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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**IREDELL COUNTY**

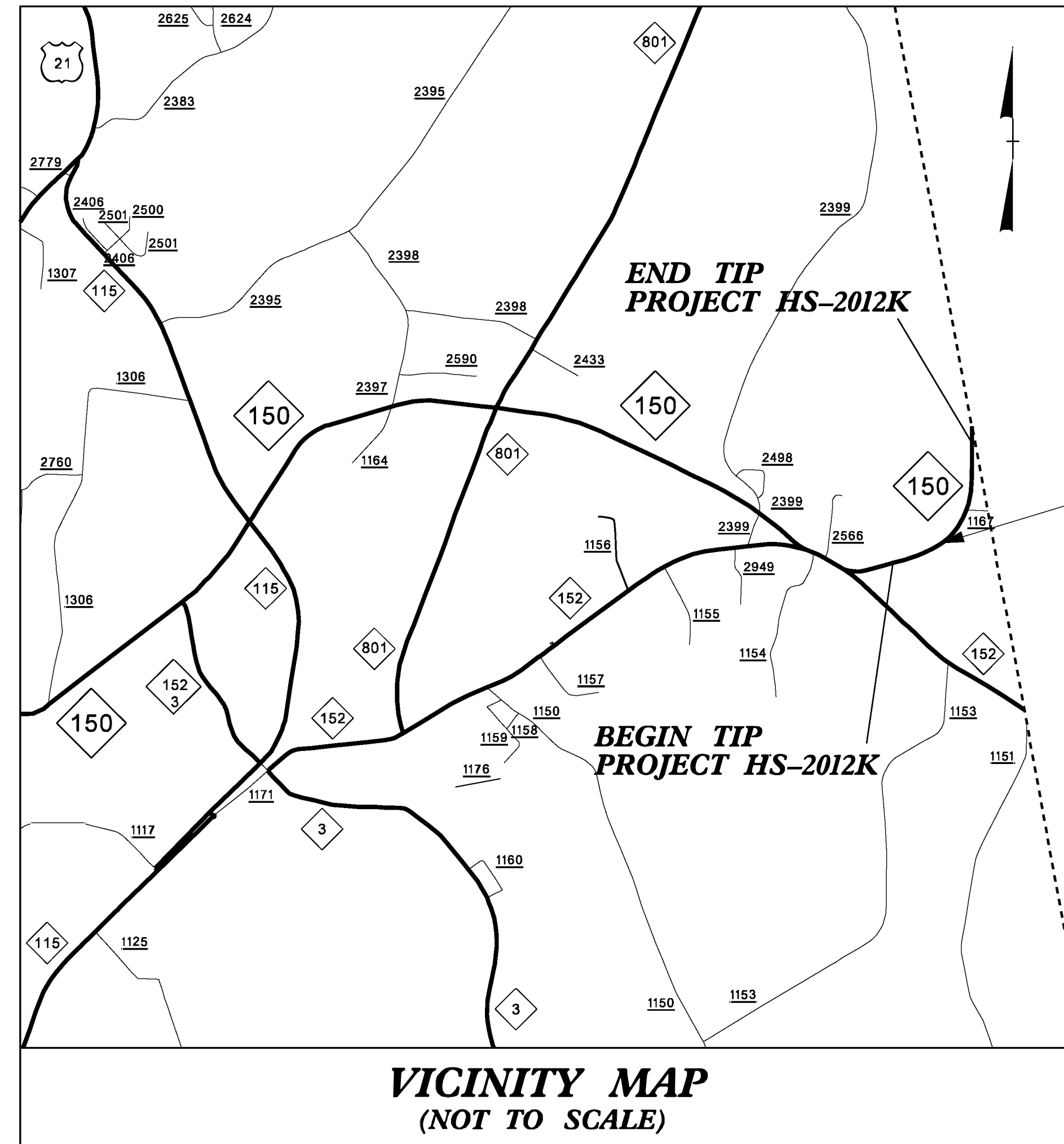
**LOCATION: NC 150 FROM MP 11.400 TO MP.11.900.**

**TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	SHEET
N.C.	<b>HS-2012K</b>	1	10
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49331.1.12	4933112	PE	
49331.3.12	4933112	CONST	

**TIP PROJECT: HS-2012K**

**CONTRACT: DL00322**



**MAP 1**

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT HS-2012K = 0.500 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012K = 0.500 MILES

Prepared In the Office of:  
**DIVISION TWELVE DDC**

1710 E. Marion Street, Shelby NC, 28150

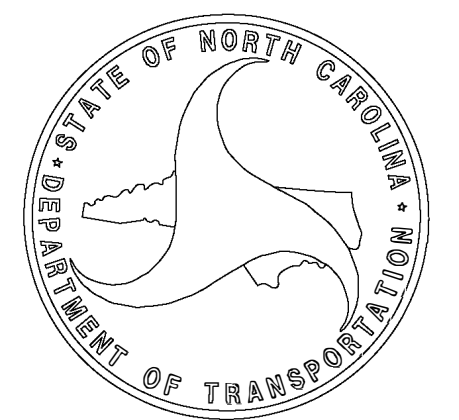
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
NA

LETTING DATE:  
MARCH 26, 2024

BRYAN K.D. SOWELL, PE  
PROJECT ENGINEER

JOSHUA S. CARPENTER  
PROJECT DESIGN ENGINEER



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

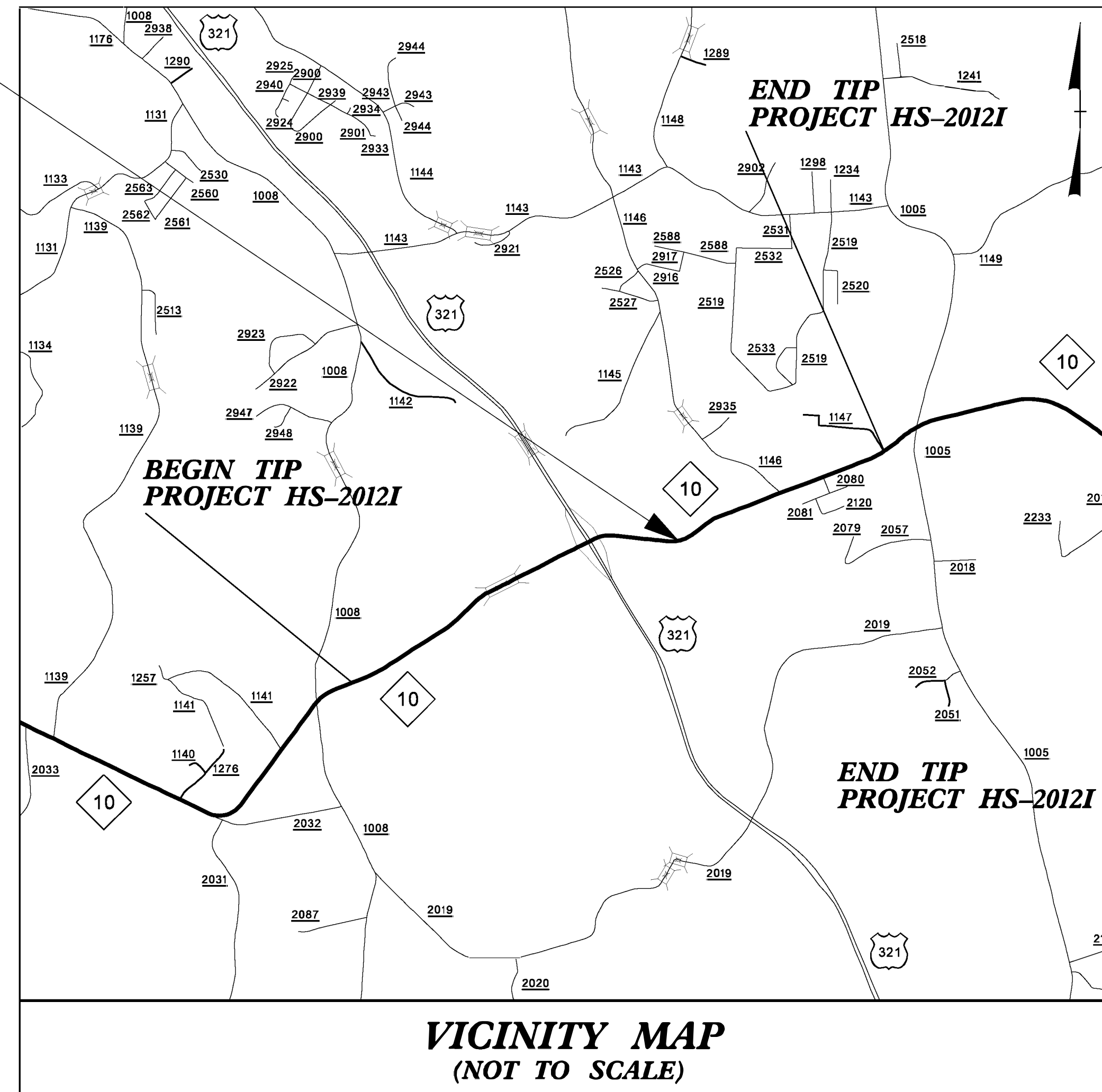
**CATAWBA COUNTY**

LOCATION: NC 10 FROM MP. 19.812 TO MP. 27.060.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2012I	2	10
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49331.1.10	4933110	PE	
49331.3.10	4933110	CONST	

TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.

MAP 2



**TIP PROJECT: HS-2012I**

**CONTRACT: DL00322**

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT HS-2012I = 3.069 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012I = 3.069 MILES

Prepared In the Office of:  
**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

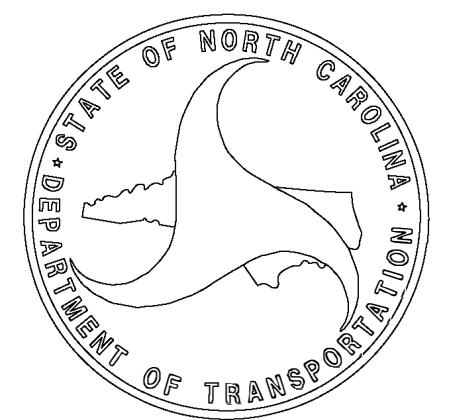
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
NA

LETTING DATE:  
MARCH 26, 2024

**BRYAN K.D. SOWELL, PE**  
PROJECT ENGINEER

**JOSHUA S. CARPENTER**  
PROJECT DESIGN ENGINEER



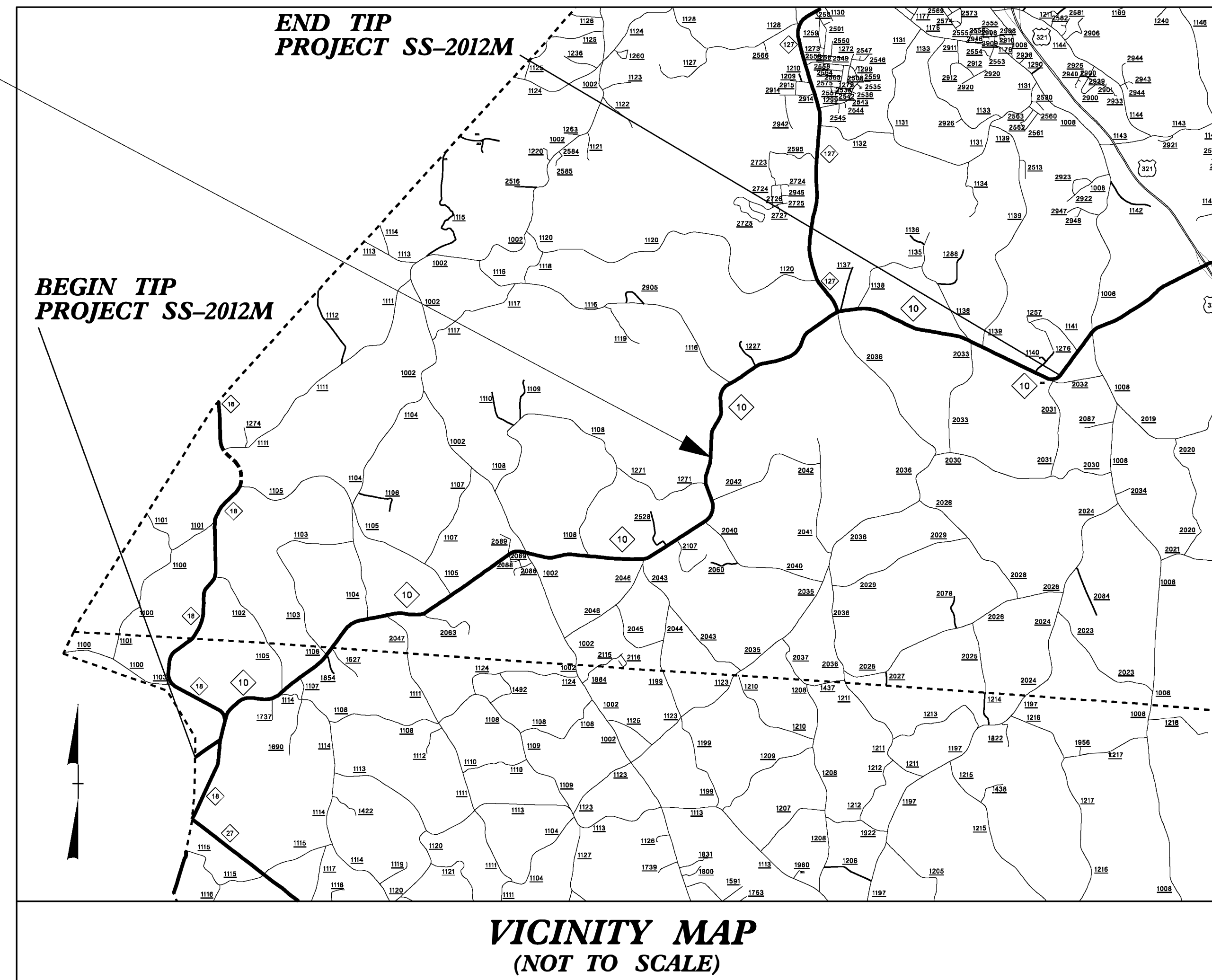
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CATAWBA & LINCOLN COUNTIES**

LOCATION: NC 10 FROM MP. 0.000 TO MP. 11.000.

TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED  
SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.

MAP 3



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2012M	3	10
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49331.1.14	4933114	PE	
49331.3.14	4933114	CONST	

**TIP PROJECT: HS-2012M**

**CONTRACT: DL00322**

**PROJECT LENGTH**  
LENGTH OF ROADWAY TIP PROJECT HS-2012M = 11.000 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012M = 11.000 MILES

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**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

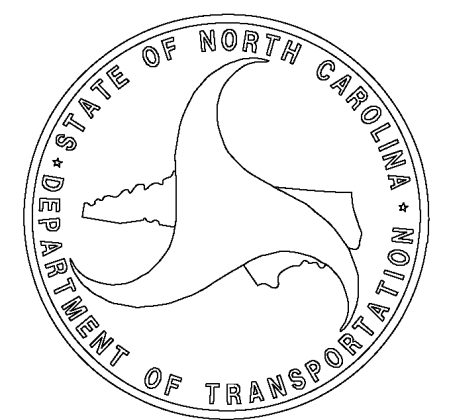
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: MARCH 26, 2024

BRYAN K.D. SOWELL, PE  
PROJECT ENGINEER

JOSHUA S. CARPENTER  
PROJECT DESIGN ENGINEER



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CATAWBA COUNTY**

**LOCATION: SR 1844 (SLANTING BRIDGE RD.) BETWEEN LAKE DR. AND BRADLEY LONG DR.**

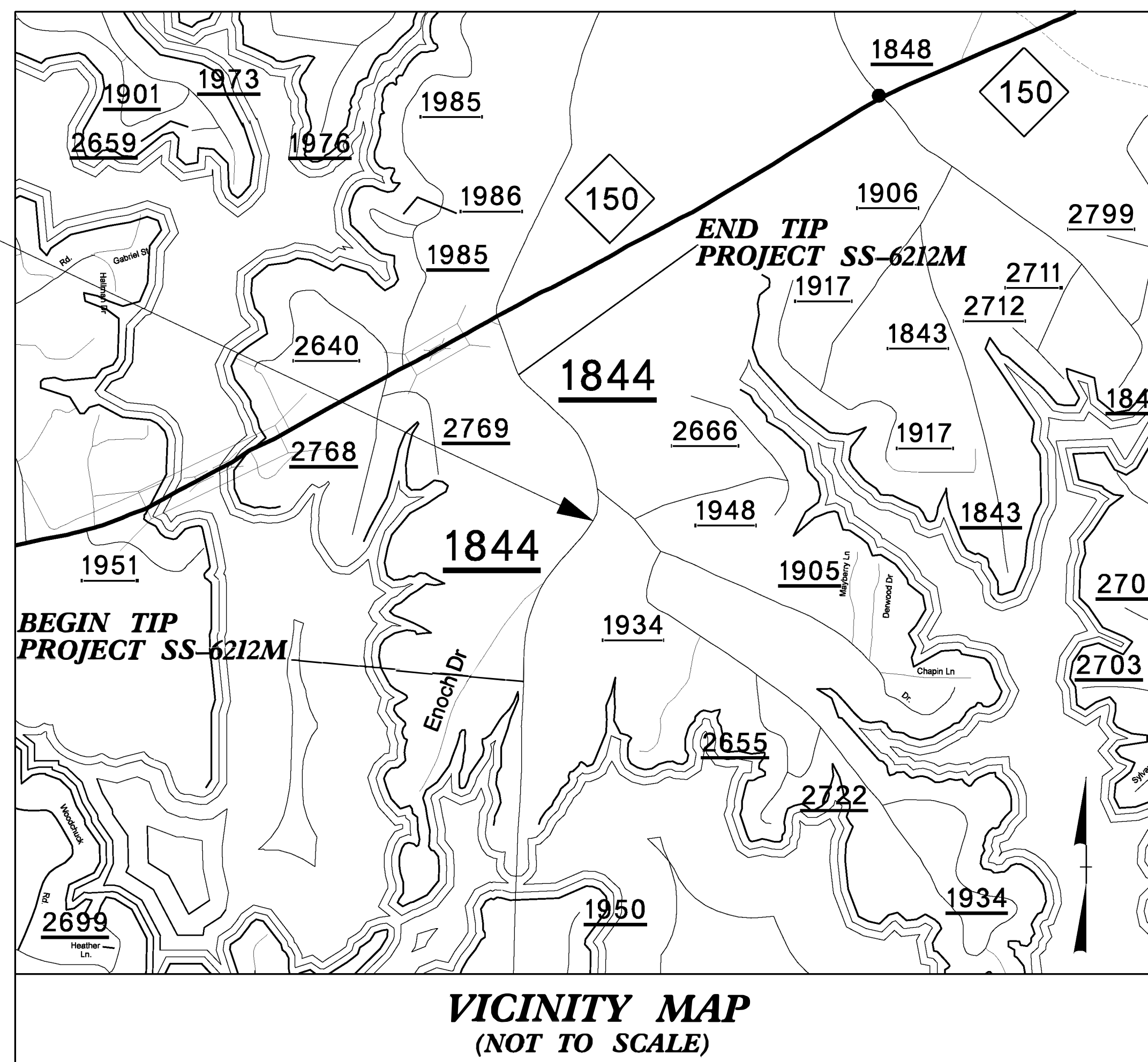
**TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SS-6212M	4	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
51125		PE/CONST	

**TIP PROJECT: SS-6212M**

**CONTRACT: DL00322**

**MAP 4**



**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT SS-6012M = 0.775 MILES  
TOTAL LENGTH OF TIP PROJECT SS-6012M = 0.775 MILES

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**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

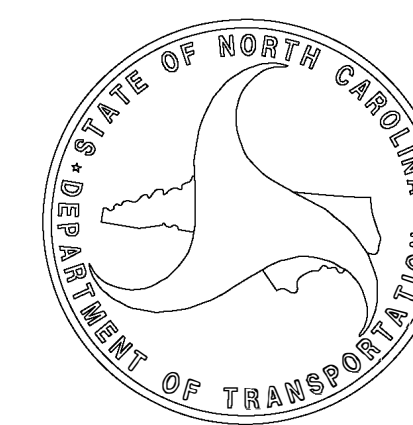
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
NA

LETTING DATE:  
MARCH 26, 2024

**BRYAN K.D. SOWELL, PE**  
PROJECT ENGINEER

**JOSHUA S. CARPENTER**  
PROJECT DESIGN ENGINEER



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CLEVELAND COUNTY**

LOCATION: NC 18 FROM MP. 0.000 TO MP. 5.965.

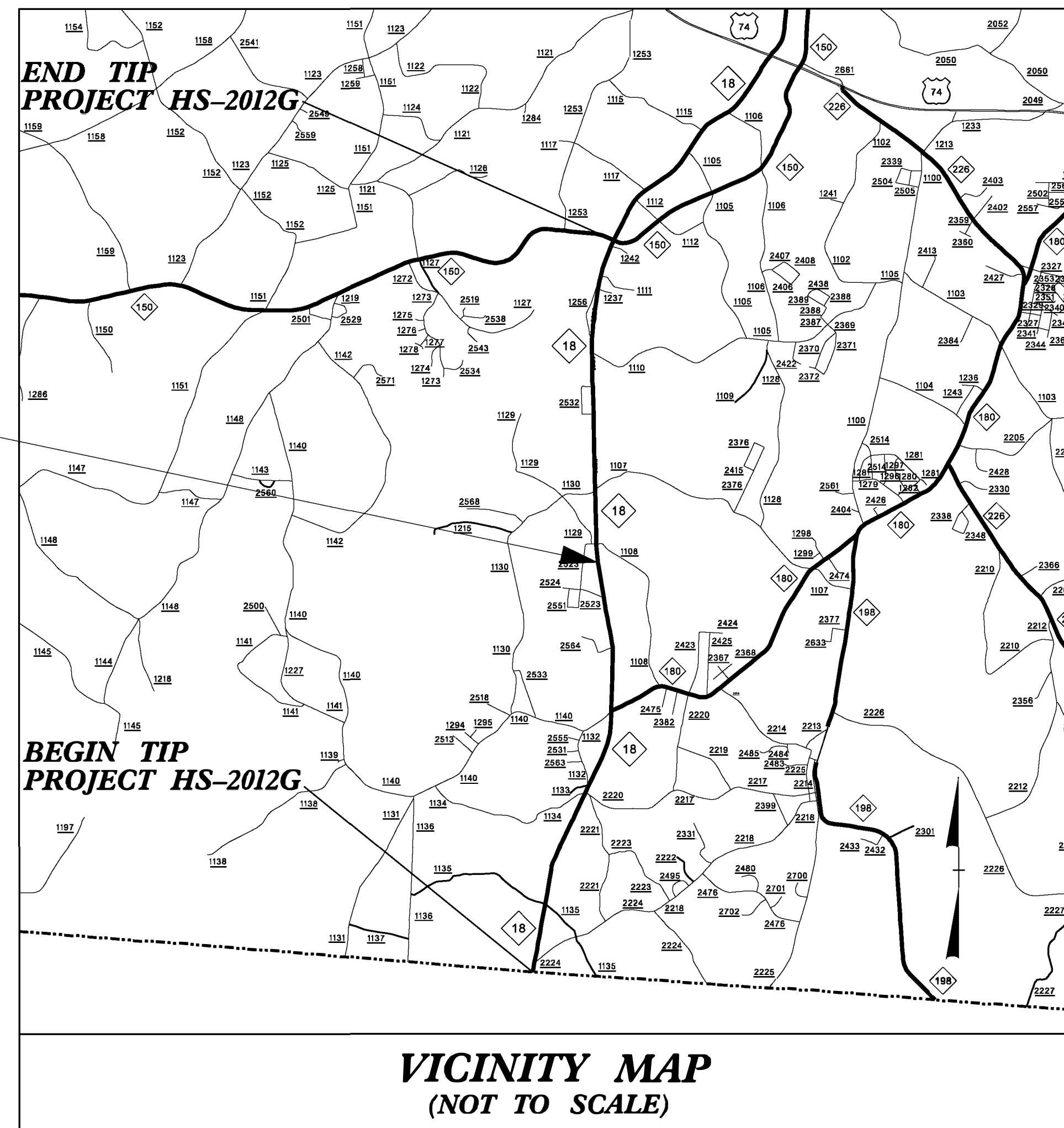
TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED  
SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2012G	5	10
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49331.1.8	4933108	PE	
49331.3.8	4933108	CONST	

**TIP PROJECT: HS-2012G**

**CONTRACT: DL00322**

MAP 5



**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT HS-2012G = 5.965 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012G = 5.965 MILES

Prepared In the Office of:  
**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

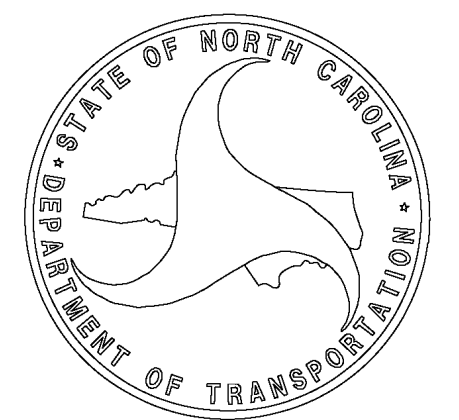
**2018 STANDARD SPECIFICATIONS**

**RIGHT OF WAY DATE:**  
NA

**LETTING DATE:**  
MARCH 26, 2024

**BRYAN K.D. SOWELL, PE**  
PROJECT ENGINEER

**JOSHUA S. CARPENTER**  
PROJECT DESIGN ENGINEER



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CLEVELAND COUNTY**

LOCATION: NC 18 FROM MP. 13.465 TO MP. 18.583.

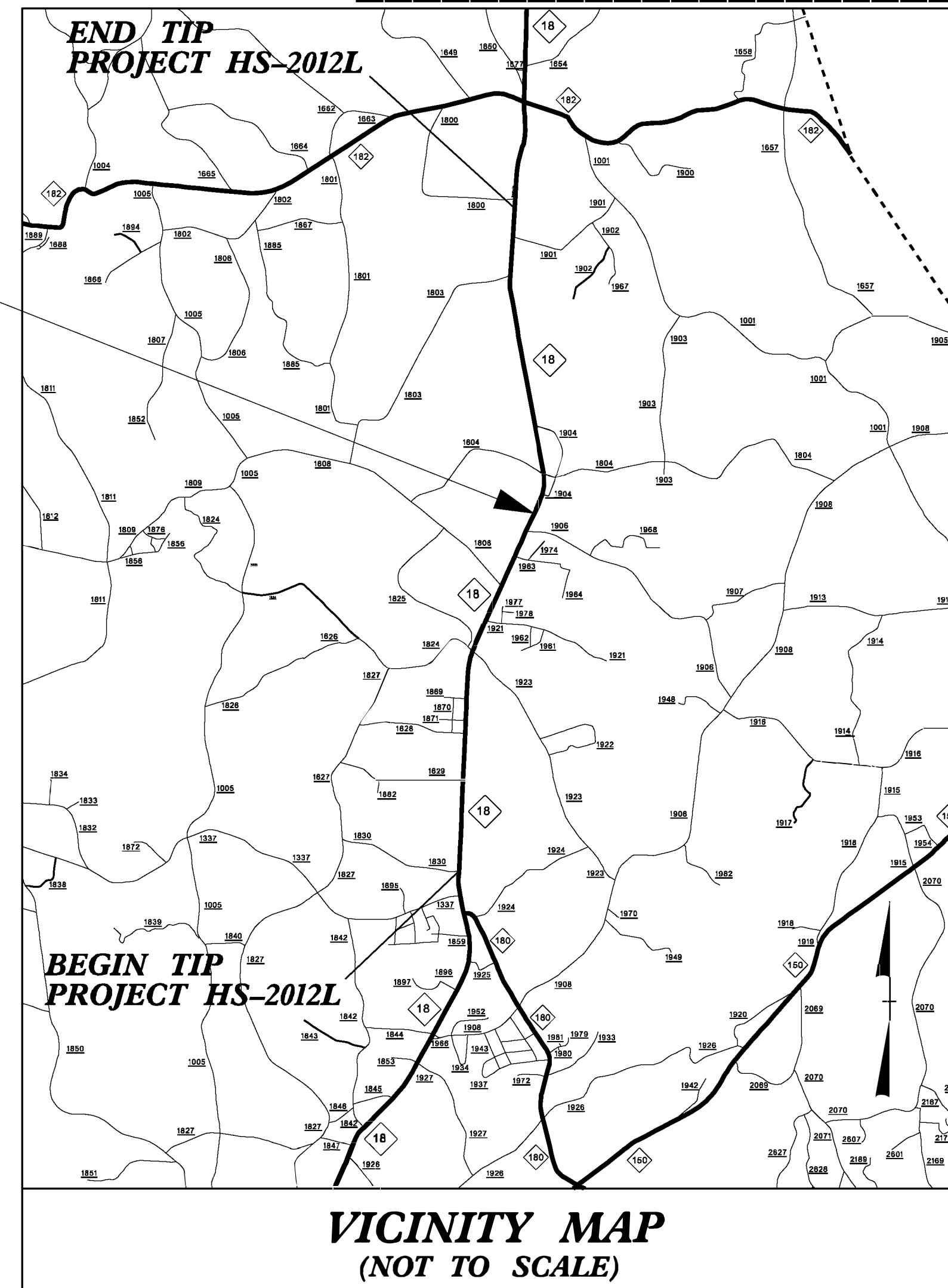
TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2012L	6	10
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49331.1.13	4933113	PE	
49331.3.13	4933113	CONST	

**TIP PROJECT: HS-2012L**

**CONTRACT: DL00322**

MAP 6



**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT HS-2012L = 5.118 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012L = 5.118 MILES

Prepared In the Office of:  
**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

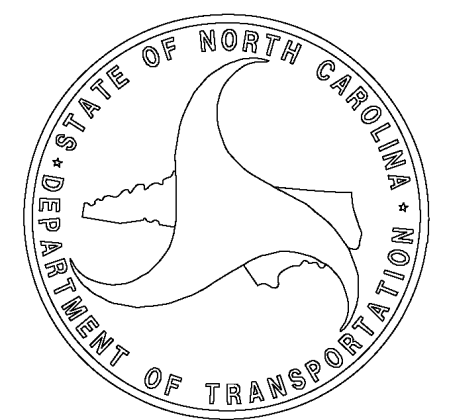
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
N/A

LETTING DATE:  
MARCH 26, 2024

**BRYAN K.D. SOWELL, PE**  
PROJECT ENGINEER

**JOSHUA S. CARPENTER**  
PROJECT DESIGN ENGINEER



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**GASTON COUNTY**

LOCATION: NC 275 FROM MP. 5.106 TO MP. 9.671.

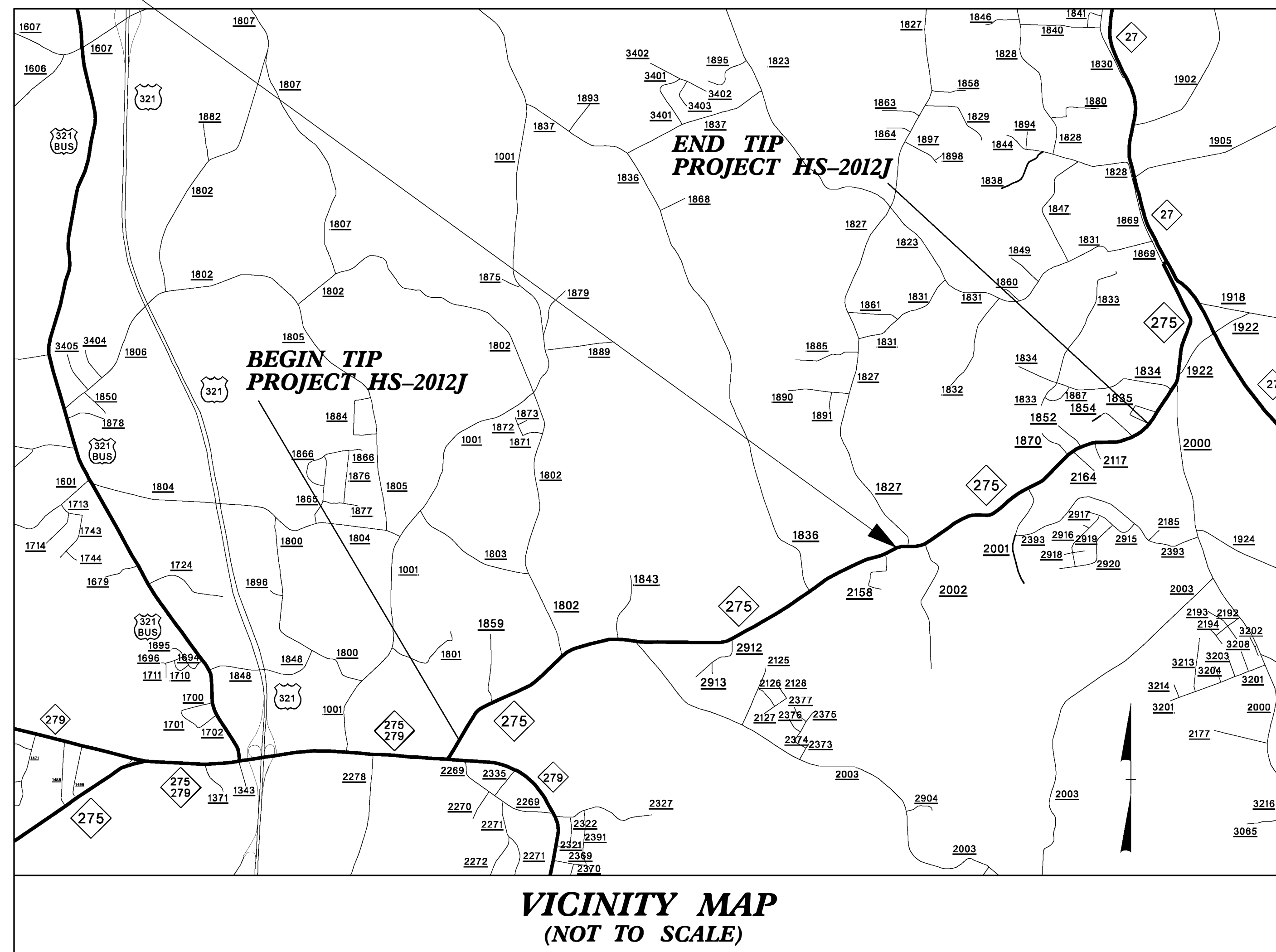
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HS-2012J	7	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
49331.1.11	4933111	PE	
49331.3.11	4933111	CONST	

**TIP PROJECT: HS-2012J**

**CONTRACT: DL00322**

**MAP 7**

**TYPE OF WORK: INSTALLATION OF CENTERLINE AND EDGELINE MILLED SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS.**



**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT HS-2012J = 4.565 MILES  
TOTAL LENGTH OF TIP PROJECT HS-2012J = 4.565 MILES

Prepared In the Office of:  
**DIVISION TWELVE DDC**  
1710 E. Marion Street, Shelby NC, 28150

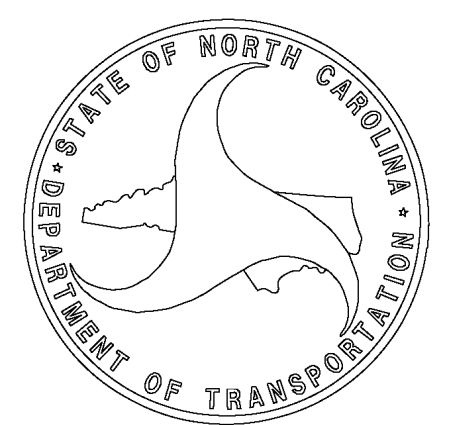
2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
N/A

LETTING DATE:  
MARCH 26, 2024

**BRYAN K.D. SOWELL, PE**  
PROJECT ENGINEER

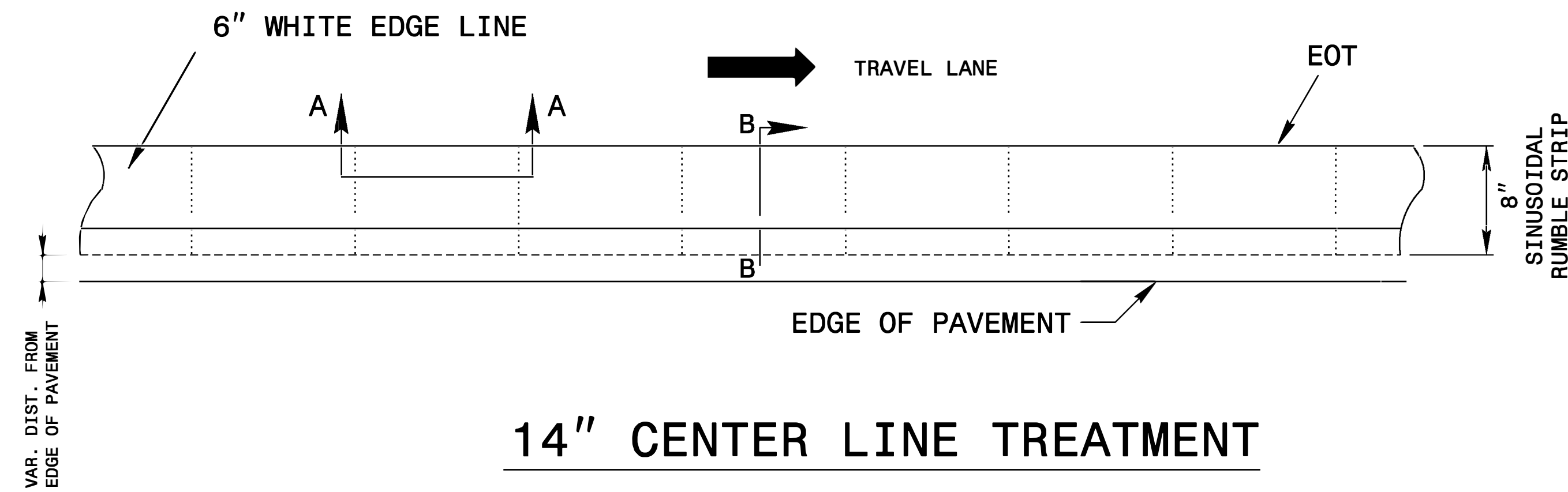
**JOSHUA S. CARPENTER**  
PROJECT DESIGN ENGINEER



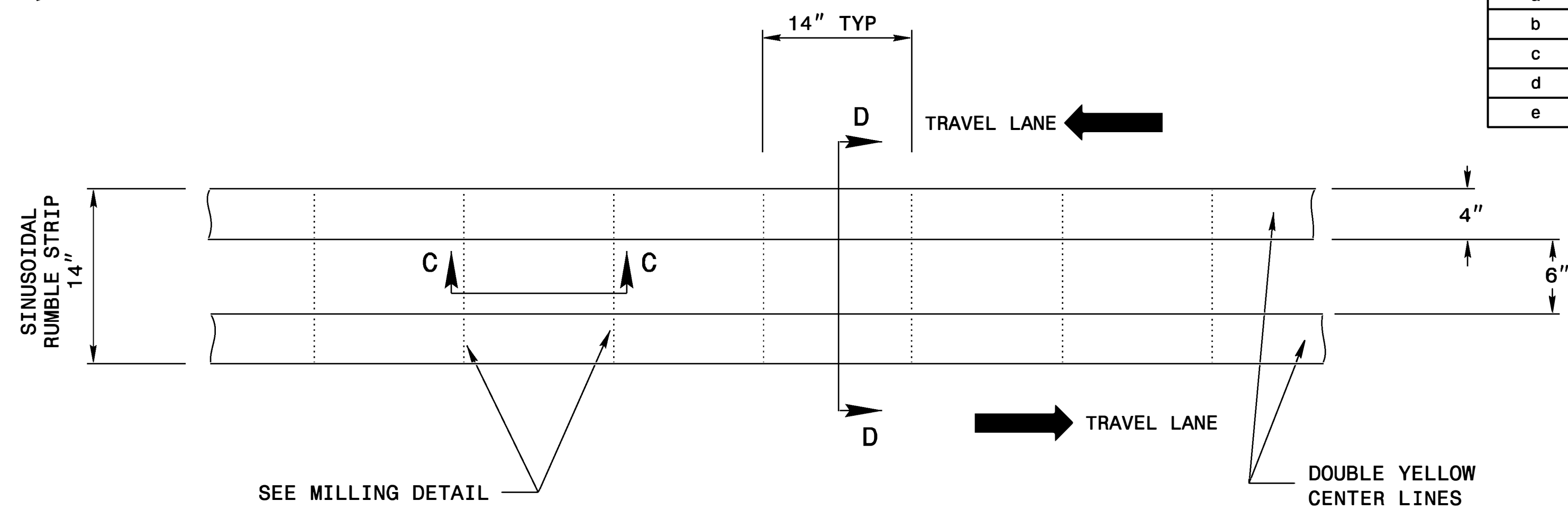


# 8" & 14" SINUSOIDAL MILLED RUMPLE STRIP DETAIL

## 8" EDGE LINE TREATMENT



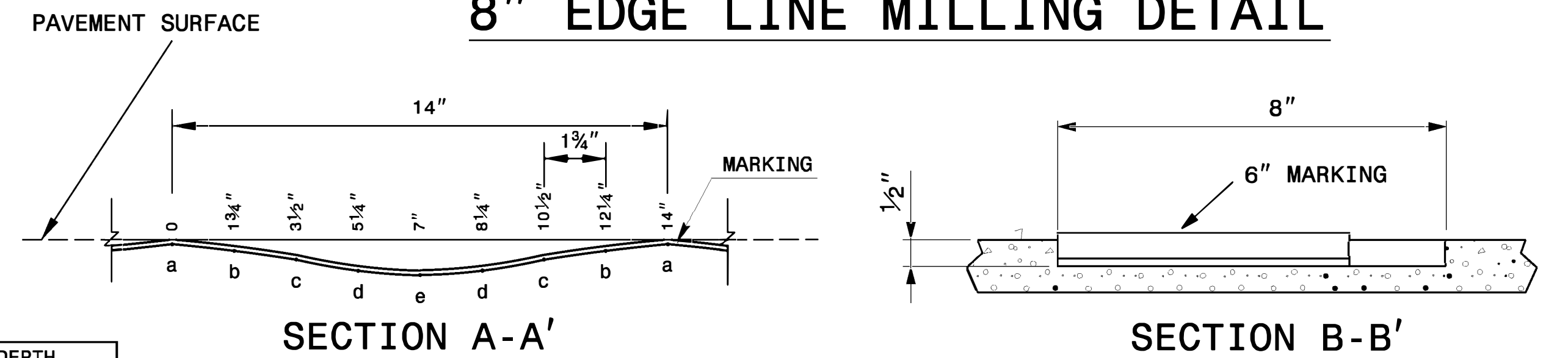
## 14" CENTER LINE TREATMENT



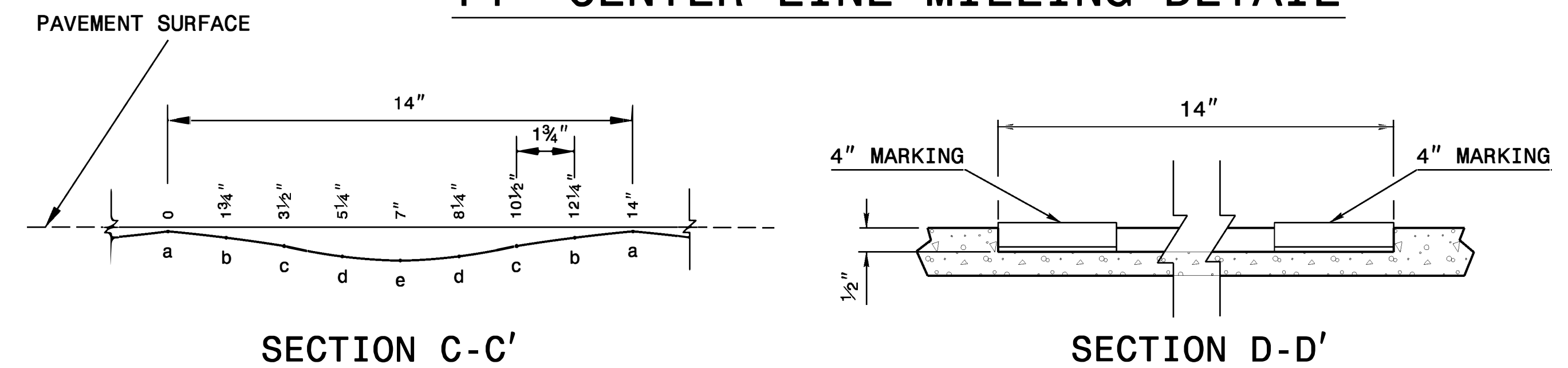
LOCATION	DEPTH	
	MIL	INCHES
a	62.5	1/16"
b	125	1/8"
c	219	7/32"
d	344	1 1/32"
e	375	3/8"

NOTE: SPECIFICATION IN TABLE FROM MNDOT RESEARCH PROJECT FINE REPORT 2016-3:  
SINUSOIDAL RUMBLE STRIP DESIGN OPTIMIZATION STUDY BY TERHEAR ET. AL. JUNE 2016.

## 8" EDGE LINE MILLING DETAIL



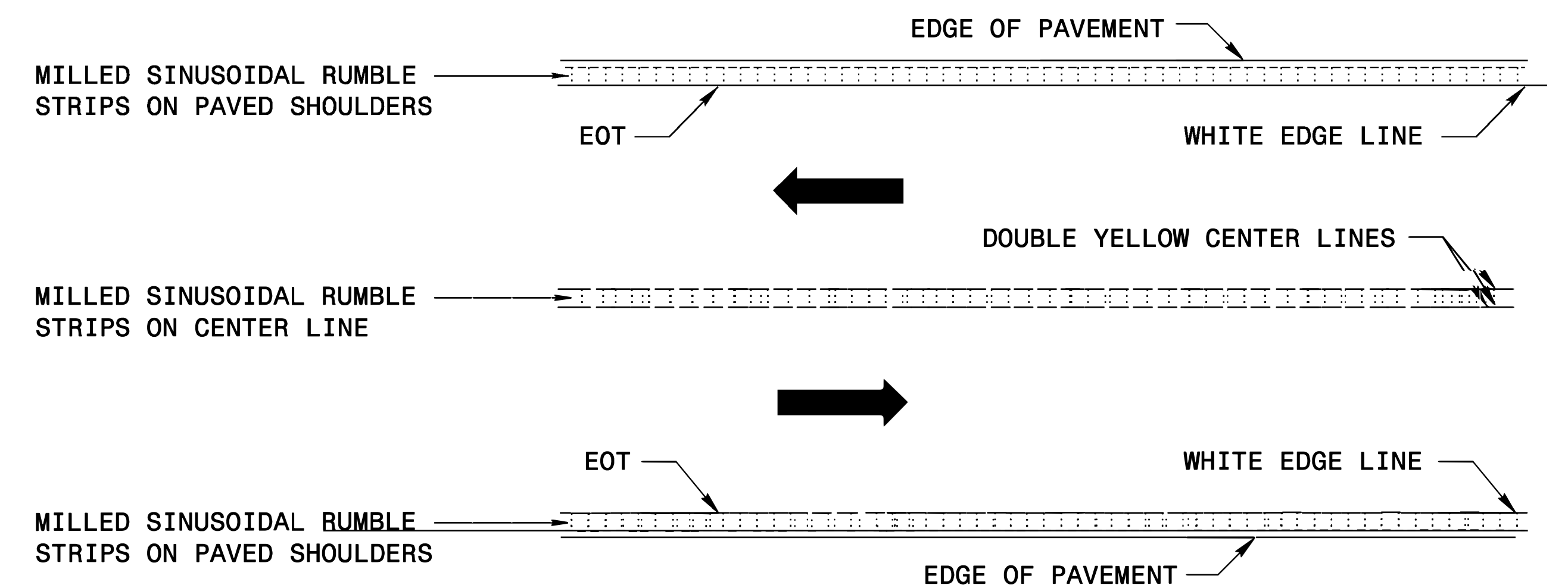
## 14" CENTER LINE MILLING DETAIL



### NOTES:

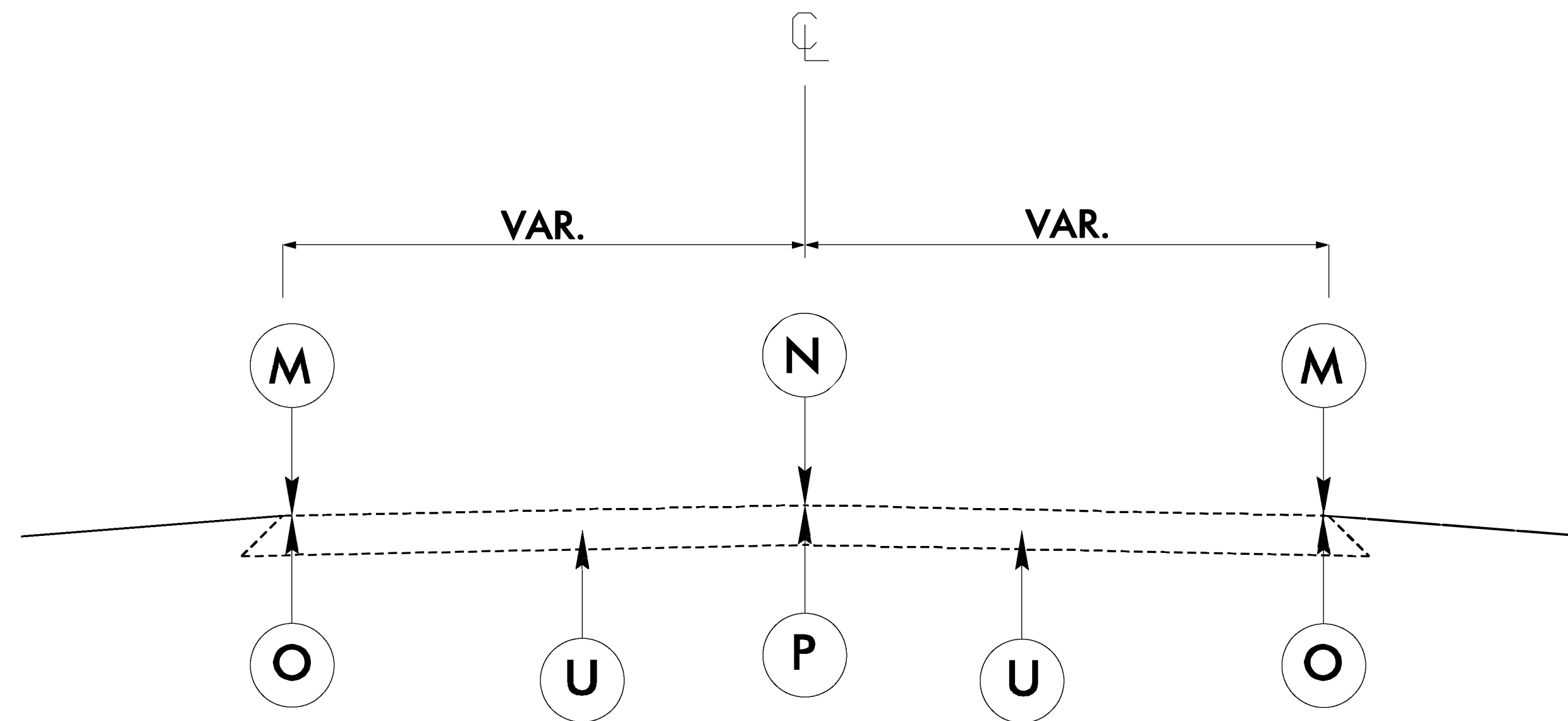
- INSTALL CENTERLINE AND EDGELINE SINUSOIDAL RUMBLE STRIPS AND PAVEMENT MARKINGS AT THE FOLLOWING LOCATIONS: MAP 1 (NC 150); MAP 2 (NC 10); MAP 3 (NC 10); MAP 4 (NC 10); MAP 5 (SR 1844); MAP 6 (NC 18); MAP 7 (NC 18); MAP 8 (NC 275).
- PLACE MILLED SINUSODIAL RUMBLES AS SHOWN ABOVE IN THIS DETAIL ON BOTH SHOULDERS IN BOTH DIRECTIONS.
- USING A VACUUM, REMOVE ALL DEBRIS FROM THE MILLINGS JUST PRIOR TO PLACING ANY PAVEMENT MARKINGS
- ENSURE GLASS BEADS ARE SPREAD UNIFORMLY OVER THE ENTIRE SURFACE OF THE PAVEMENT MARKING MATERIAL.
- PAVEMENT MARKING MATERIAL SHALL BE THERMOPLASTIC.
- RETAIN PAVEMENT MARKERS ON THE ALL MAPS.
- IF SNOWPLOWABLE MARKERS ARE TO BE INSTALLED IN THE CENTERLINE, SKIP A 24" SPACE IN THE RUMBLE STRIPES EVERY 40' OR 80' ACCORDING TO STD. 1250.01.

## LANE TREATMENT



\* DETAIL NOT TO A SCALE

# TYPICAL SECTIONS



**TYPICAL SECTION NO. 1**  
USE WITH MAPS: 1-8

PAVEMENT SCHEDULE	
M	EDGE LINE MILLED SINUSOIDAL RUMBLE STRIPS.
N	CENTERLINE MILLED SINUSOIDAL RUMBLE STRIPS.
O	6" WHITE THEROMPLASTIC EDGE LINE.
P	4" THERMOPLASTIC DOUBLE YELLOW CENTERLINE.
U	EXISTING PAVEMENT.

I3-FEB-2024 11:09  
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 isacenter AT 11/2-3/24/24

PROJECT REFERENCE #	SHEET NO.
49331.3.8, ETC.	10

**MILLED SINUSOIDAL RUMBLE STRIP, THERMOPLASTIC MARKING AND MARKER QUANTITIES**

WBS#	COUNTY	MAP NO	ROUTE	DESCRIPTION	LENGTH	WIDTH	4400000000-E	4457000000-N	1881000000-E	1881000000-E	4685000000-E	4695000000-E	4850000000-E
							WORK ZONE ADVANCE/GENERAL WARNING SIGNING	TEMPORARY TRAFFIC CONTROL	SINUSOIDAL MILLED RUMBLE STRIP 8"	SINUSOIDAL MILLED RUMBLE STRIP 14"	THERMO PAVEMENT MARKING LINES YELLOW (4", 90 MILS)	THERMO PAVEMENT MARKING LINES WHITE (6", 90 MILS)	REMOVAL OF PAVEMENT MARKING LINES, 4"
					MI	FT	SF	LS	LF	LF	LF	LF	LF
49331.3.12	Iredell	1	NC 150	MP. 11.400 to MP. 11.900	0.500		144	*	5,280.00	2,640.00	5,280.00	5,280.00	250
<b>WBS# 49331.3.12 TOTAL</b>							<b>144</b>		<b>5,280.00</b>	<b>2,640.00</b>	<b>5,280.00</b>	<b>5,280.00</b>	<b>250</b>
49331.3.10	Catawba	2	NC 10	MP. 11.922 to MP. 14.991	3.069		144	*	32,800.00	16,400.00	32,800.00	32,800.00	750
<b>WBS# 49331.3.10 TOTAL</b>							<b>144</b>		<b>32,800.00</b>	<b>16,400.00</b>	<b>32,800.00</b>	<b>32,800.00</b>	<b>750</b>
49331.3.14	Catawba / Lincoln	3	NC 10	MP. 0.000 to MP. 11.000	11.000		144	*	116,000.00	58,000.00	116,000.00	116,000.00	2,500
<b>WBS# 49331.3.14 TOTAL</b>							<b>144</b>		<b>116,000.00</b>	<b>58,000.00</b>	<b>116,000.00</b>	<b>116,000.00</b>	<b>2,500</b>
51125	Catawba	4	SR 1844 (Slanting Bridge Rd.)	Between Lake Dr. and Bradley Long Dr.	0.775		144	*	8,200.00	4,100.00	8,200.00	8,200.00	500
							<b>144</b>		<b>8,200.00</b>	<b>4,100.00</b>	<b>8,200.00</b>	<b>8,200.00</b>	<b>500</b>
49331.3.8	Cleveland	5	NC 18	MP. 0.000 to MP. 5.965	5.965		144	*	63,400.00	31,700.00	63,400.00	63,400.00	1,500
<b>WBS# 49331.3.8 TOTAL</b>							<b>144</b>		<b>63,400.00</b>	<b>31,700.00</b>	<b>63,400.00</b>	<b>63,400.00</b>	<b>1,500</b>
49331.3.13	Cleveland	6	NC 18	MP. 13.465 to MP. 18.583	5.118		144	*	54,000.00	27,000.00	54,000.00	54,000.00	1,500
<b>WBS# 49331.3.13 TOTAL</b>							<b>144</b>		<b>54,000.00</b>	<b>27,000.00</b>	<b>54,000.00</b>	<b>54,000.00</b>	<b>1,500</b>
49331.3.11	Gaston	7	NC 275	MP. 5.106 to MP. 9.671	4.565		144	*	48,500.00	24,250.00	48,500.00	48,500.00	1,000
<b>WBS# 49331.3.11 TOTAL</b>							<b>144</b>		<b>48,500.00</b>	<b>24,250.00</b>	<b>48,500.00</b>	<b>48,500.00</b>	<b>1,000</b>
<b>Contract Totals</b>					<b>30.992</b>		<b>1,008.00</b>	<b>1</b>	<b>328,180.00</b>	<b>164,090.00</b>	<b>328,180.00</b>	<b>328,180.00</b>	<b>8,000</b>