April 9, 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 Site ID# 876365; T-Mobile Site ID# CTHA354A
3 Carion Road, Union, CT 06076
Latitude: 41° 59′ 16.55″/ Longitude: -72° 06′ 48.64″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 180-foot mount on the existing 180-foot Monopole Tower located at 3 Carion Road in Union. The property is owned by Sherwood Bauer and the Tower is owned by Crown Castle. T-Mobile now intends to replace six (6) existing antennas and add three (3) new antennas. 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. T-Mobile is also proposing mount modifications as shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove and Replace:
(3) RFS – APXVTMI4-ALU-I20 Antennas **(REMOVE)** - (3) RFS – APX16DWV-16DWV-S-E-A20 Antennas **(REPLACE)**

(3) Commscope – NNVV-65B-R4 Antennas **(REMOVE)** – (3) RFS – APXVAALL24_43-U-NA20 Antennas **(REPLACE)**

Install New:
(3) AIR6449 B41 Antennas
(3) Ericsson – Radio 4415 B66A
(3) Ericsson – Radio 4449 B71+B85A
(3) Ericsson – Radio 4424 B25
(4) 6x24 HCS 4AWG hybrid trunk feedlines
(3) Site Pro 1 – HRK12 Handrail Kit

Remove:
(3) Alcatel Lucent 1900MHz 4x45W-65 MHz radio
(3) Alcatel Lucent - TD-RRH8x20-25 radio
(6) Alcatel Lucent – RRH2x50-800 radio

Ground:

Install New:
(1) SSC 6160 cabinet
(1) B160 battery cabinet
(1) BB6648
(3) BB6630
(1) DUG20
(1) PSU 4813 voltage booster
(1) CSR IXRe VE (Gen 2) router

The facility was originally approved by the Town of Union on December 27th, 2000. No conditions were included with the approval.

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 David Eaton, First Selectman for the Town of Union, as well as Joe Pajak, Building Officer for the Town of Union. A copy of this application will also be sent to the property owner.

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

2. 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.

3. 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.

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

5. 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 Acquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY
(585) 445-5896
Richard.zajac@crowncastle.com

cc:

Town of Union
Attn: David Eaton – First Selectman *(via email only to firstselectman@unionconnecticut.org)*
Town Hall
1043 Buckley Hwy
Union, CT 06076

Town of Union
Attn: Joe Pajak – Building Official *(via email only to building@unionconnecticut.org)*
Town Hall
1043 Buckley Hwy
Union, CT 06076

Sherwood Bauer *(via email only to srbauer3509@sbcglobal.net)*
1 Carion Road
Union, CT 06076

Zajac, Richard

From: Zajac, Richard
Sent: Friday, April 9, 2021 11:48 AM
To: firstselectman@unionconnecticut.org
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 3 Carion Road.pdf

Good morning,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 3 Carion Road in Union.

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, April 9, 2021 11:49 AM
To: building@unionconnecticut.org
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 3 Carion Road.pdf

Good morning,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 3 Carion Road in Union.

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, April 9, 2021 11:52 AM
To: 'srbauer3509@sbcglobal.net'
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 3 Carion Road.pdf

Good morning,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 3 Carion Road in Union.

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

Exhibit A

Original Facility Approval

Paid - Check #25867
Amt 2530.00
E. Stoveski

TOWN OF UNION

BUILDING PERMIT

Date 12/27/00

NO. 0047

Est. Value $ 253,300
Bldg. Permit Fee 2530.00
Land Use
TOTAL FEE 2,530.00

A PERMIT MUST BE OBTAINED AND FEE PAID BEFORE BEGINNING WORK.
This card must be kept posted until final inspection has been made and bottom half returned to the Building Inspector's Office before the building is occupied and a Certificate of Occupancy is issued.

The undersigned hereby applies for permit to do work according to the following specifications, same to be in all respects in accordance with the laws and building regulations of the State of Connecticut, Basic Building Code, Land Use regulations and ordinances of the Town of Union, Connecticut. A final inspection is required before the building can be occupied or a Certificate of Use or Occupancy is issued.

APPLICATION MUST BE TYPED OR PRINTED

Owner Sprint Spectrum L.P. Street 1 International Blvd. Phone (201) 684-4000

Lot No. 5 House No. 3 Road Cacion Road

Owner of land [illegible] Address 3 Cacion Road Union CT Phone (860) 974-0000

Builder McPhee Electric Address 505 Main St. Farmington CT Phone (860) 677-9797

Architect SEA Consultants Address 2080 Silas Deane Highway Suite 202 Rocky Hill CT Phone (860) 563-7775

Type of building 190' monopole + related facility Size of building

Floor area 1st floor 2nd floor Total

Type of heat: Hot Water ☐ Hot Air ☐ Steam ☐ Electric ☐ Wood ☐

Type of work: Original ☐ Alteration ☐ Addition ☐ Repair ☐ Demolish ☐

Approvals: Septic Perc ☐ Wetlands ☐ Driveway ☐ Fire Marshal ☐ Planning ☐

Signature [illegible] Agent of [illegible] Building Official [illegible]

DO NOT DESTROY OR MUTILATE.
POST THIS CARD SO IT IS VISIBLE FROM STREET.
INSPECTIONS MUST BE APPROVED AND THIS CARD RETURNED TO THE BUILDING DEPT. OFFICE BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED.

Owner of land Address Phone

BUILDING INSPECTION APPROVALS	PLUMBING INSPECTION APPROVALS	ELECTRICAL INSPECTION APPROVALS
1 FOOTINGS	1 ROUGH	1 ROUGH
2 FOUNDATION	2 FINISH	2 FINISH
3 FRAMING	**HEATING INSPECTION APPROVALS**	**FIREPLACE CHIMNEYS**
	1 ROUGH	1 ROUGH
4 INSULATION AS PER PRINT	2 FINISH Town HALL	2 FINISH AT TOWER

Work shall not proceed until the Inspector has approved the various stages of construction.

PERMIT WILL BECOME NULL AND VOID IF CONSTRUCTION WORK IS NOT STARTED WITHIN SIX MONTHS OF DATE THE PERMIT IS ISSUED AS NOTED ABOVE.

Inspections indicated on this card can be arranged for by telephone or personal written notification.

Building Official

SPRINT PCS

ATTACHMENT C
TEMPORARY DELEGATION OF APPROVAL AUTHORITY

To : VP, Controller - Sprint PCS

I

Michael Loucy	Director of Site Development
Authorizing Name (Print/Type)	**Title**

in accordance with Sprint PCS Financial Policy, paragraph 9.1, do hereby delegate my fiscal approval authority to :

Tom Kincaid	145-76-7791	Site Development Manager
Employee Name (Print/Type)	**Social Security Number**	**Title**

for the following department(s):

Department Number(s)

13249	20100/20109
20200/20209	26100/26109
20800/20809	22100/22109
23500/23509	

This delegation is effective for the period **DECEMBER 26, 2000 THROUGH DECEMBER 29, 2000** (not to exceed 30 days) and is necessary due to **VACATIOIN** (reason: e.g. absence, vacation, etc.)

Signature of person receiving temporary delegation	12/22/2000 **Date**
Signature of person whose authority is being delegated	12/22/2000 **Date**

A copy of this completed form should accompany all individual financial commitments or expenditure documentation approved under the above temporary delegation.

Exhibit B

Property Card

1 CARION RD

Location	1 CARION RD	**Mblu**	23/ 19/ 005/ /
Acct#	00003600	**Owner**	BAUER SHERWOOD R & JOAN M
Assessment	$293,490	**Appraisal**	$466,050
PID	241	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$120,200	$345,850	$466,050
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$84,140	$209,350	$293,490

Owner of Record

Owner	BAUER SHERWOOD R & JOAN M	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	1 CARION RD UNION, CT 06076	**Book & Page**	64/50
		Sale Date	12/09/2015
		Instrument	01

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
BAUER SHERWOOD R & JOAN M	$0		64/50	01	12/09/2015
BAUER SHERWOOD R	$0		32/638		05/31/1998

Building Information

Building 1 : Section 1

Year Built:	2015
Living Area:	1,008
Replacement Cost:	$123,914
Building Percent Good:	97

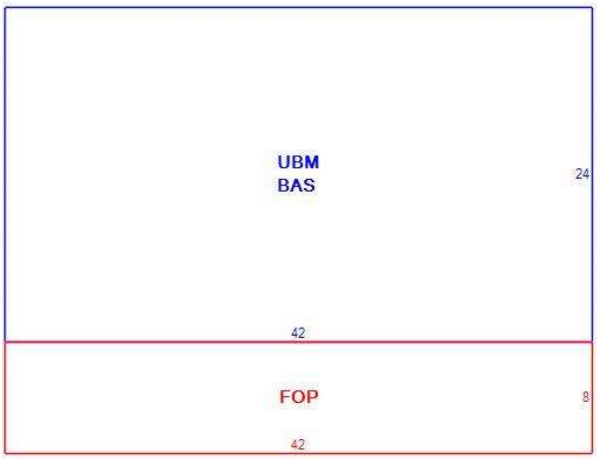
Replacement Cost
Less Depreciation: $120,200

Building Attributes	
Field	**Description**
Style	Ranch
Model	Residential
Grade:	C
Stories:	
Occupancy	
Exterior Wall 1	Cedar or Redwd
Exterior Wall 2	
Roof Structure:	Gable or Hip
Roof Cover	Archit Shingle
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Pergo/Laminate
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	Central
Total Bedrooms:	2 Bedrooms
Total Bthrms:	1
Total Half Baths:	0
Total Xtra Fixtrs:	
Total Rooms:	4
Bath Style:	Average
Kitchen Style:	Average

Building Photo

(http://images.vgsi.com/photos/UnionCTPhotos//default.jpg)

Building Layout



(ParcelSketch.ashx?pid=241&bid=241)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,008	1,008
FOP	Open Porch	336	0
UBM	Unfinished Basement	1,008	0
		2,352	1,008

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Land Line Valuation

Land Use

Use Code	1010
Description	Single Fam MDL-01
Zone	RT
Neighborhood	12
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	44.50
Frontage	0
Depth	0
Assessed Value	$209,350
Appraised Value	$345,850

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$120,200	$345,850	$466,050
2017	$122,240	$370,650	$492,890
2013	$0	$370,650	$370,650

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$84,140	$209,350	$293,490
2017	$85,570	$223,830	$309,400
2013	$0	$176,910	$176,910

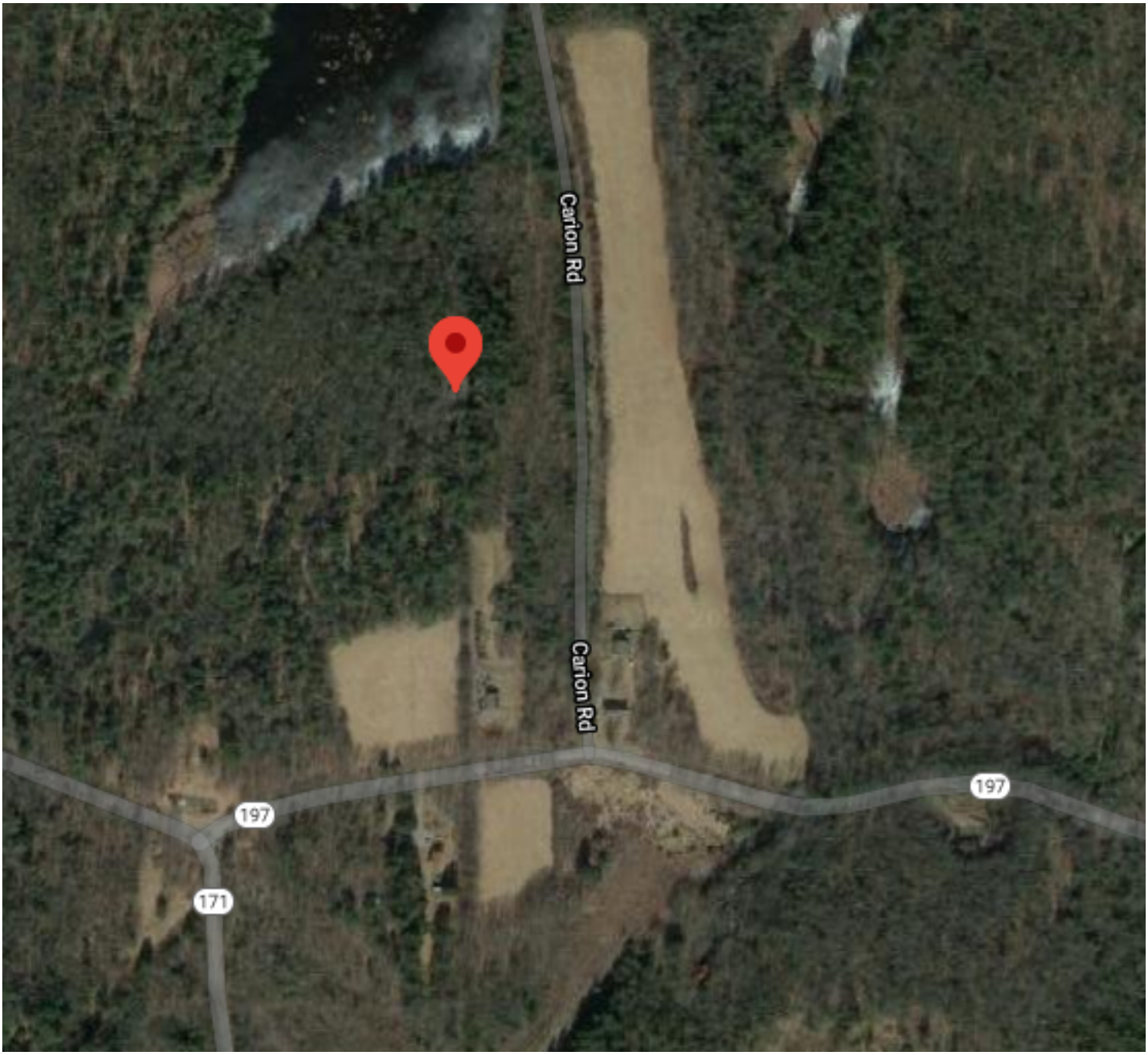

Carlon Rd
Carlon Rd
197
197
171

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER:	CTHA354A
T-MOBILE SITE NAME:	CTHA354A
SITE TYPE:	MONOPOLE
TOWER HEIGHT:	180'-0"

BUSINESS UNIT #:	876365
SITE ADDRESS:	3 CARION RD UNION, CT 06076
COUNTY:	TOLLAND
JURISDICTION:	CONNECTICUT SITING COUNCIL

T-MOBILE SPRINT RETAIN SITE CONFIGURATION: 67D5A998C 6160 (GSM ONLY)

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	KINGSTON W. / BAUER (SSUSA)
SITE ADDRESS:	3 CARION RD UNION, CT 06076
COUNTY:	TOLLAND
MAP/PARCEL #:	CT-145-23-19-000005
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.987933
LONGITUDE:	-72.113600
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	952'
CURRENT ZONING:	RT
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:	BAUER SHERWOOD R & JOAN M 1 CARION RD UNION, CT 06076
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054
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

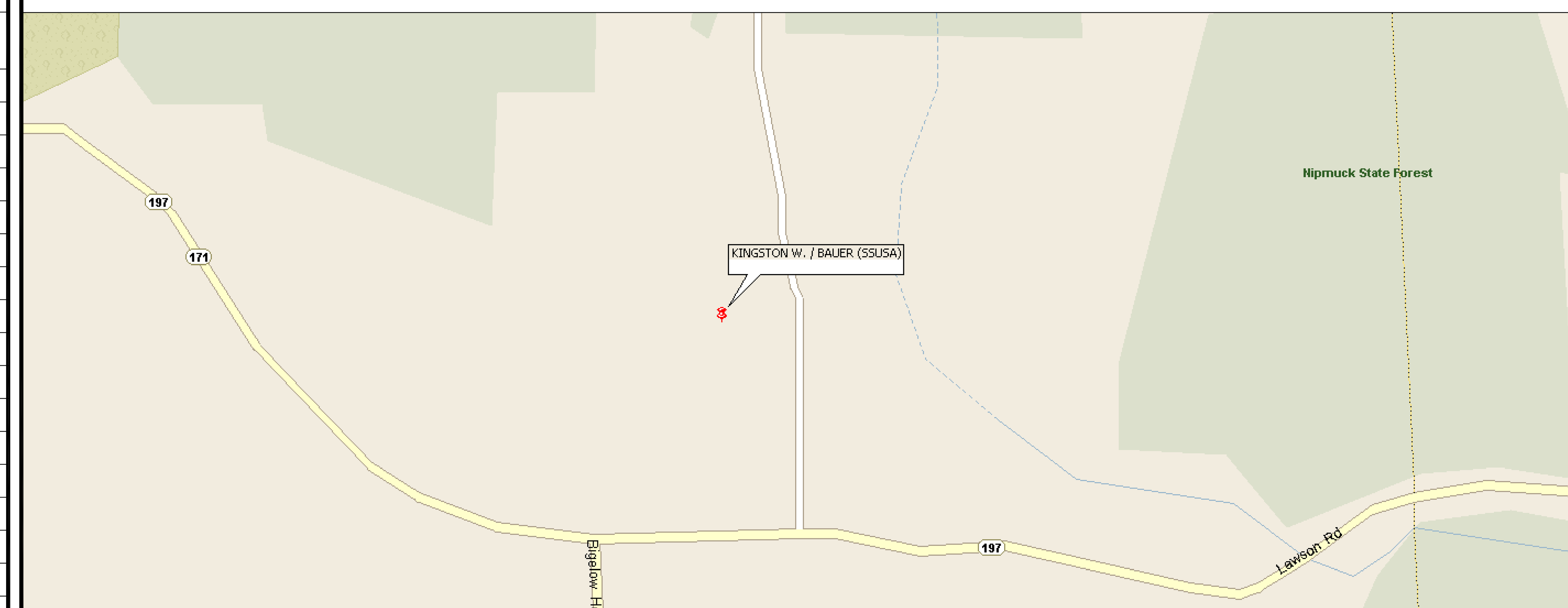
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (12) RADIOS
- INSTALL (9) ANTENNAS
- INSTALL (9) RADIOS
- INSTALL (4) 1 3 5/8" HYBRID CABLE
- INSTALL (3) SITE PRO 1 HRK12 HANDRAIL KIT.

GROUND SCOPE OF WORK:
- INSTALL (1) 6160 SITE SUPPORT CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) RBS 6601 IN SSC
- INSTALL (3) BB 6630 IN 6160 SSC
- INSTALL (1) BB 6648 IN 6160 SSC
- INSTALL (1) DUG20 IN SSC
- INSTALL (1) PSU 4813
- INSTALL(1) CSR IXRE V2 (GEN2) TRANSPORT SYSTEM

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 / 2018 CONNECTICUT SBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	TOWER ENGINEERING PROFESSIONALS
DATED:	2/11/21
MOUNT ANALYSIS:	INFINIGY ENGINEERING, PLLC
DATED:	2/1/21
RFDS REVISION:	1
DATED:	1/12/21
ORDER ID:	538765
REVISION:	1

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS BEFORE YOU DIG!
811

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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

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

SHEET NUMBER: **T-1**
REVISION: **0**

147459.002.01_KINGSTON W. BAUER.dwg — Sheet:T-1 — User: mjones — Mar 19, 2021 — 8:13am

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.

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

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–POTENTIAL 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).

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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

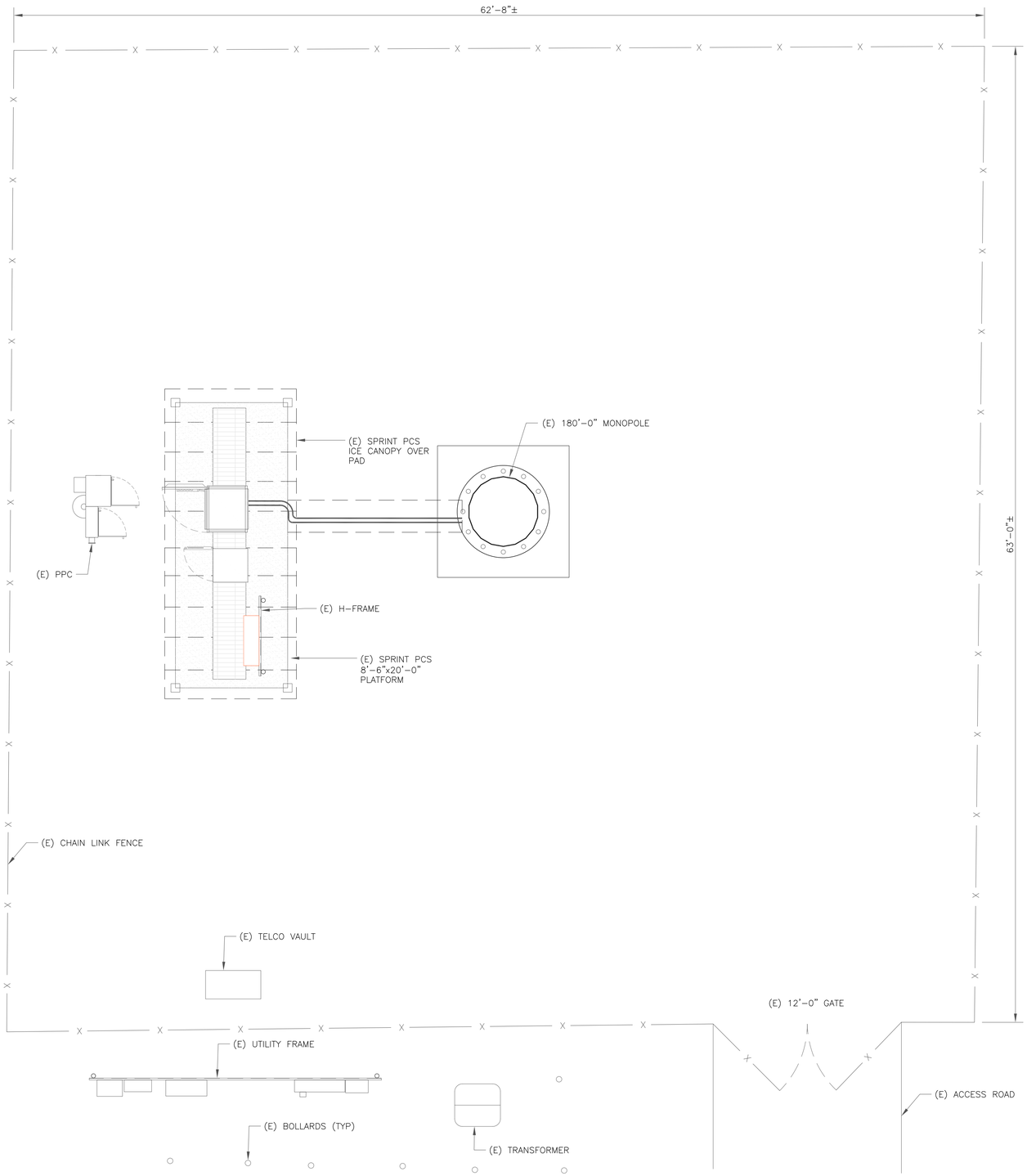
STATE OF CONNECTICUT
No. 23924
LICENSED PROFESSIONAL ENGINEER
3/18/21

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

SHEET NUMBER:	REVISION:
T-2	0

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: CT-145-23-19-000005
ZONING: RT

1 OVERALL SITE PLAN
SCALE: 4' 3' 2' 1' 0 4' 1/4"=1'-0" (FULL SIZE) 1/8"=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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
DAVID
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/18/21

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

SHEET NUMBER: C-1.1
REVISION: 0

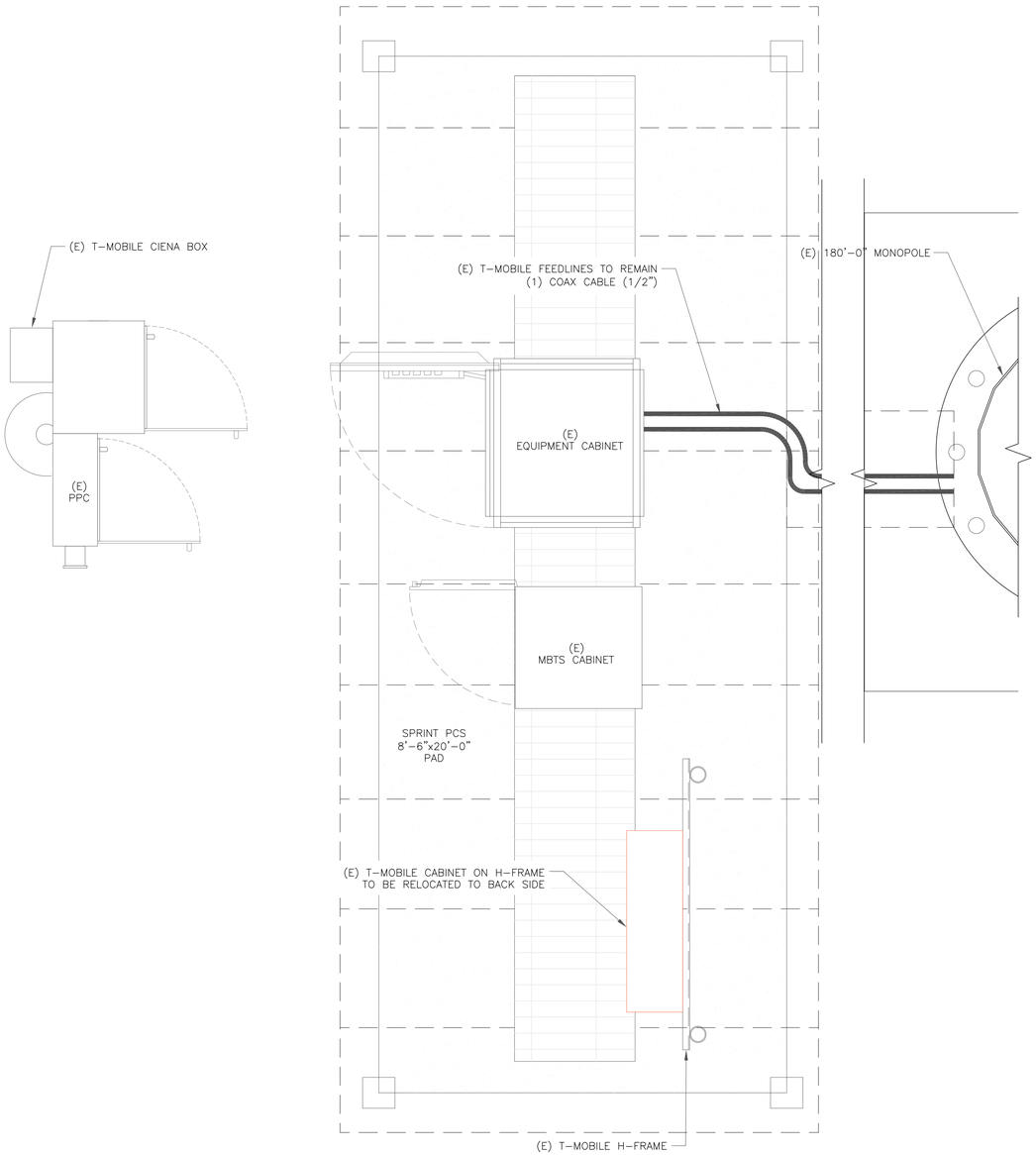
147459.002.01_KINGSTON W. BAUER.dwg – Sheet:C-1.1 – User: mjones – Mar 19, 2021 – 8:14am

EQUIPMENT LEGEND:

EXISTING

TO BE RELOCATED/REMOVED

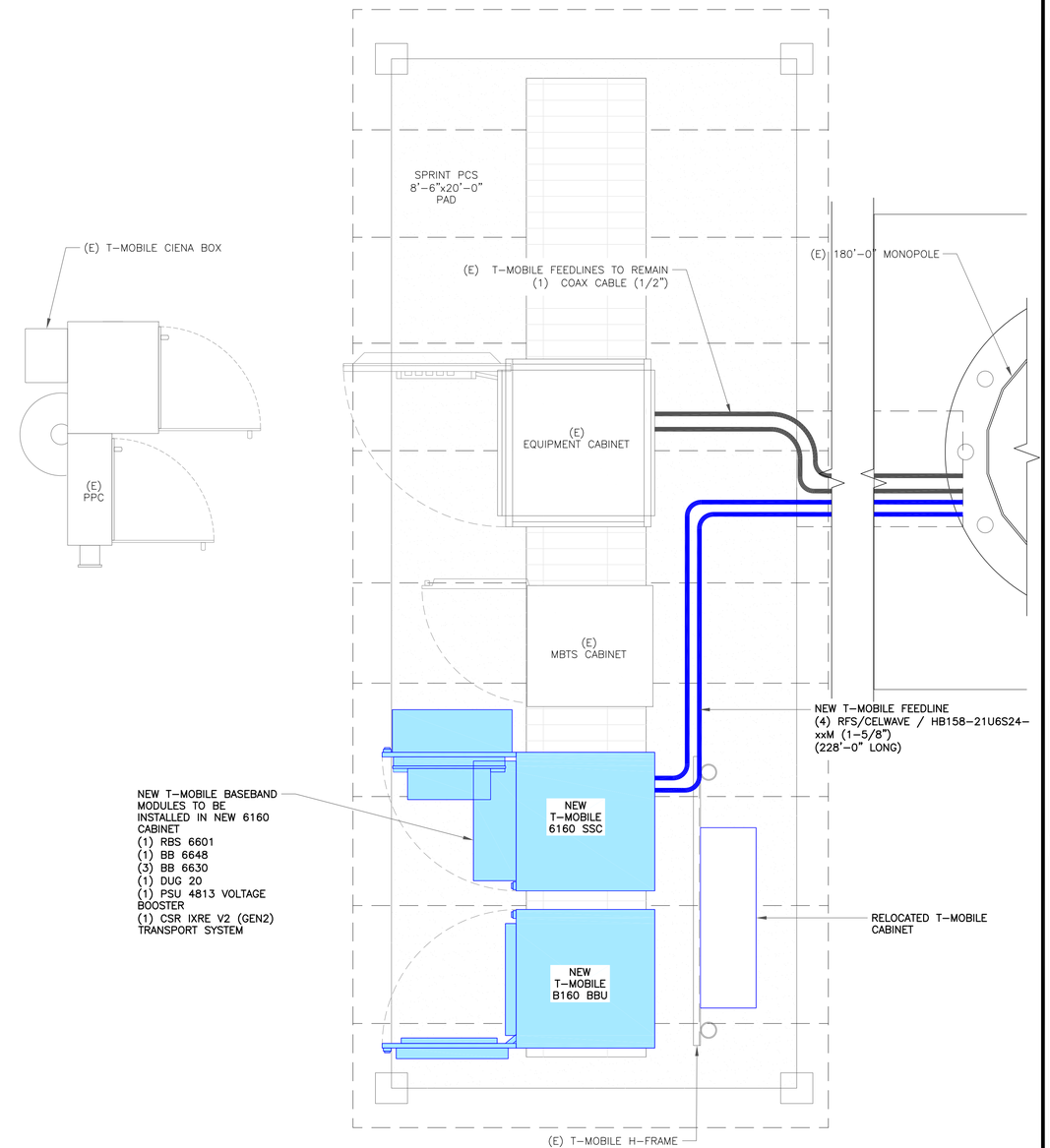
NEW



1 EXISTING EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N



2 FINAL EQUIPMENT PLAN

SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

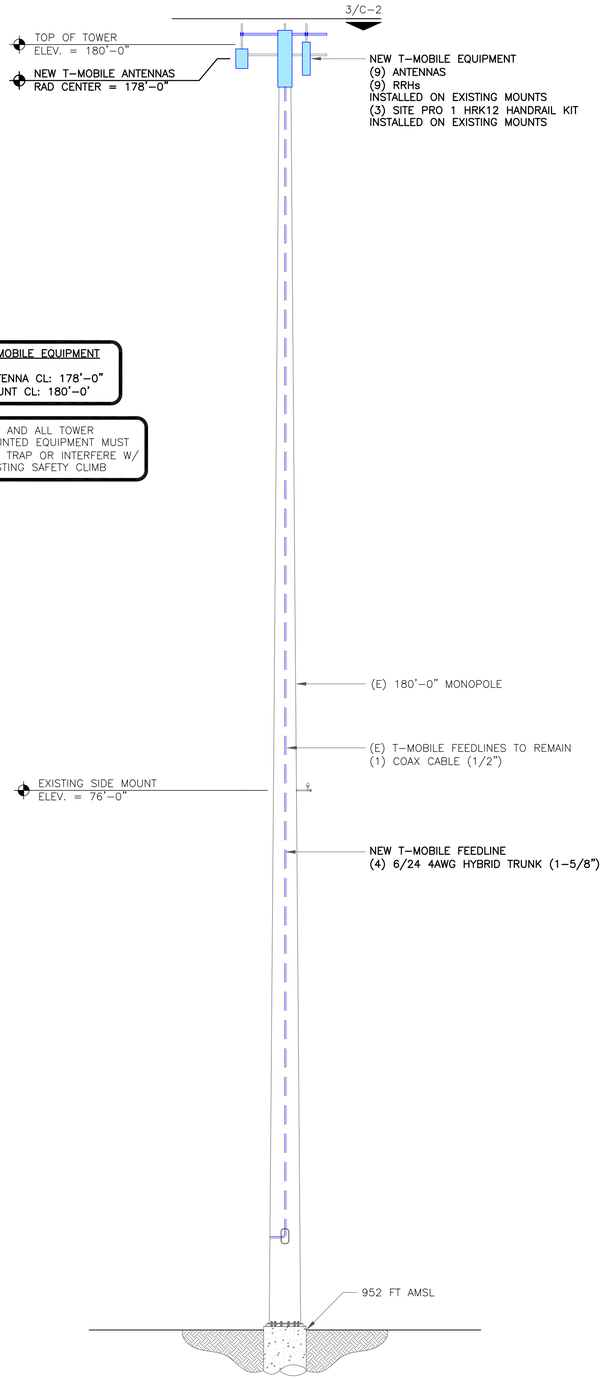
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
DAVID A. LIBERTY
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/18/21

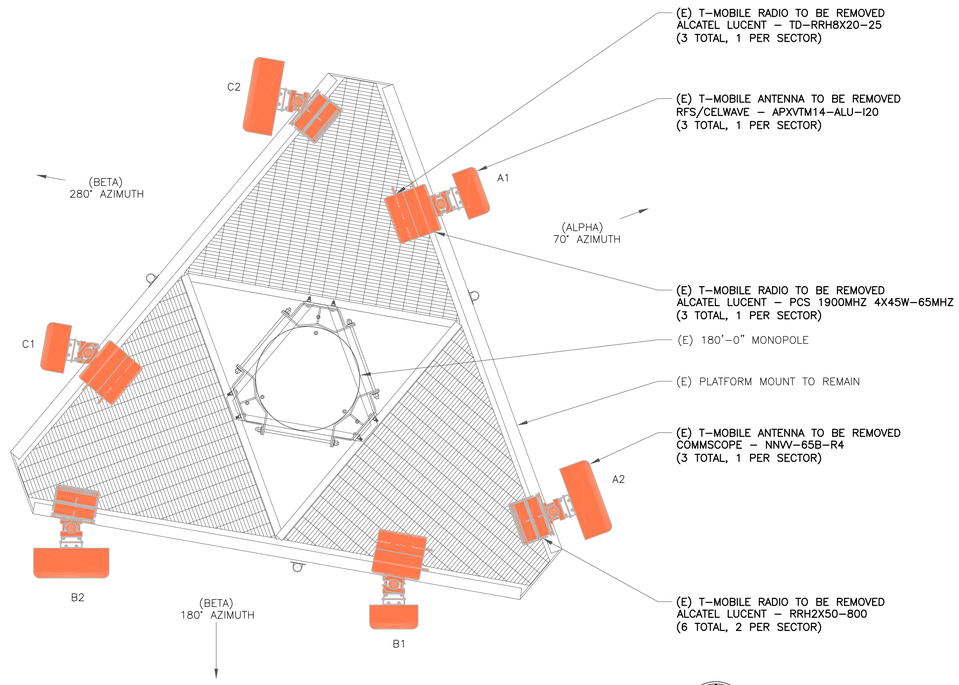
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-1.2

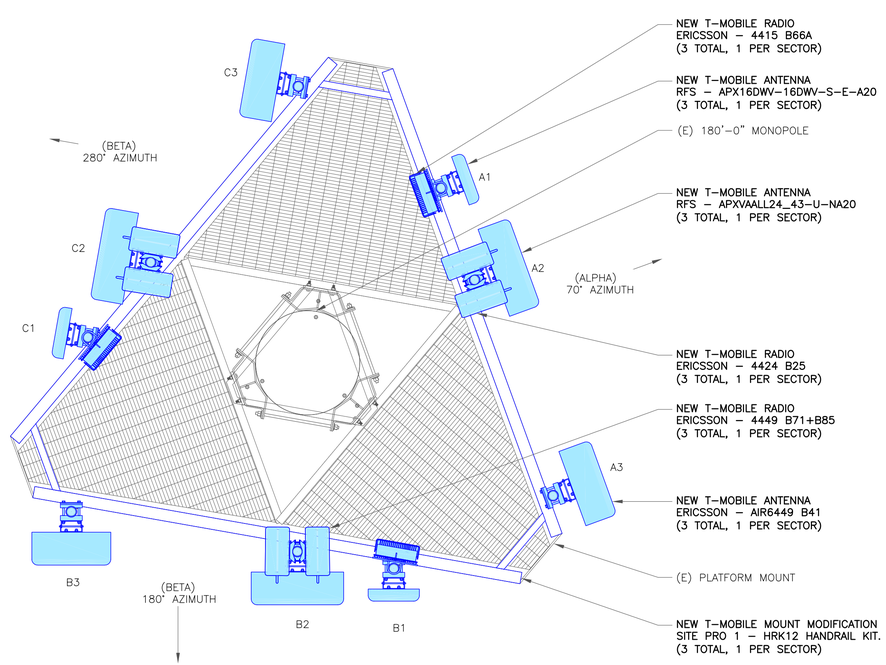
REVISION: 0



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

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

T-MOBILE SITE NUMBER:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

SHEET NUMBER: C-2

REVISION: 0

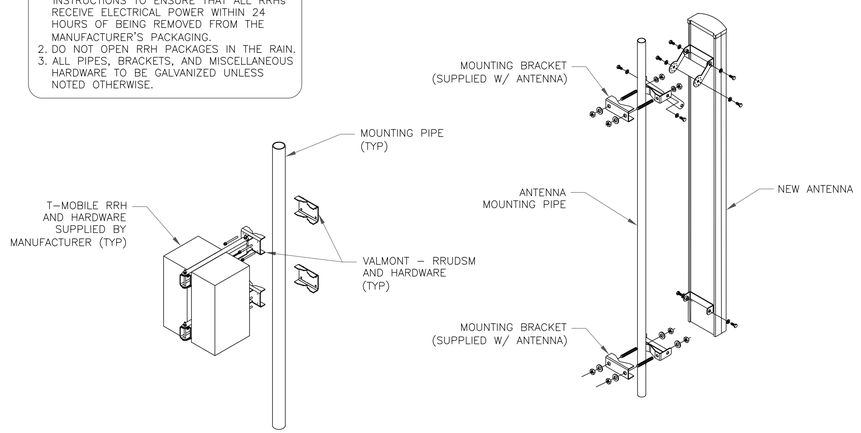
RF SYSTEM SCHEDULE

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	70°	0°	–	178'-0"	(1) 4415B66A	(1) COAX	1/2"	228'
	A-2	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	70°	0°	–	178'-0"	(1) 4449 B71+B85 (1) 4424 B25	(2) HYBRID	6/24 AWG HYBRID	228'
	A-3	L2500/N2500	ERICSSON	AIR6449 B41	70°	0°	–	178'-0"	–	–	–	–
BETA	B-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	180°	0°	–	178'-0"	(1) 4415B66A	–	–	–
	B-2	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	180°	0°	–	178'-0"	(1) 4449 B71+B85 (1) 4424 B25	(1) HYBRID	6/24 AWG HYBRID	228'
	B-3	L2500/N2500	ERICSSON	AIR6449 B41	180°	0°	–	178'-0"	–	–	–	–
GAMMA	C-1	L2100	RFS	APX16DWV-16DWV-S-E-A20	280°	0°	–	178'-0"	(1) 4415B66A	–	–	–
	C-2	L700/L600/N600/ L1900/G1900	RFS	APXVAARR24_43-U-NA20	280°	0°	–	178'-0"	(1) 4449 B71+B85 (1) 4424 B25	(1) HYBRID	6/24 AWG HYBRID	228'
	C-3	L2500/N2500	ERICSSON	AIR6449 B41	280°	0°	–	178'-0"	–	–	–	–

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
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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

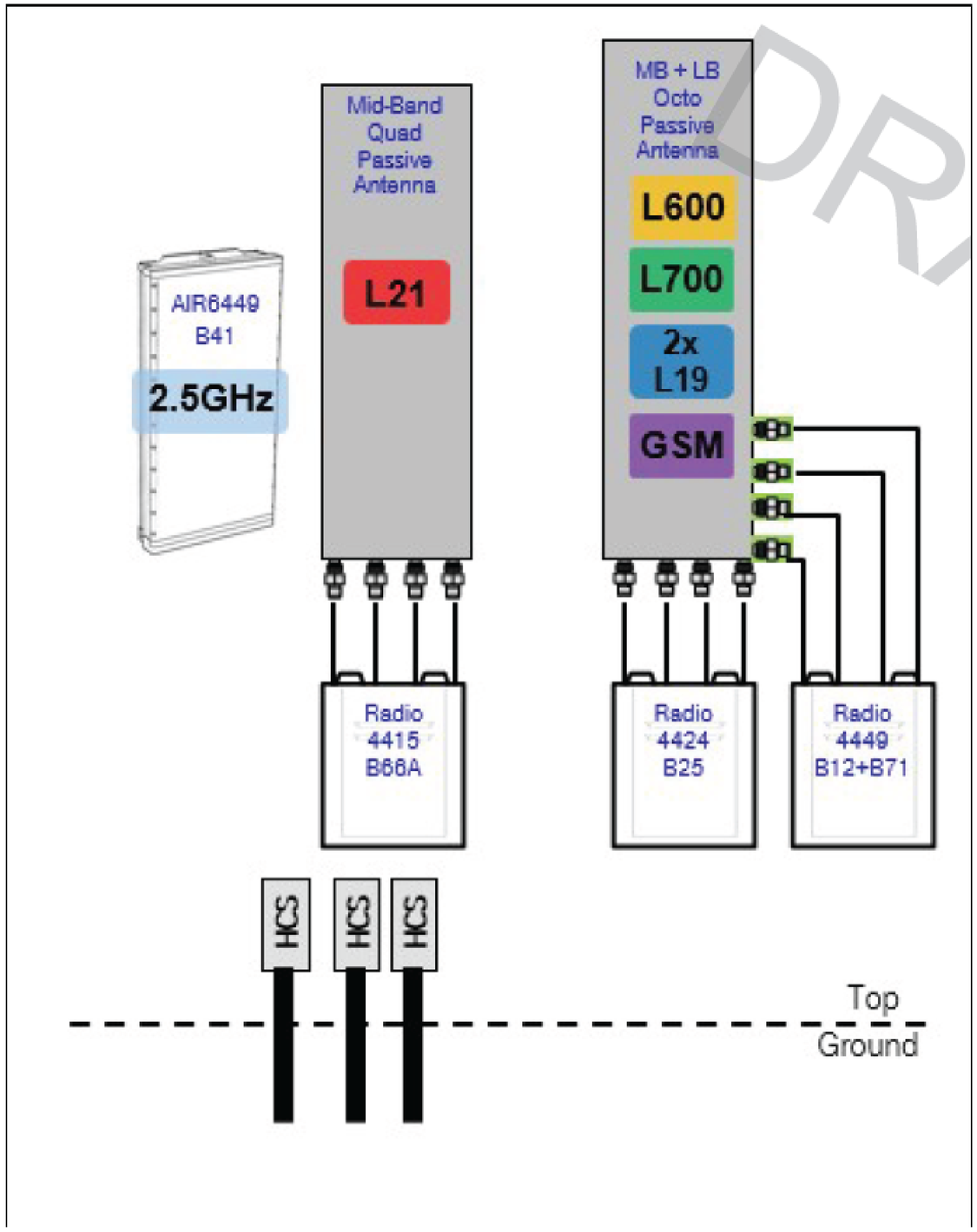
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

SHEET NUMBER: C-3

REVISION: 0

67D5A998C_1xAIR+1xQP+1xOP.jpg



1 PLUMBING DIAGRAM
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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

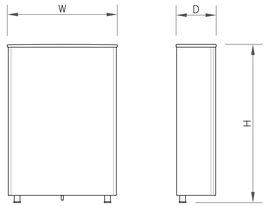
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

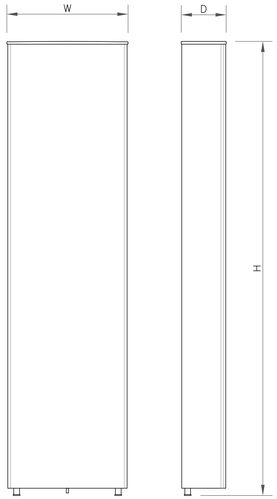
SHEET NUMBER: C-4

REVISION: 0



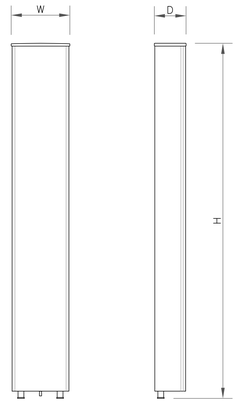
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



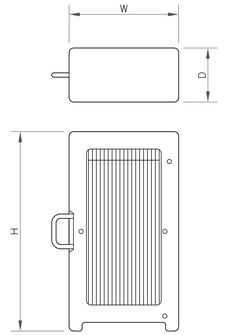
ANTENNA SPECS	
MANUFACTURER	RFS/CELWAVE
MODEL #	APXVAALL24_43-UNA20
WIDTH	24.00"
DEPTH	8.50"
HEIGHT	95.90"
WEIGHT	149.90 LBS

2 ANTENNA SPECS
SCALE: NOT TO SCALE



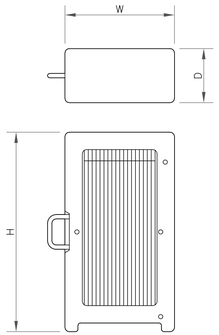
ANTENNA SPECS	
MANUFACTURER	RFS/CELWAVE
MODEL #	APX16DWV-16DWVS-E-A20
WIDTH	13.30"
DEPTH	3.15"
HEIGHT	55.90"
WEIGHT	40.70 LBS

3 ANTENNA SPECS
SCALE: NOT TO SCALE



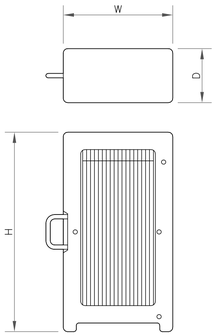
RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4415 B66A
WIDTH	13.50"
DEPTH	6.30"
HEIGHT	16.50"
WEIGHT	49.60 LBS

4 RRU SPECS
SCALE: NOT TO SCALE



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

5 RRU SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4449 B71 B85A
WIDTH	13.20"
DEPTH	10.63"
HEIGHT	17.91"
WEIGHT	73.21 LBS

6 RRU SPECS
SCALE: NOT TO SCALE

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

7 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

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

8 ERICSSON B160 BATTERY CABINET
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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV.	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
3/18/21

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

SHEET NUMBER: C-5
REVISION: 0

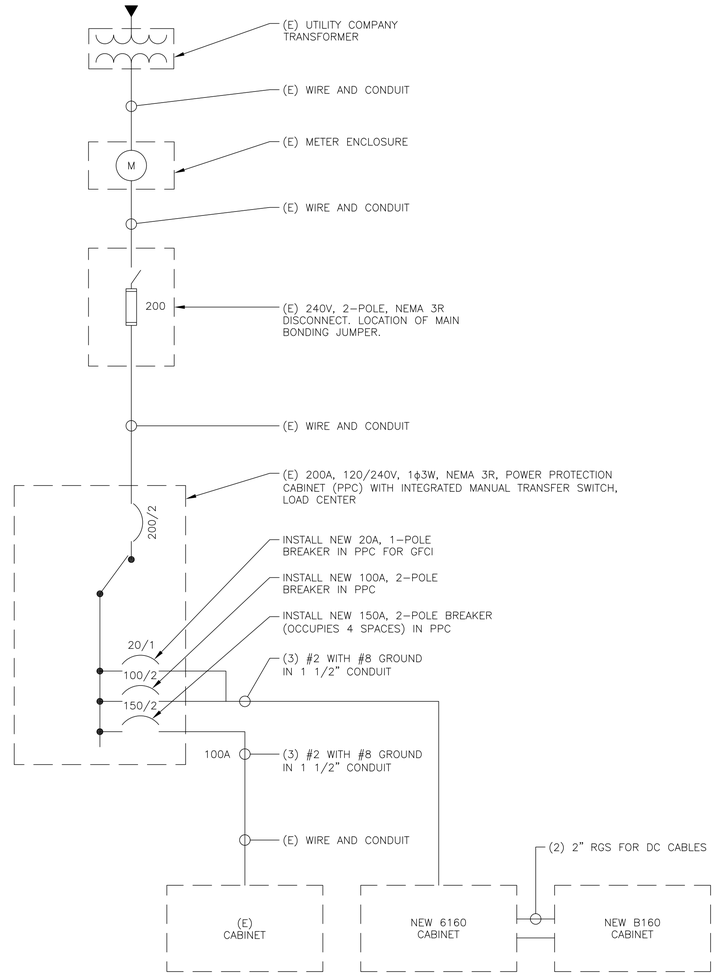
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
NEW BTS	2	100A	1	7	60A	2	SURGE PROTECTION
			2	8			
6160 CABINET	2	100A	3	9			
			4	10			
B160 CABINET	1	20A	5	11	15A	1	TELCO GFCI
FAN	1	10A	6	12			
			13	14			
			15	16			
			17	18			
			19	20			
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			

RATED VOLTAGE: ■120/240 □_____, 1 PHASE, 3 WIRE	BRANCH POLES: ■12 □24 □30 □42	APPROVED MF'RS
RATED AMPS: □100 ■200 □400 □_____,	CABINET: ■SURFACE □FLUSH	NEMA □1 ■3R □4X
□MAIN LUGS ONLY ■MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH
□FUSED ■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		

REPLACE EXISTING BREAKER IN POSITION 3 AND 4 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING BREAKER IN POSITION 5 WITH A NEW 1P 20A BREAKER
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 PHOTOS

1 FINAL T–MOBILE PANEL DETAIL
SCALE: NOT TO SCALE

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
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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

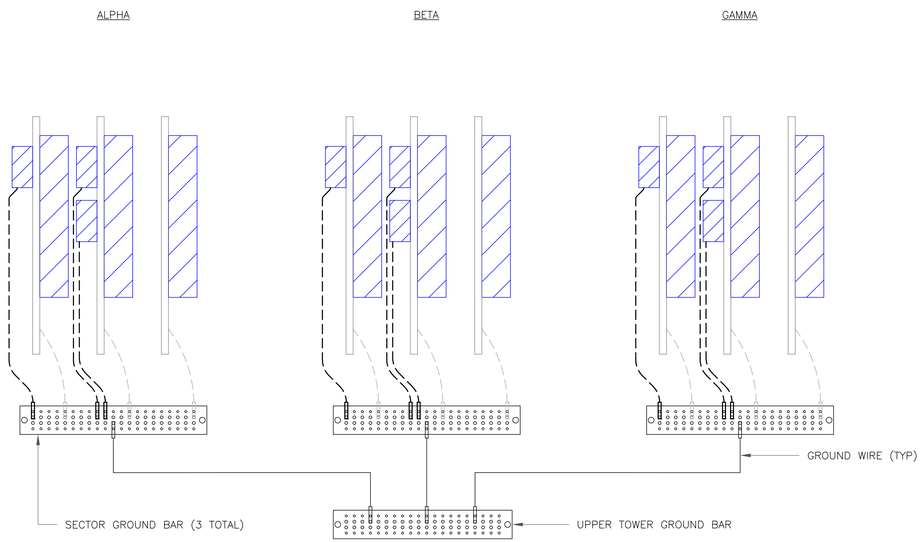
EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

SHEET NUMBER: E-1
REVISION: 0



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

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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

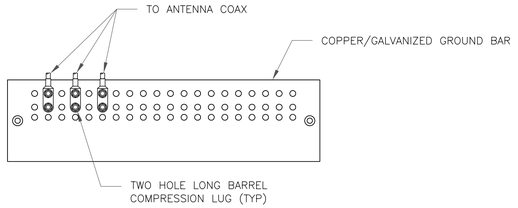
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

STATE OF CONNECTICUT
MICHAEL T. JANSEN
No. 23924
LICENSED PROFESSIONAL ENGINEER
3/18/21

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

SHEET NUMBER: G-1

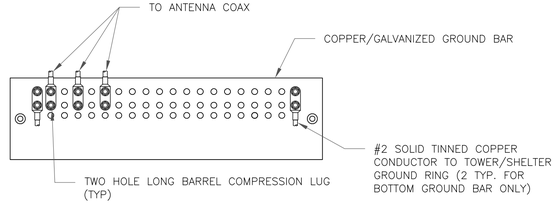
REVISION: 0



NOTES:

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

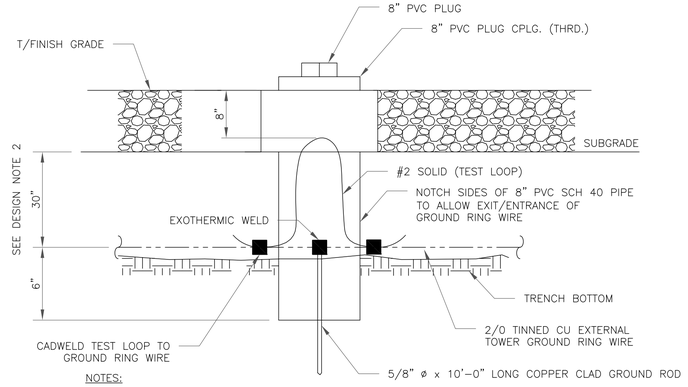
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

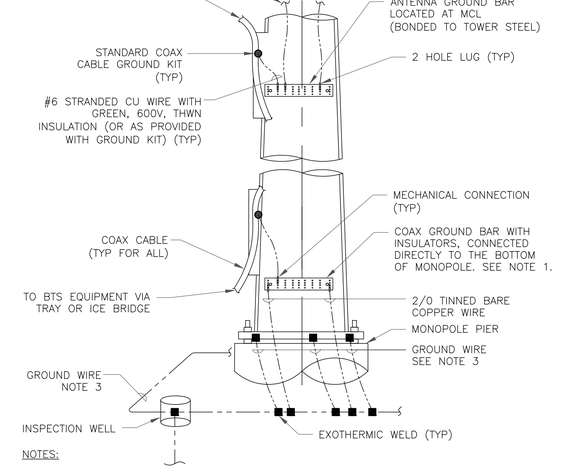
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



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)

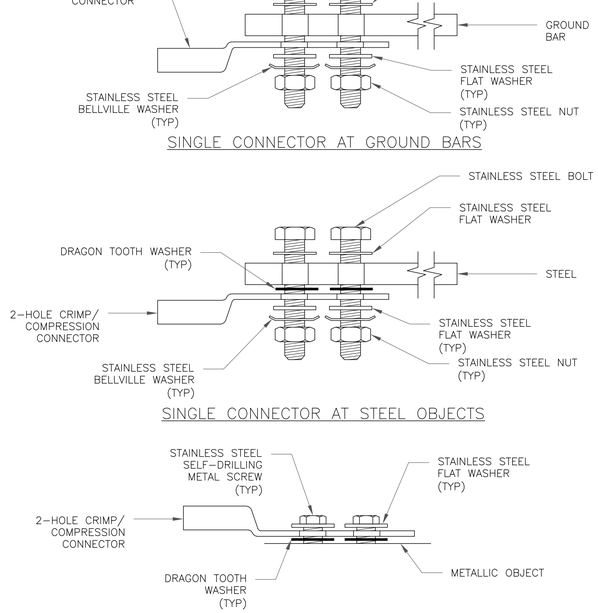
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



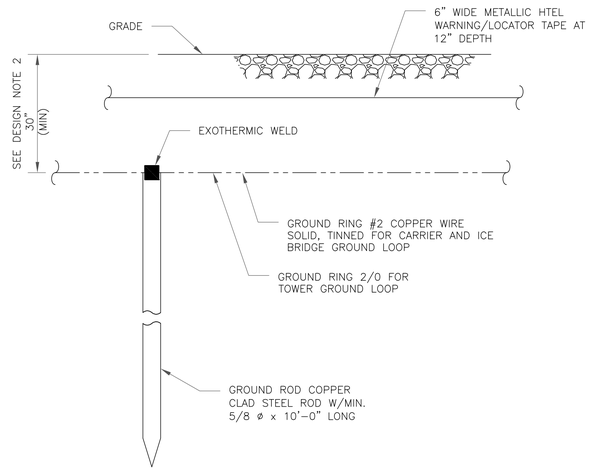
NOTES:

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

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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

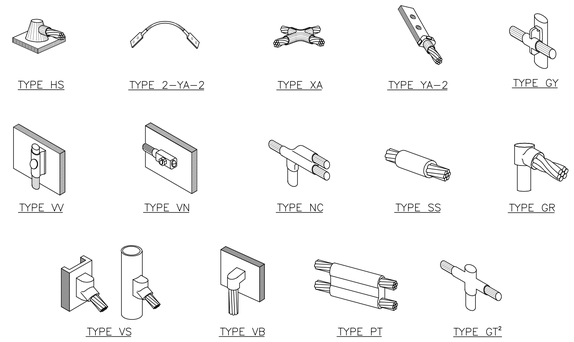
EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

SHEET NUMBER: G-2
REVISION: 0

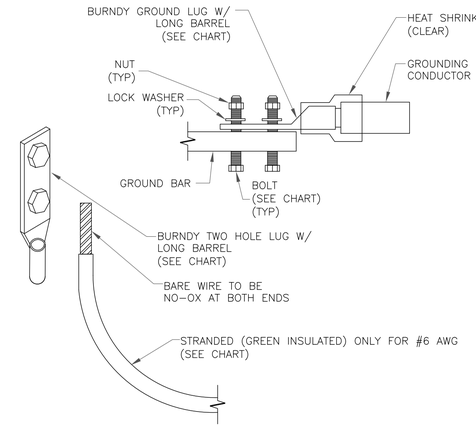


NOTE:

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

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

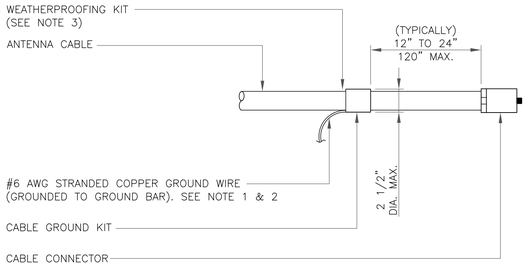
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

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

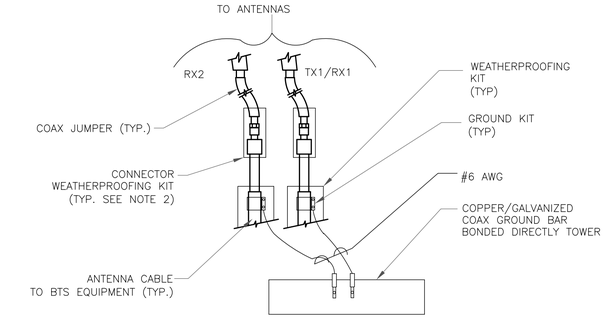
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

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

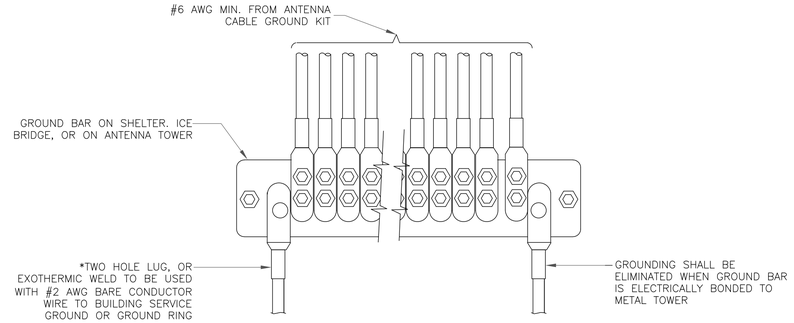
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



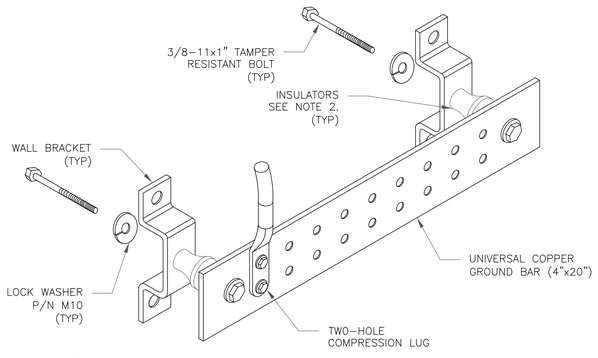
NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



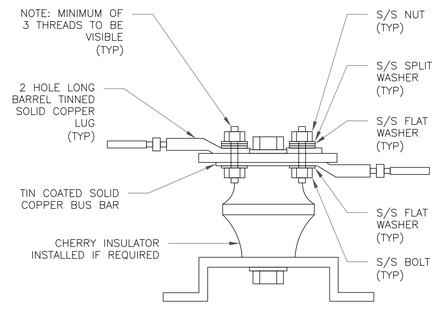
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



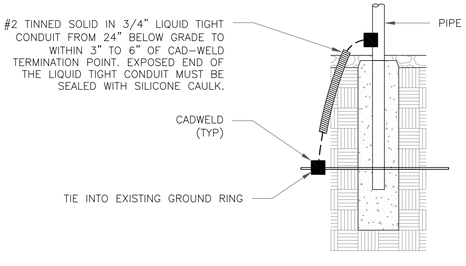
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE 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:
CTHA354A

BU #: **876365**
KINGSTON W. / BAUER (SSUSA)

3 CARION RD
UNION, CT 06076

EXISTING
180'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/23/21	LHT	PRELIMINARY REVIEW	MTJ
0	3/18/21	JJD	CONSTRUCTION	MTJ

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

SHEET NUMBER: G-3
REVISION: 0

Exhibit D

Structural Analysis Report

Date: **February 11, 2021**

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

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Site Number:	CTHA354A
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	876365
	Site Name:	Kingston W. / Bauer (SSUSA)
	JDE Job Number:	628846
	Work Order Number:	1919195
	Order Number:	538765 Rev. 1
Engineering Firm Designation:	**TEP Project Number:**	217503.496887
Site Data:	**3 Carion Rd., Union, Tolland County, CT 06076**	
	Latitude *41° 59' 16.56"*, Longitude *-72° 6' 48.96"*	
	180 Foot - Monopole Tower	

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

LC5: Proposed Equipment Configuration **Sufficient Capacity - 63.6%**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code and Appendix N based upon an ultimate 3-second gust wind speed of 125 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Gautam Sopal, E.I. / TLI

Respectfully submitted by:

Aaron T. Rucker, P.E.

Electronic Copy

02/11/2021

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180-ft monopole tower designed by Engineered Endeavors, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 125 mph
Exposure Category: B
Topographic Factor: 1.0
Ice Thickness: 2.0 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)
180.0	180.0	1	Tower Mounts	Platform Mount [LP 604-1]	4	1-5/8
		1	Site Pro 1	HRK12		
	178.0	3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
		3	Ericsson	AIR6449 B41_T-Mobile w/ Mount Pipe		
		3	RFS Celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	Ericsson	Radio 4449 B71 B85A_T-Mobile		
		3	Ericsson	Radio 4424 B25_TMO		
		3	Ericsson	Radio 4415 B66A		
76.0	77.0	1	Lucent	KS24019-L112A	1	1/2
	76.0	1	Tower Mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Reference	Source
Geotechnical Report	1531937	CCISites
Foundation Mapping Report	2259246	CCISites
Tower Manufacturer Drawings	1533008	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) The 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 Table 1, and the referenced drawings.
3) The foundation steel reinforcement was assumed to be the minimum required per ACI 318.
4) The following material grades were assumed:
   a) Concrete compressive strength: f'c = 3 ksi
   b) Foundation flexural reinforcement: fy = 60 ksi

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

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	ϕP_{allow} (K)	% Capacity	Pass / Fail
L1	180 - 155.21	Pole	TP24.22x19x0.1875	1	-4.68	850.94	22.1	Pass
L2	155.21 - 124.833	Pole	TP30.11x23.0905x0.3125	2	-8.35	1760.87	23.2	Pass
L3	124.833 - 83.3367	Pole	TP38.09x28.5893x0.4375	3	-16.85	3117.31	23.2	Pass
L4	83.3367 - 40.84	Pole	TP46.03x36.1094x0.5	4	-29.43	4310.28	24.4	Pass
L5	40.84 - 0	Pole	TP53.5x43.7164x0.5625	5	-48.59	5805.48	24.6	Pass
							Summary	
						Pole (L5)	24.6	Pass
						RATING =	**24.6**	**Pass**

Table 4 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	22.5	Pass
1,2	Base Plate	-	32.1	Pass
1,2	Base Foundation Soil Interaction	-	63.6	Pass
1,2	Base Foundation Structural	-	29.5	Pass

Structure Rating (max from all components) =	**63.6%**

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

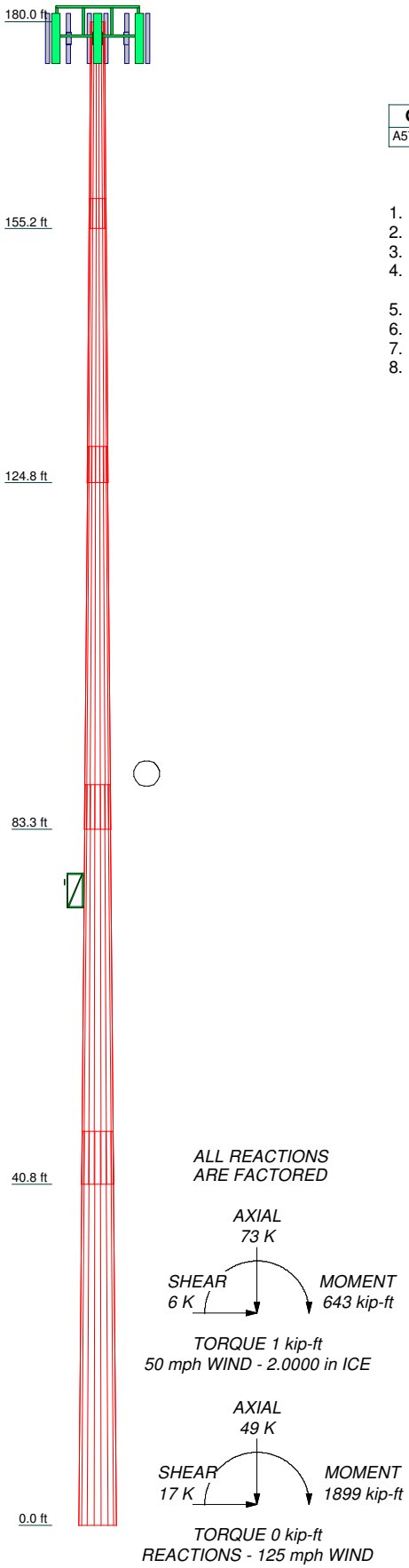
4.1) Recommendations

1) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	24.79	18	0.1875	3.58	19.0000	24.2200		1.1
2	33.96	18	0.3125	4.33	23.0905	30.1100		3.0
3	45.83	18	0.4375	5.33	28.5893	38.0900		7.1
4	47.83	18	0.5000	6.33	36.1094	46.0300		10.5
5	47.17	18	0.5625		43.7164	53.5000		13.8
							A572-65	35.5



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure B 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: 24.6%

Tower Engineering Professional

Tower Engineering Professionals, Inc.
326 Tryon Road
Raleigh, NC 27603-5263
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	***Kingston W. / Bauer (SSUSA) (BU 876365)***		
Project:	***TEP No. 217503.496887***		
Client: Crown Castle		Drawn by: TLI	App'd:
Code: TIA-222-H		Date: 02/11/21	Scale: NTS
Path: C:\Users\tlinfante\Desktop\217503.496887 KINGSTON W_ BAUER (SSUSA)\tnxTower\876365_1919195_LC5.er			Dwg No. E-1

Tower Input Data

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

Tower is located in Tolland County, Connecticut.
Tower base elevation above sea level: 930.00 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 2.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	180.00-155.21	24.79	3.58	18	19.0000	24.2200	0.1875	0.7500	A572-65 (65 ksi)
L2	155.21-124.83	33.96	4.33	18	23.0905	30.1100	0.3125	1.2500	A572-65 (65 ksi)
L3	124.83-83.34	45.83	5.33	18	28.5893	38.0900	0.4375	1.7500	A572-65 (65 ksi)
L4	83.34-40.84	47.83	6.33	18	36.1094	46.0300	0.5000	2.0000	A572-65 (65 ksi)
L5	40.84-0.00	47.17		18	43.7164	53.5000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.2642	11.1958	500.5935	6.6784	9.6520	51.8642	1001.8456	5.5990	3.0140	16.075
	24.5647	14.3023	1043.6203	8.5315	12.3038	84.8212	2088.6137	7.1525	3.9327	20.975
L2	24.1506	22.5929	1480.9453	8.0862	11.7300	126.2533	2963.8393	11.2986	3.5139	11.245
	30.5263	29.5554	3315.3843	10.5781	15.2959	216.7502	6635.1311	14.7805	4.7494	15.198
L3	29.8750	39.0923	3914.1813	9.9939	14.5234	269.5093	7833.5129	19.5499	4.2617	9.741
	38.6101	52.2852	9364.9159	13.3666	19.3497	483.9820	18742.1544	26.1476	5.9338	13.563
L4	37.7126	56.5121	9053.3179	12.6413	18.3436	493.5418	18118.5484	28.2614	5.4753	10.951
	46.6630	72.2561	18923.7555	16.1632	23.3832	809.2871	37872.4113	36.1349	7.2213	14.443
L5	45.6378	77.0459	18127.0191	15.3196	22.2079	816.2412	36277.8902	38.5302	6.7041	11.918
	54.2385	94.5133	33462.4074	18.7928	27.1780	1231.2314	66968.8455	47.2656	8.4260	14.98

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 180.00-155.21				1	1	1			
L2 155.21-124.83				1	1	1			
L3 124.83-83.34				1	1	1			
L4 83.34-40.84				1	1	1			
L5 40.84-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Safety Line 3/8	C	No	No	CaAa (Out Of Face)	180.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
							2" Ice	0.44	2.34
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	No	CaAa (Out Of Face)	180.00 - 0.00	1	No Ice	0.03	0.49
							1/2" Ice	0.14	1.01
							1" Ice	0.23	2.07
							2" Ice	0.43	6.09
180									
HB158-21U6S24-xx M_TMO(1-5/8)	A	No	No	Inside Pole	180.00 - 0.00	4	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
							2" Ice	0.00	2.50
76									
LDF4-50A(1/2")	A	No	No	Inside Pole	76.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.00-155.21	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.797	0.02
L2	155.21-124.83	A	0.000	0.000	0.000	0.000	0.30
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.202	0.02
L3	124.83-83.34	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.009	0.03
L4	83.34-40.84	A	0.000	0.000	0.000	0.000	0.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.081	0.03
L5	40.84-0.00	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.961	0.03

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.00-155.21	A	1.999	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	21.623	0.21
L2	155.21-124.83	A	1.964	0.000	0.000	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	26.496	0.26
L3	124.83-83.34	A	1.906	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.603	0.34
L4	83.34-40.84	A	1.810	0.000	0.000	0.000	0.000	0.43
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.478	0.34
L5	40.84-0.00	A	1.616	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	32.533	0.30

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180.00-155.21	-0.5547	0.3203	-2.5132	1.4510
L2	155.21-124.83	-0.5616	0.3242	-2.7250	1.5733
L3	124.83-83.34	-0.5672	0.3275	-2.8882	1.6675
L4	83.34-40.84	-0.5713	0.3298	-2.9890	1.7257
L5	40.84-0.00	-0.5740	0.3314	-2.9968	1.7302

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
180									
Platform Mount [LP 604-1]	C	None		0.0000	180.00	No Ice	23.03	23.03	0.93
						1/2" Ice	26.44	26.44	1.32
						1" Ice	29.80	29.80	1.77
						2" Ice	36.34	36.34	2.80
Site Pro 1 HRK12 Handrail Kit	C	None		0.0000	180.00	No Ice	4.56	4.56	0.25
						1/2" Ice	6.39	6.39	0.31
						1" Ice	8.18	8.18	0.40
						2" Ice	11.66	11.66	0.66
8' Ladder	B	From Centroid-Face	3.00 0.00 -1.00	0.0000	180.00	No Ice	1.53	5.33	0.10
						1/2" Ice	4.36	8.08	0.11
						1" Ice	7.19	10.83	0.13
						2" Ice	12.86	16.33	0.16
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	A	From Centroid-Fa	4.00 0.00	0.0000	180.00	No Ice	14.69	6.87	0.18
						1/2" Ice	15.46	7.55	0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		ce	-2.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45
						2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45
						2" Ice	17.82	9.67	0.78
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	0.13 0.18 0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	0.13 0.18 0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	0.13 0.18 0.23
						2" Ice	7.38	5.20	0.36
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	6.29 6.86 7.45	2.76 3.27 3.79	0.06 0.11 0.16
						2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	6.29 6.86 7.45	2.76 3.27 3.79	0.06 0.11 0.16
						2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	6.29 6.86 7.45	2.76 3.27 3.79	0.06 0.11 0.16
						2" Ice	8.68	4.90	0.29
RADIO 4449 B71 B85A_T-MOBILE	A	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	0.07 0.09 0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	0.07 0.09 0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	0.07 0.09 0.12
						2" Ice	2.72	2.28	0.17
RADIO 4424 B25_TMO	A	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	2.05 2.23 2.42	1.61 1.77 1.94	0.09 0.11 0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	2.05 2.23 2.42	1.61 1.77 1.94	0.09 0.11 0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	2.05 2.23 2.42	1.61 1.77 1.94	0.09 0.11 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.81	2.30	0.19
RADIO 4415 B66A	A	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
RADIO 4415 B66A	B	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
RADIO 4415 B66A	C	From Centroid-Face	4.00 0.00 -2.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
76									
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.85 1.14 1.43 2.01	1.67 2.34 3.01 4.35	0.07 0.08 0.09 0.12
KS24019-L112A	C	From Leg	3.00 0.00 1.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.08 0.13 0.19 0.35	0.08 0.13 0.19 0.35	0.01 0.01 0.01 0.02
***									

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

Comb. No.	Description
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
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 155.21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.79	-0.34	0.19
			Max. Mx	8	-4.69	-100.49	-1.39
			Max. My	2	-4.68	1.28	102.15
			Max. Vy	8	5.60	-100.49	-1.39
			Max. Vx	2	-5.69	1.28	102.15
			Max. Torque	12			0.73
L2	155.21 - 124.833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.99	-0.10	0.06
			Max. Mx	8	-8.36	-294.57	-3.68
			Max. My	2	-8.36	3.58	298.87
			Max. Vy	8	7.53	-294.57	-3.68
			Max. Vx	2	-7.62	3.58	298.87
			Max. Torque	12			0.67
L3	124.833 - 83.3367	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.46	0.31	-0.18
			Max. Mx	8	-16.86	-658.71	-6.86
			Max. My	2	-16.85	6.76	666.67
			Max. Vy	8	10.48	-658.71	-6.86
			Max. Vx	2	-10.57	6.76	666.67
			Max. Torque	12			0.56
L4	83.3367 - 40.84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.78	1.21	-0.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-29.43	1159.17	10.55
			Max. My	14	-29.43	-10.52	-1171.35
			Max. Vy	20	-13.58	1159.17	10.55
			Max. Vx	14	13.68	-10.52	-1171.35
			Max. Torque	38			0.63
L5	40.84 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.48	1.84	-1.06
			Max. Mx	20	-48.59	1873.24	14.67
			Max. My	14	-48.59	-14.62	-1890.19
			Max. Vy	20	-16.65	1873.24	14.67
			Max. Vx	14	16.75	-14.62	-1890.19
			Max. Torque	38			0.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	32	73.48	-2.83	-4.91
	Max. H_x	20	48.59	16.64	0.09
	Max. H_z	2	48.59	0.09	16.74
	Max. M_x	2	1890.05	0.09	16.74
	Max. M_z	8	1872.99	-16.64	-0.09
	Max. Torsion	38	0.97	2.83	4.91
	Min. Vert	19	36.44	14.36	-8.29
	Min. H_x	8	48.59	-16.64	-0.09
	Min. H_z	14	48.59	-0.09	-16.74
	Min. M_x	14	-1890.19	-0.09	-16.74
	Min. M_z	20	-1873.24	16.64	0.09
	Min. Torsion	32	-0.97	-2.83	-4.91

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	40.49	0.00	0.00	0.06	0.11	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	48.59	-0.09	-16.74	-1890.05	14.87	-0.11
0.9 Dead+1.0 Wind 0 deg - No Ice	36.44	-0.09	-16.74	-1873.53	14.69	-0.12
1.2 Dead+1.0 Wind 30 deg - No Ice	48.59	8.24	-14.45	-1629.47	-923.66	-0.07
0.9 Dead+1.0 Wind 30 deg - No Ice	36.44	8.24	-14.45	-1615.24	-915.65	-0.07
1.2 Dead+1.0 Wind 60 deg - No Ice	48.59	14.36	-8.29	-932.24	-1614.68	-0.00
0.9 Dead+1.0 Wind 60 deg - No Ice	36.44	14.36	-8.29	-924.12	-1600.61	-0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	48.59	16.64	0.09	14.82	-1872.99	0.07
0.9 Dead+1.0 Wind 90 deg - No Ice	36.44	16.64	0.09	14.65	-1856.66	0.07

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*
1.2 Dead+1.0 Wind 120 deg - No Ice	48.59	14.45	8.44	957.90	-1629.40	0.11
0.9 Dead+1.0 Wind 120 deg - No Ice	36.44	14.45	8.44	949.48	-1615.18	0.12
1.2 Dead+1.0 Wind 150 deg - No Ice	48.59	8.39	14.54	1644.33	-949.19	0.13
0.9 Dead+1.0 Wind 150 deg - No Ice	36.44	8.39	14.54	1629.92	-940.91	0.14
1.2 Dead+1.0 Wind 180 deg - No Ice	48.59	0.09	16.74	1890.19	-14.62	0.11
0.9 Dead+1.0 Wind 180 deg - No Ice	36.44	0.09	16.74	1873.64	-14.50	0.12
1.2 Dead+1.0 Wind 210 deg - No Ice	48.59	-8.24	14.45	1629.61	923.91	0.07
0.9 Dead+1.0 Wind 210 deg - No Ice	36.44	-8.24	14.45	1615.35	915.84	0.07
1.2 Dead+1.0 Wind 240 deg - No Ice	48.59	-14.36	8.29	932.38	1614.93	-0.00
0.9 Dead+1.0 Wind 240 deg - No Ice	36.44	-14.36	8.29	924.22	1600.80	-0.00
1.2 Dead+1.0 Wind 270 deg - No Ice	48.59	-16.64	-0.09	-14.67	1873.24	-0.07
0.9 Dead+1.0 Wind 270 deg - No Ice	36.44	-16.64	-0.09	-14.54	1856.85	-0.07
1.2 Dead+1.0 Wind 300 deg - No Ice	48.59	-14.45	-8.44	-957.76	1629.65	-0.11
0.9 Dead+1.0 Wind 300 deg - No Ice	36.44	-14.45	-8.44	-949.37	1615.37	-0.12
1.2 Dead+1.0 Wind 330 deg - No Ice	48.59	-8.39	-14.54	-1644.19	949.44	-0.13
0.9 Dead+1.0 Wind 330 deg - No Ice	36.44	-8.39	-14.54	-1629.81	941.10	-0.14
1.2 Dead+1.0 Ice+1.0 Temp	73.48	0.00	0.00	1.06	1.84	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	73.48	-0.02	-5.66	-640.05	4.47	-0.84
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	73.48	2.81	-4.89	-552.89	-314.99	-0.48
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	73.48	4.88	-2.82	-317.28	-549.54	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	73.48	5.64	0.02	3.65	-636.31	0.48
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	73.48	4.89	2.84	323.90	-552.07	0.84
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	73.48	2.83	4.91	557.66	-319.38	0.97
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	73.48	0.02	5.66	642.29	-0.59	0.84
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	73.48	-2.81	4.89	555.13	318.87	0.48
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	73.48	-4.88	2.82	319.51	553.41	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	73.48	-5.64	-0.02	-1.41	640.19	-0.48
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	73.48	-4.89	-2.84	-321.66	555.95	-0.84
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	73.48	-2.83	-4.91	-555.42	323.26	-0.97
Dead+Wind 0 deg - Service	40.49	-0.02	-3.63	-407.84	3.28	-0.03
Dead+Wind 30 deg - Service	40.49	1.79	-3.14	-351.60	-199.26	-0.01
Dead+Wind 60 deg - Service	40.49	3.12	-1.80	-201.14	-348.38	-0.00
Dead+Wind 90 deg - Service	40.49	3.61	0.02	3.24	-404.13	0.01

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 120 deg - Service	40.49	3.14	1.83	206.76	-351.56	0.03
Dead+Wind 150 deg - Service	40.49	1.82	3.15	354.90	-204.76	0.03
Dead+Wind 180 deg - Service	40.49	0.02	3.63	407.96	-3.07	0.03
Dead+Wind 210 deg - Service	40.49	-1.79	3.14	351.72	199.47	0.01
Dead+Wind 240 deg - Service	40.49	-3.12	1.80	201.26	348.59	-0.00
Dead+Wind 270 deg - Service	40.49	-3.61	-0.02	-3.12	404.34	-0.01
Dead+Wind 300 deg - Service	40.49	-3.14	-1.83	-206.64	351.77	-0.03
Dead+Wind 330 deg - Service	40.49	-1.82	-3.15	-354.78	204.97	-0.03

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	-40.49	0.00	0.00	40.49	0.00	0.000%
2	-0.09	-48.59	-16.74	0.09	48.59	16.74	0.000%
3	-0.09	-36.44	-16.74	0.09	36.44	16.74	0.000%
4	8.24	-48.59	-14.45	-8.24	48.59	14.45	0.000%
5	8.24	-36.44	-14.45	-8.24	36.44	14.45	0.000%
6	14.36	-48.59	-8.29	-14.36	48.59	8.29	0.000%
7	14.36	-36.44	-8.29	-14.36	36.44	8.29	0.000%
8	16.64	-48.59	0.09	-16.64	48.59	-0.09	0.000%
9	16.64	-36.44	0.09	-16.64	36.44	-0.09	0.000%
10	14.45	-48.59	8.44	-14.45	48.59	-8.44	0.000%
11	14.45	-36.44	8.44	-14.45	36.44	-8.44	0.000%
12	8.39	-48.59	14.54	-8.39	48.59	-14.54	0.000%
13	8.39	-36.44	14.54	-8.39	36.44	-14.54	0.000%
14	0.09	-48.59	16.74	-0.09	48.59	-16.74	0.000%
15	0.09	-36.44	16.74	-0.09	36.44	-16.74	0.000%
16	-8.24	-48.59	14.45	8.24	48.59	-14.45	0.000%
17	-8.24	-36.44	14.45	8.24	36.44	-14.45	0.000%
18	-14.36	-48.59	8.29	14.36	48.59	-8.29	0.000%
19	-14.36	-36.44	8.29	14.36	36.44	-8.29	0.000%
20	-16.64	-48.59	-0.09	16.64	48.59	0.09	0.000%
21	-16.64	-36.44	-0.09	16.64	36.44	0.09	0.000%
22	-14.45	-48.59	-8.44	14.45	48.59	8.44	0.000%
23	-14.45	-36.44	-8.44	14.45	36.44	8.44	0.000%
24	-8.39	-48.59	-14.54	8.39	48.59	14.54	0.000%
25	-8.39	-36.44	-14.54	8.39	36.44	14.54	0.000%
26	0.00	-73.48	0.00	0.00	73.48	0.00	0.000%
27	-0.02	-73.48	-5.66	0.02	73.48	5.66	0.000%
28	2.81	-73.48	-4.89	-2.81	73.48	4.89	0.000%
29	4.88	-73.48	-2.82	-4.88	73.48	2.82	0.000%
30	5.64	-73.48	0.02	-5.64	73.48	-0.02	0.000%
31	4.89	-73.48	2.84	-4.89	73.48	-2.84	0.000%
32	2.83	-73.48	4.91	-2.83	73.48	-4.91	0.000%
33	0.02	-73.48	5.66	-0.02	73.48	-5.66	0.000%
34	-2.81	-73.48	4.89	2.81	73.48	-4.89	0.000%
35	-4.88	-73.48	2.82	4.88	73.48	-2.82	0.000%
36	-5.64	-73.48	-0.02	5.64	73.48	0.02	0.000%
37	-4.89	-73.48	-2.84	4.89	73.48	2.84	0.000%
38	-2.83	-73.48	-4.91	2.83	73.48	4.91	0.000%
39	-0.02	-40.49	-3.63	0.02	40.49	3.63	0.000%
40	1.79	-40.49	-3.14	-1.79	40.49	3.14	0.000%
41	3.12	-40.49	-1.80	-3.12	40.49	1.80	0.000%
42	3.61	-40.49	0.02	-3.61	40.49	-0.02	0.000%
43	3.14	-40.49	1.83	-3.14	40.49	-1.83	0.000%
44	1.82	-40.49	3.15	-1.82	40.49	-3.15	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
45	0.02	-40.49	3.63	-0.02	40.49	-3.63	0.000%
46	-1.79	-40.49	3.14	1.79	40.49	-3.14	0.000%
47	-3.12	-40.49	1.80	3.12	40.49	-1.80	0.000%
48	-3.61	-40.49	-0.02	3.61	40.49	0.02	0.000%
49	-3.14	-40.49	-1.83	3.14	40.49	1.83	0.000%
50	-1.82	-40.49	-3.15	1.82	40.49	3.15	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00027007
3	Yes	4	0.00000001	0.00018037
4	Yes	5	0.00000001	0.00024795
5	Yes	5	0.00000001	0.00012457
6	Yes	5	0.00000001	0.00024207
7	Yes	5	0.00000001	0.00012158
8	Yes	4	0.00000001	0.00014383
9	Yes	4	0.00000001	0.00008508
10	Yes	5	0.00000001	0.00024930
11	Yes	5	0.00000001	0.00012470
12	Yes	5	0.00000001	0.00026640
13	Yes	5	0.00000001	0.00013356
14	Yes	4	0.00000001	0.00049933
15	Yes	4	0.00000001	0.00034143
16	Yes	5	0.00000001	0.00023858
17	Yes	5	0.00000001	0.00011977
18	Yes	5	0.00000001	0.00024141
19	Yes	5	0.00000001	0.00012134
20	Yes	4	0.00000001	0.00034534
21	Yes	4	0.00000001	0.00023309
22	Yes	5	0.00000001	0.00026319
23	Yes	5	0.00000001	0.00013201
24	Yes	5	0.00000001	0.00024925
25	Yes	5	0.00000001	0.00012461
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00024160
28	Yes	5	0.00000001	0.00028658
29	Yes	5	0.00000001	0.00028612
30	Yes	5	0.00000001	0.00023993
31	Yes	5	0.00000001	0.00029097
32	Yes	5	0.00000001	0.00029085
33	Yes	5	0.00000001	0.00024203
34	Yes	5	0.00000001	0.00028837
35	Yes	5	0.00000001	0.00028749
36	Yes	5	0.00000001	0.00024071
37	Yes	5	0.00000001	0.00029061
38	Yes	5	0.00000001	0.00029208
39	Yes	4	0.00000001	0.00001918
40	Yes	4	0.00000001	0.00006715
41	Yes	4	0.00000001	0.00006244
42	Yes	4	0.00000001	0.00001418
43	Yes	4	0.00000001	0.00006161
44	Yes	4	0.00000001	0.00007589
45	Yes	4	0.00000001	0.00002105

46	Yes	4	0.00000001	0.00005894
47	Yes	4	0.00000001	0.00006182
48	Yes	4	0.00000001	0.00001557
49	Yes	4	0.00000001	0.00007359
50	Yes	4	0.00000001	0.00006114

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 155.21	13.646	50	0.7504	0.0027
L2	158.793 - 124.833	10.427	50	0.6733	0.0010
L3	129.167 - 83.3367	6.683	50	0.5193	0.0003
L4	88.67 - 40.84	3.033	44	0.3329	0.0000
L5	47.1733 - 0	0.842	44	0.1637	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 604-1]	50	13.646	0.7504	0.0027	42750
76.00	Side Arm Mount [SO 701-1]	44	2.198	0.2794	0.0000	13402

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 155.21	63.295	24	3.4832	0.0124
L2	158.793 - 124.833	48.371	24	3.1254	0.0045
L3	129.167 - 83.3367	31.003	24	2.4104	0.0014
L4	88.67 - 40.84	14.069	12	1.5448	0.0010
L5	47.1733 - 0	3.903	12	0.7593	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 604-1]	24	63.295	3.4832	0.0124	9280
76.00	Side Arm Mount [SO 701-1]	12	10.192	1.2963	0.0008	2890

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 155.21 (1)	TP24.22x19x0.1875	24.79	0.00	0.0	13.8533	-4.68	810.42	0.006
L2	155.21 - 124.833 (2)	TP30.11x23.0905x0.3125	33.96	0.00	0.0	28.6670	-8.35	1677.02	0.005
L3	124.833 - 83.3367 (3)	TP38.09x28.5893x0.4375	45.83	0.00	0.0	50.7499	-16.85	2968.87	0.006
L4	83.3367 - 40.84 (4)	TP46.03x36.1094x0.5	47.83	0.00	0.0	70.1714	-29.43	4105.03	0.007
L5	40.84 - 0 (5)	TP53.5x43.7164x0.5625	47.17	0.00	0.0	94.5133	-48.59	5529.03	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	180 - 155.21 (1)	TP24.22x19x0.1875	102.88	456.64	0.225	0.00	456.64	0.000
L2	155.21 - 124.833 (2)	TP30.11x23.0905x0.3125	300.92	1262.08	0.238	0.00	1262.08	0.000
L3	124.833 - 83.3367 (3)	TP38.09x28.5893x0.4375	670.57	2822.08	0.238	0.00	2822.08	0.000
L4	83.3367 - 40.84 (4)	TP46.03x36.1094x0.5	1177.42	4724.02	0.249	0.00	4724.02	0.000
L5	40.84 - 0 (5)	TP53.5x43.7164x0.5625	1898.63	7622.86	0.249	0.00	7622.86	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 155.21 (1)	TP24.22x19x0.1875	5.74	243.13	0.024	0.68	495.63	0.001
L2	155.21 - 124.833 (2)	TP30.11x23.0905x0.3125	7.66	503.11	0.015	0.58	1273.40	0.000
L3	124.833 - 83.3367 (3)	TP38.09x28.5893x0.4375	10.62	890.66	0.012	0.43	2850.64	0.000
L4	83.3367 - 40.84 (4)	TP46.03x36.1094x0.5	13.73	1231.51	0.011	0.07	4768.71	0.000
L5	40.84 - 0 (5)	TP53.5x43.7164x0.5625	16.80	1658.71	0.010	0.13	7689.77	0.000

Pole Interaction Design Data

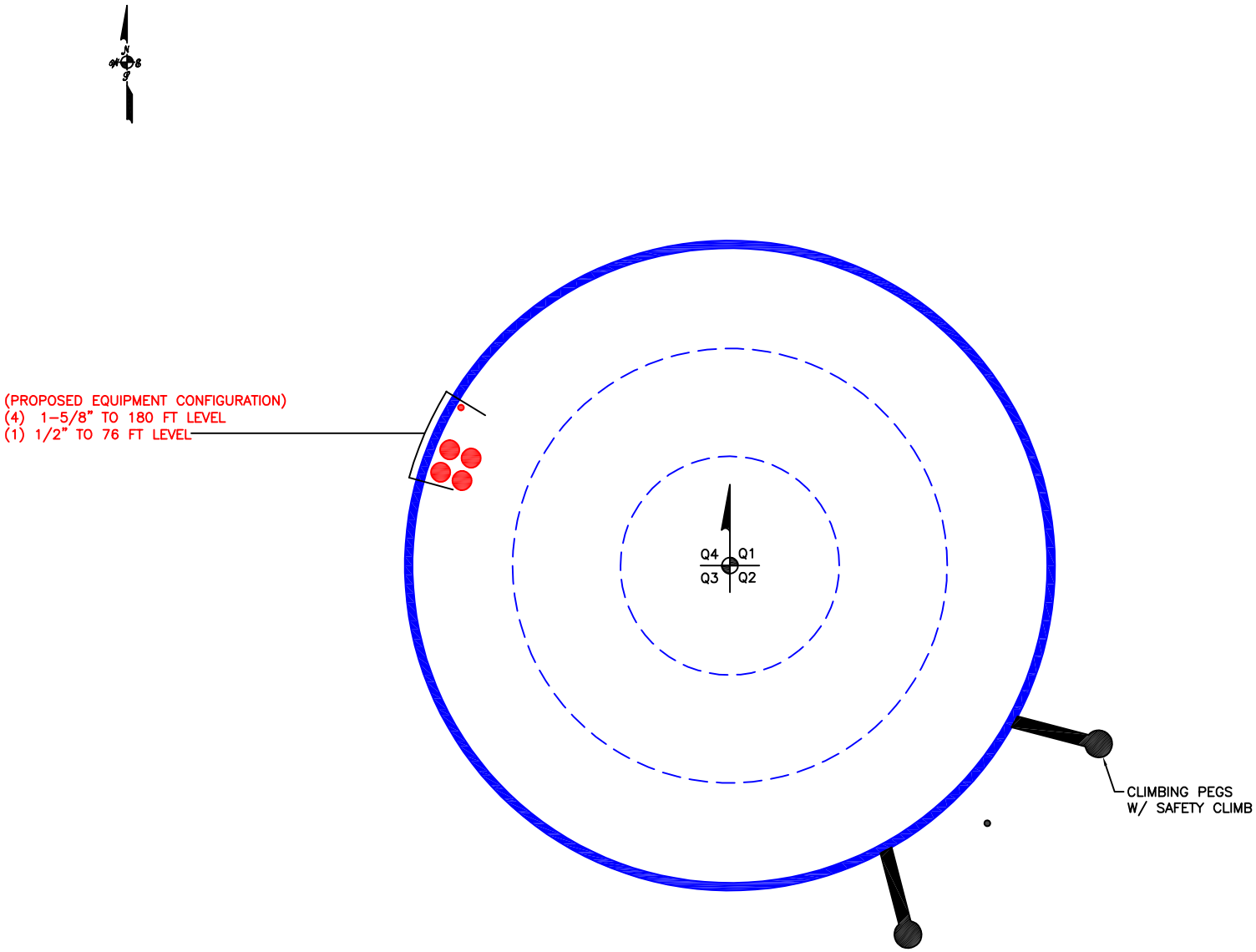
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 155.21 (1)	0.006	0.225	0.000	0.024	0.001	0.232	1.050	4.8.2
L2	155.21 - 124.833 (2)	0.005	0.238	0.000	0.015	0.000	0.244	1.050	4.8.2
L3	124.833 - 83.3367 (3)	0.006	0.238	0.000	0.012	0.000	0.243	1.050	4.8.2
L4	83.3367 - 40.84 (4)	0.007	0.249	0.000	0.011	0.000	0.257	1.050	4.8.2
L5	40.84 - 0 (5)	0.009	0.249	0.000	0.010	0.000	0.258	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 155.21	Pole	TP24.22x19x0.1875	1	-4.68	850.94	22.1	Pass
L2	155.21 - 124.833	Pole	TP30.11x23.0905x0.3125	2	-8.35	1760.87	23.2	Pass
L3	124.833 - 83.3367	Pole	TP38.09x28.5893x0.4375	3	-16.85	3117.31	23.2	Pass
L4	83.3367 - 40.84	Pole	TP46.03x36.1094x0.5	4	-29.43	4310.28	24.4	Pass
L5	40.84 - 0	Pole	TP53.5x43.7164x0.5625	5	-48.59	5805.48	24.6	Pass
							Summary	
						Pole (L5)	24.6	Pass
						RATING =	**24.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


N
W
E
S
(PROPOSED EQUIPMENT CONFIGURATION)
(4) 1-5/8" TO 180 FT LEVEL
(1) 1/2" TO 76 FT LEVEL
Q4
Q1
Q3
Q2
CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C

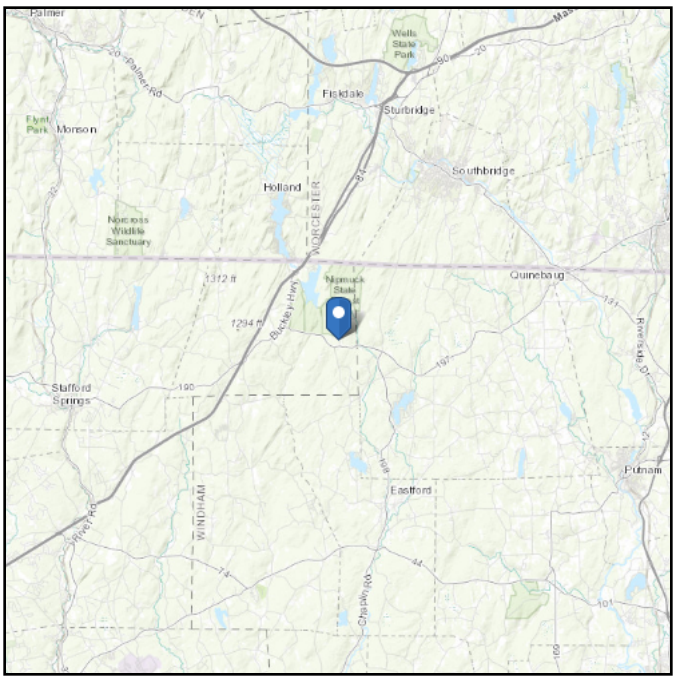
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 929.51 ft (NAVD 88)
Latitude: 41.987933
Longitude: -72.1136



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	95 Vmph
100-year MRI	102 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

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.

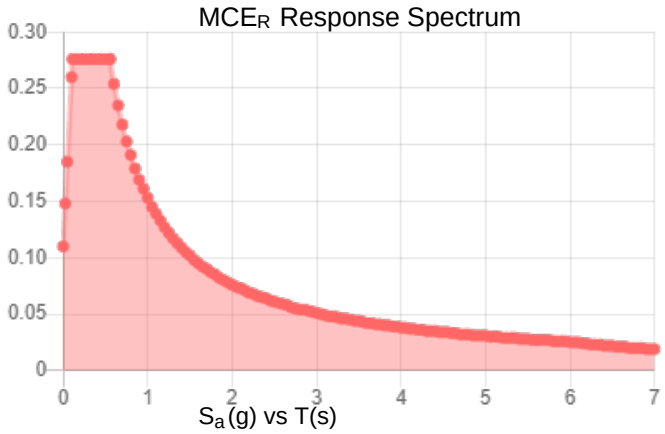
Seismic

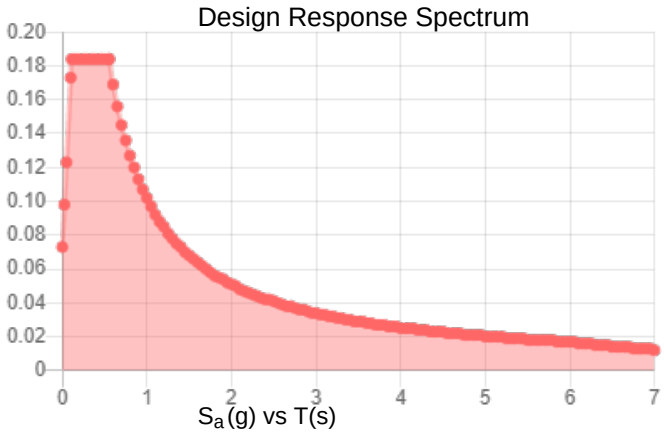
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.172	S_{DS} :	0.184
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.276	PGA_M :	0.135
S_{M1} :	0.153	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Feb 10 2021

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:	Wed Feb 10 2021

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.

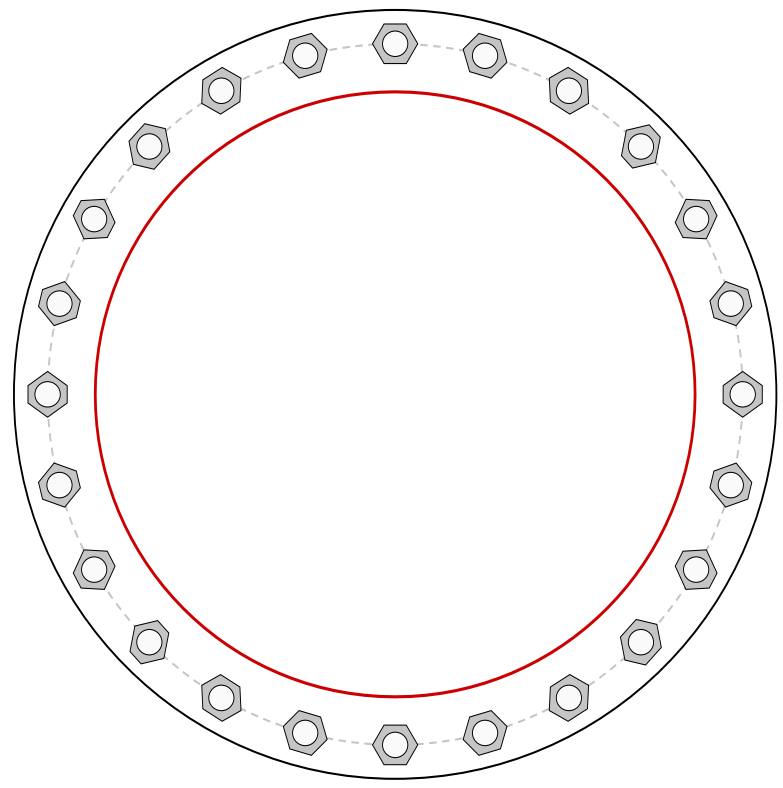
Monopole Base Plate Connection

Site Info	
BU #	876365
Site Name	Kingston W. / Bauer (S
Order #	538765 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1

Applied Loads	
Moment (kip-ft)	1899.00
Axial Force (kips)	49.00
Shear Force (kips)	17.00

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 62" BC

Base Plate Data

68" OD x 2.25" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

53.5" x 0.5625" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 63.27	ϕPn_c = 268.39	**Stress Rating**
Vu = 0.71	ϕVn = 120.77	**22.5%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	18.2	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**32.1%**	**Pass**

Pier and Pad Foundation

BU # :	876365
Site Name:	Kingston W. / Baue
App. Number:	538765 Rev. 1

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions

Compression, P_{comp}:	49	kips
Base Shear, Vu_comp:	17	kips
Moment, M_u:	1899	ft-kips
Tower Height, **H**:	180	ft
BP Dist. Above Fdn, bp_{dist}:	3.25	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	8.5	ft
Ext. Above Grade, **E**:	0.67	ft
Pier Rebar Size, **Sc**:	10	
Pier Rebar Quantity, **mc**:	41	
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**:	7.33	ft
Pad Width, W_1:	18.5	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	19	
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:	140	pcf
Ultimate Gross Bearing, Qult:	8.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	38	degrees
SPT Blow Count, N_{blows}:	48	
Base Friction, μ:	0.5	
Neglected Depth, **N**:	4.25	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	9	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	283.40	17.00	**5.7%**	**Pass**
Bearing Pressure (ksf)	6.00	2.84	**47.3%**	**Pass**
*Overturning (kip*ft)*	3209.18	2039.60	**63.6%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	10054.82	1984.00	**18.8%**	**Pass**
Pier Compression (kip)	34489.26	114.03	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	2073.94	481.94	**22.1%**	**Pass**
Pad Shear - 1-way (kips)	574.53	98.22	**16.3%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.019	**11.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3840.35	1190.40	**29.5%**	**Pass**

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

Soil Rating*:	**63.6%**
Structural Rating*:	**29.5%**

Exhibit E

Mount Analysis

Date: **February 1, 2021**

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589

Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**Sprint PCS Retain**	
	Carrier Site Number:	CTHA354A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876365
	Crown Castle Site Name:	KINGSTON W. / BAUER (SSUSA)
	Crown Castle JDE Job Number:	628846
	Crown Castle Order Number:	538765 Rev. 0
Engineering Firm Designation:	**Infinigy Engineering, PLLC Report Designation:** 1039-Z0001-B	
Site Data:	**3 Carion Road, Union, Tolland County, CT, 06076** **Latitude 41°59'16.56", Longitude -72°6'48.96"**	
Structure Information:	**Tower Height & Type:**	**180.0 ft Monopole**
	Mount Elevation:	**180.0 ft**
	Mount Type:	**10.5 ft Platform**

Dear Darcy Tarr,

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

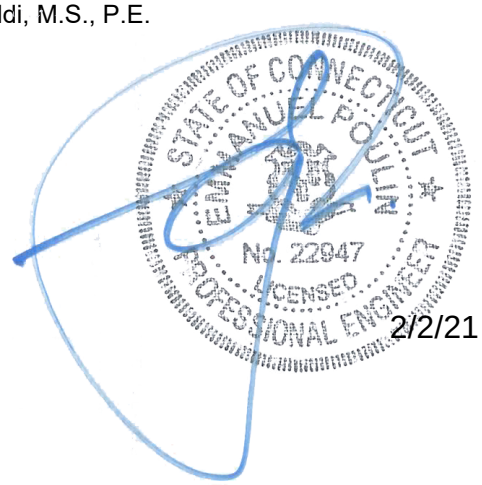
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient - 53.7%**
***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code and Appendix N based upon an ultimate 3-second gust wind speed of 125 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Jacques S. Grimaldi, M.S., P.E.

Respectfully Submitted by:
Emmanuel Poulin, P.E.
518-690-0790
structural@infinigy.com
CT PE License No. 22947



2/2/21

TABLE OF CONTENTS

1) INTRODUCTION

This is an existing 3 sector 10.5 ft Platform, designed by Engineered Endeavors Incorporated.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Connecticut State Building Code and Appendix N
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.172
Seismic S_1:	0.064
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
180.0	178.0	3	Ericsson	AIR6449 B41_T-MOBILE	10.5 ft Platform
		3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	
		3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	
		3	Ericsson	RADIO 4415 B66A	
		3	Ericsson	RADIO 4424 B25_TMO	
		3	Ericsson	RADIO 4449 B71 B85A_ T-MOBILE	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Sprint PCS Application	538765 Rev. 0	CCI Sites
Loading Document	Sprint PCS	RFDS Version: 1	TSA
Tower Manufacturer Drawings	Engineered Endeavors Incorporated	1533008	CCI Sites

3.1) Analysis Method

RISA-3D (Version 19.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool V2.1.4, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B “Software Input Calculations”.

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

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The 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) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy Engineering, PLLC should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP8	180.0	53.7	Pass
	Horizontal(s)	M1		38.3	Pass
	Handrail(s)	M33		37.9	Pass
	Support Channel(s)	M5		32.3	Pass
	Mount Connection(s)	-		3.5	Pass

Structure Rating (max from all components) =	53.7%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D - Additional Calculations” for detailed mount connection calculations.

4.1) Recommendations

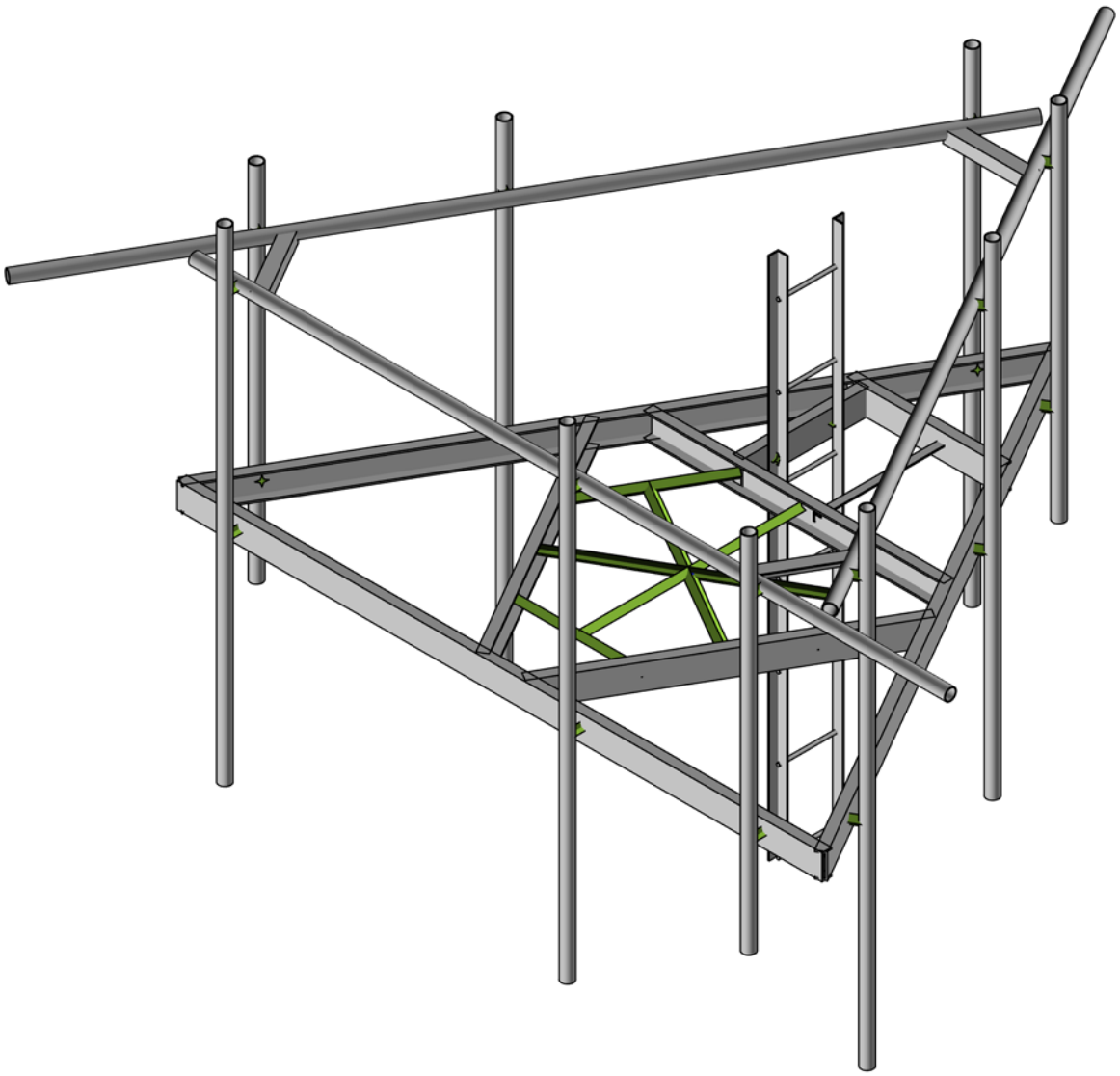
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of proposed Site Pro 1 HRK12 handrail kit.

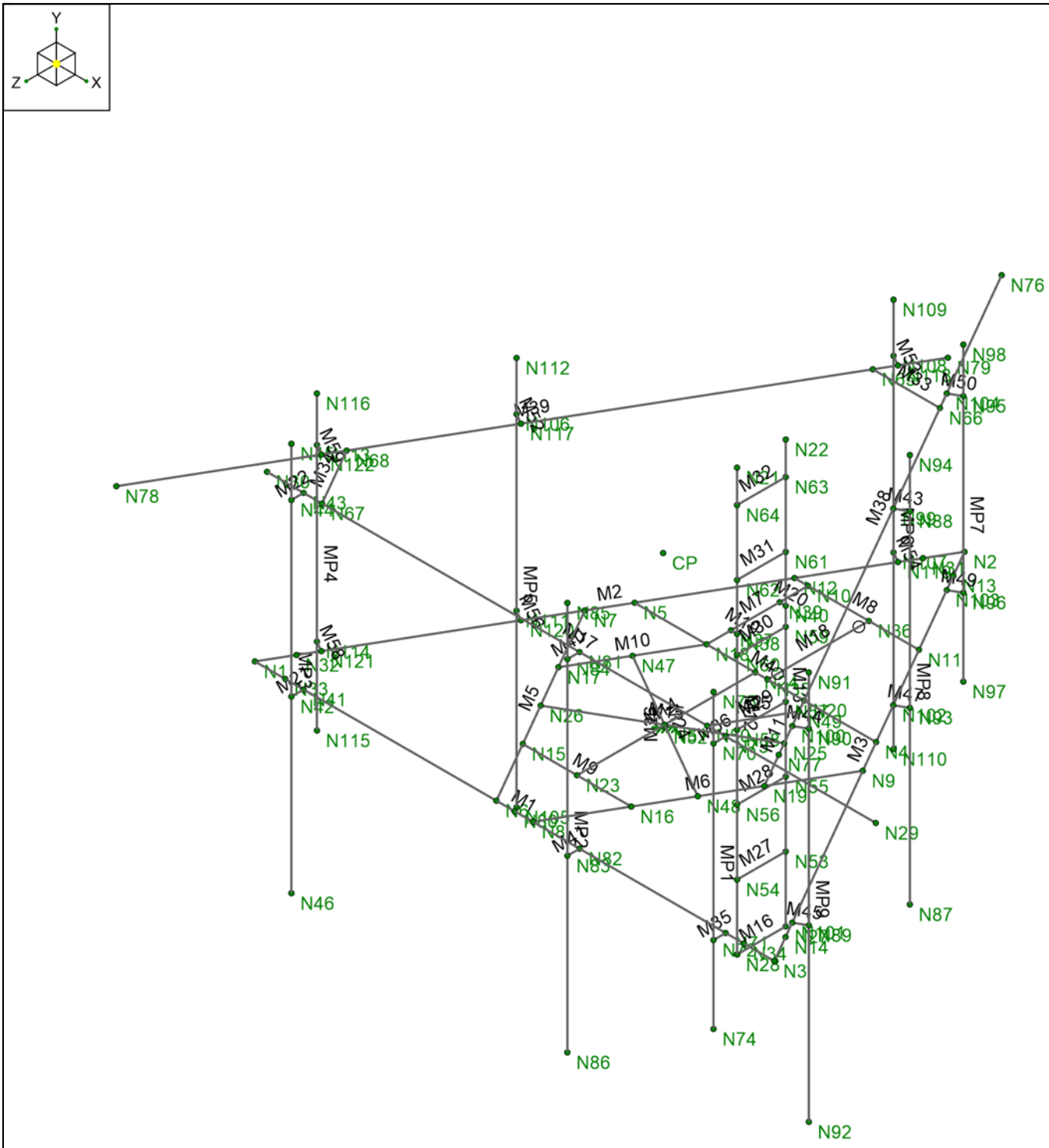
No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Infinigy Engineering, PLLC	876365	Render
JG		Feb 01, 2021
1039-Z0001-B		876365_loaded.r3d



Infinigy Engineering, PLLC	876365	Wireframe
JG		Feb 01, 2021
1039-Z0001-B		876365_loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Program Inputs

PROJECT INFORMATION	
Client:	Crown Castle
Carrier:	Sprint PCS
Engineer:	Jacques Grimaldi

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	B	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil	
Ground Elevation:	929.51	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	180.0	ft
Tower Height AGL:	180.0	ft

TOPOGRAPHIC DATA		
Topo Feature:	N/A	
Slope Distance:	N/A	ft
Crest Distance:	N/A	ft
Crest Height:	N/A	ft

FACTORS		
Directionality Fact. (K_d):	0.95	
Ground Ele. Factor (K_e):	0.97	*Rev H Only
Rooftop Speed-Up (K_s):	1.00	*Rev H Only
Topographic Factor (K_{zt}):	1.00	
Gust Effect Factor (G_h):	1.0	

CODE STANDARDS		
Building Code:	2015 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-10	

WIND AND ICE DATA		
Ultimate Wind (V_{ult}):	125	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	2.0	in
Flat Pressure:	85.90	psf
Round Pressure:	51.54	psf
Ice Wind Pressure:	8.25	psf

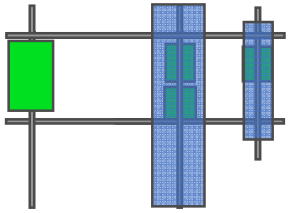
SEISMIC DATA		
Short-Period Accel. (S_s):	0.172	g
1-Second Accel. (S_1):	0.064	g
Short-Period Design (S_{DS}):	0.18	
1-Second Design (S_{D1}):	0.10	
Short-Period Coeff. (F_a):	1.60	
1-Second Coeff. (F_v):	2.40	
Amplification Factor (a_p):	1.00	
Response Mod. (R_p):	2.50	
Overstrength (Ω_o):	1.00	

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

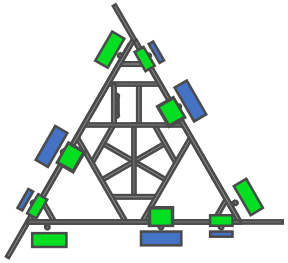
Infinigy Load Calculator V2.1.4

Program Inputs

ELEVATION VIEW



PLAN VIEW



INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

Infinigy Load Calculator V2.1.4

APPURTENANCE INFORMATION

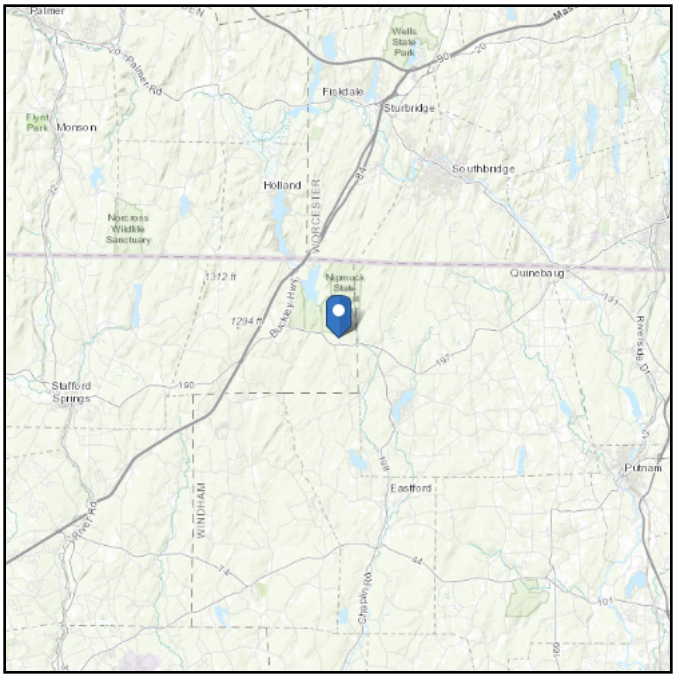
Appurtenance Name	Elevation	Qty.	K_a	q_z (psf)	EPA_N (ft^2)	EPA_T (ft^2)	Wind F_z (lbs)	Wind F_x (lbs)	Weight (lbs)	Seismic F (lbs)	Member (α sector)
ERICSSON AIR6449 B41_T-MOBILE	178.0	3	0.90	42.81	5.66	2.48	218.05	95.42	114.63	10.52	MP3
RFS/CELWAVE APX16DWV-16DWV-S-E-A20	178.0	3	0.90	42.81	6.26	1.50	241.21	57.80	40.70	3.73	MP1
RFS/CELWAVE APXVAALL24_43-U-NA20_TMO	178.0	3	0.90	42.81	14.67	5.32	565.26	204.99	149.90	13.75	MP2
ERICSSON RADIO 4415 B66A	178.0	3	0.90	42.81	1.86	0.87	71.52	33.53	49.60	4.55	MP1
ERICSSON RADIO 4424 B25_TMO	178.0	3	0.90	42.81	2.05	1.61	79.07	62.05	86.00	7.89	MP2
ERICSSON RADIO 4449 B71 B85A_T-MOBILE	178.0	3	0.90	42.81	1.97	1.59	75.91	61.13	73.21	6.72	MP2

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 929.51 ft (NAVD 88)
Latitude: 41.987933
Longitude: -72.1136



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	95 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:	Sun Jan 31 2021

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.

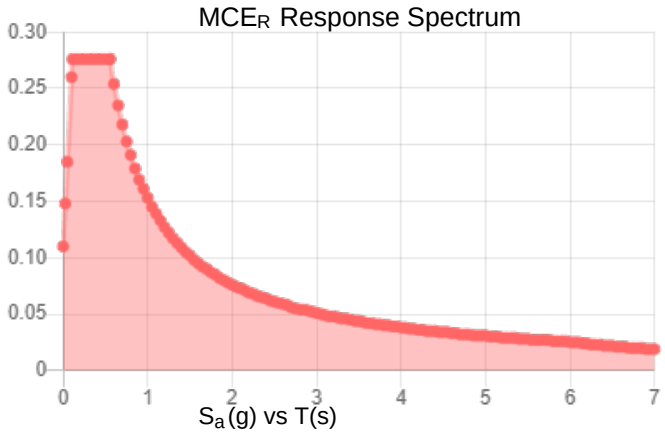
Seismic

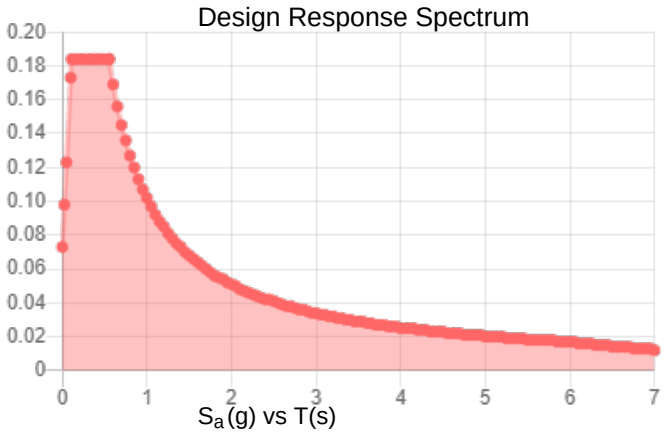
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.172	S_{DS} :	0.184
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.276	PGA_M :	0.135
S_{M1} :	0.153	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sun Jan 31 2021

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:	Sun Jan 31 2021

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 C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N3	N1		Horizontal	Beam	Channel	A36 Gr.36	Typical
2	M2	N2	N1	180	Horizontal	Beam	Channel	A36 Gr.36	Typical
3	M3	N2	N3		Horizontal	Beam	Channel	A36 Gr.36	Typical
4	M4	N4	N5	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
5	M5	N6	N7		Support Channel	Beam	Channel	A36 Gr.36	Typical
6	M6	N8	N9	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
7	M7	N18	N10	180	Support Channel	Beam	Channel	A36 Gr.36	Typical
8	M8	N11	N12		Support Channel	Beam	Channel	A36 Gr.36	Typical
9	M9	N15	N16		RIGID	None	None	RIGID	Typical
10	M10	N17	N18		RIGID	None	None	RIGID	Typical
11	M11	N19	N20		RIGID	None	None	RIGID	Typical
12	M12	N21	N28	180	Ladder Rail	Column	Single Angle	A36 Gr.36	Typical
13	M13	N22	N27	90	Ladder Rail	Column	Single Angle	A36 Gr.36	Typical
14	M14	N23	N24		RIGID	None	None	RIGID	Typical
15	M15	N25	N26		RIGID	None	None	RIGID	Typical
16	M16	N27	N28		Ladder Step	Beam	BAR	A36 Gr.36	Typical
17	M17	N29	N30	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
18	M18	N35	N36	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N37	N38		RIGID	None	None	RIGID	Typical
20	M20	N39	N40		RIGID	None	None	RIGID	Typical
21	M21	N41	N42		RIGID	None	None	RIGID	Typical
22	M22	N43	N44		RIGID	None	None	RIGID	Typical
23	MP3	N45	N46		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
24	M24	N47	N48		RIGID	None	None	RIGID	Typical
25	M25	N49	N50	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N52	N51		RIGID	None	None	RIGID	Typical
27	M27	N53	N54		Ladder Step	Beam	BAR	A36 Gr.36	Typical
28	M28	N55	N56		Ladder Step	Beam	BAR	A36 Gr.36	Typical
29	M29	N57	N58		Ladder Step	Beam	BAR	A36 Gr.36	Typical
30	M30	N59	N60		Ladder Step	Beam	BAR	A36 Gr.36	Typical
31	M31	N61	N62		Ladder Step	Beam	BAR	A36 Gr.36	Typical
32	M32	N63	N64		Ladder Step	Beam	BAR	A36 Gr.36	Typical
33	M33	N65	N66	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
34	M34	N67	N68	180	Handrail Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
35	M35	N71	N72		RIGID	None	None	RIGID	Typical
36	M36	N73	N70		RIGID	None	None	RIGID	Typical
37	MP1	N75	N74		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
38	M38	N76	N77	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
39	M39	N78	N79	90	Handrails	Beam	Pipe	A53 Gr.B	Typical
40	M40	N81	N84		RIGID	None	None	RIGID	Typical
41	M41	N82	N83		RIGID	None	None	RIGID	Typical
42	MP2	N85	N86		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
43	M43	N99	N88		RIGID	None	None	RIGID	Typical
44	M44	N100	N90		RIGID	None	None	RIGID	Typical
45	M45	N101	N89		RIGID	None	None	RIGID	Typical
46	MP9	N91	N92		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
47	M47	N102	N93		RIGID	None	None	RIGID	Typical
48	MP8	N94	N87		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
49	M49	N103	N96		RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
50	M50	N104	N95		RIGID	None	None	RIGID	Typical
51	MP7	N98	N97		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
52	M52	N117	N106		RIGID	None	None	RIGID	Typical
53	M53	N118	N108		RIGID	None	None	RIGID	Typical
54	M54	N119	N107		RIGID	None	None	RIGID	Typical
55	MP6	N109	N110		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
56	M56	N120	N111		RIGID	None	None	RIGID	Typical
57	MP5	N112	N105		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
58	M58	N121	N114		RIGID	None	None	RIGID	Typical
59	M59	N122	N113		RIGID	None	None	RIGID	Typical
60	MP4	N116	N115		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General Members				
2	RIGID		27	269.5	0
3	Total General		27	269.5	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	0.625 SR	7	84	7.308
7	A36 Gr.36	C5X9	8	618.2	462.779
8	A36 Gr.36	L1.5x1.5x4	1	25	4.87
9	A36 Gr.36	L2.5x2.5x3	3	49.6	12.683
10	A36 Gr.36	L2x2x4	2	208	55.679
11	A53 Gr.B	PIPE_2.0	12	1242	359.231
12	Total HR Steel		33	2226.8	902.55

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
1	Self Weight	DL		-1			36		8
2	Wind Load AZI 0	WLZ					72		
3	Wind Load AZI 30	None					72		
4	Wind Load AZI 60	None					72		
5	Wind Load AZI 90	WLX					72		
6	Wind Load AZI 120	None					72		
7	Wind Load AZI 150	None					72		
8	Wind Load AZI 180	None					72		
9	Wind Load AZI 210	None					72		
10	Wind Load AZI 240	None					72		
11	Wind Load AZI 270	None					72		
12	Wind Load AZI 300	None					72		
13	Wind Load AZI 330	None					72		
14	Distr. Wind Load Z	WLZ						60	
15	Distr. Wind Load X	WLX						60	
16	Ice Weight	OL1					36	60	8
17	Ice Wind Load AZI 0	OL2					72		
18	Ice Wind Load AZI 30	None					72		
19	Ice Wind Load AZI 60	None					72		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
20	Ice Wind Load AZI 90	OL3					72		
21	Ice Wind Load AZI 120	None					72		
22	Ice Wind Load AZI 150	None					72		
23	Ice Wind Load AZI 180	None					72		
24	Ice Wind Load AZI 210	None					72		
25	Ice Wind Load AZI 240	None					72		
26	Ice Wind Load AZI 270	None					72		
27	Ice Wind Load AZI 300	None					72		
28	Ice Wind Load AZI 330	None					72		
29	Distr. Ice Wind Load Z	OL2						60	
30	Distr. Ice Wind Load X	OL3						60	
31	Seismic Load Z	ELZ			-0.092		36		
32	Seismic Load X	ELX	-0.092				36		
33	Service Live Loads	LL				1			
34	Maintenance Load 1	LL				1			
35	Maintenance Load 2	LL				1			
36	Maintenance Load 3	LL				1			
37	Maintenance Load 4	LL				1			
38	Maintenance Load 5	LL				1			
39	Maintenance Load 6	LL				1			
40	Maintenance Load 7	LL				1			
41	Maintenance Load 8	LL				1			
42	Maintenance Load 9	LL				1			
43	BLC 1 Transient Area Loads	None						95	
44	BLC 16 Transient Area Loads	None						95	

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4DL	Yes	Y	1	1.4								
2	1.2DL + 1WL AZI 0	Yes	Y	1	1.2	2	1	14	1	15			
3	1.2DL + 1WL AZI 30	Yes	Y	1	1.2	3	1	14	0.866	15	0.5		
4	1.2DL + 1WL AZI 60	Yes	Y	1	1.2	4	1	14	0.5	15	0.866		
5	1.2DL + 1WL AZI 90	Yes	Y	1	1.2	5	1	14		15	1		
6	1.2DL + 1WL AZI 120	Yes	Y	1	1.2	6	1	14	-0.5	15	0.866		
7	1.2DL + 1WL AZI 150	Yes	Y	1	1.2	7	1	14	-0.866	15	0.5		
8	1.2DL + 1WL AZI 180	Yes	Y	1	1.2	8	1	14	-1	15			
9	1.2DL + 1WL AZI 210	Yes	Y	1	1.2	9	1	14	-0.866	15	-0.5		
10	1.2DL + 1WL AZI 240	Yes	Y	1	1.2	10	1	14	-0.5	15	-0.866		
11	1.2DL + 1WL AZI 270	Yes	Y	1	1.2	11	1	14		15	-1		
12	1.2DL + 1WL AZI 300	Yes	Y	1	1.2	12	1	14	0.5	15	-0.866		
13	1.2DL + 1WL AZI 330	Yes	Y	1	1.2	13	1	14	0.866	15	-0.5		
14	0.9DL + 1WL AZI 0	Yes	Y	1	0.9	2	1	14	1	15			
15	0.9DL + 1WL AZI 30	Yes	Y	1	0.9	3	1	14	0.866	15	0.5		
16	0.9DL + 1WL AZI 60	Yes	Y	1	0.9	4	1	14	0.5	15	0.866		
17	0.9DL + 1WL AZI 90	Yes	Y	1	0.9	5	1	14		15	1		
18	0.9DL + 1WL AZI 120	Yes	Y	1	0.9	6	1	14	-0.5	15	0.866		
19	0.9DL + 1WL AZI 150	Yes	Y	1	0.9	7	1	14	-0.866	15	0.5		
20	0.9DL + 1WL AZI 180	Yes	Y	1	0.9	8	1	14	-1	15			

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
21	0.9DL + 1WL AZI 210	Yes	Y	1	0.9	9	1	14	-0.866	15	-0.5		
22	0.9DL + 1WL AZI 240	Yes	Y	1	0.9	10	1	14	-0.5	15	-0.866		
23	0.9DL + 1WL AZI 270	Yes	Y	1	0.9	11	1	14		15	-1		
24	0.9DL + 1WL AZI 300	Yes	Y	1	0.9	12	1	14	0.5	15	-0.866		
25	0.9DL + 1WL AZI 330	Yes	Y	1	0.9	13	1	14	0.866	15	-0.5		
26	1.2D + 1.0Di	Yes	Y	1	1.2	16	1						
27	1.2D + 1.0Di +1.0Wi AZI 0	Yes	Y	1	1.2	16	1	17	1	29	1	30	
28	1.2D + 1.0Di +1.0Wi AZI 30	Yes	Y	1	1.2	16	1	18	1	29	0.866	30	0.5
29	1.2D + 1.0Di +1.0Wi AZI 60	Yes	Y	1	1.2	16	1	19	1	29	0.5	30	0.866
30	1.2D + 1.0Di +1.0Wi AZI 90	Yes	Y	1	1.2	16	1	20	1	29		30	1
31	1.2D + 1.0Di +1.0Wi AZI 120	Yes	Y	1	1.2	16	1	21	1	29	-0.5	30	0.866
32	1.2D + 1.0Di +1.0Wi AZI 150	Yes	Y	1	1.2	16	1	22	1	29	-0.866	30	0.5
33	1.2D + 1.0Di +1.0Wi AZI 180	Yes	Y	1	1.2	16	1	23	1	29	-1	30	
34	1.2D + 1.0Di +1.0Wi AZI 210	Yes	Y	1	1.2	16	1	24	1	29	-0.866	30	-0.5
35	1.2D + 1.0Di +1.0Wi AZI 240	Yes	Y	1	1.2	16	1	25	1	29	-0.5	30	-0.866
36	1.2D + 1.0Di +1.0Wi AZI 270	Yes	Y	1	1.2	16	1	26	1	29		30	-1
37	1.2D + 1.0Di +1.0Wi AZI 300	Yes	Y	1	1.2	16	1	27	1	29	0.5	30	-0.866
38	1.2D + 1.0Di +1.0Wi AZI 330	Yes	Y	1	1.2	16	1	28	1	29	0.866	30	-0.5
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.237	31	1	32					
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.237	31	0.866	32	0.5				
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.237	31	0.5	32	0.866				
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.237	31		32	1				
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.237	31	-0.5	32	0.866				
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.237	31	-0.866	32	0.5				
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.237	31	-1	32					
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.237	31	-0.866	32	-0.5				
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.237	31	-0.5	32	-0.866				
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.237	31		32	-1				
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.237	31	0.5	32	-0.866				
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.237	31	0.866	32	-0.5				
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.863	31	1	32					
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.863	31	0.866	32	0.5				
53	(0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.863	31	0.5	32	0.866				
54	(0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.863	31		32	1				
55	(0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.863	31	-0.5	32	0.866				
56	(0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.863	31	-0.866	32	0.5				
57	(0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.863	31	-1	32					
58	(0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.863	31	-0.866	32	-0.5				
59	(0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.863	31	-0.5	32	-0.866				
60	(0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.863	31		32	-1				
61	(0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.863	31	0.5	32	-0.866				
62	(0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.863	31	0.866	32	-0.5				
63	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 0	Yes	Y	1	1	2	0.23	14	0.23	15		33	1.5
64	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 30	Yes	Y	1	1	3	0.23	14	0.2	15	0.115	33	1.5
65	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 60	Yes	Y	1	1	4	0.23	14	0.115	15	0.2	33	1.5
66	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 90	Yes	Y	1	1	5	0.23	14		15	0.23	33	1.5
67	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 120	Yes	Y	1	1	6	0.23	14	-0.115	15	0.2	33	1.5
68	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 150	Yes	Y	1	1	7	0.23	14	-0.2	15	0.115	33	1.5
69	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 180	Yes	Y	1	1	8	0.23	14	-0.23	15		33	1.5

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
70	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 210	Yes	Y	1	1	9	0.23	14	-0.2	15	-0.115	33	1.5
71	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 240	Yes	Y	1	1	10	0.23	14	-0.115	15	-0.2	33	1.5
72	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 270	Yes	Y	1	1	11	0.23	14		15	-0.23	33	1.5
73	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 300	Yes	Y	1	1	12	0.23	14	0.115	15	-0.2	33	1.5
74	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 330	Yes	Y	1	1	13	0.23	14	0.2	15	-0.115	33	1.5
75	1.2DL + 1.5LL	Yes	Y	1	1.2	33	1.5						
76	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.058	14	0.058	15	
77	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.058	14	0.05	15	0.029
78	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.058	14	0.029	15	0.05
79	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.058	14		15	0.058
80	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.058	14	-0.029	15	0.05
81	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.058	14	-0.05	15	0.029
82	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.058	14	-0.058	15	
83	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.058	14	-0.05	15	-0.029
84	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.058	14	-0.029	15	-0.05
85	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.058	14		15	-0.058
86	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.058	14	0.029	15	-0.05
87	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.058	14	0.05	15	-0.029
88	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.058	14	0.058	15	
89	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.058	14	0.05	15	0.029
90	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.058	14	0.029	15	0.05
91	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.058	14		15	0.058
92	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.058	14	-0.029	15	0.05
93	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.058	14	-0.05	15	0.029
94	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.058	14	-0.058	15	
95	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.058	14	-0.05	15	-0.029
96	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.058	14	-0.029	15	-0.05
97	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.058	14		15	-0.058
98	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.058	14	0.029	15	-0.05
99	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.058	14	0.05	15	-0.029
100	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.058	14	0.058	15	
101	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.058	14	0.05	15	0.029
102	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.058	14	0.029	15	0.05
103	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.058	14		15	0.058
104	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.058	14	-0.029	15	0.05
105	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.058	14	-0.05	15	0.029
106	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.058	14	-0.058	15	
107	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.058	14	-0.05	15	-0.029
108	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.058	14	-0.029	15	-0.05
109	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.058	14		15	-0.058
110	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.058	14	0.029	15	-0.05
111	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.058	14	0.05	15	-0.029
112	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.058	14	0.058	15	
113	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.058	14	0.05	15	0.029
114	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.058	14	0.029	15	0.05
115	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.058	14		15	0.058
116	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.058	14	-0.029	15	0.05
117	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.058	14	-0.05	15	0.029
118	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.058	14	-0.058	15	

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
119	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.058	14	-0.05	15	-0.029
120	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.058	14	-0.029	15	-0.05
121	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.058	14		15	-0.058
122	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.058	14	0.029	15	-0.05
123	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.058	14	0.05	15	-0.029
124	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.058	14	0.058	15	
125	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.058	14	0.05	15	0.029
126	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.058	14	0.029	15	0.05
127	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.058	14		15	0.058
128	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.058	14	-0.029	15	0.05
129	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.058	14	-0.05	15	0.029
130	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.058	14	-0.058	15	
131	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.058	14	-0.05	15	-0.029
132	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.058	14	-0.029	15	-0.05
133	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.058	14		15	-0.058
134	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.058	14	0.029	15	-0.05
135	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.058	14	0.05	15	-0.029
136	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.058	14	0.058	15	
137	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.058	14	0.05	15	0.029
138	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.058	14	0.029	15	0.05
139	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.058	14		15	0.058
140	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.058	14	-0.029	15	0.05
141	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.058	14	-0.05	15	0.029
142	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.058	14	-0.058	15	
143	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.058	14	-0.05	15	-0.029
144	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.058	14	-0.029	15	-0.05
145	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.058	14		15	-0.058
146	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.058	14	0.029	15	-0.05
147	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.058	14	0.05	15	-0.029
148	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	40	1.5	2	0.058	14	0.058	15	
149	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	40	1.5	3	0.058	14	0.05	15	0.029
150	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	40	1.5	4	0.058	14	0.029	15	0.05
151	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	40	1.5	5	0.058	14		15	0.058
152	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	40	1.5	6	0.058	14	-0.029	15	0.05
153	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	40	1.5	7	0.058	14	-0.05	15	0.029
154	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	40	1.5	8	0.058	14	-0.058	15	
155	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	40	1.5	9	0.058	14	-0.05	15	-0.029
156	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	40	1.5	10	0.058	14	-0.029	15	-0.05
157	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	40	1.5	11	0.058	14		15	-0.058
158	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	40	1.5	12	0.058	14	0.029	15	-0.05
159	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	40	1.5	13	0.058	14	0.05	15	-0.029
160	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	41	1.5	2	0.058	14	0.058	15	
161	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	41	1.5	3	0.058	14	0.05	15	0.029
162	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	41	1.5	4	0.058	14	0.029	15	0.05
163	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	41	1.5	5	0.058	14		15	0.058
164	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	41	1.5	6	0.058	14	-0.029	15	0.05
165	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	41	1.5	7	0.058	14	-0.05	15	0.029
166	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	41	1.5	8	0.058	14	-0.058	15	
167	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	41	1.5	9	0.058	14	-0.05	15	-0.029

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
168	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	41	1.5	10	0.058	14	-0.029	15	-0.05
169	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	41	1.5	11	0.058	14		15	-0.058
170	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	41	1.5	12	0.058	14	0.029	15	-0.05
171	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	41	1.5	13	0.058	14	0.05	15	-0.029
172	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	42	1.5	2	0.058	14	0.058	15	
173	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	42	1.5	3	0.058	14	0.05	15	0.029
174	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	42	1.5	4	0.058	14	0.029	15	0.05
175	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	42	1.5	5	0.058	14		15	0.058
176	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	42	1.5	6	0.058	14	-0.029	15	0.05
177	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	42	1.5	7	0.058	14	-0.05	15	0.029
178	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	42	1.5	8	0.058	14	-0.058	15	
179	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	42	1.5	9	0.058	14	-0.05	15	-0.029
180	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	42	1.5	10	0.058	14	-0.029	15	-0.05
181	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	42	1.5	11	0.058	14		15	-0.058
182	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	42	1.5	12	0.058	14	0.029	15	-0.05

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N52	max	4605.054	17	11044.521	36	4787.158	2	4979.283	2	3179.106	23	4397.079	23
2		min	-4605.057	11	2292.138	54	-4787.152	20	-4349.22	20	-3179.171	17	-4551.961	5
3	Totals:	max	4605.054	17	11044.521	36	4787.158	2						
4		min	-4605.057	11	2292.138	54	-4787.152	20						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	MP8	PIPE_2.0	0.537	54	6	0.08	54		13	14916.096	32130	1871.625	1871.625	1.745	H1-1b
2	MP2	PIPE_2.0	0.532	54	2	0.101	54		8	14916.096	32130	1871.625	1871.625	1.756	H1-1b
3	MP5	PIPE_2.0	0.528	54	10	0.096	54		4	14916.096	32130	1871.625	1871.625	1.727	H1-1b
4	M1	C5X9	0.383	58.667	8	0.165	58.667	y	32	83048.14	85536	1909.122	11853	1.325	H1-1b
5	M33	L2.5x2.5x3	0.379	16.547	5	0.066	16.547	y	11	27229.407	29192.4	872.574	1971.83	1.5	H2-1
6	MP6	PIPE_2.0	0.371	54	6	0.073	54		5	14916.096	32130	1871.625	1871.625	1.868	H1-1b
7	M2	C5X9	0.355	69.333	4	0.117	12	y	5	83048.14	85536	1909.122	11853	1.359	H1-1b
8	MP3	PIPE_2.0	0.349	54	10	0.07	54		10	14916.096	32130	1871.625	1871.625	2.086	H1-1b
9	M34	L2.5x2.5x3	0.33	16.547	10	0.057	16.547	y	3	27229.407	29192.4	872.574	1971.83	1.5	H2-1
10	MP9	PIPE_2.0	0.325	54	2	0.068	54		2	14916.096	32130	1871.625	1871.625	1.863	H1-1b
11	M5	C5X9	0.323	42.154	5	0.122	42.154	y	31	38865.728	85536	1909.122	11853	1.686	H1-1b
12	M25	L2.5x2.5x3	0.315	16.547	13	0.062	16.547	y	7	27229.407	29192.4	872.574	1971.83	1.5	H2-1
13	MP7	PIPE_2.0	0.312	52.5	10	0.072	52.5		11	20866.733	32130	1871.625	1871.625	2.281	H1-1b
14	MP1	PIPE_2.0	0.292	52.5	6	0.059	52.5		6	20866.733	32130	1871.625	1871.625	2.413	H1-1b
15	M6	C5X9	0.284	17.358	35	0.106	17.358	y	36	38865.728	85536	1909.122	11853	1.769	H1-1b
16	MP4	PIPE_2.0	0.277	52.5	2	0.058	52.5		2	20866.733	32130	1871.625	1871.625	2.568	H1-1b
17	M7	C5X9	0.275	0	29	0.075	5.985	y	29	74436.578	85536	1909.122	11853	1.848	H1-1b
18	M3	C5X9	0.271	58.667	12	0.143	58.667	y	36	83048.14	85536	1909.122	11853	1.35	H1-1b
19	M38	PIPE_2.0	0.244	40.625	10	0.14	42.187		6	6295.422	32130	1871.625	1871.625	1.757	H1-1b
20	M17	PIPE_2.0	0.242	71.875	7	0.141	42.187		2	6295.422	32130	1871.625	1871.625	1.936	H1-1b
21	M39	PIPE_2.0	0.237	137.5	6	0.14	42.187		10	6295.422	32130	1871.625	1871.625	1.538	H1-1b
22	M4	C5X9	0.213	17.358	34	0.066	17.358	y	28	38865.728	85536	1909.122	11853	2.062	H1-1b
23	M12	L2x2x4	0.117	35.75	148	0.024	39	z	28	30368.666	30585.6	690.934	1576.849	1.244	H2-1

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
24	M13	L2x2x4	0.11	35.75	148	0.023	39	y	148	30368.666	30585.6	690.934	1576.849	1.282	H2-1
25	M8	C5X9	0.108	0	13	0.043	27.472	z	3	69371.456	85536	1909.122	11853	1.498	H1-1b
26	M18	L1.5x1.5x4	0.049	12.49	32	0.01	24.981	z	28	15152.943	22275	360.338	834.027	1.136	H2-1
27	M30	0.625 SR	0.032	12	27	0.007	12		29	7286.892	9940.196	103.544	103.544	2.351	H1-1b
28	M31	0.625 SR	0.019	12	28	0.006	12		29	7286.892	9940.196	103.544	103.544	2.069	H1-1b
29	M32	0.625 SR	0.019	12	28	0.006	12		29	7286.892	9940.196	103.544	103.544	2.634	H1-1b
30	M29	0.625 SR	0.017	12	28	0.005	12		29	7286.892	9940.196	103.544	103.544	2.466	H1-1b
31	M28	0.625 SR	0.015	12	28	0.004	12		29	7286.892	9940.196	103.544	103.544	2.502	H1-1b
32	M27	0.625 SR	0.014	12	28	0.003	12		29	7286.892	9940.196	103.544	103.544	2.529	H1-1b
33	M16	0.625 SR	0.013	12	28	0.003	12		29	7286.892	9940.196	103.544	103.544	2.514	H1-1b

APPENDIX D

ADDITIONAL CALCUATIONS

INFINIGY

FROM ZERO TO INFINIGY

the solutions are endless

Bolt Calculation Tool, V1.4

PROJECT DATA	
Site Name:	KINGSTON W. / BAUER (SSUSA)
Site Number:	876365
Job Code:	1039-Z0001-B
Connection Description:	Platform to Pole

APPLIED LOADS		
Bolt Tension:	503.69	lbs
Bolt Shear:	630.68	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.75	in
Bolt Grade:	A325	-
# of Bolts:	12	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	30101.39	
Shear Strength	17892.35	
Tensile Usage	1.7%	
Shear Usage	3.5%	
Interaction Check	0.00	***≤1.05***
Result	Pass	

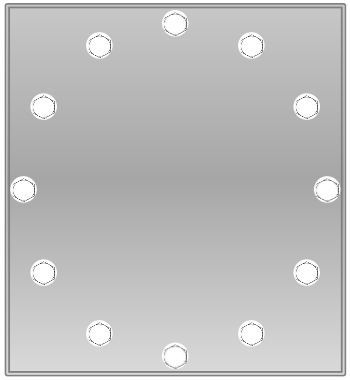


Exhibit F

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: CTHA354A

3 Carion Road
Union, Connecticut 06076

March 23, 2021

EBI Project Number: 6221001353

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.18%**

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

March 23, 2021

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

Emissions Analysis for Site: CTHA354A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **3 Carion Road** in **Union, 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 3 Carion Road in Union, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

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

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

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

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

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

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

7) 1 LTE 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 RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

12) The antenna mounting height centerline of the proposed antennas is 178 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):	178 feet	Height (AGL):	178 feet	Height (AGL):	178 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 %:	**0.57%**	Antenna B1 MPE %:	**0.57%**	Antenna C1 MPE %:	**0.57%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_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 / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd
Height (AGL):	178 feet	Height (AGL):	178 feet	Height (AGL):	178 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):	12,569.87	ERP (W):	12,569.87	ERP (W):	12,569.87
Antenna A2 MPE %:	**2.22%**	Antenna B2 MPE %:	**2.22%**	Antenna C2 MPE %:	**2.22%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
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:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd
Height (AGL):	178 feet	Height (AGL):	178 feet	Height (AGL):	178 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):	12,888.76	ERP (W):	12,888.76	ERP (W):	12,888.76
Antenna A3 MPE %:	**1.57%**	Antenna B3 MPE %:	**1.57%**	Antenna C3 MPE %:	**1.57%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	4.36%
Sprint	1.82%
Site Total MPE % :	6.18%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	4.36%
T-Mobile Sector B Total:	4.36%
T-Mobile Sector C Total:	4.36%
Site Total MPE % :	6.18%

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	178.0	5.67	2100 MHz LTE	1000	0.57%
T-Mobile 600 MHz LTE	2	591.73	178.0	1.44	600 MHz LTE	400	0.36%
T-Mobile 600 MHz NR	1	1577.94	178.0	1.92	600 MHz NR	400	0.48%
T-Mobile 700 MHz LTE	2	695.22	178.0	1.69	700 MHz LTE	467	0.36%
T-Mobile 1900 MHz GSM	4	1052.26	178.0	5.11	1900 MHz GSM	1000	0.51%
T-Mobile 1900 MHz LTE	2	2104.51	178.0	5.11	1900 MHz LTE	1000	0.51%
T-Mobile 2500 MHz LTE	1	6444.38	178.0	7.83	2500 MHz LTE	1000	0.78%
T-Mobile 2500 MHz NR	1	6444.38	178.0	7.83	2500 MHz NR	1000	0.78%
						Total:	**4.36%**

• 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:	4.36%
Sector B:	4.36%
Sector C:	4.36%
T-Mobile Maximum MPE % (Sector A):	4.36%
Site Total:	6.18%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.18%** 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.