January 4th, 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: 845455 - T-Mobile Site ID: CT11069A
363 Riversville Road, Greenwich, CT 06831
Latitude: 41° 3′ 58.60″/ Longitude: -73° 40′ 17.40″

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 160-foot mount on the existing 160-foot monopole tower located at 363 Riversville Road in Greenwich. The tower is owned by Crown Castle and the property is owned by the Greenwich Council Boy Scouts of America. T-Mobile now intends to replace three (3) antennas and ancillary equipment at the 160 foot level. This modification/proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Planned Modifications:
Tower:

Remove and Replace:
(3) AIR21 KRC118023-1_B2A_B4P Antenna **(REMOVE)** - (3) AIR6449 B41 5G Antenna 2500 MHz **(REPLACE)**

Install New:
(1) 6x12 HCS Cable (1-5/8")
(3) Radio 4415 B25
(3) SDX 1926 Q-43 diplexers

Remove:
(4) 1-5/8" coax cables
(1) 1-5/8" hybrid cable

Ground:

Install New:
(1) 6160 equipment cabinet
(1) B160 battery cabinet
(1) BB 6630
(1) BB 6648
(1) PSU 4813 voltage booster
(1) IXRE router

This facility was approved by the Town of Greenwich on July 9th, 1985. There is no copy available of the original approval. Email attached from the Town of Greenwich confirms this.

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 Mr. Fred Camillo, First Selectman for the Town of Greenwich, Ms. Katie DeLuca, Town Planner for the Town of Greenwich, and the property owner.

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

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

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

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

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

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

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

Sincerely,

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

cc:

Mr. Fred Camillo – First Selectman
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

Ms. Katie DeLuca – Town Planner
Town of Greenwich
101 Field Point Road
Greenwich, CT 06830

Greenwich Council Boy Scouts of America
63 Mason Street
Greenwich, CT 06830

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

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

WEBSTER, NY 14580
UNITED STATES US

SHIP DATE: 04JAN21
ACTWGT: 1.00 LB
CAD: 112911364/INET4280

BILL SENDER

TO **KATIE DELUCA - TOWN PLANNER**
TOWN OF GREENWICH
101 FIELD POINT ROAD

GREENWICH CT 06830
(203) 622-7894
INV:
PO:
REF: 799001.7680
DEPT:

J202020071401uv

FedEx Express

56BJ1/1136/B766

TUE - 05 JAN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7725 2368 3680**

XE CTXA

06830
CT-US **SWF**

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Exhibit A

Original Facility Approval

Terry, Dashanna

From: Patrick LaRow <Patrick.LaRow@greenwichct.org>
Sent: Thursday, January 21, 2016 12:08 PM
To: Terry, Dashanna
Cc: Barbadora, Jeff
Subject: Re: Zoning Documents - Tower at 363 Riversville Road

The Planning and Zoning office does not have any documents related to a telecommunications facility at this address.

Patrick LaRow, AICP
Deputy Director / Assistant Town Planner

Town of Greenwich
Planning and Zoning
101 Field Point Road
Greenwich, CT 06830

Phone: (203) 622-7894 Fax: (203) 622-3795
Patrick.LaRow@greenwichct.org

From: "Terry, Dashanna" <Dashanna.Terry@crowncastle.com>
To: "patrick.larow@greenwichct.org" <patrick.larow@greenwichct.org>
Cc: "Barbadora, Jeff" <Jeff.Barbadora@crowncastle.com>
Date: 01/21/2016 10:29 AM
Subject:Zoning Documents - Tower at 363 Riversville Road

Hello Patrick,

Thank you for speaking with me this morning regarding zoning documents for the tower at 363 Riversville Road. Could you please confirm here that you do not have original zoning documents for this tower?

Best,
Dashanna

DASHANNA TERRY
Real Estate Project Coordinator
T: (781) 970-0067| M: (571) 241-0984

cid:image001.png@01CF9124.0525FEA0
12 Gill Street, Suite 5800, Woburn, MA 01801 Crowncastle.com

Exhibit B

Property Card

Headquarters	Greenwich, Connecticut
Country	United States
Founded	1912
Website	reenwichscouting.org

Greenwich Council: Camps

It owns and operates the Ernest Thompson Seton Scout Reservation, a 249-acre (1.01 km) camp located off 363 Riversville Road in Greenwich and named for Ernest Thompson Seton.

Greenwich Council: Order of the Arrow

Achewon Netopalis Lodge No. 427 is the Order of the Arrow lodge for the Greenwich Council. The lodge's name translates to "Spiritual Warrior" in the Algonquian language. The lodge totem is a green witch. Founded in 1949, it is still in existence. In 1977, the lodge received the E. Urner Goodman Award for its effectiveness in promoting and increasing Scout camping in its council.

Greenwich Council: See also

- Scouting in Connecticut

Greenwich Council: References

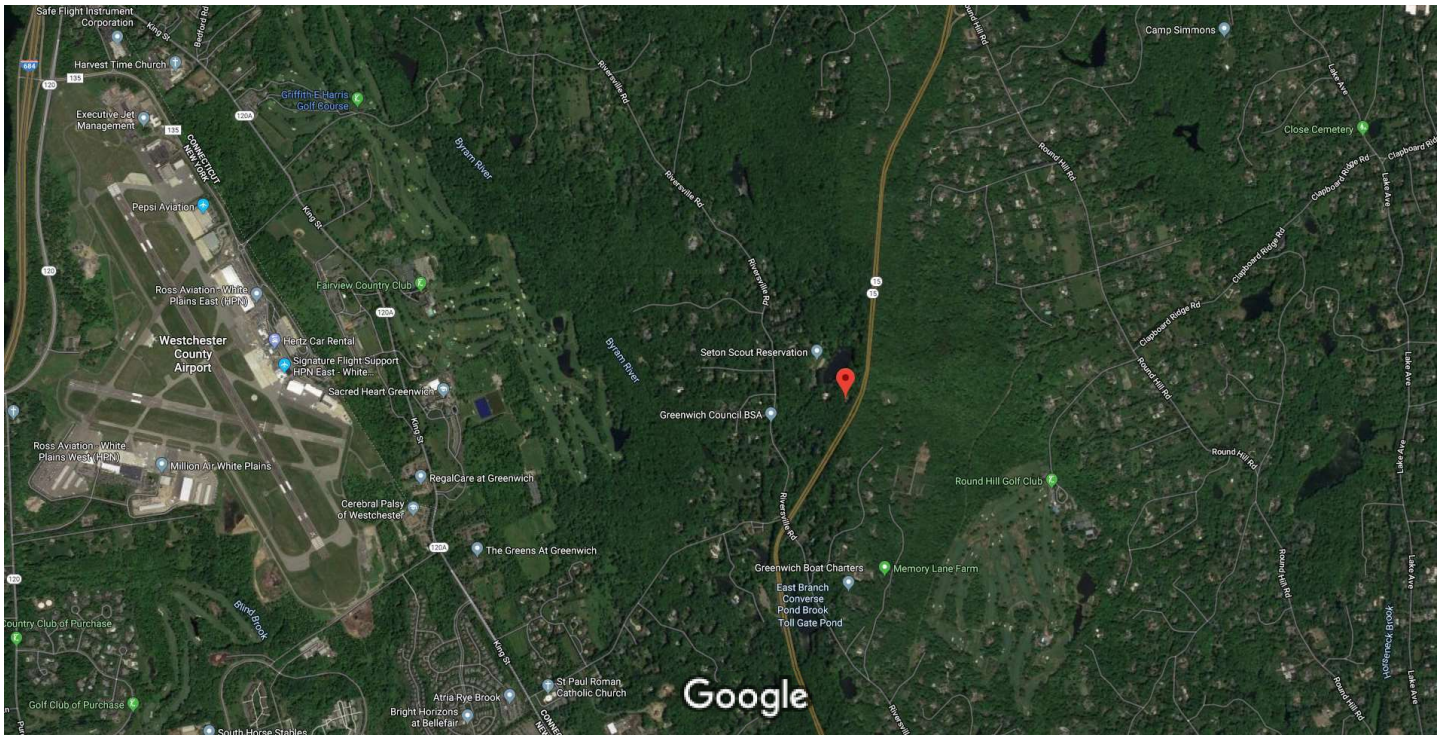
Boy Scouts of America Organization

- Boy Scouts of America
- Cub Scouting
- Boy Scouting
- Varsity Scouting
- Venturing
- Sea Scouting
- Order of the Arrow
- National Eagle Scout Association
- Learning for Life
- Exploring

Google Maps

41°03'58.6"N 73°40'17.4"W

Crown Castle - tower location



Imagery ©2019 Maxar Technologies, New York GIS, USDA Farm Service Agency, Map data ©2019 1000 ft

41°03'58.6"N 73°40'17.4"W

41.066278, -73.671500

Directions | Save | Nearby | Send to your phone | Share

Greenwich, CT 06831

388H+GC Greenwich, Connecticut

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CT11069A
T-MOBILE SITE NAME: GREENWICH/BOY SCOUTS_2
SITE TYPE: MONOPOLE
TOWER HEIGHT: 160'-0"

BUSINESS UNIT #: 841290
SITE ADDRESS: 363 RIVERSVILLE ROAD GREENWICH, CT 06831
COUNTY: FAIRFIELD
JURISDICTION: TOWN OF GREENWICH

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A997DB OUTDOOR

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	GREENWICH NORTH
SITE ADDRESS:	363 RIVERSVILLE ROAD GREENWICH, CT 06831
COUNTY:	FAIRFIELD
MAP/PARCEL #:	445888-506919
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.066278°
LONGITUDE:	-73.671501°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	225'
CURRENT ZONING:	RA
JURISDICTION:	TOWN OF GREENWICH
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	GREENWICH COUNCIL OF BOY SCOUTS INC 63 MASON ST GREENWICH, CT 06830
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	NOT PROVIDED
TELCO PROVIDER:	NOT PROVIDED

PROJECT TEAM

A&E FIRM:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277

DRAWING INDEX

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

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 24X36. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

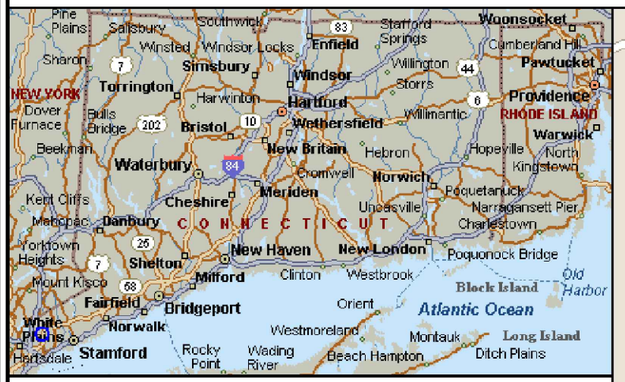
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (4) 1-5/8" COAX CABLES
- REMOVE (1) 1-5/8" HYBRID CABLES
- INSTALL (3) ANTENNAS
- INSTALL (3) RADIOS
- INSTALL (1) 6X12 HCS CABLE
- INSTALL (3) DIPLEXERS

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

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

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2015 IBC/2018 CT STATE BUILDING CODE
MECHANICAL	2015 IMC/2018 CT STATE BUILDING CODE
ELECTRICAL	2017 NEC/2018 CT STATE BUILDING CODE

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE
DATED:	10/09/20
MOUNT ANALYSIS:	INFINIGY
DATED:	10/7/20
RFDS REVISION:	6
DATED:	9/23/20
ORDER ID:	529711
REVISION:	0

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

APPROVALS

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

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

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/9/20	JTS	CONSTRUCTION	MTJ
1	12/11/20	LHT	CONSTRUCTION	GEH

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: 1

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

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

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
#4 BARS AND SMALLER 40 ksi
#5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 BARS AND LARGER 2"
#5 BARS AND SMALLER 1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
SLAB AND WALLS 3/4"
BEAMS AND COLUMNS 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

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

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ABBREVIATIONS:

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

T··Mobile···
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/9/20	JTS	CONSTRUCTION	MTJ
1	12/11/20	LHT	CONSTRUCTION	GEH

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.

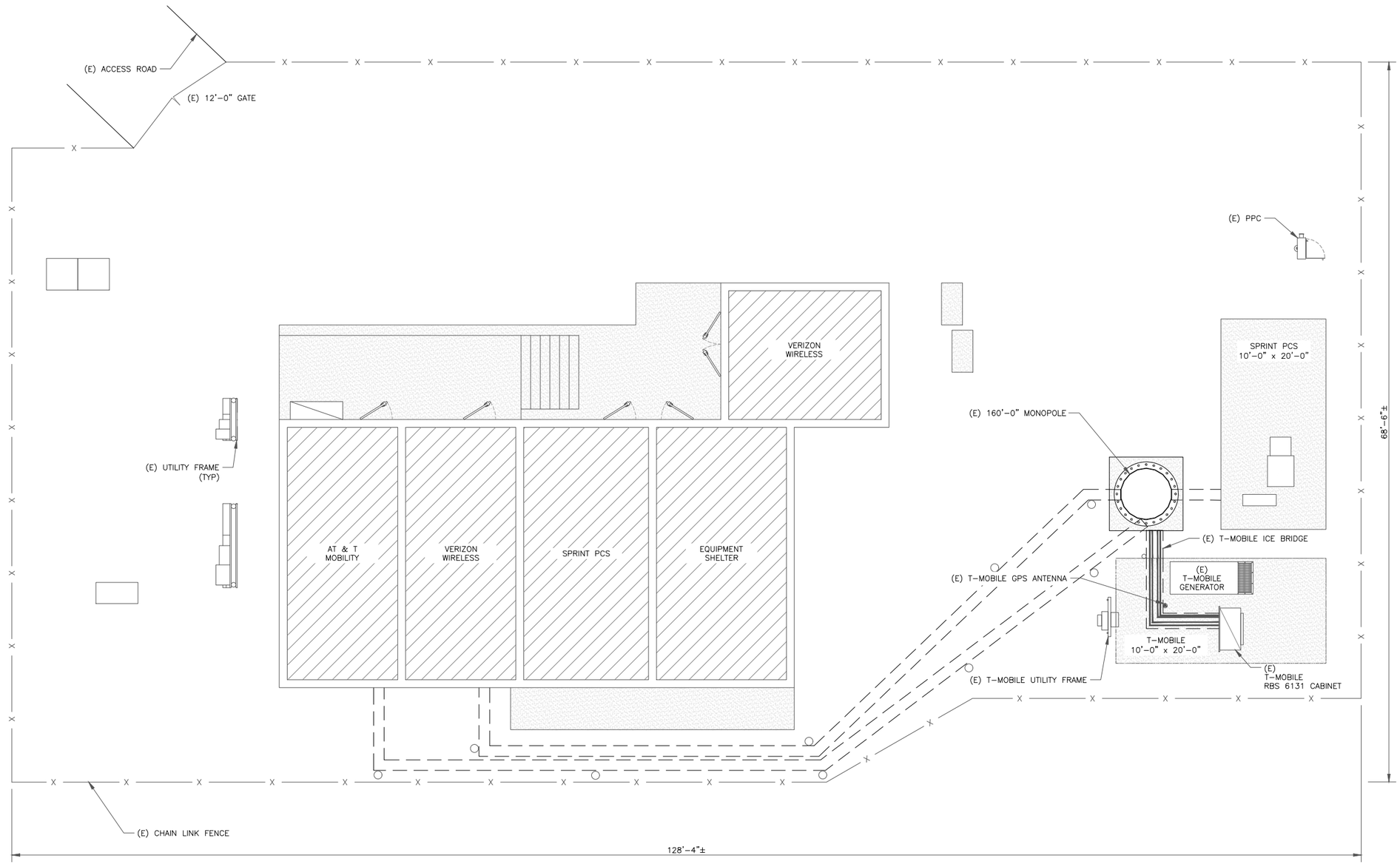
SHEET NUMBER: T-2
REVISION: 1

94951.005.01_GREENWICH NORTH_CC_TMO_NE_CD Upgrades.dwg – Sheet:T-2 – User: ghayes – Dec 11, 2020 – 3:37pm

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

MERRITT PKWY



1 OVERALL SITE PLAN
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

T-MOBILE SITE NUMBER:
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GREENWICH NORTH

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STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
12/11/20

B&T ENGINEERING, INC.
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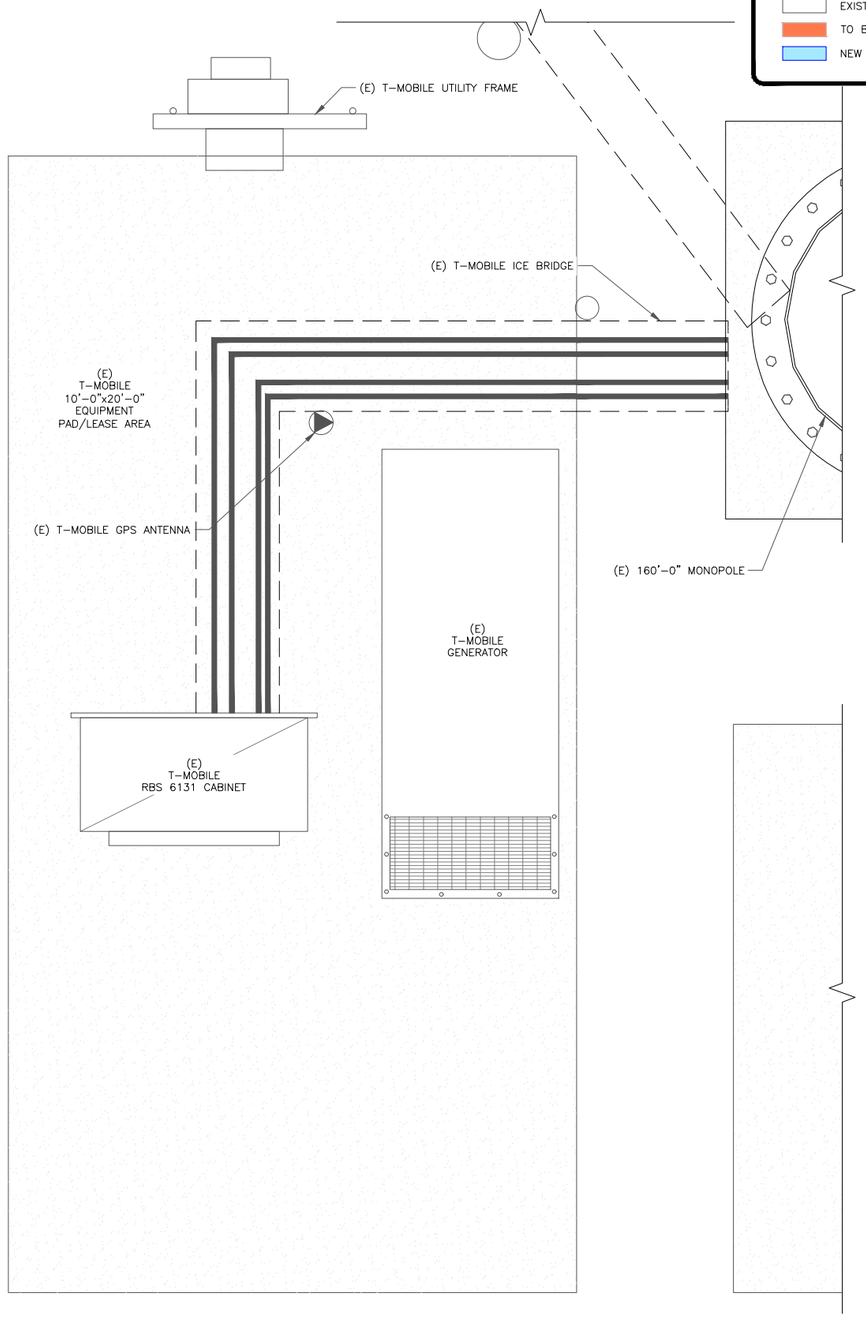
SHEET NUMBER: C-1.1
REVISION: 1

94951.005.01_GREENWICH NORTH_CC_TMO_NE_CD Upgrades.dwg – Sheet:C-1.1 – User: ghoyes – Dec 11, 2020 – 3:37pm

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)

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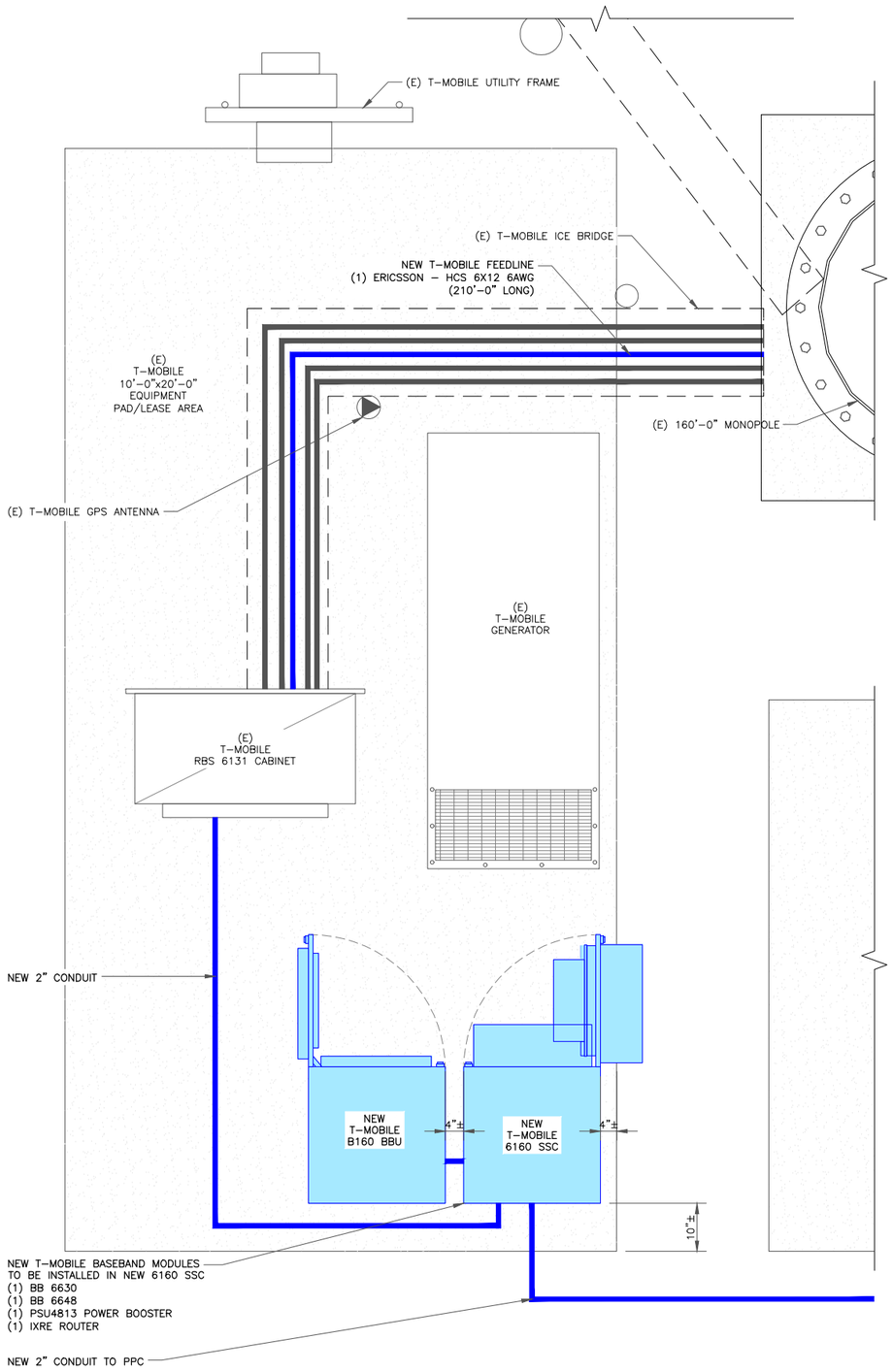

2 FINAL EQUIPMENT PLAN

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

N

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4 SYLVAN WAY
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CROWN CASTLE
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EXISTING
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1	12/11/20	LHT	CONSTRUCTION	GEH

STATE OF CONNECTICUT
GREGORY E. HOPPER
31627
LICENSED PROFESSIONAL ENGINEER
12/11/20

B&T ENGINEERING, INC.
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SHEET NUMBER: C-1.2

REVISION: 1

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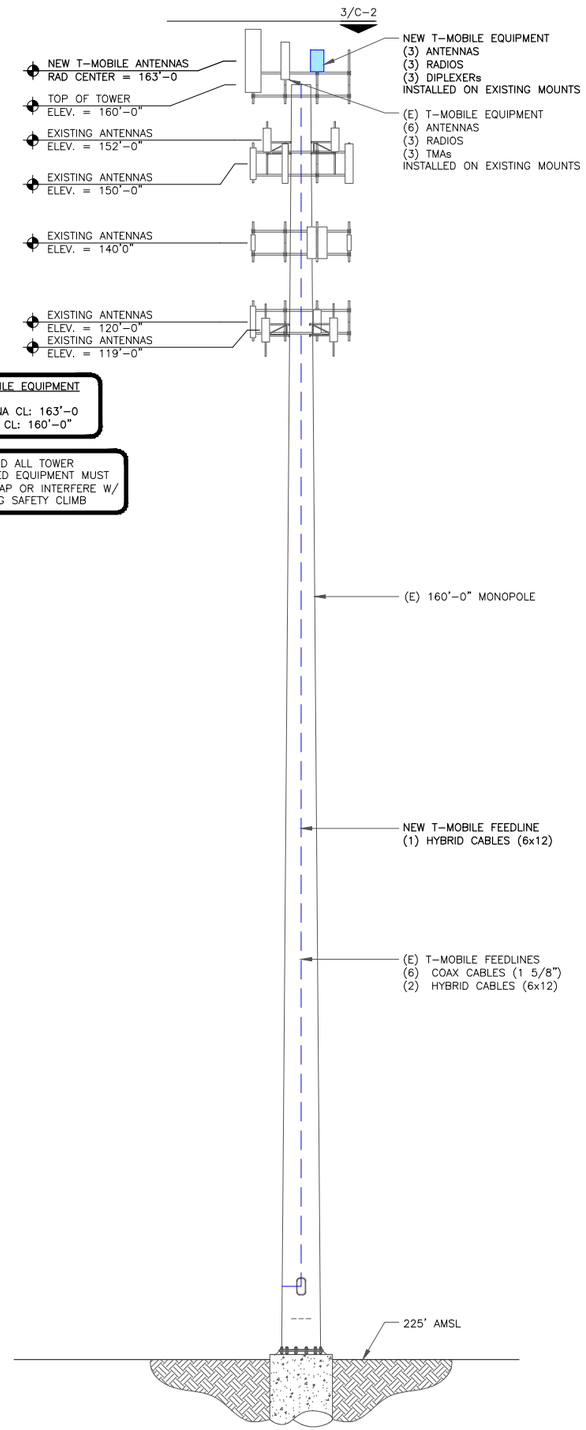
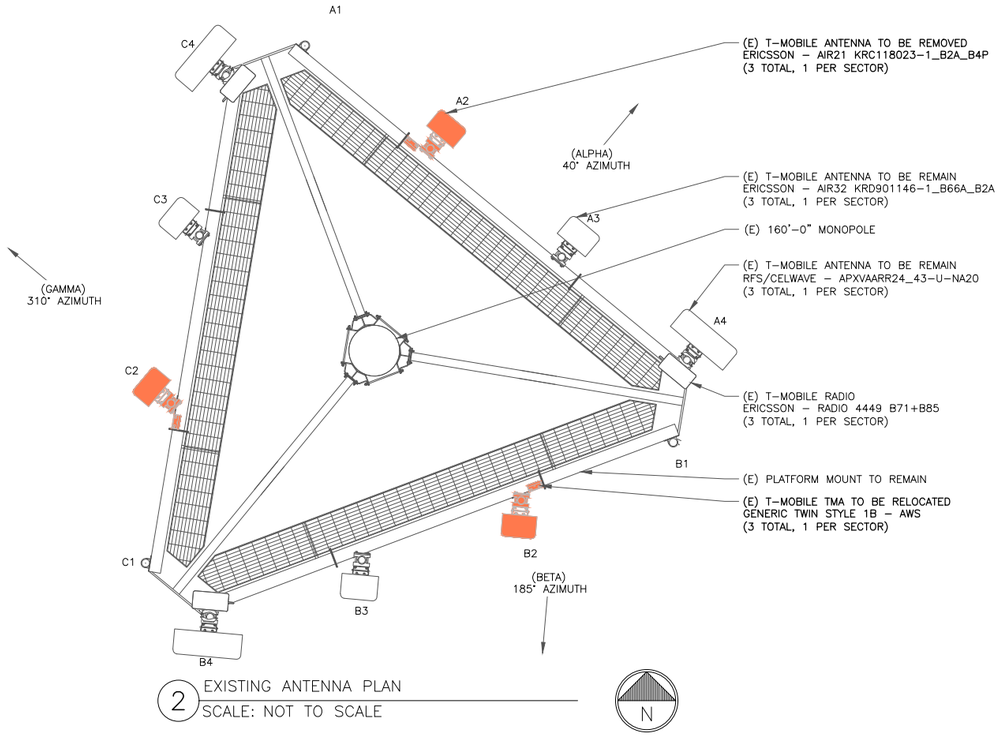
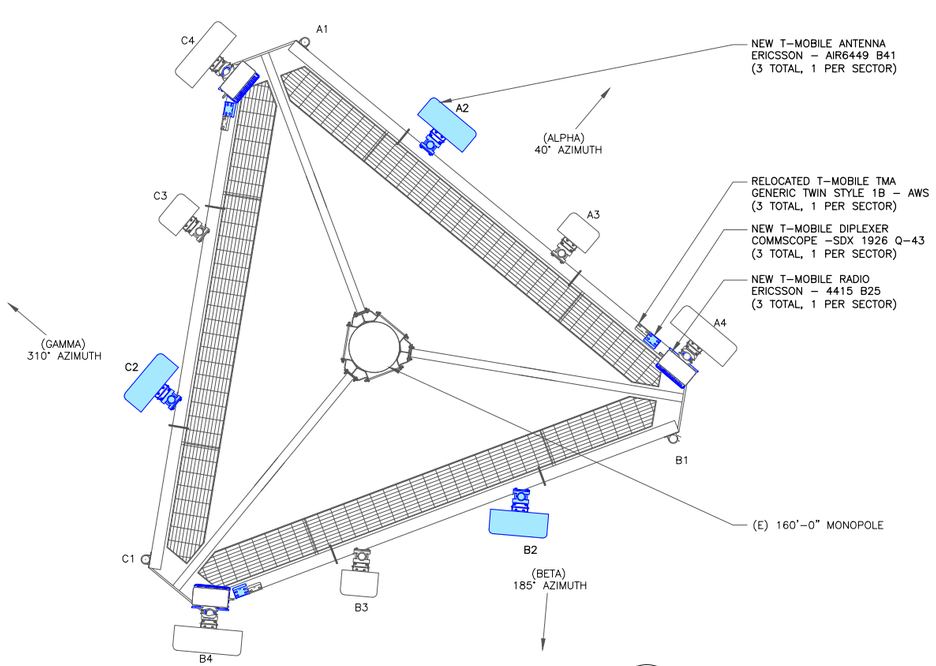


1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE



3 FINAL ANTENNA PLAN
SCALE: NOT TO SCALE

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

T-MOBILE SITE NUMBER:
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B&T ENGINEERING, INC.
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Expires 2/10/21

SHEET NUMBER: C-2

REVISION: 1

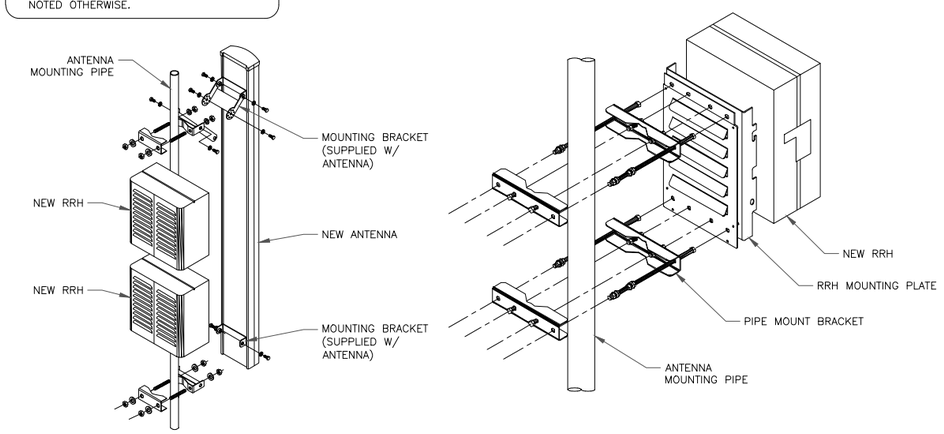
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	CABLE TYPE	CABLE DIAMETER	CABLE LENGTH
ALPHA	A-1	–	–	EMPTY ANTENNA MOUNT	40°	–	–	163'-0	–	–	–	–
	A-2	L2500/N2500	ERICSSON	AIR6449 B41	40°	0°	0°	163'-0	–	–	–	–
	A-3	L2100/G1900/L190 0L700/L600	ERICSSON	AIR32 KRD901146-1_B66A_B2A	40°	0°	0°	163'-0	–	(1) FIBER	6x12 HYBRID	210'
	A-4	L700 / L600 / N600 / L1900 / U2100	RFS	APXVAARR24_43-U-NA20	40°	0°	0°	163'-0	GENERIC TWIN STYLE 1B- AWS RADIO 4449 B71+B85 RADIO 4415 B25	(2) COAX	1 5/8"	210'
BETA	B-1	–	–	EMPTY ANTENNA MOUNT	185°	–	–	163'-0	–	–	–	–
	B-2	L2500/N2500	ERICSSON	AIR6449 B41	185°	0°	0°	163'-0	–	–	–	–
	B-3	L2100/G1900/L190 0L700/L600	ERICSSON	AIR32 KRD901146-1_B66A_B2A	185°	0°	0°	163'-0	–	(1) FIBER	6x12 HYBRID	210'
	B-4	L700 / L600 / N600 / L1900 / U2100	RFS	APXVAARR24_43-U-NA20	185°	0°	0°	163'-0	GENERIC TWIN STYLE 1B- AWS RADIO 4449 B71+B85 RADIO 4415 B25	(2) COAX	1 5/8"	210'
GAMMA	C-1	–	–	EMPTY ANTENNA MOUNT	–	–	–	163'-0	–	–	–	–
	C-2	L2500/N2500	ERICSSON	AIR6449 B41	310°	0°	0°	163'-0	–	–	–	–
	C-3	L2100/G1900/L190 0L700/L600	ERICSSON	AIR32 KRD901146-1_B66A_B2A	310°	0°	0°	163'-0	–	(1) FIBER	6x12 HYBRID	210'
	C-4	L700 / L600 / N600 / L1900 / U2100	RFS	APXVAARR24_43-U-NA20	310°	0°	0°	163'-0	GENERIC TWIN STYLE 1B- AWS RADIO 4449 B71+B85 RADIO 4415 B25	(2) COAX	1 5/8"	210'

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

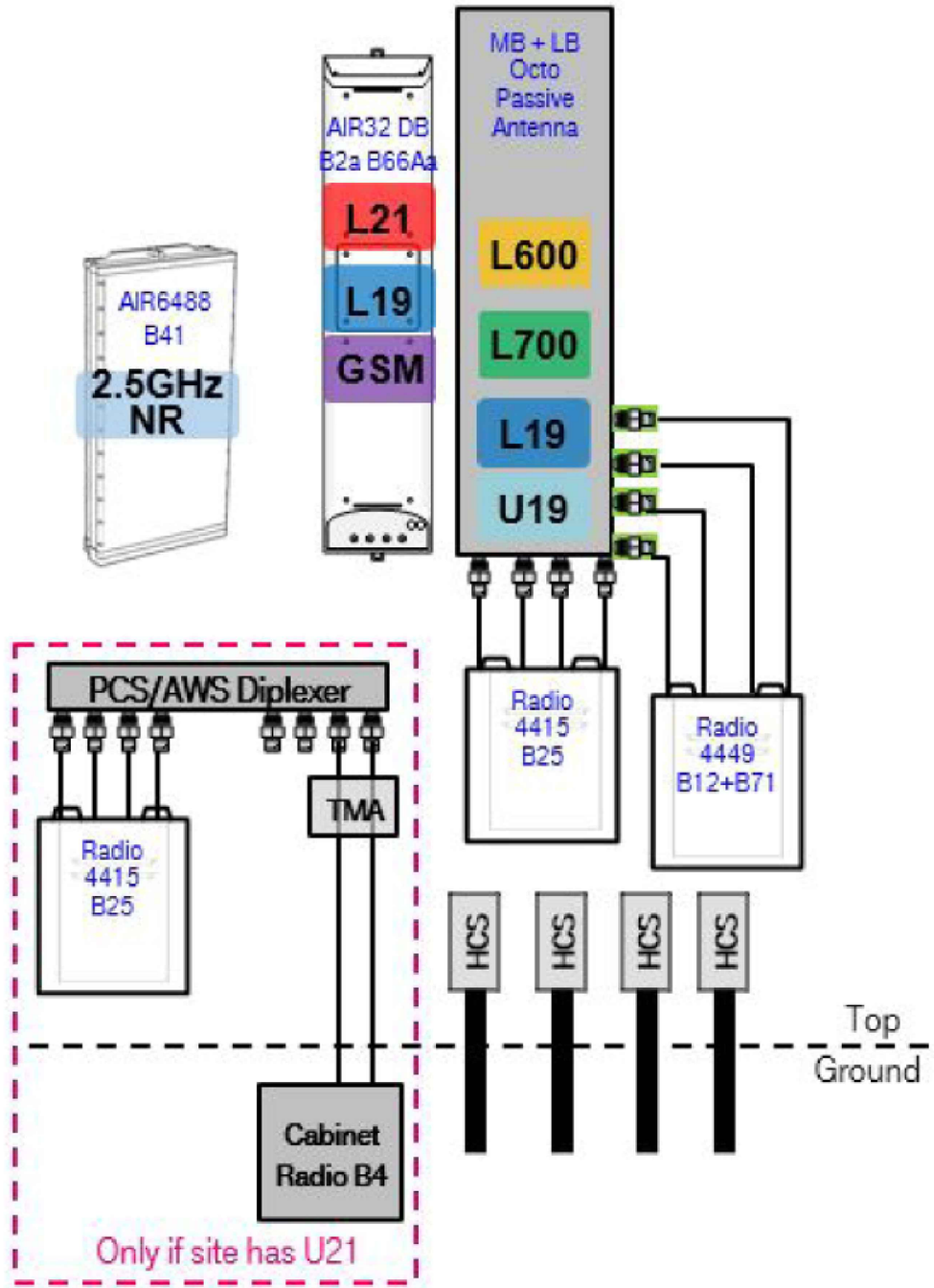
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/9/20	JTS	CONSTRUCTION	MTJ
1	12/11/20	LHT	CONSTRUCTION	GEH

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

SHEET NUMBER: C-3

REVISION: 1



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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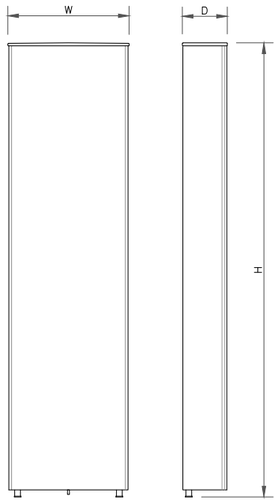
1	12/11/20	LHT	CONSTRUCTION	GEH

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

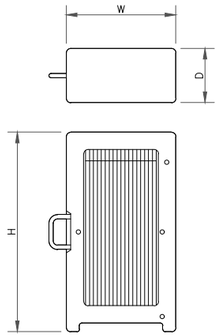
SHEET NUMBER: C-4

REVISION: 1



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



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RRUS 4415 B25
WIDTH	13.19"
DEPTH	5.39"
HEIGHT	14.96"
WEIGHT	44 LBS

2 RRU SPECS
SCALE: NOT TO SCALE

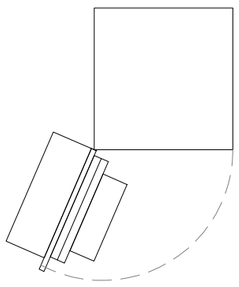
DIPLEXER SPECIFICATIONS	
MANUFACTURER	COMMSCOPE
MODEL #	SDX 1926 Q-43
WIDTH	6.93"
DEPTH	2.91"
HEIGHT	4.17"
WEIGHT	6.17 LBS

3 DIPLEXER SPECS
SCALE: NOT TO SCALE

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

4 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE

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



5 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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B&T ENGINEERING, INC.
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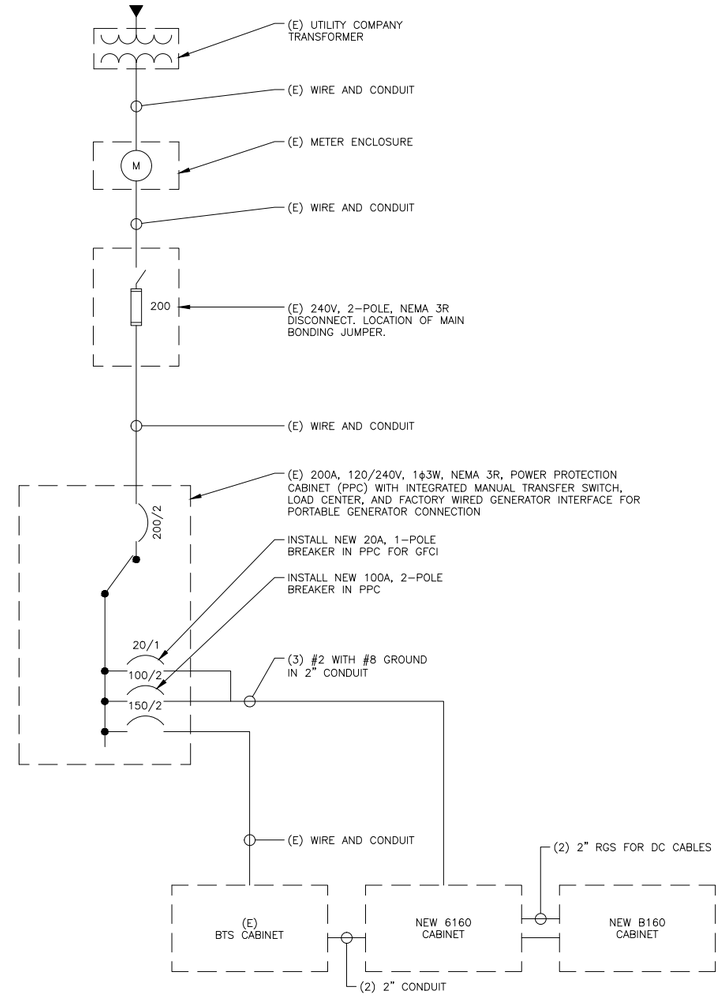
Expires 2/10/21

SHEET NUMBER: C-5
REVISION: 1

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
FIBER	1	20A	1	2	50A	2	EQUIPMENT
6160 CABINET	2	100A	3	4			
			5	6	125A	2	MAIN 6131 UMTS
6160 GFCI	2	20A	7	8			
			9	10	20A	1	LED LIGHT
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 5 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING BREAKER IN POSITION 7 WITH A NEW 2P 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 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
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CHARLOTTE, NC 28277

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

ISSUED FOR:

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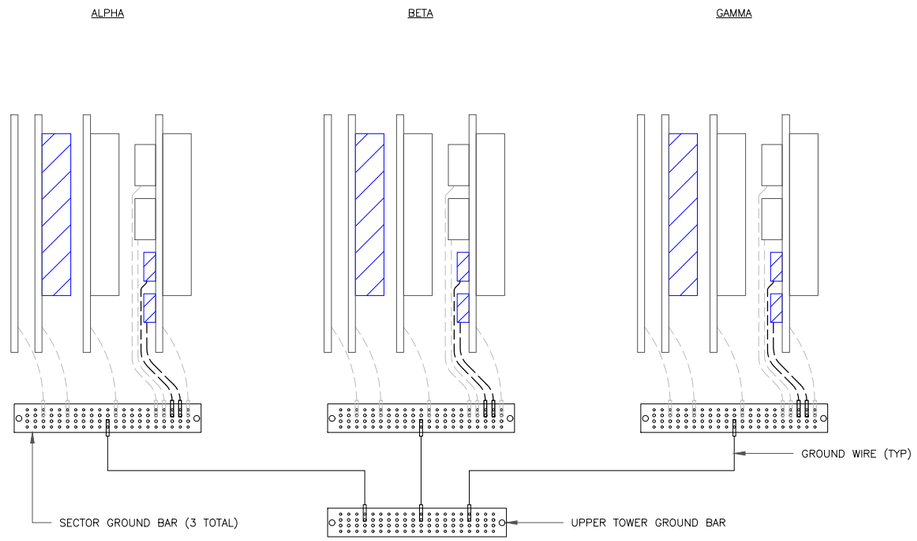
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: E-1
REVISION: 1



NOTE:

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

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile

4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

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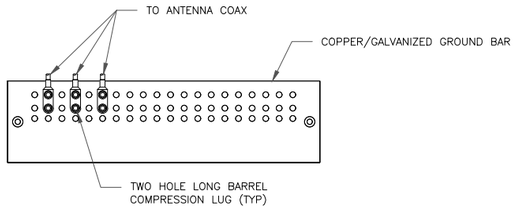
STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
12/11/20

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

SHEET NUMBER: G-1

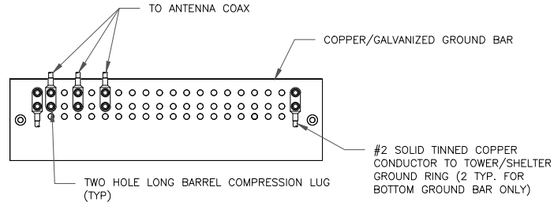
REVISION: 1



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.

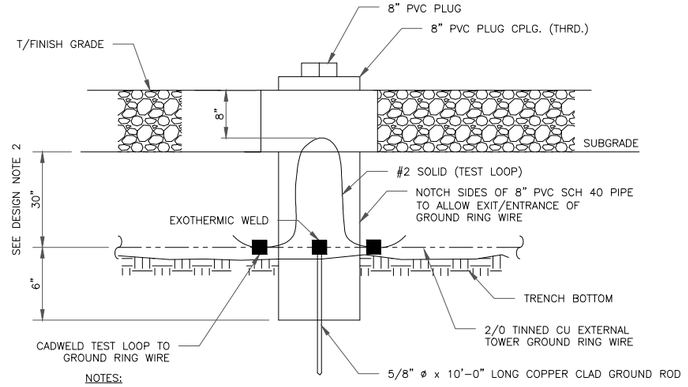
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

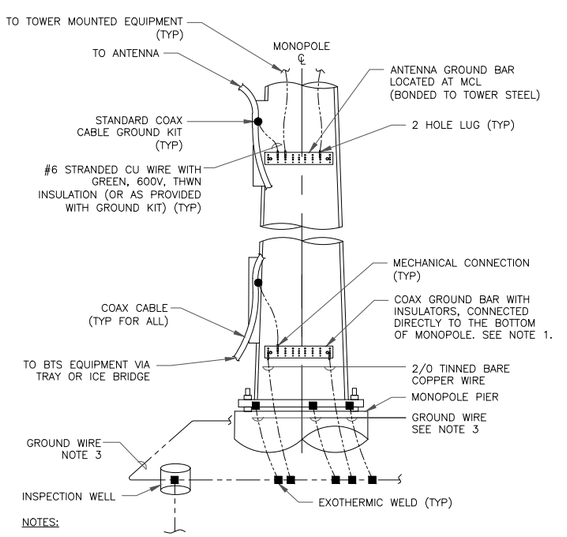
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



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)

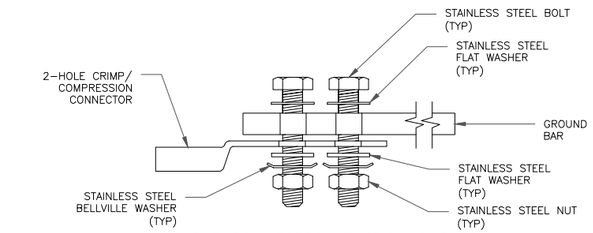
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



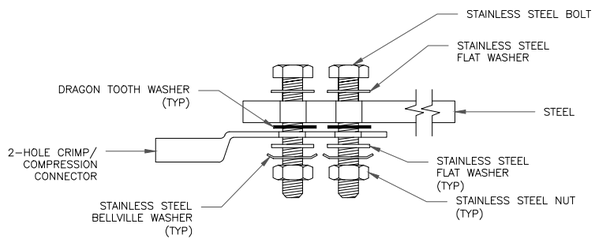
NOTES:

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.

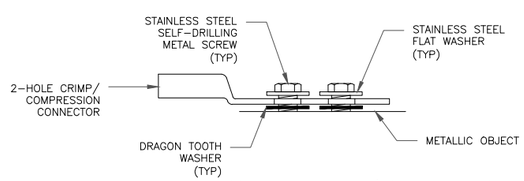
4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

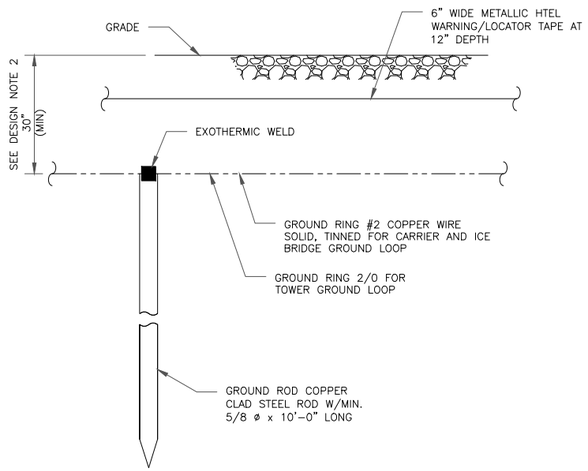


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

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

T-MOBILE SITE NUMBER:
CT11069A

BU #: **841290**
GREENWICH NORTH

363 RIVERSVILLE ROAD
GREENWICH, CT 06831

EXISTING
160'-0" MONOPOLE

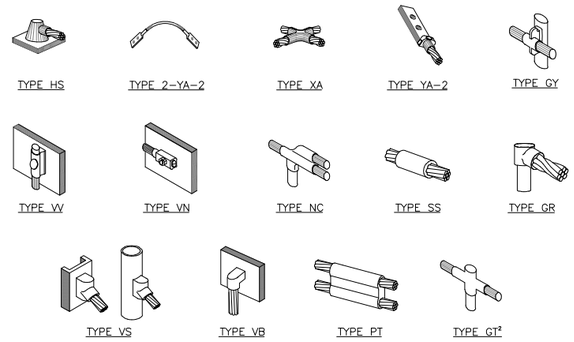
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	11/9/20	JTS	CONSTRUCTION	MTJ
1	12/11/20	LHT	CONSTRUCTION	GEH

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
12/11/20

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

SHEET NUMBER: G-2
REVISION: 1

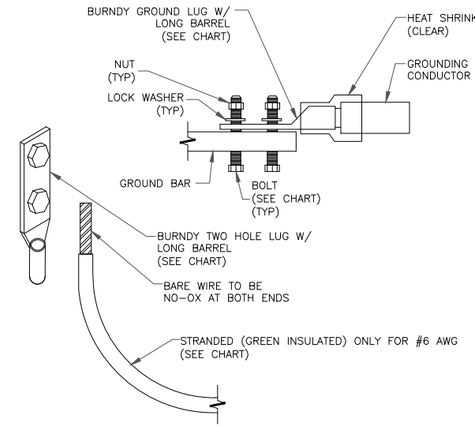


NOTE:

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

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

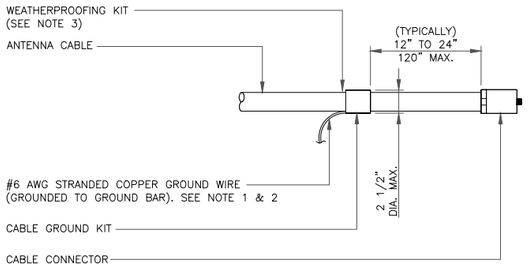
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

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

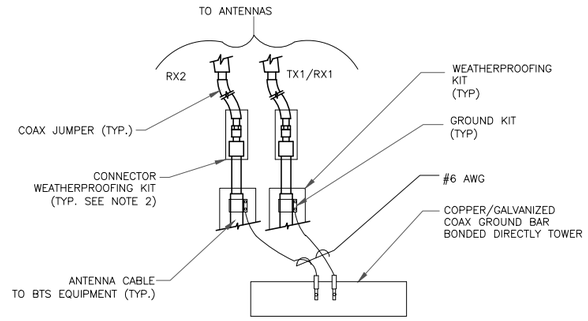
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

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

3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE

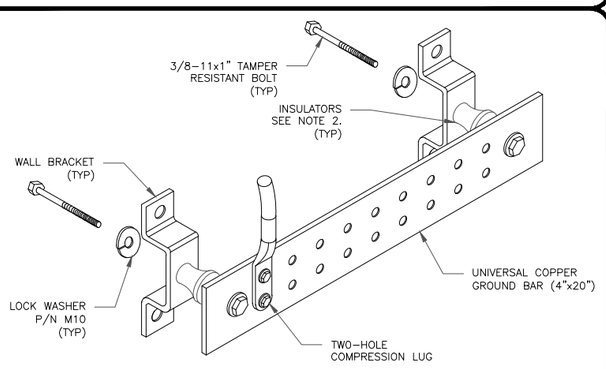


NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE

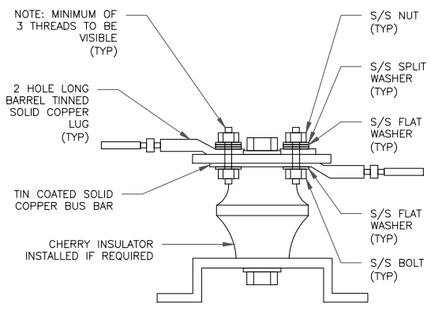
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



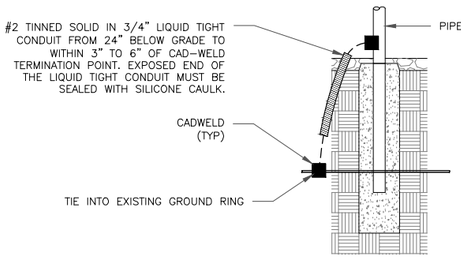
NOTES:

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

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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BU #: **841290**
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-3
REVISION: 1

Exhibit D

Structural Analysis Report

Date: **October 09, 2020**

Stephanie Lipscomb
Crown Castle
370 Mallory Station Rd
Franklin, TN 37067

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11069A
	Carrier Site Name:	Greenwich/Boy Scouts_2
Crown Castle Designation:	**Crown Castle BU Number:**	841290
	Crown Castle Site Name:	GREENWICH NORTH
	Crown Castle JDE Job Number:	620145
	Crown Castle Work Order Number:	1890085
	Crown Castle Order Number:	529711 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1890085
Site Data:	**363 RIVERSVILLE ROAD, GREENWICH, Fairfield County, CT**	
	Latitude *41° 3' 58.6"*, Longitude *-73° 40' 17.4"*	
	160 Foot - Monopole Tower	

Dear Stephanie Lipscomb,

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

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

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Donna Campbell

Respectfully submitted by:

Digitally signed by Maham Barimani
Date: 2020.10.12 11:41:17 -04'00'

STATE OF CONNECTICUT
MAHAM BARIMANI
30501
LICENSED
PROFESSIONAL ENGINEER

Maham Barimani, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC..

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 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)
160.0	163.0	3	commscope	SDX1926Q-43	3 6	1-3/8 1-5/8
		3	ericsson	AIR 32 B2A B66AA w/ Mount Pipe		
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	rfs celwave	ATMAA1412D-1A20		
	160.0	1	tower mounts	Platform Mount [LP 602-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
152.0	152.0	3	ericsson	RRUS 11	-	-
		3	ericsson	RRUS 32 B2		
		1	tower mounts	Side Arm Mount [SO 102-3]		
150.0	152.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	2 12 4	3/8 1-5/8 3/4
		3	ericsson	RADIO 4426		
		3	ericsson	RRUS 32		
		3	kaelus	DBC0061F1V51-2		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		3	quintel technology	QS66512-2 w/ Mount Pipe		
		1	raycap	DC6-48-60-18-8C		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	raycap	DC6-48-60-18-8F		
	150.0	1	tower mounts	Platform Mount [LP 712-1]		
		1	tower mounts	Side Arm Mount [SO 701-3]		
140.0	141.0	3	commscope	CBC78T-DS-43-2X	8	1-5/8
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		2	commscope	RC2DC-3315-PF-48		
		2	decibel	DB844H80E-XY w/ Mount Pipe		
		4	rfs celwave	APL868013-42T0 w/ Mount Pipe		
		3	samsung telecommunications	20W CBRS		
		3	samsung telecommunications	CBRS w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
	140.0	1	tower mounts	Platform Mount [LP 712-1]		
		1	tower mounts	Side Arm Mount [SO 701-3]		
120.0	120.0	3	alcatel lucent	TD-RRH8X20-25	3	1-1/4
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 712-1]		
		1	tower mounts	Side Arm Mount [SO 701-3]		
119.0	119.0	3	alcatel lucent	1900MHZ RRH	-	-
		3	alcatel lucent	800MHZ RRH		
		1	tower mounts	Side Arm Mount [SO 102-3]		
72.0	73.0	2	gps	GPS_A	3	1/2
	72.0	1	tower mounts	Side Arm Mount [SO 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI	5121535	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	WEI	5121536	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	5164738	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has

calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 152	Pole	TP30.62x29x0.188	1	-4.18	1112.47	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-19.81	1828.41	36.8	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.313	3	-27.39	2653.22	47.8	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.236x0.438	4	-41.28	4330.74	42.1	Pass
L5	36.46 - 0	Pole	TP59x50.335x0.5	5	-60.87	5702.67	43.0	Pass
							Summary	
						Pole (L3)	47.8	Pass
						Rating =	47.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	37.4	Pass
1	Base Plate	0	46.5	Pass
1	Base Foundation (Structure)	0	62.0	Pass
1	Base Foundation (Soil Interaction)	0	37.7	Pass
1	Flange Bolts	152	9.7	Pass
1	Flange Plate	152	8.0	Pass

Structure Rating (max from all components) =	62.0%

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

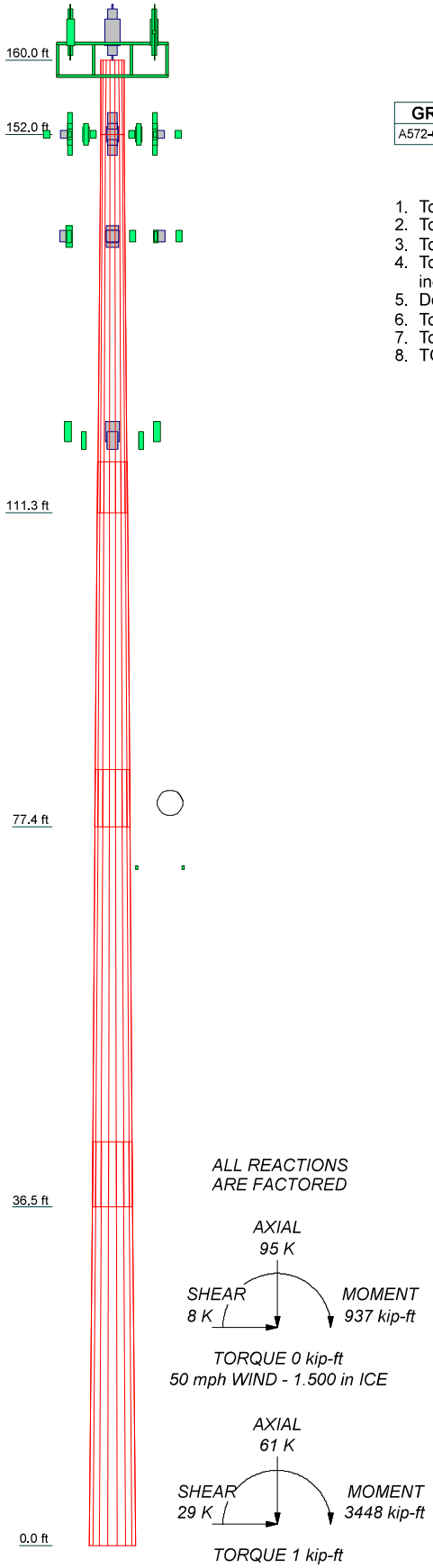
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. 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	8.000	18	0.188		29.000	30.620		0.5
2	40.710	18	0.250	5.420	30.620	38.860		3.8
3	39.290	18	0.313	6.170	37.263	45.090		5.4
4	47.130	18	0.438	7.080	43.236	52.620		10.6
5	43.540	18	0.500		50.335	59.000		12.7
							A572-65	



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 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 0.000 ft
8. TOWER RATING: 47.8%

CROWN CASTLE
The Pathway to Possible.

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

Job: ***BU 841290***			
Project:			
Client: Crown Castle	Drawn by: DCampbell		App'd:
Code: TIA-222-H	Date: 10/09/20		Scale: NTS
Path: C:\Users\dcampbell\Desktop\1 Working From Home\841290\WO 1890085 - SA\Prod\841290_RPA.eri			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:

3) Tower is located in Fairfield County, Connecticut.
4) Tower base elevation above sea level: 223.310 ft.
5) Basic wind speed of 120 mph.
6) Risk Category II.
7) Exposure Category B.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height: 0.000 ft.
11) Nominal ice thickness of 1.500 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56.00 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50.00 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) A non-linear (P-delta) analysis was used.
18) Pressures are calculated at each section.
19) Stress ratio used in pole design is 1.05.
20) Tower analysis based on target reliabilities in accordance with Annex S.
21) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
22) 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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	160.000-152.000	8.000	0.00	18	29.000	30.620	0.188	0.750	A572-65 (65 ksi)

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
L2	152.000-111.290	40.710	5.42	18	30.620	38.860	0.250	1.000	A572-65 (65 ksi)
L3	111.290-77.420	39.290	6.17	18	37.263	45.090	0.313	1.250	A572-65 (65 ksi)
L4	77.420-36.460	47.130	7.08	18	43.236	52.620	0.438	1.750	A572-65 (65 ksi)
L5	36.460-0.000	43.540		18	50.335	59.000	0.500	2.000	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	29.418	17.147	1798.409	10.228	14.732	122.075	3599.184	8.575	4.774	25.461
	31.063	18.111	2119.135	10.804	15.555	136.235	4241.058	9.057	5.059	26.982
L2	31.054	24.099	2808.140	10.781	15.555	180.530	5619.975	12.052	4.949	19.796
	39.421	30.637	5770.106	13.707	19.741	292.292	11547.804	15.321	6.399	25.597
L3	38.886	36.650	6321.988	13.117	18.930	333.974	12652.295	18.329	6.008	19.226
	45.737	44.414	11250.554	15.896	22.906	491.168	22515.912	22.211	7.386	23.635
L4	45.083	59.431	13753.203	15.193	21.964	626.175	27524.502	29.721	6.840	15.633
	53.364	72.462	24928.553	18.525	26.731	932.572	49889.908	36.238	8.491	19.408
L5	52.465	79.089	24815.629	17.692	25.570	970.485	49663.912	39.552	7.979	15.958
	59.833	92.840	40140.426	20.767	29.972	1339.264	80333.669	46.429	9.504	19.008

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 160.000-152.000				1	1	1			
L2 152.000-111.290				1	1	1			
L3 111.290-77.420				1	1	1			
L4 77.420-36.460				1	1	1			
L5 36.460-0.000				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
LDF7-50A(1-5/8)	C	No	No	Inside Pole	160.000 - 0.000	6	No Ice	0.000	0.82
							1/2" Ice	0.000	0.82
							1" Ice	0.000	0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							2" Ice	0.000	0.82
HCS 6X12 6AWG(1-3/8)	C	No	No	Inside Pole	160.000 - 0.000	3	No Ice	0.000	1.70
							1/2" Ice	0.000	1.70
							1" Ice	0.000	1.70
							2" Ice	0.000	1.70
**********									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	150.000 - 0.000	12	No Ice	0.000	0.82
							1/2" Ice	0.000	0.82
							1" Ice	0.000	0.82
							2" Ice	0.000	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	150.000 - 0.000	2	No Ice	0.000	0.06
							1/2" Ice	0.000	0.06
							1" Ice	0.000	0.06
							2" Ice	0.000	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	150.000 - 0.000	4	No Ice	0.000	0.58
							1/2" Ice	0.000	0.58
							1" Ice	0.000	0.58
							2" Ice	0.000	0.58
**********									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	140.000 - 0.000	6	No Ice	0.000	0.82
							1/2" Ice	0.000	0.82
							1" Ice	0.000	0.82
							2" Ice	0.000	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	1.30
							1/2" Ice	0.000	1.30
							1" Ice	0.000	1.30
							2" Ice	0.000	1.30
**********									
HB114-1-05U3-S3J(1-1/4)	C	No	No	Inside Pole	120.000 - 0.000	3	No Ice	0.000	0.90
							1/2" Ice	0.000	0.90
							1" Ice	0.000	0.90
							2" Ice	0.000	0.90
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	120.000 - 0.000	1	No Ice	0.000	1.22
							1/2" Ice	0.000	1.22
							1" Ice	0.000	1.22
							2" Ice	0.000	1.22
*********									
LDF4-50A(1/2)	C	No	No	Inside Pole	72.000 - 0.000	3	No Ice	0.000	0.15
							1/2" Ice	0.000	0.15
							1" Ice	0.000	0.15
							2" Ice	0.000	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	160.000-152.000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.08
L2	152.000-111.290	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.13
L3	111.290-77.420	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.14
L4	77.420-36.460	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.40
L5	36.460-0.000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

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
		C	0.000	0.000	0.000	0.000	1.25

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	160.000-152.000	A	1.489	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.08
L2	152.000-111.290	A	1.464	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.13
L3	111.290-77.420	A	1.416	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.14
L4	77.420-36.460	A	1.346	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.40
L5	36.460-0.000	A	1.199	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.25

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.000-152.000	0.000	0.000	0.000	0.000
L2	152.000-111.290	0.000	0.000	0.000	0.000
L3	111.290-77.420	0.000	0.000	0.000	0.000
L4	77.420-36.460	0.000	0.000	0.000	0.000
L5	36.460-0.000	0.000	0.000	0.000	0.000

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 Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR 32 B2A B66AA w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	7.087 7.561 8.021 8.966	6.374 7.231 7.973 9.507	0.16 0.23 0.30 0.46
AIR 32 B2A B66AA w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	7.087 7.561 8.021 8.966	6.374 7.231 7.973 9.507	0.16 0.23 0.30 0.46
AIR 32 B2A B66AA w/	C	From Leg	4.000	0.00	160.000	No Ice	7.087	6.374	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 3.00			1/2" Ice 1" Ice 2" Ice	7.561 8.021 8.966	7.231 7.973 9.507	0.23 0.30 0.46
ATMAA1412D-1A20	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.407 0.497 0.593 0.815	1.000 1.126 1.259 1.548	0.01 0.02 0.03 0.06
ATMAA1412D-1A20	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.407 0.497 0.593 0.815	1.000 1.126 1.259 1.548	0.01 0.02 0.03 0.06
ATMAA1412D-1A20	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.407 0.497 0.593 0.815	1.000 1.126 1.259 1.548	0.01 0.02 0.03 0.06
SDX1926Q-43	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.01 0.01 0.01 0.02
SDX1926Q-43	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.01 0.01 0.01 0.02
SDX1926Q-43	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.241 0.306 0.379 0.547	0.101 0.144 0.195 0.318	0.01 0.01 0.01 0.02
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.19 0.31 0.46 0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.19 0.31 0.46 0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.19 0.31 0.46 0.79
RADIO 4449 B71 B85A_T-	A	From Leg	4.000	0.00	160.000	No Ice	1.970	1.587	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
MOBILE			0.00 3.00			1/2" Ice 1" Ice 2" Ice	2.147 2.331 2.721	1.749 1.918 2.280	0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.970 2.147 2.331 2.721	1.587 1.749 1.918 2.280	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.970 2.147 2.331 2.721	1.587 1.749 1.918 2.280	0.07 0.09 0.12 0.17
RRUS 4415 B25	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.04 0.06 0.07 0.11
RRUS 4415 B25	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.04 0.06 0.07 0.11
RRUS 4415 B25	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.679 0.791 0.913 1.183	0.04 0.06 0.07 0.11
Platform Mount [LP 602-1]	C	None		0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	31.070 34.820 38.480 45.600	31.070 34.820 38.480 45.600	1.34 1.97 2.67 4.31
6' x 2" Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.02 0.03 0.05 0.09
6' x 2" Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.02 0.03 0.05 0.09
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RRUS 11	A	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.05 0.07 0.09 0.15
RRUS 11	B	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.05 0.07 0.09 0.15
RRUS 11	C	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.784 2.992 3.207 3.658	1.187 1.334 1.490 1.833	0.05 0.07 0.09 0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 32 B2	A	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.05 0.07 0.10 0.16
RRUS 32 B2	C	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.05 0.07 0.10 0.16
Side Arm Mount [SO 102-3]	C	None		0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.07 0.11 0.14 0.20
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	2.000 0.00 0.00	0.00	152.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
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HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.220 9.980 10.760 12.360	6.250 6.960 7.700 9.220	0.07 0.14 0.22 0.42
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.220 9.980 10.760 12.360	6.250 6.960 7.700 9.220	0.07 0.14 0.22 0.42
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.220 9.980 10.760 12.360	6.250 6.960 7.700 9.220	0.07 0.14 0.22 0.42
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.06 0.10 0.16 0.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
QS66512-2 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.040 4.420 4.820 5.630	4.180 4.570 4.970 5.790	0.14 0.21 0.29 0.48
QS66512-2 w/ Mount Pipe	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.040 4.420 4.820 5.630	4.180 4.570 4.970 5.790	0.14 0.21 0.29 0.48
QS66512-2 w/ Mount Pipe	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.040 4.420 4.820 5.630	4.180 4.570 4.970 5.790	0.14 0.21 0.29 0.48
RRUS 32	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RRUS 32	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RRUS 32	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.06 0.08 0.10 0.16
RADIO 4426	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.725 0.842 0.969 1.244	0.05 0.06 0.08 0.12
RADIO 4426	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.725 0.842 0.969 1.244	0.05 0.06 0.08 0.12
RADIO 4426	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	0.725 0.842 0.969 1.244	0.05 0.06 0.08 0.12
DBC0061F1V51-2	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.413 0.496 0.586 0.788	0.433 0.518 0.609 0.815	0.03 0.03 0.04 0.06
DBC0061F1V51-2	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.413 0.496 0.586 0.788	0.433 0.518 0.609 0.815	0.03 0.03 0.04 0.06
DBC0061F1V51-2	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.413 0.496 0.586 0.788	0.433 0.518 0.609 0.815	0.03 0.03 0.04 0.06
(2) LGP21401	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.01 0.02 0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(2) LGP21401	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.01 0.02 0.03 0.05
DC6-48-60-18-8F	A	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.02 0.04 0.07 0.13
DC6-48-60-18-8C	B	From Leg	4.000 0.00 2.00	0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.145 1.792 2.002 2.451	1.145 1.792 2.002 2.451	0.03 0.05 0.07 0.13
Side Arm Mount [SO 701-3]	C	None		0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.830 3.920 5.010 7.190	2.830 3.920 5.010 7.190	0.20 0.24 0.28 0.36
Platform Mount [LP 712-1]	C	None		0.00	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	24.560 27.920 31.270 37.980	24.560 27.920 31.270 37.980	1.34 1.91 2.55 3.97
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(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.630 3.070 3.530 4.490	4.130 4.600 5.090 6.110	0.03 0.06 0.11 0.21
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.630 3.070 3.530 4.490	4.130 4.600 5.090 6.110	0.03 0.06 0.11 0.21
(2) DB844H80E-XY w/ Mount Pipe	C	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.240 2.610 2.990 3.780	3.340 3.730 4.130 4.970	0.04 0.08 0.12 0.23
RC2DC-3315-PF-48	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.792 4.044 4.303 4.844	2.512 2.725 2.945 3.414	0.03 0.06 0.10 0.18
RC2DC-3315-PF-48	C	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.792 4.044 4.303 4.844	2.512 2.725 2.945 3.414	0.03 0.06 0.10 0.18
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.500 5.970 6.450 7.440	4.380 4.840 5.300 6.260	0.10 0.17 0.25 0.46
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice 1/2" Ice	5.500 5.970 6.450	4.380 4.840 5.300	0.10 0.17 0.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	7.440	6.260	0.46
						2" Ice			
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	5.500	4.380	0.10
						1/2" Ice	5.970	4.840	0.17
						1" Ice	6.450	5.300	0.25
						2" Ice	7.440	6.260	0.46
CBRS w/ Mount Pipe	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.714	1.168	0.03
						1/2" Ice	1.934	1.437	0.05
						1" Ice	2.166	1.723	0.07
						2" Ice	2.664	2.351	0.13
CBRS w/ Mount Pipe	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.714	1.168	0.03
						1/2" Ice	1.934	1.437	0.05
						1" Ice	2.166	1.723	0.07
						2" Ice	2.664	2.351	0.13
CBRS w/ Mount Pipe	C	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.714	1.168	0.03
						1/2" Ice	1.934	1.437	0.05
						1" Ice	2.166	1.723	0.07
						2" Ice	2.664	2.351	0.13
(3) RFV01U-D1A	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.875	1.250	0.08
						1/2" Ice	2.045	1.393	0.10
						1" Ice	2.223	1.543	0.12
						2" Ice	2.601	1.865	0.18
RFV01U-D2A	A	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.875	1.013	0.07
						1/2" Ice	2.045	1.145	0.09
						1" Ice	2.223	1.284	0.11
						2" Ice	2.601	1.585	0.15
(3) CBC78T-DS-43-2X	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	0.368	0.512	0.02
						1/2" Ice	0.446	0.605	0.03
						1" Ice	0.531	0.705	0.04
						2" Ice	0.723	0.927	0.06
(3) 20W CBRS	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	0.857	0.420	0.02
						1/2" Ice	0.975	0.510	0.03
						1" Ice	1.101	0.608	0.03
						2" Ice	1.374	0.833	0.06
(2) RFV01U-D2A	B	From Leg	4.000 0.00 1.00	0.00	140.000	No Ice	1.875	1.013	0.07
						1/2" Ice	2.045	1.145	0.09
						1" Ice	2.223	1.284	0.11
						2" Ice	2.601	1.585	0.15
Side Arm Mount [SO 701-3]	C	None		0.00	140.000	No Ice	2.830	2.830	0.20
						1/2" Ice	3.920	3.920	0.24
						1" Ice	5.010	5.010	0.28
						2" Ice	7.190	7.190	0.36
Platform Mount [LP 712-1]	C	None		0.00	140.000	No Ice	24.560	24.560	1.34
						1/2" Ice	27.920	27.920	1.91
						1" Ice	31.270	31.270	2.55
						2" Ice	37.980	37.980	3.97
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APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice	4.090	2.860	0.08
						1/2" Ice	4.480	3.230	0.13
						1" Ice	4.880	3.610	0.19
						2" Ice	5.710	4.400	0.33
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0.00	0.00	120.000	No Ice	4.090	2.860	0.08
						1/2"	4.480	3.230	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	4.880	3.610	0.19
						1" Ice	5.710	4.400	0.33
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.08 0.13 0.19 0.33
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.10 0.16 0.23 0.42
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.10 0.16 0.23 0.42
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.10 0.16 0.23 0.42
TD-RRH8X20-25	A	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.07 0.10 0.13 0.20
TD-RRH8X20-25	B	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.07 0.10 0.13 0.20
TD-RRH8X20-25	C	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.07 0.10 0.13 0.20
Side Arm Mount [SO 701-3]	C	None		0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.830 3.920 5.010 7.190	2.830 3.920 5.010 7.190	0.20 0.24 0.28 0.36
Platform Mount [LP 712-1]	C	None		0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	24.560 27.920 31.270 37.980	24.560 27.920 31.270 37.980	1.34 1.91 2.55 3.97
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.000 0.00 0.00	0.00	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.03 0.04 0.05 0.09
**********									
800MHZ RRH	A	From Leg	2.000	0.00	119.000	No Ice	2.134	1.773	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice	2.320 2.512	1.946 2.127	0.07 0.10
						1" Ice 2" Ice	2.920	2.510	0.16
800MHZ RRH	B	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.134 2.320 2.512 2.920	1.773 1.946 2.127 2.510	0.05 0.07 0.10 0.16
800MHZ RRH	C	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.134 2.320 2.512 2.920	1.773 1.946 2.127 2.510	0.05 0.07 0.10 0.16
1900MHZ RRH	A	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.492 2.695 2.906 3.351	3.258 3.484 3.718 4.206	0.04 0.08 0.11 0.19
1900MHZ RRH	B	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.492 2.695 2.906 3.351	3.258 3.484 3.718 4.206	0.04 0.08 0.11 0.19
1900MHZ RRH	C	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.492 2.695 2.906 3.351	3.258 3.484 3.718 4.206	0.04 0.08 0.11 0.19
Side Arm Mount [SO 102-3]	C	None		0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.07 0.11 0.14 0.20
(2) 2.375" OD x 4' Mount Pipe	A	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.02 0.03 0.04 0.06
(2) 2.375" OD x 4' Mount Pipe	B	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.02 0.03 0.04 0.06
(2) 2.375" OD x 4' Mount Pipe	C	From Leg	2.000 0.00 0.00	0.00	119.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.02 0.03 0.04 0.06
**********									
(2) GPS_A	B	From Leg	4.000 0.00 1.00	0.00	72.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.255 0.320 0.393 0.561	0.255 0.320 0.393 0.561	0.00 0.00 0.01 0.02
Side Arm Mount [SO 601-1]	B	None		0.00	72.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.220 1.850 2.480 3.740	6.300 8.610 10.920 15.540	0.16 0.20 0.23 0.31

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
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	160 - 152	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-10.23	-0.01	0.01
			Max. Mx	8	-4.18	-51.80	0.01
			Max. My	2	-4.18	-0.01	51.81
			Max. Vy	8	5.53	-51.80	0.01
			Max. Vx	2	-5.53	-0.01	51.81
			Max. Torque	22			0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.06	-2.47	2.54
			Max. Mx	8	-19.82	-548.28	1.03
			Max. My	2	-19.81	-1.13	549.54
			Max. Vy	8	19.67	-548.28	1.03
			Max. Vx	2	-19.72	-1.13	549.54
			Max. Torque	11			1.08
L3	111.29 - 77.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.29	-2.52	2.59
			Max. Mx	8	-27.40	-1248.62	0.81
			Max. My	2	-27.39	-0.92	1251.71
			Max. Vy	8	22.57	-1248.62	0.81
			Max. Vx	2	-22.63	-0.92	1251.71
			Max. Torque	11			1.08
L4	77.42 - 36.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.76	-2.68	2.49
			Max. Mx	8	-41.28	-2229.72	0.54
			Max. My	2	-41.28	-0.66	2235.01
			Max. Vy	8	26.20	-2229.72	0.54
			Max. Vx	2	-26.26	-0.66	2235.01
			Max. Torque	13			1.09
L5	36.46 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.13	-2.68	2.49
			Max. Mx	8	-60.87	-3440.27	0.23
			Max. My	2	-60.87	-0.35	3447.92
			Max. Vy	8	29.29	-3440.27	0.23
			Max. Vx	2	-29.35	-0.35	3447.92
			Max. Torque	13			1.09

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	28	95.13	-3.96	6.88
	Max. H_x	20	60.88	29.27	0.01
	Max. H_z	2	60.88	0.01	29.32
	Max. M_x	2	3447.92	0.01	29.32
	Max. M_z	8	3440.27	-29.27	-0.01
	Max. Torsion	13	1.09	-14.64	-25.40
	Min. Vert	19	45.66	25.34	-14.65
	Min. H_x	8	60.88	-29.27	-0.01
	Min. H_z	14	60.88	-0.01	-29.32
	Min. M_x	14	-3445.36	-0.01	-29.32
	Min. M_z	20	-3437.48	29.27	0.01
	Min. Torsion	25	-1.08	14.64	25.40

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	50.74	0.00	0.00	-1.00	-1.09	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	60.88	-0.01	-29.32	-3447.92	-0.35	0.80
0.9 Dead+1.0 Wind 0 deg - No Ice	45.66	-0.01	-29.32	-3415.69	0.01	0.80
1.2 Dead+1.0 Wind 30 deg - No Ice	60.88	14.63	-25.39	-2985.64	-1719.93	0.31

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 30 deg - No Ice	45.66	14.63	-25.39	-2957.69	-1703.66	0.31
1.2 Dead+1.0 Wind 60 deg - No Ice	60.88	25.34	-14.65	-1723.70	-2979.03	-0.27
0.9 Dead+1.0 Wind 60 deg - No Ice	45.66	25.34	-14.65	-1707.42	-2951.12	-0.27
1.2 Dead+1.0 Wind 90 deg - No Ice	60.88	29.27	0.01	-0.23	-3440.27	-0.77
0.9 Dead+1.0 Wind 90 deg - No Ice	45.66	29.27	0.01	0.10	-3408.09	-0.78
1.2 Dead+1.0 Wind 120 deg - No Ice	60.88	25.35	14.67	1722.96	-2980.08	-1.07
0.9 Dead+1.0 Wind 120 deg - No Ice	45.66	25.35	14.67	1707.34	-2952.15	-1.08
1.2 Dead+1.0 Wind 150 deg - No Ice	60.88	14.64	25.40	2984.13	-1721.74	-1.08
0.9 Dead+1.0 Wind 150 deg - No Ice	45.66	14.64	25.40	2956.84	-1705.46	-1.09
1.2 Dead+1.0 Wind 180 deg - No Ice	60.88	0.01	29.32	3445.36	-2.45	-0.80
0.9 Dead+1.0 Wind 180 deg - No Ice	45.66	0.01	29.32	3413.81	-2.07	-0.80
1.2 Dead+1.0 Wind 210 deg - No Ice	60.88	-14.63	25.39	2983.09	1717.13	-0.30
0.9 Dead+1.0 Wind 210 deg - No Ice	45.66	-14.63	25.39	2955.81	1701.60	-0.30
1.2 Dead+1.0 Wind 240 deg - No Ice	60.88	-25.34	14.65	1721.14	2976.24	0.27
0.9 Dead+1.0 Wind 240 deg - No Ice	45.66	-25.34	14.65	1705.54	2949.06	0.27
1.2 Dead+1.0 Wind 270 deg - No Ice	60.88	-29.27	-0.01	-2.33	3437.48	0.77
0.9 Dead+1.0 Wind 270 deg - No Ice	45.66	-29.27	-0.01	-1.98	3406.03	0.78
1.2 Dead+1.0 Wind 300 deg - No Ice	60.88	-25.35	-14.67	-1725.51	2977.29	1.06
0.9 Dead+1.0 Wind 300 deg - No Ice	45.66	-25.35	-14.67	-1709.22	2950.09	1.08
1.2 Dead+1.0 Wind 330 deg - No Ice	60.88	-14.64	-25.40	-2986.69	1718.95	1.07
0.9 Dead+1.0 Wind 330 deg - No Ice	45.66	-14.64	-25.40	-2958.72	1703.40	1.08
1.2 Dead+1.0 Ice+1.0 Temp	95.13	0.00	-0.00	-2.49	-2.68	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	95.13	-0.00	-7.94	-936.84	-2.61	0.24
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	95.13	3.96	-6.88	-811.56	-468.94	0.12
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	95.13	6.87	-3.97	-469.53	-810.38	-0.03
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	95.13	7.93	0.00	-2.41	-935.45	-0.17
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	95.13	6.87	3.97	464.65	-810.63	-0.26
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	95.13	3.97	6.88	806.49	-469.37	-0.29
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	95.13	0.00	7.94	931.52	-3.11	-0.24
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	95.13	-3.96	6.88	806.24	463.22	-0.12
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	95.13	-6.87	3.97	464.21	804.66	0.03
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	95.13	-7.93	-0.00	-2.91	929.73	0.17
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	95.13	-6.87	-3.97	-469.97	804.91	0.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	95.13	-3.97	-6.88	-811.81	463.65	0.29
Dead+Wind 0 deg - Service	50.74	-0.00	-6.90	-808.01	-0.91	0.19
Dead+Wind 30 deg - Service	50.74	3.44	-5.98	-699.78	-403.51	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
Dead+Wind 60 deg - Service	50.74	5.97	-3.45	-404.32	-698.30	-0.06
Dead+Wind 90 deg - Service	50.74	6.89	0.00	-0.81	-806.29	-0.18
Dead+Wind 120 deg - Service	50.74	5.97	3.45	402.63	-698.55	-0.25
Dead+Wind 150 deg - Service	50.74	3.45	5.98	697.91	-403.94	-0.26
Dead+Wind 180 deg - Service	50.74	0.00	6.90	805.90	-1.40	-0.19
Dead+Wind 210 deg - Service	50.74	-3.44	5.98	697.66	401.20	-0.07
Dead+Wind 240 deg - Service	50.74	-5.97	3.45	402.21	695.99	0.06
Dead+Wind 270 deg - Service	50.74	-6.89	-0.00	-1.30	803.98	0.18
Dead+Wind 300 deg - Service	50.74	-5.97	-3.45	-404.75	696.23	0.25
Dead+Wind 330 deg - Service	50.74	-3.45	-5.98	-700.02	401.62	0.26

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	-50.74	0.00	0.00	50.74	0.00	0.000%
2	-0.01	-60.88	-29.32	0.01	60.88	29.32	0.000%
3	-0.01	-45.66	-29.32	0.01	45.66	29.32	0.000%
4	14.63	-60.88	-25.39	-14.63	60.88	25.39	0.000%
5	14.63	-45.66	-25.39	-14.63	45.66	25.39	0.000%
6	25.34	-60.88	-14.65	-25.34	60.88	14.65	0.000%
7	25.34	-45.66	-14.65	-25.34	45.66	14.65	0.000%
8	29.27	-60.88	0.01	-29.27	60.88	-0.01	0.000%
9	29.27	-45.66	0.01	-29.27	45.66	-0.01	0.000%
10	25.35	-60.88	14.67	-25.35	60.88	-14.67	0.000%
11	25.35	-45.66	14.67	-25.35	45.66	-14.67	0.000%
12	14.64	-60.88	25.40	-14.64	60.88	-25.40	0.000%
13	14.64	-45.66	25.40	-14.64	45.66	-25.40	0.000%
14	0.01	-60.88	29.32	-0.01	60.88	-29.32	0.000%
15	0.01	-45.66	29.32	-0.01	45.66	-29.32	0.000%
16	-14.63	-60.88	25.39	14.63	60.88	-25.39	0.000%
17	-14.63	-45.66	25.39	14.63	45.66	-25.39	0.000%
18	-25.34	-60.88	14.65	25.34	60.88	-14.65	0.000%
19	-25.34	-45.66	14.65	25.34	45.66	-14.65	0.000%
20	-29.27	-60.88	-0.01	29.27	60.88	0.01	0.000%
21	-29.27	-45.66	-0.01	29.27	45.66	0.01	0.000%
22	-25.35	-60.88	-14.67	25.35	60.88	14.67	0.000%
23	-25.35	-45.66	-14.67	25.35	45.66	14.67	0.000%
24	-14.64	-60.88	-25.40	14.64	60.88	25.40	0.000%
25	-14.64	-45.66	-25.40	14.64	45.66	25.40	0.000%
26	0.00	-95.13	0.00	-0.00	95.13	0.00	0.000%
27	-0.00	-95.13	-7.94	0.00	95.13	7.94	0.000%
28	3.96	-95.13	-6.88	-3.96	95.13	6.88	0.000%
29	6.87	-95.13	-3.97	-6.87	95.13	3.97	0.000%
30	7.93	-95.13	0.00	-7.93	95.13	-0.00	0.000%
31	6.87	-95.13	3.97	-6.87	95.13	-3.97	0.000%
32	3.97	-95.13	6.88	-3.97	95.13	-6.88	0.000%
33	0.00	-95.13	7.94	-0.00	95.13	-7.94	0.000%
34	-3.96	-95.13	6.88	3.96	95.13	-6.88	0.000%
35	-6.87	-95.13	3.97	6.87	95.13	-3.97	0.000%
36	-7.93	-95.13	-0.00	7.93	95.13	0.00	0.000%
37	-6.87	-95.13	-3.97	6.87	95.13	3.97	0.000%
38	-3.97	-95.13	-6.88	3.97	95.13	6.88	0.000%
39	-0.00	-50.74	-6.90	0.00	50.74	6.90	0.000%
40	3.44	-50.74	-5.98	-3.44	50.74	5.98	0.000%
41	5.97	-50.74	-3.45	-5.97	50.74	3.45	0.000%
42	6.89	-50.74	0.00	-6.89	50.74	-0.00	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
43	5.97	-50.74	3.45	-5.97	50.74	-3.45	0.000%
44	3.45	-50.74	5.98	-3.45	50.74	-5.98	0.000%
45	0.00	-50.74	6.90	-0.00	50.74	-6.90	0.000%
46	-3.44	-50.74	5.98	3.44	50.74	-5.98	0.000%
47	-5.97	-50.74	3.45	5.97	50.74	-3.45	0.000%
48	-6.89	-50.74	-0.00	6.89	50.74	0.00	0.000%
49	-5.97	-50.74	-3.45	5.97	50.74	3.45	0.000%
50	-3.45	-50.74	-5.98	3.45	50.74	5.98	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	0.00046928
3	Yes	4	0.00000001	0.00030079
4	Yes	5	0.00000001	0.00053300
5	Yes	5	0.00000001	0.00025539
6	Yes	5	0.00000001	0.00053350
7	Yes	5	0.00000001	0.00025572
8	Yes	4	0.00000001	0.00049351
9	Yes	4	0.00000001	0.00031904
10	Yes	5	0.00000001	0.00051553
11	Yes	5	0.00000001	0.00024673
12	Yes	5	0.00000001	0.00054260
13	Yes	5	0.00000001	0.00026064
14	Yes	4	0.00000001	0.00048452
15	Yes	4	0.00000001	0.00031154
16	Yes	5	0.00000001	0.00052286
17	Yes	5	0.00000001	0.00025086
18	Yes	5	0.00000001	0.00052156
19	Yes	5	0.00000001	0.00025024
20	Yes	4	0.00000001	0.00050877
21	Yes	4	0.00000001	0.00032978
22	Yes	5	0.00000001	0.00054214
23	Yes	5	0.00000001	0.00026050
24	Yes	5	0.00000001	0.00051587
25	Yes	5	0.00000001	0.00024688
26	Yes	4	0.00000001	0.00002463
27	Yes	5	0.00000001	0.00030087
28	Yes	5	0.00000001	0.00034956
29	Yes	5	0.00000001	0.00034910
30	Yes	5	0.00000001	0.00030032
31	Yes	5	0.00000001	0.00034435
32	Yes	5	0.00000001	0.00034602
33	Yes	5	0.00000001	0.00029700
34	Yes	5	0.00000001	0.00034027
35	Yes	5	0.00000001	0.00034020
36	Yes	5	0.00000001	0.00029636
37	Yes	5	0.00000001	0.00034560
38	Yes	5	0.00000001	0.00034446
39	Yes	4	0.00000001	0.00004743
40	Yes	4	0.00000001	0.00019352
41	Yes	4	0.00000001	0.00019437
42	Yes	4	0.00000001	0.00004818
43	Yes	4	0.00000001	0.00017600
44	Yes	4	0.00000001	0.00020384
45	Yes	4	0.00000001	0.00004727
46	Yes	4	0.00000001	0.00018185
47	Yes	4	0.00000001	0.00018085
48	Yes	4	0.00000001	0.00004799
49	Yes	4	0.00000001	0.00020365
50	Yes	4	0.00000001	0.00017597

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	15.61	40	0.86	0.00
L2	152 - 111.29	14.18	40	0.85	0.00
L3	116.71 - 77.42	8.34	40	0.70	0.00
L4	83.59 - 36.46	4.20	39	0.47	0.00
L5	43.54 - 0	1.15	39	0.24	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	AIR 32 B2A B66AA w/ Mount Pipe	40	15.61	0.86	0.00	51165
152.000	RRUS 11	40	14.18	0.85	0.00	33275
150.000	HPA-65R-BUU-H6 w/ Mount Pipe	40	13.82	0.85	0.00	28003
140.000	(2) APL868013-42T0 w/ Mount Pipe	40	12.08	0.82	0.00	16958
120.000	APXVTM14-ALU-I20 w/ Mount Pipe	40	8.83	0.72	0.00	9531
119.000	800MHZ RRH	40	8.68	0.71	0.00	9348
72.000	(2) GPS_A	39	3.09	0.40	0.00	8876

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	66.57	2	3.65	0.01
L2	152 - 111.29	60.48	2	3.62	0.01
L3	116.71 - 77.42	35.61	2	2.97	0.00
L4	83.59 - 36.46	17.91	2	2.03	0.00
L5	43.54 - 0	4.89	2	1.01	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	AIR 32 B2A B66AA w/ Mount Pipe	2	66.57	3.65	0.01	12210
152.000	RRUS 11	2	60.48	3.62	0.01	7938
150.000	HPA-65R-BUU-H6 w/ Mount Pipe	2	58.97	3.60	0.01	6678
140.000	(2) APL868013-42T0 w/ Mount Pipe	2	51.54	3.48	0.00	4033
120.000	APXVTM14-ALU-I20 w/ Mount Pipe	2	37.71	3.06	0.00	2260
119.000	800MHZ RRH	2	37.06	3.03	0.00	2217
72.000	(2) GPS_A	2	13.17	1.71	0.00	2082

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	160 - 152 (1)	TP30.62x29x0.188	8.000	0.000	0.0	18.111	-4.18	1059.50	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.710	0.000	0.0	29.767	-19.81	1741.34	0.011
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	39.290	0.000	0.0	43.194	-27.39	2526.88	0.011
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	47.130	0.000	0.0	70.504	-41.28	4124.51	0.010
L5	36.46 - 0 (5)	TP59x50.335x0.5	43.540	0.000	0.0	92.840	-60.87	5431.11	0.011

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	160 - 152 (1)	TP30.62x29x0.188	51.81	701.24	0.074	0.00	701.24	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	549.54	1472.44	0.373	0.00	1472.44	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	1251.71	2556.32	0.490	0.00	2556.32	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	2235.01	5177.14	0.432	0.00	5177.14	0.000
L5	36.46 - 0 (5)	TP59x50.335x0.5	3447.92	7835.57	0.440	0.00	7835.57	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	160 - 152 (1)	TP30.62x29x0.188	5.53	317.85	0.017	0.00	847.11	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	19.72	517.17	0.038	0.71	1716.19	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	22.63	752.73	0.030	0.71	2891.07	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	26.26	1228.22	0.021	0.80	5501.79	0.000
L5	36.46 - 0 (5)	TP59x50.335x0.5	29.35	1618.70	0.018	0.80	8347.33	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.074	0.000	0.017	0.000	0.078	1.050	4.8.2
L2	152 - 111.29 (2)	0.011	0.373	0.000	0.038	0.000	0.386	1.050	4.8.2

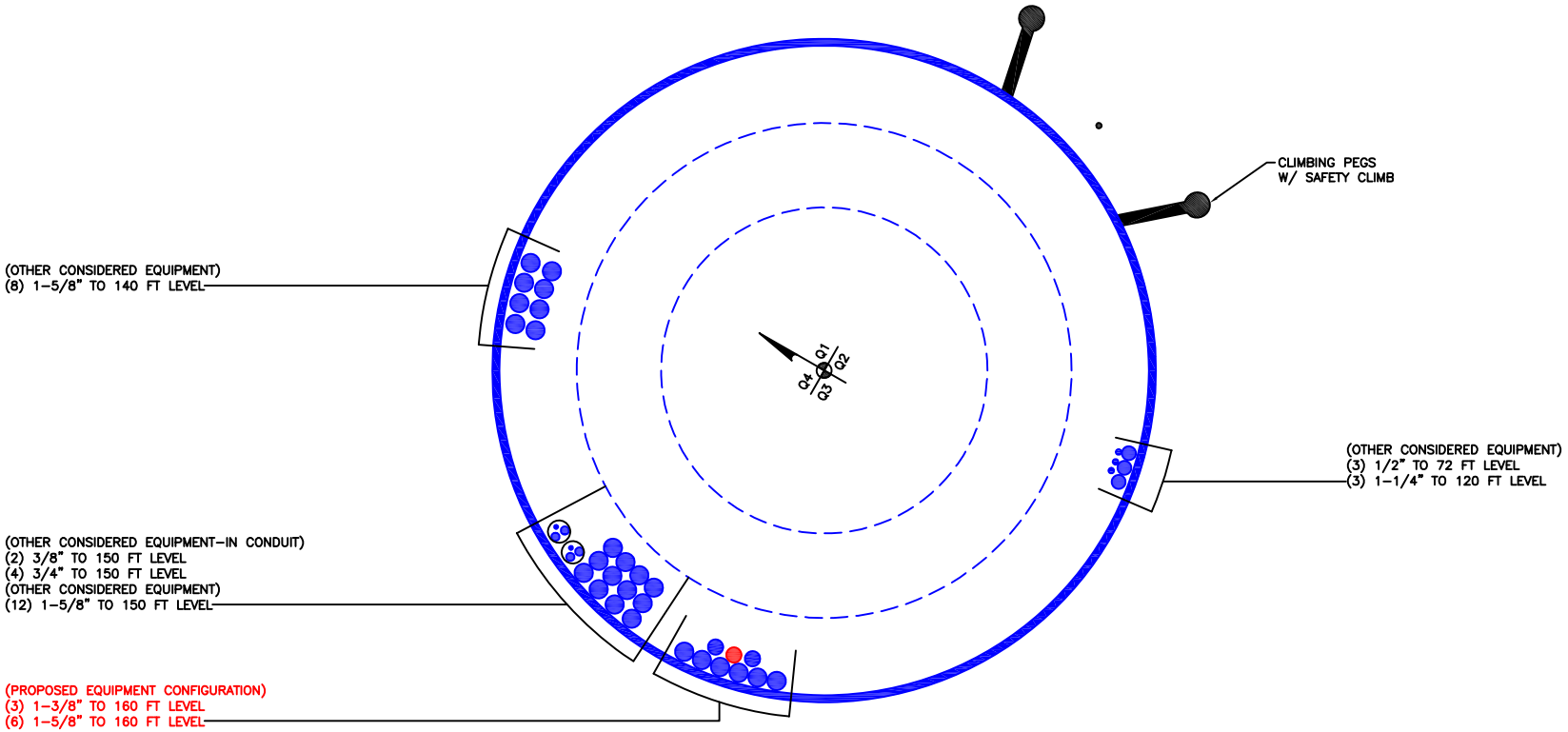
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	111.29 - 77.42 (3)	0.011	0.490	0.000	0.030	0.000	0.501	1.050	4.8.2
L4	77.42 - 36.46 (4)	0.010	0.432	0.000	0.021	0.000	0.442	1.050	4.8.2
L5	36.46 - 0 (5)	0.011	0.440	0.000	0.018	0.000	0.452	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	160 - 152	Pole	TP30.62x29x0.188	1	-4.18	1112.47	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-19.81	1828.41	36.8	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.313	3	-27.39	2653.22	47.8	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.236x0.438	4	-41.28	4330.74	42.1	Pass
L5	36.46 - 0	Pole	TP59x50.335x0.5	5	-60.87	5702.67	43.0	Pass
							Summary	
						Pole (L3)	47.8	Pass
						RATING =	**47.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT)
(8) 1-5/8" TO 140 FT LEVEL
Q1
Q2
Q3
Q4
(OTHER CONSIDERED EQUIPMENT)
(3) 1/2" TO 72 FT LEVEL
(3) 1-1/4" TO 120 FT LEVEL
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(2) 3/8" TO 150 FT LEVEL
(4) 3/4" TO 150 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-5/8" TO 150 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1-3/8" TO 160 FT LEVEL
(6) 1-5/8" TO 160 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

Elevation = 152 ft.

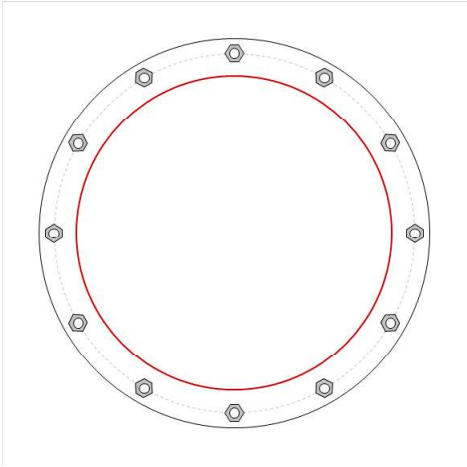
BU #	841290
Site Name	GREENWICH NORTH
Order #	529711 rev 0

TIA-222 Revision	H

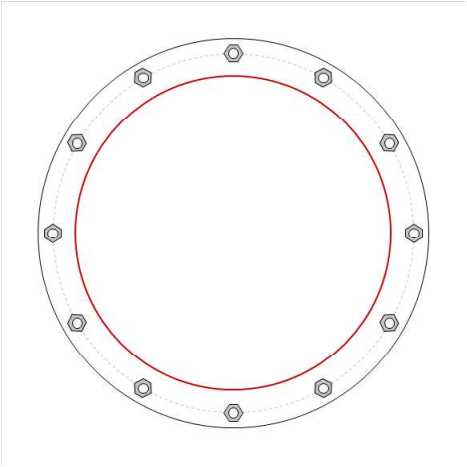
Applied Loads	
Moment (kip-ft)	51.81
Axial Force (kips)	4.18
Shear Force (kips)	5.53

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 35" BC

Top Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Bottom Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

30.62" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Bottom Pole Data

30.62" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	5.57	
Allowable (kips)	54.54	
Stress Rating:	**9.7%**	Pass

Top Plate Capacity

Max Stress (ksi):	4.56	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	**8.0%**	Pass
Tension Side Stress Rating:	**3.5%**	Pass

Bottom Plate Capacity

Max Stress (ksi):	4.56	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	**8.0%**	Pass
Tension Side Stress Rating:	**3.5%**	Pass

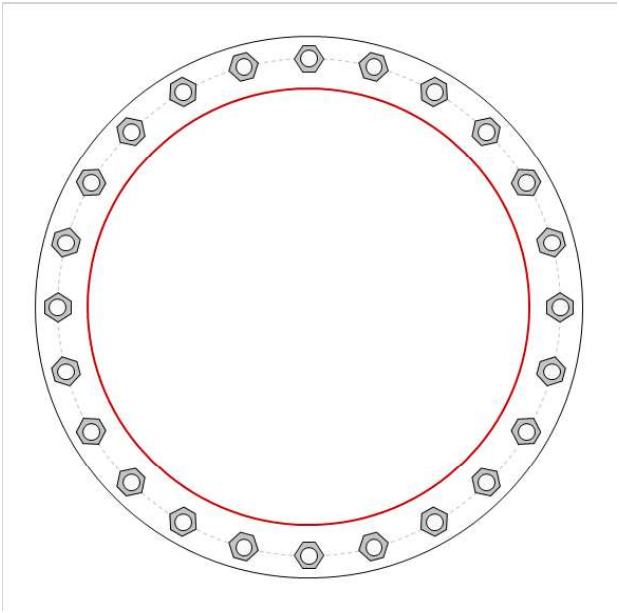
Monopole Base Plate Connection

Site Info	
BU #	841290
Site Name	GREENWICH NORTH
Order #	529711 rev 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	3447.92
Axial Force (kips)	60.87
Shear Force (kips)	29.35

**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 67" BC

Base Plate Data

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

Stiffener Data

N/A

Pole Data

59" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 105.41	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.22	ϕVn = 120.77	**37.4%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	26.36	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**46.5%**	**Pass**

Pier and Pad Foundation

BU # :	841290
Site Name:	GREENWICH NOR
App. Number:	529711 Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	60.88	kips
Base Shear, Vu_comp:	29.32	kips
Moment, M_u:	3447.92	ft-kips
Tower Height, **H**:	160	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	22	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	4	in

Pad Properties		
Depth, **D**:	9.5	ft
Pad Width, **W**:	25	ft
Pad Thickness, **T**:	4.5	ft
Pad Rebar Size (Bottom), **Sp**:	10	
Pad Rebar Quantity (Bottom), **mp**:	23	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	120	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	16	
Base Friction, μ:	0.2	
Neglected Depth, **N**:	5.00	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	375.56	29.32	**7.4%**	**Pass**
Bearing Pressure (ksf)	22.50	3.61	**15.3%**	**Pass**
*Overturning (kip*ft)*	9942.85	3747.84	**37.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5548.21	3609.18	**62.0%**	**Pass**
Pier Compression (kip)	31187.52	109.39	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	6340.37	1227.50	**18.4%**	**Pass**
Pad Shear - 1-way (kips)	1397.27	156.49	**10.7%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.018	**9.2%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	10196.70	2165.51	**20.2%**	**Pass**

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

Soil Rating*:	**37.7%**
Structural Rating*:	**62.0%**

Version 3.4.0

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 223.31 ft (NAVD 88)
Latitude: 41.066278
Longitude: -73.6715

Wind

Results:

Wind Speed:	~~116 Vmph~~	120 mph per JDX
10-year MRI	76 Vmph	
25-year MRI	85 Vmph	
50-year MRI	90 Vmph	
100-year MRI	96 Vmph	

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

Date Accessed: Thu Oct 08 2020

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

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

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

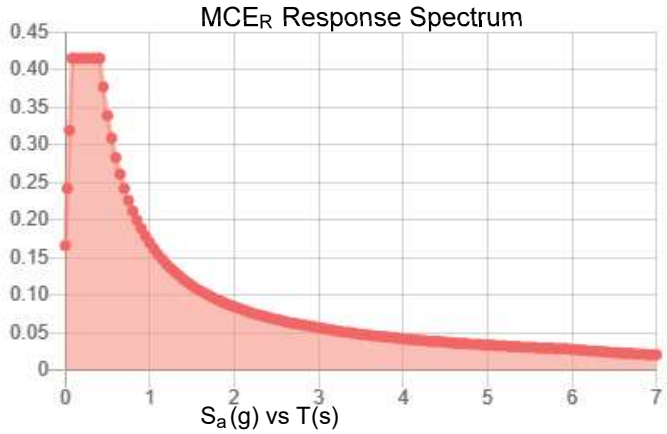
Seismic

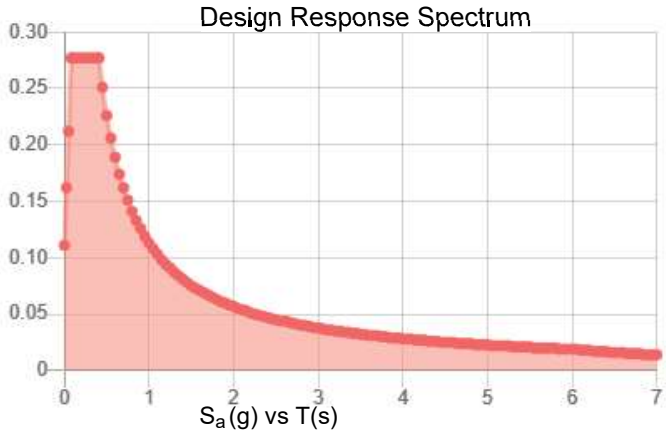
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.261	S_{DS} :	0.277
S_1 :	0.071	S_{D1} :	0.113
F_a :	1.591	T_L :	6
F_v :	2.4	PGA :	0.154
S_{MS} :	0.415	PGA_M :	0.23
S_{M1} :	0.17	F_{PGA} :	1.492
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Oct 08 2020

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Oct 08 2020

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

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

Exhibit E

Mount Analysis

Date: **October 7, 2020**

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:	**T-Mobile Anchor**	
	Carrier Site Number:	CT11069A
	Carrier Site Name:	Greenwich/Boy Scouts_2
Crown Castle Designation:	**Crown Castle BU Number:**	841290
	Crown Castle Site Name:	Greenwich North
	Crown Castle JDE Job Number:	620145
	Crown Castle Order Number:	529711 Rev. 0
Engineering Firm Designation:	**Infinigy Engineering, PLLC Report Designation:**	1039-Z0001-B
Site Data:	**363 Riversville Road, Greenwich, Fairfield County, CT, 06831** **Latitude 41°3'58.60" Longitude -73°40'17.40"**	
Structure Information:	**Tower Height & Type:**	**160.0 ft Monopole**
	Mount Elevation:	**160.0 ft**
	Mount Type:	**13.0 ft Platform**

Dear Darcy Tarr,

Infinigy Engineering, PLLC is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile'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**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Alex Mercado, E.I.T.

Respectfully Submitted by:
Christopher J. Warren, P.E.
518-690-0790
structural@infinigy.com
CT PE License No. 23544

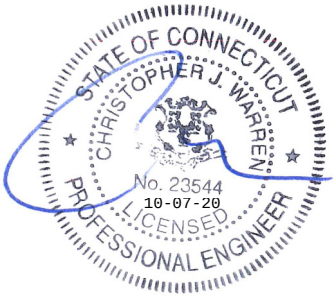


TABLE OF CONTENTS

1) INTRODUCTION

This is an existing 3 sector 13.0 ft Platform**,** designed by EEI.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Conneticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.259
Seismic S_1:	0.070
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
160.0	163.0	3	ERICSSON	AIR 32 B2A/B66AA	13.0 ft Platform
		3	ERICSSON	AIR6449 B41 T-MOBILE	
		3	RFS/CELWAVE	APXVAARR24_43-U-NA20	
		3	COMMSCOPE	SDX1926Q-43	
		3	ERICSSON	RADIO 4449 B71 B85_T-MOBILE	
		3	ERICSSON	RRUS 4415 B25	
		3	RFS/CELWAVE	ATMAA1412D-1A20	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	529711 Rev. 0	CCI Sites
Mount Analysis Report	Infinigy Engineering	7685673	CCI Sites
Loading Document	T-Mobile	RFDS Version 6	TSA

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the 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)	MP5	160.0	57.0	Pass
	Horizontal(s)	HOR2		32.0	Pass
	Standoff(s)	SA1		77.6	Pass
	Mount Connection(s)	--		62.1	Pass

Structure Rating (max from all components) =	77.6%

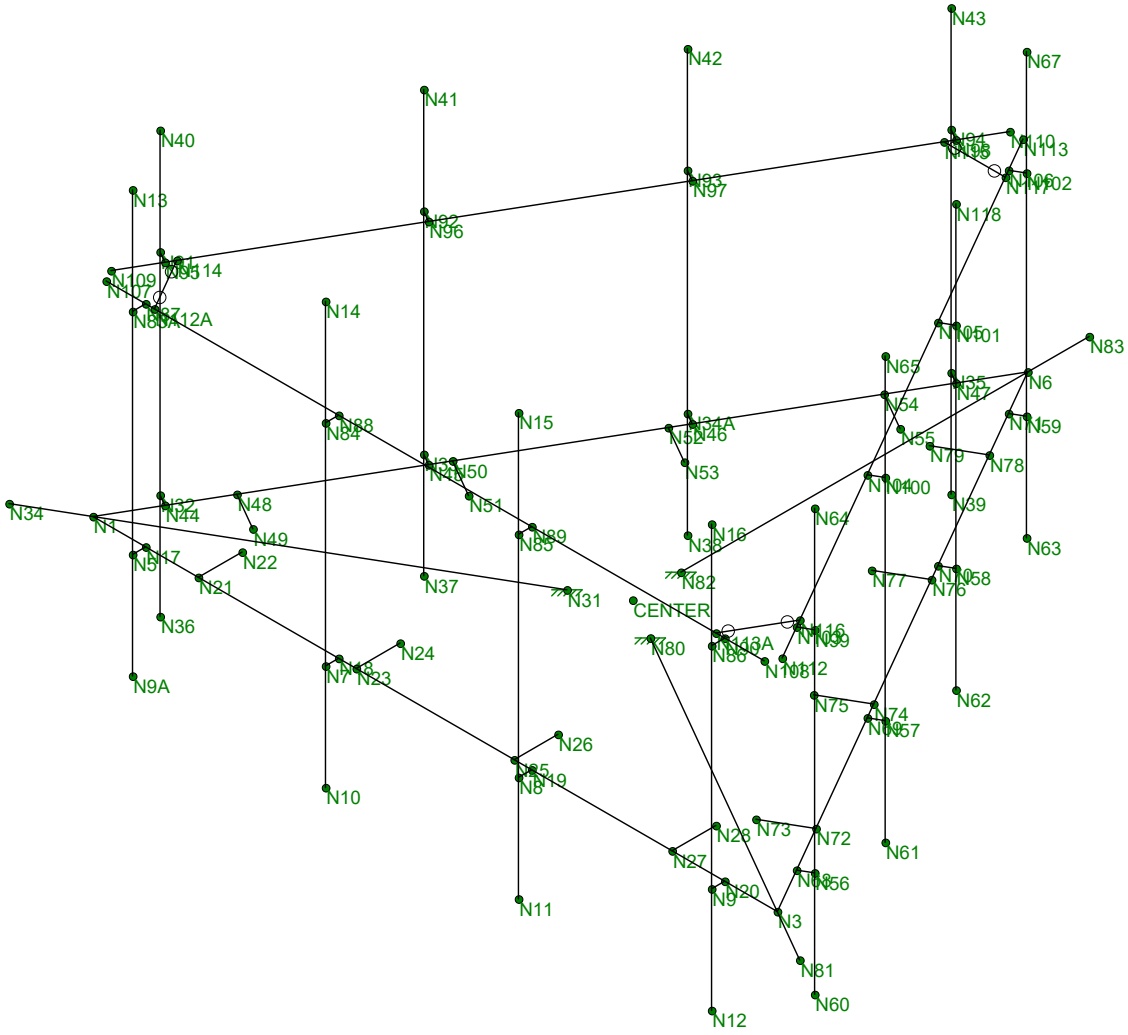
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

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

APPENDIX A

WIRE FRAME AND RENDERED MODELS



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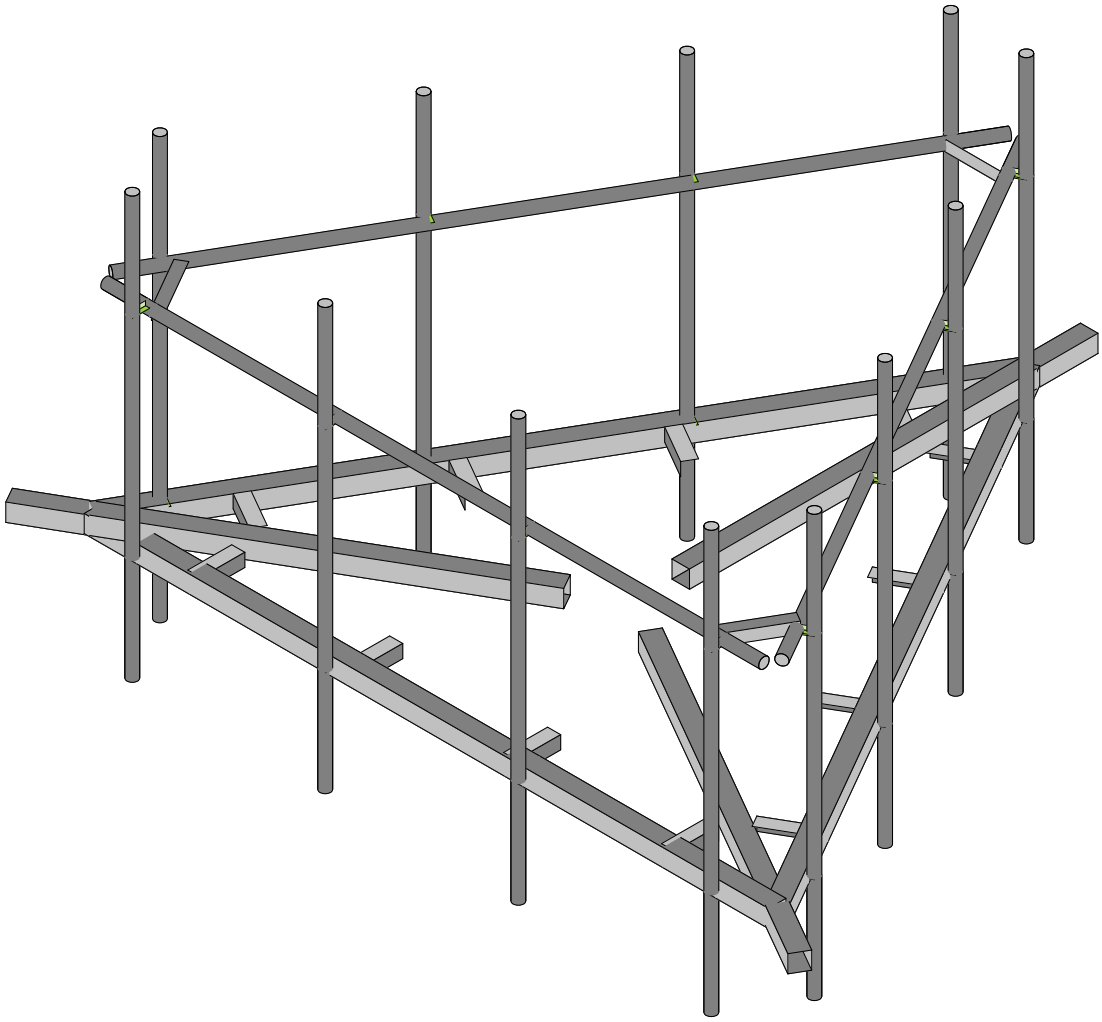
AM		Oct 7, 2020 at 1:33 PM
1039-Z0001-B		841290_loaded.r3d



Infinigy Engineering	841290	
AM		Oct 7, 2020 at 1:34 PM
1039-Z0001-B		841290_loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Program Inputs

PROJECT INFORMATION	
Client:	Crown Castle
Carrier:	T-Mobile
Engineer:	Alex Mercado

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	B	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil	
Ground Elevation:	223.31	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	160.0	ft
Tower Height AGL:	160.0	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):	0.99	*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}):	120	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	1.5	in
Flat Pressure:	78.53	psf
Round Pressure:	47.12	psf
Ice Wind Pressure:	8.18	psf

SEISMIC DATA		
Short-Period Accel. (S_s):	0.26	g
1-Second Accel. (S_1):	0.07	g
Short-Period Design (S_{DS}):	0.28	
1-Second Design (S_{D1}):	0.11	
Short-Period Coeff. (F_a):	1.59	
1-Second Coeff. (F_v):	2.40	
Amplification Factor (a_p):	1.00	
Response Mod. (R_p):	2.50	
Overstrength (Ω_o):	1.00	

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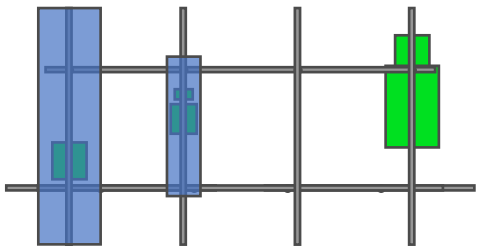
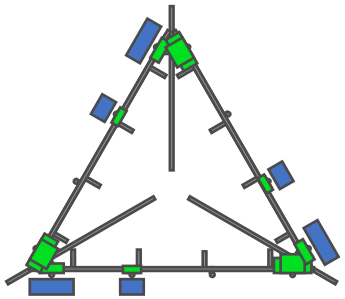
Infinigy Load Calculator V2.1.4

Program Inputs

ELEVATION VIEW



PLAN VIEW



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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 AIR 32 B2A/B66AA	163.0	3	0.90	39.47	6.51	4.71	231.27	167.41	132.20	18.18	MP3
ERICSSON AIR6449 B41_T-MOBILE	163.0	3	0.90	39.47	5.66	2.48	201.04	87.98	114.63	15.76	MP1
RFS/CELWAVE APXVAARR24_43-U-NA2(	163.0	3	0.90	39.47	14.69	6.87	522.00	244.18	128.00	17.60	MP4
COMMSCOPE SDX1926Q-43	163.0	3	0.90	39.47	0.24	0.10	8.49	3.57	6.17	0.85	MP3
ICSSON RADIO 4449 B71 B85A_T-MOBI	163.0	3	0.90	39.47	1.97	1.59	69.99	56.36	73.21	10.07	MP1
ERICSSON RRUS 4415 B25	163.0	3	0.90	39.47	1.64	0.68	58.42	24.12	44.00	6.05	MP4
RFS/CELWAVE ATMAA1412D-1A20	163.0	3	0.90	39.47	1.00	0.41	35.53	14.47	13.00	1.79	MP3

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	HOR1	N3	N1			Horizontal	Beam	Tube	A500 Gr.B...	Typical
2	HOR2	N6	N1			Horizontal	Beam	Tube	A500 Gr.B...	Typical
3	HOR3	N6	N3			Horizontal	Beam	Tube	A500 Gr.B...	Typical
4	MP4	N13	N9A			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
5	MP3	N14	N10			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
6	MP2	N15	N11			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
7	MP1	N16	N12			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
8	M8	N17	N5			RIGID	None	None	RIGID	Typical
9	M9	N18	N7			RIGID	None	None	RIGID	Typical
10	M10	N19	N8			RIGID	None	None	RIGID	Typical
11	M11	N20	N9			RIGID	None	None	RIGID	Typical
12	M12	N22	N21		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N24	N23		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
14	M14	N26	N25		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
15	M15	N28	N27		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
16	SA1	N31	N34			Standoff	Beam	Tube	A500 Gr.B...	Typical
17	MP5	N40	N36			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
18	MP6	N41	N37			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
19	MP7	N42	N38			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
20	MP8	N43	N39			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
21	M21	N44	N32			RIGID	None	None	RIGID	Typical
22	M22	N45	N33			RIGID	None	None	RIGID	Typical
23	M23	N46	N34A			RIGID	None	None	RIGID	Typical
24	M24	N47	N35			RIGID	None	None	RIGID	Typical
25	M25	N49	N48		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N51	N50		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
27	M27	N53	N52		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
28	M28	N55	N54		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
29	MP12	N64	N60			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
30	MP11	N65	N61			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
31	MP9	N67	N63			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
32	M33	N68	N56			RIGID	None	None	RIGID	Typical
33	M34	N69	N57			RIGID	None	None	RIGID	Typical
34	M35	N70	N58			RIGID	None	None	RIGID	Typical
35	M36	N71	N59			RIGID	None	None	RIGID	Typical
36	M37	N73	N72		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
37	M38	N75	N74		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
38	M39	N77	N76		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
39	M40	N79	N78		90	Angle	Beam	Single Angle	A36 Gr.36	Typical
40	SA3	N80	N81			Standoff	Beam	Tube	A500 Gr.B...	Typical
41	SA2	N82	N83			Standoff	Beam	Tube	A500 Gr.B...	Typical
42	M43	N87	N83A			RIGID	None	None	RIGID	Typical
43	M44	N88	N84			RIGID	None	None	RIGID	Typical
44	M45	N89	N85			RIGID	None	None	RIGID	Typical
45	M46	N90	N86			RIGID	None	None	RIGID	Typical
46	M47	N95	N91			RIGID	None	None	RIGID	Typical
47	M48	N96	N92			RIGID	None	None	RIGID	Typical
48	M49	N97	N93			RIGID	None	None	RIGID	Typical
49	M50	N98	N94			RIGID	None	None	RIGID	Typical
50	M51	N103	N99			RIGID	None	None	RIGID	Typical
51	M52	N104	N100			RIGID	None	None	RIGID	Typical
52	M53	N105	N101			RIGID	None	None	RIGID	Typical
53	M54	N106	N102			RIGID	None	None	RIGID	Typical
54	M55	N108	N107			Handrail	Beam	Single Angle	A36 Gr.36	Typical
55	M56	N110	N109			Handrail	Beam	Single Angle	A36 Gr.36	Typical
56	M57	N113	N112			Handrail	Beam	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
57	M57A	N113A	N116		180	Corner Angles	HBrace	Single Angle	A36 Gr.36	Typical
58	M58	N114	N112A		180	Corner Angles	HBrace	Single Angle	A36 Gr.36	Typical
59	M59	N115	N117		90	Corner Angles	HBrace	Single Angle	A36 Gr.36	Typical
60	MP10	N118	N62			Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		24	72	0
3	Total General		24	72	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L3X3X4	12	120	.049
7	A36 Gr.36	PIPE_2.0	3	450	.13
8	A36 Gr.36	L2.5x2.5x3	3	42	.011
9	A500 Gr.B Rect	HSS4X4X4	6	747.3	.768
10	A53 Gr.B	PIPE_2.0	12	1152	.333
11	Total HR Steel		36	2511.3	1.291

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	DL		-1			30		3	
2	Wind Load AZI 0	WLZ					60			
3	Wind Load AZI 30	None					60			
4	Wind Load AZI 60	None					60			
5	Wind Load AZI 90	WLX					60			
6	Wind Load AZI 120	None					60			
7	Wind Load AZI 150	None					60			
8	Wind Load AZI 180	None					60			
9	Wind Load AZI 210	None					60			
10	Wind Load AZI 240	None					60			
11	Wind Load AZI 270	None					60			
12	Wind Load AZI 300	None					60			
13	Wind Load AZI 330	None					60			
14	Distr. Wind Load Z	WLZ						60		
15	Distr. Wind Load X	WLX						60		
16	Ice Weight	OL1					30	60	3	
17	Ice Wind Load AZI 0	OL2					60			
18	Ice Wind Load AZI 30	None					60			
19	Ice Wind Load AZI 60	None					60			
20	Ice Wind Load AZI 90	OL3					60			
21	Ice Wind Load AZI 120	None					60			
22	Ice Wind Load AZI 150	None					60			
23	Ice Wind Load AZI 180	None					60			
24	Ice Wind Load AZI 210	None					60			
25	Ice Wind Load AZI 240	None					60			
26	Ice Wind Load AZI 270	None					60			
27	Ice Wind Load AZI 300	None					60			
28	Ice Wind Load AZI 330	None					60			
29	Distr. Ice Wind Load Z	OL2						60		
30	Distr. Ice Wind Load X	OL3						60		
31	Seismic Load Z	ELZ			-.138		30			
32	Seismic Load X	ELX	-.138				30			
33	Service Live Loads	LL				1				

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
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	Maintenance Load 10	LL				1				
44	Maintenance Load 11	LL				1				
45	Maintenance Load 12	LL				1				
46	BLC 1 Transient Area...	None						42		
47	BLC 16 Transient Are...	None						42		

Load Combinations

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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	.866	15	.5												
4	1.2DL + 1WL AZI 60	Yes	Y		1	1.2	4	1	14	.5	15	.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	-.5	15	.866												
7	1.2DL + 1WL AZI 150	Yes	Y		1	1.2	7	1	14	-.8...	15	.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	-.8...	15	-.5												
10	1.2DL + 1WL AZI 240	Yes	Y		1	1.2	10	1	14	-.5	15	-.8...												
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	.5	15	-.8...												
13	1.2DL + 1WL AZI 330	Yes	Y		1	1.2	13	1	14	.866	15	-.5												
14	0.9DL + 1WL AZI 0	Yes	Y		1	.9	2	1	14	1	15													
15	0.9DL + 1WL AZI 30	Yes	Y		1	.9	3	1	14	.866	15	.5												
16	0.9DL + 1WL AZI 60	Yes	Y		1	.9	4	1	14	.5	15	.866												
17	0.9DL + 1WL AZI 90	Yes	Y		1	.9	5	1	14		15	1												
18	0.9DL + 1WL AZI 120	Yes	Y		1	.9	6	1	14	-.5	15	.866												
19	0.9DL + 1WL AZI 150	Yes	Y		1	.9	7	1	14	-.8...	15	.5												
20	0.9DL + 1WL AZI 180	Yes	Y		1	.9	8	1	14	-1	15													
21	0.9DL + 1WL AZI 210	Yes	Y		1	.9	9	1	14	-.8...	15	-.5												
22	0.9DL + 1WL AZI 240	Yes	Y		1	.9	10	1	14	-.5	15	-.8...												
23	0.9DL + 1WL AZI 270	Yes	Y		1	.9	11	1	14		15	-1												
24	0.9DL + 1WL AZI 300	Yes	Y		1	.9	12	1	14	.5	15	-.8...												
25	0.9DL + 1WL AZI 330	Yes	Y		1	.9	13	1	14	.866	15	-.5												
26	1.2D + 1.0Di	Yes	Y		1	1.2	16	1																
27	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	17	1	29	1	30											
28	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	18	1	29	.866	30	.5										
29	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	19	1	29	.5	30	.866										
30	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	20	1	29		30	1										
31	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	21	1	29	-.5	30	.866										
32	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	22	1	29	-.8...	30	.5										
33	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	23	1	29	-1	30											
34	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	24	1	29	-.8...	30	-.5										
35	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	25	1	29	-.5	30	-.8...										
36	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	26	1	29		30	-1										
37	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	27	1	29	.5	30	-.8...										
38	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	28	1	29	.866	30	-.5										

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
39	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	1	32															
40	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.866	32	.5														
41	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.5	32	.866														
42	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31		32	1														
43	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.5	32	.866														
44	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.8...	32	.5														
45	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-1	32															
46	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.8...	32	-.5														
47	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.5	32	-.8...														
48	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31		32	-1														
49	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.5	32	-.8...														
50	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.866	32	-.5														
51	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	1	32															
52	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.866	32	.5														
53	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.5	32	.866														
54	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31		32	1														
55	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.5	32	.866														
56	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.8...	32	.5														
57	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-1	32															
58	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.8...	32	-.5														
59	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.5	32	-.8...														
60	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31		32	-1														
61	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.5	32	-.8...														
62	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.866	32	-.5														
63	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	2	.25	14	.25	15		33	1.5										
64	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	3	.25	14	.216	15	.125	33	1.5										
65	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	4	.25	14	.125	15	.216	33	1.5										
66	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	5	.25	14		15	.25	33	1.5										
67	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	6	.25	14	-.1...	15	.216	33	1.5										
68	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	7	.25	14	-.2...	15	.125	33	1.5										
69	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	8	.25	14	-.25	15		33	1.5										
70	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	9	.25	14	-.2...	15	-.1...	33	1.5										
71	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	10	.25	14	-.1...	15	-.2...	33	1.5										
72	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	11	.25	14		15	-.25	33	1.5										
73	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	12	.25	14	.125	15	-.2...	33	1.5										
74	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	13	.25	14	.216	15	-.1...	33	1.5										
75	1.2DL + 1.5LL	Yes	Y		1	1.2	33	1.5																
76	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	2	.063	14	.063	15											
77	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	3	.063	14	.054	15	.031										
78	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	4	.063	14	.031	15	.054										
79	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	5	.063	14		15	.063										
80	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	6	.063	14	-.0...	15	.054										
81	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	7	.063	14	-.0...	15	.031										
82	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	8	.063	14	-.0...	15											
83	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	9	.063	14	-.0...	15	-.0...										
84	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	10	.063	14	-.0...	15	-.0...										
85	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	11	.063	14		15	-.0...										
86	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	12	.063	14	.031	15	-.0...										
87	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	13	.063	14	.054	15	-.0...										
88	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	2	.063	14	.063	15											
89	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	3	.063	14	.054	15	.031										
90	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	4	.063	14	.031	15	.054										
91	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	5	.063	14		15	.063										
92	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	6	.063	14	-.0...	15	.054										
93	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	7	.063	14	-.0...	15	.031										
94	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	8	.063	14	-.0...	15											
95	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	9	.063	14	-.0...	15	-.0...										

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
96	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	10	.063	14	-.0...	15	-.0...										
97	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	11	.063	14		15	-.0...										
98	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	12	.063	14	.031	15	-.0...										
99	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	13	.063	14	.054	15	-.0...										
100	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	2	.063	14	.063	15											
101	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	3	.063	14	.054	15	.031										
102	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	4	.063	14	.031	15	.054										
103	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	5	.063	14		15	.063										
104	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	6	.063	14	-.0...	15	.054										
105	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	7	.063	14	-.0...	15	.031										
106	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	8	.063	14	-.0...	15											
107	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	9	.063	14	-.0...	15	-.0...										
108	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	10	.063	14	-.0...	15	-.0...										
109	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	11	.063	14		15	-.0...										
110	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	12	.063	14	.031	15	-.0...										
111	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	13	.063	14	.054	15	-.0...										
112	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	2	.063	14	.063	15											
113	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	3	.063	14	.054	15	.031										
114	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	4	.063	14	.031	15	.054										
115	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	5	.063	14		15	.063										
116	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	6	.063	14	-.0...	15	.054										
117	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	7	.063	14	-.0...	15	.031										
118	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	8	.063	14	-.0...	15											
119	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	9	.063	14	-.0...	15	-.0...										
120	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	10	.063	14	-.0...	15	-.0...										
121	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	11	.063	14		15	-.0...										
122	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	12	.063	14	.031	15	-.0...										
123	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	13	.063	14	.054	15	-.0...										
124	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	2	.063	14	.063	15											
125	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	3	.063	14	.054	15	.031										
126	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	4	.063	14	.031	15	.054										
127	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	5	.063	14		15	.063										
128	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	6	.063	14	-.0...	15	.054										
129	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	7	.063	14	-.0...	15	.031										
130	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	8	.063	14	-.0...	15											
131	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	9	.063	14	-.0...	15	-.0...										
132	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	10	.063	14	-.0...	15	-.0...										
133	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	11	.063	14		15	-.0...										
134	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	12	.063	14	.031	15	-.0...										
135	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	13	.063	14	.054	15	-.0...										
136	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	2	.063	14	.063	15											
137	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	3	.063	14	.054	15	.031										
138	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	4	.063	14	.031	15	.054										
139	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	5	.063	14		15	.063										
140	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	6	.063	14	-.0...	15	.054										
141	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	7	.063	14	-.0...	15	.031										
142	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	8	.063	14	-.0...	15											
143	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	9	.063	14	-.0...	15	-.0...										
144	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	10	.063	14	-.0...	15	-.0...										
145	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	11	.063	14		15	-.0...										
146	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	12	.063	14	.031	15	-.0...										
147	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	13	.063	14	.054	15	-.0...										
148	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	2	.063	14	.063	15											
149	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	3	.063	14	.054	15	.031										
150	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	4	.063	14	.031	15	.054										
151	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	5	.063	14		15	.063										
152	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	6	.063	14	-.0...	15	.054										

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
153	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	7	.063	14	-.0...	15	.031												
154	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	8	.063	14	-.0...	15													
155	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	9	.063	14	-.0...	15	-.0...												
156	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	10	.063	14	-.0...	15	-.0...												
157	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	11	.063	14		15	-.0...												
158	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	12	.063	14	.031	15	-.0...												
159	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	13	.063	14	.054	15	-.0...												
160	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	2	.063	14	.063	15													
161	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	3	.063	14	.054	15	.031												
162	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	4	.063	14	.031	15	.054												
163	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	5	.063	14		15	.063												
164	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	6	.063	14	-.0...	15	.054												
165	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	7	.063	14	-.0...	15	.031												
166	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	8	.063	14	-.0...	15													
167	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	9	.063	14	-.0...	15	-.0...												
168	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	10	.063	14	-.0...	15	-.0...												
169	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	11	.063	14		15	-.0...												
170	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	12	.063	14	.031	15	-.0...												
171	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	13	.063	14	.054	15	-.0...												
172	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	2	.063	14	.063	15													
173	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	3	.063	14	.054	15	.031												
174	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	4	.063	14	.031	15	.054												
175	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	5	.063	14		15	.063												
176	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	6	.063	14	-.0...	15	.054												
177	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	7	.063	14	-.0...	15	.031												
178	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	8	.063	14	-.0...	15													
179	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	9	.063	14	-.0...	15	-.0...												
180	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	10	.063	14	-.0...	15	-.0...												
181	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	11	.063	14		15	-.0...												
182	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	12	.063	14	.031	15	-.0...												
183	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	13	.063	14	.054	15	-.0...												
184	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	2	.063	14	.063	15													
185	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	3	.063	14	.054	15	.031												
186	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	4	.063	14	.031	15	.054												
187	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	5	.063	14		15	.063												
188	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	6	.063	14	-.0...	15	.054												
189	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	7	.063	14	-.0...	15	.031												
190	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	8	.063	14	-.0...	15													
191	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	9	.063	14	-.0...	15	-.0...												
192	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	10	.063	14	-.0...	15	-.0...												
193	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	11	.063	14		15	-.0...												
194	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	12	.063	14	.031	15	-.0...												
195	1.2DL + 1.5LM-MP10 +...	Yes	Y		1	1.2	43	1.5	13	.063	14	.054	15	-.0...												
196	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	2	.063	14	.063	15													
197	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	3	.063	14	.054	15	.031												
198	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	4	.063	14	.031	15	.054												
199	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	5	.063	14		15	.063												
200	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	6	.063	14	-.0...	15	.054												
201	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	7	.063	14	-.0...	15	.031												
202	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	8	.063	14	-.0...	15													
203	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	9	.063	14	-.0...	15	-.0...												
204	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	10	.063	14	-.0...	15	-.0...												
205	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	11	.063	14		15	-.0...												
206	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	12	.063	14	.031	15	-.0...												
207	1.2DL + 1.5LM-MP11 +...	Yes	Y		1	1.2	44	1.5	13	.063	14	.054	15	-.0...												
208	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	2	.063	14	.063	15													
209	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	3	.063	14	.054	15	.031												

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
210	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	4	.063	14	.031	15	.054										
211	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	5	.063	14		15	.063										
212	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	6	.063	14	-.0...	15	.054										
213	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	7	.063	14	-.0...	15	.031										
214	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	8	.063	14	-.0...	15											
215	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	9	.063	14	-.0...	15	-.0...										
216	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	10	.063	14	-.0...	15	-.0...										
217	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	11	.063	14		15	-.0...										
218	1.2DL + 1.5LM-MP12 +...	Yes	Y		1	1.2	45	1.5	12	.063	14	.031	15	-.0...										

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N31	max	2391.136	18	3267.886	31	1513.689	12	441.073	25	1024.977	15	168.711	24
2		min	-2476.103	12	154.844	24	-1468.778	18	-6333.755	32	-1031.595	21	-10715.655	31
3	N82	max	611.911	17	3272.504	27	2765.907	14	12439.091	27	1753.369	23	1052.155	23
4		min	-610.64	23	144.001	20	-2861.988	8	-295.552	20	-1761.36	17	-1072.089	5
5	N80	max	2453.411	4	3267.833	35	1552.836	4	276.896	15	1024.408	19	10791.794	35
6		min	-2369.21	22	154.888	16	-1507.008	22	-6199.023	34	-1032.392	25	-251.802	16
7	Totals:	max	4843.809	5	9292.373	30	4899.303	14						
8		min	-4843.807	23	2526.334	60	-4899.308	8						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
1	SA3	HSS4X...	.776	0	35	.114	0	y	12	1084...	1395...	1618...	1618...		H1-...
2	SA1	HSS4X...	.774	0	31	.114	0	y	8	1084...	1395...	1618...	1618...		H1-...
3	SA2	HSS4X...	.771	0	27	.113	0	y	4	1084...	1395...	1618...	1618...		H1-...
4	MP5	PIPE_...	.570	72	8	.104	72		8	1491...	32130	1871...	1871...		H1-...
5	MP1	PIPE_...	.570	72	12	.103	72		12	1491...	32130	1871...	1871...		H1-...
6	MP9	PIPE_...	.566	72	4	.099	72		4	1491...	32130	1871...	1871...		H1-...
7	MP12	PIPE_...	.557	72	6	.086	72		8	1491...	32130	1871...	1871...		H1-...
8	MP4	PIPE_...	.550	72	3	.085	72		4	1491...	32130	1871...	1871...		H1-...
9	MP8	PIPE_...	.547	72	10	.081	72		12	1491...	32130	1871...	1871...		H1-...
10	MP11	PIPE_...	.415	72	5	.086	72		9	1491...	32130	1871...	1871...		H1-...
11	MP3	PIPE_...	.409	72	2	.085	72		5	1491...	32130	1871...	1871...		H1-...
12	MP7	PIPE_...	.406	72	9	.084	72		13	1491...	32130	1871...	1871...		H1-...
13	MP10	PIPE_...	.387	72	4	.091	72		3	1491...	32130	1871...	1871...		H1-...
14	MP6	PIPE_...	.380	72	8	.093	72		7	1491...	32130	1871...	1871...		H1-...
15	MP2	PIPE_...	.377	72	13	.091	72		11	1491...	32130	1871...	1871...		H1-...
16	HOR2	HSS4X...	.320	0	36	.124	156	y	9	6877...	1395...	1618...	1618...		H1-...
17	HOR1	HSS4X...	.319	156	28	.124	0	y	13	6877...	1395...	1618...	1618...		H1-...
18	HOR3	HSS4X...	.318	156	32	.124	0	y	5	6877...	1395...	1618...	1618...		H1-...
19	M57	PIPE_...	.277	140.625	4	.129	139.062		7	6295...	33048	1925...	1925...		H1-...
20	M56	PIPE_...	.273	9.375	8	.127	10.937		11	6295...	33048	1925...	1925...		H1-...
21	M55	PIPE_...	.265	140.625	12	.127	139.062		3	6295...	33048	1925...	1925...		H1-...
22	M59	L2.5x2...	.015	7	3	.131	0	y	10	2751...	2919...	872....	1971...		H2-1
23	M57A	L2.5x2...	.015	6.708	11	.133	0	z	6	2751...	2919...	872....	1971...		H2-1
24	M58	L2.5x2...	.014	6.854	7	.131	14	z	2	2751...	2919...	872....	1971...		H2-1
25	M13	L3X3X4	.010	10	30	.003	10	z	38	4594...	46656	1688...	3755...		H2-1
26	M14	L3X3X4	.010	10	30	.003	10	z	38	4594...	46656	1688...	3755...		H2-1
27	M38	L3X3X4	.010	10	33	.003	10	z	33	4594...	46656	1688...	3755...		H2-1
28	M39	L3X3X4	.010	10	33	.003	10	z	33	4594...	46656	1688...	3755...		H2-1
29	M26	L3X3X4	.010	10	27	.003	10	z	34	4594...	46656	1688...	3755...		H2-1
30	M27	L3X3X4	.010	10	27	.003	10	z	34	4594...	46656	1688...	3755...		H2-1
31	M12	L3X3X4	.009	10	30	.002	10	z	38	4594...	46656	1688...	3755...		H2-1

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
32	M15	L3X3X4	.009	10	30	.002	10	z	38	4594..	46656	1688..	3755..	....	H2-1
33	M37	L3X3X4	.009	10	33	.002	10	z	32	4594..	46656	1688..	3755..	....	H2-1
34	M28	L3X3X4	.009	10	27	.002	10	z	34	4594..	46656	1688..	3755..	....	H2-1
35	M40	L3X3X4	.009	10	33	.002	10	z	33	4594..	46656	1688..	3755..	....	H2-1
36	M25	L3X3X4	.009	10	27	.002	10	z	35	4594..	46656	1688..	3755..	....	H2-1

APPENDIX D

ADDITIONAL CALCUATIONS

INFINIGY

FROM ZERO TO INFINIGY

the solutions are endless

Bolt Calculation Tool, V1.4

PROJECT DATA	
Site Name:	841290
Site Number:	CT11069A
Job Code:	1039-Z0001-B
Connection Description:	Standoff to Tower

APPLIED LOADS		
Bolt Tension:	12632.86	lbs
Bolt Shear:	854.39	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.625	in
Bolt Grade:	A325	-
# of Bolts:	4	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Tensile Usage	62.1%	
Shear Usage	6.2%	
Interaction Check	0.39	***≤1.05***
Result	Pass	

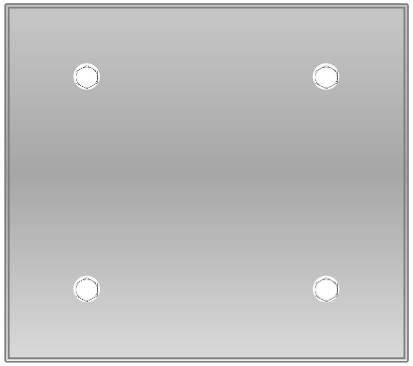

Exhibit F

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: CT11069A

Greenwich/Boy Scouts_2
363 Riversville Road Boy Scouts of America
Greenwich, Connecticut 06831

October 27, 2020

EBI Project Number: 6220005555

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**36.98%**

October 27, 2020

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

Emissions Analysis for Site: CT11069A - Greenwich/Boy Scouts_2

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **363 Riversville Road Boy Scouts of America** in **Greenwich, 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 363 Riversville Road Boy Scouts of America in Greenwich, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

5) 4 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 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 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.

8) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

9) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

10) 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.

11) 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.

12) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 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.

13) The antenna mounting height centerline of the proposed antennas is 163 feet above ground level (AGL).

14) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	163 feet	Height (AGL):	163 feet	Height (AGL):	163 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A1 MPE %:	**3.47%**	Antenna B1 MPE %:	**3.47%**	Antenna C1 MPE %:	**3.47%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	163 feet	Height (AGL):	163 feet	Height (AGL):	163 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A2 MPE %:	**1.74%**	Antenna B2 MPE %:	**1.74%**	Antenna C2 MPE %:	**1.74%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	163 feet	Height (AGL):	163 feet	Height (AGL):	163 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A3 MPE %:	**2.26%**	Antenna B3 MPE %:	**2.26%**	Antenna C3 MPE %:	**2.26%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	7.47%
AT&T	3.57%
Verizon	21.62%
Nextel	0.37%
Sprint	3.95%
Site Total MPE % :	36.98%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	7.47%
T-Mobile Sector B Total:	7.47%
T-Mobile Sector C Total:	7.47%
Site Total MPE % :	36.98%

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 2500 MHz LTE	2	6412.98	163.0	17.36	2500 MHz LTE	1000	1.74%
T-Mobile 2500 MHz NR	2	6412.98	163.0	17.36	2500 MHz NR	1000	1.74%
T-Mobile 1900 MHz GSM	4	1028.30	163.0	5.57	1900 MHz GSM	1000	0.56%
T-Mobile 1900 MHz LTE	2	2056.61	163.0	5.57	1900 MHz LTE	1000	0.56%
T-Mobile 2100 MHz LTE	2	2307.55	163.0	6.24	2100 MHz LTE	1000	0.62%
T-Mobile 600 MHz LTE	2	591.73	163.0	1.60	600 MHz LTE	400	0.40%
T-Mobile 600 MHz NR	1	1577.94	163.0	2.14	600 MHz NR	400	0.53%
T-Mobile 700 MHz LTE	2	648.82	163.0	1.76	700 MHz LTE	467	0.38%
T-Mobile 1900 MHz LTE	2	2203.69	163.0	5.96	1900 MHz LTE	1000	0.60%
T-Mobile 2100 MHz UMTS	2	1294.56	163.0	3.50	2100 MHz UMTS	1000	0.35%
						Total:	**7.47%**

• 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:	7.47%
Sector B:	7.47%
Sector C:	7.47%
T-Mobile Maximum MPE % (Sector A):	7.47%
Site Total:	36.98%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **36.98%** 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.