

BEGIN PROJECT
R-5166A

PROJECT REFERENCE NO.

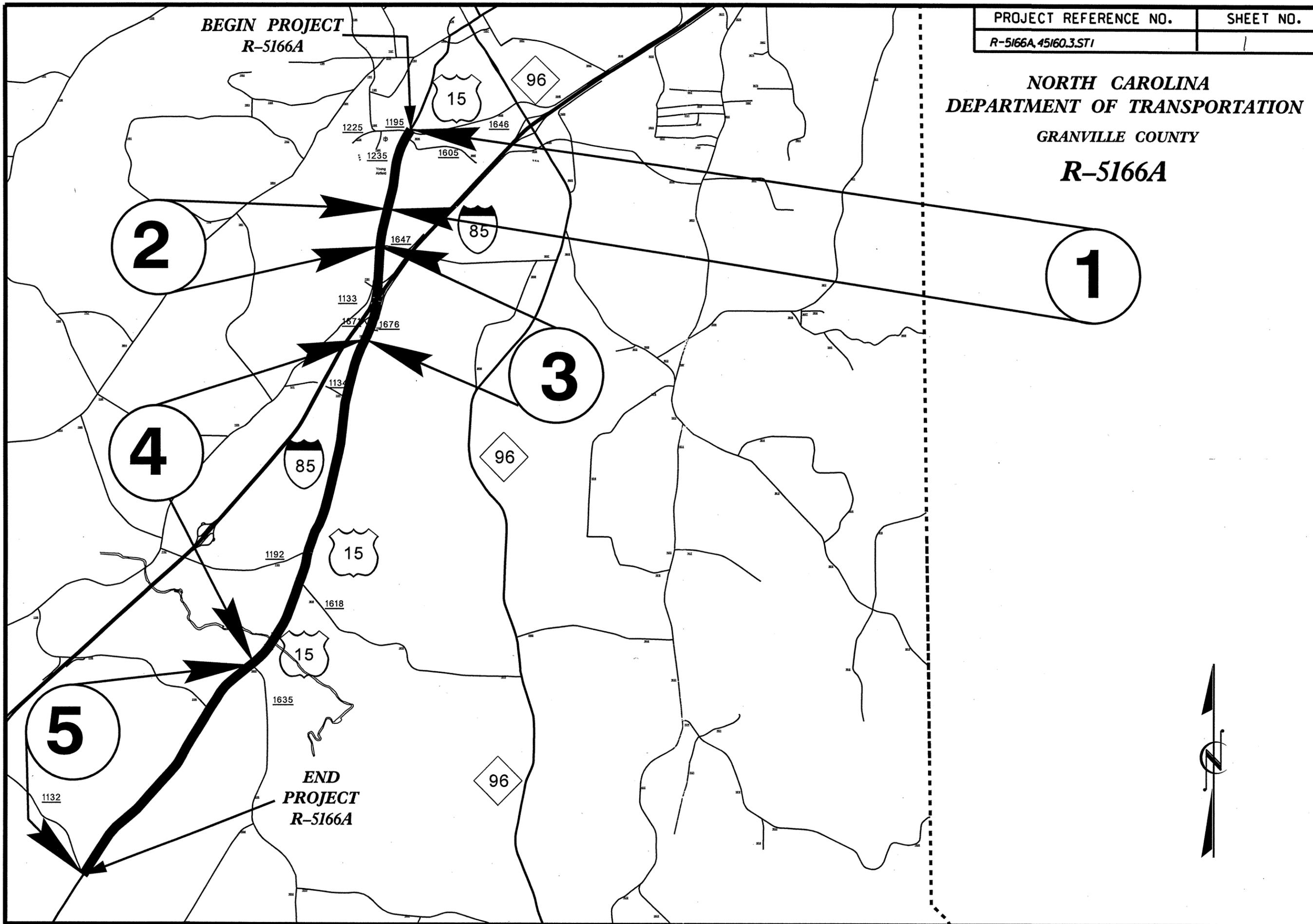
SHEET NO.

R-5166A, 45160.3.ST1

1

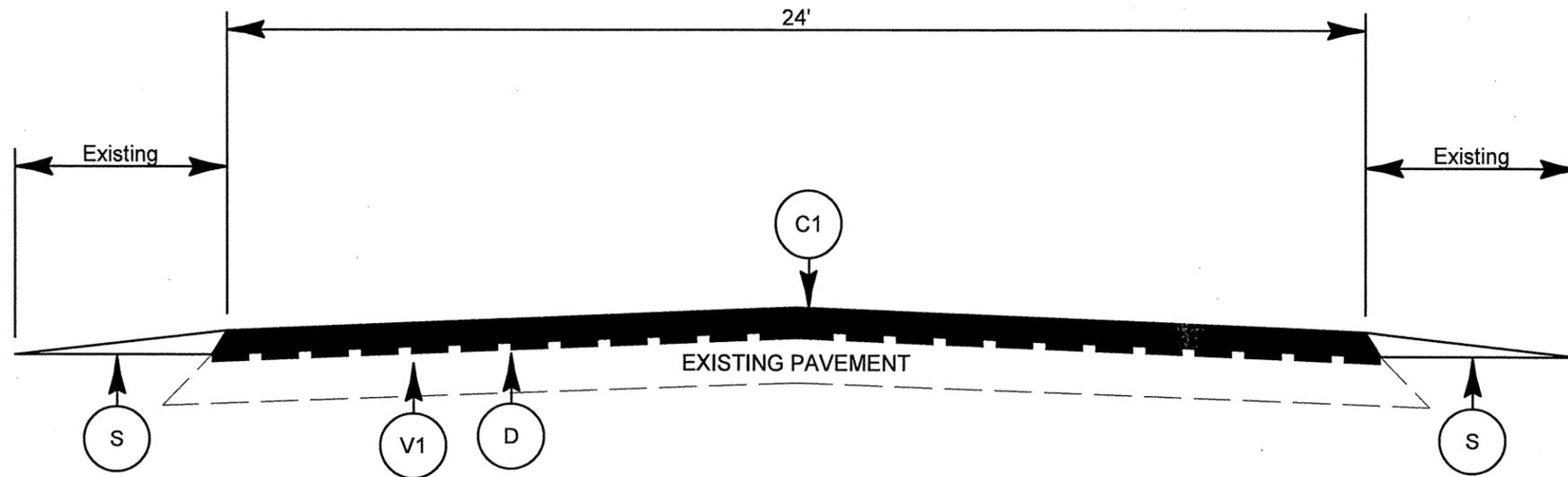
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GRANVILLE COUNTY

R-5166A

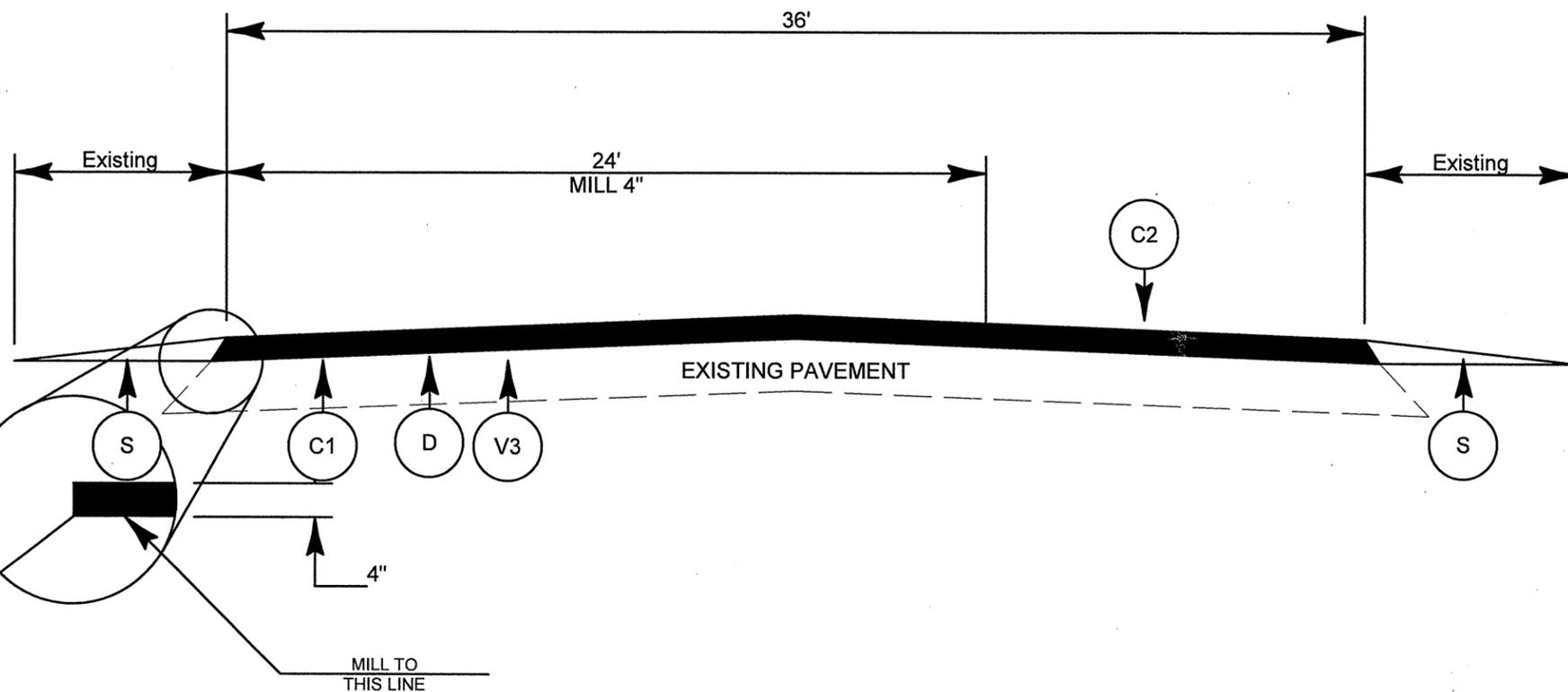


END PROJECT
R-5166A

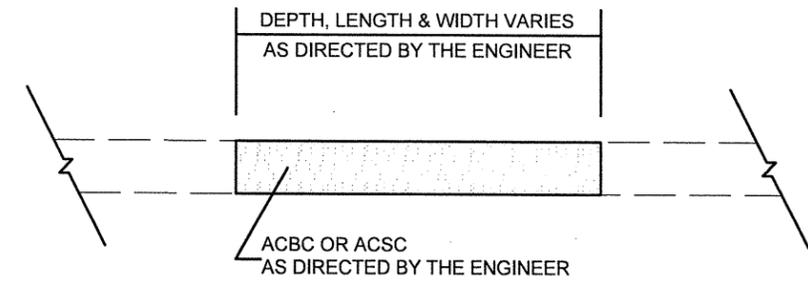
PROJECT NO. 45160.3.ST1 R-5166A	SHEET NO. 2	TOTAL SHEETS
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TYPICAL SECTION NO. 1

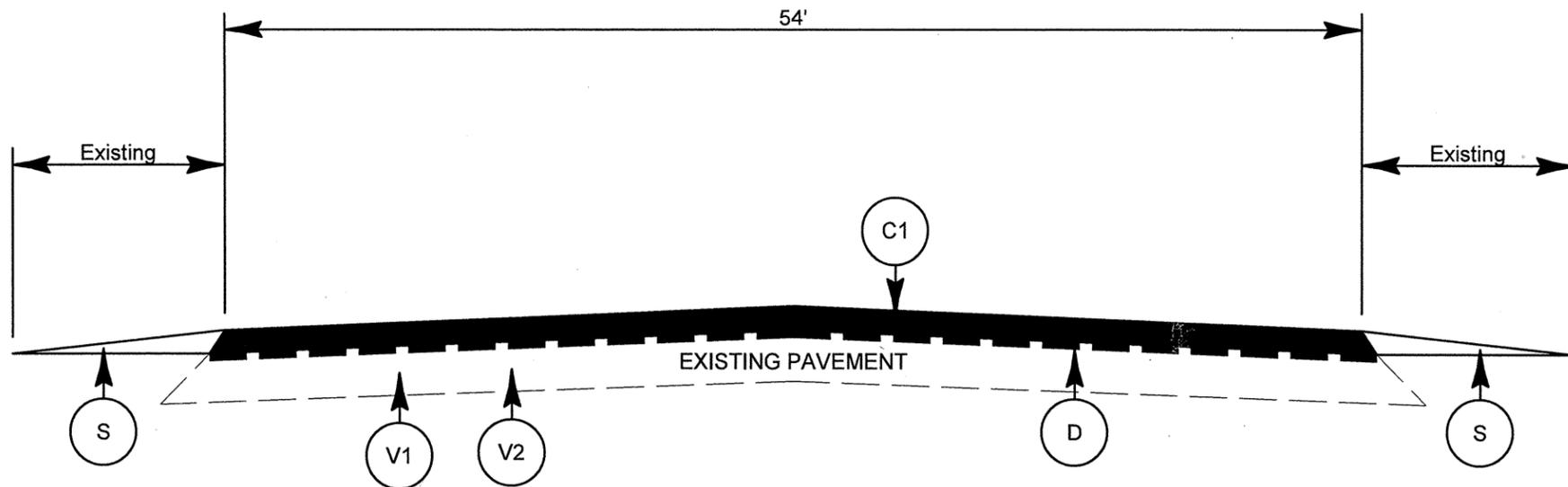


TYPICAL SECTION NO. 2

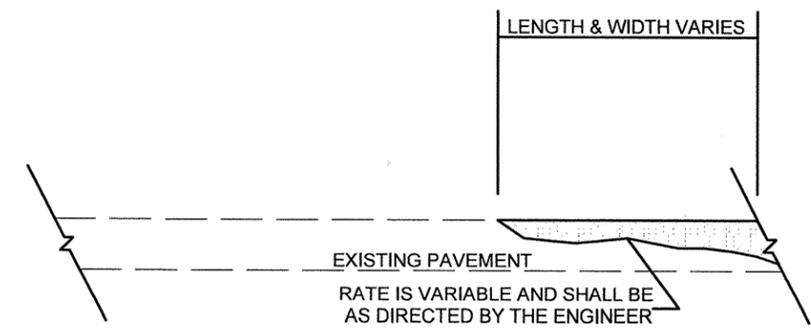
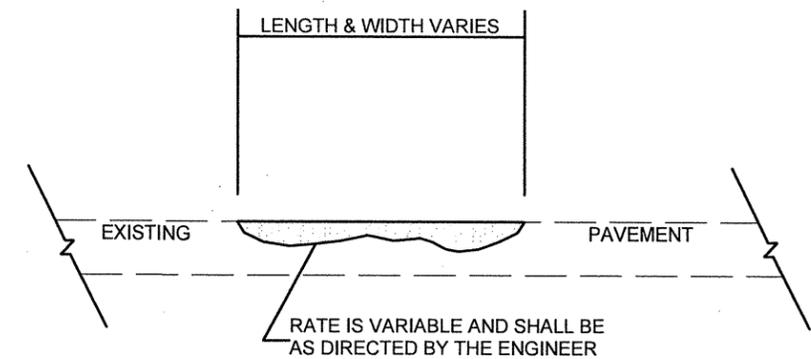


PATCHING EXISTING PAVEMENT	
PAVEMENT SCHEDULE	
*	PAVED SHOULDER REMOVAL INCIDENTAL TO B25.0B
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT A RATE OF 168 LBS/SY IN EACH OF TWO LAYERS
C2	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT A RATE OF 168 LBS/SY
D	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS/SY
E	PROP. APPROX 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 570 LBS/SY
S	SHOULDER RECONSTRUCTION TO BE PERFORMED BY THE CONTRACTOR (DO NOT PERFORM IN AREAS OF 5 1/2" MILLING)
V1	PROP. 2 1/2" DEPTH MILLING
V2	PROP. 5 1/2" DEPTH MILLING (TO BE USED IN THE SECTION WITH CENTER ISLAND)
V3	PROP. 4" DEPTH MILLING (TO BE PERFORMED ONLY ON 24' OF OLDER PAVEMENT AND NOT ON NEW TURNLANES ADDED BY DEVELOPER)

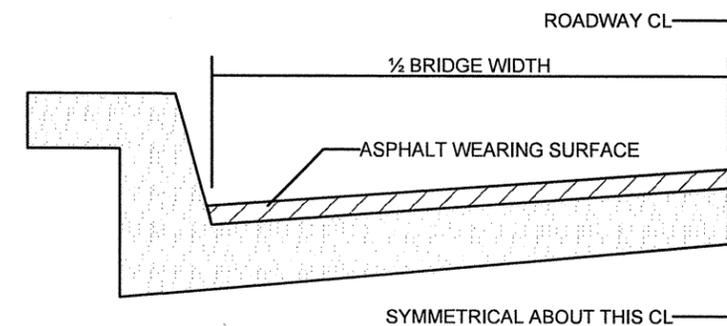
PROJECT NO. 45160.3.ST1 R-5166A	SHEET NO. 3	TOTAL SHEETS
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TYPICAL SECTION NO. 3



ASPHALT CONCRETE SURFACE COURSE
(LEVELING COURSE)



BRIDGE HALF TYPICAL SECTION

FOR BRIDGES WITH FLOOR DRAINS, CARE SHALL BE EXERCISED IN PLACING THE WEARING SURFACE AROUND FLOOR DRAINS SO AS NOT TO HINDER EFFECTIVE DRAINAGE. ALL DRAINS SHALL BE LEFT OPEN

THE PROPOSED WEARING SURFACE SHALL VARY IN THICKNESS AS NECESSARY TO PROVIDE A SMOOTH RIDING SURFACE. THE MINIMUM THICKNESS SHOULD DEPEND ON PAVEMENT TYPE AS FOLLOWS: S4.75A 1/2", SF9.5A 1.0", S9.5X 1.5", S12.5X 2.0", ULTRATHIN HOT MIX ASPHALT-TYPE A 3/4", ULTRATHIN HOT MIX ASPHALT-TYPE B 5/8", ULTRATHIN HOT MIX ASPHALT-TYPE C 1/2". THE MAXIMUM THICKNESS SHOULD DEPEND ON PAVEMENT TYPE AS FOLLOWS: S4.75A 1.0", SF9.5A 1.5", S9.5X 2.0", S12.5X 2.0", ULTRATHIN HOT MIX ASPHALT-TYPE A 3/4", ULTRATHIN HOT MIX ASPHALT-TYPE B 5/8", ULTRATHIN HOT MIX ASPHALT-TYPE C 1/2".

NOTES

ALL UNPAVED ROADS TO BE RESURFACED 50' FROM EDGE OF PAVEMENT OF MAIN PROJECT.
ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADI, OR AS DIRECTED BY THE ENGINEER.
EDGES, PAVEMENT WIDENING, INTERSECTIONS AND BRIDGE FLARES ARE INCLUDED IN THE TABLE OF QUANTITIES.
SHOULDERS AND DITCHES ARE TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE INDICATED.
BRIDGES ARE TO BE RESURFACED AT LOCATIONS AND TO DEPTH AS DIRECTED BY THE ENGINEER.

PROJECT NO.	SHEET NO.	TOTAL NO.
R-5166A	4	
45160.3.ST1		

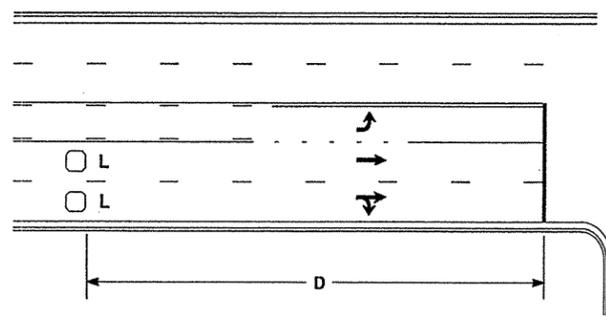
SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	FINAL SURFACE TESTING REQUIRED	LENGTH MI	WIDTH FT	INCIDENTAL STONE BASE TONS	SHOULDER RECONSTRUCTION SMI	2 1/2" MILLING SY	4" MILLING SY	5 1/2" MILLING SY	INCIDENTAL MILLING SY	INTER-MEDIATE COURSE, 119.0B TONS	SURFACE COURSE, S9.5B TONS	PG 64-22 PLANT MIX TONS	PATCHING EXISTING PAVEMENT TONS	SEED & MULCHING AC	INDUCTIVE LOOP LF
R-5166A 45160.3.ST1	Granville	1	US 15	FROM PAVEMENT JOINT N OF SR 1195 (INDUSTRY DR) TO BEGINNING OF NEW WIDENING	1	YES	0.82	26	20	1.64	13841			500	2026	2293	233	45	1.19	264
TOTAL FOR MAP NO. 1							0.82		20	1.64	13841			500	2026	2293	233	45	1.19	264
		2	US 15	BEGINNING OF NEW WIDENING TO SR 1647 (HERBERT HENLEY)	2	YES	0.38	36	10	0.76		5350		67	784	1162	107	20	0.55	
TOTAL FOR MAP NO. 2							0.38		10	0.76	0	5350		67	784	1162	107	20	0.55	
		3	US 15	FROM SR 1647 (HERBERT HENLEY) TO END OF DIVIDED HIGHWAY	1, 3	YES	0.95	54	20	0.7	11310		19388	700	4434	5334	528	50	1.38	
TOTAL FOR MAP NO. 3							0.95		20	0.7	11310	0	19388	700	4434	5334	528	50	1.38	
		4	US 15	FROM END OF DIVIDED HIGHWAY TO SR 1635 (TAR RIVER RD)	1	YES	3.5	24	20	7	50307			667	7296	8784	870	535	5.15	
TOTAL FOR MAP NO. 4							3.5		20	7	50307	0	0	667	7296	8784	870	535	5.15	
		5	US 15	FROM SR 1635 (TAR RIVER RD) TO SR 1132 (SANDERS RD)	1	YES	2.7	24	216	5.4	38016			200	5628	6776	671	400	3.92	
TOTAL FOR MAP NO. 5							2.7		216	5.4	38016	0	0	200	5628	6776	671	400	3.92	
TOTAL FOR PROJ NO. R-5166A							8.35		286	15.5	113474	5350	19388	2134	20168	24349	2409	1050	12.19	264
GRAND TOTAL							8.35		286	15.5	113474	5350	19388	2134	20168	24349	2409	1050	12.19	264

THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	4589000000-N	4685000000-E	4686000000-E	4695000000-E	4697000000-E	4710000000-E	4721000000-E	4725000000-E				4810000000-E		4820000000-E	4835000000-E	4840000000-N	4845000000-N		4905000000-N			
					TRAFFIC CONTROL LS	4" X 90 M WHITE THERMO LF	4" X 120 M YELLOW THERMO LF	4" X 120 M WHITE THERMO LF	8" X 90 M YELLOW THERMO LF	8" X 120 M YELLOW THERMO LF	24" X 120 M WHITE THERMO LF	THERMO MSG ONLY 120 M EA	THERMO LT ARROW 90 M EA	THERMO STR & RT ARROW 90 M EA	THERMO RT ARROW 90 M EA	THERMO STR ARROW 90 M EA	4" YELLOW PAINT LF	4" WHITE PAINT LF	8" YELLOW PAINT LF	24" WHITE PAINT LF	PAINT MSG ONLY EA	PAINT LT ARROW EA	PAINT STR & RT ARROW EA	PAINT STR ARROW EA	SNOW PLOWABLE MARKERS EA	
R-5166A 45160.3.ST1	Granville	1	US 15	FROM PAVEMENT JOINT N OF SR 1195 (INDUSTRY DR) TO BEGINNING OF NEW WIDENING	1	8,823	6,494	500	1,500	250	48							12,988	17,646	500	96			12	12	69
TOTAL FOR MAP NO. 1					1	8,823	6,494	500	1,500	250	48							12,988	17,646	500	96			12	12	69
		2	US 15	BEGINNING OF NEW WIDENING TO SR 1647 (HERBERT HENLEY)		4,165	4,013	502				24	3					8,026	5,016							50
TOTAL FOR MAP NO. 2						4,165	4,013	502				24	3					8,026	5,016							50
		3	US 15	FROM SR 1647 (HERBERT HENLEY) TO END OF DIVIDED HIGHWAY		10,032	10,032	2,888				8	3			1		20,064	25,840			16	6		2	213
TOTAL FOR MAP NO. 3						10,032	10,032	2,888				8	3			1		20,064	25,840			16	6		2	213
		4	US 15	FROM END OF DIVIDED HIGHWAY TO SR 1635 (TAR RIVER RD)		37,660	27,720											55,440	75,320							231
TOTAL FOR MAP NO. 4						37,660	27,720											55,440	75,320							231
		5	US 15	FROM SR 1635 (TAR RIVER RD) TO SR 1132 (SANDERS RD)		29,052	17,820											35,640	58,104							178
TOTAL FOR MAP NO. 5						29,052	17,820											35,640	58,104							178
TOTAL FOR PROJ NO. R-5166A					1	89,732	66,079	3,890	1,500	250	48	32	12	6	3	1		132,158	181,926	500	96	16	18	12	2	741
GRAND TOTAL					1	89,732	66,079	3,890	1,500	250	48	32	12	6	3	1		132,158	181,926	500	96	16	18	12	2	741

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

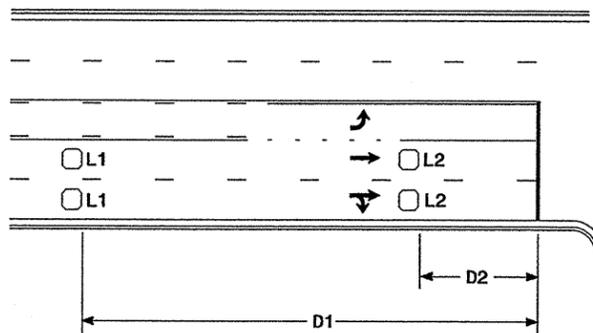


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

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



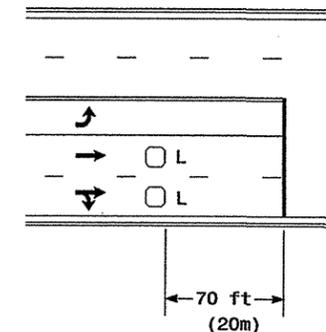
Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

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

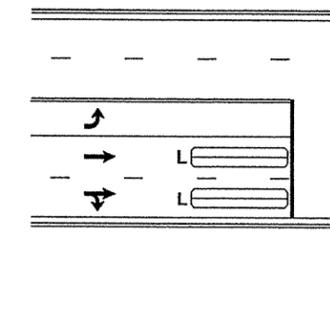
Low Speed Detection [≤35 mph (56 km/hr)]

45160.3.ST1 (R-5166A)



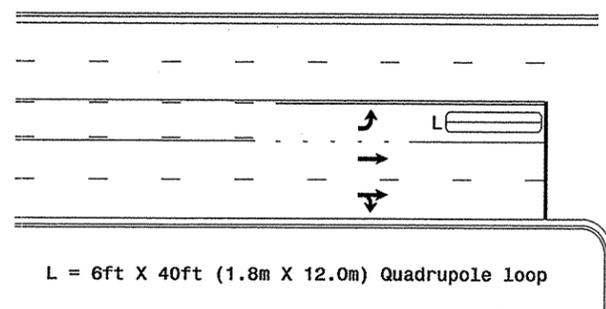
L = 6ft X 6ft (1.8m X 1.8m)
Wired in series

OR



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

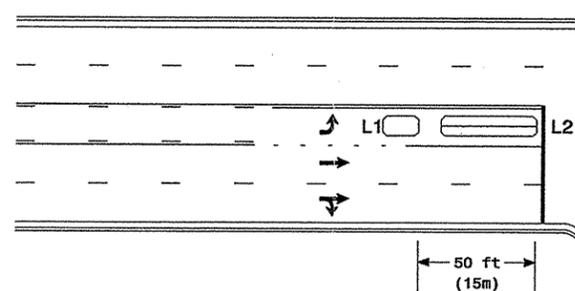
Left Turn Lane Detection



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

Presence Loop Detection

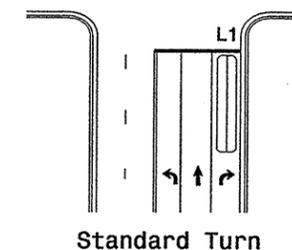
OR



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

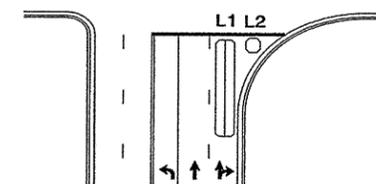
Queue Loop Detection

Right Turn Lane Detection

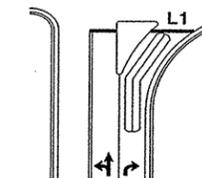


Standard Turn

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

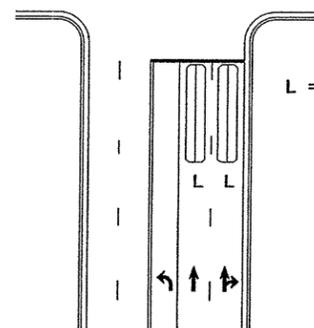


Wide Radius Turn



Channelized Turn

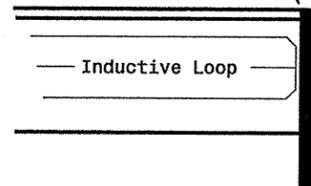
Side Street Detection



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

Typical Loop Locations

PLAN DATE: June 2006	REVIEWED BY:
PREPARED BY: P L Alexander	REVIEWED BY:
SCALE: N/A	DATE: 12/1/06

122 N. McDowell St., Raleigh, NC 27603

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

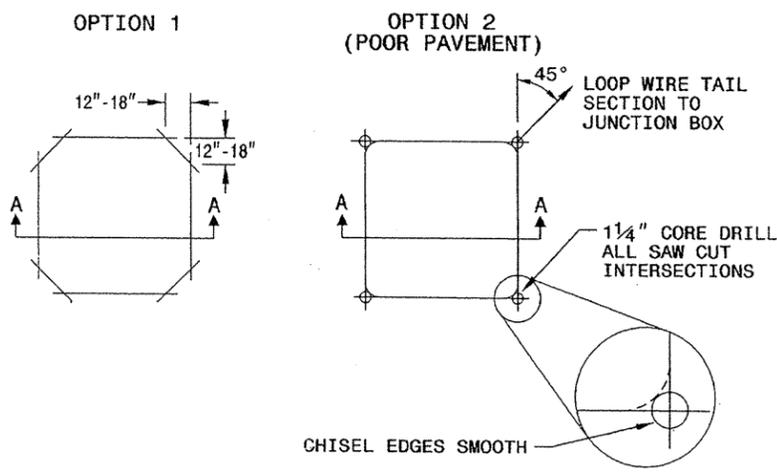
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

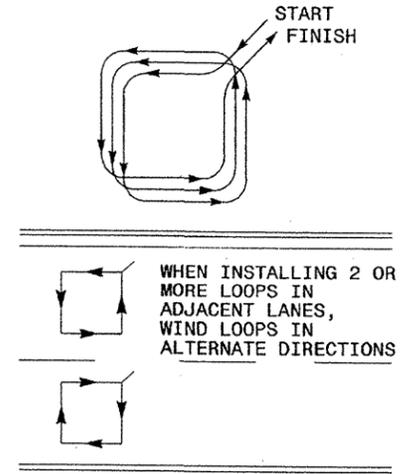
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

SAW CUT OPTIONS

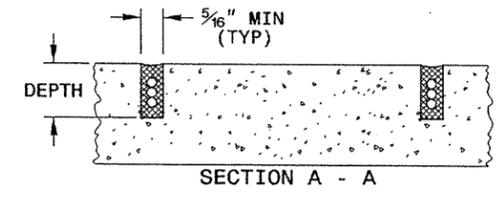


LOOP WINDING METHOD

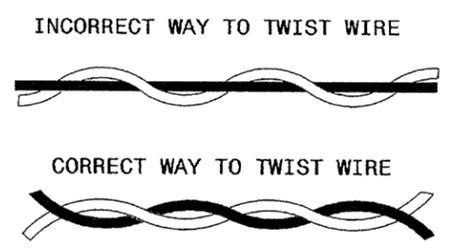


SAW SLOT DEPTH CHART

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 WIRE TWISTING METHOD

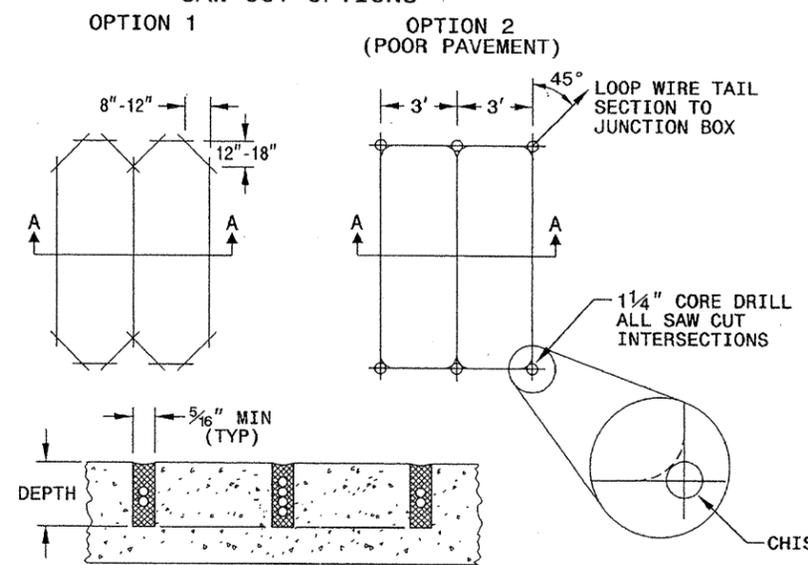


NOTES

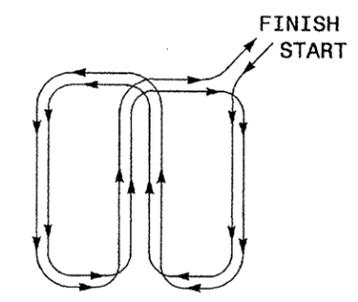
1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

QUADRUPOLE LOOP

SAW CUT OPTIONS



LOOP WINDING METHOD



SECTION A - A
DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title

Prepared in the Office of:
Intelligent Transportation
Systems & Signals Unit
750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
16286
ENGINEER
MILTON I. DEAN

Milton I. Dean 4/24/08
SIGNATURE DATE

24-Nov-2008 08:28
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ZML1110

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

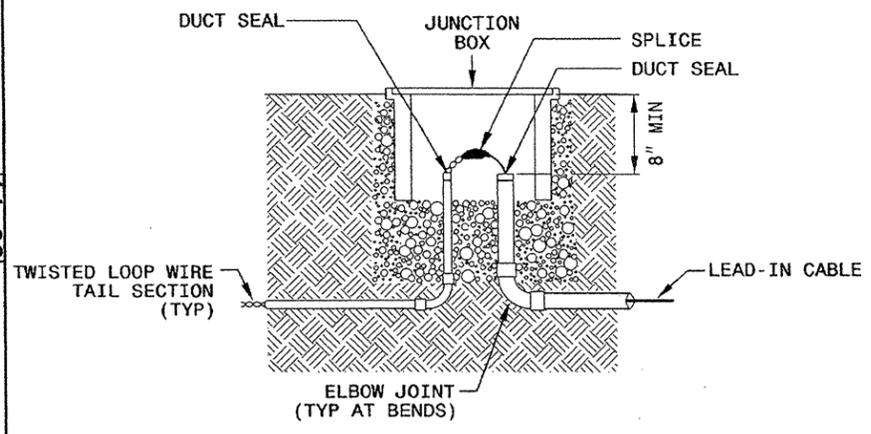
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

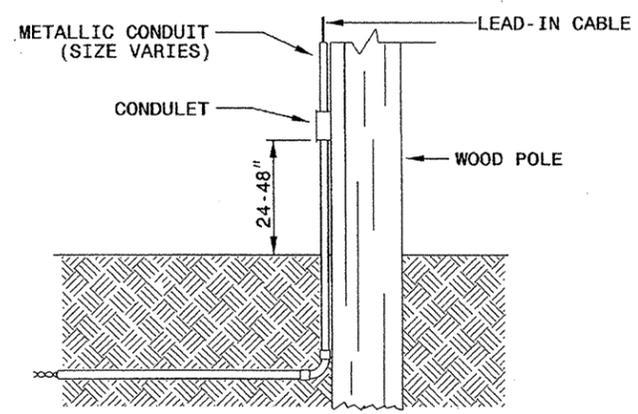
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

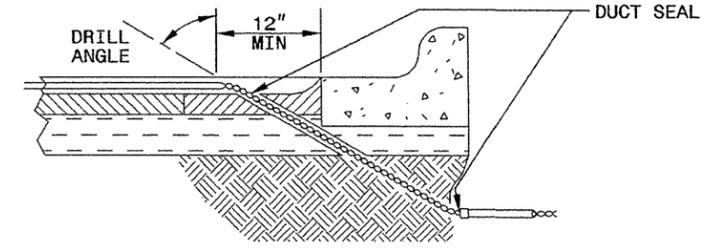


NOTE

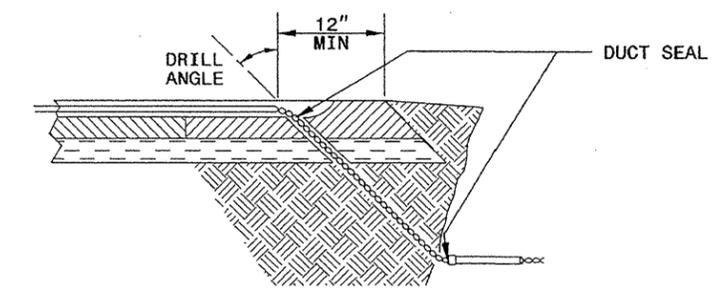
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

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.

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DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

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. Greenfield Parkway
Garner, NC 27529

SEAL

Milton I. Dean 11/24/08
SIGNATURE DATE

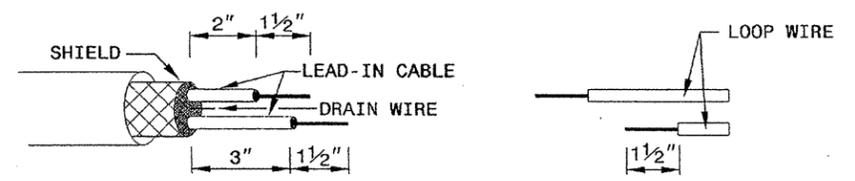
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11/17/08

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

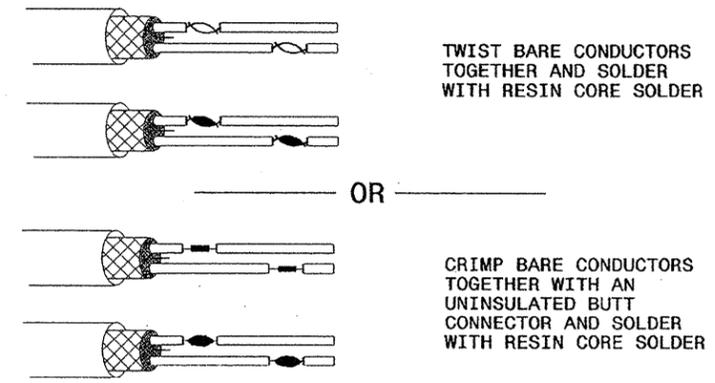
11-08
 ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

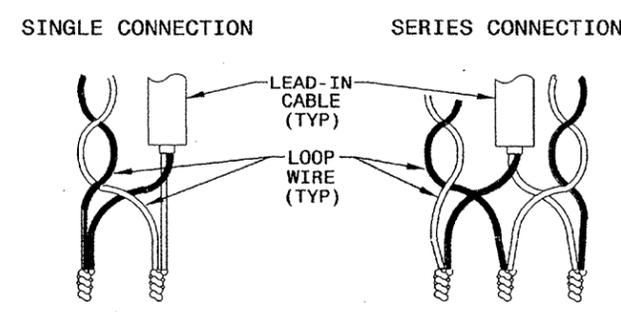


STEP 2. CONNECT AND SOLDER

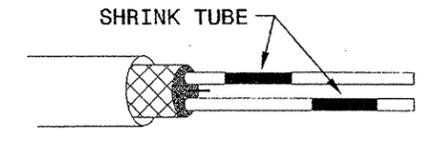


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

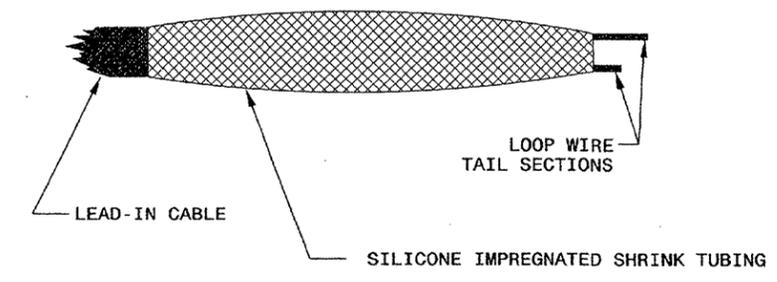
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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 RALEIGH, N.C.

11-08
 ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
 Garner, NC 27529

SEAL

Milton Alan 11/24/08
 SIGNATURE DATE

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