

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION 6

# PLANS

**Letting Date: May 17, 2023**

**CONTRACT ID: DF00440**

**TIP NO.: -----**

**FEDERAL AID NO.: -----**

**WBS ELEMENT NO.: 2023CPT.06.14.10241.1 & 2023CPT.06.14.20241.1**

**ROUTE NO.: Various**

**LOCATION: Various**

**COUNTY: Columbus**

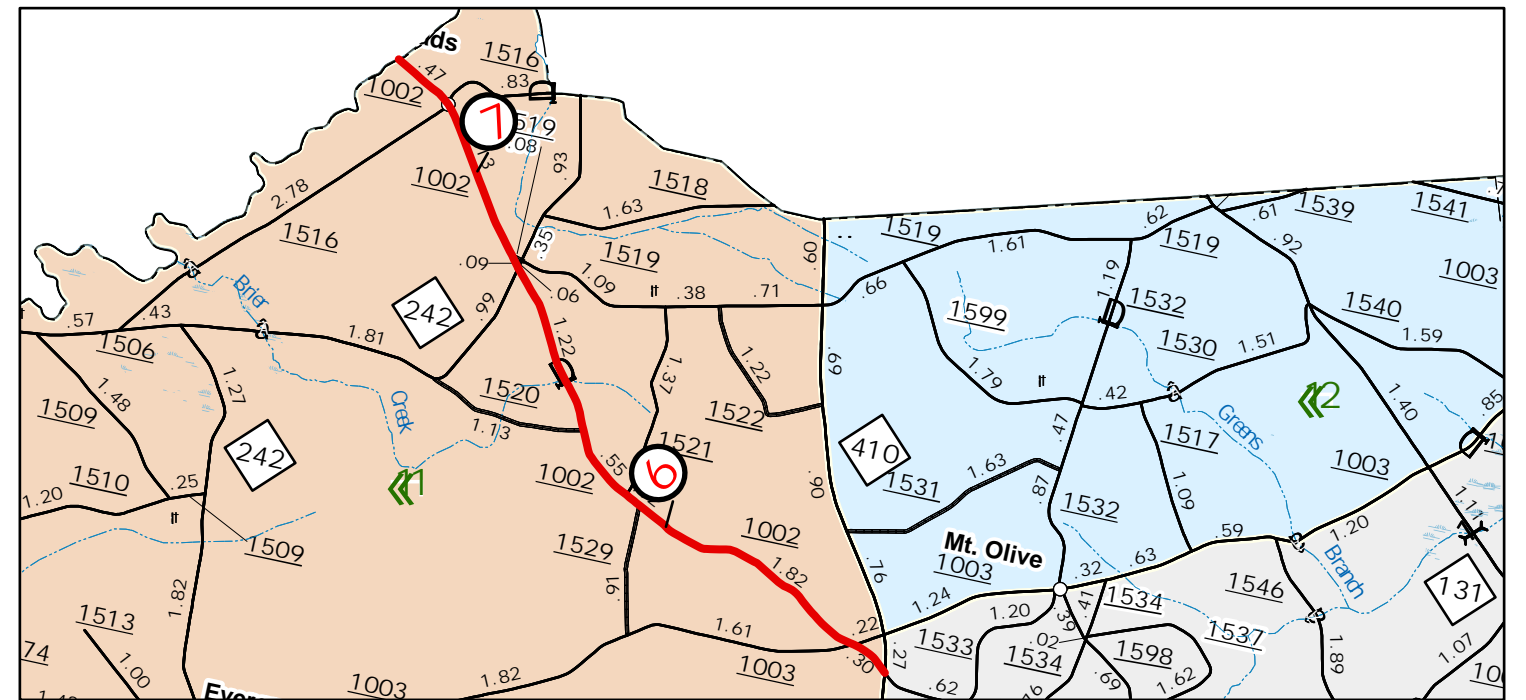
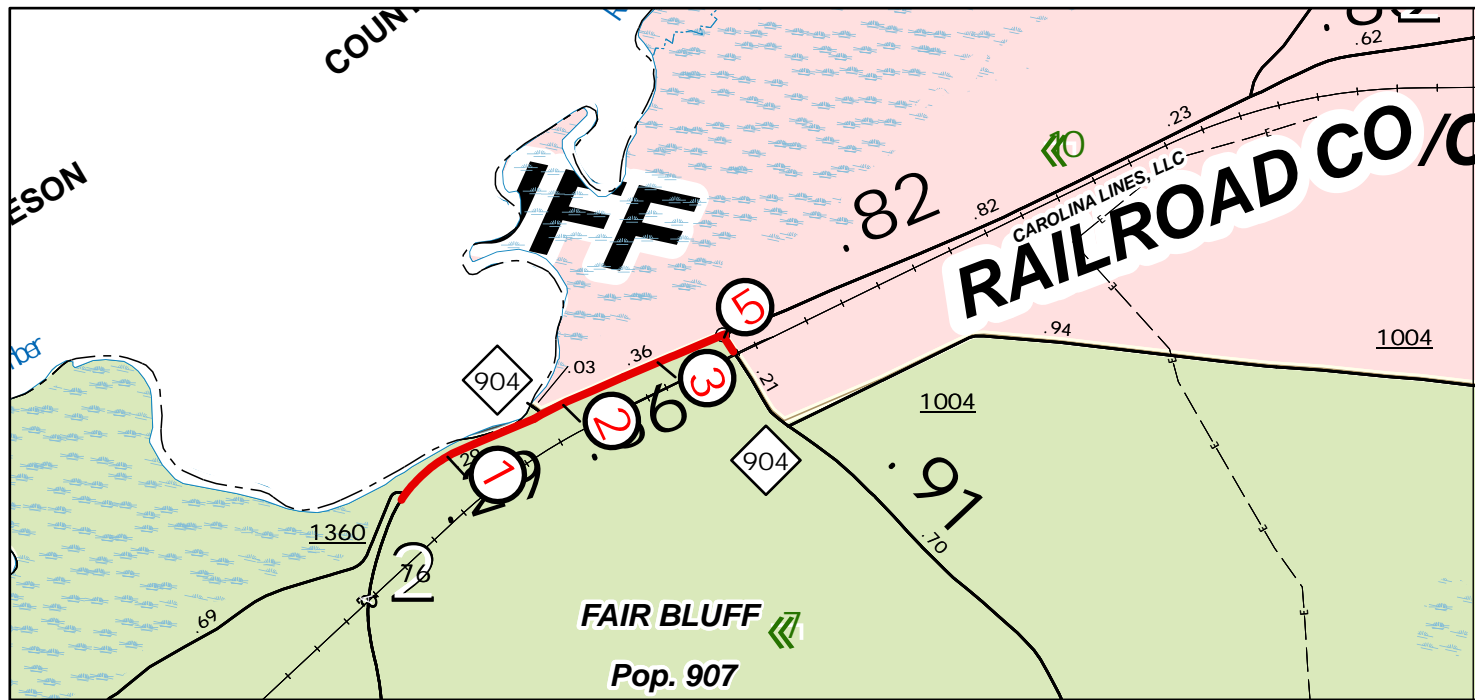
**LENGTH OF PROJECT: 12.05 Miles**

**TYPE OF WORK: Resurfacing, Milling, Widening & Pavement Markings**

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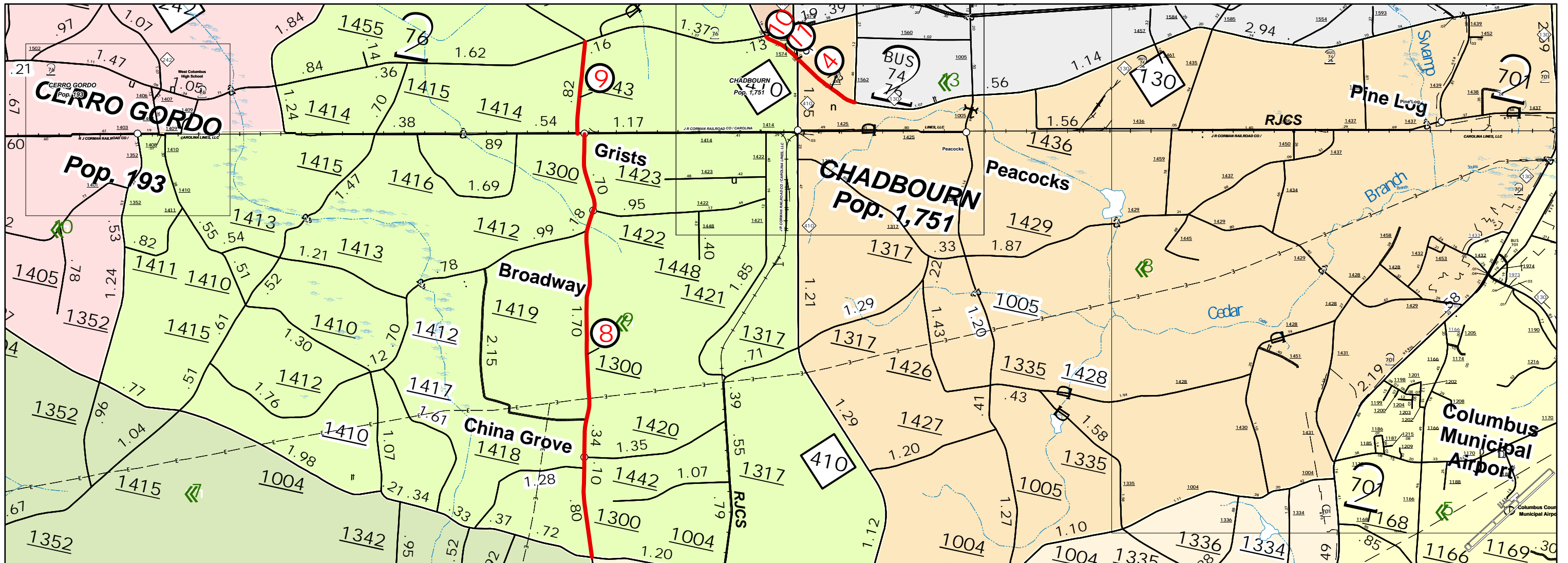
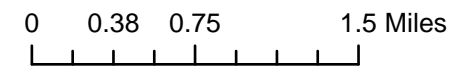
**This file or an individual page  
shall not be considered a certified document.**



# Columbus County Resurfacing

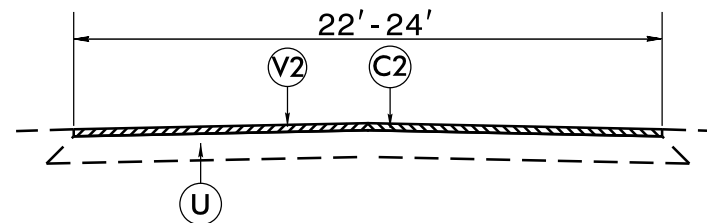
WBS: 2023CPT.06.14.20241.1  
 WBS: 2023CPT.06.14.10241.1

Contract Number: DF00440

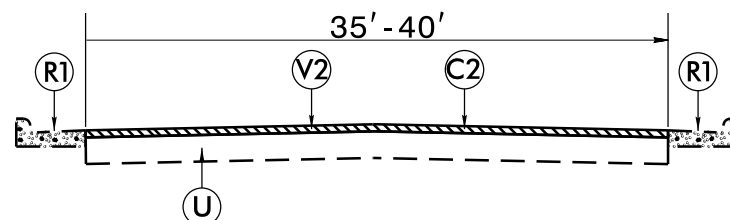


# PAVEMENT SCHEDULE

C1	1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	EXISTING CURB AND GUTTER
T1	SHOULDER RECONSTRUCTION WITH AGGREGATE SHOULDER BORROW
U	EXISTING ASPHALT PAVEMENT
V1	0"-1½" MILLING
V2	1½" MILLING
V3	2½" MILLING
V4	4" MILLING

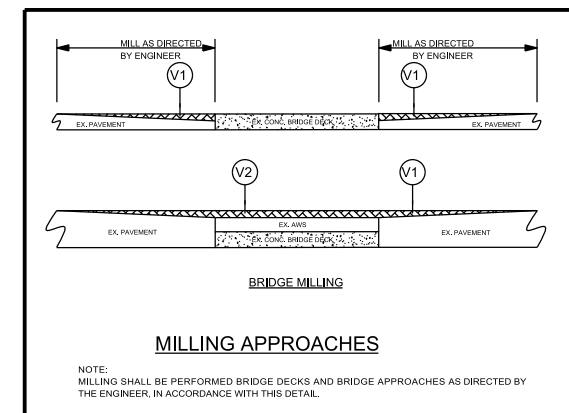


TYPICAL SECTION NO. 1



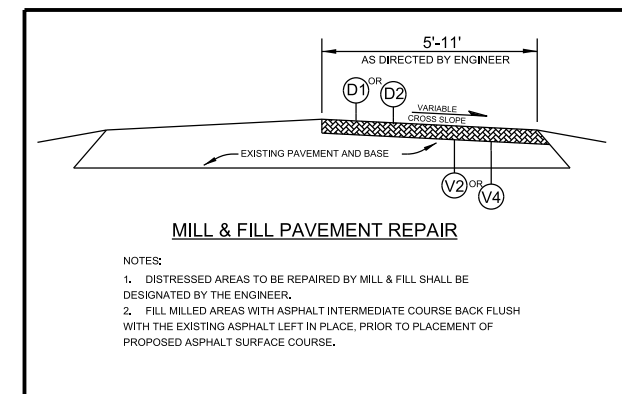
TYPICAL SECTION NO. 2

\*PLUS 4" MILL AND FILL ON MAP#2 (SEE DETAIL)



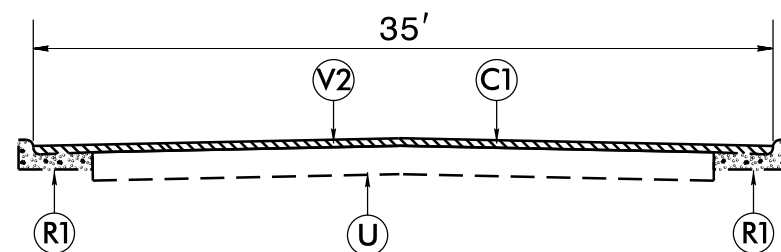
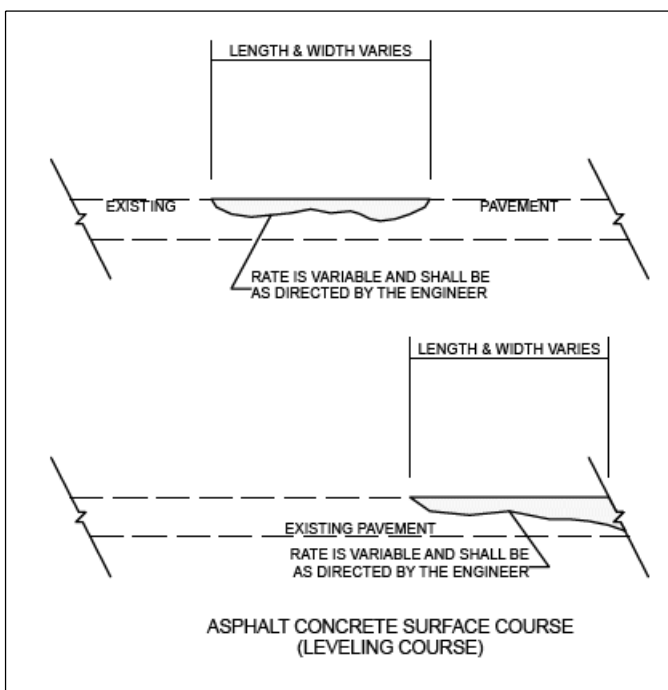
MILLING APPROACHES

NOTE: MILLING SHALL BE PERFORMED BRIDGE DECKS AND BRIDGE APPROACHES AS DIRECTED BY THE ENGINEER, IN ACCORDANCE WITH THIS DETAIL.



MILL & FILL PAVEMENT REPAIR

- NOTES:
1. DISTRESSED AREAS TO BE REPAIRED BY MILL & FILL SHALL BE DESIGNATED BY THE ENGINEER.
  2. FILL MILLED AREAS WITH ASPHALT INTERMEDIATE COURSE BACK FLUSH WITH THE EXISTING ASPHALT LEFT IN PLACE, PRIOR TO PLACEMENT OF PROPOSED ASPHALT SURFACE COURSE.

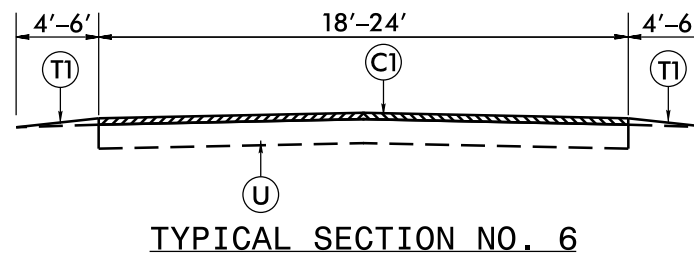
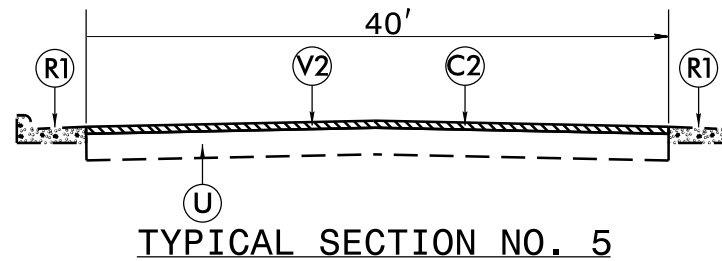
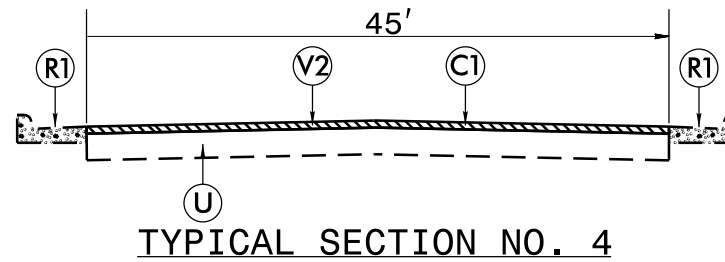


TYPICAL SECTION NO. 3

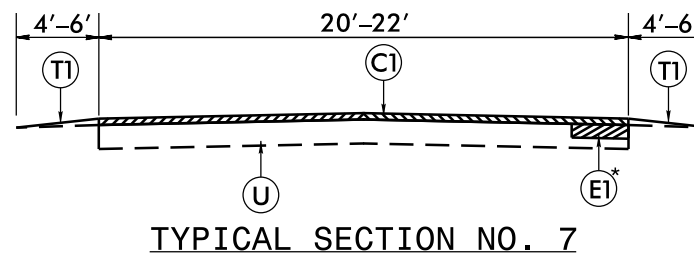
6/2/23 2:41:45 PM C:\Users\jgarcia\OneDrive\Documents\Projects\2023 Spring\03 typ.dgn

### PAVEMENT SCHEDULE

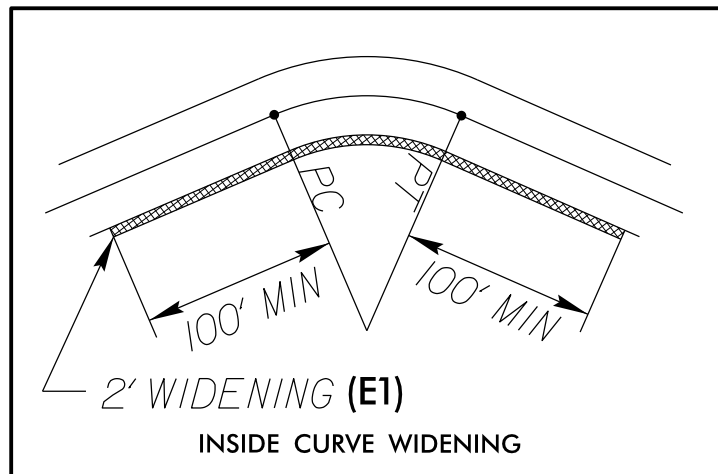
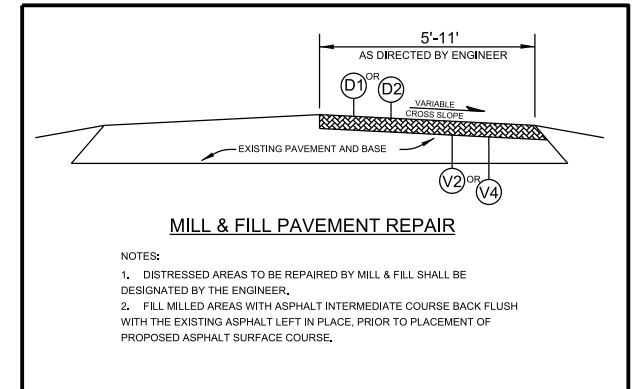
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E1	4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
R1	EXISTING CURB AND GUTTER
T1	SHOULDER RECONSTRUCTION WITH AGGREGATE SHOULDER BORROW
U	EXISTING ASPHALT PAVEMENT
V1	0"-1½" MILLING
V2	1½" MILLING
V3	2½" MILLING
V4	4" MILLING



\*PLUS 2½" MILL AND FILL ON MAP#6 (SEE DETAIL)



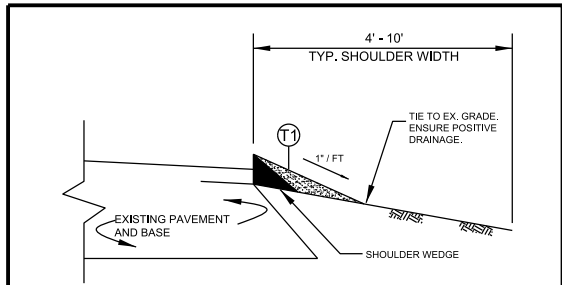
\*2' INSIDE CURVE WIDENING (SEE DETAIL)



6/2/23 2-APR-2023 15:14

# PAVEMENT SCHEDULE

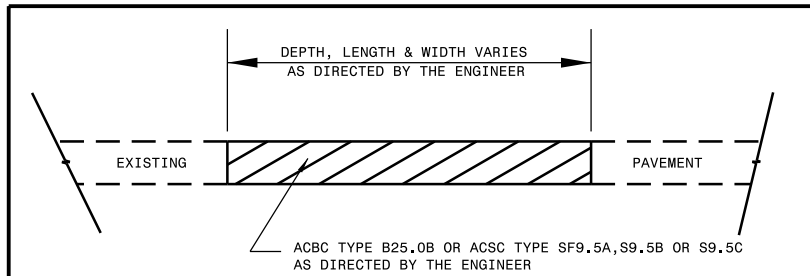
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T1	SHOULDER RECONSTRUCTION WITH AGGREGATE SHOULDER BORROW
U	EXISTING ASPHALT PAVEMENT
V1	0"-1½" MILLING
V2	1½" MILLING
V3	2½" MILLING
V4	4" MILLING



## SHOULDER RECONSTRUCTION

**NOTES:**

- SHOULDER SHALL BE RECONSTRUCTED AS SHOWN IN STD. DWG. NO. 560.01 & 560.02, WITH A MINIMUM SLOPE OF 1" PER FOOT TO ENSURE POSITIVE DRAINAGE AWAY FROM ROADWAY.
- AGGREGATE SHOULDER BORROW (ASB) MATERIAL SHALL BE PLACED USING A WIDENING MACHINE OR SIMILAR DEVICE AND COMPACTED USING A ROLLER ASB SHALL TIE FLUSH TO PAVEMENT AND EXISTING SHOULDER.



## PATCHING EXISTING PAVEMENT

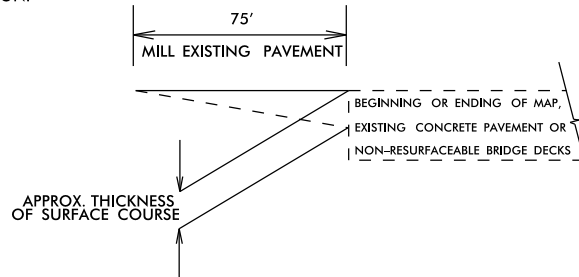
PATCHING TO BE PERFORMED PRIOR TO MILL AND FILL OPERATION

**NOTES TO CONTRACTOR**

FOR SURFACE MIXES OVER 1" IN THICKNESS, MILL THE EXISTING PAVEMENT IN ACCORDANCE WITH THE FOLLOWING SKETCH AS DIRECTED BY THE ENGINEER.

LOCATIONS SHALL INCLUDE TIES INTO EXISTING CONCRETE PAVEMENT, AT BRIDGE APPROACHES WHERE THE BRIDGE WILL NOT BE RESURFACED, AND AT THE BEGINNING AND ENDING POINT OF EACH RESURFACING MAP.

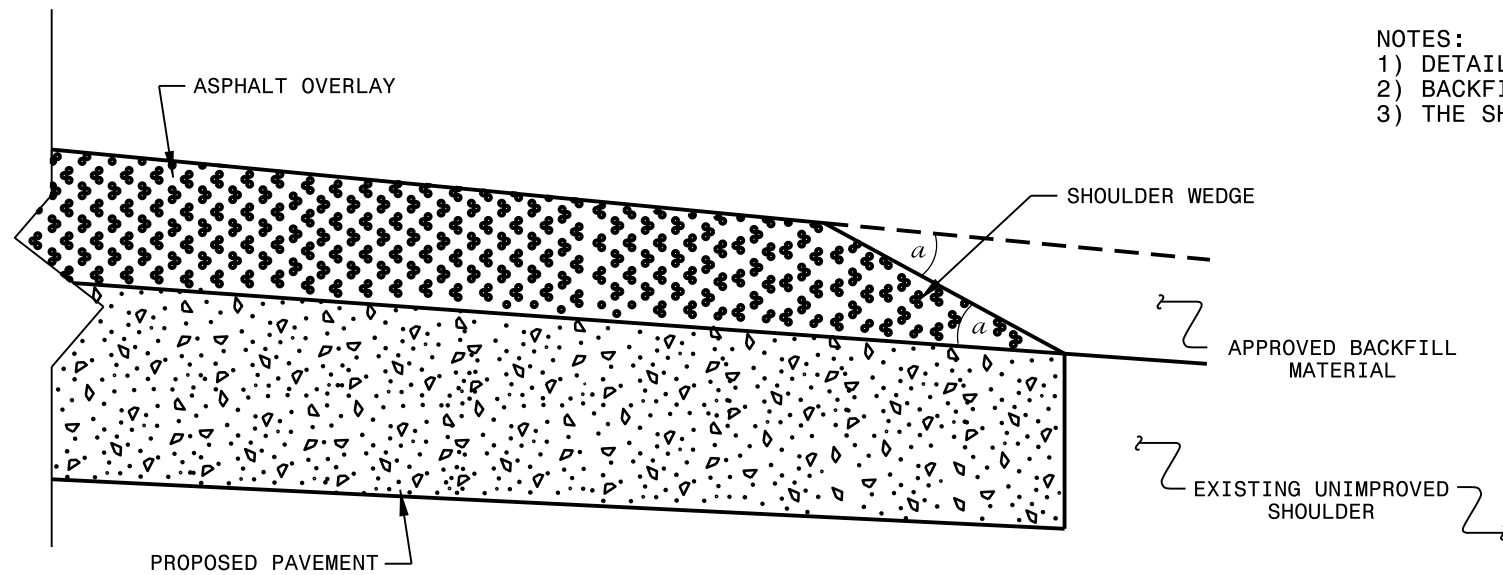
PERFORM THE WORK IN ACCORDANCE WITH SECTION 607 OF THE JANUARY 2018 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES. RESURFACING WILL BE ACCOMPLISHED AT THE SAME TIME AS THE MILLING OPERATION.



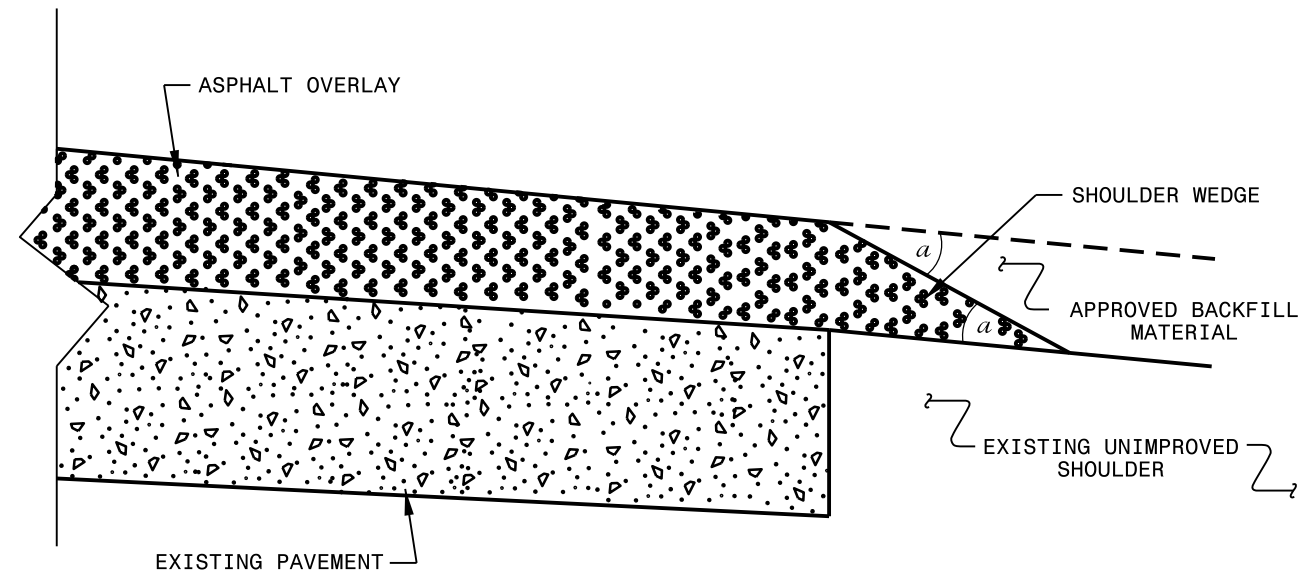
## MILLING AT PAVEMENT TIE-INS DETAIL

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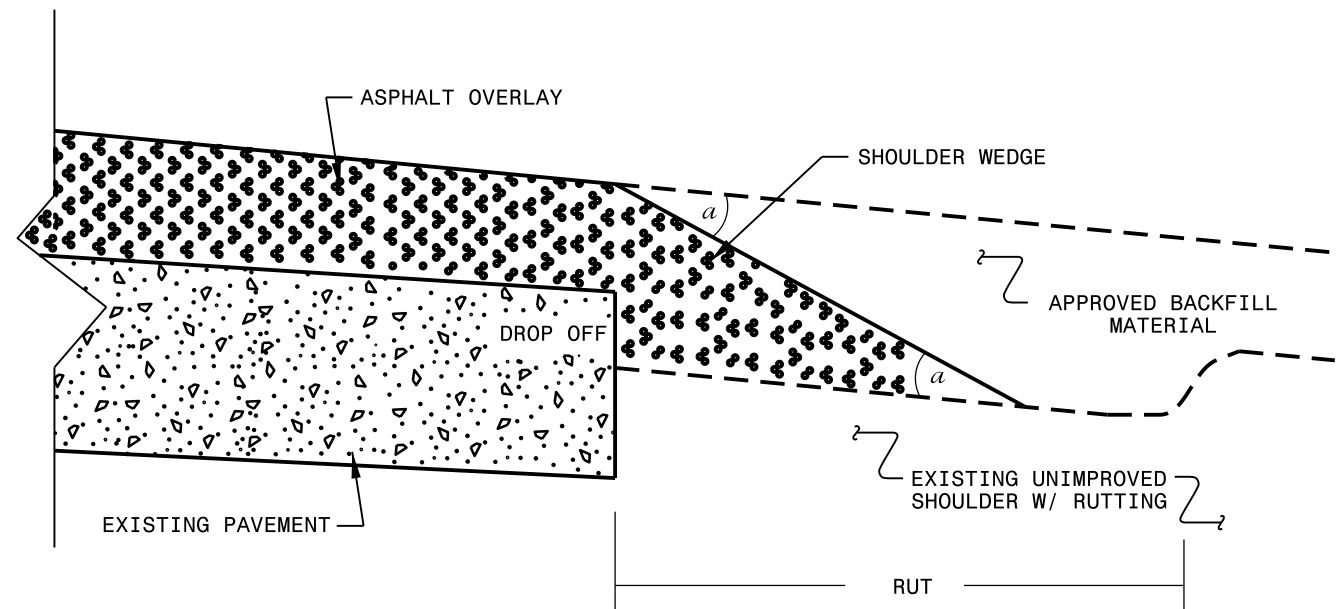
- NOTES:
- 1) DETAIL DOES NOT APPLY TO OGAFc AND ULTRA-THIN BONDED WEARING COURSE.
  - 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
  - 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS AND SIDE STREETS.



**SHOULDER WEDGE DETAIL**  
(Resurfacing Projects w/ Widening or with Existing Paved Shoulder having no dropoffs)



**SHOULDER WEDGE DETAIL**  
(Resurfacing Projects w/ NO Widening)



**SHOULDER WEDGE DETAIL**  
(Resurfacing Adjacent to Rutted Shoulder)

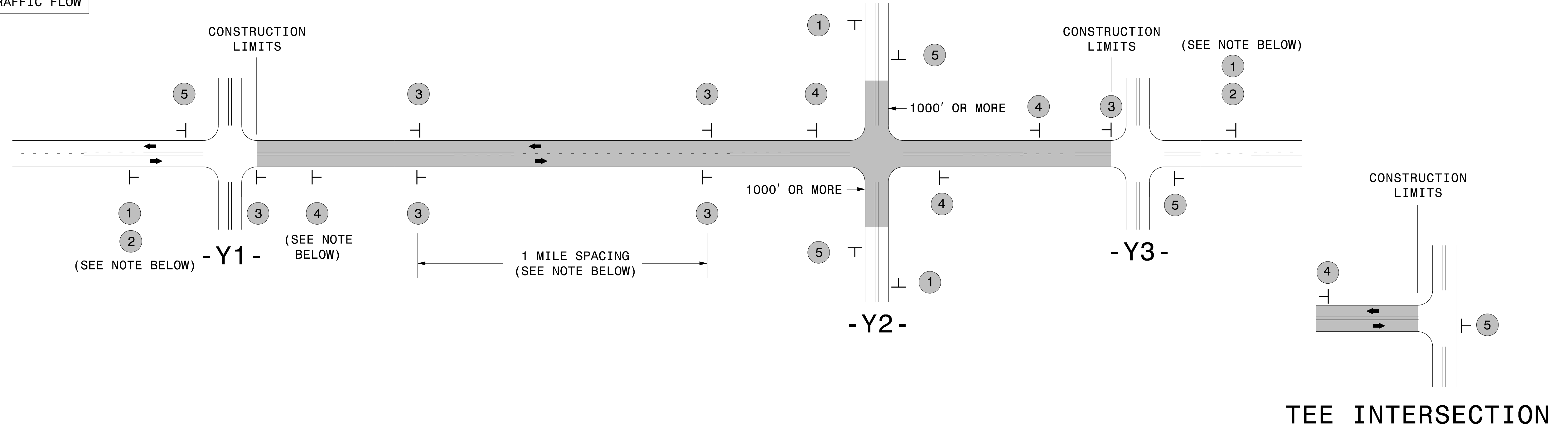
- SHOULDER WEDGE ANGLE = 30°

<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b>			
Office 919-707-6950		FAX 919-250-4119	
<b>SHOULDER WEDGE DETAILS</b>			
ORIGINAL BY: T.SPELL	DATE: 7-19-11		
MODIFIED BY:	DATE: 10/16/12		
CHECKED BY:	DATE:		
FILE SPEC.: susr/details/stand/shoulderwedgedetail.dgn			

SYSTEMS DESIGN USER NAME

# SIGNING FOR RESURFACING PROJECTS

**LEGEND**  
 ┆ STATIONARY SIGN  
 ← DIRECTION OF TRAFFIC FLOW



## MAINLINE (-L-) SIGNING

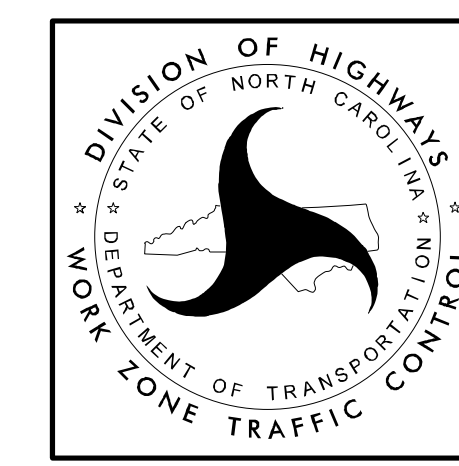
## -Y- LINE SIGNING

SIGNING NOTES AND PLACEMENT PER DIRECTION	1		PLACE 1000' PRIOR TO BEGINNING OF CONSTRUCTION LIMITS. ONLY USED ON -Y- LINES IF RESURFACING LIMITS EXTEND 1000' ALONG -Y- LINE.	<p>NO REQUIRED STATIONARY SIGNING FOR THE FOLLOWING -Y- LINE CONDITIONS:</p> <ol style="list-style-type: none"> <li>1) LESS THAN 1000' OF RESURFACING ALONG -Y- LINE</li> <li>2) SUBDIVISION ROADS</li> <li>3) DEAD END ROADS</li> </ol> <p>WHEN PAVING/CONSTRUCTION ACTIVITIES PROCEED ACROSS AN UNSIGNED -Y- LINE, PORTABLE ADVANCE WARNING SIGNS SHALL BE USED ALONG THE -Y- LINE AS SHOWN BELOW. REMOVE UPON COMPLETION OF WORK.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">             W20-1 48" X 48"            PLACED 500' IN ADVANCE OF FLAGGER.         </div> <div style="text-align: center;">             W20-7 A 48" X 48"            PLACED 250' IN ADVANCE OF FLAGGER.         </div> </div>
	2		#2 SIGN ONLY USED WHEN CONSTRUCTION LIMITS ARE 2 OR MORE MILES IN LENGTH. ROUND UP TO NEXT WHOLE NUMBER. (NO FRACTIONAL OR DECIMAL NUMBERS)	
	3		- PLACE INITIALLY AT THE CONSTRUCTION LIMITS AND SPACE 1 MILE APART THEREAFTER. - AT TEE INTERSECTIONS INSTALL INITIALLY 1/2 MILE FROM INTERSECTION AND SPACE 1 MILE APART THEREAFTER.	
	4		- THESE ARE FOR -Y- LINES THAT ARE "THROUGH" ROADWAYS. - DEAD END AND SUBDIVISION ROADS ARE NOT "THROUGH" ROADWAYS. - INSTALL 500' +/- FROM EACH -Y- LINE APPROACH AS SHOWN ABOVE. - FOR MULTIPLE -Y- LINES THAT ARE SEPARATED BY 0.25 MILES OR LESS, TREAT AS A SINGLE UNIT AND INSTALL WITHIN 500' OF EACH APPROACH. - A MAXIMUM OF 2 SIGN SETS PER MILE. DO NOT INSTALL WHEN -Y- LINES ARE WITHIN 0.5 MILES FROM "END ROAD WORK" SIGN. - FOR TEE INTERSECTIONS, INSTALL WITHIN 500' +/- OF THE INTERSECTION ALONG -L- LINE.	
	5		PLACE 500' FOLLOWING THE END OF CONSTRUCTION LIMITS OR AS SHOWN WHEN WORK ENDS AT A 3-WAY TEE INTERSECTION.	

THE ABOVE SIGNS ARE ALL THAT ARE REQUIRED FOR A CONTRACTOR TO BEGIN A RESURFACING CONTRACT. ANY ADDITIONAL SIGNS REQUESTED BY NCDOT DIVISIONS SHALL BE INSTALLED WITHIN 7 BUSINESS DAYS OF THE START OF CONTRACT WORK.

**MAPS LESS THAN 2 MILES**

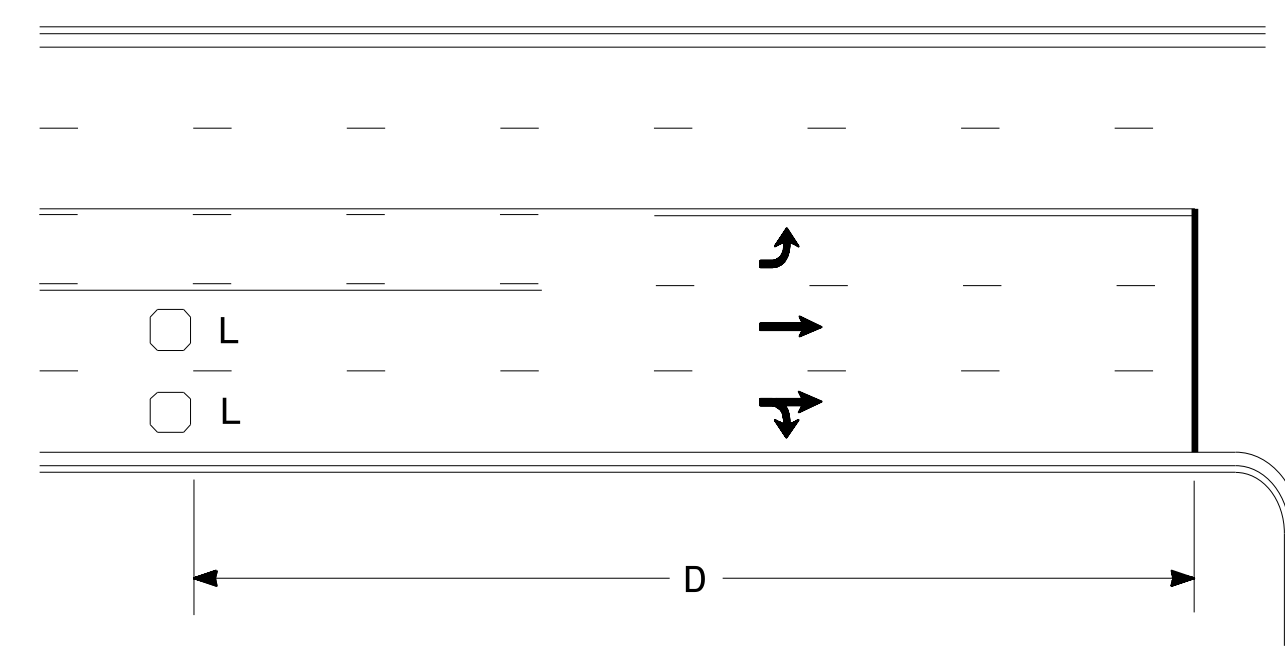
FOR RESURFACING MAPS WITH CONSTRUCTION LIMITS LESS THAN 2 MILES IN LENGTH, NO STATIONARY SIGNS ARE REQUIRED. USE PORTABLE "ROAD UNDER CONSTRUCTION" OR "ROAD WORK AHEAD" SIGNS IN LIEU OF STATIONARY ADVANCE WARNINGS SIGNS.



**ADVANCE WARNING SIGNS FOR RURAL AND SUBURBAN 2-LANE ROADWAY RESURFACING**



### High Speed Detection (≥40 mph)

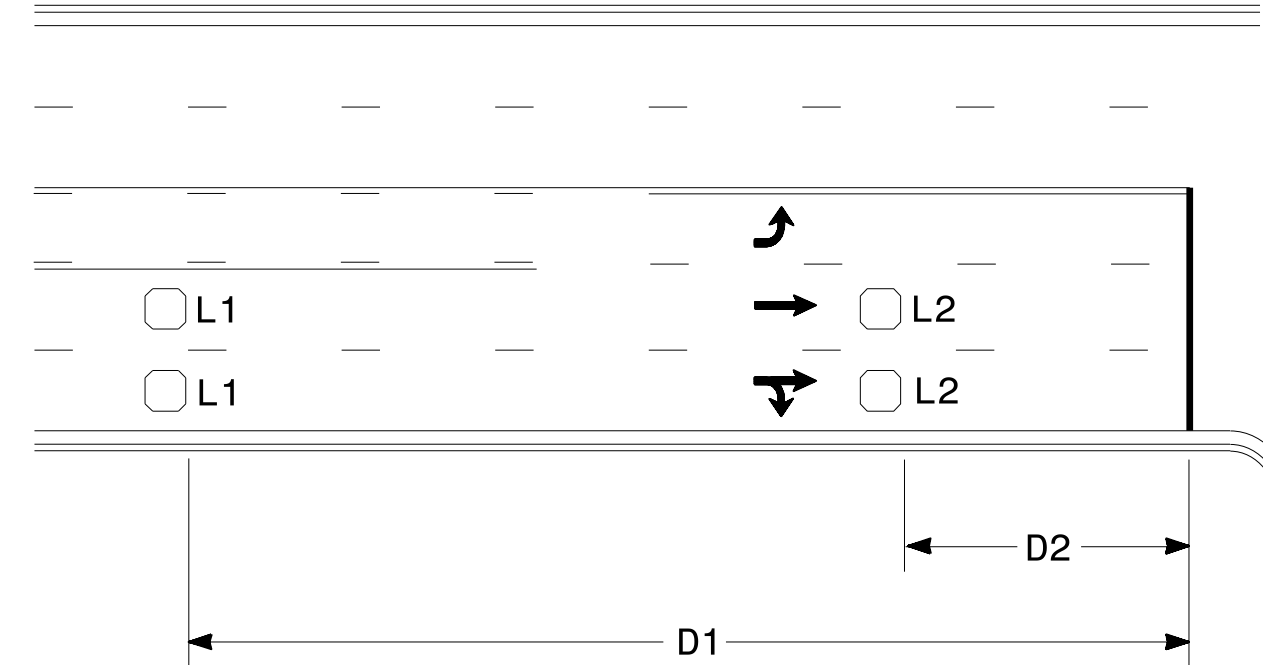


Speed Limit mph	D ft
40	250
45	300
50	355
55	420

L = 6ft X 6ft  
 Wired in series for TS1  
 Controllers  
 Wired separately for TS2,  
 170, and 2070L Controllers

Volume Density Operation

OR

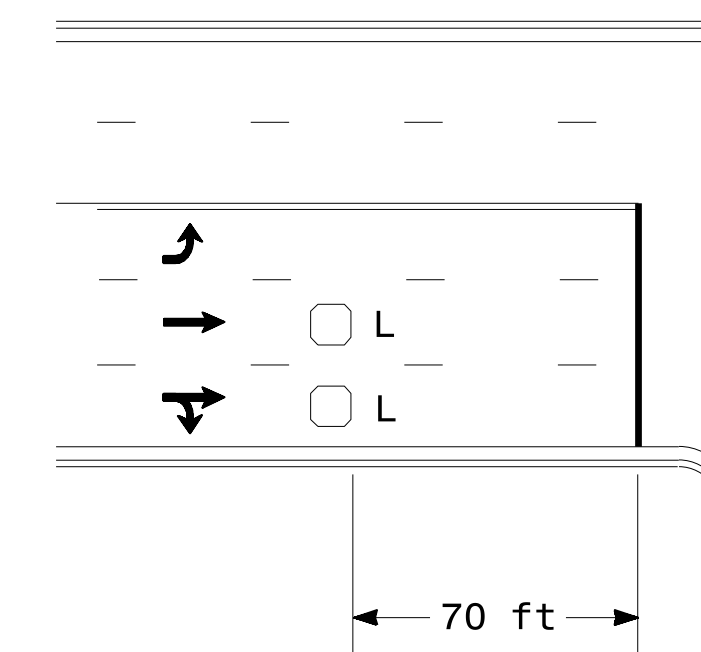


Speed Limit mph	D1 ft	D2 ft
40	250	80
45	300	90
50	355	100
55	420	110

L1 = 6ft X 6ft  
 Wired in series  
 L2 = 6ft X 6ft  
 Wired in series

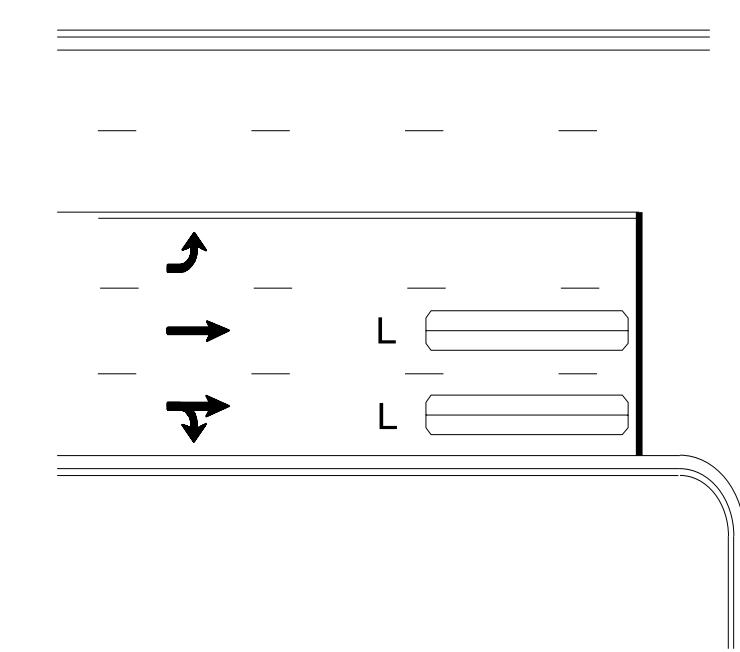
"Stretch" Operation

### Low Speed Detection (≤35 mph)



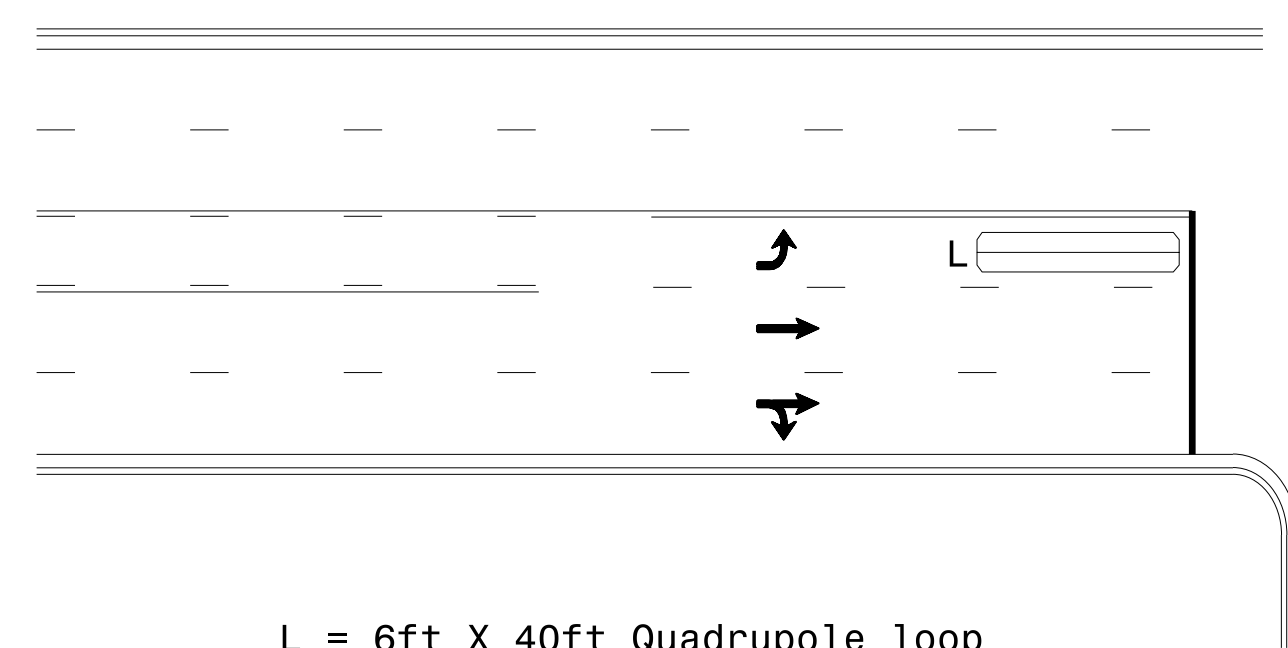
L = 6ft X 6ft  
 Wired in series

OR



L = 6ft X 40ft  
 Quadrupole loop, wired separately

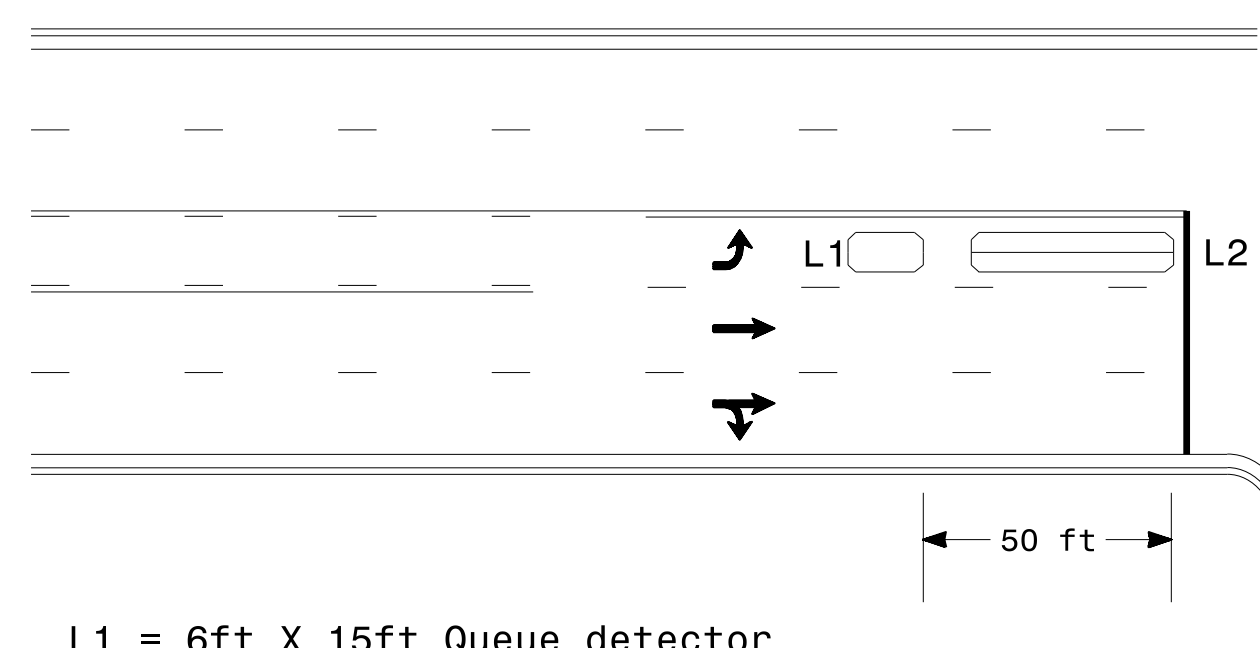
### Left Turn Lane Detection



L = 6ft X 40ft Quadrupole loop

Presence Loop Detection

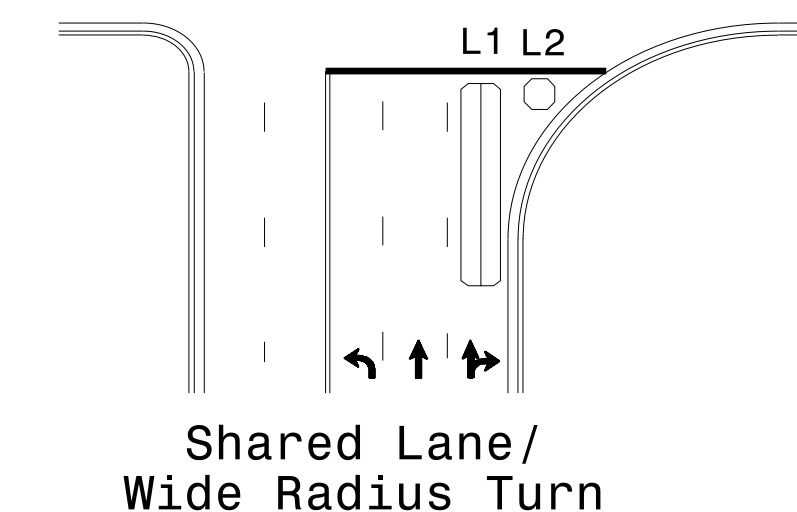
OR



L1 = 6ft X 15ft Queue detector  
 L2 = 6ft X 40ft Quadrupole loop

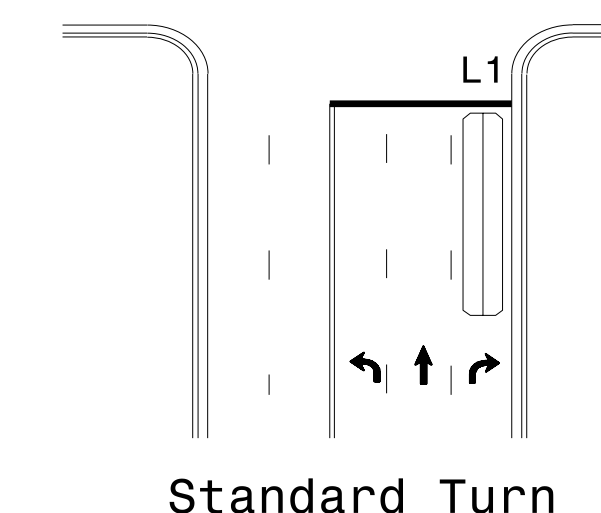
Queue Loop Detection

### Right Turn Lane Detection

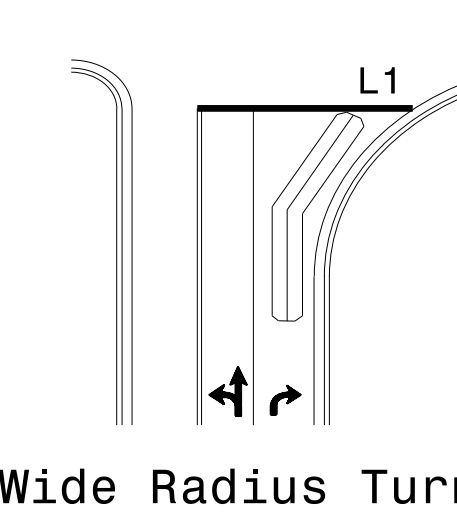


Shared Lane/  
 Wide Radius Turn

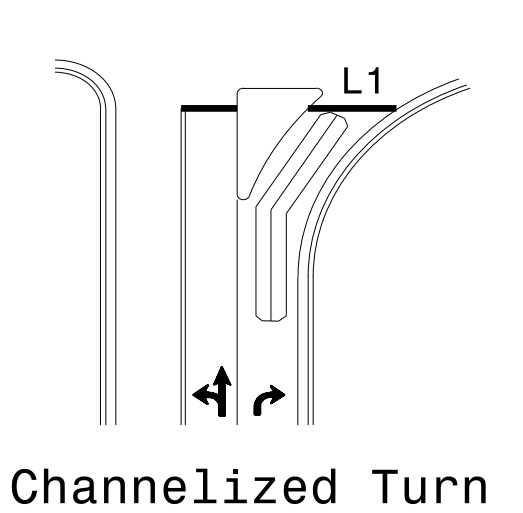
L1 = 6ft X 40ft Quadrupole loop  
 L2 = 6ft X 6ft [Minimum] Presence loop  
 Wired separately



Standard Turn

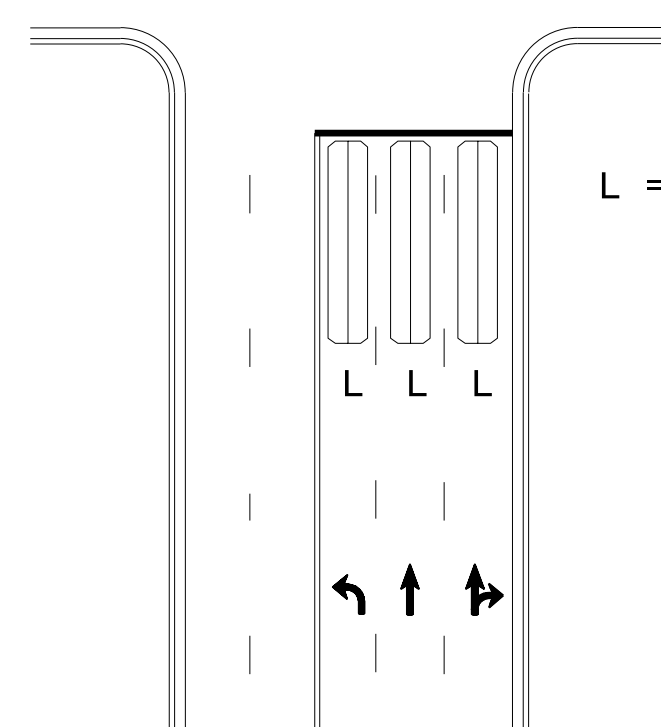


Wide Radius Turn



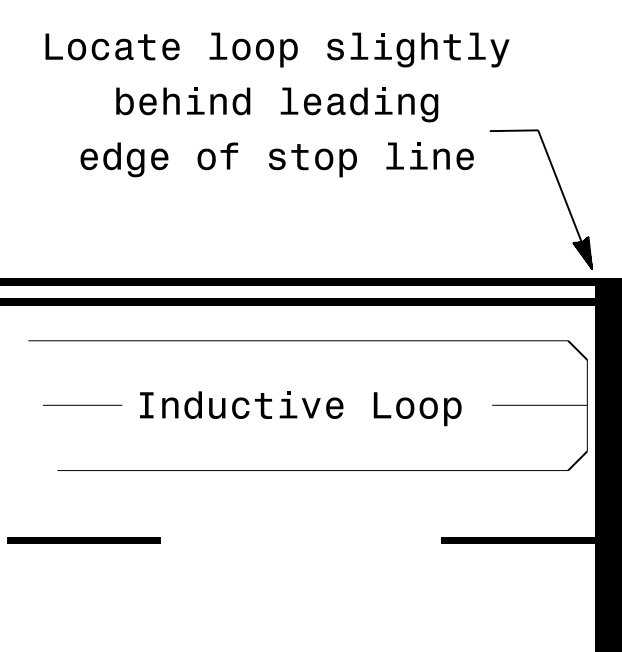
Channelized Turn

### Side Street Detection



L = 6ft X 40ft  
 Quadrupole loop  
 Wired to separate  
 detectors/channels

### Presence Loop Placement at Stop Lines



Locate loop slightly  
 behind leading  
 edge of stop line

Note:  
 Loop may be located in advance  
 of stop line under any of the  
 following conditions:  
 1) stop line is greater than 15'  
 from edge of intersecting  
 roadway  
 2) loop detects a permissive or  
 protected/permissive left turn  
 3) for an exclusive right turn  
 lane

### Recommended Number of Turns

Single 6' X 6' loop  
 (when wired separately):

Length of Lead-in ft	Number of Turns
< 250	3
250-375	4
375-525	5
> 525	6

Quadrupole loops: Use 2-4-2 turns

6' X 15' Loops:  
 Lead-in < 150', use 2 turns  
 Lead-in > 150', use 3 turns

Prepared In the Offices of:  
 TRANSPORTATION MOBILITY AND SAFETY DIVISION  
 DEPARTMENT OF TRANSPORTATION  
 SIGNAL DESIGN SECTION  
 750 N. Greenfield Pkwy, Garner, NC 27529

SEAL  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 PAMELA L. ALEXANDER  
 23489

Typical Signal Loop Locations	
PLAN DATE: January 2015	REVIEWED BY: JPG
PREPARED BY: PLA	REVIEWED BY:
SCALE: N/A	
REVISIONS	INIT. DATE
DocuSigned by:  1/30/2015 DATE SIG. INVENTORY NO.	

**GUIDELINES FOR LANE WIDTHS ON RESURFACING PROJECTS**

Contractor shall place the new pavement markings in accordance with this table and detail unless otherwise directed by the Engineer.

<b>TWO LANE - TWO WAY ROADWAY - 55 MPH</b>		
ROADWAY WIDTH	LANE WIDTH	SHOULDER WIDTH
18'	9' *	0'
20'	10' *	0'
22'	10'	1'
24'	10'	2'
26'	11'	2'
28'	12'	2'
32'	12'	4'

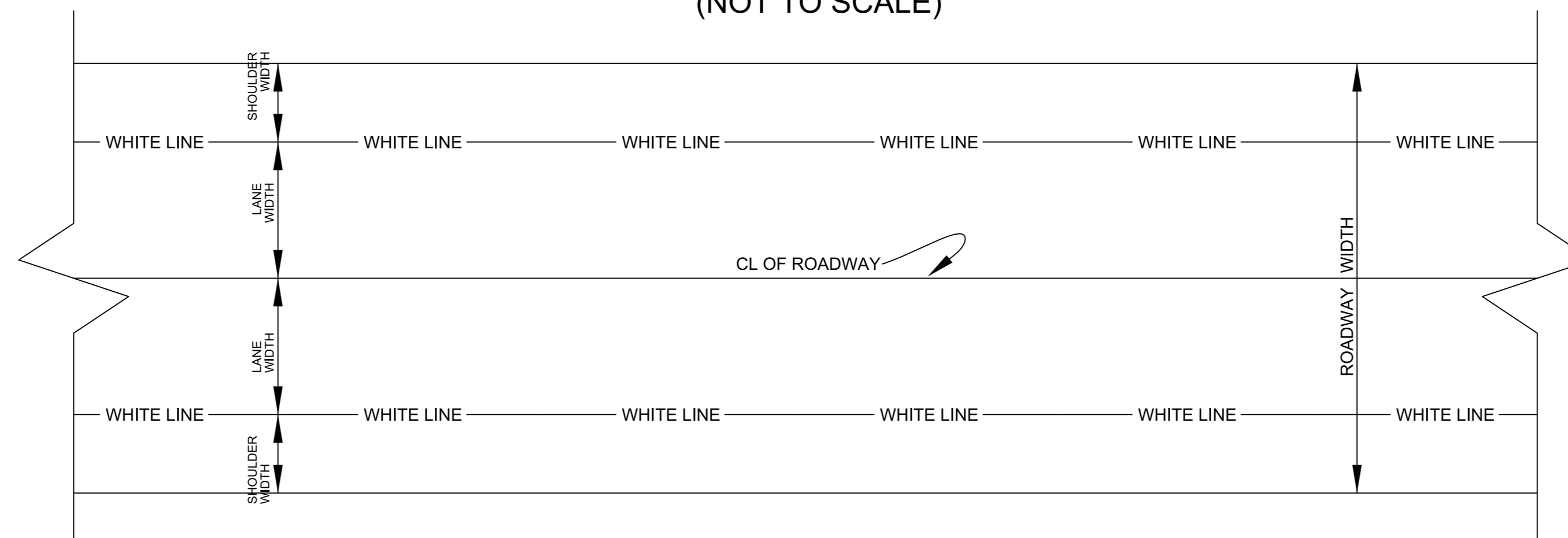
\* May vary due to pavement width

<b>TWO LANE - TWO WAY ROADWAY</b>		<b>50</b>
<b>MPH OR LESS</b>		
ROADWAY WIDTH	LANE WIDTH	SHOULDER WIDTH
18'	9' *	0'
20'	10' *	0'
22'	10'	1'
24'	10'	2'
26'	11'	2'
28'	11'	3'
32'	11'	5'

\* May vary due to pavement width

**SCHEMATIC OF ROADWAY**

(NOT TO SCALE)





PROJECT NO.	SHEET NO.	TOTAL NO.
.06.14.10241.1, 2023CPT.06.14		

### THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	4413000000-E	4457000000-N	4685000000-E		4695000000-E		4700000000-E	4709000000-E	4720000000-E		4725000000-E				4892000000-N	4900000000-N			
										WORK ZONE ADVANCE/GENERAL WARNING SIGNING	TEMPORARY TRAFFIC CONTROL	4" X 90 M WHITE THERMO	4" X 90 M YELLOW THERMO	8" X 90 M WHITE THERMO	8" X 90 M YELLOW THERMO	12" X 90 M WHITE THERMO	24" X 90 M WHITE THERMO	THERMO MSG ONLY 90 M	THERMO MSG SCHOOL 90 M	THERMO RT ARROW 90 M	THERMO LT ARROW 90 M	THERMO STR & RT ARROW 90 M	THERMO STR ARROW 90 M	GENERIC MARKING, THERMO RXR 90 M	YELLOW & YELLOW MARKERS	CRYSTAL & RED MARKERS		
										SF	LS	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
2023CPT.06.14.10241.1	Columbus	1	US-76 A	FROM SR 1360 TO BEG C&G	1	2	2WU	0.28	24	66		2,957	2,957												20			
<b>TOTAL FOR MAP NO. 1</b>												<b>2,957</b>	<b>2,957</b>												<b>20</b>			
2023CPT.06.14.10241.1	Columbus	2	US-76 B	BEG C&G TO RIVERSIDE DRIVE	2	2	2WU	0.18	35	66	1.00	1,901	1,901	75												13		
<b>TOTAL FOR MAP NO. 2</b>											<b>1</b>	<b>1,901</b>	<b>1,901</b>	<b>75</b>													<b>13</b>	
2023CPT.06.14.10241.1	Columbus	3	US-76 C	FROM RIVERSIDE DRIVE TO NC904	3	2	2WU	0.2	35			2,112	2,112													14		
<b>TOTAL FOR MAP NO. 3</b>												<b>2,112</b>	<b>2,112</b>														<b>14</b>	
2023CPT.06.14.10241.1	Columbus	4	US-74 BUS	FOM NC 410 TO SR 1562	4	4	2WU	0.65	45	38		7,200	9,400				100	16	12	12	12	12	2		91	20		
<b>TOTAL FOR MAP NO. 4</b>												<b>7,200</b>	<b>9,400</b>				<b>100</b>	<b>16</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>2</b>		<b>91</b>	<b>20</b>		
2023CPT.06.14.10241.1	Columbus	5	NC-904	FROM US 76 TO RXR	5	3	MU	0.03	40			150	600											2	7	5		
<b>TOTAL FOR MAP NO. 5</b>												<b>150</b>	<b>600</b>											<b>2</b>	<b>7</b>	<b>5</b>		
<b>TOTAL FOR PROJ NO. 2023CPT.06.14.10241.1</b>											<b>1</b>	<b>14,320</b>	<b>16,970</b>	<b>75</b>	<b>40</b>		<b>138</b>	<b>16</b>	<b>12</b>	<b>13</b>	<b>13</b>	<b>2</b>	<b>2</b>		<b>145</b>	<b>25</b>		
												<b>31,290</b>		<b>115</b>				<b>28</b>		<b>28</b>					<b>170</b>			
2023CPT.06.14.20241.1	Columbus	6	SR-1002 / OLD LUMBERTON RD A	FROM NC 410 TO NC 242.	6	2	2WU	4.01	22	250		42,346	30,075													281		
<b>TOTAL FOR MAP NO. 6</b>												<b>42,346</b>	<b>30,075</b>														<b>281</b>	
2023CPT.06.14.20241.1	Columbus	7	SR-1002 / OLD LUMBERTON RD B	FROM NC 242 TO ROB. CO.	6	2	2WU	1.7	22	124		18,292	12,750													116		
<b>TOTAL FOR MAP NO. 7</b>												<b>18,292</b>	<b>12,750</b>														<b>116</b>	
2023CPT.06.14.20241.1	Columbus	8	SR-1300 / STAKE RD	FROM 1004 TO SR 1414	7	2	2WU	3.82	20	283		41,103	28,650													267		
<b>TOTAL FOR MAP NO. 8</b>												<b>41,103</b>	<b>28,650</b>														<b>267</b>	
2023CPT.06.14.20241.1	Columbus	9	SR-1443 / GRIST RD	FROM US 76 TO SR 1414	6	2	2WU	0.82	20	96		8,823	6,150			32								2	57			
<b>TOTAL FOR MAP NO. 9</b>												<b>8,823</b>	<b>6,150</b>		<b>32</b>								<b>2</b>	<b>57</b>				
2023CPT.06.14.20241.1	Columbus	10	SR-1574 / OLD 74 A	FROM US 76 TO BEG C&G	6	2	2WU	0.28	22	38		3,013	2,957													20		
<b>TOTAL FOR MAP NO. 10</b>												<b>3,013</b>	<b>2,957</b>													<b>20</b>		
2023CPT.06.14.20241.1	Columbus	11	SR-1574 / OLD 74 B	BEG C&G TO NC410	4	3	MU	0.08	45	38		600		70										2	2	6	6	
<b>TOTAL FOR MAP NO. 11</b>												<b>600</b>		<b>70</b>									<b>2</b>	<b>2</b>	<b>6</b>	<b>6</b>		
<b>TOTAL FOR PROJ NO. 2023CPT.06.14.20241.1</b>												<b>114,177</b>	<b>80,582</b>	<b>70</b>		<b>32</b>	<b>55</b>					<b>2</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>747</b>	<b>6</b>	
												<b>194,759</b>		<b>70</b>						<b>4</b>					<b>753</b>			
<b>GRAND TOTAL</b>											<b>1</b>	<b>128,497</b>	<b>97,552</b>	<b>145</b>	<b>40</b>	<b>32</b>	<b>193</b>	<b>16</b>	<b>12</b>	<b>13</b>	<b>13</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>892</b>	<b>31</b>		
												<b>226,049</b>		<b>185</b>				<b>28</b>		<b>32</b>					<b>923</b>			