

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" ROADWAY DESIGN UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JULY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1700.01	ELECTRICAL SERVICE OPTIONS
1715.01	UNDERGROUND CONDUIT
1716.01	JUNCTION BOXES
1725.01	INDUCTIVE DETECTIVE LOOPS
1740.01	METAL POLES
1742.01	METAL POLE FOUNDATIONS
1751.01	CONTROLLERS AND CABINETS - ELECTRICAL SERVICE GROUNDING
1751.02	CONTROLLERS AND CABINETS - ELECTRICAL SERVICE DETAILS
1752.01	CONTROLLERS AND CABINETS - POWER, GROUND AND AUXILIARY POWER SYSTEMS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

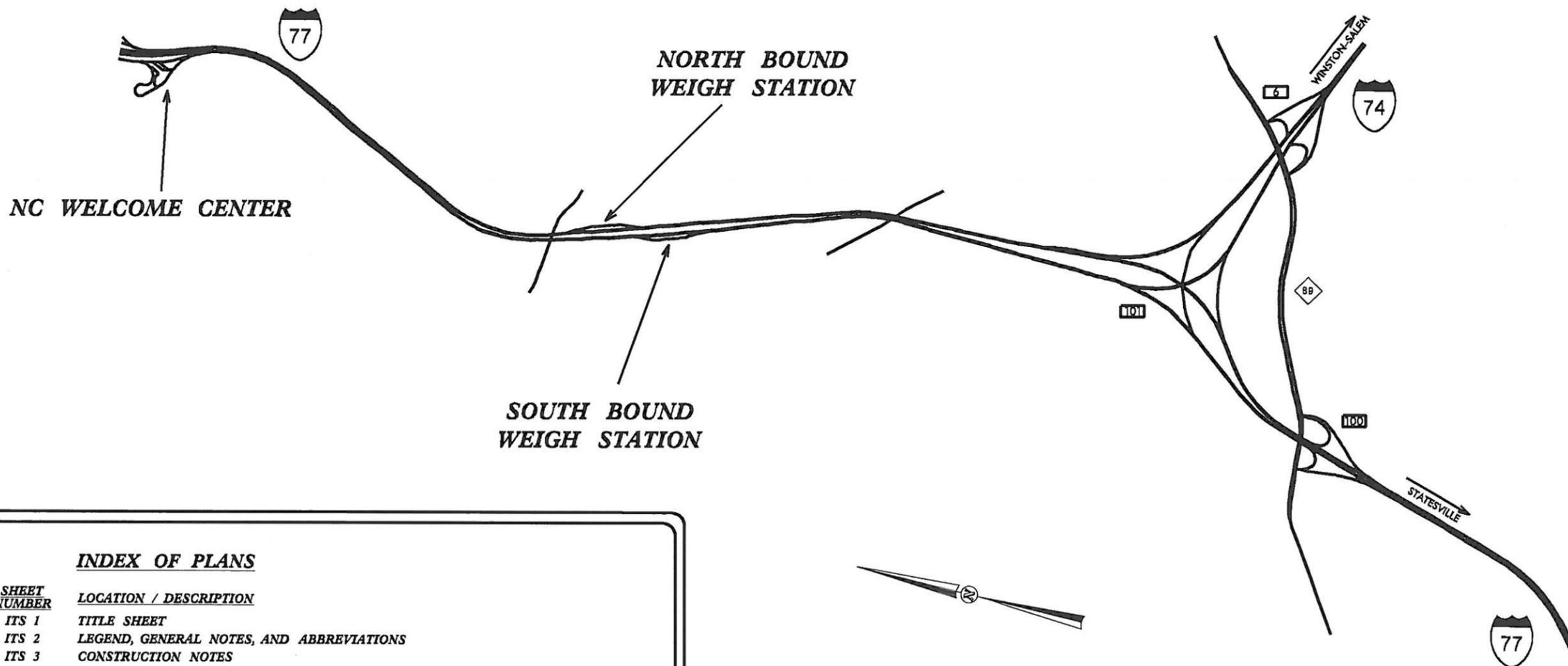
SURRY COUNTY

PLANS FOR PROPOSED
I-77 WEIGH STATION UPGRADE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	33879.2.62	ITS-1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION

THIS PROJECT CONSISTS OF FURNISHING AND INSTALLING EQUIPMENT AND MATERIALS FOR THE INSTALLATION OF A WEIGH IN MOTION SYSTEM, AUTOMATED LICENSE PLATE READER, IMAGE CAPTURE CAMERA, AND LANE CONTROL NEAR MT. AIRY, NORTH CAROLINA. RELATED MATERIALS CONSIST OF LOCAL CABINETS AND CONTROLLERS, WEIGH IN MOTION SENSORS, ALPR CAMERAS, SOFTWARE, INFRARED ILLUMINATORS, DATABASE INTERFACE, METAL POLES, METAL POLES WITH MAST ARMS, METAL POLE FOUNDATION, IMAGE CAPTURE CAMERA ASSEMBLY AND LANE CONTROL SIGNS.

WBS: 33879.2.62



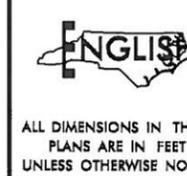
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2012 STANDARD SPECIFICATIONS

NCDOT CONTACTS:
TRANSPORTATION MOBILITY AND SAFETY

G.A. FULLER, P.E.
STATE ITS & SIGNALS ENGINEER



SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
023919
ENGINEER
GREGORY A. FULLER
5-23-13

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

LEGEND		
PROPOSED		EXISTING
-----	TRENCHED CONDUIT	-----
N/A	ELECTRICAL SERVICE	▲
○	CAMERA POLE	N/A
□	JUNCTION BOX	■
□	STANDARD INDUCTIVE LOOP DETECTOR	N/A
▭	CAMERA ASSEMBLY	N/A
⊠	EQUIPMENT CABINET	N/A
▬	PIEZOELECTRIC QUARTZ SENSOR	N/A
×	DRILL THROUGH SHOULDER FOR CONDUIT	N/A
-----	GUARDRAIL	-----
⤵	METAL POLE WITH MAST ARM	⤵

GENERAL NOTES

- OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION FOR ITEMS TO BE INSTALLED AS PART OF THIS PROJECT.
- BURIED UTILITIES AND STRUCTURES: PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS MAY EXIST ADJACENT TO AND WITHIN THE ROADWAY RIGHT-OF-WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES.
- IT IS THE CONTACTOR'S RESPONSIBILITY TO COORDINATE WITH THE OWNER OF ALL AFFECTED UTILITIES FOR WORK THAT MAY IMPACT ANY UTILITY FACILITY.
- ALL WORK SHOWN ON THESE PLANS IS TO BE PERFORMED BY THE CONTRACTOR UNLESS IT IS SPECIFICALLY NOTED THAT THE WORK WILL BE PERFORMED BY OTHERS.

ABBREVIATIONS

HDPE	HIGH DENSITY POLYETHYLENE
L	LOOP DETECTOR
N.T.S.	NOT TO SCALE
WIM	WEIGH IN MOTION
PQS	PIEZOELECTRIC QUARTZ SENSOR
S	SENSOR
NCSHP	NORTH CAROLINA STATE HIGHWAY PATROL

	LEGEND, GENERAL NOTES AND ABBREVIATIONS													
	DIVISION 11 SURRY CO. WT. AIRY PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW PREPARED BY: G. A. GREEN REVIEWED BY: T. G. PARKER	<table border="1"> <tr> <th>REVISIONS</th> <th>INT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INT.	DATE								
REVISIONS	INT.	DATE												
SCALE 0 N/A	SIGNATURE: <i>Gregory A. Green</i> DATE: 5-23-13		SEAL 023919 GREGORY A. GREEN PROFESSIONAL ENGINEER STATE OF NORTH CAROLINA											

- 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
- 3A INSTALL THREE #14 CONDUCTOR FEEDER CONDUCTORS
- 3B INSTALL AVI CABLE(S) *
- 3C INSTALL WIMSORT SIGNAL CABLE(S) *
- 3D INSTALL PIEZOELECTRIC QUARTZ SENSOR CABLES *
- 3E INSTALL LOOP WIRE
- 3F INSTALL LEAD-IN CABLE
- 3G INSTALL CCTV VIDEO AND POWER CABLES *
- 3H INSTALL FOUR #8 COPPER FEEDER CONDUCTORS
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 8A SAW CUT PAVEMENT
- 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
- 21A INSTALL CABLE(S) IN NEW 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

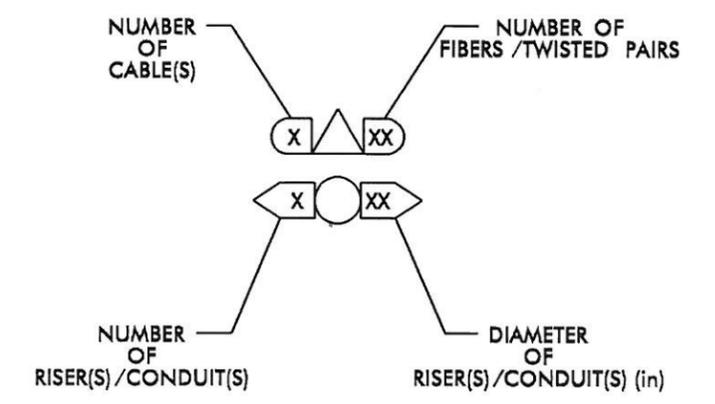
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 MODIFY EXISTING SPlice CENTER
- 31 INSTALL POLE MOUNTED CABINET
- 32 INSTALL BASE MOUNTED CABINET WITH EXTENDER
- 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 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 CABLE AND MESSENGER CABLE
- 49 REMOVE EXISTING COMMUNICATIONS CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 50 FEET OF COMMUNICATIONS CABLE
- 54 INSTALL ISOLATION TRANSFORMER
- 55 INSTALL INDUSTRIAL ETHERNET SWITCH
- 56 INSTALL VIDEO ENCODER
- 56A INSTALL VIDEO DECODER
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

- 58A INSTALL EQUIPMENT CABINET DISCONNECT
- 59 INSTALL PIEZOELECTRIC QUARTZ SENSORS
- 60 INSTALL AUTOMATED LICENSE PLATE RECOGNITION SYSTEM
- 61 INSTALL AUTOMATED USDOT RECOGNITION SYSTEM
- 62 INSTALL IMAGE CAPTURE CCTV CAMERA ASSEMBLY
- 63 INSTALL STANDARD INDUCTIVE LOOP
- 64 INSTALL OVERHEIGHT DETECTOR ASSEMBLY WITH METAL POLE AND FOUNDATION
- 65 INSTALL STEEL POLE, MASTARM AND FOUNDATION
- 66 INSTALL LED MESSAGE DISPLAY BOARD
- 67 INSTALL TRANSPONDER READER

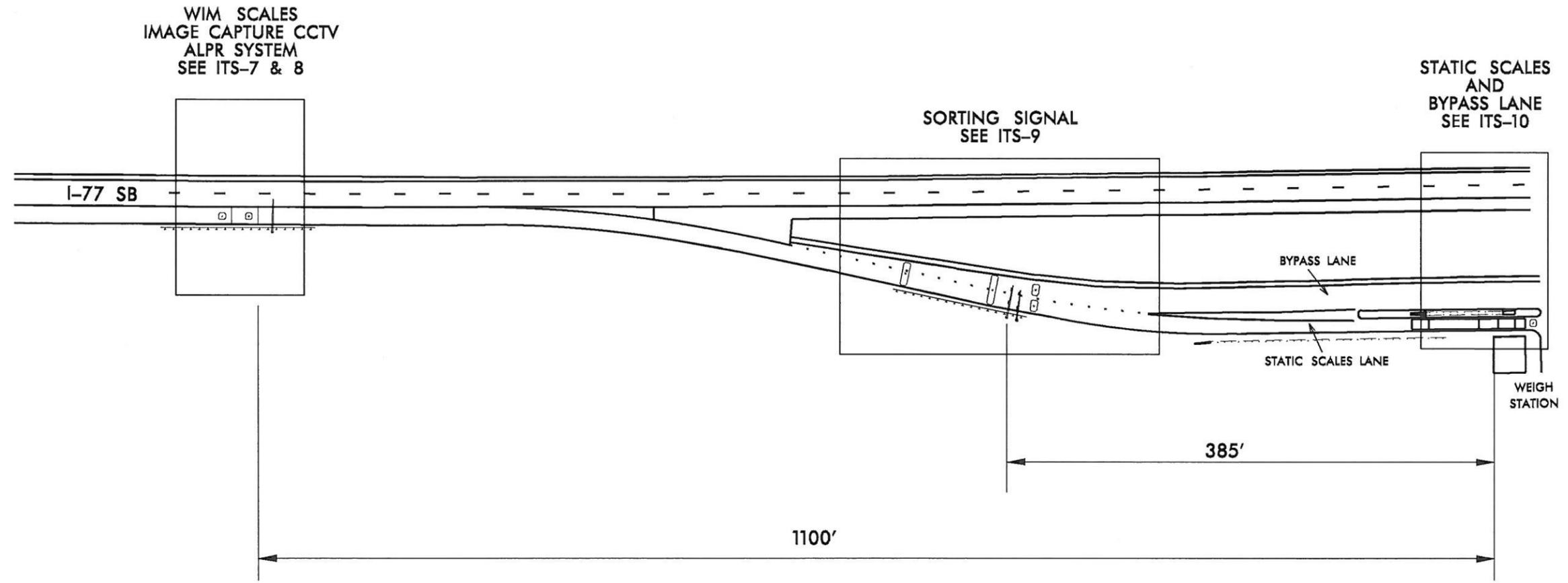
* CABLES SHALL BE PER EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND RATED FOR WET LOCATIONS.

CONSTRUCTION NOTE SYMBOLOGY KEY

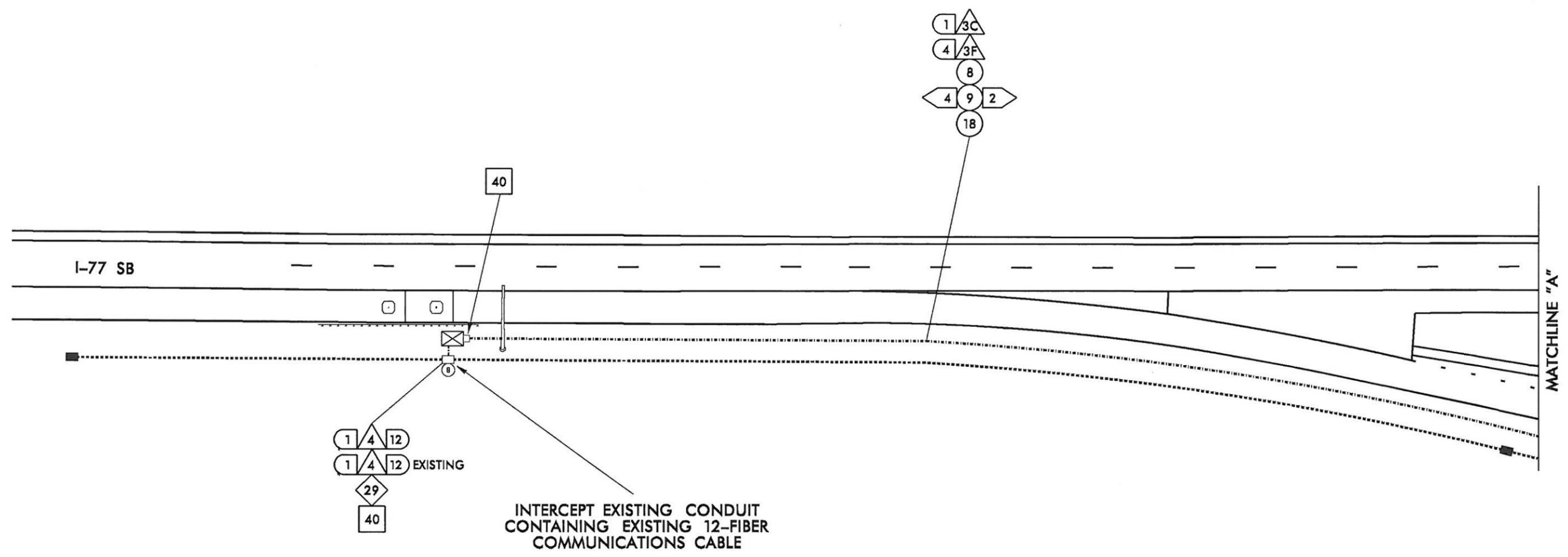
- (X) INDICATES NUMBER OF CABLES, LOOPS, ETC.
- (XX) INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- (X) INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- (XX) INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (in)



	CONSTRUCTION NOTES	
	DIVISION 11 SURRY CO. MT. AIRY PLAN DATE: MAY 2013 PREPARED BY: G. A. GREEN REVISIONS: _____ SCALE: 0 N/A	REVIEWED BY: S. C. YOW REVIEWED BY: T. G. PARKER INIT. DATE _____
DATE: 5-23-13 SIGNATURE: <i>Gregory J. Fells</i>		SEAL STATE OF NORTH CAROLINA PROFESSIONAL ENGINEER LICENSE NO. 023919 GREGORY J. FELLS



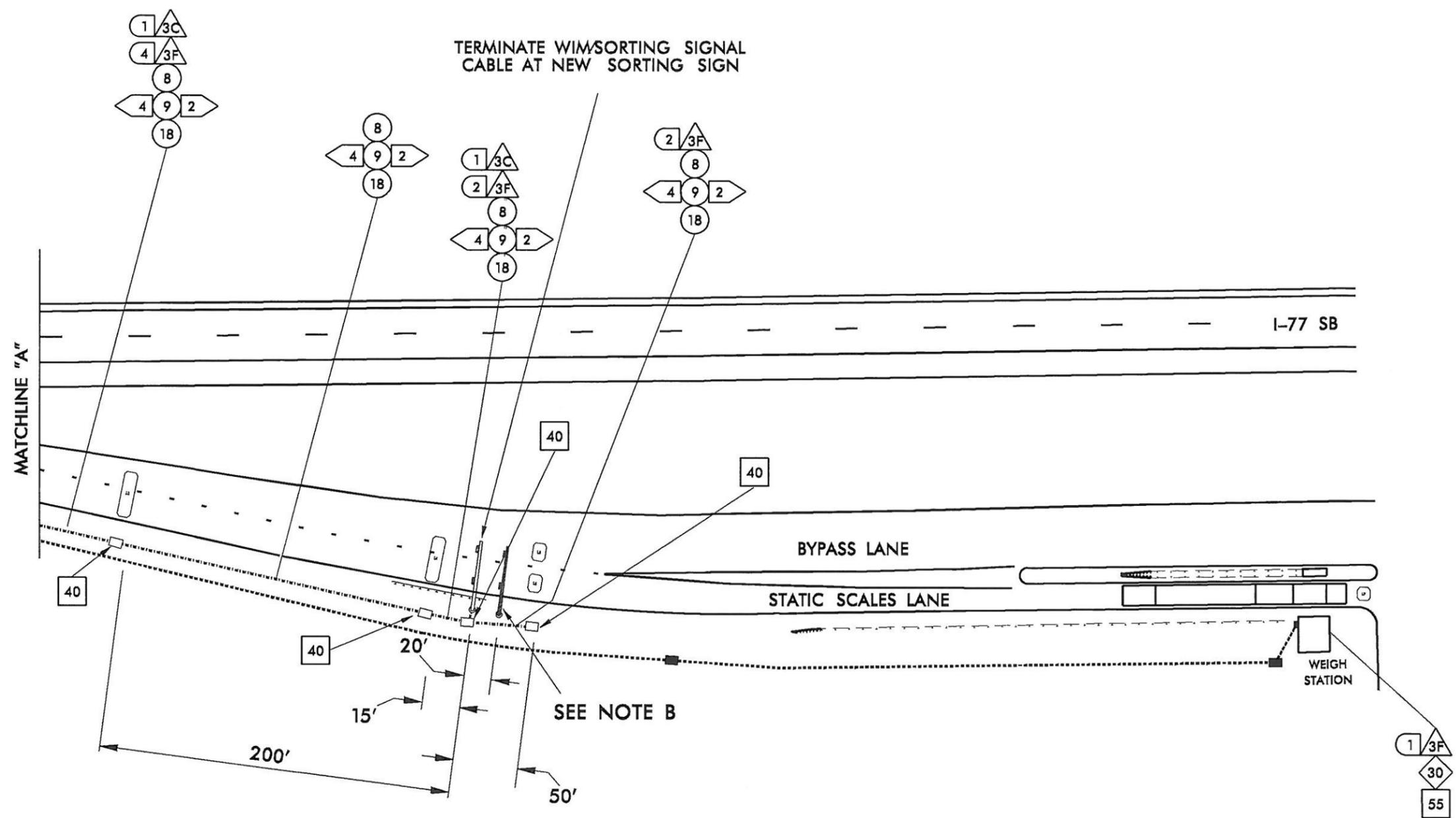
 Prepared in the Office of Mobility and Safety NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 750 N. Greenfield Plaza, Cary, NC 27513	PROJECT AREA OVERVIEW		SEAL  NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023919 GREGORY A. FULLER
	DIVISION 11 SURRY CO. MT. AIRY	PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW	
SCALE 0 N/A	REVISIONS _____	INIT. DATE _____	SIGNATURE <i>Gregory A. Fuller</i> 5-23-13 DATE



NOTES:

EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPENCLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (DANIEL ADAMS) AT (336) 903-9136 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

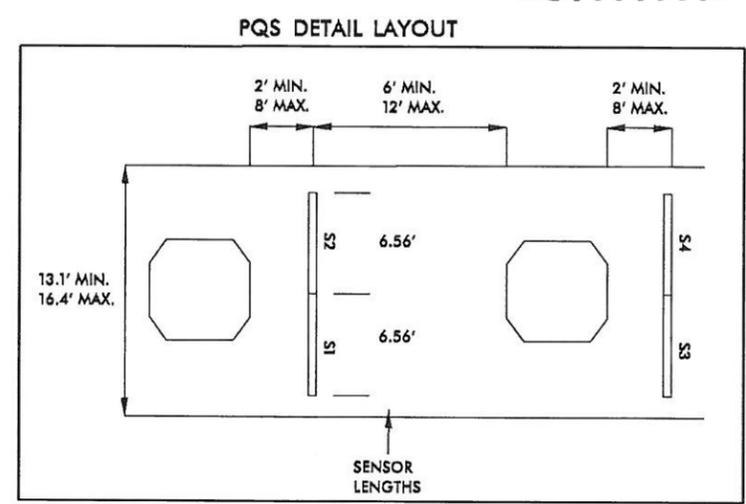
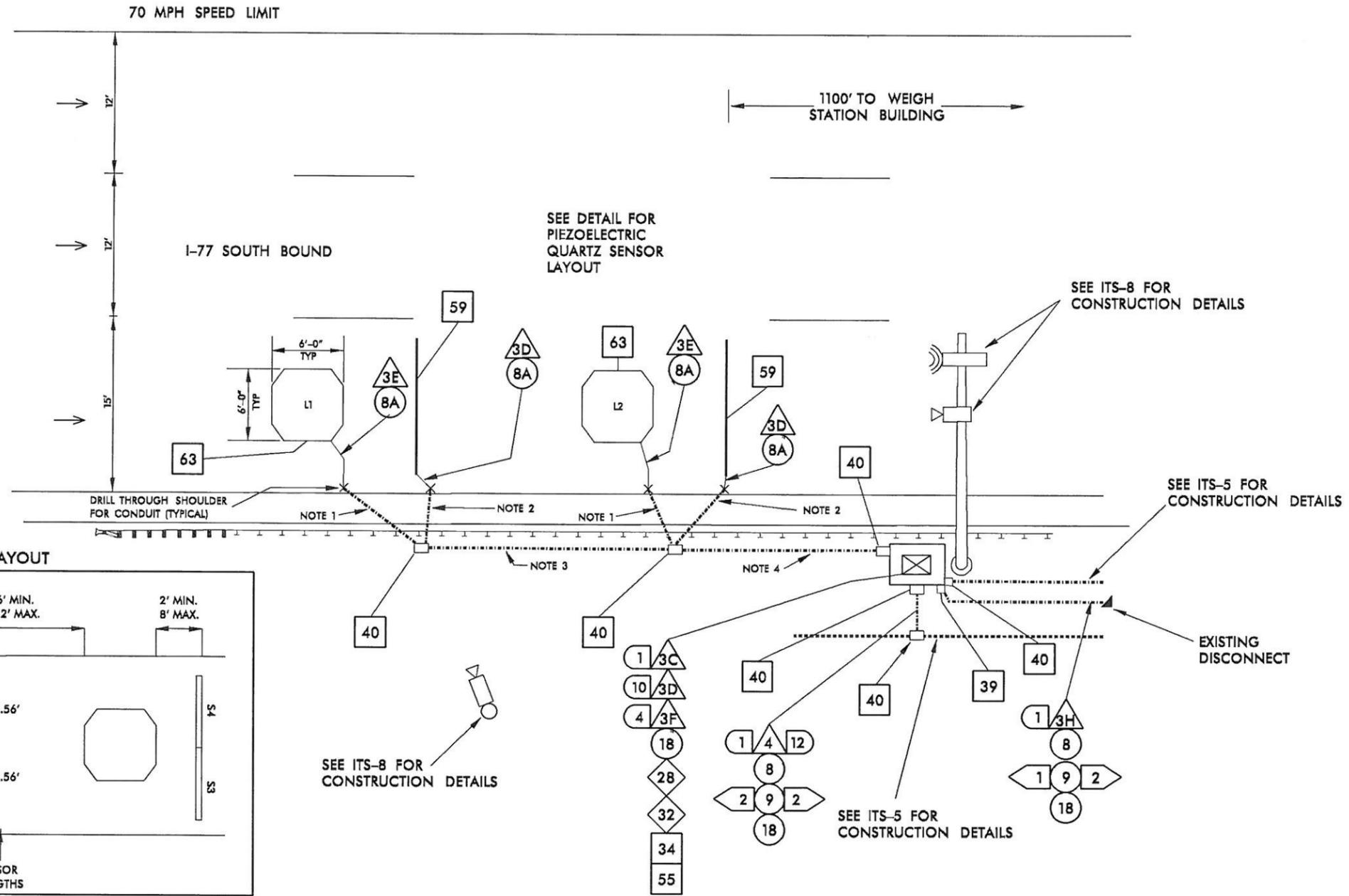
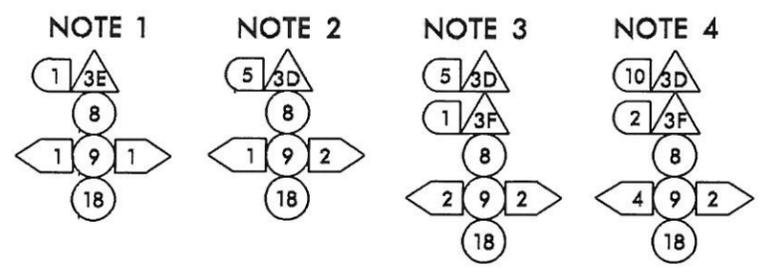
	COMMUNICATIONS CABLE AND CONDUIT ROUTING		
	DIVISION 11 SURRY CO. MT. AIRY	PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW	
SCALE D N/A	REVISIONS	INIT. DATE	SIGNATURE: <i>Gregory A. Fuller</i> DATE: 5-23-13



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- A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (DANIEL ADAMS) AT (336) 903-9136 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.
- B. REMOVE EXISTING LANE CONTROL SIGNS AND METAL POLE WITH MAST ARM.

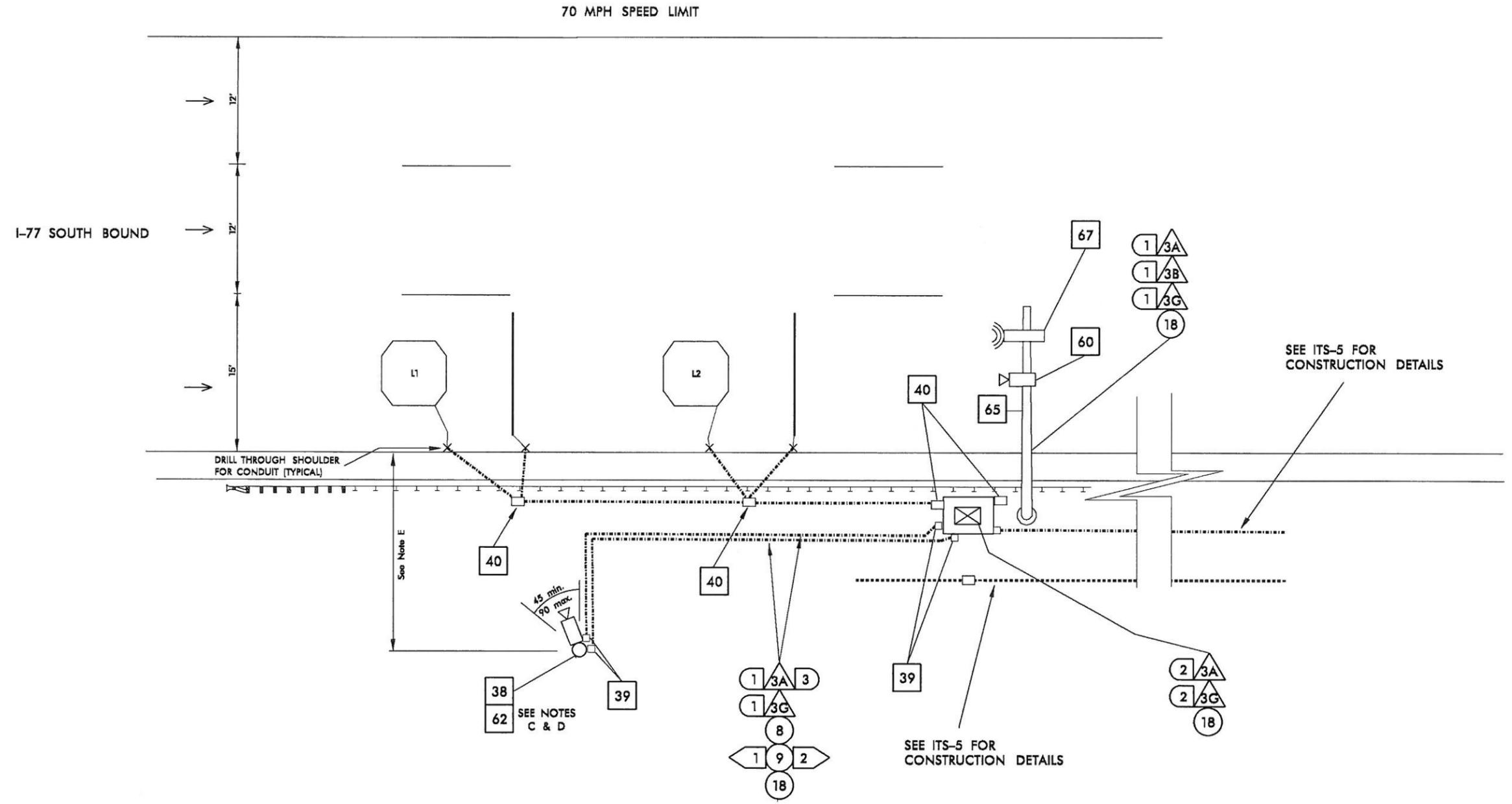
<p style="font-size: small;">Prepared in the Office of</p> <p style="font-size: x-small;">250 N. Greenfield Place, Greensboro, NC 27433</p>	<p>COMMUNICATIONS CABLE AND CONDUIT ROUTING</p> <p>DIVISION 11 SURRY CO. MT. AIRY</p> <p>PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW</p> <p>PREPARED BY: G. A. GREEN REVIEWED BY: T. G. PARKER</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	INIT.	DATE										<p>SEAL</p> <p style="font-size: small;">SEAL 023919 ENGINEER GREGORY A. GREEN</p> <p style="font-size: small;">Signature: <i>Gregory A. Green</i> 5-23-13 DATE</p>
REVISIONS	INIT.	DATE												



SENSOR SPACING SHOWN IS TYPICAL REQUIREMENT. ACTUAL SENSOR SPACING MAY BE ALTERED TO SUIT SITE CONDITIONS AND MANUFACTURER'S SPECIFICATIONS UPON APPROVAL BY THE ENGINEER.

- NOTES:
- A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPENCLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (DANIEL ADAMS) AT (336) 903-9136 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.
 - B. PIEZOELECTRIC QUARTZ SENSOR AND INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD-IN SECTIONS, MUST BE DRY CUT.

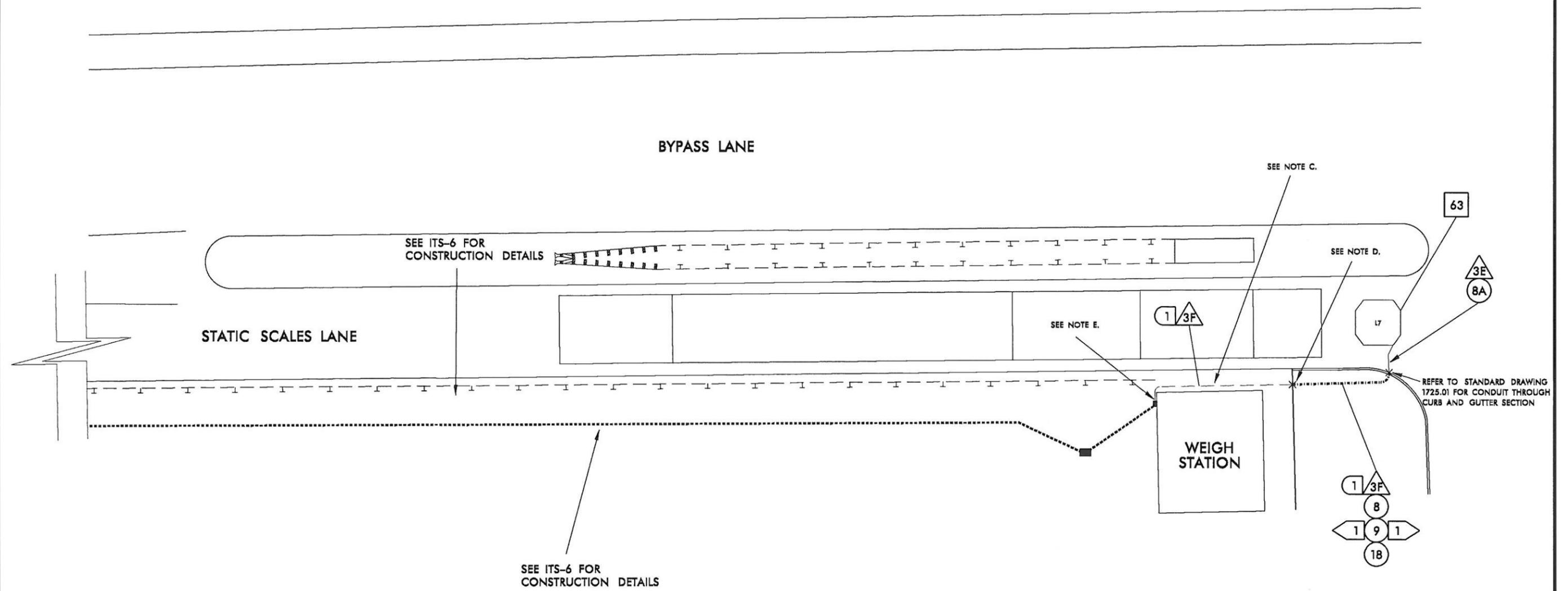
	WIM SCALES		
	DIVISION 11 SURRY CO. MT. AIRY PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW PREPARED BY: G. A. GREEN REVIEWED BY: T. G. PARKER	REVISIONS INIT. DATE	
SCALE: 0 N/A		SIGNATURE: <i>Gregory A. Fuller</i> DATE: 5-23-13	



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 - B. PIEZOELECTRIC QUARTZ SENSOR AND INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD-IN SECTIONS, MUST BE DRY CUT.
 - C. TRIGGER LOOPS FOR THE IMAGE CAPTURE CCTV AND ALPR CAMERAS SHALL BE IN-LINE WITH THE UPSTREAM EDGE OF THE CAMERA FIELD OF VIEW.
 - D. IMAGE CAPTURE TO BE TRIGGERED BY THE LEADING EDGE OF THE LOOP.
 - E. LOCATE CAMERA POLE NO MORE THAN 18' FROM EDGE OF TRAVEL LANE.

	IMAGE CAPTURE CCTV, TRANSPONDER READER AND ALPR SYSTEM		
	DIVISION 11 SURRY CO. WT. AIRY	PLAN DATE: MAY 2013 REVIEWED BY: S. C. YON	
230 N. Greenfield Place, Durham, NC 27728	SCALE: 0 N/A	REVISIONS: _____ JMT. DATE	SIGNATURE: <i>Gregory A. Fuller</i> 5-23-13 DATE

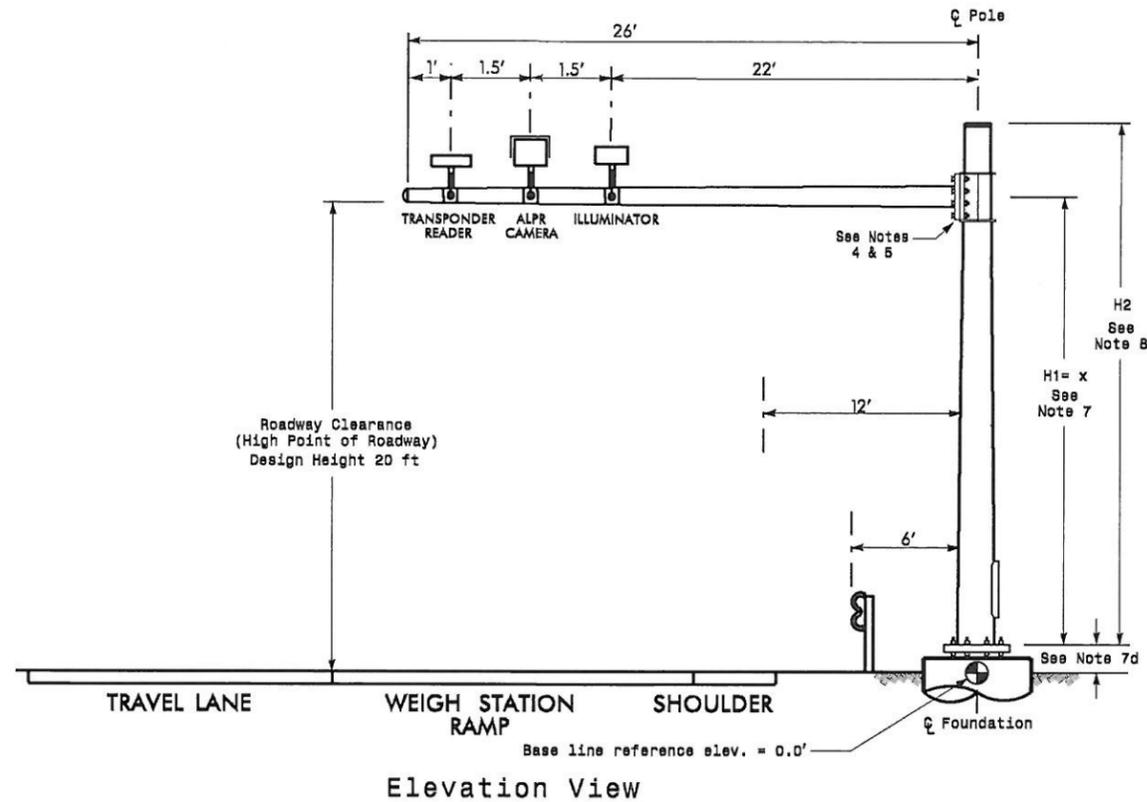
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 - B. PIEZOELECTRIC QUARTZ SENSOR AND INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD-IN SECTIONS, MUST BE DRY CUT.
 - C. REMOVE SEALANT FROM EXISTING SIDEWALK SLOT. INSTALL NEW LOOP LEAD-IN IN EXISTING SLOT. INSTALL NEW LOOP SEALANT.
 - D. TRANSITION FROM 1" PVC CONDUIT TO THE BOTTOM OF SIDEWALK SLOT AND RE-SEAL.
 - E. TRANSITION FROM EXISTING SIDEWALK SLOT TO THE BOTTOM OF THE EXISTING WALL MOUNTED CABINET WITH 1/2" NON-METALLIC FLEXIBLE CONDUIT.

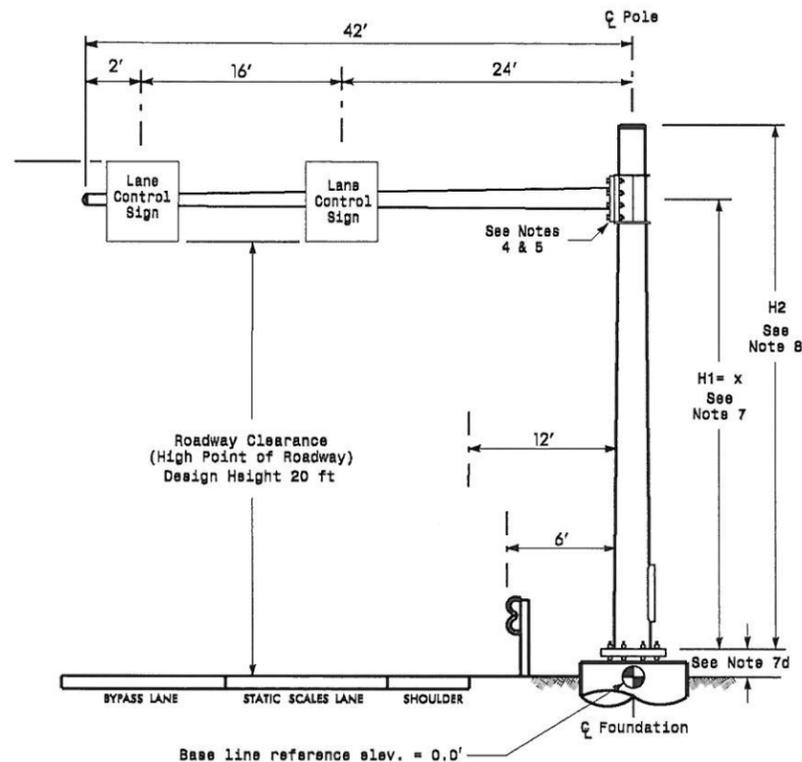
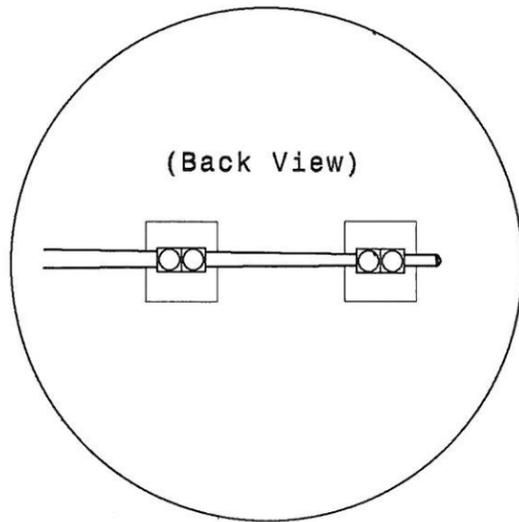
	STATIC SCALES RELEASE LOOP		
	DIVISION 11 SURRY CO. MT. AIRY	PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW	
SCALE: N/A	REVISIONS:	INVT. DATE:	SIGNATURE: <i>Gregory M. Fuller</i> DATE: 5-23-13

Design Loading for METAL POLE NO. 1



Elevation View

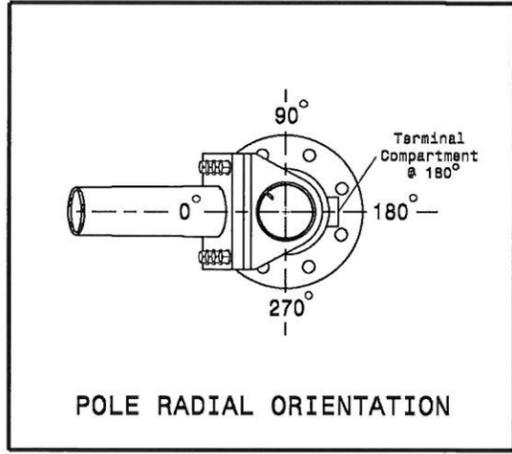
Design Loading for METAL POLE NO. 2



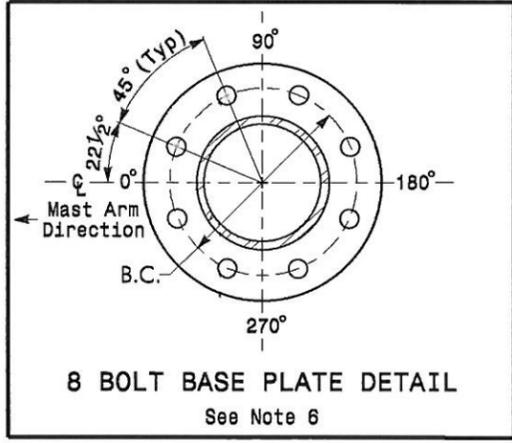
Elevation View Front

SPECIAL NOTE
The contractor is responsible for determining the mast arm attachment height (H1). Ensure that the mast arm attachment height will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval.

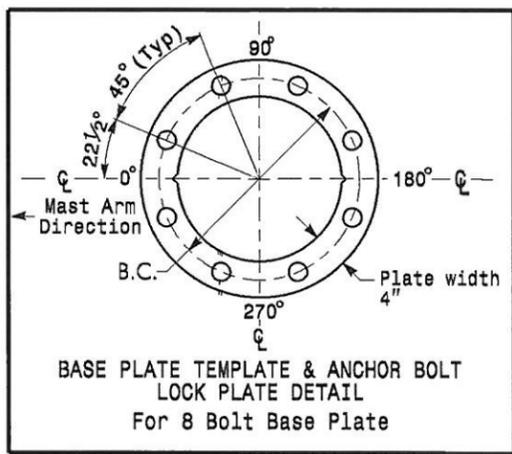
MAST ARM LOADING SCHEDULE			
LOADING SYMBOL	DESCRIPTION	SIZE	WEIGHT
□	TRANSPONDER READER	6.5" W x 4.5" L x 4.0" D	7 LBS
◻	LICENSE PLATE READER CAMERA	13.0" W x 6.0" L x 5.5" D	6 LBS
□	INFRARED ILLUMINATOR	3.0" W x 3.0" L x 3.0" D	5 LBS
◻	CONFIRMATION DISPLAY 8"-2 SECTION WITHOUT BACKPLATE	11.5" W x 20.0" L x 18" D	33LBS
↓	LANE CONTROL SIGN	28.5" W x 28.5" L x 4.0" D	155 LBS



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

Design Reference Material

- Design the metal pole structure and foundation in accordance with:
 - The 5th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the ITS and Signals project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.
 - The project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Design Requirements

- Design the metal pole structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads".
- Design all metal pole supports using stress ratios that do not exceed 1.0.
- The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 80 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Attachments to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the ITS & Signals Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the attached equipment over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NOTES

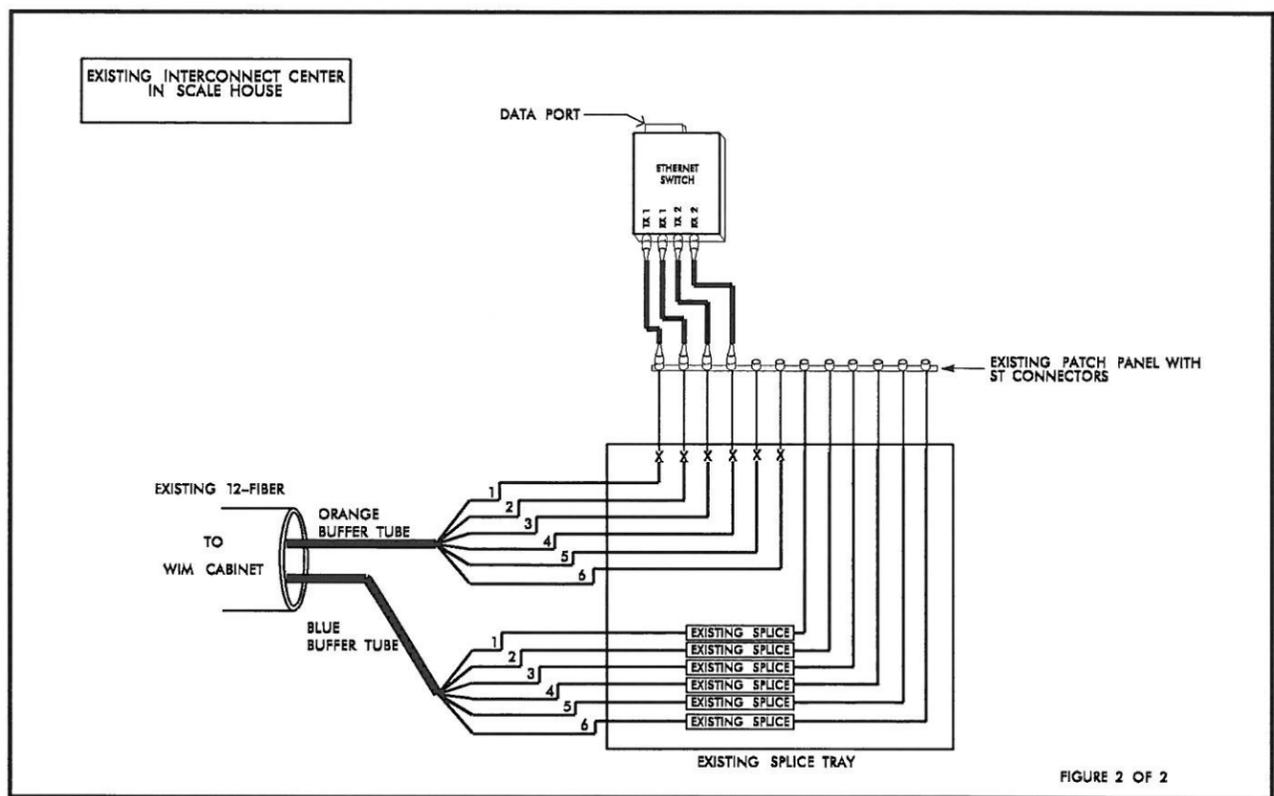
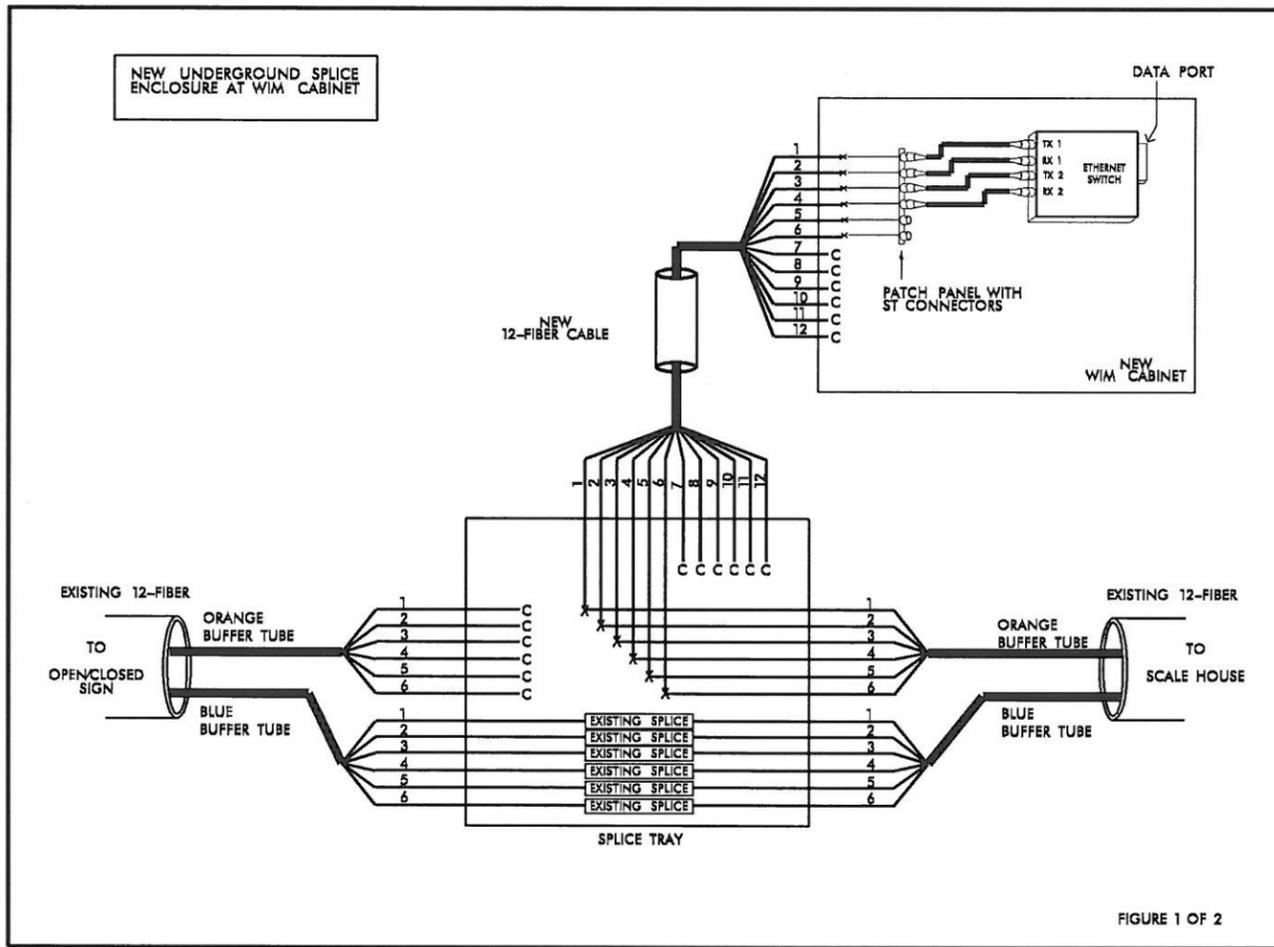
NCDOT Wind Zone 4 (90 mph)

	<p>METAL POLE WITH MAST ARM</p>		
	<p>DIVISION 11 SURRY CO. WT. AIRY</p>	<p>PLAN DATE: MAY 2013 REVIEWED BY: S. C. YOW</p>	
<p>SCALE: 0 N/A</p>	<p>PREPARED BY: G. A. GREEN</p>	<p>REVIEWED BY: C. F. ANDREWS</p>	<p>DATE: 5.23.13</p>
<p>0 N/A</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>DATE</p>
<p>Signature: <i>D. Sarfar</i></p>			<p>DATE: 5.23.13</p>

LEGEND
X = FUSION SPICE
C = CAP

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA



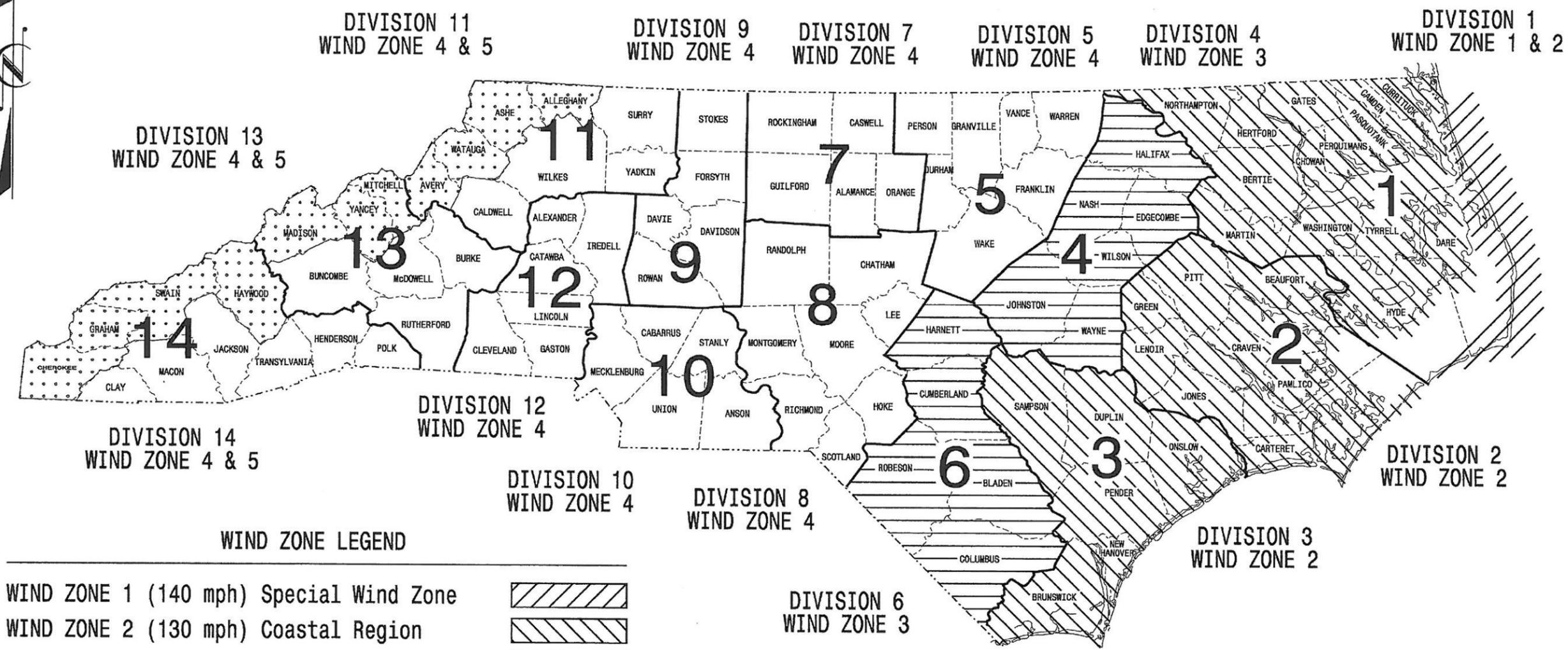
- NOTES:
1. ETHERNET TERMINATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER TERMINATIONS.
 2. DO NOT CUT BLUE BUFFER TUBE IN EXISTING 12-FIBER CABLE. THIS IS THE COMMUNICATIONS LINK BETWEEN THE SCALE HOUSE AND OPENCLOSED SIGN.
 3. COIL AND STORE ALL UNUSED FIBERS IN SPICE TRAY.
 4. COIL AND STORE ALL UNUSED BUFFER TUBES IN SPICE TRAY.

	SPICE DETAIL		
	DIVISION 11 SURRY CO. WT. AIRY		
PLAN DATE: MAY 2013	REVIEWED BY: S. C. YOW		SIGNATURE: <i>Gregory A. Fuller</i> DATE: 5-23-13
PREPARED BY: G. A. GREEN	REVIEWED BY: T. G. PARKER	REVISIONS	
SCALE: 0 N/A	INIT.	DATE	

**STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS**

STATE	PROJECT NO.	SHEET NO.
N.C.		Sig.
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	
WIND ZONE 2 (130 mph) Coastal Region	
WIND ZONE 3 (110 mph) Eastern Region	
WIND ZONE 4 (90 mph) Central & Mtn. Region	
WIND ZONE 5 (120 mph) Special Wind Zone	

<http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Designed in conformance with the 2002 Interim to the 4th Edition 2001 **AASHTO** Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

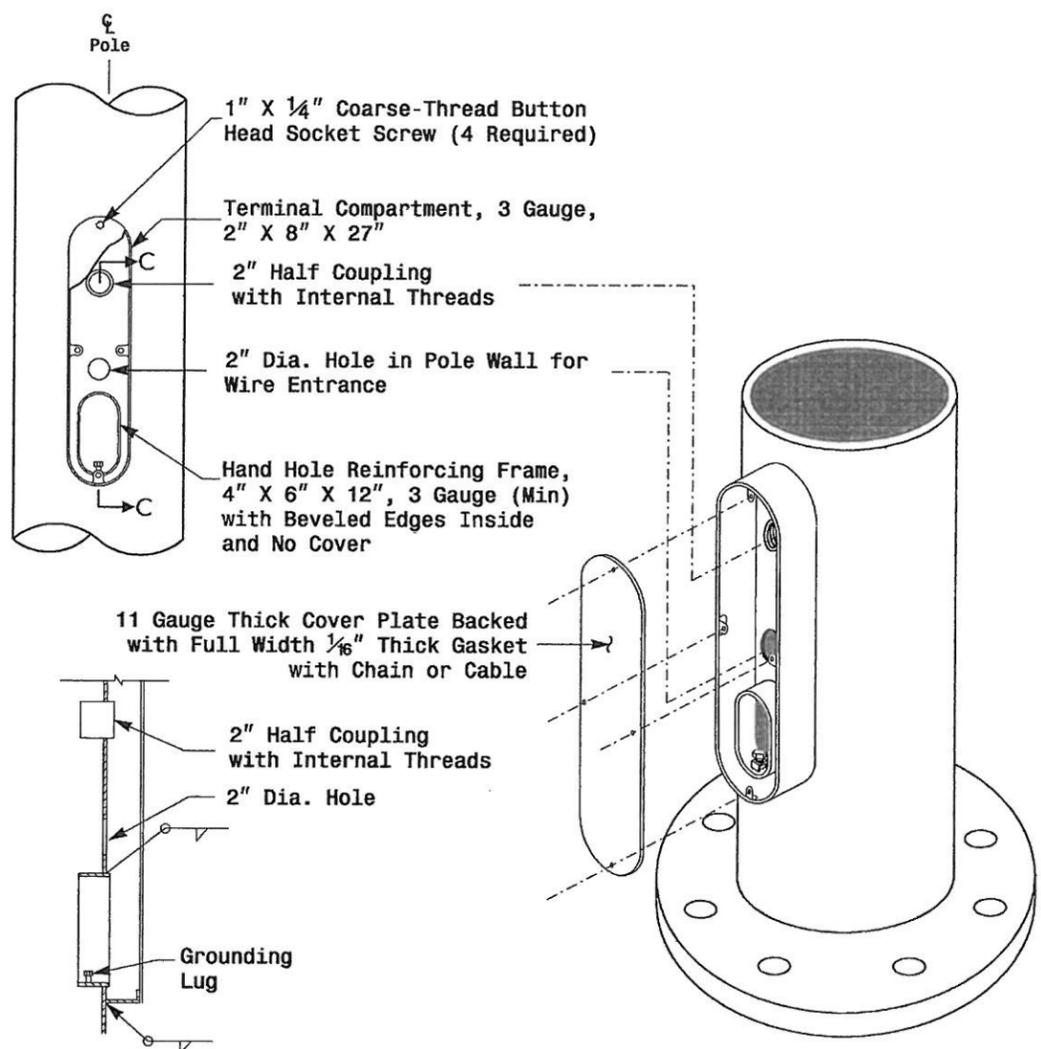
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:
MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT

G. A. Fuller, P.E. - State ITS and Signals Engineer
 G. G. Murr, Jr., P.E. - State Signals Engineer
 D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer
 C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer
 M. Aslam - ITS and Signals Structural Project Engineer
 N. Bitting, P.E. - ITS and Signals Structural Project Engineer

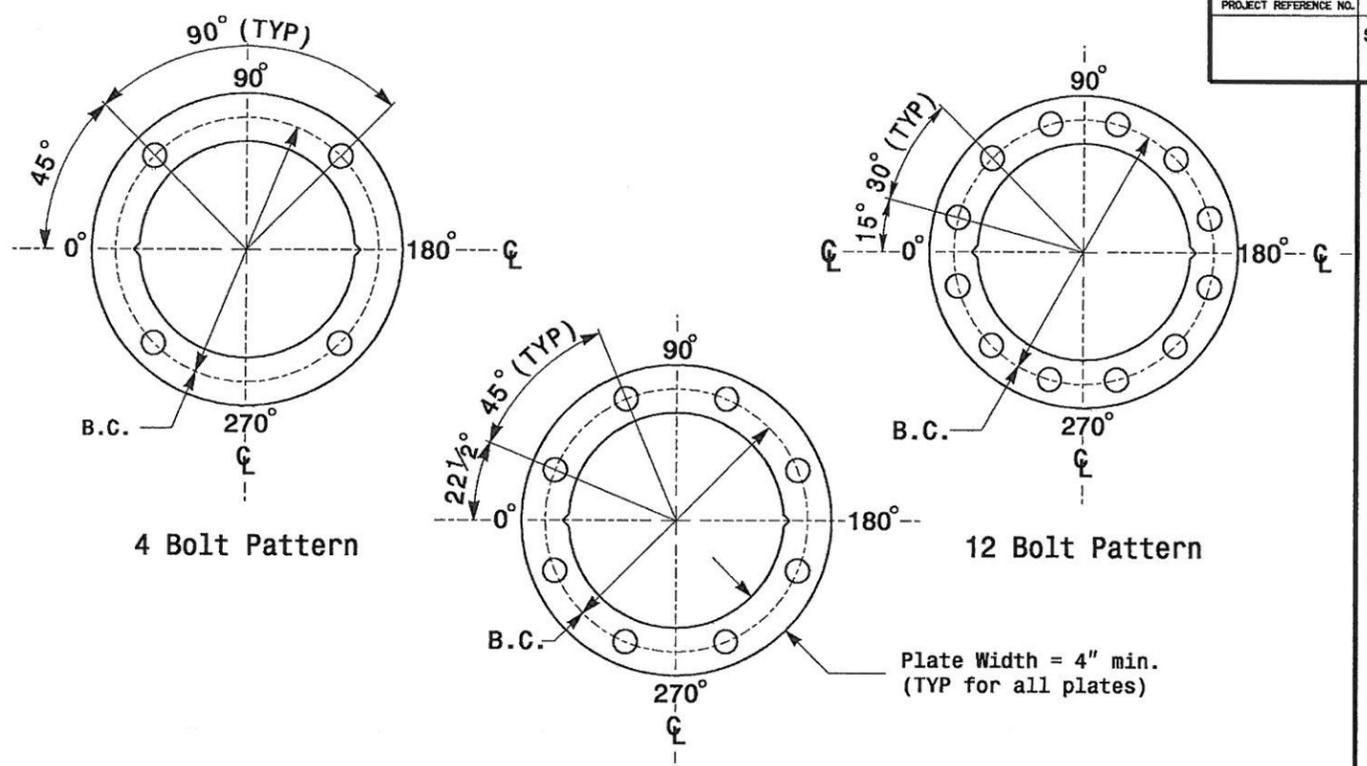
SEAL

D. Sarkar 7.21.2009
SIGNATURE DATE



Section C-C Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.
Base Plate Template and Anchor Bolt Lock Plate Details

MFG _____ MFG. DATE: MM/YY
SHAFT D/T/L/Y _____
ARM-A D/T/L/Y _____
ARM-B D/T/L/Y _____
A.B. DIA./B.C./L/Y _____
NCDOT STANDARD _____

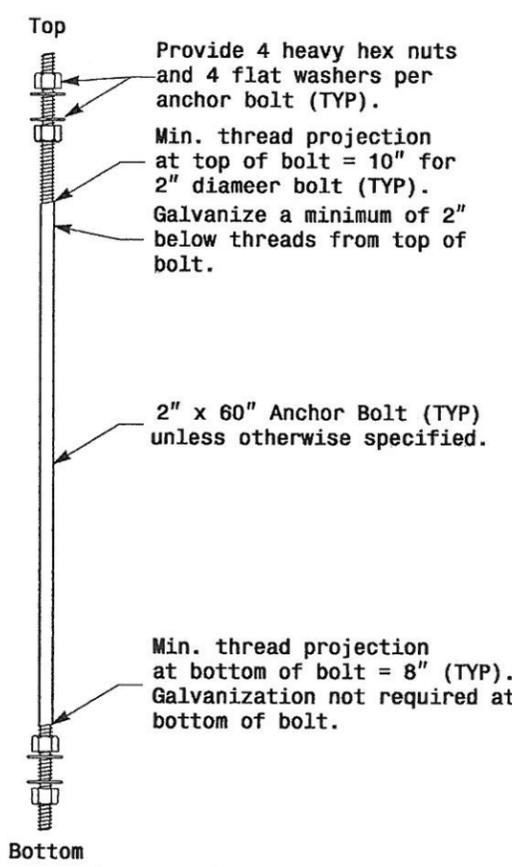
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

MFG _____ MFG. DATE: MM/YY
SECTION D/T/L/Y _____
NCDOT STANDARD _____

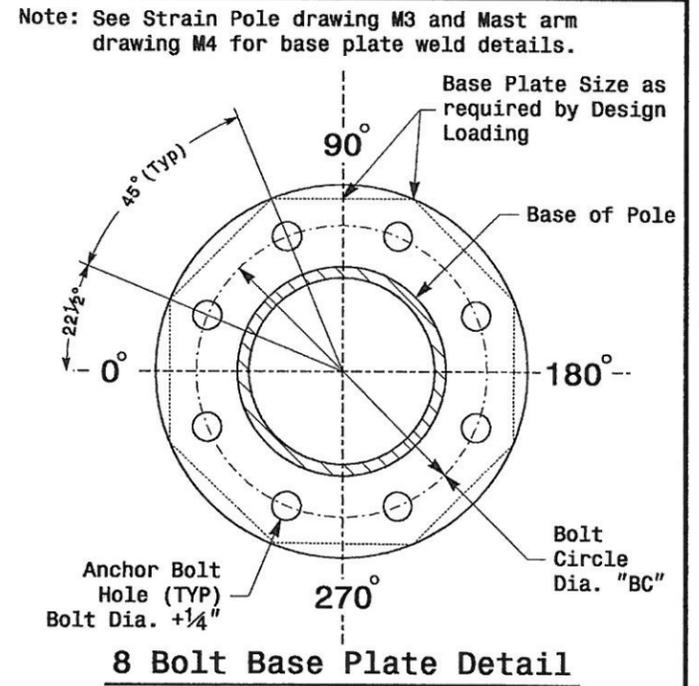
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail



8 Bolt Base Plate Detail

Prepared in the Office of:
UNIVERSITY OF NORTH CAROLINA
SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
222 N. McDowell St., Raleigh, NC 27605

Typical Fabrication Details Common To All Metal Poles

PLAN DATE: May 2005 REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander REVIEWED BY: A.W. Esposito

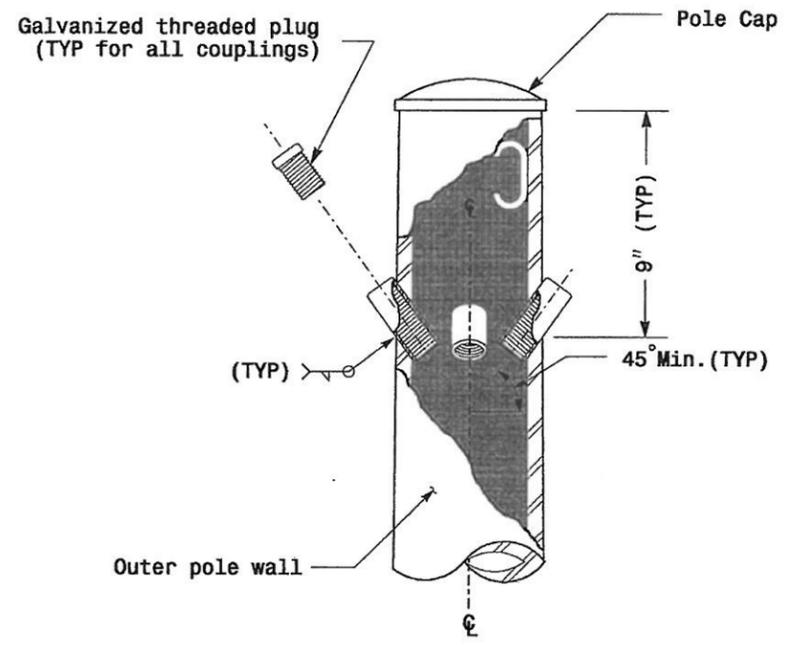
SCALE: 0 NA NONE

REVISIONS: _____ INIT. DATE _____

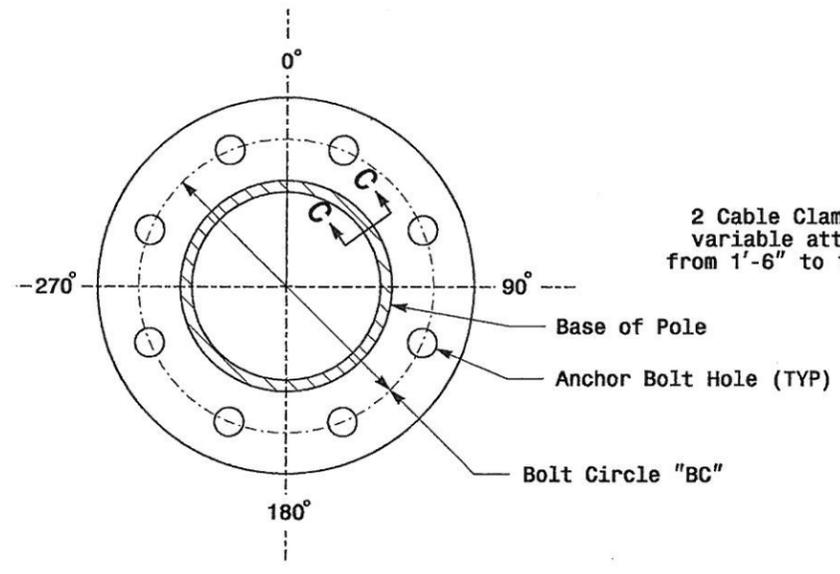
SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094
SIGNATURE: J. Sankar 9.2.2005
DATE: _____
SIG. INVENTORY NO. _____

Fabrication Details - All Poles

01-SEP-2005 10:23 D:\2004 Metal Pole Standards\2004 mg hru mg.dgn

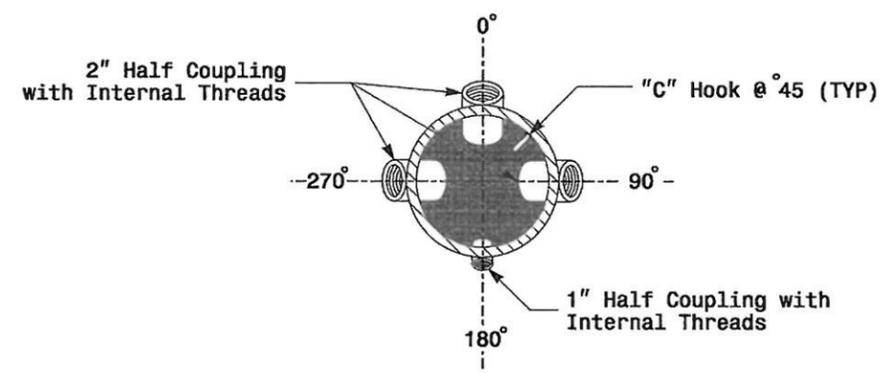
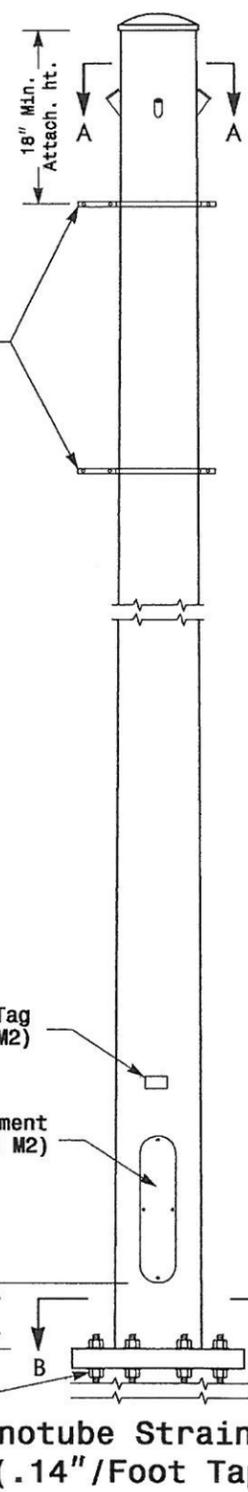


Cable Entrances at Top of Pole

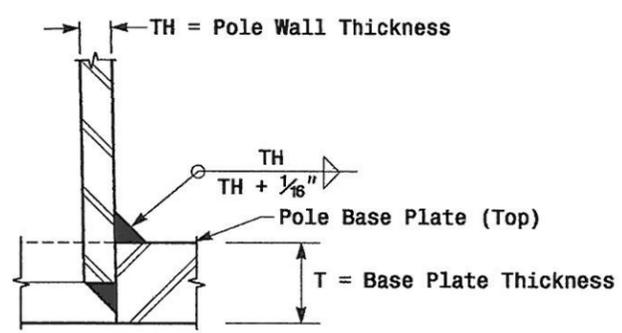


Section B-B
 (See drawing M2)
Pole Base Plate

2 Cable Clamps designed for variable attachment heights from 1'-6" to 10' below the top of the pole.



Section A-A
Radial Orientation for Factory Installed Accessories at Top of Pole

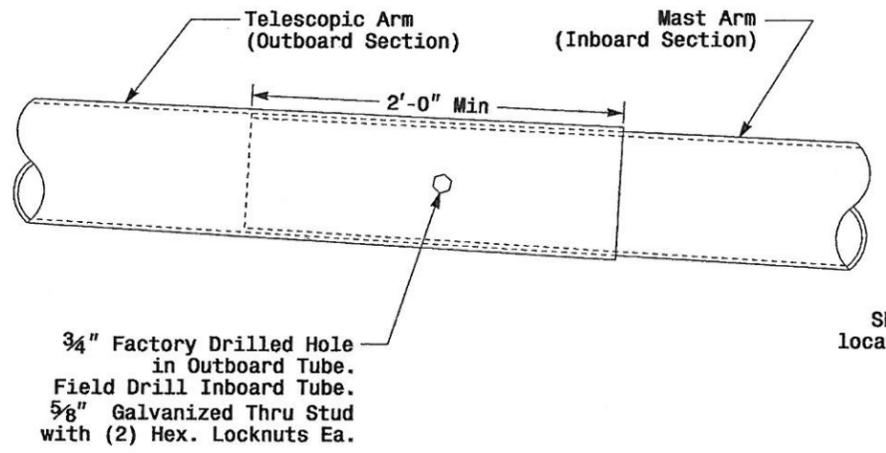
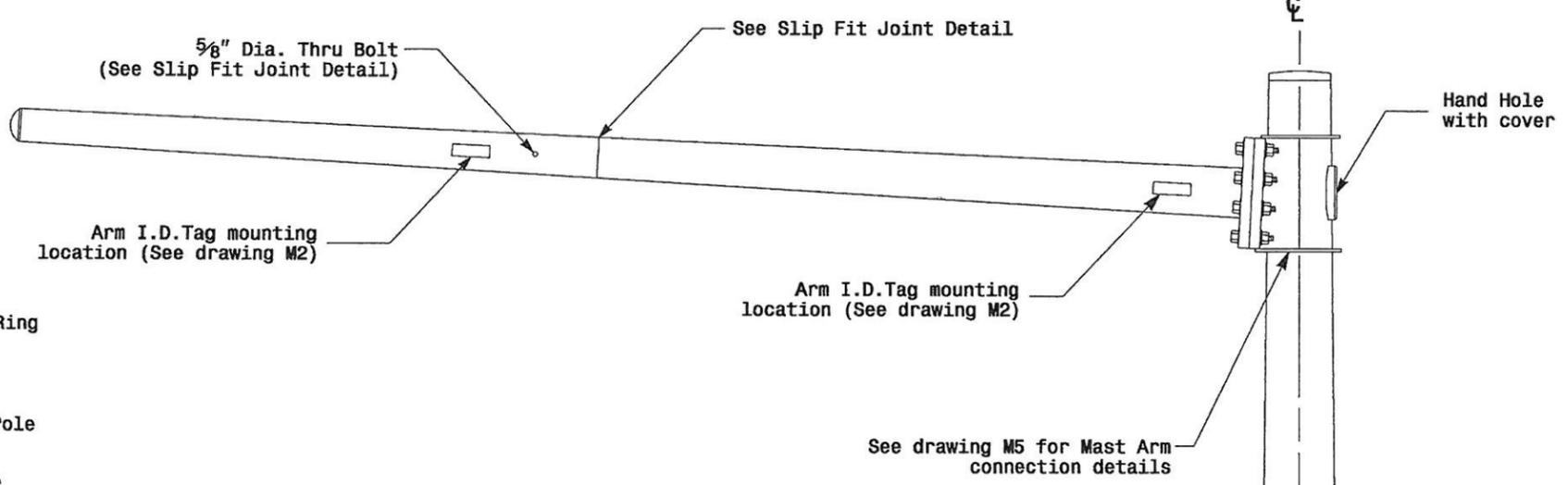
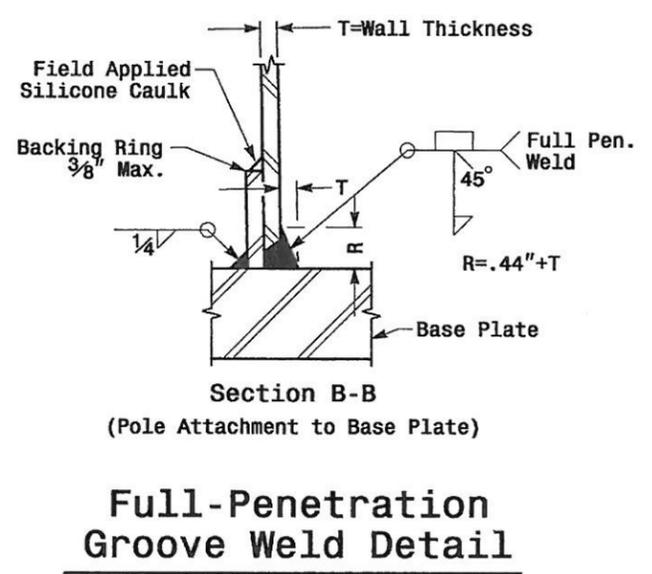
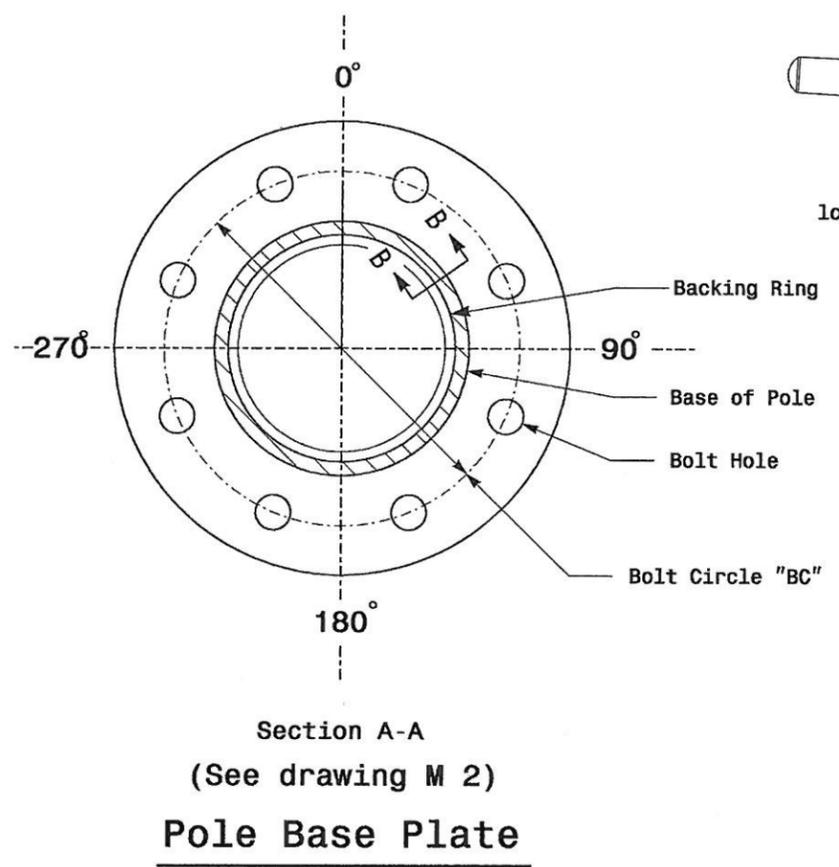


Section C-C
Socket Connection Weld Detail

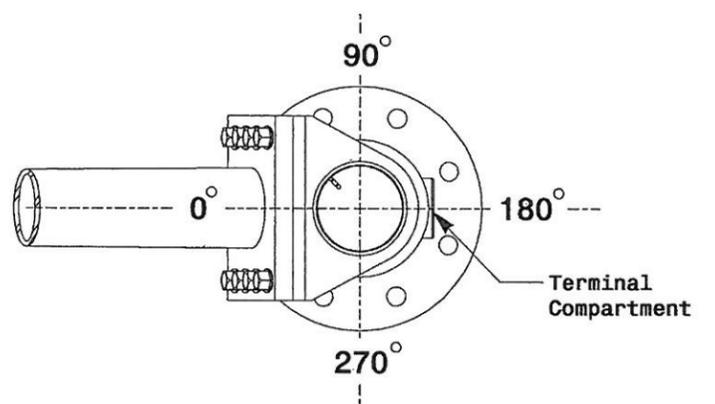
	Typical Fabrication Details For Strain Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
SIGNATURE: <i>D. Sarkar</i> 2.2.2005		DATE:	SIG. INVENTORY NO.:

Fabrication Details - Strain Poles

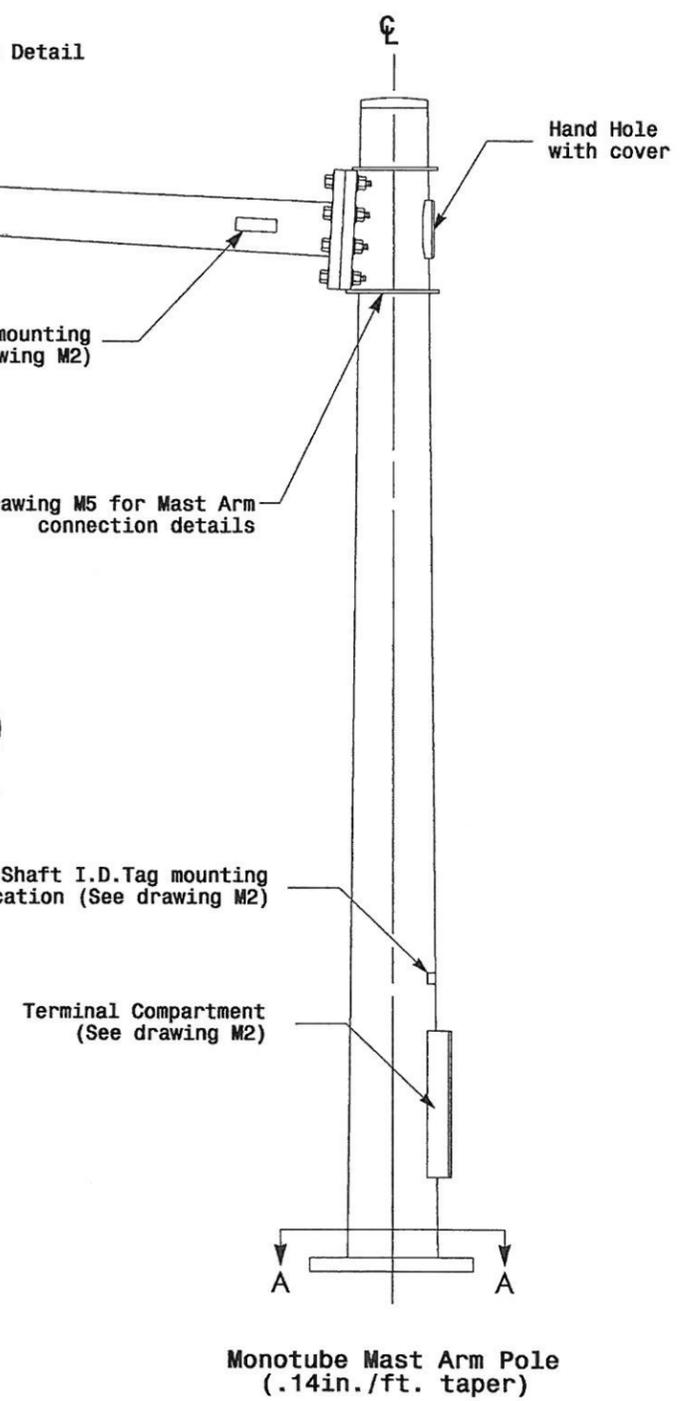
01-SEP-2005 14:07
 w:\p\alex-uni\theor\groups\2004\mtr\pole\strndr-ds\2004.mbl.dgn
 p:\sarkar



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

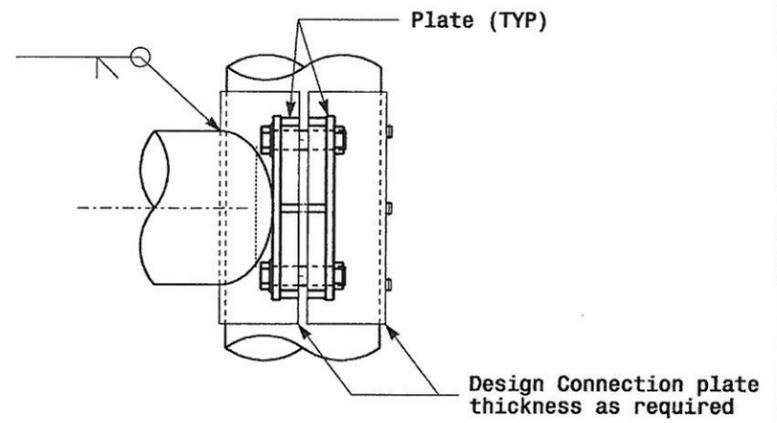


Fabrication Details - Mast Arm Poles

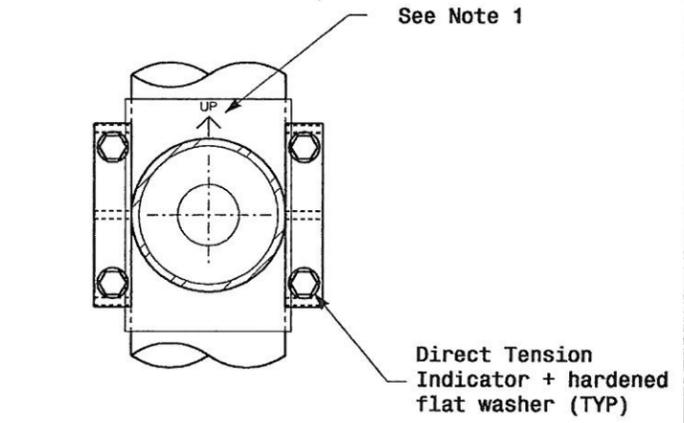
01-SEP-2005 14:08 v:\poco\es-un1\workgroups\2004 mast pole standard\2004 mk.dgn pd alexander

	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito	
SCALE: NONE	REVISIONS:	INT. DATE:	

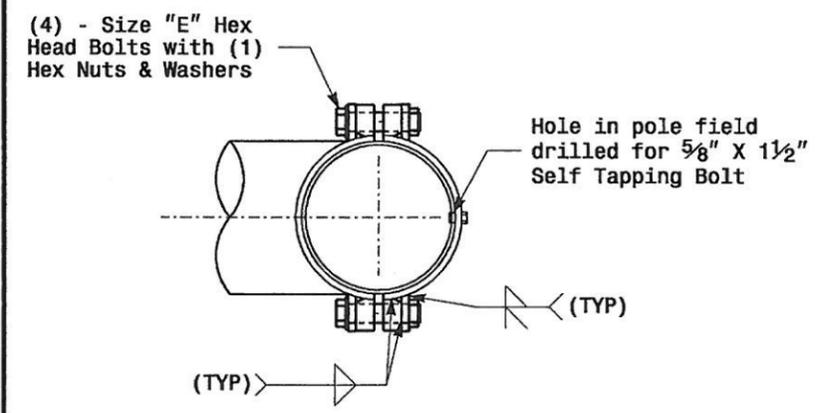
Adjustable Clamp Type Bolted Mast Arm Connection



Side Elevation View

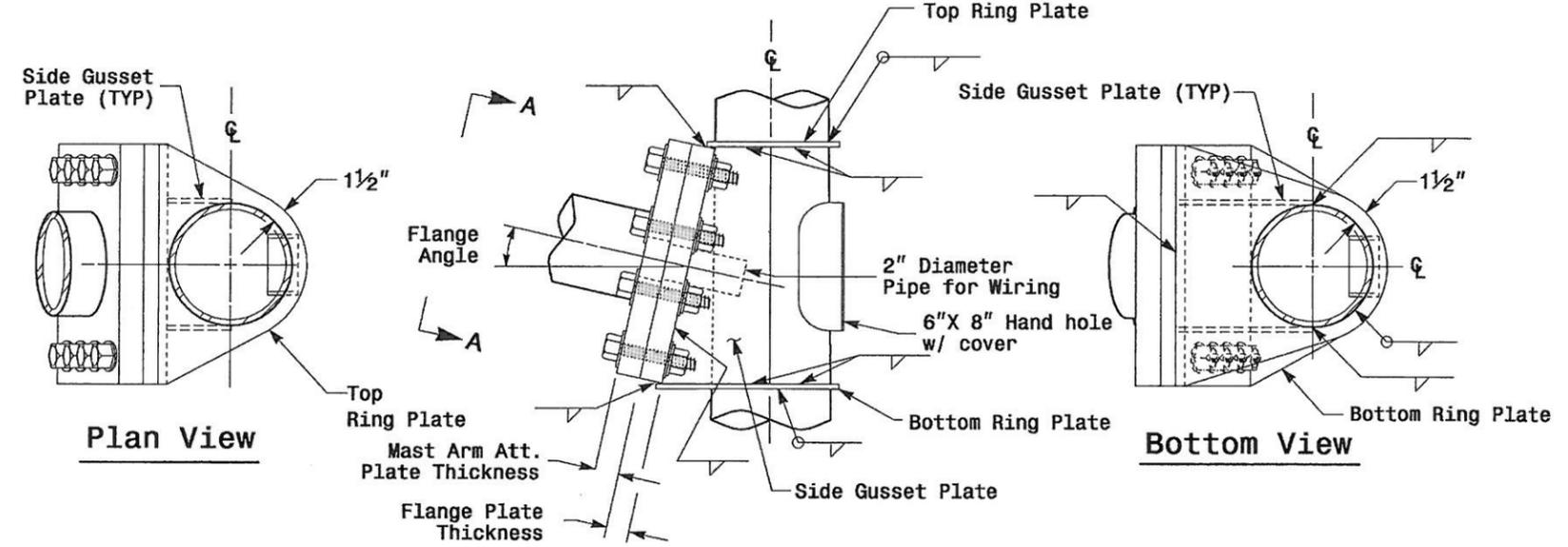


Front Elevation View



Plan View

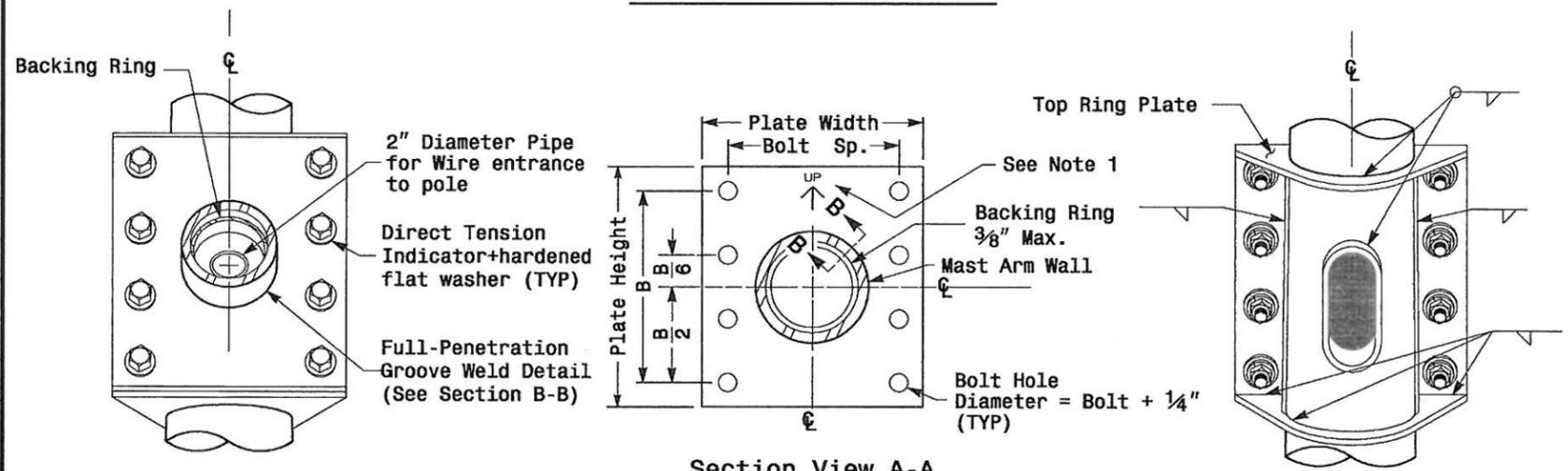
Welded Ring Stiffened Mast Arm Connection



Plan View

Side Elevation View

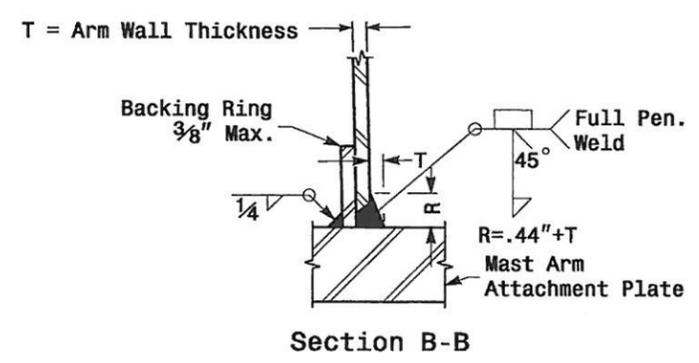
Bottom View



Front Elevation View

Mast Arm Attachment Plate

Back Elevation View



Section B-B Full-Penetration Groove Weld Detail

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing appropriate drainage points.

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.W. Esposito	

01-SEP-2005 14:11
 w:\ppl\alex-unit\work\p\oupe#2004 metal pole atrondr-dwg2004.mxd.dgn
 P.L. Alexander

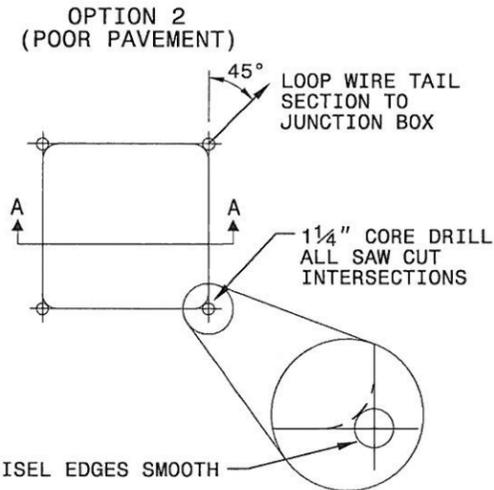
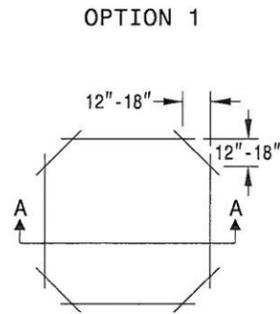
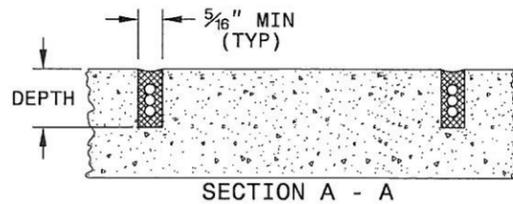
Fabrication Details - Mast Arm Poles

CONVENTIONAL 4-SIDED LOOP

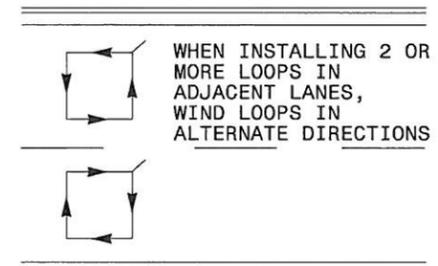
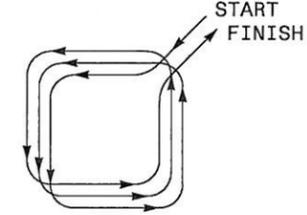
SAW CUT OPTIONS

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



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE

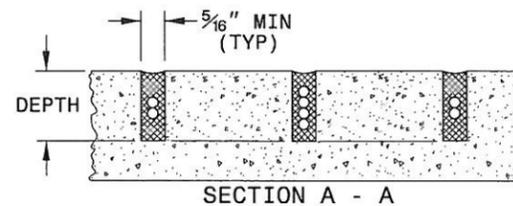
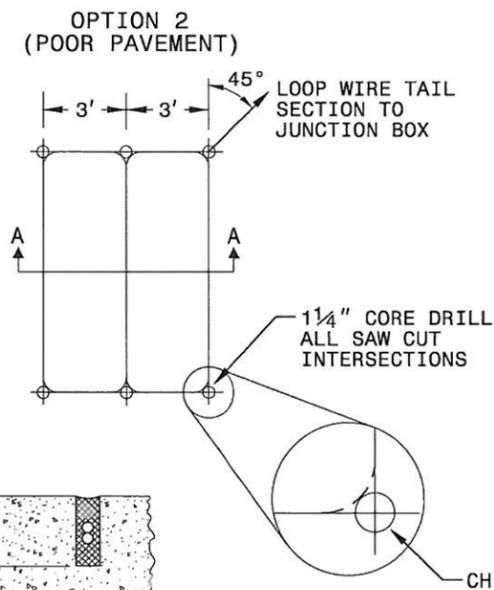
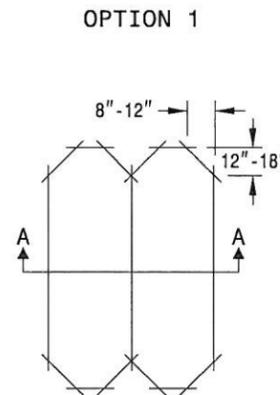


NOTES

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.

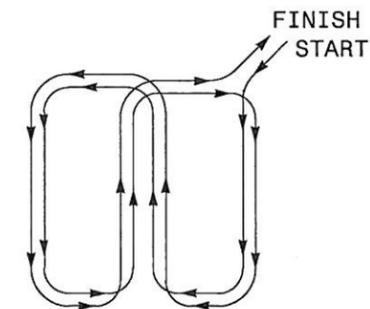
QUADRUPOLE LOOP

SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



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

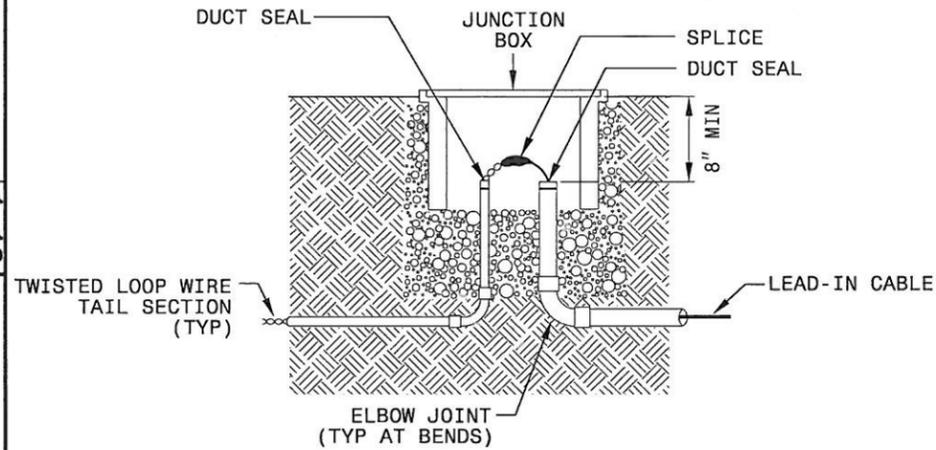
1-12

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

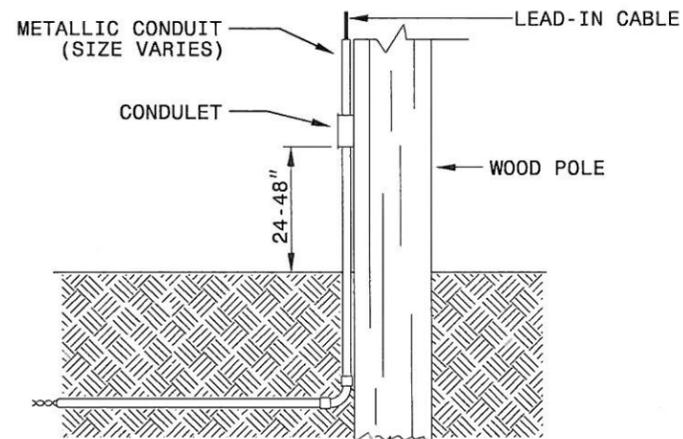
SHEET 2 OF 3
1725.01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

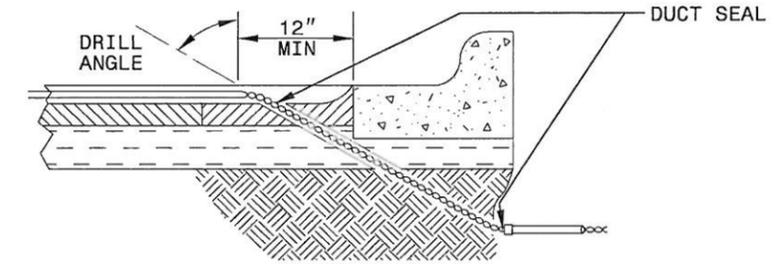


NOTE

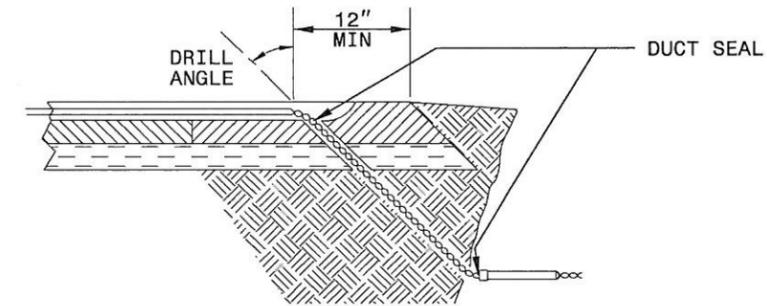
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

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.

1-12

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

SHEET 2 OF 3
1725.01

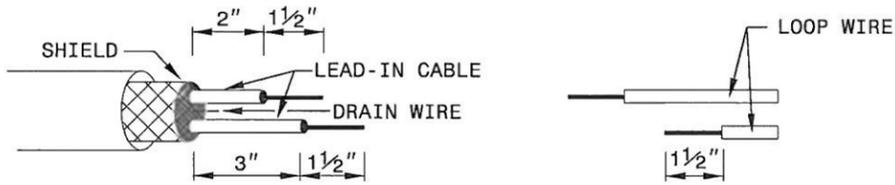
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

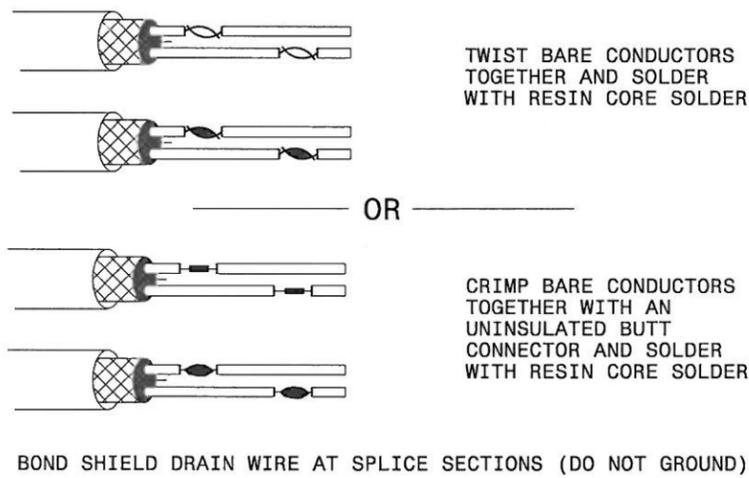
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725.01

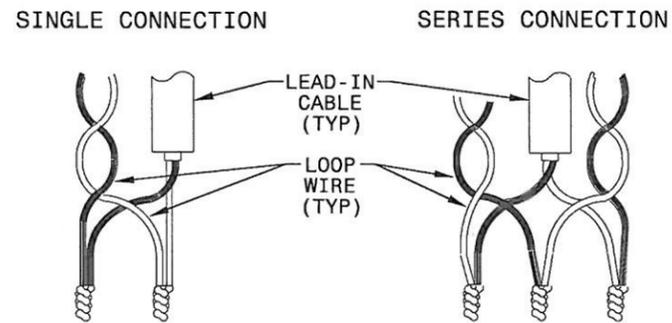
STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



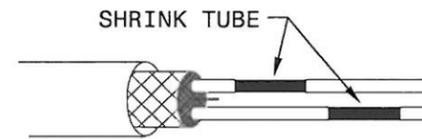
STEP 2. CONNECT AND SOLDER



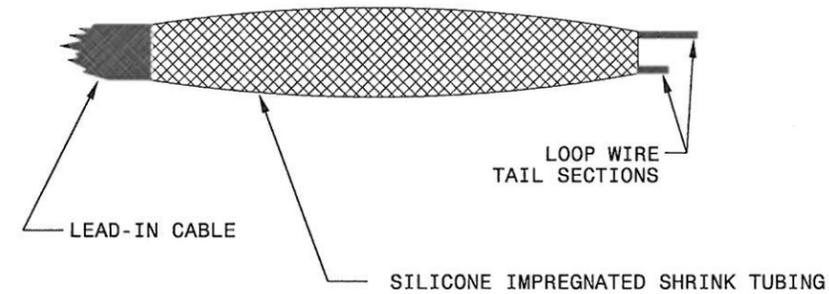
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725.01