

Michigan Department of Transportation

Infrastructure Protection and Rehabilitation Response to High Lake Levels

MDOT OR21-013

Appendix G: M-116 Ludington State Park Expanded Documentation

March 2022 (Final)

Infrastructure Protection and Rehabilitation Response to High Lake Levels

MDOT OR21-031

Appendix G: M-116 Ludington State Park Expanded Documentation

March 2022 (Final)

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As Arcadis does not have a complete control over the accuracy of the data used in the conceptual engineering and design completed in this report, it is recommended that the results shown not be used without first obtaining additional information and confirming all results. This includes, but is not limited to, the roadway survey data, the recommended bridge structures, the soils and geotechnical data, the erosion control calculations, the wave calculations, future high water and wave forecasts, and all other engineering design. The statements provided herein shall not be relied upon for any specific application without independent verification and assessment of suitability by the project's engineer of record, architect, or another party acting in similar capacity, as stipulated by the authority having jurisdiction or other applicable contractual regulations.

Therefore, while preliminary recommendations, calculations, and engineering design are based on sound and established principles, they shall not be deemed as instruction for any specific application or project without subsequent independent analysis, evaluation, verification and assessment of appropriateness for such an application by the engineer and/or architect of the project.

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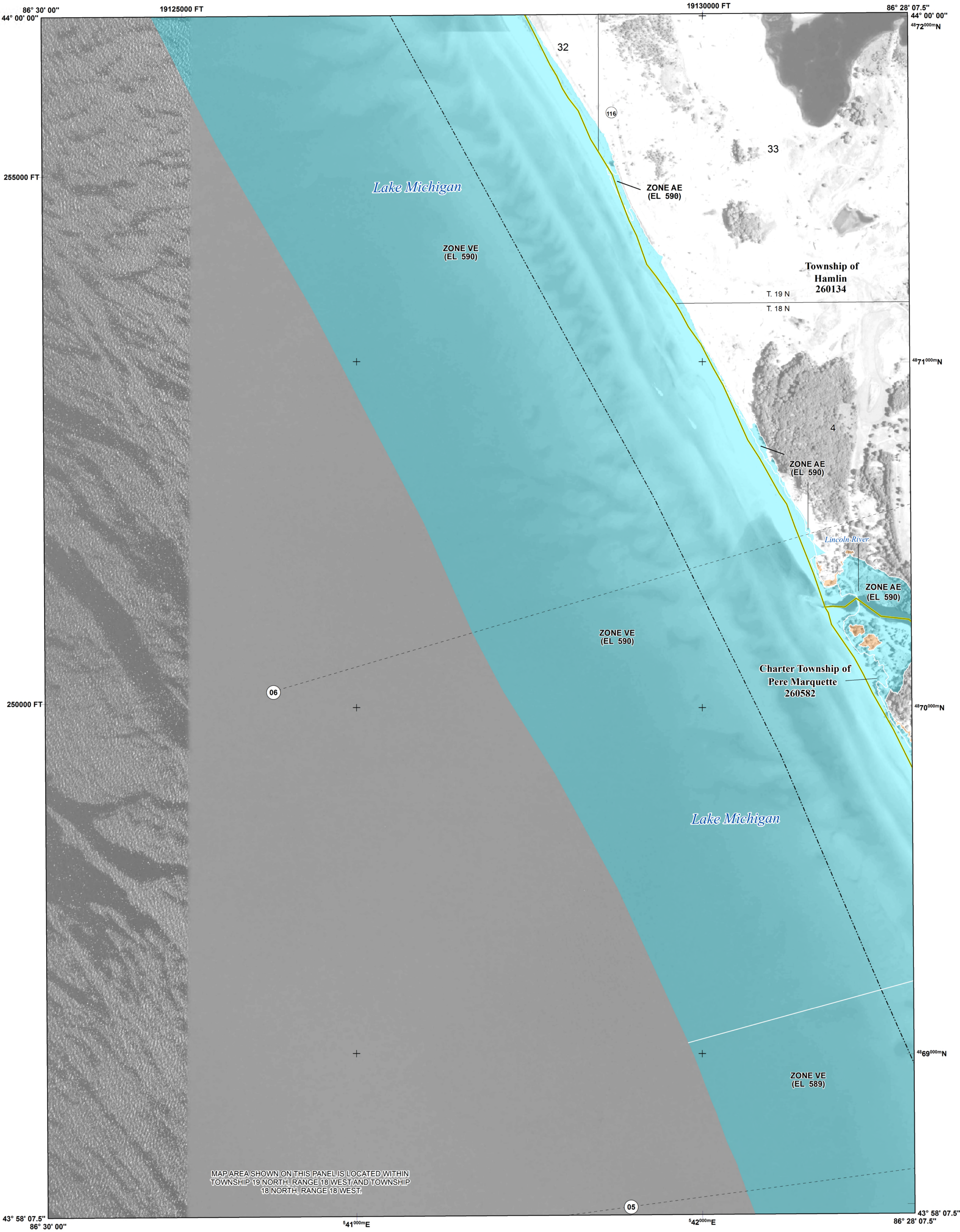
FEMA FIRM Map

26105C0119D

26105C0226D

26105C0138D

Effective Date August 24, 2021



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A,V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS		Area of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
		Coastal Transect
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
		Limit of Study
	Jurisdiction Boundary	

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM Panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <https://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

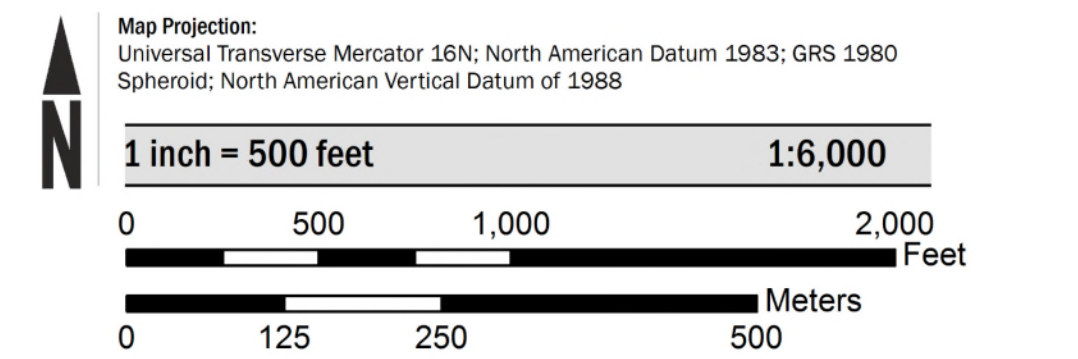
Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

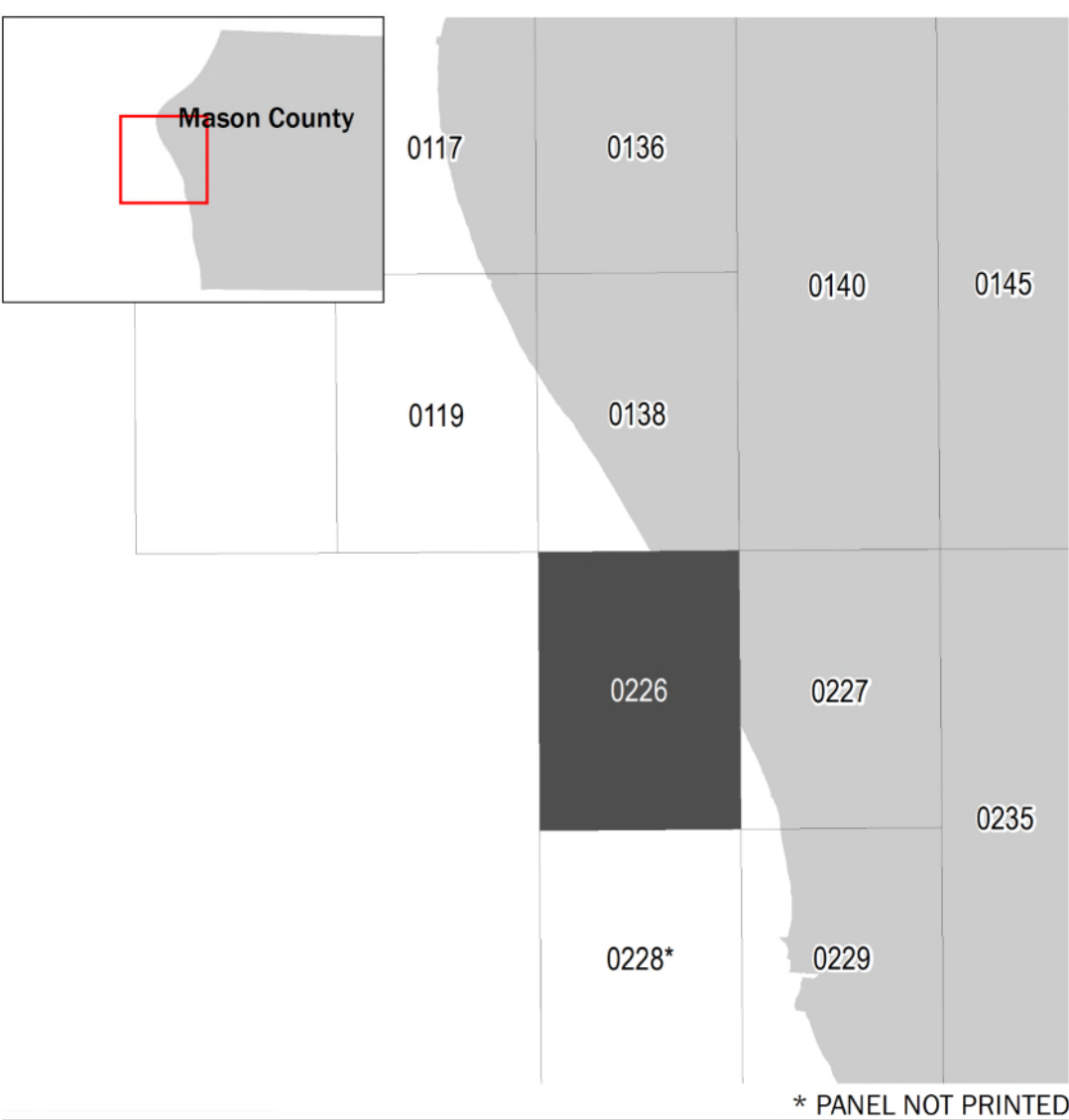
To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap shown on this FIRM was provided by the USDA FSA Aerial Photography Field Office. This information was photogrammetrically compiled at a scale of 1:12,000 from aerial photography dated 2012.

SCALE



PANEL LOCATOR



National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MASON COUNTY, MICHIGAN
(All Jurisdictions)

PANEL 226 OF 425

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
PERE MARQUETTE, CHARTER TOWNSHIP OF	260582	0226	D
HAMLIN, TOWNSHIP OF	260134	0226	D

VERSION NUMBER
2.4.3.5

MAP NUMBER
26105C0226D

MAP REVISION
AUGUST 24, 2021

Cost Estimate for Preferred Mitigation Alternative for M-116 Ludington State Park Expanded Documentation

**OPINION OF PROBABLE CONSTRUCTION COST
CITY OF LUDINGTON, MICHIGAN**

**M-116 RECONSTRUCTION
(LUDINGTON STATE PARK)**

REF NO.	ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	ITEM TOTAL
1	1500001	Mobilization, Max \$200,000.00	LSUM	1	\$200,000.00	\$200,000.00
2	201001	Clearing	Acre	10	\$5,000.00	\$52,462.81
3	2030001	Culv, Rem, Less than 24 inch	Ea	4	\$400.00	\$1,600.00
4	2040050	Pavt, Rem	Syd	41,491	\$8.00	\$331,926.22
5	2050010	Embankment, CIP	Cyd	4,904	\$12.00	\$58,848.00
6	2050016	Excavation, Earth	Cyd	118,558	\$12.00	\$1,422,696.00
7	2080001	Sediment and Erosion Control	LSUM	1	\$25,000.00	\$25,000.00
8	3010002	Subbase, CIP	Cyd	48,439	\$25.00	\$1,210,972.22
9	3020001	Aggregate Base	Ton	13,840	\$40.00	\$553,581.48
10	3070001	Shoulder, CL II	Ton	1,318	\$6.00	\$7,908.89
11	4010165	Culv, Cl A, Conc, 12 inch	Ft	100	\$80.00	\$8,000.00
12	4040063	Underdrain, Subbase, 6 inch	Ft	17,794	\$45.00	\$800,730.00
13	4040093	Underdrain Outlet, 6 inch	Ft	200	\$25.00	\$5,000.00
14	4040113	Underdrain Outlet Ending, 6 inch	Ea	8	\$200.00	\$1,600.00
15	5010045	HMA, 3E3	Ton	9,110	\$95.00	\$865,416.75
16	5010051	HMA, 4E3	Ton	3,344	\$90.00	\$300,935.25
17	5010057	HMA, 5E3	Ton	3,344	\$90.00	\$300,935.25
18	8097043	Field Office, CL 3	Mo	18	\$2,000.00	\$36,000.00
19	8100001	Traffic Signs	LSUM	1	\$10,000.00	\$10,000.00
20	8110091	Pavt Mrkg, Polyurea, 4 inch, White	Ft	17,794	\$1.00	\$17,794.00
21	8110092	Pavt Mrkg, Polyurea, 4 inch, Yellow	Ft	8,897	\$1.00	\$8,897.00
22	8120001	Maintenance of Traffic (Assume 2% of Construction Cost)	LSUM	1	\$180,000.00	\$180,000.00
23	8160027	Mulch Blanket	Syd	25,392	\$1.50	\$38,088.00
24	8160062	Topsoil Subsurface, Furn, 4 inch	Syd	50,784	\$5.00	\$253,920.00

REF NO.	ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	ITEM TOTAL
25	8167011	Turf Establishment - Seed	Syd	50,784	\$4.00	\$203,136.00
26	8240001	Contractor Staking	LSUM	1	\$25,000.00	\$25,000.00
		CONSTRUCTION SUBTOTAL				\$6,920,447.87
		30% CONTINGENCY				\$2,076,134.36
		CONSTRUCTION TOTAL				\$8,996,582.24
		RIGHT-OF-WAY	Sf	265,985	\$1.00	\$265,985.00
		UTILITY RELOCATIONS	Ft	0	\$25.00	\$0.00
		ESTIMATED PROJECT TOTAL				\$9,262,567.24

OPINION OF PROBABLE CONSTRUCTION COST
CITY OF LUDINGTON, MICHIGAN

M-116 RECONSTRUCTION
(LUDINGTON STATE PARK)

REF NO.	ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	INFLATION ADJUSTED UNIT COST	ITEM TOTAL
1	1500001	Mobilization, Max \$100,000.00	LSUM	1	\$100,000.00	\$115,000.00	\$115,000.00
2	2040050	Cold Milling HMA Surface	Syd	40,530	\$1.50	\$1.73	\$69,914.25
3	3070001	Shoulder, CL II	Ton	1,318	\$30.00	\$34.50	\$45,476.11
4	5010058	HMA, 5E3	Ton	3,344	\$90.00	\$103.50	\$346,075.54
5	8240001	Contractor Staking	LSUM	1	\$10,000.00	\$11,500.00	\$11,500.00
		CONSTRUCTION TOTAL					\$587,965.90

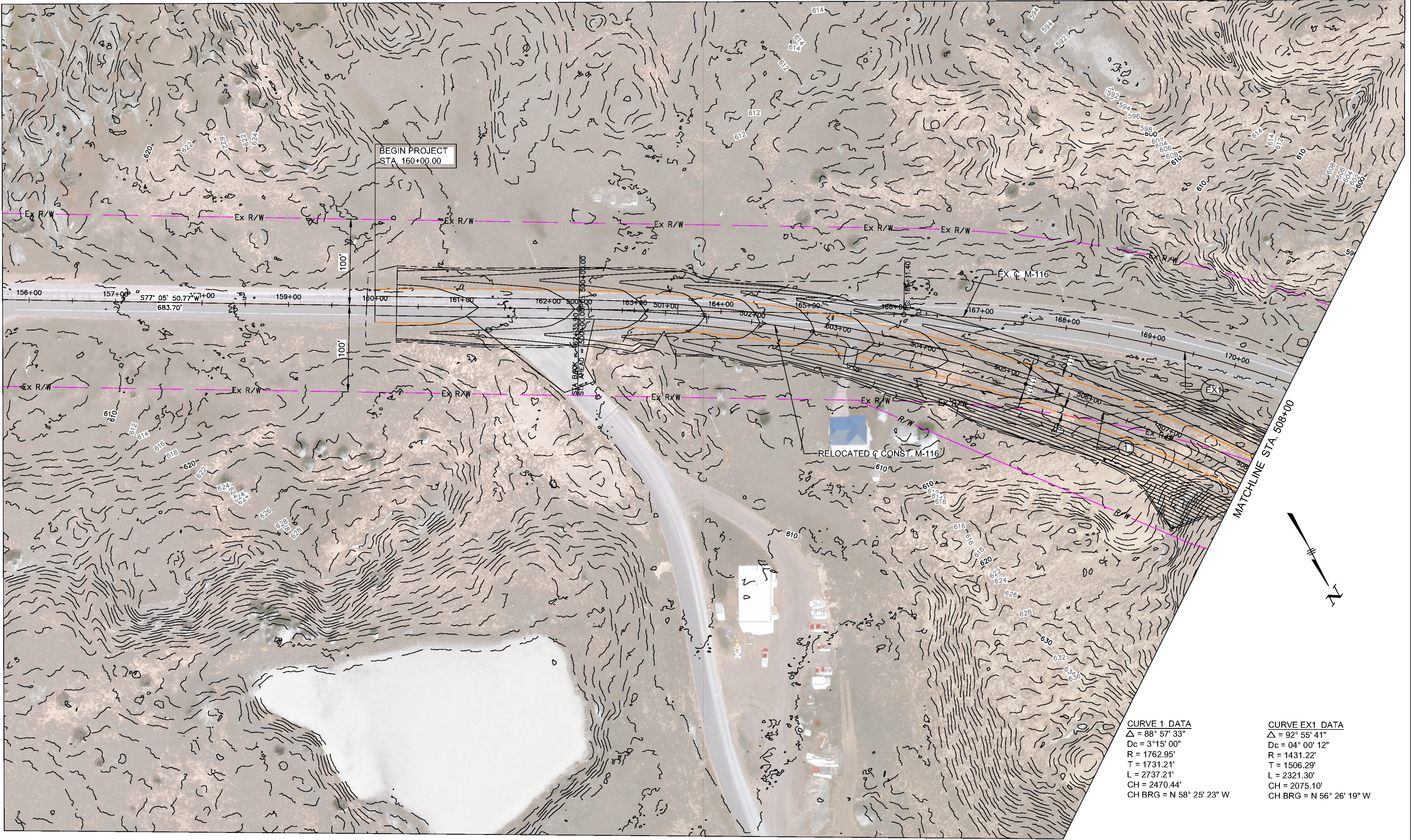
Ludington State Park
M-116 Design Criteria Matrix

Preparation Date: 6-30-2021
Consultant: ARCADIS

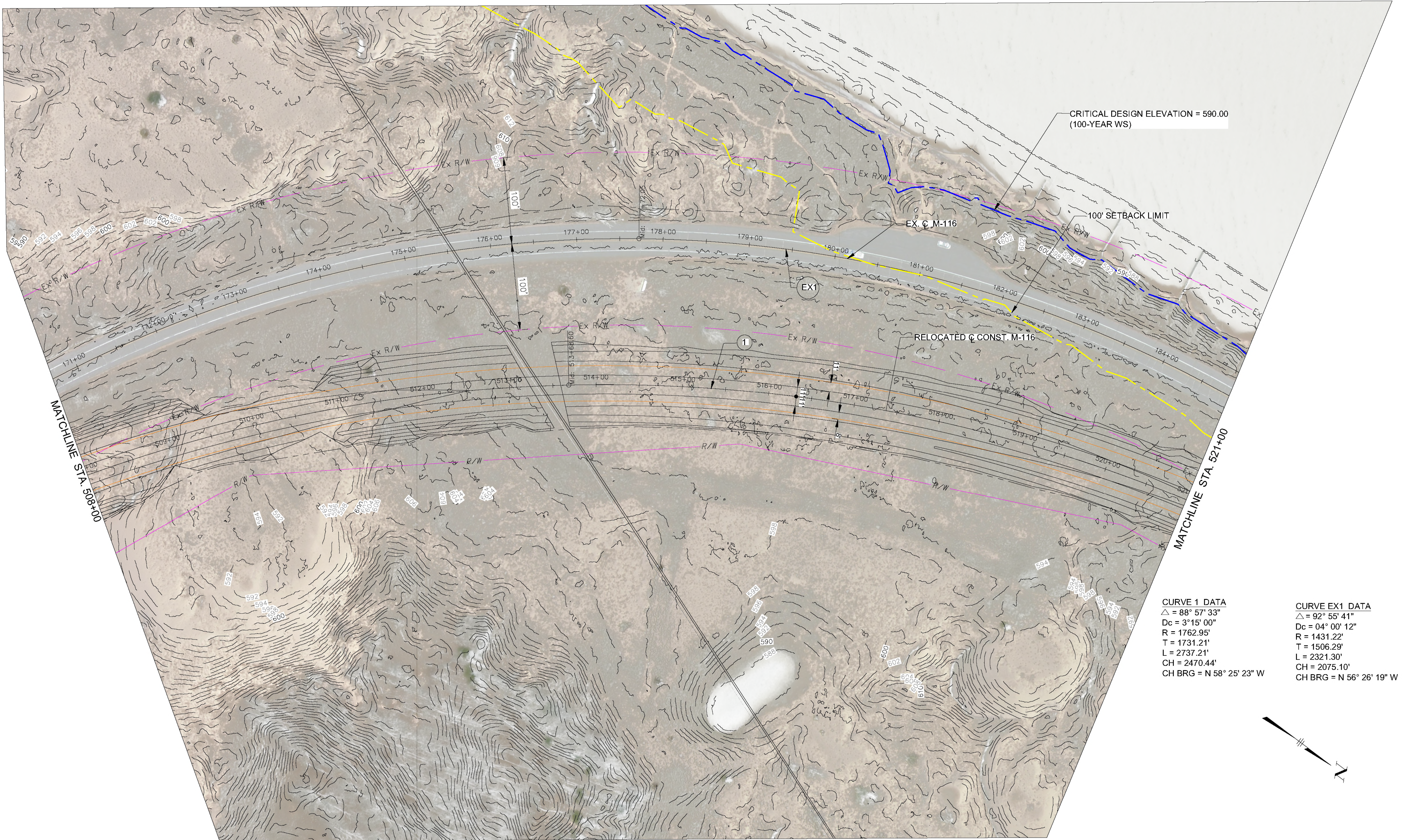
Item	Engineering Design Feature	Criteria 25 MPH	Reference
	Design Controls		
1	Highway Functional Classification	Collector	
2	Design Functional Classification	Rural Major Collector	
3	AADT (2019)	3,500	TDMS
4	CAADT (2019)	105	TDMS
5	Terrain Type	Level	Topo Maps
6	Legal Speed Limit	55	2006 Plans
7	Design Speed	60	MDOT RDM, Sec. 3.06
8	Route on the National Highway System (NHS)?	No	NHS Michigan Map
	Horizontal Alignment Design		
1	Stopping Sight Distance	570'	MDOT RDM, Sec. 3.03.01
2	Horizontal Sight Distance	570'	MDOT RDM, Sec. 3.03.01D
3	Passing Sight Distance	1000 (K=357)	AASHTO Green Book
4	Intersection Sight Distance (Left Turn)	665 (K=158)	AASHTO Green Book
5	Intersection Sight Distance (Right turn)	575 (K=118)	AASHTO Green Book
6	Decision Sight Distance (DSD)	990'	AASHTO Green Book
7	Max. Centerline deflection w/o horiz. curve	0° 55'	AASHTO Green Book
8	Max. Degree of Curve w/ superelevation (Min. Radius)	4°45' (1,206)	AASHTO Green Book
9	Max. Degree of Curve w/o superelevation (Min. Radius)	0°32' (10,743)	AASHTO Green Book
10	Design Superelevation Rate	0.070	Appendix 3A-4
11	Superelevation Transitions (equivalent max. relative slope)	222:1	AASHTO Green Book
12	Max. Curve w/o Spiral (Min. Radius)	3° 00'	AASHTO Green Book
	Vertical Alignment Design		
1	Max. Grades - Roadway (Rolling Terrain)	6.00%	MDOT RDM, Sec. 3.03.02 and Appendix 3A-4
2	Critical Length of Grade	N/A	
3	Min. Grades- Roadway	0.00%	AASHTO Green Book
4	Max. Change in Vertical algnmt. w/o vert. curve	0.30%	AASHTO Green Book
5	Vertical Curve design SSD (crest)	570 (K=151)	AASHTO Green Book
6	Vertical Curve design SSD (sag)	570 (K=136)	AASHTO Green Book
	Cross Section Design		
1	Travel Lane Width	12	MDOT RDM, Sec. 3.09.02
2	Cross Slopes (Roadway lanes)	2.00%	MDOT RDM, Sec. 3.09.02
3	Graded Shoulder Width (w/ barrier / w/o barrier)	8'+4' = 12'	MDOT RDM, Sec. 6.05.04D Shoulder Width Details
4	Treated Shoulder Width	8'	MDOT RDM, Sec. 3.09.02 and Appendix 3A-2
5	Treated Shoulder Composition	Paved	MDOT RDM, Sec. 3.09.02 and Appendix 3A-2
6	Cross Slopes (shoulders)	4.00%	MDOT RDM, Sec. 6.05.05
7	Guardrail offset from traveled way	10'	MDOT RDM, Sec. 6.05.04D Shoulder Width Details & 7.01.30B
8	Rounding	4'	

Item	Engineering Design Feature	Criteria 25 MPH	Reference
	Roadside Design		
1	Clear Zone Width	Varies 14' to 30'	MDOT RDM, Sec. 7.01.11
2	Safety Grading in Clear Zone	N/A	
3	Safety Grading outside of Clear Zone	N/A	
4	Barrier Grading	Yes, If Required	MDOT RDM, Sec. 7.01.30
5	Clear Zone Grading	Fill Slopes 1:4 Max Foreslopes.; Cut Slopes 1:4 Max. Backslopes	MDOT RDM, Sec. 2.03.01 and Sec. 7.01.11
6	Common Grading	N/A	
7	Roadside Barrier Warrants	Yes	MDOT RDM, Sec. 7.01.30
8	Median Barrier Warrants	N/A	
9	Lateral Clearence for bridge	Shoulder width + GR Offset = 10'	
10	Curve Widening	N/A	

Engineering Drawings for Preferred Mitigation Alternative for M-116 Ludington State Park Expanded Documentation

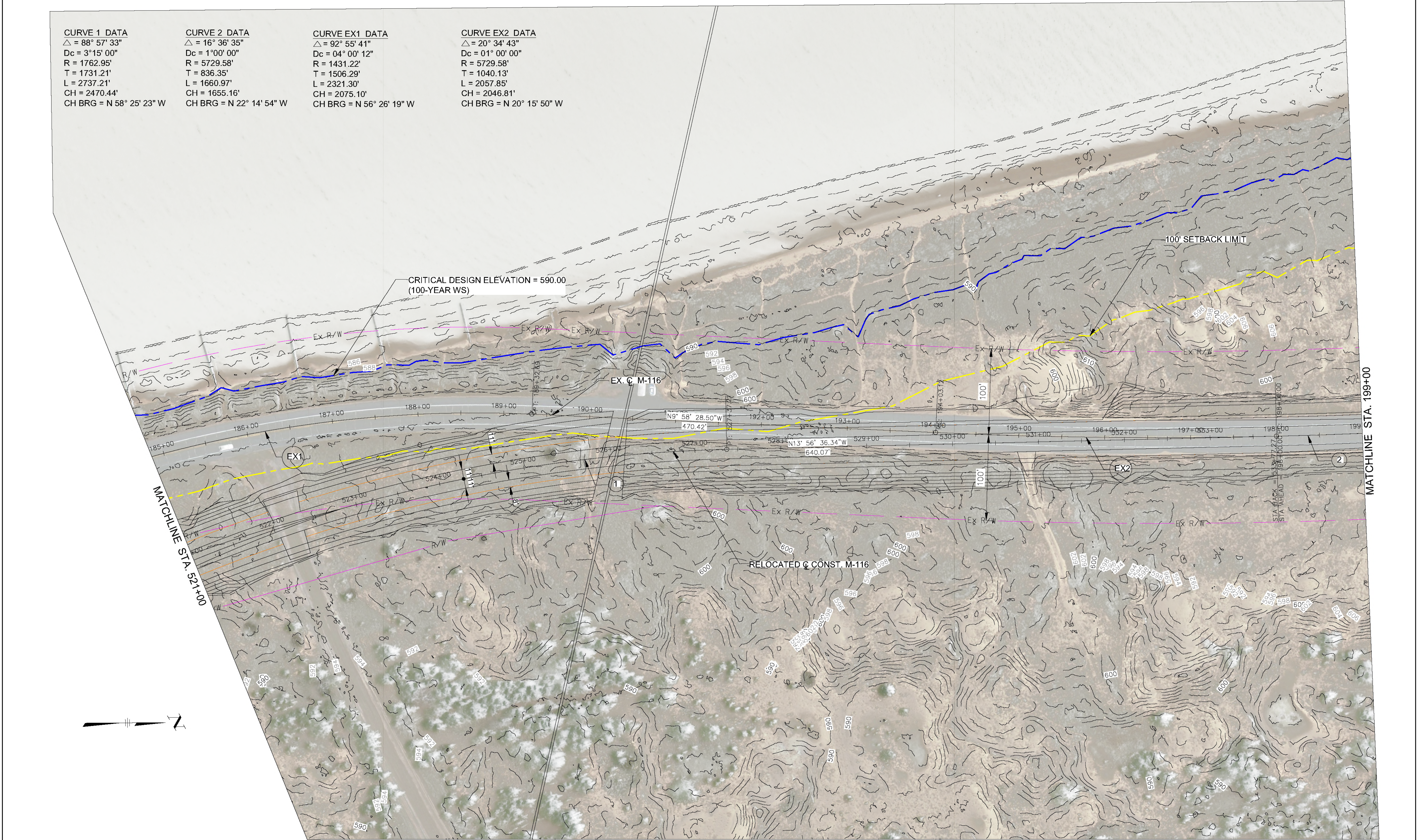


CURVE 1 DATA $\Delta = 88^\circ 57' 33''$ $Dc = 3^\circ 15' 00''$ $R = 1762.95'$ $T = 1731.21'$ $L = 2737.21'$ $CH = 2470.44'$ $CH\ BRG = N\ 58^\circ 25' 23''\ W$	CURVE EX1 DATA $\Delta = 92^\circ 55' 41''$ $Dc = 04^\circ 00' 12''$ $R = 1431.22'$ $T = 1506.29'$ $L = 2321.30'$ $CH = 2075.10'$ $CH\ BRG = N\ 56^\circ 26' 19''\ W$
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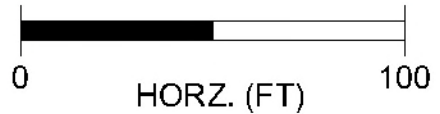


CURVE 1 DATA	CURVE EX1 DATA
$\Delta = 88^{\circ} 57' 33''$	$\Delta = 92^{\circ} 55' 41''$
$Dc = 3^{\circ} 15' 00''$	$Dc = 04^{\circ} 00' 12''$
$R = 1762.95'$	$R = 1431.22'$
$T = 1731.21'$	$T = 1506.29'$
$L = 2737.21'$	$L = 2321.30'$
$CH = 2470.44'$	$CH = 2075.10'$
$CH\ BRG = N\ 58^{\circ} 25' 23''\ W$	$CH\ BRG = N\ 56^{\circ} 26' 19''\ W$

CURVE 1 DATA	CURVE 2 DATA	CURVE EX1 DATA	CURVE EX2 DATA
△ = 88° 57' 33"	△ = 16° 36' 35"	△ = 92° 55' 41"	△ = 20° 34' 43"
Dc = 3° 15' 00"	Dc = 1° 00' 00"	Dc = 04° 00' 12"	Dc = 01° 00' 00"
R = 1762.95'	R = 5729.58'	R = 1431.22'	R = 5729.58'
T = 1731.21'	T = 836.35'	T = 1506.29'	T = 1040.13'
L = 2737.21'	L = 1660.97'	L = 2321.30'	L = 2057.85'
CH = 2470.44'	CH = 1655.16'	CH = 2075.10'	CH = 2046.81'
CH BRG = N 58° 25' 23" W	CH BRG = N 22° 14' 54" W	CH BRG = N 56° 26' 19" W	CH BRG = N 20° 15' 50" W



FINAL ROW PLAN REVISIONS						SUBMITTAL DATE:						PLAN SHEET				DRAWING SHEET	
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	M-116				STA. 521+00 TO STA. 199+00				SECT	



FILE:

DATE:
DESIGN UNIT:
TSC:

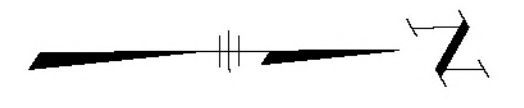
CS:
JN:

CURVE 2 DATA
Δ = 16° 36' 36"
Dc = 1° 00' 00"
R = 5729.58'
T = 836.35'
L = 1660.97'
CH = 1655.16'
CH BRG = N 22° 14' 54" W

CURVE EX2 DATA
Δ = 20° 34' 43"
Dc = 1° 00' 00"
R = 5729.58'
T = 1040.13'
L = 2057.85'
CH = 2046.81'
CH BRG = N 20° 15' 50" W




CRITICAL DESIGN ELEVATION = 590.00
(100-YEAR WS)

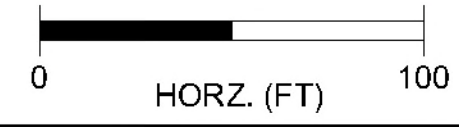
100' SETBACK LIMIT



MATCHLINE STA. 199+00

MATCHLINE STA. 213+00

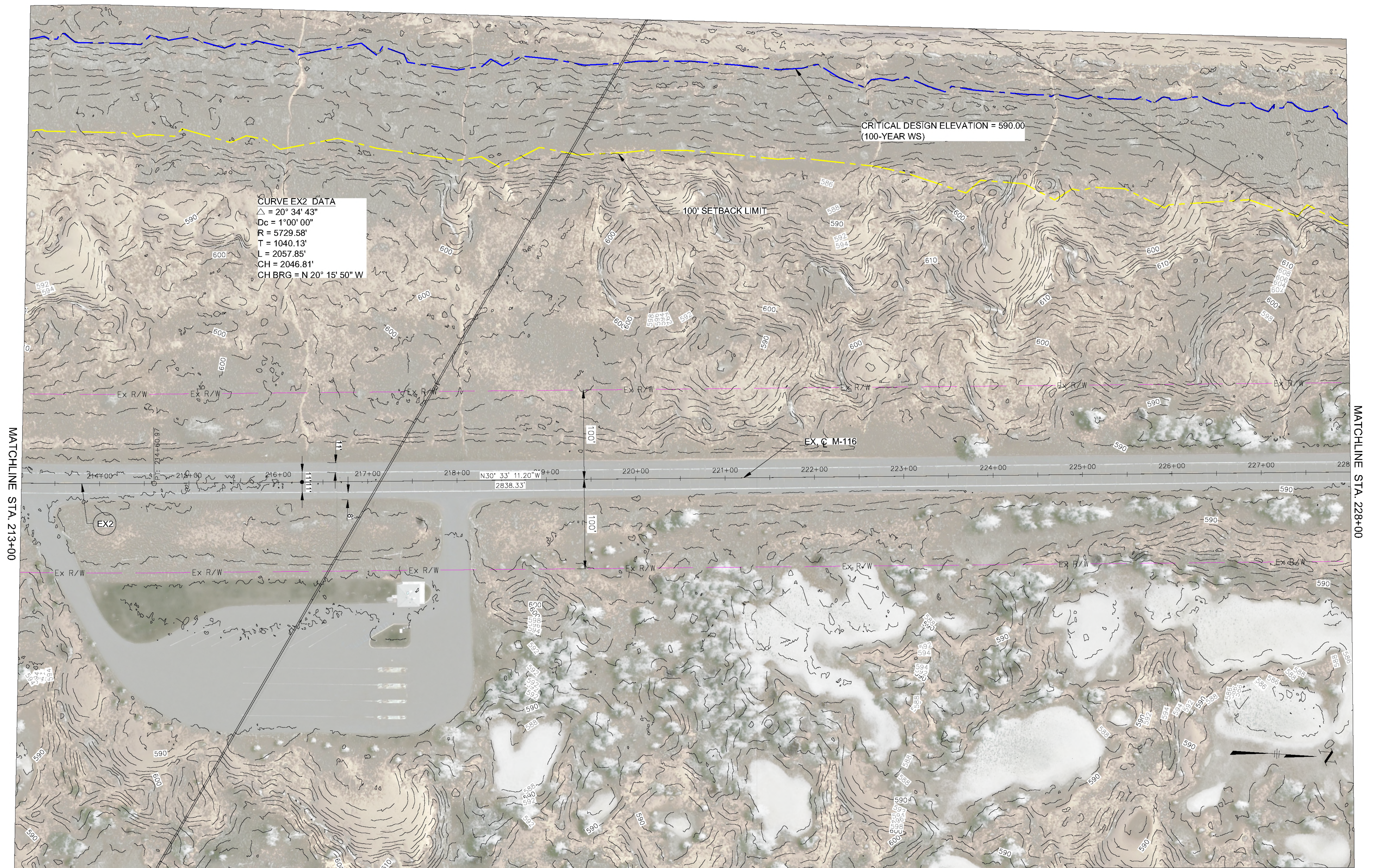
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												FILE:		TSC:		STA. 199+00 TO STA. 213+00					






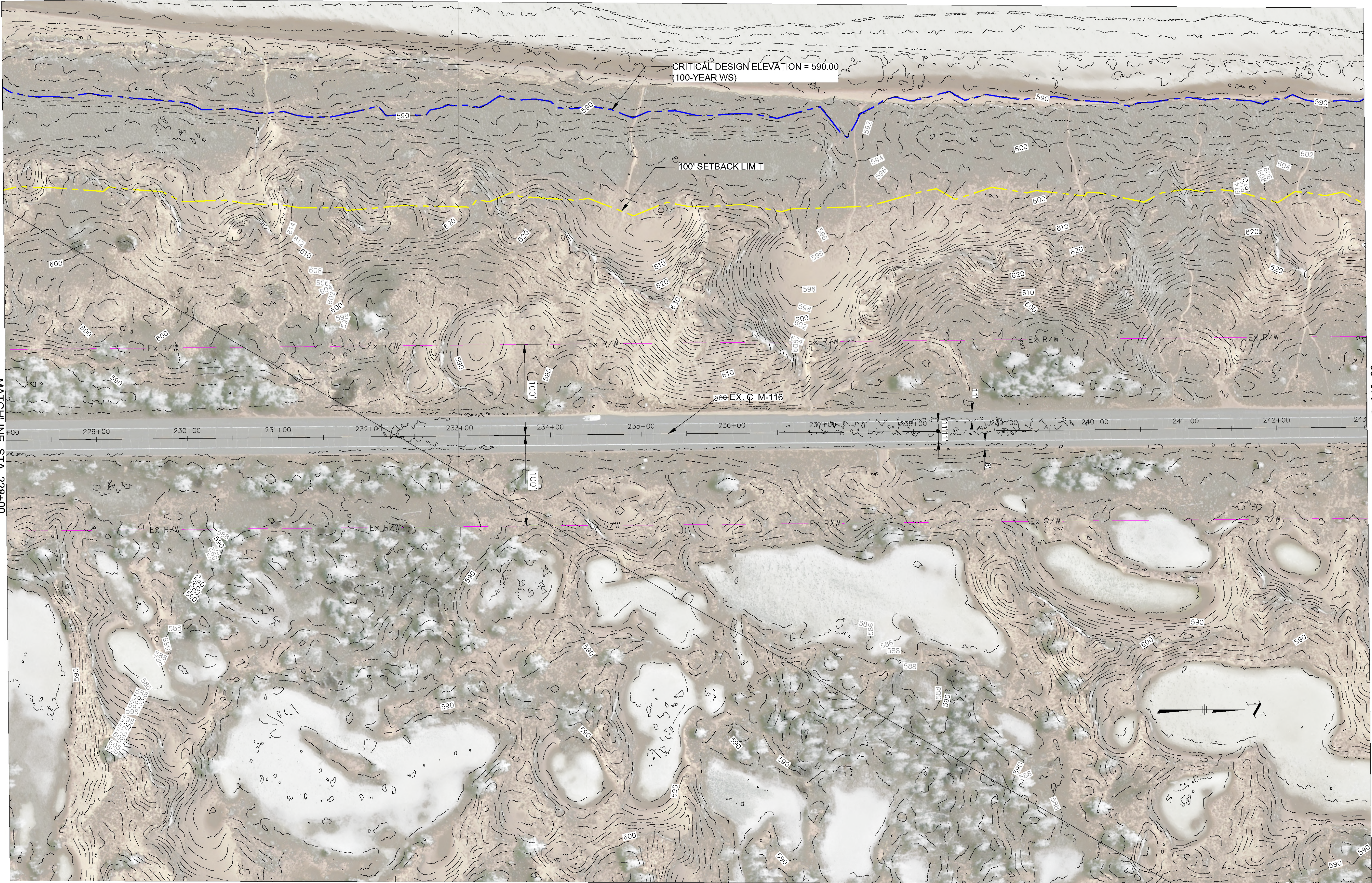
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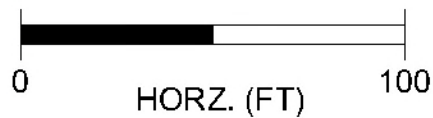
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																					TSC:				STA. 213+00 TO STA. 228+00					
														FILE:																



MATCHLINE STA. 228+00

MATCHLINE STA. 243+00

FINAL ROW PLAN REVISIONS						SUBMITTAL DATE:					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



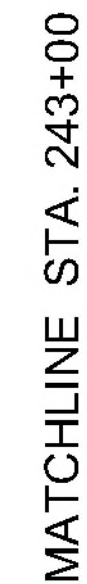
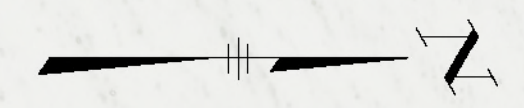
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DESIGN UNIT:
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DRAWING SHEET	
PLAN SHEET	
M-116	
STA. 228+00 TO STA. 243+00	

SECT



FINAL ROW PLAN REVISIONS				SUBMITTAL DATE:				  			DATE:	CS:		PLAN SHEET		DRAWING	SHEET
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION				DESIGN UNIT:	JN:		M-116			SECT
											FILE:			STA. 243+00 TO STA. 258+00			

CURVE EX3 DATA
△ = 9° 06' 51"
Dc = 0° 30' 00"
R = 11459.16'
T = 913.34'
L = 1822.82'
CH = 1820.90'
CH BRG = N 35° 06' 37" W

CURVE EX4 DATA
△ = 6° 13' 54"
Dc = 0° 24' 00"
R = 14323.95'
T = 779.74'
L = 1557.93'
CH = 1557.17'
CH BRG = N 36° 33' 05" W

CRITICAL DESIGN ELEVATION = 590.00
(100-YEAR WS)

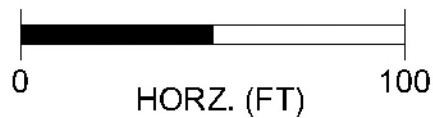
100' SETBACK LIMIT

EX. C M-116

MATCHLINE STA. 258+00

MATCHLINE STA. 273+00

FINAL ROW PLAN REVISIONS				SUBMITTAL DATE:			
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



FILE:

DATE:
DESIGN UNIT:
TSC:

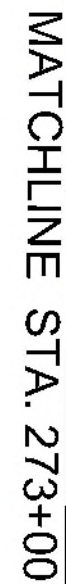
CS:
JN:

PLAN SHEET		DRAWING SHEET
M-116		
STA. 258+00 TO STA. 273+00		
		SECT




CURVED DATA
 $\Delta = 5^{\circ} 54' 09''$
 $Dc = 1^{\circ} 30' 00''$
 $R = 3819.72'$
 $T = 196.93'$
 $L = 393.51'$
 $CH = 393.33'$
 $CH\ BRG = N\ 30^{\circ} 29' 03''\ W$

CURVE EX4 DATA
 $\Delta = 6^\circ 13' 54''$
 $Dc = 0^\circ 40' 00''$
 $R = 14323.95'$
 $T = 779.74'$
 $L = 1557.93'$
 $CH = 1557.17'$
 $CH\ BRG = N\ 36^\circ\ 33'\ 05''\ W$

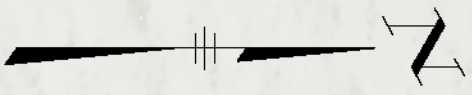
$\Delta = 05^\circ 54' 09''$
 $D_c = 00^\circ 29' 36''$
 $R = 11616.31'$
 $T = 598.88'$
 $L = 1196.69'$
 $CH = 1196.16'$
 $CH\ BRG = N\ 30^\circ 29' 03''\ W$



MATCHLINE STA. 604+00

FINAL ROW PLAN REVISIONS								SUBMITTAL DATE:				  		DATE:		CS:		PLAN SHEET		DRAWING	SHEET
NO.	DATE	AUTH	DESCRIPTION		NO.	DATE	AUTH	DESCRIPTION		DESIGN UNIT:				JN:		M-116		SECT			
										FILE:	TSC:			STA. 273+00 TO STA. 604+00							

CURVE EX5 DATA
△ = 05° 54' 09"
Dc = 00° 29' 36"
R = 11616.31'
T = 598.88'
L = 1196.69'
CH = 1196.16'
CH BRG = N 30° 29' 03" W



CRITICAL DESIGN ELEVATION = 590.00
(100-YEAR WS)

75' SETBACK LIMIT

100' SETBACK LIMIT

EX5

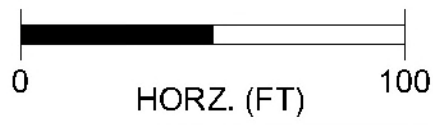
EX. C M-116

RELOCATED C CONST. M-116

MATCHLINE STA. 604+00

MATCHLINE STA. 619+00

FINAL ROW PLAN REVISIONS						SUBMITTAL DATE:					
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



FILE:

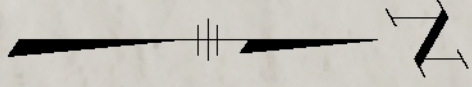
DATE:
DESIGN UNIT:
TSC:

CS:
JN:

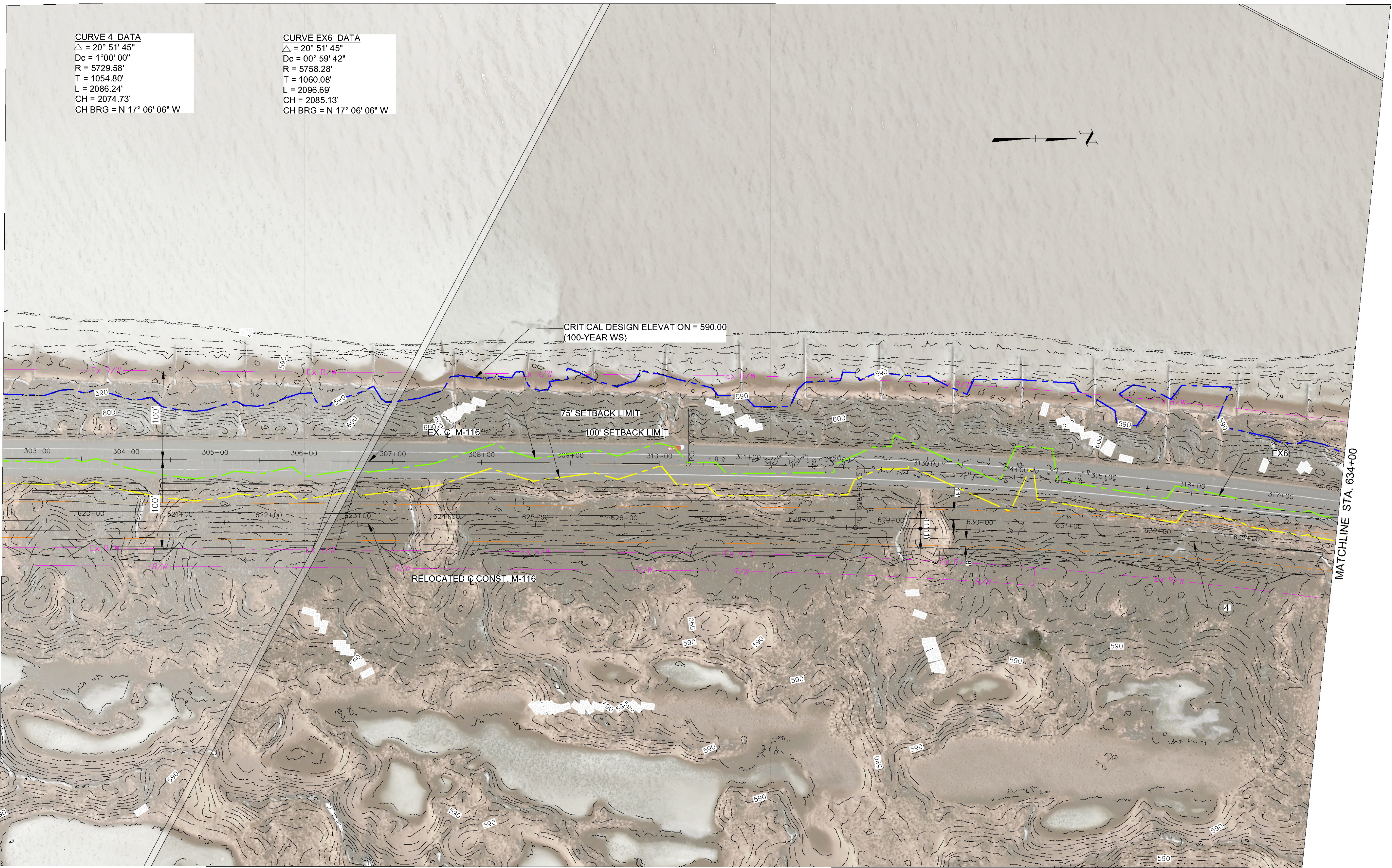
PLAN SHEET	DRAWING SHEET
M-116	
STA. 604+00 TO STA. 619+00	

CURVE 4 DATA
△ = 20° 51' 45"
Dc = 1°00' 00"
R = 5729.58'
T = 1054.80'
L = 2086.24'
CH = 2074.73'
CH BRG = N 17° 06' 06" W

CURVE EX6 DATA
△ = 20° 51' 45"
Dc = 00° 59' 42"
R = 5758.28'
T = 1060.08'
L = 2096.69'
CH = 2085.13'
CH BRG = N 17° 06' 06" W

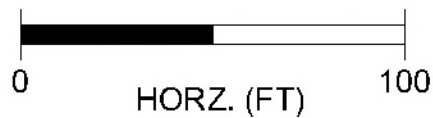


MATCHLINE STA. 619+00



MATCHLINE STA. 634+00

FINAL ROW PLAN REVISIONS				SUBMITTAL DATE:			
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



FILE:

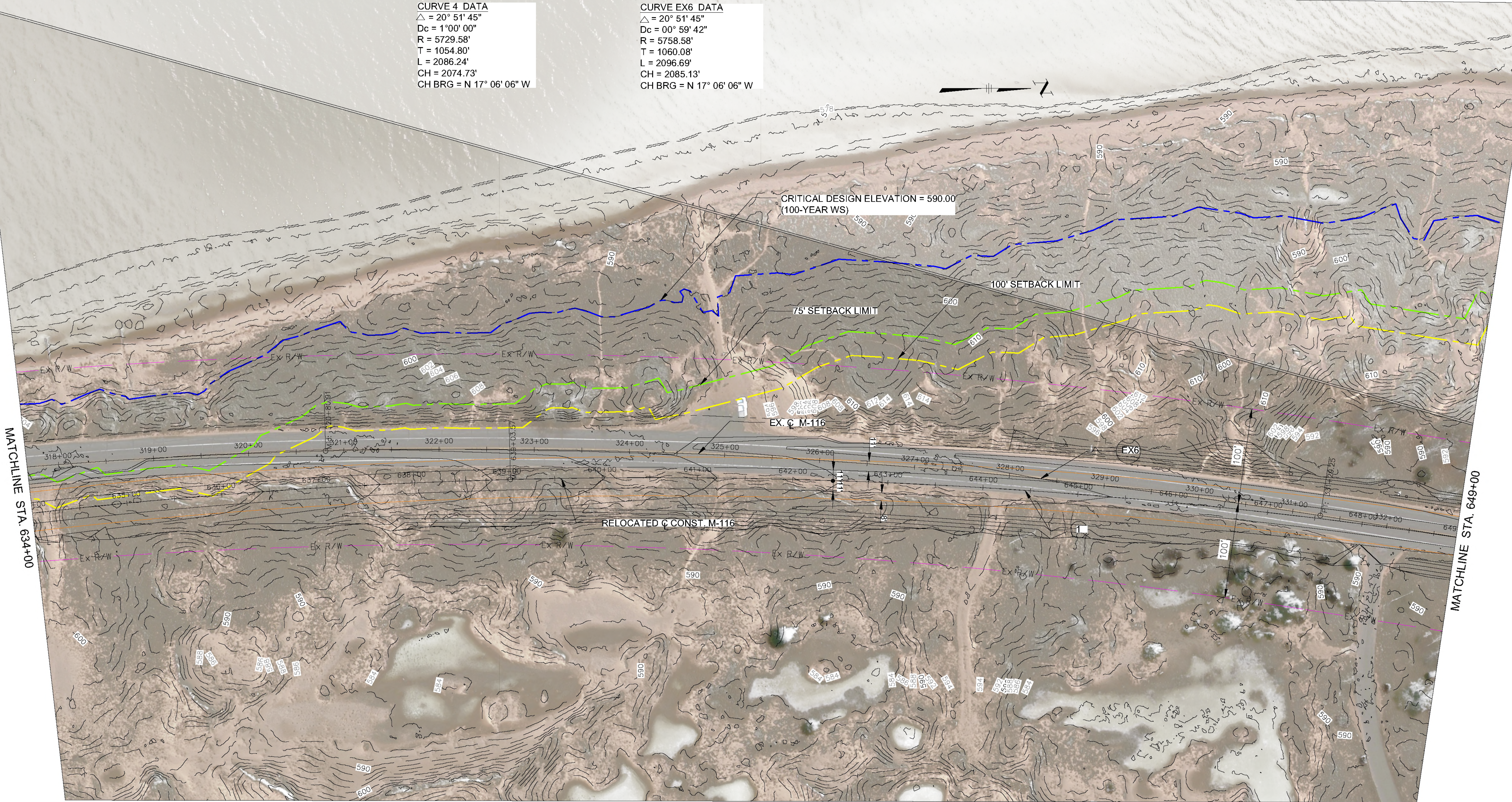
DATE:
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TSC:

CS:
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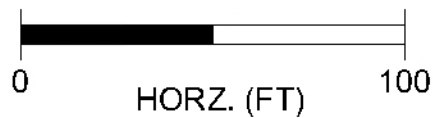
DRAWING SHEET	
PLAN SHEET	SECT
M-116	
STA. 619+00 TO STA. 634+00	

CURVE 4 DATA
△ = 20° 51' 45"
Dc = 1°00' 00"
R = 5729.58'
T = 1054.80'
L = 2086.24'
CH = 2074.73'
CH BRG = N 17° 06' 06" W

CURVE EX6 DATA
△ = 20° 51' 45"
Dc = 00° 59' 42"
R = 5758.58'
T = 1060.08'
L = 2096.69'
CH = 2085.13'
CH BRG = N 17° 06' 06" W



FINAL ROW PLAN REVISIONS						SUBMITTAL DATE:					
NO.	DATE	AUTH	DESCRIPTION			NO.	DATE	AUTH	DESCRIPTION		



FILE:

DATE:
DESIGN UNIT:
TSC:

CS:
JN:

PLAN SHEET		DRAWING SHEET	
M-116		SECT	
STA. 634+00 TO STA. 649+00			



CURVE 4 DATA
Δ = 20° 51' 45"
Dc = 1°00' 00"
R = 5729.58'
T = 1054.80'
L = 2086.24'
CH = 2074.73'
CH BRG = N 17° 06' 06" W

CRITICAL DESIGN ELEVATION = 590.00
(100-YEAR WS)

75' SETBACK LIMIT

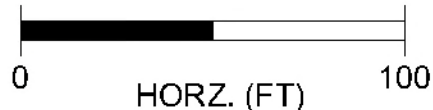
100' SETBACK LIMIT

EX. C M-116

RELOCATED C CONST. M-116

MATCHLINE STA. 649+00

FINAL ROW PLAN REVISIONS						SUBMITTAL DATE:					
NO.	DATE	AUTH	DESCRIPTION			NO.	DATE	AUTH	DESCRIPTION		



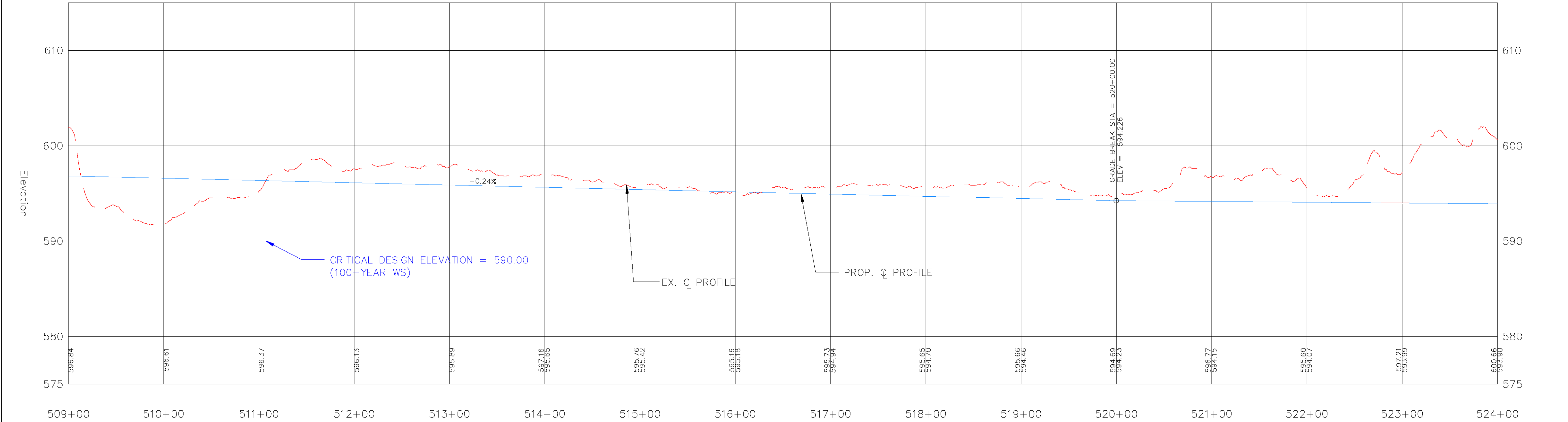
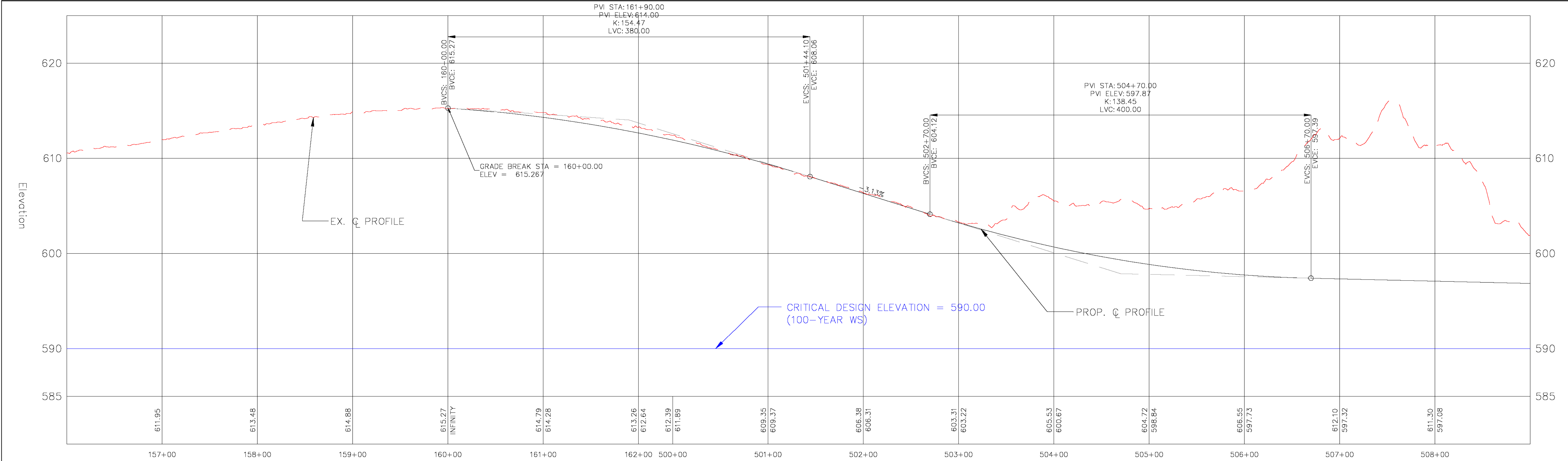
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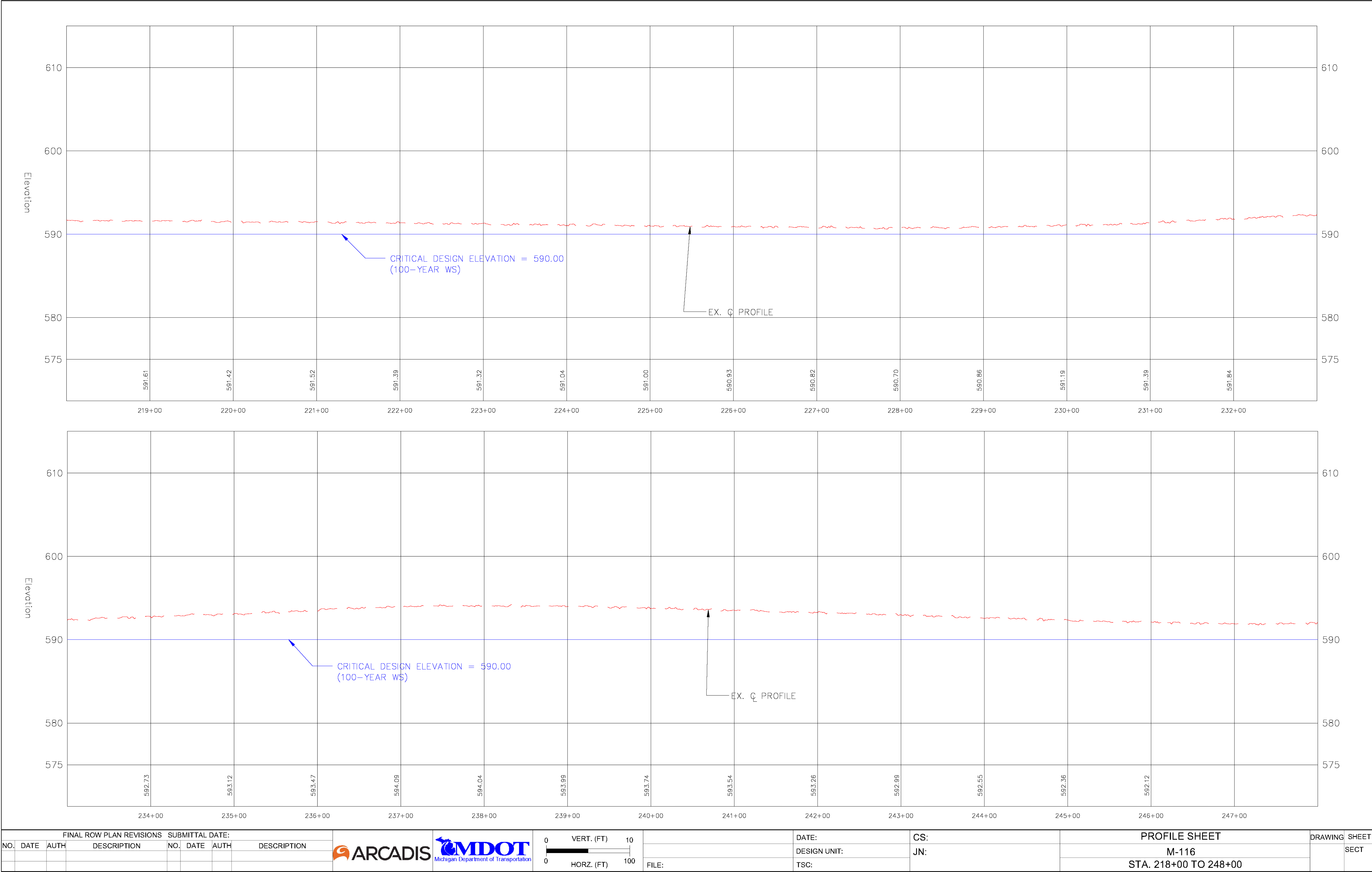
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CS:
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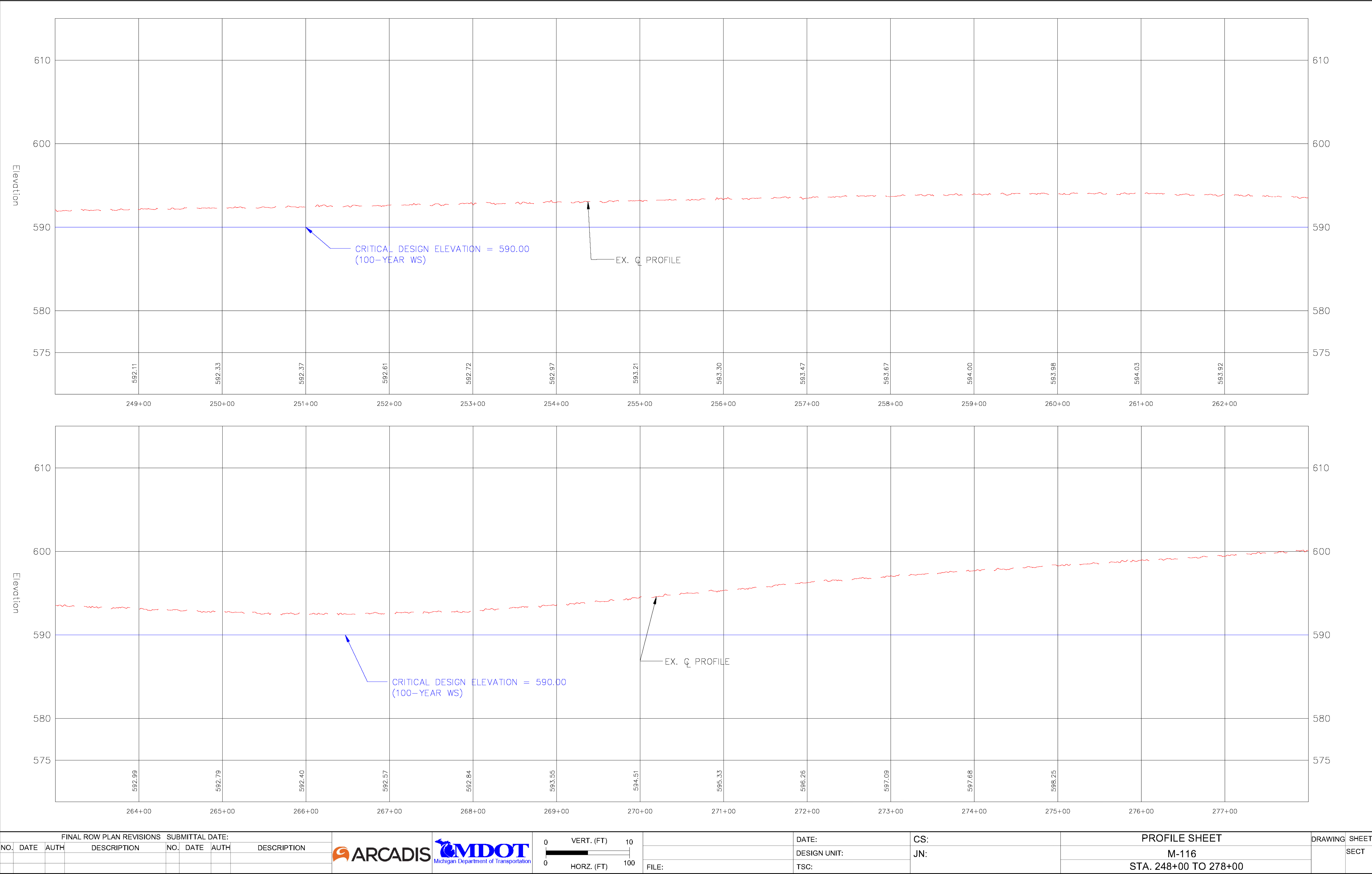
PLAN SHEET
M-116
STA. 649+00 TO END

DRAWING SHEET
SECT

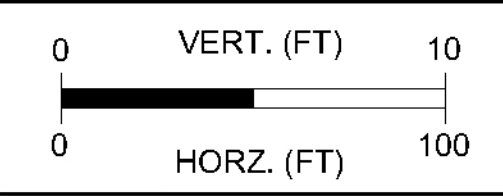




FINAL ROW PLAN REVISIONS								SUBMITTAL DATE:		 				DATE:		CS:		PROFILE SHEET		DRAWING	SHEET	
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION	M-116														
								STA. 218+00 TO 248+00														
										FILE:				DESIGN UNIT:		JN:						
														TSC:								



FINAL ROW PLAN REVISIONS							
SUBMITTAL DATE:							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

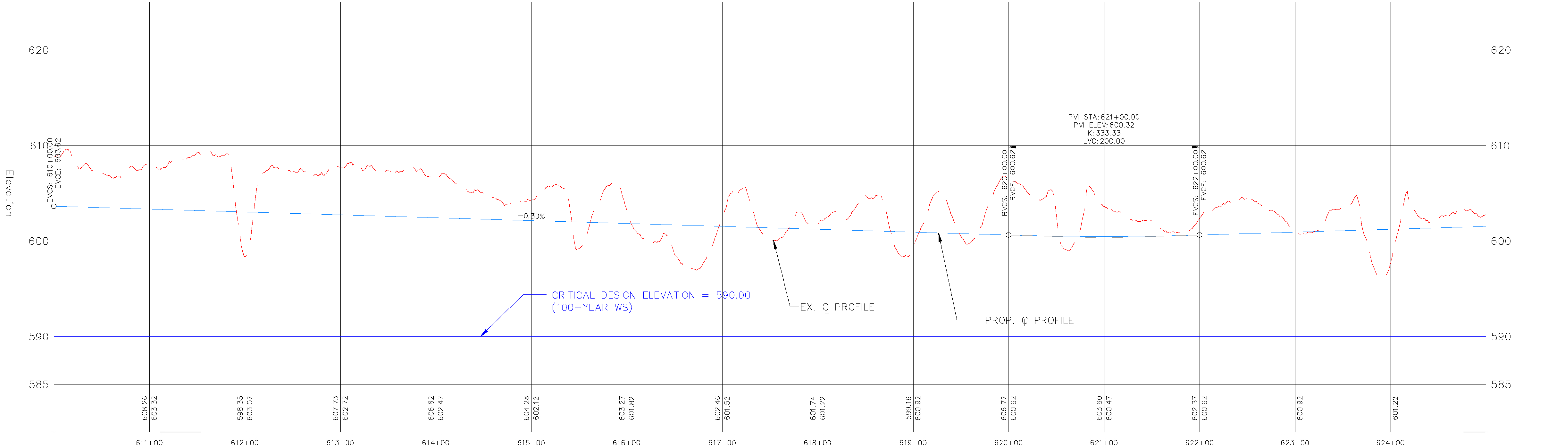
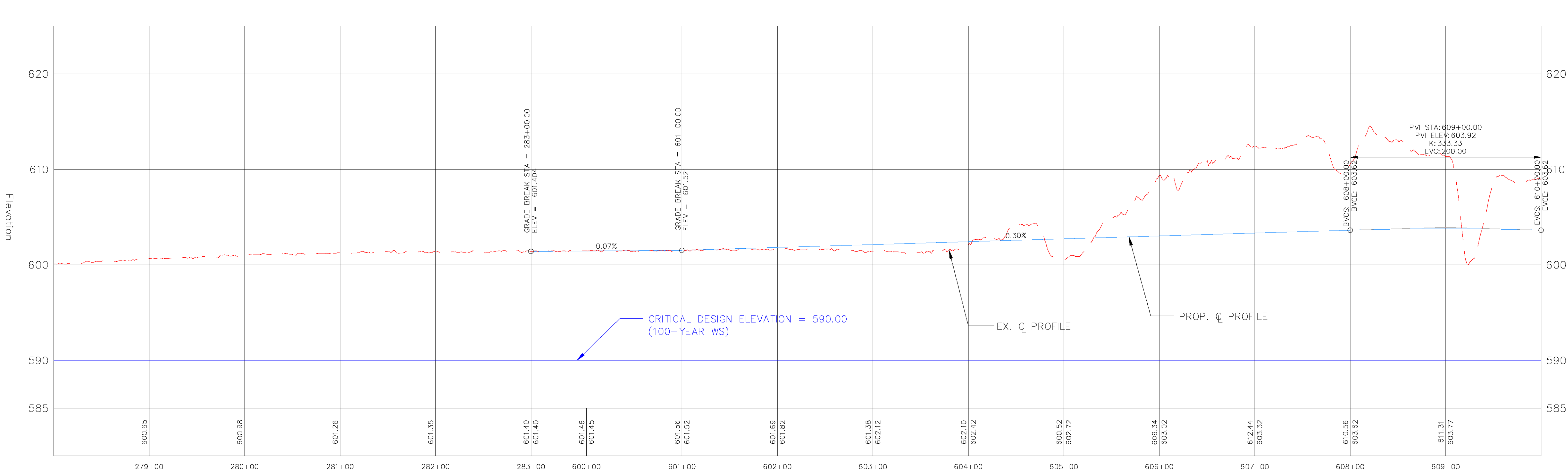




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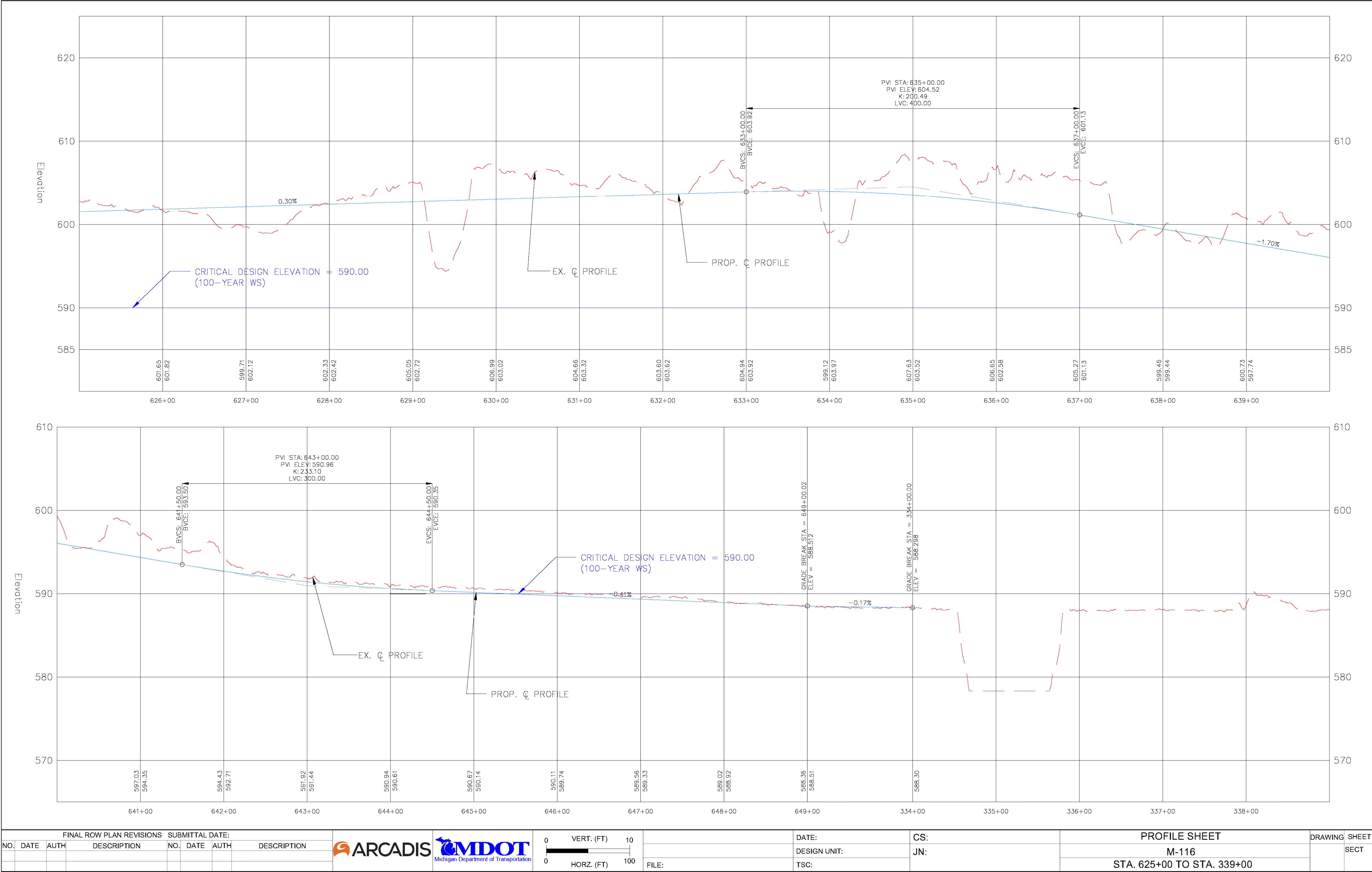
DATE:
DESIGN UNIT:
TSC:

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JN:

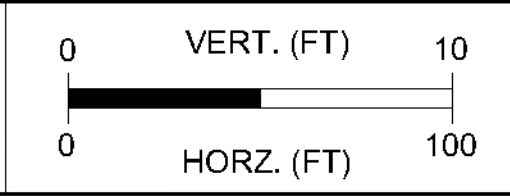
PROFILE SHEET		DRAWING	SHEET
M-116			SECT
STA. 248+00 TO 278+00			



FINAL ROW PLAN REVISIONS				SUBMITTAL DATE:				  <div><div>0</div><div>VERT. (FT)</div><div>10</div></div> <div><div>0</div><div>HORZ. (FT)</div><div>100</div></div> <div>FILE:</div>		DATE:		CS:		PROFILE SHEET		DRAWING SHEET	
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION			DESIGN UNIT:	JN:	M-116		SECT			
										TSC:	STA. 278+00 TO STA. 625+00						



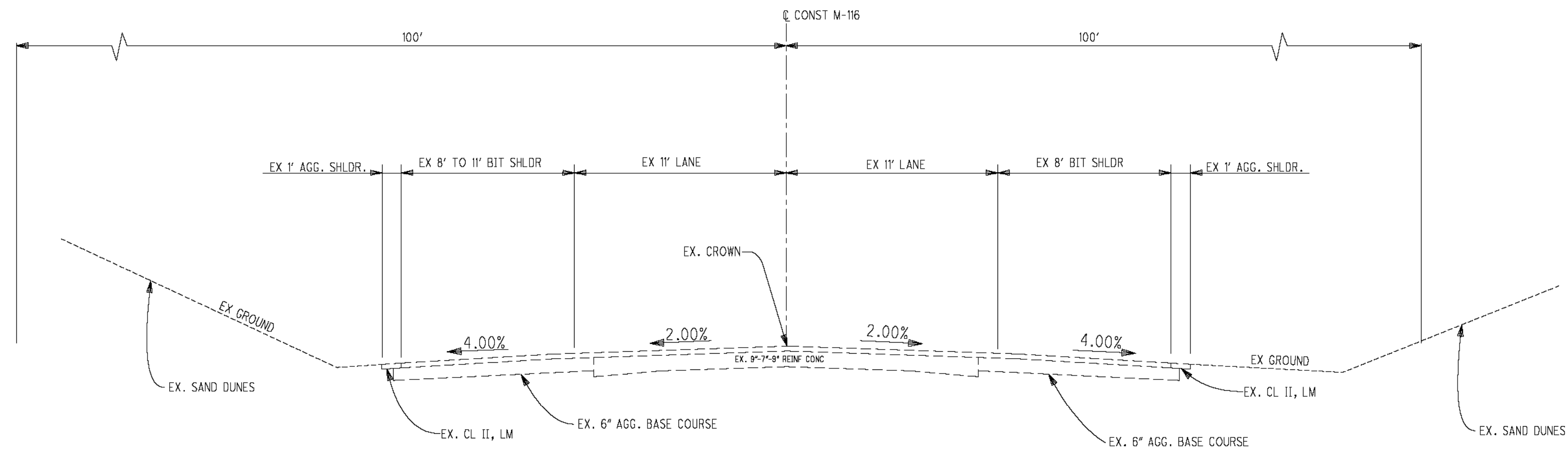
FINAL ROW PLAN REVISIONS							
SUBMITTAL DATE:							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



DATE:	
DESIGN UNIT:	
TSC:	

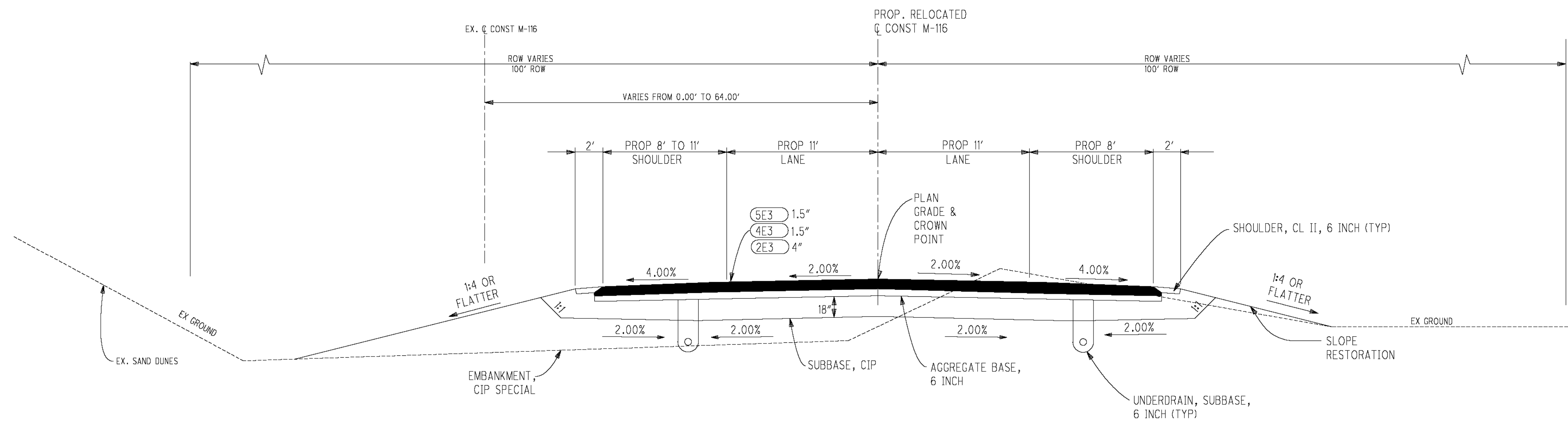
CS:	
JN:	

PROFILE SHEET		DRAWING SHEET
M-116		
STA. 625+00 TO STA. 339+00		
		SECT





EXISTING M-116 NORMAL CROWN SECTION

TO APPLY:
STA 160+00 TO STA 200+00
STA 283+00 TO STA 334+00



PROPOSED M-116 NORMAL CROWN SECTION

TO APPLY:
STA 160+00 TO STA 200+00
STA 283+00 TO STA 334+00

FINAL ROW PLAN REVISIONS								SUBMITTAL DATE:				 Michigan Department of Transportation	 0 5 HORZ. (FT)	DATE:		CS:	TYPICAL CROSS SECTION		DRAWING	SHEET		
NO.	DATE	AUTH	DESCRIPTION				NO.	DATE	AUTH	DESCRIPTION				DESIGN UNIT:	JN:		M-116			SECT		
														FILE:	TSC:							

Area of Interest for M-116 Ludington State Park Expanded Documentation



Location #6 – M-116 – Mason County



Location #7 – M-116 – Mason County



M-116 Shoreline Erosion - Grand Region - Mason County

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