Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

April 25, 2019

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for Crown Site BU: 876380**
AT&T Site ID: 10035444
Great Hollow Road, Woodbury, CT 06798
Latitude: 41° 31′ 19.20″/ Longitude: -73° 13′ 14.65″

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 139-foot level of the existing 139-foot monopole at Great Hollow Road in Woodbury, Connecticut. The tower is owned by Crown Castle. The property is owned by O&G Industries. AT&T intends to replace (3) antennas, add (3) antennas, remove (3) TMAs, remove (12) TMS, replace (6) RRUs, add (3) RRUs, add (1) DC6 and (2) DC power cables.

The facility was approved by the Connecticut Siting Council in Docket No. 236 on June 19, 2003. This approval was given with conditions. AT&T's proposed modification complies with all conditions as stated in the Council's Decision and Order.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Barbara Perkinson, First Selectman, Town of Woodbury, Town Planner Maryellen Edwards, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Exhibit-B: Structural Modification Report
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: Barbara Perkinson, First Selectman
Town of Woodbury
281 Main Street South
Weoodbury, CT 06798
203-263-2141

Marilyn Ozols, Town Planner
Town of Woodbury
281 Main Street South
Weoodbury, CT 06798
203-263-3467

O&G Industries Inc.
112 Wall Street
Torrington, CT 06790

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
Web Site: www.state.ct.us/csc/index.htm

June 24, 2003

TO: Parties and Intervenors

FROM: S. Derek Phelps, Executive Director

RE: **DOCKET NO. 236** - Sprint Spectrum L.P. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility off Great Hollow Road or at 103 Great Hollow Road, South Woodbury, Connecticut.

By its Decision and Order dated June 19, 2003, the Connecticut Siting Council granted a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility located at Site A off of Great Hollow Road, Woodbury, Connecticut.

Enclosed are the Council's Findings of Fact, Opinion, and Decision and Order.

SDP/laf

Enclosures (4)

c: Albert Palko, State Documents Librarian
Council Members

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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Phone: (860) 827-2935 Fax: (860) 827-2950
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Web Site: www.state.ct.us/csc/index.htm

CERTIFICATE

OF

ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

DOCKET NO. 236

Pursuant to General Statutes § 16-50k, as amended, the Connecticut Siting Council hereby issues a Certificate of Environmental Compatibility and Public Need to Sprint Spectrum, L.P. d/b/a Sprint PCS for the construction, maintenance and operation of a wireless telecommunications facility located at Site A off of Great Hollow Road, Woodbury, Connecticut. This Certificate is issued in accordance with and subject to the terms and conditions set forth in the Decision and Order of the Council on June 19, 2003.

By order of the Council,

Pamela B. Katz, P.E., Chairman

June 19, 2003

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@po.state.ct.us
Web Site: www.state.ct.us/csc/index.htm

June 24, 2003

Thomas J. Regan, Esq.
Brown Rudnick Berlack Israels LLP
185 Asylum Street, CityPlace I
Hartford, CT 06103-3402

RE: **DOCKET NO. 236** - Sprint Spectrum L.P. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility off Great Hollow Road or at 103 Great Hollow Road, South Woodbury, Connecticut.

Dear Attorney Regan:

By its Decision and Order dated June 19, 2003, the Connecticut Siting Council (Council) granted a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at Site A off of Great Hollow Road in Woodbury to Sprint Spectrum.

Enclosed are the Council's Certificate, Findings of Fact, Opinion, and Decision and Order.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/CML

Enclosures (4)

Town of Woodbury

Zoning Permit

Number 8156 Date: **February 3, 2004**

Permission granted to: O & G Ind. (owner) / Peter Maxwell (agent)

To Construct: Telecommunications facilities

Address: Great Hollow Road

District OS-80 Map 34 Lot 15

Set back distance from lot lines

Front:: N/A

Right Side: N/A

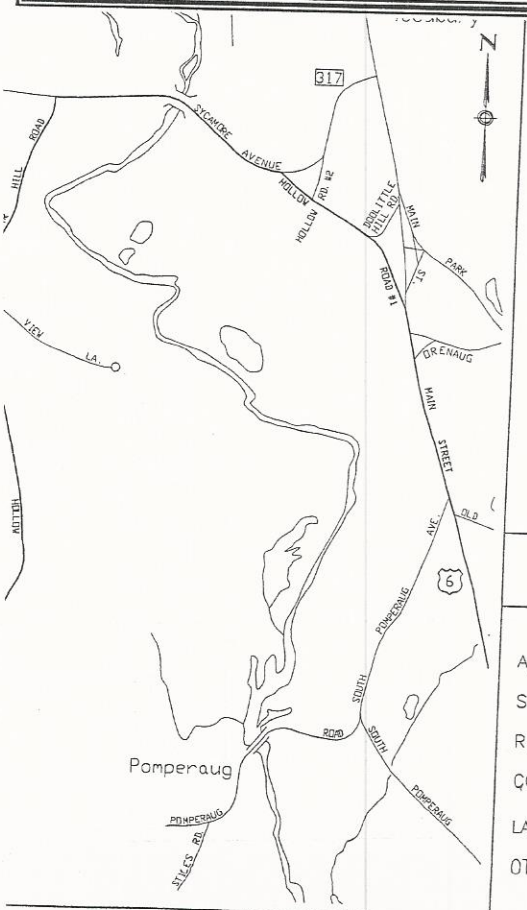
Left Side: N/A

Rear: N/A

A-2 Requirements ☐ Foundation N/A ☐ Final N/A ☐ Both Required

Reviewed and approved: ~~Judi Lynch, Land Use Administrator~~ Mark Dunn Town Planner

Building Height must be shown and indicated on the final.



PROPERTY OWNER:	ROBERT CHASE, TRUSTEE C/O O&G INDUSTRIES WOODBURY, CT
PROPERTY LESSEE:	SPRINT SITES USA 535 EAST CRESCENT AVENUE RAMSEY, NEW JERSEY 07446
APPLICANT/SUBLESSEE:	AT&T WIRELESS PCS LLC 12 OMEGA DRIVE STAMFORD, CONNECTICUT 06902
LATITUDE:	41.52201° (NAD 83)
LONGITUDE:	73.22074° (NAD 83)
ELEVATION:	590' AMSL
JURISDICTION:	TOWN OF WOODBURY, CONNECTICUT
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

B

SITE QUALIFICATION PARTICIPANTS

	NAME	COMPANY	NUMBER
A/E	IGNACIO C ARTAIZ	URS CORPORATION AES	(860) 529-8882
SAC	HOLLIS REDDING	OPTASITE, INC.	(860) 657-1460
RF	KUMAR RUGHOOBUR	BECHTEL	(203) 630-9930
CON	ALI HEMMATI	BECHTEL	(201) 707-8161
LANDLORD	RUSS VAN OUDENAREN	SPRINT SITES USA	(201) 995-4023
OTHER	–		–

STATE OF CONNECTICUT IGNACIO C. ARTAIZ

0	10/01/03	ISSUED FOR CONSTRUCTION	JCF
A	09/16/03	100% REVIEW	

URS CORPORATION AES

TITLE SHEET

Town of Woodbury

Date: 1/30/04 Zoning Permit Number 8156

Address of property: Great Hollow Road

Map No. 34 **Lot No.** 15 Subdivision Name:

Name of Owner: O & G Industries Phone Number: 860-489-9261

Address of Owner: 112 Wall Street

DESCRIPTION OF WORK PROPOSED

concrete pad & telecommunications equipment cabinets within existing fenced enclosure; antennas on existing monopole

Size of structure: Height of structure: 110'

Square footage: Number of stories:

Type of construction: 100x100 SF leased area

Zone: ☐ R-40 ☐ OS-60 ☑ OS-80 ☐ OS-100 ☐ GA ☐ MSD ☐ PI ☐ EE ☐ MQ

Width of lot: Depth of lot: Total Acreage:

Setback distances from property lines

Front yard: 223 Rear yard:

Right side yard: NA Left side yard:

Name of Agent: Peter N. Maxwell Phone Number: 860-202-0219

Address of Agent: URS Corp, 795 Brook St. Bldg 5, Rocky Hill, CT 06067

Please Note:
An agent must provide an approval letter from the owner of the subject property before application will be approved.

Check all applicable

Is this property in the Historic District?	☐ Yes	☑ No
Does this application involve any grading or filling?	☐ Yes	☐ No
Will there be construction in or within 100 feet of a wetland watercourse?	☐ Yes	☐ No
Will this require approval from the Pomperaug Health District	☑ Yes	☐ No

Other

Signature of Owner/Agent:

Approved by: Mark Dalton Date: 2-3-04

Please Note

This issued permit is based upon the plot plan submitted. Falsification by misrepresentation or omission, or failure to comply with the conditions of approval of this permit shall constitute a violation of the Town of Woodbury Zoning Regulations.

120203

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2018.

Town of Woodbury

First Deed from the Indians 1659

Information on the Property Records for the Municipality of Woodbury was last updated on 2/23/2019.

Parcel Information

Location:	202 GREAT HOLLOW RD	Property Use:	Residential	Primary Use:	Residential
Unique ID:	45300	Map Block Lot:	034-015	Acres:	210.30
490 Acres:	208.46	Zone:	OS80	Volume / Page:	360/ 104
Developers Map / Lot:		Census:	3621		

Value Information

	Appraised Value	Assessed Value
Land	1,869,813	191,400
Buildings	0	0
Detached Outbuildings	332,302	232,610
Total	2,202,115	424,010

Owner's Information

Owner's Data
O & G INDUSTRIES INC 112 WALL STREET TORRINGTON CT 06790

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Building/Equipment Cell Towers	2010			300
Building/Equipment Cell Towers	2010			64
Building/Equipment Cell Towers	2010			160
Building/Equipment Cell Towers	2010			200
Fencing Cell Towers	2010			600
Mono Pole Cell Towers	2002			150
Pad Cell Towers	2010			160
Pad Cell Towers	2002	20	10	200

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
O & G INDUSTRIES INC	360	104	03/20/2008		No	$0
CHASE ROBERT L-TTEE	241	210	05/28/1999		No	$0

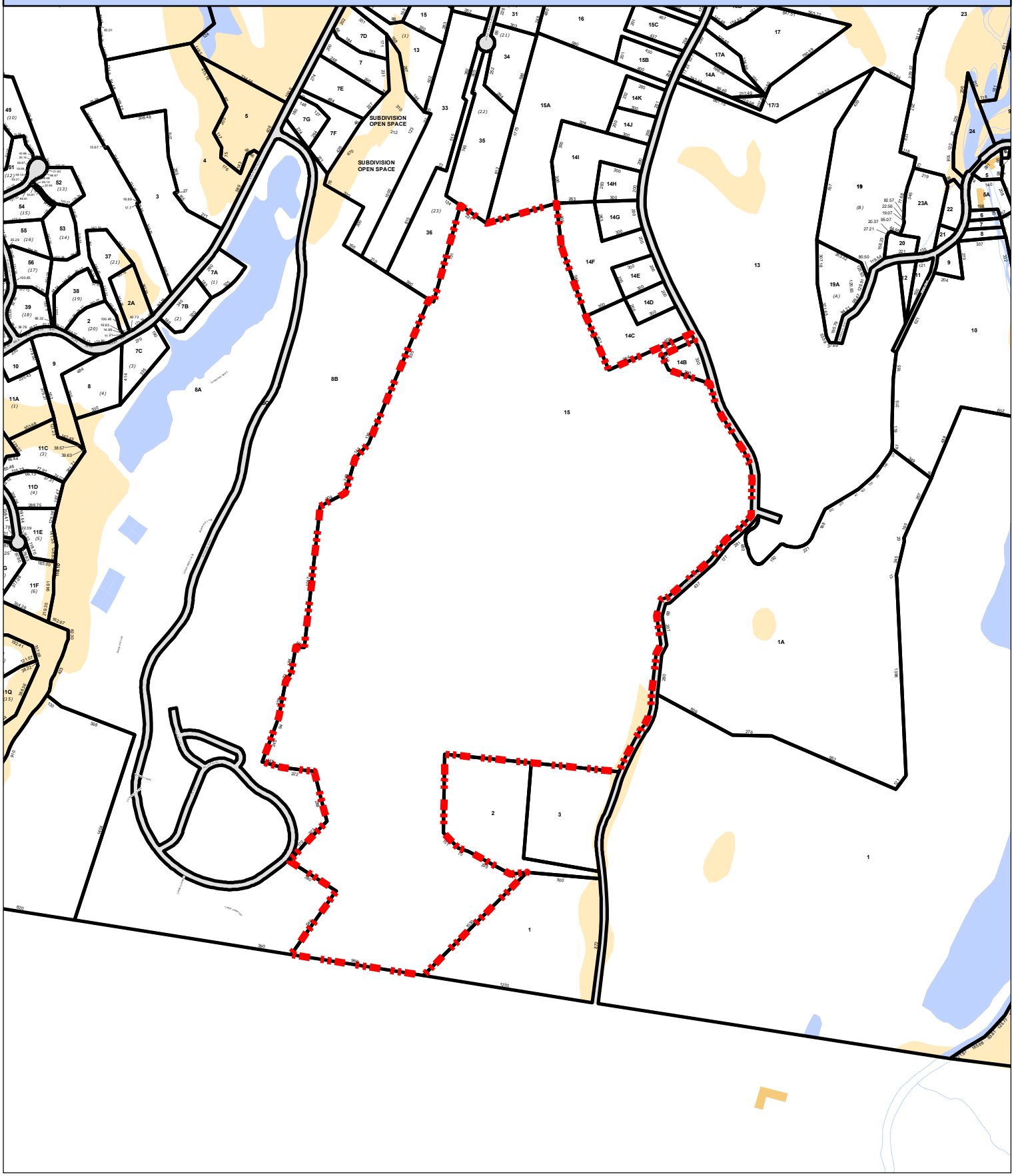
Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
19-60	Electrical	01/31/2019		Closed	INSTALL CONDUIT AND WIRING TO INSTALL AND GENERATE DC GENERATOR INTO EXISTING DC SYSTEM
B181-17	Other	09/14/2017		Closed	UPGRADE TELECOMMUNICATION ANTENNA - SPRINT - 3 NEW ANTENNA, 3 REMOTE RADIO HEAD AND A HYBRID FIBER
B053-17	Other	04/20/2017		Closed	AT&T TO REMOVE AND REPLACE THREE ANTENNAS AND ADD THREE R R U'S (NON-ANTENNA) TO EXISTING EQUIPMENT
B036-16	Other	03/17/2016		Closed	AT&T TO REMOVE AND REPLACE 3 ANTENNAS & ADD 3 RRU'S TO EXISTING EQUIPMENT
B067-15	Other	05/11/2015		Closed	REMOVING & REPLACING 3 ATTENNAS W/3 NEW + ADD I NEW CABINET ON THE EXISTING CONCRETE PAD
B004-15	Other	01/15/2015		Closed	REPLACING ANTENNA PANELS ON EXISTING TOWER ADDING REMOTE RADIO HEADS
B226-14	Other	12/11/2014		Closed	SPRINT TO ADD 3 ATENNA'S & 3 RRH &1 FIBER CABLES TO ANTENNA
B013-14	Other	02/09/2014		Closed	ADD 50 K DIESEL GENERATORS ON 4’X 8’ CONCRETE PAD, CONDUIT TO A T A MOUNTED ON EXISTING SHELTER. AL
B145-13	Comm Renovations	08/19/2013		Closed	INSTALL 1 ANTENNA & RELOCATE GROUND EQUIPMENT & ELECTRICAL
B241-12	Comm Renovations	12/19/2012		Closed	CELL TOWER-INSTALL 3 NEW ANTENNAS & ONE CABINET ON GROUND
B225-12	Comm Renovations	12/12/2012		Closed	REPLACE R EXISTING ANTENNAS W/3 NEW SPRINT ANTENNAS ON EXISTING TOWER ADDING 6 REMOTE RADIO HEADS T
8555		07/29/2003		Closed	CELL TOWER(140');OPEN SPACE-1990(69.46 AC);FOREST LAND-1991(123.0 AC); FOREST LAND REVISED-1996(CER

Town of Woodbury, Connecticut - Assessment Parcel Map

Parcel: 034-015 Address: 202 GREAT HOLLOW RD



Approximate Scale: 1 inch = 900 feet

0 470 940 1,410 1,880 Feet

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Woodbury and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced:
9/14/2018

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE REMOVED FROM EXISTING TOWER & ON GROUND:

- REMOVE (3) EXISTING ANTENNAS & (6) RRH's.

- INSTALL AT&T ANTENNA (800-10964) (BETA & GAMMA SECTORS ONLY, TOTAL OF 4).
- INSTALL AT&T ANTENNA (800-10965) (ALPHA SECTOR, TOTAL OF 2).
- INSTALL AT&T 4478 B14 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4449 B5/B12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 8843 B2/B66A (PCS/AWS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL SURGE ARRESTOR (DC6-48-60-18-8F) (TOTAL OF 1).
- INSTALL (2) DC TRUNK CABLES & (1) FIBER TRUNK CABLE.

ITEMS TO BE MOUNTED INSIDE EXISTING SHELTER:

- ADD 2x6630.

ITEMS TO REMAIN:

- (6) ANTENNAS, (3) RRU'S, (3) TMAS, (1) SURGE SUPPRESSOR, (12) COAX CABLES, (1) FIBER TRUNK CABLE & (2) DC TRUNK CABLES.

SITE ADDRESS:	GREAT HOLLOW ROAD WOODBURY, CT 06798
LATITUDE (NAD 83):	N 41° 31' 19.20"
LONGITUDE (NAD 83):	W 73° 13' 14.65"
LANDLORD:	CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK, STE 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE/INDOOR
TOWER HEIGHT:	139'
RAD CENTER:	139'
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
C-1	SITE PLAN
C-2	EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION
C-3	EXISTING & PROPOSED ANTENNA LAYOUT
C-4	EQUIPMENT DETAILS
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

CROWN CASTLE SITE ID #: 876380
CROWN CASTLE SITE NAME: O&G WOODBURY

ENGINEERING

2018 CONNECTICUT STATE BUILDING CODE
2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
ANSI/TIA-222-G

at&t

SITE NUMBER: CT2066

FA LOCATION CODE: 10035444

SITE NAME: WOODBURY CT GEART HOLLOW RD

CROWN SITE NAME: O&G WOODBURY

PROJECT: LTE 4C/LTE 5C/LTE 6C/4TX4RX SOFTWARE RETROFIT/4TX4RX SOFTWARE RETROFIT

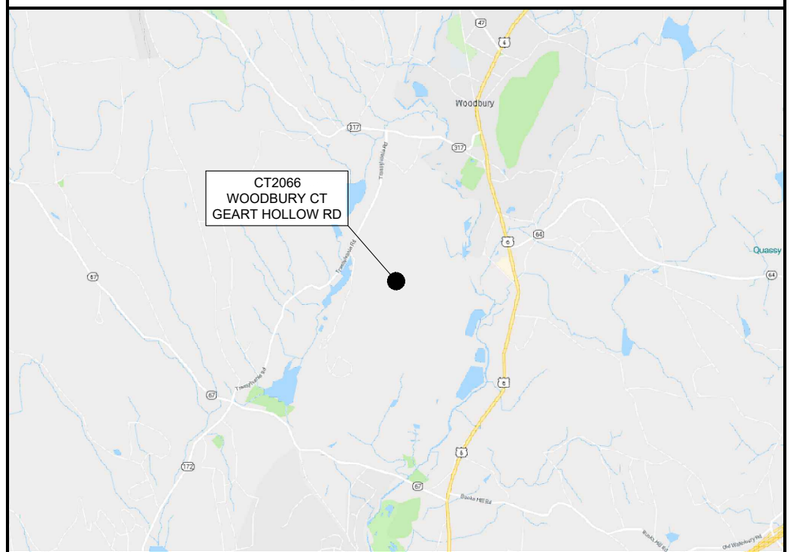
PACE ID: MRCTB035183, MRCTB035181, MRCTB035264, MRCTB035351, MRCTB035348

BU#: 876380

NOTE:

ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PRE-APPROVAL TO ENTER THE PROPERTY MUST BE OBTAINED. FOR ACCESS AUTHORIZATION, PLEASE CONTACT CROWN.

VICINITY MAP



DIRECTIONS: FROM ROCKY HILL, TAKE 91 SOUTH TO I-691 WEST, FOLLOW 691 TO ROUTE 84 WEST. TAKE EXIT 15 (SOUTHBURY). TURN RIGHT AT END OF RAMP AND FOLLOW ROUTE 6 NORTH APPROX 4 1/2 MILES.TAKE LEFT ONTO ROUTE 317 AND GO APPROX 1/2 MI. TURN LEFT ONTO BEAR HILL RD. TAKE LEFT ONTO GREAT HOLLOW ROAD, FOLLOW TO THE END. WE HAVE A SHARED DRIVEWAY WITH HOUSE #208 ON THE RIGHT SIDE AT THE END OF GREAT HOLLOW RD. SITE IS APPROX 1/4 MILE UP ACCESS RD.

GENERAL NOTES

1. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

811

UNDERGROUND SERVICE ALERT

CONNECTICUT LAW REQUIRES
TWO WORKING DAYS NOTICE PRIOR TO ANY
EARTH MOVING ACTIVITIES BY CALLING
800-922-4455 OR DIAL 811

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO:	ERCC0004
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

TITLE SHEET

T-1

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

6. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
7. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

G. PANELS AND LOAD CENTERS:

1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004
DRAWN BY: DAP
CHECKED BY: CAT

SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

GENERAL NOTES I

GN-1

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH ($)
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8 (F)
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

EXISTING CHAIN LINK FENCE — X — X — X — X —
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE
PROPOSED UNDERGROUND POWER — W — W — W — W — W —
PROPOSED UNDERGROUND TELCO — UGP — UGP — UGP — UGP —
PROPOSED OVERHEAD POWER — UGT — UGT — UGT — UGT —
PROPOSED OVERHEAD TELCO — OHP — OHP — OHP — OHP —
PROPOSED OVERHEAD UTILITIES — OHT — OHT — OHT — OHT — OHT —
PROPOSED ABOVE GROUND POWER — OHT — OHT — OHT — OHT — OHT —
PROPOSED ABOVE GROUND TELCO — AGP — AGP — AGP — AGP — AGP —
— AGT — AGT — AGT — AGT — AGT —

AB	ANCHOR BOLT	COL	COLUMN	FIN	FINISH(ED)	MAS	MASONRY	QTY	QUANTITY	TOF	TOP OF FOUNDATION
ABV	ABOVE	COMM	COMMON	FLR	FLOOR	MAX	MAXIMUM	RAD	RADIUS	TOP	TOP OF PLATE (PARAPET)
AC	ALTERNATING CURRENT	CONC	CONCRETE	FDN	FOUNDATION	MB	MACHINE BOLT	RECT	RECTIFIER	TOS	TOP OF STEEL
ADDL	ADDITIONAL	CONSTR	CONSTRUCTION	FOC	FACE OF CONCRETE	MECH	MECHANICAL	REF	REFERENCE	TOW	TOP OF WALL
AFF	ABOVE FINISHED FLOOR	DBL	DOUBLE	FOM	FACE OF MASONRY	MFR	MANUFACTURER	REINF	REINFORCEMENT	TVSS	TRANSIENT VOLTAGE SUPPRESSION
AFG	ABOVE FINISHED GRADE	DC	DIRECT CURRENT	FOS	FACE OF STUD	MGB	MASTER GROUND BAR	REQ'D	REQUIRED		SYSTEM
AIC	AMPERAGE INTERRUPTION CAPACITY	DEPT	DEPARTMENT	FOW	FACE OF WALL	MIN	MINIMUM	RET	REMOTE ELECTRIC TILT	TYP	TYPICAL
ALUM	ALUMINUM	DF	DOUGLAS FIR	FS	FINISH SURFACE	MISC	MISCELLANEOUS	RMC	RIGID METALLIC CONDUIT	UG	UNDERGROUND
ALT	ALTERNATE	DIA	DIAMETER	FT	FOOT	MTL	METAL	RRH	REMOTE RADIO HEAD	UL	UNDERWRITERS LABORATORY
ANT	ANTENNA	DIAG	DIAGONAL	FTG	FOOTING	MTS	MANUAL TRANSFER SWITCH	RRU	REMOTE RADIO UNIT	UNO	UNLESS NOTED OTHERWISE
APPROX	APPROXIMATE	DIM	DIMENSION	GA	GAUGE	MW	MICROWAVE	RWY	RACEWAY	UMTS	UNIVERSAL MOBILE
ARCH	ARCHITECTURAL	DWG	DRAWING	GEN	GENERATOR	(N)	NEW	SCH	SCHEDULE		TELECOMMUNICATIONS SYSTEM
ATS	AUTOMATIC TRANSFER SWITCH	DWL	DOWEL	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NEC	NATIONAL ELECTRIC CODE	SHT	SHEET	UPS	UNINTERRUPTIBLE POWER SYSTEM
AWG	AMERICAN WIRE GAUGE	(E)	EXISTING	GLB	GLUE LAMINATED BEAM	NO.(#)	NUMBER	SIAD	SMART INTEGRATED DEVICE		(DC POWER PLANT)
BATT	BATTERY	EA	EACH	GLV	GALVANIZED	NTS	NOT TO SCALE	SIM	SIMILAR	VIF	VERIFIED IN FIELD
BLDG	BUILDING	EC	ELECTRICAL CONDUCTOR	GPS	GLOBAL POSITIONING SYSTEM	OC	ON CENTER	SPEC	SPECIFICATION	W	WIDE
BLK	BLOCK	EL	ELEVATION	GND	GROUND	OPNG	OPENING	SQ	SQUARE	W/	WITH
BLKG	BLOCKING	ELEC	ELECTRICAL	GSM	GLOBAL SYSTEM FOR MOBILE	(P)	PROPOSED	SS	STAINLESS STEEL	WD	WOOD
BM	BEAM	EMT	ELECTRICAL METALLIC TUBING	HDR	HEADER	P/C	PRECAST CONCRETE	STD	STANDARD	W.P.	WORK POINT
BTC	BARE TINNED COPPER CONDUCTOR	ENG	ENGINEER	HGR	HANGER	PCS	PERSONAL COMMUNICATION SERVICES	STL	STEEL	WP	WEATHERPROOF
BOF	BOTTOM OF FOOTING	EQ	EQUAL	HVAC	HEAT/VENTILATION/AIR CONDITIONING	PCU	PRIMARY CONTROL UNIT	STRUCT	STRUCTURAL	WT	WEIGHT
CAB	CABINET	EXP	EXPANSION	HT	HEIGHT	PRC	PRIMARY RADIO CABINET	TEMP	TEMPORARY		
CANT	CANTILEVERED	EXT	EXTERIOR	IGR	INTERIOR GROUND RING	PP	POLARIZING PRESERVING	THK	THICKNESS		
CEC	CALIFORNIA ELECTRIC CODE	FAB	FABRICATION	IN	INCH	PSF	POUNDS PER SQUARE FOOT	TMA	TOWER MOUNTED AMPLIFIER		
CHG	CHARGING	FF	FINISH FLOOR	INT	INTERIOR	PSI	POUNDS PER SQUARE INCH	TN	TOE NAIL		
CLG	CEILING	FG	FINISH GRADE	LB(S)	POUND(S)	PT	PRESSURE TREATED	TOA	TOP OF ANTENNA		
CLR	CLEAR	FIF	FACILITY INTERFACE FRAME	LF	LINEAR FEET	PWR	POWER CABINET	TOC	TOP OF CURB		

at&t
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CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004
DRAWN BY: DAP
CHECKED BY: CAT

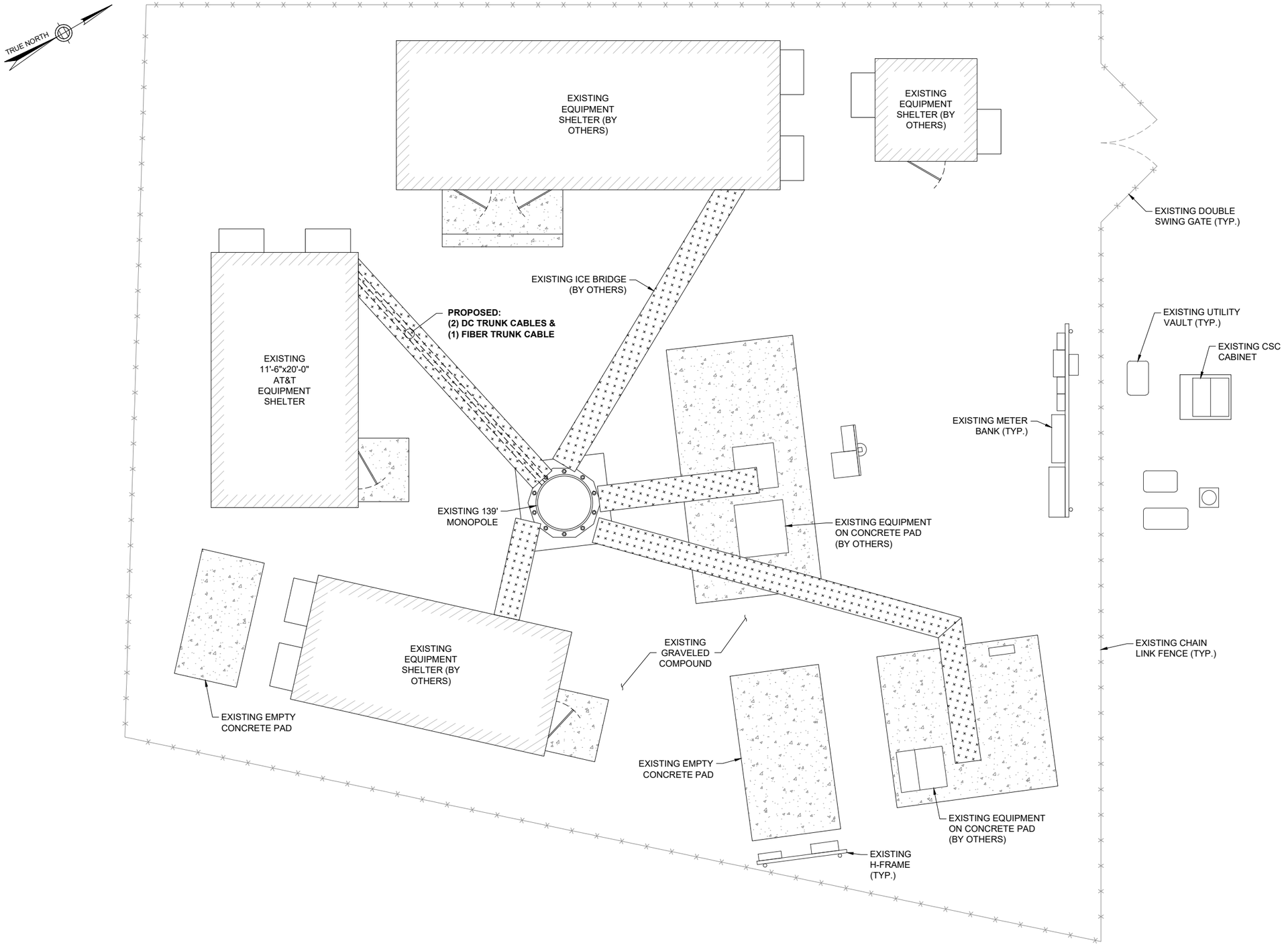
SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

GENERAL NOTES II

GN-2



NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY COM EX CONSULTANTS ON 03/20/17. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.

1 SITE PLAN

SCALE: 1/4" = 1'-0"

at&t
5841 BRIDGE STREET
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FA# 10035444
SITE# CT2066
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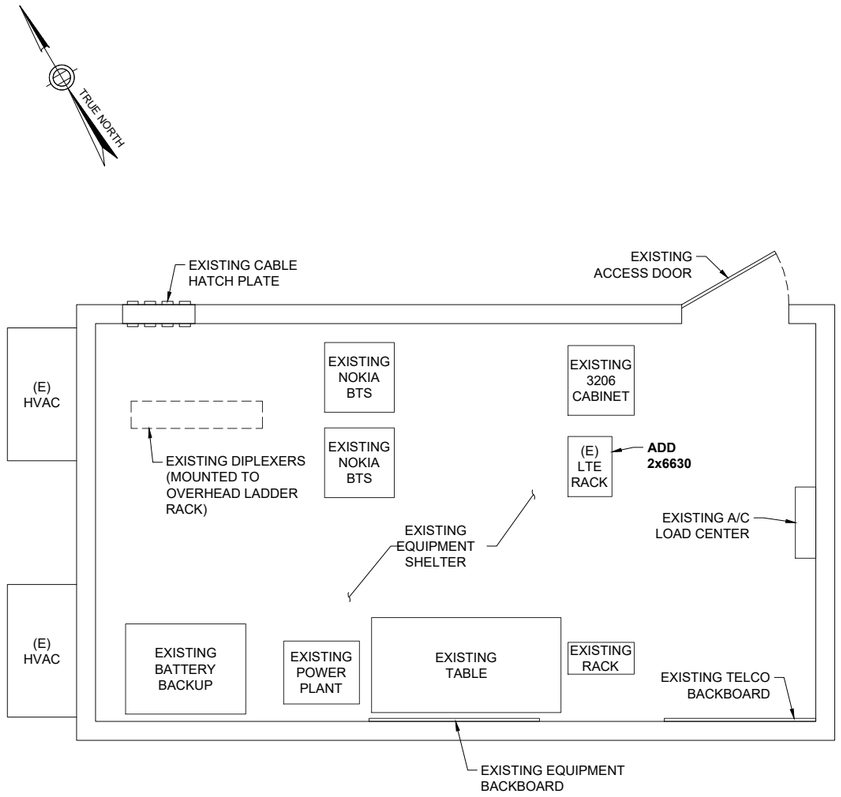
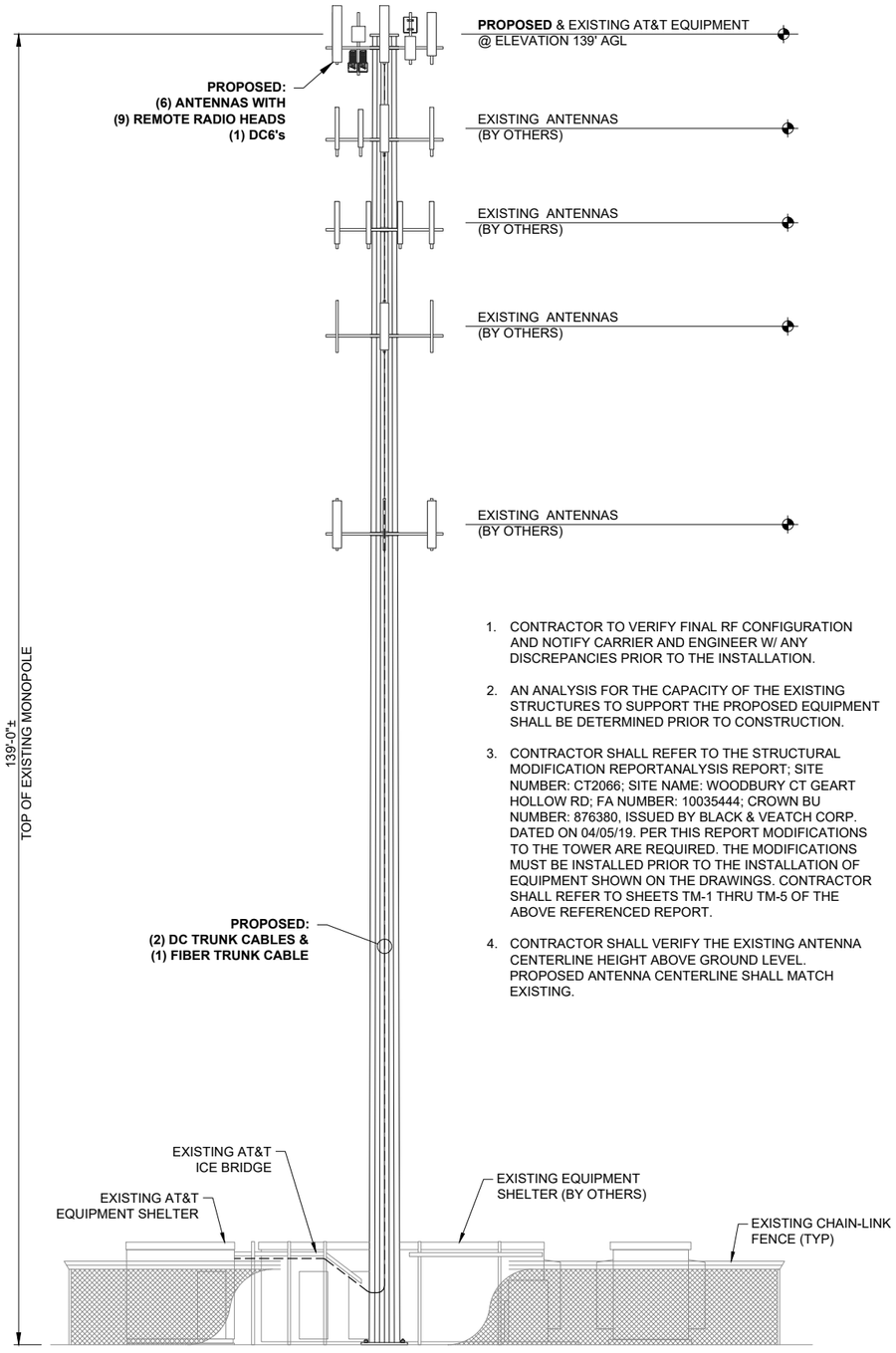
WOODBURY, CT 06798

SITE PLAN

C-1



1 EQUIPMENT LAYOUT — SCALE: 1/2" = 1'-0"



1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL REFER TO THE STRUCTURAL MODIFICATION REPORTANALYSIS REPORT; SITE NUMBER: CT2066; SITE NAME: WOODBURY CT GEART HOLLOW RD; FA NUMBER: 10035444; CROWN BU NUMBER: 876380, ISSUED BY BLACK & VEATCH CORP. DATED ON 04/05/19. PER THIS REPORT MODIFICATIONS TO THE TOWER ARE REQUIRED. THE MODIFICATIONS MUST BE INSTALLED PRIOR TO THE INSTALLATION OF EQUIPMENT SHOWN ON THE DRAWINGS. CONTRACTOR SHALL REFER TO SHEETS TM-1 THRU TM-5 OF THE ABOVE REFERENCED REPORT.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.

2 TOWER ELEVATION — SCALE: 1/8" = 1'-0"

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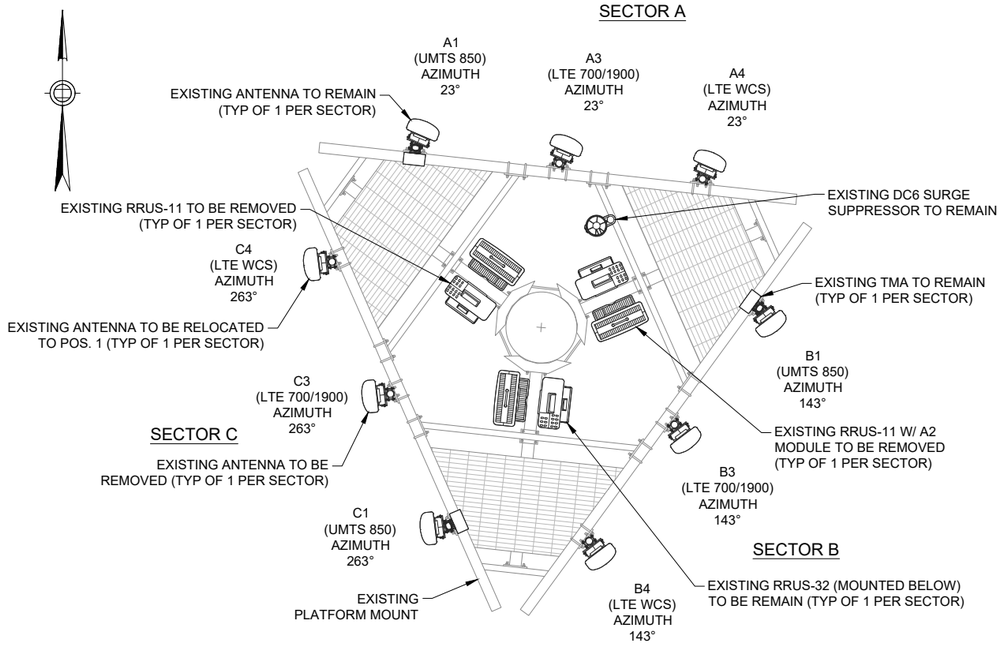
SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

C-2



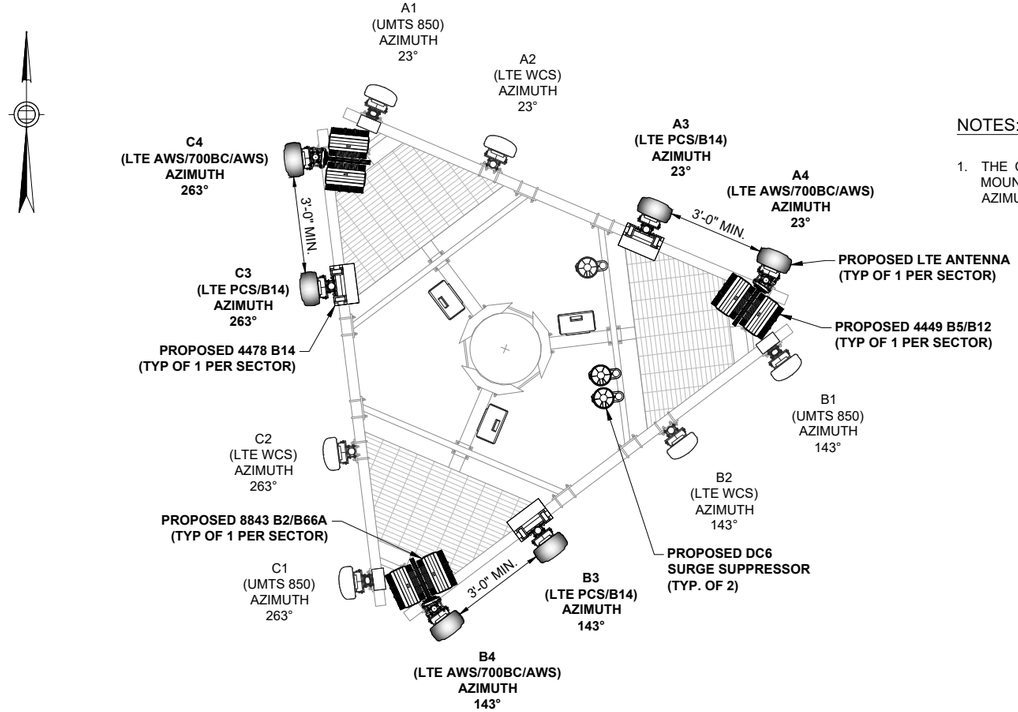
ELEVATION 139'

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. CONTRACTOR SHALL REFER TO THE TOWER EQUIPMENT INSTALLATION STRUCTURAL ANALYSIS REPORT; SITE NUMBER: CT2066; SITE NAME: WOODBURY CT GEART HOLLOW RD; FA LOCATION: 10035444; CROWN BU NUMBER: 876380; CROWN SITE NAME: O&G WOODBURY; CROWN ORDER NUMBER: 475080; ISSUED BY JACOBS ENGINEERING GROUP, INC. DATED ON 02/28/19. PER THIS ANALYSIS NO MODIFICATIONS ARE REQUIRED TO THE TOWER. CONTRACTOR SHALL CONFIRM ALL AT&T EXISTING AND PROPOSED EQUIPMENT ARE INSTALLED IN ACCORDANCE WITH THIS REPORT.
2. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
3. CONTRACTOR SHALL NOT EXCEED MOUNTING MORE THAN (2) RRHS PER ANTENNA MOUNTING PIPE - RELOCATE TO AN ADJACENT ANTENNA MOUNTING PIPE AS NEEDED.
4. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.



ELEVATION 139'

2 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. THE CONTRACTOR SHALL ROTATE THE PLATFORM MOUNT 17° TO THE EAST TO ACCOMMODATE THE AZIMUTH OF THE PROPOSED LTE ANTENNAS.

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STATE OF CONNECTICUT
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No. 0029052
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PROJECT NO:	ERCC0004
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

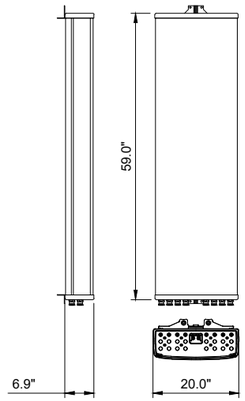
0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART
HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

EXISTING & PROPOSED
ANTENNA LAYOUT

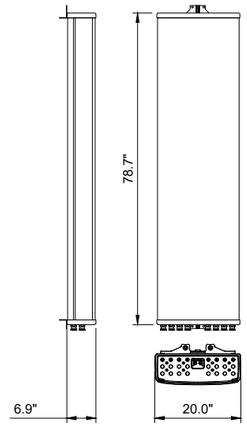
C-3

MANUFACTURER: KATHREIN
MODEL NO.: 800-10964
RADOME MATERIAL: FIBERGLASS, UV RESISTANT
COLOR: LIGHT GRAY
DIMENSIONS (LxWxD): 59.0" x 20.0" x 6.9"
1499mm x 508mm x 175mm
WEIGHT (lbs): 83.8
CONNECTOR: 8 x 4.3-10 FEMALE
FRONT WIND LOAD: 188 LBF @ 93 MPH
835 N @ 150 KM/H
SIDE WIND LOAD: 189 LBF @ 93 MPH
840 N @ 150 KM/H
WIND SPEED MAX.: >150 MPH (>241 KM/H)



1 ANTENNA SPECIFICATIONS — SCALE: N.T.S.

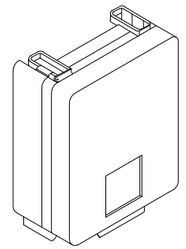
MANUFACTURER: KATHREIN
MODEL NO.: 800-10965
RADOME MATERIAL: FIBERGLASS, UV RESISTANT
COLOR: LIGHT GRAY
DIMENSIONS (LxWxD): 78.7" x 20.0" x 6.9"
1999mm x 508mm x 175mm
WEIGHT (lbs): 97.6
CONNECTOR: 8 x 4.3-10 FEMALE
FRONT WIND LOAD: 254 LBF @ 93 MPH
1130 N @ 150 KM/H
SIDE WIND LOAD: 256 LBF @ 93 MPH
1140 N @ 150 KM/H
WIND SPEED MAX.: >150 MPH (>241 KM/H)

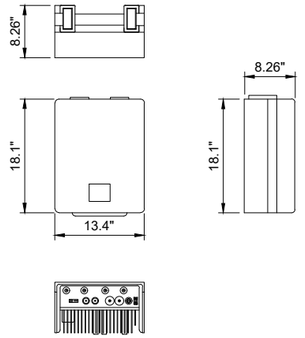


2 ANTENNA SPECIFICATIONS — SCALE: N.T.S.

MANUFACTURER: ERICSSON
MODEL NO.: RRUS-4478 B14
TECHNOLOGY: LTE 700
DIMENSIONS (HxWxD): 18.1" x 13.4" x 8.26"
WEIGHT (lbs): 59.4
POWER SUPPLY: -48V

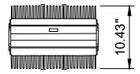
NOTE:
PENDING FINAL PRODUCT SPECIFICATION

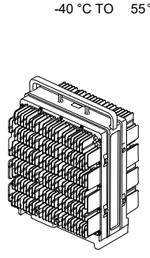


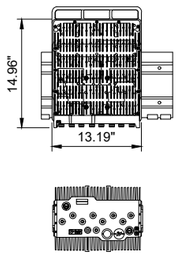


3 RRUS SPECIFICATIONS — SCALE: N.T.S.

MANUFACTURER: ERICSSON
MODEL NO.: RRUS-4449 B5 & B12
TECHNOLOGY: DUAL BAND
DIMENSIONS (HxWxD): 14.96" x 13.19" x 10.43"
WEIGHT (lbs): 73.0
POWER SUPPLY: -48V
TEMPERATURE: -40 °C TO 55°C

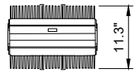


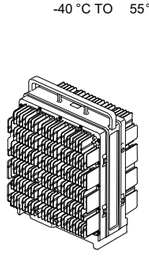


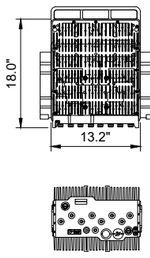


4 RRUS SPECIFICATIONS — SCALE: N.T.S.

MANUFACTURER: ERICSSON
MODEL NO.: RRUS-8843 B2/B66A
PCS/AWS
DIMENSIONS (HxWxD): 18.0" x 13.2" x 11.3"
WEIGHT (lbs): 75.0
POWER SUPPLY: -48V
TEMPERATURE: -40 °C TO 55°C

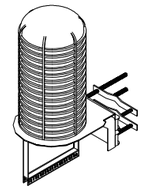


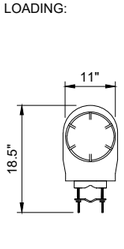


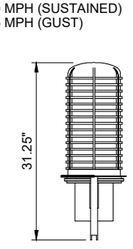


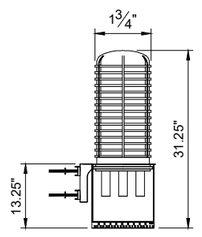
5 RRUS SPECIFICATIONS — SCALE: N.T.S.

RAYCAP DC6-48-60-18-8F
DIMENSIONS (HxWxD): 31.25" x 11.0" x 18.5"
TOTAL WEIGHT (lbs): 32.8
NOMINAL OPERATING VOLTAGE: 48 VDC
NOMINAL DISCHARGE VOLTAGE: 20 kA 8/20 sμ
MAXIMUM DISCHARGE CURRENT: 60 kA 8/20 sμ
MAX. CONT. OPERATING CURRENT: 75 VDC
VOLTAGE PROTECTION RATING: 400 V
WIND LOADING: 150 MPH (SUSTAINED)
195 MPH (GUST)





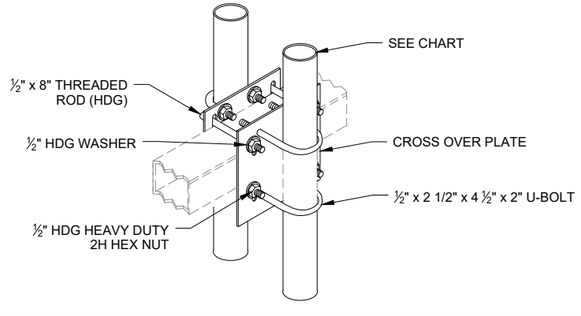




CONTRACTOR TO USE "THREAD LUBRICANT"
ON MOUNTING BOLTS DURING INSTALLATION

6 DC FIBER/DC DISTRIBUTION SYSTEM DETAIL — SCALE: N.T.S.

PART #	PIPE SIZE	STAND-OFF ARM
BBPM-K1	2-3/8"	3-1/2" - 4-1/2"
BBPM-K2	2-7/8"	3-1/2" - 4-1/2"
BBPM-K3	2-3/8"	3-1/2" - 6"
BBPM-U	2-3/8" - 4-1/2"	2-3/8" - 4-1/2"

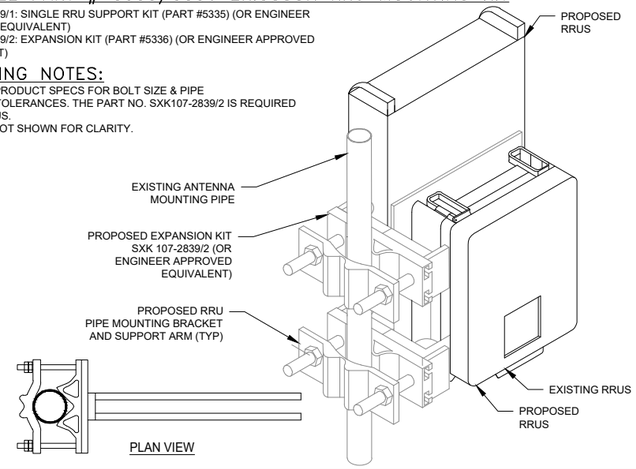


7 DC6 MOUNTING DETAIL — SCALE: N.T.S.

CUE DEE PART # 5335/5336 ERICSSON RRU MOUNTING KIT

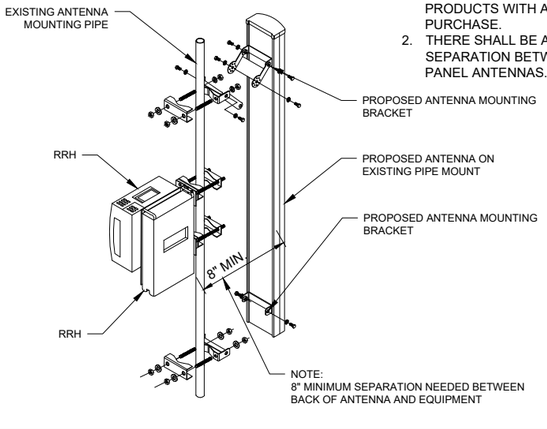
SXK 107 2839/1: SINGLE RRU SUPPORT KIT (PART #5335) (OR ENGINEER APPROVED EQUIVALENT)
SXK 107 2839/2: EXPANSION KIT (PART #5336) (OR ENGINEER APPROVED EQUIVALENT)

MOUNTING NOTES:
REFER TO PRODUCT SPECS FOR BOLT SIZE & PIPE DIAMETER TOLERANCES. THE PART NO. SXK107-2839/2 IS REQUIRED FOR (2) RRUS.
ANTENNA NOT SHOWN FOR CLARITY.



8 RRU MOUNTING DETAIL — SCALE: N.T.S.

NOTES:
1. MOUNTING OPTIONS ARE INCLUDED PRODUCTS WITH ANTENNA PURCHASE.
2. THERE SHALL BE A MINIMUM 3'-0" SEPARATION BETWEEN ALL LTE PANEL ANTENNAS.



9 ANTENNA MOUNTING DETAIL — SCALE: N.T.S.

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WOODBURY, CT 06798

EQUIPMENT DETAILS

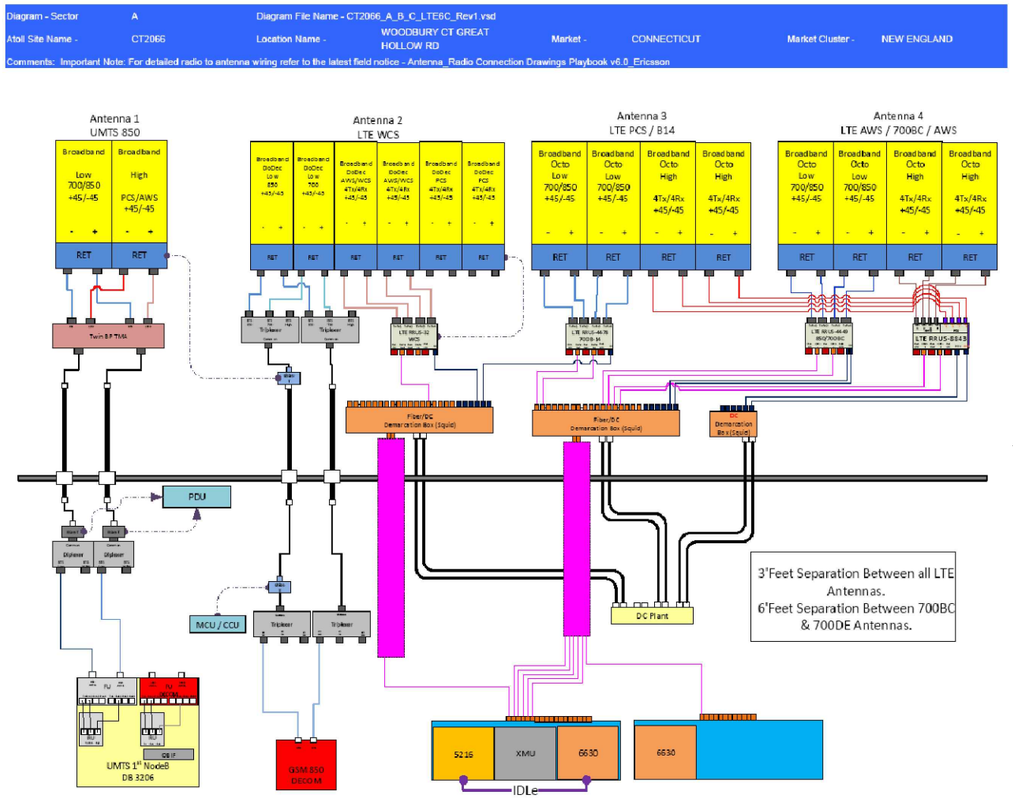
C-4

ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's	RRH's	FEEDER	RAYCAP
A1	7770 (55"x11"x5")	UMTS	23°	139'	(1) TT19-08BP111-001	-	(2) 1-1/4" EXISTING (LENGTH @ 212')	**(1) RAYCAP DC6-48-60-18-8F**
A2	QS66512-2 (72"x12"x9.6")	LTE WCS	23°	139'	-	(1) RRUS-32 (WCS)	(1) FIBER (2) 1-1/4" EXISTING (LENGTH @ 212')	
A3	**800-10965 (78.7"x20"x6.9")**	**LTE PCS/B14**	**23°**	**139'**	-	**(1) 4478 B14 (700)**	-	(1) RAYCAP DC6-48-60-18-8F
A4	**800-10965 (78.7"x20"x6.9")**	**LTE AWS/ 700BC/ AWS**	**23°**	**139'**	-	**(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (PCS/AWS)**	**(1) FIBER (4) DC (LENGTH @ 212')**	
B1	7770 (55"x11"x5")	UMTS	143°	139'	(1) TT19-08BP111-001	-	(2) 1-1/4" EXISTING (LENGTH @ 212')	
B2	QS66512-2 (72"x12"x9.6")	LTE	143°	139'	-	(1) RRUS-32 (WCS)	(1) FIBER (2) 1-1/4" EXISTING (LENGTH @ 212')	
B3	**800-10964 (59"x20"x6.9")**	**LTE PCS/B14**	**143°**	**139'**	-	**(1) 4478 B14 (700)**	-	
B4	**800-10964 (59"x20"x6.9")**	**LTE AWS/ 700BC/ AWS**	**143°**	**139'**	-	**(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (PCS/AWS)**	-	
G1	7770 (55"x11"x5")	UMTS	263°	139'	(1) TT19-08BP111-001	-	(2) 1-1/4" EXISTING (LENGTH @ 212')	
G2	QS66512-2 (72"x12"x9.6")	LTE	263°	139'	-	(1) RRUS-32 (WCS)	(1) FIBER (2) 1-1/4" EXISTING (LENGTH @ 212')	
G3	**800-10964 (59"x20"x6.9")**	**LTE PCS/B14**	**263°**	**139'**	-	**(1) 4478 B14 (700)**	-	
G4	**800-10964 (59"x20"x6.9")**	**LTE AWS/ 700BC/ AWS**	**263°**	**139'**	-	**(1) 4449 B5/B12 (850/700) (1) 8843 B2/B66A (PCS/AWS)**	-	

NOTES:

1. EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED
2. * DENOTES THAT EQUIPMENT IS TO BE GROUND MOUNTED

1 ANTENNA INFORMATION CHART — SCALE: NONE



2 RF EQUIPMENT SCHEMATIC — SCALE: NONE

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

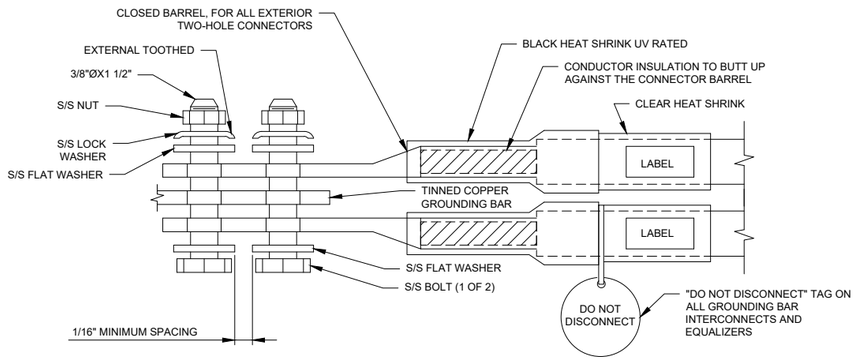
FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

ANTENNA CHART & RF EQUIPMENT SCHEMATIC

RF-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL — SCALE: NONE

GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

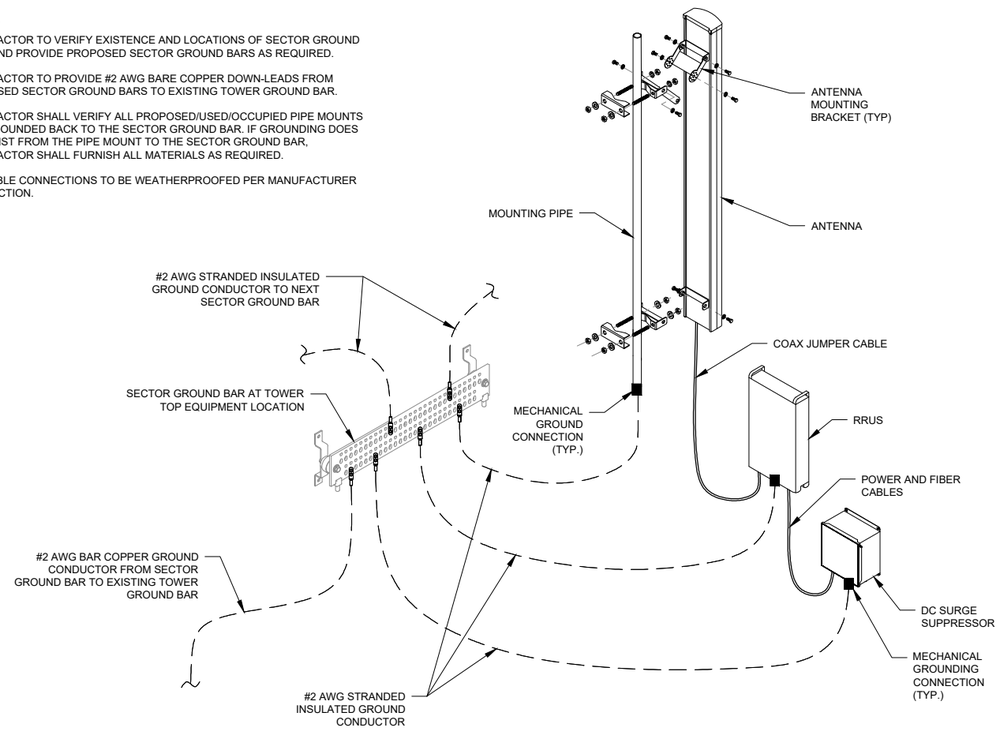
GROUNDING NOTES:

1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

2 GROUNDING BAR DETAIL — SCALE: NONE

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



3 TYPICAL ANTENNA GROUNDING SCHEMATIC — SCALE: NONE

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BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO:	ERCC0004
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

0	04/22/19	ISSUED FOR PERMITTING

FA# 10035444
SITE# CT2066
WOODBURY CT GEART HOLLOW RD
GREAT HOLLOW ROAD
WOODBURY, CT 06798

GROUNDING DETAILS

G-1

Date: **April 05, 2019**

Steve Tuttle
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-6984

Subject:	**Structural Modification Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10035444
	Carrier Site Name:	WOODBURY CT GREAT HOLLOW RD
Crown Castle Designation:	**Crown Castle BU Number:**	876380
	Crown Castle Site Name:	O&G WOODBURY
	Crown Castle JDE Job Number:	553140
	Crown Castle Work Order Number:	1720153
	Crown Castle Order Number:	475080 Rev. 0
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	400087
Site Data:	**Great Hollow Road, Woodbury, Litchfield County, CT** **Latitude *41° 31' 19.2"*, Longitude *-73° 13' 14.65"*** **138.377 Foot - Monopole Tower**	

Dear Steve Tuttle,

Black & Veatch Corp. is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4: Modified Structure w/ Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Keerati Pongrungsap

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer

04/11/2019

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 138.377 ft Monopole tower designed by Engineered Endeavors, Inc.

The tower has been modified two times in the past to accommodate additional loading.

The tower has been modified per reinforcement drawings prepared by Semaan Engineering Solutions, Inc. in November of 2005. Reinforcement consists of addition of base plate stiffeners. Refer to Legacy Modification Inspection Report prepared by Tower Engineering Professionals in March of 2019. This modification is considered ineffective in this analysis.

The tower has been modified per reinforcement drawings prepared by GPD Group, Inc. in December of 2011. Reinforcement consists of addition of new anchor bolts to existing base plate. Refer to Post Modification Inspection Report prepared by GPD Group, Inc. in January of 2013. This modification is considered effective in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	139.0	6	cci antennas	TPX-070821	2 4 2 12	3/8 7/16 3/4 1 1/4
		3	commscope	ATSBT-TOP-FF-4G		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	TT19-08BP111-001		
		3	raycap	DC6-48-60-18-8F		
		4	kathrein	80010964 w/ Mount Pipe		
		2	kathrein	80010965 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		2	quintel technology	QS46512-2 w/ Mount Pipe		
		1	quintel technology	QS66512-2 w/ Mount Pipe		
	138.0	1	cci tower mounts	Platform Mount [LP 303-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	148.0	1	dbspectra	DS9A09F36D-N	1 2	1/2 1 1/4
137.0	140.0	3	ericsson	RRUS-11	-	-
	137.0	1	cci tower mounts	Pipe Mount [PM 601-3]		
136.0	148.0	1	telewave	ANT150F6	1	1 1/4
	140.5	1	cci tower mounts	Pipe Mount [PM 601-1]		
129.0	129.0	3	alcatel lucent	RRH2x60-AWS	19	1 5/8
		1	rfs celwave	DB-B1-6C-12AB-0Z		
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe		
		3	andrew	LNX-8513DS-A1M w/ Mount Pipe		
		3	antel	BXA-70063/6CF-2 w/ Mount Pipe		
		1	cci tower mounts	Platform Mount [16' LP 303-1]		
118.0	118.0	1	rfs celwave	PAD6-59	1	1 5/8
		1	cci tower mounts	Pipe Mount [PM 601-1]		
112.0	116.0	1	telewave	ANT450F6	1	1 5/8
	112.0	1	cci tower mounts	Pipe Mount [PM 601-1]		
109.0	109.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-
		3	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		9	rfs celwave	ACU-A20-N		
		1	cci tower mounts	Side Arm Mount [SO 102-3]		
108.0	110.0	3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe	4	1 1/4
	108.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		1	cci tower mounts	Platform Mount [14' LP 714-1]		
		1	cci tower mounts	Miscellaneous [NA 510-1]		
92.0	95.0	1	telewave	ANT450F6	-	-
	92.0	1	cci tower mounts	Pipe Mount [PM 601-1]		
87.0	87.0	6	andrew	ETM19V2S12UB	2 16	3/8 1 5/8
		3	commscope	ATBT-BOTTOM-24V		
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe		
		6	rfs celwave	APXV18-209014-C w/ Mount Pipe		
		1	cci tower mounts	Platform Mount [LP 305-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
70.0	71.0	1	lucent	KS24019-L112A	1	1/2
	70.0	1	cci tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr.Clarence Welti, P.E.	1531967	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors, Inc.	2122534	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	1533002	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Semaan Engineering Solutions	2055776	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals	8290781	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD Group, Inc.	3030835	CCISITES
4-POST-MODIFICATION INSPECTION	GPD Group, Inc.	3420974	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Black & Veatch Corp.	8298096	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and have been maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading, tower/foundation details, and geotechnical data. The loading on the structure is based on CAD level drawings and carrier orders provided by the owner. If any of this information is not current and correct, this report should be considered obsolete and further analysis will be required.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	138.377 - 108.377	Pole	TP24.5x17.375x0.1875	1	-9.78	888.76	66.4	Pass
L2	108.377 - 83.6348	Pole	TP31.88x24.5x0.25	2	-15.31	1476.51	66.8	Pass
L3	83.6348 - 42.9109	Pole	TP43.42x30.0432x0.3125	3	-26.22	2519.51	66.6	Pass
L4	42.9109 - 0	Pole	TP55.5x41.0411x0.3125	4	-40.36	3362.35	75.7	Pass
							Summary	
						Pole (L4)	75.7	Pass
						Rating =	75.7	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	108.377	41.0	Pass
	Flange Plates		25.3	Pass
	Anchor Rods (Original)	0	53.6	Pass
	Anchor Rods (Modification 1)		38.3	Pass
	Base Plate		69.2	Pass
	Base Foundation	0	48.6	Pass
	Base Foundation Soil Interaction		57.3	Pass

Structure Rating (max from all components) =	75.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.

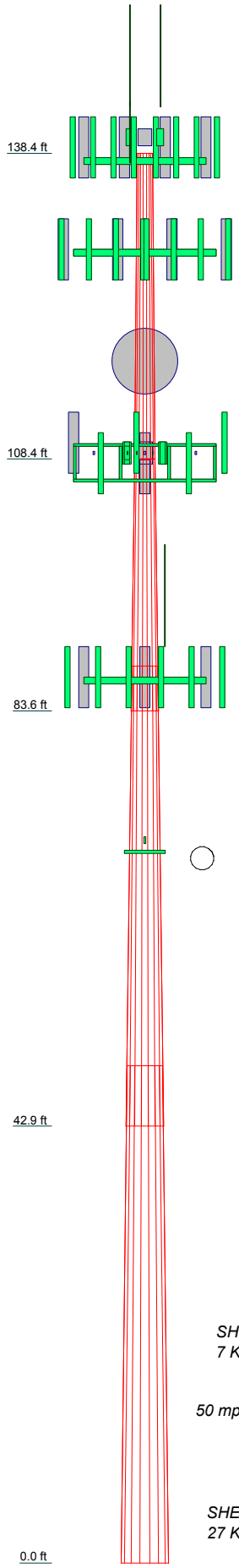
4.1) Recommendations

The tower and its foundation will have sufficient capacity to carry the proposed loading configuration after proper installation of the proposed reinforcement shown in Appendix D.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	30.00	24.74	45.21	48.84
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.3125
Socket Length (ft)		4.48	5.93	
Top Dia (in)	17.3750	24.5000	30.0432	41.0411
Bot Dia (in)	24.5000	31.8800	43.4200	55.5000
Grade	A572-65			
Weight (K)	1.3	1.9	5.6	7.9



ALL REACTIONS ARE FACTORED

AXIAL 69 K

SHEAR 7 K *MOMENT 769 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 40 K

SHEAR 27 K *MOMENT 2874 kip-ft*

TORQUE 4 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S.
9. TOWER RATING: 75.7%

BLACK & VEATCH
Building a world of difference.

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-6984
FAX: (913) 458-8145

Job: ***O&G WOODBURY (BU# 876380)***			
Project: ***400087 (876380.1720153)***			
Client: Crown Castle	Drawn by: Keerati Pongrungsap		App'd:
Code: TIA-222-H	Date: 04/05/19		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Litchfield County, Connecticut.
2) Tower base elevation above sea level: 589.96 ft.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 1.5000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) TIA-222-H Annex S..
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.05.
19) Tower analysis based on target reliabilities in accordance with Annex S.
20) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
21) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	138.38-108.38	30.00	0.00	18	17.3750	24.5000	0.1875	0.7500	A572-65 (65 ksi)
L2	108.38-83.63	24.74	4.48	18	24.5000	31.8800	0.2500	1.0000	A572-65 (65 ksi)
L3	83.63-42.91	45.21	5.93	18	30.0432	43.4200	0.3125	1.2500	A572-65 (65 ksi)
L4	42.91-0.00	48.84		18	41.0411	55.5000	0.3125	1.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	17.6141	10.2287	381.7542	6.1016	8.8265	43.2509	764.0106	5.1153	2.7280	14.549
	24.8490	14.4690	1080.5242	8.6309	12.4460	86.8170	2162.4702	7.2359	3.9820	21.237
L2	24.8394	19.2424	1429.6167	8.6088	12.4460	114.8656	2861.1145	9.6230	3.8720	15.488
	32.3332	25.0984	3172.3563	11.2287	16.1950	195.8844	6348.8868	12.5516	5.1709	20.684
L3	31.8051	29.4891	3293.1327	10.5544	15.2619	215.7742	6590.5985	14.7474	4.7376	15.16
	44.0416	42.7573	10038.1321	15.3032	22.0574	455.0922	20089.4726	21.3827	7.0919	22.694
L4	43.4079	40.3977	8466.2923	14.4587	20.8489	406.0789	16943.7247	20.2027	6.6732	21.354
	56.3080	54.7391	21062.8220	19.5916	28.1940	747.0675	42153.3590	27.3748	9.2180	29.498

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 138.38-108.38				1	1	1			
L2 108.38-83.63				1	1	1			
L3 83.63-42.91				1	1	1			
L4 42.91-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	B	No	Surface Ar (CaAa)	138.38 - 9.00	1	1	0.490 0.500	0.3750		0.22
LDF7-50A(1-5/8) ***70***	A	No	Surface Ar (CaAa)	129.00 - 8.00	8	7	-0.050 0.311	1.9800		0.82
LDF4-50A(1/2) ***	A	No	Surface Ar (CaAa)	70.00 - 8.00	1	1	-0.500 -0.487	0.6250		0.15

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
138									
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	138.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	C	No	No	Inside Pole	138.00 - 0.00	4	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
							2" Ice	0.00	0.14
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	138.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
LCF114-50J(1-1/4)	C	No	No	Inside Pole	138.00 - 0.00	12	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
***									
LCF114-50J(1-1/4)	C	No	No	Inside Pole	138.00 - 0.00	2	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
LDF4-50A(1/2)	C	No	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
136									
AVA6-50(1-1/4)	C	No	No	Inside Pole	136.00 - 0.00	1	No Ice	0.00	0.46
							1/2" Ice	0.00	0.46
							1" Ice	0.00	0.46
							2" Ice	0.00	0.46
129									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	129.00 - 0.00	11	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
112									
EC7-50(1-5/8)	C	No	No	Inside Pole	112.00 - 0.00	1	No Ice	0.00	1.01
							1/2" Ice	0.00	1.01
							1" Ice	0.00	1.01
							2" Ice	0.00	1.01
118									
EC7-50(1-5/8)	C	No	No	Inside Pole	118.00 - 0.00	1	No Ice	0.00	1.01
							1/2" Ice	0.00	1.01
							1" Ice	0.00	1.01
							2" Ice	0.00	1.01
108									
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Inside Pole	108.00 - 0.00	3	No Ice	0.00	1.20
							1/2" Ice	0.00	1.20
							1" Ice	0.00	1.20
							2" Ice	0.00	1.20
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	108.00 - 0.00	1	No Ice	0.00	1.22
							1/2" Ice	0.00	1.22
							1" Ice	0.00	1.22
							2" Ice	0.00	1.22
87									
LDF2-50(3/8)	C	No	No	Inside Pole	87.00 - 0.00	2	No Ice	0.00	0.08
							1/2" Ice	0.00	0.08
							1" Ice	0.00	0.08
							2" Ice	0.00	0.08
LDF7-50A(1-5/8)	C	No	No	Inside Pole	87.00 - 0.00	16	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	138.38-108.38	A	0.000	0.000	28.583	0.000	0.14
		B	0.000	0.000	1.125	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.56
L2	108.38-83.63	A	0.000	0.000	34.293	0.000	0.16
		B	0.000	0.000	0.928	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.74
L3	83.63-42.91	A	0.000	0.000	58.136	0.000	0.27
		B	0.000	0.000	1.527	0.000	0.01
		C	0.000	0.000	0.000	0.000	1.69
L4	42.91-0.00	A	0.000	0.000	50.568	0.000	0.23
		B	0.000	0.000	1.272	0.000	0.01
		C	0.000	0.000	0.000	0.000	1.78

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	138.38-108.38	A	1.454	0.000	0.000	43.224	0.000	0.62
		B		0.000	0.000	9.847	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.56
L2	108.38-83.63	A	1.418	0.000	0.000	51.636	0.000	0.73
		B		0.000	0.000	7.944	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.74
L3	83.63-42.91	A	1.359	0.000	0.000	94.365	0.000	1.30
		B		0.000	0.000	13.076	0.000	0.14
		C		0.000	0.000	0.000	0.000	1.69
L4	42.91-0.00	A	1.216	0.000	0.000	84.021	0.000	1.12
		B		0.000	0.000	10.491	0.000	0.11
		C		0.000	0.000	0.000	0.000	1.78

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	138.38-108.38	-3.6428	-3.7979	-2.1832	-2.5385
L2	108.38-83.63	-4.7763	-4.9555	-3.1618	-3.5341
L3	83.63-42.91	-5.3391	-5.2340	-3.9501	-3.5042
L4	42.91-0.00	-4.9319	-4.7119	-3.9340	-3.1730

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	108.38 - 138.38	1.0000	1.0000
L1	14	LDF7-50A(1-5/8)	108.38 - 129.00	1.0000	1.0000
L2	1	Safety Line 3/8	83.63 - 108.38	1.0000	1.0000
L2	14	LDF7-50A(1-5/8)	83.63 - 108.38	1.0000	1.0000
L2	26	LDF4-50A(1/2)	83.63 - 70.00	1.0000	1.0000
L3	1	Safety Line 3/8	42.91 - 83.63	1.0000	1.0000
L3	14	LDF7-50A(1-5/8)	42.91 - 83.63	1.0000	1.0000
L3	26	LDF4-50A(1/2)	42.91 - 70.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
138									
Platform Mount [LP 303-1]	C	None		0.0000	138.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
						2" Ice	31.50	31.50	2.18
5'x2" Mount Pipe	C	From Leg	1.00 0.00 2.50	0.0000	138.00	No Ice	1.19	1.19	0.02
						1/2" Ice	1.50	1.50	0.03
						1" Ice	1.81	1.81	0.04
						2" Ice	2.46	2.46	0.08
7770.00 w/ Mount Pipe	A	From Leg	4.00 -6.00 1.00	0.0000	138.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
80010965 w/ Mount Pipe	A	From Leg	4.00 -2.00 1.00	0.0000	138.00	No Ice	14.05	7.63	0.13
						1/2" Ice	14.69	8.90	0.22
						1" Ice	15.30	9.96	0.33
						2" Ice	16.53	11.92	0.57
80010965 w/ Mount Pipe	A	From Leg	4.00 2.00 1.00	0.0000	138.00	No Ice	14.05	7.63	0.13
						1/2" Ice	14.69	8.90	0.22
						1" Ice	15.30	9.96	0.33
						2" Ice	16.53	11.92	0.57
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 6.00 1.00	0.0000	138.00	No Ice	8.64	6.66	0.14
						1/2" Ice	9.29	9.66	0.21
						1" Ice	9.91	10.62	0.30
						2" Ice	11.18	12.61	0.49
80010964 w/ Mount Pipe	B	From Leg	4.00 -6.00	0.0000	138.00	No Ice	10.23	5.51	0.11
						1/2"	10.74	6.37	0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	5.75	4.25	0.06
			-2.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
80010964 w/ Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	10.23	5.51	0.11
			2.00			1/2"	10.74	6.37	0.18
			1.00			Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
QS46512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	5.79	5.88	0.12
			6.00			1/2"	6.21	6.58	0.18
			1.00			Ice	6.62	7.25	0.24
						1" Ice	7.48	8.65	0.39
						2" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	5.75	4.25	0.06
			-6.00			1/2"	6.18	5.01	0.10
			1.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
80010964 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	10.23	5.51	0.11
			-2.00			1/2"	10.74	6.37	0.18
			1.00			Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
80010964 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	10.23	5.51	0.11
			2.00			1/2"	10.74	6.37	0.18
			1.00			Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
QS46512-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	5.79	5.88	0.12
			6.00			1/2"	6.21	6.58	0.18
			1.00			Ice	6.62	7.25	0.24
						1" Ice	7.48	8.65	0.39
						2" Ice			
DS9A09F36D-N	C	From Leg	1.00	0.0000	138.00	No Ice	6.33	6.33	0.08
			0.00			1/2"	8.47	8.47	0.12
			10.00			Ice	10.63	10.63	0.18
						1" Ice	14.99	14.99	0.34
						2" Ice			
RRUS 4478 B14	A	From Leg	4.00	0.0000	138.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	B	From Leg	4.00	0.0000	138.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	C	From Leg	4.00	0.0000	138.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 32	A	From Leg	4.00	0.0000	138.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	B	From Leg	4.00	0.0000	138.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	C	From Leg	4.00	0.0000	138.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
ATSBT-TOP-FF-4G	A	From Leg	4.00	0.0000	138.00	No Ice	0.17	0.09	0.00
			0.00			1/2"	0.23	0.14	0.00
			1.00			Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
						2" Ice			
ATSBT-TOP-FF-4G	B	From Leg	4.00	0.0000	138.00	No Ice	0.17	0.09	0.00
			0.00			1/2"	0.23	0.14	0.00
			1.00			Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
						2" Ice			
ATSBT-TOP-FF-4G	C	From Leg	4.00	0.0000	138.00	No Ice	0.17	0.09	0.00
			0.00			1/2"	0.23	0.14	0.00
			1.00			Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
						2" Ice			
(2) TPX-070821	A	From Leg	4.00	0.0000	138.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			1.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
(2) TPX-070821	B	From Leg	4.00	0.0000	138.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			1.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
(2) TPX-070821	C	From Leg	4.00	0.0000	138.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			1.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	138.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	138.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	138.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	138.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	138.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	138.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	138.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
DC6-48-60-18-8F	C	From Leg	1.00	0.0000	138.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	138.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
TT19-08BP111-001	A	From Leg	4.00	0.0000	138.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			1.00			Ice	0.75	0.63	0.03
						1" Ice	0.98	0.84	0.05
						2" Ice			
TT19-08BP111-001	B	From Leg	4.00	0.0000	138.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			1.00			Ice	0.75	0.63	0.03
						1" Ice	0.98	0.84	0.05
						2" Ice			
TT19-08BP111-001	C	From Leg	4.00	0.0000	138.00	No Ice	0.55	0.45	0.02
			0.00			1/2"	0.65	0.53	0.02
			1.00			Ice	0.75	0.63	0.03
						1" Ice	0.98	0.84	0.05
						2" Ice			
137									
Pipe Mount [PM 601-3]	C	None		0.0000	137.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice	8.75	8.75	0.36
						2" Ice			
RRUS-11	A	From Leg	1.00	0.0000	137.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			3.00			Ice	3.21	1.49	0.09
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS-11	B	From Leg	1.00	0.0000	137.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			3.00			Ice	3.21	1.49	0.09
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS-11	C	From Leg	1.00	0.0000	137.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			3.00			Ice	3.21	1.49	0.09
						1" Ice	3.66	1.83	0.15
						2" Ice			
136									
Pipe Mount [PM 601-1]	B	From Leg	0.50	0.0000	136.00	No Ice	3.00	0.90	0.07
			0.00			1/2"	3.74	1.12	0.08
			4.50			Ice	4.48	1.34	0.09
						1" Ice	5.96	1.78	0.12
						2" Ice			
ANT150F6	B	From Leg	1.00	0.0000	136.00	No Ice	4.80	4.80	0.03
			0.00			1/2"	6.83	6.83	0.07
			12.00			Ice	8.87	8.87	0.11
						1" Ice	13.01	13.01	0.25
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
129									
Platform Mount [16' LP 303-1]	C	None		0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	18.76 24.15 29.54 40.32	18.76 24.15 29.54 40.32	1.60 1.90 2.19 2.78
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 -8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 -8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 -8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 8.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
BXA-70063/6CF-2 w/ Mount Pipe	A	From Leg	4.00 -2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.40 6.55 7.41 9.18	0.04 0.10 0.17 0.33
BXA-70063/6CF-2 w/ Mount Pipe	B	From Leg	4.00 -2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.40 6.55 7.41 9.18	0.04 0.10 0.17 0.33
BXA-70063/6CF-2 w/ Mount Pipe	C	From Leg	4.00 -2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.81 8.36 8.87 9.93	5.40 6.55 7.41 9.18	0.04 0.10 0.17 0.33
LNX-8513DS-A1M w/ Mount Pipe	A	From Leg	4.00 2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-8513DS-A1M w/ Mount Pipe	B	From Leg	4.00 2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-8513DS-A1M w/ Mount Pipe	C	From Leg	4.00 2.70 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RRH2x60-AWS	A	From Leg	4.00 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	2.10 2.34 2.58 3.09	0.06 0.08 0.11 0.18
RRH2x60-AWS	B	From Leg	4.00 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	2.10 2.34 2.58 3.09	0.06 0.08 0.11 0.18
RRH2x60-AWS	C	From Leg	4.00 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	2.10 2.34 2.58 3.09	0.06 0.08 0.11 0.18
DB-B1-6C-12AB-0Z	A	From Leg	4.00 0.00 0.00	0.0000	129.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.02 0.05 0.08 0.16
118									
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 3.74 4.48 5.96	0.90 1.12 1.34 1.78	0.07 0.08 0.09 0.12
112									
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	112.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 3.74 4.48 5.96	0.90 1.12 1.34 1.78	0.07 0.08 0.09 0.12
ANT450F6	A	From Leg	1.00 0.00 4.00	0.0000	112.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.01 0.02 0.04 0.10
109									
Side Arm Mount [SO 102-3]	C	None		0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 3.48 3.96 4.92	3.00 3.48 3.96 4.92	0.08 0.11 0.14 0.20
TD-RRH8x20-25	A	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	B	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	C	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-	B	From Leg	1.00	0.0000	109.00	No Ice	2.32	2.24	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
65MHz			0.00 0.00			1/2" Ice 1" Ice 2" Ice	2.53 2.74 3.19	2.44 2.65 3.09	0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
RRH2X50-800	A	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14
RRH2X50-800	B	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14
RRH2X50-800	C	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14
(3) ACU-A20-N	A	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(3) ACU-A20-N	B	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(3) ACU-A20-N	C	From Leg	1.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
108									
Platform Mount [14' LP 714-1]	C	None		0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	34.97 41.28 47.59 60.21	34.97 41.28 47.59 60.21	1.49 1.90 2.31 3.14
Miscellaneous [NA 510-1]	C	None		0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.00 8.50 11.00 16.00	6.00 8.50 11.00 16.00	0.26 0.34 0.42 0.59
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 -7.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 -7.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 -7.00 2.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.26 8.82 9.35 10.42	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41
92 Pipe Mount [PM 601-1]	B	From Leg	0.50 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 3.74 4.48 5.96	0.90 1.12 1.34 1.78	0.07 0.08 0.09 0.12
ANT450F6	B	From Leg	1.00 0.00 3.00	0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.01 0.02 0.04 0.10
*** 87 FT *** Platform Mount [LP 305-1]	C	None		0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	18.01 23.33 28.65 39.29	18.01 23.33 28.65 39.29	1.12 1.35 1.58 2.05
APXV18-209014-C w/ Mount Pipe	A	From Leg	4.00 -6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
APXV18-209014-C w/ Mount Pipe	B	From Leg	4.00 -6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
APXV18-209014-C w/ Mount Pipe	C	From Leg	4.00 -6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
APXV18-209014-C w/ Mount Pipe	A	From Leg	4.00 6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
APXV18-209014-C w/ Mount Pipe	B	From Leg	4.00 6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
APXV18-209014-C w/ Mount Pipe	C	From Leg	4.00 6.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.72 4.13 4.54 5.36	3.31 4.02 4.68 6.07	0.04 0.07 0.11 0.21
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice	11.71 12.43 13.16	9.86 11.39 12.94	0.08 0.17 0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice 2" Ice	14.54	15.29	0.51
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.71 12.43 13.16 14.54	9.86 11.39 12.94 15.29	0.08 0.17 0.27 0.51
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.71 12.43 13.16 14.54	9.86 11.39 12.94 15.29	0.08 0.17 0.27 0.51
(2) ETM19V2S12UB	A	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.72 0.82 0.94 1.19	0.20 0.27 0.35 0.53	0.01 0.02 0.02 0.04
(2) ETM19V2S12UB	B	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.72 0.82 0.94 1.19	0.20 0.27 0.35 0.53	0.01 0.02 0.02 0.04
(2) ETM19V2S12UB	C	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.72 0.82 0.94 1.19	0.20 0.27 0.35 0.53	0.01 0.02 0.02 0.04
ATBT-BOTTOM-24V	A	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.32	0.06 0.10 0.15 0.26	0.00 0.00 0.01 0.01
ATBT-BOTTOM-24V	B	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.32	0.06 0.10 0.15 0.26	0.00 0.00 0.01 0.01
ATBT-BOTTOM-24V	C	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.32	0.06 0.10 0.15 0.26	0.00 0.00 0.01 0.01
*** 70 FT ***									
Side Arm Mount [SO 701-1]	C	From Face	0.00 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
KS24019-L112A	C	From Face	3.00 0.00 1.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.20 0.26 0.41	0.14 0.20 0.26 0.41	0.01 0.01 0.01 0.02
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
118											
PAD6-59	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		118.00	6.58	No Ice 1/2" Ice 1" Ice 2" Ice	34.04 34.91 35.77 37.51	0.14 0.29 0.47 0.83
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	138.377 - 108.377	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.65	-0.10	4.36
			Max. Mx	8	-10.08	-312.57	-0.10
			Max. My	14	-9.78	-1.22	-334.75
			Max. Vy	20	-13.41	312.47	2.34
			Max. Vx	14	15.37	-1.22	-334.75
			Max. Torque	23			-4.12
L2	108.377 - 83.6348	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.40	0.31	4.90
			Max. Mx	8	-15.55	-653.62	-0.56
			Max. My	14	-15.31	-2.10	-715.80
			Max. Vy	20	-17.51	653.62	3.72
			Max. Vx	14	19.45	-2.10	-715.80
			Max. Torque	23			-4.12
L3	83.6348 - 42.9109	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.07	2.15	6.20
			Max. Mx	20	-26.37	1478.09	7.34
			Max. My	14	-26.23	-4.44	-1615.59
			Max. Vy	20	-22.28	1478.09	7.34
			Max. Vx	14	24.18	-4.44	-1615.59
			Max. Torque	23			-4.11
L4	42.9109 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.56	4.43	7.80
			Max. Mx	20	-40.36	2636.62	11.81
			Max. My	14	-40.36	-7.20	-2864.54
			Max. Vy	20	-25.14	2636.62	11.81
			Max. Vx	14	26.96	-7.20	-2864.54
			Max. Torque	23			-4.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	68.56	0.02	7.04
	Max. H_x	20	40.38	25.11	0.08
	Max. H_z	2	40.38	0.07	26.31
	Max. M_x	2	2790.90	0.07	26.31
	Max. M_z	8	2634.54	-25.11	-0.05
	Max. Torsion	9	3.32	-25.11	-0.05
	Min. Vert	11	30.29	-21.71	-14.63
	Min. H_x	8	40.38	-25.11	-0.05
	Min. H_z	14	40.38	-0.07	-26.93
	Min. M_x	14	-2864.54	-0.07	-26.93
	Min. M_z	20	-2636.62	25.11	0.08
	Min. Torsion	23	-4.00	21.98	13.12

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	33.65	0.00	0.00	-1.40	0.84	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	40.38	-0.07	-26.31	-2790.90	9.32	1.02
0.9 Dead+1.0 Wind 0 deg - No Ice	30.29	-0.07	-26.31	-2757.07	8.94	1.02
1.2 Dead+1.0 Wind 30 deg - No Ice	40.38	13.05	-23.05	-2440.43	-1371.88	-1.65
0.9 Dead+1.0 Wind 30 deg - No Ice	30.29	13.05	-23.05	-2410.86	-1355.80	-1.65
1.2 Dead+1.0 Wind 60 deg - No Ice	40.38	22.20	-13.17	-1396.07	-2332.72	-2.98
0.9 Dead+1.0 Wind 60 deg - No Ice	30.29	22.20	-13.17	-1378.95	-2305.16	-2.99
1.2 Dead+1.0 Wind 90 deg - No Ice	40.38	25.11	0.05	4.71	-2634.54	-3.31
0.9 Dead+1.0 Wind 90 deg - No Ice	30.29	25.11	0.05	5.09	-2603.34	-3.32
1.2 Dead+1.0 Wind 120 deg - No Ice	40.38	21.71	14.63	1575.02	-2276.50	-1.54
0.9 Dead+1.0 Wind 120 deg - No Ice	30.29	21.71	14.63	1556.58	-2249.60	-1.55
1.2 Dead+1.0 Wind 150 deg - No Ice	40.38	12.36	23.63	2517.82	-1291.85	-1.12
0.9 Dead+1.0 Wind 150 deg - No Ice	30.29	12.36	23.63	2488.13	-1276.70	-1.13
1.2 Dead+1.0 Wind 180 deg - No Ice	40.38	0.07	26.93	2864.54	-7.20	-1.00
0.9 Dead+1.0 Wind 180 deg - No Ice	30.29	0.07	26.93	2830.71	-7.37	-1.01
1.2 Dead+1.0 Wind 210 deg - No Ice	40.38	-12.52	24.04	2558.61	1307.98	-0.62
0.9 Dead+1.0 Wind 210 deg - No Ice	30.29	-12.52	24.04	2528.51	1292.17	-0.62
1.2 Dead+1.0 Wind 240 deg - No Ice	40.38	-21.93	14.68	1578.42	2301.04	0.52
0.9 Dead+1.0 Wind 240 deg - No Ice	30.29	-21.93	14.68	1559.98	2273.37	0.53
1.2 Dead+1.0 Wind 270 deg - No Ice	40.38	-25.11	-0.08	-11.81	2636.62	3.29
0.9 Dead+1.0 Wind 270 deg - No Ice	30.29	-25.11	-0.08	-11.23	2604.89	3.30
1.2 Dead+1.0 Wind 300 deg - No Ice	40.38	-21.98	-13.12	-1392.64	2312.37	3.99
0.9 Dead+1.0 Wind 300 deg - No Ice	30.29	-21.98	-13.12	-1375.54	2284.50	4.00
1.2 Dead+1.0 Wind 330 deg - No Ice	40.38	-12.89	-22.64	-2399.60	1359.96	3.41
0.9 Dead+1.0 Wind 330 deg - No Ice	30.29	-12.89	-22.64	-2370.45	1343.46	3.42
1.2 Dead+1.0 Ice+1.0 Temp	68.56	-0.00	-0.00	-7.80	4.43	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	68.56	-0.02	-7.04	-769.18	7.08	0.22
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	68.56	3.45	-6.05	-661.62	-367.14	-0.32
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	68.56	5.95	-3.48	-384.14	-635.07	-0.60
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	68.56	6.84	0.02	-5.65	-729.86	-0.68
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	68.56	5.92	3.80	409.34	-631.09	-0.35
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	68.56	3.39	6.26	672.35	-358.73	-0.26
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	68.56	0.02	7.15	768.58	1.88	-0.21
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	68.56	-3.35	6.24	669.75	363.18	-0.11

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	68.56	-5.90	3.77	404.83	637.45	0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	68.56	-6.84	-0.02	-10.85	738.82	0.67
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	68.56	-5.97	-3.52	-388.64	646.63	0.81
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	68.56	-3.49	-6.07	-664.22	380.61	0.69
Dead+Wind 0 deg - Service	33.65	-0.02	-6.19	-654.02	2.80	0.24
Dead+Wind 30 deg - Service	33.65	3.07	-5.43	-572.03	-320.36	-0.39
Dead+Wind 60 deg - Service	33.65	5.23	-3.10	-327.66	-545.11	-0.71
Dead+Wind 90 deg - Service	33.65	5.91	0.01	0.05	-615.66	-0.79
Dead+Wind 120 deg - Service	33.65	5.11	3.44	367.43	-532.00	-0.38
Dead+Wind 150 deg - Service	33.65	2.91	5.56	588.06	-301.65	-0.28
Dead+Wind 180 deg - Service	33.65	0.02	6.34	669.21	-1.07	-0.24
Dead+Wind 210 deg - Service	33.65	-2.95	5.66	597.63	306.68	-0.14
Dead+Wind 240 deg - Service	33.65	-5.16	3.46	368.24	538.99	0.14
Dead+Wind 270 deg - Service	33.65	-5.91	-0.02	-3.82	617.39	0.79
Dead+Wind 300 deg - Service	33.65	-5.18	-3.09	-326.85	541.58	0.95
Dead+Wind 330 deg - Service	33.65	-3.03	-5.33	-562.45	318.79	0.82

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-33.65	0.00	0.00	33.65	0.00	0.000%
2	-0.07	-40.38	-26.31	0.07	40.38	26.31	0.000%
3	-0.07	-30.29	-26.31	0.07	30.29	26.31	0.000%
4	13.05	-40.38	-23.05	-13.05	40.38	23.05	0.000%
5	13.05	-30.29	-23.05	-13.05	30.29	23.05	0.000%
6	22.20	-40.38	-13.17	-22.20	40.38	13.17	0.000%
7	22.20	-30.29	-13.17	-22.20	30.29	13.17	0.000%
8	25.11	-40.38	0.05	-25.11	40.38	-0.05	0.000%
9	25.11	-30.29	0.05	-25.11	30.29	-0.05	0.000%
10	21.71	-40.38	14.63	-21.71	40.38	-14.63	0.000%
11	21.71	-30.29	14.63	-21.71	30.29	-14.63	0.000%
12	12.36	-40.38	23.63	-12.36	40.38	-23.63	0.000%
13	12.36	-30.29	23.63	-12.36	30.29	-23.63	0.000%
14	0.07	-40.38	26.93	-0.07	40.38	-26.93	0.000%
15	0.07	-30.29	26.93	-0.07	30.29	-26.93	0.000%
16	-12.52	-40.38	24.04	12.52	40.38	-24.04	0.000%
17	-12.52	-30.29	24.04	12.52	30.29	-24.04	0.000%
18	-21.93	-40.38	14.68	21.93	40.38	-14.68	0.000%
19	-21.93	-30.29	14.68	21.93	30.29	-14.68	0.000%
20	-25.11	-40.38	-0.08	25.11	40.38	0.08	0.000%
21	-25.11	-30.29	-0.08	25.11	30.29	0.08	0.000%
22	-21.98	-40.38	-13.12	21.98	40.38	13.12	0.000%
23	-21.98	-30.29	-13.12	21.98	30.29	13.12	0.000%
24	-12.89	-40.38	-22.64	12.89	40.38	22.64	0.000%
25	-12.89	-30.29	-22.64	12.89	30.29	22.64	0.000%
26	0.00	-68.56	0.00	0.00	68.56	0.00	0.000%
27	-0.02	-68.56	-7.04	0.02	68.56	7.04	0.000%
28	3.45	-68.56	-6.05	-3.45	68.56	6.05	0.000%
29	5.95	-68.56	-3.48	-5.95	68.56	3.48	0.000%
30	6.84	-68.56	0.02	-6.84	68.56	-0.02	0.000%
31	5.92	-68.56	3.80	-5.92	68.56	-3.80	0.000%
32	3.39	-68.56	6.25	-3.39	68.56	-6.26	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.02	-68.56	7.15	-0.02	68.56	-7.15	0.000%
34	-3.35	-68.56	6.24	3.35	68.56	-6.24	0.000%
35	-5.90	-68.56	3.77	5.90	68.56	-3.77	0.000%
36	-6.84	-68.56	-0.02	6.84	68.56	0.02	0.000%
37	-5.97	-68.56	-3.52	5.97	68.56	3.52	0.000%
38	-3.49	-68.56	-6.07	3.49	68.56	6.07	0.000%
39	-0.02	-33.65	-6.19	0.02	33.65	6.19	0.000%
40	3.07	-33.65	-5.43	-3.07	33.65	5.43	0.000%
41	5.23	-33.65	-3.10	-5.23	33.65	3.10	0.000%
42	5.91	-33.65	0.01	-5.91	33.65	-0.01	0.000%
43	5.11	-33.65	3.44	-5.11	33.65	-3.44	0.000%
44	2.91	-33.65	5.56	-2.91	33.65	-5.56	0.000%
45	0.02	-33.65	6.34	-0.02	33.65	-6.34	0.000%
46	-2.95	-33.65	5.66	2.95	33.65	-5.66	0.000%
47	-5.16	-33.65	3.46	5.16	33.65	-3.46	0.000%
48	-5.91	-33.65	-0.02	5.91	33.65	0.02	0.000%
49	-5.18	-33.65	-3.09	5.18	33.65	3.09	0.000%
50	-3.03	-33.65	-5.33	3.03	33.65	5.33	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00009940
3	Yes	5	0.00000001	0.00004613
4	Yes	6	0.00000001	0.00018902
5	Yes	6	0.00000001	0.00005769
6	Yes	6	0.00000001	0.00020443
7	Yes	6	0.00000001	0.00006402
8	Yes	5	0.00000001	0.00040841
9	Yes	5	0.00000001	0.00019122
10	Yes	6	0.00000001	0.00020060
11	Yes	6	0.00000001	0.00006072
12	Yes	6	0.00000001	0.00019928
13	Yes	6	0.00000001	0.00006150
14	Yes	5	0.00000001	0.00015303
15	Yes	5	0.00000001	0.00006967
16	Yes	6	0.00000001	0.00019413
17	Yes	6	0.00000001	0.00005922
18	Yes	6	0.00000001	0.00020493
19	Yes	6	0.00000001	0.00006206
20	Yes	5	0.00000001	0.00045907
21	Yes	5	0.00000001	0.00021415
22	Yes	6	0.00000001	0.00020791
23	Yes	6	0.00000001	0.00006547
24	Yes	6	0.00000001	0.00017976
25	Yes	6	0.00000001	0.00005480
26	Yes	4	0.00000001	0.00013055
27	Yes	5	0.00000001	0.00085229
28	Yes	6	0.00000001	0.00016513
29	Yes	6	0.00000001	0.00016960
30	Yes	5	0.00000001	0.00081945
31	Yes	6	0.00000001	0.00016741
32	Yes	6	0.00000001	0.00016545
33	Yes	5	0.00000001	0.00083682
34	Yes	6	0.00000001	0.00016287
35	Yes	6	0.00000001	0.00016740
36	Yes	5	0.00000001	0.00082807
37	Yes	6	0.00000001	0.00017511
38	Yes	6	0.00000001	0.00016806
39	Yes	4	0.00000001	0.00017677
40	Yes	5	0.00000001	0.00005471
41	Yes	5	0.00000001	0.00007027
42	Yes	4	0.00000001	0.00048047

43	Yes	5	0.00000001	0.00006017
44	Yes	5	0.00000001	0.00006405
45	Yes	4	0.00000001	0.00019147
46	Yes	5	0.00000001	0.00005814
47	Yes	5	0.00000001	0.00006250
48	Yes	4	0.00000001	0.00049373
49	Yes	5	0.00000001	0.00007502
50	Yes	4	0.00000001	0.00096049

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	138.377 - 108.377	23.298	45	1.6908	0.0155
L2	108.377 - 83.6348	13.531	46	1.3241	0.0072
L3	88.1166 - 42.9109	8.623	46	0.9860	0.0036
L4	48.838 - 0	2.516	46	0.4878	0.0012

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Platform Mount [LP 303-1]	45	23.167	1.6868	0.0154	15954
137.00	Pipe Mount [PM 601-3]	45	22.818	1.6761	0.0151	15954
136.00	Pipe Mount [PM 601-1]	45	22.470	1.6655	0.0148	15954
129.00	Platform Mount [16' LP 303-1]	46	20.054	1.5896	0.0127	8507
118.00	PAD6-59	46	16.419	1.4591	0.0096	3914
112.00	Pipe Mount [PM 601-1]	46	14.577	1.3779	0.0081	3027
109.00	Side Arm Mount [SO 102-3]	46	13.707	1.3337	0.0074	2801
108.00	Platform Mount [14' LP 714-1]	46	13.425	1.3183	0.0071	2779
92.00	Pipe Mount [PM 601-1]	46	9.457	1.0499	0.0041	3997
87.00	Platform Mount [LP 305-1]	46	8.391	0.9683	0.0034	4440
70.00	Side Arm Mount [SO 701-1]	46	5.270	0.7292	0.0020	4301

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	138.377 - 108.377	99.920	14	7.2776	0.0657
L2	108.377 - 83.6348	57.949	14	5.6886	0.0302
L3	88.1166 - 42.9109	36.927	16	4.2298	0.0149
L4	48.838 - 0	10.771	16	2.0899	0.0049

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Platform Mount [LP 303-1]	14	99.357	7.2602	0.0652	3842
137.00	Pipe Mount [PM 601-3]	14	97.862	7.2139	0.0639	3842
136.00	Pipe Mount [PM 601-1]	14	96.368	7.1676	0.0627	3842
129.00	Platform Mount [16' LP 303-1]	14	85.990	6.8380	0.0537	2048
118.00	PAD6-59	14	70.360	6.2723	0.0404	939
112.00	Pipe Mount [PM 601-1]	14	62.444	5.9208	0.0338	725
109.00	Side Arm Mount [SO 102-3]	14	58.705	5.7297	0.0308	670
108.00	Platform Mount [14' LP 714-1]	14	57.495	5.6634	0.0298	664
92.00	Pipe Mount [PM 601-1]	16	40.499	4.5063	0.0171	939
87.00	Platform Mount [LP 305-1]	16	35.932	4.1528	0.0143	1043
70.00	Side Arm Mount [SO 701-1]	16	22.569	3.1253	0.0082	1008

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	138.377 - 108.377 (1)	TP24.5x17.375x0.1875	30.00	0.00	0.0	14.4690	-9.78	846.43	0.012
L2	108.377 - 83.6348 (2)	TP31.88x24.5x0.25	24.74	0.00	0.0	24.0376	-15.31	1406.20	0.011
L3	83.6348 - 42.9109 (3)	TP43.42x30.0432x0.3125	45.21	0.00	0.0	41.0176	-26.22	2399.53	0.011
L4	42.9109 - 0 (4)	TP55.5x41.0411x0.3125	48.84	0.00	0.0	54.7391	-40.36	3202.24	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	138.377 - 108.377 (1)	TP24.5x17.375x0.1875	334.75	490.86	0.682	0.00	490.86	0.000
L2	108.377 - 83.6348 (2)	TP31.88x24.5x0.25	715.81	1039.22	0.689	0.00	1039.22	0.000
L3	83.6348 - 42.9109 (3)	TP43.42x30.0432x0.3125	1615.81	2349.93	0.688	0.00	2349.93	0.000
L4	42.9109 - 0 (4)	TP55.5x41.0411x0.3125	2873.55	3679.57	0.781	0.00	3679.57	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	138.377 - 108.377 (1)	TP24.5x17.375x0.1875	15.37	253.93	0.061	0.87	540.66	0.002
L2	108.377 - 83.6348 (2)	TP31.88x24.5x0.25	19.45	421.86	0.046	1.01	1119.17	0.001
L3	83.6348 - 42.9109 (3)	TP43.42x30.0432x0.3125	24.34	719.86	0.034	0.62	2607.00	0.000
L4	42.9109 - 0 (4)	TP55.5x41.0411x0.3125	27.14	960.67	0.028	0.62	4642.97	0.000

Pole Interaction Design Data

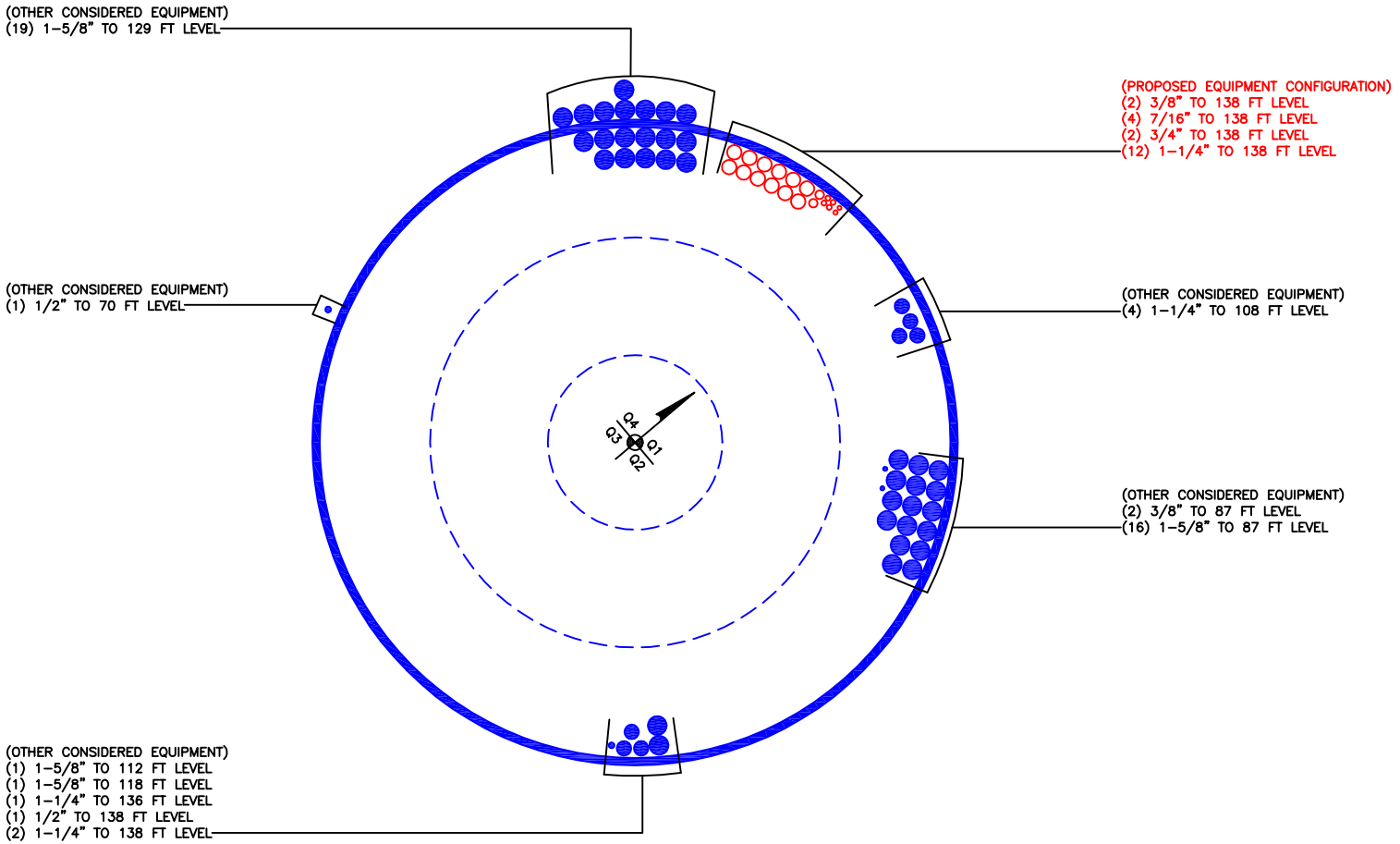
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	138.377 - 108.377 (1)	0.012	0.682	0.000	0.061	0.002	0.697	1.050	4.8.2
L2	108.377 - 83.6348 (2)	0.011	0.689	0.000	0.046	0.001	0.702	1.050	4.8.2
L3	83.6348 - 42.9109 (3)	0.011	0.688	0.000	0.034	0.000	0.700	1.050	4.8.2
L4	42.9109 - 0 (4)	0.013	0.781	0.000	0.028	0.000	0.794	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	138.377 - 108.377	Pole	TP24.5x17.375x0.1875	1	-9.78	888.76	66.4	Pass
L2	108.377 - 83.6348	Pole	TP31.88x24.5x0.25	2	-15.31	1476.51	66.8	Pass
L3	83.6348 - 42.9109	Pole	TP43.42x30.0432x0.3125	3	-26.22	2519.51	66.6	Pass
L4	42.9109 - 0	Pole	TP55.5x41.0411x0.3125	4	-40.36	3362.35	75.7	Pass
							Summary	
						Pole (L4)	75.7	Pass
						RATING =	**75.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876380 TOWER ID:C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

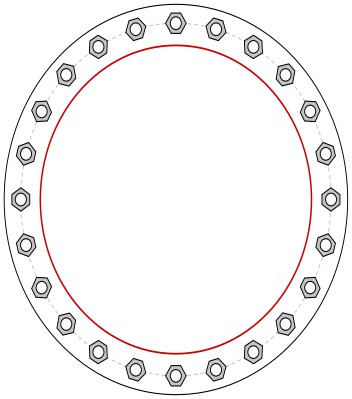
Elevation = 108.377 ft.

BU #	876380
Site Name	O&G WOODBURY
Order #	475080 Rev.0
TIA-222 Revision	H

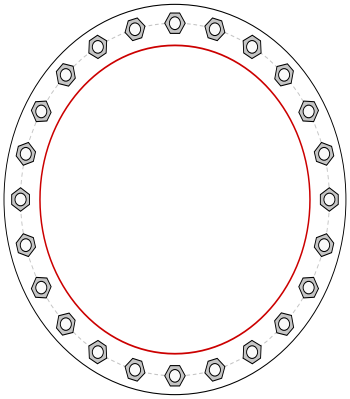
Applied Loads	
Moment (kip-ft)	334.75
Axial Force (kips)	9.78
Shear Force (kips)	15.37

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(24) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 28" BC

Top Plate Data

31" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Bottom Plate Data

31" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

24.5" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Bottom Pole Data

24.5" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	23.49	
Allowable (kips)	54.53	
Stress Rating:	**41.0%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	14.34	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	**25.3%**	**Pass**
Tension Side Stress Rating:	**13.7%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	14.34	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	**25.3%**	**Pass**
Tension Side Stress Rating:	**13.7%**	**Pass**

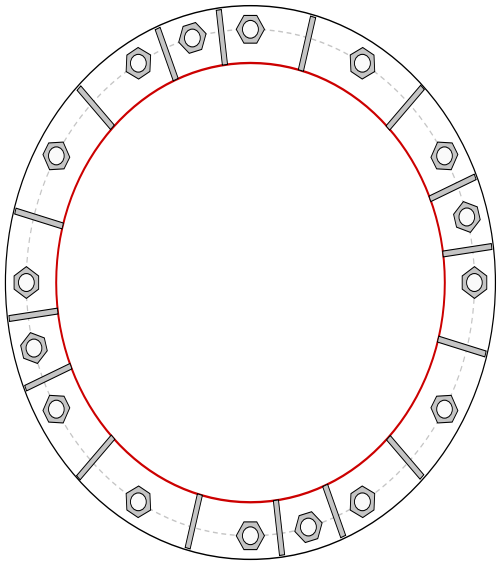
Monopole Base Plate Connection

Site Info	
BU #	876380
Site Name	O&G WOODBURY
Order #	475080 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.125

Applied Loads	
Moment (kip-ft)	2873.55
Axial Force (kips)	40.36
Shear Force (kips)	27.14

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 64" BC
GROUP 2: (4) 2-1/4" ø bolts (F1554-105 N; Fy=105 ksi, Fu=125 ksi) on 64" BC

Base Plate Data

70" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

(16) 15"H x 7"W x 0.75"T, Notch: 0.75"
plate: Fy= 65 ksi ; weld: Fy= 80 ksi
horiz. weld: 0.375" groove, 45 dbl bevel, 0.25" fillet
vert. weld: 0.25" fillet

Pole Data

55.5" x 0.3125" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:		
Pu_c = 137.15	ϕPn_c = 243.75	**Stress Rating**
Vu = 1.7	ϕVn = 73.13	**53.6%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_c = 137.15	ϕPn_c = 341.25	**Stress Rating**
Vu = 1.7	ϕVn = 102.38	**38.3%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	39.23	(Roark's Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**69.2%**	**Pass**

Stiffener Summary

Horizontal Weld:	**34.7%**	**Pass**
Vertical Weld:	**57.8%**	**Pass**
Plate Flexure+Shear:	**14.2%**	**Pass**
Plate Tension+Shear:	**34.1%**	**Pass**
Plate Compression:	**44.7%**	**Pass**

Pole Summary

Punching Shear:	**17.9%**	**Pass**

Pier and Pad Foundation

BU # :	876380
Site Name:	O&G WOODBURY
App. Number:	475080 Rev.0

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☑
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	40.36	kips
Base Shear, Vu_comp:	27.14	kips
Moment, M_u:	2873.55	ft-kips
Tower Height, **H**:	138.377	ft
BP Dist. Above Fdn, bp_{dist}:	4.875	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	1	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	46	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.5	ft
Pad Width, **W**:	23	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size (Top), Sp_{top}:	8	
Pad Top Rebar Quantity (Top), mp_{top}:	21	
Pad Rebar Size (Bottom), **Sp**:	8	
Pad Rebar Quantity (Bottom), **mp**:	37	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	135	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	120	
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	273.40	27.14	**9.5%**	**Pass**
Bearing Pressure (ksf)	9.00	2.35	**26.1%**	**Pass**
*Overturning (kip*ft)*	5388.43	3088.13	**57.3%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5872.59	2995.68	**48.6%**	**Pass**
Pier Compression (kip)	31187.52	80.05	**0.2%**	**Pass**
*Pad Flexure (kip*ft)*	4020.44	1055.50	**25.0%**	**Pass**
Pad Shear - 1-way (kips)	824.79	176.82	**20.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.030	**15.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	4364.46	1797.41	**39.2%**	**Pass**

**Rating per TIA-222-H Section 15.5*

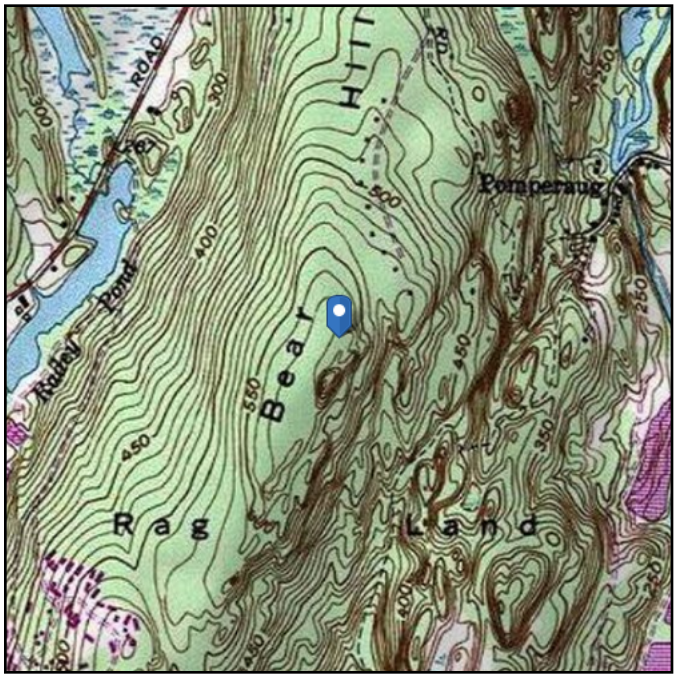
Soil Rating*:	**57.3%**
Structural Rating*:	**48.6%**

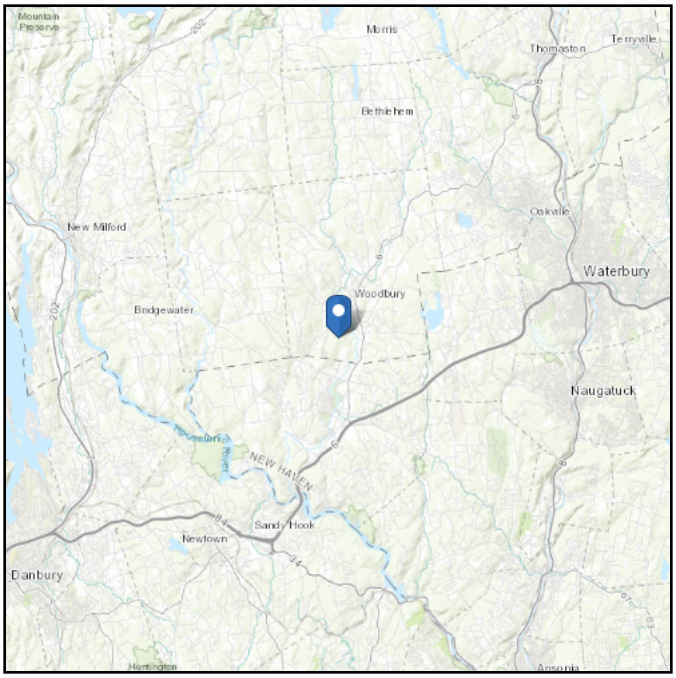
Version 3.2.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	589.96 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.522
Soil Class:	D - Stiff Soil	**Longitude:**	-73.220736





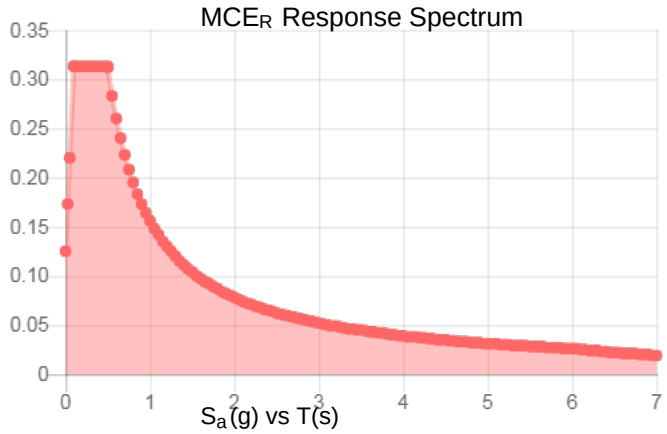
Seismic

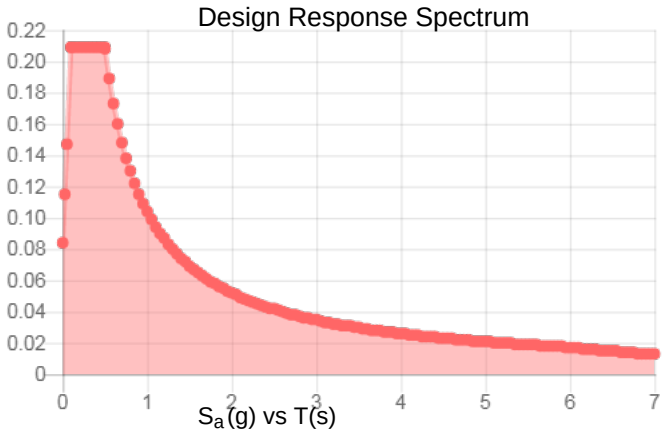
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.196	S_{DS} :	0.209
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.103
S_{MS} :	0.313	PGA_M :	0.164
S_{M1} :	0.156	F_{PGA} :	1.594
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Apr 02 2019

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 02 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX D

STRUCTURAL DESIGN DRAWINGS

MONOPOLE REINFORCEMENT DRAWINGS

SITE NAME: O&G WOODBURY
BU NUMBER: 876380

SITE ADDRESS:
GREAT HOLLOW ROAD
WOODBURY, CT 06798
LITCHFIELD COUNTY, USA

HOT WORK INCLUDED	
N/A	BASE GRINDING ONLY
X	BASE WELDING (AND GRINDING)
N/A	AERIAL GRINDING ONLY
N/A	AERIAL WELDING (AND GRINDING)

SAFETY CLIMB: 'LOOK UP'
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER REINFORCEMENTS AND EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS.

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE TIA-222-H STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS USING AN ULTIMATE 3-SECOND GUST WIND SPEED OF 120 MPH FROM THE 2018 CONNECTICUT STATE BUILDING CODE, 50 MPH WITH 1.50 INCH ICE THICKNESS AND 60 MPH UNDER SERVICE LOADS, EXPOSURE CATEGORY B.

TOWER INFORMATION

TOWER MANUFACTURER / CCI DOC #:	EEI / CCI DOC #1533002
TOWER HEIGHT / TYPE:	138.377 FT MONOPOLE TOWER
TOWER LOCATION: DATUM: NAD 1983	LATITUDE 41° 31' 19.20" LONGITUDE -73° 13' 14.65"
STRUCTURAL DESIGN DRAWING:	B&V / WO #1720153
STRUCTURAL ANALYSIS REPORT:	B&V / WO #1703519
ORDER ID:	475080 REV #0

PROJECT CONTACTS

CROWN PROJECT MANAGER
DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCASTLE.COM

CROWN CONSTRUCTION MANAGER
JASON D'AMICO
(860) 209-0104
JASON.DAMICO@CROWNCASTLE.COM

BLACK & VEATCH CONTACTS
CROWNCASTLERFI@BV.COM
PATRICK DAVIS, P.E.
(913) 458-6984

LOCATION MAP

NO SCALE

DRIVING DIRECTIONS

ROUTE 6 IN WOODBURY. ROUTE 317 WEST. TURN SOUTH (RIGHT) ON BEAR HILL ROAD. FOLLOW ONTO GREAT HOLLOW ROAD. CONTINUE SOUTH UNTIL END. TURN INTO RESIDENTIAL ADDRESS: 208 GREAT HILL ROAD AND BEAR RIGHT AROUND HOUSE. FOLLOW ACCESS ROAD TO TOWER SITE SET BACK IN WOODS.

ATTENTION ALL CONTRACTORS

ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

DRAWING INDEX

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	GB

REV	DATE	DESCRIPTION
0	04/05/19	ISSUED FOR CONSTRUCTION

BU #876380
WO #1720153
O&G WOODBURY
GREAT HOLLOW ROAD
WOODBURY, CT 06798
LITCHFIELD COUNTY, USA

SHEET TITLE

TITLE PAGE

SHEET NUMBER

TM-1

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE–CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED–SOW–10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED–SOW–10007	ONCE THE PRE–MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED–SOW–10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR CERTIFIED WELD INSPECTION	CED–SOW–10007 CED–STD–10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED–SOW–10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED–SOW–10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION REPORT	CED–SOW–10066 CED–STD–10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON–DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE OF MONOPOLE BASE PLATE	ENG–SOW–10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED–SOW–10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
CONSTRUCTION			
N/A	FOUNDATION INSPECTIONS	CED–SOW–10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED–SOW–10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
N/A	EARTHWORK	CED–SOW–10144	FOUNDATION SUB–GRADES SHALL BE INSPECTED AND APPROVED BY AN APPROVED FOUNDATION INSPECTOR AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
N/A	MICROPILE/ROCK ANCHOR	CED–SOW–10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
N/A	POST–INSTALLED ANCHOR ROD VERIFICATION	CED–SOW–10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	ENG–STD–10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
X	FIELD CERTIFIED WELD INSPECTION	CED–SOW–10066 CED–STD–10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON–SITE COLD GALVANIZING VERIFICATION	ENG–STD–10149 ENG–BUL–10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON–SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
N/A	TENSION TWIST AND PLUMB	CED–PRC–10182 CED–STD–10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS–BUILT DRAWINGS	CED–SOW–10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
POST–CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED–SOW–10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
N/A	POST–INSTALLED ANCHOR ROD PULL TESTS	CED–PRC–10119	POST–INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED–SOW–10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
N/A	BOLT INSTALLATION VERIFICATION REPORT	CED–SOW–10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE–TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED–PRC–10283 CED–FRM–10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED–SOW–10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			

MODIFICATION INSPECTION NOTES

GENERAL

1. THE MI IS AN ON–SITE VISUAL AND HANDS–ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).
2. NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.
3. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.
4. ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED–LST–10173, "APPROVED MI VENDORS".
5. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (POC).
6. REFER TO CROWN CED–SOW–10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
   - THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
   - THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
   - WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON–SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE–TENSIONING OPERATIONS.
   - WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON–SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

REQUIRED PHOTOS

1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
   - PRE–CONSTRUCTION GENERAL SITE CONDITION
   - PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - RAW MATERIALS
     - PHOTOS OF ALL CRITICAL DETAILS
     - FOUNDATION MODIFICATIONS
     - WELD PREPARATION
     - BOLT INSTALLATION
     - FINAL INSTALLED CONDITION
     - SURFACE COATING REPAIR
   - POST CONSTRUCTION PHOTOGRAPHS
     - FINAL INFIELD CONDITION
2. PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
3. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED–SOW–10007.

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	GB

REV	DATE	DESCRIPTION
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STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER

04/11/2019

BU #876380
WO #1720153
O&G WOODBURY
GREAT HOLLOW ROAD
WOODBURY, CT 06798
LITCHFIELD COUNTY, USA

SHEET TITLE

MODIFICATION INSPECTION CHECKLIST

SHEET NUMBER

TM-2

GENERAL NOTES

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.

2. THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.

3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.

5. ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.

6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE ENGINEER OF RECORD (EOR) AND FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.

7. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.

8. USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.

9. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.

10. STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.

11. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

12. ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS. CONSTRUCTION SHALL BE PERFORMED ONLY IN "GOOD WEATHER". "GOOD WEATHER" MEANS LITTLE OR NO WIND AND RAIN AND MINIMUM TEMPERATURE OF 50 DEGREES F. CONTACT ENGINEER FOR ADDITIONAL INSTRUCTIONS IF "GOOD WEATHER" CANNOT BE ACHIEVED.

14. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.

15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.

16. STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.

17. DO NOT SCALE DRAWINGS.

18. FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.

19. MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.

20. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE CROWN POC. ALL ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED BY THE ENGINEER OF RECORD. IF THE GENERAL CONTRACTOR FINDS THAT THE CLIMBING FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE-FABRICATION MAPPING, OR WHILE ON-SITE, THE GENERAL CONTRACTOR SHALL CONTACT THE CROWN POC TO DETERMINE A METHOD OF RESOLUTION.

21. CONTRACTOR TO VERIFY REQUIRED STEEL PLATE LENGTHS FROM BOTTOM OF SECTION TO BOTTOM OF NEXT SECTION.

22. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.

23. ALL CHANGES/ALTERNATES/REVISIONS TO THESE DRAWINGS SHALL BE DOCUMENTED BY REQUEST FOR INFORMATION (RFI) FORM APPROVED BY ENGINEER OF RECORD. FINAL WORK AUTHORIZATION AND ALL CHANGE ORDERS SHALL BE APPROVED BY CLIENT AND/OR CLIENT REPRESENTATIVE PRIOR TO PROCEEDING WITH ANY WORK THAT DEVIATES FROM THE ORIGINAL DESIGN, SCOPE, PRICE AND/OR SCHEDULE.

24. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).

25. IN THE EVENT OF AN EMERGENCY, CONTRACTOR SHALL CONTACT BLACK & VEATCH AND CROWN CASTLE PERSONNEL TO REPORT ANY EVENT OR EMERGENCY INCIDENT AT ANY CROWN CASTLE TOWER SITE PER THE CONTACT INFORMATION PROVIDED ON SHEET TM-1.

26. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

27. IF, DURING THE COURSE OF A FOUNDATION MODIFICATION, THE GC ENCOUNTERS EXISTING CONDUIT LOCATED WITHIN THE CONFINES OF THE EXISTING OR PROPOSED FOUNDATION CONCRETE, AND THIS CONDUIT IS NOT IN A LOCATION THAT IS SPECIFIED WITHIN THESE DESIGN DRAWINGS, THE GC SHALL IMMEDIATELY CONTACT THE EOR FOR GUIDANCE BEFORE PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS. IF CONDUIT IS TO BE INSTALLED THROUGH THE EXISTING FOUNDATION OR PROPOSED FOUNDATION MODIFICATION AND HASN'T BEEN SPECIFIED WITHIN THESE DESIGN DRAWINGS THEN THE GC SHALL IMMEDIATELY CONTACT THE EOR FOR GUIDANCE PRIOR TO PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS.

STRUCTURAL STEEL NOTES

1. DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO).
   A. TIA-222: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   B. TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   C. AISC: MANUAL OF STEEL CONSTRUCTION

2. ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO.
   A. STRUCTURAL STEEL, ASTM A572 GRADE 65 (FY = 65 KSI).
   B. ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS.
   C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
   E. ALL SHIMS, ASTM A36.

3. ALL HOLES SHALL BE CUT WITH A GRINDER OR DRILLED. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.

4. ALL FASTENERS SHALL NOT BE REUSED.

5. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.

6. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.

7. HOT-DIP GALVANIZE ALL ITEMS, UNO.
   GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.

8. FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".

9. AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES, AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

BASE PLATE GROUT REMOVAL NOTES

1. WHEN BASE PLATE GROUT REMOVAL IS SPECIFIED IN THE TOWER MODIFICATION TABLE, THE CONTRACTOR SHALL TAKE THE FOLLOWING STEPS:

   A. THE GC SHALL BEGIN THIS PROCEDURE AS EARLY AS POSSIBLE DURING THE MODIFICATION PROCESS SO THAT IF ISSUES ARISE, THEY CAN BE RESOLVED WITHIN THE ANTICIPATED MODIFICATION TIMELINE.

   B. IF ANY DETERIORATED GROUT EXISTS, BEGIN AT THIS LOCATION. REMOVE DETERIORATED GROUT AND THE GROUT AROUND THE NEAREST ONE OR TWO ANCHOR RODS TO FULLY EXPOSE THE LEVELING NUT. IF THE GC DISCOVERS THAT A HALF NUT OR JAM NUT WAS USED AS A LEVELING NUT, OR IF NO LEVELING NUT IS PRESENT, IMMEDIATELY CONTACT CED AND THE CROWN POC (TYPICALLY THE MOD PM) FOR A RESOLUTION. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.

   C. OTHERWISE, CHECK THE LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR". IF SEVERE CORROSION / MATERIAL LOSS IS FOUND OR CORROSION EXISTS TO THE POINT WHERE THE LEVELING NUT IS UNABLE TO BE TIGHTENED WHEN OBVIOUSLY LOOSE, IMMEDIATELY NOTIFY THE CROWN POC (TYPICALLY THE MOD PM). REFERENCE ENG-BUL-10114 "RUST CLASSIFICATION" FOR EXAMPLES OF MATERIAL LOSS. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.

   D. IN THE EVENT THAT SEVERE CORROSION IS NOT ENCOUNTERED, AND BEING SURE TO CHECK EACH ANCHOR ROD FOR CORROSION PER ENG-BUL-10114 "RUST CLASSIFICATION", REMOVE ALL EXISTING BASEPLATE GROUT WHILE CHECKING EACH LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR".

   E. CONSISTENT WITH SECTION 1.3.2.4 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR", HAND TOOL CLEAN TO SSPC-SP2 AND SOLVENT CLEAN TO SSPC-SP1, ALL EXPOSED STRUCTURAL STEEL ELEMENTS, INCLUDING ANCHOR RODS, LEVELING NUTS, AND UNDERSIDE OF BASE PLATE TO THE GREATEST EXTENT POSSIBLE. ENSURE THAT ALL OLD GROUT IS REMOVED TO ALLOW COLD GALVANIZING TO ADHERE TO THE STEEL.

   F. APPLY BY BRUSH TWO COATS OF A CROWN-APPROVED COLD-GALVANIZING COMPOUND TO ALL EXPOSED STRUCTURAL STEEL ELEMENTS BENEATH THE BASE PLATE, AND ALLOW CURING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. A LIST OF CROWN-APPROVED DIRECT APPLICATION COLD-GALVANIZING COMPOUNDS CAN BE FOUND IN ENG-STD-10149 "TOWER PROTECTIVE COATINGS GUIDELINES" SECTION 2.1.1.

   G. THE GC SHALL PROVIDE PHOTOS OF EACH ANCHOR ROD WITH LEVELING NUT AFTER CLEANING BUT BEFORE COLD-GALVANIZATION, AND ALSO AGAIN AFTER COLD-GALVANIZATION, FOR INCLUSION IN THE MI REPORT.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL".

2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.

3. ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN ENG-PLN-10015, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.

4. FOR ALL WELDING, USE E80XX ELECTRODES FOR SMAW PROCESS AND E8XT-XX ELECTRODES FOR FCAW PROCESS, UNO.

5. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.

6. REPAIR THE GALVANIZED COATING. ALL AREAS AFFECTED BY THE FIELD DRILLING, FIELD GRINDING AND FIELD WELDING, BOTH INSIDE AND OUTSIDE THE MONOPOLE, SHALL BE REPAIRED PER CROWN DOCUMENT ENG-STD-10149. PRODUCTS TO BE APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. AREAS THAT HAVE BEEN TOUCHED UP SHOULD BE INSPECTED AS PART OF THE ROUTINE MAINTENANCE OF THE STRUCTURE. NO SPRAY PAINT IS ALLOWED. AFTER ZINC-RICH PAINT IS DRY, OVERCOAT WITH OWNER'S PAINT SPECIFICATIONS, APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.

8. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.

9. FIELD NDE MINIMUM REQUIREMENTS
   - FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
   - FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".
   - FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: TOWER BASE PLATE NDE, AND ENG-BUL-10051: NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
   - ALL TESTING LIMITATIONS SHALL BE DETAILED IN THE NDE REPORT.

10. MOVE ALL COAX AND OTHER FLAMMABLE MATERIALS FROM ANY AREA THAT MAY BE HEATED DURING CONSTRUCTION.

11. CONTRACTOR SHALL MAKE PROPER PRECAUTIONS AND PROCEDURES TO PROTECT THE STRUCTURE FROM CATCHING FIRE DURING ALL WELDING OPERATIONS. THE FOLLOWING FIRE SAFETY PREVENTION PROTOCOL IS THE MINIMUM REQUIREMENTS DURING WELDING OPERATIONS. ALSO REFERENCE CROWN DOCUMENT ENG-BUL-10172 FOR ADDITIONAL WELDING REQUIREMENTS.
    - 500 GALLON WATER TANK WITH PUMP TO BE ON SITE AT ALL TIMES.
    - 2 FIRE EXTINGUISHERS ON SITE AT ALL TIMES.
    - 2 MAN FIRE WATCH ON ANY ADJACENT STRUCTURES, FIELDS AND POLE.
    - INTERMITTENT COOLING OF WELDED SURFACE TO REDUCE HEAT IN STRUCTURE.

DETAIL DRAWINGS SHALL GOVERN OVER ANY VARIANCE FROM THIS SHEET

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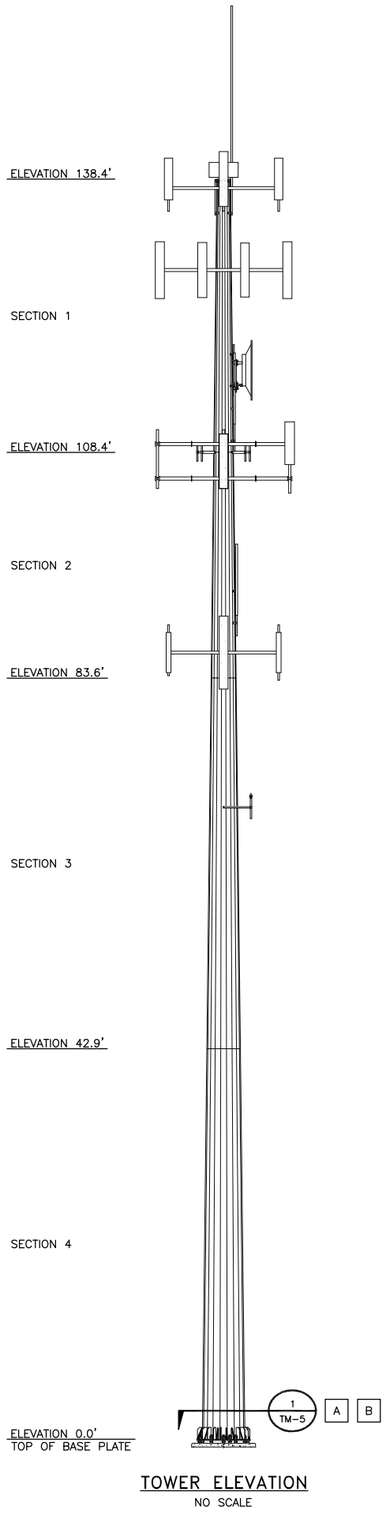
SHEET TITLE

NOTES

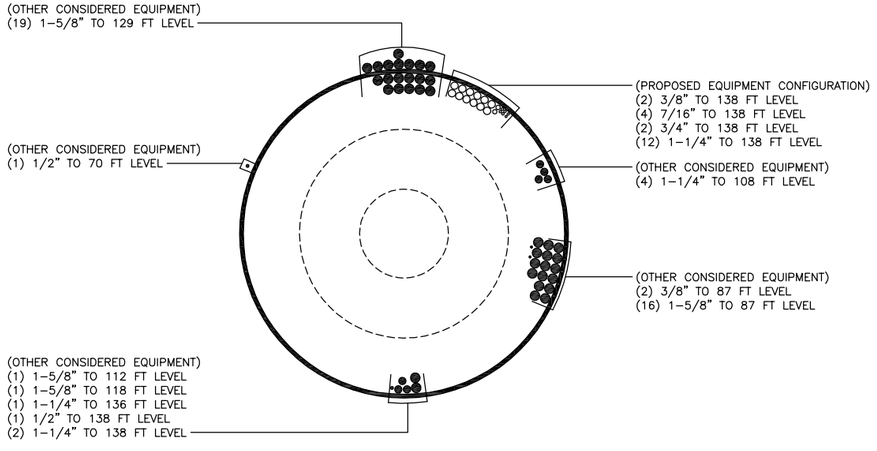
SHEET NUMBER

TM-3



TOWER ELEVATION
NO SCALE

POLE MODIFICATION SCHEDULE			
CALLOUT	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0	REMOVE (8) EXISTING BASE PLATE STIFFENER PLATES	TM-5
B	0.0	INSTALL (16) NEW BASE PLATE STIFFENER PLATES	TM-5
FOR PARTS NOT DETAILED WITHIN THE DRAWING AND STARTING WITH "CCI-", SEE THE FOLLOWING CATALOG FOR DETAILS: CED-CAT-10300, MONOPOLE STANDARD DRAWINGS AND APPROVED REINFORCEMENT COMPONENTS.			



COAX FEEDLINE PLAN
NO SCALE

EXISTING FEEDLINE PLAN SHOWN ON THIS DRAWING IS BASED ON CURRENT BEST KNOWLEDGE OF THE EXISTING CONDITION. IF THE EXISTING FEEDLINE LAYOUT IS NOT AS SHOWN ON THIS DRAWING CONTRACTOR SHALL NOTIFY ENGINEER.

PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.

MANUFACTURER POLE SPECIFICATIONS	
POLE SHAFT TYPE	18 SIDED POLYGON
SHAFT STEEL	ASTM A572 GRADE 65
BASE PLATE STEEL	ASTM A572 GRADE 60
ANCHOR RODS	2 1/4"ø #18J ASTM A615 GRADE 75

MANUFACTURER SHAFT SECTION DATA					
SHAFT SECTION	SHAFT LENGTH (FT)	THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLAT (IN)	
				@ TOP	@ BOTTOM
1	30.00	0.1875	N/A	17.375	24.500
2	24.74	0.2500	53.78	24.500	31.880
3	45.21	0.3125	71.13	30.043	43.420
4	48.84	0.3125		41.041	55.500
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

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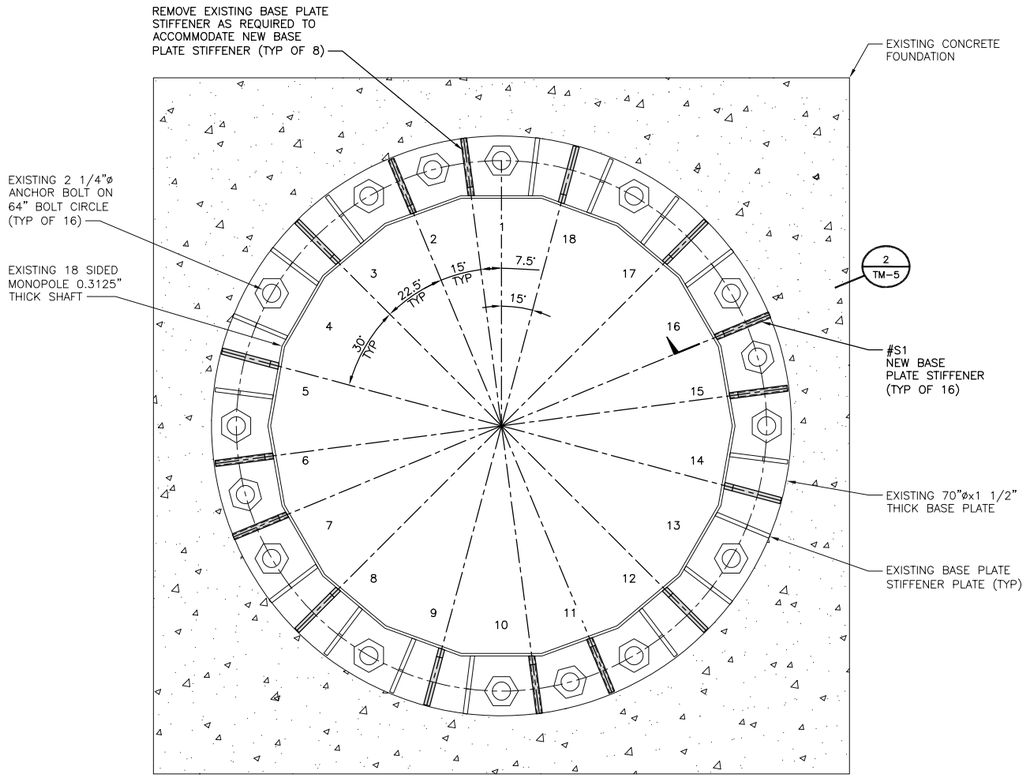
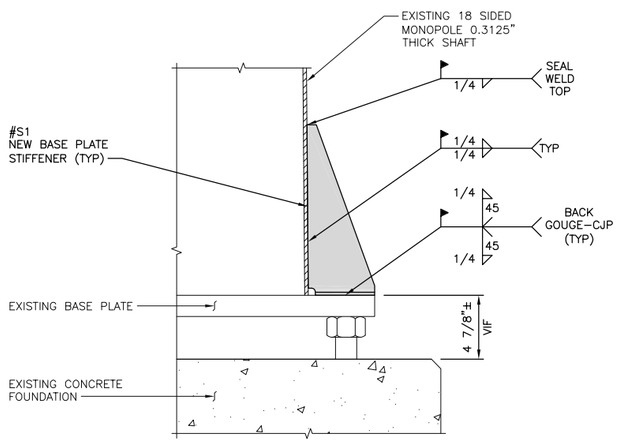
SHEET NUMBER
TM-4



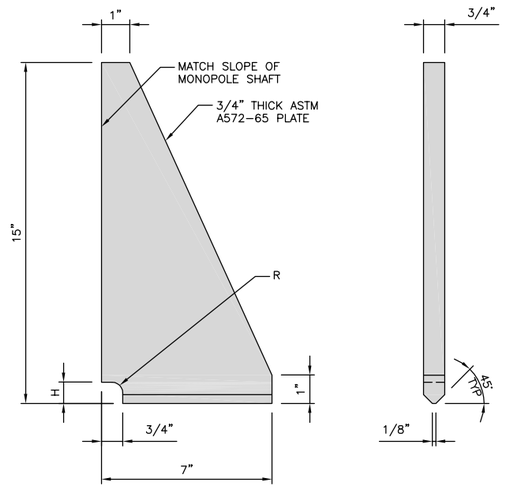
SECTION 1
BASE PLATE STIFFENER PLATE PLAN
NO SCALE



SECTION 2
NO SCALE

NOTES

1. FIELD LOCATE STIFFENER PLATES EVENLY SPACED ABOUT SHAFT AS SHOWN AND AS REQUIRED TO AVOID EXISTING INTERFERENCES.
2. ALL NEW PLATES SHALL BE HOT-DIPPED GALVANIZED.



NOTE

R = STIFFENER THICKNESS/2
H = STIFFENER THICKNESS

#S1
STIFFENER PLATE
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	GB

REV	DATE	DESCRIPTION
0	04/05/19	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
04/11/2019

BU #876380
WO #1720153
O&G WOODBURY
GREAT HOLLOW ROAD
WOODBURY, CT 06798
LITCHFIELD COUNTY, USA

SHEET TITLE
BASE PLATE
STIFFENER PLATE DETAILS

SHEET NUMBER
TM-5

Date: **February 29, 2019**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704-405-6607

Jacobs Engineering Group, Inc.
5449 Bells Ferry Rd
Acworth, GA 30102
770-701-2500
www.jacobs.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Equipment Change-Out**	
	Carrier Site Number:	10035444
	Carrier Site Name:	Woodbury CT Great
Crown Castle Designation:	**Crown Castle BU Number:**	876380
	Crown Castle Site Name:	O&G Woodbury
	Crown Castle JDE Job Number:	553140
	Crown Castle PO Number:	1318072
	Crown Castle Application Number:	475080 Revision 0
Engineering Firm Designation:	**Jacobs Engineering Group, Inc. Report Designation:** ERCC0303	
Site Data:	**Great Hollow Road** **Woodbury, Litchfield County, CT, 06798** **Latitude 41°31'19.20" Longitude -73°13'15.60"**	
Structure Information:	**Tower Height & Type:**	**139 ft Monopole**
	Mount Elevation:	**138 ft**
	Mount Type:	**12.5 ft Platform**

Dear Charles McGuirt,

Jacobs Engineering Group, Inc. is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of AT&T's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform (single) **Sufficient**

The analysis has been performed in accordance with the TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 116 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

We at Jacobs Engineering Group, Inc. appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this, please give us a call.

Mount analysis prepared by: Alexandre Matout

Engineer of Record:

Craig Thomas, PE
PE No. 0029052

2/28/19

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a 12.5 ft Platform, mapped by Hightower Solutions, Inc., dated 2/18/2019

2) ANALYSIS CRITERIA

Building Code: 2018 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 116 mph
Exposure Category: B
Topographic Factor at Mount: 1
Ice Thickness: 1 in
Wind Speed with Ice: 50 mph
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
138.0	139.0	3	POWERVAWE TECHNOLOGIES	7770.00	Platform
		2	QUINTEL TECHNOLOGY	QS46512-2	
		1	QUINTEL TECHNOLOGY	QS66512-2	
		2	KATHREIN	80010965	
		4	KATHREIN	80010964	
		3	POWERVAWE TECHNOLOGIES	TT19-08BP111-001	
		3	RAYCAP	DC6-48-60-18-8F	
		6	CCI ANTENNAS	TPX-070821	
		3	COMMSCOPE	ATSBTTOP-FF-4G	
		3	ERICSSON	RRUS 32	
		3	ERICSSON	RRUS 8843 B2/B66A	
		3	ERICSSON	RRUS 4449 B5/B12	
		3	ERICSSON	RRUS 4478 B14	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
4-MOUNT MAPPING	Hightower Solutions, Inc.	2/18/2019	CCISITES
MOUNT PHOTOS	Hightower Solutions, Inc.	2/18/2019	CCISITES
APPLICATION	AT&T	460474 Revision *0*	CCISITES

3.1) Analysis Method

RISA-3D (Version 17.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed, using Microsoft Excel, by Jacobs was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 Tower Mount Analysis (Revision C).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325
U-Bolts	ASTM A307

6) Antenna pipes to be implemented vertically on/between the face members and equally spaced horizontally along the mount face.
7) RRHs to be implemented vertically between the face members.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Antenna Pipe Members	M10	138.0	73.0	Pass
1	Horizontal Members	M16	138.0	33.0	Pass
1	Standoff Members	M27	138.0	54.1	Pass
2	Mount-to-Tower Connection	-	138.0	9.2	Pass

Structure Rating (max from all components) =	**73.0%**

Notes:

1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Analysis Output" for calculations supporting the % capacity consumed.
3) Rating per TIA-222-H, Section 15.5.

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

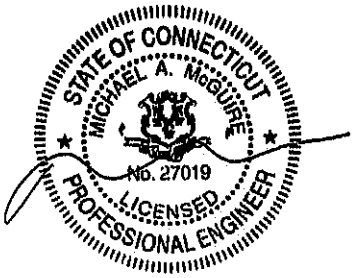
RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: O&G WOODBURY
Crown Castle Site BU: 876380
AT&T Mobility, LLC Site FA #: 10036444
Great Hollow Road
WOODBURY, CT
2/27/2019

Report Status:

AT&T Mobility, LLC Is Compliant



sealed 28feb2019 mike@h2dc.com
H2DC PLLC CT CoA#: 0001714

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive,
Suite 315

Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
WOODBURY, CT

My signature on the cover of this document indicates:

That I, Michael A McGuire, am currently and actively licensed to provide (in this state/jurisdiction as indicated within the professional electrical engineering seal on the cover of this document) professional electrical engineering services, as an employee of Hurricane Hill Development Company, PLLC , a duly authorized/registered engineering firm (in this state, as applicable) on behalf of SiteSafe, LLC; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "O&G WOODBURY" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 2.375% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 5.867% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Crown Castle
O&G WOODBURY
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.174 %
AT&T Mobility, LLC (Proposed)	0.167 %
AT&T Mobility, LLC (Proposed)	0.501 %
AT&T Mobility, LLC (Proposed)	0.504 %
AT&T Mobility, LLC (Proposed)	0.395 %
AT&T Mobility, LLC (Proposed)	0.311 %
AT&T Mobility, LLC (Proposed)	0.323 %
Northeast Utilities	0.015 %
Sprint	0.328 %
Sprint	0.328 %
Sprint	0.123 %
Sprint	0.124 %
Sprint	0.486 %
T-Mobile	0.369 %
T-Mobile	0.184 %
T-Mobile	0.184 %
Town of Woodbury	0.07 %
Verizon Wireless	0.254 %
Verizon Wireless	0.364 %
Verizon Wireless	0.332 %
Verizon Wireless	0.33 %
Composite Site MPE:	5.867 %

AT&T Mobility, LLC
O&G WOODBURY
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	0.98693	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.17416	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Powerwave	7770	139	23	1094	0.542981	0.09582	0.846235	0.149336
Powerwave	7770	139	143	1094	0.542981	0.09582	0.846235	0.149336
Powerwave	7770	139	263	1094	0.54229	0.095698	0.846235	0.149336

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.67347	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16735	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Quintel	QS66512-2	139	23	2858	0.822567	0.082257	1.639392	0.163939
Quintel	QS46512-2	139	143	2168	0.800422	0.080042	1.31541	0.131541
Quintel	QS46512-2	139	263	2168	0.813792	0.081379	1.31541	0.131541

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	2.84071	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.5013	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Quintel	QS66512-2	139	23	1996	1.261908	0.226219	1.69439	0.29901
Quintel	QS46512-2	139	143	2090	2.39238	0.422185	2.757913	0.486691
Quintel	QS46512-2	139	263	2090	2.372646	0.418702	2.757913	0.486691

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	2.47823	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.50439	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Quintel	QS66512-2	139	23	2239	1.139301	0.231879	1.613535	0.328399
Quintel	QS46512-2	139	143	1863	1.940609	0.394968	2.44416	0.497454
Quintel	QS46512-2	139	263	1863	1.927683	0.392337	2.44416	0.497455

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.95363	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.39536	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	139	23	7114	1.618633	0.161863	3.821312	0.382131
Kathrein-Scala	800-10964	139	143	5274	1.19991	0.119991	2.832779	0.283278
Kathrein-Scala	800-10964	139	263	5274	1.19991	0.119991	2.832779	0.283278

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.10672	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.31067	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	139	23	6168	1.38388	0.138388	2.960598	0.29606
Kathrein-Scala	800-10964	139	143	5154	1.153941	0.115394	2.488378	0.248838
Kathrein-Scala	800-10964	139	263	5154	1.153941	0.115394	2.488378	0.248838

AT&T Mobility, LLC (Proposed)
O&G WOODBURY
Carrier Summary

Frequency:	763	MHz
Maximum Permissible Exposure (MPE):	508.67	µW/cm^2
Maximum power density at ground level:	1.64445	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32329	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	139	23	2959	1.179847	0.231949	1.54122	0.302992
Kathrein-Scala	800-10964	139	143	2209	0.909806	0.178861	1.280902	0.251816
Kathrein-Scala	800-10964	139	263	2209	0.903676	0.177656	1.280902	0.251816

Northeast Utilities
O&G WOODBURY
Carrier Summary

Frequency:	936	MHz
Maximum Permissible Exposure (MPE):	624	µW/cm^2
Maximum power density at ground level:	0.09086	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.01456	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
dbSpectra	DS9A09F36D-N	148	0	240	0.090861	0.014561	0.090861	0.014561

Sprint
O&G WOODBURY
Carrier Summary

Frequency:	1990	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.27917	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32792	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	108	30	3804	1.321267	0.132127	3.035783	0.303578
RFS	APXVSPP18-C-A20	108	150	3804	1.313822	0.131382	3.035784	0.303578
RFS	APXVSPP18-C-A20	108	270	3804	1.313822	0.131382	3.035784	0.303578

Sprint
O&G WOODBURY
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.27917	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32792	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	108	30	3804	1.321267	0.132127	3.035783	0.303578
RFS	APXVSPP18-C-A20	108	150	3804	1.313822	0.131382	3.035784	0.303578
RFS	APXVSPP18-C-A20	108	270	3804	1.313822	0.131382	3.035784	0.303578

Sprint
O&G WOODBURY
Carrier Summary

Frequency:	869	MHz
Maximum Permissible Exposure (MPE):	579.33	µW/cm^2
Maximum power density at ground level:	0.71158	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.12283	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	108	30	1084	0.681166	0.117578	0.701375	0.121066
RFS	APXVSPP18-C-A20	108	150	1084	0.683487	0.117978	0.701375	0.121066
RFS	APXVSPP18-C-A20	108	270	1084	0.681166	0.117578	0.701375	0.121066

Sprint
O&G WOODBURY
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0.71158	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.12383	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVSPP18-C-A20	108	30	1084	0.681166	0.118532	0.701375	0.122049
RFS	APXVSPP18-C-A20	108	150	1084	0.683487	0.118936	0.701375	0.122049
RFS	APXVSPP18-C-A20	108	270	1084	0.681166	0.118532	0.701375	0.122049

Sprint
O&G WOODBURY
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.86075	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.48608	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVTM14-C-I20	108	30	6168	1.980662	0.198066	3.75482	0.375482
RFS	APXVTM14-C-I20	108	150	6168	1.979541	0.197954	3.75482	0.375482
RFS	APXVTM14-C-I20	108	270	6168	1.980662	0.198066	3.75482	0.375482

T-Mobile
O&G WOODBURY
Carrier Summary

Frequency:	700	MHz
Maximum Permissible Exposure (MPE):	466.67	µW/cm^2
Maximum power density at ground level:	1.72029	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36863	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-6515DS-VTM	87	30	1715	1.090269	0.233629	1.414986	0.303211
ANDREW	LNX-6515DS-VTM	87	150	1715	1.090269	0.233629	1.414986	0.303211
ANDREW	LNX-6515DS-VTM	87	270	1715	1.090269	0.233629	1.414986	0.303211

T-Mobile
O&G WOODBURY
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.83817	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.18382	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-209014	87	30	1637	0.99521	0.099521	1.286006	0.128601
RFS	APXV18-209014	87	150	1637	0.99521	0.099521	1.286006	0.128601
RFS	APXV18-209014	87	270	1637	0.99521	0.099521	1.286006	0.128601

T-Mobile
O&G WOODBURY
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.83817	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.18382	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-209014	87	30	1637	0.99521	0.099521	1.286006	0.128601
RFS	APXV18-209014	87	150	1637	0.99521	0.099521	1.286006	0.128601
RFS	APXV18-209014	87	270	1637	0.99521	0.099521	1.286006	0.128601

Town of Woodbury
O&G WOODBURY
Carrier Summary

Frequency:	160	MHz
Maximum Permissible Exposure (MPE):	200	µW/cm^2
Maximum power density at ground level:	0.13976	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.06988	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Telewave	ANT150F6	148	0	100	0.139756	0.069878	0.139756	0.069878

Verizon Wireless
O&G WOODBURY
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	1.27345	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.25435	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	BXA-70063-6CF	129	30	2010	1.022612	0.20425	1.207126	0.241104
Antel	BXA-70063-6CF	129	150	2010	1.024665	0.20466	1.207126	0.241104
Antel	BXA-70063-6CF	129	270	2010	1.024666	0.20466	1.207126	0.241104

Verizon Wireless
O&G WOODBURY
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	2.06544	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36449	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-8513DS-VTM	129	30	3163	1.989793	0.35114	2.051218	0.36198
ANDREW	LNX-8513DS-VTM	129	150	3163	1.992122	0.351551	2.051218	0.36198
ANDREW	LNX-8513DS-VTM	129	270	3163	1.989793	0.35114	2.051218	0.36198

Verizon Wireless
O&G WOODBURY
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.32366	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.33237	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	HBXX-6517DS-VTM	129	30	5621	1.535971	0.153597	3.040152	0.304015
ANDREW	HBXX-6517DS-VTM	129	150	5621	1.542277	0.154228	3.040152	0.304015
ANDREW	HBXX-6517DS-VTM	129	270	5621	1.542277	0.154228	3.040153	0.304015

Verizon Wireless
O&G WOODBURY
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.29908	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32991	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	HBXX-6517DS-VTM	129	30	5130	1.559178	0.155918	3.05848	0.305848
ANDREW	HBXX-6517DS-VTM	129	150	5130	1.552029	0.155203	3.058479	0.305848
ANDREW	HBXX-6517DS-VTM	129	270	5130	1.559178	0.155918	3.058479	0.305848

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 25APR19
ACTWGT: 1.80 LB
CAD: 104924194/INET4100

BILL SENDER

TO **BARBARA PERKINSON, FIRST SELECTMAN**
TOWN OF WOODBURY
281 MAIN STREET SOUTH

WOODBURY CT 06798
(203) 263-2141 REF: 1734.7680
INV:
PO: DEPT:

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ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 25APR19
ACTWGT: 1.80 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MARILYN OZOLS, PLANNING COMMISSION**
TOWN OF WOODBURY
281 MAIN STREET SOUTH

WOODBURY CT 06798
(203) 263-2467 REF: 1734.7680
INV:
PO: DEPT:

565J1/D7E5/23AD

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ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 25APR19
ACTWGT: 1.80 LB
CAD: 104924194/INET4100

BILL SENDER

TO **O&G INDUSTRIES INC.**
112 WALL STREET

TORRINGTON CT 06790
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J1/D7E5/23AD

FedEx Express

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