Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

May 31, 2017

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

RE: **Notice of Exempt Modification for T-Mobile / L700 Crown Site BU: 5800059**
T-Mobile Site ID: CTHA332C
Located at: 258 Ridge Road, Madison, CT 06433
Latitude: 41° 18' 33.3" / Longitude: -72° 36' 51.57"

Dear Ms. Bachman,

T-Mobile currently maintains six (6) antennas at the 150-foot level of the existing 150-foot monopole at 258 Ridge Road, Madison, CT. The tower is owned by Crown Castle. The property is owned by the Town of Madison. T-Mobile now intends to add three (3) antennas and three (3) RRUs at the same 150-foot level.

This facility was approved by the Connecticut Siting Council, Docket Number 363 on October 30, 2008. This approval included the condition(s) that:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Omnipoint Communications, Inc. and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level. The tower and compound shall be moved approximately 50 feet to the north to avoid tree clearing.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Madison for comment, and all

parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:

a. final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping; and
b. construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.
4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Madison public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.
7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.

8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Madison. Any proposed modifications to this Decision and Order shall likewise be so served.
9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
10. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.
11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

This modification complies with the aforementioned condition(s).

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

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

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

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

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

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

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

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

Sincerely,

Amanda Cornwall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Cornwall@crowncastle.com
Attachments:

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

cc: First Selectman Tom Banisch
Town of Madison
8 Campus Drive
Madison, CT 06443

Mr. David Anderson-Town Planner
Planning and Zoning

8 Campus Drive
Madison, CT 06443

Crown Castle (Tower Owner)
12 Gill Street, Suite 5800
Woburn, Ma 01801

Town of Madison (Property Owner)
8 Campus Drive
Madison, CT 06443

DOCKET NO. 363 – Crown Communications Inc. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility located at 258 Ridge Road, Madison, Connecticut.	}	Connecticut
	}	Siting
	}	Council

October 30, 2008

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Crown Communications Inc., hereinafter referred to as the Certificate Holder, for a telecommunications facility at 258 Ridge Road, Madison, Connecticut

The facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Omnipoint Communications, Inc. and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level. The tower and compound shall be moved approximately 50 feet to the north to avoid tree clearing.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Madison for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping; and
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Madison public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.

8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Madison. Any proposed modifications to this Decision and Order shall likewise be so served.

9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

10. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.

11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

Pursuant to General Statutes § 16-50p, the Council hereby directs that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the *New Haven Register* and *The Source.*

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
Crown Communications, Inc.	Christopher B. Fisher, Esq. Cuddy & Feder LLP 445 Hamilton Avenue, 14th Floor White Plains, NY 10601
Intervenor	**Its Representative**
Omnipoint Communications, Inc.	Julie Kohler, Esq. Jesse Langer, Esq. Cohen and Wolf, P.C. 1115 Broad Street Bridgeport, CT 06604

258 RIDGE RD

Location	258 RIDGE RD	**Mblu**	78/ 3/ / /
Acct#	00453700	**Owner**	TOWN OF MADISON
Assessment	$106,900	**Appraisal**	$152,700
PID	4717	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$152,700	$152,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$106,900	$106,900

Owner of Record

Owner TOWN OF MADISON
Co-Owner

Sale Price $100,000
Certificate
Book & Page 660/ 162
Sale Date 06/16/1995
Instrument 15

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
TOWN OF MADISON	$100,000		660/ 162	15	06/16/1995

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

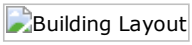
Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Stories:	

Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Fireplace(s)	
Xtra FPL Open	

Building Photo

(http://images.vgsi.com/photos/MadisonCTPhotos//\01\00\68/3

Building Layout



Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	9035
Description	Municipal Town
Zone	RU-1

Land Line Valuation

Size (Acres)	3
Depth	0

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$152,700	$152,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$106,900	$106,900

258 Ridge Rd

Imagery ©2017 Google, Map data ©2017 Google 50 ft

T-Mobile

T-MOBILE SITE NUMBER: CTHA332C
T-MOBILE SITE NAME: HA332/WASTE STATION
SITE TYPE: MONOPOLE
TOWER HEIGHT: 150'-0"

CROWN CASTLE BU #: 5800059
SITE ADDRESS: 258 RIDGE ROAD MADISON, CONNECTICUT 06433
COUNTY: NEW HAVEN
JURISDICTION: CONNECTICUT SITING COUNCIL

T-MOBILE L700_702Cu CONFIGURATION

SITE INFORMATION

CROWN CASTLE SITE NAME:	RIDGE ROAD, MADISON
SITE ADDRESS:	258 RIDGE ROAD MADISON, CONNECTICUT 06433
COUNTY:	NEW HAVEN
MAP/PARCEL #:	MADI-000051-000001
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 18' 33.3"
LONGITUDE:	-72° 36' 51.57"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	128.0 FT
CURRENT ZONING:	RU-1
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	VB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TOWN OF MADISON 8 CAMPUS DRIVE MADISON, CT 06443
TOWER OWNER:	TOWER DEVELOPMENT CORPORATION 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE NORTHEAST 35 GRIFFIN RD SOUTH BLOOMFIELD, CT 06002
CROWN CASTLE APPLICATION ID:	387383
ELECTRIC PROVIDER:	EVERSOURCE (800) 286-2000
TELCO PROVIDER:	LIGHTTOWER (800) 497-5578

PROJECT TEAM

CROWN CASTLE A&E FIRM:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 TRICIA PELON - PROJECT MANAGER (518) 373-3507 JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104 KIMBERLY MYL - A&E PROJECT MANAGER KIMBERLY.MYL@CROWNCASTLE.COM (201) 236-9069

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	OVERALL AND ENLARGED SITE PLAN
C-2	FINAL ELEVATION AND ANTENNA PLANS
C-3	ANTENNA AND CABLE SCHEDULE
C-4	RFDS
C-5	PLUMBING DIAGRAM
C-6	EQUIPMENT SPECIFICATIONS
G-1	ANTENNA GROUNDING DETAILS
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

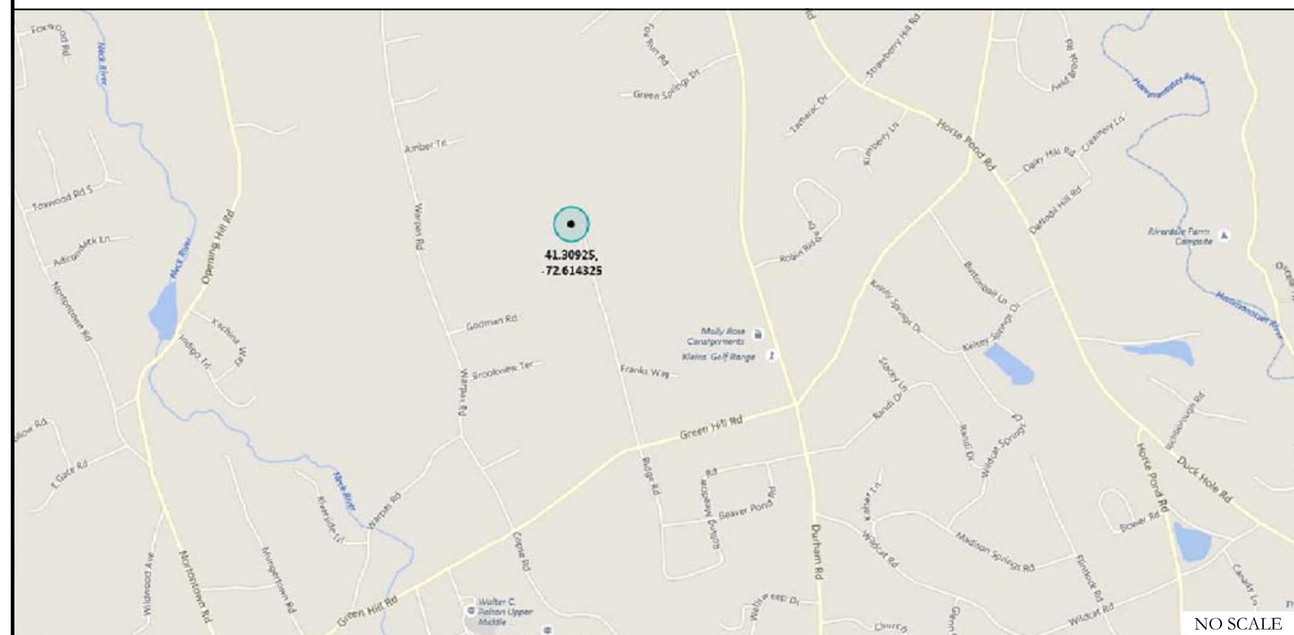
CODE TYPE	CODE
BUILDING	2016 CT STATE BUILDING CODE/2012 IBC W/ CT AMENDMENTS
MECHANICAL	2016 CT STATE BUILDING CODE/2012 IMC W/ CT AMENDMENTS
ELECTRICAL	2016 CT STATE BUILDING CODE/2014 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: CROWN CASTLE DATED MAY 03, 2017

MOUNT ANALYSIS: BY OTHERS

LOCATION MAP



APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- INSTALL (3) ANTENNAS
- INSTALL (3) RRUs

DESIGN PACKAGE BASED ON THE RFDS
REVISION: 0.1
DATE: 3/20/2017

DESIGN PACKAGE BASED ON THE APPLICATION
ID: 387383
REVISION: 0

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

CALL CONNECTICUT ONE CALL
(800) 922-4455
WWW.CBYD.COM
CALL 2 WORKING DAYS
BEFORE YOU DIG!

811

T-Mobile
T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CTHA332C

BU #: **5800059**
RIDGE ROAD, MADISON

258 RIDGE ROAD
MADISON, CONNECTICUT
06433

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	05/15/17	JAS	PRELIMINARY	LMR
B	05/22/17	JAS	PRELIMINARY	LMR
0	05/30/17	JAS	CONSTRUCTION	JPL

DocuSigned by:
Justin Linette
1B4005B2547C41D...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1

REVISION: 0

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8"ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALLS.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR-	
SUBCONTRACTOR-	GENERAL CONTRACTOR (CONSTRUCTION)
CARRIER-	T-MOBILE
TOWER OWNER-	CROWN CASTLE
OEM-	ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:

AGL	ABOVE GRADE LEVEL
BTS	BASE TRANSCEIVER STATION
(E)	EXISTING
MIN.	MINIMUM
REF	REFERENCE
RF	RADIO FREQUENCY
T.B.D.	TO BE DETERMINED
T.B.R.	TO BE RESOLVED
TYP	TYPICAL
REQ	REQUIRED
EGR	EQUIPMENT GROUND RING
AWG	AMERICAN WIRE GAUGE
MGB	MASTER GROUND BAR
EG	EQUIPMENT GROUND
BCW	BARE COPPER WIRE
SIAD	SMART INTEGRATED ACCESS DEVICE
GEN	GENERATOR
IGR	INTERIOR GROUND RING (HALO)
RBS	RADIO BASE STATION

SYMBOLS:

- SOLID GROUND BUS BAR
- SOLID NEUTRAL BUS BAR
- SUPPLEMENTAL GROUND CONDUCTOR
- 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- CHEMICAL GROUND ROD
- TEST WELL
- DISCONNECT SWITCH
- METER
- EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
- MECHANICAL CONNECTION
- GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL; SHALL MEET OR EXCEED UL 50 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "T-MOBILE".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 AWG SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS, WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

NEC INSULATOR COLOR CODE

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED-POLARITY MARK AT TERMINATION
VDC NEG	-	*BLACK-POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)

T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CTHA332C

BU #: **5800059**
RIDGE ROAD, MADISON

258 RIDGE ROAD
MADISON, CONNECTICUT
06433

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	05/15/17	JAS	PRELIMINARY	LMR
B	05/22/17	JAS	PRELIMINARY	LMR
0	05/30/17	JAS	CONSTRUCTION	JPL

DocuSigned by:
Justin Linette
184088B2547C41D...

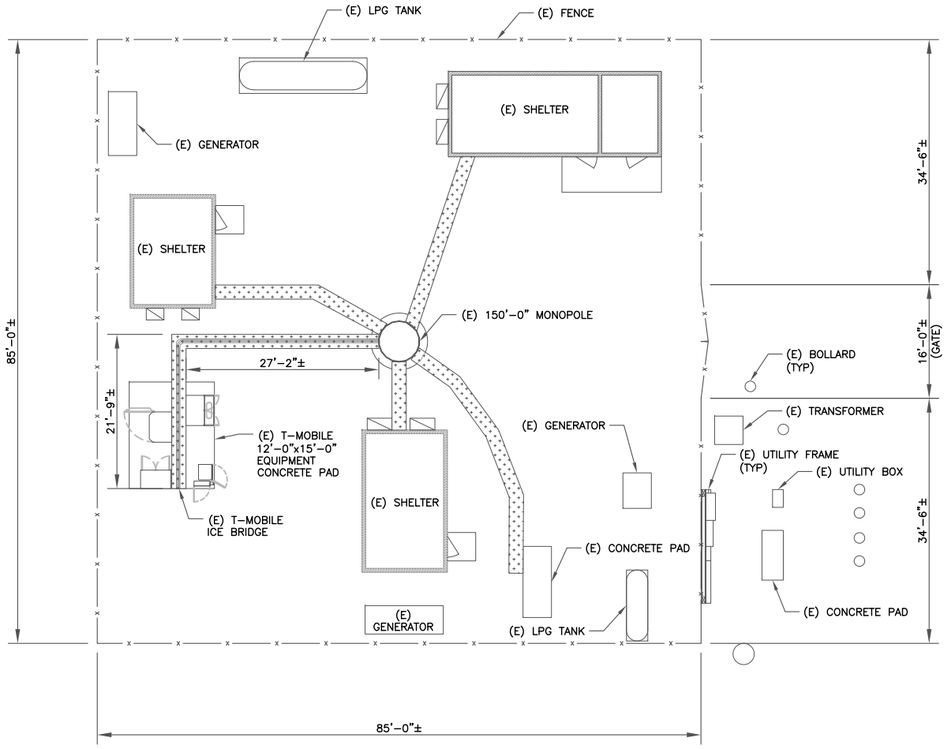
STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

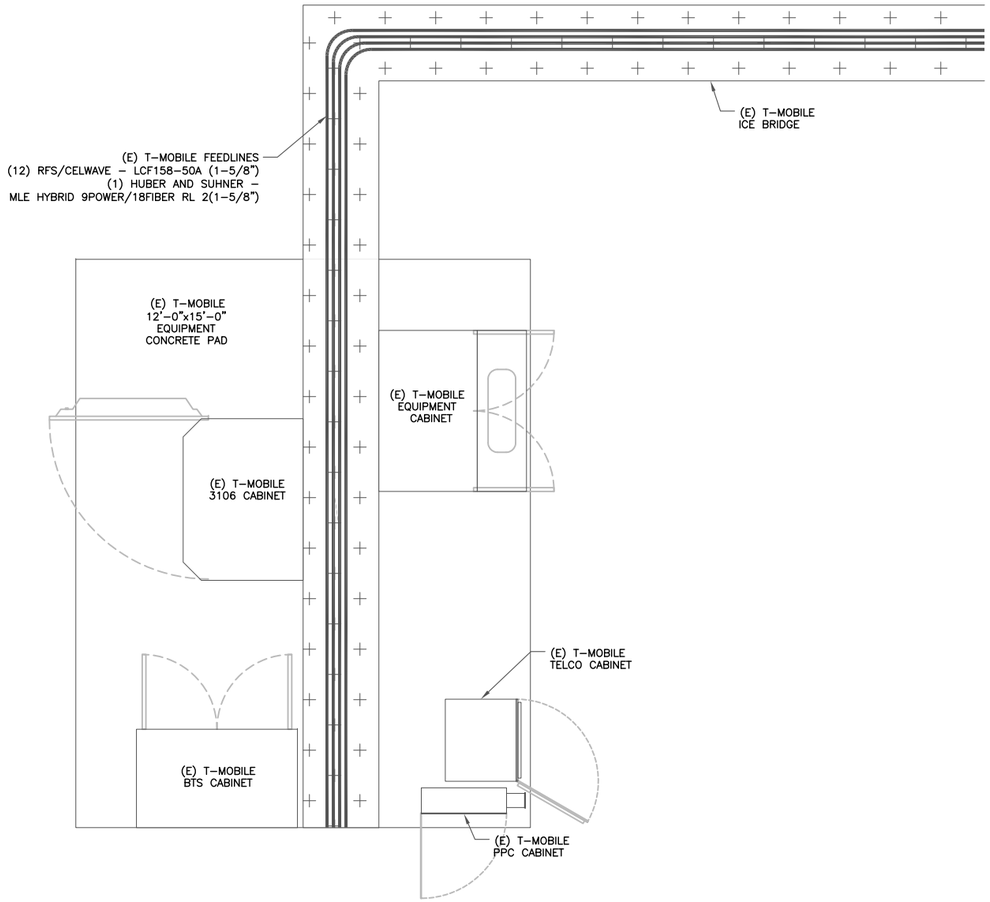
SHEET NUMBER: T-2

REVISION: 0



1 OVERALL SITE PLAN
SCALE: 8' 4' 0 8' 3/32"=1'-0" (FULL SIZE) 3/64"=1'-0" (11x17)

N



2 ENLARGED SITE PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

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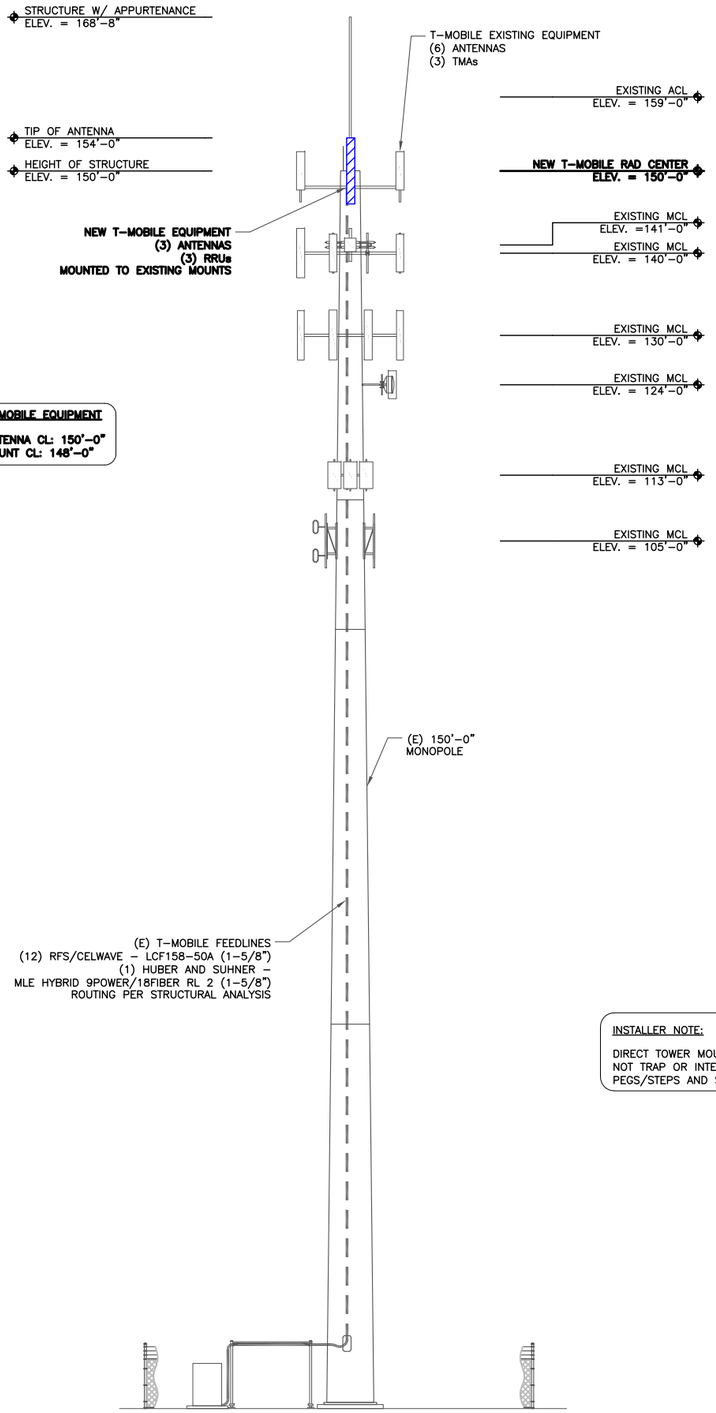
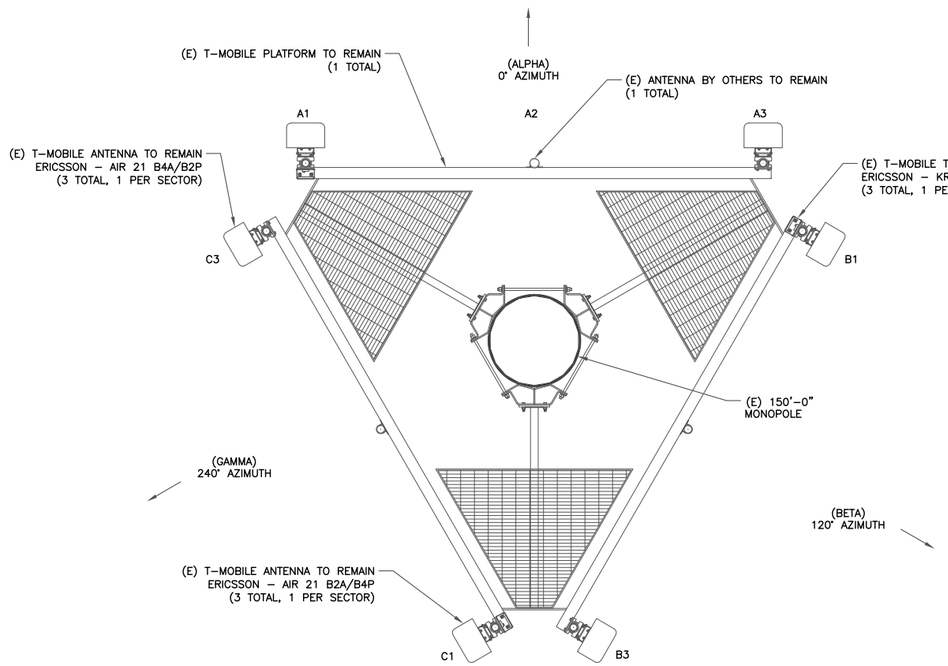


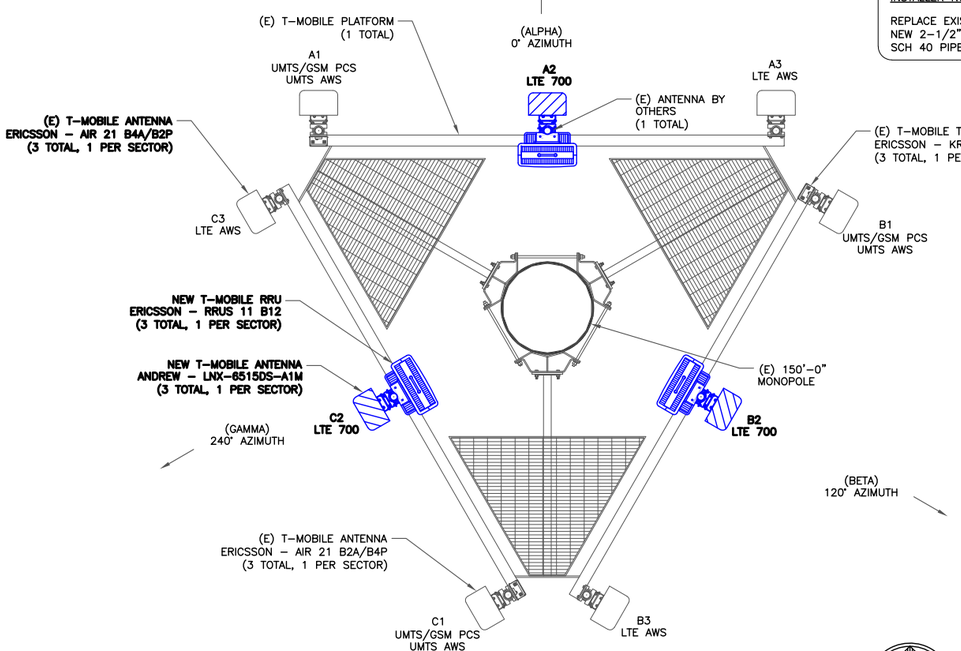
INSTALLER NOTE:

DIRECT TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ CLIMBING PEGS/STEPS AND SAFETY CLIMB.

1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



INSTALLER NOTE:

REPLACE EXISTING PIPE MOUNTS WITH NEW 2-1/2" STD (2-7/8" O.D.) GALV. SCH 40 PIPE AS REQ'D.

3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

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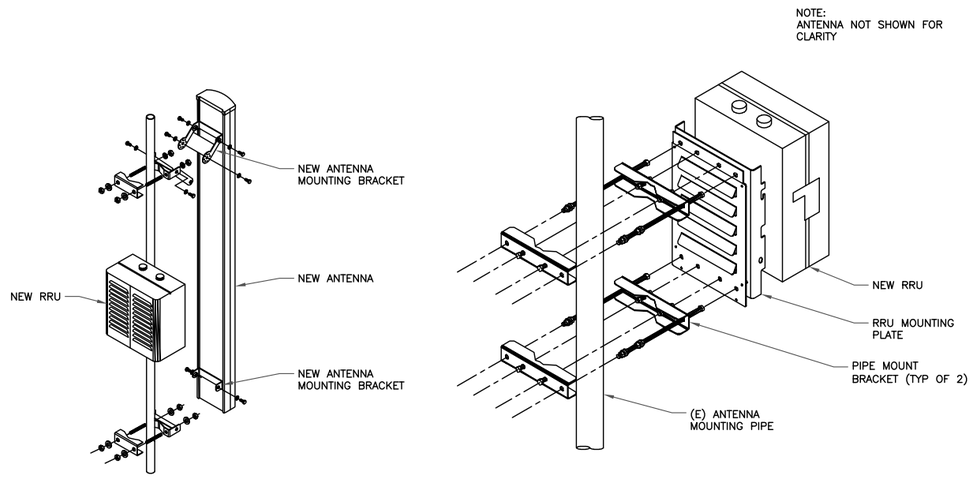
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	UMTS/GSM PCS UMTS AWS	150'-0"	0°	ERICSSON	AIR 21 B2A/B4P	0°	2°/2°	(1) ERICSSON – KRY 112 144/1	COAX/HYBRID
ALPHA	**A2**	**LTE 700**	150'-0"	0°	**ANDREW**	**LNX-6515DS-A1M**	**0°**	**2°**	**(1) ERICSSON – RRUS 11 B12**	HYBRID
ALPHA	A3	LTE AWS	**150'-0"**	**0°**	ERICSSON	AIR 21 B4A/B2P	0°	2°	–	HYBRID
BETA	B1	UMTS/GSM PCS UMTS AWS	150'-0"	120°	ERICSSON	AIR 21 B2A/B4P	0°	2°/2°	(1) ERICSSON – KRY 112 144/1	COAX/HYBRID
BETA	**B2**	**LTE 700**	150'-0"	120°	**ANDREW**	**LNX-6515DS-A1M**	**0°**	**2°**	**(1) ERICSSON – RRUS 11 B12**	HYBRID
BETA	B3	LTE AWS	**150'-0"**	**120°**	ERICSSON	AIR 21 B4A/B2P	0°	2°	–	HYBRID
GAMMA	C1	UMTS/GSM PCS UMTS AWS	150'-0"	240°	ERICSSON	AIR 21 B2A/B4P	0°	2°/2°	(1) ERICSSON – KRY 112 144/1	COAX/HYBRID
GAMMA	**C2**	**LTE 700**	150'-0"	240°	**ANDREW**	**LNX-6515DS-A1M**	**0°**	**2°**	**(1) ERICSSON – RRUS 11 B12**	HYBRID
GAMMA	C3	LTE AWS	**150'-0"**	**240°**	ERICSSON	AIR 21 B4A/B2P	0°	2°	–	HYBRID

CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	COAX	1-5/8"	12
EXISTING	HYBRID	1-5/8"	1
FINAL CABLE QUANTITY			**13**

1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE



NOTE:
ALL PIPES BRACKETS AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE

2 ANTENNA & RRU MOUNTING DETAIL
SCALE: NOT TO SCALE

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REVISION: 0

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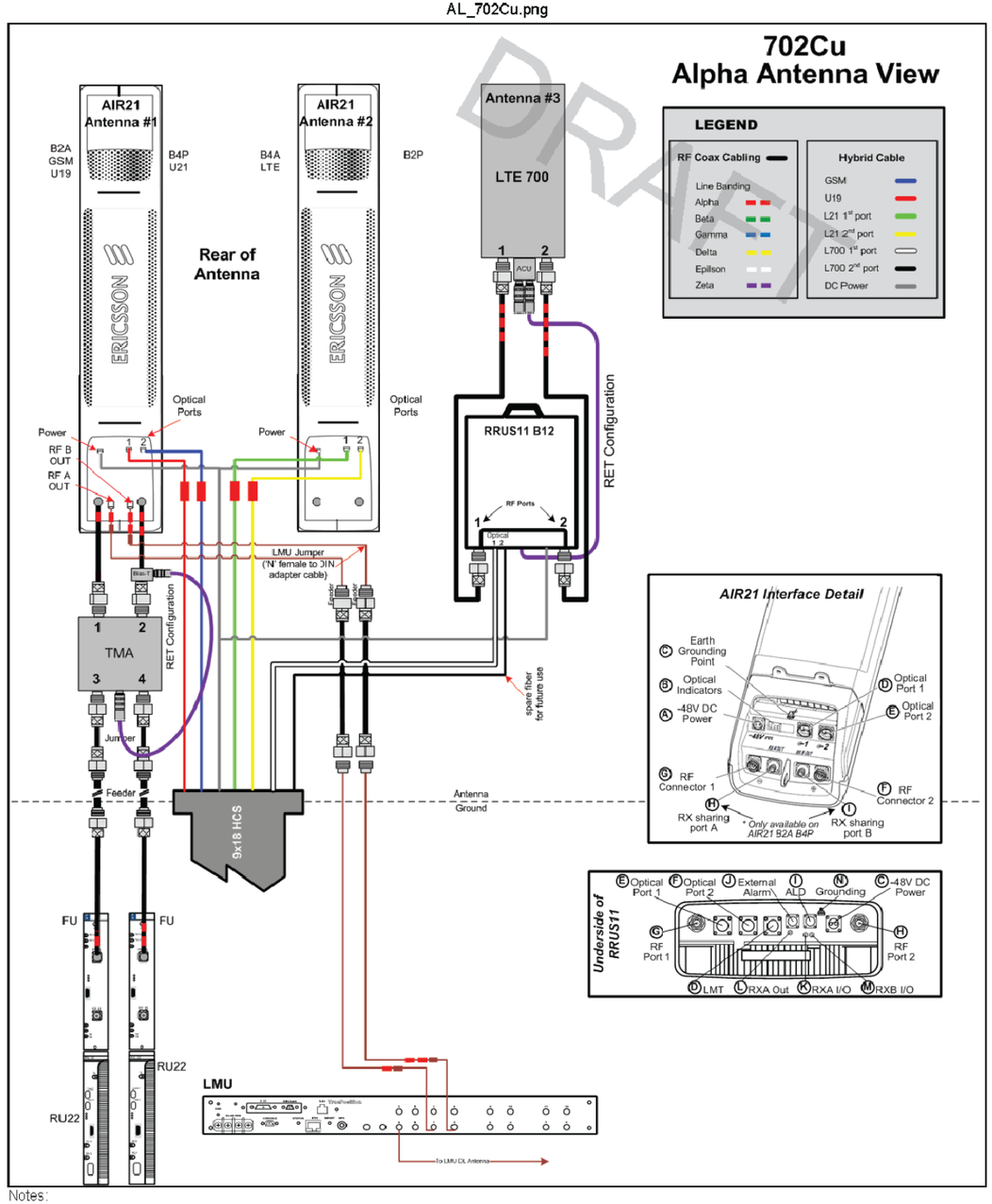


Notes:

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CTHA332C

BU #: **5800059**
RIDGE ROAD, MADISON

258 RIDGE ROAD
MADISON, CONNECTICUT
06433

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	05/15/17	JAS	PRELIMINARY	LMR
B	05/22/17	JAS	PRELIMINARY	LMR
0	05/30/17	JAS	CONSTRUCTION	JPL

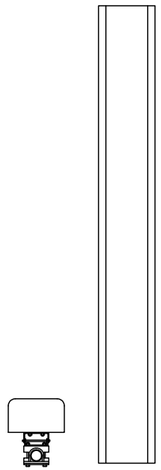
DocuSigned by:
Justin Linette
184088B2547C41B...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

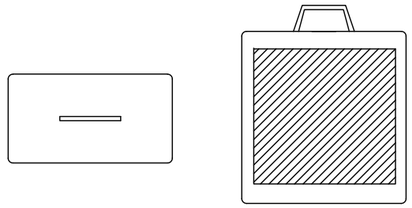
Justin Peter Linette, P.E.
Professional Engineer License: 31965

SHEET NUMBER: C-5
REVISION: 0



ANDREW LNX-6515DS-A1M
WEIGHT (WITHOUT MOUNTING HARDWARE): 43.7 LBS
SIZE (HxWxD): 96.60x11.90x7.10 IN.
MOUNTING HARDWARE P/N: DB380-3 & DB5083D
RATED WIND VELOCITY: 149.8 MPH

1 ANDREW LNX-6515DS-A1M
SCALE: NOT TO SCALE



ERICSSON RRUS 11
WEIGHT (FULLY EQUIPPED): 50.7 LBS
SIZE (HxWxD): 19.7x17x7.2 IN.

2 ERICSSON – RRUS 11
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

4 NOT USED
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
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T-MOBILE SITE NUMBER:
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258 RIDGE ROAD
MADISON, CONNECTICUT
06433

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Justin Linette
1840BB2547C415...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
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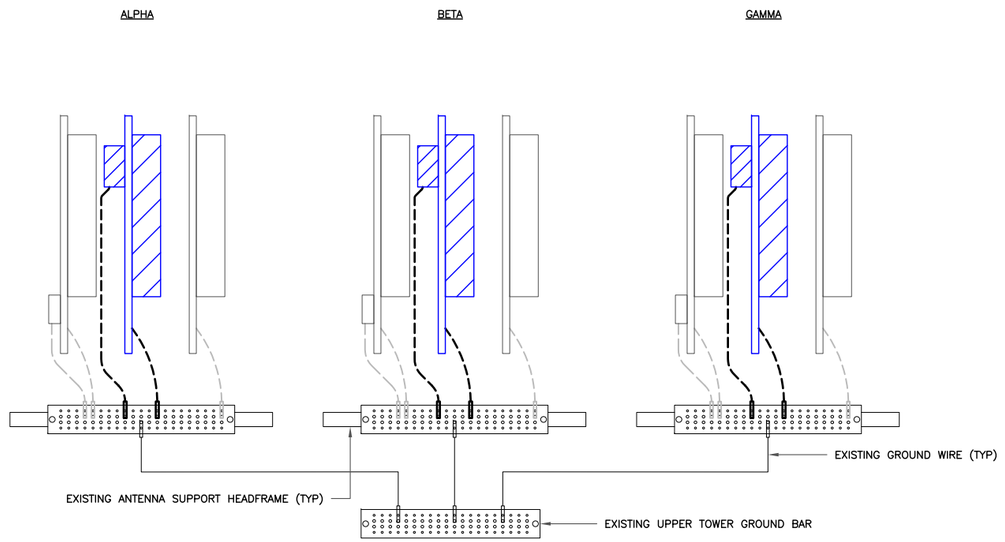
5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

SHEET NUMBER: C-6
REVISION: 0



1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CTHA332C

BU #: **5800059**
RIDGE ROAD, MADISON

258 RIDGE ROAD
MADISON, CONNECTICUT
06433

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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B	05/22/17	JAS	PRELIMINARY	LMR
0	05/30/17	JAS	CONSTRUCTION	JPL

DocuSigned by:
Justin Linette
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STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
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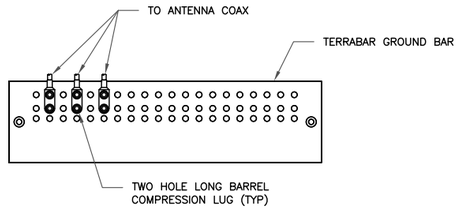
PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

SHEET NUMBER: G-1

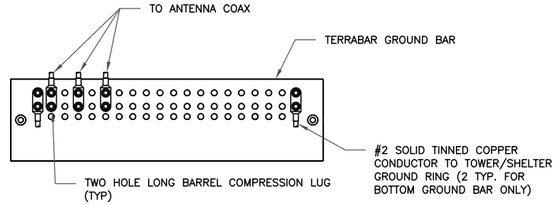
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

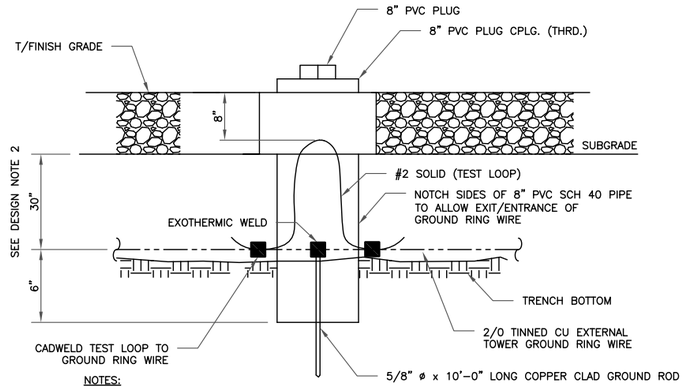
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. INSTALL GROUND BARS AT 75 FT. INTERVAL MAXIMUM.
4. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

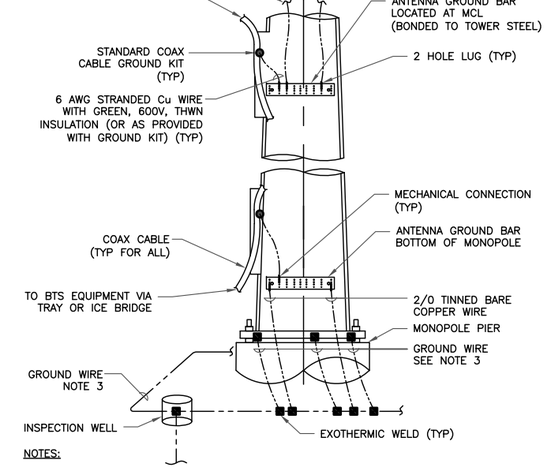
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

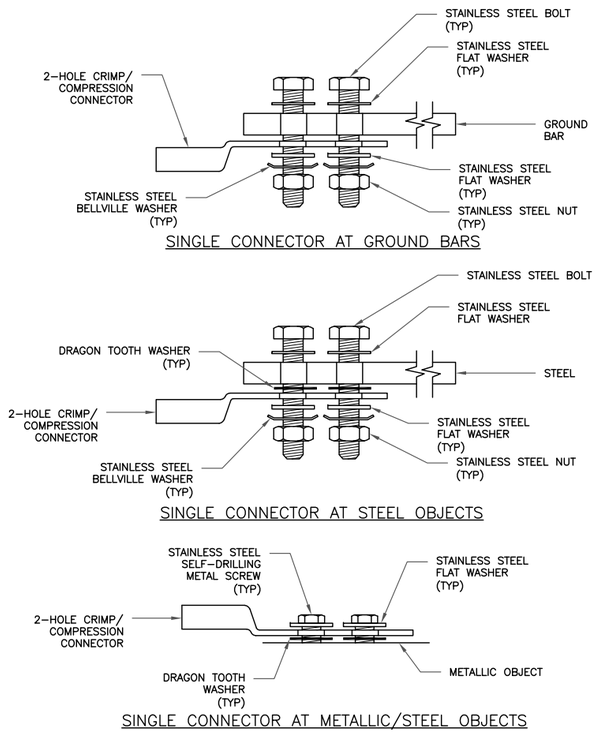
3 INSPECTION PORT DETAIL
SCALE: NOT TO SCALE



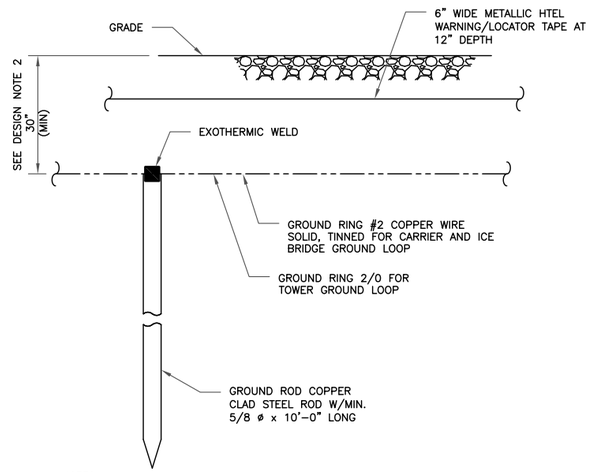
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST
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CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

T-MOBILE SITE NUMBER:
CTHA332C

BU #: **5800059**
RIDGE ROAD, MADISON

258 RIDGE ROAD
MADISON, CONNECTICUT
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EXISTING 150'-0" MONOPOLE

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0	05/30/17	JAS	CONSTRUCTION	JPL

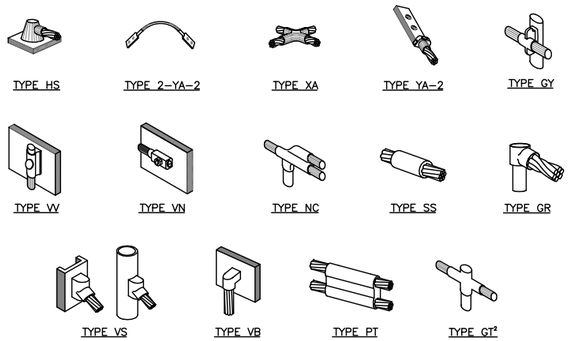
DocuSigned by:
Justin Linette
1B4095B2547C410...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

SHEET NUMBER: G-2
REVISION: 0

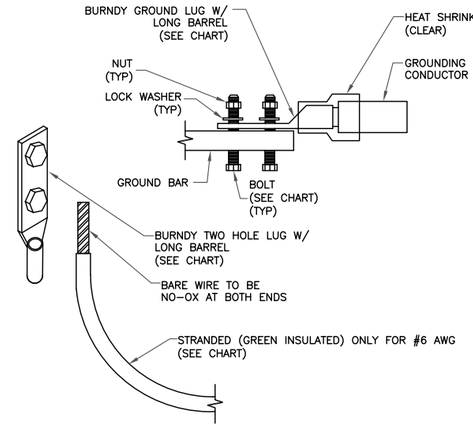


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

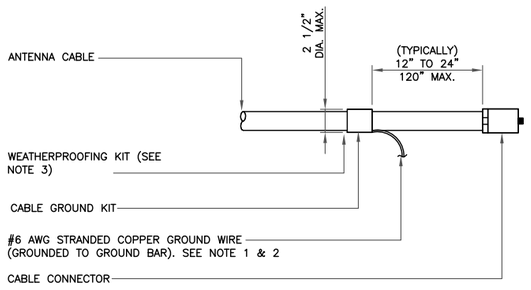
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

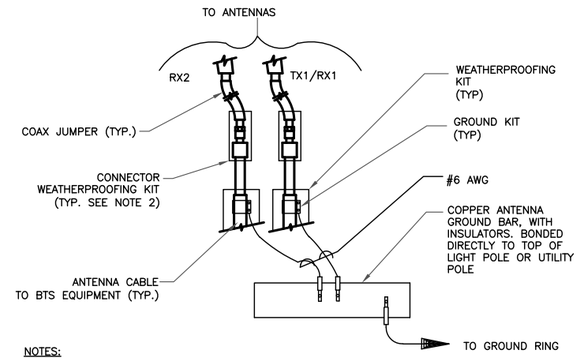
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

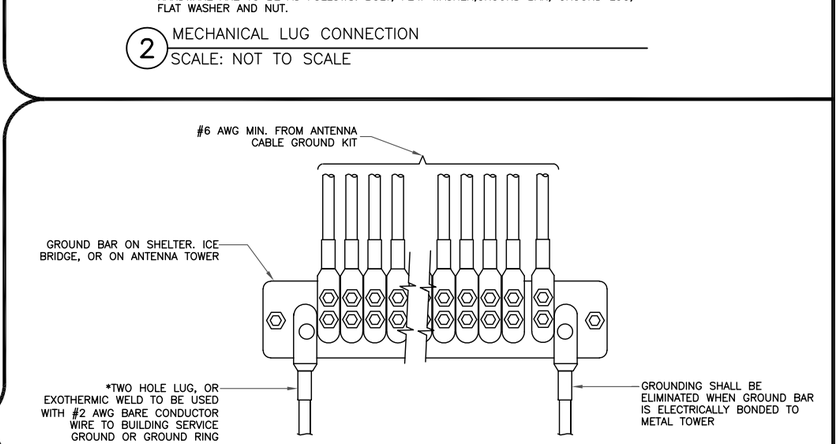
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



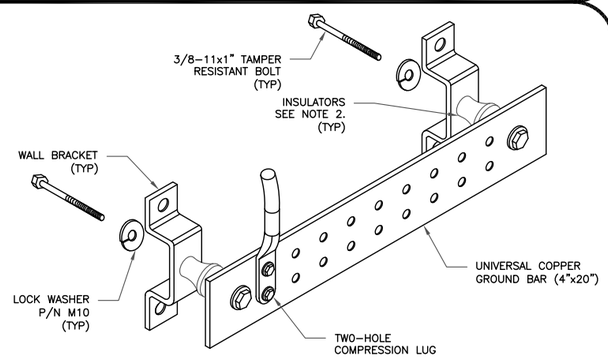
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



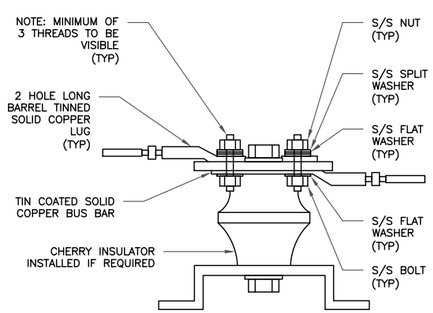
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



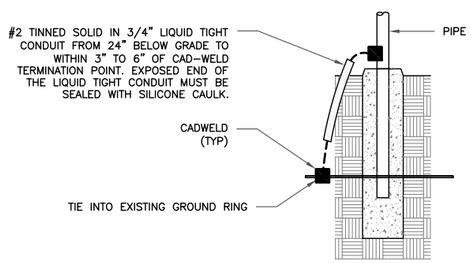
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-MOBILE NORTHEAST
35 GRIFFIN RD SOUTH
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
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BU #: **5800059**
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DocuSigned by:
Justin Linette
1B4095B25A7C41D...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

5/30/2017 | 4:04:41 PM EDT

Justin Peter Linette, P.E.
Professional Engineer License: 31965

SHEET NUMBER: G-3
REVISION: 0

Date: **May 01, 2017**

Charles Trask
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CTHA332C
	Carrier Site Name:	HA332/Waste Station
Crown Castle Designation:	**Crown Castle BU Number:**	5800059
	Crown Castle Site Name:	Ridge Road, Madison
	Crown Castle JDE Job Number:	434074
	Crown Castle Work Order Number:	1399368
	Crown Castle Application Number:	387383 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1399368
Site Data:	**258 Ridge Road, MADISON, New Haven County, CT** **Latitude *41° 18' 33.3"*, Longitude *-72° 36' 51.57"*** **150 Foot - Monopole Tower**	

Dear Charles Trask,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1399368, in accordance with application 387383, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Dolly Hsu, E.I.T. / RTC/ AGH

Respectfully submitted by:

Maham Barimani, P.E.
Sr. Project Engineer
tnxTower Report - version
7.0.5.1

STATE OF CONNECTICUT
MAHAM BARIMANI
30501
LICENSED
PROFESSIONAL ENGINEER

05-03-2017

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Valmont in October of 2008. The tower was originally designed for a wind speed of 115 mph per TIA-222-G.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 101 mph with no ice, 50 mph with 0.75-inch ice thickness and 60 mph under service loads, exposure category B.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	150.0	3	andrew	LNX-6515DS-A1M w/ Mount Pipe	-	-	-
		3	ericsson	RRUS 11 B12			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	159.0	1	dbspectra	DS4C06F36D-N	2 13	7/8 1-5/8	1
	150.0	3	ericsson	ERICSSON AIR 21 B2P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	148.0	1	tower mounts	Platform Mount [LP 303-1]			
141.0	141.0	3	ericsson	TME-RRUS-11	-	-	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
140.0	140.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	1 2 12	3/8 5/8 1-5/8	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21903			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 304-1]			
130.0	132.0	3	alcatel lucent	RRH2X60-AWS	13	1-5/8	1
	130.0	3	alcatel lucent	RRH2x60-700			
		6	decibel	DB846F65ZAXY w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	alcatel lucent	RRH2X60-PCS	1	1-5/8	2
		6	commscope	SBNHH-1D65B w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
124.0	124.0	1	kathrein	800 10251 w/ Mount Pipe	2 1	11/32 7/8	1
		1	radiowaves	HP2-4.7NS			
		1	tower mounts	Side Arm Mount [SO 701-1]			
113.0	113.0	3	kathrein	800 10252 w/ Mount Pipe	3	7/8	1
		1	tower mounts	T-Arm Mount [TA 702-1]			
105.0	105.0	1	rfi antennas	CSA40-67-DIN	2	7/8	2
		1	sinclair	SC323			
		2	tower mounts	Side Arm Mount [SO 309-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150	150	12	allgon	7273	-	-
		2	decibel	DB616		
		6	generic	TMA		
140	140	12	antel	RWA-80017	-	-
		6	generic	TMA		
130	130	12	allgon	7273	-	-
		6	generic	TMA		
120	120	12	allgon	7273	-	-
		6	generic	TMA		
80	80	1	generic	4-FT STD. MICROWAVE	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	ANS Consultants, Inc.	2354009	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont	2354010	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	2354011	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 110	Pole	TP39.633x28.4x0.25	1	-13.80	1945.82	26.7	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-17.75	2432.35	33.9	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-31.54	4251.93	37.9	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-54.45	6054.63	39.2	Pass
							Summary	
						Pole (L4)	39.2	Pass
						Rating =	39.2	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	34.9	Pass
1	Base Plate	0	29.0	Pass
1	Base Foundation Structure	0	43.1	Pass
1	Base Foundation Soil Interaction	0	20.3	Pass

Structure Rating (max from all components) =	**43.1%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

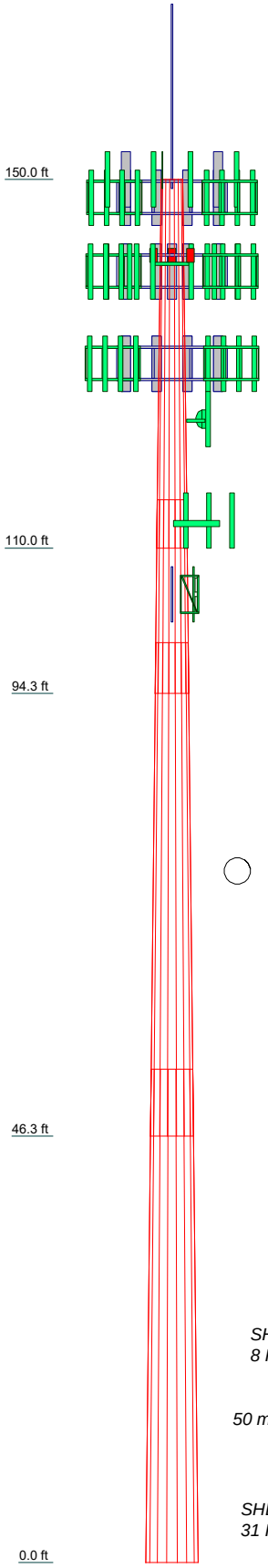
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	40.00	18	0.250	5.25	28.400	39.633		3.6
2	21.00	18	0.281	5.50	37.659	43.556		2.6
3	53.50	18	0.375	7.25	41.449	56.472	A572-65	10.5
4	53.50	18	0.438		53.686	68.710		15.4
								32.1



ALL REACTIONS ARE FACTORED

AXIAL 86 K

SHEAR 8 K

MOMENT 871 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL 54 K

SHEAR 31 K

MOMENT 3261 kip-ft

TORQUE 4 kip-ft
REACTIONS - 101 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 2'	150	AM-X-CD-16-65-00T-RET w/ Mount Pipe	140
Pipe Mount [PM 601-1]	149	(2) LGP21401	140
Side Arm Mount [SO 102-3]	149	(2) LGP21401	140
ERICSSON AIR 21 B2P w/ Mount Pipe	148	(2) LGP21401	140
ERICSSON AIR 21 B4P w/ Mount Pipe	148	(2) LGP21903	140
ERICSSON AIR 21 B4P w/ Mount Pipe	148	(2) LGP21903	140
ERICSSON AIR 21 B4P w/ Mount Pipe	148	(2) LGP21903	140
LNX-6515DS-A1M w/ Mount Pipe	148	DC6-48-60-18-8F	140
LNX-6515DS-A1M w/ Mount Pipe	148	Platform Mount [LP 304-1]	140
LNX-6515DS-A1M w/ Mount Pipe	148	(2) DB846F65ZAXY w/ Mount Pipe	130
RRUS 11 B12	148	(2) DB846F65ZAXY w/ Mount Pipe	130
RRUS 11 B12	148	(2) DB846F65ZAXY w/ Mount Pipe	130
RRUS 11 B12	148	(2) SBNHH-1D65B w/ Mount Pipe	130
KRY 112 144/1	148	(2) SBNHH-1D65B w/ Mount Pipe	130
KRY 112 144/1	148	(2) SBNHH-1D65B w/ Mount Pipe	130
KRY 112 144/1	148	RRH2x60-700	130
DS4C06F36D-N	148	RRH2x60-700	130
ERICSSON AIR 21 B2P w/ Mount Pipe	148	RRH2x60-700	130
ERICSSON AIR 21 B2P w/ Mount Pipe	148	RRH2X60-AWS	130
Platform Mount [LP 303-1]	148	RRH2X60-AWS	130
TME-RRUS-11	141	RRH2X60-AWS	130
TME-RRUS-11	141	(2) DB-T1-6Z-8AB-0Z	130
TME-RRUS-11	141	RRH2X60-PCS	130
6' x 3" Horizontal Mount Pipe	141	RRH2X60-PCS	130
6' x 3" Horizontal Mount Pipe	141	RRH2X60-PCS	130
6' x 3" Horizontal Mount Pipe	141	Platform Mount [LP 304-1]	130
(2) 4' x 2" Pipe Mount	141	800 10251 w/ Mount Pipe	124
(2) 4' x 2" Pipe Mount	141	6' x 2" Mount Pipe	124
(2) 4' x 2" Pipe Mount	141	Side Arm Mount [SO 701-1]	124
Side Arm Mount [SO 102-3]	141	HP2-4.7NS	124
(2) 7770.00 w/ Mount Pipe	140	T-Arm Mount [TA 702-1]	113
(2) 7770.00 w/ Mount Pipe	140	(3) 800 10252 w/ Mount Pipe	113
(2) 7770.00 w/ Mount Pipe	140	CSA40-67-DIN	105
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	Side Arm Mount [SO 309-1]	105
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	Side Arm Mount [SO 309-1]	105
		SC323	105

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 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. TOWER RATING: 39.2%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: ***BU# 5800059***			
Project:			
Client: Crown Castle	Drawn by: Dolly Hsu		App'd:
Code: TIA-222-G	Date: 05/01/17		Scale: NTS
Path: R:\SA Models - Letters\Work Area\DHsu\WIP\5800059 WO 1393368\5800059.eri			Dwg No. E-1

Tower Input Data

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

3) Tower is located in New Haven County, Connecticut.
4) Basic wind speed of 101 mph.
5) Structure Class II.
6) Exposure Category B.
7) Topographic Category 1.
8) Crest Height 0.00 ft.
9) Nominal ice thickness of 0.750 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.00 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50.00 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.
18) 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				

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	150.00-110.00	40.00	5.25	18	28.400	39.633	0.250	1.000	A572-65 (65 ksi)
L2	110.00-94.25	21.00	5.50	18	37.659	43.556	0.281	1.125	A572-65 (65 ksi)
L3	94.25-46.25	53.50	7.25	18	41.449	56.472	0.375	1.500	A572-65 (65 ksi)
L4	46.25-0.00	53.50		18	53.686	68.710	0.438	1.750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	28.838	22.337	2236.246	9.993	14.427	155.002	4475.435	11.171	4.558	18.234
	40.244	31.250	6123.656	13.981	20.134	304.152	12255.369	15.628	6.535	26.142
L2	39.737	33.366	5889.316	13.269	19.131	307.848	11786.380	16.686	6.133	21.806
	44.228	38.631	9139.882	15.363	22.126	413.075	18291.791	19.319	7.171	25.496
L3	43.657	48.888	10420.184	14.581	21.056	494.878	20854.080	24.449	6.635	17.693
	57.343	66.769	26545.722	19.914	28.688	925.332	53126.374	33.391	9.279	24.744
L4	56.582	73.942	26487.969	18.903	27.273	971.231	53010.792	36.978	8.679	19.837
	69.770	94.805	55829.000	24.237	34.905	1599.470	111731.461	47.411	11.323	25.881

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.00-110.00				1	1	1			
L2 110.00-94.25				1	1	1			
L3 94.25-46.25				1	1	1			
L4 46.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF5-50A(7/8")	A	No	Inside Pole	148.00 - 6.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LCF158-50A(1-5/8")	A	No	Inside Pole	148.00 - 6.00	12	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80
						1" Ice	0.00	0.80
MLE Hybrid 9Power/18Fiber RL 2(1 5/8) **	A	No	Inside Pole	148.00 - 6.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
AVA7-50(1-5/8)	C	No	Inside Pole	140.00 - 2.00	12	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
LDF4-75A(5/8")	C	No	Inside Pole	140.00 - 2.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
FB-L98B-002-75000(3/8")	C	No	Inside Pole	140.00 - 2.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
2" Rigid Conduit	C	No	Inside Pole	140.00 - 2.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
**								
AVA7-50(1-5/8)	B	No	Inside Pole	130.00 - 6.00	13	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
HB158-1-08U8-S8J18(1-5/8")	B	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
**								
LDF5-50A(7/8")	C	No	Inside Pole	124.00 - 2.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
7921A(11/32")	C	No	Inside Pole	124.00 - 2.00	2	No Ice	0.00	0.50
						1/2" Ice	0.00	0.50
						1" Ice	0.00	0.50
**								
LDF5-50A(7/8")	C	No	Inside Pole	113.00 - 2.00	3	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
**								
AVA5-50(7/8)	A	No	Inside Pole	105.00 - 0.00	2	No Ice	0.00	0.30
						1/2" Ice	0.00	0.30
						1" Ice	0.00	0.30
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-110.00	A	0.000	0.000	0.000	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	0.000	0.37
L2	110.00-94.25	A	0.000	0.000	0.000	0.000	0.18
		B	0.000	0.000	0.000	0.000	0.16
		C	0.000	0.000	0.000	0.000	0.22
L3	94.25-46.25	A	0.000	0.000	0.000	0.000	0.57
		B	0.000	0.000	0.000	0.000	0.50
		C	0.000	0.000	0.000	0.000	0.67
L4	46.25-0.00	A	0.000	0.000	0.000	0.000	0.48
		B	0.000	0.000	0.000	0.000	0.43
		C	0.000	0.000	0.000	0.000	0.61

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	150.00-110.00	A	1.719	0.000	0.000	0.000	0.000	0.43
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.37
L2	110.00-94.25	A	1.679	0.000	0.000	0.000	0.000	0.18
		B		0.000	0.000	0.000	0.000	0.16
		C		0.000	0.000	0.000	0.000	0.22
L3	94.25-46.25	A	1.617	0.000	0.000	0.000	0.000	0.57
		B		0.000	0.000	0.000	0.000	0.50
		C		0.000	0.000	0.000	0.000	0.67
L4	46.25-0.00	A	1.444	0.000	0.000	0.000	0.000	0.48
		B		0.000	0.000	0.000	0.000	0.43
		C		0.000	0.000	0.000	0.000	0.61

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	150.00-110.00	0.000	0.000	0.000	0.000
L2	110.00-94.25	0.000	0.000	0.000	0.000
L3	94.25-46.25	0.000	0.000	0.000	0.000
L4	46.25-0.00	0.000	0.000	0.000	0.000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lighting Rod 5/8" x 2'	C	From Leg	0.00 0.00 1.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	0.13 0.28 0.41	0.13 0.28 0.41	0.01 0.01 0.01
148 ERICSSON AIR 21 B2P w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2P w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4P w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4P w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	11.65 12.37 13.10	9.84 11.37 12.92	0.08 0.17 0.27
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	148.00	No Ice 1/2" Ice 1" Ice	11.65 12.37 13.10	9.84 11.37 12.92	0.08 0.17 0.27
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.00 0.00	0.00	148.00	No Ice 1/2"	11.65 12.37	9.84 11.37	0.08 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice	13.10	12.92	0.27
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.00	148.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			2.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.00	148.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			2.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.00	148.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			2.00			Ice	3.26	1.48	0.10
						1" Ice			
KRY 112 144/1	A	From Leg	4.00	0.00	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			2.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	B	From Leg	4.00	0.00	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			2.00			Ice	0.51	0.30	0.02
						1" Ice			
KRY 112 144/1	C	From Leg	4.00	0.00	148.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			2.00			Ice	0.51	0.30	0.02
						1" Ice			
DS4C06F36D-N	A	From Leg	0.50	0.00	148.00	No Ice	5.50	5.50	0.07
			0.00			1/2"	7.37	7.37	0.11
			11.00			Ice	9.25	9.25	0.16
						1" Ice			
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.00	149.00	No Ice	3.00	0.90	0.07
			0.00			1/2"	3.74	1.12	0.08
			2.00			Ice	4.48	1.34	0.09
						1" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	149.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice			
Platform Mount [LP 303-1]	C	None		0.00	148.00	No Ice	14.66	14.66	1.25
						1/2"	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice			
141									
TME-RRUS-11	A	From Leg	1.00	0.00	141.00	No Ice	2.96	1.67	0.06
			0.00			1/2"	3.23	1.98	0.08
			0.00			Ice	3.50	2.30	0.12
						1" Ice			
TME-RRUS-11	B	From Leg	1.00	0.00	141.00	No Ice	2.96	1.67	0.06
			0.00			1/2"	3.23	1.98	0.08
			0.00			Ice	3.50	2.30	0.12
						1" Ice			
TME-RRUS-11	C	From Leg	1.00	0.00	141.00	No Ice	2.96	1.67	0.06
			0.00			1/2"	3.23	1.98	0.08
			0.00			Ice	3.50	2.30	0.12
						1" Ice			
6' x 3" Horizontal Mount Pipe	A	From Leg	0.50	0.00	141.00	No Ice	1.77	0.07	0.03
			0.00			1/2"	2.13	0.12	0.04
			0.00			Ice	2.50	0.19	0.06
						1" Ice			
6' x 3" Horizontal Mount Pipe	B	From Leg	0.50	0.00	141.00	No Ice	1.77	0.07	0.03
			0.00			1/2"	2.13	0.12	0.04
			0.00			Ice	2.50	0.19	0.06
						1" Ice			
6' x 3" Horizontal Mount Pipe	C	From Leg	0.50	0.00	141.00	No Ice	1.77	0.07	0.03
			0.00			1/2"	2.13	0.12	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	2.50	0.19	0.06
						1" Ice			
(2) 4' x 2" Pipe Mount	A	From Leg	0.50	0.00	141.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
(2) 4' x 2" Pipe Mount	B	From Leg	0.50	0.00	141.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
(2) 4' x 2" Pipe Mount	C	From Leg	0.50	0.00	141.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice			
Side Arm Mount [SO 102-3]	C	None		0.00	141.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice			
140									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	140.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.00	140.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.00	140.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.00	140.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.00	140.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.00	140.00	No Ice	8.26	6.30	0.07
			0.00			1/2"	8.82	7.48	0.14
			0.00			Ice	9.35	8.37	0.21
						1" Ice			
(2) LGP21401	A	From Leg	4.00	0.00	140.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
(2) LGP21401	B	From Leg	4.00	0.00	140.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
(2) LGP21401	C	From Leg	4.00	0.00	140.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
(2) LGP21903	A	From Leg	4.00	0.00	140.00	No Ice	0.23	0.16	0.01
			0.00			1/2"	0.29	0.21	0.01
			0.00			Ice	0.36	0.28	0.02
						1" Ice			
(2) LGP21903	B	From Leg	4.00	0.00	140.00	No Ice	0.23	0.16	0.01
			0.00			1/2"	0.29	0.21	0.01
			0.00			Ice	0.36	0.28	0.02
						1" Ice			
(2) LGP21903	C	From Leg	4.00	0.00	140.00	No Ice	0.23	0.16	0.01
			0.00			1/2"	0.29	0.21	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	0.36	0.28	0.02
						1" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.00	140.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			0.00			Ice	1.45	1.45	0.05
						1" Ice			
Platform Mount [LP 304-1]	C	None		0.00	140.00	No Ice	17.46	17.46	1.35
						1/2"	22.44	22.44	1.62
						Ice	27.42	27.42	1.90
						1" Ice			
132 *130*									
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.00	0.00	130.00	No Ice	7.27	7.82	0.05
			0.00			1/2"	7.83	9.01	0.11
			0.00			Ice	8.35	9.91	0.19
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.00	0.00	130.00	No Ice	7.27	7.82	0.05
			0.00			1/2"	7.83	9.01	0.11
			0.00			Ice	8.35	9.91	0.19
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.00	0.00	130.00	No Ice	7.27	7.82	0.05
			0.00			1/2"	7.83	9.01	0.11
			0.00			Ice	8.35	9.91	0.19
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.00	130.00	No Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			0.00			Ice	9.48	9.19	0.22
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.00	130.00	No Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			0.00			Ice	9.48	9.19	0.22
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.00	130.00	No Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			0.00			Ice	9.48	9.19	0.22
						1" Ice			
RRH2x60-700	A	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2x60-700	B	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2x60-700	C	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2X60-AWS	A	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			2.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2X60-AWS	B	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			2.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2X60-AWS	C	From Leg	4.00	0.00	130.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			2.00			Ice	4.03	2.29	0.11
						1" Ice			
(2) DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.00	130.00	No Ice	4.80	2.00	0.04
			0.00			1/2"	5.07	2.19	0.08
			0.00			Ice	5.35	2.39	0.12
						1" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.00	130.00	No Ice	2.20	1.72	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	2.39 2.59	1.90 2.09	0.08 0.10
RRH2X60-PCS	B	From Leg	4.00 0.00 0.00	0.00	130.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	C	From Leg	4.00 0.00 0.00	0.00	130.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
Platform Mount [LP 304-1]	C	None		0.00	130.00	No Ice 1/2" Ice 1" Ice	17.46 22.44 27.42	17.46 22.44 27.42	1.35 1.62 1.90
124 800 10251 w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.00	124.00	No Ice 1/2" Ice 1" Ice	4.36 4.70 5.06	2.26 2.77 3.31	0.04 0.08 0.11
6' x 2" Mount Pipe	B	From Leg	1.50 0.00 0.00	0.00	124.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Side Arm Mount [SO 701-1]	B	From Leg	1.50 0.00 0.00	0.00	124.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
113 (3) 800 10252 w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice	6.53 6.92 7.31	3.62 4.14 4.67	0.04 0.09 0.15
T-Arm Mount [TA 702-1]	B	From Leg	1.50 0.00 0.00	0.00	113.00	No Ice 1/2" Ice 1" Ice	2.78 3.39 4.00	2.23 2.43 2.63	0.11 0.14 0.17
105 SC323	A	From Leg	1.00 0.00 0.00	0.00	105.00	No Ice 1/2" Ice 1" Ice	1.19 1.87 2.39	1.19 1.87 2.39	0.01 0.01 0.03
CSA40-67-DIN	B	From Leg	1.00 0.00 0.00	0.00	105.00	No Ice 1/2" Ice 1" Ice	10.60 16.44 22.37	10.60 16.44 22.37	0.07 0.20 0.37
Side Arm Mount [SO 309-1]	A	From Leg	0.50 0.00 0.00	0.00	105.00	No Ice 1/2" Ice 1" Ice	2.82 4.07 5.32	2.20 3.16 4.12	0.04 0.06 0.08
Side Arm Mount [SO 309-1]	B	From Leg	0.50 0.00 0.00	0.00	105.00	No Ice 1/2" Ice 1" Ice	2.82 4.07 5.32	2.20 3.16 4.12	0.04 0.06 0.08
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft^2	Weight K

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
**											
HP2-4.7NS	B	Paraboloid w/Shroud (HP)	From Leg	1.50 0.00 0.00	0.00		124.00	2.04	No Ice 1/2" Ice 1" Ice	3.27 3.55 3.82	0.03 0.05 0.06
**											

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 Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 110	Pole	Max Tension	33	0.00	0.00	0.00
			Max. Compression	26	-30.81	-0.17	-1.58
			Max. Mx	8	-13.80	-392.63	0.24
			Max. My	14	-13.81	0.29	-394.36
			Max. Vy	20	-17.44	392.57	-0.91
			Max. Vx	2	-17.35	-0.44	393.68
			Max. Torque	5			-2.11
L2	110 - 94.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.13	-5.91	-4.49
			Max. Mx	8	-17.75	-691.55	-2.55
			Max. My	14	-17.77	-3.27	-688.98
			Max. Vy	20	-20.62	689.58	0.94
			Max. Vx	2	-20.34	1.37	687.24
			Max. Torque	5			-4.50
L3	94.25 - 46.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.91	-5.99	-4.55
			Max. Mx	8	-31.55	-1754.02	-10.84
			Max. My	14	-31.55	-12.09	-1739.57
			Max. Vy	20	-25.39	1753.78	9.69
			Max. Vx	2	-25.11	11.75	1738.20
			Max. Torque	5			-4.50
L4	46.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.24	-5.99	-4.55
			Max. Mx	20	-54.45	3254.06	19.78
			Max. My	14	-54.45	-22.14	-3224.19
			Max. Vy	20	-30.65	3254.06	19.78
			Max. Vx	2	-30.37	23.72	3223.27
			Max. Torque	5			-4.50

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	86.24	-0.00	-0.00
	Max. H_x	20	54.46	30.63	0.19
	Max. H_z	2	54.46	0.22	30.35
	Max. M_x	2	3223.27	0.22	30.35
	Max. M_z	8	3252.29	-30.59	-0.18
	Max. Torsion	17	4.49	15.15	-26.20
	Min. Vert	5	40.85	-15.18	26.19
	Min. H_x	8	54.46	-30.59	-0.18
	Min. H_z	14	54.46	-0.19	-30.34
	Min. M_x	14	-3224.19	-0.19	-30.34
	Min. M_z	20	-3254.06	30.63	0.19
	Min. Torsion	5	-4.50	-15.18	26.19

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	45.38	0.00	0.00	0.80	-1.19	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	54.46	-0.22	-30.35	-3223.27	23.72	3.81
0.9 Dead+1.6 Wind 0 deg - No Ice	40.85	-0.22	-30.35	-3206.97	23.98	3.82
1.2 Dead+1.6 Wind 30 deg - No Ice	54.46	15.18	-26.19	-2780.98	-1614.55	4.49
0.9 Dead+1.6 Wind 30 deg - No Ice	40.85	15.18	-26.19	-2766.95	-1605.89	4.50
1.2 Dead+1.6 Wind 60 deg - No Ice	54.46	26.44	-15.01	-1592.71	-2810.98	3.82

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 60 deg - No Ice	40.85	26.44	-15.01	-1584.77	-2796.19	3.82
1.2 Dead+1.6 Wind 90 deg - No Ice	54.46	30.59	0.18	20.32	-3252.29	2.14
0.9 Dead+1.6 Wind 90 deg - No Ice	40.85	30.59	0.18	19.97	-3235.24	2.14
1.2 Dead+1.6 Wind 120 deg - No Ice	54.46	26.57	15.30	1626.62	-2824.95	-0.05
0.9 Dead+1.6 Wind 120 deg - No Ice	40.85	26.57	15.30	1618.03	-2810.09	-0.06
1.2 Dead+1.6 Wind 150 deg - No Ice	54.46	15.45	26.34	2798.82	-1643.62	-2.23
0.9 Dead+1.6 Wind 150 deg - No Ice	40.85	15.45	26.34	2784.21	-1634.82	-2.24
1.2 Dead+1.6 Wind 180 deg - No Ice	54.46	0.19	30.34	3224.19	-22.14	-3.87
0.9 Dead+1.6 Wind 180 deg - No Ice	40.85	0.19	30.34	3207.39	-21.67	-3.88
1.2 Dead+1.6 Wind 210 deg - No Ice	54.46	-15.15	26.20	2785.05	1608.00	-4.48
0.9 Dead+1.6 Wind 210 deg - No Ice	40.85	-15.15	26.20	2770.49	1600.11	-4.49
1.2 Dead+1.6 Wind 240 deg - No Ice	54.46	-26.46	14.98	1591.31	2811.21	-3.75
0.9 Dead+1.6 Wind 240 deg - No Ice	40.85	-26.46	14.98	1582.88	2797.16	-3.76
1.2 Dead+1.6 Wind 270 deg - No Ice	54.46	-30.63	-0.19	-19.78	3254.06	-2.14
0.9 Dead+1.6 Wind 270 deg - No Ice	40.85	-30.63	-0.19	-19.94	3237.74	-2.14
1.2 Dead+1.6 Wind 300 deg - No Ice	54.46	-26.60	-15.32	-1626.97	2826.03	0.05
0.9 Dead+1.6 Wind 300 deg - No Ice	40.85	-26.60	-15.32	-1618.87	2811.92	0.05
1.2 Dead+1.6 Wind 330 deg - No Ice	54.46	-15.48	-26.36	-2800.20	1644.28	2.22
0.9 Dead+1.6 Wind 330 deg - No Ice	40.85	-15.48	-26.36	-2786.08	1636.23	2.23
1.2 Dead+1.0 Ice+1.0 Temp	86.24	0.00	0.00	4.55	-5.99	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	86.24	-0.03	-8.24	-856.13	-2.29	1.19
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	86.24	4.12	-7.13	-739.34	-435.66	1.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	86.24	7.15	-4.10	-423.08	-752.01	1.09
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	86.24	8.26	0.02	7.34	-868.04	0.56
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	86.24	7.16	4.14	436.73	-753.61	-0.11
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	86.24	4.15	7.15	750.64	-439.41	-0.75
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	86.24	0.03	8.24	865.25	-9.09	-1.20
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	86.24	-4.11	7.13	749.08	422.65	-1.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	86.24	-7.15	4.09	431.73	740.36	-1.08
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	86.24	-8.27	-0.03	1.70	856.70	-0.56
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	86.24	-7.17	-4.14	-427.87	742.13	0.11
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	86.24	-4.16	-7.15	-741.99	427.85	0.75
Dead+Wind 0 deg - Service	45.38	-0.04	-5.99	-633.45	3.73	0.75
Dead+Wind 30 deg - Service	45.38	3.00	-5.17	-546.44	-318.55	0.89
Dead+Wind 60 deg - Service	45.38	5.22	-2.96	-312.68	-553.91	0.76
Dead+Wind 90 deg - Service	45.38	6.04	0.03	4.63	-640.73	0.42
Dead+Wind 120 deg - Service	45.38	5.24	3.02	320.62	-556.66	-0.01

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 150 deg - Service	45.38	3.05	5.20	551.21	-324.27	-0.44
Dead+Wind 180 deg - Service	45.38	0.04	5.99	634.89	-5.30	-0.77
Dead+Wind 210 deg - Service	45.38	-2.99	5.17	548.50	315.38	-0.89
Dead+Wind 240 deg - Service	45.38	-5.22	2.96	313.67	552.08	-0.74
Dead+Wind 270 deg - Service	45.38	-6.04	-0.04	-3.26	639.20	-0.42
Dead+Wind 300 deg - Service	45.38	-5.25	-3.02	-319.43	555.00	0.01
Dead+Wind 330 deg - Service	45.38	-3.05	-5.20	-550.22	322.52	0.44

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-45.38	0.00	0.00	45.38	0.00	0.000%
2	-0.22	-54.46	-30.35	0.22	54.46	30.35	0.000%
3	-0.22	-40.85	-30.35	0.22	40.85	30.35	0.000%
4	15.18	-54.46	-26.19	-15.18	54.46	26.19	0.000%
5	15.18	-40.85	-26.19	-15.18	40.85	26.19	0.000%
6	26.44	-54.46	-15.01	-26.44	54.46	15.01	0.000%
7	26.44	-40.85	-15.01	-26.44	40.85	15.01	0.000%
8	30.59	-54.46	0.18	-30.59	54.46	-0.18	0.000%
9	30.59	-40.85	0.18	-30.59	40.85	-0.18	0.000%
10	26.57	-54.46	15.30	-26.57	54.46	-15.30	0.000%
11	26.57	-40.85	15.30	-26.57	40.85	-15.30	0.000%
12	15.45	-54.46	26.34	-15.45	54.46	-26.34	0.000%
13	15.45	-40.85	26.34	-15.45	40.85	-26.34	0.000%
14	0.19	-54.46	30.34	-0.19	54.46	-30.34	0.000%
15	0.19	-40.85	30.34	-0.19	40.85	-30.34	0.000%
16	-15.15	-54.46	26.20	15.15	54.46	-26.20	0.000%
17	-15.15	-40.85	26.20	15.15	40.85	-26.20	0.000%
18	-26.46	-54.46	14.98	26.46	54.46	-14.98	0.000%
19	-26.46	-40.85	14.98	26.46	40.85	-14.98	0.000%
20	-30.63	-54.46	-0.19	30.63	54.46	0.19	0.000%
21	-30.63	-40.85	-0.19	30.63	40.85	0.19	0.000%
22	-26.60	-54.46	-15.32	26.60	54.46	15.32	0.000%
23	-26.60	-40.85	-15.32	26.60	40.85	15.32	0.000%
24	-15.48	-54.46	-26.36	15.48	54.46	26.36	0.000%
25	-15.48	-40.85	-26.36	15.48	40.85	26.36	0.000%
26	0.00	-86.24	0.00	-0.00	86.24	-0.00	0.000%
27	-0.03	-86.24	-8.24	0.03	86.24	8.24	0.000%
28	4.12	-86.24	-7.13	-4.12	86.24	7.13	0.000%
29	7.15	-86.24	-4.10	-7.15	86.24	4.10	0.000%
30	8.26	-86.24	0.02	-8.26	86.24	-0.02	0.000%
31	7.16	-86.24	4.14	-7.16	86.24	-4.14	0.000%
32	4.15	-86.24	7.15	-4.15	86.24	-7.15	0.000%
33	0.03	-86.24	8.24	-0.03	86.24	-8.24	0.000%
34	-4.11	-86.24	7.13	4.11	86.24	-7.13	0.000%
35	-7.15	-86.24	4.09	7.15	86.24	-4.09	0.000%
36	-8.27	-86.24	-0.03	8.27	86.24	0.03	0.000%
37	-7.17	-86.24	-4.14	7.17	86.24	4.14	0.000%
38	-4.16	-86.24	-7.15	4.16	86.24	7.15	0.000%
39	-0.04	-45.38	-5.99	0.04	45.38	5.99	0.000%
40	3.00	-45.38	-5.17	-3.00	45.38	5.17	0.000%
41	5.22	-45.38	-2.96	-5.22	45.38	2.96	0.000%
42	6.04	-45.38	0.03	-6.04	45.38	-0.03	0.000%
43	5.24	-45.38	3.02	-5.24	45.38	-3.02	0.000%
44	3.05	-45.38	5.20	-3.05	45.38	-5.20	0.000%
45	0.04	-45.38	5.99	-0.04	45.38	-5.99	0.000%
46	-2.99	-45.38	5.17	2.99	45.38	-5.17	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
47	-5.22	-45.38	2.96	5.22	45.38	-2.96	0.000%
48	-6.04	-45.38	-0.04	6.04	45.38	0.04	0.000%
49	-5.25	-45.38	-3.02	5.25	45.38	3.02	0.000%
50	-3.05	-45.38	-5.20	3.05	45.38	5.20	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00044753
3	Yes	4	0.00000001	0.00029485
4	Yes	5	0.00000001	0.00005983
5	Yes	5	0.00000001	0.00002865
6	Yes	5	0.00000001	0.00004623
7	Yes	5	0.00000001	0.00002184
8	Yes	4	0.00000001	0.00030573
9	Yes	4	0.00000001	0.00019924
10	Yes	5	0.00000001	0.00005243
11	Yes	5	0.00000001	0.00002482
12	Yes	5	0.00000001	0.00005639
13	Yes	5	0.00000001	0.00002682
14	Yes	4	0.00000001	0.00051860
15	Yes	4	0.00000001	0.00034139
16	Yes	5	0.00000001	0.00004580
17	Yes	5	0.00000001	0.00002166
18	Yes	5	0.00000001	0.00005825
19	Yes	5	0.00000001	0.00002785
20	Yes	4	0.00000001	0.00025122
21	Yes	4	0.00000001	0.00016334
22	Yes	5	0.00000001	0.00005240
23	Yes	5	0.00000001	0.00002484
24	Yes	5	0.00000001	0.00004933
25	Yes	5	0.00000001	0.00002333
26	Yes	4	0.00000001	0.00002138
27	Yes	5	0.00000001	0.00006141
28	Yes	5	0.00000001	0.00006685
29	Yes	5	0.00000001	0.00006659
30	Yes	5	0.00000001	0.00006273
31	Yes	5	0.00000001	0.00006790
32	Yes	5	0.00000001	0.00006815
33	Yes	5	0.00000001	0.00006281
34	Yes	5	0.00000001	0.00006636
35	Yes	5	0.00000001	0.00006639
36	Yes	5	0.00000001	0.00006109
37	Yes	5	0.00000001	0.00006528
38	Yes	5	0.00000001	0.00006526
39	Yes	4	0.00000001	0.00002255
40	Yes	4	0.00000001	0.00004021
41	Yes	4	0.00000001	0.00002765
42	Yes	4	0.00000001	0.00001636
43	Yes	4	0.00000001	0.00002733
44	Yes	4	0.00000001	0.00003280
45	Yes	4	0.00000001	0.00002341
46	Yes	4	0.00000001	0.00002922
47	Yes	4	0.00000001	0.00003740
48	Yes	4	0.00000001	0.00001591
49	Yes	4	0.00000001	0.00002694
50	Yes	4	0.00000001	0.00002580

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	8.24	43	0.48	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	115.25 - 94.25	4.91	43	0.41	0.00
L3	99.75 - 46.25	3.64	43	0.36	0.00
L4	53.5 - 0	1.02	43	0.18	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Lighting Rod 5/8" x 2'	43	8.24	0.48	0.00	108942
149.00	Pipe Mount [PM 601-1]	43	8.14	0.48	0.00	108942
148.00	ERICSSON AIR 21 B2P w/ Mount Pipe	43	8.04	0.48	0.00	108942
141.00	TME-RRUS-11	43	7.34	0.47	0.00	60523
140.00	(2) 7770.00 w/ Mount Pipe	43	7.24	0.47	0.00	54471
130.00	(2) DB846F65ZAXY w/ Mount Pipe	43	6.26	0.45	0.00	27235
124.00	HP2-4.7NS	43	5.69	0.44	0.00	20950
113.00	(3) 800 10252 w/ Mount Pipe	43	4.71	0.40	0.00	15843
105.00	SC323	43	4.05	0.38	0.00	16068

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	41.77	10	2.43	0.01
L2	115.25 - 94.25	24.87	10	2.09	0.01
L3	99.75 - 46.25	18.49	10	1.80	0.01
L4	53.5 - 0	5.19	22	0.89	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Lighting Rod 5/8" x 2'	10	41.77	2.43	0.01	21516
149.00	Pipe Mount [PM 601-1]	10	41.26	2.43	0.01	21516
148.00	ERICSSON AIR 21 B2P w/ Mount Pipe	10	40.75	2.42	0.01	21516
141.00	TME-RRUS-11	10	37.20	2.37	0.01	11953
140.00	(2) 7770.00 w/ Mount Pipe	10	36.70	2.36	0.01	10758
130.00	(2) DB846F65ZAXY w/ Mount Pipe	10	31.74	2.27	0.01	5378
124.00	HP2-4.7NS	10	28.87	2.21	0.01	4136
113.00	(3) 800 10252 w/ Mount Pipe	10	23.89	2.05	0.01	3128
105.00	SC323	10	20.55	1.90	0.01	3186

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 110 (1)	TP39.633x28.4x0.25	40.00	0.00	0.0	30.080	-13.80	1945.82	0.007
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	21.00	0.00	0.0	37.252	-17.75	2432.35	0.007

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	53.50	0.00	0.0	64.346	-31.54	4251.93	0.007
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	53.50	0.00	0.0	94.805	-54.45	6054.63	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 110 (1)	TP39.633x28.4x0.25	394.54	1518.72	0.260	0.00	1518.72	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	692.19	2089.54	0.331	0.00	2089.54	0.000
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	1757.86	4731.10	0.372	0.00	4731.10	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	3260.90	8512.42	0.383	0.00	8512.42	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 110 (1)	TP39.633x28.4x0.25	17.39	972.91	0.018	0.67	3041.16	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	20.65	1216.17	0.017	0.05	4184.20	0.000
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	25.42	2125.97	0.012	0.05	9473.75	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	30.71	3027.31	0.010	0.05	17045.58	0.000

Pole Interaction Design Data

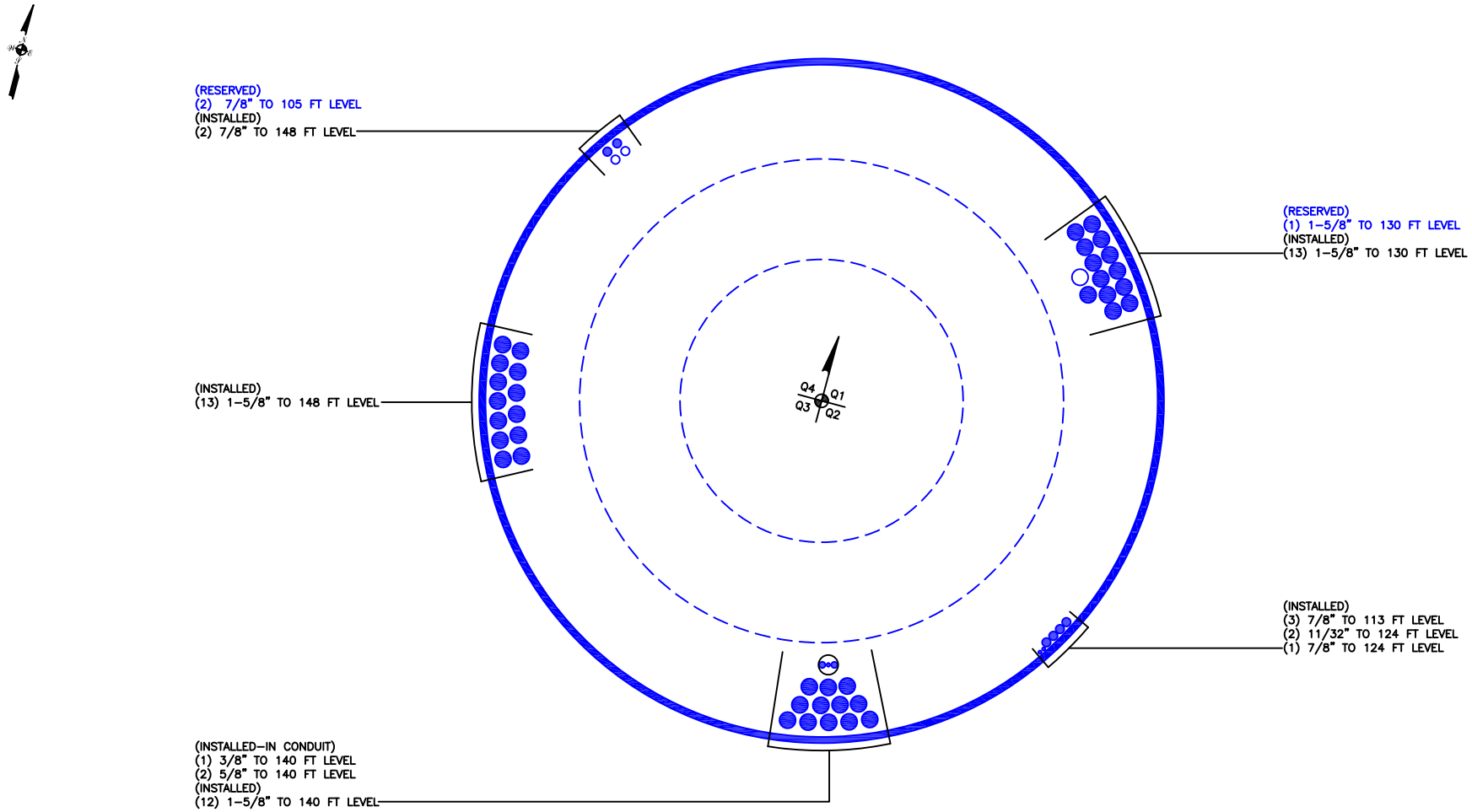
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110 (1)	0.007	0.260	0.000	0.018	0.000	0.267	1.000	4.8.2
L2	110 - 94.25 (2)	0.007	0.331	0.000	0.017	0.000	0.339	1.000	4.8.2
L3	94.25 - 46.25 (3)	0.007	0.372	0.000	0.012	0.000	0.379	1.000	4.8.2
L4	46.25 - 0 (4)	0.009	0.383	0.000	0.010	0.000	0.392	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 110	Pole	TP39.633x28.4x0.25	1	-13.80	1945.82	26.7	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-17.75	2432.35	33.9	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-31.54	4251.93	37.9	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-54.45	6054.63	39.2	Pass
							Summary	
						Pole (L4)	39.2	Pass
						RATING =	**39.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 5800059 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions:
1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *5800059*
Site Name: *Ridge Road, Madison*
App #: *387383 Rev. 0*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	76	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	77	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	12	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	68.71	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	3261	ft-kips
Factored Axial, Pu:	54	kips
Factored Shear, Vu:	31	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	90.6	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	34.9%	**Pass**

Base Plate Results — Flexural Check

Base Plate Stress:	13.0	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	29.0%	**Pass**

PL Ref. Data
Yield Line (in): 40.18
Max PL Length: 40.18

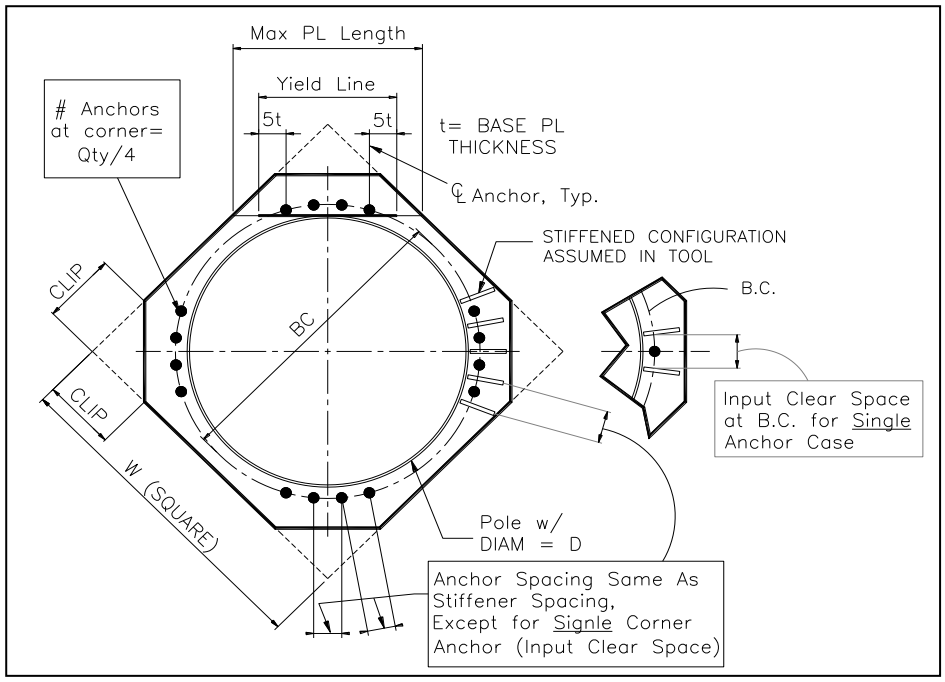
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 5/1/2017

BU:	5800059
Site Name:	Ridge Road, Madison
App Number:	387383 Rev. 0
Work Order:	1399368

Monopole Drilled Pier

Input

Criteria

TIA Revision:	G
ACI 318 Revision:	2008
Seismic Category:	B

Forces

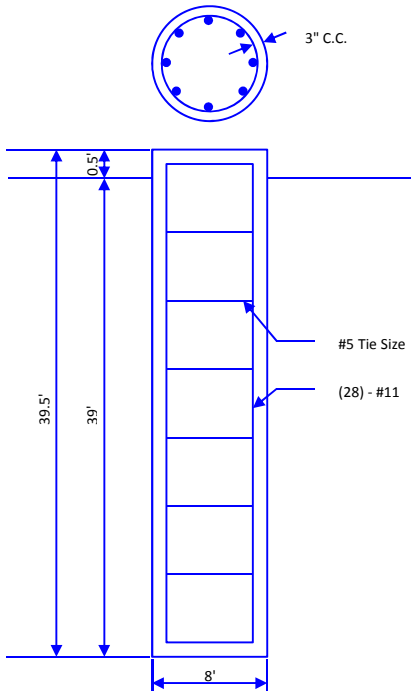
Compression	54	kips
Shear	31	kips
Moment	3261	k-ft
Swelling Force	0	kips

Foundation Dimensions

Pier Diameter:	8	ft
Ext. above grade:	0.5	ft
Depth below grade:	39	ft

Material Properties

Number of Rebar:	28	
Rebar Size:	11	
Tie Size	5	
Rebar tensile strength:	60	ksi
Concrete Strength:	4000	psi
Ultimate Concrete Strain	0.003	in/in
Clear Cover to Ties:	3	in



Soil Profile: 5800059 Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	4	0	4	65	0	0	0	0	0	
2	8	4	12	65	100	22			0	
3	8	12	20	42.6	400	27			0	
4	19	20	39	62.6	200	31			6	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	10.49	ft
Max Moment, Mu:	3517.99	k-ft
Soil Safety Factor:	6.54	
Safety Factor Req'd:	1.33	
RATING:	20.3%	

Soil Axial Capacity

Skin Friction (k):	431.35	kips
End Bearing (k):	226.19	kips
Comp. Capacity (k), ϕCn:	657.54	kips
Comp. (k), Cu:	54.00	kips
RATING:	8.2%	

Concrete/Steel Check

Mu (from soil analysis)	3517.99	k-ft
ϕMn	8168.71	k-ft
RATING:	43.1%	

rho provided	0.60	
rho required	0.33	OK

Rebar Spacing	8.39	
Spacing required	22.56	OK

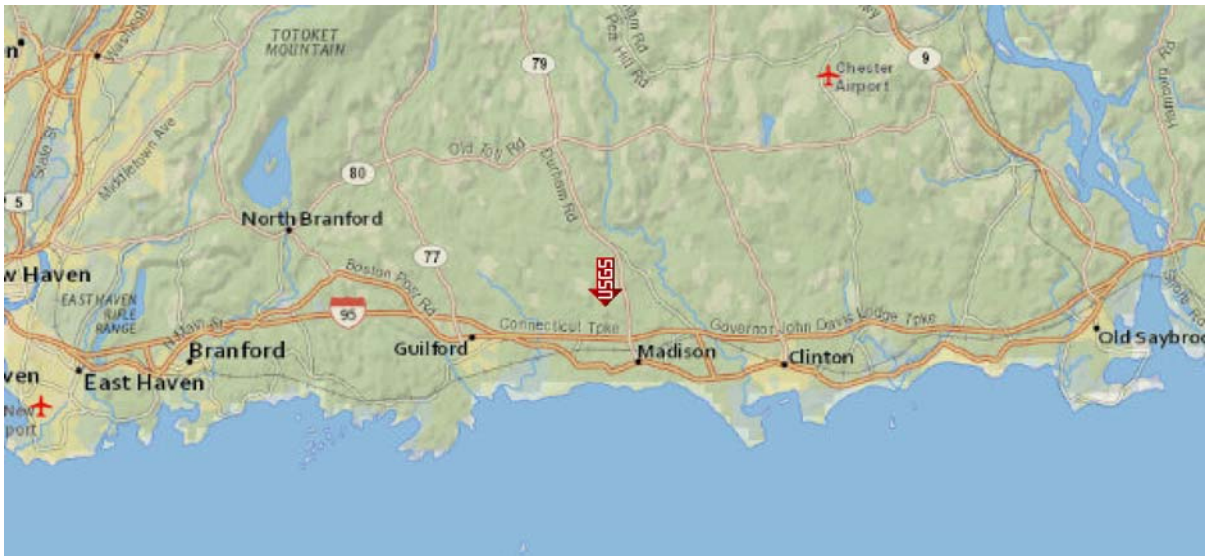
Dev. Length required	28.26	
Dev. Length provided	53.51	OK

Overall Foundation Rating: 43.1%

USGS Design Maps Summary Report

User–Specified Input

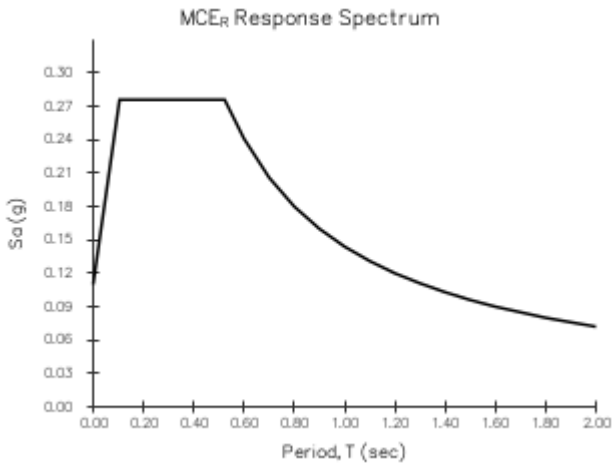
Report Title	5800059 Mon May 1, 2017 12:17:00 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.30925°N, 72.61433°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

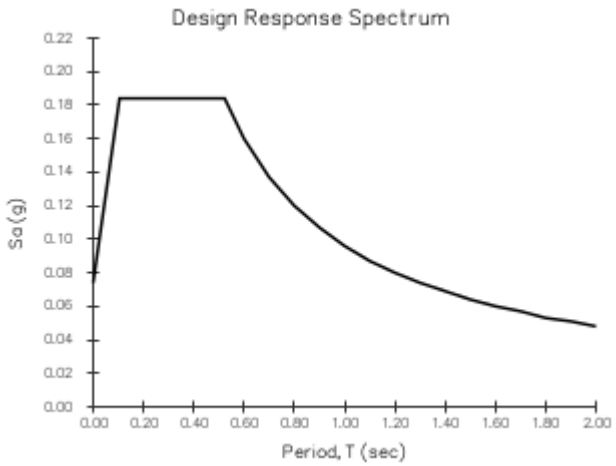


USGS–Provided Output

S_S =	0.172 g	S_{MS} =	0.276 g	S_{DS} =	0.184 g
S_1 =	0.060 g	S_{M1} =	0.144 g	S_{D1} =	0.096 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU: 5800059
Work Order: 1399368
Application: 387383 Rev. 0

	Degrees	Minutes	Seconds		
Site Latitude =	41	18	33.29	41.3092	degrees
Site Longitude =	-72	36	51.56	-72.6143	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				*(Table 2-1)*
Site Class =	D - Stiff Soil				*(Table 2-11)*

Spectral response acceleration short periods, S_S =	0.172	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.060	

Importance Factor, I =	1.0	*(Table 2-3)*
Acceleration-based site coefficient, F_a =	1.6	*(Table 2-12)*
Velocity-based site coefficient, F_v =	2.4	*(Table 2-13)*

Design spectral response acceleration short period, S_{DS} =	0.183	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.096	*(2.7.6)*

Seismic Design Category - Short Period Response =	B	*ASCE 7-05 Table 11.6-1*
Seismic Design Category - 1s Period Response =	B	*ASCE 7-05 Table 11.6-2*

Worst Case Seismic Design Category =	B	*ASCE 7-05 Tables 11.6-1 and 6-2*

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

T-Mobile Existing Facility

Site ID: CTHA332C

HA332/Waste Station
258 Ridge Road
Madison, CT 06433

May 19, 2017

EBI Project Number: 6217002176

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.16 %

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

EBI Consulting
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May 19, 2017

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

Emissions Analysis for Site: **CTHA332C – HA332/Waste Station**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **258 Ridge Road, Madison, 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 public 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 public 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 limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) 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 **258 Ridge Road, Madison, 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, 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 (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 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.

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) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF path an additional 1.91 dB of loss factored into the calculations used for this analysis. This is based on manufacturers Specifications for 180 feet of 1-5/8" coax cable on each path.

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 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 AIR21 B4A/B2P** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-A1M** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-A1M** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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 **150 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 public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
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	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	0.81	Antenna B1 MPE%	0.81	Antenna C1 MPE%	0.81
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
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	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,172.21	ERP (W):	6,172.21	ERP (W):	6,172.21
Antenna A2 MPE%	1.07	Antenna B2 MPE%	1.07	Antenna C2 MPE%	1.07
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.32	Antenna B3 MPE%	0.32	Antenna C3 MPE%	0.32

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.20 %**
Verizon Wireless	3.17 %
AT&T	1.79 %
Site Total MPE %:	**7.16 %**

T-Mobile Sector A Total:	2.20 %
T-Mobile Sector B Total:	2.20 %
T-Mobile Sector C Total:	2.20 %
Site Total:	7.16 %

T-Mobile _Max Values 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	150	8.09	AWS - 2100 MHz	1000	0.81%
T-Mobile AWS - 2100 MHz UMTS	2	751.83	150	2.61	AWS - 2100 MHz	1000	0.26%
T-Mobile PCS - 1900 MHz UMTS	2	1,167.14	150	4.05	PCS - 1900 MHz	1000	0.40%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	150	4.05	PCS - 1900 MHz	1000	0.40%
T-Mobile 700 MHz LTE	1	865.21	150	1.50	700 MHz	467	0.32%
						Total:*	**2.20%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.20 %
Sector B:	2.20 %
Sector C:	2.20 %
T-Mobile Per Sector Maximum:	2.20 %
Site Total:	7.16 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.16%** of the allowable FCC established general public 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.