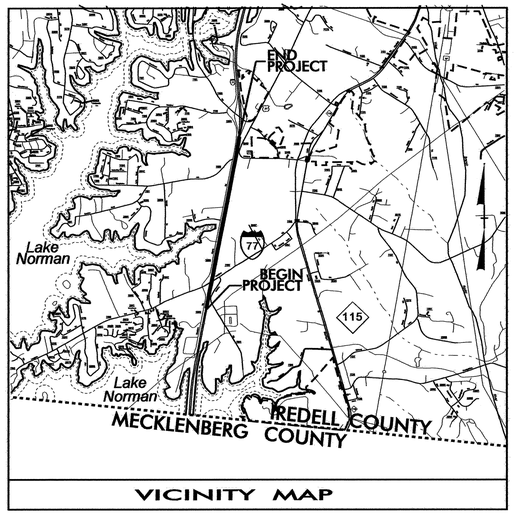
STATE	PROJECT NO.	SHEET NO.
N.C.	I-4411	Sig.1

PROJECT: 35604.1.1.2 I-4411



VICINITY MAP

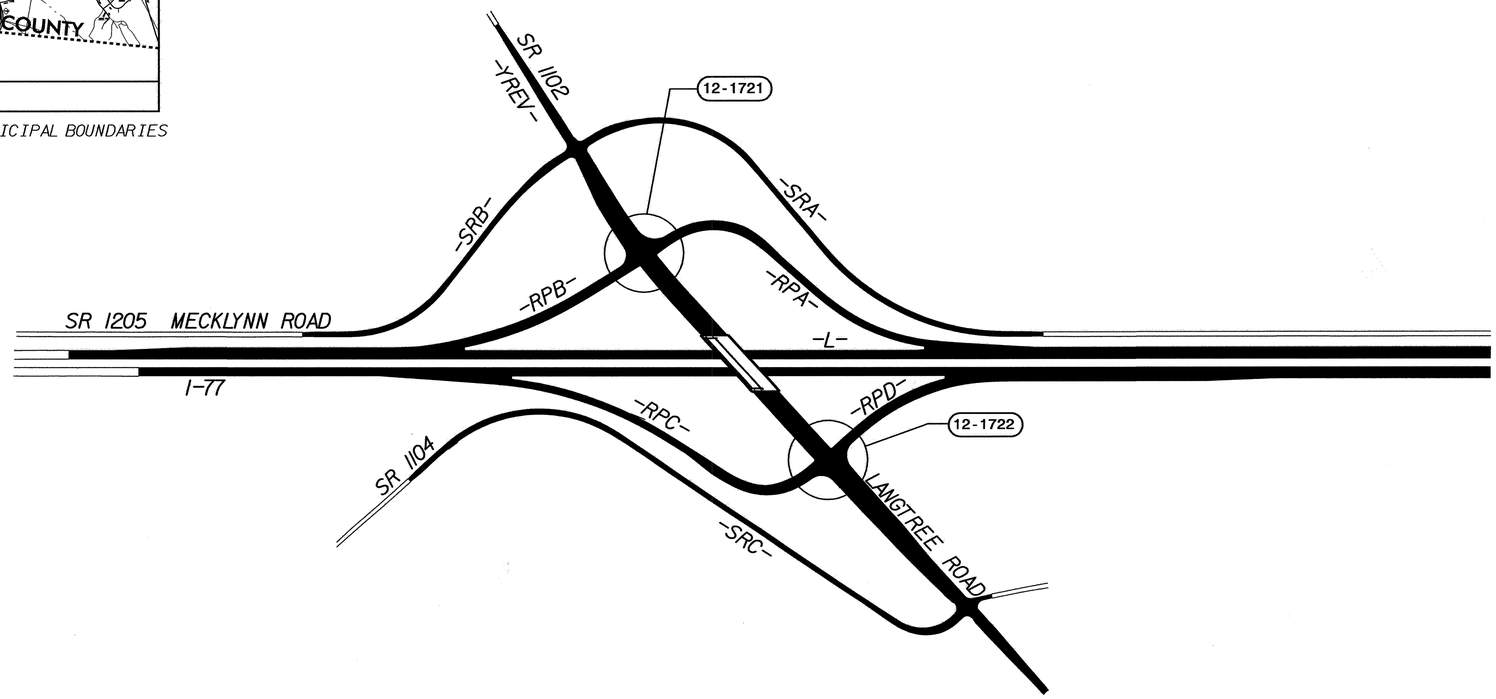
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: PROPOSED INTERCHANGE AT EXISTING I–77 AND SR 1102 GRADE SEPARATION

TYPE OF WORK: TRAFFIC SIGNALS



INDEX OF PLANS

SHEET NUMBER	SIGNAL INVENTORY NUMBER	LOCATION /DESCRIPTION
SIG. 1	——	Title Sheet
SIG. 2–3	12–1721	SR 1102 (Langtree Road) at I–77 Ramp A
SIG. 4–5	12–1722	SR 1102 (Langtree Road) at I–77 Ramp C
SIG. 6–11	——	Standard Metal Pole Details
SIG. 12	——	Cabinet Component Layout
SIG. 13–16	——	Communications Cable and Conduit Routing Plans

LEGEND

(##-####) ***SIGNAL INVENTORY NUMBER***

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

DOUMIT Y. ISHAK – SIGNALS AND GEOMETRICS CONTRACTS ENGINEER
GEORGE C. BROWN, PE – SIGNAL EQUIPMENT DESIGN ENGINEER
G. G. MURR, JR., PE – TRAFFIC MANAGEMENT SYSTEMS ENGINEER

N

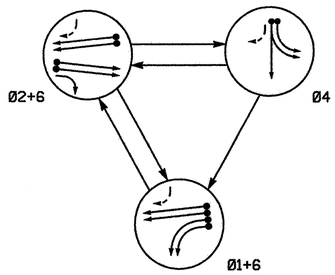
Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section

122 N. McDowell St., Raleigh, NC 27603

PROJECT REFERENCE NO.	SHEET NO.
I-4411	Sig. 2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

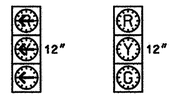
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø4	FLASH
11, 12	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y

SIGNAL FACE I.D.

Denotes L.E.D.



11, 12

21, 22
41, 42
61, 62

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	—	——	——	—	Y
1B	6X40	0	2-4-2	Y	1	Y	Y	—	——	——	—	Y
2A/S01	6X6	300	6	Y	2	Y	Y	—	——	——	Y	Y
2B/S02	6X6	300	6	Y	2	Y	Y	—	——	——	Y	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	—	——	——	—	Y
4B	6X40	0	2-4-2	Y	4	Y	Y	—	——	——	—	Y
6A	6X6	300	4	Y	6	Y	Y	—	——	——	—	Y
6B	6X6	300	4	Y	6	Y	Y	—	——	——	—	Y

2070L TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	7	12	7	12
Extension 1 *	2.0	6.0	3.0	6.0
Max Green 1 *	20	100	30	100
Yellow Clearance	3.0	4.3	3.6	4.8
Red Clearance	3.3	1.0	2.0	1.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	-	1.5
Max Variable Initial *	-	34	-	34
Time Before Reduction *	-	15	-	15
Time To Reduction *	-	30	-	30
Minimum Gap	-	3.0	-	3.0
Recall Mode	-	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3 Phase
Fully Actuated
(Langtree Road Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data:
   Master Asset #: 11205
   Controller Asset #: 1721

PLAN QUANTITIES

Pay Item	Feet
Signal Cable	1285
Messenger Cable	440
Lead-in Cable	1000

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
M	Master Controller & Cabinet	M
□	Junction Box	■
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
→	Pavement Marking Arrow	→
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ
Ⓓ	Combined Through and Left Arrow Sign (R3-6L)	Ⓓ
Ⓔ	Left Arrow "ONLY" Sign (R3-5L)	Ⓔ
◯	Metal Strain Pole	◘

THIS PLAN SHALL SUPERSEDE THE PLAN SEALED ON 11/2/04.

New Installation

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, NCDEPARTMENT OF TRANSPORTATION, Signals and Geometrics Section
122 N. McDonald St., Raleigh, NC 27603

SR 1102 (Langtree Road) at I-77 Ramp A

Division 12 Iredell County Mooresville

PLAN DATE: January 2006 REVIEWED BY: Z.W. Little
PREPARED BY: B.E. Wynn REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY W. WILLIAMS
SIGNATURE 2/14/06 DATE

SIG. INVENTORY NO. 12-1721

27-FEB-2006 08:10
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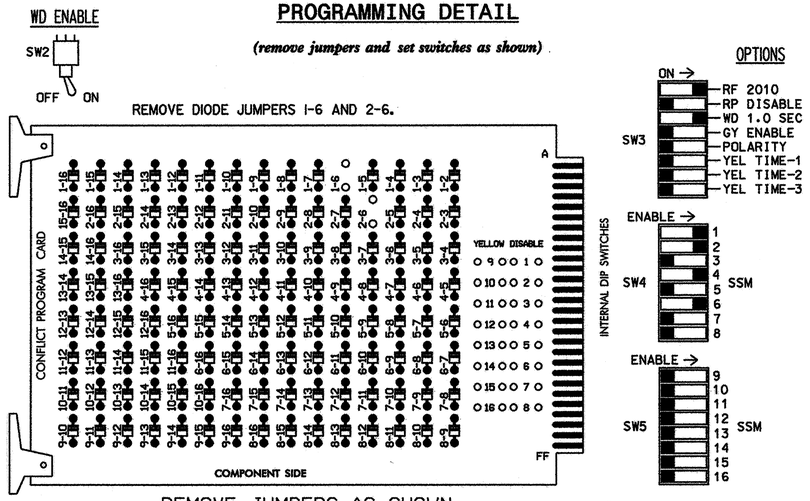
zwlittle

PROJECT REFERENCE NO.	SHEET NO.
	Sig. 3

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 3,5,7,8, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the Langtree Road Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET.....CONTRACTOR SUPPLIED 332
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S4,S6
PHASES USED.....1,2,4,6
OVERLAPS.....NONE

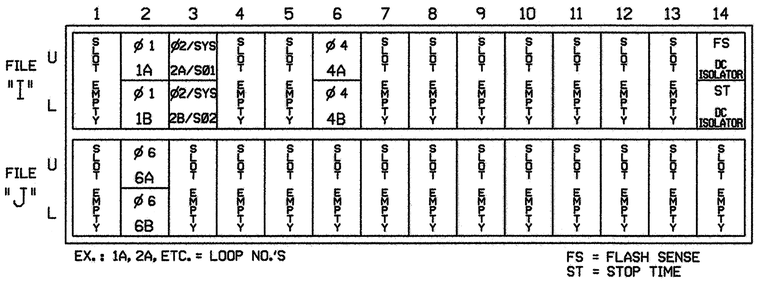
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11,12	21,22	NU	NU	41,42	NU	NU	61,62	NU	NU	NU	NU
RED		128			101			134				
YELLOW		129			102			135				
GREEN		130			103			136				
RED ARROW	125											
YELLOW ARROW	126											
GREEN ARROW	127											

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-5,6	I2U	39	1	2	1	Y	Y			
1B	TB2-7,8	I2L	43	5	12	1	Y	Y			
2A/SØ1	TB2-9,10	I3U	63	25	32	2/SYS	Y	Y			
2B/SØ2	TB2-11,12	I3L	76	38	42	2/SYS	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1721
DESIGNED: JANUARY 2006
SEALED: 2/14/06
REVISED:

This plan supersedes the plan sealed on 11/9/04.

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
North Carolina Department of Transportation, Traffic Engineering and Safety Systems Branch, Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SR 1102 (Langtree Road) at I-77 Ramp A

Division 12 | Iredell County | Mooresville

PLAN DATE: FEBRUARY 2006 | REVIEWED BY: TODD JOYCE
PREPARED BY: JAMES W. PESZKO | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 2/15/06
SIGNATURE DATE

SIG. INVENTORY NO. 12-1721

14-FEB-2006 14:39
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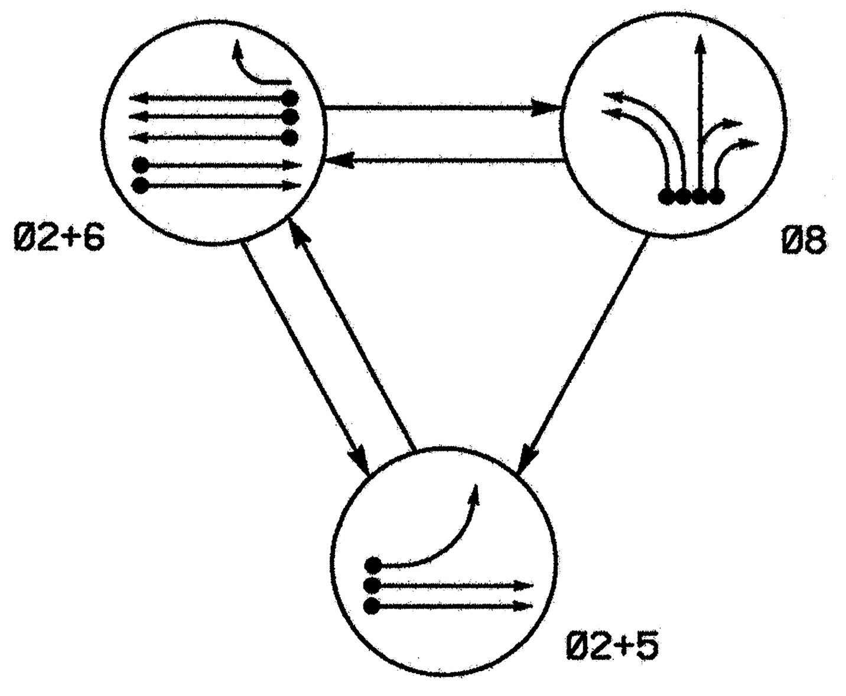
jpeszko

PROJECT REFERENCE NO.	SHEET NO.
I-4411	Sig. 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

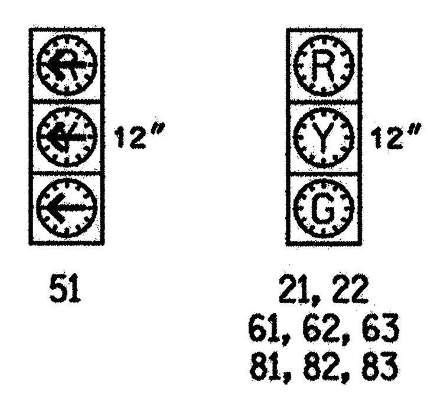
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø8	FLASH
21, 22	G	G	R	Y
51	←	R	R	R
61, 62, 63	R	G	R	Y
81, 82, 83	R	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



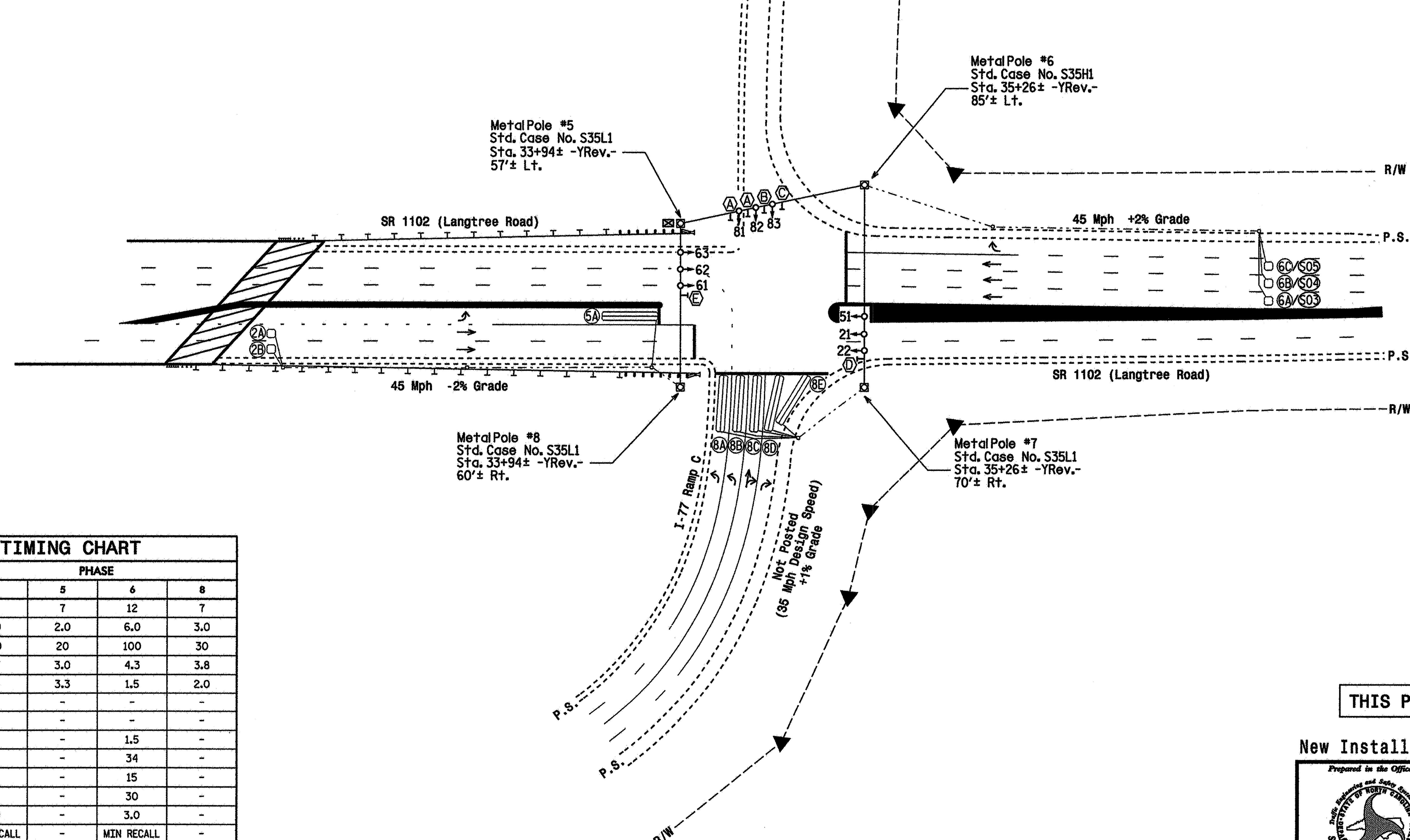
2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	TURNS	DISTANCE FROM STOPBAR (FT)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
2A	6X6	5	300	Y	2	Y	Y	–	–	——	——	Y
2B	6X6	5	300	Y	2	Y	Y	–	–	——	——	Y
5A	6X40	2-4-2	0	Y	5	Y	Y	–	–	——	——	Y
6A/S03	6X6	5	300	Y	6	Y	Y	–	Y	——	——	Y
6B/S04	6X6	5	300	Y	6	Y	Y	–	Y	——	——	Y
6C/S05	6X6	5	300	Y	6	Y	Y	–	Y	——	——	Y
8A	6X40	2-4-2	0	Y	8	Y	Y	–	–	——	——	Y
8B	6X40	2-4-2	0	Y	8	Y	Y	–	–	——	——	Y
8C	6X40	2-4-2	0	Y	8	Y	Y	–	–	——	10	Y
8D	6X40	2-4-2	0	Y	8	Y	Y	–	–	——	15	Y
8E	6X40	2-4-2	0	Y	8	Y	Y	–	–	——	20	Y

3 Phase
Fully Actuated
(Langtree Road Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2002 and "Standard Specifications for Roads and Structures" dated January 2002.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data:
   Controller Asset #: 1722



PLAN QUANTITIES

Pay Item	Feet
Signal Cable	820
Messenger Cable	400
Lead-in Cable	1390

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Metal Strain Pole	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Right Arrow Sign (R3-6R)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	No Right Turn Sign (R3-1)	Ⓓ
Ⓔ	No Left Turn Sign (R3-2)	Ⓔ

2070L TIMING CHART

FEATURE	PHASE 2	5	6	8
Min Green 1 *	12	7	12	7
Extension 1 *	6.0	2.0	6.0	3.0
Max Green 1 *	100	20	100	30
Yellow Clearance	4.7	3.0	4.3	3.8
Red Clearance	1.6	3.3	1.5	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.5	-	1.5	-
Max Variable Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduction *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

THIS PLAN SHALL SUPERSEDE THE PLAN SEALED ON 1/28/05.

New Installation

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, North Carolina Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50 1"=50'

SR 1102 (Langtree Road) at I-77 Ramp C

Division 12 Iredell County Mooresville

PLAN DATE: January 2006	REVIEWED BY: Z.M. Little
PREPARED BY: B.E. Wynn	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY W. WILLIAMS
SIGNATURE 2/14/06 DATE
SIG. INVENTORY NO. 12-1722

03-MAR-2006 13:41
s:*its signals*workgroups*tip projects*i-4411*signals*revsignals*121722_sig_dsn_2006xxxx.dgn
zmlittle

PROJECT REFERENCE NO.	SHEET NO.
I-4411	Sig. 5

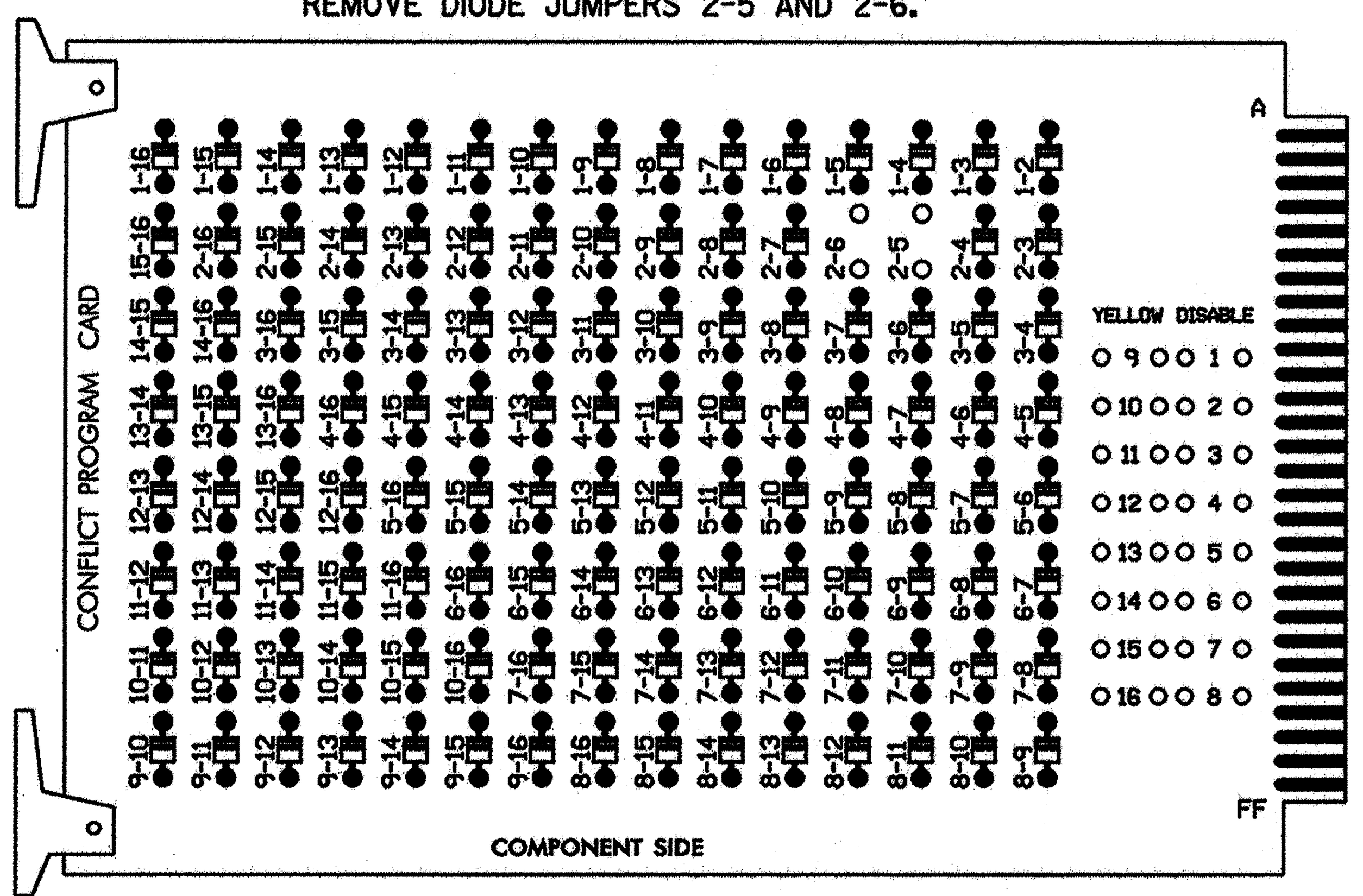
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

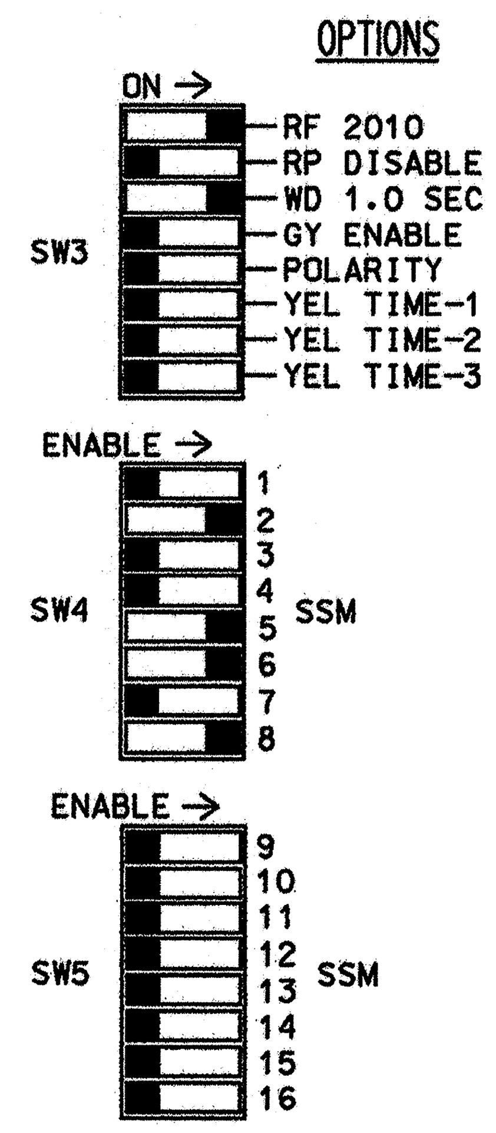
WD ENABLE

SW2 OFF ON

REMOVE DIODE JUMPERS 2-5 AND 2-6.



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,7, 9,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. Program phases 2 and 6, on the controller unit, for Variable Initial and Gap Reduction.
6. The cabinet and controller are part of the Langtree Road Closed Loop System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	51	61,62 63	NU	NU	81,82 83	NU
RED		128						134			107	
YELLOW		129						135			108	
GREEN		130						136			109	
RED ARROW							131					
YELLOW ARROW							132					
GREEN ARROW							133					

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER..............CONTRACTOR SUPPLIED 2070L
CABINET.................CONTRACTOR SUPPLIED 332
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S2,S5,S6,S8
PHASES USED.............2,5,6,8
OVERLAPS................NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø 2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		ø 2 2B												ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø 5 5A	ø6/SYS 6A/S03	ø6/SYS 6C/S05	SLOT EMPTY	ø 8 8A	ø 8 8C	ø 8 8E	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED	ø6/SYS 6B/S04	NOT USED		ø 8 8B	ø 8 8D	NOT USED						

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			
6A/S03	TB3-9,10	J3U	64	26	36	6/SYS	Y	Y			
6B/S04	TB3-11,12	J3L	77	39	46	6/SYS	Y	Y			
6C/S05	TB5-1,2	J4U	48	10	26	6/SYS	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			10
8D	TB7-3,4	J7L	79	41	48	8	Y	Y			15
8E	TB7-5,6	J8U	50	12	28	8	Y	Y			20

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1722
DESIGNED: JANUARY 2006
SEALED: 2/14/06
REVISED:

This plan supersedes the plan sealed on 1/31/05.

New Installation

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals Management Section, State of North Carolina Department of Transportation

122 N. McDowell St., Raleigh, NC 27603

SR 1102 (Langtree Road) at I-77 Ramp C

Division 12 Iredell County Mooresville

PLAN DATE: FEBRUARY 2006 REVIEWED BY: TODD JOYCE
PREPARED BY: JAMES M. PESZKO REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 2/15/06
SIGNATURE DATE

SIG. INVENTORY NO. 12-1722

14-FEB-2006 14:02
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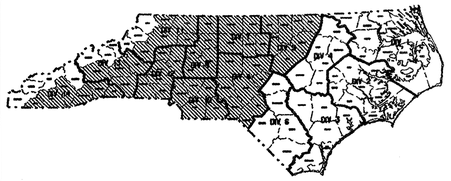
jpeszko

NCDOT METAL POLE STANDARDS

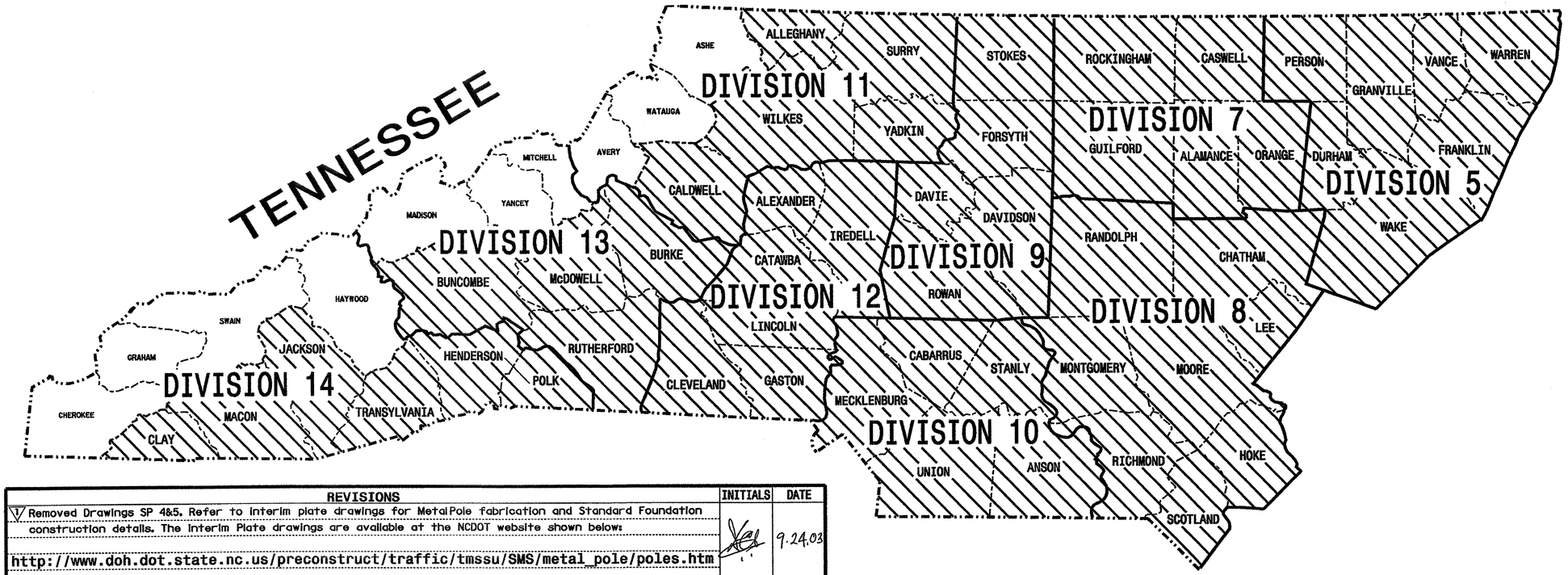


STATE	PROJECT NO.	SHEET NO.
N.C.	I-4411	Sig. 6
F. A. PROJ. NO.		dwg.SP1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

METAL STRAIN POLE STANDARDS FOR ZONE 4 – 90 mph (40 m/s)

ALL COUNTIES WITHIN DIVISIONS 5, 7, 8, 9, 10, AND 12.
AILEGHANY, CALDWELL, SURRY, WILKES, AND YADKIN COUNTIES IN DIVISION 11.
BUNCOMBE, BURKE, McDOWELL, AND RUTHERFORD COUNTIES IN DIVISION 13.
CLAY, HENDERSON, JACKSON, MACON, POLK, RUTHERFORD, AND TRANSYLVANIA COUNTIES IN DIVISION 14.



REVISIONS	INITIALS	DATE
▽ Removed Drawings SP 4&5. Refer to interim plate drawings for MetalPole fabrication and Standard Foundation construction details. The interim Plate drawings are available at the NCDOT website shown below:		
http://www.doh.dot.state.nc.us/preconstruct/traffic/tmssu/SMS/metal_pole/poles.htm		9.24.03

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section

122 N. McDowell St., Raleigh, NC 27603

Designed in conformance with the 2002 Interim to the 4th Edition 2001

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminares, and Traffic Signals

INDEX OF PLANS

NCDOT CONTACTS:

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

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A. M. ESPOSITO, P.E. – SIGNALS AND GEOMETRICS PROJECT ENGINEER
C. F. ANDREWS, JR. – SIGNALS AND GEOMETRICS PROJECT ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 2.14.03
SIGNATURE DATE

STANDARD STRAIN POLE NOTES

PROJECT REFERENCE NO.	SHEET NO.
I-4411	Sig. 7 dwg.SP2

GENERAL

1. THESE NOTES PROVIDE INFORMATION AND REQUIREMENTS FOR THE DESIGN, FABRICATION, AND INSTALLATION OF STANDARD METAL STRAIN POLES. THEY ARE TO BE USED BY DESIGN ENGINEERS, CONTRACTORS, AND POLE MANUFACTURERS IN THE SELECTION, FABRICATION, AND INSTALLATION OF METAL TRAFFIC SIGNAL SUPPORTS IN NORTH CAROLINA. THE NOTES ARE CATEGORIZED FOR EASE OF USE, AND ARE NUMBERED CHRONOLOGICALLY. NOTES THAT ARE SPECIFIC TO A PARTICULAR SITUATION, DESIGN DETAIL OR REQUIREMENT ARE SHOWN ON THE APPLICABLE PAGE TO CLARIFY INTENT AND UNDERSTANDING.
2. THE FOLLOWING STANDARD DESIGNS ARE BASED ON LIGHT AND HEAVY LOADING CASES. NO VARIATIONS, SUBSTITUTION OR RE-DESIGN OF THE SPECIFIED POLES AND FOUNDATIONS WILL BE PERMITTED UNLESS IT IS APPROVED BY THE TRAFFIC ENGINEERING BRANCH.
3. THESE METAL POLE STANDARDS MAKE REFERENCE TO THE NCDOT "ROADWAY STANDARD DRAWINGS" DATED JANUARY 2002 HERE IN AFTER REFERED TO AS THE STANDARD DRAWINGS AND TO THE NCDOT "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2002 HERE IN AFTER REFERED TO AS THE STANDARD SPECIFICATIONS. IF THERE IS A DISCREPANCY BETWEEN THE STANDARD DRAWINGS/SPECIFICATIONS AND THESE STANDARDS, THEN THESE DRAWINGS AND SPECIFICATIONS SHALL GOVERN.
4. POLE CASES PREAPPROVED ON THE DEPARTMENTS QUALIFIED PRODUCTS LIST (QPL) WILL NOT REQUIRE MANUFACTURER'S SHOP DRAWINGS. HOWEVER, CERTIFICATION OF COMPLIANCE WITH THE MANUFACTURER'S PREAPPROVED SHOP DRAWING ON FILE WITH THE DEPARTMENT SHALL BE FURNISHED TO THE ENGINEER. IF POLE CASES ARE NOT ON THE QPL, OR VARIATIONS TO A CASE STANDARD HAS BEEN APPROVED, MANUFACTURER'S SHOP DRAWINGS SHALL BE REQUIRED.

DESIGN CRITERIA

5. THE METAL POLE DESIGN SHALL CONFORM TO THE "2002 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS" AND LATEST APPROVED INTERIM SPECIFICATIONS. DESIGN WIND PRESSURES AND APPLICATIONS ARE IN ACCORDANCE WITH SECTION 3.8 AND 3.9 OF THE 2001 AASHTO SPECIFICATIONS.
6. THE THICKNESS OF A SINGLE PLY POLE MAY BE SUBSTITUTED BY USING A 2 PLY POLE AS LONG AS THE POLE BASE DOES NOT EXCEED THE SPECIFIED MINIMUM DIAMETER BY MORE THAN 1.25". NO EXCEPTIONS TO THIS DESIGN PARAMETER WILL BE ALLOWED.
7. THESE STRAIN POLE STANDARDS ALLOW FOR SIGNAL HEADS TO BE PLACED ANYWHERE ALONG THE SPANWIRE. THE MOST CRITICAL LOCATIONS ARE SHOWN IN THE TYPICAL INTERSECTION LOADING CASES SHOWN ON DRAWING SP3 (LOAD CASE AND DESIGN DETAILS SHEET) OF THESE STANDARDS. FOR DESIGN PURPOSES, USE 4% SAG FOR THE SPANWIRE. ROADWAY DESIGN CLEARANCE RANGE FROM BOTTOM OF SIGNAL HEADS TO PAVEMENT IS 17 FEET.
8. PROVISIONS SHALL BE MADE FOR DRAINAGE OF WATER FROM INSIDE THE METAL POLE.

POLE MATERIALS

9. PROVIDE MATERIALS FOR STEEL METAL POLES THAT COMPLY WITH SECTION 1098-15 OF THE STANDARD SPECIFICATIONS.
   POLE MONOTUBE SHALL:
   - BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.
   - USE ASTM A595 MATERIAL (55 KSI) OR EQUIVALENT AS APPROVED BY THE ENGINEER.
   - HAVE A LINEAR TAPER OF 0.14 IN/FT.
10. BASE PLATE SHALL:
    - BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.
    - CONFORM TO AASHTO M270 GRADE 36 OR EQUIVALENT.
11. ANCHOR BOLTS, NUTS, AND WASHER MATERIAL:
    - ANCHOR BOLTS - USE AASHTO M 314 GRADE 55 MATERIAL OR EQUIVALENT.
    - NUTS - USE AASHTO M291 GRADE 2H, DH, OR DH3 MATERIAL OR EQUIVALENT.
    - WASHERS - USE AASHTO M293 MATERIAL OR EQUIVALENT.
12. ALL ANCHOR BOLTS, NUTS, WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 OR M298.

POLE FABRICATION

13. ALL OTHER STEEL HARDWARE MATERIAL REQUIRED BUT NOT SPECIFIED ABOVE SHALL COMPLY WITH SECTION 1098-15 OF THE STANDARD SPECIFICATIONS.
14. POLE ASSEMBLIES SHALL BE PERMANENTLY TAGGED OR ENGRAVED WITH THE FOLLOWING:
    - POLE MANUFACTURERS NAME
    - MANUFACTURE DATE
    - POLE CASE NUMBER
    - THICKNESS AND GRADE OF STEEL
15. CIRCUMFERENTIAL WELDING OF THE POLES ARE ALLOWED PROVIDED THE FOLLOWING CONDITIONS ARE MET:
    - THE METAL POLES SHALL NOT BE SPLICED WITHIN 5 FEET FROM BASE NOR WITHIN 2 FEET FROM ANY CONNECTION.
    - ONLY ONE SPLICE PER UPRIGHT WILL BE PERMITTED.
    - THE QUALITY CONTROL AND WORKMANSHIP OF THE SPLICE WELDS ARE THE SOLE RESPONSIBILITY OF THE POLE MANUFACTURER.
16. ALL WELDS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE AWS D1.1 STRUCTURAL WELDING CODE.
17. PROVIDE 2- 3" FACTORY DRILLED HOLES THROUGH THE POLE WALL FOR WIRE ENTRANCE ACCESS TO THE TERMINAL STRIP INSIDE THE TERMINAL COMPARTMENT. THE HOLES SHALL BE IN THE CENTER OF THE TERMINAL COMPARTMENT (0 DEGREES ON THE POLES RADIAL INDEX) LOCATED AT 26" AND 36" FROM THE BASE OF THE POLE. SEE DRAWING SP4 (POLE FABRICATION DETAILS) OF THESE METAL POLE STANDARDS FOR GRAPHIC DETAILS.
18. THE METAL POLE SHALL BE FABRICATED WITH 3-2" THREADED HALF COUPLINGS AND 1-1" THREADED HALF COUPLING INSTALLED 9" FROM THE TOP OF THE POLE TO RECEIVE THE WEATHERHEADS FOR SIGNAL WIRE ENTRANCES TO THE POLE. THE HALF COUPLINGS SHALL BE WELDED AT NO LESS THAN A 45 DEGREE ANGLE FROM HORIZONTAL TO PROPERLY INSTALL THE WEATHERHEADS. THE 1" HALF COUPLING FOR ELECTRICAL SERVICE ENTRANCE SHALL BE LOCATED AT 0 DEGREES ON THE POLES RADIAL INDEX. ALL OTHER 2" HALF COUPLINGS SHALL BE LOCATED AT 90 DEGREE INCREMENTS. PROVIDE WEATHER TIGHT BUSHING CAPS FOR ALL HALF COUPLINGS. REFER TO DRAWING SP4 (POLE FABRICATION DETAILS) OF THESE METAL POLE STANDARDS FOR GRAPHIC DETAILS.
19. PROVIDE A FACTORY STANDARD "J" HOOK FOR CABLE SUPPORT WELDED INSIDE THE TOP OF THE POLE AT 225 DEGREES ON THE POLES RADIAL INDEX. REFER TO DRAWING SP4 (POLE FABRICATION DETAILS) OF THES METAL POLE STANDARDS FOR GRAPHIC DETAILS.
20. FOR ALL OTHER NON-STRUCTURAL DETAILS AND REQUIREMENTS, REFER TO APPLICABLE SECTIONS OF THESE STANDARDS, THE TRAFFIC SIGNAL PLANS AND SPECIFICATIONS.
21. AT THE TIME OF SHIPMENT FROM THE FACTORY, ENSURE THE POLE IS PACKAGED SO THAT WATER CAN NOT GET INSIDE OF THE POLE.
22. SHIP ALL POLE ACCESSORIES FOR EACH POLE IN A SEPARATE WATERTIGHT CONTAINER WITH A LABEL THAT IDENTIFIES THE SPECIFIC POLE AND DESCRIBES THE CONTENTS.

SOIL TESTING AND STANDARD POLE FOUNDATIONS

23. THE FOUNDATION SIZE FOR POLES IN THESE METAL POLE STANDARDS IS DETERMINED BY CONDUCTING A SUBSURFACE SOIL INVESTIGATION. FOR DETAILS OF THE SUBSURFACE INVESTIGATION, AND PROPER SELECTION/DETERMINATION OF THE METAL POLE FOUNDATIONS, REFER TO AND COMPLY WITH THE "METAL POLE STANDARD FOUNDATIONS" SPECIAL PROVISION WHICH IS TO BE CONSIDERED AN INTEGRAL PART OF THESE METAL POLE STANDARDS.
24. STRAIN POLE FOUNDATIONS DEPTHS HAVE BEEN PRE-DESIGNED USING THE CHART SHOWN BELOW. TO DETERMINE THE CORRECT DEPTH OF EACH FOUNDATION:
    a.- USING THE STATEWIDE COUNTY WIND ZONE CHART ON DRAWING SP3 (LOAD CASE AND DESIGN DETAILS), MAKE SURE YOU HAVE THE APPROPRIATE WIND ZONE SELECTED.
    b.- SELECT THE SOIL TYPE THAT BEST DESCRIBES THE SOIL CHARACTERISTICS (EITHER CLAY OR SAND)
    c.- PERFORM A STANDARD PENETRATION TEST AT EACH PROPOSED FOUNDATION SITE TO DETERMINE "N" VALUE. (NUMBER OF BLOWS PER FOOT FROM STANDARD PENETRATION TEST).
    d.- GET THE APPROPRIATE POLE CASE LOAD NUMBER FROM THE PLANS OR FROM THE DIVISION TRAFFIC ENGINEER.
    e.- USING THE PREVIOUSLY DETERMINED SOIL TYPE AND "N" VALUE, SELECT THE APPROPRIATE COLUMN IN THE CHART. SELECT THE APPROPRIATE LINE THAT THE POLE LOAD CASE IS SHOWN ON IN THE CHART. THE CORRECT DEPTH OF THE FOUNDATION IS THE VALUE THAT IS SHOWN WHERE THE COLUMN AND THE LINE INTERSECT.
    f.- FILL OUT AND SUBMIT FOR APPROVAL TO THE DIVISION A "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION LOCATION.

FOUNDATION SELECTION TABLE

42" Diameter Drilled Pier Length (L) - Feet

LOAD CASE	WIND ZONE 4 - SOIL TYPES						
	Clay				Sand		
	Medium Design N-Value 4-8	Stiff Design N-Value 9-15	Very Stiff Design N-Value 16-30	Hard Design N-Value >30	Loose Design N-Value 4-10	Medium Design N-Value 11-30	Dense Design N-Value >30
S26L1	18.0	13.0	10.5	9.0	16.5	14.5	13.0
S30L1	18.5	13.0	10.5	9.0	17.0	15.0	13.5
S35L1	19.0	13.5	11.0	9.0	17.5	15.5	14.0
S30H1	22.0	15.0	12.0	9.5	19.5	17.0	15.0
S35H1	23.0	15.5	12.5	10.0	20.0	17.5	15.5

CONCRETE VOLUME (cubic yards)=.356xL

25. A "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION IS REQUIRED TO BE SUBMITTED AND APPROVED PRIOR TO ANY DRILLING IN THE FIELD. THIS FORM AS WELL AS THE STANDARD FOUNDATION SPECIAL PROVISIONS CAN BE OBTAINED AT THE FOLLOWING WEBSITE:

    http://www.doh.dot.state.nc.us/preconstruct/highway/dsn srvc/soils/form/default.htm

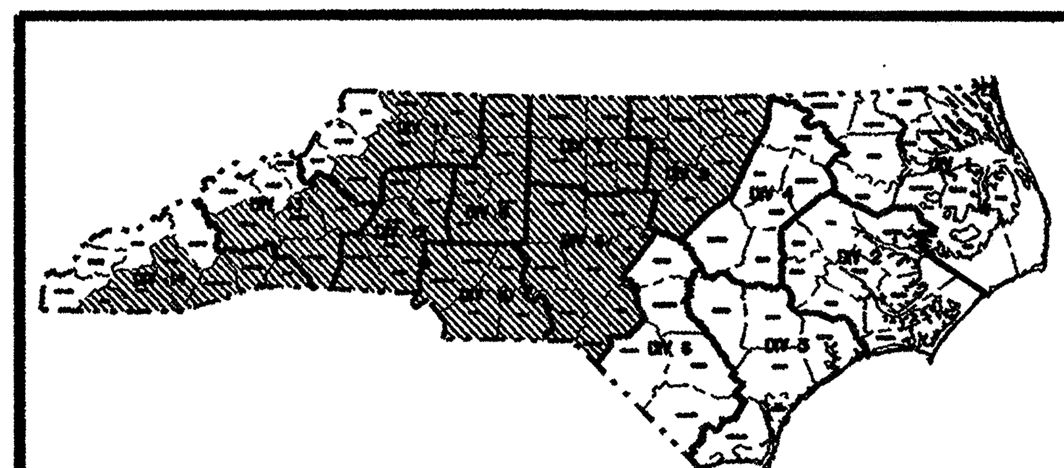
26. COMPLY WITH THE PROVISIONS OF SECTION 1742 OF THE STANDARD SPECIFICATIONS FOR INSTALLATION.
27. REFER TO STANDARD DRAWING 1742.01 FOR FOR FOUNDATION INSTALLATION DETAILS.
28. REINFORCING STEEL SHALL BE DEFORMED AND CONFORM TO ASTM A615 GRADE 60. TIES MAY BE DEFORMED OR PLAIN.
29. CIRCULAR TIE REINFORCING RINGS MAY BE VERTICALLY ADJUSTED BY +/- 3" AT A DEPTH BETWEEN 2'-0" AND 3'-0" TO FACILLITATE THE INSTALLATION OF ELECTRICAL CONDUIT ENTERING IN THE CAGE.
30. THE CONCRETE SHALL BE DRILL PIER CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS IN ACCORDANCE WITH SECTION 1000 OF THE NORTH CAROLINA STANDARD SPECIFICATIONS. FOR DETAILS, SEE SPECIAL PROVISIONS.
31. THE TRAFFIC SIGNAL SUPPORT STRUCTURE SHALL NOT BE ERECTED BEFORE THE CONCRETE IN THE FOUNDATION HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
32. NON-SHRINK GROUT SHALL BE A MIX CONSISTING OF 1 PART CEMENT, 3 PARTS SAND BY WEIGHT, AND 2 GRAMS OF ALUMINUM POWDER PER 94 LBS. OF CEMENT USED. WATER SHALL BE LIMITED TO THAT AMOUNT REQUIRED TO PRODUCE A WORKABLE MIX. PROVIDE SMALL PIPE TO DRAIN WATER PER STANDARD SPECIFICATIONS.
33. THE TOP OF EACH FOUNDATION SHALL BE PERMANENTLY MARKED (WITH STAMP OR EMBEDDED PLATE) TO IDENTIFY THE TYPE OR DEPTH OF THE FOUNDATION.
34. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS.

POLE INSTALLATION

35. COMPLY WITH THE PROVISIONS OF SECTION 1072 & 1742 OF THE STANDARD SPECIFICATIONS FOR INSTALLATION.
36. REFER TO STANDARD DRAWING 1742.01 FOR FOR POLE AND HARDWARE INSTALLATION DETAILS.
37. SIGNAL HEADS CAN BE PLACED ANYWHERE ALONG THE SPANWIRE. THE MOST CRITICAL LOCATIONS ARE SHOWN IN THE TYPICAL INTERSECTION LOADING CASE. FOR DESIGN PURPOSES, USE 4% SAG FOR THE SPANWIRE.
38. WHEN ATTACHING POLE TO FOUNDATION, THE DISTANCE BETWEEN THE BOTTOM OF THE LEVELING NUT TO THE TOP OF THE CONCRETE FOUNDATION SHOULD NOT BE GREATER THEN ONE ANCHOR NUT HEIGHT. THE TOP OF EACH ANCHOR BOLT SHOULD NOT EXTEND MORE THAN ONE ANCHOR NUT HEIGHT ABOVE TOP NUT TO FACILITATE THE INSTALLATION OF A THREADED NUT COVER.
39. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WHEN THE DISTANCE BETWEEN THE SPANWIRE ATTACHMENT CLAMP ON THE POLE AND THE WEATHER HEADS EXCEEDS 36". USE ¾" STAINLESS STEEL STRAPS TO LASH WIRE TO THE POLE. SEE DRAWING SP4 (POLE FABRICATION DETAILS) OF THESE STANDARDS FOR GRAPHIC DETAILS.
40. FOR OTHER DETAILS REGARDING METAL POLE INSTALLATION, SEE PROJECT SPECIAL PROVISIONS.

METAL STRAIN POLES

WIND ZONE 4 (90 MPH)



Prepared in the Offices of: Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 NA NONE

METAL POLE STANDARD NOTES

PLAN DATE:	SEPTEMBER 2002	REVIEWED BY:	R. E. MULLINAX
PREPARED BY:	C. F. ANDREWS	REVIEWED BY:	D. C. SARKAR
REVISIONS		INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

D. Sarkar 2.14.03
SIGNATURE DATE

14-FEB-2003 09:07
I:\Signals\Standard Pole Dwgs#2002mastarms1.dgn
ccandrews

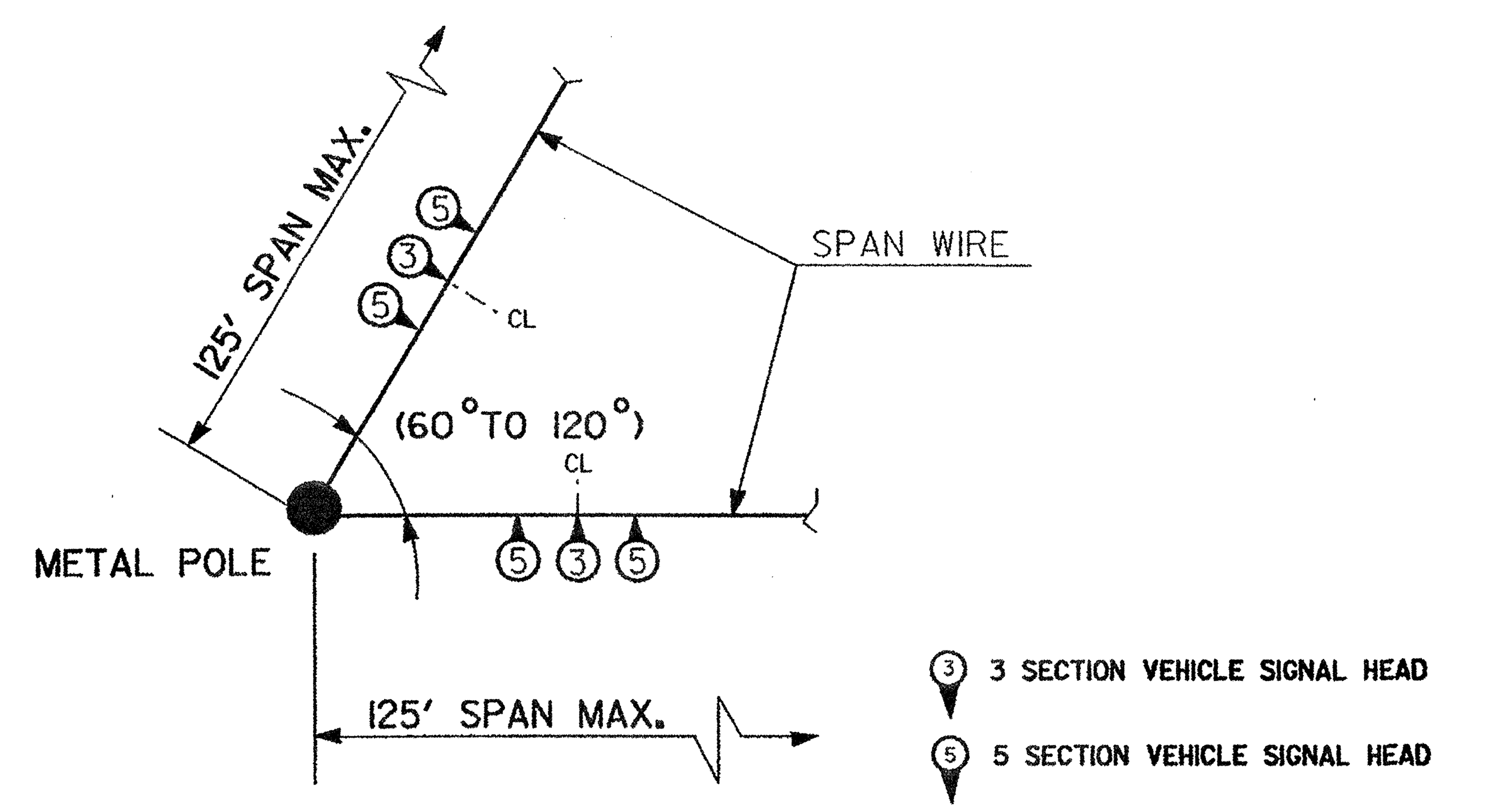
ZONE 4 (90 MPH)

LIGHT LOADING

(FOR ONE POLE AND ONE FOUNDATION)

CASE No.	POLE HEIGHT IN (FT.)	METAL POLE: WALL THICKNESS TH GAGE,(IN)	METAL POLE: BASE DIAMETER (IN.)	BASE PLATES: D (IN.)	BASE PLATES: BC (IN.)	BASE PLATES: T (IN.)	ANCHOR BOLTS: DIAMETER X TOTAL LENGTH (IN.)	CONCRETE FOOTING: DIAMETER d (IN.)	CONCRETE FOOTING: DEPTH L (FT.)	CONCRETE FOOTING: VOLUME (CU. YDS.)	REINFORCING BARS: BAR	REINFORCING BARS: NO.	REINFORCING BARS: SIZE
S26L1	26	.5	13	28	22	2½	2 X 66	42	*	*	V	10	#8
											CT	*	#4
S30L1	30	.5	14	28	22	2½	2 X 66	42	*	*	V	10	#8
											CT	*	#4
S35L1	35	.5	15	28	22	2½	2 X 66	42	*	*	V	10	#8
											CT	*	#4

* SEE NOTE 23 AND 24 ON SHEET 2 OF THE STANDARD NOTES.



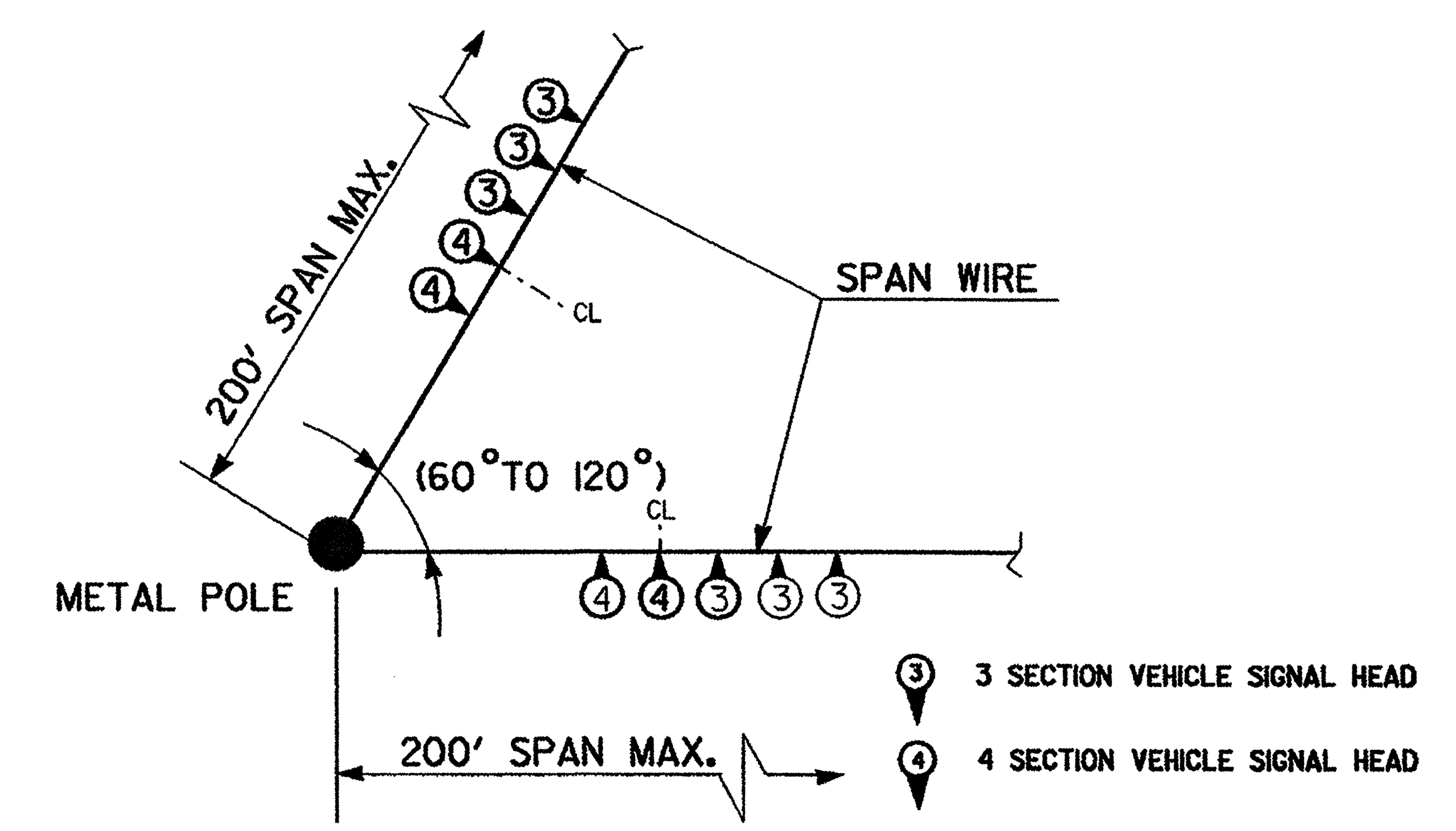
TYPICAL INTERSECTION

HEAVY LOADING

(FOR ONE POLE AND ONE FOUNDATION)

CASE No.	POLE HEIGHT IN (FT.)	METAL POLE: WALL THICKNESS TH GAGE, (IN.)	METAL POLE: BASE DIAMETER (IN.)	BASE PLATES: D (IN.)	BASE PLATES: BC (IN.)	BASE PLATES: T (IN.)	ANCHOR BOLTS: DIAMETER X TOTAL LENGTH (IN.)	CONCRETE FOOTING: DIAMETER d (IN.)	CONCRETE FOOTING: DEPTH L (FT.)	CONCRETE FOOTING: VOLUME (CU. YDS.)	REINFORCING BARS: BAR	REINFORCING BARS: NO.	REINFORCING BARS: SIZE
S30H1	30	.5	16	31	25	2½	2 X 66	42	*	*	V	10	#8
											CT	*	#4
S35H1	35	.5	18	31	25	2½	2 X 66	42	*	*	V	10	#8
											CT	*	#4

* SEE NOTE 23 AND 24 ON SHEET 2 OF THE STANDARD NOTES.

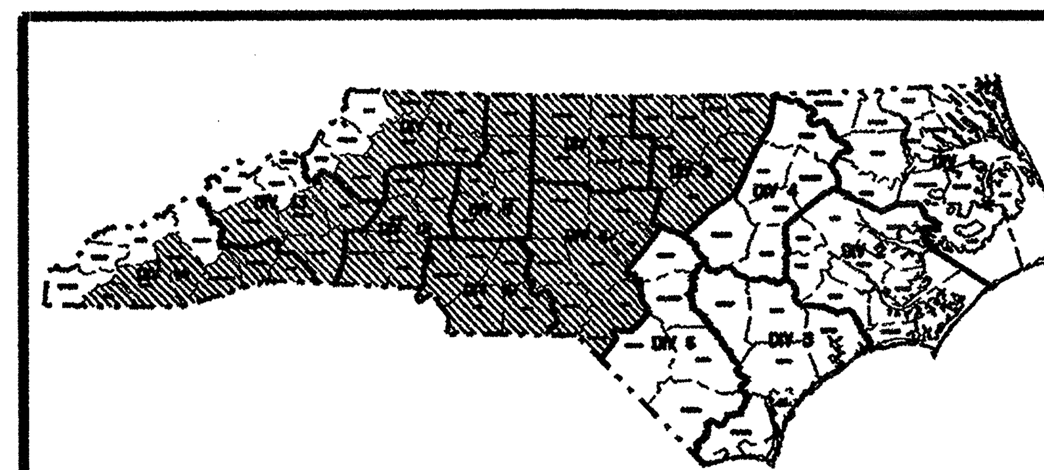


TYPICAL INTERSECTION

METAL STRAIN POLES

TABLE OF STATEWIDE COUNTY WIND ZONES

ZONE 1 *140 mph /63 m/s*	ZONE 2 *130 mph /58 m/s*	ZONE 3 *110 mph /49 m/s*	ZONE 4 *90 mph /40 m/s*	ZONE 5 *120 mph /58 m/s*
CURRITUCK (1) DARE (1) HYDE (1)	BERTIE (1) CAMDEN (1) CHOWAN (1) CURRITUCK (1) DARE (1) GATES (1) HERTFORD (1) HYDE (1) PASQUOTANK (1) NORTHAMPTON (1) MARTIN (1) PERQUIMANS (1) TYRRELL (1) WASHINGTON (1) BEAUFORT (2) CARTERET (2) CRAVEN (2) GREEN (2) JONES (2) LENOIR (2) PAMLICO (2) PITT (2) BRUNSWICK (3) DUPLIN (3) ONSLOW (3) NEW HANOVER (3) PENDER (3) SAMPSON (3)	EDGECOMBE (4) HALIFAX (4) JOHNSTON (4) NASH (4) WAYNE (4) WILSON (4) BLADEN (6) COLUMBUS (6) CUMBERLAND (6) HARNETT (6) ROBESON (6)	DURHAM (5) FRANKLIN (5) GRANVILLE (5) PERSON (5) VANCE (5) WARREN (5) WAKE (5) ALAMANCE (7) CASWELL (7) GUILFORD (7) ORANGE (7) ROCKINGHAM (7) SCOTLAND (8) CHATHAM (8) HOKE (8) LEE (8) MONTGOMERY (8) MOORE (8) RANDOLPH (8) RICHMOND (8) DAVIDSON (9) DAVIE (9) FORSYTH (9) ROWAN (9) STOKES (9) ANSON (10) CABARRUS (10) MECKLENBURG (10) STANLY (10) UNION (10) ALLEGHANY (11) CALDWELL (11) SURRY (11) WILKES (11) YADKIN (11) ALEXANDER (12) CATAWBA (12) CLEVELAND (12) GASTON (12) IREDELL (12) LINCOLN (12) BUNCOMBE (13) BURKE (13) McDOWELL (13) RUTHERFORD (13) CLAY (14) HENDERSON (14) JACKSON (14) MACON (14) POLK (14) TRANSYLVANIA (14)	ASHE (11) AVERY (11) WATAUGA (11) MADISON (13) MITCHELL (13) YANCEY (13) CHEROKEE (14) GRAHAM (14) HAYWOOD (14) SWAIN (14)



Prepared in the Offices of: Traffic Engineering and Safety Systems Branch — Signals and Geometrics Section, State of North Carolina Department of Transportation
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 NA — NONE

WIND ZONE 4
LOAD CASE AND DESIGN DETAILS

PLAN DATE: SEPTEMBER 2002	REVIEWED BY: D.C. SARKAR
PREPARED BY: C.F. ANDREWS	REVIEWED BY: R.E. MULLINAX

REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar — SIGNATURE — 2.14.03 — DATE

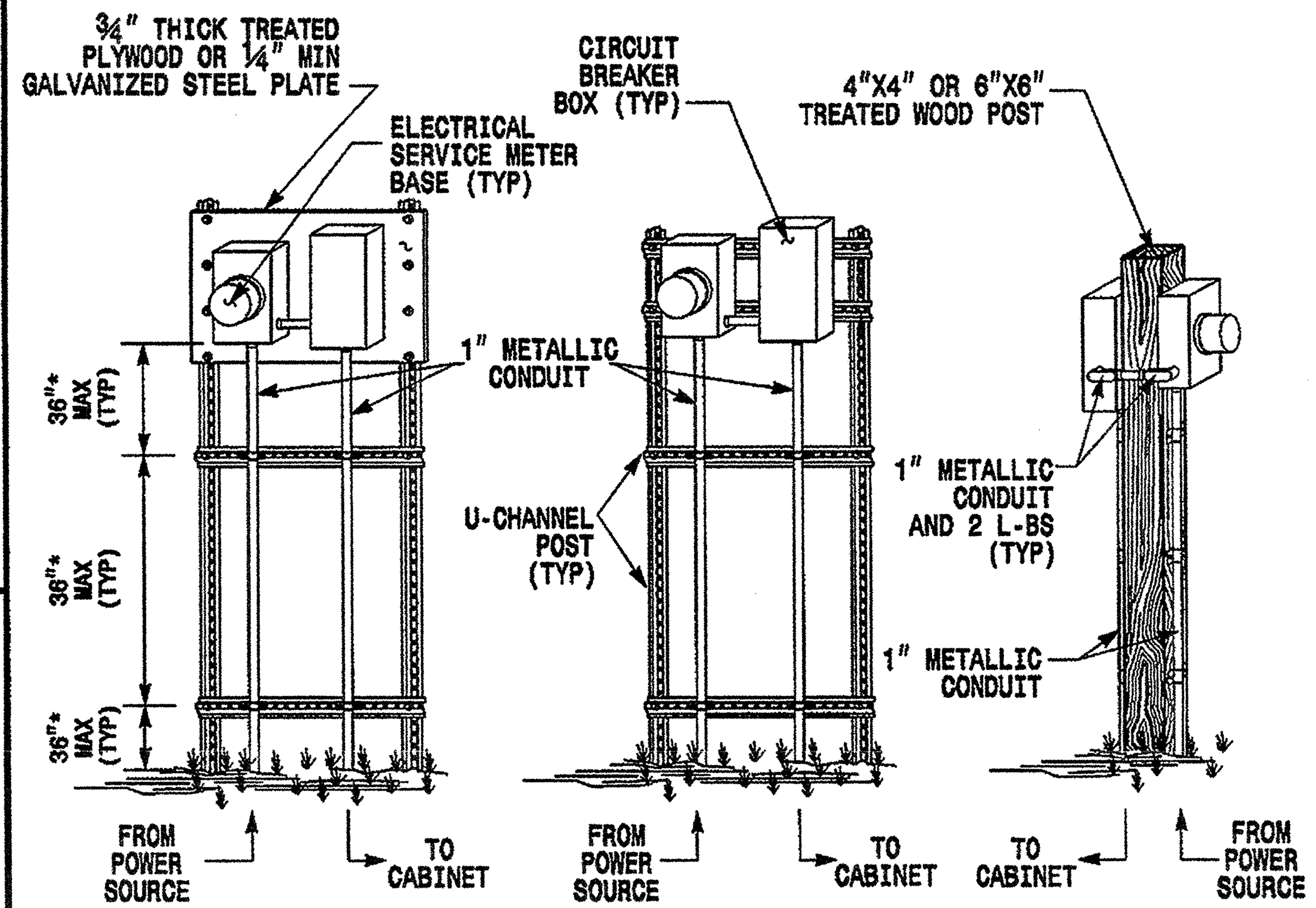
13-FEB-2003 15:30
u:\Wyoming Standard Pole Dwgs\2002mastarms1.dgn
candrews

PROJECT REFERENCE NO.	SHEET NO.
I-4411	516.9

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

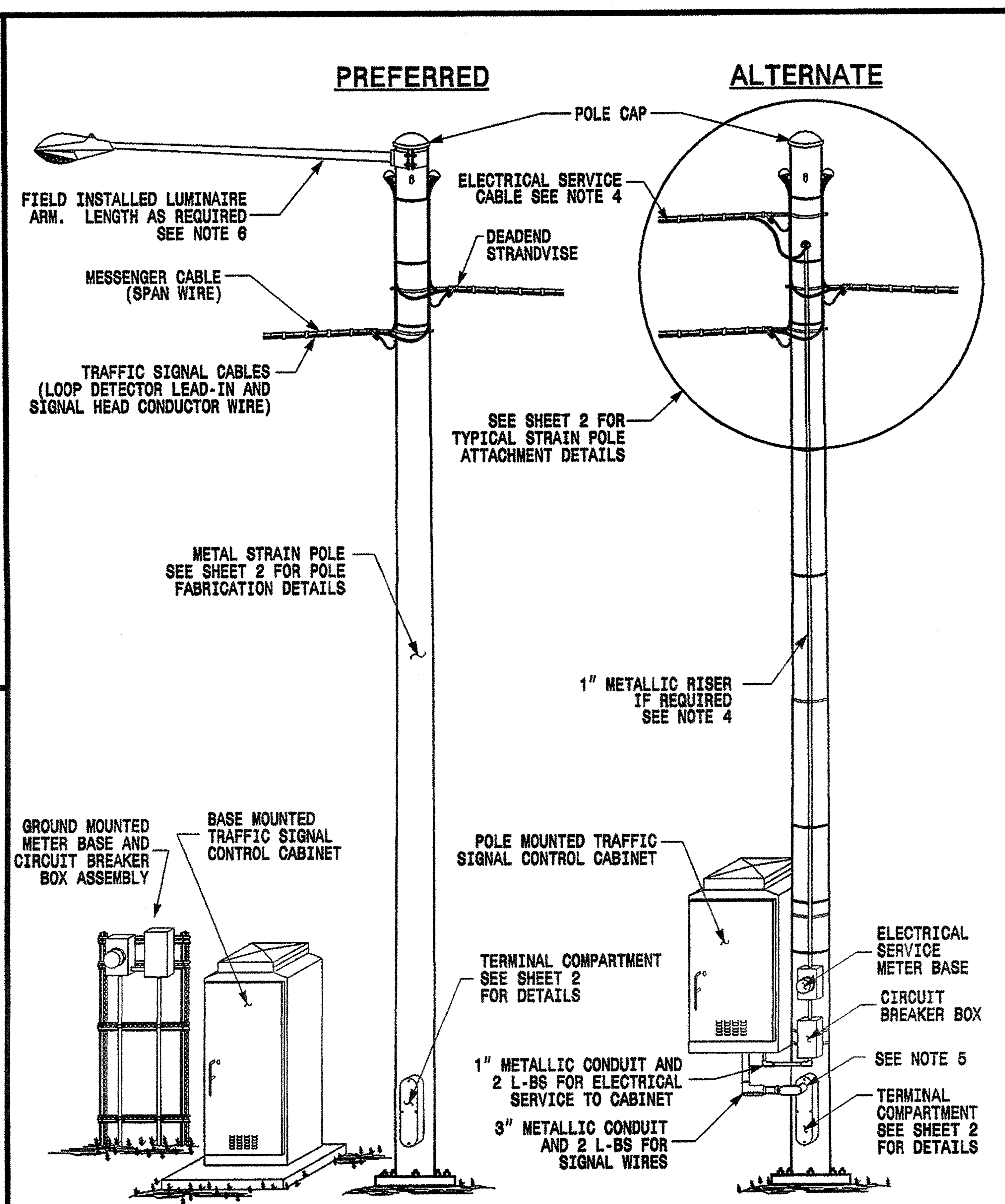
ENGLISH STANDARD DRAWING FOR
METAL POLES
ELECTRICAL SERVICE AND SIGNAL CABINET MOUNTING OPTIONS

SHEET 1 OF 3
1740.01



GROUND MOUNTED METER BASE OPTIONS WITH UNDERGROUND ELECTRICAL SERVICE

*MAXIMUM TOTAL HEIGHT TO METER BASE NOT TO EXCEED 5'



BASE MOUNTED TRAFFIC SIGNAL CABINET WITH GROUND MOUNTED METER BASE AND UNDERGROUND ELECTRICAL SERVICE

POLE MOUNTED TRAFFIC SIGNAL CABINET WITH POLE MOUNTED METER BASE AND OVERHEAD ELECTRICAL SERVICE

GENERAL NOTES

1. WHEN TRAFFIC SIGNALS ARE INSTALLED USING METAL SIGNAL SUPPORTS:
   - BASE MOUNTED CABINETS ARE THE PREFERRED CABINET OPTION.
   - ROUTE POWER SOURCE UNDERGROUND AND USE GROUND MOUNTING OPTIONS SHOWN ABOVE TO INSTALL METER BASE AND CIRCUIT BREAKER BOX IF POSSIBLE.
2. LOCATE THE METER BASE ASSEMBLY NEAR THE SIGNAL CABINET IN A MANNER THAT WILL ALLOW EASY ACCESS TO THE CIRCUIT BREAKER BOX.
3. INSTALL METER BASE ASSEMBLIES AS SHOWN ABOVE. ENSURE 1" METALLIC CONDUITS ARE PROPERLY SECURED BETWEEN THE METER BASE ASSEMBLIES AND THE GROUND TO MINIMIZE DAMAGE POTENTIAL. REFER TO ROADWAY STANDARD DRAWING 1751.02 FOR ELECTRICAL SERVICE DETAILS.
4. INSTALL ELECTRICAL SERVICE ENTRANCE CONDUCTOR AS SHOWN WHEN UNDERGROUND SOURCE IS NOT AN OPTION. METER BASE AND CIRCUIT BREAKER BOX MAY BE INSTALLED ON THE POLE WHEN POLE MOUNTED CABINETS ARE REQUIRED FOR THE INSTALLATION. SEE SHEET 2 FOR ADDITIONAL INSTALLATION DETAILS.
5. FOR POLE MOUNTED CABINETS, USE A FACTORY DRILLED HOLE IN THE TERMINAL COMPARTMENT TO PROVIDE ACCESS FOR SIGNAL WIRES ENTERING THE POLE FROM THE CABINET. FIELD DRILLED HOLES ARE ACCEPTABLE ONLY IF APPROVED BY THE ENGINEER.
6. SEE ROADWAY STANDARD DRAWING 1406.01 (LIGHT STANDARD LUMINAIRES) FOR LUMINAIRE INSTALLATIONS.

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

ENGLISH STANDARD DRAWING FOR METAL POLES ELECTRICAL SERVICE AND SIGNAL CABINET MOUNTING OPTIONS

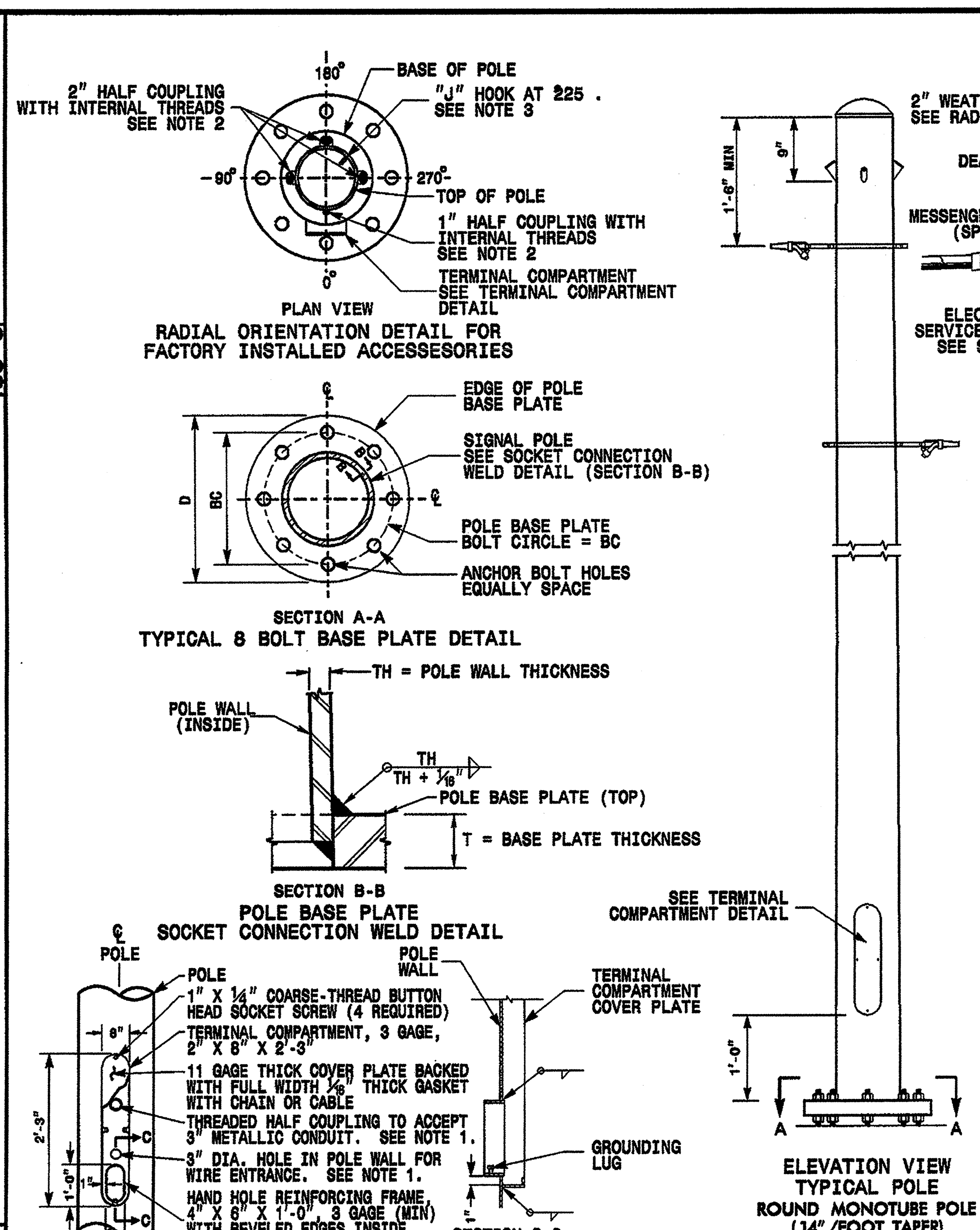
SHEET 1 OF 3
1740.01

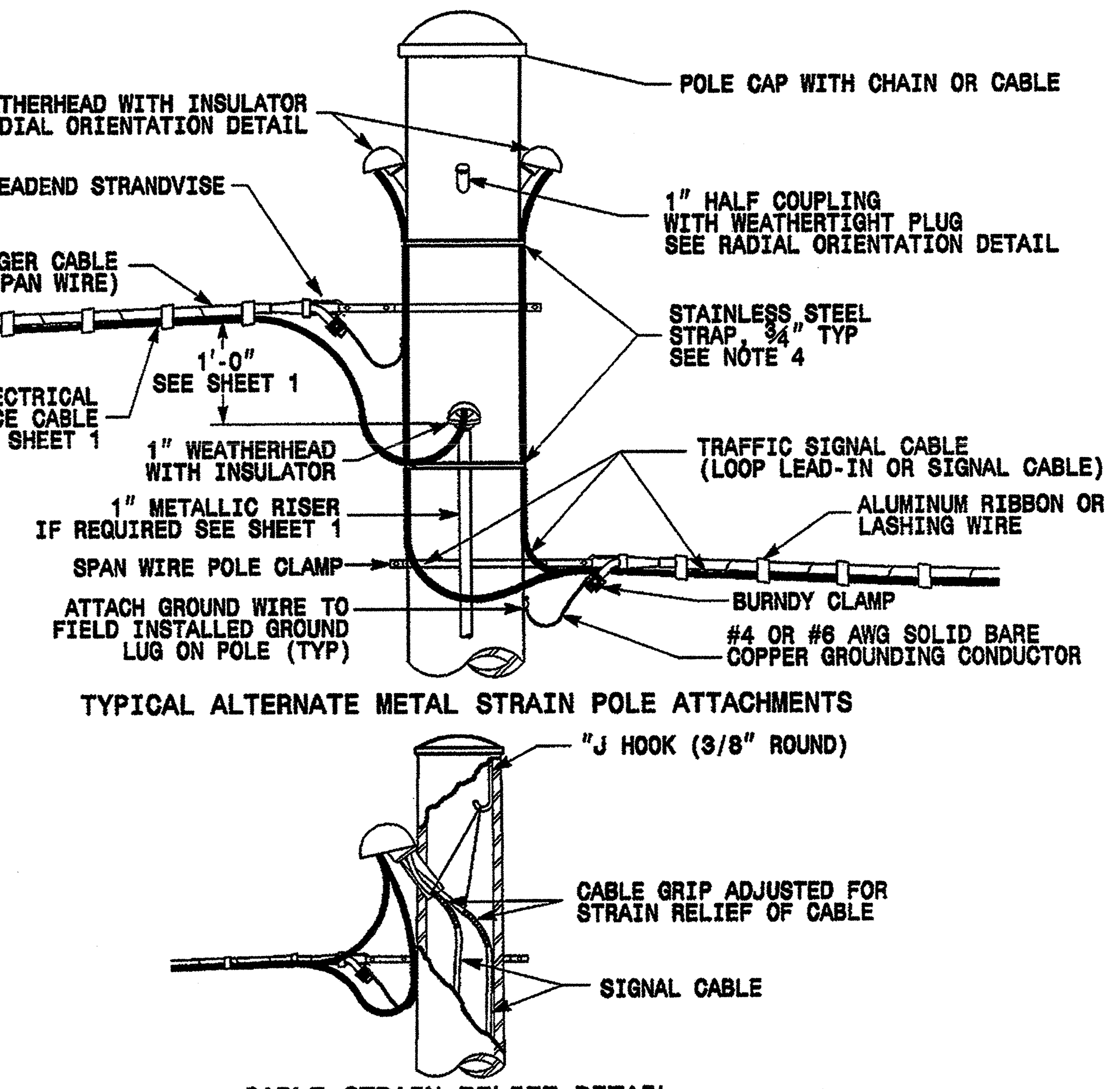
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

9-03

ENGLISH STANDARD DRAWING FOR
METAL POLES
FABRICATION AND ATTACHMENT DETAILS

SHEET 2 OF 3
1740.01





GENERAL NOTES

1. PROVIDE 2-3" FACTORY DRILLED HOLES THROUGH THE POLE WALL FOR WIRE ENTRANCE ACCESS INSIDE THE TERMINAL COMPARTMENT. LOCATE THE HOLES IN THE CENTER OF THE TERMINAL COMPARTMENT (0 DEGREES ON THE POLES RADIAL INDEX) AT 28" AND 36" FROM BASE OF THE POLE. WELD A THREADED HALF COUPLING IN THE TOP HOLE THAT CAN RECEIVE A 3" DIA. METALLIC CONDUIT.
2. FABRICATE THE METAL POLE WITH 3-2" THREADED HALF COUPLINGS AND 1-1" THREADED HALF COUPLING INSTALLED 9" FROM THE TOP OF THE POLE TO FACILITATE WEATHERHEAD INSTALLATION FOR SIGNAL WIRE ENTRANCE TO THE POLE. WELD THE COUPLINGS TO THE POLE AT AN ANGLE OF NO LESS THAN 45 DEGREES FROM HORIZONTAL TO PROPERLY INSTALL THE WEATHERHEADS. LOCATE THE HALF COUPLINGS ON THE POLE AS SHOWN IN THE RADIAL ORIENTATION DETAIL.
3. PROVIDE A FACTORY STANDARD "J" HOOK FOR CABLE SUPPORT WELDED INSIDE THE TOP OF THE POLE AT 225 DEGREES ON THE POLES RADIAL INDEX.
4. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WHEN THE DISTANCE BETWEEN THE SPANWIRE ATTACHMENT CLAMP ON THE POLE AND THE WEATHERHEADS EXCEEDS 36". USE 3/4" STAINLESS STEEL STRAPS TO SECURE WIRE TO THE POLE.
5. DO NOT INSTALL FIBER OPTIC COMMUNICATION CABLE IN OR ON ANY METAL POLES FOR THE PURPOSE OF TRANSITIONING THE RUNS FROM OVERHEAD TO UNDERGROUND. OVERHEAD ATTACHMENTS MAY BE ALLOWED USING A 3-BOLT CLAMP WITH "J" HOOK IF THE PURPOSE OF THE ATTACHMENT IS TO CONTINUE A RUN OVERHEAD. SEE SHEET 3.

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

9-03

ENGLISH STANDARD DRAWING FOR METAL POLES FABRICATION AND ATTACHMENT DETAILS

SHEET 2 OF 3
1740.01

Structural Engineer: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 JEBESH C. SARKAR — D. SarKar 9.23.03 (SIGNATURE, DATE)

Electrical Engineer: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16286 MILTON I. DEAN — Milton I Dean 9-24-03 (SIGNATURE, DATE)

Standard Drawings

Traffic Management and Signal Systems Unit
122 N. McDowell St., Raleigh, NC 27603

See Plate for Title

Original: 2002 Standards

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG.10

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

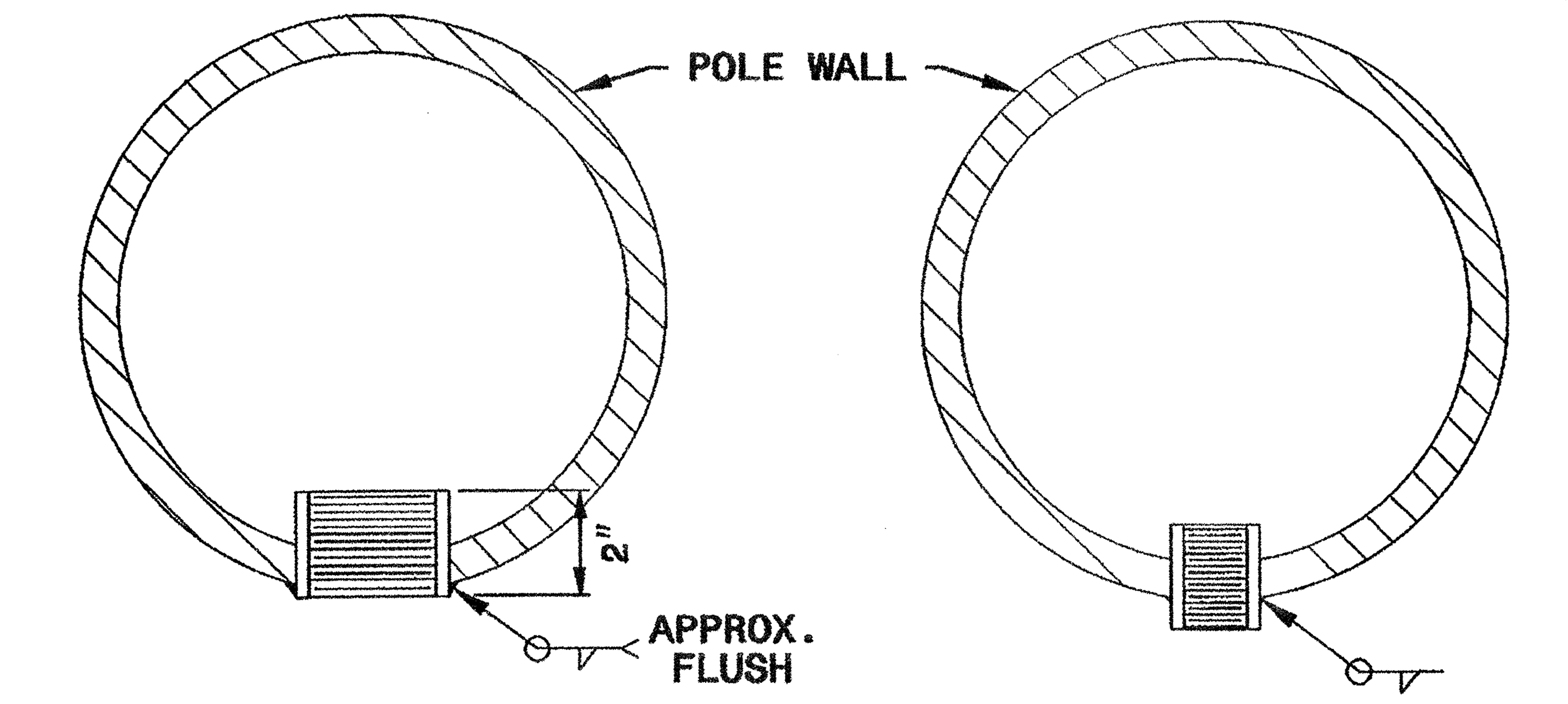
9-03

ENGLISH STANDARD DRAWING FOR
METAL POLES
MISCELLANEOUS DETAILS

MOUNTING POINT DETAIL

CABLE ENTRANCE IN TERMINAL COMPARTMENT

CABLE ENTRANCES AT TOP OF POLE



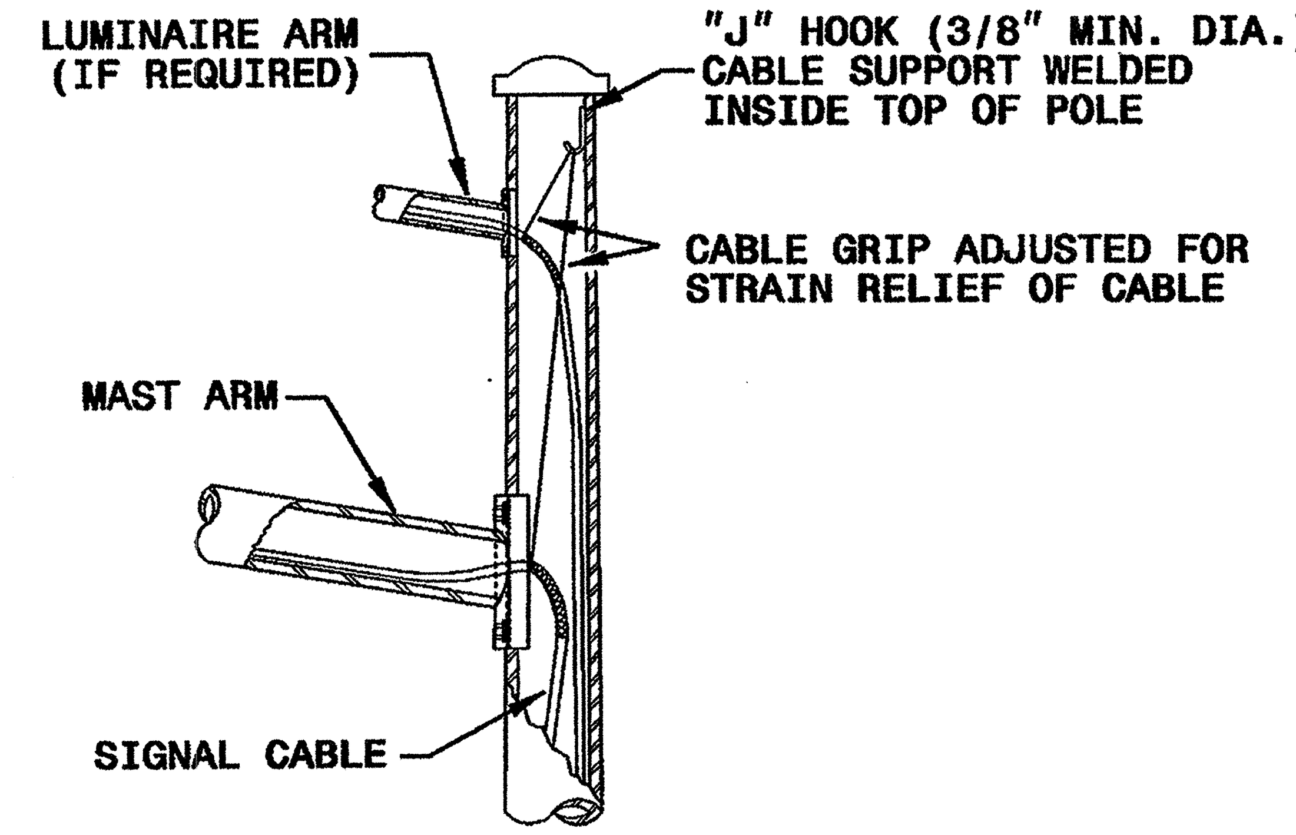
HALF COUPLING WITH INTERNAL 3" THREADS TO ACCEPT 3" METALLIC CONDUIT

HALF COUPLINGS WITH INTERNAL 1" & 2" THREADS TO ACCEPT 1" & 2" METALLIC CONDUITS

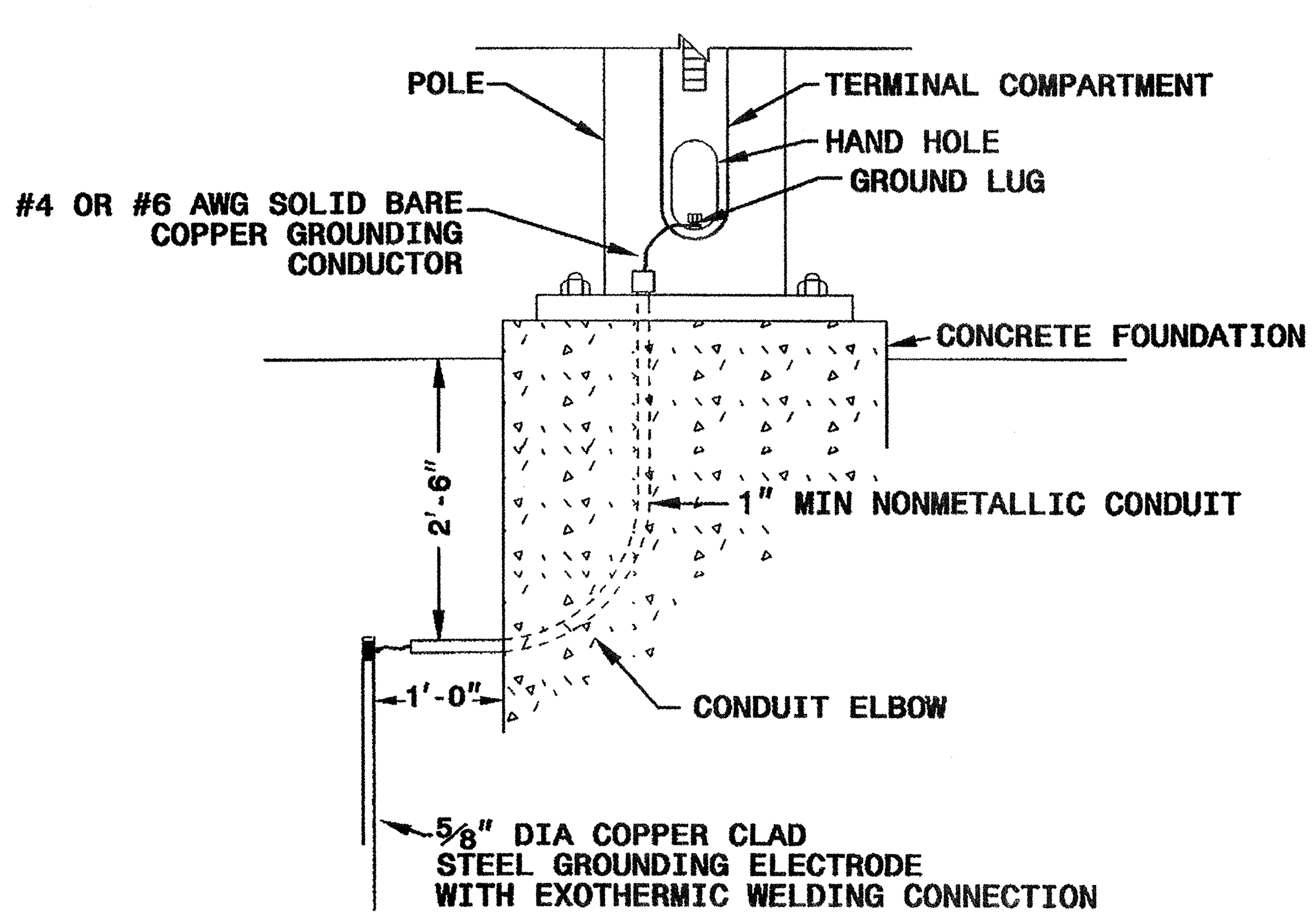
SEE GENERAL NOTE NO. 1 ON SHEET 2 OF THIS STANDARD DRAWING FOR FABRICATION DETAILS.

SEE GENERAL NOTE NO. 2 ON SHEET 2 OF THIS STANDARD DRAWING FOR FABRICATION DETAILS.

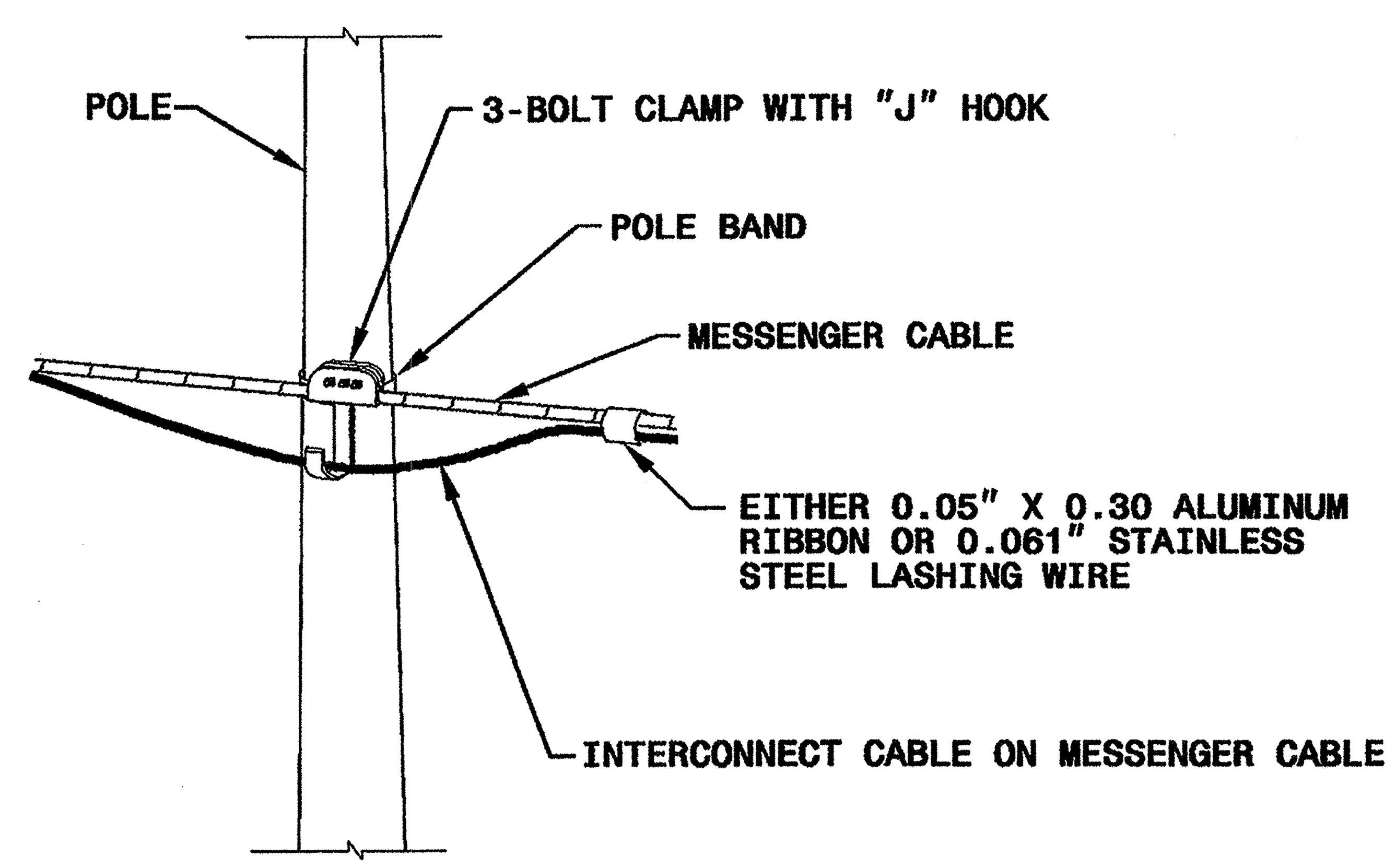
CABLE STRAIN RELIEF



METAL POLE GROUNDING DETAIL



ATTACHMENT OF CABLE TO INTERMEDIATE METAL POLE



SHEET 3 OF 3
1740.01

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

9-03

ENGLISH STANDARD DRAWING FOR
METAL POLES
MISCELLANEOUS DETAILS

SHEET 3 OF 3
1740.01

Structural Engineer	Electrical Engineer
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR	NORTH CAROLINA PROFESSIONAL SEAL 16286 ENGINEER MILTON I. DEAN
D. Sarkar 9.19.2003 (SIGNATURE, DATE)	Milton I. Dean 9/22/03 (SIGNATURE, DATE)

Standard Drawings
Traffic Management and Signal Systems Unit
122 N. McDowell St., Raleigh, NC 27603

See Plate for Title

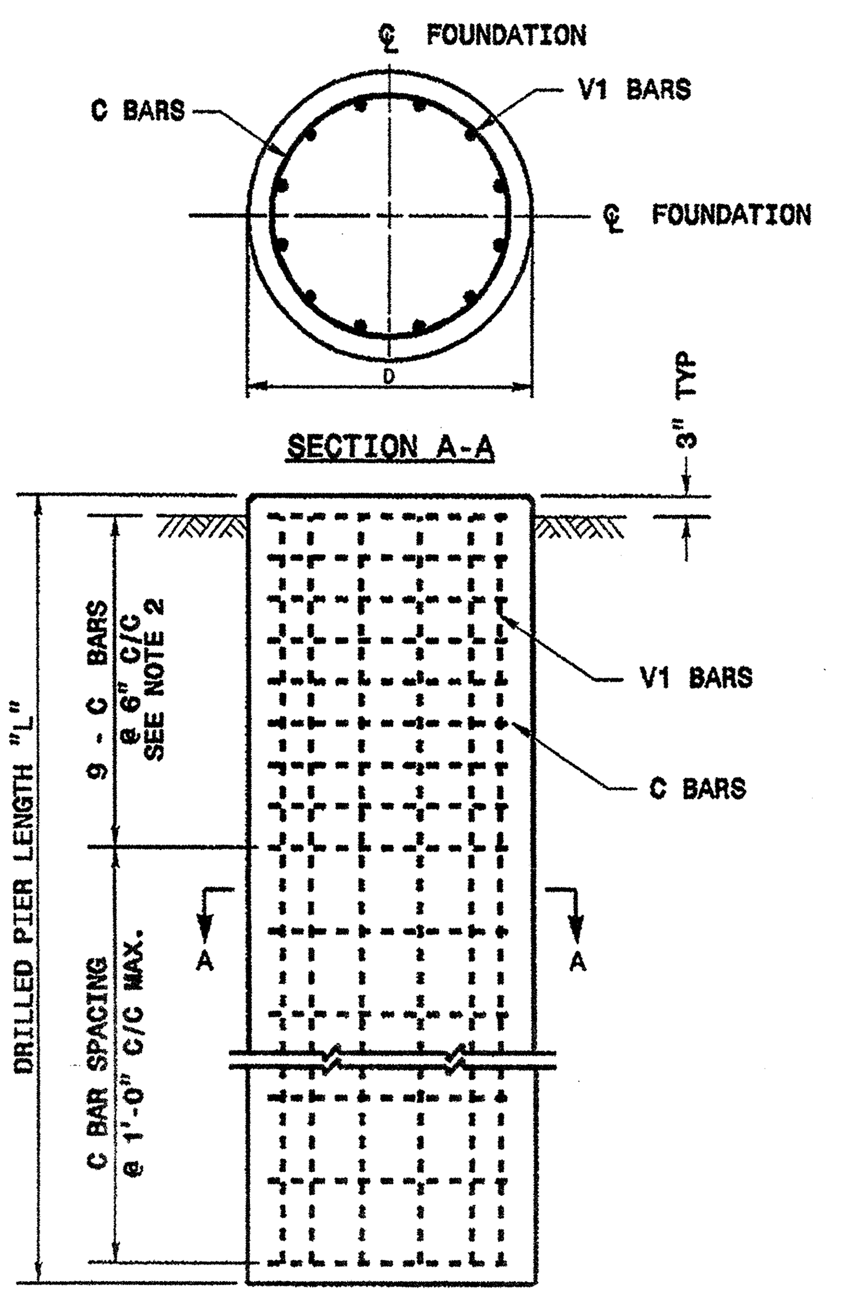
Original: 2002 Standards

20-AUG-2004 12:08
W:#Peoples-Unit#Workgroups#2003 METAL POLE STANDARDS#plate sheets#174201 plan sheet.dgn
palexander

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

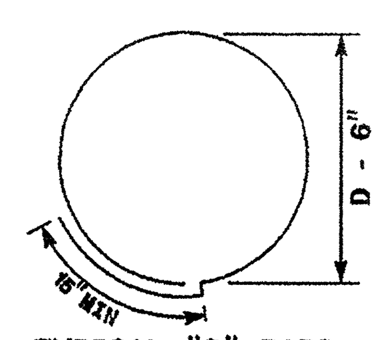
ENGLISH STANDARD DRAWING FOR
METAL POLE FOUNDATIONS
REINFORCING CAGE DETAILS

SHEET 1 OF 2
1742.01

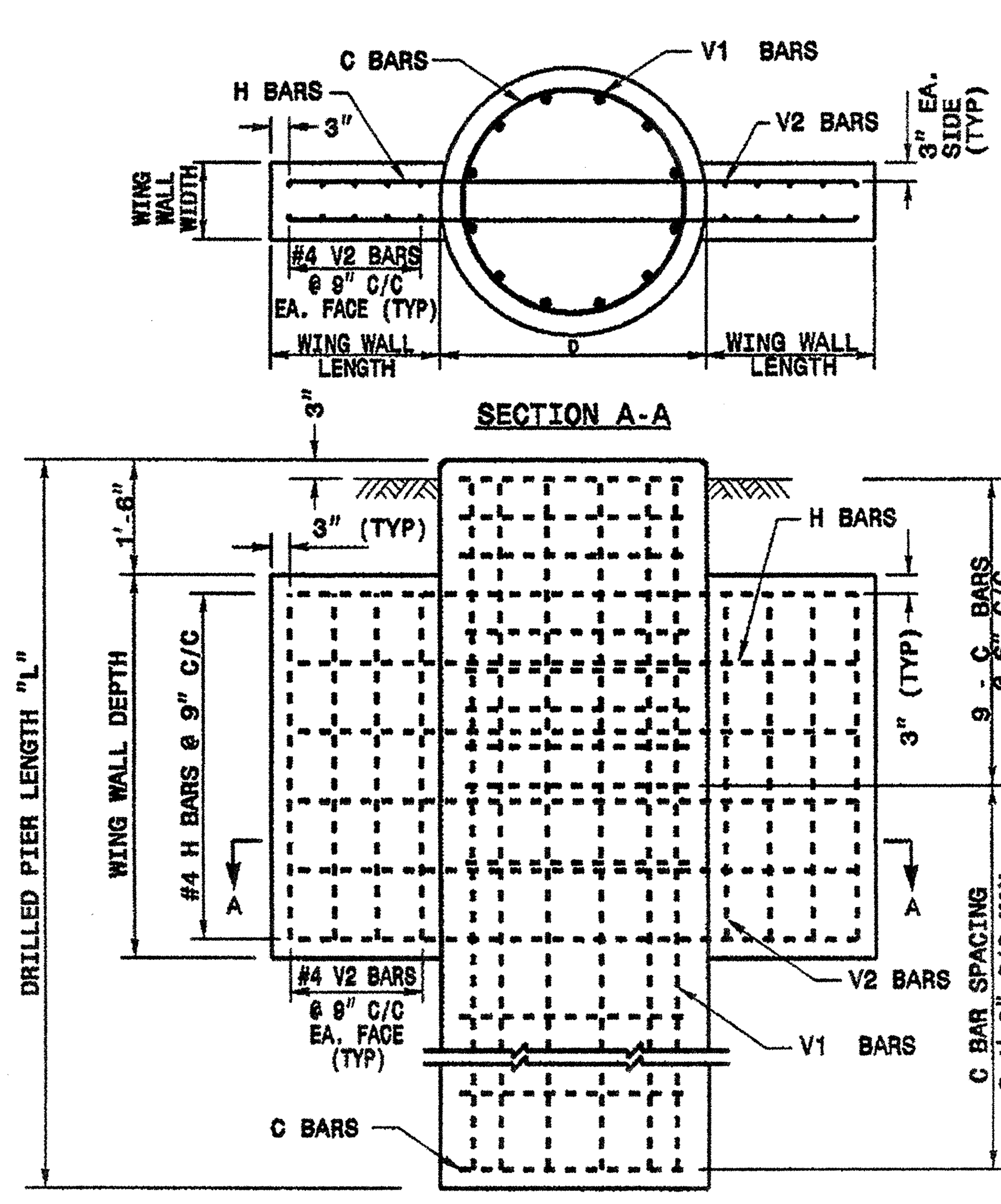


REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)						
SHAFT DIA. (in.)	VOLUME OF CONC. (cu. yds.)	BAR NAME	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Construction Note No. 1.
** See Construction Note No. 2.



TYPICAL "C" BARS



REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS						
Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

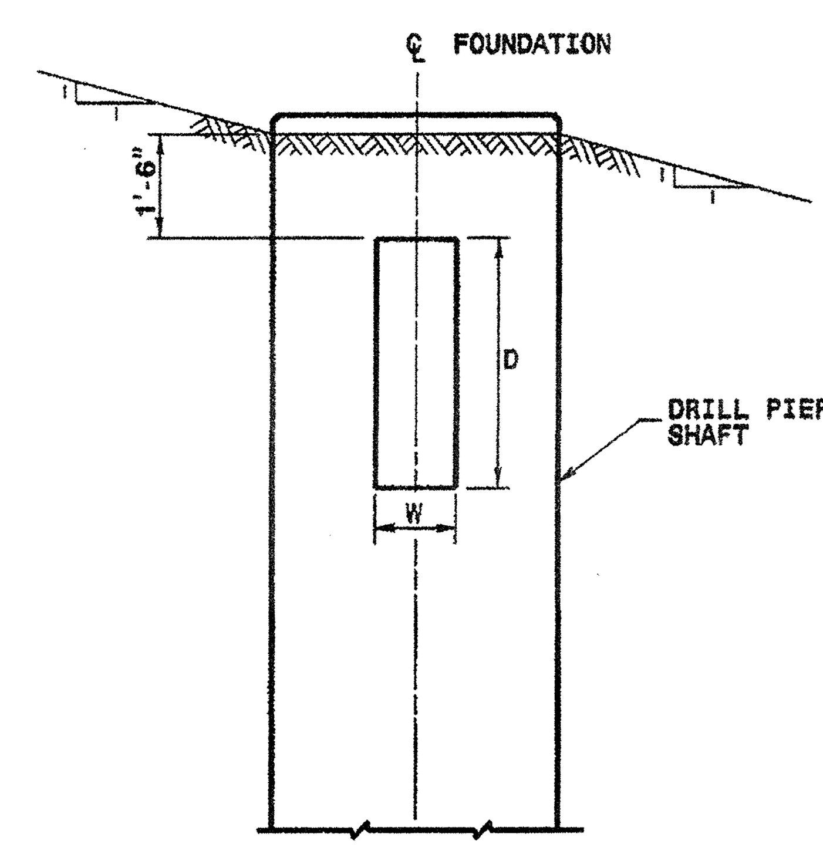
* See Construction Note No. 1.
** See Construction Note No. 2.

WING WALL DETAILS				
Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

See Construction Note No. 3.

NOTES

1. THE NUMBER OF C-BARS IS BASED ON FOUNDATION DEPTH. SEE FOUNDATION SELECTION TABLES.
2. CIRCULAR TIE REINFORCING RINGS MAY BE VERTICALLY ADJUSTED BY +/- 3" AT A DEPTH BETWEEN 2'-0" AND 3'-0" TO FACILITATE THE INSTALLATION OF ELECTRICAL CONDUIT ENTERING IN THE CAGE.
3. THE LENGTH OF V1-BARS IS BASED ON FOUNDATION DEPTH. SEE FOUNDATION SELECTION TABLES.
4. THE QUANTITIES FOR STEEL AND CONCRETE SHOWN IN THE WING WALL DETAILS CHART REFLECT THE AMOUNT OF MATERIAL FOR 1 PAIR OF WING WALLS (2 WING WALLS PER DRILL PIER SHAFT.)
5. CONCRETE DRILL PIER SHAFT VOLUME (CU. YDS.):
   FOR 42" DIA.= .356xL
   FOR 48" DIA.= .465xL
6. DEFORM REINFORCING STEEL TO CONFORM TO ASTM A615 GRADE 60. TIES MAY BE DEFORMED OR PLAIN.
7. CAST CONCRETE AGAINST UNDISTURBED SOIL.
8. DO NOT ERECT TRAFFIC SIGNAL STRUCTURES BEFORE THE CONCRETE IN THE FOUNDATION HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
9. MAKE PROVISIONS FOR DRAINAGE OF WATER FROM INSIDE OF THE METAL SUPPORT.
10. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION SEE PROJECT SPECIAL PROVISIONS.
11. IN CASE OF ANY CROSS SLOPES, GRADE AROUND THE FOUNDATION AS FOLLOWS:



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

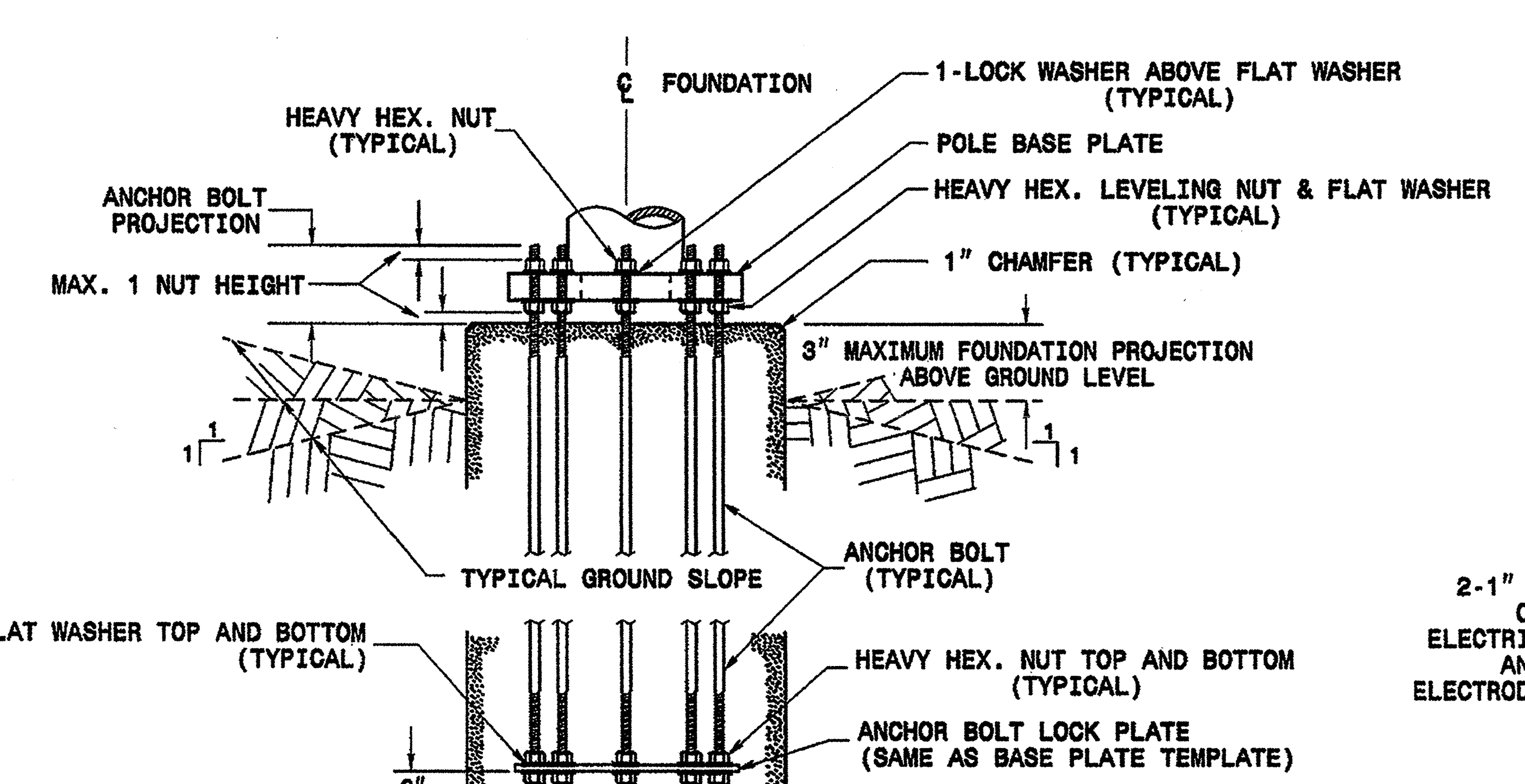
ENGLISH STANDARD DRAWING FOR
METAL POLE FOUNDATIONS
REINFORCING CAGE DETAILS

SHEET 1 OF 2
1742.01

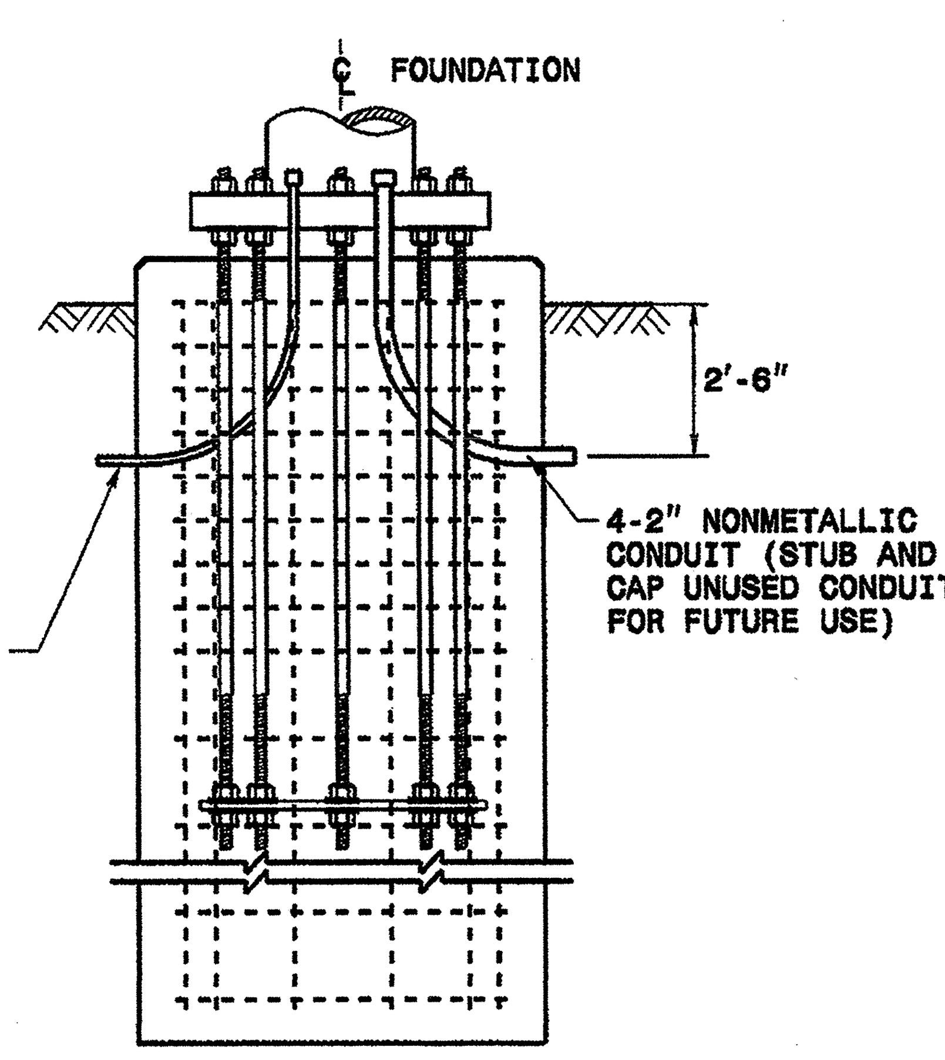
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
METAL POLE FOUNDATIONS
INSTALLATION DETAILS

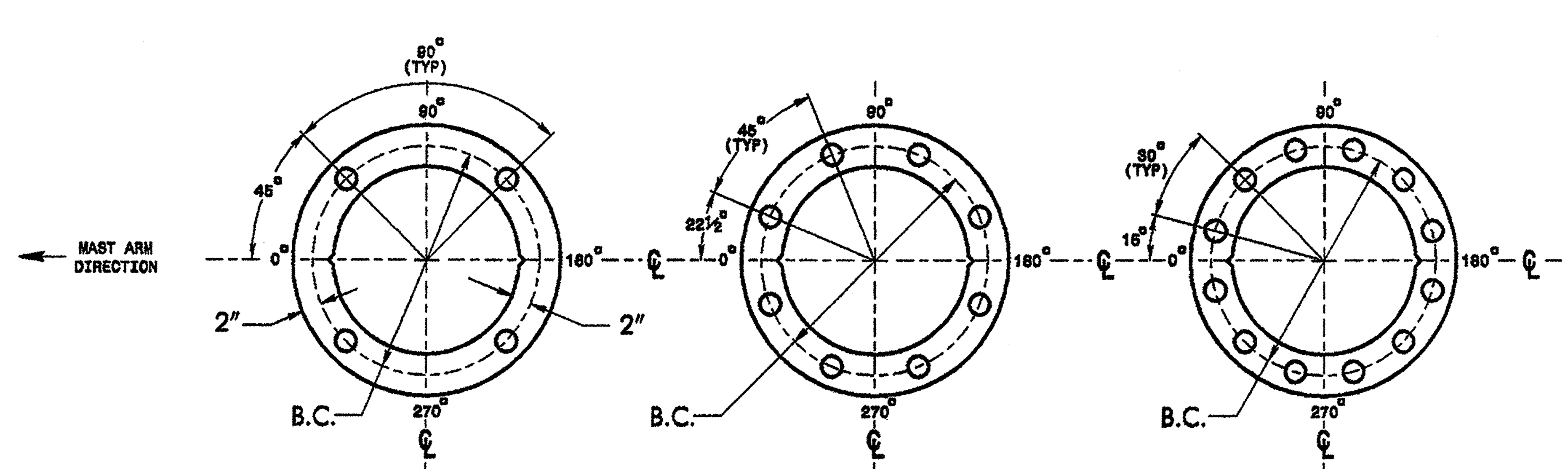
SHEET 2 OF 2
1742.01



TYPICAL FOUNDATION
ANCHOR BOLT DETAILS
REINFORCING CAGE NOT SHOWN FOR CLARITY



TYPICAL FOUNDATION
CONDUIT DETAILS



CONSTRUCT TEMPLATES AND PLATES FROM ¼" THICK STEEL. GALVANIZING IS NOT REQUIRED.

BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS

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

ENGLISH STANDARD DRAWING FOR
METAL POLE FOUNDATIONS
INSTALLATION DETAILS

SHEET 2 OF 2
1742.01

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG.11

Structural Engineer — NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR — SIGNATURE D. Sarkar — DATE 8/20/04

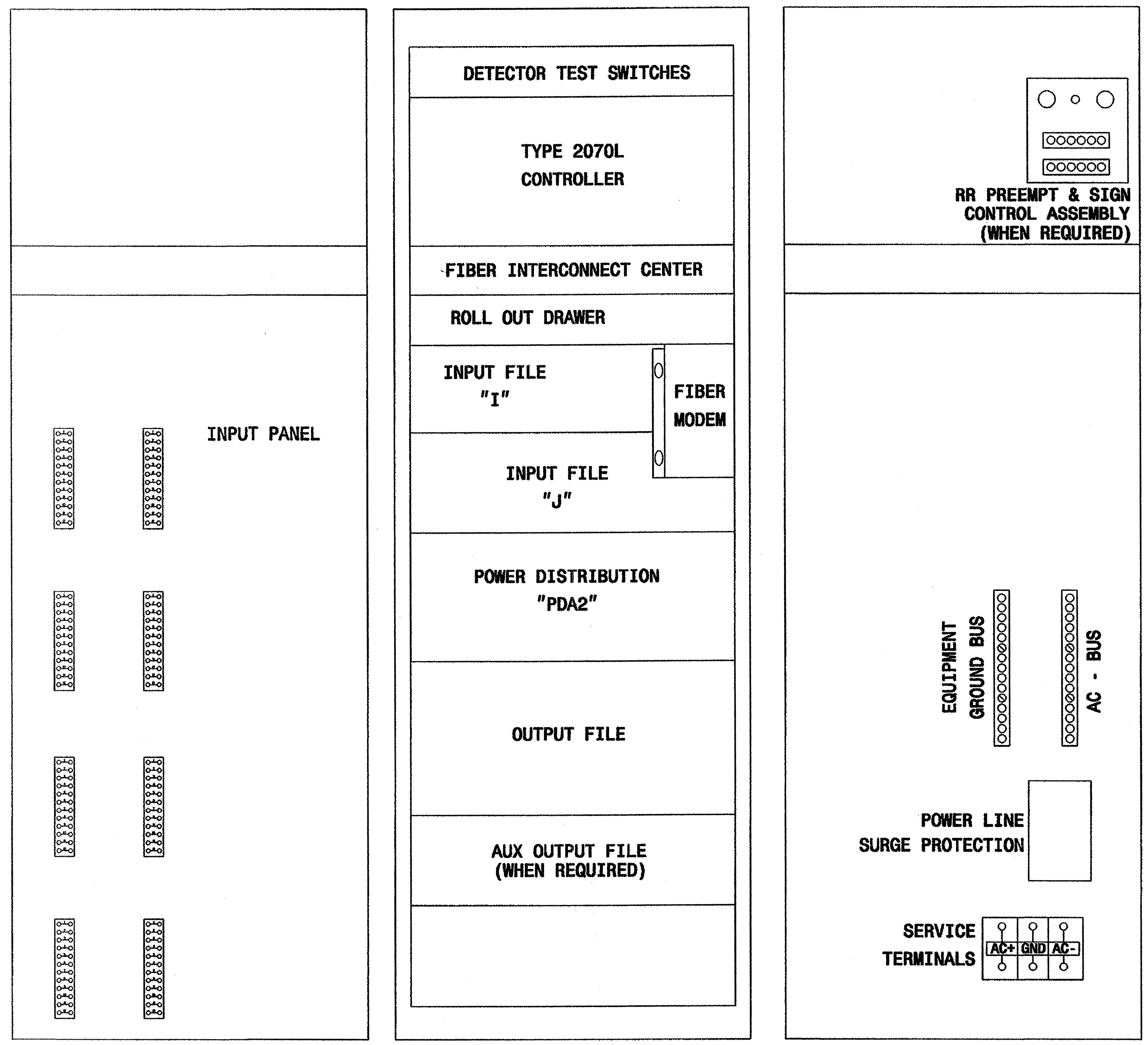
Electrical Engineer — NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER — SIGNATURE Gregory A. Fuller — DATE 8/25/04

Standard Drawings
Traffic Management and Signal Systems Unit
122 N. McDowell St., Raleigh, NC 27603

See Plate for Title

Original: 2002 Standards

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG. 12



332A CABINET
LEFT SIDE

332A CABINET

332A CABINET
RIGHT SIDE

REAR VIEW

NOTE

-PROVIDE A 2 " SPACE BETWEEN THE CONTROLLER AND THE ROLL OUT DRAWER TO ACCOMMODATE A FIBER INTERCONNECT CENTER.

Typical Drawing

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
State of North Carolina Department of Transportation
Signals and Geometrics Section

122 N. McDowell St., Raleigh, NC 27603

Cabinet Component Layout
170 Cabinet Model 332A
with 2070L Controller

PLAN DATE:	October 2002	REVIEWED BY:	
PREPARED BY:	P L Alexander	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
16286
ENGINEER
MILTON I. DEAN

Milton I. Dean 11/13/02
SIGNATURE DATE

SIG. INVENTORY NO. NA

13-NOV-2002 10:48
U:\cadd\170 cabinet.dgn
palexander

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG. 13

I-4411

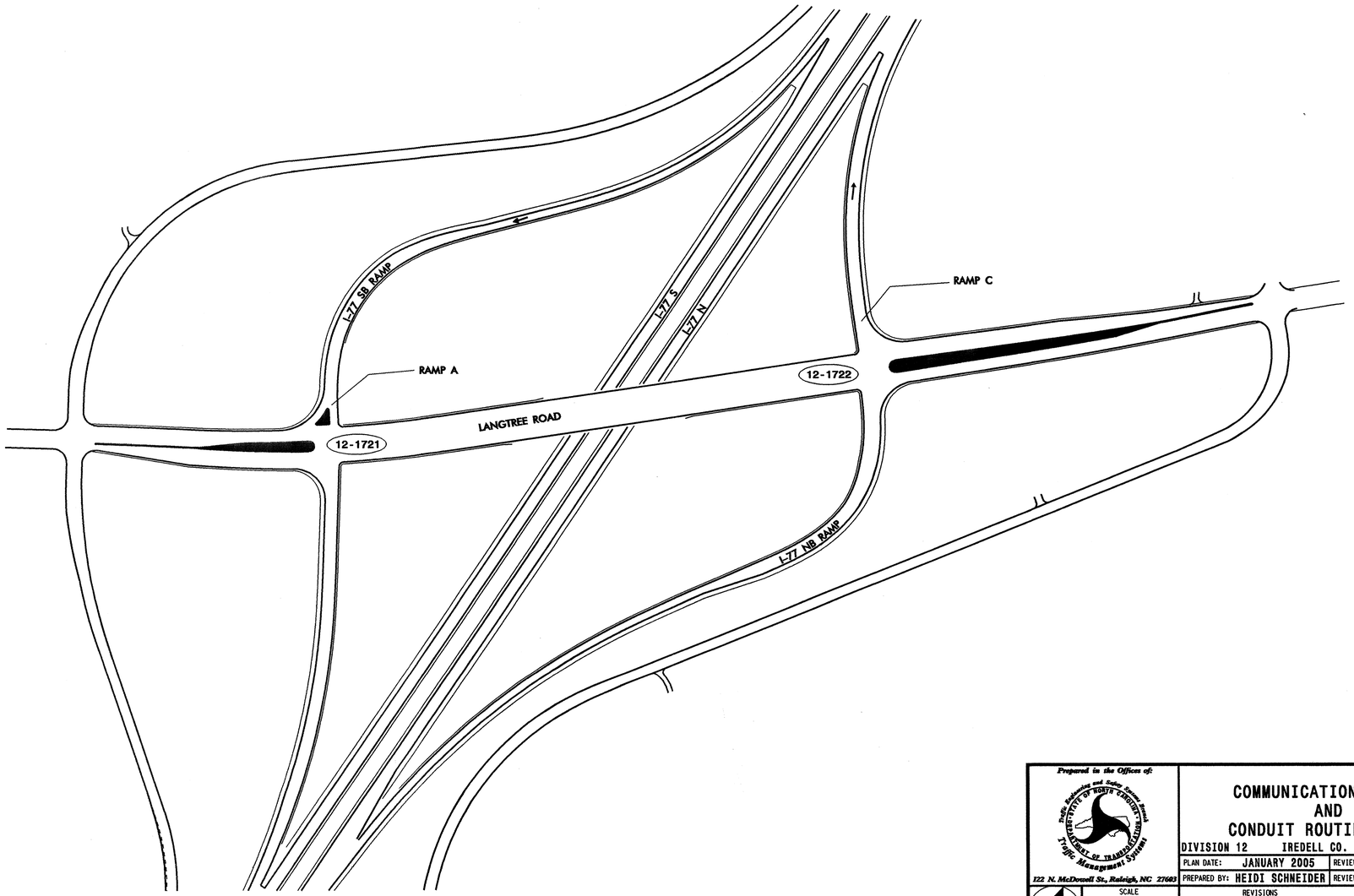
PROJECT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: SR 1102 (LANGTREE ROAD) @ I-77 NORTH BOUND AND SOUTH BOUND RAMPS IN MOORESVILLE

TYPE OF WORK: COMMUNICATIONS CABLE AND CONDUIT ROUTING



Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 12 | IREDELL CO. | MOORESVILLE

PLAN DATE: JANUARY 2005 | REVIEWED BY: NEIL AVERY

PREPARED BY: HEIDI SCHNEIDER | REVIEWED BY: G.G.MURR,JR.,PE

SCALE: 0 — NONE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

SIGNATURE 1-27-05 DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
I-4411	S16.14

1 INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2 INSTALL REA, PE – 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3 INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4 INSTALL SMFO CABLE
5 INSTALL MMFO CABLE
6 INSTALL FIBER OPTIC DROP CABLE
7 INSTALL TRACER WIRE
8 TRENCH
9 INSTALL PVC CONDUIT
10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
14 INSTALL POLYETHYLENE CONDUIT
15 DIRECTIONAL DRILL CONDUIT
16 BORE AND JACK CONDUIT
17 INSTALL CABLE(S) IN EXISTING CONDUIT
18 INSTALL CABLE(S) IN NEW CONDUIT
19 INSTALL CABLE(S) IN EXISTING RISER
20 INSTALL CABLE(S) IN NEW RISER
21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29 INSTALL UNDERGROUND SPLICE ENCLOSURE
30 INSTALL AERIAL SPLICE ENCLOSURE
31 INSTALL POLE MOUNTED SPLICE CABINET
32 INSTALL BASE MOUNTED SPLICE CABINET
33 REMOVE EXISTING SPLICE CABINET

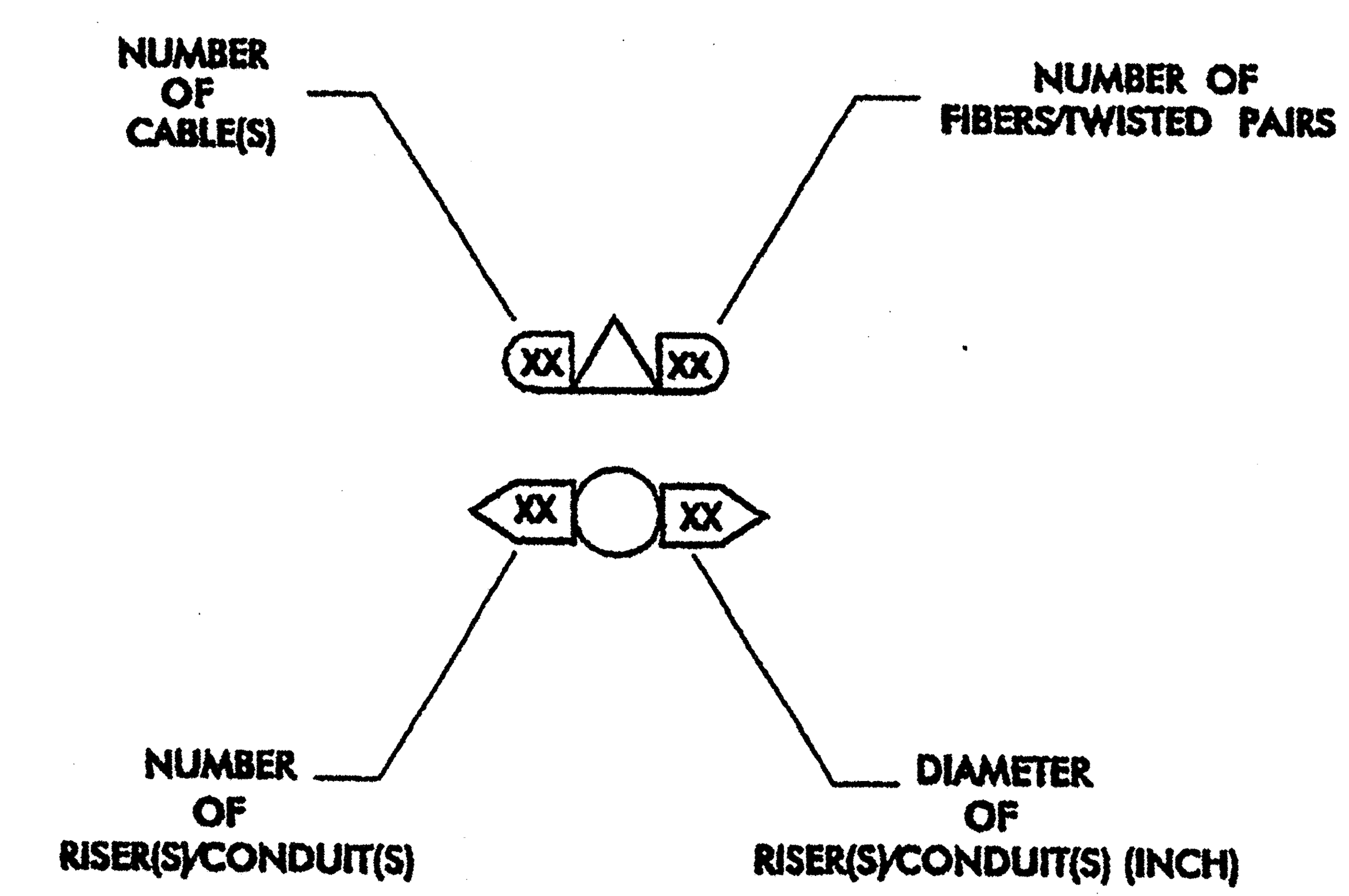
34 INSTALL CABINET FOUNDATION
35 REMOVE EXISTING CABINET FOUNDATION
36 INSTALL CCTV CAMERA ASSEMBLY
37 INSTALL CCTV CAMERA WOOD POLE
38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39 INSTALL JUNCTION BOX
40 INSTALL OVERSIZED JUNCTION BOX
41 REMOVE EXISTING JUNCTION BOX
42 INSTALL WOOD POLE
43 REMOVE EXISTING WOOD POLE
44 INSTALL AERIAL GUY ASSEMBLY
45 INSTALL STANDARD GUY ASSEMBLY
46 INSTALL SIDEWALK GUY ASSEMBLY
47 INSTALL MESSENGER CABLE
48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
49 REMOVE EXISTING MESSENGER CABLE
50 INSTALL TELEPHONE SERVICE
51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52 INSTALL DELINEATOR MARKER
53 STORE 20 FEET OF COMMUNICATIONS CABLE
54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
56 LASH CABLE(S) TO NEW MESSENGER CABLE
57 MODIFY EXISTING ELECTRICAL SERVICE
58 INSTALL NEW ELECTRICAL SERVICE

LEGEND

FO	NEW FIBER OPTIC COMMUNICATIONS CABLE
TWIST PR	NEW TWISTED PAIR COMMUNICATIONS CABLE
EXI	EXISTING COMMUNICATIONS CABLE
REM	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
DD	NEW DIRECTIONAL DRILLED CONDUIT
B&J	NEW BORED AND JACKED CONDUIT
	NEW JUNCTION BOX
	EXISTING JUNCTION BOX
	NEW WOOD POLE
	EXISTING WOOD POLE
S	AERIAL SPLICE ENCLOSURE
	NEW METAL POLE
	EXISTING METAL POLE
	NEW CCTV ASSEMBLY
	NEW STANDARD GUY ASSEMBLY
	NEW SIDEWALK GUY ASSEMBLY
	NEW CABLE STORAGE RACKS (SNOW SHOES)
X	EXISTING CONTROLLER AND CABINET
S	EXISTING SPLICE CABINET
S	NEW SPLICE CABINET
SP	SIGNAL POLE
XX-XXXX	SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

XX	INDICATES NUMBER OF CABLES, LOOPS, ETC.
XX	INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
XX	INDICATES NUMBER OF RISER(S)/CONDUIT(S)
XX	INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

CONSTRUCTION NOTES

PLAN DATE:	REVIEWED BY:
PREPARED BY:	REVIEWED BY: G. A. FULLER

REVISIONS	INIT.	DATE

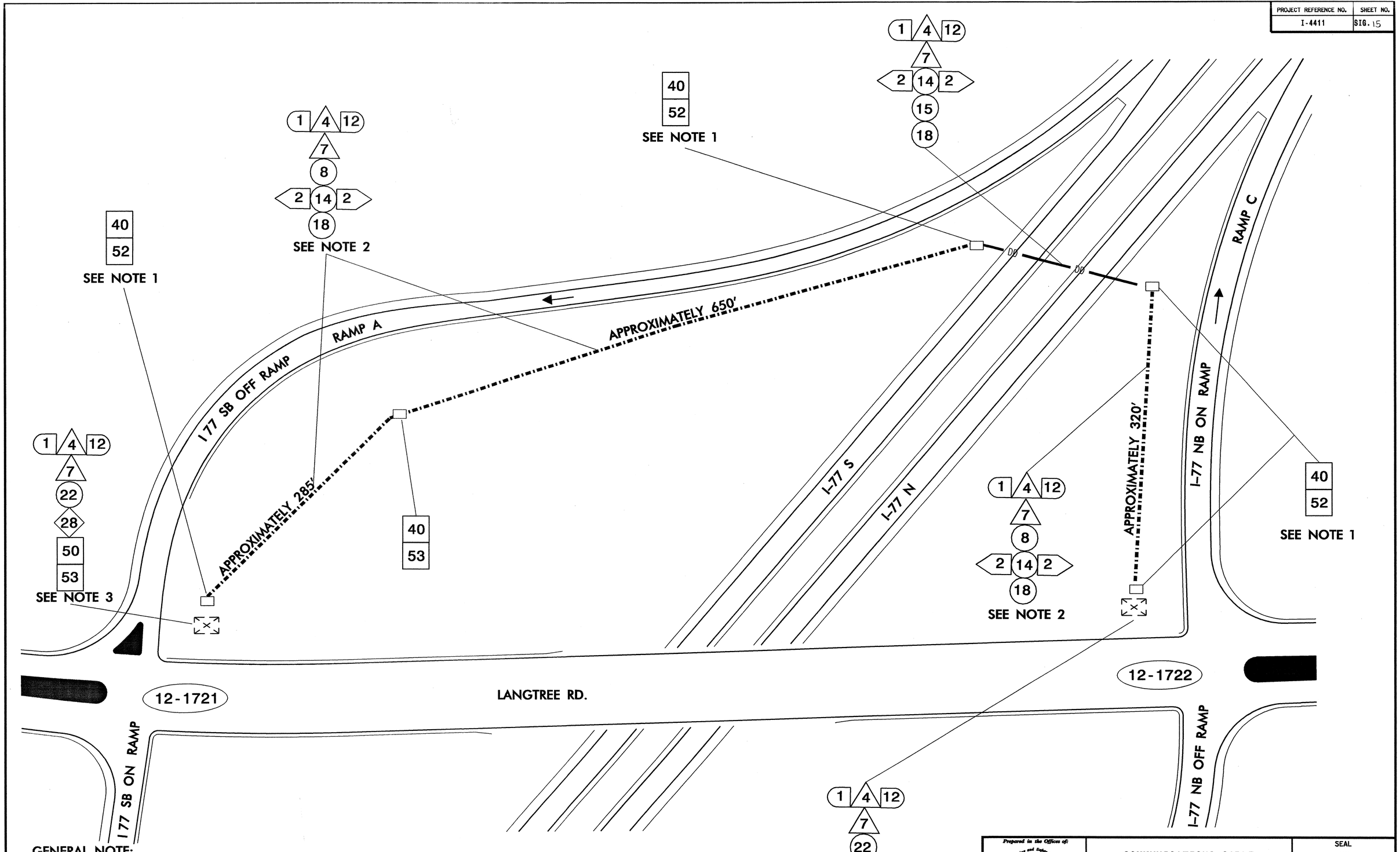
SCALE 0

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 10/31/02
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG. 15



GENERAL NOTE:

SEAL ALL CONDUIT ENDS WITH MECHANICAL SEALING DEVICES AT ALL JUNCTION BOX AND SIGNAL CABINET ENTRANCES. INSTALL A PULL ROPE IN ALL SPARE CONDUITS.

NOTE 1: STORE 60 FEET OF COMMUNICATIONS CABLE.

NOTE 2: UPON APPROVAL BY THE ENGINEER, PLOWING MAY BE USED IN LIEU OF TRENCHING.

NOTE 3: BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

NOTE 4: DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS.

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
1722 N. McDowell St., Raleigh, NC 27603

SCALE: N, 0, NONE

COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS

DIVISION 12 IREDELL CO. MOORESVILLE

PLAN DATE: JANUARY 2005 | REVIEWED BY: NEIL AVERY

PREPARED BY: HEIDI SCHNEIDER | REVIEWED BY: G.G.MURR, JR., PE

REVISIONS	INIT.	DATE

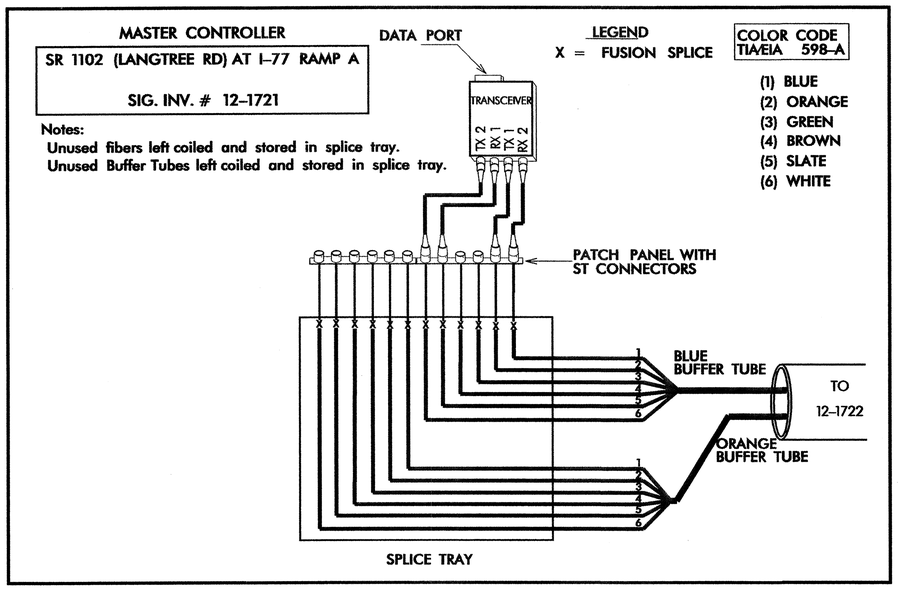
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

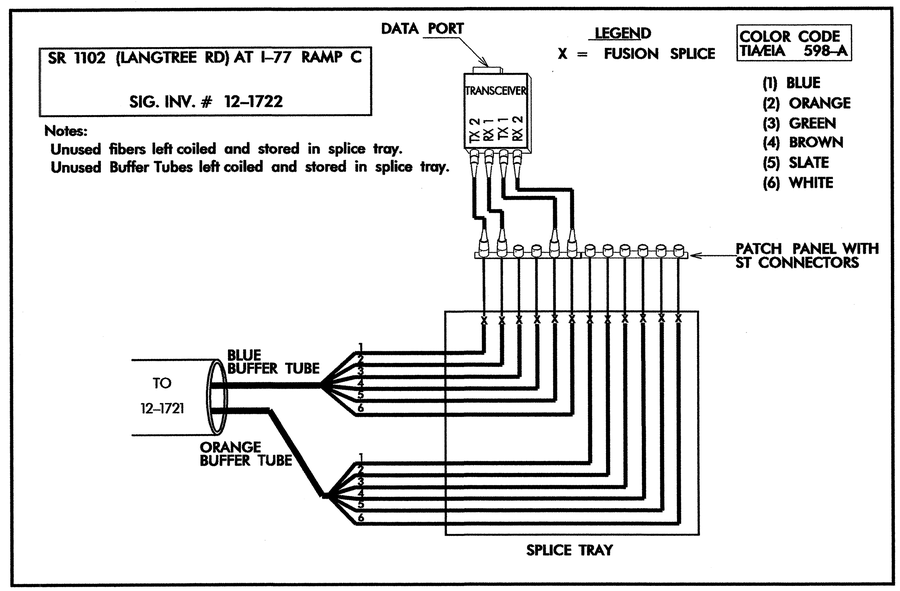
SIGNATURE 1-27-05 DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
I-4411	SIG. 16

FIBER OPTIC CABLE





TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NC DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE 0

SPLICE PLAN

DIVISION 12 IREDELL CO. MOORESVILLE
PLAN DATE: JANUARY 2005 REVIEWED BY: HTS/INA
PREPARED BY: S.C. WARDLE REVIEWED BY: G.G.MURR,JR.,PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
SIGNATURE 1-27-05 DATE

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