GROUND MOUNTED SERVICE EQUIPMENT OPTIONS
FOR UNDERGROUND ELECTRICAL SERVICE

1. LOCATE THE SERVICE EQUIPMENT NEAR THE SIGNAL CABINET IN A MANNER THAT WILL ALLOW EASY ACCESS TO THE SERVICE DISCONNECT. LOCATE SERVICE EQUIPMENT SO AS NOT TO OBSTRUCT SIGHT DISTANCE OF VEHICLES TURNING RIGHT ON RED.

2. FOR GROUND MOUNTED ELECTRICAL SERVICE INSTALLATIONS WHEN POST MOUNTING IS CHOSEN, INSTALL TREATED WOOD POSTS A MINIMUM OF 3 FEET INTO THE GROUND.

3. INSTALL ALL METER BASES MOUNTED IN PEDESTALS AT A HEIGHT NOT TO EXCEED 5 FEET AS MEASURED FROM THE CENTER OF THE METER. INSTALL ALL OTHER METER BASES AT A HEIGHT BETWEEN 4 FEET AND 5 FEET AS MEASURED FROM THE CENTER OF THE METER. SEAL ANY UNUSED MOUNTING HOLES ON COMBINATION PANELS, METER BASES AND SERVICE DISCONNECTS.

4. INSTALL OVERHEAD ELECTRICAL SERVICE ON POLES AS SHOWN WHEN UNDERGROUND SOURCE IS NOT AN OPTION. COMBINATION PANELS, OR METER BASES AND SERVICE DISCONNECTS, MAY BE INSTALLED ON POLES WHEN POLE MOUNTED SIGNAL CABINETS ARE REQUIRED FOR THE INSTALLATION. DO NOT ROUTE UNFUSED OVERHEAD ELECTRICAL SERVICE CONDUIT INSIDE OF METAL POLES.

5. TYPICAL POINT OF DELIVERY FOR UNDERGROUND SERVICE IS INSIDE OF METER BASE. TYPICAL POINT OF DELIVERY FOR OVERHEAD SERVICE IS AT THE WEATHERHEAD ENTRANCE AT THE TOP OF THE SERVICE RISER.

6. THE ABOVE GROUND PORTION OF ELECTRICAL SERVICE CONDUIT TO THE SIGNAL CABINET MUST BE METALLIC. THE BELOW GROUND PORTION MAY BE METALLIC OR PVC.

NOTES
TYPICAL ELECTRICAL CONNECTION DETAIL FOR 
OVERHEAD SERVICE INSTALLATION 
(SHOWN WITH METER BASE/SERVICE DISCONNECT OPTION AND WITH 
GROUNDING ELECTRODE CONDUCTOR TERMINATED IN DISCONNECT)

NOTES
1. WHEN USING A HUB LISTED AS A GROUNDING HUB (UL TYPES DWTT AND KDE), 
THE BONDING BUSHING IN THE METER BASE IS NOT NECESSARY.
MULTIPLE ELECTRODES

PLACE GROUNDING ELECTRODES IN A STRAIGHT LINE

SECTIONAL ELECTRODES

PLACE GROUNDING ELECTRODES AT 90°
5/8" DIA COPPER CLAD STEEL GROUNDING ELECTRODES, WITH EXOTHERMIC WELDING CONNECTION

WIRE STAPLES, 24" SPACING ABOVE 8 FEET AND 12" SPACING BELOW 8 FEET ABOVE GROUND (TYP)

FOR JOINT USE POLES ONLY, #6 AWG MIN SOLID BARE COPPER WITH SPLIT BOLT CONNECTORS OR PARALLEL GROOVE CLAMPS ON EACH END (CONNECTION TO BE MADE ABOVE SPECIAL ROUTING SHOWN BELOW)

FOR JOINT USE POLES ONLY, #6 AWG MIN SOLID BARE COPPER WITH SPLIT BOLT CONNECTORS OR PARALLEL GROOVE CLAMPS ON EACH END (CONNECTION TO BE MADE ABOVE SPECIAL ROUTING SHOWN BELOW)

SYSTEM POLE GROUND CONDUCTOR TO POWER WIRE STAPLES, 24" SPACING ABOVE 8 FEET AND 12" SPACING BELOW 8 FEET ABOVE GROUND (TYP)

PROVIDE WIRING ROUTING AND STAPLING SO THAT STAPLES MAY BE TEMPORARILY REMOVED AND GROUNDING WIRES CAN BE PULLED MIN 1.5" OFF POLE & SPACED MAX 0.75" APART TO ENABLE TESTING OF GROUNDING ELECTRODE RESISTANCE BY CLAMP ON TESTER
## STANDARD SIGNAL FACE CLEARANCES

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>WALK</th>
<th>DON'T WALK</th>
<th>OFF</th>
<th>ON</th>
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</tbody>
</table>

- **W** - WALK
- **FDW** - FLASHING DON'T WALK
- **DN** - DON'T WALK
- **FY** - FLASHING YELLOW ARROW

### Right of Way Phase
- **G** - Green
- **R** - Red
- **Y** - Yellow
- **F** - Flashing

### Clearance Phases
- **PED** - Pedestrian
- **WALK** - Walk
- **DON'T WALK** - Don't Walk
- **OFF** - Off
- **ON** - On

### Roadway Standard Drawing for Roadway Standard Drawings

**State of North Carolina Department of Transportation**

**Division of Highways**

**City of Raleigh, N.C.**

**Department of Transportation**

**State of North Carolina Division of Highways Raleigh, N.C.**

**Roadway Standard Drawing for Roadway Standard Drawings**
SIGNAL HEADS

WOOD POLE MOUNTING

FRONT VIEW

SIGNAL CABLE

GALVANIZED 2-HOLE PIPE STRAP ON 5' CENTERS

LEAD-IN CABLE

GALVANIZED 2-HOLE PIPE STRAP

1" MIN METALLIC CONDUIT FOR PEDESTRIAN SIGNAL CABLE

SIDE VIEW

FOR OVERHEAD INSTALLATION

GALVANIZED 2-HOLE PIPE STRAP

1" MIN METALLIC CONDUIT FOR PEDESTRIAN SIGNAL CABLE

SIDE VIEW

FOR OVERHEAD INSTALLATION

GALVANIZED 2-HOLE PIPE STRAP

1" MIN METALLIC CONDUIT FOR PEDESTRIAN SIGNAL CABLE

NOTES

1. CONNECT PUSHBUTTON TO CONTROLLER CABLE USING LEAD-IN CABLE. BOND PUSHBUTTON HOUSING AND ALL METAL COMPONENTS TO CABINET GROUND USING LEAD-IN CABLE GROUND.

2. MATCH MOUNTING BRACKETS TO MOUNTING REQUIREMENTS. OTHER APPROVED STYLES OF BRACKETS MAY BE USED.

3. REFER TO ROADWAY STANDARD DRAWING 1720.01 FOR GROUNDING AND SPANWIRE ATTACHMENT.

ROADWAY STANDARD DRAWING FOR WOOD POLE MOUNTING

PEDESTRIAN PUSHBUTTON OR APS ASSEMBLY

FOR UNDERGROUND INSTALLATION

7 MIN. 10 MAX

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

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

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

1. CONNECT PUSHBUTTON TO CONTROLLER CABINET USING LEAD-IN CABLE (INSIDE POLE FOR PREFERRED MOUNTING). BOND PUSHBUTTON HOUSING TO CABINET GROUND USING CABLE GROUND.

2. BOND METAL POLE AT CABINET LOCATION TO CABINET GROUND USING #14 AWG TYPE THWN.

3. MATCH MOUNTING BRACKETS TO MOUNTING REQUIREMENTS. OTHER APPROVED STYLES OF BRACKETS MAY BE USED.
NOTES

1. MATCH MOUNTING BRACKETS TO MOUNTING REQUIREMENTS. OTHER APPROVED STYLES OF BRACKETS MAY BE USED.

2. IF PUSHBUTTONS ARE INSTALLED, CONNECT PUSHBUTTON TO CONTROLLER CABINET USING LEAD-IN CABLE INSIDE POLE FOR PREFERRED MOUNTING. BOND PUSHBUTTON HOUSING COMPONENTS TO CABINET GROUND USING CABLE GROUND.

3. BOND METAL POLE AT CABINET LOCATION TO CABINET GROUND USING #14 AWG TYPE THWN.

ALTERNATE

1" MIN METALLIC CONDUIT FOR SIGNAL CABLE

1/4" MIN STAINLESS STEEL STRAP ON 5' CENTERS (TYP)

1/4" STAINLESS STEEL STRAPS (TYP)
NOTE

1. CONNECT PUSHTO-TO CONTROLLER CABINET USING LEAD-IN CABLE. BOND PUSHTOUSING AND ALL METAL COMPONENTS TO CABINET GROUND USING CABLE GROUND.

2. BOND PEDESTAL ASSEMBLY TO CABINET GROUND WITH #14 AWG TYPE THWN.

3. REFER TO ROADWAY STANDARD DRAWING 1743 FOR PEDESTAL INFORMATION.
SIGNAL HEADS - PUSHBUTTON POST MOUNTING

NOTES

1. CONNECT PUSHBUTTON TO CONTROLLER CABINET USING LEAD-IN CABLE. BOND PUSHBUTTON HOUSING AND ALL METAL COMPONENTS TO CABINET GROUND USING CABLE GROUND.

2. REFER TO ROADWAY STANDARD DRAWING 1743 FOR PEDESTAL INFORMATION.
NOTE

1. IF PUSHBUTTONS ARE INSTALLED, CONNECT PUSHBUTTON TO CONTROLLER CABINET USING LEAD-IN CABLE. BOND PUSHBUTTON HOUSING TO CABINET GROUND USING CABLE GROUND.

2. BOND PEDESTAL ASSEMBLY TO CABINET GROUND WITH #14 AWG TYPE THWN.

3. REFER TO ROADWAY STANDARD DRAWING 1743 FOR PEDESTAL INFORMATION.
**WIRE COLOR**

<table>
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<th>INDICATION TYPE/COLOR</th>
<th>R</th>
<th>3-SECTION CIRCULAR</th>
<th>3-SECTION ARROW</th>
<th>3-SECTION PYA</th>
<th>4-SECTION PYA</th>
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<tr>
<td>RED</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- DON'T WALK</td>
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<tr>
<td>YELLOW</td>
<td>Y</td>
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<td>EF</td>
<td>EF</td>
<td>Y</td>
<td>- WALK</td>
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<tr>
<td>GREEN</td>
<td>G</td>
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<tr>
<td>RED-BLACK STRIPE</td>
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<tr>
<td>YELLOW-BLACK STRIPE</td>
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<tr>
<td>GREEN-BLACK STRIPE</td>
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<tr>
<td>WHITE</td>
<td>←</td>
<td></td>
<td>←</td>
<td>←</td>
<td>→</td>
<td>NEUTRAL</td>
</tr>
</tbody>
</table>

SOLID OR STRIPED COLORS MAY BE USED ON HEADS WITH MIXED INDICATION TYPES. WHERE PRACTICAL, COORDINATE WIRE COLOR WITH INDICATION COLOR. WHERE INSULATION COLOR DOES NOT MATCH THE INDICATION COLOR OF VEHICULAR DISPLAYS, WRAP APPROPRIATELY COLORED TAPE OVER INSULATION NEAR TERMINATION POINTS.
1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
2. The face of the pushbutton should be parallel to the applicable crosswalk.
3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

**LEGEND**
- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area
**IN EXISTING PAVEMENT**

(Not at Gutter)

- Saw cut 3" min.
- Pavement
- Replace subbase in kind
- Conduit
- Backfill
- Undisturbed subgrade
- Concrete or asphalt patch to match existing

**In Existing Pavement**

(At Gutter)

- Saw cut 3" min.
- Pavement
- Replace subbase in kind
- Conduit
- Backfill
- Undisturbed subgrade
- Concrete or asphalt patch to match existing

**In Sidewalk Or Driveway**

- Replace entire sidewalk or driveway section, as required
- Curb or curb & gutter
- Roadway surface
- Undisturbed earth
- Marker tape
- Backfill
- Conduit

**In New Pavement**

- Pavement
- Trench width
- Subbase
- Backfill
- Undisturbed subgrade

**In Earth**

- Trench width
- Undisturbed earth
- Marker tape
- Backfill
- Conduit

**Note**

Dig trench wide enough to accept the required conduits and to permit proper compaction.

**The removal of pavement beyond the edges of the trench, as shown, will not be required if said edges are saw cut and maintained neatly with no shatter.**
NOTE

THE CONTRACTOR, WITH APPROVAL FROM THE ENGINEER, MAY ADJUST FINAL BURIAL DEPTH OF CONDUIT(S) IN ORDER TO TRAVERSE NON-MOVABLE OBJECTS.

CONDUIT TRENCHING

CONDUIT LOCATED BEHIND GUARDRAIL

CONDUIT LOCATED IN FRONT OF GUARDRAIL

SLOPE MAY VARY

CONDUIT TRENCHING AROUND NON-MOVABLE OBJECT

FINISHED GRADE

MARKER TAPE

12" MIN

BACKFILL TO SUPPORT CONDUIT. MINIMIZE SEVERITY OF CABLE BEND BY PROVIDING GRADUAL TRANSITION FROM CURRENT POSITION TO REQUIRED POSITION.
INSTALLATION CROSS-SECTION

JUNCTION BOX
OVER-SIZED

BONDING CLAMP FOR METAL CONDUITS (TYP)
COVER
BOND ALL METAL CONDUITS TOGETHER USING A SINGLE, CONTINUOUS #6 AWG SOLID BARE COPPER WIRE

EARTH

CONDUIT RISE FROM TRENCH TO JUNCTION BOX

10' MIN

CONDUIT AS REQUIRED

FOR CONDUITS ENTERING JUNCTION BOX THROUGH THE SIDES, SEAL AROUND THE CONDUIT WITH NON-SHRINKING GROUT

FOR COMMUNICATIONS CABLE (FIBER OPTIC/TWISTED PAIR) INSTALLATION, USE 45° ELL MAX

NOTES

1. OTHER STYLES OF JUNCTION BOXES WILL BE ACCEPTABLE PROVIDED THEY SATISFY REQUIREMENTS OF SECTION 1716 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

2. SECURE COVER WITH TWO HEX BOLTS.

3. INSTALL CONDUIT THROUGH BOTTOM OF JUNCTION BOX. AS AN ALTERNATIVE CONDUIT MAY ENTER THROUGH "MOUSE HOLE" INTO SIDE OF JUNCTION BOX.

4. FOR CURB AND GUTTER SECTIONS, LOCATE JUNCTION BOXES A MINIMUM OF 6" BEHIND BACK OF CURB AND FOR PAVEMENT SECTIONS A MINIMUM OF 2' FROM PAVEMENT EDGE OR WITHIN RIGHT OF WAY.

5. COIL AND STORE 10' OF TRACER WIRE IN ALL JUNCTION BOXES WITH FIBER OPTIC CABLE.

OVER-SIZED JUNCTION BOX

TRAFFIC SIGNAL

EMBOSSED, IMPRESSED, MOLDED OR ENGRAVED LETTERS MIN 1 1/2" HIGH

NCDOT FIBER OPTIC

TOP VIEW OF COVER

STANDARD SIZE JUNCTION BOX

JUNCTION BOX
STANDARD SIZE

BONDING CLAMP FOR METAL CONDUITS (TYP)
COVER
BOND ALL METAL CONDUITS TOGETHER USING A SINGLE, CONTINUOUS #6 AWG SOLID BARE COPPER WIRE

EARTH

OVER-SIZED

CONDUIT AS REQUIRED FOR NON-COMMUNICATIONS CABLE INSTALLATION, USE 90° ELL MAX
TWO-BOLT METHOD (PREFERRED)

1" SERVICE RISER WITH WEATHERHEAD

5/8" SHOULDER EYE BOLT WITH CURVED SQUARE WASHERS (3" X 3") AND DOUBLE NUTS

GALVANIZED 2-HOLE PIPE STRAPS ON 5 CENTERS

BOLT

WASHER

PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT

5/8" SHOULDER ANGLE EYE BOLT WITH CURVED SQUARE WASHER (3" X 3") AND NUT

PARALLEL GROOVE CLAMP

ONE-BOLT METHOD

1" SERVICE RISER WITH WEATHERHEAD

5/8" EYE NUT WITH CURVED SQUARE WASHER (3" X 3") AND NUT

PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT

MULTIPLE SPANS

INSTALL EYE BOLTS 8 INCHES APART VERTICALLY, MINIMUM

SHOULDER EYE BOLT WITH WASHER, NUTS AND ANGLE EYE (TYP)

PARALLEL GROOVE CLAMP

PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT

COMMUNICATIONS CABLE AT INTERMEDIATE POLE

SUSPENSION CLAMP WITH "J" HOOK

PARALLEL GROOVE CLAMP

WRAPPING TAPE OR LASHING WIRE (TYP)

COMMUNICATIONS CABLE

NOTE

FOR CONNECTING MESSENGER TO MESSENGER, USE PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT. FOR CONNECTING COPPER WIRE TO MESSENGER, USE PARALLEL GROOVE CLAMP.
GENERAL NOTES

1. GUY EACH SPAN SEPARATELY.

2. USE EYE HARDWARE (EYE BOLTS, EYE NUTS, ANGLE EYES, EYES, TRIPLE-EYE BOLT ANCHOR RODS) WITH ROUNDED GROOVES IN THE EYES. PROVIDE A SEPARATE GROOVE FOR EACH CABLE TO BE TERMINATED.

3. SEE ROADWAY STANDARD DRAWING 1720 FOR METHODS OF ATTACHMENT AND GROUNDING.
Sheet 2 of 3
1721.01

DEADEND STRANDVISE

GUY CABLE

SIDEWALK GUY CLAMP END FITTING

SIDEWALK GUY POLE PLATE

1/2" GALVANIZED PIPE

W = 5' TO 10', BUT NOT GREATER THAN H

GUY GUARD

3-BOLT CLAMP

TRIPLE-EYE BOLT

THREADED ANCHOR

ROD WITH ANCHOR

RALEIGH, N.C.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

RALEIGH, N.C.

DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA

ROADWAY STANDARD DRAWING FOR GUY ASSEMBLIES

SIDEWALK DOWN GUY
**SAW SLOT DEPTH CHART**

<table>
<thead>
<tr>
<th>DEPTH (IN)</th>
<th>NO. OF WIRE TURNS</th>
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<tbody>
<tr>
<td>2</td>
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<tr>
<td>3</td>
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**CONVENTIONAL 4-SIDED LOOP**

**SAW CUT OPTIONS**

**OPTION 1**

- 12'-18'

**OPTION 2** *(POOR PAVEMENT)*

- 45°
- 5/8" MIN (TYP)

**LOOP WINDING METHOD**

**START**

**FINISH**

**LOOP WIRE TAIL SECTION TO JUNCTION BOX**

**NOTE**

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**

**OPTION 1**

- 8'-12'

**OPTION 2** *(POOR PAVEMENT)*

- 12'-18'
- 45°

**LOOP WINDING METHOD**

**START**

**FINISH**

**LOOP WIRE TAIL SECTION TO JUNCTION BOX**

**NOTE**

- 1¼" CORE DRILL ALL SAW CUT INTERSECTIONS

**CHISEL EDGES SMOOTH**

**SECTION A - A**

**INDUCTIVE DETECTION LOOP**

**ROADWAY STANDARD DRAWING FOR INDUCTIVE DETECTION LOOPS**
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.
**Loop Wire and Lead-In Cable Connection Details**

**Single Connection**
- Loop Wire
- Lead-In Cable

**Series Connection**
- Loop Wire
- Lead-In Cable

**Step 1. Strip Loop Wire and Lead-In Cable**
- Shield
- Lead-In Cable
- Drain Wire
- Loop Wire

**Step 2. Connect and Solder**
- Twist bare conductors together with resin core solder
- Or
- Crimp bare conductors together with an uninsulated butt connector and solder with resin core solder

**Step 3. Insulate Each Solder Joint Separately**
- Shrink tube

**Step 4. Environmentally Protect Splice**
- Loop Wire tail sections
- Silicone impregnated shrink tubing

**Bond Shield Drain Wire at Splice Sections (Do Not Ground)**
TOP VIEW

ATTACH CABLE TO AND BETWEEN EACH STORAGE RACK (SNOW SHOE)

CABLE STORAGE RACKS
(SNOW SHOES)

POLE

PLAN VIEW

50'

FIBER-OPTIC CABLE
SPARE CABLE STORAGE

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

ROADWAY STANDARD DRAWING FOR
FIBER-OPTIC CABLE
SPARE CABLE STORAGE

SHEET 1 OF 1
1730.01
RADIO SYSTEM INSTALLATION

SPREAD SPECTRUM RADIO

ROADWAY STANDARD DRAWING FOR

SPREAD SPECTRUM RADIO

RADIO SYSTEM INSTALLATION

RALIEGH, N.C.
DIVISION OF HIGHWAYS
DEPT. OF TRANSPORTATION
NORTH CAROLINA

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

1. WOOD POLE — BOND #6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF #6 AWG SOLID BARE COPPER WIRE TO THE POLE GROUND USING A SPLIT BOLT CONNECTOR. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE GROUND. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "POLE GROUND" IS IN PLACE.

METAL POLE — BOND #6 AWG SOLID BARE COPPER WIRE TO ANTENNA SUPPORT USING LISTED PIPE CLAMP. BOND OTHER END OF #6 AWG SOLID BARE COPPER WIRE TO THE POLE OR EXISTING SYSTEM GROUND USING A METHOD APPROVED BY THE ENGINEER. BOND SHIELD OF COAXIAL CABLE WITH AN APPROVED GROUNDING SYSTEM (USING #6 AWG STRANDED COPPER WIRE) BONDED TO THE POLE BY A METHOD APPROVED BY THE ENGINEER. WEATHERPROOF THE CONNECTION ONCE THE GROUNDING SYSTEM IS INSTALLED. ENSURE "SYSTEM GROUND" IS IN PLACE.

2. YAGI ANTENNA SHOWN IN VERTICAL POLARIZATION POSITION FOR CLARIFICATION. TYPICALLY INSTALL ANTENNA IN HORIZONTAL POLARIZATION POSITION.

3. TO CONSERVE VERTICAL SPACING ON THE POLE (JOINT-USE OR SIGNAL POLE) WITH REGARDS TO THE SURROUNDING UTILITIES, INSTALL THE ANTENNA MOUNTING HARDWARE USING ONE OF THE TWO METHODS LISTED BELOW: (ENSURE THAT THE MOUNTING METHOD DOES NOT DEGRADE THE ANTENNA'S SIGNAL INTEGRITY)

A) ROTATE THE VERTICAL SUPPORT ARM 90 DEGREES SUCH THAT THE ANTENNA IS AT THE SAME HEIGHT AS THE HORIZONTAL SUPPORT ARM.

B) ELIMINATE THE VERTICAL SUPPORT ARM AND MOUNT THE ANTENNA TO THE HORIZONTAL SUPPORT ARM.

C) ANTENNA, ANTENNA SUPPORT ARM, AND SIGN TO MAINTAIN A 40" SEPARATION FROM NEUTRAL/POWER AND 12" FROM OTHER UTILITIES.

4. INSTALL AN END CAP TO SEAL THE EXPOSED END OF THE MOUNTING PIPE.
1. Legend and border shall be direct applied non-reflective sheeting.
2. Background shall be Grade C reflective sheeting.

NOTE: THIS SIGN SHALL BE PRODUCED AS A DECAL

RF ANTENNA DISCONNECT SWITCH

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<th>X</th>
<th>Y</th>
<th>WID</th>
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Letter spacings are to start of next letter

Spacing Factor is 1 unless specified otherwise
### POLE MOUNTED SIGN

**SIGN NUMBER:** SP05223  
**BACKG COLOR:** Yellow  
**COPY COLOR:** Black  
**PROJECT ID:** DIV: INTELLINET TRANSPORTATION SYSTEMS  
**DATE:** Revised M.Manriquez 5/23/2017  
**CHECKED BY:** SUSAN KUNZ

#### USE NOTES:
1. Legend and border shall be direct applied non-reflective sheeting.  
2. Background shall be Grade C reflective sheeting.

#### LETTER POSITIONS

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#### Total Area
0.8 Sq.Ft.

####CTIONS
- **Symbol:** X  
- **Type:** D  
- **Quantity:**  
- **Sign Width:** 0'-9"  
- **Height:** 1'-0"  
- **Total Area:** 0.8 Sq.Ft.  
- **Border Type:** Flush  
- **Recess:** 0"  
- **Width:** 0.2"  
- **Radii:** 1"  
- **No. Z Bars:**  
- **Length:**  

#### Background
- **Material:** 0.063" (1.6 mm) ALUMINUM
- **Legend and border shall be direct applied non-reflective sheeting.

#### USE NOTES
- **Note:** Letter spacings are to start of next letter.
NOTES:

1. CONSTRUCT POSTS ON FHWA APPROVED BREAKAWAY BASES OR ANCHORS.
2. CONSTRUCT POST FOUNDATIONS IN ACCORDANCE WITH STANDARD DRAWING 1743.04.
3. PUSHBUTTON POSTS ARE DESIGNED FOR USE IN ALL WIND ZONE REGIONS.

PEDESTAL BASE REACTIONS USING 4" OD SCHEDULE 40 ALUMINUM PIPE ARE:

- AXIAL LOAD: 60 LBS
- SHEAR LOAD: 120 LBS
- MOMENT LOAD: 435 FT-LBS

4. BASE REACTIONS ARE BASED ON A DESIGN LOADING FOR 2 PUSHBUTTONS AND 2 PEDESTAL SIGNS. DO NOT EXCEED THE DESIGN LOADING WITHOUT APPROVAL.
5. ALL ELECTRICAL CONDUCTORS INSIDE OF BREAKAWAY SUPPORTS SHOULD SHEAR OR BREAKAWAY TRANSFORMER BASES.

PEDESTAL BASE ANCHORING DETAIL

PEDESTRIAN PUSH-BUTTON POST (TYPE I)

TRANSFORMER BASE ANCHORING DETAIL

TO BE USED WITH BREAKAWAY ANCHORS ONLY
NOTES:
1. CONSTRUCT PEDESTALS ON FHWA APPROVED BREAKAWAY BASES OR ANCHORS.
2. CONSTRUCT PEDESTAL FOUNDATIONS IN ACCORDANCE WITH STANDARD DRAWING 1743.04.
3. NORMAL DUTY PEDESTALS ARE DESIGNED FOR USE IN ALL WIND ZONE REGIONS.
   PEDESTAL BASE REACTIONS USING 4½" OD SCHEDULE 40 ALUMINUM PIPE ARE:
   AXIAL LOAD: 970 LB
   SHEAR LOAD: 370 LB
   MOMENT LOAD: 2,580 FT-LBS
4. BASE REACTIONS ARE BASED ON A DESIGN LOADING FOR 2 - 3 SECTION SIGNAL HEADS.
   2 - PEDESTRIAN SIGNALS, 2 PUSHBUTTONS AND 2 PEDESTRIAN SIGNS. DO NOT EXCEED
   DESIGN LOADING WITHOUT APPROVAL.
5. ALL ELECTRICAL CONDUCTORS INSIDE OF BREAKAWAY SUPPORTS SHOULD SHEAR OR
   BECOME DISCONNECTED AS CLOSE TO THE FOUNDATION BASE AS POSSIBLE DURING
   A KNOCKDOWN. REFER TO ELECTRICAL CONDUCTOR SHEAR DEVICE DETAIL. IF ALTERNATIVES
   ARE AVAILABLE THEY CAN BE USED PER APPROVAL OF THE
6. PROVIDE POLE AND BASE COLLAR ASSEMBLY.

NORMAL DUTY PEDESTAL ON
BREAKAWAY TRANSFORMER BASE

TOP VIEW
FRONT VIEW
SIDE VIEW
BOTH VIEW

TRANSFORMER BASE STYLES
NORMAL DUTY PEDESTALS (TYPE II)

BREAKAWAY ANCHOR BOLT DETAIL
TO BE USED WITH BREAKAWAY ANCHORS ONLY

PULL OUT FORCE= 2730 LBS.
SHEAR FORCE= 120 LBS.
MINIMUM SAFETY FACTOR= 2.5

OPTION-1
OPTION-2

ELECTRICAL CONDUCTOR
SHEAR DEVICE DETAIL
SEE NOTE #6

BREAKAWAY ANCHOR BOLT DETAIL
TO BE USED WITH THREADED FLANGE BASES ONLY

PLAN VIEW
ELEVATION VIEW

THREADED FLANGE BASE STYLES
TO BE USED WITH BREAKAWAY ANCHORS ONLY

7½" MIN. BOLT CIRCLE
12½" MIN. BOLT CIRCLE

PER STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.
DIVISION OF HIGHWAYS
DEPT. OF TRANSPORTATION
NORTH CAROLINA
STATE OF
R A L E I
G H ,
N .
C.

ROADWAY STANDARD DRAWING FOR
NORMAL DUTY PEDESTALS
NORMAL DUTY PEDESTALS (TYPE II)

SHEET 1 OF 1
1743.02
NOTES:

1. CONSTRUCT PEDESTALS ON FHWA APPROVED BREAKAWAY BASES OR ANCHORS.
2. CONSTRUCT PEDESTAL FOUNDATIONS IN ACCORDANCE WITH STANDARD DRAWING 1743.04.
3. HEAVY DUTY PEDESTALS ARE DESIGNED FOR USE IN ALL WIND ZONE REGIONS.
4. PEDESTAL BASE REACTIONS USING 4½” OD SCHEDULE 120 GALVANIZED STEEL PIPE ARE:
   - AXIAL LOAD: 600 LBS
   - SHEAR LOAD: 1,500 LBS
   - MOMENT LOAD: 14,500 FT-LBS
5. BASE REACTIONS ARE BASED ON A DESIGN LOADING FOR 2 - 12” SIGNALS AND A 48” X 48” SIGN. DO NOT EXCEED DESIGN LOADING WITHOUT APPROVAL.
6. ALL ELECTRICAL CONDUCTORS INSIDE OF BREAKAWAY SUPPORTS SHOULD SHEAR OR BECOME DISCONNECTED AS CLOSE TO THE FOUNDATION BASE AS POSSIBLE DURING A KNOCKDOWN. REFER TO ELECTRICAL CONDUCTOR SHEAR DEVICE DETAIL. IF ALTERNATIVES ARE AVAILABLE THEY CAN BE USED PER APPROVAL OF THE ENGINEER.
7. DO NOT USE BREAKAWAY ANCHOR BOLTS WITH THIS TYPE OF PEDESTAL.
PEDESTAL FOUNDATION DETAILS FOR SIDEWALK

NOTES:

1. CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.

2. COMPLY WITH APPLICABLE PROVISIONS OF SECTION 625 FOR CONCRETE CONSTRUCTION.

3. USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF F'c= 3000 PSI (MIN.).

4. USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.

5. GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
   A. SANDY TYPE SOIL
   B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
   C. WIND SPEED NOT TO EXCEED 140 MPH
   IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.

6. MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.

7. ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.

8. USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.

C. WIND SPEED NOT TO EXCEED 140 MPH

B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION

A. SANDY TYPE SOIL

TYPE DESCRIPTION:

PEDESTAL FOUNDATION TYPE AND SIZE

<table>
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<th>PEDESTAL DESCRIPTION</th>
<th>DIAMETER &quot;A&quot;</th>
<th>DEPTH &quot;B&quot;</th>
<th>CONCRETE VOLUME CY</th>
<th>DIAMETER (MIN.)</th>
<th>INSTALL GROUNDING SYSTEM (YES/NO)</th>
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PEDESTAL FOUNDATION DETAILS:

PEDESTAL FOUNDATION - PLAN VIEW

PEDESTAL FOUNDATION - LONG SECTION A-A

REINFORCING STEEL SCHEDULE

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NOTE

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