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

February 20, 2019

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

RE: **Notice of Exempt Modification for AT&T Crown Site BU: 876367**
AT&T Site ID: CTL05717
1439 Voluntown Rd GRISWOLD, CT 06384
Latitude: 41° 34′ 33.99″ / Longitude: -71° 53′ 16.96″

Dear Ms. Bachman:

AT&T currently maintains 9 antennas at the 165 foot level of the existing 179.5-foot Monopole Tower at 1439 Voluntown Rd. Griswold, CT 06384. The tower is owned by Crown Castle. The property is owned by Robert & Mildred Rose. AT&T intends to swap (6) antennas, (6) RRU's, remove (6) Diplexers and add (3) RRU's, (4) DC Power Cables, and (1) Fiber Cable.

This facility was approved by the Town of Griswold Planning & Zoning Commission on November 08, 1999. This approval was given with the conditions that Sprint Spectrum only use cabinets designed as standalone and that a 29,000 cash bond be made payable to the town treasurer.

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 First Selectman Todd Babbitt, the Town of Griswold, Jack Cipriano, Building Official 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: Nesmet Badawi.

Sincerely,

Nesmet Badawi
Real Estate Specialist
1200 MacArthur Blvd Suite 200 Mahwah NJ 07430
201-514-7374
Nesmet.Badawi.Contractor@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Todd Babbitt
Town Hall, 28 Main St.
Jewett City Ct, 06351

Jack Cipriano, Building Official
Town Hall, 28 Main St.
Jewett City CT, 06351

Rose & Robert Mildred
4017 Washington Rd.
McMurray, PA 15317

Badawi, Nesmet (Contractor)

From: TrackingUpdates@fedex.com
Sent: Wednesday, February 20, 2019 11:02 AM
To: Badawi, Nesmet (Contractor)
Subject: FedEx Shipment 774513574364 Notification

This shipment is scheduled to be sent on 02/20/2019.

See "Preparing for Delivery" for helpful tips

Tracking # 774513574364

Anticipated ship date:
Wed, 2/20/2019

Nesmet Badawi
Crown Castle
MAHWAH, NJ 07430
US

Initiated

Scheduled delivery:
Thu, 2/21/2019 by 10:30 am

Rose & Robert Mildred
4017 Washington Rd.
CANONSBURG, PA 15317
US

Shipment Facts

Tracking number:	774513574364
Reference:	1766.6680
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	0.50 lb.
Special handling/Services:	Adult Signature Required
	Deliver Weekday

Preparing for Delivery

To help ensure successful delivery of your shipment, please review the below.

Won't be in?

If an adult (age and required identification vary by country) will not be available to sign for the delivery, you may be able to hold it at a convenient FedEx location for pickup.

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 10:02 AM CST on 02/20/2019.

All weights are estimated.

The shipment is scheduled for delivery on or before the scheduled delivery displayed above. FedEx does not determine money-back guarantee or delay claim requests based on the scheduled delivery. Please see the FedEx Service Guide for terms and conditions of service, including the FedEx Money-Back Guarantee, or contact your FedEx customer support representative.

To track the latest status of your shipment, click on the tracking number above.

Thank you for your business.

Badawi, Nesmet (Contractor)

From: TrackingUpdates@fedex.com
Sent: Wednesday, February 20, 2019 10:57 AM
To: Badawi, Nesmet (Contractor)
Subject: FedEx Shipment 774513530160 Notification

This shipment is scheduled to be sent on 02/20/2019.

See "Preparing for Delivery" for helpful tips

Tracking # 774513530160

Anticipated ship date:
Wed, 2/20/2019

Nesmet Badawi
Crown Castle
MAHWAH, NJ 07430
US

Initiated

Scheduled delivery:
Thu, 2/21/2019 by 12:00 pm

Jack Cipriano, Building Official
Town Hall
28 Main St.
JEWETT CITY, CT 06351
US

Shipment Facts

Tracking number:	774513530160
Reference:	1766.6680
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	0.50 lb.
Special handling/Services:	Adult Signature Required
	Deliver Weekday

Preparing for Delivery

To help ensure successful delivery of your shipment, please review the below.

Won't be in?

If an adult (age and required identification vary by country) will not be available to sign for the delivery, you may be able to hold it at a convenient FedEx location for pickup.

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 9:57 AM CST on 02/20/2019.

All weights are estimated.

The shipment is scheduled for delivery on or before the scheduled delivery displayed above. FedEx does not determine money-back guarantee or delay claim requests based on the scheduled delivery. Please see the FedEx Service Guide for terms and conditions of service, including the FedEx Money-Back Guarantee, or contact your FedEx customer support representative.

To track the latest status of your shipment, click on the tracking number above.

Thank you for your business.

Badawi, Nesmet (Contractor)

From: TrackingUpdates@fedex.com
Sent: Wednesday, February 20, 2019 10:52 AM
To: Badawi, Nesmet (Contractor)
Subject: FedEx Shipment 774513447703 Notification

This shipment is scheduled to be sent on 02/20/2019.

See "Preparing for Delivery" for helpful tips

Tracking # 774513447703

Anticipated ship date:
Wed, 2/20/2019

Nesmet Badawi
Crown Castle
MAHWAH, NJ 07430
US

Initiated

Scheduled delivery:
Thu, 2/21/2019 by 12:00 pm

The Honorable Todd Babbitt
Town Hall,
28 Main St.
JEWETT CITY, CT 06351
US

Shipment Facts

Tracking number:	774513447703
Reference:	1766.6680
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	0.50 lb.
Special handling/Services:	Adult Signature Required
	Deliver Weekday

Preparing for Delivery

To help ensure successful delivery of your shipment, please review the below.

Won't be in?

If an adult (age and required identification vary by country) will not be available to sign for the delivery, you may be able to hold it at a convenient FedEx location for pickup.

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 9:52 AM CST on 02/20/2019.

All weights are estimated.

The shipment is scheduled for delivery on or before the scheduled delivery displayed above. FedEx does not determine money-back guarantee or delay claim requests based on the scheduled delivery. Please see the FedEx Service Guide for terms and conditions of service, including the FedEx Money-Back Guarantee, or contact your FedEx customer support representative.

To track the latest status of your shipment, click on the tracking number above.

Thank you for your business.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

WIRELESS PLANNING SERVICES, LLC
PLANNING & ZONING SERVICES FOR THE WIRELESS INDUSTRY
306 East Main Street, Suite 202, Lakeland, FL 33801
PHONE 863-838-9686
E-MAIL jim@wiley-malless.com

Site Name / #:	Wappingers Falls / Bob's Antiq 876367		
Site Address:	1439 Voluntown Rd., Griswold, CT 06384	Structure Type:	Lease ext
Jurisdiction:	**Connecticut Siting Council**	Website Address:	www.griswold-ct.org
Contact Person/Title:	Carl Fontneay, Griswold, CT Town Planner	Phone No.:	860-376-7060

Is the Zoning Code available online? [x] Yes [ ] No

Notes from Contact: 9/11/08 No Issues. The city does not regulate lease extensions or easement agreements between private parties. **Jurisdiction revision. Tower was approved zoning by Conditional Use Permit (in CCI records). CUP requires a $29,000 removal bond which is in place (bond document received by WPS).**

DOCUMENTS PROVIDED BY CLIENT

- [x] Zoning Approval
- [ ] Zoning Ordinance
- [x] Other:
  - *Specify:* building permit
- [ ] Planning Commission Meeting Minutes
- [ ] Board of Adjustment Meeting Minutes
- [ ] Other Minutes
  - *Specify:*

ANALYSIS OF TOWER ZONING APPROVAL

Date tower received zoning approval: November 8, 1999
Date current tower zoning ordinance adopted: 3/7/89 CT Siting Council
Did the tower receive zoning approval under the current or a previous zoning code? [x] Current [ ] Previous
Current status of tower:

- [x] Conforming Use
- [ ] Legal Non-Conforming Use
- [ ] Illegal Non-Conforming Use

If Nonconforming use (Legal/Illegal) identify/explain any restrictions including any against adding tenants/future site development.

Does the zoning approval expire? [ ] Yes [x] No

If yes, what is the duration of the approval including any renewals:

Was the tower approved consistent with the zoning code in place at the time of approval?	[x] Yes	[ ] No
Are there any non-compliance or notice of violations (NOVs) pending against this site?	[ ] Yes	[x] No
If yes, explain:		
Are there any annual reports, renewals, updates or other filings required for this site? **$29,000 Removal Bond as per CUP**	[x] Yes	[ ] No
If yes, are all filings current as of the date of this report?	[x] Yes	[ ] No

CERTIFICATION

This report was prepared for and may be relied upon by Morgan Stanley, Crown Castle International, Global Signal Inc., Pinnacle Towers, LCC, their respective Subsidiaries, and their respective successors and assigns. Any rating agency or issuer or purchaser of any security collateralized or otherwise backed by the property or any loans placed upon the property may further rely upon the report. We also consent to the inclusion of this report in any form, whether in paper or digital format, including any electronic media such as CD-ROM or the internet, in the Prospectus Supplement relating to any Pinnacle securitization, and we consent to the reference to our firm under the caption "Experts" in such Prospectus Supplement.

9/29/08

Wireless Planning Services, LLC BY James B. Malless, AICP

Signature/Date

876367

TOWER/STRUCTURE REMOVAL BOND

Bond Number: **674013692**
Replaces Bond 6043692
Effective July 17 2008

KNOW ALL MEN BY THESE PRESENTS, THAT **STC Five LLC**, as Principal, and **Liberty Mutual Insurance Company**, a corporation duly organized under the laws of the State of **Massachusetts**, as Surety, are held and firmly bound unto **Town of Town of Griswold- Town Hall, 28 Main Street, Griswold, CT 06351**, as Obligee, in the sum of **Twenty Nine Thousand And 00/100** Dollars **($29,000.00)** lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, the liability of the Surety being limited to the penal sum of this bond regardless of the number of years the bond is in effect.

WHEREAS the Principal has entered into a written agreement with the property owner for the placement of a tower or structure furnishing telephone, television or other electronic media service, which agreement sets forth the terms and conditions which govern the use of such towers or structures and which agreement is hereby specifically referred to and made part hereof, and

WHEREAS, the **Town of Griswold, CT** requires the submission of a bond guaranteeing the maintenance, replacement, removal or relocation of said tower or structure located at **1439 Voluntown Rd., Griswold, CT 06351- Site ID# CT33XC011.**

NOW THEREFORE, the condition of this obligation is such, that if the above bounden Principal shall perform in accordance with the aforesaid ordinance and/or agreement, and indemnify the Obligee against all loss caused by Principal's breech of any ordinance or agreement relating to maintenance, replacement, removal or relocations of a tower or structure, then this obligation shall be void, otherwise to remain in full force and effect unless cancelled as set forth below.

THIS BOND may be cancelled by Surety by giving thirty (30) days written notice to the Obligee. Such cancellation shall not affect any liability the Surety may have or incurred under this bond prior to the effective date of the termination. Provided that no action, suit or proceeding shall be maintained against the Surety on this bond unless action is brought within twelve (12) months of the cancellation date of this bond.

THIS BOND signed, sealed, dated on the **20th** day of **June, 2008**. This bond is effective the **17th** day of **July, 2008**.

STC Five LLC

By: _____ Principal

George A. Liddy
Manager, Risk Management

Liberty Mutual Insurance Company

By: _____ Surety

Kristy M Barber, Attorney-In-Fact

2295272

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY
BOSTON, MASSACHUSETTS
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint

PAIGE M. TURNER, ROY R. YANCEY, KEITH A. STILES, MICHAEL J. GRANACHER, KRISTY M. BARBER, ALL OF THE CITY O KANSAS CITY, STATE OF MISSOURI

, each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding FIFTY MILLION AND 00/100********** DOLLARS ($ 50,000,000.00*****) each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts; Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 28th day of February, 2008.

LIBERTY MUTUAL INSURANCE COMPANY

By _____
Garnet W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 28th day of February, 2008, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires Nov. 28, 2009
Member, Pennsylvania Association of Notaries

By _____
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 20th day of June, 2008.

By _____
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call

Removal Bond

FY F

Wappinges Falls 876367

Town of Griswold

28 Main Street
Griswold, CT 06351
Phone (860) 376-7060, Fax (860) 376-7070

9/11/2008

To: Laura Tenpenny - Wireless Planning Services FAX 863-644-6191

From: Carl Fontneau Cover + 2

Re: A Hanked Copy of Tower Removal Bond ratified July 17, 2008.

As I mentioned over the phone, earlier, the Connecticut Siting Council has seized jurisdiction for new towers, modification to, or co-locations to wireless tower across the state rather than previously when they were through local zoning regulations.

Regards Carl

File: 10226/22676.011 #2
cc: Susan Lasteg
CEM.

Town of Griswold

TOWN HALL, 32 SCHOOL STREET
JEWETT CITY, CONNECTICUT 06351

SELECTMEN	376-7061
ASSESSOR	376-7071
TAX COLLECTOR	376-7068
SOCIAL SERVICES	376-7067
PUBLIC HEALTH NURSES	376-7077

RECEIVED
NOV 24 1999

TOWN CLERK	376-7063
BUILDING INSPECTOR	376-7065
PLANNING & ZONING	376-7073
BOOKKEEPING	376-7074
SANITARIAN	376-7065

PLANNING & ZONING COMMISSION

November 22, 1999

CERTIFIED MAIL: Z 307 858 482
RETURN RECEIPT REQUESTED

Sprint Spectrum
9 Barnes Industrial Road
Wallingford, CT 06492

Re: Sprint Spectrum, LP, Special Exception Application SE 3-00
and Zoning Permit Application ZP 6-00
1439 Voluntown Road, Griswold, CT

Gentlemen:

The Griswold Planning & Zoning Commission, at its Regular Meeting held on November 8, 1999, reviewed the above-referenced applications to erect a 190 ft telecommunications tower and support facilities at 1439 Voluntown Road in accordance with Section 11.19 of the Griswold Zoning Regulations.

Following a public hearing and a discussion on the proposed facility, the commission unanimously voted to approve applications SE 3-00 and ZP 6-00 with the following conditions:

1. The proposed equipment cabinets shall be designed to stand alone or shall be placed in a structure that conforms to Section 11.19.3.n. of the Griswold Zoning Regulations. The metal roof structure over the equipment cabinets as proposed is not permitted by the Regulations and, therefore, must be removed from the site plan.

2. A $29,000.00 cash bond shall be made payable to the Treasurer of the Town of Griswold in accordance with Section 11.19.7 of the Griswold Zoning Regulations.

Please be advised that it will be necessary for your engineer to file one set of fixed line mylars, one set of regular mylars, and five sets of paper prints with the above-noted corrections and with original seals and signatures for endorsement by the undersigned.

Should you have any questions regarding the above, please contact Mario J. Tristany, Jr., at (860)376-7084.

Very truly yours,

J. Clyde Seaman, Jr.

F. Clyde Seaman
Chairman

cc: Atty. Tom Regan, Brown, Rudnick, Freed & Gesmer, P.C.
Donald Duthaler, P.E., O'Brien & Geer Engineers, Inc.

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING TOWER:

- REMOVE (6) ANTENNAS, (6) RRH's & (6) DIPLEXERS

- INSTALL AT&T ANTENNA (800-10964) (TOTAL OF 2 ALPHA SECTOR).
- INSTALL AT&T ANTENNA (800-10966) (TYP OF 2 BETA & GAMMA SECTOR, TOTAL OF 4)
- INSTALL AT&T 4449 B5/12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4478 B14 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 8843 B2/B66A (AWS//PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL SURGE ARRESTOR (DC6-48-60-18-8F) (TOTAL OF 2).
- INSTALL (4) DC TRUNKS & (1) FIBER CABLE.
- INSTALL SITE PRO 1 HANDRAIL KIT (TYP. OF 1 PER SECTOR, TOTAL OF 3)
- REMOVE & REPLACE ANTENNA PIPE MOUNT IN POSITION 1 (TYP. OF 1 PER SECTOR, TOTAL OF 3)

ITEMS TO BE MOUNTED INSIDE EXISTING SHELTER:

- SWAP BB WITH PROPOSED 6630
- ADD XMU
- INSTALL 5G RBS 6630

ITEMS TO REMAIN:

- (3) ANTENNAS, (6) TMAS (3) BIAS TEES, (1) DC6 SURGE SUPPRESSOR (2) DC TRUNK CABLES, (1) FIBER TRUNK CABLE & (12) COAX.

SITE ADDRESS:	1439 VOLUNTOWN ROAD GRISWOLD, CT 06384
LATITUDE (NAD 83):	N 41° 34' 33.99"
LONGITUDE (NAD 83):	W 71° 53' 16.96"
LANDLORD:	CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK, STE 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE/OUTDOOR
TOWER HEIGHT:	179'-6"'
RAD CENTER:	167'
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 I
S-1	HANDRAIL KIT DETAIL
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

CROWN CASTLE SITE ID #: 876367
CROWN CASTLE SITE NAME: WAPPINGERS FALLS/ BOB'S ANTIQ

ENGINEERING

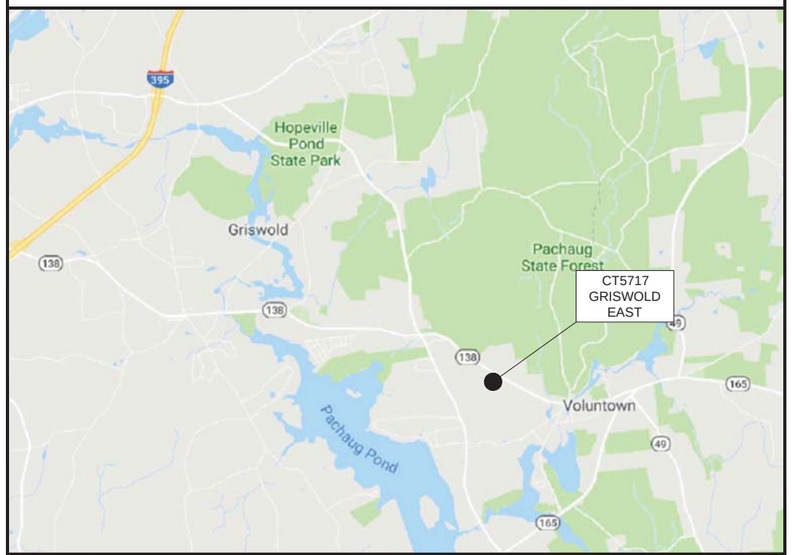
2018 CONNECTICUT STATE BUILDING CODE
2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
ANSI/TIA-222-G

NOT FOR CONSTRUCTION

SITE NUMBER: CT5717

FA LOCATION CODE: 10071047
SITE NAME: GRISWOLD EAST
CROWN SITE NAME: WAPPINGERS FALLS/BOB'S ANTIQ
PROJECT: LTE 2C/3C/4C/5C/4TX4RX
PACE ID: MRCTB035153, MRCTB035161, MRCTB035208, MRCTB035225, 2051A0KQBG
BU#: 876367

VICINITY MAP



I-95N TO EXIT 76. MAKE A LEFT ONTO I 395 TO EXIT 85. ONCE OF EXIT,FOLLOW TO SECOND TRAFFIC LIGHT AND MAKE RIGHT ONTO RTE 138. FOLLOW RTE 138 PAST INTERSECTION FOR SR 201 AND LOOK FOR ADDRESS ABOUT 1/2 MILE ON THE RIGHT.MAKE RIGHT INTO ANTIQUE SHOP ROAD AND LOOK FOR ACCESS ROAD ON LEFT SIDE.

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.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP - CALL BEFORE YOU DIG!

UNDERGROUND SERVICE ALERT

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

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.

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
Craig Thomas
02/12/2019
13:17:28 -05'00'

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

SUBMITTALS

2	02/12/19	RF COMMENTS
1	01/31/19	ISSUED FOR CONSTRUCTION
0	12/28/18	ISSUED FOR PERMITTING

FA# 10071047
SITE# CT5717
GRISWOLD EAST

1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

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.

NOT FOR CONSTRUCTION

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

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

JACOBS
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120 ST. JAMES AVENUE, 5TH FLOOR
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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
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)

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

THESE DOCUMENTS ARE IN COMPLIANCE WITH AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOW CODES AND STANDARDS AS APPLICABLE: 2018 CONNECTICUT STATE BUILDING CODE. 2017 NATIONAL ELECTRIC CODE OR LATEST EDITION.

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		

NOT FOR CONSTRUCTION

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 Thomas
02/12/2019
13:17:46-05'00
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS

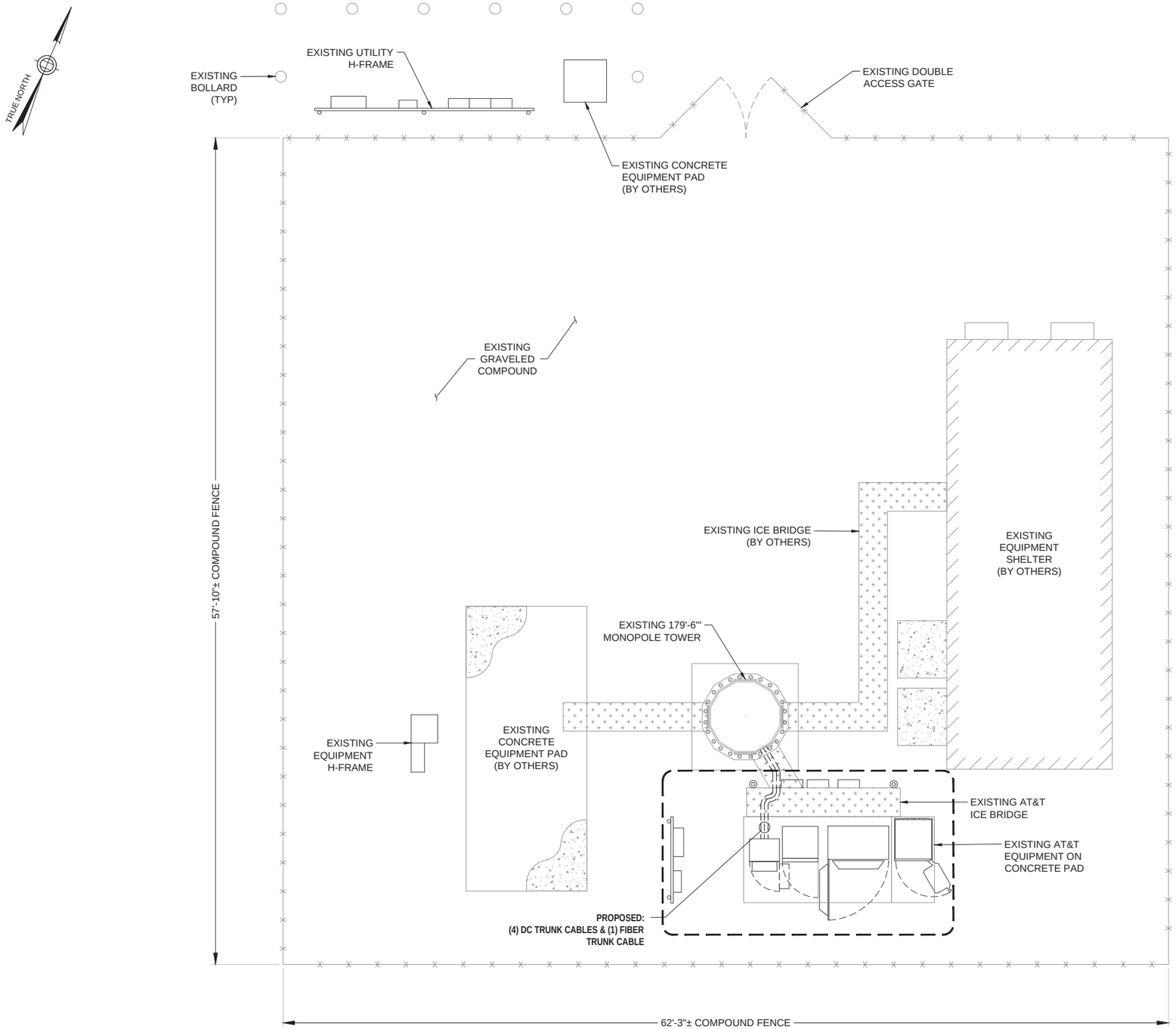
2	02/12/19	RF COMMENTS
1	01/31/19	ISSUED FOR CONSTRUCTION
0	12/28/18	ISSUED FOR PERMITTING

FA# 10071047
SITE# CT5717
GRISWOLD EAST

1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

GENERAL NOTES II

GN-2



NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY HUDSON DESIGN GROUP ON 10/16/12. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.

1 SITE PLAN

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

NOT FOR CONSTRUCTION

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
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JACOBS
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120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
Craig Thomas
02/12/2019
13:17:57-05'00
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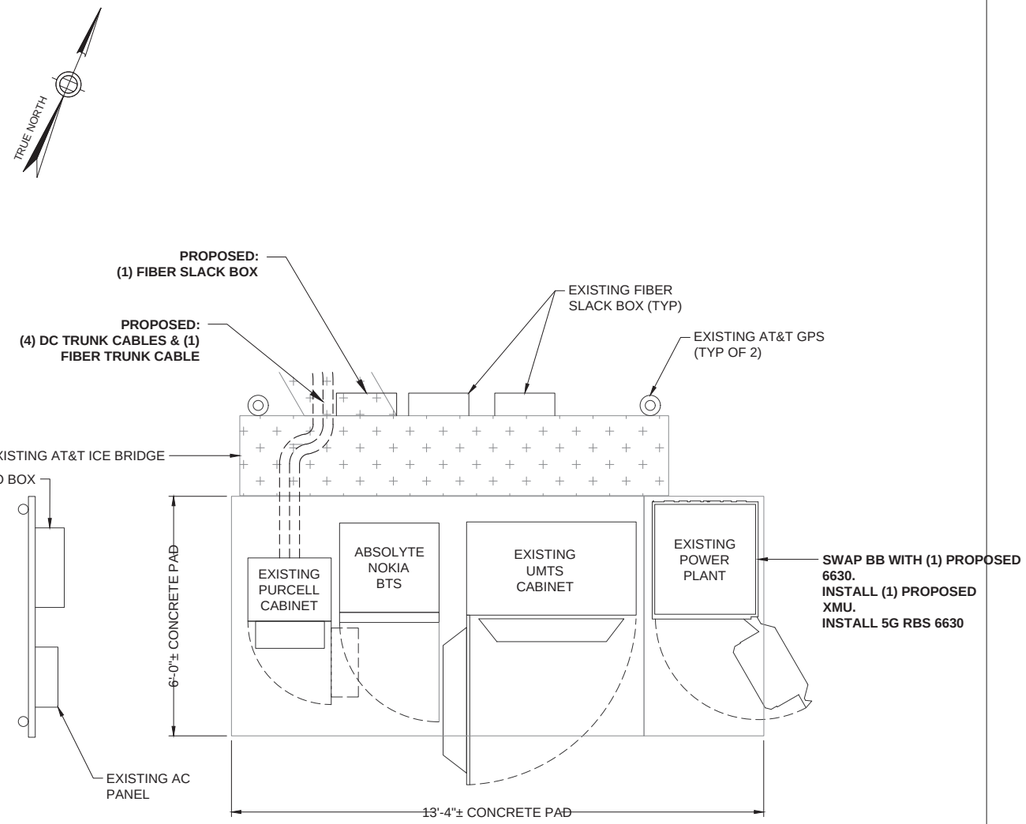
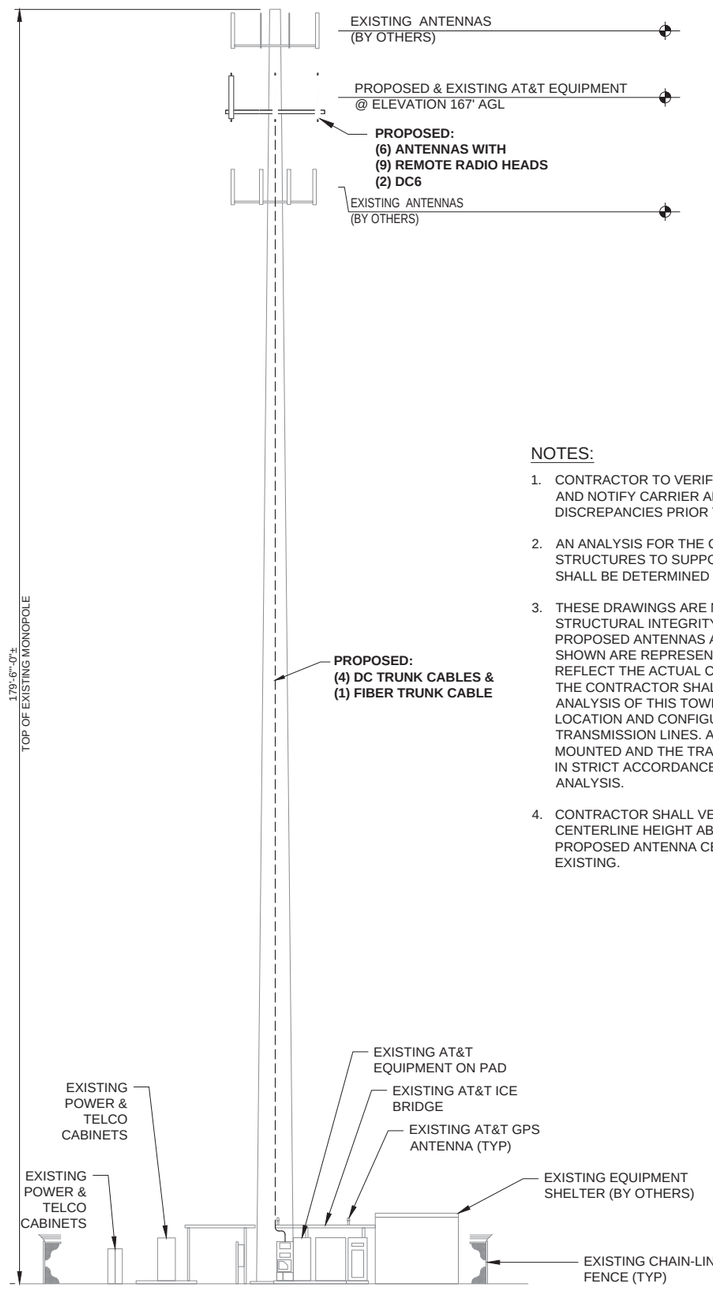
SITE PLAN

C-1



1 EQUIPMENT LAYOUT

SCALE: 135/256" = 1'-0"



2 TOWER ELEVATION

SCALE: ############

NOTES:

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. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND TRANSMISSION LINES SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE STRUCTURAL ANALYSIS OF THIS TOWER SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND TRANSMISSION LINES. ALL ANTENNAS MUST BE MOUNTED AND THE TRANSMISSION LINES CONFIGURED IN STRICT ACCORDANCE WITH THE STRUCTURAL ANALYSIS.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.

NOT FOR CONSTRUCTION

at&t
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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
Craig Thomas
02/12/2019
13:18:05 -05'00'

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

SUBMITTALS

2	02/12/19	RF COMMENTS
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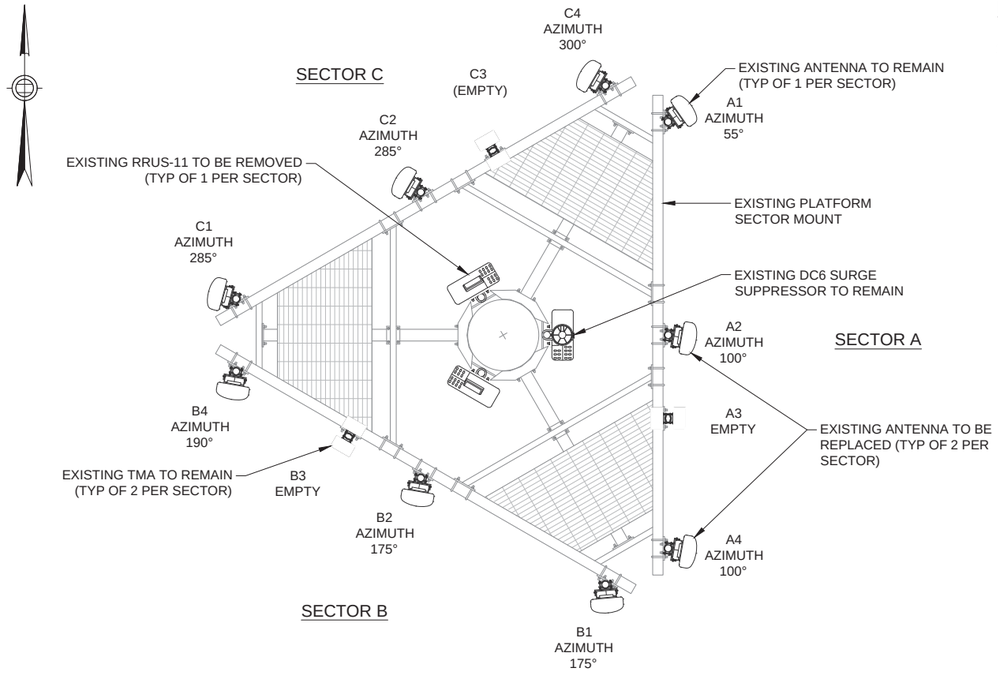
FA# 10071047
SITE# CT5717
GRISWOLD EAST

1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

EQUIPMENT LAYOUT &
PROPOSED TOWER
ELEVATION

C-2



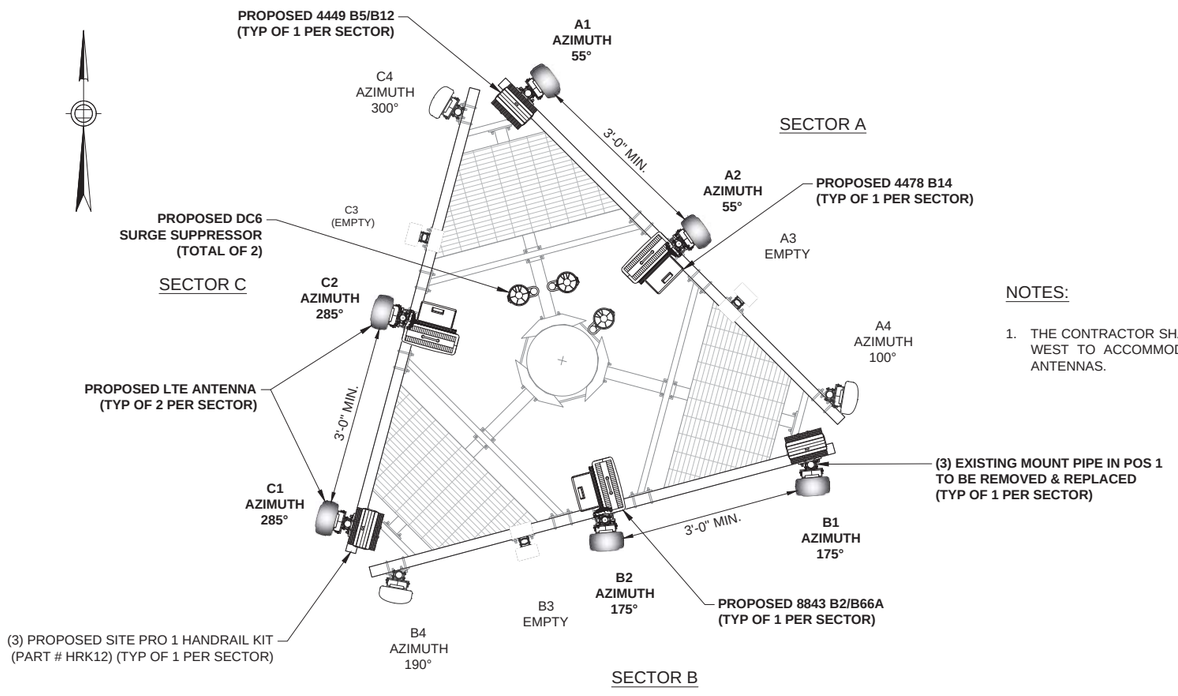
ELEVATION 167'

1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND ASSOCIATED EQUIPMENT SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE MOUNT ANALYSIS OF THIS SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND EQUIPMENT. ALL ANTENNAS AND EQUIPMENT MUST BE MOUNTED IN STRICT ACCORDANCE WITH THE MOUNT ANALYSIS.



ELEVATION 167'

DO NOT INSTALL PROPOSED SQUID OR SURGE SUPPRESSOR ON TOWER LEG

NOTES:

1. THE CONTRACTOR SHALL ROTATE THE EXISTING PLATFORM MOUNT 45° TO THE WEST TO ACCOMMODATE THE AZIMUTH OF THE EXISTING AND PROPOSED ANTENNAS.

1 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

NOT FOR CONSTRUCTION

at&t
5841 BRIDGE STREET
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3 CORPORATE PARK DRIVE
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JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
Craig Thomas
02/12/2019
15:18:15 -05'00'
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

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

SUBMITTALS

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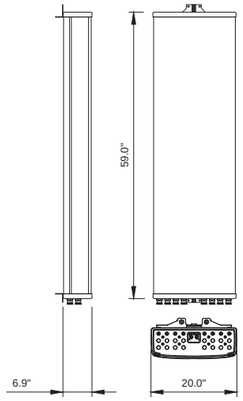
EXISTING & PROPOSED
ANTENNA LAYOUT

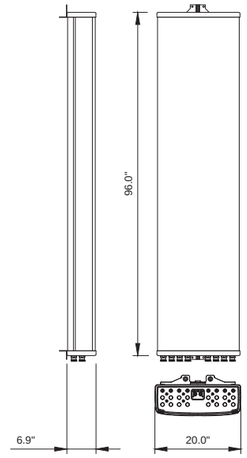
C-3

MANUFACTURER:	KATHREIN
MODEL NO.:	80010964
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)



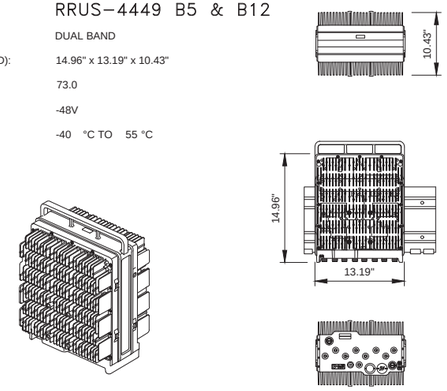
1 ANTENNA SPECIFICATIONS — SCALE: N.T.S.

MANUFACTURER:	KATHREIN
MODEL NO.:	80010966
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	96.0" x 20.0" x 6.9" 2438mm x 508mm x 175mm
WEIGHT (lbs):	114.6
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	315 LBF @ 93 MPH 1400 N @ 150 KM/H
SIDE WIND LOAD:	316 LBF @ 93 MPH 1405 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)



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

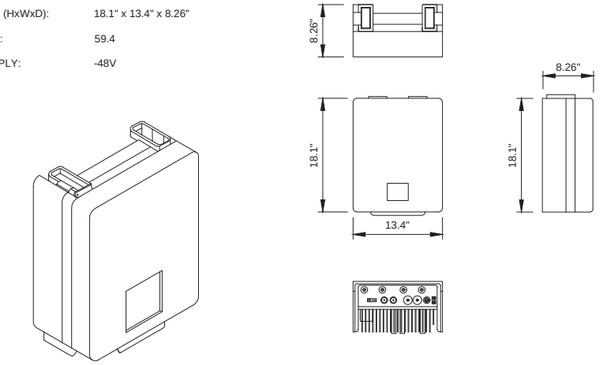
MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-4449 B5 & B12
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	14.96" x 13.19" x 10.43"
WEIGHT (lbs):	73.0
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C



3 RRUS SPECIFICATIONS — SCALE: N.T.S.

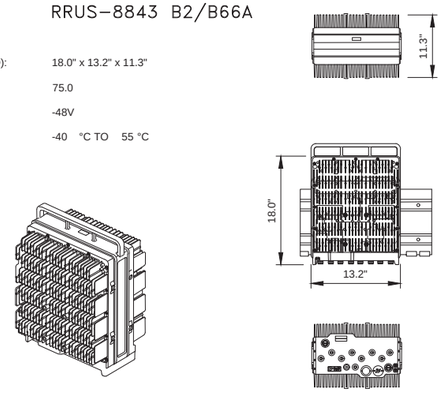
MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-4478 B14
TECHNOLOGY:	LTE 700
DIMENSIONS (HxWxD):	18.1" x 13.4" x 8.26"
WEIGHT (lbs):	59.4
POWER SUPPLY:	-48V

NOTE:
PENDING FINAL PRODUCT SPECIFICATION



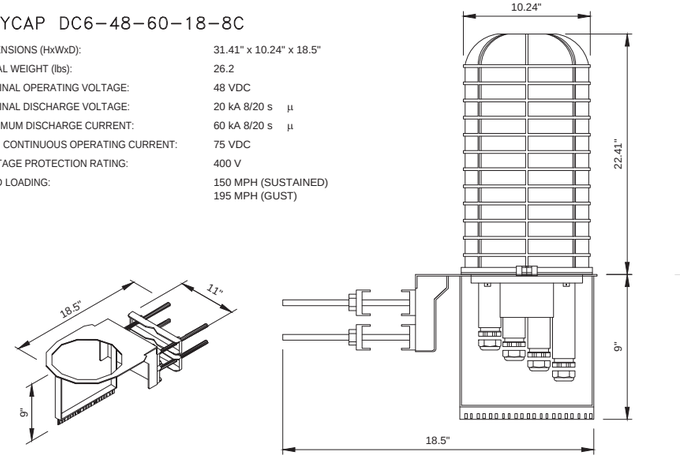
4 RRUS SPECIFICATIONS — SCALE: N.T.S.

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



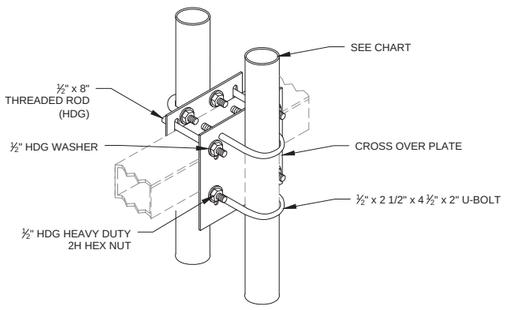
5 RRUS SPECIFICATIONS — SCALE: N.T.S.

	RAYCAP DC6-48-60-18-8C
DIMENSIONS (HxWxD):	31.41" x 10.24" x 18.5"
TOTAL WEIGHT (lbs):	26.2
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 s μ
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 s μ
MAX. CONTINUOUS OPERATING CURRENT:	75 VDC
VOLTAGE PROTECTION RATING:	400 V
WIND LOADING:	150 MPH (SUSTAINED) 195 MPH (GUST)



6 SURGE PROTECTION SPECIFICATIONS — SCALE: N.T.S.

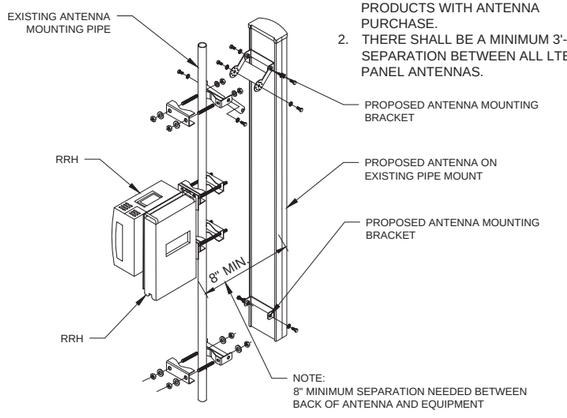
PART #	PIPE SIZE	STAND-OFF ARM
BBPM-K1	2-3/8"	3-1/2" - 4-1/2"
BBPM-K2	2-7/8"	3-1/2" - 4-1/2"
BBPM-K3	2-3/8"	3-1/2" - 6"
BBPM-U	2-3/8" - 4-1/2"	2-3/8" - 4-1/2"



7 DC6 MOUNTING DETAIL — SCALE: N.T.S.

NOTES:

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



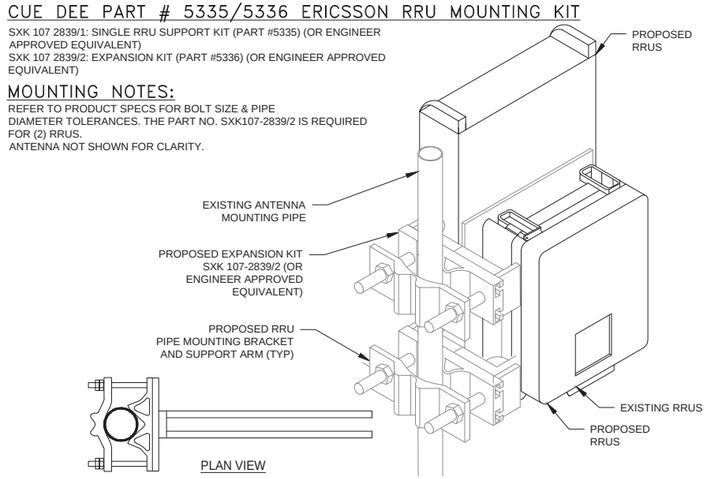
8 ANTENNA MOUNTING DETAIL — SCALE: N.T.S.

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.



9 RRU MOUNTING DETAIL — SCALE: N.T.S.

NOT FOR CONSTRUCTION

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 Thomas
02/12/20
13:18:25 -05:00
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

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

SUBMITTALS

2	02/12/19	RF COMMENTS
1	01/31/19	ISSUED FOR CONSTRUCTION
0	12/28/18	ISSUED FOR PERMITTING

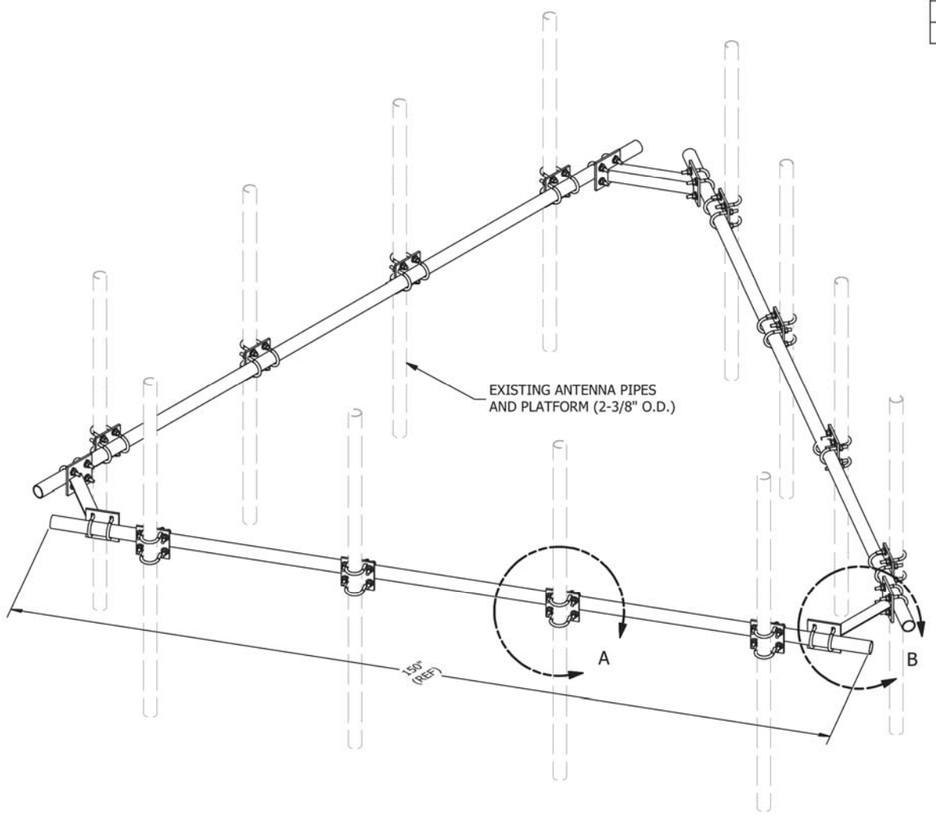
FA# 10071047
SITE# CT5717
GRISWOLD EAST

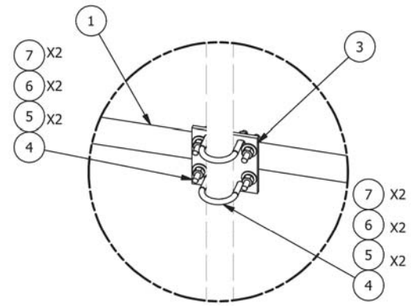
1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

EQUIPMENT DETAILS I

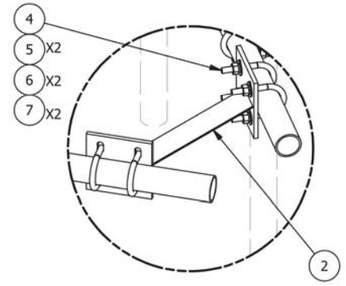
C-4

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
4	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	37.51
5	120	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	4.09
6	120	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60
					TOTAL WT. #	272.43





DETAIL A



DETAIL B

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP		CEK	7/10/2014
	REVISION HISTORY			

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: HANDRAIL KIT FOR 12'-6" FACE

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	KC8 5/30/2012		HRK12	1 OF 1
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
81 / 01	CUSTOMER	BMC 7/13/2014	HRK12	

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

NOT FOR CONSTRUCTION

1 HANDRAIL KIT DETAIL

SCALE: N.T.S.

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 Thomas — 02/12/20[illegible] 13:18:36 -05:00 — No. 0029052 — LICENSED PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS

2	02/12/19	RF COMMENTS
1	01/31/19	ISSUED FOR CONSTRUCTION
0	12/28/18	ISSUED FOR PERMITTING

FA# 10071047
SITE# CT5717
GRISWOLD EAST
1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

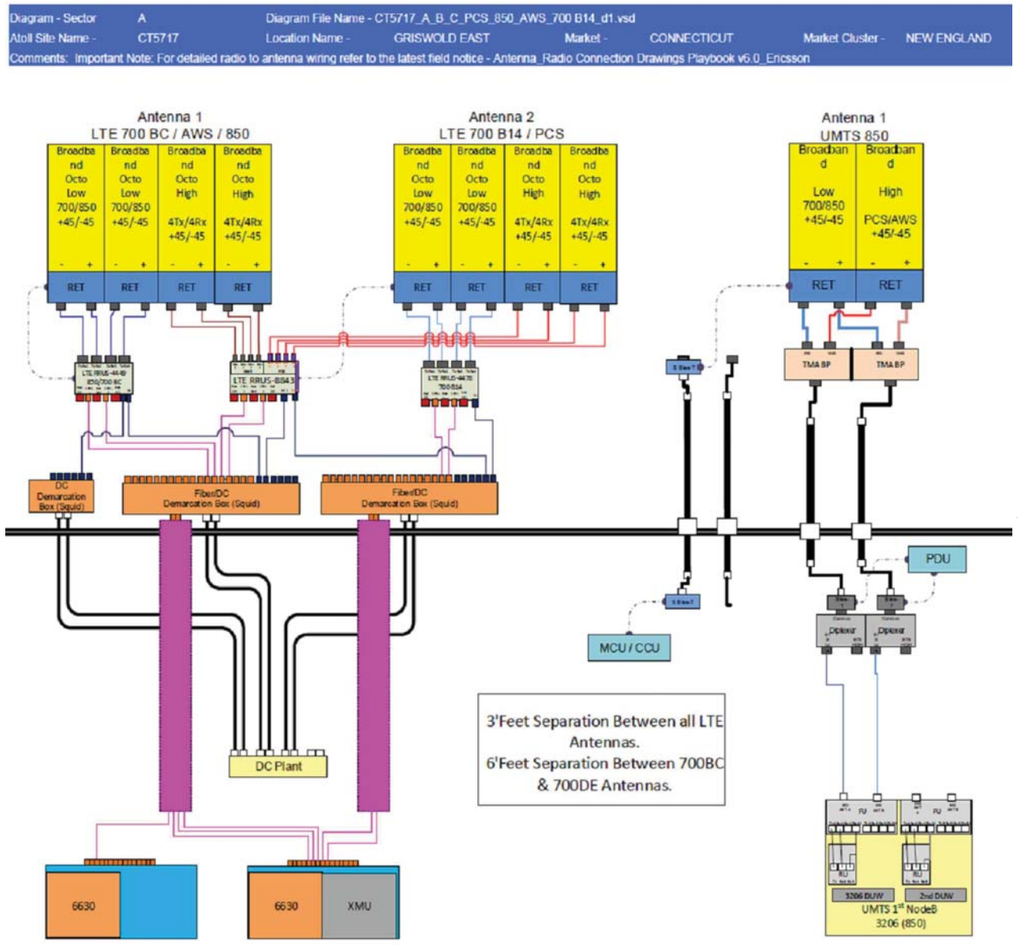
HANDRAIL KIT DETAIL

S-1

ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's	RRH's	FEEDER	RAYCAP
A1	**800-10964 (59"x20"x6.9")**	**LTE**	**55°**	**167'**	-	**(1) B5/B12 4449**	**(1) FIBER (4) DC (LENGTH @ 205')**	**(2) RAYCAP DC6-48-60-0-8F**
A2	**800-10964 (59"x20"x6.9")**	**LTE**	**55°**	**167'**	-	**(1) B14 4478 (1) B2/B66A 8843**	(2) 1-1/4" EXISTING (2) FIBER (LENGTH @ 205')	
A3	-	-	-	-	-	-	-	(1) RAYCAP DC6-48-60-18-8C
A4	7770 (55"x11"x5")	UMTS	100°	167'	(2) LGP17201	-	(2) 1-1/4" EXISTING (LENGTH @ 205')	
B1	**800-10966 (96"x20"x6.9")**	**LTE**	**175°**	**167'**	-	**(1) B5/B12 4449**	-	
B2	**800-10966 (96"x20"x6.9")**	**LTE**	**175°**	**167'**	-	**(1) B14 4478 (1) B2/B66A 8843**	(1) FIBER (2) 1-1/4" EXISTING (LENGTH @ 205')	
B3	-	-	-	-	-	-	-	
B4	7770 (55"x11"x5")	UMTS	190°	167'	(2) LGP17201	-	(2) 1-1/4" EXISTING (LENGTH @ 205')	
G1	**800-10966 (96"x20"x6.9")**	**LTE**	**285°**	**167'**	-	**(1) B5/B12 4449**	-	
G2	**800-10966 (96"x20"x6.9")**	**LTE**	**285°**	**167'**	-	**(1) B14 4478 (1) B2/B66A 8843**	(1) FIBER (2) 1-1/4" EXISTING (LENGTH @ 205')	
G3	-	-	-	-	-	-	-	
G4	7770 (55"x11"x5")	UMTS	300°	167'	(2) LGP17201	-	(2) 1-1/4" EXISTING (LENGTH @ 205')	

*EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED

1 ANTENNA INFORMATION CHART — SCALE: NONE



2 RF EQUIPMENT SCHEMATIC — SCALE: NONE

NOT FOR CONSTRUCTION

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

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

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

STATE OF CONNECTICUT
Craig Thomas
02/12/2019
13:18:47-05:00
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS

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FA# 10071047
SITE# CT5717
GRISWOLD EAST

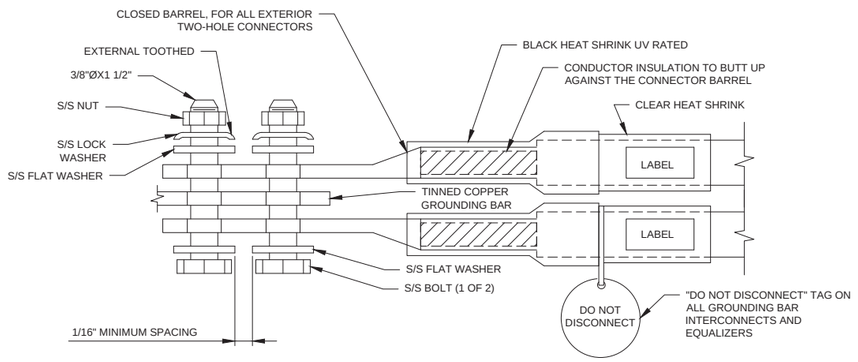
1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

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:

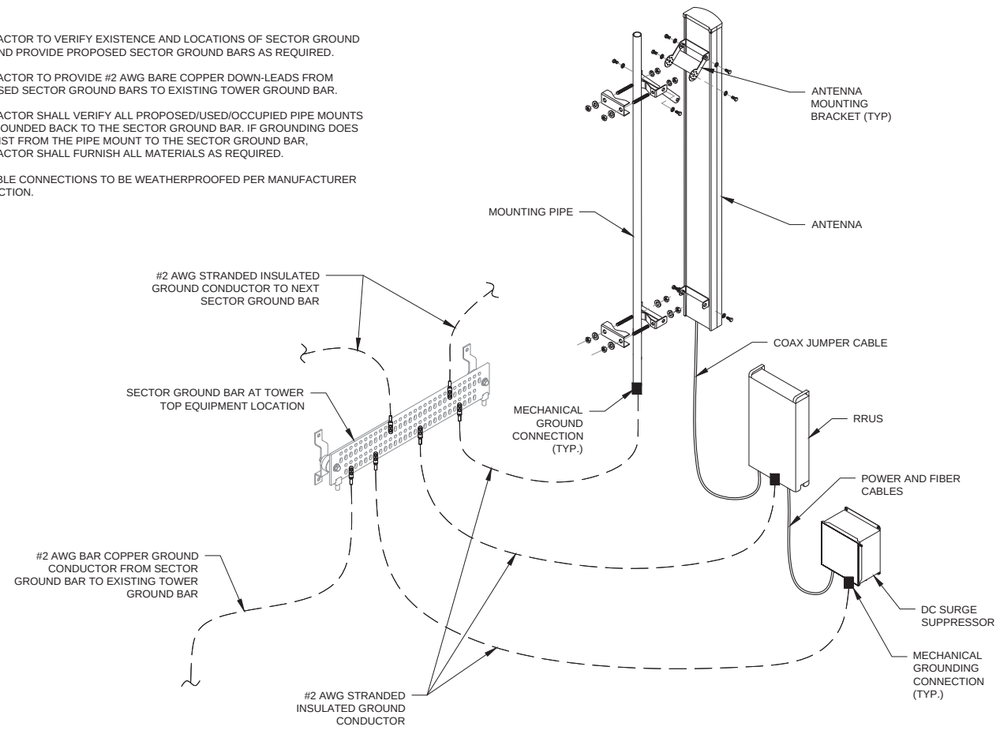
1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY 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

NOT FOR CONSTRUCTION

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

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

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SUBMITTALS

2	02/12/19	RF COMMENTS
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FA# 10071047
SITE# CT5717
GRISWOLD EAST

1439 VOLUNTOWN ROAD
GRISWOLD, CT 06384

GROUNDING DETAILS

G-1

RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: WAPPINGERS FALLS / BOB'S ANTIQ
Crown Castle Site ID: 876367
AT&T Mobility, LLC FA #: 10071047
1439 Voluntown Road
GRISWOLD, CT
1/14/2019

Report Status:

AT&T Mobility, LLC Is Compliant

Klaus Bender
Registered Professional Engineer (Electrical)
Expires December 31, 2021

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
GRISWOLD, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, LLC in Vienna, Virginia; 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 "WAPPINGERS FALLS / BOB'S ANTIQ" ("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 2.073% 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 3.581% 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
WAPPINGERS FALLS / BOB'S ANTIQ
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.191 %
AT&T Mobility, LLC (Proposed)	0.23 %
AT&T Mobility, LLC (Proposed)	0.327 %
AT&T Mobility, LLC (Proposed)	0.34 %
AT&T Mobility, LLC (Proposed)	0.335 %
AT&T Mobility, LLC (Proposed)	0.322 %
AT&T Mobility, LLC (Proposed)	0.328 %
Sprint	0.173 %
Sprint	0.189 %
Sprint	0.055 %
Verizon Wireless	0.233 %
Verizon Wireless	0.322 %
Verizon Wireless	0.193 %
Verizon Wireless	0.345 %
Composite Site MPE:	3.581 %

AT&T Mobility, LLC
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.0804	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.19066	%

					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	169	100	1094	0.362045	0.06389	0.561963	0.09917
Powerwave	7770	169	190	1094	0.362045	0.06389	0.561963	0.09917
Powerwave	7770	169	300	1094	0.362506	0.063972	0.561963	0.09917

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.29799	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.2298	%

					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	800-10964	167	55	3516	0.593784	0.059378	1.299127	0.129913
Kathrein-Scala	800-10966	167	175	4046	1.256287	0.125629	2.146942	0.214694
Kathrein-Scala	800-10966	167	285	4046	1.267807	0.126781	2.146942	0.214694

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.85559	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32746	%

					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	800-10964	167	55	2631	0.544067	0.096012	0.663337	0.117059
Kathrein-Scala	800-10966	167	175	4287	1.021422	0.180251	1.680209	0.296508
Kathrein-Scala	800-10966	167	285	4287	1.021422	0.180251	1.680209	0.296508

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	1.66821	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.33953	%

					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	800-10964	167	55	2209	0.613395	0.124843	0.872409	0.177559
Kathrein-Scala	800-10966	167	175	3623	0.98085	0.19963	1.288792	0.262305
Kathrein-Scala	800-10966	167	285	3623	0.98085	0.19963	1.288793	0.262305

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.34523	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.33452	%

					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	800-10964	167	55	5274	0.822045	0.082204	1.928132	0.192813
Kathrein-Scala	800-10966	167	175	7364	1.575569	0.157557	3.06497	0.306497
Kathrein-Scala	800-10966	167	285	7364	1.575569	0.157557	3.06497	0.306497

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.21727	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32173	%

					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	800-10964	167	55	5154	0.788262	0.078826	1.696715	0.169671
Kathrein-Scala	800-10966	167	175	6168	1.582009	0.158201	2.32066	0.232066
Kathrein-Scala	800-10966	167	285	6168	1.582009	0.158201	2.32066	0.232066

AT&T Mobility, LLC (Proposed)
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	763	MHz
Maximum Permissible Exposure (MPE):	508.67	µW/cm^2
Maximum power density at ground level:	1.66821	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32796	%

					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	800-10964	167	55	2209	0.613395	0.120589	0.872409	0.171509
Kathrein-Scala	800-10966	167	175	3623	0.98085	0.192828	1.288792	0.253367
Kathrein-Scala	800-10966	167	285	3623	0.98085	0.192828	1.288793	0.253367

Sprint
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.72505	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.17251	%

					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	177	0	6168	0.710833	0.071083	1.329677	0.132968
RFS	APXVTM14-C-I20	177	120	6168	0.710833	0.071083	1.329677	0.132968
RFS	APXVTM14-C-I20	177	240	6168	0.710561	0.071056	1.329677	0.132968

Sprint
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.88763	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.18876	%

					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**
Commscope	NNVV-65B-R4	177	0	2781	0.73207	0.073207	0.936141	0.093614
Commscope	NNVV-65B-R4	177	0	2781	0.73207	0.073207	0.936141	0.093614
Commscope	NNVV-65B-R4	177	120	2781	0.730114	0.073011	0.936141	0.093614
Commscope	NNVV-65B-R4	177	120	2781	0.730114	0.073011	0.936141	0.093614
Commscope	NNVV-65B-R4	177	240	2781	0.73207	0.073207	0.936141	0.093614
Commscope	NNVV-65B-R4	177	240	2781	0.73207	0.073207	0.936141	0.093614

Sprint
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0.31597	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.05498	%

					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**
Commscope	NNVV-65B-R4	177	0	951	0.282696	0.049193	0.28515	0.04962
Commscope	NNVV-65B-R4	177	120	951	0.282156	0.049099	0.28515	0.04962
Commscope	NNVV-65B-R4	177	240	951	0.282696	0.049193	0.28515	0.04962

Verizon Wireless
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.32759	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.23276	%

					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	153	40	5621	1.068488	0.106849	2.125478	0.212548
ANDREW	HBXX-6517DS-VTM	153	160	5621	1.0728	0.10728	2.125478	0.212548
ANDREW	HBXX-6517DS-VTM	153	280	5621	1.0728	0.10728	2.125478	0.212548

Verizon Wireless
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	1.61347	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.32226	%

					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-6514DS-VTM	153	40	2827	1.059127	0.211543	1.597562	0.319087
ANDREW	LNX-6514DS-VTM	153	160	2827	1.058858	0.21149	1.597562	0.319087
ANDREW	LNX-6514DS-VTM	153	280	2827	1.059127	0.211543	1.597562	0.319087

Verizon Wireless
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.93239	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.19324	%

					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-6516DS-VTM	153	40	3726	0.875484	0.087548	1.873585	0.187358
ANDREW	HBXX-6516DS-VTM	153	160	3726	0.861065	0.086107	1.873584	0.187358
ANDREW	HBXX-6516DS-VTM	153	280	3726	0.875484	0.087548	1.873584	0.187358

Verizon Wireless
WAPPINGERS FALLS / BOB'S ANTIQ
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.95456	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.34492	%

					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	LPA-80080-4CF	157	40	1423	0.588863	0.103917	0.612635	0.108112
Antel	LPA-80080-4CF	157	40	1423	0.588863	0.103917	0.612635	0.108112
Antel	LPA-80080-4CF	157	160	1423	0.588863	0.103917	0.612635	0.108112
Antel	LPA-80080-4CF	157	160	1423	0.588863	0.103917	0.612635	0.108112
Antel	LPA-80080-4CF	157	280	1596	0.700277	0.123578	0.965912	0.170455
Antel	LPA-80080-4CF	157	280	1596	0.700277	0.123578	0.965912	0.170455

Date: **January 29, 2019**

Charles McGuirt
Crown Castle
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INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Subject:	**Mount Modification Report**	
Carrier Designation:	***ATT Mount Modification***	
	Carrier Site Number:	10071047
	Carrier Site Name:	CTL05717
Crown Castle Designation:	**Crown Castle BU Number:**	876367
	Crown Castle Site Name:	Wappingers Falls/ Bob's Antiq
	Crown Castle JDE Job Number:	548701
	Crown Castle Order Number:	471668 Rev. 0
Engineering Firm Designation:	**Infinigy Report Designation:**	1039-A0002-B
Site Data:	**1439 Voluntown Rd, Griswold, New London County, CT 06384** **Latitude 41°34'33.99" Longitude -71°53'16.96"**	
Structure Information:	**Tower Height & Type:**	**179.5 ft Monopole**
	Mount Elevation:	**165.0 ft**
	Mount Type:	**12.0 ft Platform Mount**

Dear Charles McGuirt,

Infinigy Engineering, PLLC is pleased to submit this **"Mount Modification Report"** to determine the structural integrity of ATT's antenna mounting system with the proposed appurtenance and equipment addition on the above-mentioned 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 the acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform Mount **Sufficient**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 133 mph from the 2015 International Building Code. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

We at Infinigy Engineering, PLLC appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Christopher Kudlacik

Respectfully Submitted by:

Joe Johnston, P.E.
VP Structural Engineering / Principal

TABLE OF CONTENTS

1) INTRODUCTION

The mount is an existing 12.0 ft Platform Mount mapped by Infinigy Engineering. This mount is installed at the 165.0 ft elevation on 1 sector of the 179.5 ft Monopole**.**

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	133 mph
Exposure Category:	C
Topographic Factor at Base:	1.000
Topographic Factor at Mount:	1.000
Ice Thickness:	1.28 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.167
Seismic S_1:	0.060
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 Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
165.0	169.0	3	Powerwave	7770.00	12.0' Platform Mount
	167.0	2	Kathrein	80010964	
		4	Kathrein	80010966	
		6	Powerwave	LGP 17201	
		1	Raycap	DC6-48-60-18-8F	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14	
		3	Ericsson	8843 B2/B66A	
		3	Kathrein	782 10253	
		2	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	ATT Application	471668 Rev. 0	CCI Sites
Mount Data	Infinigy Engineering	Sitepro1 RMQP	On File

3.1) Analysis Method

RISA-3D (Version 17.0.2), 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.

Infinigy Mount Analysis Tool 3.0.2, a tool internally developed by Infinigy, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

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) Steel grades have been assumed as follows:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy Engineering PLLC 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 (12.0 ft Platform Mount, All Sector)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe	M32	165.0	80.6	Pass
	Horizontal	M7		38.8	Pass
	Stand Off	M5		89.9	Pass
2, 3	Bolt Check	-		18.3	Pass

Structure Rating (max from all components) =	89.9%

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical
3) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

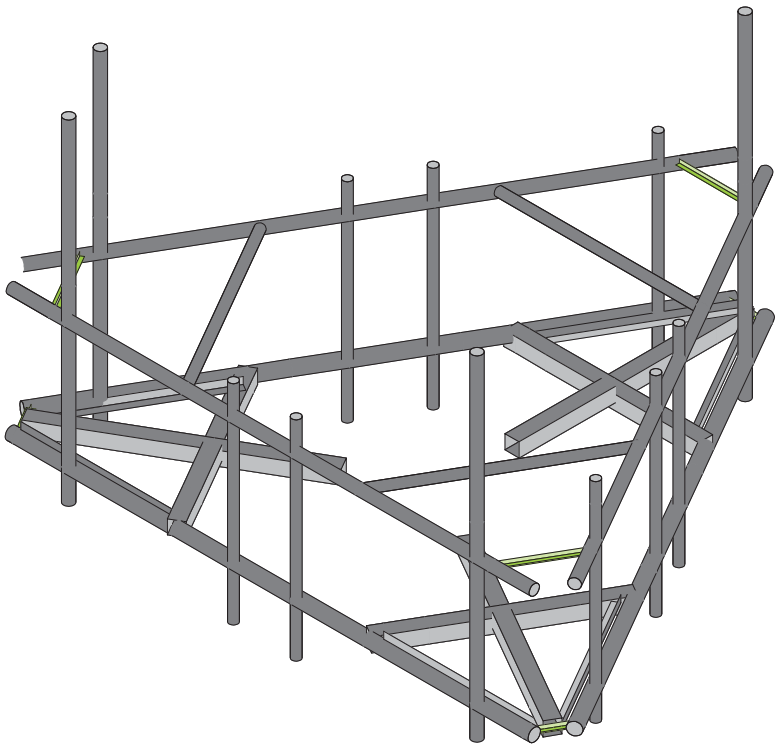
4.1) Recommendations

The mount has sufficient capacity to support the proposed loading configuration after the following is installed:

- Install (1) Sitepro1 HRK-12-3HD handrail
- Replace (4) existing mount pipe with (4) 2.875” OD Sch 40, 8’-0” Long. Install Kathrein 80010966 onto these mount pipes.

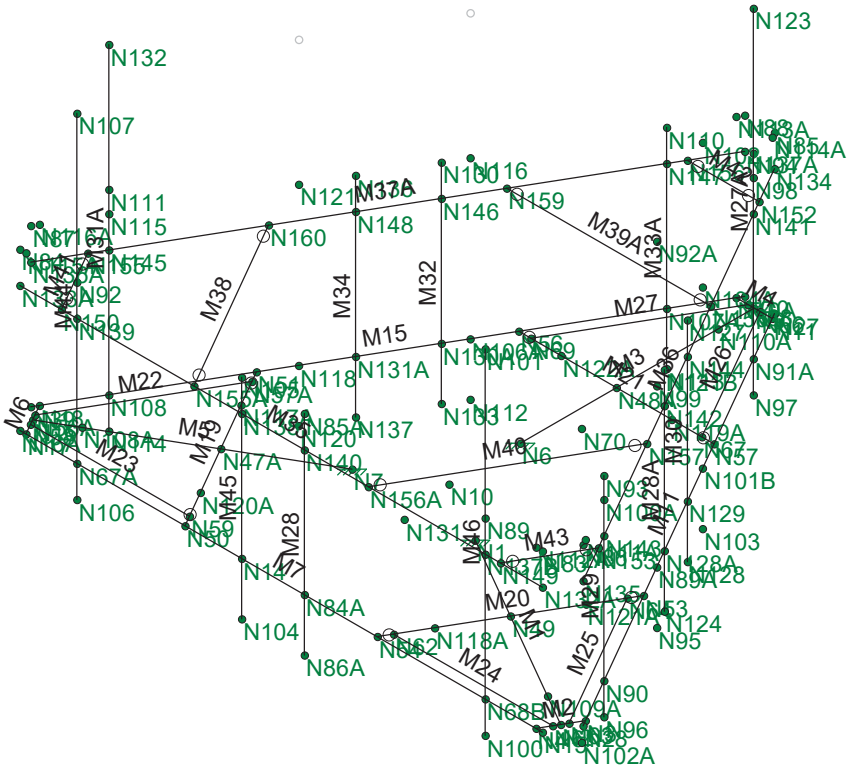
APPENDIX A

WIRE FRAME AND RENDERED MODELS



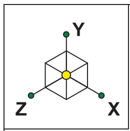
Envelope Only Solution

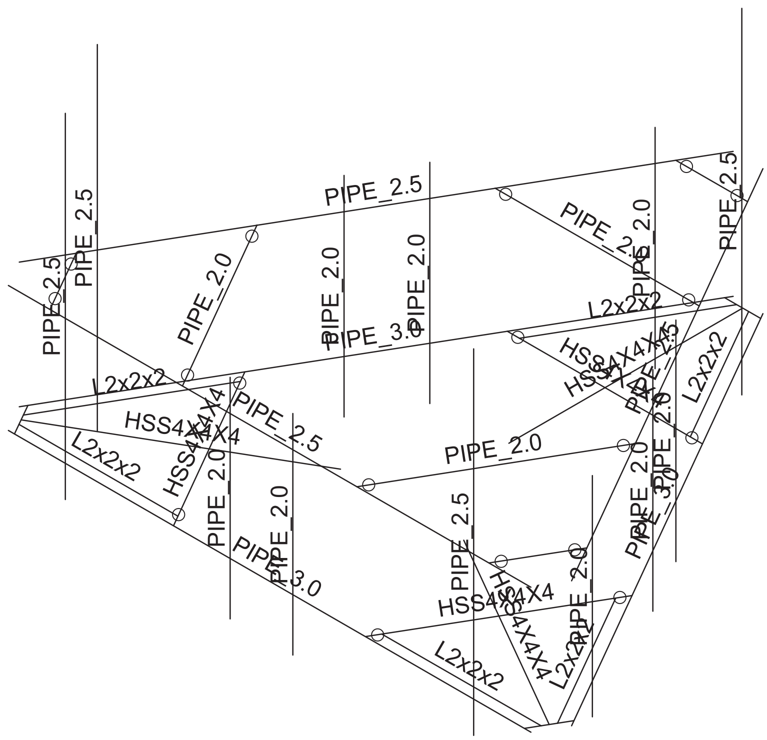
Infinigy Engineering PLLC	876367	Existing Configuration
CLK		Jan 23, 2019 at 10:37 AM
1039-A0002-B		876367_MOD.r3d



Envelope Only Solution

Infinigy Engineering PLLC	876367	Wireframe
CLK		Jan 23, 2019 at 10:38 AM
1039-A0002-B		876367_MOD.r3d





Envelope Only Solution

Infinigy Engineering PLLC		Member Shapes
CLK	876367	Jan 23, 2019 at 10:38 AM
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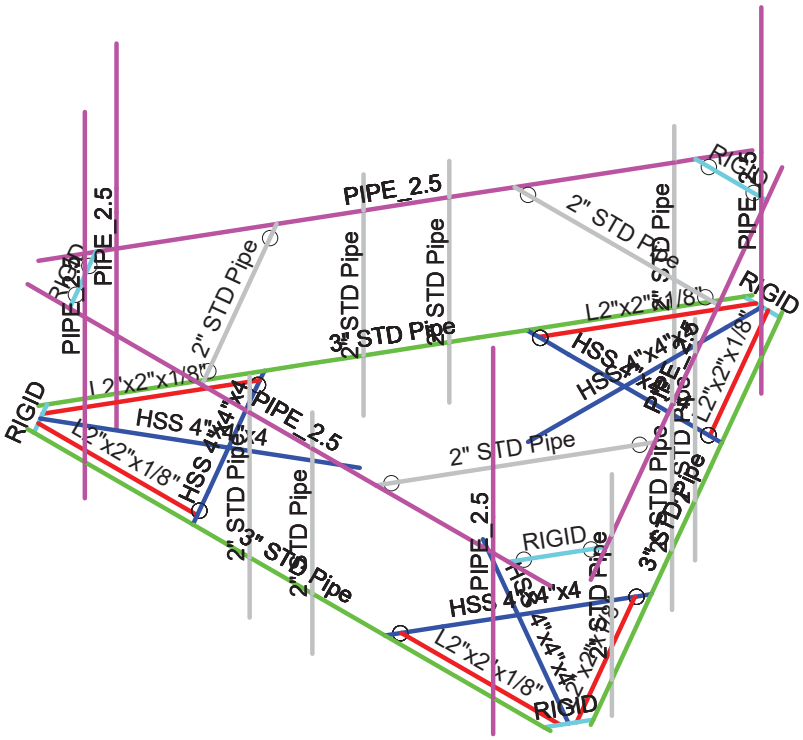
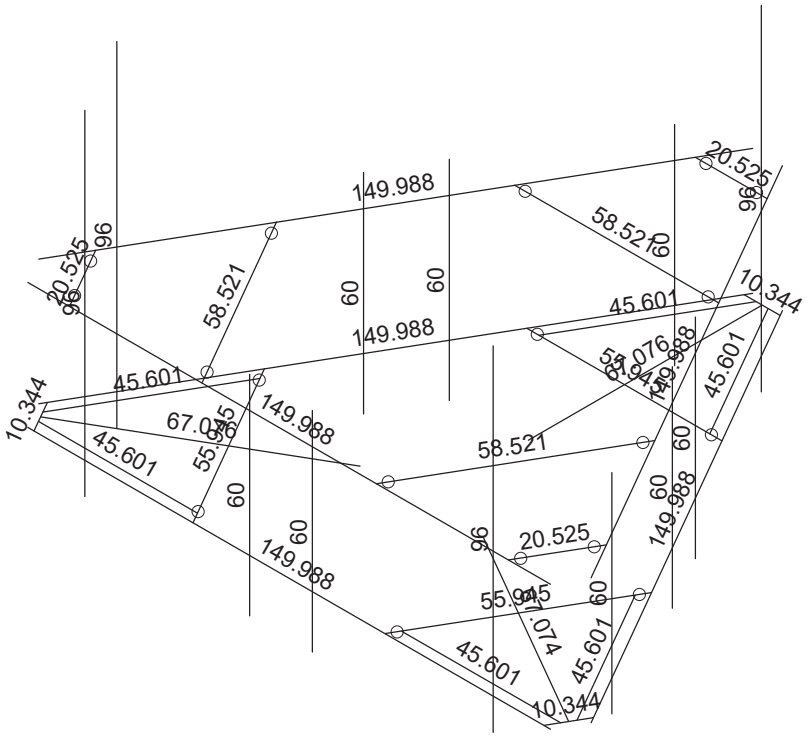


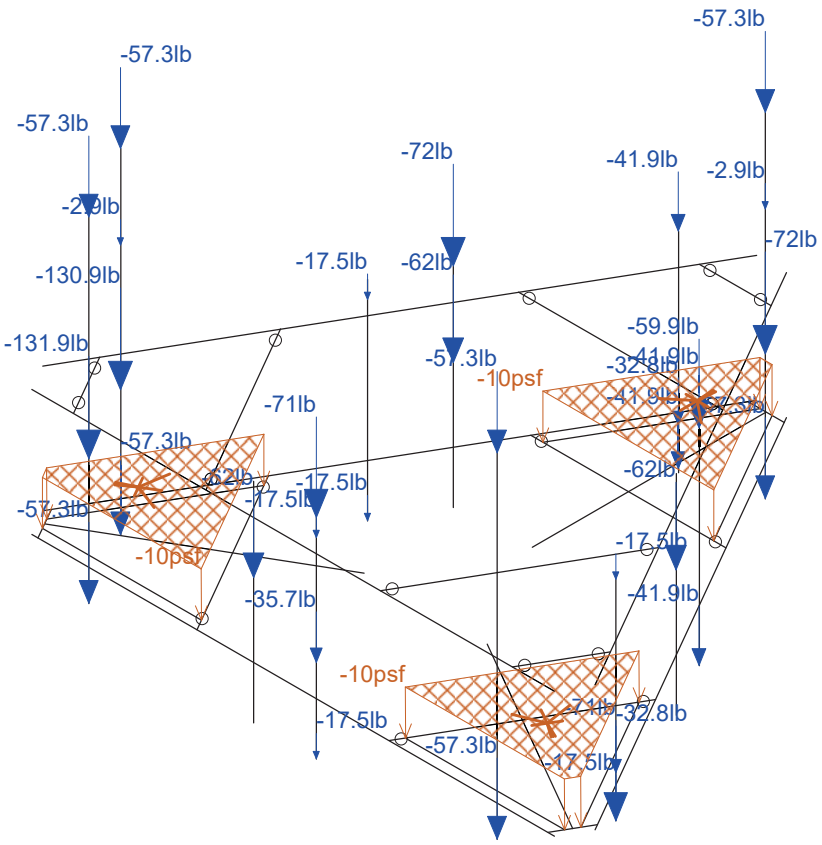
Envelope Only Solution

Infinigy Engineering PLLC	876367	Section Sets
CLK		Jan 23, 2019 at 10:39 AM
1039-A0002-B		876367_MOD.r3d



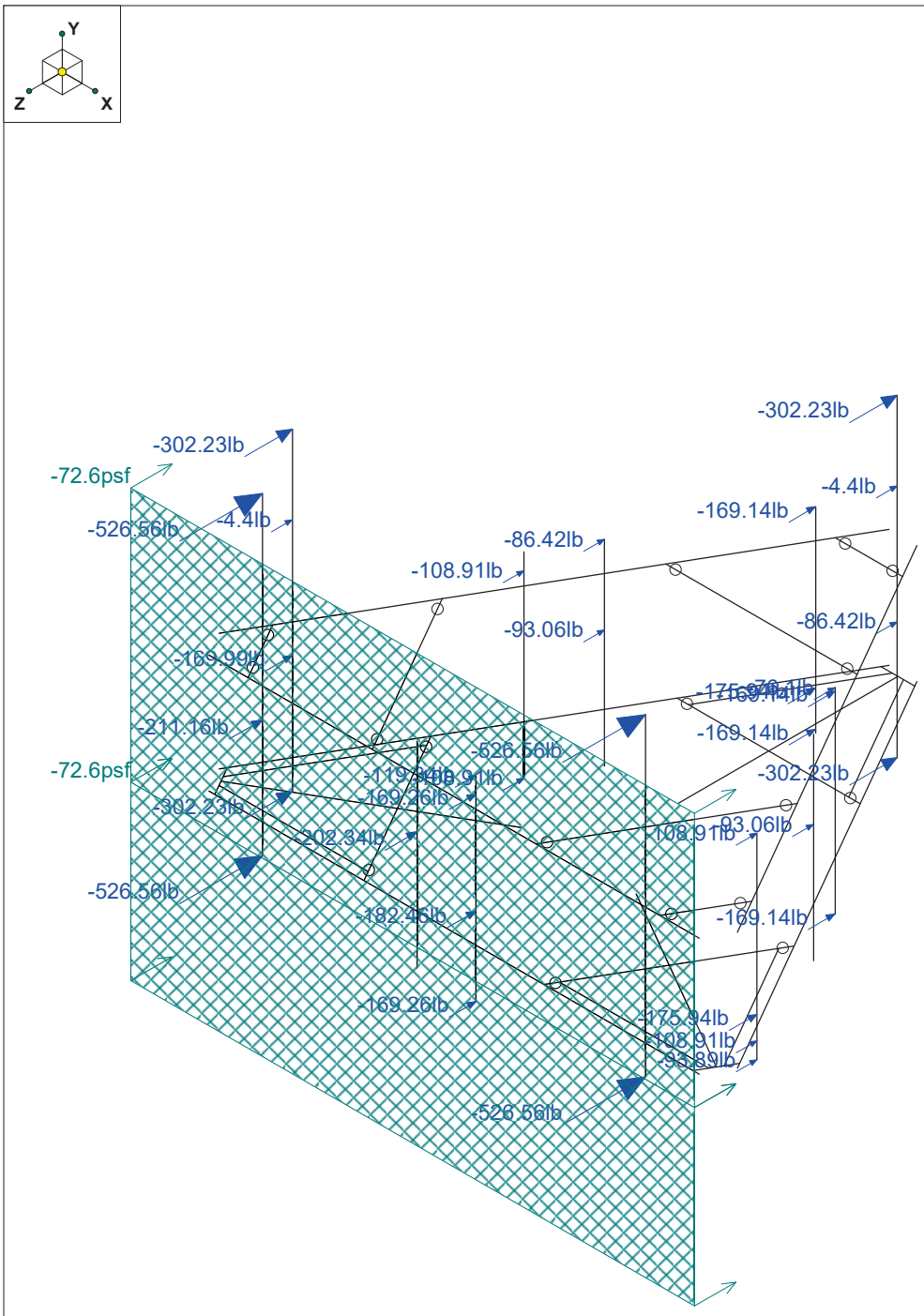
Member Length (in) Displayed
Envelope Only Solution

Infinigy Engineering PLLC	876367	Member Lengths
CLK		Jan 23, 2019 at 10:38 AM
1039-A0002-B		876367_MOD.r3d



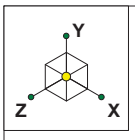
Loads: BLC 1, Self Weight
Envelope Only Solution

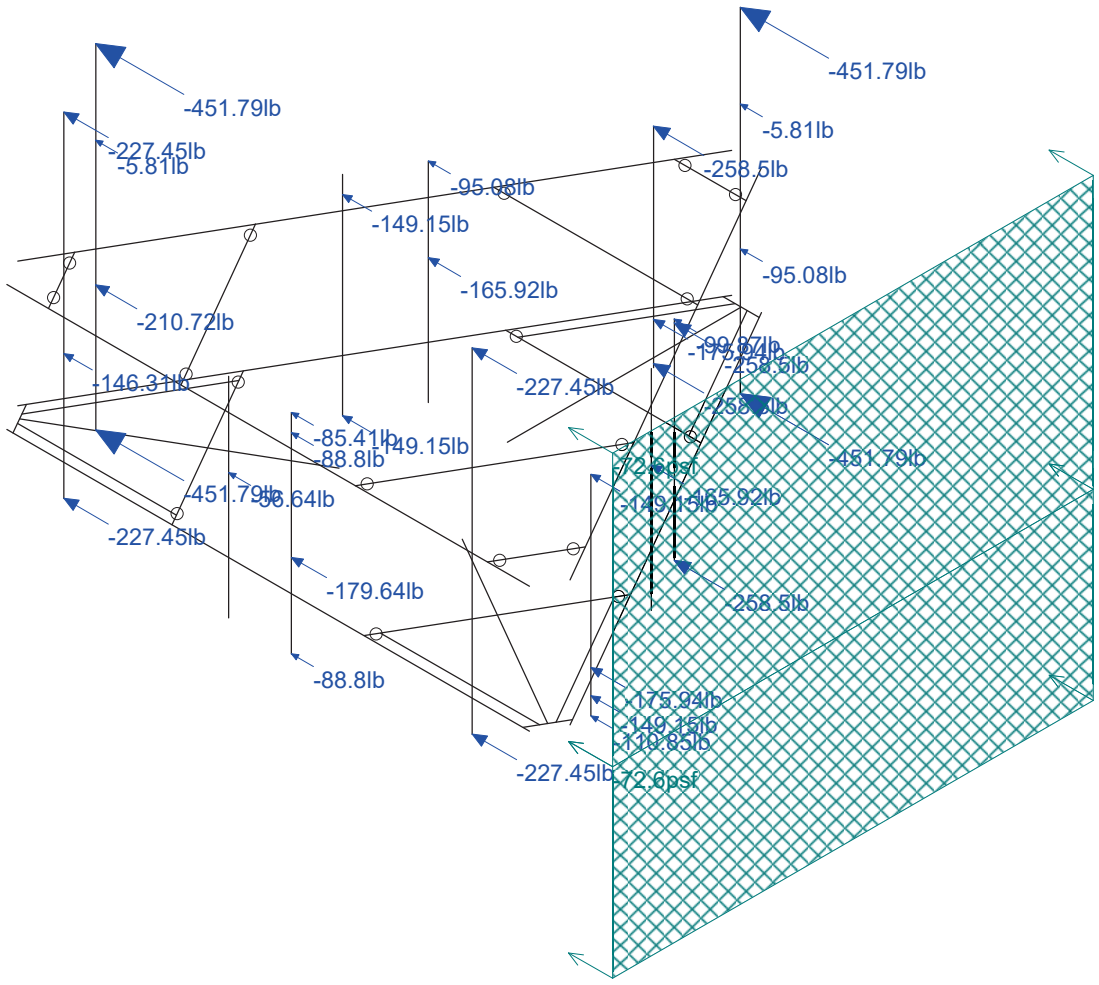
Infinigy Engineering PLLC	876367	Dead Load
CLK		Jan 23, 2019 at 10:39 AM
1039-A0002-B		876367_MOD.r3d



Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution

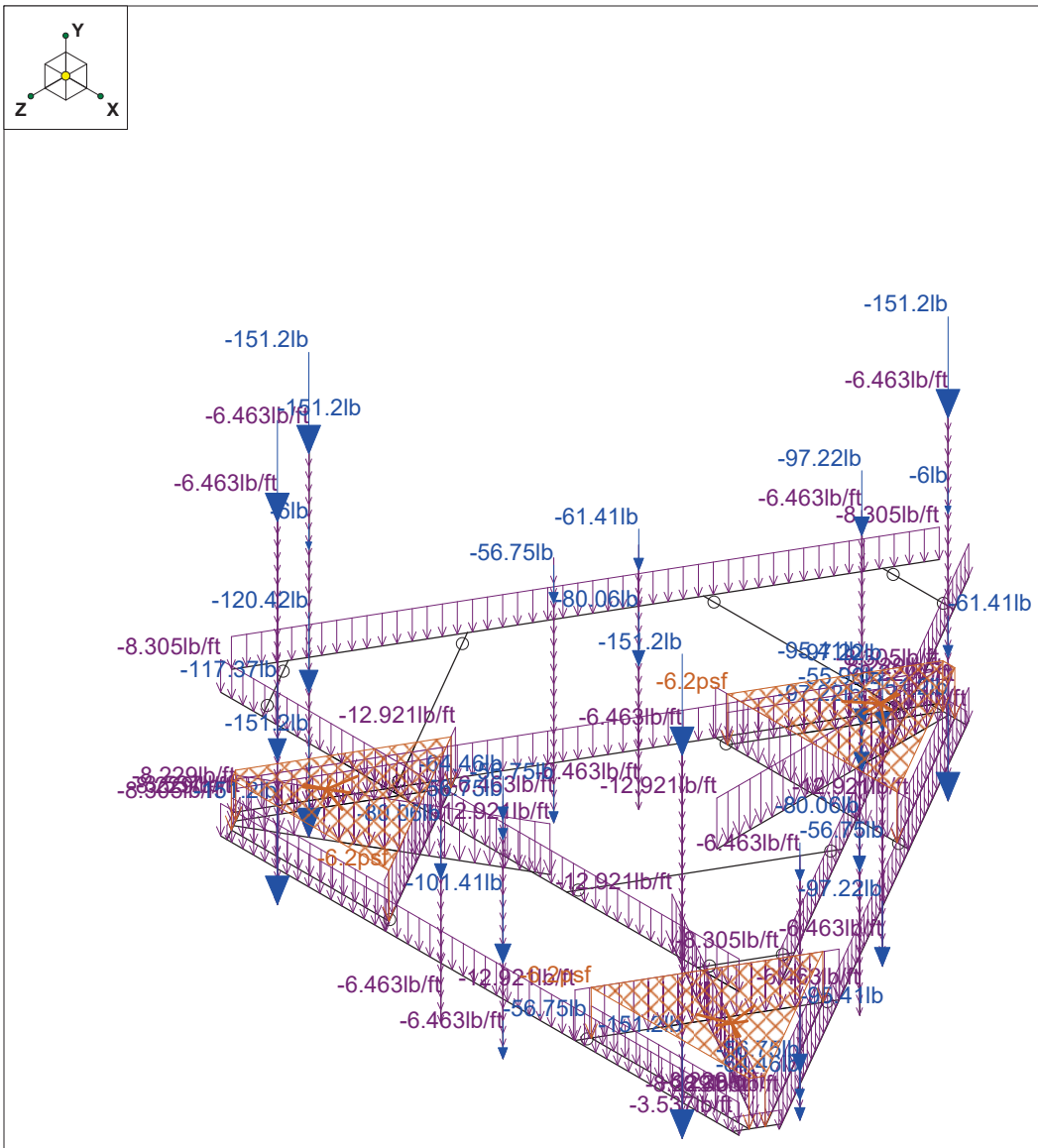
Infinigy Engineering PLLC	876367	Wind Load 000
CLK		Jan 23, 2019 at 10:40 AM
1039-A0002-B		876367_MOD.r3d





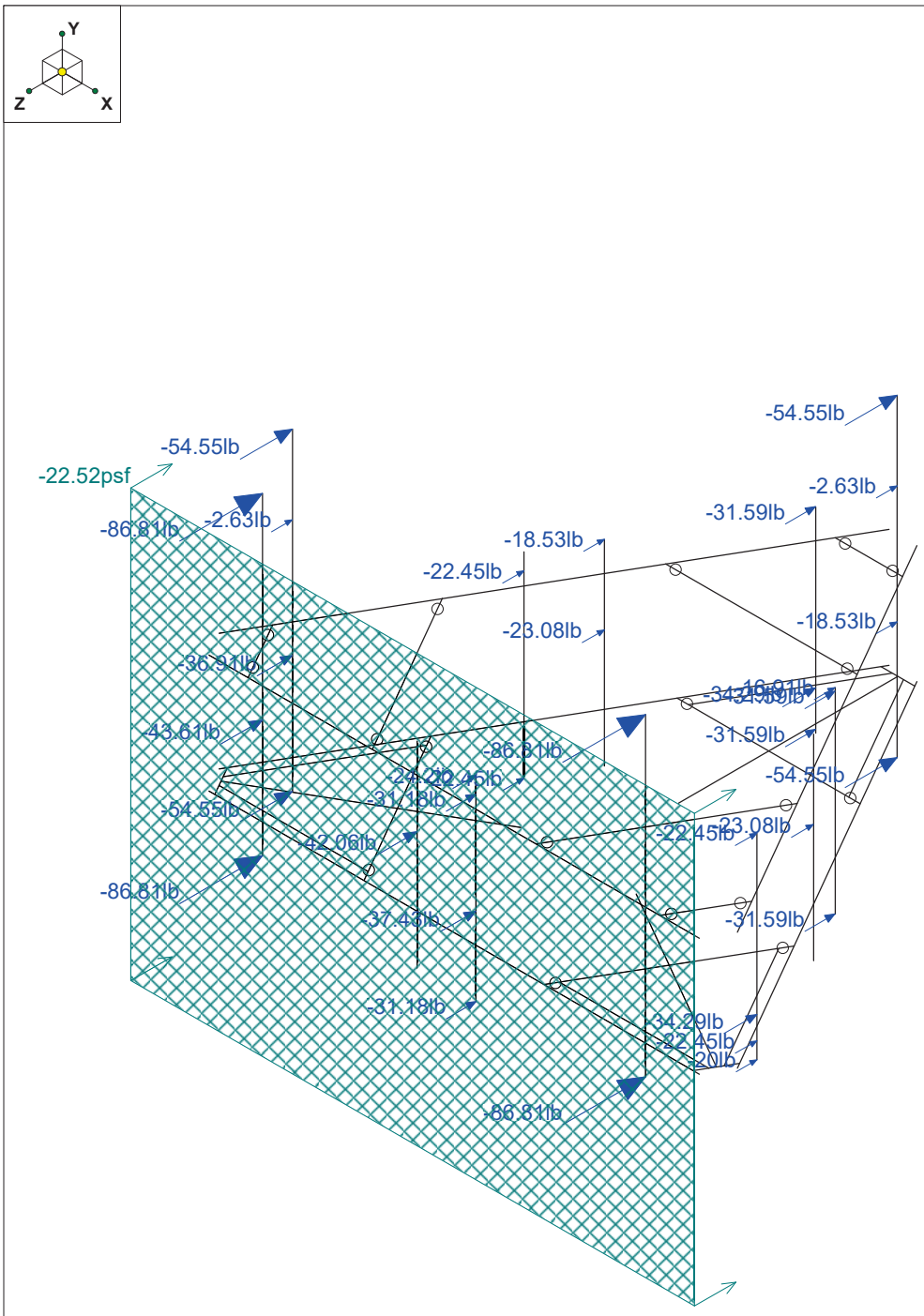
Loads: BLC 3, Wind Load AZI 090
Envelope Only Solution

Infinigy Engineering PLLC	876367	Wind Load 090
CLK		Jan 23, 2019 at 10:40 AM
1039-A0002-B		876367_MOD.r3d



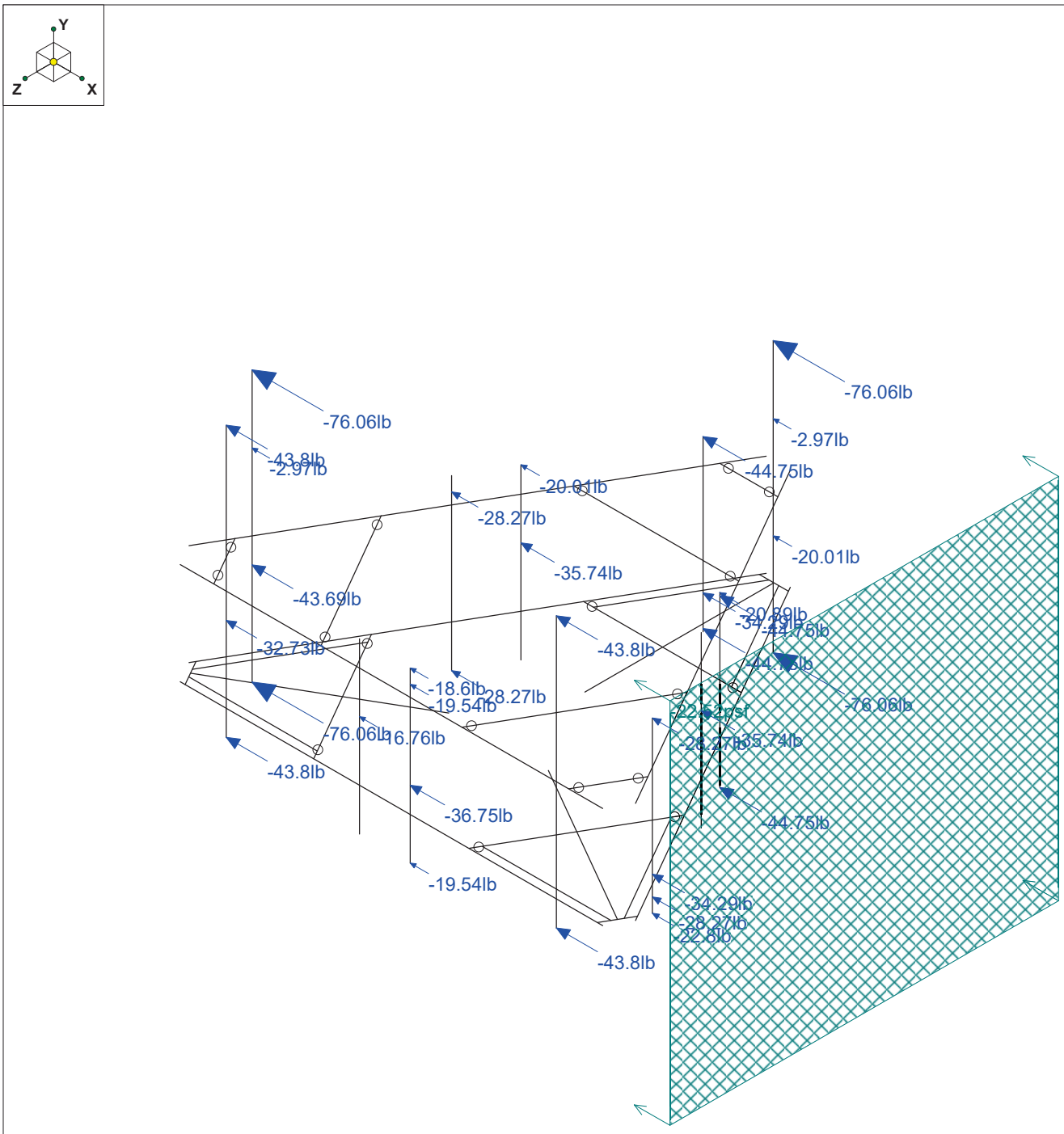
Loads: BLC 4, Ice Weight
Envelope Only Solution

Infinigy Engineering PLLC	876367	Ice Load
CLK		Jan 23, 2019 at 10:40 AM
1039-A0002-B		876367_MOD.r3d



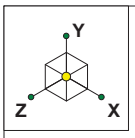
Loads: BLC 5, Wind + Ice Load AZI 000
Envelope Only Solution

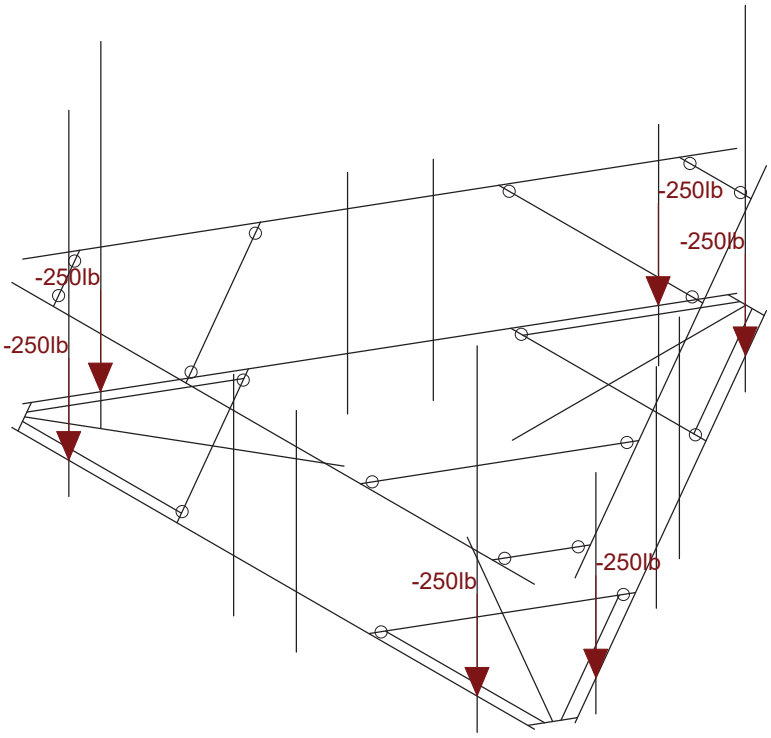
Infinigy Engineering PLLC	876367	Wind + Ice Load 000
CLK		Jan 23, 2019 at 10:40 AM
1039-A0002-B		876367_MOD.r3d



Loads: BLC 6, Wind + Ice Load AZI 090
Envelope Only Solution

Infinigy Engineering PLLC	876367	Wind + Ice Load 090
CLK		Jan 23, 2019 at 10:40 AM
1039-A0002-B		876367_MOD.r3d





Loads: BLC 7, Service Live 1
Envelope Only Solution

Infinigy Engineering PLLC	876367	Service Load
CLK		Jan 23, 2019 at 10:41 AM
1039-A0002-B		876367_MOD.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	Wappingers Falls
Client:	CCI
Carrier:	ATT
Engineer:	CLK
Date:	1/29/2019

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2015 IBC
Structure Load Standard:	TIA-222-H
Antenna Load Standard:	TIA-222-H
Structure Risk Category:	II
Structure Type:	Mount - Platform
Number of Sectors:	3
Structure Shape 2:	Round

Rooftop Inputs:

Rooftop Wind Speed-Up?: No

Wind Loading Inputs:

Design Wind Velocity:	133	mph (ultimate 3-second gust)
Wind Centerline 2 (z_2):	165.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
60.50	1.00	**72.60**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
8.55	1.00	**22.52**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (ultimate 3-second gust)
Base Ice Thickness:	1.28	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
Powerwave 7770.00	169.0	3	1.00	Flat	Flat	60.81	5.57	338.52	177.60	217.83	298.29
Kathrein 80010964	167.0	2	1.00	Flat	Flat	60.65	10.00	606.37	248.93	338.29	517.01
Kathrein 80010966	167.0	3	1.00	Flat	Flat	60.65	17.36	1053.13	454.90	604.46	903.57
Powerwave LGP_17201_	167.0	6	1.00	Flat	Flat	60.65	1.67	101.17	28.32	46.53	82.96
Raycap_DC6-48-60-18-8F__	167.0	1	1.00	Flat	Flat	60.65	2.90	175.94	175.94	175.94	175.94
Raycap_DC6-48-60-18-8F__	167.0	2	1.00	Flat	Flat	60.65	2.90	175.94	175.94	175.94	175.94
Ericsson RRUS_4449 B5/B12_	167.0	3	1.00	Flat	Flat	60.65	1.97	119.34	85.41	93.89	110.85
Ericsson RRUS_4478 B14_	167.0	3	1.00	Flat	Flat	60.65	1.84	111.75	64.22	76.10	99.87
Ericsson RRUS 8843 B2/B66A_	167.0	3	1.00	Flat	Flat	60.65	1.64	99.41	82.09	86.42	95.08
Kathrein 782_10253__	167.0	3	1.00	Flat	Flat	60.65	0.11	6.52	3.70	4.40	5.81
Kathrein 80010966	167.0	1	1.00	Flat	Flat	60.65	17.36	1053.13	454.90	604.46	903.57

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
2	M2	N4	N3			RIGID	None	None	RIGID	Typical
3	M3	N6	N9			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
4	M4	N11	N10A			RIGID	None	None	RIGID	Typical
5	M5	N7	N16			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
6	M6	N18	N17			RIGID	None	None	RIGID	Typical
7	M7	N16A	N15			3" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
8	M11	N28	N27			3" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
9	M15	N40	N39			3" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
10	M19	N51	N50			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
11	M20	N54	N53			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
12	M21	N57	N56			HSS 4"x4"x4	Beam	Tube	A53 Gr.B	Typical
13	M22	N56A	N57A			L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
14	M23	N58	N59		270	L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
15	M24	N61	N62			L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
16	M25	N63	N64		270	L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
17	M26	N66	N67			L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
18	M27	N68	N69		270	L2"x2"x1/8"	Beam	Single Angle	A36 Gr.36	Typical
19	M46	N101	N100			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
20	M45	N104	N105			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
21	M44	N107	N106			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
22	M31	N84	N83			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
23	M33	N88	N87			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
24	M37	N115A	N116A		180	RIGID	None	None	RIGID	Typical
25	M39	N112A	N111A		90	RIGID	None	None	RIGID	Typical
26	M28	N86A	N85A			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
27	M27A	N123	N97			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
28	M28A	N124	N121B			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
29	M29	N93	N96			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
30	M30	N128	N127			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
31	M31A	N132	N114			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
32	M32	N133	N130			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
33	M33A	N110	N113			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
34	M34	N137	N136			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
35	M35	N133A	N132A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
36	M36	N135	N134			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
37	M37A	N137A	N136A			PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
38	M38	N155A	N160			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
39	M39A	N159	N158			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
40	M40	N156A	N157			2" STD Pipe	Beam	Pipe	A53 Gr.B	Typical
41	M41	N150	N155			RIGID	None	None	RIGID	Typical
42	M42	N156	N152			RIGID	None	None	RIGID	Typical
43	M43	N149	N153			RIGID	None	None	RIGID	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		8	113.3	0
3	Total General		8	113.3	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L2x2x2	6	273.6	0
7	A53 Gr.B	HSS4X4X4	6	369.1	.4
8	A53 Gr.B	PIPE_2.0	13	955.5	.3

Material Takeoff (Continued)

	Material	Size	Pieces	Length[in]	Weight[K]
9	A53 Gr.B	PIPE_2.5	7	834	.4
10	A53 Gr.B	PIPE_3.0	3	450	.3
11	Total HR Steel		35	2882.1	1.3

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	DL		-1			39		3	
2	Wind Load AZI 000	WLZ					39		2	
3	Wind Load AZI 090	WLX					39		2	
4	Ice Weight	OL1					39	37	3	
5	Wind + Ice Load AZI ...	OL2					39		1	
6	Wind + Ice Load AZI ...	OL3					39		1	
7	Service Live 1	LL				6				
8	BLC 1 Transient Area...	None						48		
9	BLC 2 Transient Area...	None						50		
10	BLC 3 Transient Area...	None						43		
11	BLC 4 Transient Area...	None						48		
12	BLC 5 Transient Area...	None						38		
13	BLC 6 Transient Area...	None						31		

Load Combinations

	Description	S...	PD...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	F...	B...	Fa...	F...	F...	F...	F...
1	1.4D	Yes	Y		DL	1.4												
2	1.2D + 1W AZI 000	Yes	Y		DL	1.2	WLZ	1										
3	1.2D + 1W AZI 030	Yes	Y		DL	1.2	WLZ	.866	WLX	.5								
4	1.2D + 1W AZI 060	Yes	Y		DL	1.2	WLZ	.5	WLX	.866								
5	1.2D + 1W AZI 090	Yes	Y		DL	1.2			WLX	1								
6	1.2D + 1W AZI 120	Yes	Y		DL	1.2	WLZ	-.5	WLX	.866								
7	1.2D + 1W AZI 150	Yes	Y		DL	1.2	WLZ	-.866	WLX	.5								
8	1.2D + 1W AZI 180	Yes	Y		DL	1.2	WLZ	-1										
9	1.2D + 1W AZI 210	Yes	Y		DL	1.2	WLZ	-.866	WLX	-.5								
10	1.2D + 1W AZI 240	Yes	Y		DL	1.2	WLZ	-.5	WLX	-.866								
11	1.2D + 1W AZI 270	Yes	Y		DL	1.2			WLX	-1								
12	1.2D + 1W AZI 300	Yes	Y		DL	1.2	WLZ	.5	WLX	-.866								
13	1.2D + 1W AZI 330	Yes	Y		DL	1.2	WLZ	.866	WLX	-.5								
14	0.9D + 1W AZI 000	Yes	Y		DL	.9	WLZ	1										
15	0.9D + 1W AZI 030	Yes	Y		DL	.9	WLZ	.866	WLX	.5								
16	0.9D + 1W AZI 060	Yes	Y		DL	.9	WLZ	.5	WLX	.866								
17	0.9D + 1W AZI 090	Yes	Y		DL	.9			WLX	1								
18	0.9D + 1W AZI 120	Yes	Y		DL	.9	WLZ	-.5	WLX	.866								
19	0.9D + 1W AZI 150	Yes	Y		DL	.9	WLZ	-.866	WLX	.5								
20	0.9D + 1W AZI 180	Yes	Y		DL	.9	WLZ	-1										
21	0.9D + 1W AZI 210	Yes	Y		DL	.9	WLZ	-.866	WLX	-.5								
22	0.9D + 1W AZI 240	Yes	Y		DL	.9	WLZ	-.5	WLX	-.866								
23	0.9D + 1W AZI 270	Yes	Y		DL	.9			WLX	-1								
24	0.9D + 1W AZI 300	Yes	Y		DL	.9	WLZ	.5	WLX	-.866								
25	0.9D + 1W AZI 330	Yes	Y		DL	.9	WLZ	.866	WLX	-.5								
26	1.2D + 1.0Di	Yes	Y		DL	1.2	OL1	1										
27	1.2D + 1.0Di + 1.0Wi AZI 000	Yes	Y		DL	1.2	OL1	1	OL2	1								
28	1.2D + 1.0Di + 1.0Wi AZI 030	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5						
29	1.2D + 1.0Di + 1.0Wi AZI 060	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.8...						
30	1.2D + 1.0Di + 1.0Wi AZI 090	Yes	Y		DL	1.2	OL1	1			OL3	1						
31	1.2D + 1.0Di + 1.0Wi AZI 120	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.8...						
32	1.2D + 1.0Di + 1.0Wi AZI 150	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5						

Load Combinations (Continued)

	Description	S...	PD...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	F...	B...	Fa...	...	F...	F...	F...	F...	F...	F...
33	1.2D + 1.0Di + 1.0Wi AZI 180	Yes	Y		DL	1.2	OL1	1	OL2	-1											
34	1.2D + 1.0Di + 1.0Wi AZI 210	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5									
35	1.2D + 1.0Di + 1.0Wi AZI 240	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-....									
36	1.2D + 1.0Di + 1.0Wi AZI 270	Yes	Y		DL	1.2	OL1	1			OL3	-1									
37	1.2D + 1.0Di + 1.0Wi AZI 300	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-....									
38	1.2D + 1.0Di + 1.0Wi AZI 330	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5									
39	1.2D + 1.5L + 1.0WL (30 mph) AZI 000	Yes	Y		DL	1.2	LL	1.5	WLZ	.051											
40	1.2D + 1.5L + 1.0WL (30 mph) AZI 030	Yes	Y		DL	1.2	LL	1.5	WLZ	.044	W...	.0...									
41	1.2D + 1.5L + 1.0WL (30 mph) AZI 060	Yes	Y		DL	1.2	LL	1.5	WLZ	.025	W...	.0...									
42	1.2D + 1.5L + 1.0WL (30 mph) AZI 090	Yes	Y		DL	1.2	LL	1.5			W...	.0...									
43	1.2D + 1.5L + 1.0WL (30 mph) AZI 120	Yes	Y		DL	1.2	LL	1.5	WLZ	-.025	W...	.0...									
44	1.2D + 1.5L + 1.0WL (30 mph) AZI 150	Yes	Y		DL	1.2	LL	1.5	WLZ	-.044	W...	.0...									
45	1.2D + 1.5L + 1.0WL (30 mph) AZI 180	Yes	Y		DL	1.2	LL	1.5	WLZ	-.051											
46	1.2D + 1.5L + 1.0WL (30 mph) AZI 210	Yes	Y		DL	1.2	LL	1.5	WLZ	-.044	W...	-....									
47	1.2D + 1.5L + 1.0WL (30 mph) AZI 240	Yes	Y		DL	1.2	LL	1.5	WLZ	-.025	W...	-....									
48	1.2D + 1.5L + 1.0WL (30 mph) AZI 270	Yes	Y		DL	1.2	LL	1.5			W...	-....									
49	1.2D + 1.5L + 1.0WL (30 mph) AZI 300	Yes	Y		DL	1.2	LL	1.5	WLZ	.025	W...	-....									
50	1.2D + 1.5L + 1.0WL (30 mph) AZI 330	Yes	Y		DL	1.2	LL	1.5	WLZ	.044	W...	-....									

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	3798.181	4	3693.859	10	2838.184	3	2723.666	15	1421.264	8	7211.902	10
2		min	-3581.714	22	-1777.879	16	-2719.667	21	-4552.884	9	-1425.15	14	-4223.653	16
3	N6	max	2024.796	5	3949.144	2	4423.25	14	9188.983	2	2955.865	23	1046.7	11
4		min	-2014.019	23	-1926.017	20	-4688.192	8	-5274.166	20	-2968.849	5	-1003.587	17
5	N7	max	3472.594	18	4082.083	6	3040.91	13	2484.321	25	2266.019	2	3948.066	24
6		min	-3701.236	12	-1533.158	24	-2892.96	19	-5182.261	7	-2238.753	20	-8453.462	6
7	Totals:	max	8978.222	17	8533.901	33	9385.518	2						
8		min	-8978.222	11	2766.582	14	-9385.518	20						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Ch...	Loc[in]	LC	Shear Check	Loc....		LC	phi*Pnc [lb]	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M1	HSS4X4X4	.769	0	10	.197	0	y	8	96102.299	106155	12311...	12311...	2...	H1-1b
2	M3	HSS4X4X4	.848	0	13	.175	0	y	3	96101.935	106155	12311...	12311...	2...	H1-1b
3	M5	HSS4X4X4	.899	0	6	.228	0	y	8	96101.935	106155	12311...	12311...	2...	H1-1b
4	M7	PIPE_3.0	.370	3.125	3	.388	3.125		3	28254.335	65205	5748.75	5748.75	2...	H3-6
5	M11	PIPE_3.0	.272	3.125	8	.327	146...		5	28254.335	65205	5748.75	5748.75	2...	H3-6
6	M15	PIPE_3.0	.367	146.863	9	.399	146...		9	28254.335	65205	5748.75	5748.75	2...	H3-6
7	M19	HSS4X4X4	.339	27.973	7	.161	2.914	y	8	99056.372	106155	12311...	12311...	1...	H1-1b
8	M20	HSS4X4X4	.329	27.973	9	.148	27....	y	9	99056.372	106155	12311...	12311...	1...	H1-1b
9	M21	HSS4X4X4	.333	27.973	3	.140	53....	y	13	99056.372	106155	12311...	12311...	1...	H1-1b
10	M22	L2x2x2	.204	45.601	6	.013	45....	y	33	7549.8	15908.4	402.563	777.451	1...	H2-1
11	M23	L2x2x2	.192	45.601	4	.013	45....	z	29	7549.8	15908.4	402.563	824.703	2...	H2-1
12	M24	L2x2x2	.169	45.601	10	.012	45....	y	37	7549.8	15908.4	402.563	781.351	1...	H2-1
13	M25	L2x2x2	.177	45.601	10	.012	45....	z	33	7549.8	15908.4	402.563	761.667	1...	H2-1
14	M26	L2x2x2	.172	45.601	2	.012	45....	y	29	7549.8	15908.4	402.563	788.642	1...	H2-1
15	M27	L2x2x2	.174	45.601	2	.012	45....	z	38	7549.8	15908.4	402.563	763.403	1...	H2-1
16	M46	PIPE_2.5	.708	51	2	.079	51		8	30038.461	50715	3596.25	3596.25	3...	H1-1b
17	M45	PIPE_2.0	.623	15	11	.145	15		11	23808.54	32130	1871.6...	1871.6...	1...	H1-1b
18	M44	PIPE_2.5	.711	51	2	.105	87		3	30038.461	50715	3596.25	3596.25	3...	H1-1b
19	M28	PIPE_2.0	.702	15	5	.156	15		11	23808.54	32130	1871.6...	1871.6...	1...	H1-1b
20	M27A	PIPE_2.5	.590	51	5	.060	51		12	30038.461	50715	3596.25	3596.25	1...	H1-1b
21	M28A	PIPE_2.0	.693	15	3	.191	15		9	23808.54	32130	1871.6...	1871.6...	1...	H1-1b
22	M29	PIPE_2.0	.703	50.625	8	.121	50....		2	23808.54	32130	1871.6...	1871.6...	1...	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Ch...	Loc[in]	LC	Shear Check	Loc....		LC	phi*Pnc [lb]	phi*Pn...	phi*M...	phi*M...	...	Eqn
23	M30	PIPE_2.0	.702	15	3	.185	15		9	23808.54	32130	1871.6..	1871.6..	1...	H1-1b
24	M31A	PIPE_2.5	.644	51	11	.116	87		9	30038.461	50715	3596.25	3596.25	1...	H1-1b
25	M32	PIPE_2.0	.806	15	7	.198	15		7	23808.54	32130	1871.6..	1871.6..	1...	H1-1b
26	M33A	PIPE_2.0	.770	45	6	.100	45		6	23808.54	32130	1871.6..	1871.6..	1...	H1-1b
27	M34	PIPE_2.0	.776	15	7	.202	15		13	23808.54	32130	1871.6..	1871.6..	1...	H1-1b
28	M35	PIPE_2.5	.671	12.499	9	.369	12....		9	14561.121	50715	3596.25	3596.25	2...	H3-6
29	M36	PIPE_2.5	.564	132.802	10	.295	15....		2	14561.121	50715	3596.25	3596.25	2...	H1-1b
30	M37A	PIPE_2.5	.675	134.364	9	.371	134...		9	14561.121	50715	3596.25	3596.25	3...	H3-6
31	M38	PIPE_2.0	.058	31.699	3	.225	58....		3	24158.68	32130	1871.6..	1871.6..	1...	H3-6
32	M39A	PIPE_2.0	.039	29.26	8	.191	0		5	24158.68	32130	1871.6..	1871.6..	1...	H1-1b
33	M40	PIPE_2.0	.035	29.26	4	.196	0		7	24158.68	32130	1871.6..	1871.6..	1...	H1-1b

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	HSS 4"x4"x4	HSS4X4X4	Beam	Tube	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
2	3" STD Pipe	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
3	L2"x2"x1/8"	L2x2x2	Beam	Single Angle	A36 Gr.36	Typical	.491	.189	.189	.003
4	2" STD Pipe	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	LL2.5"x2.5"x3/1...	LL2.5x2.5...	Beam	Double Angle (3/4 Gap)	A36 Gr.36	Typical	1.8	2.46	1.07	.023
6	L2.5"x2.5"x3/16"	L2.5x2.5x3	Beam	Single Angle	A36 Gr.36	Typical	.901	.535	.535	.011
7	PIPE_2.5	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N6	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N7	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes	** NA **			None
3	M3						Yes				None
4	M4						Yes	** NA **			None
5	M5						Yes				None
6	M6						Yes	** NA **			None
7	M7						Yes				None
8	M11						Yes				None
9	M15						Yes				None
10	M19	BenPIN	BenPIN				Yes				None
11	M20	BenPIN	BenPIN				Yes				None
12	M21	BenPIN	BenPIN				Yes				None
13	M22						Yes				None
14	M23						Yes				None
15	M24						Yes				None
16	M25						Yes				None
17	M26						Yes				None
18	M27						Yes				None
19	M46						Yes				None
20	M45						Yes				None
21	M44						Yes				None
22	M31						Yes			Inactive	None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
23	M33						Yes			Inactive	None
24	M37						Yes	** NA **		Inactive	None
25	M39						Yes	** NA **		Inactive	None
26	M28						Yes				None
27	M27A						Yes				None
28	M28A						Yes				None
29	M29						Yes				None
30	M30						Yes				None
31	M31A						Yes				None
32	M32						Yes				None
33	M33A						Yes				None
34	M34						Yes				None
35	M35						Yes				None
36	M36						Yes				None
37	M37A						Yes				None
38	M38	BenPIN	BenPIN				Yes				None
39	M39A	BenPIN	BenPIN				Yes				None
40	M40	BenPIN	BenPIN				Yes				None
41	M41	BenPIN	BenPIN				Yes	** NA **			None
42	M42	BenPIN	BenPIN				Yes	** NA **			None
43	M43	BenPIN	BenPIN				Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	HSS 4"x4"x4	67.074			Lbyy						Lateral
2	M3	HSS 4"x4"x4	67.076			Lbyy						Lateral
3	M5	HSS 4"x4"x4	67.076			Lbyy						Lateral
4	M7	3" STD Pipe	149.988			Lbyy						Lateral
5	M11	3" STD Pipe	149.988			Lbyy						Lateral
6	M15	3" STD Pipe	149.988			Lbyy						Lateral
7	M19	HSS 4"x4"x4	55.945			Lbyy						Lateral
8	M20	HSS 4"x4"x4	55.945			Lbyy						Lateral
9	M21	HSS 4"x4"x4	55.945			Lbyy						Lateral
10	M22	L2"x2"x1/8"	45.601			Lbyy						Lateral
11	M23	L2"x2"x1/8"	45.601			Lbyy						Lateral
12	M24	L2"x2"x1/8"	45.601			Lbyy						Lateral
13	M25	L2"x2"x1/8"	45.601			Lbyy						Lateral
14	M26	L2"x2"x1/8"	45.601			Lbyy						Lateral
15	M27	L2"x2"x1/8"	45.601			Lbyy						Lateral
16	M46	PIPE_2.5	96			Lbyy						Lateral
17	M45	2" STD Pipe	60			Lbyy						Lateral
18	M44	PIPE_2.5	96			Lbyy						Lateral
19	M31	2" STD Pipe	149.988			Lbyy						Lateral
20	M33	2" STD Pipe	149.988			Lbyy						Lateral
21	M28	2" STD Pipe	60			Lbyy						Lateral
22	M27A	PIPE_2.5	96			Lbyy						Lateral
23	M28A	2" STD Pipe	60			Lbyy						Lateral
24	M29	2" STD Pipe	60			Lbyy						Lateral
25	M30	2" STD Pipe	60			Lbyy						Lateral
26	M31A	PIPE_2.5	96			Lbyy						Lateral
27	M32	2" STD Pipe	60			Lbyy						Lateral
28	M33A	2" STD Pipe	60			Lbyy						Lateral
29	M34	2" STD Pipe	60			Lbyy						Lateral
30	M35	PIPE_2.5	149.988			Lbyy						Lateral
31	M36	PIPE_2.5	149.988			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
32	M37A	PIPE_2.5	149.988			Lbyy						Lateral
33	M38	2" STD Pipe	58.521			Lbyy						Lateral
34	M39A	2" STD Pipe	58.521			Lbyy						Lateral
35	M40	2" STD Pipe	58.521			Lbyy						Lateral

Joint Loads and Enforced Displacements (BLC 7 : Service Live 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N67A	L	Y	-250
2	N68B	L	Y	-250
3	N90	L	Y	-250
4	N91A	L	Y	-250
5	N107A	L	Y	-250
6	N108	L	Y	-250

Member Point Loads (BLC 1 : Self Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	Y	-17.5	0
2	M46	Y	-57.3	0
3	M45	Y	-31	36
4	M28	Y	-32.8	24
5	M28	Y	-71	60
6	M44	Y	-59.9	60
7	M44	Y	-72	60
8	M28	Y	-2.9	24
9	M44	Y	-57.3	0
10	M28	Y	-17.5	55
11	M46	Y	-57.3	96
12	M45	Y	-31	36
13	M44	Y	-57.3	96
14	M29	Y	-17.5	0
15	M30	Y	-41.9	0
16	M27A	Y	-57.3	0
17	M28A	Y	-31	36
18	M29	Y	-32.8	48
19	M29	Y	-71	60
20	M30	Y	-59.9	60
21	M27A	Y	-72	60
22	M27A	Y	-2.9	24
23	M29	Y	-17.5	55
24	M30	Y	-41.9	59
25	M27A	Y	-57.3	96
26	M28A	Y	-31	36
27	M34	Y	-17.5	0
28	M33A	Y	-41.9	0
29	M31A	Y	-57.3	0
30	M32	Y	-31	36
31	M33A	Y	-32.8	48
32	M31A	Y	-71	60
33	M31A	Y	-59.9	60
34	M32	Y	-72	60
35	M31A	Y	-2.9	24
36	M34	Y	-17.5	55
37	M33A	Y	-41.9	59
38	M31A	Y	-57.3	96

Member Point Loads (BLC 1 : Self Weight) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
39	M32	Y	-31	36

Member Point Loads (BLC 2 : Wind Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	Z	-169.26	0
2	M46	Z	-526.56	0
3	M45	Z	-101.17	36
4	M28	Z	-175.94	24
5	M28	Z	-119.34	60
6	M44	Z	-111.75	60
7	M44	Z	-99.41	60
8	M28	Z	-6.52	24
9	M44	Z	-526.56	0
10	M28	Z	-169.26	55
11	M46	Z	-526.56	96
12	M45	Z	-101.17	36
13	M44	Z	-526.56	96
14	M29	Z	-108.91	0
15	M30	Z	-169.14	0
16	M27A	Z	-302.23	0
17	M28A	Z	-46.53	36
18	M29	Z	-175.94	48
19	M29	Z	-93.89	60
20	M30	Z	-76.1	60
21	M27A	Z	-86.42	60
22	M27A	Z	-4.4	24
23	M29	Z	-108.91	55
24	M30	Z	-169.14	59
25	M27A	Z	-302.23	96
26	M28A	Z	-46.53	36
27	M34	Z	-108.91	0
28	M33A	Z	-169.14	0
29	M31A	Z	-302.23	0
30	M32	Z	-46.53	36
31	M33A	Z	-175.94	48
32	M31A	Z	-93.89	60
33	M31A	Z	-76.1	60
34	M32	Z	-86.42	60
35	M31A	Z	-4.4	24
36	M34	Z	-108.91	55
37	M33A	Z	-169.14	59
38	M31A	Z	-302.23	96
39	M32	Z	-46.53	36

Member Point Loads (BLC 3 : Wind Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	X	-88.8	0
2	M46	X	-227.45	0
3	M45	X	-28.32	36
4	M28	X	-175.94	24
5	M28	X	-85.41	60
6	M44	X	-64.22	60
7	M44	X	-82.09	60
8	M28	X	-3.7	24
9	M44	X	-227.45	0
10	M28	X	-88.8	55

Member Point Loads (BLC 3 : Wind Load AZI 090) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
11	M46	X	-227.45	96
12	M45	X	-28.32	36
13	M44	X	-227.45	96
14	M29	X	-149.15	0
15	M30	X	-258.5	0
16	M27A	X	-451.79	0
17	M28A	X	-82.96	36
18	M29	X	-175.94	48
19	M29	X	-110.85	60
20	M30	X	-99.87	60
21	M27A	X	-95.08	60
22	M27A	X	-5.81	24
23	M29	X	-149.15	55
24	M30	X	-258.5	59
25	M27A	X	-451.79	96
26	M28A	X	-82.96	36
27	M34	X	-149.15	0
28	M33A	X	-258.5	0
29	M31A	X	-451.79	0
30	M32	X	-82.96	36
31	M33A	X	-175.94	48
32	M31A	X	-110.85	60
33	M31A	X	-99.87	60
34	M32	X	-95.08	60
35	M31A	X	-5.81	24
36	M34	X	-149.15	55
37	M33A	X	-258.5	59
38	M31A	X	-451.79	96
39	M32	X	-82.96	36

Member Point Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	Y	-56.75	0
2	M46	Y	-151.2	0
3	M45	Y	-40.03	36
4	M28	Y	-95.41	24
5	M28	Y	-64.46	60
6	M44	Y	-55.96	60
7	M44	Y	-61.41	60
8	M28	Y	-6	24
9	M44	Y	-151.2	0
10	M28	Y	-56.75	55
11	M46	Y	-151.2	96
12	M45	Y	-40.03	36
13	M44	Y	-151.2	96
14	M29	Y	-56.75	0
15	M30	Y	-97.22	0
16	M27A	Y	-151.2	0
17	M28A	Y	-40.03	36
18	M29	Y	-95.41	48
19	M29	Y	-64.46	60
20	M30	Y	-55.96	60
21	M27A	Y	-61.41	60
22	M27A	Y	-6	24
23	M29	Y	-56.75	55
24	M30	Y	-97.22	59

Member Point Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
25	M27A	Y	-151.2	96
26	M28A	Y	-40.03	36
27	M34	Y	-56.75	0
28	M33A	Y	-97.22	0
29	M31A	Y	-151.2	0
30	M32	Y	-40.03	36
31	M33A	Y	-95.41	48
32	M31A	Y	-64.46	60
33	M31A	Y	-55.96	60
34	M32	Y	-61.41	60
35	M31A	Y	-6	24
36	M34	Y	-56.75	55
37	M33A	Y	-97.22	59
38	M31A	Y	-151.2	96
39	M32	Y	-40.03	36

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	Z	-31.18	0
2	M46	Z	-86.81	0
3	M45	Z	-21.03	36
4	M28	Z	-34.29	24
5	M28	Z	-24.2	60
6	M44	Z	-22.87	60
7	M44	Z	-20.74	60
8	M28	Z	-3.14	24
9	M44	Z	-86.81	0
10	M28	Z	-31.18	55
11	M46	Z	-86.81	96
12	M45	Z	-21.03	36
13	M44	Z	-86.81	96
14	M29	Z	-22.45	0
15	M30	Z	-31.59	0
16	M27A	Z	-54.55	0
17	M28A	Z	-11.54	36
18	M29	Z	-34.29	48
19	M29	Z	-20	60
20	M30	Z	-16.91	60
21	M27A	Z	-18.53	60
22	M27A	Z	-2.63	24
23	M29	Z	-22.45	55
24	M30	Z	-31.59	59
25	M27A	Z	-54.55	96
26	M28A	Z	-11.54	36
27	M34	Z	-22.45	0
28	M33A	Z	-31.59	0
29	M31A	Z	-54.55	0
30	M32	Z	-11.54	36
31	M33A	Z	-34.29	48
32	M31A	Z	-20	60
33	M31A	Z	-16.91	60
34	M32	Z	-18.53	60
35	M31A	Z	-2.63	24
36	M34	Z	-22.45	55
37	M33A	Z	-31.59	59
38	M31A	Z	-54.55	96

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
39	M32	Z	-11.54	36

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M28	X	-19.54	0
2	M46	X	-43.8	0
3	M45	X	-8.38	36
4	M28	X	-34.29	24
5	M28	X	-18.6	60
6	M44	X	-14.93	60
7	M44	X	-17.8	60
8	M28	X	-2.46	24
9	M44	X	-43.8	0
10	M28	X	-19.54	55
11	M46	X	-43.8	96
12	M45	X	-8.38	36
13	M44	X	-43.8	96
14	M29	X	-28.27	0
15	M30	X	-44.75	0
16	M27A	X	-76.06	0
17	M28A	X	-17.87	36
18	M29	X	-34.29	48
19	M29	X	-22.8	60
20	M30	X	-20.89	60
21	M27A	X	-20.01	60
22	M27A	X	-2.97	24
23	M29	X	-28.27	55
24	M30	X	-44.75	59
25	M27A	X	-76.06	96
26	M28A	X	-17.87	36
27	M34	X	-28.27	0
28	M33A	X	-44.75	0
29	M31A	X	-76.06	0
30	M32	X	-17.87	36
31	M33A	X	-34.29	48
32	M31A	X	-22.8	60
33	M31A	X	-20.89	60
34	M32	X	-20.01	60
35	M31A	X	-2.97	24
36	M34	X	-28.27	55
37	M33A	X	-44.75	59
38	M31A	X	-76.06	96
39	M32	X	-17.87	36

Member Distributed Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in,..	End Location[in,...
1	M1	Y	-12.921	-12.921	0	%100
2	M2	Y	-3.537	-3.537	0	%100
3	M3	Y	-12.921	-12.921	0	%100
4	M4	Y	-3.537	-3.537	0	%100
5	M5	Y	-12.921	-12.921	0	%100
6	M6	Y	-3.537	-3.537	0	%100
7	M7	Y	-8.305	-8.305	0	%100
8	M11	Y	-8.305	-8.305	0	%100
9	M15	Y	-8.305	-8.305	0	%100

Member Distributed Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
10	M19	Y	-12.921	-12.921	0	%100
11	M20	Y	-12.921	-12.921	0	%100
12	M21	Y	-12.921	-12.921	0	%100
13	M22	Y	-8.229	-8.229	0	%100
14	M23	Y	-8.229	-8.229	0	%100
15	M24	Y	-8.229	-8.229	0	%100
16	M25	Y	-8.229	-8.229	0	%100
17	M26	Y	-8.229	-8.229	0	%100
18	M27	Y	-8.229	-8.229	0	%100
19	M46	Y	-6.463	-6.463	0	%100
20	M45	Y	-6.463	-6.463	0	%100
21	M44	Y	-6.463	-6.463	0	%100
22	M31	Y	-6.463	-6.463	0	%100
23	M33	Y	-6.463	-6.463	0	%100
24	M37	Y	-3.537	-3.537	0	%100
25	M39	Y	-3.537	-3.537	0	%100
26	M28	Y	-6.463	-6.463	0	%100
27	M27A	Y	-6.463	-6.463	0	%100
28	M28A	Y	-6.463	-6.463	0	%100
29	M29	Y	-6.463	-6.463	0	%100
30	M30	Y	-6.463	-6.463	0	%100
31	M31A	Y	-6.463	-6.463	0	%100
32	M32	Y	-6.463	-6.463	0	%100
33	M33A	Y	-6.463	-6.463	0	%100
34	M34	Y	-6.463	-6.463	0	%100
35	M35	Y	-8.305	-8.305	0	%100
36	M36	Y	-8.305	-8.305	0	%100
37	M37A	Y	-8.305	-8.305	0	%100

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M5	Y	-.228	-5.359	26.83	34.879
2	M5	Y	-5.359	-11.238	34.879	42.928
3	M5	Y	-11.238	-9.68	42.928	50.977
4	M5	Y	-9.68	-5.094	50.977	59.027
5	M5	Y	-5.094	-.531	59.027	67.076
6	M19	Y	-6.473	-6.473	5.81	50.135
7	M22	Y	-1.493	-2.244	0	8.208
8	M22	Y	-2.244	-4.268	8.208	16.416
9	M22	Y	-4.268	-7.614	16.416	24.625
10	M22	Y	-7.614	-4.675	24.625	32.833
11	M22	Y	-4.675	-.038	32.833	41.041
12	M23	Y	-1.494	-2.245	0	8.208
13	M23	Y	-2.245	-4.271	8.208	16.416
14	M23	Y	-4.271	-7.621	16.416	24.625
15	M23	Y	-7.621	-4.68	24.625	32.833
16	M23	Y	-4.68	-.038	32.833	41.041
17	M3	Y	-.228	-5.359	26.83	34.879
18	M3	Y	-5.359	-11.238	34.879	42.928
19	M3	Y	-11.238	-9.68	42.928	50.977
20	M3	Y	-9.68	-5.094	50.977	59.027
21	M3	Y	-5.094	-.531	59.027	67.076
22	M21	Y	-6.473	-6.473	5.811	50.135
23	M26	Y	-1.494	-2.245	0	8.208
24	M26	Y	-2.245	-4.269	8.208	16.416
25	M26	Y	-4.269	-7.615	16.416	24.625

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
26	M26	Y	-7.615	-4.675	24.625	32.833
27	M26	Y	-4.675	-.038	32.833	41.041
28	M27	Y	-1.492	-2.244	0	8.208
29	M27	Y	-2.244	-4.27	8.208	16.416
30	M27	Y	-4.27	-7.621	16.416	24.625
31	M27	Y	-7.621	-4.68	24.625	32.833
32	M27	Y	-4.68	-.038	32.833	41.041
33	M1	Y	-.228	-5.359	26.83	34.879
34	M1	Y	-5.359	-11.238	34.879	42.928
35	M1	Y	-11.238	-9.681	42.928	50.977
36	M1	Y	-9.681	-5.095	50.977	59.025
37	M1	Y	-5.095	-.531	59.025	67.074
38	M20	Y	-6.473	-6.473	5.81	50.135
39	M24	Y	-1.493	-2.245	0	8.208
40	M24	Y	-2.245	-4.271	8.208	16.416
41	M24	Y	-4.271	-7.621	16.416	24.625
42	M24	Y	-7.621	-4.68	24.625	32.833
43	M24	Y	-4.68	-.038	32.833	41.041
44	M25	Y	-1.493	-2.245	0	8.208
45	M25	Y	-2.245	-4.268	8.208	16.416
46	M25	Y	-4.268	-7.615	16.416	24.625
47	M25	Y	-7.615	-4.675	24.625	32.833
48	M25	Y	-4.675	-.038	32.833	41.041

Member Distributed Loads (BLC 9 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M46	Z	-17.394	-17.394	6	84
2	M45	Z	-14.369	-14.369	18	60
3	M44	Z	-17.394	-17.394	6	84
4	M28	Z	-14.369	-14.369	18	60
5	M27A	Z	-17.394	-17.394	6	84
6	M28A	Z	-14.369	-14.369	18	60
7	M29	Z	-14.369	-14.369	0	48
8	M30	Z	-14.369	-14.369	18	60
9	M31A	Z	-17.394	-17.394	6	84
10	M32	Z	-14.369	-14.369	18	60
11	M33A	Z	-14.369	-14.369	0	42
12	M34	Z	-14.369	-14.369	18	60
13	M35	Z	-17.394	-17.394	0	149.988
14	M36	Z	-8.697	-8.697	0	149.988
15	M37A	Z	-8.697	-8.697	0	149.988
16	M38	Z	-7.184	-7.184	0	58.521
17	M39A	Z	-14.369	-14.369	0	58.521
18	M40	Z	-7.184	-7.184	0	58.521
19	M41	Z	0	0	0	20.525
20	M42	Z	0	0	0	20.525
21	M43	Z	0	0	0	20.525
22	M1	Z	-20.958	-20.958	0	67.074
23	M2	Z	0	0	0	10.344
24	M4	Z	0	0	0	10.344
25	M5	Z	-20.958	-20.958	0	67.076
26	M6	Z	0	0	0	10.344
27	M7	Z	-21.175	-21.175	0	149.988
28	M11	Z	-10.588	-10.588	0	149.988
29	M15	Z	-10.588	-10.588	0	149.988
30	M19	Z	-12.1	-12.1	0	55.945

Member Distributed Loads (BLC 9 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
31	M20	Z	-12.1	-12.1	0	55.945
32	M21	Z	-24.2	-24.2	0	55.945
33	M22	Z	-6.05	-6.05	0	45.601
34	M23	Z	-12.1	-12.1	0	45.601
35	M24	Z	-12.1	-12.1	0	45.601
36	M25	Z	-6.05	-6.05	0	45.601
37	M26	Z	-6.05	-6.05	0	45.601
38	M27	Z	-6.05	-6.05	0	45.601
39	M46	Z	-17.394	-17.394	84	96
40	M45	Z	-14.369	-14.369	0	18
41	M44	Z	-17.394	-17.394	84	96
42	M28	Z	-14.369	-14.369	0	18
43	M27A	Z	-17.394	-17.394	84	96
44	M28A	Z	-14.369	-14.369	0	18
45	M29	Z	-14.369	-14.369	48	60
46	M30	Z	-14.369	-14.369	0	18
47	M31A	Z	-17.394	-17.394	84	96
48	M32	Z	-14.369	-14.369	0	18
49	M33A	Z	-14.369	-14.369	42	60
50	M34	Z	-14.369	-14.369	0	18

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M46	X	-17.394	-17.394	6	84
2	M45	X	-14.369	-14.369	18	60
3	M44	X	-17.394	-17.394	6	84
4	M28	X	-14.369	-14.369	18	60
5	M27A	X	-17.394	-17.394	6	84
6	M28A	X	-14.369	-14.369	18	60
7	M29	X	-14.369	-14.369	0	48
8	M30	X	-14.369	-14.369	18	60
9	M31A	X	-17.394	-17.394	6	84
10	M32	X	-14.369	-14.369	18	60
11	M33A	X	-14.369	-14.369	0	42
12	M34	X	-14.369	-14.369	18	60
13	M36	X	-15.063	-15.063	0	149.988
14	M37A	X	-15.063	-15.063	0	149.988
15	M38	X	-12.444	-12.444	0	58.521
16	M40	X	-12.444	-12.444	0	58.521
17	M41	X	0	0	0	20.525
18	M43	X	0	0	0	20.525
19	M1	X	-12.1	-12.1	0	67.074
20	M2	X	0	0	0	10.344
21	M3	X	-24.2	-24.2	0	67.076
22	M5	X	-12.1	-12.1	0	67.076
23	M6	X	0	0	0	10.344
24	M11	X	-18.338	-18.338	0	149.988
25	M15	X	-18.338	-18.338	0	149.988
26	M19	X	-20.958	-20.958	0	55.945
27	M20	X	-20.958	-20.958	0	55.945
28	M22	X	-10.479	-10.479	0	45.601
29	M25	X	-10.479	-10.479	0	45.601
30	M26	X	-10.479	-10.479	0	45.601
31	M27	X	-10.479	-10.479	0	45.601
32	M46	X	-17.394	-17.394	84	96
33	M45	X	-14.369	-14.369	0	18

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
34	M44	X	-17.394	-17.394	84	96
35	M28	X	-14.369	-14.369	0	18
36	M27A	X	-17.394	-17.394	84	96
37	M28A	X	-14.369	-14.369	0	18
38	M29	X	-14.369	-14.369	48	60
39	M30	X	-14.369	-14.369	0	18
40	M31A	X	-17.394	-17.394	84	96
41	M32	X	-14.369	-14.369	0	18
42	M33A	X	-14.369	-14.369	42	60
43	M34	X	-14.369	-14.369	0	18

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M5	Y	-.141	-3.323	26.83	34.879
2	M5	Y	-3.323	-6.967	34.879	42.928
3	M5	Y	-6.967	-6.002	42.928	50.977
4	M5	Y	-6.002	-3.158	50.977	59.027
5	M5	Y	-3.158	-.329	59.027	67.076
6	M19	Y	-4.013	-4.013	5.81	50.135
7	M22	Y	-.925	-1.391	0	8.208
8	M22	Y	-1.391	-2.646	8.208	16.416
9	M22	Y	-2.646	-4.721	16.416	24.625
10	M22	Y	-4.721	-2.899	24.625	32.833
11	M22	Y	-2.899	-.023	32.833	41.041
12	M23	Y	-.926	-1.392	0	8.208
13	M23	Y	-1.392	-2.648	8.208	16.416
14	M23	Y	-2.648	-4.725	16.416	24.625
15	M23	Y	-4.725	-2.902	24.625	32.833
16	M23	Y	-2.902	-.023	32.833	41.041
17	M3	Y	-.141	-3.323	26.83	34.879
18	M3	Y	-3.323	-6.967	34.879	42.928
19	M3	Y	-6.967	-6.002	42.928	50.977
20	M3	Y	-6.002	-3.158	50.977	59.027
21	M3	Y	-3.158	-.329	59.027	67.076
22	M21	Y	-4.013	-4.013	5.811	50.135
23	M26	Y	-.926	-1.392	0	8.208
24	M26	Y	-1.392	-2.647	8.208	16.416
25	M26	Y	-2.647	-4.721	16.416	24.625
26	M26	Y	-4.721	-2.899	24.625	32.833
27	M26	Y	-2.899	-.023	32.833	41.041
28	M27	Y	-.925	-1.392	0	8.208
29	M27	Y	-1.392	-2.648	8.208	16.416
30	M27	Y	-2.648	-4.725	16.416	24.625
31	M27	Y	-4.725	-2.902	24.625	32.833
32	M27	Y	-2.902	-.023	32.833	41.041
33	M1	Y	-.141	-3.323	26.83	34.879
34	M1	Y	-3.323	-6.967	34.879	42.928
35	M1	Y	-6.967	-6.002	42.928	50.977
36	M1	Y	-6.002	-3.159	50.977	59.025
37	M1	Y	-3.159	-.329	59.025	67.074
38	M20	Y	-4.013	-4.013	5.81	50.135
39	M24	Y	-.926	-1.392	0	8.208
40	M24	Y	-1.392	-2.648	8.208	16.416
41	M24	Y	-2.648	-4.725	16.416	24.625
42	M24	Y	-4.725	-2.902	24.625	32.833
43	M24	Y	-2.902	-.023	32.833	41.041

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
44	M25	Y	-.926	-1.392	0	8.208
45	M25	Y	-1.392	-2.646	8.208	16.416
46	M25	Y	-2.646	-4.721	16.416	24.625
47	M25	Y	-4.721	-2.899	24.625	32.833
48	M25	Y	-2.899	-.023	32.833	41.041

Member Distributed Loads (BLC 12 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M1	Z	-6.501	-6.501	0	67.074
2	M2	Z	0	0	0	10.344
3	M4	Z	0	0	0	10.344
4	M5	Z	-6.501	-6.501	0	67.076
5	M6	Z	0	0	0	10.344
6	M7	Z	-6.568	-6.568	0	149.988
7	M11	Z	-3.284	-3.284	0	149.988
8	M15	Z	-3.284	-3.284	0	149.988
9	M19	Z	-3.753	-3.753	0	55.945
10	M20	Z	-3.753	-3.753	0	55.945
11	M21	Z	-7.507	-7.507	0	55.945
12	M22	Z	-1.877	-1.877	0	45.601
13	M23	Z	-3.753	-3.753	0	45.601
14	M24	Z	-3.753	-3.753	0	45.601
15	M25	Z	-1.877	-1.877	0	45.601
16	M26	Z	-1.877	-1.877	0	45.601
17	M27	Z	-1.877	-1.877	0	45.601
18	M46	Z	-5.395	-5.395	6	96
19	M45	Z	-4.457	-4.457	0	60
20	M44	Z	-5.395	-5.395	6	96
21	M28	Z	-4.457	-4.457	0	60
22	M27A	Z	-5.395	-5.395	6	96
23	M28A	Z	-4.457	-4.457	0	60
24	M29	Z	-4.457	-4.457	0	60
25	M30	Z	-4.457	-4.457	0	60
26	M31A	Z	-5.395	-5.395	6	96
27	M32	Z	-4.457	-4.457	0	60
28	M33A	Z	-4.457	-4.457	0	60
29	M34	Z	-4.457	-4.457	0	60
30	M35	Z	-5.395	-5.395	0	149.988
31	M36	Z	-2.698	-2.698	0	149.988
32	M37A	Z	-2.698	-2.698	0	149.988
33	M38	Z	-2.229	-2.229	0	58.521
34	M39A	Z	-4.457	-4.457	0	58.521
35	M40	Z	-2.229	-2.229	0	58.521
36	M41	Z	0	0	0	20.525
37	M42	Z	0	0	0	20.525
38	M43	Z	0	0	0	20.525

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M1	X	-3.753	-3.753	0	67.074
2	M2	X	0	0	0	10.344
3	M3	X	-7.507	-7.507	0	67.076
4	M5	X	-3.753	-3.753	0	67.076
5	M6	X	0	0	0	10.344
6	M11	X	-5.688	-5.688	0	149.988
7	M15	X	-5.688	-5.688	0	149.988

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
8	M19	X	-6.501	-6.501	0	55.945
9	M20	X	-6.501	-6.501	0	55.945
10	M22	X	-3.25	-3.25	0	45.601
11	M25	X	-3.25	-3.25	0	45.601
12	M26	X	-3.25	-3.25	0	45.601
13	M27	X	-3.25	-3.25	0	45.601
14	M46	X	-5.395	-5.395	6	96
15	M45	X	-4.457	-4.457	0	60
16	M44	X	-5.395	-5.395	6	96
17	M28	X	-4.457	-4.457	0	60
18	M27A	X	-5.395	-5.395	6	96
19	M28A	X	-4.457	-4.457	0	60
20	M29	X	-4.457	-4.457	0	60
21	M30	X	-4.457	-4.457	0	60
22	M31A	X	-5.395	-5.395	6	96
23	M32	X	-4.457	-4.457	0	60
24	M33A	X	-4.457	-4.457	0	60
25	M34	X	-4.457	-4.457	0	60
26	M36	X	-4.673	-4.673	0	149.988
27	M37A	X	-4.673	-4.673	0	149.988
28	M38	X	-3.86	-3.86	0	58.521
29	M40	X	-3.86	-3.86	0	58.521
30	M41	X	0	0	0	20.525
31	M43	X	0	0	0	20.525

Member Area Loads (BLC 1 : Self Weight)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N59	N57A	N56A	N58	Y	Two Way	-10
2	N69	N67	N66	N68	Y	Two Way	-10
3	N62	N64	N63	N61	Y	Two Way	-10

Member Area Loads (BLC 2 : Wind Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N68A	N70	N102A	N101A	Z	Open Structure	-72.6
2	N101A	N102A	N71	N69A	Z	Open Structure	-72.6

Member Area Loads (BLC 3 : Wind Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N70	N72	N103A	N102A	X	Open Structure	-72.6
2	N102A	N103A	N73	N71	X	Open Structure	-72.6

Member Area Loads (BLC 4 : Ice Weight)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N59	N57A	N56A	N58	Y	Two Way	-6.2
2	N69	N67	N66	N68	Y	Two Way	-6.2
3	N62	N64	N63	N61	Y	Two Way	-6.2

Member Area Loads (BLC 5 : Wind + Ice Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N68A	N70	N71	N69A	Z	Open Structure	-22.52

Member Area Loads (BLC 6 : Wind + Ice Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]

Member Area Loads (BLC 6 : Wind + Ice Load AZI 090) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N70	N72	N73	N71	X	Open Structure	-22.52

APPENDIX D

ADDITIONAL CALCUATIONS

Date:	1/29/2019
Client	CCI
Carrier	ATT
Engineer:	CLK
Site:	844815
Job #:	1039-A0002-B

Code:	LRFD
Bolt Diameter	0.625
Bolt Grade:	A325
Threads Excluded?:	
Axial (lbs):	4082.00
Shear (lbs):	4688.00

Bolt Info:

Yield Strength (F_{yb})	92.0 kips
Ultimate Strength (F_{ub})	120.0 kips
Threads/in (n)	11
Gross Area (A_{gb})	0.307 in²
Net Area (A_{nb})	0.226 in²

Bolt Capacity (1/2" A307 Through Bolt), Total of (2) per Connection				
	Ult Load / Bolt	Factored Load (ϕ=0.75)	# of Bolts	Factor Joint Capacity
Axial (lb)	27120.2	20340.1	1	20340
Shear(lb)	16567.0	12425.2	1	12425

Interaction Check	
$T/\phi T_n$	20.1%
$V/\phi Vn$	37.7%
≤1.0	18.3%
	OK

APPENDIX E

Mount Modification Design Drawings (MDD)

GENERAL NOTES:

1. THESE DOCUMENTS WERE DESIGNED IN ACCORDANCE WITH THE LATEST VERSION OF APPLICABLE LOCAL/STATE/COUNTY/CITY BUILDING CODES, AS WELL AS ANSI/TIA-222 STANDARD, AWWA-D100 STANDARD, NDS, NEC, MSJC, AND/OR THE LATEST VERSION OF THE INTERNATIONAL BUILDING CODE, UNLESS NOTED OTHERWISE IN THE CORRESPONDING STRUCTURAL REPORT.
2. ALL CONSTRUCTION METHODS SHOULD FOLLOW STANDARDS OF GOOD CONSTRUCTION PRACTICE.
3. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN SIMILAR CONSTRUCTION.
4. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. IF OBSTRUCTIONS ARE FOUND, CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD PRIOR TO CONTINUING WORK.
5. ANY CHANGES OR ADDITIONS MUST CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS, AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL CHANGES OR ADDITIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND/OR CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE DURING CONSTRUCTION. TIA-1019-A-2011 IS AN APPROPRIATE REFERENCE FOR THOSE DESIGNS MEETING TIA STANDARDS. THE ENGINEER OF RECORD MAY PROVIDE FORMAL RIGGING PLANS AT THE REQUEST AND EXPENSE OF THE CONTRACTOR.
7. INSTALLATION SHALL NOT INTERFERE NOR DENY ADEQUATE ACCESS TO OR FROM ANY EXISTING OR PROPOSED OPERATIONAL AND SAFETY EQUIPMENT.
8. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ANY FABRICATION. CONTACT INFINIGY ENGINEERING IF ANY DISCREPANCIES EXIST.

STEEL CONSTRUCTION NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION 14TH EDITION, FOR THE DESIGN AND FABRICATION OF STEEL COMPONENTS.
2. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES, AND GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS' RECOMMENDATIONS.
3. ALL FIELD DRILLED HOLES TO BE USED FOR FIELD BOLTING INSTALLATION SHALL BE STANDARD HOLES, AS DEFINED BY AISC, UNLESS NOTED OTHERWISE.
4. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
5. ALL STEEL MEMBERS AND CONNECTIONS SHALL MEET THE FOLLOWING GRADES:
   - ANGLES, CHANNELS, PLATES AND BARS TO BE A36. Fy=36 KSI, U.N.O.
   - W SHAPES TO BE A992. Fy=50 KSI, U.N.O.
   - RECTANGULAR HSS TO BE A500, GRADE B. FY=46 KSI, U.N.O.
   - ROUND HSS TO BE A500, GRADE B. FY=42 KSI, U.N.O.
   - STEEL PIPE TO BE A53, GRADE B. Fy=35 KSI, U.N.O.
   - BOLTS TO BE A307. Fu=120 KSI, U.N.O.
   - U-BOLTS AND LAG SCREWS TO BE A307 GR A. Fu=60 KSI, U.N.O.
6. ALL WELDING SHALL BE DONE USING E70XX ELECTRODES, U.N.O.
7. ALL WELDING SHALL CONFORM TO AISC AND AWS D1.1 LATEST EDITION.
8. ALL HILTI ANCHORS TO BE CARBON STEEL, U.N.O.
   - MECHANICAL ANCHORS: KWIK BOLT-TZ, U.N.O.
   - CMU BLOCK ANCHORS: ADHESIVE - HY120, U.N.O.
   - CONCRETE ANCHORS: ADHESIVE - HY150, U.N.O.
   - CONCRETE REBAR: ADHESIVE - RE500, U.N.O.
9. ALL STUDS TO BE NELSON CAPACITOR DISCHARGE 1/4"-20 LOW CARBON STEEL COPPER-FLASH AT 55 KSI ULT/50 KSI YIELD, U.N.O.
10. BOLTS SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED BY AISC.
11. MINIMUM EDGE DISTANCES SHALL CONFORM TO AISC TABLE J3.4.

CONCRETE CONSTRUCTION NOTES:

1. CONCRETE TO BE 4000 PSI @ 28 DAYS. REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. CONCRETE INSTALLATION TO CONFORM TO ACI-318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE. ALL CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH FREE OF WATER AND ALL FOREIGN OBJECTS AND MATERIALS. A MINIMUM OF THREE INCHES OF CONCRETE SHALL COVER ALL REINFORCEMENT. WELDING OF REBAR IS NOT PERMITTED.
2. EXISTING CONCRETE SURFACES THAT ARE TO BE IN CONTACT WITH NEW PROPOSED CONCRETE SHOULD BE WIRE BRUSHED CLEAN AND TREATED WITH APPROPRIATE MECHANICAL SCRATCH COAT AND REPAIR MATERIALS OR APPROPRIATE CHEMICAL METHODS SUCH AS THE APPLICATION OF A BONDING AGENT, EX. SAKRETE OR EQUIVALENT, TO ENSURE A QUALITY BOND BETWEEN EXISTING AND PROPOSED CONCRETE SURFACES.

FIBER REINFORCED POLYMER (FRP) NOTES:

1. FRP PLATES, SHAPES, BOLTS AND NUTS (STUD/NUT ASSEMBLIES) SHALL CONFORM TO ASTM D638, 695, 790. PLATES AND SHAPES TO BE FY = 5.35 KSI LW (SAFETY FACTOR OF 8), .945 KSI CW (SAFETY FACTOR OF 8) MIN.
2. IF FIELD FABRICATION IS REQUIRED, ALL CUT EDGES AND DRILLED HOLES TO BE SEALED USING VINYL ESTER SEALING KIT SUPPLIED BY THE MANUFACTURER.
3. ALL FASTENERS TO BE 1/2" DIA FRP THREADED ROD WITH FIBER REINFORCED THERMOPLASTIC NUT, SPACED AT 12 INCHES ON CENTER MAXIMUM, U.N.O., FOR PANELS AND AS DESIGNED FOR STRUCTURAL MEMBERS.
4. THE COLOR AND SURFACE PATTERN OF EXPOSED FRP PANELS SHALL MATCH THE EXTERIOR OF THE EXISTING BUILDING, U.N.O.
5. STUD/NUT ASSEMBLIES SHOULD BE LUBRICATED FOR INSTALLATION
6. ENSURE BEARING SURFACES OF THE NUTS ARE PARALLEL TO THE SURFACES BEING FASTENED.
7. TORQUE BOLTS ACCORDING TO THE FOLLOWING TABLE:

INSTALLATION TORQUE TABLE

SIZE	ULTIMATE TORQUE STRENGTH	RECOMMENDED MAXIMUM INSTALLATION TORQUE
3/8-16 UNC	8 FT-LBS	4 FT-LBS
1/2-13 UNC	18 FT-LBS	8 FT-LBS
5/8-11 UNC	35 FT-LBS	16 FT-LBS
3/4-10 UNC	50 FT-LBS	24 FT-LBS
1-8 UNC	110 FT-LBS	50 FT-LBS

8. WHEN TIGHTENING FRP STUD/NUT ASSEMBLIES, WRENCHES MUST MAKE FULL CONTACT WITH ALL NUT EDGES. A STANDARD SIX POINT SOCKET IS RECOMMENDED.
9. STUD/NUT ASSEMBLIES SHOULD BE BONDED BY APPLYING BONDING AGENT TO ENTIRE NUT AND EXPOSED STUD.
10. ALL FRP MATERIALS TO BE PROVIDED BY FIBERGRATE COMPOSITE STRUCTURES, DALLAS TX, OR APPROVED EQUAL.
11. ALL FRP SHAPES TO BE DYNAFORM PULTRUDED STRUCTURAL SHAPES.
12. ALL FRP PLATES TO BE FIBERPLATE MOLDED FRP PLATE.
13. ALL FRP PANELS TO BE FIBERPLATE CLADDING PANEL.
14. EACH FRP PANEL TO BE IDENTIFIED WITH LARR#25536 AND FIBERGRATE COMPOSITE STRUCTURAL LABEL.
15. FRP MATERIAL TO BE CLASSIFIED AS CC1 OR BETTER, AND HAVE MAXIMUM FLAME SPREAD OF 50.
16. ALL DESIGN AND CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH LOS ANGELES RESEARCH REPORT RR25536, DATED FEBRUARY 1, 2016.
17. SPECIAL INSPECTIONS MUST BE PROVIDED FOR ALL FRP INSTALLMENTS. SEE SPECIAL INSPECTION SECTION, THIS SHEET.

RATIO OF EDGE DISTANCE TO FRP FASTENER DIAMETER

	RANGE	RECOMMENDED
EDGE DISTANCE - CL* BOLT TO END	2.0-4.0	3.0
EDGE DISTANCE - CL* BOLT TO SIDE	1.5-3.5	2.5
BOLT PITCH - CL* TO CL*	4.0-5.0	5.0

WOOD CONSTRUCTION NOTES:

1. ALL EXISTING WOOD SHAPES ARE ASSUMED TO BE DOUGLAS FIR-LARCH WITH A REFERENCE DESIGN BENDING VALUE OF 1000 PSI MIN.
2. ALL PROPOSED WOOD SHAPES ARE TO BE DOUGLAS FIR-LARCH WITH A REFERENCE DESIGN BENDING VALUE OF 1000 PSI MIN. U.N.O.
3. ALL EXISTING AND PROPOSED GLUED LAMINATED TIMBERS ARE TO BE 24F-1.8C DOUGLAS FIR BALANCED WITH A REFERENCE DESIGN BENDING VALUE OF 2400 PSI MIN. U.N.O.

MASONRY CONSTRUCTION NOTES:

1. ALL BRICK TO BE 1500 PSI MIN. REINFORCING BAR (IF APPLICABLE) TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. ALL MORTAR TO BE 2000 PSI MIN.
   - FOR INTERIOR/ABOVE GRADE APPLICATIONS TYPE N MORTAR HAVING MINIMUM MODULUS OF RUPTURE OF 100 PSI SHALL BE USED. FOR EXTERIOR/BELOW GRADE APPLICATIONS TYPE M OR S MORTAR HAVING A MINIMUM MODULUS OF RUPTURE OF 133 PSI.
   - BRICK AND MORTAR INSTALLATION TO CONFORM TO MSJC BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES.
2. ALL CMU TO BE 1500 PSI MIN. REINFORCING BAR (IF APPLICABLE) TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. ALL MORTAR TO BE 2000 PSI MIN.
   - FOR INTERIOR/ABOVE GRADE APPLICATIONS, TYPE N MORTAR HAVING MINIMUM MODULUS OF RUPTURE OF 64 PSI SHALL BE USED FOR UNGROUTED BLOCKS, AND 158 PSI FOR FULLY GROUTED BLOCKS.
   - FOR EXTERIOR/BELOW GRADE APPLICATIONS TYPE M OR S MORTAR HAVING A MINIMUM MODULUS OF RUPTURE OF 84 PSI SHALL BE USED FOR UNGROUTED BLOCKS, AND 163 PSI FOR FULLY GROUTED BLOCKS.
   - BRICK AND MORTAR INSTALLATION TO CONFORM TO MSJC BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES.

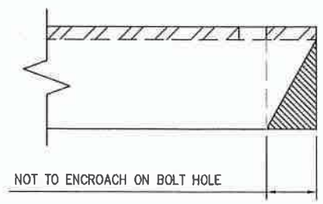
TOWER PLUMB & TENSION NOTES:

1. PLUMB AND TENSION TOWER UPON COMPLETION OF STRUCTURAL MODIFICATIONS DETAILED IN THESE DRAWINGS.
2. RETENSIONING OF EXISTING GUY WIRES SHALL BE PERFORMED AT A TIME WHEN THE WIND VELOCITY IS LESS THAN 10 MPH AT GROUND LEVEL AND WITH NO ICE ON THE STRUCTURE AND GUY WIRES.
3. PLUMB THE TOWER WHILE RETENSIONING THE EXISTING GUY WIRES. THE HORIZONTAL DISTANCE BETWEEN THE VERTICAL CENTERLINES AT ANY TWO ELEVATIONS SHALL NOT EXCEED 0.25% OF THE VERTICAL DISTANCE BETWEEN TWO ELEVATIONS FOR LATTICED STRUCTURES.
4. THE TWIST BETWEEN ANY TWO ELEVATIONS THROUGHOUT THE HEIGHT OF A LATTICE STRUCTURE SHALL NOT EXCEED 0.5 DEGREES IN 10 FEET. THE MAXIMUM TWIST OVER THE LATTICE STRUCTURE HEIGHT SHALL NOT EXCEED 5 DEGREES.

SPECIAL INSPECTIONS NOTES:

1. A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER AND APPROVED BY THE JURISDICTION, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH THE THE GOVERNING BUILDING CODE, APPLICABLE SECTION(S) AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
   a. STRUCTURAL WELDING (CONTINUOUS INSPECTION OF FIELD WELDS ONLY).
   b. HIGH STRENGTH BOLTS (PERIODIC INSPECTION OF A325 AND/OR A490 BOLTS) TO BE TIGHTENED PER "TURN-OF-THE-NUT" METHOD.
   c. MECHANICAL AND EPOXIED ANCHORAGES.
   d. FIBER REINFORCED POLYMER.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT THE FRP MATERIAL SPECIFIED ON THE APPROVED DESIGN DOCUMENTS IS BEING INSTALLED.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT ALL CUT EDGES AND DRILLED HOLES ARE PROPERLY SEALED USING A VINYL ESTER SEALING KIT SUPPLIED BY THE MANUFACTURER.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT THE STRUCTURE IS BUILT IN ACCORDANCE WITH THE APPROVED DESIGN DOCUMENTS.
2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM WORK WITHOUT THE SPECIAL INSPECTIONS.

MAXIMUM ALLOWABLE ANGLE CLIP



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JOSEPH R. JOHNSTON
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Joseph R. Johnston
JAN 17 2019

No	Submittal / Revision	App'd	Date
0	ISSUED FOR REVIEW	JRJ	01/25/19

Drawn: BE Date: 01/25/19
Designed: CK Date: 01/25/19
Checked: NRO Date: 01/25/19

Project Number: 1039-A0002-B

Project Title: BU# 876367

CTL05717

1436 VOLUNTOWN RD
GRISWOLD, CT 06351

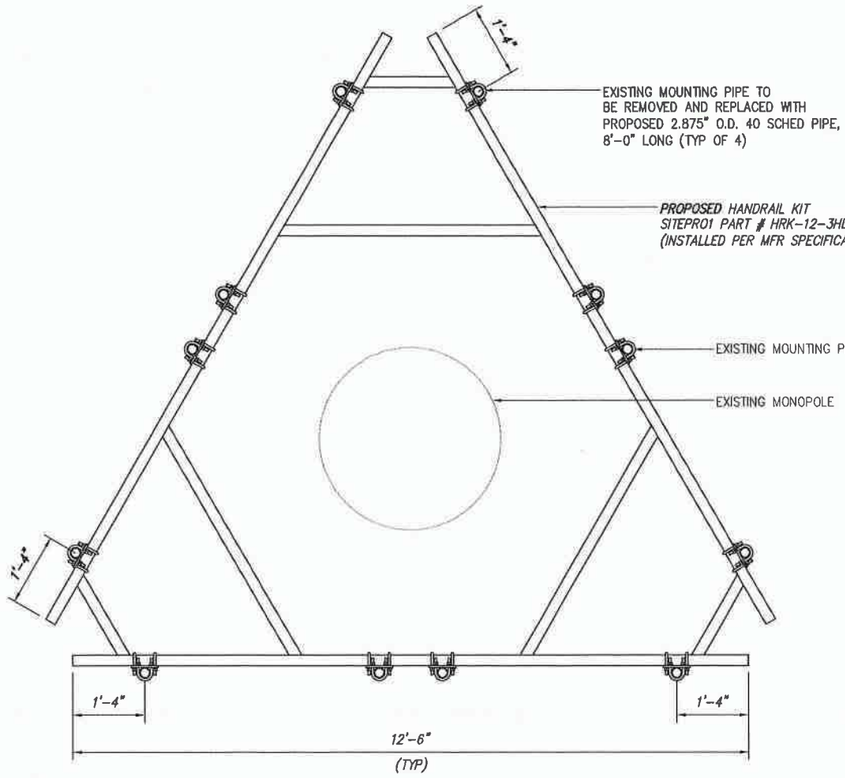
Prepared For:

CROWN CASTLE
3 Corporate Park, Suite 101
Clifton Park, NY 12065

Drawing Scale: AS NOTED
Date: 01/25/19

Drawing Title: GENERAL NOTES

Drawing Number: S-1



1 PLAN VIEW
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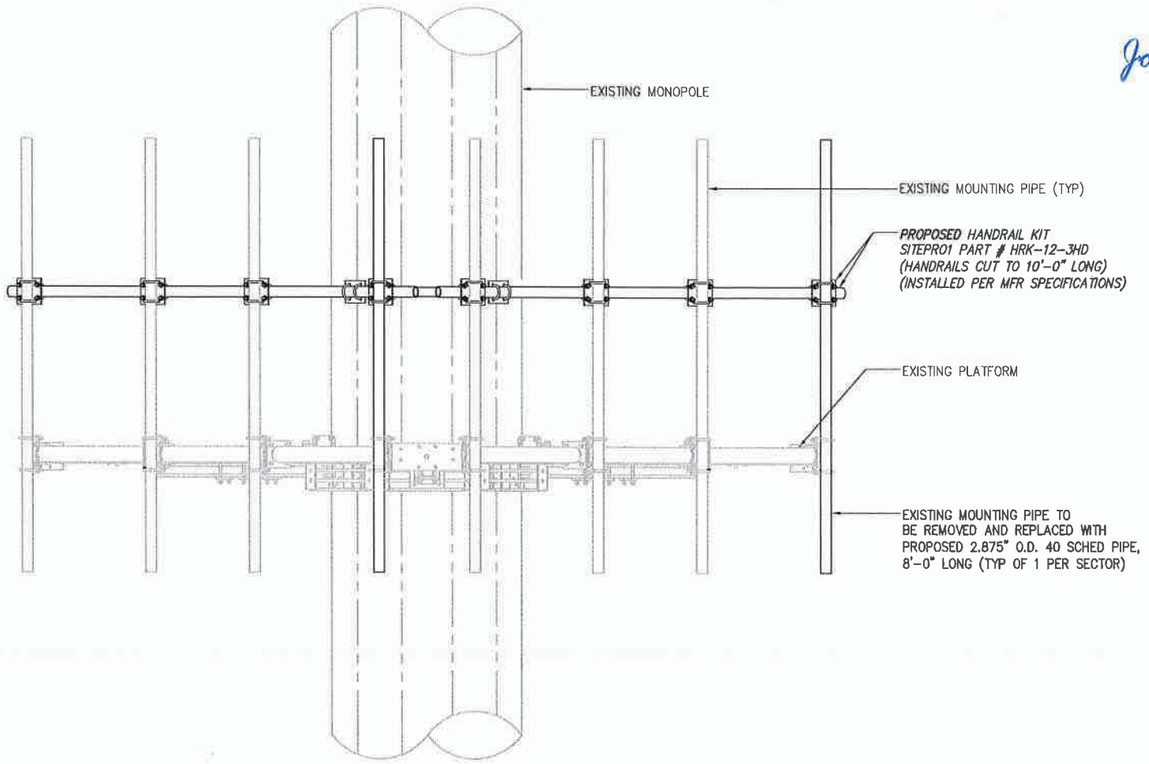

2 ELEVATION VIEW
SCALE: NOT TO SCALE

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CROWN CASTLE
3 Corporate Park, Suite 101
Clifton Park, NY 12065

Drawing Scale:
AS NOTED

Date:
01/25/19

Drawing Title
PLATFORM MODIFICATION

Drawing Number
S-2

Date: **December 18, 2018**

Heather Simeone
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10071047
	Carrier Site Name:	CTL05717
Crown Castle Designation:	**Crown Castle BU Number:**	876367
	Crown Castle Site Name:	WAPPINGERS FALLS / BOB'S ANTIQ
	Crown Castle JDE Job Number:	548701
	Crown Castle Work Order Number:	1671212
	Crown Castle Order Number:	471668 Rev. 0
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	400087
Site Data:	**1439 Voluntown Rd, Griswold, New London County, CT** **Latitude *41° 34' 33.99"*, Longitude *-71° 53' 16.96"*** **179.5 Foot - Monopole Tower**	

Dear Heather Simeone,

Black & Veatch Corp. is pleased to submit this **"Structural Analysis 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:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 135 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: Anup Chitale

Respectfully submitted by:

Ping Jiang, P.E.

Professional Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 179.5 ft Monopole tower designed by Engineered Endeavors, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	135 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)
167.0	167.0	1	cci tower mounts	Side Arm Mount [SO 102-3]	-	-
		6	ericsson	TME-RRUS 11		
165.0	169.0	3	powerwave technologies	7770.00 w/ Mount Pipe	12 4 2 2	1 1/4 3/4 3/8 7/16
	167.0	3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	782 10253		
		2	kathrein	80010964 w/ Mount Pipe		
		4	kathrein	80010966 w/ Mount Pipe		
		6	powerwave technologies	LGP 17201		
		3	raycap	DC6-48-60-18-8F		
	165.0	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)
177.0	177.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	4	1 1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		1	site pro 1	RMQP-xxx 12.5' Low Profile Platform		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
155.0	157.0	3	alcatel lucent	RRH2X60-AWS	8	1 5/8
		3	alcatel lucent	RRH2X60-PCS		
		3	alcatel lucent	RRH2x60-700		
		6	andrew	CBC721-DF		
		2	antel	LPA-80063/4CF w/ Mount Pipe		
		4	antel	LPA-80080/4CF w/ Mount Pipe		
		3	commscope	HBXX-6516DS-A2M w/ Mount Pipe		
		3	commscope	HBXX-6517DS-A2M w/ Mount Pipe		
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
	155.0	1	cci tower mounts	Platform Mount [LP 303-1]		
60.0	60.0	1	cci tower mounts	Side Arm Mount [SO 701-1]	1	1/2
		1	gps	GPS_A		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Criscuolo Shepard Associates, P.C.	1613525	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors, Inc.	1613910	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	1999079	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), 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 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	179.5 - 129.75	Pole	TP31.86x19.59x0.3125	1	-14.21	2341.33	45.8	Pass
L2	129.75 - 84.58	Pole	TP42.26x30.1252x0.375	2	-23.98	3635.92	57.5	Pass
L3	84.58 - 40.7	Pole	TP52.21x40.0857x0.4375	3	-37.89	5158.51	56.2	Pass
L4	40.7 - 0	Pole	TP61.25x49.6082x0.5	4	-59.04	7022.34	52.4	Pass
							Summary	
						Pole (L2)	57.5	Pass
						Rating =	**57.5**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	61.7	Pass
1	Base Plate	0	61.3	Pass
1	Base Foundation	0	66.1	Pass
1	Base Foundation Soil Interaction	0	56.4	Pass

Structure Rating (max from all components) =	**66.1%**

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

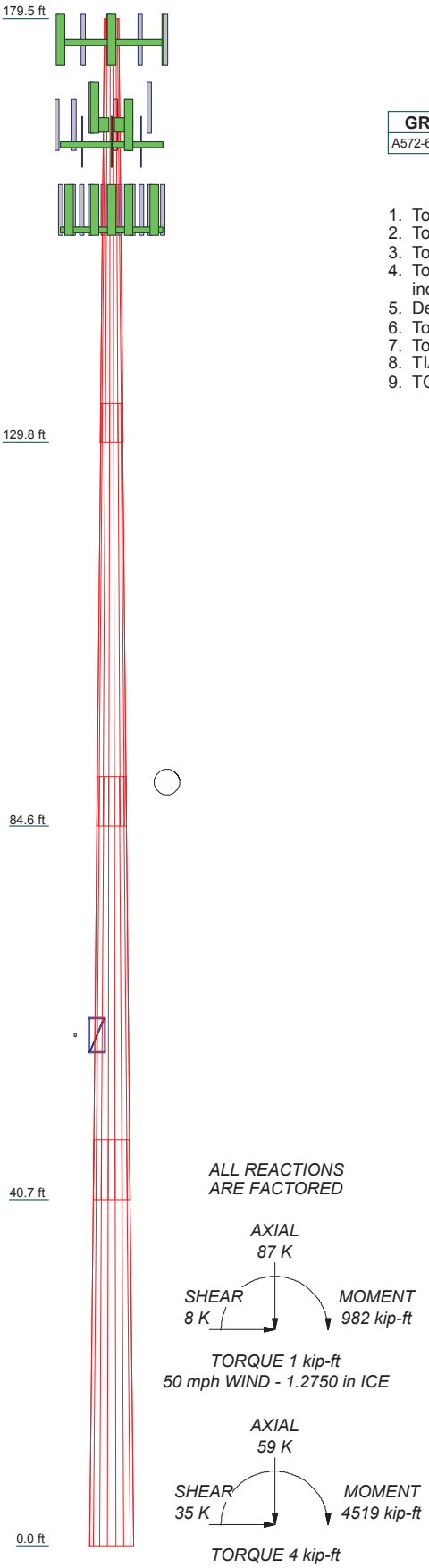
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	49.75	18	0.3125	4.50	19.5900	31.8600	A572-65	4.3
2	49.67	18	0.3750	5.83	30.1252	42.2600		7.2
3	49.71	18	0.4375	7.08	40.0857	52.2100		10.7
4	47.78	18	0.5000		49.6082	61.2500		14.2



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 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: 57.5%

BLACK & VEATCH
Building a world of difference.
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Overland Park, KS 66211
Phone: (913) 458-8145
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Job: ***WAPPINGERS FALLS / BOB'S ANTIQ (BU# 876367***		
Project: ***400087 (876367.1671212)***		
Client: Crown Castle	Drawn by: Anup Chitale	App'd:
Code: TIA-222-H	Date: 12/18/18	Scale: NTS
Path: Y:\TELECOM\2018\Engineering\Projects\CC\SA Sites\876367\876367.1671212 - TSA\Structural\876367.1671212 Structural Analysis.eri		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 New London County, Connecticut.
2. Tower base elevation above sea level: 286.00 ft.
3. Basic wind speed of 135 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 1.2750 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. 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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	179.50-129.75	49.75	4.50	18	19.5900	31.8600	0.3125	1.2500	A572-65 (65 ksi)
L2	129.75-84.58	49.67	5.83	18	30.1252	42.2600	0.3750	1.5000	A572-65

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
L3	84.58-40.70	49.71	7.08	18	40.0857	52.2100	0.4375	1.7500	(65 ksi) A572-65 (65 ksi)
L4	40.70-0.00	47.78		18	49.6082	61.2500	0.5000	2.0000	(65 ksi) 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	19.8440	19.1209	897.7316	6.8435	9.9517	90.2087	1796.6445	9.5623	2.8978	9.273
	32.3033	31.2912	3934.4972	11.1994	16.1849	243.0971	7874.1715	15.6486	5.0574	16.184
L2	31.6484	35.4101	3959.5257	10.5613	15.3036	258.7320	7924.2614	17.7084	4.6420	12.379
	42.8541	49.8536	11049.7181	14.8692	21.4681	514.7045	22113.9758	24.9315	6.7778	18.074
L3	42.0804	55.0564	10934.3273	14.0751	20.3635	536.9565	21883.0422	27.5335	6.2851	14.366
	52.9479	71.8926	24345.5640	18.3792	26.5227	917.9149	48723.1625	35.9531	8.4190	19.243
L4	52.0480	77.9347	23745.2034	17.4334	25.2010	942.2343	47521.6513	38.9747	7.8510	15.702
	62.1177	96.4103	44952.4352	21.5663	31.1150	1444.7191	89964.0200	48.2143	9.9000	19.8

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 179.50-129.75				1	1	1			
L2 129.75-84.58				1	1	1			
L3 84.58-40.70				1	1	1			
L4 40.70-0.00				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 ***	A	No	Surface Af (CaAa)	179.50 - 8.00	1	1	-0.260 -0.250	0.0000	0.7500	0.22
LDF4-50A(1/2) **** *** ***	C	No	Surface Af (CaAa)	60.00 - 7.00	1	1	0.011 0.100	0.0000	1.2500	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
177									
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Inside Pole	177.00 - 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
HB114-13U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	177.00 - 0.00	1	No Ice	0.00	0.99
							1/2" Ice	0.00	0.99
							1" Ice	0.00	0.99
							2" Ice	0.00	0.99
165									
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	165.00 - 0.00	4	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
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	165.00 - 0.00	1	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
LDF6-50A(1-1/4)	C	No	No	Inside Pole	165.00 - 0.00	12	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	165.00 - 0.00	1	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	165.00 - 0.00	2	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
2" innerduct conduit	C	No	No	Inside Pole	165.00 - 0.00	3	No Ice	0.00	0.20
							1/2" Ice	0.00	0.20
							1" Ice	0.00	0.20
							2" Ice	0.00	0.20
155									
FLC 158-50J(1-5/8)	C	No	No	Inside Pole	155.00 - 0.00	6	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
							2" Ice	0.00	0.92
HB158-1-08U8-S8J18(1-5/8)	C	No	No	Inside Pole	155.00 - 0.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
****									
***									
***									

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	179.50-129.75	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.79
L2	129.75-84.58	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.05
L3	84.58-40.70	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.02
L4	40.70-0.00	A	0.000	0.000	0.000	0.000	0.01

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
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.95

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	179.50-129.75	A	1.486	0.000	0.000	14.789	0.000	0.19
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.79
L2	129.75-84.58	A	1.433	0.000	0.000	13.427	0.000	0.18
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.05
L3	84.58-40.70	A	1.359	0.000	0.000	12.579	0.000	0.16
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	5.533	0.000	1.09
L4	40.70-0.00	A	1.211	0.000	0.000	8.886	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	9.158	0.000	1.06

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	179.50-129.75	0.0000	0.0000	-1.2051	0.6217
L2	129.75-84.58	0.0000	0.0000	-1.2703	0.6581
L3	84.58-40.70	0.0000	0.0000	-1.3667	1.2139
L4	40.70-0.00	0.0000	0.0000	-1.1624	1.4522

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	129.75 - 179.50	1.0000	1.0000
L2	1	Safety Line 3/8	84.58 - 129.75	1.0000	1.0000
L2	19	LDF4-50A(1/2)	84.58 - 60.00	1.0000	1.0000
L3	1	Safety Line 3/8	40.70 - 84.58	1.0000	1.0000
L3	19	LDF4-50A(1/2)	40.70 - 60.00	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
Transition Ladder	C	From Leg	2.00 0.00 -2.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.00 8.00 10.00 14.00	6.00 8.00 10.00 14.00	0.16 0.24 0.32 0.48
177									
Site Pro 1 RMQP-xxx 12.5' Low Profile Platform	C	None		0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	16.78 19.69 22.79 28.42	16.01 18.91 21.86 27.61	1.21 1.48 1.81 2.29
6'x2" Mount Pipe	A	From Face	3.00 -6.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Face	3.00 -6.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	3.00 -6.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
NNVV-65B-R4 w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
NNVV-65B-R4 w/ Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
NNVV-65B-R4 w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.51 13.11 13.67 14.82	7.41 8.60 9.50 11.33	0.10 0.19 0.29 0.52
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Face	3.00 6.00 0.00	0.0000	177.00	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 Face	3.00 6.00 0.00	0.0000	177.00	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 Face	3.00 6.00 0.00	0.0000	177.00	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
(2) RRH2X50-800	A	From Face	3.00 0.00 0.00	0.0000	177.00	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
(2) RRH2X50-800	B	From Face	3.00	0.0000	177.00	No Ice	1.70	1.28	0.05

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
			0.00 0.00			1/2" Ice	1.86 2.03	1.43 1.58	0.07 0.09
						1" Ice	2.40	1.91	0.14
						2" Ice			
(2) RRH2X50-800	C	From Face	3.00 0.00 0.00	0.0000	177.00	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
PCS 1900MHZ 4X45W-65MHZ	A	From Face	3.00 0.00 0.00	0.0000	177.00	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-65MHZ	B	From Face	3.00 0.00 0.00	0.0000	177.00	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-65MHZ	C	From Face	3.00 0.00 0.00	0.0000	177.00	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
TD-RRH8X20-25	A	From Face	3.00 0.00 0.00	0.0000	177.00	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 Face	3.00 0.00 0.00	0.0000	177.00	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 Face	3.00 0.00 0.00	0.0000	177.00	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
167 Side Arm Mount [SO 102-3]	C	None		0.0000	167.00	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
4'x4" Pipe Mount	A	From Face	0.50 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.58 1.84 2.40	1.10 1.58 1.84 2.40	0.04 0.06 0.07 0.11
4'x4" Pipe Mount	B	From Face	0.50 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.58 1.84 2.40	1.10 1.58 1.84 2.40	0.04 0.06 0.07 0.11
4'x4" Pipe Mount	C	From Face	0.50 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.58 1.84 2.40	1.10 1.58 1.84 2.40	0.04 0.06 0.07 0.11
RRUS 11	A	From Face	1.00 -1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15

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
RRUS 11	B	From Face	1.00 -1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15
RRUS 11	C	From Face	1.00 -1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15
RRUS 11	A	From Face	1.00 1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15
RRUS 11	B	From Face	1.00 1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15
RRUS 11	C	From Face	1.00 1.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.78 2.99 3.21 3.66	1.19 1.33 1.49 1.83	0.05 0.07 0.10 0.15
165									
Platform Mount [LP 303-1]	C	None		0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.66 18.87 23.08 31.50	14.66 18.87 23.08 31.50	1.25 1.48 1.71 2.18
6'x2" Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Face	3.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
80010964 w/ Mount Pipe	A	From Face	3.00 -6.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	10.23 10.74 11.24 12.25	5.51 6.37 7.12 8.64	0.11 0.18 0.26 0.45
80010964 w/ Mount Pipe	A	From Face	3.00 -2.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	10.23 10.74 11.24 12.25	5.51 6.37 7.12 8.64	0.11 0.18 0.26 0.45
80010966 w/ Mount Pipe	B	From Face	3.00 -6.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	17.60 18.33 19.07 20.49	9.64 11.15 12.70 15.03	0.15 0.26 0.39 0.68
80010966 w/ Mount Pipe	C	From Face	3.00 -2.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	17.60 18.33 19.07 20.49	9.64 11.15 12.70 15.03	0.15 0.26 0.39 0.68

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			
80010966 w/ Mount Pipe	B	From Face	3.00 -6.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	17.60 18.33 19.07 20.49	9.64 11.15 12.70 15.03	0.15 0.26 0.39 0.68
80010966 w/ Mount Pipe	C	From Face	3.00 -2.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	17.60 18.33 19.07 20.49	9.64 11.15 12.70 15.03	0.15 0.26 0.39 0.68
7770.00 w/ Mount Pipe	A	From Face	3.00 2.00 4.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Face	3.00 2.00 4.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Face	3.00 2.00 4.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
RRUS 4478 B14	A	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	C	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 8843 B2/B66A	A	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	A	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16

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			
RRUS 4449 B5/B12	C	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
(2) LGP 17201	A	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.67 1.83 2.00 2.36	0.47 0.57 0.68 0.91	0.03 0.04 0.06 0.09
(2) LGP 17201	B	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.67 1.83 2.00 2.36	0.47 0.57 0.68 0.91	0.03 0.04 0.06 0.09
(2) LGP 17201	C	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.67 1.83 2.00 2.36	0.47 0.57 0.68 0.91	0.03 0.04 0.06 0.09
782 10253	A	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.11 0.15 0.20 0.33	0.06 0.10 0.14 0.25	0.00 0.00 0.01 0.01
782 10253	B	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.11 0.15 0.20 0.33	0.06 0.10 0.14 0.25	0.00 0.00 0.01 0.01
782 10253	C	From Face	3.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.11 0.15 0.20 0.33	0.06 0.10 0.14 0.25	0.00 0.00 0.01 0.01
DC6-48-60-18-8F	A	From Face	1.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-18-8F	B	From Face	1.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-18-8F	C	From Face	1.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
155 Platform Mount [LP 303-1]	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.66 18.87 23.08 31.50	14.66 18.87 23.08 31.50	1.25 1.48 1.71 2.18
(2) LPA-80080/4CF w/ Mount Pipe	A	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.22 3.59 4.34	6.57 7.19 7.84 9.17	0.03 0.08 0.13 0.25
(2) LPA-80080/4CF w/ Mount Pipe	B	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice	2.86 3.22 3.59	6.57 7.19 7.84	0.03 0.08 0.13

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	4.34	9.17	0.25
						2" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.38 6.78 7.19 8.04	6.60 7.23 7.88 9.21	0.04 0.10 0.18 0.34
HBXX-6516DS-A2M w/ Mount Pipe	A	From Face	3.00 -2.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 6.06 6.47 7.32	4.53 5.20 5.86 7.20	0.05 0.10 0.15 0.29
HBXX-6516DS-A2M w/ Mount Pipe	B	From Face	3.00 -2.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 6.06 6.47 7.32	4.53 5.20 5.86 7.20	0.05 0.10 0.15 0.29
HBXX-6516DS-A2M w/ Mount Pipe	C	From Face	3.00 -2.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.66 6.06 6.47 7.32	4.53 5.20 5.86 7.20	0.05 0.10 0.15 0.29
LNX-6514DS-A1M w/ Mount Pipe	A	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.44 9.00 9.53 10.62	7.10 8.30 9.21 11.06	0.06 0.13 0.20 0.39
LNX-6514DS-A1M w/ Mount Pipe	B	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.44 9.00 9.53 10.62	7.10 8.30 9.21 11.06	0.06 0.13 0.20 0.39
LNX-6514DS-A1M w/ Mount Pipe	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.44 9.00 9.53 10.62	7.10 8.30 9.21 11.06	0.06 0.13 0.20 0.39
HBXX-6517DS-A2M w/ Mount Pipe	A	From Face	3.00 2.00 2.00	0.0000	155.00	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 Face	3.00 2.00 2.00	0.0000	155.00	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 Face	3.00 2.00 2.00	0.0000	155.00	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
(2) CBC721-DF	A	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.39 0.46 0.55 0.75	0.11 0.17 0.23 0.37	0.00 0.01 0.01 0.02
(2) CBC721-DF	B	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.39 0.46 0.55 0.75	0.11 0.17 0.23 0.37	0.00 0.01 0.01 0.02
(2) CBC721-DF	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice Ice	0.39 0.46 0.55	0.11 0.17 0.23	0.00 0.01 0.01

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	0.75	0.37	0.02
						2" Ice			
RRH2X60-PCS	A	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.39 2.59 3.01	1.72 1.90 2.09 2.48	0.06 0.08 0.10 0.16
RRH2X60-PCS	B	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.39 2.59 3.01	1.72 1.90 2.09 2.48	0.06 0.08 0.10 0.16
RRH2X60-PCS	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.39 2.59 3.01	1.72 1.90 2.09 2.48	0.06 0.08 0.10 0.16
RRH2x60-700	A	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RRH2x60-700	B	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RRH2x60-700	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.50 3.76 4.03 4.58	1.82 2.05 2.29 2.79	0.06 0.08 0.11 0.17
RRH2X60-AWS	A	From Face	3.00 0.00 2.00	0.0000	155.00	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 Face	3.00 0.00 2.00	0.0000	155.00	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 Face	3.00 0.00 2.00	0.0000	155.00	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-T1-6Z-8AB-0Z	C	From Face	3.00 0.00 2.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 5.07 5.35 5.93	2.00 2.19 2.39 2.81	0.04 0.08 0.12 0.21
60									
Side Arm Mount [SO 701-1]	A	From Face	0.00 0.00 0.00	0.0000	60.00	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
GPS_A	A	From Face	3.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
*** ***									

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
***								

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	179.5 - 129.75	Pole	Max Tension	3	0.00	-0.00	-0.00
			Max. Compression	26	-31.83	2.88	0.67
			Max. Mx	20	-14.29	644.18	-4.04
			Max. My	2	-14.20	-3.15	657.73
			Max. Vy	20	-21.35	644.18	-4.04
			Max. Vx	2	-21.91	-3.15	657.73
			Max. Torque	6			4.51
L2	129.75 - 84.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.42	3.31	0.72
			Max. Mx	20	-24.04	1676.59	-9.42
			Max. My	2	-23.98	-8.49	1714.99
			Max. Vy	20	-25.78	1676.59	-9.42
			Max. Vx	2	-26.35	-8.49	1714.99
			Max. Torque	18			-4.20
L3	84.58 - 40.7	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.81	3.93	0.76
			Max. Mx	20	-37.92	2873.53	-14.76
			Max. My	2	-37.89	-13.73	2936.08
			Max. Vy	20	-30.29	2873.53	-14.76
			Max. Vx	2	-30.87	-13.73	2936.08
			Max. Torque	18			-4.34
L4	40.7 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.15	4.31	0.47
			Max. Mx	20	-59.04	4429.73	-21.20
			Max. My	2	-59.04	-20.11	4519.33
			Max. Vy	20	-34.76	4429.73	-21.20
			Max. Vx	2	-35.31	-20.11	4519.33
			Max. Torque	18			-4.33

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	87.15	-0.01	7.66
	Max. H_x	21	44.29	34.73	-0.13
	Max. H_z	3	44.29	-0.13	35.28
	Max. M_x	2	4519.33	-0.13	35.28
	Max. M_z	8	4427.02	-34.73	0.13
	Max. Torsion	6	4.33	-30.14	17.75
	Min. Vert	11	44.29	-30.01	-17.53
	Min. H_x	8	59.06	-34.73	0.13
	Min. H_z	14	59.06	0.13	-35.28
	Min. M_x	14	-4518.77	0.13	-35.28
	Min. M_z	20	-4429.73	34.73	-0.13
	Min. Torsion	18	-4.33	30.14	-17.75

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.21	0.00	0.00	-0.22	1.05	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	59.06	0.13	-35.28	-4519.33	-20.11	-2.96
0.9 Dead+1.0 Wind 0 deg -	44.29	0.13	-35.28	-4469.68	-20.21	-2.95

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
No Ice						
1.2 Dead+1.0 Wind 30 deg - No Ice	59.06	17.48	-30.62	-3924.61	-2231.29	-4.21
0.9 Dead+1.0 Wind 30 deg - No Ice	44.29	17.48	-30.62	-3881.48	-2207.16	-4.19
1.2 Dead+1.0 Wind 60 deg - No Ice	59.06	30.14	-17.75	-2278.42	-3844.35	-4.33
0.9 Dead+1.0 Wind 60 deg - No Ice	44.29	30.14	-17.75	-2253.35	-3802.57	-4.32
1.2 Dead+1.0 Wind 90 deg - No Ice	59.06	34.73	-0.13	-21.69	-4427.02	-3.30
0.9 Dead+1.0 Wind 90 deg - No Ice	44.29	34.73	-0.13	-21.36	-4378.87	-3.29
1.2 Dead+1.0 Wind 120 deg - No Ice	59.06	30.01	17.53	2240.85	-3822.99	-1.37
0.9 Dead+1.0 Wind 120 deg - No Ice	44.29	30.01	17.53	2216.35	-3781.47	-1.37
1.2 Dead+1.0 Wind 150 deg - No Ice	59.06	17.25	30.49	3902.74	-2194.19	0.93
0.9 Dead+1.0 Wind 150 deg - No Ice	44.29	17.25	30.49	3860.01	-2170.52	0.92
1.2 Dead+1.0 Wind 180 deg - No Ice	59.06	-0.13	35.28	4518.77	22.76	2.99
0.9 Dead+1.0 Wind 180 deg - No Ice	44.29	-0.13	35.28	4469.27	22.15	2.97
1.2 Dead+1.0 Wind 210 deg - No Ice	59.06	-17.48	30.62	3924.08	2233.92	4.23
0.9 Dead+1.0 Wind 210 deg - No Ice	44.29	-17.48	30.62	3881.09	2209.09	4.21
1.2 Dead+1.0 Wind 240 deg - No Ice	59.06	-30.14	17.75	2277.94	3847.01	4.33
0.9 Dead+1.0 Wind 240 deg - No Ice	44.29	-30.14	17.75	2252.99	3804.52	4.32
1.2 Dead+1.0 Wind 270 deg - No Ice	59.06	-34.73	0.13	21.20	4429.73	3.27
0.9 Dead+1.0 Wind 270 deg - No Ice	44.29	-34.73	0.13	21.00	4380.85	3.27
1.2 Dead+1.0 Wind 300 deg - No Ice	59.06	-30.01	-17.53	-2241.38	3825.72	1.34
0.9 Dead+1.0 Wind 300 deg - No Ice	44.29	-30.01	-17.53	-2216.74	3783.47	1.35
1.2 Dead+1.0 Wind 330 deg - No Ice	59.06	-17.25	-30.49	-3903.31	2196.88	-0.93
0.9 Dead+1.0 Wind 330 deg - No Ice	44.29	-17.25	-30.49	-3860.43	2172.50	-0.92
1.2 Dead+1.0 Ice+1.0 Temp	87.15	-0.00	-0.00	-0.47	4.31	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	87.15	0.01	-7.66	-981.90	2.40	-0.56
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	87.15	3.80	-6.64	-851.49	-481.83	-0.70
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	87.15	6.57	-3.84	-493.06	-835.73	-0.66
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	87.15	7.58	-0.01	-2.64	-964.48	-0.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	87.15	6.56	3.82	488.34	-833.59	-0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	87.15	3.78	6.62	848.34	-478.12	0.26
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	87.15	-0.01	7.66	980.89	6.67	0.56
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	87.15	-3.80	6.64	850.47	490.89	0.70
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	87.15	-6.57	3.84	492.04	844.80	0.66
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	87.15	-7.58	0.01	1.63	973.55	0.44
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	87.15	-6.56	-3.82	-489.36	842.66	0.11
1.2 Dead+1.0 Wind 330	87.15	-3.78	-6.62	-849.35	487.19	-0.26

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
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	49.21	0.02	-6.24	-794.29	-2.64	-0.53
Dead+Wind 30 deg - Service	49.21	3.09	-5.41	-689.79	-391.18	-0.75
Dead+Wind 60 deg - Service	49.21	5.33	-3.14	-400.52	-674.59	-0.77
Dead+Wind 90 deg - Service	49.21	6.14	-0.02	-4.00	-776.95	-0.59
Dead+Wind 120 deg - Service	49.21	5.30	3.10	393.53	-670.83	-0.24
Dead+Wind 150 deg - Service	49.21	3.05	5.39	685.55	-384.65	0.17
Dead+Wind 180 deg - Service	49.21	-0.02	6.24	793.82	4.89	0.53
Dead+Wind 210 deg - Service	49.21	-3.09	5.41	689.32	393.42	0.75
Dead+Wind 240 deg - Service	49.21	-5.33	3.14	400.05	676.83	0.77
Dead+Wind 270 deg - Service	49.21	-6.14	0.02	3.53	779.19	0.59
Dead+Wind 300 deg - Service	49.21	-5.30	-3.10	-394.00	673.07	0.24
Dead+Wind 330 deg - Service	49.21	-3.05	-5.39	-686.02	386.90	-0.17

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	-49.21	0.00	0.00	49.21	0.00	0.000%
2	0.13	-59.06	-35.28	-0.13	59.06	35.28	0.000%
3	0.13	-44.29	-35.28	-0.13	44.29	35.28	0.000%
4	17.48	-59.06	-30.62	-17.48	59.06	30.62	0.000%
5	17.48	-44.29	-30.62	-17.48	44.29	30.62	0.000%
6	30.14	-59.06	-17.75	-30.14	59.06	17.75	0.000%
7	30.14	-44.29	-17.75	-30.14	44.29	17.75	0.000%
8	34.73	-59.06	-0.13	-34.73	59.06	0.13	0.000%
9	34.73	-44.29	-0.13	-34.73	44.29	0.13	0.000%
10	30.01	-59.06	17.53	-30.01	59.06	-17.53	0.000%
11	30.01	-44.29	17.53	-30.01	44.29	-17.53	0.000%
12	17.25	-59.06	30.49	-17.25	59.06	-30.49	0.000%
13	17.25	-44.29	30.49	-17.25	44.29	-30.49	0.000%
14	-0.13	-59.06	35.28	0.13	59.06	-35.28	0.000%
15	-0.13	-44.29	35.28	0.13	44.29	-35.28	0.000%
16	-17.48	-59.06	30.62	17.48	59.06	-30.62	0.000%
17	-17.48	-44.29	30.62	17.48	44.29	-30.62	0.000%
18	-30.14	-59.06	17.75	30.14	59.06	-17.75	0.000%
19	-30.14	-44.29	17.75	30.14	44.29	-17.75	0.000%
20	-34.73	-59.06	0.13	34.73	59.06	-0.13	0.000%
21	-34.73	-44.29	0.13	34.73	44.29	-0.13	0.000%
22	-30.01	-59.06	-17.53	30.01	59.06	17.53	0.000%
23	-30.01	-44.29	-17.53	30.01	44.29	17.53	0.000%
24	-17.25	-59.06	-30.49	17.25	59.06	30.49	0.000%
25	-17.25	-44.29	-30.49	17.25	44.29	30.49	0.000%
26	0.00	-87.15	0.00	0.00	87.15	0.00	0.000%
27	0.01	-87.15	-7.66	-0.01	87.15	7.66	0.000%
28	3.80	-87.15	-6.64	-3.80	87.15	6.64	0.000%
29	6.57	-87.15	-3.84	-6.57	87.15	3.84	0.000%
30	7.58	-87.15	-0.01	-7.58	87.15	0.01	0.000%
31	6.56	-87.15	3.82	-6.56	87.15	-3.82	0.000%
32	3.78	-87.15	6.62	-3.78	87.15	-6.62	0.000%
33	-0.01	-87.15	7.66	0.01	87.15	-7.66	0.000%
34	-3.80	-87.15	6.64	3.80	87.15	-6.64	0.000%
35	-6.57	-87.15	3.84	6.57	87.15	-3.84	0.000%
36	-7.58	-87.15	0.01	7.58	87.15	-0.01	0.000%
37	-6.56	-87.15	-3.82	6.56	87.15	3.82	0.000%
38	-3.78	-87.15	-6.62	3.78	87.15	6.62	0.000%
39	0.02	-49.21	-6.24	-0.02	49.21	6.24	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
40	3.09	-49.21	-5.41	-3.09	49.21	5.41	0.000%
41	5.33	-49.21	-3.14	-5.33	49.21	3.14	0.000%
42	6.14	-49.21	-0.02	-6.14	49.21	0.02	0.000%
43	5.30	-49.21	3.10	-5.30	49.21	-3.10	0.000%
44	3.05	-49.21	5.39	-3.05	49.21	-5.39	0.000%
45	-0.02	-49.21	6.24	0.02	49.21	-6.24	0.000%
46	-3.09	-49.21	5.41	3.09	49.21	-5.41	0.000%
47	-5.33	-49.21	3.14	5.33	49.21	-3.14	0.000%
48	-6.14	-49.21	0.02	6.14	49.21	-0.02	0.000%
49	-5.30	-49.21	-3.10	5.30	49.21	3.10	0.000%
50	-3.05	-49.21	-5.39	3.05	49.21	5.39	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	0.00006139
3	Yes	4	0.00000001	0.00076019
4	Yes	6	0.00000001	0.00005086
5	Yes	5	0.00000001	0.00044166
6	Yes	6	0.00000001	0.00005703
7	Yes	5	0.00000001	0.00049652
8	Yes	5	0.00000001	0.00009656
9	Yes	5	0.00000001	0.00004488
10	Yes	6	0.00000001	0.00005154
11	Yes	5	0.00000001	0.00044834
12	Yes	6	0.00000001	0.00005206
13	Yes	5	0.00000001	0.00045248
14	Yes	5	0.00000001	0.00008965
15	Yes	5	0.00000001	0.00004108
16	Yes	6	0.00000001	0.00005740
17	Yes	5	0.00000001	0.00049910
18	Yes	6	0.00000001	0.00005086
19	Yes	5	0.00000001	0.00044200
20	Yes	5	0.00000001	0.00006902
21	Yes	4	0.00000001	0.00085975
22	Yes	6	0.00000001	0.00005373
23	Yes	5	0.00000001	0.00046740
24	Yes	6	0.00000001	0.00005360
25	Yes	5	0.00000001	0.00046562
26	Yes	4	0.00000001	0.00002357
27	Yes	5	0.00000001	0.00030616
28	Yes	5	0.00000001	0.00034939
29	Yes	5	0.00000001	0.00035112
30	Yes	5	0.00000001	0.00029833
31	Yes	5	0.00000001	0.00034507
32	Yes	5	0.00000001	0.00034678
33	Yes	5	0.00000001	0.00030497
34	Yes	5	0.00000001	0.00035806
35	Yes	5	0.00000001	0.00035236
36	Yes	5	0.00000001	0.00030401
37	Yes	5	0.00000001	0.00035330
38	Yes	5	0.00000001	0.00035546
39	Yes	4	0.00000001	0.00006125
40	Yes	4	0.00000001	0.00014228
41	Yes	4	0.00000001	0.00020193
42	Yes	4	0.00000001	0.00006733
43	Yes	4	0.00000001	0.00014447
44	Yes	4	0.00000001	0.00014785
45	Yes	4	0.00000001	0.00006411
46	Yes	4	0.00000001	0.00020574
47	Yes	4	0.00000001	0.00014512
48	Yes	4	0.00000001	0.00006489
49	Yes	4	0.00000001	0.00016730

50	Yes	4	0.00000001	0.00016466

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	179.5 - 129.75	21.407	39	1.1192	0.0067
L2	134.25 - 84.58	11.459	39	0.9001	0.0029
L3	90.41 - 40.7	4.798	39	0.5336	0.0011
L4	47.78 - 0	1.273	39	0.2458	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	Transition Ladder	39	20.821	1.1097	0.0064	56952
167.00	Side Arm Mount [SO 102-3]	39	18.493	1.0707	0.0055	22780
165.00	Platform Mount [LP 303-1]	39	18.032	1.0625	0.0053	19638
155.00	Platform Mount [LP 303-1]	39	15.772	1.0185	0.0044	11622
60.00	Side Arm Mount [SO 701-1]	39	2.001	0.3181	0.0005	7944

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	179.5 - 129.75	121.794	2	6.3677	0.0372
L2	134.25 - 84.58	65.239	2	5.1282	0.0162
L3	90.41 - 40.7	27.322	2	3.0398	0.0061
L4	47.78 - 0	7.246	2	1.3995	0.0021

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	Transition Ladder	2	118.467	6.3142	0.0363	10251
167.00	Side Arm Mount [SO 102-3]	2	105.232	6.0948	0.0309	4099
165.00	Platform Mount [LP 303-1]	2	102.613	6.0488	0.0299	3533
155.00	Platform Mount [LP 303-1]	2	89.764	5.8008	0.0249	2088
60.00	Side Arm Mount [SO 701-1]	2	11.394	1.8116	0.0029	1397

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	179.5 - 129.75 (1)	TP31.86x19.59x0.3125	49.75	0.00	0.0	30.1903	-14.21	2229.84	0.006
L2	129.75 - 84.58 (2)	TP42.26x30.1252x0.375	49.67	0.00	0.0	48.1583	-23.98	3462.78	0.007
L3	84.58 - 40.7 (3)	TP52.21x40.0857x0.4375	49.71	0.00	0.0	69.4947	-37.89	4912.87	0.008
L4	40.7 - 0 (4)	TP61.25x49.6082x0.5	47.78	0.00	0.0	96.4102	-59.04	6687.94	0.009

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	179.5 - 129.75 (1)	TP31.86x19.59x0.3125	657.79	1392.33	0.472	0.00	1392.33	0.000
L2	129.75 - 84.58 (2)	TP42.26x30.1252x0.375	1715.01	2877.03	0.596	0.00	2877.03	0.000
L3	84.58 - 40.7 (3)	TP52.21x40.0857x0.4375	2936.12	5051.43	0.581	0.00	5051.43	0.000
L4	40.7 - 0 (4)	TP61.25x49.6082x0.5	4519.38	8351.67	0.541	0.00	8351.67	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	179.5 - 129.75 (1)	TP31.86x19.59x0.3125	21.88	529.84	0.041	4.08	1383.47	0.003
L2	129.75 - 84.58 (2)	TP42.26x30.1252x0.375	26.35	845.18	0.031	2.81	2939.50	0.001
L3	84.58 - 40.7 (3)	TP52.21x40.0857x0.4375	30.87	1219.63	0.025	2.96	5252.29	0.001
L4	40.7 - 0 (4)	TP61.25x49.6082x0.5	35.31	1692.00	0.021	2.96	8854.17	0.000

Pole Interaction Design Data

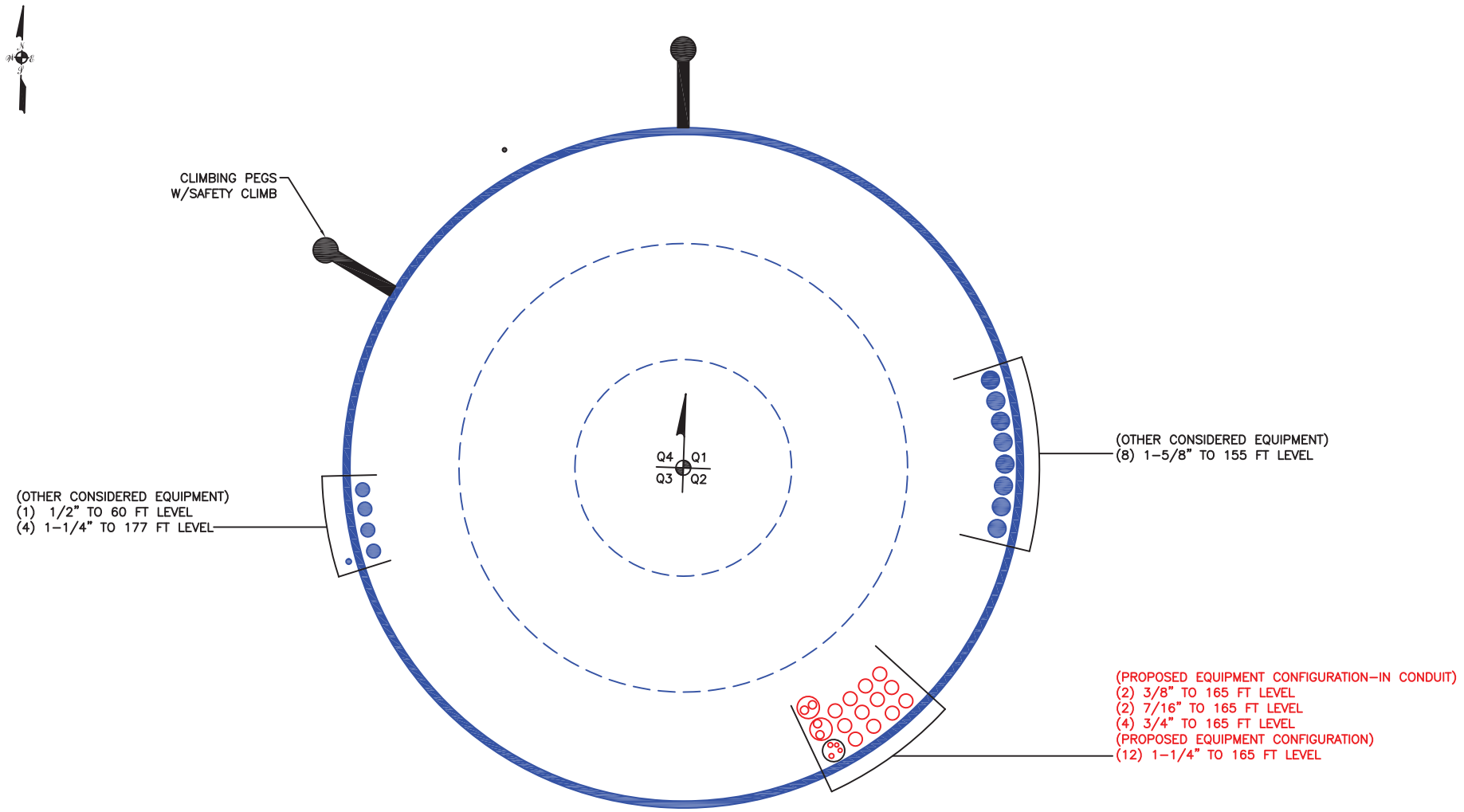
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	179.5 - 129.75 (1)	0.006	0.472	0.000	0.041	0.003	0.481	1.050	4.8.2
L2	129.75 - 84.58 (2)	0.007	0.596	0.000	0.031	0.001	0.604	1.050	4.8.2
L3	84.58 - 40.7 (3)	0.008	0.581	0.000	0.025	0.001	0.590	1.050	4.8.2
L4	40.7 - 0 (4)	0.009	0.541	0.000	0.021	0.000	0.550	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	179.5 - 129.75	Pole	TP31.86x19.59x0.3125	1	-14.21	2341.33	45.8	Pass
L2	129.75 - 84.58	Pole	TP42.26x30.1252x0.375	2	-23.98	3635.92	57.5	Pass
L3	84.58 - 40.7	Pole	TP52.21x40.0857x0.4375	3	-37.89	5158.51	56.2	Pass
L4	40.7 - 0	Pole	TP61.25x49.6082x0.5	4	-59.04	7022.34	52.4	Pass
							Summary	
						Pole (L2)	57.5	Pass
						RATING =	**57.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876367 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

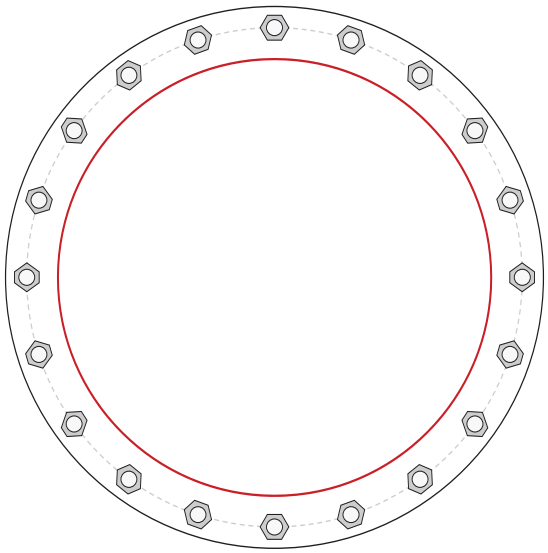
Monopole Base Plate Connection

Site Info	
BU #	876367
Site Name	ppingers Falls / BOB's A
Order #	471668 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	4519.38
Axial Force (kips)	59.04
Shear Force (kips)	35.31

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 70" BC

Base Plate Data

76" OD x 2.25" Plate (A871-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

61.25" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 157.84	ϕPn_c = 243.75	**Stress Rating**
Vu = 1.77	ϕVn = 73.13	**61.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	34.75	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**61.3%**	**Pass**

Pier and Pad Foundation

BU # :	876367
Site Name:	Wappingers Falls /
App. Number:	471668 Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions

Compression, P_{comp}:	59	kips
Base Shear, Vu_comp:	35	kips
Moment, M_u:	4519	ft-kips
Tower Height, **H**:	179.5	ft
BP Dist. Above Fdn, bp_{dist}:	5	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7.5	ft
Ext. Above Grade, **E**:	1	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	24	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	2	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.5	ft
Pad Width, **W**:	27	ft
Pad Thickness, **T**:	6	ft
Pad Rebar Size (Bottom), **Sp**:	11	
Pad Rebar Quantity (Bottom), **mp**:	27	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	100	pcf
Ultimate Gross Bearing, Qult:	16.650	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	99	
Base Friction, μ:	0.5	
Neglected Depth, **N**:	3.33	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)	348.30	35.00	**9.6%**	**Pass**
Bearing Pressure (ksf)	12.49	2.36	**18.9%**	**Pass**
*Overturning (kip*ft)*	8497.20	4796.08	**56.4%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6587.09	4571.50	**66.1%**	**Pass**
Pier Compression (kip)	35802.00	74.19	**0.2%**	**Pass**
*Pad Flexure (kip*ft)*	12459.97	1681.58	**12.9%**	**Pass**
Pad Shear - 1-way (kips)	2055.87	165.50	**7.7%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.011	**5.6%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	23200.14	2742.90	**11.3%**	**Pass**

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

Soil Rating*:	**56.4%**
Structural Rating*:	**66.1%**

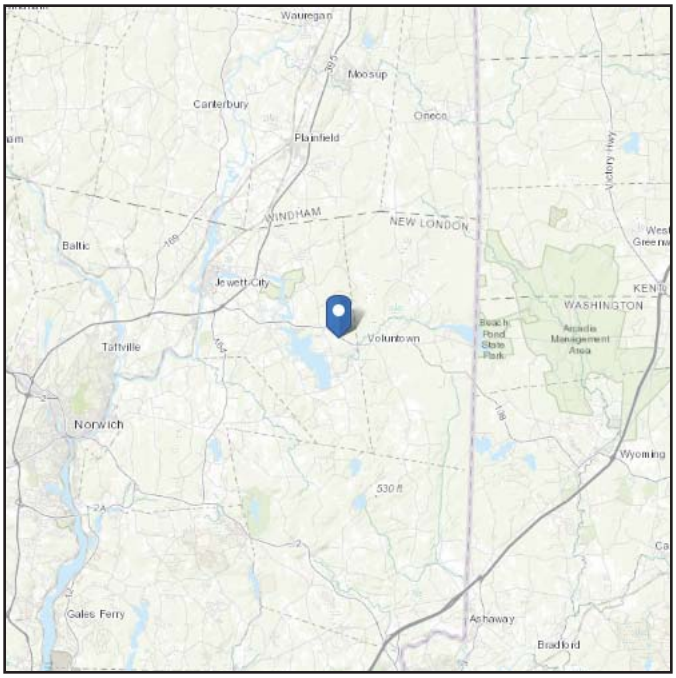
Version 3.1.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 285.92 ft (NAVD 88)
Latitude: 41.576108
Longitude: -71.888044



Wind

Results:	**79 Vmph**
Wind Speed:	133 Vmph
10-year MRI	79 Vmph
25-year MRI	89 Vmph
50-year MRI	99 Vmph
100-year MRI	108 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Mon Dec 17 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

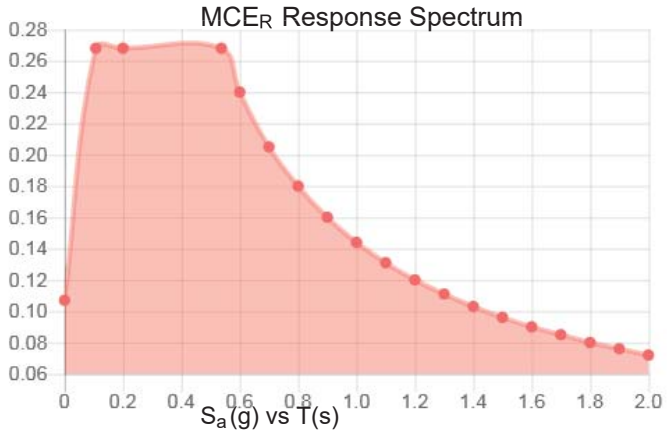
Seismic

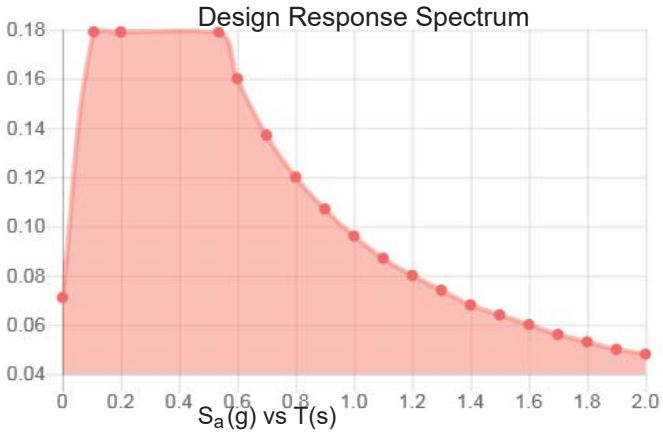
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.167	S_{DS} :	0.179
S_1 :	0.060	S_{D1} :	0.096
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.084
S_{MS} :	0.268	PGA_M :	0.134
S_{M1} :	0.144	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Dec 17 2018

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:	Mon Dec 17 2018

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.