keen
N. L. McDonald	D. A. Popp	B. Bradley
G. A. Novey	D. R. Claman	J. McCollough
S. P. Anderson	B. Hofer	M. Sloppy
A. Gourley	D. McDonald	D. R. Tebben
H. Holak	J. R. Schoenrock	W. N. Cameron
Z. T. Bitting	K. Brink	V. Brewer
J. Garton	A. Schleier	

**DUBUQUE CO.**

PCC PAVEMENT - GRADE AND NEW  
STP-052-2(121)--2C-31

LETTING DATE  
1/16/2019



**Highway Division**

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

**DUBUQUE COUNTY**

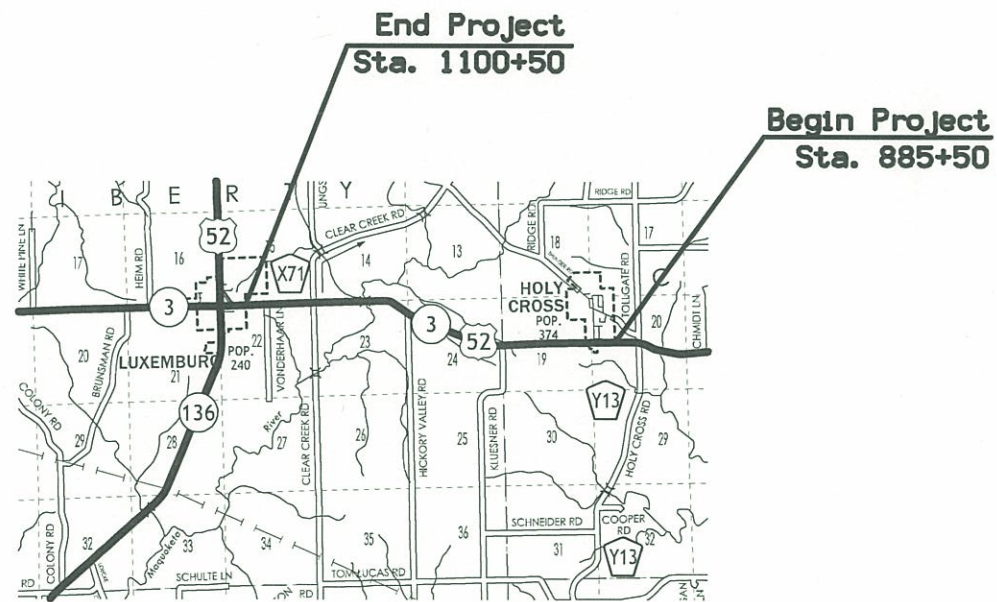
PCC PAVEMENT - GRADE AND ~~NEW~~ *Replace*

From Tollgate Rd. (Co. Rd. Y-13) N. To The ECL Of Luxemburg

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.  
Value Engineering Saves. Refer to Article 1105.15 of the Specifications.

*BLM  
4-29-15*



*Art Gourley } District  
Doug McDonald }  
Dave Widick } ROW  
Jeff Larson }  
Dustin Skogerboe } Design  
Yan Jia }  
Amy Schleier }  
Kevin Patel }  
Mark Sloppy - OLE*

DESIGN DATA BBBAN			
2018	AADT	2488	V.P.D.
2038	AADT	2761	V.P.D.
20--	DHV	--	V.P.H.
	TRUCKS	--	%
	Total		
	Design ESALs	--	

REVISIONS

TOTAL
PROJECT IDENTIFICATION NUMBER
10-31-052-020-04
PROJECT NUMBER
STP-052-2(121)--2C-31
R.O.W. PROJECT NUMBER
STPN-052-2(124)--2J-31

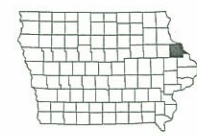
INDEX OF SHEETS	
No.	DESCRIPTION
<b>A Sheets</b>	<b>Title Sheets</b>
A.1	Title Sheet
A.2 - 5	Questions/Locations of Concern & Design Criteria
A.6 - 12	Project Concept
<b>B Sheets</b>	<b>Typical Cross Sections and Details</b>
B.1 - 2	Typical Cross Sections and Details
<b>D Sheets</b>	<b>Mainline Plan and Profile Sheets</b>
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2 - 9	US 52 Plan & Profile - Segment 4
<b>E Sheets</b>	<b>Side Road Plan and Profile Sheets</b>
* E.1	Main Street & Kluesner Road
* E.2	Hickory Valley Road & Clear Creek Road
* E.3	Vonderhaar Lane
<b>G Sheets</b>	<b>Survey Sheets</b>
G.1	Survey Information & GPS Project Controls
G.2	GPS Project Control Map
<b>J Sheets</b>	<b>Traffic Control and Staging Sheets</b>
* J.1	Traffic Control Plan
* J.2	Detour Map
<b>W Sheets</b>	<b>Mainline Cross Sections</b>
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 74	Mainline Cross Sections
<b>X Sheets</b>	<b>Side Road Cross Sections</b>
X.1 - 10	Side Road Cross Sections
	* Color Plan Sheets

D3 PLAN - Date: 06/19/2015  
D5 PLAN - Date: 12/15/2015  
D8 PLAN - Date: 11/06/2018  
SECTION 3 LETTING - Date: 01/17/2018  
SECTION 2 LETTING - Date: 01/15/2020  
SECTION 1 LETTING - Date: 01/20/2021

**PRELIMINARY PLANS**

Subject to change by final design.

D2 PLAN - Date: 04/22/2015



## Questions/Locations of Concern:

- 1) Lower profile for curve from Sta. 885+75 - Sta. 890+25? Enough existing ROW
- 2) Look at drainage in area encompassing Main St. Intersection
  - Impacts to pipe outlets in North ditch need to be considered
  - Look at Intake and pipe outlet along south ditch
  - Check drainage pattern in NW quadrant of Main St./US 52 Intersection
- 3) Check Sight Distance of Entrance at Sta. 926+00 (looking east) - *School bus stop*
  - Possible to flatten vertical geometry?
- 4) Line up entrances at Sta. 1004+84 & 1005+12?
- 5) Discuss Hickory Valley Road SE Return Design (Drainage) *ROW dependant*
  - Lengthen vertical curve at Sta. 1013+50 to allow better sight distance of upcoming horizontal curve?
- 6) Line up entrances at Sta. 1083+40 & Sta. 1084+10?
- 7) Look at proposed curb west of Vonderhaar Lane; Intersection Design/Drainage?
- 8) Evaluate Stopping Sight Distance/Vertical Curve flattening at Vonderhaar Lane
- 9) Verify EOP at Luxemburg

## Estimated Earthwork Quantities:

Total Cut = 104,000 CY  
Total Fill+30% = 18,000 CY  

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Total Waste = 86,000 CY

- OK

### Notes:

(1) 2% on the outside 2' as it will be paved with the mainline. 4% on the 4' granular shoulder.

(2) From Sta. 885+50 to Sta. 916+00 there was a series of vertical curves of which 5 (3 crest and 2 sag) curves do not meet 55 mph design speed. There is also a sag curve at Sta. 1089+75 that does not meet 55 mph design speed. Improving these curves to current standard would involve significant earthwork and/or major impacts to adjacent properties. There were 2 crashes (excluding animals) for the last 10 years and none of them are clearly related to sharp vertical curves. As the Purpose and Needs for this project is to replace the pavement instead of correcting the sub-standard geometry, it was decided not to flatten these vertical curves.

(3) Three areas on this project have a grade (5.6%, 5.7%, and 6.0%) exceeding the acceptable maximum gradient of 5% for 55 mph. These areas are within the series of vertical curves noted in (2) above. Flattening these grades will affect several curves, increase impacts to adjacent properties, and require more earthwork. So for the same reasons stated in (2), it was proposed to leave these grades alone. The rest of the grades are all flatter than 5%.

(4) 24' for areas with 4:1 foreslope and 20' for curbed areas when foreslope is 6:1 or flatter.

(5) Concept included 4' paved shoulder. 6' total (2' paved and 4' granular) is proposed. Justification for wider shoulders:

- Crash reduction of 15% when compared with 4' shoulders per Highway Safety Manual for single vehicle runoff the road, multiple vehicle head-on, and opposite and same direction sideswipes;
- Improves sight distances for entrances and sideroads; and
- More recovery area for drivers who left the travel lane as run-off the road crashes ranks #1 (excluding crashes related to animals) for this corridor.

<b>Roadway</b>	U.S. 52		
<b>PIN Number</b>	10-31-052-020-04	<b>Submittal Date</b>	
<b>Project Number</b>	STP-052-2(121)--2C-31	<b>Approval Date</b>	
<b>District</b>	District 6	<b>Assistant District Engineer</b>	
<b>County</b>	Dubuque (31)	<b>or</b>	
<b>Route</b>	U.S. 52	<b>Office Director</b>	
<b>Location</b>	From Tollgate Rd. (Co. Rd. Y-13) N. To The ECL Of Luxemburg		
<b>Work Type</b>	PCC Pavement- Grade and New		
<b>Segment Manager</b>	Yanxiao Jia		
<b>Designer</b>	Dustin Skogerboe, and Yanxiao Jia		
Design Manual Section 1C-1 last update: 05-06-14	<b>Rural Two-Lane Highways (Rural Arterials)</b>		
	Design Element	Preferred	Acceptable
			Project Values
	Design speed (mph)	60	50
	Maximum superelevation rate (Refer to Section 2A-2)	6%	8%
	Design lane width (ft)	12	12
	Full depth paved width (ft)	14	14
	Right turn lane (ft)	12	10
	Climbing Lane (ft)	12	12
	Left turn lane (ft)	12	10
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum
	Auxiliary and turn lanes	3%	3% maximum
	Crown break at centerline	4%	4% maximum
Shoulder cross-slope (on tangent sections)	4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
	Curbed roadways	2%	not steeper than 3:1
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)	3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1
	w/o drainage structures	10:1	6:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--
Bridge width—new	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths
Bridge width—existing		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14
	Over railroad	23.3	23.3
	Sign trusses and pedestrian bridges	17.5	17
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures
Level of Service		B	B

Rural Two-Lane Highways (Rural Arterials)

Roadway Design Speed (mph) =		55														
Design Manual Section 1C-1 last update: 05-06-14		Design Criteria for High Speed Roadways														
Design Element		Preferred Criteria						Acceptable Criteria						Project Values		
		Design Speed, mph						Design Speed, mph								
		50	55	60	65	70	75	50	55	60	65	70	75			
Stopping sight distance (ft) (Refer to Section 6D-1)		425	495	570	645	730	820	425	495	570	645	730	820			
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	e <sub>max</sub> = 6%		833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	1060
		e <sub>max</sub> = 8%		--	--	--	--	--	--	--	--	758	960	1200	1480	1810
Minimum vertical curve length (ft) (Refer to Section 2B-1)		150	165	180	195	210	225	150	165	180	195	210	225	225	300	
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves		84	114	151	193	247	312	84	114	151	193	247	312	(2)	
	sag vertical curves	roadways without fixed source lighting	96	115	136	157	181	206	96	115	136	157	181	206	(2)	
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	N/A	
Minimum gradient (%) (Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.625, 0.3		
Maximum gradient (%) (Refer to Section 2B-1)	Urban roadways		4		3				7	6	6	--	--	--	N/A	
	Rural roadways		4		3				5	5	4	4	4	4	6.0 (3)	
	Interstates		4		3				5	5	4	4	4	4	N/A	
Clear zone		See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						24 (4)		

Rural Two-Lane Highways (Rural Arterials)

Design year ADT = 2761 vpd						
Design Manual Section <u>1C-1</u> last update: 05-06-14		Effective Shoulder Width and Type for Two-Lane Highways				
Preferred (values shown in feet)			Acceptable (values shown in feet)			Project Values
	Rural Roadways	Urban Roadways		Rural Roadways	Urban Roadways	
Turn lanes with shoulders	6	6	Turn lanes with shoulders	6	0	N/A
Turn lanes with curbs	6	See Section <u>3C-2</u>	Turn lanes with curbs	6	0	N/A
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	N/A
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width	
Routes where bicycles are to be accommodated	10	10	Design year ADT > 2000 vpd	8	2*	(5) Effective shoulder width = 6' with 2' paved
On roadways approaching urban areas (due to increased bike traffic)	10	10				
On all curves with a superelevation rate of 7.0% or greater	10	10				
On roadways with design year ADT > 5000	10	6	Design year ADT between 400 - 2000 vpd	6	2*	
On all other NHS	10	4	Design year ADT < 400 vpd	4	2*	
On non-NHS routes with design year ADT > 3000	10	4				
On non-NHS routes with design year ADT < 3000	8	2*				

\*Requires safety edge-Refer to Section 3C-6

Curbs should be located beyond the outer edge of the effective shoulder width in rural areas

Refer to Section 3C-2 for curb offsets in urban areas

Notes:

See next page for comments.

IOWA DEPARTMENT OF TRANSPORTATION

**TO OFFICE:** District 6  
**ATTENTION:** Jim Schnoebelen  
**FROM:** Kevin K. Patel  
**OFFICE:** Design  
**SUBJECT:** 3R Project Concept - FINAL

**DATE:** May 7, 2012  
**PROJECT:** Dubuque County  
 STP-052-2(111)--2C-31  
 PIN: 10-31-052-020

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**DATE OF REVIEW:** April 12, 2011; **PARTICIPANTS:** From District 6 – Ken Yanna, Art Gourley, Bruce Kuehl, John Wilson, Roger Boulet, Dave Shanahan and Steve Lueck; From the Office of Design – Kevin Patel, Chris Brakke, Ben Behnami and Amy Schleier.

**Alternative 1.** The resurfacing option, although provides the lowest cost, does not meet the long term objectives of this project. The pavement is 85 years old and combined with the lack of subbase material and deterioration at the joints, the pavement should be replaced. The resurfacing option along with the placement of the longitudinal subdrains will provide a short term solution to the rough ride in that develops in the winter months. The estimated cost for alternative 1 is \$21,950,700, which includes \$10,000 for ROW.

**Alternative 2.** This alternative replaces the existing pavement on the present alignment. This alternative avoids the purchase of right of way with exception of select locations and maintains the scenic quality of the roadway by utilizing context sensitive design solutions. This is the preferred option. The estimated cost for alternative 2 is \$37,559,500 which includes \$30,000 for ROW.

**Alternative 3.** This alternative will replace U.S. 52 on a new vertical and horizontal alignment throughout much of the corridor. This alternative will provide a higher design speed with flatter foreslopes; however, the new geometry will require a significant amount of right of way. The estimated cost for alternative 3 is \$136,617,100 which includes \$5.6 million for ROW.

**PROJECT DATA**

ROUTE: U.S. 52 from: north side of the bridge over the North Fork of the Little Maquoketa River (just south of Sageville) to the east city limits of Luxemburg (MP 52.38-MP 72.72)  
 LENGTH: 20.34 miles  
 PLANNING CLASSIFICATION: Area Development  
 MAINTENANCE SERVICE LEVEL: 3  
 TRAFFIC: 2015 --- 2,240 ADT with 11% trucks  
 2035 --- 3,170 ADT with 12% trucks  
 PRESENT PAVEMENT SURFACE: HMA  
 PRESENT PAVEMENT WIDTH: 24 ft.  
 PRESENT SHOULDER WIDTH: 3 ft. TYPE: Granular

MP to MP	Dir.	Type	Avg. Str. No.	80% Str. No.	Jt. Str. No.	PCI	IRI	K Value
52.38 to 52.81	both	HMA	4.70	3.29	3.44	66	2.62	40
52.81 to 55.90	both	HMA	--	--	--	75	1.32	--
55.90 to 57.16	both	HMA	--	--	--	78	1.37	--
57.16 to 57.89	Both	HMA	4.93	3.52	3.57	73	1.42	55
57.89 to 58.40	Both	HMA	5.44	3.91	3.37	77	1.14	58
58.40 to 62.11	Both	HMA	--	--	--	68	1.77	--
62.11 to 62.69	Both	HMA	--	--	--	73	1.56	--
62.69 to 63.09	Both	HMA	--	--	--	65	2.16	--
63.09 to 64.23	Both	HMA	--	--	--	77	1.81	--
64.23 to 69.06	Both	HMA	--	--	--	62	2.14	--
69.06 to 69.48	Both	HMA	--	--	--	62	3.08	--
69.48 to 72.91	Both	HMA	3.58	2.28	2.54	53	2.50	36

Note: Above values do not reflect the 2011 resurfacing project.

**PAVEMENT HISTORY:**

**MP 52.38 TO 52.81**

ORIGINAL PAVEMENT: 24 ft. wide, 8 in. PCC  
 COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
 YEAR CONSTRUCTED: 1976  
 RESURFACED: 2001, 2.5 in., 28 ft. wide HMA  
 2011, 2 in., 28 ft. wide HMA (Scarified 2 in.)

**MP 52.81 TO 55.90**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
 COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
 YEAR CONSTRUCTED: 1927  
 WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
 RESURFACED: 1984, 3 in., 24 ft. wide HMA  
 1996, 24 ft. wide BSC  
 2001, 2.5 in., 24 ft wide HMA  
 2011, 2 in., 28 ft. wide HMA (Scarified 2 in.)

**MP 55.90 to 57.16**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
 COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I



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YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2008, widened to 28 ft. wide with 5.5 in. HMA  
2008, 2.5 in. 28 ft. wide HMA resurfacing (Scarified 2.5 in.)  
2011, 2 in., 28 ft. wide HMA (Scarified 2 in.)

**MP 57.16 TO 57.89**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1997, 1.5 in., 24 ft. wide HMA (Scarified 1.5 in.)  
2001, 2.5 in., 24 ft. wide HMA  
2011, 2 in., 28 ft. wide HMA (Scarified 2 in.) MP 57.16 to 57.294 only

**MP 57.89 TO 58.40**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1997, 1.5 in., 24 ft. wide HMA (Scarified 1.5 in.)  
2001, 2.5 in., 24 ft. wide HMA

**MP 58.40 TO 62.11**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2011, 2 in., 28 ft. wide HMA (Scarified 2 in.) MP 58.96 to 60.94 only

**MP 62.11 TO 62.69**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2008, widened to 28 ft. with 5.5 in. HMA

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2008, 2.5 in. 28 ft. wide HMA resurfacing (Scarified 2.5 in.)

**MP 62.69 TO 63.09**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft wide BSC  
2001, 2.5 in., 24 ft wide HMA

**MP 63.09 TO 64.23**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2008, widened to 28 ft. with 5.5 in. HMA  
2008, 2.5 in. 28 ft. wide HMA resurfacing (Scarified 2.5 in.)

**MP 64.23 TO 69.06**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2011, 2 in., 28 ft. wide HMA (Scarified 1.5 in.) MP 64.5166 to 64.902,  
MP 66.046 to 66.356, MP 67.165 to 67.639, and MP 68.660 to  
69.06

**MP 69.06 TO 69.48**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2008, widened to 28 ft. with 5.5 in. HMA  
2008, 2.5 in. 28 ft. wide HMA resurfacing (Scarified 2.5 in.)  
2011, 2 in., 28 ft. wide HMA (Scarified 1.5 in.)

**MP 69.48 to 72.91**

ORIGINAL PAVEMENT: 18 ft. wide, 7 in. PCC  
COARSE AGGREGATE SOURCE: Rose Spur CLASS: 3I  
YEAR CONSTRUCTED: 1927  
WIDENED: 1967, to 24 ft. wide and resurface using 3 in. HMA  
RESURFACED: 1984, 3 in., 24 ft. wide HMA (Scarified 1 in.)  
1996, 24 ft. wide BSC  
2001, 2.5 in., 24 ft. wide HMA  
2011, 2 in., 28 ft. wide HMA (Scarified 1.5 in.) MP 69.48 to 69.879 and  
MP 71.492 to 72.025

**EXISTING CONDITIONS AND CAUSES OF DISTRESS:**

The existing pavement from MP 51.92-52.81 is an 8" jointed PCC built in 1976. The coarse aggregate is a Class 3I crushed limestone from Rose Spur. The pavement was overlaid with 2.5" HMA in 2001.

The remaining pavement sections from MP 52.81-72.91 consist of a 7" jointed PCC built in 1927 with the Rose Spur crushed limestone. The original PCC has been overlaid with HMA four to five times between 1967 and 2011 as detailed in the pavement history. Total thickness of HMA overlays is approximately 7.5". Cores taken prior to the 2011 resurfacing from various locations showed actual HMA thickness varies between 5.5" – 7.5". The PCC in some cores was completely deteriorated.

The pavement surface on all sections is either a 2001, 2008 or 2011 HMA overlay and therefore have a reasonably good surface condition. The current PCIs range between 62-78, reflecting the relatively new pavement surface. Most of the surface distress is reflective cracking of the transverse joints/cracks and the longitudinal widening joint. The pavement is performing poorly in the winter due to heaving at the transverse cracks which causes a very rough ride. Other pavements where this is occurring have been found to have severe deterioration of the PCC at the joints which allows water to enter the pavement and freeze forming ice lenses that heave the pavement. The ride improves in the summer months but does not completely recover from the heaving in the winter.

**SAFETY CONSIDERATIONS:**

During the five-year study period from January 1, 2006 through December 31, 2010, there were 171 crashes including 1 fatal crash, 38 personal injury crashes and 132 property damage only crashes. 40% of the total crashes were caused by an animal in the roadway. The crash rate is 205/HMVM which is higher than the statewide rural average of 158/HMVM.

There are many sections of the existing roadway where the profile grade does not fall within the preferred range of 0.5% to 4.0%. There are 109 vertical curves (of the 164

total curves) within the project that do not meet the proposed 55 mph design speed. There are also 77 horizontal curves (of the 82 total) do not meet current 55 mph design speed criteria. The foreslopes throughout the length of the project are typically 3:1 or steeper. Specific locations and lengths of foreslopes steeper than 3:1 cannot be determined from the as-built plans. Transverse slopes at entrances, dikes, and sideroads are steeper than 6:1 throughout the project.

Many of the vertical and horizontal alignment deficiencies, as well as the existing foreslopes cannot be improved without acquiring additional right of way. Where possible, improvements should be made to correct these deficiencies without the acquisition of right of way.

There are two (2) bridges located within the project limits. They are:

Sta. 720+12 (FHWA 24040, Maint. #3171.4S052), 100 ft. x 44 ft. continuous concrete slab bridge over the North Fork Maquoketa River

Sta. 1285+00 (FHWA 24030, Maint. 3157.8S052), 151 ft. 4 in. x 30 ft. pretensioned prestressed concrete beam bridge over the North Fork of the Little Maquoketa River.

The estimated cost for guardrail updates at the two bridges is \$63,200. The estimated cost for widening and overlaying bridge #24030 is \$481,200.

There are four (4) large culverts with headwalls that are marked with either Type 2 or Type 3 object markers. They are:

- (1) Sta. 1181+02.3, a 14 ft. x 14 ft. twin RCB. This culvert is recommended for replacement.
- (2) Sta. 1229+21.8, a 6 ft. x 4 ft. RCB. This culvert will be used as constructed.
- (3) Sta. 1271+85.5, a 8 ft. x 6 ft. RCB. The arch section of this culvert will be removed and replaced. The existing RCB section will be used as constructed.
- (4) Sta. 670+49, a 6 ft. x 6 ft. RCB. This culvert is recommended for replacement.

In addition, there are 29 small culverts that will require right of way for extension. Therefore, it is recommended to use all culvert structures as constructed in Alternative 1. In Alternative 2, these structures will be replaced in-kind without extending them unless there is adequate ROW to do so. In Alternative 3, culverts will be replaced.

There are several areas throughout the project with low tension cable and w-beam guardrail in place, typically protecting vehicles from areas with steep foreslopes. It is recommended to replace the existing cable with new high-tension cable guardrail if the foreslope range from 2:1 to 3:1. As the shoulders along much of the corridor are narrow, the placement of high-tension cable guardrail should strive to maximize the available shoulder area while maintaining at least 1' of 10:1 slope behind the guardrail. In areas

where the foreslopes are steeper than 2:1 w-beam should be used. Consideration should also be used to employing aesthetic barrier rail systems to in order to maintain the scenic quality of the roadway. The steel guardrail in the area known as Gillespie Hill will be used at constructed.

**FEASIBLE ALTERNATIVES:**

This project on U.S. 52 extends from west side of the bridge over the north fork of the Maquoketa River (just south of Sageville) to the east city limits of Luxemburg, a distance of approximately 20 miles. Three alternatives are discussed below 1) Resurfacing 2) Reconstruction on the existing alignment and 3) Reconstruction on new alignment. The total cost of each one of these alternatives is shown below; however, given the length of the project, it is anticipated that smaller sized projects will be developed for letting. The limits of these smaller projects are shown in the "Cost by Section" attachment along with their associated costs.

**ALTERNATIVE 1: HMA Overlay**

The existing mainline pavement will be milled 4.5 in. deep and replaced with 6 in. of HMA. The HMA overlay will consist of three 2 in. lifts, 24 ft. wide. Prior to the HMA, full depth PCC patching will be required. The existing width of the shoulder varies throughout the corridor; however, when possible 4 ft. paved shoulders will be placed. Edgeline and centerline rumble strips will be constructed the length of the project with the exception of in urban areas and turn lanes.

Auxiliary turn lanes will be constructed at the following intersections:

- Co. Rd. C9Y in Sageville: Major right turn lane for westbound traffic  
Left turn lane for eastbound traffic
- Five Points Rd./S. Mound Rd.: Minor right turn lanes for both east & westbound traffic  
Left turn lane for westbound traffic
- James Rd. in Rickardsville: Minor right turn lane for westbound traffic  
Left turn lane for eastbound traffic
- Holy Cross Rd./Tollgate Rd.: Minor right turn lanes for both east & westbound traffic  
Left turn lane for eastbound traffic

The estimated cost for turn lanes, excluding ROW, is \$551,700.

The installation of longitudinal subdrains is recommended on both sides of the roadway throughout the length of the project. It is recommended that the subdrains be installed a year prior to the rehabilitation project in order to drain the subgrade which is believed to be contributing to the frost heaving and the subsequent poor ride. The ditch depth in some areas throughout the project is shallow therefore it may be necessary to reduce the normal depth of the subdrain installation, as well as increasing the length of the subdrain run and switching between the left and right side in order to provide a suitable outlet.

The bridge over the North Fork of the Maquoketa River (#3171.4S052) will be used as constructed; however, new bridge approach sections will be placed along with new guardrail. The bridge over the North Fork of the Little Maquoketa River (#3157.8S052) will be widened from 30 ft. to 44 ft. and overlaid at an estimated cost of \$481,200. The existing guardrail will be replaced.

The existing drainage structures will be used as constructed throughout the project.

Design approval will be required for areas where the profile grade does not fall between the recommended 0.5% - 4.0% grade. Areas that do not meet the 55 mph design speed criteria will be signed accordingly.

It appears that a small amount of right of way will be required for construction of the auxiliary turn lanes.

Traffic will be reduced down to one lane during resurfacing via the use of flaggers and a pilot car operation.

<u>Item</u>	<u>Estimated Cost</u>
Pavement Scarification	\$ 649,100
Class 10, roadway & borrow	399,000
Patching	1,000,000
HMA, mainline (3 lifts, includes binder)	8,335,800
HMA, shoulder	2,308,100
Auxiliary turn lanes	551,700
Milled edgeline and centerline rumble strips	31,000
Longitudinal subdrains (includes outlets)	1,146,200
Bridge approach sections	139,100
Guardrail at bridges (includes removal and class 10 blister)	66,600
Remove and replace cable guardrail	180,300
Bridge widening and overlay	481,200
Erosion control	5,000
Wetland Mitigation	50,000
Traffic Control @ 5%	767,200
Mobilization @ 5%	767,200
<u>M &amp; C @ 30%</u>	<u>5,063,200</u>
<b>Total excluding ROW</b>	<b>\$21,940,700</b>
ROW	10,000
<b>Total including ROW</b>	<b>\$21,950,700</b>

**ALTERNATIVE 2: PCC Reconstruction, lowering roadway to original grade**

The existing mainline pavement and granular shoulders will be removed. The road bed will be excavated to provide for 9.5 in. PCC, 12 in. modified subbase and a layer of

GeoGrid with the finished profile grade similar to the original one constructed in 1927. The new PCC pavement will be 24 feet wide. The existing width of the shoulder varies throughout the corridor; however, when possible a 4 ft. paved shoulders will be placed. Edgeline rumble strips will be constructed the length of the project with the exception of in urban areas and turn lanes. The existing foreslopes will be flattened to 6:1/3.5:1 when possible to do so and remain on existing right-of-way.

This alternative preserves the scenic quality of the roadway by utilizing context sensitive design solutions by using much of the existing horizontal and vertical geometry. However, when possible, both the horizontal and vertical alignment should be improved upon without acquiring additional right of way. This may include adjusting the vertical profile grade, lengthening horizontal curves and flattening foreslopes.

All intersections should be evaluated to ensure that no operational problems will exist and sight distance is maximized. The design should strive to improve the safety and operation of the intersections. The addition of left and right turn lanes should also be included when warranted. This may require the acquisition of right of way. Improvements to the intersections such as additional signs, removal of trees, relocation of utility poles and installation of warning lights should also be considered.

Auxiliary turn lanes will be constructed at the following intersections:

Co. Rd. C9Y in Sageville:	Major right turn lane for westbound traffic Left turn lane for eastbound traffic
Five Points Rd./S. Mound Rd.:	Minor right turn lanes for both east & westbound traffic Left turn lane for westbound traffic
James Rd. in Rickardsville:	Minor right turn lane for westbound traffic Left turn lane for eastbound traffic
Holy Cross Rd./Tollgate Rd.:	Minor right turn lanes for both east & westbound traffic Left turn lane for eastbound traffic
Burton Furnace Rd. in Durango:	Minor right turn lane for eastbound traffic Left turn lane for westbound traffic

The estimated cost for turn lanes, excluding ROW, is \$709,300.

The intersection of U.S. 52 and Burtons Furnace Road in Durango will be reconstructed to improve the skew angle to approximately 90 degrees. This will result in approximately 500 ft. of reconstruction to Burtons Furnace Road. The existing county bridge, southeast of the intersection will be used as constructed.

The installation of longitudinal subdrains is recommended throughout the project and possibly both sides of the roadway in some locations. The ditch depth in some areas throughout the project is shallow therefore it may be necessary to reduce the normal depth of the subdrain installation, as well as increasing the length of the subdrain run and switching between the left and right side in order to provide a suitable outlet.

The bridge over the North Fork of the Maquoketa River (#3171.4S052) will be used as constructed; however, new bridge approach sections will be placed along with new guardrail. The bridge over the North Fork of the Little Maquoketa River (#3157.8S052) will be widened from 30 ft. to 44 ft. and overlaid at an estimated cost of \$481,200. The existing guardrail will be replaced. New drainage structures will be installed throughout the project.

Design approval will be required for areas where the profile grade does not fall between the recommended 0.5% - 4.0% grade. Areas that do not meet the 55 mph design speed criteria will be signed accordingly.

It appears that a small amount of right of way will be required for construction of the auxiliary turn lanes and for the realignment of Burtons Furnace Road in Durango.

During construction the roadway will be closed and traffic will be routed to an off-site detour, which is detailed later in this concept. The contractor will be responsible for maintaining local access to residents. The project shall strive to reduce disruption to residents such as not closing adjacent side roads at the same time and using high early strength concrete at key locations.

<u>Item</u>	<u>Estimated Cost</u>
Removal of pavement	\$ 1,644,500
PCC Pavement, 9.5 in.	10,701,200
Modified subbase	3,373,200
Polymer geo-grid	616,700
Excavation, Class 10, waste	685,200
Paved shoulder	1,807,800
Auxiliary turn lanes	709,300
Milled edgeline rumble strips	43,100
Longitudinal subdrains (includes outlets)	1,146,200
Drainage structures	4,000,000
Bridge approach sections	139,100
Guardrail at bridges (includes removal and class 10 blister)	66,600
Remove and replace cable guardrail (high tension)	180,300
Bridge widening and overlay	481,200
Erosion control	600,000
Wetland Mitigation	50,000
Traffic Control @ 5%	1,312,200
Mobilization @ 5%	1,312,200
M & C @ 30%	8,660,700
<b>Total excluding ROW</b>	<b>\$37,529,500</b>
ROW	30,000
<b>Total including ROW</b>	<b>\$37,559,500</b>

**ALTERNATIVE 3: Alignment improved to meet a 55 mph design criteria.**

In alternative 3, the alignment will match the existing alignment when it is possible to achieve 55 mph design speed criteria. In areas where either horizontal or vertical 55 mph design criteria cannot be met, the alignment will be shifted off the existing US 52 alignment in order to meet this criteria. The towns of Sageville, Durango and Rickardsville, as well as the area known as Gillespie Hill, shall be designed using a minimum 35 mph design criteria.

The existing mainline pavement and granular shoulders will be removed. The road bed will be excavated to provide for 9.5 in. PCC, 12 in. modified subbase and a layer of GeoGrid. The new pavement will be 28 feet wide with 8 ft. granular shoulders. Foreslopes will be 6:1/3.5:1.

The bridge over the North Fork of the Maquoketa River (#3171.4S052) will be used as constructed; however, new bridge approach sections will be placed along with new guardrail. The bridge over the North Fork of the Little Maquoketa River (#3157.8S052) will be widened from 30 ft. to 44 ft. and overlaid at an estimated cost of \$481,200. The existing guardrail will be replaced.

Auxiliary turn lanes will be constructed at the following intersections:

- Co. Rd. C9Y in Sageville: Major right turn lane for westbound traffic  
Left turn lane for eastbound traffic
- Five Points Rd./S. Mound Rd.: Minor right turn lanes for both east & westbound traffic  
Left turn lane for westbound traffic
- James Rd. in Rickardsville: Minor right turn lane for westbound traffic  
Left turn lane for eastbound traffic
- Holy Cross Rd./Tollgate Rd.: Minor right turn lanes for both east & westbound traffic  
Left turn lane for eastbound traffic
- Burton Furnace Rd. in Durango: Minor right turn lane for eastbound traffic  
Left turn lane for westbound traffic

The estimated cost for turn lanes, excluding ROW, is \$709,300.

The installation of longitudinal subdrains is recommended throughout the project and possibly both sides of the roadway in some locations.

Horizontal and vertical alignment improvements will require extensive reconstruction of sideroads and entrances throughout the corridor. Preliminary acquisition estimates are more than 40 structures and 350-400 acres of right of way.

During construction the roadway will be closed and traffic will be routed to an off-site detour, which is detailed later in this concept. The contractor will be responsible for maintaining local access to residents. The project shall strive to reduce disruption to

residents such as not closing adjacent side roads at the same time and using high early strength concrete at key locations.

<u>Item</u>	<u>Estimated Cost</u>
Removal of pavement	\$ 1,644,500
Excavation, Class 10 roadway & borrow	13,496,100
Excavation, Class 12, rock	33,415,700
Excavation, Class 10, waste	12,606,600
PCC Pavement, 9.5 in.	12,476,600
Modified subbase	4,045,200
Polymer geo-grid	719,000
Granular shoulders, 8 ft. wide	1,297,300
Bridge approaches	152,500
Bridge widening and overlay	481,200
Auxiliary turn lanes	709,300
Longitudinal subdrains (includes outlets)	1,146,200
Milled edgeline rumble strips	43,100
Guardrail at bridges (includes removal, paved shoulder & class 10 blister)	103,400
Remove and replace cable guardrail (high tension)	180,300
Drainage structures	8,000,000
Rebuilding entrances and sideroad connections	2,000,000
Erosion control	600,000
Wetland mitigation	200,000
Traffic Control @ 3%	2,799,500
Mobilization @ 5%	4,665,900
M & C @ 30%	30,234,700
<b>Total excluding ROW</b>	<b>\$131,017,100</b>
ROW	5,600,000
<b>Total including ROW</b>	<b>136,617,100</b>

**RECOMMENDATIONS:** The recommended method of rehabilitation for this project is Alternative 2.

Context Sensitive Design solutions should be employed for this project, thus allowing some flexibility in the improvements made.

Small amounts of right of way will be required for Alternatives 1 and 2. Extensive right of way will be required for Alternative 3.

The Office of Location and Environment has reviewed the scope of the three alternatives. It was determined that Alternatives 1 and 2 will likely require a Nationwide Permit may require wetland/stream mitigation, while Alternative 3 will likely require an Individual Permit and substantial wetland/stream mitigation. A detailed preliminary wetlands review (W00) will be completed once the final concept has been distributed.

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During construction of alternatives 2 or 3, the roadway will be closed and traffic will be routed to an off-site detour. The suggested detour is IA 136 south from Luxemburg 10 miles, then US 20 east 21 miles, then IA 32 north 5 miles to meet US 52 / IA 3. The total distance user cost is anticipated to be \$2,099,000 per construction year. The costs for road maintenance will be \$83,200 as calculated by the Gas Tax Methods. Detour signing will be \$10,000. Out of distance travel is 15 miles. The contractor will be responsible for maintaining local access to residents. The project shall strive to reduce disruption to residents such as not closing adjacent side roads at the same time and using high early strength concrete at key locations.

**FUNDS PROGRAMMED:** This proposed project is not in the 2012-2016 program. A schedule of events for plan development will be determined following approval of the Project Concept.

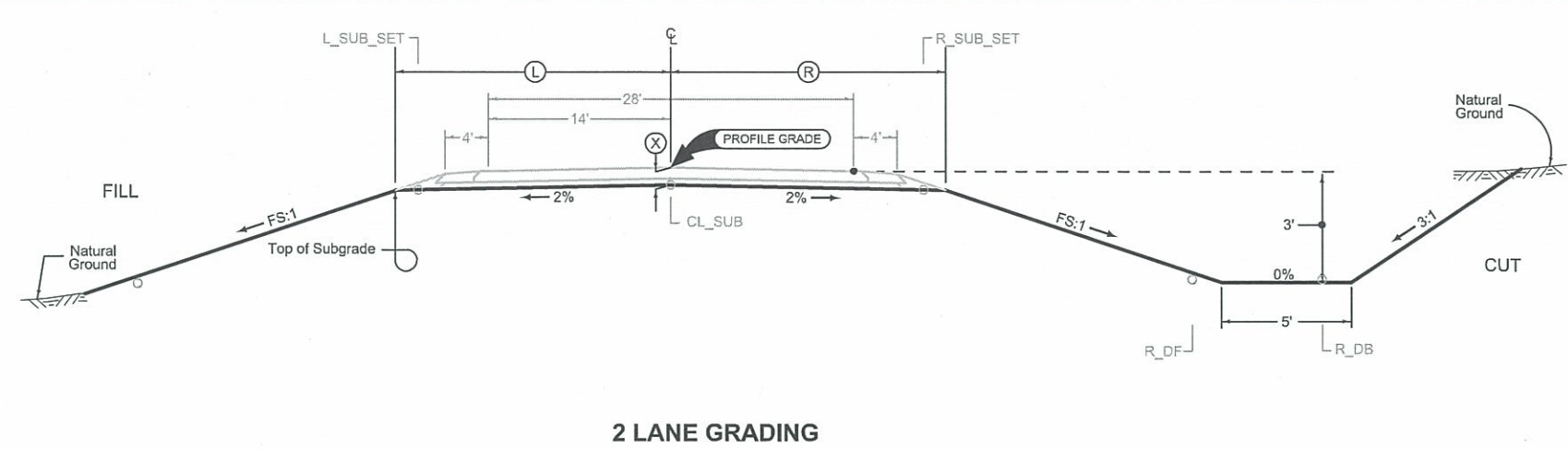
KKP:als  
cc:

- |                 |                  |                |
|-----------------|------------------|----------------|
| J. F. Adam      | M. J. Dillavou   | M. J. Kennerly |
| K. D. Nicholson | C. B. Brakke     | F. W. Todey    |
| R. L. Stanley   | A. A. Welch      | N. L. McDonald |
| G. A. Novey     | R. R. Walton     | N. M. Miller   |
| E. C. Wright    | T. D. Crouch     | M. J. Donovan  |
| M. J. Sankey    | M. A. Swenson    | R. A. Younie   |
| S. J. Gent      | D. E. Sprengeler | J. Vortherms   |
| C. C. Poole     | B. D. Hofer      | S. C. Marler   |
| L. C. Funnell   | D. L. Newell     | E. J. Ranney   |
| D. R. Tebben    | J. R. Berger     | T. D. Hanson   |
| S. A. Schram    | K. A. Yanna      | B. A. Kuehl    |
| J. C. Wilson    | C. L. Cutler     | D. L. Rick     |
| A. F. Gourley   | N. M. Abuissa    | T. M. Storey   |
| A. Wilson       | E. J. Engle      | M.L. Hobbs     |
| S. W. Flockhart |                  |                |

LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	Ⓕ Feet	Ⓓ Feet	ⓧ Inches	FS
US 52	885+50.0   1100+50.0	25.5	25.5	21.5	4:1

Normal section shown may be modified appropriately in areas of superelevated curves or other locations specifically designated by the Engineer.

See plan & profile sheets for additional details of ditches and backslopes.

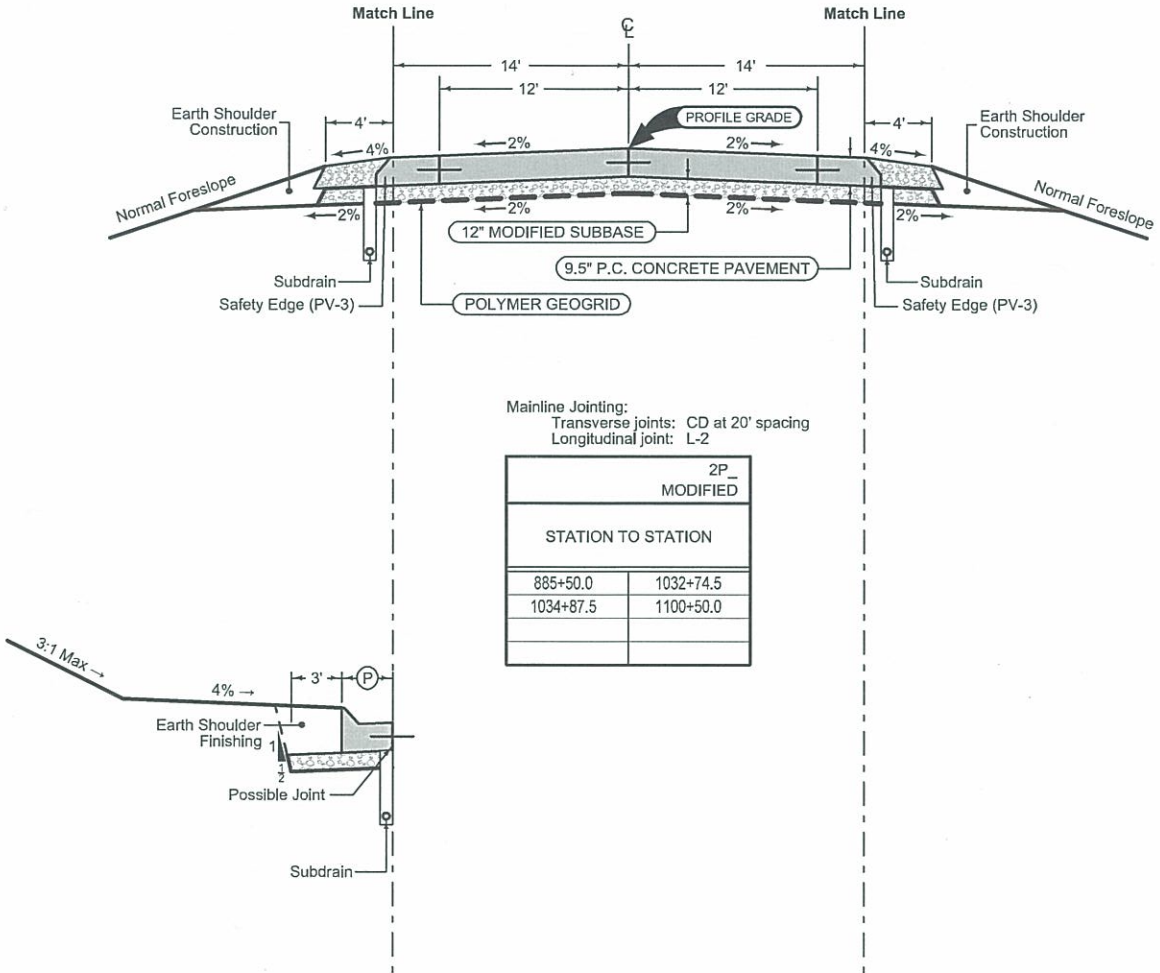


G\_2\_Grade  
MODIFIED

**Safety Edge**

2\_G\_ Modified

STATION TO STATION	
885+50.0	898+48.0
901+25.0	925+64.9
935+00.0	1002+50.0
1006+25.0	1032+74.5
1034+87.5	1089+51.6
1092+70.0	1100+00.0



**Safety Edge**

2\_G\_ Modified

STATION TO STATION	
885+50.0	1032+74.5
1034+87.5	1100+00.0

**Curbed Shoulder**

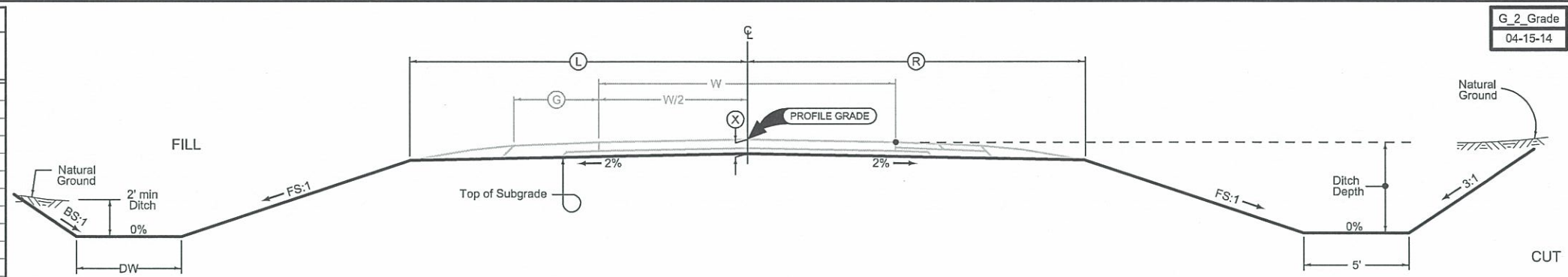
Shoulder Jointing:  
Longitudinal joint not required when distance from back of curb to nearest joint is less than 15':

Single pour: L-2  
Staged: KT-2  
Transverse: C at 20' spacing

2\_Curb\_ 04-19-11

STATION TO STATION		Ⓟ Feet	Curb Type See PV-102
898+48.0	901+25.0	5	6" Sloped
925+64.9	935+00.0	5	6" Sloped
1002+50.0	1006+25.0	5	6" Sloped
1089+51.6	1092+70.0	5	6" Sloped

LOCATION		DIMENSIONS					
ROAD IDENTIFICATION	STATION TO STATION	(L) Feet	(R) Feet	(X) Inches	FS	BS	DW
Main Street	5898+23.5 - 5898+75.0	27.6	**	21.5	4	3	5
Kluesner Road	4949+40.0 - 4950+13.0	**	**	21.5	4	3	5
Hickory Valley Road	31006+30.0 - 31007+12.5	**	**	21.5	4	3	5
Clear Creek Road	21061+60.0 - 21062+59.5	22.6	22.6	21.5	4	3	5
Vonderhaar Lane	11087+85.0 - 11088+93.4	21.6	21.6	21.5	4	3	5
** See Cross Sections							



Normal section shown may be modified appropriately in areas of super-elevated curves or other locations specifically designated by the Engineer.

See plan & profile sheets and cross sections for additional details of ditches and backslopes.

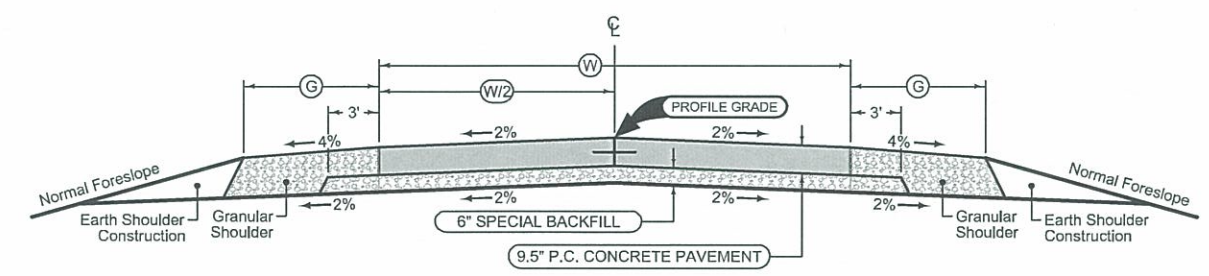
**2 LANE GRADING**

G\_2\_Grade  
04-15-14

*Review with the County*

**Granular Shoulder**

STATION TO STATION		(G) Feet
SR Main Street	5898+60.6 - 5898+75.0	2
SR Kluesner Road	4949+40.0 - 4949+63.0	2
SR Hickory Valley Road	31006+30.0 - 31006+94.4	2
SR Clear Creek Road	21061+60.0 - 21062+19.0	2
	21063+46.8 - 21064+00.0	2
SR Vonderhaar Lane	11087+85.0 - 11088+56.4	2



Mainline Jointing:  
Transverse joints: CD at 20' spacing  
Longitudinal joint: L-2

STATION TO STATION		(w) Feet
SR Main Street	5898+23.5 - 5898+75.0	36
SR Kluesner Road	4949+40.0 - 4950+13.0	24
SR Hickory Valley Road	31006+30.0 - 31007+12.5	24
SR Clear Creek Road	21061+60.0 - 21062+59.5	26
	21062+87.5 - 21064+00.0	26
SR Vonderhaar Lane	11087+85.0 - 11088+93.4	24

**Granular Shoulder**

STATION TO STATION		(G) Feet
SR Main Street	5898+70.8 - 5898+75.0	2
SR Kluesner Road	4949+40.0 - 4949+63.0	2
SR Hickory Valley Road	31006+30.0 - 31006+44.6	2
SR Clear Creek Road	21061+60.0 - 21062+29.5	2
	21062+87.5 - 21064+00.0	2
SR Vonderhaar Lane	11087+85.0 - 11088+65.2	2

See Tab 100-24 or 100-25 for pavement quantities.  
See Tab 112-9 for shoulder quantities.

**PAVED COUNTY ROADS**



### SURVEY SYMBOLS

- S Soil Sampling Site (Wetlands)
- TLNR Tree Line Right
- FWD Wood Fence
- SI Sign
- TDC Tree Deciduous
- PPB Power Pole Co. 2
- FW Wire Fence
- MH Utility Access (Manhole)
- HDG Hedge Row
- TEV Evergreen Tree
- FCL Chain Link and Security Fence
- GRV Grave
- RET Retaining Walls
- TLNL Tree Line Left
- WEL Well
- TPD Telephone Pedestal
- SHR Shrub
- FLG Flag Poles
- PR Electric Riser Pole
- UB Utility Box
- GP Guard Post (Less Than 4 Posts)
- TFR Tree Fruit
- TIL Tile Line
- EB Electrical Box
- IN Storm Sewer Intake
- BIN Grain Bin
- PPA Power Pole Co. 1
- OUT Tile Outlet
- MIS Miscellaneous
- GDL Guard Rail Steel
- SL Speed Limit Sign
- STP Stump
- TR Telephone Riser Pole
- LUM Luminaire
- MM Mile Marker Post
- WH Water Hydrant
- LP L.P. Tank
- SEP Septic Tank
- PLG Location of General Photo
- WV Water Valve
- INB Storm Sewer Beehive Intake
- BB Billboard
- TV Satellite TV Dish
- AST Above Ground Storage Tank
- SNP Unpaved Shoulder
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- D Centerline Draw or Stream (Down)
- EP Edge of Paved Roads (ML or SR)
- SH Paved Shoulder
- BNK Stream Bank
- DU Centerline Draw or Stream (Up)
- ENP Edge Paved Entrance & Park Lot
- EG Edge of Gravel Road
- SWK Sidewalk
- CON Concrete or A/C Slab
- RIP Rip-Rap
- CU Back of Curb
- GU Gutter In Front of Curb
- DIK Centerline of Dike or Dam
- ST Spiral Point
- PRO Profile Shot
- SOP Size of Pipe or Culvert
- UE Utility Elevation
- BL Topo Breakline
- C Centerline BL of Road (ML or SR)
- S Soil Sampling Site (Wetlands)

### UTILITY LEGEND

- ALLIANT
- MAQUOKETA VALLEY REC
- ALLIANT (QLD)
- WINDSTREAM (QLD)
- CITY OF RICKARDSVILLE (QLD)
- CENTURY LINK (QLD)
- WINDSTREAM (QLD)
- CITY OF HOLY CROSS (QLD)
- CITY OF RICKARDSVILLE (QLD)
- CITY OF HOLY CROSS (QLD)

### PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING		
Design Color No.	Description	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

### PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

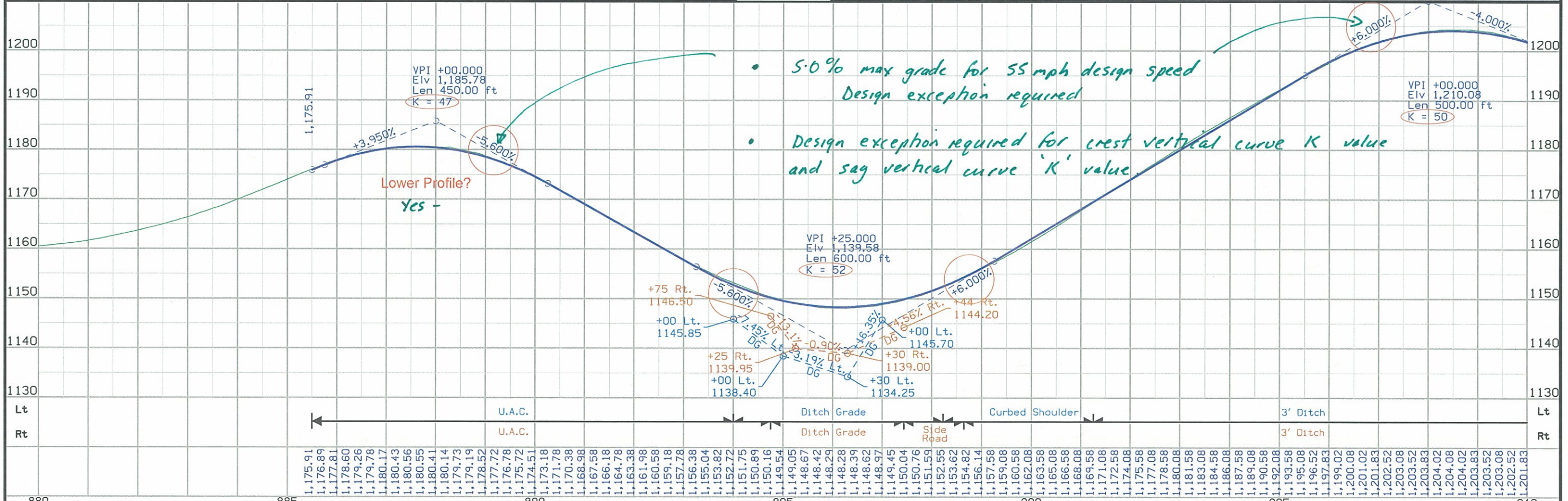
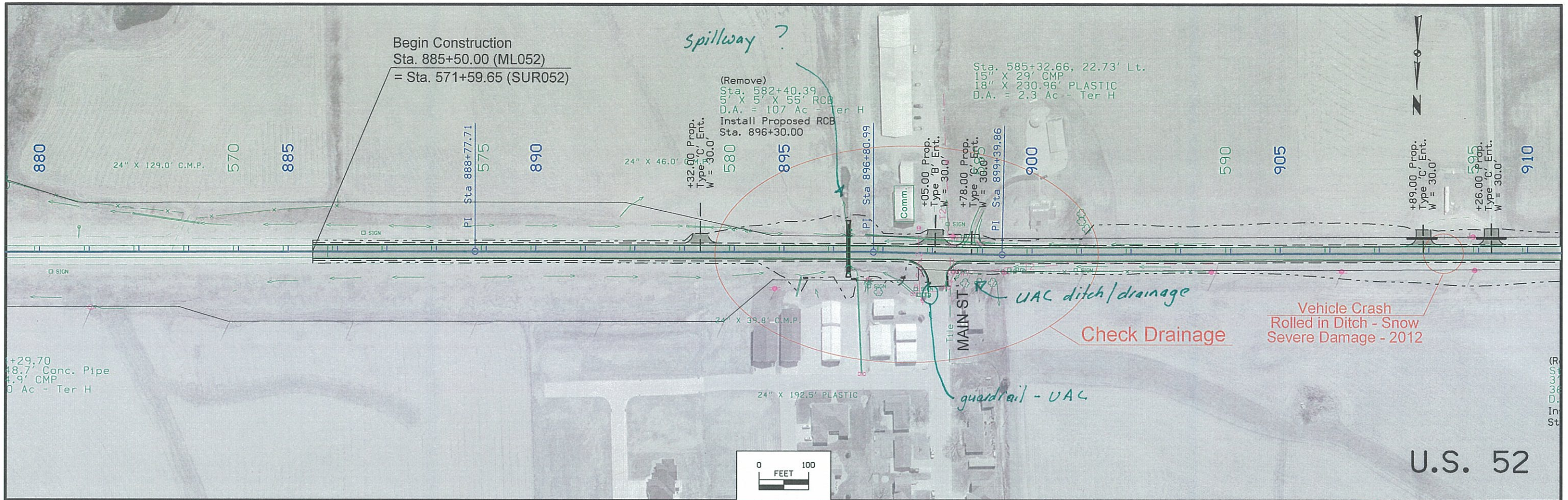
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

### RIGHT-OF-WAY LEGEND

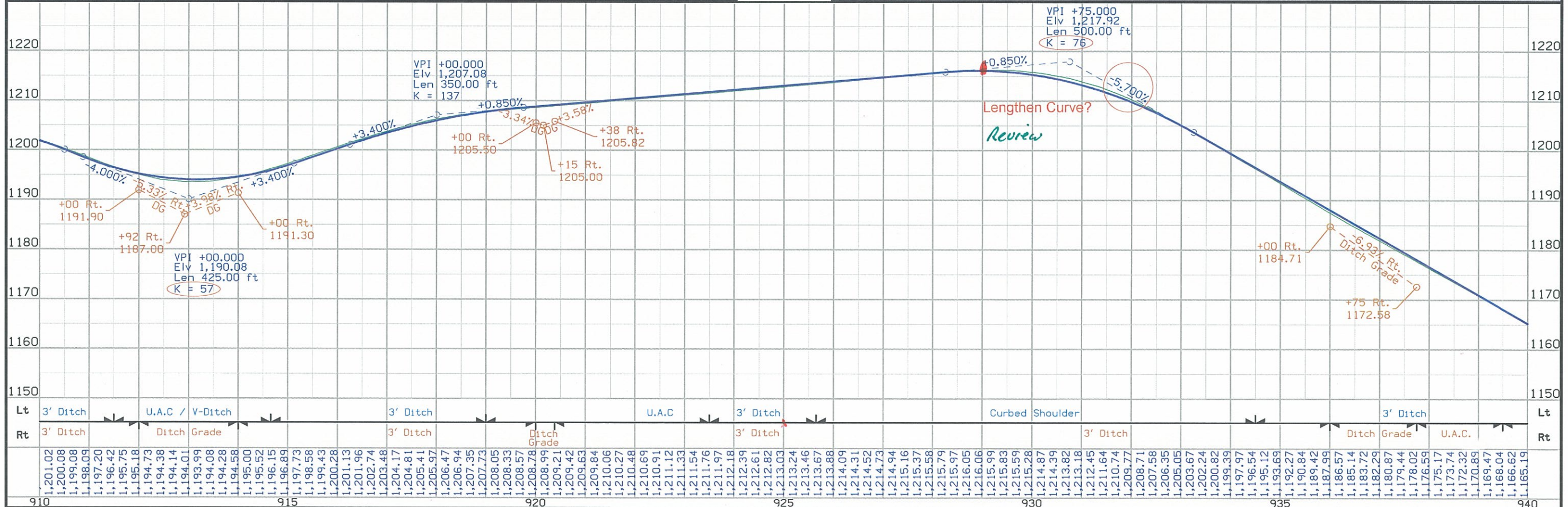
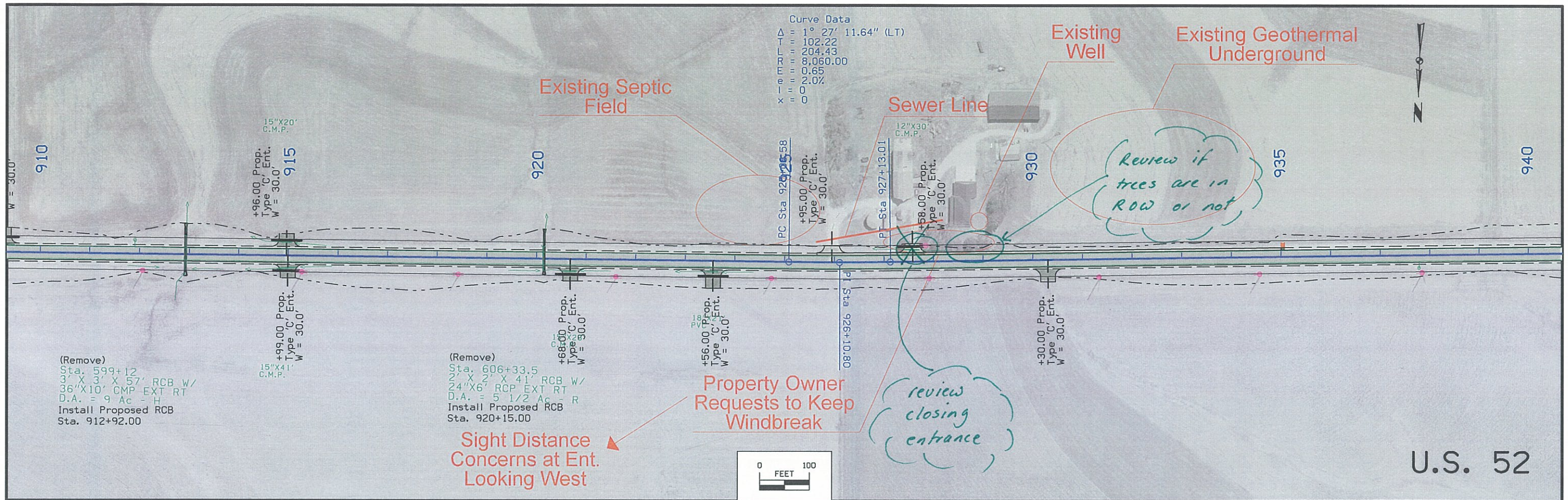
- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

## PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

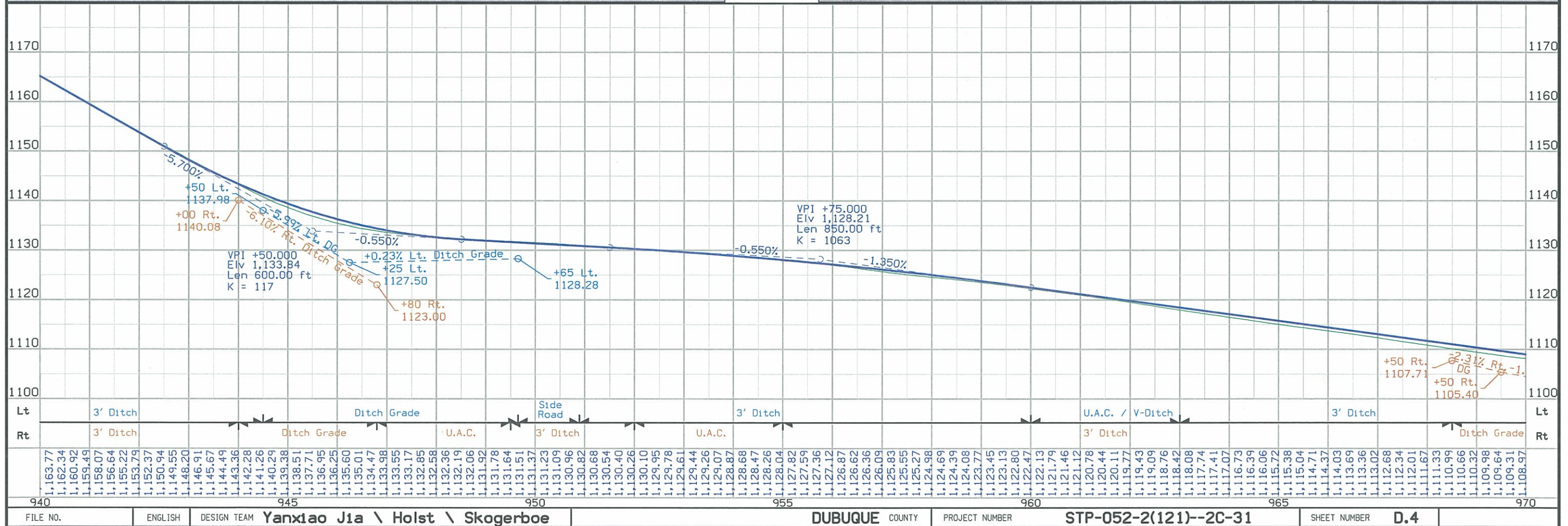
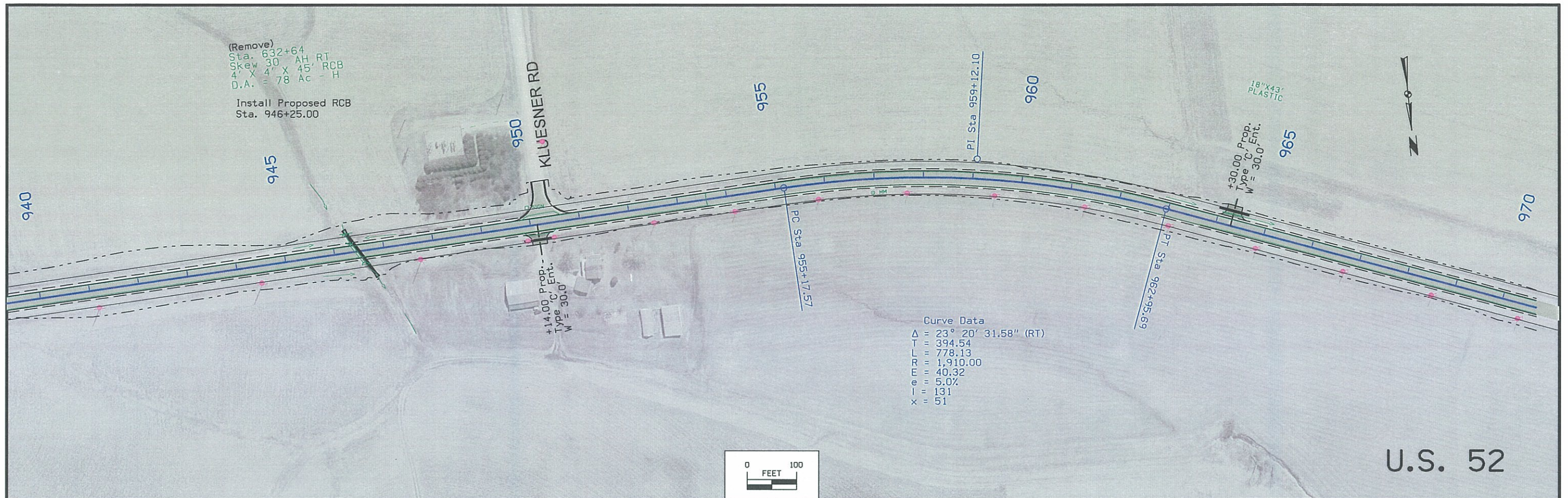
(COVERS SHEET SERIES D, E, F, & K)

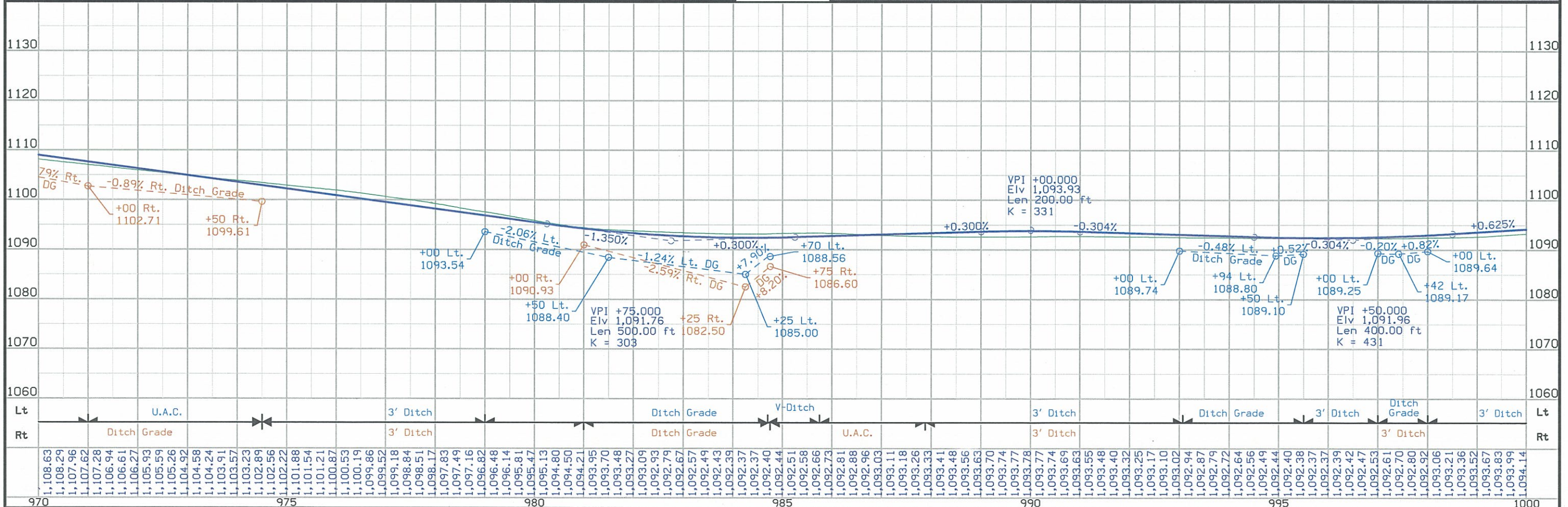
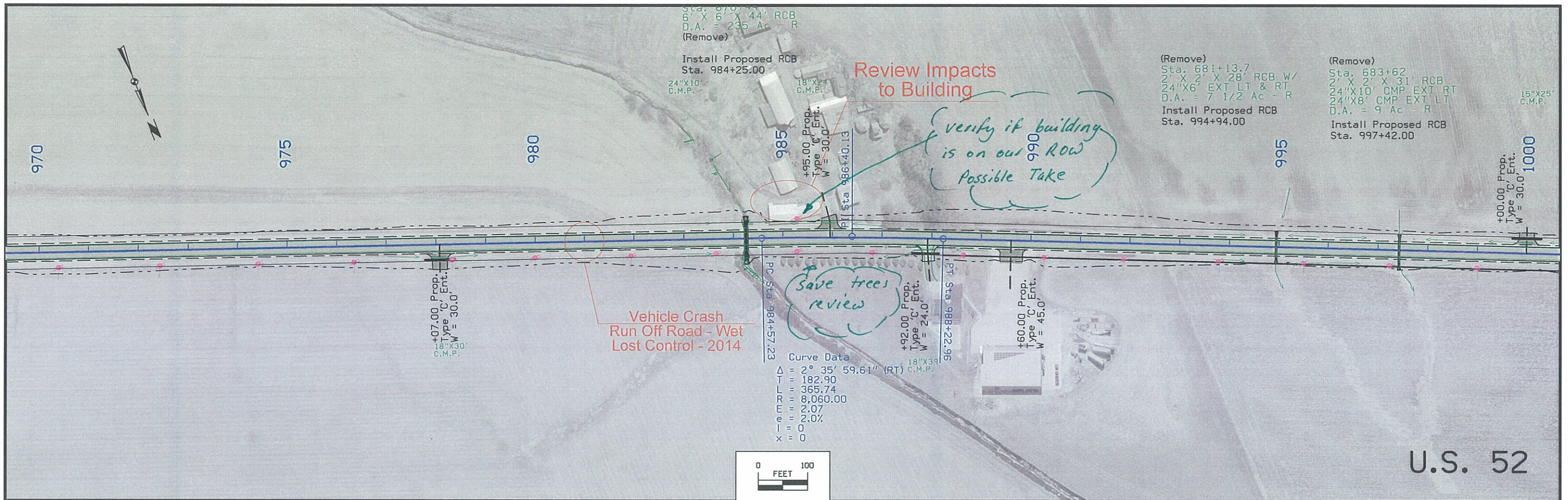


FILE NO.	ENGLISH	DESIGN TEAM	Yanxiao Jia \ Holst \ Skogerboe	DUBUQUE COUNTY	PROJECT NUMBER	STP-052-2(121)--2C-31	SHEET NUMBER	D.2
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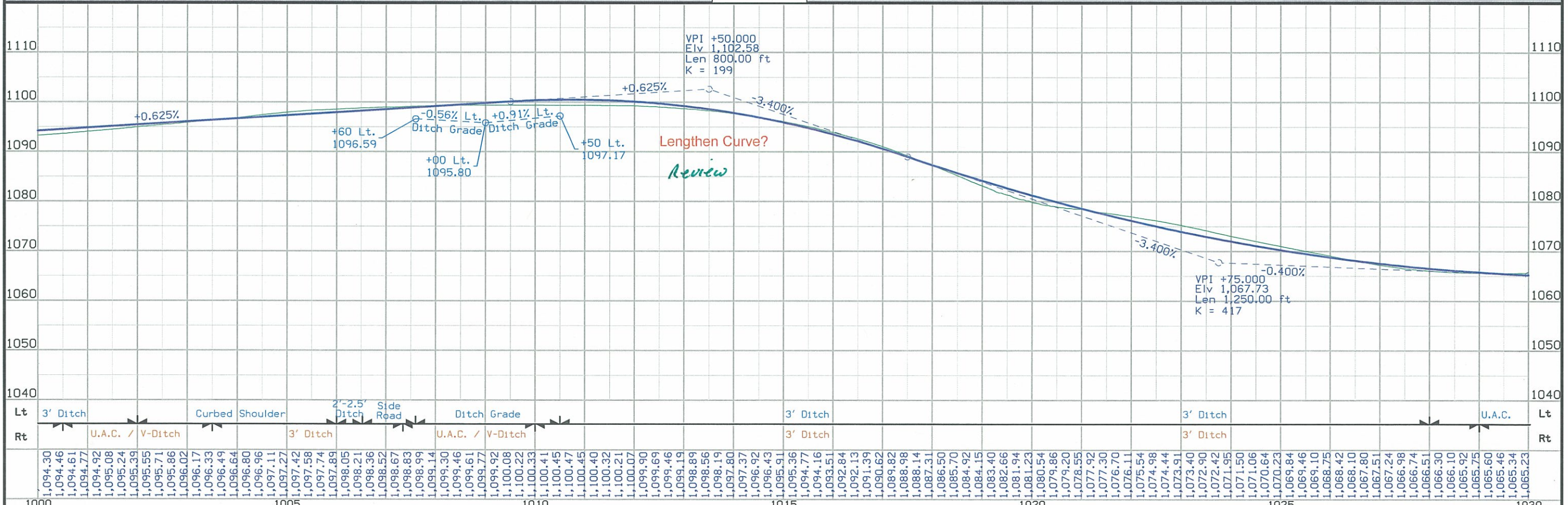
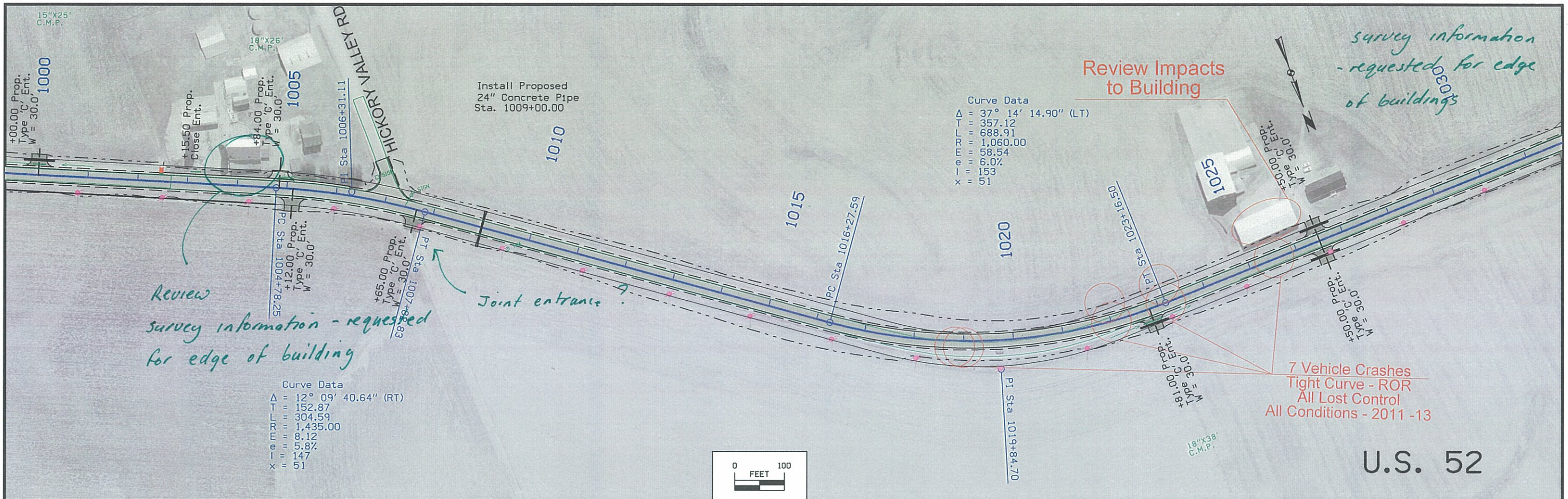


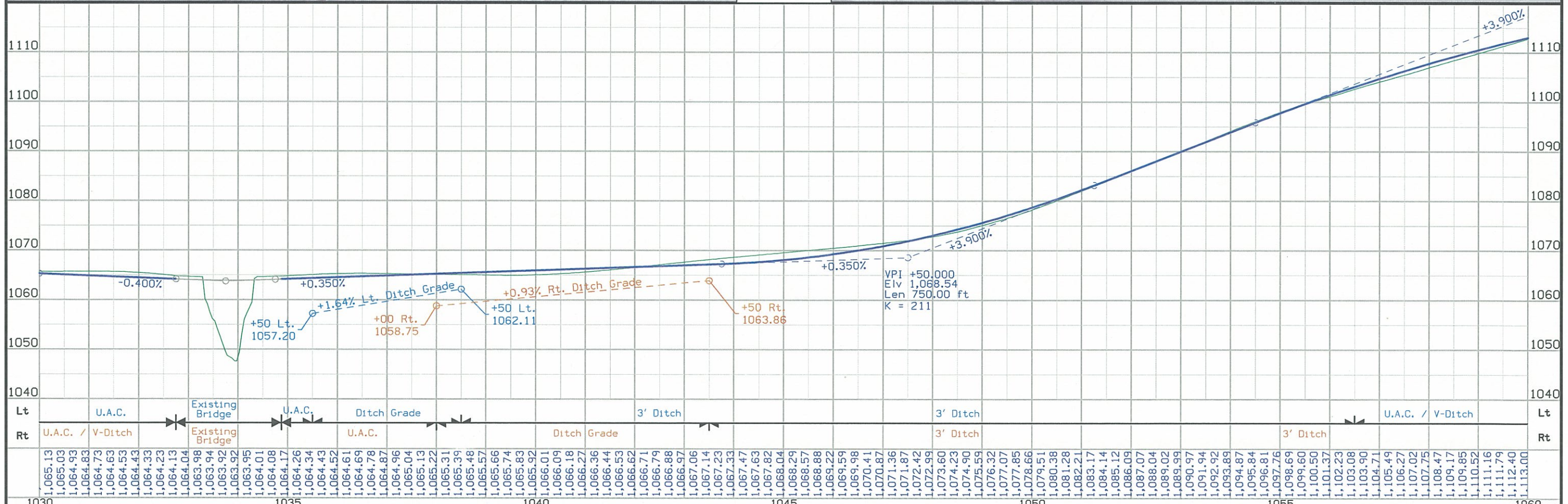
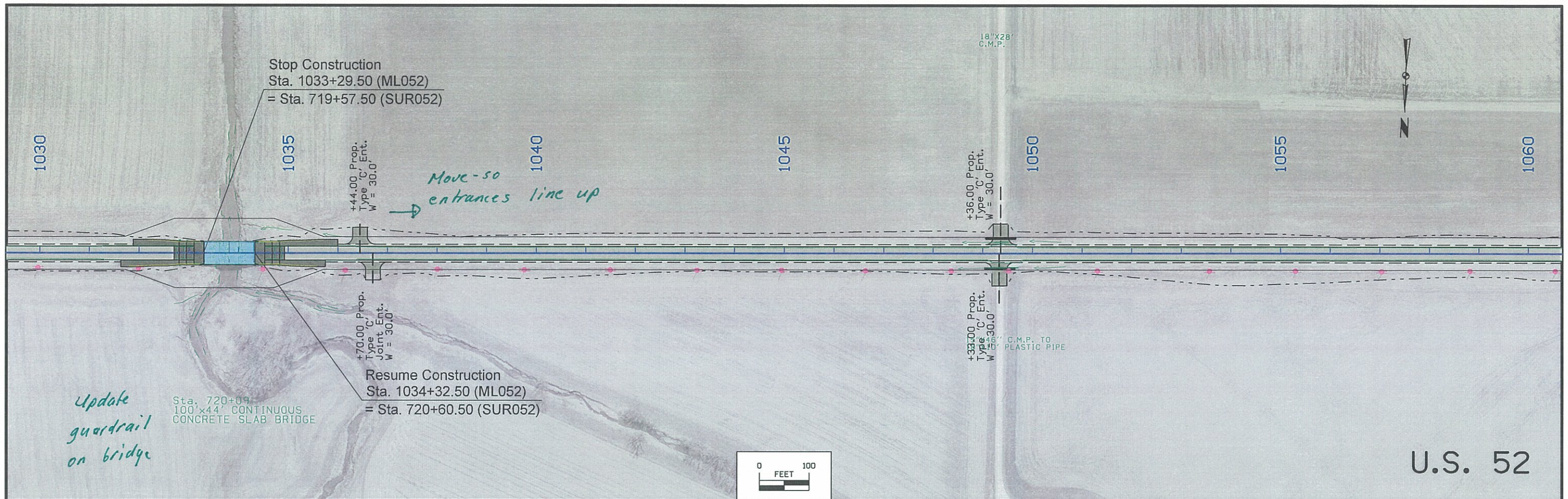
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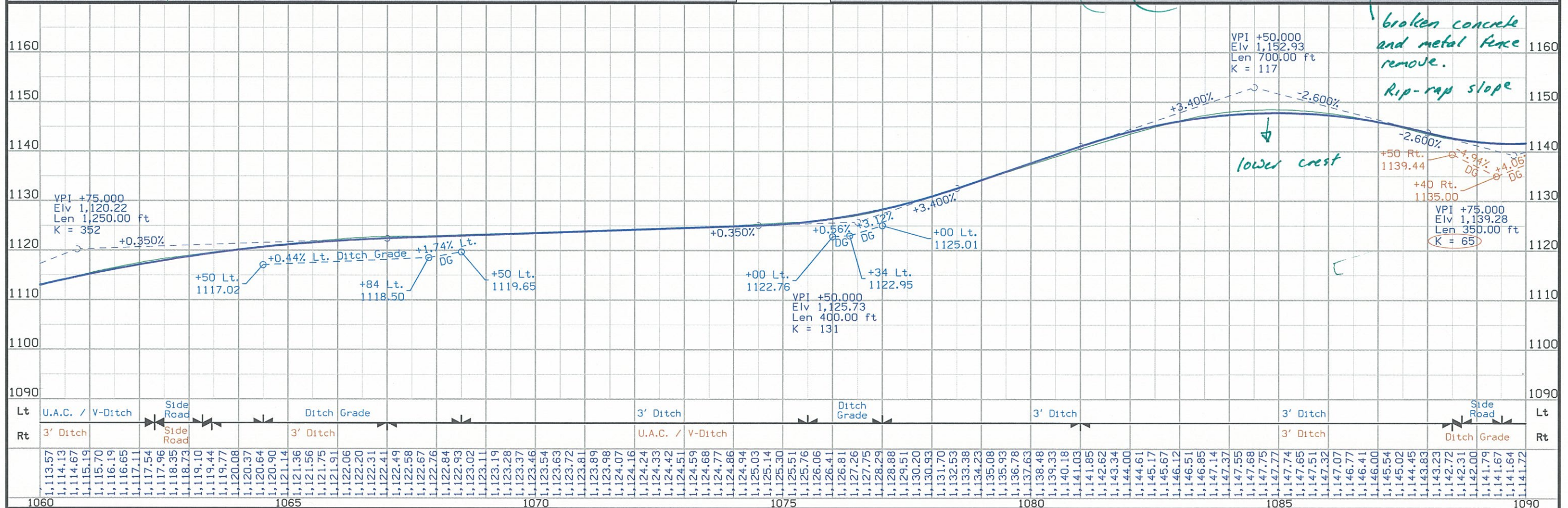
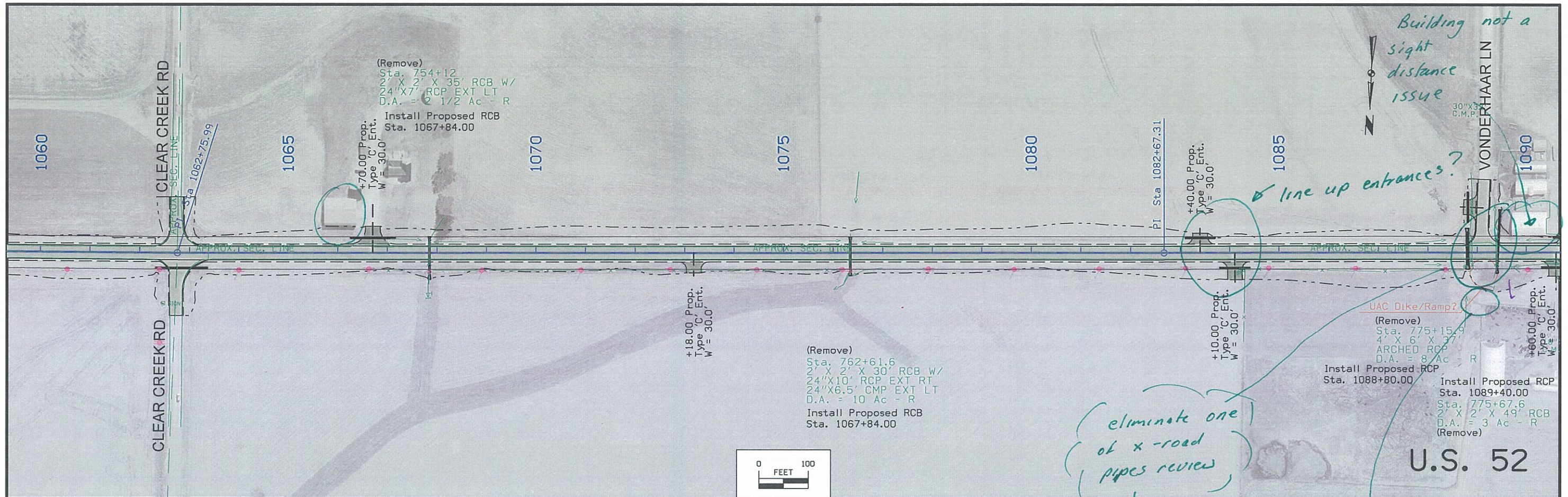


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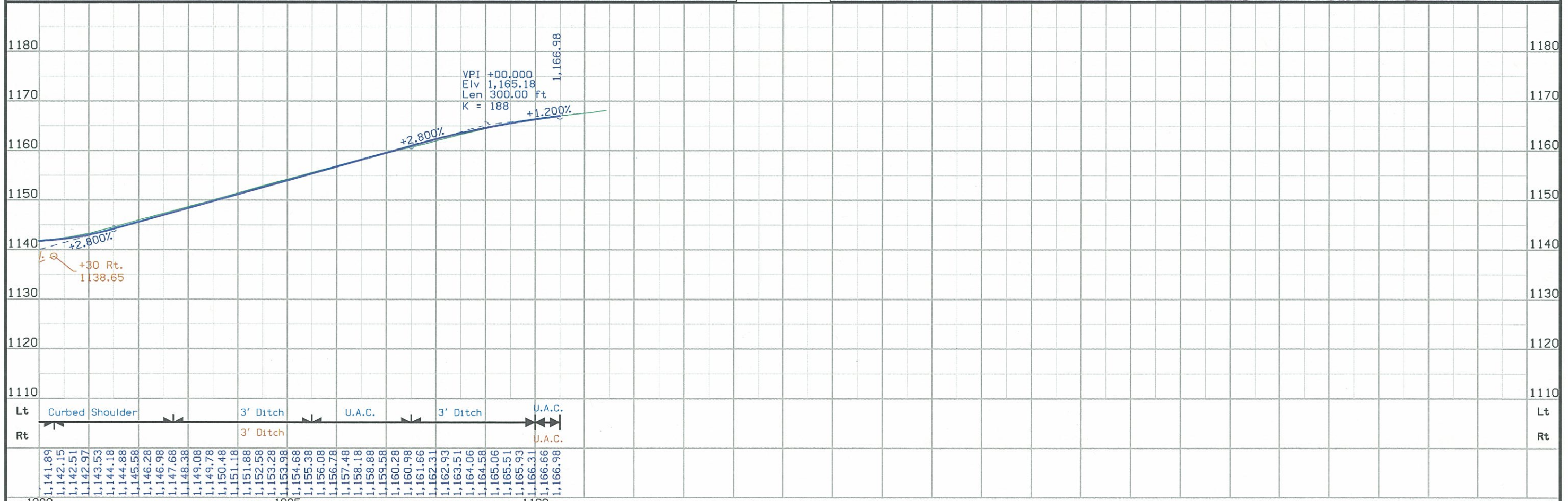
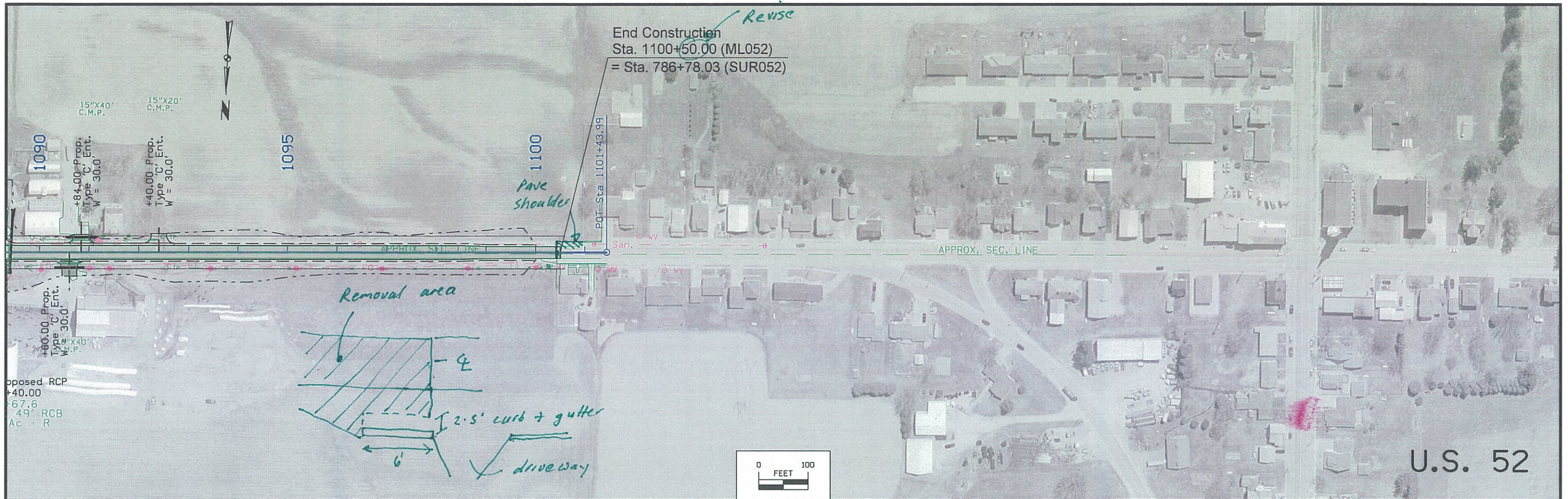


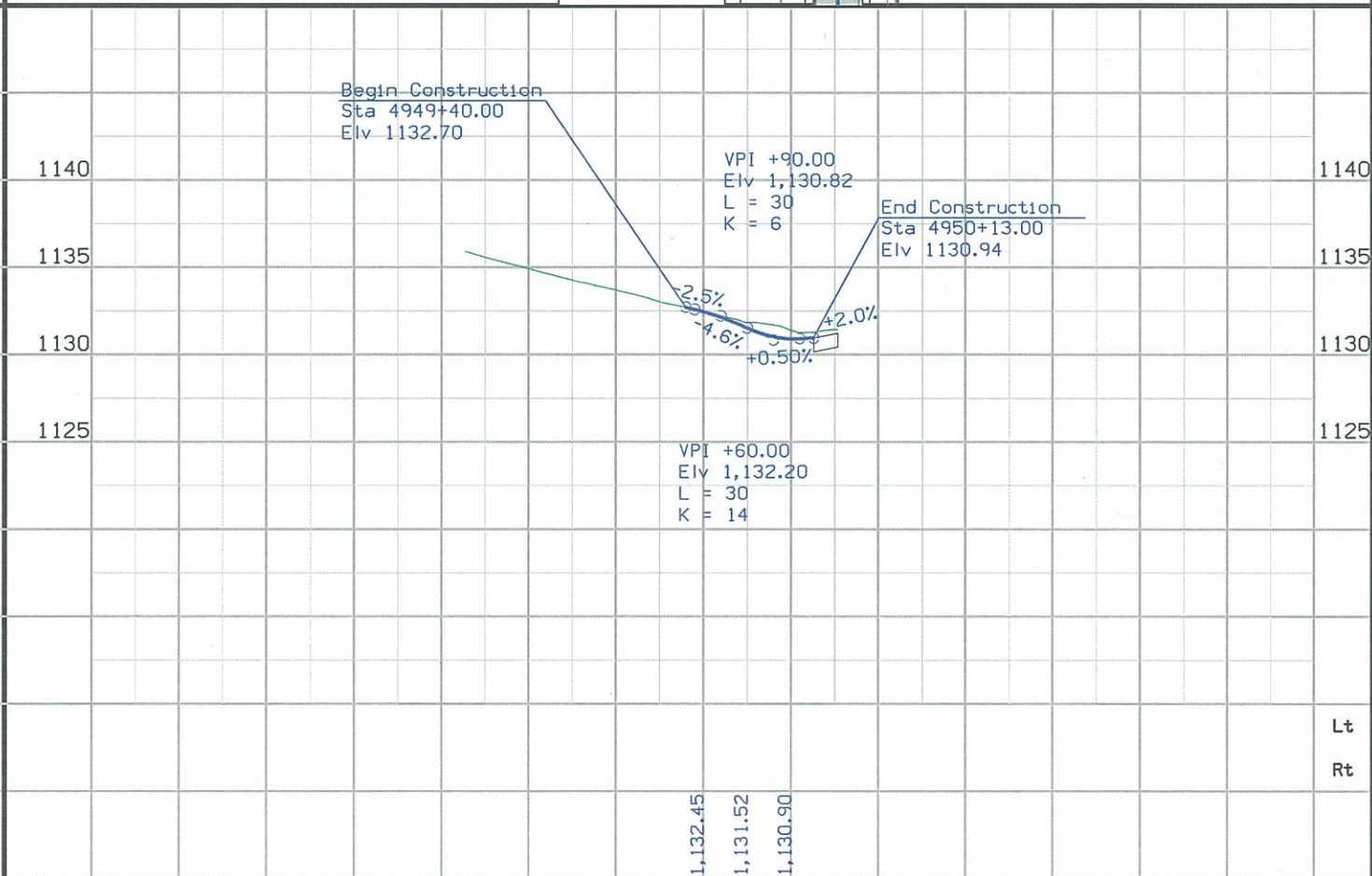
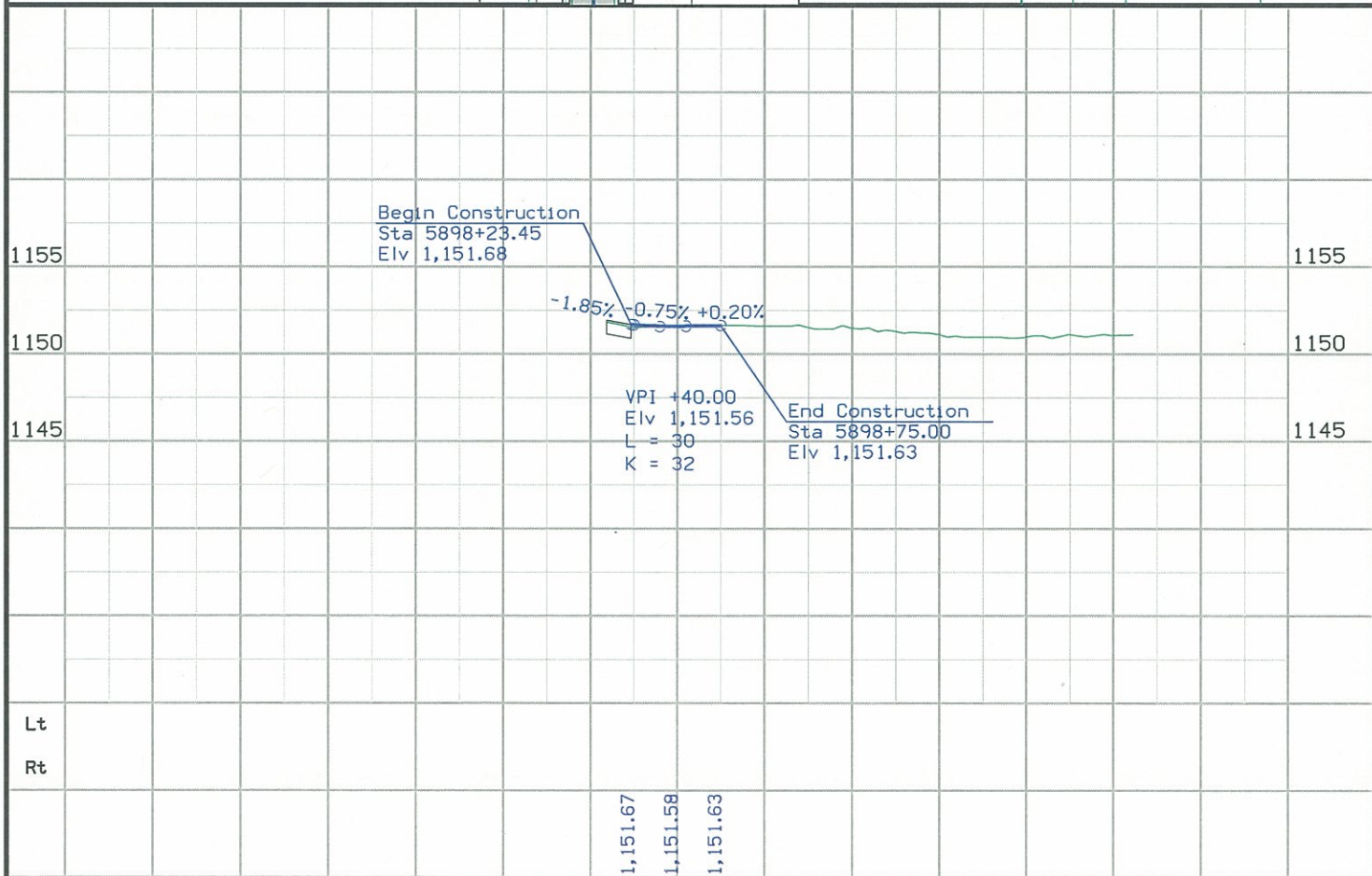
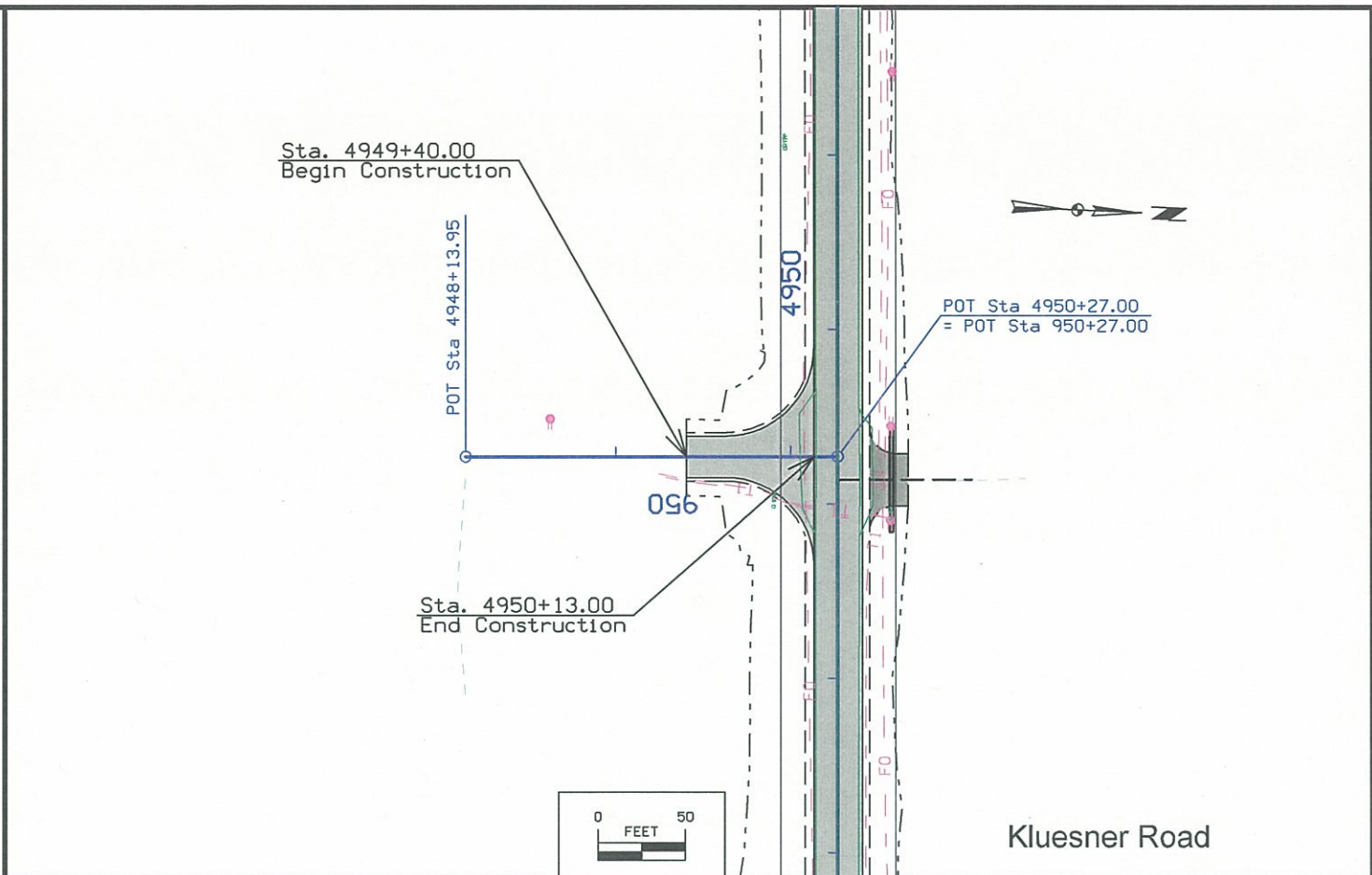
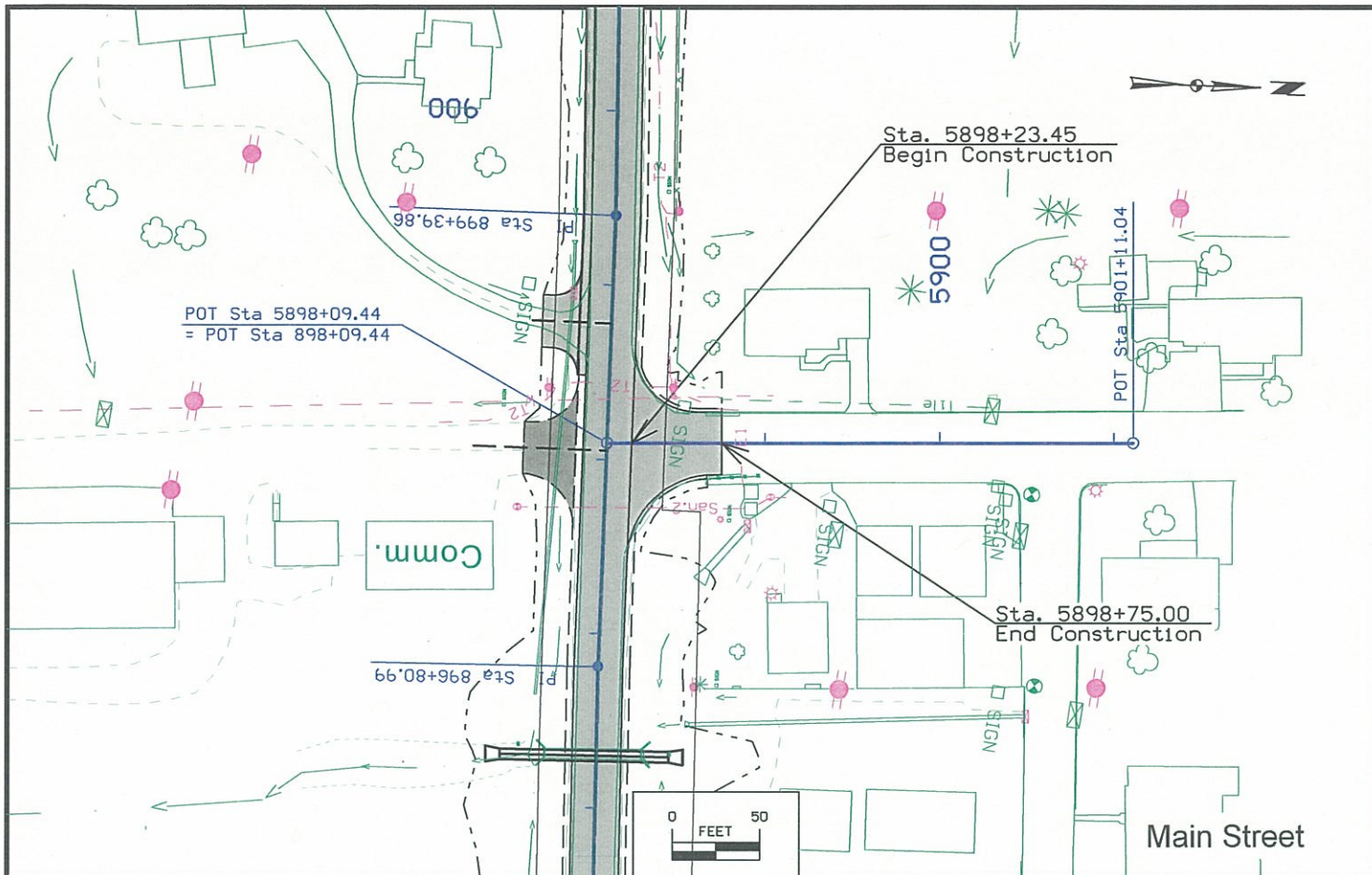
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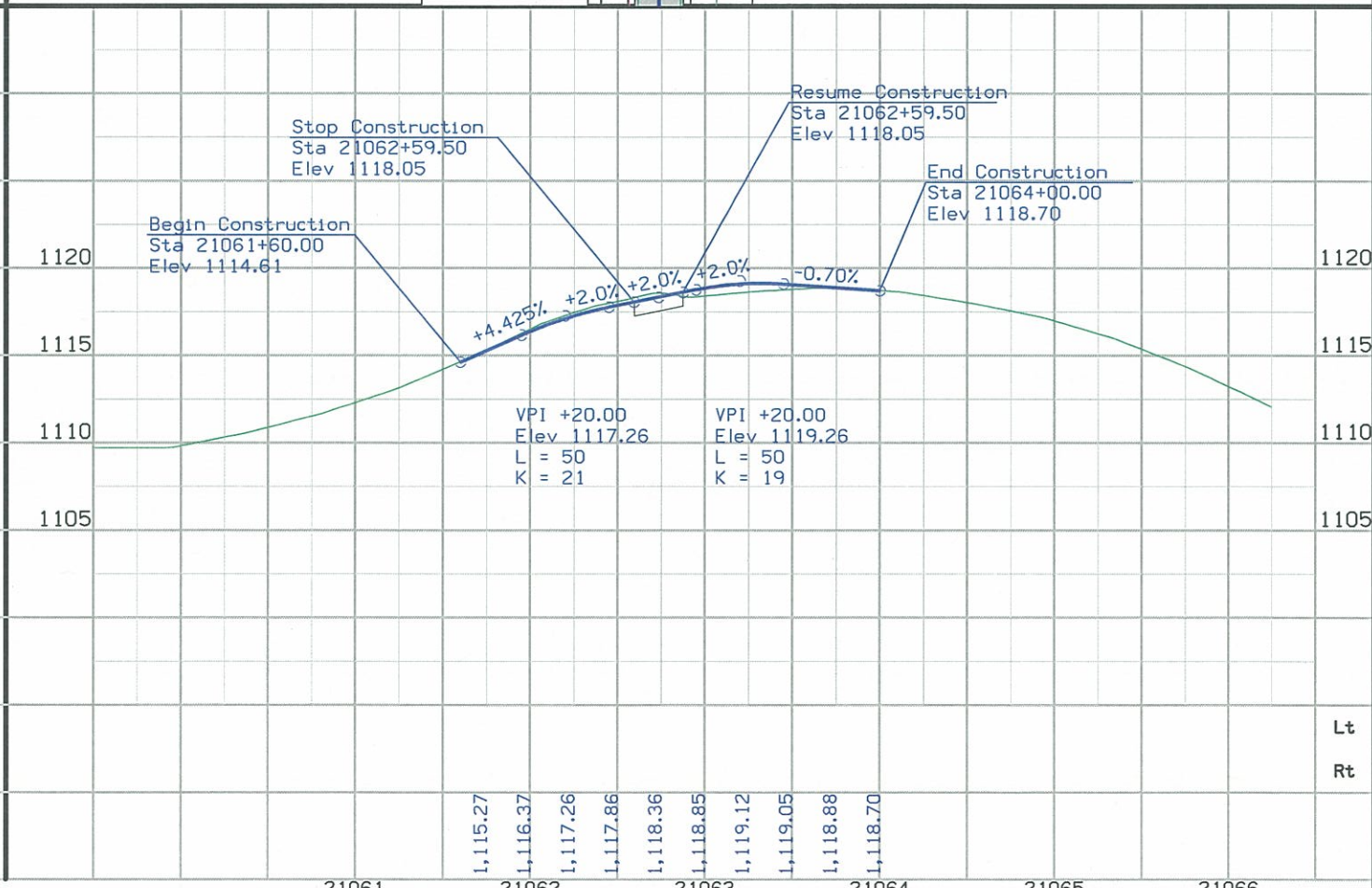
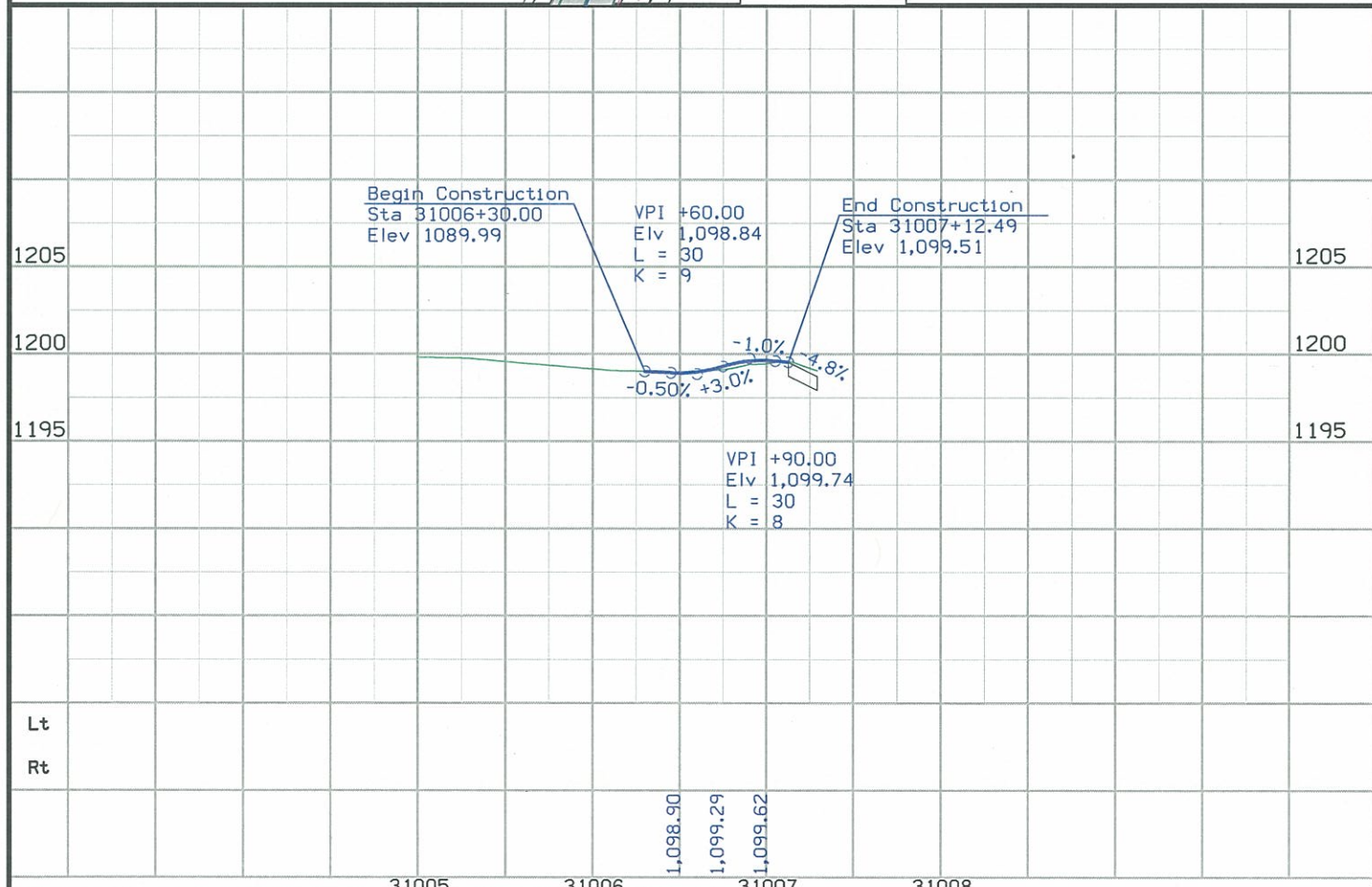
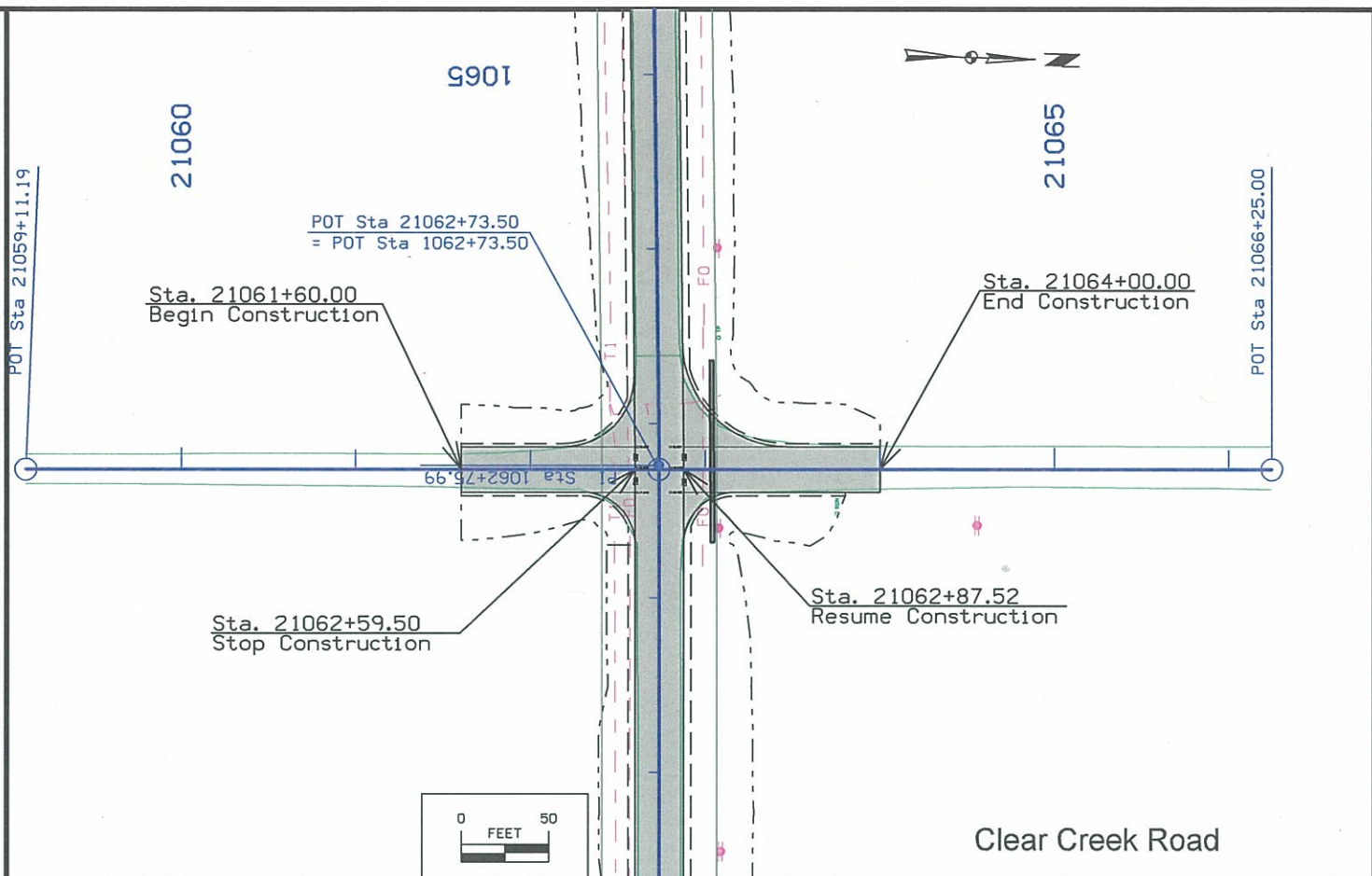
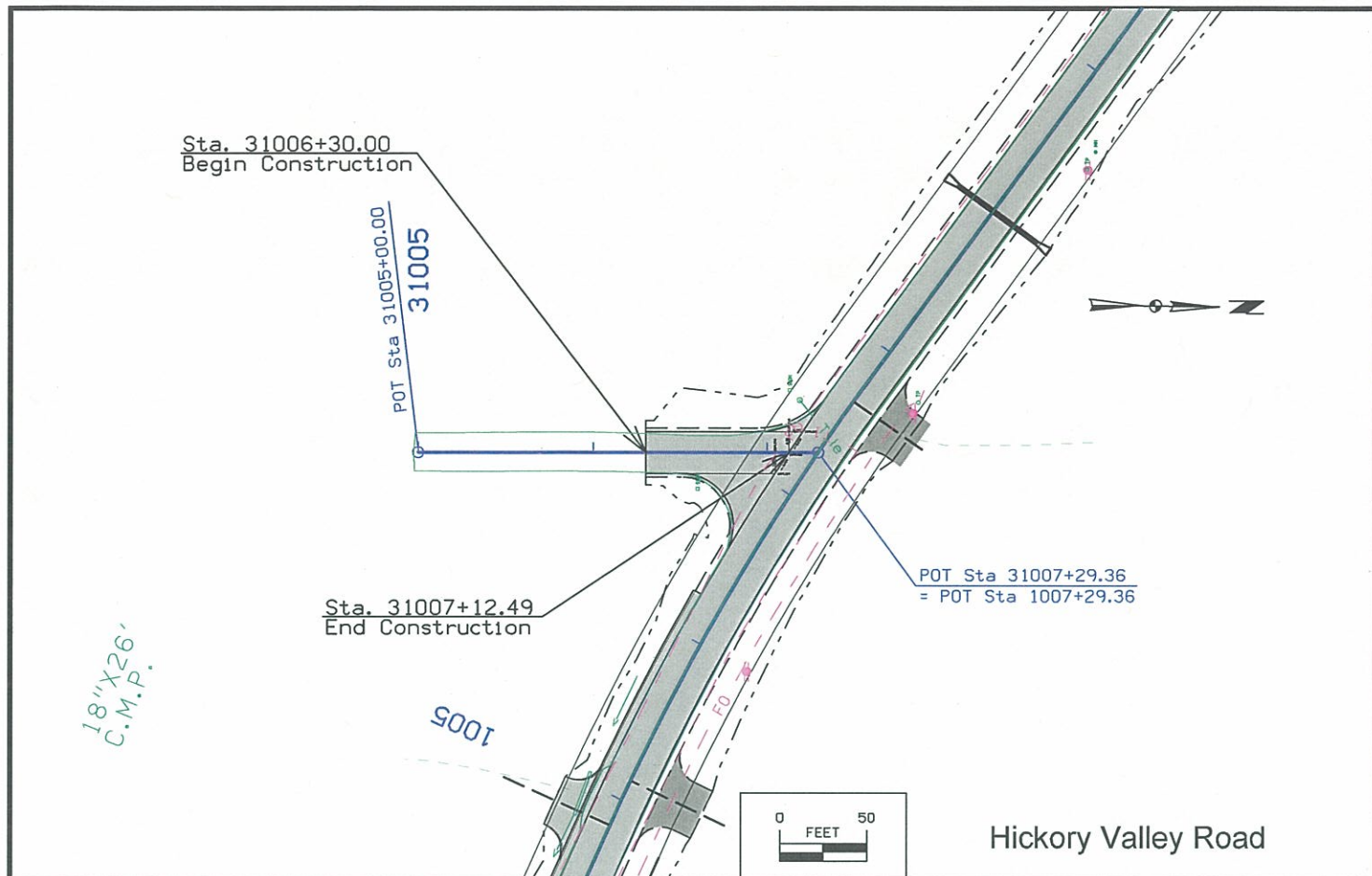


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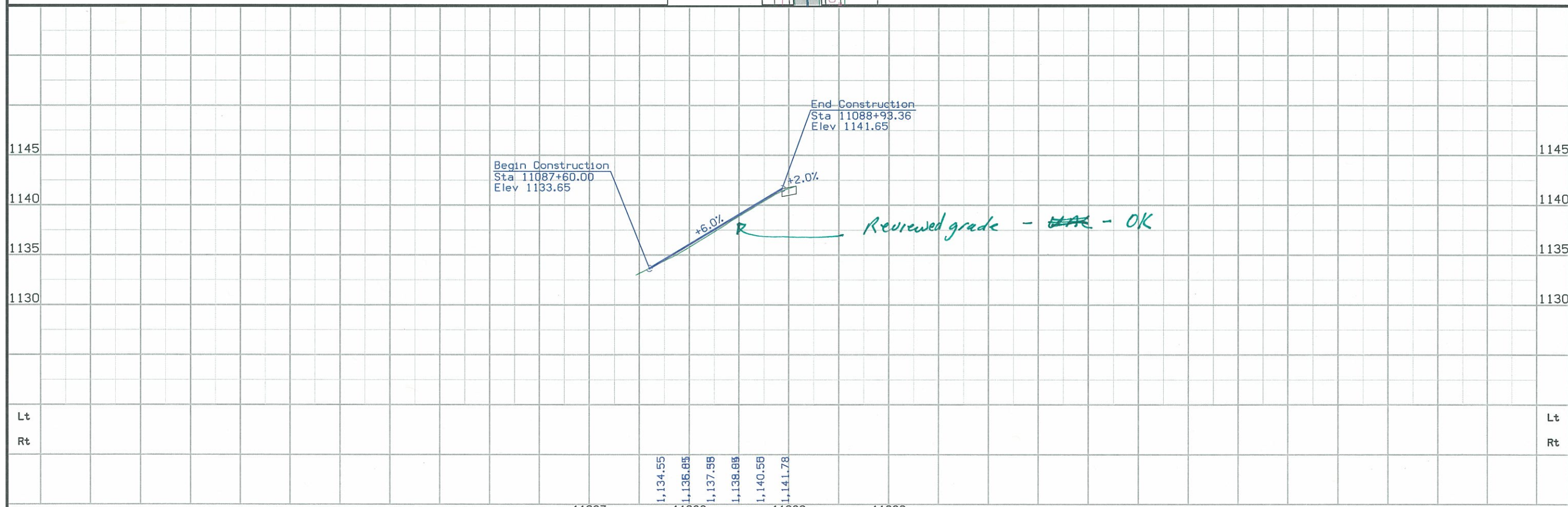
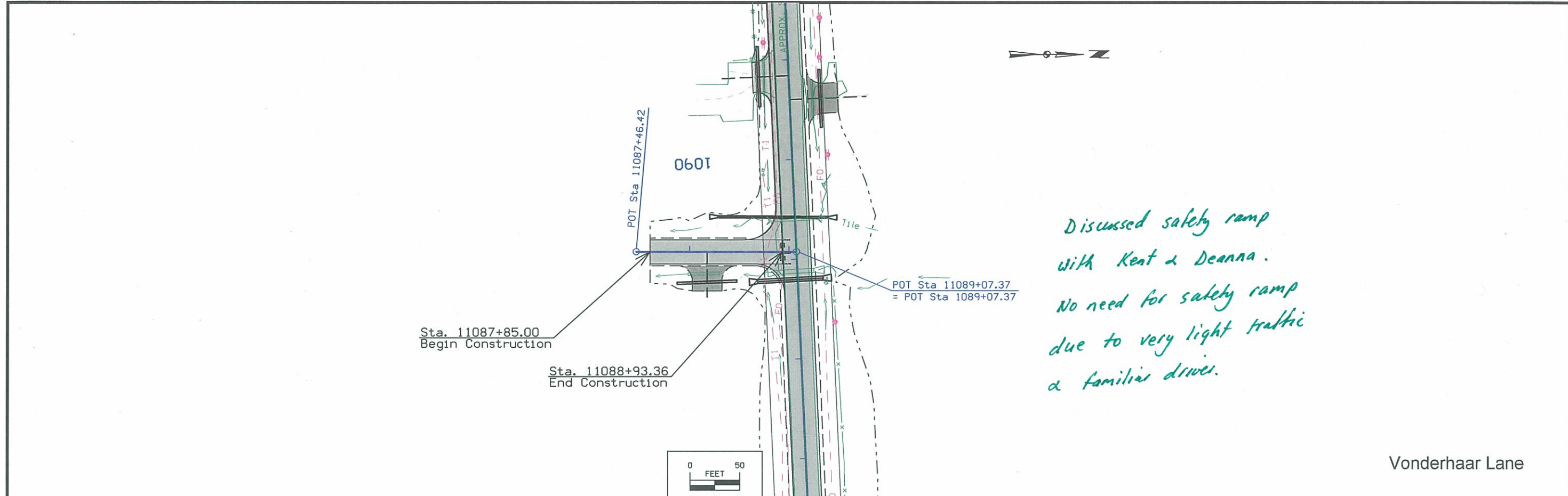








FILE NO.	ENGLISH	DESIGN TEAM	Yanxiao Jia \ Holst \ Skogerboe	DUBUQUE COUNTY	PROJECT NUMBER	STP-052-2(121)-2C-31	SHEET NUMBER	E.2
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## Survey Information

This survey is for road re-construction.

### Vertical Control

Vertical datum for this survey is relative to 1st. Order NGS monuments along US 52.

### Horizontal Control

Geodetic datum for this survey is relative to NAD 83 (2011) Modified Iowa State Plane North Zone (US Survey Feet.) A National Geodetic Survey HARN marker designated as A178 was used to transfer coordinates to Project Control. Redundant RTK observations were used to verify the published values. The project coordinates are scaled around NGS Pt. A178 at 3687343.14 N, 5619919.96 E, 1121.97 EL. Additional control points were placed throughout the project using a GNSS Base-Rover setup relative to Pt. A178. A minimum of three observations with appropriate time spans between were averaged. The horizontal standard deviation of these observations was less than 0.03 ft. at 95% confidence level (2 sigma).

1/Combined Scale Factor of project= 1.000102260823

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built plans FN-3-9(21)—21-31. Survey stationing was related to the plan station opposite a reference monument found at PI Sta. 585+59.6 and run ahead without equation.

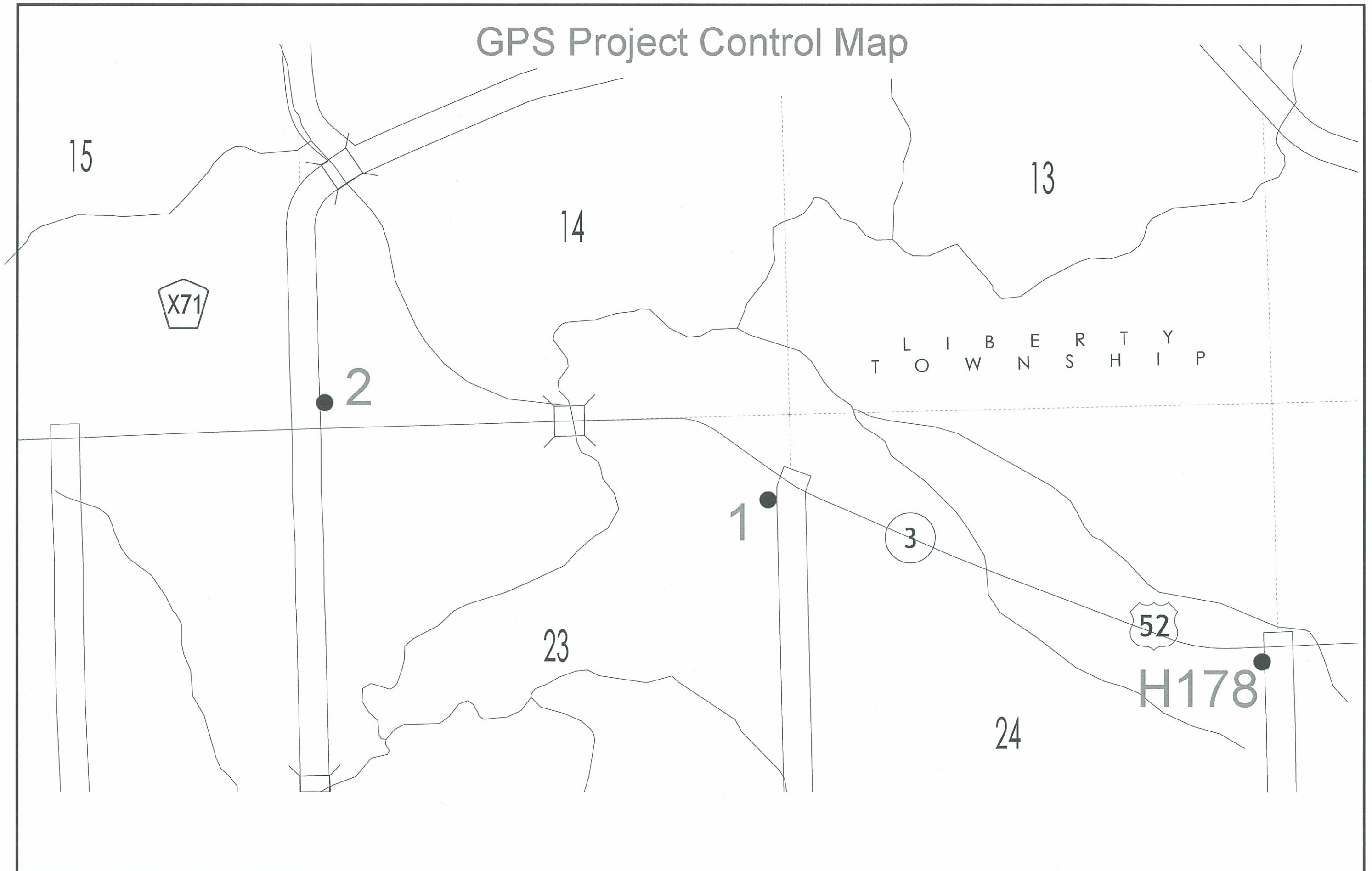
Survey stationing relates to as built plan stationing as follows:

PI Sta. 585+59.6 FN-3-9(21)—21-31 plans=  
Survey PI Sta. 585+59.6

## GPS PROJECT CONTROL

Point	North	East	Elevation	Station	Offset	Feature	Description
H178	3689643.411	5590167.017	1133.8400	636+71.99	-175.1803	CP	FD USGS MON. CONTROL POINT
1	3691500.6430	5584814.7230	1097.4600	693+10.67	-93.2299	CP	SET FENO CONTROL POINT
2	3692314.7130	5579528.2660	1118.1300	748+67.21	111.8293	CP	SET FENO CONTROL POINT

# GPS Project Control Map

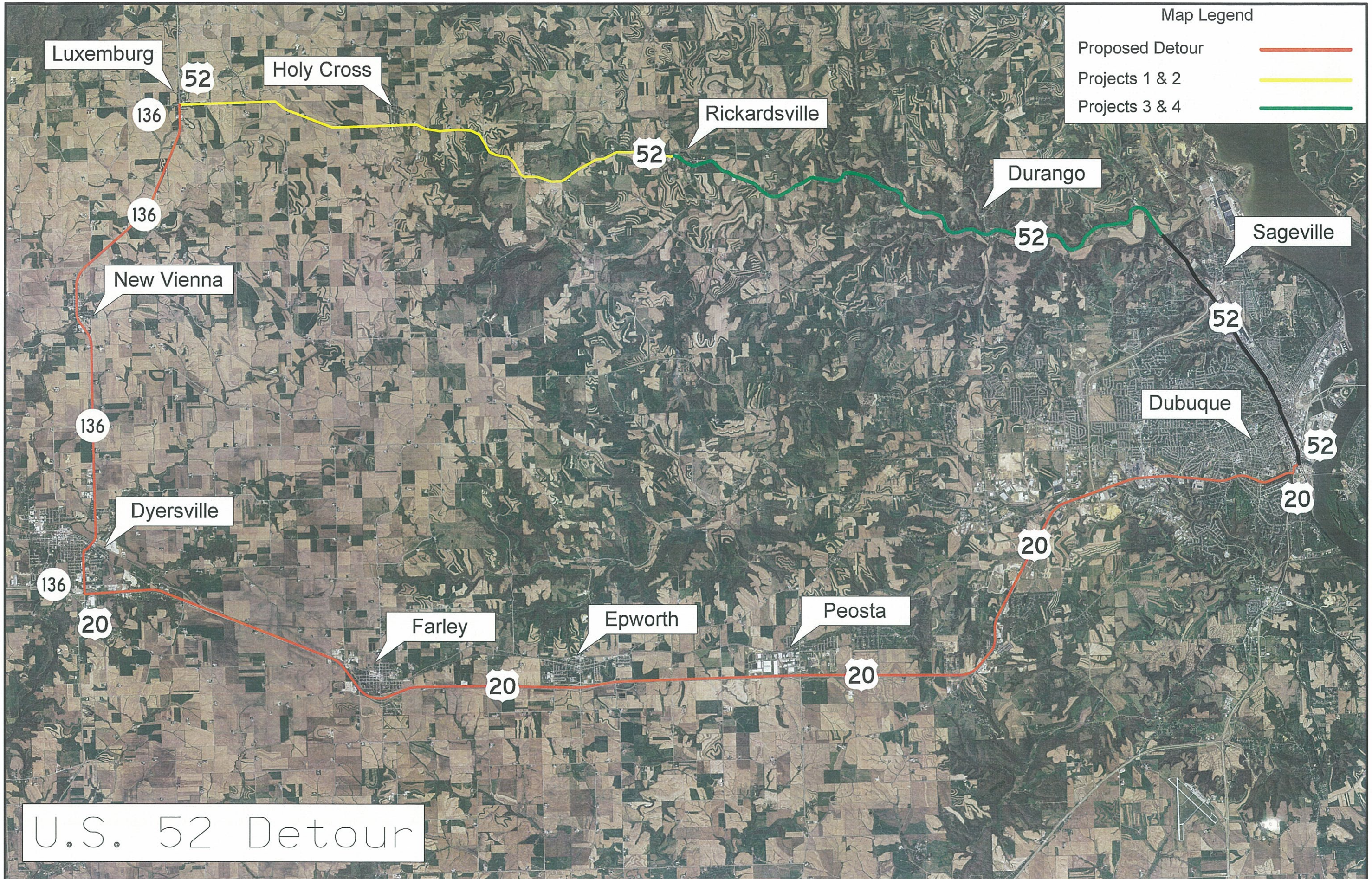


108-23A  
08-01-08

### TRAFFIC CONTROL PLAN

During construction, U.S. 52 will be closed and traffic will be routed to an off-site detour.

The Contractor will maintain local access to residents.



Map Legend

- Proposed Detour —
- Projects 1 & 2 —
- Projects 3 & 4 —

U.S. 52 Detour



**LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)**

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\RCB
- Proposed Pipe\RCB
- Proposed Dike
- All Elements Associated with Proposed Entrances

**LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)**

- TS ————— Topsoil (Class 10)
- TS A ————— Topsoil (Type A Disposal)
- TS B ————— Topsoil (Type B Disposal)
- TS C ————— Topsoil (Type C Disposal)
- CL 10 ————— Class 10 Materials
- SEL LO ————— Select Loams And Clay-Loams
- SEL SA ————— Select Sand
- UNS A ————— Unsuitable Type A Disposal
- UNS B ————— Unsuitable Type B Disposal
- UNS C ————— Unsuitable Type C Disposal
- SHALE ————— Shale
- WASTE ————— Waste
- B&W LS ————— Broken and Weathered Rock
- ROCK ————— Solid Rock
- BLDRS ————— Boulders

Note: All layer lines and descriptions identify layers above the line.

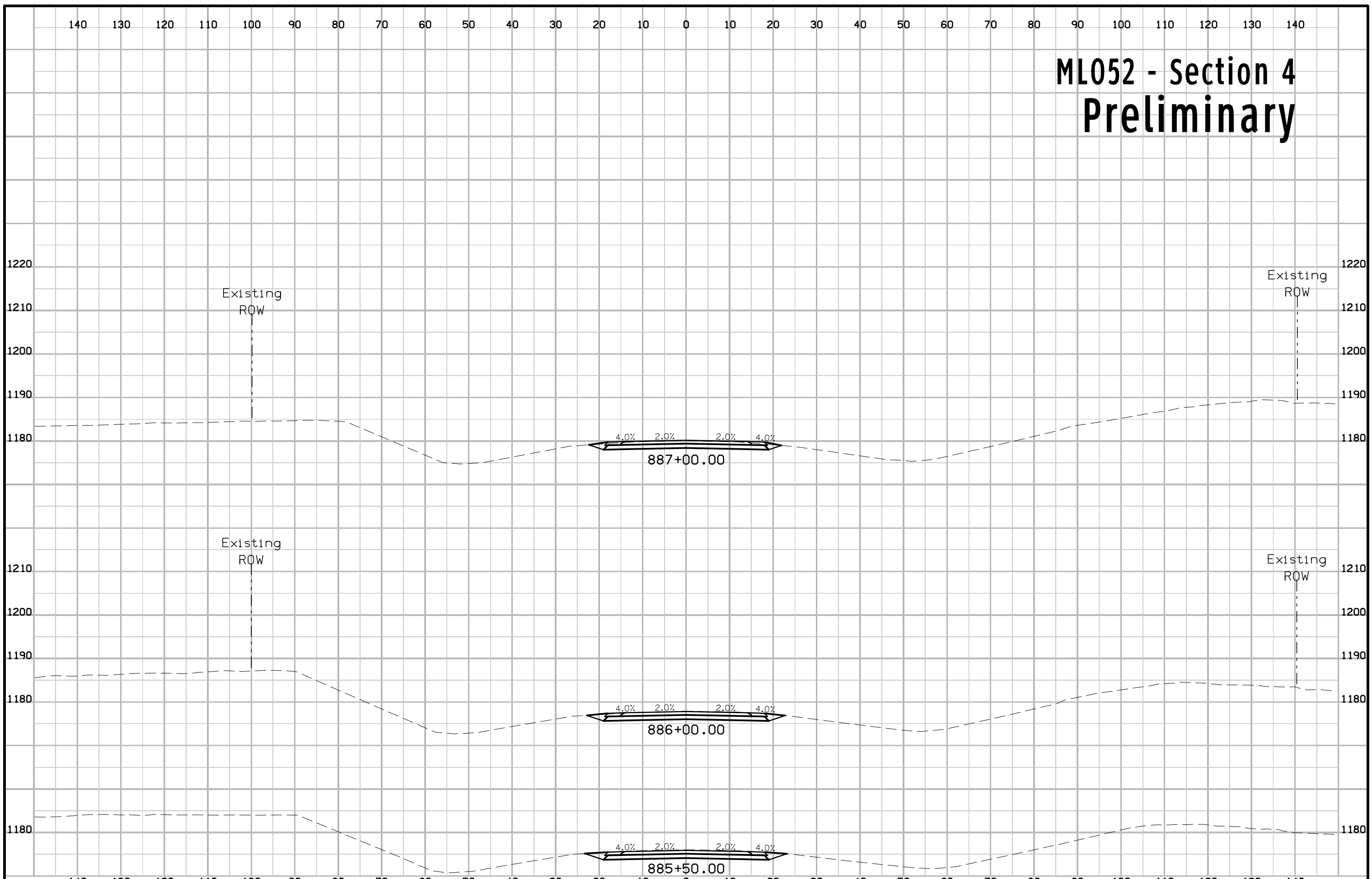
Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

**SYMBOL LEGEND OF CROSS SECTION SHEETS**

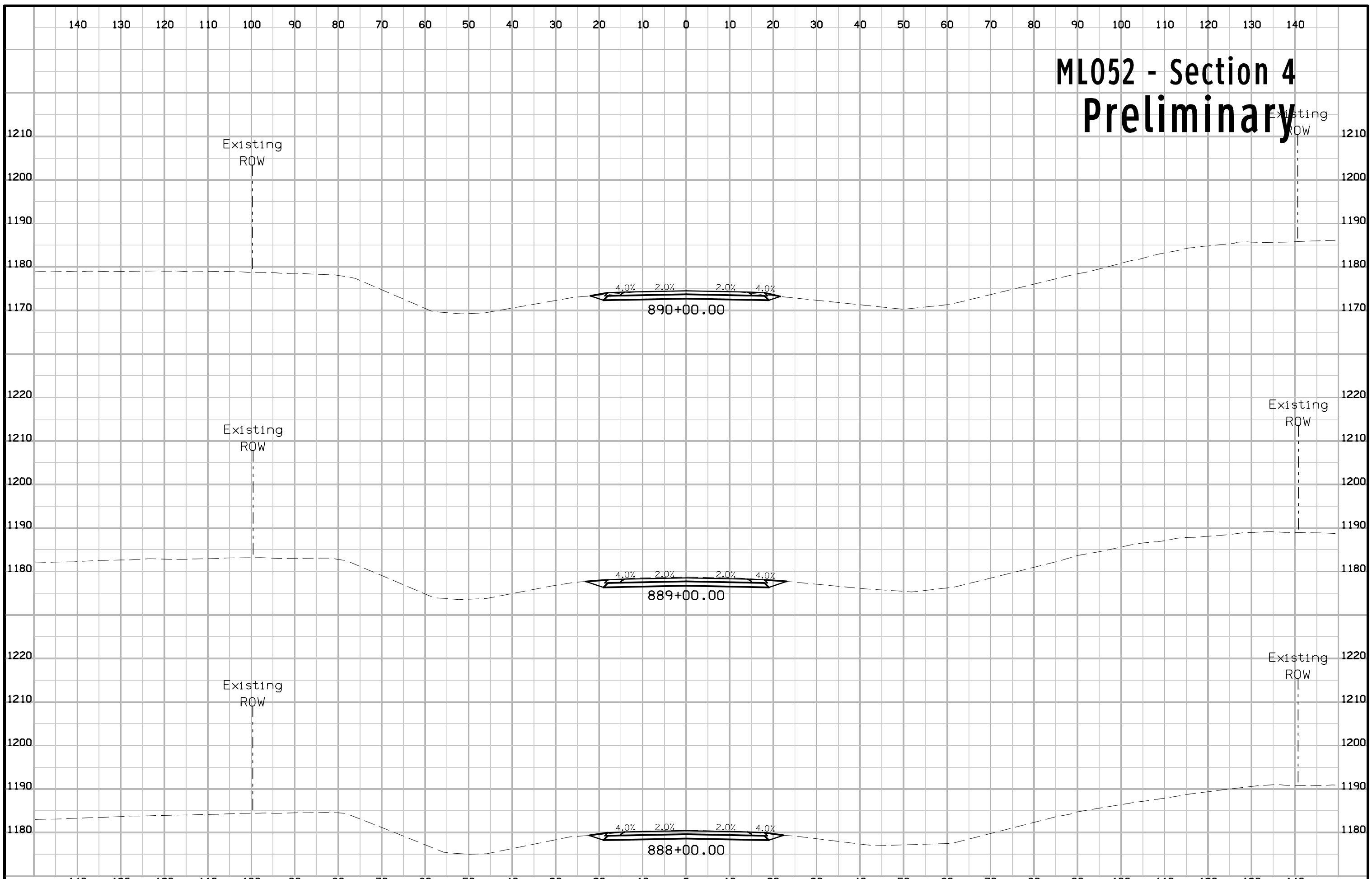
- Existing ROW  
|  
Existing Right-of-Way Limit
- Proposed ROW  
|  
Proposed Right-of-Way Limit
- Temporary ROW  
|  
Temporary Right-of-Way Limit

**CROSS SECTION  
LEGEND AND SYMBOL  
INFORMATION SHEET  
(COVERS SHEET SERIES W, X, Y, & Z)**

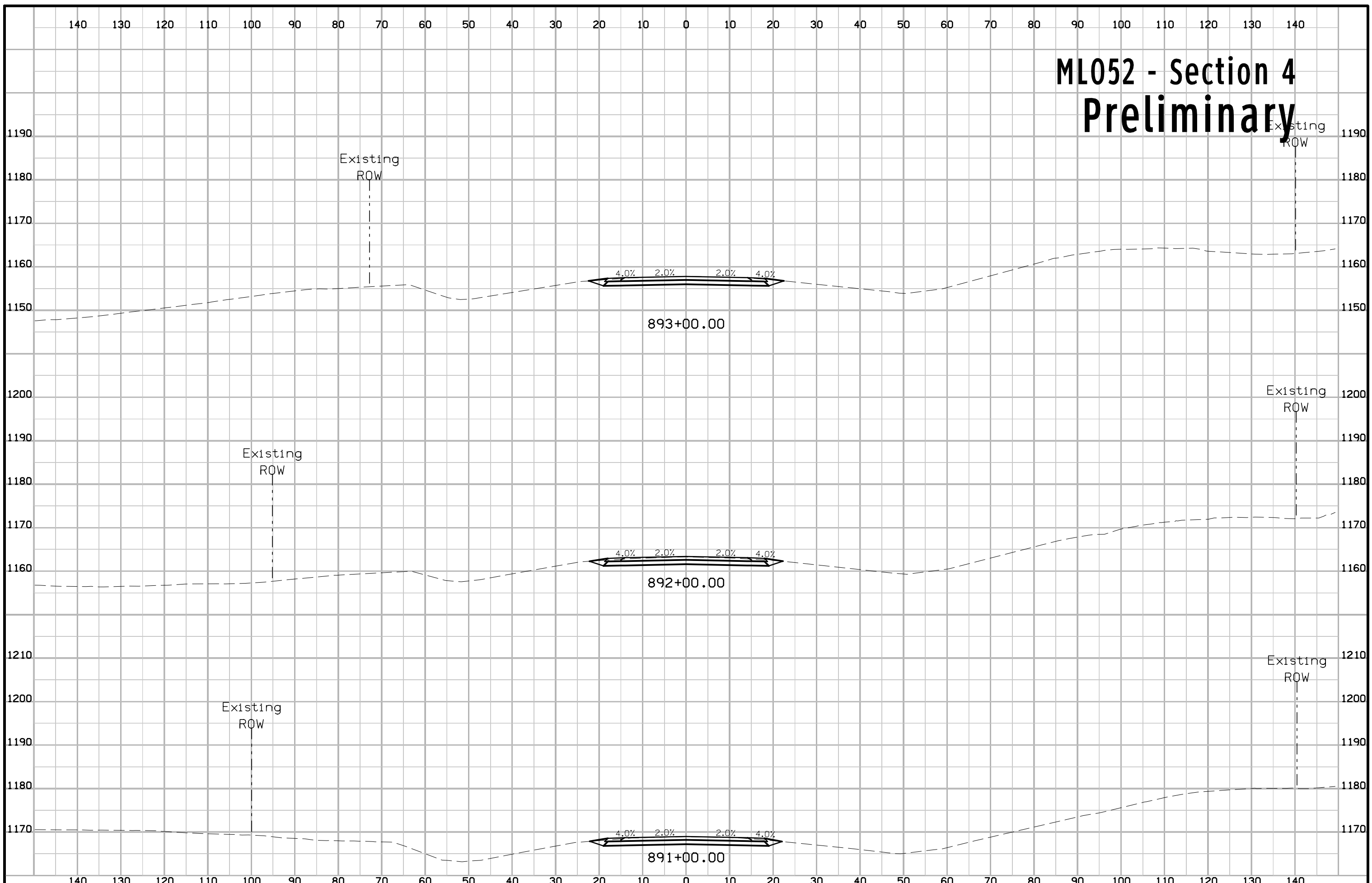
# ML052 - Section 4 Preliminary



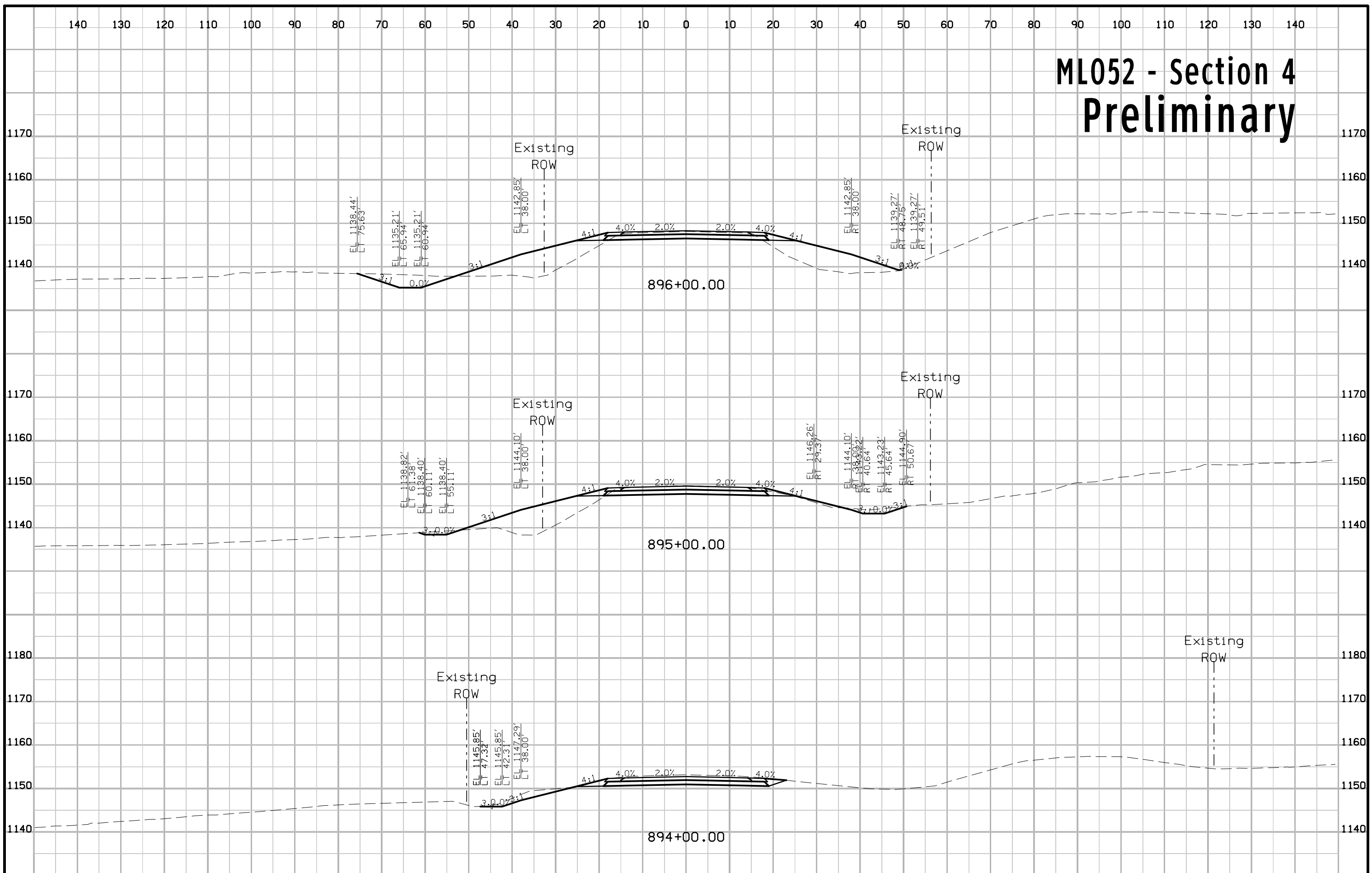
# ML052 - Section 4 Preliminary



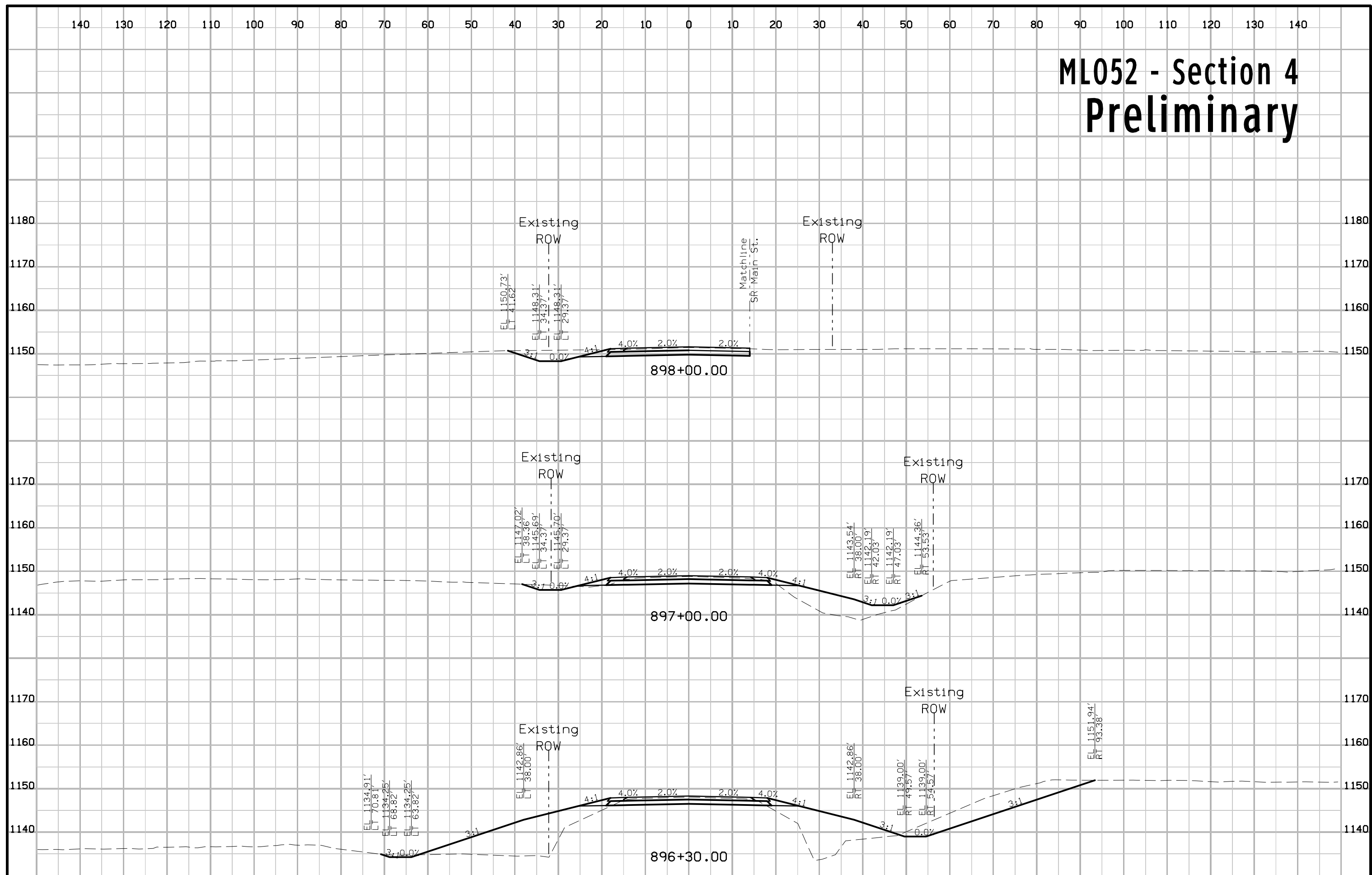
# ML052 - Section 4 Preliminary



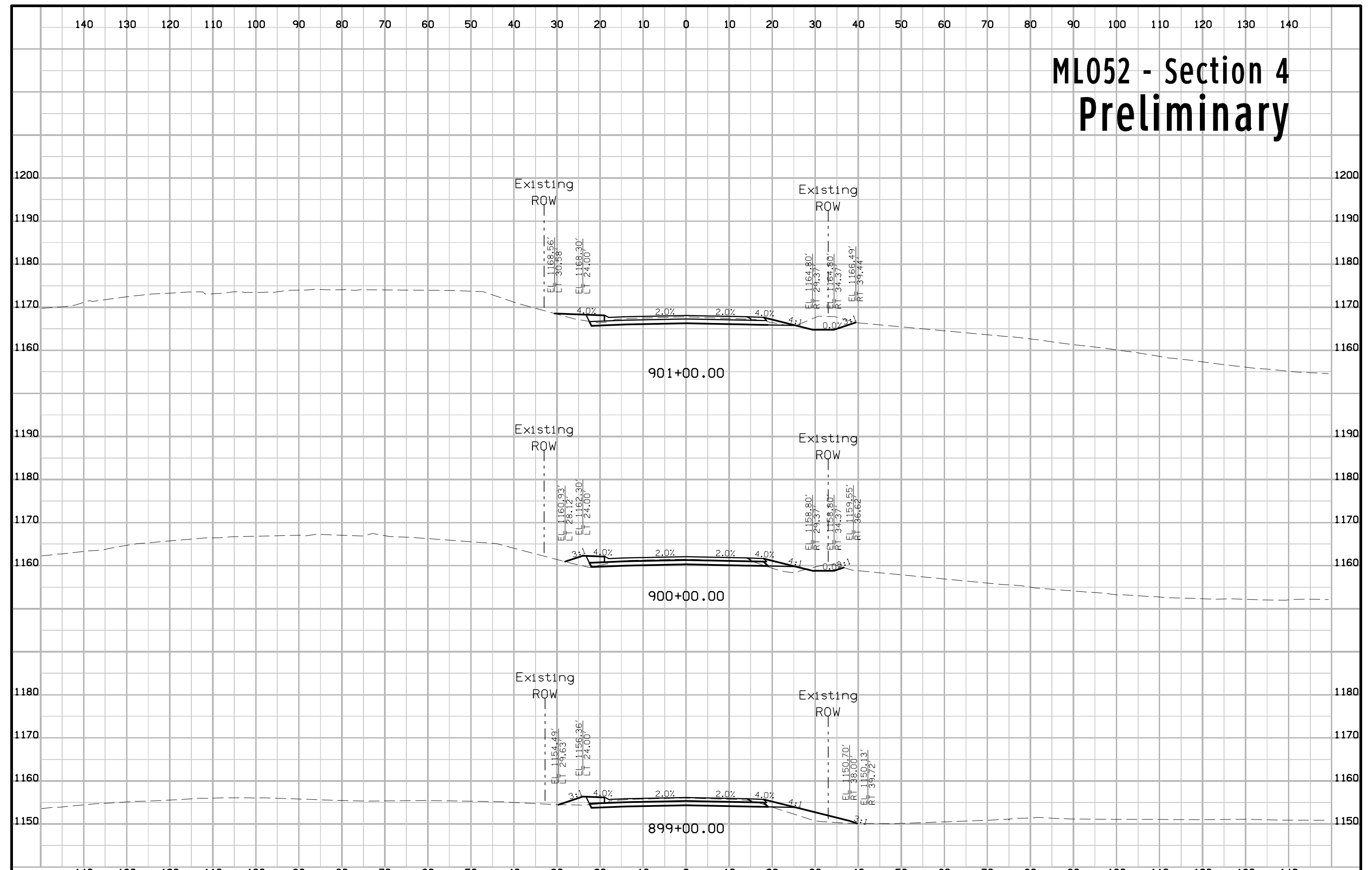
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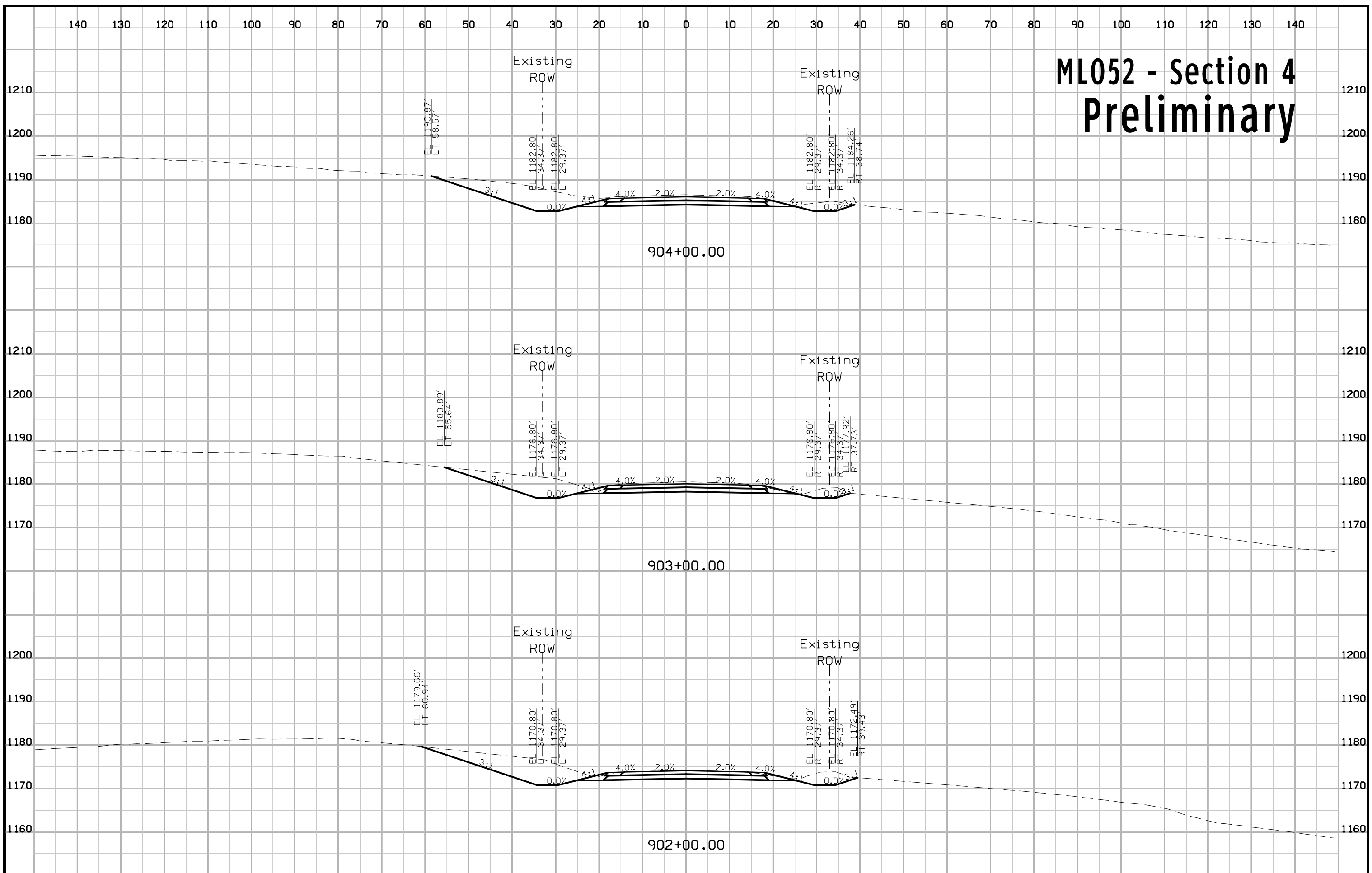
# ML052 - Section 4 Preliminary



# ML052 - Section 4 Preliminary

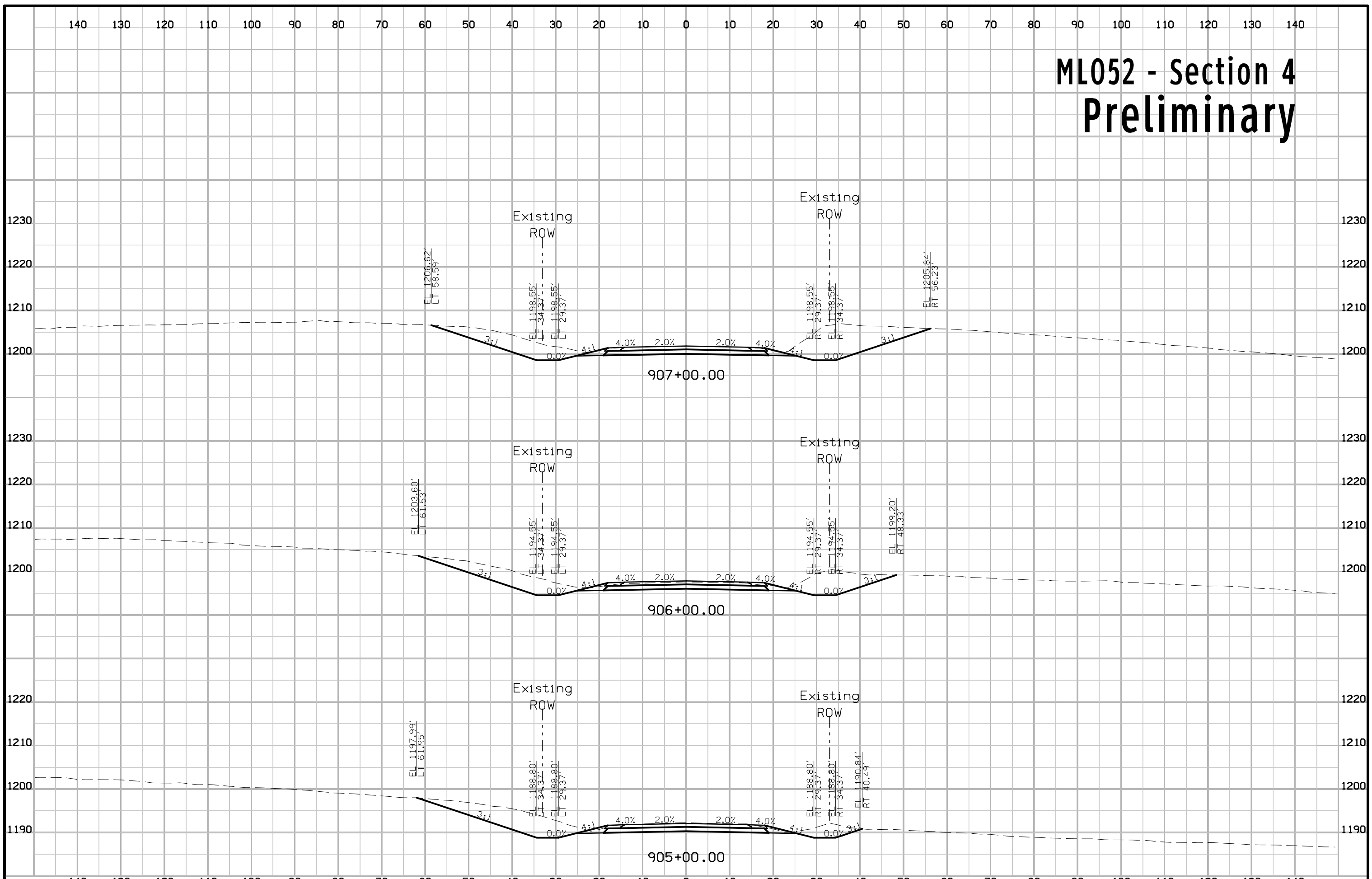


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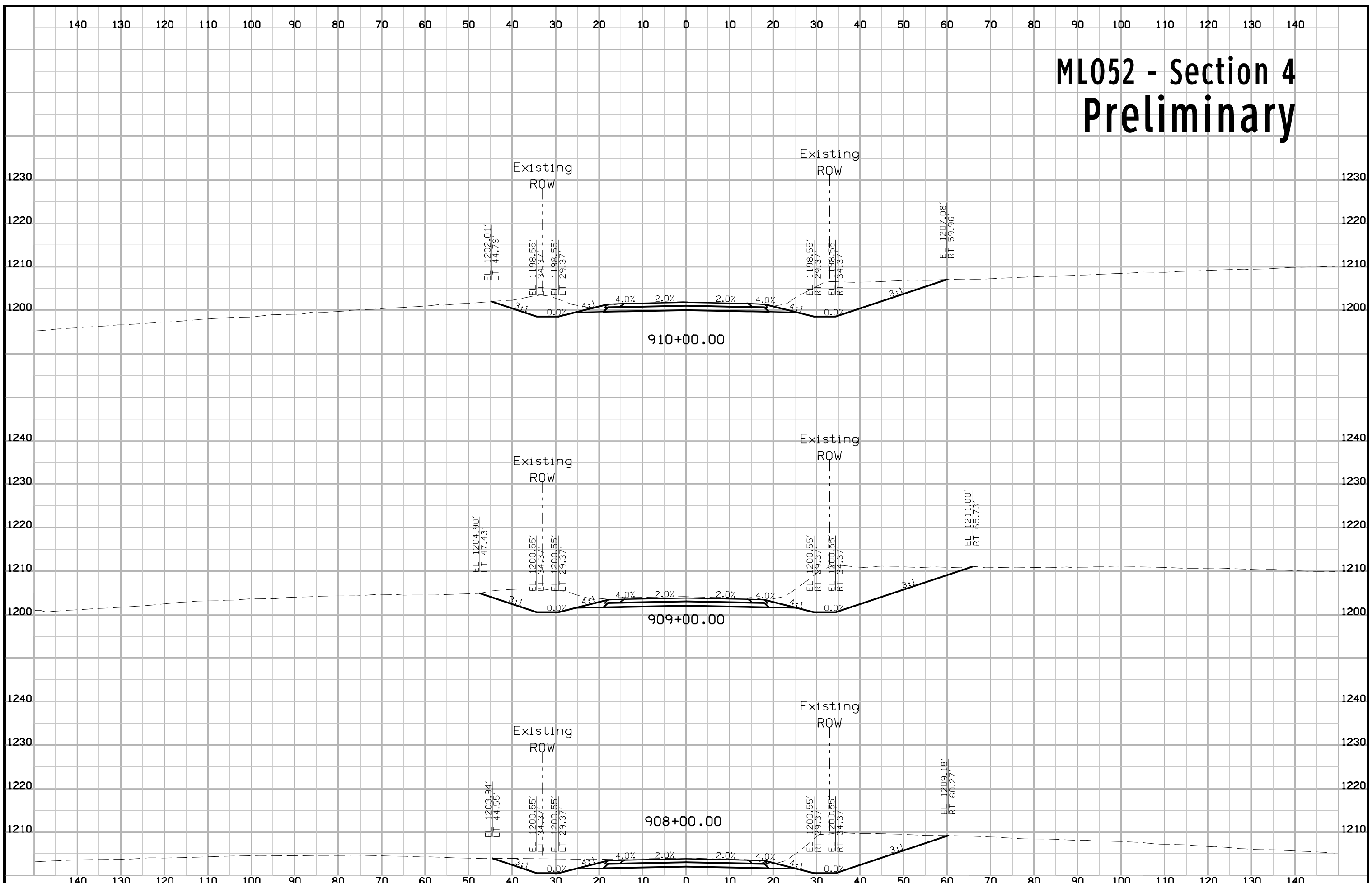




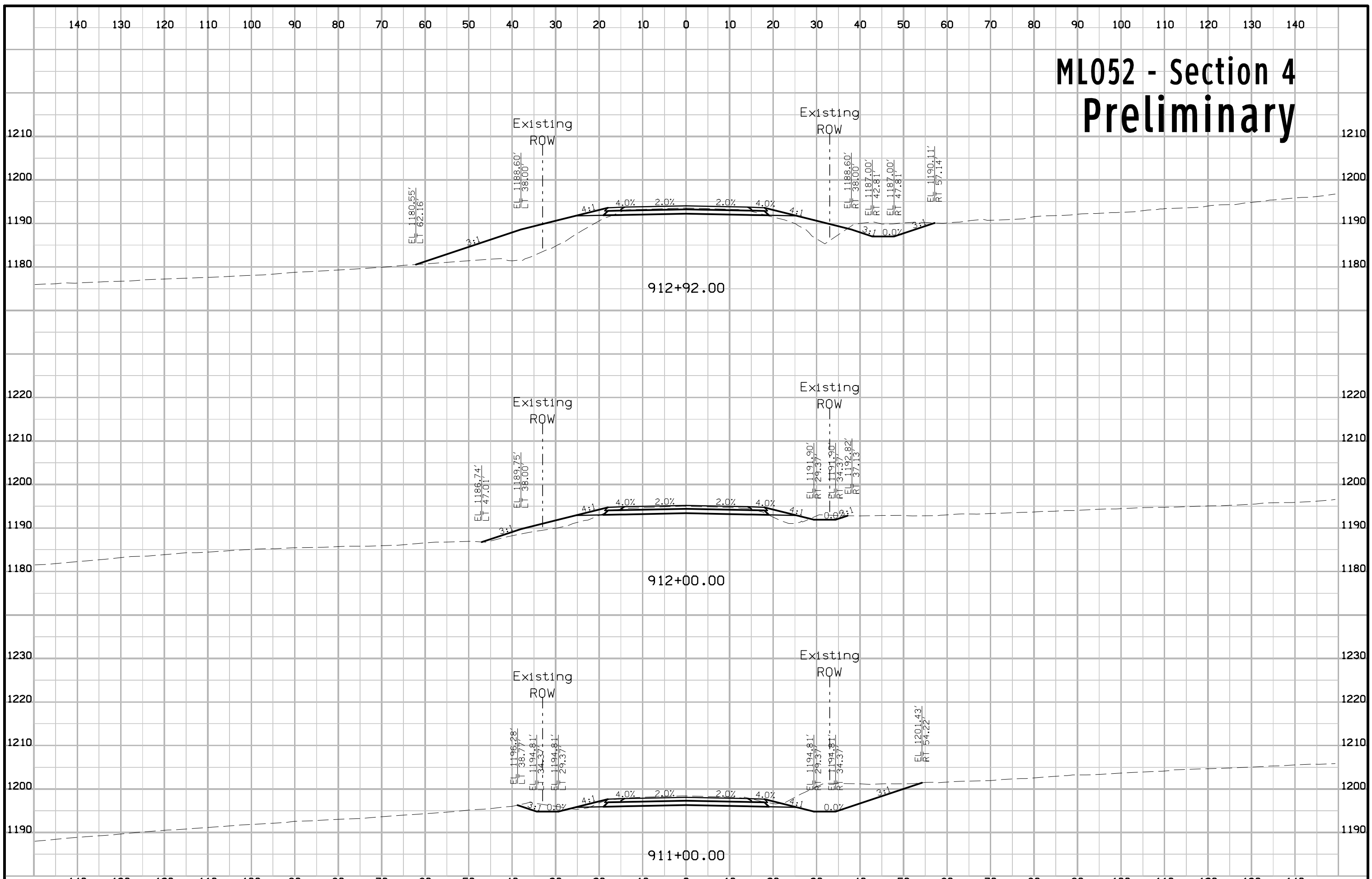
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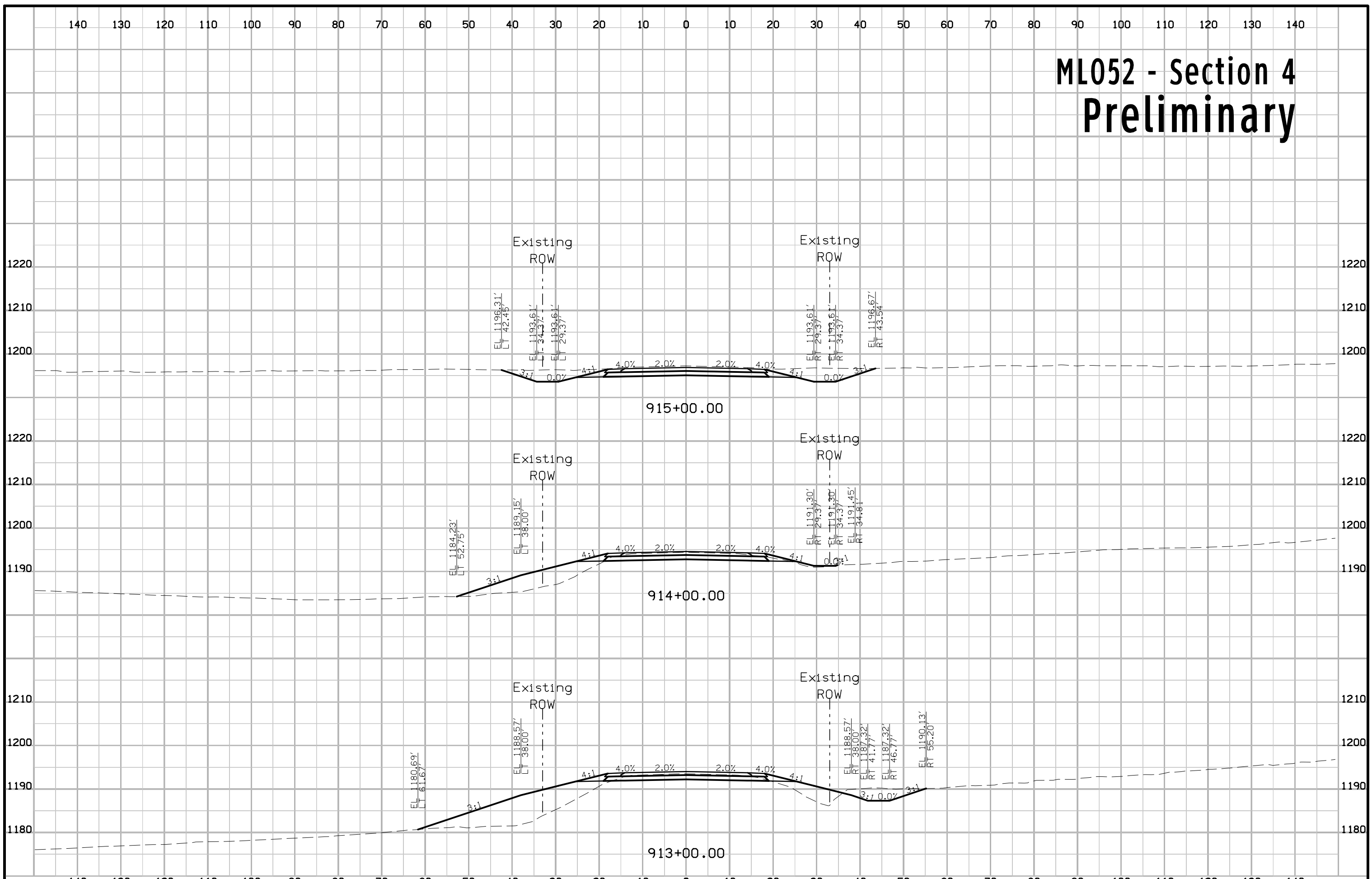
# ML052 - Section 4 Preliminary



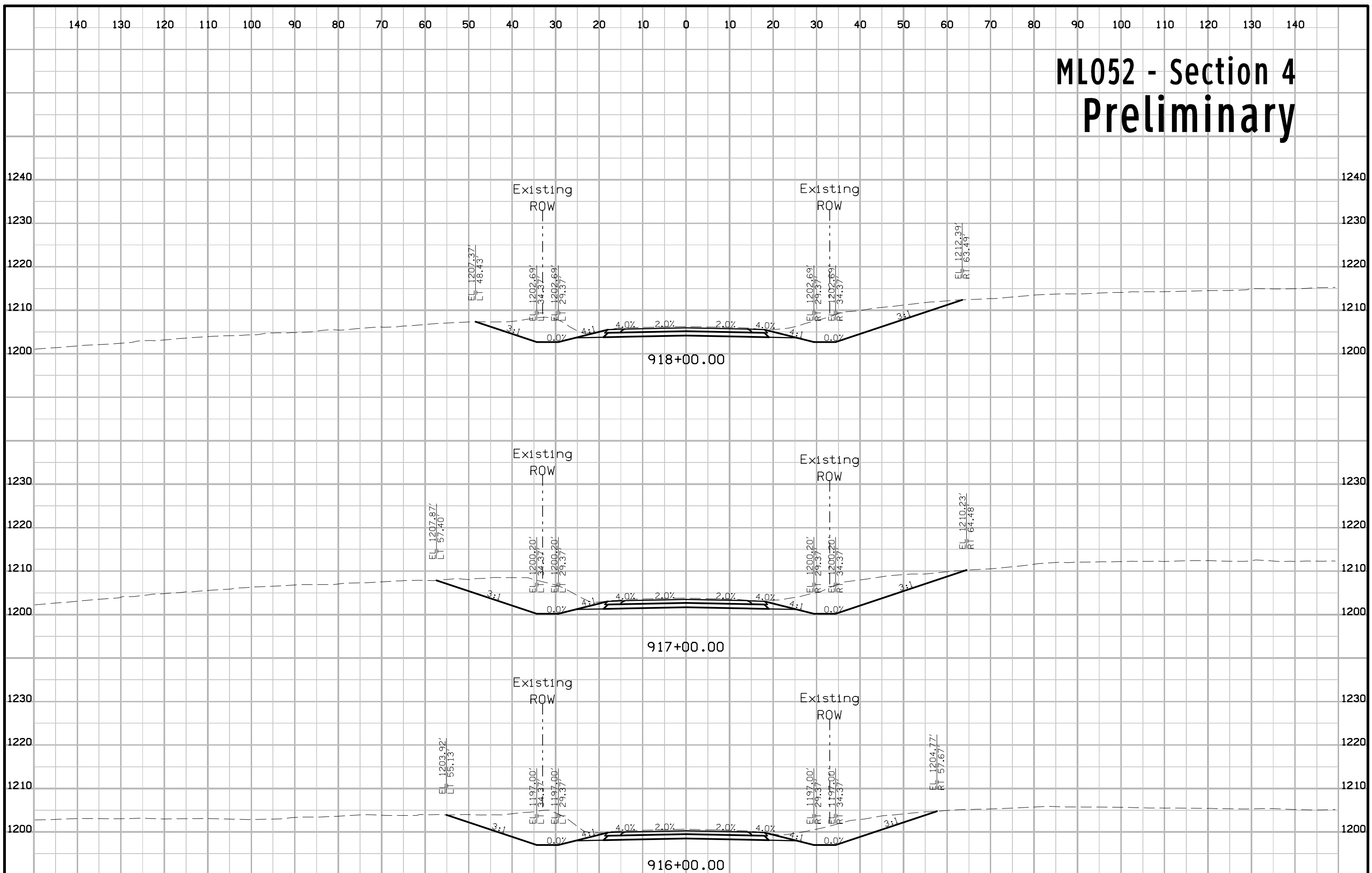
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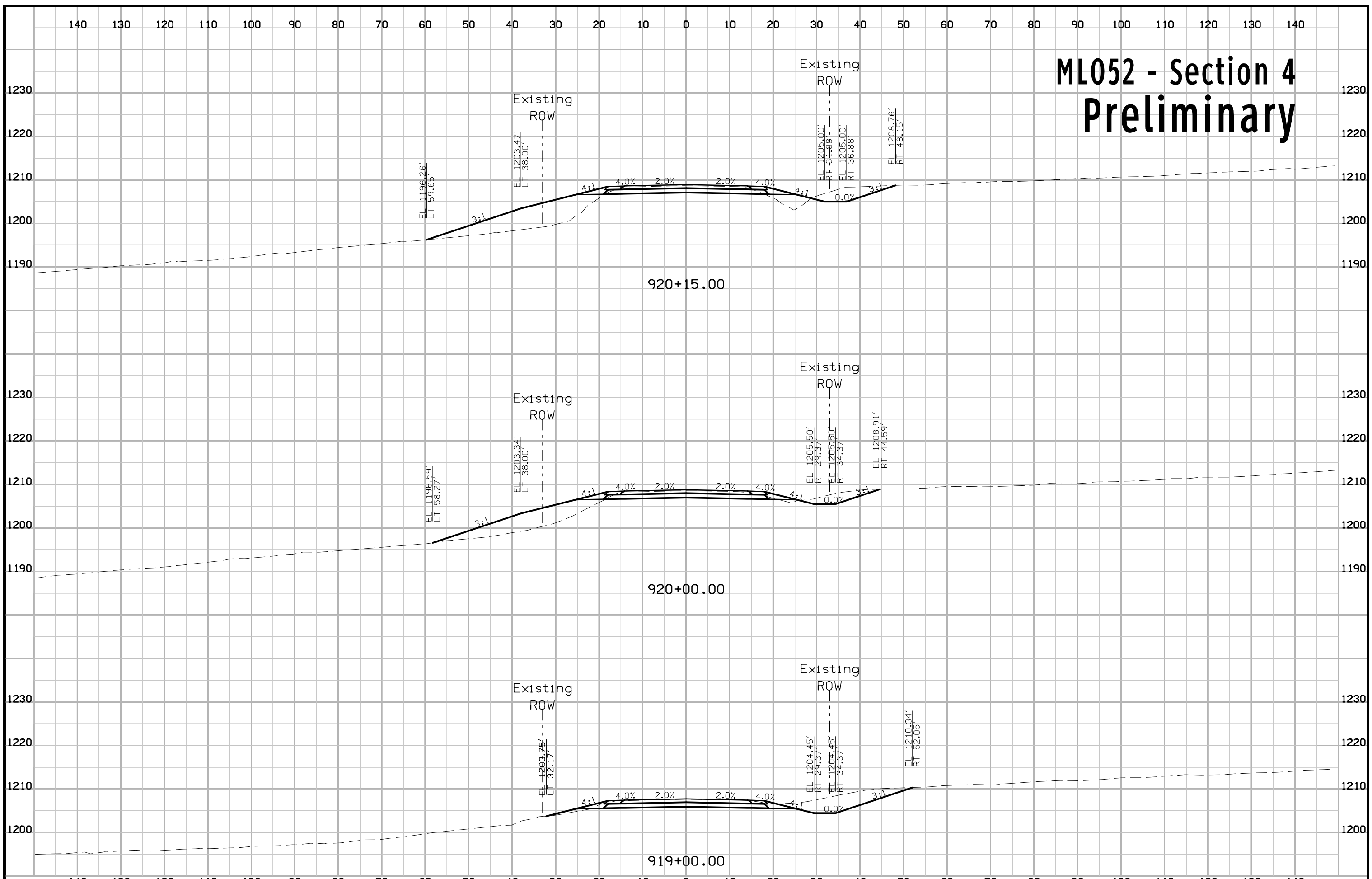
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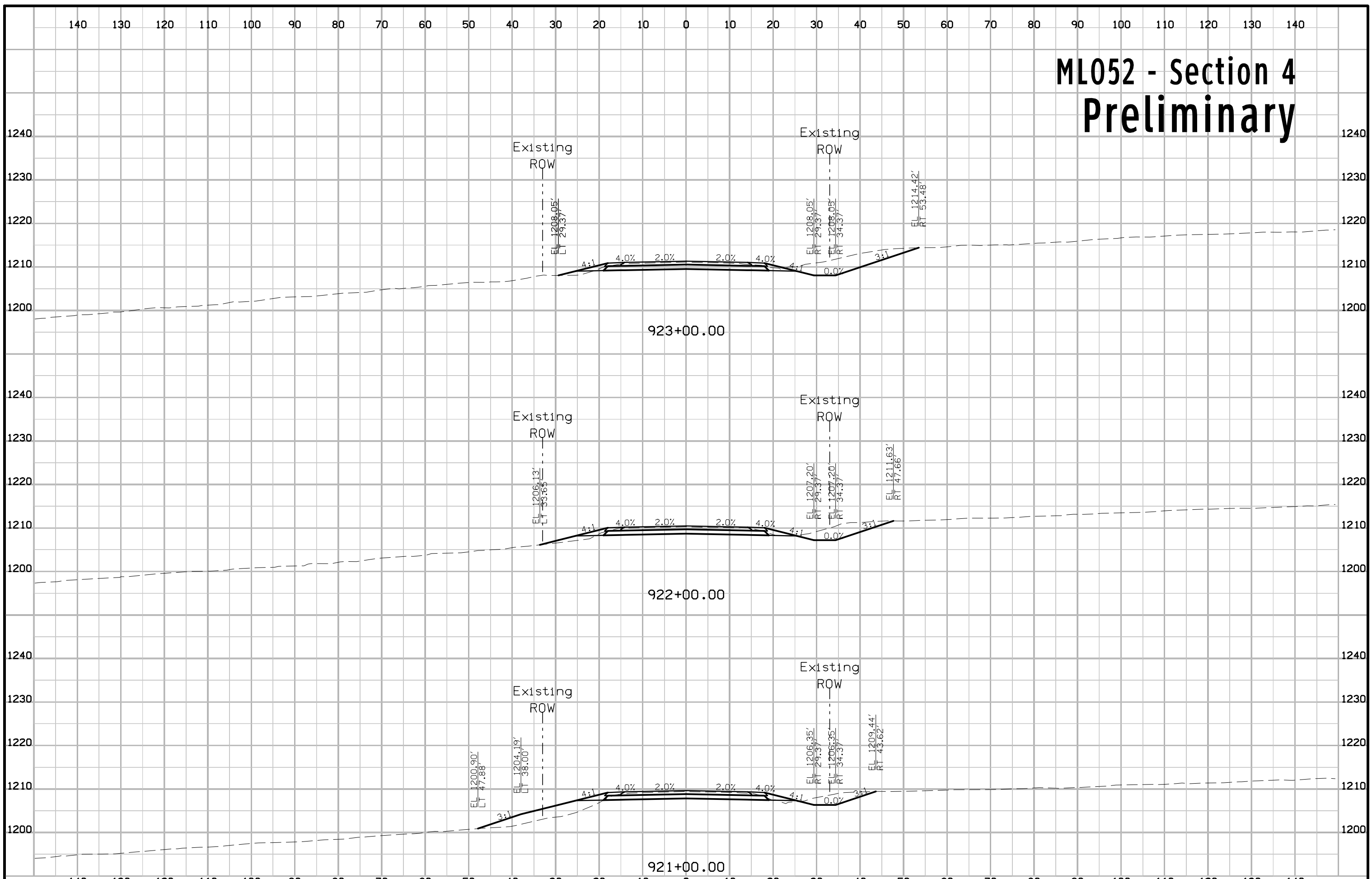
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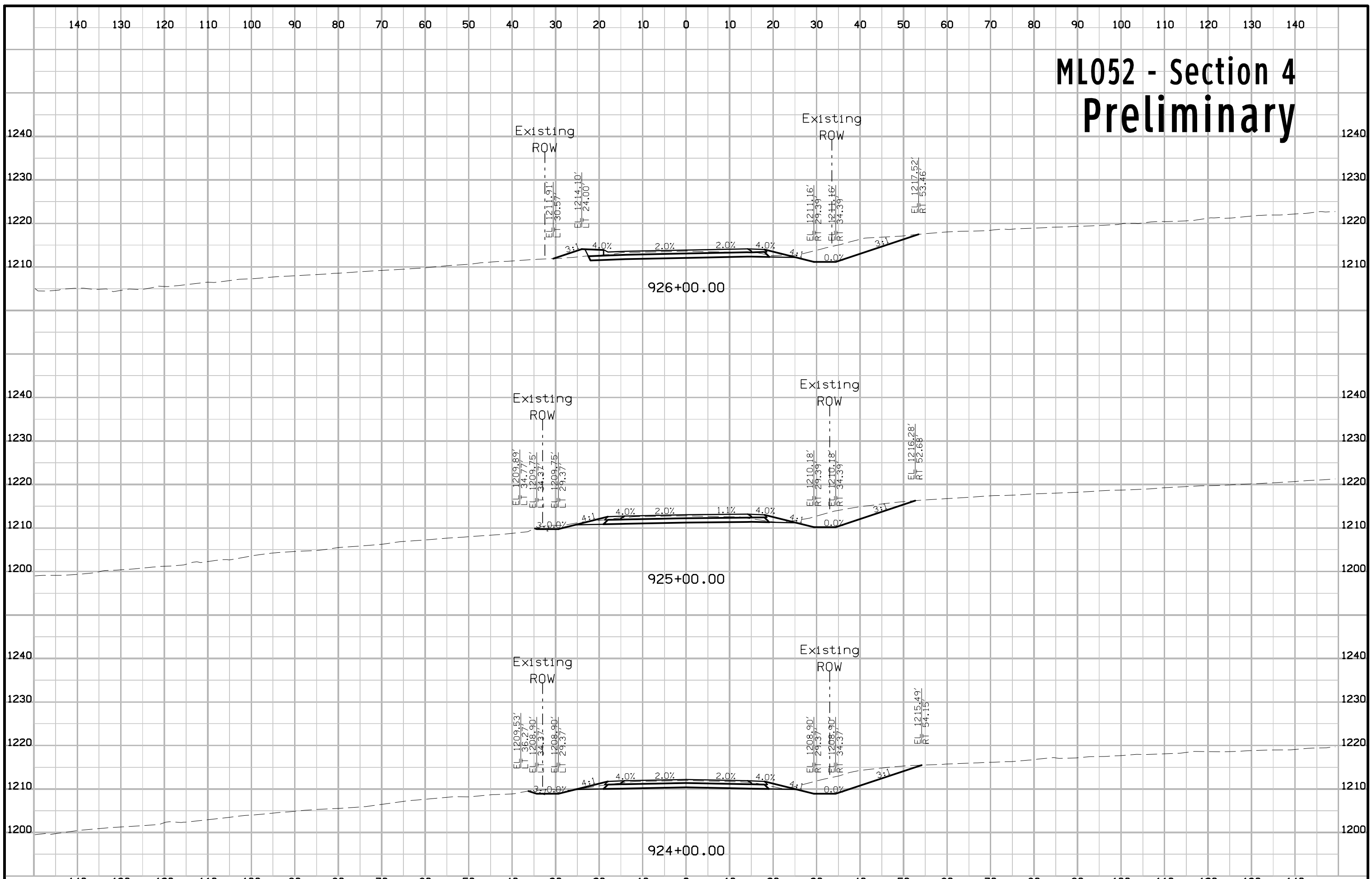
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# ML052 - Section 4 Preliminary

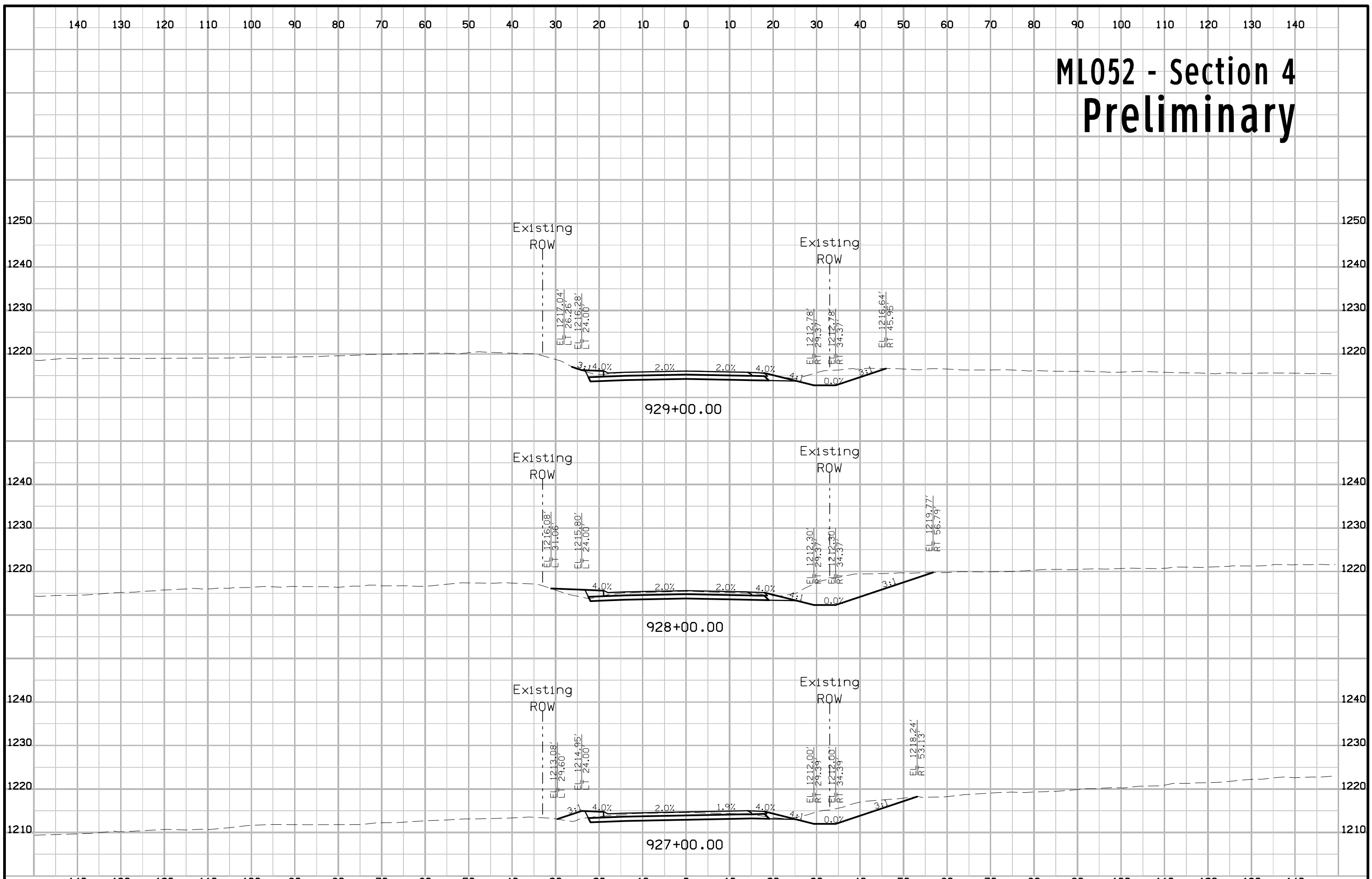


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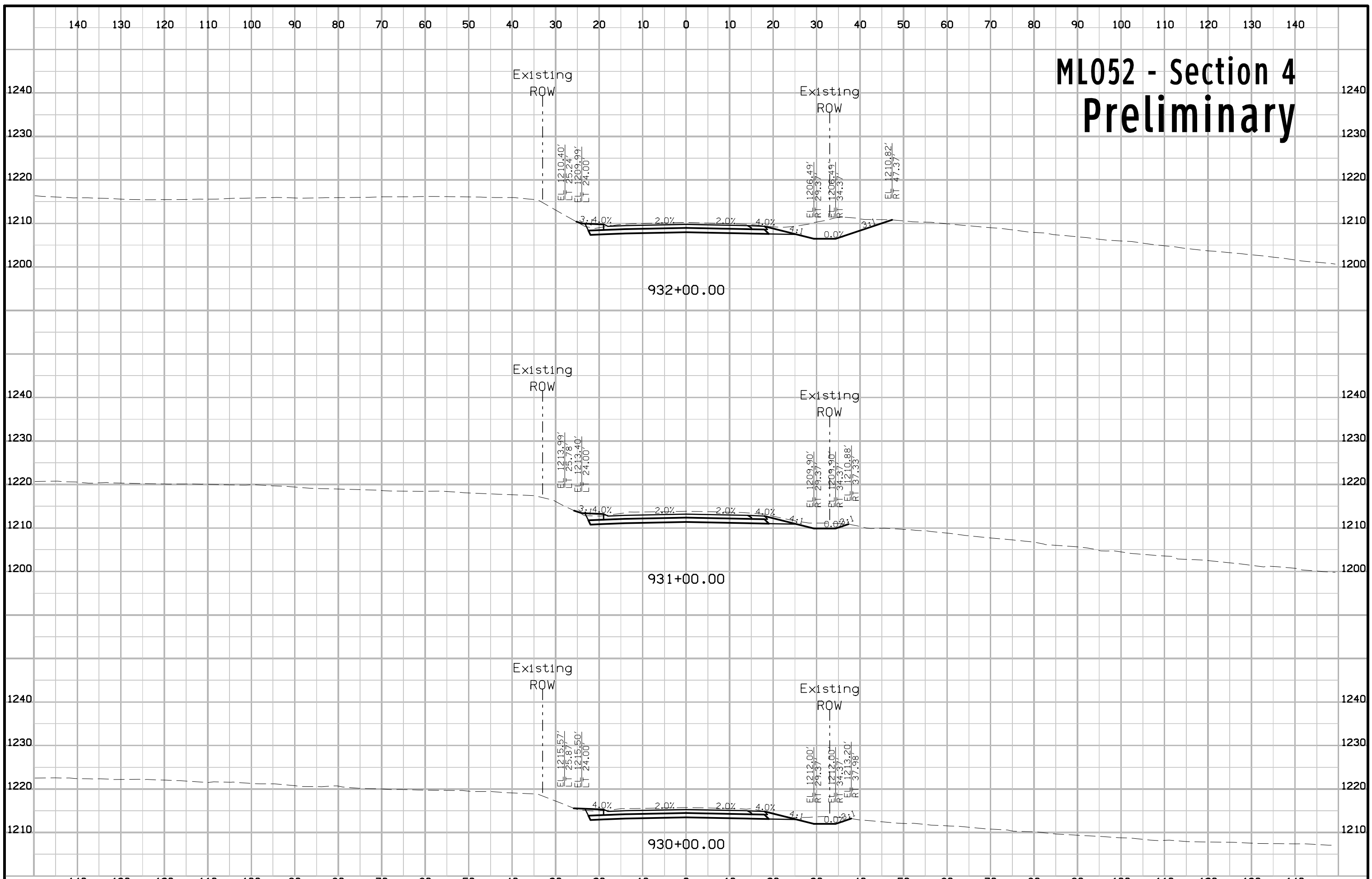




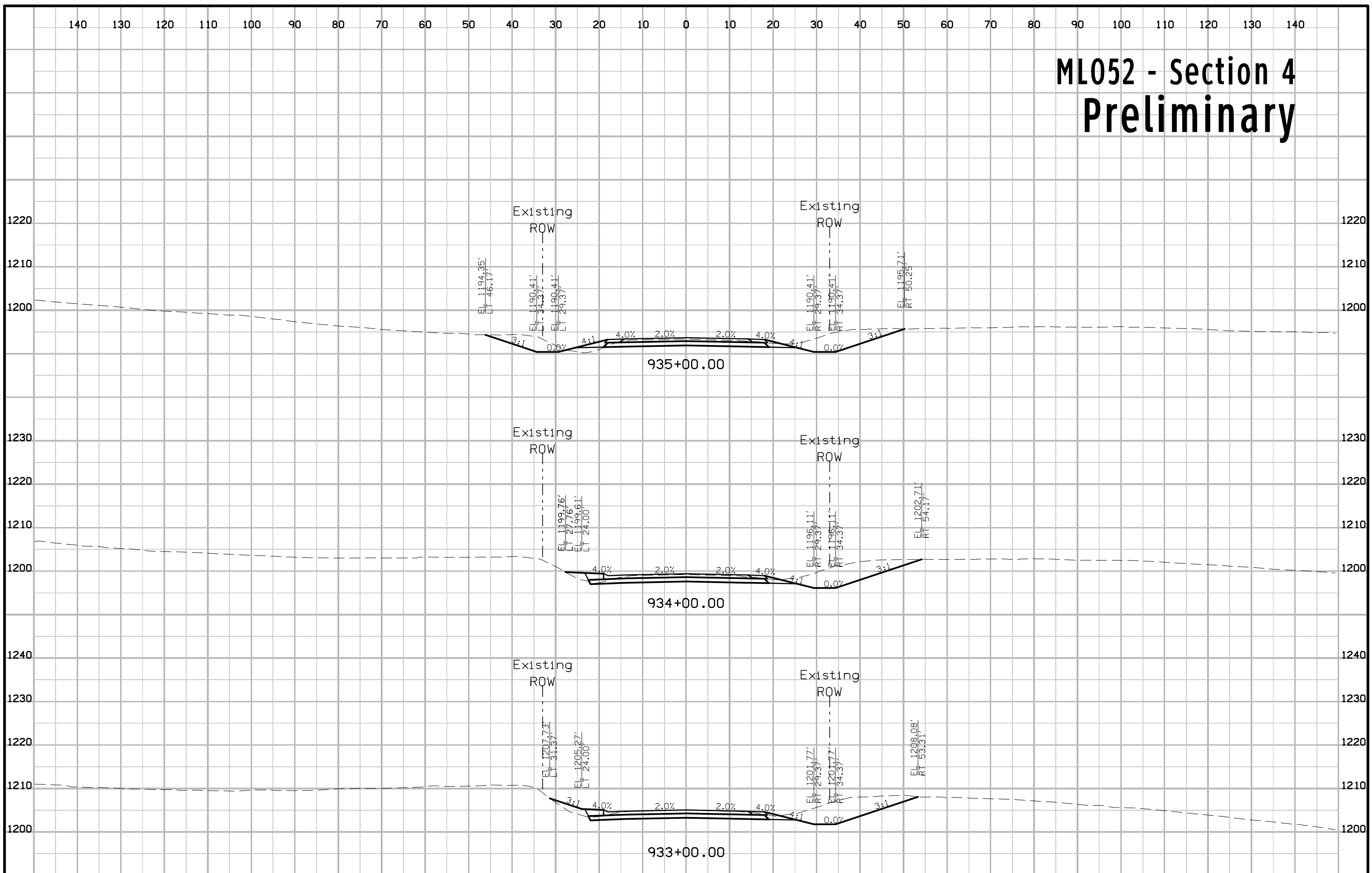
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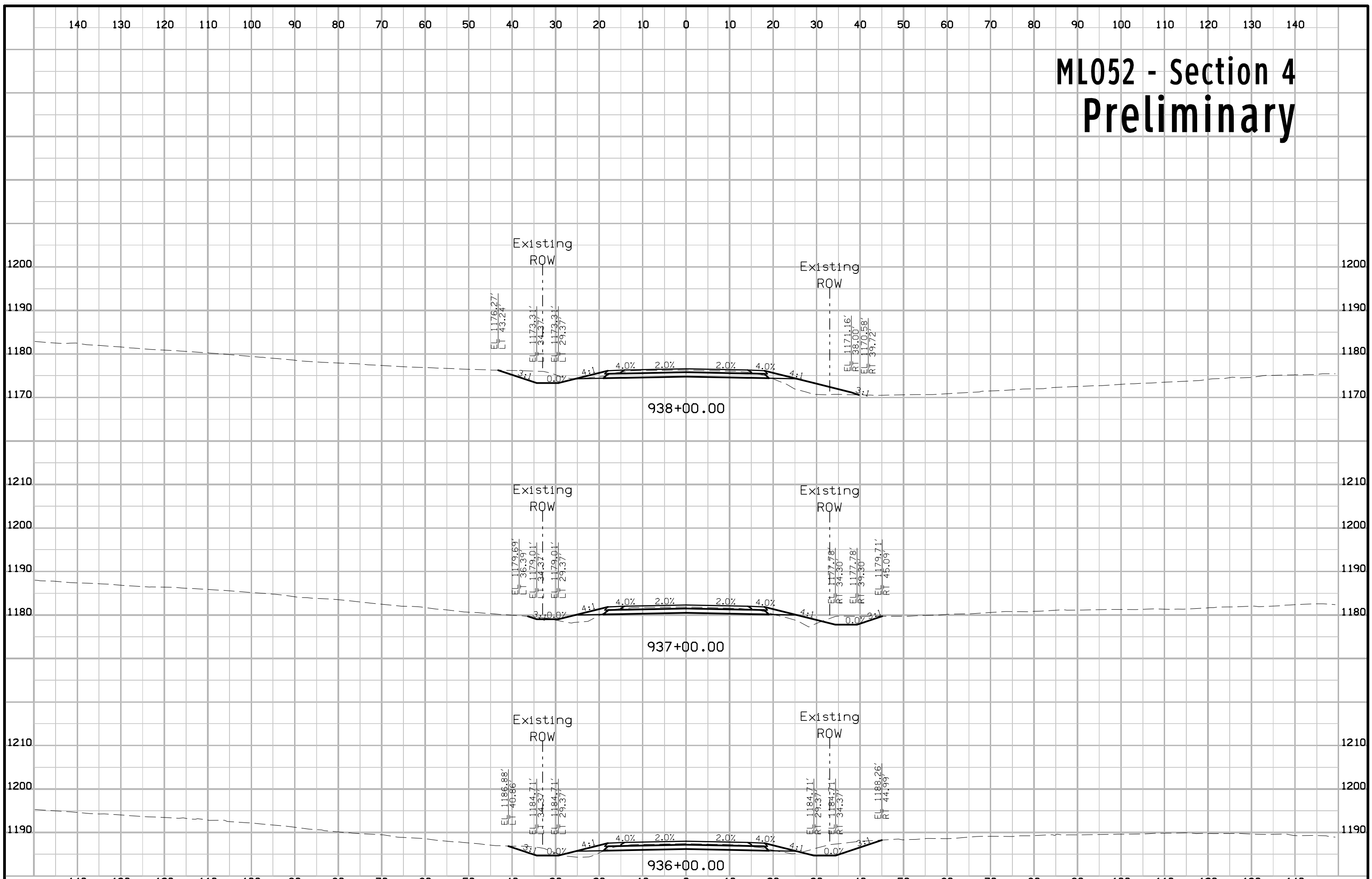
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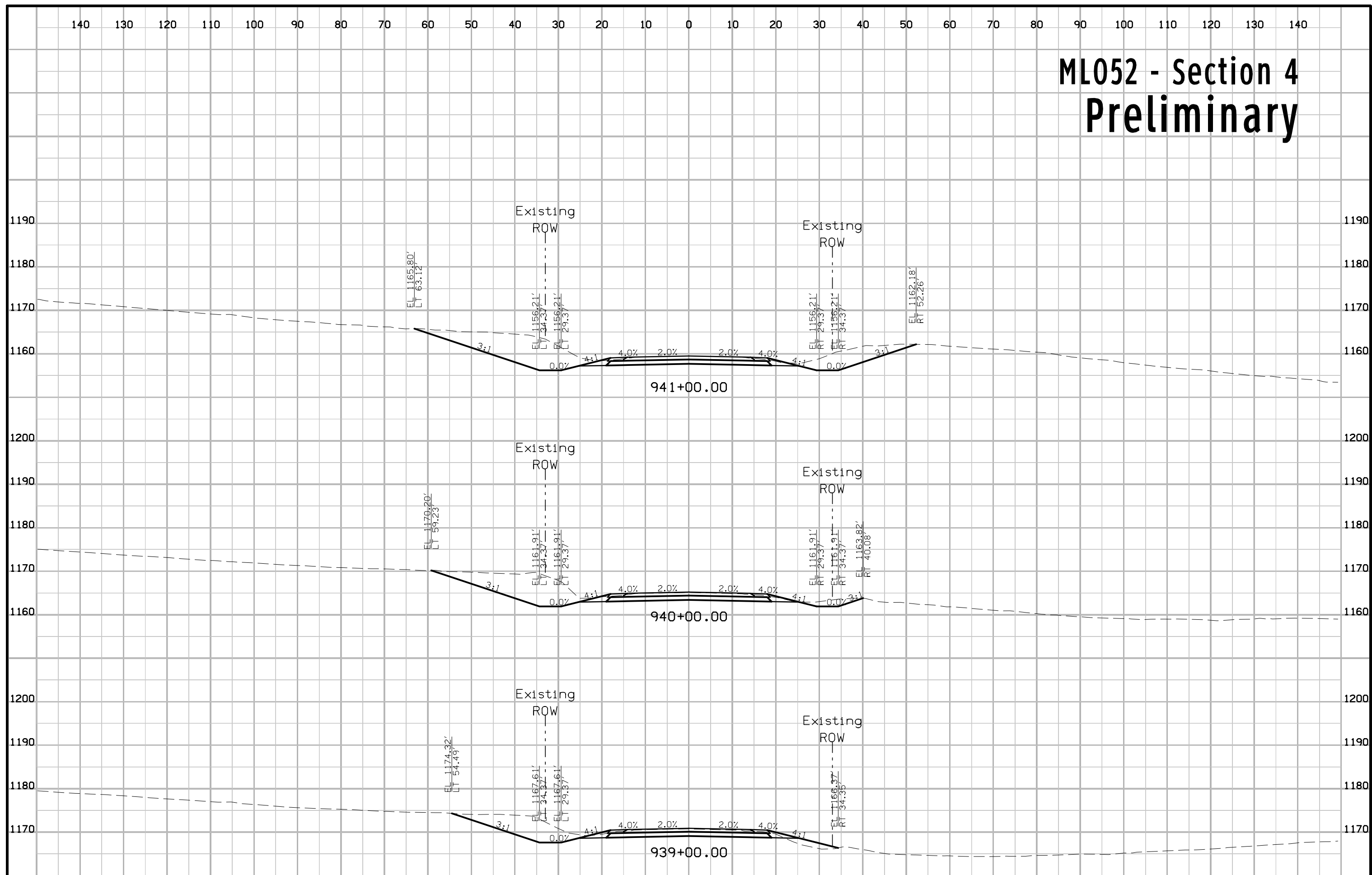
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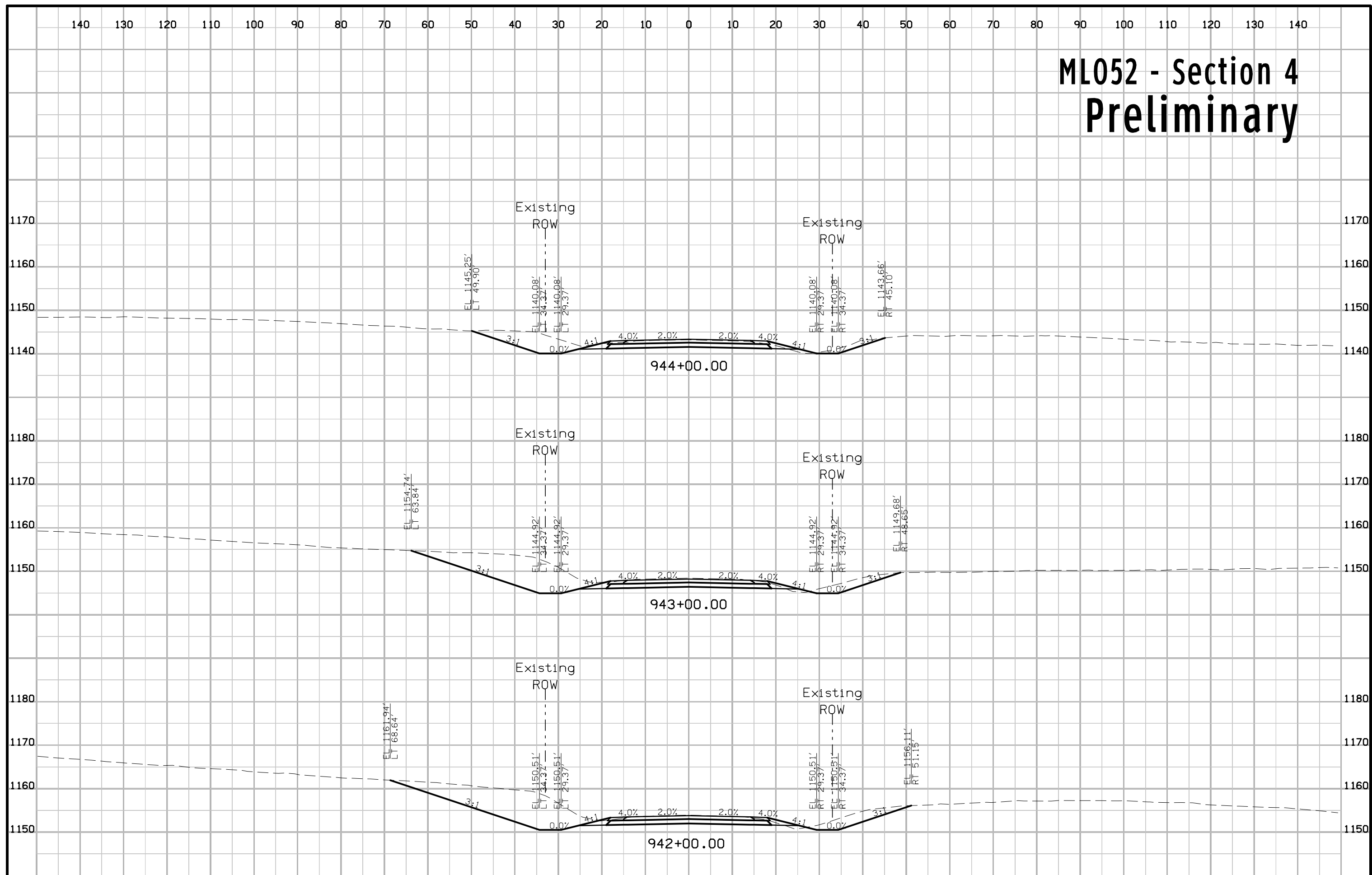
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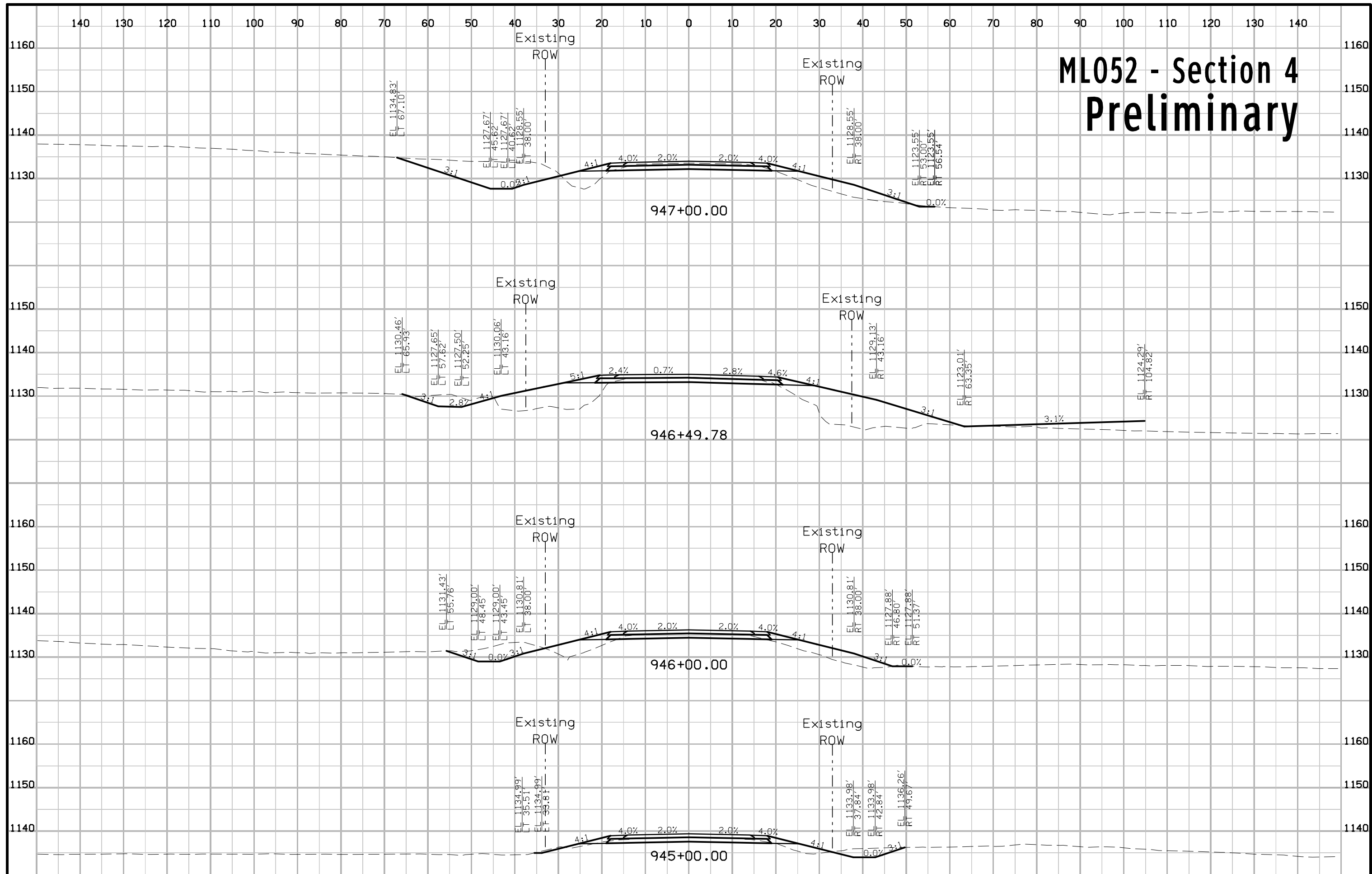
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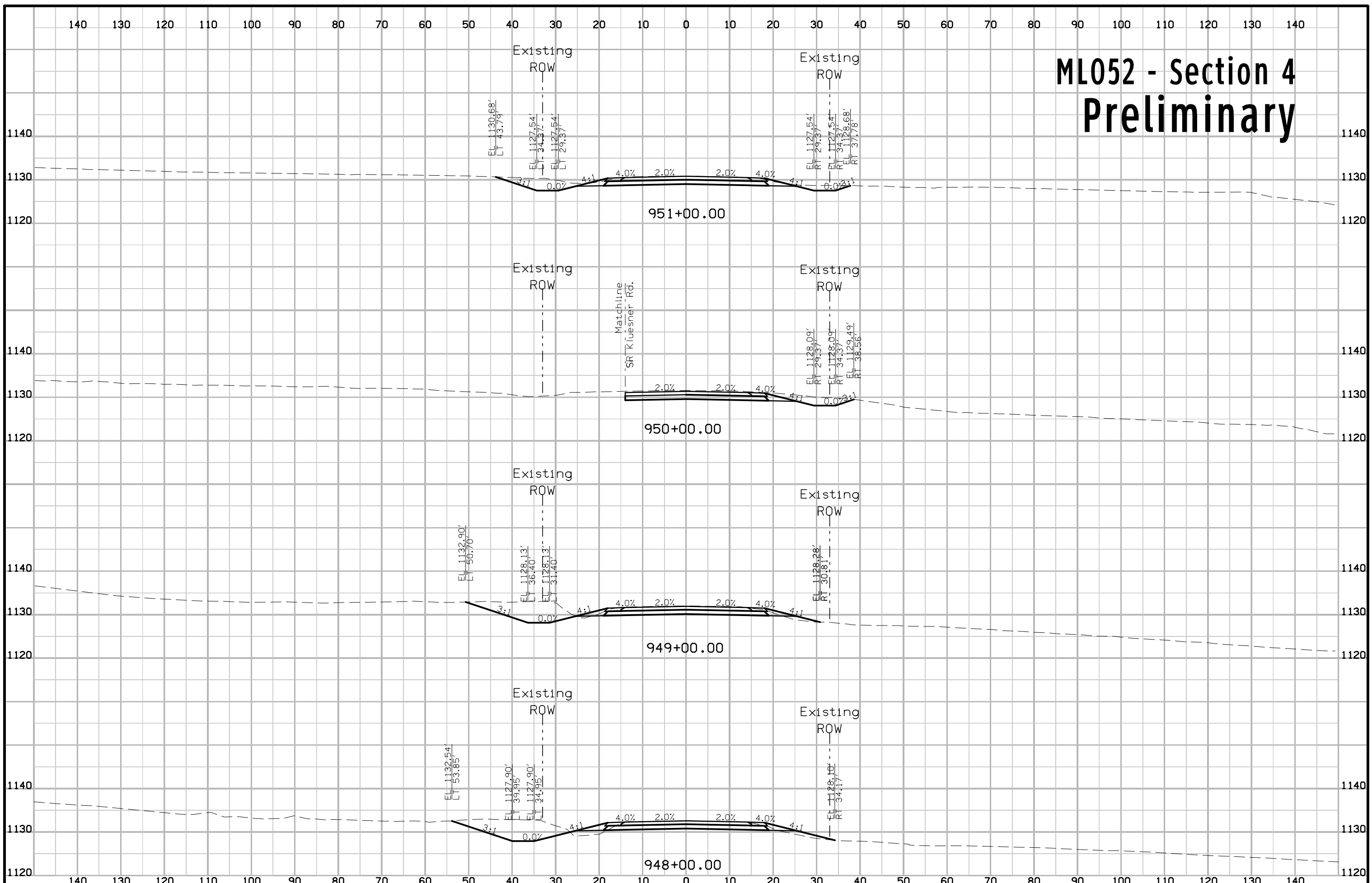
# ML052 - Section 4 Preliminary



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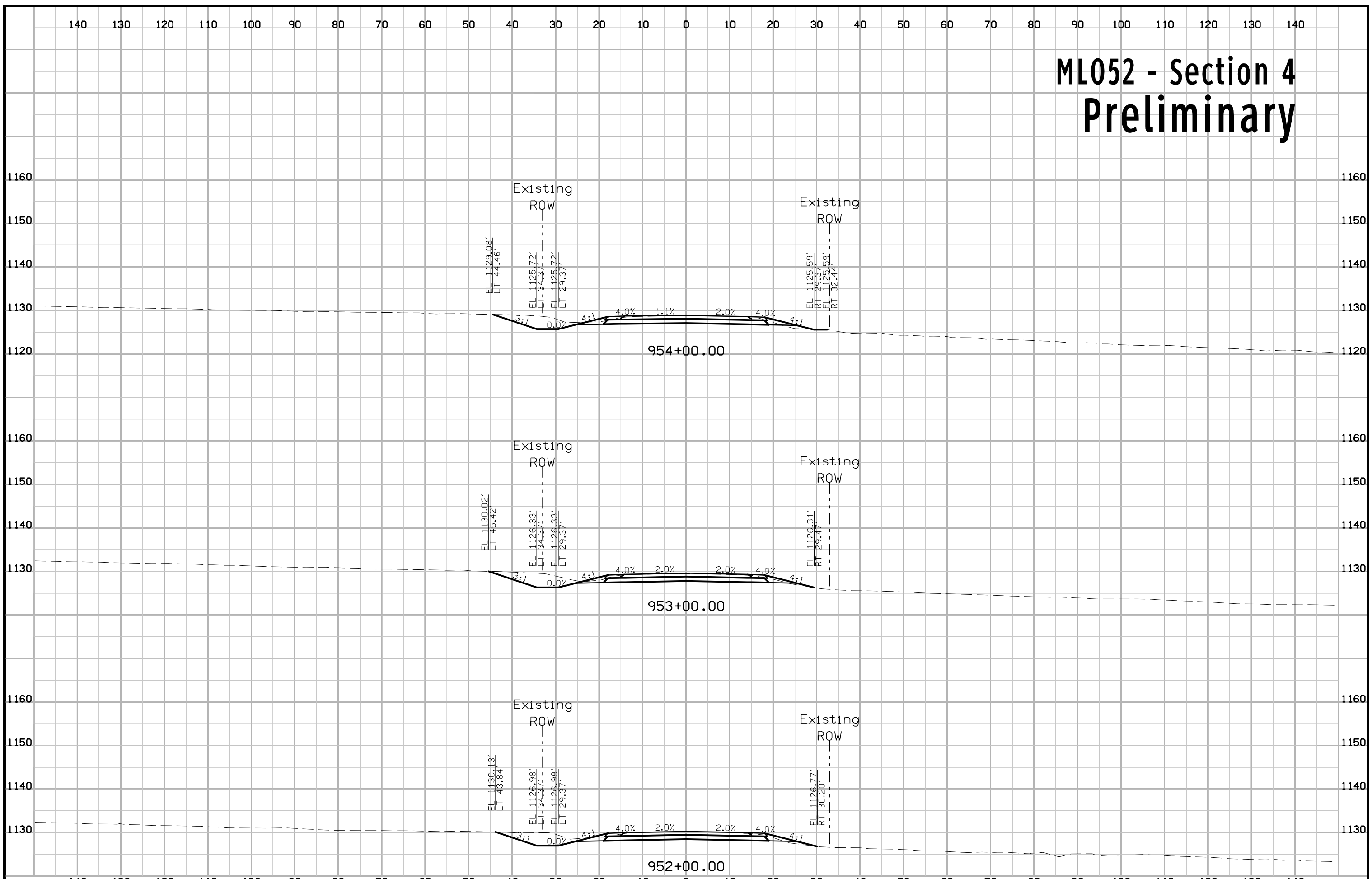


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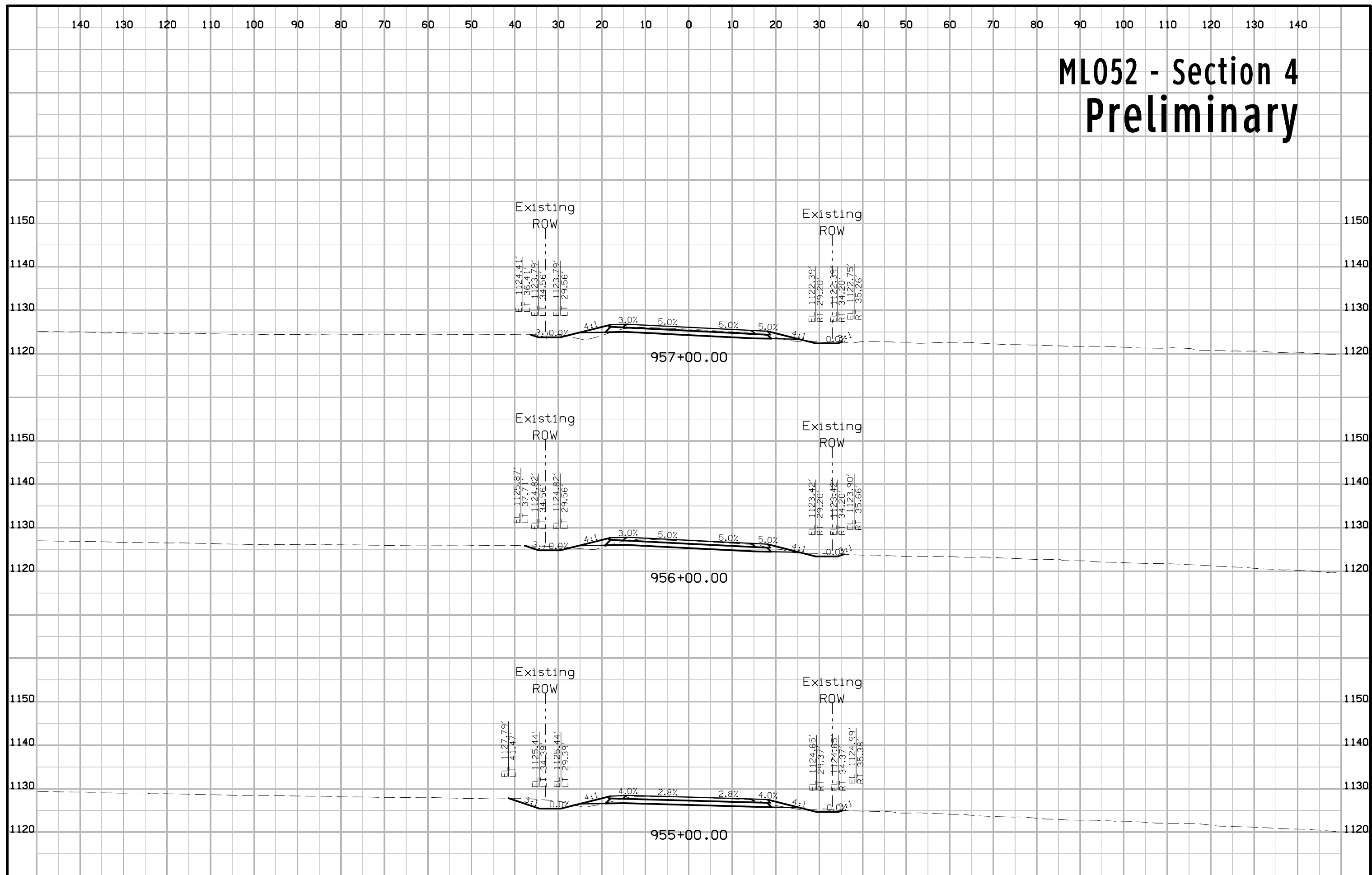




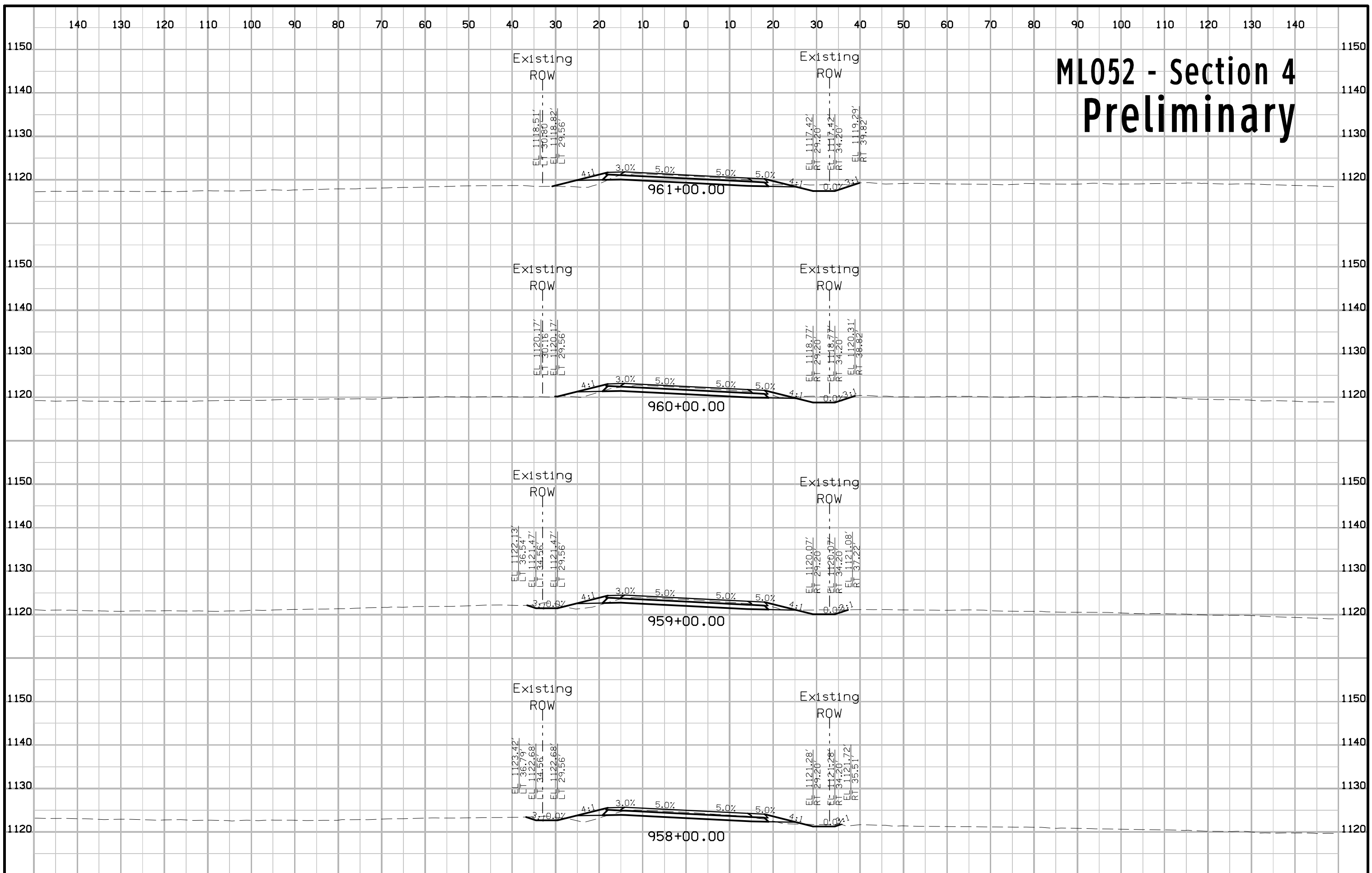
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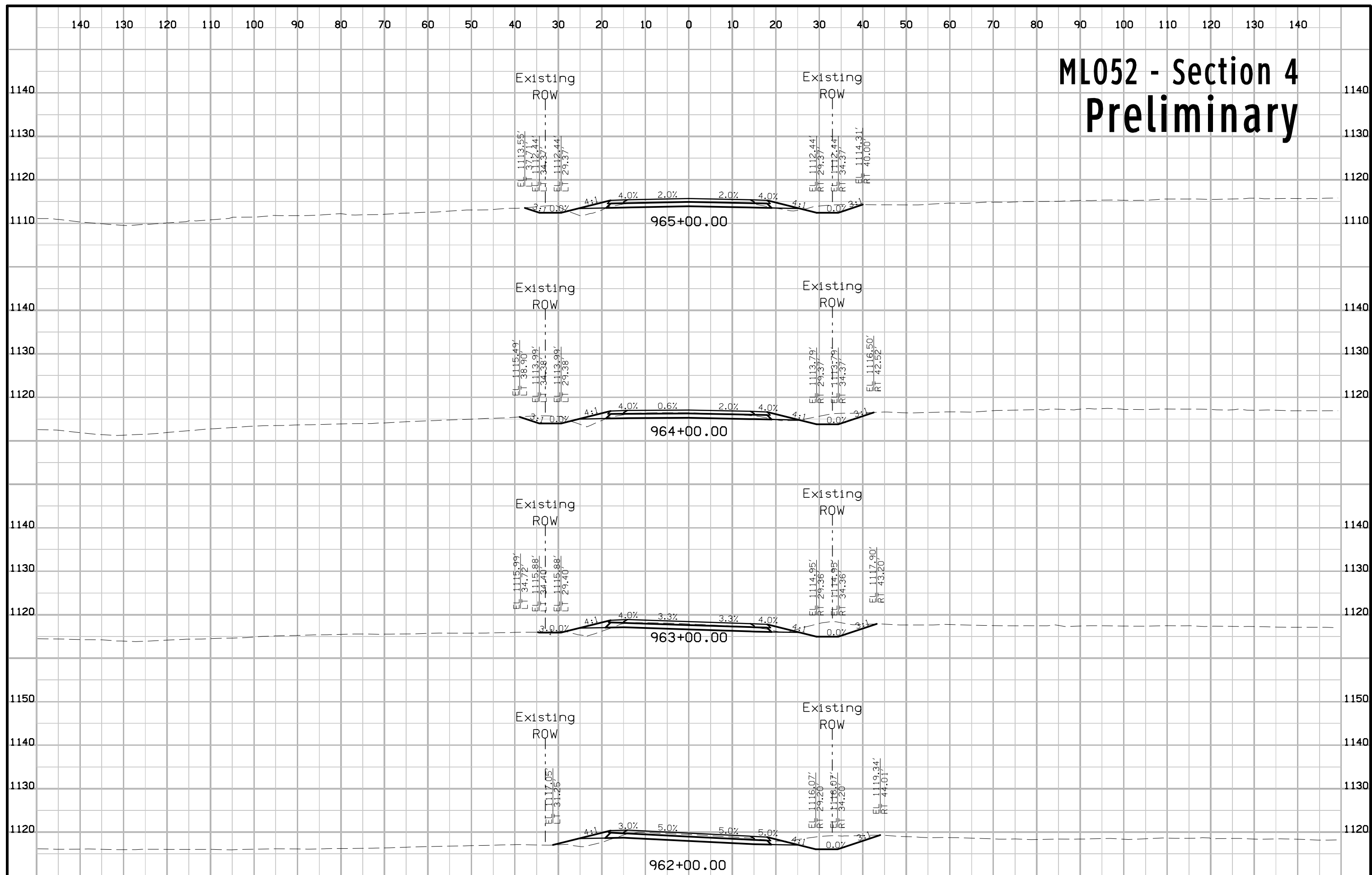
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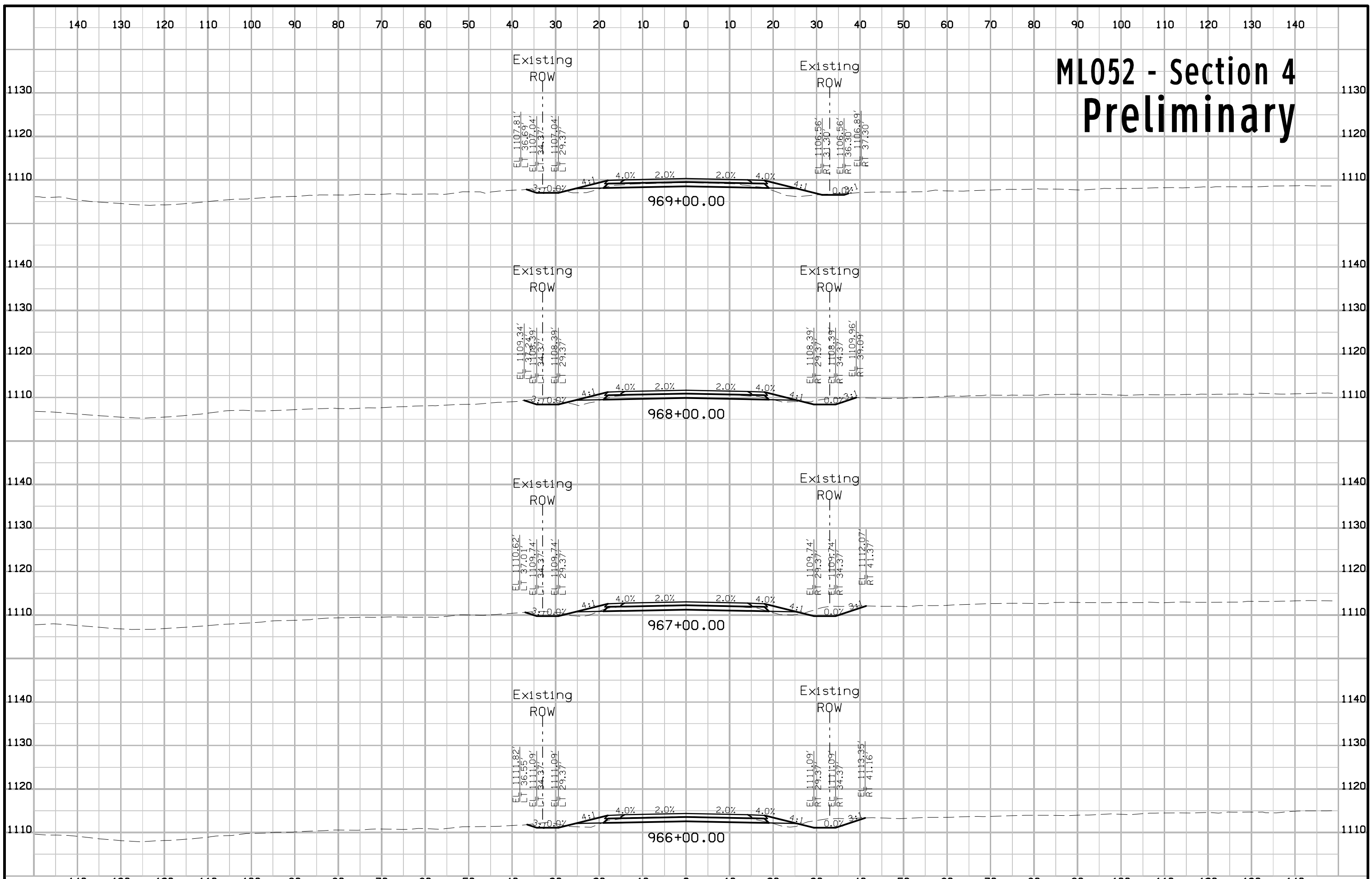
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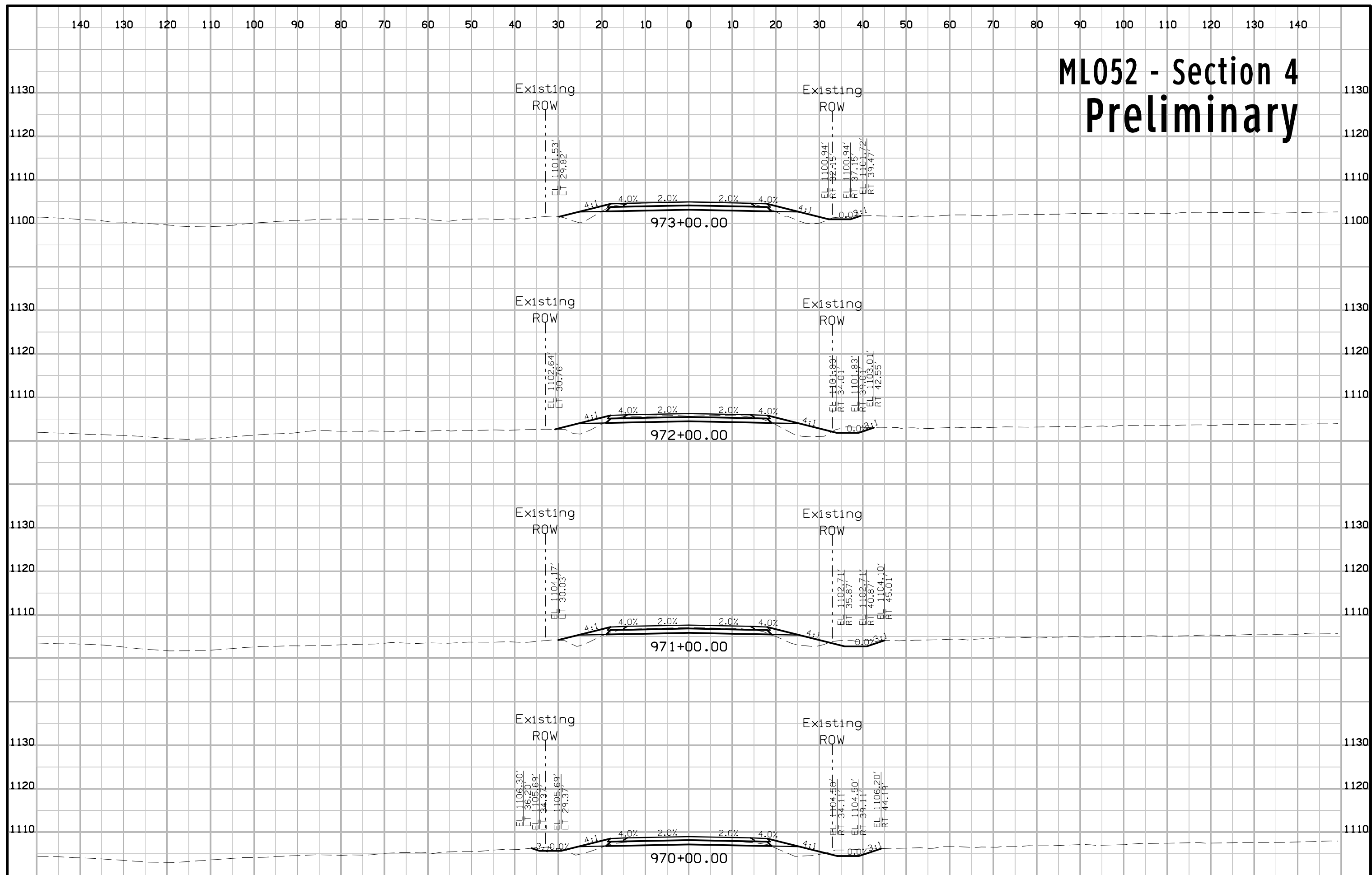
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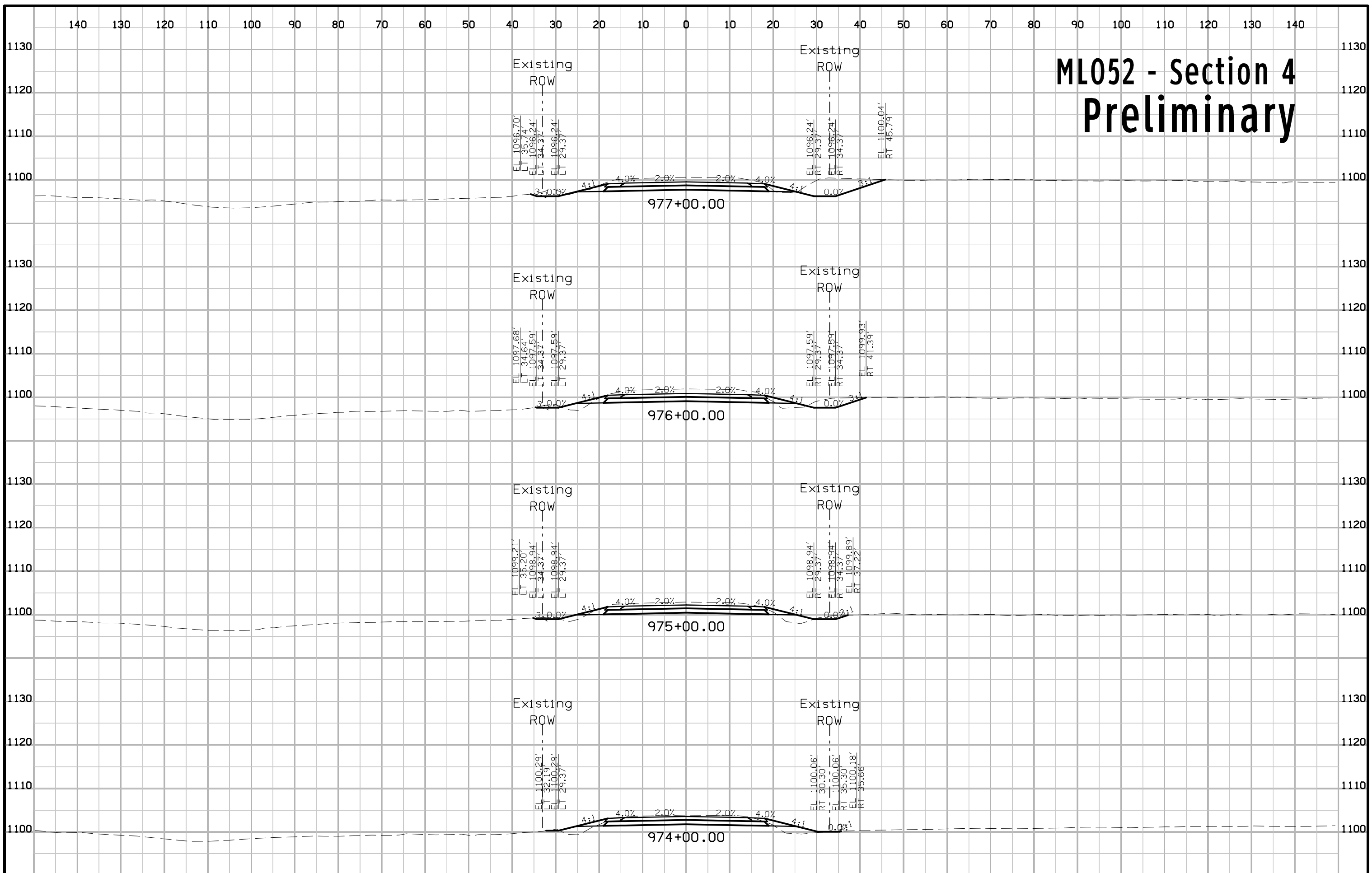
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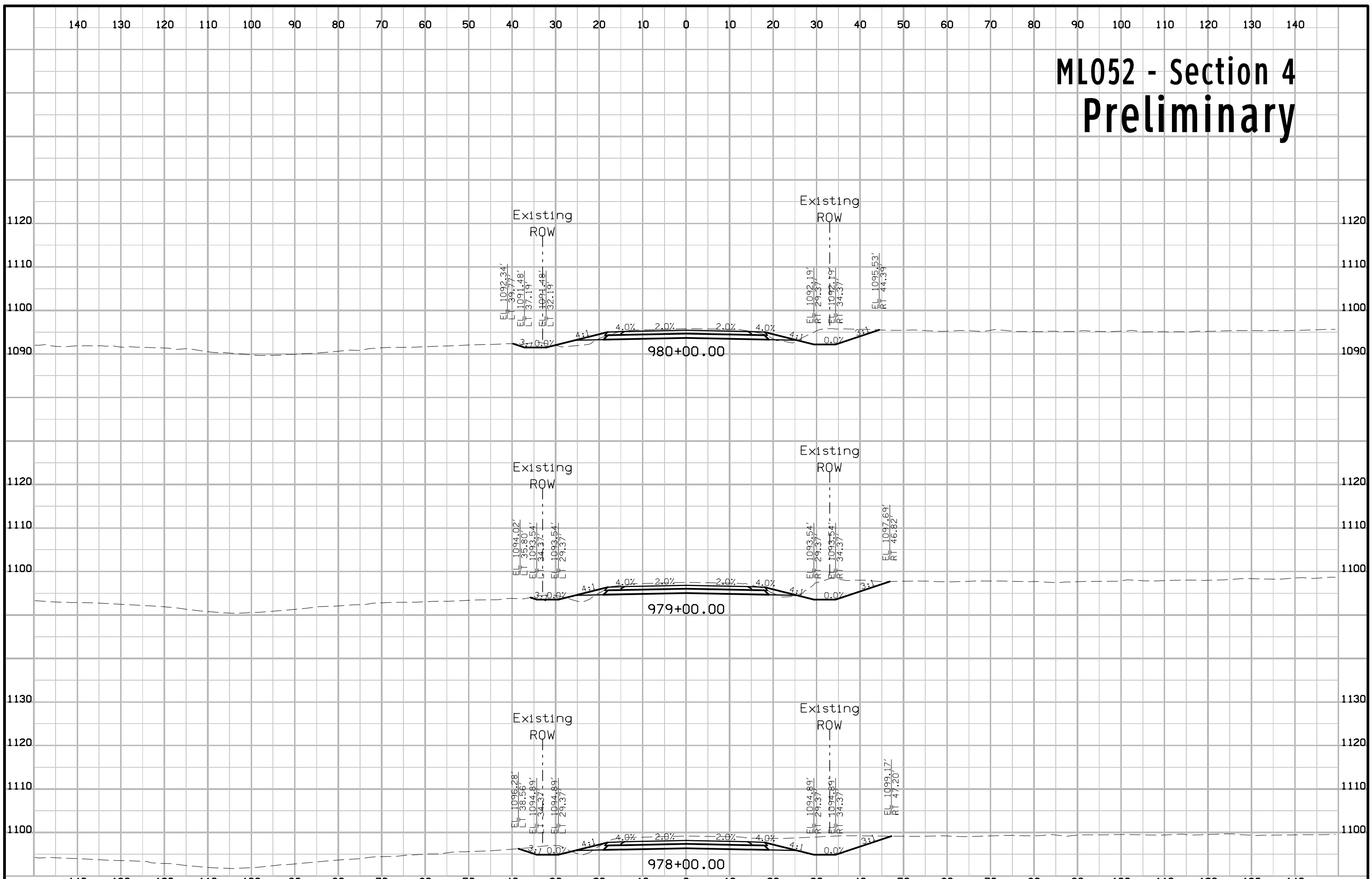
# ML052 - Section 4 Preliminary



# ML052 - Section 4 Preliminary

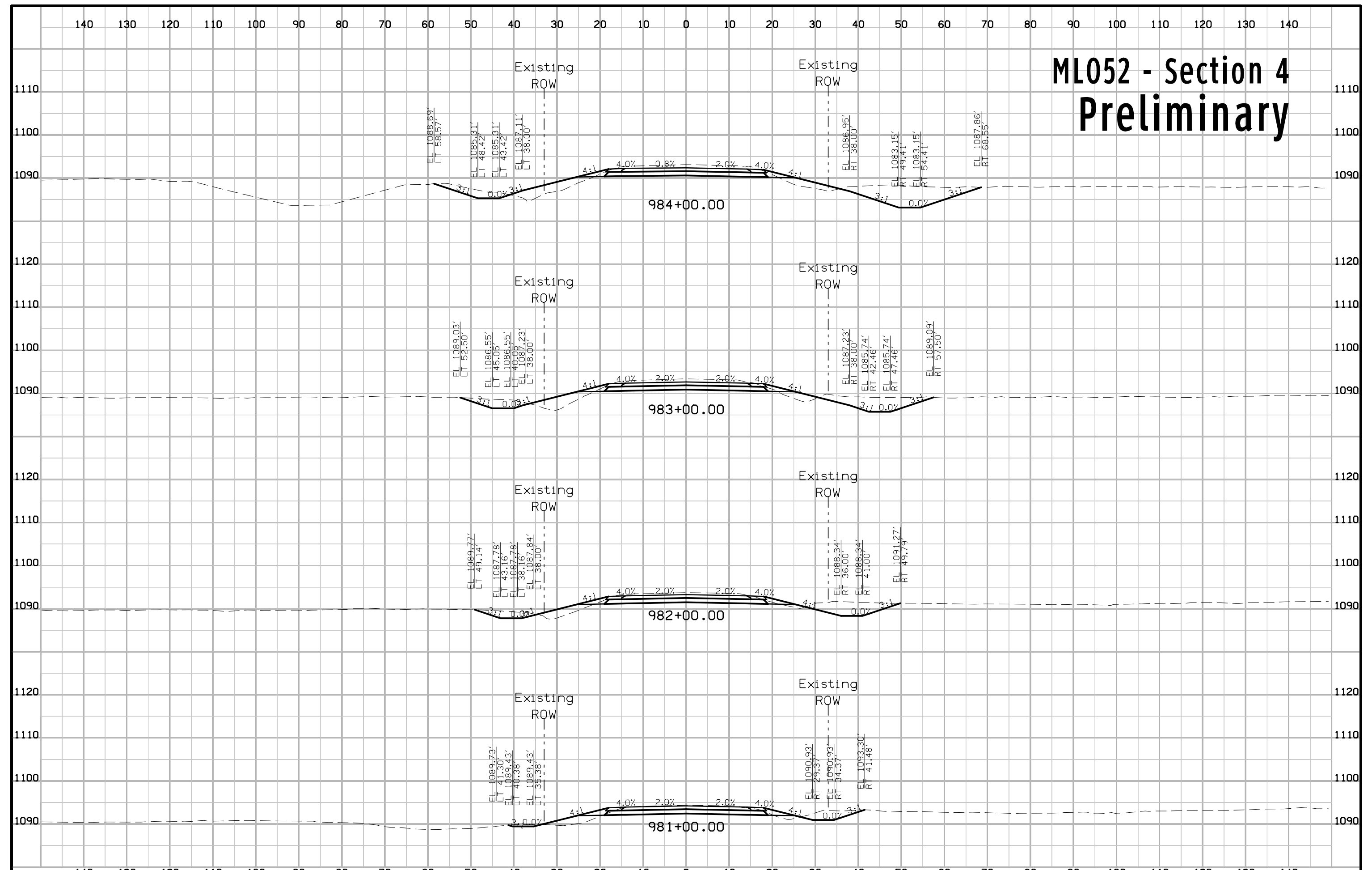


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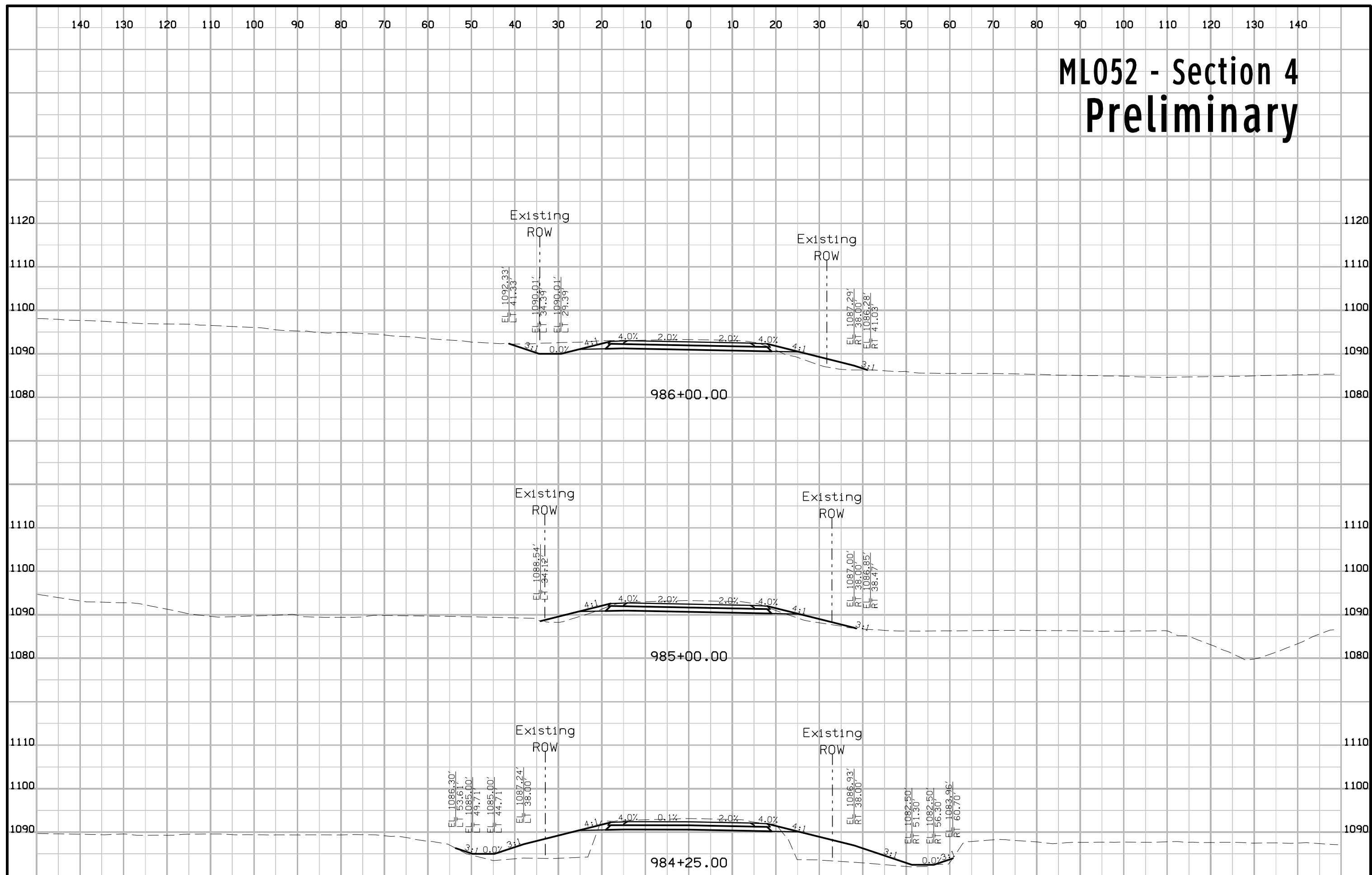




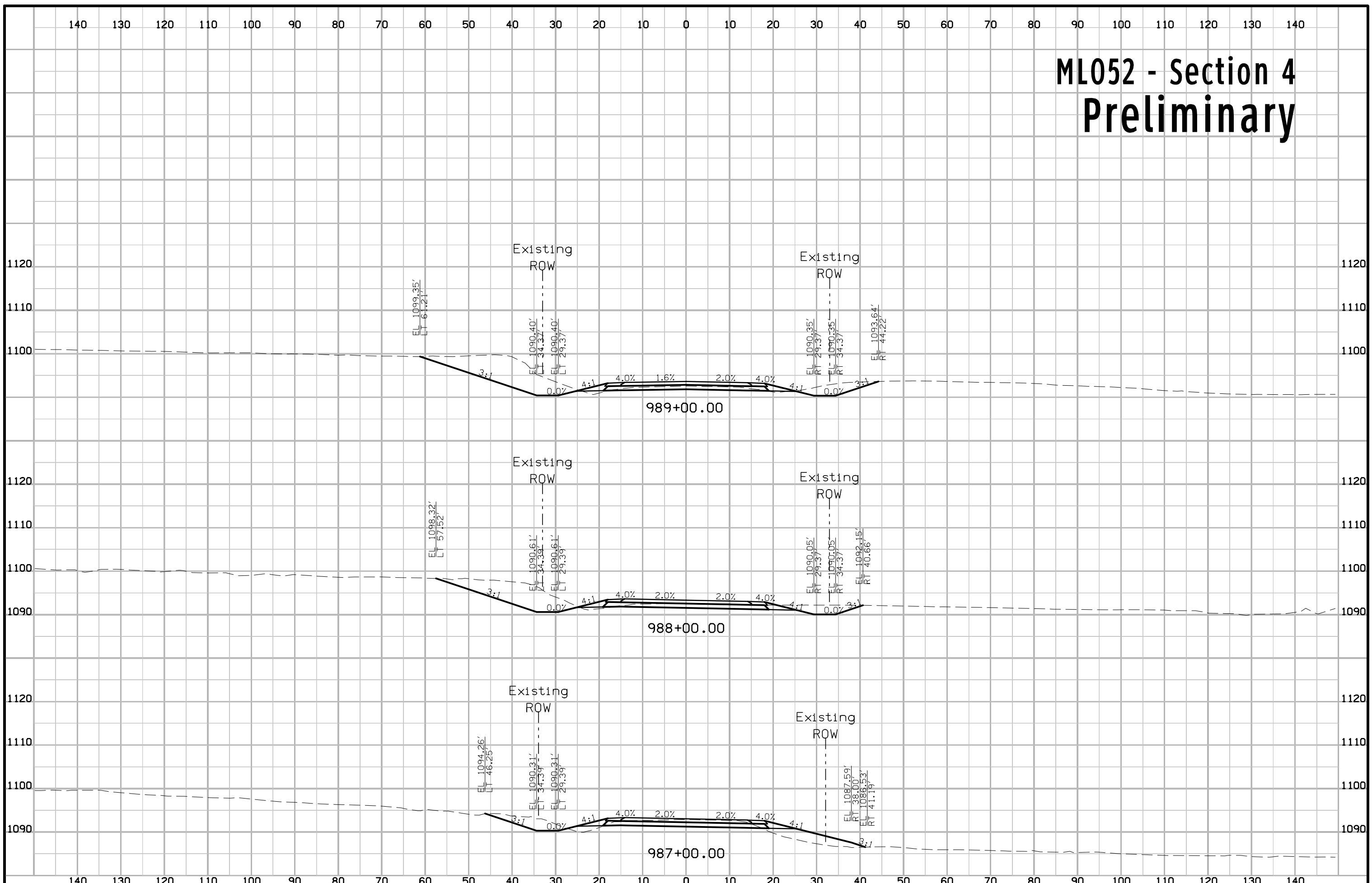
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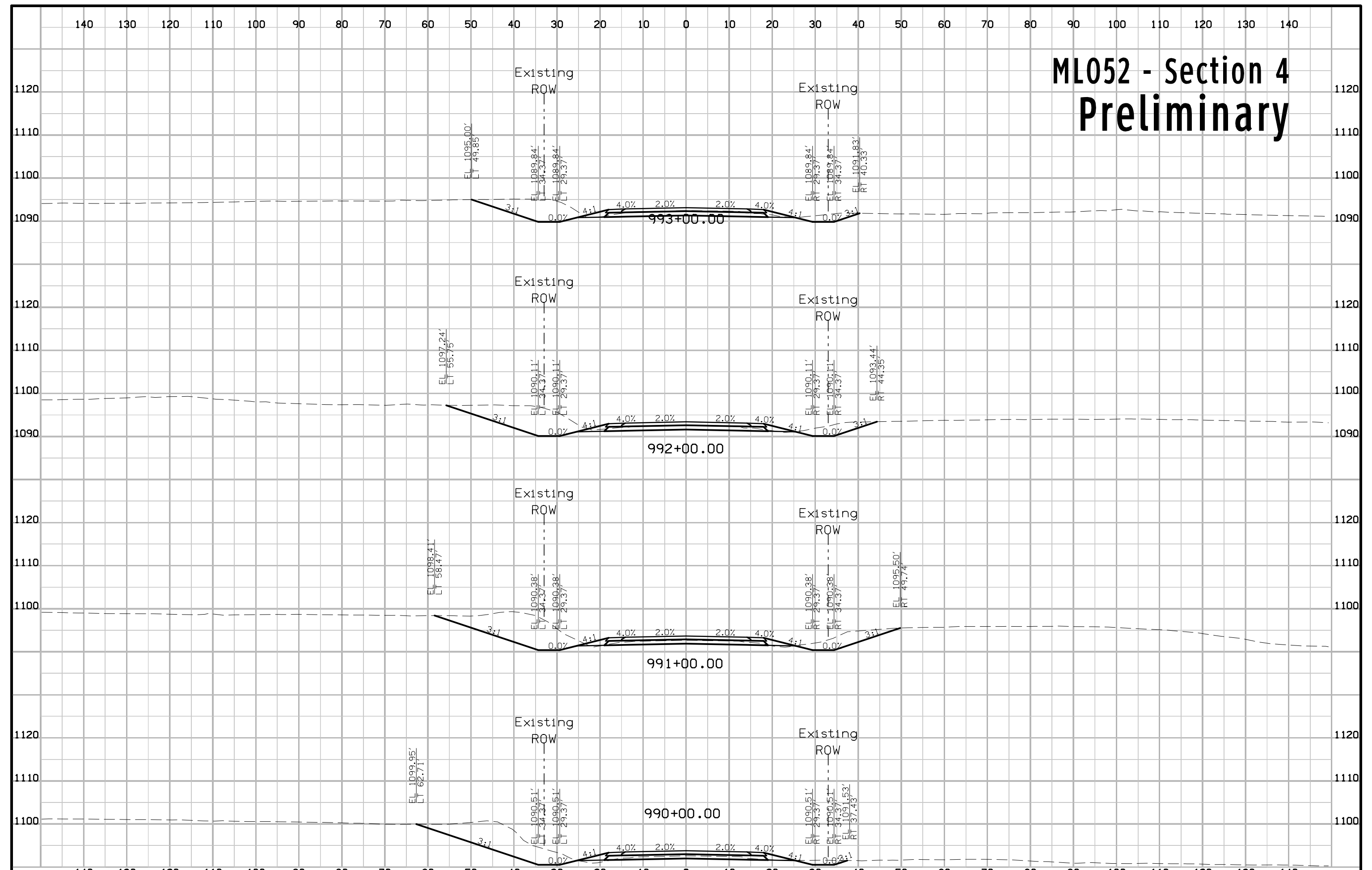
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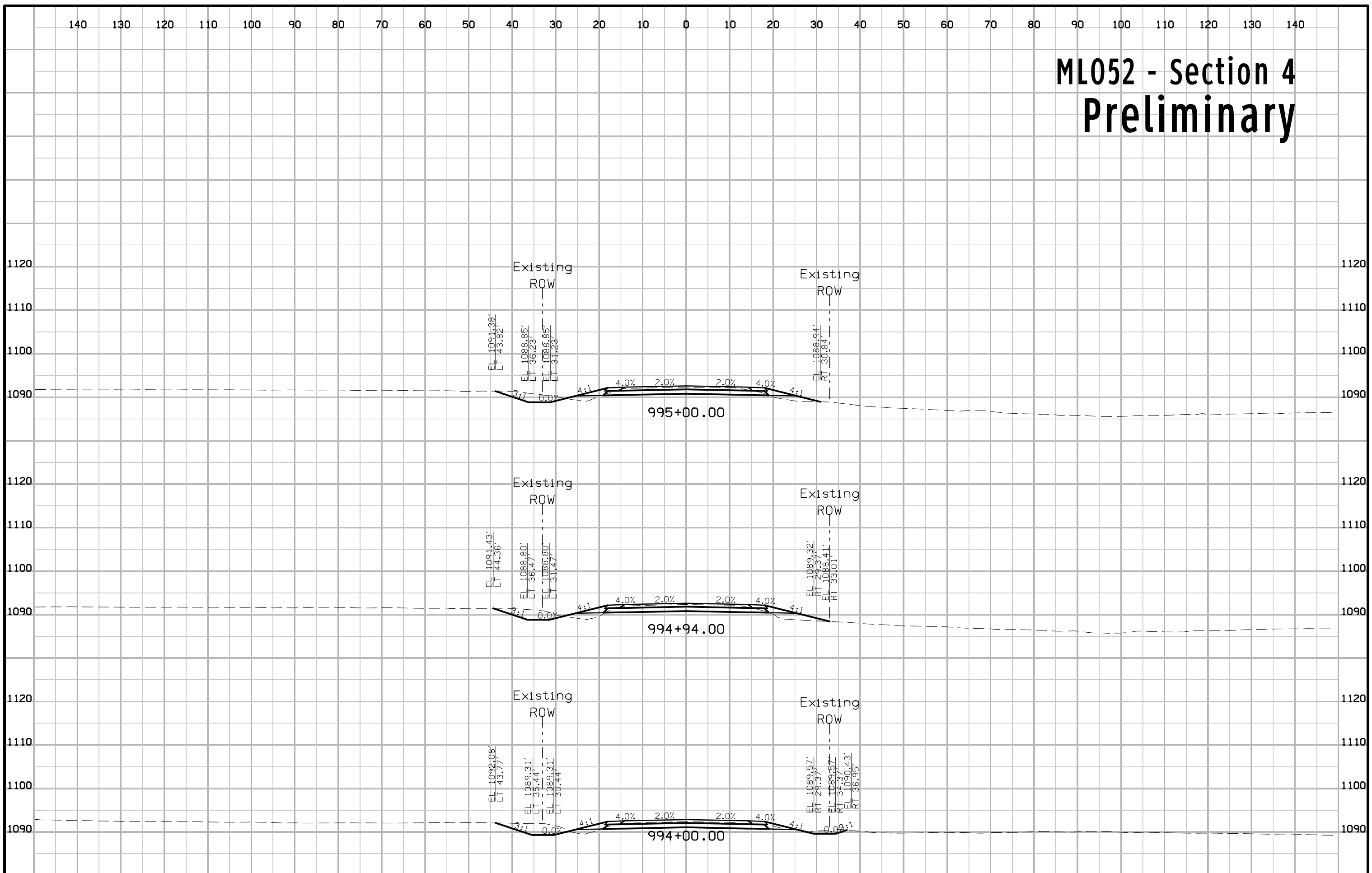
# ML052 - Section 4 Preliminary



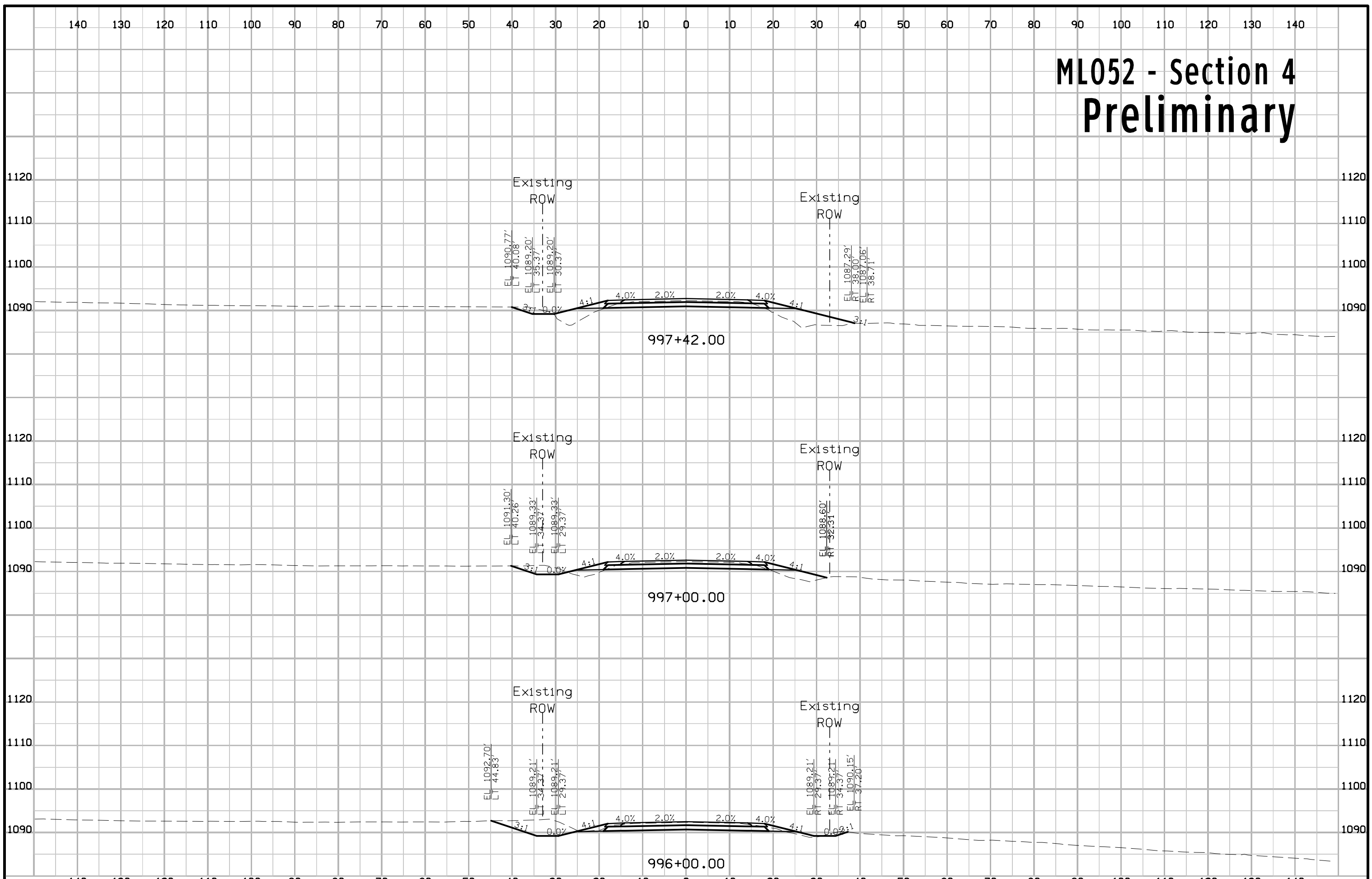
# ML052 - Section 4 Preliminary



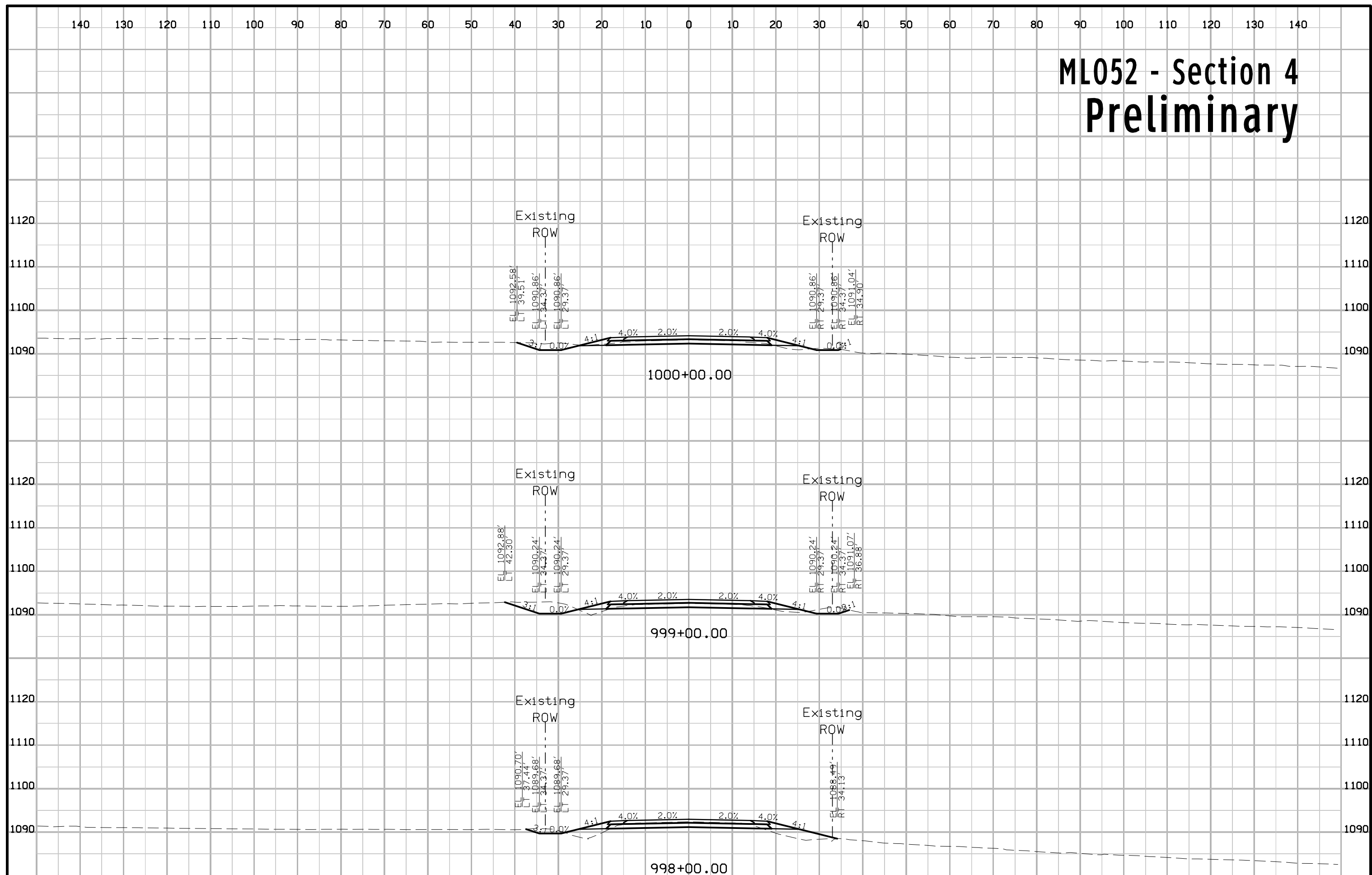
# ML052 - Section 4 Preliminary



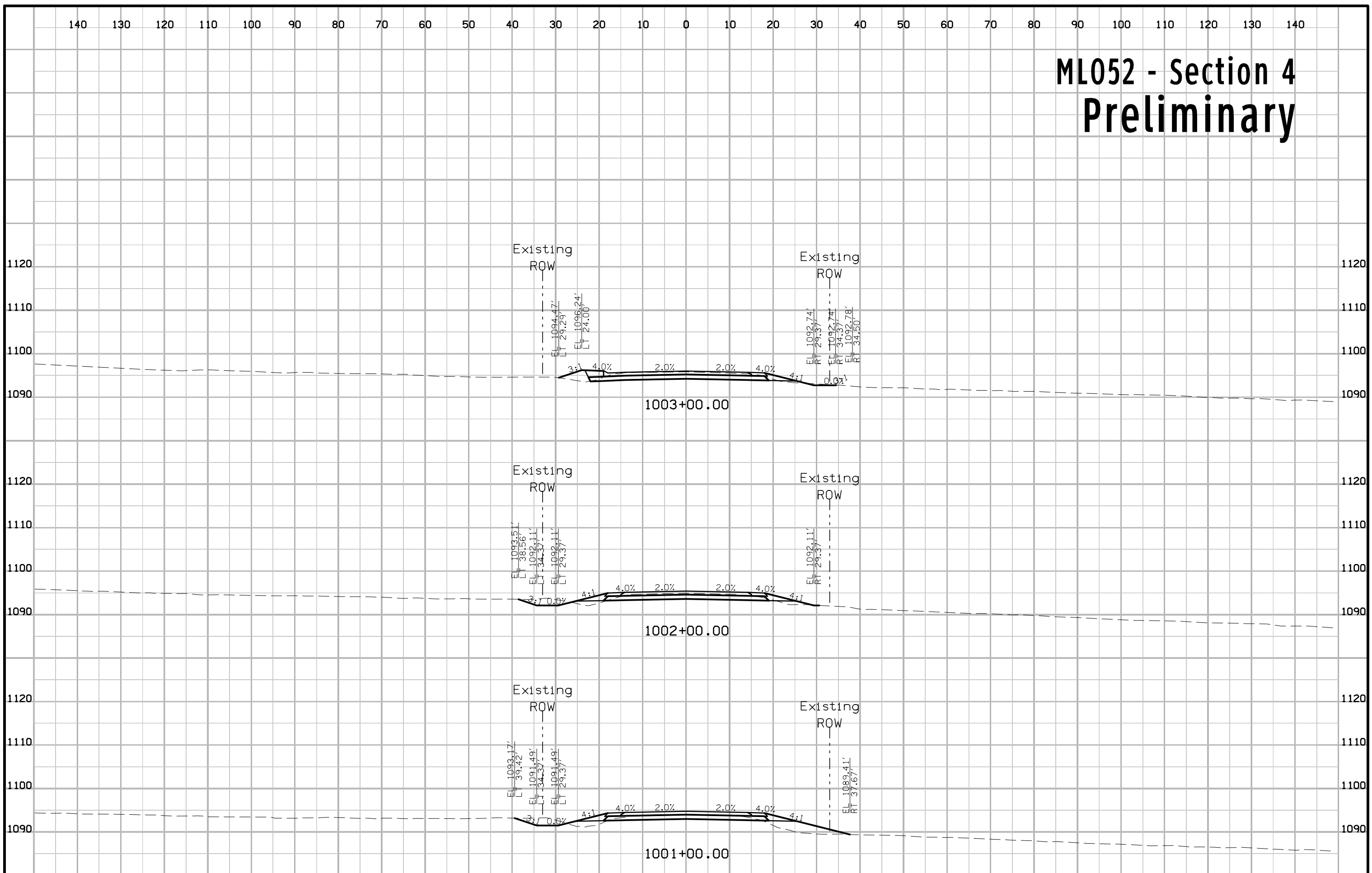
# ML052 - Section 4 Preliminary



# ML052 - Section 4 Preliminary

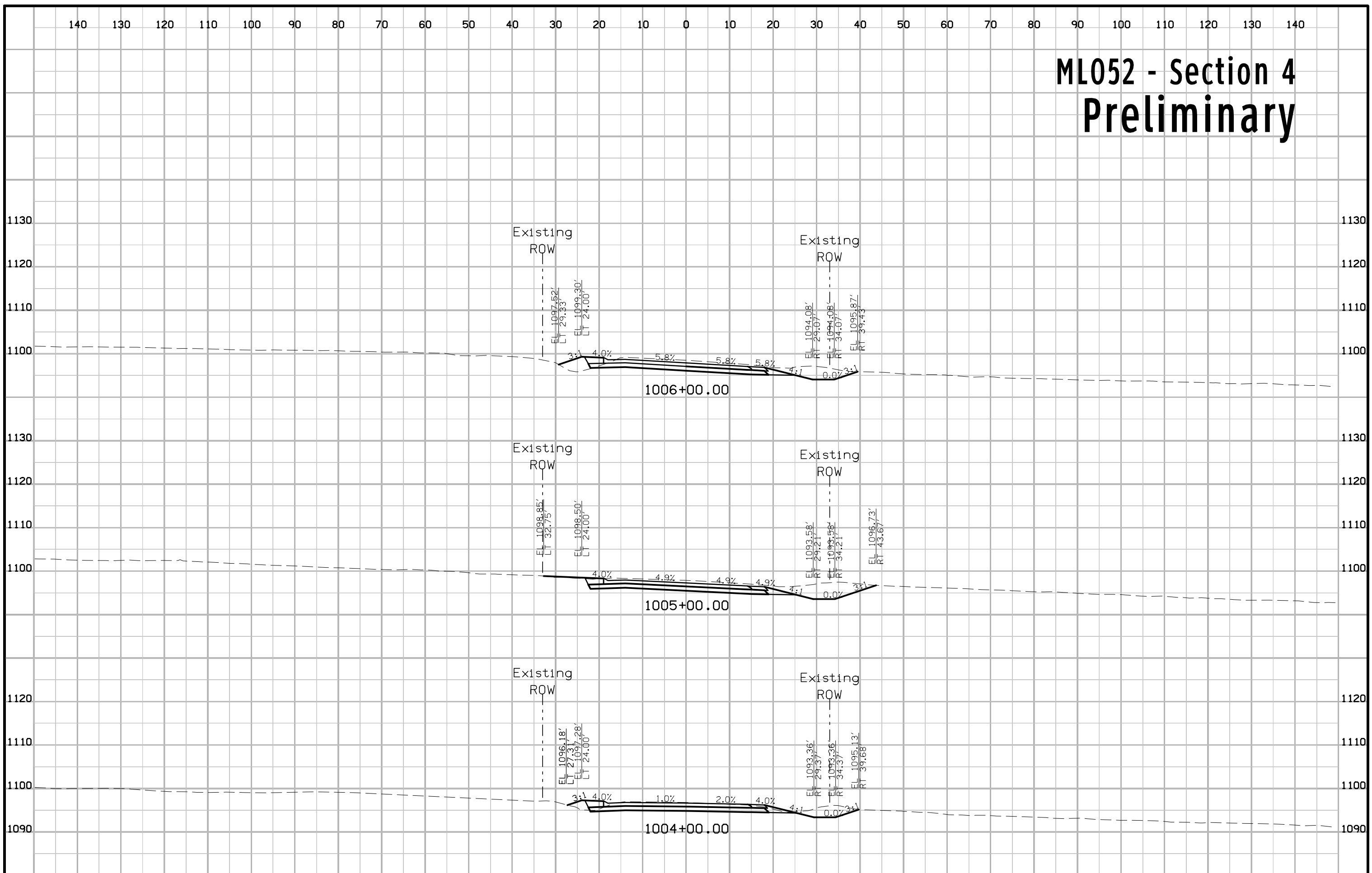


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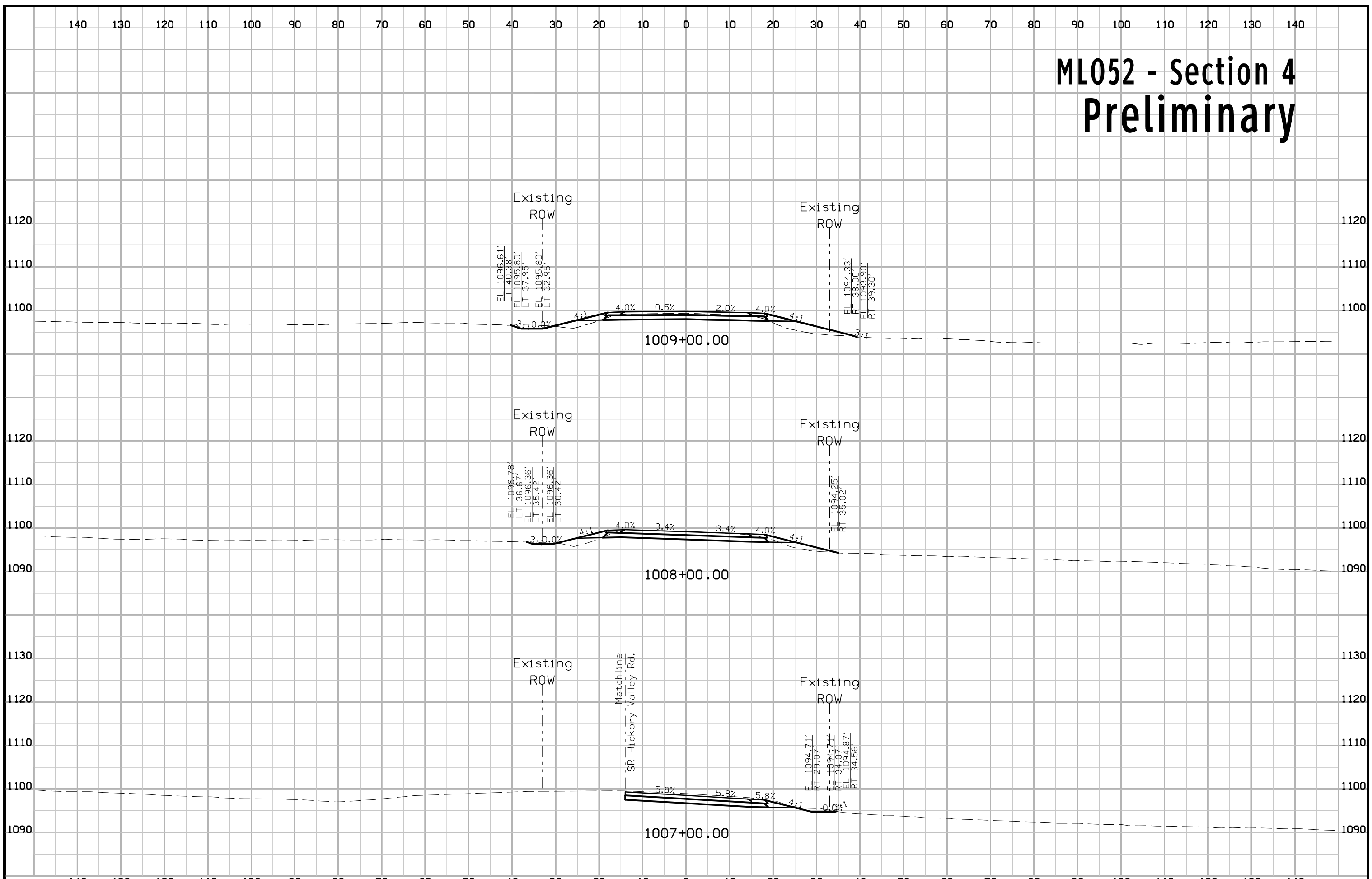




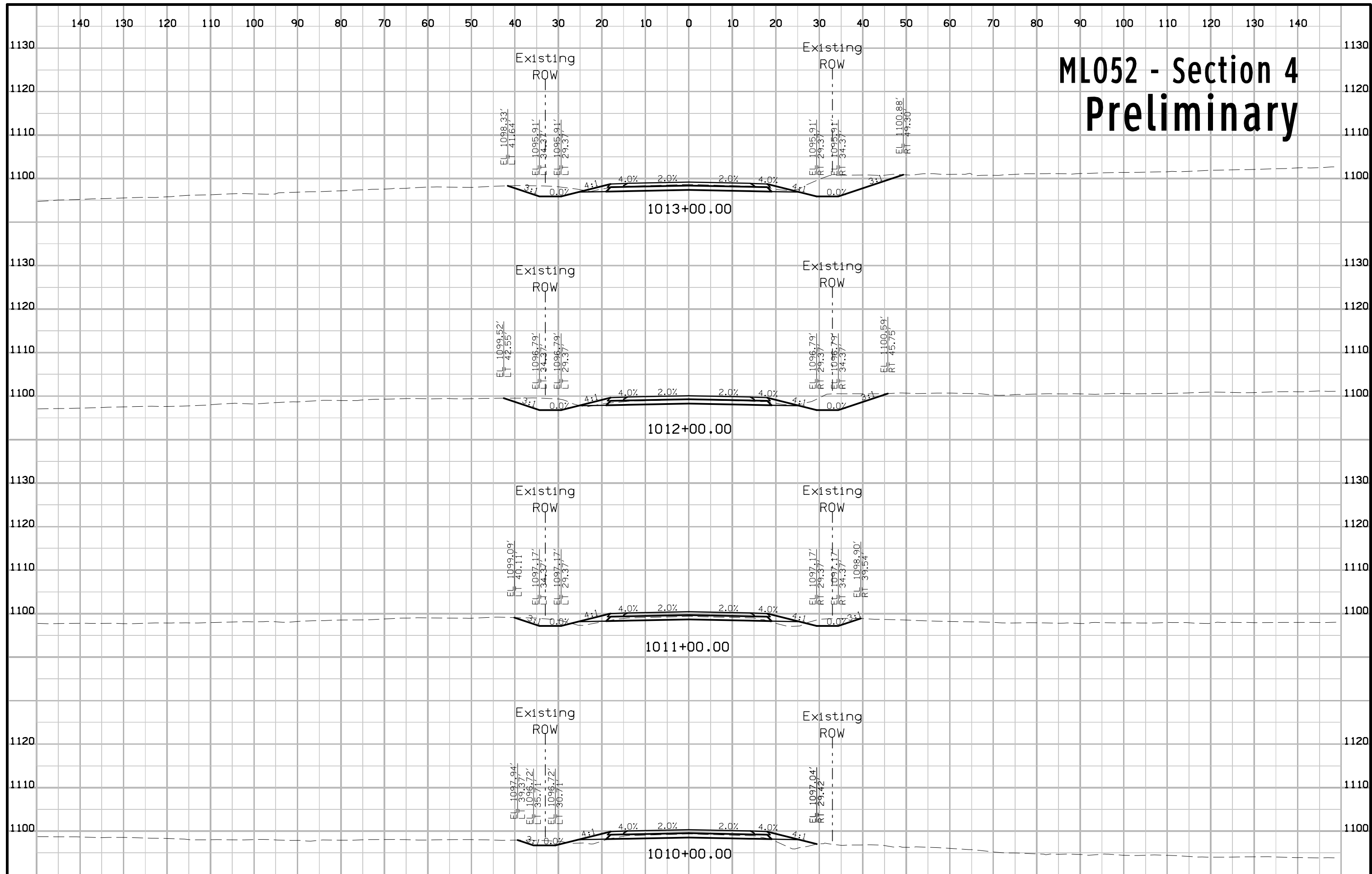
# ML052 - Section 4 Preliminary



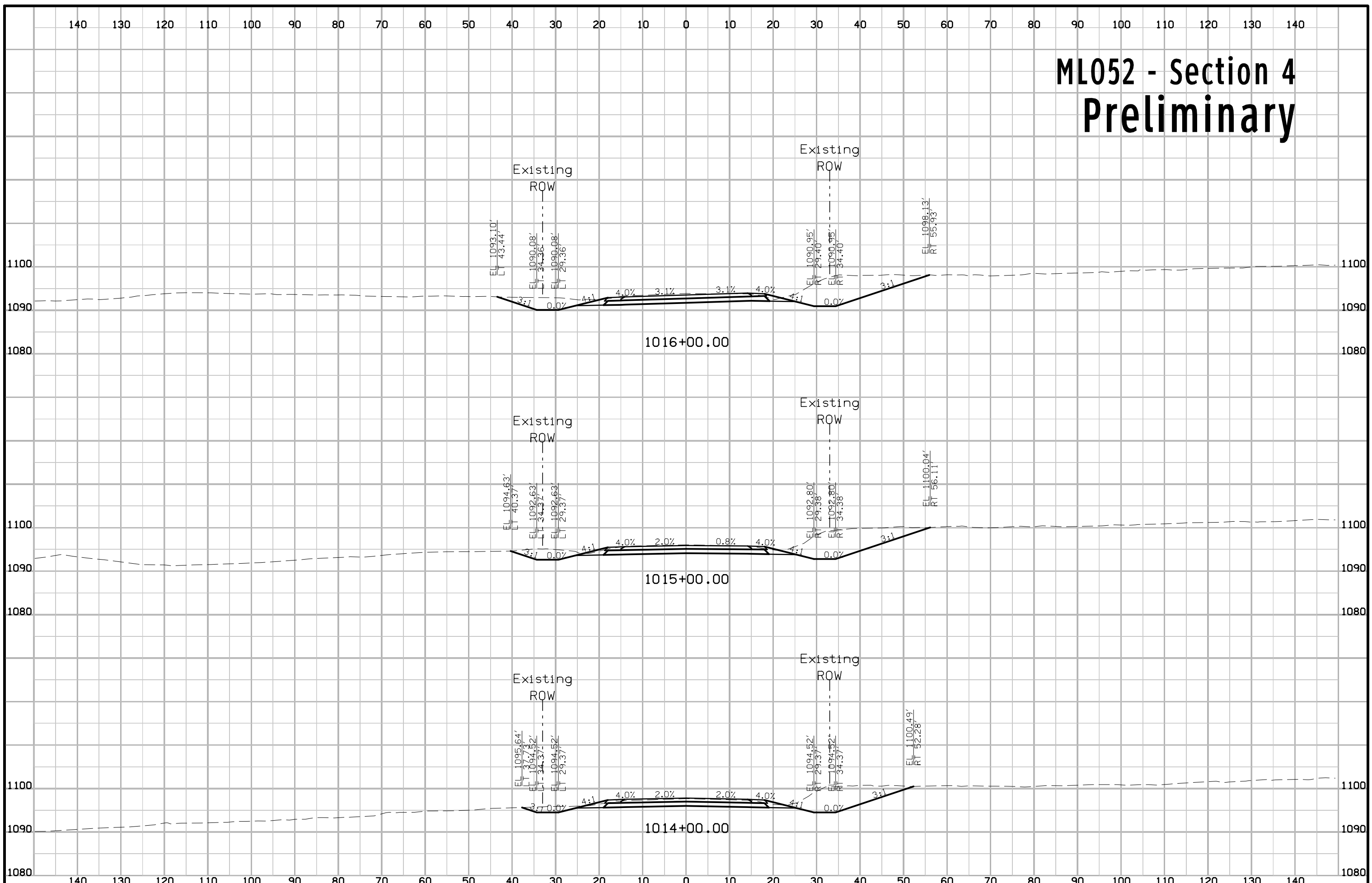
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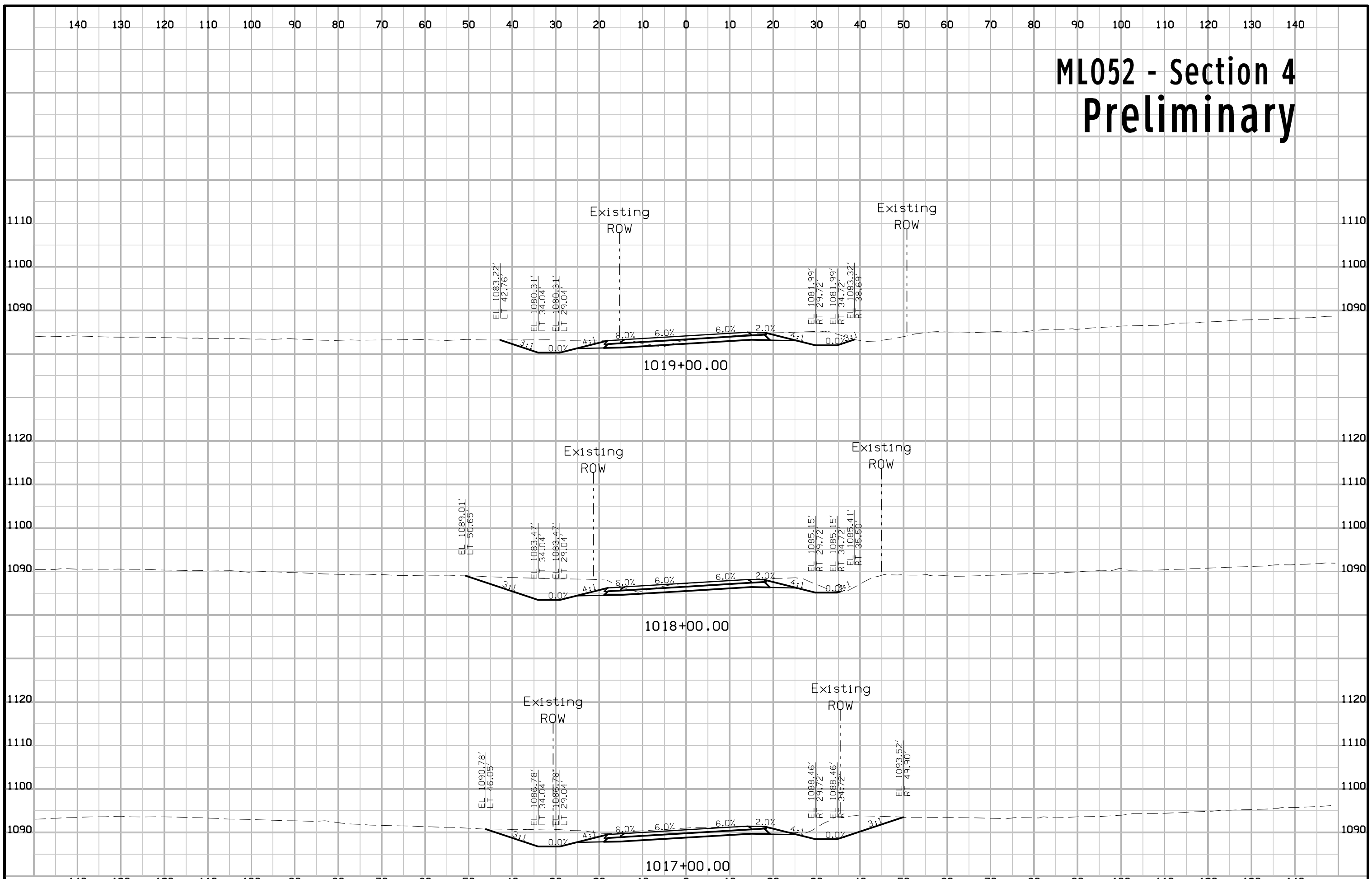
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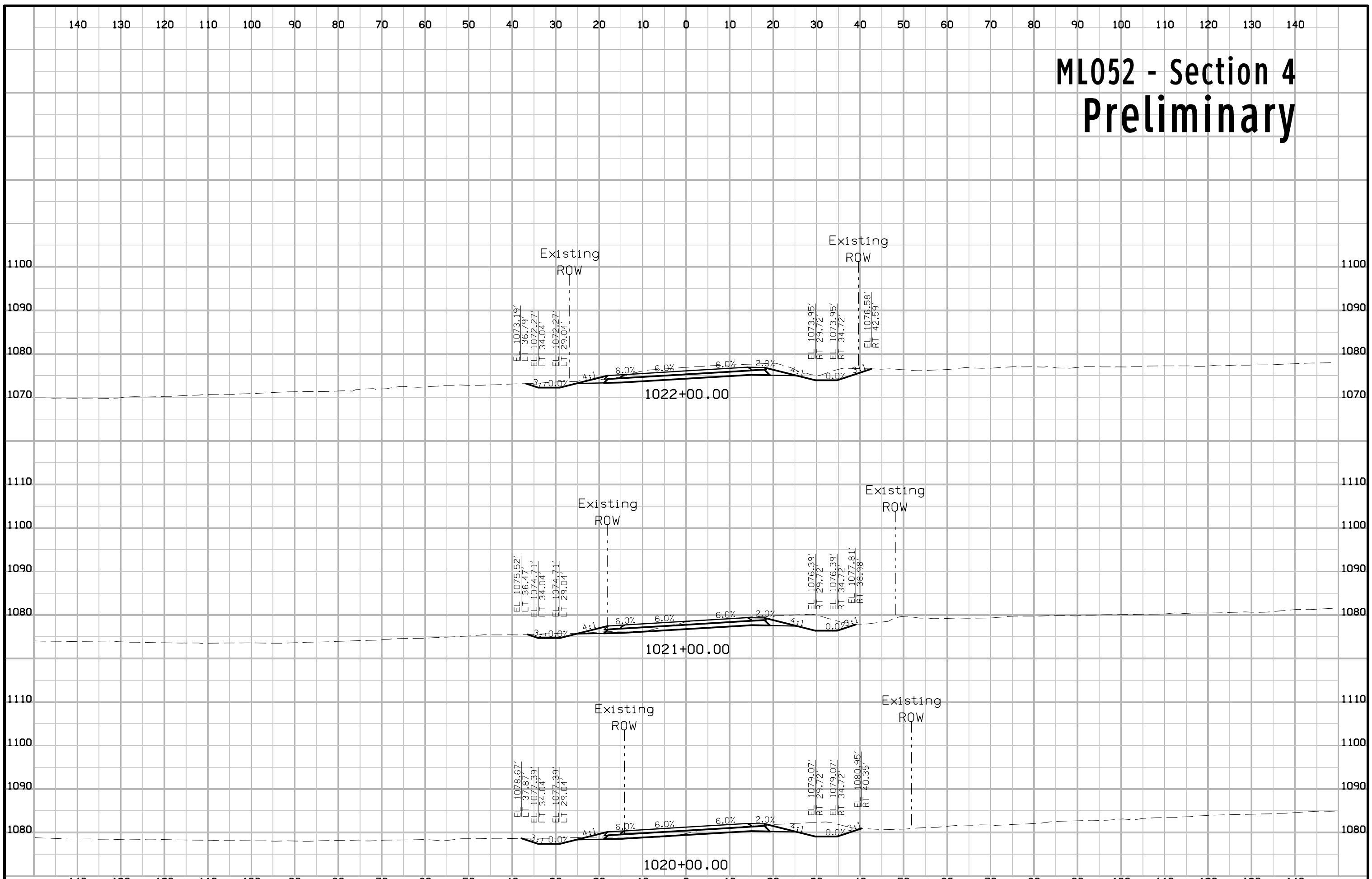
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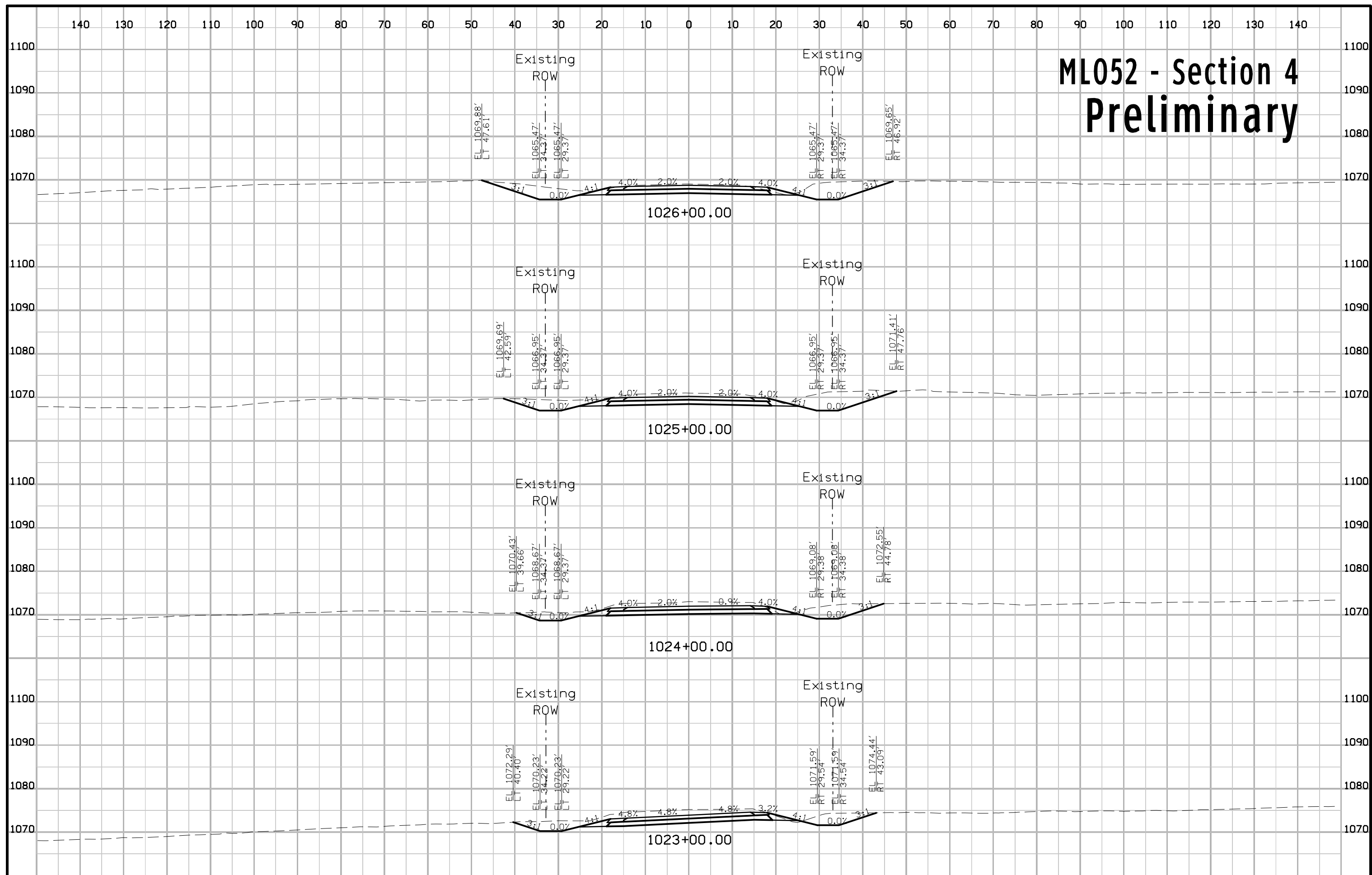
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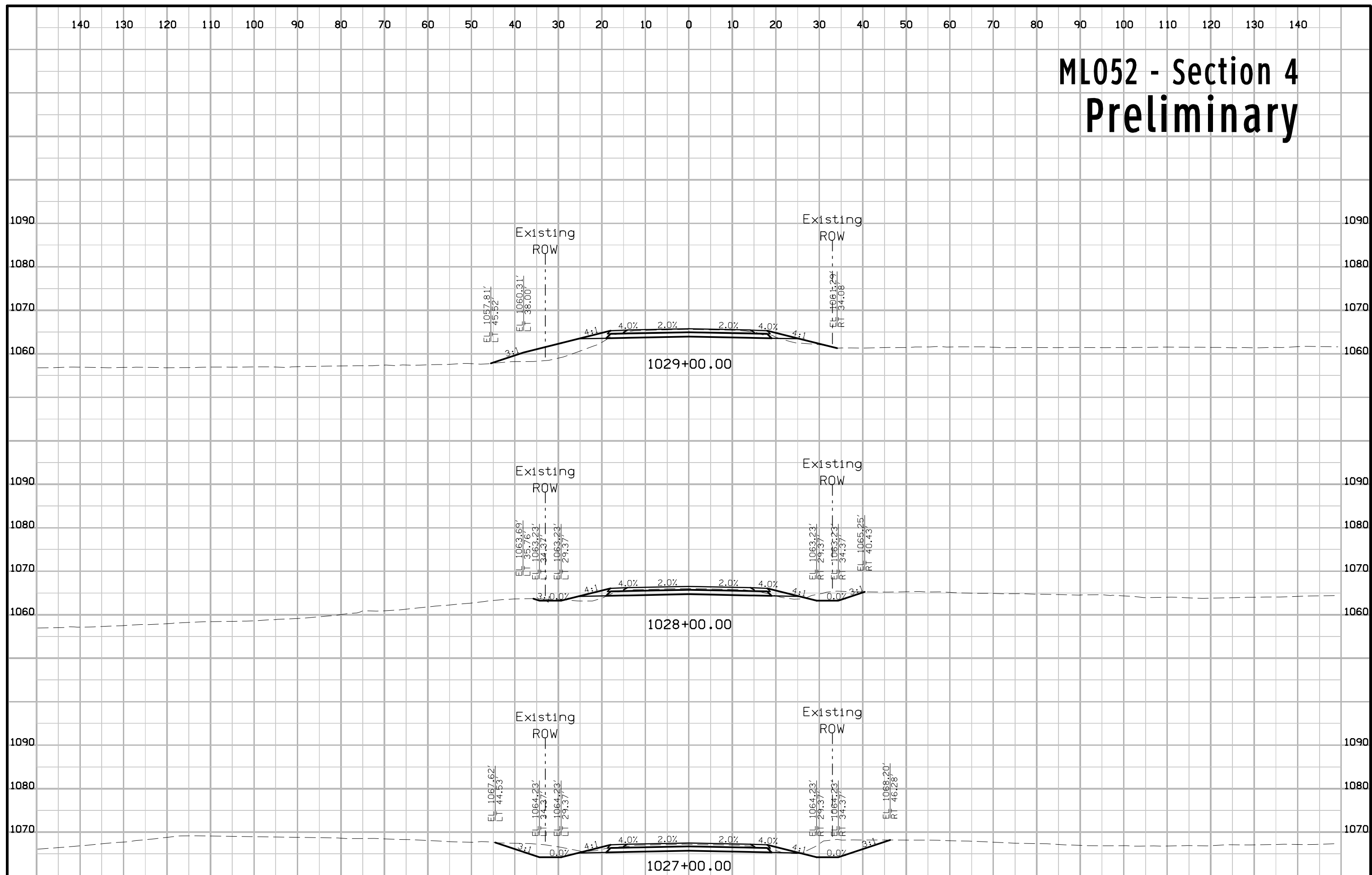
# ML052 - Section 4 Preliminary



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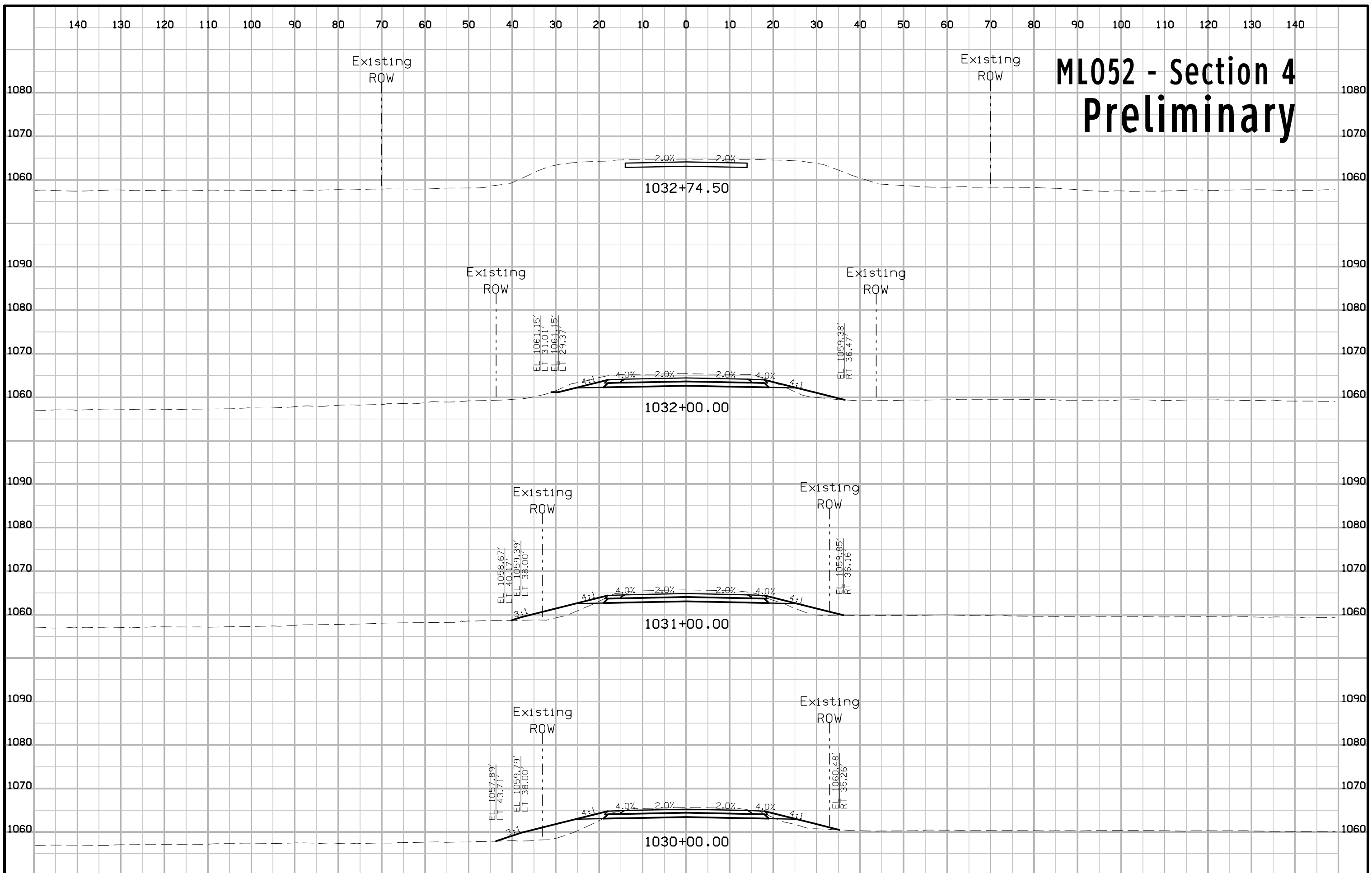


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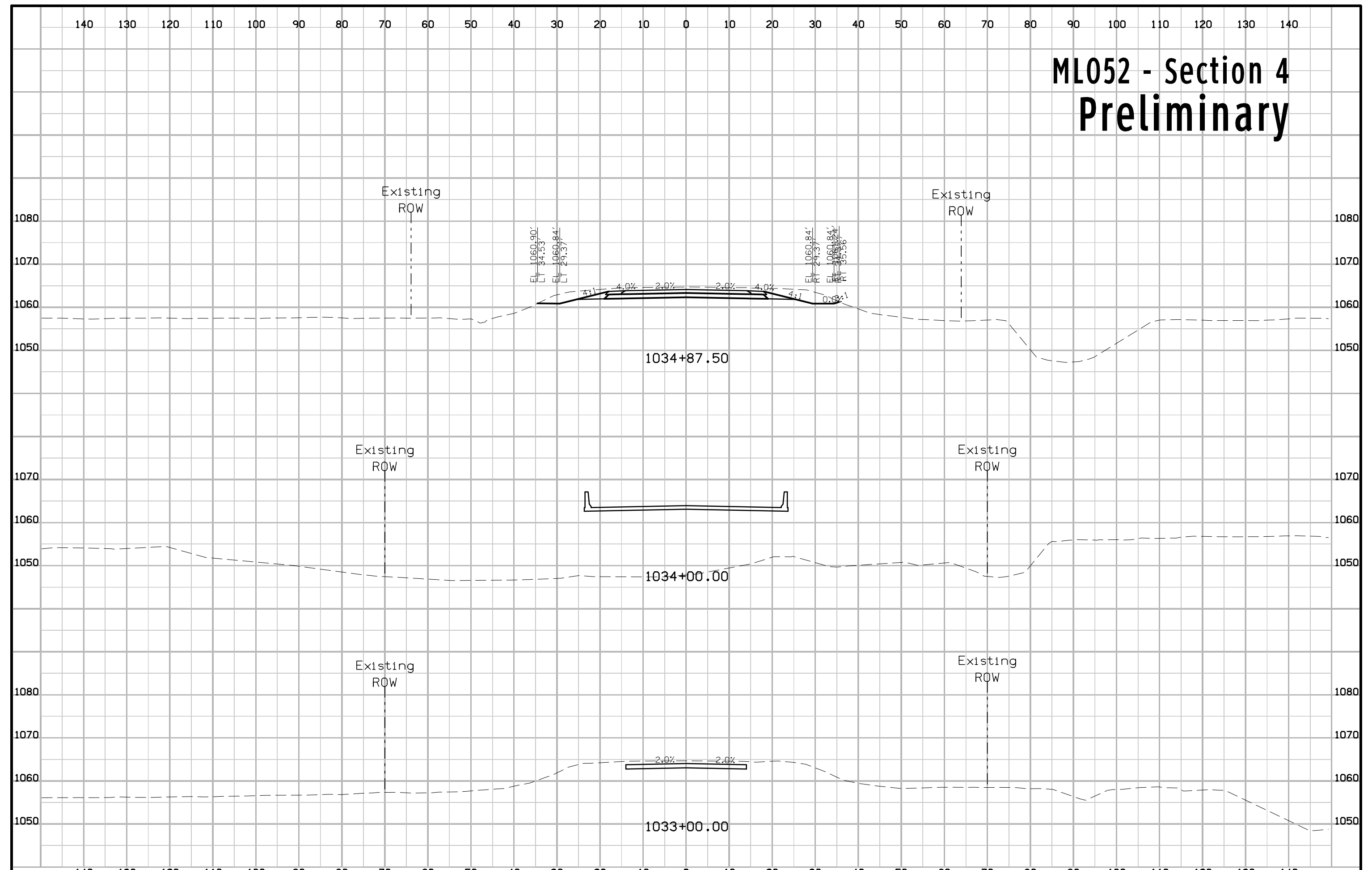




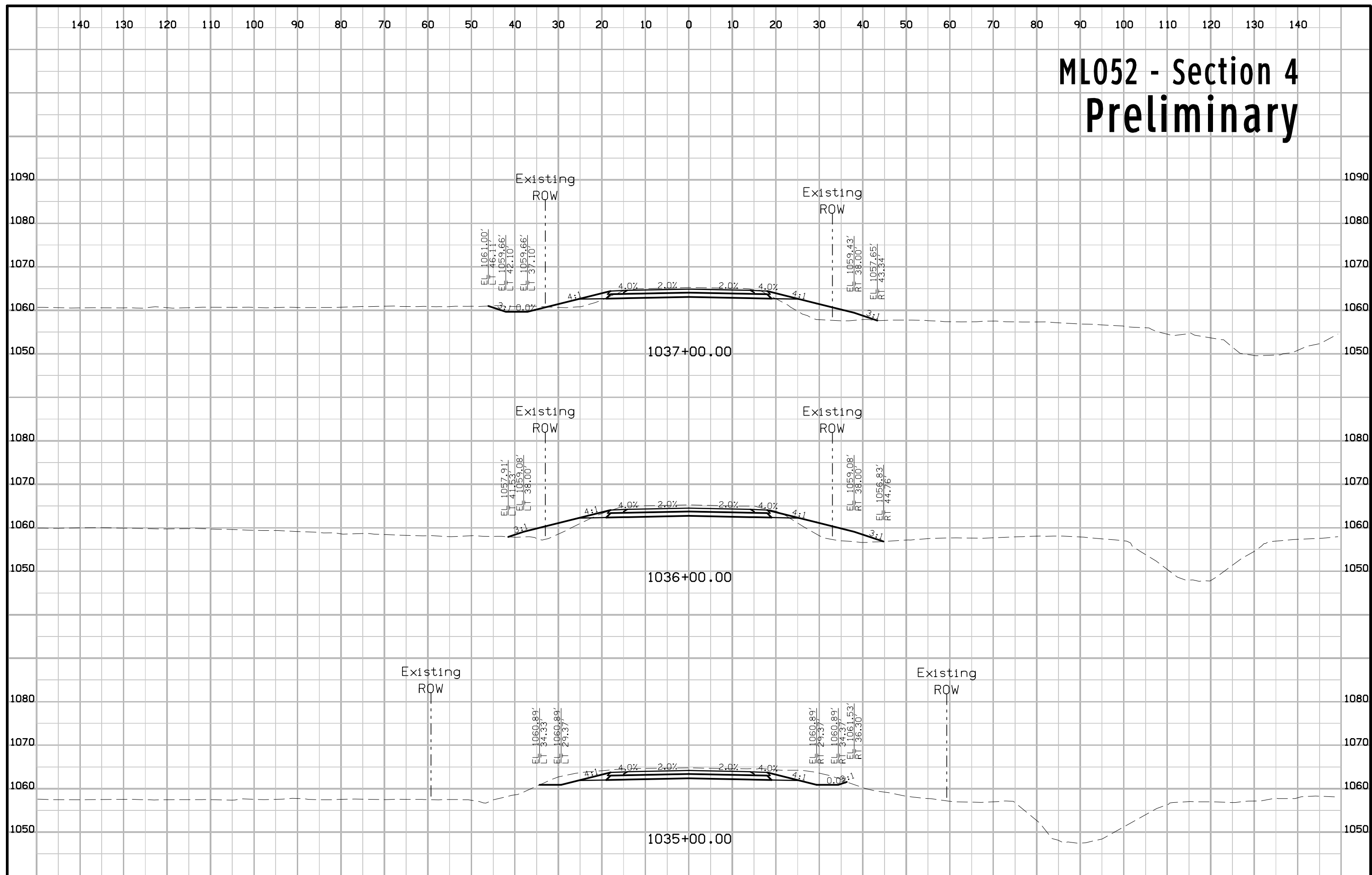
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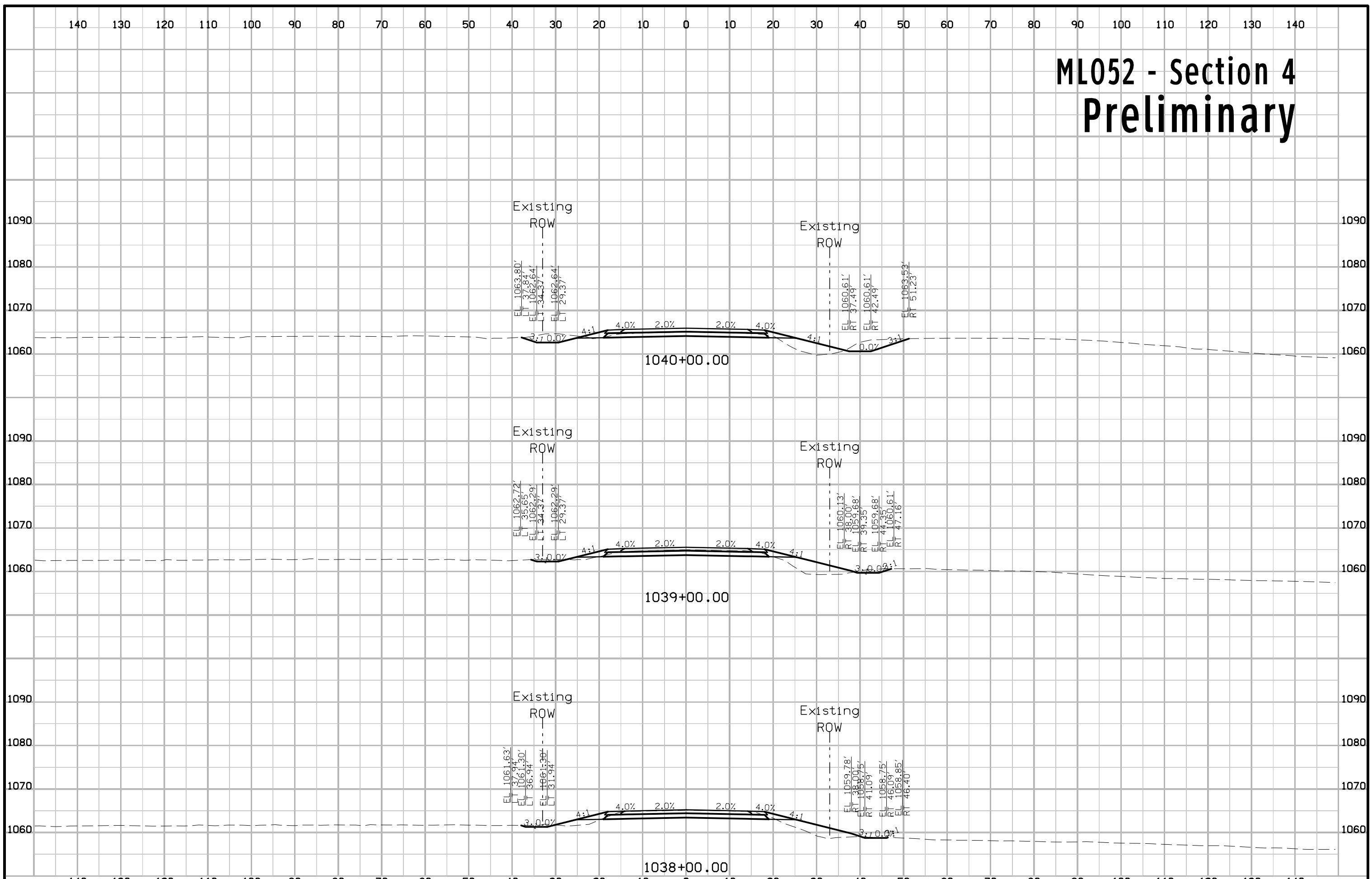
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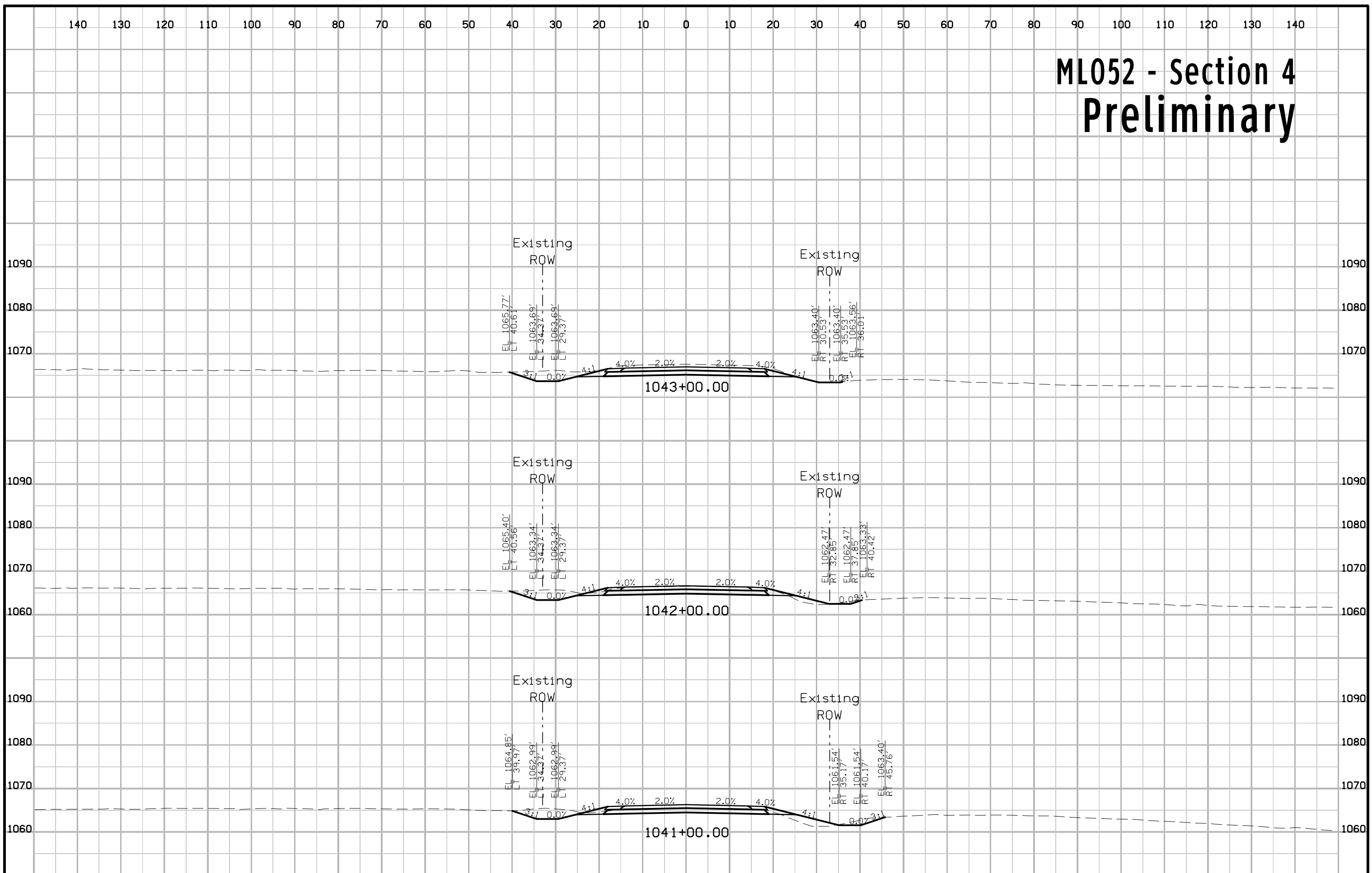
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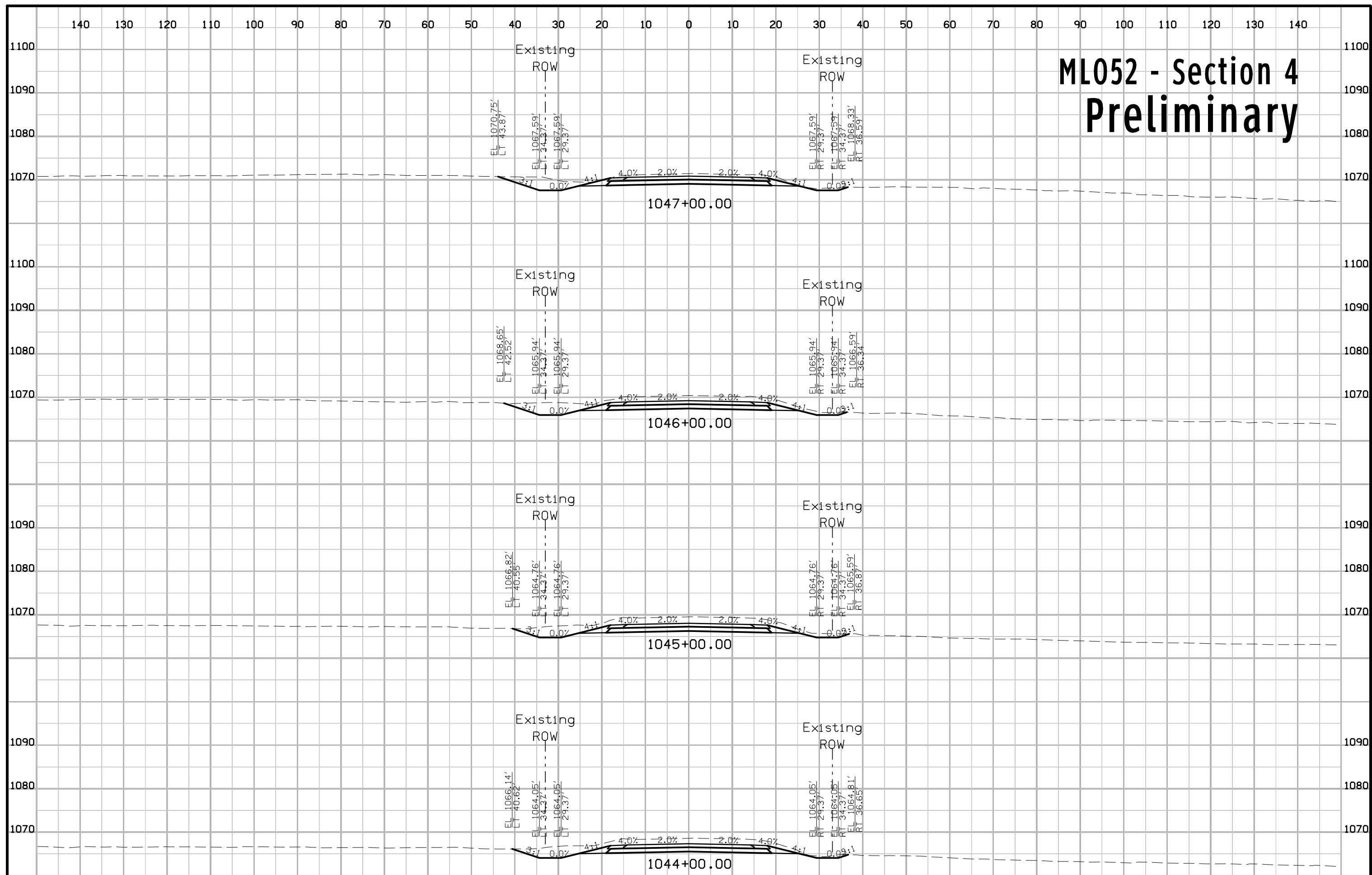
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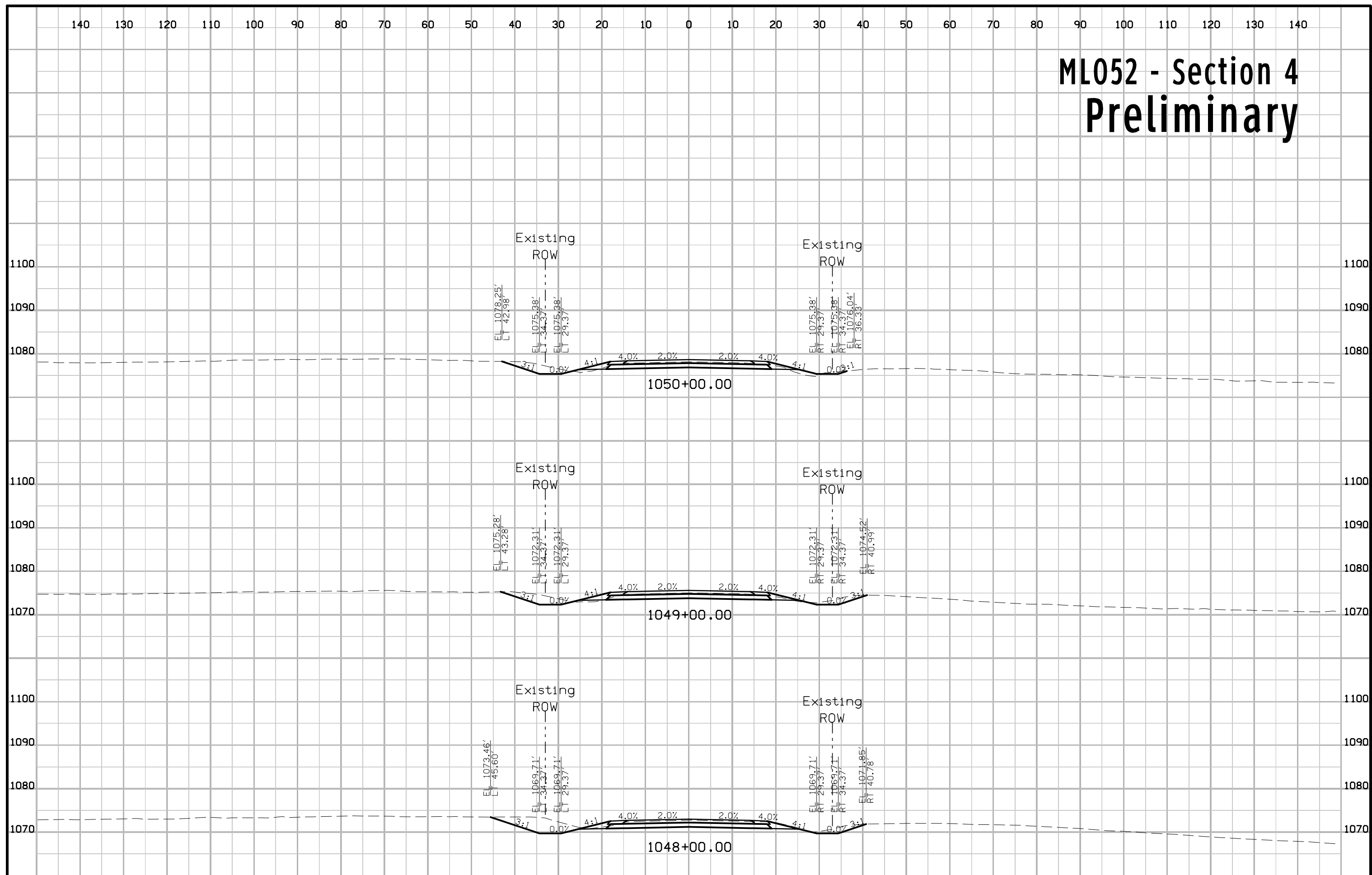
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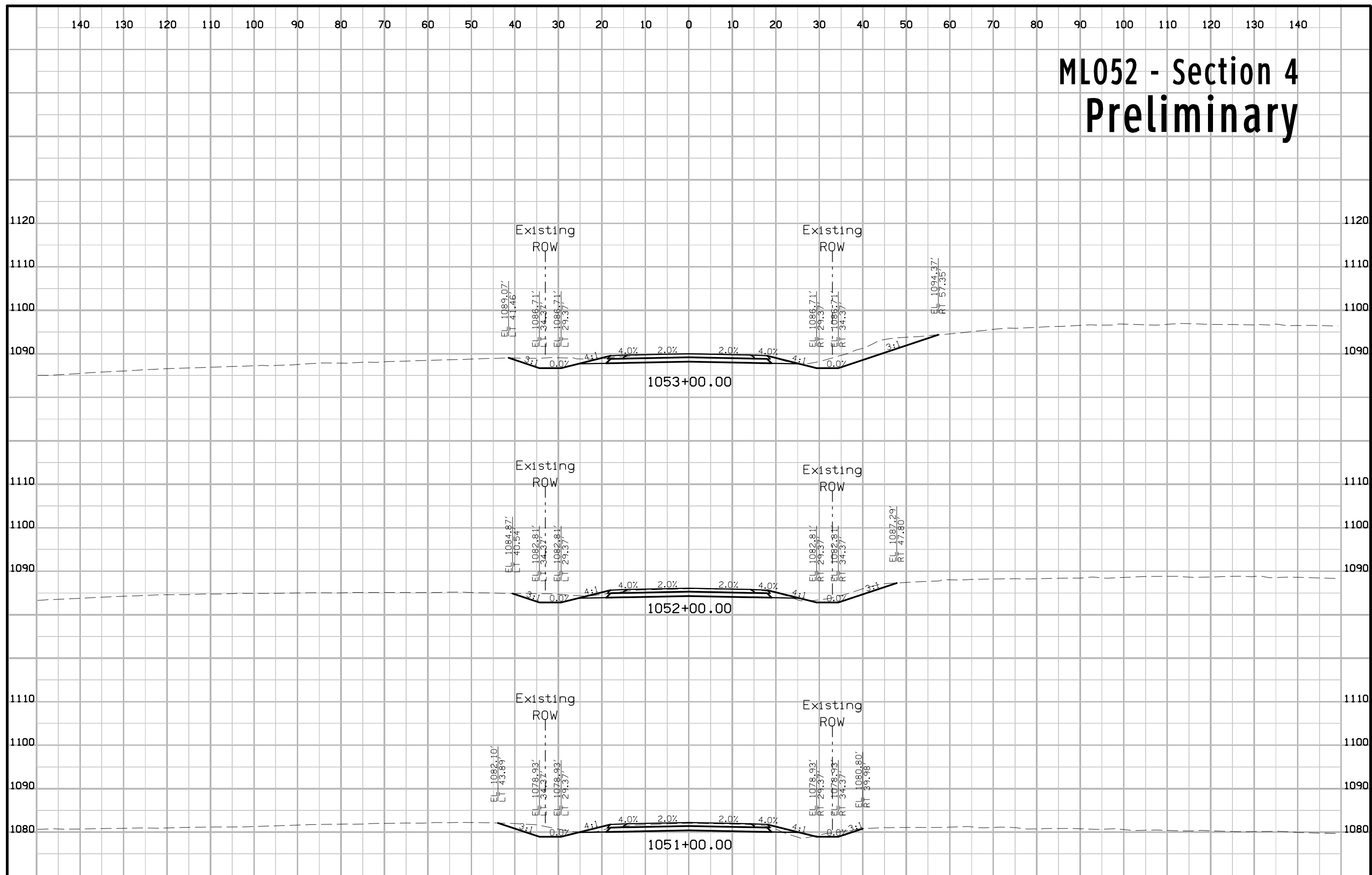
# ML052 - Section 4 Preliminary



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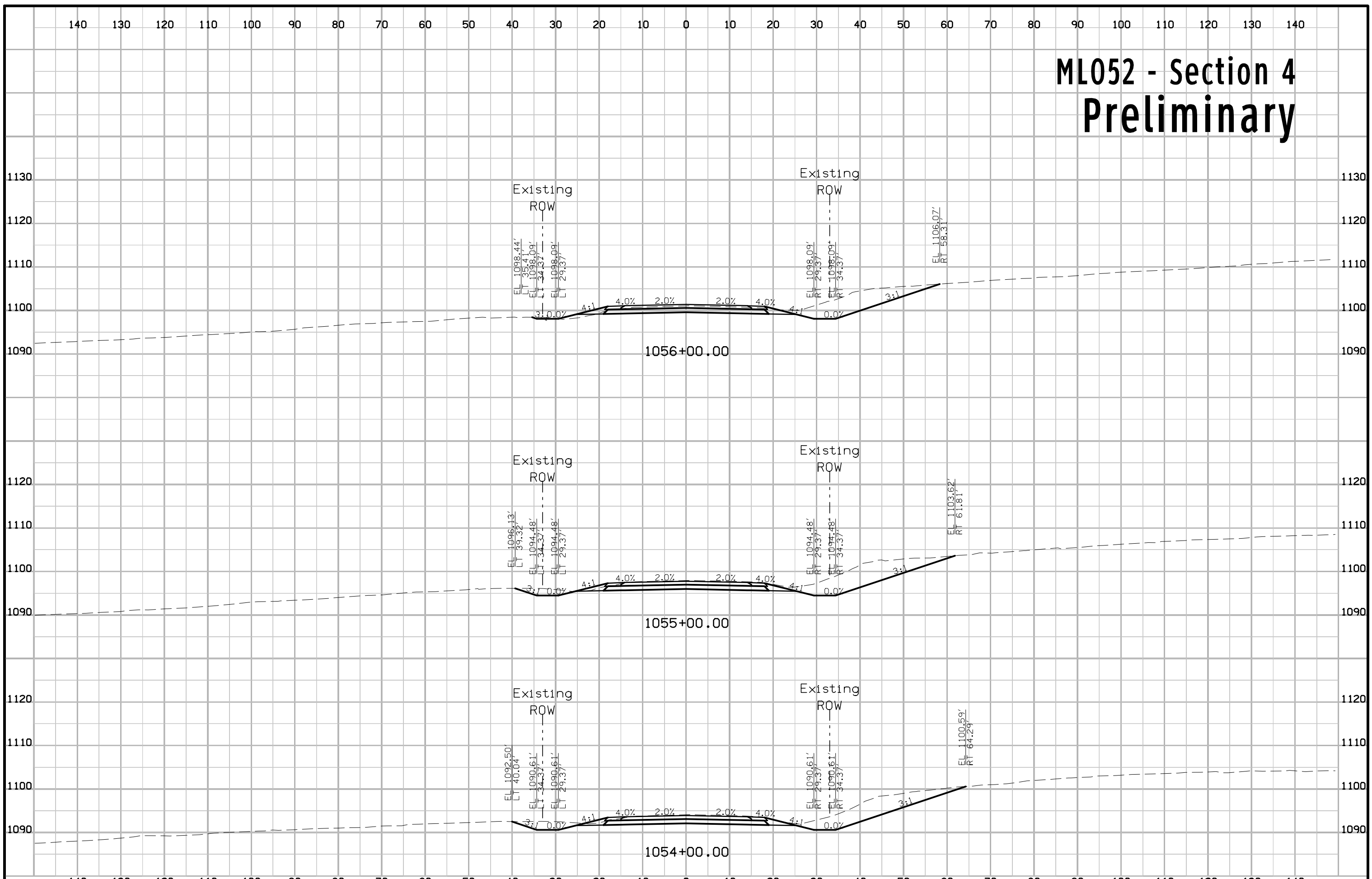


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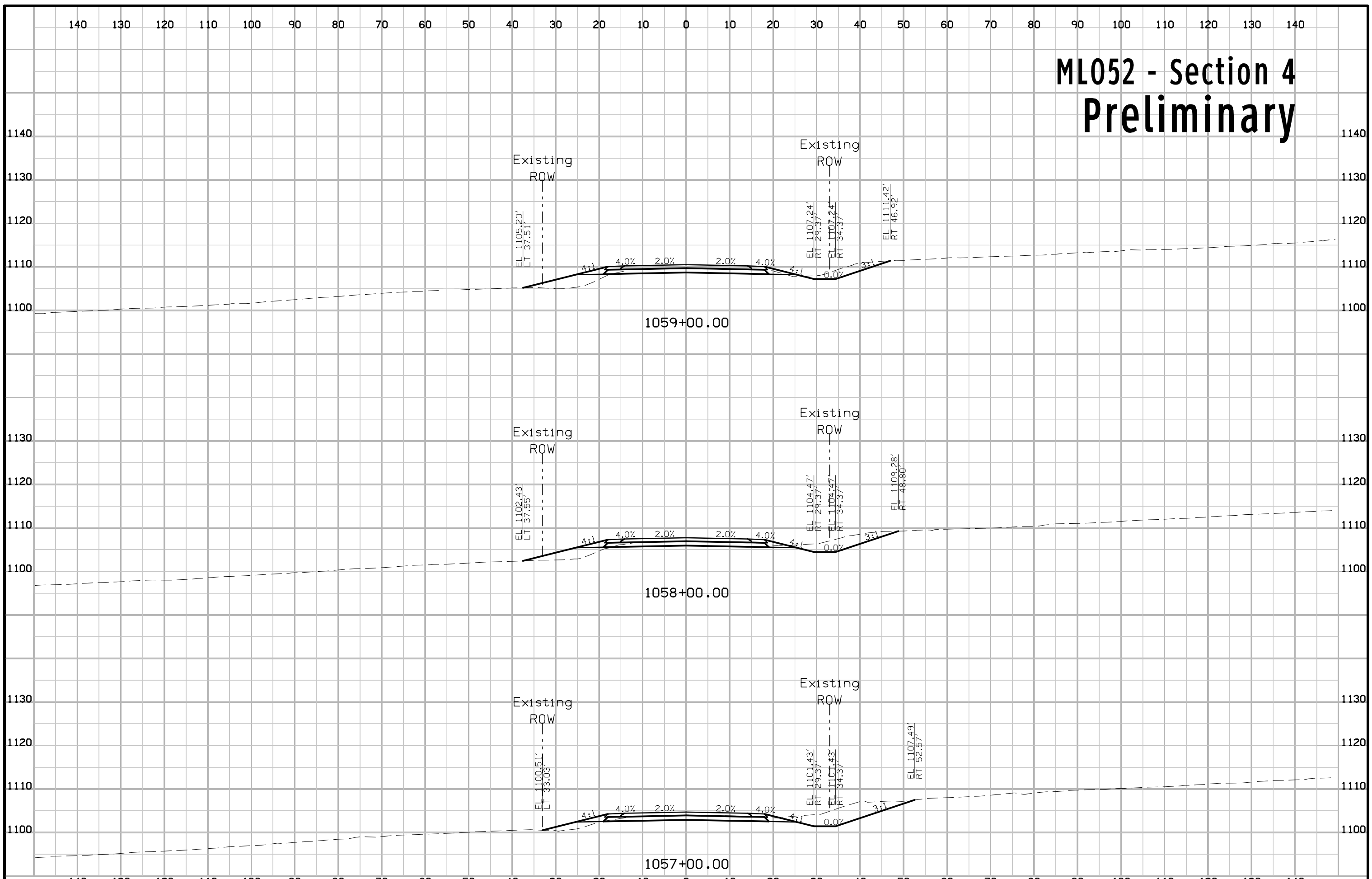




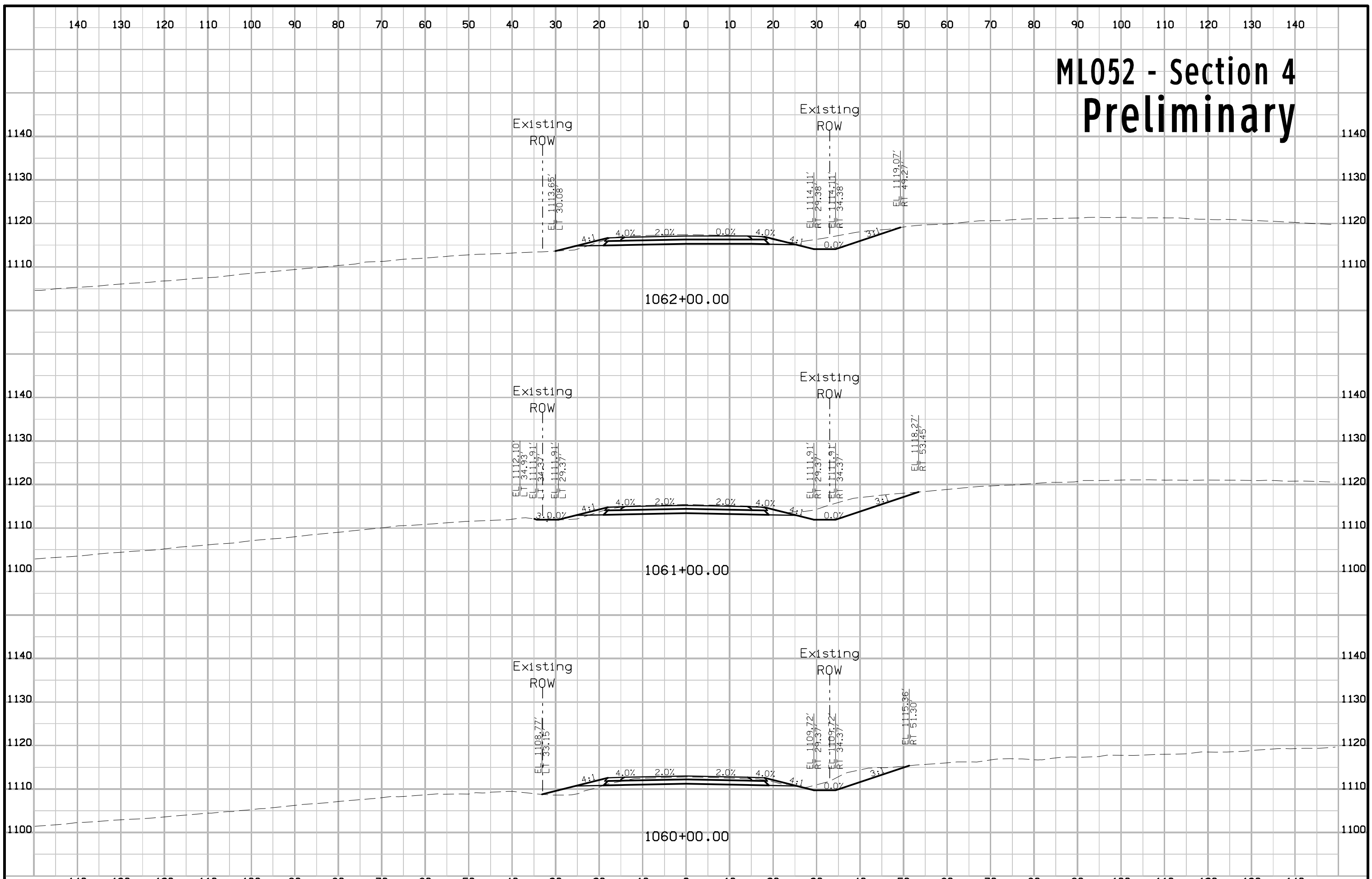
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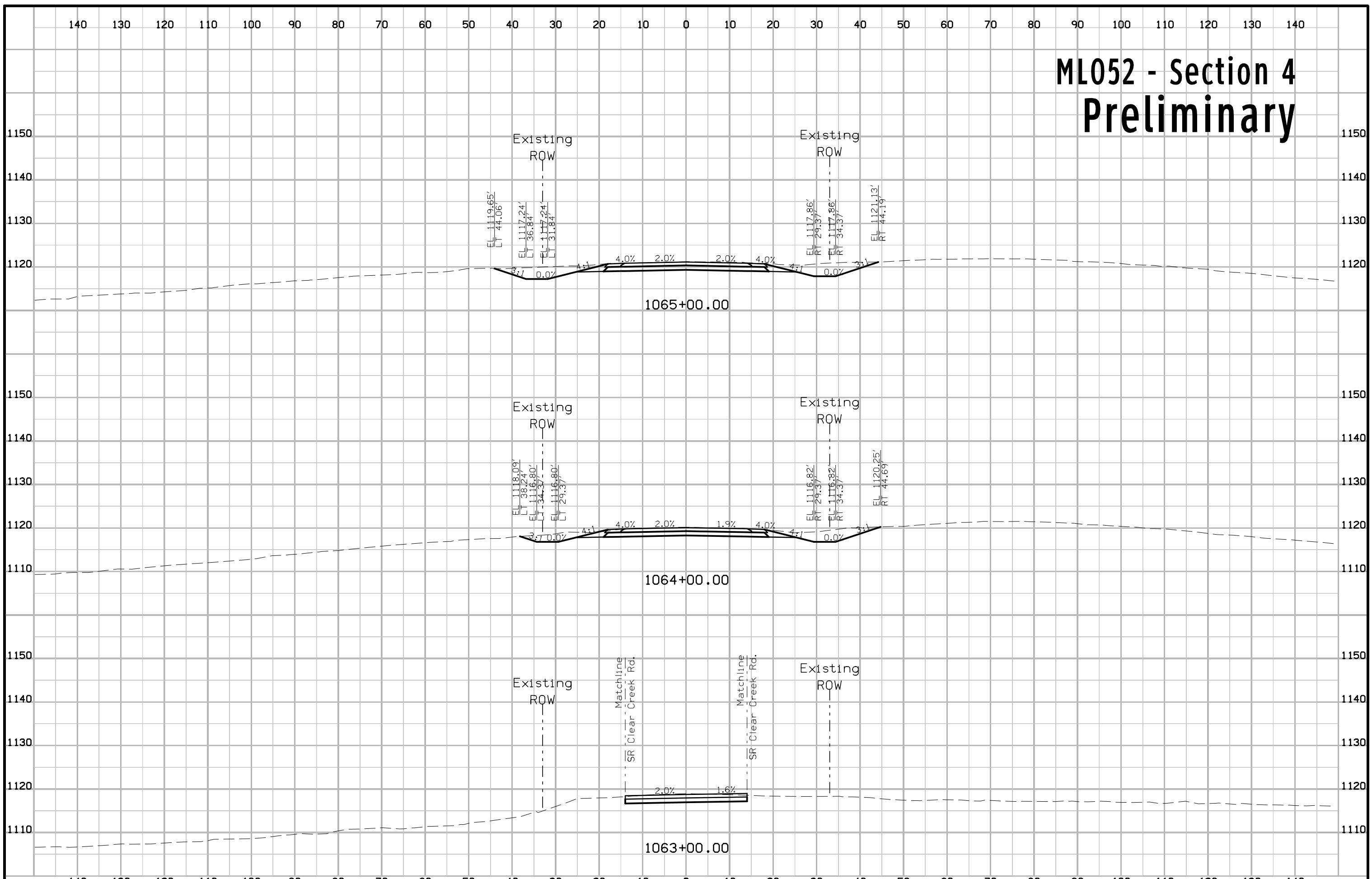
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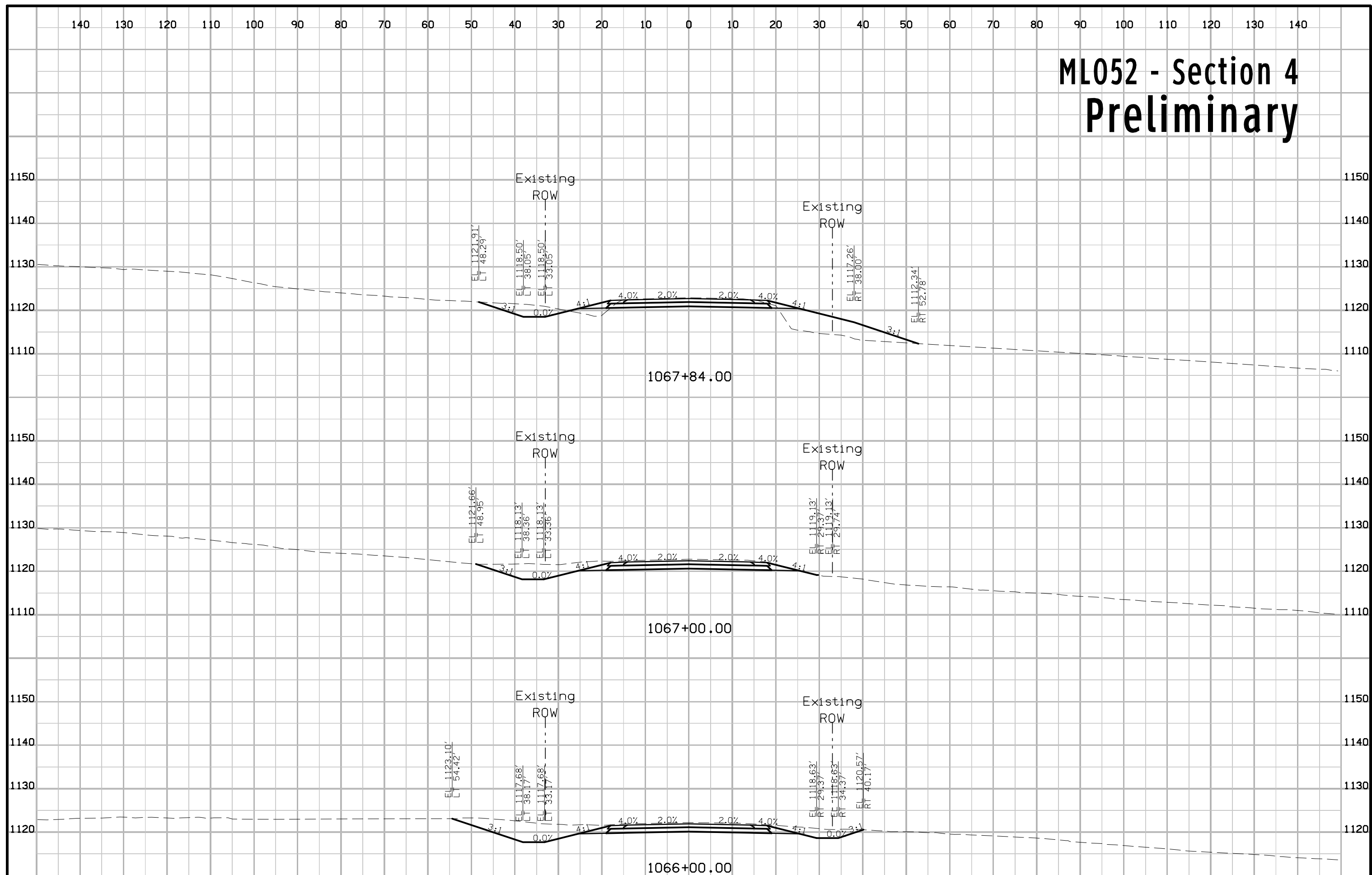
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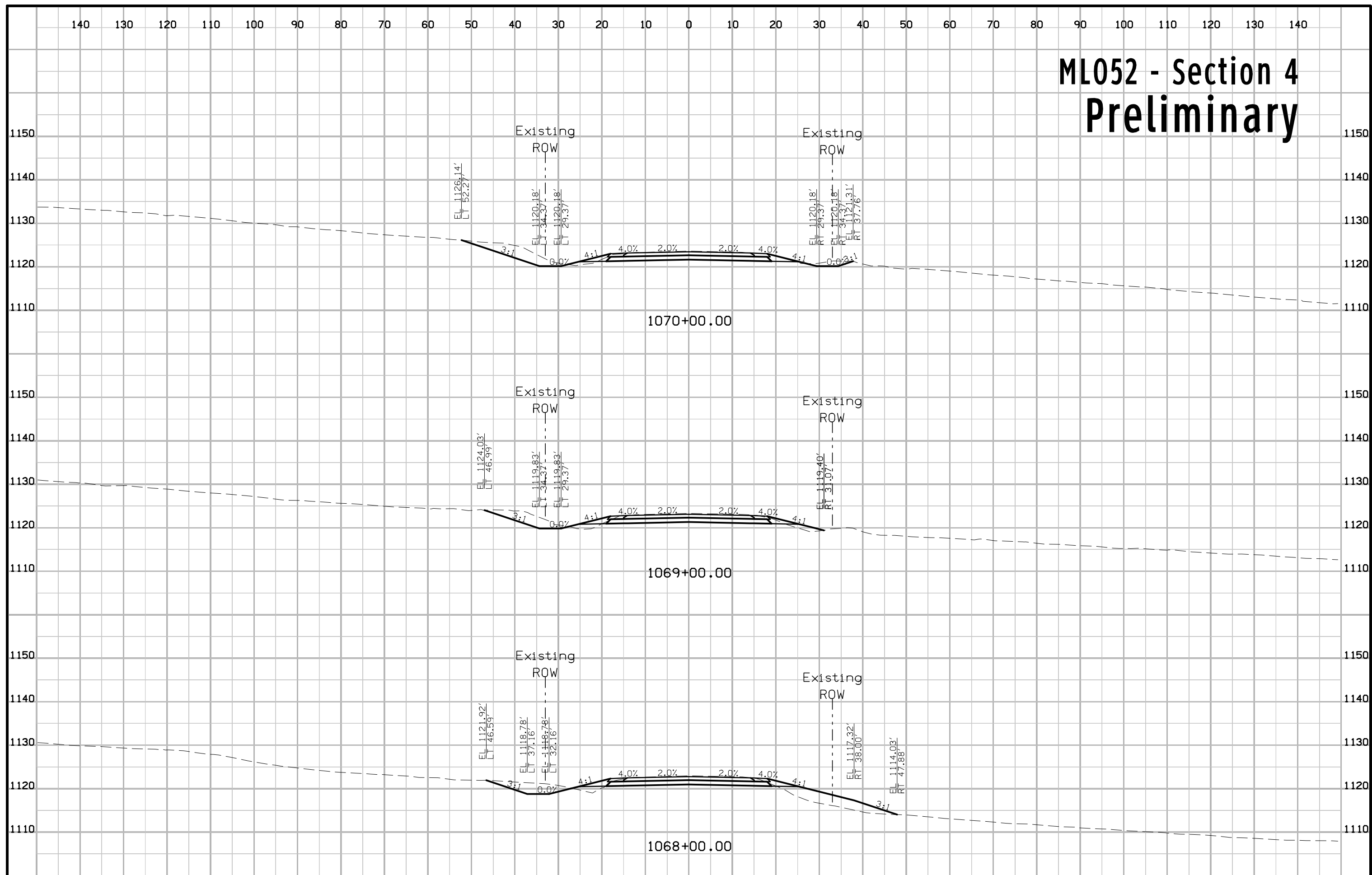
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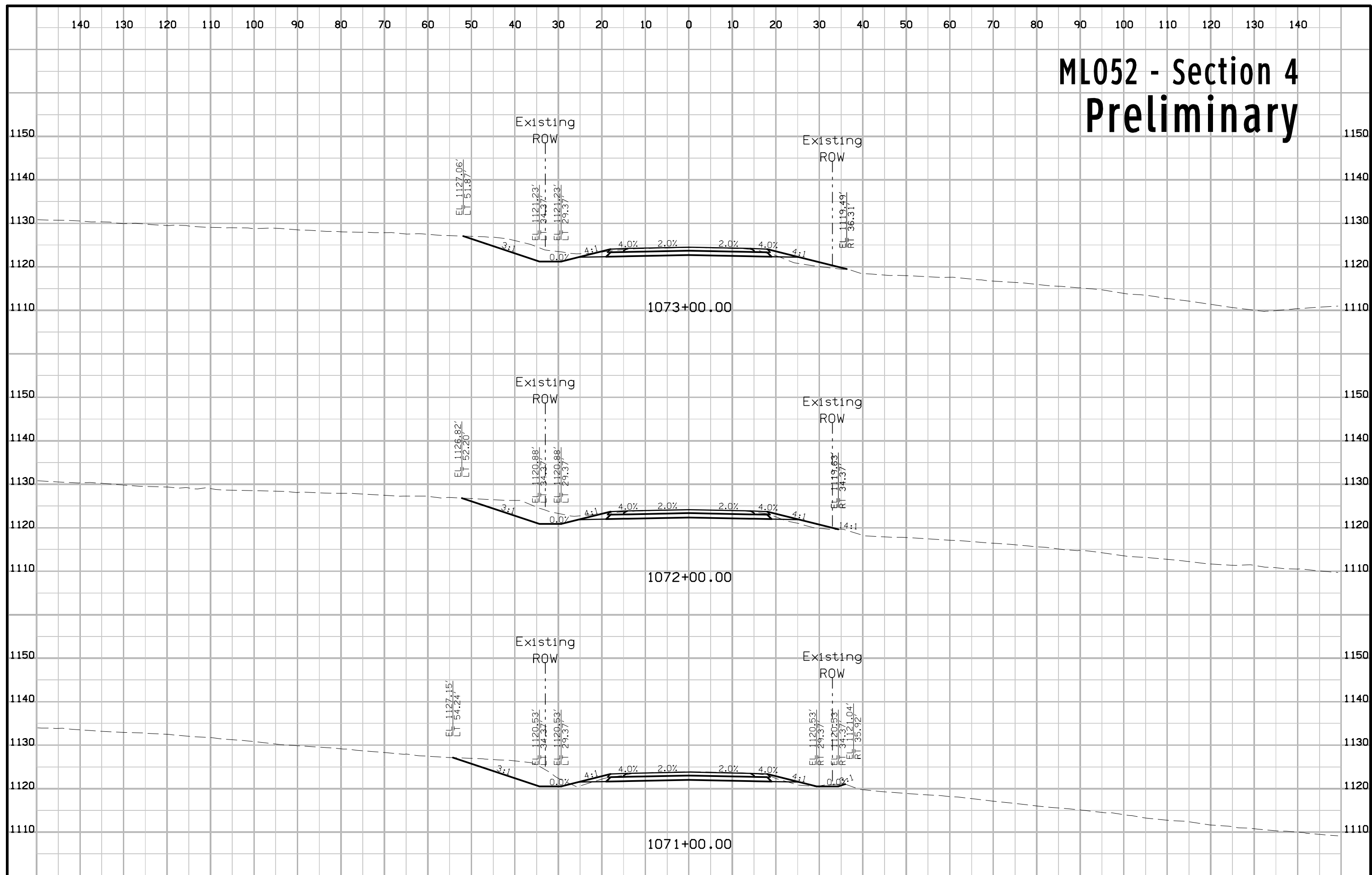
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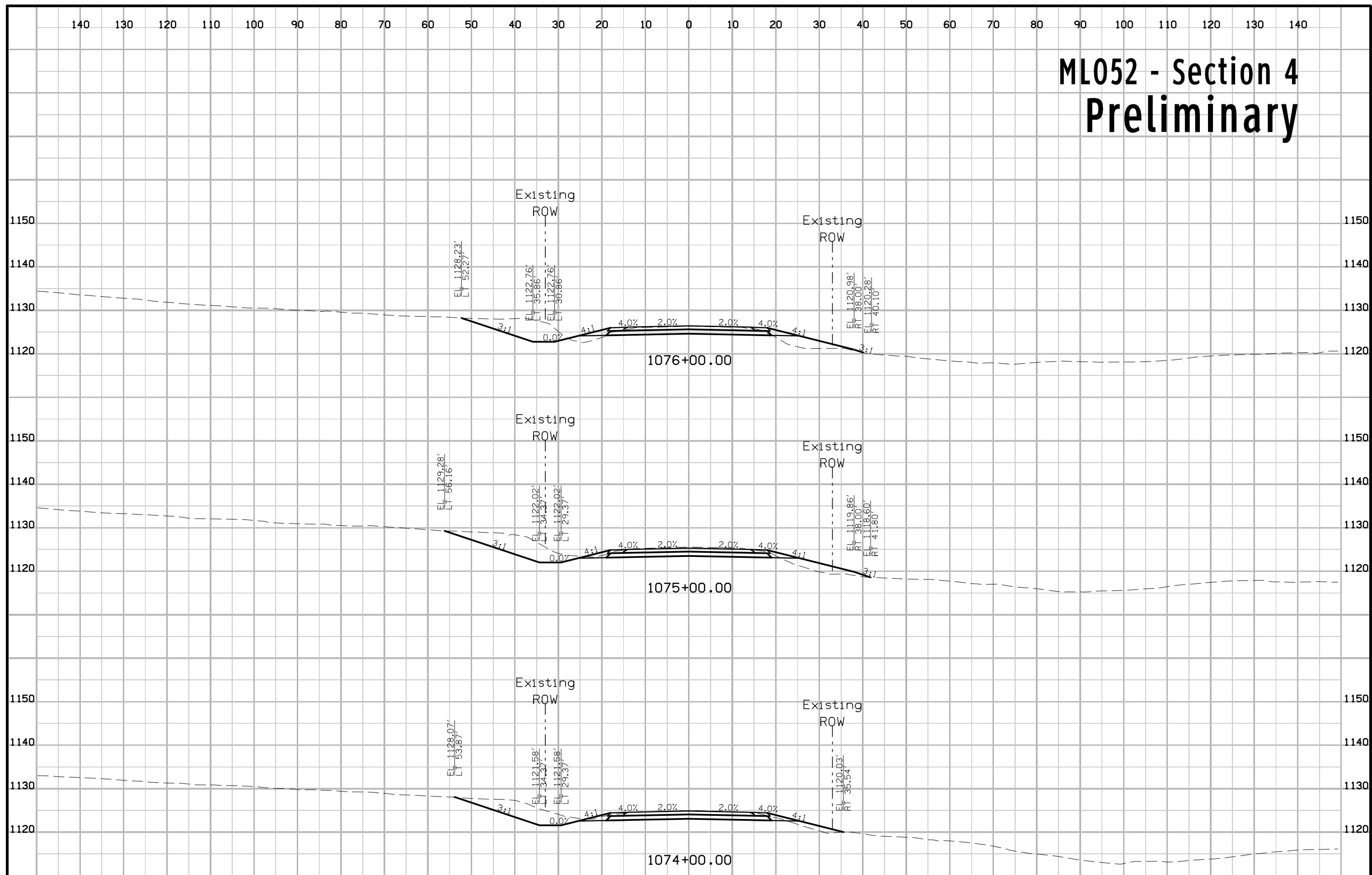
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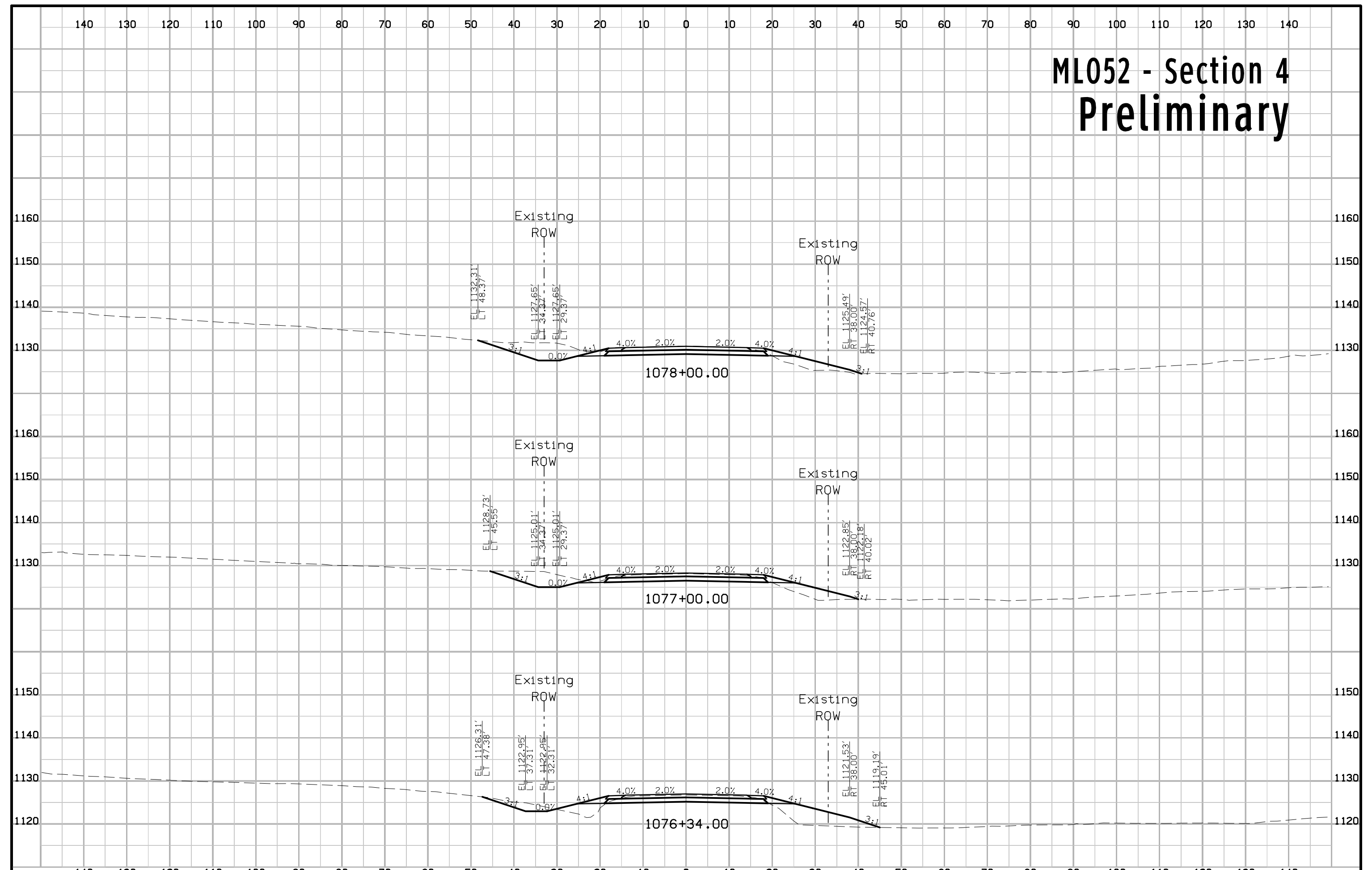


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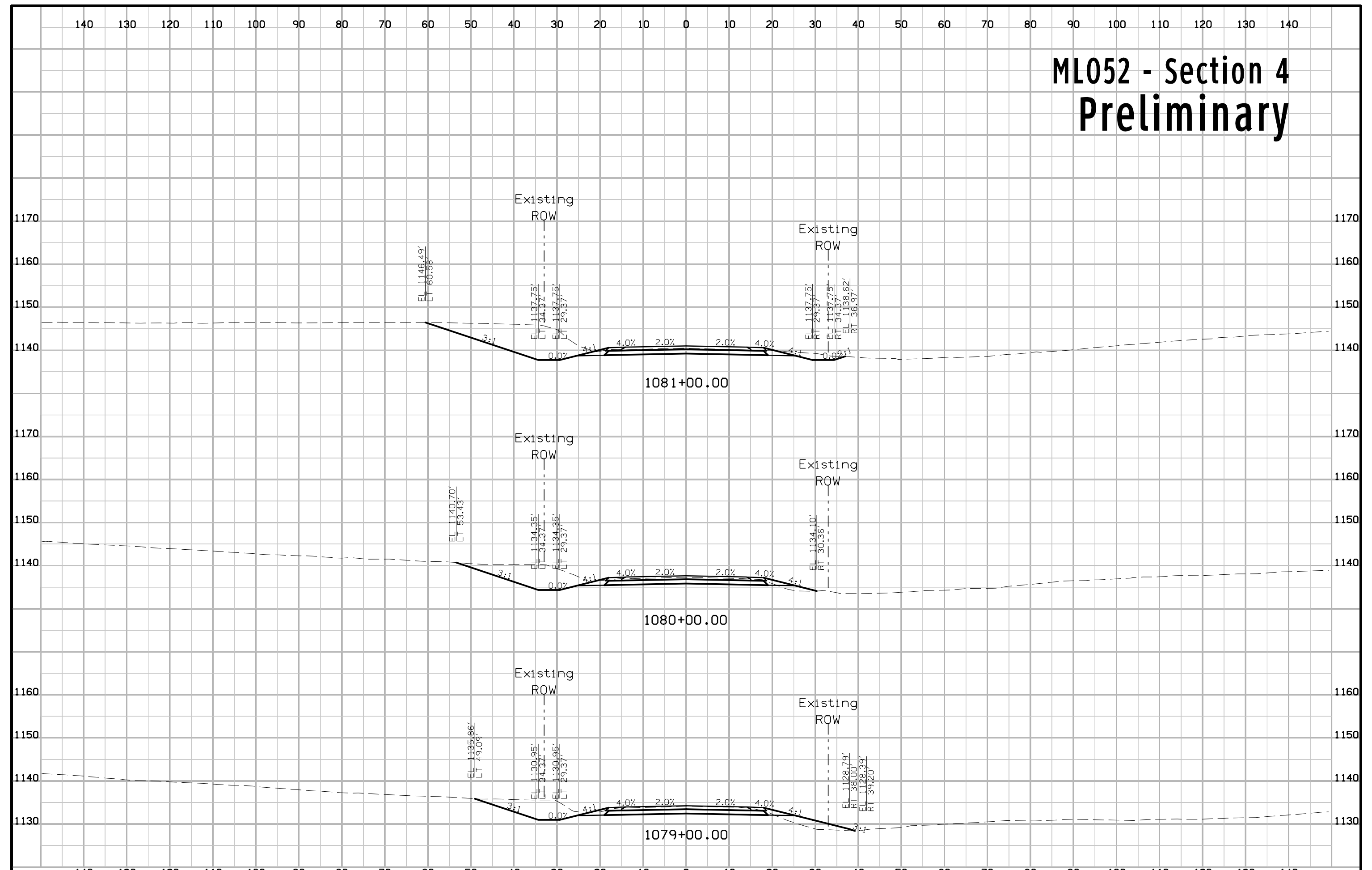




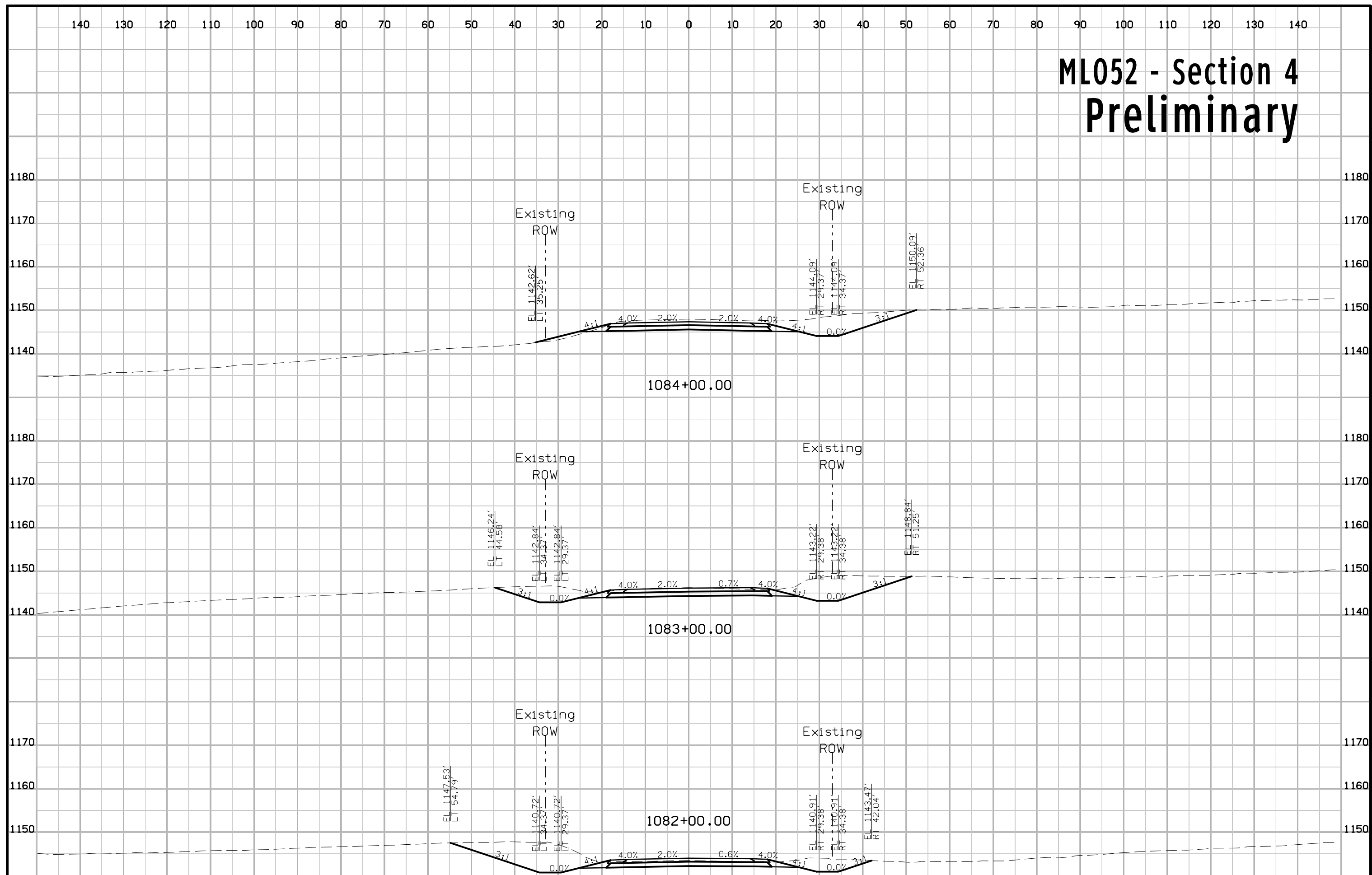
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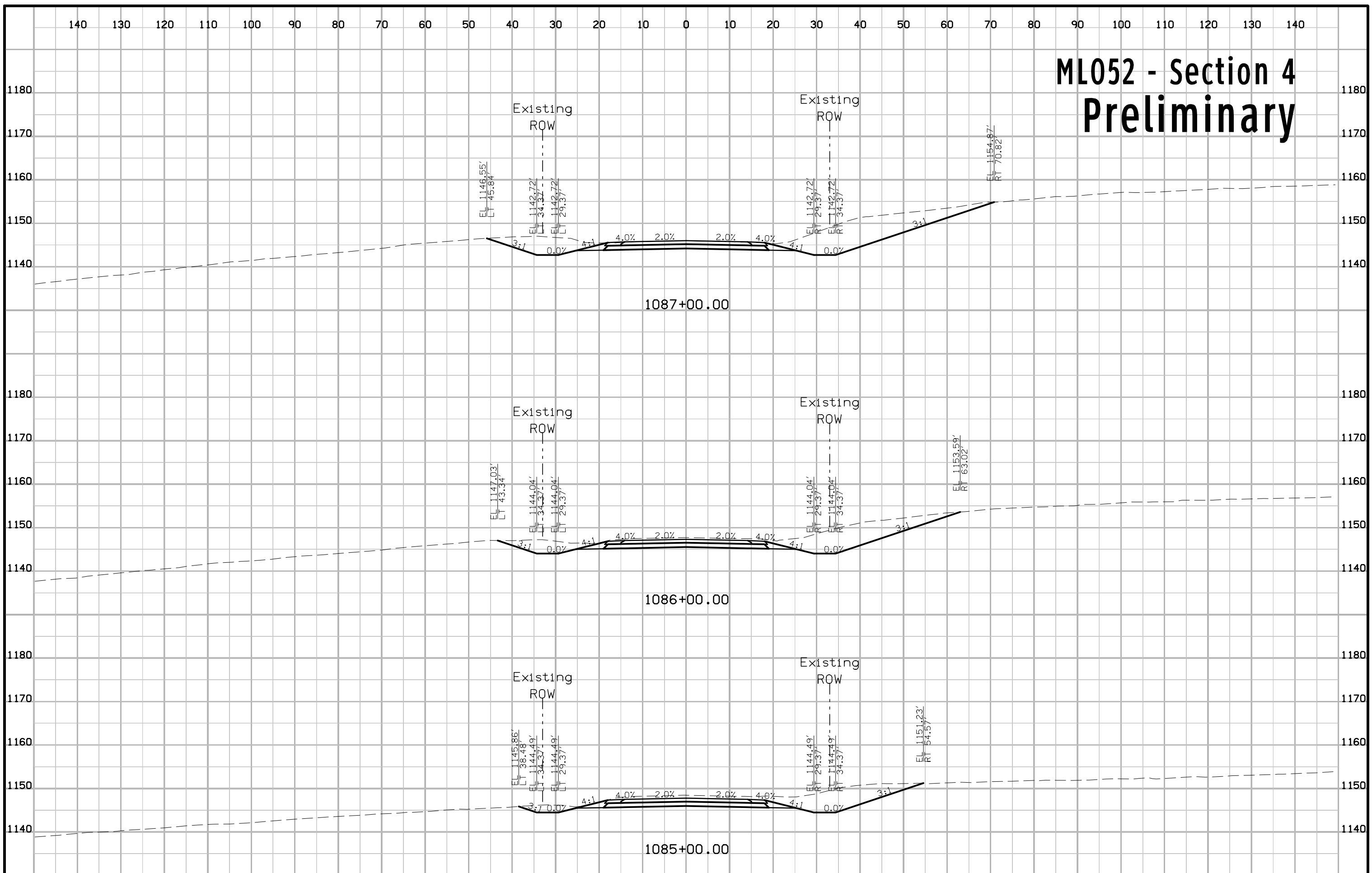
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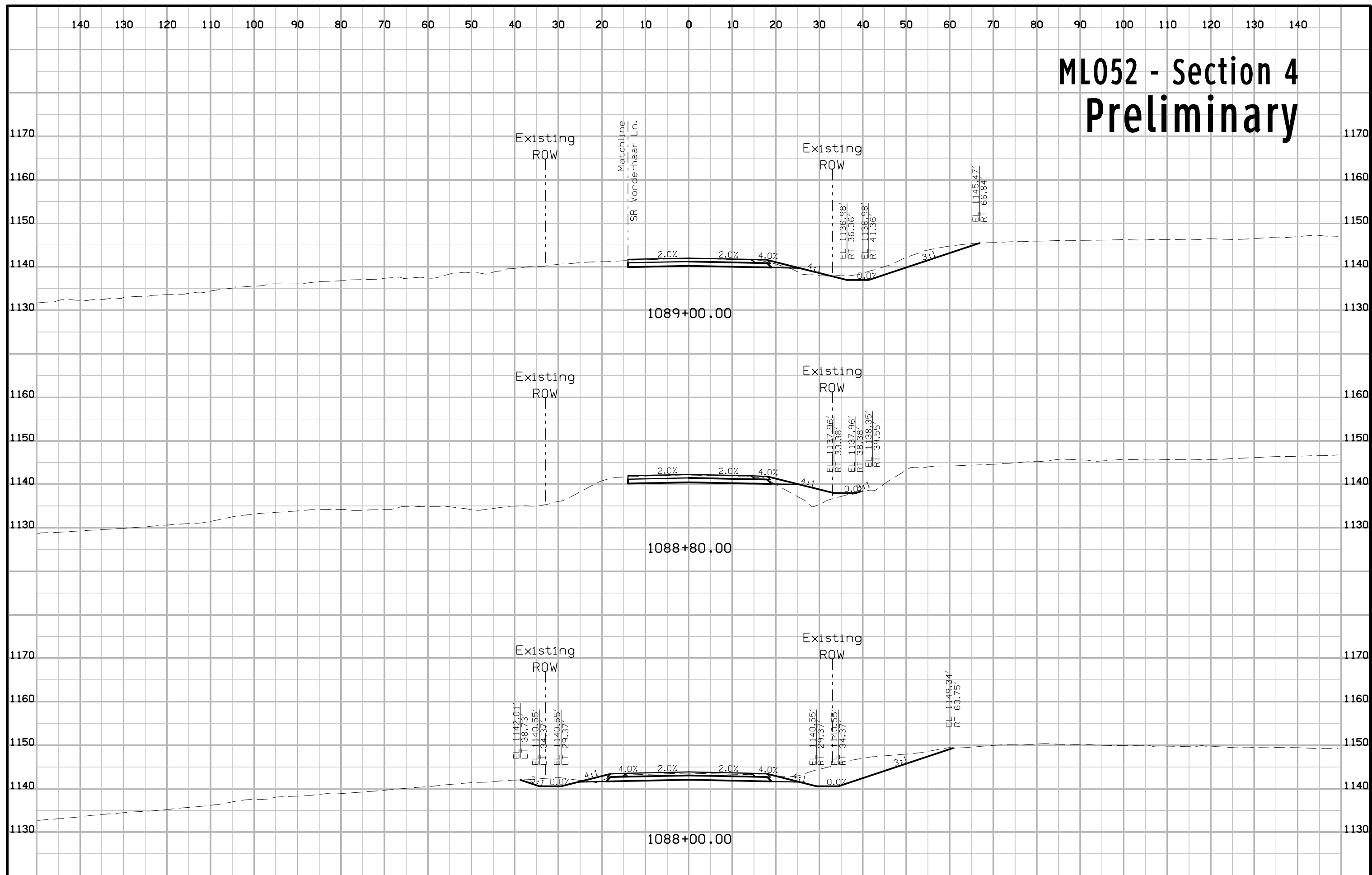
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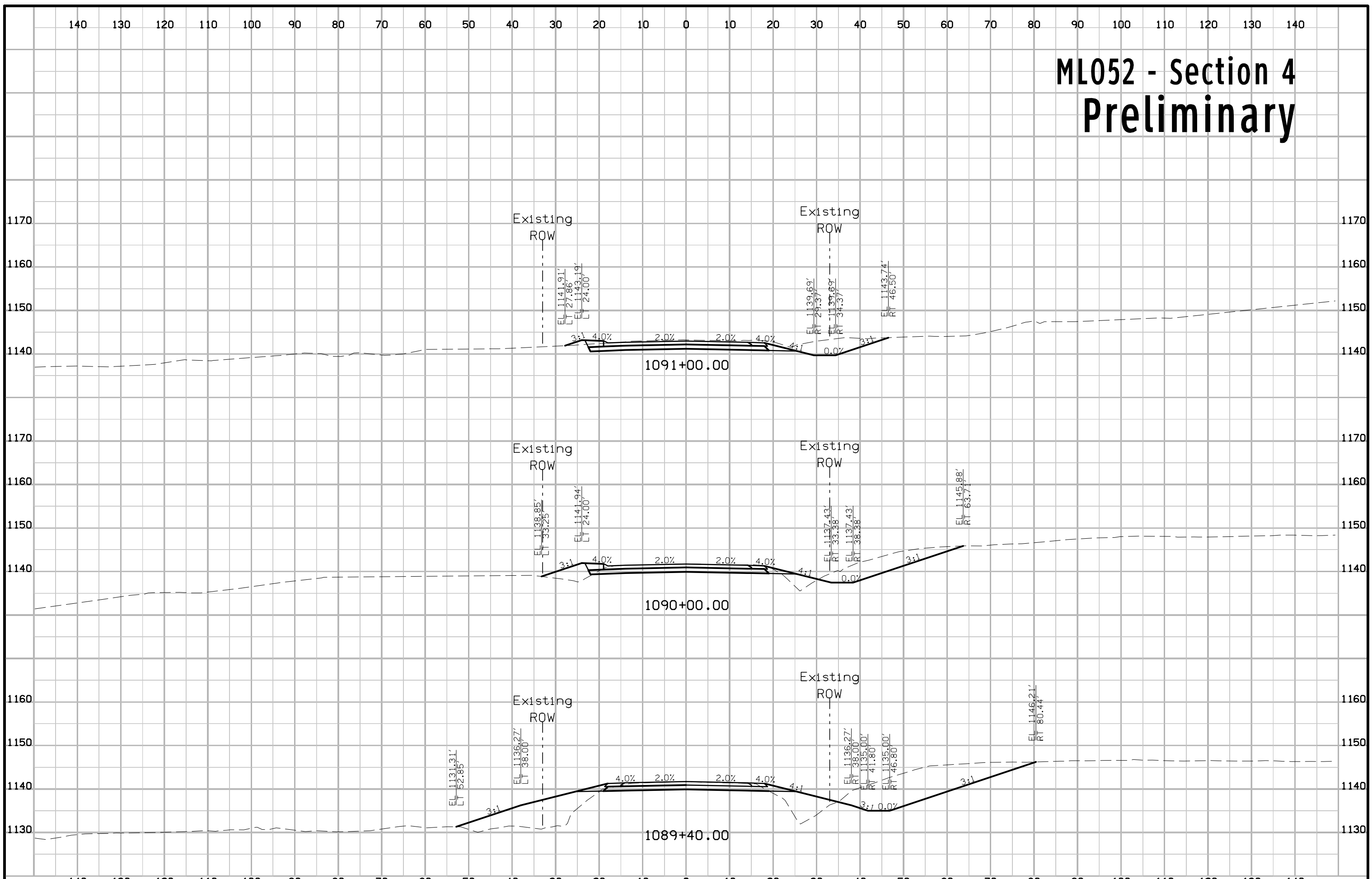
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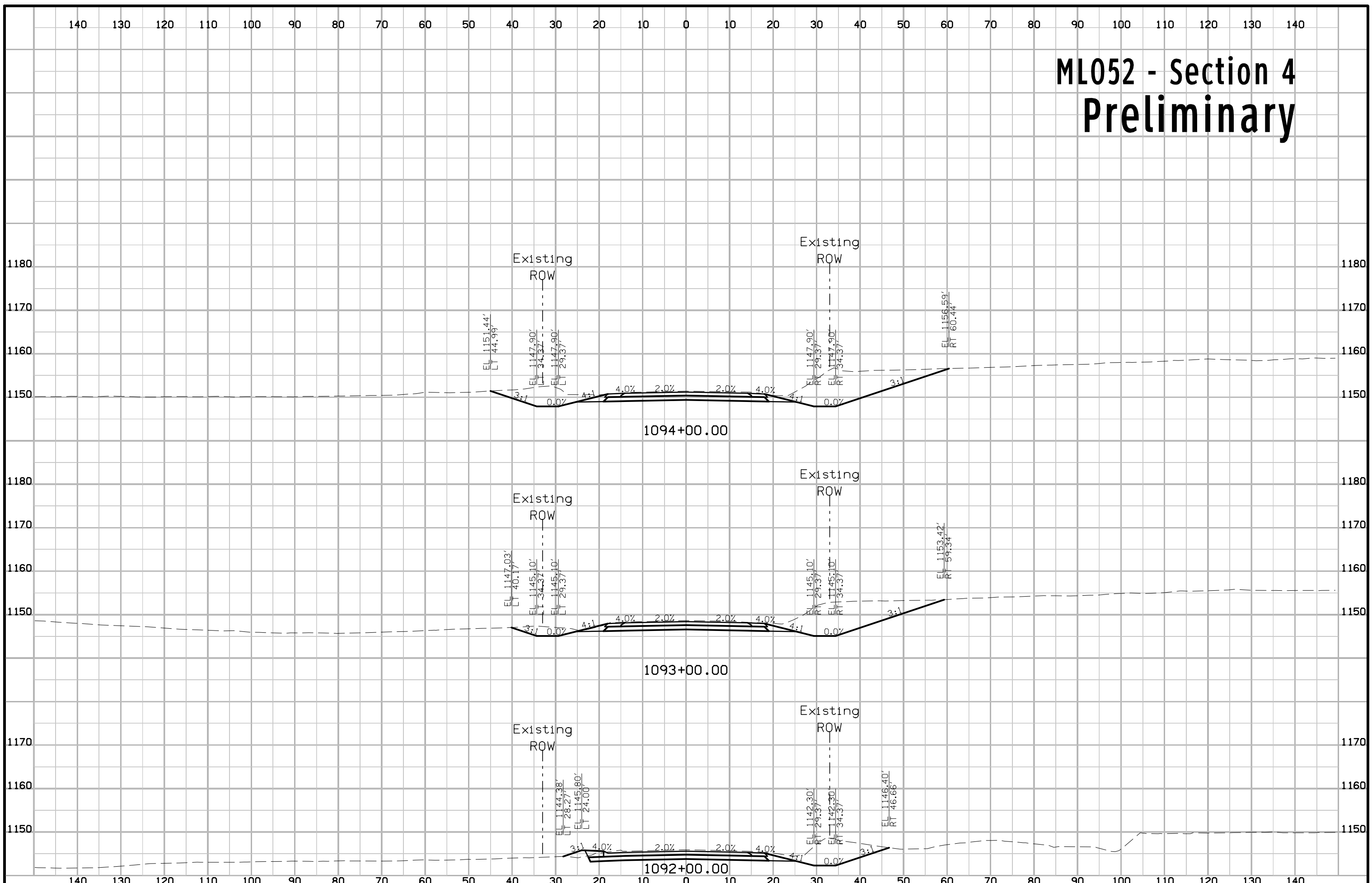
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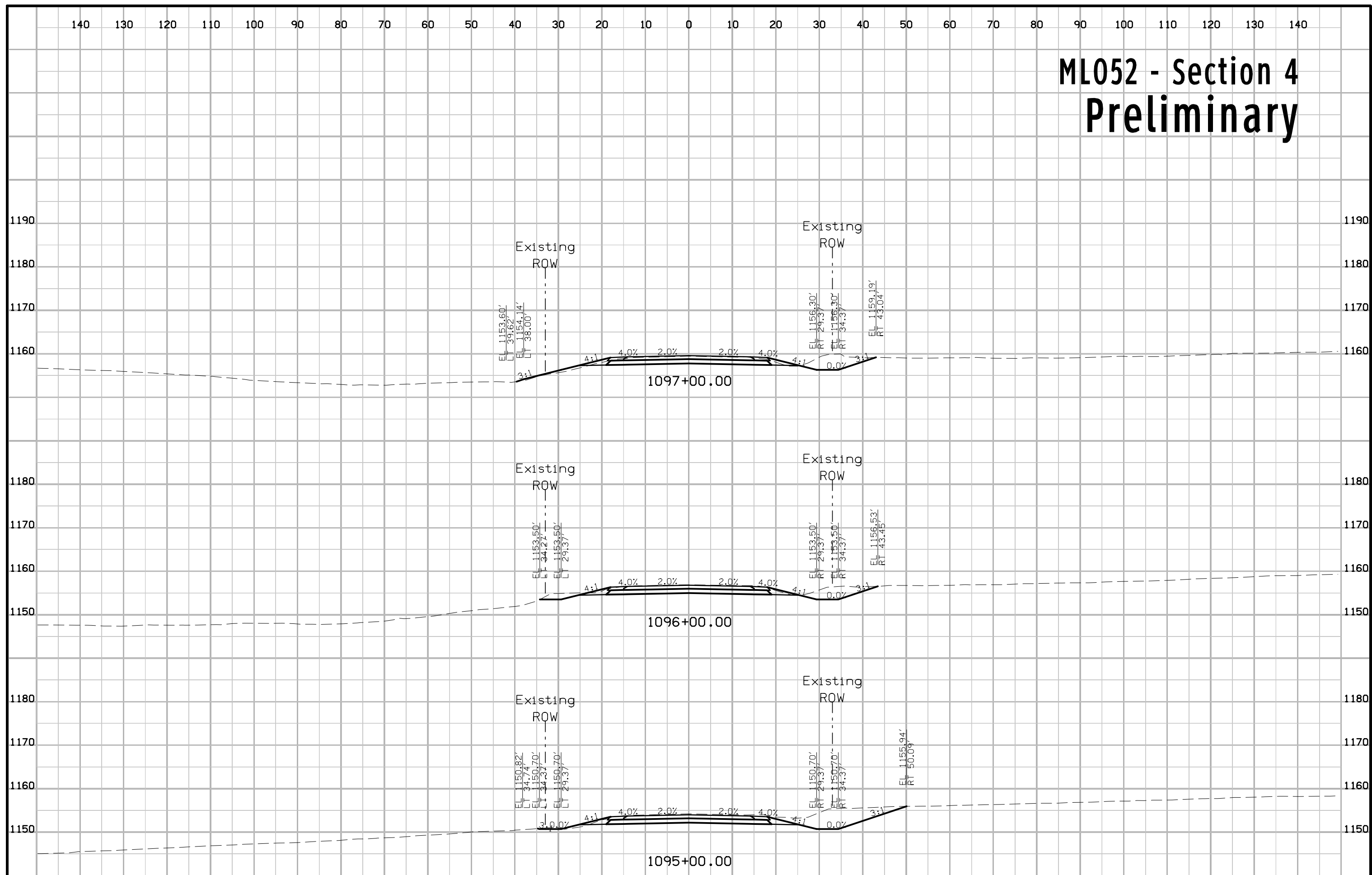
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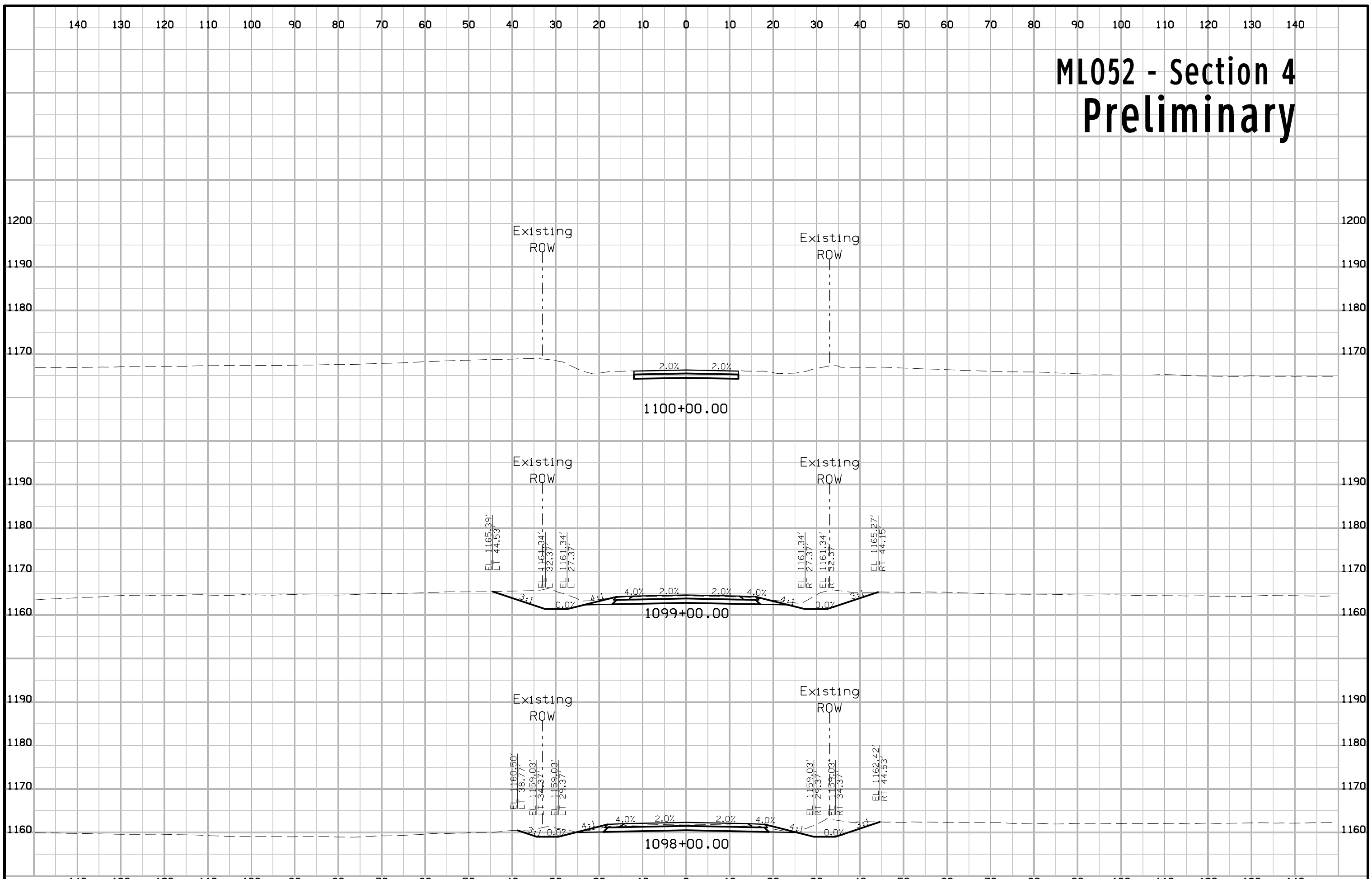


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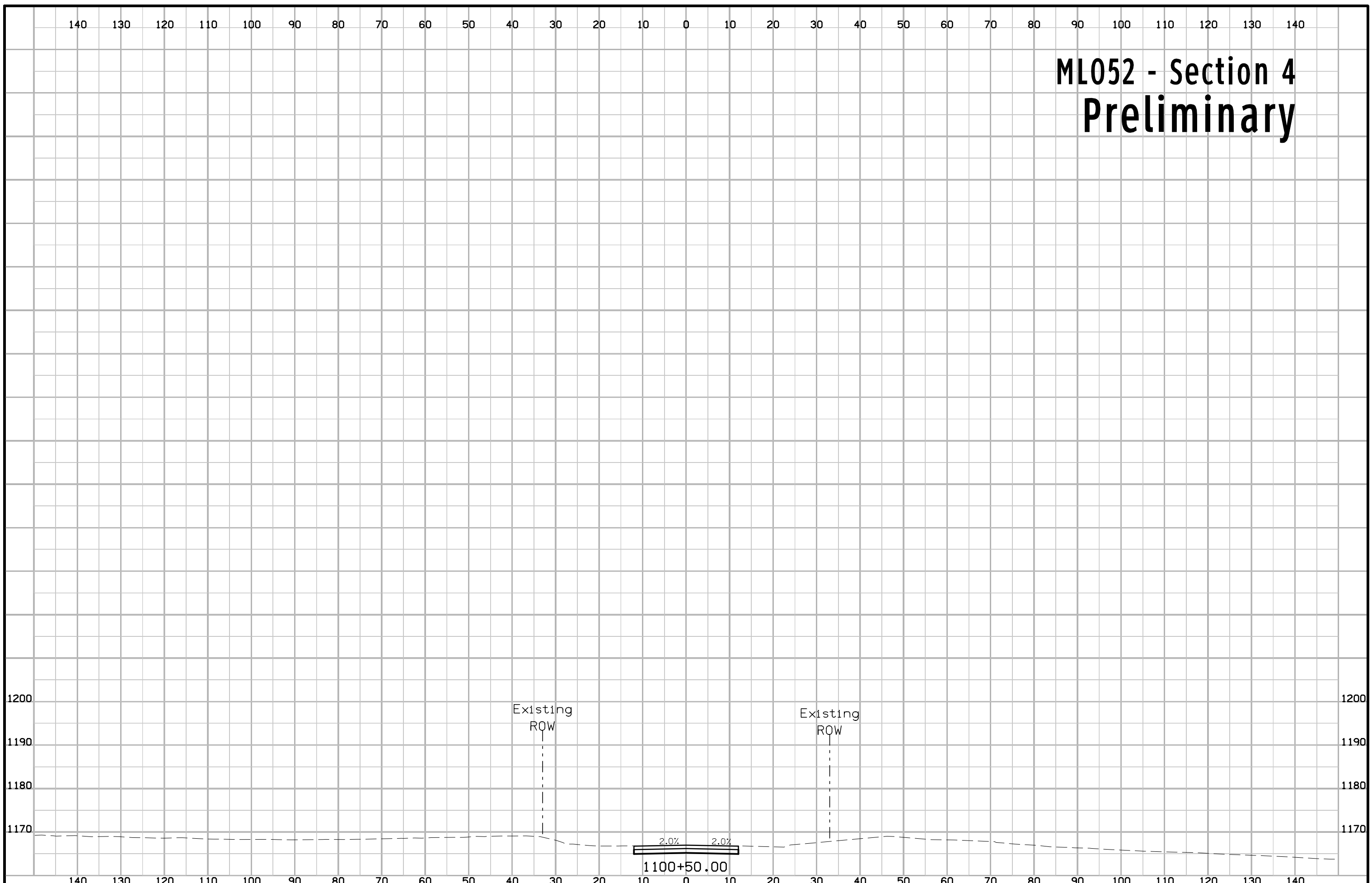




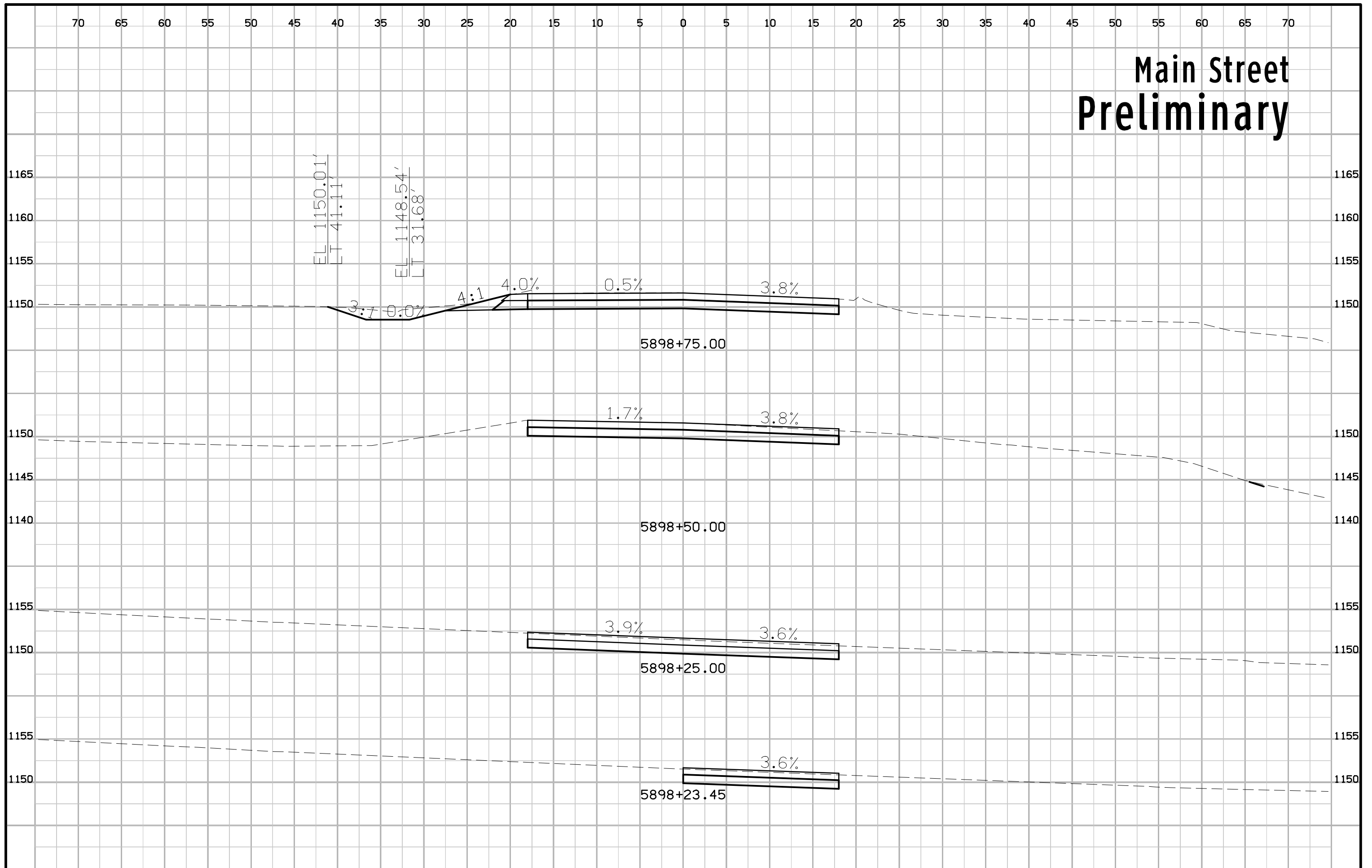
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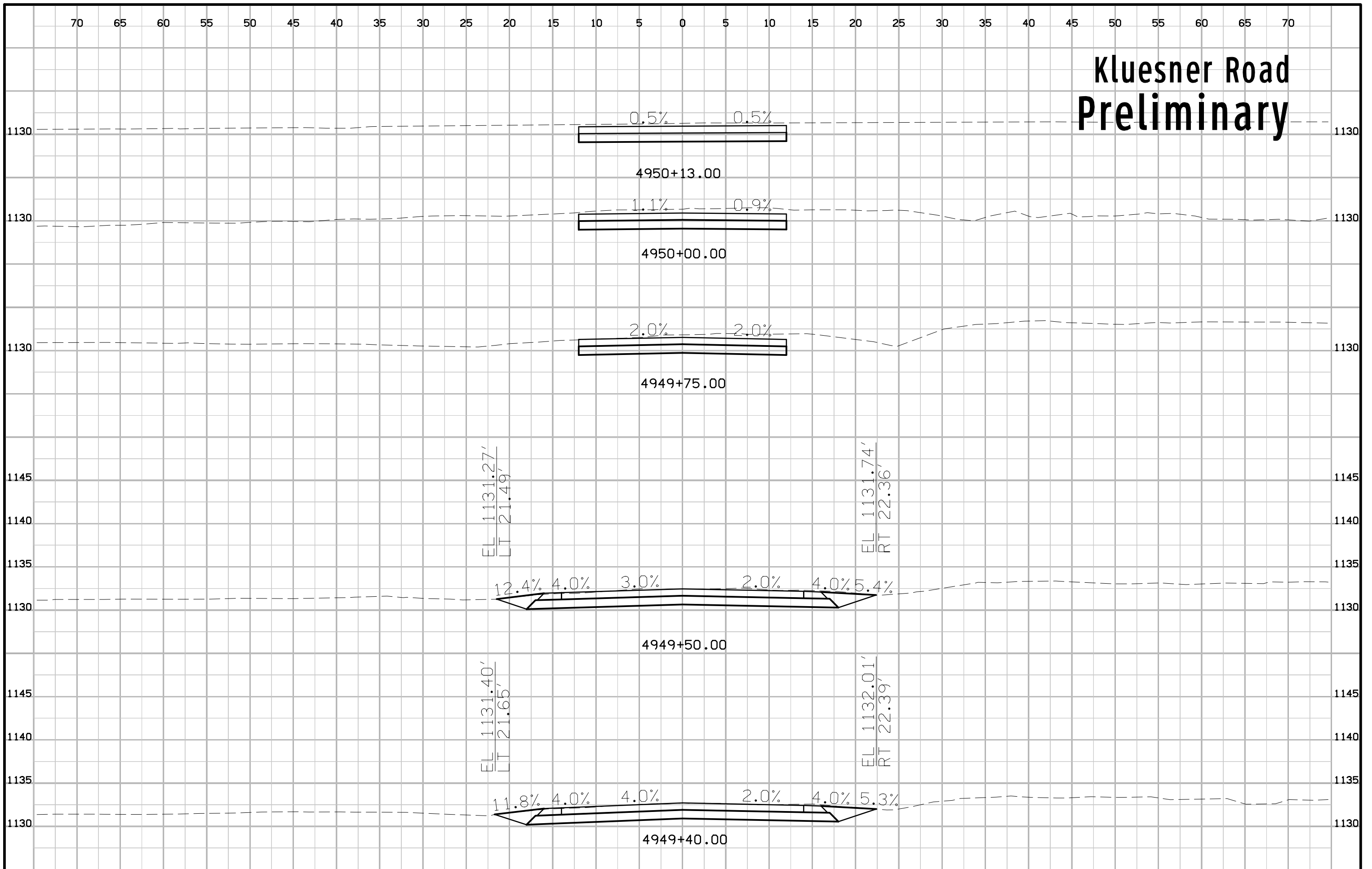
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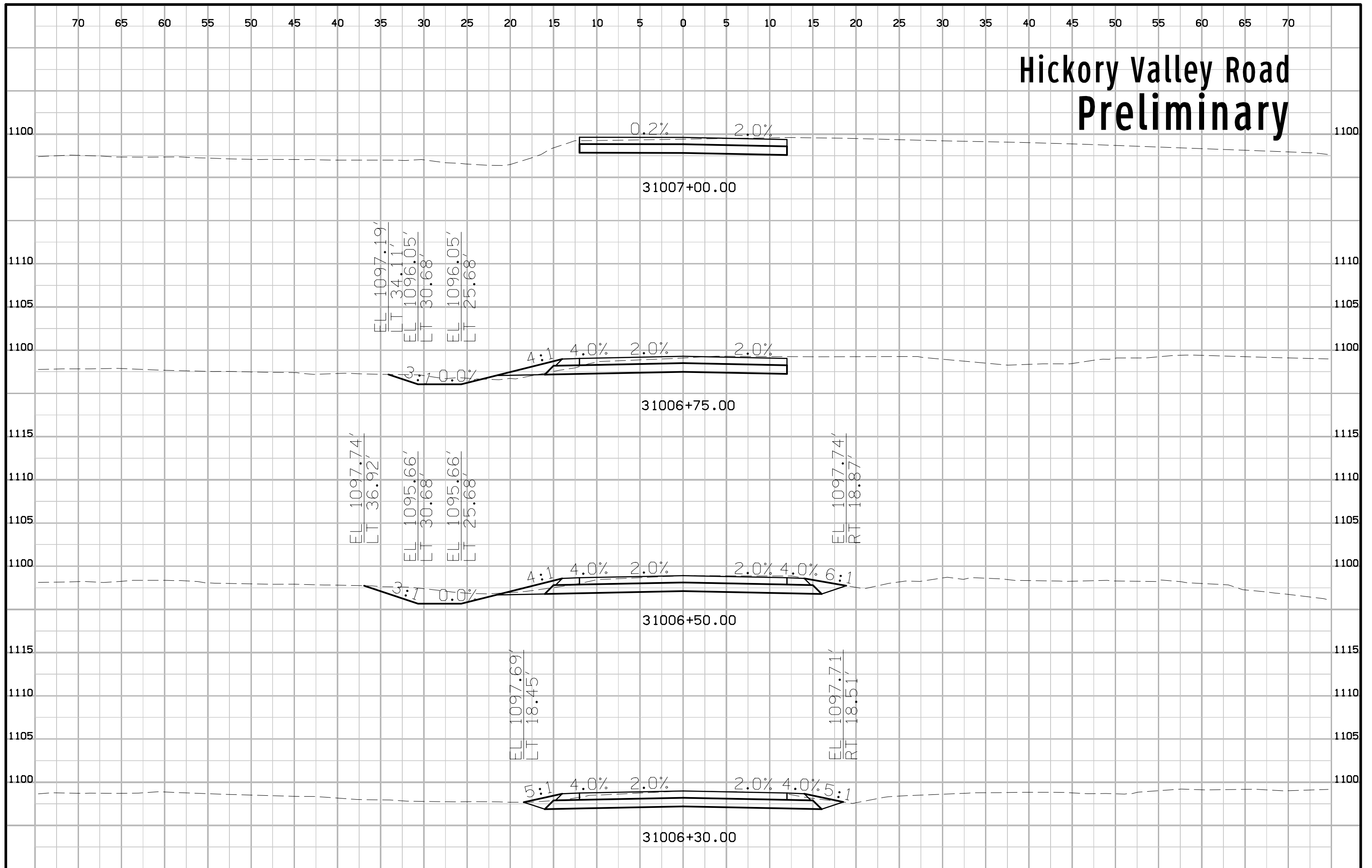
# Main Street Preliminary



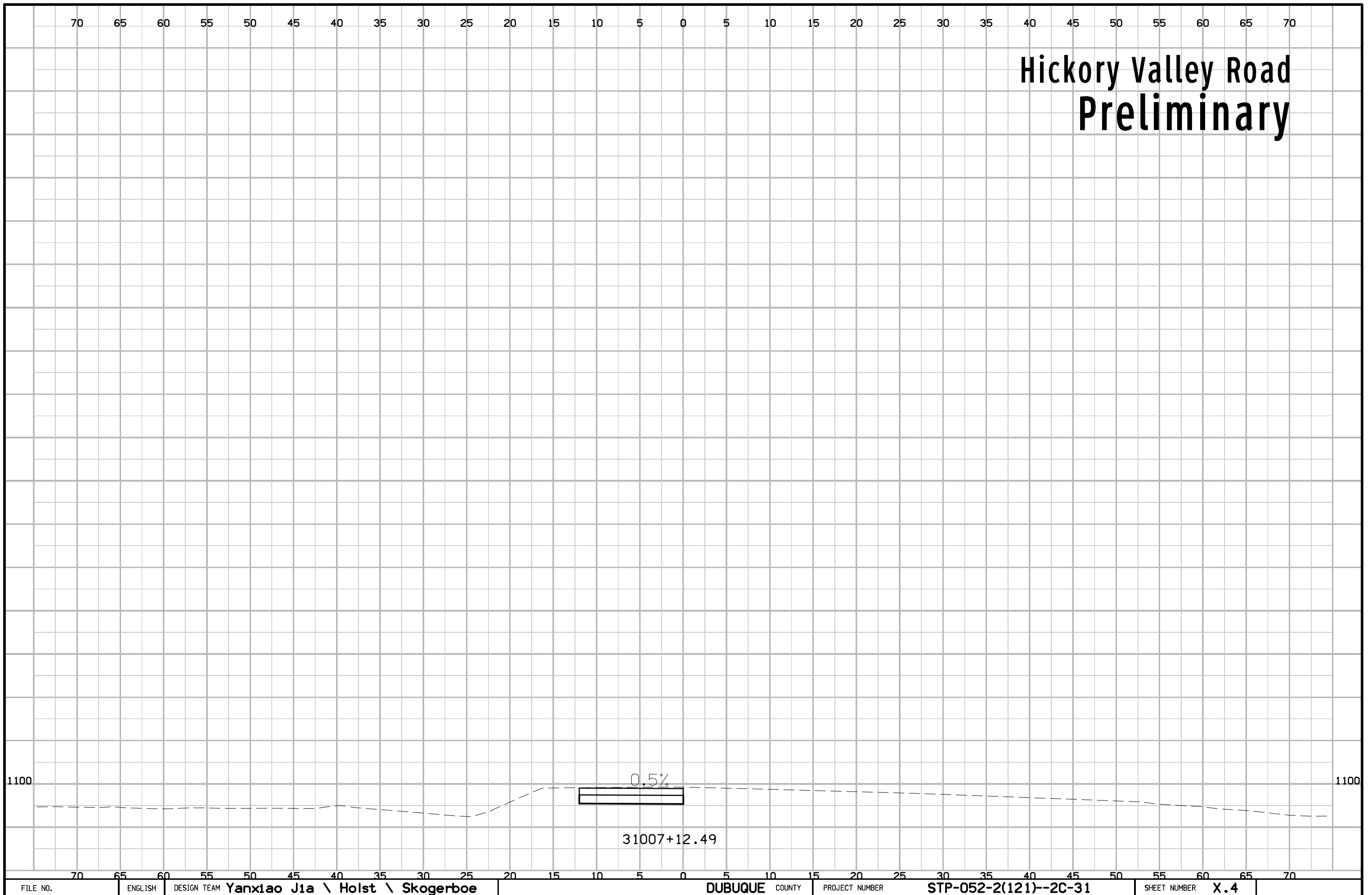
# Kluesner Road Preliminary



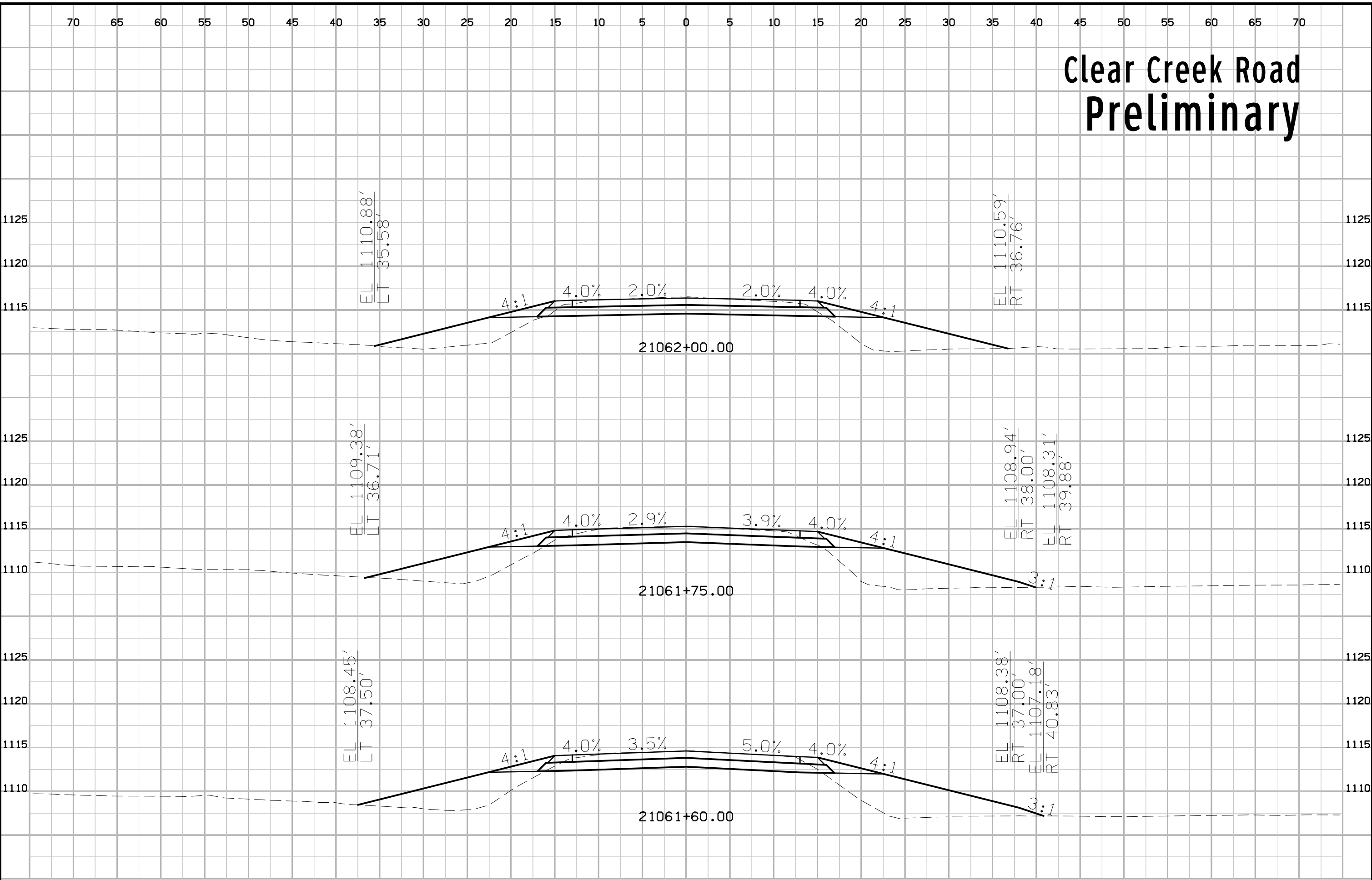
# Hickory Valley Road Preliminary



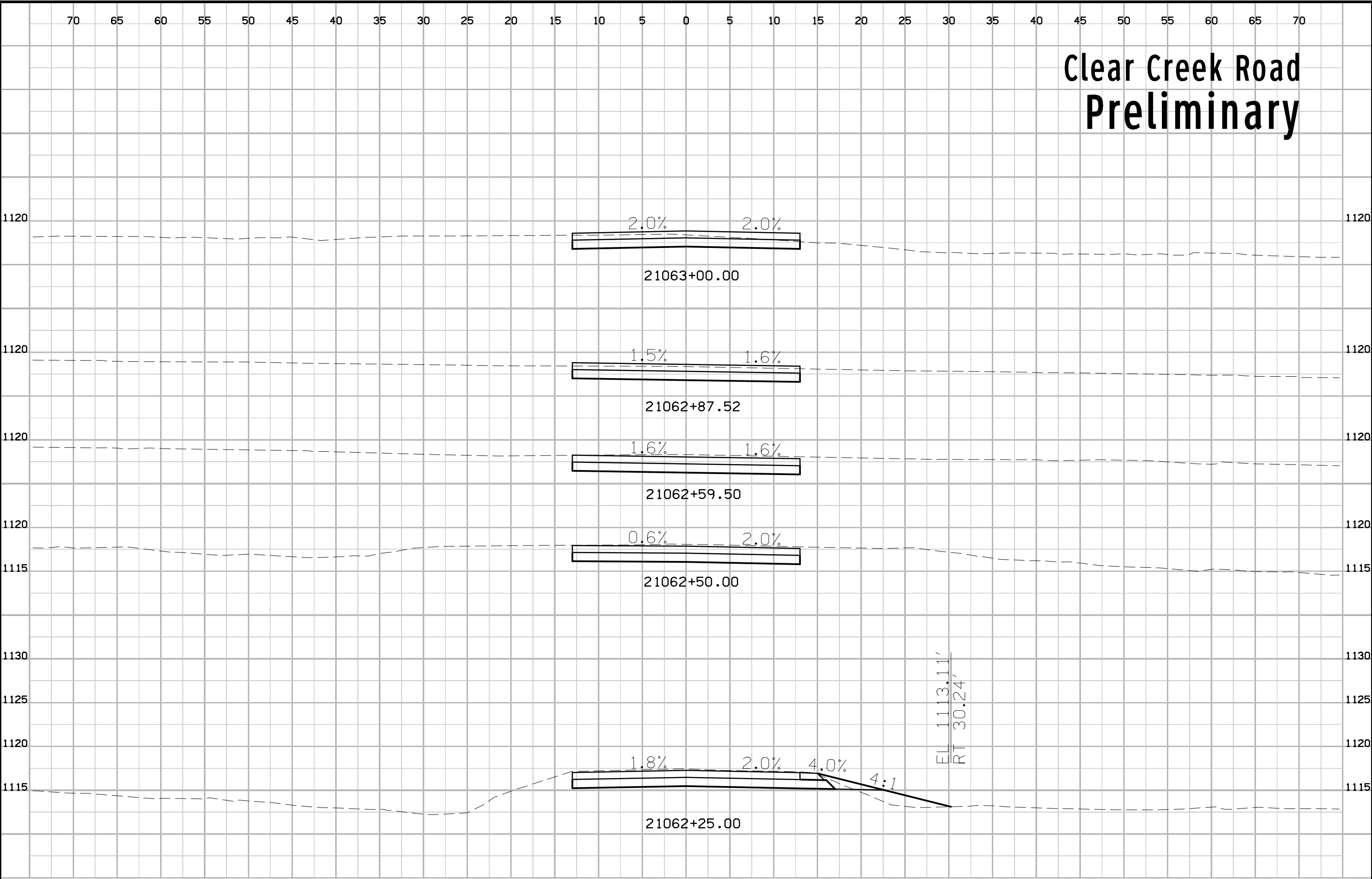
# Hickory Valley Road Preliminary



# Clear Creek Road Preliminary

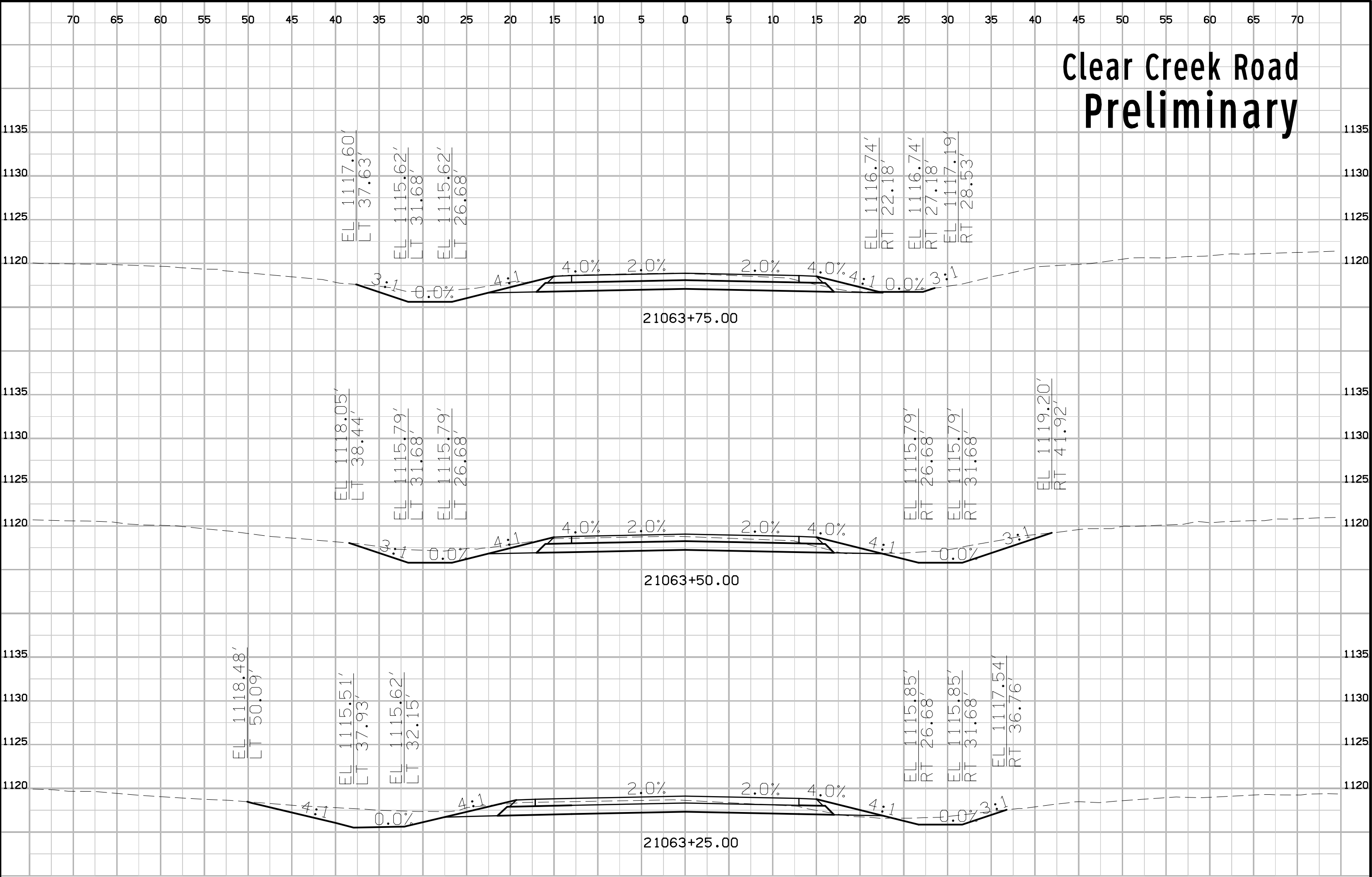


# Clear Creek Road Preliminary

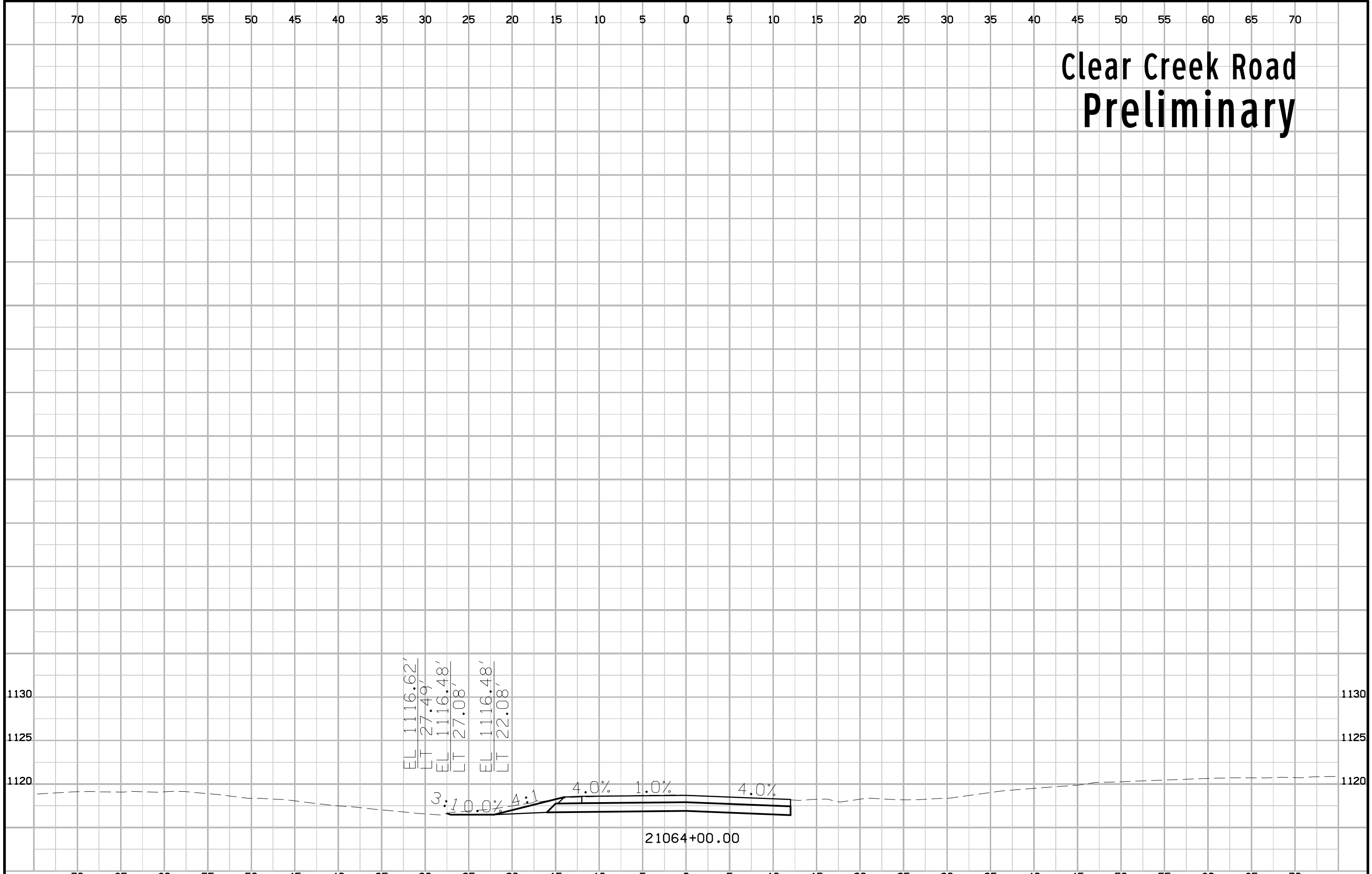




# Clear Creek Road Preliminary



# Clear Creek Road Preliminary

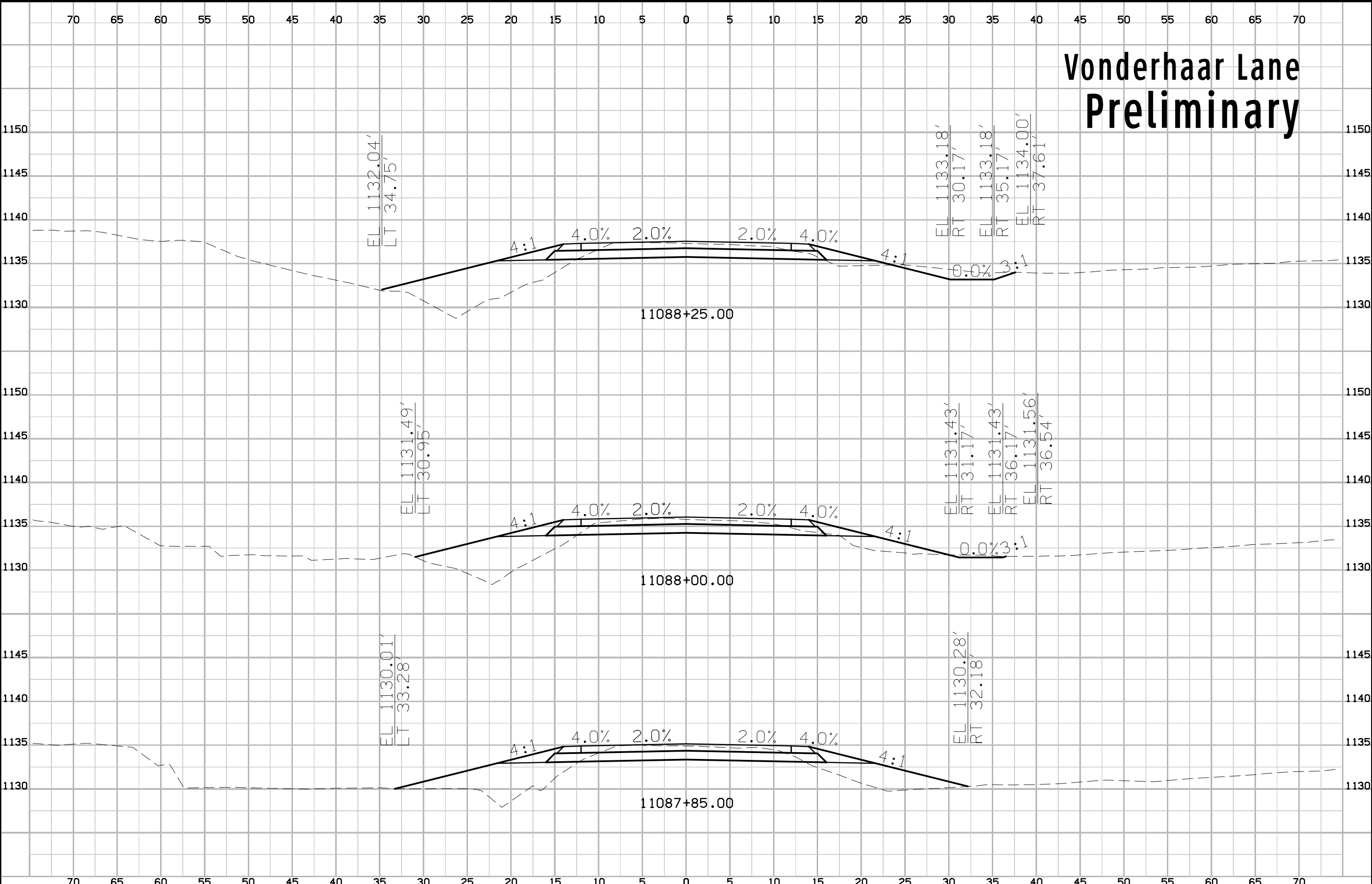


EL 1116.62'  
LT 27.49'  
EL 1116.48'  
LT 27.08'  
EL 1116.48'  
LT 22.08'

3:1 4:1 4.0% 1.0% 4.0%

21064+00.00

# Vonderhaar Lane Preliminary



# Vonderhaar Lane Preliminary

