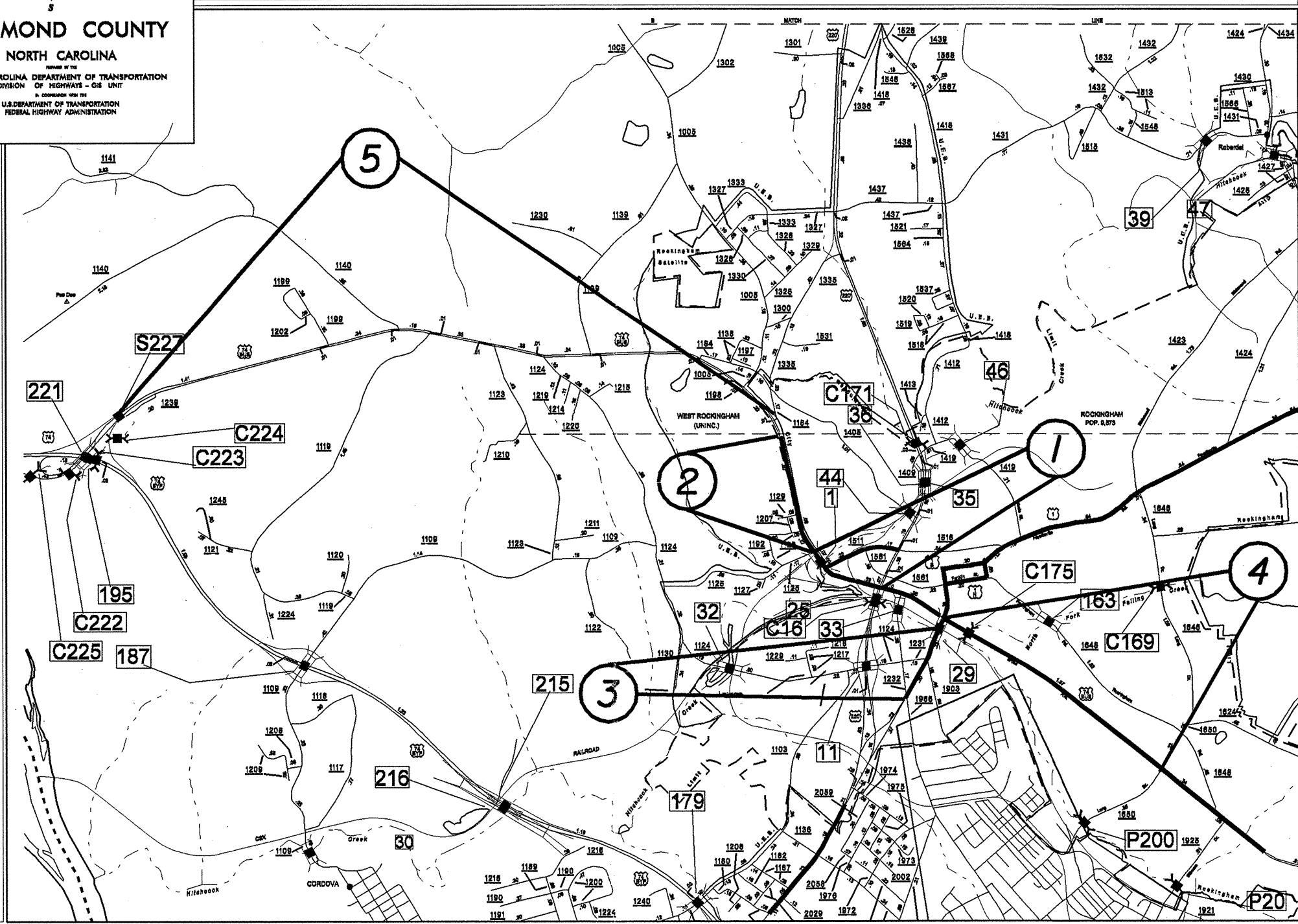





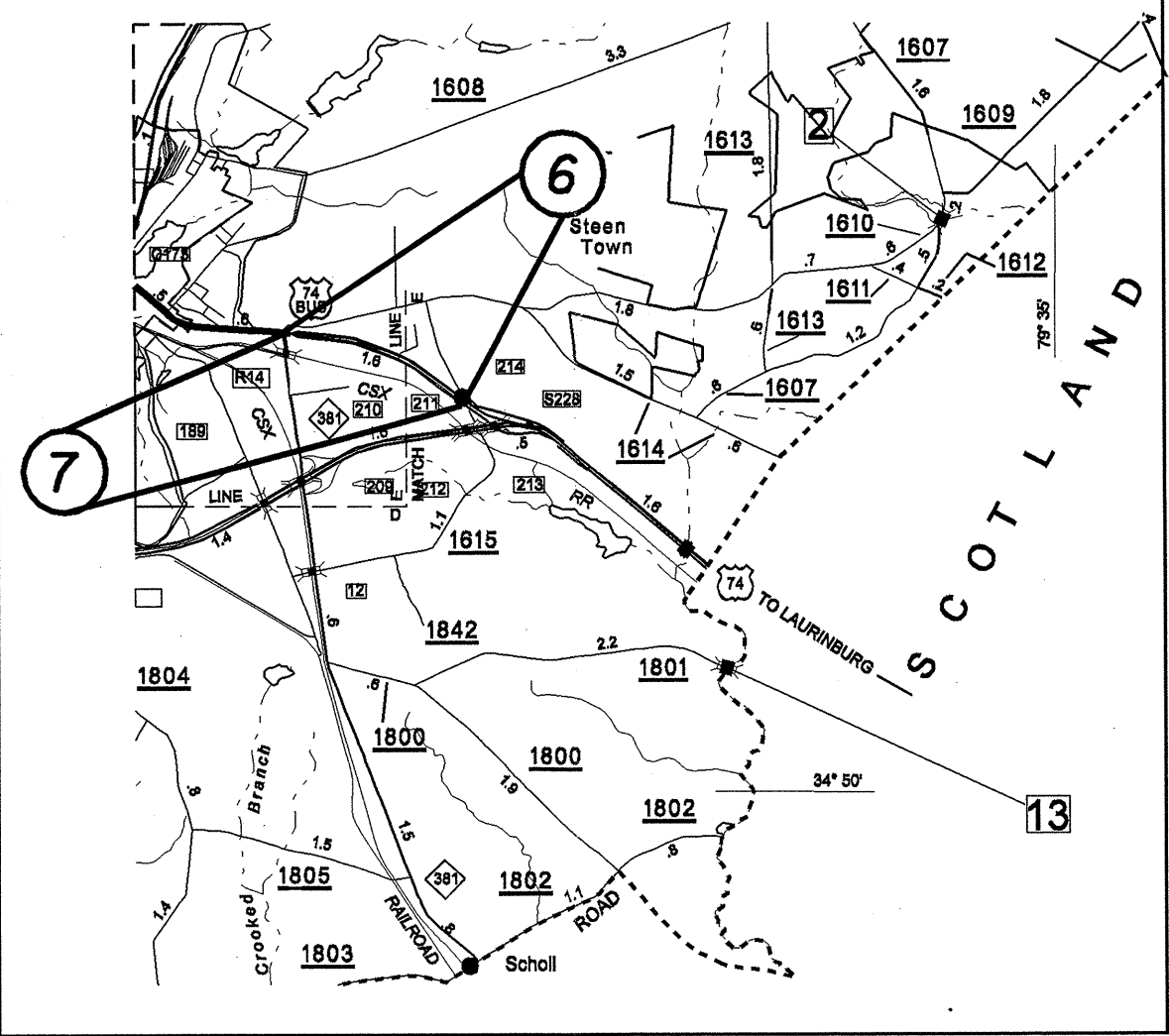
RICHMOND COUNTY

NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - GIS UNIT
A CONTRACTOR WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



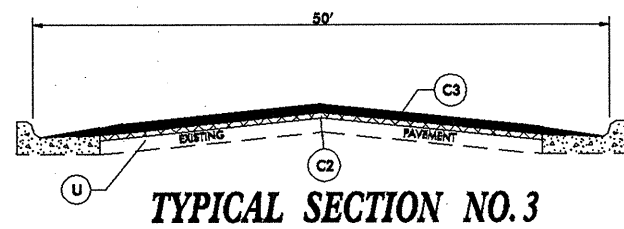
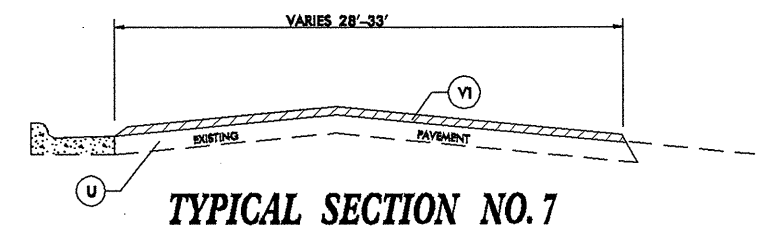
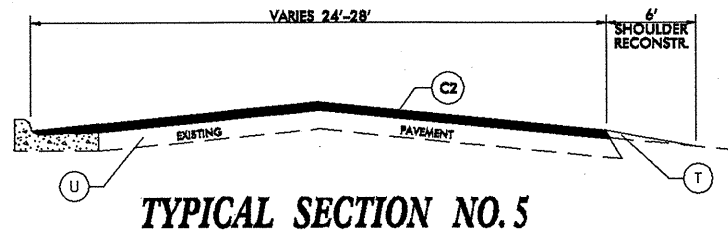
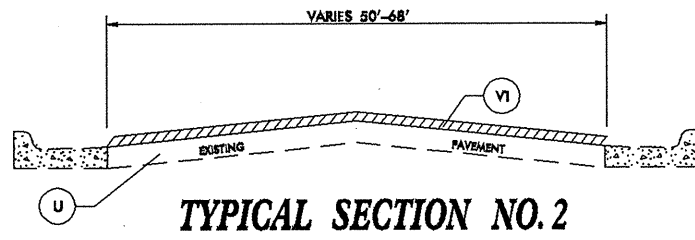
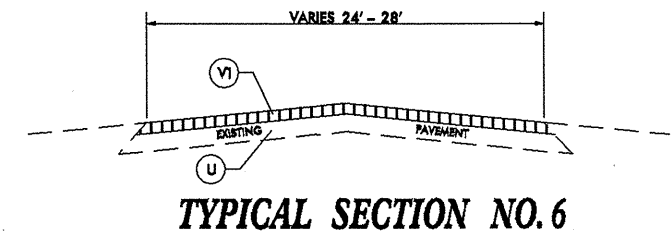
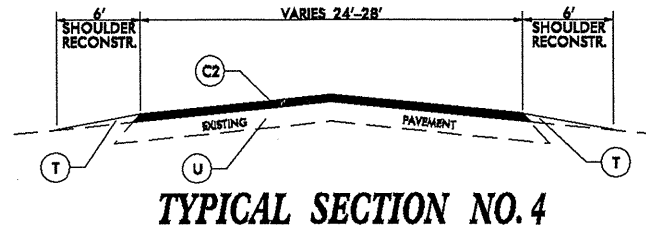
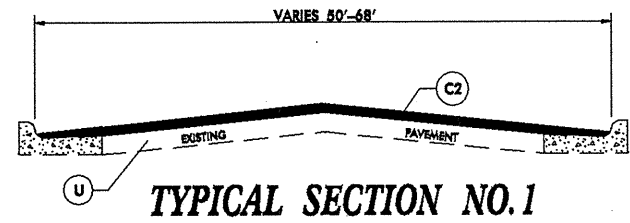

RICHMOND COUNTY
 NORTH CAROLINA
STATE OF NORTH CAROLINA
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
SECTION OF HIGHWAYS - 8th DISTRICT
IN ACCORDANCE WITH
THE DEPARTMENT OF TRANSPORTATION
PERMANENT ADMINISTRATION



040397

28-AUG-2009 14:43
 igs\desktop\local_settings\temporary internet files\olkidd\richmond.dgn

RICHMOND COUNTY TYPICAL SECTIONS



NOTE: LOCATIONS FOR PLACEMENT OF FRICTION COURSE WILL BE DETERMINED BY THE ENGINEER PRIOR TO CONSTRUCTION

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 8 - INCIDENTALS	
846.01	Concrete Curb, Gutter and Curb & Gutter
848.05	Wheelchair Ramp - Curb Cut
848.06	Wheelchair Ramp - Retrofitting of Existing Curb

PAVEMENT SCHEDULE	
C2	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C3	PROP. APPROX. 5/8" OPEN GRADED ASPHALT CONCRETE FRICTION COURSE, TYPE FC-1, AT AN AVERAGE RATE OF 70 LBS. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V1	1 1/2" MILLING

01-SEP-2009 10:08 AM C:\projects\div8\div8\848.05\848.05\848.05.dwg BCR.10771.12-richmond\richmond-resurf_raleigh_submittal\richmond.dgn

PROJECT NO.	SHEET NO.	TOTAL NO.
8CR.10771.12	4	5

SUMMARY OF QUANTITIES

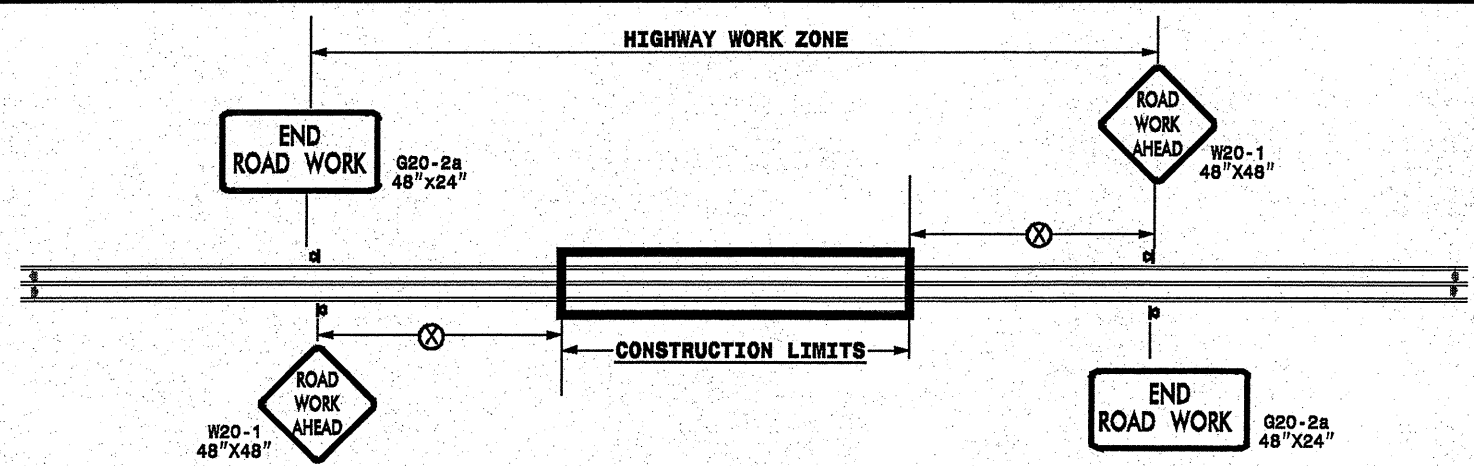
PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	FINAL SURFACE TESTING REQUIRED	LENGTH MI	WIDTH FT	FRICTION COURSE, FC-1 TONS	INCIDENTAL STONE BASE TONS	SHOULDER RECONSTRUCTION SMI	1½" MILLING SY	INCIDENTAL MILLING SY	SURFACE COURSE, S9.5C TONS	PG 64-22 PLANT MIX TONS	PG 70-22 PLANT MIX TONS	2'-6" CURB & GUTTER LF	RETROFIT EXISTING WHEELCHAIR RAMPS EA	WHEEL-CHAIR RAMPS EA	ADJUST DROP INLET EA	MANHOLES EA	METER OR VALVE BOX EA	SEED & MULCHING AC	INDUCTIVE LOOP LF				
8CR.10771.12	Richmond	1	US 74 BUS	FROM SR 1125 TO PVMT JT AT US 220	1,2,3	NO	0.31	50	195			9,100		805	13	48						3	1					
TOTAL FOR MAP NO. 1							0.31		195			9,100		805	13	48							3	1				
		2	US 74 BUS	FROM SR 1125 TO CJ 0.62 MILES NORTH OF SR 1125	1	NO	0.62	56	0			0	315	1,710	0	103	140	4	3			1	3					
TOTAL FOR MAP NO. 2							0.62		0			0	315	1,710	0	103	140	4	3					1	3			
		3	US 1	FROM PVMT JT AT US 220 TO PVMT JT AT US 74 BUS	1,2	NO	0.38	68	0			14,500		1,300	0	78	40		5			7	2					
TOTAL FOR MAP NO. 3							0.38		0			14,500		1,300	0	78	40		5					7	2			
		4	US 74 BUS	FROM PVMT JT AT US 1 TO SR 1650 (INCLUDING INTERSECTIONS)	1,2	NO	1.35	60	0			47,520		4,200	0	252	560					1			11,600			
TOTAL FOR MAP NO. 4							1.35		0			47,520		4,200	0	252	560							1			11,600	
		5	US 74 BUS WB	FROM BEGIN DIV HWY TO PVMT JT AT US 74 BYP	4,5,6,7	NO	3.84	28	0	100	7.68	63,100		5,565	0	334				1		1	5.60					
TOTAL FOR MAP NO. 5							3.84		0	100	7.68	63,100		5,565	0	334	0						1		1	5.60		
		6	US 74 BUS WB	FROM PVMT JT AT NC 381 TO US 74 BYP	4,6	NO	1.25	28	0	20	2.5	20,535		1,815	0	109								1.82				
TOTAL FOR MAP NO. 6							1.25		0	20	2.5	20,535		1,815	0	109	0										1.82	
		7	US 74 BUS EB	FROM US 74 BYP TO PVMT JT AT NC 381	4,6	NO	1.15	28	0	20	2.3	18,900		1,670	0	100								1.70				
TOTAL FOR MAP NO. 7							1.15		0	20	2.3	18,900		1,670	0	100	0										1.70	
TOTAL FOR PROJ NO. 8CR.10771.12							8.9		195	140	12.48	173,655	315	17,065	13	1,024	740	4	8	1	12	7	9.12				11,600	
GRAND TOTAL							8.9		195	140	12.48	173,655	315	17,065	13	1,024	740	4	8	1	12	7	9.12			11,600		

PROJECT NO.	SHEET NO.	TOTAL NO.
8CR.10771.12	5	5

THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	4685000000-E		4686000000-E		4710000000-E	4725000000-E				4810000000-N		4900000000-N	
					4" X 90 M WHITE THERMO LF	4" X 90 M YELLOW THERMO LF	4" X 120 M WHITE THERMO LF	4" X 120 M YELLOW THERMO LF	24" X 120 M WHITE THERMO LF	THERMO STR ARROW 90 M EA	THERMO LT ARROW 90 M EA	THERMO STR & RT ARROW 90 M EA	THERMO RT ARROW 90 M EA	4" WHITE PAINT LF	4" YELLOW PAINT LF	YELLOW & YELLOW MARKERS EA	CYAN & RED MARKERS EA
8CR.10771.12	Richmond	1	US 74 BUS	FROM SR 1125 TO PVMT JT AT US 220			835	4,095		2	3			800	4,000	90	85
TOTAL FOR MAP NO. 1							835	4,095		2	3			800	4,000	90	85
		2	US 74 BUS	FROM SR 1125 TO CJ 0.62 MILES NORTH OF SR 1125	6,600		2,000	7,100		4	6			0	0	85	175
TOTAL FOR MAP NO. 2					6,600		2,000	7,100		4	6			0	0	85	175
		3	US 1	FROM PVMT JT AT US 220 TO PVMT JT AT US 74 BUS	3,600		1,000	3,910		6	15	9		4,600	3,910	50	50
TOTAL FOR MAP NO. 3					3,600		1,000	3,910		6	15	9		4,600	3,910	50	50
		4	US 74 BUS	FROM PVMT JT AT US 1 TO SR 1650 (INCLUDING INTERSECTIONS)			4,250	17,520	140	8	57	2	4	4,200	17,500	180	180
TOTAL FOR MAP NO. 4							4,250	17,520	140	8	57	2	4	4,200	17,500	180	180
		5	US 74 BUS WB	FROM BEGIN DIV HWY TO PVMT JT AT US 74 BYP	20,275	20,275	5,625							20,275	20,275		253
TOTAL FOR MAP NO. 5					20,275	20,275	5,625							20,275	20,275		253
		6	US 74 BUS WB	FROM PVMT JT AT NC 381 TO US 74 BYP	6,600	6,600	1,675							8,200	6,600		83
TOTAL FOR MAP NO. 6					6,600	6,600	1,675							8,200	6,600		83
		7	US 74 BUS EB	FROM US 74 BYP TO PVMT JT AT NC 381	6,075	6,075	1,560							7,600	6,000		76
TOTAL FOR MAP NO. 7					6,075	6,075	1,560							7,600	6,000		76
TOTAL FOR PROJ NO. 8CR.10771.12					43,150	32,950	16,945	32,625	140	20	81	11	4	45,675	58,285	405	902
					76,100		49,570				116			103,960		1,307	
GRAND TOTAL					43,150	32,950	16,945	32,625	140	20	81	11	4	45,675	58,285	405	902
					76,100		49,570				116			103,960		1,307	

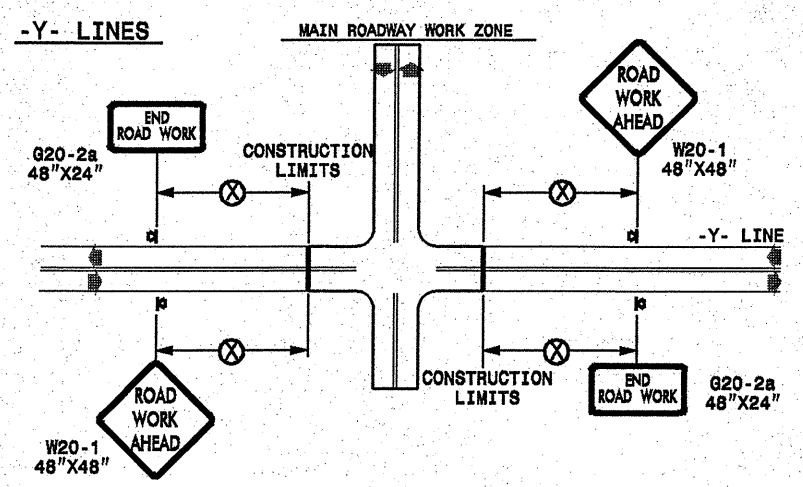
TWO-WAY UNDIVIDED ** (L-LINES)



POSTED SPEED LIMIT (M.P.H.)	RECOMMENDED MINIMUM SIGN SPACING
≤ 50	500'
≥ 55	1000'

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAYS INTERSECTING ALONG 2 WAY UNDIVIDED WORK ZONE (Y-LINES)



GENERAL NOTES

- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCE WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE PORTABLE WORK ZONE SIGNS ONLY WITH PORTABLE WORK ZONE SIGN STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER. PORTABLE WORK ZONE SIGNS MAY BE ROLL UP OR APPROVED COMPOSITE.
- PROVIDE PORTABLE WORK ZONE SIGN STANDS, PORTABLE SIGNS AND SIGN SHEETING WHICH ARE LISTED ON THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S APPROVED PRODUCT LIST OR ACCEPTED AS TRAFFIC QUALIFIED BY THE TRAFFIC CONTROL UNIT.
- ** TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND

◀ PORTABLE SIGN

➔ DIRECTION OF TRAFFIC FLOW

DETAIL DRAWING
FOR TWO-WAY UNDIVIDED
WORK ZONE WARNING SIGNS

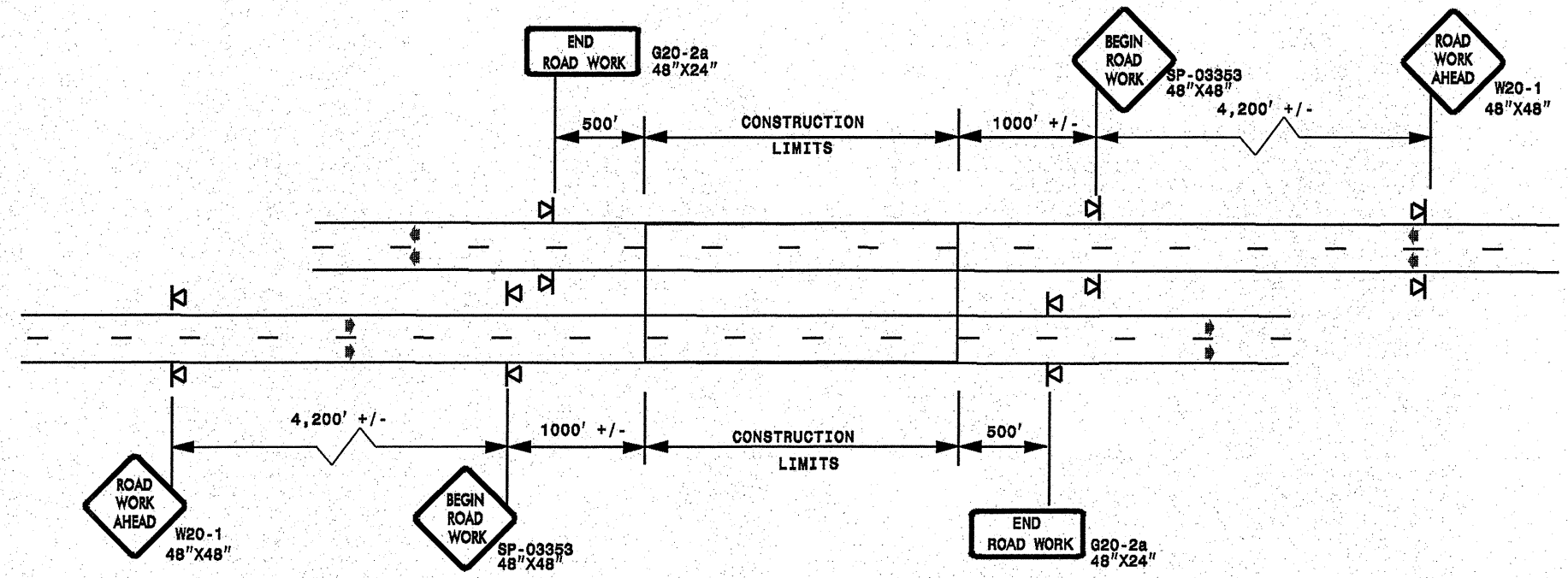
SHEET 1 OF 1

APPROVED: _____ DATE: _____	DETAIL DRAWING FOR TWO-WAY UNDIVIDED ADVANCED WORK ZONE WARNING SIGNS	SCALE: NONE		REVISIONS
SEAL		DATE: _____		DWG. BY: _____
		DESIGN BY: _____		10-98 03/04
		REVIEWED BY: _____		01/01 11/04

28-AUG-2009 13:30
 s:\signing\resurfacing\030509\resurfacing\030509.dwg
 AT WZ1231302

ADVANCE WORK ZONE WARNING SIGNING FOR FREEWAYS (4 LANES OR GREATER)

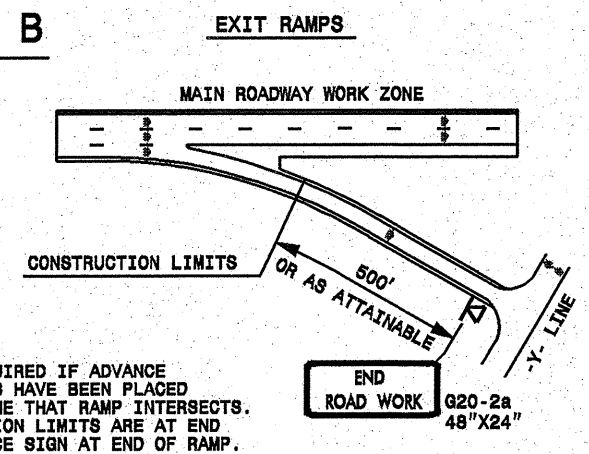
DETAIL A



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

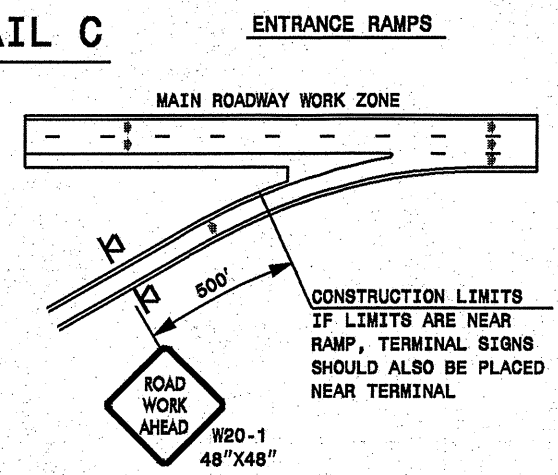
ROADWAYS INTERSECTING ALONG FREEWAY WORK ZONE (Y-LINES)

DETAIL B

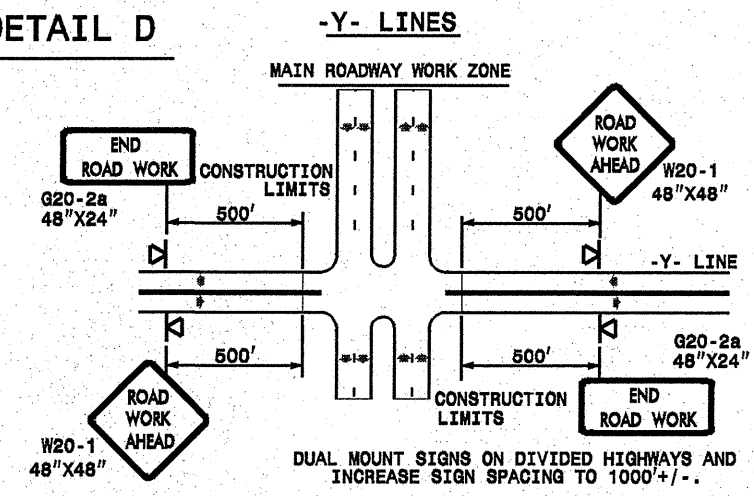


NOTE:
SIGN NOT REQUIRED IF ADVANCE WARNING SIGNS HAVE BEEN PLACED ALONG -Y- LINE THAT RAMP INTERSECTS. IF CONSTRUCTION LIMITS ARE AT END OF RAMP, PLACE SIGN AT END OF RAMP.

DETAIL C



DETAIL D



**DETAIL DRAWING
FOR FREEWAYS
WORK ZONE WARNING SIGNS
(SHORT-DURATION LANE CLOSURES)**

GENERAL NOTES

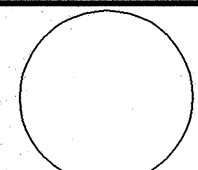
- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCE WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE PORTABLE WORK ZONE SIGNS ONLY WITH PORTABLE WORK ZONE SIGN STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER. PORTABLE WORK ZONE SIGNS MAY BE ROLL UP OR APPROVED COMPOSITE.
- PROVIDE PORTABLE WORK ZONE SIGN STANDS, PORTABLE SIGNS AND SIGN SHEETING WHICH ARE LISTED ON THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S APPROVED PRODUCT LIST OR ACCEPTED AS TRAFFIC QUALIFIED BY THE TRAFFIC CONTROL UNIT.
- ** TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND

◁ PORTABLE SIGN

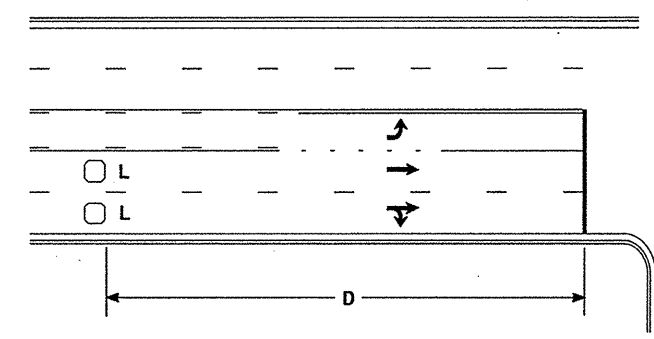
➔ DIRECTION OF TRAFFIC FLOW

SHEET 1 OF 1

APPROVED: _____ DATE: _____	DETAIL DRAWING FOR FREEWAYS WORK ZONE WARNING SIGNS	
SEAL 	SCALE: NONE	REVISIONS
	DATE: _____	7-98 10/01
	DWG. BY: _____	10-98 09/04
	DESIGN BY: _____	01/01 11/04
REVIEWED BY: _____	CHD FILE	

28-AUG-2009 13:31 s:\signing\resur_facing_030509\resur_facing2009\dlv08\c202453_8cr107712_richmond_us74bus\c202453_8cr107712_freeway4lanesgreat.july2006.por\table.dgn

High Speed Detection [≥40 mph (64 km/hr)]

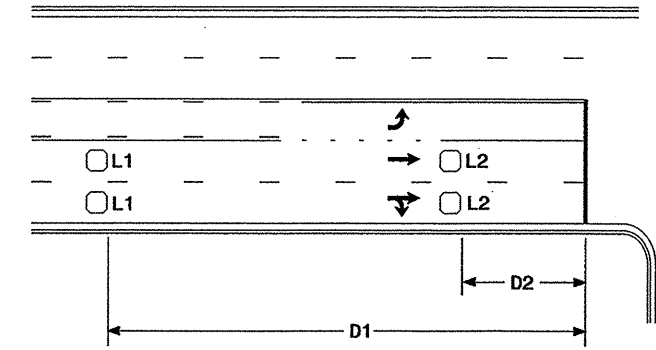


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

L = 6ft X 6ft (1.8m X 1.8m)
Wired in series for TS1
Controllers
Wired separately for TS2,
170, and 2070L Controllers

Volume Density Operation

OR

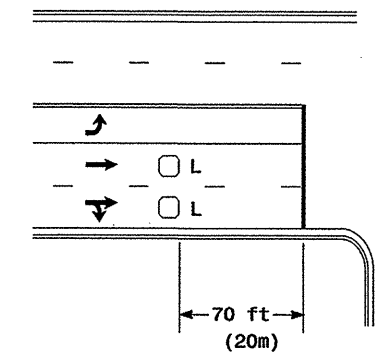


Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

L1 = 6ft X 6ft
(1.8m X 1.8m)
Wired in series
L2 = 6ft X 6ft
(1.8m X 1.8m)
Wired in series

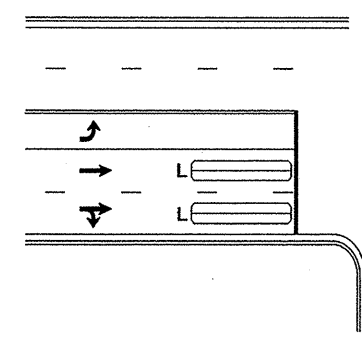
"Stretch" Operation

Low Speed Detection [≤35 mph (56 km/hr)]



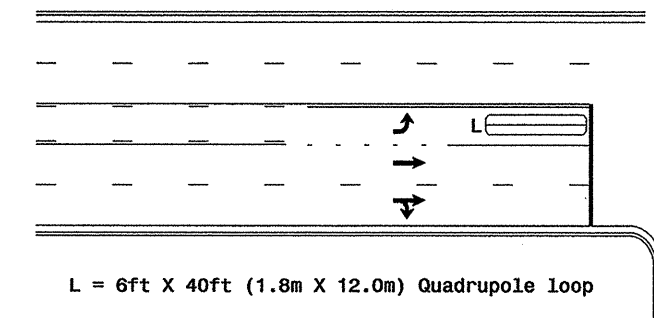
L = 6ft X 6ft (1.8m X 1.8m)
Wired in series

OR



L = 6ft X 40ft (1.8m X 12.0m)
Quadrupole loop, wired separately

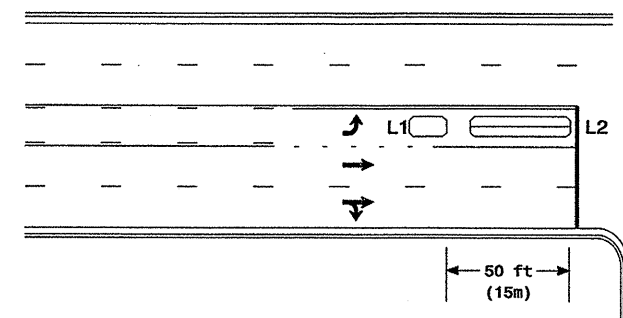
Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole Loop

Presence Loop Detection

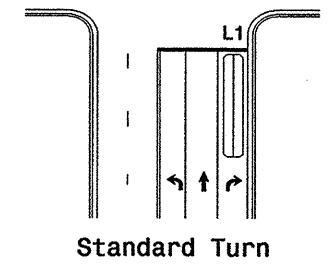
OR



L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

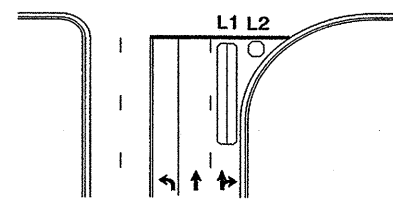
Queue Loop Detection

Right Turn Lane Detection

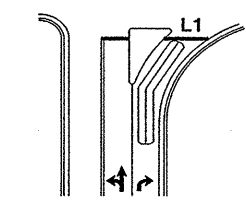


Standard Turn

L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop
Wired separately
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop
Wired in series

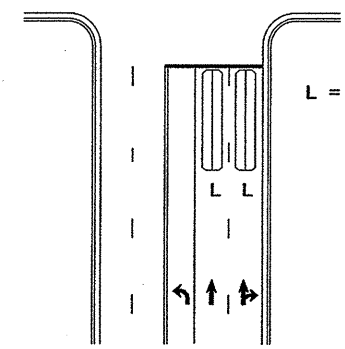


Wide Radius Turn



Channelized Turn

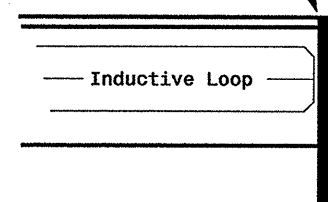
Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)
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 when stop line is
greater than 15' (4.5m) from edge
of intersecting roadway; or, when
loop detects a permissive or
protected/permissive left turn.

Recommended Number of Turns

Single 6' X 6' (1.8m X 1.8m)
loop (wired separately):

Length of Lead-in ft (m)	Number of Turns
< 250 (75)	3
250-375 (75-115)	4
375-525 (115-160)	5
> 525 (160)	6

Quadrupole loops: Use 2-4-2 turns
6' X 15' (1.8m X 4.6m) Loops:
Lead-in < 150' (45 m), use 2 turns
Lead-in > 150' (45 m), use 3 turns

19-06C-2006 14129
87415 signal 1411b turn inmiscalloopphyscol2006.dgn
p.l.alexander

Typical Loop Locations

PLAN DATE: June 2006	REVIEWED BY:
PREPARED BY: P. L. Alexander	REVIEWED BY:
SCALE: N/A	REVISIONS:
	INIT. DATE
	6/2/06
SIGNATURE: P. L. Alexander	
DATE: 6/2/06	
SIC. INVENTORY NO.:	

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

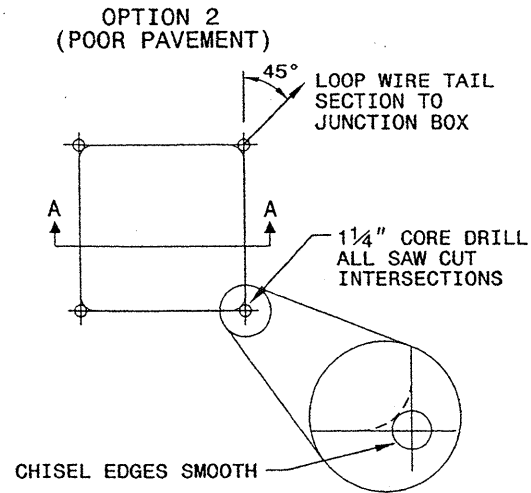
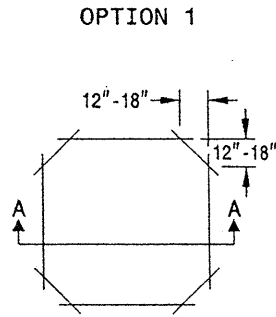
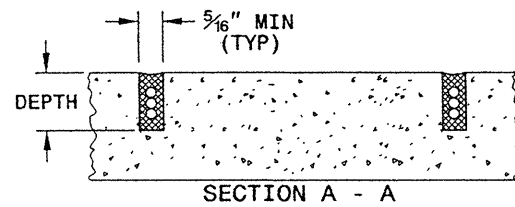
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

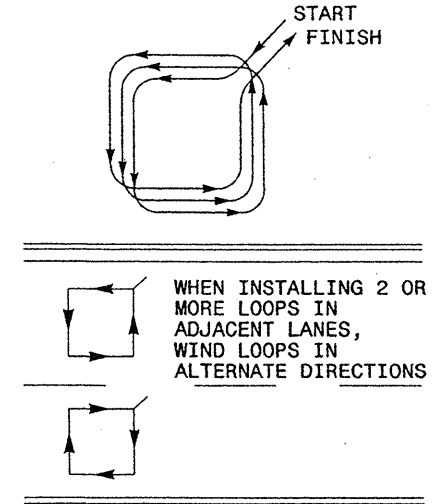
SAW CUT OPTIONS

SAW SLOT DEPTH CHART

DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



LOOP WINDING METHOD



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE

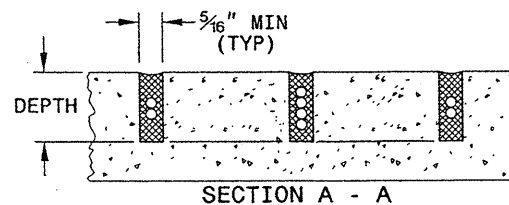
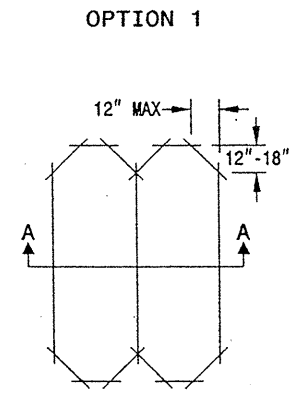


NOTES

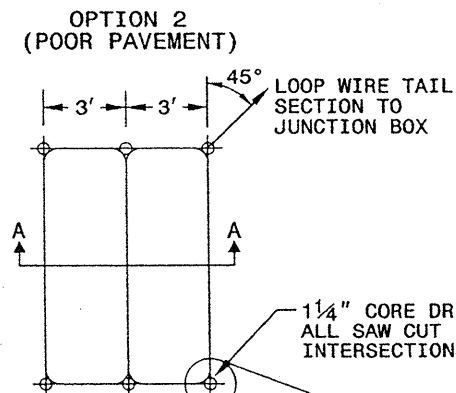
1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

QUADRUPOLE LOOP

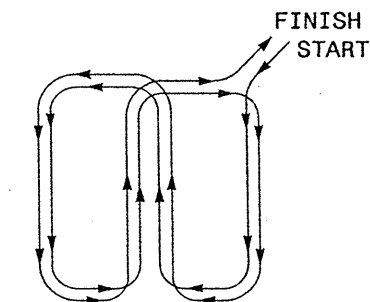
SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT



LOOP WINDING METHOD



See Plate for Title

Prepared in the Offices of:
Intelligent Transportation Systems & Signals Unit
DEPARTMENT OF TRANSPORTATION
STATE OF NORTH CAROLINA
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
016286
MILTON I. DEAN
Signature: *Milton I. Dean* 9/5/07
DATE

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

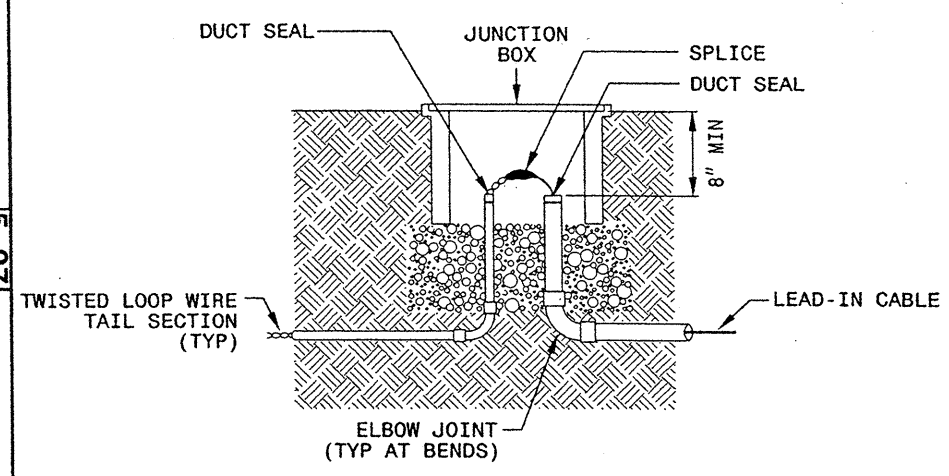
5-07

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

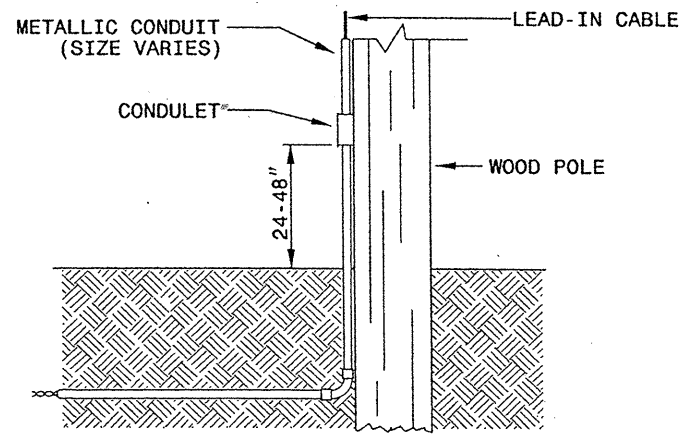
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

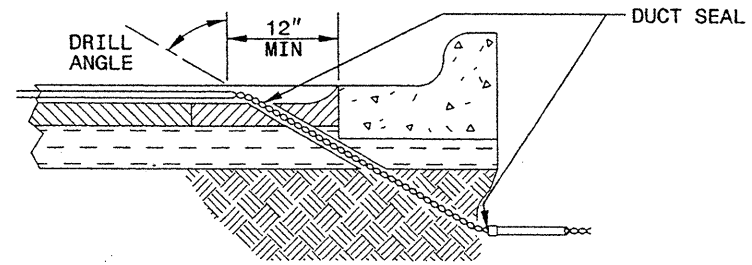


NOTE

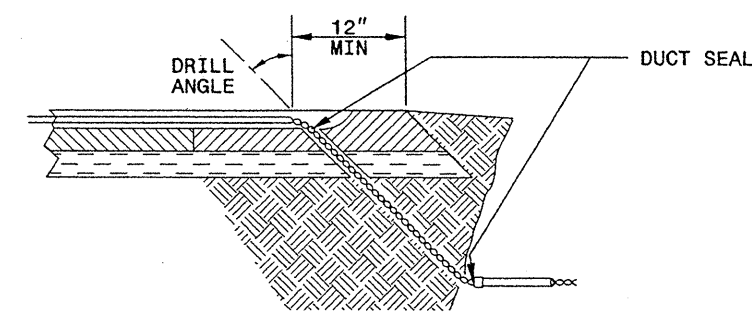
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

5-07

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greensfield Parkway
 Garner, NC 27529

SEAL

Milton I. Deen 9/5/07
 SIGNATURE DATE

