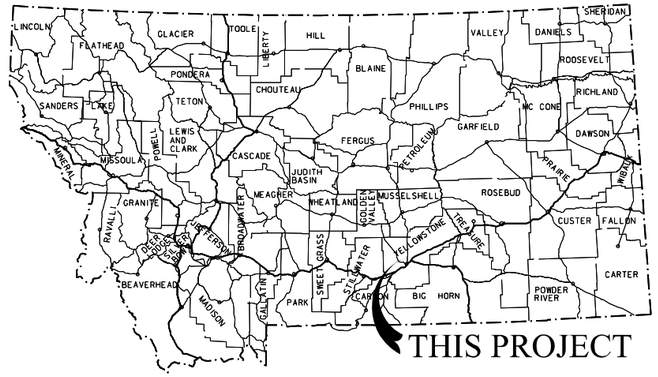
APPENDIX A

RESOURCE MAPS
(Plan and Profile)



MONTANA DEPARTMENT OF TRANSPORTATION

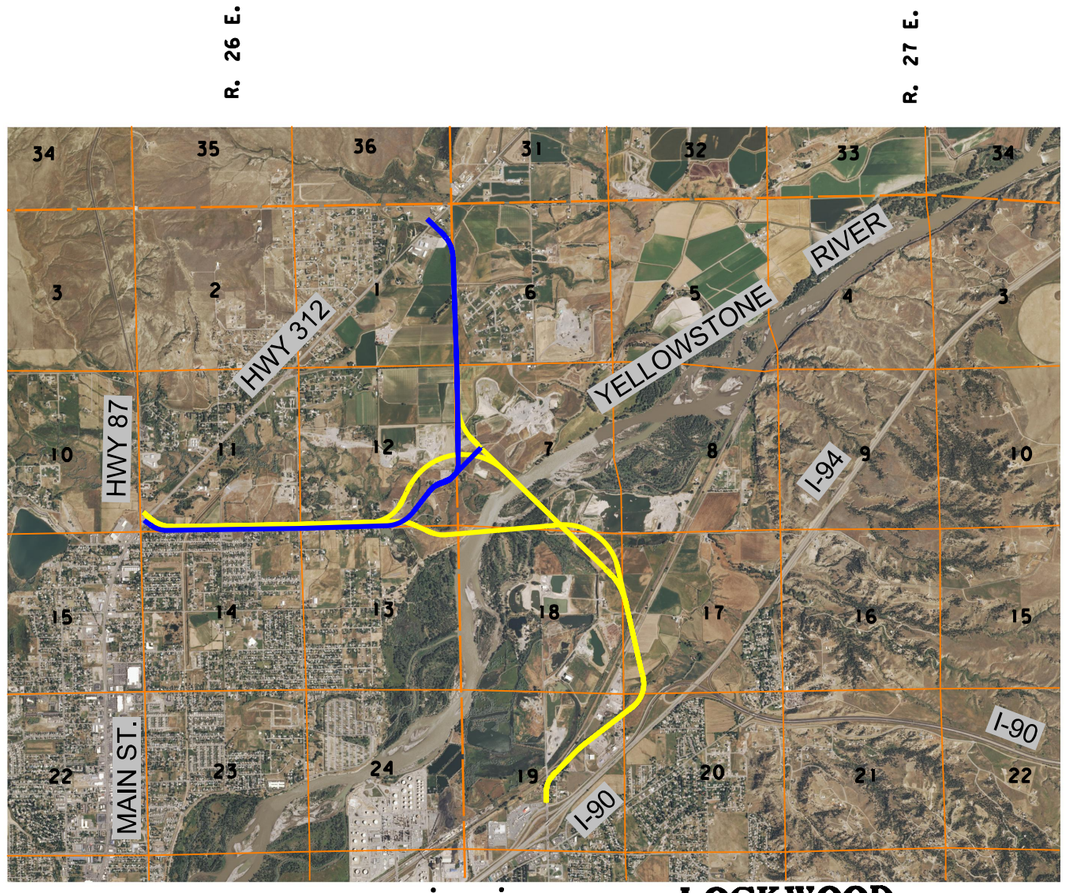
FEDERAL AID PROJECT NCPD 56(55)
BILLINGS BYPASS EIS
PRELIMINARY DESIGN ALTERNATIVES
PHASE I

YELLOWSTONE COUNTY

DESIGN DATA

CSF = N/A

SURFACING SOURCES -
CONTRACTOR FURNISHED



PLANS PREPARED BY

DOWL HKM
GRANITE TOWER BUILDING
222 N. 32ND ST., SUITE 700
P.O. BOX 31318
BILLINGS, MT 59107-1318
406-656-6399
406-656-6398 (FAX)
DOWLHKM.COM

RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS

R / W & I.C.	
P. E.	

DOWL HKM

BY _____

DATE _____

MONTANA DEPARTMENT OF TRANSPORTATION

RECEIVED :

BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED :

_____ _____
DIVISION ADMINISTRATOR DATE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ01.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY
2		8/23/2013	REVIEWED BY			UPN 4199	
		10:19:22 AM nguterrez	CHECKED BY				

TABLE OF CONTENTS

ROAD PLANS		SHEET NO.
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	MARY ST OPTION 1	M1-1 - M1-10
	MARY ST OPTION 1, SECONDARY	M1-11 - M1-14
	MARY ST OPTION 1, CURVE ALT	M1-15 - M1-16
	MARY ST OPTION 2	M2-1 - M2-11
	MARY ST OPTION 2, SECONDARY	M2-12 - M2-14
	MARY ST OPTION 2, CURVE ALT	M2-15 - M2-16
	FIVE MILE RD	F-1 - F-9
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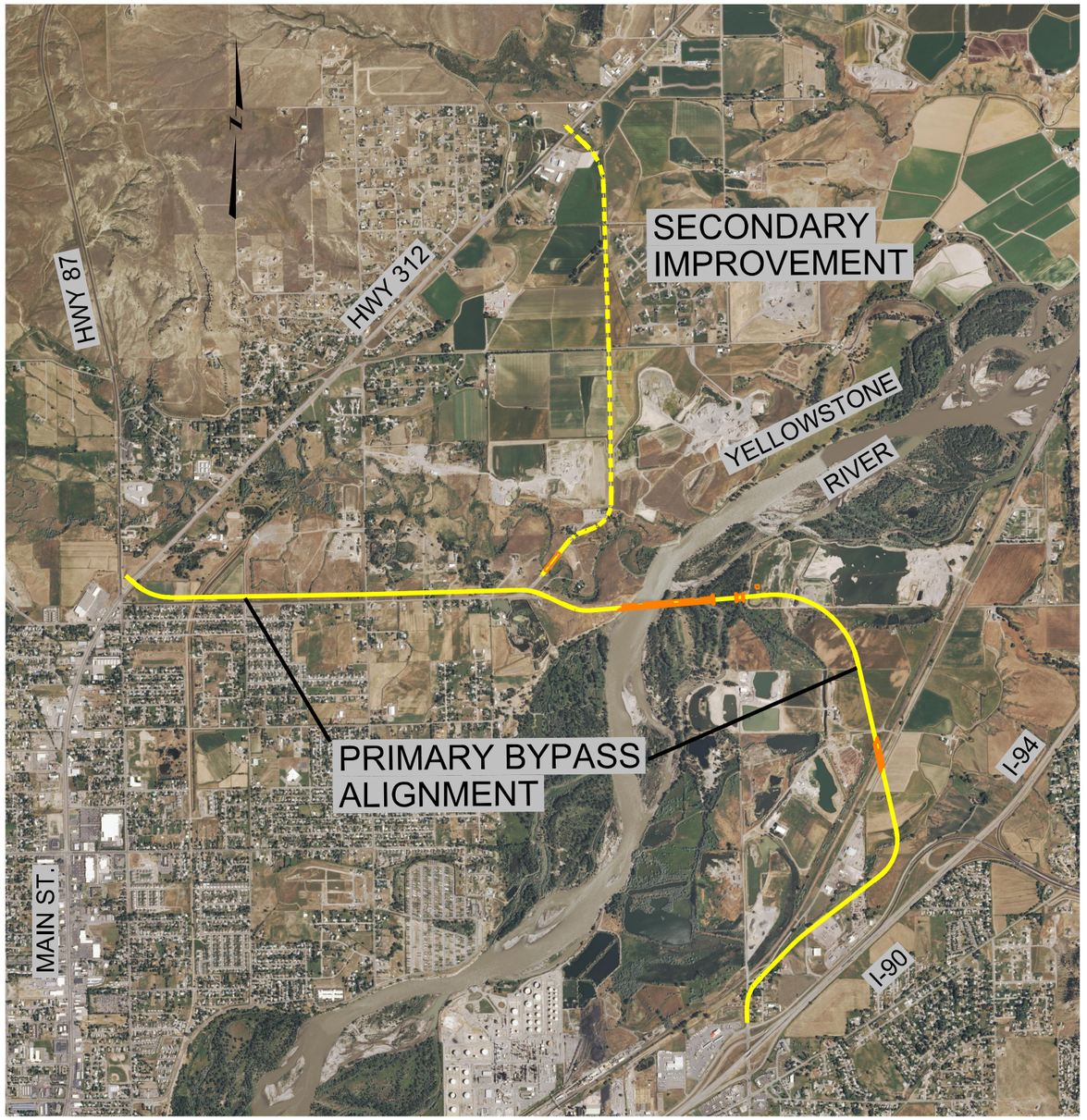
CROSS SECTIONS	SHEET NO.
MARY ST OPTION 1	M1-1 - M1-85
MARY ST OPTION 1, SECONDARY	M1-86 - M1-117
MARY ST OPTION 2	M2-1 - M2-87
MARY ST OPTION 2, SECONDARY	M2-88 - M2-108
FIVE MILE RD	F-1 - F-77
FIVE MILE RD, SECONDARY	F-86 - F-119

MARY ST OPTION 1
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE

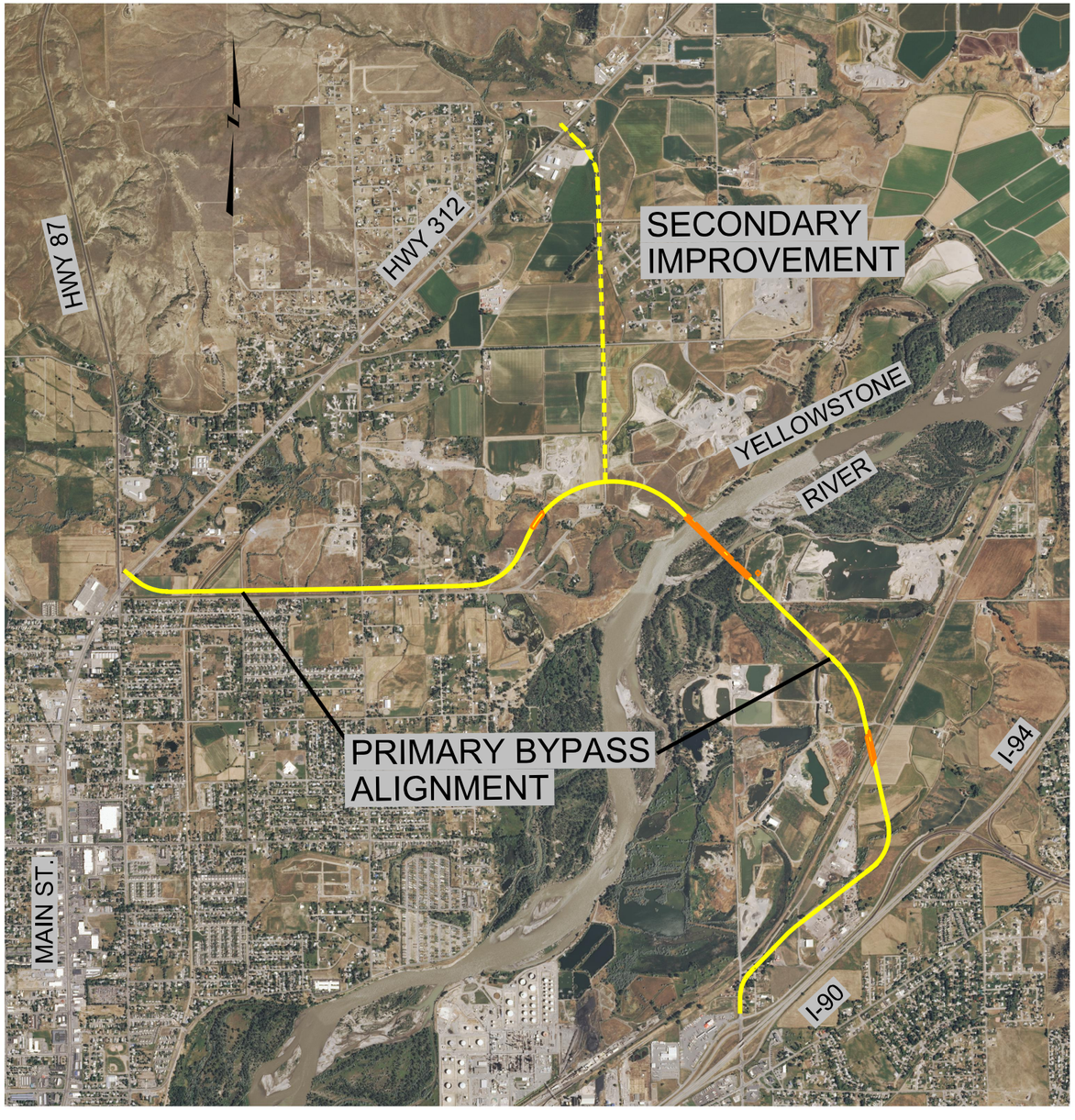


DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ01.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
		8/23/2013	REVIEWED BY					UPN 4199 / SHEET 2
1		10:21:31 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY		

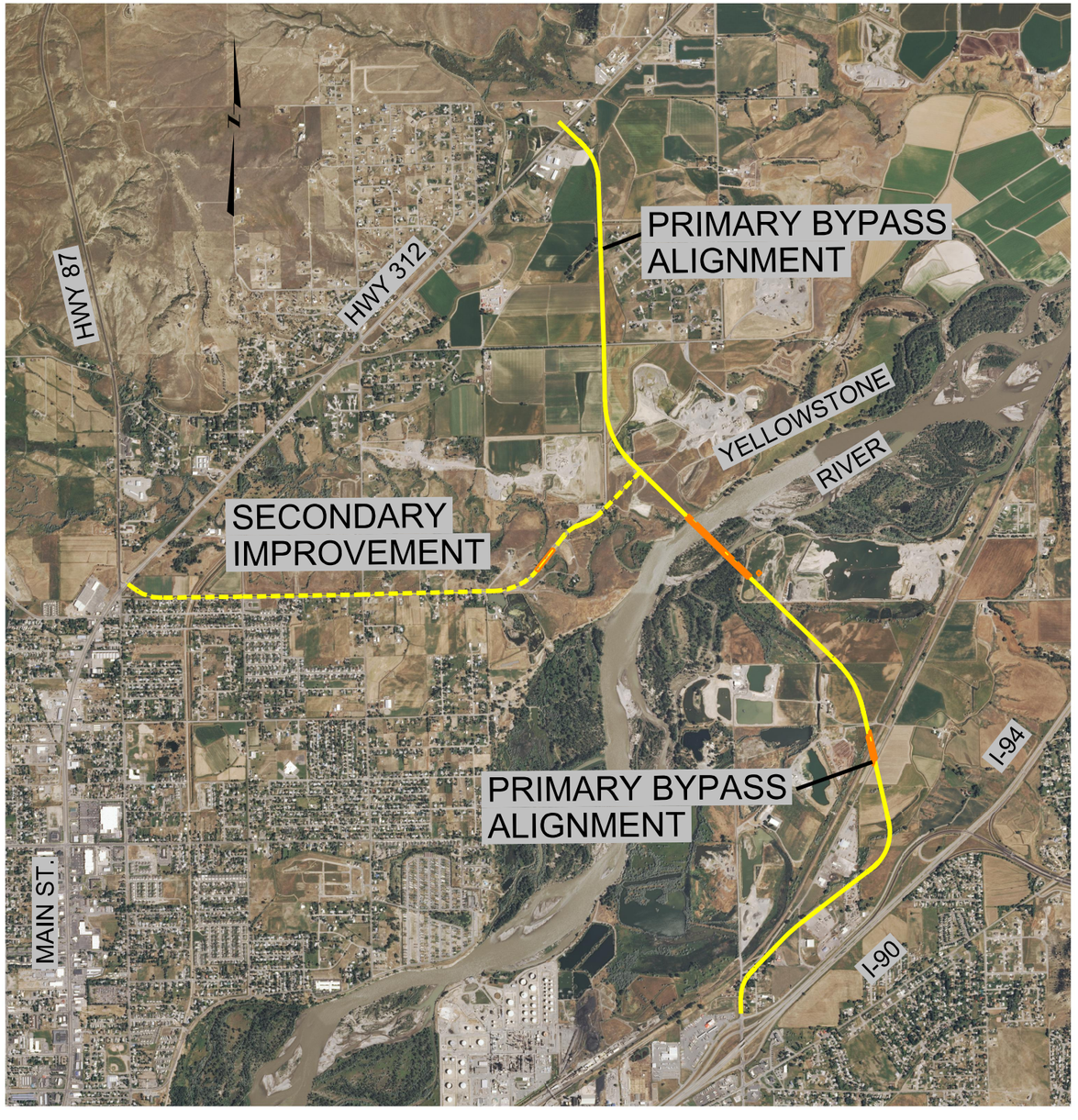
MARY ST OPTION 2
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE



FIVE MILE RD
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE

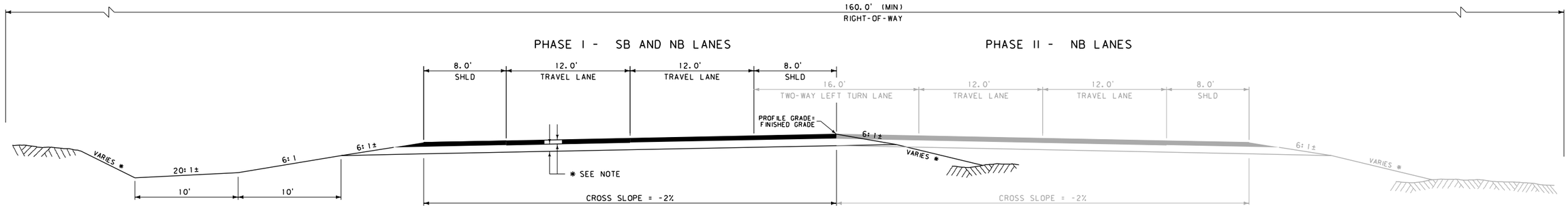


DOWL HKM

2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ01.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
1		8/23/2013	REVIEWED BY					UPN 4199	SHEET 3
		10:21:48 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY			

NHS URBAN PRINCIPAL ARTERIAL PRIMARY

DESIGN SPEED: 55 MPH

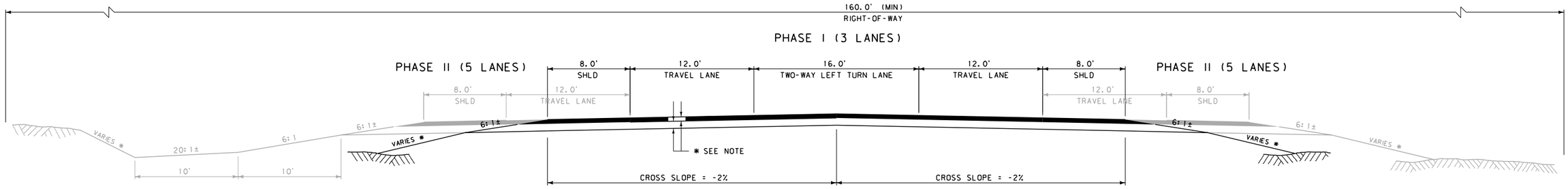


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS URBAN PRINCIPAL ARTERIAL PRIMARY

DESIGN SPEED: 55 MPH

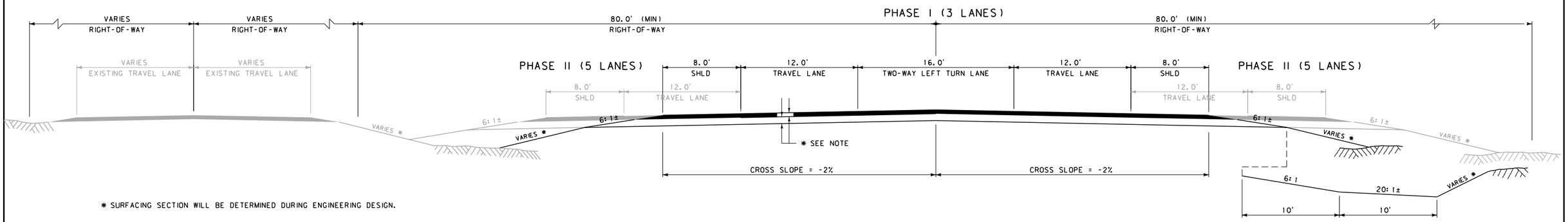


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS URBAN PRINCIPAL ARTERIAL PRIMARY – WITH FRONTAGE ROAD

DESIGN SPEED: 55 MPH



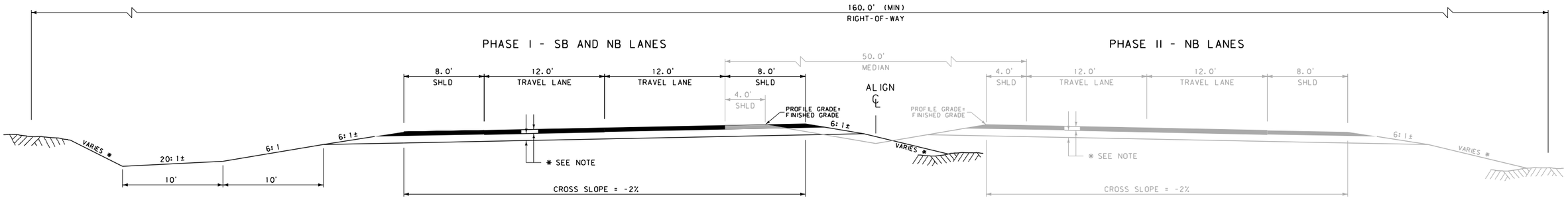
* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ01.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY						
1		10:58:40 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY		UPN 4199	SHEET 4

DOWL HKM

NHS URBAN PRINCIPAL ARTERIAL
MARY ST – PRIMARY

DESIGN SPEED: 55 MPH

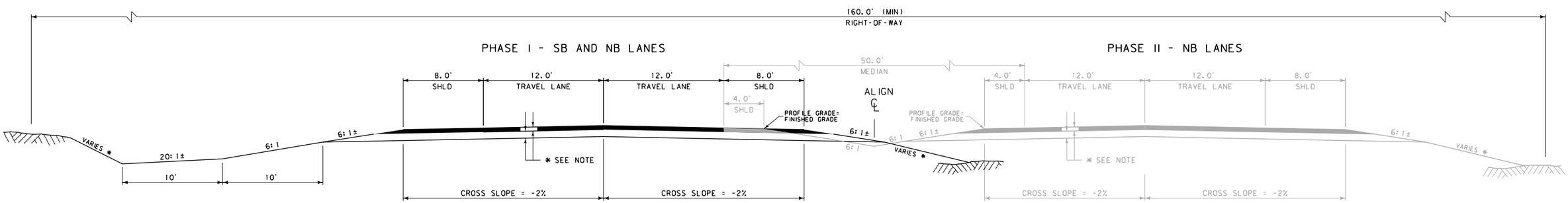


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS RURAL PRINCIPAL ARTERIAL
FIVE MILE RD – PRIMARY

DESIGN SPEED: 70 MPH (FLAT TERRAIN), 60 MPH (ROLLING TERRAIN)



* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ01.dgn	DESIGNED BY			ROAD PLANS	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
1		10:58:48 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY	PRELIMINARY	UPN 4199 / SHEET 5

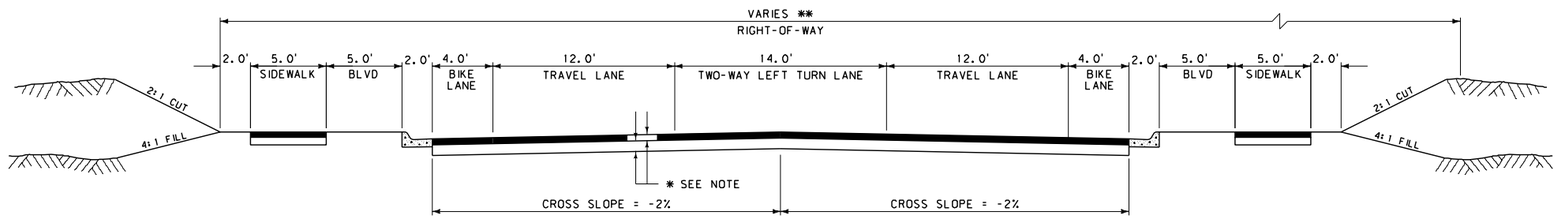
DOWL HKM

URBAN SECONDARY COLLECTOR
MARY ST – SECONDARY

DESIGN SPEED: 45 MPH

CITY OF BILLINGS – PRINCIPAL ARTERIAL

PHASE I



** PER CURRENT CITY OF BILLINGS SUBDIVISION REGULATIONS:
PRINCIPAL ARTERIAL = 130'
MINOR ARTERIAL = 100'

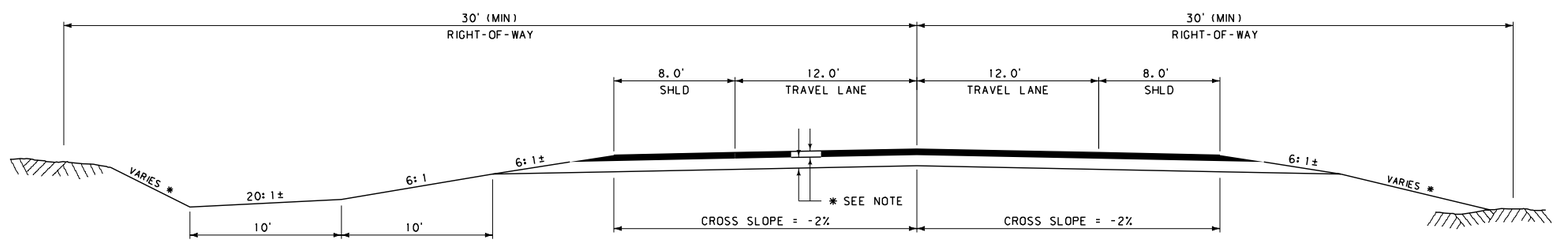
* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

RURAL SECONDARY COLLECTOR
FIVE MILE RD – SECONDARY

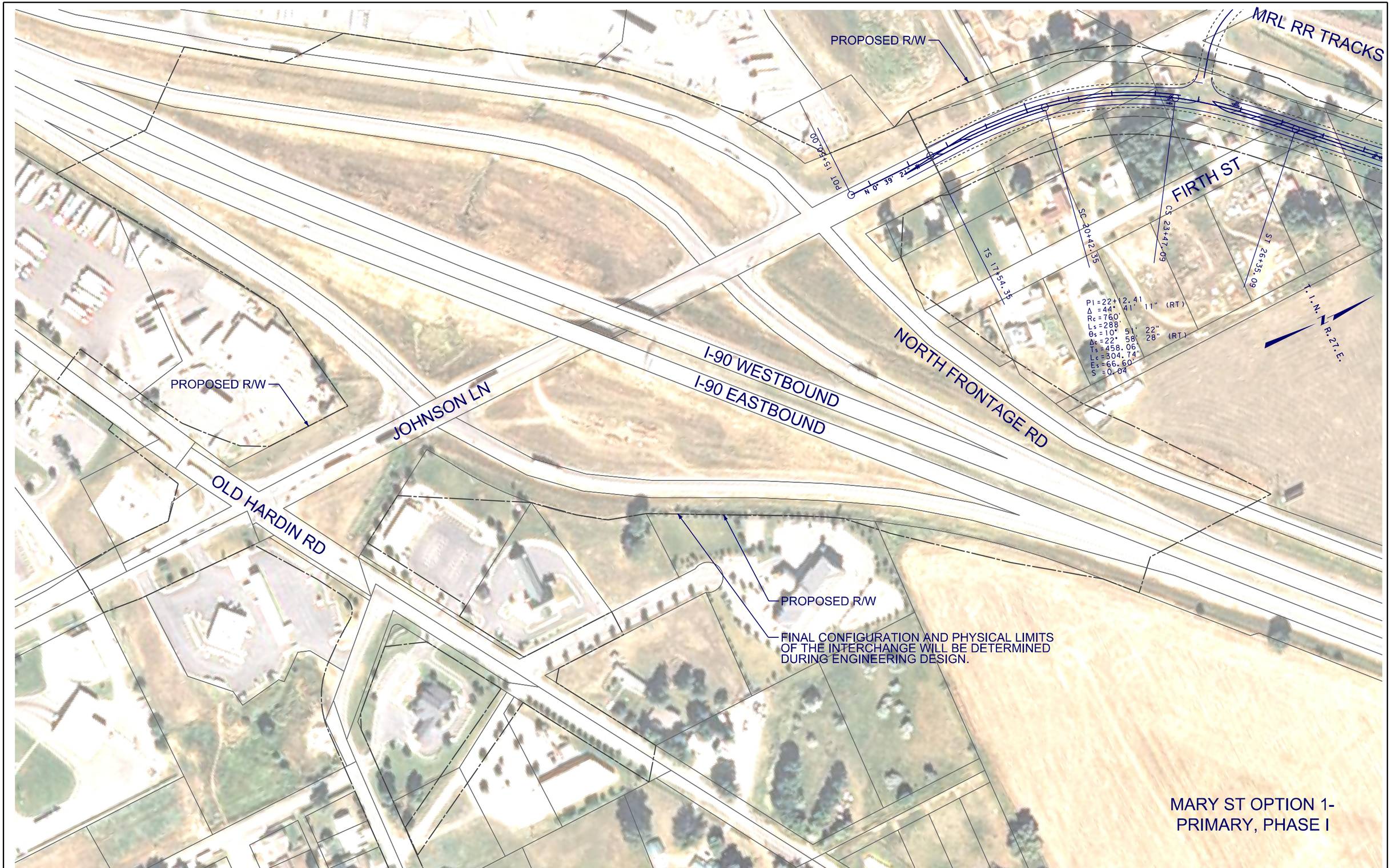
DESIGN SPEED: 60 MPH
(FLAT TERRAIN)

PHASE I



* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ01.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY					UPN 4199 / SHEET 6
1		10:58:57 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY		



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplnZ01_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		11:04:34 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		UPN 4199	SHEET M1-1

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERCHANGE WILL BE DETERMINED DURING ENGINEERING DESIGN.

T. 1 N. R. 27 E.

JOHNSON LN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

MRL RR TRACKS

OBLITERATE ROADWAY

COULSON RD

FIRTH ST

N 44° 01' 50" E

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

FIRTH ST TO REMAIN AS A DEAD END STREET

POT 15+50.00

N 0° 39' 24" E

SC 20+42.35

CS 23+47.09

ST 26+35.09

PC 35+54.54

PT 39+95.95

TS 17+54.35

PI = 22+12.41
Δ = 44° 41' 11" (RT)
Rc = 760'
Ls = 288'
θs = 10° 55' 51"
Δc = 22° 58' 28" (RT)
Ts = 458.96'
Lc = 304.60'
Le = 66.60'
S = 0.04

PI = 37+75.64
Δ = 8° 25' 49" (RT)
R = 3,000'
T = 221.10'
L = 441.41'
Le = 8.14'
S = 0.05

02

30

40

DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I

3,120.00

600' VC

-2.000%

-0.440%

26+00.00
EL. 3,099.00

JOHNSON LN

COULSON RD

3140
3130
3120
3110
3100
3090
3080
3070
3060

15+00
20+00
30+00
40+00
45+00

3 2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz01_M1.dgn 8/23/2013 4:08:38 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET MI-2

COULSON RD

50

60

70

T. 1 N. R. 27 E.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

N 52° 27' 39" E

TS 58+12.38

SC 61+24.38

PI = 65+87.76
Δ = 65° 26' 30" (LT)
Rs = 960'
Ls = 312'
θs = 9° 18' 38"
Δc = 46° 49' 14" (LT)
Ts = 775.38'
Lc = 784.49'
Es = 186.09'
S = 0.08

CS 69+08.87

ST 72+20.87

N 12° 58' 51" W

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

SEE SHEET M1-15 AND M1-16
FOR CURVE ALT ALIGNMENT

DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I

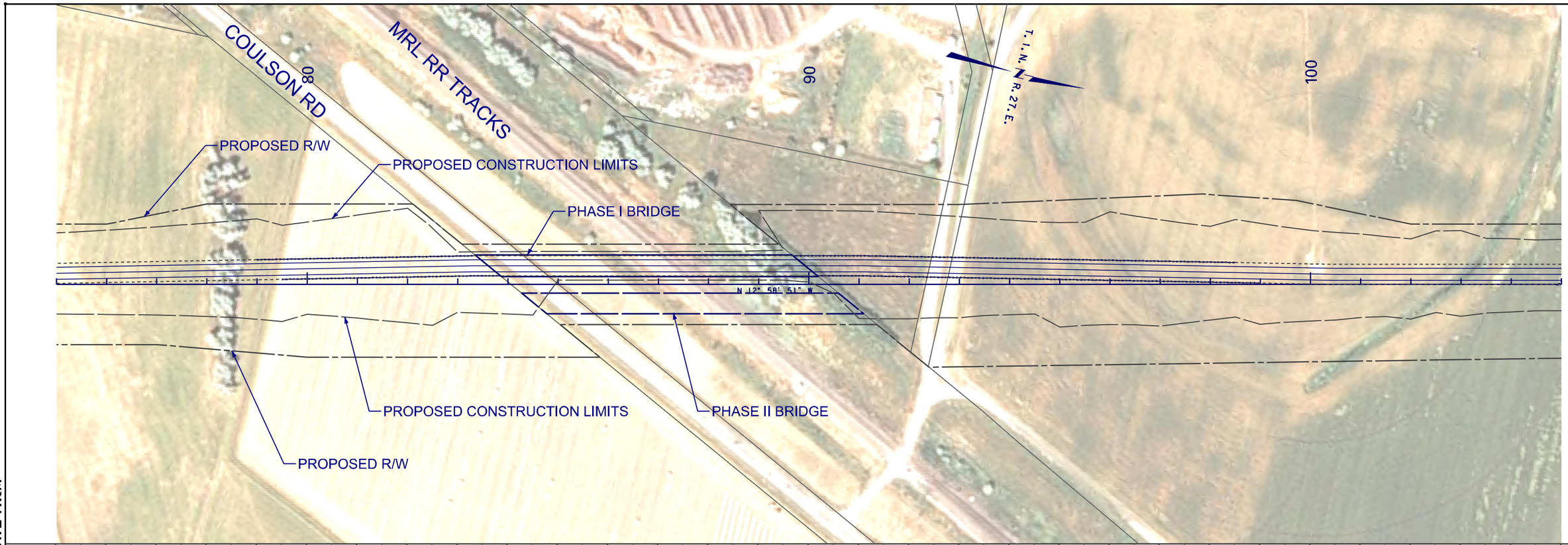
3120
3110
3100
3090
3080
3070
3060
3050
3040

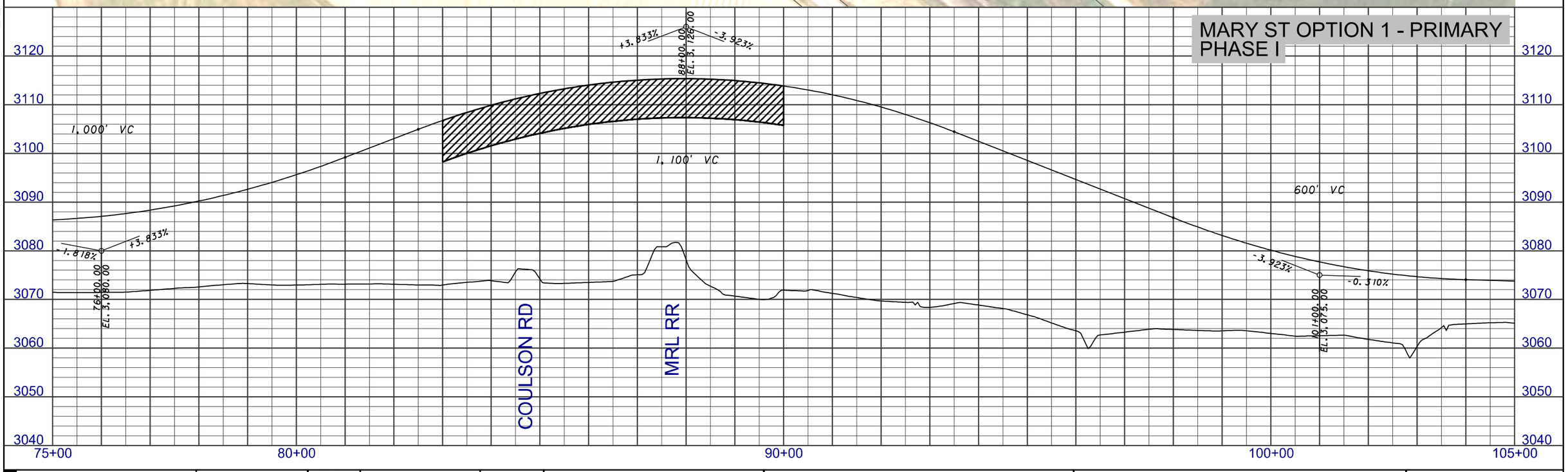
600' VC
-0.440%
+0.857%
51+00.00
EL. 3,088.00

+0.857%
-1.818%
65+00.00
EL. 3,100.00
600' VC

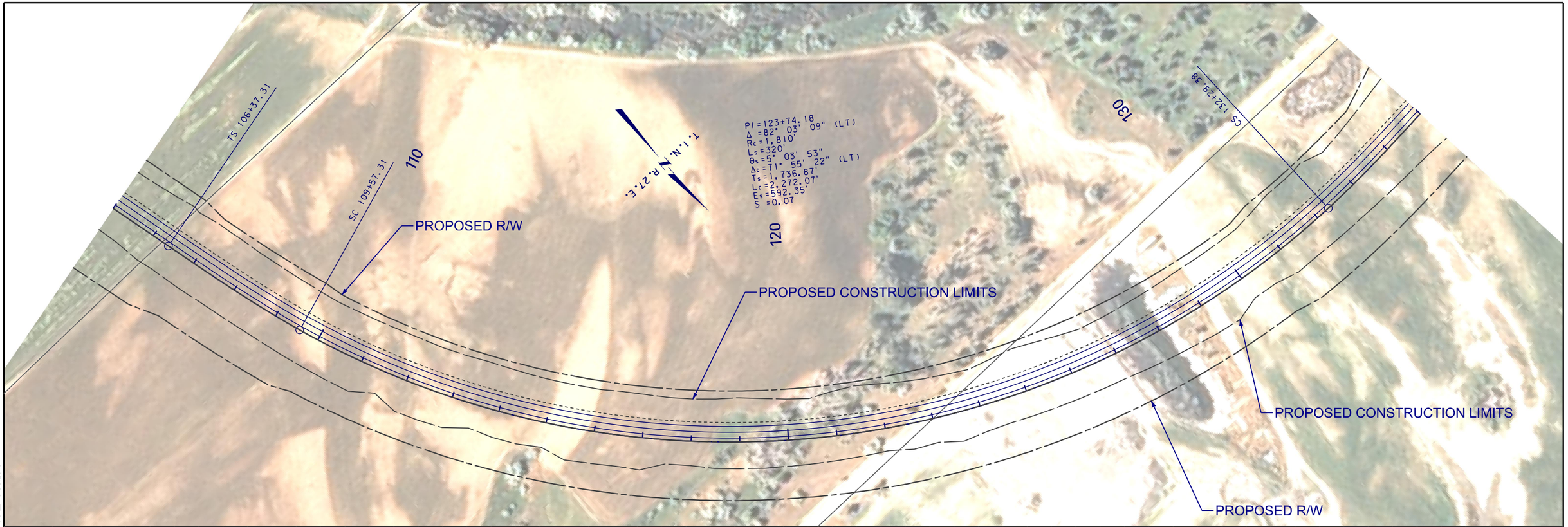
45+00
50+00
60+00
70+00
75+00

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz01_M1.dgn 8/23/2013 4:08:56 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-3



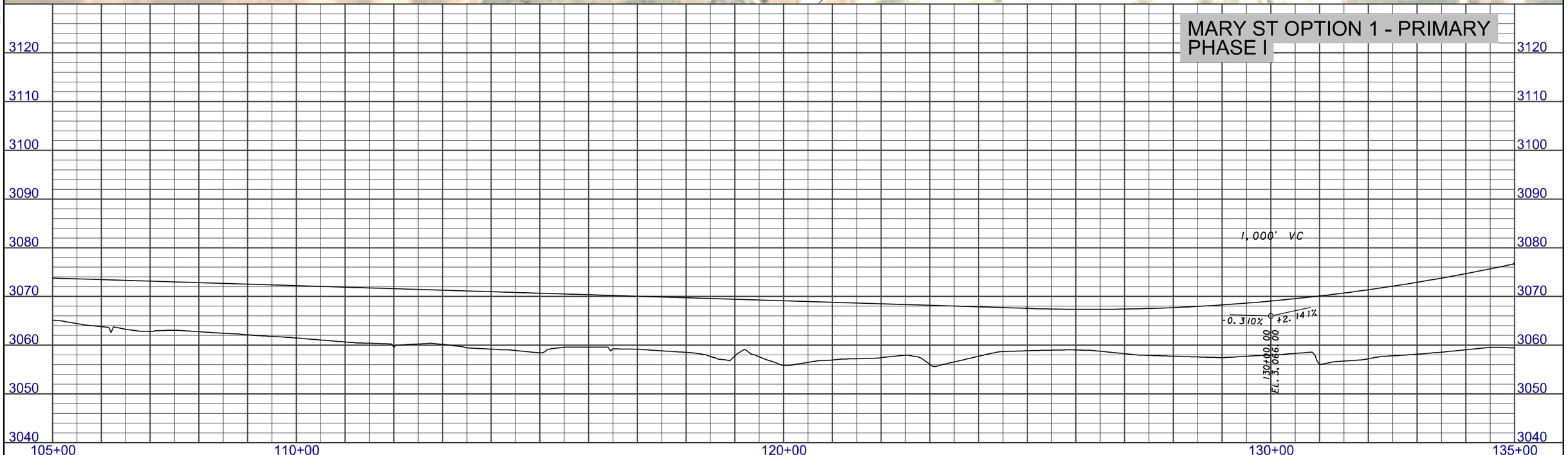


2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz01_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-4
		4:09:14 PM ngutierrez	CHECKED BY				

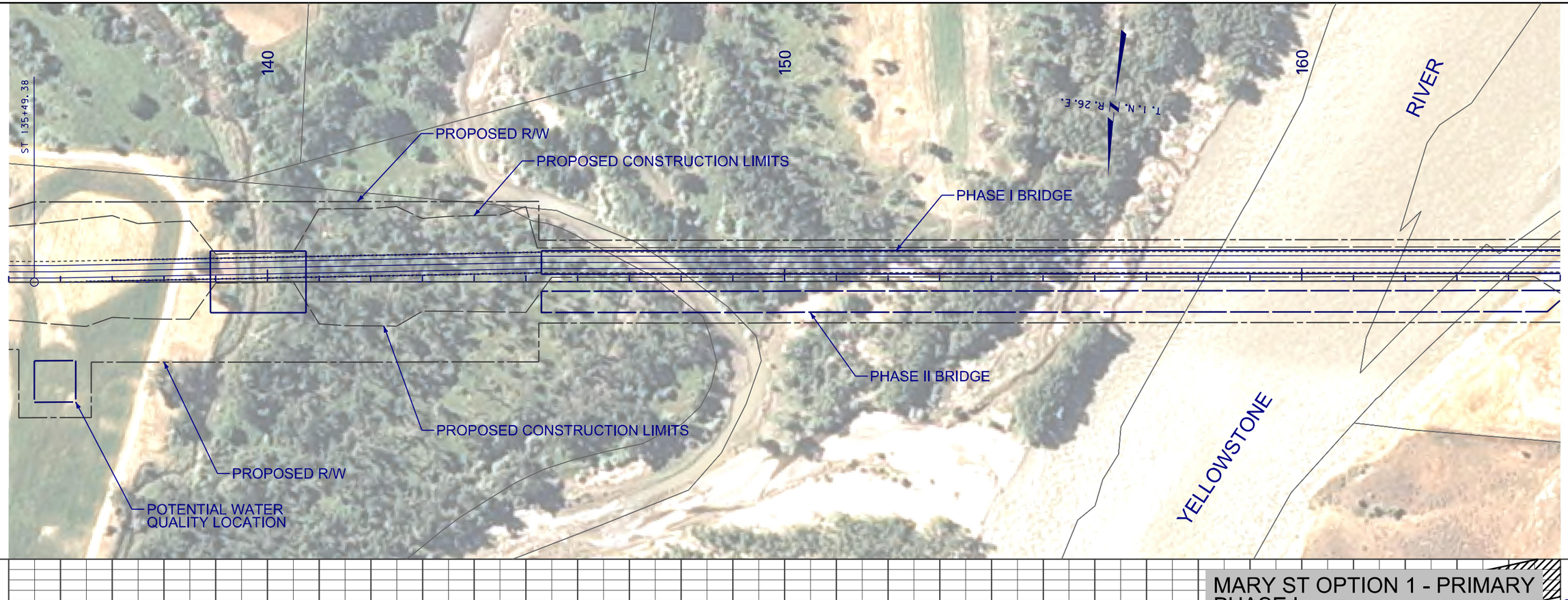


DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz02_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		11:13:32 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET M1-5



DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I

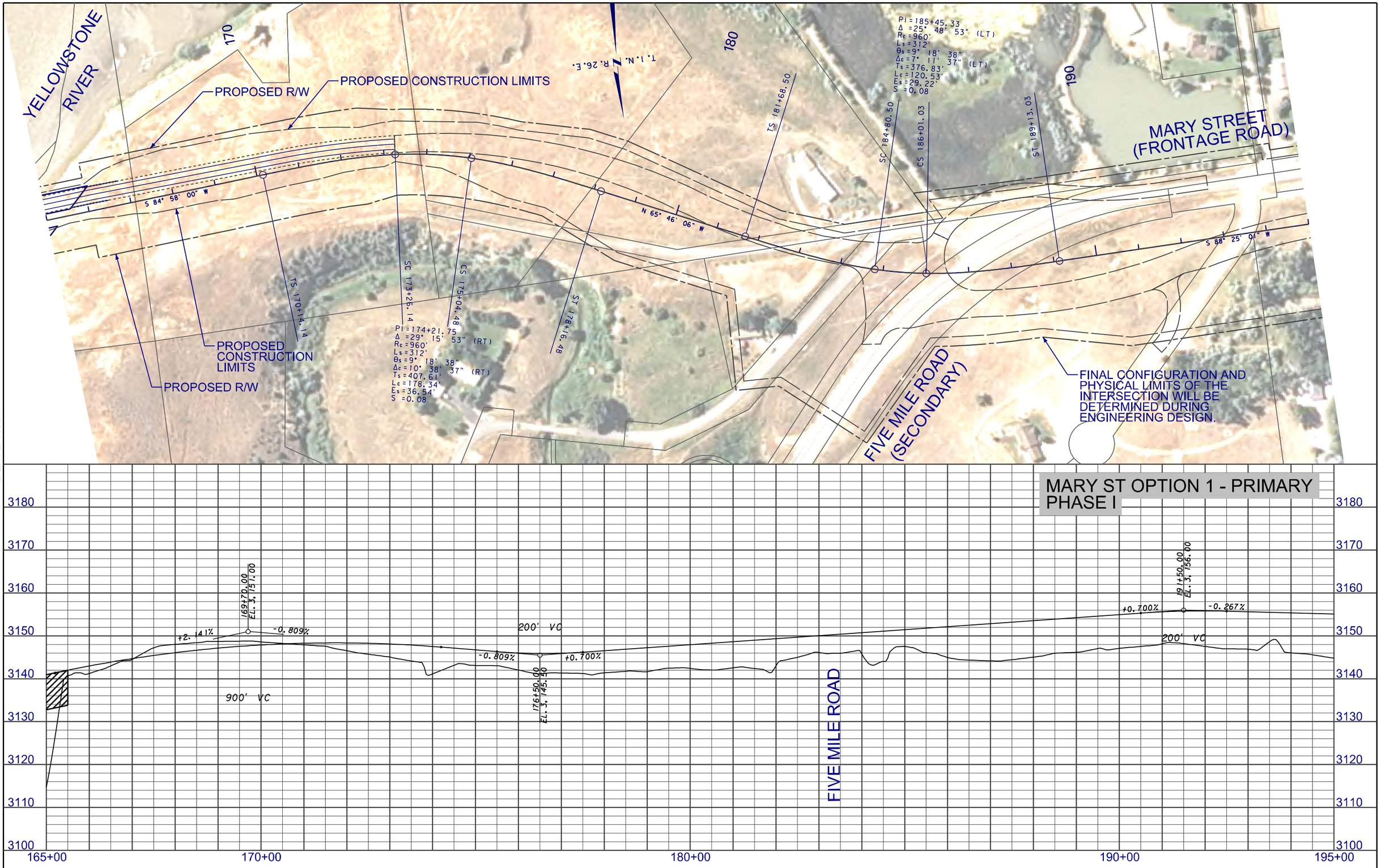
+2.14%

YELLOWSTONE RIVER

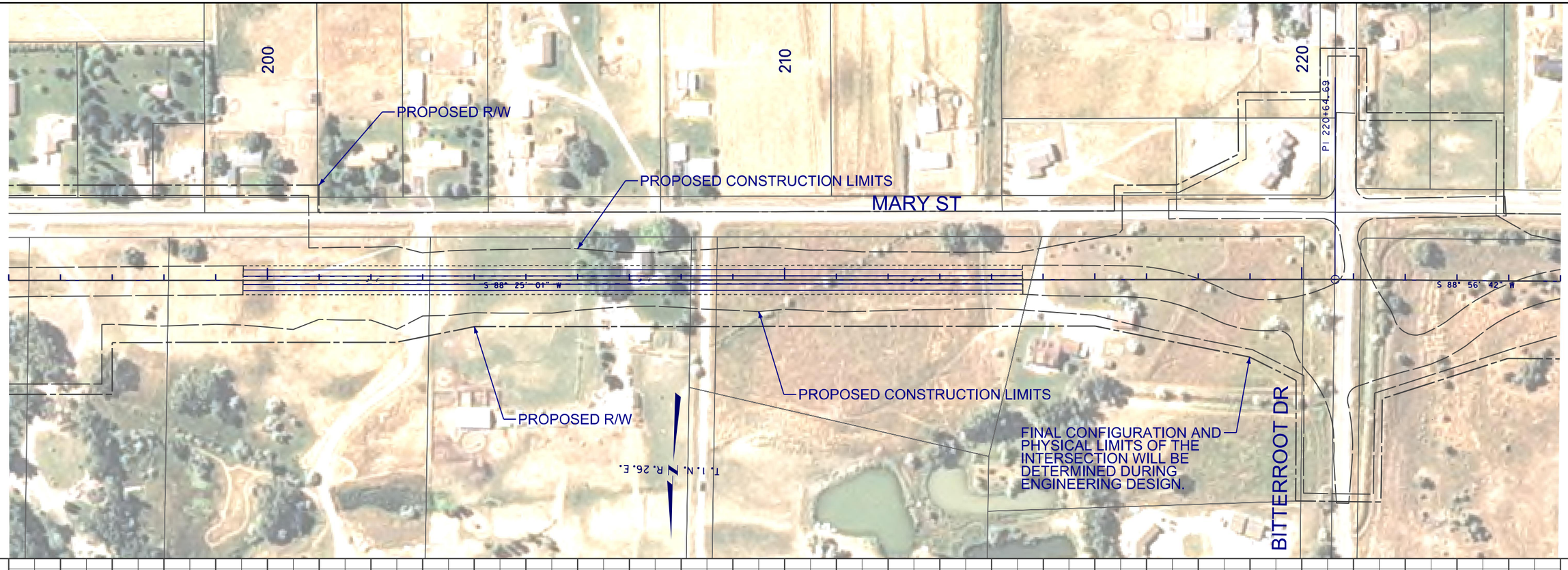
3140 3130 3120 3110 3100 3090 3080 3070 3060

135+00 140+00 150+00 160+00 165+00

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz02_M1.dgn 8/19/2013 11:13:49 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-6

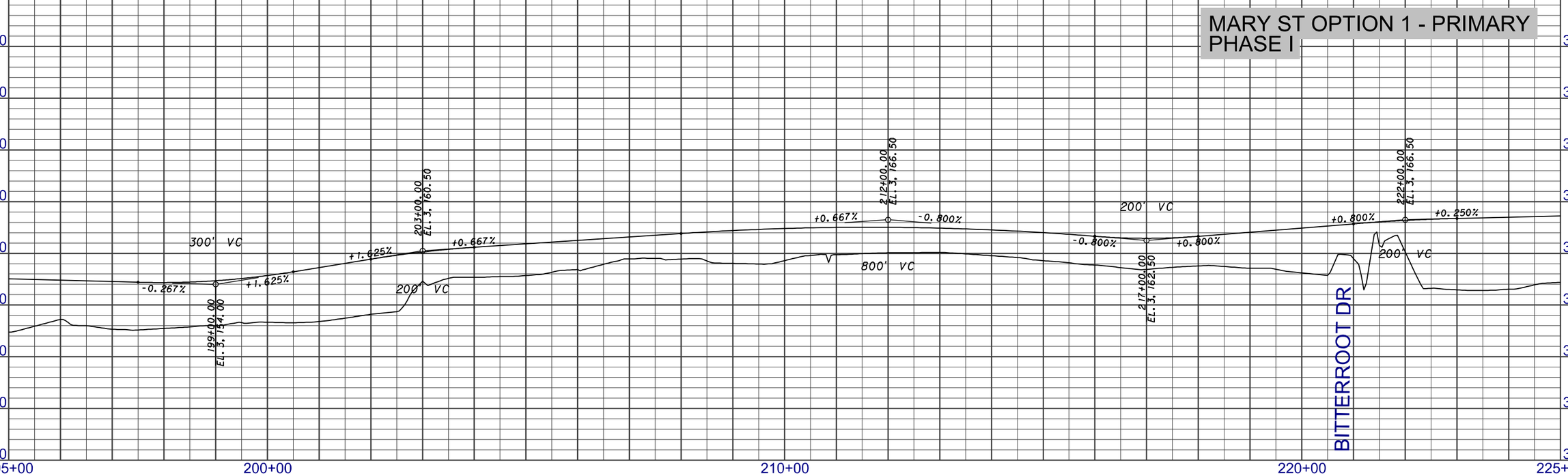


2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz02_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-7
		11:14:06 AM ngutierrez	CHECKED BY				

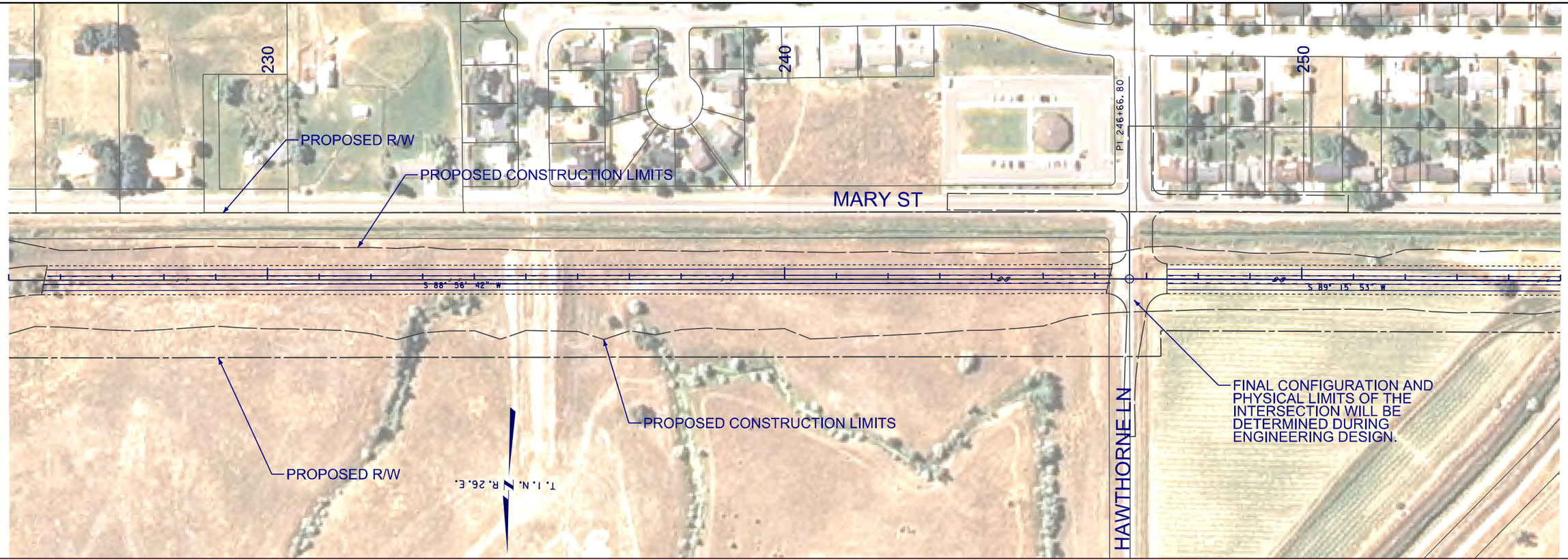


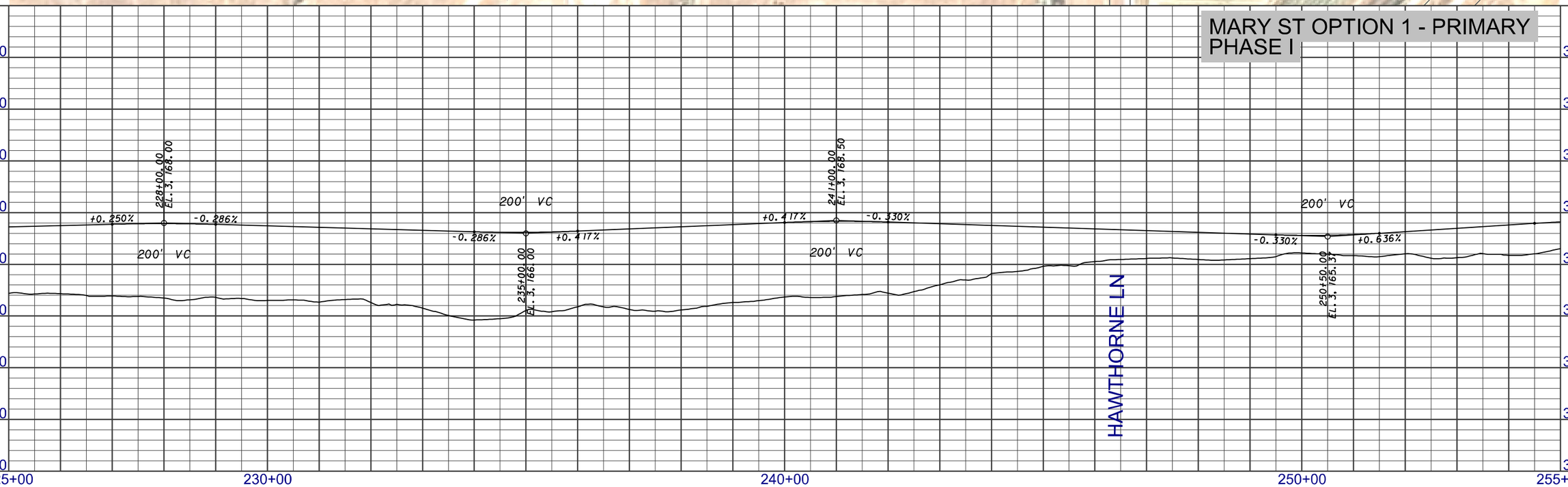
DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I



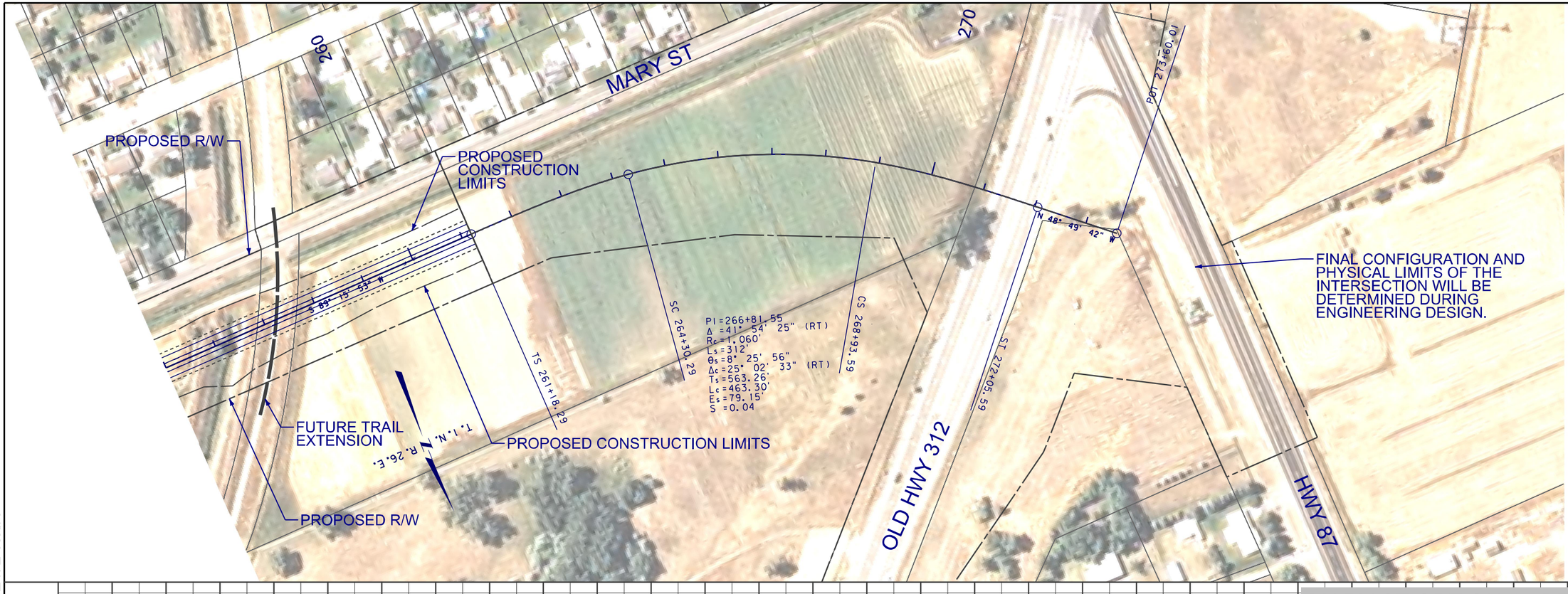
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz03_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-8
		10:43:55 AM ngutierrez	CHECKED BY				





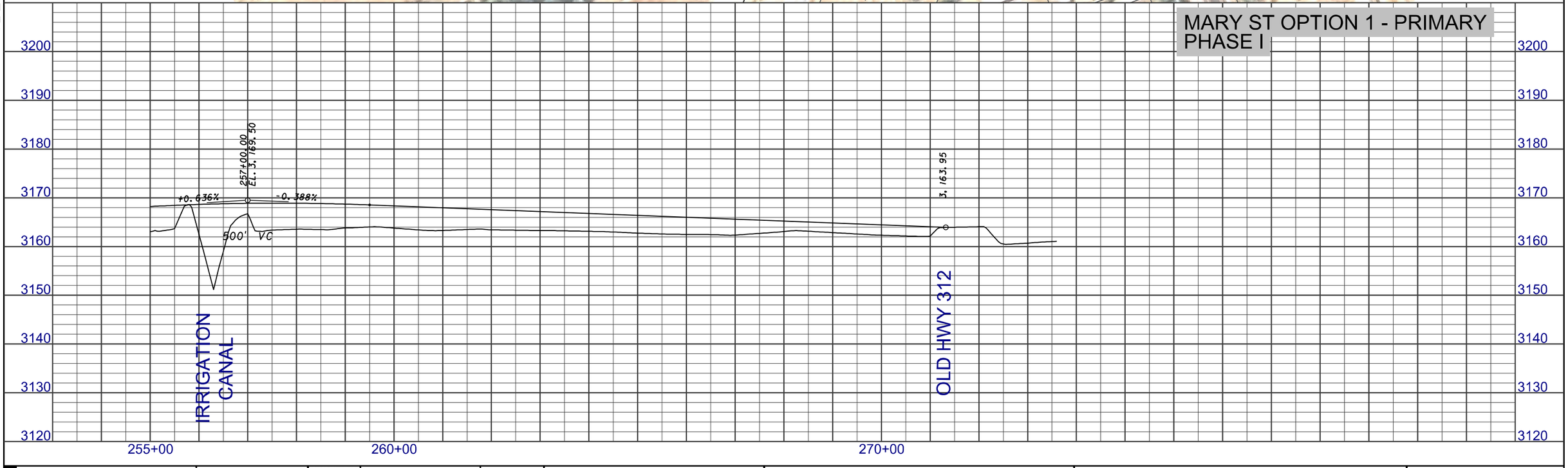
DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz03_M1.dgn 8/23/2013 10:44:12 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-9



DOWL HKM

MARY ST OPTION 1 - PRIMARY
PHASE I



2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz03_M1.dgn 8/23/2013 10:44:30 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-10

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

FIVE MILE CREEK

FIVE MILE RD

POT 10+00.00

PI=20+75.30
Δ=32° 12' 06" (RT)
Rc=590'
Ls=272'
θs=13° 12' 26"
Δc=5° 47' 15" (RT)
Ts=307.57'
Lc=59.60'
Es=29.52'
S=0.08

PI=29+45.46
Δ=71° 04' 13" (LT)
Rc=590'
Ls=272'
θs=13° 12' 26"
Δc=44° 39' 22" (LT)
Ts=560.87'
Le=459.84'
Es=141.44'
S=0.08

N 38° 00' 33" E

N 70° 12' 39" E

N 0° 51' 34" W

TS 11+67.14

SC 20+39.14

CS 20+99.33

ST 23+71.33

TS 23+84.58

SC 26+56.58

CS 31+16.43

ST 33+88.43

T. 1 N., R. 27 E.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

10+00.00
EL. 3,135.00

19+00.00
EL. 3,110.00

32+00.00
EL. 3,151.00

1,000' VC

500' VC

-2.778%

+3.54%

+3.154%

+0.320%

FIVE MILE CREEK

MARY ST OPTION 1 - SECONDARY

3180 3170 3160 3150 3140 3130 3120 3110 3100

10+00 20+00 30+00

DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M1\4199rdplpz01_M1-2ND.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY				UPN 4199 / SHEET M1-11
		11:18:56 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		

DOWL HKM

40

50

60

T. 1 N. R. 27 E.

PI 55+65.34

DOVER RD

PI 65+65.34

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

FIVE MILE RD

N 0° 51' 34" W

N 1° 21' 34" W

N 1° 51' 34" W

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

MARY ST OPTION 1 - SECONDARY

3190
3180
3170
3160
3150
3140
3130
3120
3110

44+50.00
EL. 3,155.00

+0.320%

-0.304%

600' VC

600' VC

0.304%

-0.212%

56+00.00
EL. 3,151.50

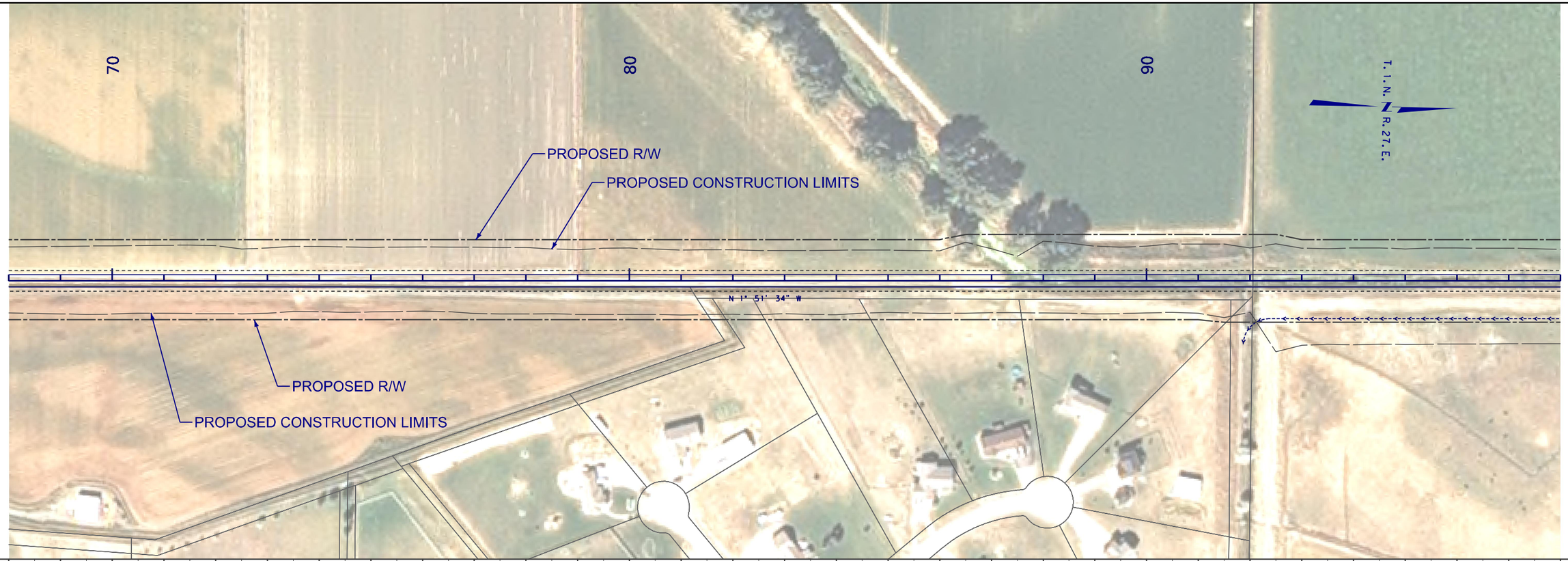
40+00

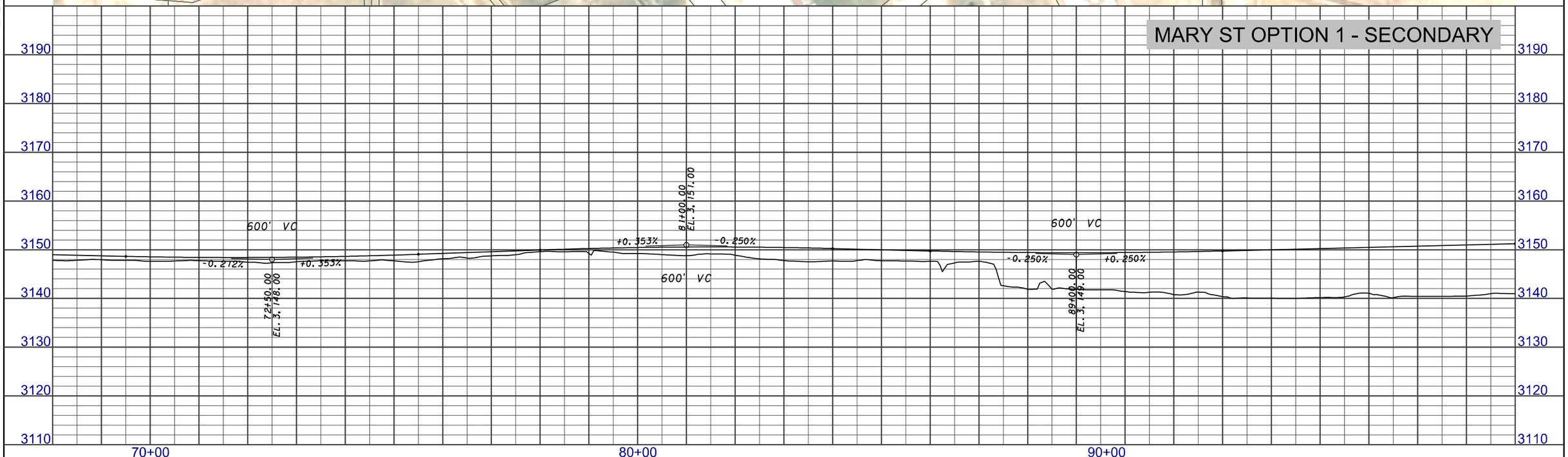
50+00

60+00

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M1\4199rdplpz01_M1-2ND.dgn 8/19/2013 11:19:14 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-12

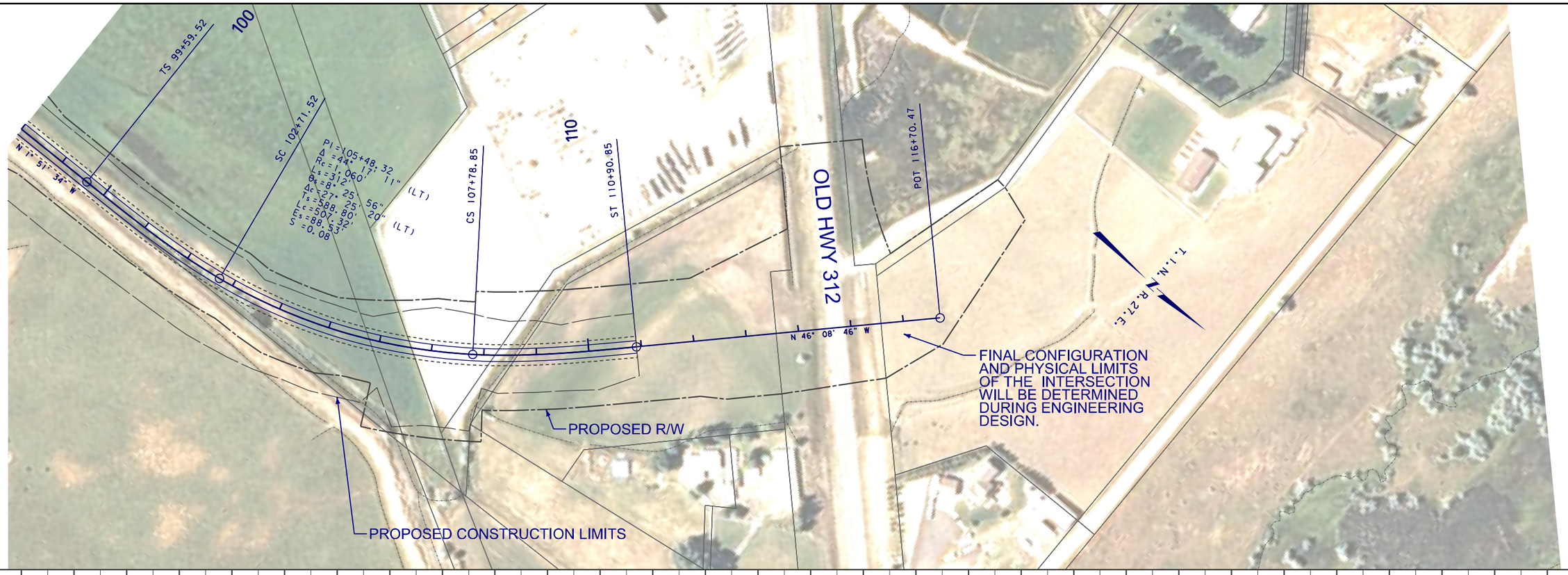
DOWL HKM





2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M1\4199rdplpz01_M1-2ND.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
1		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-13
		11:19:31 AM ngutierrez	CHECKED BY				

DOWL HKM



MARY ST OPTION 1 - SECONDARY

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M1\4199rdplpz02_M1-2ND.dgn	DESIGNED BY		ROAD PLANS	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY				
		11:22:07 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY	PRELIMINARY	UPN 4199 SHEET M1-14

COULSON RD

T. 1 N. R. 27 E.

PDT 10+00.00 = EO = 40+83.70

TS 16+07.20

SC 18+02.20

PI = 35+04.06
Δ = 65° 26' 30" (LT)
Rc = 2,800'
Ls = 795'
θs = 16° 59' 42"
Δc = 61° 27' 05" (LT)
Ts = 1,896.87'
Lc = 3,003.08'
Es = 528.80'

N 52° 27' 39" E

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

MARY ST OPTION 1 - PRIMARY
CURVE ALT - PHASE I

10+00.00 = 40+83.70
EL. 3,092.47

600' VC

-0.440%

+0.613%

20+16.30
EL. 3,088.00

+0.613%

-1.364%

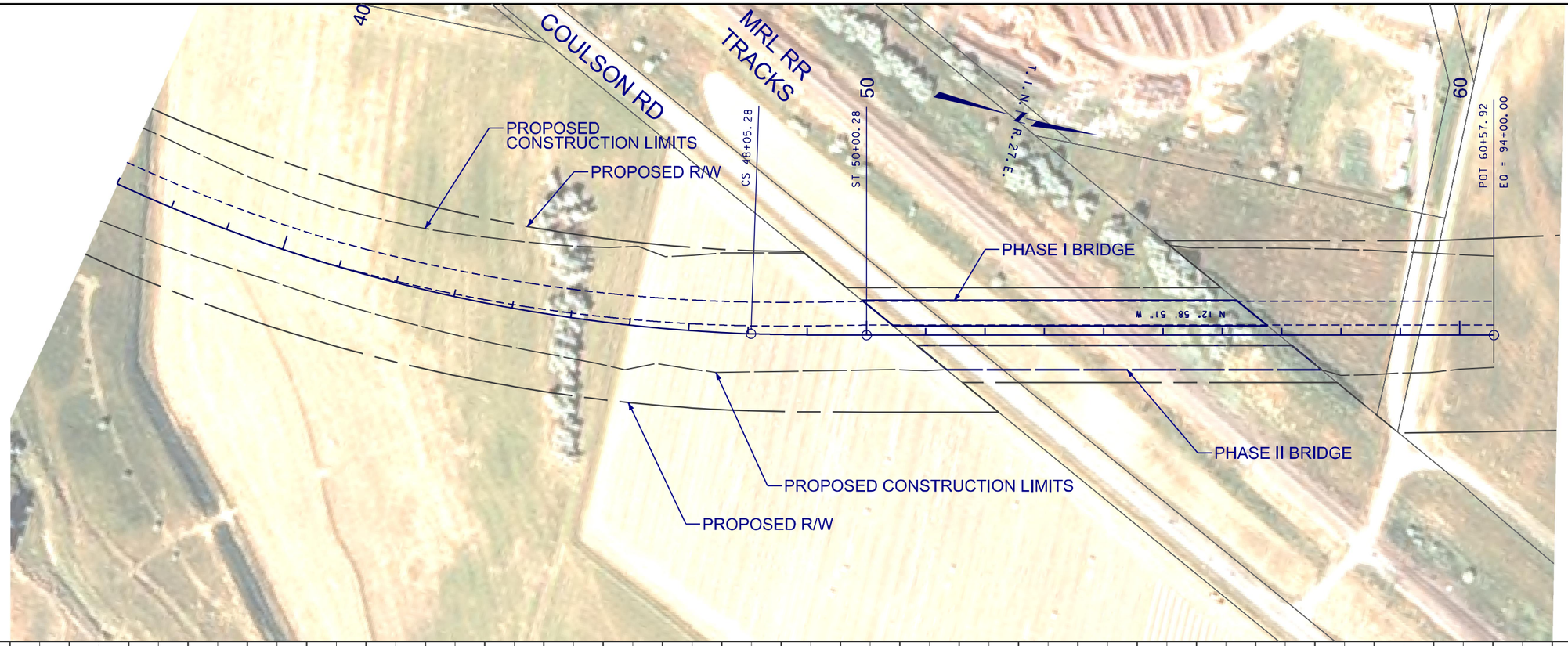
31+67.92
EL. 3,095.00

600' VC

3120
3110
3100
3090
3080
3070
3060
3050
3040

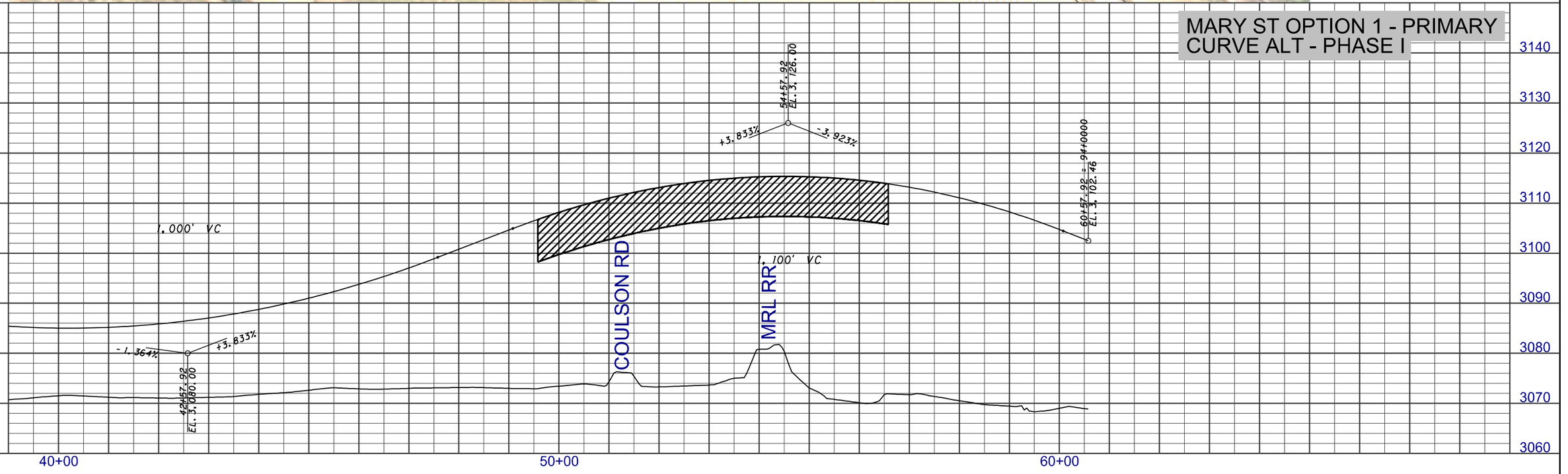
10+00
20+00
30+00

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz04_M1.dgn 8/23/2013 10:46:53 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET MI-15

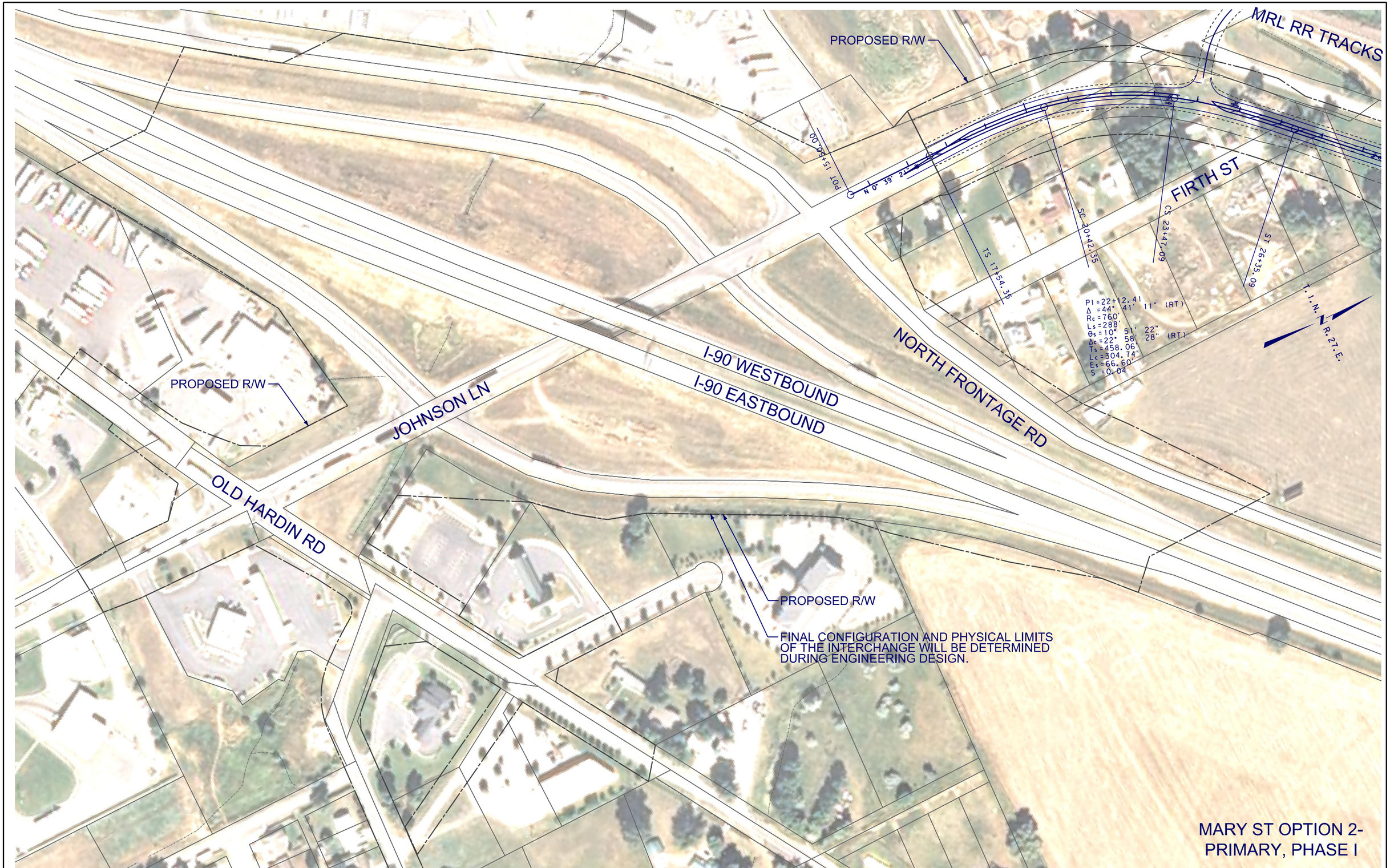


DOWL HKM

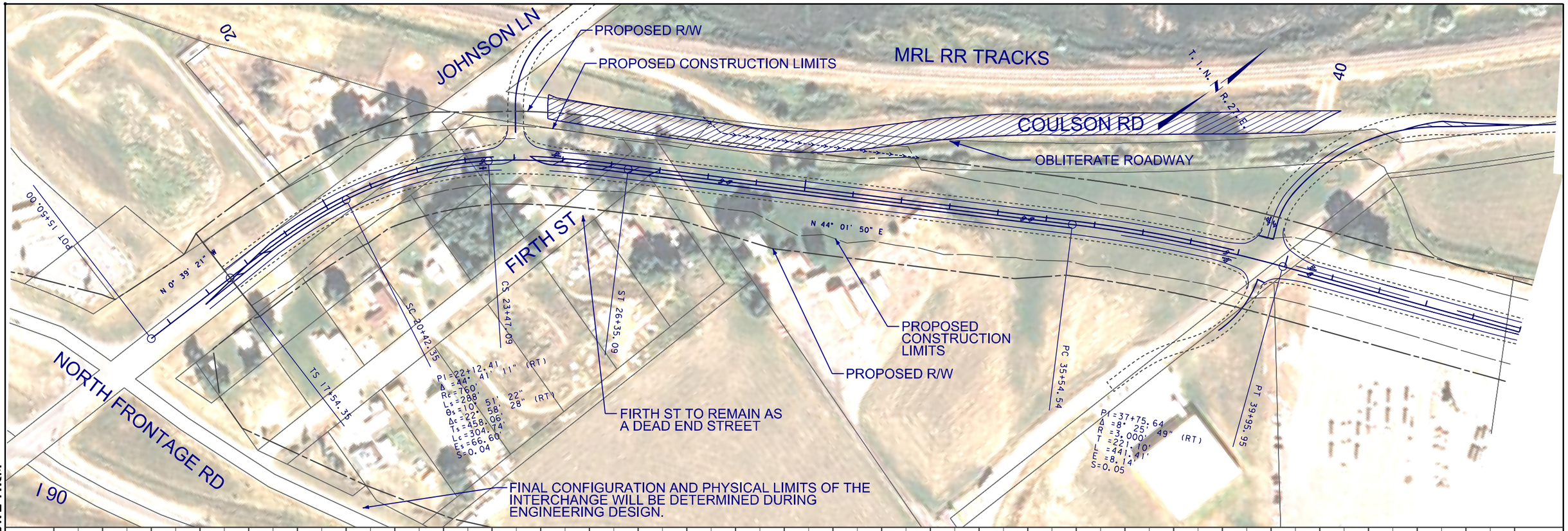
MARY ST OPTION 1 - PRIMARY
CURVE ALT - PHASE I

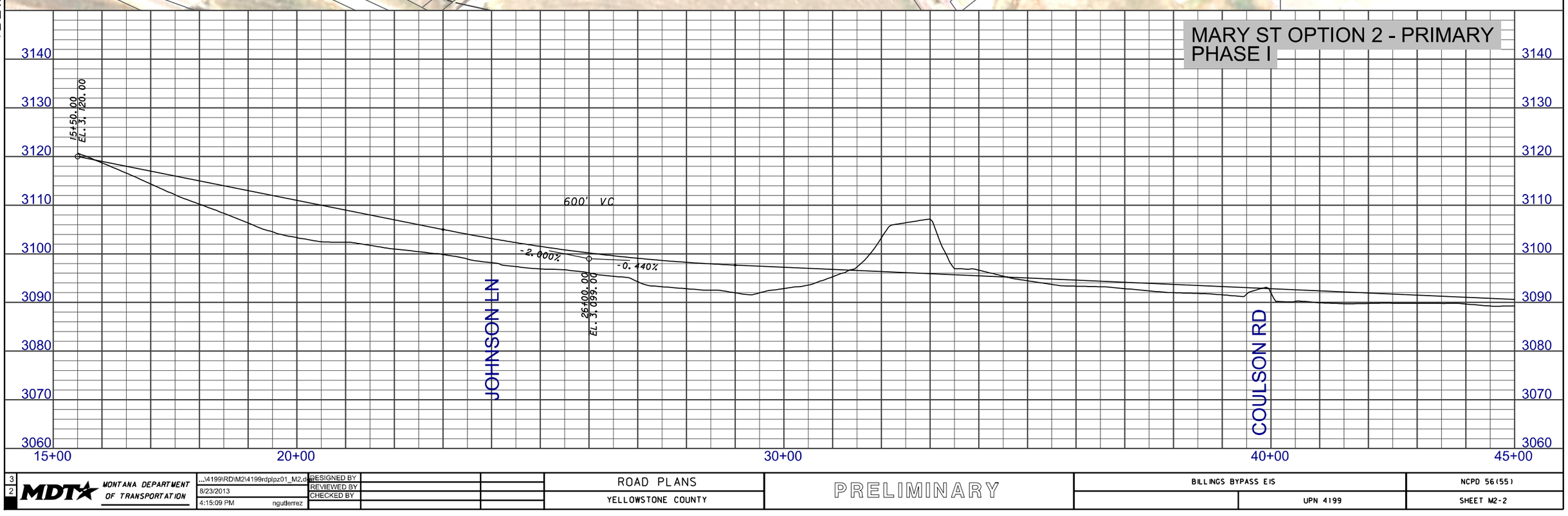


2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz04_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-16
		10:47:11 AM ngutierrez	CHECKED BY				



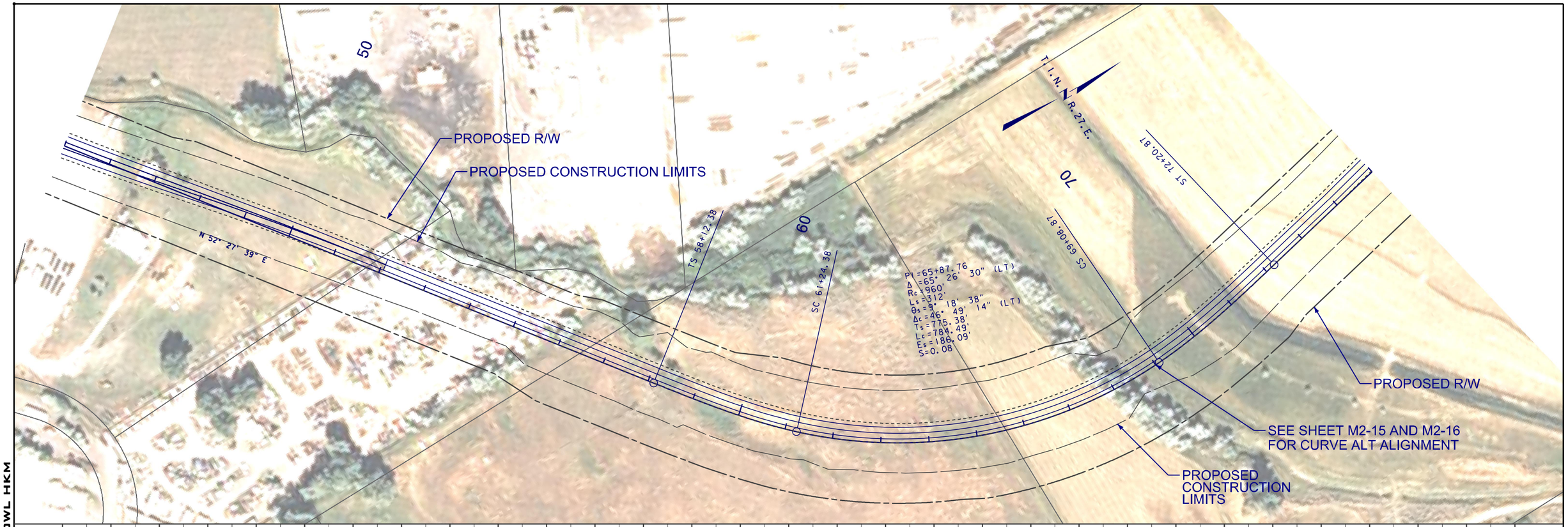
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplnZ01_M2.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY					UPN 4199 / SHEET M2-1
		11:43:02 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY		

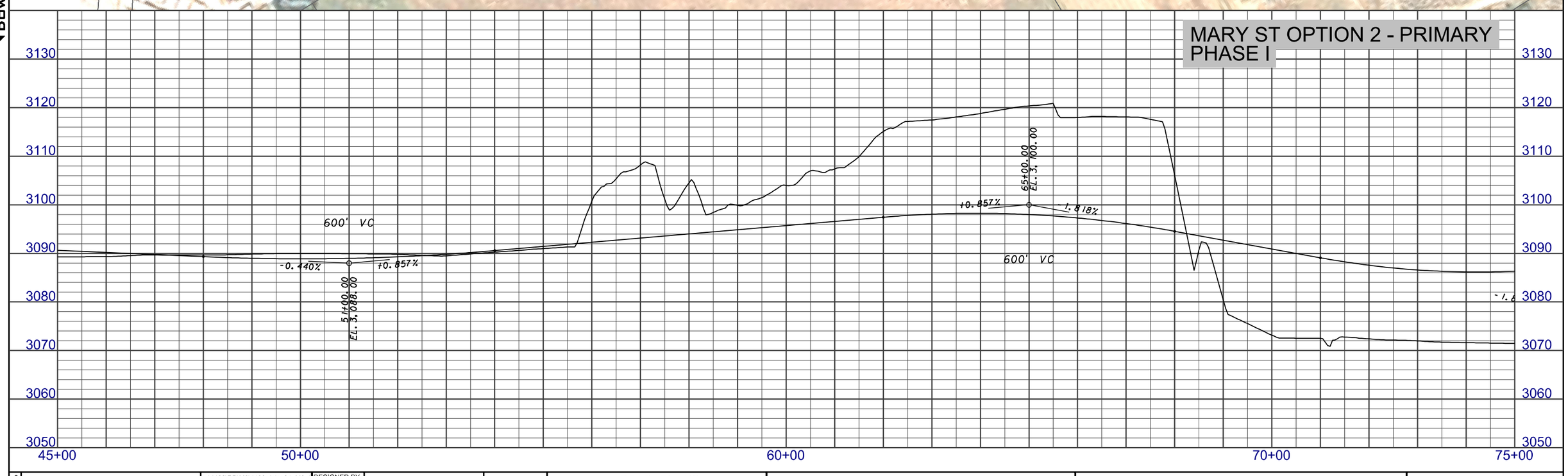




DOWL HKM

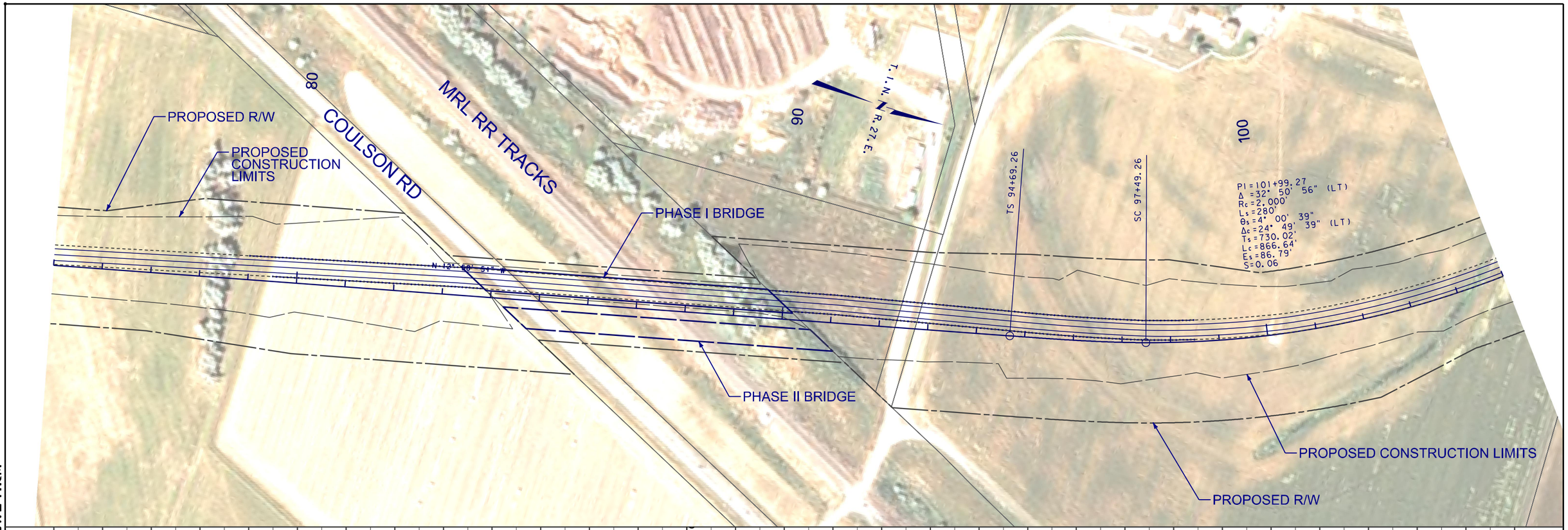
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz01_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M2-2
		4:15:09 PM ngutierrez	CHECKED BY				

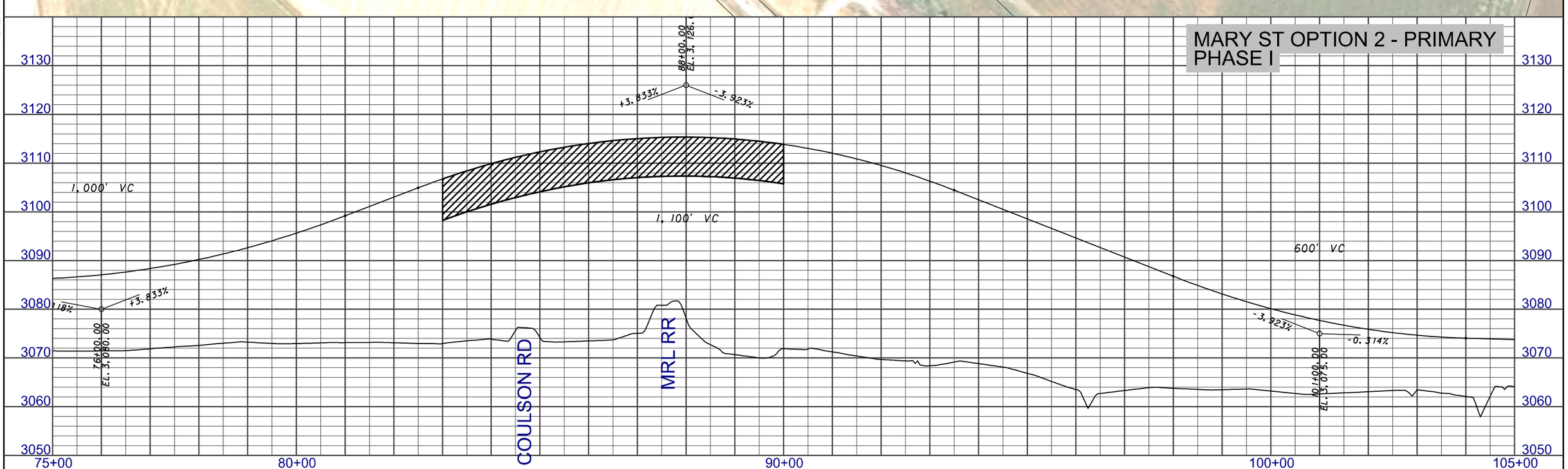




DOWL HKM

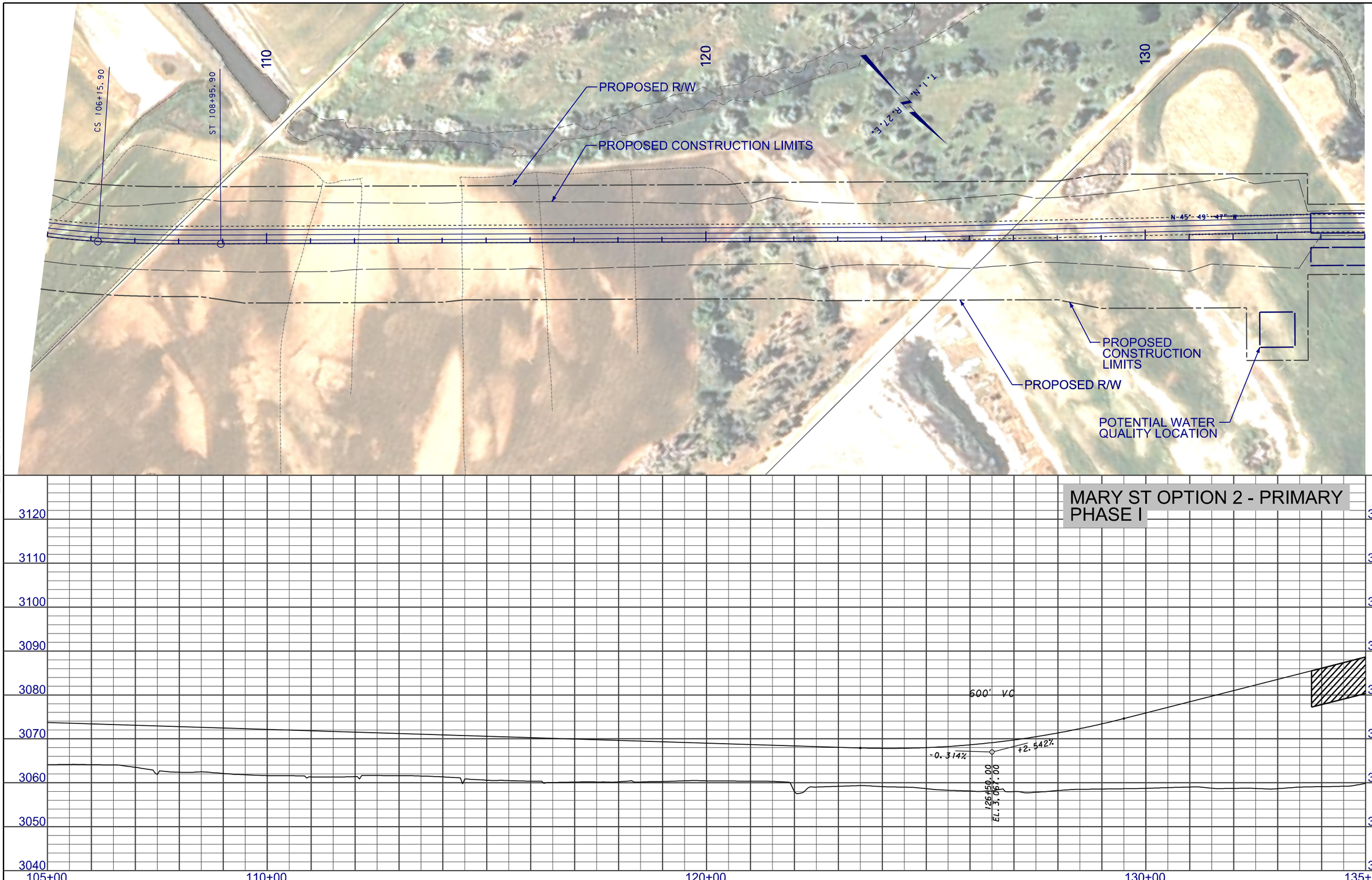
3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz01_M2.dgn 8/23/2013 4:15:27 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-3





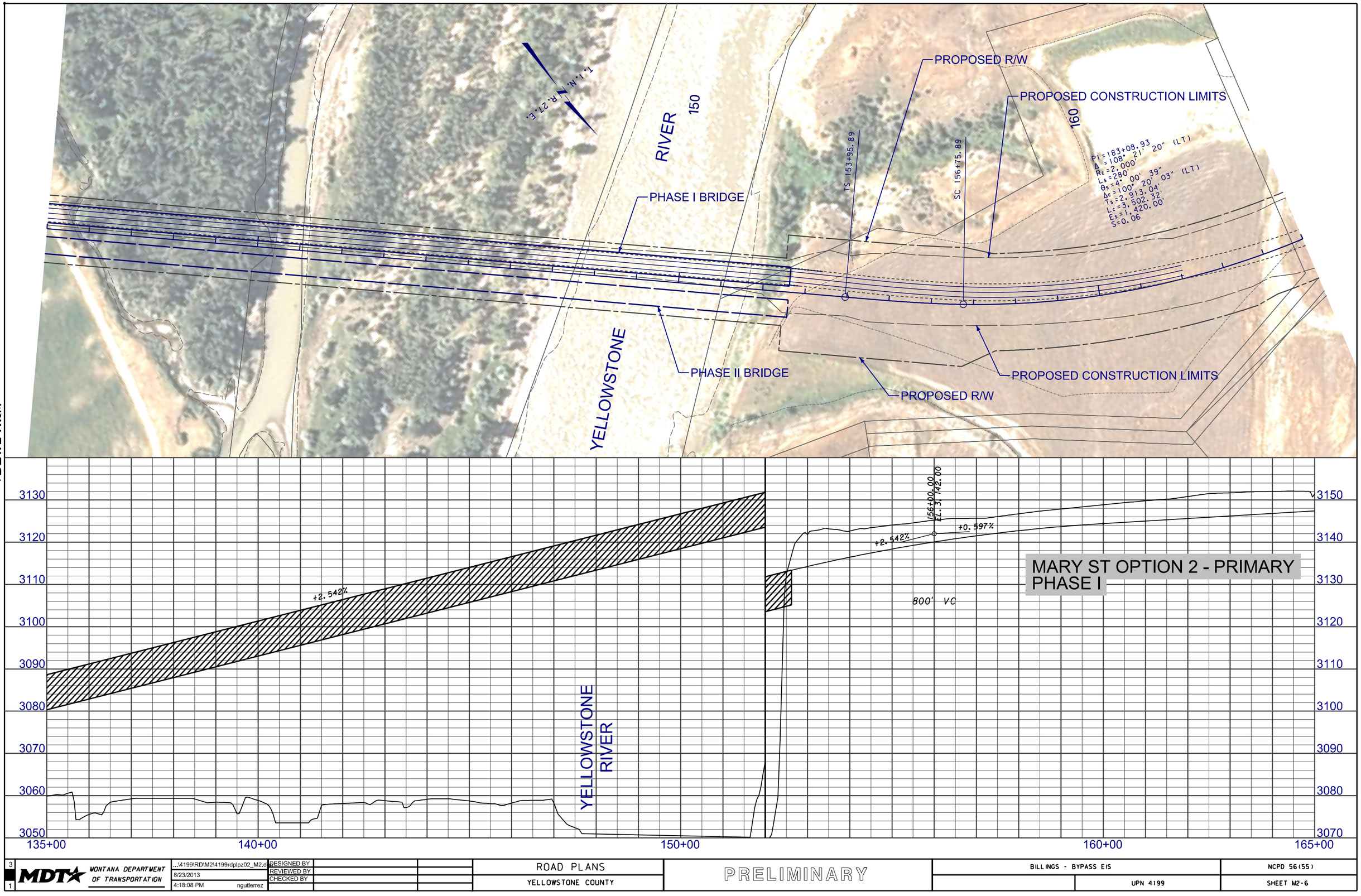
DOWL HKM

2 / 1 MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz01_M2.dgn 8/23/2013 4:15:45 PM ngutlerrez	DESIGNED BY / REVIEWED BY / CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-4

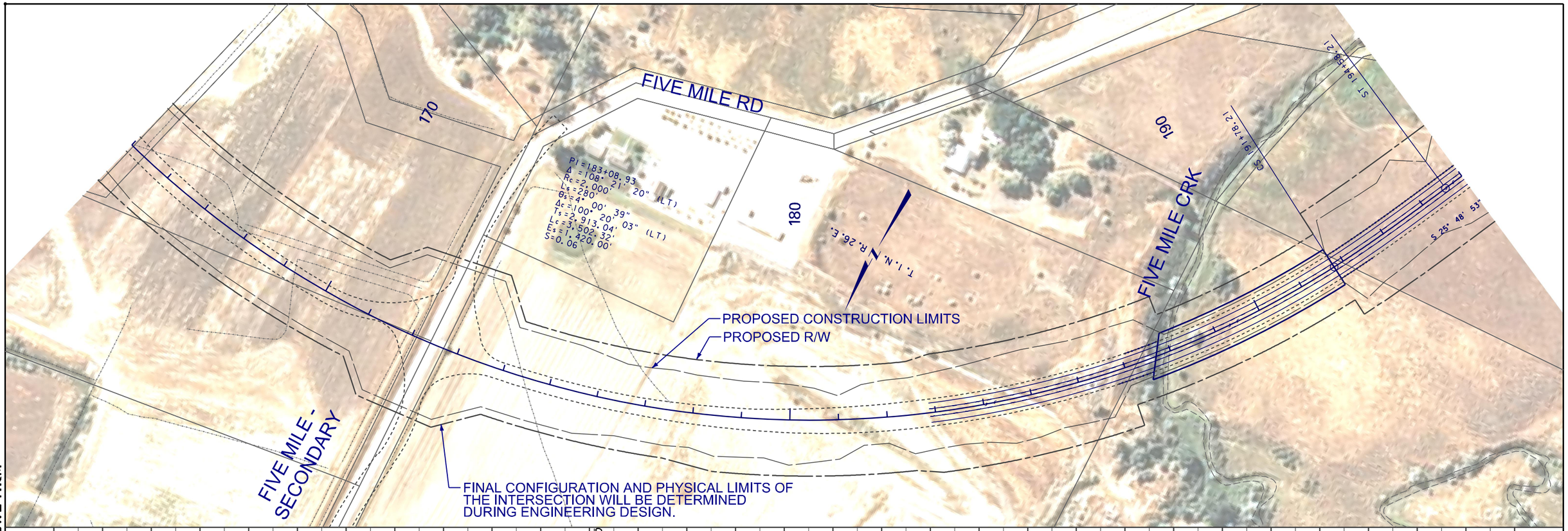


DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz02_M2.dgn	DESIGNED BY	ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY	YELLOWSTONE COUNTY		UPN 4199	SHEET M2-5
		4:17:50 PM ngutlerrez	CHECKED BY				

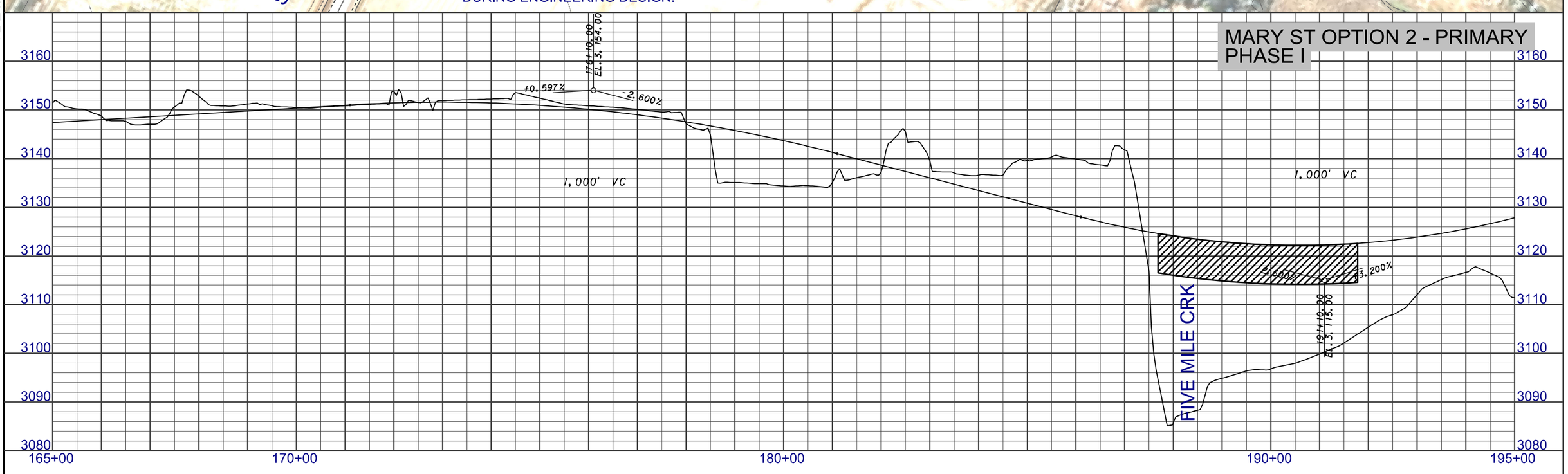


3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz02_M2.dgn 8/23/2013 4:18:08 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-6



DOWL HKM

MARY ST OPTION 2 - PRIMARY PHASE I



2 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz02_M2.dgn 8/23/2013 4:18:27 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-7

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

MARY ST

FLAMING CREEK CIRCLE

PI = 205+36.79
Δ = 62° 36' 07" (RT)
Rc = 1,200'
Ls = 320'
θs = 7° 38' 22"
Δc = 47° 19' 23" (RT)
Ts = 891.71'
Lc = 991.13'
Es = 208.57'
S = 0.08

SC 199+65.08

TS 196+45.08

CS 209+56.22

ST 212+76.22

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

S 88° 25' 01" W

T. 1 N. R. 26 E.

DOWL HKM

MARY ST OPTION 2 - PRIMARY
PHASE I

3180 3170 3160 3150 3140 3130 3120 3110 3100

195+00 200+00 210+00 220+00 225+00

+3.200% +0.505% +0.505% +1.286% +1.286% -0.353%

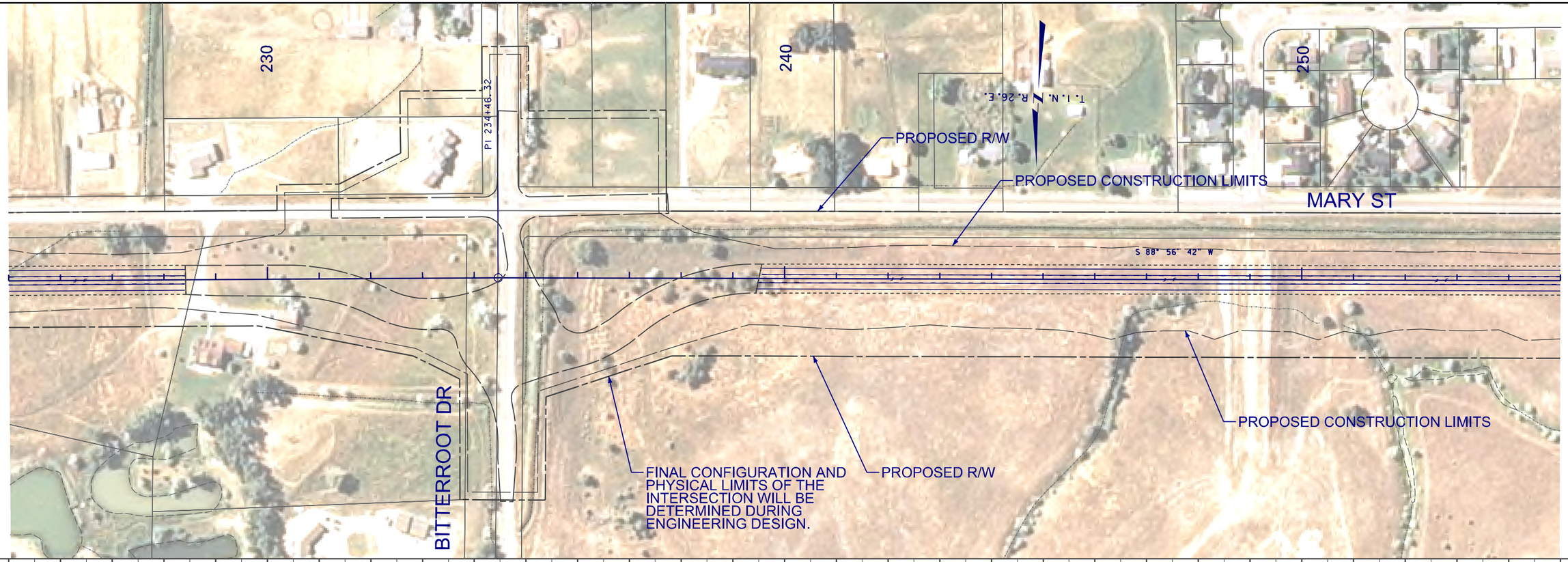
1,000' VC 500' VC 800' VC

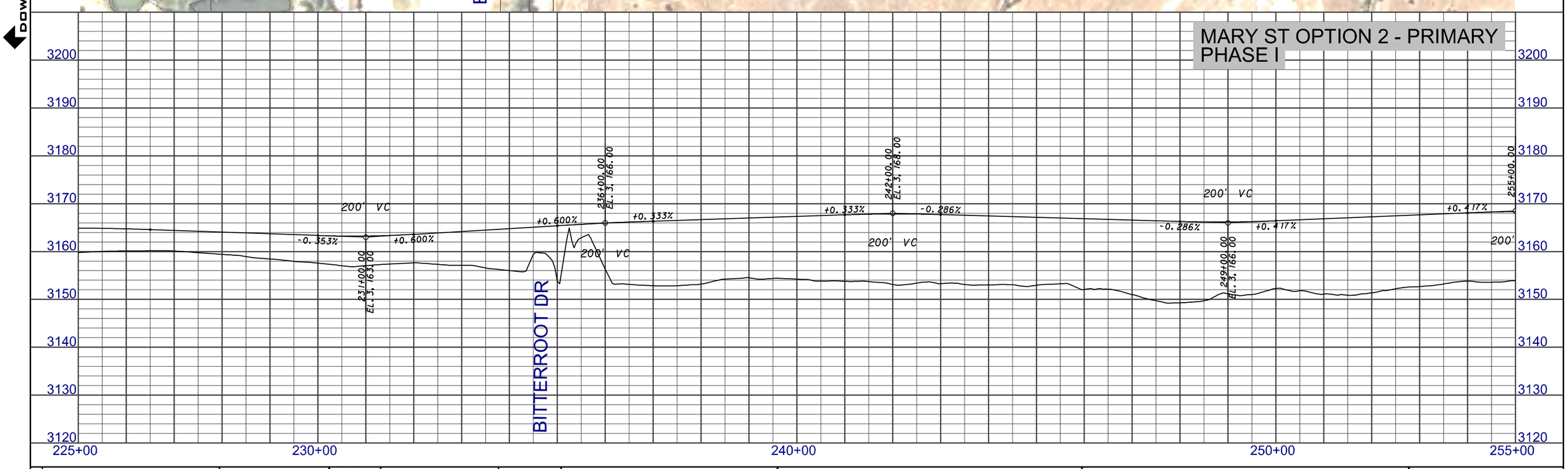
201+10.00 EL. 3,147.00

212+00.00 EL. 3,152.50

222+50.00 EL. 3,166.00

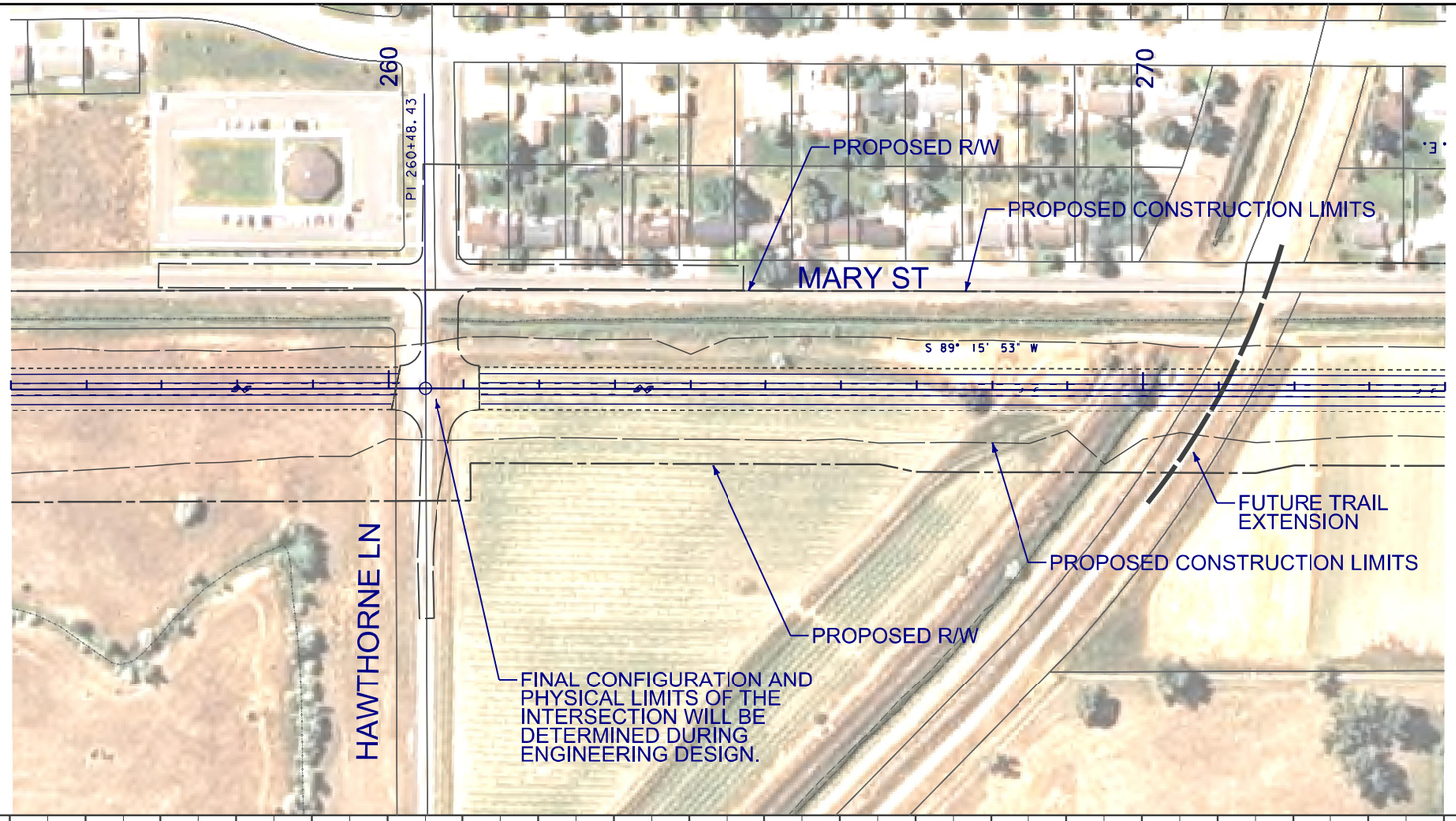
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz03_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M2-8
		4:20:46 PM ngutierrez	CHECKED BY				





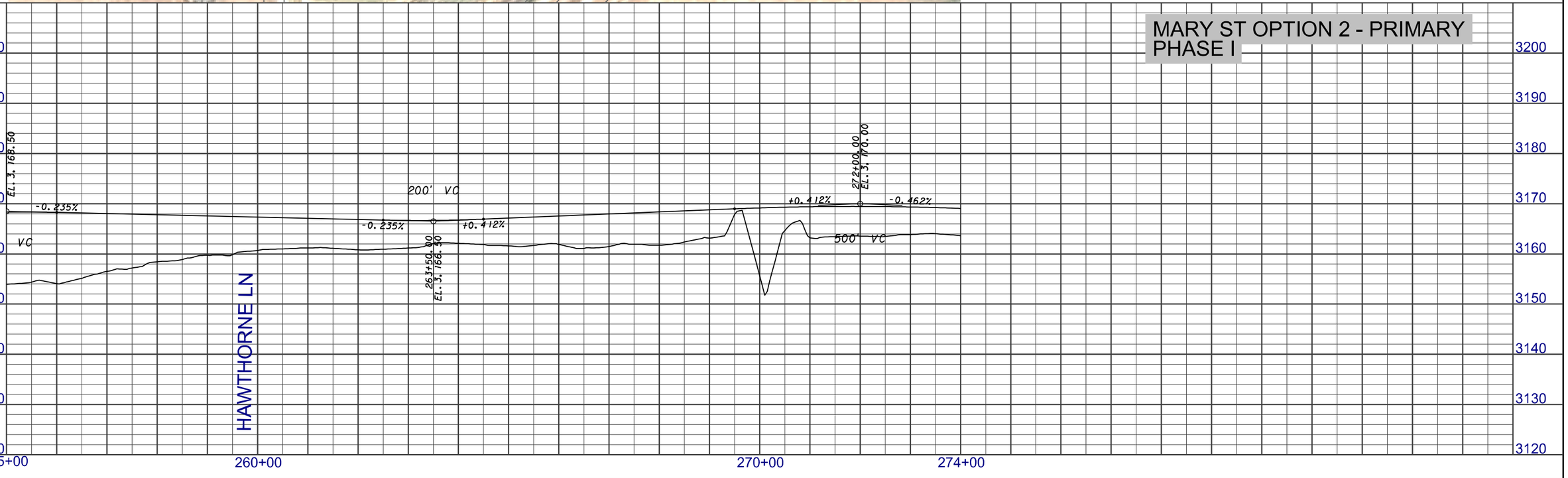
DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz03_M2.dgn 8/23/2013 4:21:04 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-9

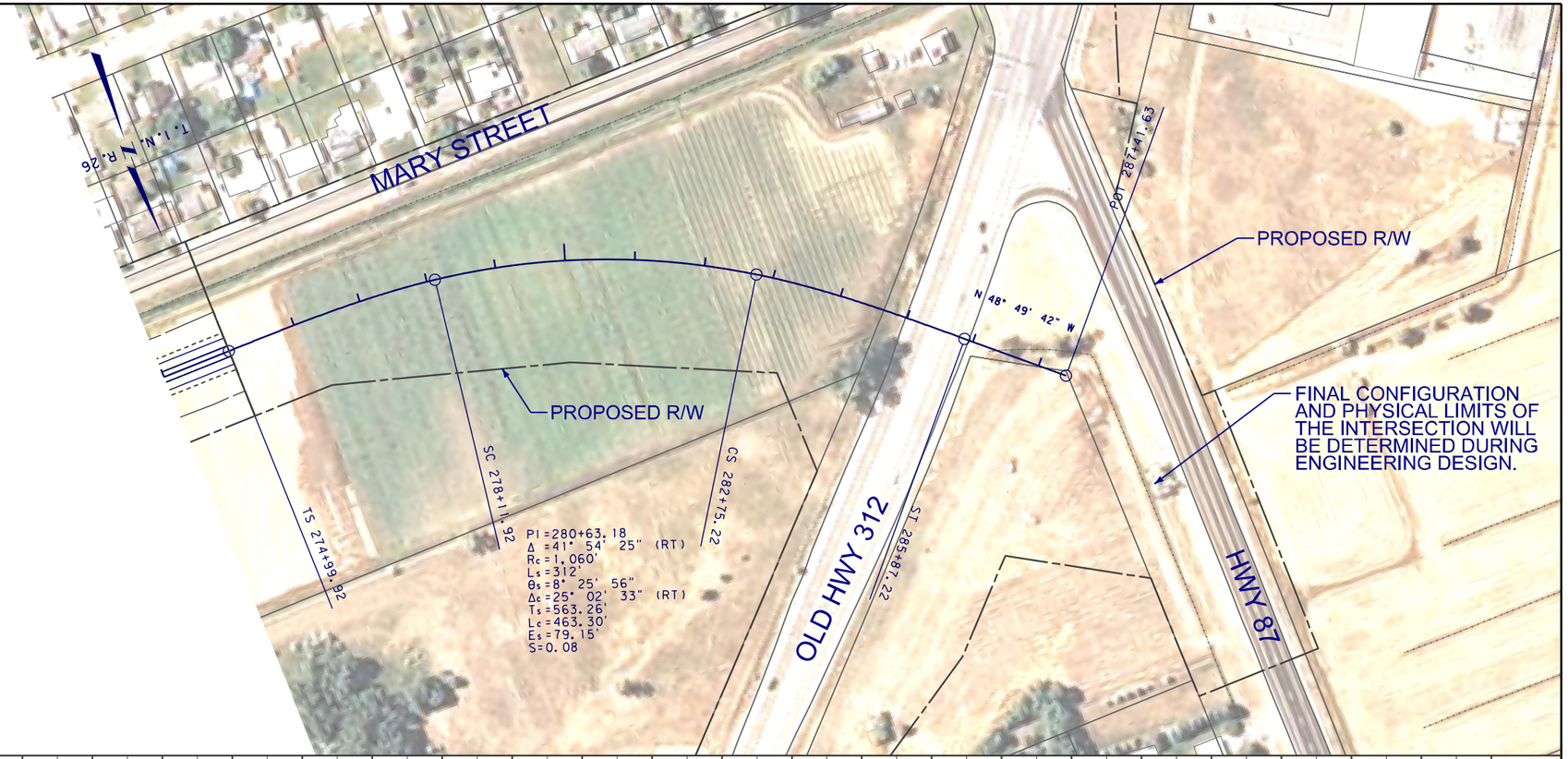


DOWL HKM

MARY ST OPTION 2 - PRIMARY
PHASE I

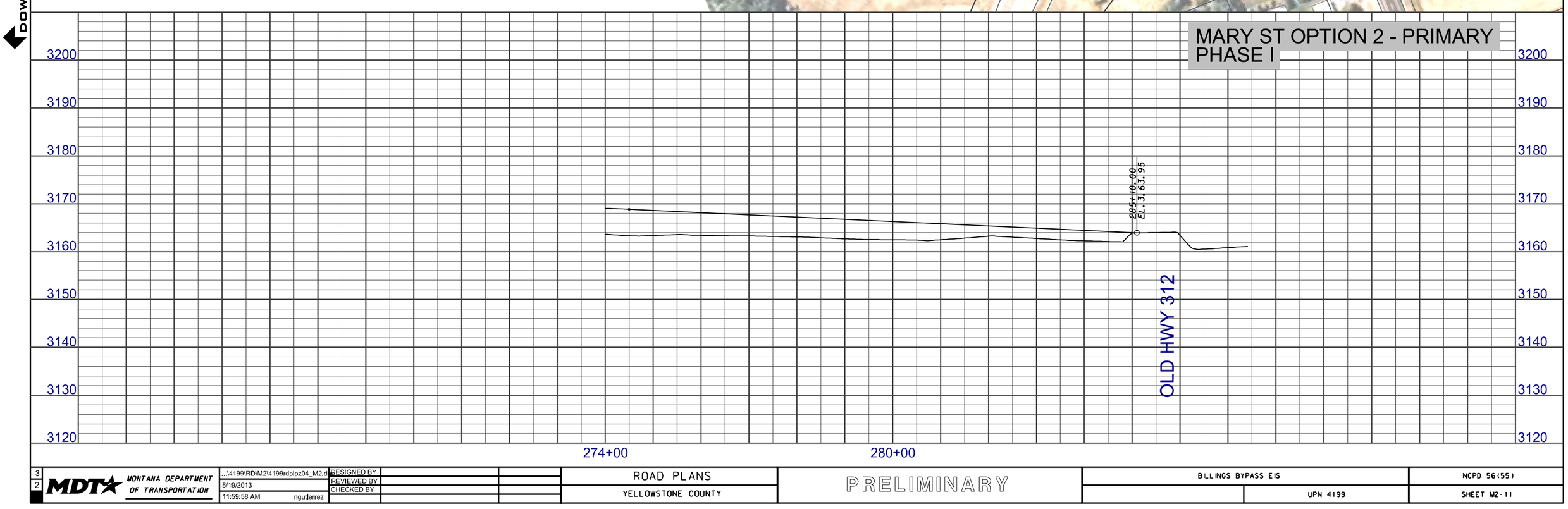


2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz03_M2.dgn 8/23/2013 4:21:22 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-10



DOWL HKM

MARY ST OPTION 2 - PRIMARY
PHASE I



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz04_M2.dgn	DESIGNED BY			ROAD PLANS	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY			YELLOWSTONE COUNTY	PRELIMINARY / UPN 4199 / SHEET M2-11
		11:59:58 AM ngutierrez	CHECKED BY				

DOWL HKM

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

FIVE MILE RD

POT 10+00.00

PI 29+88.79

N 0° 51' 34" W

N 1° 21' 34" W

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

T. 1 N., R. 27 E.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

MARY OPTION 2 - PRIMARY

MARY ST OPTION 2 - SECONDARY

10+00.00
EL. 3,151.53

18+50.00
EL. 3,155.00

30+00.00
EL. 3,151.50

+0.408%

-0.304%

600' VC

600' VC

-0.304%

-0.212%

3190
3180
3170
3160
3150
3140
3130
3120
3110

10+00
20+00
30+00

MARY OPTION 2 - PRIMARY

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M2\4199rdplpz01_M2-2nd.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY			YELLOWSTONE COUNTY		UPN 4199	SHEET M2-12
		12:02:07 PM ngutierrez	CHECKED BY						

DOWL HKM

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

PI 39+88.79

40

50

60

T. 1 N. R. 26. E.

N 1° 51' 34" W

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

DOVER RD

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

MARY ST OPTION 2 - SECONDARY

DOVER RD

3180
3170
3160
3150
3140
3130
3120
3110
3100

600' VC
-0.272%
+0.353%
46+50.00
EL. 3,148.00

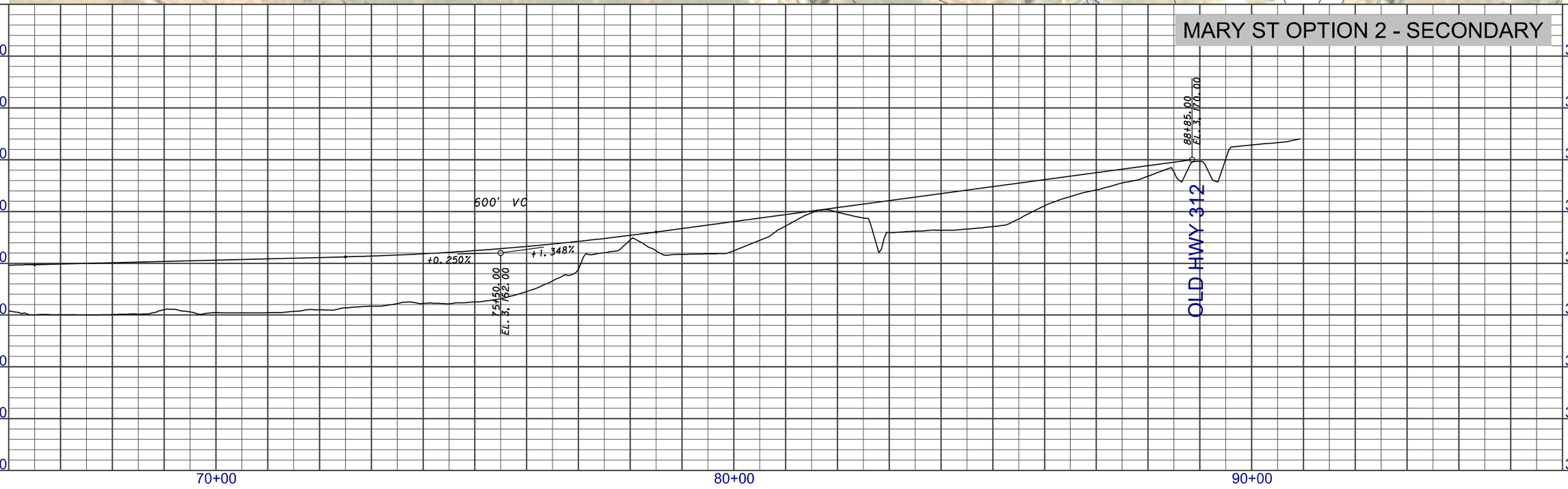
600' VC
+0.353%
-0.235%
55+00.00
EL. 3,151.00

600' VC
-0.235%
+0.250%
63+50.00
EL. 3,149.00

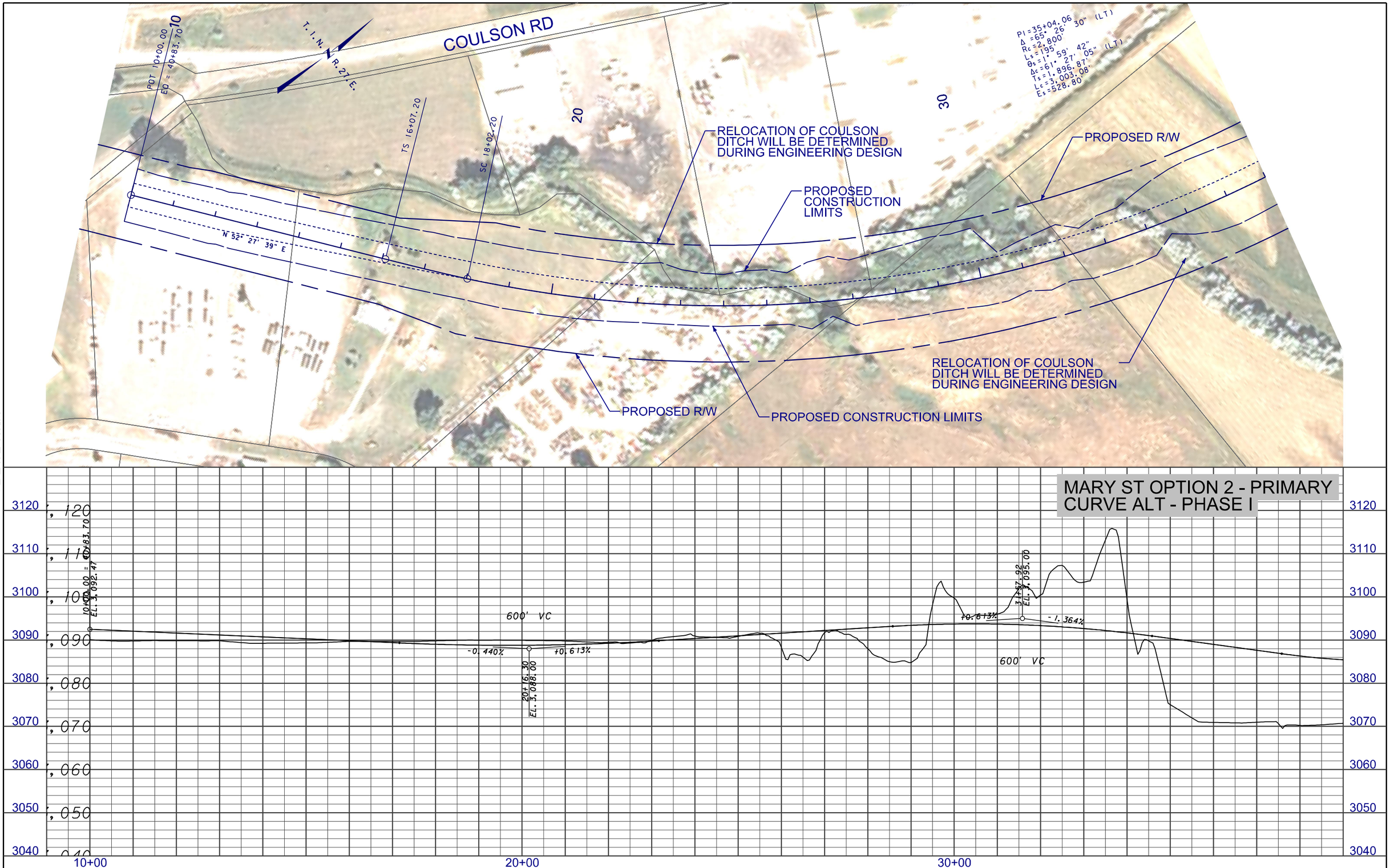
40+00
50+00
60+00

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M2\4199rdplpz01_M2-2nd.dg 8/19/2013 12:02:25 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-13

MARY ST OPTION 2 - SECONDARY

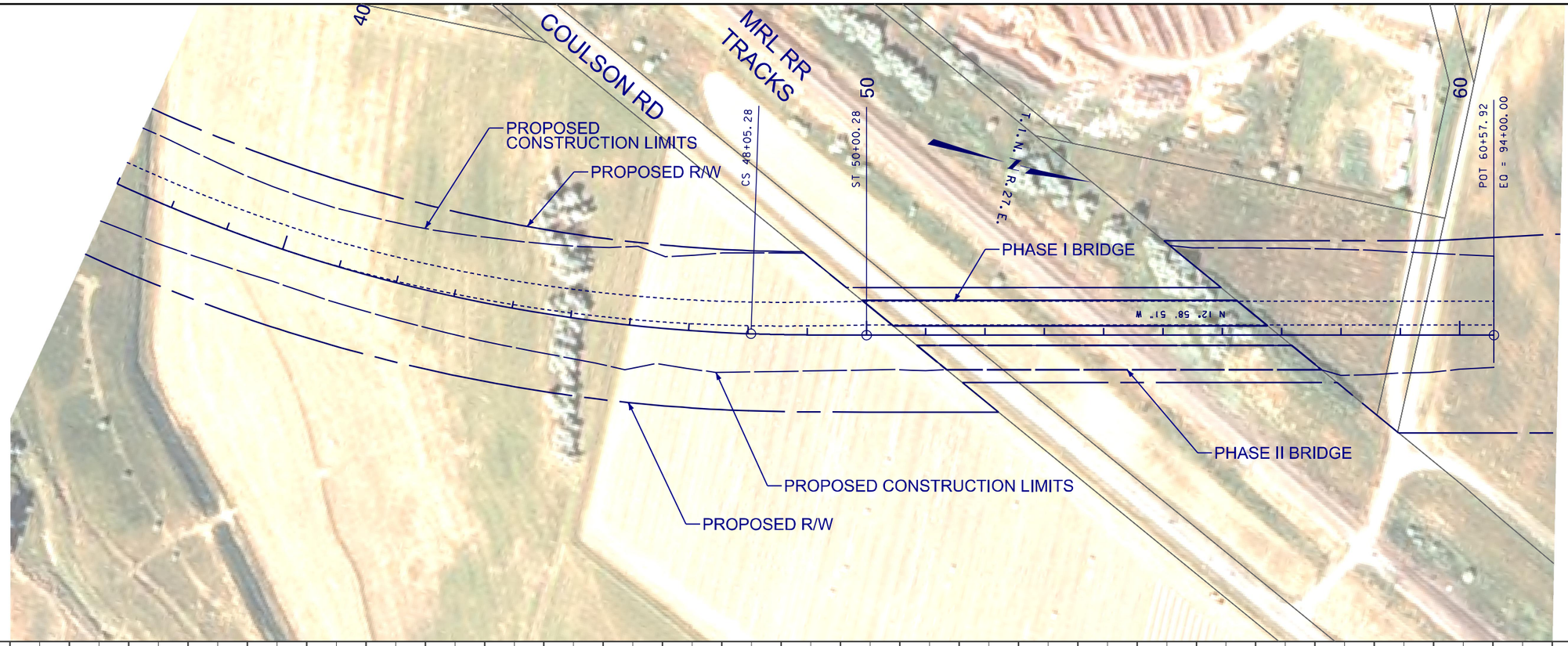


2 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\M2\4199rdplpz01_M2-2nd.dg 8/19/2013 12:02:43 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-14



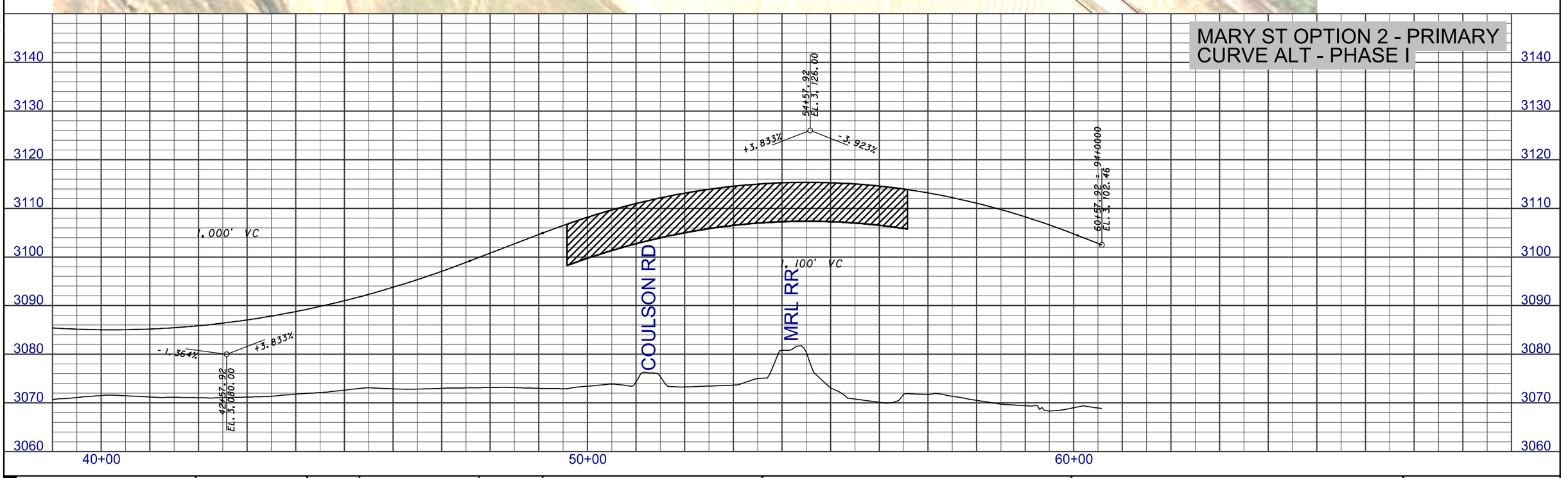
DOWL HKM

3 / 1 MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz05_M2.dgn 8/23/2013 4:26:30 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-15

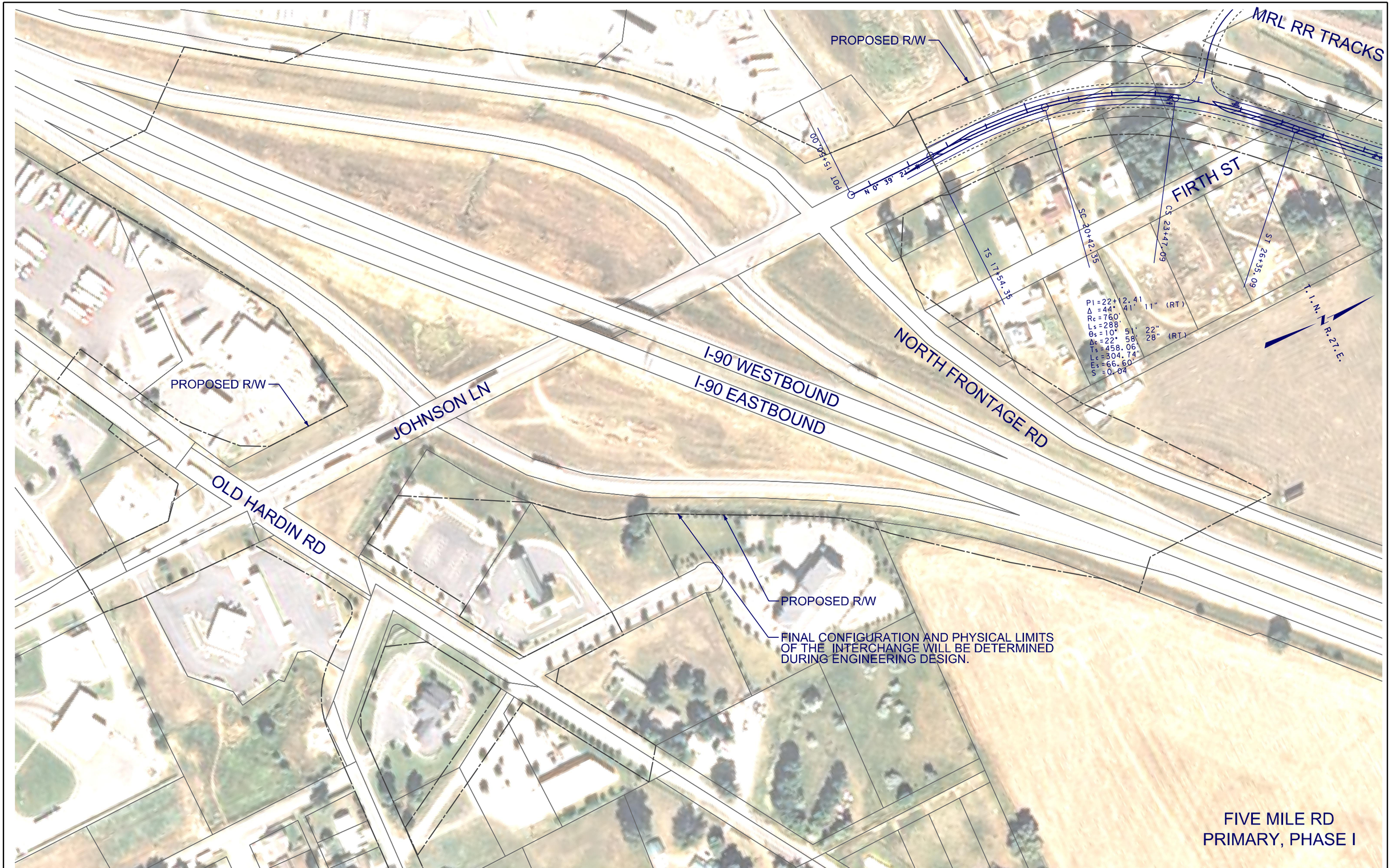


DOWL HKM

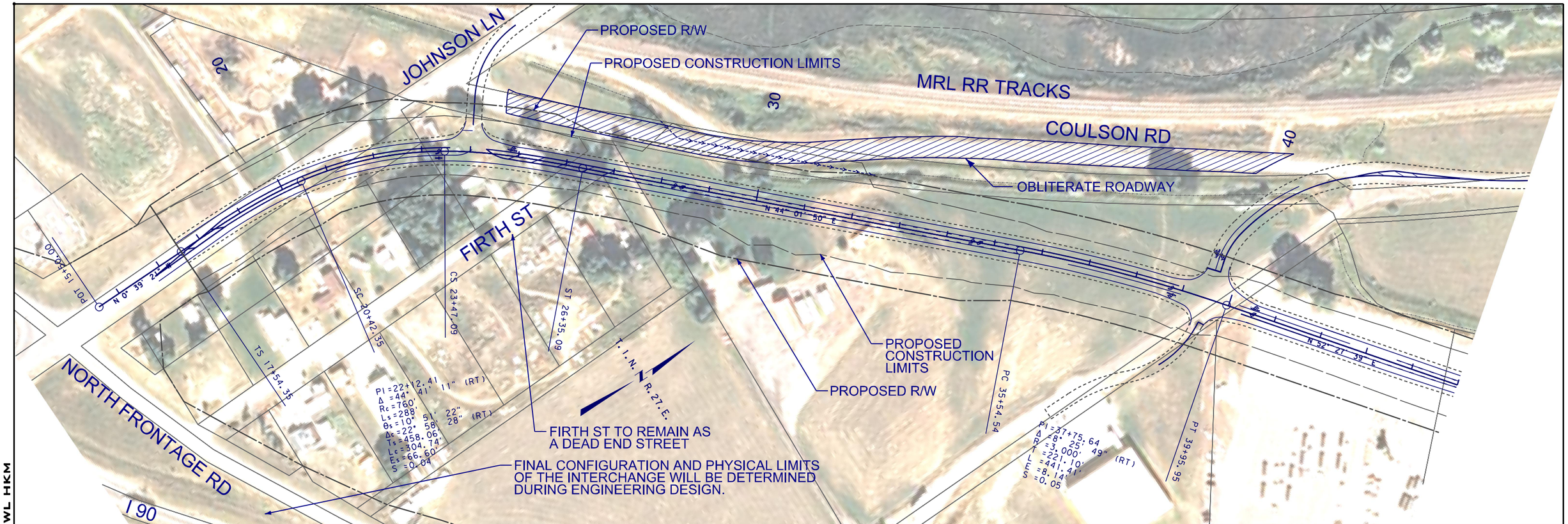
MARY ST OPTION 2 - PRIMARY
CURVE ALT - PHASE I

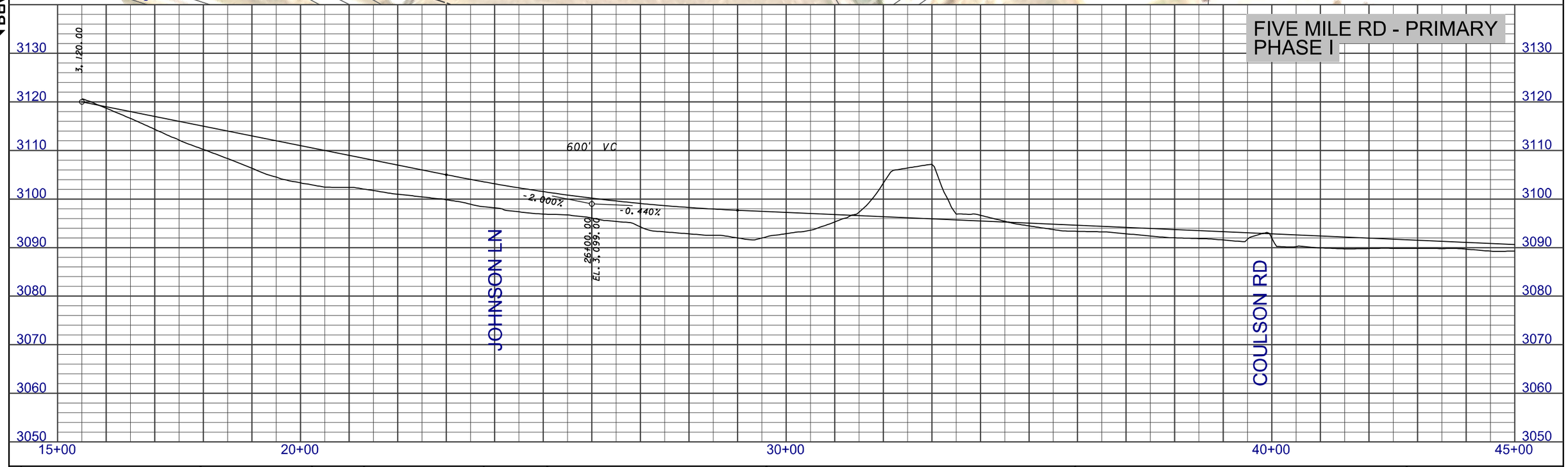


2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz05_M2.dgn 8/23/2013 4:26:48 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-16

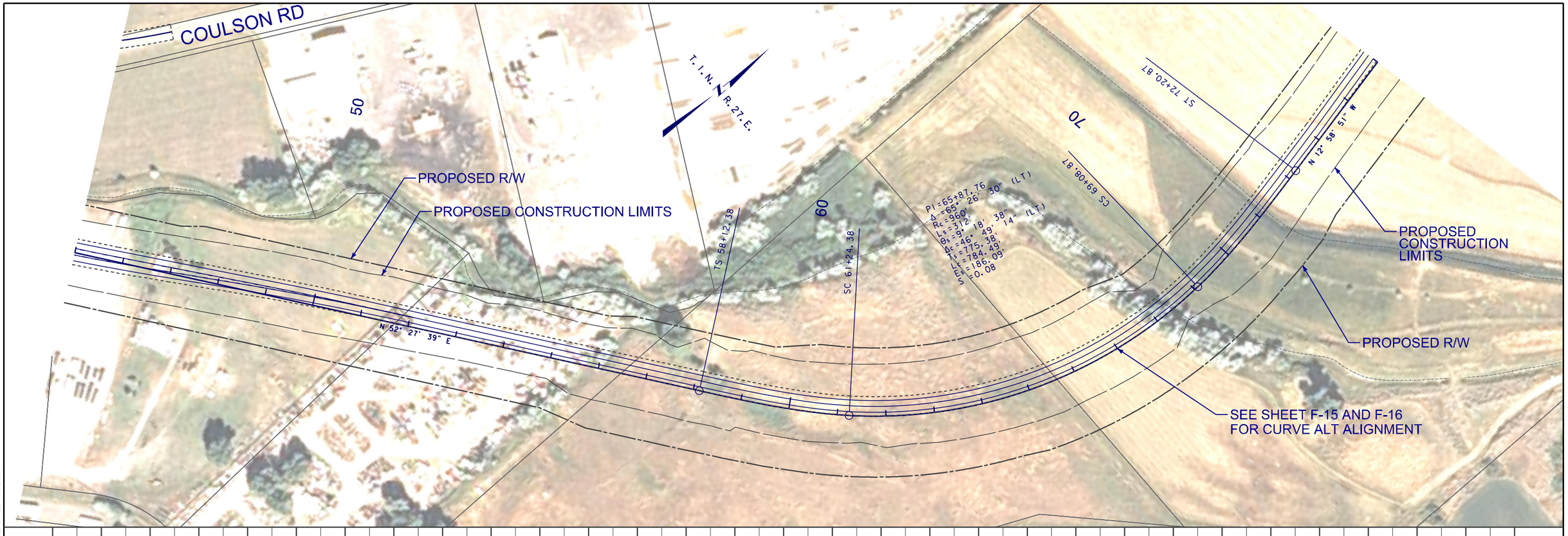


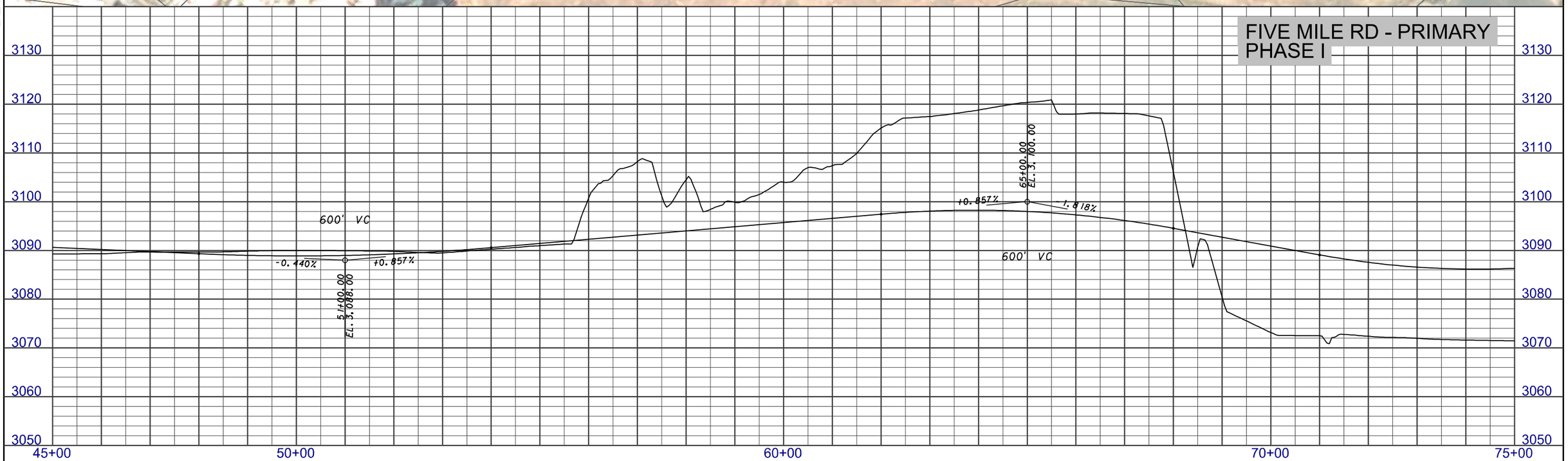
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdpInZ01_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY					UPN 4199
		12:25:23 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET F-1



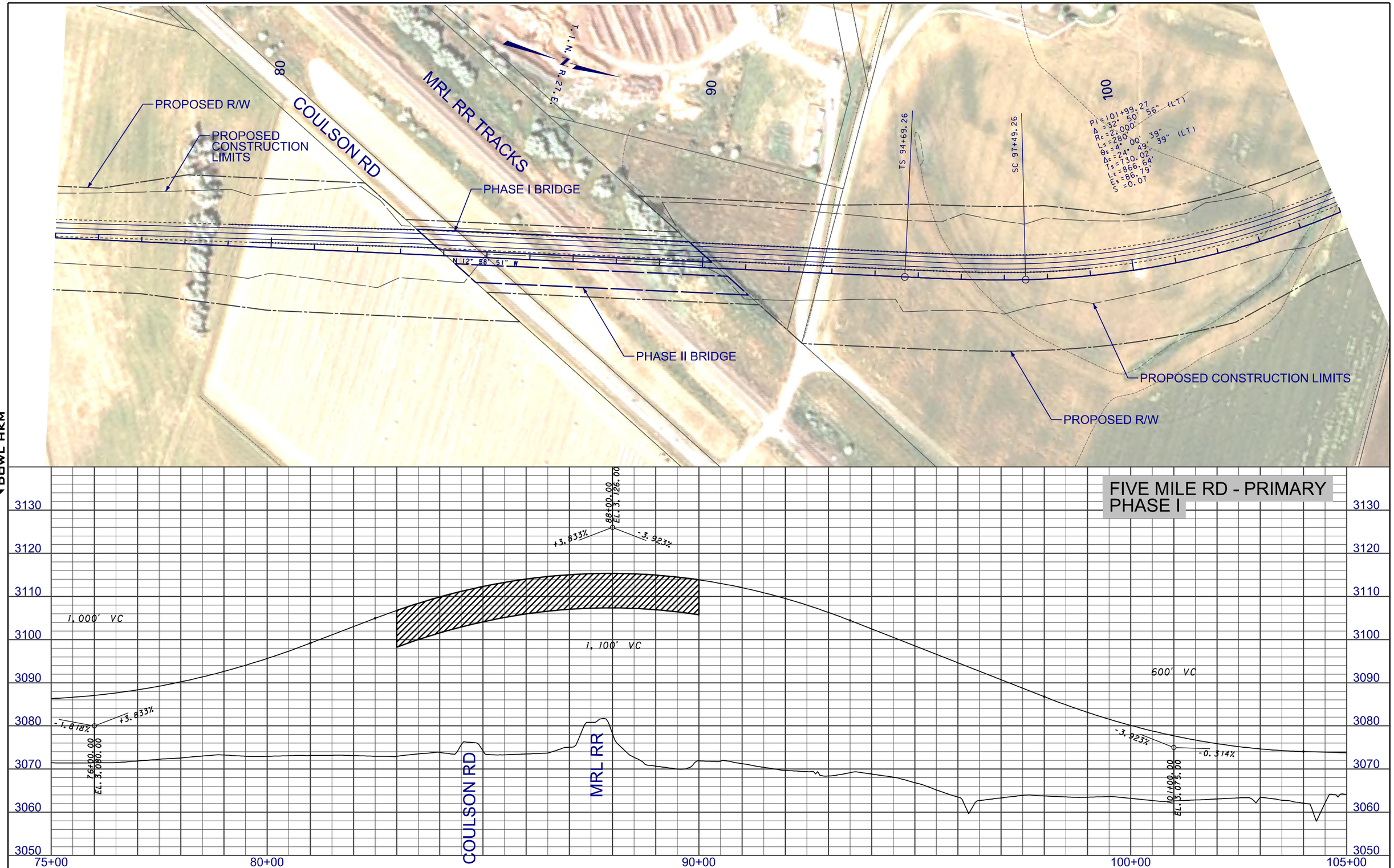


3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz01_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY			SHEET F-2
		12:27:54 PM ngutierrez	CHECKED BY					





3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz01_F.dgn 8/19/2013 12:28:12 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-3



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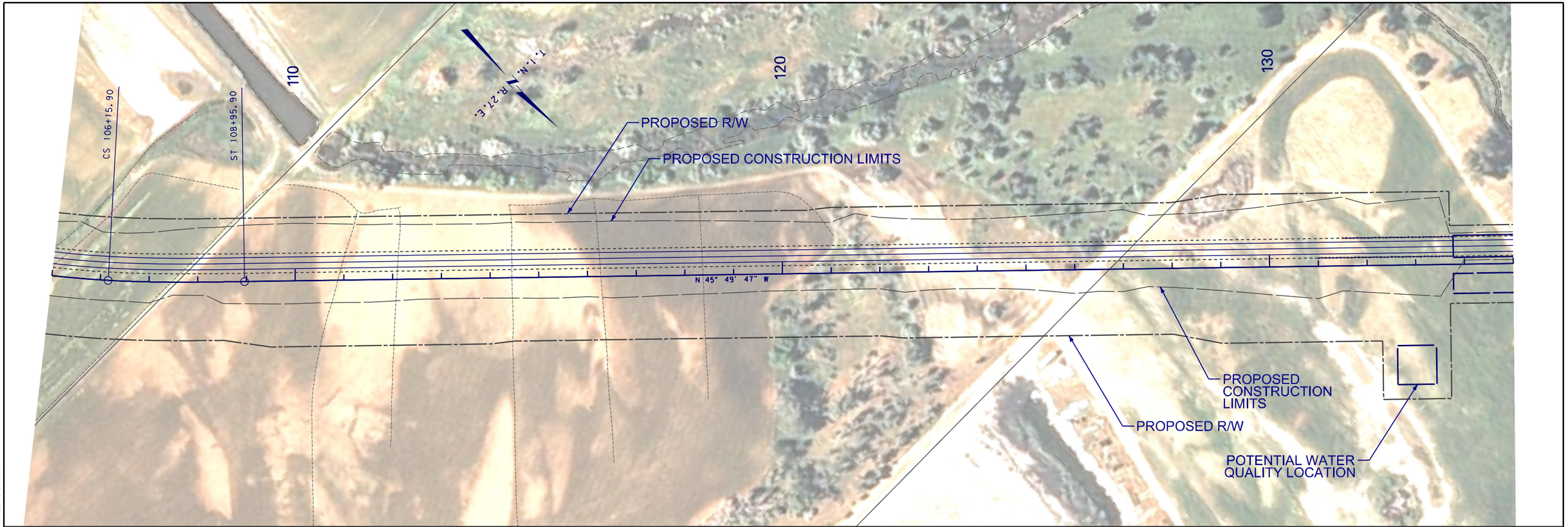
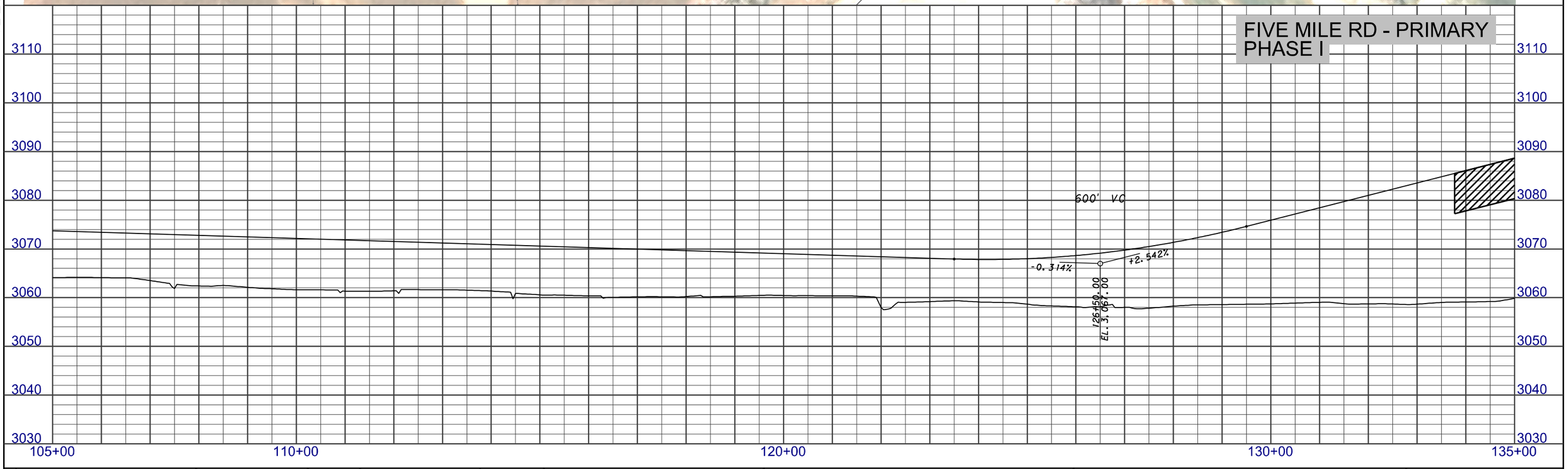
1		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY	PRELIMINARY	UPN 4199 SHEET F-4
		12:28:31 PM ngutierrez	CHECKED BY				

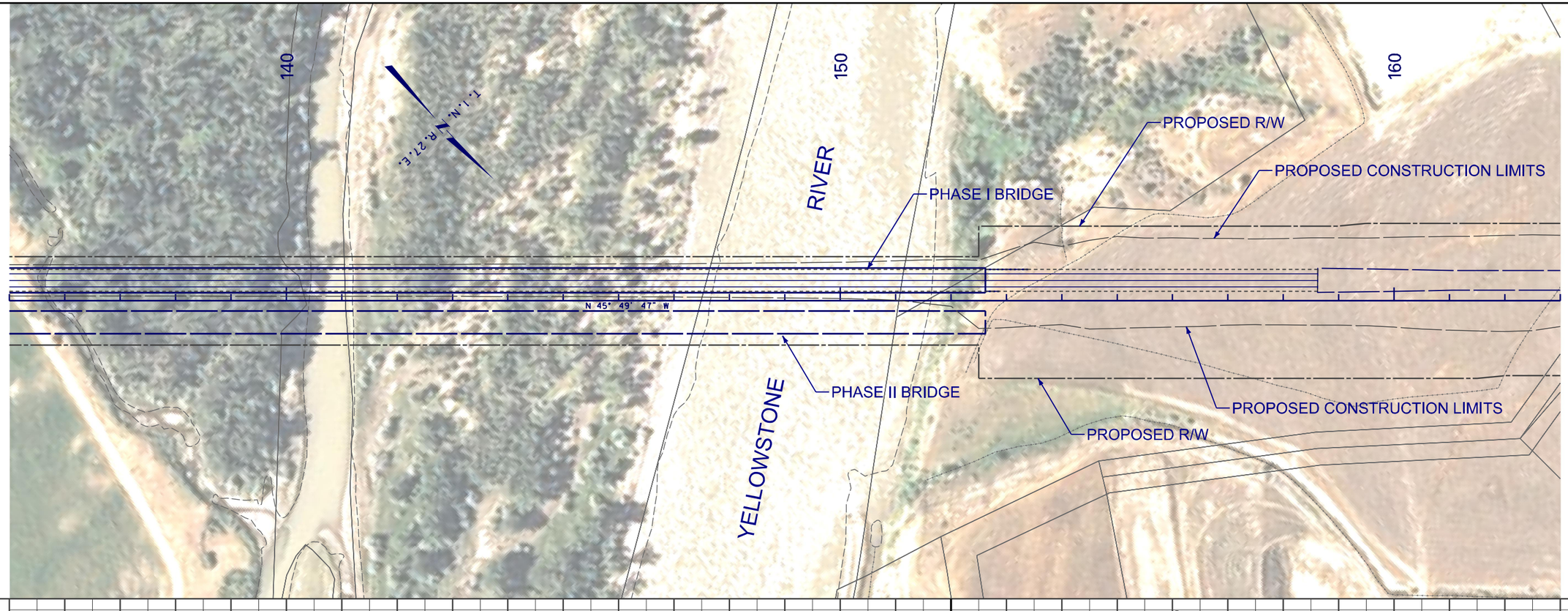


DOWL HKM

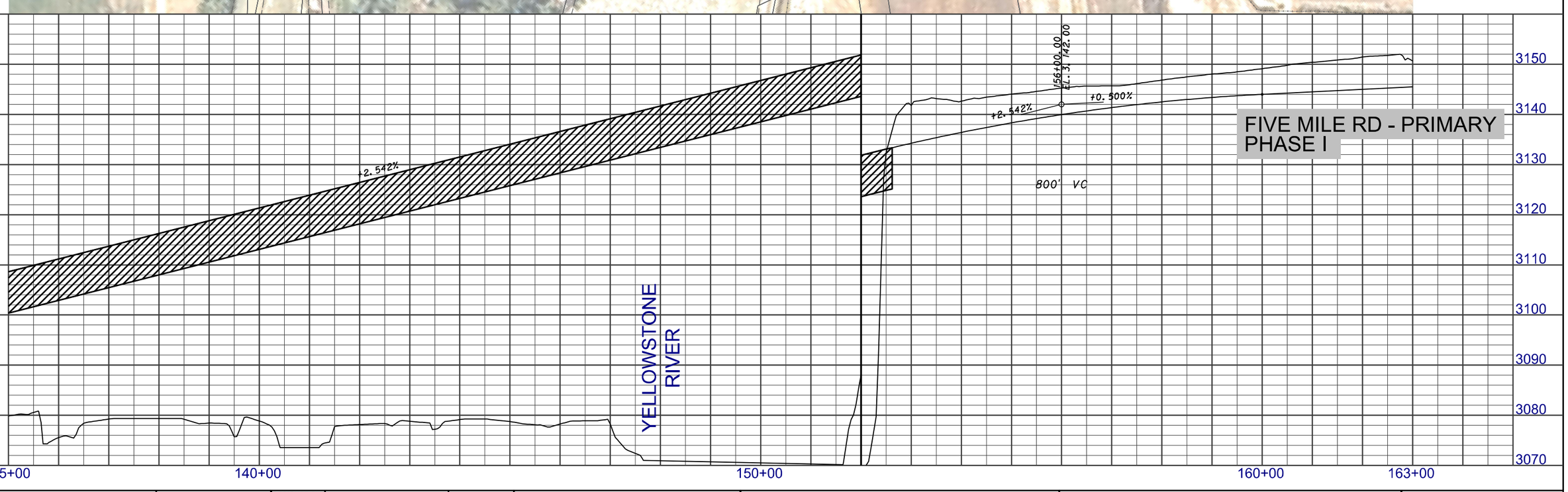
FIVE MILE RD - PRIMARY
PHASE I



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz02_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		12:31:00 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET F-5

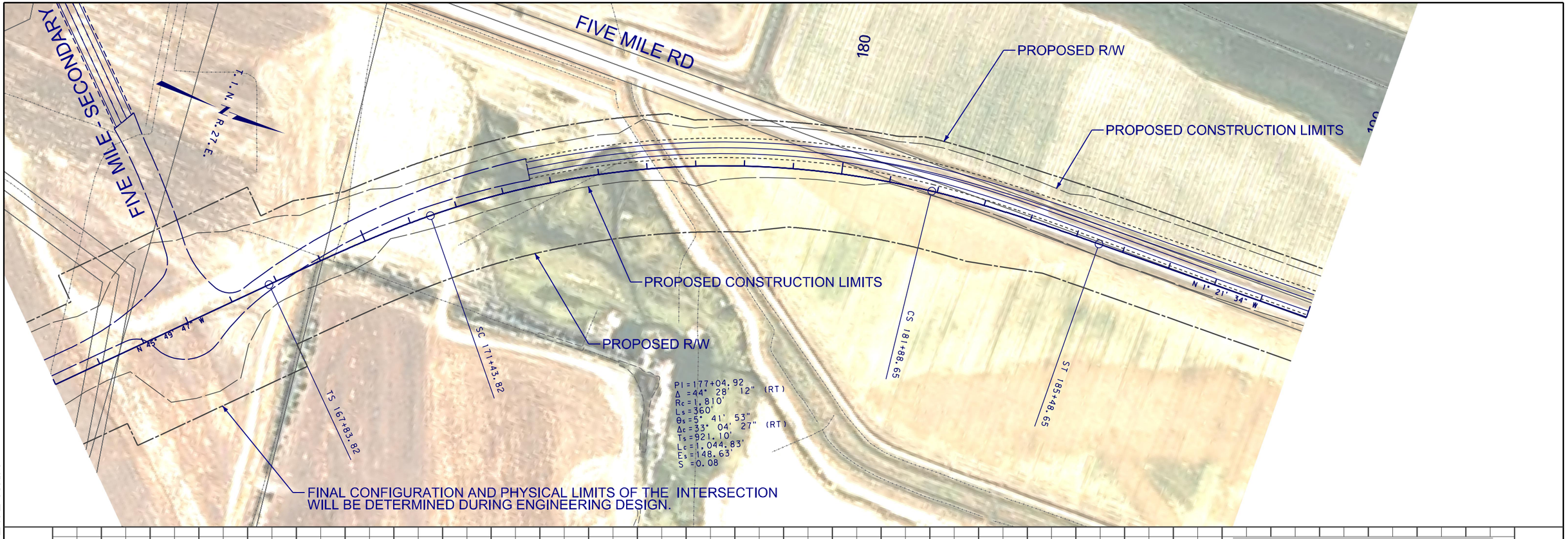


DOWL HKM



FIVE MILE RD - PRIMARY
PHASE I

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz02_F.dgn 8/19/2013 12:31:18 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-6



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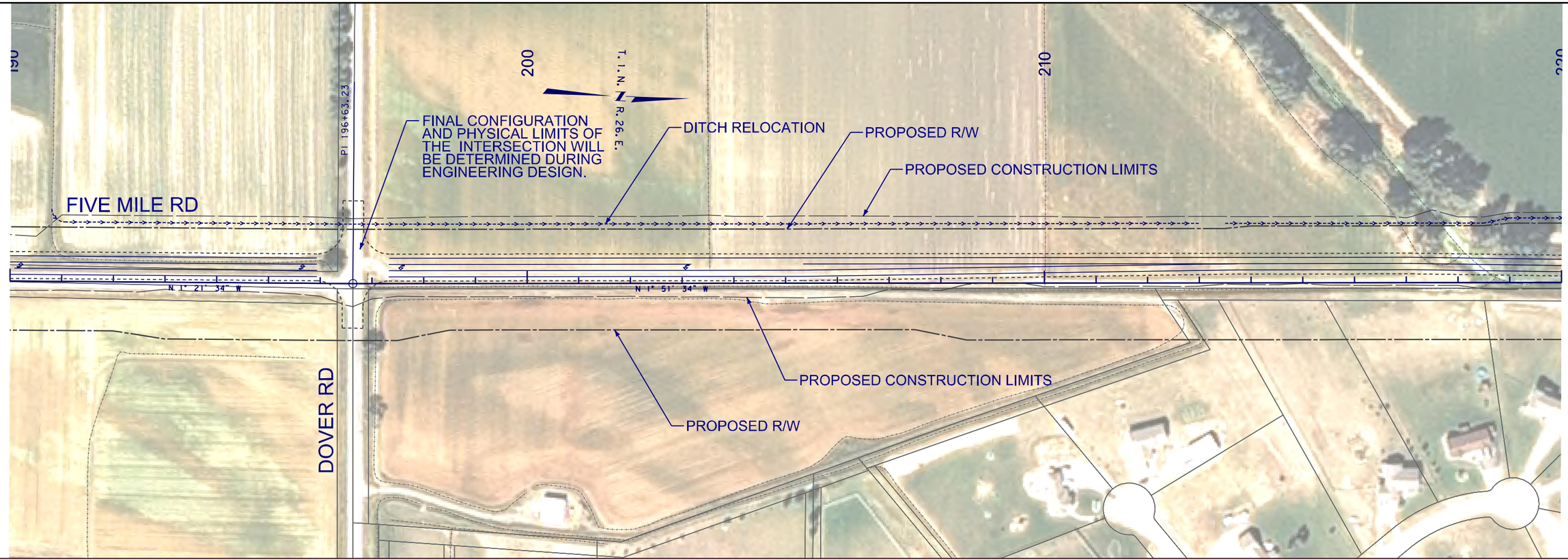
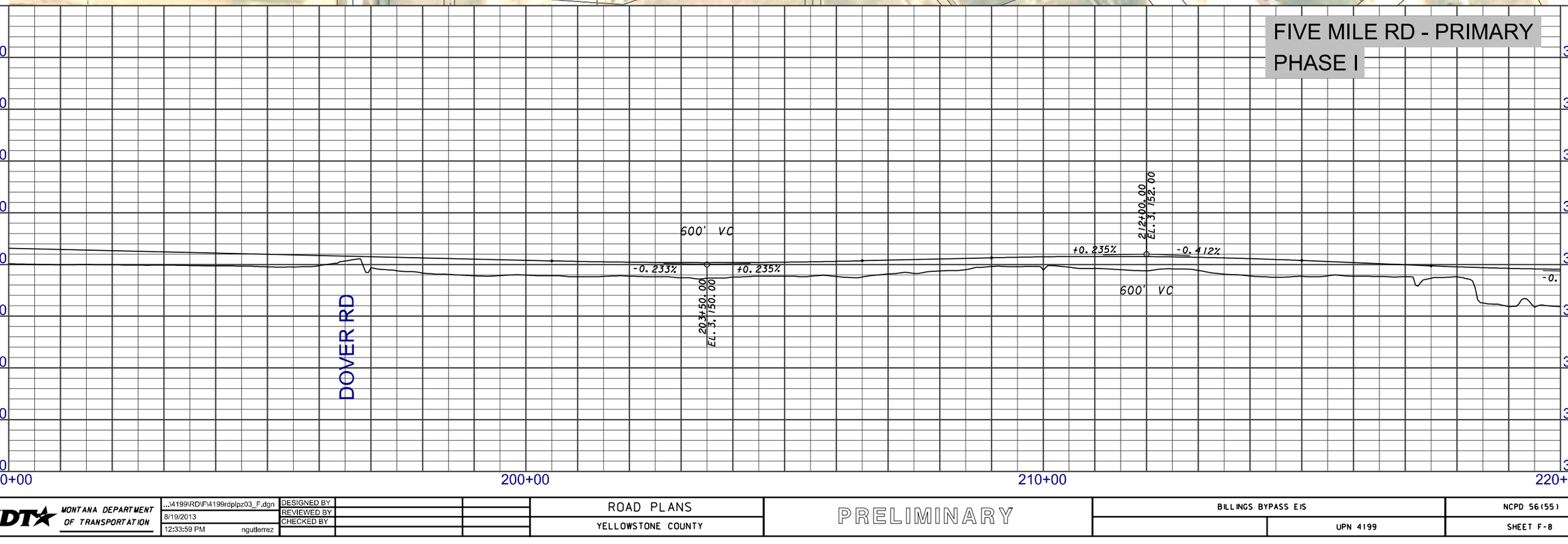
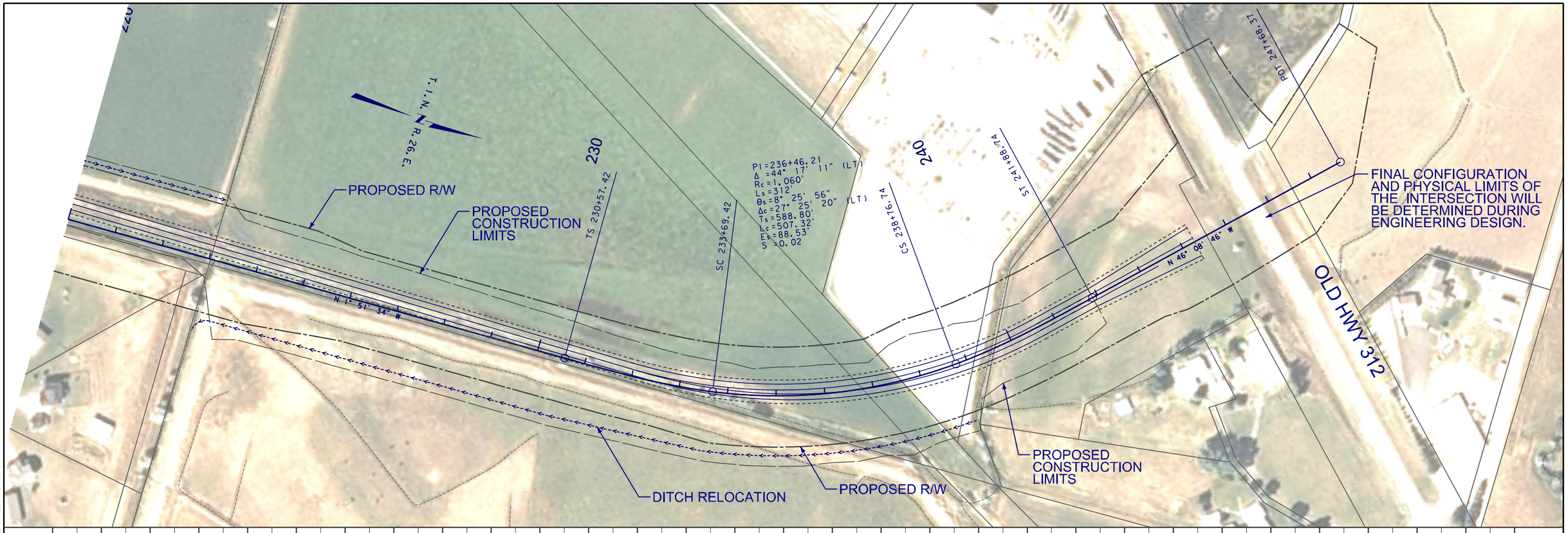
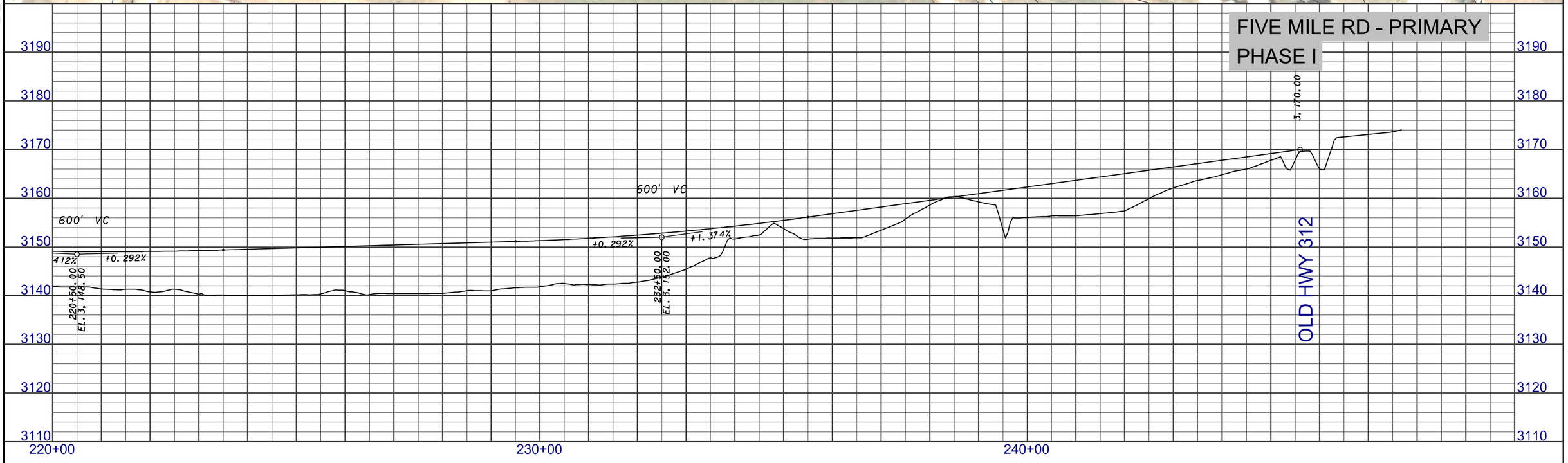




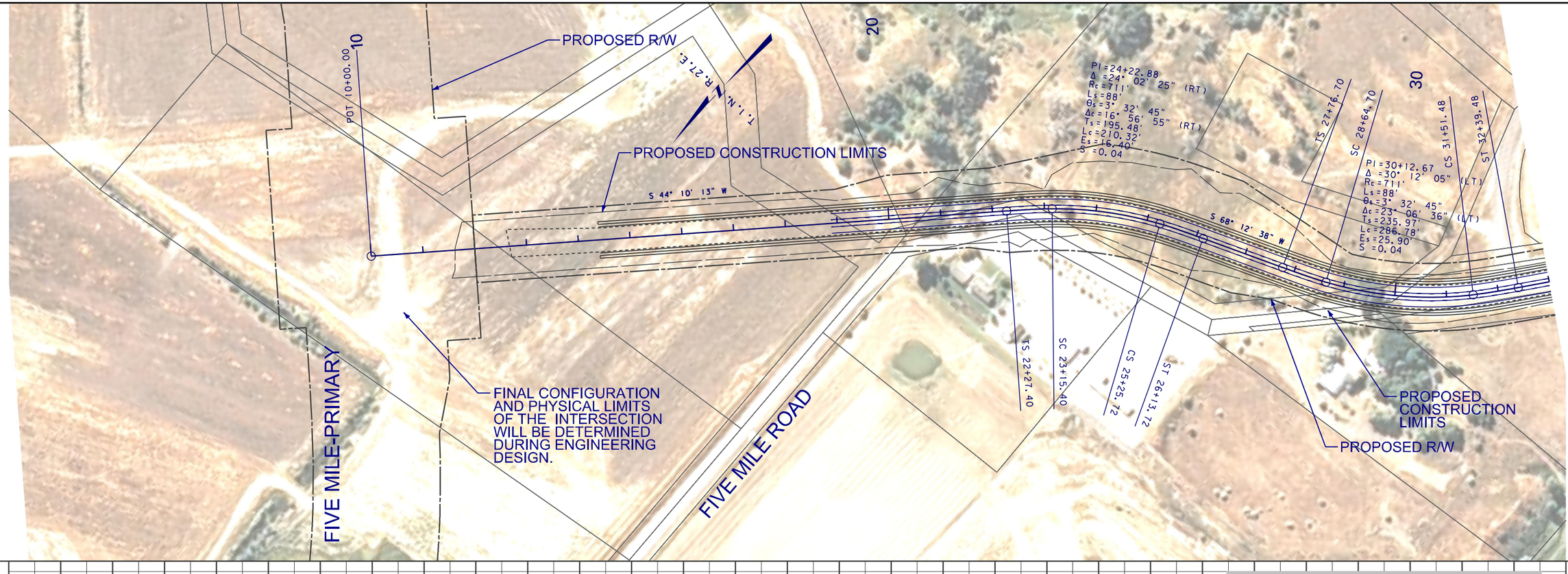
DOWL HKM

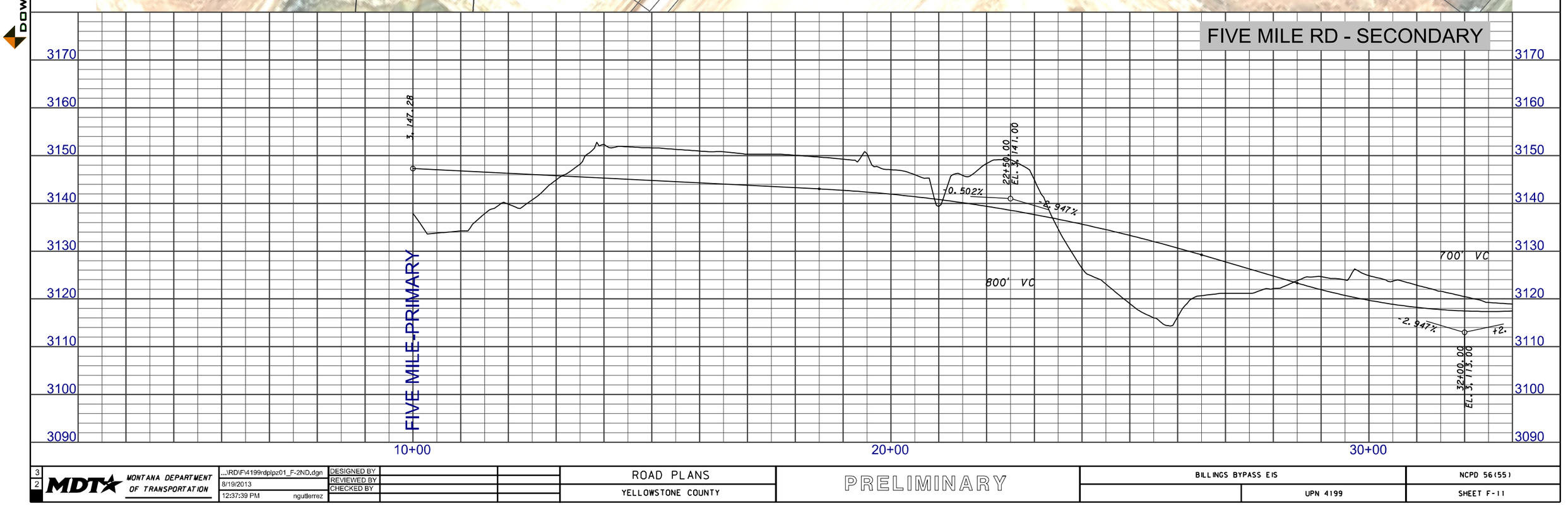
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz03_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		12:33:59 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET F-8





3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz03_F.dgn 8/19/2013 12:34:18 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-9





DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\F\4199rdplpz01_F-2ND.dgn	DESIGNED BY		ROAD PLANS	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY	UPN 4199	SHEET F-11
		12:37:39 PM ngutierrez	CHECKED BY		PRELIMINARY		

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

MARY STREET

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

FLAMING CREEK CIR

FIVE MILE CREEK

PI = 46+79.61
Δ = 50° 24' 28" (RT)
R = 1,200'
T = 564.78'
L = 1,055.74'
E = 126.26'

PC 41+14.83

PT 51+70.57

S 38° 00' 33" W

T. 1 N. R. 27 E.

40

60

FIVE MILE RD - SECONDARY

55+00.00
EL. 3,163.00

+2.74%

-0.500%

1,500' VC

-2.74%

3170
3160
3150
3140
3130
3120
3110
3100
3090

40+00

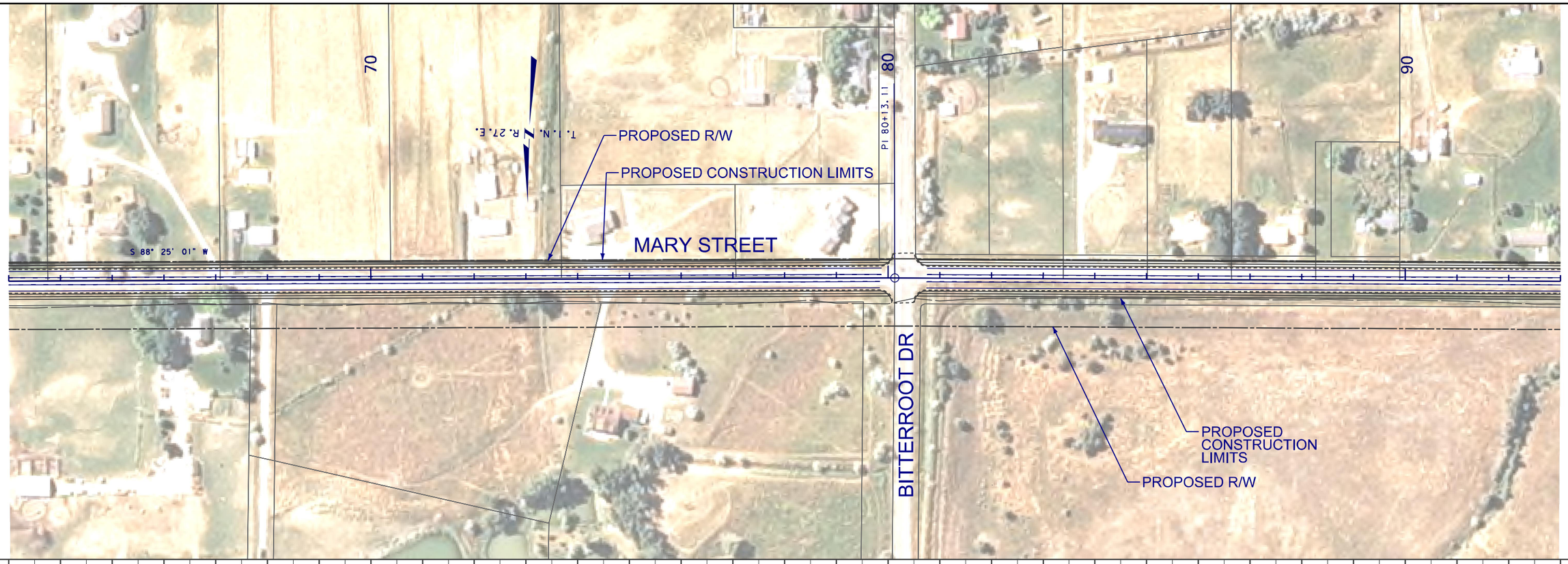
50+00

60+00

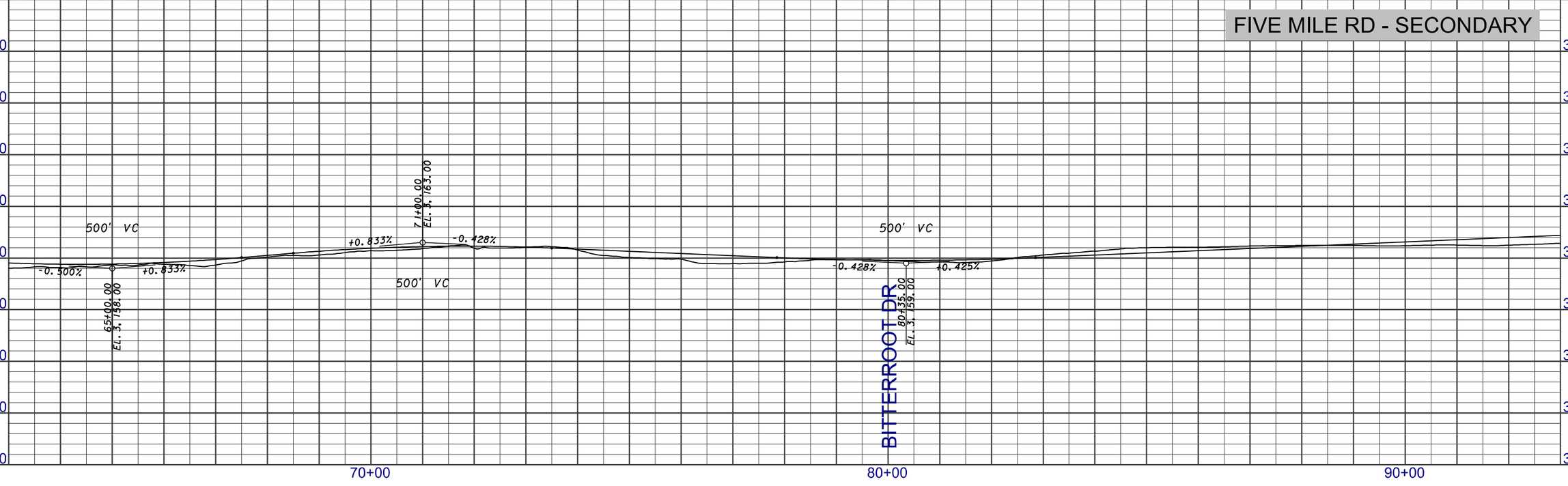
DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\F\4199rdplpz01_F-2ND.dgn 8/19/2013 12:37:57 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-12

DOWL HKM



FIVE MILE RD - SECONDARY



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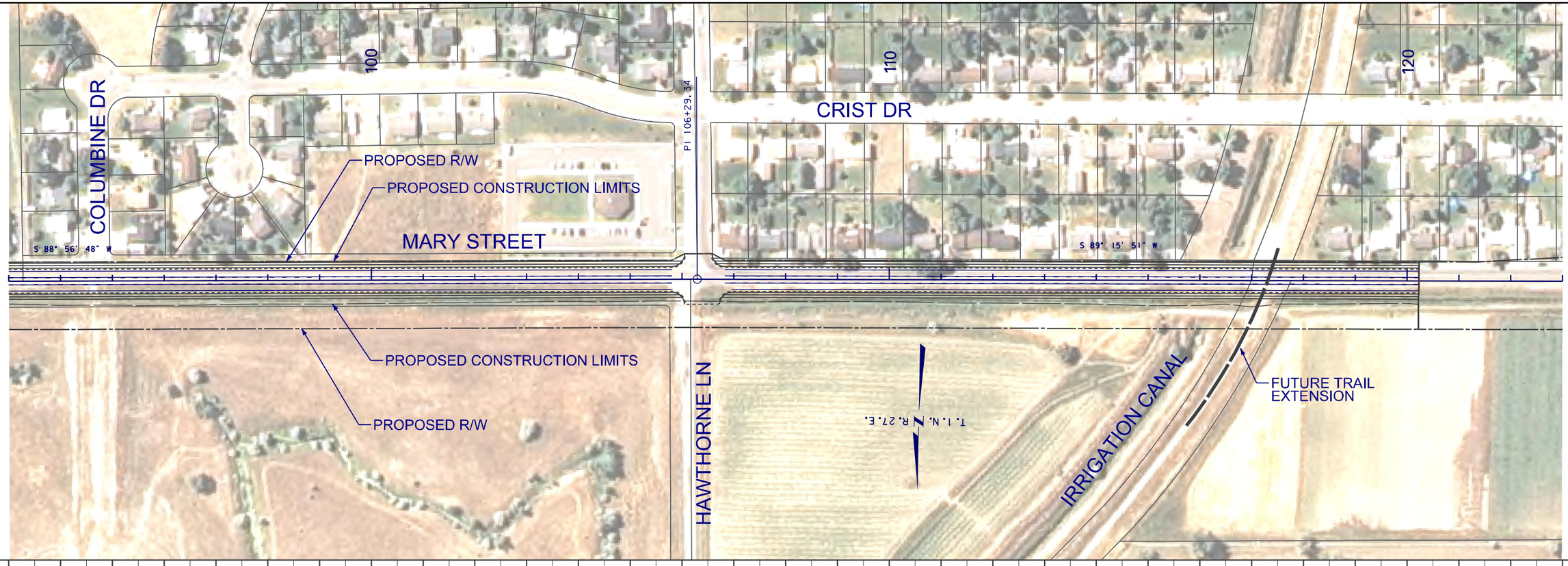
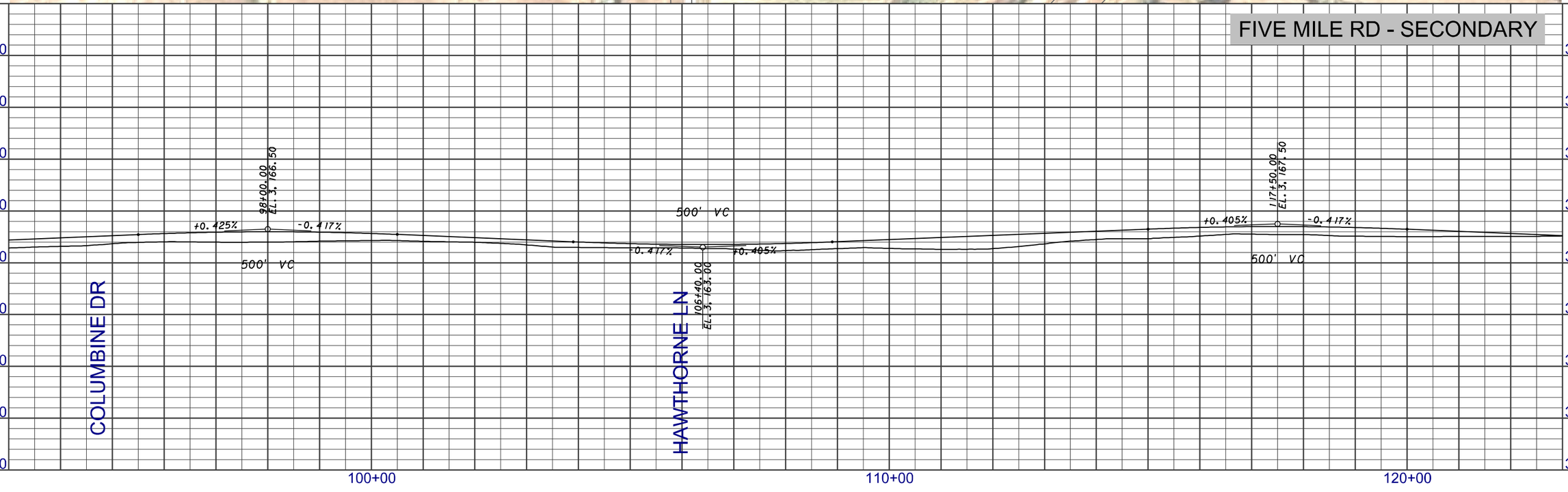
1		8/19/2013	REVIEWED BY				
		12:38:15 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY	PRELIMINARY UPN 4199	SHEET F-13

DOWL HKM





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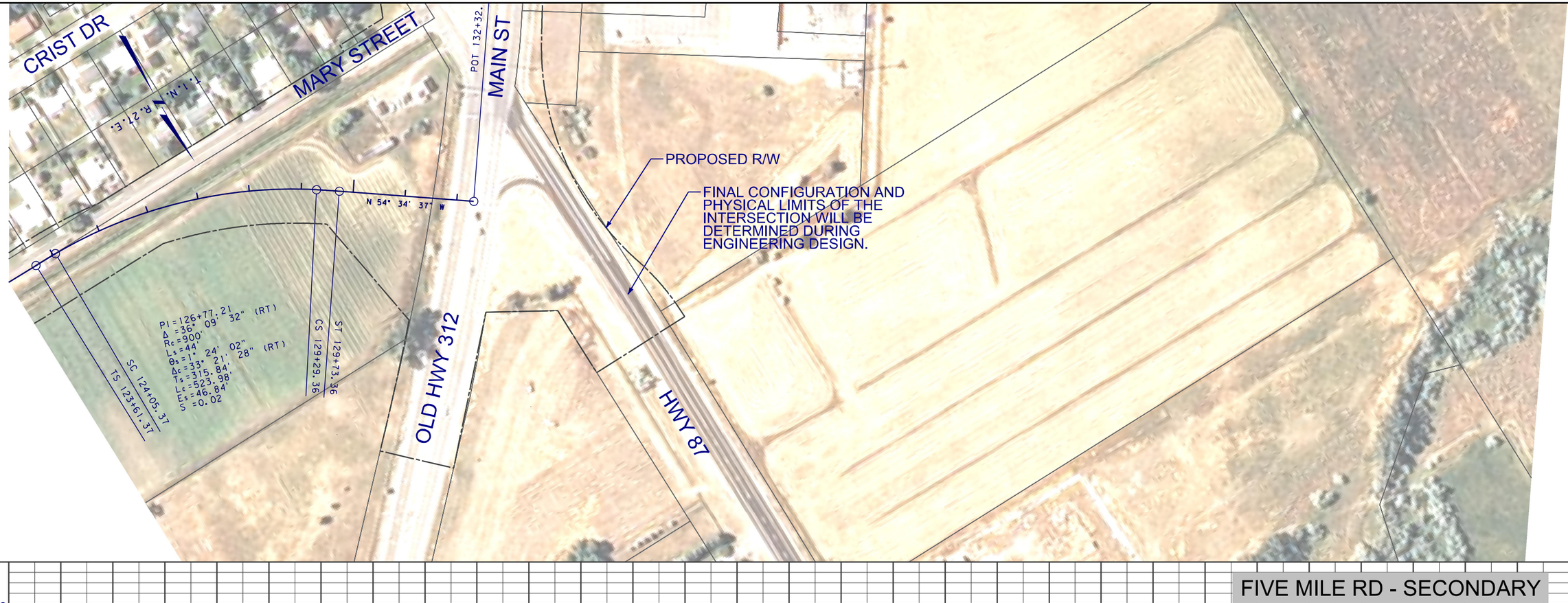
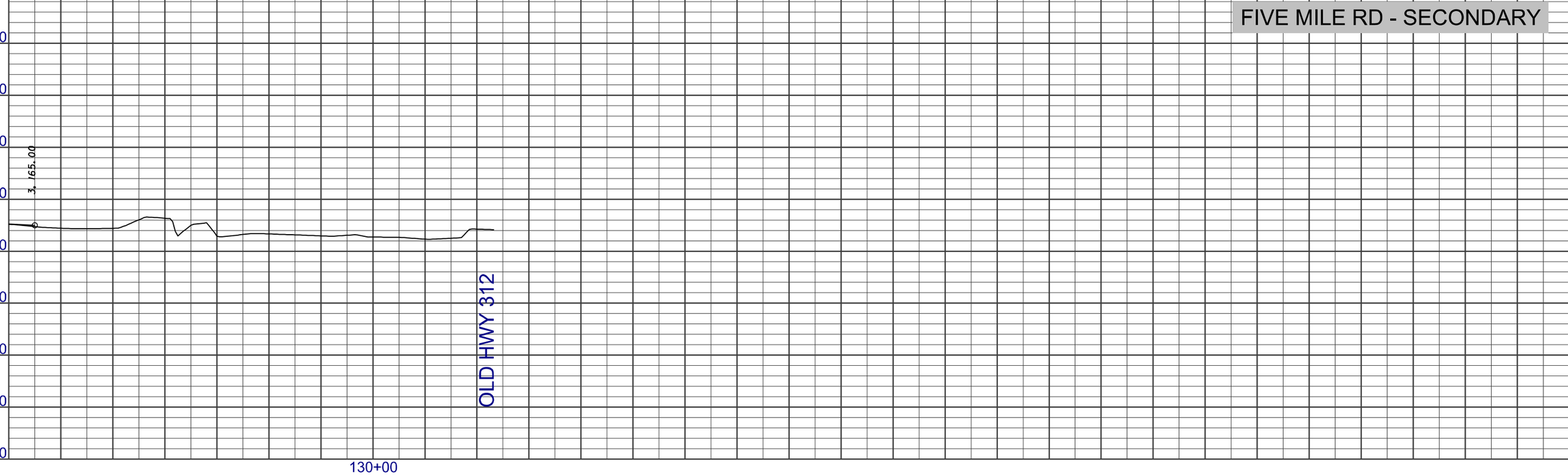
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET F-14
		5:02:44 PM ngutierrez	CHECKED BY				





DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\RD\F\4199rdplpz02_F-2ND.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET F-15
		5:03:02 PM ngutierrez	CHECKED BY				

COULSON RD

T. 1 N. R. 27 E.

PDT 10+00.00
ED = 40+83.70

TS 16+07.20

SC 18+02.20

N 52° 27' 39" E

PI = 35+04.06
Δ = 65° 26' 30" (LT)
Rc = 2,800'
Ls = 795'
θs = 16° 59' 42"
Δc = 61° 27' 05" (LT)
Ts = 1,896.87'
Lc = 3,003.08'
Es = 528.80'

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

10

20

30

DOWL HKM

FIVE MILE RD - PRIMARY
CURVE ALT - PHASE I

10+00.00 = 40+83.70
EL. 3,092.47

600' VC

-0.440%

+0.613%

20+16.30
EL. 3,088.00

31+57.92
EL. 3,095.00

+0.613%

-1.364%

600' VC

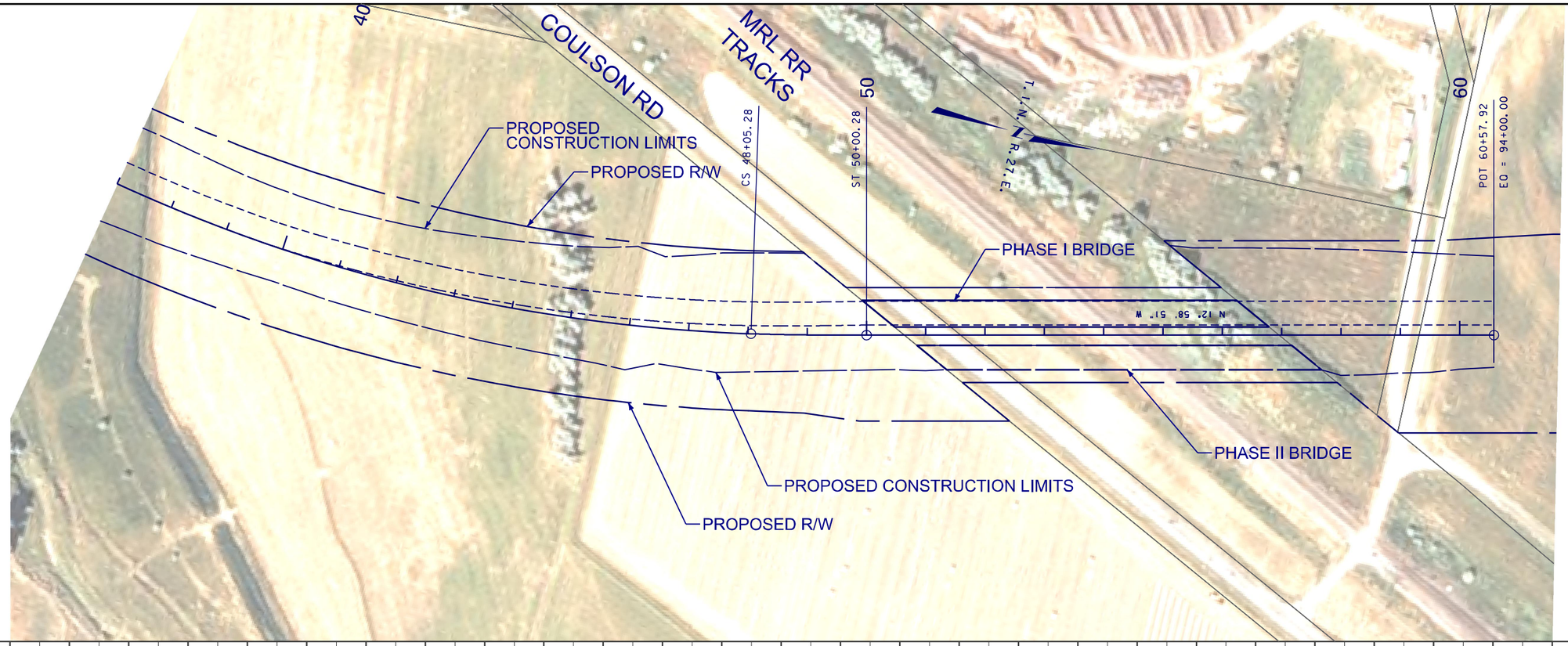
3120
3110
3100
3090
3080
3070
3060
3050
3040

10+00

20+00

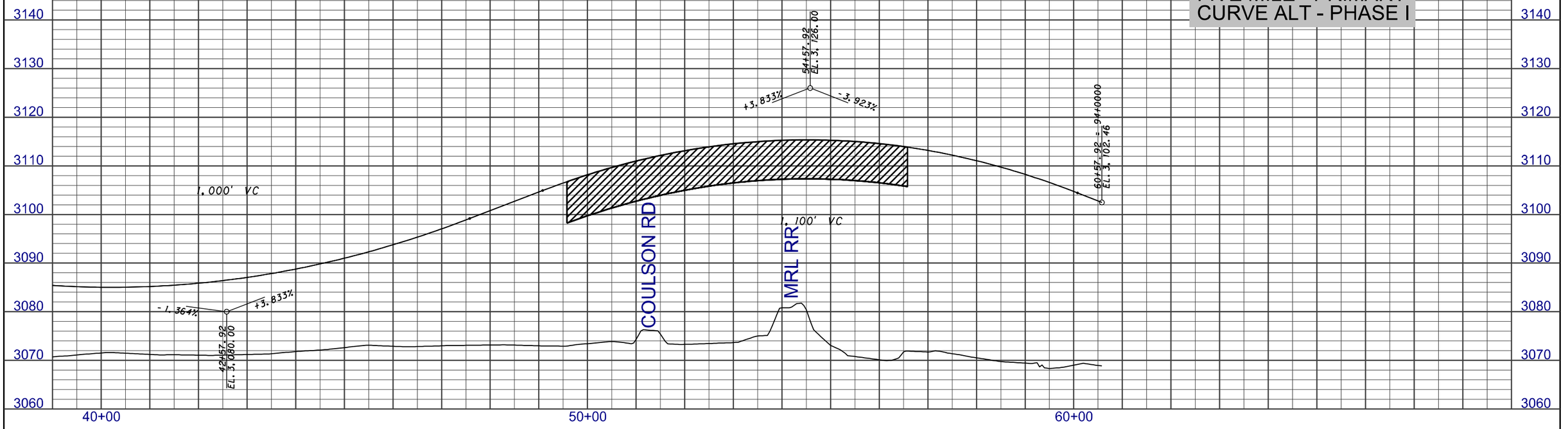
30+00

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz04_F.dgn 8/23/2013 4:57:17 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-16



DOWL HKM

FIVE MILE - PRIMARY
CURVE ALT - PHASE I



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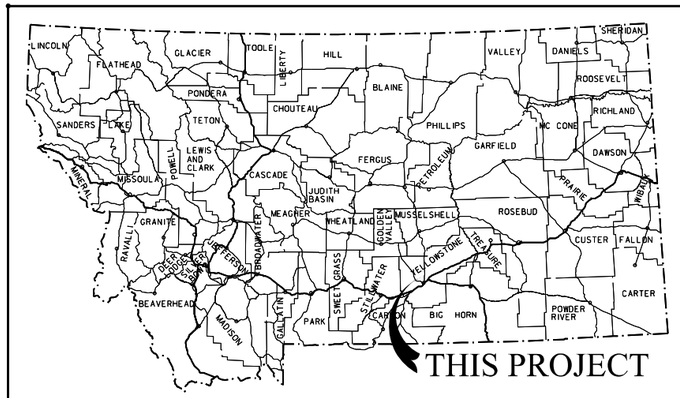


MONTANA DEPARTMENT OF TRANSPORTATION

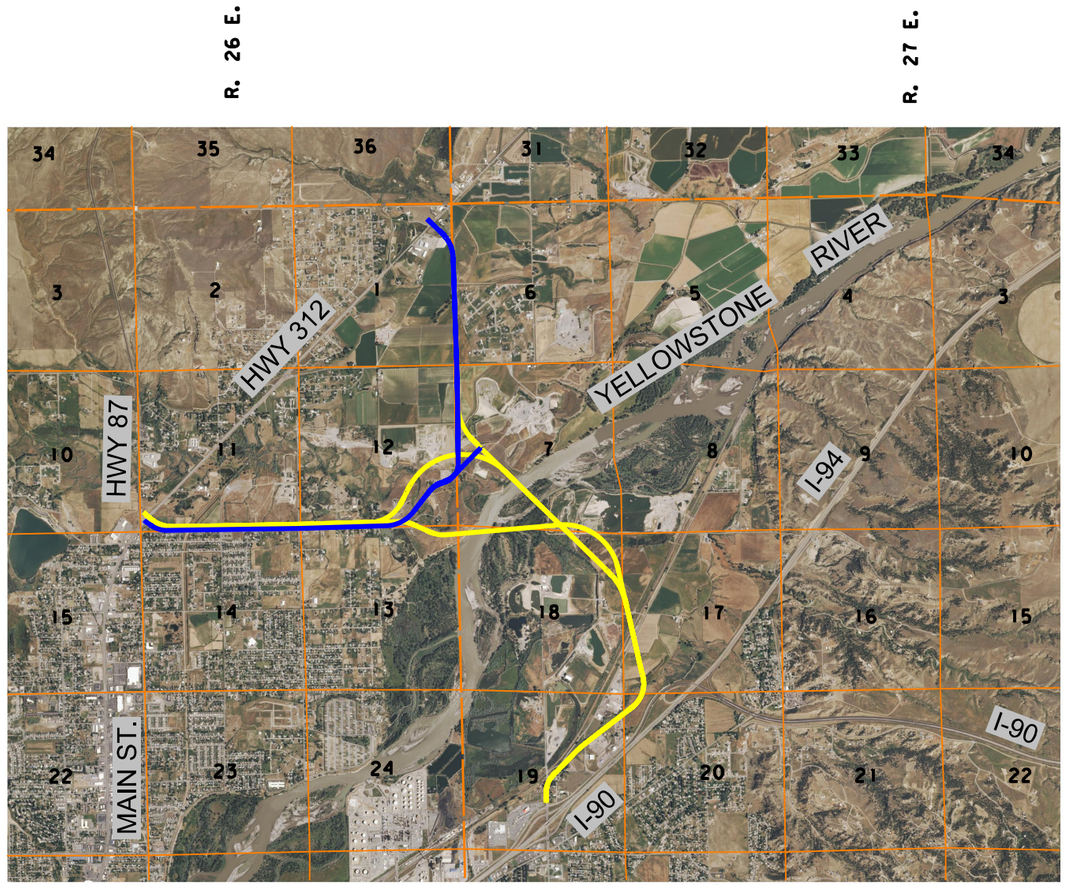
FEDERAL AID PROJECT NCPD 56(55)
BILLINGS BYPASS EIS
PRELIMINARY DESIGN ALTERNATIVES
PHASE II

YELLOWSTONE COUNTY

DESIGN DATA

CSF = N/A

SURFACING SOURCES -
CONTRACTOR FURNISHED



N

DOWL HKM

PLANS PREPARED BY

DOWL HKM
GRANITE TOWER BUILDING
222 N. 32ND ST., SUITE 700
P.O. BOX 31318
BILLINGS, MT 59107-1318
406-656-6399
406-656-6398 (FAX)
DOWLHKM.COM

RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS

R / W & I.C.	
P. E.	

DOWL HKM

BY _____

DATE _____

MONTANA DEPARTMENT OF TRANSPORTATION

RECEIVED :

BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED :

_____ _____
DIVISION ADMINISTRATOR DATE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ02.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY
2		8/23/2013	REVIEWED BY			UPN 4199	
		10:56:22 AM nguterrez	CHECKED BY				

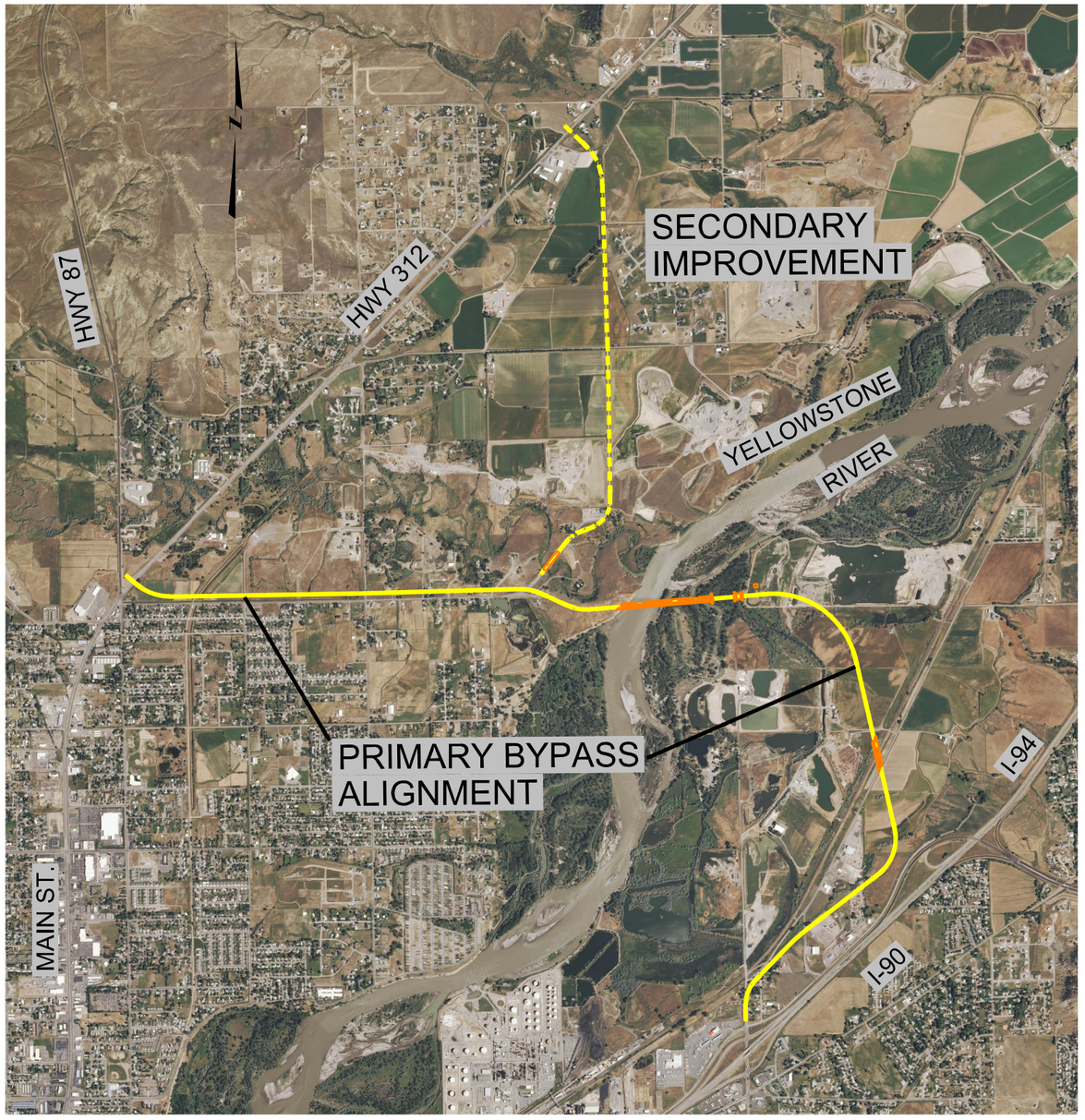
TABLE OF CONTENTS

ROAD PLANS		SHEET NO.
TITLE SHEET		1
TABLE OF CONTENTS		2
MARY ST OPTION 1 KEY MAP		2
MARY ST OPTION 2 KEY MAP		3
FIVE MILE RD KEY MAP		3
TYPICAL SECTIONS		4-6
EARTHWORK SUMMARY		7
PLAN & PROFILE		
	MARY ST OPTION 1	M1-1 - M1-10
	MARY ST OPTION 1, CURVE ALT	M1-11 - M1-12
	MARY ST OPTION 2	M2-1 - M2-11
	MARY ST OPTION 2, CURVE ALT	M2-12 - M2-13
	FIVE MILE RD	F-1 - F-9
	FIVE MILE RD, CURVE ALT	F-10 - F-11

CROSS SECTIONS	SHEET NO.
MARY ST OPTION 1	M1-1 - M1-85
MARY ST OPTION 2	M2-1 - M2-87
FIVE MILE RD	F-1 - F-77

MARY ST OPTION 1
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE

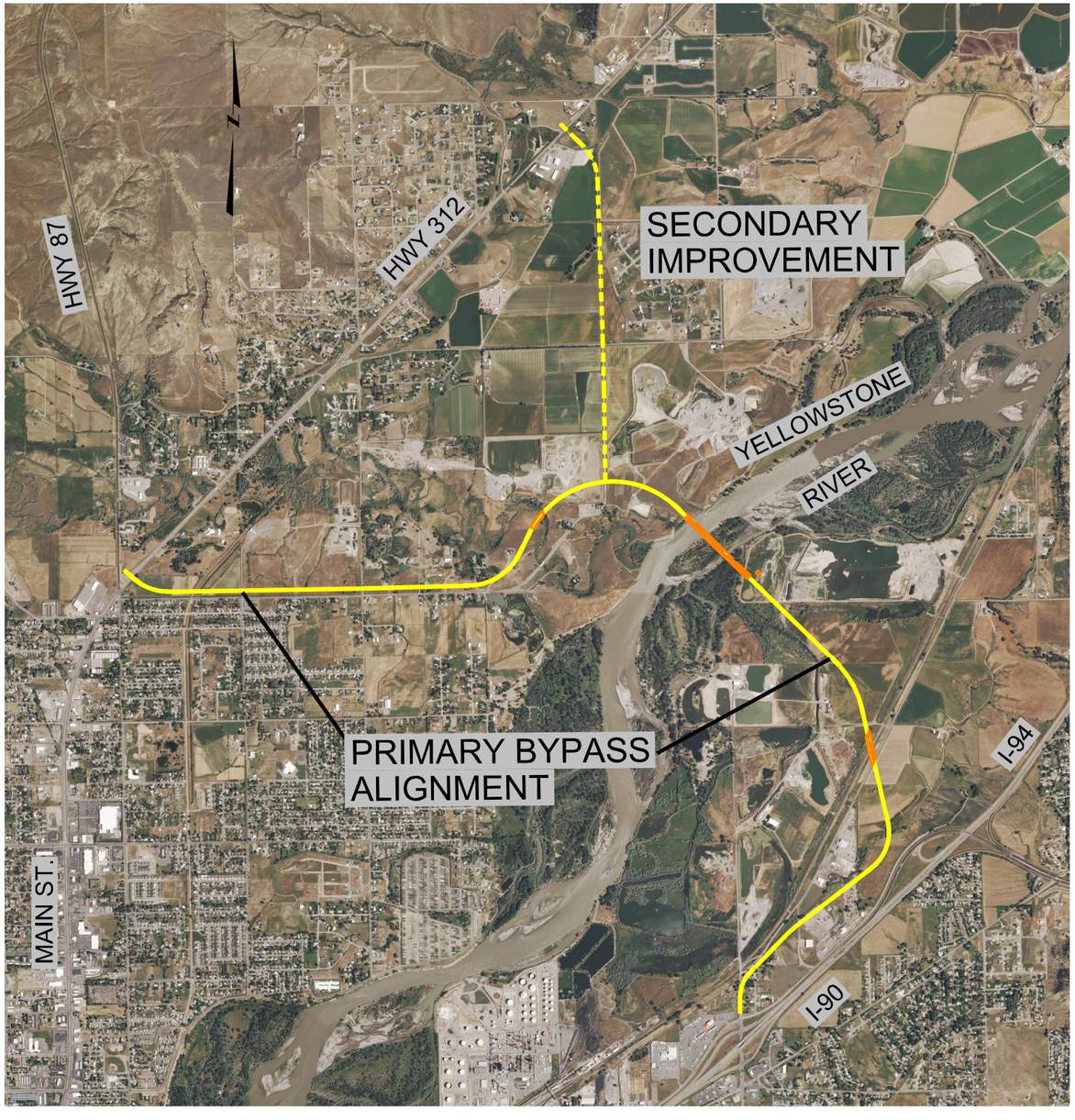


DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ02.dgn 8/23/2013 10:56:40 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET 2

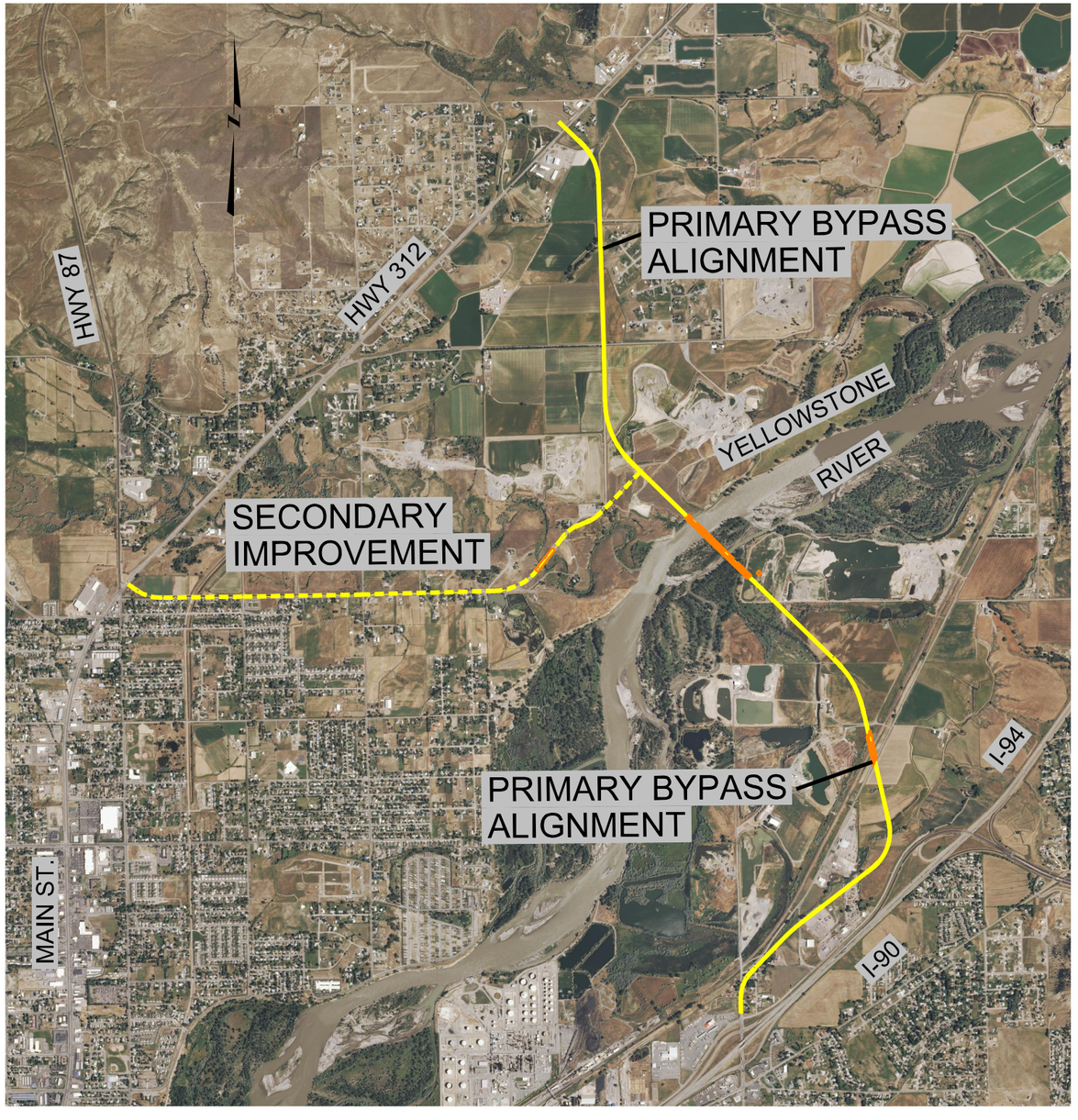
MARY ST OPTION 2
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE



FIVE MILE RD
ALIGNMENT ALTERNATIVE KEY MAP

NOT TO SCALE

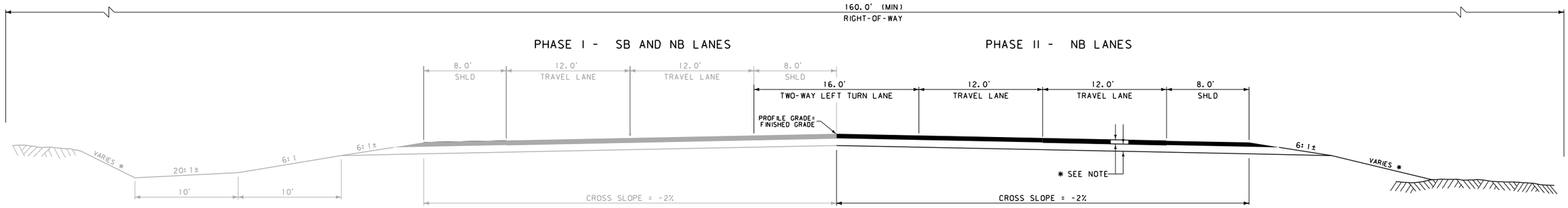


DOWL HKM

2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTTLZ02.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY			YELLOWSTONE COUNTY		UPN 4199 / SHEET 3
		10:56:57 AM ngutierrez	CHECKED BY					

NHS URBAN PRINCIPAL ARTERIAL PRIMARY

DESIGN SPEED: 55 MPH

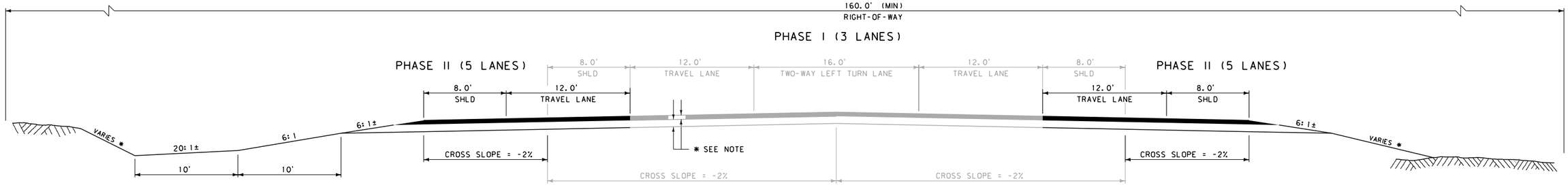


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS URBAN PRINCIPAL ARTERIAL PRIMARY

DESIGN SPEED: 55 MPH

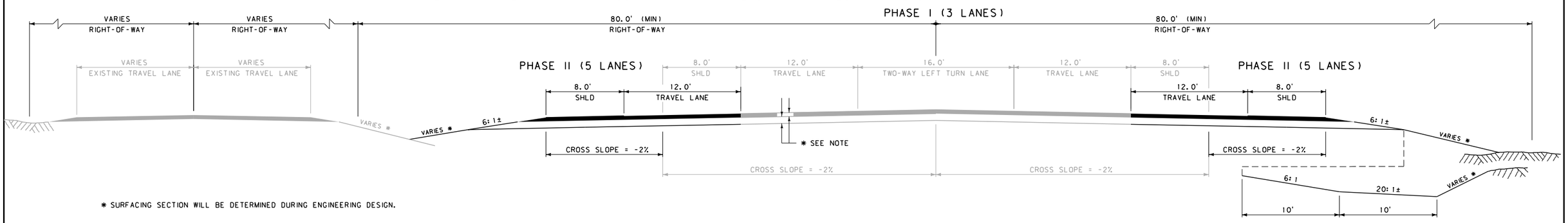


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS URBAN PRINCIPAL ARTERIAL PRIMARY – WITH FRONTAGE ROAD

DESIGN SPEED: 55 MPH



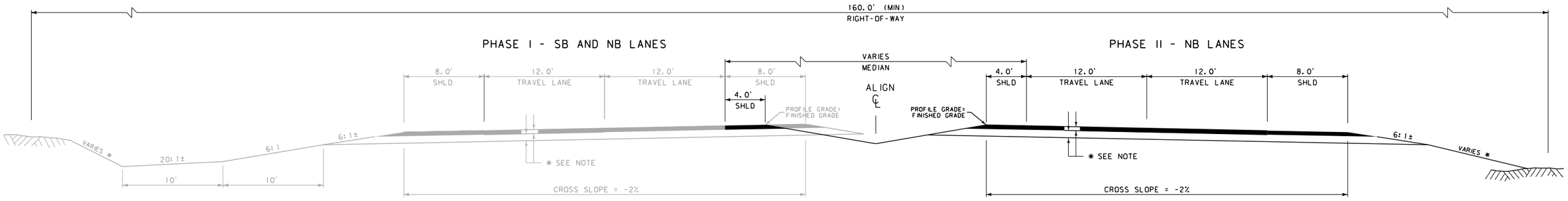
* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ02.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY			YELLOWSTONE COUNTY		UPN 4199 / SHEET 4
1		10:59:38 AM ngutierrez	CHECKED BY					

NHS URBAN PRINCIPAL ARTERIAL
MARY ST – PRIMARY

DESIGN SPEED: 55 MPH

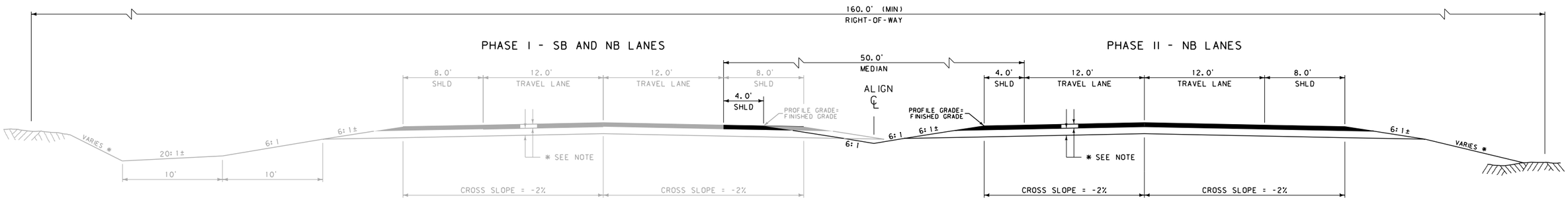


* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

NHS RURAL PRINCIPAL ARTERIAL
FIVE MILE RD – PRIMARY

DESIGN SPEED: 70 MPH (FLAT TERRAIN), 60 MPH (ROLLING TERRAIN)



* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ02.dgn	DESIGNED BY			ROAD PLANS	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY					
1		10:59:46 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY	PRELIMINARY	UPN 4199 / SHEET 5

DOWL HKM

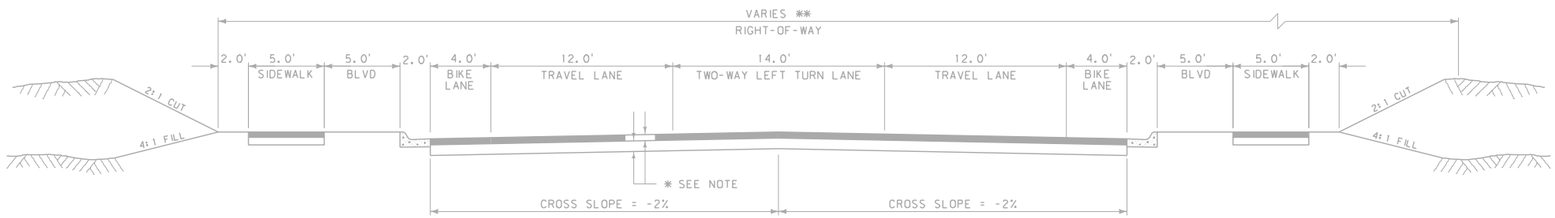
PHASE I CONSTRUCTION

URBAN SECONDARY COLLECTOR
MARY ST – SECONDARY

CITY OF BILLINGS – PRINCIPAL ARTERIAL

DESIGN SPEED: 45 MPH

PHASE I



** PER CURRENT CITY OF BILLINGS SUBDIVISION REGULATIONS:
PRINCIPAL ARTERIAL = 130'
MINOR ARTERIAL = 100'

* FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

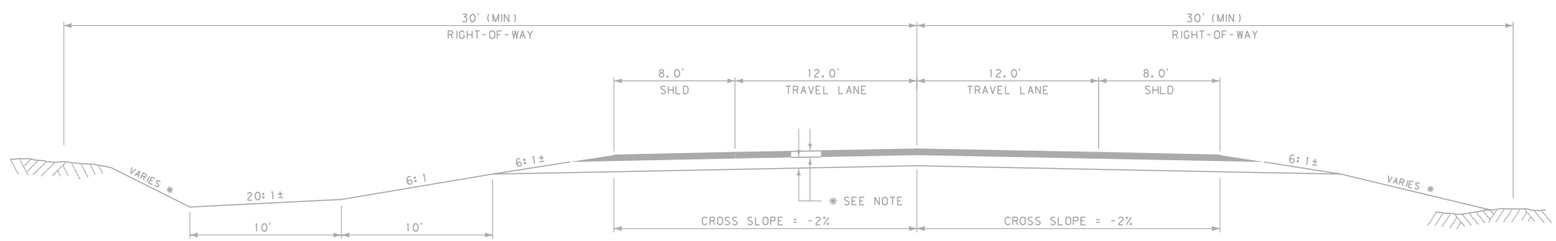
* BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
15' - 20'	2:1
OVER 20'	1.5:1

PHASE I CONSTRUCTION

RURAL SECONDARY COLLECTOR
FIVE MILE RD – SECONDARY

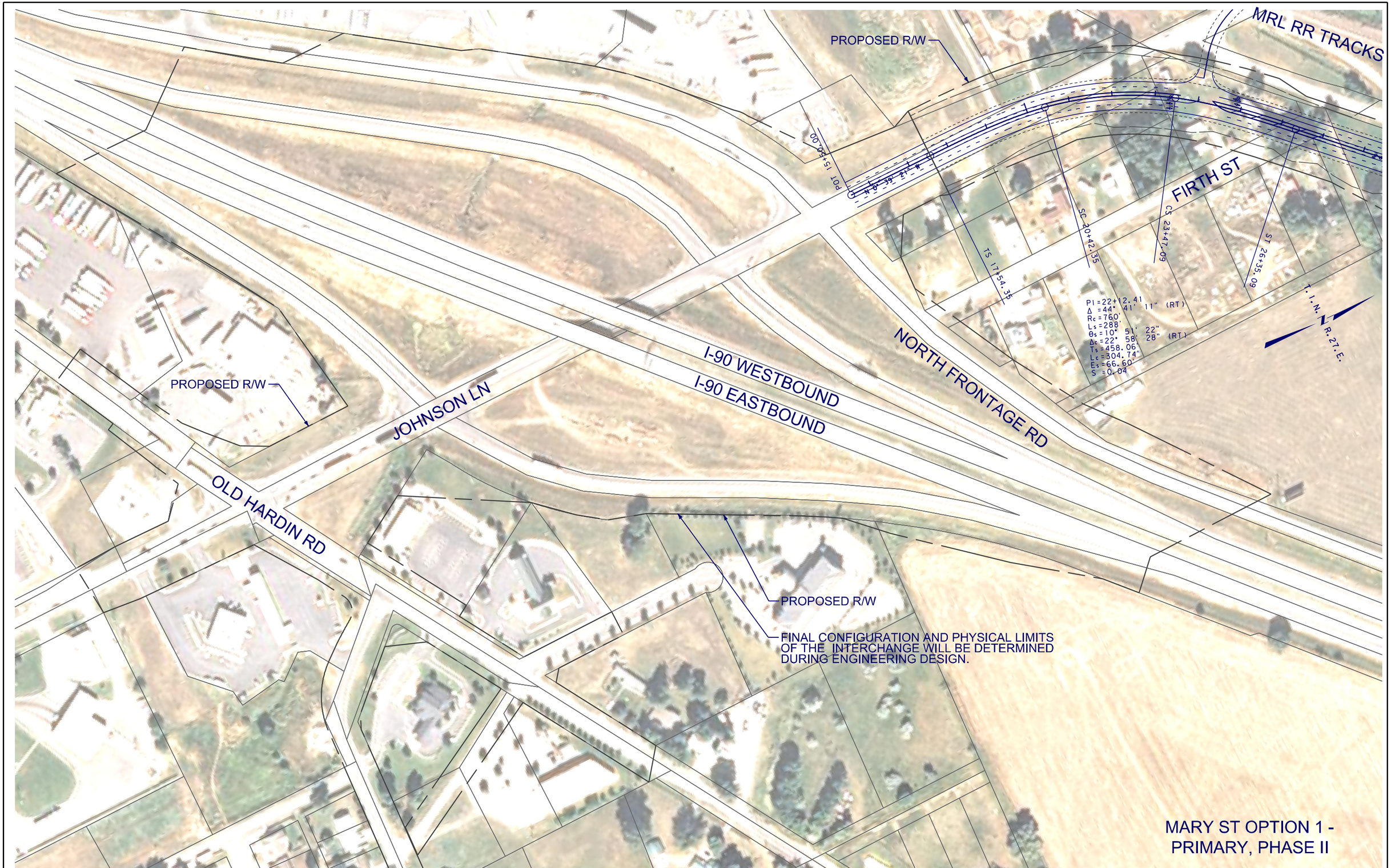
DESIGN SPEED: 60 MPH
(FLAT TERRAIN)

PHASE I

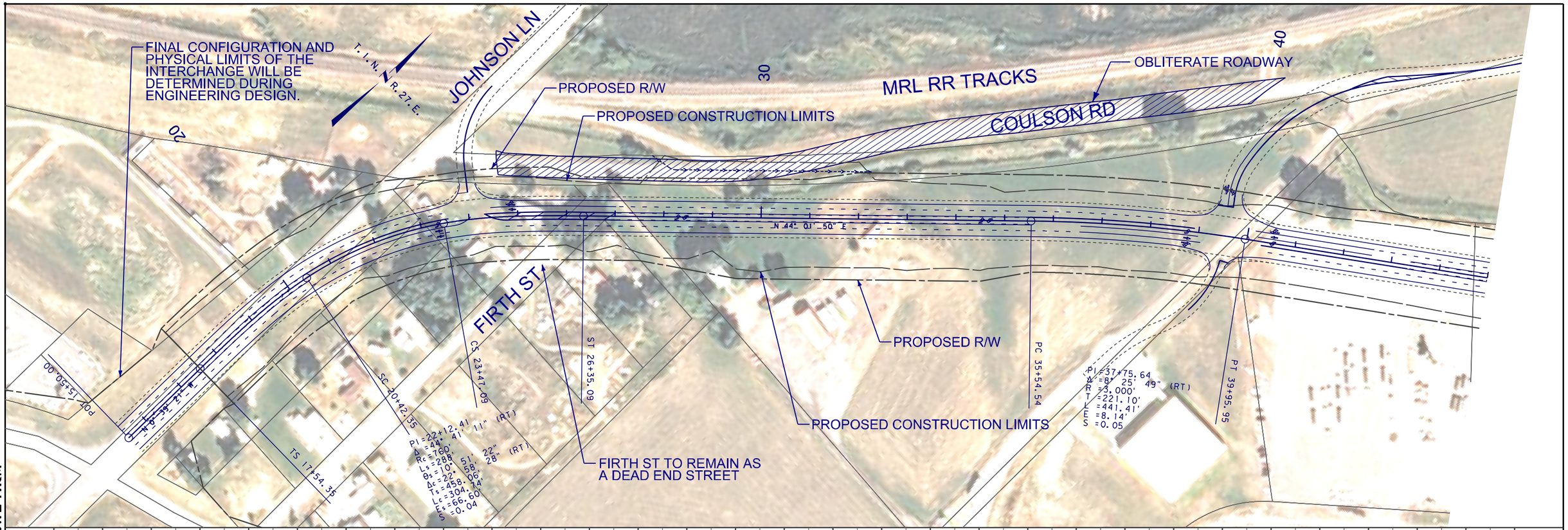


* SURFACING SECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

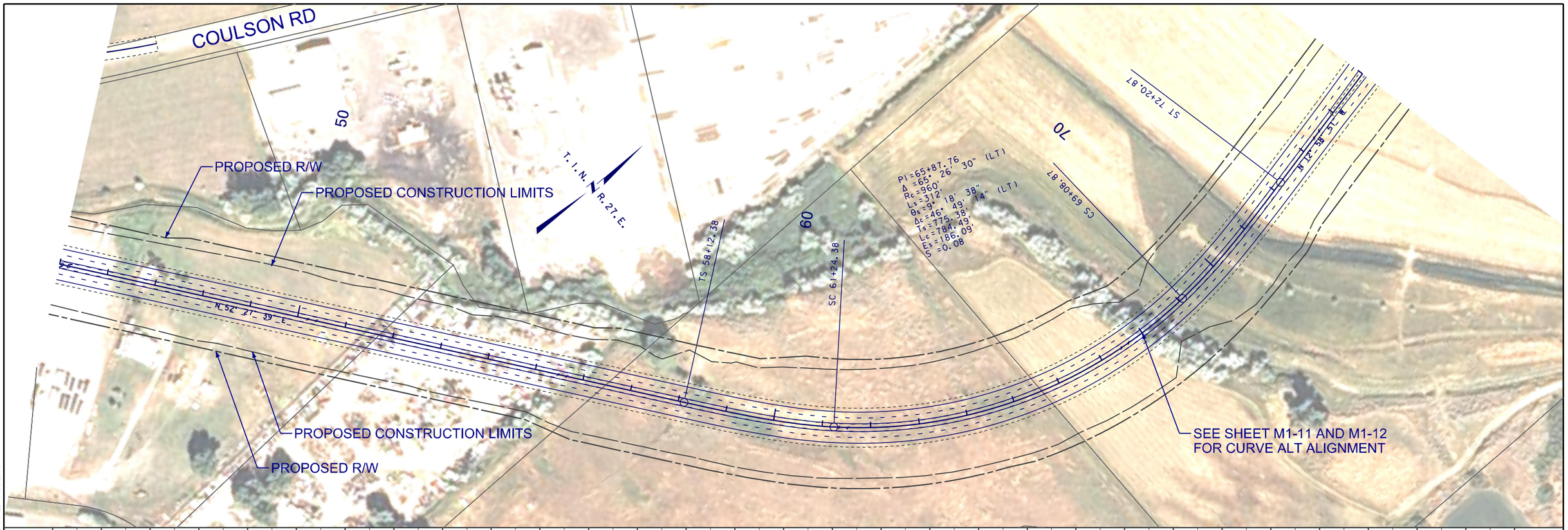
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\03\4199\RD\4199RDTYPZ02.dgn	DESIGNED BY			ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY						
1		10:59:54 AM ngutierrez	CHECKED BY			YELLOWSTONE COUNTY		UPN 4199	SHEET 6

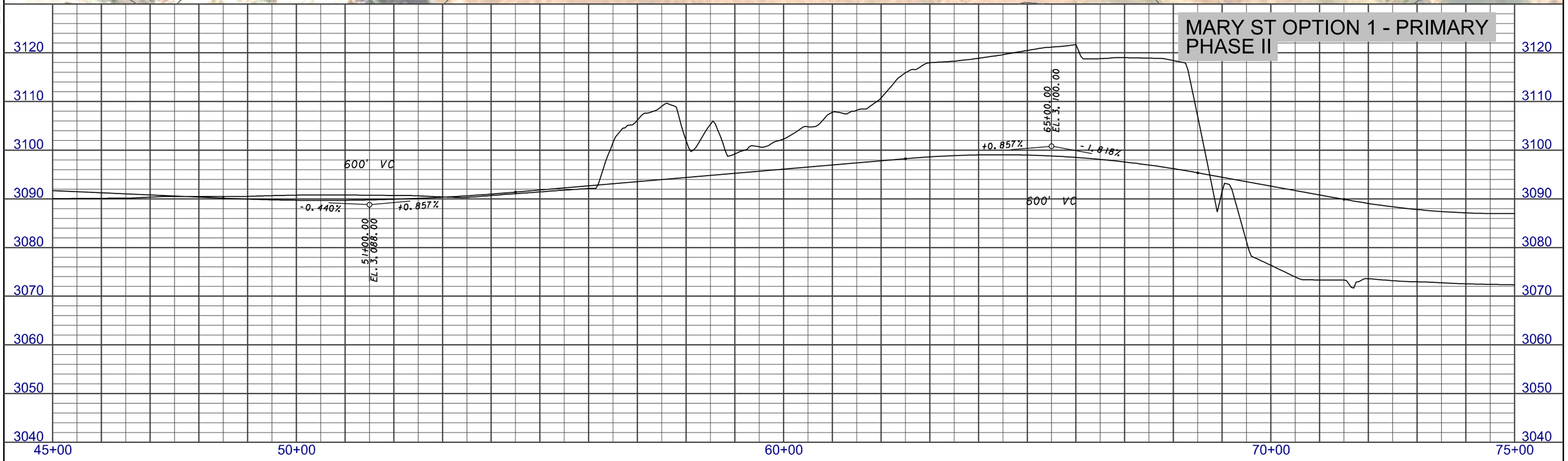


3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplnZ11_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY				UPN 4199 / SHEET M1-1
		11:23:38 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		

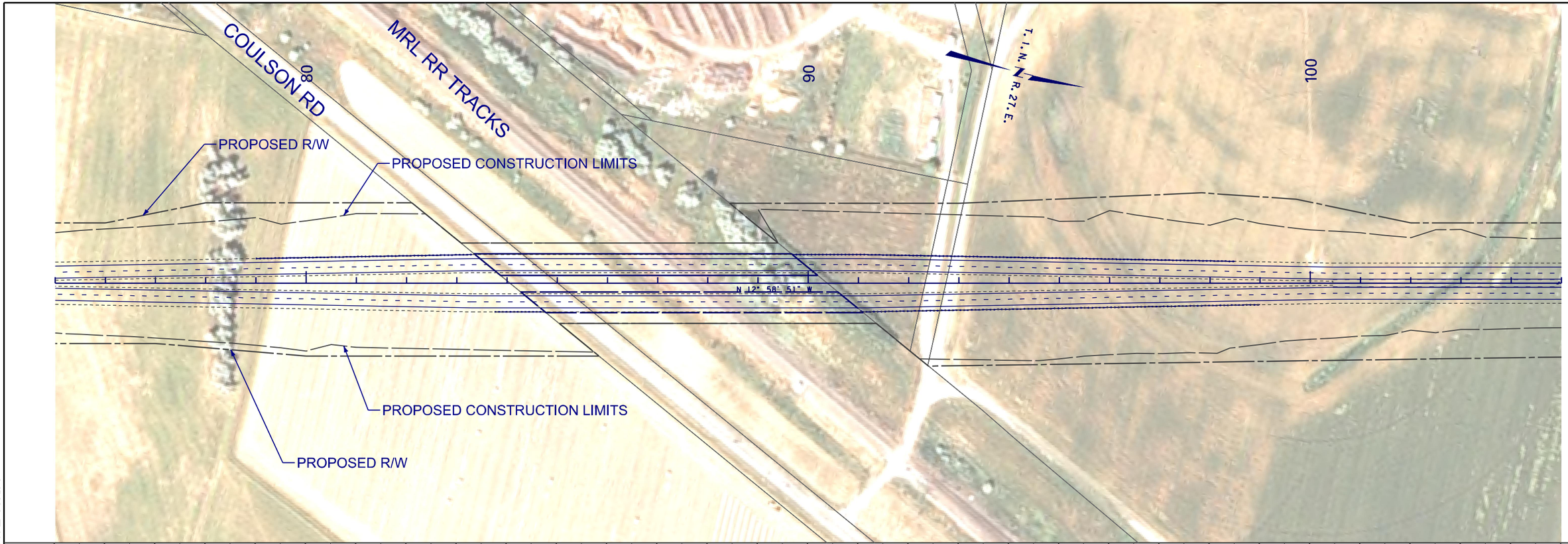


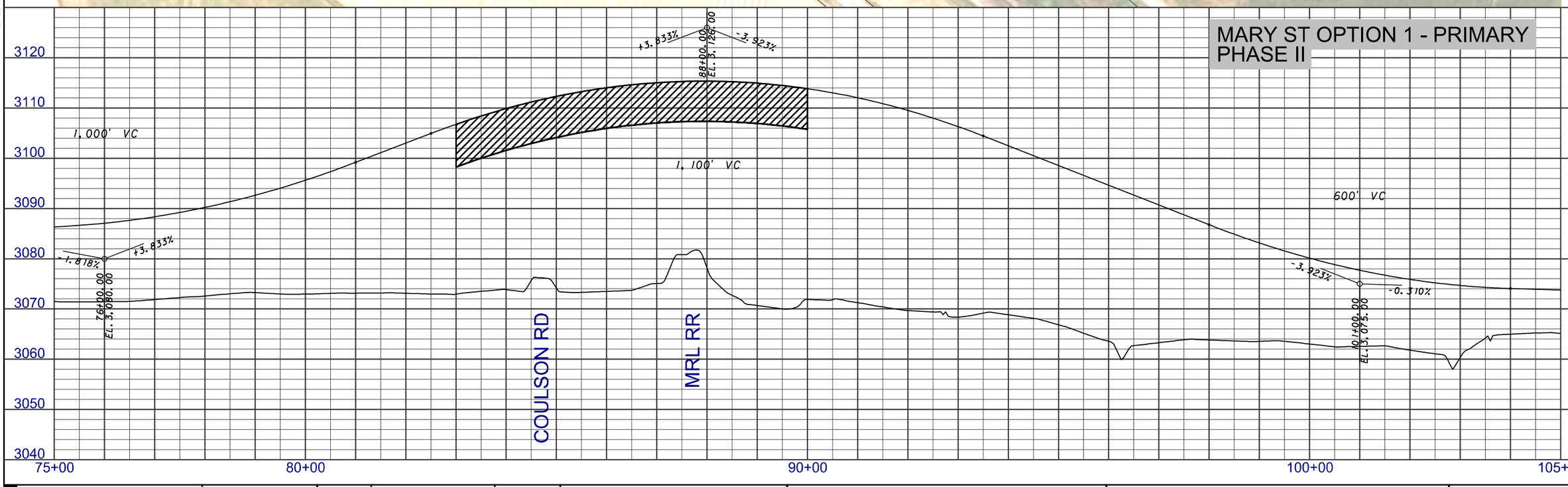
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz11_M1.dgn	DESIGNED BY	ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY	YELLOWSTONE COUNTY		UPN 4199	SHEET M1-2
		11:04:06 AM ngutlerrez	CHECKED BY				



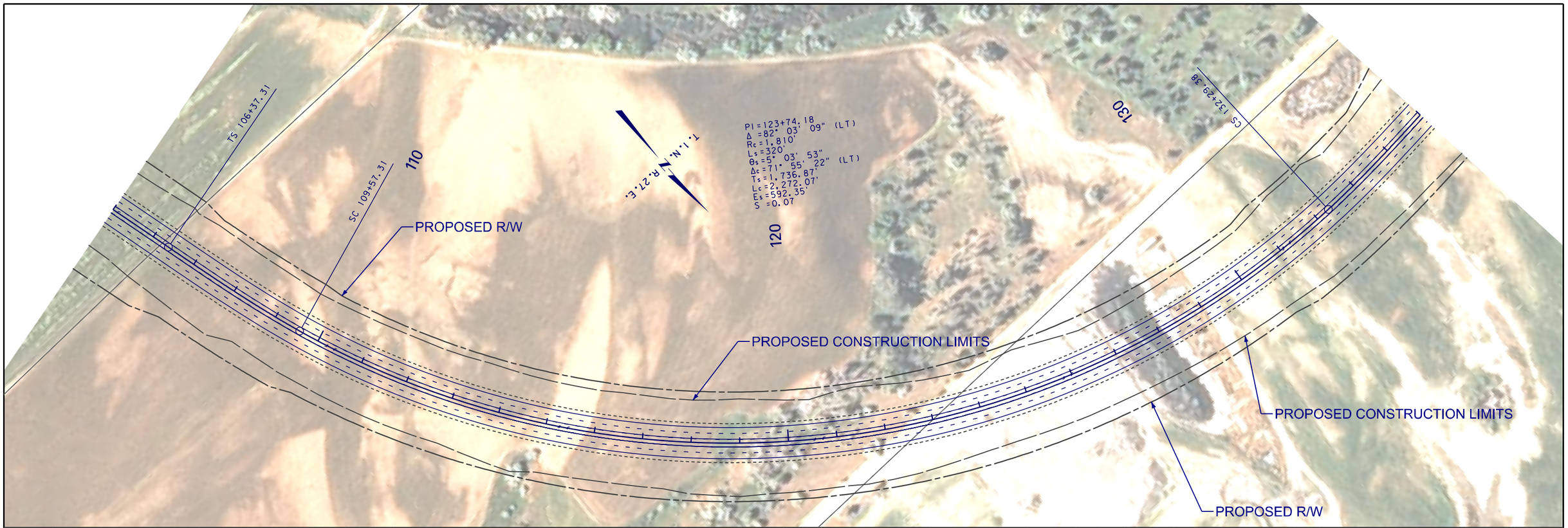


3 / 1 MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz11_M1.dgn 8/23/2013 11:04:25 AM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-3





2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz11_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY				UPN 4199 / SHEET M1-4
		11:04:42 AM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		



MARY ST OPTION 1 - PRIMARY
PHASE II

3120 3110 3100 3090 3080 3070 3060 3050 3040

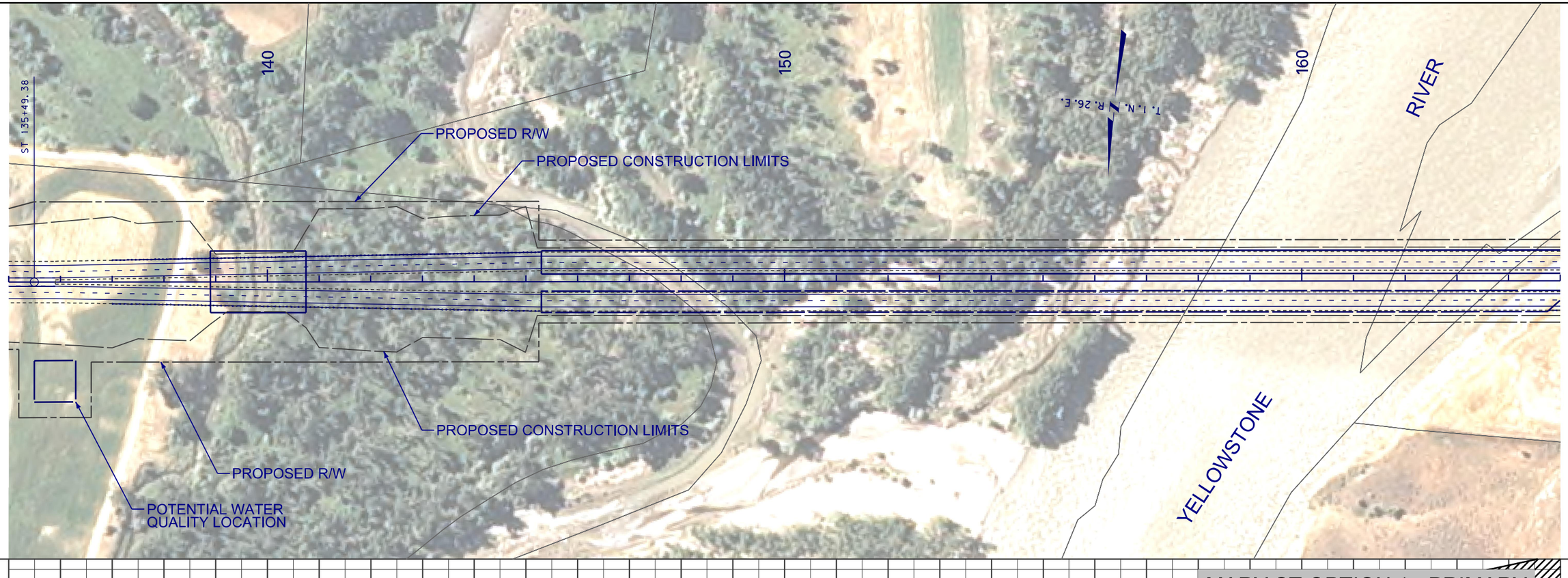
105+00 110+00 120+00 130+00 135+00

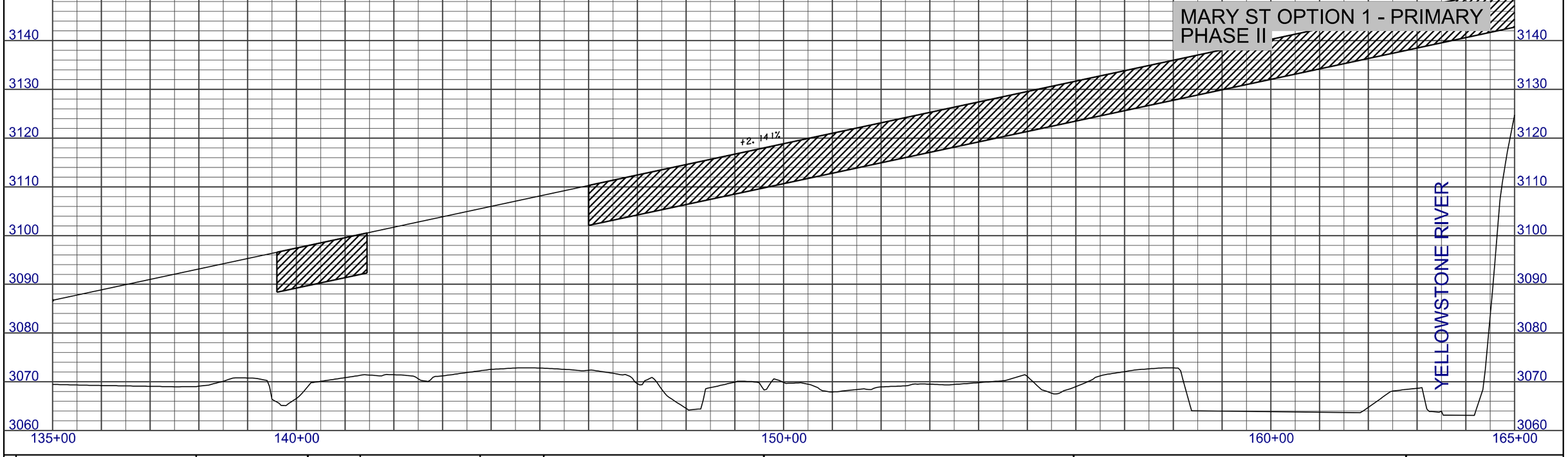
1,000' VC

-0.31% +2.14%

130+00.00
EL. 3,066.00

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz12_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY				UPN 4199 / SHEET M1-5
		3:56:48 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		





3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz12_M1.dgn 8/23/2013 3:57:06 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-6

YELLOWSTONE RIVER

170

180

190

T. 1 N. R. 26 E.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

S 84° 58' 00" W

N 65° 46' 06" W

S 88° 25' 04" W

TS 170+14.14

SC 173+26.14

CS 175+04.48

ST 178+16.48

TS 181+68.50

SC 184+80.50

CS 186+01.03

ST 189+13.03

PI = 174+21.75
Δ = 29° 15' 53" (RT)
Rc = 960'
Ls = 312'
θs = 9° 18' 38"
Δc = 10° 38' 37" (RT)
Ts = 407.61'
Lc = 178.34'
Es = 36.54'
S = 0.08

PI = 185+45.33
Δ = 25° 48' 53" (LT)
Rc = 960'
Ls = 312'
θs = 9° 18' 38"
Δc = 7° 11' 37" (LT)
Ts = 376.83'
Lc = 120.53'
Es = 29.22'
S = 0.08

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

MARY STREET (FRONTAGE ROAD)

FIVE MILE ROAD (SECONDARY)

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

MARY ST OPTION 1 - PRIMARY
PHASE II

3180
3170
3160
3150
3140
3130
3120
3110
3100

169+70.00
EL. 3,151.00

+2.14%

-0.809%

900' VC

176+50.00
EL. 3,145.50

200' VC

-0.809%

+0.700%

191+50.00
EL. 3,156.00

+0.700%

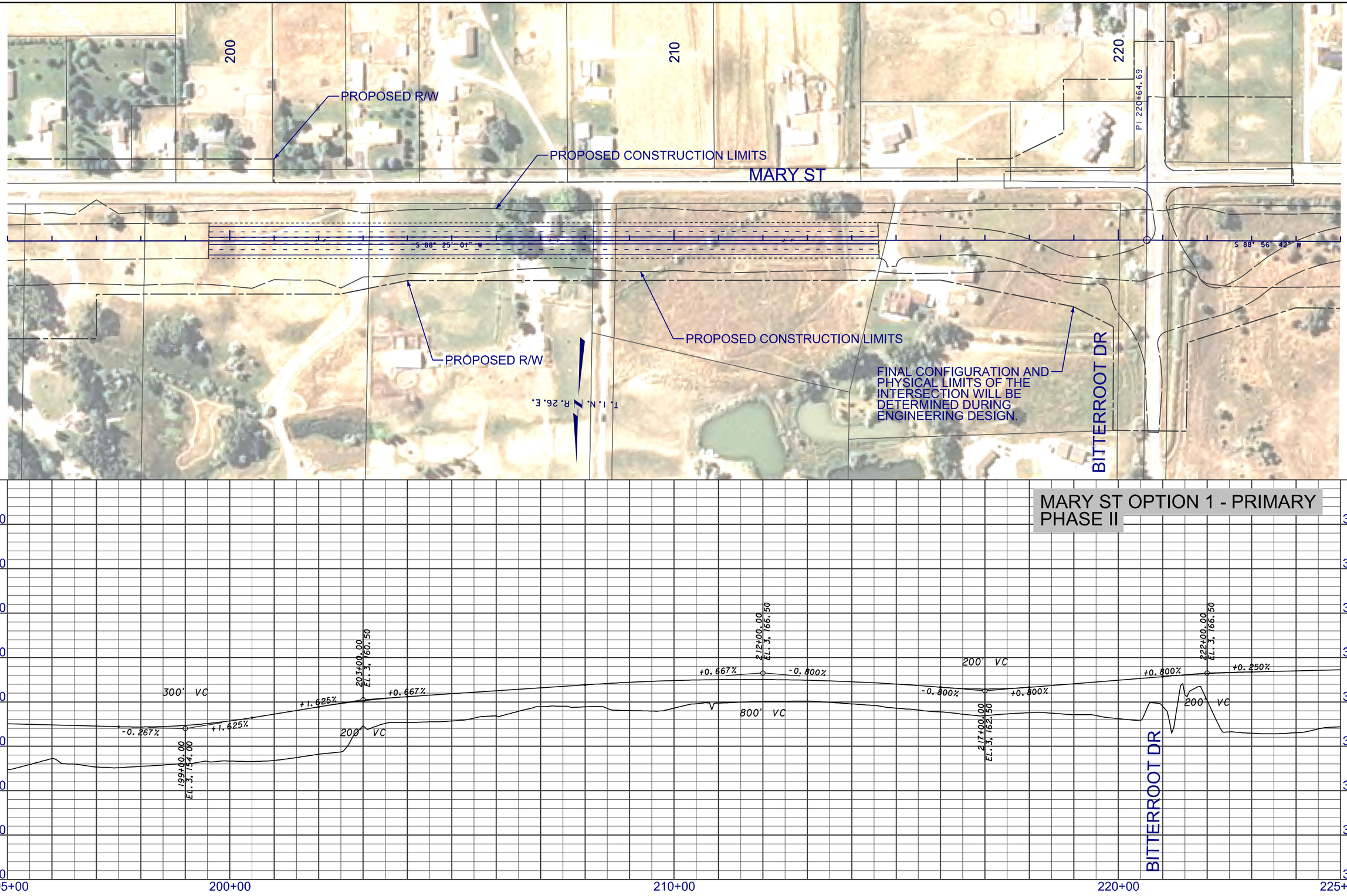
-0.267%

200' VC

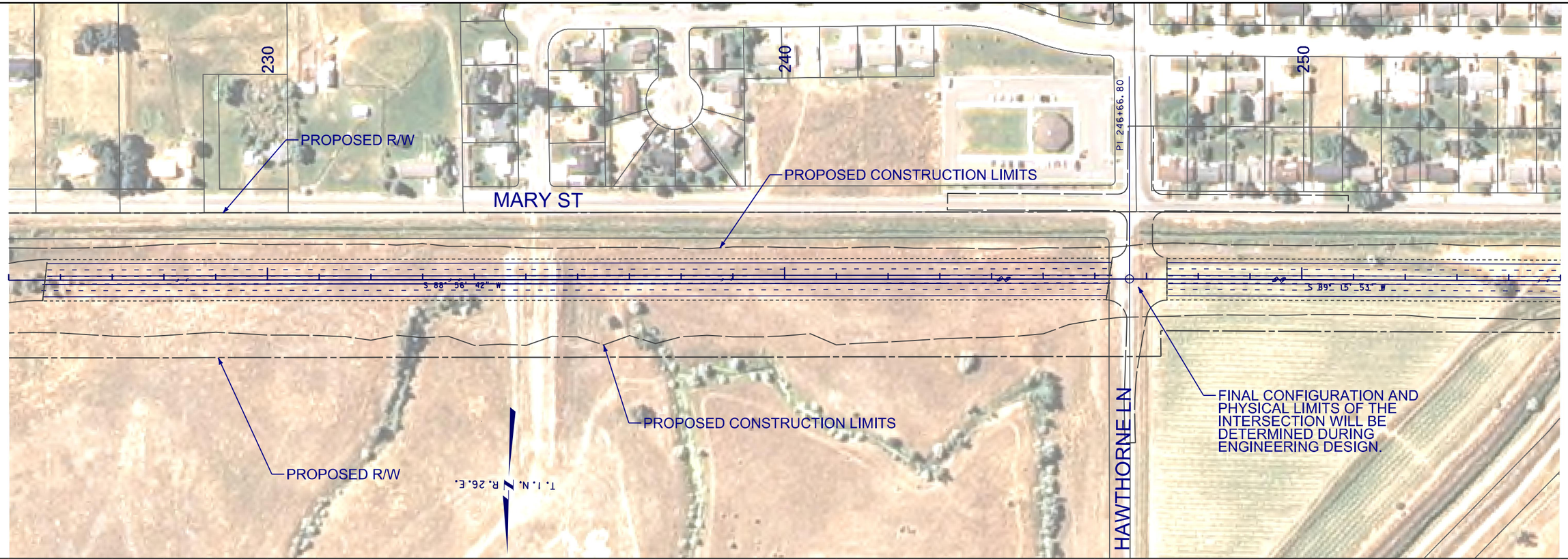
FIVE MILE ROAD

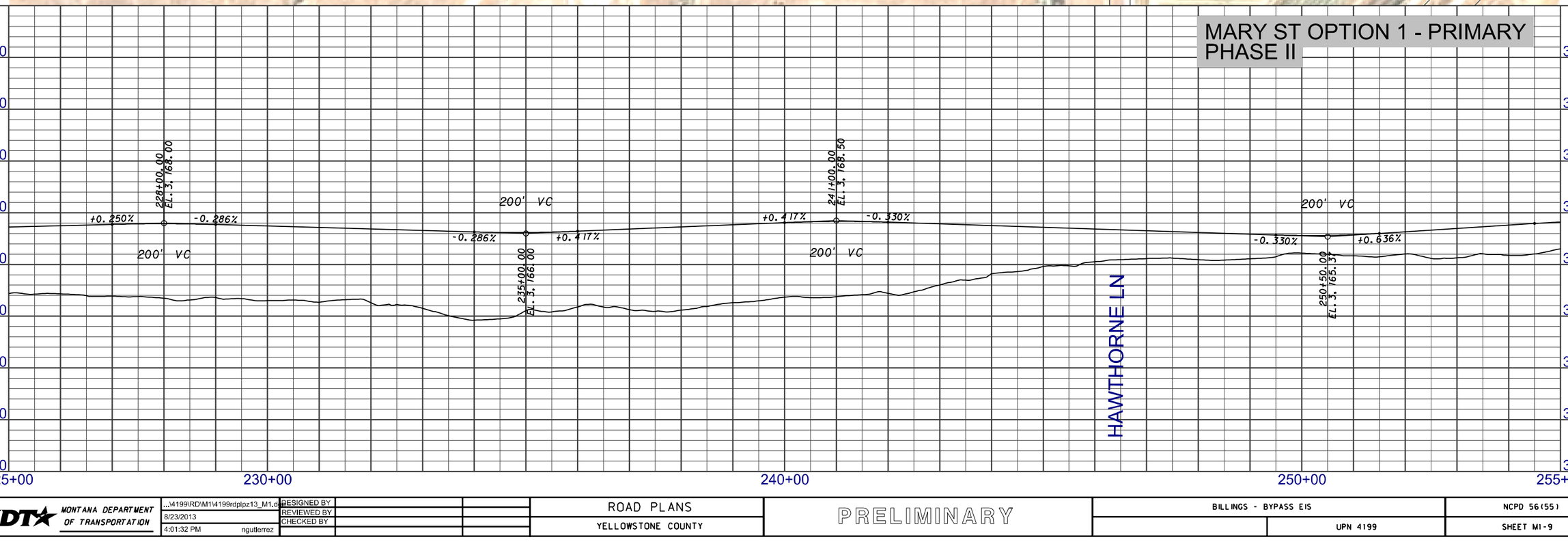
165+00
170+00
180+00
190+00
195+00

2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz12_M1.dgn 8/23/2013 3:57:24 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-7



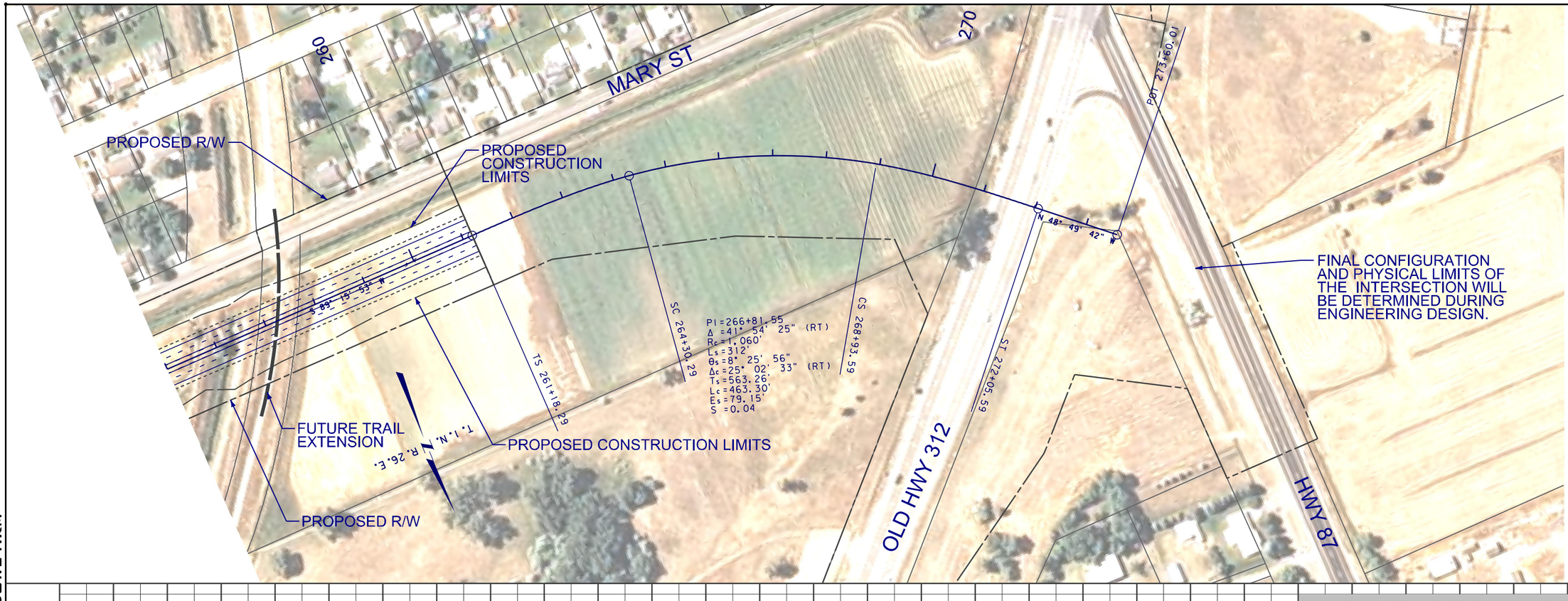
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz13_M1.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-8
		4:01:14 PM ngutierrez	CHECKED BY				

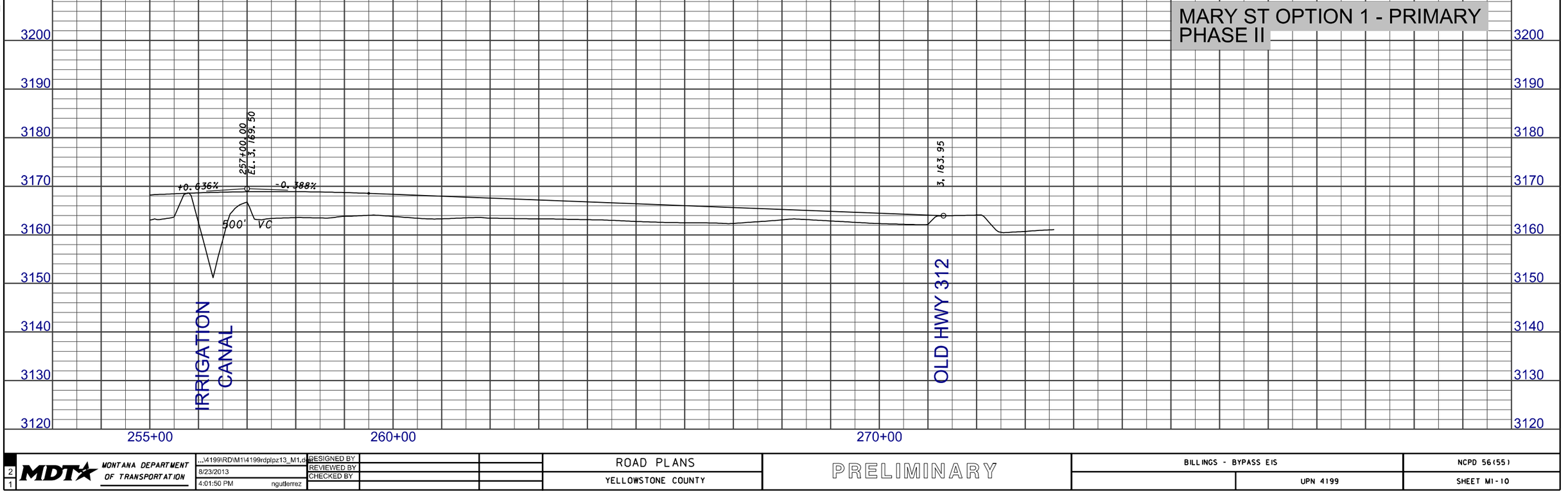




DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz13_M1.dgn 8/23/2013 4:01:32 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-9





DOWL HKM

2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz13_M1.dgn 8/23/2013 4:01:50 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-10

COULSON RD

T. 1 N. R. 27 E.

POT 10+00.00 = EO = 40+83.70

TS 16+07.20

SC 18+02.20

PI = 35+04.06
Δ = 65° 26' 30" (LT)
Rc = 2,800'
Ls = 795'
θs = 1° 59' 42"
Δc = 61° 27' 05" (LT)
Ts = 1,896.87'
Lc = 3,003.08'
Es = 528.80'

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

N 52° 27' 39" E

RELOCATION OF COULSON DITCH WILL BE DETERMINED DURING ENGINEERING DESIGN

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

BOWL HKM

MARY ST OPTION 1 - PRIMARY
CURVE ALT - PHASE II

10+00.00 = 40+83.70
EL. 3,092.47

600' VC

-0.440%

+0.613%

20+16.30
EL. 3,088.00

+0.613%

-1.364%

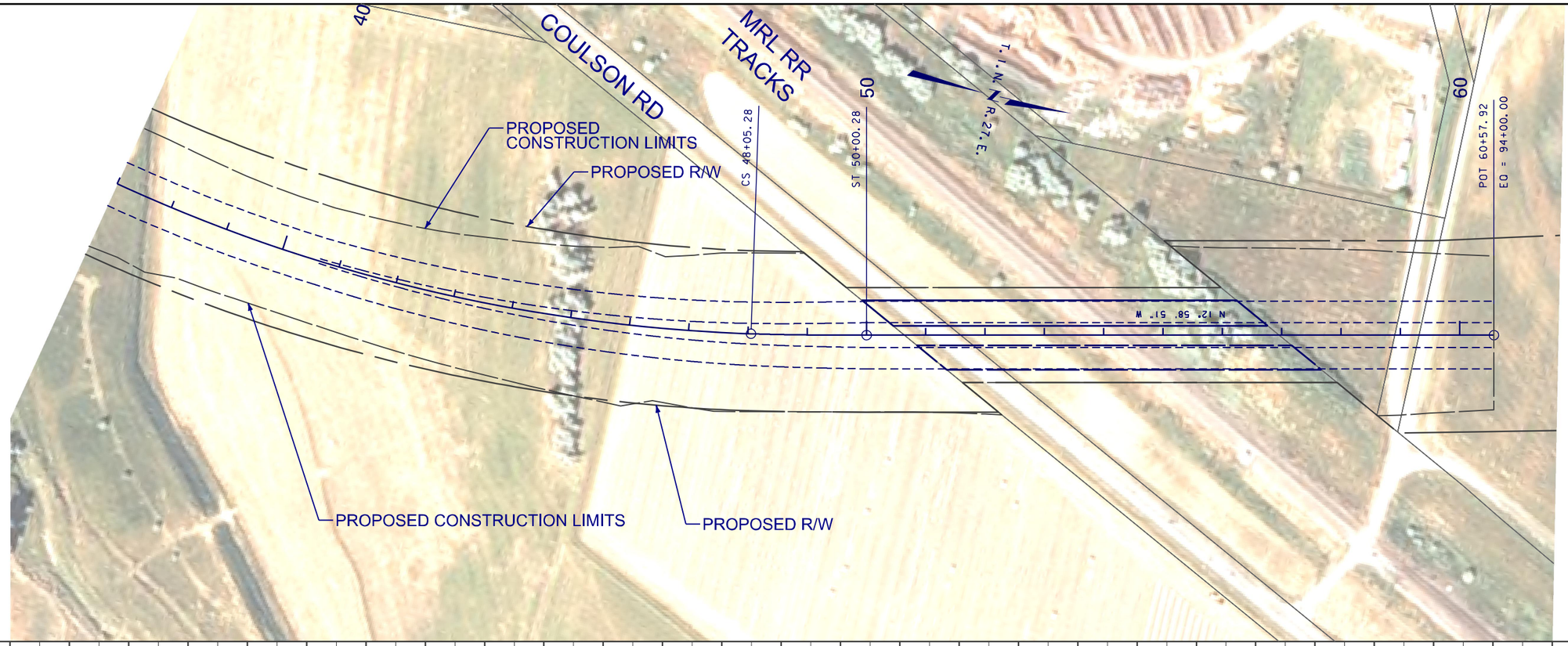
31+67.92
EL. 3,095.00

600' VC

3120
3110
3100
3090
3080
3070
3060
3050
3040

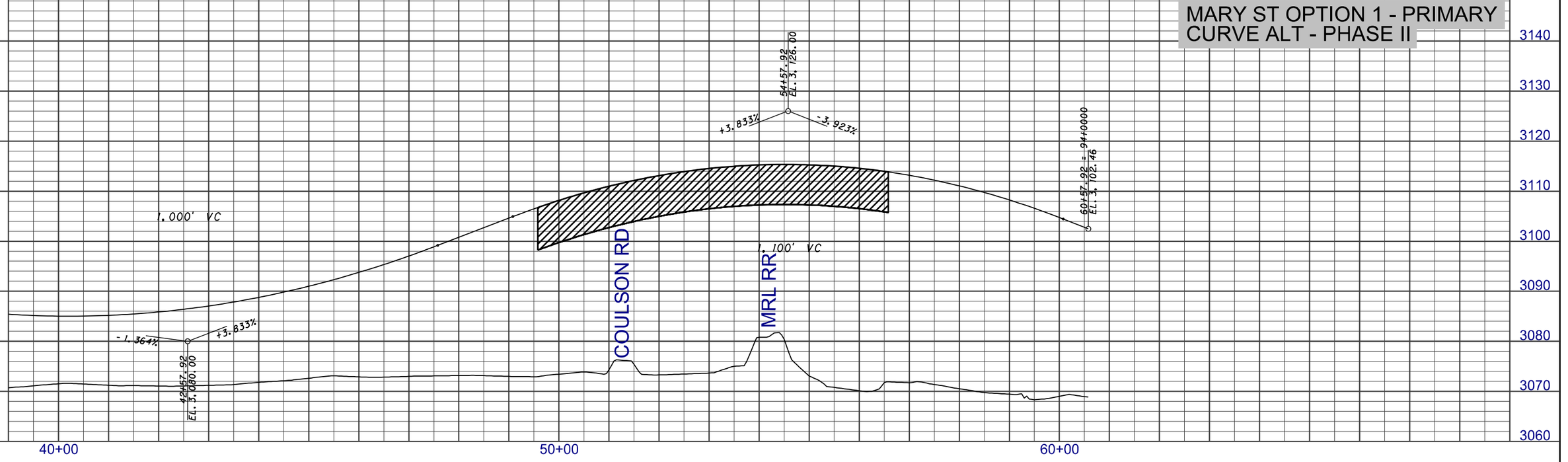
10+00
20+00
30+00

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M1\4199rdplpz14_M1.dgn 8/23/2013 11:26:49 AM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M1-11



DOWL HKM

MARY ST OPTION 1 - PRIMARY
CURVE ALT - PHASE II



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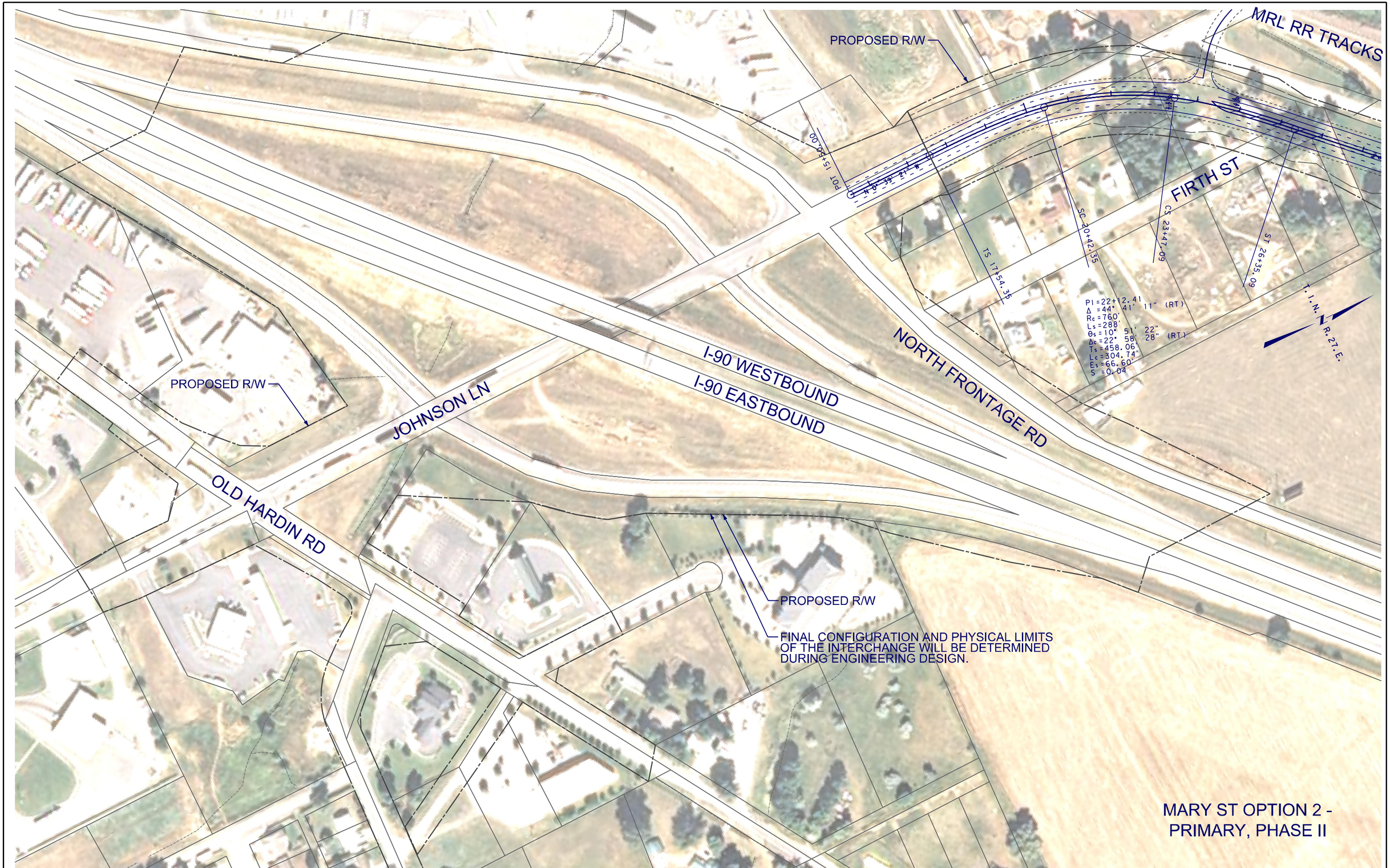
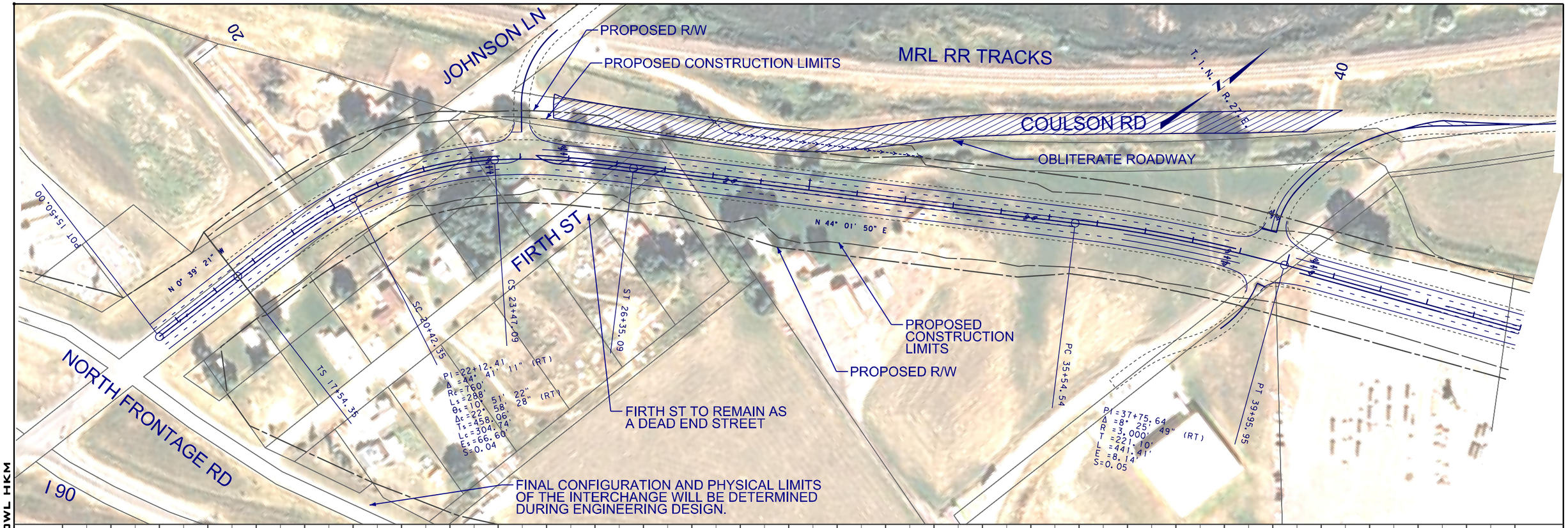
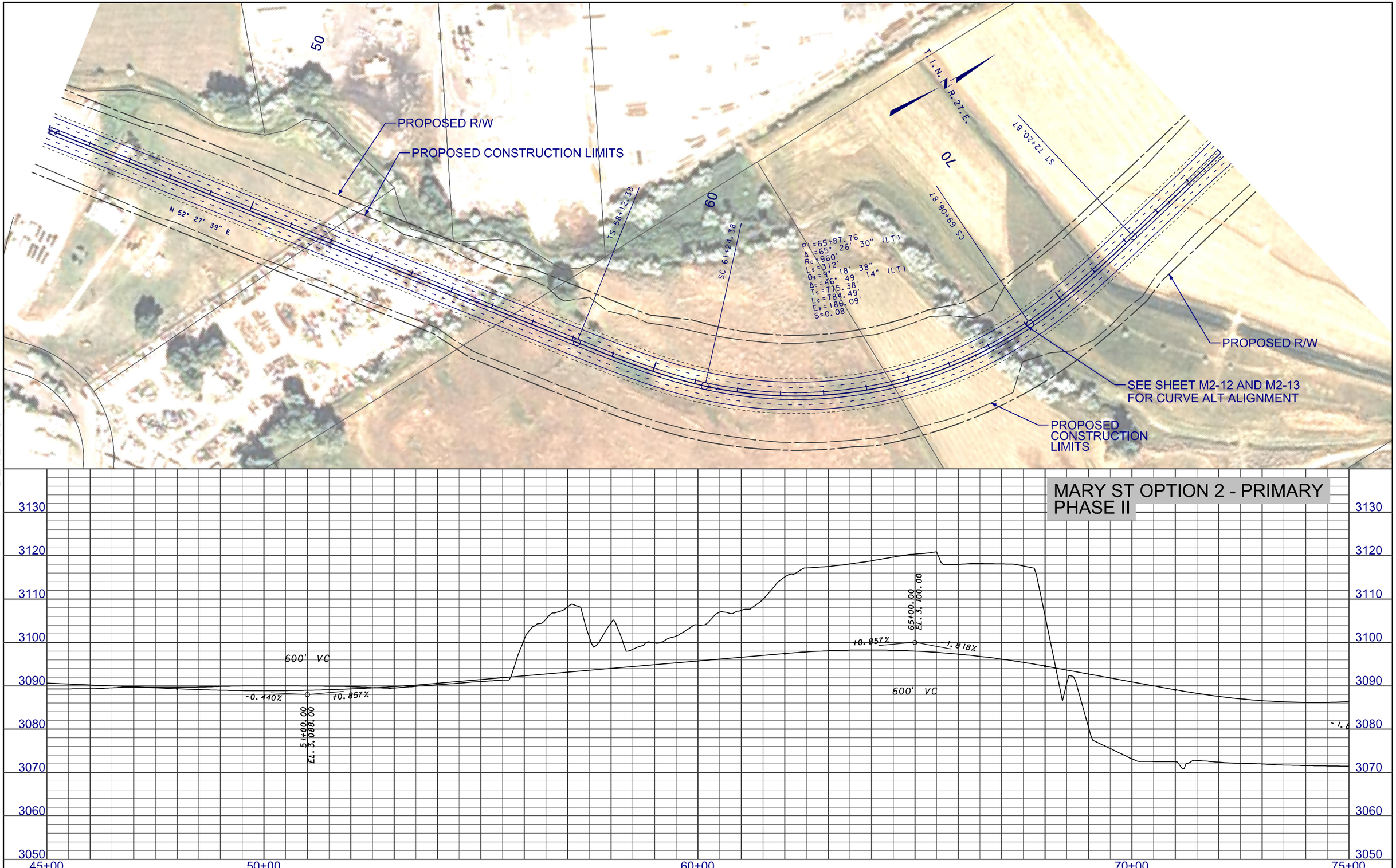
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M1-12
		11:27:07 AM ngutierrez	CHECKED BY				



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplnZ11_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY				UPN 4199 / SHEET M2-1
		12:05:44 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		

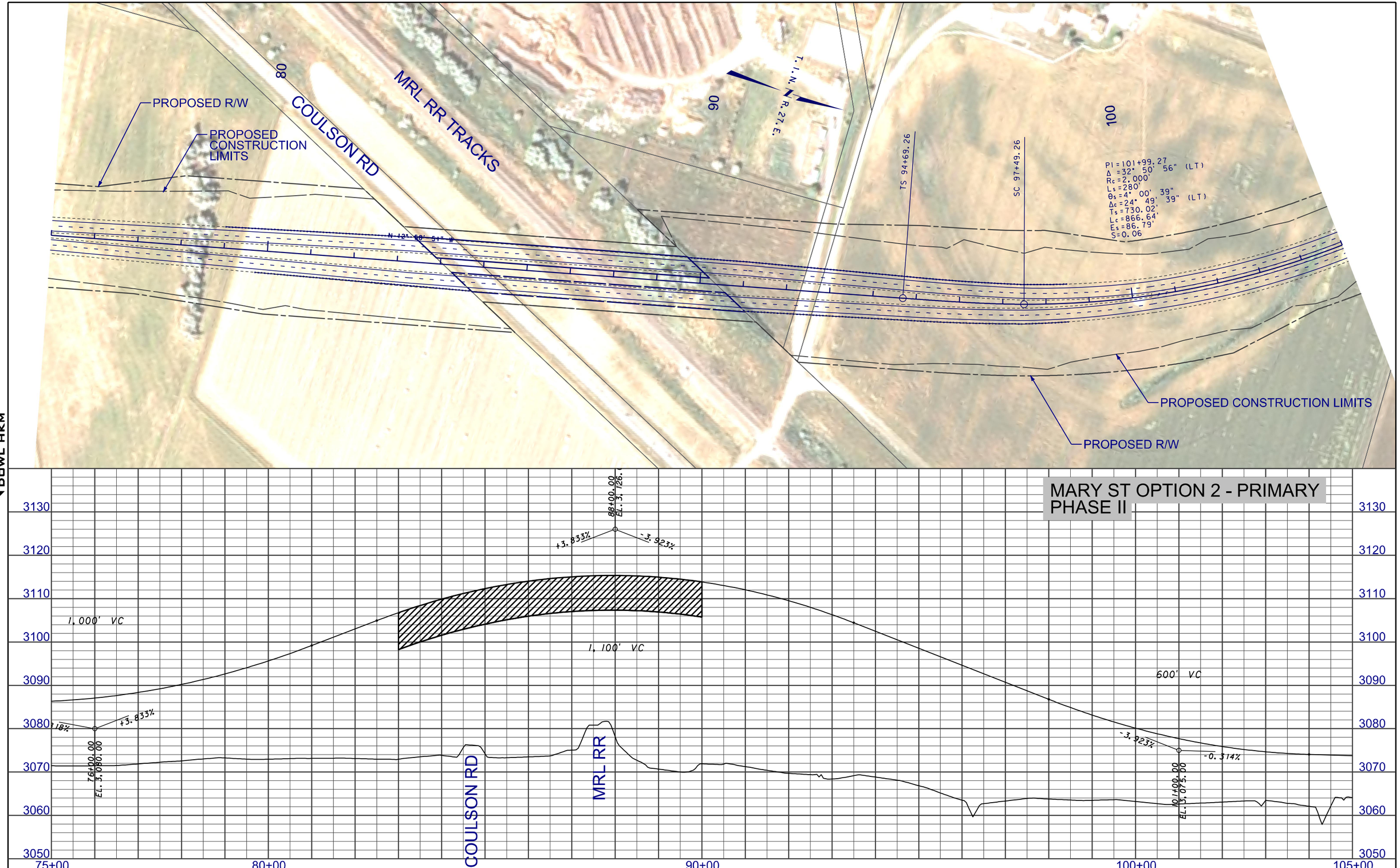


3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz11_M2.dgn	DESIGNED BY	ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY	YELLOWSTONE COUNTY		UPN 4199	SHEET M2-2
		4:33:58 PM ngutlerrez	CHECKED BY				

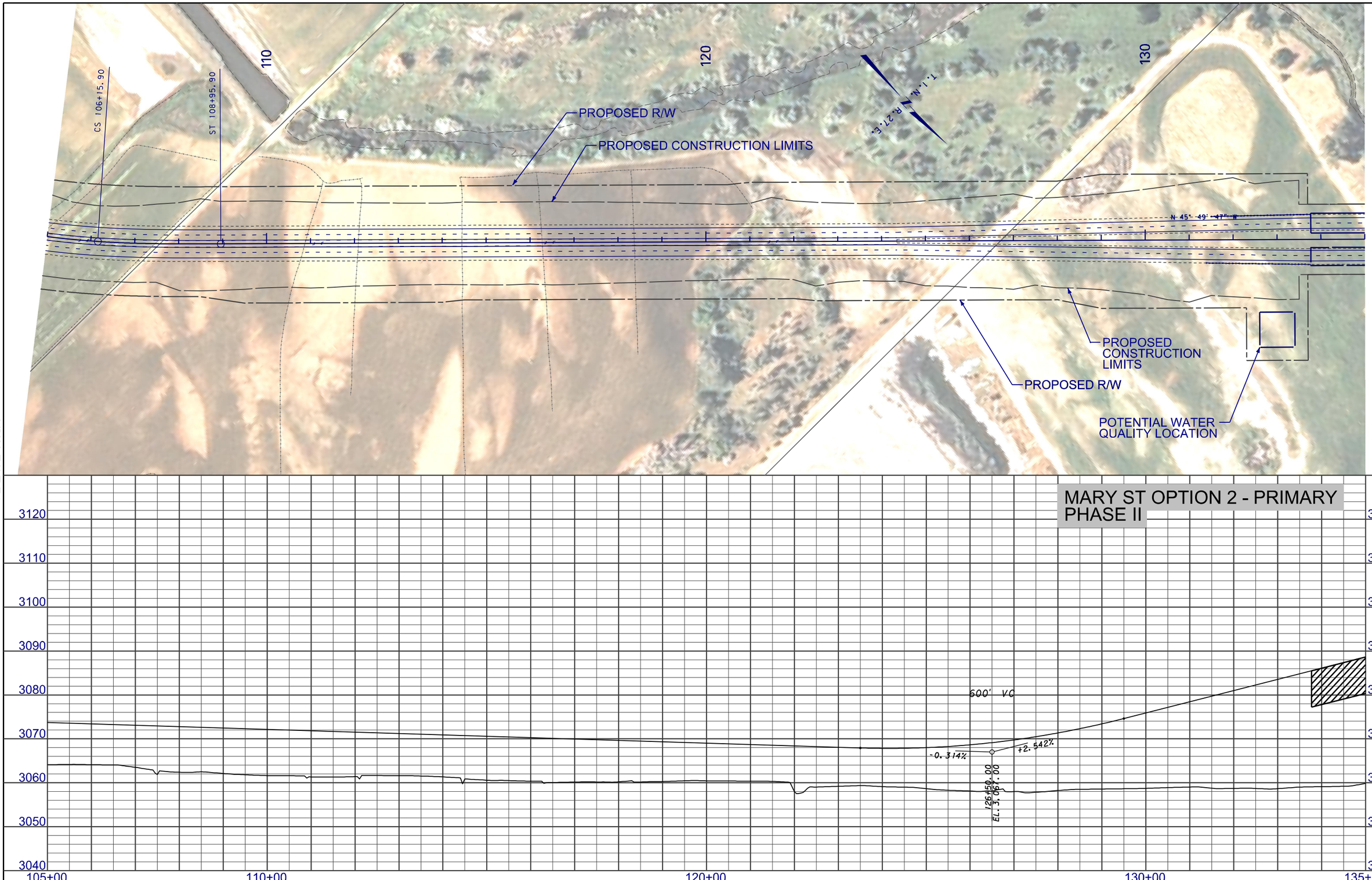


DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz11_M2.dgn 8/23/2013 4:34:16 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-3



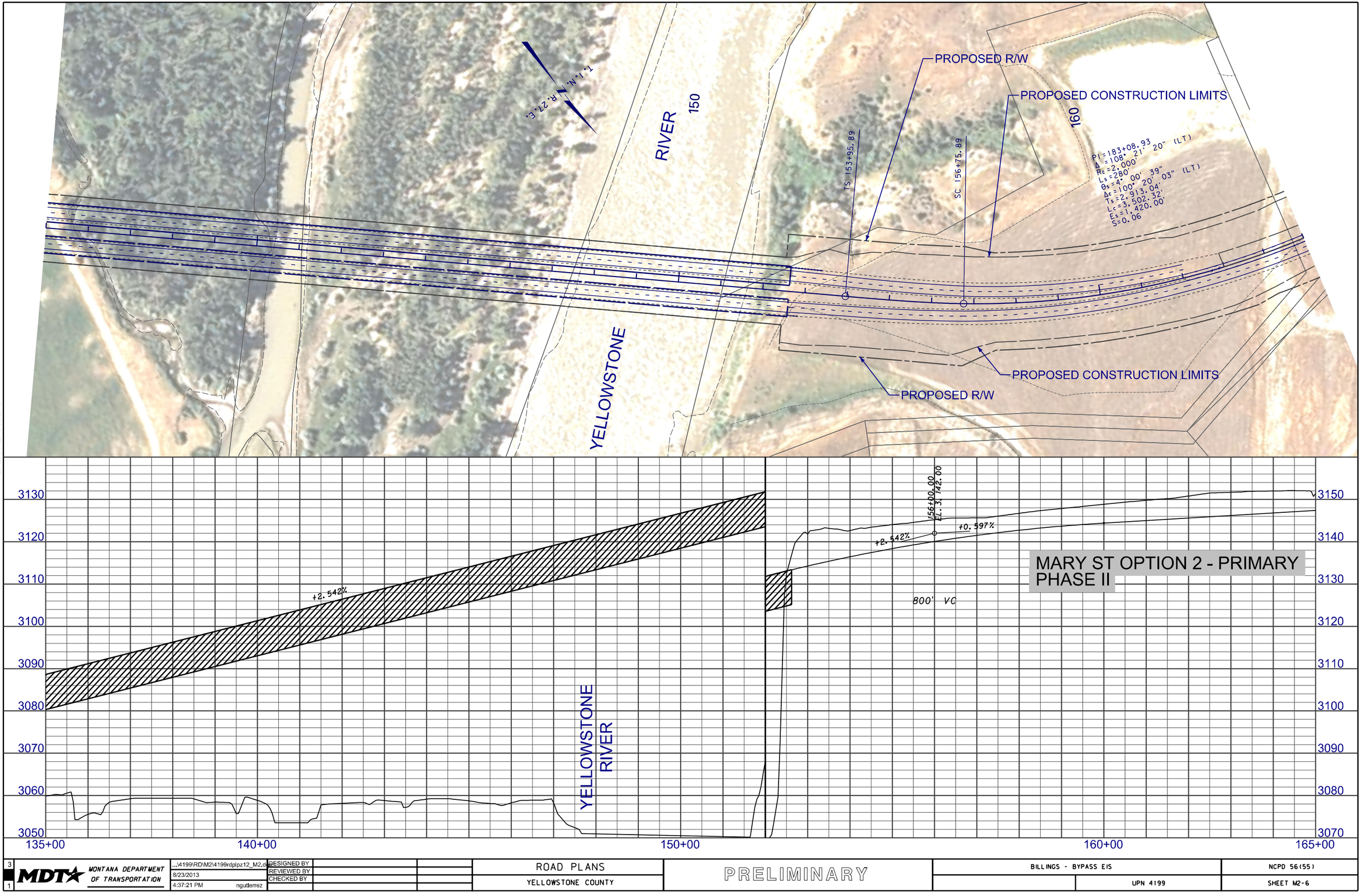
2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz11_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M2-4
		4:34:34 PM ngutierrez	CHECKED BY				



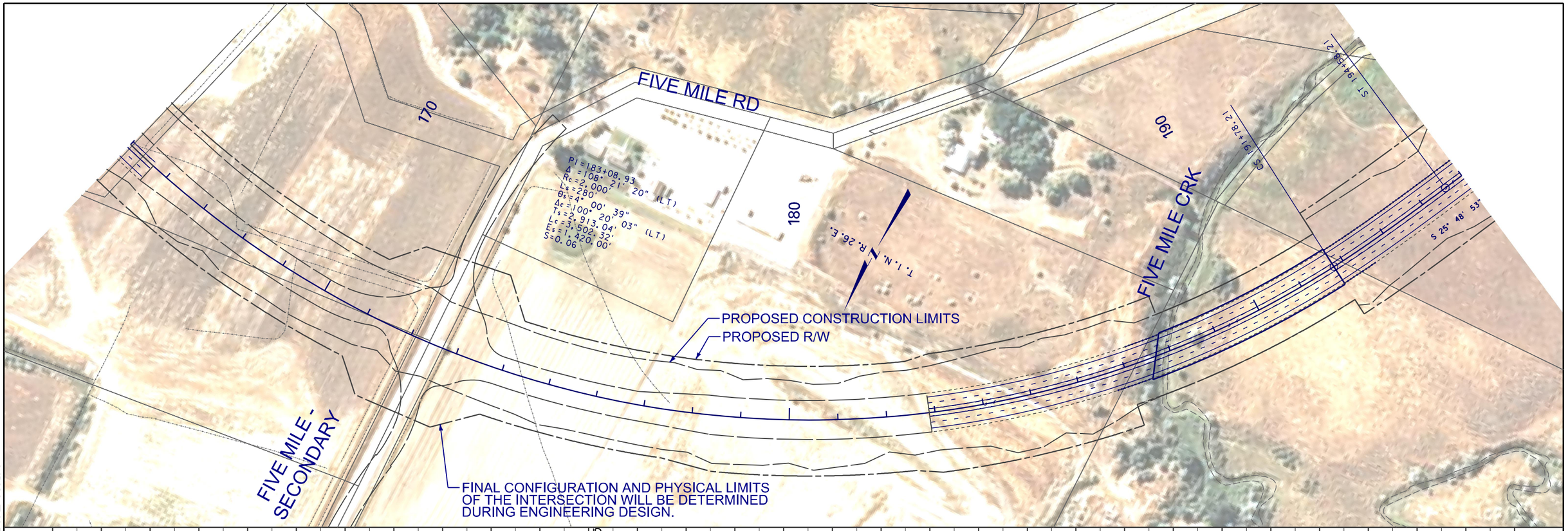
BOWL HKM

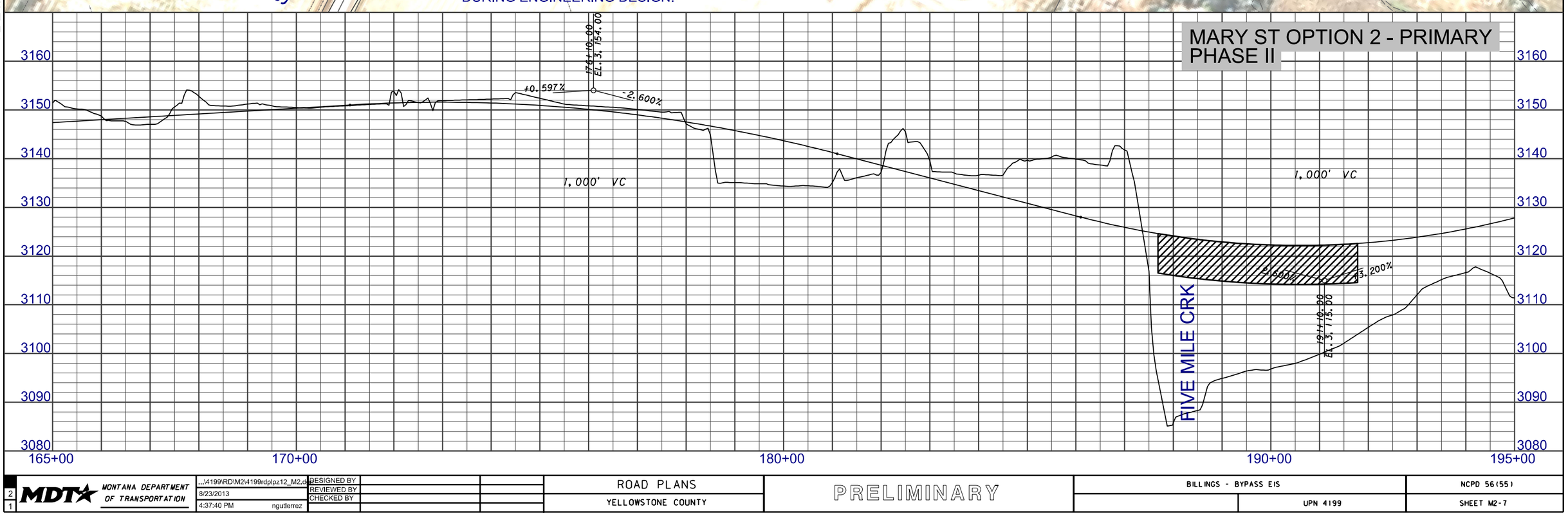
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz12_M2.dgn	DESIGNED BY		ROAD PLANS	BILLINGS - BYPASS EIS	NCPD 56(55)
2		8/23/2013	REVIEWED BY				
		4:37:02 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY	UPN 4199	SHEET M2-5

PRELIMINARY



3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz12_M2.dgn 8/23/2013 4:37:21 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-6





DOWL HKM

2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz12_M2.dgn 8/23/2013 4:37:40 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-7

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

MARY ST

FLAMING CREEK CIRCLE

PI = 205+36.79
Δ = 62° 36' 07" (RT)
Rc = 1,200'
Ls = 320'
θs = 7° 38' 22"
Δc = 47° 19' 23" (RT)
Ts = 891.71'
Lc = 991.13'
Es = 208.57'
S = 0.08

SC 199+65.08

TS 196+45.08

CS 209+56.22

ST 212+76.22

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

S 88° 25' 01" W

T. 1 N. R. 26 E.

220

200

DOWL HKM

MARY ST OPTION 2 - PRIMARY
PHASE II

3180
3170
3160
3150
3140
3130
3120
3110
3100

195+00
200+00
210+00
220+00
225+00

199+10.00
EL. 3,147.00

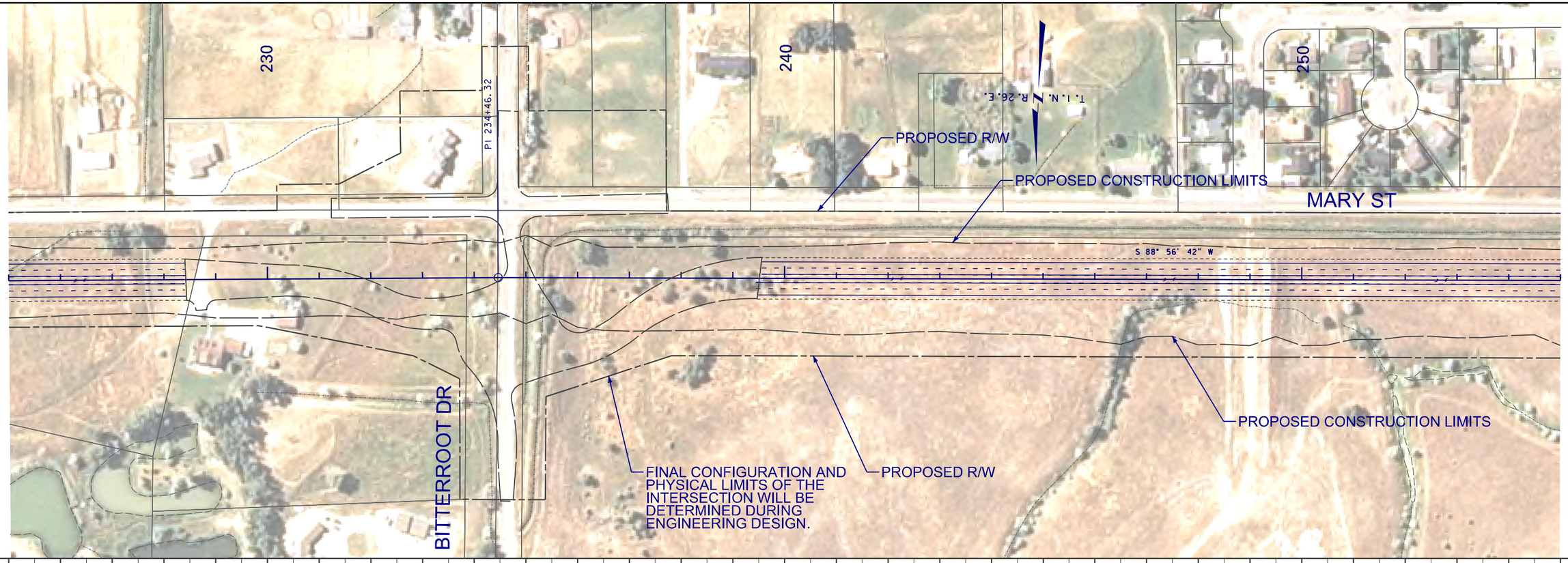
+3.200%
+0.505%
+0.505%
+1.286%
+1.286%
-0.353%

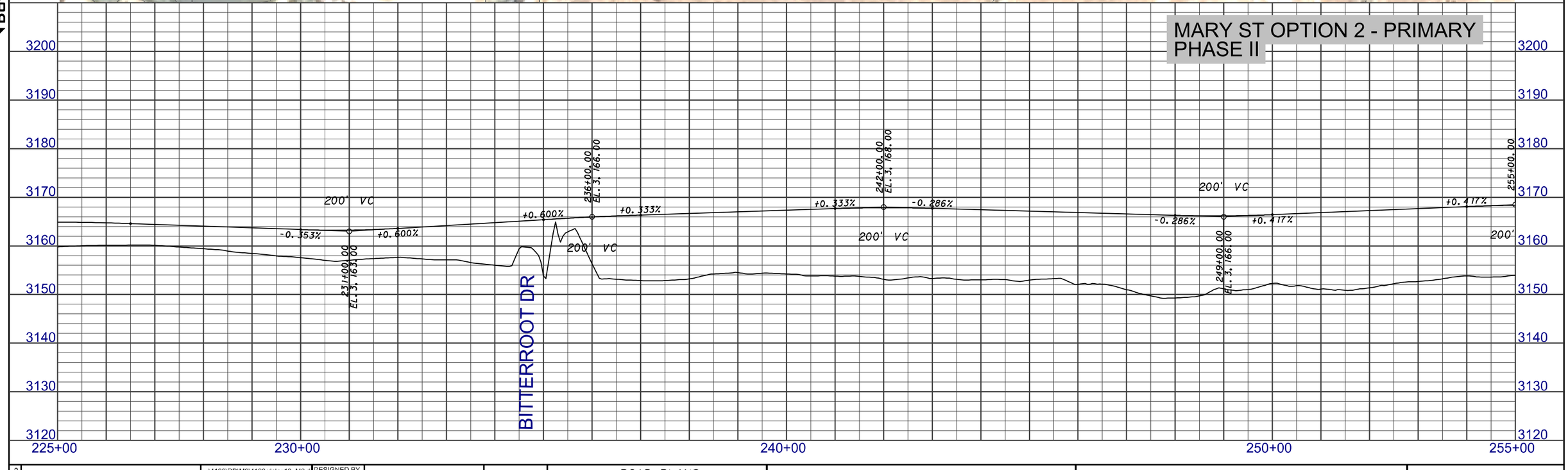
1,000' VC
500' VC
800' VC

212+00.00
EL. 3,152.50

222+50.00
EL. 3,166.00

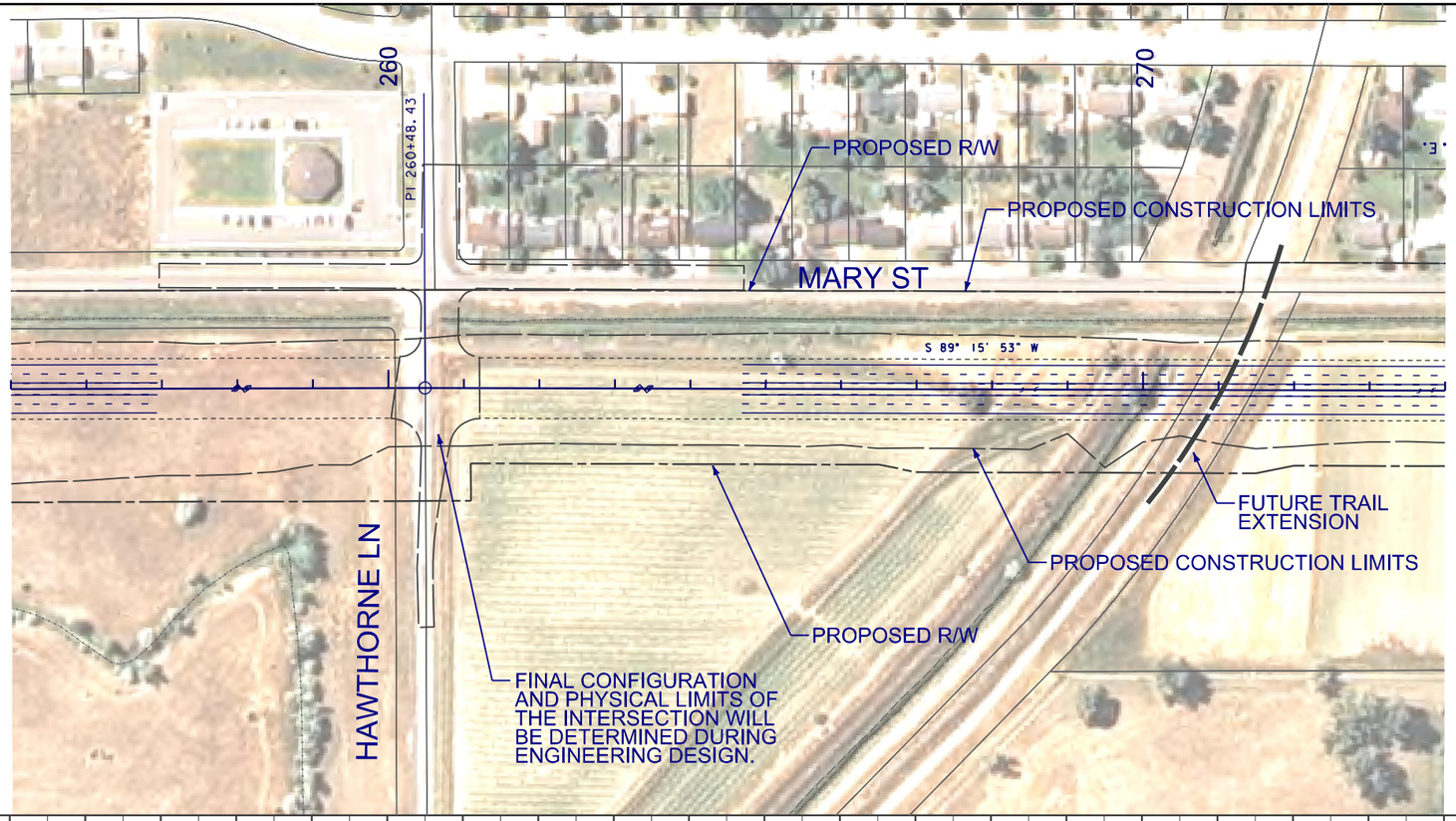
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz13_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M2-8
		4:39:46 PM ngutierrez	CHECKED BY				

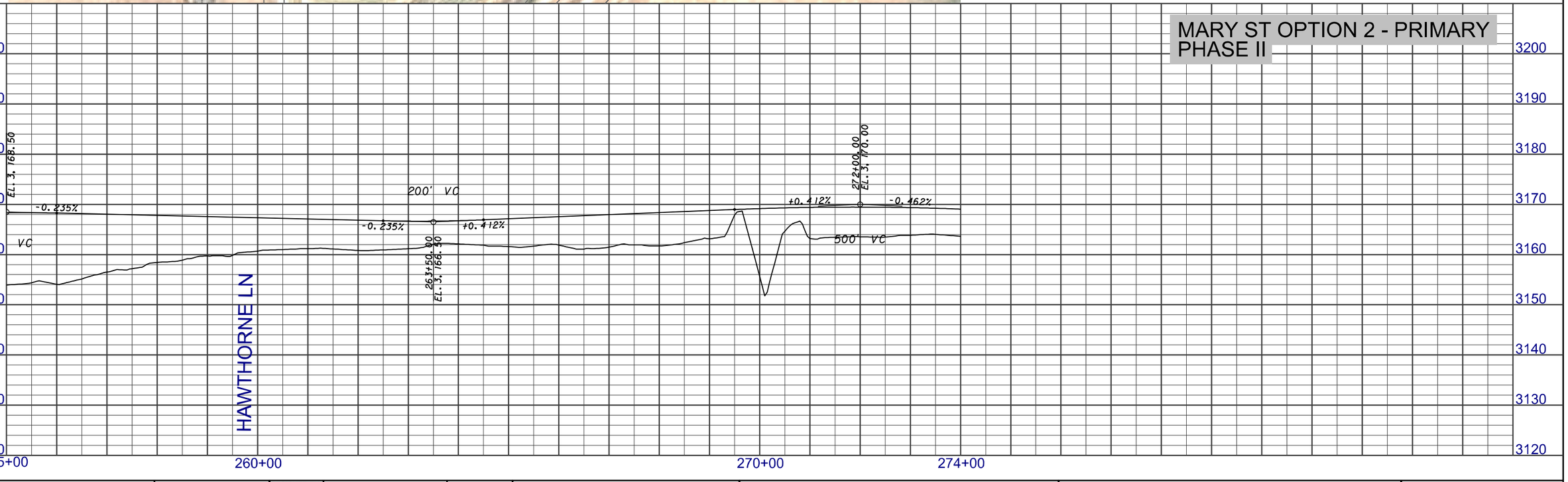




DOWL HKM

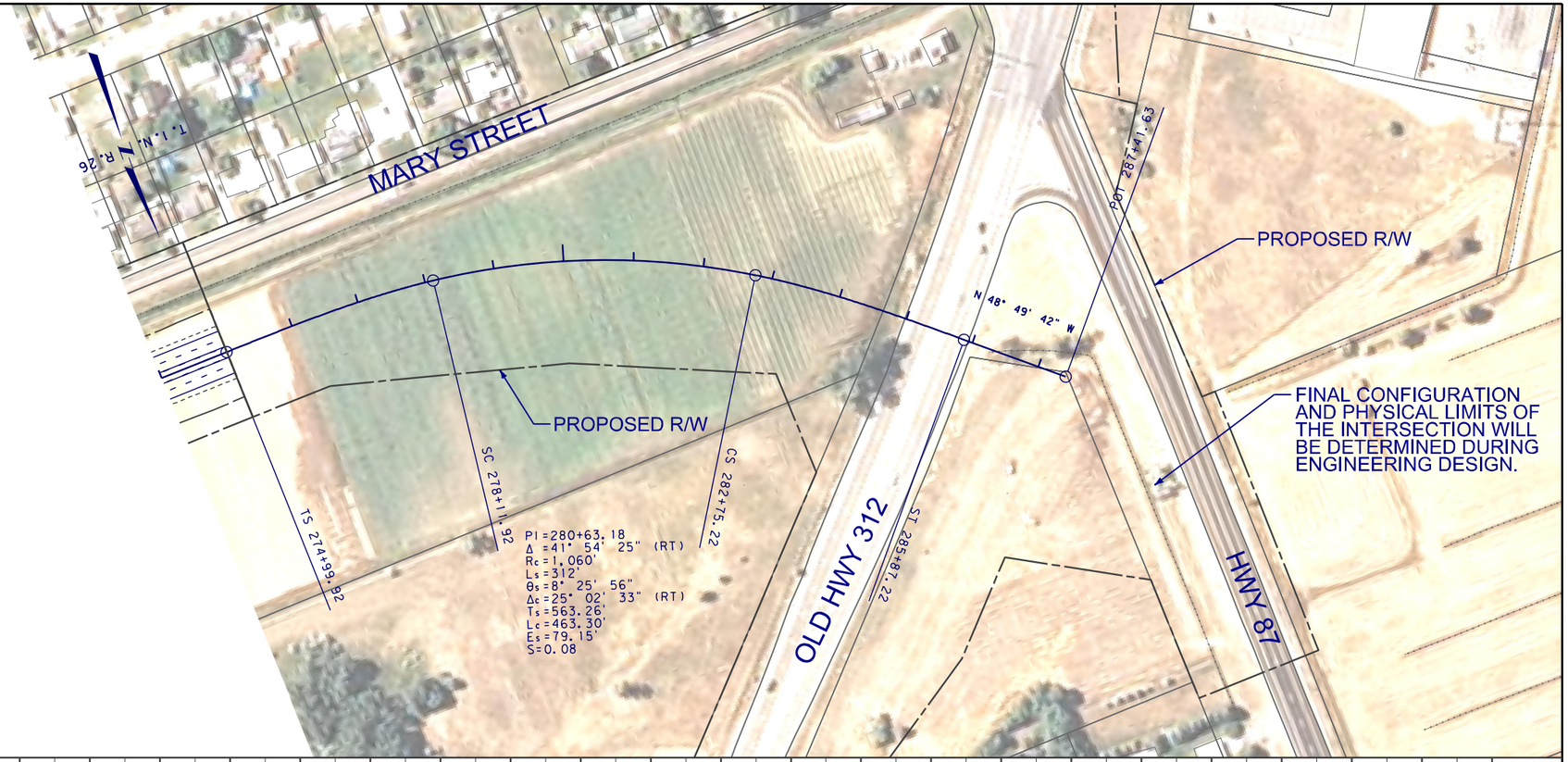
3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz13_M2.dgn 8/23/2013 4:40:04 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-9





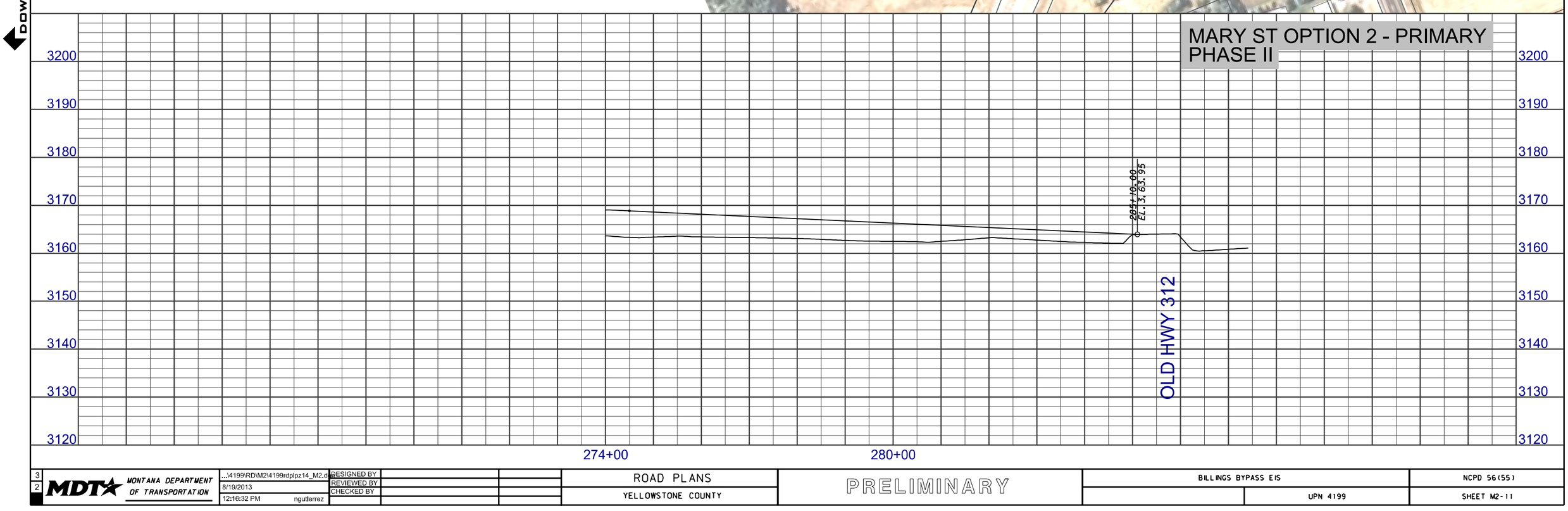
MARY ST OPTION 2 - PRIMARY
PHASE II

2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz13_M2.dgn 8/23/2013 4:40:22 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-10

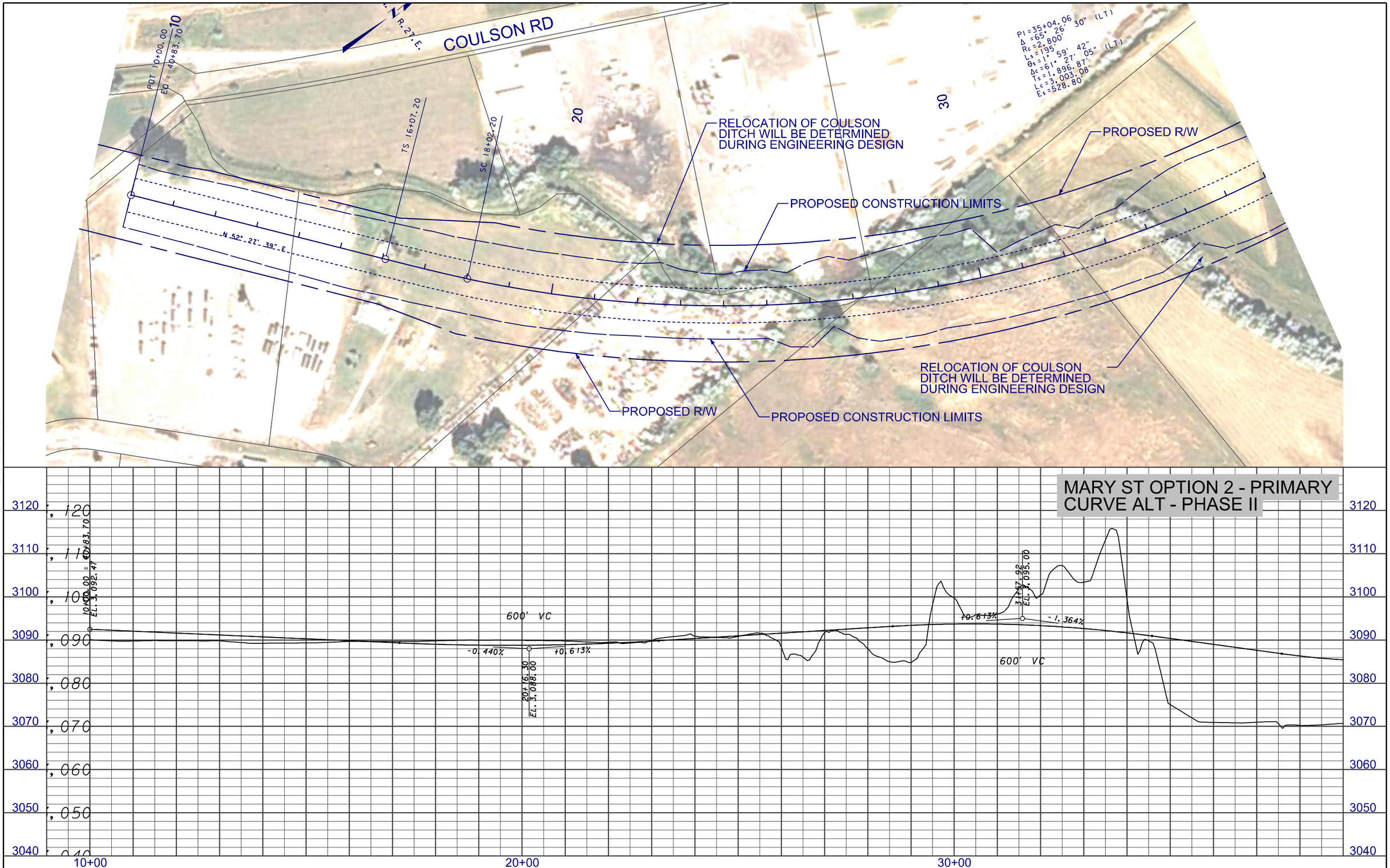


DOWL HKM

MARY ST OPTION 2 - PRIMARY
PHASE II

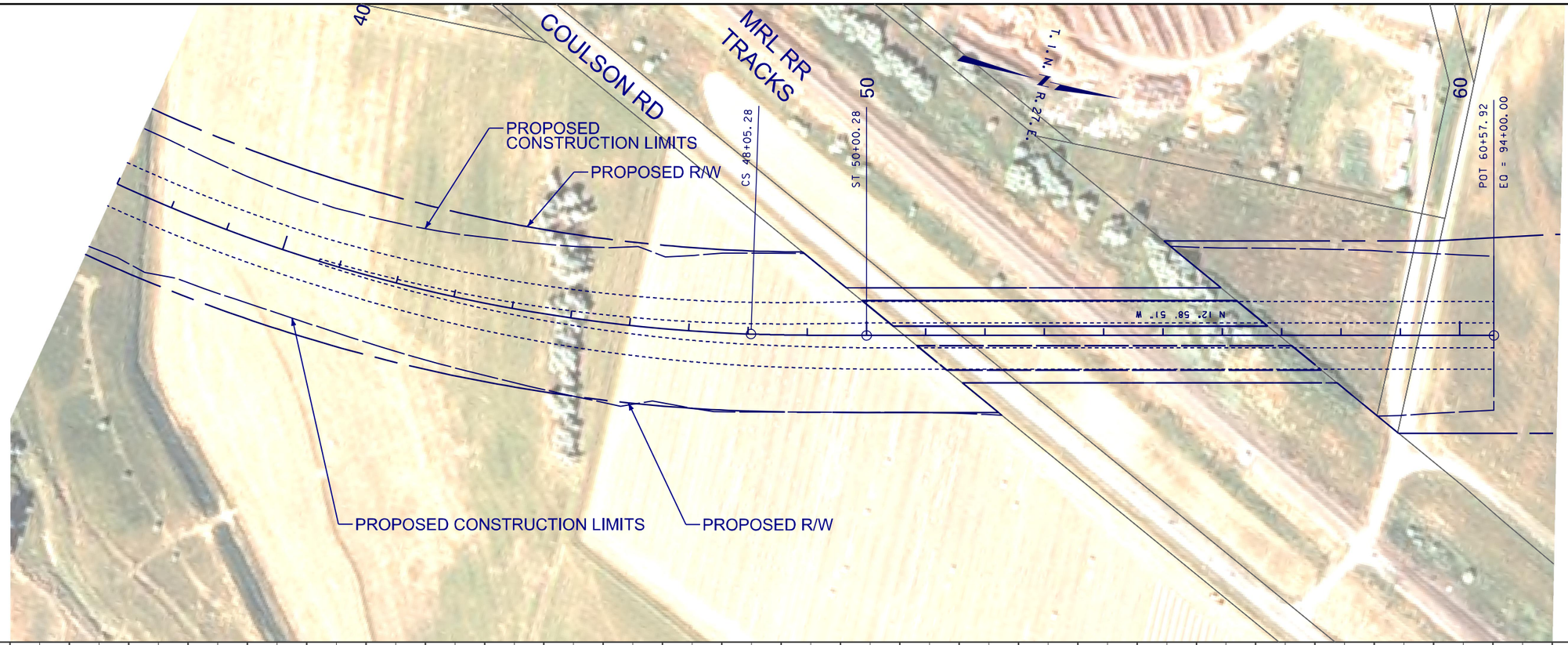


3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz14_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY		YELLOWSTONE COUNTY			SHEET M2-11
		12:16:32 PM ngutierrez	CHECKED BY					



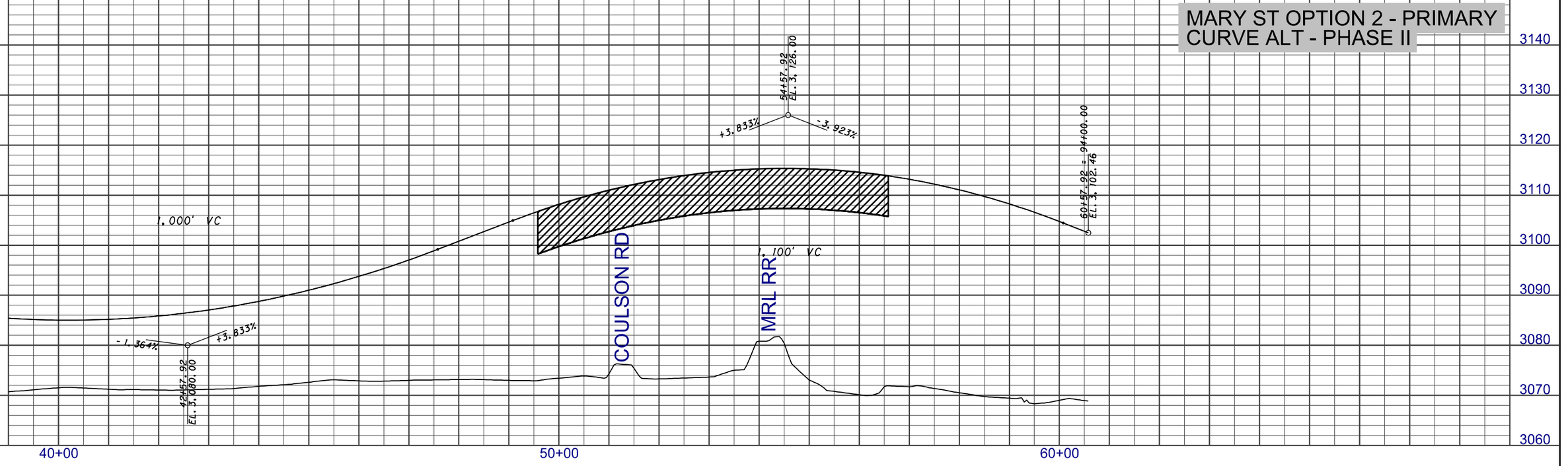
DOWL HKM

3 / 1 MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz15_M2.dgn 8/23/2013 4:47:56 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET M2-12

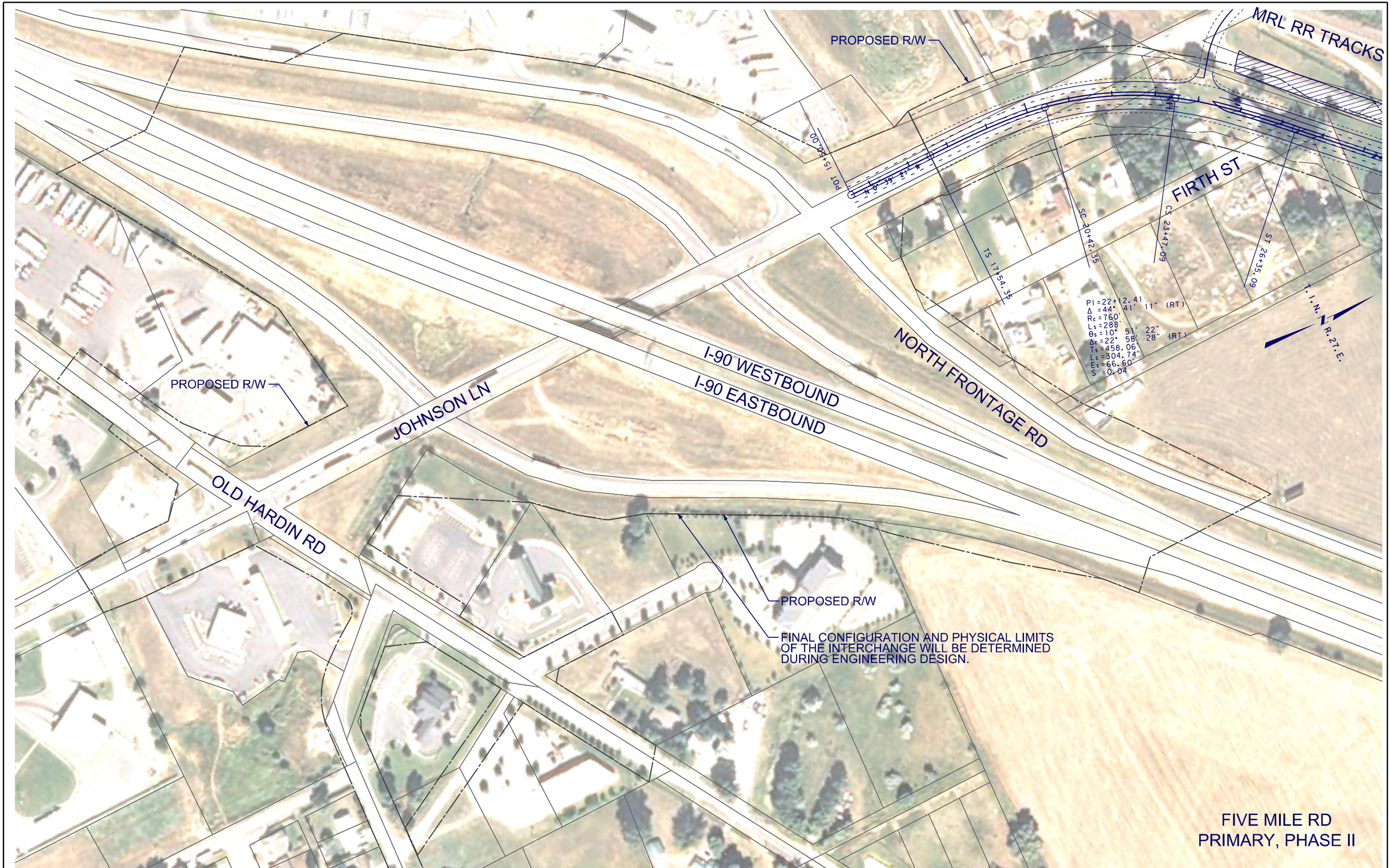


DOWL HKM

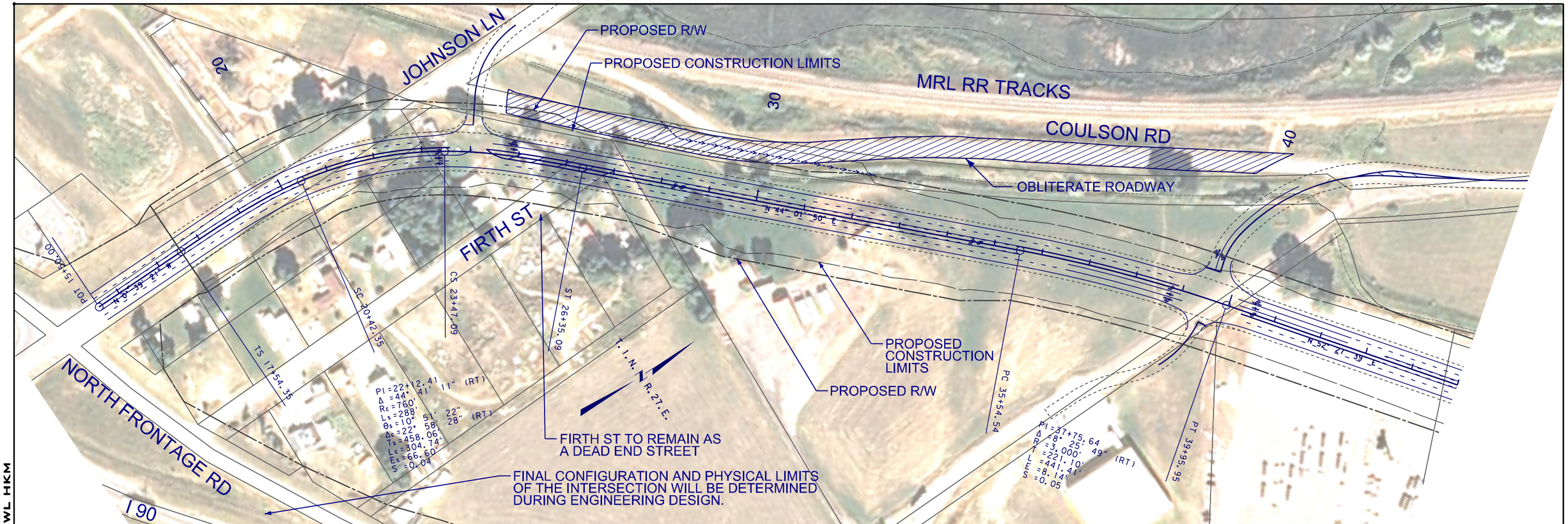
MARY ST OPTION 2 - PRIMARY
CURVE ALT - PHASE II



2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\M2\4199rdplpz15_M2.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET M2-13
		4:48:14 PM ngutierrez	CHECKED BY				



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplnZ11_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
2		8/19/2013	REVIEWED BY				UPN 4199 / SHEET F-1
		12:45:37 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY		



DOWL HKM

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz11_F.dgn	DESIGNED BY	ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199 — NCPD 56(55) / SHEET F-2
2		8/23/2013	REVIEWED BY			
		5:05:56 PM ngutierrez	CHECKED BY	YELLOWSTONE COUNTY		

COULSON RD

50

T. 1 N. R. 27 E.

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

N 52° 21' 39" E

TS 58+12.38

60

SC 61+24.38

PI = 65+87.76
Δ = 65° 26' 30" (LT)
Rc = 960'
Ls = 512'
θs = 9° 18' 38"
Δc = 46° 49' 14" (LT)
Tc = 715.38'
Lc = 784.49'
Es = 186.09'
S = 0.08

70

CS 69+08.87

ST 72+20.87

N 12° 58' 24" W

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

SEE SHEET F-10 AND F-11
FOR CURVE ALT ALIGNMENT

DOWL HKM

FIVE MILE RD - PRIMARY
PHASE II

600' VC

-0.440%

+0.857%

61+00.00
EL. 3,088.00

65+00.00
EL. 3,100.00

+0.857%

-1.918%

600' VC

3130	3130
3120	3120
3110	3110
3100	3100
3090	3090
3080	3080
3070	3070
3060	3060
3050	3050

45+00 50+00 60+00 70+00 75+00

3
1

MDT MONTANA DEPARTMENT OF TRANSPORTATION

...\4199\RD\F\4199rdplpz11_F.dgn
8/23/2013
5:06:15 PM ngutierrez

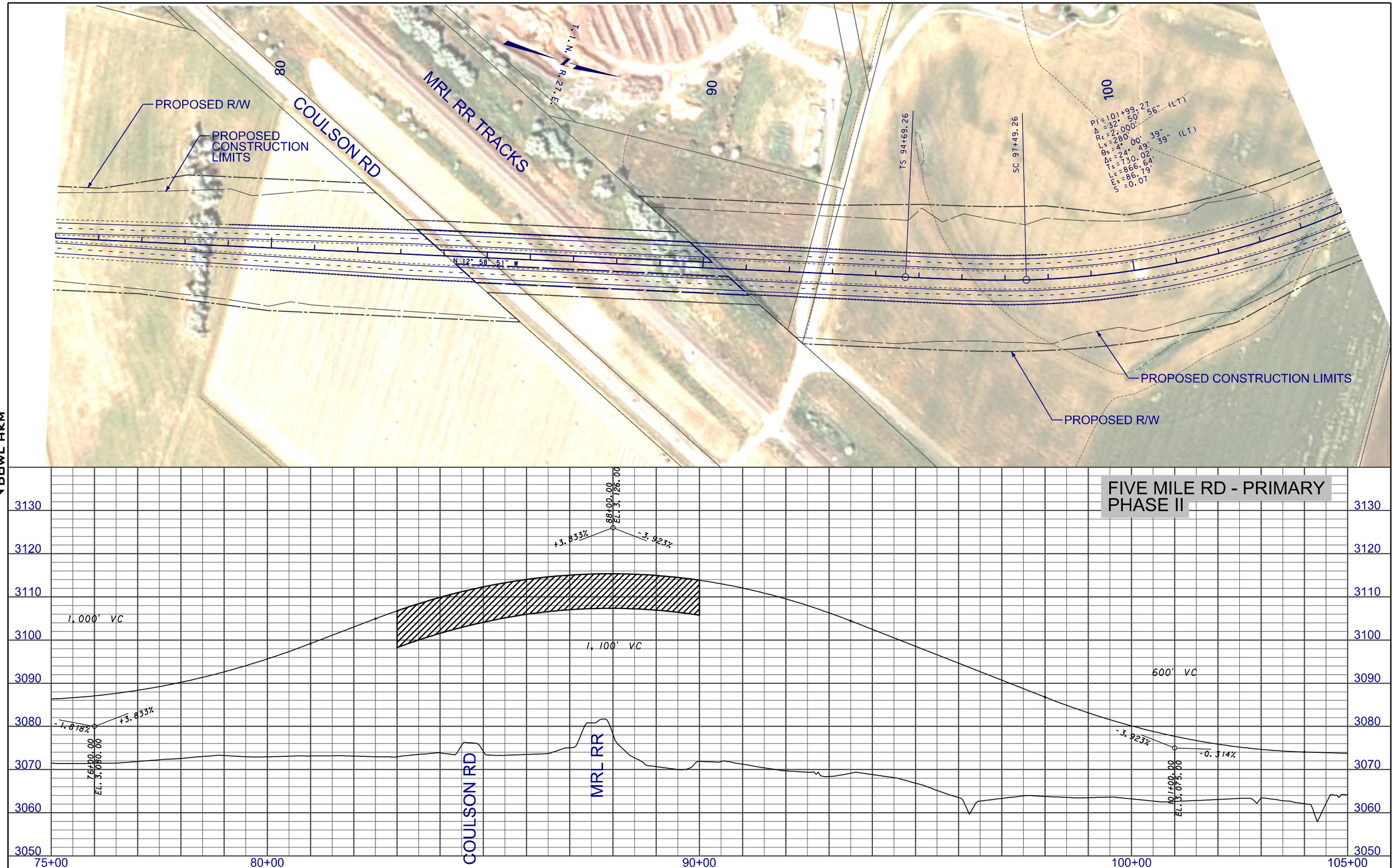
DESIGNED BY
REVIEWED BY
CHECKED BY

ROAD PLANS
YELLOWSTONE COUNTY

PRELIMINARY

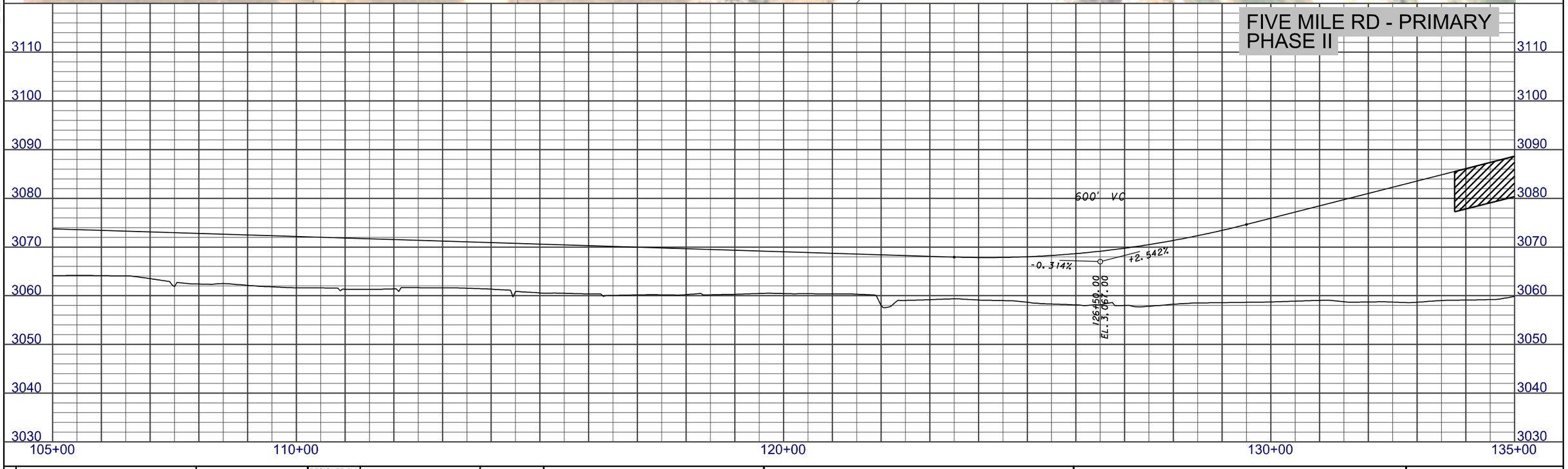
BILLINGS BYPASS EIS
UPN 4199

NCPD 56(55)
SHEET F-3

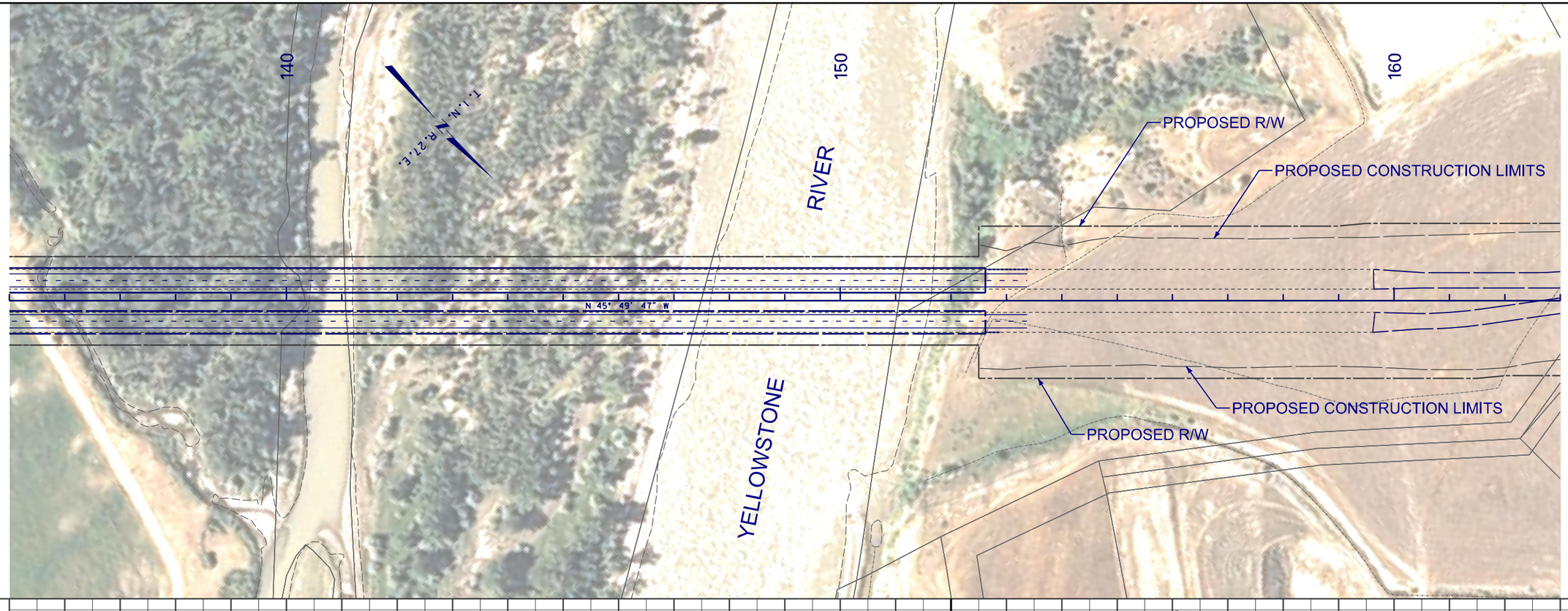


DOWL HKM

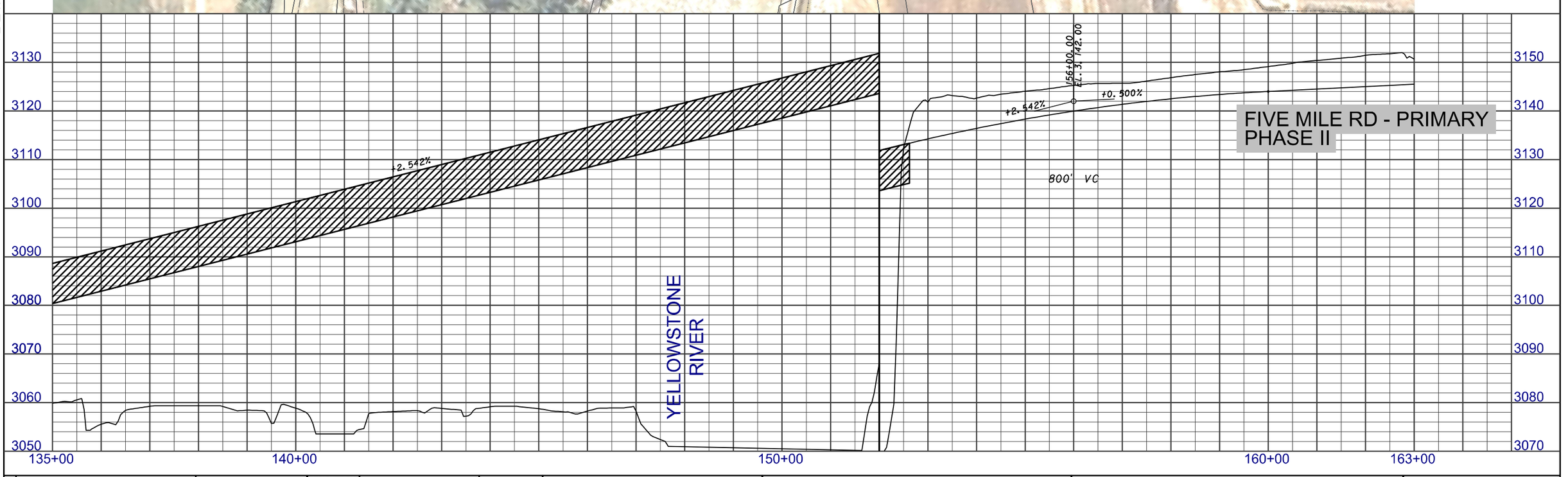
2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz11_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET F-4
		5:06:34 PM ngutierrez	CHECKED BY				



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz12_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		12:55:25 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET F-5



DOWL HKM



FIVE MILE RD - PRIMARY
PHASE II

3 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz12_F.dgn 8/19/2013 12:55:43 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-6

FIVE MILE RD

FIVE MILE - SECONDARY

T. 1 N., R. 27 E.

180

PROPOSED R/W

PROPOSED CONSTRUCTION LIMITS

PROPOSED CONSTRUCTION LIMITS

PROPOSED R/W

N 45° 49' 47" W

N 1° 21' 34" W

SC 171+43.82

CS 181+88.65

ST 185+48.65

TS 167+83.82

PI = 177+04.92
Δ = 44° 28' 12" (RT)
Rc = 1,810'
Ls = 360'
θs = 5° 41' 53"
Δc = 33° 04' 27" (RT)
Ts = 921.10'
Lc = 1,044.83'
Es = 148.63'
S = 0.08

FINAL CONFIGURATION AND PHYSICAL LIMITS OF THE INTERSECTION WILL BE DETERMINED DURING ENGINEERING DESIGN.

DOWNSTREAM

FIVE MILE RD - PRIMARY
PHASE II

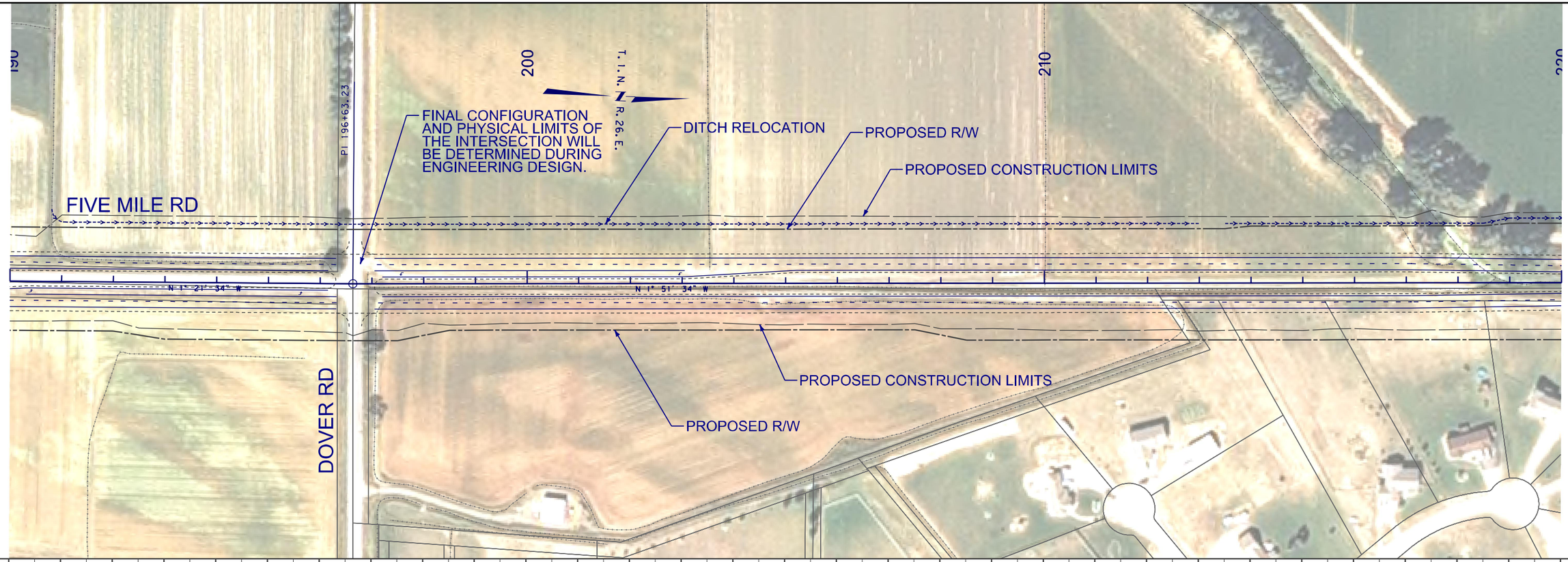
3190
3180
3170
3160
3150
3140
3130
3120
3110

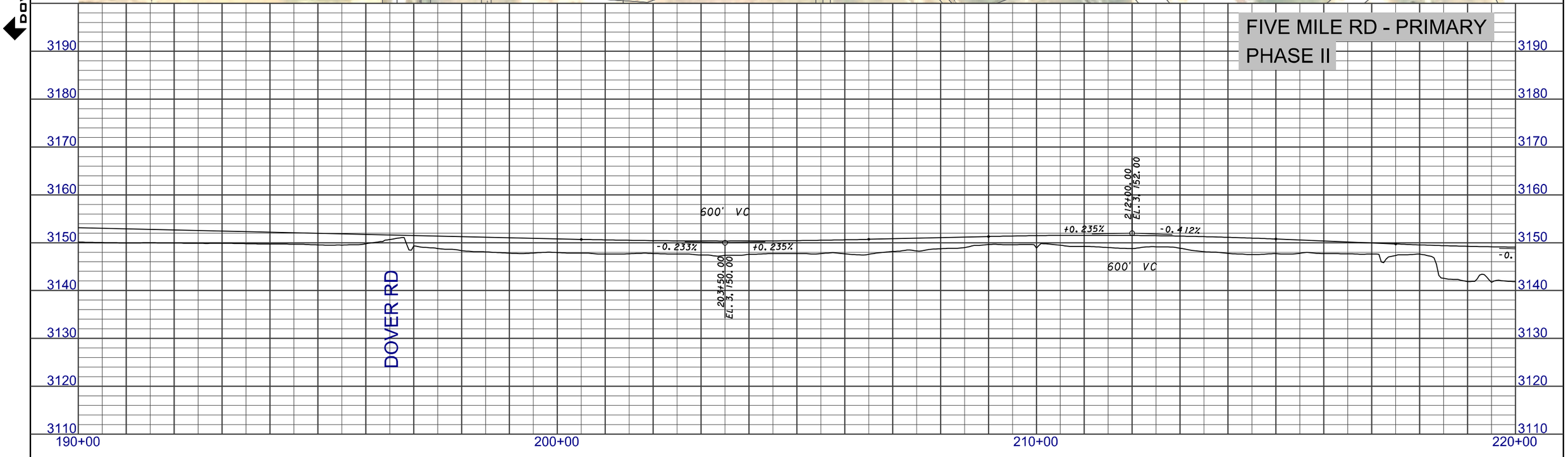
163+00
170+00
180+00
190+00

182+00.00
EL. 3,155.00

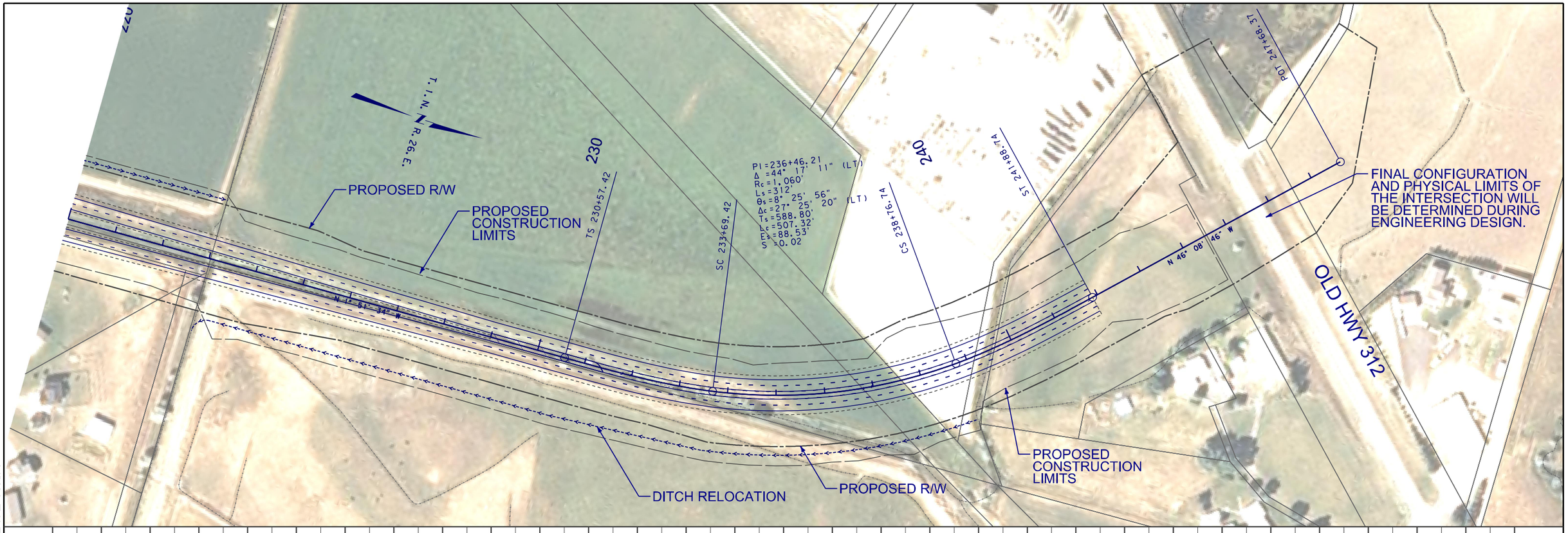
+0.500%
-0.233%
600' VC

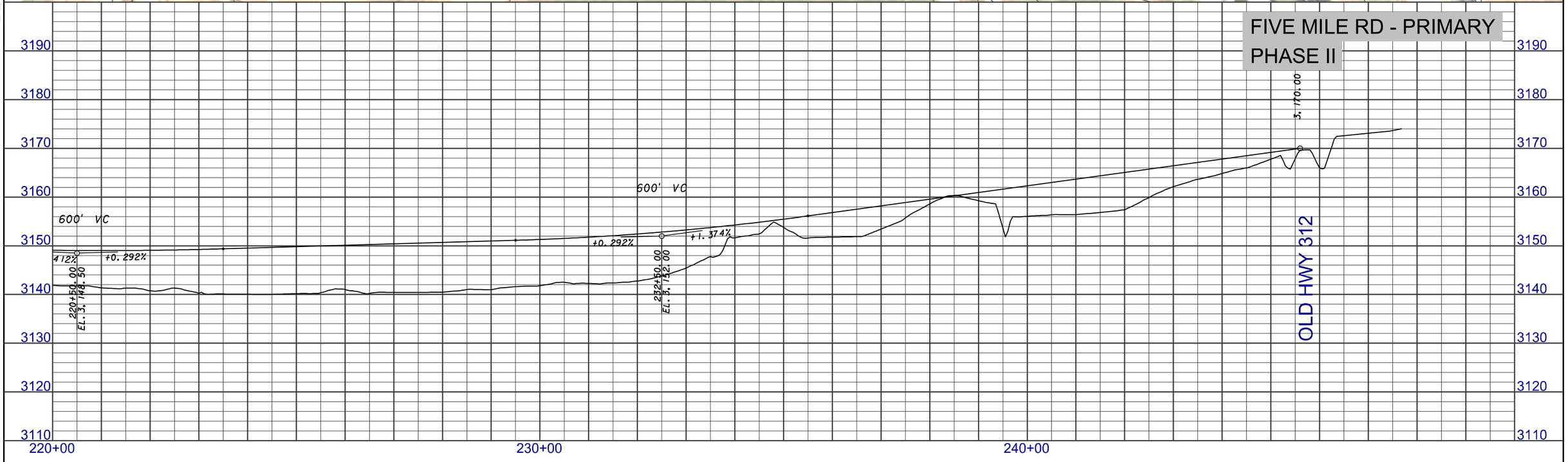
2 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz12_F.dgn 8/19/2013 12:56:01 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-7



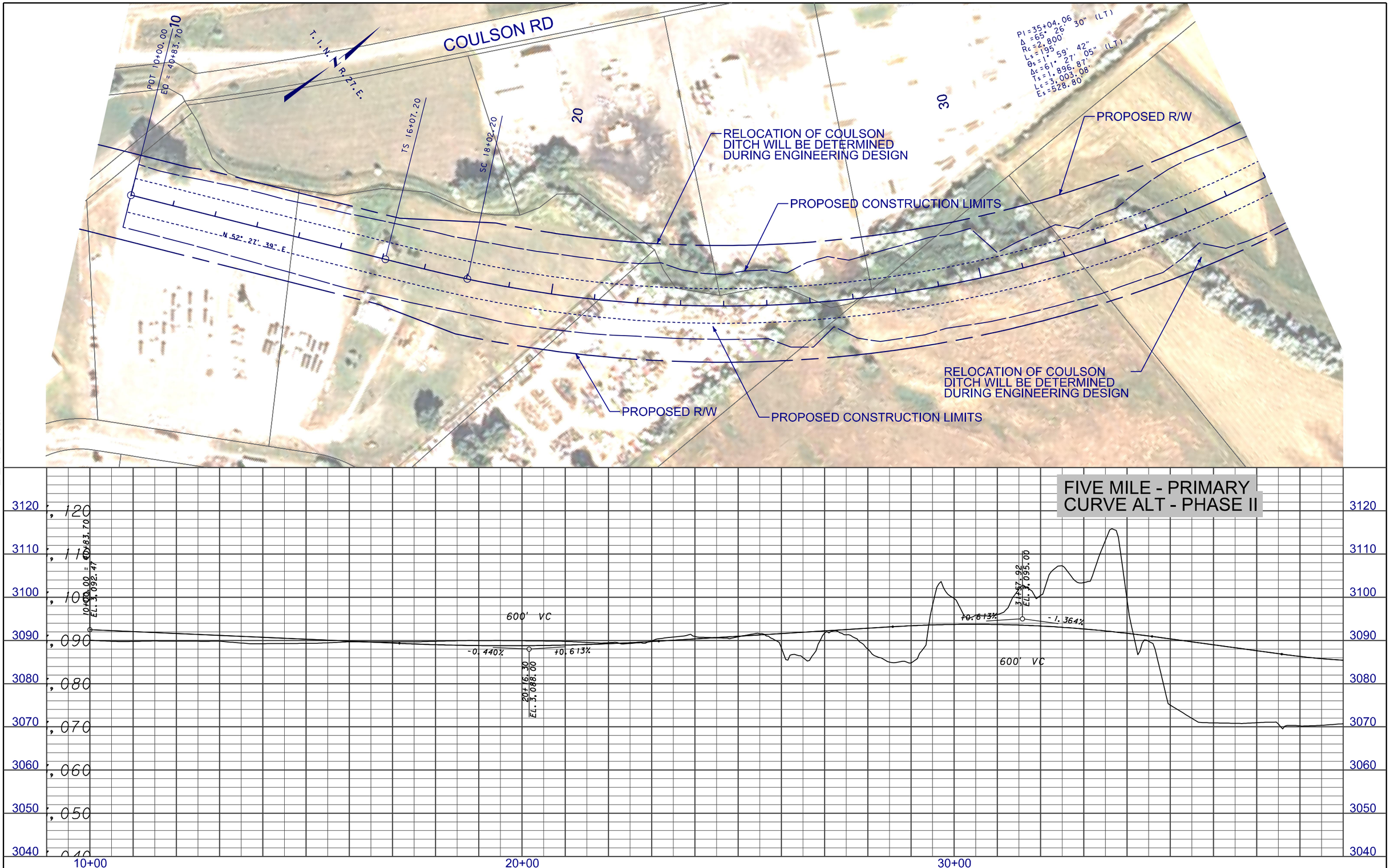


3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz13_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS BYPASS EIS / UPN 4199	NCPD 56(55)
2		8/19/2013	REVIEWED BY					
		12:57:51 PM ngutierrez	CHECKED BY		YELLOWSTONE COUNTY			SHEET F-8



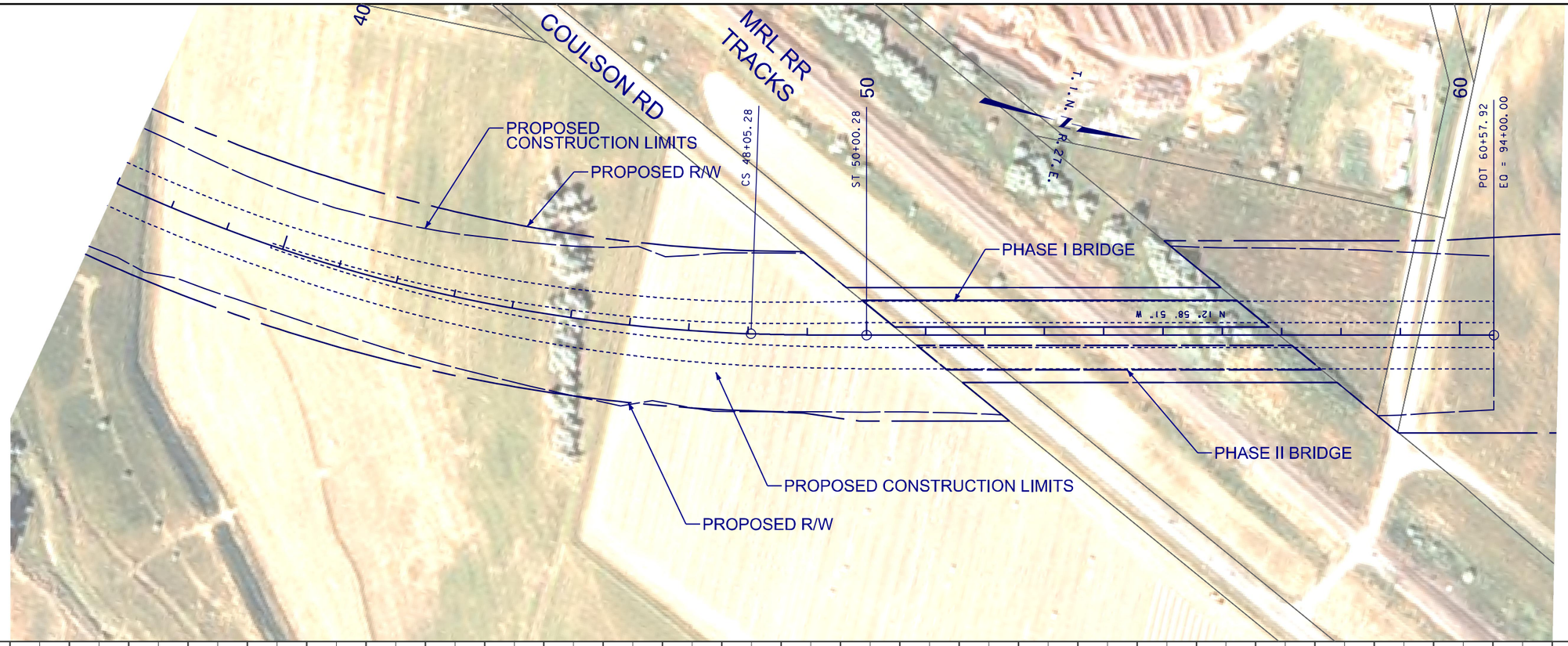


3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz13_F.dgn 8/19/2013 12:58:10 PM ngutierrez	DESIGNED BY REVIEWED BY CHECKED BY		ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-9



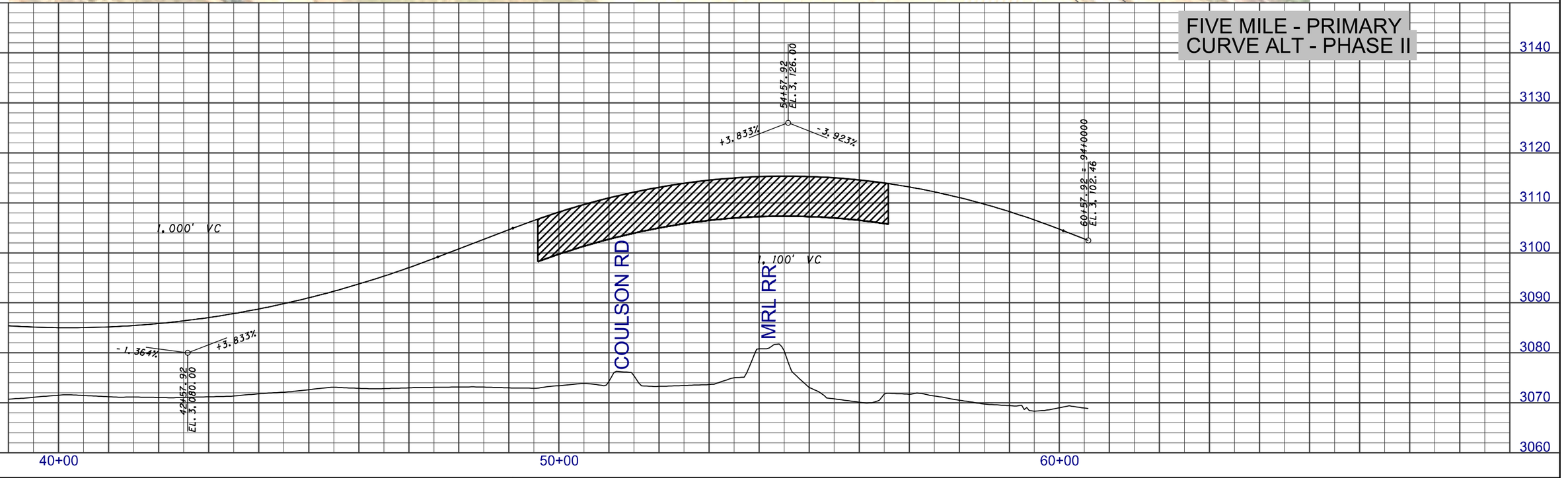
DOWL HKM

3 / 1	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz14_F.dgn 8/23/2013 5:12:06 PM ngutlerrez	DESIGNED BY REVIEWED BY CHECKED BY	ROAD PLANS YELLOWSTONE COUNTY	PRELIMINARY	BILLINGS - BYPASS EIS UPN 4199	NCPD 56(55) SHEET F-10



DOWL HKM

FIVE MILE - PRIMARY
CURVE ALT - PHASE II



2	MDT MONTANA DEPARTMENT OF TRANSPORTATION	...\4199\RD\F\4199rdplpz14_F.dgn	DESIGNED BY		ROAD PLANS	PRELIMINARY	BILLINGS - BYPASS EIS / NCPD 56(55)
1		8/23/2013	REVIEWED BY		YELLOWSTONE COUNTY		UPN 4199 / SHEET F-11
		5:12:24 PM ngutierrez	CHECKED BY				