March 5th, 2021

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

RE: **Notice of Exempt Modification for T-Mobile:**
Crown Castle Site ID: 871584 - T-Mobile Site ID: CT11189E
115 Birch Mountain Road, Glastonbury, CT 06033
Latitude: 41° 42′ 32.24″ / Longitude: -72° 28′ 24.41″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) total antennas at the 182-foot mount on the existing 200-foot Self Support Tower, located at 115 Birch Mountain Road, Glastonbury, CT. The tower is owned by Crown Castle and the property is owned by Scarrone Park LLC. T-Mobile now intends to remove (3) existing antennas and install six (6) new antennas at the 182-foot mount. This modification/ proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times

Planned Modifications:
Tower:

Remove:
(9) 1 5/8" Coax
(3) TMA

Remove and Replace:
(3) RFS-APXV18-209015-C-A20 Antenna 1900 MHz **(REMOVE)** - (3) RFS-APX16DWV-16DWV-S-E-A20 2100 MHz Antenna **(REPLACE)**

Install New:
(3) 6x12 HCS cable
(3) AIR6449B412500 MHz Antenna
(3) Radio 4424 B25
(3) Radio 4415 B66A

Existing to Remain:
(3) RFS - APXVAARR24_43-U-NA20 600/700 MHz Antenna

Ground:

Install new:
(1) SSC 6160 equipment cabinet
(1) B160 battery cabinet
(1) BB6630
(1) BB6648
(1) PSU 4813 voltage booster
(1) iXRe router

The facility was approved by the Town of Glastonbury Zoning Board of Appeals on August 7, 1998. This approval was made without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Richard Johnson, Town of Glastonbury Town Manager, Peter Carey, Building Official, and Scarrone Park LLC, the property owner.

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

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

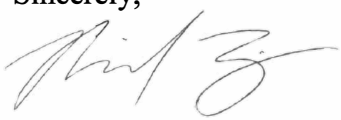
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

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

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

Sincerely,



Richard Zajac
Site Aquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY 14586
(585) 445-5896
richard.zajac@crowncastle.com

cc:

Richard Johnson, Town Manager – *via email to richard.johnson@glastonbury–ct.gov*
Town of Glastonbury
Town Hall – 2nd Floor
2155 Main Street
Glastonbury, CT 06033
860.652.7500

Peter Carey, Building Official – *via email to peter.carey@glastonbury–ct.gov*
Town of Glastonbury
Town Hall – 2nd Floor
2155 Main Street
Glastonbury, CT 06033
860.652.7524

Scarrone Park LLC, Property Owner
C/O Maria A. Toczyska
3385 Hebron Avenue
Glastonbury, CT 06033
860.306.3849

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 5, 2021 11:15 AM
To: richard.johnson@glastonbury-ct.gov
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 115 Birch Mtn Rd.pdf

Good morning Mr. Johnson,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 115 Birch Mountain Road in Glastonbury.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 5, 2021 11:18 AM
To: peter.carey@glastonbury-ct.gov
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 115 Birch Mtn Rd.pdf

Good morning Mr. Carey,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 115 Birch Mountain Road in Glastonbury.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

ORIGIN ID:ONHA (585) 445-5896
RICHARD ZAJAC
CROWN CASTLE
629 KAYLEIGH DR

WEBSTER, NY 14580
UNITED STATES US

SHIP DATE: 05MAR21
ACTWGT: 1.00 LB
CAD: 112911364/INET4340

BILL SENDER

TO **C/O MARIA A. TOCZYSKA**
SCARRONE PARK LLC
3385 HEBRON AVENUE

GLASTONBURY CT 06033
(860) 306-3849
INV:
PO:
REF: 799001.7680
DEPT:

J211121011901uv

FedEx Express

56DJ3/AC39/FE4A

MON - 08 MAR 4:30P
STANDARD OVERNIGHT

TRK# 0201 **7730 7935 3559**

XE BDLA

06033
BDL
CT-US

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

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

Exhibit A

Original Facility Approval

0425-01

TOWN OF GLASTONBURY
APPLICATION FOR BUILDING PERMIT
CONNECTICUT STATE BUILDING CODE (SBC111.0)

DEPARTMENT DECISION

..... Approved ..... Disapproved

....
Date Inspector

ESTIMATED COSTS

Structural	180,870
Plumbing	
Electrical	10,000
Heating/AC	
Fire Protection	
Total	190,870

FEES

C.O. & Use	
Structural	
Plumbing	
Electrical	
Heating/AC	
Fire Protection	
Total	

ACTUAL COST AFFIDAVIT MAY BE REQUESTED

(Please Print or Type All Entries)

115 BIRCH MOUNTAIN ROAD — Job Location Street Address
N92 — Lot#

CAROLYN R. SCARRONE C/O DAVID SHERWOOD — Owner's Name
ALTEL, SHERWOOD & JANENDA, LLC

701 HEBRON AVE — Street Address
GLASTONBURY — Town
CT — State
06033 — Zip

Home Phone#
860-652-4070 — Work Phone#
860-652-4022 — Fax#
Mobile Phone#

NOTARAS NORTH AMERICAN ANTENNA SITES — PAUL BENNER PROJECT MANAGER — Applicant's Name (If other than Owner)

6349 FORGE TWSP — Street Address
BENSALEM — Town
PA — State
19020 — Zip

Home Phone#
215-757-4955 — Work Phone#
215-757-6152 — Fax#
Mobile Phone#

C.E.R. TOWERS, L.L.C. — Contractor/General Contractor
16-148-9449 — Registration #

7693 WEST STATE ST — Street Address
LOWVILLE — Town
NY — State
13367 — Zip
315-376-0056 — Telephone#

Home Phone#
Work Phone#
315-376-8139 — Fax#
Mobile Phone#

ZONING INFORMATION:

Distance From:

Zone..RURAL RESIDENCE..

Street Line.....73'..... Rear Line.....220'.....

Right Line.....750'..... Left Line.....175'.....

Zoning Board of Appeals Approval....VOL 205 PAGE 93.....TPZ Special Permit.....

Project Type:

a) ☒ New Construction
b) ☐ Addition
c) ☐ Alteration
d) ☒ Repair/Replacement
e) ☐ Demolition
f) ☐ Relocation
g) ☐ Change of Use
h) ☐ Article 32
i) ☐ Designated Historic Structure

Construction Type: ☐ 1A ☐ 1B ☐ 2A ☐ 2B ☐ 2C ☐ 3A ☐ 3B ☐ 4 ☐ 5A ☐ 5B

Use Group(s):

☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
☐ B ☐ F-1 ☐ F-2
☐ H-1 ☐ H-2 ☐ H-3 ☐ H-4
☐ I-1 ☐ I-2 ☐ I-3
☐ M ☐ R-1 ☐ R-2 ☐ R-3
☐ S-1 ☐ S-2 ☐ U

Mixed Use: ☐ Yes ☐ No ☐ Separated ☐ Nonseparated

(Over)

Exhibit B

Property Card

115 BIRCH MOUNTAIN RD

Location	115 BIRCH MOUNTAIN RD	**Mblu**	N6/ 2920/ E0001C/ /
Acct#	29203387	**Owner**	SCARRONE PARK LLC
Assessment	$566,600	**Appraisal**	$809,400
PID	13487	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$800	$808,600	$809,400
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$600	$566,000	$566,600

Owner of Record

Owner	SCARRONE PARK LLC
Co-Owner	C/O TOCZYSKA MARIA A
Address	3385 HEBRON AVE GLASTONBURY, CT 06033-2806

Sale Price	$0
Certificate	
Book & Page	3525/0218
Sale Date	11/15/2018
Instrument	79

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
TOCZYSKA MARIA A	$0		3525/0216	81	11/15/2018
SCARRONE CAROLYN R REVOCABLE TRUST	$0		3468/0328	25	01/22/2018
SCARRONE CAROLYN R REVOCABLE TRUST	$0		1829/0101	79	06/03/2003
SCARRONE CAROLYN R	$0		1261/0312		07/29/1999

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0

Replacement Cost
Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Occupancy	
Exterior Wall 1	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Floor/Cover 1	
Floor/Cover 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Rooms:	
Extra Kitchens	
Style Sub Class	
Bsmt Garages	
Fireplaces	

Building Photo

(http://images.vgsi.com/photos/GlastonburyCTPhotos//\02\02\02/02.jpg)

Building Layout

(http://images.vgsi.com/photos/GlastonburyCTPhotos//Sketches/13487_13

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

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 350V
Description Cell Tower 00 MDL
Zone RR
Category

Land Line Valuation

Size (Acres) 11.54
Assessed Value $566,000
Appraised Value $808,600

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**

SHD2	Shed-Metal-Storage			168 S.F.	$800	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
4000	$800	$808,600	$809,400

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
4000	$600	$566,000	$566,600

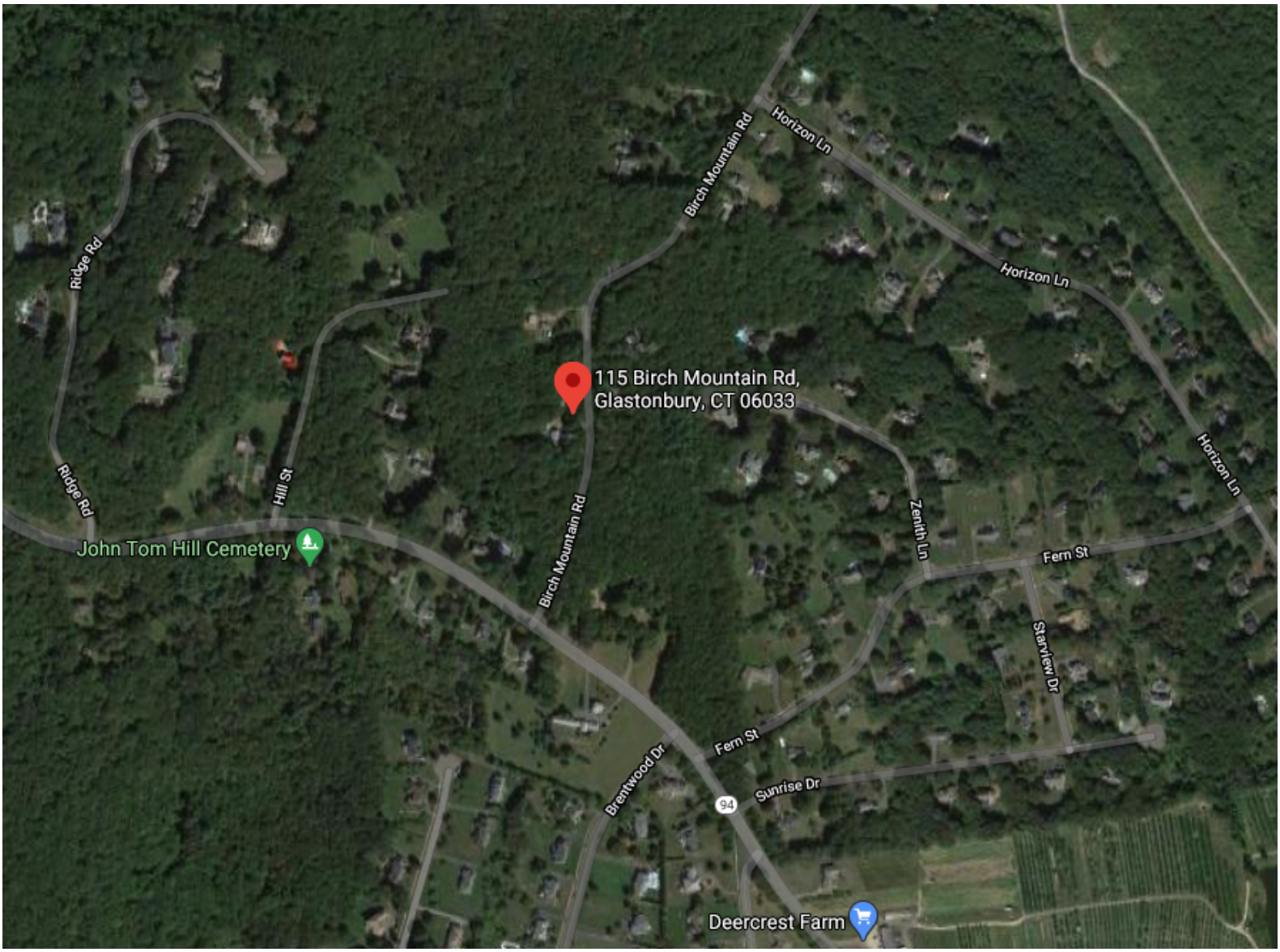

115 Birch Mountain Rd,
Glastonbury, CT 06033
Birch Mountain Rd
Horizon Ln
Horizon Ln
Horizon Ln
Ridge Rd
Ridge Rd
Hill St
Birch Mountain Rd
John Tom Hill Cemetery
Zenith Ln
Fern St
Starview Dr
Fern St
Brentwood Dr
Sunrise Dr
94
Deercrest Farm

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CT11189E
T-MOBILE SITE NAME: GLASTONBURY/ RT-94 & FERN
SITE TYPE: SELF-SUPPORT TOWER
TOWER HEIGHT: 200'-0"

BUSINESS UNIT #: 871584
SITE ADDRESS: 115 BIRCH MTN ROAD GLASTONBURY, CT 06033
COUNTY: HARTFORD
JURISDICTION: CONNECTICUT SITING COUNCIL

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A998C

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	JOHN TOM HILL
SITE ADDRESS:	115 BIRCH MTN ROAD GLASTONBURY, CT 06033
COUNTY:	HARTFORD
MAP/PARCEL #:	04200115
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.708956
LONGITUDE:	-72.473447
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	915'
CURRENT ZONING:	RR (RURAL RESIDENCE)
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	SCARRONE PARK LLC C/O TOCZYSKA MARIA A 3385 HEBRON AVE GLASTONBURY, CT 06033-2806
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	NOT PROVIDED
TELCO PROVIDER:	NOT PROVIDED

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S BOULDER AVE, SUITE 300 TULSA, OK 74119 JENNY PAUL (918) 587-4630
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 24X36. 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.

PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (9) 1 5/8" COAX CABLES
- INSTALL (6) ANTENNAS
- INSTALL (6) RRHs
- INSTALL (3) 6X12 HCS CABLE

GROUND SCOPE OF WORK:
- INSTALL SSC 6160 CABINET
- INSTALL B160 BATTERY CABINET
- INSTALL (1) BB 6630
- INSTALL (1) BB 6648
- INSTALL (1) PSU 4813 VOLTAGE BOOSTER
- INSTALL (1) iXRe ROUTER

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

LOCATION MAP

NO SCALE

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	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE
DATED:	11/6/20
MOUNT ANALYSIS:	PAUL J. FORD & CO
DATED:	10/8/20
RFDS REVISION:	3
DATED:	9/23/20
ORDER ID:	529712
REVISION:	1

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

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.

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

STATE OF CONNECTICUT
No. 23824
LICENSED
PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-1
REVISION: 1

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. 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 CASTLE USA INC. 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 ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. 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 CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR 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 E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. 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, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. 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 CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR 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.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR 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.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. 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.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR 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 CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR 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.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR 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.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER 40 ksi
   #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER 2"
   #5 BARS AND SMALLER 1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS 3/4"
   BEAMS AND COLUMNS 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

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 CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR 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 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 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE 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 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 RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING 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 CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., 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 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

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. CONTRACTOR 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.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR 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.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION 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 NOT 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), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) 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 THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) 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 BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. 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 BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

STATE OF CONNECTICUT · CHAD TUTTLE · No. 23924 · LICENSED PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-2
REVISION: 1

SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS OR FROM ASSESSORS MAPS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET

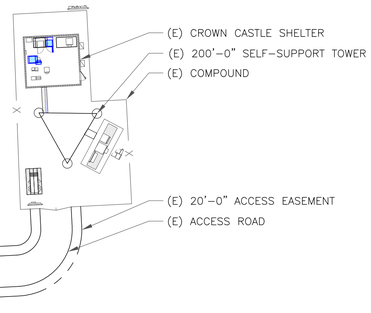
APN: 04200001A
ZONING: RR

APN: 04200001E
ZONING: RR

APPROXIMATE LOCATION OF PROPERTY LINE

BIRCH MOUNTAIN RD

APPROXIMATE LOCATION OF PROPERTY LINE



APN: 04200001W
ZONING: RR

APN: 04200115
ZONING: RR

APPROXIMATE LOCATION OF PROPERTY LINE

1 OVERALL SITE PLAN
SCALE: 30' 15' 0 30' 1"=30'-0" (FULL SIZE) 1"=60'-0" (11x17)

N

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

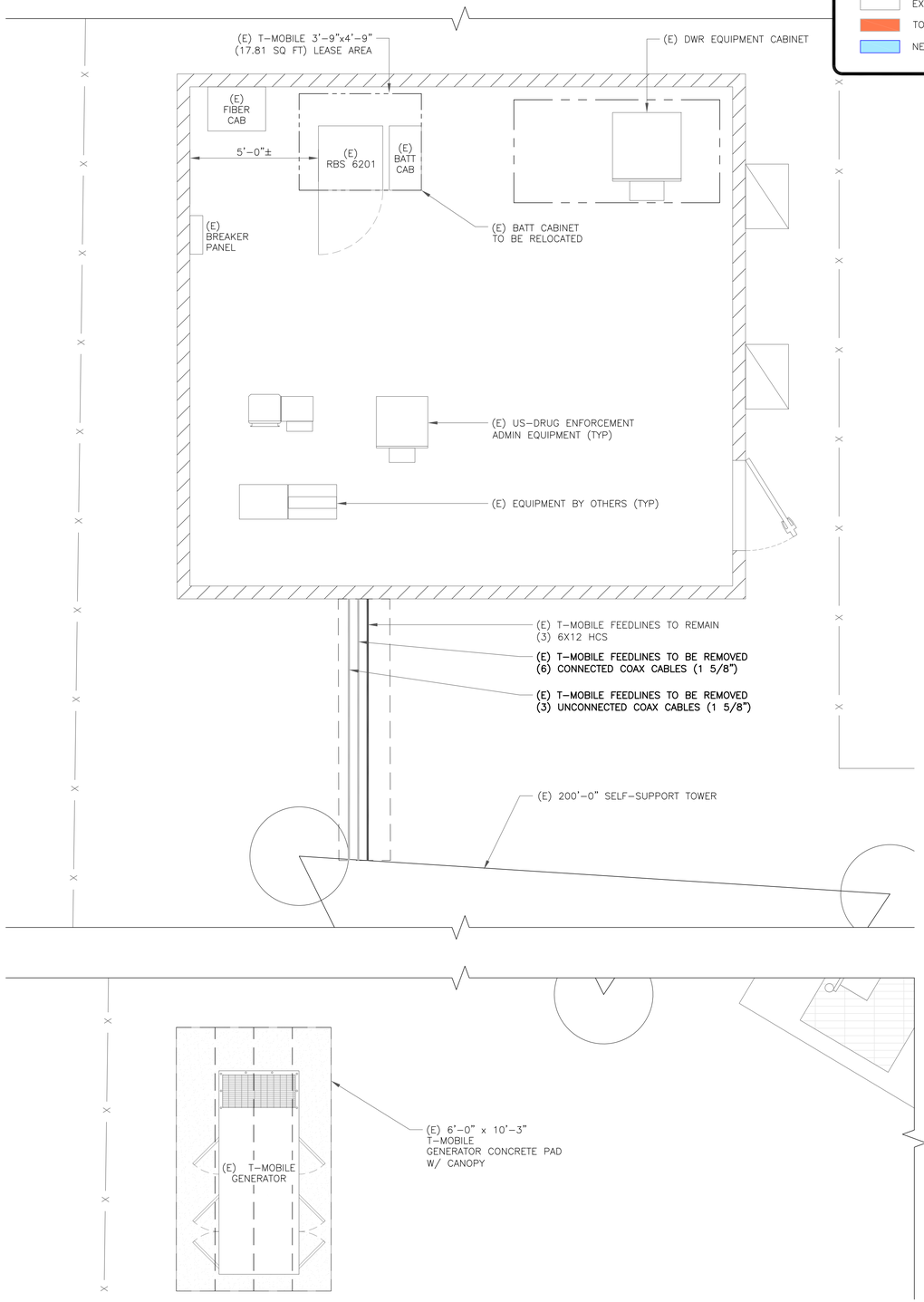
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

STATE OF CONNECTICUT
No. 23924
LICENSED PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-1.1
REVISION: 1



1 EXISTING EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

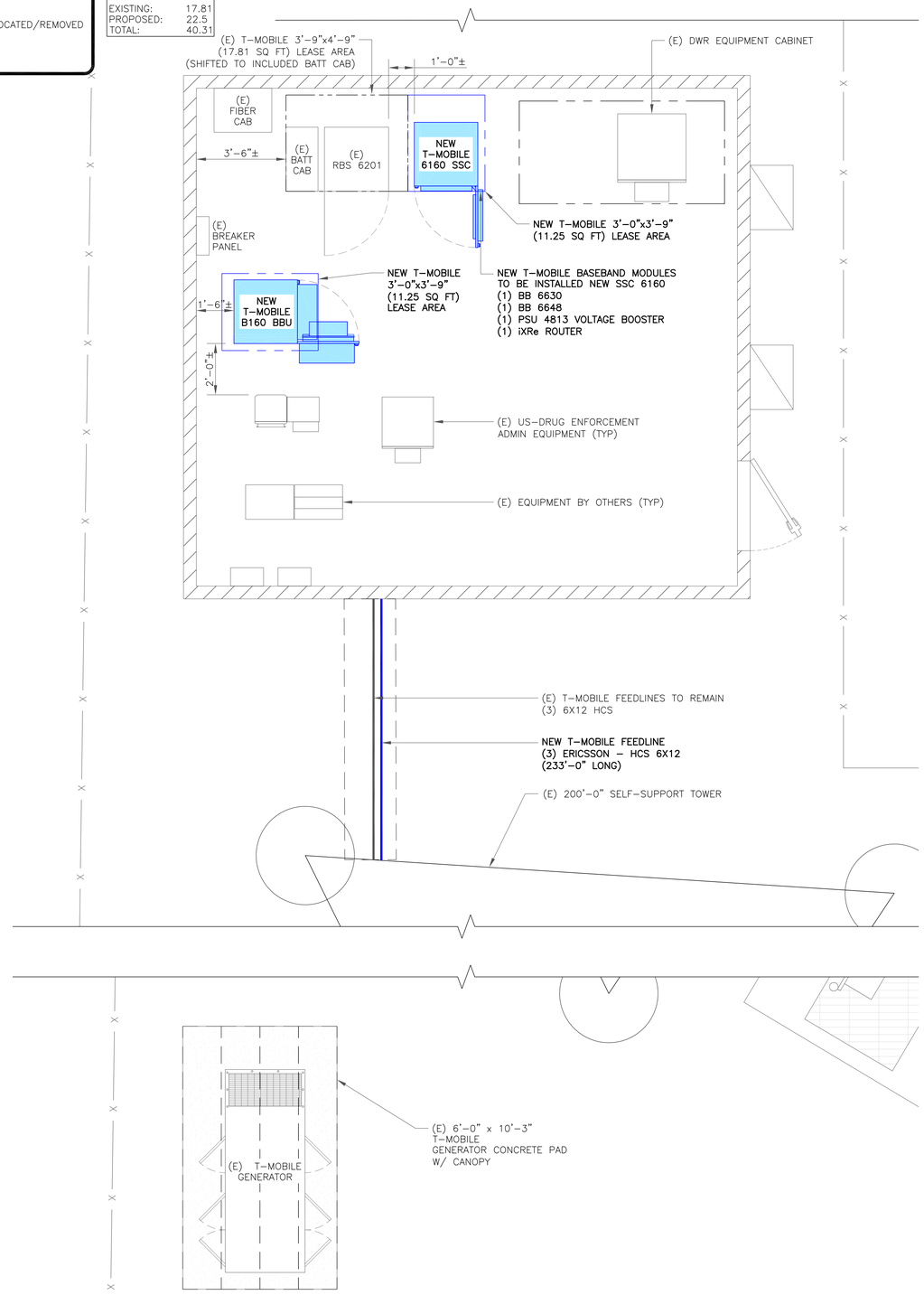
N

EQUIPMENT LEGEND:

- EXISTING
- TO BE RELOCATED/REMOVED
- NEW

LEASE AREA SQ. FT

EXISTING:	17.81
PROPOSED:	22.5
TOTAL:	40.31



2 FINAL EQUIPMENT PLAN
SCALE: 2' 1' 0 2' 3/8"=1'-0" (FULL SIZE) 3/16"=1'-0" (11x17)

N

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

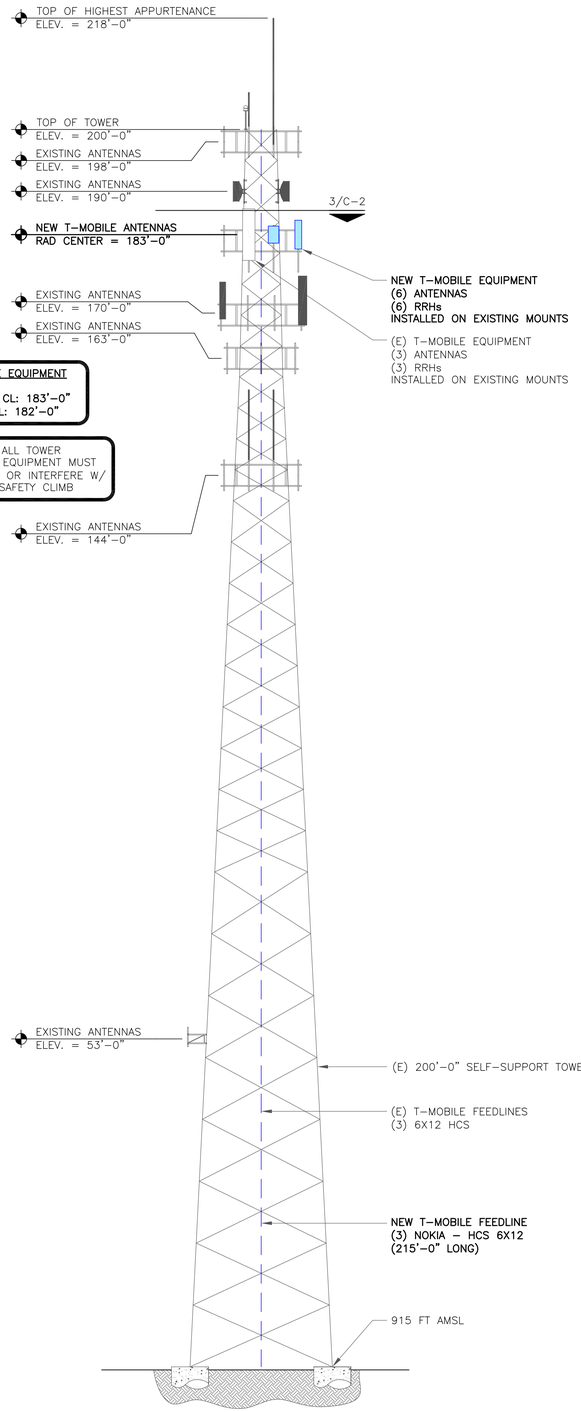
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

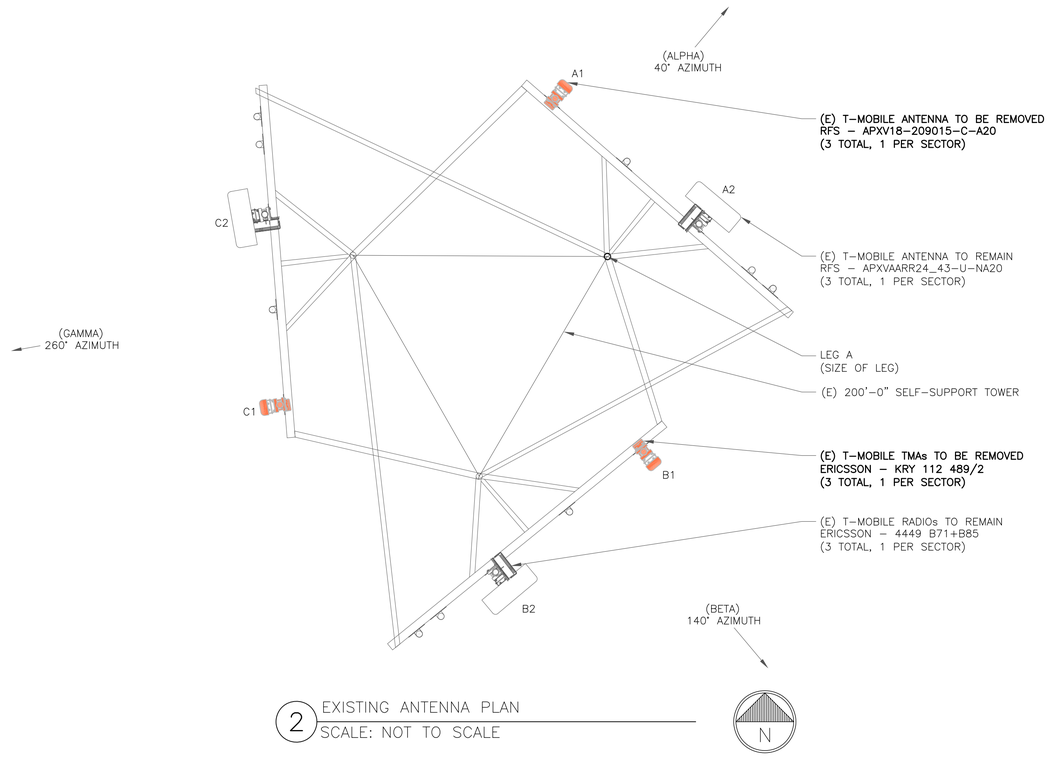
STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

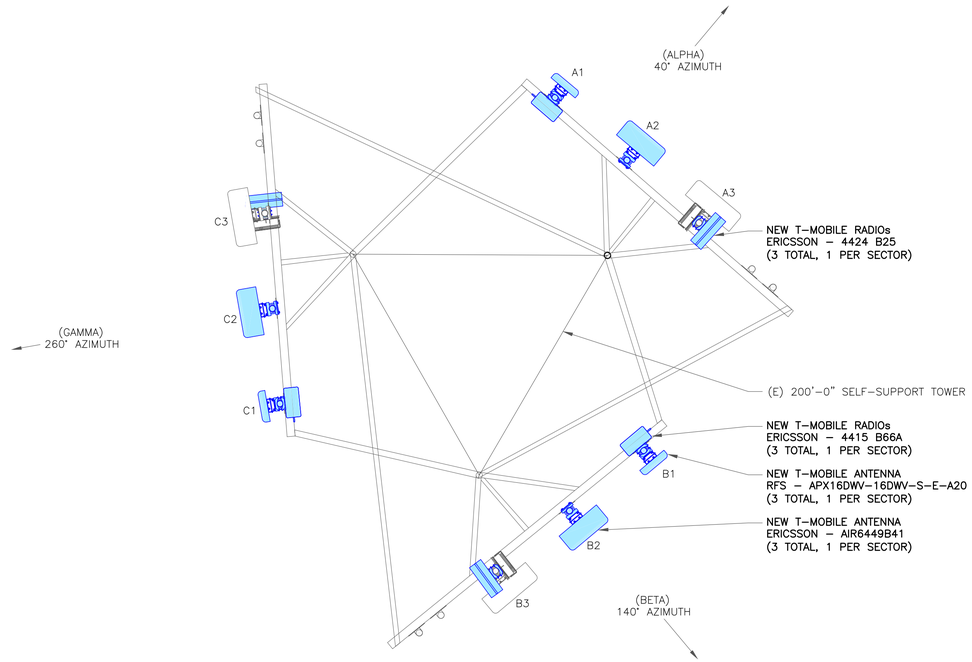
SHEET NUMBER: C-1.2
REVISION: 1



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE



3 FINAL ANTENNA PLAN
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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1717 S. BOULDER
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TULSA, OK 74119
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T-MOBILE SITE NUMBER:
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BU #: **871584**
JOHN TOM HILL

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GLASTONBURY, CT 06033

EXISTING
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ISSUED FOR:

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1	2/4/21	MTJ	CONSTRUCTION	MDW

STATE OF CONNECTICUT
CHRISTOPHER R. CLOUTIER
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
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Expires 2/10/21

SHEET NUMBER: C-2

REVISION: 1

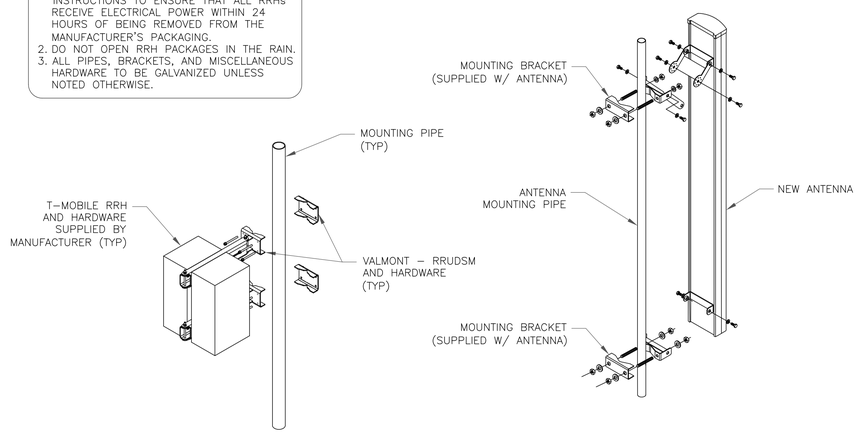
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	CABLE TYPE	CABLE DIAMETER	CABLE LENGTH
ALPHA	A-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	40°	0°	–	183'-0"	4415 B66A	(3) 6X12 HCS (1) 6X12 HCS	1-5/8"	223'
	A-2	L2500/N2500	ERICSSON	AIR6449 B41	40°	0°	–	183'-0"	–		1-5/8"	
	A-3	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	40°	0°	–	183'-0"	4449 B71+B85 4424 B25		–	
BETA	B-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	140°	0°	–	183'-0"	4415 B66A	(1) 6X12 HCS	–	223'
	B-2	L2500/N2500	ERICSSON	AIR6449 B41	140°	0°	–	183'-0"	–		1-5/8"	
	B-3	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	140°	0°	–	183'-0"	4449 B71+B85 4424 B25		–	
GAMMA	C-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	260°	0°		183'-0"	4415 B66A	(1) 6X12 HCS	–	223'
	C-2	L2500/N2500	ERICSSON	AIR6449 B41	260°	0°	–	183'-0"	–		1-5/8"	
	B-3	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	260°	0°		183'-0"	4449 B71+B85 4424 B25		–	

1 ANTENNA & FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
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T-MOBILE SITE NUMBER:
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BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
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EXISTING
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2/4/21

B&T ENGINEERING, INC.
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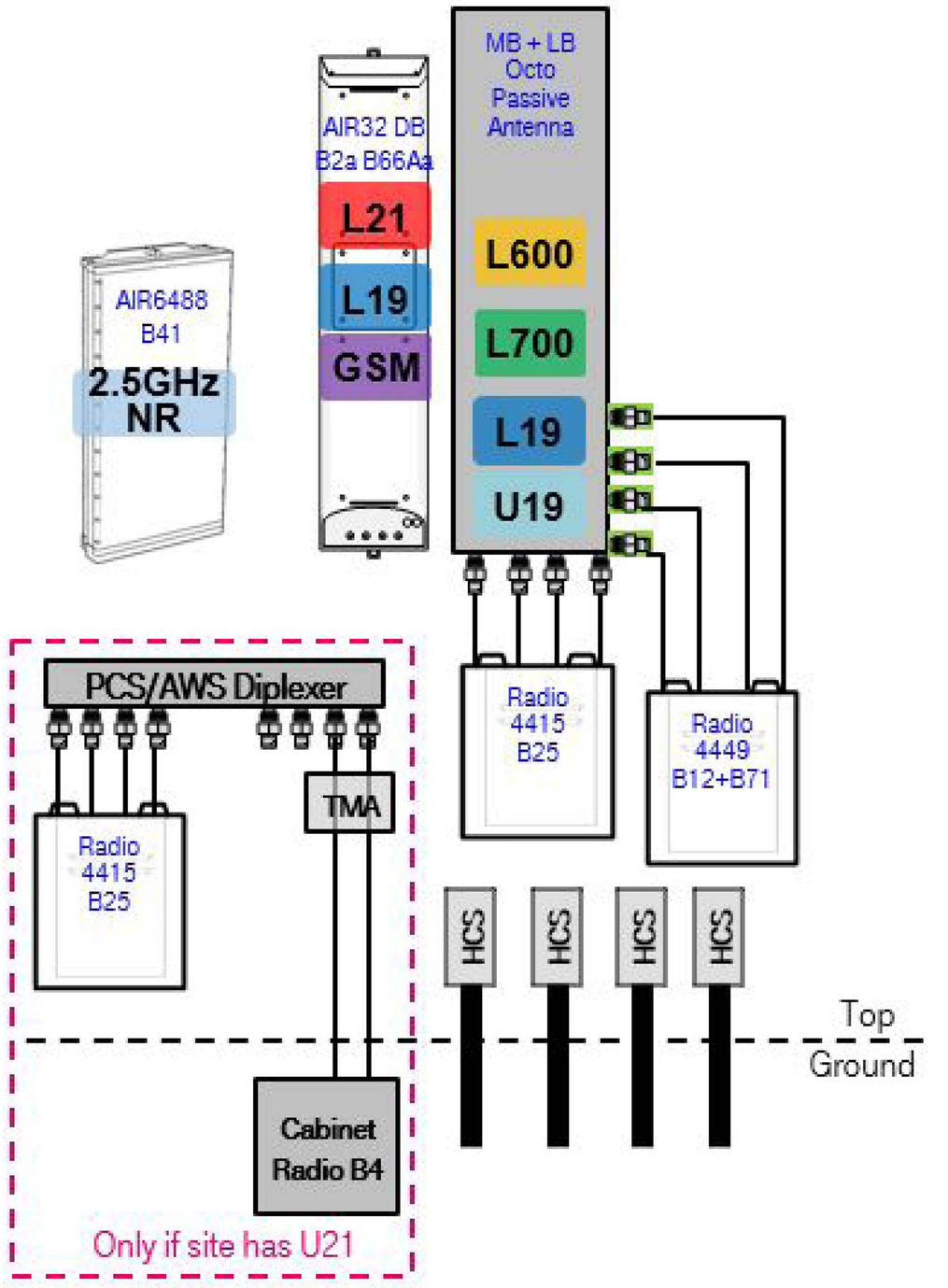
SHEET NUMBER: C-3

REVISION: 1



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
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BU #: **871584**
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EXISTING
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B&T ENGINEERING, INC.
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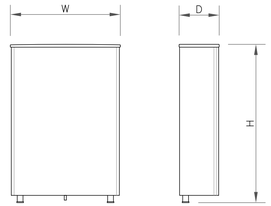
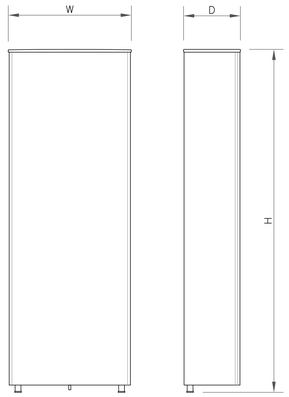
Expires 2/10/21

SHEET NUMBER: C-4
REVISION: 1



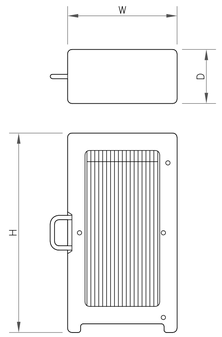
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6649 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



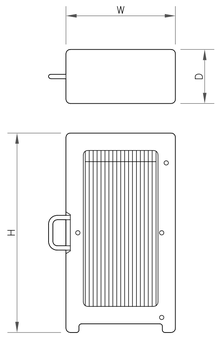
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APX16DWW-16DWV-S-E-A20
WIDTH	13.30"
DEPTH	3.15"
HEIGHT	55.90"
WEIGHT	127 LBS

2 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4415 B66A
WIDTH	13.20"
DEPTH	5.4"
HEIGHT	14.90"
WEIGHT	46.30 LBS

3 RRU SPECS
SCALE: NOT TO SCALE

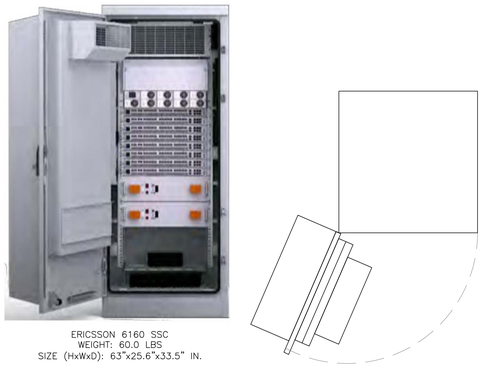


RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4424 B25
WIDTH	14.40"
DEPTH	11.30"
HEIGHT	17.10"
WEIGHT	86.0 LBS

4 RRU SPECS
SCALE: NOT TO SCALE

BATTERY CABINET SPECIFICATIONS	
MODEL #	B160
MANUF.	ERICSSON
HEIGHT	63"
WIDTH	26"
DEPTH	26"
WEIGHT	

5 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE



ERICSSON 6160 SSC
WEIGHT: 60.0 LBS
SIZE (HxWxD): 63"x25.6"x33.5" IN.

6 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
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TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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1	2/4/21	MTJ	CONSTRUCTION	MDW

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

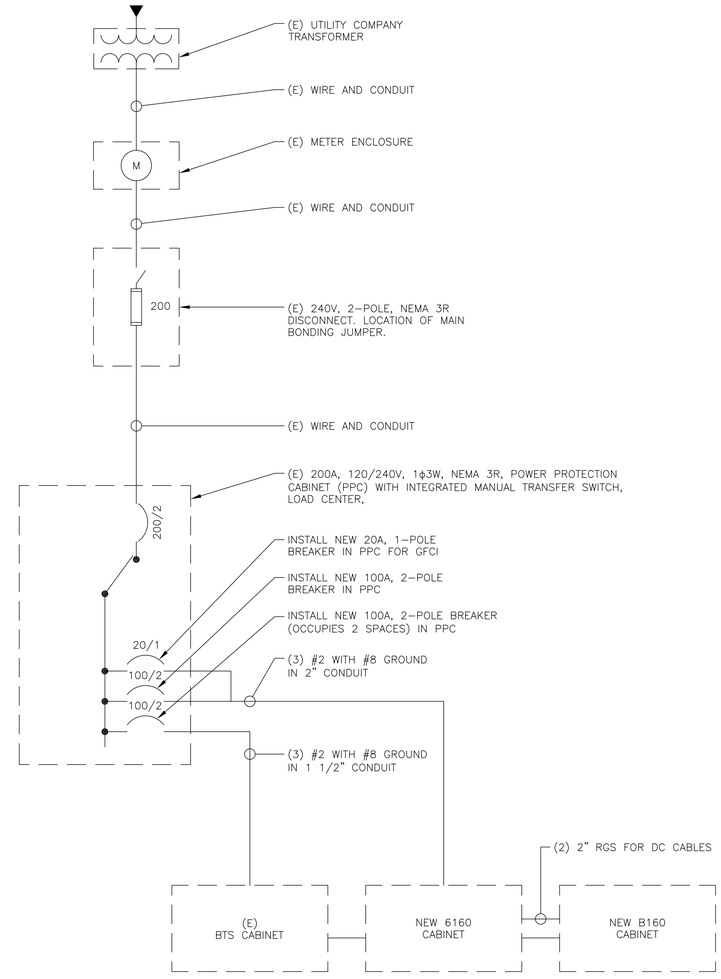
SHEET NUMBER: C-5
REVISION: 1

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
GENERATOR BATTERY CHARGER	1	20A	1	2	100A	2	RBS 6201
GENERATOR BLOCK SWITCH	1	20A	3	4			
ENCLOSURE 6160	2	100A	5	6	20A	1	BTS
			7	8			
6160 GFCI	1	20A	9	10			
			11	12			
			13	14			
			15	16			
			17	18			
			19	20			
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			

RATED VOLTAGE: ■120/240 □_____, 1 PHASE, 3 WIRE	BRANCH POLES: □12 □24 ■30 □42		APPROVED MF'RS
□100 ■200 □400 □_____,	CABINET: ■SURFACE □FLUSH		NEMA □1 ■3R □4X
MAIN LUGS ONLY / MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR		■KEYED DOOR LATCH
CIRCUIT BREAKER BRANCH DEVICES	□_____ TO BE GFCI BREAKERS		FULL NEUTRAL BUS / GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL			

INSTALL A NEW 2P 100A BREAKER IN POSITION 5 AND 7 FOR NEW ENCLOSURE 6160
INSTALL A NEW 1P 20A BREAKER IN POSITION 9 FOR 6160 GFCI
REPLACE EXISTING BREAKER IN POSITION 2 AND 4 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6201 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 100A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
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T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

ISSUED FOR:

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STATE OF CONNECTICUT
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2/4/21

B&T ENGINEERING, INC.
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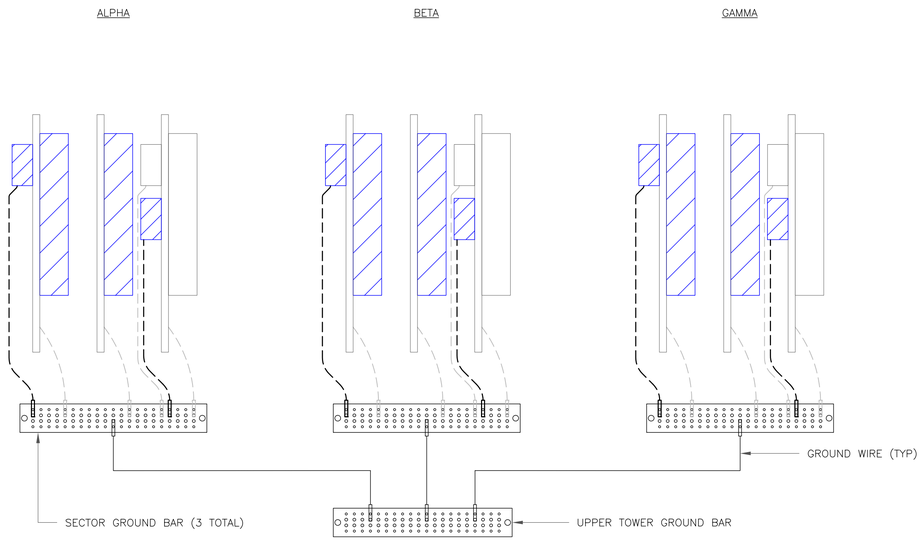
Expires 2/10/21

SHEET NUMBER: E-1
REVISION: 1



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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ISSUED FOR:

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0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

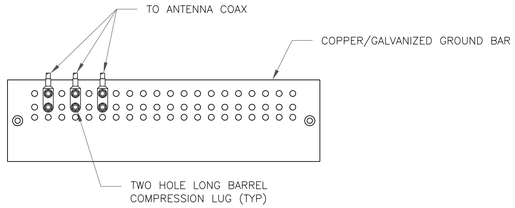
CHRISTOPHER R. CLOUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-1

REVISION: 1

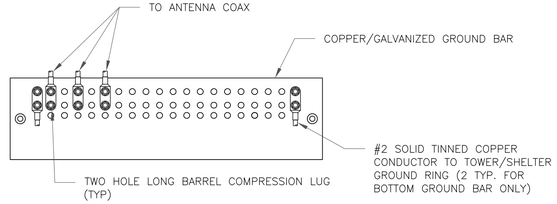
12118G.005.01_JOHN TOM HILL_CC_TMO_NE_CD Upgrades.dwg – Sheet:G-1 – User: mwesel – Feb 04, 2021 – 5:26pm



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 ANTENNA MOUNT STEEL.

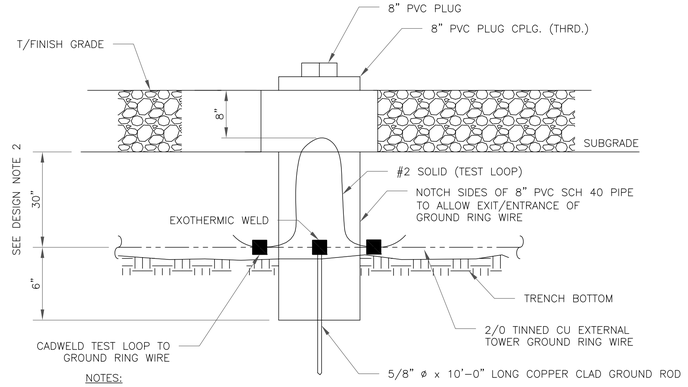
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

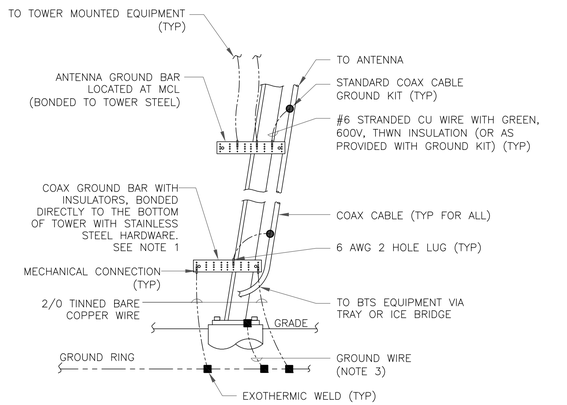
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



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)

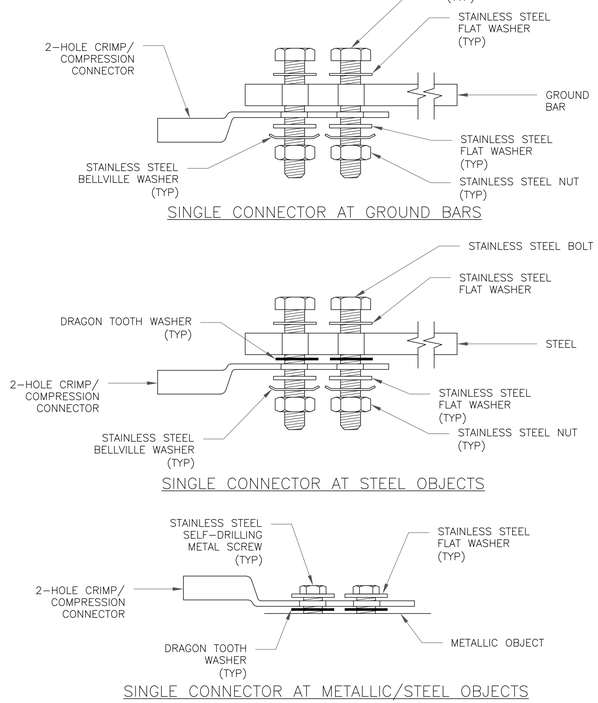
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



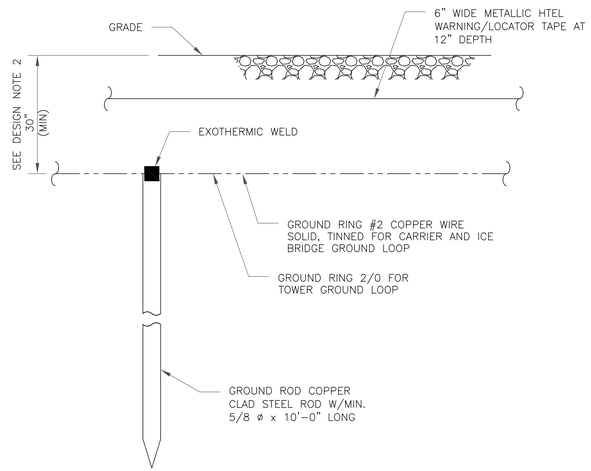
NOTES:

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 USA INC. 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

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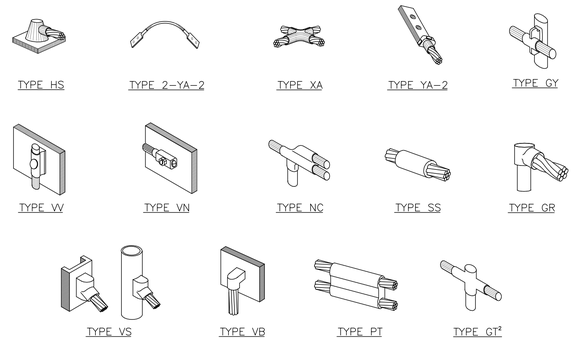
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-2
REVISION: 1

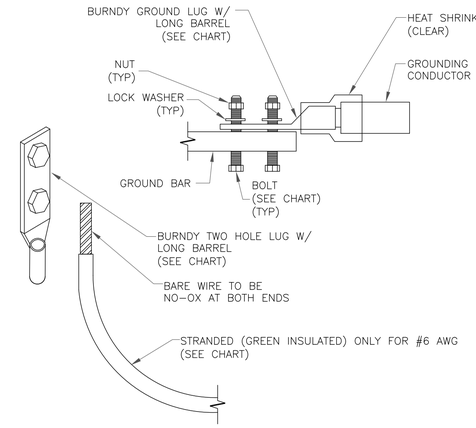


NOTE:

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

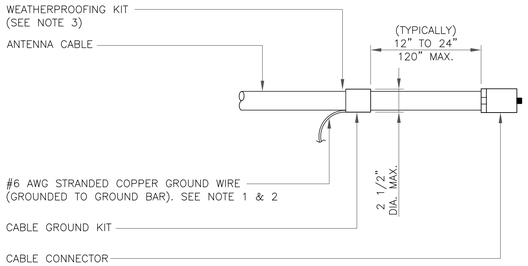
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



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.

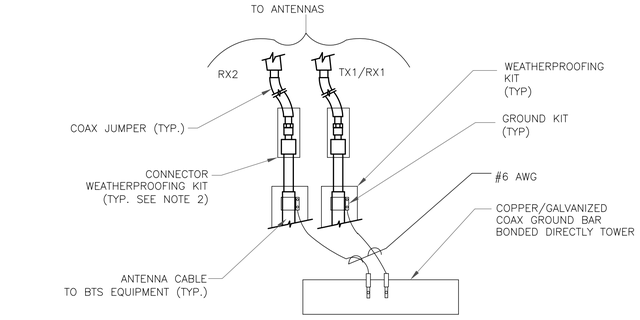
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



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

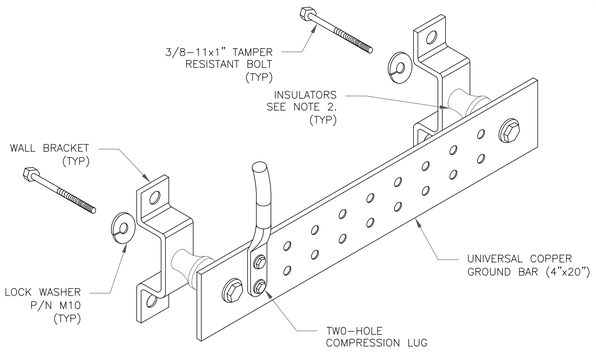


NOTES:

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

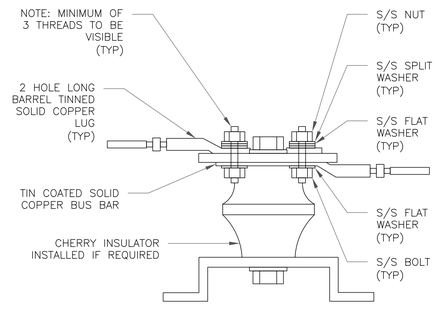
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



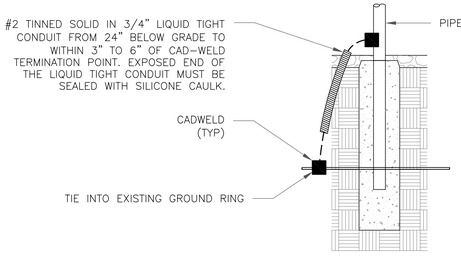
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. 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
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11189E

BU #: **871584**
JOHN TOM HILL

115 BIRCH MTN ROAD
GLASTONBURY, CT 06033

EXISTING
200'-0" SELF-SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/5/20	LHT	CONSTRUCTION	RMC
1	2/4/21	MTJ	CONSTRUCTION	MDW

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-3
REVISION: 1

Exhibit D

Structural Analysis Report

Date: **November 06, 2020**

Rebecca Klein
Crown Castle
6325 Ardrey Kell Rd., Suite 600
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:	CT11189E
	Carrier Site Name:	Glastonbury/ Rt-94 & Fern
Crown Castle Designation:	**Crown Castle BU Number:**	871584
	Crown Castle Site Name:	John Tom Hill
	Crown Castle JDE Job Number:	620149
	Crown Castle Work Order Number:	1898298
	Crown Castle Order Number:	529712 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1898298
Site Data:	**115 Birch Mtn. Road, GLASTONBURY, Hartford County, CT**	
	Latitude *41° 42' 32.24"*, Longitude *-72° 28' 24.41"*	
	200 Foot - Self Support Tower	

Dear Rebecca Klein,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

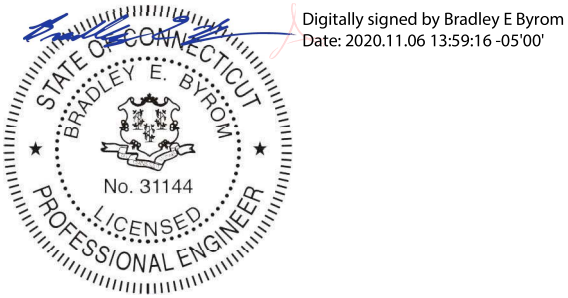
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Modified Structure w/Proposed Equipment Configuration **Sufficient Capacity-91.9%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Subhash Mandal

Respectfully submitted by:



Bradley E. Byrom, P.E., S.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 200 ft Self Support tower designed by SABRE COMMUNICATIONS. The tower has been modified per reinforcement drawings prepared by Crown Castle in June of 2020.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
182.0	183.0	3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe	6	1-5/8
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4424 B25_TMO		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	182.0	3	sitepro1	STK-U Stiff Arm Kit		
		1	tower mounts	Sector Mount [SM 702-3]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
198.0	208.0	1	rfs celwave	ALR10-O	3 2	7/8 1/2
	205.0	1	decibel	DB225-A		
		1	rfs celwave	PD1107-1		
		1	rfs celwave	PD201-7		
	204.0	1	scala	OGB6-928N		
	198.0	1	tower mounts	Sector Mount [SM 702-3]		
190.0	190.0	3	commscope	USX6-6W-6GR	18 9	1/4 1/2
		6	saf	MXM REPEATER MK2		
		3	tower mounts	Pipe Mount [PM 601-1]		
170.0	171.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	4	1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	170.0	1	tower mounts	Sector Mount [SM 506-3]		
163.0	163.0	1	kathrein	PR-850	1	1/2
		1	tower mounts	Pipe Mount [PM 601-1]		
144.0	155.0	1	sinclair	SRL480N1DT4	2 3	7/8 1/2
	152.0	2	rfs celwave	PD1109-1		
	144.0	1	tower mounts	Sector Mount [SM 702-3]		
53.0	55.0	1	lucent	KS24019-L112A	1	1/2
	53.0	1	tower mounts	Side Arm Mount [SO 202-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E.	1404208	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Sabre/ TEP (Mapped)	2068370	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Sabre	1403674	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Crown Castle	9122283	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), 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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) 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 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	200 - 180	Leg	Sabre 2.875x.375	3	-28.45	100.37	28.3	Pass
T2	180 - 160	Leg	Sabre 3.5 x .3	33	-79.69	116.34	68.5	Pass
T3	160 - 140	Leg	Sabre 4 x .318	60	-123.07	149.09	82.5	Pass
T4	140 - 120	Leg	Sabre 4.5 x .438	87	-161.68	211.28	76.5	Pass
T5	120 - 100	Leg	Sabre 5.5625 x .375	108	-197.59	251.62	78.5	Pass
T6	100 - 80	Leg	Sabre 5.5625 x .375	129	-231.30	251.62	91.9	Pass
T7	80 - 60	Leg	Sabre 6.625 x .432	150	-261.19	319.52	81.7	Pass
T8	60 - 40	Leg	Sabre 8.625 x .322	165	-292.63	351.50	83.3	Pass
T9	40 - 20	Leg	Sabre 8.625 x .5	180	-324.04	531.40	61.0	Pass
T10	20 - 0	Leg	Sabre 8.625 x .5	195	-354.54	531.40	66.7	Pass
T1	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	10	-5.38	13.85	38.9 65.2 (b)	Pass
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	37	-5.79	9.47	61.2 70.7 (b)	Pass
T3	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	64	-5.99	6.54	91.7	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	91	-6.49	12.36	52.5 64.1 (b)	Pass
T5	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	113	-6.60	9.61	68.6	Pass
T6	100 - 80	Diagonal	L3x3x3/16	134	-6.96	13.18	52.8 63.7 (b)	Pass
T7	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	155	-8.10	18.99	42.6 53.6 (b)	Pass
T8	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	169	-8.73	16.23	53.8 57.1 (b)	Pass
T9	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	184	-9.25	13.73	67.4	Pass
T10	20 - 0	Diagonal	L4x4x1/4	199	-10.31	17.67	58.4 64.1 (b)	Pass
T1	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.40	7.66	5.3	Pass
							Summary	
						Leg (T6)	91.9	Pass
						Diagonal (T3)	91.7	Pass
						Top Girt (T1)	5.3	Pass
						Bolt Checks	72.1	Pass
						Rating =	91.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	55.7	Pass
1	Base Foundation (Structure)	0	64.4	Pass
1	Base Foundation (Soil Interaction)	0	65.7	Pass

Structure Rating (max from all components) =	**91.9%**

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

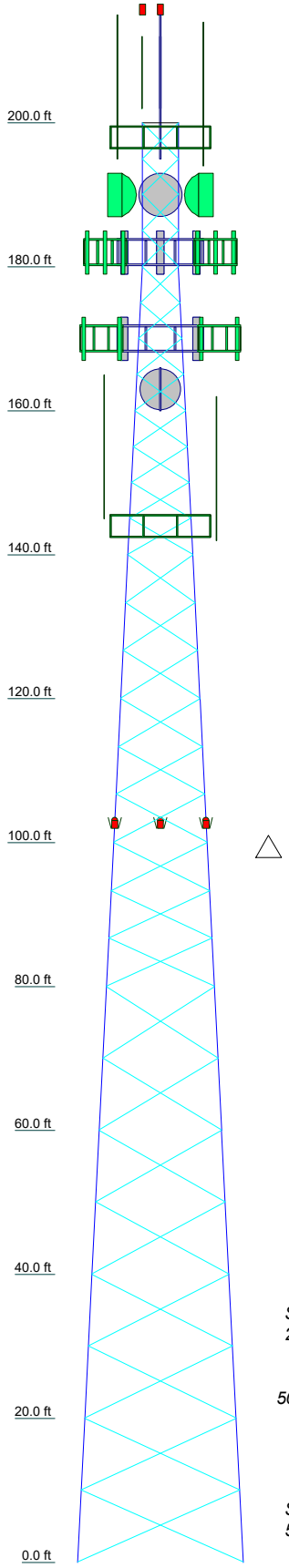
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration once the proposed modifications are installed.

APPENDIX A

TNXTOWER OUTPUT

Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10											
Legs		Sabre 2.875x.375	Sabre 3.5 x .3	Sabre 4 x .318	Sabre 4.5 x .438	Sabre 5.5625 x .375		Sabre 6.625 x .432	Sabre 8.625 x .322	Sabre 8.625 x .5												
Leg Grade		A572-50																				
Diagonals		L1 3/4x1 3/4x3/16			L2 1/2x2 1/2x3/16		L3x3x3/16		L3 1/2x3 1/2x1/4		L4x4x1/4											
Diagonal Grade		A36																				
Top Girts		N.A.										L1 3/4x1 3/4x3/16										
Face Width (ft)	23						21			19			17			15			13		11		9		7		5
# Panels @ (ft)		8 @ 9.95833										9 @ 6.63889										12 @ 4.97917
Weight (K)	25.4	4.7		4.4		3.3		3.2		2.4		2.1		1.9		1.3		1.1		1.0		



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 91.9%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 362 K
SHEAR: 36 K

UPLIFT: -312 K
SHEAR: 32 K

AXIAL 173 K
SHEAR 20 K
MOMENT 2336 kip-ft

TORQUE 11 kip-ft
50 mph WIND - 2.000 in ICE

AXIAL 60 K
SHEAR 58 K
MOMENT 6838 kip-ft

TORQUE 25 kip-ft
REACTIONS - 125 mph WIND

CROWN CASTLE
The Pathway to Possible

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

Job: **BU 871584**			
Project:			
Client: Crown Castle	Drawn by: SMandal	App'd:	
Code: TIA-222-H	Date: 11/06/20	Scale: NTS	
Path: C:\Users\smandal\Desktop\WIP\871584\WO 1898298 - SA\Prod\871584_RPA.eri		Dwg No. E-1	

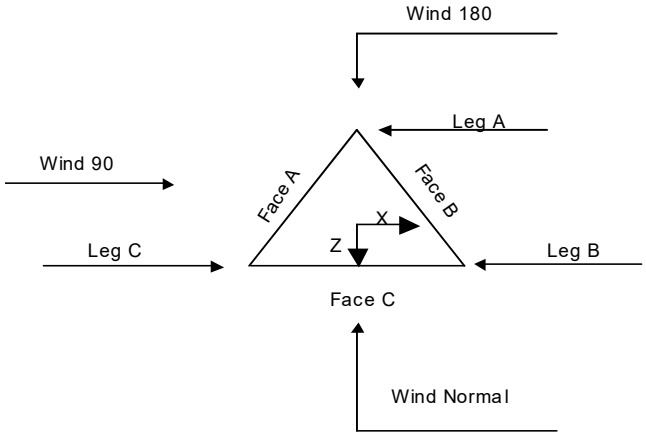
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 200.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.000 ft at the top and 23.000 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

3) Tower is located in Hartford County, Connecticut.
4) Tower base elevation above sea level: 878.00 ft.
5) Basic wind speed of 125 mph.
6) Risk Category II.
7) Exposure Category C.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height: 0.00 ft.
11) Nominal ice thickness of 2.000 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) Pressures are calculated at each section.
18) Tower analysis based on target reliabilities in accordance with Annex S.
19) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
20) Stress ratio used in tower member design is 1.05.
21) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	200.00-180.00			5.000	1	20.00
T2	180.00-160.00			5.000	1	20.00
T3	160.00-140.00			7.000	1	20.00
T4	140.00-120.00			9.000	1	20.00
T5	120.00-100.00			11.000	1	20.00
T6	100.00-80.00			13.000	1	20.00
T7	80.00-60.00			15.000	1	20.00
T8	60.00-40.00			17.000	1	20.00
T9	40.00-20.00			19.000	1	20.00
T10	20.00-0.00			21.000	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	200.00-180.00	4.979	X Brace	No	No	0.000	1.000
T2	180.00-160.00	4.979	X Brace	No	No	0.000	1.000
T3	160.00-140.00	4.979	X Brace	No	No	0.000	1.000
T4	140.00-120.00	6.639	X Brace	No	No	0.000	1.000
T5	120.00-100.00	6.639	X Brace	No	No	0.000	1.000
T6	100.00-80.00	6.639	X Brace	No	No	0.000	1.000
T7	80.00-60.00	9.958	X Brace	No	No	0.000	1.000
T8	60.00-40.00	9.958	X Brace	No	No	0.000	1.000
T9	40.00-20.00	9.958	X Brace	No	No	0.000	1.000
T10	20.00-0.00	9.958	X Brace	No	No	0.000	1.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 200.00-180.00	Pipe	Sabre 2.875x.375	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.00-160.00	Pipe	Sabre 3.5 x .3	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160.00-140.00	Pipe	Sabre 4 x .318	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 140.00-120.00	Pipe	Sabre 4.5 x .438	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 120.00-100.00	Pipe	Sabre 5.5625 x .375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 100.00-80.00	Pipe	Sabre 5.5625 x .375	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 80.00-60.00	Pipe	Sabre 6.625 x .432	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T8 60.00-40.00	Pipe	Sabre 8.625 x .322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T9 40.00-20.00	Pipe	Sabre 8.625 x .5	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T10 20.00-0.00	Pipe	Sabre 8.625 x .5	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 200.00-180.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 200.00-180.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 180.00-160.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 160.00-140.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 140.00-120.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 120.00-100.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 100.00-80.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 80.00-60.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 60.00-40.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 40.00-20.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T10 20.00-0.00	0.00	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 200.00-180.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.00-160.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 200.00-180.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180.00-160.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160.00-140.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.00-120.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.00-100.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.00-80.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.00-60.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.00-40.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.00-20.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.00-0.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 200.00-180.00	Flange	0.750 A325X	4	0.625 A325X	1	0.625 A325X	1	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T2 180.00-160.00	Flange	1.000 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T3 160.00-140.00	Flange	1.000 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T4 140.00-120.00	Flange	1.250 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T5 120.00-100.00	Flange	1.250 A325X	4	0.625 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T6 100.00-80.00	Flange	1.250 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T7 80.00-60.00	Flange	1.250 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T8 60.00-40.00	Flange	1.375 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T9 40.00-20.00	Flange	1.375 A325X	6	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T10 20.00-0.00	Flange	0.000 A572-50	0	0.750 A325X	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***													
LDF4-50A(1/2)	B	No	No	Ar (CaAa)	198.00 - 163.00	0.000	0.18	1	1	0.500	0.630		0.150
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	198.00 - 0.00	-2.000	0.03	1	1	0.500	0.630		0.150
LDF5-50A(7/8)	B	No	No	Ar (CaAa)	198.00 - 144.00	0.000	0.16	3	2	0.500	1.090		0.330
***													
760178129(1/4)	B	No	No	Ar (CaAa)	190.00 - 182.00	1.000	-0.08	18	9	0.330	0.330		0.044
LDF4-50A(1/2)	B	No	No	Ar (CaAa)	190.00 - 182.00	0.000	-0.08	9	9	0.625	0.625		0.150
760178129(1/4)	B	No	No	Ar (CaAa)	182.00 - 0.00	3.000	-0.08	18	9	0.330	0.001		0.040
LDF4-50A(1/2)	B	No	No	Ar (CaAa)	182.00 - 0.00	2.000	-0.08	9	9	0.625	0.001		0.150
***													
AVA7-50(1-5/8)	B	No	No	Ar (CaAa)	182.00 - 0.00	0.000	-0.1	6	6	0.500	2.010		0.700
Feedline Ladder (Af)	B	No	No	Af (CaAa)	168.00 - 0.00	0.000	-0.1	1	1	1.500	1.500		8.400
***													
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Ar (CaAa)	170.00 - 0.00	-2.000	0.02	4	4	0.500	1.540		1.200
Feedline Ladder (Af)	C	No	No	Af (CaAa)	170.00 - 0.00	-1.000	0.005	1	1	3.000	3.000		8.400
***													
FLC 12-50J(1/2)	B	No	No	Ar (CaAa)	163.00 - 144.00	0.000	0.14	2	2	0.500	0.640		0.170
***													
LDF5-50A(7/8)	B	No	No	Ar (CaAa)	144.00 - 0.00	0.000	0.15	5	5	0.500	1.090		0.330

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF4-50A(1/2) ***	B	No	No	Ar (CaAa)	144.00 - 56.00	0.000	0.12	5	5	0.625	0.630		0.150
LDF4-50A(1/2) ***	C	No	No	Ar (CaAa)	53.00 - 0.00	-1.500	0.03	1	1	0.630	0.630		0.150
LDF4-50A(1/2)	B	No	No	Ar (CaAa)	56.00 - 0.00	1.000	0.15	6	6	0.630	0.630		0.150
LDF2-50(3/8")	B	No	No	Ar (CaAa)	100.00 - 0.00	0.000	0.04	1	1	0.500	0.440		0.080
50-AC-208-8SM(3/4")	B	No	No	Ar (CaAa)	200.00 - 0.00	0.000	0.05	1	1	0.740	0.740		0.290
Feedline Ladder (Af) ***	B	No	No	Af (CaAa)	200.00 - 0.00	0.000	0.05	1	1	3.000	3.000		8.400
Feedline Ladder (Af)	B	No	No	Af (CaAa)	200.00 - 0.00	0.000	0.15	1	1	3.000	3.000		8.400
Thin Flat Bar Climbing Ladder	C	No	No	Af (CaAa)	200.00 - 0.00	0.000	0	1	1	2.000	2.000		4.000
Safety Line 3/8 ***	C	No	No	Ar (CaAa)	200.00 - 0.00	0.000	0	1	1	0.375	0.375		0.220
1 1/2" Rigid Conduit **	B	No	No	Ar (CaAa)	200.00 - 0.00	0.000	0.06	1	1	1.500	1.500		1.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	180.00 - 0.00	0.000	-0.13	1	1	3.000	3.000		8.400
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	140.00 - 0.00	0.000	-0.03	1	1	3.000	3.000		8.400

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
***								

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
T1	200.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	43.169	0.000	0.41
		C	0.000	0.000	8.551	0.000	0.09
T2	180.00-160.00	A	0.000	0.000	10.000	0.000	0.17
		B	0.000	0.000	58.649	0.000	0.58
		C	0.000	0.000	19.837	0.000	0.22
T3	160.00-140.00	A	0.000	0.000	10.000	0.000	0.17
		B	0.000	0.000	64.374	0.000	0.69
		C	0.000	0.000	30.997	0.000	0.35
T4	140.00-120.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	70.854	0.000	0.70
		C	0.000	0.000	30.997	0.000	0.35
T5	120.00-100.00	A	0.000	0.000	20.000	0.000	0.34

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	70.854	0.000	0.70
		C	0.000	0.000	30.997	0.000	0.35
T6	100.00-80.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	71.734	0.000	0.70
		C	0.000	0.000	30.997	0.000	0.35
T7	80.00-60.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	71.734	0.000	0.70
		C	0.000	0.000	30.997	0.000	0.35
T8	60.00-40.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	72.742	0.000	0.71
		C	0.000	0.000	31.816	0.000	0.35
T9	40.00-20.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	72.994	0.000	0.71
		C	0.000	0.000	32.257	0.000	0.35
T10	20.00-0.00	A	0.000	0.000	20.000	0.000	0.34
		B	0.000	0.000	72.994	0.000	0.71
		C	0.000	0.000	32.257	0.000	0.35

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
T1	200.00-180.00	A	2.025	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	122.399	0.000	2.13
		C		0.000	0.000	32.043	0.000	0.57
T2	180.00-160.00	A	2.003	0.000	0.000	18.011	0.000	0.47
		B		0.000	0.000	189.341	0.000	3.08
		C		0.000	0.000	57.862	0.000	1.06
T3	160.00-140.00	A	1.978	0.000	0.000	17.912	0.000	0.47
		B		0.000	0.000	206.883	0.000	3.35
		C		0.000	0.000	82.449	0.000	1.52
T4	140.00-120.00	A	1.950	0.000	0.000	35.598	0.000	0.92
		B		0.000	0.000	218.156	0.000	3.52
		C		0.000	0.000	81.812	0.000	1.49
T5	120.00-100.00	A	1.918	0.000	0.000	35.340	0.000	0.91
		B		0.000	0.000	216.443	0.000	3.46
		C		0.000	0.000	81.081	0.000	1.47
T6	100.00-80.00	A	1.879	0.000	0.000	35.035	0.000	0.89
		B		0.000	0.000	222.823	0.000	3.49
		C		0.000	0.000	80.218	0.000	1.44
T7	80.00-60.00	A	1.833	0.000	0.000	34.662	0.000	0.88
		B		0.000	0.000	220.167	0.000	3.40
		C		0.000	0.000	79.162	0.000	1.40
T8	60.00-40.00	A	1.772	0.000	0.000	34.177	0.000	0.85
		B		0.000	0.000	219.074	0.000	3.32
		C		0.000	0.000	83.217	0.000	1.42
T9	40.00-20.00	A	1.684	0.000	0.000	33.471	0.000	0.82
		B		0.000	0.000	214.662	0.000	3.16
		C		0.000	0.000	83.790	0.000	1.38
T10	20.00-0.00	A	1.509	0.000	0.000	32.069	0.000	0.75
		B		0.000	0.000	204.766	0.000	2.84
		C		0.000	0.000	79.134	0.000	1.24

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	200.00-180.00	5.772	-1.242	6.623	-0.410
T2	180.00-160.00	4.863	-2.309	6.752	-2.095
T3	160.00-140.00	5.765	-2.107	8.067	-1.956

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T4	140.00-120.00	5.074	-2.835	7.804	-2.814
T5	120.00-100.00	5.645	-3.119	8.764	-3.125
T6	100.00-80.00	5.916	-3.258	10.070	-3.632
T7	80.00-60.00	6.763	-3.678	11.410	-4.114
T8	60.00-40.00	7.221	-3.493	11.974	-3.526
T9	40.00-20.00	7.703	-3.562	12.625	-3.426
T10	20.00-0.00	7.648	-3.555	12.723	-3.740

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	LDF4-50A(1/2)	180.00 - 198.00	0.6000	0.5372
T1	3	LDF4-50A(1/2)	180.00 - 198.00	0.6000	0.5372
T1	4	LDF5-50A(7/8)	180.00 - 198.00	0.6000	0.5372
T1	6	760178129(1/4)	182.00 - 190.00	0.6000	0.5372
T1	7	LDF4-50A(1/2)	182.00 - 190.00	0.6000	0.5372
T1	8	760178129(1/4)	180.00 - 182.00	0.6000	0.5372
T1	9	LDF4-50A(1/2)	180.00 - 182.00	0.6000	0.5372
T1	11	AVA7-50(1-5/8)	180.00 - 182.00	0.6000	0.5372
T1	26	50-AC-208-8SM(3/4")	180.00 - 200.00	0.6000	0.5372
T1	27	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.5372
T1	29	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.5372
T1	30	Thin Flat Bar Climbing Ladder	180.00 - 200.00	0.6000	0.5372
T1	31	Safety Line 3/8	180.00 - 200.00	0.6000	0.5372
T1	33	1 1/2" Rigid Conduit	180.00 - 200.00	0.6000	0.5372
T2	2	LDF4-50A(1/2)	163.00 - 180.00	0.6000	0.5940
T2	3	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.5940
T2	4	LDF5-50A(7/8)	160.00 - 180.00	0.6000	0.5940
T2	8	760178129(1/4)	160.00 - 180.00	0.6000	0.5940
T2	9	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.5940
T2	11	AVA7-50(1-5/8)	160.00 - 180.00	0.6000	0.5940
T2	12	Feedline Ladder (Af)	160.00 - 168.00	0.6000	0.5940
T2	14	HB114-1-0813U4-M5J(1-1/4)	160.00 - 170.00	0.6000	0.5940
T2	15	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.5940
T2	17	FLC 12-50J(1/2)	160.00 - 163.00	0.6000	0.5940
T2	26	50-AC-208-8SM(3/4")	160.00 - 180.00	0.6000	0.5940

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
T2	27	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5940
T2	29	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5940
T2	30	Thin Flat Bar Climbing Ladder	160.00 - 180.00	0.6000	0.5940
T2	31	Safety Line 3/8	160.00 - 180.00	0.6000	0.5940
T2	33	1 1/2" Rigid Conduit	160.00 - 180.00	0.6000	0.5940
T2	35	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5940
T3	3	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	4	LDF5-50A(7/8)	144.00 - 160.00	0.6000	0.6000
T3	8	760178129(1/4)	140.00 - 160.00	0.6000	0.6000
T3	9	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	11	AVA7-50(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	14	HB114-1-0813U4-M5J(1-1/4)	140.00 - 160.00	0.6000	0.6000
T3	15	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	17	FLC 12-50J(1/2)	144.00 - 160.00	0.6000	0.6000
T3	19	LDF5-50A(7/8)	140.00 - 144.00	0.6000	0.6000
T3	20	LDF4-50A(1/2)	140.00 - 144.00	0.6000	0.6000
T3	26	50-AC-208-8SM(3/4")	140.00 - 160.00	0.6000	0.6000
T3	27	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	29	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	30	Thin Flat Bar Climbing Ladder	140.00 - 160.00	0.6000	0.6000
T3	31	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T3	33	1 1/2" Rigid Conduit	140.00 - 160.00	0.6000	0.6000
T3	35	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T4	3	LDF4-50A(1/2)	120.00 - 140.00	0.6000	0.6000
T4	8	760178129(1/4)	120.00 - 140.00	0.6000	0.6000
T4	9	LDF4-50A(1/2)	120.00 - 140.00	0.6000	0.6000
T4	11	AVA7-50(1-5/8)	120.00 - 140.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T4	14	HB114-1-0813U4-M5J(1-1/4)	120.00 - 140.00	0.6000	0.6000
T4	15	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T4	19	LDF5-50A(7/8)	120.00 - 140.00	0.6000	0.6000
T4	20	LDF4-50A(1/2)	120.00 - 140.00	0.6000	0.6000
T4	26	50-AC-208-8SM(3/4")	120.00 - 140.00	0.6000	0.6000
T4	27	Feedline Ladder (Af)	120.00 -	0.6000	0.6000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
T4	29	Feedline Ladder (Af)	140.00 120.00 -	0.6000	0.6000
T4	30	Thin Flat Bar Climbing Ladder	140.00 120.00 -	0.6000	0.6000
T4	31	Safety Line 3/8	140.00 120.00 -	0.6000	0.6000
T4	33	1 1/2" Rigid Conduit	140.00 120.00 -	0.6000	0.6000
T4	35	Feedline Ladder (Af)	140.00 120.00 -	0.6000	0.6000
T4	36	Feedline Ladder (Af)	140.00 120.00 -	0.6000	0.6000
T5	3	LDF4-50A(1/2)	140.00 100.00 -	0.6000	0.6000
T5	8	760178129(1/4)	120.00 100.00 -	0.6000	0.6000
T5	9	LDF4-50A(1/2)	120.00 100.00 -	0.6000	0.6000
T5	11	AVA7-50(1-5/8)	120.00 100.00 -	0.6000	0.6000
T5	12	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T5	14	HB114-1-0813U4-M5J(1-1/4)	120.00 100.00 -	0.6000	0.6000
T5	15	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T5	19	LDF5-50A(7/8)	120.00 100.00 -	0.6000	0.6000
T5	20	LDF4-50A(1/2)	120.00 100.00 -	0.6000	0.6000
T5	26	50-AC-208-8SM(3/4")	120.00 100.00 -	0.6000	0.6000
T5	27	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T5	29	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T5	30	Thin Flat Bar Climbing Ladder	120.00 100.00 -	0.6000	0.6000
T5	31	Safety Line 3/8	120.00 100.00 -	0.6000	0.6000
T5	33	1 1/2" Rigid Conduit	120.00 100.00 -	0.6000	0.6000
T5	35	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T5	36	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	3	LDF4-50A(1/2)	120.00 80.00 -	0.6000	0.6000
T6	8	760178129(1/4)	100.00 80.00 -	0.6000	0.6000
T6	9	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T6	11	AVA7-50(1-5/8)	100.00 80.00 -	0.6000	0.6000
T6	12	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T6	14	HB114-1-0813U4-M5J(1-1/4)	100.00 80.00 -	0.6000	0.6000
T6	15	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T6	19	LDF5-50A(7/8)	100.00 80.00 -	0.6000	0.6000
T6	20	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T6	25	LDF2-50(3/8")	100.00 80.00 -	0.6000	0.6000
T6	26	50-AC-208-8SM(3/4")	100.00 80.00 -	0.6000	0.6000
			100.00		

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
T6	27	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	29	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	30	Thin Flat Bar Climbing Ladder	80.00 - 100.00	0.6000	0.6000
T6	31	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	33	1 1/2" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T6	35	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	36	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	3	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	8	760178129(1/4)	60.00 - 80.00	0.6000	0.6000
T7	9	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	11	AVA7-50(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	14	HB114-1-0813U4-M5J(1-1/4)	60.00 - 80.00	0.6000	0.6000
T7	15	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	19	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T7	20	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	25	LDF2-50(3/8")	60.00 - 80.00	0.6000	0.6000
T7	26	50-AC-208-8SM(3/4")	60.00 - 80.00	0.6000	0.6000
T7	27	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	29	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	30	Thin Flat Bar Climbing Ladder	60.00 - 80.00	0.6000	0.6000
T7	31	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	33	1 1/2" Rigid Conduit	60.00 - 80.00	0.6000	0.6000
T7	35	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	36	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	3	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T8	8	760178129(1/4)	40.00 - 60.00	0.6000	0.6000
T8	9	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T8	11	AVA7-50(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	14	HB114-1-0813U4-M5J(1-1/4)	40.00 - 60.00	0.6000	0.6000
T8	15	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	19	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T8	20	LDF4-50A(1/2)	56.00 - 60.00	0.6000	0.6000
T8	22	LDF4-50A(1/2)	40.00 -	0.6000	0.6000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
			53.00		
T8	24	LDF4-50A(1/2)	40.00 - 56.00	0.6000	0.6000
T8	25	LDF2-50(3/8")	40.00 - 60.00	0.6000	0.6000
T8	26	50-AC-208-8SM(3/4")	40.00 - 60.00	0.6000	0.6000
T8	27	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	29	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	30	Thin Flat Bar Climbing Ladder	40.00 - 60.00	0.6000	0.6000
T8	31	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	33	1 1/2" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T8	35	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	36	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	3	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	8	760178129(1/4)	20.00 - 40.00	0.6000	0.6000
T9	9	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	11	AVA7-50(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	14	HB114-1-0813U4-M5J(1-1/4)	20.00 - 40.00	0.6000	0.6000
T9	15	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	19	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T9	22	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	25	LDF2-50(3/8")	20.00 - 40.00	0.6000	0.6000
T9	26	50-AC-208-8SM(3/4")	20.00 - 40.00	0.6000	0.6000
T9	27	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	29	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	30	Thin Flat Bar Climbing Ladder	20.00 - 40.00	0.6000	0.6000
T9	31	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T9	33	1 1/2" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T9	35	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	36	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	3	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	8	760178129(1/4)	0.00 - 20.00	0.6000	0.6000
T10	9	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	11	AVA7-50(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	14	HB114-1-0813U4-M5J(1-1/4)	0.00 - 20.00	0.6000	0.6000
T10	15	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	19	LDF5-50A(7/8)	0.00 - 20.00	0.6000	0.6000
T10	22	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	24	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	25	LDF2-50(3/8")	0.00 - 20.00	0.6000	0.6000
T10	26	50-AC-208-8SM(3/4")	0.00 - 20.00	0.6000	0.6000
T10	27	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	29	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	30	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T10	31	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T10	33	1 1/2" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T10	35	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	36	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

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
15" Dia. x 15" Beacon	A	From Leg	0.00 0.000 15.000	0.000	200.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.78 1.24 1.40 1.75	0.78 1.24 1.40 1.75	0.03 0.05 0.07 0.12
2.4" x 16' Mount Pipe	A	From Leg	0.00 0.000 7.000	0.000	200.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.84 5.47 7.11 10.45	3.84 5.47 7.11 10.45	0.06 0.09 0.13 0.23
15" Dia. x 15" Beacon	C	From Leg	0.00 0.000 15.000	0.000	200.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.78 1.24 1.40 1.75	0.78 1.24 1.40 1.75	0.03 0.05 0.07 0.12
2.4" x 16' Mount Pipe	C	From Leg	0.00 0.000 7.000	0.000	200.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.84 5.47 7.11 10.45	3.84 5.47 7.11 10.45	0.06 0.09 0.13 0.23
3" x 6" SideLight	A	From Leg	0.00 0.000 0.000	0.000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.09 0.14 0.19 0.34	0.09 0.14 0.19 0.34	0.00 0.00 0.00 0.01
3" x 6" SideLight	B	From Leg	0.00 0.000 0.000	0.000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.09 0.14 0.19 0.34	0.09 0.14 0.19 0.34	0.00 0.00 0.00 0.01
3" x 6" SideLight	C	From Leg	0.00 0.000 0.000	0.000	102.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.09 0.14 0.19 0.34	0.09 0.14 0.19 0.34	0.00 0.00 0.00 0.01
**									
DB225-A	A	From Leg	4.00 0.000 7.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.21 5.78 8.35 13.48	3.21 5.78 8.35 13.48	0.04 0.05 0.06 0.08

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*
ALR10-O	B	From Leg	4.00 0.000 10.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.63 15.31 17.39 20.79	6.63 15.31 17.39 20.79	0.09 0.18 0.28 0.52
OGB6-928N	B	From Leg	4.00 0.000 6.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.97 1.33 1.63 2.26	0.97 1.33 1.63 2.26	0.01 0.02 0.03 0.06
PD1107-1	C	From Leg	4.00 0.000 7.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.18 3.29 4.43 6.42	2.18 3.29 4.43 6.42	0.01 0.02 0.05 0.12
PD201-7	C	From Leg	4.00 0.000 7.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.81 2.62 3.76	1.02 1.81 2.62 3.76	0.00 0.01 0.03 0.07
(4) 6' x 2" Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(4) 6' x 2" Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(4) 6' x 2" Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(2) 4' x 2" Pipe Mount	A	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	B	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	C	From Leg	4.00 0.000 0.000	0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
Sector Mount [SM 702-3]	C	None		0.000	198.00	No Ice 1/2" Ice 1" Ice 2" Ice	38.89 50.40 61.77 84.35	38.89 50.40 61.77 84.35	1.55 2.28 3.22 5.70
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(2) MXM REPEATER MK2	A	From Leg	1.00 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.57 1.73 1.90 2.26	0.75 0.88 1.01 1.29	0.02 0.03 0.04 0.08
(2) MXM REPEATER MK2	B	From Leg	1.00 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice	1.57 1.73 1.90 2.26	0.75 0.88 1.01 1.29	0.02 0.03 0.04 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						2" Ice			
(2) MXM REPEATER MK2	C	From Leg	1.00 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.57 1.73 1.90 2.26	0.75 0.88 1.01 1.29	0.02 0.03 0.04 0.08
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0.07 0.08 0.09 0.13
Pipe Mount [PM 601-1]	B	From Leg	0.50 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0.07 0.08 0.09 0.13
Pipe Mount [PM 601-1]	C	From Leg	0.50 0.000 0.000	0.000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0.07 0.08 0.09 0.13
***									
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.19 0.31 0.46 0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.19 0.31 0.46 0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.19 0.31 0.46 0.79
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.87 6.23 6.61 7.38	3.27 3.73 4.20 5.20	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.87 6.23 6.61 7.38	3.27 3.73 4.20 5.20	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.87 6.23 6.61 7.38	3.27 3.73 4.20 5.20	0.13 0.18 0.23 0.36
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.29 6.86 7.45 8.68	2.76 3.27 3.79 4.90	0.06 0.11 0.16 0.29
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.29 6.86 7.45 8.68	2.76 3.27 3.79 4.90	0.06 0.11 0.16 0.29
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.00 0.000 1.000	0.000	182.00	No Ice 1/2" Ice	6.29 6.86 7.45	2.76 3.27 3.79	0.06 0.11 0.16

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice	8.68	4.90	0.29
						2" Ice			
RADIO 4449 B12/B71	A	From Leg	4.00	0.000	182.00	No Ice	1.65	1.16	0.07
			0.000			1/2"	1.81	1.30	0.09
			1.000			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	B	From Leg	4.00	0.000	182.00	No Ice	1.65	1.16	0.07
			0.000			1/2"	1.81	1.30	0.09
			1.000			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	C	From Leg	4.00	0.000	182.00	No Ice	1.65	1.16	0.07
			0.000			1/2"	1.81	1.30	0.09
			1.000			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4415 B66A_CCIV3	A	From Leg	4.00	0.000	182.00	No Ice	1.64	0.68	0.05
			0.000			1/2"	1.80	0.79	0.06
			1.000			Ice	1.97	0.91	0.07
						1" Ice	2.32	1.18	0.11
						2" Ice			
RADIO 4415 B66A_CCIV3	B	From Leg	4.00	0.000	182.00	No Ice	1.64	0.68	0.05
			0.000			1/2"	1.80	0.79	0.06
			1.000			Ice	1.97	0.91	0.07
						1" Ice	2.32	1.18	0.11
						2" Ice			
RADIO 4415 B66A_CCIV3	C	From Leg	4.00	0.000	182.00	No Ice	1.64	0.68	0.05
			0.000			1/2"	1.80	0.79	0.06
			1.000			Ice	1.97	0.91	0.07
						1" Ice	2.32	1.18	0.11
						2" Ice			
RADIO 4424 B25_TMO	A	From Leg	4.00	0.000	182.00	No Ice	2.05	1.61	0.09
			0.000			1/2"	2.23	1.77	0.11
			1.000			Ice	2.42	1.94	0.13
						1" Ice	2.81	2.30	0.19
						2" Ice			
RADIO 4424 B25_TMO	B	From Leg	4.00	0.000	182.00	No Ice	2.05	1.61	0.09
			0.000			1/2"	2.23	1.77	0.11
			1.000			Ice	2.42	1.94	0.13
						1" Ice	2.81	2.30	0.19
						2" Ice			
RADIO 4424 B25_TMO	C	From Leg	4.00	0.000	182.00	No Ice	2.05	1.61	0.09
			0.000			1/2"	2.23	1.77	0.11
			1.000			Ice	2.42	1.94	0.13
						1" Ice	2.81	2.30	0.19
						2" Ice			
Sector Mount [SM 702-3]	C	None		0.000	182.00	No Ice	38.89	38.89	1.55
						1/2"	50.40	50.40	2.28
						Ice	61.77	61.77	3.22
						1" Ice	84.35	84.35	5.70
						2" Ice			
(3) 6' x 2" Mount Pipe	A	From Leg	4.00	0.000	182.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
(3) 6' x 2" Mount Pipe	B	From Leg	4.00	0.000	182.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
(3) 6' x 2" Mount Pipe	C	From Leg	4.00	0.000	182.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert ft ft ft*	*Azimuth Adjustment ° *	*Placement ft*		*C_AA_A Front ft^2*	*C_AA_A Side ft^2*	*Weight K*
						1" Ice	3.06	3.06	0.09
						2" Ice			
SitePro STK-U Stiff Arm Kit	A	From Leg	2.00	0.000	182.00	No Ice	1.14	0.00	0.02
			0.000			1/2"	1.76	0.00	0.03
			0.000			Ice	2.14	0.00	0.04
						1" Ice	2.90	0.00	0.08
						2" Ice			
SitePro STK-U Stiff Arm Kit	B	From Leg	2.00	0.000	182.00	No Ice	1.14	0.00	0.02
			0.000			1/2"	1.76	0.00	0.03
			0.000			Ice	2.14	0.00	0.04
						1" Ice	2.90	0.00	0.08
						2" Ice			
SitePro STK-U Stiff Arm Kit	C	From Leg	2.00	0.000	182.00	No Ice	1.14	0.00	0.02
			0.000			1/2"	1.76	0.00	0.03
			0.000			Ice	2.14	0.00	0.04
						1" Ice	2.90	0.00	0.08
						2" Ice			
**									
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00	0.000	170.00	No Ice	4.09	2.86	0.08
			0.000			1/2"	4.48	3.23	0.13
			1.000			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00	0.000	170.00	No Ice	4.09	2.86	0.08
			0.000			1/2"	4.48	3.23	0.13
			1.000			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00	0.000	170.00	No Ice	4.09	2.86	0.08
			0.000			1/2"	4.48	3.23	0.13
			1.000			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00	0.000	170.00	No Ice	7.55	4.23	0.11
			0.000			1/2"	8.04	4.67	0.20
			1.000			Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.00	0.000	170.00	No Ice	7.55	4.23	0.11
			0.000			1/2"	8.04	4.67	0.20
			1.000			Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00	0.000	170.00	No Ice	7.55	4.23	0.11
			0.000			1/2"	8.04	4.67	0.20
			1.000			Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.00	0.000	170.00	No Ice	2.32	2.24	0.06
			0.000			1/2"	2.53	2.44	0.08
			1.000			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.00	0.000	170.00	No Ice	2.32	2.24	0.06
			0.000			1/2"	2.53	2.44	0.08
			1.000			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.00	0.000	170.00	No Ice	2.32	2.24	0.06
			0.000			1/2"	2.53	2.44	0.08
			1.000			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
TD-RRH8X20-25	A	From Leg	4.00	0.000	170.00	No Ice	4.05	1.53	0.07
			0.000			1/2"	4.30	1.71	0.10

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* *K*
			1.000			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8X20-25	B	From Leg	4.00	0.000	170.00	No Ice	4.05	1.53	0.07
			0.000			1/2"	4.30	1.71	0.10
			1.000			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8X20-25	C	From Leg	4.00	0.000	170.00	No Ice	4.05	1.53	0.07
			0.000			1/2"	4.30	1.71	0.10
			1.000			Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
(2) RRH2X50-800	A	From Leg	4.00	0.000	170.00	No Ice	1.70	1.28	0.05
			0.000			1/2"	1.86	1.43	0.07
			1.000			Ice	2.03	1.58	0.09
						1" Ice	2.40	1.91	0.14
						2" Ice			
(2) RRH2X50-800	B	From Leg	4.00	0.000	170.00	No Ice	1.70	1.28	0.05
			0.000			1/2"	1.86	1.43	0.07
			1.000			Ice	2.03	1.58	0.09
						1" Ice	2.40	1.91	0.14
						2" Ice			
(2) RRH2X50-800	C	From Leg	4.00	0.000	170.00	No Ice	1.70	1.28	0.05
			0.000			1/2"	1.86	1.43	0.07
			1.000			Ice	2.03	1.58	0.09
						1" Ice	2.40	1.91	0.14
						2" Ice			
10' horizontal x 2" Pipe Mount	A	From Leg	2.00	0.000	170.00	No Ice	1.90	0.01	0.03
			0.000			1/2"	2.92	0.04	0.04
			0.000			Ice	3.97	0.09	0.06
						1" Ice	5.65	0.21	0.13
						2" Ice			
10' horizontal x 2" Pipe Mount	B	From Leg	2.00	0.000	170.00	No Ice	1.90	0.01	0.03
			0.000			1/2"	2.92	0.04	0.04
			0.000			Ice	3.97	0.09	0.06
						1" Ice	5.65	0.21	0.13
						2" Ice			
10' horizontal x 2" Pipe Mount	C	From Leg	2.00	0.000	170.00	No Ice	1.90	0.01	0.03
			0.000			1/2"	2.92	0.04	0.04
			0.000			Ice	3.97	0.09	0.06
						1" Ice	5.65	0.21	0.13
						2" Ice			
6' x 2" Mount Pipe	A	From Leg	4.00	0.000	170.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6' x 2" Mount Pipe	B	From Leg	4.00	0.000	170.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.00	0.000	170.00	No Ice	1.43	1.43	0.02
			0.000			1/2"	1.92	1.92	0.03
			0.000			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
Sector Mount [SM 506-3]	C	None		0.000	170.00	No Ice	32.27	32.27	1.74
						1/2"	45.45	45.45	2.39
						Ice	58.44	58.44	3.23
						1" Ice	84.07	84.07	5.54
						2" Ice			
***									
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.000	163.00	No Ice	1.32	1.32	0.07

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*
			0.000 0.000			1/2" Ice 1" Ice 2" Ice	1.58 1.84 2.40	1.58 1.84 2.40	0.08 0.09 0.13
***									
(2) PD1109-1	B	From Leg	4.00 0.000 8.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.83 3.89 4.97 6.37	2.83 3.89 4.97 6.37	0.02 0.04 0.07 0.14
SRL480N1DT4	C	From Leg	4.00 0.000 11.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.35 8.08 9.81 13.32	6.35 8.08 9.81 13.32	0.03 0.07 0.11 0.25
(4) 6' x 2" Mount Pipe	A	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(4) 6' x 2" Mount Pipe	B	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(4) 6' x 2" Mount Pipe	C	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
(2) 4' x 2" Pipe Mount	A	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	B	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
(2) 4' x 2" Pipe Mount	C	From Leg	4.00 0.000 0.000	0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.79 1.03 1.28 1.81	0.79 1.03 1.28 1.81	0.03 0.04 0.04 0.07
Sector Mount [SM 702-3]	C	None		0.000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	38.89 50.40 61.77 84.35	38.89 50.40 61.77 84.35	1.55 2.28 3.22 5.70
***									
KS24019-L112A	C	From Leg	2.00 0.000 2.000	-30.000	53.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.18 0.26 0.42	0.10 0.18 0.26 0.42	0.01 0.01 0.01 0.01
Side Arm Mount [SO 202-1]	C	From Leg	1.00 0.000 0.000	-30.000	53.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.78 2.24 2.75 3.89	2.97 3.57 4.19 5.55	0.11 0.13 0.16 0.25
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight
				ft	°	°	ft	ft		ft^2	K
USX6-6W-6GR	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.000 0.000	-6.000		190.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.27 29.07 29.86 31.44	0.20 0.35 0.50 0.80
USX6-6W-6GR	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0.000 0.000	53.000		190.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.27 29.07 29.86 31.44	0.20 0.35 0.50 0.80
USX6-6W-6GR **	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.000 0.000	-49.000		190.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.27 29.07 29.86 31.44	0.20 0.35 0.50 0.80
PR-850 ***	A	Grid	From Leg	1.00 0.000 0.000	30.000		163.00	5.67	No Ice 1/2" Ice 1" Ice 2" Ice	25.22 25.97 26.71 28.21	0.04 0.17 0.30 0.57

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
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
T1	200 - 180	Leg	Max Tension	15	28.66	-0.02	-0.66
			Max. Compression	2	-35.55	0.04	1.30
			Max. Mx	20	-1.77	-1.13	-0.02
			Max. My	2	-35.55	0.04	1.30
			Max. Vy	18	-5.63	1.10	-0.58
			Max. Vx	2	-7.15	0.04	1.30
		Diagonal	Max Tension	25	5.39	0.00	0.00
			Max. Compression	24	-5.38	0.00	0.00
			Max. Mx	31	0.83	0.03	0.00
			Max. My	17	-4.53	-0.01	0.01
			Max. Vy	31	-0.02	0.03	0.00
			Max. Vx	17	-0.00	0.01	0.01
		Top Girt	Max Tension	3	0.38	0.00	0.00
			Max. Compression	14	-0.40	0.00	0.00
			Max. Mx	26	-0.09	-0.04	0.00
			Max. Vy	26	-0.03	0.00	0.00
T2	180 - 160	Leg	Max Tension	15	73.53	-0.10	0.00
			Max. Compression	2	-85.88	0.69	-0.01
			Max. Mx	2	-41.44	1.30	-0.04
			Max. My	16	-6.57	0.08	0.63
			Max. Vy	3	-6.66	0.68	-0.01
			Max. Vx	16	-2.61	0.05	0.26
		Diagonal	Max Tension	24	5.85	0.00	0.00
			Max. Compression	24	-5.90	0.00	0.00
			Max. Mx	31	1.46	0.03	0.00
			Max. My	24	-5.63	-0.01	-0.01
			Max. Vy	31	-0.03	0.03	0.00
			Max. Vx	24	0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	15	112.13	-0.31	0.02
			Max. Compression	2	-128.92	0.96	-0.04
			Max. Mx	3	-127.09	0.97	-0.04
			Max. My	17	-13.09	0.02	0.86
			Max. Vy	2	-8.07	0.96	-0.04
			Max. Vx	16	-3.00	0.02	0.86
		Diagonal	Max Tension	24	5.96	0.00	0.00
			Max. Compression	24	-5.99	0.00	0.00
			Max. Mx	27	1.44	0.04	-0.01
			Max. My	27	-2.08	0.03	-0.01
			Max. Vy	29	0.04	0.04	-0.00
			Max. Vx	27	0.00	0.00	0.00
T4	140 - 120	Leg	Max Tension	15	147.94	-0.20	0.00
			Max. Compression	2	-168.50	0.91	-0.03
			Max. Mx	3	-133.36	0.97	-0.04
			Max. My	17	-13.36	0.02	0.86
			Max. Vy	18	-8.53	0.89	-0.02
			Max. Vx	16	-3.21	0.03	0.67

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	24	6.67	0.00	0.00
			Max. Compression	24	-6.71	0.00	0.00
			Max. Mx	27	1.68	0.08	-0.01
			Max. My	27	-2.14	0.07	-0.01
			Max. Vy	29	0.06	0.08	-0.01
			Max. Vx	27	0.00	0.00	0.00
T5	120 - 100	Leg	Max Tension	15	179.27	-0.38	0.01
			Max. Compression	2	-203.86	1.18	-0.04
			Max. Mx	2	-203.86	1.18	-0.04
			Max. My	4	-0.52	-0.03	-0.84
			Max. Vy	18	-9.34	1.16	-0.02
			Max. Vx	16	-3.52	0.05	0.84
		Diagonal	Max Tension	4	6.56	0.00	0.00
			Max. Compression	4	-6.60	0.00	0.00
			Max. Mx	29	1.83	0.10	-0.01
			Max. My	27	-2.21	0.09	-0.01
			Max. Vy	29	0.07	0.10	-0.01
			Max. Vx	27	0.00	0.00	0.00
T6	100 - 80	Leg	Max Tension	15	208.23	-0.72	0.04
			Max. Compression	2	-237.22	1.57	-0.07
			Max. Mx	3	-234.32	1.57	-0.07
			Max. My	4	-1.49	-0.05	-1.34
			Max. Vy	18	-10.21	1.57	-0.02
			Max. Vx	16	-4.12	0.04	1.34
		Diagonal	Max Tension	4	6.97	0.00	0.00
			Max. Compression	4	-6.96	0.00	0.00
			Max. Mx	29	2.01	0.15	0.02
			Max. My	27	-2.52	0.12	-0.02
			Max. Vy	29	0.09	0.15	0.02
			Max. Vx	27	0.00	0.00	0.00
T7	80 - 60	Leg	Max Tension	15	235.65	-1.03	0.02
			Max. Compression	2	-269.73	2.05	-0.05
			Max. Mx	2	-269.73	2.05	-0.05
			Max. My	4	-1.60	-0.05	-1.34
			Max. Vy	18	-11.39	2.03	-0.01
			Max. Vx	16	-4.34	0.09	1.16
		Diagonal	Max Tension	4	8.08	0.00	0.00
			Max. Compression	4	-8.10	0.00	0.00
			Max. Mx	27	2.97	0.25	0.03
			Max. My	34	2.58	0.24	0.03
			Max. Vy	29	0.12	0.25	-0.03
			Max. Vx	34	-0.01	0.00	0.00
T8	60 - 40	Leg	Max Tension	15	262.00	-1.15	0.02
			Max. Compression	2	-301.34	2.30	-0.05
			Max. Mx	2	-301.34	2.30	-0.05
			Max. My	4	-3.48	-0.14	-2.28
			Max. Vy	18	-12.84	2.29	-0.04
			Max. Vx	16	-4.39	0.10	1.63
		Diagonal	Max Tension	4	8.60	0.00	0.00
			Max. Compression	2	-8.73	0.00	0.00
			Max. Mx	29	2.56	0.29	-0.04
			Max. My	28	2.68	0.28	-0.04
			Max. Vy	29	0.13	0.29	-0.04
			Max. Vx	28	0.01	0.00	0.00
T9	40 - 20	Leg	Max Tension	7	287.41	-1.23	0.03
			Max. Compression	2	-332.63	2.55	-0.06
			Max. Mx	29	55.60	-4.25	-0.01
			Max. My	4	-4.70	-0.02	-1.64
			Max. Vy	18	-13.96	2.55	-0.01
			Max. Vx	16	-4.61	0.15	1.32
		Diagonal	Max Tension	4	8.97	0.00	0.00
			Max. Compression	2	-9.25	0.00	0.00
			Max. Mx	29	1.81	0.31	-0.04
			Max. My	27	-2.50	0.28	-0.04
			Max. Vy	29	0.14	0.31	-0.04
			Max. Vx	27	0.01	0.00	0.00
T10	20 - 0	Leg	Max Tension	7	312.99	1.15	0.01
			Max. Compression	2	-363.53	0.00	0.00
			Max. Mx	35	-157.08	4.48	-0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	4	-7.87	-0.21	-3.12
			Max. Vy	18	-15.55	0.00	-0.00
			Max. Vx	16	-4.26	0.00	-0.00
		Diagonal	Max Tension	16	9.66	0.00	0.00
			Max. Compression	2	-10.31	0.00	0.00
			Max. Mx	29	0.61	0.42	0.04
			Max. My	28	5.02	0.31	-0.05
			Max. Vy	29	0.15	0.42	0.04
			Max. Vx	28	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	357.80	31.50	-17.90
	Max. H_x	18	357.80	31.50	-17.90
	Max. H_z	7	-311.67	-27.64	15.76
	Min. Vert	7	-311.67	-27.64	15.76
	Min. H_x	7	-311.67	-27.64	15.76
	Min. H_z	18	357.80	31.50	-17.90
Leg B	Max. Vert	10	344.47	-29.78	-17.48
	Max. H_x	23	-294.82	25.81	15.25
	Max. H_z	23	-294.82	25.81	15.25
	Min. Vert	23	-294.82	25.81	15.25
	Min. H_x	10	344.47	-29.78	-17.48
	Min. H_z	10	344.47	-29.78	-17.48
Leg A	Max. Vert	2	362.05	0.53	35.98
	Max. H_x	20	19.93	3.78	1.53
	Max. H_z	2	362.05	0.53	35.98
	Min. Vert	15	-310.40	-0.52	-31.25
	Min. H_x	9	15.16	-3.76	1.16
	Min. H_z	15	-310.40	-0.52	-31.25

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.95	0.00	0.00	-1.94	-11.05	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	59.94	0.05	-57.08	-6813.60	-22.93	20.68
0.9 Dead+1.0 Wind 0 deg - No Ice	44.96	0.05	-57.08	-6813.01	-19.62	20.68
1.2 Dead+1.0 Wind 30 deg - No Ice	59.94	27.56	-50.19	-6030.13	-3224.23	22.84
0.9 Dead+1.0 Wind 30 deg - No Ice	44.96	27.56	-50.19	-6029.54	-3220.92	22.84
1.2 Dead+1.0 Wind 60 deg - No Ice	59.94	46.52	-28.80	-3527.59	-5480.16	6.81
0.9 Dead+1.0 Wind 60 deg - No Ice	44.96	46.52	-28.80	-3527.01	-5476.84	6.81
1.2 Dead+1.0 Wind 90 deg - No Ice	59.94	54.23	-0.01	-4.00	-6400.67	-10.17
0.9 Dead+1.0 Wind 90 deg - No Ice	44.96	54.23	-0.01	-3.41	-6397.35	-10.17
1.2 Dead+1.0 Wind 120 deg - No Ice	59.94	46.72	28.67	3467.57	-5461.32	-9.62
0.9 Dead+1.0 Wind 120 deg - No Ice	44.96	46.72	28.67	3468.16	-5458.00	-9.62
1.2 Dead+1.0 Wind 150 deg	59.94	24.82	45.21	5517.19	-2955.26	-6.25

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
- No Ice 0.9 Dead+1.0 Wind 150 deg - No Ice	44.96	24.82	45.21	5517.77	-2951.95	-6.25
1.2 Dead+1.0 Wind 180 deg - No Ice	59.94	0.03	53.59	6480.70	-17.42	-21.01
0.9 Dead+1.0 Wind 180 deg - No Ice	44.96	0.03	53.59	6481.28	-14.11	-21.01
1.2 Dead+1.0 Wind 210 deg - No Ice	59.94	-27.45	49.85	5963.12	3178.27	-24.89
0.9 Dead+1.0 Wind 210 deg - No Ice	44.96	-27.45	49.85	5963.70	3181.58	-24.89
1.2 Dead+1.0 Wind 240 deg - No Ice	59.94	-49.26	30.14	3611.90	5684.55	-9.50
0.9 Dead+1.0 Wind 240 deg - No Ice	44.96	-49.26	30.14	3612.49	5687.87	-9.50
1.2 Dead+1.0 Wind 270 deg - No Ice	59.94	-54.25	0.01	0.94	6378.44	10.03
0.9 Dead+1.0 Wind 270 deg - No Ice	44.96	-54.25	0.01	1.52	6381.76	10.03
1.2 Dead+1.0 Wind 300 deg - No Ice	59.94	-43.83	-27.26	-3369.43	5177.28	12.19
0.9 Dead+1.0 Wind 300 deg - No Ice	44.96	-43.83	-27.26	-3368.85	5180.60	12.19
1.2 Dead+1.0 Wind 330 deg - No Ice	59.94	-24.80	-45.48	-5573.09	2926.51	7.95
0.9 Dead+1.0 Wind 330 deg - No Ice	44.96	-24.80	-45.48	-5572.51	2929.82	7.95
1.2 Dead+1.0 Ice+1.0 Temp	172.52	0.00	-0.00	-12.07	-81.57	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	172.52	0.01	-18.47	-2231.78	-82.89	11.01
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	172.52	9.34	-16.61	-2002.95	-1183.05	11.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	172.52	16.36	-9.79	-1190.54	-2009.70	4.14
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	172.52	18.43	-0.01	-14.43	-2267.84	-3.50
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	172.52	15.34	9.16	1099.29	-1904.24	-5.80
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	172.52	8.38	15.33	1861.15	-1080.09	-6.40
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	172.52	-0.12	18.07	2175.00	-61.12	-10.27
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	172.52	-9.36	16.63	1980.88	1024.05	-11.32
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	172.52	-16.73	10.11	1200.82	1876.65	-4.75
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	172.52	-18.50	0.21	22.63	2117.03	3.60
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	172.52	-14.95	-8.97	-1109.80	1707.59	6.29
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	172.52	-8.51	-15.22	-1868.37	938.51	7.58
Dead+Wind 0 deg - Service	49.95	0.01	-13.84	-1653.85	-13.40	5.02
Dead+Wind 30 deg - Service	49.95	6.68	-12.17	-1463.84	-789.80	5.54
Dead+Wind 60 deg - Service	49.95	11.28	-6.98	-856.91	-1336.92	1.65
Dead+Wind 90 deg - Service	49.95	13.15	-0.00	-2.34	-1560.16	-2.47
Dead+Wind 120 deg - Service	49.95	11.33	6.95	839.60	-1332.35	-2.33
Dead+Wind 150 deg - Service	49.95	6.02	10.96	1336.69	-724.56	-1.51
Dead+Wind 180 deg - Service	49.95	0.01	13.00	1570.36	-12.06	-5.09
Dead+Wind 210 deg - Service	49.95	-6.66	12.09	1444.84	762.98	-6.04
Dead+Wind 240 deg - Service	49.95	-11.95	7.31	874.61	1370.82	-2.30
Dead+Wind 270 deg - Service	49.95	-13.16	0.00	-1.15	1539.11	2.43
Dead+Wind 300 deg -	49.95	-10.63	-6.61	-818.55	1247.79	2.96

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
Service Dead+Wind 330 deg - Service	49.95	-6.02	-11.03	-1353.00	701.92	1.93

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-49.95	0.00	-0.00	49.95	0.00	0.000%
2	0.05	-59.94	-57.08	-0.05	59.94	57.08	0.000%
3	0.05	-44.96	-57.08	-0.05	44.96	57.08	0.000%
4	27.56	-59.94	-50.19	-27.56	59.94	50.19	0.000%
5	27.56	-44.96	-50.19	-27.56	44.96	50.19	0.000%
6	46.52	-59.94	-28.80	-46.52	59.94	28.80	0.000%
7	46.52	-44.96	-28.80	-46.52	44.96	28.80	0.000%
8	54.23	-59.94	-0.01	-54.23	59.94	0.01	0.000%
9	54.23	-44.96	-0.01	-54.23	44.96	0.01	0.000%
10	46.72	-59.94	28.67	-46.72	59.94	-28.67	0.000%
11	46.72	-44.96	28.67	-46.72	44.96	-28.67	0.000%
12	24.82	-59.94	45.21	-24.82	59.94	-45.21	0.000%
13	24.82	-44.96	45.21	-24.82	44.96	-45.21	0.000%
14	0.03	-59.94	53.59	-0.03	59.94	-53.59	0.000%
15	0.03	-44.96	53.59	-0.03	44.96	-53.59	0.000%
16	-27.45	-59.94	49.85	27.45	59.94	-49.85	0.000%
17	-27.45	-44.96	49.85	27.45	44.96	-49.85	0.000%
18	-49.26	-59.94	30.14	49.26	59.94	-30.14	0.000%
19	-49.26	-44.96	30.14	49.26	44.96	-30.14	0.000%
20	-54.25	-59.94	0.01	54.25	59.94	-0.01	0.000%
21	-54.25	-44.96	0.01	54.25	44.96	-0.01	0.000%
22	-43.83	-59.94	-27.26	43.83	59.94	27.26	0.000%
23	-43.83	-44.96	-27.26	43.83	44.96	27.26	0.000%
24	-24.80	-59.94	-45.48	24.80	59.94	45.48	0.000%
25	-24.80	-44.96	-45.48	24.80	44.96	45.48	0.000%
26	0.00	-172.52	0.00	-0.00	172.52	0.00	0.000%
27	0.01	-172.52	-18.47	-0.01	172.52	18.47	0.000%
28	9.34	-172.52	-16.61	-9.34	172.52	16.61	0.000%
29	16.36	-172.52	-9.79	-16.36	172.52	9.79	0.000%
30	18.43	-172.52	-0.01	-18.43	172.52	0.01	0.000%
31	15.34	-172.52	9.16	-15.34	172.52	-9.16	0.000%
32	8.38	-172.52	15.33	-8.38	172.52	-15.33	0.000%
33	-0.12	-172.52	18.07	0.12	172.52	-18.07	0.000%
34	-9.36	-172.52	16.63	9.36	172.52	-16.63	0.000%
35	-16.73	-172.52	10.11	16.73	172.52	-10.11	0.000%
36	-18.50	-172.52	0.21	18.50	172.52	-0.21	0.000%
37	-14.95	-172.52	-8.97	14.95	172.52	8.97	0.000%
38	-8.51	-172.52	-15.22	8.51	172.52	15.22	0.000%
39	0.01	-49.95	-13.84	-0.01	49.95	13.84	0.000%
40	6.68	-49.95	-12.17	-6.68	49.95	12.17	0.000%
41	11.28	-49.95	-6.98	-11.28	49.95	6.98	0.000%
42	13.15	-49.95	-0.00	-13.15	49.95	0.00	0.000%
43	11.33	-49.95	6.95	-11.33	49.95	-6.95	0.000%
44	6.02	-49.95	10.96	-6.02	49.95	-10.96	0.000%
45	0.01	-49.95	13.00	-0.01	49.95	-13.00	0.000%
46	-6.66	-49.95	12.09	6.66	49.95	-12.09	0.000%
47	-11.95	-49.95	7.31	11.95	49.95	-7.31	0.000%
48	-13.16	-49.95	0.00	13.16	49.95	-0.00	0.000%
49	-10.63	-49.95	-6.61	10.63	49.95	6.61	0.000%
50	-6.02	-49.95	-11.03	6.02	49.95	11.03	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	200 - 180	6.604	40	0.332	0.035
T2	180 - 160	5.215	40	0.318	0.029
T3	160 - 140	3.941	40	0.270	0.021
T4	140 - 120	2.882	40	0.215	0.016
T5	120 - 100	2.031	40	0.175	0.013
T6	100 - 80	1.344	40	0.136	0.009
T7	80 - 60	0.821	40	0.097	0.006
T8	60 - 40	0.456	40	0.067	0.005
T9	40 - 20	0.212	40	0.038	0.003
T10	20 - 0	0.065	47	0.019	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
200.00	15" Dia. x 15" Beacon	40	6.604	0.332	0.035	171365
198.00	DB225-A	40	6.463	0.331	0.035	171365
190.00	USX6-6W-6GR	40	5.903	0.328	0.033	85682
182.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	40	5.351	0.321	0.030	47509
170.00	APXVTM14-ALU-I20 w/ Mount Pipe	40	4.556	0.297	0.025	26826
163.00	PR-850	40	4.120	0.278	0.022	21304
144.00	(2) PD1109-1	40	3.076	0.225	0.017	21651
102.00	3" x 6" SideLight	40	1.405	0.140	0.009	28616
53.00	KS24019-L112A	40	0.359	0.057	0.004	44237

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	200 - 180	27.170	2	1.366	0.146
T2	180 - 160	21.438	2	1.310	0.121
T3	160 - 140	16.196	4	1.110	0.087
T4	140 - 120	11.847	4	0.885	0.067
T5	120 - 100	8.352	4	0.719	0.052
T6	100 - 80	5.525	4	0.560	0.038
T7	80 - 60	3.378	4	0.397	0.026
T8	60 - 40	1.877	4	0.277	0.019
T9	40 - 20	0.871	4	0.156	0.012
T10	20 - 0	0.270	19	0.078	0.006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
200.00	15" Dia. x 15" Beacon	2	27.170	1.366	0.146	41617
198.00	DB225-A	2	26.589	1.364	0.144	41617
190.00	USX6-6W-6GR	2	24.275	1.351	0.135	20808
182.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	2	21.998	1.322	0.124	11538
170.00	APXVTM14-ALU-I20 w/ Mount Pipe	4	18.721	1.224	0.104	6527
163.00	PR-850	4	16.930	1.146	0.091	5187

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
144.00	(2) PD1109-1	4	12.642	0.926	0.070	5262
102.00	3" x 6" SideLight	4	5.778	0.577	0.039	6956
53.00	KS24019-L112A	4	1.475	0.233	0.017	10768

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	200	Leg	A325X	0.750	4	7.16	30.10	0.238	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	5.39	7.88	0.685	1.05	Member Block Shear
		Top Girt	A325X	0.625	1	0.38	7.88	0.049	1.05	Member Block Shear
T2	180	Leg	A325X	1.000	4	18.38	54.52	0.337	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	5.85	7.88	0.742	1.05	Member Block Shear
T3	160	Leg	A325X	1.000	4	28.03	54.52	0.514	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	5.96	7.88	0.757	1.05	Member Block Shear
T4	140	Leg	A325X	1.250	4	36.99	87.22	0.424	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	6.67	9.91	0.673	1.05	Member Block Shear
T5	120	Leg	A325X	1.250	4	44.82	87.22	0.514	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	6.56	9.91	0.662	1.05	Member Block Shear
T6	100	Leg	A325X	1.250	6	34.71	87.22	0.398	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	6.97	10.42	0.668	1.05	Member Block Shear
T7	80	Leg	A325X	1.250	6	39.27	87.22	0.450	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	8.08	14.36	0.563	1.05	Member Bearing
T8	60	Leg	A325X	1.375	6	43.67	103.94	0.420	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	8.60	14.36	0.599	1.05	Member Bearing
T9	40	Leg	A325X	1.375	6	47.90	103.94	0.461	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	8.97	14.36	0.625	1.05	Member Bearing
T10	20	Diagonal	A325X	0.750	1	9.66	14.36	0.673	1.05	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	200 - 180	Sabre 2.875x.375	20.00	4.98	66.9 K=1.00	2.945	-28.45	95.59	0.298 [1]
T2	180 - 160	Sabre 3.5 x .3	20.03	4.99	52.7 K=1.00	3.016	-79.69	110.80	0.719 [1]
T3	160 - 140	Sabre 4 x .318	20.03	4.99	45.8 K=1.00	3.678	-123.07	141.99	0.867 [1]
T4	140 - 120	Sabre 4.5 x .438	20.03	6.65	55.2 K=1.00	5.589	-161.68	201.22	0.804 [1]

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T5	120 - 100	Sabre 5.5625 x .375	20.03	6.65	43.4 K=1.00	6.111	-197.59	239.63	0.825 [1]
T6	100 - 80	Sabre 5.5625 x .375	20.03	6.65	43.4 K=1.00	6.111	-231.30	239.63	0.965 [1]
T7	80 - 60	Sabre 6.625 x .432	20.03	9.97	54.5 K=1.00	8.405	-261.19	304.30	0.858 [1]
T8	60 - 40	Sabre 8.625 x .322	20.03	9.97	40.7 K=1.00	8.399	-292.63	334.76	0.874 [1]
T9	40 - 20	Sabre 8.625 x .5	20.03	9.97	41.6 K=1.00	12.763	-324.04	506.09	0.640 [1]
T10	20 - 0	Sabre 8.625 x .5	20.03	9.97	41.6 K=1.00	12.763	-354.54	506.09	0.701 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	200 - 180	L1 3/4x1 3/4x3/16	7.06	3.21	114.2 K=1.02	0.621	-5.38	13.19	0.408 [1]
T2	180 - 160	L1 3/4x1 3/4x3/16	8.38	4.02	140.4 K=1.00	0.621	-5.79	9.01	0.643 [1]
T3	160 - 140	L1 3/4x1 3/4x3/16	10.06	4.84	169.0 K=1.00	0.621	-5.99	6.22	0.963 [1]
T4	140 - 120	L2 1/2x2 1/2x3/16	12.56	6.11	148.1 K=1.00	0.902	-6.49	11.77	0.551 [1]
T5	120 - 100	L2 1/2x2 1/2x3/16	14.30	6.93	168.0 K=1.00	0.902	-6.60	9.15	0.721 [1]
T6	100 - 80	L3x3x3/16	16.09	7.83	157.6 K=1.00	1.090	-6.96	12.56	0.554 [1]
T7	80 - 60	L3 1/2x3 1/2x1/4	19.27	9.46	163.5 K=1.00	1.690	-8.10	18.09	0.448 [1]
T8	60 - 40	L3 1/2x3 1/2x1/4	21.01	10.23	176.9 K=1.00	1.690	-8.73	15.45	0.565 [1]
T9	40 - 20	L3 1/2x3 1/2x1/4	22.79	11.12	192.4 K=1.00	1.690	-9.25	13.07	0.708 [1]
T10	20 - 0	L4x4x1/4	24.60	12.03	181.6 K=1.00	1.940	-10.31	16.83	0.613 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	200 - 180	L1 3/4x1 3/4x3/16	5.00	4.47	156.1 K=1.00	0.621	-0.40	7.29	0.055 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	200 - 180	Sabre 2.875x.375	20.00	0.08	1.1	2.945	28.66	132.54	0.216 [1]
T2	180 - 160	Sabre 3.5 x .3	20.03	0.08	0.9	3.016	73.53	135.72	0.542 [1]
T3	160 - 140	Sabre 4 x .318	20.03	0.08	0.8	3.678	112.13	165.53	0.677 [1]
T4	140 - 120	Sabre 4.5 x .438	20.03	0.08	0.7	5.589	147.94	251.52	0.588 [1]
T5	120 - 100	Sabre 5.5625 x .375	20.03	0.08	0.5	6.111	179.27	275.01	0.652 [1]
T6	100 - 80	Sabre 5.5625 x .375	20.03	0.08	0.5	6.111	208.23	275.01	0.757 [1]
T7	80 - 60	Sabre 6.625 x .432	20.03	0.08	0.5	8.405	235.65	378.22	0.623 [1]
T8	60 - 40	Sabre 8.625 x .322	20.03	0.08	0.3	8.399	262.00	377.97	0.693 [1]
T9	40 - 20	Sabre 8.625 x .5	20.03	0.08	0.3	12.763	287.41	574.32	0.500 [1]
T10	20 - 0	Sabre 8.625 x .5	20.03	0.08	0.3	12.763	312.99	574.32	0.545 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	200 - 180	L1 3/4x1 3/4x3/16	7.06	3.21	75.1	0.360	5.39	15.68	0.344 [1]
T2	180 - 160	L1 3/4x1 3/4x3/16	8.38	4.02	93.1	0.360	5.85	15.68	0.373 [1]
T3	160 - 140	L1 3/4x1 3/4x3/16	10.06	4.84	111.4	0.360	5.96	15.68	0.380 [1]
T4	140 - 120	L2 1/2x2 1/2x3/16	11.45	5.56	88.1	0.571	6.67	24.84	0.269 [1]
T5	120 - 100	L2 1/2x2 1/2x3/16	14.30	6.93	109.1	0.571	6.56	24.84	0.264 [1]
T6	100 - 80	L3x3x3/16	16.09	7.83	101.9	0.694	6.97	30.21	0.231 [1]
T7	80 - 60	L3 1/2x3 1/2x1/4	19.27	9.46	105.7	1.103	8.08	48.00	0.168 [1]
T8	60 - 40	L3 1/2x3 1/2x1/4	21.01	10.23	114.3	1.103	8.60	48.00	0.179 [1]
T9	40 - 20	L3 1/2x3 1/2x1/4	22.79	11.12	124.1	1.103	8.97	48.00	0.187 [1]
T10	20 - 0	L4x4x1/4	24.60	12.03	116.9	1.291	9.66	56.16	0.172 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	200 - 180	L1 3/4x1 3/4x3/16	5.00	4.47	106.4	0.360	0.38	15.68	0.024 [1]

[1] P_u / ϕP_n controls

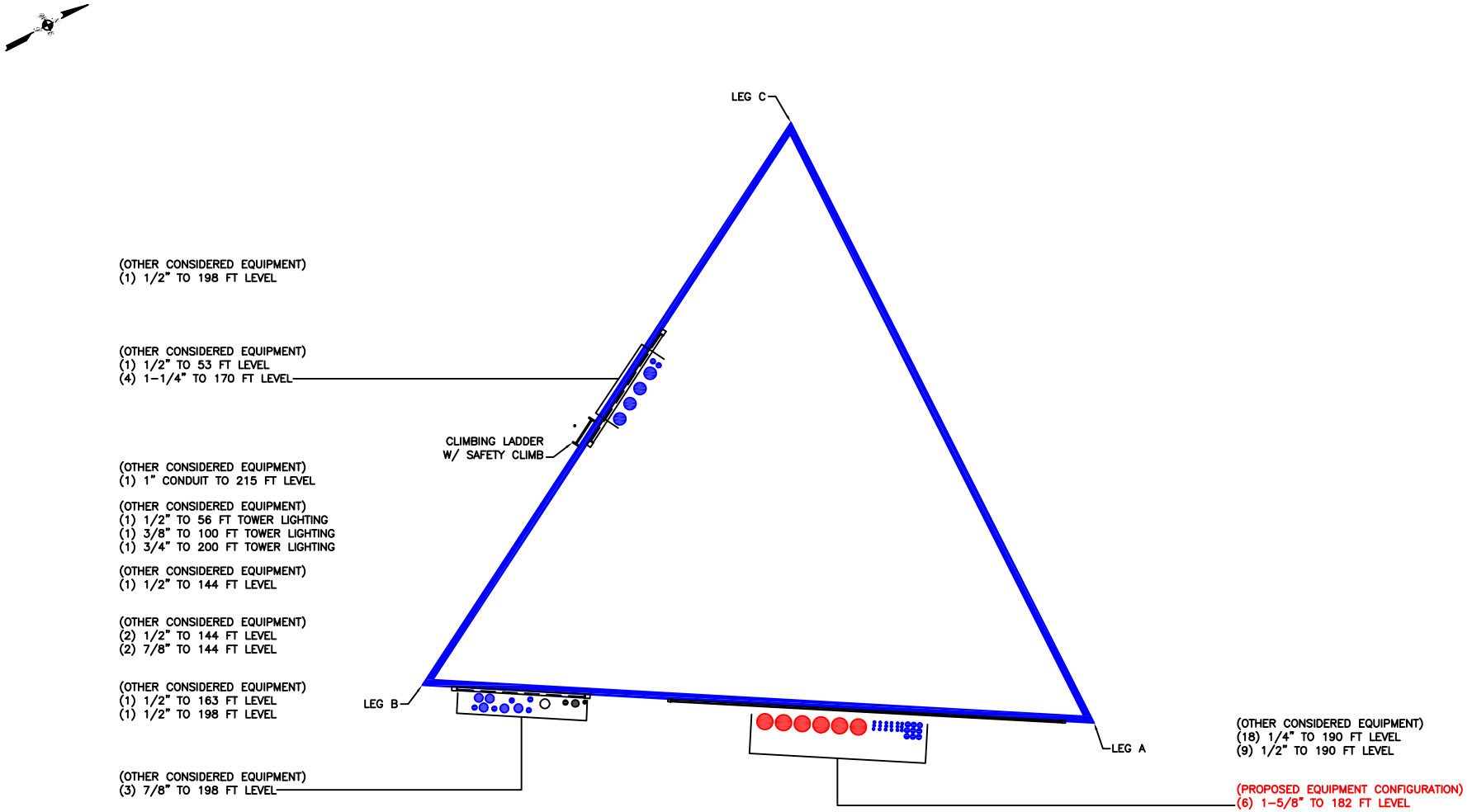
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	200 - 180	Leg	Sabre 2.875x.375	3	-28.45	100.37	28.3	Pass
T2	180 - 160	Leg	Sabre 3.5 x .3	33	-79.69	116.34	68.5	Pass
T3	160 - 140	Leg	Sabre 4 x .318	60	-123.07	149.09	82.5	Pass
T4	140 - 120	Leg	Sabre 4.5 x .438	87	-161.68	211.28	76.5	Pass
T5	120 - 100	Leg	Sabre 5.5625 x .375	108	-197.59	251.62	78.5	Pass
T6	100 - 80	Leg	Sabre 5.5625 x .375	129	-231.30	251.62	91.9	Pass
T7	80 - 60	Leg	Sabre 6.625 x .432	150	-261.19	319.52	81.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T8	60 - 40	Leg	Sabre 8.625 x .322	165	-292.63	351.50	83.3	Pass
T9	40 - 20	Leg	Sabre 8.625 x .5	180	-324.04	531.40	61.0	Pass
T10	20 - 0	Leg	Sabre 8.625 x .5	195	-354.54	531.40	66.7	Pass
T1	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	10	-5.38	13.85	38.9	Pass
							65.2 (b)	
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	37	-5.79	9.47	61.2	Pass
							70.7 (b)	
T3	160 - 140	Diagonal	L1 3/4x1 3/4x3/16	64	-5.99	6.54	91.7	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	91	-6.49	12.36	52.5	Pass
							64.1 (b)	
T5	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	113	-6.60	9.61	68.6	Pass
T6	100 - 80	Diagonal	L3x3x3/16	134	-6.96	13.18	52.8	Pass
							63.7 (b)	
T7	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	155	-8.10	18.99	42.6	Pass
							53.6 (b)	
T8	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	169	-8.73	16.23	53.8	Pass
							57.1 (b)	
T9	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	184	-9.25	13.73	67.4	Pass
T10	20 - 0	Diagonal	L4x4x1/4	199	-10.31	17.67	58.4	Pass
							64.1 (b)	
T1	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.40	7.66	5.3	Pass
							Summary	
						Leg (T6)	91.9	Pass
						Diagonal (T3)	91.7	Pass
						Top Girt (T1)	5.3	Pass
						Bolt Checks	72.1	Pass
						RATING =	**91.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


LEG C
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 198 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 53 FT LEVEL
(4) 1-1/4" TO 170 FT LEVEL
CLIMBING LADDER
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT)
(1) 1" CONDUIT TO 215 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 56 FT TOWER LIGHTING
(1) 3/8" TO 100 FT TOWER LIGHTING
(1) 3/4" TO 200 FT TOWER LIGHTING
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 144 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/2" TO 144 FT LEVEL
(2) 7/8" TO 144 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 163 FT LEVEL
(1) 1/2" TO 198 FT LEVEL
LEG B
(OTHER CONSIDERED EQUIPMENT)
(3) 7/8" TO 198 FT LEVEL
LEG A
(OTHER CONSIDERED EQUIPMENT)
(18) 1/4" TO 190 FT LEVEL
(9) 1/2" TO 190 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(6) 1-5/8" TO 182 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	871584
Site Name	John Tom Hill
Order #	529712 rev. 1

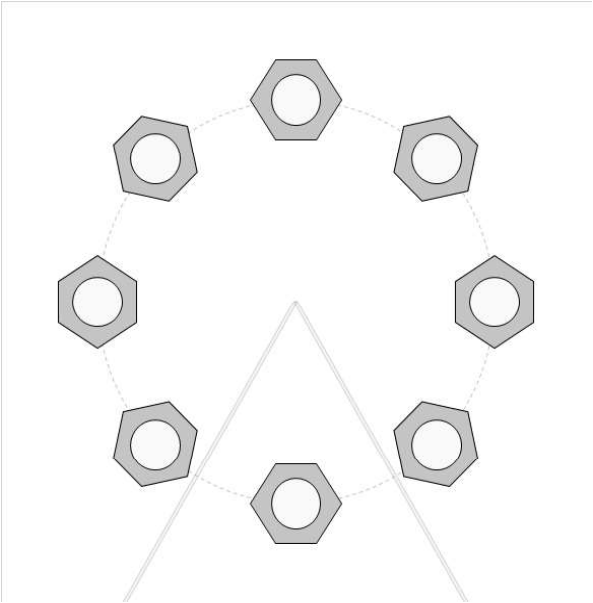
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	362.05	311.67
Shear Force (kips)	35.98	31.82

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(8) 1-1/2" ø bolts (A572-50 N; Fy=50 ksi, Fu=65 ksi)

l_{ar} (in): 1.125

Analysis Results

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

Pu_c = 45.26	ϕPn_c = 79.52	**Stress Rating**
Vu = 4.5	ϕVn = 35.78	**55.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Pier and Pad Foundation

BU # :	871584
Site Name:	John Tom Hill
App. Number:	529712 rev 1

TIA-222 Revision:	H
Tower Type:	Self Support

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

Superstructure Analysis Reactions

Compression, P_{comp}:	362.05	kips
Compression Shear, Vu_comp:	19.33	kips
Uplift, P_{uplift}:	311.67	kips
Uplift Shear, V_{u_uplift}:	19.33	kips
Tower Height, **H**:	200	ft
Base Face Width, **BW**:	23	ft
BP Dist. Above Fdn, bp_{dist}:	2.625	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	3.5	ft
Ext. Above Grade, **E**:	0.4167	ft
Pier Rebar Size, **Sc**:	7	
Pier Rebar Quantity, **mc**:	14	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	10.5	ft
Pad Width, **W**:	15	ft
Pad Thickness, **T**:	1.75	ft
Pad Rebar Size (Bottom), **Sp**:	7	
Pad Rebar Quantity (Bottom), **mp**:	20	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	16.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	36	degrees
SPT Blow Count, N_{blows}:	28	
Base Friction, μ:	0.6	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	8	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Uplift (kips)	451.48	311.67	**65.7%**	**Pass**
Lateral (Sliding) (kips)	124.75	19.33	**14.8%**	**Pass**
Bearing Pressure (ksf)	12.00	3.06	**24.3%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	974.27	177.19	**17.3%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	262.19	177.19	**64.4%**	**Pass**
Pier Compression (kip)	4592.74	377.38	**7.8%**	**Pass**
*Pad Flexure (kip*ft)*	858.77	402.59	**44.6%**	**Pass**
Pad Shear - 1-way (kips)	246.78	106.16	**41.0%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.102	**59.1%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	990.20	106.32	**10.2%**	**Pass**
Pad Shear - 2-way (Uplift) (ksi)	0.164	0.108	**62.6%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	990.20	106.32	**10.2%**	**Pass**

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

Soil Rating*:	**65.7%**
Structural Rating*:	**64.4%**

Version 3.4.0

Concrete Grade Beam Verification

Reference

Inputs:

$V := 58 \cdot kip$

$fc := 4000 \cdot psi$

$fy := 60000 \cdot psi$

$Ag := 2.5ft \cdot 2ft = 5\,ft^2$

$Ast := 6 \cdot 0.79in^2 = 4.74 \cdot in^2$

$L := 20ft$

Forcea on Grade Beam: $Pu := \frac{V}{3}$

Compression: $Pu = 19.33 \cdot kip$

Tension: $Tu := Pu = 19.33 \cdot kip$

$w_{soil} := 6in \cdot 2ft \cdot 118pcf = 118 \cdot plf$

$w_{beam} := 2ft \cdot 2ft \cdot 150pcf = 600 \cdot plf$

$w := 1.2 \cdot (w_{soil} + w_{beam}) = 861.6 \cdot plf$

$M_u := \frac{w \cdot L^2}{12} = 28.72 \cdot kip \cdot ft$

Moment:

$d := 2 \cdot ft$

$d_t := 2ft - 3in - 0.375in - \frac{1in}{2} = 20.13 \cdot in$

$b := 2.5ft$

$a := \frac{\frac{Ast}{2} \cdot fy}{0.85 \cdot fc \cdot b} = 1.39 \cdot in$

$\varepsilon_{ty} := 0.002$

[ACI 318-14 Eq. 22.2.2.4.1]
[ACI 318-14 21.2.2.1]

$$\beta_1 := \begin{cases} 0.85 & \text{if } fc \geq 2500 \cdot psi \wedge fc \leq 4000 \cdot psi \\ \left[0.85 - .05\left(\frac{\frac{fc}{psi} - 4000}{1000}\right)\right] & \text{if } fc > 4000 \cdot psi \wedge fc < 8000 \cdot psi \\ 0.65 & \text{if } fc \geq 8000 \cdot psi \end{cases} = 0.85$$

[ACI 318-14 Table 22.2.2.4.3]

$c := \frac{a}{\beta_1} = 1.64 \cdot in$

$\varepsilon_t := \frac{0.003(d_t - c)}{c} = 0.0338$

$$\phi := \begin{cases} 0.9 & \text{if } \varepsilon_t \geq 0.005 \\ 0.65 + 0.25 \cdot \dfrac{(\varepsilon_t \cdot \varepsilon_{ty})}{0.005 - \varepsilon_{ty}} & \text{if } \varepsilon_t > \varepsilon_{ty} \wedge \varepsilon_t < 0.005 \\ 0.65 & \text{if } \varepsilon_t \leq \varepsilon_{ty} \end{cases} = 0.9$$

[ACI 318-14 Table 21.2.2]

Compression Check:

$P_o := 0.85 \cdot fc \cdot (Ag - Ast) + fy \cdot Ast = 2716.28 \cdot kip$ [ACI 318-14 Eq. 22.4.2.2]

$P_{nmax} := 0.80 \cdot P_o = 2173.03 \cdot kip$ [ACI 318-14 Table 22.4.2.1]

$\phi Pn := \phi \cdot P_{nmax} = 1955.72 \cdot kip$

$\phi Pn = 1955.72 \cdot kip$

CompressionCheck = "SUFFICIENT"

Capacity = 0.99·%

Tension Check:

$\phi Tn := \phi \cdot fy \cdot Ast$

$\phi Tn = 255.96 \cdot kip$ [ACI 318-14 Eq. 22.4.3.1]

TensionCheck = "SUFFICIENT"

TensionCapacity = 7.55·%

Bending Check:

$\phi Mn := \phi \cdot \dfrac{Ast}{2} \cdot fy \cdot \left(d_t - \dfrac{a}{2} \right) = 207.2 \cdot kip \cdot ft$

BendingCheck = "SUFFICIENT"

BendingCapacity = 13.86·%

Dowel Embedment:

Horizontal Dowel Size: #6

Total Number of Dowels: (Per End) $n_d := 8$

Grade: $Fy_{dowel} := 60ksi$ $Fu_{dowel} := 90ksi$

Maximum Allowable Yield Strength: $Check_{yield} := \begin{cases} \text{"REDESIGN"} & \text{if } Fy_{dowel} > 60ksi \\ \text{"Okay"} & \text{otherwise} \end{cases} = \text{"Okay"}$

Dowel Diameter: $D_{dowel} := vlookup(dowel, Rebar, 2) \cdot in = 0.75 \cdot in$

Singel Dowel Area: $A_{dowel} := vlookup(dowel, Rebar, 3) \cdot in^2 = 0.44 \cdot in^2$

Dowel Development into Existing Pier (Hilti Catalog Tables)

Epoxy := Hilti HIT-HY 200

Rebar Embedment into Exisiting Pad: $L_{re} := 9in$

Epoxy Design Tensile Strength: (Inc. Load Adjustment Factors) $\phi N_n := 3.87kip$

Epoxy Design Shear Strength: (Inc. Load Adjustment Factors) $\phi V_n := 3.31kip$

New Concrete Modification Factor: $\lambda_n := 1.0$

Pier Surface: Roughened Concrete

Coefficient of Friction: $\mu := coeff\ \lambda_n = 1.0$ ACI 318-14 Table 22.9.4.2

Minimum Embedment from HILTI: $L_{r\_min} := \begin{cases} L_{500\_min} & \text{if Epoxy} = 0 \\ L_{200\_min} & \text{otherwise} \end{cases} = 3.5 \cdot in$

$Check := \begin{cases} \text{"Okay"} & \text{if } L_{re} \geq L_{r\_min} \\ \text{"No Good"} & \text{otherwise} \end{cases}$

Check = "Okay"

Minimum Spacing of Adhesive Anchors: $S_v := 6 \cdot D_{dowel} = 4.5 \cdot in$ ACI 318-14 17.7.1

Minimum Distance from Edge of Concrete for Adhesive Anchors: $Edge_v := 6 \cdot D_{dowel} = 4.5 \cdot in$ ACI 318-14 17.7.3

Tensile Force per single Dowel $T_{dowel} := \frac{Pu}{n_d} = 2.42 \cdot kip$

Dowel Tension Check $Check := \begin{cases} \text{"Okay"} & \text{if } \phi N_n \geq T_{dowel} \\ \text{"No Good"} & \text{otherwise} \end{cases}$

$Check = \text{"Okay"}$

Dowel Tension Rating: $rating := \frac{T_{dowel}}{\phi N_n} = 62.45 \cdot \%$

Shear Force per single Dowel $V_{dowel} := \frac{\frac{w \cdot L}{2}}{n_d} = 1.08 \cdot kip$

Dowel Tension Check $Check := \begin{cases} \text{"Okay"} & \text{if } \phi N_n \geq T_{dowel} \\ \text{"No Good"} & \text{otherwise} \end{cases}$

$Check = \text{"Okay"}$

Dowel Tension Rating: $rating := \frac{V_{dowel}}{\phi V_n} = 32.54 \cdot \%$

Dowel Combined Rating: $rating := \left(\frac{T_{dowel}}{\phi N_n}\right)^2 + \left(\frac{V_{dowel}}{\phi V_n}\right)^2 = 49.58 \cdot \%$

Dowel Development into to New Beam (ACI 318-14 Chapter 25)

Assumed Development Length: $L_d := 18 \cdot in$

New Concrete Compressive Strength: $f_c := 4000 \cdot psi$

Concrete Modification Factor: $\lambda := 1.0$

Modification Factors: $\psi_c := 1$ $\psi_e := 1$ $\psi_r := 1$

Required Embedment Length: (Standard Hook Termination) — ACI 318-14 25.4.3.2

$$l_d := \frac{1}{50} \cdot \frac{\frac{Fy_{dowel}}{psi}}{\lambda \cdot \sqrt{\frac{f_c}{psi}}} \cdot \psi_c \cdot \psi_e \cdot \psi_r \cdot D_{dowel} = 14.23 \cdot in$$

$$l_{d\_req} := \max\left(l_d, 8 \cdot D_{dowel}, 6in\right) = 14.23 \cdot in$$

$$Check := \begin{cases} \text{"Okay"} & \text{if } L_d \geq l_{d\_req} \\ \text{"No Good"} & \text{otherwise} \end{cases} = \text{"Okay"}$$

Check = "Okay"

Designed Development Length: $L_{dh} := L_d = 18 \cdot in$

Required Hook Extension Length: (90 degree hook) $L_{ext} := 12 \cdot D_{dowel} = 9 \cdot in$ — ACI 318-14 Table 25.3.1

Minimum Inside Bend Diameter: (90 degree hook) $d_{bend} = 4.5 \cdot in$ — ACI 318-14 Table 25.3.1

Shear Reinforcement Check (ties/stirrups) (ACI 318-14 Chapter 9)

$D_{tie} := 0.375 \cdot in$

$A_{tie} := 0.11 \cdot in^2$

$A_v := A_{tie} = 0.11 \cdot in^2$

$s := 16 \cdot in$

$$V_s := \begin{cases} \frac{A_v \cdot fy \cdot d}{s} & \text{if } \frac{A_v \cdot fy \cdot d}{s} \le \frac{8 \cdot \frac{b}{in} \cdot \frac{d}{in} \cdot \sqrt{\frac{fc}{psi}}}{1000} \cdot kip \\ \left(\frac{8 \cdot \frac{b}{in} \cdot \frac{d}{in} \cdot \sqrt{\frac{fc}{psi}}}{1000} \cdot kip \right) & \text{otherwise} \end{cases} = 9.9 \cdot kip$$

$$V_c := \frac{2 \cdot \frac{b}{in} \cdot \frac{d}{in} \cdot \sqrt{\frac{fc}{psi}}}{1000} \cdot kip = 91.07 \cdot kip$$

$V_n := V_s + V_c = 100.97 \cdot kip$

$\phi V_n := 0.75 \cdot V_n = 75.73 \cdot kip$

$V_u := \frac{w \cdot L}{2} = 8.62 \cdot kip$

$$Check := \begin{cases} \text{"Okay"} & \text{if } \phi V_n \ge V_u \\ \text{"No Good"} & \text{otherwise} \end{cases} = \text{"Okay"}$$

Check = "Okay"

$$Check := \begin{cases} \text{"Stirrups Not Required"} & \text{if } V_u \le 0.5 \cdot 0.75 \cdot V_c \\ \text{"Stirrup Design Required"} & \text{otherwise} \end{cases} = \text{"Stirrups Not Required"}$$

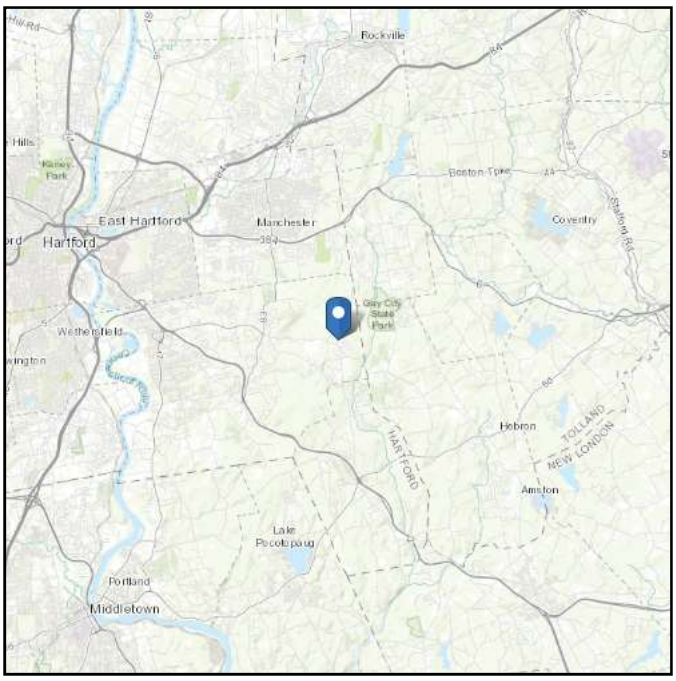
Check = "Stirrups Not Required"

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 877.95 ft (NAVD 88)
Latitude: 41.708956
Longitude: -72.473447



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Mon Oct 12 2020

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

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

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

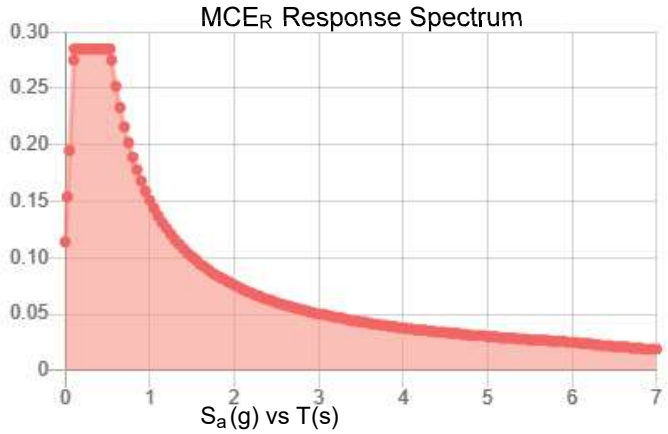
Seismic

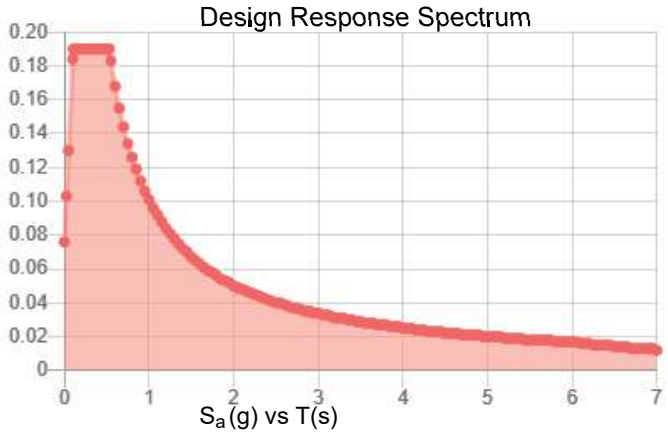
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.19
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.285	PGA_M :	0.143
S_{M1} :	0.151	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Oct 12 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Oct 12 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

PAUL J. FORD & COMPANY

Date: October 08, 2020

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject:	**Mount Analysis Report**	
Carrier Designation:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11189E
	Carrier Site Name:	Glastonbury/ Rt-94 & Fern
Crown Castle Designation:	**Crown Castle BU Number:**	871584
	Crown Castle Site Name:	John Tom Hill
	Crown Castle JDE Job Number:	620149
	Crown Castle Purchase Order Number:	1575295
	Crown Castle Order Number:	529712 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37520-2210.001.8190
Site Data:	**115 Birch Mtn. Road, Glastonbury, Hartford County, CT 06033** **Latitude 41.708889°, Longitude -72.473333°**	
Structure Information:	**Tower Height & Type:**	**200 Foot Self Support**
	Mount Elevation:	**182 Foot**
	Mount Type:	**(3) Sector 15 Foot Sector Frame**

Dear Darcy Tarr,

Paul J Ford and Company is pleased to submit this "Mount Analysis Report" to determine the structural integrity of the T-Mobile antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

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

15' Sector Frame (Typical) **SUFFICIENT**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: RG

Respectfully submitted by:

Deepesh Savla, PE
Project Manager
dsavla@pauljford.com

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

10.09.2020

TABLE OF CONTENTS

1) INTRODUCTION

The existing mount under consideration are (3)-15' Sector Frame mount, mapped by RKS on 04/07/2019.

The mount has been modified per reinforcement drawings prepared by PJF, in May of 2019. Reinforcement consists of SitePro1 STK-U 1 Stiff Arm.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.178
Seismic S1:	0.063
Maintenance Loading Wind Speed:	30 mph
Maintenance Load at Mid/End-Points, Lv:	250 lb
Maintenance Load at Mount Pipes, Lm:	500 lb

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
182	183	3	RFS CELWAVE	APX16DWV-16DWV-S-E-A20	(3)-SECTOR MOUNT (15')
		3	ERICSSON	AIR6449 B41_T-MOBILE	
		3	RFS CELWAVE	APXVAARR24_43-U-NA20	
		3	ERICSSON	RADIO 4415 B66A_CCIV3	
		3	ERICSSON	RADIO 4449 B12/B71	
		3	ERICSSON	RADIO 4424 B25_TMO	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Order	ID: 529712 Rev. 0 Dated: 9/30/2020	-	CCISites
Radio Frequency Data Sheet	RFDS ID #: CT11189E Version 3.00, Dated: 9/23/2020	-	CCISites
Photos	Dated: 9/28/2020	-	CCISites
Mount Analysis Report	Project #: A37519-1779.001.8190 Dated:5/02/2019	-	PJF
Mount Mapping	Project #: 871584 Dated: 4/07/2019	8355339	RKS

3.1) Analysis Method

RISA-3D (version 17.0.4), 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.

A tool internally developed, using Microsoft Excel, by Paul J. Ford and Company was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades are as follows, unless noted otherwise:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Threaded Rods* — *ASTM A36 (GR 36)*
   - *f) Connection Bolts* — *ASTM A325*
   - *g) U-Bolts* — *SAE J429 (GR 2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the mount

.

4) ANALYSIS RESULTS

Table 3 - Mount Component Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2,3	Face Horizontals	182	65.8	Pass
1,2,3	Standoff Members		85.4	Pass
1,2,3	Tie Backs		13.3	Pass
1,2,3	Bracing Members		38.1	Pass
1,2,3	Mount Pipes		28.6	Pass
1,2,3	Mount to Tower Connection		17.7	Pass

Mount Rating (max from all components) =	85.4%

Notes:
1) See additional documentation in "Appendix B – Software Analysis Output" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5
3) All sectors are typical

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[2]	Notes
N76	Existing	928	Leg	Pipe 3.5x0.3	5817	1,2
N75A	Existing	637	Leg	Pipe 3.5x0.3	1745	2,3

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING MOUNTS BY PAUL J. FORD AND COMPANY

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

APPENDIX A

SOFTWARE INPUT CALCULATION

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project Number: 37520-2210.001.8190
Date: 10/8/2020
Engineer: RG

Mount Loading per TIA-222-H (Version v3.0 - Effective 9/14/2020)

Structure & Wind Speed

Structure Type =	Mount	Ultimate Wind Speed =	125 mph
		Ice Wind Speed =	50 mph
Mount Type =	1 Sector	Service Wind Speed =	30 mph
Mount Centerline (z) =	182.00 ft	Non-Op Wind Speed =	- mph
Risa $^{C}/_{L}$ Y-Coordinate =	20.00 in	Op Wind Speed =	- mph
		Ice Thickness =	2 in

Topography

Risk Category =	II
Exposure Category =	C
Topographic Category =	1
Structure Base Height (Z_s) =	877.95 ft
Crest Height (H) =	ft

Velocity Pressure Coefficients

z_g =	900 ft	(Table 2-4)
α' =	9.50	(Table 2-4)
K_z =	1.44	(Section 2.6.5.2)

K_{zmin} = 0.85
K_{zcalc} = 1.44
K_{zmax} = 2.01

			Override
K_{zt} =	1.00	(Section 2.6.6.2.1)	
K_d =	0.95	(Section 16.6)	
K_e =	0.97	(Section 2.6.8)	
G_h =	1.00	(Section 16.6)	
K_{as} =	1.0	(Annex S - Wind Force)	
q_z =	52.85 psf	(Section 2.6.11.6)	

Ice Loading

h =		in (Bar Grating Height)
I_i =	1.00	(Table 2-3)
K_{as} =	1.0	(Annex S - Ice)
q_{iz} =	8.73 psf	(Section 2.6.11.6)
K_z =	1.19	(Section 2.6.10)
t_c =	2.37 in	(Section 2.6.10)
W_i =	11.07 psf	(Grating Ice Weight)

Wind Pressure

			Override
K_s =	0.9	(on all Appurt. / Member Forces)	
$(q_z)(G_h)(K_{as})$ =	52.85 psf		
$(q_{iz})(G_h)(K_{as})$ =	8.73 psf	(Ice)	

Analysis Settings

Analysis Scope =	Client	File Suffix =	_Client.r3d
Analysis Wind Direction Increment =	30°		
EPA Calculation Method =	TIA		
Construction Duration =			

Maintenance Point Loads

	Load	Label	Node #
L_{m1} =	500 lbs	N29	28
L_{m2} =	500 lbs	N33	32
L_{m3} =	500 lbs	N35	34
L_{m4} =	500 lbs	N37	36

	Load	Label	Node #
L_{v1} =	250 lbs	N56	55
L_{v2} =	250 lbs	N1	1
L_{v3} =	250 lbs	N2	2
L_{v4} =	250 lbs		-

Risa3D Source: C:\PJF\MountToolProcessor\Files\Submission149\Risa149.r3d (26 Total Populated Members)

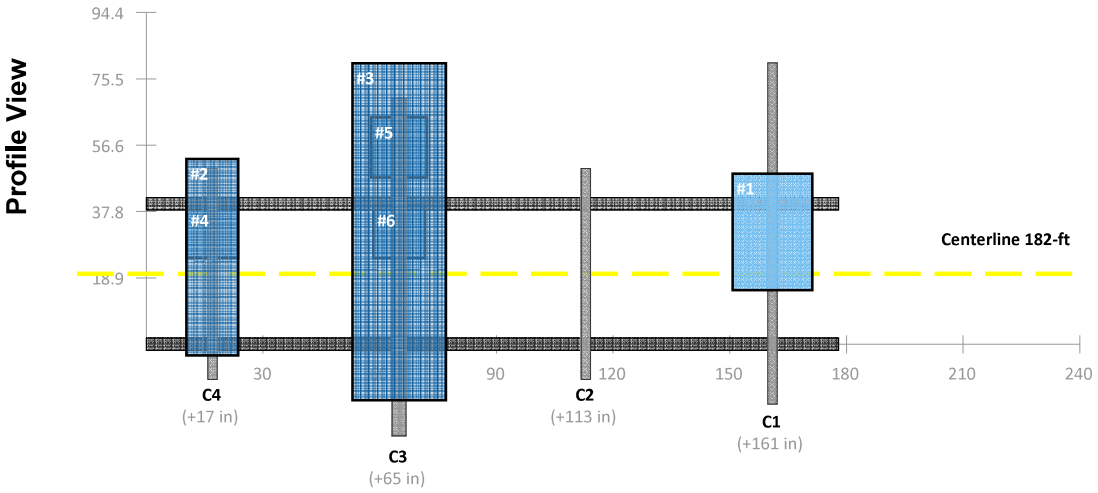
Antennas

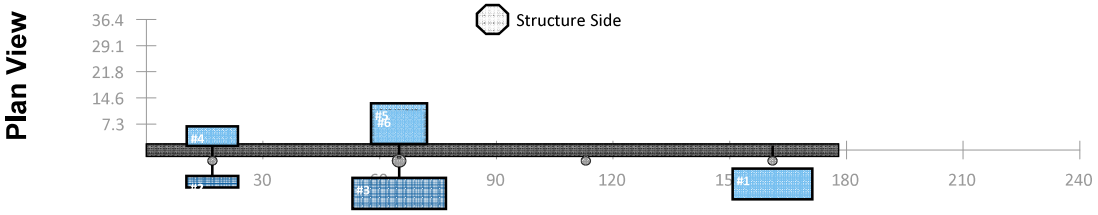
Item	Include Loading	Status	Mounting Location	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Quantity	Orientation	Use tnxTower C_AA_A (CFD)	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)	Override Top Antenna Mounting Location (in)	Override Bottom Antenna Mounting Location (in)	Normal Wind Force per Antenna (lbs)	Transverse Wind Force per Antenna (lbs)
1	Yes	Proposed	Mount	ERICSSON	AIR6449 B41_T-MOBILE	33.11	20.51	8.54	Flat	114.63	C	1	1	Normal	No	27.11		185.870	180.046	183	62.56	35.45			269.167	117.792
2	Yes	Proposed	Mount	RFS CELWAVE	APX16DWV-16DWV-S-E-A20_CCI CFD	55.9	13.3	3.2	Flat	40.7	C	4	1	Normal	Yes	49.90		182.421	181.579	182.4	59.75	9.85			297.751	71.346
3	Yes	Installed	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20_CCI CFD	95.9	24	8.7	Flat	128	C	3	1	Normal	Yes	89.90	74.8	183.050	181.283	183	95.40	20.60			697.764	253.040
4	Yes	Proposed	Mount	ERICSSON	RADIO 4415 B66A_CCIV3	14.9	13.2	5.4	Flat	46.3	C	4	1	Normal	No	8.90		184.129	179.871	183	46.45	37.55			77.957	32.198
5	Yes	Proposed	Mount	ERICSSON	RADIO 4424 B25_TMO	17.1	14.4	11.3	Flat	86	C	3	1	Normal	No	11.10		185.704	178.629	185	87.55	76.45			97.601	76.590
6	Yes	Installed	Mount	ERICSSON	RADIO 4449 B12/B71	15	13.2	9.3	Flat	74	C	3	1	Normal	No	9.00		185.792	178.542	183	62.50	53.50			78.481	55.293

Dishes

Item	Include Loading	Status	Mounting Location	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Dish C/L (ft)	Min Dish C/L (ft)	Dish C/L (ft)	Dish Top Mount Location from Mount Pipe Bottom	Dish Bottom Mount Location from Mount Pipe Bottom	Override Top Dish Mounting Location (in)	Override Bottom Dish Mounting Location (in)

Sector C (ALL SECTORS ARE TYPICAL)





Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Horizontal Offset (in)	Lateral Offset (in)
#1	TME/RRH	ERICSSON	AIR6449 B41_T-MOBILE	33.11	20.51	8.54	183.00	C1	0.00	-3.00
#2	Antenna	RFS CELWAVE	APX16DWV-16DWV-S-E-A20	55.90	13.30	3.20	182.40	C4	0.00	3.00
#3	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	183.00	C3	0.00	3.00
#4	TME/RRH	ERICSSON	RADIO 4415 B66A_CCIV3	14.90	13.20	5.40	183.00	C4	0.00	-3.00
#5	TME/RRH	ERICSSON	RADIO 4424 B25_TMO	17.10	14.40	11.30	185.00	C3	0.00	-3.00
#6	TME/RRH	ERICSSON	RADIO 4449 B12/B71	15.00	13.20	9.30	183.00	C3	0.00	-3.00

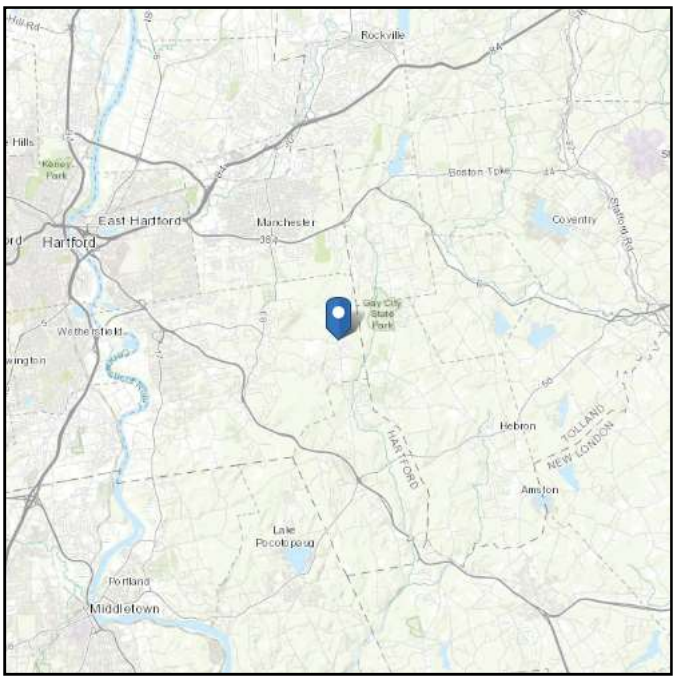
1. A 6" tolerance for proposed equipment is acceptable.
2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 879.67 ft (NAVD 88)
Latitude: 41.708889
Longitude: -72.473333



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Thu May 02 2019

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

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

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

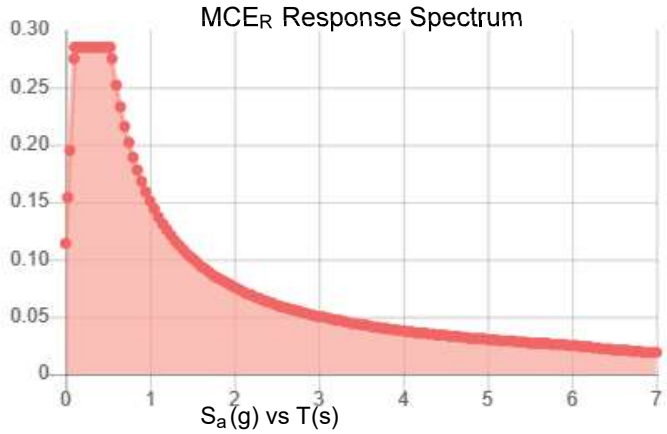
Seismic

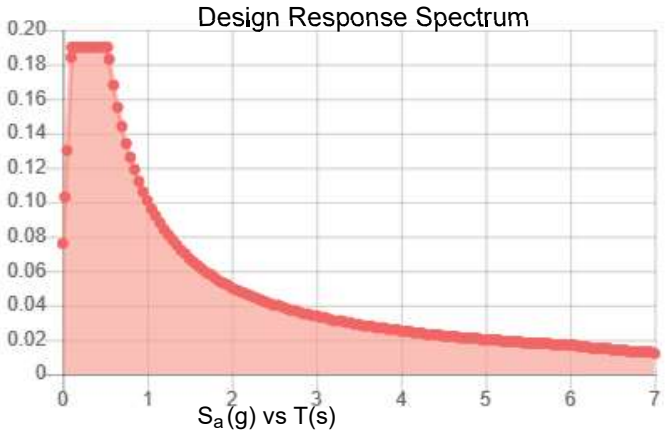
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.178	S_{DS} :	0.19
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.285	PGA_M :	0.143
S_{M1} :	0.151	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu May 02 2019

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

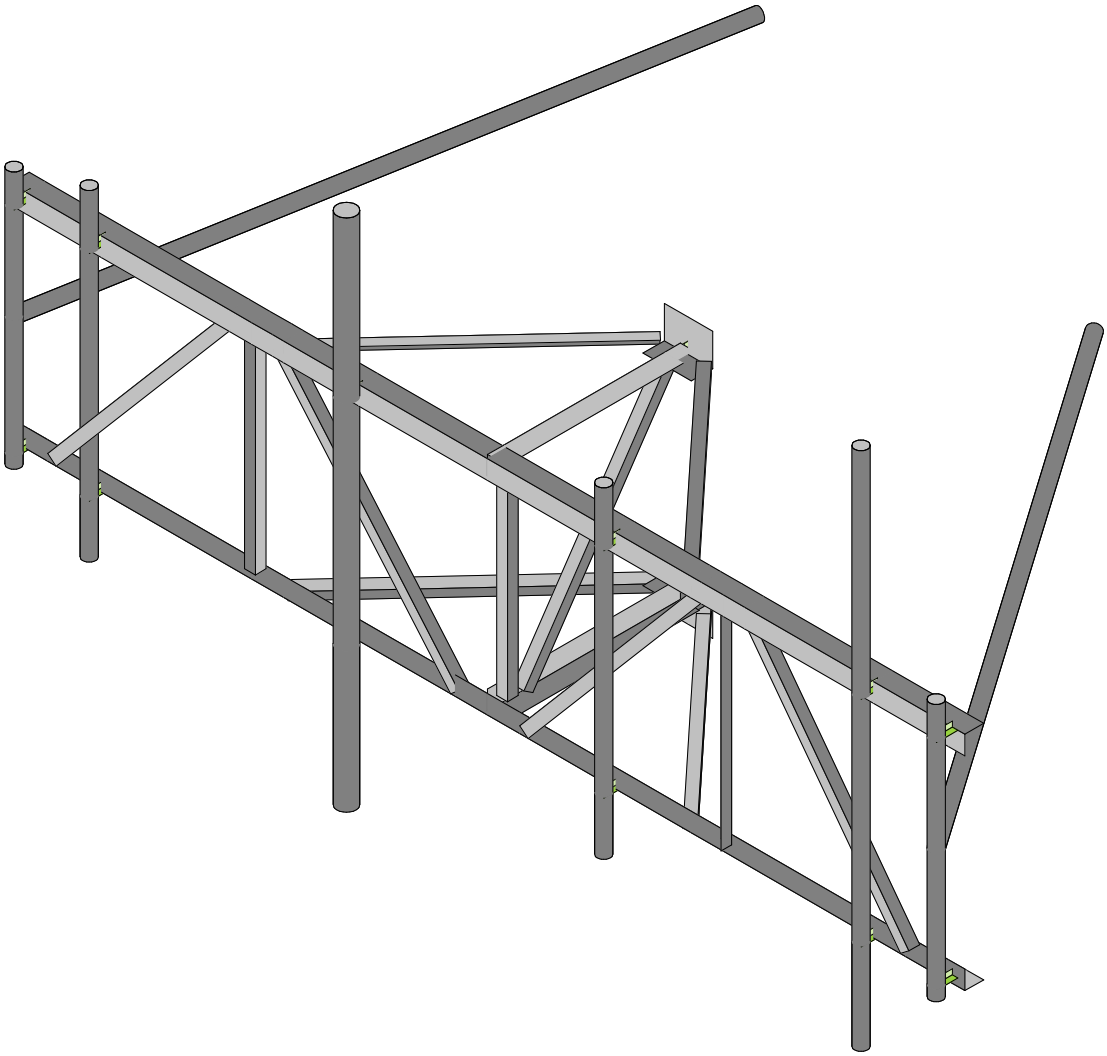
Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu May 02 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

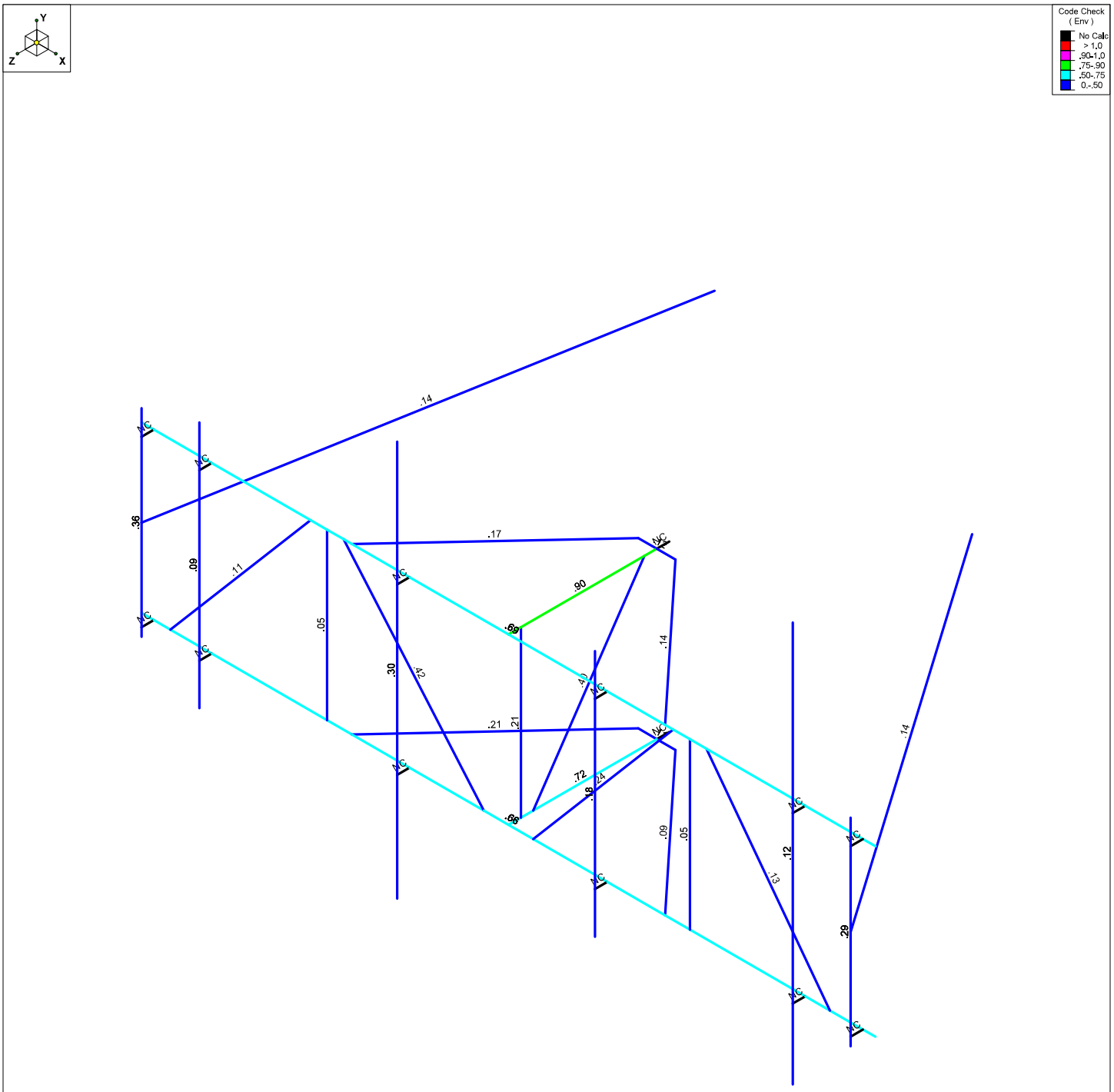
APPENDIX B

SOFTWARE ANALYSIS OUTPUT



Envelope Only Solution

Paul J. Ford and Company	871584_John Tom Hill	SK - 1
RG		Oct 9, 2020 at 12:10 AM
37520-2210.001.8190		Risa149_Client_2020-10-08T1438...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	871584_John Tom Hill	SK - 2
RG		Oct 9, 2020 at 12:10 AM
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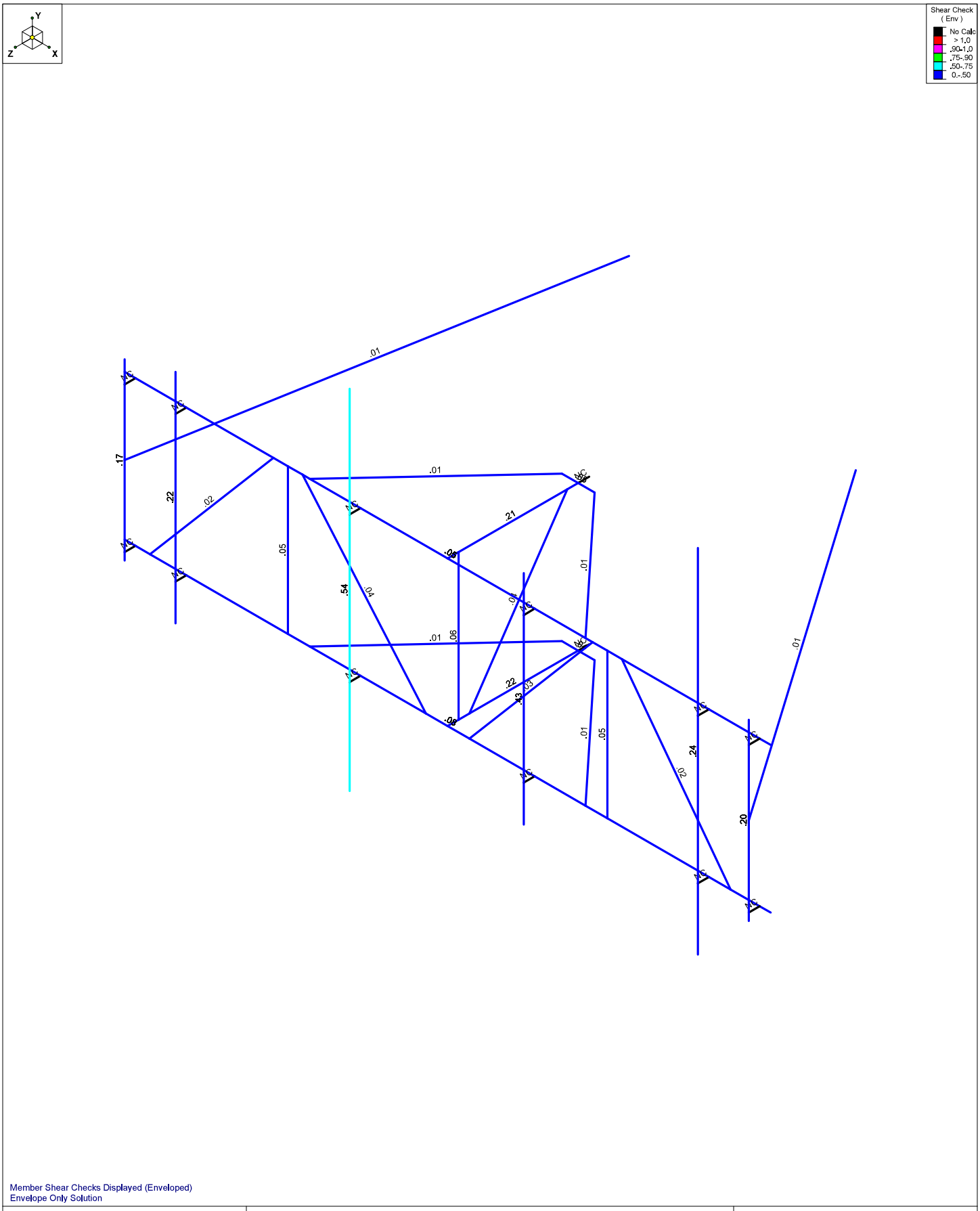

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	871584_John Tom Hill	SK - 3
RG		Oct 9, 2020 at 12:10 AM
37520-2210.001.8190		Risa149_Client_2020-10-08T1438...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B 42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.B 46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	CROSSC1	N1	N2		270	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
2	CROSSC2	N3	N4		180	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
3	M3	N5	N6			PIPE 2.0	Column	Pipe	A53 Gr.B	Typical
4	M4	N7	N8			RIGID	None	None	RIGID	Typical
5	M5	N9	N10			RIGID	None	None	RIGID	Typical
6	M6	N11	N12			PIPE 2.0	Column	Pipe	A53 Gr.B	Typical
7	M7	N13	N14			RIGID	None	None	RIGID	Typical
8	M8	N15	N16			RIGID	None	None	RIGID	Typical
9	M9	N17	N18			RIGID	None	None	RIGID	Typical
10	M10	N19	N32			RIGID	None	None	RIGID	Typical
11	M11	N20	N21			RIGID	None	None	RIGID	Typical
12	M13	N24	N25			RIGID	None	None	RIGID	Typical
13	C4	N27	N26			PIPE 2.0	Column	Pipe	A53 Gr.B	Typical
14	M15	N28	N29			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
15	C3	N30	N31			PIPE_3.0	Column	Pipe	A53 Gr.B	Typical
16	M18	N33	N34			RIGID	None	None	RIGID	Typical
17	M19	N35	N36			RIGID	None	None	RIGID	Typical
18	M20	N37	N38			RIGID	None	None	RIGID	Typical
19	C2	N40	N39			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
20	C1	N42	N41			PIPE_2.0	Column	Pipe	A53 Gr.B	Typical
21	M23	N43	N44		270	L2x2x3	Column	Single Angle	A36 Gr.36	Typical
22	M24	N45	N46			L2x2x3	Column	Single Angle	A36 Gr.36	Typical
23	M25	N47	N48		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
24	M26	N49	N50		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
25	M27	N51	N52		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
26	M28	N53	N54		180	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
27	M29	N55	N71		90	L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
28	M30	N56	N73			L3.5X3.5X6	Beam	Single Angle	A36 Gr.36	Typical
29	M31	N57	N58		90	L2x2x3	VBrace	Single Angle	A36 Gr.36	Typical
30	M32	N59	N60			L2x2x3	Column	Single Angle	A36 Gr.36	Typical
31	M33	N61	N62		90	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
32	M34	N62	N64			L6X4X6	Beam	Single Angle	A36 Gr.36	Typical
33	M35	N63	N64		180	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
34	M37	N67	N68			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
35	M38	N70	N68		180	L6X4X6	Beam	Single Angle	A36 Gr.36	Typical
36	M39	N69	N70		270	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
37	M40	N71	N72			RIGID	None	None	RIGID	Typical
38	M41	N73	N74			RIGID	None	None	RIGID	Typical
39	M40A	N75	N76			PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
40	M40B	N74A	N75A			PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic ...
1	CROSSC1						Yes	Default			None
2	CROSSC2						Yes				None
3	M3						Yes	** NA **			None
4	M4		OOOXOO				Yes	** NA **			None
5	M5		OOOXOO				Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7		OOOXOO				Yes	** NA **			None
8	M8		OOOXOO				Yes	** NA **			None
9	M9	OOOXOX					Yes	** NA **			None
10	M10	OOOXOX					Yes	** NA **			None
11	M11	OOOXOX					Yes	** NA **			None
12	M13	OOOXOX					Yes	** NA **			None
13	C4						Yes	** NA **			None
14	M15		OOOXOO				Yes	** NA **			None
15	C3						Yes	** NA **			None
16	M18	OOOXOX					Yes	** NA **			None
17	M19	OOOXOX					Yes	** NA **			None
18	M20	OOOXOX					Yes	** NA **			None
19	C2						Yes	** NA **			None
20	C1						Yes	** NA **			None
21	M23	BenPIN	BenPIN				Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
22	M24	BenPIN	BenPIN				Yes	** NA **			None
23	M25	BenPIN	BenPIN				Yes	** NA **			None
24	M26	BenPIN	BenPIN				Yes	** NA **			None
25	M27	BenPIN	BenPIN				Yes	** NA **			None
26	M28	BenPIN	BenPIN				Yes	** NA **			None
27	M29	BenPIN					Yes	Default			None
28	M30	BenPIN					Yes	Default			None
29	M31	BenPIN	BenPIN				Yes	** NA **			None
30	M32	BenPIN	BenPIN				Yes	** NA **			None
31	M33	BenPIN	BenPIN				Yes	Default			None
32	M34						Yes				None
33	M35	BenPIN	BenPIN				Yes	Default			None
34	M37	BenPIN	BenPIN				Yes	Default			None
35	M38						Yes				None
36	M39	BenPIN	BenPIN				Yes	Default			None
37	M40						Yes	** NA **			None
38	M41						Yes	** NA **			None
39	M40A	BenPIN					Yes	Default			None
40	M40B	BenPIN					Yes	Default			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	CROSSC1	L3.5X3.5X6	178	51	51	Lbyy						Lateral
2	CROSSC2	L3.5X3.5X6	178	51	51	Lbyy						Lateral
3	M3	PIPE_2.0	48			Lbyy						Lateral
4	M6	PIPE_2.0	48			Lbyy						Lateral
5	C4	PIPE_2.0	60			Lbyy						Lateral
6	C3	PIPE_3.0	96			Lbyy						Lateral
7	C2	PIPE_2.0	60			Lbyy						Lateral
8	C1	PIPE_2.0	97			Lbyy						Lateral
9	M23	L2x2x3	40			Lbyy						Lateral
10	M24	L2x2x3	40			Lbyy						Lateral
11	M25	L2x2x3	52.498			Lbyy						Lateral
12	M26	L2x2x3	52.498			Lbyy						Lateral
13	M27	L2x2x3	52.498			Lbyy						Lateral
14	M28	L2x2x3	50			Lbyy						Lateral
15	M29	L3.5X3.5X6	36			Lbyy						Lateral
16	M30	L3.5X3.5X6	36			Lbyy						Lateral
17	M31	L2x2x3	48.26			Lbyy						Lateral
18	M32	L2x2x3	40			Lbyy						Lateral
19	M33	L2x2x3	49.176			Lbyy						Lateral
20	M34	L6X4X6	9			Lbyy						Lateral
21	M35	L2x2x3	49.176			Lbyy						Lateral
22	M37	L2x2x3	49.176			Lbyy						Lateral
23	M38	L6X4X6	9			Lbyy						Lateral
24	M39	L2x2x3	49.176			Lbyy						Lateral
25	M40A	PIPE_2.0	120			Lbyy						Lateral
26	M40B	PIPE_2.0	120			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1.1			12			
2	Wind 0	None					24	52		
3	Wind 30	None					24	52		
4	Wind 60	None					24	52		
5	Wind 90	None					24	52		
6	Wind 120	None					24	52		
7	Wind 150	None					24	52		
8	Ice Load	None					12	26		
9	Ice 0	None					24	52		
10	Ice 30	None					24	52		
11	Ice 60	None					24	52		
12	Ice 90	None					24	52		
13	Ice 120	None					24	52		
14	Ice 150	None					24	52		
15	Lm1	None				1				
16	Lm2	None				1				
17	Lm3	None				1				
18	Lm4	None				1				
19	Lv1	None				1				
20	Lv2	None				1				
21	Lv3	None				1				
22	Lv4	None				1				

Load Combinations

	Description	So...	P...	S...	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
1	1.4 D	Yes	Y		1	1.4																				
2	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	2	1																		
3	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	3	1																		
4	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	4	1																		
5	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	5	1																		
6	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	6	1																		
7	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	7	1																		
8	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	2	-1																		
9	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	3	-1																		
10	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	4	-1																		
11	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	5	-1																		
12	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	6	-1																		
13	1.2 D + 1.0 Wo...	Yes	Y		1	1.2	7	-1																		
14	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	9	1																
15	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	10	1																
16	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	11	1																
17	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	12	1																
18	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	13	1																
19	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	14	1																
20	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	9	-1																
21	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	10	-1																
22	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	11	-1																
23	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	12	-1																
24	1.2 D + 1.0 Di+...	Yes	Y		1	1.2	8	1	13	-1																

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
25	1.2 D + 1.0 Di +..	Yes	Y		1	1.2	8	1	14	-1																
26	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	2	.058																
27	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	3	.058																
28	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	4	.058																
29	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	5	.058																
30	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	6	.058																
31	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	7	.058																
32	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	2	.058																
33	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	3	.058																
34	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	4	.058																
35	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	5	.058																
36	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	6	.058																
37	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	15	1.5	7	.058																
38	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	2	.058																
39	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	3	.058																
40	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	4	.058																
41	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	5	.058																
42	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	6	.058																
43	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	7	.058																
44	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	2	.058																
45	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	3	.058																
46	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	4	.058																
47	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	5	.058																
48	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	6	.058																
49	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	16	1.5	7	.058																
50	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	2	.058																
51	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	3	.058																
52	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	4	.058																
53	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	5	.058																
54	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	6	.058																
55	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	7	.058																
56	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	2	.058																
57	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	3	.058																
58	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	4	.058																
59	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	5	.058																
60	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	6	.058																
61	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	17	1.5	7	.058																
62	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	2	.058																
63	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	3	.058																
64	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	4	.058																
65	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	5	.058																
66	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	6	.058																
67	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	7	.058																
68	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	2	-.058																
69	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	3	-.058																
70	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	4	-.058																
71	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	5	-.058																
72	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	6	-.058																
73	1.2 D + 1.5 Lm...	Yes	Y		1	1.2	18	1.5	7	-.058																
74	1.2 D + 1.5 Lv1	Yes	Y		1	1.2	19	1.5																		
75	1.2 D + 1.5 Lv2	Yes	Y		1	1.2	20	1.5																		
76	1.2 D + 1.5 Lv3	Yes	Y		1	1.2	21	1.5																		

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
77	1.2 D + 1.5 Lv4	Yes	Y		1	1.2	22	1.5																		
78	1.0 D	Yes	Y		1	1																				

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code ...	Loc[in]	LC	Shear Check	Loc[...	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M29	L3.5X3.5X6	.897	33	22	.211	36	z	25	69978....	81000	40.078	89.424	1...	H2-1
2	M30	L3.5X3.5X6	.720	6	21	.224	6	y	16	69978....	81000	40.078	89.424	1...	H2-1
3	CROSSC2	L3.5X3.5X6	.691	66.75	32	.051	48.2...	y	16	60395....	81000	40.078	62.061	1	H2-1
4	CROSSC1	L3.5X3.5X6	.661	66.75	34	.084	89	z	22	60395....	81000	40.078	62.061	1	H2-1
5	M26	L2x2x3	.416	26.796	24	.037	0	y	32	8955.648	23392.8	6.693	12.731	1...	H2-1
6	M31	L2x2x3	.397	24.13	25	.038	0	z	64	10403....	23392.8	6.693	12.991	1...	H2-1
7	M3	PIPE 2.0	.360	24	13	.174	24		37	26521....	32130	22.459	22.459	1...	H1-1b
8	C3	PIPE 3.0	.304	66	37	.536	66		32	46290....	65205	68.985	68.985	1...	H3-6
9	M6	PIPE 2.0	.295	24	3	.197	46		32	26521....	32130	22.459	22.459	1...	H1-1b
10	M27	L2x2x3	.240	25.702	64	.034	52.4...	y	36	8955.648	23392.8	6.693	12.731	1...	H2-1
11	M32	L2x2x3	.209	21.25	17	.062	0	z	32	13407....	23392.8	6.693	13.532	1...	H2-1
12	M37	L2x2x3	.206	24.588	15	.013	0	y	22	10085....	23392.8	6.693	12.933	1...	H2-1
13	C2	PIPE 2.0	.178	50	32	.427	10		32	23808.54	32130	22.459	22.459	1	H3-6
14	M33	L2x2x3	.167	24.588	3	.009	49.1...	z	19	10085....	23392.8	6.693	12.933	1...	H2-1
15	M35	L2x2x3	.143	24.588	25	.014	49.1...	y	25	10085....	23392.8	6.693	12.933	1...	H2-1
16	M40B	PIPE 2.0	.138	60	24	.010	0		23	9836.597	32130	22.459	22.459	1...	H1-1b
17	M40A	PIPE 2.0	.137	60	16	.010	120		22	9836.597	32130	22.459	22.459	1...	H1-1b
18	M28	L2x2x3	.130	25	24	.024	0	y	32	9802.923	23392.8	6.693	12.882	1...	H2-1
19	M34	L6X4X6	.117	4.5	9	.047	4.5	z	9	107464...	116964	61.31	184.212	1...	H2-1
20	C1	PIPE 2.0	.116	17.177	32	.241	17.1...		32	14678....	32130	22.459	22.459	1...	H3-6
21	M38	L6X4X6	.110	4.5	33	.044	4.5	z	33	107464...	116964	61.31	179.201	1...	H2-1
22	M25	L2x2x3	.110	26.249	16	.019	52.4...	y	32	8955.648	23392.8	6.693	12.731	1...	H2-1
23	M39	L2x2x3	.092	24.588	16	.009	0	z	16	10085....	23392.8	6.693	12.933	1...	H2-1
24	C4	PIPE 2.0	.089	50	8	.216	10		32	23808.54	32130	22.459	22.459	1	H1-1b
25	M23	L2x2x3	.053	20	6	.048	40	y	32	13407....	23392.8	6.693	13.532	1...	H2-1
26	M24	L2x2x3	.048	20	8	.047	0	z	32	13407....	23392.8	6.693	13.532	1...	H2-1

APPENDIX C

ADDITIONAL CALCULATIONS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # 37520-2210.001.8190
By DS
Date: 10/08/20
v3.6, Effective 08/10/2020

MOUNT TO TOWER CONNECTION CHECKS-LRFD

TIA Rev.	H-15.5	AISC	15th
Mount Type	3-Sector	Checks	Bolts

REACTIONS FROM RISA-3D

NODE	LC	Horizontal Shear (k)	Vertical Shear (k)	Axial along member(k)	Moment about horizontal axis (ft-k)	Moment about Vertical axis (ft-k)	Torque (ft-k)
N72	envelope	1.50	5.50	4.91	0.00	0.00	0.00

Bolt Information	Type	Dia (in)	Quantity	Vertical Bolt spacing (D) (in)	Horizontal Bolt spacing (B) (in)
	U-Bolt	0.625	4	2	2.5

Note: Quantity of U-bolt should be entered to consider each leg.
Ex: 2 U-bolts should be entered as 4 under quantity

CHECKS	Forces	Strength	Rating
TENSION (K)	1.23	12.8	9.6%
		Reduced Tensile Rating	-
SHEAR (k)	1.43	7.7	18.6%

Note: Tension reduction not required if tension or shear capacity < 30%

Controlling Rating per TIA-222-H Section 15.5:	17.7%

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11189E

Glastonbury/ Rt-94 & Fern
115 Birch Mountain Road
Glastonbury, Connecticut 06033

November 12, 2020

EBI Project Number: 6220005863

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**12.24%**

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

November 12, 2020

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

Emissions Analysis for Site: CT11189E - Glastonbury/ Rt-94 & Fern

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **115 Birch Mountain Road** in **Glastonbury, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 115 Birch Mountain Road in Glastonbury, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 1 LTE channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

8) 1 NR channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

9) 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.

10) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

12) The antenna mounting height centerline of the proposed antennas is 183 feet above ground level (AGL).

13) 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.

14) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	183 feet	Height (AGL):	183 feet	Height (AGL):	183 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE %:	**0.50%**	Antenna B1 MPE %:	**0.50%**	Antenna C1 MPE %:	**0.50%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	183 feet	Height (AGL):	183 feet	Height (AGL):	183 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	38,477.89	ERP (W):	38,477.89	ERP (W):	38,477.89
Antenna A2 MPE %:	**4.13%**	Antenna B2 MPE %:	**4.13%**	Antenna C2 MPE %:	**4.13%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd
Height (AGL):	183 feet	Height (AGL):	183 feet	Height (AGL):	183 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,873.80	ERP (W):	12,873.80	ERP (W):	12,873.80
Antenna A3 MPE %:	**1.99%**	Antenna B3 MPE %:	**1.99%**	Antenna C3 MPE %:	**1.99%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	6.62%
Various Carriers	1.41%
Unknown	2.16%
Sprint	2.05%
Site Total MPE % :	12.24%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	6.62%
T-Mobile Sector B Total:	6.62%
T-Mobile Sector C Total:	6.62%
Site Total MPE % :	12.24%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2100 MHz LTE	2	2334.27	183.0	5.01	2100 MHz LTE	1000	0.50%
T-Mobile 2500 MHz LTE	1	19238.94	183.0	20.65	2500 MHz LTE	1000	2.07%
T-Mobile 2500 MHz NR	1	19238.94	183.0	20.65	2500 MHz NR	1000	2.07%
T-Mobile 600 MHz LTE	2	591.73	183.0	1.27	600 MHz LTE	400	0.32%
T-Mobile 600 MHz NR	1	1577.94	183.0	1.69	600 MHz NR	400	0.42%
T-Mobile 700 MHz LTE	2	648.82	183.0	1.39	700 MHz LTE	467	0.30%
T-Mobile 1900 MHz GSM	4	1101.85	183.0	4.73	1900 MHz GSM	1000	0.47%
T-Mobile 1900 MHz LTE	2	2203.69	183.0	4.73	1900 MHz LTE	1000	0.47%
						Total:	**6.62%**

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

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	6.62%
Sector B:	6.62%
Sector C:	6.62%
T-Mobile Maximum MPE % (Sector A):	6.62%
Site Total:	12.24%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.24%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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