



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

January 31, 2019

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

RE: Notice of Exempt Modification for Crown Site BU: 806386
AT&T Site ID: 10091758
83 Reeds Gap Road, North Branford, CT 06472
Latitude: 41° 24' 12.47"/ Longitude: -72° 44' 38.90"

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 65-foot level of the existing 92-foot monopole at 83 Reeds Gap Road, North Branford, CT 06472. The tower is owned by Crown Castle. The property is owned by Mary A. Liska. AT&T intends to replace (6) of the existing antennas with (6) new antennas, remove (6) Diplexers, replace (3) existing RRUS with (3) RRUs, add (2) DC6's, add (2) fiber cables and add (2) DC power cables.

The facility was approved by the Town of Stafford Springs Planning and Zoning Commission. I have requested the original approval from the Town but have not received same to date.

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 The Honorable Michael J. Doody, Mayor of the Town of North Branford, Carey Duques, Planning and Zoning Administrator/Town Planner for the Town of North Branford, and Mary A. Liska as the property owner. 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.

Melanie A. Bachman

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Page 2

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

Sincerely,



Anne Marie Zsamba, Esq.

Real Estate Specialist

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

(201) 236-9224

annemarie.zsamba@crowncastle.com

Attachments:

Tab 1: Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes

Tab 2: Exhibit-B: Structural Modification Report

Tab 3: Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Michael J. Doody
Town of North Branford – Town Manager’s Office
909 Foxon Road
North Branford, CT 06471

Carey Duques- Planning and Zoning Administrator/Town Planner
Town of North Branford
909 Foxon Road
North Branford, CT 06471

Mary A Liska- Landowner
332 Waties Drive
Murrells Inlet, SC 29576

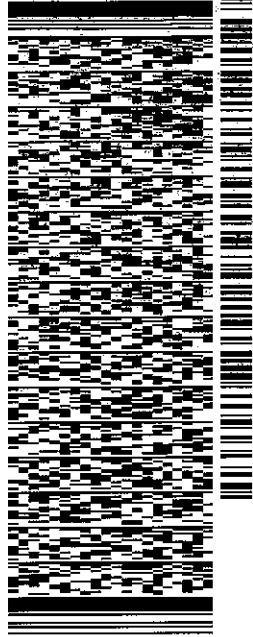
ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBIA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 31 JAN 19
ACTWGT: 3.50 LB
CAD: 104924194INNET4100

BILL SENDER

TO MELANIE BACHMAN
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
(860) 827-2951 REF: 17656990
INV/ DEPT:
PO:

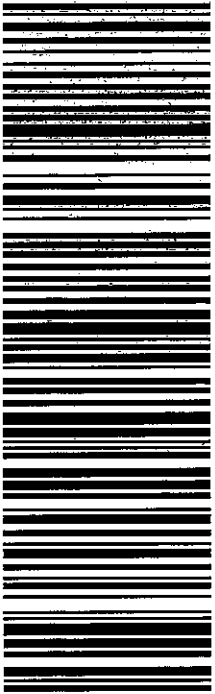


565J20E3D/23AD

TRK# 7743 5829 2961
0201

FRI - 01 FEB 10:30A
PRIORITY OVERNIGHT

EB BDLA 06051
CT-US BDL



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

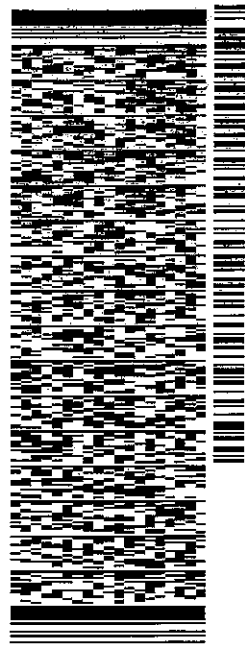
SHIP DATE: 31 JAN 19
ACTWTGT: 1.50 LB
CAD: 104924194/NET4100
BILL SENDER

TO MARY A LISKA

332 WATIES DRIVE

MURRELLS INLET SC 29576
(201) 236-9224 REF: 1734/7690

PO. DEPT.



J191015010701ev

565J20E3D/23AD

TRK# 7743 5828 1254
0201

FRI - 01 FEB 12:00P
PRIORITY OVERNIGHT

XH GGEA

SC-US 29576
CAE



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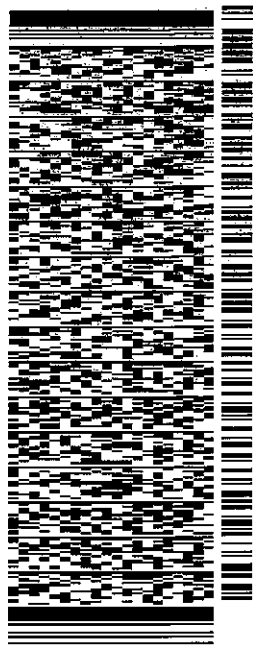
ORIGIN ID: GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 31 JAN 19
ACTWGT: 1.50 LB
CAD: 104924194/NET14100
BILL SENDER

TO CAREY DUQUES - TOWN PLANNER

TOWN OF NORTH BRANFORD
909 FOXON ROAD
NORTH BRANFORD CT 06471
(201) 236-9224 REF: 17347690
INVT
PO. DEPT.

565J20E3D/23AD

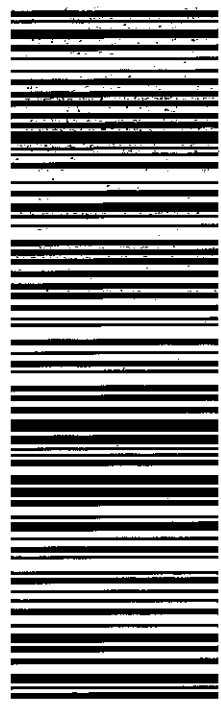


TRK# 7743 5826 6703
0201

FRI - 01 FEB 10:30A
PRIORITY OVERNIGHT

EB RSPA

06471
CT-US BDL



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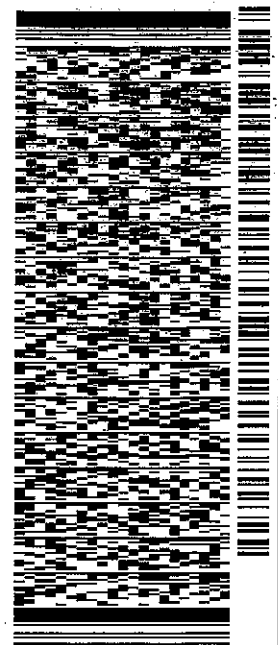
ORIGIN:DGFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 31 JAN 19
ACTWGT: 1.50 LB
CAD: 104924194/NET4100

BILL SENDER

TO TOWN OF NORTH BRANFORD
MICHAEL J. DOODY, MAYOR
TOWN MANAGERS OFFICE
909 FOXON ROAD
NORTH BRANFORD CT 06471
(201) 236-9224
REF: 1734/7680
PO. DEPT.

565J20E3D/23AD



FRI - 01 FEB 10:30A

PRIORITY OVERNIGHT

TRK# 7743 5825 1413
0201

EB RSPA

06471
CT-US BDL

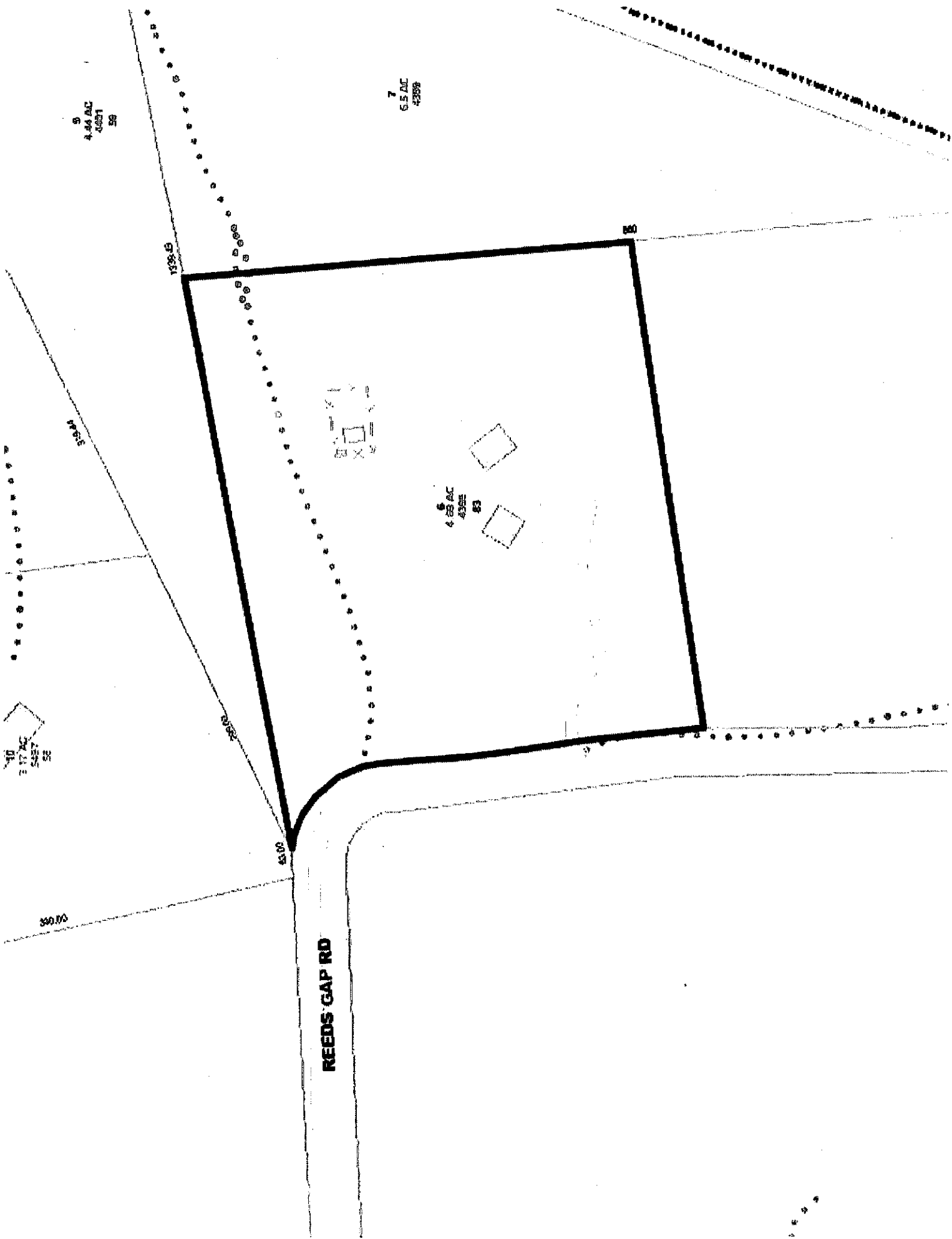


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5
4.94 AC
48071
50

7
6.5 AC
42898

6
4.83 AC
43282
53

10
3.17 AC
42877
58

1335.5

85

354.5

655.2

43.00

350.00

REEDS GAP RD

83 REEDS GAP RD

Location 83 REEDS GAP RD

Mblu 70/B 6/ / /

Acct# 002385

Owner TAMULEVICH DAVID

Assessment \$269,400

Appraisal \$384,800

PID 4398

Building Count 1

Current Value

| Appraisal | | | |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2015 | \$186,100 | \$198,700 | \$384,800 |

| Assessment | | | |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2015 | \$130,300 | \$139,100 | \$269,400 |

Owner of Record

Owner TAMULEVICH DAVID

Sale Price \$120,000

Co-Owner

Certificate

Address 83 REEDS GAP RD

Book & Page 465/1113

NORTHFORD, CT 06472-1122

Sale Date 01/02/2014

Instrument 08

Ownership History

| Ownership History | | | | | |
|--------------------|------------|-------------|-------------|------------|------------|
| Owner | Sale Price | Certificate | Book & Page | Instrument | Sale Date |
| TAMULEVICH DAVID | \$120,000 | | 465/1113 | 08 | 01/02/2014 |
| LISKA MARY TRUSTEE | \$0 | | 451/ 511 | | 06/14/2012 |
| LISKA MARY | \$0 | | 212/ 677 | | 09/20/1991 |

Building Information

Building 1 : Section 1

Year Built: 1983
Living Area: 1,666
Replacement Cost: \$140,202
Building Percent 86
Good:
Replacement Cost
Less Depreciation: \$120,600

Building Attributes

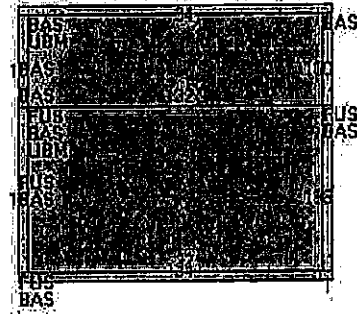
| Field | Description |
|--------------------|----------------|
| Style | Colonial |
| Model | Residential |
| Grade: | Average |
| Stories: | 2 Stories |
| Occupancy | 1 |
| Exterior Wall 1 | Cedar or Redwd |
| Exterior Wall 2 | |
| Roof Structure: | Salt Box |
| Roof Cover | Asphalt Shingl |
| Interior Wall 1 | Drywall/Sheet |
| Interior Wall 2 | Knotty Pine Pa |
| Interior Flr 1 | Pine/Soft Wood |
| Interior Flr 2 | Carpet |
| Heat Fuel | Electric |
| Heat Type: | Geothermal |
| AC Type: | Heat Pump |
| Total Bedrooms: | 2 Bedrooms |
| Total Bthrms: | 2 |
| Total Half Baths: | 0 |
| Total Xtra Fixtrs: | |
| Total Rooms: | 4 Rooms |
| Bath Style: | Average |
| Kitchen Style: | Average |

Building Photo



(<http://images.vgsi.com/photos/NorthBranfordCTPhotos//\00\01>)

Building Layout



(<http://images.vgsi.com/photos/NorthBranfordCTPhotos//Sketch>)

| Building Sub-Areas (sq ft) | | | Legend |
|----------------------------|----------------------|------------|-------------|
| Code | Description | Gross Area | Living Area |
| BAS | First Floor | 1,020 | 1,020 |
| FUS | Full Upper Story | 646 | 646 |
| UBM | Basement, Unfinished | 896 | 0 |
| | | 2,562 | 1,666 |

Extra Features

| Extra Features | | | | Legend |
|----------------|----------------|---------|---------|--------|
| Code | Description | Size | Value | Bldg # |
| FPL1 | FIREPLACE 1STY | 1 UNITS | \$3,400 | 1 |
| FPO | EXTRA FPL OPEN | 1 UNITS | \$1,300 | 1 |

Land

Land Use

Land Line Valuation

Use Code 1010
Description SINGLE FAM MDL-01
Zone R80
Neighborhood
Alt Land Appr No
Category

Size (Acres) 4.69
Frontage 0
Depth 0
Assessed Value \$139,100
Appraised Value \$198,700

Outbuildings

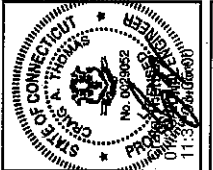
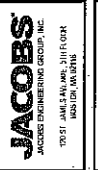
| Outbuildings | | | | | | Legend |
|--------------|----------------------|----------|-----------------|-----------|----------|--------|
| Code | Description | Sub Code | Sub Description | Size | Value | Bldg # |
| BRN3 | BARN 1 STY W/LOFT | | | 1200 S.F. | \$29,300 | 1 |
| ELCB | ELECTRONIC COMM BLDG | | | 200 S.F. | \$31,500 | 1 |

Valuation History

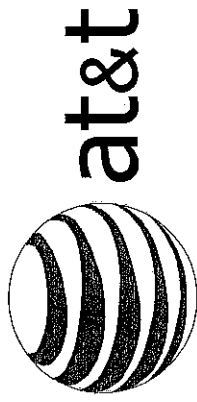
| Appraisal | | | |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2017 | \$186,100 | \$198,700 | \$384,800 |
| 2016 | \$186,100 | \$198,700 | \$384,800 |
| 2015 | \$186,100 | \$198,700 | \$384,800 |

| Assessment | | | |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land | Total |
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| 2015 | \$130,300 | \$139,100 | \$269,400 |

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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.



SITE NUMBER: CTL05634

FA LOCATION CODE: 10091758

SITE NAME: GUILFORD - SR17

CROWN SITE NAME: NHV 106 943628

PROJECT: LTE 2C/3C/4C/4TX4RX

PACE ID: MRCTB035196, MRCTB035233, MRCTB035174,

MRCTB035315

BU#: 806386

PROJECT INFORMATION

SCOPE OF WORK

- ITEMS TO BE MOUNTED ON THE EXISTING TOWER
 - INSTALL 1X1 ANTENNA (P/MS/SS/BAK) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 - INSTALL 1X1 ANTENNA (P/MS/SS/BAK) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 - INSTALL 1X1 ANTENNA (P/MS/SS/BAK) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 - INSTALL ERGONOMY RINGS 448 35672 (609709) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 - INSTALL ERGONOMY RINGS 3643 39989A (448925) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
 - INSTALL 2X 1/2" TRUNKS 411 FIBER CABLE
- ITEMS TO BE MOUNTED ON EXISTING CONCRETE PAD:
 - SHAW 650 1471 1633
 - ADD 560 FIBER BOX
- ITEMS TO REMAIN:
 - 1) ANTENNAE, (2) TMS, (3) BMS, (4) TDS, (5) DCS SURGE SUPPRESSOR

ITEMS TO BE MOUNTED ON EXISTING CONCRETE PAD:

- SHAW 650 1471 1633
- ADD 560 FIBER BOX

ITEMS TO REMAIN:

- 1) ANTENNAE, (2) TMS, (3) BMS, (4) TDS, (5) DCS SURGE SUPPRESSOR

SITE ADDRESS: 43 REEDS GAP ROAD
NORTH BRANFORD, CT 06472

LATITUDE (NAD 83): N 41° 24' 25.17"
LONGITUDE (NAD 83): W 72° 44' 38.90"

LANDLORD: CROWN CASTLE INTERNATIONAL
510 W. CLIMMINGS PARK, SITE 3000
WORWON, MA 01901

TYPE OF SITE: SELF-SUPPORT / OUTDOOR

TOWER HEIGHT: 69

RAD CENTER: TELECOMMUNICATIONS FACILITY

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY

DRAWING INDEX

| SHEET NO. | SHEET TITLE |
|-----------|---|
| T-1 | TITLE SHEET |
| GM-1 | GENERAL NOTES I |
| GM-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 |
| RF-1 | ANTENNA COURT & RF EQUIPMENT SCHEMATIC |
| GR-1 | GROUNDING DETAILS |

CROWN CASTLE SITE ID #: 806386
CROWN CASTLE SITE NAME: NHV 106 943628

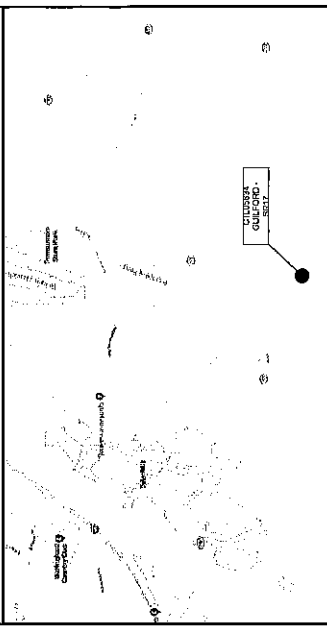
ENGINEERING

- 2018 CONNECTICUT STATE BUILDING CODE
- 2018 AMERICAN WIRELESS INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL MECHANICAL CODE
- 2015 INTERNATIONAL ENERGY CONSERVATION CODE
- 2017 NATIONAL ELECTRICAL CODE (NFPA 70: 2017)
- FAN510A-2243

GENERAL NOTES

- THE FACILITY IS AN UNMANNED STATION AND REMAINS EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR MAINTENANCE PURPOSES. ACCESS TO THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
- CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE NAE REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

VICINITY MAP



BEFORE USING COORDINATE ROAD, PLANNING AND LOCALITY, THEY MUST FIRST BE NORTH-BRANDFORD 181 NORTH, FOLLOW TO EXIT 2, TURN RIGHT LEFT ON REEDS GAP ROAD, TURN RIGHT ON REEDS GAP ROAD, FOLLOW THE ROAD TO THE END AND UP THE DIRT ROAD TO THE TOWER.



UNDERGROUND SERVICE ALERT
CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EXCAVATION OR OTHER WORKING ACTIVITIES BY CALLING 888-922-4455 OR DIAL 911

PROJECT NO: 10091758

DATE: 08/11/2017

CHECKED BY: CAT

SUBMITTALS

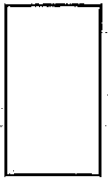
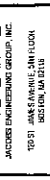
| | |
|---|-------------------------|
| 1 | ISSUED FOR CONSTRUCTION |
| 2 | ISSUED FOR PERMITTING |

THE DRAWING IS PROPERTY OF CROWN CASTLE. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF CROWN CASTLE. ANY UNAUTHORIZED REPRODUCTION OR TRANSMISSION IS STRICTLY PROHIBITED AND WILL BE PROSECUTED TO THE FULL EXTENT OF THE LAW.

FW# 10091758
SITE# CTL05634
GUILFORD - SR17
43 REEDS GAP ROAD
NORTH BRANFORD, CT 06472

TITLE SHEET

T-1



PROJ: 11611151000

SHEET NO: 11611151000

DATE: 11/12/12

PROJECT: 11611151000

DRY: 11611151000

SCALE: AS SHOWN

BY: [Signature]

CHECKED BY: [Signature]

DATE: [Date]

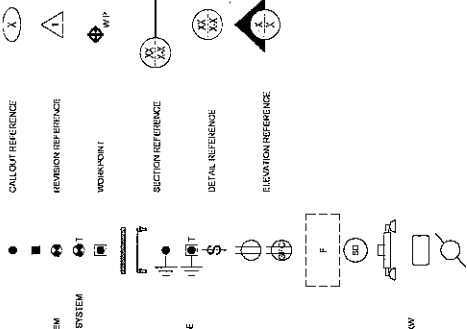
APPROVED BY: [Signature]

DATE: [Date]

GENERAL NOTES I

GENERAL NOTES II

GN-2



EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

○ MECHANICAL CONNECTION

○ ELECTRICAL CONNECTION

○ TEST POINT

○ GROUNDING POINT

○ GROUNDING POINT WITH INSULATION BARRIER

○ GROUNDING BAR

○ SHELFER GROUNDING BAR

○ GROUNDING ROD

○ TEST POINT

○ SWIMME TAPLE SWITCH

○ DEFLEXION RECEPACLE

○ DEFLEXION RECEPACLE

○ FLOURESCENT LIGHTING FIXTURE

○ TWO LAMPS 48-76

○ EXISTING SINGLE DETECTION (SD)

○ EXISTING EMERGENCY LIGHTING (EL)

○ SECURITY LIGHT VPHODCELLITHOWIA ALLOW

○ EXISTING UTILITY POLE

○ EXISTING CHAIN LINK FENCE

○ EXISTING WOODWORK FROM FENCE

○ EXISTING WALL STRUCTURE

○ LEASE AREA

○ PROPERTY LINE (PL)

○ SETBACKS

○ PROPOSED DRAINAGE DITCH

○ PROPOSED EXISTING CABLE TRAY

○ EXISTING WATER LINE

○ PROPOSED UNDERGROUND POWER

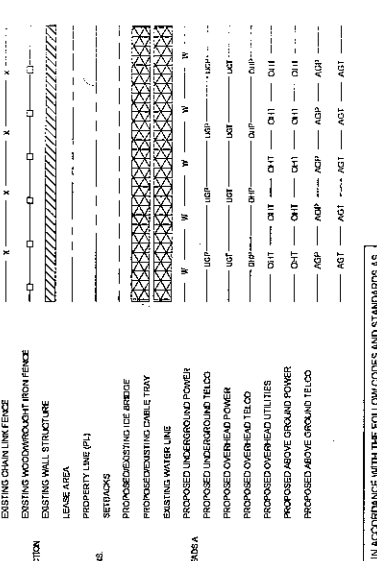
○ PROPOSED UNDERGROUND TELECO

○ PROPOSED OVERHEAD POWER

○ PROPOSED OVERHEAD TELECO

○ PROPOSED ABOVE GROUND POWER

○ PROPOSED ABOVE GROUND TELECO



11. CONTRACTOR SHALL REFER TO THE TOWER STRUCTURAL ANALYSIS DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/MOUNTING.

12. ALL STRUCTURAL CONNECTIONS SHALL BE WELDED TO THE TOWER STRUCTURE. ALL CONNECTIONS SHALL BE MADE TO THE TOWER STRUCTURE ON EACH TOWER AND EACH LAYER SHALL BE WELDED THREE TIMES WEATHERPROOFING SHALL BE SMOOTH WITHOUT BURRS. BLEEDING IS NOT ALLOWED.

13. IF REQUIRED TO MOUNT ANTENNAS AND/OR COAX:

14. ANTENNAS SHALL BE MOUNTED ON AN APPROVED MOUNTING SYSTEM AS SHOWN ON DRAWING.

15. FOR REGULATOR TOWERS, TAHOUEZ APPROVED PAINT IS REQUIRED.

16. DO NOT PAINT OVER COLORED OR EQUIPMENT IDENTIFICATION MARKINGS.

17. ALL CABLES SHALL BE GROUNDING WITH COAXIAL CABLE GROUNDING CABLES FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.

18. GROUNDING AT MID LEVEL.

19. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.

20. GROUNDING INSIDE THE EQUIPMENT SHELL AT ENTRY POINT.

21. GROUNDING INSIDE THE EQUIPMENT SHELL AT THE ENTRY POINT.

22. ALL PROPOSED GROUNDING BARS DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR.

23. MINIMUM CLEARANCE OF 6" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONNECTIONS IS THE CORRECT TYPE AND MODEL PRIOR TO INSTALLATION.

25. ALL CABLES FOR NUMBERING, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATIONS AND AS SHOWN ON DRAWING.

26. CONTRACTOR SHALL FURNISH AND INSTALL A 17'-4" SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

27. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.

28. CONTRACTOR SHALL DESIGN AND EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH THIS SECTION 200 AND ALL CHANGING AND TENDING REQUIREMENTS IN THE TOWER MANUFACTURER'S SPECIFICATIONS.

29. ALL GROUNDING CONDUCTORS SHALL BE COPPER, NO ALUMINUM CONDUCTORS SHALL BE USED.

30. ALL CABLES SHALL BE GROUNDING WITH COAXIAL CABLE GROUNDING SYSTEM, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.

31. GROUNDING AT ANTENNA LEVEL.

32. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200' ADDITIONAL CABLE GROUNDING IS REQUIRED.

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34. GROUNDING OUTSIDE THE EQUIPMENT SHELL AT ENTRY POINT.

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GROUNDING NOTES

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ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT NFPA 702 OR APPLICABLE LOCAL CODES.

2. ALL STEEL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A152, 29MC (HOT-DIP GALVANIZED) CONSTRUCTION FROM AND STEEL PROTECTANTS, UNLESS NOTED OTHERWISE.

3. ALL BOLTS, NUTS, WASHERS, AND BRACES AND HANGERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A152 29MC-GALVANIZING PROTECTANTS FROM AND STEEL PROTECTANTS, UNLESS NOTED OTHERWISE.

4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY GOLD OXIDIZING IN ACCORDANCE WITH ASTM A152 29MC-GALVANIZING PROTECTANTS FROM AND STEEL PROTECTANTS, UNLESS NOTED OTHERWISE.

5. ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCKWASHERS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.

6. ALL ANTENNAS SHALL BE INSTALLED WITH A 50-ohm LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.

7. ALL UNUSUAL PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-ohm LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.

8. PRIOR TO SETTING ANTENNA ASSEMBLIES AND DOWNLEADS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR PROPER ALIGNMENT AND IDENTIFICATION. ANTENNA CONTRACTOR SHALL MARK ANTENNA MOUNT WITH A RED MARKER TO IDENTIFY THE ANTENNA MOUNT. ANTENNA CONTRACTOR SHALL MARK ANTENNA MOUNT WITH A RED MARKER TO IDENTIFY THE ANTENNA MOUNT.

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10. CONTRACTOR SHALL RECORD THE SECTOR, A, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO THE CLIENT.

TOWER REQUIREMENTS

11. ALL UP CONNECTIONS SHALL BE IDENTIFIED BY A TORQUE WRENCH.

12. ALL UP CONNECTIONS, COAXING, HARDWARE, AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTRASTING STRAIGHT LINE FROM BOTH SIZES OF THE CONNECTION.

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THESE DOCUMENTS ARE IN COMPLIANCE WITH THE FOLLOWING CODES AND STANDARDS AS APPLICABLE. ZERO CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS AS APPLICABLE.

| COL | COUNTY | INDUSTRY | REG | QTY | QTY | QTY | QTY | QTY |
|-----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| ANP | ANNE ARD | ANNE ARD | ANNE ARD | ANNE ARD | ANNE ARD | ANNE ARD | ANNE ARD | ANNE ARD |
| AS | ALABAMA | ALABAMA | ALABAMA | ALABAMA | ALABAMA | ALABAMA | ALABAMA | ALABAMA |
| CA | CALIFORNIA | CALIFORNIA | CALIFORNIA | CALIFORNIA | CALIFORNIA | CALIFORNIA | CALIFORNIA | CALIFORNIA |
| CO | COLORADO | COLORADO | COLORADO | COLORADO | COLORADO | COLORADO | COLORADO | COLORADO |
| DC | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA |
| FL | FLORIDA | FLORIDA | FLORIDA | FLORIDA | FLORIDA | FLORIDA | FLORIDA | FLORIDA |
| GA | GEORGIA | GEORGIA | GEORGIA | GEORGIA | GEORGIA | GEORGIA | GEORGIA | GEORGIA |
| HI | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII |
| IA | IOWA | IOWA | IOWA | IOWA | IOWA | IOWA | IOWA | IOWA |
| IL | ILLINOIS | ILLINOIS | ILLINOIS | ILLINOIS | ILLINOIS | ILLINOIS | ILLINOIS | ILLINOIS |
| IN | INDIANA | INDIANA | INDIANA | INDIANA | INDIANA | INDIANA | INDIANA | INDIANA |
| KS | KANSAS | KANSAS | KANSAS | KANSAS | KANSAS | KANSAS | KANSAS | KANSAS |
| KY | KENTUCKY | KENTUCKY | KENTUCKY | KENTUCKY | KENTUCKY | KENTUCKY | KENTUCKY | KENTUCKY |
| LA | LOUISIANA | LOUISIANA | LOUISIANA | LOUISIANA | LOUISIANA | LOUISIANA | LOUISIANA | LOUISIANA |
| MA | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS | MASSACHUSETTS |
| MD | MARYLAND | MARYLAND | MARYLAND | MARYLAND | MARYLAND | MARYLAND | MARYLAND | MARYLAND |
| ME | MAINE | MAINE | MAINE | MAINE | MAINE | MAINE | MAINE | MAINE |
| MN | MINNESOTA | MINNESOTA | MINNESOTA | MINNESOTA | MINNESOTA | MINNESOTA | MINNESOTA | MINNESOTA |
| MO | MISSOURI | MISSOURI | MISSOURI | MISSOURI | MISSOURI | MISSOURI | MISSOURI | MISSOURI |
| MS | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI | MISSISSIPPI |
| MT | MONTANA | MONTANA | MONTANA | MONTANA | MONTANA | MONTANA | MONTANA | MONTANA |
| NC | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA | NORTH CAROLINA |
| ND | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA | NORTH DAKOTA |
| NE | NEBRASKA | NEBRASKA | NEBRASKA | NEBRASKA | NEBRASKA | NEBRASKA | NEBRASKA | NEBRASKA |
| NH | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE | NEW HAMPSHIRE |
| NJ | NEW JERSEY | NEW JERSEY | NEW JERSEY | NEW JERSEY | NEW JERSEY | NEW JERSEY | NEW JERSEY | NEW JERSEY |
| NM | NEW MEXICO | NEW MEXICO | NEW MEXICO | NEW MEXICO | NEW MEXICO | NEW MEXICO | NEW MEXICO | NEW MEXICO |
| NY | NEW YORK | NEW YORK | NEW YORK | NEW YORK | NEW YORK | NEW YORK | NEW YORK | NEW YORK |
| OH | OHIO | OHIO | OHIO | OHIO | OHIO | OHIO | OHIO | OHIO |
| OK | OKLAHOMA | OKLAHOMA | OKLAHOMA | OKLAHOMA | OKLAHOMA | OKLAHOMA | OKLAHOMA | OKLAHOMA |
| OR | OREGON | OREGON | OREGON | OREGON | OREGON | OREGON | OREGON | OREGON |
| PA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA | PENNSYLVANIA |
| RI | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND | RHODE ISLAND |
| SC | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA | SOUTH CAROLINA |
| SD | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA | SOUTH DAKOTA |
| TN | TENNESSEE | TENNESSEE | TENNESSEE | TENNESSEE | TENNESSEE | TENNESSEE | TENNESSEE | TENNESSEE |
| TX | TEXAS | TEXAS | TEXAS | TEXAS | TEXAS | TEXAS | TEXAS | TEXAS |
| UT | UTAH | UTAH | UTAH | UTAH | UTAH | UTAH | UTAH | UTAH |
| VA | VIRGINIA | VIRGINIA | VIRGINIA | VIRGINIA | VIRGINIA | VIRGINIA | VIRGINIA | VIRGINIA |
| VT | VERMONT | VERMONT | VERMONT | VERMONT | VERMONT | VERMONT | VERMONT | VERMONT |
| WA | WASHINGTON | WASHINGTON | WASHINGTON | WASHINGTON | WASHINGTON | WASHINGTON | WASHINGTON | WASHINGTON |
| WI | WISCONSIN | WISCONSIN | WISCONSIN | WISCONSIN | WISCONSIN | WISCONSIN | WISCONSIN | WISCONSIN |
| WV | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA | WEST VIRGINIA |
| WY | WYOMING | WYOMING | WYOMING | WYOMING | WYOMING | WYOMING | WYOMING | WYOMING |
| DC | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA | DISTRICT OF COLUMBIA |
| PR | Puerto Rico | Puerto Rico | Puerto Rico | Puerto Rico | Puerto Rico | Puerto Rico | Puerto Rico | Puerto Rico |
| AK | ALASKA | ALASKA | ALASKA | ALASKA | ALASKA | ALASKA | ALASKA | ALASKA |
| HI | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII | HAWAII |

GENERAL NOTES

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6. GROUNDING AT ANTENNA LEVEL.

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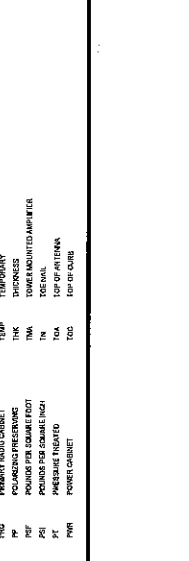
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GENERAL NOTES I

GENERAL NOTES II

GN-2



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11. ALL UP CONNECTIONS SHALL BE IDENTIFIED BY A TORQUE WRENCH.

12. ALL UP CONNECTIONS, COAXING, HARDWARE, AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTRASTING STRAIGHT LINE FROM BOTH SIZES OF THE CONNECTION.

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50. ALL COAXIAL ANTENNA HARDWARE SHALL BE IDENTIFIED BY A TORQUE WRENCH.

GENERAL NOTES

1. CONTRACTOR SHALL FURNISH AND INSTALL A 17'-4" SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

2. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.

3. CONTRACTOR SHALL DESIGN AND EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH THIS SECTION 200 AND ALL CHANGING AND TENDING REQUIREMENTS IN THE TOWER MANUFACTURER'S SPECIFICATIONS.

4. ALL GROUNDING CONDUCTORS SHALL BE COPPER, NO ALUMINUM CONDUCTORS SHALL BE USED.

5. ALL CABLES SHALL BE GROUNDING WITH COAXIAL CABLE GROUNDING SYSTEM, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.

6. GROUNDING AT ANTENNA LEVEL.

7. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200' ADDITIONAL CABLE GROUNDING IS REQUIRED.

8. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.

9. GROUNDING OUTSIDE THE EQUIPMENT SHELL AT ENTRY POINT.

10. GROUNDING INSIDE THE EQUIPMENT SHELL AT THE ENTRY POINT.

11. ALL PROPOSED GROUNDING BARS DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS. MINIMUM CLEARANCE OF 6" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

GENERAL NOTES I

GENERAL NOTES II

GN-2



GROUNDING NOTES

37. CONTRACTOR SHALL FURNISH AND INSTALL A 17'-4" SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

38. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.

39. CONTRACTOR SHALL DESIGN AND EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH THIS SECTION 200 AND ALL CHANGING AND TENDING REQUIREMENTS IN THE TOWER MANUFACTURER'S SPECIFICATIONS.

40. ALL GROUNDING CONDUCTORS SHALL BE COPPER, NO ALUMINUM CONDUCTORS SHALL BE USED.

41. ALL CABLES SHALL BE GROUNDING WITH COAXIAL CABLE GROUNDING SYSTEM, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.

42. GROUNDING AT ANTENNA LEVEL.

43. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200' ADDITIONAL CABLE GROUNDING IS REQUIRED.

44. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.

45. GROUNDING OUTSIDE THE EQUIPMENT SHELL AT ENTRY POINT.

46. GROUNDING INSIDE THE EQUIPMENT SHELL AT THE ENTRY POINT.

47. ALL PROPOSED GROUNDING BARS DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS. MINIMUM CLEARANCE OF 6" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT NFPA 702 OR APPLICABLE LOCAL CODES.

2. ALL STEEL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A152, 29MC (HOT-DIP GALVANIZED) CONSTRUCTION FROM AND STEEL PROTECTANTS, UNLESS NOT



300 WEST 34TH STREET
NEW YORK, NY 10018



300 WEST 34TH STREET
NEW YORK, NY 10018



2000 JAMES AVENUE, SUITE 1000
HOUSTON, TX 77058



PROJECT NO. 07-011
DATE 07/11/07

DRAWN BY: BRH
CHECKED BY: CAT

SUBMITTALS

| | | |
|---|-------|-------------------------|
| 1 | ISSUE | ISSUED FOR CONSTRUCTION |
| 2 | ISSUE | ISSUED FOR PERMITTING |

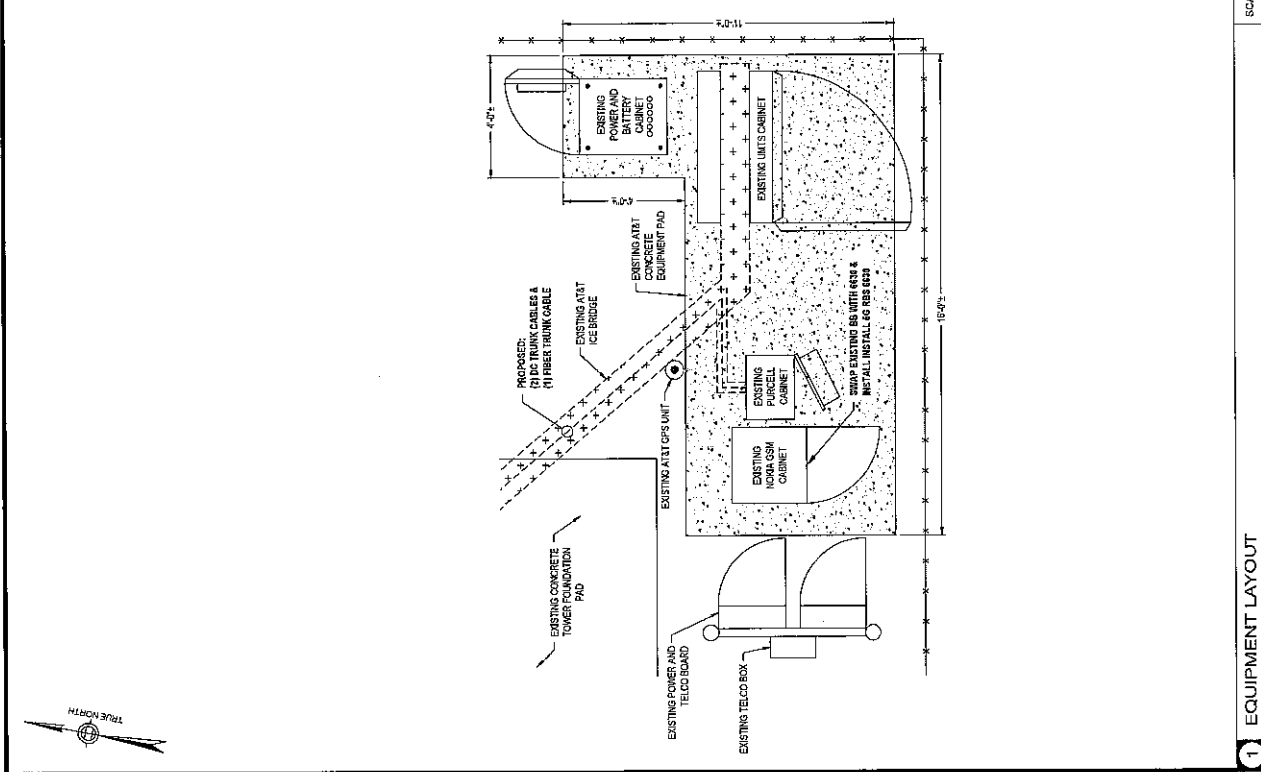
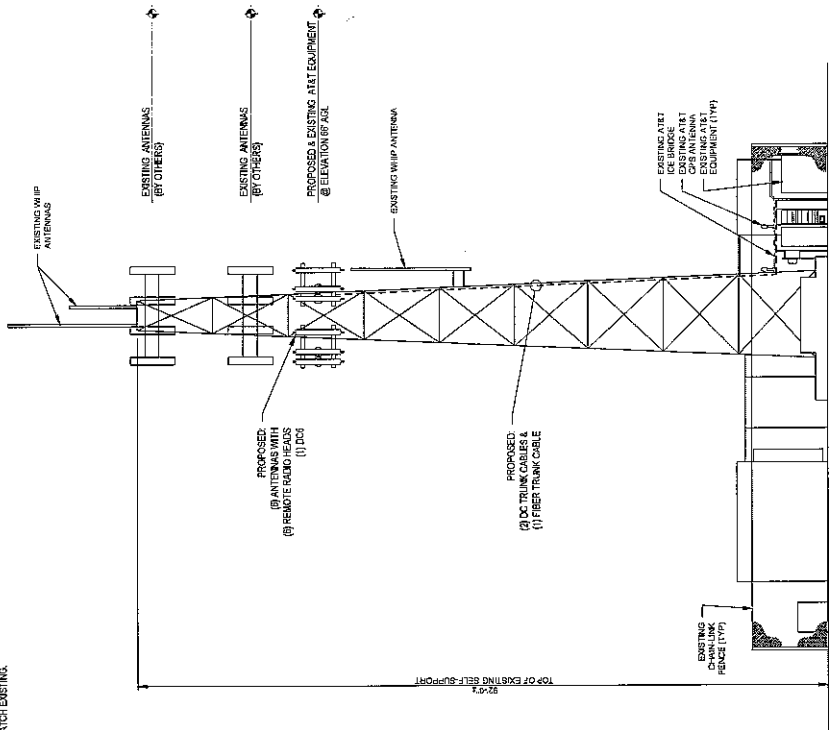
FAP 10091753
SITE CTL05034
GUILFORD - SR17
43 REEDS CREEK ROAD
NORTH BRANFORD, CT 06417

EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

C-2

NOTES:

1. CONTRACTOR TO VERIFY FINAL PC CONFIGURATION AND NOTIFY CARRIER AND ENGINEER IF ANY DISCREPANCIES PRIOR TO 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 CAPACITY OF THE EXISTING STRUCTURES. THE STRUCTURAL 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 PROPOSED LOADS AND CONFIGURATIONS OF TRANSMISSION LINES. ALL TRANSMISSION LINES SHALL 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.

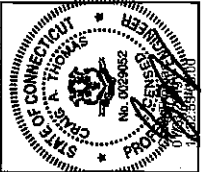
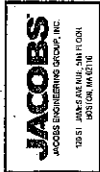


1 EQUIPMENT LAYOUT

SCALE: 1/2" = 1'-0"

2 TOWER ELEVATION

SCALE: 1/8" = 1'-0"



| | |
|-------------|---------|
| PROJECT NO. | ENTUR01 |
| DRAWN BY: | BRH |
| CHECKED BY: | CAT |

| | |
|------------|-------------------------|
| SUBMITTALS | |
| 1 | ISSUED FOR CONSTRUCTION |
| 2 | ISSUED FOR PERMITTING |

REPRODUCTION OF THIS DRAWING IS PROHIBITED WITHOUT THE WRITTEN PERMISSION OF THE CONTRACTOR. ANY REPRODUCTION OF THIS DRAWING FOR ANY PURPOSE IS PROHIBITED WITHOUT THE WRITTEN PERMISSION OF THE CONTRACTOR. ANY REPRODUCTION OF THIS DRAWING FOR ANY PURPOSE IS PROHIBITED WITHOUT THE WRITTEN PERMISSION OF THE CONTRACTOR.

FA# 10091758
SITE# CTJ05034
GUILFORD - SR17
RIVERSIDE ROAD
NORTH BRANFORD, CT 06472

GROUNDING DETAILS

G-1

GENERAL NOTES:

- CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-7419
- ALL INSTALLATIONS SHALL BE FIELD VERIFIED
- ALL JACKING CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

GROUNDING NOTES:

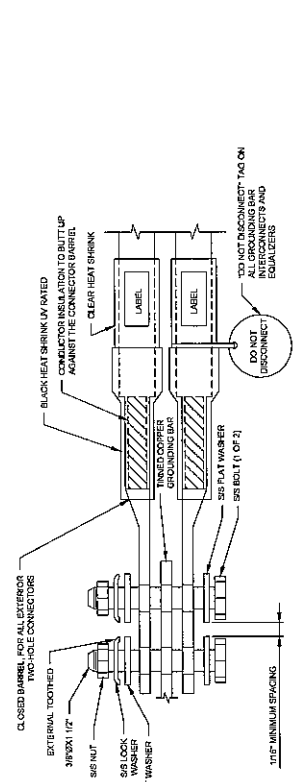
- TOWER GROUNDING BAR (EXTEND TO) AWG TINNED CUP WIRE FROM BURRED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
- ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGB02T-024T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
- GROUNDING BAR LOCATED CLOSE TO GROUND LOCK BOX: TERROD PART #035146. INSTALL PER MANUFACTURER GUIDELINES
- 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 SOLDER TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP OF PIPE
- ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED COPPER TUBES UNLESS NOTED OTHERWISE
- ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOCATED IN SHARPLY BENT.
- HOT-SPREAD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS
- ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTIONS AND MATERIALS FOR THE PARTICULAR APPLICATION
- ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED IN THE PROPER POSITION. TIGHTEN LOCK WASHERS. GROUNDING BUS BARS MAY HAVE PRE-DRILLED HOLES OR TYPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE. USE STAINLESS STEEL
- EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CIRCUIT POINT.
- PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. PERSONAL METAL CLIPS WHICH COME IN CONTACT WITH THE GROUNDING CONDUCTOR SHALL NOT BE USED.
- E-COAX ON ICE BRIDGE IS MORE THAT 6" FROM THE GROUND BAR AT THE BASE OF THE TOWER. A SECOND GROUND BAR WILL BE USED AT THE END OF THE ICE BRIDGE RING TO GROUND THE COAX GROUND KIT AND THE SURGE ARRESTORS. SURGE ARRESTORS INSTALLED BY LICENT ONLY HAVE 6" GROUND TALS
- CONTRACTOR SHALL REPAIR/REPLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE
- DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED CUP WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO SUCH MECHANICALLY WELOIDS
- CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUNDING BAR SHALL BE INSTALLED IF REQUIRED.

SCALE: NONE

2 GROUNDING BAR DETAIL

NOTES:

- EXOTHERMIC WELD OF TWO #2 AWG BARE TINNED COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURRED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- 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", "M", "N", "T") WITH 1" HIGH LETTERING.
- ALL HARDWARE SHALL BE STAINLESS STEEL. ALL HARDWARE SHALL BE STAINLESS STEEL.
- USE STAINLESS STEEL LOCK WASHERS AND NUTS. USE STAINLESS STEEL PLAT WASHERS BETWEEN UG AND STEEL. COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- DO NOT INSTALL COPPER GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTORS DOWN TO GROUNDING BARS.
- NUTS AND WASHERS SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACKSIDE. INSTALL BLACK HEAT SHRINKING TUBE. PROVIDE INSULATION ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
- SUPPLIED AND INSTALLED BY CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPIKE CONNECTION POINTS.
- ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL AND SHIMMERS.

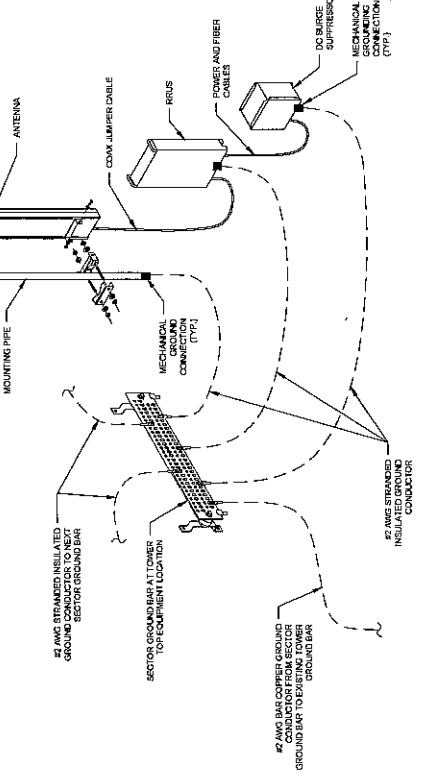


SCALE: NONE

1 EXTERIOR TWO HOLE LUG DETAIL

NOTES:

- CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUNDING BARS AND PROVIDE PROPOSED SECTOR GROUNDING BARS AS REQUIRED.
- CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWNLEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
- CONTRACTOR SHALL VERIFY ALL PROPOSED UNBURRED PIPE MOUNTS NOT LEAST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
- ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



SCALE: NONE

3 TYPICAL ANTENNA GROUNDING SCHEMATIC

Date: December 18, 2018

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



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: 10091758
Carrier Site Name: CTL05634

Crown Castle Designation: Crown Castle BU Number: 806386
Crown Castle Site Name: NHV 106 943628
Crown Castle JDE Job Number: 548692
Crown Castle Work Order Number: 1670846
Crown Castle Order Number: 471721 Rev. 0

Engineering Firm Designation: TEP Project Number: 48909.201723

Site Data: 83 Reeds Gap Road, North Branford, New Haven County, CT 06472
Latitude 41° 24' 12.47", Longitude -72° 44' 38.90"
92 Foot - Self Supporting Tower

Dear Heather Simeone,

Tower Engineering Professionals 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

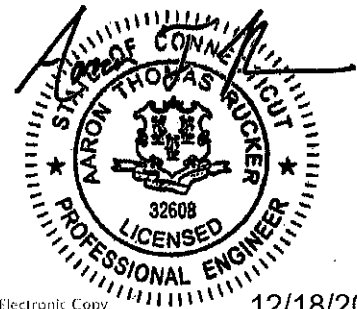
Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 125 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: Gregory D. Keller / CDC

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

12/18/2018

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tnxTower Output

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Additional Calculations

1) INTRODUCTION

This tower is a 92-ft self-supporting tower designed by Rohn. The tower has been modified multiple times in the past to accommodate additional loading. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
 Risk Category: II
 Wind Speed: 125 mph
 Exposure Category: C
 Topographic Factor: 1.0
 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) | |
|---------------------|----------------------------|--------------------|------------------------|---------------------------|----------------------|---------------------------|-------------------------|
| 77.0 | 77.0 | 3 | CCI Antennas | HPA65R-BU6A w/ Mount Pipe | - | - | |
| | | 1 | Tower Mounts | Side Arm Mount [SO 305-3] | | | |
| 65.0 | 68.0 | 3 | Powerwave Technologies | 7770.00 w/ Mount Pipe | 2 2 2 12 | 3/4 7/16 3/8 7/8 | |
| | | 3 | Kathrein | 80010965 w/ Mount Pipe | | | |
| | 3 | Ericsson | RRUS 4449 B5/B12 | | | | |
| | 3 | Ericsson | RRUS 8843 B2/B66A | | | | |
| | 3 | Kathrein | 782 10253 | | | | |
| | 2 | Raycap | DC6-48-60-18-8F | | | | |
| | 65.0 | 65.0 | 6 | Powerwave Technologies | | | LGP21401 |
| | | | 1 | Tower Mounts | | | Sector Mount [SM 502-3] |

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) |
|---------------------|----------------------------|--------------------|----------------------|-------------------------------|----------------------|---------------------|
| 91.0 | 97.0 | 1 | Sinclair | SD210D-SF2P4SNM w/ Mount Pipe | 3 | 7/8 |
| | 94.0 | 1 | Sinclair | SD310-HF2P4SNM w/ Mount Pipe | | |
| | 91.0 | 2 | Tower Mounts | Side Arm Mount [SO 304-1] | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) |
|---------------------|----------------------------|--------------------|----------------------|-----------------------------|----------------------|---------------------|
| 90.0 | 90.0 | 6 | Commscope | JAHH-65B-R3B w/ Mount Pipe | 12 2 | 1-5/8 1-1/4 |
| | | 4 | Decibel | DB844G65ZAXY w/ Mount Pipe | | |
| | | 2 | Antel | LPA-80063/6CF w/ Mount Pipe | | |
| | | 3 | Alcatel Lucent | RRH4X45-AWS4 B66 | | |
| | | 3 | Alcatel Lucent | B13 RRH4X30-4R | | |
| | | 3 | Nokia | Airscale RRH 4T4R B5 160W | | |
| | | 2 | RFS Celwave | DB-T1-6Z-8AB-0Z | | |
| | | 3 | Site Pro 1 | VFA12-HD Sector Mount | | |
| 59.0 | 84.0 | 1 | RFS Celwave | 220-1N | 1 | 1/2 |
| | 60.0 | 1 | GPS | GPS_A | | |
| 59.0 | 59.0 | 1 | Tower Mounts | Side Arm Mount [SO 305-1] | 1 | 1/2 |
| | 34.0 | 35.0 | 1 | Spectracom | | |

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

| Document | Remarks | Reference | Source |
|------------------------------|---------------------------------|-----------|----------|
| Geotechnical Report | JGI Eastern, Inc. | 1069632 | CCISites |
| Foundation Calculations | Vertical Structures, Inc. | 4063555 | CCISites |
| Tower Manufacturer Drawings | Rohn | 962042 | CCISites |
| Tower Reinforcement Drawings | All-Points Technology Corp. | 962041 | CCISites |
| Tower Reinforcement Drawings | Vertical Structures, Inc. | 1093271 | CCISites |
| Post Modification Inspection | Vertical Structures, Inc. | 1285457 | CCISites |
| Tower Reinforcement Drawings | FDH Engineering, Inc. | 3841012 | CCISites |
| Post Modification Inspection | Tower Engineering Professionals | 4061638 | 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) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.
- 3) All tower components are in sufficient condition to carry their full design capacity.
- 4) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
- 5) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
- 6) The foundation steel reinforcement was assumed to be the minimum required per ACI 318.
- 7) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

| Section No | Elevation (ft) | Component Type | Size | Critical Element | P (lb) | ϕP_{allow} (lb) | % Capacity | Pass / Fail |
|------------|-------------------|----------------|-------------------|------------------|---------|-----------------------|------------------|-------------|
| T1 | 92 - 80 | Leg | ROHN 2 STD | 3 | -10669 | 38684 | 27.6 | Pass |
| T2 | 80 - 75 | Leg | ROHN 2.5 STD | 27 | -15153 | 59993 | 25.3 | Pass |
| T3 | 75 - 70 | Leg | ROHN 2.5 STD | 35 | -20904 | 59993 | 34.8 | Pass |
| T4 | 70 - 65 | Leg | ROHN 2.5 STD | 44 | -25959 | 59993 | 43.3 | Pass |
| T5 | 65 - 60 | Leg | ROHN 2.5 STD | 53 | -33713 | 59993 | 56.2 | Pass |
| T6 | 60 - 40 | Leg | ROHN 2.5 X-STR | 65 | -59700 | 91946 | 64.9 | Pass |
| T7 | 40 - 20 | Leg | ROHN 3 X-STR | 95 | -85101 | 129461 | 65.7 | Pass |
| T8 | 20 - 13.3333 | Leg | ROHN 3.5 X-STR | 125 | -93165 | 161657 | 57.6 | Pass |
| T9 | 13.3333 - 6.66667 | Leg | ROHN 3.5 X-STR | 137 | -101404 | 161687 | 62.7 | Pass |
| T10 | 6.66667 - 0 | Leg | ROHN 3.5 X-STR | 149 | -109196 | 161715 | 67.5 | Pass |
| T1 | 92 - 80 | Diagonal | L1 1/2x1 1/2x1/8 | 18 | -2772 | 5027 | 55.1 76.4 (b) | Pass |
| T2 | 80 - 75 | Diagonal | L1 3/4x1 3/4x1/8 | 32 | -2916 | 6214 | 46.9 63.6 (b) | Pass |
| T3 | 75 - 70 | Diagonal | L2x2x1/4 | 42 | -2808 | 16102 | 17.4 38.6 (b) | Pass |
| T4 | 70 - 65 | Diagonal | L1 3/4x1 3/4x1/8 | 50 | -2893 | 5137 | 56.3 63.7 (b) | Pass |
| T5 | 65 - 60 | Diagonal | L2x2x1/4 | 59 | -3816 | 13367 | 28.5 49.4 (b) | Pass |
| T6 | 60 - 40 | Diagonal | L2x2x1/4 | 68 | -4232 | 8106 | 52.2 54.4 (b) | Pass |
| T7 | 40 - 20 | Diagonal | L2 1/2x2 1/2x3/16 | 99 | -4629 | 9640 | 48.0 69.0 (b) | Pass |
| T8 | 20 - 13.3333 | Diagonal | L2 1/2x2 1/2x3/16 | 129 | -4782 | 8902 | 53.7 70.3 (b) | Pass |

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (lb) | ΦP_{allow} (lb) | % Capacity | Pass / Fail |
|-------------|-------------------|----------------------|-------------------|------------------|--------|-----------------------|----------------------------|----------------------------|
| T9 | 13.3333 - 6.66667 | Diagonal | L2 1/2x2 1/2x3/8 | 141 | -4928 | 15287 | 32.2 61.7 (b) | Pass |
| T10 | 6.66667 - 0 | Diagonal | L2 1/2x2 1/2x3/8 | 153 | -5118 | 14094 | 36.3 63.9 (b) | Pass |
| T6 | 60 - 40 | Secondary Horizontal | L2 1/2x2 1/2x1/4 | 73 | -1035 | 24818 | 4.2 13.7 (b) | Pass |
| T7 | 40 - 20 | Secondary Horizontal | L2x2x1/4 | 104 | -1476 | 8739 | 16.9 20.5 (b) | Pass |
| T8 | 20 - 13.3333 | Secondary Horizontal | L2x2x1/4 | 133 | -1616 | 7855 | 20.6 22.4 (b) | Pass |
| T9 | 13.3333 - 6.66667 | Secondary Horizontal | L2x2x1/4 | 145 | -1759 | 7048 | 25.0 | Pass |
| T10 | 6.66667 - 0 | Secondary Horizontal | L2x2x1/4 | 157 | -1894 | 6359 | 29.8 | Pass |
| T1 | 92 - 80 | Top Girt | L2x2x1/8 | 5 | -103 | 4273 | 2.4 2.6 (b) | Pass |
| T5 | 65 - 60 | Top Girt | L2 1/2x2 1/2x3/16 | 55 | -153 | 7955 | 1.9 3.9 (b) | Pass |
| | | | | | | | Summary | |
| | | | | | | | Leg (T10) | 67.5 Pass |
| | | | | | | | Diagonal (T1) | 76.4 Pass |
| | | | | | | | Secondary Horizontal (T10) | 29.8 Pass |
| | | | | | | | Top Girt (T5) | 3.9 Pass |
| | | | | | | | Bolt Checks | 76.4 Pass |
| | | | | | | | RATING = | 76.4 Pass |

Table 5 - Tower Component Stresses vs. Capacity - LC7

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| 1,2 | Anchor Rods | - | 71.2 | Pass |
| 1,2 | Base Foundation Soil Interaction | - | 84.4 | Pass |
| 1,2 | Base Foundation Structural | - | 16.7 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 84.4% |
|---|--------------|

Notes:

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

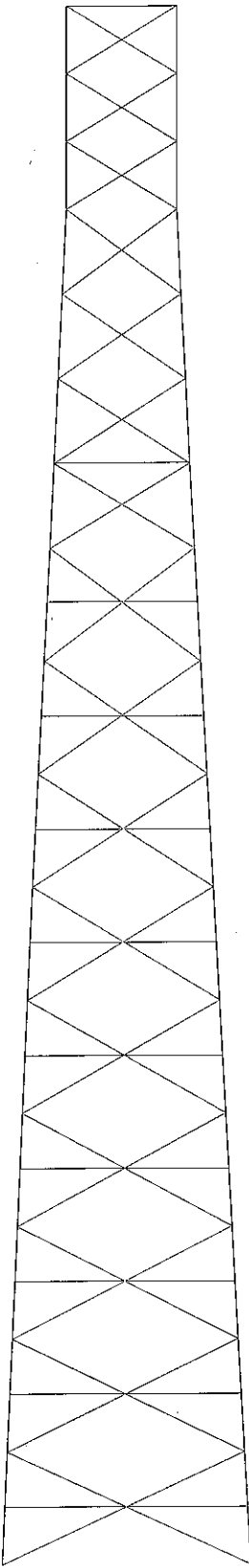
4.1) Recommendations

- 1) If the load differs from that described in Tables 1 and 2 of this report, the referenced drawings, or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) 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 | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 |
| Legs | ROHN 2.5 STD | ROHN 2.5 STD | ROHN 2.5 STD | ROHN 2.5 STD | ROHN 2.5 X-STR | ROHN 2.5 X-STR | ROHN 3 X-STR | ROHN 3.5 X-STR | ROHN 3.5 X-STR | ROHN 3.5 X-STR |
| Lag Grade | | | | | A572-50 | A572-50 | A572-50 | A572-50 | A572-50 | A572-50 |
| Diagonals | L1 1/2x1 1/2x1/8 | A | L2x2x1/4 | A | L2x2x1/4 | L2 1/2x2 1/2x3/16 | L2 1/2x2 1/2x3/16 | L2 1/2x2 1/2x3/16 | L2 1/2x2 1/2x3/16 | L2 1/2x2 1/2x3/16 |
| Diagonal Grade | | | | | A36 | A36 | A36 | A36 | A36 | A36 |
| Top Chords | L2x2x1/8 | | N.A. | | | | N.A. | | | |
| Sec. Horizontals | | | N.A. | | | | N.A. | | | |
| Face Width (ft) | 6.52063 | 6.5623 | 7.0625 | 7.5625 | 8.0625 | 10.6042 | 12.6354 | 13.3229 | 14.0104 | 14.6979 |
| # Panels @ (ft) | 3 @ 4 | | 4 @ 5 | | | 9 @ 6.66667 | | | | |
| Weight (lb) | 340.3 | 187.9 | 288.6 | 176.4 | 364.5 | 1584.8 | 1775.5 | 954.6 | 954.6 | 7292.3 |

92.0 ft
89.0 ft
75.0 ft
70.0 ft
65.0 ft
60.0 ft
40.0 ft
20.0 ft
13.3 ft
6.7 ft
0.0 ft



DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|-----------------------------------|-----------|---------------------------|-----------|
| SD310-HF2P4SNM | 91 | Side Arm Mount [SO 305-3] | 77 |
| SD210-SF2P4SNM | 91 | 7770.00 w/ Mount Pipe | 85 |
| Side Arm Mount [SO 304-1] | 91 | 7770.00 w/ Mount Pipe | 85 |
| Side Arm Mount [SO 304-1] | 91 | 7770.00 w/ Mount Pipe | 85 |
| (2) DB84-G65ZAXY w/ Mount Pipe | 90 | 80010965 w/ Mount Pipe | 65 |
| (2) DB84-G65ZAXY w/ Mount Pipe | 90 | 80010965 w/ Mount Pipe | 65 |
| (2) LPA-80063/6CF w/ Mount Pipe | 90 | 80010965 w/ Mount Pipe | 65 |
| 220-1N | 90 | 782 10253 | 65 |
| (2) JAHH-85B-R3B w/ Mount Pipe | 90 | 782 10253 | 65 |
| (2) JAHH-85B-R3B w/ Mount Pipe | 90 | 782 10253 | 65 |
| (2) JAHH-85B-R3B w/ Mount Pipe | 90 | (2) LGP21401 | 65 |
| RRH4X45-AWS4 B66 | 90 | (2) LGP21401 | 65 |
| RRH4X45-AWS4 B66 | 90 | (2) LGP21401 | 65 |
| RRH4X45-AWS4 B66 | 90 | DC6-48-60-18-8F | 65 |
| B13 RRH4X30-4R | 90 | DC6-48-60-18-8F | 65 |
| B13 RRH4X30-4R | 90 | RRUS 8843 B2/B66A | 65 |
| B13 RRH4X30-4R | 90 | RRUS 8843 B2/B66A | 65 |
| AIRSCALE RRH 4T4R B5 160W | 90 | RRUS 8843 B2/B66A | 65 |
| AIRSCALE RRH 4T4R B5 160W | 90 | RRUS 4449 B5/B12 | 65 |
| AIRSCALE RRH 4T4R B5 160W | 90 | RRUS 4449 B5/B12 | 65 |
| (2) DB-T1-6Z-8AB-0Z | 90 | RRUS 4449 B5/B12 | 65 |
| 2.4" dia. x 8" 6" Stabilizer | 90 | Sector Mount [SM 502-3] | 65 |
| Silepro VFA12-HD Sector Mount (3) | 90 | GPS_A | 59 |
| HPA65R-BU6A w/ Mount Pipe | 77 | Side Arm Mount [SO 305-1] | 59 |
| HPA65R-BU6A w/ Mount Pipe | 77 | 8225 | 34 |
| HPA65R-BU6A w/ Mount Pipe | 77 | | |

SYMBOL LIST

| MARK | SIZE | MARK | SIZE |
|------|------------------|------|-------------------|
| A | L1 3/4x1 3/4x1/8 | B | L2 1/2x2 1/2x3/16 |

MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---------|--------|--------|-------|--------|--------|
| A572-50 | 50 ksi | 65 ksi | A36 | 36 ksi | 58 ksi |

TOWER DESIGN NOTES

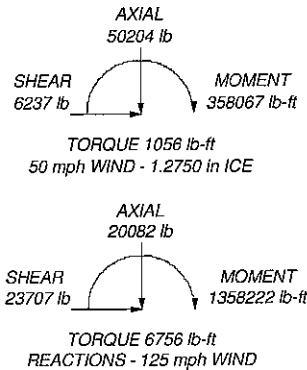
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in 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: 76.4%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 113399 lb
SHEAR: 14476 lb

UPLIFT: -97571 lb
SHEAR: 12715 lb



| | | | | | |
|--|--|---|--|-------------------|--|
|  Tower Engineering Professionals | Tower Engineering Professionals | | Job: NHV 106 943628 (BU 806386) | | |
| | 326 Tryon Road | | Project: TEP No. 48909.201723 | | |
| | Raleigh, NC 27603 | | Client: Crown Castle | | |
| | Phone: (919) 661-6351 | | Drawn by: gdkeller | | |
| | FAX: (919) 661-6350 | | Date: 12/18/18 | | |
| | | Scale: NT | | App'd: | |
| | | Path: C:\Users\gdkeller\Desktop\TOWER\NHV 48909\806386_LCS.dwg | | Dwg No. E- | |

| | | |
|--|--|----------------------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 1 of 21 |
| | Project TEP No. 48909.201723 | Date 14:14:56 12/18/18 |
| | Client Crown Castle | Designed by gdkeller |

Tower Input Data

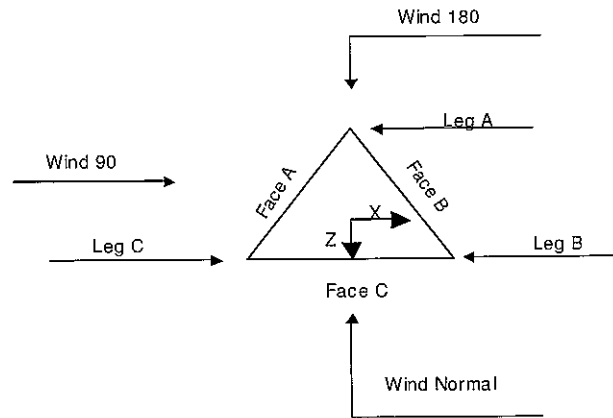
The main tower is a 3x free standing tower with an overall height of 92.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.52 ft at the top and 14.70 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Tower base elevation above sea level: 583.00 ft.
- Basic wind speed of 125 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.2750 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- TIA-222-H Annex S.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/r For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque √ Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|--|--|

| | | |
|--|--|----------------------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 2 of 21 |
| | Project TEP No. 48909.201723 | Date 14:14:56 12/18/18 |
| | Client Crown Castle | Designed by gdkeller |



Triangular Tower

Tower Section Geometry

| Tower Section | Tower Elevation | Assembly Database | Description | Section Width | Number of Sections | Section Length |
|---------------|-----------------|-------------------|-------------|---------------|--------------------|----------------|
| | ft | | | ft | | ft |
| T1 | 92.00-80.00 | | | 6.52 | 1 | 12.00 |
| T2 | 80.00-75.00 | | | 6.56 | 1 | 5.00 |
| T3 | 75.00-70.00 | | | 7.06 | 1 | 5.00 |
| T4 | 70.00-65.00 | | | 7.56 | 1 | 5.00 |
| T5 | 65.00-60.00 | | | 8.06 | 1 | 5.00 |
| T6 | 60.00-40.00 | | | 8.56 | 1 | 20.00 |
| T7 | 40.00-20.00 | | | 10.60 | 1 | 20.00 |
| T8 | 20.00-13.33 | | | 12.64 | 1 | 6.67 |
| T9 | 13.33-6.67 | | | 13.32 | 1 | 6.67 |
| T10 | 6.67-0.00 | | | 14.01 | 1 | 6.67 |

Tower Section Geometry (cont'd)

| Tower Section | Tower Elevation | Diagonal Spacing | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset | Bottom Girt Offset |
|---------------|-----------------|------------------|--------------|------------------------|-----------------|-----------------|--------------------|
| | ft | ft | | | | in | in |
| T1 | 92.00-80.00 | 4.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T2 | 80.00-75.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T3 | 75.00-70.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T4 | 70.00-65.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T5 | 65.00-60.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |

| | | |
|--|--|----------------------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 3 of 21 |
| | Project TEP No. 48909.201723 | Date 14:14:56 12/18/18 |
| | Client Crown Castle | Designed by gdkeller |

| Tower Section | Tower Elevation ft | Diagonal Spacing ft | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset in | Bottom Girt Offset in |
|---------------|-----------------------|------------------------|--------------|------------------------|-----------------|-----------------------|--------------------------|
| T6 | 60.00-40.00 | 6.67 | X Brace | No | Yes | 0.0000 | 0.0000 |
| T7 | 40.00-20.00 | 6.67 | X Brace | No | Yes | 0.0000 | 0.0000 |
| T8 | 20.00-13.33 | 6.67 | X Brace | No | Yes | 0.0000 | 0.0000 |
| T9 | 13.33-6.67 | 6.67 | X Brace | No | Yes | 0.0000 | 0.0000 |
| T10 | 6.67-0.00 | 6.67 | X Brace | No | Yes | 0.0000 | 0.0000 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Type | Leg Size | Leg Grade | Diagonal Type | Diagonal Size | Diagonal Grade |
|-----------------------|----------|----------------|---------------------|---------------|-------------------|-----------------|
| T1 92.00-80.00 | Pipe | ROHN 2 STD | A572-50 (50 ksi) | Equal Angle | L1 1/2x1 1/2x1/8 | A36 (36 ksi) |
| T2 80.00-75.00 | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) | Equal Angle | L1 3/4x1 3/4x1/8 | A36 (36 ksi) |
| T3 75.00-70.00 | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) | Equal Angle | L2x2x1/4 | A36 (36 ksi) |
| T4 70.00-65.00 | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) | Equal Angle | L1 3/4x1 3/4x1/8 | A36 (36 ksi) |
| T5 65.00-60.00 | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) | Equal Angle | L2x2x1/4 | A36 (36 ksi) |
| T6 60.00-40.00 | Pipe | ROHN 2.5 X-STR | A572-50 (50 ksi) | Equal Angle | L2x2x1/4 | A36 (36 ksi) |
| T7 40.00-20.00 | Pipe | ROHN 3 X-STR | A572-50 (50 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T8 20.00-13.33 | Pipe | ROHN 3.5 X-STR | A572-50 (50 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T9 13.33-6.67 | Pipe | ROHN 3.5 X-STR | A572-50 (50 ksi) | Equal Angle | L2 1/2x2 1/2x3/8 | A36 (36 ksi) |
| T10 6.67-0.00 | Pipe | ROHN 3.5 X-STR | A572-50 (50 ksi) | Equal Angle | L2 1/2x2 1/2x3/8 | A36 (36 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Top Girt Type | Top Girt Size | Top Girt Grade | Bottom Girt Type | Bottom Girt Size | Bottom Girt Grade |
|-----------------------|---------------|-------------------|-----------------|------------------|------------------|-------------------|
| T1 92.00-80.00 | Equal Angle | L2x2x1/8 | A36 (36 ksi) | Pipe | | A36 (36 ksi) |
| T5 65.00-60.00 | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) | Pipe | | A36 (36 ksi) |

Tower Section Geometry (cont'd)

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 5 of 21 |
| | Project | TEP No. 48909.201723 | Date | 14:14:56 12/18/18 |
| | Client | Crown Castle | Designed by | gdkeller |

| Tower Elevation ft | Calc K Single Angles | Calc K Solid Rounds | K Factors ¹ | | | | | | | | |
|-----------------------|-------------------------|------------------------|------------------------|---------------------|---------------------|-----------------|-------|--------|----------------|----------------|---|
| | | | Legs | X Brace Diags | K Brace Diags | Single Diags | Girts | Horiz. | Sec. Horiz. | Inner Brace | |
| | | | | Y | X | Y | X | Y | X | Y | X |
| 75.00-70.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T4 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 70.00-65.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T5 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 65.00-60.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T6 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60.00-40.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| T7 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 40.00-20.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| T8 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20.00-13.33 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |
| T9 13.33-6.67 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T10 6.67-0.00 | Yes | No | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 |

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|-----------------------|---------------------------|---|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|------|
| | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U |
| T1 92.00-80.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T2 80.00-75.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T3 75.00-70.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T4 70.00-65.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T5 65.00-60.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T6 60.00-40.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T7 40.00-20.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T8 20.00-13.33 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T9 13.33-6.67 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T10 6.67-0.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|-----------------------|------------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T1 92.00-80.00 | Flange | 0.6250 | 4 | 0.5000 | 1 | 0.5000 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 0 |
| | | A325X | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | |
| T2 80.00-75.00 | Flange | 0.6250 | 0 | 0.5000 | 1 | 0.5000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 0 |
| | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | | A325N | |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 6 of 21 |
| | Project | TEP No. 48909.201723 | Date | 14:14:56 12/18/18 |
| | Client | Crown Castle | Designed by | gdkeller |

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|--------------------|---------------------|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T3 75.00-70.00 | Flange | 0.6250 | 0 | 0.5000 | 1 | 0.5000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 0 |
| | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | | A325N | |
| T4 70.00-65.00 | Flange | 0.6250 | 0 | 0.5000 | 1 | 0.5000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 0 |
| | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | | A325N | |
| T5 65.00-60.00 | Flange | 0.6250 | 4 | 0.5000 | 1 | 0.5000 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 0 |
| | | A325X | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | |
| T6 60.00-40.00 | Flange | 0.7500 | 4 | 0.5000 | 1 | 0.5000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.5000 | 1 |
| | | A325X | | A325N | | A325N | | A325N | | A325N | | A325N | | A325N | |
| T7 40.00-20.00 | Flange | 0.8750 | 4 | 0.5000 | 1 | 0.5000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 1 |
| | | A325X | | A325X | | A325N | | A325N | | A325N | | A325N | | A325X | |
| T8 20.00-13.33 | Flange | 0.8750 | 0 | 0.5000 | 1 | 0.5000 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 1 |
| | | A449 | | A325X | | A325N | | A325N | | A325N | | A325N | | A325X | |
| T9 13.33-6.67 | Flange | 0.8750 | 0 | 0.5000 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 1 |
| | | A449 | | A325X | | A325N | | A325N | | A325N | | A325N | | A325X | |
| T10 6.67-0.00 | Flange | 0.8750 | 0 | 0.5000 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 1 |
| | | A449 | | A325X | | A325N | | A325N | | A325N | | A325N | | A325X | |

Feed Line/Linear Appurtenances - Entered As Round Or Flat

| Description | Face or Leg | Allow Shield | Exclude From Torque Calculation | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | # Per Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight plf |
|------------------------|-------------|--------------|---------------------------------|----------------|---------------|----------------|--------------------------|----|-----------|------------------|----------------------|--------------|------------|
| **A Face** | | | | | | | | | | | | | |
| LDF4-50A(1/2) | A | No | No | Ar (CaAa) | 59.00 - 34.00 | -1.0000 | 0.1 | 1 | 1 | 0.5000 | 0.6250 | | 0.15 |
| LDF4-50A(1/2) | A | No | No | Ar (CaAa) | 34.00 - 0.00 | -1.0000 | 0.1 | 2 | 2 | 0.5000 | 0.6250 | | 0.15 |
| LDF5-50A(7/8) | A | No | No | Ar (CaAa) | 91.00 - 0.00 | -2.0000 | 0.15 | 3 | 2 | 0.5000 | 1.0900 | | 0.33 |
| LDF7-50A(1-5/8) | A | No | No | Ar (CaAa) | 90.00 - 0.00 | 0.0000 | 0.1 | 12 | 12 | 0.5000 | 1.9800 | | 0.82 |
| HB114-1-081 | A | No | No | Ar (CaAa) | 90.00 - 0.00 | 2.0000 | 0.15 | 2 | 2 | 0.5000 | 1.5400 | | 1.20 |
| 3U4-M5F(1-1/4) | A | No | No | Af (CaAa) | 92.00 - 0.00 | 0.0000 | 0.1 | 1 | 1 | 3.0000 | 3.0000 | | 8.40 |
| Feedline Ladder (Af) | | | | | | | | | | | | | |
| **C Face** | | | | | | | | | | | | | |
| AVA5-50(7/8) | C | No | No | Ar (CaAa) | 65.00 - 0.00 | 0.0000 | -0.35 | 12 | 7 | 0.5000 | 1.1020 | | 0.30 |
| 2.25" Flexible Conduit | C | No | No | Ar (CaAa) | 65.00 - 0.00 | 0.0000 | -0.3 | 1 | 1 | 2.2500 | 2.2500 | | 0.34 |
| FB-L98B-002-75000(3/8) | C | No | No | Ar (CaAa) | 65.00 - 0.00 | 0.0000 | -0.3 | 2 | 2 | 0.3937 | 0.0000 | | 0.06 |
| WR-VG122S T-BRDA(7/16) | C | No | No | Ar (CaAa) | 65.00 - 0.00 | 0.0000 | -0.3 | 2 | 2 | 0.4600 | 0.0000 | | 0.14 |
| WR-VG86ST-BRD(3/4) | C | No | No | Ar (CaAa) | 65.00 - 0.00 | 0.0000 | -0.3 | 2 | 2 | 0.7950 | 0.0000 | | 0.58 |
| Feedline Ladder (Af) | C | No | No | Af (CaAa) | 65.00 - 0.00 | 0.0000 | -0.35 | 1 | 1 | 3.0000 | 3.0000 | | 8.40 |
| *** | | | | | | | | | | | | | |

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| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 7 of 21 |
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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} ft ² /ft | Weight plf |
|-------------|-------------|--------------|---------------------------------|----------------|--------------|--------------|-------------------------------------|------------|
| *** | | | | | | | | |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight lb |
|---------------|--------------------|------|--------------------------------|--------------------------------|---|--|-----------|
| T1 | 92.00-80.00 | A | 0.000 | 0.000 | 36.437 | 0.000 | 234 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T2 | 80.00-75.00 | A | 0.000 | 0.000 | 17.555 | 0.000 | 108 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T3 | 75.00-70.00 | A | 0.000 | 0.000 | 17.555 | 0.000 | 108 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T4 | 70.00-65.00 | A | 0.000 | 0.000 | 17.555 | 0.000 | 108 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T5 | 65.00-60.00 | A | 0.000 | 0.000 | 17.555 | 0.000 | 108 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 10.237 | 0.000 | 70 |
| T6 | 60.00-40.00 | A | 0.000 | 0.000 | 71.407 | 0.000 | 435 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 40.948 | 0.000 | 278 |
| T7 | 40.00-20.00 | A | 0.000 | 0.000 | 72.345 | 0.000 | 438 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 40.948 | 0.000 | 278 |
| T8 | 20.00-13.33 | A | 0.000 | 0.000 | 24.240 | 0.000 | 146 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 13.649 | 0.000 | 93 |
| T9 | 13.33-6.67 | A | 0.000 | 0.000 | 24.240 | 0.000 | 146 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 13.649 | 0.000 | 93 |
| T10 | 6.67-0.00 | A | 0.000 | 0.000 | 24.240 | 0.000 | 146 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | 0.000 | 0.000 | 13.649 | 0.000 | 93 |

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} In Face ft ² | C _{AA} Out Face ft ² | Weight lb |
|---------------|--------------------|-------------|------------------|--------------------------------|--------------------------------|---|--|-----------|
| T1 | 92.00-80.00 | A | 1.403 | 0.000 | 0.000 | 70.219 | 0.000 | 948 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T2 | 80.00-75.00 | A | 1.389 | 0.000 | 0.000 | 33.758 | 0.000 | 448 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 8 of 21 |
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| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight lb |
|---------------|-----------------------|-------------|---------------------|-----------------------------------|-----------------------------------|---|--|--------------|
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T3 | 75.00-70.00 | A | 1.379 | 0.000 | 0.000 | 33.703 | 0.000 | 446 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T4 | 70.00-65.00 | A | 1.370 | 0.000 | 0.000 | 33.645 | 0.000 | 443 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| T5 | 65.00-60.00 | A | 1.359 | 0.000 | 0.000 | 33.583 | 0.000 | 441 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 23.369 | 0.000 | 289 |
| T6 | 60.00-40.00 | A | 1.329 | 0.000 | 0.000 | 139.860 | 0.000 | 1796 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 92.407 | 0.000 | 1133 |
| T7 | 40.00-20.00 | A | 1.263 | 0.000 | 0.000 | 143.240 | 0.000 | 1750 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 90.050 | 0.000 | 1083 |
| T8 | 20.00-13.33 | A | 1.191 | 0.000 | 0.000 | 47.708 | 0.000 | 561 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 29.162 | 0.000 | 343 |
| T9 | 13.33-6.67 | A | 1.132 | 0.000 | 0.000 | 47.103 | 0.000 | 540 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 28.459 | 0.000 | 329 |
| T10 | 6.67-0.00 | A | 1.014 | 0.000 | 0.000 | 45.904 | 0.000 | 501 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0 |
| | | C | | 0.000 | 0.000 | 27.065 | 0.000 | 302 |

Feed Line Center of Pressure

| Section | Elevation ft | CP _x in | CP _z in | CP _x Ice in | CP _z Ice in |
|---------|-----------------|-----------------------|-----------------------|------------------------------|------------------------------|
| T1 | 92.00-80.00 | -5.2095 | -9.0225 | -5.1976 | -8.5498 |
| T2 | 80.00-75.00 | -6.0276 | -10.2313 | -6.1166 | -9.9574 |
| T3 | 75.00-70.00 | -5.9873 | -10.3850 | -6.2297 | -10.2848 |
| T4 | 70.00-65.00 | -6.5428 | -11.2822 | -6.6330 | -10.9520 |
| T5 | 65.00-60.00 | 2.5805 | -5.8091 | 4.2538 | -2.7214 |
| T6 | 60.00-40.00 | 2.9107 | -6.9442 | 4.4402 | -3.6833 |
| T7 | 40.00-20.00 | 2.9999 | -7.5389 | 4.6881 | -4.4568 |
| T8 | 20.00-13.33 | 3.1127 | -7.9620 | 4.8742 | -4.9926 |
| T9 | 13.33-6.67 | 3.2037 | -8.1991 | 4.9881 | -5.2992 |
| T10 | 6.67-0.00 | 3.2886 | -8.4220 | 5.0505 | -5.7708 |

Shielding Factor Ka

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|---------------------------|-------------------------|--------------------------|-----------------------|
| T1 | 4 | LDF5-50A(7/8) | 80.00 - 91.00 | 0.6000 | 0.6000 |
| T1 | 6 | LDF7-50A(1-5/8) | 80.00 - 90.00 | 0.6000 | 0.6000 |
| T1 | 7 | HB114-1-0813U4-M5F(1-1/4) | 80.00 - 90.00 | 0.6000 | 0.6000 |
| T1 | 8 | Feedline Ladder (AF) | 80.00 - 92.00 | 0.6000 | 0.6000 |

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|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 9 of 21 |
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| | Client | Crown Castle | Designed by | gdkeller |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|---------------------------|-------------------------|-----------------------|--------------------|
| T2 | 4 | LDF5-50A(7/8) | 75.00 - 80.00 | 0.6000 | 0.6000 |
| T2 | 6 | LDF7-50A(1-5/8) | 75.00 - 80.00 | 0.6000 | 0.6000 |
| T2 | 7 | HB114-1-0813U4-M5F(1-1/4) | 75.00 - 80.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T2 | 8 | Feedline Ladder (Af) | 75.00 - 80.00 | 0.6000 | 0.6000 |
| T3 | 4 | LDF5-50A(7/8) | 70.00 - 75.00 | 0.6000 | 0.6000 |
| T3 | 6 | LDF7-50A(1-5/8) | 70.00 - 75.00 | 0.6000 | 0.6000 |
| T3 | 7 | HB114-1-0813U4-M5F(1-1/4) | 70.00 - 75.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T3 | 8 | Feedline Ladder (Af) | 70.00 - 75.00 | 0.6000 | 0.6000 |
| T4 | 4 | LDF5-50A(7/8) | 65.00 - 70.00 | 0.6000 | 0.6000 |
| T4 | 6 | LDF7-50A(1-5/8) | 65.00 - 70.00 | 0.6000 | 0.6000 |
| T4 | 7 | HB114-1-0813U4-M5F(1-1/4) | 65.00 - 70.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T4 | 8 | Feedline Ladder (Af) | 65.00 - 70.00 | 0.6000 | 0.6000 |
| T5 | 4 | LDF5-50A(7/8) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 6 | LDF7-50A(1-5/8) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 7 | HB114-1-0813U4-M5F(1-1/4) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T5 | 8 | Feedline Ladder (Af) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 10 | AVA5-50(7/8) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 11 | 2.25" Flexible Conduit | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 12 | FB-L98B-002-75000(3/8) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 13 | WR-VG122ST-BRDA(7/16) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 14 | WR-VG86ST-BRD(3/4) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T5 | 15 | Feedline Ladder (Af) | 60.00 - 65.00 | 0.6000 | 0.6000 |
| T6 | 2 | LDF4-50A(1/2) | 40.00 - 59.00 | 0.6000 | 0.6000 |
| T6 | 4 | LDF5-50A(7/8) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 6 | LDF7-50A(1-5/8) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 7 | HB114-1-0813U4-M5F(1-1/4) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T6 | 8 | Feedline Ladder (Af) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 10 | AVA5-50(7/8) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 11 | 2.25" Flexible Conduit | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 12 | FB-L98B-002-75000(3/8) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 13 | WR-VG122ST-BRDA(7/16) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 14 | WR-VG86ST-BRD(3/4) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T6 | 15 | Feedline Ladder (Af) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T7 | 2 | LDF4-50A(1/2) | 34.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 3 | LDF4-50A(1/2) | 20.00 - 34.00 | 0.6000 | 0.6000 |
| T7 | 4 | LDF5-50A(7/8) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 6 | LDF7-50A(1-5/8) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 7 | HB114-1-0813U4-M5F(1-1/4) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T7 | 8 | Feedline Ladder (Af) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 10 | AVA5-50(7/8) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 11 | 2.25" Flexible Conduit | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 12 | FB-L98B-002-75000(3/8) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 13 | WR-VG122ST-BRDA(7/16) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 14 | WR-VG86ST-BRD(3/4) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T7 | 15 | Feedline Ladder (Af) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T8 | 3 | LDF4-50A(1/2) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 4 | LDF5-50A(7/8) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 6 | LDF7-50A(1-5/8) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 7 | HB114-1-0813U4-M5F(1-1/4) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| | |) | | | |
| T8 | 8 | Feedline Ladder (Af) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 10 | AVA5-50(7/8) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 11 | 2.25" Flexible Conduit | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 12 | FB-L98B-002-75000(3/8) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 13 | WR-VG122ST-BRDA(7/16) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T8 | 14 | WR-VG86ST-BRD(3/4) | 13.33 - 20.00 | 0.6000 | 0.6000 |

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| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 10 of 21 |
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| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K_a No Ice | K_a Ice |
|---------------|----------------------|---------------------------|-------------------------|--------------|-----------|
| T8 | 15 | Feedline Ladder (Af) | 13.33 - 20.00 | 0.6000 | 0.6000 |
| T9 | 3 | LDF4-50A(1/2) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 4 | LDF5-50A(7/8) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 6 | LDF7-50A(1-5/8) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 7 | HB114-1-0813U4-M5F(1-1/4) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 8 | Feedline Ladder (Af) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 10 | AVA5-50(7/8) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 11 | 2.25" Flexible Conduit | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 12 | FB-L98B-002-75000(3/8) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 13 | WR-VG122ST-BRDA(7/16) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 14 | WR-VG86ST-BRD(3/4) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T9 | 15 | Feedline Ladder (Af) | 6.67 - 13.33 | 0.6000 | 0.6000 |
| T10 | 3 | LDF4-50A(1/2) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 4 | LDF5-50A(7/8) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 6 | LDF7-50A(1-5/8) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 7 | HB114-1-0813U4-M5F(1-1/4) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 8 | Feedline Ladder (Af) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 10 | AVA5-50(7/8) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 11 | 2.25" Flexible Conduit | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 12 | FB-L98B-002-75000(3/8) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 13 | WR-VG122ST-BRDA(7/16) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 14 | WR-VG86ST-BRD(3/4) | 0.00 - 6.67 | 0.6000 | 0.6000 |
| T10 | 15 | Feedline Ladder (Af) | 0.00 - 6.67 | 0.6000 | 0.6000 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | Placement | C_{AA} Front | C_{AA} Side | Weight |
|-----------------------------------|-------------|-------------|----------------------------|--------------------|-----------|--|----------------------------------|-------------------------|
| | | | ft ft ft | ° | ft | ft ² | ft ² | lb |
| **91** | | | | | | | | |
| SD310-HF2P4SNM | C | From Leg | 2.00 0.00 3.00 | 0.0000 | 91.00 | No Ice 10.74 1/2" Ice 15.26 1" Ice 15.95 2" Ice 17.36 | 10.74 15.26 15.95 17.36 | 20 179 346 706 |
| SD210-SF2P4SNM | B | From Leg | 2.00 0.00 6.00 | 0.0000 | 91.00 | No Ice 10.74 1/2" Ice 15.26 1" Ice 15.95 2" Ice 17.36 | 10.74 15.26 15.95 17.36 | 20 179 346 706 |
| Side Arm Mount [SO 304-1] | B | From Leg | 1.00 0.00 0.00 | -41.0000 | 91.00 | No Ice 0.63 1/2" Ice 1.00 1" Ice 1.37 2" Ice 2.11 | 0.94 1.45 1.96 2.98 | 23 32 41 59 |
| Side Arm Mount [SO 304-1] | C | From Leg | 1.00 0.00 0.00 | 79.0000 | 91.00 | No Ice 0.63 1/2" Ice 1.00 1" Ice 1.37 2" Ice 2.11 | 0.94 1.45 1.96 2.98 | 23 32 41 59 |
| **90** | | | | | | | | |
| (2) DB844G65ZAXY w/ Mount Pipe | A | From Leg | 4.00 0.00 | 49.0000 | 90.00 | No Ice 4.58 1/2" Ice 4.96 | 4.80 5.42 | 34 80 |

| | | | | | | | | |
|--|-----------------|--|----------------------------|--|--------------------|--|-------------------|--|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | | NHV 106 943628 (BU 806386) | | Page | | 11 of 21 | |
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| | Client | | Crown Castle | | Designed by | | gdkeller | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A | | Weight |
|---------------------------------|-------------|-------------|--------------|------|--------------------|-----------|-------------------------------|-----------------|--------|
| | | | Horz Lateral | Vert | | | Front | Side | |
| | | | ft | ft | ° | ft | ft ² | ft ² | lb |
| | | | 0.00 | | | 1" Ice | 5.34 | 6.04 | 132 |
| | | | | | | 2" Ice | 6.14 | 7.34 | 257 |
| (2) DB844G65ZAXY w/ Mount Pipe | B | From Leg | 4.00 | | 49.0000 | No Ice | 4.58 | 4.80 | 34 |
| | | | 0.00 | | | 1/2" Ice | 4.96 | 5.42 | 80 |
| | | | 0.00 | | | 1" Ice | 5.34 | 6.04 | 132 |
| | | | | | | 2" Ice | 6.14 | 7.34 | 257 |
| (2) LPA-80063/6CF w/ Mount Pipe | C | From Leg | 4.00 | | 59.0000 | No Ice | 10.06 | 10.45 | 56 |
| | | | 0.00 | | | 1/2" Ice | 10.75 | 11.74 | 151 |
| | | | 0.00 | | | 1" Ice | 11.40 | 12.87 | 255 |
| | | | | | | 2" Ice | 12.62 | 14.82 | 493 |
| 220-1N | C | From Leg | 4.00 | | 59.0000 | No Ice | 5.00 | 5.00 | 25 |
| | | | 2.00 | | | 1/2" Ice | 7.03 | 7.03 | 62 |
| | | | -6.00 | | | 1" Ice | 9.07 | 9.07 | 112 |
| | | | | | | 2" Ice | 13.22 | 13.22 | 249 |
| (2) JAHH-65B-R3B w/ Mount Pipe | A | From Leg | 4.00 | | 49.0000 | No Ice | 9.35 | 7.65 | 86 |
| | | | 0.00 | | | 1/2" Ice | 9.92 | 8.83 | 163 |
| | | | 0.00 | | | 1" Ice | 10.46 | 9.73 | 247 |
| | | | | | | 2" Ice | 11.55 | 11.56 | 445 |
| (2) JAHH-65B-R3B w/ Mount Pipe | B | From Leg | 4.00 | | 49.0000 | No Ice | 9.35 | 7.65 | 86 |
| | | | 0.00 | | | 1/2" Ice | 9.92 | 8.83 | 163 |
| | | | 0.00 | | | 1" Ice | 10.46 | 9.73 | 247 |
| | | | | | | 2" Ice | 11.55 | 11.56 | 445 |
| (2) JAHH-65B-R3B w/ Mount Pipe | C | From Leg | 4.00 | | 59.0000 | No Ice | 9.35 | 7.65 | 86 |
| | | | 0.00 | | | 1/2" Ice | 9.92 | 8.83 | 163 |
| | | | 0.00 | | | 1" Ice | 10.46 | 9.73 | 247 |
| | | | | | | 2" Ice | 11.55 | 11.56 | 445 |
| RRH4X45-AWS4 B66 | A | From Leg | 4.00 | | 49.0000 | No Ice | 2.66 | 1.59 | 64 |
| | | | -2.00 | | | 1/2" Ice | 2.88 | 1.77 | 84 |
| | | | 0.00 | | | 1" Ice | 3.10 | 1.96 | 108 |
| | | | | | | 2" Ice | 3.58 | 2.36 | 165 |
| RRH4X45-AWS4 B66 | B | From Leg | 4.00 | | 49.0000 | No Ice | 2.66 | 1.59 | 64 |
| | | | -2.00 | | | 1/2" Ice | 2.88 | 1.77 | 84 |
| | | | 0.00 | | | 1" Ice | 3.10 | 1.96 | 108 |
| | | | | | | 2" Ice | 3.58 | 2.36 | 165 |
| RRH4X45-AWS4 B66 | C | From Leg | 4.00 | | 59.0000 | No Ice | 2.66 | 1.59 | 64 |
| | | | -2.00 | | | 1/2" Ice | 2.88 | 1.77 | 84 |
| | | | 0.00 | | | 1" Ice | 3.10 | 1.96 | 108 |
| | | | | | | 2" Ice | 3.58 | 2.36 | 165 |
| B13 RRH4X30-4R | A | From Leg | 4.00 | | 49.0000 | No Ice | 2.16 | 1.62 | 57 |
| | | | 2.00 | | | 1/2" Ice | 2.35 | 1.79 | 77 |
| | | | 0.00 | | | 1" Ice | 2.55 | 1.97 | 99 |
| | | | | | | 2" Ice | 2.97 | 2.36 | 154 |
| B13 RRH4X30-4R | B | From Leg | 4.00 | | 49.0000 | No Ice | 2.16 | 1.62 | 57 |
| | | | 2.00 | | | 1/2" Ice | 2.35 | 1.79 | 77 |
| | | | 0.00 | | | 1" Ice | 2.55 | 1.97 | 99 |
| | | | | | | 2" Ice | 2.97 | 2.36 | 154 |
| B13 RRH4X30-4R | C | From Leg | 4.00 | | 59.0000 | No Ice | 2.16 | 1.62 | 57 |
| | | | 2.00 | | | 1/2" Ice | 2.35 | 1.79 | 77 |
| | | | 0.00 | | | 1" Ice | 2.55 | 1.97 | 99 |
| | | | | | | 2" Ice | 2.97 | 2.36 | 154 |
| AIRSCALE RRH 4T4R B5 160W | A | From Leg | 4.00 | | 49.0000 | No Ice | 1.29 | 0.72 | 35 |
| | | | 2.00 | | | 1/2" Ice | 1.43 | 0.83 | 47 |
| | | | 0.00 | | | 1" Ice | 1.58 | 0.96 | 60 |
| | | | | | | 2" Ice | 1.90 | 1.22 | 95 |
| AIRSCALE RRH 4T4R B5 160W | B | From Leg | 4.00 | | 49.0000 | No Ice | 1.29 | 0.72 | 35 |
| | | | 2.00 | | | 1/2" Ice | 1.43 | 0.83 | 47 |
| | | | 0.00 | | | 1" Ice | 1.58 | 0.96 | 60 |

| | | |
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| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 12 of 21 |
| | Project TEP No. 48909.201723 | Date 14:14:56 12/18/18 |
| | Client Crown Castle | Designed by gdkeller |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight |
|---|-------------|-------------|----------|---------|--------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | Horz | Lateral | | | | | |
| AIRSCALE RRH 4T4R B5 160W | C | From Leg | 4.00 | 59.0000 | 90.00 | 2" Ice | 1.90 | 1.22 | 95 |
| | | | 2.00 | | | No Ice | 1.29 | 0.72 | 35 |
| | | | 0.00 | | | 1/2" Ice | 1.43 | 0.83 | 47 |
| | | | | | | 1" Ice | 1.58 | 0.96 | 60 |
| (2) DB-T1-6Z-8AB-0Z | A | From Leg | 4.00 | 49.0000 | 90.00 | 2" Ice | 1.90 | 1.22 | 95 |
| | | | 2.00 | | | No Ice | 4.80 | 2.00 | 44 |
| | | | 0.00 | | | 1/2" Ice | 5.07 | 2.19 | 80 |
| | | | | | | 1" Ice | 5.35 | 2.39 | 120 |
| 2.4" dia. x 8' 6" Stabilizer | C | None | | 0.0000 | 90.00 | 2" Ice | 5.93 | 2.81 | 213 |
| | | | | | | No Ice | 2.04 | 0.05 | 31 |
| | | | | | | 1/2" Ice | 2.62 | 0.08 | 51 |
| | | | | | | 1" Ice | 3.21 | 0.12 | 77 |
| Sitepro VFA12-HD Sector Mount (3) | C | None | | 0.0000 | 90.00 | 2" Ice | 4.42 | 0.21 | 153 |
| | | | | | | No Ice | 25.20 | 25.20 | 1974 |
| | | | | | | 1/2" Ice | 38.36 | 38.36 | 2412 |
| | | | | | | 1" Ice | 51.52 | 51.52 | 2850 |
| **77** HPA65R-BU6A w/ Mount Pipe | A | From Leg | 3.00 | 69.0000 | 77.00 | 2" Ice | 77.84 | 77.84 | 3726 |
| | | | 0.00 | | | No Ice | 8.09 | 7.19 | 67 |
| | | | 0.00 | | | 1/2" Ice | 8.64 | 8.36 | 136 |
| | | | | | | 1" Ice | 9.16 | 9.24 | 212 |
| HPA65R-BU6A w/ Mount Pipe | B | From Leg | 3.00 | 69.0000 | 77.00 | 2" Ice | 10.22 | 11.05 | 393 |
| | | | 0.00 | | | No Ice | 8.09 | 7.19 | 67 |
| | | | 0.00 | | | 1/2" Ice | 8.64 | 8.36 | 136 |
| | | | | | | 1" Ice | 9.16 | 9.24 | 212 |
| HPA65R-BU6A w/ Mount Pipe | C | From Leg | 3.00 | 69.0000 | 77.00 | 2" Ice | 10.22 | 11.05 | 393 |
| | | | 0.00 | | | No Ice | 8.09 | 7.19 | 67 |
| | | | 0.00 | | | 1/2" Ice | 8.64 | 8.36 | 136 |
| | | | | | | 1" Ice | 9.16 | 9.24 | 212 |
| Side Arm Mount [SO 305-3] | C | None | | 0.0000 | 77.00 | 2" Ice | 10.22 | 11.05 | 393 |
| | | | | | | No Ice | 2.64 | 2.64 | 90 |
| | | | | | | 1/2" Ice | 4.10 | 4.10 | 130 |
| | | | | | | 1" Ice | 5.56 | 5.56 | 170 |
| **67** **65** 7770.00 w/ Mount Pipe | A | From Leg | 4.00 | 29.0000 | 65.00 | 2" Ice | 8.48 | 8.48 | 249 |
| | | | -6.00 | | | No Ice | 5.75 | 4.25 | 55 |
| | | | 3.00 | | | 1/2" Ice | 6.18 | 5.01 | 103 |
| | | | | | | 1" Ice | 6.61 | 5.71 | 157 |
| 7770.00 w/ Mount Pipe | B | From Leg | 4.00 | 29.0000 | 65.00 | 2" Ice | 7.49 | 7.16 | 287 |
| | | | -6.00 | | | No Ice | 5.75 | 4.25 | 55 |
| | | | 3.00 | | | 1/2" Ice | 6.18 | 5.01 | 103 |
| | | | | | | 1" Ice | 6.61 | 5.71 | 157 |
| 7770.00 w/ Mount Pipe | C | From Leg | 4.00 | 49.0000 | 65.00 | 2" Ice | 7.49 | 7.16 | 287 |
| | | | -6.00 | | | No Ice | 5.75 | 4.25 | 55 |
| | | | 3.00 | | | 1/2" Ice | 6.18 | 5.01 | 103 |
| | | | | | | 1" Ice | 6.61 | 5.71 | 157 |
| 80010965 w/ Mount Pipe | A | From Leg | 4.00 | 69.0000 | 65.00 | 2" Ice | 7.49 | 7.16 | 287 |
| | | | 6.00 | | | No Ice | 14.05 | 7.63 | 125 |
| | | | 1.00 | | | 1/2" Ice | 14.69 | 8.90 | 222 |
| | | | | | | 1" Ice | 15.30 | 9.96 | 327 |
| 80010965 w/ Mount Pipe | B | From Leg | 4.00 | 69.0000 | 65.00 | 2" Ice | 16.53 | 11.92 | 569 |
| | | | 6.00 | | | No Ice | 14.05 | 7.63 | 125 |
| | | | 1.00 | | | 1/2" Ice | 14.69 | 8.90 | 222 |
| | | | | | | 1" Ice | 15.30 | 9.96 | 327 |
| 80010965 w/ Mount Pipe | C | From Leg | 4.00 | 69.0000 | 65.00 | 2" Ice | 16.53 | 11.92 | 569 |
| | | | | | | No Ice | 14.05 | 7.63 | 125 |

| | | | |
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| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | | Page 13 of 21 |
| | Project TEP No. 48909.201723 | | Date 14:14:56 12/18/18 |
| | Client Crown Castle | | Designed by gdkeller |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight |
|-------------------|-------------|-------------|----------|---------|--------------------|-----------|-----------------------|----------------------|--------|
| | | | Horz | Lateral | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 782 10253 | A | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 0.11 | 0.06 | 3 |
| | | | -6.00 | | | 1/2" Ice | 0.15 | 0.10 | 4 |
| | | | 1.00 | | | 1" Ice | 0.20 | 0.14 | 6 |
| | | | | | | 2" Ice | 0.33 | 0.25 | 13 |
| 782 10253 | B | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 0.11 | 0.06 | 3 |
| | | | -6.00 | | | 1/2" Ice | 0.15 | 0.10 | 4 |
| | | | 1.00 | | | 1" Ice | 0.20 | 0.14 | 6 |
| | | | | | | 2" Ice | 0.33 | 0.25 | 13 |
| 782 10253 | C | From Leg | 4.00 | 49.0000 | 65.00 | No Ice | 0.11 | 0.06 | 3 |
| | | | -6.00 | | | 1/2" Ice | 0.15 | 0.10 | 4 |
| | | | 1.00 | | | 1" Ice | 0.20 | 0.14 | 6 |
| | | | | | | 2" Ice | 0.33 | 0.25 | 13 |
| (2) LGP21401 | A | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 1.10 | 0.21 | 14 |
| | | | -2.00 | | | 1/2" Ice | 1.24 | 0.27 | 21 |
| | | | 0.00 | | | 1" Ice | 1.38 | 0.35 | 30 |
| | | | | | | 2" Ice | 1.69 | 0.52 | 55 |
| (2) LGP21401 | B | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 1.10 | 0.21 | 14 |
| | | | -2.00 | | | 1/2" Ice | 1.24 | 0.27 | 21 |
| | | | 0.00 | | | 1" Ice | 1.38 | 0.35 | 30 |
| | | | | | | 2" Ice | 1.69 | 0.52 | 55 |
| (2) LGP21401 | C | From Leg | 4.00 | 49.0000 | 65.00 | No Ice | 1.10 | 0.21 | 14 |
| | | | -2.00 | | | 1/2" Ice | 1.24 | 0.27 | 21 |
| | | | 0.00 | | | 1" Ice | 1.38 | 0.35 | 30 |
| | | | | | | 2" Ice | 1.69 | 0.52 | 55 |
| DC6-48-60-18-8F | A | From Leg | 4.00 | 69.0000 | 65.00 | No Ice | 1.21 | 1.21 | 33 |
| | | | 6.00 | | | 1/2" Ice | 1.89 | 1.89 | 55 |
| | | | 1.00 | | | 1" Ice | 2.11 | 2.11 | 80 |
| | | | | | | 2" Ice | 2.57 | 2.57 | 138 |
| DC6-48-60-18-8F | B | From Leg | 4.00 | 69.0000 | 65.00 | No Ice | 1.21 | 1.21 | 33 |
| | | | 6.00 | | | 1/2" Ice | 1.89 | 1.89 | 55 |
| | | | 1.00 | | | 1" Ice | 2.11 | 2.11 | 80 |
| | | | | | | 2" Ice | 2.57 | 2.57 | 138 |
| RRUS 8843 B2/B66A | A | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 1.64 | 1.35 | 72 |
| | | | -6.00 | | | 1/2" Ice | 1.80 | 1.50 | 90 |
| | | | 1.00 | | | 1" Ice | 1.97 | 1.65 | 110 |
| | | | | | | 2" Ice | 2.32 | 1.99 | 159 |
| RRUS 8843 B2/B66A | B | From Leg | 4.00 | 29.0000 | 65.00 | No Ice | 1.64 | 1.35 | 72 |
| | | | -6.00 | | | 1/2" Ice | 1.80 | 1.50 | 90 |
| | | | 1.00 | | | 1" Ice | 1.97 | 1.65 | 110 |
| | | | | | | 2" Ice | 2.32 | 1.99 | 159 |
| RRUS 8843 B2/B66A | C | From Leg | 4.00 | 49.0000 | 65.00 | No Ice | 1.64 | 1.35 | 72 |
| | | | -6.00 | | | 1/2" Ice | 1.80 | 1.50 | 90 |
| | | | 1.00 | | | 1" Ice | 1.97 | 1.65 | 110 |
| | | | | | | 2" Ice | 2.32 | 1.99 | 159 |
| RRUS 4449 B5/B12 | A | From Leg | 4.00 | 69.0000 | 65.00 | No Ice | 1.97 | 1.41 | 71 |
| | | | 6.00 | | | 1/2" Ice | 2.14 | 1.56 | 90 |
| | | | 1.00 | | | 1" Ice | 2.33 | 1.73 | 111 |
| | | | | | | 2" Ice | 2.72 | 2.07 | 163 |
| RRUS 4449 B5/B12 | B | From Leg | 4.00 | 69.0000 | 65.00 | No Ice | 1.97 | 1.41 | 71 |
| | | | 6.00 | | | 1/2" Ice | 2.14 | 1.56 | 90 |
| | | | 1.00 | | | 1" Ice | 2.33 | 1.73 | 111 |
| | | | | | | 2" Ice | 2.72 | 2.07 | 163 |
| RRUS 4449 B5/B12 | C | From Leg | 4.00 | 69.0000 | 65.00 | No Ice | 1.97 | 1.41 | 71 |
| | | | 6.00 | | | 1/2" Ice | 2.14 | 1.56 | 90 |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 14 of 21 |
| | Project | TEP No. 48909.201723 | Date | 14:14:56 12/18/18 |
| | Client | Crown Castle | Designed by | gdkeller |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight |
|---------------------------|-------------|-------------|----------------------------|--------------------|-----------|-----------------------|----------------------|--------|
| | | | ft | ° | ft | ft ² | ft ² | lb |
| | | | 1.00 | | | 1" Ice 2.33 | 1.73 | 111 |
| | | | | | | 2" Ice 2.72 | 2.07 | 163 |
| Sector Mount [SM 502-3] | C | None | | 0.0000 | 65.00 | No Ice 33.02 | 33.02 | 1673 |
| | | | | | | 1/2" Ice 47.36 | 47.36 | 2224 |
| | | | | | | 1" Ice 61.70 | 61.70 | 2775 |
| | | | | | | 2" Ice 90.38 | 90.38 | 3876 |
| **59** | | | | | | | | |
| GPS_A | C | From Leg | 3.00 | 0.0000 | 59.00 | No Ice 0.26 | 0.26 | 1 |
| | | | 0.00 | | | 1/2" Ice 0.32 | 0.32 | 5 |
| | | | 1.00 | | | 1" Ice 0.39 | 0.39 | 10 |
| | | | | | | 2" Ice 0.56 | 0.56 | 25 |
| Side Arm Mount [SO 305-1] | C | From Leg | 1.50 | 39.0000 | 59.00 | No Ice 0.94 | 1.41 | 30 |
| | | | 0.00 | | | 1/2" Ice 1.48 | 2.17 | 43 |
| | | | 0.00 | | | 1" Ice 2.02 | 2.93 | 57 |
| | | | | | | 2" Ice 3.10 | 4.45 | 83 |
| **34** | | | | | | | | |
| 8225 | B | From Leg | 2.00 | 0.0000 | 34.00 | No Ice 0.89 | 0.89 | 1 |
| | | | 0.00 | | | 1/2" Ice 1.06 | 1.06 | 9 |
| | | | 1.00 | | | 1" Ice 1.23 | 1.23 | 18 |
| | | | | | | 2" Ice 1.59 | 1.59 | 46 |
| **** | | | | | | | | |

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 |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job | NHV 106 943628 (BU 806386) | Page | 15 of 21 |
| | Project | TEP No. 48909.201723 | Date | 14:14:56 12/18/18 |
| | Client | Crown Castle | Designed by | gdkeller |

| Comb. No. | Description |
|-----------|--|
| 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 Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-------------------|---------------------|-----------------|--------|---------|
| T1 | 92 - 80 | 1.438 | 50 | 0.1270 | 0.0205 |
| T2 | 80 - 75 | 1.110 | 50 | 0.1200 | 0.0132 |
| T3 | 75 - 70 | 0.980 | 50 | 0.1156 | 0.0103 |
| T4 | 70 - 65 | 0.859 | 50 | 0.1095 | 0.0092 |
| T5 | 65 - 60 | 0.743 | 50 | 0.1025 | 0.0069 |
| T6 | 60 - 40 | 0.634 | 50 | 0.0940 | 0.0059 |
| T7 | 40 - 20 | 0.290 | 43 | 0.0605 | 0.0030 |
| T8 | 20 - 13.3333 | 0.078 | 43 | 0.0291 | 0.0012 |
| T9 | 13.3333 - 6.66667 | 0.037 | 43 | 0.0198 | 0.0006 |
| T10 | 6.66667 - 0 | 0.010 | 43 | 0.0100 | 0.0003 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|--------------|--------------------------------|-----------------|---------------|--------|---------|------------------------|
| 91.00 | SD310-HF2P4SNM | 50 | 1.410 | 0.1265 | 0.0199 | 180633 |
| 90.00 | (2) DB844G65ZAXY w/ Mount Pipe | 50 | 1.382 | 0.1260 | 0.0193 | 180633 |
| 77.00 | HPA65R-BU6A w/ Mount Pipe | 50 | 1.031 | 0.1176 | 0.0113 | 36820 |
| 65.00 | 7770.00 w/ Mount Pipe | 50 | 0.743 | 0.1025 | 0.0069 | 37026 |
| 59.00 | GPS_A | 50 | 0.613 | 0.0923 | 0.0058 | 32475 |
| 34.00 | 8225 | 43 | 0.213 | 0.0507 | 0.0023 | 36765 |

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| tnxTower Tower Engineering Professionals 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350 | Job NHV 106 943628 (BU 806386) | Page 16 of 21 |
| | Project TEP No. 48909.201723 | Date 14:14:56 12/18/18 |
| | Client Crown Castle | Designed by gdkeller |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-------------------|------------------------|-----------------|-----------|------------|
| T1 | 92 - 80 | 6.230 | 10 | 0.5435 | 0.0890 |
| T2 | 80 - 75 | 4.825 | 10 | 0.5163 | 0.0574 |
| T3 | 75 - 70 | 4.265 | 10 | 0.4983 | 0.0449 |
| T4 | 70 - 65 | 3.742 | 10 | 0.4729 | 0.0398 |
| T5 | 65 - 60 | 3.236 | 10 | 0.4440 | 0.0298 |
| T6 | 60 - 40 | 2.765 | 10 | 0.4079 | 0.0257 |
| T7 | 40 - 20 | 1.265 | 10 | 0.2635 | 0.0130 |
| T8 | 20 - 13.3333 | 0.341 | 10 | 0.1270 | 0.0050 |
| T9 | 13.3333 - 6.66667 | 0.160 | 10 | 0.0865 | 0.0027 |
| T10 | 6.66667 - 0 | 0.043 | 10 | 0.0435 | 0.0014 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 91.00 | SD310-HF2P4SNM | 10 | 6.112 | 0.5416 | 0.0865 | 44159 |
| 90.00 | (2) DB844G65ZAXY w/ Mount Pipe | 10 | 5.994 | 0.5397 | 0.0840 | 44159 |
| 77.00 | HPA65R-BU6A w/ Mount Pipe | 10 | 4.485 | 0.5064 | 0.0490 | 8646 |
| 65.00 | 7770.00 w/ Mount Pipe | 10 | 3.236 | 0.4440 | 0.0298 | 8584 |
| 59.00 | GPS_A | 10 | 2.676 | 0.4004 | 0.0252 | 7578 |
| 34.00 | 8225 | 10 | 0.928 | 0.2209 | 0.0099 | 8461 |

Bolt Design Data

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt lb | Allowable Load per Bolt lb | Ratio Load Allowable | Allowable Ratio | Criteria |
|-------------|-----------------|----------------|------------|-----------------|-----------------|-----------------------------|-------------------------------|----------------------|-----------------|--------------------|
| T1 | 92 | Leg | A325X | 0.6250 | 4 | 1984 | 20340 | 0.098 | 1.05 | Bolt Tension |
| | | Diagonal | A325X | 0.5000 | 1 | 2793 | 3480 | 0.803 | 1.05 | Member Block Shear |
| T2 | 80 | Top Girt | A325X | 0.5000 | 1 | 113 | 4133 | 0.027 | 1.05 | Member Bearing |
| T3 | 75 | Diagonal | A325X | 0.5000 | 1 | 2759 | 4133 | 0.668 | 1.05 | Member Bearing |
| T4 | 70 | Diagonal | A325X | 0.5000 | 1 | 2912 | 7176 | 0.406 | 1.05 | Gusset Bearing |
| T5 | 65 | Diagonal | A325X | 0.5000 | 1 | 2763 | 4133 | 0.669 | 1.05 | Member Bearing |
| T5 | | Leg | A325X | 0.6250 | 4 | 6923 | 20340 | 0.340 | 1.05 | Bolt Tension |
| T5 | | Diagonal | A325X | 0.5000 | 1 | 3719 | 7176 | 0.518 | 1.05 | Gusset Bearing |
| T5 | | Top Girt | A325X | 0.5000 | 1 | 256 | 6199 | 0.041 | 1.05 | Member Bearing |
| T6 | 60 | Leg | A325X | 0.7500 | 4 | 12790 | 30101 | 0.425 | 1.05 | Bolt Tension |
| | | Diagonal | A325N | 0.5000 | 1 | 4101 | 7176 | 0.572 | 1.05 | Gusset Bearing |
| | | Secondary | A325N | 0.5000 | 1 | 1035 | 7176 | 0.144 | 1.05 | Gusset Bearing |
| T7 | 40 | Horizontal | | | | | | | | |
| | | Leg | A325X | 0.8750 | 4 | 18391 | 41556 | 0.443 | 1.05 | Bolt Tension |
| | | Diagonal | A325X | 0.5000 | 1 | 4489 | 6199 | 0.724 | 1.05 | Member Bearing |
| | | Secondary | A325X | 0.6250 | 1 | 1476 | 6864 | 0.215 | 1.05 | Gusset Bearing |

| | | |
|--|--|----------------------------------|
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| | Client Crown Castle | Designed by gdkeller |

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt lb | Allowable Load per Bolt lb | Ratio Load Allowable | Allowable Ratio | Criteria |
|-------------|-----------------|----------------|------------|-----------------|-----------------|-----------------------------|-------------------------------|----------------------|-----------------|----------------|
| T8 | 20 | Horizontal | | | | | | | | |
| | | Diagonal | A325X | 0.5000 | 1 | 4574 | 6199 | 0.738 | 1.05 | Member Bearing |
| T9 | 13.3333 | Secondary | A325X | 0.6250 | 1 | 1616 | 6864 | 0.235 | 1.05 | Gusset Bearing |
| | | Horizontal | | | | | | | | |
| T10 | 6.66667 | Diagonal | A325X | 0.5000 | 1 | 4646 | 7176 | 0.648 | 1.05 | Gusset Bearing |
| | | Secondary | A325X | 0.6250 | 1 | 1759 | 6864 | 0.256 | 1.05 | Gusset Bearing |
| | | Horizontal | | | | | | | | |
| | | Diagonal | A325X | 0.5000 | 1 | 4813 | 7176 | 0.671 | 1.05 | Gusset Bearing |
| | | Secondary | A325X | 0.6250 | 1 | 1894 | 6864 | 0.276 | 1.05 | Gusset Bearing |
| | | Horizontal | | | | | | | | |

Compression Checks

Leg Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|----------------|---------|----------------------|----------------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | ROHN 2 STD | 12.00 | 4.00 | 61.0 | 1.0745 | -10669 | 36842 | 0.290 ¹ |
| T2 | 80 - 75 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 K=1.00 | 1.7040 | -15153 | 57136 | 0.265 ¹ |
| T3 | 75 - 70 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 K=1.00 | 1.7040 | -20904 | 57136 | 0.366 ¹ |
| T4 | 70 - 65 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 K=1.00 | 1.7040 | -25959 | 57136 | 0.454 ¹ |
| T5 | 65 - 60 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 K=1.00 | 1.7040 | -33713 | 57136 | 0.590 ¹ |
| T6 | 60 - 40 | ROHN 2.5 X-STR | 20.03 | 3.45 | 44.8 K=1.00 | 2.2535 | -59700 | 87568 | 0.682 ¹ |
| T7 | 40 - 20 | ROHN 3 X-STR | 20.03 | 3.43 | 36.2 K=1.00 | 3.0159 | -85101 | 123296 | 0.690 ¹ |
| T8 | 20 - 13.3333 | ROHN 3.5 X-SIR | 6.68 | 3.43 | 31.5 K=1.00 | 3.6784 | -93165 | 153959 | 0.605 ¹ |
| T9 | 13.3333 - 6.66667 | ROHN 3.5 X-SIR | 6.68 | 3.42 | 31.4 K=1.00 | 3.6784 | -101404 | 153988 | 0.659 ¹ |
| T10 | 6.66667 - 0 | ROHN 3.5 X-SIR | 6.68 | 3.42 | 31.4 K=1.00 | 3.6784 | -109196 | 154014 | 0.709 ¹ |

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------|---------|----------------------|-------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | L1 1/2x1 1/2x1/8 | 7.67 | 3.62 | 146.6 | 0.3594 | -2772 | 4788 | 0.579 ¹ |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
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| | Client | Crown Castle | Designed by | gdkeller |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|-------------------|---------|----------------------|-----------------|----------------------|----------------------|-----------------------|---------------------------------|
| T2 | 80 - 75 | L1 3/4x1 3/4x1/8 | 8.45 | 4.13 | K=1.00 142.8 | 0.4219 | -2916 | 5918 | 0.493 ¹ |
| T3 | 75 - 70 | L2x2x1/4 | 8.86 | 4.31 | K=1.00 132.3 | 0.9380 | -2808 | 15336 | 0.183 ¹ |
| T4 | 70 - 65 | L1 3/4x1 3/4x1/8 | 9.28 | 4.54 | K=1.00 157.1 | 0.4219 | -2893 | 4892 | 0.591 ¹ |
| T5 | 65 - 60 | L2x2x1/4 | 9.70 | 4.73 | K=1.00 145.2 | 0.9380 | -3816 | 12730 | 0.300 ¹ |
| T6 | 60 - 40 | L2x2x1/4 | 12.24 | 6.08 | K=1.00 186.5 | 0.9380 | -4232 | 7720 | 0.548 ¹ |
| T7 | 40 - 20 | L2 1/2x2 1/2x3/16 | 13.99 | 6.92 | K=1.00 167.7 | 0.9023 | -4629 | 9181 | 0.504 ¹ |
| T8 | 20 - 13.3333 | L2 1/2x2 1/2x3/16 | 14.59 | 7.20 | K=1.00 174.5 | 0.9023 | -4782 | 8478 | 0.564 ¹ |
| T9 | 13.3333 - 6.66667 | L2 1/2x2 1/2x3/8 | 15.21 | 7.48 | K=1.00 184.4 | 1.7300 | -4928 | 14559 | 0.339 ¹ |
| T10 | 6.66667 - 0 | L2 1/2x2 1/2x3/8 | 15.83 | 7.79 | K=1.00 192.1 | 1.7300 | -5118 | 13423 | 0.381 ¹ |

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|------------------|---------|----------------------|-----------------|----------------------|----------------------|-----------------------|---------------------------------|
| T6 | 60 - 40 | L2 1/2x2 1/2x1/4 | 10.25 | 4.86 | K=1.01 119.4 | 1.1900 | -1035 | 23636 | 0.044 ¹ |
| T7 | 40 - 20 | L2x2x1/4 | 12.29 | 5.85 | K=1.00 179.6 | 0.9380 | -1476 | 8323 | 0.177 ¹ |
| T8 | 20 - 13.3333 | L2x2x1/4 | 12.97 | 6.17 | K=1.00 189.4 | 0.9380 | -1616 | 7481 | 0.216 ¹ |
| T9 | 13.3333 - 6.66667 | L2x2x1/4 | 13.66 | 6.52 | K=1.00 200.0 | 0.9380 | -1759 | 6712 | 0.262 ¹ |
| T10 | 6.66667 - 0 | L2x2x1/4 | 14.35 | 6.86 | K=1.00 210.6 | 0.9380 | -1894 | 6056 | 0.313 ¹ |

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | L2x2x1/8 | 6.52 | 6.11 | K=1.00 184.6 | 0.4844 | -103 | 4070 | 0.025 ¹ |
| T5 | 65 - 60 | L2 1/2x2 1/2x3/16 | 8.06 | 7.61 | K=1.00 184.6 | 0.9023 | -153 | 7576 | 0.020 ¹ |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
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¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|----------------|---------|----------------------|------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | ROHN 2 STD | 12.00 | 4.00 | 61.0 | 1.0745 | 7937 | 48354 | 0.164 ¹ |
| T2 | 80 - 75 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 | 1.7040 | 12237 | 76682 | 0.160 ¹ |
| T3 | 75 - 70 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 | 1.7040 | 17619 | 76682 | 0.230 ¹ |
| T4 | 70 - 65 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 | 1.7040 | 22438 | 76682 | 0.293 ¹ |
| T5 | 65 - 60 | ROHN 2.5 STD | 5.01 | 5.01 | 63.4 | 1.7040 | 27691 | 76682 | 0.361 ¹ |
| T6 | 60 - 40 | ROHN 2.5 X-STR | 20.03 | 3.23 | 41.9 | 2.2535 | 51216 | 101409 | 0.505 ¹ |
| T7 | 40 - 20 | ROHN 3 X-STR | 20.03 | 3.25 | 34.3 | 3.0159 | 73638 | 135717 | 0.543 ¹ |
| T8 | 20 - 13.3333 | ROHN 3.5 X-STR | 6.68 | 3.25 | 29.9 | 3.6784 | 80680 | 165529 | 0.487 ¹ |
| T9 | 13.3333 - 6.66667 | ROHN 3.5 X-STR | 6.68 | 3.26 | 29.9 | 3.6784 | 87699 | 165529 | 0.530 ¹ |
| T10 | 6.66667 - 0 | ROHN 3.5 X-STR | 6.68 | 3.26 | 29.9 | 3.6784 | 94132 | 165529 | 0.569 ¹ |

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|-------------------|---------|----------------------|-------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | L1 1/2x1 1/2x1/8 | 7.67 | 3.62 | 96.0 | 0.2109 | 2793 | 9176 | 0.304 ¹ |
| T2 | 80 - 75 | L1 3/4x1 3/4x1/8 | 8.45 | 4.13 | 93.1 | 0.2578 | 2759 | 11215 | 0.246 ¹ |
| T3 | 75 - 70 | L2x2x1/4 | 8.86 | 4.31 | 87.4 | 0.5863 | 2912 | 25505 | 0.114 ¹ |
| T4 | 70 - 65 | L1 3/4x1 3/4x1/8 | 9.28 | 4.54 | 102.1 | 0.2578 | 2763 | 11215 | 0.246 ¹ |
| T5 | 65 - 60 | L2x2x1/4 | 9.70 | 4.73 | 95.7 | 0.5863 | 3719 | 25505 | 0.146 ¹ |
| T6 | 60 - 40 | L2x2x1/4 | 12.24 | 6.08 | 121.8 | 0.5863 | 4101 | 25505 | 0.161 ¹ |
| T7 | 40 - 20 | L2 1/2x2 1/2x3/16 | 13.99 | 6.92 | 108.3 | 0.5889 | 4489 | 25616 | 0.175 ¹ |
| T8 | 20 - 13.3333 | L2 1/2x2 1/2x3/16 | 14.59 | 7.20 | 112.6 | 0.5889 | 4574 | 25616 | 0.179 ¹ |
| T9 | 13.3333 - 6.66667 | L2 1/2x2 1/2x3/8 | 15.21 | 7.48 | 121.3 | 1.1217 | 4646 | 48795 | 0.095 ¹ |
| T10 | 6.66667 - 0 | L2 1/2x2 1/2x3/8 | 15.83 | 7.79 | 126.2 | 1.1217 | 4813 | 48795 | 0.099 ¹ |

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------|---------|----------------------|-------|----------------------|----------------------|-----------------------|---------------------------------|
| T6 | 60 - 40 | L2 1/2x2 1/2x1/4 | 10.25 | 4.86 | 156.3 | 0.7753 | 1035 | 33726 | 0.031 ¹ |
| T7 | 40 - 20 | L2x2x1/4 | 12.29 | 5.85 | 236.4 | 0.5629 | 1476 | 24485 | 0.060 ¹ |

| | | | | |
|--|---------|----------------------------|-------------|-------------------|
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| | Client | Crown Castle | Designed by | gdkeller |

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-------------------|----------|---------|----------------------|-------|----------------------|----------------------|-----------------------|---------------------------------|
| T8 | 20 - 13.3333 | L2x2x1/4 | 12.97 | 6.17 | 249.0 | 0.5629 | 1616 | 24485 | 0.066 ¹ |
| T9 | 13.3333 - 6.66667 | L2x2x1/4 | 13.66 | 6.52 | 262.6 | 0.5629 | 1759 | 24485 | 0.072 ¹ |
| T10 | 6.66667 - 0 | L2x2x1/4 | 14.35 | 6.86 | 276.1 | 0.5629 | 1894 | 24485 | 0.077 ¹ |

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _n ft | Kl/r | A in ² | P _u lb | φP _n lb | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------------------|---------|----------------------|-------|----------------------|----------------------|-----------------------|---------------------------------|
| T1 | 92 - 80 | L2x2x1/8 | 6.52 | 6.11 | 121.2 | 0.3047 | 113 | 13254 | 0.009 ¹ |
| T5 | 65 - 60 | L2 1/2x2 1/2x3/16 | 8.06 | 7.61 | 120.6 | 0.5889 | 256 | 25616 | 0.010 ¹ |

¹ P_u / φP_n controls

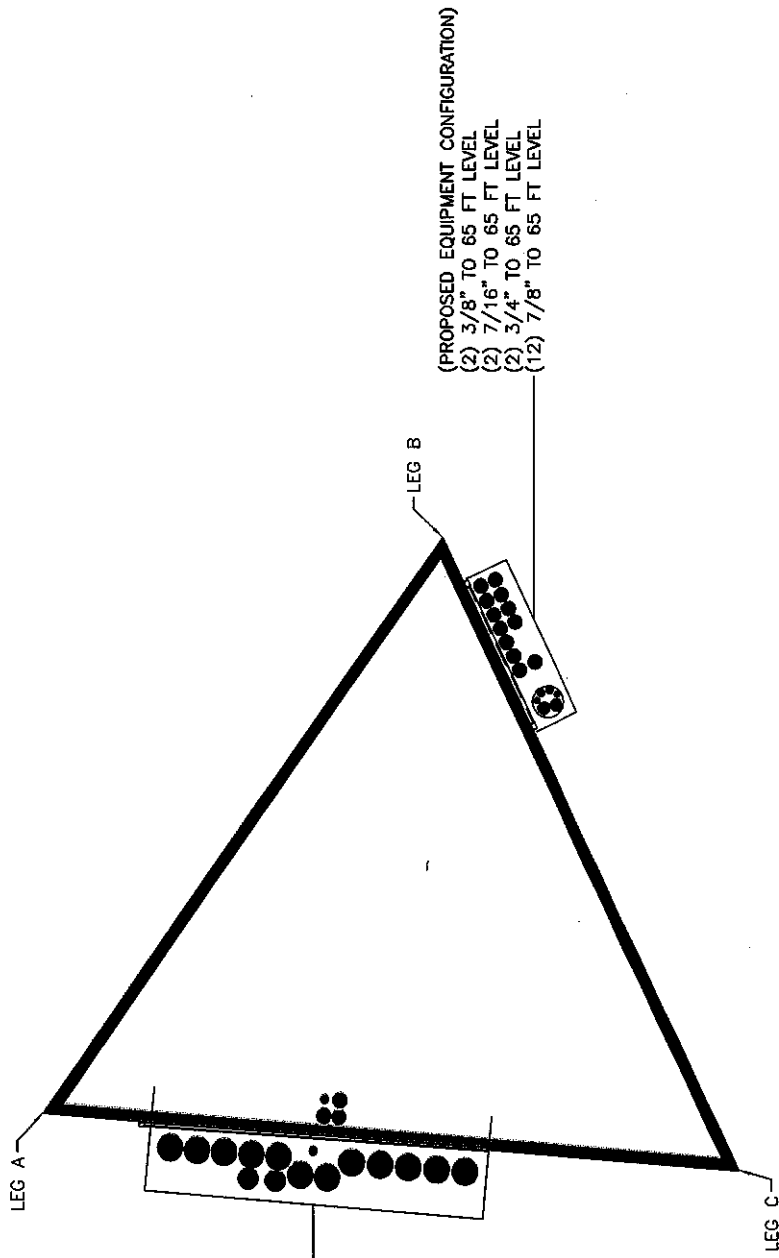
Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P lb | φP _{allow} lb | % Capacity | Pass Fail |
|-------------|-------------------|----------------|-------------------|------------------|---------|---------------------------|---------------|--------------|
| T1 | 92 - 80 | Leg | ROHN 2 STD | 3 | -10669 | 38684 | 27.6 | Pass |
| T2 | 80 - 75 | Leg | ROHN 2.5 STD | 27 | -15153 | 59993 | 25.3 | Pass |
| T3 | 75 - 70 | Leg | ROHN 2.5 STD | 35 | -20904 | 59993 | 34.8 | Pass |
| T4 | 70 - 65 | Leg | ROHN 2.5 STD | 44 | -25959 | 59993 | 43.3 | Pass |
| T5 | 65 - 60 | Leg | ROHN 2.5 STD | 53 | -33713 | 59993 | 56.2 | Pass |
| T6 | 60 - 40 | Leg | ROHN 2.5 X-STR | 65 | -59700 | 91946 | 64.9 | Pass |
| T7 | 40 - 20 | Leg | ROHN 3 X-STR | 95 | -85101 | 129461 | 65.7 | Pass |
| T8 | 20 - 13.3333 | Leg | ROHN 3.5 X-STR | 125 | -93165 | 161657 | 57.6 | Pass |
| T9 | 13.3333 - 6.66667 | Leg | ROHN 3.5 X-STR | 137 | -101404 | 161687 | 62.7 | Pass |
| T10 | 6.66667 - 0 | Leg | ROHN 3.5 X-STR | 149 | -109196 | 161715 | 67.5 | Pass |
| T1 | 92 - 80 | Diagonal | L1 1/2x1 1/2x1/8 | 18 | -2772 | 5027 | 55.1 | Pass |
| T2 | 80 - 75 | Diagonal | L1 3/4x1 3/4x1/8 | 32 | -2916 | 6214 | 46.9 | Pass |
| T3 | 75 - 70 | Diagonal | L2x2x1/4 | 42 | -2808 | 16102 | 63.6 (b) | Pass |
| T4 | 70 - 65 | Diagonal | L1 3/4x1 3/4x1/8 | 50 | -2893 | 5137 | 17.4 | Pass |
| T5 | 65 - 60 | Diagonal | L2x2x1/4 | 59 | -3816 | 13367 | 38.6 (b) | Pass |
| T6 | 60 - 40 | Diagonal | L2x2x1/4 | 68 | -4232 | 8106 | 56.3 | Pass |
| T7 | 40 - 20 | Diagonal | L2 1/2x2 1/2x3/16 | 99 | -4629 | 9640 | 63.7 (b) | Pass |
| T8 | 20 - 13.3333 | Diagonal | L2 1/2x2 1/2x3/16 | 129 | -4782 | 8902 | 28.5 | Pass |
| T9 | 13.3333 - 6.66667 | Diagonal | L2 1/2x2 1/2x3/8 | 141 | -4928 | 15287 | 49.4 (b) | Pass |
| T10 | 6.66667 - 0 | Diagonal | L2 1/2x2 1/2x3/8 | 153 | -5118 | 14094 | 52.2 | Pass |
| | | | | | | | 54.4 (b) | |
| | | | | | | | 48.0 | Pass |
| | | | | | | | 69.0 (b) | |
| | | | | | | | 53.7 | Pass |
| | | | | | | | 70.3 (b) | |
| | | | | | | | 32.2 | Pass |
| | | | | | | | 61.7 (b) | |
| | | | | | | | 36.3 | Pass |

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| | Client | Crown Castle | Designed by | gdkeller |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P lb | ϕP_{allow} lb | % Capacity | Pass Fail | |
|-------------|-------------------|----------------------|-------------------|------------------|-------|---------------------|----------------------------|-------------|-------------|
| T6 | 60 - 40 | Secondary Horizontal | L2 1/2x2 1/2x1/4 | 73 | -1035 | 24818 | 63.9 (b) 4.2 | Pass | |
| T7 | 40 - 20 | Secondary Horizontal | L2x2x1/4 | 104 | -1476 | 8739 | 13.7 (b) 16.9 | Pass | |
| T8 | 20 - 13.3333 | Secondary Horizontal | L2x2x1/4 | 133 | -1616 | 7855 | 20.5 (b) 20.6 | Pass | |
| T9 | 13.3333 - 6.66667 | Secondary Horizontal | L2x2x1/4 | 145 | -1759 | 7048 | 22.4 (b) 25.0 | Pass | |
| T10 | 6.66667 - 0 | Secondary Horizontal | L2x2x1/4 | 157 | -1894 | 6359 | 29.8 | Pass | |
| T1 | 92 - 80 | Top Girt | L2x2x1/8 | 5 | -103 | 4273 | 2.4 | Pass | |
| T5 | 65 - 60 | Top Girt | L2 1/2x2 1/2x3/16 | 55 | -153 | 7955 | 2.6 (b) 1.9 | Pass | |
| | | | | | | | 3.9 (b) | | |
| | | | | | | | Summary | | |
| | | | | | | | Leg (T10) | 67.5 | Pass |
| | | | | | | | Diagonal (T1) | 76.4 | Pass |
| | | | | | | | Secondary Horizontal (T10) | 29.8 | Pass |
| | | | | | | | Top Girt (T5) | 3.9 | Pass |
| | | | | | | | Bolt Checks | 76.4 | Pass |
| | | | | | | | RATING = | 76.4 | Pass |

APPENDIX B
BASE LEVEL DRAWING



(OTHER CONSIDERED EQUIPMENT)
(3) 7/8" TO 91 FT LEVEL
(2) 1-1/4" TO 90 FT LEVEL
(12) 1-5/8" TO 90 FT LEVEL
(1) 1/2" TO 59 FT LEVEL
(1) 1/2" TO 34 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 65 FT LEVEL
(2) 7/16" TO 65 FT LEVEL
(2) 3/4" TO 65 FT LEVEL
(12) 7/8" TO 65 FT LEVEL

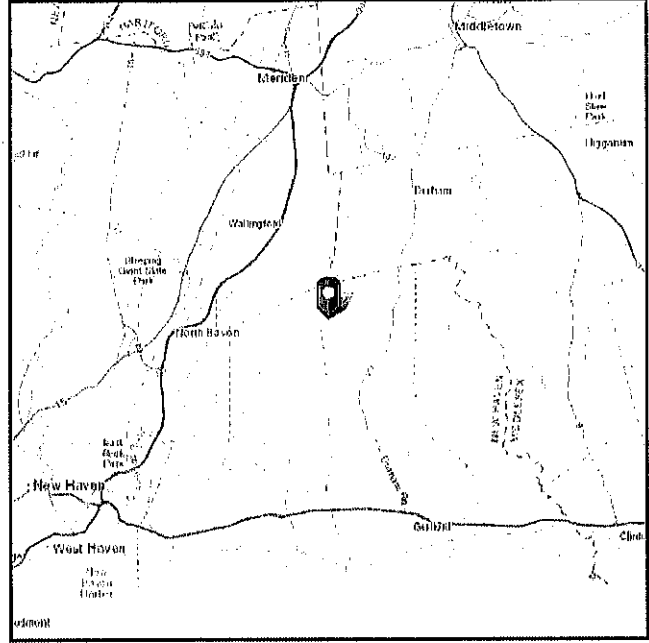
APPENDIX C
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 583.14 ft (NAVD 88)
Latitude: 41.403464
Longitude: -72.744139



Wind

| | |
|-----------------|--|
| Results: | 78 Vmph |
| Wind Speed: | 126 Vmph Using an ultimate 3-second gust speed of 125 mph as required by Connecticut State Building Code requirements. |
| 10-year MRI | 78 Vmph |
| 25-year MRI | 87 Vmph |
| 50-year MRI | 94 Vmph |
| 100-year MRI | 103 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: Thu Dec 13 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.

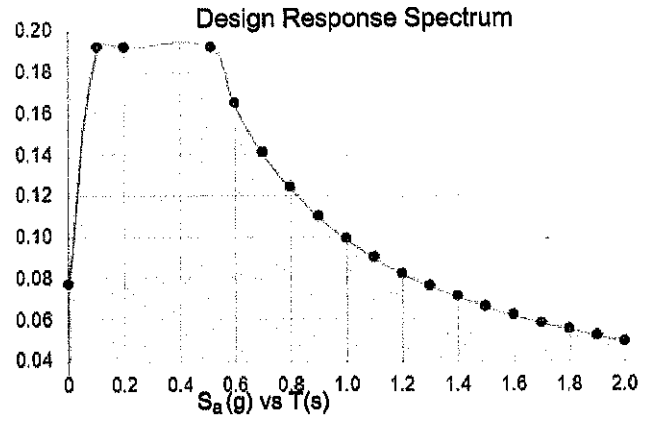
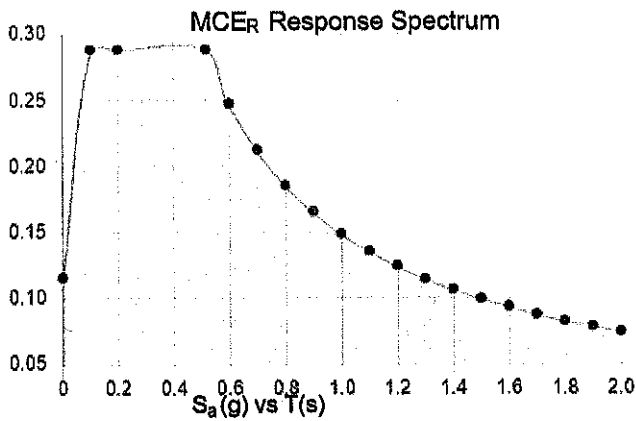
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

| | | | |
|------------|-------|--------------------|-------|
| S_s : | 0.180 | S_{DS} : | 0.192 |
| S_1 : | 0.062 | S_{D1} : | 0.099 |
| F_a : | 1.600 | T_L : | 6.000 |
| F_v : | 2.400 | PGA : | 0.092 |
| S_{MS} : | 0.288 | PGA _M : | 0.147 |
| S_{M1} : | 0.148 | F_{PGA} : | 1.600 |
| | | I_e : | 1 |

Seismic Design Category B



Data Accessed:
Date Source:

Thu Dec 13 2018
 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.

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: Thu Dec 13 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.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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CCIplate

| Project Information | |
|---------------------|----------------|
| BU # | 806386 |
| Site Name | NHV 106 943628 |
| Order # | 471721 Rev. 0 |

| Tower Information | |
|-------------------|--------------|
| Tower Type | Self Support |
| TIA-222 Rev | H |

Apply TIA-222-H Section 15.5

| Applied Loads | | |
|---------------|--------|--------|
| | Comp. | Uplift |
| Axial (k) | 113.40 | 97.57 |
| Shear (k) | 14.48 | 12.72 |

| Anchor Rod Data | |
|----------------------|-------------|
| Quantity: | 4 |
| Diameter (in): | 0.875 |
| Material Grade: | A449 |
| Grout Considered: | |
| l_{ar} (in): | 0.125 |
| Eta Factor, η : | |
| Thread Type: | N-Included |
| Configuration: | Symmetrical |

Fy=92 ksi Fu=120 ksi
Not Considered, $l_{ar} \leq 1(d)$

| Anchor Rod Results | |
|---------------------------------|-------|
| Axial, Pu_c (kips) | 28.35 |
| Shear, Vu (kips) | 3.62 |
| Moment, Mu (kip-in) | - |
| Axial Cap., ϕPn_c (kips) | 42.50 |
| Shear Cap., ϕVn (kips) | 12.75 |
| Moment Cap., ϕMn (kip-in) | - |
| Stress Rating | 71.2% |

Pass

Date: December 18, 2018

Charles McGuirt
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

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 Analysis Report

Carrier Designation: AT&T Upgrade
Carrier Site Number: 10091758
Carrier Site Name: CTL05634

Crown Castle Designation: Crown Castle BU Number: 806386
Crown Castle Site Name: NHC 106 943628
Crown Castle JDE Job Number: 548692
Crown Castle Order Number: 471724, Rev. 0

Engineering Firm Designation: Infinigy Report Designation: 1039-A0002-B

Site Data: 83 Reeds Gap Road, North Branford, New Haven County, CT 06472
Latitude 41°24'12.47" Longitude -72°44'38.9"

Structure Information: Tower Height & Type: 92.0 ft Monopole
Mount Elevation: 65.0 ft
Mount Type: 10 ft Sector Frame

Dear Charles McGuirt,

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

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

10 ft Sector Frame (typical)

Sufficient

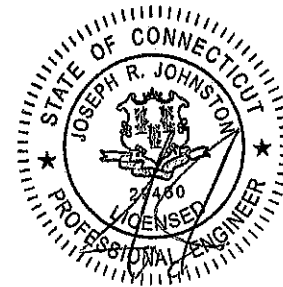
The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from the 2015 International Building Code and 2018 Connecticut Building Code. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II was/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 analysis prepared by: Christopher Kudlacik

Respectfully Submitted by:

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



12-18-18

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1) INTRODUCTION

This mount is an existing Site Pro 1 VFA12. This mount is installed at the 65.0 ft elevation on 3 sector(s) of the 92.0 ft Self Supporting Tower.

2) ANALYSIS CRITERIA

Building Code: 2015 IBC
 TIA-222 Revision: TIA-222-H
 Risk Category: II
 Ultimate Wind Speed: 125 mph
 Exposure Category: C
 Topographic Factor at Base: 1.0
 Topographic Factor at Mount: 1.0
 Ice Thickness: 1.28 in
 Wind Speed with Ice: 50 mph
 Live Loading Wind Speed: 30 mph
 Man Live Load at Mount Pipes: 500 lb

Table 1 - Final Equipment Configuration

| Mount Centerline (ft) | Antenna Centerline (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Mount / Modification Details | |
|-----------------------|-------------------------|--------------------|----------------------|-----------------|------------------------------|-------------------|
| 65.0 | 77.0 | 3 | CCI | HPA65R-BU8A | 10 ft Sector Frame | |
| | 68.0 | 3 | Powerwave | 7770.00 | | |
| | 66.0 | | 3 | Kathrein | | 80010965 |
| | | | 3 | Ericsson | | RRUS 4449 B5/B12 |
| | | | 3 | Ericsson | | RRUS 8843 B2/B66A |
| | | | 3 | Kathrein | | 782 10253 |
| | | 3 | Raycap | DC6-48-60-18-8F | | |
| 65.0 | 6 | Powerwave | LGP21401 | | | |

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

| Document | Remarks | Reference | Source |
|-------------------|------------------|----------------|------------|
| Crown Application | AT&T Application | 472236, Rev. 0 | CCI Sites |
| Mount | -- | VFA12 | Site Pro 1 |
| Photos | -- | 806386 | CCI Sites |

3.1) Analysis Method

RISA-3D (Version 17.0.0), 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.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision 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 Table 1 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, unless noted otherwise:

| | |
|------------------------------------|------------------|
| Channel, Solid Round, Angle, Plate | ASTM A36 (GR 36) |
| HSS (Rectangular) | ASTM A53 (GR 35) |
| 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. Infingy 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 (10 ft Sector Frame, Typical)

| Notes | Component | Critical Member | Centerline (ft) | % Capacity | Pass / Fail |
|-------|------------|-----------------|-----------------|------------|-------------|
| 1,2 | Standoff | M9 | 65.0 | 46.3% | Pass |
| | Horizontal | M4 | | 60.7% | Pass |
| | ½" Bolt | -- | | 14.7% | Pass |
| | Mount Pipe | M17 | | 44.6% | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 96.5% |
|---|--------------|

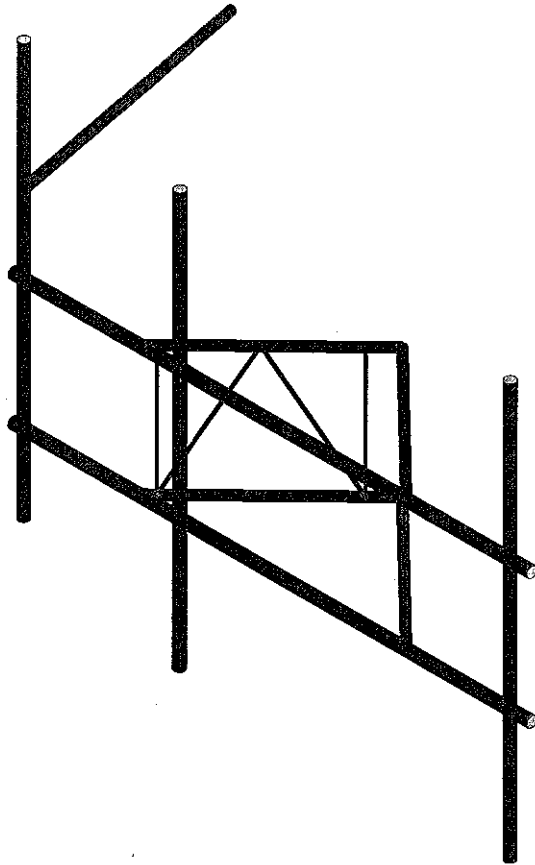
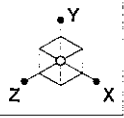
Notes:

- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) All sectors are typical

4.1) Recommendations

Mount was found to be sufficient per code requirement and will no require modification at this time.

APPENDIX A
WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Infinigy Engineering PLLC

DVA

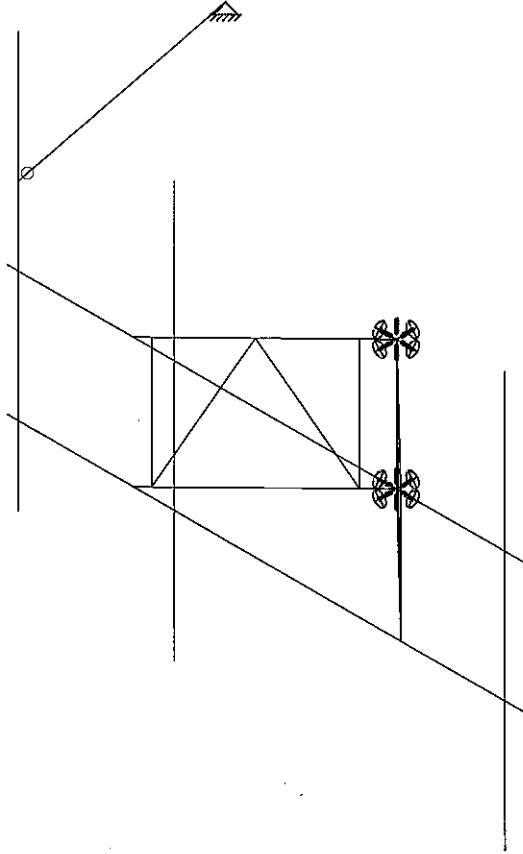
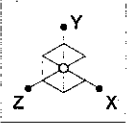
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NHV 106 943628

Final Configuration

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DVA

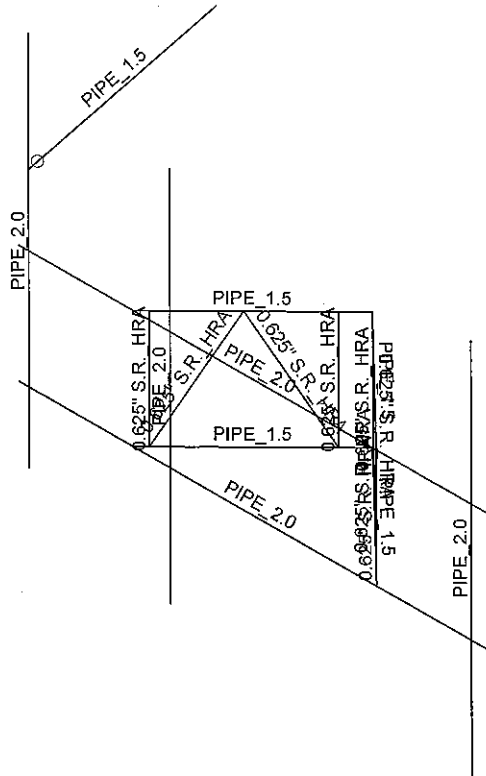
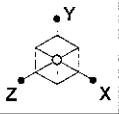
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NHV 106 943628

Wireframe

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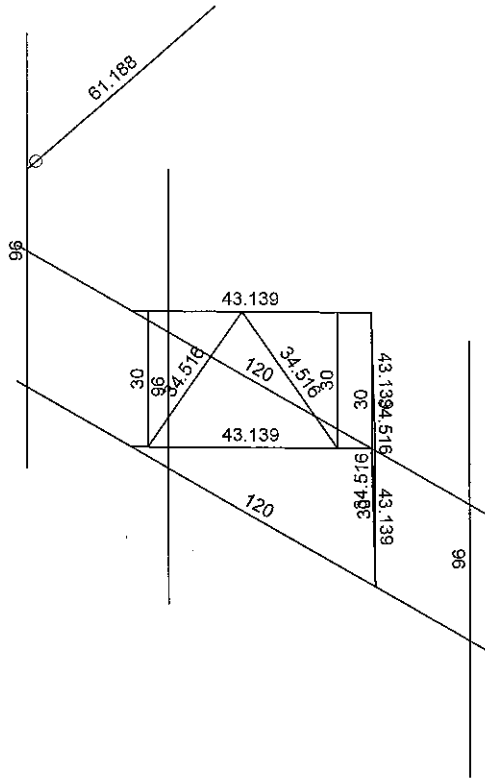
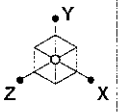
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NHV 106 943628

Member Shape

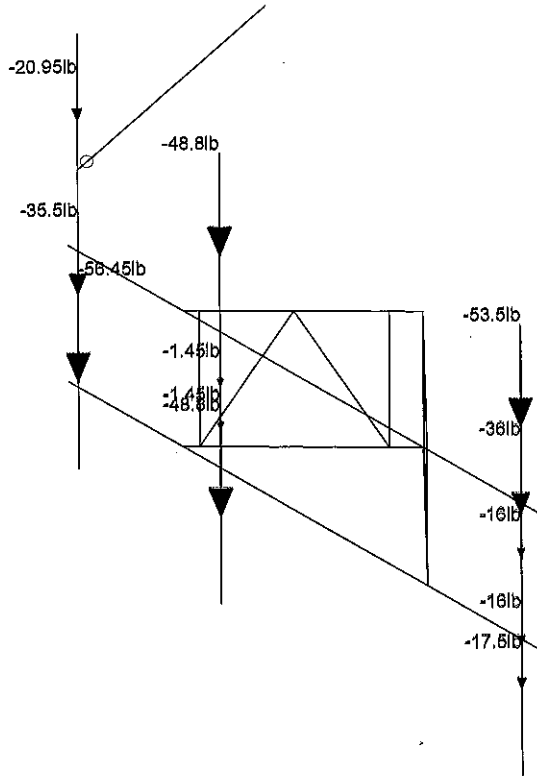
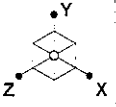
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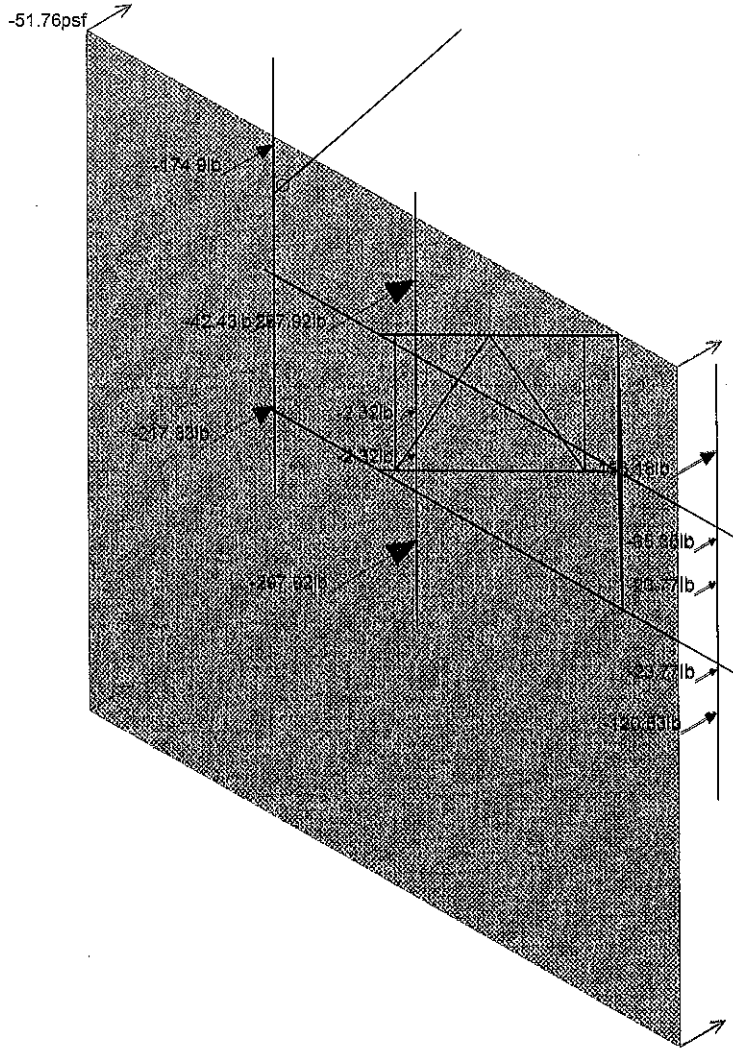
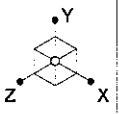
Member Length (in) Displayed
Envelope Only Solution

| | | |
|---------------------------|----------------|-------------------------|
| Infinigy Engineering PLLC | NHV 106 943628 | Member Lengths |
| DVA | | Dec 18, 2018 at 6:57 PM |
| 1039-A0002-B | | 806386.R3D |



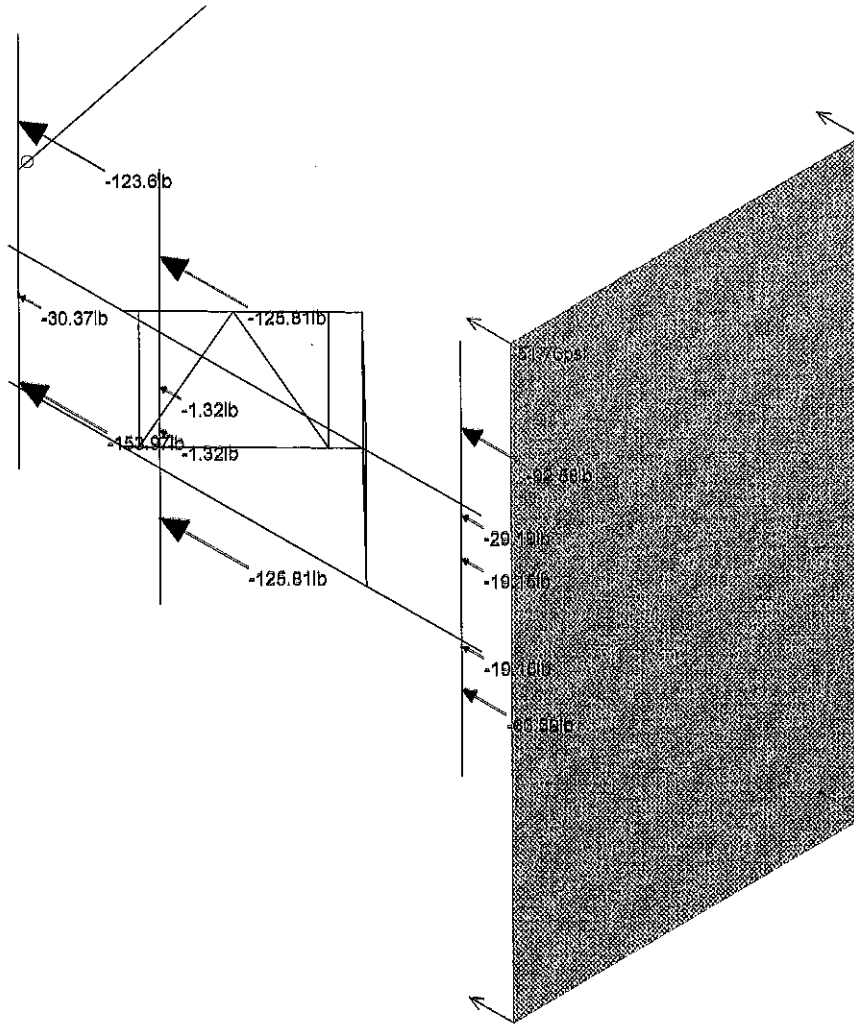
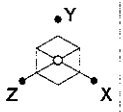
Loads: BLC 1, Self Weight
Envelope Only Solution

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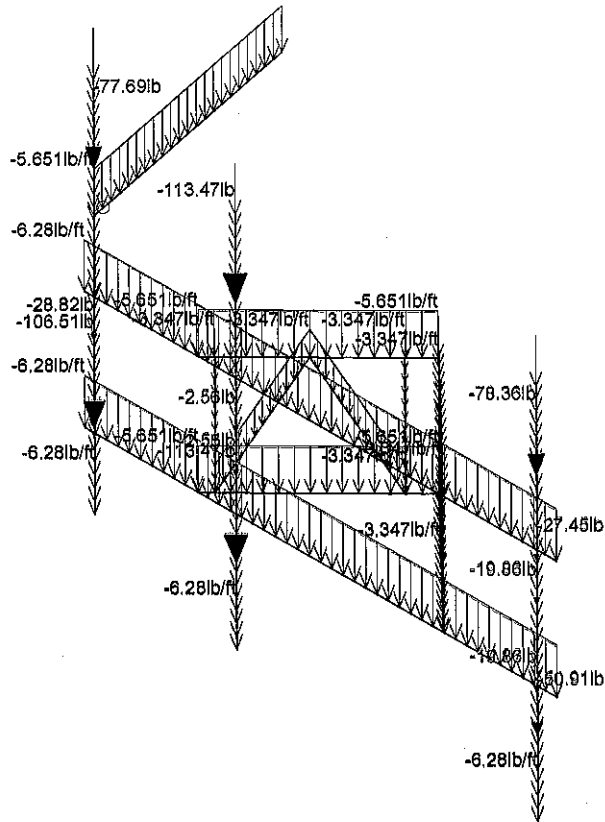
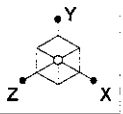
Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution

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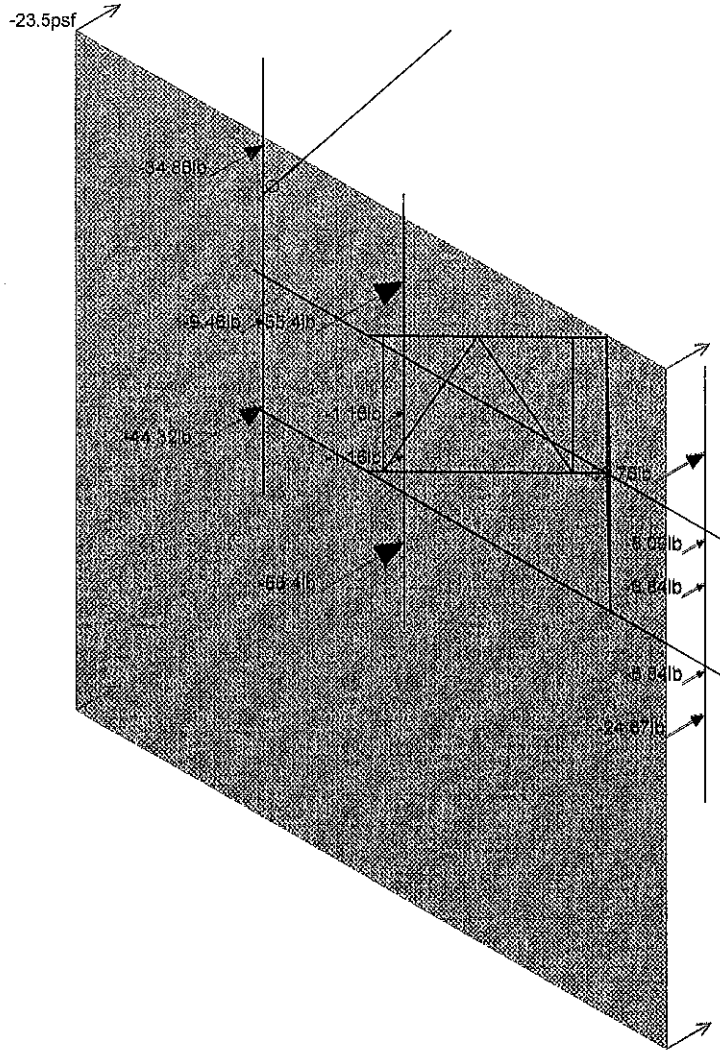
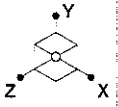
Loads: BLC 3, Wind Load AZI 090
Envelope Only Solution

| | | |
|---------------------------|----------------|-------------------------|
| Infinigy Engineering PLLC | NHV 106 943628 | 090 Wind |
| DVA | | Dec 18, 2018 at 7:00 PM |
| 1039-A0002-B | | 806386.R3D |



Loads: BLC 4, Ice Weight
Envelope Only Solution

| | | |
|---------------------------|----------------|-------------------------|
| Infinigy Engineering PLLC | NHV 106 943628 | Ice Load |
| DVA | | Dec 18, 2018 at 7:01 PM |
| 1039-A0002-B | | 806386.R3D |



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

Infinigy Engineering PLLC

DVA

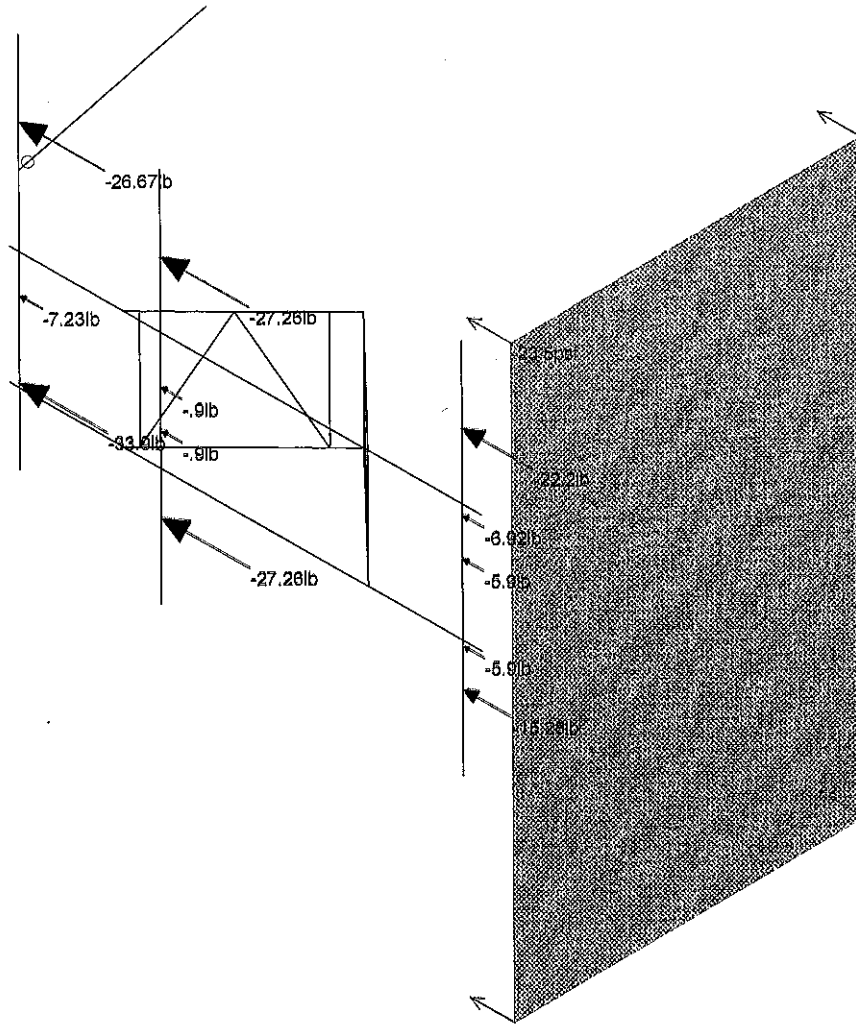
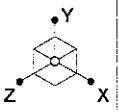
1039-A0002-B

NHV 106 943628

000 Ice Wind

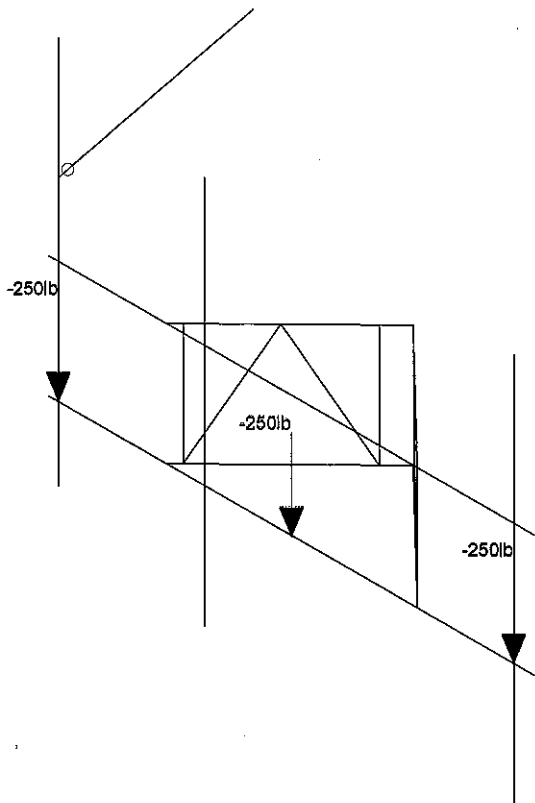
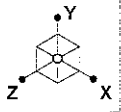
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806386.R3D



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

| | | |
|---------------------------|----------------|-------------------------|
| Infinigy Engineering PLLC | NHV 106 943628 | 090 Ice Wind |
| DVA | | Dec 18, 2018 at 7:02 PM |
| 1039-A0002-B | | 806386.R3D |



Loads: BLC 7, Service Live 1

| | | |
|---------------------------|----------------|-------------------------|
| Infinigy Engineering PLLC | NHV 106 943628 | Service Loads |
| DVA | | Dec 18, 2018 at 7:05 PM |
| 1039-A0002-B | | 806386.R3D |

APPENDIX B
SOFTWARE INPUT CALCULATIONS

Site Name: NHV 106.943628
 Client: Crown Castle
 Carrier: AT&T
 Engineer: DVA
 Date: 12/10/2018



Site Information Inputs:
 Adopted Building Code: 2015 IBC
 Structure Load Standard: TIA-222-H
 Antenna Load Standard: TIA-222-H
 Structure Risk Category: I
 Structure Type: Mount - Sector
 Number of Sectors: 3
 Structure Shape 1: Round

Rooftop Inputs:
 Rooftop Wind Speed-Up?: No

Wind Loading Inputs:
 Design Wind Velocity: 125 mph (ultimate 3-second gust)
 Wind Centerline 1 (z₁): 66.0 ft
 Side Face Angle (θ): 90 degrees
 Exposure Category: C
 Topographic Category: 1

| Wind with No Ice | | |
|----------------------|----------------|-----------------------|
| q _s (psf) | G _h | F _{ST} (psf) |
| 43.13 | 1.00 | 51.76 |

| Wind with Ice | | |
|----------------------|----------------|-----------------------|
| q _s (psf) | G _h | F _{ST} (psf) |
| 6.90 | 1.00 | 23.50 |

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 | K _a | Front Shape | Side Shape | q _z (psf) | EPA (ft ²) | F _z (lbs) | F _x (lbs) | F _{z(60)} (lbs) | F _{x(30)} (lbs) |
|-------------------------|----------------|----------------|----------------|-------------|------------|----------------------|------------------------|----------------------|----------------------|--------------------------|--------------------------|
| CCUWRAG5H8D06A | 77.0 | 1 | 1.00 | Flat | Flat | 44.56 | 7.85 | 349.80 | 247.21 | 272.85 | 324.15 |
| POWERWAVE777D00 | 66.0 | 3 | 1.00 | Flat | Flat | 43.41 | 5.57 | 241.65 | 126.78 | 155.50 | 212.93 |
| KATHRIN80010855 | 66.0 | 3 | 1.00 | Flat | Flat | 43.13 | 13.81 | 595.84 | 251.61 | 337.67 | 509.79 |
| WINDCUTTRUSS448889/8122 | 66.0 | 3 | 1.00 | Flat | Flat | 43.13 | 1.97 | 84.87 | 60.74 | 66.77 | 78.83 |
| WINDCUTTRUSS884881/856A | 66.0 | 3 | 1.00 | Flat | Flat | 43.13 | 1.64 | 70.70 | 58.38 | 61.46 | 67.62 |
| KATHRIN8240289 | 66.0 | 3 | 1.00 | Flat | Flat | 43.13 | 0.11 | 4.64 | 2.63 | 3.13 | 4.14 |
| KAYAPIC08348801818 | 66.0 | 2 | 1.00 | Round | Round | 43.13 | 1.21 | 52.26 | 52.26 | 52.26 | 52.26 |
| POWERWAVEUG221401 | 66.0 | 6 | 1.00 | Flat | Flat | 43.00 | 0.55 | 23.77 | 19.15 | 20.31 | 22.61 |

APPENDIX C
SOFTWARE ANALYSIS OUTPUT

Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(de...) | Section/Shape | Type | Design List | Material | Design Rules |
|----|-------|---------|---------|---------|---------------|---------------|--------|-------------|------------|--------------|
| 1 | M1 | N1 | N2 | | | Frame Rail | Beam | Pipe | A53 Gr. B | Typical |
| 2 | M2 | N3 | N4 | | | Arm | Beam | Pipe | A53 Gr. B | Typical |
| 3 | M3 | N4 | N5 | | | Arm | Beam | Pipe | A53 Gr. B | Typical |
| 4 | M4 | N6 | N20 | | | Frame Rail | Beam | Pipe | A53 Gr. B | Typical |
| 5 | M5 | N7 | N8 | | | Arm | Beam | Pipe | A53 Gr. B | Typical |
| 6 | M6 | N8 | N9 | | | Arm | Beam | Pipe | A53 Gr. B | Typical |
| 7 | M7 | N10 | N12 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 8 | M8 | N11 | N14 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 9 | M9 | N12 | N13 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 10 | M10 | N13 | N14 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 11 | M11 | N19 | N15 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 12 | M12 | N17 | N16 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 13 | M13 | N17 | N18 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 14 | M14 | N18 | N19 | | | Bracing | Beam | BAR | A36 Gr. 36 | Typical |
| 15 | M15 | N22 | N23 | | | Mount Pipe | Column | Pipe | A53 Gr. B | Typical |
| 16 | M16 | N25 | N26 | | | Mount Pipe | Column | Pipe | A53 Gr. B | Typical |
| 17 | M17 | N29 | N30 | | | Mount Pipe | Column | Pipe | A53 Gr. B | Typical |
| 18 | M18 | N33 | N34 | | | Stabilizer | HBrace | Pipe | A53 Gr. B | Typical |

Material Takeoff

| | Material | Size | Pieces | Length[in] | Weight[K] |
|---|------------------|-----------------|--------|------------|-----------|
| 1 | Hot Rolled Steel | | | | |
| 2 | A36 Gr. 36 | 0.625" S.R. HRA | 8 | 258.1 | 0 |
| 3 | A53 Gr. B | PIPE 1.5 | 5 | 233.7 | 0 |
| 4 | A53 Gr. B | PIPE 2.0 | 5 | 528 | .2 |
| 5 | Total HR Steel | | 18 | 1019.8 | .2 |

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 | Frame Rail | 120 | | | Lbyy | | | | | | Lateral |
| 2 | M2 | Arm | 43.139 | | | Lbyy | | | | | | Lateral |
| 3 | M3 | Arm | 43.139 | | | Lbyy | | | | | | Lateral |
| 4 | M4 | Frame Rail | 120 | | | Lbyy | | | | | | Lateral |
| 5 | M5 | Arm | 43.139 | | | Lbyy | | | | | | Lateral |
| 6 | M6 | Arm | 43.139 | | | Lbyy | | | | | | Lateral |
| 7 | M7 | Bracing | 30 | | | Lbyy | | | .7 | .7 | | Lateral |
| 8 | M8 | Bracing | 30 | | | Lbyy | | | .7 | .7 | | Lateral |
| 9 | M9 | Bracing | 34.516 | | | Lbyy | | | .7 | .7 | | Lateral |
| 10 | M10 | Bracing | 34.516 | | | Lbyy | | | .7 | .7 | | Lateral |
| 11 | M11 | Bracing | 30 | | | Lbyy | | | .7 | .7 | | Lateral |
| 12 | M12 | Bracing | 30 | | | Lbyy | | | .7 | .7 | | Lateral |
| 13 | M13 | Bracing | 34.516 | | | Lbyy | | | .7 | .7 | | Lateral |
| 14 | M14 | Bracing | 34.516 | | | Lbyy | | | .7 | .7 | | Lateral |
| 15 | M15 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 16 | M16 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 17 | M17 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 18 | M18 | Stabilizer | 61.188 | | | | | | | | | Lateral |

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 | | | | None |
| 3 | M3 | | | | | | Yes | | | | None |
| 4 | M4 | | | | | | Yes | | | | None |
| 5 | M5 | | | | | | Yes | | | | None |
| 6 | M6 | | | | | | Yes | | | | None |
| 7 | M7 | | | | | | Yes | | | | None |
| 8 | M8 | | | | | | Yes | | | | None |
| 9 | M9 | | | | | | Yes | | | | None |
| 10 | M10 | | | | | | Yes | | | | None |
| 11 | M11 | | | | | | Yes | | | | None |
| 12 | M12 | | | | | | Yes | | | | None |
| 13 | M13 | | | | | | Yes | | | | None |
| 14 | M14 | | | | | | Yes | | | | None |
| 15 | M15 | | | | | | Yes | ** NA ** | | | None |
| 16 | M16 | | | | | | Yes | ** NA ** | | | None |
| 17 | M17 | | | | | | Yes | ** NA ** | | | None |
| 18 | M18 | BenPIN | | | | | Yes | ** NA ** | | | None |

Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design ... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|------------|-----------------|--------|-------------|-----------|------------|---------|-----------|-----------|---------|
| 1 | Mount Pipe | PIPE 2.0 | Column | Pipe | A53 Gr.B | Typical | 1.02 | .627 | .627 | 1.25 |
| 2 | Bracing | 0.625" S.R. HRA | Beam | BAR | A36 Gr.36 | Typical | .307 | .007 | .007 | .015 |
| 3 | Stabilizer | PIPE 1.5 | HBrace | Pipe | A53 Gr.B | Typical | .749 | .293 | .293 | .586 |
| 4 | Arm | PIPE 1.5 | Beam | Pipe | A53 Gr.B | Typical | .749 | .293 | .293 | .586 |
| 5 | Frame Rail | PIPE 2.0 | Beam | Pipe | A53 Gr.B | Typical | 1.02 | .627 | .627 | 1.25 |

Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distribut... | Area(M... | Surface... |
|----|---------------------------|----------|-----------|-----------|-----------|-------|-------|--------------|-----------|------------|
| 1 | Self Weight | DL | | -1 | | | 14 | | | |
| 2 | Wind Load AZI 000 | WLZ | | | | | 14 | | 1 | |
| 3 | Wind Load AZI 090 | WLX | | | | | 14 | | 1 | |
| 4 | Ice Weight | OL1 | | | | | 14 | 18 | | |
| 5 | Wind + Ice Load AZI 000 | OL2 | | | | | 14 | | 1 | |
| 6 | Wind + Ice Load AZI 090 | OL3 | | | | | 14 | | 1 | |
| 7 | Service Live 1 | LL | | | | 2 | 1 | | | |
| 8 | BLC 2 Transient Area L... | None | | | | | | 17 | | |
| 9 | BLC 3 Transient Area L... | None | | | | | | 15 | | |
| 10 | BLC 5 Transient Area L... | None | | | | | | 17 | | |
| 11 | BLC 6 Transient Area L... | None | | | | | | 15 | | |

Load Combinations

| | Description | So..P... | S... | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor |
|---|-------------------|----------|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 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 | | | | | | | | |

Load Combinations (Continued)

| | Description | So. | P... | S... | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | | | | |
|----|--------------------------------------|-----|------|------|-----|--------|-----|--------|-----|--------|-----|--------|-------|--|--|--|
| 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 | .866 | | | | |
| 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 | .866 | | | | |
| 32 | 1.2D + 1.0Di + 1.0Wi AZI 150 | Yes | Y | | DL | 1.2 | OL1 | 1 | OL2 | -.866 | OL3 | .5 | | | | |
| 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 | -.866 | | | | |
| 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 | -.866 | | | | |
| 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 | .058 | | | | | | |
| 40 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 030 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | .05 | WLX | .029 | | | | |
| 41 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 060 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | .029 | WLX | .05 | | | | |
| 42 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 090 | Yes | Y | | DL | 1.2 | LL | 1.5 | | | WLX | .058 | | | | |
| 43 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 120 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | -.029 | WLX | .05 | | | | |
| 44 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 150 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | -.05 | WLX | .029 | | | | |
| 45 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 180 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | -.058 | | | | | | |
| 46 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 210 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | -.05 | WLX | -.029 | | | | |
| 47 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 240 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | -.029 | WLX | -.05 | | | | |
| 48 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 270 | Yes | Y | | DL | 1.2 | LL | 1.5 | | | WLX | -.058 | | | | |
| 49 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 300 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | .029 | WLX | -.05 | | | | |
| 50 | 1.2D + 1.5L + 1.0WL (30 mph) AZI 330 | Yes | Y | | DL | 1.2 | LL | 1.5 | WLZ | .05 | WLX | -.029 | | | | |

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 | N8 | Reaction | Reaction | Reaction | Reaction | | Reaction |
| 2 | N4 | Reaction | Reaction | Reaction | Reaction | | Reaction |
| 3 | N34 | Reaction | Reaction | Reaction | | | |

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 | N8 | max | 816.315 | 5 | 907.912 | 45 | 702.635 | 25 | -18.886 | 23 | 0 | 50 | 121.988 | 4 |
| 2 | | min | -678.066 | 23 | 212.89 | 14 | -1814.069 | 32 | -238.69 | 30 | 0 | 1 | -105.463 | 22 |
| 3 | N4 | max | 272.06 | 17 | 922.417 | 38 | 1715.839 | 28 | -42.585 | 21 | 0 | 50 | 74.44 | 16 |
| 4 | | min | -423.481 | 36 | 218.299 | 20 | -428.592 | 21 | -250.308 | 29 | 0 | 1 | -129.459 | 35 |
| 5 | N34 | max | 119.755 | 4 | 22.539 | 35 | 613.173 | 4 | 0 | 50 | 0 | 50 | 0 | 50 |
| 6 | | min | -123.905 | 10 | 5.834 | 18 | -606.582 | 10 | 0 | 1 | 0 | 1 | 0 | 1 |
| 7 | Totals: | max | 1169.424 | 17 | 1817.655 | 50 | 1986.552 | 14 | | | | | | |
| 8 | | min | -1169.424 | 11 | 519.491 | 14 | -1986.552 | 8 | | | | | | |

Member Point Loads (BLC 1 : Self Weight)

| | Member Label | Direction | Magnitude [lb, lb-ft] | Location [in, %] |
|----|--------------|-----------|-----------------------|------------------|
| 1 | M17 | Y | -20.95 | %20 |
| 2 | M15 | Y | -17.5 | %20 |
| 3 | M16 | Y | -48.8 | %20 |
| 4 | M17 | Y | -35.5 | %20 |
| 5 | M15 | Y | -36 | %60 |
| 6 | M16 | Y | -1.45 | %40 |
| 7 | M15 | Y | -16 | %30 |
| 8 | M17 | Y | -20.95 | %80 |
| 9 | M15 | Y | -17.5 | %80 |
| 10 | M16 | Y | -48.8 | %80 |
| 11 | M17 | Y | -35.5 | %40 |
| 12 | M15 | Y | -36 | %80 |
| 13 | M16 | Y | -1.45 | %50 |
| 14 | M15 | Y | -16 | %50 |

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

| | Member Label | Direction | Magnitude [lb, lb-ft] | Location [in, %] |
|----|--------------|-----------|-----------------------|------------------|
| 1 | M17 | Z | -174.9 | %20 |
| 2 | M15 | Z | -120.83 | %20 |
| 3 | M16 | Z | -297.92 | %20 |
| 4 | M17 | Z | -42.43 | %20 |
| 5 | M15 | Z | -35.35 | %60 |
| 6 | M16 | Z | -2.32 | %40 |
| 7 | M15 | Z | -23.77 | %30 |
| 8 | M17 | Z | -174.9 | %80 |
| 9 | M15 | Z | -120.83 | %80 |
| 10 | M16 | Z | -297.92 | %80 |
| 11 | M17 | Z | -42.43 | %40 |
| 12 | M15 | Z | -35.35 | %80 |
| 13 | M16 | Z | -2.32 | %50 |

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

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 14 | M15 | Z | -23.77 | %50 |

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

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 1 | M17 | X | -123.6 | %20 |
| 2 | M15 | X | -63.39 | %20 |
| 3 | M16 | X | -125.81 | %20 |
| 4 | M17 | X | -30.37 | %20 |
| 5 | M15 | X | -29.19 | %60 |
| 6 | M16 | X | -1.32 | %40 |
| 7 | M15 | X | -19.15 | %30 |
| 8 | M17 | X | -123.6 | %80 |
| 9 | M15 | X | -63.39 | %80 |
| 10 | M16 | X | -125.81 | %80 |
| 11 | M17 | X | -30.37 | %40 |
| 12 | M15 | X | -29.19 | %80 |
| 13 | M16 | X | -1.32 | %50 |
| 14 | M15 | X | -19.15 | %50 |

Member Point Loads (BLC 4 : Ice Weight)

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 1 | M17 | Y | -77.69 | %20 |
| 2 | M15 | Y | -50.91 | %20 |
| 3 | M16 | Y | -113.47 | %20 |
| 4 | M17 | Y | -28.82 | %20 |
| 5 | M15 | Y | -27.45 | %60 |
| 6 | M16 | Y | -2.56 | %40 |
| 7 | M15 | Y | -19.86 | %30 |
| 8 | M17 | Y | -77.69 | %80 |
| 9 | M15 | Y | -50.91 | %80 |
| 10 | M16 | Y | -113.47 | %80 |
| 11 | M17 | Y | -28.82 | %40 |
| 12 | M15 | Y | -27.45 | %80 |
| 13 | M16 | Y | -2.56 | %50 |
| 14 | M15 | Y | -19.86 | %50 |

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

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 1 | M17 | Z | -34.86 | %20 |
| 2 | M15 | Z | -24.67 | %20 |
| 3 | M16 | Z | -55.4 | %20 |
| 4 | M17 | Z | -9.46 | %20 |
| 5 | M15 | Z | -8.09 | %60 |
| 6 | M16 | Z | -1.16 | %40 |
| 7 | M15 | Z | -6.84 | %30 |
| 8 | M17 | Z | -34.86 | %80 |
| 9 | M15 | Z | -24.67 | %80 |
| 10 | M16 | Z | -55.4 | %80 |
| 11 | M17 | Z | -9.46 | %40 |
| 12 | M15 | Z | -8.09 | %80 |

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

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 13 | M16 | Z | -1.16 | %50 |
| 14 | M15 | Z | -6.84 | %50 |

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

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|----|--------------|-----------|---------------------|----------------|
| 1 | M17 | X | -26.67 | %20 |
| 2 | M15 | X | -15.28 | %20 |
| 3 | M16 | X | -27.26 | %20 |
| 4 | M17 | X | -7.23 | %20 |
| 5 | M15 | X | -6.92 | %60 |
| 6 | M16 | X | -.9 | %40 |
| 7 | M15 | X | -5.9 | %30 |
| 8 | M17 | X | -26.67 | %80 |
| 9 | M15 | X | -15.28 | %80 |
| 10 | M16 | X | -27.26 | %80 |
| 11 | M17 | X | -7.23 | %40 |
| 12 | M15 | X | -6.92 | %80 |
| 13 | M16 | X | -.9 | %50 |
| 14 | M15 | X | -5.9 | %50 |

Member Point Loads (BLC 7 : Service Live 1)

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[in,%] |
|---|--------------|-----------|---------------------|----------------|
| 1 | M1 | Y | -250 | %50 |

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/in, lb*s^2*in)] |
|---|-------------|-------|-----------|---|
| 1 | N24 | L | Y | -250 |
| 2 | N31 | L | Y | -250 |

Member Distributed Loads (BLC 4 : Ice Weight)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location...End Location[...] |
|----|--------------|-----------|------------------------------|----------------------------|------------------------------------|
| 1 | M1 | Y | -6.28 | -6.28 | 0 %100 |
| 2 | M2 | Y | -5.651 | -5.651 | 0 %100 |
| 3 | M3 | Y | -5.651 | -5.651 | 0 %100 |
| 4 | M4 | Y | -6.28 | -6.28 | 0 %100 |
| 5 | M5 | Y | -5.651 | -5.651 | 0 %100 |
| 6 | M6 | Y | -5.651 | -5.651 | 0 %100 |
| 7 | M7 | Y | -3.347 | -3.347 | 0 %100 |
| 8 | M8 | Y | -3.347 | -3.347 | 0 %100 |
| 9 | M9 | Y | -3.347 | -3.347 | 0 %100 |
| 10 | M10 | Y | -3.347 | -3.347 | 0 %100 |
| 11 | M11 | Y | -3.347 | -3.347 | 0 %100 |
| 12 | M12 | Y | -3.347 | -3.347 | 0 %100 |
| 13 | M13 | Y | -3.347 | -3.347 | 0 %100 |
| 14 | M14 | Y | -3.347 | -3.347 | 0 %100 |
| 15 | M15 | Y | -6.28 | -6.28 | 0 %100 |
| 16 | M16 | Y | -6.28 | -6.28 | 0 %100 |
| 17 | M17 | Y | -6.28 | -6.28 | 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... | End Location[i.. |
|----|--------------|-----------|------------------------------|----------------------------|-------------------|------------------|
| 18 | M18 | Y | -5.651 | -5.651 | 0 | %100 |

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location... | End Location[i.. |
|----|--------------|-----------|------------------------------|----------------------------|-------------------|------------------|
| 1 | M1 | Z | -10.244 | -10.244 | 0 | 120 |
| 2 | M2 | Z | -5.889 | -5.889 | 0 | 43.139 |
| 3 | M3 | Z | -5.889 | -5.889 | 0 | 43.139 |
| 4 | M4 | Z | -10.244 | -10.244 | 0 | 120 |
| 5 | M5 | Z | -5.889 | -5.889 | 0 | 43.139 |
| 6 | M6 | Z | -5.889 | -5.889 | 0 | 43.139 |
| 7 | M7 | Z | -2.696 | -2.696 | 0 | 30 |
| 8 | M8 | Z | -2.696 | -2.696 | 0 | 30 |
| 9 | M9 | Z | -2.531 | -2.531 | 0 | 34.516 |
| 10 | M10 | Z | -2.531 | -2.531 | 0 | 34.516 |
| 11 | M11 | Z | -2.696 | -2.696 | 0 | 30 |
| 12 | M12 | Z | -2.696 | -2.696 | 0 | 30 |
| 13 | M13 | Z | -2.531 | -2.531 | 0 | 34.516 |
| 14 | M14 | Z | -2.531 | -2.531 | 0 | 34.516 |
| 15 | M15 | Z | -10.244 | -10.244 | 0 | 96 |
| 16 | M16 | Z | -10.244 | -10.244 | 0 | 96 |
| 17 | M17 | Z | -10.244 | -10.244 | 0 | 96 |

Member Distributed Loads (BLC 9 : BLC 3 Transient Area Loads)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location... | End Location[i.. |
|----|--------------|-----------|------------------------------|----------------------------|-------------------|------------------|
| 1 | M2 | X | -5.699 | -5.699 | 0 | 43.139 |
| 2 | M3 | X | -5.699 | -5.699 | 0 | 43.139 |
| 3 | M5 | X | -5.699 | -5.699 | 0 | 43.139 |
| 4 | M6 | X | -5.699 | -5.699 | 0 | 43.139 |
| 5 | M7 | X | -2.696 | -2.696 | 0 | 30 |
| 6 | M8 | X | -2.696 | -2.696 | 0 | 30 |
| 7 | M9 | X | -2.52 | -2.52 | 0 | 34.516 |
| 8 | M10 | X | -2.52 | -2.52 | 0 | 34.516 |
| 9 | M11 | X | -2.696 | -2.696 | 0 | 30 |
| 10 | M12 | X | -2.696 | -2.696 | 0 | 30 |
| 11 | M13 | X | -2.52 | -2.52 | 0 | 34.516 |
| 12 | M14 | X | -2.52 | -2.52 | 0 | 34.516 |
| 13 | M15 | X | -10.244 | -10.244 | 0 | 96 |
| 14 | M16 | X | -10.244 | -10.244 | 0 | 96 |
| 15 | M17 | X | -10.244 | -10.244 | 0 | 96 |

Member Distributed Loads (BLC 10 : BLC 5 Transient Area Loads)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location... | End Location[i.. |
|---|--------------|-----------|------------------------------|----------------------------|-------------------|------------------|
| 1 | M1 | Z | -4.651 | -4.651 | 0 | 120 |
| 2 | M2 | Z | -2.674 | -2.674 | 0 | 43.139 |
| 3 | M3 | Z | -2.674 | -2.674 | 0 | 43.139 |
| 4 | M4 | Z | -4.651 | -4.651 | 0 | 120 |
| 5 | M5 | Z | -2.674 | -2.674 | 0 | 43.139 |
| 6 | M6 | Z | -2.674 | -2.674 | 0 | 43.139 |
| 7 | M7 | Z | -1.224 | -1.224 | 0 | 30 |
| 8 | M8 | Z | -1.224 | -1.224 | 0 | 30 |

Member Distributed Loads (BLC 10 : BLC 5 Transient Area Loads) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location...End Location[... |
|----|--------------|-----------|------------------------------|----------------------------|-----------------------------------|
| 9 | M9 | Z | -1.149 | -1.149 | 0 34.516 |
| 10 | M10 | Z | -1.149 | -1.149 | 0 34.516 |
| 11 | M11 | Z | -1.224 | -1.224 | 0 30 |
| 12 | M12 | Z | -1.224 | -1.224 | 0 30 |
| 13 | M13 | Z | -1.149 | -1.149 | 0 34.516 |
| 14 | M14 | Z | -1.149 | -1.149 | 0 34.516 |
| 15 | M15 | Z | -4.651 | -4.651 | 0 96 |
| 16 | M16 | Z | -4.651 | -4.651 | 0 96 |
| 17 | M17 | Z | -4.651 | -4.651 | 0 96 |

Member Distributed Loads (BLC 11 : BLC 6 Transient Area Loads)

| | Member Label | Direction | Start Magnitude[lb/ft,F,psf] | End Magnitude[lb/ft,F,psf] | Start Location...End Location[... |
|----|--------------|-----------|------------------------------|----------------------------|-----------------------------------|
| 1 | M2 | X | -2.588 | -2.588 | 0 43.139 |
| 2 | M3 | X | -2.588 | -2.588 | 0 43.139 |
| 3 | M5 | X | -2.588 | -2.588 | 0 43.139 |
| 4 | M6 | X | -2.588 | -2.588 | 0 43.139 |
| 5 | M7 | X | -1.224 | -1.224 | 0 30 |
| 6 | M8 | X | -1.224 | -1.224 | 0 30 |
| 7 | M9 | X | -1.144 | -1.144 | 0 34.516 |
| 8 | M10 | X | -1.144 | -1.144 | 0 34.516 |
| 9 | M11 | X | -1.224 | -1.224 | 0 30 |
| 10 | M12 | X | -1.224 | -1.224 | 0 30 |
| 11 | M13 | X | -1.144 | -1.144 | 0 34.516 |
| 12 | M14 | X | -1.144 | -1.144 | 0 34.516 |
| 13 | M15 | X | -4.651 | -4.651 | 0 96 |
| 14 | M16 | X | -4.651 | -4.651 | 0 96 |
| 15 | M17 | X | -4.651 | -4.651 | 0 96 |

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

| | Joint A | Joint B | Joint C | Joint D | Direction | Distribution | Magnitude[psf] |
|---|---------|---------|---------|---------|-----------|--------------|----------------|
| 1 | N36 | N38 | N37 | N35 | Z | Open Str... | -51.76 |

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

| | Joint A | Joint B | Joint C | Joint D | Direction | Distribution | Magnitude[psf] |
|---|---------|---------|---------|---------|-----------|--------------|----------------|
| 1 | N38 | N40 | N39 | N37 | X | Open Str... | -51.76 |

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

| | Joint A | Joint B | Joint C | Joint D | Direction | Distribution | Magnitude[psf] |
|---|---------|---------|---------|---------|-----------|--------------|----------------|
| 1 | N36 | N38 | N37 | N35 | Z | Open Str... | -23.5 |

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

| | Joint A | Joint B | Joint C | Joint D | Direction | Distribution | Magnitude[psf] |
|---|---------|---------|---------|---------|-----------|--------------|----------------|
| 1 | N38 | N40 | N39 | N37 | X | Open Str... | -23.5 |

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

| Mem... | Shape | Code Check | L... | LC | Shear Ch... | L..... | LC | phi... | phi... | phi*Mn y-y [lb-ft] | phi..... | Egn |
|--------|---------------------|------------|------|----|-------------|--------|----|--------|--------|--------------------|----------|------|
| 1 | M4 PIPE 2.0 | .607 | 2.. | 23 | .333 | 2.. | 11 | 983. | 321.. | 1871.625 | 187... | H... |
| 2 | M9 0.625" S.R._HRA | .463 | 3.. | 36 | .011 | 0 | 4 | 289. | 994.. | 103.542 | 103... | H... |
| 3 | M17 PIPE 2.0 | .446 | 48 | 5 | .239 | 48 | 5 | 149. | 321.. | 1871.625 | 187... | H... |
| 4 | M13 0.625" S.R._HRA | .425 | 0 | 39 | .018 | 0 | 8 | 289. | 994.. | 103.542 | 103... | H... |
| 5 | M5 PIPE 1.5 | .370 | 0 | 12 | .113 | 2.. | 12 | 184. | 235.. | 1105.125 | 110... | H... |
| 6 | M2 PIPE 1.5 | .281 | 4.. | 36 | .125 | 2.. | 9 | 184. | 235.. | 1105.125 | 110... | H... |
| 7 | M16 PIPE 2.0 | .262 | 60 | 3 | .114 | 60 | 4 | 149. | 321.. | 1871.625 | 187... | H... |
| 8 | M1 PIPE 2.0 | .256 | 9.. | 3 | .155 | 2.. | 10 | 983. | 321.. | 1871.625 | 187... | H... |
| 9 | M6 PIPE 1.5 | .230 | 4.. | 13 | .097 | 0 | 40 | 184. | 235.. | 1105.125 | 110... | H... |
| 10 | M15 PIPE 2.0 | .196 | 60 | 36 | .047 | 60 | 12 | 149. | 321.. | 1871.625 | 187... | H... |
| 11 | M3 PIPE 1.5 | .177 | 4.. | 14 | .086 | 4.. | 45 | 184. | 235.. | 1105.125 | 110... | H... |
| 12 | M8 0.625" S.R._HRA | .158 | 30 | 40 | .037 | 30 | 10 | 383. | 994.. | 103.542 | 103... | H... |
| 13 | M12 0.625" S.R._HRA | .127 | 0 | 11 | .014 | 0 | 10 | 383. | 994.. | 103.542 | 103... | H... |
| 14 | M10 0.625" S.R._HRA | .110 | 3.. | 36 | .009 | 3.. | 13 | 289. | 994.. | 103.542 | 103... | H... |
| 15 | M11 0.625" S.R._HRA | .081 | 30 | 41 | .019 | 0 | 10 | 383. | 994.. | 103.542 | 103... | H... |
| 16 | M14 0.625" S.R._HRA | .073 | 0 | 30 | .011 | 3.. | 10 | 289. | 994.. | 103.542 | 103... | H... |
| 17 | M7 0.625" S.R._HRA | .054 | 30 | 36 | .012 | 30 | 10 | 383. | 994.. | 103.542 | 103... | H... |
| 18 | M18 PIPE 1.5 | .043 | 0 | 4 | .003 | 6.. | 38 | 144. | 235.. | 1105.125 | 110... | H... |

APPENDIX D
ADDITIONAL CALCUATIONS

| | |
|-----------|------------|
| Date: | 12/18/2018 |
| Client | Crown |
| Carrier | AT&T |
| Engineer: | ATE |
| Site: | 806386 |
| Job #: | 600-003 |

| | |
|--------|-------------|
| Code: | LRFD |
| Axial: | 1814.07 lbs |
| Shear: | 922.42 lbs |

| Bolt Capacity (1/2" A307 Bolt) | | | | |
|--------------------------------|-----------------|-------------------------------|------------|-----------------------|
| | Ult Load / Bolt | Factored Load ($\phi=0.75$) | # of Bolts | Factor Joint Capacity |
| Axial (lb) | 8226.7 | 6170.0 | 2 | 12340 |
| Shear(lb) | 5133.3 | 3850.0 | 2 | 7700 |

| Interaction Check | |
|-------------------|-------|
| $T / \phi T_n$ | 14.7% |
| $V / \phi V_n$ | 12.0% |
| ≤ 1.0 | 3.6% |
| | OK |



RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Site: NHV 106 943628
Crown Castle Site ID: 806386
App ID: 471721
83 REEDS GAP ROAD
NORTH BRANFORD, 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, Inc.

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
NORTH BRANFORD, 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, Inc. 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 "NHV 106 943628" ("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 5.566% 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 8.309% 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.

AT&T Mobility, LLC
NHV 106 943628
Site Summary

| Carrier | Area Maximum Percentage MPE |
|--------------------------------|------------------------------------|
| AT&T Mobility, LLC (Proposed) | 1.736 % |
| AT&T Mobility, LLC (Proposed) | 1.527 % |
| AT&T Mobility, LLC (Proposed) | 1.683 % |
| AT&T Mobility, LLC | 0.62 % |
| Town of North Branford, CT | 0.129 % |
| Town of North Branford, CT | 0.608 % |
| Verizon Wireless | 0.445 % |
| Verizon Wireless | 0.642 % |
| Verizon Wireless | 0.919 % |
| Composite Site MPE: | 8.309 % |

**AT&T Mobility, LLC (Proposed)
NHV 106 943628
Carrier Summary**

Frequency: 2110 MHz
 Maximum Permissible Exposure (MPE): 1000 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 17.36272 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 1.73627 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|-------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| CCI Antennas | HPA65R-BU6A | 77 | 50 | 5497 | 12.828526 | 1.282853 | 17.29747 | 1.729747 |
| CCI Antennas | HPA65R-BU6A | 77 | 170 | 5497 | 12.953721 | 1.295372 | 17.297472 | 1.729747 |
| CCI Antennas | HPA65R-BU6A | 77 | 290 | 5497 | 12.828526 | 1.282853 | 17.297472 | 1.729747 |

**AT&T Mobility, LLC (Proposed)
NHV 106 943628
Carrier Summary**

Frequency: 1930 MHz
 Maximum Permissible Exposure (MPE): 1000 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 15.27169 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 1.52717 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|----------------|-----------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| Kathrein-Scala | 800-10965 | 66 | 50 | 6168 | 6.621223 | 0.662122 | 14.524007 | 1.452401 |
| Kathrein-Scala | 800-10965 | 66 | 170 | 6168 | 6.621249 | 0.662125 | 14.524007 | 1.452401 |
| Kathrein-Scala | 800-10965 | 66 | 290 | 6168 | 6.591034 | 0.659103 | 14.524006 | 1.452401 |

AT&T Mobility, LLC (Proposed)
NHV 106 943628
Carrier Summary

Frequency: 734 MHz
 Maximum Permissible Exposure (MPE): 489.33 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 8.2336 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 1.68262 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|----------------|-----------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| Kathrein-Scala | 800-10965 | 66 | 50 | 2959 | 5.425229 | 1.108698 | 7.664344 | 1.566283 |
| Kathrein-Scala | 800-10965 | 66 | 170 | 2959 | 5.425229 | 1.108698 | 7.664344 | 1.566283 |
| Kathrein-Scala | 800-10965 | 66 | 290 | 2959 | 5.42523 | 1.108698 | 7.664344 | 1.566283 |

**AT&T Mobility, LLC
NHV 106 943628
Carrier Summary**

Frequency: 869 MHz
 Maximum Permissible Exposure (MPE): 579.33 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 3.59072 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.6198 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|-------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| Powerwave | 7770 | 66 | 10 | 547 | 1.361997 | 0.235097 | 2.100639 | 0.362596 |
| Powerwave | 7770 | 66 | 130 | 547 | 1.361997 | 0.235097 | 2.100639 | 0.362596 |
| Powerwave | 7770 | 66 | 270 | 547 | 1.361997 | 0.235097 | 2.100638 | 0.362596 |

Town of North Branford, CT
NHV 106 943628
Carrier Summary

Frequency: 450 MHz
 Maximum Permissible Exposure (MPE): 300 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 0.3881 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.12937 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|-------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| SINCLAIR | SD310 | 94 | 300 | 100 | 0.175388 | 0.058463 | 0.388099 | 0.129366 |

Town of North Branford, CT
NHV 106 943628
Carrier Summary

Frequency: 150 MHz
 Maximum Permissible Exposure (MPE): 200 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 1.21631 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.60815 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|-----------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| SINCLAIR | SD210D-SF2P2SNM | 97 | 60 | 100 | 1.114537 | 0.557269 | 1.216308 | 0.608154 |

**Verizon Wireless
NHV 106 943628
Carrier Summary**

Frequency: 1900 MHz
 Maximum Permissible Exposure (MPE): 1000 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 4.45498 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.4455 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|----------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| Antel | BXA-171063-8CF | 90 | 30 | 3708 | 2.70066 | 0.270066 | 3.922952 | 0.392295 |
| Antel | BXA-171063-8CF | 90 | 150 | 3708 | 2.698298 | 0.26983 | 3.922953 | 0.392295 |
| Antel | BXA-171063-8CF | 90 | 280 | 3708 | 2.70066 | 0.270066 | 3.922952 | 0.392295 |

**Verizon Wireless
NHV 106 943628
Carrier Summary**

Frequency: 751 MHz
 Maximum Permissible Exposure (MPE): 500.67 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 3.21184 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.64151 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|----------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| ANDREW | LNX-6514DS-T4M | 90 | 30 | 1919 | 2.748171 | 0.548902 | 3.159637 | 0.631086 |
| Antel | BXA-70063-6CF | 90 | 150 | 2010 | 2.013518 | 0.402167 | 2.608398 | 0.520985 |
| ANDREW | LNX-6514DS-T4M | 90 | 280 | 1919 | 2.748171 | 0.548902 | 3.159637 | 0.631086 |

**Verizon Wireless
NHV 106 943628
Carrier Summary**

Frequency: 850 MHz
 Maximum Permissible Exposure (MPE): 566.67 $\mu\text{W}/\text{cm}^2$
 Maximum power density at ground level: 5.20604 $\mu\text{W}/\text{cm}^2$
 Highest percentage of Maximum Permissible Exposure: 0.91871 %

| Antenna Make | Model | Height (feet) | Orientation (degrees true) | ERP (Watts) | On Axis | | Area | |
|--------------|---------------|---------------|----------------------------|-------------|---|----------------|---|----------------|
| | | | | | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE | Max Power Density ($\mu\text{W}/\text{cm}^2$) | Percent of MPE |
| ANDREW | DB844G65ZAXY | 90 | 30 | 1775 | 2.469615 | 0.435814 | 2.574042 | 0.454243 |
| ANDREW | DB844G65ZAXY | 90 | 30 | 1775 | 2.469615 | 0.435814 | 2.574042 | 0.454243 |
| ANDREW | DB844G65ZAXY | 90 | 150 | 1775 | 2.454072 | 0.433071 | 2.574042 | 0.454243 |
| ANDREW | DB844G65ZAXY | 90 | 150 | 1775 | 2.454072 | 0.433071 | 2.574042 | 0.454243 |
| Antel | LPA-80063-6CF | 90 | 280 | 2255 | 1.91226 | 0.337458 | 1.997628 | 0.352523 |
| Antel | LPA-80063-6CF | 90 | 280 | 2255 | 1.91226 | 0.337458 | 1.997628 | 0.352523 |