Alex Murshteyn, Site Acquisition Consultant
c/o T-Mobile Northeast LLC ("T-Mobile")
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

September 14, 2018

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

**RE: Notice of Exempt Modification // Site Number: CT11182A (ATC: 302483)**
**260 Beckley Road (aka 268 aka 264 Beckley Rd), Berlin, CT 06037**
**N 41.63166 // W 72.72986**

Dear Ms. Bachman:

T-Mobile Northeast LLC ("T-Mobile") currently maintains rights to 3 antennas, physically removed pursuant to structural modification required in 2017 by American Tower Corporation ("ATC"), with the de-stacking of the 20' tower-top extension section and their 162-foot level on the existing 151.5-foot monopole tower. ATC owns the tower, located at 260 Beckley Road, Berlin, CT. The property is owned by Elaine E. Matulis & John C. Matulis, Jr. The Council has allowed T-Mobile predecessors' use of the existing site since 1998. T-Mobile now intends to consolidate its tower equipment at the 142-foot level, upon a new platform mounts, along with 6 new antennas for its LTE (600/700/1900/2100 MHz) replacements as a part of this LTE/PCS/AWS upgrade. T-Mobile will additionally remove and replace 6 tower top amplifiers (TTAs), install 3 new remote radio head units (RRUs), and 1 new hybrid fiber cable; altogether updating leased equipment rights, as reflected by the final configuration outlined in the structural analysis and proposed hereby. Note that all structural upgrades to this tower which were described above, as previously required by ATC Project #11912109, have since been completed pursuant to the modification drawings last dated October 3, 2017 and stamped October 6, 2017, which are enclosed herewith for reference.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to

Mark H. Kaczynski, Mayor for the Town of Berlin, its Zoning Enforcement Officer Maureen Giusti, including for Planning and Zoning, to American Tower, the tower owner, and to the ground owners, Elaine E. Matulis & John C. Matulis, Jr.

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

Enclosed to accommodate this filing are construction drawings dated September 6, 2018 by A.T. Engineering Service, PLLC a structural analysis dated August 28, 2018 by A.T. Engineering Service, PLLC and an RF Emissions Analysis Report dated August 6, 2018 by EBI Consulting.

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 new antenna 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, as shown in the attached structural analysis by A.T. Engineering Service, PLLC, dated August 28, 2018.

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,

Alex Murshteyn, Site Acquisition Consultant
c/o T-Mobile Northeast LLC
Centerline Communications, LLC
750 West Center Street, Floor 3
West Bridgewater, MA 02379
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

Attachments

cc: Mark Kaczynski, Mayor - as elected official - 1Z9Y45030338739459
Maureen Giusti, ZEO, Planning and Zoning - as P&Z official - 1Z9Y45030320044063
American Tower Corporation - as tower owner - 1Z9Y45030337341675
Elaine & John Matulis - as property owners - 1Z9Y45030321532284

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# Structural Analysis Report

| | | |
|---|---|---|
| **Structure** | : | **151.5 ft Monopole (De-stacked from 174.5')** |
| **ATC Site Name** | : | **Brln - Berlin, CT** |
| **ATC Site Number** | : | **302483** |
| **Engineering Number** | : | **OAA731959_C3_05** |
| **Proposed Carriers** | : | **T-Mobile** |
| **Carrier Site Name** | : | **Berlin/ Rt-9 X22_1** |
| **Carrier Site Number** | : | **CT11182A** |
| **Site Location** | : | **260 Beckley Road**<br>**Kensington, CT 06037-2419**<br>**41.631722,-72.729900** |
| **County** | : | **Hartford** |
| **Date** | : | **August 28, 2018** |
| **Max Usage** | : | **99.8%** |
| **Result** | : | **Pass*** |

Prepared By:
Travis J. Gatling
Structural Engineer I

Travis J. Gatling

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32598
LICENSED
PROFESSIONAL ENGINEER

Authorized by "EOR"
Aug 29 2018 3:29 PM cosign

**COA: D94317**

AMERICAN TOWER
CORPORATION

## Table of Contents

## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 151.5 ft monopole to reflect the changes proposed by T-Mobile.

## Supporting Documents

| | |
|---|---|
| **Tower Drawings** | ITT Meyer Type "B", dated July 21, 2001<br>Mapping by Smith Cullum Acq. #CT-0019, dated July 21, 2001<br>Mapping by ATC Report #0682, dated January 7, 2016 |
| **Foundation Drawing** | SpectraSite Project #CT-0019, dated May 29, 2003 |
| **Geotechnical Report** | Daniel G. Loucks Project #CT-0019, dated December 21, 2001 |
| **Modifications** | Scientel Project #Berlin-CT0019, dated July 30, 2002<br>ATC Project #11912109_P5_02, dated October 3, 2017* |

*** The changes outlined by ATC Project #11912109_P5_02 must be completed for this analysis to be valid.**

## Analysis

The tower was analyzed using tnxTower version 8.0.2.1 analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

| | |
|---|---|
| **Basic Wind Speed:** | 97 mph (3-Second Gust, $V_{ASD}$) / 125 mph (3-second Gust, $V_{ULT}$) |
| **Basic Wind Speed w/ Ice:** | 50 mph (3-Second Gust) w/ 1" radial ice concurrent |
| **Code:** | ANSI/TIA-222-G / 2012 IBC / 2016 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.182, $S_1$ = 0.063 |
| **Site Class:** | D - Stiff Soil |

## 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 the pending modifications cited in the Supporting Documents table are not completed prior to T-Mobile's installation, the results of this analysis are no longer valid, and T-Mobile should contact American Tower's Site Manager for further direction on how to proceed.

If you have any questions or require additional information, please contact American Tower via email at 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

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 151.5 | 153.0 | 6 | CCI TPX-070821 | Platform w/ Handrails | (12) 1 1/4" Coax<br>(4) 0.78" 8 AWG 6<br>(2) 0.39" Fiber Trunk<br>(1) 3" conduit | AT&T Mobility |
| | | 6 | Powerwave LGP21401 | | | |
| | | 2 | Raycap DC6-48-60-18-8F (32.8Lbs) | | | |
| | | 3 | Ericsson RRUS 11 (Band 12) (55 Lbs) | | | |
| | | 3 | Ericsson RRUS 32 (50.8 Lbs) | | | |
| | | 3 | Ericsson RRUS 32 B2 | | | |
| | | 3 | Powerwave 7770.00 | | | |
| | | 3 | Quintel QS66512-2 | | | |
| | | 3 | CCI OPA-65R-LCUU-H6 | | | |
| 127.0 | 127.0 | 3 | Alcatel-Lucent RRH2x50-08 | Platform w/ Handrails | (4) 1 1/4" Hybriflex | Sprint Nextel |
| | | 3 | Alcatel-Lucent 800MHz 2X50W RRH w/ Filter | | | |
| | | 6 | Alcatel-Lucent 4x40W RRH | | | |
| | | 3 | Alcatel-Lucent TD-RRH8x20 | | | |
| | | 2 | RFS APXVSPP18-C-A20 | | | |
| | | 1 | RFS APXV9ERR18-C-A20 | | | |
| | | 3 | Commscope DT465B-2XR | | | |
| 119.0 | 119.0 | 3 | Nokia AirScale RRH 4T4R B5 160W AHCA | Low Profile Platform | (18) 1 5/8" Coax<br>(2) 1 5/8" Fiber | Verizon |
| | | 3 | Alcatel-Lucent RRH2X60-AWS | | | |
| | | 3 | Alcatel-Lucent B25 RRH4x30 | | | |
| | | 2 | RFS DB-T1-6Z-8AB-0Z | | | |
| | | 3 | Commscope LNX-6514DS-A1M | | | |
| | | 6 | Commscope JAHH-65B-R3B | | | |
| | | 6 | Antel LPA-80063-6CF-EDIN-X | | | |

## Equipment to be Removed

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 163.0 | 163.0 | 3 | Ericsson AIR 21, 1.3 M, B2A B4P | Flush | (12) 1 5/8" Coax<br>(1) 1 5/8" Fiber | T-Mobile |
| | | 3 | Ericsson KRY 112 144/1 | | | |

## Proposed Equipment

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 142.0 | 142.0 | 3 | Ericsson KRY 112 144/2 | Platform w/ Handrails | (12) 1 5/8" Coax<br>(2) 1 1/4" Fiber<br>(1) 1 5/8" Fiber | T-Mobile |
| | | 3 | Ericsson KRY 112 489/2 | | | |
| | | 3 | Ericsson Radio 4449 B12,B71 | | | |
| | | 3 | Ericsson AIR32 B66Aa/B2a | | | |
| | | 3 | RFS APXVAARR24_43-U-NA20 | | | |

**[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).**

Install proposed coax inside the pole shaft.

## Structure Usages

| Structural Component | Controlling Usage | Pass/Fail |
|---|---|---|
| Anchor Bolts | 86% | Pass |
| Shaft | 78% | Pass |
| Base Plate | 51% | Pass |

## Foundations

| Reaction Component | Analysis Reactions | % of Usage |
|---|---|---|
| Moment (Kips-Ft) | 4,206.0 | 99.8% |
| Axial (Kips) | 51.0 | 53% |
| Shear (Kips) | 42.0 | 71% |
| Anchor Moment (Kips-Ft) | 3,170.0 | 99.2% |

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) (°) |
|---|---|---|---|---|
| 142.0 | Ericsson KRY 112 144/1 | T-Mobile | 8.180 | 5.94 |
| | Ericsson Radio 4449 B12,B71 | | | |
| | Ericsson AIR32 B66Aa/B2a | | | |
| | RFS APXVAARR24_43-U-NA20 | | | |

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

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## Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

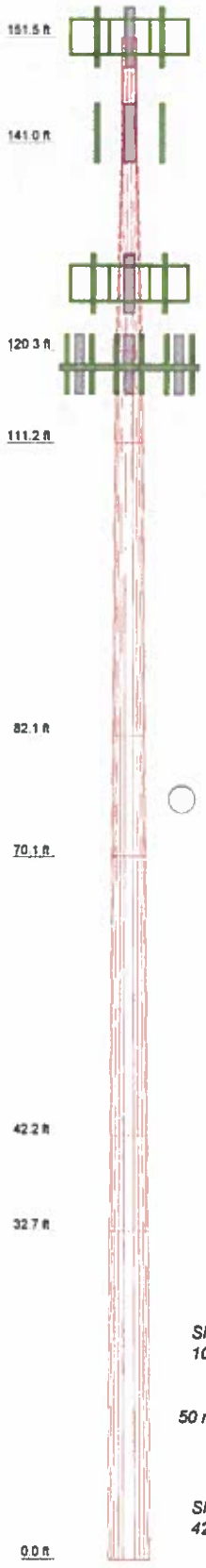
-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

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. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

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 we supply.

| Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Length (ft) | 10.50 | 20.67 | 9.14 | 29.11 | 12.02 | 27.82 | 9.53 | 32.71 |
| Number of Sides | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Thickness (in) | 0.2400 | 0.3059 | 0.3063 | 0.3141 | 0.3804 | 0.4014 | 0.4706 | 0.4906 |
| Top Dia (in) | 17.1872 | 17.7841 | 31.5570 | 33.0280 | 38.3470 | 39.7110 | 43.9500 | 45.0640 |
| Bot Dia (in) | 17.7841 | 31.5570 | 33.0280 | 38.3470 | 39.7110 | 43.9500 | 45.0640 | 49.5520 |
| Grade | A572-65 | | | | | | | |
| Weight (K) | 0.5 | 1.7 | 1.0 | 3.5 | 1.9 | 5.1 | 2.2 | 8.2 |




## DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|---|---|---|---|
| (2) TPX-070821 | 151.5 | Flat Platform w/ Handrails | 142 |
| (2) TPX-070821 | 151.5 | RRH2x50-08 | 127 |
| (2) TPX-070821 | 151.5 | RRH2x50-08 | 127 |
| (2) LGP21401 | 151.5 | RRH2x50-08 | 127 |
| (2) LGP21401 | 151.5 | 800 MHz 2X50W RRH w/ Filter | 127 |
| (2) LGP21401 | 151.5 | 800 MHz 2X50W RRH w/ Filter | 127 |
| DC6-48-60-18-8F(32.8 lbs) | 151.5 | 800 MHz 2X50W RRH w/ Filter | 127 |
| DC6-48-60-18-8F(32.8 lbs) | 151.5 | (2) 4x40W RRH (88 lb) | 127 |
| (2) RRUS 11 (Band 12) (55 lb) | 151.5 | (2) 4x40W RRH (88 lb) | 127 |
| (2) RRUS 11 (Band 12) (55 lb) | 151.5 | (2) 4x40W RRH (88 lb) | 127 |
| (2) RRUS 11 (Band 12) (55 lb) | 151.5 | TD-RRH8x20 | 127 |
| RRUS 32 (50.8 lbs) | 151.5 | TD-RRH8x20 | 127 |
| RRUS 32 (50.8 lbs) | 151.5 | TD-RRH8x20 | 127 |
| RRUS 32 (50.8 lbs) | 151.5 | APXVSPP18-C-A20 | 127 |
| RRUS 32 B2 | 151.5 | APXVSPP18-C-A20 | 127 |
| RRUS 32 B2 | 151.5 | APXV9ERR18-C-A20 | 127 |
| RRUS 32 B2 | 151.5 | DT465B-2XR | 127 |
| 7770.00 | 151.5 | DT465B-2XR | 127 |
| 7770.00 | 151.5 | DT465B-2XR | 127 |
| 7770.00 | 151.5 | Round Platform w/ Handrails | 127 |
| QS66512-2 | 151.5 | AirScale RRH 4T4R B5 160W AHCA | 119 |
| QS66512-2 | 151.5 | AirScale RRH 4T4R B5 160W AHCA | 119 |
| QS66512-2 | 151.5 | AirScale RRH 4T4R B5 160W AHCA | 119 |
| OPA-65R-LCUU-H6 | 151.5 | RRH2X60-AWS | 119 |
| OPA-65R-LCUU-H6 | 151.5 | RRH2X60-AWS | 119 |
| OPA-65R-LCUU-H6 | 151.5 | RRH2X60-AWS | 119 |
| Flat Platform w/ Handrails | 151.5 | B25 RRH4x30 | 119 |
| KRY 112 144/2 | 142 | B25 RRH4x30 | 119 |
| KRY 112 144/2 | 142 | B25 RRH4x30 | 119 |
| KRY 112 144/2 | 142 | DB-T1-6Z-8AB-0Z | 119 |
| KRY 112 469/2 | 142 | DB-T1-6Z-8AB-0Z | 119 |
| KRY 112 469/2 | 142 | LNX-6514DS-A1M | 119 |
| KRY 112 469/2 | 142 | LNX-6514DS-A1M | 119 |
| Radio 4449 B12,B71 | 142 | LNX-6514DS-A1M | 119 |
| Radio 4449 B12,B71 | 142 | (2) JAHH-65B-R3B | 119 |
| Radio 4449 B12,B71 | 142 | (2) JAHH-65B-R3B | 119 |
| AIR32 B66Aa/B2a | 142 | (2) JAHH-65B-R3B | 119 |
| AIR32 B66Aa/B2a | 142 | (2) LPA-80063-6CF-EDIN-X | 119 |
| AIR32 B66Aa/B2a | 142 | (2) LPA-80063-6CF-EDIN-X | 119 |
| APXVAARR24_43-U-NA20 | 142 | (2) LPA-80063-6CF-EDIN-X | 119 |
| APXVAARR24_43-U-NA20 | 142 | Round Low Profile Platform | 119 |
| APXVAARR24_43-U-NA20 | 142 | | |

## MATERIAL STRENGTH

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

## TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Combined pole and wrap structure.
9. Sections modeled to have equivalent inertia to pole and wrap combined.
10. TOWER RATING: 78.4%

*ALL REACTIONS ARE FACTORED*

*AXIAL 115 K*

*SHEAR 10 K* *MOMENT 1178 kip-ft*

*TORQUE 1 kip-ft*
*50 mph WIND - 1.0000 in ICE*

*AXIAL 51 K*

*SHEAR 42 K* *MOMENT 4206 kip-ft*

*TORQUE 6 kip-ft*
*REACTIONS - 97 mph WIND*


ATC_logo
*American Tower Corporation*
3500 Regency Parkway, Suite 100
Cary, NC 27518
Phone: (919) 466-5258
FAX:


| | | | |
|---|---|---|---|
| Job: *Brin-Berlin (302483)* | | | |
| Project: *OAA731959_C3_05* | | | |
| Client: T-Mobile | Drawn by: travis gatling | App'd: | |
| Code: TIA-222-G | Date: 08/28/18 | Scale: NTS | |
| Path: | | Dwg No. E-1 | |

## Tower Input Data

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

- Tower is located in Hartford County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 97 mph.
- Structure Class II.
- Exposure Category B.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Combined pole and wrap structure..
- Sections modeled to have equivalent inertia to pole and wrap combined..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

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

## Tapered Pole Section Geometry

| Section | Elevation<br>ft | Section Length<br>ft | Splice Length<br>ft | Number of Sides | Top Diameter<br>in | Bottom Diameter<br>in | Wall Thickness<br>in | Bend Radius<br>in | Pole Grade |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 151.50-141.00 | 10.50 | 0.00 | 12 | 17.1872 | 17.7841 | 0.2400 | 0.9600 | A572-65 (65 ksi) |
| L2 | 141.00-120.33 | 20.67 | 0.00 | 12 | 17.7841 | 31.5570 | 0.3059 | 2.0000 | A572-65 (65 ksi) |
| L3 | 120.33-111.19 | 9.14 | 0.00 | 12 | 31.5570 | 33.0280 | 0.3063 | 2.0000 | A572-65 (65 ksi) |
| L4 | 111.19-82.08 | 29.11 | 0.00 | 12 | 33.0280 | 38.3470 | 0.3141 | 2.2000 | A572-65 (65 ksi) |
| L5 | 82.08-70.06 | 12.02 | 0.00 | 12 | 38.3470 | 39.7110 | 0.3804 | 2.4000 | A572-65 (65 ksi) |
| L6 | 70.06-42.24 | 27.82 | 0.00 | 12 | 39.7110 | 43.9500 | 0.4014 | 2.6000 | A572-65 (65 ksi) |
| L7 | 42.24-32.71 | 9.53 | 0.00 | 12 | 43.9500 | 45.0640 | 0.4706 | 2.8000 | A572-65 (65 ksi) |
| L8 | 32.71-0.00 | 32.71 | | 12 | 45.0640 | 49.5520 | 0.4906 | 3.0000 | A572-65 (65 ksi) |

## Tapered Pole Properties

| Section | Tip Dia.<br>in | Area<br>in$^2$ | I<br>in$^4$ | r<br>in | C<br>in | I/C<br>in$^3$ | J<br>in$^4$ | It/Q<br>in$^2$ | w<br>in | w/t |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 17.7088 | 13.0968 | 480.1168 | 6.0671 | 8.9030 | 53.9277 | 972.8469 | 6.4458 | 3.9630 | 16.512 |
| | 18.3268 | 13.5581 | 532.6554 | 6.2808 | 9.2122 | 57.8209 | 1079.3043 | 6.6729 | 4.1229 | 17.179 |
| L2 | 18.3035 | 17.2160 | 671.2919 | 6.2572 | 9.2122 | 72.8702 | 1360.2194 | 8.4732 | 3.9463 | 12.901 |
| | 32.5623 | 30.7823 | 3837.2246 | 11.1879 | 16.3465 | 234.7425 | 7775.2574 | 15.1501 | 7.6375 | 24.967 |
| L3 | 32.5622 | 30.8221 | 3842.0947 | 11.1878 | 16.3465 | 235.0404 | 7785.1256 | 15.1697 | 7.6364 | 24.931 |
| | 34.0851 | 32.2730 | 4410.5870 | 11.7144 | 17.1085 | 257.8009 | 8937.0451 | 15.8838 | 8.0306 | 26.218 |
| L4 | 34.0823 | 33.0869 | 4519.6700 | 11.7116 | 17.1085 | 264.1768 | 9158.0767 | 16.2844 | 8.0097 | 25.501 |
| | 39.5889 | 38.4666 | 7102.1213 | 13.6158 | 19.8637 | 357.5419 | 14390.8231 | 18.9321 | 9.4352 | 30.039 |
| L5 | 39.5655 | 46.5048 | 8556.3285 | 13.5920 | 19.8637 | 430.7510 | 17337.4413 | 22.8883 | 9.2575 | 24.336 |
| | 40.9777 | 48.1756 | 9512.0483 | 14.0804 | 20.5703 | 462.4166 | 19273.9886 | 23.7106 | 9.6231 | 25.297 |
| L6 | 40.9703 | 50.8080 | 10021.0923 | 14.0728 | 20.5703 | 487.1632 | 20305.4499 | 25.0061 | 9.5668 | 23.834 |
| | 45.3588 | 56.2869 | 13625.1654 | 15.5904 | 22.7661 | 598.4848 | 27608.2791 | 27.7027 | 10.7028 | 26.664 |
| L7 | 45.3344 | 65.8857 | 15898.0688 | 15.5656 | 22.7661 | 698.3220 | 32213.7975 | 32.4270 | 10.5174 | 22.349 |
| | 46.4877 | 67.5738 | 17151.6341 | 15.9644 | 23.3432 | 734.7608 | 34753.8607 | 33.2578 | 10.8159 | 22.983 |
| L8 | 46.4806 | 70.4140 | 17856.5130 | 15.9573 | 23.3432 | 764.9572 | 36182.1365 | 34.6556 | 10.7623 | 21.937 |
| | 51.1269 | 77.5039 | 23811.6328 | 17.5640 | 25.6679 | 927.6801 | 48248.8237 | 38.1450 | 11.9651 | 24.389 |

| Tower Elevation<br>ft | Gusset Area (per face)<br>ft$^2$ | Gusset Thickness<br>in | Gusset Grade | Adjust. Factor $A_f$ | Adjust. Factor $A_a$ | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals<br>in | Double Angle Stitch Bolt Spacing Horizontals<br>in | Double Angle Stitch Bolt Spacing Redundants<br>in |
|---|---|---|---|---|---|---|---|---|---|
| L1<br>151.50-141.00 | | | | 1 | 1 | 1 | | | |
| L2<br>141.00-120.33 | | | | 1 | 1 | 1 | | | |
| L3<br>120.33-111.19 | | | | 1 | 1 | 1 | | | |
| L4<br>111.19-82.08 | | | | 1 | 1 | 1 | | | |
| L5 82.08-70.06 | | | | 1 | 1 | 1 | | | |
| L6 70.06-42.24 | | | | 1 | 1 | 1 | | | |
| L7 42.24-32.71 | | | | 1 | 1 | 1 | | | |

| Tower Elevation ft | Gusset Area (per face) ft² | Gusset Thickness in | Gusset Grade | Adjust. Factor $A_f$ | Adjust. Factor $A_r$ | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in | Double Angle Stitch Bolt Spacing Redundants in |
|---|---|---|---|---|---|---|---|---|---|
| L8 32.71-0.00 | | | | 1 | 1 | 1 | | | |

## Feed Line/Linear Appurtenances - Entered As Round Or Flat

| Description | Sector | Component Type | Placement ft | Total Number | Number Per Row | Start/End Position | Width or Diameter in | Perimeter in | Weight plf |
|---|---|---|---|---|---|---|---|---|---|
| *** | | | | | | | | | |
| 1 5/8" Coax | B | Surface Ar (CaAa) | 119.00 - 5.00 | 18 | 6 | 0.300<br>0.500 | 1.9800 | | 0.82 |
| 1 5/8" (1.63"-41.3mm) Fiber | C | Surface Ar (CaAa) | 119.00 - 5.00 | 2 | 2 | -0.490<br>-0.480 | 1.6300 | | 1.61 |
| *** | | | | | | | | | |
| 4" Wrap Seams | A | Surface Ar (CaAa) | 141.00 - 5.00 | 1 | 1 | 0.000<br>0.000 | 4.0000 | | 0.00 |
| 4" Wrap Seams | B | Surface Ar (CaAa) | 141.00 - 5.00 | 1 | 1 | 0.000<br>0.000 | 4.0000 | | 0.00 |
| 4" Wrap Seams | C | Surface Ar (CaAa) | 141.00 - 5.00 | 1 | 1 | 0.000<br>0.000 | 4.0000 | | 0.00 |

## Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | $C_AA_f$ ft²/ft | Weight plf |
|---|---|---|---|---|---|---|---|---|
| 1 1/4" Coax | C | No | Inside Pole | 151.50 - 5.00 | 12 | No Ice | 0.00 | 0.66 |
| | | | | | | 1/2" Ice | 0.00 | 0.66 |
| | | | | | | 1" Ice | 0.00 | 0.66 |
| 0.39" (10mm) Fiber Trunk | C | No | Inside Pole | 151.50 - 5.00 | 2 | No Ice | 0.00 | 0.06 |
| | | | | | | 1/2" Ice | 0.00 | 0.06 |
| | | | | | | 1" Ice | 0.00 | 0.06 |
| 0.78" (19.7mm) 8 AWG 6 | C | No | Inside Pole | 151.50 - 5.00 | 4 | No Ice | 0.00 | 0.59 |
| | | | | | | 1/2" Ice | 0.00 | 0.59 |
| | | | | | | 1" Ice | 0.00 | 0.59 |
| 3" conduit | C | No | Inside Pole | 151.50 - 5.00 | 1 | No Ice | 0.00 | 1.78 |
| | | | | | | 1/2" Ice | 0.00 | 1.78 |
| | | | | | | 1" Ice | 0.00 | 1.78 |
| *** | | | | | | | | |
| 1 5/8" (1.63"-41.3mm) Fiber | C | No | Inside Pole | 142.00 - 5.00 | 1 | No Ice | 0.00 | 1.61 |
| | | | | | | 1/2" Ice | 0.00 | 1.61 |
| | | | | | | 1" Ice | 0.00 | 1.61 |
| 1 1/4" (1.25"- 31.8mm) Fiber | C | No | Inside Pole | 142.00 - 5.00 | 2 | No Ice | 0.00 | 1.05 |
| | | | | | | 1/2" Ice | 0.00 | 1.05 |
| | | | | | | 1" Ice | 0.00 | 1.05 |
| 1 5/8" Coax | C | No | Inside Pole | 142.00 - 5.00 | 12 | No Ice | 0.00 | 0.82 |
| | | | | | | 1/2" Ice | 0.00 | 0.82 |
| | | | | | | 1" Ice | 0.00 | 0.82 |
| *** | | | | | | | | |
| 1 1/4" Hybriflex | C | No | Inside Pole | 127.00 - 5.00 | 4 | No Ice | 0.00 | 0.66 |
| | | | | | | 1/2" Ice | 0.00 | 0.66 |
| | | | | | | 1" Ice | 0.00 | 0.66 |

## Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|
| L1 | 151.50-141.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.14 |
| L2 | 141.00-120.33 | A | 0.000 | 0.000 | 7.937 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 7.937 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 7.937 | 0.000 | 0.55 |
| L3 | 120.33-111.19 | A | 0.000 | 0.000 | 3.571 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 12.849 | 0.000 | 0.12 |
| | | C | 0.000 | 0.000 | 6.117 | 0.000 | 0.28 |
| L4 | 111.19-82.08 | A | 0.000 | 0.000 | 11.644 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 46.227 | 0.000 | 0.43 |
| | | C | 0.000 | 0.000 | 21.134 | 0.000 | 0.92 |
| L5 | 82.08-70.06 | A | 0.000 | 0.000 | 4.808 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 19.088 | 0.000 | 0.18 |
| | | C | 0.000 | 0.000 | 8.727 | 0.000 | 0.38 |
| L6 | 70.06-42.24 | A | 0.000 | 0.000 | 11.128 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 44.178 | 0.000 | 0.41 |
| | | C | 0.000 | 0.000 | 20.197 | 0.000 | 0.88 |
| L7 | 42.24-32.71 | A | 0.000 | 0.000 | 3.812 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 15.134 | 0.000 | 0.14 |
| | | C | 0.000 | 0.000 | 6.919 | 0.000 | 0.30 |
| L8 | 32.71-0.00 | A | 0.000 | 0.000 | 11.084 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 44.003 | 0.000 | 0.41 |
| | | C | 0.000 | 0.000 | 20.117 | 0.000 | 0.88 |

## Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|
| L1 | 151.50-141.00 | A | 2.321 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.14 |
| L2 | 141.00-120.33 | A | 2.293 | 0.000 | 0.000 | 17.749 | 0.000 | 0.36 |
| | | B | | 0.000 | 0.000 | 17.749 | 0.000 | 0.36 |
| | | C | | 0.000 | 0.000 | 17.749 | 0.000 | 0.91 |
| L3 | 120.33-111.19 | A | 2.267 | 0.000 | 0.000 | 7.801 | 0.000 | 0.16 |
| | | B | | 0.000 | 0.000 | 23.826 | 0.000 | 0.60 |
| | | C | | 0.000 | 0.000 | 15.410 | 0.000 | 0.55 |
| L4 | 111.19-82.08 | A | 2.226 | 0.000 | 0.000 | 24.604 | 0.000 | 0.49 |
| | | B | | 0.000 | 0.000 | 84.032 | 0.000 | 2.12 |
| | | C | | 0.000 | 0.000 | 52.666 | 0.000 | 1.81 |
| L5 | 82.08-70.06 | A | 2.174 | 0.000 | 0.000 | 10.035 | 0.000 | 0.20 |
| | | B | | 0.000 | 0.000 | 34.417 | 0.000 | 0.86 |
| | | C | | 0.000 | 0.000 | 21.466 | 0.000 | 0.73 |
| L6 | 70.06-42.24 | A | 2.108 | 0.000 | 0.000 | 22.859 | 0.000 | 0.44 |
| | | B | | 0.000 | 0.000 | 78.834 | 0.000 | 1.93 |
| | | C | | 0.000 | 0.000 | 48.858 | 0.000 | 1.66 |
| L7 | 42.24-32.71 | A | 2.025 | 0.000 | 0.000 | 7.673 | 0.000 | 0.14 |
| | | B | | 0.000 | 0.000 | 26.650 | 0.000 | 0.64 |
| | | C | | 0.000 | 0.000 | 16.382 | 0.000 | 0.56 |
| L8 | 32.71-0.00 | A | 1.861 | 0.000 | 0.000 | 21.400 | 0.000 | 0.37 |
| | | B | | 0.000 | 0.000 | 75.445 | 0.000 | 1.73 |

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|
| | | C | | 0.000 | 0.000 | 45.587 | 0.000 | 1.54 |

## Feed Line Center of Pressure

| Section | Elevation ft | $CP_X$ in | $CP_Z$ in | $CP_X$ Ice in | $CP_Z$ Ice in |
|---|---|---|---|---|---|
| L1 | 151.50-141.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L2 | 141.00-120.33 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L3 | 120.33-111.19 | 3.8867 | 1.4679 | 4.2779 | 1.7354 |
| L4 | 111.19-82.08 | 4.4839 | 1.6954 | 4.9580 | 2.0125 |
| L5 | 82.08-70.06 | 4.6041 | 1.7425 | 5.2080 | 2.1144 |
| L6 | 70.06-42.24 | 4.6949 | 1.7782 | 5.4025 | 2.1924 |
| L7 | 42.24-32.71 | 4.8097 | 1.8228 | 5.5759 | 2.2605 |
| L8 | 32.71-0.00 | 4.6140 | 1.7495 | 5.2735 | 2.1315 |

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

## Shielding Factor Ka

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | $K_a$ No Ice | $K_a$ Ice |
|---|---|---|---|---|---|
| L2 | 15 | 4" Wrap Seams | 120.33 - 141.00 | 1.0000 | 1.0000 |
| L2 | 16 | 4" Wrap Seams | 120.33 - 141.00 | 1.0000 | 1.0000 |
| L2 | 17 | 4" Wrap Seams | 120.33 - 141.00 | 1.0000 | 1.0000 |
| L3 | 12 | 1 5/8" Coax | 111.19 - 119.00 | 1.0000 | 1.0000 |
| L3 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 111.19 - 119.00 | 1.0000 | 1.0000 |
| L3 | 15 | 4" Wrap Seams | 111.19 - 120.33 | 1.0000 | 1.0000 |
| L3 | 16 | 4" Wrap Seams | 111.19 - 120.33 | 1.0000 | 1.0000 |
| L3 | 17 | 4" Wrap Seams | 111.19 - 120.33 | 1.0000 | 1.0000 |
| L4 | 12 | 1 5/8" Coax | 82.08 - 111.19 | 1.0000 | 1.0000 |
| L4 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 82.08 - 111.19 | 1.0000 | 1.0000 |
| L4 | 15 | 4" Wrap Seams | 82.08 - 111.19 | 1.0000 | 1.0000 |
| L4 | 16 | 4" Wrap Seams | 82.08 - 111.19 | 1.0000 | 1.0000 |
| L4 | 17 | 4" Wrap Seams | 82.08 - 111.19 | 1.0000 | 1.0000 |
| L5 | 12 | 1 5/8" Coax | 70.06 - 82.08 | 1.0000 | 1.0000 |
| L5 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 70.06 - 82.08 | 1.0000 | 1.0000 |
| L5 | 15 | 4" Wrap Seams | 70.06 - 82.08 | 1.0000 | 1.0000 |
| L5 | 16 | 4" Wrap Seams | 70.06 - 82.08 | 1.0000 | 1.0000 |
| L5 | 17 | 4" Wrap Seams | 70.06 - 82.08 | 1.0000 | 1.0000 |
| L6 | 12 | 1 5/8" Coax | 42.24 - 70.06 | 1.0000 | 1.0000 |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | $K_a$ No Ice | $K_a$ Ice |
|---|---|---|---|---|---|
| L6 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 42.24 - 70.06 | 1.0000 | 1.0000 |
| L6 | 15 | 4" Wrap Seams | 42.24 - 70.06 | 1.0000 | 1.0000 |
| L6 | 16 | 4" Wrap Seams | 42.24 - 70.06 | 1.0000 | 1.0000 |
| L6 | 17 | 4" Wrap Seams | 42.24 - 70.06 | 1.0000 | 1.0000 |
| L7 | 12 | 1 5/8" Coax | 32.71 - 42.24 | 1.0000 | 1.0000 |
| L7 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 32.71 - 42.24 | 1.0000 | 1.0000 |
| L7 | 15 | 4" Wrap Seams | 32.71 - 42.24 | 1.0000 | 1.0000 |
| L7 | 16 | 4" Wrap Seams | 32.71 - 42.24 | 1.0000 | 1.0000 |
| L7 | 17 | 4" Wrap Seams | 32.71 - 42.24 | 1.0000 | 1.0000 |
| L8 | 12 | 1 5/8" Coax | 5.00 - 32.71 | 1.0000 | 1.0000 |
| L8 | 13 | 1 5/8" (1.63"-41.3mm) Fiber | 5.00 - 32.71 | 1.0000 | 1.0000 |
| L8 | 15 | 4" Wrap Seams | 5.00 - 32.71 | 1.0000 | 1.0000 |
| L8 | 16 | 4" Wrap Seams | 5.00 - 32.71 | 1.0000 | 1.0000 |
| L8 | 17 | 4" Wrap Seams | 5.00 - 32.71 | 1.0000 | 1.0000 |

## Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| (2) TPX-070821 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.55 | 0.18 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.56 | 0.25 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.66 | 0.32 | 0.02 |
| (2) TPX-070821 | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.55 | 0.18 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.56 | 0.25 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.66 | 0.32 | 0.02 |
| (2) TPX-070821 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.55 | 0.18 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.56 | 0.25 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.66 | 0.32 | 0.02 |
| (2) LGP21401 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 0.36 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 1.45 | 0.48 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.61 | 0.60 | 0.03 |
| (2) LGP21401 | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 0.36 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 1.45 | 0.48 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.61 | 0.60 | 0.03 |
| (2) LGP21401 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 0.36 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 1.45 | 0.48 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 1.61 | 0.60 | 0.03 |
| DC6-48-60-18-8F(32.8 lbs) | B | From Leg | 0.50 | | 0.0000 | 151.50 | No Ice | 1.28 | 0.79 | 0.02 |
| | | | 0.00 | | | | 1/2" Ice | 1.27 | 1.27 | 0.04 |
| | | | 0.00 | | | | 1" Ice | 1.45 | 1.45 | 0.05 |
| DC6-48-60-18-8F(32.8 lbs) | C | From Leg | 0.50 | | 0.0000 | 151.50 | No Ice | 1.28 | 0.79 | 0.02 |
| | | | 0.00 | | | | 1/2" Ice | 1.27 | 1.27 | 0.04 |
| | | | 0.00 | | | | 1" Ice | 1.45 | 1.45 | 0.05 |
| (2) RRUS 11 (Band 12) (55 lb) | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.07 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 2.72 | 1.21 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.92 | 1.36 | 0.10 |
| (2) RRUS 11 (Band 12) (55 lb) | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.07 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 2.72 | 1.21 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.92 | 1.36 | 0.10 |
| (2) RRUS 11 (Band 12) (55 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.07 | 0.06 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| lb) | | | 0.00 | | | | 1/2" Ice | 2.72 | 1.21 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.92 | 1.36 | 0.10 |
| RRUS 32 (50.8 lbs) | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 2.42 | 0.08 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 2.64 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.86 | 0.14 |
| RRUS 32 (50.8 lbs) | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 2.42 | 0.08 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 2.64 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.86 | 0.14 |
| RRUS 32 (50.8 lbs) | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 2.42 | 0.08 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 2.64 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.86 | 0.14 |
| RRUS 32 B2 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.67 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 1.86 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.05 | 0.10 |
| RRUS 32 B2 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.67 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 1.86 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.05 | 0.10 |
| RRUS 32 B2 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 0.00 | 1.67 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 1.86 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 2.05 | 0.10 |
| 7770.00 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 5.51 | 2.93 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 6.75 | 3.63 | 0.11 |
| 7770.00 | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 5.51 | 2.93 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 6.75 | 3.63 | 0.11 |
| 7770.00 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 5.51 | 2.93 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 6.75 | 3.63 | 0.11 |
| QS66512-2 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 8.13 | 5.00 | 0.11 |
| | | | 0.00 | | | | 1/2" Ice | 9.23 | 5.80 | 0.17 |
| | | | 0.00 | | | | 1" Ice | 10.33 | 6.60 | 0.23 |
| QS66512-2 | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 8.13 | 5.00 | 0.11 |
| | | | 0.00 | | | | 1/2" Ice | 9.23 | 5.80 | 0.17 |
| | | | 0.00 | | | | 1" Ice | 10.33 | 6.60 | 0.23 |
| QS66512-2 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 8.13 | 5.00 | 0.11 |
| | | | 0.00 | | | | 1/2" Ice | 9.23 | 5.80 | 0.17 |
| | | | 0.00 | | | | 1" Ice | 10.33 | 6.60 | 0.23 |
| OPA-65R-LCUU-H6 | A | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 9.66 | 5.52 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 10.13 | 5.97 | 0.13 |
| | | | 0.00 | | | | 1" Ice | 10.61 | 6.43 | 0.20 |
| OPA-65R-LCUU-H6 | B | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 9.66 | 5.52 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 10.13 | 5.97 | 0.13 |
| | | | 0.00 | | | | 1" Ice | 10.61 | 6.43 | 0.20 |
| OPA-65R-LCUU-H6 | C | From Leg | 3.00 | | 0.0000 | 151.50 | No Ice | 9.66 | 5.52 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 10.13 | 5.97 | 0.13 |
| | | | 0.00 | | | | 1" Ice | 10.61 | 6.43 | 0.20 |
| Flat Platform w/ Handrails | C | None | | | 0.0000 | 151.50 | No Ice | 42.40 | 42.40 | 2.00 |
| | | | | | | | 1/2" Ice | 48.40 | 48.40 | 2.45 |
| | | | | | | | 1" Ice | 54.40 | 54.40 | 2.90 |
| *** | | | | | | | | | | |
| KRY 112 144/2 | A | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.23 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.30 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.38 | 0.02 |
| KRY 112 144/2 | B | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.23 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.30 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.38 | 0.02 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| KRY 112 144/2 | C | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.23 | 0.01 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.30 | 0.01 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.38 | 0.02 |
| KRY 112 489/2 | A | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.36 | 0.02 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.44 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.54 | 0.03 |
| KRY 112 489/2 | B | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.36 | 0.02 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.44 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.54 | 0.03 |
| KRY 112 489/2 | C | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 0.00 | 0.36 | 0.02 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 0.44 | 0.02 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 0.54 | 0.03 |
| Radio 4449 B12,B71 | A | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 1.64 | 1.16 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 2.20 | 1.55 | 0.90 |
| | | | 0.00 | | | | 1" Ice | 2.76 | 1.94 | 1.73 |
| Radio 4449 B12,B71 | B | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 1.64 | 1.16 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 2.20 | 1.55 | 0.90 |
| | | | 0.00 | | | | 1" Ice | 2.76 | 1.94 | 1.73 |
| Radio 4449 B12,B71 | C | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 1.64 | 1.16 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 2.20 | 1.55 | 0.90 |
| | | | 0.00 | | | | 1" Ice | 2.76 | 1.94 | 1.73 |
| AIR32 B66Aa/B2a | A | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 6.51 | 2.70 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 7.78 | 3.22 | 0.18 |
| | | | 0.00 | | | | 1" Ice | 9.05 | 3.74 | 0.22 |
| AIR32 B66Aa/B2a | B | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 6.51 | 2.70 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 7.78 | 3.22 | 0.18 |
| | | | 0.00 | | | | 1" Ice | 9.05 | 3.74 | 0.22 |
| AIR32 B66Aa/B2a | C | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 6.51 | 2.70 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 7.78 | 3.22 | 0.18 |
| | | | 0.00 | | | | 1" Ice | 9.05 | 3.74 | 0.22 |
| APXVAARR24_43-U-NA20 | A | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 20.24 | 5.15 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 23.53 | 5.99 | 0.24 |
| | | | 0.00 | | | | 1" Ice | 26.82 | 6.83 | 0.35 |
| APXVAARR24_43-U-NA20 | B | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 20.24 | 5.15 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 23.53 | 5.99 | 0.24 |
| | | | 0.00 | | | | 1" Ice | 26.82 | 6.83 | 0.35 |
| APXVAARR24_43-U-NA20 | C | From Leg | 3.00 | | 0.0000 | 142.00 | No Ice | 20.24 | 5.15 | 0.13 |
| | | | 0.00 | | | | 1/2" Ice | 23.53 | 5.99 | 0.24 |
| | | | 0.00 | | | | 1" Ice | 26.82 | 6.83 | 0.35 |
| Flat Platform w/ Handrails | C | None | | | 0.0000 | 142.00 | No Ice | 42.40 | 42.40 | 2.00 |
| | | | | | | | 1/2" Ice | 48.40 | 48.40 | 2.45 |
| | | | | | | | 1" Ice | 54.40 | 54.40 | 2.90 |
| *** | | | | | | | | | | |
| RRH2x50-08 | A | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 1.70 | 1.10 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.27 | 1.80 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.84 | 2.50 | 0.09 |
| RRH2x50-08 | B | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 1.70 | 1.10 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.27 | 1.80 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.84 | 2.50 | 0.09 |
| RRH2x50-08 | C | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 1.70 | 1.10 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.27 | 1.80 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.84 | 2.50 | 0.09 |
| 800 MHz 2X50W RRH w/ Filter | A | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.93 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 2.24 | 2.11 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 2.43 | 2.29 | 0.11 |
| 800 MHz 2X50W RRH w/ Filter | B | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.93 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 2.24 | 2.11 | 0.09 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front ft² | $C_AA_A$ Side ft² | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0.00 | | | | 1" Ice | 2.43 | 2.29 | 0.11 |
| 800 MHz 2X50W RRH w/ Filter | C | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.93 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 2.24 | 2.11 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 2.43 | 2.29 | 0.11 |
| (2) 4x40W RRH (88 lb) | A | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 3.80 | 0.09 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 4.06 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 4.34 | 0.15 |
| (2) 4x40W RRH (88 lb) | C | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 3.80 | 0.09 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 4.06 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 4.34 | 0.15 |
| (2) 4x40W RRH (88 lb) | B | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 3.80 | 0.09 |
| | | | 0.00 | | | | 1/2" Ice | 0.00 | 4.06 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 0.00 | 4.34 | 0.15 |
| TD-RRH8x20 | A | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.40 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 4.59 | 1.61 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 4.88 | 1.82 | 0.12 |
| TD-RRH8x20 | B | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.40 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 4.59 | 1.61 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 4.88 | 1.82 | 0.12 |
| TD-RRH8x20 | C | From Face | 3.00 | | 0.0000 | 127.00 | No Ice | 0.00 | 1.40 | 0.07 |
| | | | 0.00 | | | | 1/2" Ice | 4.59 | 1.61 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 4.88 | 1.82 | 0.12 |
| APXVSPP18-C-A20 | A | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 8.02 | 5.28 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 8.48 | 5.74 | 0.11 |
| | | | 0.00 | | | | 1" Ice | 8.94 | 6.20 | 0.16 |
| APXVSPP18-C-A20 | B | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 8.02 | 5.28 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 8.48 | 5.74 | 0.11 |
| | | | 0.00 | | | | 1" Ice | 8.94 | 6.20 | 0.16 |
| APXV9ERR18-C-A20 | C | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 8.02 | 5.81 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 8.48 | 6.27 | 0.11 |
| | | | 0.00 | | | | 1" Ice | 8.94 | 6.73 | 0.17 |
| DT465B-2XR | A | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 9.10 | 5.97 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.56 | 6.43 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.04 | 6.90 | 0.18 |
| DT465B-2XR | B | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 9.10 | 5.97 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.56 | 6.43 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.04 | 6.90 | 0.18 |
| DT465B-2XR | C | From Leg | 3.00 | | 0.0000 | 127.00 | No Ice | 9.10 | 5.97 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.56 | 6.43 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.04 | 6.90 | 0.18 |
| Round Platform w/ Handrails | C | None | | | 0.0000 | 127.00 | No Ice | 27.20 | 27.20 | 2.00 |
| | | | | | | | 1/2" Ice | 34.20 | 34.20 | 2.40 |
| | | | | | | | 1" Ice | 41.20 | 41.20 | 2.80 |
| *** | | | | | | | | | | |
| AirScale RRH 4T4R B5 160W AHCA | A | From Leg | 3.00 | | 0.0000 | 119.00 | No Ice | 1.29 | 0.65 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 1.75 | 0.88 | 0.05 |
| | | | 0.00 | | | | 1" Ice | 2.21 | 1.11 | 0.06 |
| AirScale RRH 4T4R B5 160W AHCA | B | From Leg | 3.00 | | 0.0000 | 119.00 | No Ice | 1.29 | 0.65 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 1.75 | 0.88 | 0.05 |
| | | | 0.00 | | | | 1" Ice | 2.21 | 1.11 | 0.06 |
| AirScale RRH 4T4R B5 160W AHCA | C | From Leg | 3.00 | | 0.0000 | 119.00 | No Ice | 1.29 | 0.65 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 1.75 | 0.88 | 0.05 |
| | | | 0.00 | | | | 1" Ice | 2.21 | 1.11 | 0.06 |
| RRH2X60-AWS | A | From Leg | 3.00 | | 0.0000 | 119.00 | No Ice | 0.00 | 1.49 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 2.40 | 1.67 | 0.06 |
| | | | 0.00 | | | | 1" Ice | 2.61 | 1.86 | 0.08 |
| RRH2X60-AWS | B | From Leg | 3.00 | | 0.0000 | 119.00 | No Ice | 0.00 | 1.49 | 0.04 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Offsets: Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0.00 | | | | 1/2" Ice | 2.40 | 1.67 | 0.06 |
| | | | 0.00 | | | | 1" Ice | 2.61 | 1.86 | 0.08 |
| RRH2X60-AWS | C | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 0.00 | 1.49 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 2.40 | 1.67 | 0.06 |
| | | | 0.00 | | | | 1" Ice | 2.61 | 1.86 | 0.08 |
| B25 RRH4x30 | A | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 0.00 | 1.29 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.31 | 1.45 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.50 | 1.61 | 0.09 |
| B25 RRH4x30 | B | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 0.00 | 1.29 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.31 | 1.45 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.50 | 1.61 | 0.09 |
| B25 RRH4x30 | C | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 0.00 | 1.29 | 0.05 |
| | | | 0.00 | | | | 1/2" Ice | 2.31 | 1.45 | 0.07 |
| | | | 0.00 | | | | 1" Ice | 2.50 | 1.61 | 0.09 |
| DB-T1-6Z-8AB-0Z | B | From Leg | 0.50 | 0.0000 | 119.00 | | No Ice | 4.80 | 2.00 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 5.07 | 2.19 | 0.08 |
| | | | 0.00 | | | | 1" Ice | 5.35 | 2.39 | 0.12 |
| DB-T1-6Z-8AB-0Z | C | From Leg | 0.50 | 0.0000 | 119.00 | | No Ice | 4.80 | 2.00 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 5.07 | 2.19 | 0.08 |
| | | | 0.00 | | | | 1" Ice | 5.35 | 2.39 | 0.12 |
| LNX-6514DS-A1M | A | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 8.17 | 5.41 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 8.63 | 5.86 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 9.10 | 6.33 | 0.15 |
| LNX-6514DS-A1M | B | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 8.17 | 5.41 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 8.63 | 5.86 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 9.10 | 6.33 | 0.15 |
| LNX-6514DS-A1M | C | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 8.17 | 5.41 | 0.04 |
| | | | 0.00 | | | | 1/2" Ice | 8.63 | 5.86 | 0.09 |
| | | | 0.00 | | | | 1" Ice | 9.10 | 6.33 | 0.15 |
| (2) JAHH-65B-R3B | A | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.11 | 5.98 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.58 | 6.44 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.05 | 6.91 | 0.18 |
| (2) JAHH-65B-R3B | B | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.11 | 5.98 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.58 | 6.44 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.05 | 6.91 | 0.18 |
| (2) JAHH-65B-R3B | C | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.11 | 5.98 | 0.06 |
| | | | 0.00 | | | | 1/2" Ice | 9.58 | 6.44 | 0.12 |
| | | | 0.00 | | | | 1" Ice | 10.05 | 6.91 | 0.18 |
| (2) LPA-80063-6CF-EDIN-X | A | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.73 | 9.06 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice | 11.07 | 9.61 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 11.64 | 10.16 | 0.18 |
| (2) LPA-80063-6CF-EDIN-X | B | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.73 | 9.06 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice | 11.07 | 9.61 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 11.64 | 10.16 | 0.18 |
| (2) LPA-80063-6CF-EDIN-X | C | From Leg | 3.00 | 0.0000 | 119.00 | | No Ice | 9.73 | 9.06 | 0.03 |
| | | | 0.00 | | | | 1/2" Ice | 11.07 | 9.61 | 0.10 |
| | | | 0.00 | | | | 1" Ice | 11.64 | 10.16 | 0.18 |
| Round Low Profile Platform | C | None | | | 0.0000 | 119.00 | No Ice | 21.70 | 21.70 | 1.50 |
| | | | | | | | 1/2" Ice | 27.20 | 27.20 | 1.70 |
| | | | | | | | 1" Ice | 32.70 | 32.70 | 1.90 |

## Load Combinations

| Comb. No. | Description |
|---|---|
| 1 | Dead Only |
| 2 | 1.2 Dead+1.6 Wind 0 deg - No Ice |
| 3 | 0.9 Dead+1.6 Wind 0 deg - No Ice |
| 4 | 1.2 Dead+1.6 Wind 30 deg - No Ice |
| 5 | 0.9 Dead+1.6 Wind 30 deg - No Ice |
| 6 | 1.2 Dead+1.6 Wind 60 deg - No Ice |
| 7 | 0.9 Dead+1.6 Wind 60 deg - No Ice |
| 8 | 1.2 Dead+1.6 Wind 90 deg - No Ice |
| 9 | 0.9 Dead+1.6 Wind 90 deg - No Ice |
| 10 | 1.2 Dead+1.6 Wind 120 deg - No Ice |
| 11 | 0.9 Dead+1.6 Wind 120 deg - No Ice |
| 12 | 1.2 Dead+1.6 Wind 150 deg - No Ice |
| 13 | 0.9 Dead+1.6 Wind 150 deg - No Ice |
| 14 | 1.2 Dead+1.6 Wind 180 deg - No Ice |
| 15 | 0.9 Dead+1.6 Wind 180 deg - No Ice |
| 16 | 1.2 Dead+1.6 Wind 210 deg - No Ice |
| 17 | 0.9 Dead+1.6 Wind 210 deg - No Ice |
| 18 | 1.2 Dead+1.6 Wind 240 deg - No Ice |
| 19 | 0.9 Dead+1.6 Wind 240 deg - No Ice |
| 20 | 1.2 Dead+1.6 Wind 270 deg - No Ice |
| 21 | 0.9 Dead+1.6 Wind 270 deg - No Ice |
| 22 | 1.2 Dead+1.6 Wind 300 deg - No Ice |
| 23 | 0.9 Dead+1.6 Wind 300 deg - No Ice |
| 24 | 1.2 Dead+1.6 Wind 330 deg - No Ice |
| 25 | 0.9 Dead+1.6 Wind 330 deg - No Ice |
| 26 | 1.2 Dead+1.0 Ice+1.0 Temp |
| 27 | 1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp |
| 28 | 1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp |
| 29 | 1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp |
| 30 | 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp |
| 31 | 1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp |
| 32 | 1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp |
| 33 | 1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp |
| 34 | 1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp |
| 35 | 1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp |
| 36 | 1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp |
| 37 | 1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp |
| 38 | 1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp |
| 39 | Dead+Wind 0 deg - Service |
| 40 | Dead+Wind 30 deg - Service |
| 41 | Dead+Wind 60 deg - Service |
| 42 | Dead+Wind 90 deg - Service |
| 43 | Dead+Wind 120 deg - Service |
| 44 | Dead+Wind 150 deg - Service |
| 45 | Dead+Wind 180 deg - Service |
| 46 | Dead+Wind 210 deg - Service |
| 47 | Dead+Wind 240 deg - Service |
| 48 | Dead+Wind 270 deg - Service |
| 49 | Dead+Wind 300 deg - Service |
| 50 | Dead+Wind 330 deg - Service |

## Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection ft | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|

| Section No. | Elevation ft | Horz. Deflection ft | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| L1 | 151.5 - 141 | 1.951 | 46 | 1.2908 | 0.0019 |
| L2 | 141 - 120.33 | 1.716 | 46 | 1.2569 | 0.0015 |
| L3 | 120.33 - 111.19 | 1.283 | 46 | 1.1480 | 0.0018 |
| L4 | 111.19 - 82.08 | 1.104 | 46 | 1.0957 | 0.0019 |
| L5 | 82.08 - 70.06 | 0.608 | 40 | 0.8387 | 0.0015 |
| L6 | 70.06 - 42.24 | 0.444 | 40 | 0.7245 | 0.0013 |
| L7 | 42.24 - 32.71 | 0.161 | 40 | 0.4312 | 0.0008 |
| L8 | 32.71 - 0 | 0.097 | 40 | 0.3366 | 0.0006 |

## Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection ft | Tilt ° | Twist ° | Radius of Curvature ft |
|---|---|---|---|---|---|---|
| 151.50 | (2) TPX-070821 | 46 | 1.951 | 1.2908 | 0.0019 | 19909 |
| 142.00 | KRY 112 144/2 | 46 | 1.739 | 1.2608 | 0.0015 | 11034 |
| 127.00 | RRH2x50-08 | 46 | 1.419 | 1.1858 | 0.0018 | 11328 |
| 119.00 | AirScale RRH 4T4R B5 160W AHCA | 46 | 1.257 | 1.1407 | 0.0018 | 11240 |

## Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection ft | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| L1 | 151.5 - 141 | 9.177 | 16 | 6.0753 | 0.0091 |
| L2 | 141 - 120.33 | 8.077 | 16 | 5.9228 | 0.0074 |
| L3 | 120.33 - 111.19 | 6.041 | 16 | 5.4126 | 0.0087 |
| L4 | 111.19 - 82.08 | 5.198 | 16 | 5.1663 | 0.0087 |
| L5 | 82.08 - 70.06 | 2.863 | 4 | 3.9534 | 0.0071 |
| L6 | 70.06 - 42.24 | 2.089 | 4 | 3.4147 | 0.0062 |
| L7 | 42.24 - 32.71 | 0.760 | 4 | 2.0311 | 0.0036 |
| L8 | 32.71 - 0 | 0.459 | 4 | 1.5849 | 0.0028 |

## Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection ft | Tilt ° | Twist ° | Radius of Curvature ft |
|---|---|---|---|---|---|---|
| 151.50 | (2) TPX-070821 | 16 | 9.177 | 6.0753 | 0.0091 | 4394 |
| 142.00 | KRY 112 144/2 | 16 | 8.180 | 5.9406 | 0.0072 | 2433 |
| 127.00 | RRH2x50-08 | 16 | 6.678 | 5.5905 | 0.0086 | 2449 |
| 119.00 | AirScale RRH 4T4R B5 160W AHCA | 16 | 5.916 | 5.3782 | 0.0087 | 2421 |

# Compression Checks

## Pole Design Data

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | A $in^2$ | $P_u$ K | $\phi P_n$ K | Ratio $\frac{P_u}{\phi P_n}$ |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 151.5 - 141 (1) | TP17.7841x17.1872x0.24 | 10.50 | 0.00 | 0.0 | 13.5581 | -7.85 | 999.37 | 0.008 |
| L2 | 141 - 120.33 (2) | TP31.557x17.7841x0.3059 | 20.67 | 0.00 | 0.0 | 30.7823 | -14.23 | 2146.63 | 0.007 |
| L3 | 120.33 - 111.19 (3) | TP33.028x31.557x0.3063 | 9.14 | 0.00 | 0.0 | 32.2730 | -18.34 | 2210.95 | 0.008 |
| L4 | 111.19 - 82.08 (4) | TP38.347x33.028x0.3141 | 29.11 | 0.00 | 0.0 | 38.4666 | -24.26 | 2491.00 | 0.010 |
| L5 | 82.08 - 70.06 (5) | TP39.711x38.347x0.3804 | 12.02 | 0.00 | 0.0 | 48.1756 | -27.38 | 3343.96 | 0.008 |
| L6 | 70.06 - 42.24 (6) | TP43.95x39.711x0.4014 | 27.82 | 0.00 | 0.0 | 56.2869 | -35.55 | 3831.48 | 0.009 |
| L7 | 42.24 - 32.71 (7) | TP45.064x43.95x0.4706 | 9.53 | 0.00 | 0.0 | 67.5738 | -38.92 | 4843.91 | 0.008 |
| L8 | 32.71 - 0 (8) | TP49.552x45.064x0.4906 | 32.71 | 0.00 | 0.0 | 77.5039 | -51.35 | 5448.80 | 0.009 |

## Pole Bending Design Data

| Section No. | Elevation ft | Size | $M_{ux}$ kip-ft | $\phi M_{nx}$ kip-ft | Ratio $\frac{M_{ux}}{\phi M_{nx}}$ | $M_{uy}$ kip-ft | $\phi M_{ny}$ kip-ft | Ratio $\frac{M_{uy}}{\phi M_{ny}}$ |
|---|---|---|---|---|---|---|---|---|
| L1 | 151.5 - 141 (1) | TP17.7841x17.1872x0.24 | 57.62 | 355.17 | 0.162 | 0.00 | 355.17 | 0.000 |
| L2 | 141 - 120.33 (2) | TP31.557x17.7841x0.3059 | 300.92 | 1364.17 | 0.221 | 0.00 | 1364.17 | 0.000 |
| L3 | 120.33 - 111.19 (3) | TP33.028x31.557x0.3063 | 493.54 | 1471.78 | 0.335 | 0.00 | 1471.78 | 0.000 |
| L4 | 111.19 - 82.08 (4) | TP38.347x33.028x0.3141 | 1246.22 | 1929.46 | 0.646 | 0.00 | 1929.46 | 0.000 |
| L5 | 82.08 - 70.06 (5) | TP39.711x38.347x0.3804 | 1607.03 | 2674.77 | 0.601 | 0.00 | 2674.77 | 0.000 |
| L6 | 70.06 - 42.24 (6) | TP43.95x39.711x0.4014 | 2544.35 | 3394.93 | 0.749 | 0.00 | 3394.93 | 0.000 |
| L7 | 42.24 - 32.71 (7) | TP45.064x43.95x0.4706 | 2896.72 | 4389.17 | 0.660 | 0.00 | 4389.17 | 0.000 |
| L8 | 32.71 - 0 (8) | TP49.552x45.064x0.4906 | 4206.35 | 5434.94 | 0.774 | 0.00 | 5434.94 | 0.000 |

## Pole Shear Design Data

| Section No. | Elevation ft | Size | Actual $V_u$ K | $\phi V_n$ K | Ratio $\frac{V_u}{\phi V_n}$ | Actual $T_u$ kip-ft | $\phi T_n$ kip-ft | Ratio $\frac{T_u}{\phi T_n}$ |
|---|---|---|---|---|---|---|---|---|
| L1 | 151.5 - 141 (1) | TP17.7841x17.1872x0.24 | 9.53 | 499.68 | 0.019 | 0.41 | 723.49 | 0.001 |
| L2 | 141 - 120.33 (2) | TP31.557x17.7841x0.3059 | 15.47 | 1073.31 | 0.014 | 0.59 | 2775.27 | 0.000 |
| L3 | 120.33 - 111.19 (3) | TP33.028x31.557x0.3063 | 22.97 | 1105.48 | 0.021 | 0.09 | 2993.78 | 0.000 |

| Section No. | Elevation ft | Size | Actual $V_u$ K | $\phi V_n$ K | Ratio $\frac{V_u}{\phi V_n}$ | Actual $T_u$ kip-ft | $\phi T_n$ kip-ft | Ratio $\frac{T_u}{\phi T_n}$ |
|---|---|---|---|---|---|---|---|---|
| L4 | 111.19 - 82.08 (4) | TP38.347x33.028x0.3141 | 28.86 | 1245.50 | 0.023 | 1.62 | 3923.29 | 0.000 |
| L5 | 82.08 - 70.06 (5) | TP39.711x38.347x0.3804 | 31.22 | 1671.98 | 0.019 | 2.26 | 5441.35 | 0.000 |
| L6 | 70.06 - 42.24 (6) | TP43.95x39.711x0.4014 | 36.23 | 1915.74 | 0.019 | 3.70 | 6905.35 | 0.001 |
| L7 | 42.24 - 32.71 (7) | TP45.064x43.95x0.4706 | 37.76 | 2421.95 | 0.016 | 4.17 | 8931.67 | 0.000 |
| L8 | 32.71 - 0 (8) | TP49.552x45.064x0.4906 | 42.32 | 2724.40 | 0.016 | 5.50 | 11057.67 | 0.000 |

## Pole Interaction Design Data

| Section No. | Elevation ft | Ratio $\frac{P_u}{\phi P_n}$ | Ratio $\frac{M_{ux}}{\phi M_{nx}}$ | Ratio $\frac{M_{uy}}{\phi M_{ny}}$ | Ratio $\frac{V_u}{\phi V_n}$ | Ratio $\frac{T_u}{\phi T_n}$ | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 151.5 - 141 (1) | 0.008 | 0.162 | 0.000 | 0.019 | 0.001 | 0.170 ✔ | 1.000 | 4.8.2 ✔ |
| L2 | 141 - 120.33 (2) | 0.007 | 0.221 | 0.000 | 0.014 | 0.000 | 0.227 ✔ | 1.000 | 4.8.2 ✔ |
| L3 | 120.33 - 111.19 (3) | 0.008 | 0.335 | 0.000 | 0.021 | 0.000 | 0.344 ✔ | 1.000 | 4.8.2 ✔ |
| L4 | 111.19 - 82.08 (4) | 0.010 | 0.646 | 0.000 | 0.023 | 0.000 | 0.656 ✔ | 1.000 | 4.8.2 ✔ |
| L5 | 82.08 - 70.06 (5) | 0.008 | 0.601 | 0.000 | 0.019 | 0.000 | 0.609 ✔ | 1.000 | 4.8.2 ✔ |
| L6 | 70.06 - 42.24 (6) | 0.009 | 0.749 | 0.000 | 0.019 | 0.001 | 0.759 ✔ | 1.000 | 4.8.2 ✔ |
| L7 | 42.24 - 32.71 (7) | 0.008 | 0.660 | 0.000 | 0.016 | 0.000 | 0.668 ✔ | 1.000 | 4.8.2 ✔ |
| L8 | 32.71 - 0 (8) | 0.009 | 0.774 | 0.000 | 0.016 | 0.000 | 0.784 ✔ | 1.000 | 4.8.2 ✔ |

## Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $\phi P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| L1 | 151.5 - 141 | Pole | TP17.7841x17.1872x0.24 | 1 | -7.85 | 999.37 | 17.0 | Pass |
| L2 | 141 - 120.33 | Pole | TP31.557x17.7841x0.3059 | 2 | -14.23 | 2146.63 | 22.7 | Pass |
| L3 | 120.33 - 111.19 | Pole | TP33.028x31.557x0.3063 | 3 | -18.34 | 2210.95 | 34.4 | Pass |
| L4 | 111.19 - 82.08 | Pole | TP38.347x33.028x0.3141 | 4 | -24.26 | 2491.00 | 65.6 | Pass |
| L5 | 82.08 - 70.06 | Pole | TP39.711x38.347x0.3804 | 5 | -27.38 | 3343.96 | 60.9 | Pass |
| L6 | 70.06 - 42.24 | Pole | TP43.95x39.711x0.4014 | 6 | -35.55 | 3831.48 | 75.9 | Pass |
| L7 | 42.24 - 32.71 | Pole | TP45.064x43.95x0.4706 | 7 | -38.92 | 4843.91 | 66.8 | Pass |
| L8 | 32.71 - 0 | Pole | TP49.552x45.064x0.4906 | 8 | -51.35 | 5448.80 | 78.4 | Pass |
| | | | | | | | Summary | |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $\phi P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Pole (L8) | 78.4 | Pass |
| | | | | | | **RATING =** | **78.4** | **Pass** |

# Base Plate & Anchor Rod Analysis

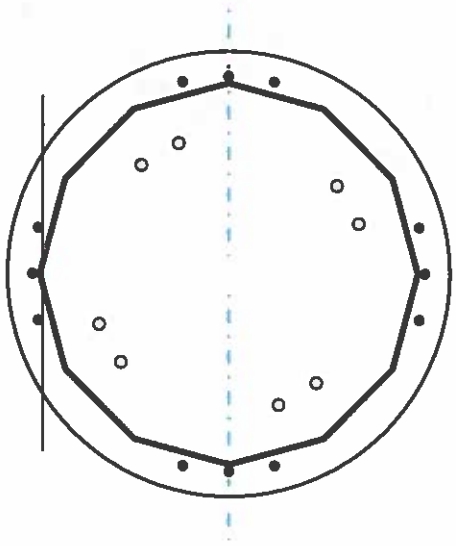
| Pole Dimensions | | |
|---|---|---|
| Number of Sides | 12 | - |
| Diameter | 51 | in |
| Thickness | 0.75 | in |
| Orientation Offset | | ° |

| Base Reactions | | |
|---|---|---|
| Moment, Mu | 4206 | k-ft |
| Axial, Pu | 51 | k |
| Shear, Vu | 42 | k |
| Neutral Axis | 90 | ° |

| Report Capacities | | |
|---|---|---|
| Component | Capacity | Result |
| Base Plate | 51% | Pass |
| Anchor Rods | 86% | Pass |
| Dwyidag | - | - |

| Base Plate | | |
|---|---|---|
| Shape | Round | - |
| Diameter, ø | 62 | in |
| Thickness | 2 | in |
| Grade | A572-60 | - |
| Yield Strength, Fy | 60 | ksi |
| Tensile Strength, Fu | 75 | ksi |
| Clip | N/A | in |
| Orientation Offset | | ° |
| Anchor Rod Detail | c | η=0.55 |
| Clear Distance | N/A | in |
| Applied Moment, Mu | 790.5 | k |
| Bending Stress, ϕMn | 1563.2 | k |

| Original Anchor Rods | | |
|---|---|---|
| Arrangement | Cluster | - |
| Quantity | 12 | - |
| Diameter, ø | 1 3/4 | in |
| Bolt Circle | 55 | in |
| Grade | Other | |
| Yield Strength, Fy | 127.7 | ksi |
| Tensile Strength, Fu | 150 | ksi |
| Spacing | 6.5 | in |
| Orientation Offset | 45 | ° |
| Applied Force, Pu | 195.9 | k |
| Anchor Rods, ϕPn | 227.9 | k |



| Additional Anchor Rods | | |
|---|---|---|
| Quantity | 8 | - |
| Diameter, ø | 2 1/4 | in |
| Bolt Circle | 39 | in |
| Grade | A325 | |
| Yield Strength, Fy | 92 | ksi |
| Tensile Strength, Fu | 120 | ksi |
| Bypass Base? | No | |
| Orientation Offset | | ° |
| Applied Force, Pu | 220.9 | k |
| Additional Rod, ϕPn | 811.8 | k |

# Calculations for Monopole Base Plate & Anchor Rod Analysis

**Reaction Distribution**

| Reaction | Shear Vu | Moment Mu | Factor |
|---|---|---|---|
| - | k | k-ft | - |
| Base Forces | 42.0 | 4206.0 | 1.00 |
| Anchor Rod Forces | 37.9 | 2672.7 | 0.64 |
| Additional Bolt (Grp1) Forces | 4.1 | 1533.3 | 0.36 |
| Additional Bolt (Grp2) Forces | | | |
| Dywidag Forces | | | |
| Stiffener Forces | | | |

**Geometric Properties**

| Section | Gross Area | Net Area | Individual Inertia | Threads per Inch | Moment of Inertia |
|---|---|---|---|---|---|
| - | $in^2$ | $in^2$ | $in^4$ | # | $in^4$ |
| Pole | 117.0509 | 9.7542 | 1.8426 | | 36967.22 |
| Bolt | 2.4053 | 1.8995 | 0.2871 | 5 | 8622.24 |
| Bolt1 | 3.9761 | 3.2477 | 0.8393 | 4.5 | 4946.45 |
| Bolt2 | | | | | |
| Dywidag | | | | | |
| Stiffener | | | | | |

| Base Plate | | |
|---|---|---|
| Shape | Round | - |
| Diameter, D | 62 | in |
| Thickness, t | 2 | in |
| Yield Strength, Fy | 60 | ksi |
| Tensile Strength, Fu | 75 | ksi |
| Base Plate Chord | 35.256 | in |
| Detail Type | c | - |
| Detail Factor | 0.55 | - |
| Clear Distance | N/A | - |

| External Base Plate | | |
|---|---|---|
| Chord Length AA | 24.949 | in |
| Additional AA | 4.000 | in |
| Section Modulus, Z | 28.949 | $in^3$ |
| Applied Moment, Mu | 790.5 | k-ft |
| Bending Capacity, ϕMn | 1563.2 | k-ft |
| Capacity, Mu/ϕMn | 0.506 | OK |
| | | |
| Chord Length AB | 20.829 | in |
| Additional AB | 4.000 | in |
| Section Modulus, Z | 24.829 | $in^3$ |
| Applied Moment, Mu | 268.9 | k-ft |
| Bending Capacity, ϕMn | 1340.8 | k-ft |
| Capacity, Mu/ϕMn | 0.201 | OK |
| | | |
| Bend Line Length | 0.000 | in |
| Additional Bend Line | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

| Internal Base Plate | | |
|---|---|---|
| Arc Length | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Moment Arm | 0.000 | in |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

| Anchor Rods | | |
|---|---|---|
| Anchor Rod Quantity, N | 12 | - |
| Rod Diameter, d | 1.75 | in |
| Bolt Circle, BC | 55 | in |
| Yield Strength, Fy | 127.7 | ksi |
| Tensile Strength, Fu | 150 | ksi |
| Applied Axial, Pu | 195.9 | k |
| Applied Shear, Vu | 0.0 | k |
| Compressive Capacity, ϕPn | 227.9 | k |
| Tensile Capacity, ϕRnt | 0.860 | OK |
| Interaction Capacity | 0.860 | OK |

| Additional Bolt Group 1 | | |
|---|---|---|
| Bolt Quantity, N | 8 | - |
| Bolt Diameter, d | 2.25 | in |
| Bolt Circle, BC | 39 | in |
| Yield Strength, Fy | 92 | ksi |
| Tensile Strength, Fu | 120 | ksi |
| Applied Axial, Pu | 220.9 | k |
| Applied Shear, Vu | 0.0 | k |
| Compressive Capacity, ϕPn | 311.8 | k |
| Compressive Capacity, ϕPn | 0.708 | OK |
| Interaction Capacity | 0.708 | OK |

| Additional Bolt Group 2 | | |
|---|---|---|
| Bolt Quantity, N | 0 | - |
| Bolt Diameter, d | 0 | in |
| Bolt Circle, BC | 0 | in |
| Yield Strength, Fy | 0 | ksi |
| Tensile Strength, Fu | 0 | ksi |
| Applied Axial, Pu | 0.0 | k |
| Applied Shear, Vu | 0.0 | k |
| Compressive Capacity, ϕPn | 0.0 | k |
| Compressive Capacity, ϕPn | | |
| Interaction Capacity | | |

| Dywidag Reinforcement | | |
|---|---|---|
| Dywidag Quantity, N | 0 | - |
| Dywidag Diameter, d | 2.5 | in |
| Bolt Circle, BC | 57.88 | in |
| Yield Strength, Fy | 80 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Applied Axial, Pu | 0.0 | k |
| Compressive Capacity, ϕPn | 0.0 | k |
| Capacity, Pu/ϕPn | | |

| Base Plate Stiffeners | | |
|---|---|---|
| Applied Axial Force, Pu | 0.0 | k |
| Applied Horizontal Force, Vu | 0.00 | k |

| Vertical Weld | | |
|---|---|---|
| Vert.-to-Stiffener a=$e_x$/l | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Compressive Capacity, ϕPn | #DIV/0! | k |
| Vert.-to-Plate a=$e_x$/l | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Shear Capacity, ϕVn | #DIV/0! | k |
| $P_u/\phi_P P_n + V_u/\phi_V V_n$ | - | |

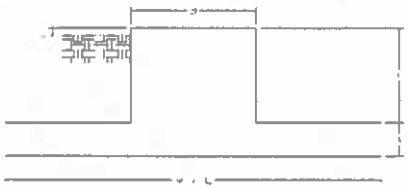
| Horizontal Weld | | |
|---|---|---|
| Horz.-to-Stiffener a=$e_x$/l | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Effective Fillet | 0.000 | in |
| Compressive Capacity, ϕPn | #DIV/0! | k |
| Horz.-to-Pole a=$e_x$/l | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Shear Capacity, ϕVn | #DIV/0! | k |
| $P_u/\phi_P P_n + V_u/\phi_V V_n$ | - | |

| Plate Tension | | |
|---|---|---|
| Gross Cross Section | 0.000 | $in^2$ |
| Net Cross Section | 0.000 | $in^2$ |
| Tensile Capacity, ϕTn | 0.0 | k |
| Capacity, Tu/ϕTn | - | |

| Plate Compression | | |
|---|---|---|
| Radius of Gyration | #DIV/0! | $in^3$ |
| kl/r | #DIV/0! | - |
| 4.71 $\sqrt{(E/Fy)}$ | 0.00 | - |
| Buckling Stress(Fe) | 0.0 | - |
| Crit. Buckling Stress(Fcr) | 0.0 | ksi |
| Compressive Capacity, ϕPn | 0.0 | k |
| Capacity, Pu/ϕPn | - | |

| | |
|---|---|
| Site Name: | Brln-Berlin |
| Site Number: | 302483 |
| Engineering Number: | OAA731959 |
| Engineer: | TJG |
| Date: | 08/28/18 |
| Tower Type: | MP |

*Program Last Updated:* *5/13/2014*



**Design Loads (Factored) - Analysis per TIA-222-G Standards**

| | | |
|---|---|---|
| Design / Analysis / Mapping: | Mapping | |
| Compression/Leg: | 51 | |
| Total Shear: | 42 | k |
| Moment: | 4206 | k-ft |
| Tower + Appurtenance Weight: | 51 | k |
| Depth to Base of Foundation (l + t - h): | 8 | ft |
| Diameter of Pier (d): | 7 | ft |
| Height of Pier above Ground (h): | 0.5 | ft |
| Width of Pad (W): | 11 | ft |
| Length of Pad (L): | 11 | ft |
| Thickness of Pad (t): | 2.6 | ft |
| Tower Leg Center to Center: | 0 | ft |
| Number of Tower Legs: | 1 | (1 if MP or GT) |
| 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: | 135 | pcf |
| Unit Weight of Water: | 62.4 | pcf |
| Unit Weight of Soil Below Water Table: | 72.6 | pcf |
| Friction Angle of Uplift: | 40 | Degrees |
| Ultimate Coefficient of Shear Friction: | 0.35 | |
| Ultimate Compressive Bearing Pressure: | 52000 | psf |
| Ultimate Passive Pressure on Pad Face: | 500 | psf |
| **Factored Moment Applied to Rock Anchors** | 3170 | k-ft |
| $\phi_{Soil\ and\ Concrete\ Weight}$: | 0.9 | |
| $\phi_{Soil}$: | 0.75 | |

**Rock Anchor Usage**

| | | |
|---|---|---|
| Rock Anchor Resistance: | 3360.0 | k |
| Rock Anchor Tensile Resistance: | 0.992 | Result: OK |

**Overturning Moment Usage**

| | | |
|---|---|---|
| Design OTM: | 4563.0 | k-ft |
| Weight of Soil and Concrete OTM Resistance: | 141.4 | k |
| OTM Resistance from Soil and Concrete: | 777.6 | k-ft |
| OTM Resistance from Tower: | 233.8 | k-ft |
| OTM Resistance from Soil Facture: | 527.8 | k-ft |
| OTM Resistance from Passive Pressure on Pad Face: | 16.5 | k-ft |
| OTM Resistance: | 4570.1 | k-ft |
| Design OTM / OTM Resistance: | 0.998 | Result: OK |

**Soil Bearing Pressure Usage**

| | | |
|---|---|---|
| Total Weight (Foundation, Soil, Tower): | 187.9 | k |
| Factored Nominal Bearing Pressure: | 39000 | psf |
| Net Bearing Pressure/Factored Nominal Bearing Pressure: | 0.53 | Result: OK |
| Load Direction Controling Design Bearing Pressure: | Diagonal to Pad Edge | |

**Sliding Factor of Safety**

| | | |
|---|---|---|
| Total Factored Sliding Resistance: | 58.9 | k |
| Sliding Design / Sliding Resistance: | 0.71 | Result: OK |

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
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SUITE 100
CARY, NC 27518
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COA: PEC.0001553

# 302483 - BRLN - BERLIN, CONNECTICUT

174.5 FT MONOPOLE MODIFICATIONS

## AS-BUILT SIGN-OFF

| DESCRIPTION | SIGNATURE | DATE |
|---|---|---|
| CONTRACTOR NAME | | |
| CONTRACTOR REPRESENTATIVE (PRINT NAME) | | |
| CONTRACTOR REPRESENTATIVE (SIGNATURE) | | |
| REDEVELOPMENT P.M. (PRINT NAME) | | |
| REDEVELOPMENT P.M. (SIGNATURE) | | |

## PROJECT SUMMARY

ATC PROJECT NUMBER: 11912109_P5_02

CUSTOMER: OPERATIONS

CUSTOMER SITE NAME: N/A

CUSTOMER SITE NUMBER: N/A

SITE ADDRESS: 260 BECKLEY ROAD
KENSINGTON, CT 06037

DATE: 10/03/17

GEOGRAPHIC COORDINATES: 41.63172222
-72.7299

## PROJECT DESCRIPTION

THE MODIFICATIONS PRESENTED ON THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL ANALYSIS COMPLETED UNDER ENGINEERING PROJECT NUMBER 11912109_P8_01 DATED 11/09/16. SATISFACTORY COMPLETION OF THE WORK INDICATED ON THESE DRAWINGS WILL RESULT IN THE STRUCTURE MEETING THE REQUIREMENTS OF THE SPECIFICATIONS UNDER WHICH THE STRUCTURAL WAS COMPLETED.

| SHEET | SHEET TITLE | REV. |
|---|---|---|
| IGN | IBC GENERAL NOTES | 0 |
| A-1 | MODIFICATION PROFILE | 0 |

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COA: PEC.0001553



| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FIRST ISSUE | CWB | 10/03/17 |
| | | | |
| | | | |
| | | | |
| | | | |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN
CONNECTICUT

SITE ADDRESS:
260 BECKLEY ROAD
KENSINGTON, CT 06037

| | |
|---|---|
| DRAWN BY: | CWB |
| APPROVED BY: | JDB |
| DATE DRAWN: | 10/03/17 |
| ATC JOB NO: | 11912109_P5_02 |

COVER

SHEET NUMBER: COVER

REVISION: 0

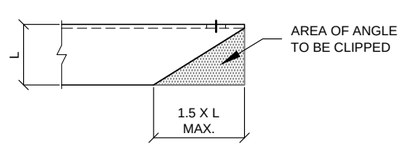
## GENERAL

1. ALL WORK TO BE COMPLETED PER APPLICABLE LOCAL, STATE, FEDERAL CODES AND ORDINANCES AND COMPLY WITH ATC MASTER SPECIFICATIONS FOR WIRELESS TOWER SITES. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND ABIDING BY ALL REQUIRED PERMITS.
2. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
4. ANY SUBSTITUTIONS SHALL CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS, AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
5. ANY MANUFACTURED DESIGN ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. THESE DESIGN ELEMENTS MUST BE STAMPED BY AN ENGINEER PROFESSIONALLY REGISTERED IN THE STATE OF THE PROJECT, AND SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL PRIOR TO FABRICATION.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY, PER ANSI/TIA-322 AND ANSI/ASSE A10.48, TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
8. CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.

## STRUCTURAL STEEL

1. ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATIONS, LATEST EDITION.
2. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
3. ALL U-BOLTS SHALL BE ASTM A36 OR EQUIVALENT, WITH LOCKING DEVICE, UNLESS NOTED OTHERWISE.
4. FIELD CUT EDGES, EXCEPT DRILLED HOLES, SHALL BE GROUND SMOOTH.
5. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES & GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS RECOMMENDATIONS.
6. ALL STRUCTURAL STEEL EMBEDDED IN THE CONCRETE SHALL BE APPLIED WITH (2) BRUSHED COATS OF POLYGUARD CA-14 MASTIC OR EQUIVALENT. REFER TO THE MANUFACTURER SPECIFICATIONS FOR SURFACE PREPARATION AND APPLICATION. APPLICATION OF POLYGUARD 400 WRAP IS NOT ESSENTIAL.
7. CONTRACTOR SHALL PERFORM WORK ON ONLY ONE (1) TOWER FACE AND REPLACE/REINFORCE ONE (1) BOLT/MEMBER AT A TIME.
8. ALL FIELD DRILLED HOLES TO BE USED FOR FIELD BOLTING INSTALLATION SHALL BE STANDARD HOLES, AS DEFINED BY AISC, UNLESS NOTED OTHERWISE.

### MAXIMUM ALLOWABLE ANGLE CLIP




## PAINT

1. AS REQUIRED, CLEAN AND PAINT PROPOSED STEEL ACCORDING TO FAA ADVISORY CIRCULAR AC 70/7460-1L.

## WELDING

1. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
2. ALL WELDS SHALL BE INSPECTED VISUALLY. IF DIRECTED BY ENGINEER OF RECORD, 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE (100% IF REJECTABLE DEFECTS ARE FOUND) TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. REPAIR ALL WELDS AS NECESSARY.
3. INSPECTION SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
4. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNLESS NOTED OTHERWISE.
5. ALL WELDING ON LATTICE TOWERS SHALL BE DONE WITH E70XX ELECTRODES. ALL WELDING ON POLE STRUCTURES SHALL BE DONE WITH E80XX ELECTRODES UNLESS NOTED OTHERWISE.
6. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING 1/2" BEYOND ALL FIELD WELD SURFACES. AFTER WELD AND WELD INSPECTION IS COMPLETE, REPAIR ALL GROUND AND WELDED SURFACES WITH ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS RECOMMENDATIONS.

## BOLT TIGHTENING PROCEDURE

1. STRUCTURAL CONNECTIONS TO BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC SPECIFICATIONS.
2. FLANGE BOLTS SHALL BE INSTALLED AND TIGHTENED USING DIRECT TENSION INDICATING (DTI) SQUIRTER WASHERS. DTI SQUIRTER WASHERS ARE TO BE INSTALLED AND ORIENTED / TIGHTENED PER MANUFACTURER SPECIFICATIONS TO ACHIEVE DESIRED LEVEL OF BOLT PRE-TENSION.
3. IN LIEU OF USING DTI SQUIRTER WASHERS, FLANGE BOLTS MAY BE TIGHTENED USING AISC / RCSC "TURN-OF-THE-NUT" METHOD, PENDING APPROVAL BY THE ENGINEER OF RECORD (EOR). TIGHTEN FLANGE BOLTS USING THE CHART BELOW:

**BOLT LENGTHS UP TO AND INCLUDING FOUR DIAMETERS**

| | | |
|---|---|---|
| 1/2" | BOLTS UP TO AND INCLUDING 2.0 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 5/8" | BOLTS UP TO AND INCLUDING 2.5 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 3/4" | BOLTS UP TO AND INCLUDING 3.0 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 7/8" | BOLTS UP TO AND INCLUDING 3.5 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 1" | BOLTS UP TO AND INCLUDING 4.0 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 1-1/8" | BOLTS UP TO AND INCLUDING 4.5 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 1-1/4" | BOLTS UP TO AND INCLUDING 5.0 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 1-3/8" | BOLTS UP TO AND INCLUDING 5.5 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |
| 1-1/2" | BOLTS UP TO AND INCLUDING 6.0 INCH LENGTH | +1/3 TURN BEYOND SNUG TIGHT |

**BOLT LENGTHS OVER FOUR DIAMETERS BUT NOT EXCEEDING EIGHT DIAMETERS**

| | | |
|---|---|---|
| 1/2" | BOLTS 2.25 TO 4.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 5/8" | BOLTS 2.75 TO 5.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 3/4" | BOLTS 3.25 TO 6.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 7/8" | BOLTS 3.75 TO 7.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 1" | BOLTS 4.25 TO 8.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 1-1/8" | BOLTS 4.75 TO 9.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 1-1/4" | BOLTS 5.25 TO 10.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 1-3/8" | BOLTS 5.75 TO 11.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |
| 1-1/2" | BOLTS 6.25 TO 12.0 INCH LENGTH | +1/2 TURN BEYOND SNUG TIGHT |

4. SPLICE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS", LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

   FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.

   8.2.1 TURN-OF-NUT PRETENSIONING
   BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

5. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.

   ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT INSERTION OF THE BOLTS WITHOUT UNDUE DAMAGE TO THE THREADS. BOLTS SHALL BE PLACED IN ALL HOLES WITH WASHERS POSITIONED AS REQUIRED AND NUTS THREADED TO COMPLETE THE ASSEMBLY. COMPACTING THE JOINT TO THE SNUG-TIGHT CONDITION SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. THE SNUG-TIGHTENED CONDITION IS THE TIGHTNESS THAT IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.

## APPLICABLE CODES AND STANDARDS

1. ANSI/TIA: STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, 222-G EDITION.
2. 2016 CONNECTICUT STATE BUILDING CODE.
3. 2012 INTERNATIONAL BUILDING CODE.
4. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-02.
5. CRSI: CONCRETE REINFORCING STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, LATEST EDITION.
6. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
7. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE, LATEST EDITION.

## SPECIAL INSPECTION

1. A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH IBC 2012, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
   a) STRUCTURAL WELDING (CONTINUOUS INSPECTION OF FIELD WELD ONLY)
   b) HIGH STRENGTH BOLTS (PERIODIC INSPECTION OF A325 EXTENSION FLANGE BOLTS TO BE TIGHTENED PER "TURN-OF-THE-NUT" METHOD)
2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH IBC 2012, SECTION 1704, UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM SUCH WORK WITHOUT THE SPECIAL INSPECTIONS.


AMERICAN TOWER®
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PHONE: (919) 468-0112
COA: PEC.0001553




| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FIRST ISSUE | CWB | 10/03/17 |
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| | | | |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN

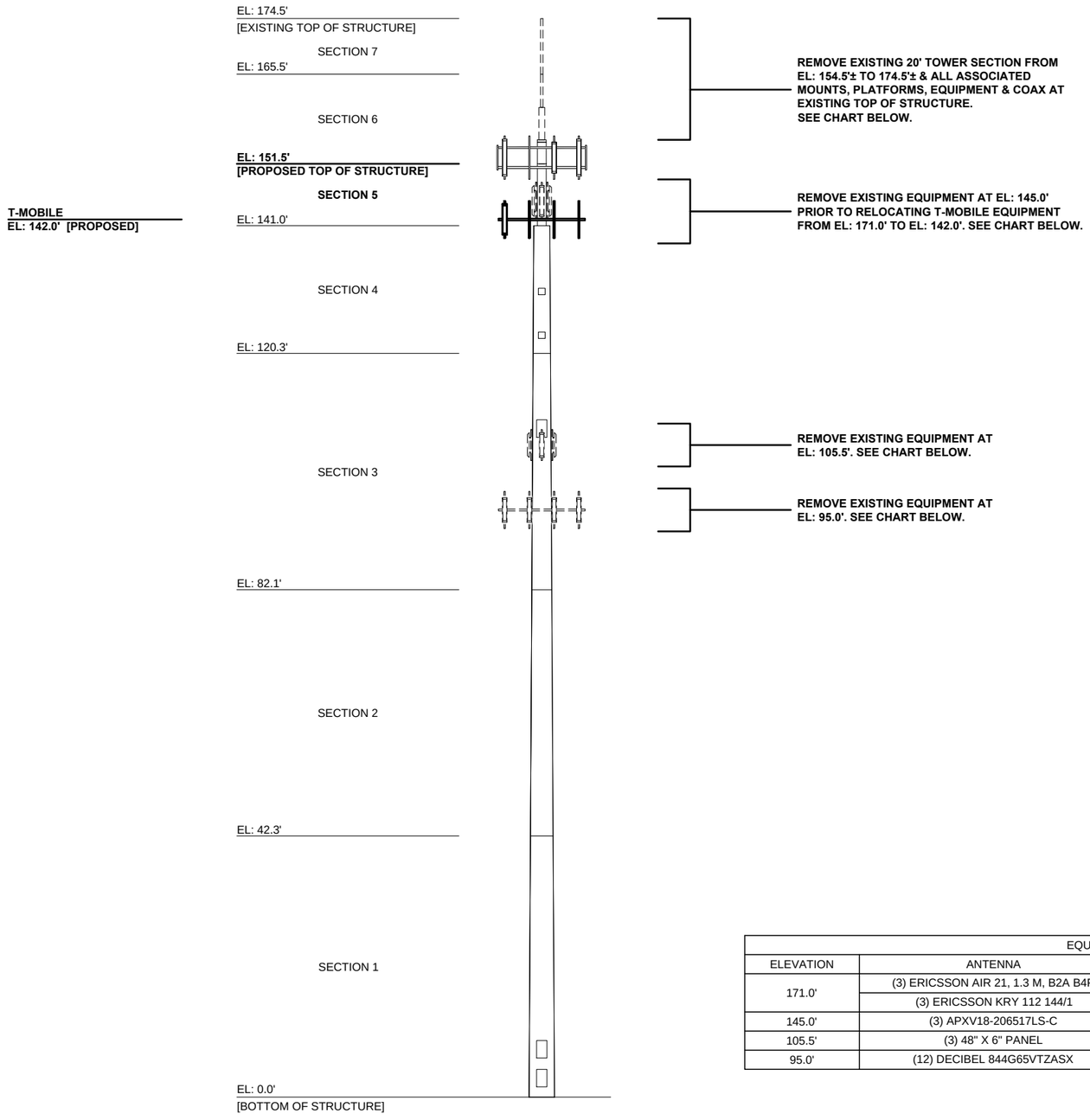
CONNECTICUT

SITE ADDRESS:
260 BECKLEY ROAD
KENSINGTON, CT 06037

| | |
|---|---|
| DRAWN BY: | CWB |
| APPROVED BY: | JDB |
| DATE DRAWN: | 10/03/17 |
| ATC JOB NO: | 11912109_P5_02 |

IBC GENERAL NOTES

| SHEET NUMBER: | REVISION: |
|---|---|
| IGN | 0 |




TOWER ELEVATION VIEW

**REMOVE EXISTING 20' TOWER SECTION FROM EL: 154.5'± TO 174.5'± & ALL ASSOCIATED MOUNTS, PLATFORMS, EQUIPMENT & COAX AT EXISTING TOP OF STRUCTURE. SEE CHART BELOW.**

**REMOVE EXISTING EQUIPMENT AT EL: 145.0' PRIOR TO RELOCATING T-MOBILE EQUIPMENT FROM EL: 171.0' TO EL: 142.0'. SEE CHART BELOW.**

**REMOVE EXISTING EQUIPMENT AT EL: 105.5'. SEE CHART BELOW.**

**REMOVE EXISTING EQUIPMENT AT EL: 95.0'. SEE CHART BELOW.**

| EQUIPMENT TO BE REMOVED | | | | |
|---|---|---|---|---|
| ELEVATION | ANTENNA | MOUNT | COAX | ADDITIONAL NOTES |
| 171.0' | (3) ERICSSON AIR 21, 1.3 M, B2A B4P<br>(3) ERICSSON KRY 112 144/1 | T-ARM | (6) 1 5/8" COAX<br>(1) 1 5/8" FIBER | TO BE RELOCATED TO EL: 142.0' |
| 145.0' | (3) APXV18-206517LS-C | FLUSH | (6) 1 5/8" COAX | ---- |
| 105.5' | (3) 48" X 6" PANEL | FLUSH | (6) 1 1/4" COAX | ---- |
| 95.0' | (12) DECIBEL 844G65VTZASX | LOW PROFILE PLATFORM | (12) 1 5/8" COAX | ---- |

**NOTE:**
**CONTACT AMERICAN TOWER FIELD OPERATIONS WHEN EXISTING EQUIPMENT INTERFERES WITH INSTALLATION OF MODIFICATIONS. ONCE APPROVED, EXISTING EQUIPMENT MAY BE TEMPORARILY MOVED DURING INSTALLATION & REINSTALLED TO THE ORIGINAL HEIGHT & LOCATION BY CONTRACTOR POST COMPLETION OF MODIFICATIONS.**

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MODIFICATION PROFILE

| SHEET NUMBER: | REVISION: |
|---|---|
| A-1 | 0 |

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11182A

Berlin/ Rt-9 X22_1
260 Beckley Road
Berlin, CT 06037

**August 6, 2018**

**EBI Project Number: 6218005409**

| Site Compliance Summary | |
|---|---|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general population allowable limit: | 16.66 % |

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

August 6, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11182A – Berlin/ Rt-9 X22_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **260 Beckley Road, Berlin, CT**, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is 1000 $\mu W/cm^2$. 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 **260 Beckley Road, Berlin, CT**, 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 all calculations, all equipment was calculated using the following assumptions:

1) 2 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.

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

4) 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.

5) 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.

6) 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.

7) 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.

8) 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

9) The antennas used in this modeling are the **Ericsson AIR32 B66Aa/B2A** & **RFS APXVAARR24_43-U-NA20** for 1900 MHz (PCS), 2100 MHz (AWS), 600 MHz and 700 MHz channels. 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 manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

10) The antenna mounting height centerline of the proposed antennas is **142 feet** above ground level (AGL).

11) 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.

12) 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: | Ericsson AIR32 B66Aa/B2A | Make / Model: | Ericsson AIR32 B66Aa/B2A | Make / Model: | Ericsson AIR32 B66Aa/B2A |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 142 feet | Height (AGL): | 142 feet | Height (AGL): | 142 feet |
| Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) |
| Channel Count | 4 | Channel Count | 4 | Channel Count | 4 |
| Total TX Power(W): | 240 | Total TX Power(W): | 240 | Total TX Power(W): | 240 |
| ERP (W): | 9,337.08 | ERP (W): | 9,337.08 | ERP (W): | 9,337.08 |
| Antenna A1 MPE% | **1.81** | Antenna B1 MPE% | **1.81** | Antenna C1 MPE% | **1.81** |
| Antenna #: | **2** | Antenna #: | **2** | Antenna #: | **2** |
| Make / Model: | RFS APXVAARR24_43-U-NA20 | Make / Model: | RFS APXVAARR24_43-U-NA20 | Make / Model: | RFS APXVAARR24_43-U-NA20 |
| Gain: | 15.65 / 16.35 / 12.95 / 13.35 dBd | Gain: | 15.65 / 16.35 / 12.95 / 13.35 dBd | Gain: | 15.65 / 16.35 / 12.95 / 13.35 dBd |
| Height (AGL): | 142 feet | Height (AGL): | 142 feet | Height (AGL): | 142 feet |
| Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz | Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz | Frequency Bands | 1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz |
| Channel Count | 8 | Channel Count | 8 | Channel Count | 8 |
| Total TX Power(W): | 240 | Total TX Power(W): | 240 | Total TX Power(W): | 240 |
| ERP (W): | 7,273.89 | ERP (W): | 7,273.89 | ERP (W): | 7,273.89 |
| Antenna A2 MPE% | **2.05** | Antenna B2 MPE% | **2.05** | Antenna C2 MPE% | **2.05** |

| **Site Composite MPE%** | |
|---|---|
| **Carrier** | **MPE%** |
| T-Mobile (Per Sector Max) | **3.86 %** |
| AT&T | **2.73** |
| MetroPCS | **0.66** |
| Berlin FD | **0.02** |
| Verizon Wireless | **7.17** |
| Sprint | **1.14** |
| Nextel | **1.08** |
| **Site Total MPE %:** | **16.66 %** |

| | |
|---|---|
| T-Mobile Sector A Total: | 3.86 % |
| T-Mobile Sector B Total: | 3.86 % |
| T-Mobile Sector C Total: | 3.86 % |
| | |
| Site Total: | 16.66 % |

| **T-Mobile _Frequency Band / Technology (Per Sector)** | **# Channels** | **Watts ERP (Per Channel)** | **Height (feet)** | **Total Power Density ($\mu W/cm^2$)** | **Frequency (MHz)** | **Allowable MPE ($\mu W/cm^2$)** | **Calculated % MPE** |
|---|---|---|---|---|---|---|---|
| T-Mobile AWS - 2100 MHz LTE | 2 | 2,334.27 | 142 | 9.07 | AWS - 2100 MHz | 1000.00 | 0.91% |
| T-Mobile PCS - 1900 MHz LTE | 2 | 2,334.27 | 142 | 9.07 | PCS - 1900 MHz | 1000.00 | 0.91% |
| T-Mobile PCS - 1900 MHz GSM | 2 | 1,101.85 | 142 | 4.28 | PCS - 1900 MHz | 1000.00 | 0.42% |
| T-Mobile AWS - 2100 MHz UMTS | 2 | 1,294.56 | 142 | 5.03 | AWS - 2100 MHz | 1000.00 | 0.50% |
| T-Mobile 600 MHz LTE | 2 | 591.73 | 142 | 2.30 | 600 MHz | 400.00 | 0.58% |
| T-Mobile 700 MHz LTE | 2 | 648.82 | 142 | 2.52 | 700 MHz | 467.00 | 0.54% |
| | | | | | | **Total:** | **3.86%** |

## 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:

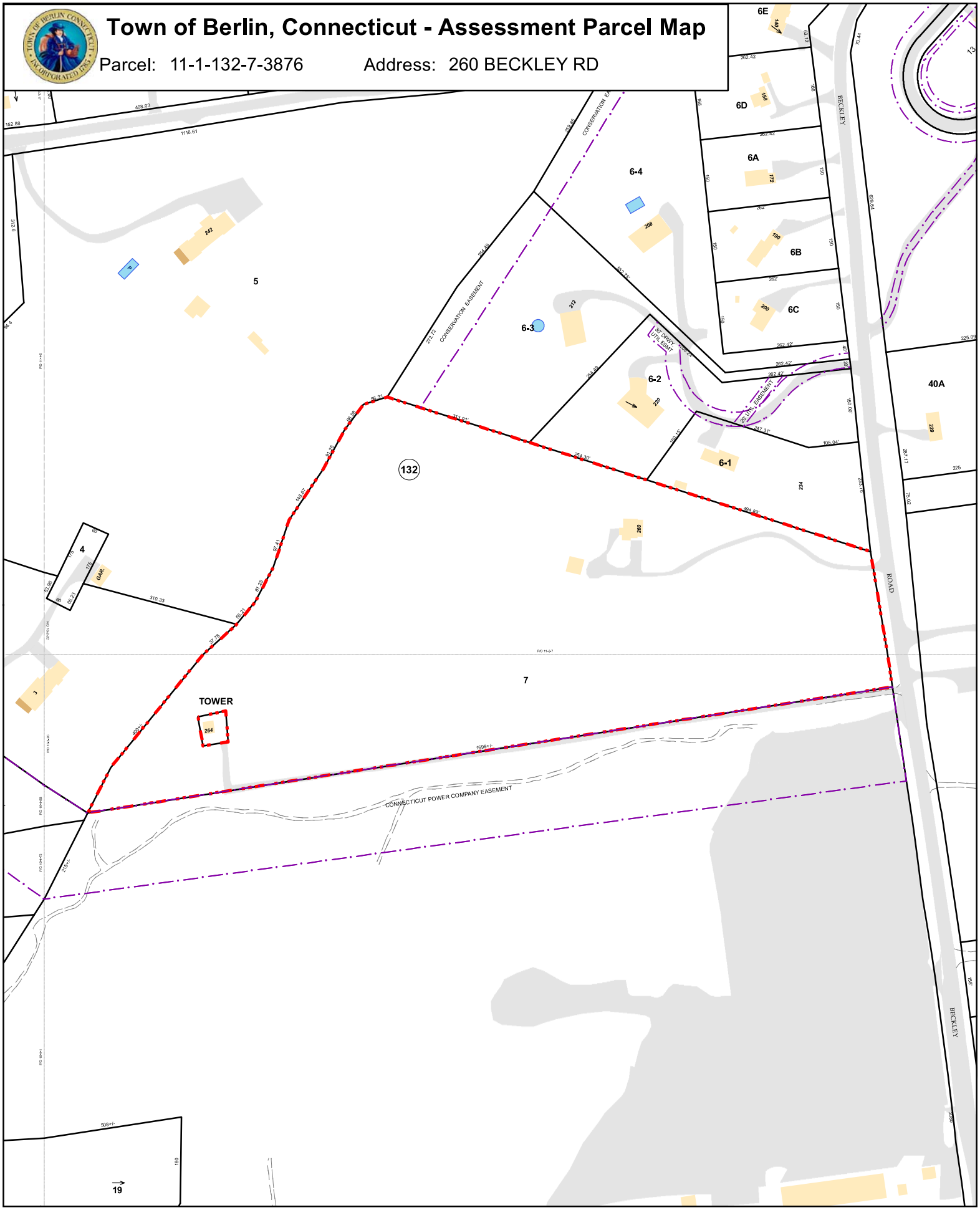
| T-Mobile Sector | Power Density Value (%) |
|---|---|
| Sector A: | 3.86 % |
| Sector B: | 3.86 % |
| Sector C: | 3.86 % |
| T-Mobile Maximum MPE % (Per Sector): | 3.86 % |
| | |
| Site Total: | 16.66 % |
| | |
| Site Compliance Status: | **COMPLIANT** |

The anticipated composite MPE value for this site assuming all carriers present is **16.66%** 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.

# Town of Berlin, Connecticut - Assessment Parcel Map

Parcel: 11-1-132-7-3876 Address: 260 BECKLEY RD




N
W E
S

NEGEO
New England Geosystems
www.negeosystems.com
202 Main Street Extension - C2
Middletown, CT 06457 • (203) 404 - 7129

**Approximate Scale:** 1 inch = 250 feet

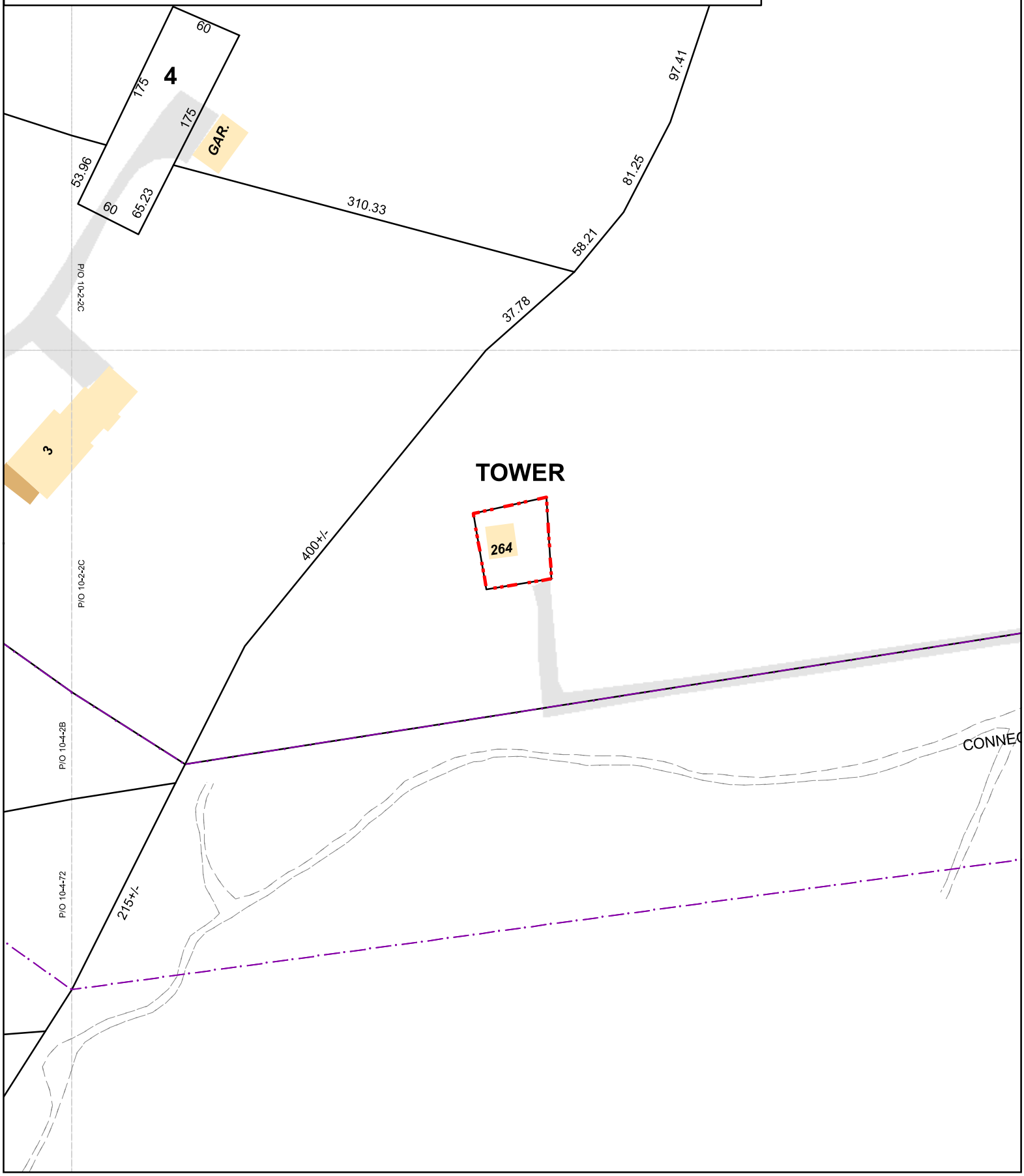
0 125 250 375 500 Feet

**Map Produced: December 2017**

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

# Town of Berlin, Connecticut - Assessment Parcel Map

Parcel: 11-3-132-7-3877 Address: 286 BECKLEY RD




Approximate Scale: 1 inch = 100 feet

0 50 100 150 200 Feet

Map Produced: December 2017

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

# Town of Berlin, CT

Property Listing Report

| Map Block Lot | 11-1-132-7-3876 | Account | 1040690 |
|---|---|---|---|

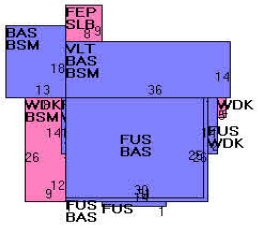
## Property Information

| | |
|---|---|
| Property Location | 260 BECKLEY RD |
| Owner | MATULIS ELAINE E & JOHN C JR |
| Co-Owner | |
| Mailing Address | 260 BECKLEY RD<br>BERLIN CT 06037 |
| Land Use | 1010 Single Family |
| Land Class | R |
| Zoning Code | R-43 |
| Census Tract | |

| | |
|---|---|
| Street Index | 2 |
| Acreage | 17.9 |
| Utilities | All Public |
| Lot Setting/ Desc | Above |
| Additional Info | |

## Photo

## Sketch




## Primary Construction Details

| | |
|---|---|
| Year Built | 1981 |
| Stories | 2 |
| Building Style | Contemp |
| Building Use | Residential |
| Building Condition | B- |
| Floors | Hardwood |
| Total Rooms | 8 |

| | |
|---|---|
| Bedrooms | 4 Bedrooms |
| Full Bathrooms | 2 |
| Half Bathrooms | 1 |
| Bath Style | Average |
| Kitchen Style | Average |
| Roof Style | Gable |
| Roof Cover | Asph/F Gls/Cmp |

| | |
|---|---|
| Exterior Walls | Clapboard |
| Interior Walls | Drywall |
| Heating Type | Forced Air-Duc |
| Heating Fuel | Oil/Gas |
| AC Type | Central |
| Gross Bldg Area | 4284 |
| Total Living Area | 2406 |

Report Created On 12/15/2017

# Town of Berlin, CT

Property Listing Report | Map Block Lot **11-1-132-7-3876** | Account **1040690**

## Valuation Summary (Assessed value = 70% of Appraised Value)

| Item | Appraised | Assessed |
|---|---|---|
| Buildings | **185600** | **129900** |
| Extras | **0** | **0** |
| Improvements | **201300** | **141000** |
| Outbuildings | **15700** | **11100** |
| Land | **453600** | **100511** |
| Total | **654900** | **241511** |

## Outbuilding and Extra Items

| Type | Description |
|---|---|
| **Barn 1 Story** | **1024 S.F.** |
| **Shed Wd Res** | **64 S.F.** |
| **SCREEN HOUSE** | **72 S.F.** |
| **Shed Wd Res** | **140 S.F.** |
| | |
| | |
| | |
| | |
| | |
| | |

## Sub Areas

| Subarea Type | Gross Area (sq ft) | Living Area (sq ft) |
|---|---|---|
| **Vaulted Ceiling** | **504** | **0** |
| **Porch, Enclosed, Finished** | **72** | **0** |
| **Slab** | **72** | **0** |
| **First Floor** | **1544** | **1544** |
| **Deck, Wood** | **272** | **0** |
| **Upper Story, Finished** | **862** | **862** |
| **Basement** | **958** | **0** |
| | | |
| | | |
| Total Area | **4284** | **2406** |

## Sales History

| Owner of Record | Book/ Page | Sale Date | Sale Price |
|---|---|---|---|
| **MATULIS ELAINE E & JOHN C JR** | **234/ 913** | **5/7/1984** | **0** |

Report Created On **12/15/2017**

# Town of Berlin, CT

## Property Listing Report

Map Block Lot **11-3-132-7-3877** Account **1040691**

## Property Information

| | |
|---|---|
| Property Location | **286 BECKLEY RD** |
| Owner | **MATULIS ELAINE E & JOHN C JR** |
| Co-Owner | |
| Mailing Address | **260 BECKLEY RD**<br>**BERLIN CT 06037** |
| Land Use | **4330 Rad/TV Twr** |
| Land Class | **I** |
| Zoning Code | **R-43** |
| Census Tract | |

| | |
|---|---|
| Street Index | **2030** |
| Acreage | **0.01** |
| Utilities | |
| Lot Setting/Desc | |
| Additional Info | |

## Photo

No Photo Available

## Sketch

## Primary Construction Details

| | | | | | |
|---|---|---|---|---|---|
| Year Built | | Bedrooms | | Exterior Walls | |
| Stories | | Full Bathrooms | | Interior Walls | |
| Building Style | | Half Bathrooms | | Heating Type | |
| Building Use | | Bath Style | | Heating Fuel | |
| Building Condition | | Kitchen Style | | AC Type | |
| Floors | | Roof Style | | Gross Bldg Area | |
| Total Rooms | | Roof Cover | | Total Living Area | |

Report Created On **12/15/2017**

# Town of Berlin, CT

**Property Listing Report** | Map Block Lot **11-3-132-7-3877** | Account **1040691**

## Valuation Summary

(Assessed value = 70% of Appraised Value)

| Item | Appraised | Assessed |
|---|---|---|
| Buildings | | |
| Extras | | |
| Improvements | | |
| Outbuildings | | |
| Land | | |
| Total | | |

## Outbuilding and Extra Items

| Type | Description |
|---|---|
| Generator | 130 UNITS |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

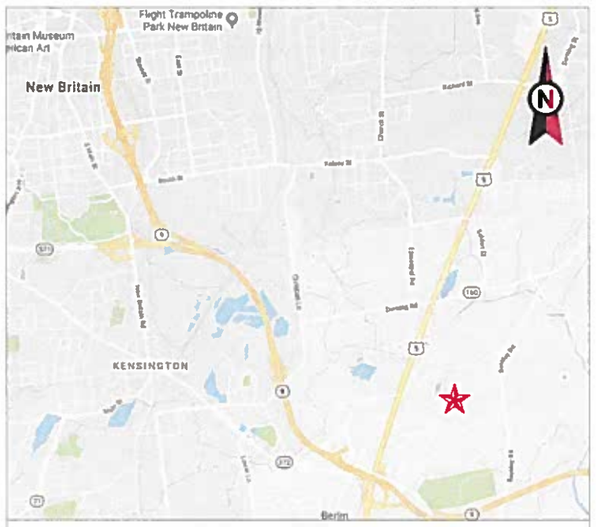
## Sub Areas

| Subarea Type | Gross Area (sq ft) | Living Area (sq ft) |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Total Area | | 0 |

## Sales History

| Owner of Record | Book/ Page | Sale Date | Sale Price |
|---|---|---|---|
| MATULIS ELAINE E & JOHN C JR | | | |

Report Created On **12/15/2017**

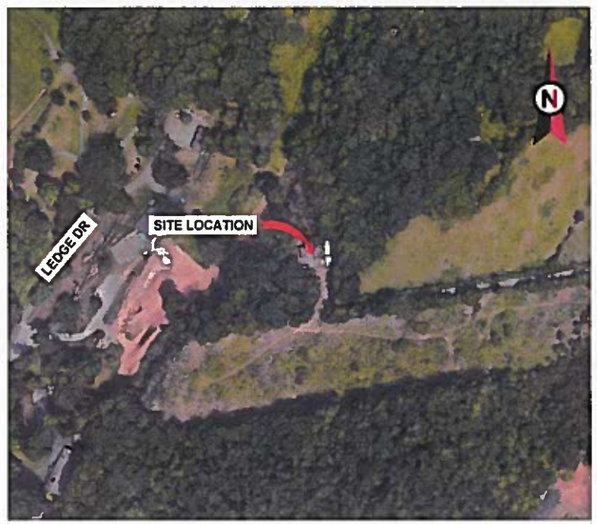



VICINITY MAP

AMERICAN TOWER®

# ATC SITE NAME: BRLN - BERLIN
# ATC SITE NUMBER: 302483
# T-MOBILE SITE ID: CT11182A
# SITE ADDRESS: 286 BECKLEY ROAD BERLIN, CT 06037

## T-MOBILE ANTENNA AMENDMENT
## 67D94B HYBRID CONFIGURATION




LOCATION MAP

### COMPLIANCE CODE

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.

1. INTERNATIONAL BUILDING CODE (IBC)
2. NATIONAL ELECTRIC CODE (NEC)
3. LOCAL BUILDING CODE
4. CITY/COUNTY ORDINANCES

### PROJECT SUMMARY

SITE ADDRESS:

286 BECKLEY ROAD
BERLIN, CT 06037
COUNTY: HARTFORD

GEOGRAPHIC COORDINATES:

LATITUDE: 41.63172222
LONGITUDE: -72.7299
GROUND ELEVATION: 185' AMSL

### PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:

REMOVE (3) PANELS AND (3) TTAs

INSTALL (6) NEW PANELS, (3) RRUs, (6) TTAs, AND (2) 1-1/4" HYBRID CABLES

EXISTING (12) 1-5/8" COAX CABLES AND (1) 1-5/8" HYBRID CABLE TO REMAIN

### PROJECT NOTES

1. THE FACILITY IS UNMANNED.
2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE.
3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE.
4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED.
5. HANDICAP ACCESS IS NOT REQUIRED.

### SHEET INDEX

| SHEET NO. | DESCRIPTION | REV. | DATE | BY |
|---|---|---|---|---|
| G-001 | TITLE SHEET | 0 | 09/06/18 | MG |
| G-002 | GENERAL NOTES | 0 | 09/06/18 | MG |
| C-101 | DETAILED SITE PLAN & TOWER ELEVATION | 0 | 09/06/18 | MG |
| C-501 | ANTENNA INFORMATION & SCHEDULE | 0 | 09/06/18 | MG |
| C-502 | CONSTRUCTION DETAILS | 0 | 09/06/18 | MG |
| E-501 | GROUNDING DETAILS | 0 | 09/06/18 | MG |
| R-601 | SUPPLEMENTAL | | | |

### UTILITY COMPANIES

POWER COMPANY: EVERSOURCE
PHONE: (877) 659-6326

TELEPHONE COMPANY: FRONTIER COMMUNICATIONS
PHONE: (800) 376-6843

811 Know what's below. Call before you dig.

### PROJECT TEAM

TOWER OWNER:

AMERICAN TOWER
10 PRESIDENTIAL WAY
WOBURN, MA 01801

ENGINEER:

ATC TOWER SERVICES, LLC
3500 REGENCY PKWY STE 100
CARY, NC 27518

PROPERTY OWNER:

JOHN & ELAINE MATULIS
260 BECKLEY RD
BERLIN, CT 06037

APPLICANT:

T-MOBILE
200 WESTGATE PARKWAY
SUITE 200
RICHMOND, VA 23233

CARRIER CONTACT:

JUHN L. LOUISSAINT
(757) 305-8000

### PROJECT LOCATION DIRECTIONS

FROM NEW BRITAIN, CT:

HEAD WEST ON WHITING ST TOWARD FRANKLIN SQ/TURN LEFT AT THE 1ST CROSS STREET ONTO S MAIN ST/TURN LEFT ONTO ELLIS ST/TURN RIGHT AT THE 2ND CROSS STREET ONTO COLUMBUS BLVD/MERGE ONTO CT-9 S VIA THE RAMP ON THE LEFT TO MIDDLETOWN/TAKE EXIT 22 FOR CT-372 E/TURN RIGHT AT THE 1ST CROSS STREET TO STAY ON CT-372 E/TURN LEFT ONTO BERLIN ST/TURN LEFT AT THE 1ST CROSS STREET ONTO BECKLEY RD. DESTINATION WILL BE ON THE LEFT.

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553



| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | MG | 09/06/18 |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN

SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL:


Authorized by "EOR"
Sep 6 2018 12:07 PM cosign

T-Mobile

| | |
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

TITLE SHEET

| SHEET NUMBER: | REVISION: |
|---|---|
| G-001 | 0 |

## GENERAL CONSTRUCTION NOTES:

1. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC MASTER SPECIFICATIONS.
2. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
4. 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.
5. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
6. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
7. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
9. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
10. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE T-MOBILE WIRELESS REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE T-MOBILE WIRELESS REP PRIOR TO PROCEEDING.
11. EACH CONTRACTOR SHALL COOPERATE WITH THE T-MOBILE WIRELESS REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
12. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE T-MOBILE WIRELESS CONSTRUCTION MANAGER.
13. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
14. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE T-MOBILE WIRELESS REP IMMEDIATELY.
15. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
16. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
17. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH LANDLORD AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
18. CONTRACTOR SHALL FURNISH T-MOBILE WIRELESS WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
19. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE WIRELESS 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.
20. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE WIRELESS REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY T-MOBILE WIRELESS MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
21. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH T-MOBILE WIRELESS SPECIFICATIONS AND REQUIREMENTS.
22. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO T-MOBILE WIRELESS FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
23. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO T-MOBILE WIRELESS SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
24. 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.
25. CONTRACTOR SHALL NOTIFY T-MOBILE WIRELESS 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.
26. 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.
27. 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 NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLECT 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.
28. 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 WIRELESS REP. ANY WORK FOUND BY THE T-MOBILE WIRELESS REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
29. 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.

## STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2. STRUCTURAL STEEL ROLLED SHAPES, PLATES AND BARS SHALL CONFORM TO THE FOLLOWING ASTM DESIGNATIONS:
   - A. ASTM A-572, GRADE 50 - ALL W SHAPES, UNLESS NOTED OR A992 OTHERWISE
   - B. ASTM A-36 - ALL OTHER ROLLED SHAPES, PLATES AND BARS UNLESS NOTED OTHERWISE.
   - C. ASTM A-500, GRADE B - HSS SECTION (SQUARE, RECTANGULAR, AND ROUND)
   - D. ASTM A-325, TYPE SC OR N - ALL BOLTS FOR CONNECTING STRUCTURAL MEMBERS
   - E. ASTM F-1554 07 - ALL ANCHOR BOLTS, UNLESS NOTED OTHERWISE
3. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
4. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES AND GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.
5. DO NOT DRILL HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON STRUCTURAL DRAWINGS.
6. CONNECTIONS:
   - A. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
   - B. ALL WELDS SHALL BE INSPECTED VISUALLY. 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. REPAIR ALL WELDS AS NECESSARY.
   - C. INSPECTION SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
   - D. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE BURNING/WELDING PERMITS AS REQUIRED BY LOCAL GOVERNING AUTHORITY AND IF REQUIRED SHALL HAVE FIRE DEPARTMENT DETAIL FOR ANY WELDING ACTIVITY.
   - E. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNLESS NOTED OTHERWISE.
   - F. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
   - G. PRIOR TO FIELD WELDING GALVANIZING MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING ½" BEYOND ALL FIELD WELD SURFACES. AFTER WELD AND WELD INSPECTION IS COMPLETE, REPAIR ALL GROUND AND WELDED SURFACES WITH ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS RECOMMENDATIONS.

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553



| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | MG | 09/06/18 |
| △ | | | |
| △ | | | |
| △ | | | |
| △ | | | |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN

SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL:


Authorized by "EOR"
Sep 6 2018 12:07 PM cosign

T-Mobile

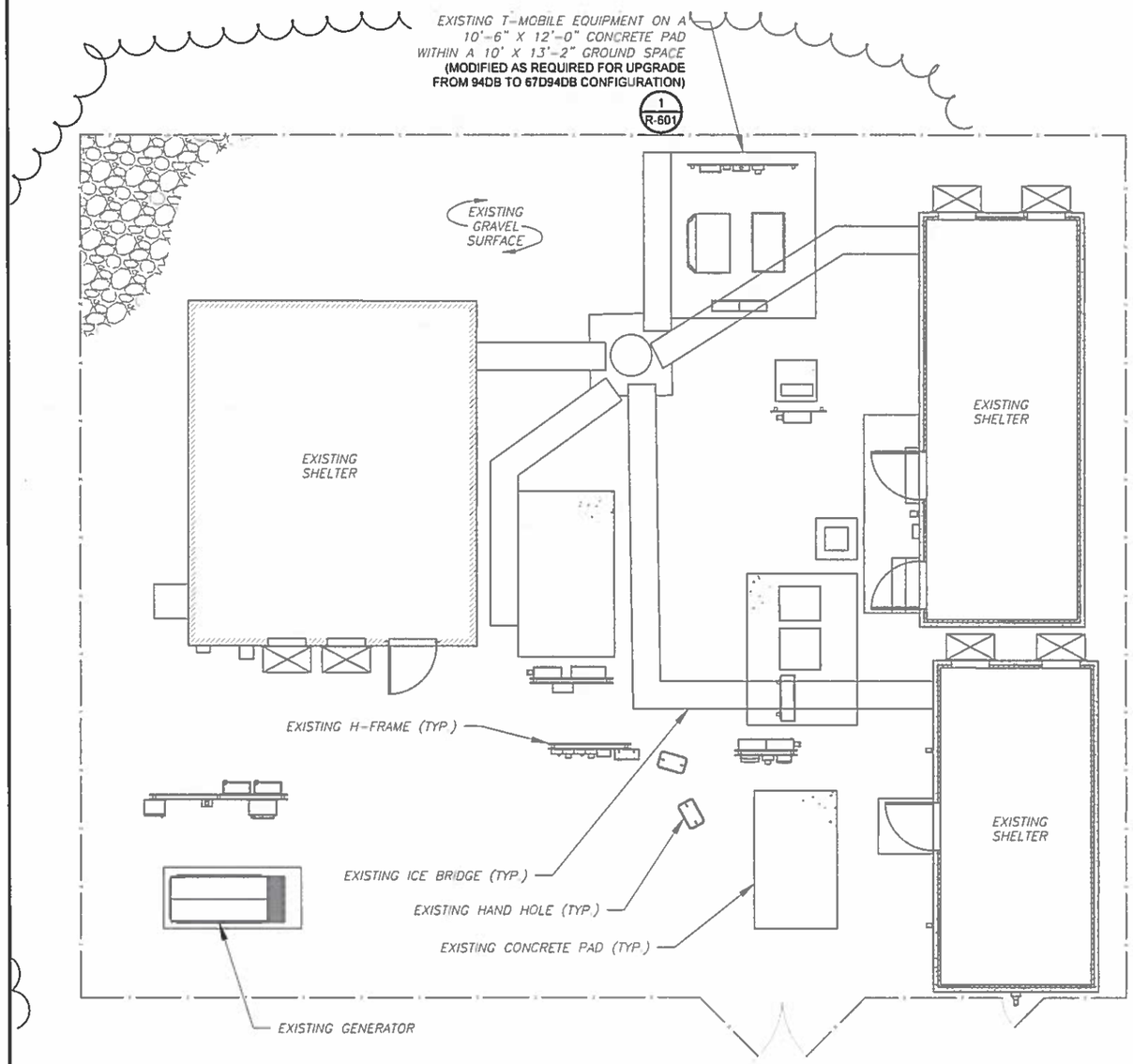
| | |
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

GENERAL NOTES

| SHEET NUMBER: | REVISION: |
|---|---|
| G-002 | 0 |

SITE PLAN NOTES:

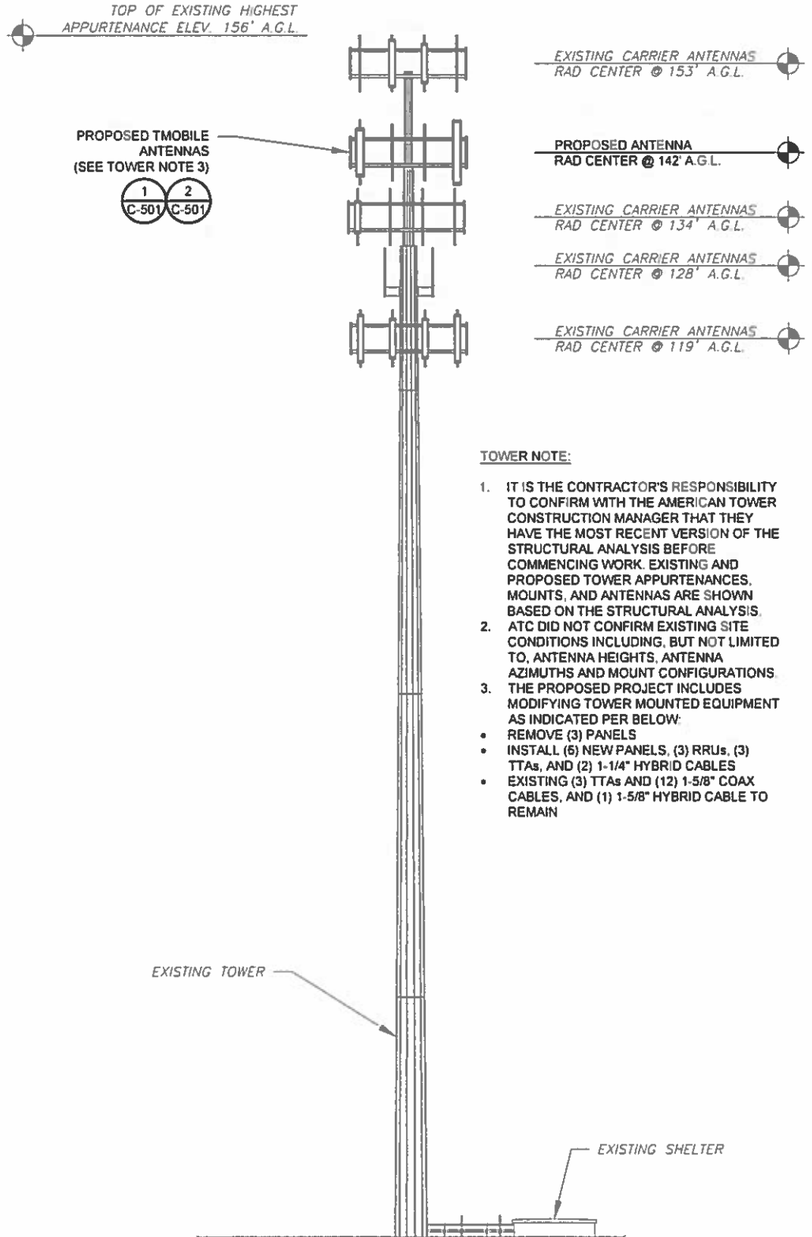
1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.
2. ICE BRIDGE, CABLE LADDER, COAX PORT, AND COAX CABLE 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.




1 DETAILED SITE PLAN

0 10' 20'

SCALE: 1"=10' (11X17)
1"=5' (22X34)




TOWER NOTE:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE AMERICAN TOWER CONSTRUCTION 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.
2. ATC DID NOT CONFIRM EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO, ANTENNA HEIGHTS, ANTENNA AZIMUTHS AND MOUNT CONFIGURATIONS.
3. THE PROPOSED PROJECT INCLUDES MODIFYING TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:
   - REMOVE (3) PANELS
   - INSTALL (6) NEW PANELS, (3) RRUs, (3) TTAs, AND (2) 1-1/4" HYBRID CABLES
   - EXISTING (3) TTAs AND (12) 1-5/8" COAX CABLES, AND (1) 1-5/8" HYBRID CABLE TO REMAIN

2 TOWER ELEVATION
SCALE: NOT TO SCALE


AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553




| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | MG | 09/06/18 |
| △ | | | |
| △ | | | |
| △ | | | |
| △ | | | |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN

SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL:

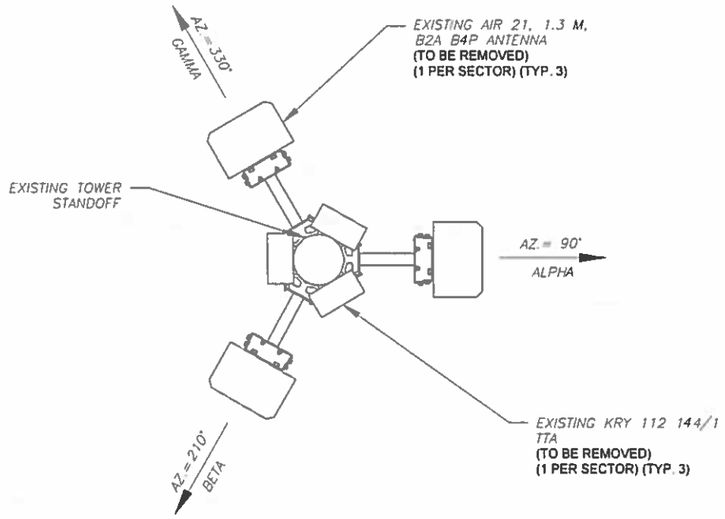

Authorized by "EOR"
Sep 6 2018 12:07 PM cosign

T-Mobile

| | |
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

DETAILED SITE PLAN & TOWER ELEVATION

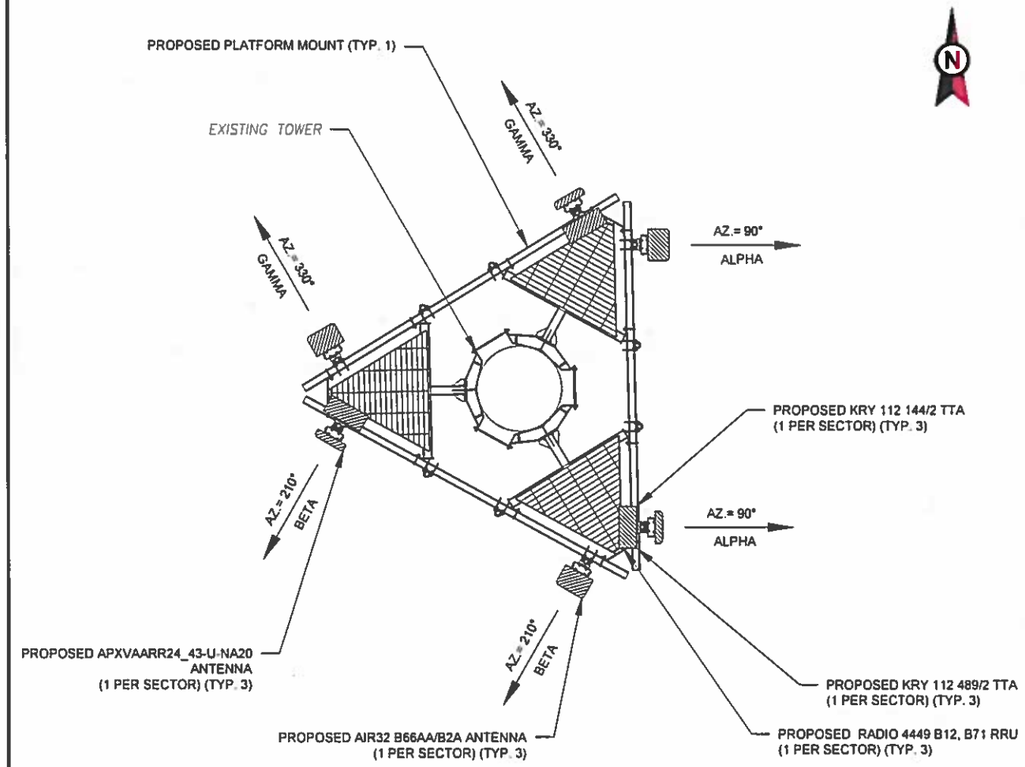
| SHEET NUMBER: | REVISION: |
|---|---|
| C-101 | 0 |




## 1 EXISTING ANTENNA PLAN

NOTES:

1. ATC HAS NOT YET VERIFIED ANY EXISTING ANTENNA CONFIGURATION OR MOUNT CONFIGURATION. CONTRACTOR TO VERIFY MOUNT CONFIGURATION HAS SUFFICIENT SPACE FOR PROPOSED LESSEE EQUIPMENT (I.E. CLEARANCES, MOUNT PIPE OR SUFFICIENT LENGTH, ETC.) ATC DID NOT ANALYZE ANTENNA MOUNT TO DETERMINE ADEQUATE STRUCTURAL CAPACITY FOR ANY LESSEE LOADING.




## 2 FINAL ANTENNA PLAN

NOTES:

1. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS ON FILE WITH THE ATC CM.
2. SPACING OF PROPOSED EQUIPMENT SHALL BE CONFIRMED FOR TOWER CONFLICTS AND PROPOSED MOUNTS SHALL NOT IMPEDE TOWER CLIMBING PEGS.

EXISTING ANTENNA/ COAX SCHEDULE

| SECTOR | ANT. | MANUFACTURER (MODEL #) | RAD CENTER | AZIMUTH (TN) | MECH. D-TILT | ELEC. D-TILT | ADDITIONAL TOWER MOUNTED EQUIPMENT | ANTENNA COAX DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| ALPHA | A1 | AIR 21 B2A B4P | 163'-0" | 90° | 0° | – | KRY 112 144/1 | (4) 1-5/8" |
| BETA | B1 | AIR 21 B2A B4P | 163'-0" | 210° | 0° | – | KRY 112 144/1 | (4) 1-5/8" |
| GAMMA | C1 | AIR 21 B2A B4P | 163'-0" | 330° | 0° | – | KRY 112 144/1 | (4) 1-5/8" |

1. (1) EXISTING 1-5/8" HYBRID CABLE (TO REMAIN).

FINAL ANTENNA/ COAX SCHEDULE

| SECTOR | ANT. | MANUFACTURER (MODEL #) | RAD CENTER | AZIMUTH (TN) | MECH. D-TILT | ELEC. D-TILT | ADDITIONAL TOWER MOUNTED EQUIPMENT | ANTENNA COAX DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| ALPHA | A1 | AIR32 B66AA/B2A | 142'-0" | 90° | - | 2° | - | - |
| ALPHA | A2 | APXVAARR24_43-U-NA20 | 142'-0" | 90° | - | 2° | RADIO 4449 B12,B71<br>KRY 112 489/2<br>KRY 112 144/2 | (4) 1-5/8" |
| BETA | B1 | AIR32 B66AA/B2A | 142'-0" | 210° | - | 2° | - | - |
| BETA | B2 | APXVAARR24_43-U-NA20 | 142'-0" | 210° | - | 2° | RADIO 4449 B12,B71<br>KRY 112 489/2<br>KRY 112 144/2 | (4) 1-5/8" |
| GAMMA | C1 | AIR32 B66AA/B2A | 142'-0" | 330° | - | 2° | - | - |
| GAMMA | C2 | APXVAARR24_43-U-NA20 | 142'-0" | 330° | - | 2° | RADIO 4449 B12,B71<br>KRY 112 489/2<br>KRY 112 144/2 | (4) 1-5/8" |

1. BASED ON APPROVED ATC APPLICATION OAA731959, DATED 05/11/18. CONFIRM WITH T-MOBILE REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS.
2. (1) EXISTING 1-5/8" HYBRID CABLE (TO REMAIN).
3. (2) PROPOSED 1-1/4" HYBRID CABLE (177'±)

## 3 ANTENNA SCHEDULE

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553



| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | MG | 09/06/18 |

ATC SITE NUMBER:
302483

ATC SITE NAME:
BRLN - BERLIN

SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL: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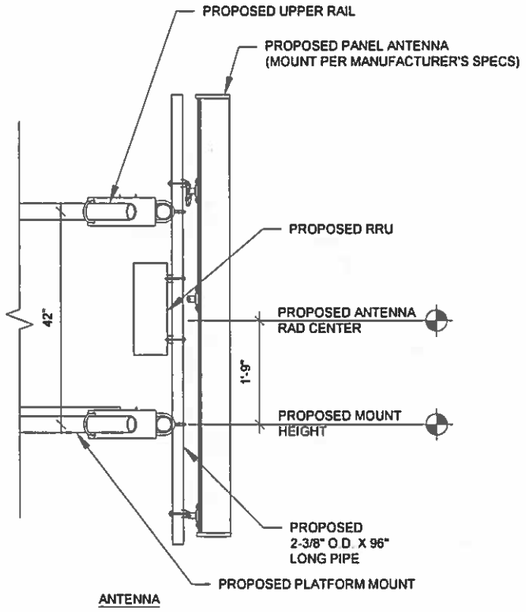
T-Mobile

| | |
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

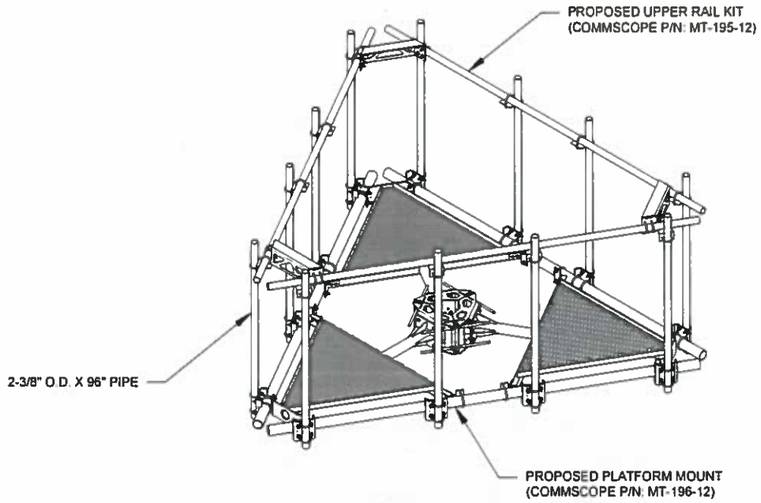
ANTENNA INFORMATION & SCHEDULE

| SHEET NUMBER: | REVISION: |
|---|---|
| C-501 | 0 |




1 PROPOSED ANTENNA MOUNTING DETAIL (ELEVATION)

SCALE: NOT TO SCALE




2 ISOMETRIC PLATFORM DETAIL

SCALE: N.T.S.

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
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SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL:


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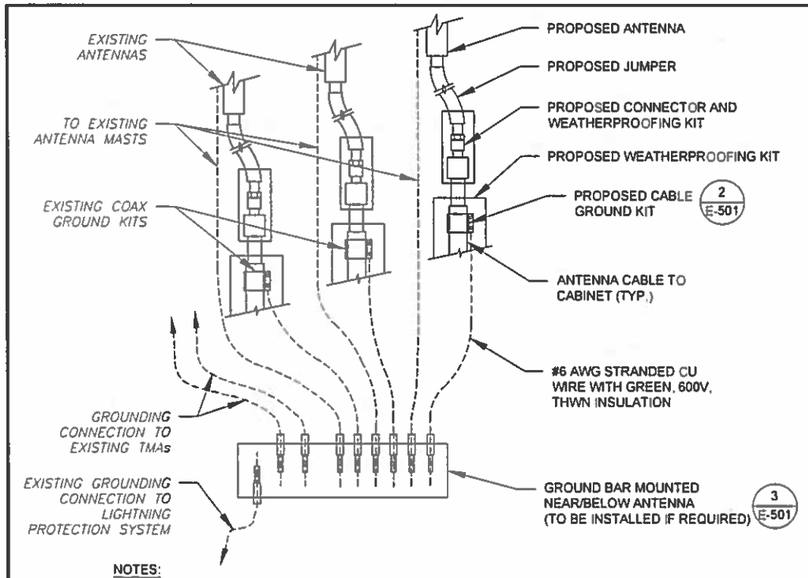
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

CONSTRUCTION DETAILS

| SHEET NUMBER: | REVISION: |
|---|---|
| C-502 | 0 |

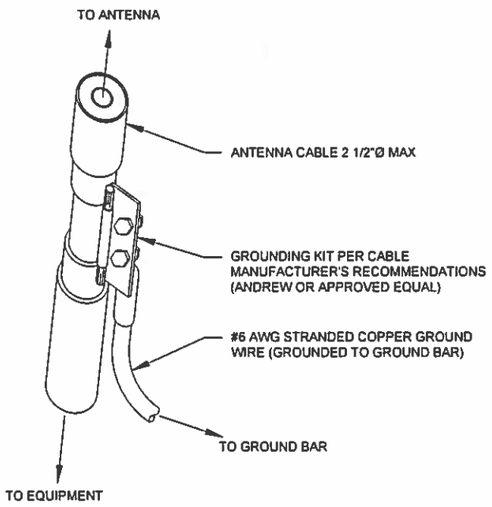



NOTES:

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: NOT TO SCALE

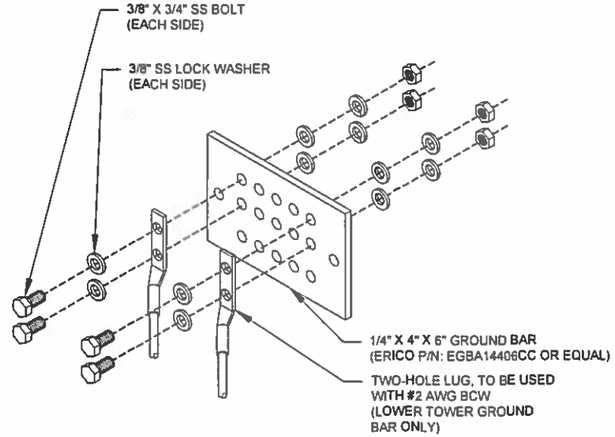



GROUND KIT NOTES:

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: NOT TO SCALE




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: NOT TO SCALE

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553



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ATC SITE NAME:
BRLN - BERLIN

SITE ADDRESS:
286 BECKLEY ROAD
BERLIN, CT 06037

SEAL:


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| | |
|---|---|
| DRAWN BY: | MG |
| APPROVED BY: | KRF |
| DATE DRAWN: | 09/06/18 |
| ATC JOB NO: | 12497565 |

GROUNDING DETAILS

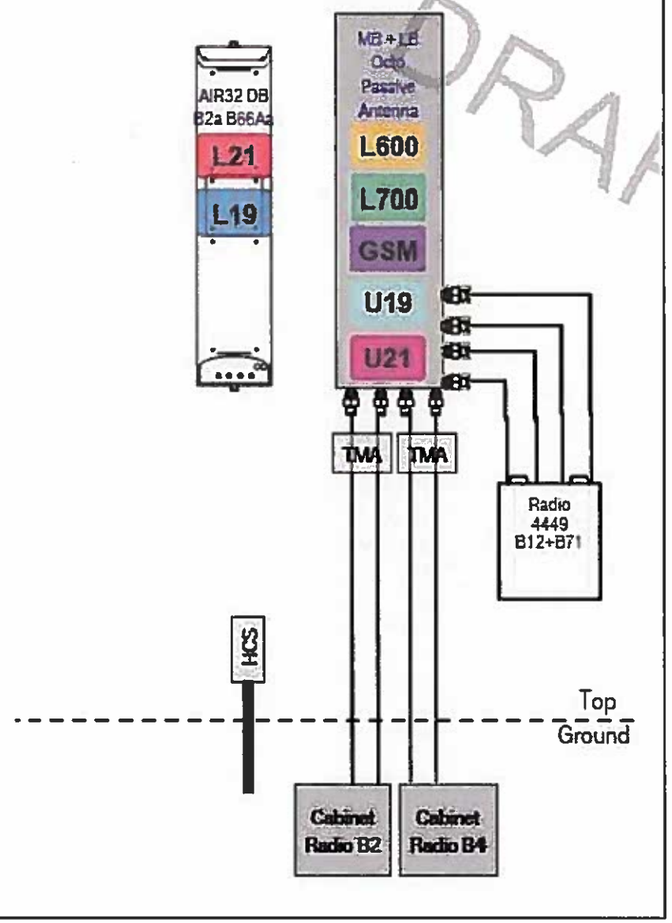
| SHEET NUMBER: | REVISION: |
|---|---|
| E-501 | 0 |

| Existing RAN Equipment | | |
|---|---|---|
| Template: 84DB Outdoor (evolved from 4B) | | |
| Enclosure | 1 | 2 |
| Enclosure Type | RBS 6102 | Tower Top Mount |
| Baseband | DUS41 (L2100, L1900) DUW30 (U2100) DUG20 (G1900) | |
| Hybrid Cable System | | Ericsson 3x6 HCS *Select Length* |
| Radio | RUS01 B4 (x3) (U2100) RUS01 B4 (x3) (L2100) | |

| Proposed RAN Equipment | | |
|---|---|---|
| Template: 67D94DB Hybrid (evolved from 4B) | | |
| Enclosure | 1 | 2 |
| Enclosure Type | RBS 6102 | Ancillary Equipment |
| Baseband | BB 5216 (L2100, L1900, L700, L600) DUW30 (U2100) DUG20 (G1900) | |
| Hybrid Cable System | | Ericsson 6x12 HCS *Select Length & AWG* (x2) Ericsson 6x12 HCS *Select AWG & Length* |
| Multiplexer | XMU | |
| Radio | RUS01 B2 (x3) (G1900) RUS01 B4 (x6) (U2100) RUS01 B2 (x3) | |
| RAN Scope of Work: | | |
| Swap DUL with DUS41.Remove existing LMU coax.Remove existing Metro loading and use RC for L700. | | |

1 CABINET CONFIGURATION
SCALE: NOT TO SCALE

67D94DB_1xAIR+1OPJPG




Notes:

2 ANTENNA CONFIGURATION
SCALE: NOT TO SCALE

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

SUPPLEMENTAL

| SHEET NUMBER: | REVISION: |
|---|---|
| R-601 | 0 |