

10 INDUSTRIAL AVE,  
SUITE 3  
MAHWAH NJ 07430  
PHONE: 201.684.0055  
FAX: 201.684.0066



July 8th, 2022

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification  
104 Bunker Hill Road, Andover, CT  
Latitude: 41.7377778  
Longitude: -72.3497222  
T-Mobile Site#: CT11502A - Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 148-foot level of the existing 180-foot monopole tower at 104 Bunker Hill Road, Andover, CT. The 180-foot monopole tower is owned and operated by American Tower Corporation. The property is owned by Leon and Benjamin Price. T-Mobile now intends to remove three (3) existing antennas and add three (3) new 5G antennas. The new antennas will be installed at the same 148-foot level of the tower.

**Planned Modifications:**

**Tower:**

Remove

- (3) RR90-17-XXDP Antennas
- (3) KRY 112 489/2 TMAs
- (3) KRY 112 144/2 TMAs
- (12) 1-5/8" Coax Cables

Install New:

- (3) AIR6449 B41 Antennas
- (3) Radio 4460 B25+B66
- (3) 1.99" Hybrid Cable

**Ground:**

Install New:

(1) Enclosure 6160, (1) B160, (1) BB6648, (1) PSU 4813, and (1) CSR IXRe V2 Router

Remove:

(3) RRHs

This tower was originally approved by the Town of Andover's Planning and Zoning Board on November 6th, 1999 with no known conditions. A copy of this letter is included in this filing.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-SOj-73, a copy of this letter is being sent to First Selectman - Jeffrey Maguire, Elected Official, and Jim Hallisey, Zoning Agent, as well as the tower and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications 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 Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

**Eric Breun**

Transcend Wireless

Cell: 201-658-7728

Email: [ebreun@transcendwireless.com](mailto:ebreun@transcendwireless.com)

Attachments

cc: Jeffrey Maguire - First Selectman of Andover

Jim Hallisey - Zoning Agent

American Tower Corporation – Tower Owner

Leon and Benjamin Price - Property Owners

ERIC BREUN  
2016587728  
1 INTERNATIONAL BLVD.  
MAHWAH NJ 07495

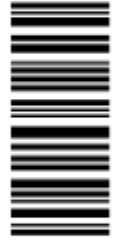
1 LBS

1 OF 1

**SHIP TO:**  
JIM HALLISEY  
17 SCHOOL ROAD  
**ANDOVER CT 06232**



**CT 061 9-01**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9821 8950



BILLING: P/P

Reference #1: CT11502A

XGL 22.06.15 NV-05 28.0A 07/2022\*



TM

ERIC BREUN  
2016587728  
1 INTERNATIONAL BLVD.  
MAHWAH NJ 07495

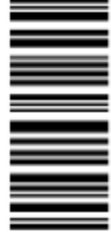
1 LBS

1 OF 1

**SHIP TO:**  
FIRST SELECTMAN  
JEFFREY MAGUIRE  
17 SCHOOL ROAD  
**ANDOVER CT 06232**

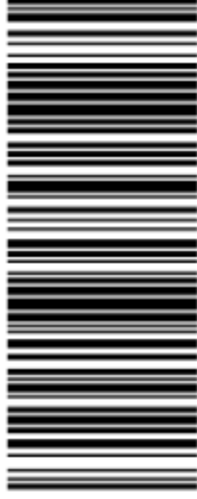


**CT 061 9-01**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9530 8948



BILLING: P/P

Reference #1: CT11502A

XGL 22.06.15 NV-05 28.0A 07/2022\*



TM

ERIC BREUN  
2016587728  
1 INTERNATIONAL BLVD.  
MAHWAH NJ 07495

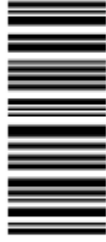
1 LBS

1 OF 1

**SHIP TO:**  
LEON AND BENJAMIN PRICE  
104 BUNKER HILL ROAD  
ANDOVER CT 06232

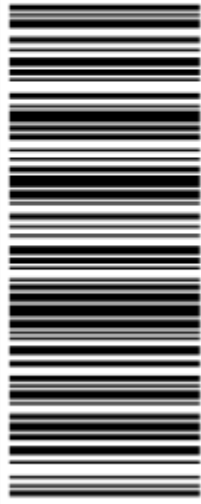


**CT 061 9-01**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9909 8972



BILLING: P/P

Reference #1: CT11502A

XOL 22.06.15 NV-95 28.0A 07/2022\*



TM

ERIC BREUN  
2016587728  
1 INTERNATIONAL BLVD.  
MAHWAH NJ 07495

1 LBS

1 OF 1

**SHIP TO:**  
AMERICAN TOWER CORPORATION  
10 PRESIDENTIAL WAY  
WOBURN MA 01801

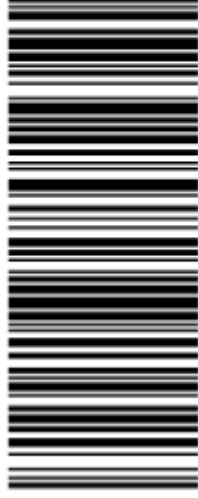


**MA 018 9-04**



**UPS GROUND**

TRACKING #: 1Z V25 742 03 9614 8968



BILLING: P/P

Reference #1: CT11502A

XOL 22.06.15 NV-95 28.0A 07/2022\*



TM

**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 07/07/2022

**Delivery Time:** 11:32 AM

**Signed by:** ANCRI

**TRANSCEND WIRELESS**

**Tracking Number:** [1ZV257420396148968](#)

**Ship To:** AMERICAN TOWER CORPORATION  
10 PRESIDENTIAL WAY  
WOBURN, MA 01801  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** CT11502A

**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 07/07/2022

**Delivery Time:** 1:10 PM

**Signed by:** GOUCHEAU

**TRANSCEND WIRELESS**

**Tracking Number:** [1ZV257420398218950](#)

**Ship To:** JIM HALLISEY  
17 SCHOOL ROAD  
ANDOVER, CT 06232  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** CT11502A

**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 07/07/2022

**Delivery Time:** 1:10 PM

**Signed by:** GOUCHEAU

## TRANSCEND WIRELESS

**Tracking Number:** [1ZV257420395308948](#)

**Ship To:** JEFFREY MAGUIRE  
17 SCHOOL ROAD  
ANDOVER, CT 06232  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

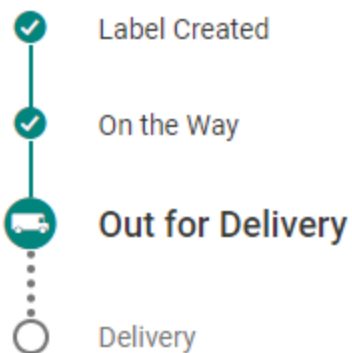
**Package Weight:** 1.0 LBS

**Reference Number:** CT11502A

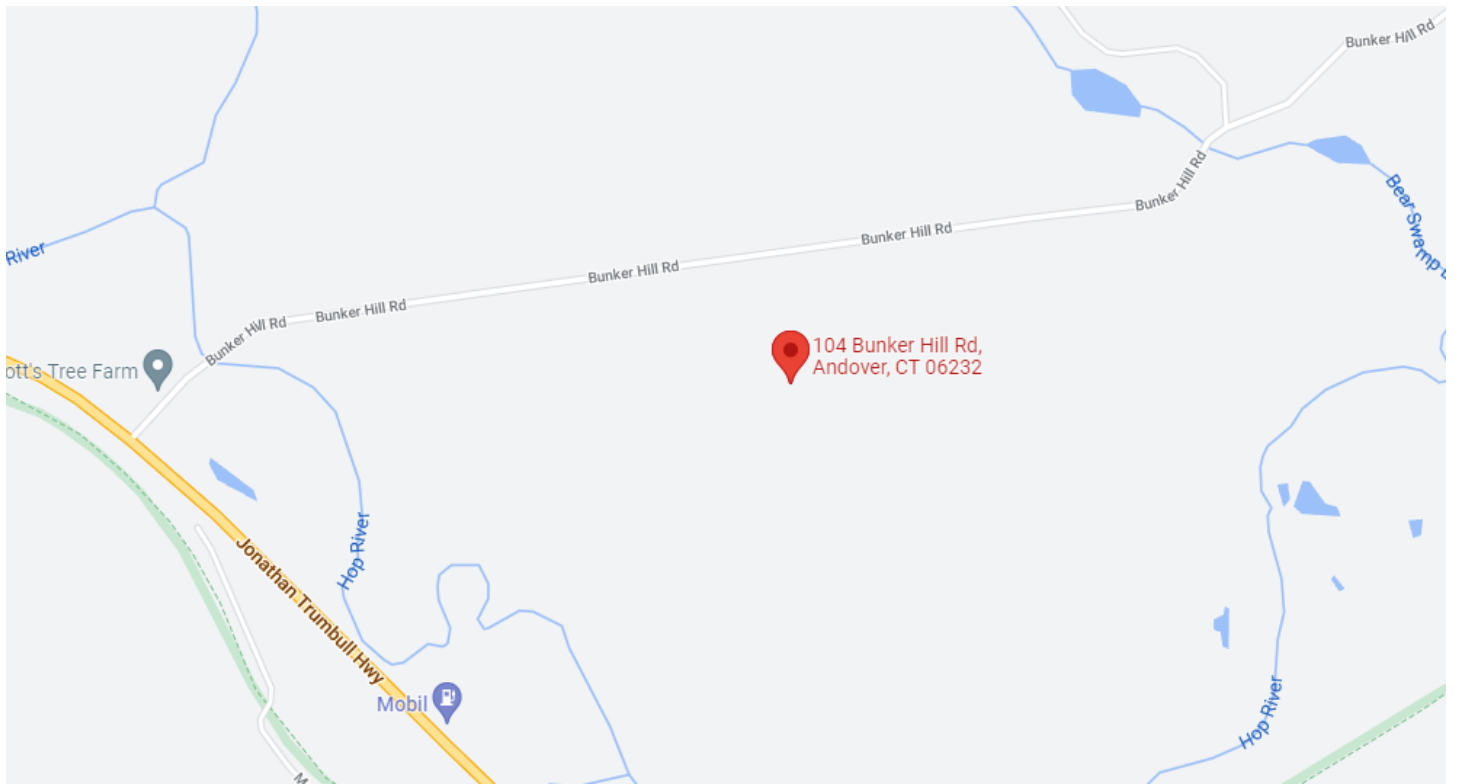
Your shipment  
1ZV257420399098972

Estimated delivery

**Today, July 07 by 7:00 P.M.**



**Ship To**  
ANDOVER, CT US



# 104 BUNKER HILL RD

[Q Sales](#)
[Print](#)
[Map It](#)

|                   |                    |                       |                       |
|-------------------|--------------------|-----------------------|-----------------------|
| <b>Location</b>   | 104 BUNKER HILL RD | <b>Mblu</b>           | 33/ 36/ 3/ 1          |
| <b>Acct#</b>      | 1023               | <b>Owner</b>          | PRICE LEON & BENJAMIN |
| <b>Assessment</b> | \$332,220          | <b>Appraisal</b>      | \$474,600             |
| <b>PID</b>        | 1023               | <b>Building Count</b> | 1                     |

## Current Value

| Appraisal      |              |           |           |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land      | Total     |
| 2021           | \$215,200    | \$259,400 | \$474,600 |

| Assessment     |              |           |           |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land      | Total     |
| 2021           | \$150,640    | \$181,580 | \$332,220 |

## Owner of Record

|                 |   |                        |            |
|-----------------|---|------------------------|------------|
| <b>Owner</b>    | PRICE LEON & BENJAMIN                   | <b>Sale Price</b>      | \$0        |
| <b>Co-Owner</b> |   | <b>Certificate</b>     |            |
| <b>Address</b>  | 104 BUNKER HILL RD<br>ANDOVER, CT 06232 | <b>Book &amp; Page</b> | 0113/1034  |
|                 |   | <b>Sale Date</b>       | 10/18/2010 |
|                 |   | <b>Instrument</b>      | 26         |

## Ownership History

| Ownership History            |            |             |             |            |            |
|------------------------------|------------|-------------|-------------|------------|------------|
| Owner                        | Sale Price | Certificate | Book & Page | Instrument | Sale Date  |
| PRICE LEON & BENJAMIN        | \$0        |             | 0113/1034   | 26         | 10/18/2010 |
| PRICE LEON                   | \$0        |             | 0094/0229   |            | 08/23/2004 |
| GREEN DEBORAH R & PRICE LEON | \$0        |             | 0075/0459   |            | 07/06/2000 |
| GREEN DEBORAH R & PRICE LEON | \$184,000  |             | 0068/0950   | 00         | 12/10/1997 |
| ARNER DAVID C & MARSHA A     | \$89,000   |             | 0028/0674   | 00         | 04/15/1976 |



## Building Information

### Building 1 : Section 1

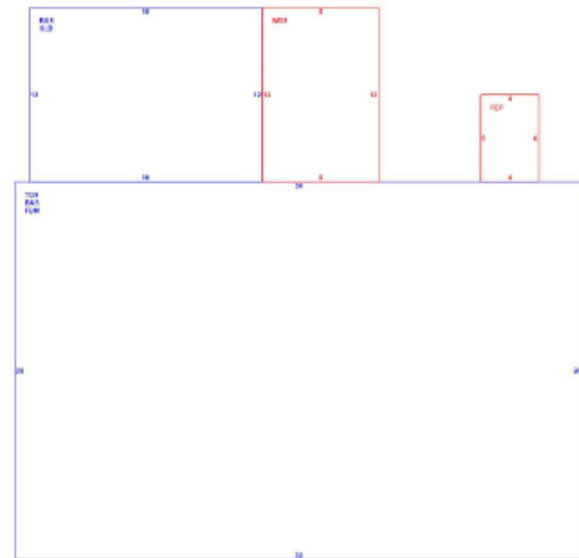
**Year Built:** 1969  
**Living Area:** 2,017  
**Replacement Cost:** \$248,898  
**Building Percent Good:** 65  
**Replacement Cost Less Depreciation:** \$161,800

| Building Attributes |                 |
|---------------------|-----------------|
| Field               | Description     |
| Style:              | Colonial        |
| Model               | Residential     |
| Grade:              | C+              |
| Stories:            | 1 3/4 Stories   |
| Occupancy           | 1               |
| Exterior Wall 1     | Clapboard       |
| Exterior Wall 2     |                 |
| Roof Structure:     | Gambrel         |
| Roof Cover          | Asph/F Glis/Cmp |
| Interior Wall 1     | Drywall/Sheet   |
| Interior Wall 2     |                 |
| Interior Flr 1      | Laminate        |
| Interior Flr 2      |                 |
| Heat Fuel           | Oil             |
| Heat Type:          | Hot Water       |
| AC Type:            | None            |
| Total Bedrooms:     | 3 Bedrooms      |
| Total Bthrms:       | 2               |
| Total Half Baths:   | 1               |

### Building Photo



### Building Layout



|                    |         |
|--------------------|---------|
| Total Xtra Fixtrs: |         |
| Total Rooms:       | 7 Rooms |
| Bath Style:        | Average |
| Kitchen Style:     | Average |
| Num Kitchens       | 01      |
| Cndtn              |         |
| Num Park           |         |
| Fireplaces         |         |
| Fndtn Cndtn        |         |
| Basement           |         |

| Building Sub-Areas (sq ft) |                           |            | Legend      |
|----------------------------|---------------------------|------------|-------------|
| Code                       | Description               | Gross Area | Living Area |
| BAS                        | First Floor               | 1,206      | 1,206       |
| TQS                        | Three Quarter Story       | 1,014      | 811         |
| FBM                        | Basement, Finished        | 1,014      | 0           |
| FEP                        | Porch, Enclosed, Finished | 24         | 0           |
| SLB                        | Slab                      | 192        | 0           |
| WD2                        | Deck, Wood                | 96         | 0           |
|                            |                           | 3,546      | 2,017       |

## Land

### Land Use

|                        |                     |
|------------------------|---------------------|
| Use Code               | 1010                |
| Description            | Single Fam MDL-01 ⓘ |
| Zone                   | R-80                |
| Neighborhood           | 12                  |
| Alt Land Appr Category | No                  |

### Land Line Valuation

|                 |           |
|-----------------|-----------|
| Size (Acres)    | 13.90     |
| Frontage        | 0         |
| Depth           | 0         |
| Assessed Value  | \$181,580 |
| Appraised Value | \$259,400 |

## Outbuildings

| Outbuildings |                |          |                 |              |          | Legend |
|--------------|----------------|----------|-----------------|--------------|----------|--------|
| Code         | Description    | Sub Code | Sub Description | Size         | Value    | Bldg # |
| FN3          | Fence-8' Chain |          |                 | 200.00 L.F.  | \$1,800  | 1      |
| SHD5         | Shed           |          |                 | 220.00 S.F.  | \$5,500  | 1      |
| SHD5         | Shed           |          |                 | 768.00 S.F.  | \$19,400 | 1      |
| FGR1         | Garage Av      |          |                 | 2080.00 S.F. | \$15,000 | 1      |
| SHP3         | Work Shop Pr   |          |                 | 2640.00 S.F. | \$11,900 | 1      |

## Valuation History

| Appraisal      |              |           |           |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land      | Total     |
| 2021           | \$215,200    | \$259,400 | \$474,600 |
| 2020           | \$192,100    | \$276,300 | \$468,400 |
| 2015           | \$210,100    | \$251,700 | \$461,800 |

| Assessment     |              |           |           |
|----------------|--------------|-----------|-----------|
| Valuation Year | Improvements | Land      | Total     |
| 2021           | \$150,640    | \$181,580 | \$332,220 |
| 2020           | \$134,500    | \$193,400 | \$327,900 |
| 2015           | \$147,000    | \$176,200 | \$323,200 |

**From:** [Building Admin](#)  
**To:** [John Coleman](#)  
**Cc:** [Zoning](#)  
**Subject:** 104 Bunker Hill Rd.  
**Date:** Tuesday, December 7, 2021 11:33:08 AM  
**Attachments:** [DOC120721-12072021110942.pdf](#)

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Good Morning Mr. Coleman,

I have attached the motions from the 11/6/1999 Planning & Zoning meeting. This says the application for the telecommunication facility at 104 Bunker Hill Rd., Andover CT was approved.

If you have any further questions please feel free to contact us.

Thank you.

Kathy  
12/07/2021

*Lynn Werner  
Andover Building & Land Use  
17 School Road  
Andover, Ct. 06232*

*860-742-7305 ext 219*

TOWN OF ANDOVER  
PLANNING & ZONING COMMISSION  
NOVEMBER 15, 1999

MOTIONS

Public Hearing on the application of Nextel Communications of the Mid-Atlantic, Inc. for a Special Permit to construct a Telecommunication Facility was reconvened and subsequently closed.

The application of James Bousfield to amend the Andover zoning regulations by adding Sections 9.0.4, 12.2.9 and 24.3.42a was opened and subsequently closed.

OLD BUSINESS

1) Application of Nextel Communications of the Mid-Atlantic, Inc. for a telecommunication facility at the property of Leon Price and Deborah Green located at 104 Bunker Hill Rd.

A motion was made (by Erich Siismets) to approve the application for a request for a telecommunication facility at 104 Bunker Hill Rd. with conditions. Seconded by Robert Russell the motion passed 4-0-0 with Leigh Ann Hutchinson abstaining.

NEW BUSINESS

1) Application of James Bousfield. Request to amend the zoning regulations by adding three sections: 9.0.4, 12.2.9, and 24.3.42a. Erich Siismets made the following motion:

Move to add the following sections to the zoning regulations:

9.0.8 Self-Storage Facilities

12.2.9 Self-Storage Facilities. One paved parking space for every fifty units, plus one space for each full-time employee.

24.3.42a – Self-Storage Facility – A facility open to the general public consisting of individual, leased, storage units of 300 square ft, or less. Each unit shall have direct access from the facility driveway and shall be utilized for the storage of personal property, equipment, inventory, boats, trailers, automobiles, etc. Units shall not be used as work areas or to conduct business, maintenance or repairs of any kind. Outside storage of any kind is prohibited.

Seconded by Jeanne Sheehan the motion passed 5-0-0.

APPLICATION FOR SPECIAL PERMIT

of

NEXTEL COMMUNICATIONS OF THE MID-ATLANTIC, INC.

d/b/a

NEXTEL COMMUNICATIONS

for a

PERSONAL WIRELESS TELECOMMUNICATION FACILITY

Submitted to:

ANDOVER PLANNING AND ZONING COMMISSION

July 14, 1999

Prepared by:

Hurwitz & Sagarin, LLC  
147 North Broad Street  
Milford, Connecticut 06460

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| III. | NEED FOR THE FACILITY               | Page 3  |
| IV.  | OTHER SITING CONSIDERATIONS         | Page 6  |
| V.   | COMPLIANCE WITH ANDOVER REGULATIONS | Page 8  |
| V.   | CONCLUSION                          | Page 14 |

## LIST OF EXHIBITS

|   |           |
|---|-----------|
| APPLICATION MATERIALS   | Exhibit 1 |
| PROPAGATION MAP WITHOUT PROPOSED FACILITY                       | Exhibit 2 |
| SEARCH AREA RING  | Exhibit 3 |
| PROPAGATION MAP OF PROPOSED FACILITY                            | Exhibit 4 |
| PROPAGATION MAP WITH PROPOSED FACILITY<br>AND SURROUNDING SITES | Exhibit 5 |
| FALL ZONE ANALYSIS  | Exhibit 6 |
| VIEWSHED ANALYSIS   | Exhibit 7 |
| AIRSPACE SAFETY ANALYSIS CORP. LETTER                           | Exhibit 8 |
| RADIO FREQUENCY EMISSIONS REPORT                                | Exhibit 9 |

I. Introduction

Nextel Communications of the Mid-Atlantic, Inc., doing business as Nextel Communications (“Applicant”) respectfully submits this memorandum in support of its application for a special permit to install a wireless telecommunications facility (the “Facility”) at 104 Bunker Hill Rd. (the “Site”). A copy of the Application and associated documents are included as Exhibit 1. The Site is known as Lot 3, Block 36 on Map 33 of the Town of Andover Tax Assessor’s Maps and is located in an R-80 (Residential) District. The proposed use is permitted in an R-80 district pursuant to § 4.13 as a telecommunication facility.

The proposed installation will close a significant gap in the Applicant’s digital wireless network by providing wireless communications services to the local area in the least obtrusive means possible.

II. Description of the Proposed Facility

The Facility will consist of a 180 foot monopole, with an antenna platform located at the 178 foot level. Each antenna will be approximately 3 ½ feet tall and therefore will not exceed a height of 180 feet. A total of twelve antennas may be attached to the antenna platform. An equipment shelter, 10' by 20', will be located adjacent to the proposed monopole. All of the necessary related equipment will be located in the equipment shelter. Telephone and electric utilities will be run underground from Bunker Hill Road. The monopole and shelter will be surrounded by a security fence. The entire Facility will be unmanned.



III. Need for the Facility

A. FCC Requirements. The Applicant is licensed by the Federal Communications Commissions ("FCC") to provide its service throughout Connecticut. The FCC requires Nextel, as a provider of enhanced specialized mobile radio ("ESMR") services, to complete the construction and build-out of its wireless network and fill coverage gaps in its federally licensed service area, which includes the Town of Andover. The Applicant's ESMR system combines voice, data and text messaging, enabling it to provide mobile telephone, paging and dispatch service through a single handset. The Applicant's service, therefore, provides great flexibility to public and private users.

There is also a public need for the Applicant's service, as evidenced by the granting of a license to the Applicant by the FCC. This grant constitutes a finding that the public interest will be served by the Applicant's service and is consistent with the public policy of the United States "to make available so far as possible, to all people of the United States a rapid, efficient, nationwide and worldwide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of national defense, for the purpose of promoting safety of life and property through the use of wire and radio communication...[.]" 47 U.S.C. § 151. In fact, at the time the FCC granted the Applicant's license, the FCC determined that the Applicant's service furthers the FCC's statutory mandate and the public policy of the United

States... [to] "encourage the larger and more efficient use of the radio in the public interest" (FCC Decision 91-56).<sup>1</sup>

B. Coverage within the Town of Andover.

The Applicant has prepared a visual analysis to demonstrate its need to locate a wireless telecommunications facility in this area of Andover. This analysis is called a signal propagation map and displays the geographical area that is served by Nextel wireless facilities within a certain area. A propagation map of the Applicant's coverage in Andover without the proposed Facility is included as Exhibit 2. The area that is colored green displays Nextel coverage from other existing or proposed facilities. As this propagation map demonstrates, a significant coverage gap exists along Route 6 and the entire town of Andover. As described above, the Applicant must provide service to this cell or geographical area, which currently does not receive service.

In order to provide comprehensive service to this entire area, a wireless facility must be placed within a very specific region. That area within which a facility must be located to provide complete coverage is called the Search Area Ring. The Search Area Ring for this cell is attached as Exhibit 3. As the search ring demonstrates, the Applicant had a very small region within which it could locate its facility. If the facility were located outside of this

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<sup>1</sup> Please also note that under the Federal Communications Act of 1934, as revised in 1993, the Applicant is subject to FCC regulation as a commercial mobile services ("CMS") common carrier. See 47 U.S.C. §332. A CMS common carrier must provide service in all parts of its coverage area, upon reasonable request. Therefore, to fulfill its common carrier and public utility obligation, the Applicant must be able to serve all parts of Andover.

Search Area Ring, the facility would not provide complete coverage throughout this cell and coverage gaps would remain. This would have resulted in an unacceptable level of service.

With the proposed Facility at 104 Bunker Hill Road, the Applicant is able to provide coverage throughout the cell and the previous coverage gaps are eliminated. Exhibit 4 displays the coverage to be achieved from the proposed Facility. Exhibit 5 displays the coverage from the proposed Facility with the coverage from other existing or proposed facilities in the area. As Exhibit 5 demonstrates, the coverage gap created by the surrounding sites is remedied with the proposed Bunker Hill Road Facility.

In conclusion, the propagation studies demonstrate the compelling public need for the Facility at the proposed location.

#### IV. Other Siting Considerations

While the propagations studies and Search Area Ring discussed above demonstrate the need for the proposed Facility in this area of Andover, please note that both the type and location for this Facility were carefully reviewed by Nextel.

As a matter of policy, when seeking a location for a new Facility, Nextel first attempts to locate an existing structure, such as buildings or other telecommunications towers, on which it can place its Facility. This is called co-location. Only after determining that there are no existing structures of sufficient height in the Search Area Ring does Nextel propose a new monopole.

In regard to the Facility which is the subject of this application, Nextel conducted an exhaustive survey of sites within the Search Area Ring to identify any co-location opportunities. Only after determining that there are no buildings or structures of sufficient height in or near the Search Area Ring, Nextel searched for an appropriate location for a monopole. The site selected by Nextel permits it to provide coverage in the most inconspicuous manner possible because (1) only one Facility is required; (2) the parcel selected for the Facility is comprised of nearly fourteen acres and offers substantial, mature screening; (3) the monopole is as low as it can be while still providing the necessary coverage throughout the cell; and (4) the site is adjacent to another utility use, the Algonquin Gas Company right-of-way. As a result, not only is the proposed Facility consistent with and in harmony with the surrounding area, but there is no other location within the Search Area Ring that is better

suited for this use. In short, Nextel has selected the least obtrusive method of providing coverage to this area of Andover which does not currently receive Nextel coverage.

V. Compliance with the Andover Zoning Regulations

The Facility will be an integral part of Nextel Communications' network of facilities located throughout the state. The FCC requires Nextel, as a provider of enhanced specialized mobile radio ("ESMR") services, to complete the construction and build-out of its wireless network and fill coverage gaps in its federally licensed service area, which includes the Town of Andover. Without the requested special permit approval, Nextel will be unable to provide coverage to this area of Andover.

The granting of the special permit approval will be consistent with the general purpose and intent of the Andover Zoning Regulations and will conserve the public health, safety convenience, welfare and property values. As set forth below, Nextel has met all applicable standards for approval of the Special Permit.

4.13.3

- a) A completed special permit application is attached as Exhibit 1.
  - b) Site plans, which include all of the items listed in this subsection, have been submitted with the application.
  - c) The site plans provide details of the equipment shelter, access drive, fencing, utilities, lighting, and landscaping. Final construction details of the proposed tower will be provided on the construction drawings to be submitted in conjunction with a building permit application.
  - d) A fall zone analysis by H. Edmund Bergeron Associates is attached as Exhibit 6.
- It should be noted, however, that monopoles are an extremely strong and resilient type of

structure. There are no known failures of a monopole in the United States. Should there be an exceptionally high wind, monopoles are designed to relieve that stress by bending or twisting in the middle of the pole. As a result, a monopole does not topple from its base. Nevertheless, please note, that the proposed monopole complies with all setback standards in the Regulations.

- e) A view shed analysis is attached as Exhibit 7.
- f) These maps are attached as Exhibits 2, 3, 4, and 5.

#### 4.13.4

- a) The lot for the proposed Facility is 605,484 sq. ft. and, therefore, exceeds the 40,000 sq. ft. minimum.
- b) The proposed monopole is 180 ft. tall and, therefore, does not exceed the 200 ft. height limitation.
- c) As with all Nextel monopoles, the proposed Facility will be designed to accommodate a minimum of three telecommunications service providers, including Nextel.
- d) The proposed Facility will be enclosed with a 6 ft. security fence.
- e) Substantial and mature landscaping currently exists surrounding the leased parcel.
- f) The majority of the access drive from Bunker Hill Road currently exists. The balance of the access drive and the parking area will be constructed of a dust-free surface.

g) The proposed monopole will be galvanized steel which will weather to a matte gray color. Further, and as set forth in a letter from the Air Space Safety Analysis Corporation, attached as Exhibit 8, the monopole will not be required to be lit.

h) All utility lines shall be installed underground.

i) A report from Charles S. Fitch, an independent, Connecticut licensed, professional engineer documenting that the proposed telecommunications Facility complies with the emission standards established by the Federal Communications Commission is attached as Exhibit 9. This report also certifies that the proposed Facility will not interfere with public safety communications, radio, television or other existing communications systems.

j) The proposed Facility will be set back 317 ft. from the nearest residential property line, and will be 725 ft. from the nearest neighboring residence and thus complies with the setback requirements.

k) Lighting shall be kept to a minimum. As stated above, the monopole will not be lit. In addition, the equipment shelter will have just one light fixture which will be operated by a motion detector.

l) No signage is proposed for the Facility, other than a 1 ft. x 1 ft. emergency sign.

m) No generator is proposed as a part of the Facility.

n) The telecommunication tower will be a monopole design.



o) No dish antennas are proposed. The panel antennas will be 52" high and 8" wide.

As a result, the proposed Facility complies with all standards for telecommunications facilities set forth in the Andover Zoning Regulations.

The proposed Facility also complies with the applicable special permit provisions set forth in § 23.4 of the Regulations.

a) A complete application with all necessary information has been submitted to the Commission.

b) No variance or inland/wetland permit is required by the proposed Facility.

c) The proposed Facility will be utilizing an existing access drive, which fronts on Bunker Hill Road.

d) A Nextel technician will visit the site approximately once per month to perform routine maintenance. As a result, there will be no impact on traffic.

e) The access will be sufficient for police and fire protection.

f) No sanitary waste disposal systems are proposed because none are needed.

g) Soil erosion and sedimentation control measures will be installed as depicted on Sheet C-3 of the site plan.

h) No sanitary disposal system is proposed.

i) The proposed Facility does not pose a risk of degradation of surface or ground water supplies.

j) The proposed Facility is not a development to be served by a water company.

k) The proposed Facility will have no impact on the health, safety or welfare of the citizens of Andover. Adequate emergency access is provided; adequate utilities are available; no flood proofing measures are necessary; the proposed Facility will have no impact on the natural environment; no glare, smoke, heat or pollution will be associated with the proposed Facility.

l) The proposed use shall be appropriate for the designated location. The proposed Facility is a completely passive use and will have no impact on existing land uses. As stated, there will be no impact on traffic. The proposed Facility will not obstruct light or air, and will not emit any noise, light, smoke, odor, gas, dust, or any other offensive emission. As set forth in Exhibit 8, the proposed Facility complies with all FCC standards for radio frequency emissions. The proposed use does not create any inherent police or fire protection needs. The Facility will preserve the character of the neighborhood because it will comply with all set back requirements, it is on an extremely large parcel, and will be shielded by substantial, existing, mature trees. Only telephone and electric utilities will be necessary for the Facility and will not pose any special burdens.

m) As shown and discussed in greater detail in the view shed analysis, attached as Exhibit 6, the proposed Facility will have a minimum visual impact on the neighborhood. Many views of the facility will be shielded by vegetation or topography. From those areas where the Facility is visible, there will only be a de minimis impact as shown on in the photosimulations included in the viewshed analysis.

n) The proposed Facility will have no impact on pedestrian or vehicular traffic.

Further, the proposed Facility will not, in any way, hinder or discourage the appropriate development of adjacent land. Further, detailed analyses have determined that facilities, such as the one proposed in this Application, have no impact on adjacent property values

As established above, the use proposed by Nextel Communications complies with each and every applicable requirement set forth in the Andover Zoning Regulations.

Conclusion

By granting the requested approval, the Commission will permit the Applicant to comply with its statutory mandate to build out its network and provide local businesses, residents and public service entities with a safe and reliable wireless communications alternative.

ANDOVER TOWN PLANNING AND ZONING COMMISSION  
APPLICATION FOR A SPECIAL PERMIT

The undersigned applicant hereby applies to the Town Planning and Zoning Commission for approval of a Special Permit under Section(s) 4.13.0 of the Andover Zoning Regulations for the following:

Construction of a personal wireless telecommunications facility.

Address or location of subject parcel: 104 Bunker Hill Road

Size of subject parcel: 13.9 ac. approx. Zone of subject parcel: R-80

Description of subject parcel, as per Assessor's records:

Map(s) # 33 Block(s) # 36 Lot(s) # 3

Deed Reference: Vol. 68 Page 950 Zone

How will the proposed Special Permit relate to the adopted Plan of Development? The proposed use will be consistent with the Plan of Development because the proposed use is permitted in an R-80 zone.

Allowing said Special use will be of benefit to the Town of Andover for the following reason: It will provide Nextel service to the businesses and residents of the Town of Andover.

Applicant (If more than one, list on a separate sheet)

Name: Nextel Communications of the MidAtlantic, Inc. Signature: [Signature]  
DULY AUTHORIZED

Address: 100 Corporate Place, Rocky Hill, CT 06067

Telephone: 860-513-5400 Date: July 13, 1999

( ) Owner ( ) Optionee ( ) Buyer (X) Agent Check one

Owner(s) of Record (If other than applicant) (If more than one, list on a separate sheet)

Name Deborah R. and Leon Price Signature SEE ATTACHED L.O.A.

Address: 104 Bunker Hill Road

Telephone: 860-742-3023 Date:

The following items shall be included as part of this application:

- ( ) Fee - \$60.00 The fee for a "Special Permit" is \$50.00 + an additional \$10.00 which is a state mandated fee on all land-use applications. (Make check payable to "Town of Andover").
- ( ) Drawing and data as may be required.
- ( ) Obtain sign from Agent two (2) weeks prior to Public Hearing. (\$2.00 fee) It is the applicant's responsibility to maintain sign for the two (2) week period. Sign must be conspicuously displayed. Corner properties require one sign on each street.

NOTE TO APPLICANT:

In accordance with Connecticut State Statutes Revised 1958 requires that certification of approval of this Special Permit to be filed with the Town Clerk's Office before becoming effective. Effective date shall be twenty days after legal publication. This allows landowners within 100 feet to appeal within 15 days and landowners within 500 feet to appeal within 20 days.

---

FOR OFFICE USE ONLY

|                      |       |
|----------------------|-------|
| Special Permit #     | _____ |
| Application Received | _____ |
| Public Hearing Date  | _____ |
| Published Dated      | _____ |
| Effective Date       | _____ |
| Fee Paid             | _____ |

SPPMT

Nextel Communications  
100 Corporate Place, Rocky Hill, CT 06067  
860 513-5400 FAX 860 513-5444



**LETTER OF AUTHORIZATION**

Municipality:

Tax Assessor's Parcel Number:

Re: Building Permits and Land Use Approvals

Deborah Green + Leon Price the Owner of 104 Bunker Hill Rd (the "Property") does hereby appoint Nextel Communications of the Mid-Atlantic, Inc. ("Nextel") and its agents and representatives as Owner's Agent for the purpose of completing, executing, and/or filing any applications, form, map, approval, variance, special permit or other land use approval or building permit ("Approvals") required to provide Nextel with lawful access to, and the ability to use the Property for the purpose of installing, erecting, or otherwise placing antennae, support structures and related equipment on the Property. Owner shall fully cooperate with Nextel and its agents and representatives in obtaining any required Approvals. Nextel shall be responsible for all costs, filing fees, or any expense incurred in the connection with securing any Approvals.

Property Owner: Deborah Green and Leon Price

By: Deborah Green and Leon Price

Name: owners Deborah Green *JR*

Its: \_\_\_\_\_

Date: 8/29/98

STATE OF CONNECTICUT:

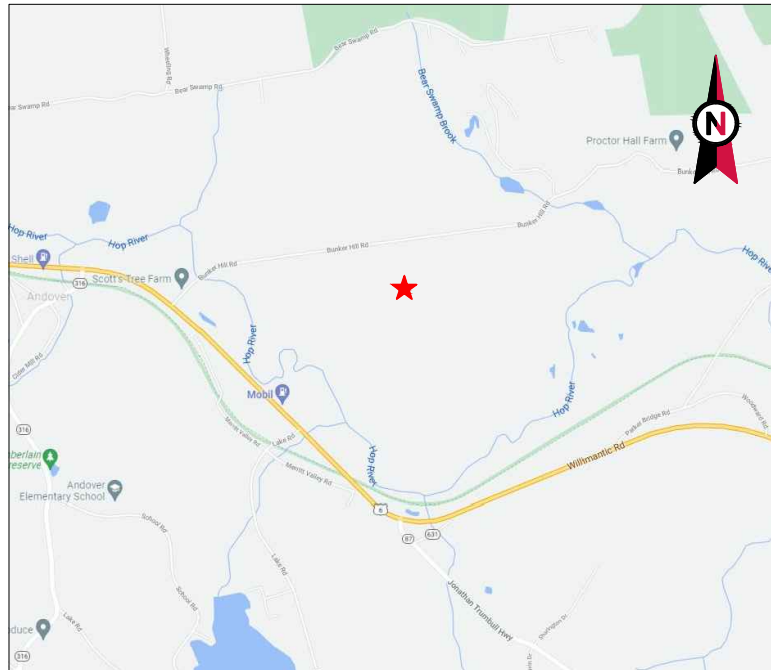
COUNTY OF \_\_\_\_\_

Signed and Sworn to before me this 29 th day of August 1998

June H. Clark  
Notary Public

My Commission expires: ---

**JUNE H. CLARK**  
**NOTARY PUBLIC**  
MY COMMISSION EXPIRES NOV. 30, 2002



VICINITY MAP



**AMERICAN TOWER®**

ATC SITE NAME: ANDOVER-BUNKER HILL ROAD  
 ATC SITE NUMBER: 302472  
 T-MOBILE SITE NAME: SPECTRASITE ANDOVER  
 T-MOBILE SITE NUMBER: CT11502A  
 SITE ADDRESS: 104 BUNKER HILL ROAD  
 ANDOVER, CT 06232-1301



LOCATION MAP

**T-MOBILE ANCHOR ANTENNA AMENDMENT PLAN  
 67D5A998E ODE+6160 CONFIGURATION**

| COMPLIANCE CODE  | PROJECT SUMMARY  | PROJECT DESCRIPTION   | SHEET INDEX |                                |      |          |     |
|--|--|---|-------------|--------------------------------|------|----------|-----|
| ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.<br><br>1. 2015 INTERNATIONAL BUILDING CODE (IBC)<br>2. 2017 NATIONAL ELECTRIC CODE (NEC)<br>3. 2018 CT STATE BUILDING CODE<br>4. LOCAL BUILDING CODE<br>5. CITY/COUNTY ORDINANCES | <u>SITE ADDRESS:</u><br>104 BUNKER HILL ROAD<br>ANDOVER, CT 06232-1301<br>COUNTY:TOLLAND<br><br><u>GEOGRAPHIC COORDINATES:</u><br>LATITUDE: 41.73779302<br>LONGITUDE: -72.34984685<br>GROUND ELEVATION: 546' AMSL  | THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:<br><u>TOWER WORK:</u><br>REMOVE (3) ANTENNA(s), (3) RRH(s), (6) TMA(s) AND (12) COAX CABLE(s)<br><br>INSTALL (1) UPPER SUPPORT RAIL, (3) ANTENNA(s), (3) RRH(s), AND (3) HYBRID CABLE(s)<br><br>EXISTING (3) ANTENNA(s), (3) RRH(s) AND (1) HYBRID CABLE(s) TO REMAIN<br><br><u>GROUND WORK:</u><br>REMOVE (3) RRHs<br><br>RELOCATE (1) PTS8003 BATTERY CABINET<br><br>INSTALL (1) 6160 CABINET, (1) B160 BATTERY CABINET, (1) BB 6648, (1) PSU 4813 vR4A VOLTAGE BOOSTER, AND (1) CSR IXRe V2 ROUTER<br><br>EXISTING (1) 6201 ODE CABINET, (1) DUG20 AND (2) BB 6630 TO REMAIN  | SHEET NO:   | DESCRIPTION:                   | REV: | DATE:    | BY: |
|  | <u>PROJECT TEAM</u><br><br><u>TOWER OWNER:</u> AMERICAN TOWER<br>10 PRESIDENTIAL WAY<br>WOBURN, MA 01801<br><br><u>ENGINEER:</u> POWER OF DESIGN GROUP, LLC<br>11490 BLUEGRASS PKWY<br>LOUISVILLE, KY 40299<br><br><u>PROPERTY OWNER:</u> LEON PRICE<br>104 BUNKER HILL ROAD<br>ANDOVER,CT 06232 | <u>PROJECT NOTES</u><br>1. THE FACILITY IS UNMANNED.<br>2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE.<br>3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE.<br>4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED.<br>5. HANDICAP ACCESS IS NOT REQUIRED.<br>6. THE PROJECT DEPICTED IN THESE PLANS QUALIFIES AS AN ELIGIBLE FACILITIES REQUEST ENTITLES TO EXPEDITED REVIEW UNDER 47 U.S.C. § 1455(A) AS A MODIFICATION OF AN EXISTING WIRELESS TOWER THAT INVOLVES THE COLLOCATION REMOVAL AND/OR REPLACEMENT OF TRANSMISSION EQUIPMENT THAT IS NOT SUBSTANTIAL CHANGE UNDER CFR § 1.61000 (B)(7). | G-001       | TITLE SHEET                    | 2    | 06/07/22 | ADE |
| <u>UTILITY COMPANIES</u><br><br>POWER COMPANY: EVERSOURCE<br>PHONE: (877) 659-6326<br><br>TELEPHONE COMPANY: FRONTIER COMMUNICATIONS<br>PHONE: (800) 376-6843  | <u>PROJECT TEAM</u><br><br><u>TOWER OWNER:</u> AMERICAN TOWER<br>10 PRESIDENTIAL WAY<br>WOBURN, MA 01801<br><br><u>ENGINEER:</u> POWER OF DESIGN GROUP, LLC<br>11490 BLUEGRASS PKWY<br>LOUISVILLE, KY 40299<br><br><u>PROPERTY OWNER:</u> LEON PRICE<br>104 BUNKER HILL ROAD<br>ANDOVER,CT 06232 | <u>PROJECT NOTES</u><br>1. THE FACILITY IS UNMANNED.<br>2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE.<br>3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE.<br>4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED.<br>5. HANDICAP ACCESS IS NOT REQUIRED.<br>6. THE PROJECT DEPICTED IN THESE PLANS QUALIFIES AS AN ELIGIBLE FACILITIES REQUEST ENTITLES TO EXPEDITED REVIEW UNDER 47 U.S.C. § 1455(A) AS A MODIFICATION OF AN EXISTING WIRELESS TOWER THAT INVOLVES THE COLLOCATION REMOVAL AND/OR REPLACEMENT OF TRANSMISSION EQUIPMENT THAT IS NOT SUBSTANTIAL CHANGE UNDER CFR § 1.61000 (B)(7). | G-002       | GENERAL NOTES                  | 2    | 06/07/22 | ADE |
|  | <u>PROJECT TEAM</u><br><br><u>TOWER OWNER:</u> AMERICAN TOWER<br>10 PRESIDENTIAL WAY<br>WOBURN, MA 01801<br><br><u>ENGINEER:</u> POWER OF DESIGN GROUP, LLC<br>11490 BLUEGRASS PKWY<br>LOUISVILLE, KY 40299<br><br><u>PROPERTY OWNER:</u> LEON PRICE<br>104 BUNKER HILL ROAD<br>ANDOVER,CT 06232 | <u>PROJECT LOCATION DIRECTIONS</u><br>I-287 EAST TO I-684 NORTH TO I-284 EAST INTO CONNECTICUT. FOLLOW I-84 THROUGH HARTFORD TO I-384 SOUTH/EAST. FOLLOW I-384 TO END THEN EAST ON ROUTE 6. FOLLOW ROUTE 6 THROUGH COLUMBIA AND INTO THE TOWN OF ANDOVER. TURN LEFT (NORTH) ONTO BUNKER HILL ROAD. THE SITE WILL BE ON YOUR RIGHT (#104).   | C-101       | DETAILED SITE PLAN             | 2    | 06/07/22 | ADE |
|  | <u>PROJECT TEAM</u><br><br><u>TOWER OWNER:</u> AMERICAN TOWER<br>10 PRESIDENTIAL WAY<br>WOBURN, MA 01801<br><br><u>ENGINEER:</u> POWER OF DESIGN GROUP, LLC<br>11490 BLUEGRASS PKWY<br>LOUISVILLE, KY 40299<br><br><u>PROPERTY OWNER:</u> LEON PRICE<br>104 BUNKER HILL ROAD<br>ANDOVER,CT 06232 | <u>PROJECT LOCATION DIRECTIONS</u><br>I-287 EAST TO I-684 NORTH TO I-284 EAST INTO CONNECTICUT. FOLLOW I-84 THROUGH HARTFORD TO I-384 SOUTH/EAST. FOLLOW I-384 TO END THEN EAST ON ROUTE 6. FOLLOW ROUTE 6 THROUGH COLUMBIA AND INTO THE TOWN OF ANDOVER. TURN LEFT (NORTH) ONTO BUNKER HILL ROAD. THE SITE WILL BE ON YOUR RIGHT (#104).   | C-102       | DETAILED GROUND PLAN           | 2    | 06/07/22 | ADE |
|  |  |   | C-201       | TOWER ELEVATION                | 2    | 06/07/22 | ADE |
|  |  |   | C-401       | ANTENNA INFORMATION & SCHEDULE | 2    | 06/07/22 | ADE |
|  |  |   | C-501       | CONSTRUCTION DETAILS           | 2    | 06/07/22 | ADE |
|  |  |   | E-501       | GROUNDING DETAILS              | 2    | 06/07/22 | ADE |
|  |  |   | R-601       | SUPPLEMENTAL                   |      |          |     |
|  |  |   | R-602       | SUPPLEMENTAL                   |      |          |     |
|  |  |   | R-603       | SUPPLEMENTAL                   |      |          |     |
|  |  |   | R-604       | SUPPLEMENTAL                   |      |          |     |
|  |  |   | R-605       | SUPPLEMENTAL                   |      |          |     |
|  |  |   | R-606       | SUPPLEMENTAL                   |      |          |     |

**AMERICAN TOWER®**

**POD**  
POWER OF DESIGN

11490 BLUEGRASS PKWY  
 LOUISVILLE, KY 40299  
 502-437-5252

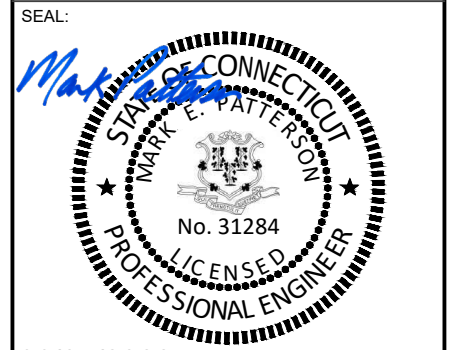
| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 1    | FOR CONSTRUCTION | ADE | 02/23/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
302472

ATC SITE NAME:  
ANDOVER-BUNKER HILL ROAD

T-MOBILE SITE NAME:  
SPECTRASITE ANDOVER

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301



06/07/2022

|              |                     |
|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**TITLE SHEET**

SHEET NUMBER: **G-001** REVISION: **2**



**GENERAL CONSTRUCTION NOTES:**

1. OWNER FURNISHED MATERIALS, T-MOBILE "THE COMPANY" WILL PROVIDE AND THE CONTRACTOR WILL INSTALL
  - A. BTS EQUIPMENT FRAME (PLATFORM) AND ICEBRIDGE SHELTER (GROUND BUILD/CO-LOCATE ONLY)
  - B. AC/TELCO INTERFACE BOX (PPC)
  - C. ICE BRIDGE (CABLE TRAY WITH COVER) (GROUND BUILD/CO-LOCATE ONLY, GC TO FURNISH AND INSTALL FOR ROOFTOP INSTALLATION)
  - D. TOWERS, MONOPOLES
  - E. TOWER LIGHTING
  - F. GENERATORS & LIQUID PROPANE TANK
  - G. ANTENNA STANDARD BRACKETS, FRAMES AND PIPES FOR MOUNTING
  - H. ANTENNAS (INSTALLED BY OTHERS)
  - I. TRANSMISSION LINE
  - J. TRANSMISSION LINE JUMPERS
  - K. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
  - L. TRANSMISSION LINE GROUND KITS
  - M. HANGERS
  - N. HOISTING GRIPS
  - O. BTS EQUIPMENT
2. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB-FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER-CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFORMERS AND DISCONNECT SWITCHES WHERE APPLICABLE, TEMPORARY ELECTRICAL POWER, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NON-STANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF T-MOBILE TO APPLY FOR PERMITTING AND CONTRACTOR RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS.
3. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSIEIA/TIA-222, AND COMPLY WITH ATC CONSTRUCTION SPECIFICATIONS.
4. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
6. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
7. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
8. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
9. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
11. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
12. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE T-MOBILE REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE T-MOBILE REP PRIOR TO PROCEEDING.
13. EACH CONTRACTOR SHALL COOPERATE WITH THE T-MOBILE REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
14. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE T-MOBILE CONSTRUCTION MANAGER.
15. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
16. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE T-MOBILE REP AND ENGINEER OF RECORD IMMEDIATELY.
17. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
19. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH AMERICAN TOWER CORPORATION (ATC) AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
20. CONTRACTOR SHALL FURNISH T-MOBILE AND AMERICAN TOWER CORPORATION (ATC) WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
21. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.

22. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY T-MOBILE MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
23. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH T-MOBILE SPECIFICATIONS AND REQUIREMENTS.
24. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO T-MOBILE FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
25. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO T-MOBILE SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
26. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
27. CONTRACTOR SHALL NOTIFY T-MOBILE REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.
29. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
30. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE T-MOBILE REP. ANY WORK FOUND BY THE T-MOBILE REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
31. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.
32. T-MOBILE FURNISHED EQUIPMENT SHALL BE PICKED-UP AT THE T-MOBILE WAREHOUSE, NO LATER THAN 48HR AFTER BEING NOTIFIED INSURED, STORED, UNCRATE, PROTECTED AND INSTALLED BY THE CONTRACTOR WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AFTER PICKING IT UP.
33. T-MOBILE OR HIS ARCHITECT/ENGINEER RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH, IN HIS OWN OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO T-MOBILE OR THEIR ARCHITECT/ENGINEER.

**SPECIAL CONSTRUCTION**

**ANTENNA INSTALLATION NOTES:**

1. WORK INCLUDED:
  - A. ANTENNA AND COAXIAL CABLES ARE FURNISHED BY T-MOBILE UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND
  - B. INSTALL ANTENNA AS INDICATE ON DRAWINGS AND T-MOBILE SPECIFICATIONS.
  - C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS
  - D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE.
  - E. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ANRITZU-PACKARD 8713B RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY DOMAIN REFLECTOMETER(FDR) TESTS RESULTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE AS PER ATTACHED RFS "MINIMUM FIELD TESTING RECOMMENDED FOR ANTENNA AND HELIAX COAXIAL CABLE SYSTEMS" DATED 10/5/93. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE BOUND AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
  - F. INSTALL COAXIAL CABLES AND TERMINATING BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
  - G. ANTENNA AND COAXIAL CABLE GROUNDING:
2. ALL EXTERIOR #6 GREED GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH RFS CONNECTORS/SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
3. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS)

ALL DISCREPANCIES FROM WHAT IS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL BE COMMUNICATED TO ATC ENGINEERING IMMEDIATELY FOR CORRECTION OR RE-DESIGN. FAILURE TO COMMUNICATE DIRECTLY WITH ATC ENGINEERING OR ANY CHANGES FROM THE DESIGN CONDUCTED WITHOUT PRIOR APPROVAL FROM ATC ENGINEERING SHALL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.



| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| ①    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| ②    | FOR CONSTRUCTION | ADE | 06/07/22 |
| △    |                  |     |          |
| △    |                  |     |          |
| △    |                  |     |          |

ATC SITE NUMBER:  
**302472**

ATC SITE NAME:  
**ANDOVER-BUNKER HILL ROAD**

T-MOBILE SITE NAME:  
**SPECTRASITE ANDOVER**

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301



06/07/2022



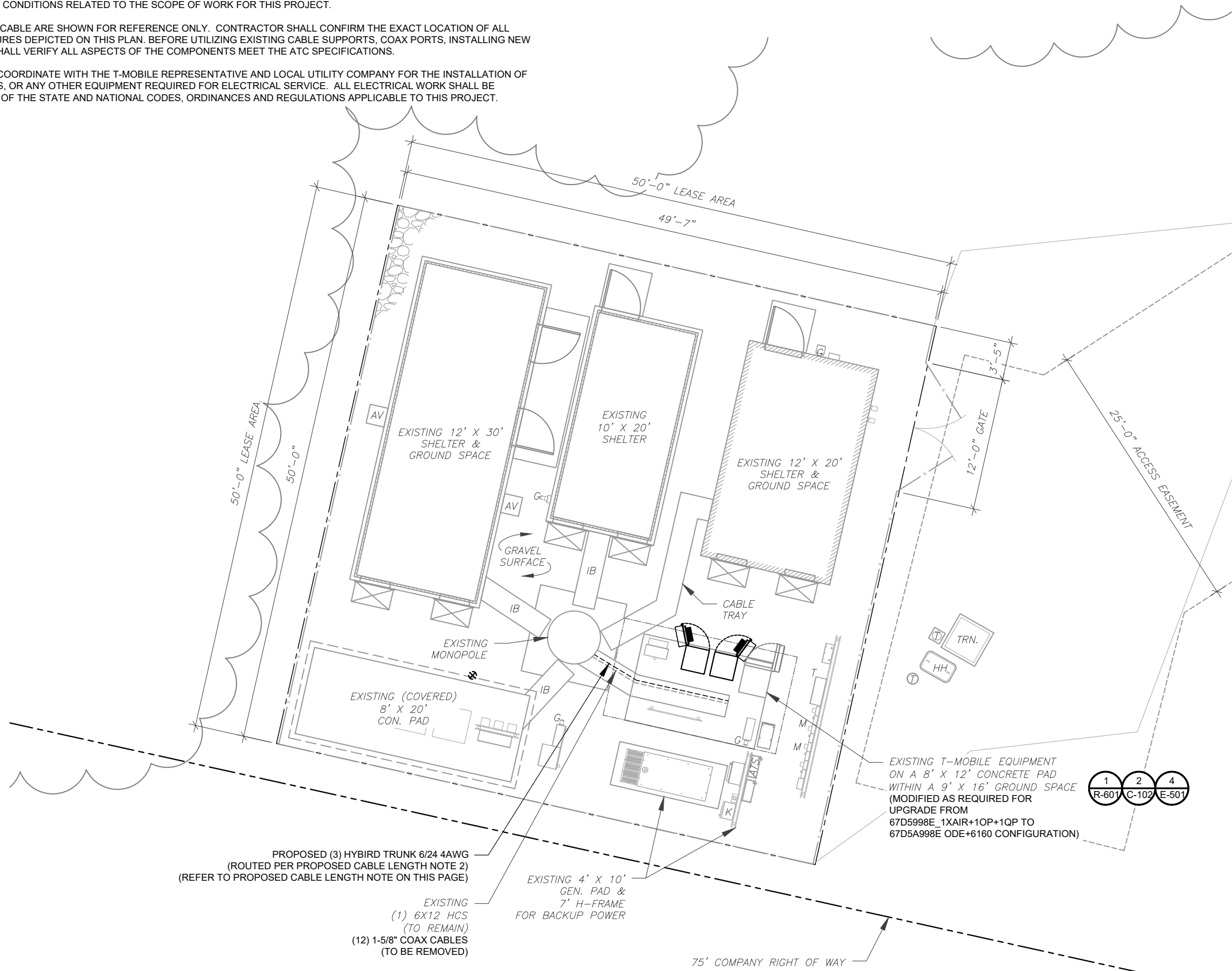
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|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

| GENERAL NOTES                 |                       |
|-------------------------------|-----------------------|
| SHEET NUMBER:<br><b>G-002</b> | REVISION:<br><b>2</b> |

**SITE PLAN NOTES:**

1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.
2. ICE BRIDGE, CABLE LADDER, COAX PORT, AND COAX CABLE ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL PROPOSED AND EXISTING EQUIPMENT AND STRUCTURES DEPICTED ON THIS PLAN. BEFORE UTILIZING EXISTING CABLE SUPPORTS, COAX PORTS, INSTALLING NEW PORTS OR ANY OTHER EQUIPMENT, CONTRACTOR SHALL VERIFY ALL ASPECTS OF THE COMPONENTS MEET THE ATC SPECIFICATIONS.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE T-MOBILE REPRESENTATIVE AND LOCAL UTILITY COMPANY FOR THE INSTALLATION OF CONDUITS, CONDUCTORS, BREAKERS, DISCONNECTS, OR ANY OTHER EQUIPMENT REQUIRED FOR ELECTRICAL SERVICE. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE STATE AND NATIONAL CODES, ORDINANCES AND REGULATIONS APPLICABLE TO THIS PROJECT.

| LEGEND |                           |
|--------|---------------------------|
| ⊗      | GROUNDING TEST WELL       |
| ATS    | AUTOMATIC TRANSFER SWITCH |
| B      | BOLLARD                   |
| CSC    | CELL SITE CABINET         |
| D      | DISCONNECT                |
| E      | ELECTRICAL                |
| F      | FIBER                     |
| GEN    | GENERATOR                 |
| G      | GENERATOR RECEPTACAL      |
| HH, V  | HAND HOLE, VAULT          |
| IB     | ICE BRIDGE                |
| K      | KENTROX BOX               |
| LC     | LIGHTING CONTROL          |
| M      | METER                     |
| PB     | PULL BOX                  |
| PP     | POWER POLE                |
| T      | TELCO                     |
| TRN    | TRANSFORMER               |
| — x —  | CHAINLINK FENCE           |



**PROPOSED CABLE LENGTH:**

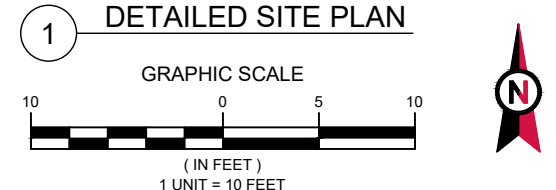
1. ESTIMATED LENGTH OF PROPOSED CABLE IS **185'**. ESTIMATED LENGTH OF CABLE WAS PROVIDED BY CUSTOMER OR CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES). CDS DEFER TO GREATEST CABLE LENGTH.
2. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.

PROPOSED (3) HYBRID TRUNK 6/24 4AWG (ROUTED PER PROPOSED CABLE LENGTH NOTE 2) (REFER TO PROPOSED CABLE LENGTH NOTE ON THIS PAGE)

EXISTING (1) 6X12 HCS (TO REMAIN)

(12) 1-5/8" COAX CABLES (TO BE REMOVED)

EXISTING 4' X 10' GEN. PAD & 7' H-FRAME FOR BACKUP POWER



**AMERICAN TOWER®**

**POD**  
POWER OF DESIGN

11490 BLUEGRASS PKWY  
LOUISVILLE, KY 40299  
502-437-5252

| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
**302472**

ATC SITE NAME:  
**ANDOVER-BUNKER HILL ROAD**

T-MOBILE SITE NAME:  
**SPECTRASITE ANDOVER**

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301

SEAL:

STATE OF CONNECTICUT  
MARK E. PATTERSON  
No. 31284  
LICENSED PROFESSIONAL ENGINEER

06/07/2022

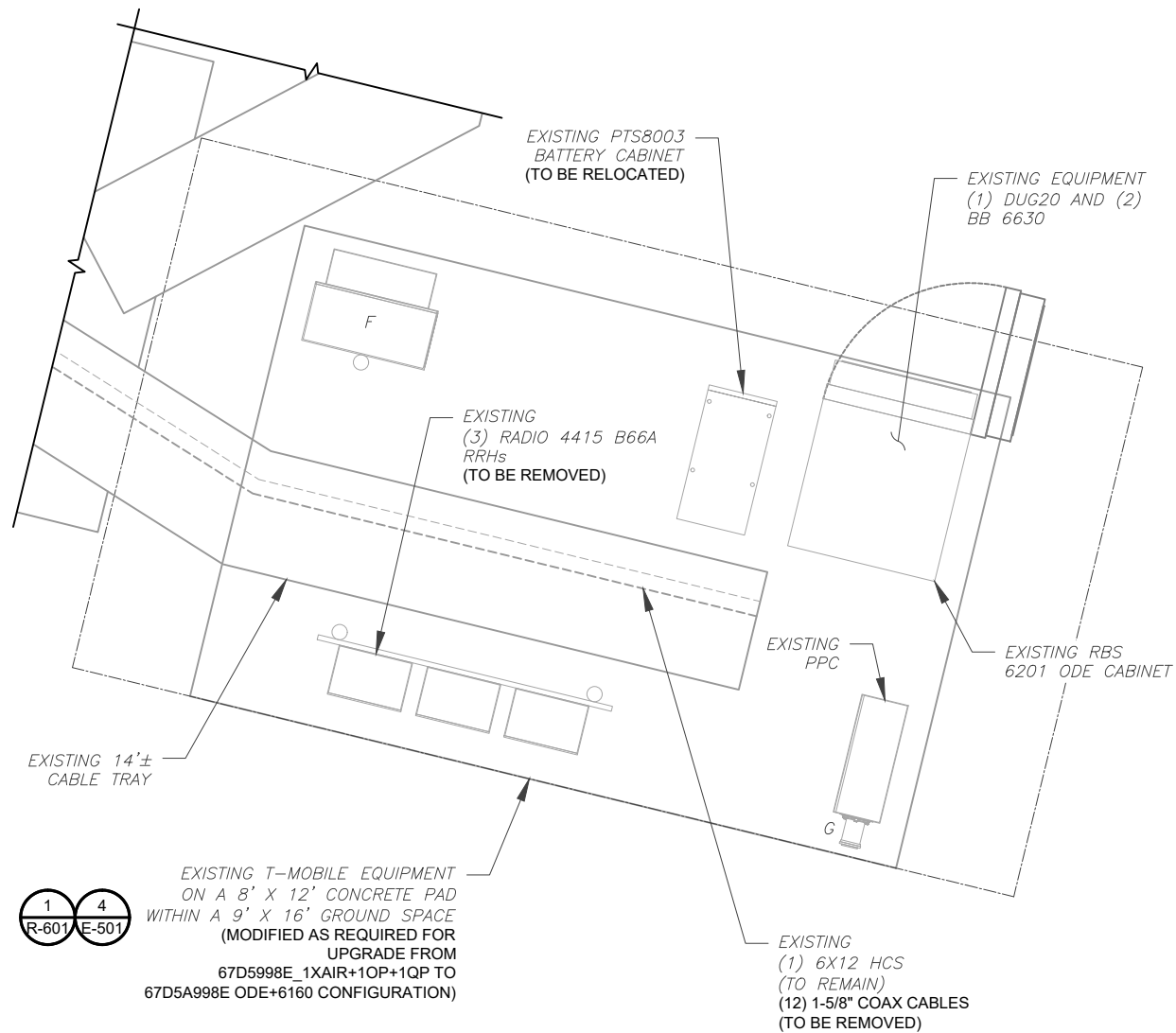


|              |                     |
|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

|                           |           |
|---------------------------|-----------|
| <b>DETAILED SITE PLAN</b> |           |
| SHEET NUMBER:             | REVISION: |
| <b>C-101</b>              | <b>2</b>  |

**SITE PLAN NOTES:**

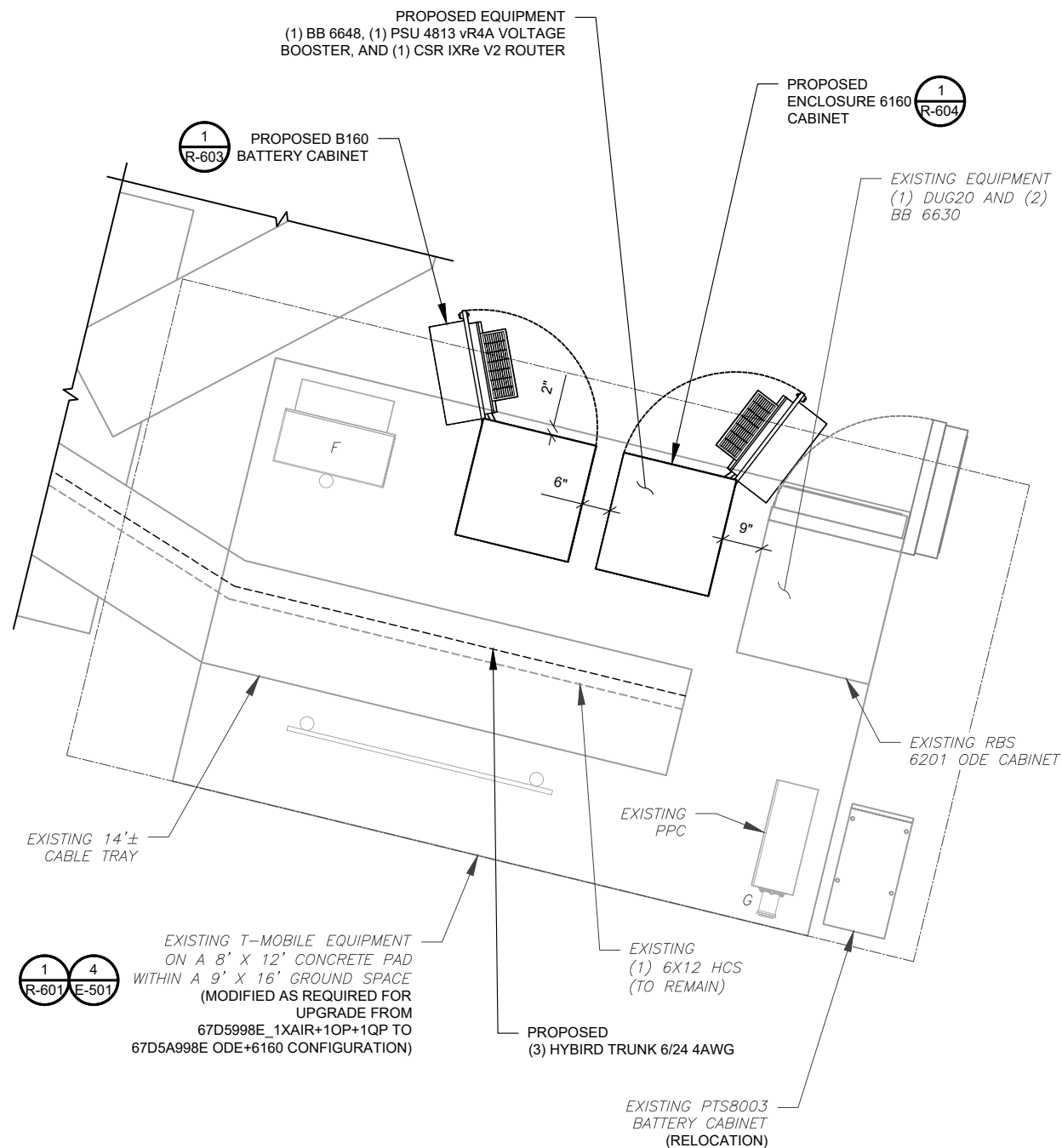
1. CONTRACTOR TO VERIFY THERE IS NO LIVE AAV FIBER RUNNING THROUGH EXISTING DEAD EQUIPMENT. IF SO, THIS WILL NEED TO BE RERUN THROUGH CONDUIT PRIOR TO REMOVING DEAD 2G (6201 CABS) EQUIPMENT.
2. REMOVE EXISTING 2G CABINETS, AND POWER / TELCO WHIPS ASSOCIATED WITH THE DEAD EQUIPMENT IF APPLICABLE.
3. ALL OPEN PORTS NEED TO BE SEALED / WEATHERPROOFED PROPERLY
4. ALL UNNEEDED / EXCESS EQUIPMENT AND GARBAGE TO BE REMOVED FROM EQUIPMENT AREA. DISPOSE OF MATERIALS PROPERLY OFF SITE.



1 EXISTING GROUND EQUIPMENT LAYOUT



T-MOBILE CM APPROVAL REQUIRED BEFORE INSTALLING CABINETS



2 PROPOSED GROUND EQUIPMENT LAYOUT



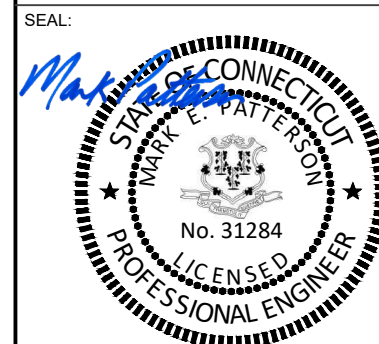
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|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 1    | FOR CONSTRUCTION | ADE | 02/23/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |

ATC SITE NUMBER:  
302472

ATC SITE NAME:  
ANDOVER-BUNKER HILL ROAD

T-MOBILE SITE NAME:  
SPECTRASITE ANDOVER

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301



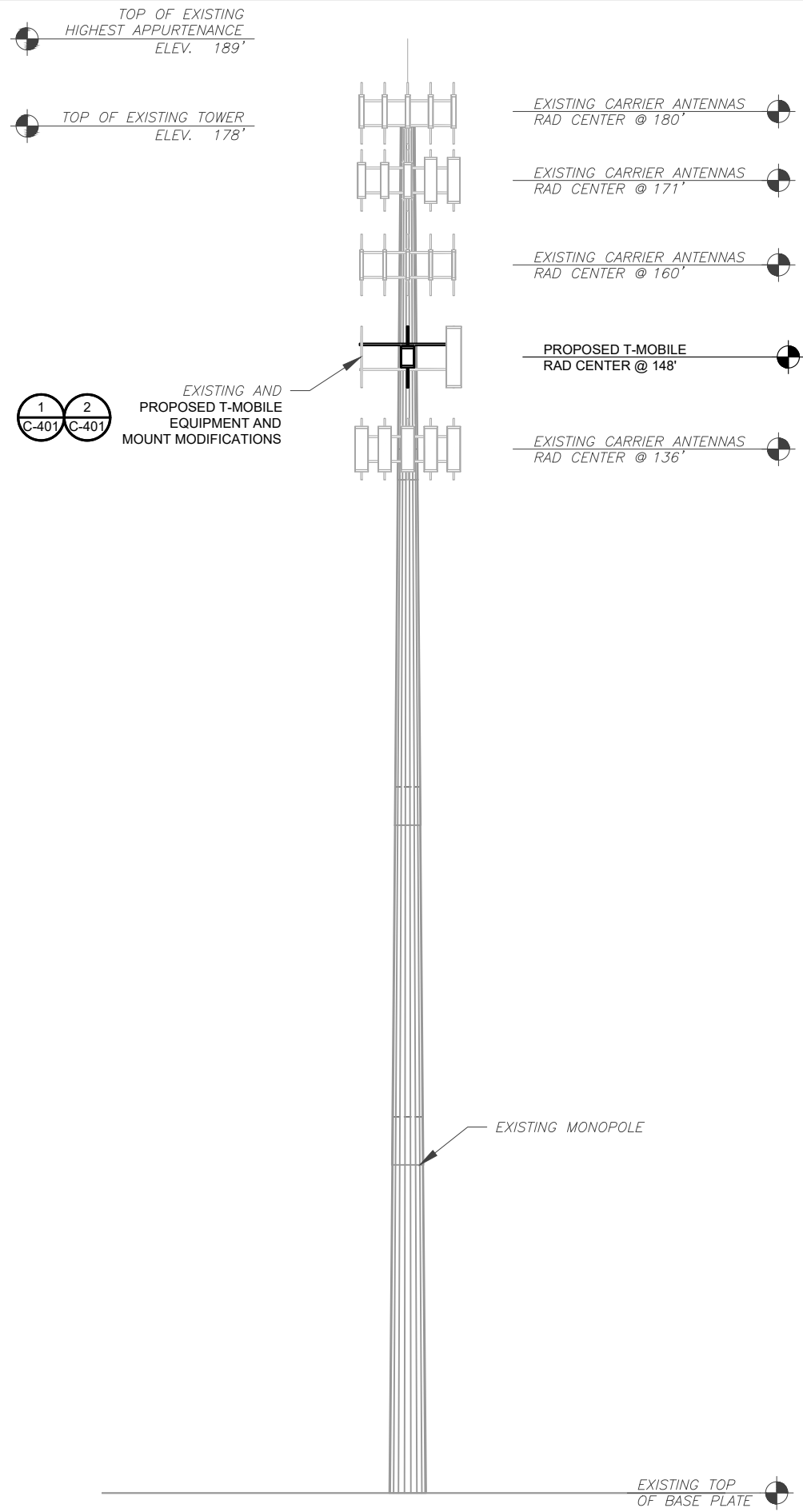
06/07/2022



|              |                     |
|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**DETAILED GROUND PLAN**

|               |           |
|---------------|-----------|
| SHEET NUMBER: | REVISION: |
| <b>C-102</b>  | <b>2</b>  |



PER MOUNT ANALYSIS COMPLETED BY AMERICAN TOWER CORPORATION, DATED JANUARY 10, 2022, THE EXISTING MOUNT MUST BE MODIFIED TO ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT MODIFICATION PROPOSED IN THE MOUNT ANALYSIS, INCLUDED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT

- TOWER NOTE:**
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE PROJECT MANAGER THAT THEY HAVE THE MOST RECENT VERSION OF THE STRUCTURAL ANALYSIS BEFORE COMMENCING WORK. EXISTING AND PROPOSED TOWER APPURTENANCES, MOUNTS, AND ANTENNAS ARE SHOWN BASED ON THE STRUCTURAL ANALYSIS.
  - WHERE APPLICABLE, ALL NEW ANTENNAS, EQUIPMENT, MOUNTS, CABLING, ETC. SHALL BE PAINTED/SOCKED TO MATCH EXISTING EQUIPMENT IN ACCORDANCE WITH FAA, JURISDICTION, AND/OR OTHER LOCAL REQUIREMENTS.
  - ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.
  - TOWER ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE TO MATCH STRUCTURAL ANALYSIS. ELEVATIONS DO NOT REFLECT TRUE ABOVE GROUND LEVEL (A.G.L.)

**1 TOWER ELEVATION**  
SCALE: N.T.S.



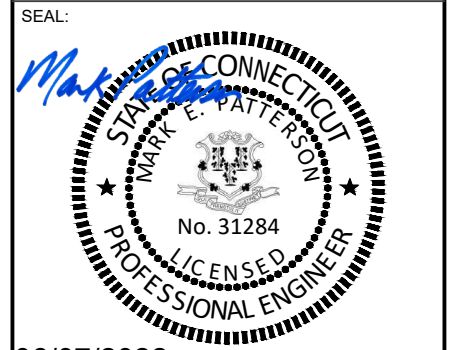
| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| ①    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| ②    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
**302472**

ATC SITE NAME:  
**ANDOVER-BUNKER HILL ROAD**

T-MOBILE SITE NAME:  
**SPECTRASITE ANDOVER**

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301

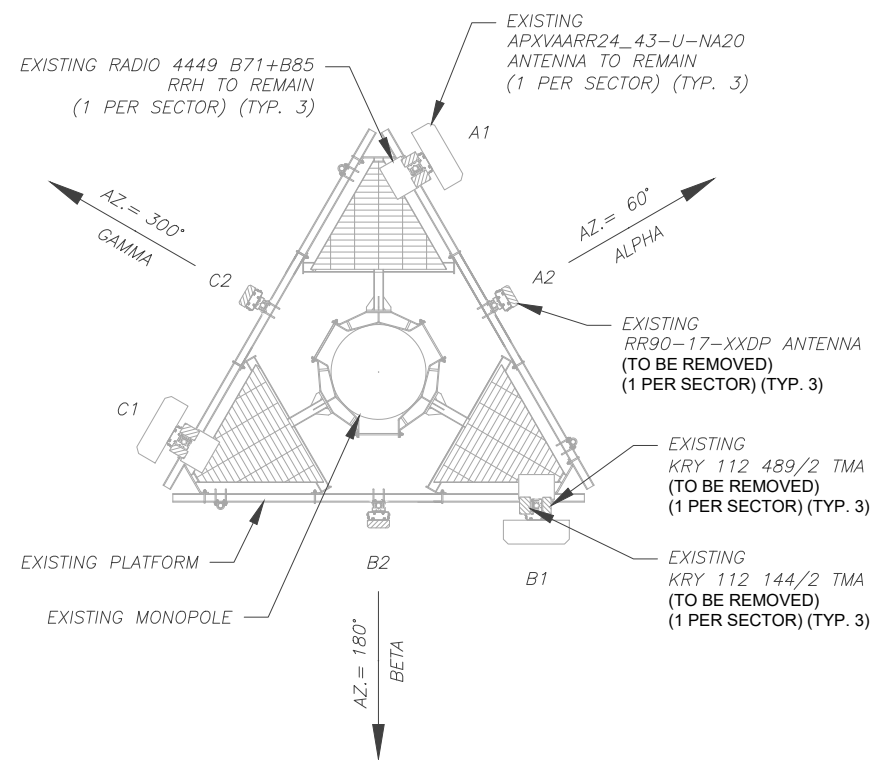


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|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**TOWER ELEVATION**

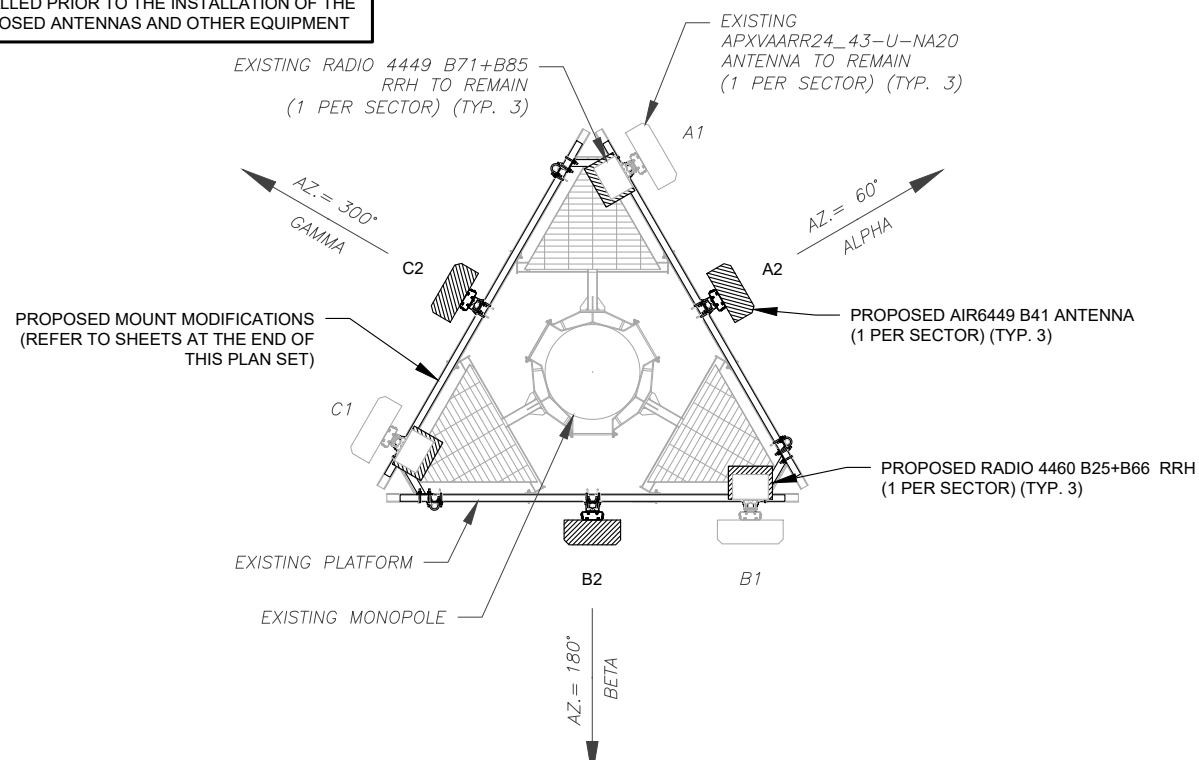
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| SHEET NUMBER:<br><b>C-201</b> | REVISION:<br><b>2</b> |
|-------------------------------|-----------------------|

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**1 EXISTING ANTENNA PLAN**  
SCALE: N.T.S.

PER MOUNT ANALYSIS COMPLETED BY AMERICAN TOWER CORPORATION, DATED JANUARY 10, 2022, THE EXISTING MOUNT MUST BE MODIFIED TO ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT MODIFICATION PROPOSED IN THE MOUNT ANALYSIS, INCLUDED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT



**2 FINAL ANTENNA PLAN**  
SCALE: N.T.S.

11490 BLUEGRASS PKWY  
LOUISVILLE, KY 40299  
502-437-5252

| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
**302472**

ATC SITE NAME:  
**ANDOVER-BUNKER HILL ROAD**

T-MOBILE SITE NAME:  
**SPECTRASITE ANDOVER**

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301

| EXISTING ANTENNA SCHEDULE |      |      |                 |                      |                            |                  |                     |                                    |        |
|---------------------------|------|------|-----------------|----------------------|----------------------------|------------------|---------------------|------------------------------------|--------|
| LOCATION                  |      |      | ANTENNA SUMMARY |                      |                            |                  | NON ANTENNA SUMMARY |                                    |        |
| SECTOR                    | RAD  | AZ   | POS             | ANTENNA              | BAND                       | MECH/ELEC D-TILT | STATUS              | ADDITIONAL TOWER MOUNTED EQUIPMENT | STATUS |
| ALPHA                     | 148' | 60°  | A1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                           |      |      | A2              | RR90-17-XXDP         | -                          | -                | RMV                 | -                                  | -      |
| BETA                      | 148' | 180° | B1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                           |      |      | B2              | RR90-17-XXDP         | -                          | -                | RMV                 | -                                  | -      |
| GAMMA                     | 148' | 300° | C1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                           |      |      | C2              | RR90-17-XXDP         | -                          | -                | RMV                 | -                                  | -      |

**NOTES**

- CONFIRM WITH T-MOBILE REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS FOR NSN CONFIGURATION (CONFIG). GC TO CAP ALL UNUSED PORTS.
- CONFIRM SPACING OF PROPOSED EQUIP DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.

**STATUS ABBREVIATIONS**

RMV: TO BE REMOVED  
RMN: TO REMAIN  
REL: TO BE RELOCATED  
ADD: TO BE ADDED

| FINAL ANTENNA SCHEDULE |      |      |                 |                      |                                  |                  |                     |                                    |        |
|------------------------|------|------|-----------------|----------------------|----------------------------------|------------------|---------------------|------------------------------------|--------|
| LOCATION               |      |      | ANTENNA SUMMARY |                      |                                  |                  | NON ANTENNA SUMMARY |                                    |        |
| SECTOR                 | RAD  | AZ   | POS             | ANTENNA              | BAND                             | MECH/ELEC D-TILT | STATUS              | ADDITIONAL TOWER MOUNTED EQUIPMENT | STATUS |
| ALPHA                  | 148' | 60°  | A1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100/G1900 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                        |      |      | A2              | AIR6449 B41          | L2500/N2500                      | 0°/2°            | ADD                 | -                                  | -      |
| BETA                   | 148' | 180° | B1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100/G1900 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                        |      |      | B2              | AIR6449 B41          | L2500/N2500                      | 0°/2°            | ADD                 | -                                  | -      |
| GAMMA                  | 148' | 300° | C1              | APXVAARR24_43-U-NA20 | N600/L600/L700/L1900/L2100/G1900 | 0°/2°            | RMN                 | (1) RADIO 4449 B71+B85             | RMN    |
|                        |      |      | C2              | AIR6449 B41          | L2500/N2500                      | 0°/2°            | ADD                 | -                                  | -      |

**CABLE LENGTHS FOR JUMPERS**

JUNCTION BOX TO RRU: 15'  
RRU TO ANTENNA: 10'

| EXISTING FIBER DISTRIBUTION/OVP BOX |        | EXISTING CABLING SUMMARY |              |        |
|-------------------------------------|--------|--------------------------|--------------|--------|
| MODEL NUMBER                        | STATUS | COAX                     | HYBRID       | STATUS |
| -                                   | -      | -                        | (1) 6X12 HCS | RMN    |
| -                                   | -      | (12) 1-5/8"              | -            | RMV    |

**3 EQUIPMENT SCHEDULES**

| FINAL FIBER DISTRIBUTION / OVP BOX |        | FINAL CABLING SUMMARY |               |        |
|------------------------------------|--------|-----------------------|---------------|--------|
| MODEL NUMBER                       | STATUS | COAX                  | HYBRID        | STATUS |
| -                                  | -      | -                     | (1) 6X12 HCS  | RMN    |
| -                                  | -      | -                     | (3) 6/24 4AWG | ADD    |

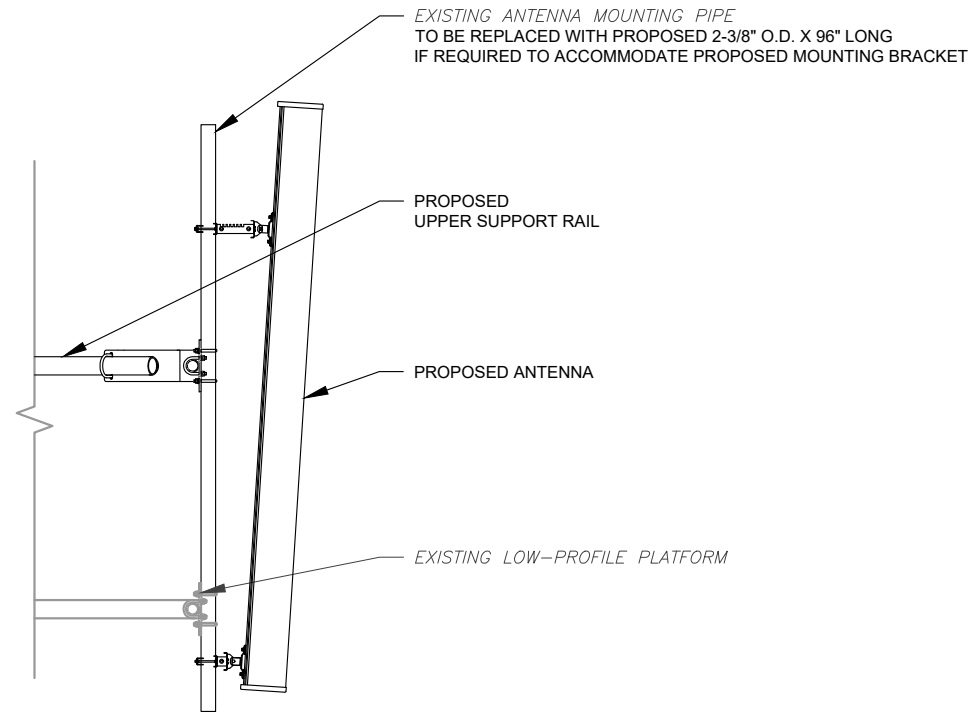
SEAL:

06/07/2022

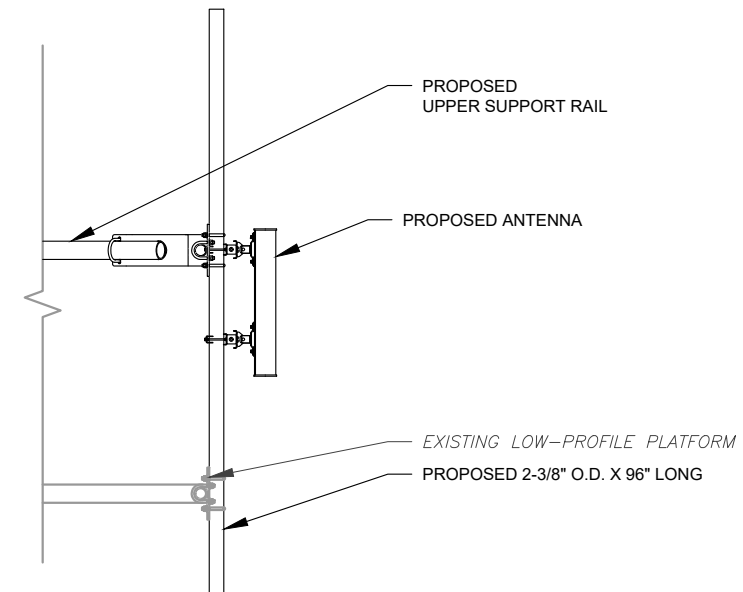
|              |                     |
|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**ANTENNA INFORMATION & SCHEDULE**

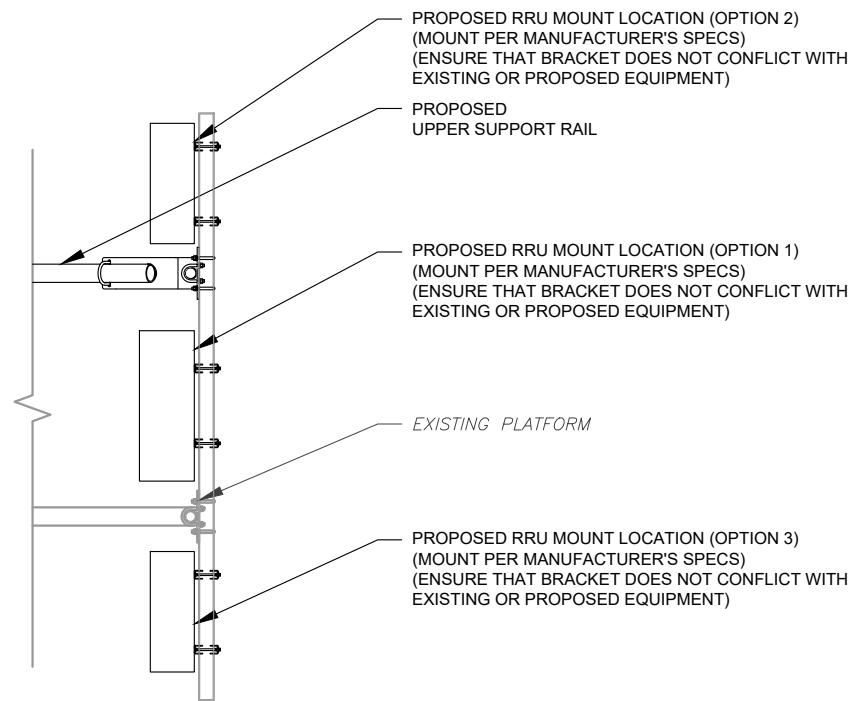
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| SHEET NUMBER: | REVISION: |
| <b>C-401</b>  | <b>2</b>  |



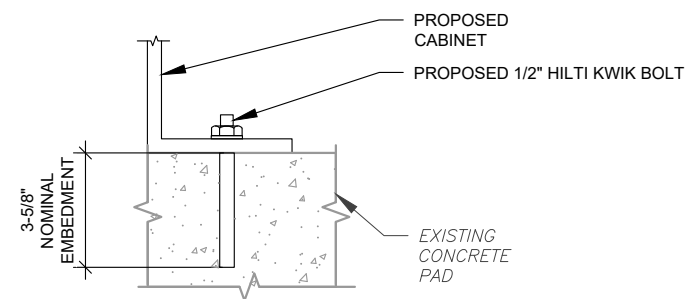
1 PROPOSED ANTENNA MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



2 PROPOSED 5G ANTENNA MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



3 PROPOSED RRU MOUNTING DETAIL - TYPICAL  
SCALE: N.T.S.



4 CABINET ATTACHMENT DETAIL  
SCALE: NOT TO SCALE

**NOTE:**  
INSTALL HILTI KWIK BOLT ANCHORS STRICTLY PER INSTALLATION INSTRUCTIONS INCLUDED WITH PRODUCT OR FOUND ONLINE AT WWW.US.HILTI.COM. PROPER INSTALLATION IS CRITICAL FOR FULL PERFORMANCE.



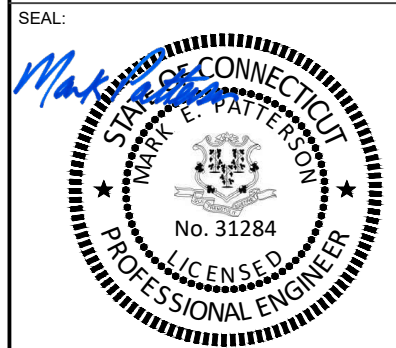
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|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
302472

ATC SITE NAME:  
ANDOVER-BUNKER HILL ROAD

T-MOBILE SITE NAME:  
SPECTRASITE ANDOVER

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301



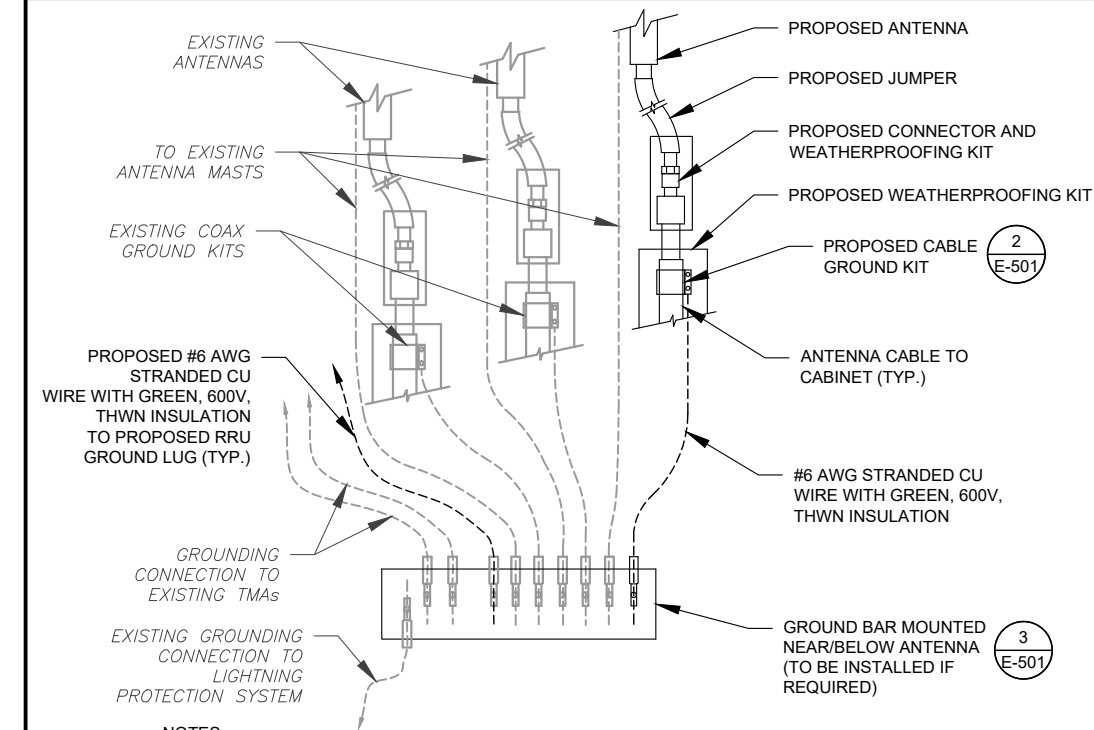
06/07/2022



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|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**CONSTRUCTION  
DETAILS**

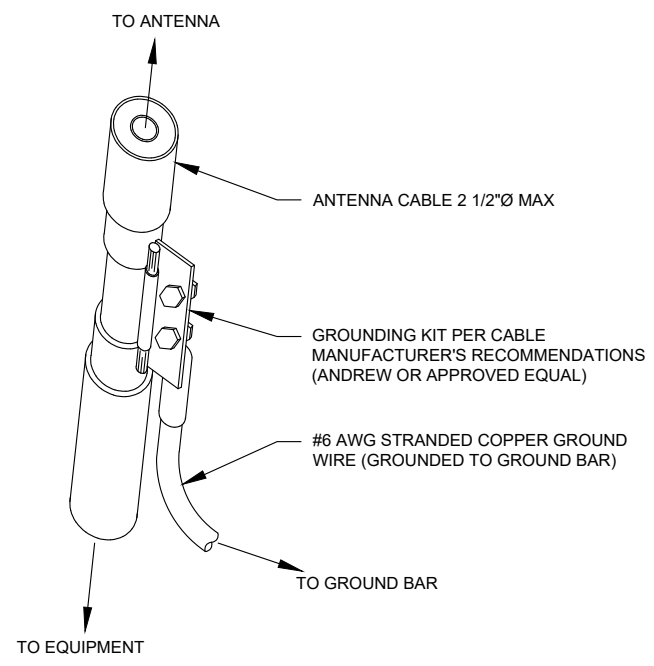
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| SHEET NUMBER: | REVISION: |
| <b>C-501</b>  | <b>2</b>  |



**NOTES:**

1. THIS DETAIL IS INTENDED TO SHOW THE GENERAL GROUNDING REQUIREMENTS. SLIGHT ADJUSTMENTS MAY BE REQUIRED BASED ON EXISTING SITE CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD ADJUSTMENTS AS NEEDED AND INFORM THE CONSTRUCTION MANAGER OF ANY CONFLICTS.
2. SITE GROUNDING SHALL COMPLY WITH T-MOBILE GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH T-MOBILE GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.

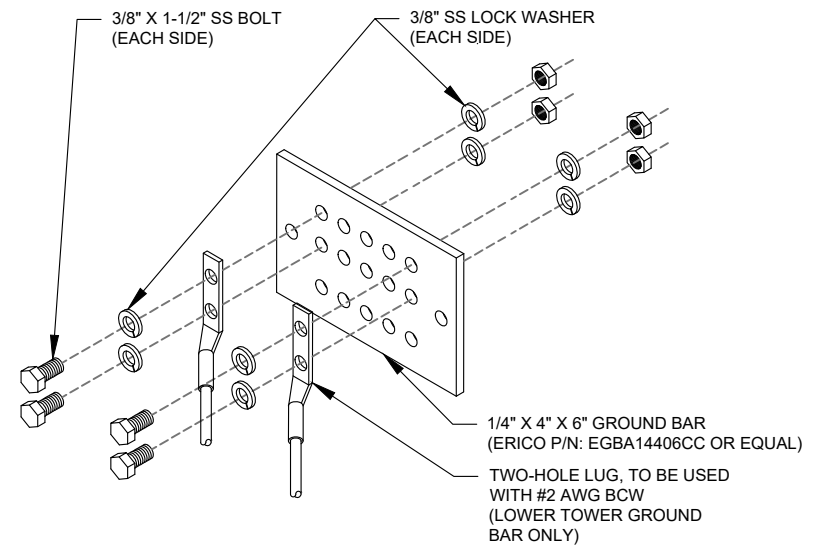
**1 TYPICAL ANTENNA GROUNDING DIAGRAM**  
SCALE: N.T.S.



**GROUND KIT NOTES:**

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. CONTRACTOR SHALL PROVIDE WEATHERPROOFING KIT (ANDREW PART NUMBER 221213) AND INSTALL/TAPE PER MANUFACTURER'S SPECIFICATIONS.

**2 CABLE GROUND KIT CONNECTION DETAIL**  
SCALE: N.T.S.



**GROUND BAR NOTES:**

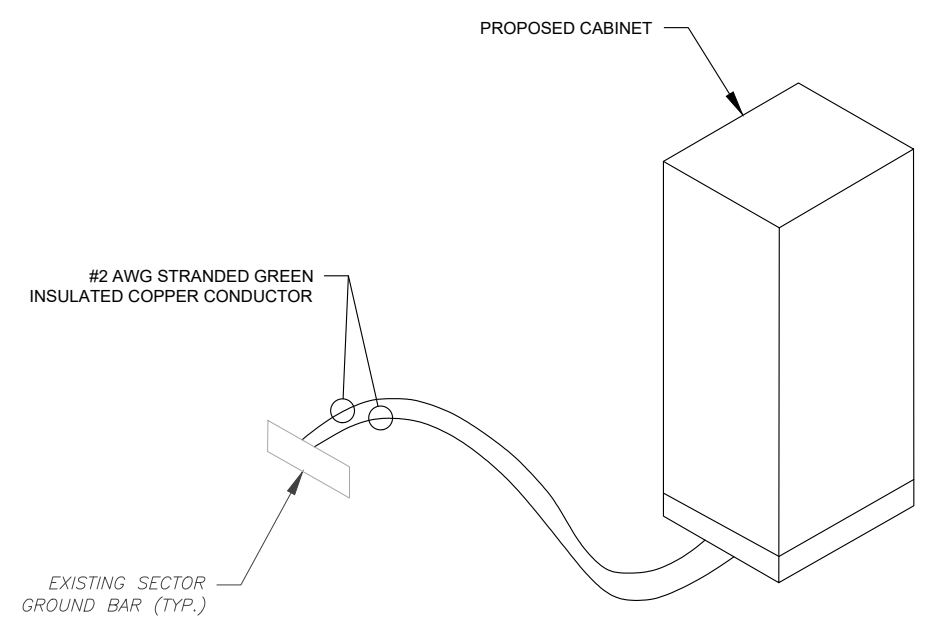
1. GROUND BAR KITS COME WITH ALL HARDWARE, NUTS, BOLTS, WASHERS, ETC. EXCEPT THE STRUCTURAL MOUNTING MEMBER(S).
2. GROUND BAR TO BE BONDED DIRECTLY TO TOWER.

**3 TOWER GROUND BAR DETAIL**  
SCALE: N.T.S.

**ELECTRICAL NOTES:**

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE T-MOBILE REPRESENTATIVE AND LOCAL UTILITY COMPANY FOR THE INSTALLATION OF CONDUITS, CONDUCTORS, BREAKERS, DISCONNECTS, OR ANY OTHER EQUIPMENT REQUIRED FOR ELECTRICAL SERVICE. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE STATE AND NATIONAL CODES, ORDINANCES AND REGULATIONS APPLICABLE TO THIS PROJECT.
2. ATC HAS NOT VERIFIED ANY EXISTING T-MOBILE GROUND EQUIPMENT OR ELECTRICAL LOADING. PROPOSED WORK BASED ON INSTALLATION CONFIGURATION PROVIDED BY T-MOBILE. CONTRACTOR TO VERIFY EXISTING T-MOBILE PANEL HAS SUFFICIENT SPACE FOR PROPOSED BREAKER, PROPOSED CABLE AND CONDUIT SHALL BE MINIMUM SIZE PER BELOW IN CHART.
3. FOR SPECIFIC CABINET / ANCILLARY EQUIPMENT WIRING REQUIREMENTS, THE T-MOBILE CONTRACTOR SHOULD REFERENCE DESIGN DOCUMENTS PROVIDED BY T-MOBILE FOR THIS CURRENT PROJECT CONFIGURATION, IN ACCORDANCE WITH LOCAL JURISDICTION REQUIREMENTS & NEC STANDARDS & PRACTICES.

| OCPD SIZE | WIRE SIZE | GROUND SIZE | CONDUIT SIZE |
|-----------|-----------|-------------|--------------|
| 80A/2P    | 2#3 AWG   | #8 AWG      | 1-1/4"       |
| 100/2P    | 2#2 AWG   | #8 AWG      | 1-1/4"       |
| 125A/2P   | 2#1 AWG   | #8 AWG      | 1-1/2"       |
| 150A/2P   | 2#1/0 AWG | #8 AWG      | 1-1/2"       |



**4 CABINET GROUNDING DETAIL**  
SCALE: N.T.S.



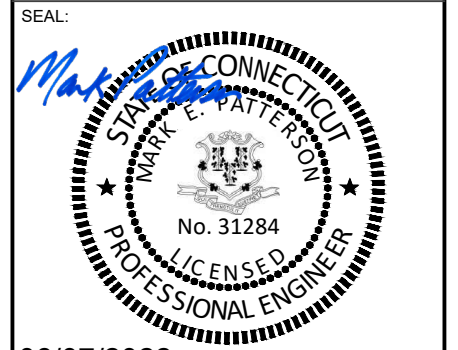
| REV. | DESCRIPTION      | BY  | DATE     |
|------|------------------|-----|----------|
| 0    | FOR CONSTRUCTION | AJ  | 02/08/22 |
| 2    | FOR CONSTRUCTION | ADE | 06/07/22 |
|      |                  |     |          |
|      |                  |     |          |
|      |                  |     |          |

ATC SITE NUMBER:  
**302472**

ATC SITE NAME:  
**ANDOVER-BUNKER HILL ROAD**

T-MOBILE SITE NAME:  
**SPECTRASITE ANDOVER**

SITE ADDRESS:  
104 BUNKER HILL ROAD  
ANDOVER, CT 06232-1301



06/07/2022



|              |                     |
|--------------|---------------------|
| DATE DRAWN:  | 02/08/22            |
| ATC JOB NO:  | 13764996            |
| CUSTOMER ID: | SPECTRASITE ANDOVER |
| CUSTOMER #:  | CT11502A            |

**GROUNDING DETAILS**

|               |           |
|---------------|-----------|
| SHEET NUMBER: | REVISION: |
| <b>E-501</b>  | <b>2</b>  |

Existing Template: 67D94E\_1DP+1OP  
 Proposed Template: 67D5998E\_1xAIR+1OP

| Sector 1 (Existing) view from behind |                                   |  |  |   |    |
|--------------------------------------|-----------------------------------|--|--|---|----|
| Coverage Type                        | A - Outdoor Macro                 |  |  |   |    |
| Antenna                              | 1                                 |  | 2  |   |    |
| Antenna Model                        | RFS - APXVAARR24_43-U-NA20 (Octo) |  | EMS - RR90-17-XXDP (Dual)                          |   |    |
| Azimuth                              | 60                                |  | 60   |   |    |
| M. Tilt                              | 0                                 |  | 0  |   |    |
| Height                               | 148                               |  | 148  |   |    |
| Ports                                | P1                                | P2                                     | P3   | P4  | P5 |
| Active Tech.                         | L700 L600<br>N600                 | L700 L600<br>N600                      | L1900 G1900  | L2100   |    |
| Dark Tech.                           |                                   |  |  |   |    |
| Restricted Tech.                     |                                   |  |  |   |    |
| Decomm. Tech.                        |                                   |  |  |   |    |
| E. Tilt                              | 2                                 | 2                                      | 2  | 2   |    |
| Cables                               | Coax Jumper (x2)                  | Coax Jumper (x2)                       | 1-5/8" Coax - 160 ft. (x2)                         | 1-5/8" Coax - 160 ft. (x2)                          |    |
| TMA's                                |                                   |  | Ericsson Twin Style 1A - KRY 112 489/2 (AtAntenna) | Ericsson Twin Style 1BX - KRY 112 144/2 (AtAntenna) |    |
| Diplexers / Combiners                |                                   |  |  |   |    |
| Radio                                | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) |  | Radio 4415 B66A (At Cabinet)                        |    |

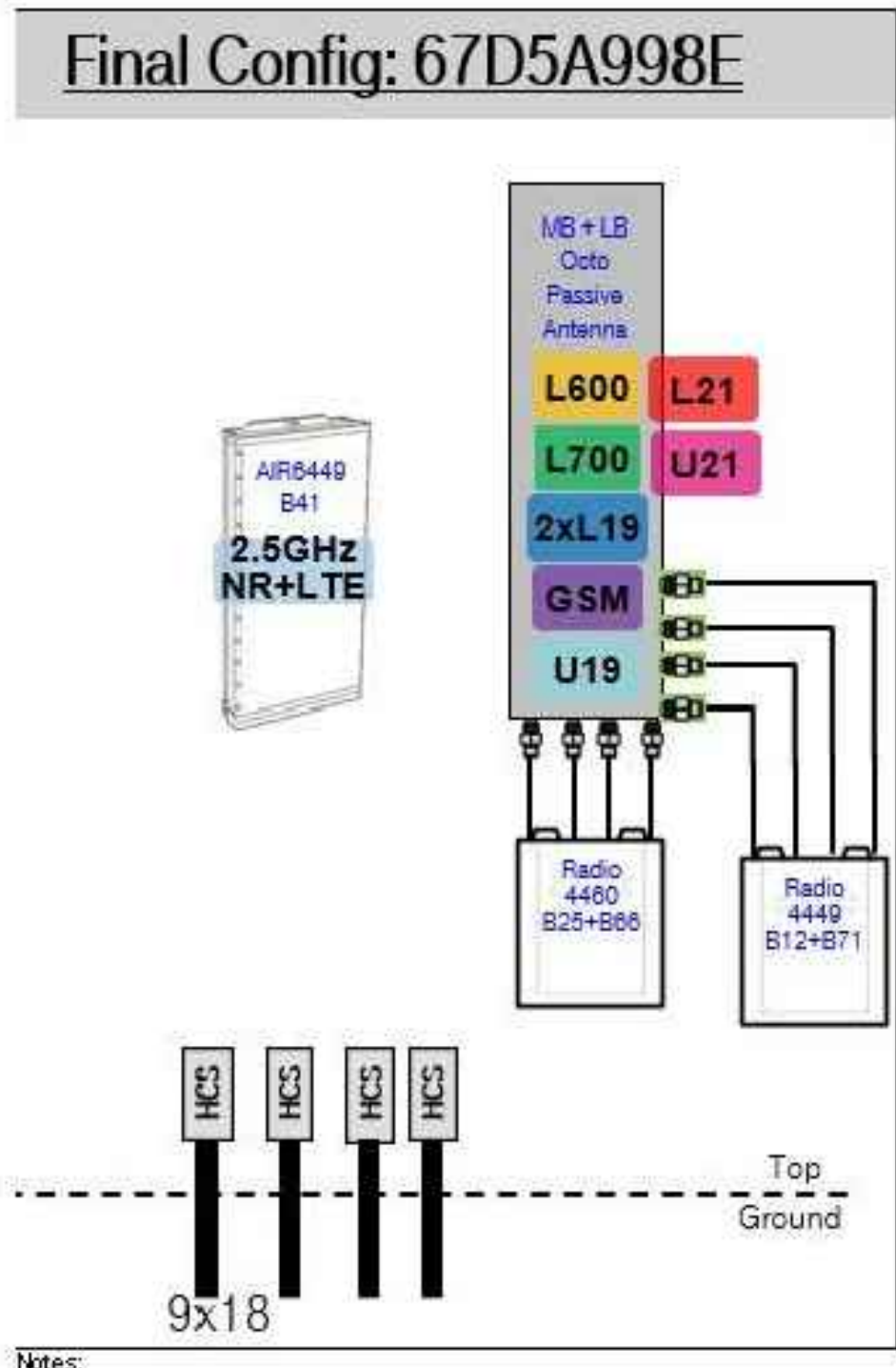
Unconnected Equipment:

Scope of Work:

Replace LB Dual in Position 1 with (1) LB/MB Octo.  
 Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.  
 Move Coaxial Lines and PCS TMA in Position 2 to Mid-Band Ports of LB/MB Octo in Position 1.  
 Add (1) AWS TMA to Position 1. Connect Coaxial Lines and AWS TMA in Position 1 to Mid-Band Ports of LB/MB Octo.  
 Remove Bias T.

\*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

1 CABINET CONFIGURATION  
 SCALE: NOT TO SCALE



Notes:

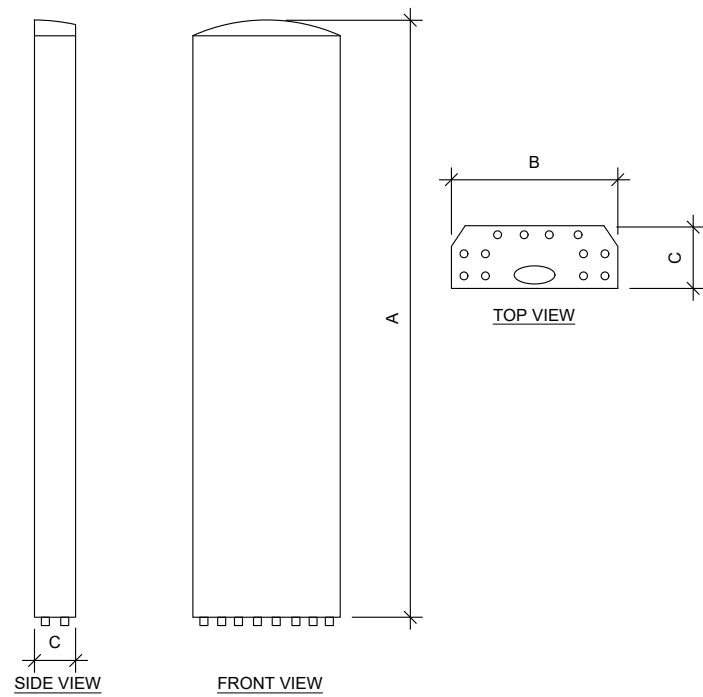
2 ANTENNA CONFIGURATION  
 SCALE: NOT TO SCALE

SUPPLEMENTAL

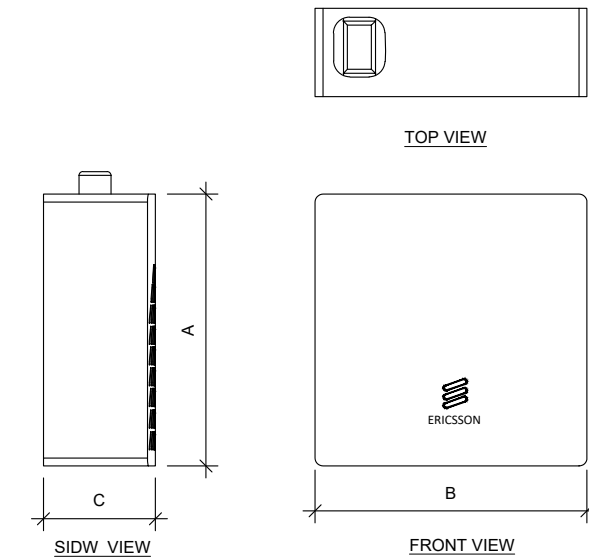
SHEET NUMBER: R-601  
 REVISION: 2

NOTE: THIS SHEET CREATED BY OTHERS AND PROVIDED BY REQUEST OF CUSTOMER WITHOUT EDIT.





| ANTENNA SPECIFICATIONS |       |       |      |              |
|------------------------|-------|-------|------|--------------|
| ANTENNA MODEL          | A     | B     | C    | WEIGHT (LBS) |
| AIR6449 B41            | 33.1" | 20.6" | 8.6" | 104.0        |



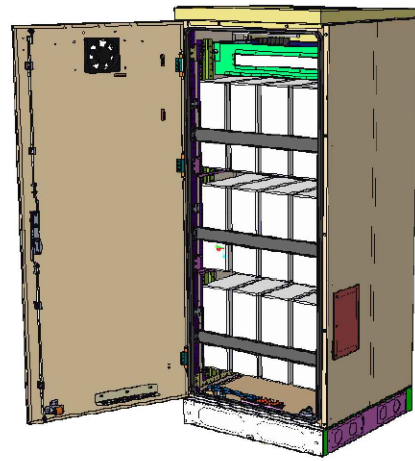
| RRU SPECIFICATIONS |       |       |       |              |
|--------------------|-------|-------|-------|--------------|
| RRU MODEL          | A     | B     | C     | WEIGHT (LBS) |
| RADIO 4460 B25+B66 | 19.6" | 15.7" | 12.1" | 109.0        |

1 EQUIPMENT DETAILS  
SCALE: NOT TO SCALE

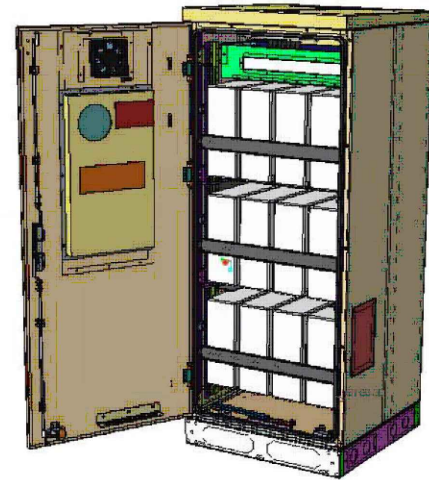
SUPPLEMENTAL

|                               |                       |
|-------------------------------|-----------------------|
| SHEET NUMBER:<br><b>R-602</b> | REVISION:<br><b>2</b> |
|-------------------------------|-----------------------|

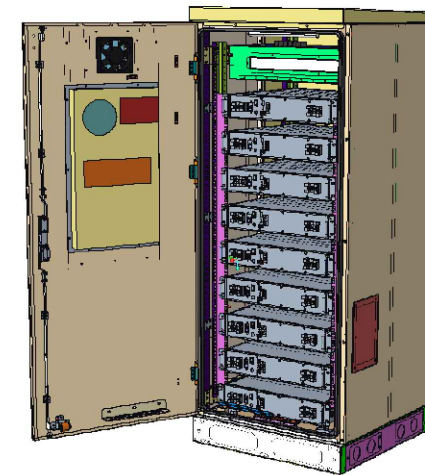
## Enclosure B160



Enclosure B160  
AirCon + VRLA



Enclosure B160  
AirCon + Li-Ion



Enclosure B160  
Convection Cooling  
+ VRLA

PA1 | 2019-02-03 | Ericsson Confidential | Page 1

## Enclosure B160

### Capacity

- VRLA 12V: 100Ah / 150Ah / 170Ah / 190Ah / 210Ah
- Li-Ion: 24U 19" / 23"
- Sodium-Nickel: 3x FIAMM

### Electrical specification

- DC Output: -48VDC/200A
- Battery breakers: 2x 125/2p
- Alarms: Door open, Climate failure, MCB Connection

### Mechanical specification

- Weight: 134kg
- Dimensions: 63 x 26 x 26 in. (incl. Base frame)
- Base frame height: 6 in.
- Material: Galvanized steel (180g/m<sup>2</sup>)
- Color: Powder paint NCS 2002-B
- Door: Front access
- Locking type: Pad lock / cylinder

### Environmental specification

- Ingress protection: VRLA/Sodium IP44  
Li-Ion IP55
  - Relative humidity: 15-100%
- ### Climate system
- Air Conditioner
  - Fan type: DC
  - Cooling capacity: 500W @L35/L35
  - Convection cooling
  - Emergency fan

PA1 | 2019-02-03 | Ericsson Confidential | Page 2

SUPPLEMENTAL

SHEET NUMBER:

R-603

REVISION:

2

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# Enclosure 6160 AC

The Enclosure 6160 is a multi-purpose site cabinet designed to support a multitude of equipment such as ERS Baseband, Transport, Li-Ion battery and 3PP vendor equipment. It also provides a highly capable power system and battery back-up - all in a streamlined design and minimized footprint to support cost efficient expansion of mobile broadband.

Being an all-in-one enclosure, the Enclosure 6160 is a very fitting choice for all types of sites where the capacity need is large or room for future expansion is needed. It is ideally used for modernizing existing sites or in greenfield scenarios to match both current and future needs.

With a robust design, IP65 compliance and a sealed Heat Exchanger (HEX) climate system the Enclosure 6160 ensures optimal environmental protection of the active equipment - enabling them for a long-lasting service. The complete system is also integrated and verified for the entire Ericsson Radio System and ensures best-in-class service.

The power system offers 31,5kW of power in total and provides 24kW of -48V DC power for both internal and external consumers.

The equipment space allows 19U of rack space ensuring well enough capacity for existing need and future expansion.

One of the main advantages of the Enclosure 6160 is its default integration with ENM - allowing for advanced remote monitoring and control such a fault management (alarms), inventory management and performance measurements. The cabinet also provides an open O&M interface for integration to 3PP O&M systems.



## Preliminary technical specification for Enclosure 6160 AC

### CAPACITY

|                           |  |
|---------------------------|--|
| Rack space user equipment | 19U (19" rack)   |
| Hardware capabilities     | Power and CPRI support for multi-standard remote radios (RRU or AIR)<br>ERS Baseband and Transport units<br>Li-Ion batteries<br>3PP equipment<br>Additional power feed available as option |

### MECHANICAL SPECIFICATION

|                       |   |
|-----------------------|---|
| Weight                | 145 kg (excluding active equipment)<br>320 lbs (excluding active equipment)   |
| Dimension (H x W x D) | 1600 x 650 x 650 mm (incl. Base frame)<br>63 x 26 x 26 in. (incl. Base frame) |
| Base frame height     | 150 mm<br>6 in.   |
| Mounting position     | Ground  |
| Enclosure material    | Aluminum  |
| Color                 | Power paint NCS 2002-B  |
| Door                  | Front access  |
| Rack type             | 19" (IEC 60297-3-100)   |
| Locking type          | Pad lock or Cylinder  |

### POWER SYSTEM

|                                |  |
|--------------------------------|--|
| Input voltage                  | 3P+N+PE: 346/200-415/240 VAC<br>2P+N+PE: 208/120-220/127 VAC<br>1P+N+PE: 200-250 VAC |
| Input power                    | <33kW  |
| Output load (-48VDC)           | 24kW   |
| Total capacity (-48VDC)        | 31.5kW   |
| AC SPD                         | Class 2/Type 2   |
| DC SPD                         | Class 2/Type 2   |
| PSU Slots                      | 9x   |
| Service outlet                 | Optional   |
| Priority load                  | 8x Circuit Breaker   |
| LLVD 1                         | 6x Circuit Breaker   |
| LLVD 2                         | 6x Circuit Breaker   |
| CB ratings                     | 3A / 5A / 10A / 15A / 20A / 25A / 30A / 40A / 50A / 60A / 80A / 100A                 |
| Battery Interface              | 2x Circuit Breaker   |
| Battery Circuit Breaker rating | 125A 2pol (200A)   |
| PSU capacity                   | 3500W  |

SUPPLEMENTAL

SHEET NUMBER:  
**R-604**

REVISION:  
**2**

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Eng. Number 13764996\_C8\_01  
January 10, 2022  
Page 1

## Mount Analysis Report

**ATC Site Name** : Andover-bunker Hill Road, CT  
**ATC Site Number** : 302472  
**Engineering Number** : 13764996\_C8\_01  
**Mount Elevation** : 148 ft  
**Carrier** : T-Mobile  
**Carrier Site Name** : SpectraSite Andover  
**Carrier Site Number** : CT11502A  
**Site Location** : 104 Bunker Hill Road  
 Andover, CT 06232-1301  
 41.73779302 , -72.34984685  
**County** : Tolland  
**Date** : January 10, 2022  
**Max Usage** : 85%  
**Result** : Contingent Pass

Prepared By:  
Max Carter  
Structural Engineer I

Reviewed By:



COA: PEC.0001553

### Introduction

The purpose of this report is to summarize results of the mount analysis performed for T-Mobile at 148 ft.

### Supporting Documents

|                            |  |
|----------------------------|--|
| Specifications Sheet       | Site Pro 1 RMQP-3xx, dated July 7, 2015    |
| Radio Frequency Data Sheet | RFDS ID #CT11502A, dated December 14, 2021 |
| Reference Photos           | Site photos from 2018                      |

### Analysis

This mount was analyzed using American Tower Corporation's Mount Analysis Program and RISA-3D.

|                               |  |
|-------------------------------|--|
| Basic Wind Speed:             | 119 mph (3-Second Gust)                                |
| Basic Wind Speed w/ Ice:      | 50 mph (3-Second Gust) w/ 1 1/2" radial ice concurrent |
| Codes:                        | ANSI/TIA-222-H   |
| Exposure Category:            | B  |
| Risk Category:                | II   |
| Topographic Factor Procedure: | Method 2   |
| Feature:                      | Hill   |
| Crest Height (H):             | 344 ft   |
| Crest Length (L):             | 2786 ft  |
| Spectral Response:            | Ss = 0.193, S1 = 0.055                                 |
| Site Class:                   | D - Stiff Soil   |
| Live Loads:                   | Lm = 500 lbs   |

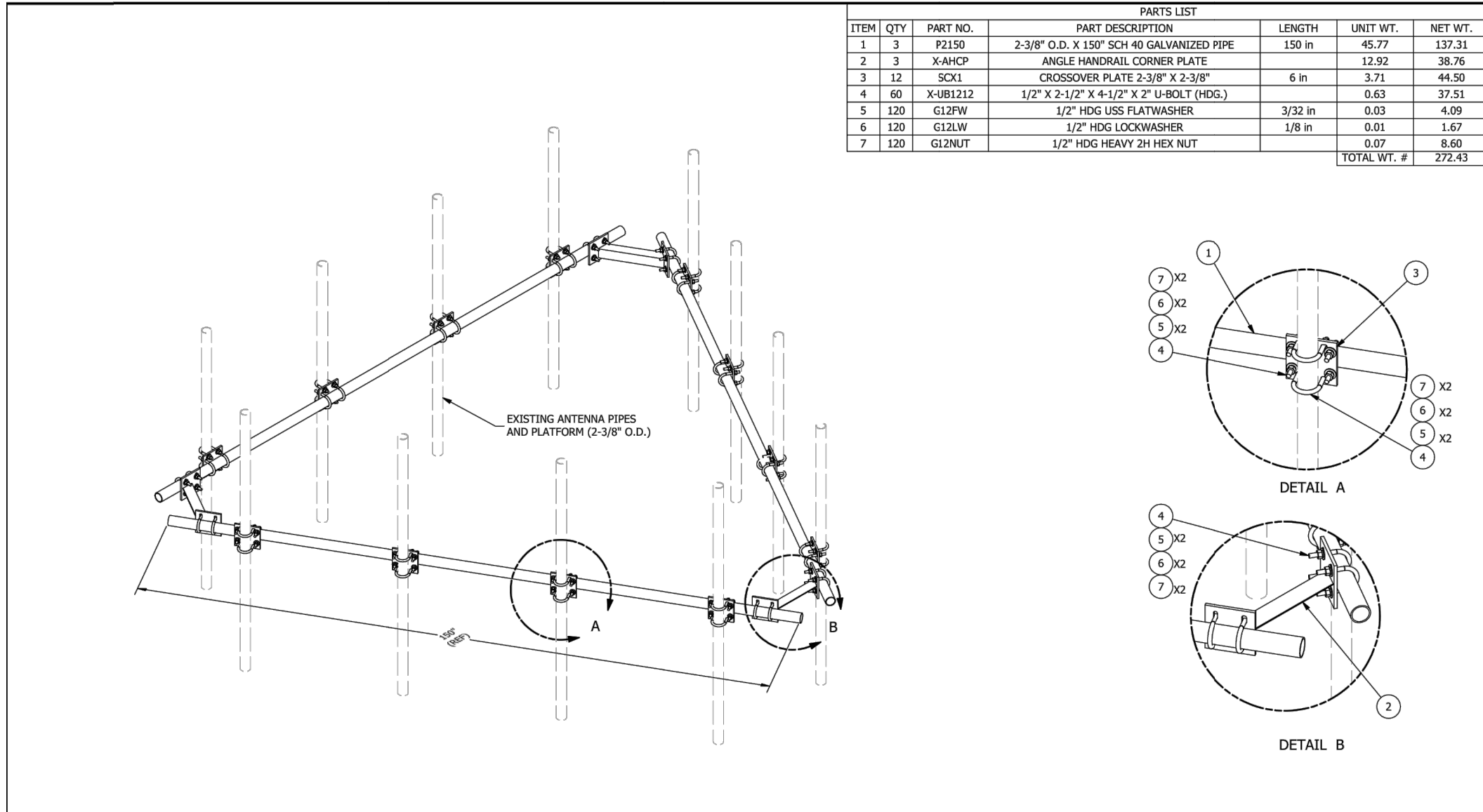
\* Based on experience, it has been determined that the Lr load cases will not control over Lm load cases in platform mount analyses. Therefore, these load cases have been excluded from this analysis.

### Conclusion

Based on the analysis results, the antenna mount meets the requirements per the applicable codes listed above provided the modifications listed below are completed:

- Install Site Pro 1 HRK12 handrail reinforcement kit (or similar) approximately 36" above existing platform as requested by T-MOBILE.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



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

|   |  |   |  |  |  |
|---|--|---|--|--|--|
| <b>TOLERANCE NOTES</b><br>TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:<br>SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )<br>DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES<br>LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES<br>BENDS ARE $\pm 1/2$ DEGREE<br>ALL OTHER MACHINING ( $\pm 0.030"$ )<br>ALL OTHER ASSEMBLY ( $\pm 0.060"$ ) |  | DESCRIPTION<br><b>HANDRAIL KIT FOR 12'-6" FACE</b>  |  | Locations:<br>New York, NY<br>Atlanta, GA<br>Los Angeles, CA<br>Plymouth, IN<br>Salem, OR<br>Dallas, TX<br>Engineering Support Team:<br>1-888-753-7446 |  |
| CPD NO. KC8<br>DRAWN BY 5/30/2012<br>CLASS 81 SUB 01<br>DRAWING USAGE CUSTOMER  |  | ENG. APPROVAL<br>CHECKED BY BMC<br>DATE 7/13/2014   |  | PART NO. HRK12<br>DWG. NO. HRK12   |  |
| REVISION HISTORY<br>A REPLACED HCP WITH X-AHCP<br>CEK 7/10/2014   |  | PROPRIETARY NOTE:<br>THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED. |  | PAGE 1 OF 1  |  |



**AMERICAN TOWER®**  
CORPORATION

---

## Mount Analysis Report

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41.73779302 , -72.34984685  
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**Date** : January 10, 2022  
**Max Usage** : 85%  
**Result** : Contingent Pass

Prepared By:  
Max Carter  
Structural Engineer I

*Max Carter*

Reviewed By:



Authorized by "EOR"  
10 Jan 2022 10:14:42

**cosign**

**COA: PEC.0001553**



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Introduction ..... 1

Supporting Documents ..... 1

Analysis ..... 1

Conclusion ..... 1

Application Loading ..... 2

Structure Usages ..... 2

Mount Layout ..... 3

Equipment Layout ..... 4

Standard Conditions ..... 6

Calculations ..... Attached



## Introduction

The purpose of this report is to summarize results of the mount analysis performed for T-Mobile at 148 ft.

## Supporting Documents

|                                   |  |
|-----------------------------------|--|
| <b>Specifications Sheet</b>       | Site Pro 1 RMQP-3xx, dated July 7, 2015    |
| <b>Radio Frequency Data Sheet</b> | RFDS ID #CT11502A, dated December 14, 2021 |
| <b>Reference Photos</b>           | Site photos from 2018                      |

## Analysis

This mount was analyzed using American Tower Corporation's Mount Analysis Program and RISA-3D

|                                      |  |
|--------------------------------------|--|
| <b>Basic Wind Speed:</b>             | 119 mph (3-Second Gust)                                |
| <b>Basic Wind Speed w/ Ice:</b>      | 50 mph (3-Second Gust) w/ 1 1/2" radial ice concurrent |
| <b>Codes:</b>                        | ANSI/TIA-222-H   |
| <b>Exposure Category:</b>            | B  |
| <b>Risk Category:</b>                | II   |
| <b>Topographic Factor Procedure:</b> | Method 2   |
| <b>Feature:</b>                      | Hill   |
| <b>Crest Height (H):</b>             | 344 ft   |
| <b>Crest Length (L):</b>             | 2786 ft  |
| <b>Spectral Response:</b>            | Ss = 0.193, S1 = 0.055                                 |
| <b>Site Class:</b>                   | D - Stiff Soil   |
| <b>Live Loads:</b>                   | Lm = 500 lbs   |

\* Based on experience, it has been determined that the Lv load cases will not control over Lm load cases in platform mount analyses. Therefore, these load cases have been excluded from this analysis.

## Conclusion

Based on the analysis results, the antenna mount meets the requirements per the applicable codes listed above provided the modifications listed below are completed:

- Install Site Pro 1 HRK12 handrail reinforcement kit (or similar) approximately 36" above existing platform as requested by T-MOBILE.

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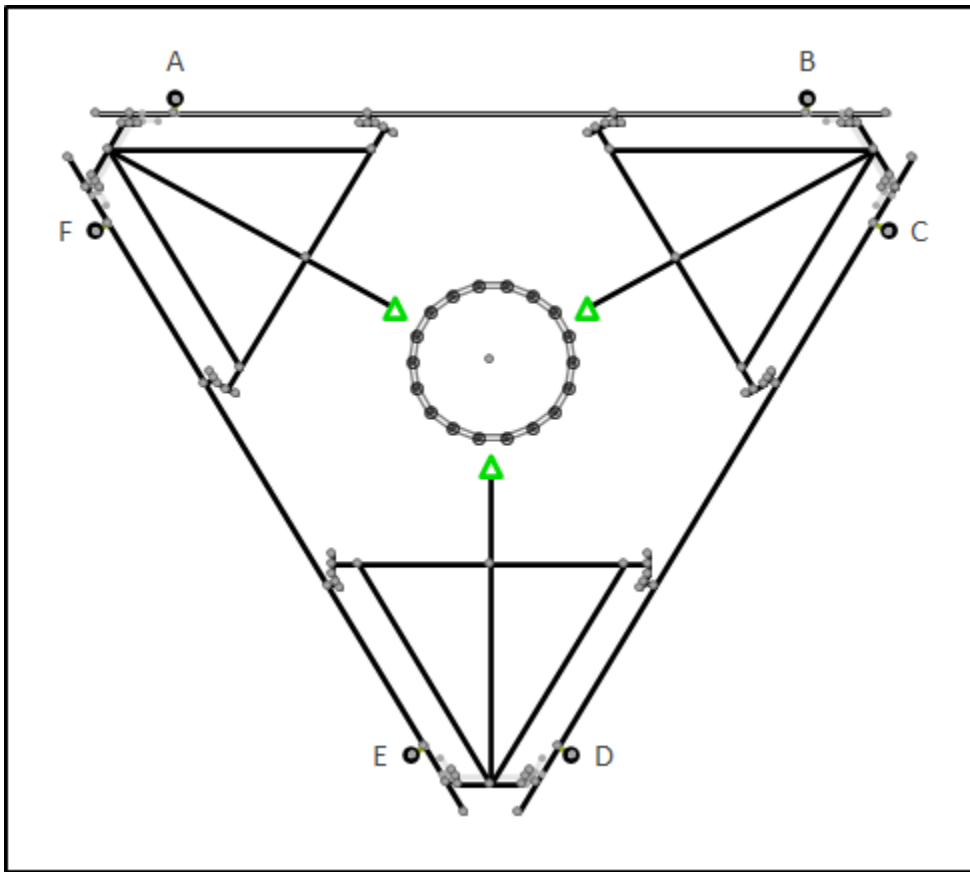
**Application Loading**

| Mount Centerline (ft) | Equipment Centerline (ft) | Qty | Equipment Manufacturer & Model |
|-----------------------|---------------------------|-----|--------------------------------|
| 148.0                 | 148.0                     | 3   | Ericsson Air6449 B41           |
|                       |                           | 3   | RFS APXVAARR24_43-U-NA20       |
|                       |                           | 3   | Ericsson Radio 4449 B12,B71    |
|                       |                           | 3   | Ericsson 4460 BAND 2/25        |

**Structure Usages**

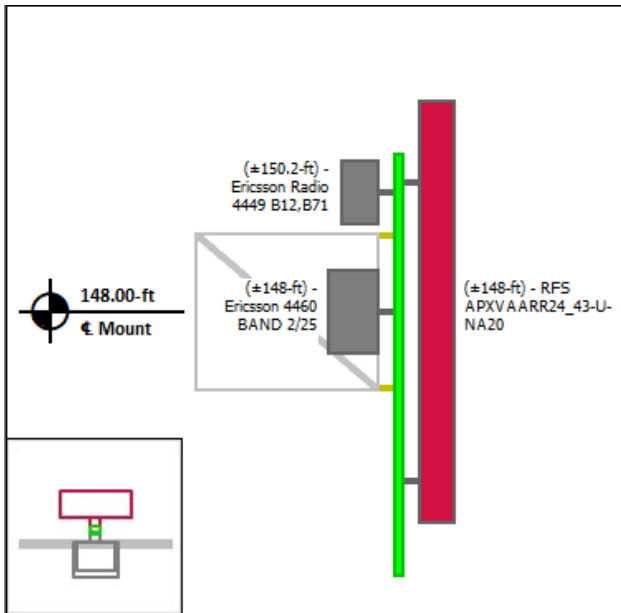
| Structural Component | Controlling Usage | Pass/Fail |
|----------------------|-------------------|-----------|
| Horizontals          | 85%               | Pass      |
| Mount Pipes          | 65%               | Pass      |
| Connection Check     | 62%               | Pass      |

**Mount Layout**

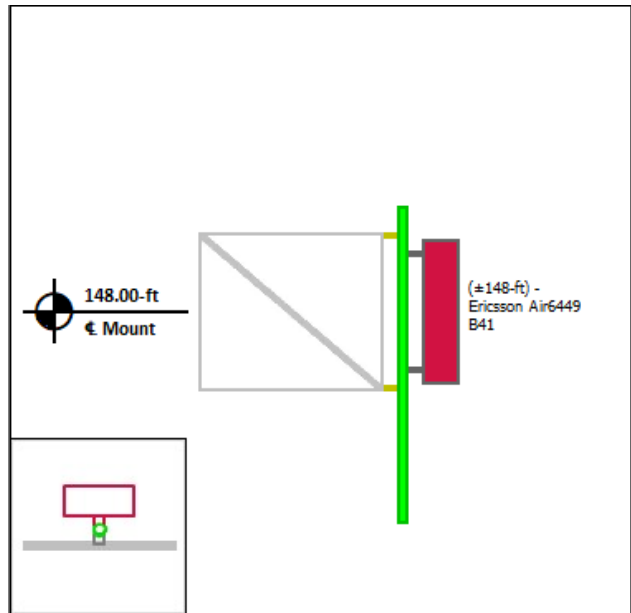


**Equipment Layout**

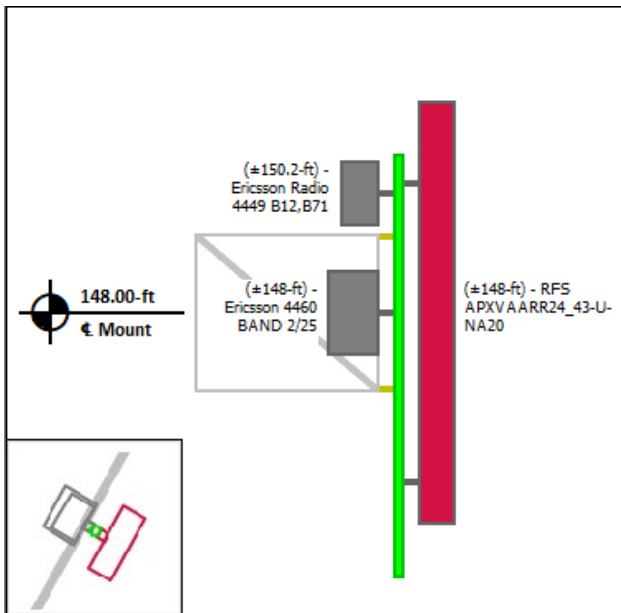
**Mount Pipe A**



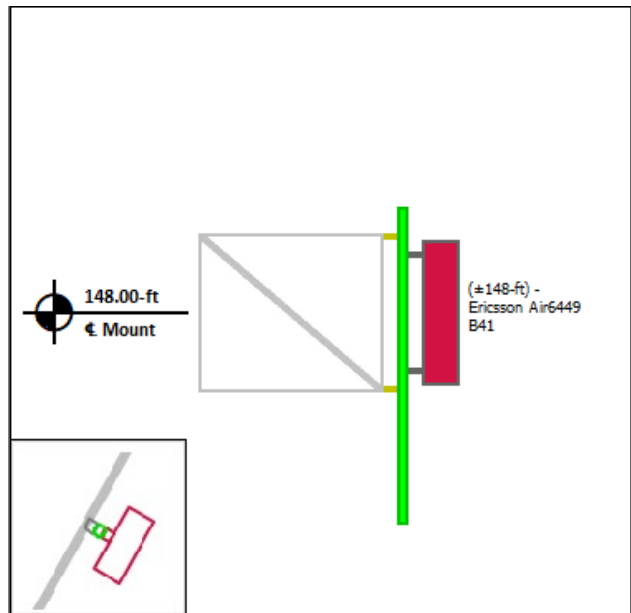
**Mount Pipe B**



**Mount Pipe C**

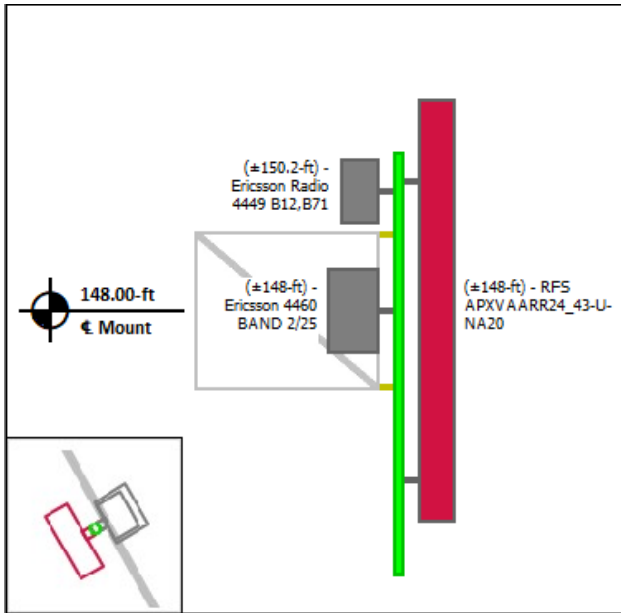


**Mount Pipe D**

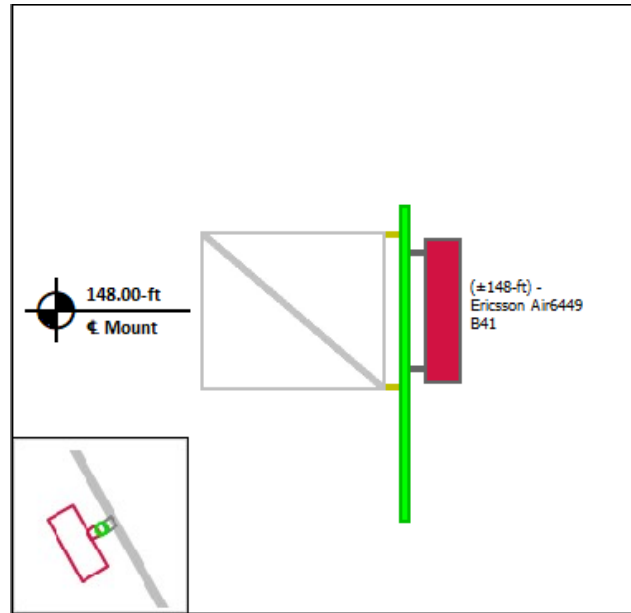


**Equipment Layout Cont'd.**

**Mount Pipe E**



**Mount Pipe F**



### **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding equipment, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

All connections are to be verified for condition and tightness by the installation contractor preceding any changes to the appurtenance mounting system and/or equipment attached to it.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

Installation of all equipment and steel should be confirmed not to cause tower conflicts nor impede the tower climbing pegs.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.



Site Number: 302472  
 Project Number: 13764996\_C8\_01  
 Carrier: T-Mobile  
 Mount Elevation: 148 ft  
 Date: 1/10/2022

## Mount Analysis Force Calculations

| Wind & Ice Load Calculations      |          |      |     |
|-----------------------------------|----------|------|-----|
| Velocity Pressure Coefficient     | $K_z$    | 1.11 |     |
| Topographic Factor                | $K_{zt}$ | 1.25 |     |
| Rooftop Wind Speed-up Factor      | $K_s$    | 1.00 |     |
| Shielding Factor                  | $K_a$    | 0.90 |     |
| Ground Elevation Factor           | $K_e$    | 0.98 |     |
| Wind Direction Probability Factor | $K_d$    | 0.95 |     |
| Basic Wind Speed                  | $V$      | 119  | mph |
| Velocity Pressure                 | $q_z$    | 46.7 | psf |
| Height Escalation Factor          | $K_{iz}$ | 1.16 |     |
| Thickness of Radial Glaze Ice     | $T_{iz}$ | 1.89 | in  |

| Seismic Load Calculations         |          |        |     |
|-----------------------------------|----------|--------|-----|
| Short Period DSRAP                | $S_{D5}$ | 0.206  |     |
| 1 Second DSRAP                    | $S_{D1}$ | 0.088  |     |
| Importance Factor                 | $I$      | 1.0    |     |
| Response Modification Coefficient | $R$      | 2.0    |     |
| Seismic Response Coefficient      | $C_s$    | 0.103  |     |
| Amplification Factor              | $A$      | 1.0    |     |
| Total Weight                      | $W$      | 2407.3 | lbs |
| Total Shear Force                 | $V_s$    | 247.8  | lbs |
| Horizontal Seismic Load           | $E_h$    | 247.8  | lbs |
| Vertical Seismic Load             | $E_v$    | 99.1   | lbs |

| Antenna Calculations (Elevations per Application/RFDS)* |        |       |       |        |         |         |            |            |
|---|--------|-------|-------|--------|---------|---------|------------|------------|
| Equipment   | Height | Width | Depth | Weight | $EPA_N$ | $EPA_T$ | $EPA_{Ni}$ | $EPA_{Ti}$ |
| Model #   | in     | in    | in    | lbs    | sqft    | sqft    | sqft       | sqft       |
| Ericsson Air6449 B41                                    | 33.1   | 20.6  | 8.6   | 104.0  | 5.68    | 1.56    | 7.49       | 2.50       |
| RFS APXVAARR24_43-U-NA20                                | 95.9   | 24.0  | 8.7   | 127.9  | 20.24   | 3.48    | 24.34      | 5.18       |
| Ericsson Radio 4449 B12,B71                             | 14.9   | 13.2  | 9.3   | 74.0   | 1.64    | 1.15    | 2.64       | 2.03       |
| Ericsson 4460 BAND 2/25                                 | 19.6   | 15.7  | 12.1  | 109.0  | 2.56    | 1.98    | 3.79       | 3.09       |

\* Equipment with EPA values N/A were not considered in the mount analysis

## Mount-to-Tower Connection Analysis

### Applied Loads from RISA 3D

|                              |                |        |       |
|------------------------------|----------------|--------|-------|
| Controlling Load Combination |                | 26     |       |
| Node Label                   |                | N002   |       |
| Force in X                   | F <sub>x</sub> | -8.1   | lbs   |
| Force in Y                   | F <sub>y</sub> | 2688.5 | lbs   |
| Force in Z                   | F <sub>z</sub> | 659.5  | lbs   |
| Moment about X               | M <sub>x</sub> | 7894.8 | lb-ft |
| Moment about Y               | M <sub>y</sub> | 4.1    | lb-ft |
| Moment about Z               | M <sub>z</sub> | 342.6  | lb-ft |

### Bolt Shear and Tensile Capacity

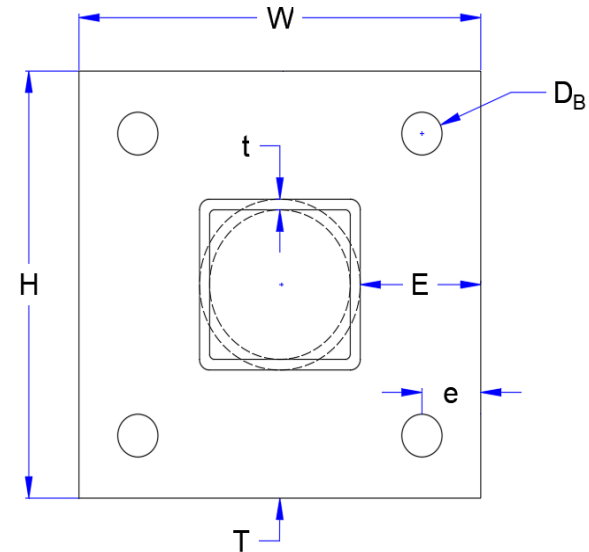
|                      |   |      |      |
|----------------------|---|------|------|
| Bolt Quantity        | n   | 4    |      |
| Bolt Diameter        | D <sub>B</sub>                                    | 5/8  | in   |
| Bolt Edge Distance   | e   | 1    | in   |
| Bolt Grade           |   | A325 |      |
| Bolt F <sub>y</sub>  | F <sub>yB</sub>                                   | 92   | ksi  |
| Bolt F <sub>u</sub>  | F <sub>uB</sub>                                   | 120  | ksi  |
| Applied Shear        | V <sub>u</sub>                                    | 0.73 | k    |
| Applied Tension      | T <sub>u</sub>                                    | 8.06 | k    |
| Tensile Strength     | φT <sub>n</sub>                                   | 20.3 | k    |
| Interaction Capacity | (T <sub>u</sub> +V <sub>u</sub> )/φT <sub>n</sub> | 43%  | Pass |

### Plate Flexural Capacity

|                      |                                 |      |      |
|----------------------|---------------------------------|------|------|
| Plate Height         | H                               | 8    | in   |
| Plate Width          | W                               | 8    | in   |
| Plate Thickness      | T                               | 1/2  | in   |
| Plate Grade          |                                 | A36  |      |
| Plate F <sub>y</sub> | F <sub>yP</sub>                 | 36   | ksi  |
| Plate F <sub>u</sub> | F <sub>uP</sub>                 | 58   | ksi  |
| Shear Capacity       | φV <sub>n</sub>                 | 26.9 | k    |
| Applied Moment       | M <sub>u</sub>                  | 16.1 | k-in |
| Flexural Strength    | φM <sub>n</sub>                 | 26.1 | k-in |
| Flexural Capacity    | M <sub>u</sub> /φM <sub>n</sub> | 62%  | Pass |

### Prying Action Considerations

|                         |    |      |    |
|-------------------------|----|------|----|
| Moment Arm              | b  | 1.00 | in |
| Effective Moment Arm    | b' | 0.69 | in |
| Tributary Length        | ρ  | 2.75 | in |
| Effective Edge Distance | a' | 1.31 | in |

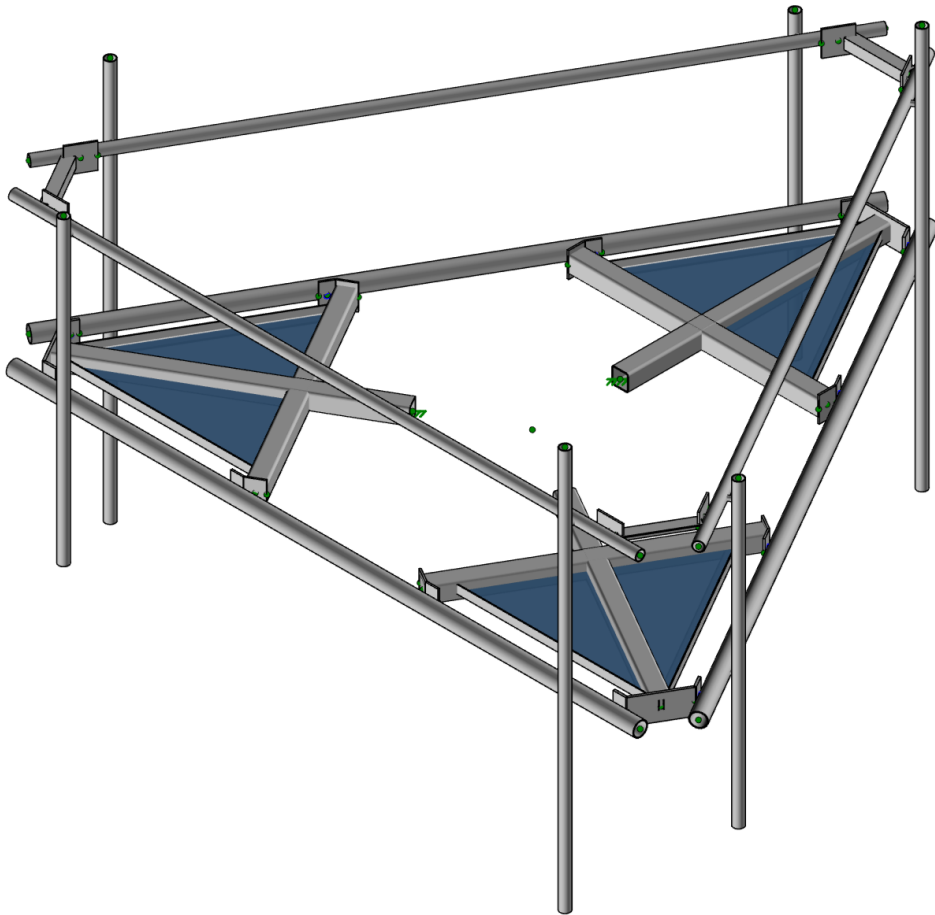
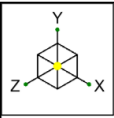


### Weld and Base Metal Capacity

|                       |                                 |           |
|-----------------------|---------------------------------|-----------|
| Standoff Type         |                                 | Tube      |
| Standoff Member       |                                 | HSS4x4x4  |
| Member Edge Distance  | E                               | 2 in      |
| Member Width          | w                               | 4 in      |
| Member Thickness      | t                               | 0.250 in  |
| Member Grade          |                                 | A53 Gr. B |
| Member F <sub>y</sub> | F <sub>yM</sub>                 | 35 ksi    |
| Member F <sub>u</sub> | F <sub>uM</sub>                 | 60 ksi    |
| Weld Size             | a                               | 1/4 in    |
| Weld Length           | l                               | 16.0 in   |
| Applied Load          | P <sub>u</sub>                  | 16.1 k    |
| Weld Strength         | φR <sub>n</sub>                 | 44.5 k    |
| Weld Capacity         | P <sub>u</sub> /φR <sub>n</sub> | 36% Pass  |

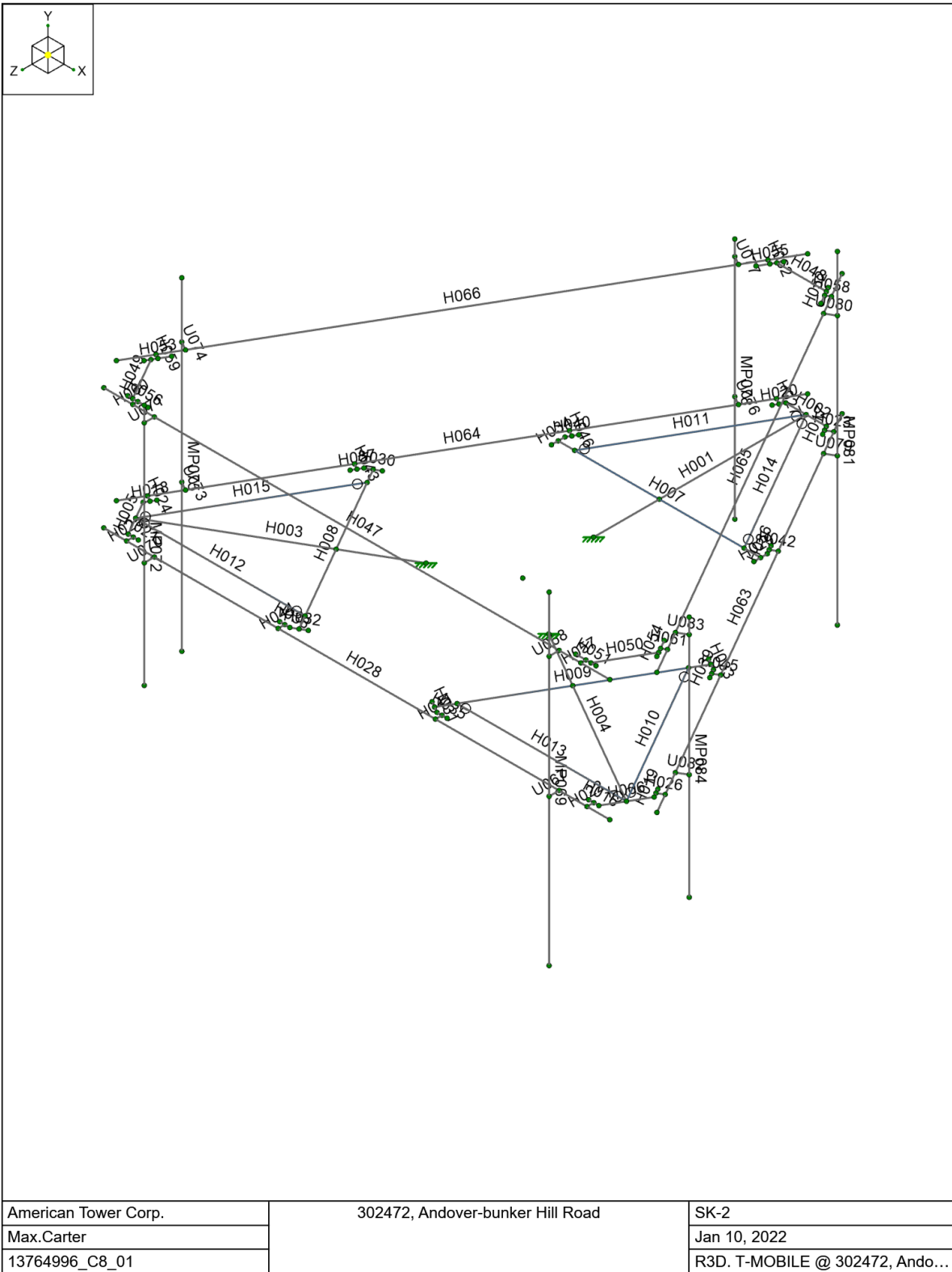
|                                  |       |            |
|----------------------------------|-------|------------|
| Minimum Base Metal Thickness     | 0.206 | in         |
| Controlling Base Metal Thickness | 0.250 | in         |
| Base Metal Result                |       | Acceptable |

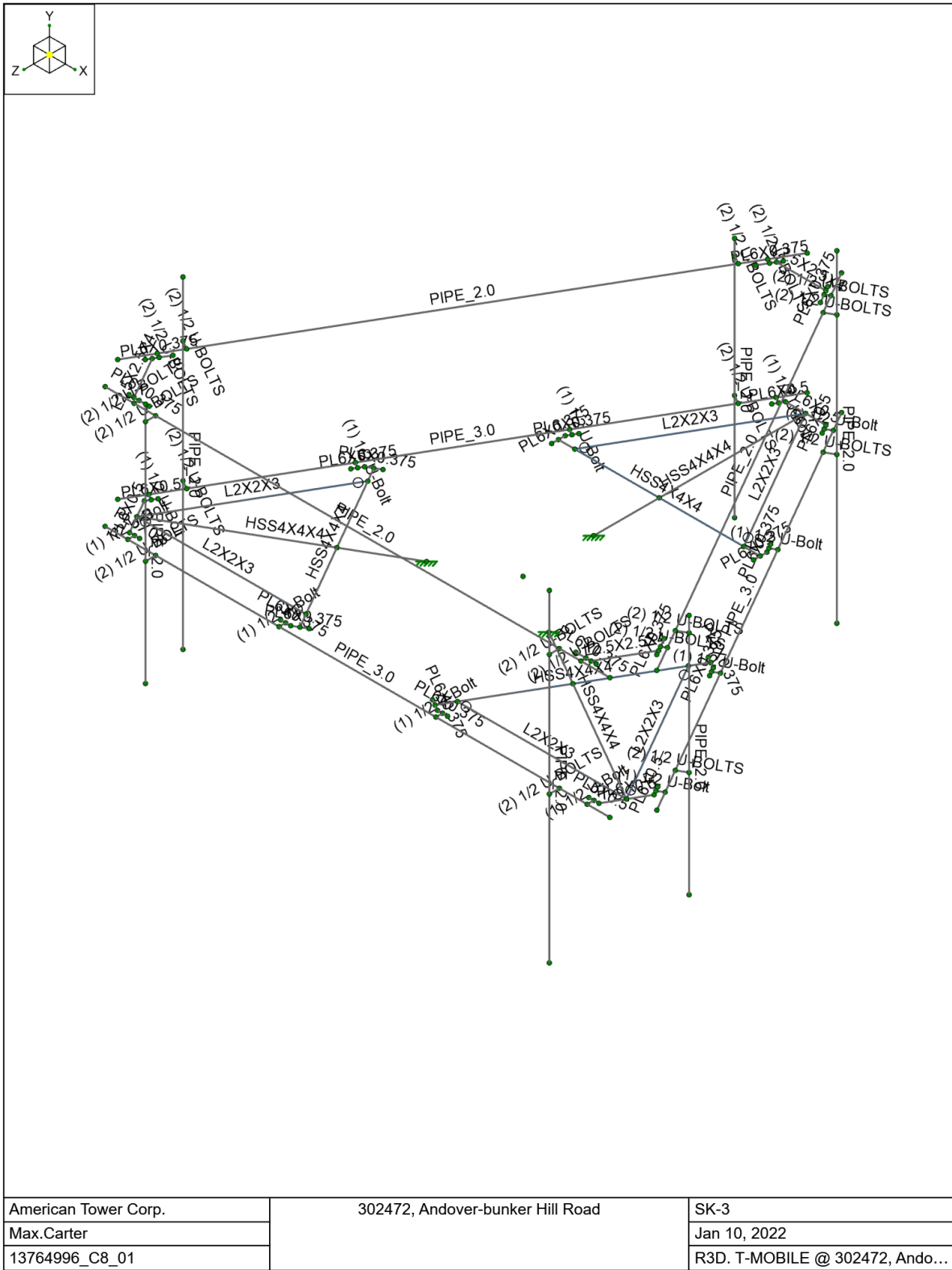
|                             |                  |      |      |
|-----------------------------|------------------|------|------|
| Minimum Thickness           | t <sub>min</sub> | 0.30 | in   |
| No Prying Thickness         | t <sub>np</sub>  | 0.39 | in   |
| Min Bolt Strength Thickness | t <sub>c</sub>   | 0.62 | k-in |
| Prying Action Bolt Tension  | T <sub>up</sub>  | 0.00 | k    |

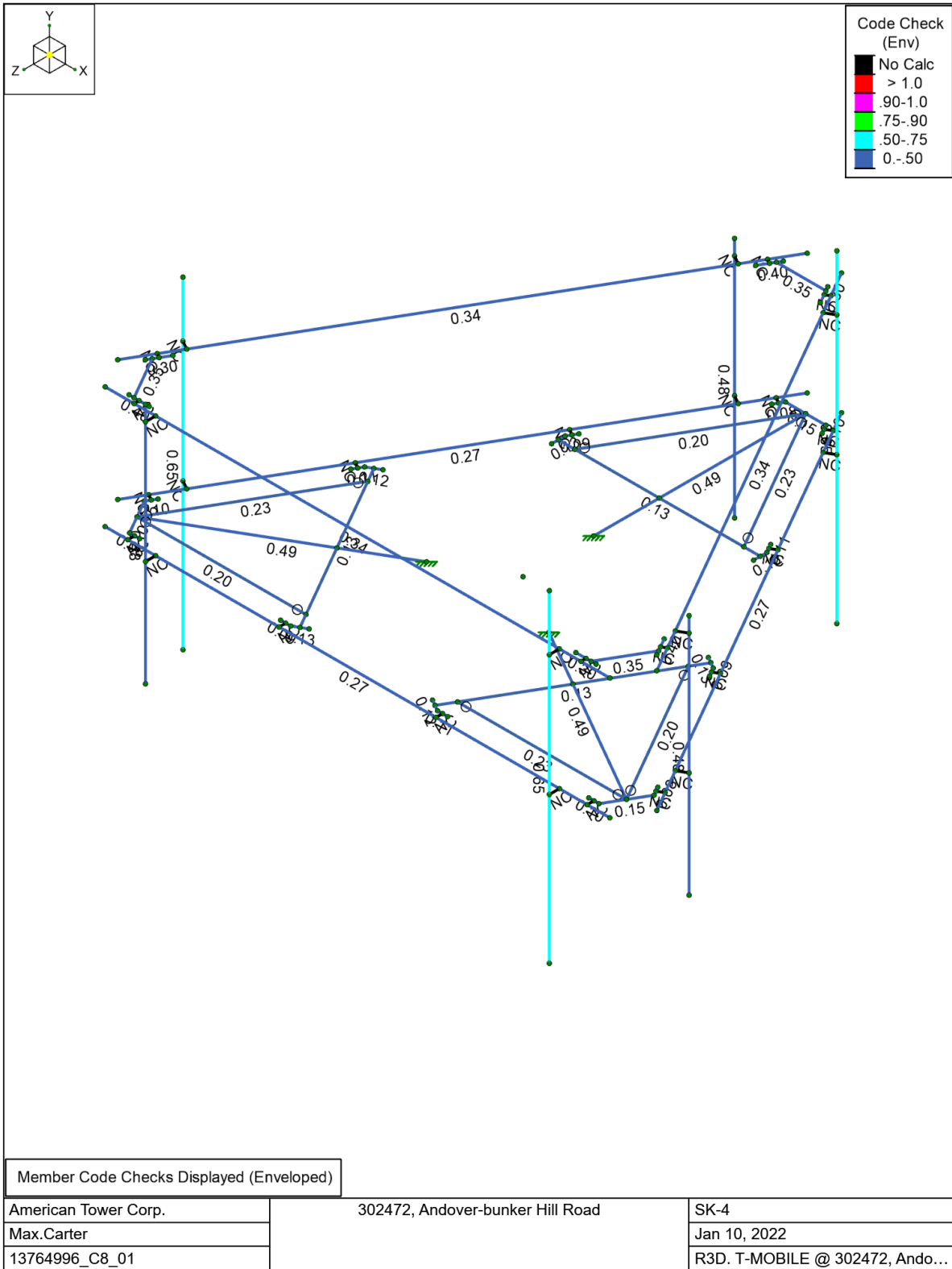


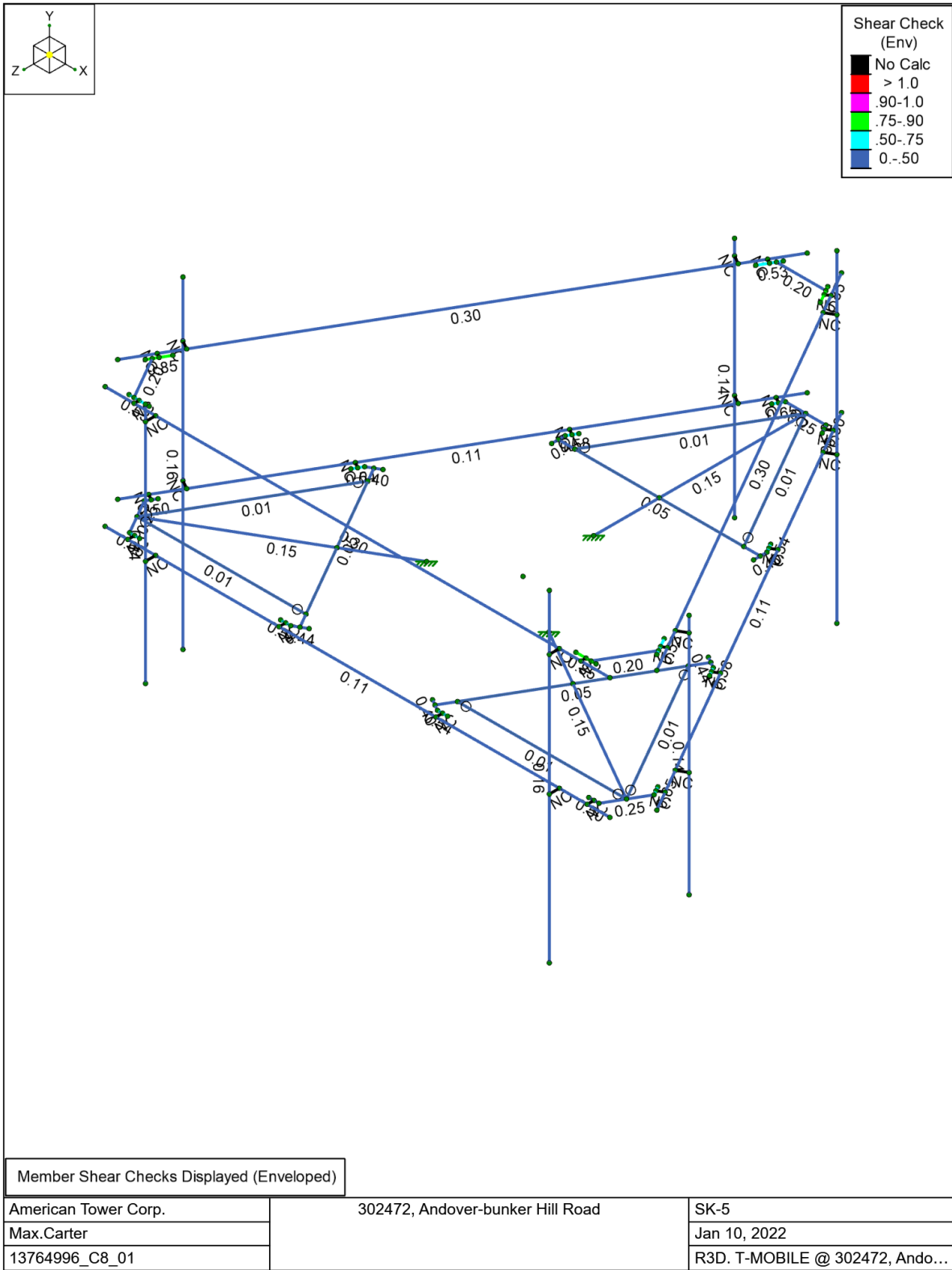
|                      |                                  |                                 |
|----------------------|----------------------------------|---------------------------------|
| American Tower Corp. | 302472, Andover-bunker Hill Road | SK-1                            |
| Max.Carter           |                                  | Jan 10, 2022                    |
| 13764996_C8_01       |                                  | R3D. T-MOBILE @ 302472, Ando... |













**Node Boundary Conditions**

|   | Node Label | X [lb/in] | Y [lb/in] | Z [lb/in] | X Rot [k-in/rad] | Y Rot [k-in/rad] | Z Rot [k-in/rad] |
|---|------------|-----------|-----------|-----------|------------------|------------------|------------------|
| 1 | N002       | Reaction  | Reaction  | Reaction  | Reaction         | Reaction         | Reaction         |
| 2 | N006       | Reaction  | Reaction  | Reaction  | Reaction         | Reaction         | Reaction         |
| 3 | N007       | Reaction  | Reaction  | Reaction  | Reaction         | Reaction         | Reaction         |

**Member Primary Data**

|    | Label | I Node | J Node | Rotate(deg) | Section/Shape  | Type | Design List | Material         | Design Rule |
|----|-------|--------|--------|-------------|----------------|------|-------------|------------------|-------------|
| 1  | H001  | N002   | N003   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 2  | H002  | N004   | N005   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 3  | H003  | N006   | N012   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 4  | H004  | N007   | N013   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 5  | H005  | N008   | N010   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 6  | H006  | N009   | N011   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 7  | H007  | N015   | N016   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 8  | H008  | N021   | N023   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 9  | H009  | N022   | N024   |             | HSS4X4X4       | Beam | None        | A500 Gr. B [SQR] | Typical     |
| 10 | H010  | N029   | N013   |             | L2X2X3         | Beam | None        | A36              | Typical     |
| 11 | H011  | N030   | N003   |             | L2X2X3         | Beam | None        | A36              | Typical     |
| 12 | H012  | N025   | N012   |             | L2X2X3         | Beam | None        | A36              | Typical     |
| 13 | H013  | N026   | N013   | 270         | L2X2X3         | Beam | None        | A36              | Typical     |
| 14 | H014  | N027   | N003   | 270         | L2X2X3         | Beam | None        | A36              | Typical     |
| 15 | H015  | N028   | N012   | 270         | L2X2X3         | Beam | None        | A36              | Typical     |
| 16 | H016  | N009   | N032   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 17 | H017  | N004   | N038   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 18 | H018  | N008   | N039   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 19 | H019  | N011   | N044   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 20 | H020  | N005   | N045   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 21 | H021  | N010   | N033   |             | PL6X0.5        | Beam | None        | A36              | Typical     |
| 22 | H022  | N034   | N036   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 23 | H023  | N040   | N046   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 24 | H024  | N041   | N047   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 25 | H025  | N035   | N037   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 26 | H026  | N042   | N048   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 27 | H027  | N043   | N049   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 28 | H028  | N017   | N018   |             | PIPE 3.0       | Beam | None        | A53 Gr. B        | Typical     |
| 29 | H029  | N050   | N051   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 30 | H030  | N052   | N054   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 31 | H031  | N053   | N055   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 32 | H032  | N056   | N058   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 33 | H033  | N057   | N059   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 34 | H034  | N060   | N031   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 35 | H035  | N055   | N061   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 36 | H036  | N051   | N067   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 37 | H037  | N054   | N068   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 38 | H038  | N058   | N062   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 39 | H039  | N059   | N069   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 40 | H040  | N031   | N070   |             | PL6X0.375      | Beam | None        | A36              | Typical     |
| 41 | H041  | N063   | N065   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 42 | H042  | N071   | N075   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 43 | H043  | N072   | N076   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 44 | H044  | N064   | N066   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 45 | H045  | N073   | N077   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 46 | H046  | N074   | N078   |             | (1) 1/2 U-Bolt | Beam | None        | SAE J429 Gr. 2   | Typical     |
| 47 | H047  | N079   | N080   |             | PIPE 2.0       | Beam | None        | A53 Gr. B        | Typical     |
| 48 | H048  | N085   | N086   | 90          | L2.5X2.5X4     | Beam | None        | A36              | Typical     |



**Member Primary Data (Continued)**

|    | Label | I Node | J Node | Rotate(deg) | Section/Shape   | Type   | Design List | Material       | Design Rule |
|----|-------|--------|--------|-------------|-----------------|--------|-------------|----------------|-------------|
| 49 | H049  | N082   | N083   | 90          | L2.5X2.5X4      | Beam   | None        | A36            | Typical     |
| 50 | H050  | N081   | N084   | 90          | L2.5X2.5X4      | Beam   | None        | A36            | Typical     |
| 51 | H051  | N087   | N090   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 52 | H052  | N088   | N091   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 53 | H053  | N089   | N092   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 54 | H054  | N094   | N097   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 55 | H055  | N095   | N098   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 56 | H056  | N093   | N096   |             | PL6X0.375       | Beam   | None        | A36            | Typical     |
| 57 | H057  | N099   | N105   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 58 | H058  | N100   | N106   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 59 | H059  | N101   | N107   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 60 | H060  | N102   | N108   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 61 | H061  | N103   | N109   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 62 | H062  | N104   | N110   |             | (2) 1/2 U-BOLTS | Beam   | None        | SAE J429 Gr. 2 | Typical     |
| 63 | H063  | N111   | N113   |             | PIPE 3.0        | Beam   | None        | A53 Gr. B      | Typical     |
| 64 | H064  | N112   | N114   |             | PIPE 3.0        | Beam   | None        | A53 Gr. B      | Typical     |
| 65 | H065  | N115   | N117   |             | PIPE 2.0        | Beam   | None        | A53 Gr. B      | Typical     |
| 66 | H066  | N116   | N118   |             | PIPE 2.0        | Beam   | None        | A53 Gr. B      | Typical     |
| 67 | U067  | N119   | N125   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 68 | U068  | N126   | N127   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 69 | MP069 | N128   | N129   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |
| 70 | U070  | N120   | N130   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 71 | U071  | N131   | N132   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 72 | MP072 | N133   | N134   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |
| 73 | U073  | N122   | N135   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 74 | U074  | N136   | N137   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 75 | MP075 | N138   | N139   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |
| 76 | U076  | N124   | N140   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 77 | U077  | N141   | N142   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 78 | MP078 | N143   | N144   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |
| 79 | U079  | N121   | N145   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 80 | U080  | N146   | N147   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 81 | MP081 | N148   | N149   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |
| 82 | U082  | N123   | N150   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 83 | U083  | N151   | N152   |             | (2) 1/2 U-BOLTS | Beam   | None        | A36            | Typical     |
| 84 | MP084 | N153   | N154   |             | PIPE 2.0        | Column | None        | A53 Gr. B      | Typical     |

**Member Advanced Data**

|    | Label | I Release | J Release | Physical | Deflection Ratio Options | Activation | Seismic DR |
|----|-------|-----------|-----------|----------|--------------------------|------------|------------|
| 1  | H001  |           |           | Yes      | N/A                      |            | None       |
| 2  | H002  |           |           | Yes      | N/A                      |            | None       |
| 3  | H003  |           |           | Yes      | N/A                      |            | None       |
| 4  | H004  |           |           | Yes      | N/A                      |            | None       |
| 5  | H005  |           |           | Yes      | N/A                      |            | None       |
| 6  | H006  |           |           | Yes      | N/A                      |            | None       |
| 7  | H007  |           |           | Yes      | N/A                      |            | None       |
| 8  | H008  |           |           | Yes      | N/A                      |            | None       |
| 9  | H009  |           |           | Yes      | N/A                      |            | None       |
| 10 | H010  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 11 | H011  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 12 | H012  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 13 | H013  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 14 | H014  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 15 | H015  | BenPIN    | BenPIN    | Yes      | N/A                      |            | None       |
| 16 | H016  |           |           | Yes      | N/A                      |            | None       |



Company : American Tower Corp.  
 Designer : Max.Carter  
 Job Number : 13764996\_C8\_01  
 Model Name : 302472, Andover-bunker Hill Road

1/10/2022  
 11:51:15 AM  
 Checked By : -

**Member Advanced Data (Continued)**

|    | Label | I Release | J Release | Physical | Deflection Ratio Options | Activation | Seismic DR |
|----|-------|-----------|-----------|----------|--------------------------|------------|------------|
| 17 | H017  |           |           | Yes      | N/A                      |            | None       |
| 18 | H018  |           |           | Yes      | N/A                      |            | None       |
| 19 | H019  |           |           | Yes      | N/A                      |            | None       |
| 20 | H020  |           |           | Yes      | N/A                      |            | None       |
| 21 | H021  |           |           | Yes      | N/A                      |            | None       |
| 22 | H022  |           |           | Yes      | Default                  | Exclude    | None       |
| 23 | H023  |           |           | Yes      | Default                  | Exclude    | None       |
| 24 | H024  |           |           | Yes      | Default                  | Exclude    | None       |
| 25 | H025  |           |           | Yes      | Default                  | Exclude    | None       |
| 26 | H026  |           |           | Yes      | Default                  | Exclude    | None       |
| 27 | H027  |           |           | Yes      | Default                  | Exclude    | None       |
| 28 | H028  |           |           | Yes      | N/A                      |            | None       |
| 29 | H029  |           |           | Yes      | N/A                      |            | None       |
| 30 | H030  |           |           | Yes      | N/A                      |            | None       |
| 31 | H031  |           |           | Yes      | N/A                      |            | None       |
| 32 | H032  |           |           | Yes      | N/A                      |            | None       |
| 33 | H033  |           |           | Yes      | N/A                      |            | None       |
| 34 | H034  |           |           | Yes      | N/A                      |            | None       |
| 35 | H035  |           |           | Yes      | N/A                      |            | None       |
| 36 | H036  |           |           | Yes      | N/A                      |            | None       |
| 37 | H037  |           |           | Yes      | N/A                      |            | None       |
| 38 | H038  |           |           | Yes      | N/A                      |            | None       |
| 39 | H039  |           |           | Yes      | N/A                      |            | None       |
| 40 | H040  |           |           | Yes      | N/A                      |            | None       |
| 41 | H041  |           |           | Yes      | Default                  | Exclude    | None       |
| 42 | H042  |           |           | Yes      | Default                  | Exclude    | None       |
| 43 | H043  |           |           | Yes      | Default                  | Exclude    | None       |
| 44 | H044  |           |           | Yes      | Default                  | Exclude    | None       |
| 45 | H045  |           |           | Yes      | Default                  | Exclude    | None       |
| 46 | H046  |           |           | Yes      | Default                  | Exclude    | None       |
| 47 | H047  |           |           | Yes      | N/A                      |            | None       |
| 48 | H048  |           |           | Yes      | N/A                      |            | None       |
| 49 | H049  |           |           | Yes      | N/A                      |            | None       |
| 50 | H050  |           |           | Yes      | N/A                      |            | None       |
| 51 | H051  |           |           | Yes      | N/A                      |            | None       |
| 52 | H052  |           |           | Yes      | N/A                      |            | None       |
| 53 | H053  |           |           | Yes      | N/A                      |            | None       |
| 54 | H054  |           |           | Yes      | N/A                      |            | None       |
| 55 | H055  |           |           | Yes      | N/A                      |            | None       |
| 56 | H056  |           |           | Yes      | N/A                      |            | None       |
| 57 | H057  |           |           | Yes      | N/A                      | Exclude    | None       |
| 58 | H058  |           |           | Yes      | N/A                      | Exclude    | None       |
| 59 | H059  |           |           | Yes      | N/A                      | Exclude    | None       |
| 60 | H060  |           |           | Yes      | N/A                      | Exclude    | None       |
| 61 | H061  |           |           | Yes      | N/A                      | Exclude    | None       |
| 62 | H062  |           |           | Yes      | N/A                      | Exclude    | None       |
| 63 | H063  |           |           | Yes      | N/A                      |            | None       |
| 64 | H064  |           |           | Yes      | N/A                      |            | None       |
| 65 | H065  |           |           | Yes      | N/A                      |            | None       |
| 66 | H066  |           |           | Yes      | N/A                      |            | None       |
| 67 | U067  |           |           | Yes      | N/A                      | Exclude    | None       |
| 68 | U068  |           |           | Yes      | N/A                      | Exclude    | None       |
| 69 | MP069 |           |           | Yes      | ** NA **                 |            | None       |
| 70 | U070  |           |           | Yes      | N/A                      | Exclude    | None       |
| 71 | U071  |           |           | Yes      | N/A                      | Exclude    | None       |



**Member Advanced Data (Continued)**

|    | Label | I Release | J Release | Physical | Deflection Ratio Options | Activation | Seismic DR |
|----|-------|-----------|-----------|----------|--------------------------|------------|------------|
| 72 | MP072 |           |           | Yes      | ** NA **                 |            | None       |
| 73 | U073  |           |           | Yes      | N/A                      | Exclude    | None       |
| 74 | U074  |           |           | Yes      | N/A                      | Exclude    | None       |
| 75 | MP075 |           |           | Yes      | ** NA **                 |            | None       |
| 76 | U076  |           |           | Yes      | N/A                      | Exclude    | None       |
| 77 | U077  |           |           | Yes      | N/A                      | Exclude    | None       |
| 78 | MP078 |           |           | Yes      | ** NA **                 |            | None       |
| 79 | U079  |           |           | Yes      | N/A                      | Exclude    | None       |
| 80 | U080  |           |           | Yes      | N/A                      | Exclude    | None       |
| 81 | MP081 |           |           | Yes      | ** NA **                 |            | None       |
| 82 | U082  |           |           | Yes      | N/A                      | Exclude    | None       |
| 83 | U083  |           |           | Yes      | N/A                      | Exclude    | None       |
| 84 | MP084 |           |           | Yes      | ** NA **                 |            | None       |

**Hot Rolled Steel Design Parameters**

|    | Label | Shape          | Length [in] | Lb y-y [in] | Lb z-z [in] | Lcomp top [in] | L-Torque [in] | K y-y | K z-z | Function |
|----|-------|----------------|-------------|-------------|-------------|----------------|---------------|-------|-------|----------|
| 1  | H001  | HSS4X4X4       | 63          |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 2  | H002  | PL6X0.5        | 12          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 3  | H003  | HSS4X4X4       | 63          |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 4  | H004  | HSS4X4X4       | 63          |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 5  | H005  | PL6X0.5        | 12          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 6  | H006  | PL6X0.5        | 12          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 7  | H007  | HSS4X4X4       | 60          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 8  | H008  | HSS4X4X4       | 60          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 9  | H009  | HSS4X4X4       | 60          |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 10 | H010  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 11 | H011  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 12 | H012  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 13 | H013  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 14 | H014  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 15 | H015  | L2X2X3         | 50.229      |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 16 | H016  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 17 | H017  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 18 | H018  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 19 | H019  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 20 | H020  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 21 | H021  | PL6X0.5        | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 22 | H022  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 23 | H023  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 24 | H024  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 25 | H025  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 26 | H026  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 27 | H027  | (1) 1/2 U-Bolt | 2           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 28 | H028  | PIPE 3.0       | 150         |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 29 | H029  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 30 | H030  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 31 | H031  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 32 | H032  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 33 | H033  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 34 | H034  | PL6X0.375      | 4           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 35 | H035  | PL6X0.375      | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 36 | H036  | PL6X0.375      | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 37 | H037  | PL6X0.375      | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 38 | H038  | PL6X0.375      | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 39 | H039  | PL6X0.375      | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |





**Hot Rolled Steel Design Parameters (Continued)**

|    | Label | Shape           | Length [in] | Lb y-y [in] | Lb z-z [in] | Lcomp top [in] | L-Torque [in] | K y-y | K z-z | Function |
|----|-------|-----------------|-------------|-------------|-------------|----------------|---------------|-------|-------|----------|
| 40 | H040  | PL6X0.375       | 3           |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 41 | H041  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 42 | H042  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 43 | H043  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 44 | H044  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 45 | H045  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 46 | H046  | (1) 1/2 U-Bolt  | 1.965       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 47 | H047  | PIPE 2.0        | 150         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 48 | H048  | L2.5X2.5X4      | 14.71       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 49 | H049  | L2.5X2.5X4      | 14.71       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 50 | H050  | L2.5X2.5X4      | 14.71       |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 51 | H051  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 52 | H052  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 53 | H053  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 54 | H054  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 55 | H055  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 56 | H056  | PL6X0.375       | 6           |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 57 | H057  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 58 | H058  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 59 | H059  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 60 | H060  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 61 | H061  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 62 | H062  | (2) 1/2 U-BOLTS | 1.5         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 63 | H063  | PIPE 3.0        | 150         |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 64 | H064  | PIPE 3.0        | 150         |             |             | Lbyy           |               | 1     | 1     | Lateral  |
| 65 | H065  | PIPE 2.0        | 150         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 66 | H066  | PIPE 2.0        | 150         |             |             | Lbyy           |               | 0.65  | 0.65  | Lateral  |
| 67 | U067  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 68 | U068  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 69 | MP069 | PIPE 2.0        | 96          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |
| 70 | U070  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 71 | U071  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 72 | MP072 | PIPE 2.0        | 72          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |
| 73 | U073  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 74 | U074  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 75 | MP075 | PIPE 2.0        | 96          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |
| 76 | U076  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 77 | U077  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 78 | MP078 | PIPE 2.0        | 72          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |
| 79 | U079  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 80 | U080  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 81 | MP081 | PIPE 2.0        | 96          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |
| 82 | U082  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 83 | U083  | (2) 1/2 U-BOLTS | 3           |             |             | Lbyy           |               | 0.5   | 0.5   | Lateral  |
| 84 | MP084 | PIPE 2.0        | 72          | Segment     | Segment     | Lbyy           | Segment       | 2.1   | 2.1   | Lateral  |

**Hot Rolled Steel Properties**

|   | Label            | E [psi] | G [psi]   | Nu  | Therm. Coeff. [1e <sup>5</sup> F <sup>-1</sup> ] | Density [lb/ft <sup>3</sup> ] | Yield [psi] | Ry  | Fu [psi] | Rt  |
|---|------------------|---------|-----------|-----|--|-------------------------------|-------------|-----|----------|-----|
| 1 | A500 Gr. B [SQR] | 2.9e+07 | 1.115e+07 | 0.3 | 0.65   | 527                           | 46000       | 1.4 | 58000    | 1.3 |
| 2 | A36              | 2.9e+07 | 1.115e+07 | 0.3 | 0.65   | 490                           | 36000       | 1.5 | 58000    | 1.2 |
| 3 | SAE J429 Gr. 2   | 2.9e+07 | 1.115e+07 | 0.3 | 0.65   | 490                           | 57000       | 1.1 | 74000    | 1.1 |
| 4 | A53 Gr. B        | 2.9e+07 | 1.115e+07 | 0.3 | 0.65   | 490                           | 35000       | 1.6 | 60000    | 1.2 |



**Envelope Node Reactions**

| Node Label    | X [lb]    | LC | Y [lb]   | LC | Z [lb]    | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|---------------|-----------|----|----------|----|-----------|----|------------|----|------------|----|------------|----|
| 1 N002 max    | 1305.681  | 5  | 2688.495 | 26 | 2634.005  | 14 | 7894.821   | 26 | 1939.463   | 11 | 1578.385   | 11 |
| 2 min         | -1304.766 | 23 | 205.143  | 20 | -2645.065 | 8  | 199.682    | 20 | -1931.054  | 17 | -1399.935  | 17 |
| 3 N006 max    | 2300.157  | 18 | 2688.491 | 30 | 1287.73   | 12 | 442.201    | 14 | 1939.441   | 3  | -144.372   | 24 |
| 4 min         | -2310.737 | 12 | 205.152  | 24 | -1283.934 | 18 | -3807.648  | 32 | -1931.033  | 21 | -7008.395  | 30 |
| 5 N007 max    | 2270.575  | 4  | 2688.491 | 34 | 1533.32   | 2  | 607.122    | 14 | 1939.427   | 7  | 6665.807   | 34 |
| 6 min         | -2261.997 | 22 | 205.152  | 16 | -1525.694 | 20 | -4408.296  | 32 | -1931.018  | 25 | 201.56     | 16 |
| 7 Totals: max | 4903.649  | 17 | 7672.739 | 29 | 5293.846  | 2  |            |    |            |    |            |    |
| 8 min         | -4903.649 | 11 | 2166.259 | 23 | -5293.846 | 8  |            |    |            |    |            |    |

**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks**

| Member  | Shape      | Code Check | Loc[in] | LC | Shear Check | Loc[in] | Dir | LC | phi*Pnc [lb] | phi*Pnt [lb] | phi*Mn y-y [lb-ft] | phi*Mn z-z [lb-ft] | Cb    | Eqn   |
|---------|------------|------------|---------|----|-------------|---------|-----|----|--------------|--------------|--------------------|--------------------|-------|-------|
| 1 H001  | HSS4X4X4   | 0.492      | 0       | 36 | 0.149       | 0       | z   | 11 | 124317.885   | 139518       | 16180.5            | 16180.5            | 2.202 | H1-1b |
| 2 H002  | PL6X0.5    | 0.146      | 6       | 12 | 0.253       | 6       | y   | 10 | 83348.625    | 97200        | 1012.5             | 12150              | 1.205 | H1-1b |
| 3 H003  | HSS4X4X4   | 0.492      | 0       | 28 | 0.149       | 0       | z   | 3  | 124317.885   | 139518       | 16180.5            | 16180.5            | 2.202 | H1-1b |
| 4 H004  | HSS4X4X4   | 0.492      | 0       | 32 | 0.149       | 0       | z   | 7  | 124317.885   | 139518       | 16180.5            | 16180.5            | 2.202 | H1-1b |
| 5 H005  | PL6X0.5    | 0.146      | 6       | 4  | 0.253       | 6       | y   | 2  | 83348.625    | 97200        | 1012.5             | 12150              | 1.205 | H1-1b |
| 6 H006  | PL6X0.5    | 0.146      | 6       | 8  | 0.253       | 6       | y   | 6  | 83348.625    | 97200        | 1012.5             | 12150              | 1.205 | H1-1b |
| 7 H007  | HSS4X4X4   | 0.129      | 30      | 37 | 0.052       | 4.375   | z   | 13 | 133484.923   | 139518       | 16180.5            | 16180.5            | 1.336 | H1-1b |
| 8 H008  | HSS4X4X4   | 0.129      | 30      | 29 | 0.052       | 4.375   | z   | 5  | 133484.923   | 139518       | 16180.5            | 16180.5            | 1.336 | H1-1b |
| 9 H009  | HSS4X4X4   | 0.129      | 30      | 33 | 0.052       | 4.375   | z   | 9  | 133484.923   | 139518       | 16180.5            | 16180.5            | 1.336 | H1-1b |
| 10 H010 | L2X2X3     | 0.197      | 25.115  | 12 | 0.008       | 50.229  | z   | 6  | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 11 H011 | L2X2X3     | 0.197      | 25.115  | 4  | 0.008       | 50.229  | z   | 10 | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 12 H012 | L2X2X3     | 0.197      | 25.115  | 8  | 0.008       | 50.229  | z   | 2  | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 13 H013 | L2X2X3     | 0.231      | 25.115  | 8  | 0.01        | 50.229  | y   | 8  | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 14 H014 | L2X2X3     | 0.231      | 25.115  | 12 | 0.01        | 50.229  | y   | 12 | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 15 H015 | L2X2X3     | 0.231      | 25.115  | 4  | 0.01        | 50.229  | y   | 4  | 9724.796     | 23392.8      | 557.717            | 1072.365           | 1.136 | H2-1  |
| 16 H016 | PL6X0.5    | 0.098      | 1.5     | 2  | 0.501       | 1.5     | y   | 2  | 95014.386    | 97200        | 1012.5             | 12150              | 1.654 | H1-1b |
| 17 H017 | PL6X0.5    | 0.098      | 1.5     | 6  | 0.501       | 1.5     | y   | 6  | 95014.386    | 97200        | 1012.5             | 12150              | 1.654 | H1-1b |
| 18 H018 | PL6X0.5    | 0.098      | 1.5     | 10 | 0.501       | 1.5     | y   | 10 | 95014.386    | 97200        | 1012.5             | 12150              | 1.654 | H1-1b |
| 19 H019 | PL6X0.5    | 0.077      | 1.5     | 6  | 0.646       | 1.5     | y   | 6  | 95014.386    | 97200        | 1012.5             | 12150              | 1.69  | H1-1b |
| 20 H020 | PL6X0.5    | 0.077      | 1.5     | 10 | 0.646       | 1.5     | y   | 10 | 95014.386    | 97200        | 1012.5             | 12150              | 1.69  | H1-1b |
| 21 H021 | PL6X0.5    | 0.077      | 1.5     | 2  | 0.646       | 1.5     | y   | 2  | 95014.386    | 97200        | 1012.5             | 12150              | 1.69  | H1-1b |
| 22 H028 | PIPE 3.0   | 0.266      | 96.875  | 30 | 0.11        | 142.188 | z   | 2  | 28250.554    | 65205        | 5748.75            | 5748.75            | 1.51  | H1-1b |
| 23 H029 | PL6X0.375  | 0.119      | 4       | 13 | 0.403       | 2       | y   | 6  | 70719.442    | 72900        | 569.531            | 9112.5             | 1.38  | H1-1b |
| 24 H030 | PL6X0.375  | 0.119      | 4       | 5  | 0.403       | 2       | y   | 10 | 70719.442    | 72900        | 569.531            | 9112.5             | 1.38  | H1-1b |
| 25 H031 | PL6X0.375  | 0.119      | 4       | 9  | 0.403       | 2       | y   | 2  | 70719.442    | 72900        | 569.531            | 9112.5             | 1.38  | H1-1b |
| 26 H032 | PL6X0.375  | 0.126      | 2       | 7  | 0.437       | 2       | y   | 2  | 70719.442    | 72900        | 569.531            | 9112.5             | 1.385 | H1-1b |
| 27 H033 | PL6X0.375  | 0.126      | 2       | 11 | 0.437       | 2       | y   | 6  | 70719.442    | 72900        | 569.531            | 9112.5             | 1.385 | H1-1b |
| 28 H034 | PL6X0.375  | 0.126      | 2       | 3  | 0.437       | 2       | y   | 10 | 70719.442    | 72900        | 569.531            | 9112.5             | 1.385 | H1-1b |
| 29 H035 | PL6X0.375  | 0.111      | 0       | 9  | 0.537       | 0       | y   | 8  | 70011.374    | 72900        | 569.531            | 9112.5             | 2.192 | H1-1b |
| 30 H036 | PL6X0.375  | 0.111      | 0       | 13 | 0.537       | 0       | y   | 12 | 70011.374    | 72900        | 569.531            | 9112.5             | 2.192 | H1-1b |
| 31 H037 | PL6X0.375  | 0.111      | 0       | 5  | 0.537       | 0       | y   | 4  | 70011.374    | 72900        | 569.531            | 9112.5             | 2.192 | H1-1b |
| 32 H038 | PL6X0.375  | 0.091      | 1.5     | 3  | 0.575       | 0       | y   | 8  | 70011.374    | 72900        | 569.531            | 9112.5             | 1.406 | H1-1b |
| 33 H039 | PL6X0.375  | 0.091      | 1.5     | 7  | 0.575       | 0       | y   | 12 | 70011.374    | 72900        | 569.531            | 9112.5             | 1.406 | H1-1b |
| 34 H040 | PL6X0.375  | 0.091      | 1.5     | 11 | 0.575       | 0       | y   | 4  | 70011.374    | 72900        | 569.531            | 9112.5             | 1.406 | H1-1b |
| 35 H047 | PIPE 2.0   | 0.339      | 14.062  | 13 | 0.303       | 9.375   | z   | 2  | 14559.939    | 32130        | 1871.625           | 1871.625           | 2.612 | H3-6  |
| 36 H048 | L2.5X2.5X4 | 0.346      | 0       | 6  | 0.198       | 0       | z   | 12 | 37765.457    | 38556        | 1113.554           | 2537.388           | 1.5   | H2-1  |
| 37 H049 | L2.5X2.5X4 | 0.346      | 0       | 10 | 0.198       | 0       | z   | 4  | 37765.457    | 38556        | 1113.554           | 2537.388           | 1.5   | H2-1  |
| 38 H050 | L2.5X2.5X4 | 0.346      | 0       | 2  | 0.198       | 0       | z   | 8  | 37765.457    | 38556        | 1113.554           | 2537.388           | 1.5   | H2-1  |
| 39 H051 | PL6X0.375  | 0.299      | 3       | 3  | 0.848       | 1.5     | y   | 2  | 68085.235    | 72900        | 569.531            | 9112.5             | 1.404 | H1-1b |
| 40 H052 | PL6X0.375  | 0.299      | 3       | 7  | 0.848       | 1.5     | y   | 6  | 68085.235    | 72900        | 569.531            | 9112.5             | 1.404 | H1-1b |
| 41 H053 | PL6X0.375  | 0.299      | 3       | 11 | 0.848       | 1.5     | y   | 10 | 68085.235    | 72900        | 569.531            | 9112.5             | 1.404 | H1-1b |
| 42 H054 | PL6X0.375  | 0.397      | 1.5     | 9  | 0.531       | 3       | y   | 13 | 68085.235    | 72900        | 569.531            | 9112.5             | 1.626 | H1-1b |
| 43 H055 | PL6X0.375  | 0.397      | 1.5     | 13 | 0.531       | 3       | y   | 5  | 68085.235    | 72900        | 569.531            | 9112.5             | 1.626 | H1-1b |



Company : American Tower Corp.  
 Designer : Max.Carter  
 Job Number : 13764996\_C8\_01  
 Model Name : 302472, Andover-bunker Hill Road

1/10/2022  
 11:51:15 AM  
 Checked By : -

**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)**

| Member | Shape | Code Check | Loc[in] | LC     | Shear Check | Loc[in] | Dir     | LC | phi*Pnc [lb] | phi*Pnt [lb] | phi*Mn y-y [lb-ft] | phi*Mn z-z [lb-ft] | Cb     | Eqn   |       |
|--------|-------|------------|---------|--------|-------------|---------|---------|----|--------------|--------------|--------------------|--------------------|--------|-------|-------|
| 44     | H056  | PL6X0.375  | 0.397   | 1.5    | 5           | 0.531   | 3       | y  | 9            | 68085.235    | 72900              | 569.531            | 9112.5 | 1.626 | H1-1b |
| 45     | H063  | PIPE 3.0   | 0.266   | 96.875 | 34          | 0.11    | 142.187 | 6  | 28250.554    | 65205        | 5748.75            | 5748.75            | 1.51   | H1-1b |       |
| 46     | H064  | PIPE 3.0   | 0.266   | 96.875 | 26          | 0.11    | 142.188 | 10 | 28250.554    | 65205        | 5748.75            | 5748.75            | 1.51   | H1-1b |       |
| 47     | H065  | PIPE 2.0   | 0.339   | 14.062 | 5           | 0.303   | 9.375   | 6  | 14559.939    | 32130        | 1871.625           | 1871.625           | 2.612  | H3-6  |       |
| 48     | H066  | PIPE 2.0   | 0.339   | 14.063 | 9           | 0.303   | 9.375   | 10 | 14559.939    | 32130        | 1871.625           | 1871.625           | 2.612  | H3-6  |       |
| 49     | MP069 | PIPE 2.0   | 0.652   | 52     | 2           | 0.157   | 52      | 9  | 19963.662    | 32130        | 1871.625           | 1871.625           | 1.286  | H1-1b |       |
| 50     | MP072 | PIPE 2.0   | 0.483   | 40.5   | 3           | 0.14    | 40.5    | 9  | 19963.662    | 32130        | 1871.625           | 1871.625           | 2.113  | H1-1b |       |
| 51     | MP075 | PIPE 2.0   | 0.652   | 52     | 10          | 0.157   | 52      | 5  | 19963.662    | 32130        | 1871.625           | 1871.625           | 1.843  | H1-1b |       |
| 52     | MP078 | PIPE 2.0   | 0.483   | 40.5   | 11          | 0.14    | 40.5    | 5  | 19963.662    | 32130        | 1871.625           | 1871.625           | 2.142  | H1-1b |       |
| 53     | MP081 | PIPE 2.0   | 0.652   | 52     | 6           | 0.157   | 52      | 13 | 19963.662    | 32130        | 1871.625           | 1871.625           | 2.194  | H1-1b |       |
| 54     | MP084 | PIPE 2.0   | 0.483   | 40.5   | 7           | 0.14    | 40.5    | 13 | 19963.662    | 32130        | 1871.625           | 1871.625           | 1.824  | H1-1b |       |



**AMERICAN TOWER®**  
CORPORATION



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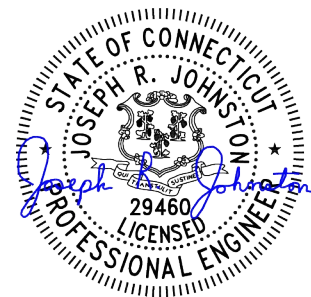
## Structural Analysis Report

**Structure** : 178 ft Monopole  
**ATC Site Name** : Andover-bunker Hill Road, CT  
**ATC Site Number** : 302472  
**Engineering Number** : 13764996\_C3\_03  
**Proposed Carrier** : T-MOBILE  
**Carrier Site Name** : SpectraSite Andover  
**Carrier Site Number** : CT11502A  
**Site Location** : 104 Bunker Hill Road  
Andover, CT 06232-1301  
41.7378, -72.3498  
**County** : Tolland  
**Date** : January 14, 2022  
**Max Usage** : 90%  
**Result** : Pass

Prepared By:

Tiffany Ta  
Airosmith Engineering

Reviewed By:



**COA : PEC.0001553**

1/17/2022



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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 178 ft Monopole to reflect the change in loading by T-MOBILE.

## Supporting Documents

|                            |  |
|----------------------------|--|
| <b>Tower Drawings</b>      | Summit, PJF Job #29200-028, dated January 14, 2000   |
| <b>Foundation Drawing</b>  | Summit, PJF Job #29200-012, dated January 14, 2000   |
| <b>Geotechnical Report</b> | Tectonic Project #1170.C966, dated November 30, 1999 |

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

|                                      |  |
|--------------------------------------|--|
| <b>Basic Wind Speed:</b>             | 119 mph (3-second gust)  |
| <b>Basic Wind Speed w/ Ice:</b>      | 50 mph (3-second gust) w/ 1.50" radial ice concurrent            |
| <b>Code:</b>                         | ANSI/TIA-222-H / 2015 IBC / 2018 Connecticut State Building Code |
| <b>Exposure Category:</b>            | B  |
| <b>Risk Category:</b>                | II   |
| <b>Topographic Factor Procedure:</b> | Method 2   |
| <b>Crest Height (H):</b>             | 344 ft   |
| <b>Crest Length (L):</b>             | 2786 ft  |
| <b>Spectral Response:</b>            | $S_s = 0.19$ , $S_i = 0.06$                                      |
| <b>Site Class:</b>                   | D - Stiff Soil - Default   |

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

**Existing and Reserved Equipment**

| Elev. <sup>1</sup> (ft) | Qty | Equipment  | Mount Type                         | Lines   | Carrier              |
|-------------------------|-----|--|------------------------------------|---|----------------------|
| 180.4                   | 12  | Powerwave Allgon 7120.16.05.00 / A-800-110-131-0-N | Triangular Low Profile Platform    | -   |                      |
| 168.0                   | 6   | Alcatel-Lucent RRH2x50-08                          | Triangular Platform with Handrails | (4) 1 1/4" Hybriflex Cable<br>(6) 1 5/8" Coax   | SPRINT NEXTEL        |
|                         | 3   | Alcatel-Lucent TD-RRH8x20-25 w/ Solar Shield       |                                    |   |                      |
|                         | 3   | Alcatel-Lucent 1900 MHz 4X45 RRH                   |                                    |   |                      |
|                         | 3   | Commscope NNVV-65B-R4                              |                                    |   |                      |
|                         | 3   | RFS APXVTM14-ALU-I20                               |                                    |   |                      |
| 158.0                   | 3   | Samsung MT6407-77A                                 | Triangular Platform with Handrails | (6) 1 5/8" Coax<br>(2) 1 5/8" Hybriflex   | VERIZON WIRELESS     |
|                         | 3   | Samsung B5/B13 RRH-BR04C                           |                                    |   |                      |
|                         | 3   | Samsung B2/B66A RRH-BR049                          |                                    |   |                      |
|                         | 6   | Andrew SBNHH-1D65B                                 |                                    |   |                      |
|                         | 6   | Antel LPA-80080/4CF ____                           |                                    |   |                      |
|                         | 1   | Raycap RVZDC-6627-PF-48                            |                                    |   |                      |
| 148.0                   | 3   | Ericsson Radio 4449 B12,B71                        | Triangular Platform with Handrails | -   | T-MOBILE             |
|                         | 3   | RFS APXVAARR24_43-U-NA20                           |                                    |   |                      |
| 137.0                   | 6   | CCI DMP65R-BU6DA                                   | Triangular Platform with Handrails | (2) 2" Carflex Non-Metallic Conduit<br>(2) 0.39" (10mm) Fiber Trunk<br>(6) 0.78" (19.7mm) 8 AWG 6<br>(12) 1 1/4" Coax | AT&T MOBILITY        |
|                         | 3   | Powerwave Allgon 7770.00                           |                                    |   |                      |
|                         | 3   | Ericsson RRUS 4449 B5, B12                         |                                    |   |                      |
|                         | 3   | Ericsson RRUS 4478 B14                             |                                    |   |                      |
|                         | 3   | Raycap DC6-48-60-18-8F ("Squid")                   |                                    |   |                      |
|                         | 3   | Ericsson RRUS 8843 B2, B66A                        |                                    |   |                      |
|                         | 6   | Powerwave Allgon LGP21401                          |                                    |   |                      |
|                         | 6   | LGP Allgon LGP21903                                |                                    |   |                      |
| 124.0                   | 3   | JMA Wireless MX08FRO665-21                         | Triangular Platform with Handrails | (1) 1.60" (40.6mm) Hybrid   | DISH WIRELESS L.L.C. |
|                         | 3   | Fujitsu TA08025-B604                               |                                    |   |                      |
|                         | 3   | Fujitsu TA08025-B605                               |                                    |   |                      |
|                         | 1   | Commscope RDIDC-9181-PF-48                         |                                    |   |                      |
| 108.0                   | 1   | Generic GPS  | Stand-Off                          | (1) 1/2" Coax   | VERIZON WIRELESS     |
| 97.0                    | 1   | Generic GPS  | Stand-Off                          | (1) 1/2" Coax   | SPRINT NEXTEL        |
| 88.5                    | 1   | Generic GPS  | Stand-Off                          | -   |                      |

**Equipment to be Removed**

| Elev. <sup>1</sup> (ft) | Qty | Equipment              | Mount Type | Lines   | Carrier  |
|-------------------------|-----|------------------------|------------|---|----------|
| 148.0                   | 3   | Ericsson KRY 112 144/1 | -          | (1) 1 5/8" (1.63"-41.3mm) Fiber<br>(12) 1 5/8" Coax | T-MOBILE |
|                         | 3   | EMS RR90-17-02DP       |            |   |          |
|                         | 3   | Ericsson KRY 112 489/2 |            |   |          |



**Proposed Equipment**

| Elev. <sup>1</sup> (ft) | Qty | Equipment               | Mount Type                         | Lines   | Carrier  |
|-------------------------|-----|-------------------------|------------------------------------|---|----------|
| 148.0                   | 3   | Ericsson 4460 BAND 2/25 | Triangular Platform with Handrails | (1) 1 1/4" Hybriflex Cable<br>(3) 1.99" (50.7mm) Hybrid | T-MOBILE |
|                         | 3   | Ericsson Air6449 B41    |                                    |   |          |

<sup>1</sup> Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed lines inside the pole shaft.



### Structure Usages

| Structural Component | Controlling Usage | Pass/Fail |
|----------------------|-------------------|-----------|
| Anchor Bolts         | 81%               | Pass      |
| Shaft                | 90%               | Pass      |
| Base Plate           | 38%               | Pass      |

### Foundations

| Reaction Component | Analysis Reactions | % of Usage |
|--------------------|--------------------|------------|
| Moment (Kips-Ft)   | 5814.8             | 67%        |
| Axial (Kips)       | 70.7               | 63%        |
| Shear (Kips)       | 44.3               | 24%        |

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

### Deflection and Sway\*

| Antenna Elevation (ft) | Antenna                 | Carrier  | Deflection (ft) | Sway (Rotation) (°) |
|------------------------|-------------------------|----------|-----------------|---------------------|
| 148.0                  | Ericsson Air6449 B41    | T-MOBILE | 2.333           | 1.870               |
|                        | Ericsson 4460 BAND 2/25 |          |                 |                     |

\*Deflection, Twist and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-H

## **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

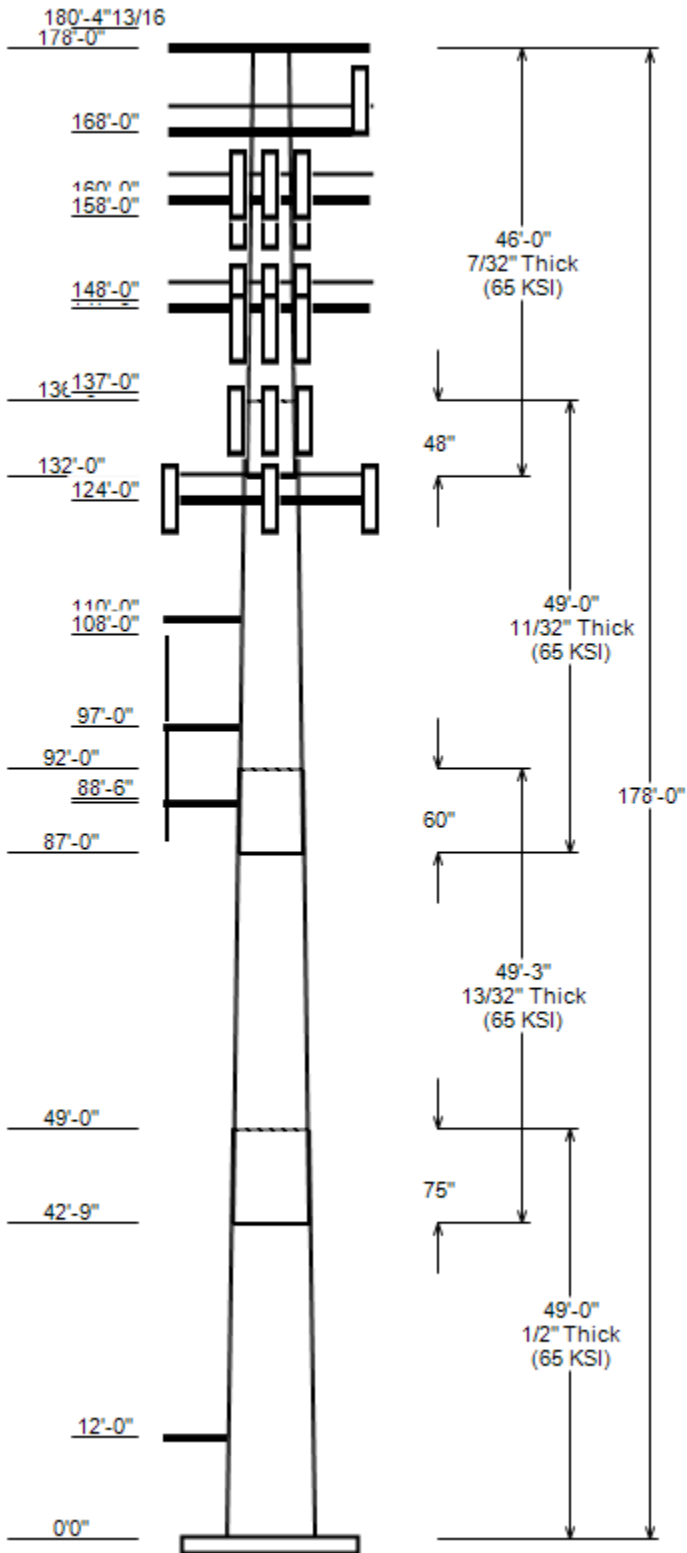
Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

JOB INFORMATION

Asset : 302472, Andover-bunker Hill Road  
 Client : T-MOBILE  
 Code : ANSI/TIA-222-H

Height : 178 ft  
 Base Width : 56.91  
 Shape : 18 Sides



SITE PARAMETERS

Base Elev (ft): 0.00 Structure Class: II  
 Taper : 0.20700 (In/ft) Exposure : B  
 Topographic Category : 0 Topographic Feature: Hill  
 Topo Method : Method 2

SECTION PROPERTIES

| Shaft Section | Length (ft) | Diameter (in)    |                     | Thick (in) | Joint Type | Overlap Length (in) | Shape    | Steel Grade (ksi) |
|---------------|-------------|------------------|---------------------|------------|------------|---------------------|----------|-------------------|
|               |             | Across Flats Top | Across Flats Bottom |            |            |                     |          |                   |
| 1             | 49.000      | 46.77            | 56.91               | 0.500      |            | 0.000               | 18 Sides | 65                |
| 2             | 49.250      | 38.68            | 48.87               | 0.406      | Slip Joint | 75.000              | 18 Sides | 65                |
| 3             | 49.000      | 30.26            | 40.40               | 0.344      | Slip Joint | 60.000              | 18 Sides | 65                |
| 4             | 46.000      | 22.00            | 31.52               | 0.219      | Slip Joint | 48.000              | 18 Sides | 65                |

DISCRETE APPURTENANCE

| Attach Elev (ft) | Force Elev (ft) | Qty | Description                    |
|------------------|-----------------|-----|--------------------------------|
| 180.4            | 180.4           | 12  | Powerwave Allgon 7120.16.05.00 |
| 178.0            | 178.0           | 1   | Generic Flat Low Profile Platf |
| 168.0            | 170.8           | 6   | Alcatel-Lucent RRH2x50-08      |
| 168.0            | 171.0           | 3   | Alcatel-Lucent 1900 MHz 4X45 R |
| 168.0            | 171.8           | 3   | Alcatel-Lucent TD-RRH8x20-25 w |
| 168.0            | 171.0           | 3   | RFS APXVTM14-ALU-I20           |
| 168.0            | 171.0           | 3   | Commscope NNVV-65B-R4          |
| 168.0            | 168.0           | 1   | Generic Flat Platform with Han |
| 160.0            | 160.0           | 1   | Generic Flat Platform with Han |
| 158.0            | 158.0           | 3   | Samsung B2/B66A RRH-BR049      |
| 158.0            | 158.0           | 3   | Samsung B5/B13 RRH-BR04C       |
| 158.0            | 158.0           | 1   | Raycap RVZDC-6627-PF-48        |
| 158.0            | 158.0           | 3   | Samsung MT6407-77A             |
| 158.0            | 159.5           | 6   | Antel LPA-80080/4CF            |
| 158.0            | 160.1           | 6   | Andrew SBNHH-1D65B             |
| 148.0            | 147.6           | 3   | Ericsson Radio 4449 B12,B71    |
| 148.0            | 148.0           | 3   | Ericsson 4460 BAND 2/25        |
| 148.0            | 148.0           | 3   | Ericsson Air6449 B41           |
| 148.0            | 146.1           | 3   | RFS APXVAARR24_43-U-NA20       |
| 147.0            | 147.0           | 3   | Generic Mount Reinforcement    |
| 147.0            | 147.0           | 1   | Generic Round Platform with Ha |
| 137.0            | 134.6           | 6   | LGP Allgon LGP21903            |
| 137.0            | 136.2           | 6   | Powerwave Allgon LGP21401      |
| 137.0            | 138.1           | 3   | Raycap DC6-48-60-18-8F ("Squid |
| 137.0            | 137.6           | 3   | Ericsson RRUS 8843 B2, B66A    |
| 137.0            | 137.6           | 3   | Ericsson RRUS 4478 B14         |
| 137.0            | 137.7           | 3   | Ericsson RRUS 4449 B5, B12     |
| 137.0            | 136.6           | 3   | Powerwave Allgon 7770.00       |
| 137.0            | 136.3           | 6   | CCI DMP65R-BU6DA               |
| 137.0            | 137.0           | 1   | Platform with Handrails RMQP-4 |
| 124.0            | 124.0           | 1   | Commscope RDIDC-9181-PF-48     |
| 124.0            | 124.0           | 3   | Fujitsu TA08025-B605           |
| 124.0            | 124.0           | 3   | Fujitsu TA08025-B604           |
| 124.0            | 124.0           | 3   | JMA Wireless MX08FRO665-21     |
| 124.0            | 124.0           | 1   | Generic Flat Platform with Han |
| 110.0            | 110.0           | 1   | Stand-Off                      |
| 108.0            | 106.6           | 1   | Generic GPS                    |
| 97.0             | 95.7            | 1   | Generic GPS                    |
| 97.0             | 97.0            | 1   | Stand-Off                      |
| 88.5             | 88.5            | 1   | Generic GPS                    |
| 88.0             | 88.0            | 1   | Stand-Off                      |
| 12.0             | 12.0            | 1   | Stand-Off                      |

**JOB INFORMATION**

Asset : 302472, Andover-bunker Hill Road  
 Client : T-MOBILE  
 Code : ANSI/TIA-222-H

Height : 178 ft  
 Base Width : 56.91  
 Shape : 18 Sides

**LINEAR APPURTENANCE**

| Elev From (ft) | Elev To (ft) | Description                     | Exp To Wind |
|----------------|--------------|---------------------------------|-------------|
| 0.0            | 168.0        | 1 5/8" Coax                     | No          |
| 0.0            | 168.0        | 1 1/4" Hybriflex Cable          | No          |
| 0.0            | 158.0        | 1 5/8" Hybriflex                | No          |
| 0.0            | 158.0        | 1 5/8" Coax                     | No          |
| 0.0            | 148.0        | 1.99" (50.7mm) Hybrid           | No          |
| 0.0            | 148.0        | 1 1/4" Hybriflex Cable          | No          |
| 0.0            | 138.0        | 2" Carflex Non-Metallic Conduit | No          |
| 0.0            | 137.0        | 1 1/4" Coax                     | No          |
| 0.0            | 137.0        | 0.78" (19.7mm) 8 AWG 6          | No          |
| 0.0            | 137.0        | 0.39" (10mm) Fiber Trunk        | No          |
| 0.0            | 124.0        | 1.60" (40.6mm) Hybrid           | No          |
| 0.0            | 108.0        | 1/2" Coax                       | No          |
| 0.0            | 97.0         | 1/2" Coax                       | No          |

**LOAD CASES**

|                      |                                  |
|----------------------|----------------------------------|
| 1.2D + 1.0W          | 119 mph wind with no ice         |
| 0.9D + 1.0W          | 119 mph wind with no ice         |
| 1.2D + 1.0Di + 1.0Wi | 50 mph wind with 1.5" radial ice |
| 1.2D + 1.0Ev + 1.0Eh | Seismic                          |
| 0.9D - 1.0Ev + 1.0Eh | Seismic (Reduced DL)             |
| 1.0D + 1.0W          | 60 mph Wind with No Ice          |

**REACTIONS**

| Load Case            | Moment (kip-ft) | Shear (Kip) | Axial (Kip) |
|----------------------|-----------------|-------------|-------------|
| 1.2D + 1.0W          | 5814.80         | 44.26       | 70.74       |
| 0.9D + 1.0W          | 5705.78         | 44.22       | 53.04       |
| 1.2D + 1.0Di + 1.0Wi | 1706.69         | 12.54       | 108.67      |
| 1.2D + 1.0Ev + 1.0Eh | 267.86          | 1.78        | 71.15       |
| 0.9D - 1.0Ev + 1.0Eh | 261.37          | 1.77        | 49.23       |
| 1.0D + 1.0W          | 1310.05         | 10.06       | 59.02       |

**DISH DEFLECTIONS**

| Load Case | Attach Elev (ft) | Deflection (in) | Rotation (deg) |
|-----------|------------------|-----------------|----------------|
|-----------|------------------|-----------------|----------------|

ASSET: 302472, Andover-bunker Hill Road  
CUSTOMER: T-MOBILE

CODE: ANSI/TIA-222-H  
ENG NO: 13764996\_C3\_03

### ANALYSIS PARAMETERS

|                                     |                   |                       |              |
|-------------------------------------|-------------------|-----------------------|--------------|
| <b>Location:</b>                    | Tolland County,CT | <b>Height:</b>        | 178 ft       |
| <b>Type and Shape:</b>              | Taper, 18 Sides   | <b>Base Diameter:</b> | 56.91 in     |
| <b>Manufacturer:</b>                | Undetermined      | <b>Top Diameter:</b>  | 22.00 in     |
| <b>K<sub>d</sub> (non-service):</b> | 0.95              | <b>Taper:</b>         | 0.2070 in/ft |
| <b>K<sub>e</sub>:</b>               | 0.98              | <b>Rotation:</b>      | 0.000°       |

### ICE & WIND PARAMETERS

|                               |          |                                   |           |
|-------------------------------|----------|-----------------------------------|-----------|
| <b>Exposure Category:</b>     | B        | <b>Design Wind Speed w/o Ice:</b> | 119 mph   |
| <b>Risk Category:</b>         | II       | <b>Design Wind Speed w/Ice:</b>   | 50 mph    |
| <b>Topo Factor Procedure:</b> | Method 2 | <b>Operational Wind Speed:</b>    | 60 mph    |
|                               |          | <b>Design Ice Thickness:</b>      | 1.50 in   |
|                               |          | <b>HMSL:</b>                      | 547.00 ft |
| <b>Crest Height(H):</b>       | 344 ft   | <b>Distance from Apex (x):</b>    | 483 ft    |
| <b>Crest Length(L):</b>       | 2786 ft  | <b>Upwind/Downwind:</b>           | Upwind    |
| <b>Feature:</b>               | Hill     |                                   |           |

### SEISMIC PARAMETERS

|                             |                                 |   |       |
|-----------------------------|---------------------------------|---|-------|
| <b>Analysis Method:</b>     | Equivalent Lateral Force Method |   |       |
| <b>Site Class:</b>          | D - Stiff Soil                  | <b>Period Based on Rayleigh Method (sec):</b> | 3.20  |
| <b>T<sub>L</sub> (sec):</b> | 6                               | <b>P:</b>                                     | 1     |
| <b>S<sub>s</sub>:</b>       | 0.193                           | <b>S<sub>1</sub>:</b>                         | 0.055 |
| <b>F<sub>a</sub>:</b>       | 1.600                           | <b>F<sub>v</sub>:</b>                         | 2.400 |
| <b>S<sub>ds</sub>:</b>      | 0.206                           | <b>S<sub>d1</sub>:</b>                        | 0.088 |
|                             |                                 | <b>C<sub>s</sub>:</b>                         | 0.030 |
|                             |                                 | <b>C<sub>s</sub> Max:</b>                     | 0.030 |
|                             |                                 | <b>C<sub>s</sub> Min:</b>                     | 0.030 |

### LOAD CASES

|                      |                                  |
|----------------------|----------------------------------|
| 1.2D + 1.0W          | 119 mph wind with no ice         |
| 0.9D + 1.0W          | 119 mph wind with no ice         |
| 1.2D + 1.0Di + 1.0Wi | 50 mph wind with 1.5" radial ice |
| 1.2D + 1.0Ev + 1.0Eh | Seismic                          |
| 0.9D - 1.0Ev + 1.0Eh | Seismic (Reduced DL)             |
| 1.0D + 1.0W          | 60 mph Wind with No Ice          |

**SHAFT SECTION PROPERTIES**

| Sect Info    | Length (ft) | Thick (in) | Fy (ksi) | Joint Type | Slip Joint len (in) | Weight (lb) | Bottom   |           |                         |                       |           |           | Top      |           |                         |                       |           |           |               |
|--------------|-------------|------------|----------|------------|---------------------|-------------|----------|-----------|-------------------------|-----------------------|-----------|-----------|----------|-----------|-------------------------|-----------------------|-----------|-----------|---------------|
|              |             |            |          |            |                     |             | Dia (in) | Elev (ft) | Area (in <sup>2</sup> ) | Ix (in <sup>4</sup> ) | W/t Ratio | D/t Ratio | Dia (in) | Elev (in) | Area (in <sup>2</sup> ) | Ix (in <sup>4</sup> ) | W/t Ratio | D/t Ratio | Taper (in/ft) |
| 1-18         | 49.00       | 0.5000     | 65       |            | 0.00                | 13,584      | 56.91    | 0.000     | 89.52                   | 35,990.1              | 18.31     | 113.82    | 46.77    | 49.00     | 73.42                   | 19,857.1              | 14.73     | 93.53     | 0.2070        |
| 2-18         | 49.25       | 0.4063     | 65       | Slip       | 75.00               | 9,371       | 48.87    | 42.750    | 62.50                   | 18,549.0              | 19.45     | 120.29    | 38.68    | 92.00     | 49.35                   | 9,133.1               | 15.02     | 95.20     | 0.2070        |
| 3-18         | 49.00       | 0.3438     | 65       | Slip       | 60.00               | 6,364       | 40.40    | 87.000    | 43.71                   | 8,860.8               | 18.96     | 117.51    | 30.26    | 136.00    | 32.64                   | 3,690.1               | 13.75     | 88.01     | 0.2070        |
| 4-18         | 46.00       | 0.2188     | 65       | Slip       | 48.00               | 2,885       | 31.52    | 0         | 21.74                   | 2,691.5               | 23.64     | 144.07    | 22.00    | 178.00    | 15.13                   | 906.7                 | 15.97     | 100.55    | 0.2070        |
| Shaft Weight |             |            |          |            |                     | 32,204      |          |           |                         |                       |           |           |          |           |                         |                       |           |           |               |

**DISCRETE APPURTENANCE PROPERTIES**

| Attach Elev (ft) | Description                    | Qty | Ka   | Vert Ecc (ft) | No Ice      |           |                    | Ice         |           |                    |
|------------------|--------------------------------|-----|------|---------------|-------------|-----------|--------------------|-------------|-----------|--------------------|
|                  |                                |     |      |               | Weight (lb) | EPAA (sf) | Orientation Factor | Weight (lb) | EPAA (sf) | Orientation Factor |
| 180.40           | Powerwave Allgon 7120.16.05.00 | 12  | 0.80 | 0.000         | 15.40       | 5.317     | 0.70               | 186.10      | 4.977     | 0.70               |
| 178.00           | Generic Flat Low Profile Platf | 1   | 1.00 | 0.000         | 1875.00     | 26.100    | 1.00               | 2762.24     | 47.016    | 1.00               |
| 168.00           | Generic Flat Platform with Han | 1   | 1.00 | 0.000         | 2500.00     | 42.400    | 1.00               | 4438.78     | 65.288    | 1.00               |
| 168.00           | RFS APXVTM14-ALU-I20           | 3   | 0.75 | 3.000         | 56.20       | 6.342     | 0.66               | 206.48      | 8.719     | 0.66               |
| 168.00           | Commscope NNVV-65B-R4          | 3   | 0.75 | 3.000         | 77.40       | 12.271    | 0.64               | 351.63      | 15.331    | 0.64               |
| 168.00           | Alcatel-Lucent TD-RRH8x20-25 w | 3   | 0.75 | 3.800         | 70.00       | 4.046     | 0.50               | 173.14      | 5.495     | 0.50               |
| 168.00           | Alcatel-Lucent 1900 MHz 4X45 R | 3   | 0.75 | 3.000         | 60.00       | 2.322     | 0.50               | 147.95      | 3.501     | 0.50               |
| 168.00           | Alcatel-Lucent RRH2x50-08      | 6   | 0.75 | 2.800         | 52.90       | 1.701     | 0.50               | 117.57      | 2.643     | 0.50               |
| 160.00           | Generic Flat Platform with Han | 1   | 1.00 | 0.000         | 2500.00     | 42.400    | 1.00               | 4432.85     | 65.218    | 1.00               |
| 158.00           | Antel LPA-80080/4CF            | 6   | 0.75 | 1.500         | 12.00       | 5.399     | 0.62               | 161.57      | 3.541     | 0.62               |
| 158.00           | Samsung MT6407-77A             | 3   | 0.75 | 0.000         | 81.60       | 4.709     | 0.61               | 192.38      | 6.360     | 0.61               |
| 158.00           | Raycap RVZDC-6627-PF-48        | 1   | 0.75 | 0.000         | 32.00       | 3.781     | 0.50               | 151.19      | 5.218     | 0.50               |
| 158.00           | Samsung B2/B66A RRH-BR049      | 3   | 0.75 | 0.000         | 84.40       | 1.875     | 0.50               | 153.74      | 2.856     | 0.50               |
| 158.00           | Samsung B5/B13 RRH-BR04C       | 3   | 0.75 | 0.000         | 70.30       | 1.875     | 0.50               | 132.47      | 2.856     | 0.50               |
| 158.00           | Andrew SBNHH-1D65B             | 6   | 0.75 | 2.100         | 50.70       | 8.173     | 0.69               | 241.42      | 11.249    | 0.69               |
| 148.00           | Ericsson Air6449 B41           | 3   | 0.75 | 0.000         | 104.00      | 5.682     | 0.63               | 251.53      | 7.400     | 0.63               |
| 148.00           | Ericsson 4460 BAND 2/25        | 3   | 0.75 | 0.000         | 109.00      | 2.564     | 0.67               | 204.68      | 3.705     | 0.67               |
| 148.00           | RFS APXAARR24_43-U-NA20        | 3   | 0.75 | -1.900        | 127.90      | 20.243    | 0.63               | 552.88      | 24.258    | 0.63               |
| 148.00           | Ericsson Radio 4449 B12,B71    | 3   | 0.75 | -0.400        | 74.00       | 1.639     | 0.50               | 134.61      | 2.552     | 0.50               |
| 147.00           | Generic Round Platform with Ha | 1   | 1.00 | 0.000         | 2500.00     | 27.200    | 1.00               | 4252.15     | 53.643    | 1.00               |
| 147.00           | Generic Mount Reinforcement    | 3   | 1.00 | 0.000         | 200.00      | 7.500     | 1.00               | 409.35      | 15.599    | 1.00               |
| 137.00           | Platform with Handrails RMQP-4 | 1   | 1.00 | 0.000         | 2500.00     | 34.800    | 1.00               | 4375.27     | 60.904    | 1.00               |
| 137.00           | CCI DMP65R-BU6DA               | 6   | 0.75 | -0.700        | 79.40       | 12.709    | 0.63               | 356.76      | 15.712    | 0.63               |
| 137.00           | Powerwave Allgon 7770.00       | 3   | 0.75 | -0.400        | 35.00       | 5.508     | 0.65               | 157.40      | 7.797     | 0.65               |
| 137.00           | Ericsson RRUS 4449 B5, B12     | 3   | 0.75 | 0.700         | 71.00       | 1.969     | 0.50               | 140.39      | 2.973     | 0.50               |
| 137.00           | Ericsson RRUS 4478 B14         | 3   | 0.75 | 0.600         | 59.90       | 1.842     | 0.50               | 119.43      | 2.808     | 0.50               |
| 137.00           | Ericsson RRUS 8843 B2, B66A    | 3   | 0.75 | 0.600         | 72.00       | 1.639     | 0.50               | 138.00      | 2.549     | 0.50               |
| 137.00           | Raycap DC6-48-60-18-8F ("Squid | 3   | 0.75 | 1.100         | 31.80       | 1.470     | 0.50               | 98.23       | 2.222     | 0.50               |
| 137.00           | LGP Allgon LGP21903            | 6   | 0.75 | -2.400        | 5.50        | 0.231     | 0.50               | 14.56       | 0.597     | 0.50               |
| 137.00           | Powerwave Allgon LGP21401      | 6   | 0.75 | -0.800        | 14.10       | 1.104     | 0.50               | 40.96       | 1.872     | 0.50               |
| 124.00           | Generic Flat Platform with Han | 1   | 1.00 | 0.000         | 2500.00     | 42.400    | 1.00               | 4397.58     | 64.802    | 1.00               |
| 124.00           | JMA Wireless MX08FRO665-21     | 3   | 0.75 | 0.000         | 64.50       | 12.489    | 0.64               | 339.05      | 15.491    | 0.64               |
| 124.00           | Fujitsu TA08025-B604           | 3   | 0.75 | 0.000         | 63.90       | 1.962     | 0.50               | 126.19      | 2.945     | 0.50               |
| 124.00           | Fujitsu TA08025-B605           | 3   | 0.75 | 0.000         | 75.00       | 1.962     | 0.50               | 141.92      | 2.945     | 0.50               |
| 124.00           | Commscope RDIDC-9181-PF-48     | 1   | 0.75 | 0.000         | 21.90       | 1.867     | 0.50               | 82.69       | 2.828     | 0.50               |
| 110.00           | Stand-Off                      | 1   | 1.00 | 0.000         | 100.00      | 3.000     | 1.00               | 151.66      | 4.661     | 1.00               |
| 108.00           | Generic GPS                    | 1   | 1.00 | -1.400        | 10.00       | 0.900     | 0.50               | 40.94       | 1.576     | 0.50               |
| 97.00            | Stand-Off                      | 1   | 1.00 | 0.000         | 100.00      | 3.000     | 1.00               | 151.17      | 4.645     | 1.00               |
| 97.00            | Generic GPS                    | 1   | 1.00 | -1.300        | 10.00       | 0.900     | 0.50               | 40.70       | 1.571     | 0.50               |
| 88.50            | Generic GPS                    | 1   | 1.00 | 0.000         | 10.00       | 0.900     | 0.50               | 40.50       | 1.567     | 0.50               |
| 88.00            | Stand-Off                      | 1   | 1.00 | 0.000         | 100.00      | 3.000     | 1.00               | 150.80      | 4.633     | 1.00               |
| 12.00            | Stand-Off                      | 1   | 1.00 | 0.000         | 100.00      | 3.000     | 1.00               | 142.17      | 4.355     | 1.00               |
| Totals           | Num Loadings: 42               |     |      |               | 123         | 21,095.00 |                    | 45,955.28   |           |                    |

**LINEAR APPURTENANCE PROPERTIES**

Load Case Azimuth (deg) : 0.00

| Elev From (ft) | Elev To (ft) | Qty | Description           | Coax Dia (in) | Coax Wt (lb/ft) | Max Flat | Dist Coax/ Row | Dist Between Rows (in) | Dist Between Cols (in) | Azimuth (deg) | Dist From Face (in) | Exposed To Wind | Carrier       |
|----------------|--------------|-----|-----------------------|---------------|-----------------|----------|----------------|------------------------|------------------------|---------------|---------------------|-----------------|---------------|
| 0.00           | 168.00       | 6   | 1 5/8" Coax           | 1.98          | 0.82            | N        | 0              | 0                      | 0                      | 0             | 0                   | N               | SPRINT NEXTEL |
| 0.00           | 168.00       | 4   | 1 1/4" Hybriflex Cabl | 1.54          | 1               | N        | 0              | 0                      | 0                      | 0             | 0                   | N               | SPRINT NEXTEL |

ASSET: 302472, Andover-bunker Hill Road  
 CUSTOMER: T-MOBILE

CODE: ANSI/TIA-222-H  
 ENG NO: 13764996\_C3\_03

| Elev From (ft) | Elev To (ft) | Qty | Description           | Coax Dia (in) | Coax Wt (lb/ft) | Flat | Max Coax/ Row | Dist Between Rows(in) | Dist Between Cols(in) | Azimuth (deg) | Dist From Face (in) | Exposed To Wind | Carrier       |
|----------------|--------------|-----|-----------------------|---------------|-----------------|------|---------------|-----------------------|-----------------------|---------------|---------------------|-----------------|---------------|
| 0.00           | 158.00       | 6   | 1 5/8" Coax           | 1.98          | 0.82            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | VERIZON WIREL |
| 0.00           | 158.00       | 2   | 1 5/8" Hybriflex      | 1.98          | 1.3             | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | VERIZON WIREL |
| 0.00           | 148.00       | 3   | 1.99" (50.7mm) Hybrid | 1.99          | 1.9             | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | T-MOBILE      |
| 0.00           | 148.00       | 1   | 1 1/4" Hybriflex Cabl | 1.54          | 1               | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | T-MOBILE      |
| 0.00           | 138.00       | 2   | 2" Carflex Non-Metall | 2.36          | 0.68            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | AT&T MOBILITY |
| 0.00           | 137.00       | 12  | 1 1/4" Coax           | 1.55          | 0.63            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | AT&T MOBILITY |
| 0.00           | 137.00       | 6   | 0.78" (19.7mm) 8 AWG  | 0.78          | 0.59            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | AT&T MOBILITY |
| 0.00           | 137.00       | 2   | 0.39" (10mm) Fiber Tr | 0.39          | 0.06            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | AT&T MOBILITY |
| 0.00           | 124.00       | 1   | 1.60" (40.6mm) Hybrid | 1.6           | 2.34            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | DISH WIRELESS |
| 0.00           | 108.00       | 1   | 1/2" Coax             | 0.63          | 0.15            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | VERIZON WIREL |
| 0.00           | 97.00        | 1   | 1/2" Coax             | 0.63          | 0.15            | N    | 0             | 0                     | 0                     | 0             | 0                   | N               | SPRINT NEXTEL |

SEGMENT PROPERTIES

(Max Len: 5.ft)

| Seg Top Elev (ft) | Description     | Thick (in) | Flat Dia (in) | Area (in <sup>2</sup> ) | Ix (in <sup>4</sup> ) | W/t Ratio | D/t Ratio | F'y (ksi) | S (in <sup>3</sup> ) | Z (in <sup>3</sup> ) | Weight (lb) |
|-------------------|-----------------|------------|---------------|-------------------------|-----------------------|-----------|-----------|-----------|----------------------|----------------------|-------------|
| 0.00              |                 | 0.5000     | 56.910        | 89.519                  | 35,990.10             | 18.31     | 113.82    | 79.9      | 1245.6               | 0.0                  | 0.0         |
| 5.00              |                 | 0.5000     | 55.875        | 87.877                  | 34,045.10             | 17.94     | 111.75    | 80.3      | 1200.1               | 0.0                  | 1,509.1     |
| 10.00             |                 | 0.5000     | 54.840        | 86.234                  | 32,171.50             | 17.58     | 109.68    | 80.7      | 1155.5               | 0.0                  | 1,481.2     |
| 12.00             |                 | 0.5000     | 54.426        | 85.577                  | 31,441.70             | 17.43     | 108.85    | 80.9      | 1137.8               | 0.0                  | 584.6       |
| 15.00             |                 | 0.5000     | 53.805        | 84.592                  | 30,367.90             | 17.21     | 107.61    | 81.2      | 1111.7               | 0.0                  | 868.6       |
| 20.00             |                 | 0.5000     | 52.770        | 82.949                  | 28,633.10             | 16.85     | 105.54    | 81.6      | 1068.7               | 0.0                  | 1,425.3     |
| 25.00             |                 | 0.5000     | 51.735        | 81.307                  | 26,965.50             | 16.48     | 103.47    | 82        | 1026.6               | 0.0                  | 1,397.3     |
| 30.00             |                 | 0.5000     | 50.700        | 79.664                  | 25,364.10             | 16.12     | 101.40    | 82.4      | 985.4                | 0.0                  | 1,369.4     |
| 35.00             |                 | 0.5000     | 49.665        | 78.022                  | 23,827.30             | 15.75     | 99.33     | 82.6      | 944.9                | 0.0                  | 1,341.4     |
| 40.00             |                 | 0.5000     | 48.630        | 76.379                  | 22,353.90             | 15.39     | 97.26     | 82.6      | 905.4                | 0.0                  | 1,313.5     |
| 42.75             | Bot - Section 2 | 0.5000     | 48.060        | 75.476                  | 21,570.00             | 15.19     | 96.12     | 82.6      | 884.0                | 0.0                  | 710.5       |
| 45.00             |                 | 0.5000     | 47.595        | 74.736                  | 20,942.50             | 15.02     | 95.19     | 82.6      | 866.7                | 0.0                  | 1,051.2     |
| 49.00             | Top - Section 1 | 0.4063     | 47.579        | 60.832                  | 17,102.90             | 18.89     | 117.10    | 79.2      | 708.0                | 0.0                  | 1,843.6     |
| 50.00             |                 | 0.4063     | 47.372        | 60.565                  | 16,878.70             | 18.80     | 116.59    | 79.3      | 701.8                | 0.0                  | 206.5       |
| 55.00             |                 | 0.4063     | 46.337        | 59.230                  | 15,787.20             | 18.35     | 114.05    | 79.8      | 671.1                | 0.0                  | 1,019.1     |
| 60.00             |                 | 0.4063     | 45.302        | 57.895                  | 14,743.80             | 17.90     | 111.50    | 80.4      | 641.0                | 0.0                  | 996.4       |
| 65.00             |                 | 0.4063     | 44.267        | 56.561                  | 13,747.40             | 17.45     | 108.95    | 80.9      | 611.7                | 0.0                  | 973.7       |
| 70.00             |                 | 0.4063     | 43.232        | 55.226                  | 12,796.90             | 17.00     | 106.40    | 81.4      | 583.0                | 0.0                  | 951.0       |
| 75.00             |                 | 0.4063     | 42.197        | 53.891                  | 11,891.30             | 16.55     | 103.86    | 81.9      | 555.0                | 0.0                  | 928.3       |
| 80.00             |                 | 0.4063     | 41.162        | 52.556                  | 11,029.50             | 16.10     | 101.31    | 82.5      | 527.8                | 0.0                  | 905.5       |
| 85.00             |                 | 0.4063     | 40.127        | 51.222                  | 10,210.30             | 15.65     | 98.76     | 82.6      | 501.2                | 0.0                  | 882.8       |
| 87.00             | Bot - Section 3 | 0.4063     | 39.713        | 50.688                  | 9,894.30              | 15.47     | 97.74     | 82.6      | 490.7                | 0.0                  | 346.8       |
| 88.00             |                 | 0.4063     | 39.506        | 50.421                  | 9,738.80              | 15.38     | 97.23     | 82.6      | 485.5                | 0.0                  | 320.4       |
| 88.50             |                 | 0.4063     | 39.402        | 50.287                  | 9,661.70              | 15.34     | 96.98     | 82.6      | 483.0                | 0.0                  | 159.6       |
| 90.00             |                 | 0.4063     | 39.092        | 49.887                  | 9,432.70              | 15.20     | 96.21     | 82.6      | 475.3                | 0.0                  | 476.2       |
| 92.00             | Top - Section 2 | 0.3438     | 39.365        | 42.580                  | 8,191.60              | 18.43     | 114.50    | 79.7      | 409.9                | 0.0                  | 629.0       |
| 95.00             |                 | 0.3438     | 38.744        | 41.902                  | 7,806.60              | 18.11     | 112.69    | 80.1      | 396.9                | 0.0                  | 431.2       |
| 97.00             |                 | 0.3438     | 38.330        | 41.450                  | 7,556.90              | 17.90     | 111.49    | 80.4      | 388.3                | 0.0                  | 283.6       |
| 100.00            |                 | 0.3438     | 37.709        | 40.773                  | 7,192.20              | 17.58     | 109.68    | 80.7      | 375.7                | 0.0                  | 419.7       |
| 105.00            |                 | 0.3438     | 36.674        | 39.643                  | 6,611.00              | 17.05     | 106.67    | 81.4      | 355.0                | 0.0                  | 684.1       |
| 108.00            |                 | 0.3438     | 36.053        | 38.966                  | 6,277.70              | 16.73     | 104.87    | 81.7      | 343.0                | 0.0                  | 401.2       |
| 110.00            |                 | 0.3438     | 35.639        | 38.514                  | 6,061.90              | 16.52     | 103.66    | 82        | 335.0                | 0.0                  | 263.6       |
| 115.00            |                 | 0.3438     | 34.604        | 37.384                  | 5,544.10              | 15.98     | 100.65    | 82.6      | 315.6                | 0.0                  | 645.7       |
| 120.00            |                 | 0.3438     | 33.569        | 36.255                  | 5,056.60              | 15.45     | 97.64     | 82.6      | 296.7                | 0.0                  | 626.4       |
| 124.00            |                 | 0.3438     | 32.741        | 35.351                  | 4,687.90              | 15.03     | 95.23     | 82.6      | 282.0                | 0.0                  | 487.3       |
| 125.00            |                 | 0.3438     | 32.534        | 35.126                  | 4,598.60              | 14.92     | 94.63     | 82.6      | 278.4                | 0.0                  | 119.9       |
| 130.00            |                 | 0.3438     | 31.499        | 33.996                  | 4,169.10              | 14.39     | 91.62     | 82.6      | 260.7                | 0.0                  | 588.0       |
| 132.00            | Bot - Section 4 | 0.3438     | 31.085        | 33.544                  | 4,005.10              | 14.18     | 90.42     | 82.6      | 253.8                | 0.0                  | 229.8       |
| 135.00            |                 | 0.3438     | 30.464        | 32.867                  | 3,767.30              | 13.86     | 88.61     | 82.6      | 243.6                | 0.0                  | 558.7       |
| 136.00            | Top - Section 3 | 0.2188     | 30.695        | 21.164                  | 2,483.50              | 22.97     | 140.29    | 74.4      | 159.4                | 0.0                  | 183.7       |
| 137.00            |                 | 0.2188     | 30.488        | 21.020                  | 2,433.20              | 22.81     | 139.34    | 74.6      | 157.2                | 0.0                  | 71.8        |
| 140.00            |                 | 0.2188     | 29.867        | 20.589                  | 2,286.50              | 22.31     | 136.50    | 75.2      | 150.8                | 0.0                  | 212.4       |
| 145.00            |                 | 0.2188     | 28.832        | 19.870                  | 2,055.30              | 21.47     | 131.77    | 76.1      | 140.4                | 0.0                  | 344.2       |
| 147.00            |                 | 0.2188     | 28.418        | 19.583                  | 1,967.40              | 21.14     | 129.88    | 76.5      | 136.4                | 0.0                  | 134.2       |
| 148.00            |                 | 0.2188     | 28.211        | 19.439                  | 1,924.30              | 20.97     | 128.93    | 76.7      | 134.4                | 0.0                  | 66.4        |
| 150.00            |                 | 0.2188     | 27.797        | 19.151                  | 1,840.20              | 20.64     | 127.04    | 77.1      | 130.4                | 0.0                  | 131.3       |
| 155.00            |                 | 0.2188     | 26.761        | 18.432                  | 1,640.70              | 19.80     | 122.31    | 78.1      | 120.8                | 0.0                  | 319.7       |
| 158.00            |                 | 0.2188     | 26.140        | 18.001                  | 1,528.20              | 19.30     | 119.47    | 78.7      | 115.1                | 0.0                  | 186.0       |
| 160.00            |                 | 0.2188     | 25.726        | 17.714                  | 1,456.10              | 18.97     | 117.58    | 79.1      | 111.5                | 0.0                  | 121.5       |
| 165.00            |                 | 0.2188     | 24.691        | 16.995                  | 1,286.00              | 18.14     | 112.85    | 80.1      | 102.6                | 0.0                  | 295.3       |
| 168.00            |                 | 0.2188     | 24.070        | 16.564                  | 1,190.50              | 17.63     | 110.01    | 80.7      | 97.4                 | 0.0                  | 171.3       |
| 170.00            |                 | 0.2188     | 23.656        | 16.276                  | 1,129.60              | 17.30     | 108.12    | 81.1      | 94.1                 | 0.0                  | 111.7       |
| 175.00            |                 | 0.2188     | 22.621        | 15.557                  | 986.50                | 16.47     | 103.39    | 82        | 85.9                 | 0.0                  | 270.8       |
| 178.00            |                 | 0.2188     | 22.000        | 15.126                  | 906.70                | 15.97     | 100.55    | 82.6      | 81.2                 | 0.0                  | 156.6       |

Totals: 32,207.1



|                        |                          |               |
|------------------------|--------------------------|---------------|
| Load Case: 1.2D + 1.0W | 119 mph wind with no ice | 27 Iterations |
| Gust Response Factor:  | 1.10                     |               |
| Dead load Factor:      | 1.20                     |               |
| Wind Load Factor:      | 1.00                     |               |

**CALCULATED FORCES**

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (ft-kips) | Phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|------------------|------------------|--------------------|----------------|-------|
| 0.00          | -70.74           | -44.26           | 0.00            | -5,814.8        | 0.00            | 5,814.80                   | 6,434.86      | 1,571.07      | 8,004.98         | 7,461.32         | 0                  | 0              | 0.791 |
| 5.00          | -68.53           | -43.90           | 0.00            | -5,593.5        | 0.00            | 5,593.53                   | 6,350.74      | 1,542.24      | 7,713.96         | 7,227.49         | 0.12               | -0.23          | 0.786 |
| 10.00         | -66.40           | -43.64           | 0.00            | -5,374.0        | 0.00            | 5,374.03                   | 6,265.35      | 1,513.41      | 7,428.32         | 6,995.84         | 0.48               | -0.45          | 0.780 |
| 12.00         | -65.40           | -43.36           | 0.00            | -5,286.7        | 0.00            | 5,286.74                   | 6,230.84      | 1,501.88      | 7,315.57         | 6,903.82         | 0.69               | -0.55          | 0.777 |
| 15.00         | -64.08           | -43.09           | 0.00            | -5,156.7        | 0.00            | 5,156.66                   | 6,178.70      | 1,484.59      | 7,148.07         | 6,766.48         | 1.08               | -0.69          | 0.773 |
| 20.00         | -61.98           | -42.74           | 0.00            | -4,941.2        | 0.00            | 4,941.23                   | 6,090.77      | 1,455.76      | 6,873.21         | 6,539.47         | 1.93               | -0.93          | 0.767 |
| 25.00         | -59.90           | -42.39           | 0.00            | -4,727.6        | 0.00            | 4,727.55                   | 6,001.58      | 1,426.93      | 6,603.74         | 6,314.89         | 3.03               | -1.17          | 0.759 |
| 30.00         | -57.86           | -42.03           | 0.00            | -4,515.6        | 0.00            | 4,515.63                   | 5,911.12      | 1,398.11      | 6,339.66         | 6,092.84         | 4.38               | -1.41          | 0.752 |
| 35.00         | -55.86           | -41.66           | 0.00            | -4,305.5        | 0.00            | 4,305.48                   | 5,796.61      | 1,369.28      | 6,080.96         | 5,850.41         | 5.99               | -1.66          | 0.746 |
| 40.00         | -53.92           | -41.35           | 0.00            | -4,097.2        | 0.00            | 4,097.18                   | 5,674.58      | 1,340.45      | 5,827.66         | 5,605.46         | 7.87               | -1.91          | 0.741 |
| 42.75         | -52.86           | -41.14           | 0.00            | -3,983.5        | 0.00            | 3,983.48                   | 5,607.46      | 1,324.60      | 5,690.63         | 5,472.97         | 9.01               | -2.05          | 0.738 |
| 45.00         | -51.40           | -40.87           | 0.00            | -3,890.9        | 0.00            | 3,890.92                   | 5,552.55      | 1,311.63      | 5,579.74         | 5,365.75         | 10                 | -2.17          | 0.735 |
| 49.00         | -48.92           | -40.59           | 0.00            | -3,727.4        | 0.00            | 3,727.45                   | 4,335.44      | 1,067.60      | 4,548.90         | 4,204.89         | 11.91              | -2.37          | 0.899 |
| 50.00         | -48.52           | -40.37           | 0.00            | -3,686.9        | 0.00            | 3,686.86                   | 4,322.18      | 1,062.91      | 4,509.07         | 4,173.47         | 12.41              | -2.43          | 0.896 |
| 55.00         | -46.88           | -39.97           | 0.00            | -3,485.0        | 0.00            | 3,485.00                   | 4,255.09      | 1,039.49      | 4,312.54         | 4,017.36         | 15.11              | -2.73          | 0.880 |
| 60.00         | -45.28           | -39.55           | 0.00            | -3,285.2        | 0.00            | 3,285.16                   | 4,186.73      | 1,016.06      | 4,120.39         | 3,862.97         | 18.13              | -3.03          | 0.863 |
| 65.00         | -43.70           | -39.12           | 0.00            | -3,087.4        | 0.00            | 3,087.42                   | 4,117.10      | 992.64        | 3,932.62         | 3,710.36         | 21.48              | -3.34          | 0.844 |
| 70.00         | -42.16           | -38.68           | 0.00            | -2,891.8        | 0.00            | 2,891.83                   | 4,046.20      | 969.21        | 3,749.23         | 3,559.63         | 25.14              | -3.65          | 0.824 |
| 75.00         | -40.65           | -38.24           | 0.00            | -2,698.4        | 0.00            | 2,698.42                   | 3,974.03      | 945.79        | 3,570.22         | 3,410.85         | 29.13              | -3.96          | 0.803 |
| 80.00         | -39.17           | -37.78           | 0.00            | -2,507.2        | 0.00            | 2,507.25                   | 3,900.60      | 922.36        | 3,395.59         | 3,264.10         | 33.44              | -4.27          | 0.780 |
| 85.00         | -37.78           | -37.43           | 0.00            | -2,318.3        | 0.00            | 2,318.34                   | 3,805.51      | 898.94        | 3,225.33         | 3,102.86         | 38.08              | -4.58          | 0.759 |
| 87.00         | -37.22           | -37.28           | 0.00            | -2,243.5        | 0.00            | 2,243.48                   | 3,765.85      | 889.57        | 3,158.45         | 3,038.19         | 40.03              | -4.71          | 0.750 |
| 88.00         | -36.66           | -37.04           | 0.00            | -2,206.2        | 0.00            | 2,206.20                   | 3,746.02      | 884.89        | 3,125.28         | 3,006.11         | 41.02              | -4.78          | 0.745 |
| 88.50         | -36.41           | -36.93           | 0.00            | -2,187.7        | 0.00            | 2,187.68                   | 3,736.10      | 882.54        | 3,108.76         | 2,990.14         | 41.52              | -4.81          | 0.743 |
| 90.00         | -35.71           | -36.75           | 0.00            | -2,132.3        | 0.00            | 2,132.29                   | 3,706.35      | 875.52        | 3,059.45         | 2,942.46         | 43.05              | -4.9           | 0.736 |
| 92.00         | -34.79           | -36.49           | 0.00            | -2,058.8        | 0.00            | 2,058.80                   | 3,055.31      | 747.27        | 2,633.87         | 2,450.78         | 45.13              | -5.03          | 0.854 |
| 95.00         | -34.06           | -36.25           | 0.00            | -1,949.4        | 0.00            | 1,949.35                   | 3,020.81      | 735.38        | 2,550.71         | 2,384.21         | 48.34              | -5.22          | 0.831 |
| 97.00         | -33.43           | -35.86           | 0.00            | -1,876.9        | 0.00            | 1,876.86                   | 2,997.56      | 727.45        | 2,496.01         | 2,340.12         | 50.56              | -5.36          | 0.816 |
| 100.00        | -32.67           | -35.51           | 0.00            | -1,769.3        | 0.00            | 1,769.30                   | 2,962.30      | 715.56        | 2,415.08         | 2,274.45         | 53.98              | -5.56          | 0.791 |
| 105.00        | -31.51           | -35.12           | 0.00            | -1,591.8        | 0.00            | 1,591.75                   | 2,902.52      | 695.74        | 2,283.15         | 2,166.26         | 59.98              | -5.89          | 0.748 |
| 108.00        | -30.81           | -34.85           | 0.00            | -1,486.4        | 0.00            | 1,486.40                   | 2,866.04      | 683.85        | 2,205.78         | 2,102.12         | 63.74              | -6.09          | 0.720 |
| 110.00        | -30.21           | -34.40           | 0.00            | -1,416.7        | 0.00            | 1,416.70                   | 2,841.47      | 675.92        | 2,154.93         | 2,059.71         | 66.32              | -6.23          | 0.701 |
| 115.00        | -29.09           | -33.93           | 0.00            | -1,244.7        | 0.00            | 1,244.70                   | 2,777.47      | 656.10        | 2,030.42         | 1,953.71         | 72.99              | -6.54          | 0.650 |
| 120.00        | -28.01           | -33.48           | 0.00            | -1,075.1        | 0.00            | 1,075.08                   | 2,693.56      | 636.27        | 1,909.61         | 1,836.87         | 79.99              | -6.84          | 0.598 |
| 124.00        | -23.87           | -29.51           | 0.00            | -941.2          | 0.00            | 941.16                     | 2,626.43      | 620.42        | 1,815.63         | 1,746.00         | 85.8               | -7.06          | 0.550 |
| 125.00        | -23.64           | -29.26           | 0.00            | -911.6          | 0.00            | 911.64                     | 2,609.65      | 616.45        | 1,792.50         | 1,723.64         | 87.28              | -7.12          | 0.540 |
| 130.00        | -22.69           | -28.88           | 0.00            | -765.3          | 0.00            | 765.34                     | 2,525.74      | 596.63        | 1,679.10         | 1,614.02         | 94.86              | -7.38          | 0.486 |
| 132.00        | -22.30           | -28.64           | 0.00            | -707.6          | 0.00            | 707.59                     | 2,492.18      | 588.70        | 1,634.78         | 1,571.17         | 97.96              | -7.48          | 0.462 |
| 135.00        | -21.48           | -28.37           | 0.00            | -621.7          | 0.00            | 621.68                     | 2,441.83      | 576.81        | 1,569.41         | 1,507.99         | 102.69             | -7.62          | 0.423 |
| 136.00        | -21.21           | -28.26           | 0.00            | -593.3          | 0.00            | 593.31                     | 1,416.76      | 371.43        | 1,022.39         | 888.99           | 104.29             | -7.67          | 0.688 |
| 137.00        | -17.03           | -22.96           | 0.00            | -565.0          | 0.00            | 565.05                     | 1,410.85      | 368.90        | 1,008.55         | 879.23           | 105.9              | -7.71          | 0.659 |
| 140.00        | -16.65           | -22.62           | 0.00            | -496.2          | 0.00            | 496.16                     | 1,392.81      | 361.33        | 967.59           | 850.05           | 110.79             | -7.9           | 0.600 |
| 145.00        | -16.08           | -22.27           | 0.00            | -383.1          | 0.00            | 383.08                     | 1,361.73      | 348.72        | 901.22           | 801.85           | 119.18             | -8.17          | 0.494 |
| 147.00        | -12.54           | -19.06           | 0.00            | -338.5          | 0.00            | 338.54                     | 1,348.94      | 343.67        | 875.33           | 782.74           | 122.62             | -8.27          | 0.445 |
| 148.00        | -11.27           | -16.56           | 0.00            | -319.5          | 0.00            | 319.47                     | 1,342.47      | 341.15        | 862.53           | 773.23           | 124.35             | -8.32          | 0.424 |
| 150.00        | -11.08           | -16.25           | 0.00            | -286.4          | 0.00            | 286.36                     | 1,329.38      | 336.10        | 837.20           | 754.27           | 127.84             | -8.41          | 0.390 |
| 155.00        | -10.62           | -15.87           | 0.00            | -205.1          | 0.00            | 205.10                     | 1,295.76      | 323.49        | 775.55           | 707.39           | 136.72             | -8.6           | 0.301 |
| 158.00        | -9.44            | -12.72           | 0.00            | -153.5          | 0.00            | 153.54                     | 1,274.98      | 315.92        | 739.68           | 679.62           | 142.13             | -8.69          | 0.235 |
| 160.00        | -6.68            | -9.77            | 0.00            | -128.1          | 0.00            | 128.11                     | 1,260.87      | 310.88        | 716.25           | 661.28           | 145.77             | -8.74          | 0.200 |
| 165.00        | -6.31            | -9.40            | 0.00            | -79.2           | 0.00            | 79.24                      | 1,224.71      | 298.26        | 659.31           | 616.03           | 154.95             | -8.84          | 0.135 |
| 168.00        | -2.48            | -4.32            | 0.00            | -44.8           | 0.00            | 44.85                      | 1,202.41      | 290.69        | 626.27           | 589.33           | 160.5              | -8.89          | 0.078 |
| 170.00        | -2.38            | -4.07            | 0.00            | -36.2           | 0.00            | 36.22                      | 1,187.28      | 285.65        | 604.72           | 571.72           | 164.22             | -8.91          | 0.066 |
| 175.00        | -2.10            | -3.76            | 0.00            | -15.9           | 0.00            | 15.87                      | 1,148.59      | 273.03        | 552.50           | 528.44           | 173.53             | -8.94          | 0.032 |
| 178.00        | 0.00             | -3.39            | 0.00            | -4.6            | 0.00            | 4.58                       | 1,123.79      | 265.46        | 522.30           | 502.56           | 179.13             | -8.95          | 0.009 |

|                            |                          |               |
|----------------------------|--------------------------|---------------|
| Load Case: 0.9D + 1.0W     | 119 mph wind with no ice | 27 Iterations |
| Gust Response Factor: 1.10 |                          |               |
| Dead load Factor: 0.90     |                          |               |
| Wind Load Factor: 1.00     |                          |               |

**CALCULATED FORCES**

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (ft-kips) | Phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|------------------|------------------|--------------------|----------------|-------|
| 0.00          | -53.04           | -44.22           | 0.00            | -5,705.8        | 0.00            | 5,705.78                   | 6,434.86      | 1,571.07      | 8,004.98         | 7,461.32         | 0                  | 0              | 0.774 |
| 5.00          | -51.34           | -43.79           | 0.00            | -5,484.7        | 0.00            | 5,484.69                   | 6,350.74      | 1,542.24      | 7,713.96         | 7,227.49         | 0.12               | -0.22          | 0.768 |
| 10.00         | -49.71           | -43.49           | 0.00            | -5,265.7        | 0.00            | 5,265.73                   | 6,265.35      | 1,513.41      | 7,428.32         | 6,995.84         | 0.47               | -0.45          | 0.761 |
| 12.00         | -48.94           | -43.17           | 0.00            | -5,178.8        | 0.00            | 5,178.75                   | 6,230.84      | 1,501.88      | 7,315.57         | 6,903.82         | 0.68               | -0.54          | 0.759 |
| 15.00         | -47.93           | -42.84           | 0.00            | -5,049.2        | 0.00            | 5,049.24                   | 6,178.70      | 1,484.59      | 7,148.07         | 6,766.48         | 1.06               | -0.68          | 0.755 |
| 20.00         | -46.31           | -42.43           | 0.00            | -4,835.0        | 0.00            | 4,835.02                   | 6,090.77      | 1,455.76      | 6,873.21         | 6,539.47         | 1.89               | -0.91          | 0.748 |
| 25.00         | -44.71           | -42.02           | 0.00            | -4,622.9        | 0.00            | 4,622.86                   | 6,001.58      | 1,426.93      | 6,603.74         | 6,314.89         | 2.97               | -1.14          | 0.740 |
| 30.00         | -43.15           | -41.61           | 0.00            | -4,412.8        | 0.00            | 4,412.75                   | 5,911.12      | 1,398.11      | 6,339.66         | 6,092.84         | 4.3                | -1.38          | 0.732 |
| 35.00         | -41.61           | -41.19           | 0.00            | -4,204.7        | 0.00            | 4,204.70                   | 5,796.61      | 1,369.28      | 6,080.96         | 5,850.41         | 5.87               | -1.62          | 0.727 |
| 40.00         | -40.13           | -40.84           | 0.00            | -3,998.8        | 0.00            | 3,998.77                   | 5,674.58      | 1,340.45      | 5,827.66         | 5,605.46         | 7.7                | -1.87          | 0.721 |
| 42.75         | -39.32           | -40.61           | 0.00            | -3,886.5        | 0.00            | 3,886.47                   | 5,607.46      | 1,324.60      | 5,690.63         | 5,472.97         | 8.82               | -2.01          | 0.718 |
| 45.00         | -38.20           | -40.31           | 0.00            | -3,795.1        | 0.00            | 3,795.10                   | 5,552.55      | 1,311.63      | 5,579.74         | 5,365.75         | 9.79               | -2.12          | 0.715 |
| 49.00         | -36.33           | -40.03           | 0.00            | -3,633.9        | 0.00            | 3,633.86                   | 4,335.44      | 1,067.60      | 4,548.90         | 4,204.89         | 11.66              | -2.32          | 0.874 |
| 50.00         | -36.00           | -39.77           | 0.00            | -3,593.8        | 0.00            | 3,593.84                   | 4,322.18      | 1,062.91      | 4,509.07         | 4,173.47         | 12.15              | -2.37          | 0.871 |
| 55.00         | -34.73           | -39.31           | 0.00            | -3,395.0        | 0.00            | 3,394.98                   | 4,255.09      | 1,039.49      | 4,312.54         | 4,017.36         | 14.79              | -2.67          | 0.855 |
| 60.00         | -33.49           | -38.85           | 0.00            | -3,198.4        | 0.00            | 3,198.42                   | 4,186.73      | 1,016.06      | 4,120.39         | 3,862.97         | 17.74              | -2.97          | 0.837 |
| 65.00         | -32.28           | -38.37           | 0.00            | -3,004.2        | 0.00            | 3,004.19                   | 4,117.10      | 992.64        | 3,932.62         | 3,710.36         | 21.01              | -3.26          | 0.819 |
| 70.00         | -31.09           | -37.89           | 0.00            | -2,812.3        | 0.00            | 2,812.34                   | 4,046.20      | 969.21        | 3,749.23         | 3,559.63         | 24.59              | -3.57          | 0.799 |
| 75.00         | -29.92           | -37.41           | 0.00            | -2,622.9        | 0.00            | 2,622.88                   | 3,974.03      | 945.79        | 3,570.22         | 3,410.85         | 28.48              | -3.87          | 0.778 |
| 80.00         | -28.78           | -36.92           | 0.00            | -2,435.9        | 0.00            | 2,435.86                   | 3,900.60      | 922.36        | 3,395.59         | 3,264.10         | 32.69              | -4.17          | 0.755 |
| 85.00         | -27.71           | -36.55           | 0.00            | -2,251.3        | 0.00            | 2,251.27                   | 3,805.51      | 898.94        | 3,225.33         | 3,102.86         | 37.22              | -4.47          | 0.734 |
| 87.00         | -27.29           | -36.39           | 0.00            | -2,178.2        | 0.00            | 2,178.18                   | 3,765.85      | 889.57        | 3,158.45         | 3,038.19         | 39.12              | -4.6           | 0.726 |
| 88.00         | -26.86           | -36.16           | 0.00            | -2,141.8        | 0.00            | 2,141.79                   | 3,746.02      | 884.89        | 3,125.28         | 3,006.11         | 40.08              | -4.66          | 0.721 |
| 88.50         | -26.67           | -36.04           | 0.00            | -2,123.7        | 0.00            | 2,123.71                   | 3,736.10      | 882.54        | 3,108.76         | 2,990.14         | 40.57              | -4.69          | 0.719 |
| 90.00         | -26.14           | -35.85           | 0.00            | -2,069.6        | 0.00            | 2,069.65                   | 3,706.35      | 875.52        | 3,059.45         | 2,942.46         | 42.06              | -4.78          | 0.712 |
| 92.00         | -25.43           | -35.58           | 0.00            | -1,998.0        | 0.00            | 1,997.95                   | 3,055.31      | 747.27        | 2,633.87         | 2,450.78         | 44.09              | -4.9           | 0.826 |
| 95.00         | -24.87           | -35.33           | 0.00            | -1,891.2        | 0.00            | 1,891.21                   | 3,020.81      | 735.38        | 2,550.71         | 2,384.21         | 47.23              | -5.09          | 0.804 |
| 97.00         | -24.39           | -34.92           | 0.00            | -1,820.6        | 0.00            | 1,820.55                   | 2,997.56      | 727.45        | 2,496.01         | 2,340.12         | 49.38              | -5.22          | 0.788 |
| 100.00        | -23.79           | -34.55           | 0.00            | -1,715.8        | 0.00            | 1,715.78                   | 2,962.30      | 715.56        | 2,415.08         | 2,274.45         | 52.72              | -5.42          | 0.765 |
| 105.00        | -22.90           | -34.14           | 0.00            | -1,543.0        | 0.00            | 1,543.04                   | 2,902.52      | 695.74        | 2,283.15         | 2,166.26         | 58.57              | -5.74          | 0.723 |
| 108.00        | -22.36           | -33.87           | 0.00            | -1,440.6        | 0.00            | 1,440.62                   | 2,866.04      | 683.85        | 2,205.78         | 2,102.12         | 62.23              | -5.94          | 0.696 |
| 110.00        | -21.89           | -33.40           | 0.00            | -1,372.9        | 0.00            | 1,372.89                   | 2,841.47      | 675.92        | 2,154.93         | 2,059.71         | 64.74              | -6.06          | 0.677 |
| 115.00        | -21.03           | -32.90           | 0.00            | -1,205.9        | 0.00            | 1,205.91                   | 2,777.47      | 656.10        | 2,030.42         | 1,953.71         | 71.25              | -6.37          | 0.627 |
| 120.00        | -20.21           | -32.45           | 0.00            | -1,041.4        | 0.00            | 1,041.40                   | 2,693.56      | 636.27        | 1,909.61         | 1,836.87         | 78.06              | -6.65          | 0.577 |
| 124.00        | -17.19           | -28.61           | 0.00            | -911.6          | 0.00            | 911.59                     | 2,626.43      | 620.42        | 1,815.63         | 1,746.00         | 83.71              | -6.87          | 0.531 |
| 125.00        | -17.01           | -28.35           | 0.00            | -883.0          | 0.00            | 882.98                     | 2,609.65      | 616.45        | 1,792.50         | 1,723.64         | 85.16              | -6.93          | 0.521 |
| 130.00        | -16.28           | -27.97           | 0.00            | -741.2          | 0.00            | 741.24                     | 2,525.74      | 596.63        | 1,679.10         | 1,614.02         | 92.53              | -7.18          | 0.468 |
| 132.00        | -15.98           | -27.73           | 0.00            | -685.3          | 0.00            | 685.30                     | 2,492.18      | 588.70        | 1,634.78         | 1,571.17         | 95.55              | -7.28          | 0.445 |
| 135.00        | -15.37           | -27.48           | 0.00            | -602.1          | 0.00            | 602.11                     | 2,441.83      | 576.81        | 1,569.41         | 1,507.99         | 100.16             | -7.41          | 0.408 |
| 136.00        | -15.17           | -27.38           | 0.00            | -574.6          | 0.00            | 574.63                     | 1,416.76      | 371.43        | 1,022.39         | 888.99           | 101.71             | -7.46          | 0.663 |
| 137.00        | -12.16           | -22.24           | 0.00            | -547.2          | 0.00            | 547.25                     | 1,410.85      | 368.90        | 1,008.55         | 879.23           | 103.28             | -7.5           | 0.635 |
| 140.00        | -11.87           | -21.88           | 0.00            | -480.5          | 0.00            | 480.53                     | 1,392.81      | 361.33        | 967.59           | 850.05           | 108.04             | -7.68          | 0.577 |
| 145.00        | -11.44           | -21.54           | 0.00            | -371.1          | 0.00            | 371.12                     | 1,361.73      | 348.72        | 901.22           | 801.85           | 116.2              | -7.95          | 0.475 |
| 147.00        | -8.87            | -18.48           | 0.00            | -328.0          | 0.00            | 328.03                     | 1,348.94      | 343.67        | 875.33           | 782.74           | 119.54             | -8.04          | 0.429 |
| 148.00        | -7.98            | -16.03           | 0.00            | -309.6          | 0.00            | 309.55                     | 1,342.47      | 341.15        | 862.53           | 773.23           | 121.23             | -8.09          | 0.408 |
| 150.00        | -7.84            | -15.73           | 0.00            | -277.5          | 0.00            | 277.48                     | 1,329.38      | 336.10        | 837.20           | 754.27           | 124.63             | -8.18          | 0.376 |
| 155.00        | -7.50            | -15.35           | 0.00            | -198.8          | 0.00            | 198.85                     | 1,295.76      | 323.49        | 775.55           | 707.39           | 133.26             | -8.36          | 0.289 |
| 158.00        | -6.71            | -12.26           | 0.00            | -148.8          | 0.00            | 148.84                     | 1,274.98      | 315.92        | 739.68           | 679.62           | 138.53             | -8.45          | 0.226 |
| 160.00        | -4.72            | -9.44            | 0.00            | -124.3          | 0.00            | 124.32                     | 1,260.87      | 310.88        | 716.25           | 661.28           | 142.07             | -8.5           | 0.193 |
| 165.00        | -4.45            | -9.08            | 0.00            | -77.1           | 0.00            | 77.10                      | 1,224.71      | 298.26        | 659.31           | 616.03           | 151                | -8.6           | 0.130 |
| 168.00        | -1.73            | -4.19            | 0.00            | -43.6           | 0.00            | 43.65                      | 1,202.41      | 290.69        | 626.27           | 589.33           | 156.4              | -8.64          | 0.076 |
| 170.00        | -1.66            | -3.95            | 0.00            | -35.3           | 0.00            | 35.28                      | 1,187.28      | 285.65        | 604.72           | 571.72           | 160.01             | -8.66          | 0.063 |
| 175.00        | -1.46            | -3.66            | 0.00            | -15.5           | 0.00            | 15.54                      | 1,148.59      | 273.03        | 552.50           | 528.44           | 169.07             | -8.69          | 0.031 |
| 178.00        | 0.00             | -3.39            | 0.00            | -4.6            | 0.00            | 4.58                       | 1,123.79      | 265.46        | 522.30           | 502.56           | 174.51             | -8.7           | 0.009 |

|                                 |                                  |      |                            |
|---------------------------------|----------------------------------|------|----------------------------|
| Load Case: 1.2D + 1.0Di + 1.0Wi | 50 mph wind with 1.5" radial ice |      | 27 Iterations              |
| Gust Response Factor: 1.10      | Ice Dead Load Factor             | 1.00 |                            |
| Dead load Factor: 1.20          |                                  |      | Ice Importance Factor 1.00 |
| Wind Load Factor: 1.00          |                                  |      |                            |

**CALCULATED FORCES**

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (ft-kips) | Phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|------------------|------------------|--------------------|----------------|-------|
| 0.00          | -108.67          | -12.54           | 0.00            | -1,706.7        | 0.00            | 1,706.69                   | 6,434.86      | 1,571.07      | 8,004.98         | 7,461.32         | 0                  | 0              | 0.246 |
| 5.00          | -106.14          | -12.47           | 0.00            | -1,644.0        | 0.00            | 1,643.98                   | 6,350.74      | 1,542.24      | 7,713.96         | 7,227.49         | 0.04               | -0.07          | 0.244 |
| 10.00         | -103.61          | -12.42           | 0.00            | -1,581.6        | 0.00            | 1,581.61                   | 6,265.35      | 1,513.41      | 7,428.32         | 6,995.84         | 0.14               | -0.13          | 0.243 |
| 12.00         | -102.45          | -12.36           | 0.00            | -1,556.8        | 0.00            | 1,556.76                   | 6,230.84      | 1,501.88      | 7,315.57         | 6,903.82         | 0.2                | -0.16          | 0.242 |
| 15.00         | -100.94          | -12.31           | 0.00            | -1,519.7        | 0.00            | 1,519.67                   | 6,178.70      | 1,484.59      | 7,148.07         | 6,766.48         | 0.32               | -0.2           | 0.241 |
| 20.00         | -98.45           | -12.24           | 0.00            | -1,458.1        | 0.00            | 1,458.12                   | 6,090.77      | 1,455.76      | 6,873.21         | 6,539.47         | 0.57               | -0.27          | 0.239 |
| 25.00         | -95.99           | -12.17           | 0.00            | -1,396.9        | 0.00            | 1,396.90                   | 6,001.58      | 1,426.93      | 6,603.74         | 6,314.89         | 0.89               | -0.34          | 0.237 |
| 30.00         | -93.56           | -12.10           | 0.00            | -1,336.0        | 0.00            | 1,336.03                   | 5,911.12      | 1,398.11      | 6,339.66         | 6,092.84         | 1.29               | -0.42          | 0.235 |
| 35.00         | -91.17           | -12.03           | 0.00            | -1,275.5        | 0.00            | 1,275.51                   | 5,796.61      | 1,369.28      | 6,080.96         | 5,850.41         | 1.77               | -0.49          | 0.234 |
| 40.00         | -88.82           | -11.96           | 0.00            | -1,215.4        | 0.00            | 1,215.38                   | 5,674.58      | 1,340.45      | 5,827.66         | 5,605.46         | 2.32               | -0.56          | 0.233 |
| 42.75         | -87.54           | -11.91           | 0.00            | -1,182.5        | 0.00            | 1,182.49                   | 5,607.46      | 1,324.60      | 5,690.63         | 5,472.97         | 2.65               | -0.61          | 0.232 |
| 45.00         | -85.93           | -11.85           | 0.00            | -1,155.7        | 0.00            | 1,155.69                   | 5,552.55      | 1,311.63      | 5,579.74         | 5,365.75         | 2.95               | -0.64          | 0.231 |
| 49.00         | -83.10           | -11.79           | 0.00            | -1,108.3        | 0.00            | 1,108.27                   | 4,335.44      | 1,067.60      | 4,548.90         | 4,204.89         | 3.51               | -0.7           | 0.283 |
| 50.00         | -82.69           | -11.75           | 0.00            | -1,096.5        | 0.00            | 1,096.48                   | 4,322.18      | 1,062.91      | 4,509.07         | 4,173.47         | 3.66               | -0.72          | 0.282 |
| 55.00         | -80.69           | -11.66           | 0.00            | -1,037.8        | 0.00            | 1,037.75                   | 4,255.09      | 1,039.49      | 4,312.54         | 4,017.36         | 4.46               | -0.81          | 0.277 |
| 60.00         | -78.74           | -11.58           | 0.00            | -979.4          | 0.00            | 979.43                     | 4,186.73      | 1,016.06      | 4,120.39         | 3,862.97         | 5.35               | -0.9           | 0.272 |
| 65.00         | -76.81           | -11.48           | 0.00            | -921.6          | 0.00            | 921.55                     | 4,117.10      | 992.64        | 3,932.62         | 3,710.36         | 6.34               | -0.99          | 0.267 |
| 70.00         | -74.93           | -11.39           | 0.00            | -864.1          | 0.00            | 864.13                     | 4,046.20      | 969.21        | 3,749.23         | 3,559.63         | 7.43               | -1.08          | 0.261 |
| 75.00         | -73.08           | -11.29           | 0.00            | -807.2          | 0.00            | 807.19                     | 3,974.03      | 945.79        | 3,570.22         | 3,410.85         | 8.61               | -1.18          | 0.255 |
| 80.00         | -71.26           | -11.19           | 0.00            | -750.7          | 0.00            | 750.74                     | 3,900.60      | 922.36        | 3,395.59         | 3,264.10         | 9.89               | -1.27          | 0.248 |
| 85.00         | -69.49           | -11.10           | 0.00            | -694.8          | 0.00            | 694.82                     | 3,805.51      | 898.94        | 3,225.33         | 3,102.86         | 11.27              | -1.36          | 0.242 |
| 87.00         | -68.79           | -11.06           | 0.00            | -672.6          | 0.00            | 672.62                     | 3,765.85      | 889.57        | 3,158.45         | 3,038.19         | 11.85              | -1.4           | 0.240 |
| 88.00         | -68.10           | -11.00           | 0.00            | -661.6          | 0.00            | 661.56                     | 3,746.02      | 884.89        | 3,125.28         | 3,006.11         | 12.15              | -1.42          | 0.238 |
| 88.50         | -67.80           | -10.97           | 0.00            | -656.1          | 0.00            | 656.06                     | 3,736.10      | 882.54        | 3,108.76         | 2,990.14         | 12.29              | -1.43          | 0.238 |
| 90.00         | -67.01           | -10.93           | 0.00            | -639.6          | 0.00            | 639.61                     | 3,706.35      | 875.52        | 3,059.45         | 2,942.46         | 12.75              | -1.46          | 0.236 |
| 92.00         | -65.97           | -10.86           | 0.00            | -617.8          | 0.00            | 617.76                     | 3,055.31      | 747.27        | 2,633.87         | 2,450.78         | 13.37              | -1.5           | 0.274 |
| 95.00         | -65.03           | -10.81           | 0.00            | -585.2          | 0.00            | 585.16                     | 3,020.81      | 735.38        | 2,550.71         | 2,384.21         | 14.32              | -1.55          | 0.267 |
| 97.00         | -64.20           | -10.71           | 0.00            | -563.6          | 0.00            | 563.55                     | 2,997.56      | 727.45        | 2,496.01         | 2,340.12         | 14.98              | -1.59          | 0.262 |
| 100.00        | -63.28           | -10.63           | 0.00            | -531.4          | 0.00            | 531.43                     | 2,962.30      | 715.56        | 2,415.08         | 2,274.45         | 16                 | -1.65          | 0.255 |
| 105.00        | -61.78           | -10.53           | 0.00            | -478.3          | 0.00            | 478.27                     | 2,902.52      | 695.74        | 2,283.15         | 2,166.26         | 17.79              | -1.75          | 0.242 |
| 108.00        | -60.85           | -10.47           | 0.00            | -446.7          | 0.00            | 446.66                     | 2,866.04      | 683.85        | 2,205.78         | 2,102.12         | 18.91              | -1.81          | 0.234 |
| 110.00        | -60.10           | -10.35           | 0.00            | -425.7          | 0.00            | 425.73                     | 2,841.47      | 675.92        | 2,154.93         | 2,059.71         | 19.68              | -1.85          | 0.228 |
| 115.00        | -58.66           | -10.23           | 0.00            | -374.0          | 0.00            | 373.96                     | 2,777.47      | 656.10        | 2,030.42         | 1,953.71         | 21.67              | -1.95          | 0.213 |
| 120.00        | -57.26           | -10.12           | 0.00            | -322.8          | 0.00            | 322.80                     | 2,693.56      | 636.27        | 1,909.61         | 1,836.87         | 23.76              | -2.04          | 0.197 |
| 124.00        | -49.70           | -8.97            | 0.00            | -282.3          | 0.00            | 282.34                     | 2,626.43      | 620.42        | 1,815.63         | 1,746.00         | 25.5               | -2.11          | 0.181 |
| 125.00        | -49.43           | -8.90            | 0.00            | -273.4          | 0.00            | 273.37                     | 2,609.65      | 616.45        | 1,792.50         | 1,723.64         | 25.94              | -2.12          | 0.178 |
| 130.00        | -48.12           | -8.79            | 0.00            | -228.9          | 0.00            | 228.87                     | 2,525.74      | 596.63        | 1,679.10         | 1,614.02         | 28.21              | -2.2           | 0.161 |
| 132.00        | -47.60           | -8.72            | 0.00            | -211.3          | 0.00            | 211.30                     | 2,492.18      | 588.70        | 1,634.78         | 1,571.17         | 29.13              | -2.23          | 0.154 |
| 135.00        | -46.57           | -8.64            | 0.00            | -185.2          | 0.00            | 185.15                     | 2,441.83      | 576.81        | 1,569.41         | 1,507.99         | 30.55              | -2.27          | 0.142 |
| 136.00        | -46.23           | -8.60            | 0.00            | -176.5          | 0.00            | 176.51                     | 1,416.76      | 371.43        | 1,022.39         | 888.99           | 31.03              | -2.29          | 0.232 |
| 137.00        | -37.14           | -7.00            | 0.00            | -167.9          | 0.00            | 167.91                     | 1,410.85      | 368.90        | 1,008.55         | 879.23           | 31.51              | -2.3           | 0.218 |
| 140.00        | -36.58           | -6.90            | 0.00            | -146.9          | 0.00            | 146.92                     | 1,392.81      | 361.33        | 967.59           | 850.05           | 32.97              | -2.35          | 0.199 |
| 145.00        | -35.66           | -6.79            | 0.00            | -112.4          | 0.00            | 112.43                     | 1,361.73      | 348.72        | 901.22           | 801.85           | 35.48              | -2.44          | 0.167 |
| 147.00        | -29.56           | -5.58            | 0.00            | -98.8           | 0.00            | 98.85                      | 1,348.94      | 343.67        | 875.33           | 782.74           | 36.51              | -2.46          | 0.148 |
| 148.00        | -26.02           | -4.91            | 0.00            | -93.3           | 0.00            | 93.27                      | 1,342.47      | 341.15        | 862.53           | 773.23           | 37.02              | -2.48          | 0.140 |
| 150.00        | -25.68           | -4.81            | 0.00            | -83.4           | 0.00            | 83.45                      | 1,329.38      | 336.10        | 837.20           | 754.27           | 38.07              | -2.5           | 0.130 |
| 155.00        | -24.86           | -4.68            | 0.00            | -59.4           | 0.00            | 59.39                      | 1,295.76      | 323.49        | 775.55           | 707.39           | 40.72              | -2.56          | 0.103 |
| 158.00        | -20.45           | -3.85            | 0.00            | -44.5           | 0.00            | 44.54                      | 1,274.98      | 315.92        | 739.68           | 679.62           | 42.34              | -2.59          | 0.082 |
| 160.00        | -15.51           | -2.93            | 0.00            | -36.8           | 0.00            | 36.84                      | 1,260.87      | 310.88        | 716.25           | 661.28           | 43.42              | -2.6           | 0.068 |
| 165.00        | -14.79           | -2.80            | 0.00            | -22.2           | 0.00            | 22.17                      | 1,224.71      | 298.26        | 659.31           | 616.03           | 46.17              | -2.63          | 0.048 |
| 168.00        | -6.47            | -1.27            | 0.00            | -12.3           | 0.00            | 12.31                      | 1,202.41      | 290.69        | 626.27           | 589.33           | 47.82              | -2.64          | 0.026 |
| 170.00        | -6.22            | -1.17            | 0.00            | -9.8            | 0.00            | 9.78                       | 1,187.28      | 285.65        | 604.72           | 571.72           | 48.93              | -2.65          | 0.022 |
| 175.00        | -5.61            | -1.05            | 0.00            | -3.9            | 0.00            | 3.91                       | 1,148.59      | 273.03        | 552.50           | 528.44           | 51.71              | -2.66          | 0.012 |
| 178.00        | 0.00             | -0.79            | 0.00            | -0.8            | 0.00            | 0.76                       | 1,123.79      | 265.46        | 522.30           | 502.56           | 53.38              | -2.66          | 0.002 |

ASSET: 302472, Andover-bunker Hill Road  
 CUSTOMER: T-MOBILE

CODE: ANSI/TIA-222-H  
 ENG NO: 13764996\_C3\_03

|                            |                         |               |
|----------------------------|-------------------------|---------------|
| Load Case: 1.0D + 1.0W     | 60 mph Wind with No Ice | 26 Iterations |
| Gust Response Factor: 1.10 |                         |               |
| Dead load Factor: 1.00     |                         |               |
| Wind Load Factor: 1.00     |                         |               |

**CALCULATED FORCES**

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (ft-kips) | Phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|------------------|------------------|--------------------|----------------|-------|
| 0.00          | -59.02           | -10.06           | 0.00            | -1,310.0        | 0.00            | 1,310.05                   | 6,434.86      | 1,571.07      | 8,004.98         | 7,461.32         | 0                  | 0              | 0.185 |
| 5.00          | -57.31           | -9.97            | 0.00            | -1,259.8        | 0.00            | 1,259.75                   | 6,350.74      | 1,542.24      | 7,713.96         | 7,227.49         | 0.03               | -0.05          | 0.183 |
| 10.00         | -55.63           | -9.90            | 0.00            | -1,209.9        | 0.00            | 1,209.91                   | 6,265.35      | 1,513.41      | 7,428.32         | 6,995.84         | 0.11               | -0.1           | 0.182 |
| 12.00         | -54.87           | -9.83            | 0.00            | -1,190.1        | 0.00            | 1,190.10                   | 6,230.84      | 1,501.88      | 7,315.57         | 6,903.82         | 0.16               | -0.12          | 0.181 |
| 15.00         | -53.88           | -9.76            | 0.00            | -1,160.6        | 0.00            | 1,160.59                   | 6,178.70      | 1,484.59      | 7,148.07         | 6,766.48         | 0.24               | -0.16          | 0.180 |
| 20.00         | -52.25           | -9.68            | 0.00            | -1,111.8        | 0.00            | 1,111.77                   | 6,090.77      | 1,455.76      | 6,873.21         | 6,539.47         | 0.44               | -0.21          | 0.179 |
| 25.00         | -50.65           | -9.59            | 0.00            | -1,063.4        | 0.00            | 1,063.39                   | 6,001.58      | 1,426.93      | 6,603.74         | 6,314.89         | 0.68               | -0.26          | 0.177 |
| 30.00         | -49.08           | -9.50            | 0.00            | -1,015.4        | 0.00            | 1,015.45                   | 5,911.12      | 1,398.11      | 6,339.66         | 6,092.84         | 0.99               | -0.32          | 0.175 |
| 35.00         | -47.54           | -9.41            | 0.00            | -968.0          | 0.00            | 967.95                     | 5,796.61      | 1,369.28      | 6,080.96         | 5,850.41         | 1.35               | -0.37          | 0.174 |
| 40.00         | -46.03           | -9.33            | 0.00            | -920.9          | 0.00            | 920.91                     | 5,674.58      | 1,340.45      | 5,827.66         | 5,605.46         | 1.77               | -0.43          | 0.172 |
| 42.75         | -45.21           | -9.28            | 0.00            | -895.2          | 0.00            | 895.25                     | 5,607.46      | 1,324.60      | 5,690.63         | 5,472.97         | 2.03               | -0.46          | 0.172 |
| 45.00         | -44.07           | -9.22            | 0.00            | -874.4          | 0.00            | 874.36                     | 5,552.55      | 1,311.63      | 5,579.74         | 5,365.75         | 2.25               | -0.49          | 0.171 |
| 49.00         | -42.07           | -9.15            | 0.00            | -837.5          | 0.00            | 837.49                     | 4,335.44      | 1,067.60      | 4,548.90         | 4,204.89         | 2.68               | -0.53          | 0.209 |
| 50.00         | -41.82           | -9.10            | 0.00            | -828.3          | 0.00            | 828.33                     | 4,322.18      | 1,062.91      | 4,509.07         | 4,173.47         | 2.79               | -0.55          | 0.208 |
| 55.00         | -40.60           | -9.00            | 0.00            | -782.8          | 0.00            | 782.83                     | 4,255.09      | 1,039.49      | 4,312.54         | 4,017.36         | 3.4                | -0.61          | 0.204 |
| 60.00         | -39.40           | -8.90            | 0.00            | -737.8          | 0.00            | 737.82                     | 4,186.73      | 1,016.06      | 4,120.39         | 3,862.97         | 4.08               | -0.68          | 0.200 |
| 65.00         | -38.22           | -8.80            | 0.00            | -693.3          | 0.00            | 693.31                     | 4,117.10      | 992.64        | 3,932.62         | 3,710.36         | 4.83               | -0.75          | 0.196 |
| 70.00         | -37.07           | -8.70            | 0.00            | -649.3          | 0.00            | 649.31                     | 4,046.20      | 969.21        | 3,749.23         | 3,559.63         | 5.66               | -0.82          | 0.192 |
| 75.00         | -35.94           | -8.59            | 0.00            | -605.8          | 0.00            | 605.83                     | 3,974.03      | 945.79        | 3,570.22         | 3,410.85         | 6.55               | -0.89          | 0.187 |
| 80.00         | -34.84           | -8.49            | 0.00            | -562.9          | 0.00            | 562.87                     | 3,900.60      | 922.36        | 3,395.59         | 3,264.10         | 7.53               | -0.96          | 0.181 |
| 85.00         | -33.76           | -8.41            | 0.00            | -520.4          | 0.00            | 520.44                     | 3,805.51      | 898.94        | 3,225.33         | 3,102.86         | 8.57               | -1.03          | 0.177 |
| 87.00         | -33.33           | -8.37            | 0.00            | -503.6          | 0.00            | 503.62                     | 3,765.85      | 889.57        | 3,158.45         | 3,038.19         | 9.01               | -1.06          | 0.175 |
| 88.00         | -32.87           | -8.32            | 0.00            | -495.2          | 0.00            | 495.25                     | 3,746.02      | 884.89        | 3,125.28         | 3,006.11         | 9.23               | -1.07          | 0.174 |
| 88.50         | -32.68           | -8.29            | 0.00            | -491.1          | 0.00            | 491.09                     | 3,736.10      | 882.54        | 3,108.76         | 2,990.14         | 9.34               | -1.08          | 0.173 |
| 90.00         | -32.15           | -8.25            | 0.00            | -478.7          | 0.00            | 478.66                     | 3,706.35      | 875.52        | 3,059.45         | 2,942.46         | 9.69               | -1.1           | 0.171 |
| 92.00         | -31.44           | -8.19            | 0.00            | -462.2          | 0.00            | 462.15                     | 3,055.31      | 747.27        | 2,633.87         | 2,450.78         | 10.15              | -1.13          | 0.199 |
| 95.00         | -30.89           | -8.14            | 0.00            | -437.6          | 0.00            | 437.58                     | 3,020.81      | 735.38        | 2,550.71         | 2,384.21         | 10.88              | -1.17          | 0.194 |
| 97.00         | -30.41           | -8.05            | 0.00            | -421.3          | 0.00            | 421.31                     | 2,997.56      | 727.45        | 2,496.01         | 2,340.12         | 11.38              | -1.2           | 0.190 |
| 100.00        | -29.87           | -7.97            | 0.00            | -397.2          | 0.00            | 397.16                     | 2,962.30      | 715.56        | 2,415.08         | 2,274.45         | 12.15              | -1.25          | 0.185 |
| 105.00        | -28.99           | -7.88            | 0.00            | -357.3          | 0.00            | 357.32                     | 2,902.52      | 695.74        | 2,283.15         | 2,166.26         | 13.5               | -1.32          | 0.175 |
| 108.00        | -28.46           | -7.82            | 0.00            | -333.7          | 0.00            | 333.69                     | 2,866.04      | 683.85        | 2,205.78         | 2,102.12         | 14.34              | -1.37          | 0.169 |
| 110.00        | -28.02           | -7.72            | 0.00            | -318.0          | 0.00            | 318.05                     | 2,841.47      | 675.92        | 2,154.93         | 2,059.71         | 14.92              | -1.4           | 0.164 |
| 115.00        | -27.18           | -7.61            | 0.00            | -279.5          | 0.00            | 279.47                     | 2,777.47      | 656.10        | 2,030.42         | 1,953.71         | 16.43              | -1.47          | 0.153 |
| 120.00        | -26.36           | -7.51            | 0.00            | -241.4          | 0.00            | 241.43                     | 2,693.56      | 636.27        | 1,909.61         | 1,836.87         | 18                 | -1.54          | 0.141 |
| 124.00        | -22.60           | -6.62            | 0.00            | -211.4          | 0.00            | 211.40                     | 2,626.43      | 620.42        | 1,815.63         | 1,746.00         | 19.31              | -1.59          | 0.130 |
| 125.00        | -22.45           | -6.56            | 0.00            | -204.8          | 0.00            | 204.77                     | 2,609.65      | 616.45        | 1,792.50         | 1,723.64         | 19.64              | -1.6           | 0.128 |
| 130.00        | -21.68           | -6.48            | 0.00            | -172.0          | 0.00            | 171.95                     | 2,525.74      | 596.63        | 1,679.10         | 1,614.02         | 21.35              | -1.66          | 0.115 |
| 132.00        | -21.38           | -6.43            | 0.00            | -159.0          | 0.00            | 158.99                     | 2,492.18      | 588.70        | 1,634.78         | 1,571.17         | 22.05              | -1.68          | 0.110 |
| 135.00        | -20.71           | -6.37            | 0.00            | -139.7          | 0.00            | 139.72                     | 2,441.83      | 576.81        | 1,569.41         | 1,507.99         | 23.12              | -1.71          | 0.101 |
| 136.00        | -20.49           | -6.34            | 0.00            | -133.4          | 0.00            | 133.35                     | 1,416.76      | 371.43        | 1,022.39         | 888.99           | 23.48              | -1.72          | 0.165 |
| 137.00        | -16.51           | -5.16            | 0.00            | -127.0          | 0.00            | 127.00                     | 1,410.85      | 368.90        | 1,008.55         | 879.23           | 23.84              | -1.73          | 0.156 |
| 140.00        | -16.23           | -5.08            | 0.00            | -111.5          | 0.00            | 111.53                     | 1,392.81      | 361.33        | 967.59           | 850.05           | 24.94              | -1.77          | 0.143 |
| 145.00        | -15.76           | -5.00            | 0.00            | -86.2           | 0.00            | 86.15                      | 1,361.73      | 348.72        | 901.22           | 801.85           | 26.83              | -1.84          | 0.119 |
| 147.00        | -12.50           | -4.29            | 0.00            | -76.1           | 0.00            | 76.14                      | 1,348.94      | 343.67        | 875.33           | 782.74           | 27.61              | -1.86          | 0.107 |
| 148.00        | -11.19           | -3.72            | 0.00            | -71.9           | 0.00            | 71.86                      | 1,342.47      | 341.15        | 862.53           | 773.23           | 28                 | -1.87          | 0.101 |
| 150.00        | -11.02           | -3.65            | 0.00            | -64.4           | 0.00            | 64.41                      | 1,329.38      | 336.10        | 837.20           | 754.27           | 28.78              | -1.89          | 0.094 |
| 155.00        | -10.62           | -3.57            | 0.00            | -46.2           | 0.00            | 46.15                      | 1,295.76      | 323.49        | 775.55           | 707.39           | 30.79              | -1.93          | 0.074 |
| 158.00        | -9.29            | -2.85            | 0.00            | -34.6           | 0.00            | 34.55                      | 1,274.98      | 315.92        | 739.68           | 679.62           | 32.01              | -1.95          | 0.058 |
| 160.00        | -6.67            | -2.20            | 0.00            | -28.8           | 0.00            | 28.84                      | 1,260.87      | 310.88        | 716.25           | 661.28           | 32.83              | -1.96          | 0.049 |
| 165.00        | -6.34            | -2.11            | 0.00            | -17.9           | 0.00            | 17.86                      | 1,224.71      | 298.26        | 659.31           | 616.03           | 34.9               | -1.99          | 0.034 |
| 168.00        | -2.57            | -0.97            | 0.00            | -10.1           | 0.00            | 10.12                      | 1,202.41      | 290.69        | 626.27           | 589.33           | 36.15              | -2             | 0.019 |
| 170.00        | -2.46            | -0.92            | 0.00            | -8.2            | 0.00            | 8.17                       | 1,187.28      | 285.65        | 604.72           | 571.72           | 36.99              | -2             | 0.016 |
| 175.00        | -2.19            | -0.85            | 0.00            | -3.6            | 0.00            | 3.59                       | 1,148.59      | 273.03        | 552.50           | 528.44           | 39.09              | -2.01          | 0.009 |
| 178.00        | 0.00             | -0.77            | 0.00            | -1.0            | 0.00            | 1.04                       | 1,123.79      | 265.46        | 522.30           | 502.56           | 40.35              | -2.01          | 0.002 |

**EQUIVALENT LATERAL FORCES METHOD ANALYSIS**

(Based on ASCE7-16 Chapters 11, 12 and 15)

|  |          |
|--|----------|
| Spectral Response Acceleration for Short Period ( $S_S$ ):               | 0.193    |
| Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):           | 0.055    |
| Long-Period Transition Period ( $T_L$ – Seconds):                        | 6        |
| Importance Factor ( $I_e$ ):   | 1.000    |
| Site Coefficient $F_a$ :   | 1.600    |
| Site Coefficient $F_v$ :   | 2.400    |
| Response Modification Coefficient (R):                                   | 1.500    |
| Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):      | 0.206    |
| Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ): | 0.088    |
| Seismic Response Coefficient ( $C_s$ ):                                  | 0.030    |
| Upper Limit $C_s$ :  | 0.030    |
| Lower Limit $C_s$ :  | 0.030    |
| Period based on Rayleigh Method (sec):                                   | 3.200    |
| Redundancy Factor ( $\rho$ ):  | 1.000    |
| Seismic Force Distribution Exponent ( $k$ ):                             | 2.000    |
| Total Unfactored Dead Load:  | 59.030 k |
| Seismic Base Shear (E):  | 1.770 k  |

**1.2D + 1.0Ev + 1.0Eh Seismic**

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---------|------------------------|-------------|---------------|----------|-----------------------|---------------------|
| 53      | 176.5                  | 157         | 4,879         | 0.007    | 12                    | 194                 |
| 52      | 172.5                  | 271         | 8,058         | 0.011    | 20                    | 336                 |
| 51      | 169                    | 112         | 3,192         | 0.004    | 8                     | 139                 |
| 50      | 166.5                  | 198         | 5,490         | 0.008    | 13                    | 246                 |
| 49      | 162.5                  | 340         | 8,975         | 0.012    | 22                    | 422                 |
| 48      | 159                    | 139         | 3,523         | 0.005    | 9                     | 173                 |
| 47      | 156.5                  | 235         | 5,763         | 0.008    | 14                    | 292                 |
| 46      | 152.5                  | 402         | 9,347         | 0.013    | 23                    | 499                 |
| 45      | 149                    | 164         | 3,645         | 0.005    | 9                     | 204                 |
| 44      | 147.5                  | 90          | 1,948         | 0.003    | 5                     | 111                 |
| 43      | 146                    | 181         | 3,848         | 0.005    | 9                     | 224                 |
| 42      | 142.5                  | 460         | 9,338         | 0.013    | 23                    | 571                 |
| 41      | 138.5                  | 283         | 5,432         | 0.008    | 13                    | 351                 |
| 40      | 136.5                  | 107         | 2,003         | 0.003    | 5                     | 133                 |
| 39      | 135.5                  | 219         | 4,029         | 0.006    | 10                    | 272                 |
| 38      | 133.5                  | 666         | 11,867        | 0.016    | 29                    | 826                 |
| 37      | 131                    | 301         | 5,170         | 0.007    | 13                    | 374                 |
| 36      | 127.5                  | 767         | 12,462        | 0.017    | 31                    | 952                 |
| 35      | 124.5                  | 156         | 2,412         | 0.003    | 6                     | 193                 |
| 34      | 122                    | 640         | 9,519         | 0.013    | 23                    | 794                 |
| 33      | 117.5                  | 817         | 11,276        | 0.016    | 28                    | 1,014               |
| 32      | 112.5                  | 836         | 10,580        | 0.015    | 26                    | 1,038               |
| 31      | 109                    | 340         | 4,037         | 0.006    | 10                    | 422                 |
| 30      | 106.5                  | 516         | 5,851         | 0.008    | 14                    | 640                 |
| 29      | 102.5                  | 875         | 9,194         | 0.013    | 23                    | 1,086               |
| 28      | 98.5                   | 534         | 5,184         | 0.007    | 13                    | 663                 |
| 27      | 96                     | 360         | 3,321         | 0.005    | 8                     | 447                 |
| 26      | 93.5                   | 546         | 4,776         | 0.007    | 12                    | 678                 |
| 25      | 91                     | 706         | 5,844         | 0.008    | 14                    | 876                 |
| 24      | 89.25                  | 534         | 4,251         | 0.006    | 10                    | 662                 |
| 23      | 88.25                  | 179         | 1,392         | 0.002    | 3                     | 222                 |
| 22      | 87.5                   | 359         | 2,747         | 0.004    | 7                     | 445                 |
| 21      | 86                     | 423         | 3,132         | 0.004    | 8                     | 526                 |
| 20      | 82.5                   | 1,075       | 7,314         | 0.010    | 18                    | 1,334               |

| Segment  | Height Above Base (ft) | Weight (lb) | W <sub>z</sub> (lb-ft) | C <sub>vx</sub> | Horizontal Force (lb) | Vertical Force (lb) |
|--|------------------------|-------------|------------------------|-----------------|-----------------------|---------------------|
| 19   | 77.5                   | 1,097       | 6,591                  | 0.009           | 16                    | 1,362               |
| 18   | 72.5                   | 1,120       | 5,887                  | 0.008           | 14                    | 1,390               |
| 17   | 67.5                   | 1,143       | 5,207                  | 0.007           | 13                    | 1,418               |
| 16   | 62.5                   | 1,165       | 4,553                  | 0.006           | 11                    | 1,447               |
| 15   | 57.5                   | 1,188       | 3,928                  | 0.005           | 10                    | 1,475               |
| 14   | 52.5                   | 1,211       | 3,338                  | 0.005           | 8                     | 1,503               |
| 13   | 49.5                   | 245         | 600                    | 0.001           | 1                     | 304                 |
| 12   | 47                     | 1,997       | 4,411                  | 0.006           | 11                    | 2,479               |
| 11   | 43.875                 | 1,138       | 2,190                  | 0.003           | 5                     | 1,412               |
| 10   | 41.375                 | 816         | 1,397                  | 0.002           | 3                     | 1,013               |
| 9  | 37.5                   | 1,505       | 2,117                  | 0.003           | 5                     | 1,868               |
| 8  | 32.5                   | 1,533       | 1,619                  | 0.002           | 4                     | 1,903               |
| 7  | 27.5                   | 1,561       | 1,181                  | 0.002           | 3                     | 1,938               |
| 6  | 22.5                   | 1,589       | 804                    | 0.001           | 2                     | 1,972               |
| 5  | 17.5                   | 1,617       | 495                    | 0.001           | 1                     | 2,007               |
| 4  | 13.5                   | 984         | 179                    | 0.000           | 0                     | 1,221               |
| 3  | 11                     | 661         | 80                     | 0.000           | 0                     | 821                 |
| 2  | 7.5                    | 1,673       | 94                     | 0.000           | 0                     | 2,076               |
| 1  | 2.5                    | 1,701       | 11                     | 0.000           | 0                     | 2,111               |
| Powerwave Allgon 7120.16.05.00 / A-800-110-13I-0-N | 178                    | 185         | 5,855                  | 0.008           | 14                    | 229                 |
| Generic Flat Low Profile Platform                  | 178                    | 1,875       | 59,408                 | 0.082           | 146                   | 2,327               |
| Alcatel-Lucent RRH2x50-08                          | 168                    | 317         | 8,958                  | 0.012           | 22                    | 394                 |
| Alcatel-Lucent 1900 MHz 4X45 RRH                   | 168                    | 180         | 5,080                  | 0.007           | 12                    | 223                 |
| Alcatel-Lucent TD-RRH8x20-25 w/ Solar Shield       | 168                    | 210         | 5,927                  | 0.008           | 15                    | 261                 |
| RFS APXVTM14-ALU-I20                               | 168                    | 169         | 4,759                  | 0.007           | 12                    | 209                 |
| Commscope NNVV-65B-R4                              | 168                    | 232         | 6,554                  | 0.009           | 16                    | 288                 |
| Generic Flat Platform with Handrails               | 168                    | 2,500       | 70,560                 | 0.098           | 173                   | 3,103               |
| Generic Flat Platform with Handrails               | 160                    | 2,500       | 64,000                 | 0.089           | 157                   | 3,103               |
| Generic Flat Platform with Handrails               | 124                    | 2,500       | 38,440                 | 0.053           | 94                    | 3,103               |
| Samsung B5/B13 RRH-BR04C                           | 158                    | 211         | 5,265                  | 0.007           | 13                    | 262                 |
| Samsung B2/B66A RRH-BR049                          | 158                    | 253         | 6,321                  | 0.009           | 15                    | 314                 |
| Raycap RVZDC-6627-PF-48                            | 158                    | 32          | 799                    | 0.001           | 2                     | 40                  |
| Samsung MT6407-77A                                 | 158                    | 245         | 6,111                  | 0.008           | 15                    | 304                 |
| Antel LPA-80080/4CF                                | 158                    | 72          | 1,797                  | 0.002           | 4                     | 89                  |
| Andrew SBNHH-1D65B                                 | 158                    | 304         | 7,594                  | 0.010           | 19                    | 378                 |
| Ericsson Radio 4449 B12,B71                        | 148                    | 222         | 4,863                  | 0.007           | 12                    | 276                 |
| Ericsson 4460 BAND 2/25                            | 148                    | 327         | 7,163                  | 0.010           | 18                    | 406                 |
| Ericsson Air6449 B41                               | 148                    | 312         | 6,834                  | 0.010           | 17                    | 387                 |
| RFS APXVAARR24_43-U-NA20                           | 148                    | 384         | 8,405                  | 0.012           | 21                    | 476                 |
| Generic Mount Reinforcement                        | 147                    | 600         | 12,965                 | 0.018           | 32                    | 745                 |
| Generic Round Platform with Handrails              | 147                    | 2,500       | 54,022                 | 0.075           | 132                   | 3,103               |
| LGP Allgon LGP21903                                | 137                    | 33          | 619                    | 0.001           | 2                     | 41                  |
| Powerwave Allgon LGP21401                          | 137                    | 85          | 1,588                  | 0.002           | 4                     | 105                 |
| Raycap DC6-48-60-18-8F ("Squid")                   | 137                    | 95          | 1,791                  | 0.002           | 4                     | 118                 |
| Ericsson RRUS 8843 B2, B66A                        | 137                    | 216         | 4,054                  | 0.006           | 10                    | 268                 |
| Ericsson RRUS 4478 B14                             | 137                    | 180         | 3,373                  | 0.005           | 8                     | 223                 |
| Ericsson RRUS 4449 B5, B12                         | 137                    | 213         | 3,998                  | 0.006           | 10                    | 264                 |
| Powerwave Allgon 7770.00                           | 137                    | 105         | 1,971                  | 0.003           | 5                     | 130                 |
| CCI DMP65R-BU6DA                                   | 137                    | 476         | 8,942                  | 0.012           | 22                    | 591                 |
| Platform with Handrails RMQP-496-HK                | 137                    | 2,500       | 46,922                 | 0.065           | 115                   | 3,103               |
| Commscope RDIDC-9181-PF-48                         | 124                    | 22          | 337                    | 0.000           | 1                     | 27                  |
| Fujitsu TA08025-B605                               | 124                    | 225         | 3,460                  | 0.005           | 8                     | 279                 |
| Fujitsu TA08025-B604                               | 124                    | 192         | 2,948                  | 0.004           | 7                     | 238                 |
| JMA Wireless MX08FRO665-21                         | 124                    | 194         | 2,975                  | 0.004           | 7                     | 240                 |
| Stand-Off  | 110                    | 100         | 1,210                  | 0.002           | 3                     | 124                 |
| Stand-Off  | 97                     | 100         | 941                    | 0.001           | 2                     | 124                 |
| Stand-Off  | 88                     | 100         | 774                    | 0.001           | 2                     | 124                 |
| Stand-Off  | 12                     | 100         | 14                     | 0.000           | 0                     | 124                 |
| Generic GPS  | 108                    | 10          | 117                    | 0.000           | 0                     | 12                  |
| Generic GPS  | 97                     | 10          | 94                     | 0.000           | 0                     | 12                  |
| Generic GPS  | 88.5                   | 10          | 78                     | 0.000           | 0                     | 12                  |
|  |                        | 59,026      | 722,367                | 1.000           | 1,771                 | 73,262              |

**0.9D - 1.0Ev + 1.0Eh Seismic (Reduced DL)**

| Segment  | Height Above Base (ft) | Weight (lb) | W <sub>z</sub> (lb-ft) | C <sub>vx</sub> | Horizontal Force (lb) | Vertical Force (lb) |
|--|------------------------|-------------|------------------------|-----------------|-----------------------|---------------------|
| 53   | 176.5                  | 157         | 4,879                  | 0.007           | 12                    | 135                 |
| 52   | 172.5                  | 271         | 8,058                  | 0.011           | 20                    | 233                 |
| 51   | 169                    | 112         | 3,192                  | 0.004           | 8                     | 96                  |
| 50   | 166.5                  | 198         | 5,490                  | 0.008           | 13                    | 170                 |
| 49   | 162.5                  | 340         | 8,975                  | 0.012           | 22                    | 292                 |
| 48   | 159                    | 139         | 3,523                  | 0.005           | 9                     | 120                 |
| 47   | 156.5                  | 235         | 5,763                  | 0.008           | 14                    | 202                 |
| 46   | 152.5                  | 402         | 9,347                  | 0.013           | 23                    | 345                 |
| 45   | 149                    | 164         | 3,645                  | 0.005           | 9                     | 141                 |
| 44   | 147.5                  | 90          | 1,948                  | 0.003           | 5                     | 77                  |
| 43   | 146                    | 181         | 3,848                  | 0.005           | 9                     | 155                 |
| 42   | 142.5                  | 460         | 9,338                  | 0.013           | 23                    | 395                 |
| 41   | 138.5                  | 283         | 5,432                  | 0.008           | 13                    | 243                 |
| 40   | 136.5                  | 107         | 2,003                  | 0.003           | 5                     | 92                  |
| 39   | 135.5                  | 219         | 4,029                  | 0.006           | 10                    | 188                 |
| 38   | 133.5                  | 666         | 11,867                 | 0.016           | 29                    | 572                 |
| 37   | 131                    | 301         | 5,170                  | 0.007           | 13                    | 259                 |
| 36   | 127.5                  | 767         | 12,462                 | 0.017           | 31                    | 658                 |
| 35   | 124.5                  | 156         | 2,412                  | 0.003           | 6                     | 134                 |
| 34   | 122                    | 640         | 9,519                  | 0.013           | 23                    | 549                 |
| 33   | 117.5                  | 817         | 11,276                 | 0.016           | 28                    | 701                 |
| 32   | 112.5                  | 836         | 10,580                 | 0.015           | 26                    | 718                 |
| 31   | 109                    | 340         | 4,037                  | 0.006           | 10                    | 292                 |
| 30   | 106.5                  | 516         | 5,851                  | 0.008           | 14                    | 443                 |
| 29   | 102.5                  | 875         | 9,194                  | 0.013           | 23                    | 752                 |
| 28   | 98.5                   | 534         | 5,184                  | 0.007           | 13                    | 459                 |
| 27   | 96                     | 360         | 3,321                  | 0.005           | 8                     | 309                 |
| 26   | 93.5                   | 546         | 4,776                  | 0.007           | 12                    | 469                 |
| 25   | 91                     | 706         | 5,844                  | 0.008           | 14                    | 606                 |
| 24   | 89.25                  | 534         | 4,251                  | 0.006           | 10                    | 458                 |
| 23   | 88.25                  | 179         | 1,392                  | 0.002           | 3                     | 154                 |
| 22   | 87.5                   | 359         | 2,747                  | 0.004           | 7                     | 308                 |
| 21   | 86                     | 423         | 3,132                  | 0.004           | 8                     | 364                 |
| 20   | 82.5                   | 1,075       | 7,314                  | 0.010           | 18                    | 923                 |
| 19   | 77.5                   | 1,097       | 6,591                  | 0.009           | 16                    | 942                 |
| 18   | 72.5                   | 1,120       | 5,887                  | 0.008           | 14                    | 962                 |
| 17   | 67.5                   | 1,143       | 5,207                  | 0.007           | 13                    | 981                 |
| 16   | 62.5                   | 1,165       | 4,553                  | 0.006           | 11                    | 1,001               |
| 15   | 57.5                   | 1,188       | 3,928                  | 0.005           | 10                    | 1,020               |
| 14   | 52.5                   | 1,211       | 3,338                  | 0.005           | 8                     | 1,040               |
| 13   | 49.5                   | 245         | 600                    | 0.001           | 1                     | 210                 |
| 12   | 47                     | 1,997       | 4,411                  | 0.006           | 11                    | 1,715               |
| 11   | 43.875                 | 1,138       | 2,190                  | 0.003           | 5                     | 977                 |
| 10   | 41.375                 | 816         | 1,397                  | 0.002           | 3                     | 701                 |
| 9  | 37.5                   | 1,505       | 2,117                  | 0.003           | 5                     | 1,293               |
| 8  | 32.5                   | 1,533       | 1,619                  | 0.002           | 4                     | 1,317               |
| 7  | 27.5                   | 1,561       | 1,181                  | 0.002           | 3                     | 1,341               |
| 6  | 22.5                   | 1,589       | 804                    | 0.001           | 2                     | 1,365               |
| 5  | 17.5                   | 1,617       | 495                    | 0.001           | 1                     | 1,389               |
| 4  | 13.5                   | 984         | 179                    | 0.000           | 0                     | 845                 |
| 3  | 11                     | 661         | 80                     | 0.000           | 0                     | 568                 |
| 2  | 7.5                    | 1,673       | 94                     | 0.000           | 0                     | 1,437               |
| 1  | 2.5                    | 1,701       | 11                     | 0.000           | 0                     | 1,461               |
| Powerwave Allgon 7120.16.05.00 / A-800-110-13I-0-N | 178                    | 185         | 5,855                  | 0.008           | 14                    | 159                 |
| Generic Flat Low Profile Platform                  | 178                    | 1,875       | 59,408                 | 0.082           | 146                   | 1,610               |
| Alcatel-Lucent RRH2x50-08                          | 168                    | 317         | 8,958                  | 0.012           | 22                    | 273                 |
| Alcatel-Lucent 1900 MHz 4X45 RRH                   | 168                    | 180         | 5,080                  | 0.007           | 12                    | 155                 |
| Alcatel-Lucent TD-RRH8x20-25 w/ Solar Shield       | 168                    | 210         | 5,927                  | 0.008           | 15                    | 180                 |
| RFS APXVTM14-ALU-I20                               | 168                    | 169         | 4,759                  | 0.007           | 12                    | 145                 |
| Commscope NNVV-65B-R4                              | 168                    | 232         | 6,554                  | 0.009           | 16                    | 199                 |
| Generic Flat Platform with Handrails               | 168                    | 2,500       | 70,560                 | 0.098           | 173                   | 2,147               |
| Generic Flat Platform with Handrails               | 160                    | 2,500       | 64,000                 | 0.089           | 157                   | 2,147               |
| Generic Flat Platform with Handrails               | 124                    | 2,500       | 38,440                 | 0.053           | 94                    | 2,147               |
| Samsung B5/B13 RRH-BR04C                           | 158                    | 211         | 5,265                  | 0.007           | 13                    | 181                 |
| Samsung B2/B66A RRH-BR049                          | 158                    | 253         | 6,321                  | 0.009           | 15                    | 217                 |
| Raycap RVZDC-6627-PF-48                            | 158                    | 32          | 799                    | 0.001           | 2                     | 27                  |
| Samsung MT6407-77A                                 | 158                    | 245         | 6,111                  | 0.008           | 15                    | 210                 |
| Antel LPA-80080/4CF                                | 158                    | 72          | 1,797                  | 0.002           | 4                     | 62                  |
| Andrew SBNHH-1D65B                                 | 158                    | 304         | 7,594                  | 0.010           | 19                    | 261                 |

| Segment                               | Height Above Base (ft) | Weight (lb) | W <sub>z</sub> (lb-ft) | C <sub>vx</sub> | Horizontal Force (lb) | Vertical Force (lb) |
|---------------------------------------|------------------------|-------------|------------------------|-----------------|-----------------------|---------------------|
| Ericsson Radio 4449 B12,B71           | 148                    | 222         | 4,863                  | 0.007           | 12                    | 191                 |
| Ericsson 4460 BAND 2/25               | 148                    | 327         | 7,163                  | 0.010           | 18                    | 281                 |
| Ericsson Air6449 B41                  | 148                    | 312         | 6,834                  | 0.010           | 17                    | 268                 |
| RFS APXVAARR24_43-U-NA20              | 148                    | 384         | 8,405                  | 0.012           | 21                    | 330                 |
| Generic Mount Reinforcement           | 147                    | 600         | 12,965                 | 0.018           | 32                    | 515                 |
| Generic Round Platform with Handrails | 147                    | 2,500       | 54,022                 | 0.075           | 132                   | 2,147               |
| LGP Allgon LGP21903                   | 137                    | 33          | 619                    | 0.001           | 2                     | 28                  |
| Powerwave Allgon LGP21401             | 137                    | 85          | 1,588                  | 0.002           | 4                     | 73                  |
| Raycap DC6-48-60-18-8F ("Squid")      | 137                    | 95          | 1,791                  | 0.002           | 4                     | 82                  |
| Ericsson RRUS 8843 B2, B66A           | 137                    | 216         | 4,054                  | 0.006           | 10                    | 186                 |
| Ericsson RRUS 4478 B14                | 137                    | 180         | 3,373                  | 0.005           | 8                     | 154                 |
| Ericsson RRUS 4449 B5, B12            | 137                    | 213         | 3,998                  | 0.006           | 10                    | 183                 |
| Powerwave Allgon 7770.00              | 137                    | 105         | 1,971                  | 0.003           | 5                     | 90                  |
| CCI DMP65R-BU6DA                      | 137                    | 476         | 8,942                  | 0.012           | 22                    | 409                 |
| Platform with Handrails RMQP-496-HK   | 137                    | 2,500       | 46,922                 | 0.065           | 115                   | 2,147               |
| Commscope RDIDC-9181-PF-48            | 124                    | 22          | 337                    | 0.000           | 1                     | 19                  |
| Fujitsu TA08025-B605                  | 124                    | 225         | 3,460                  | 0.005           | 8                     | 193                 |
| Fujitsu TA08025-B604                  | 124                    | 192         | 2,948                  | 0.004           | 7                     | 165                 |
| JMA Wireless MX08FRO665-21            | 124                    | 194         | 2,975                  | 0.004           | 7                     | 166                 |
| Stand-Off                             | 110                    | 100         | 1,210                  | 0.002           | 3                     | 86                  |
| Stand-Off                             | 97                     | 100         | 941                    | 0.001           | 2                     | 86                  |
| Stand-Off                             | 88                     | 100         | 774                    | 0.001           | 2                     | 86                  |
| Stand-Off                             | 12                     | 100         | 14                     | 0.000           | 0                     | 86                  |
| Generic GPS                           | 108                    | 10          | 117                    | 0.000           | 0                     | 9                   |
| Generic GPS                           | 97                     | 10          | 94                     | 0.000           | 0                     | 9                   |
| Generic GPS                           | 88.5                   | 10          | 78                     | 0.000           | 0                     | 9                   |
|                                       |                        | 59,026      | 722,367                | 1.000           | 1,771                 | 50,693              |

**1.2D + 1.0Ev + 1.0Eh Seismic**

**CALCULATED FORCES**

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (fr-kips) | Mu Mx (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (kips) | Phi Mn (kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|---------------|---------------|--------------------|----------------|-------|
| 0.00          | -71.15           | -1.78            | 0.00            | -267.86         | 0.00            | 267.86                     | 6,434.86      | 1,571.07      | 8,005         | 7,461.32      | 0.00               | 0.00           | 0.05  |
| 5.00          | -69.07           | -1.79            | 0.00            | -258.98         | 0.00            | 258.98                     | 6,350.74      | 1,542.24      | 7,714         | 7,227.49      | 0.01               | -0.01          | 0.05  |
| 10.00         | -68.25           | -1.80            | 0.00            | -250.03         | 0.00            | 250.03                     | 6,265.35      | 1,513.41      | 7,428         | 6,995.84      | 0.02               | -0.02          | 0.05  |
| 12.00         | -66.91           | -1.80            | 0.00            | -246.44         | 0.00            | 246.44                     | 6,230.84      | 1,501.88      | 7,316         | 6,903.82      | 0.03               | -0.03          | 0.05  |
| 15.00         | -64.90           | -1.81            | 0.00            | -241.04         | 0.00            | 241.04                     | 6,178.70      | 1,484.59      | 7,148         | 6,766.48      | 0.05               | -0.03          | 0.05  |
| 20.00         | -62.93           | -1.82            | 0.00            | -231.99         | 0.00            | 231.99                     | 6,090.77      | 1,455.76      | 6,873         | 6,539.47      | 0.09               | -0.04          | 0.05  |
| 25.00         | -60.99           | -1.83            | 0.00            | -222.89         | 0.00            | 222.89                     | 6,001.58      | 1,426.93      | 6,604         | 6,314.89      | 0.14               | -0.05          | 0.05  |
| 30.00         | -59.09           | -1.83            | 0.00            | -213.76         | 0.00            | 213.76                     | 5,911.12      | 1,398.11      | 6,340         | 6,092.84      | 0.20               | -0.07          | 0.05  |
| 35.00         | -57.22           | -1.84            | 0.00            | -204.59         | 0.00            | 204.59                     | 5,796.61      | 1,369.28      | 6,081         | 5,850.41      | 0.28               | -0.08          | 0.05  |
| 40.00         | -56.20           | -1.84            | 0.00            | -195.41         | 0.00            | 195.41                     | 5,674.58      | 1,340.45      | 5,828         | 5,605.46      | 0.37               | -0.09          | 0.05  |
| 42.75         | -54.79           | -1.84            | 0.00            | -190.35         | 0.00            | 190.35                     | 5,607.46      | 1,324.60      | 5,691         | 5,472.97      | 0.42               | -0.10          | 0.05  |
| 45.00         | -52.31           | -1.83            | 0.00            | -186.21         | 0.00            | 186.21                     | 5,552.55      | 1,311.63      | 5,580         | 5,365.75      | 0.47               | -0.10          | 0.04  |
| 49.00         | -52.01           | -1.84            | 0.00            | -178.88         | 0.00            | 178.88                     | 4,335.44      | 1,067.60      | 4,549         | 4,204.89      | 0.56               | -0.11          | 0.06  |
| 50.00         | -50.51           | -1.83            | 0.00            | -177.05         | 0.00            | 177.05                     | 4,322.18      | 1,062.91      | 4,509         | 4,173.47      | 0.58               | -0.11          | 0.05  |
| 55.00         | -49.03           | -1.83            | 0.00            | -167.89         | 0.00            | 167.89                     | 4,255.09      | 1,039.49      | 4,313         | 4,017.36      | 0.71               | -0.13          | 0.05  |
| 60.00         | -47.58           | -1.83            | 0.00            | -158.74         | 0.00            | 158.74                     | 4,186.73      | 1,016.06      | 4,120         | 3,862.97      | 0.85               | -0.14          | 0.05  |
| 65.00         | -46.16           | -1.82            | 0.00            | -149.59         | 0.00            | 149.59                     | 4,117.10      | 992.64        | 3,933         | 3,710.36      | 1.01               | -0.16          | 0.05  |
| 70.00         | -44.77           | -1.82            | 0.00            | -140.47         | 0.00            | 140.47                     | 4,046.20      | 969.21        | 3,749         | 3,559.63      | 1.18               | -0.17          | 0.05  |
| 75.00         | -43.41           | -1.81            | 0.00            | -131.38         | 0.00            | 131.38                     | 3,974.03      | 945.79        | 3,570         | 3,410.85      | 1.37               | -0.19          | 0.05  |
| 80.00         | -42.08           | -1.80            | 0.00            | -122.34         | 0.00            | 122.34                     | 3,900.60      | 922.36        | 3,396         | 3,264.10      | 1.58               | -0.20          | 0.05  |
| 85.00         | -41.55           | -1.80            | 0.00            | -113.35         | 0.00            | 113.35                     | 3,805.51      | 898.94        | 3,225         | 3,102.86      | 1.80               | -0.22          | 0.05  |
| 87.00         | -41.11           | -1.79            | 0.00            | -109.76         | 0.00            | 109.76                     | 3,765.85      | 889.57        | 3,158         | 3,038.19      | 1.89               | -0.23          | 0.05  |
| 88.00         | -40.76           | -1.79            | 0.00            | -107.97         | 0.00            | 107.97                     | 3,746.02      | 884.89        | 3,125         | 3,006.11      | 1.94               | -0.23          | 0.05  |
| 88.50         | -40.09           | -1.77            | 0.00            | -107.08         | 0.00            | 107.08                     | 3,736.10      | 882.54        | 3,109         | 2,990.14      | 1.97               | -0.23          | 0.05  |
| 90.00         | -39.21           | -1.76            | 0.00            | -104.41         | 0.00            | 104.41                     | 3,706.35      | 875.52        | 3,059         | 2,942.46      | 2.04               | -0.23          | 0.05  |
| 92.00         | -38.53           | -1.75            | 0.00            | -100.89         | 0.00            | 100.89                     | 3,055.31      | 747.27        | 2,634         | 2,450.78      | 2.14               | -0.24          | 0.05  |
| 95.00         | -38.08           | -1.75            | 0.00            | -95.64          | 0.00            | 95.64                      | 3,020.81      | 735.38        | 2,551         | 2,384.21      | 2.29               | -0.25          | 0.05  |
| 97.00         | -37.28           | -1.73            | 0.00            | -92.15          | 0.00            | 92.15                      | 2,997.56      | 727.45        | 2,496         | 2,340.12      | 2.40               | -0.26          | 0.05  |
| 100.00        | -36.20           | -1.71            | 0.00            | -86.95          | 0.00            | 86.95                      | 2,962.30      | 715.56        | 2,415         | 2,274.45      | 2.56               | -0.27          | 0.05  |
| 105.00        | -35.56           | -1.70            | 0.00            | -78.38          | 0.00            | 78.38                      | 2,902.52      | 695.74        | 2,283         | 2,166.26      | 2.85               | -0.28          | 0.05  |
| 108.00        | -35.12           | -1.70            | 0.00            | -73.27          | 0.00            | 73.27                      | 2,866.04      | 683.85        | 2,206         | 2,102.12      | 3.03               | -0.29          | 0.05  |



| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (fr-kips) | Mu Mx (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (kips) | Phi Mn (kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|---------------|---------------|--------------------|----------------|-------|
| 110.00        | -33.96           | -1.67            | 0.00            | -69.87          | 0.00            | 69.87                      | 2,841.47      | 675.92        | 2,155         | 2,059.71      | 3.16               | -0.30          | 0.05  |
| 115.00        | -32.95           | -1.64            | 0.00            | -61.53          | 0.00            | 61.53                      | 2,777.47      | 656.10        | 2,030         | 1,953.71      | 3.48               | -0.32          | 0.04  |
| 120.00        | -32.15           | -1.62            | 0.00            | -53.31          | 0.00            | 53.31                      | 2,693.56      | 636.27        | 1,910         | 1,836.87      | 3.82               | -0.33          | 0.04  |
| 124.00        | -28.07           | -1.48            | 0.00            | -46.81          | 0.00            | 46.81                      | 2,626.43      | 620.42        | 1,816         | 1,746.00      | 4.10               | -0.34          | 0.04  |
| 125.00        | -27.12           | -1.45            | 0.00            | -45.33          | 0.00            | 45.33                      | 2,609.65      | 616.45        | 1,792         | 1,723.64      | 4.17               | -0.34          | 0.04  |
| 130.00        | -26.75           | -1.44            | 0.00            | -38.10          | 0.00            | 38.10                      | 2,525.74      | 596.63        | 1,679         | 1,614.02      | 4.54               | -0.36          | 0.03  |
| 132.00        | -25.92           | -1.40            | 0.00            | -35.22          | 0.00            | 35.22                      | 2,492.18      | 588.70        | 1,635         | 1,571.17      | 4.69               | -0.36          | 0.03  |
| 135.00        | -25.65           | -1.40            | 0.00            | -31.01          | 0.00            | 31.01                      | 2,441.83      | 576.81        | 1,569         | 1,507.99      | 4.92               | -0.37          | 0.03  |
| 136.00        | -25.51           | -1.39            | 0.00            | -29.61          | 0.00            | 29.61                      | 1,416.76      | 371.43        | 1,022         | 888.99        | 5.00               | -0.37          | 0.05  |
| 137.00        | -20.32           | -1.17            | 0.00            | -28.22          | 0.00            | 28.22                      | 1,410.85      | 368.90        | 1,009         | 879.23        | 5.07               | -0.37          | 0.05  |
| 140.00        | -19.75           | -1.14            | 0.00            | -24.72          | 0.00            | 24.72                      | 1,392.81      | 361.33        | 968           | 850.05        | 5.31               | -0.38          | 0.04  |
| 145.00        | -19.53           | -1.14            | 0.00            | -19.01          | 0.00            | 19.01                      | 1,361.73      | 348.72        | 901           | 801.85        | 5.72               | -0.40          | 0.04  |
| 147.00        | -15.57           | -0.94            | 0.00            | -16.74          | 0.00            | 16.74                      | 1,348.94      | 343.67        | 875           | 782.74        | 5.89               | -0.40          | 0.03  |
| 148.00        | -13.82           | -0.85            | 0.00            | -15.80          | 0.00            | 15.80                      | 1,342.47      | 341.15        | 863           | 773.23        | 5.97               | -0.40          | 0.03  |
| 150.00        | -13.32           | -0.83            | 0.00            | -14.09          | 0.00            | 14.09                      | 1,329.38      | 336.10        | 837           | 754.27        | 6.14               | -0.41          | 0.03  |
| 155.00        | -13.03           | -0.81            | 0.00            | -9.95           | 0.00            | 9.95                       | 1,295.76      | 323.49        | 776           | 707.39        | 6.57               | -0.42          | 0.02  |
| 158.00        | -11.47           | -0.73            | 0.00            | -7.51           | 0.00            | 7.51                       | 1,274.98      | 315.92        | 740           | 679.62        | 6.84               | -0.42          | 0.02  |
| 160.00        | -7.95            | -0.52            | 0.00            | -6.06           | 0.00            | 6.06                       | 1,260.87      | 310.88        | 716           | 661.28        | 7.01               | -0.42          | 0.02  |
| 165.00        | -7.70            | -0.51            | 0.00            | -3.45           | 0.00            | 3.45                       | 1,224.71      | 298.26        | 659           | 616.03        | 7.46               | -0.43          | 0.01  |
| 168.00        | -3.09            | -0.21            | 0.00            | -1.93           | 0.00            | 1.93                       | 1,202.41      | 290.69        | 626           | 589.33        | 7.73               | -0.43          | 0.01  |
| 170.00        | -2.75            | -0.19            | 0.00            | -1.50           | 0.00            | 1.50                       | 1,187.28      | 285.65        | 605           | 571.72        | 7.91               | -0.43          | 0.01  |
| 175.00        | -2.56            | -0.18            | 0.00            | -0.54           | 0.00            | 0.54                       | 1,148.59      | 273.03        | 552           | 528.44        | 8.36               | -0.43          | 0.00  |
| 178.00        | 0.00             | -0.16            | 0.00            | 0.00            | 0.00            | 0.00                       | 1,123.79      | 265.46        | 522           | 502.56        | 8.64               | -0.43          | 0.00  |

0.9D - 1.0Ev + 1.0Eh Seismic (Reduced DL)

CALCULATED FORCES

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (fr-kips) | Mu Mx (ft-kips) | Resultant Moment (ft-kips) | Phi Pn (kips) | Phi Vn (kips) | Phi Tn (kips) | Phi Mn (kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---------------|------------------|------------------|-----------------|-----------------|-----------------|----------------------------|---------------|---------------|---------------|---------------|--------------------|----------------|-------|
| 0.00          | -49.23           | -1.77            | 0.00            | -261.37         | 0.00            | 261.37                     | 6,434.86      | 1,571.07      | 8,005         | 7,461.32      | 0.00               | 0.00           | 0.04  |
| 5.00          | -47.80           | -1.78            | 0.00            | -252.50         | 0.00            | 252.50                     | 6,350.74      | 1,542.24      | 7,714         | 7,227.49      | 0.01               | -0.01          | 0.04  |
| 10.00         | -47.23           | -1.79            | 0.00            | -243.59         | 0.00            | 243.59                     | 6,265.35      | 1,513.41      | 7,428         | 6,995.84      | 0.02               | -0.02          | 0.04  |
| 12.00         | -46.30           | -1.79            | 0.00            | -240.02         | 0.00            | 240.02                     | 6,230.84      | 1,501.88      | 7,316         | 6,903.82      | 0.03               | -0.02          | 0.04  |
| 15.00         | -44.91           | -1.80            | 0.00            | -234.64         | 0.00            | 234.64                     | 6,178.70      | 1,484.59      | 7,148         | 6,766.48      | 0.05               | -0.03          | 0.04  |
| 20.00         | -43.54           | -1.80            | 0.00            | -225.66         | 0.00            | 225.66                     | 6,090.77      | 1,455.76      | 6,873         | 6,539.47      | 0.09               | -0.04          | 0.04  |
| 25.00         | -42.20           | -1.81            | 0.00            | -216.65         | 0.00            | 216.65                     | 6,001.58      | 1,426.93      | 6,604         | 6,314.89      | 0.14               | -0.05          | 0.04  |
| 30.00         | -40.88           | -1.81            | 0.00            | -207.63         | 0.00            | 207.63                     | 5,911.12      | 1,398.11      | 6,340         | 6,092.84      | 0.20               | -0.06          | 0.04  |
| 35.00         | -39.59           | -1.81            | 0.00            | -198.58         | 0.00            | 198.58                     | 5,796.61      | 1,369.28      | 6,081         | 5,850.41      | 0.27               | -0.08          | 0.04  |
| 40.00         | -38.89           | -1.81            | 0.00            | -189.53         | 0.00            | 189.53                     | 5,674.58      | 1,340.45      | 5,828         | 5,605.46      | 0.36               | -0.09          | 0.04  |
| 42.75         | -37.91           | -1.81            | 0.00            | -184.55         | 0.00            | 184.55                     | 5,607.46      | 1,324.60      | 5,691         | 5,472.97      | 0.41               | -0.09          | 0.04  |
| 45.00         | -36.20           | -1.80            | 0.00            | -180.48         | 0.00            | 180.48                     | 5,552.55      | 1,311.63      | 5,580         | 5,365.75      | 0.46               | -0.10          | 0.04  |
| 49.00         | -35.99           | -1.80            | 0.00            | -173.28         | 0.00            | 173.28                     | 4,335.44      | 1,067.60      | 4,549         | 4,204.89      | 0.54               | -0.11          | 0.05  |
| 50.00         | -34.95           | -1.80            | 0.00            | -171.48         | 0.00            | 171.48                     | 4,322.18      | 1,062.91      | 4,509         | 4,173.47      | 0.57               | -0.11          | 0.05  |
| 55.00         | -33.93           | -1.79            | 0.00            | -162.50         | 0.00            | 162.50                     | 4,255.09      | 1,039.49      | 4,313         | 4,017.36      | 0.69               | -0.13          | 0.05  |
| 60.00         | -32.92           | -1.79            | 0.00            | -153.53         | 0.00            | 153.53                     | 4,186.73      | 1,016.06      | 4,120         | 3,862.97      | 0.83               | -0.14          | 0.05  |
| 65.00         | -31.94           | -1.78            | 0.00            | -144.60         | 0.00            | 144.60                     | 4,117.10      | 992.64        | 3,933         | 3,710.36      | 0.98               | -0.15          | 0.05  |
| 70.00         | -30.98           | -1.77            | 0.00            | -135.69         | 0.00            | 135.69                     | 4,046.20      | 969.21        | 3,749         | 3,559.63      | 1.15               | -0.17          | 0.05  |
| 75.00         | -30.04           | -1.76            | 0.00            | -126.84         | 0.00            | 126.84                     | 3,974.03      | 945.79        | 3,570         | 3,410.85      | 1.34               | -0.18          | 0.05  |
| 80.00         | -29.11           | -1.75            | 0.00            | -118.04         | 0.00            | 118.04                     | 3,900.60      | 922.36        | 3,396         | 3,264.10      | 1.53               | -0.20          | 0.04  |
| 85.00         | -28.75           | -1.74            | 0.00            | -109.30         | 0.00            | 109.30                     | 3,805.51      | 898.94        | 3,225         | 3,102.86      | 1.75               | -0.21          | 0.04  |
| 87.00         | -28.44           | -1.74            | 0.00            | -105.82         | 0.00            | 105.82                     | 3,765.85      | 889.57        | 3,158         | 3,038.19      | 1.84               | -0.22          | 0.04  |
| 88.00         | -28.20           | -1.73            | 0.00            | -104.08         | 0.00            | 104.08                     | 3,746.02      | 884.89        | 3,125         | 3,006.11      | 1.89               | -0.22          | 0.04  |
| 88.50         | -27.74           | -1.72            | 0.00            | -103.22         | 0.00            | 103.22                     | 3,736.10      | 882.54        | 3,109         | 2,990.14      | 1.91               | -0.22          | 0.04  |
| 90.00         | -27.13           | -1.71            | 0.00            | -100.63         | 0.00            | 100.63                     | 3,706.35      | 875.52        | 3,059         | 2,942.46      | 1.98               | -0.23          | 0.04  |
| 92.00         | -26.66           | -1.70            | 0.00            | -97.22          | 0.00            | 97.22                      | 3,055.31      | 747.27        | 2,634         | 2,450.78      | 2.08               | -0.23          | 0.05  |
| 95.00         | -26.35           | -1.69            | 0.00            | -92.13          | 0.00            | 92.13                      | 3,020.81      | 735.38        | 2,551         | 2,384.21      | 2.23               | -0.24          | 0.05  |
| 97.00         | -25.80           | -1.68            | 0.00            | -88.75          | 0.00            | 88.75                      | 2,997.56      | 727.45        | 2,496         | 2,340.12      | 2.33               | -0.25          | 0.05  |
| 100.00        | -25.04           | -1.66            | 0.00            | -83.72          | 0.00            | 83.72                      | 2,962.30      | 715.56        | 2,415         | 2,274.45      | 2.49               | -0.26          | 0.05  |
| 105.00        | -24.60           | -1.65            | 0.00            | -75.44          | 0.00            | 75.44                      | 2,902.52      | 695.74        | 2,283         | 2,166.26      | 2.77               | -0.27          | 0.04  |
| 108.00        | -24.30           | -1.64            | 0.00            | -70.50          | 0.00            | 70.50                      | 2,866.04      | 683.85        | 2,206         | 2,102.12      | 2.94               | -0.28          | 0.04  |
| 110.00        | -23.50           | -1.61            | 0.00            | -67.22          | 0.00            | 67.22                      | 2,841.47      | 675.92        | 2,155         | 2,059.71      | 3.06               | -0.29          | 0.04  |
| 115.00        | -22.80           | -1.58            | 0.00            | -59.18          | 0.00            | 59.18                      | 2,777.47      | 656.10        | 2,030         | 1,953.71      | 3.37               | -0.30          | 0.04  |
| 120.00        | -22.25           | -1.56            | 0.00            | -51.26          | 0.00            | 51.26                      | 2,693.56      | 636.27        | 1,910         | 1,836.87      | 3.70               | -0.32          | 0.04  |
| 124.00        | -19.42           | -1.42            | 0.00            | -45.02          | 0.00            | 45.02                      | 2,626.43      | 620.42        | 1,816         | 1,746.00      | 3.97               | -0.33          | 0.03  |
| 125.00        | -18.76           | -1.39            | 0.00            | -43.59          | 0.00            | 43.59                      | 2,609.65      | 616.45        | 1,792         | 1,723.64      | 4.04               | -0.33          | 0.03  |
| 130.00        | -18.51           | -1.38            | 0.00            | -36.63          | 0.00            | 36.63                      | 2,525.74      | 596.63        | 1,679         | 1,614.02      | 4.40               | -0.34          | 0.03  |
| 132.00        | -17.93           | -1.35            | 0.00            | -33.87          | 0.00            | 33.87                      | 2,492.18      | 588.70        | 1,635         | 1,571.17      | 4.54               | -0.35          | 0.03  |
| 135.00        | -17.75           | -1.34            | 0.00            | -29.82          | 0.00            | 29.82                      | 2,441.83      | 576.81        | 1,569         | 1,507.99      | 4.77               | -0.36          | 0.03  |

ASSET: 302472, Andover-bunker Hill Road  
 CUSTOMER: T-MOBILE

CODE: ANSI/TIA-222-H  
 ENG NO: 13764996\_C3\_03

| Seg<br>Elev<br>(ft) | Pu<br>FY (-)<br>(kips) | Vu<br>FX (-)<br>(kips) | Tu<br>MY<br>(ft-kips) | Mu<br>MZ<br>(fr-kips) | Mu<br>Mx<br>(ft-kips) | Resultant<br>Moment<br>(ft-kips) | Phi<br>Pn<br>(kips) | Phi<br>Vn<br>(kips) | Phi<br>Tn<br>(kips) | Phi<br>Mn<br>(kips) | Total<br>Deflect<br>(in) | Rotation<br>(deg) | Ratio |
|---------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|----------------------------------|---------------------|---------------------|---------------------|---------------------|--------------------------|-------------------|-------|
| 136.00              | -17.65                 | -1.34                  | 0.00                  | -28.48                | 0.00                  | 28.48                            | 1,416.76            | 371.43              | 1,022               | 888.99              | 4.84                     | -0.36             | 0.05  |
| 137.00              | -14.06                 | -1.12                  | 0.00                  | -27.14                | 0.00                  | 27.14                            | 1,410.85            | 368.90              | 1,009               | 879.23              | 4.92                     | -0.36             | 0.04  |
| 140.00              | -13.66                 | -1.10                  | 0.00                  | -23.78                | 0.00                  | 23.78                            | 1,392.81            | 361.33              | 968                 | 850.05              | 5.15                     | -0.37             | 0.04  |
| 145.00              | -13.51                 | -1.09                  | 0.00                  | -18.28                | 0.00                  | 18.28                            | 1,361.73            | 348.72              | 901                 | 801.85              | 5.54                     | -0.38             | 0.03  |
| 147.00              | -10.77                 | -0.90                  | 0.00                  | -16.10                | 0.00                  | 16.10                            | 1,348.94            | 343.67              | 875                 | 782.74              | 5.70                     | -0.39             | 0.03  |
| 148.00              | -9.56                  | -0.82                  | 0.00                  | -15.20                | 0.00                  | 15.20                            | 1,342.47            | 341.15              | 863                 | 773.23              | 5.78                     | -0.39             | 0.03  |
| 150.00              | -9.22                  | -0.80                  | 0.00                  | -13.56                | 0.00                  | 13.56                            | 1,329.38            | 336.10              | 837                 | 754.27              | 5.95                     | -0.39             | 0.03  |
| 155.00              | -9.01                  | -0.78                  | 0.00                  | -9.57                 | 0.00                  | 9.57                             | 1,295.76            | 323.49              | 776                 | 707.39              | 6.36                     | -0.40             | 0.02  |
| 158.00              | -7.94                  | -0.70                  | 0.00                  | -7.23                 | 0.00                  | 7.23                             | 1,274.98            | 315.92              | 740                 | 679.62              | 6.62                     | -0.41             | 0.02  |
| 160.00              | -5.50                  | -0.50                  | 0.00                  | -5.83                 | 0.00                  | 5.83                             | 1,260.87            | 310.88              | 716                 | 661.28              | 6.79                     | -0.41             | 0.01  |
| 165.00              | -5.33                  | -0.49                  | 0.00                  | -3.32                 | 0.00                  | 3.32                             | 1,224.71            | 298.26              | 659                 | 616.03              | 7.22                     | -0.41             | 0.01  |
| 168.00              | -2.13                  | -0.21                  | 0.00                  | -1.86                 | 0.00                  | 1.86                             | 1,202.41            | 290.69              | 626                 | 589.33              | 7.48                     | -0.42             | 0.01  |
| 170.00              | -1.90                  | -0.19                  | 0.00                  | -1.45                 | 0.00                  | 1.45                             | 1,187.28            | 285.65              | 605                 | 571.72              | 7.66                     | -0.42             | 0.00  |
| 175.00              | -1.77                  | -0.17                  | 0.00                  | -0.52                 | 0.00                  | 0.52                             | 1,148.59            | 273.03              | 552                 | 528.44              | 8.10                     | -0.42             | 0.00  |
| 178.00              | 0.00                   | -0.16                  | 0.00                  | 0.00                  | 0.00                  | 0.00                             | 1,123.79            | 265.46              | 522                 | 502.56              | 8.36                     | -0.42             | 0.00  |

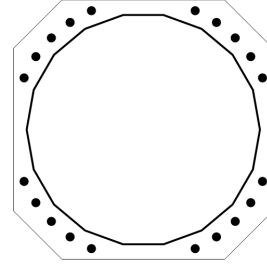
ANALYSIS SUMMARY

| Load Case            | Reactions             |                       |                       |                           |                           |                           | Max Usage    |                      |
|----------------------|-----------------------|-----------------------|-----------------------|---------------------------|---------------------------|---------------------------|--------------|----------------------|
|                      | Shear<br>FX<br>(kips) | Shear<br>FZ<br>(kips) | Axial<br>FY<br>(kips) | Moment<br>MX<br>(ft-kips) | Moment<br>MY<br>(ft-kips) | Moment<br>MZ<br>(ft-kips) | Elev<br>(ft) | Interaction<br>Ratio |
| 1.2D + 1.0W          | 44.26                 | 0.00                  | 70.74                 | 0.00                      | 0.00                      | 5814.80                   | 49.00        | 0.9                  |
| 0.9D + 1.0W          | 44.22                 | 0.00                  | 53.04                 | 0.00                      | 0.00                      | 5705.78                   | 49.00        | 0.87                 |
| 1.2D + 1.0Di + 1.0Wi | 12.54                 | 0.00                  | 108.67                | 0.00                      | 0.00                      | 1706.69                   | 49.00        | 0.28                 |
| 1.2D + 1.0Ev + 1.0Eh | 1.84                  | 0.00                  | 71.15                 | 0.00                      | 0.00                      | 267.86                    | 49.00        | 0.05                 |
| 0.9D - 1.0Ev + 1.0Eh | 1.81                  | 0.00                  | 49.23                 | 0.00                      | 0.00                      | 261.37                    | 49.00        | 0.05                 |
| 1.0D + 1.0W          | 10.06                 | 0.00                  | 59.02                 | 0.00                      | 0.00                      | 1310.05                   | 49.00        | 0.21                 |

**BASE PLATE ANALYSIS @ 0 FT**

**PLATE PARAMETERS (ID# 11012)**

Width: 64 in  
 Shape: Square  
 Thickness: 3 in  
 Grade: A572-50  
 Yield Strength: 50 ksi  
 Tensile Strength: 65 ksi  
 Clip Length: 12 in  
 Rod Detail Type: d  
 Clear Distance: 4.5 in  
 Base Weld Size: 0.125 in  
 Orientation Offset: - °  
 Analysis Type: Plastic  
 Neutral Axis: 134 °



**ANCHOR ROD PARAMETERS**

| Class                  | Arrangement | Quantity | Diameter (in) | Circle (in) | Grade   | Fy (ksi) | Fu (ksi) | Spacing (in) | Offset (°) |
|------------------------|-------------|----------|---------------|-------------|---------|----------|----------|--------------|------------|
| Original<br>[ID# 3220] | Cluster     | 20       | 2.25          | 64          | A615-75 | 75       | 100      | 6            | -          |

**ANCHOR ROD GEOMETRY AND APPLIED LOADS --- ORIGINAL (20) 2.25"Ø [ID 3220]**

**GEOMETRY AND APPLIED LOADS (UNFACTORED)**

| Position | Radians | X<br>(in) | Y<br>(in) | Moment Arm<br>(in) | Inertia<br>(in <sup>4</sup> ) | Axial Load<br>(k) | Shear Load<br>(k) |
|----------|---------|-----------|-----------|--------------------|-------------------------------|-------------------|-------------------|
| 1        | 0.410   | 29.34     | 12.77     | -28.747            | 2684.654                      | -184.07           | 1.30              |
| 2        | 0.598   | 26.45     | 18.01     | -30.245            | 2971.674                      | -184.07           | 0.63              |
| 3        | 0.785   | 22.63     | 22.63     | -30.683            | 3058.331                      | -184.07           | 0.06              |
| 4        | 0.973   | 18.01     | 26.45     | -30.045            | 2932.579                      | -184.07           | 0.76              |
| 5        | 1.160   | 12.77     | 29.34     | -28.354            | 2611.898                      | -184.07           | 1.42              |
| 6        | 1.981   | -12.77    | 29.34     | -10.740            | 375.448                       | -184.07           | 3.48              |
| 7        | 2.169   | -18.01    | 26.45     | -5.193             | 88.428                        | -184.07           | 3.67              |
| 8        | 2.356   | -22.63    | 22.63     | 0.536              | 1.771                         | 198.22            | 3.72              |
| 9        | 2.544   | -26.45    | 18.01     | 6.246              | 127.522                       | 198.22            | 3.64              |
| 10       | 2.731   | -29.34    | 12.77     | 11.737             | 448.203                       | 198.22            | 3.44              |
| 11       | 3.552   | -29.34    | -12.77    | 28.747             | 2684.655                      | 198.22            | 1.30              |
| 12       | 3.739   | -26.45    | -18.01    | 30.245             | 2971.674                      | 198.22            | 0.63              |
| 13       | 3.927   | -22.63    | -22.63    | 30.683             | 3058.331                      | 198.22            | 0.06              |
| 14       | 4.114   | -18.01    | -26.45    | 30.045             | 2932.579                      | 198.22            | 0.76              |
| 15       | 4.302   | -12.77    | -29.34    | 28.354             | 2611.898                      | 198.22            | 1.42              |
| 16       | 5.123   | 12.77     | -29.34    | 10.740             | 375.447                       | 198.22            | 3.48              |
| 17       | 5.310   | 18.01     | -26.45    | 5.193              | 88.427                        | 198.22            | 3.67              |
| 18       | 5.498   | 22.63     | -22.63    | -0.536             | 1.771                         | -184.07           | 3.72              |
| 19       | 5.685   | 26.45     | -18.01    | -6.246             | 127.522                       | -184.07           | 3.64              |
| 20       | 5.873   | 29.34     | -12.77    | -11.737            | 448.203                       | -184.07           | 3.44              |

ASSET: 302472, Andover-bunker Hill Road  
 CUSTOMER: T-MOBILE

CODE: ANSI/TIA-222-H  
 ENG NO: 13764996

**REACTION DISTRIBUTION**

| Component     | ID                        | Moment<br>Mu (k-ft) | Axial Load<br>Pu (k) | Shear<br>Vu (k) | Moment Factor |
|---------------|---------------------------|---------------------|----------------------|-----------------|---------------|
| Pole          | 56.91"ø x 0.5" (18 Sides) | 5814.8              | 70.74                | 44.26           | 1.000         |
| Bolt Group    | Original (20) 2.25"ø      | 5814.8              | -                    | 44.26           | 1.000         |
| <b>TOTALS</b> |                           | <b>5814.8</b>       | <b>70.74</b>         | <b>44.26</b>    |               |

**COMPONENT PROPERTIES**

| Component  | ID                        | Gross Area<br>(in <sup>2</sup> ) | Net Area<br>(in <sup>2</sup> ) | Individual Inertia<br>(in <sup>4</sup> ) | Moment of Inertia<br>(in <sup>4</sup> ) | Threads/in |
|------------|---------------------------|----------------------------------|--------------------------------|--|---|------------|
| Pole       | 56.91"ø x 0.5" (18 Sides) | 88.1595                          | -                              | -  | 35073.77                                | -          |
| Bolt Group | Original (20) 2.25"ø      | 3.9761                           | 3.2477                         | 0.8393                                   | 30601.01                                | 4.5        |

**EXTERNAL BASE PLATE BEND LINE ANALYSIS @ 0 FT**

**POLE PROPERTIES**

Flat-to-Flat Diameter: 57.04 in  
 Point-to-Point Diameter: 57.92 in  
 Flat Width: 10.057 in  
 Flat Radians: 0.349 rad

**PLATE PROPERTIES**

Neutral Axis: 134 °  
 Bend Line Lower Limit: rad  
 Bend Line Upper Limit: -0.125 rad

| Bend Line | Chord Length<br>(in) | Additional Length<br>(in) | Section Modulus<br>(in <sup>3</sup> ) | Applied Moment<br>Mu (k-in) | Moment Capacity<br>φMn (k-in) | Ratio |
|-----------|----------------------|---------------------------|---------------------------------------|-----------------------------|-------------------------------|-------|
| Flat      | 33.475               | 0.00                      | 75.318                                | 1287.6                      | 3389.3                        | 0.380 |
| Corner    | 32.595               | 0.00                      | 73.338                                | 937.0                       | 3300.2                        | 0.284 |

**PLASTIC ANCHOR ROD ANALYSIS**

| Class    | Group Quantity | Rod Diameter<br>(in) | Applied Axial Load<br>Pu (k) | Applied Shear Load<br>Vu (k) | Compressive Capacity<br>φPn (k) | Ratio |
|----------|----------------|----------------------|------------------------------|------------------------------|---------------------------------|-------|
| Original | 20             | 2.25                 | 198.3                        | 3.7                          | 243.6                           | 0.814 |

**Site Name:** Andover-bunker Hill Rd, CT  
**Site Number:** 302472  
**Tower Type:** MP  
**Design Loads (Factored) - Analysis per TIA-222-H Standards**

## Monolithic Mat & Pier Foundation Analysis

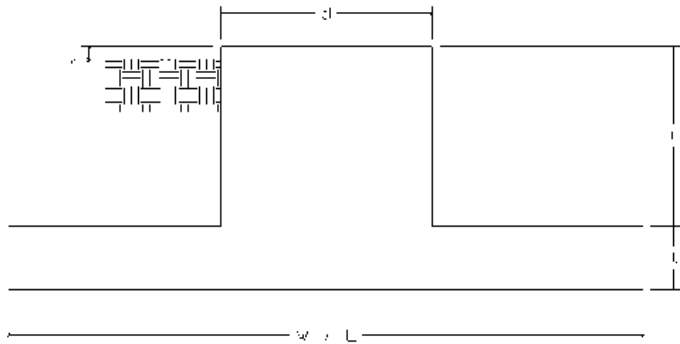
| Foundation Analysis Parameters             |          |      |
|--|----------|------|
| Design / Analysis / Mapping:               | Analysis | -    |
| Compression/Leg:                           | 70.7     | k    |
| Uplift/Leg:                                | 0.0      | k    |
| Total Shear:                               | 44.3     | k    |
| Moment:                                    | 5,814.8  | k-ft |
| Tower + Appurtenance Weight:               | 70.7     | k    |
| Depth to Base of Foundation (l + t - h):   | 9.5      | ft   |
| Diameter of Pier (d):                      | 8        | ft   |
| Length of Pier (l):                        | 6        | ft   |
| Height of Pier above Ground (h):           | 0.5      | ft   |
| Width of Pad (W):                          | 24       | ft   |
| Length of Pad (L):                         | 24       | ft   |
| Thickness of Pad (t):                      | 4        | ft   |
| Tower Leg Center to Center:                | 0        | ft   |
| Number of Tower Legs:                      | 1        | -    |
| Tower Center from Mat Center:              | 0        | ft   |
| Depth Below Ground Surface to Water Table: | 99       | ft   |
| Unit Weight of Concrete:                   | 150      | pcf  |
| Unit Weight of Soil Above Water Table:     | 125      | pcf  |
| Unit Weight of Water:                      | 62.4     | pcf  |
| Unit Weight of Soil Below Water Table:     | 62.6     | pcf  |
| Friction Angle of Uplift:                  | 15       | °    |
| Coefficient of Shear Friction:             | 0.30     | -    |
| Ultimate Compressive Bearing Pressure:     | 8,000    | psf  |
| Ultimate Passive Pressure on Pad Face:     | 0        | psf  |
| $f_{\text{Soil and Concrete Weight}}$ :    | 0.9      | -    |
| $f_{\text{Soil}}$ :                        | 0.75     | -    |

| Foundation Steel Parameters      |        |                 |
|----------------------------------|--------|-----------------|
| Shear/Leg (Compression):         | 44.3   | k               |
| Shear/Leg (Uplift):              | 44.3   | k               |
| Concrete Strength ( $f'_c$ ):    | 3,000  | psi             |
| Pad Tension Steel Depth:         | 44.31  | in              |
| Dead Load Factor:                | 0.9    | -               |
| $f_{\text{Shear}}$ :             | 0.75   | -               |
| $f_{\text{Flexure / Tension}}$ : | 0.9    | -               |
| $f_{\text{Compression}}$ :       | 0.65   | -               |
| b:                               | 0.85   | -               |
| Bottom Pad Rebar Size #:         | 11     | -               |
| # of Bottom Pad Rebar:           | 24     | -               |
| Pad Bottom Steel Area:           | 37.44  | in <sup>2</sup> |
| Pad Steel $F_y$ :                | 60,000 | psi             |
| Top Pad Rebar Size #:            | 11     | -               |
| # of Top Pad Rebar:              | 24     | -               |
| Pad Top Steel Area:              | 37.44  | in <sup>2</sup> |
| Pier Rebar Size #:               | 11     | -               |
| Pier Steel Area (Single Bar):    | 1.56   | in <sup>2</sup> |
| # of Pier Rebar:                 | 40     | -               |
| Pier Steel $F_y$ :               | 60,000 | psi             |
| Pier Cage Diameter:              | 87.4   | in              |
| Rebar Strain Limit:              | 0.008  | -               |
| Steel Elastic Modulus:           | 29,000 | ksi             |
| Tie Rebar Size #:                | 5      | -               |
| Tie Steel Area (Single Bar):     | 0.31   | in <sup>2</sup> |
| Tie Spacing:                     | 6      | in              |
| Tie Steel $F_y$ :                | 40,000 | psi             |
| Clear Cover:                     | 3      | in              |

| Overturning Moment Usage     |        |      |
|------------------------------|--------|------|
| Design OTM:                  | 6257.4 | k-ft |
| OTM Resistance:              | 9373.6 | k-ft |
| Design OTM / OTM Resistance: | 67%    | Pass |

| Soil Bearing Pressure Usage                         |                      |      |
|---|----------------------|------|
| Net Bearing Pressure:                               | 3756                 | psf  |
| Factored Nominal Bearing Pressure:                  | 6000                 | psf  |
| Factored Nominal (Net) Bearing Pressure:            | 63%                  | Pass |
| Load Direction Controlling Design Bearing Pressure: | Diagonal to Pad Edge |      |

| Sliding Factor of Safety              |       |      |
|---------------------------------------|-------|------|
| Ultimate Friction Resistance:         | 243.4 | k    |
| Ultimate Passive Pressure Resistance: | 0.0   | k    |
| Total Factored Sliding Resistance:    | 182.5 | k    |
| Sliding Design / Sliding Resistance:  | 24%   | Pass |



| Pad Strength Capacity                                 |                      |      |  |
|---|----------------------|------|--|
| Factored One Way Shear ( $V_u$ ):                     | 323.4                | k    |  |
| One Way Shear Capacity ( $fV_c$ ):                    | 810.7                | k    | ACI 318-14 25.5.5.1                          |
| $V_u / fV_c$ :  | 40%                  | Pass |  |
| Load Direction Controlling Shear Capacity:            | Diagonal to Pad Edge |      |  |
| Lower Steel Pad Factored Moment ( $M_u$ ):            | 2318.6               | k-ft |  |
| Lower Steel Pad Moment Capacity ( $fM_n$ ):           | 7246.7               | k-ft | ACI 318-14 22.3.1.1                          |
| $M_u / fM_n$ :  | 32%                  | Pass |  |
| Load Direction Controlling Flexural Capacity:         | Parallel to Pad Edge |      |  |
| Upper Steel Pad Factored Moment ( $M_u$ ):            | 988.8                | k-ft |  |
| Upper Steel Pad Moment Capacity ( $fM_n$ ):           | 7246.7               | k-ft |  |
| $M_u / fM_n$ :  | 14%                  | Pass |  |
| Lower Pad Flexural Reinforcement Ratio:               | 0.0029               |      | OK - ACI 318-14 7.6.1.1 & 8.6.1.1            |
| Upper Pad Flexural Reinforcement Ratio:               | 0.0029               |      | OK - ACI 318-14 7.6.1.1 & 8.6.1.1            |
| Lower Pad Reinforcement Spacing:                      | 12.2                 | in   | OK - ACI 318-14 7.7.2.3, 8.7.2.2, & 24.4.3.3 |
| Upper Pad Reinforcement Spacing:                      | 12.2                 | in   | OK - ACI 318-14 7.7.2.3, 8.7.2.2, & 24.4.3.3 |
| Ultimate Punching Shear Stress, $v_u$ :               | 36.28                | psi  | ACI 318-14 R8.4.4.2.3                        |
| Nominal Punching Shear Capacity ( $f_c v_c$ ):        | 164.3                | psi  | ACI 318-14 22.6.5.2                          |
| $v_u / f_c v_c$ :                                     | 22%                  | Pass |  |
| Pier Moment Pad Flexure Transfer Ratio, $\gamma_f$ :  | 0.60                 |      | TIA-222-H 9.4.2                              |
| Moment Transfer Effective Flexural Width, $B_{eff}$ : | 20.00                | ft   | TIA-222-H 9.4.2                              |
| Moment Transfer Through Pad Flexure:                  | 43778.59             | k-in | TIA-222-H 9.4.2                              |
| Moment Transfer Flexural Capacity ( $fM_{sc,f}$ ):    | 74652.04             | k-in |  |
| $g_f M_{sc} / fM_{sc,f}$ :                            | 0%                   | Pass |  |

| Pier Strength Capacity                           |         |      |  |
|--|---------|------|--|
| Factored Moment in Pier ( $M_u$ ):               | 6080.4  | k-ft |  |
| Pier Moment Capacity ( $fM_n$ ):                 | 11999.6 | k-ft |  |
| $M_u / fM_n$ :                                   | 51%     | Pass |  |
| Factored Shear in Pier ( $V_u$ ):                | 44.3    | k    |  |
| Pier Shear Capacity ( $fV_n$ ):                  | 835.7   | k    | ACI 318-14 22.5.1.1                            |
| $V_u / fV_c$ :                                   | 5%      | Pass |  |
| Pier Shear Reinforcement Ratio:                  | 0.0005  |      | OK - No Ties Necessary for Shear - ACI11.5.6.1 |
| Factored Tension in Pier ( $T_u$ ):              | 0.0     | k    |  |
| Pier Tension Capacity ( $fT_n$ ):                | 3369.6  | k    |  |
| $T_u / fT_n$ :                                   | 0%      | Pass |  |
| Factored Compression in Pier ( $P_u$ ):          | 70.7    | k    |  |
| Pier Compression Capacity ( $fP_n$ ):            | 9563.8  | k    | ACI 318-14 22.4.2.1                            |
| $P_u / fP_n$ :                                   | 1%      | Pass |  |
| Minimum Depth to Develop Vertical Rebar:         | 63      | in   | ACI 318-14 25.4.2.3                            |
| Minimum Hook Development Length:                 | 31      | in   | ACI 318-14 25.4.3.1                            |
| Minimum Mat Thickness / Edge Distance from Pier: | 34.0    | in   |  |
| Minimum Foundation Depth:                        | 8.35    | ft   |  |
| $M_u / f_B M_n + T_u / f_T T_n$ :                | 51%     | Pass |  |



|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

**Section 1 - Site Information**

|  |  |                                      |
|--|--|--------------------------------------|
| <b>Site ID:</b> CT11502A                             | <b>Site Name:</b> SpectraSite Andover    | <b>Latitude:</b> 41.73783800         |
| <b>Status:</b> Draft                                 | <b>Site Class:</b> Monopole              | <b>Longitude:</b> -72.34965500       |
| <b>Version:</b> 3                                    | <b>Site Type:</b> Structure Non Building | <b>Address:</b> 104 Bunker Hill Road |
| <b>Project Type:</b> Anchor                          | <b>Plan Year:</b> 2022                   | <b>City, State:</b> Andover, CT      |
| <b>Approved:</b> Not Approved                        | <b>Market:</b> CONNECTICUT CT            | <b>Region:</b> NORTHEAST             |
| <b>Approved By:</b> Not Approved                     | <b>Vendor:</b> Ericsson                  |                                      |
| <b>Last Modified:</b> 12/10/2021 2:3:58 PM           | <b>Landlord:</b> Spectrasite             |                                      |
| <b>Last Modified By:</b> Pratik.Patil30@T-Mobile.com |  |                                      |

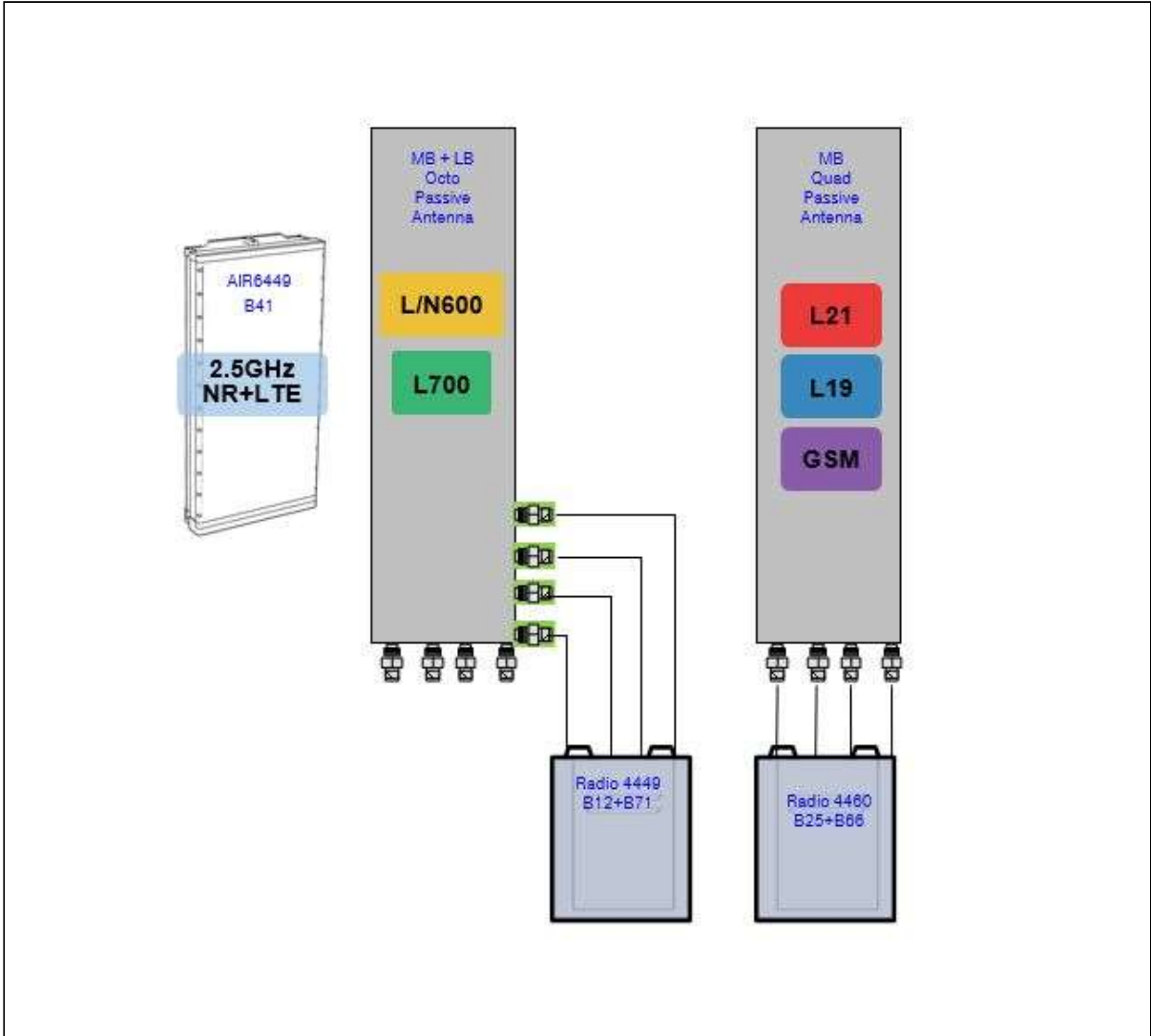
|   |                         |  |                     |                     |
|---|-------------------------|--|---------------------|---------------------|
| <b>RAN Template:</b> 67D5A998E ODE+6160 |                         | <b>AL Template:</b> 67D5998E_1xAIR+1OP |                     |                     |
| <b>Sector Count:</b> 3                  | <b>Antenna Count:</b> 6 | <b>Coax Line Count:</b> 0              | <b>TMA Count:</b> 0 | <b>RRU Count:</b> 6 |

**Section 2 - Existing Template Images**

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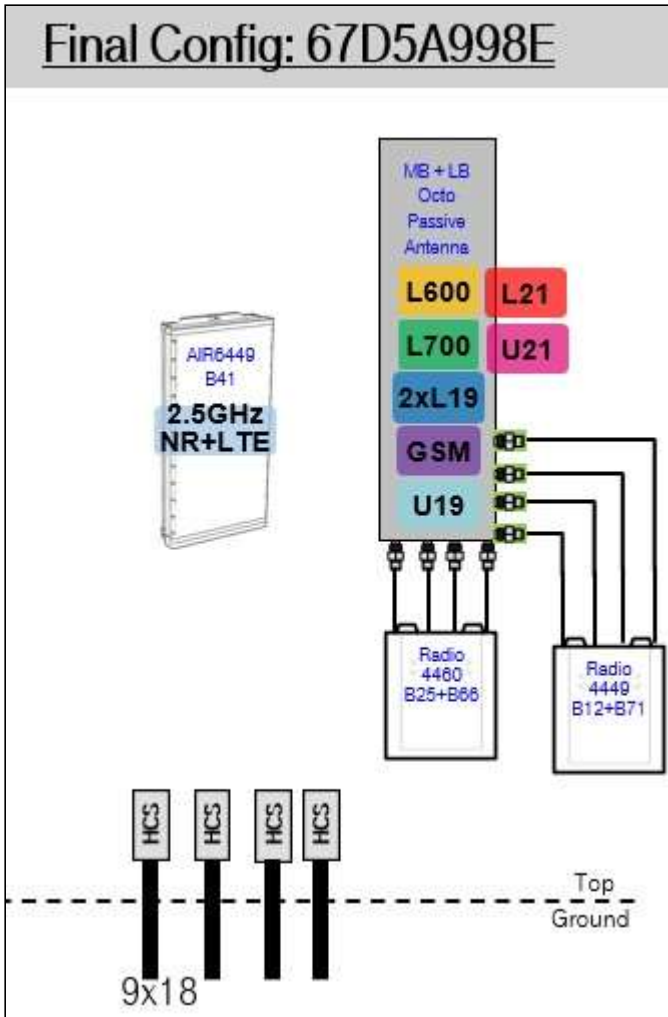
Section 3 - Proposed Template Images

67D5998E\_1xAIR+1OP+1QP.JPG



Notes:

67D5A998E.jpg



Notes:

**Section 4 - Siteplan Images**

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| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D94E

|                            |   |                           |                                 |
|----------------------------|---|---------------------------|---------------------------------|
| <b>Enclosure</b>           | <b>1</b>                                |                           |                                 |
| <b>Enclosure Type</b>      | RBS 6201 ODE                            |                           |                                 |
| <b>Baseband</b>            | DUG20<br>G1900                          | BB 6630<br>L2100<br>L1900 | BB 6630<br>L700<br>L600<br>N600 |
| <b>Hybrid Cable System</b> | Ericsson 6x12 HCS *Select Length & AWG* |                           |                                 |
| <b>Radio</b>               | RUS01 B2 (x 3)<br>G1900                 | RUS01 B2 (x 3)<br>L1900   |                                 |

Proposed RAN Equipment

Template: 67D5A998E ODE+6160

|                            |   |   |                           |
|----------------------------|---|---|---------------------------|
| <b>Enclosure</b>           | <b>1</b>  | <b>2</b>  | <b>3</b>                  |
| <b>Enclosure Type</b>      | RBS 6201 ODE  | Enclosure 6160 AC V1  | B160                      |
| <b>Baseband</b>            | DUG20<br>G1900  | BB 6630<br>L700<br>L600<br>N600                                   | BB 6648<br>L2500<br>N2500 |
| <b>Hybrid Cable System</b> | Ericsson Hybrid Trunk 6/24 4AWG 100m<br>Ericsson 6x12 HCS *Select Length & AWG* | PSU 4813 vR4A (Kit)<br>Ericsson Hybrid Trunk 6/24 4AWG 100m (x 2) |                           |
| <b>Transport System</b>    |   | CSR IXRe V2 (Gen2)  |                           |

RAN Scope of Work:

- Remove and return all cabinet radios from existing base station cabinet.
- Add (1) Enclosure 6160.
- Add (1) IXRe Router to new Enclosure 6160.
- Add (1) BB6648 for L2500 and N2500 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.
- Add (1) PSU4813 Voltage Booster to new Enclosure 6160.
- Add (1) Battery Cabinet B160.
- Existing : (1) 6X12 (12) Coaxial Cables
- Remove all Coax
- Add (1) 6x24 terminating at the ODE and (2) 6X24 HCS terminating at the Enclosure 6160. Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

Section 6 - A&L Equipment

Existing Template: 67D94E\_1DP+1OP  
Proposed Template: 67D5998E\_1xAIR+1OP

Sector 1 (Existing) view from behind

|                              |                                   |  |  |   |           |
|------------------------------|-----------------------------------|--|--|---|-----------|
| <b>Coverage Type</b>         | A - Outdoor Macro                 |  |  |   |           |
| <b>Antenna</b>               | 1                                 |  |  | 2   |           |
| <b>Antenna Model</b>         | RFS - APXVAARR24_43-U-NA20 (Octo) |  |  | EMS - RR90-17-XXDP (Dual)                           |           |
| <b>Azimuth</b>               | 60                                |  |  | 60  |           |
| <b>M. Tilt</b>               | 0                                 |  |  | 0   |           |
| <b>Height</b>                | 148                               |  |  | 148   |           |
| <b>Ports</b>                 | <b>P1</b>                         | <b>P2</b>                              | <b>P3</b>  | <b>P4</b>   | <b>P5</b> |
| <b>Active Tech.</b>          | L700 L600<br>N600                 | L700 L600<br>N600                      | L1900 G1900  | L2100   |           |
| <b>Dark Tech.</b>            |                                   |  |  |   |           |
| <b>Restricted Tech.</b>      |                                   |  |  |   |           |
| <b>Decomm. Tech.</b>         |                                   |  |  |   |           |
| <b>E. Tilt</b>               | 2                                 | 2                                      | 2  | 2   |           |
| <b>Cables</b>                | Coax Jumper (x2)                  | Coax Jumper (x2)                       | 1-5/8" Coax - 160 ft. (x2)                         | 1-5/8" Coax - 160 ft. (x2)                          |           |
| <b>TMA's</b>                 |                                   |  | Ericsson Twin Style 1A - KRY 112 489/2 (AtAntenna) | Ericsson Twin Style 1BX - KRY 112 144/2 (AtAntenna) |           |
| <b>Diplexers / Combiners</b> |                                   |  |  |   |           |
| <b>Radio</b>                 | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) |  | Radio 4415 B66A (At Cabinet)                        |           |
| <b>Sector Equipment</b>      |                                   |  |  |   |           |

Unconnected Equipment:

Scope of Work:

Replace LB Dual in Position 1 with (1) LB/MB Octo.  
Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.  
Move Coaxial Lines and PCS TMA in Position 2 to Mid-Band Ports of LB/MB Octo in Position 1.  
Add (1) AWS TMA to Position 1. Connect Coaxial Lines and AWS TMA in Position 1 to Mid-Band Ports of LB/MB Octo.  
Remove Bias T.

\*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

| Sector 1 (Proposed) view from behind |                                   |  |                                  |  |                   |                   |
|--------------------------------------|-----------------------------------|--|----------------------------------|--|-------------------|-------------------|
| Coverage Type                        | A - Outdoor Macro                 |  |                                  |  |                   |                   |
| Antenna                              | 1                                 |  |                                  | 2  |                   |                   |
| Antenna Model                        | RFS - APXVAARR24_43-U-NA20 (Octo) |  |                                  | Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO) |                   |                   |
| Azimuth                              | 60                                |  |                                  | 60   |                   |                   |
| M. Tilt                              | 0                                 |  |                                  | 0  |                   |                   |
| Height                               | 148                               |  |                                  | 148  |                   |                   |
| Ports                                | P1                                | P2                                     | P3                               | P4   | P5                | P6                |
| Active Tech.                         | L700 L600<br>N600                 | L700 L600<br>N600                      | L2100 L1900<br>G1900             | L2100 L1900<br>G1900                                   | L2500 N2500       | L2500 N2500       |
| Dark Tech.                           |                                   |  |                                  |  |                   |                   |
| Restricted Tech.                     |                                   |  |                                  |  |                   |                   |
| Decomm. Tech.                        |                                   |  |                                  |  |                   |                   |
| E. Tilt                              | 2                                 | 2                                      | 2                                | 2  | 2                 | 2                 |
| Cables                               | Coax Jumper (x2)<br>Fiber Jumper  | Coax Jumper (x2)<br>Fiber Jumper       | Coax Jumper (x2)<br>Fiber Jumper | Coax Jumper (x2)<br>Fiber Jumper                       | Fiber Jumper (x2) | Fiber Jumper (x2) |
| TMA's                                |                                   |  |                                  |  |                   |                   |
| Diplexers / Combiners                |                                   |  |                                  |  |                   |                   |
| Radio                                | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) | Radio 4460 B25+B66 (At Antenna)  | SHARED Radio 4460 B25+B66 (At Antenna)                 |                   |                   |
| Sector Equipment                     |                                   |  |                                  |  |                   |                   |

**Unconnected Equipment:**

**Scope of Work:**

Add a handrail Kit.

There will be Two antennae per sector.

Remove all TMA's.

Remove all Coaxial Lines.

Replace (1) Radio 4415 B25 with (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 1 at antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2

Ensure RET control is enabled for all technology layers according to the Design Documents

\*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

| Sector 2 (Existing) view from behind  |                                   |  |  |   |           |
|---|-----------------------------------|--|--|---|-----------|
| <b>Coverage Type</b>  | A - Outdoor Macro                 |  |  |   |           |
| <b>Antenna</b>  | 1                                 |  |  | 2   |           |
| <b>Antenna Model</b>  | RFS - APXVAARR24_43-U-NA20 (Octo) |  |  | EMS - RR90-17-XXDP (Dual)                           |           |
| <b>Azimuth</b>  | 180                               |  |  | 180   |           |
| <b>M. Tilt</b>  | 0                                 |  |  | 0   |           |
| <b>Height</b>   | 148                               |  |  | 148   |           |
| <b>Ports</b>  | <b>P1</b>                         | <b>P2</b>                              | <b>P3</b>  | <b>P4</b>   | <b>P5</b> |
| <b>Active Tech.</b>   | L700 L600<br>N600                 | L700 L600<br>N600                      | L1900 G1900  | L2100   |           |
| <b>Dark Tech.</b>   |                                   |  |  |   |           |
| <b>Restricted Tech.</b>   |                                   |  |  |   |           |
| <b>Decomm. Tech.</b>  |                                   |  |  |   |           |
| <b>E. Tilt</b>  | 2                                 | 2                                      | 2  | 2   |           |
| <b>Cables</b>   | Coax Jumper (x2)                  | Coax Jumper (x2)                       | 1-5/8" Coax - 160 ft. (x2)                         | 1-5/8" Coax - 160 ft. (x2)                          |           |
| <b>TMA's</b>  |                                   |  | Ericsson Twin Style 1A - KRY 112 489/2 (AtAntenna) | Ericsson Twin Style 1BX - KRY 112 144/2 (AtAntenna) |           |
| <b>Diplexers / Combiners</b>  |                                   |  |  |   |           |
| <b>Radio</b>  | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) |  | Radio 4415 B66A (At Cabinet)                        |           |
| <b>Sector Equipment</b>   |                                   |  |  |   |           |
| <b>Unconnected Equipment:</b>   |                                   |  |  |   |           |
| <b>Scope of Work:</b>   |                                   |  |  |   |           |
| Replace LB Dual in Position 1 with (1) LB/MB Octo.<br>Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.<br>Move Coaxial Lines and PCS TMA in Position 2 to Mid-Band Ports of LB/MB Octo in Position 1.<br>Add (1) AWS TMA to Position 1. Connect Coaxial Lines and AWS TMA in Position 1 to Mid-Band Ports of LB/MB Octo.<br>Remove Bias T. |                                   |  |  |   |           |
| *A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.  |                                   |  |  |   |           |



|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

| Sector 2 (Proposed) view from behind |                                   |  |                                  |  |                   |                   |
|--------------------------------------|-----------------------------------|--|----------------------------------|--|-------------------|-------------------|
| <b>Coverage Type</b>                 | A - Outdoor Macro                 |  |                                  |  |                   |                   |
| <b>Antenna</b>                       | 1                                 |  |                                  | 2  |                   |                   |
| <b>Antenna Model</b>                 | RFS - APXVAARR24_43-U-NA20 (Octo) |  |                                  | Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO) |                   |                   |
| <b>Azimuth</b>                       | 180                               |  |                                  | 180  |                   |                   |
| <b>M. Tilt</b>                       | 0                                 |  |                                  | 0  |                   |                   |
| <b>Height</b>                        | 148                               |  |                                  | 148  |                   |                   |
| <b>Ports</b>                         | <b>P1</b>                         | <b>P2</b>                              | <b>P3</b>                        | <b>P4</b>  | <b>P5</b>         | <b>P6</b>         |
| <b>Active Tech.</b>                  | L700 L600<br>N600                 | L700 L600<br>N600                      | L2100 L1900<br>G1900             | L2100 L1900<br>G1900                                   | L2500 N2500       | L2500 N2500       |
| <b>Dark Tech.</b>                    |                                   |  |                                  |  |                   |                   |
| <b>Restricted Tech.</b>              |                                   |  |                                  |  |                   |                   |
| <b>Decomm. Tech.</b>                 |                                   |  |                                  |  |                   |                   |
| <b>E. Tilt</b>                       | 2                                 | 2                                      | 2                                | 2  | 2                 | 2                 |
| <b>Cables</b>                        | Coax Jumper (x2)<br>Fiber Jumper  | Coax Jumper (x2)<br>Fiber Jumper       | Coax Jumper (x2)<br>Fiber Jumper | Coax Jumper (x2)<br>Fiber Jumper                       | Fiber Jumper (x2) | Fiber Jumper (x2) |
| <b>TMA's</b>                         |                                   |  |                                  |  |                   |                   |
| <b>Diplexers / Combiners</b>         |                                   |  |                                  |  |                   |                   |
| <b>Radio</b>                         | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) | Radio 4460 B25+B66 (At Antenna)  | SHARED Radio 4460 B25+B66 (At Antenna)                 |                   |                   |
| <b>Sector Equipment</b>              |                                   |  |                                  |  |                   |                   |

**Unconnected Equipment:**

**Scope of Work:**

Add a handrail Kit.

There will be Two antennae per sector.

Remove all TMA's.

Remove all Coaxial Lines.

Replace (1) Radio 4415 B25 with (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 1 at antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2

Ensure RET control is enabled for all technology layers according to the Design Documents

\*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

| Sector 3 (Existing) view from behind  |                                   |  |  |   |           |
|---|-----------------------------------|--|--|---|-----------|
| <b>Coverage Type</b>  | A - Outdoor Macro                 |  |  |   |           |
| <b>Antenna</b>  | 1                                 |  |  | 2   |           |
| <b>Antenna Model</b>  | RFS - APXVAARR24_43-U-NA20 (Octo) |  |  | EMS - RR90-17-XXDP (Dual)                           |           |
| <b>Azimuth</b>  | 300                               |  |  | 300   |           |
| <b>M. Tilt</b>  | 0                                 |  |  | 0   |           |
| <b>Height</b>   | 148                               |  |  | 148   |           |
| <b>Ports</b>  | <b>P1</b>                         | <b>P2</b>                              | <b>P3</b>  | <b>P4</b>   | <b>P5</b> |
| <b>Active Tech.</b>   | L700 L600<br>N600                 | L700 L600<br>N600                      | L1900 G1900  | L2100   |           |
| <b>Dark Tech.</b>   |                                   |  |  |   |           |
| <b>Restricted Tech.</b>   |                                   |  |  |   |           |
| <b>Decomm. Tech.</b>  |                                   |  |  |   |           |
| <b>E. Tilt</b>  | 2                                 | 2                                      | 2  | 2   |           |
| <b>Cables</b>   | Coax Jumper (x2)                  | Coax Jumper (x2)                       | 1-5/8" Coax - 160 ft. (x2)                         | 1-5/8" Coax - 160 ft. (x2)                          |           |
| <b>TMA's</b>  |                                   |  | Ericsson Twin Style 1A - KRY 112 489/2 (AtAntenna) | Ericsson Twin Style 1BX - KRY 112 144/2 (AtAntenna) |           |
| <b>Diplexers / Combiners</b>  |                                   |  |  |   |           |
| <b>Radio</b>  | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) |  | Radio 4415 B66A (At Cabinet)                        |           |
| <b>Sector Equipment</b>   |                                   |  |  |   |           |
| <b>Unconnected Equipment:</b>   |                                   |  |  |   |           |
| <b>Scope of Work:</b>   |                                   |  |  |   |           |
| Replace LB Dual in Position 1 with (1) LB/MB Octo.<br>Add (1) Radio 4449 B71+B12 to Position 1 for L600 and L700.<br>Move Coaxial Lines and PCS TMA in Position 2 to Mid-Band Ports of LB/MB Octo in Position 1.<br>Add (1) AWS TMA to Position 1. Connect Coaxial Lines and AWS TMA in Position 1 to Mid-Band Ports of LB/MB Octo.<br>Remove Bias T. |                                   |  |  |   |           |
| *A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.  |                                   |  |  |   |           |

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

| Sector 3 (Proposed) view from behind |                                   |  |                                  |  |                   |                   |
|--------------------------------------|-----------------------------------|--|----------------------------------|--|-------------------|-------------------|
| <b>Coverage Type</b>                 | A - Outdoor Macro                 |  |                                  |  |                   |                   |
| <b>Antenna</b>                       | 1                                 |  |                                  | 2  |                   |                   |
| <b>Antenna Model</b>                 | RFS - APXVAARR24_43-U-NA20 (Octo) |  |                                  | Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO) |                   |                   |
| <b>Azimuth</b>                       | 300                               |  |                                  | 300  |                   |                   |
| <b>M. Tilt</b>                       | 0                                 |  |                                  | 0  |                   |                   |
| <b>Height</b>                        | 148                               |  |                                  | 148  |                   |                   |
| <b>Ports</b>                         | <b>P1</b>                         | <b>P2</b>                              | <b>P3</b>                        | <b>P4</b>  | <b>P5</b>         | <b>P6</b>         |
| <b>Active Tech.</b>                  | L700 L600<br>N600                 | L700 L600<br>N600                      | L2100 L1900<br>G1900             | L2100 L1900<br>G1900                                   | L2500 N2500       | L2500 N2500       |
| <b>Dark Tech.</b>                    |                                   |  |                                  |  |                   |                   |
| <b>Restricted Tech.</b>              |                                   |  |                                  |  |                   |                   |
| <b>Decomm. Tech.</b>                 |                                   |  |                                  |  |                   |                   |
| <b>E. Tilt</b>                       | 2                                 | 2                                      | 2                                | 2  | 2                 | 2                 |
| <b>Cables</b>                        | Coax Jumper (x2)<br>Fiber Jumper  | Coax Jumper (x2)<br>Fiber Jumper       | Coax Jumper (x2)<br>Fiber Jumper | Coax Jumper (x2)<br>Fiber Jumper                       | Fiber Jumper (x2) | Fiber Jumper (x2) |
| <b>TMAs</b>                          |                                   |  |                                  |  |                   |                   |
| <b>Diplexers / Combiners</b>         |                                   |  |                                  |  |                   |                   |
| <b>Radio</b>                         | Radio 4449 B71+B85 (At Antenna)   | SHARED Radio 4449 B71+B85 (At Antenna) | Radio 4460 B25+B66 (At Antenna)  | SHARED Radio 4460 B25+B66 (At Antenna)                 |                   |                   |
| <b>Sector Equipment</b>              |                                   |  |                                  |  |                   |                   |

**Unconnected Equipment:**

**Scope of Work:**

Add a handrail Kit.

There will be Two antennae per sector.

Remove all TMAs.

Remove all Coaxial Lines.

Replace (1) Radio 4415 B25 with (1) Radio 4460 B25+B66 for L2100, L1900 (Both carriers), and GSM to Position 1 at antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2

Ensure RET control is enabled for all technology layers according to the Design Documents

\*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

|  |  |
|--|--|
| <b>RAN Template:</b><br>67D5A998E ODE+6160 | <b>A&amp;L Template:</b><br>67D5998E_1xAIR+1OP |
|--|--|

**Section 7 - Power Systems Equipment**

|  |
|--|
| <b>Existing Power Systems Equipment</b>          |
| ----- This section is intentionally blank. ----- |

|   |                      |
|---|----------------------|
| <b>Proposed Power Systems Equipment</b> |                      |
| <b>Enclosure</b>                        | 1                    |
| <b>Enclosure Type</b>                   | Enclosure 6160 AC V1 |

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT  
EVALUATION OF HUMAN EXPOSURE POTENTIAL  
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11502A

SpectraSite Andover  
104 Bunker Hill Road  
Andover, Connecticut 06232

**February 21, 2022**

**EBI Project Number: 6222001247**

| Site Compliance Summary   |                  |
|---|------------------|
| Compliance Status:  | <b>COMPLIANT</b> |
| Site total MPE% of<br>FCC general<br>population<br>allowable limit: | <b>22.36%</b>    |

February 21, 2022

T-Mobile

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CT11502A - SpectraSite Andover

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **104 Bunker Hill Road** in **Andover, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$ , respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 104 Bunker Hill Road in Andover, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

- 6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 7) 1 LTE Traffic channel (LTE IC and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.
- 8) 1 LTE Broadcast channel (LTE IC and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.
- 9) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 10) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.
- 11) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 12) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 13) The antennas used in this modeling are the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APXVAARR24\_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied



specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 14) The antenna mounting height centerline of the proposed antennas is 148 feet above ground level (AGL).
- 15) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 16) All calculations were done with respect to uncontrolled / general population threshold limits.

## T-Mobile Site Inventory and Power Data

|                     |  |                     |  |                     |  |
|---------------------|--|---------------------|--|---------------------|--|
| Sector:             | A  | Sector:             | B  | Sector:             | C  |
| Antenna #:          | 1  | Antenna #:          | 1  | Antenna #:          | 1  |
| Make / Model:       | RFS<br>APXVAARR24_43-<br>U-NA20  | Make / Model:       | RFS<br>APXVAARR24_43-<br>U-NA20  | Make / Model:       | RFS<br>APXVAARR24_43-<br>U-NA20  |
| Frequency Bands:    | 600 MHz / 600 MHz /<br>700 MHz / 1900<br>MHz / 1900 MHz /<br>2100 MHz          | Frequency Bands:    | 600 MHz / 600 MHz /<br>700 MHz / 1900<br>MHz / 1900 MHz /<br>2100 MHz          | Frequency Bands:    | 600 MHz / 600 MHz /<br>700 MHz / 1900<br>MHz / 1900 MHz /<br>2100 MHz          |
| Gain:               | 12.95 dBd / 12.95<br>dBd / 13.35 dBd /<br>15.65 dBd / 15.65<br>dBd / 16.35 dBd | Gain:               | 12.95 dBd / 12.95<br>dBd / 13.35 dBd /<br>15.65 dBd / 15.65<br>dBd / 16.35 dBd | Gain:               | 12.95 dBd / 12.95<br>dBd / 13.35 dBd /<br>15.65 dBd / 15.65<br>dBd / 16.35 dBd |
| Height (AGL):       | 148 feet   | Height (AGL):       | 148 feet   | Height (AGL):       | 148 feet   |
| Channel Count:      | 13   | Channel Count:      | 13   | Channel Count:      | 13   |
| Total TX Power (W): | 560.00 Watts   | Total TX Power (W): | 560.00 Watts   | Total TX Power (W): | 560.00 Watts   |
| ERP (W):            | 18,052.03  | ERP (W):            | 18,052.03  | ERP (W):            | 18,052.03  |
| Antenna A1 MPE %:   | 4.22%  | Antenna B1 MPE %:   | 4.22%  | Antenna C1 MPE %:   | 4.22%  |
| Antenna #:          | 2  | Antenna #:          | 2  | Antenna #:          | 2  |
| Make / Model:       | Ericsson AIR 6449  | Make / Model:       | Ericsson AIR 6449  | Make / Model:       | Ericsson AIR 6449  |
| Frequency Bands:    | 2500 MHz / 2500<br>MHz / 2500 MHz /<br>2500 MHz                                | Frequency Bands:    | 2500 MHz / 2500<br>MHz / 2500 MHz /<br>2500 MHz                                | Frequency Bands:    | 2500 MHz / 2500<br>MHz / 2500 MHz /<br>2500 MHz                                |
| Gain:               | 22.35 dBd / 17.3 dBd<br>/ 22.35 dBd / 17.3<br>dBd                              | Gain:               | 22.35 dBd / 17.3 dBd<br>/ 22.35 dBd / 17.3<br>dBd                              | Gain:               | 22.35 dBd / 17.3 dBd<br>/ 22.35 dBd / 17.3<br>dBd                              |
| Height (AGL):       | 148 feet   | Height (AGL):       | 148 feet   | Height (AGL):       | 148 feet   |
| Channel Count:      | 4  | Channel Count:      | 4  | Channel Count:      | 4  |
| Total TX Power (W): | 240.00 Watts   | Total TX Power (W): | 240.00 Watts   | Total TX Power (W): | 240.00 Watts   |
| ERP (W):            | 34,144.54  | ERP (W):            | 34,144.54  | ERP (W):            | 34,144.54  |
| Antenna A2 MPE %:   | 6.09%  | Antenna B2 MPE %:   | 6.09%  | Antenna C2 MPE %:   | 6.09%  |

| Site Composite MPE %        |        |
|-----------------------------|--------|
| Carrier                     | MPE %  |
| T-Mobile (Max at Sector A): | 10.31% |
| Dish                        | 1.7%   |
| AT&T                        | 5.16%  |
| Verizon                     | 2.9%   |
| Nextel                      | 0.19%  |
| Sprint                      | 2.1%   |
| Site Total MPE % :          | 22.36% |

| T-Mobile MPE % Per Sector |        |
|---------------------------|--------|
| T-Mobile Sector A Total:  | 10.31% |
| T-Mobile Sector B Total:  | 10.31% |
| T-Mobile Sector C Total:  | 10.31% |
|                           |        |
| Site Total MPE % :        | 22.36% |

### T-Mobile Maximum MPE Power Values (Sector A)

| T-Mobile Frequency Band / Technology (Sector A) | # Channels | Watts ERP (Per Channel) | Height (feet) | Total Power Density ( $\mu\text{W}/\text{cm}^2$ ) | Frequency (MHz)                | Allowable MPE ( $\mu\text{W}/\text{cm}^2$ ) | Calculated % MPE |
|---|------------|-------------------------|---------------|---|--------------------------------|---|------------------|
| T-Mobile 600 MHz LTE                            | 2          | 591.73                  | 148.0         | 2.11  | 600 MHz LTE                    | 400   | 0.53%            |
| T-Mobile 600 MHz NR                             | 1          | 1577.94                 | 148.0         | 2.81  | 600 MHz NR                     | 400   | 0.70%            |
| T-Mobile 700 MHz LTE                            | 2          | 648.82                  | 148.0         | 2.31  | 700 MHz LTE                    | 467   | 0.50%            |
| T-Mobile 1900 MHz GSM                           | 4          | 1101.85                 | 148.0         | 7.86  | 1900 MHz GSM                   | 1000  | 0.79%            |
| T-Mobile 1900 MHz LTE                           | 2          | 2203.69                 | 148.0         | 7.86  | 1900 MHz LTE                   | 1000  | 0.79%            |
| T-Mobile 2100 MHz LTE                           | 2          | 2589.11                 | 148.0         | 9.23  | 2100 MHz LTE                   | 1000  | 0.92%            |
| T-Mobile 2500 MHz LTE IC & 2C Traffic           | 1          | 10307.45                | 148.0         | 18.38   | 2500 MHz LTE IC & 2C Traffic   | 1000  | 1.84%            |
| T-Mobile 2500 MHz LTE IC & 2C Broadcast         | 1          | 1074.06                 | 148.0         | 1.92  | 2500 MHz LTE IC & 2C Broadcast | 1000  | 0.19%            |
| T-Mobile 2500 MHz NR Traffic                    | 1          | 20614.90                | 148.0         | 36.76   | 2500 MHz NR Traffic            | 1000  | 3.68%            |
| T-Mobile 2500 MHz NR Broadcast                  | 1          | 2148.13                 | 148.0         | 3.83  | 2500 MHz NR Broadcast          | 1000  | 0.38%            |
|   |            |                         |               |   |                                | <b>Total:</b>                               | <b>10.31%</b>    |

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

| T-Mobile Sector                    | Power Density Value (%) |
|------------------------------------|-------------------------|
| Sector A:                          | 10.31%                  |
| Sector B:                          | 10.31%                  |
| Sector C:                          | 10.31%                  |
| T-Mobile Maximum MPE % (Sector A): | 10.31%                  |
|                                    |                         |
| Site Total:                        | 22.36%                  |
|                                    |                         |
| Site Compliance Status:            | <b>COMPLIANT</b>        |

The anticipated composite MPE value for this site assuming all carriers present is **22.36%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.