

GENERAL CONDITIONS OF APPROVAL

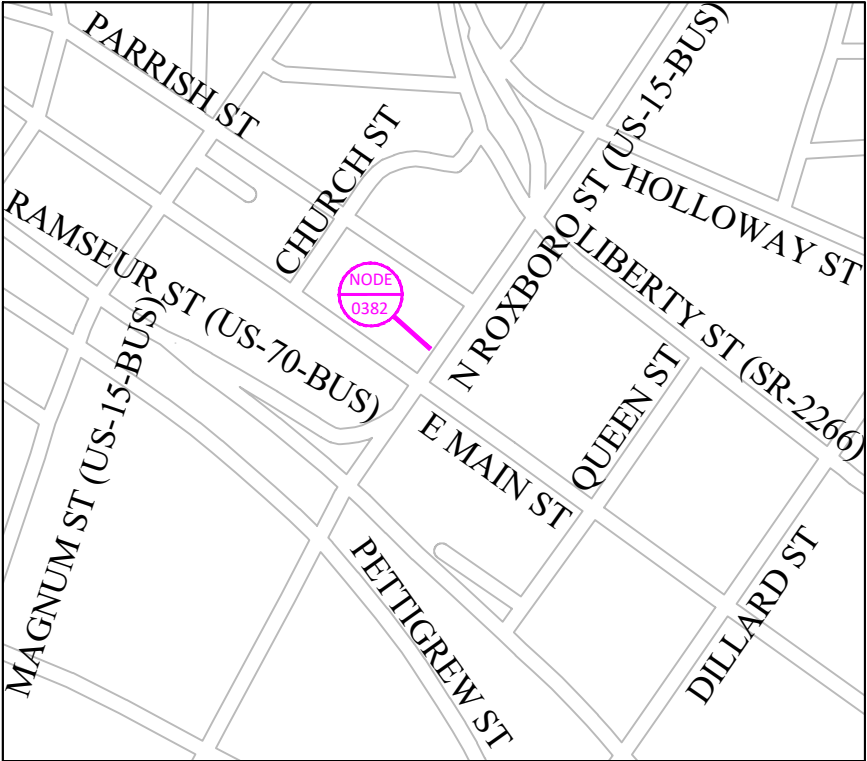
1. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED IN THE CONTRACT DOCUMENTS.
2. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR(S) SHALL VISIT THE JOB SITE(S) AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED PER THE CONTRACT DOCUMENTS. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ARCHITECT/ ENGINEER.
3. THE CONTRACTOR SHALL RECEIVE WRITTEN AUTHORIZATION TO PROCEED ON ANY WORK NOT CLEARLY DEFINED OR IDENTIFIED IN THE CONSTRUCTION DOCUMENTS BEFORE STARTING ANY WORK.
4. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES, INCLUDING APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS.
5. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS. IF THESE RECOMMENDATIONS ARE IN CONFLICT WITH THE CONTRACT DOCUMENTS AND/OR APPLICABLE CODES OR REGULATIONS, REVIEW THE CONFLICT FOR DIRECTION WITH THE IMPLEMENTATION ENGINEER AND ARCHITECT/ENGINEER PRIOR TO PROCEEDING.
6. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEEDINGS AND FOR COORDINATION OF ALL PORTIONS OF THE WORK UNDER THE CONTRACT INCLUDING CONTACT AND COORDINATION WITH THE IMPLEMENTATION ENGINEER AND WITH THE AUTHORIZED REPRESENTATIVE OF ANY OUTSIDE POLE OR PROPERTY OWNER.
7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, PAVING, CURBS, VEGETATION, GALVANIZED SURFACE OR OTHER EXISTING ELEMENTS AND UPON COMPLETION OF THE WORK, REPAIR ANY DAMAGE THAT OCCURRED DURING CONSTRUCTION TO THE SATISFACTION OF FIBERTECH.
8. KEEP THE GENERAL AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH, AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. LEAVE PREMISES IN CLEAN CONDITION DAILY.
9. PLANS ARE INTENDED TO BE DIAGRAMMATIC ONLY AND SHOULD NOT BE SCALED UNLESS OTHERWISE NOTED. RELY ONLY ON ANNOTATED DIMENSIONS AND REQUEST INFORMATION IF ADDITIONAL DIMENSIONS ARE REQUIRED.
10. THE EXISTENCE AND LOCATION OF UTILITIES AND OTHER AGENCY'S FACILITIES ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. OTHER FACILITIES MAY EXIST BEYOND WHAT IS NOTED. CONTRACTOR SHALL VERIFY LOCATIONS PRIOR TO START OF CONSTRUCTION AND USE EXTREME CARE AND PROTECTIVE MEASURES TO PREVENT DAMAGE TO THESE FACILITIES. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF UTILITIES OR OTHER AGENCY'S FACILITIES WITHIN THE LIMITS OF WORK, WHETHER THEY ARE IDENTIFIED IN THE CONTRACT DOCUMENTS OR NOT.

PUBLIC WORKS CONDITIONS OF APPROVAL

SPECIAL CONDITIONS OF APPROVAL

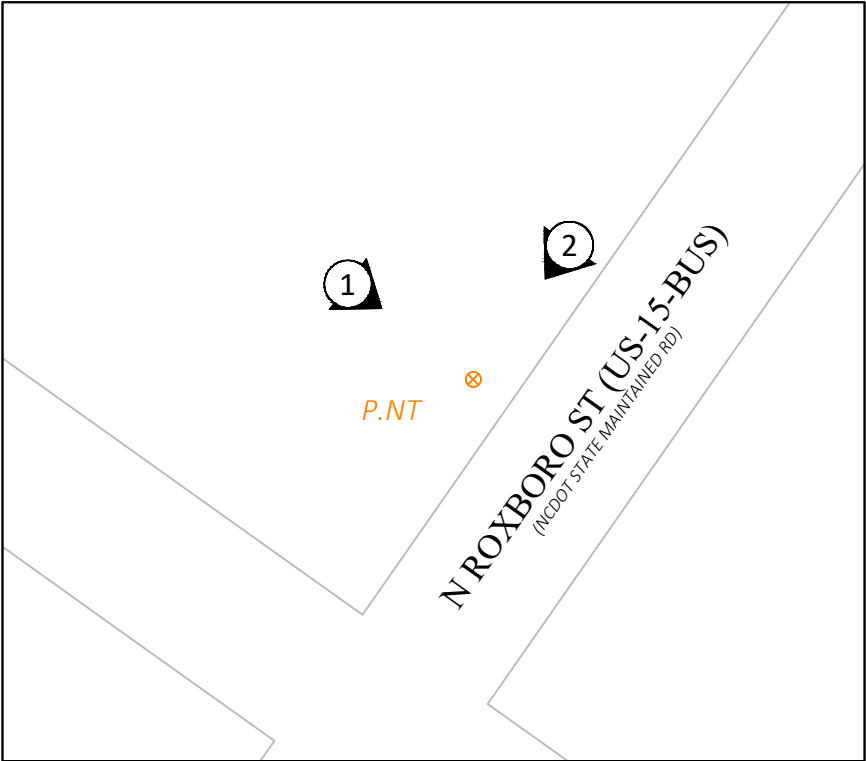


SMALL CELL
PROPOSED NODE SC-NC 0382 LOCATION
DURHAM, NC



VICINITY MAP

LAT: 35.994025° LONG: -78.898332°
1" = 500'



NODE PLACEMENT

1" = 50'

PROPOSED NODE INFORMATION:

LATITUDE: 35.994025°
LONGITUDE: -78.898332°
ELEVATION: 404' AMSL

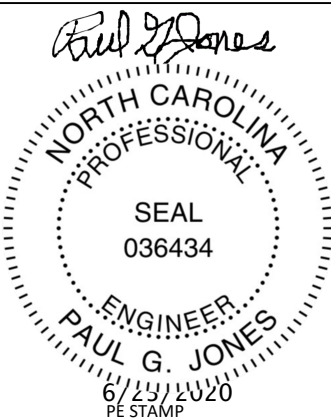
SITE INFORMATION:

SITE ADDRESS: 200 E MAIN ST
DURHAM, NC 27701
PROPERTY PIN: 0821-09-96-9856
ZONING: DOWNTOWN DESIGN - CORE
COUNTY: DURHAM
WATERSHED: THIRD FORK CREEK
RIVER BASIN: CAPE FEAR
LAND USE: CMNTY SVC/GOVT BLDGS

POLE OWNER:
DUKE ENERGY

NOTES:

PREPARED FOR:



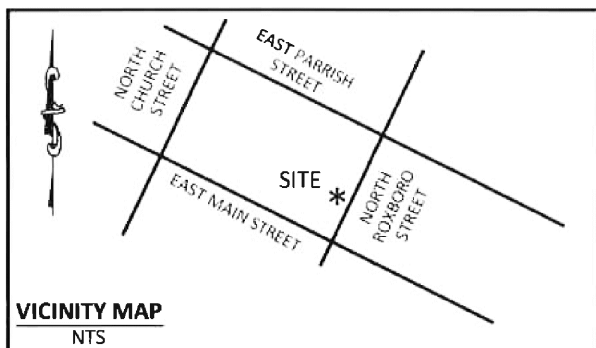
PREPARED BY:











FIBERTECH SMALL CELL
LOCATION MAPS

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR,ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20
DRAFTER: BAJ		1
SCALE: AS NOTED		
ISSUE DATE: 03/08/17		
INDEX NAME: SC-NC 0382		
SHEET #: 1 OF 15		

FOR PERMITTING PURPOSES ONLY



LEGEND

- | | |
|-----------------------------------------------------------------------------------|----------------------|
|  | EXIST. UTILITY POLE |
|  | EXIST. LIGHT POLE |
|  | COTTON SPINDLE FOUND |
|  | IRON PIPE FOUND |
|  | COMPUTED POINT |
|  | CONCRETE MONUMENT |
|  | TELEPHONE PEDESTAL |
|  | UTILITY HANDHOLE |



STATE PLANE (NAD 83)

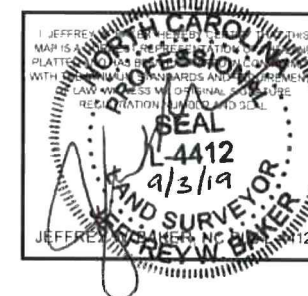
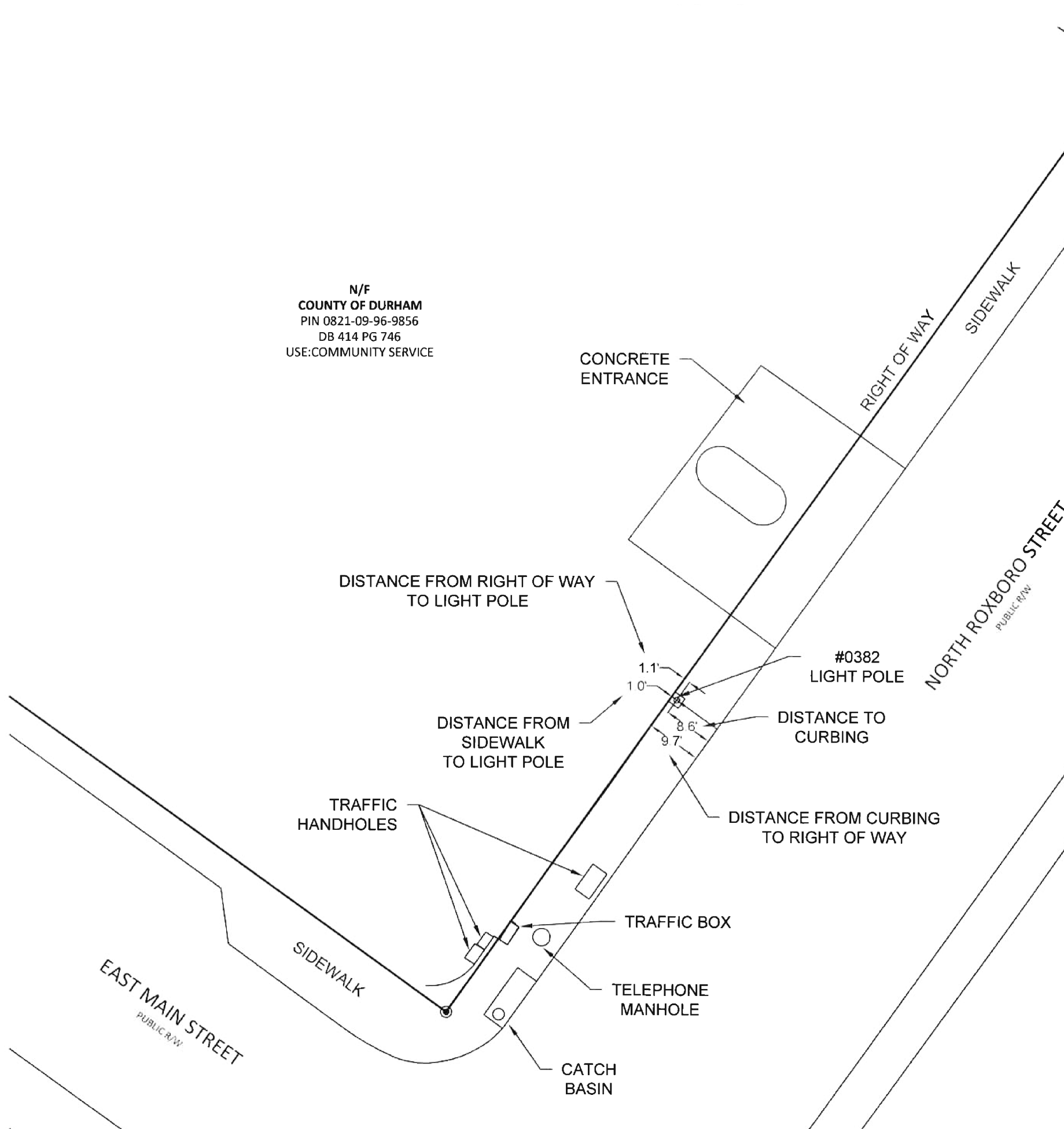
N/F
COUNTY OF DURHAM
PIN 0821-09-96-9856
DB 414 PG 746
USE:COMMUNITY SERVICE

EXISTING CENTER OF POLE

LATITUDE N 35° 59' 38.49" (NAD83)
LONGITUDE W -78° 53' 54.11" (NAD83)

GENERAL NOTES

- 1 THIS SURVEY WAS PREPARED BY BATEMAN CIVIL SURVEY CO., UNDER THE SUPERVISION OF JEFFREY W BAKER, PLS
- 2 THIS PLAN HAS BEEN PREPARED FOR LAYOUT AND PERMITTING PURPOSES ONLY
3. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES SHOWN WERE TAKEN FROM EXISTING FIELD EVIDENCE, EXISTING DEEDS AND PLATS OF PUBLIC RECORD, AND INFORMATION SUPPLIED TO THE SURVEYOR BY THE CLIENT
- 4 VERTICAL DATUM IS (NAVD88), THE LATITUDE, LONGITUDE AND STATE PLANE COORDINATES, IF SHOWN, ARE GIVEN IN NORTH AMERICAN DATUM OF 1983 (NAD83)
- 5 FIELD EQUIPMENT USED: TOPCON TOTAL STATION, EPOCH 35
- 6 ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES AND ALL BEARINGS ARE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM UNLESS OTHERWISE SHOWN
- 7 THIS MAP IS NOT A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS



LOCATION: DURHAM, NORTH CAROLINA
35.994025°, -78.898332°

POLE OWNER:	DUKE ENERGY
-------------	-------------

NOTES:

PREPARED FOR:

PREPARED BY:



21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
EXISTING CONDITIONS SURVEY

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20

DRAFTER: BAI

SCALE: SEE BAR SCALE

ISSUE DATE: 03/08/17

INDEX NAME: SC-NC 033

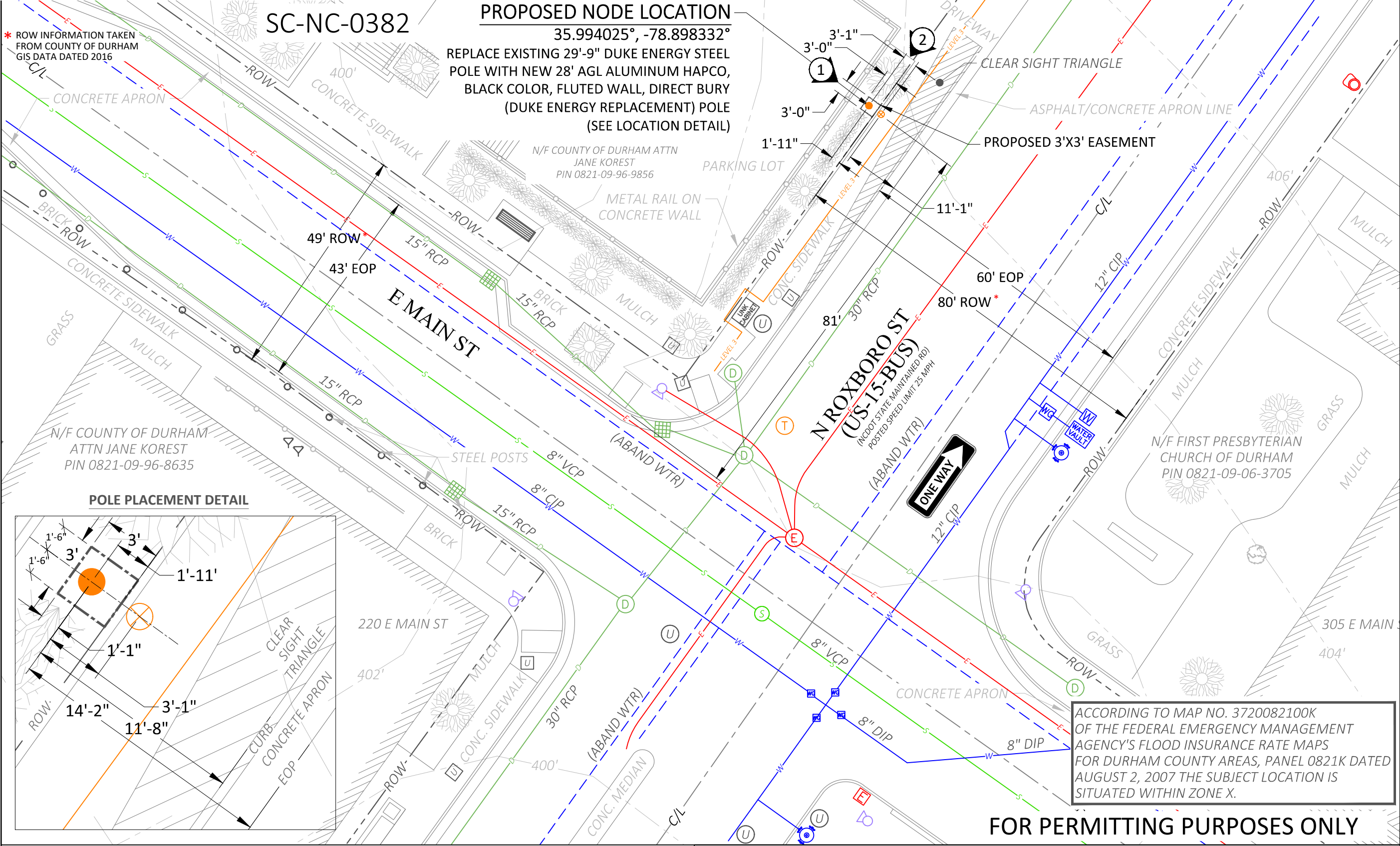
SC-NC-0382

PROPOSED NODE LOCATION

35.994025°, -78.898332°

REPLACE EXISTING 29'-9" DUKE ENERGY STEEL POLE WITH NEW 28' AGL ALUMINUM HAPCO, BLACK COLOR, FLUTED WALL, DIRECT BURY (DUKE ENERGY REPLACEMENT) POLE (SEE LOCATION DETAIL)

* ROW INFORMATION TAKEN FROM COUNTY OF DURHAM GIS DATA DATED 2016



Paul G. Jones

NORTH CAROLINA PROFESSIONAL SEAL 036434 ENGINEER PAUL G. JONES 6/23/2020

North Carolina 811 www.nc811.org

CALL BEFORE YOU DIG
REQUIRES 72 HOURS
BEFORE YOU EXCAVATE
811 OR 1-800-632-4949

LOCATION: DURHAM, NORTH CAROLINA
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY: PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL SITE PLAN

REVISIONS		
REV	DESCRIPTION	DATE
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2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TWP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20

DRAFTER: BAJ	3
SCALE: SEE BAR SCALE	
ISSUE DATE: 03/08/17	
INDEX NAME: SC-NC GN 0382	
SHEET #: 3 OF 15	

NOTE:
REPLACE EXISTING 29'-9" DUKE ENERGY POLE
WITH NEW 28' AGL ALUMINUM HAPCO,
BLACK COLOR, FLUTED WALL, DIRECT BURY
(DUKE ENERGY REPLACEMENT) POLE

STREETLIGHT 26'-8"

STREETLIGHT 26'-8"

29'-9"

SCALE IN FEET

1

EXISTING PROFILE - REAR VIEW
LOOKING SOUTHEAST TOWARDS N ROXBORO ST

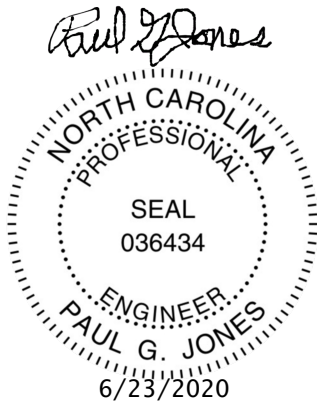
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0

5

2

EXISTING PROFILE - SIDE VIEW
LOOKING SOUTHWEST TOWARDS E MAIN ST



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR:
CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:
PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
EXISTING

REVISIONS		
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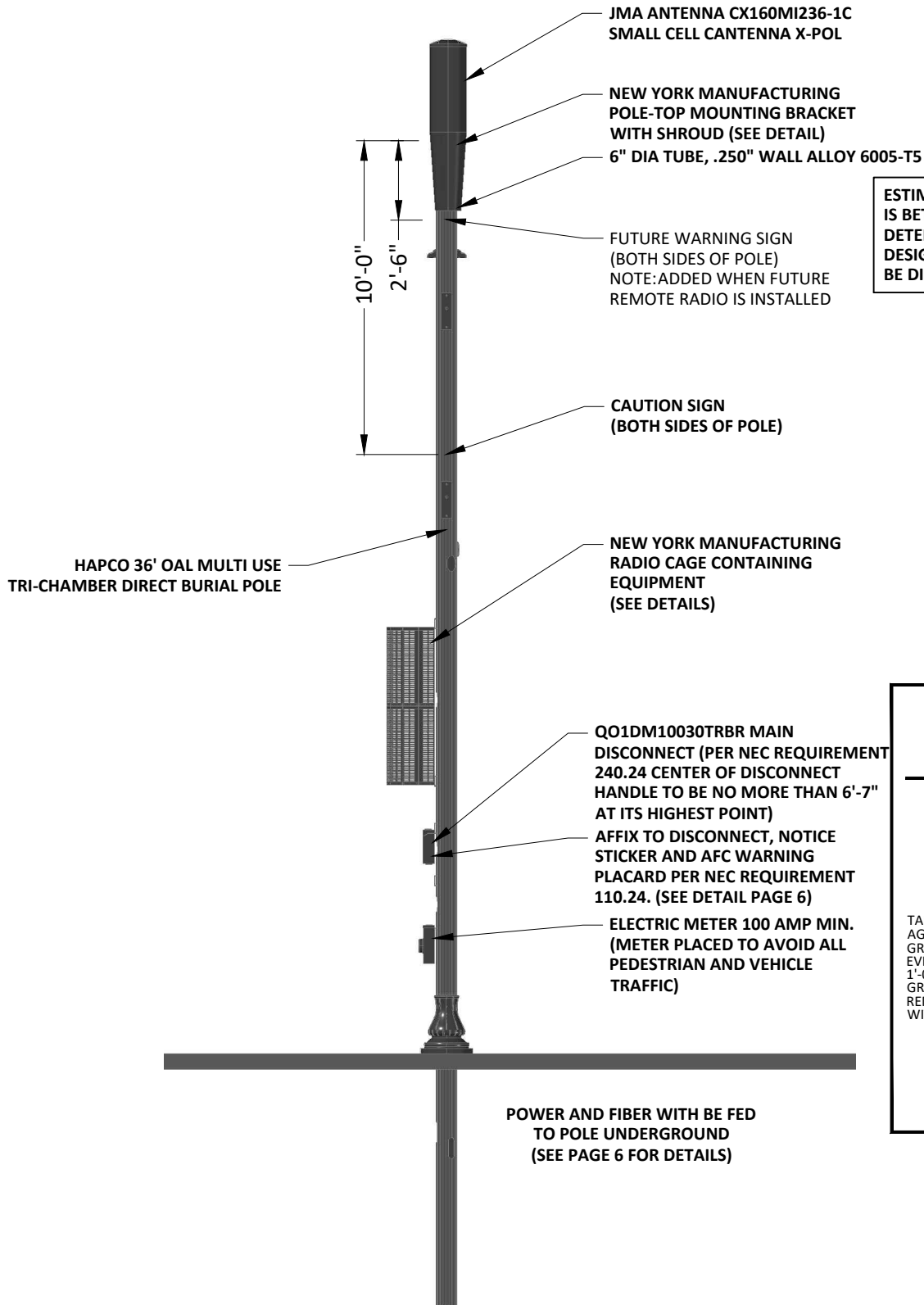
DRAFTER: BAJ
SCALE: 1" = 5'
ISSUE DATE: 01/31/17
NODE NAME: SC-NC 0382
SHEET #: 4 OF 15

THERE SHALL NOT BE ANY EXISTING, PROPOSED, OR FUTURE AERIAL SPANNING ATTACHMENTS ADDED TO THIS POLE.

ABSOLUTELY NO FIELD CORING/DRILLING OR CUTTING OF METALLIC POLE TO BE ALLOWED. ALL PROPOSED EQUIPMENT MUST BE Banded TO POLE.

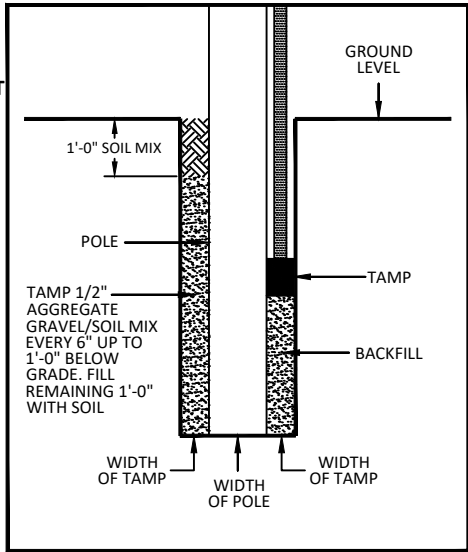
NOTE:
REPLACE EXISTING 29'-9" DUKE ENERGY POLE WITH NEW 28' AGL ALUMINUM HAPCO, BLACK COLOR, FLUTED WALL, DIRECT BURY (DUKE ENERGY REPLACEMENT) POLE

ALL EQUIPMENT MOUNTED ON POLE SHALL BE PAINTED BLACK



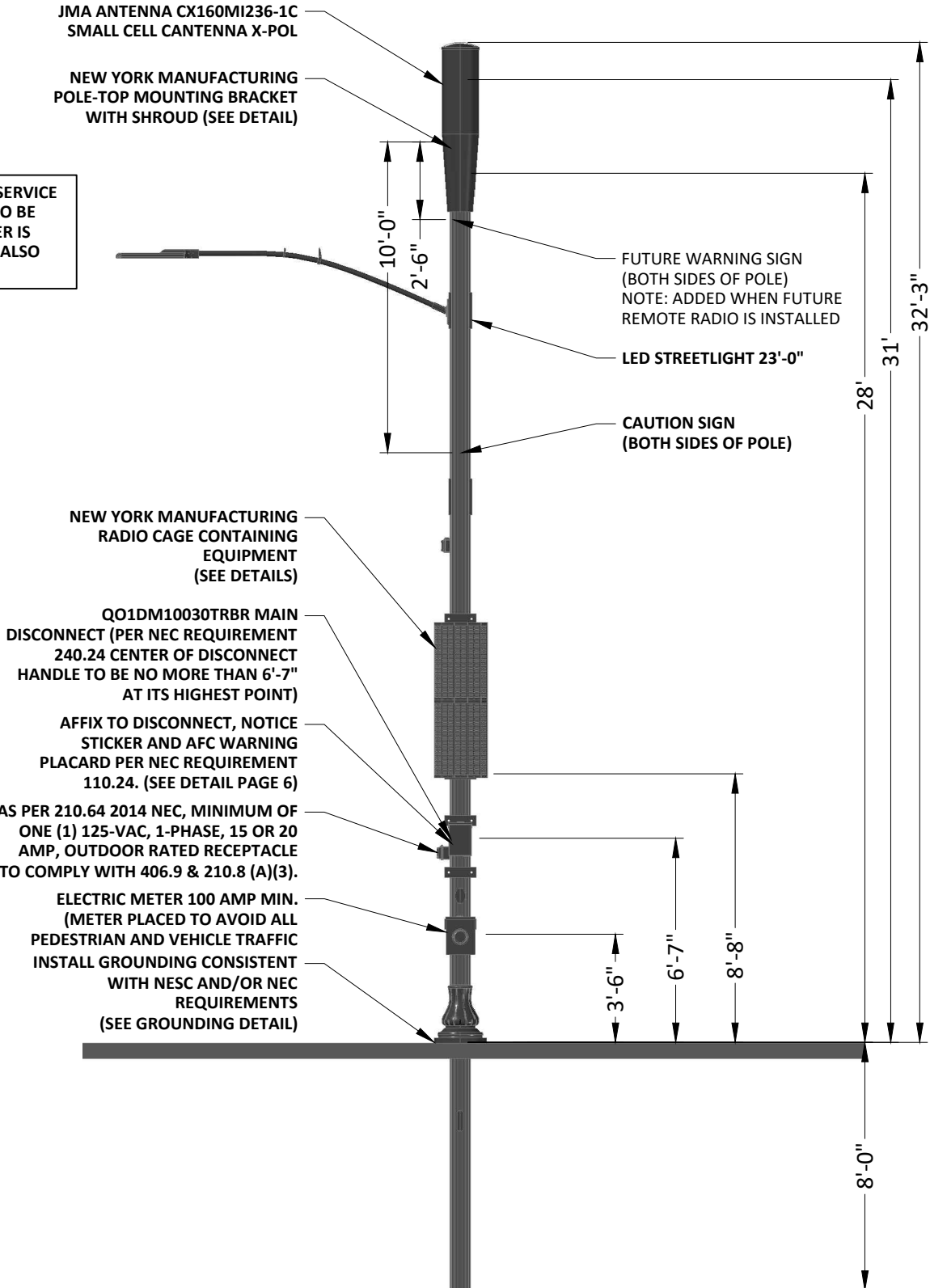
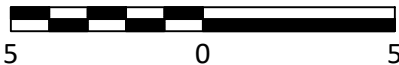
ESTIMATED GROUND-FAULT FOR UNDERGROUND SERVICE IS BETWEEN 3000-6000 AMPS. EXACT AMPERAGE TO BE DETERMINED BY POWER COMPANY AT TIME POWER IS DESIGNED AND SUPPLIED. EXACT AMPERAGE WILL ALSO BE DISPLAYED ON DISCONNECT SWITCH.

SET POLE TO A DEPTH OF 8'-0" BELOW GRADE WITHIN NORMAL SOIL/DIRT CONDITIONS. POLE TO BE BACK-FILLED AND TAMPED AROUND POLE FOR PROPER INSTALLATION

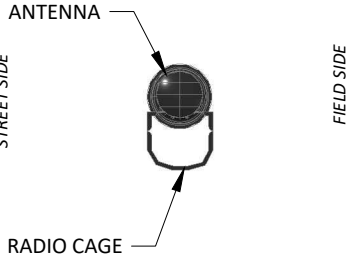


POLE SET DETAIL
N.T.S

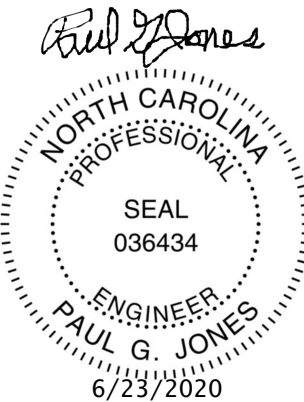
SCALE IN FEET



2 PROPOSED PROFILE - SIDE VIEW
LOOKING SOUTHWEST TOWARDS E MAIN ST



PROPOSED TOP VIEW



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

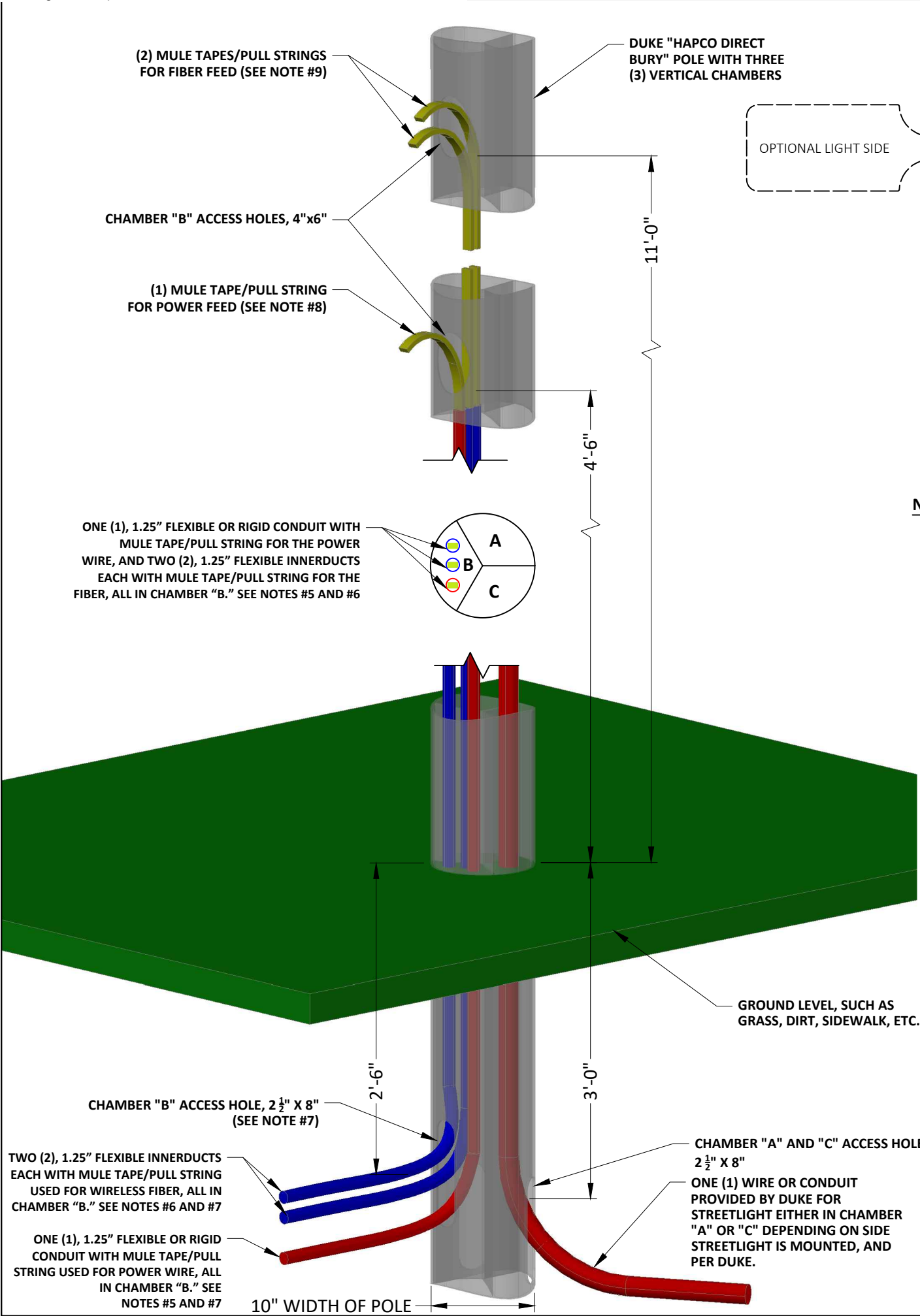
NOTES:

PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY: PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketecom.org
1-508-337-7600

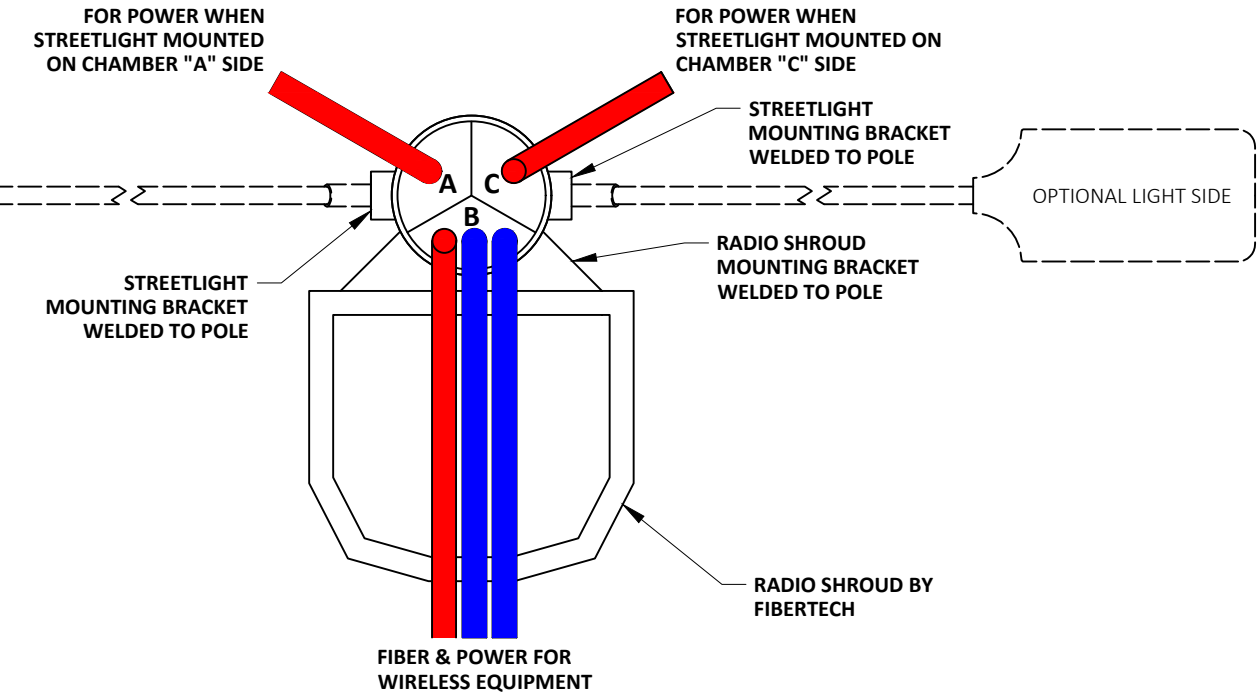
FIBERTECH SMALL CELL
PROPOSED

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TWP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20
DRAFTER: BAJ		
SCALE: 1" = 5'		
ISSUE DATE: 01/31/17		
NODE NAME: SC-NC 0382		
SHEET #: 5 OF 15		



NOTES:

- 1) THE FOLLOWING INSTRUCTIONS MUST BE FOLLOWED UNLESS DIRECTED OTHERWISE BY DUKE AND/OR FIBERTECH.
- 2) CHAMBERS "A" AND "C" INSIDE THE POLE ARE DEDICATED FOR USE BY DUKE ONLY (FOR STREET LIGHT POWER WIRE).
- 3) CHAMBER "B" INSIDE THE POLE IS DEDICATED FOR USE WITH WIRELESS EQUIPMENT (FIBER AND POWER).
- 4) ALL FLEXIBLE INNERDUCTS, FLEXIBLE OR RIGID CONDUIT, AND MULE TAPE/PULL STRING USED FOR FIBER AND POWER SHOWN ON THIS DRAWING ARE FOR PICTORIAL REFERENCE ONLY. ACTUAL ORIENTATION AND INSTALLATION MAY VARY AT TIME OF INSTALLATION AS PER SITE REQUIREMENTS AND AS DICTATED BY DUKE AND/OR FIBERTECH.
- 5) ONE (1), 1.25" FLEXIBLE OR RIGID CONDUIT USED FOR THE POWER WIRE TO POWER THE WIRELESS EQUIPMENT SHALL BE INSTALLED WITH MULE TAPE/PULL STRING. THE FLEXIBLE OR RIGID CONDUIT SHALL ENTER THE ACCESS HOLE AT A DEPTH OF 2'-6" BELOW GROUND LEVEL, SHALL EXTEND UPWARD IN POLE THROUGH CHAMBER "B," AND THEN SHALL STOP AT THE ACCESS HOLE AT 3'-4" ABOVE GROUND LEVEL.
- 6) TWO (2), 1.25" FLEXIBLE INNERDUCTS USED FOR WIRELESS FIBER SHALL EACH BE INSTALLED, EACH WITH MULE TAPE/PULL STRING. BOTH FLEXIBLE INNERDUCTS SHALL ENTER THE ACCESS HOLE AT A DEPTH OF 2'-6" BELOW GROUND LEVEL, SHALL EXTEND UPWARD IN POLE THROUGH CHAMBER "B," AND THEN SHALL STOP AT THE ACCESS HOLE AT 3'-4" ABOVE GROUND LEVEL.
- 7) AFTER TWO (2) FIBER FLEXIBLE INNERDUCTS AND ONE (1) POWER FLEXIBLE OR RIGID CONDUIT HAVE BEEN PLACED IN THE POLE AT THE 2'-6" DEPTH BELOW GROUND AND HAVE BEEN EXTENDED UP THE POLE IN CHAMBER "B" AS NOTED ABOVE, THE INNERDUCT AND CONDUIT PLACING CONTRACTOR SHALL FILL THE GAP BETWEEN THE ACCESS HOLE, FLEXIBLE INNERDUCTS AND CONDUIT AT THE 2'-6" DEPTH BELOW GROUND WITH FOAM OR WATER REPELLENT MATERIAL TO KEEP THE INSIDE OF THE POLE CLEAN OF DEBRIS.
- 8) THE ONE (1) EXPOSED MULE TAPE/PULL STRING USED IN THE 1.25" FLEXIBLE OR RIGID CONDUIT FOR THE POWER WIRE IN CHAMBER "B" SHALL EXIT THE POLE AT THE ACCESS HOLE AT 3'-4" ABOVE GROUND LEVEL AND THEN BE TEMPORARILY TAPED/SECURED TO THE OUTSIDE OF THE POLE TO PULL THE POWER WIRE AT A LATER TIME TO THE POWER METER BOX.
- 9) THE TWO (2) EXPOSED MULE TAPES/PULL STRINGS USED IN THE 1.25" FLEXIBLE INNERDUCTS FOR THE FIBER SHALL CONTINUE UP THROUGH THE POLE IN CHAMBER "B" AND OUT OF THE ACCESS HOLE AT 10'-6" ABOVE GROUND LEVEL AND THEN BE TEMPORARILY TAPED/SECURED TO THE OUTSIDE OF THE POLE TO PULL FIBER (ONE NOW AND ONE FUTURE) AT A LATER TIME TO THE WIRELESS EQUIPMENT. AFTER THE FIRST MULE TAPE/PULL STRING IS USED TO PULL AND INSTALL THE FIRST FIBER, THE SPARE MULE TAPE/PULL STRING FOR THE FUTURE FIBER SHALL CONTINUE TO EXTEND OUTSIDE THE ACCESS HOLE AND SHALL BE SECURED/TIED TO THE WIRELESS EQUIPMENT SHROUD OR RADIO EQUIPMENT BRACKET FOR EASY ACCESS AND USE IN THE FUTURE.
- 10) CONSTRUCTION/INSTALLATION PERSONNEL SHALL CONTACT A DUKE OR FIBERTECH REPRESENTATIVE IMMEDIATELY IF/WHEN ANY ISSUE ARISES.



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY: PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
CONDUIT PLAN

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
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3	ADDED TMP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20

DRAFTER: BAJ
SCALE: NTS
ISSUE DATE: 01/31/17
NODE NAME: SC-NC 0382
SHEET #: 6 OF 15



EXISTING PHOTOGRAPHIC VIEW



PROPOSED PHOTOGRAPHIC SIMULATION

Paul G. Jones

NORTH CAROLINA
PROFESSIONAL
SEAL
036434
ENGINEER
PAUL G. JONES
6/23/2020

LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR:

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:

PIKE TELECOM
21 Oxford Rd.
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
PHOTO SIM

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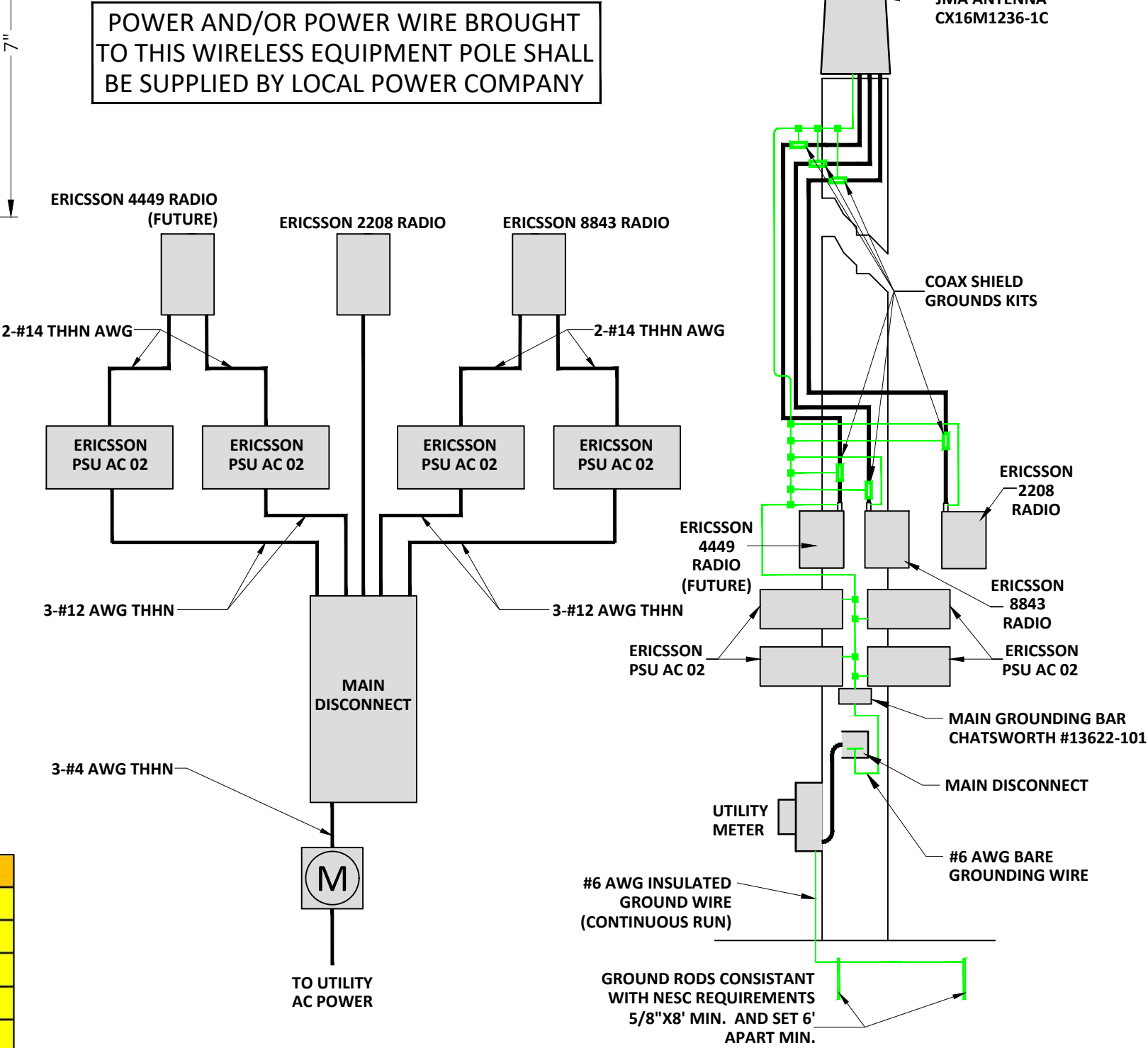
DRAFTER: BAJ	7
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 7 OF 15	



POLE SIGNAGE
NOT TO SCALE

Host (B1)				Remote (D1)		
Color	TX	RX	Technologies	Color	TX	RX
		SFP Label				SFP Label
Purple	1471	1491	1900 PCS LTE	Gray	1491	1471
Green	1511	1531	850 CDMA	Blue	1531	1511
Orange	1551	1571	700 LTE	Yellow	1571	1551
Brown	1591	1611	2100 AWS LTE	Red	1611	1591

COLOR CODING REFERENCE



ELECTRICAL DIAGRAM
NOT TO SCALE

TYPICAL GROUNDING DIAGRAM
NOT TO SCALE



LOCATION: DURHAM, NC
35.994025°, -78.898332°
POLE OWNER: DUKE ENERGY

NOTES:

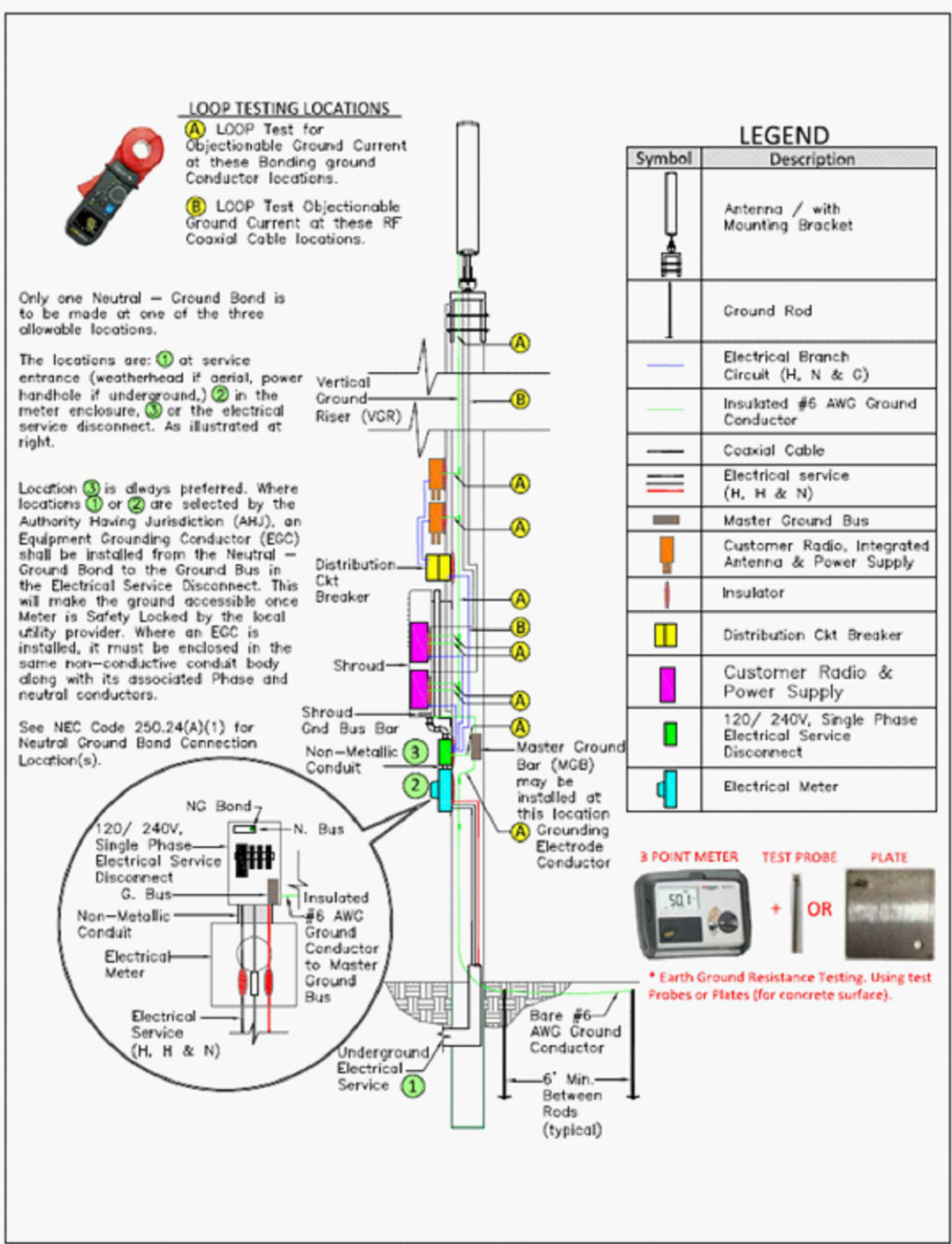
PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY: PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
POLE SIGNAGE/
WIRING DIAGRAM

REVISIONS		
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DRAFTER: BAJ	8
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 8 OF 15	



TESTING DIAGRAM

TESTING & DOCUMENTATION

Earth Ground Resistance Test -

- 1st test-
- Use 3-Point, 62% fall potential ground Meter
 - Must read less than 25 ohms before being connected to the power system neutral. Take pictures of the reading
- 2nd test-
- -Same test as above after being connected to the power system neutral should read less than 5 ohms. Take pictures of the reading

Bonding and Objectionable Current Test -

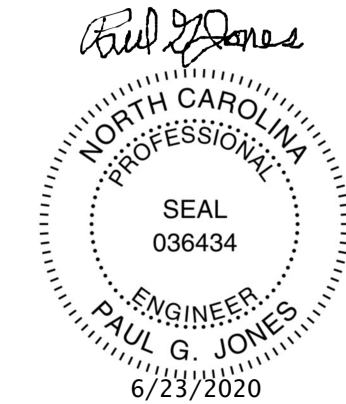
- 3rd test-
- Use clamp-on earth ground meter
 - Performed while site is energized and test every “loop”
 - Each “loop” must read less than 1 ohm
 - Take picture of each loop reading

Contact Voltage Test -

- 4th test-
- Use a Foreign Voltage Detector
 - Test at all conductive services (meter box, disconnect, concrete, etc.) at the Node Pole.
 - Should have 0 voltage reading at all points. Take pictures of all tests.



TEST EQUIPMENT



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

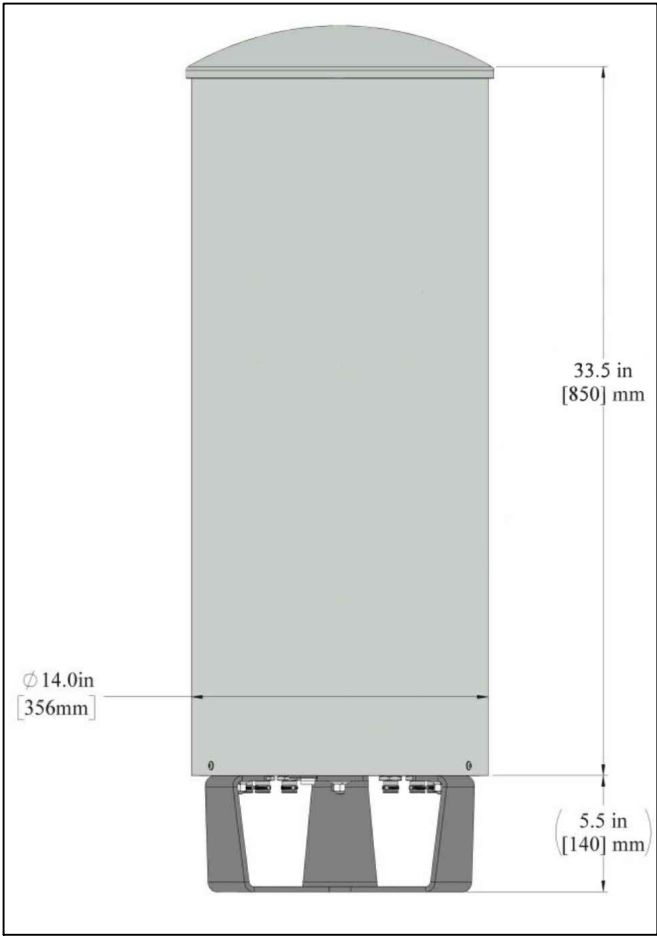
PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

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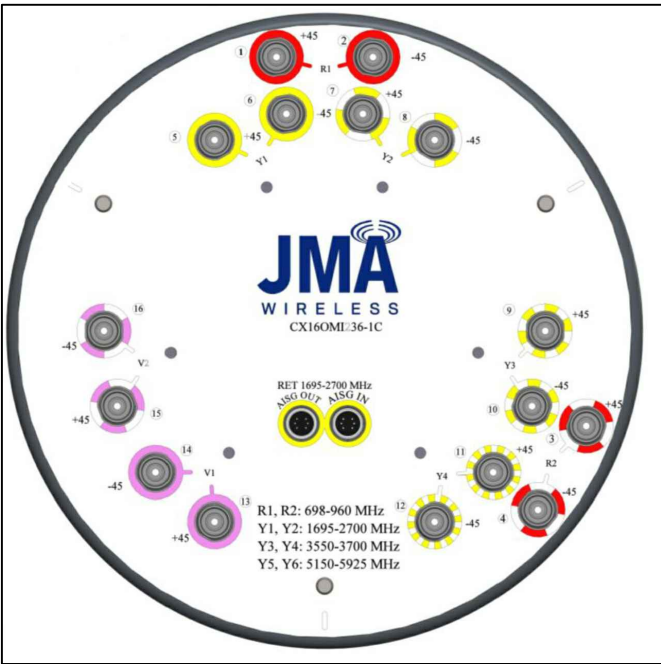
FIBERTECH SMALL CELL TESTING & DOCUMENTATION

REVISIONS		
REV	DESCRIPTION	DATE
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2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20

DRAFTER: BAJ	9
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 9 OF 15	



ANTENNA CX160MI236-1C SMALL CELL CANTENNA X-POL
698-960/1695-2700/3550-3700/5150-5925MHz
SIDE VIEW



ANTENNA CX160MI236-1C SMALL CELL CANTENNA X-POL
698-960/1695-2700/3550-3700/5150-5925MHz
BOTTOM VIEW
(FOR ANTENNA COLOR SEE PROPOSED PAGE)

Product Specifications

CX160MI236-1C and -2C

NWAV™ X-Pol OMNI Antenna | 16-Port | 2.98 cu. ft | 360°

JMA WIRELESS

Mechanical specifications	
Dimensions height/diameter, inches (mm)	35.4/14 (947/355)
Volume (cubic feet)	2.98
No. of RF input ports, connector type and location	16 x 4.3-10 female, bottom
RF connector torque	96 lbf-in (10.85 N m or 8 lbf-ft)
Net antenna weight, lbs. (kg)	35 (15.9)
Rated wind survival speed, mph (km/h)	150 (241)
Frontal wind loading @ 160 km/h, lbf (N)	TBD
Equivalent flat plate @100 mph and Cd=2, sq. ft	TBD

Ordering information	
Antenna model	Description
CX160MI236-1C	2F X-Pol 16P OMNI 360°, HB 2-8° RET, 4.3-10
CX160MI236-2C	2F X-Pol 16P OMNI 360°, HB 2-8° MET, 4.3-10
Mounting Bracket Options	See small cell mounting bracket options http://info.jmawireless.com/ret-antenna-matrix

16-Port 2 ft 360° Cantenna with MET/RET-controlled from 1695-2700 MHz

(4) 698-960 MHz & (4) 1695-2700 MHz & (4) 3550-3700 MHz & (4) 5150-5925 MHz

- X-Pol, small cell, Hex-Port antenna
- Suitable for pole or building mount
- 4x4 MIMO low-band, 4x4 MIMO for each of AWS/PCS/LAA/CBRS
- Internal beam combining
- Dependent MET/RET control for 1695-2700 MHz frequencies
- Suitable for LTE/UMTS/CDMA/GSM technologies
- Cost-effective solution for neutral host locations

Omni Clover

Electrical specification (minimum/maximum)	Ports 1,2,3,4		Ports 5,6,7,8					
Frequency bands, MHz	698-798	824-880	1695-1880	1850-1990	1920-2180	2300-2500	2500-2700	
Polarization	± 45°		± 45°					
Average gain over all tilts, dBi	3.5	3.5	9.4	9.7	9.9	10.1	10.2	
Horizontal beamwidth (HBW), degrees	360°		360°					
Vertical beamwidth, (VBW), degrees¹	73°	70°	15.7°	15.1°	14.6°	14.6°	12.2°	
Electrical downtilt (EDT) range, degrees	0° (FET)		2-8° (MET/RET)					
Minimum cross polar isolation, port-to-port, dB	25	25	25	25	25	25	25	
Maximum VSWR/return loss, dB	1.5:1/-14.0		1.5:1/-14.0					
Maximum passive intermodulation (PIM), 2x 20W carrier, dBc	-153		-153					
Maximum input power per any port, watts	250		125					

Electrical specification (minimum/maximum)	Ports 9,10,11,12	Ports 13,14, 15,16				
Frequency bands, MHz	3550- 3700	5150- 5350	5350- 5470	5470- 5725	5725- 5850	5850- 5925
Polarization	± 45°	± 45°				
Average gain over all tilts, dBi	5.9	5.5	5.7	5.5	5.5	5.6
Horizontal beamwidth (HBW), deg	360°					
Vertical beamwidth, (VBW), deg ¹	30°	24°	24°	20°	14°	18°
Elec downtilt (EDT) range, deg	0° (FET)					
Min X polar isolation, P2P, dB	25	25				
Max VSWR/return loss, dB	1.5:1/-14.0	1.5:1/-14.0				
PIM	N/A					
Maximum input power port	10	25	-	25	1.0	-

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CX160MI236-1C/2C_v1
Page 1

Remote Electrical Tilt (RET 1000) Information

RET location	Integrated into antenna
RET interface connector type	8-pin AISG connector per IEC 60130-9
RET interface connector quantity	2 pairs of AISG male/female connectors
RET interface connector location	Bottom of the antenna
Total No. of internal RETs high bands	1
RET input operating voltage, vdc	10-30
RET max power consumption, idle state, W	≤ 2.0
RET max power consumption, normal operating conditions, W	≤ 13.0
RET communication protocol	AISG 2.0/3GPP

RET topology

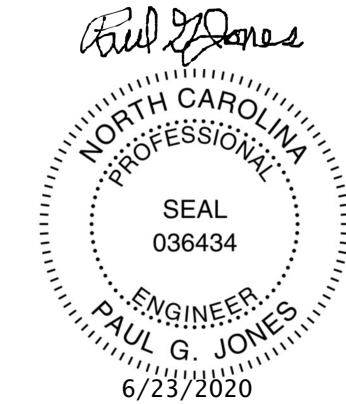
A single RET device controls all 3 sectors via the designated external AISG connector as shown below

Array topology

Array ID	Band	RF Port
R1	698-960	1-2
R2	698-960	3-4
Y1	1695-2700	5-6
Y2	1695-2700	7-8
Y3	3550-3700	9-10
Y4	3550-3700	11-12
V1	5150-5925	13-14
V2	5150-5925	15-16

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CX160MI236-1C/2C_v1
Page 3



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

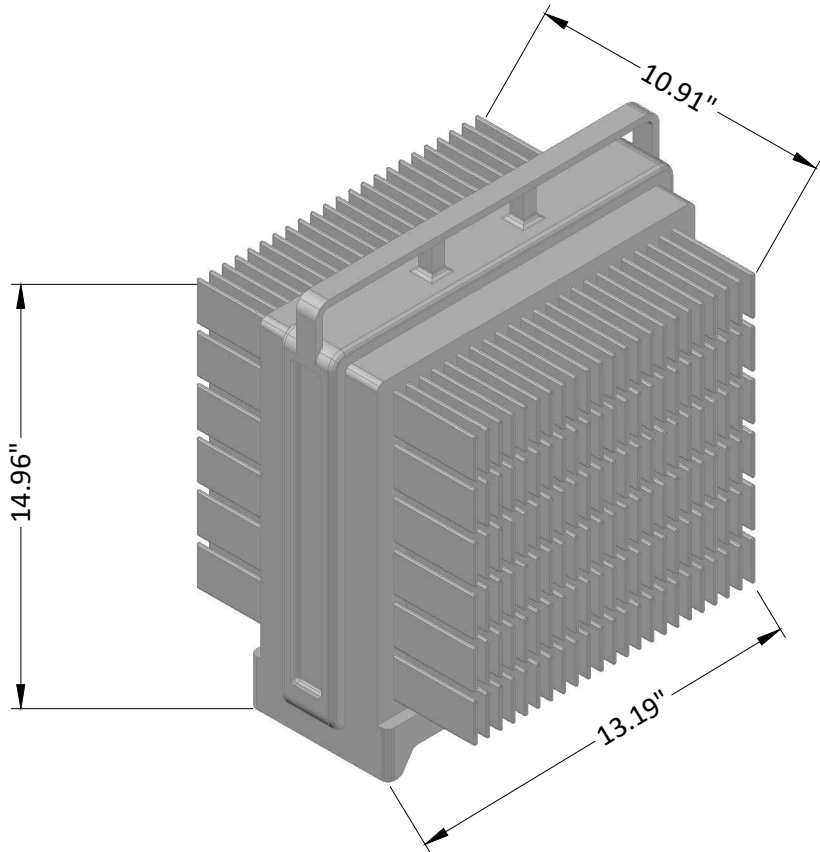
PREPARED FOR: CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY: PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

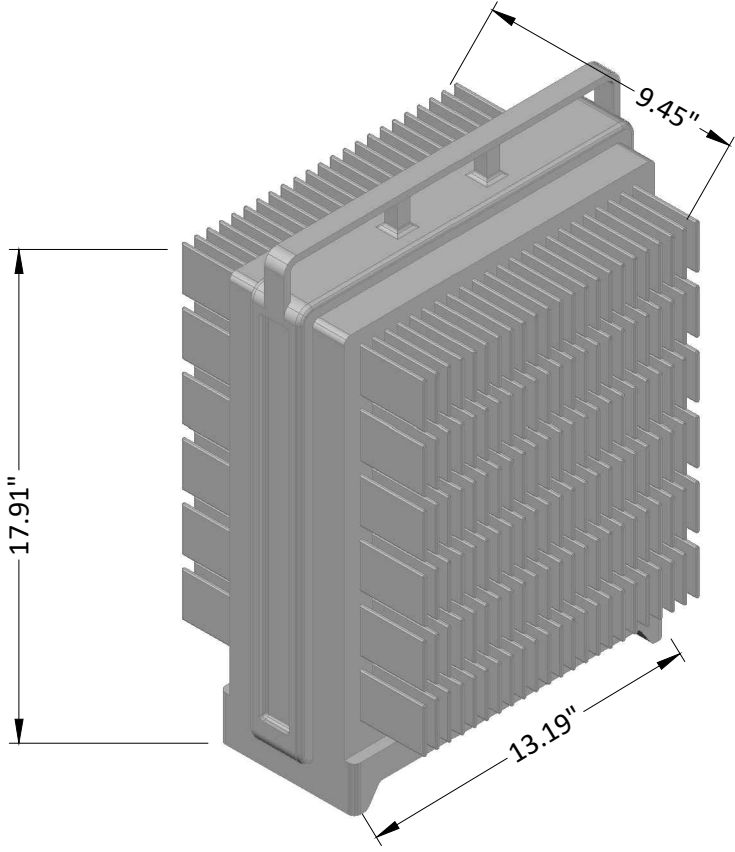
FIBERTECH SMALL CELL
CX160MI236-1C
ANTENNA DETAIL

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
4	ADDED PROP. POLE EASEMENT	06/12/20

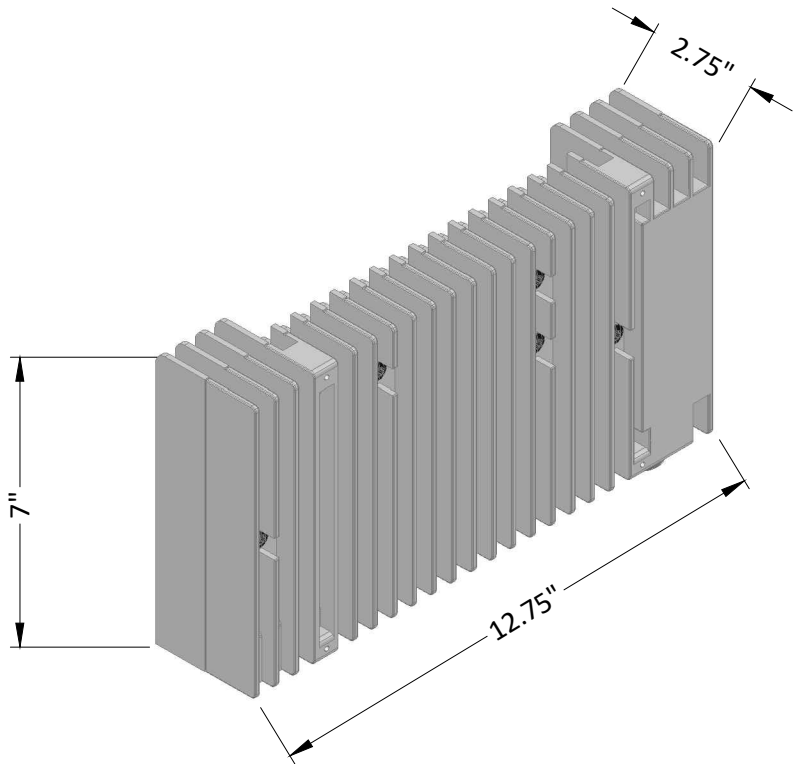
DRAFTER: BAJ	10
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 10 OF 15	



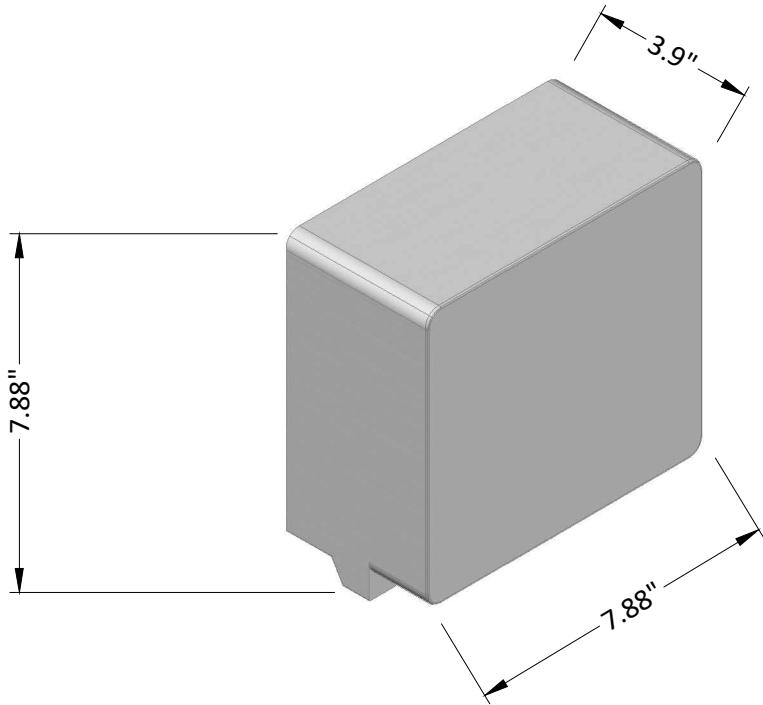
ERICSSON 8843 REMOTE RADIO
ISOMETRIC VIEW



ERICSSON 4449 REMOTE RADIO (FUTURE)
ISOMETRIC VIEW



ERICSSON RECTIFIER PSU AC 02
ISOMETRIC VIEW



ERICSSON 2208 RRH
ISOMETRIC VIEW



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR:

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

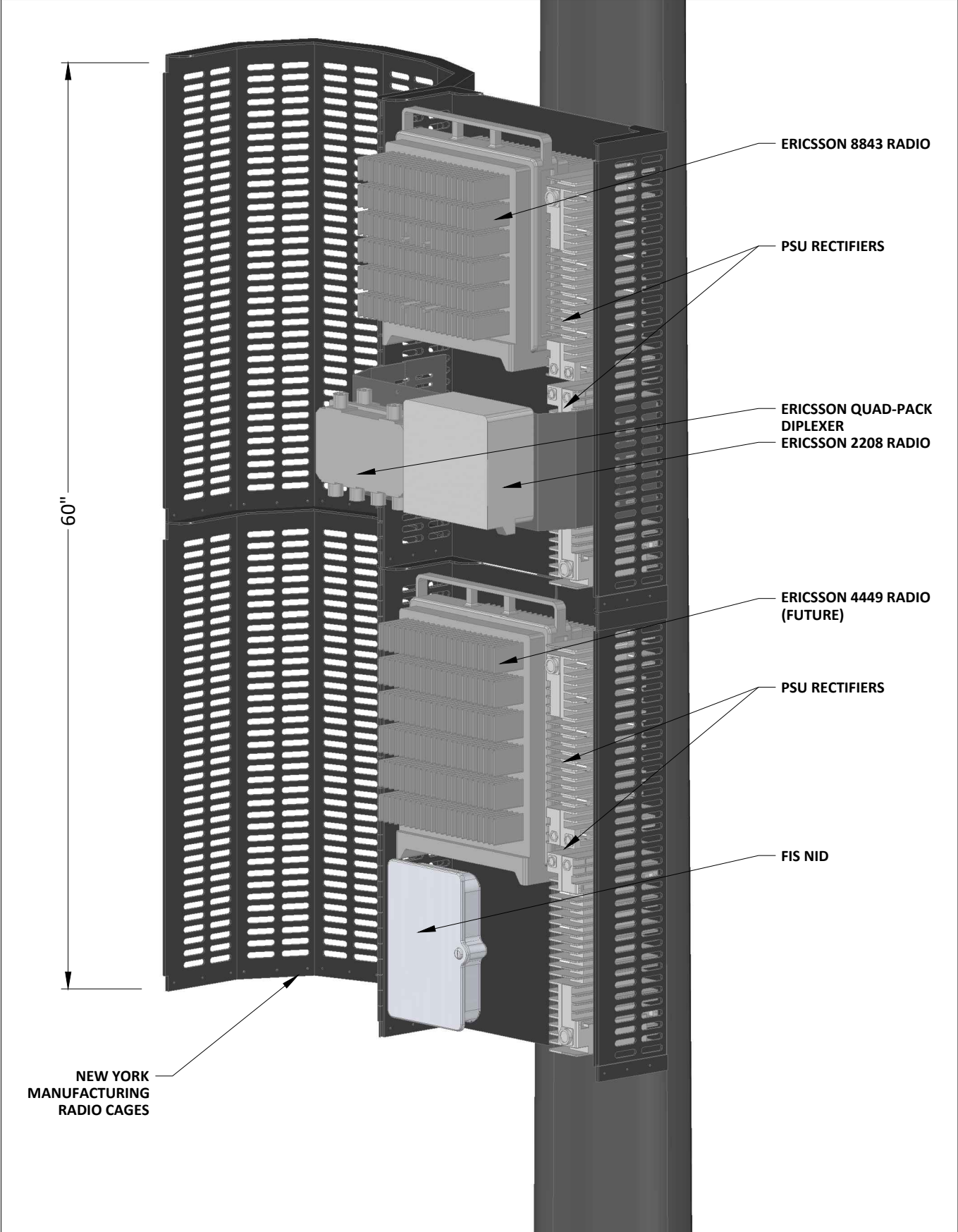
PREPARED BY:

21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
RADIO & EQUIPMENT
DETAILS

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
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DRAFTER: BAJ	11
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 11 OF 15	



NEW YORK MANUFACTURING RADIO CAGE
EQUIPMENT ARRANGEMENT
ISOMETRIC VIEW



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

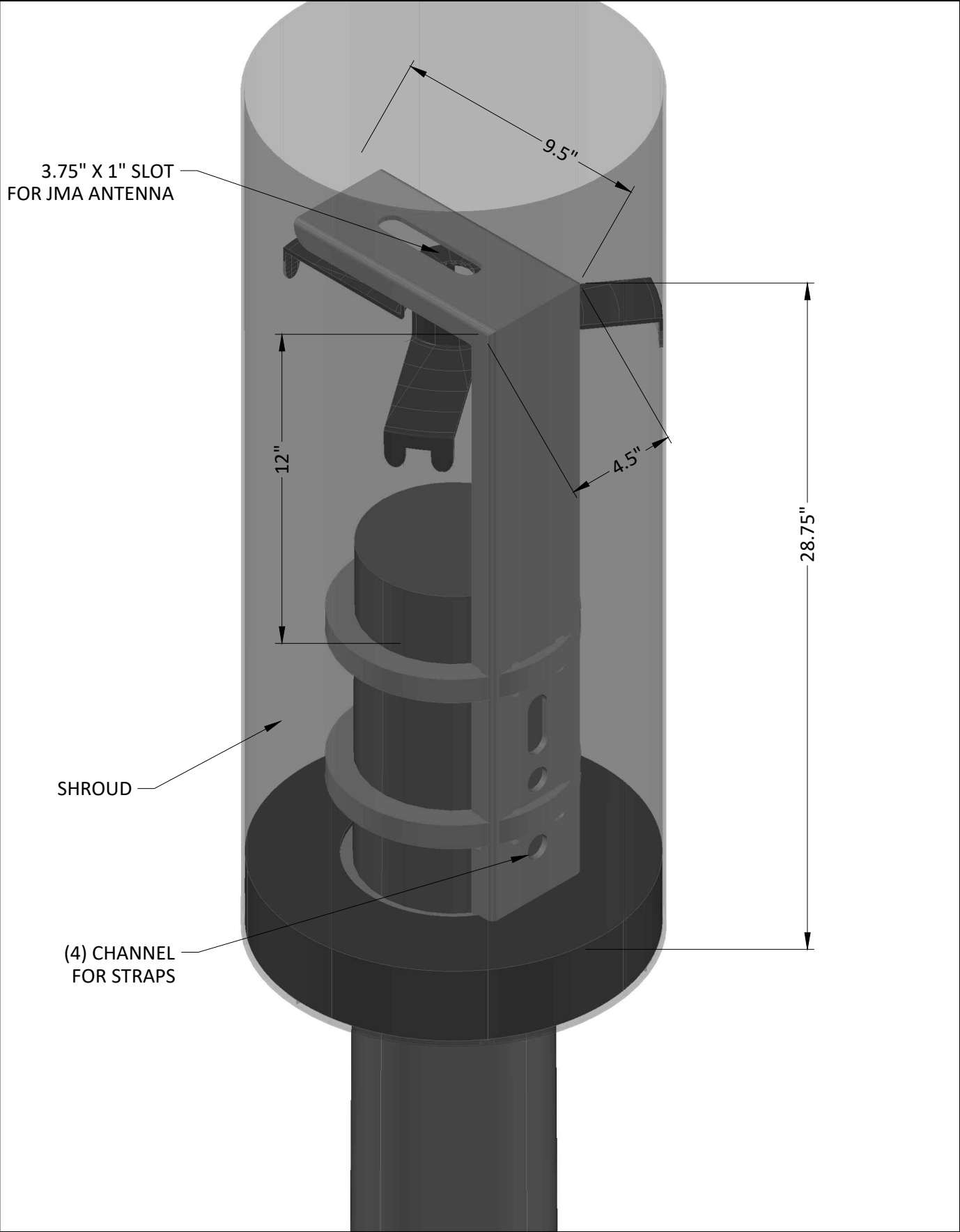
PREPARED FOR:
CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:
PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

**FIBERTECH SMALL CELL
NEW YORK MANUFACTURING
RADIO CAGE**

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
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DRAFTER: BAJ	12
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 12 OF 15	



NEW YORK MANUFACTURING TOP POLE BRACKET
WITH SHROUD FOR JMA ANTENNA
CONCEPTUAL VIEW



LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

NOTES:

PREPARED FOR:

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:

21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600

FIBERTECH SMALL CELL
MOUNTING BRACKET
DETAILS

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TMP & PE STAMPED SURVEY	01/29/20
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DRAFTER: BAJ	13
SCALE: NTS	
ISSUE DATE: 01/31/17	
NODE NAME: SC-NC 0382	
SHEET #: 13 OF 15	

Pole ID:SC-NC 0382.pplx

O-Calc® Pro Analysis Report

Tuesday, June 23, 2020 8:31 AM

Pole Num: NT

Aux Data 1 SC-NC 0382

Aux Data 2 Hapco 36' Straight FlutedTri-Chamber Pole

Aux Data 3 Unset

Aux Data 4 Unset

Aux Data 5 Unset

Aux Data 6 Unset

Latitude: 0.000000 Deg

Pole Length / Class: 36 / NA

Material: Steel (Embedded)

Setting Depth (ft): 8.00

G/L Circumference (in): 25.13

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Longitude: 0.000000 Deg

Code: NESC

NESC Rule: Rule 250B

Construction Grade: C

Loading District: Medium

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Elevation: 0 Feet

Structure Type: Unguyed Tangent


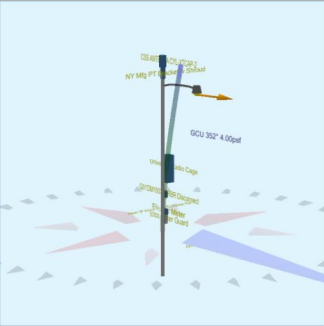
Status: Unguyed

Pole Strength Factor: 1.00

Transverse Wind LF: 1.75

Wire Tension LF: 1.00

Vertical LF: 1.90



Pole Capacity Utilization (%)	Height (ft)	Wind Angle (deg)
Maximum	30.7	0.0
Groundline	30.7	0.0
Vertical	4.6	0.0

Pole Moments (ft-lb)	Load Angle (deg)	Wind Angle (deg)
Max Cap Util	6,312	352.2
Groundline	6,312	352.2
GL Allowable	20,806	

Groundline Load Summary - Reporting Angle Mode: Load - Reporting Angle: 352.2°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
GenericEquipments	137	45.6	1,976	31.3	9.5	1,997	251	41	2,038	9.3
SteelPoles	131	43.4	2,111	33.4	10.2	2,133	2	0	2,133	9.8
Streetlights	33	11.0	2,225	35.3	10.7	2,249	213	35	2,284	10.5
Pole Load	301	100.0	6,312	100.0	30.3	6,378	466	77	6,455	29.6
Pole Reserve Capacity			14,494		69.7	15,458			15,381	70.4

User:RDoddI PIKE OCP:5.03

*Includes Load Factor(s)

Page 1 of 2

²Worst Wind Per Guy Wire

³Wind At 352°

Pole ID:SC-NC 0382.pplx

O-Calc® Pro Analysis Report

Tuesday, June 23, 2020 8:31 AM

Load Summary by Owner - Reporting Angle Mode: Load - Reporting Angle: 352.2°

	Shear Load* (lbs)	Applied Load (%)	Bending Moment (ft-lb)	Applied Moment (%)	Pole Capacity (%)	Bending Stress (+/- psi)	Vertical Load (lbs)	Vertical Stress (psi)	Total Stress (psi)	Pole Capacity (%)
Fibertech	119	39.5	1,925	30.5	9.3	1,945	222	37	1,982	9.1
DUKE	39	12.9	2,247	35.6	10.8	2,271	232	38	2,309	10.6
Elco	13	4.2	29	0.5	0.1	29	10	2	31	0.1
Pole	131	43.4	2,111	33.4	10.2	2,133	2	0	2,133	9.8
Totals:	301	100.0	6,312	100.0	30.3	6,378	466	77	6,455	29.6

Detailed Load Components:

GenericEquipment

	Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)	
Cylinder	CSS ANTENNA CYL-X7CAP-2	Fibertech	30.00	0.46	90.0	0.0	45.00	24.20	--	15.08	--	0	532	533
Cylinder	NY Mfg PT Bracket w Shroud	Fibertech	28.00	1.00	0.0	0.0	10.00	24.00	--	10.00	--	2	327	328
Box	Universal Radio Cage	Fibertech	11.17	13.00	270.0	0.0	50.00	60.00	18.00	--	20.00	14	940	954
Box	Q01DM10030TRBR Disconnect	Fibertech	6.58	6.50	270.0	0.0	12.00	14.00	5.00	--	10.00	2	37	38
Box	Electric Meter	DUKE	3.50	7.00	270.0	0.0	10.00	12.00	6.00	--	10.00	2	20	21
Box	Elco Meter Guard	Elco	2.17	6.25	270.0	0.0	5.00	19.00	8.50	--	8.00	1	27	28
Totals:											20	1,883	1,903	

Streetlight

	Owner	Height (ft)	Horiz. Offset (in)	Offset Angle (deg)	Rotate Angle (deg)	Unit Weight (lbs)	Unit Height (in)	Unit Depth (in)	Unit Diameter (in)	Unit Length (in)	Offset Moment* (ft-lb)	Wind Moment* (ft-lb)	Moment at GL* (ft-lb)	
General	Luminaire Arm DS32-08	DUKE	28.00	3.11	0.0	0.0	112.00	1.83	20.00	4.00	96.00	1,278	864	2,142
Totals:											1,278	864	2,142	

Notes

Date	Author	Description
1/13/2017	UCS	Note

UNIVERSAL RADIO CAGE CONTAINS:
(2) ERICSSON PSU AC02;
(2) ERICSSON mRRUS 12 RR;
COYOTE DTC.
EQUIPMENT WEIGHTS (10lbs ea.) INCLUDED IN TOTAL WEIGHT OF RADIO CAGE.

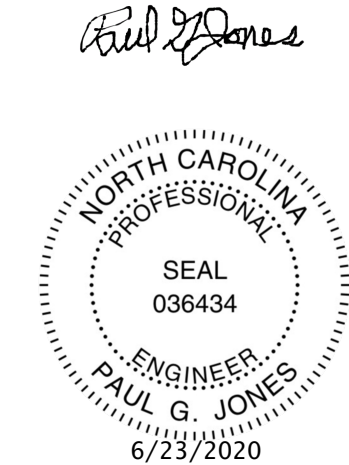
User:RDoddI PIKE OCP:5.03

*Includes Load Factor(s)

Page 2 of 2

²Worst Wind Per Guy Wire

³Wind At 352°



LOCATION:

DURHAM, NC


35.994025°, -78.898332°

POLE OWNER:

DUKE ENERGY

NOTES:


PREPARED FOR:



CROWN CASTLE

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:



21 Oxford Rd
Mansfield, MA 02048
www.piketecom.org
1-508-337-7600

FIBERTECH SMALL CELL

OALC

REVISIONS

REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
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3	ADDED TMP & PE STAMPED SURVEY	01/29/20
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DRAFTER: BAJ

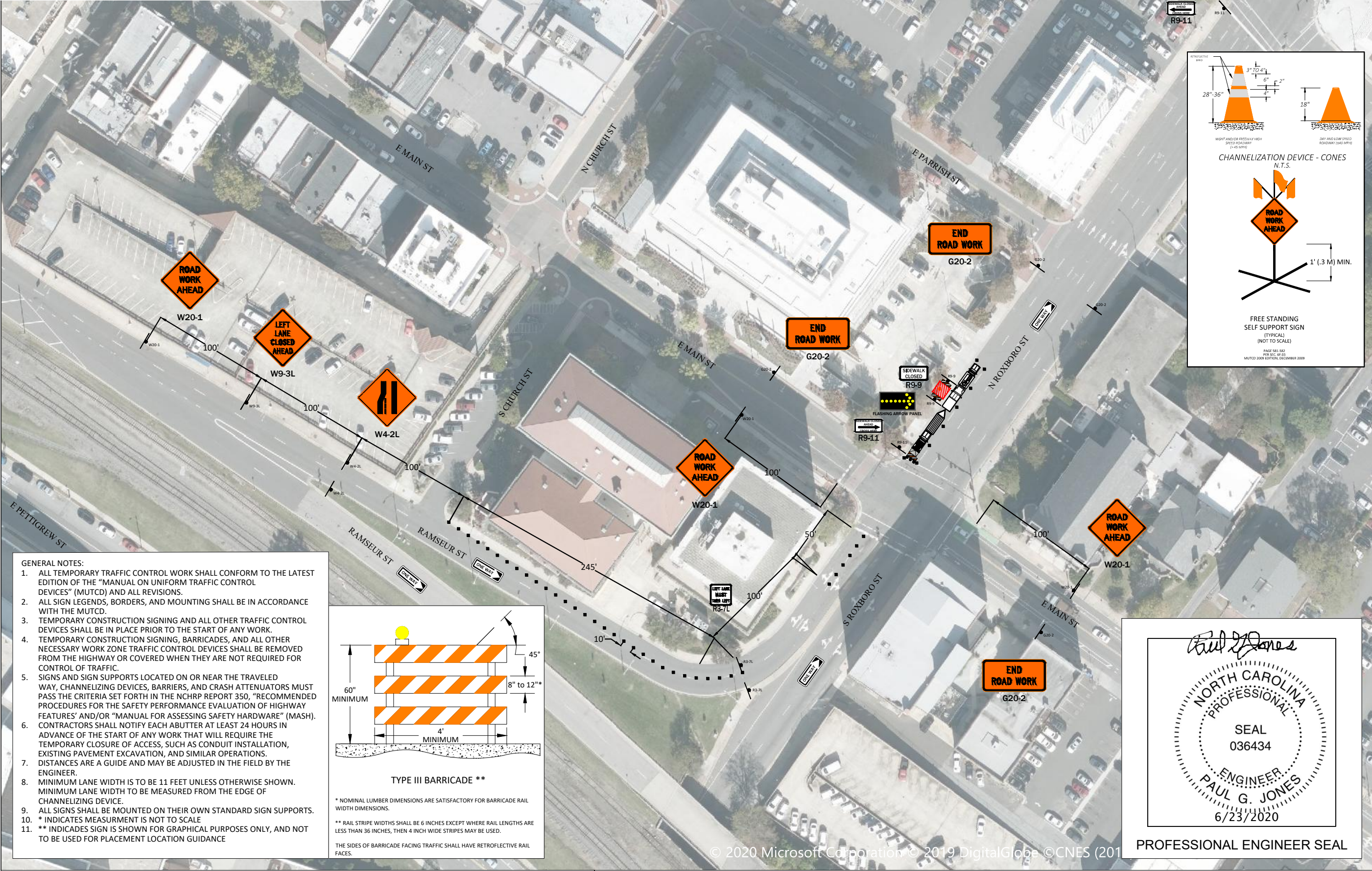
SCALE: NTS

ISSUE DATE: 01/31/17

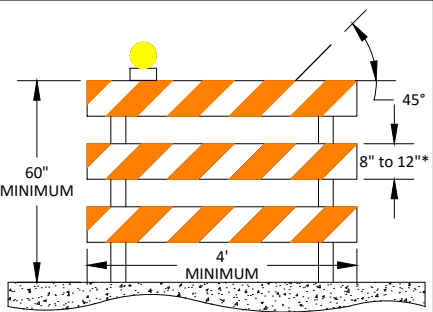
NODE NAME: SC-NC 0382

SHEET #: 14 OF 15

14



- GENERAL NOTES:
1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
 2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
 3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
 4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
 5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN THE NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, AND SIMILAR OPERATIONS.
 6. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
 7. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF CHANNELIZING DEVICE.
 8. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
 9. * INDICATES MEASUREMENT IS NOT TO SCALE.
 10. ** INDICATES SIGN IS SHOWN FOR GRAPHICAL PURPOSES ONLY, AND NOT TO BE USED FOR PLACEMENT LOCATION GUIDANCE.

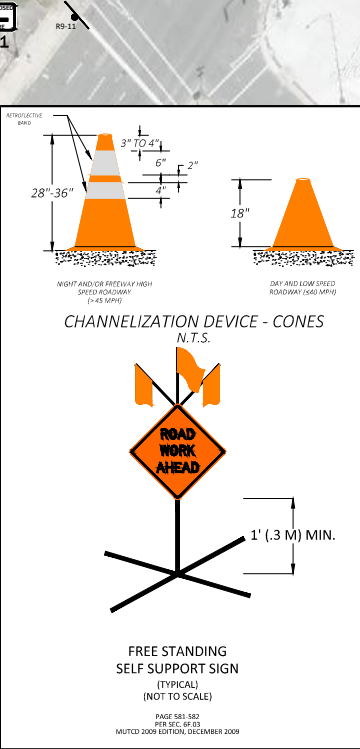


TYPE III BARRICADE **

* NOMINAL LUMBER DIMENSIONS ARE SATISFACTORY FOR BARRICADE RAIL WIDTH DIMENSIONS.

** RAIL STRIPE WIDTHS SHALL BE 6 INCHES EXCEPT WHERE RAIL LENGTHS ARE LESS THAN 36 INCHES, THEN 4 INCH WIDE STRIPES MAY BE USED.

THE SIDES OF BARRICADE FACING TRAFFIC SHALL HAVE RETROFLECTIVE RAIL FACES.



PHASE I		
TRAFFIC LEGEND		
	WORK ZONE	
	PROPOSED TRENCH	
	CHANNELIZING DEVICE (CONE)	
	DRUM	
	SIGN	
	FLAGGER	
	SINGLE PARKING METER	
	DOUBLE PARKING METER	
	VARIABLE MESSAGE BOARD	
	ARROW BOARD	
	TYPE 3 BARRICADE	
	HIGH LEVEL WARNING DEVICE	
	CONSTRUCTION TRUCK	
	TRUCK MOUNTED ATTENUATOR	
	TRAFFIC FLOW	
	TRAFFIC FLOW	
	TRAFFIC FLOW	
	TRAFFIC FLOW	
	2 WAY TRAFFIC	

LOCATION: DURHAM, NC
35.994025°, -78.898332°

POLE OWNER: DUKE ENERGY

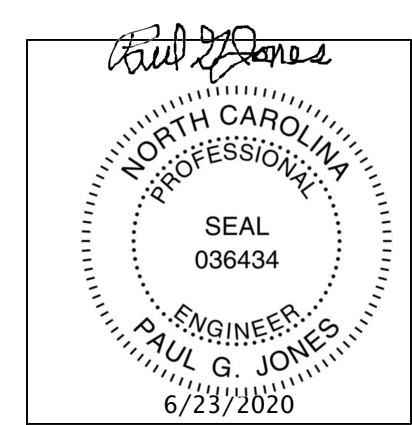
NOTES:

PREPARED FOR:

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

PREPARED BY:

PIKE TELECOM
21 Oxford Rd
Mansfield, MA 02048
www.piketelecom.org
1-508-337-7600



PROFESSIONAL ENGINEER SEAL

TRAFFIC MANAGEMENT PLAN

REVISIONS		
REV	DESCRIPTION	DATE
1	REVISED POLE TYPE	10/30/18
2	REVISED POLE COLOR, ANTENNA & EQUIPMENT	08/28/19
3	ADDED TWP & PE STAMPED SURVEY	01/29/20

DRAFTER: RD	15
SCALE: SEE BAR SCALE	
ISSUE DATE: 01/31/17	
INDEX NAME: SC-NC 0382	
SHEET #: 15 OF 15	

SCALE IN FEET

