



March 19, 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# 876402; T-Mobile Site ID# CTNA628A
175 Stafford Street, Stafford, CT 06077
Latitude: 41° 59' 13.38"/ Longitude: -72° 15' 40.78"**

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 150-foot mount on the existing 150-foot Monopole Tower located at 175 Stafford Street in Stafford. The property is owned by Harry and Nancy Pragl and the Tower is owned by Crown Castle. T-Mobile now intends to replace six (6) existing antennas and add three (3) new antennas. This modification/proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times. T-Mobile is also proposing mount modifications as shown on the enclosed mount analysis.

Planned Modifications:

Tower:

Remove and Replace:

(3) RFS – APXVTM14-ALU-120 Antennas (**REMOVE**) - (3) RFS – APX16DWV-16DWV-S-E-A20 Antennas (**REPLACE**)

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

(3) Alcatel Lucent - 800 MHz 2X50W RRH Radios (**REMOVE**) – (3) Ericsson – 4415 B66A Radios (**REPLACE**)

(3) Alcatel Lucent – TD-RRH8X20-25 Radios (**REMOVE**) – (3) Ericsson – 4449 B71+B85 Radios (**REPLACE**)

(3) Alcatel Lucent – PCS 1900MHz 4X45-65MHz Radios (**REMOVE**) – (3) Ericsson – 4424 B25 Radios (**REPLACE**)

Install New:

(3) AIR6449 B41 Antennas

(4) 1 5/8" hybrid cables

Ground:

Install New:

- (1) SSC 6160 cabinet
- (1) B160 battery cabinet
- (1) BB6648
- (3) BB6630
- (1) PSU 4813 voltage booster
- (1) DUG20
- (1) CSR IXRe router V2

The facility was approved by the Connecticut Siting Council in Docket No. 212 on June 3, 2002. The approval was given with conditions which this exempt modification follows.

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 Mary Mitta, First Selectwoman for the Town of Stafford, as well as David Perkins, Zoning Enforcement Officer for the Town of Stafford. A copy will also be sent to 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).

Melanie A. Bachman

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Sincerely,

A handwritten signature in black ink, appearing to read 'Richard Zajac', written in a cursive style.

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

cc:

The Honorable Mary Mitta, First Selectwoman (*via email only to staffordtownhall@staffordct.org*)
Stafford Town Hall
1 Main Street
Stafford Springs, CT 06076

David Perkins, Zoning Enforcement Official (*via email only to zoning@staffordct.org*)
Stafford Town Hall
1 Main Street
Stafford Springs, CT 06076

Harry & Nancy Pragl (*via email only to hpragl@cox.net*)
PO Box 154 B
Staffordville, CT 06077

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 19, 2021 12:51 PM
To: First Selectman, Town of Stafford
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 175 Stafford St.pdf

Good afternoon Ms. Mitta,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 175 Stafford Street in Stafford.

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

Thank you,

RICH ZAJAC

Site Acquisition Specialist

T: (585) 445-5896 M: (607) 346-7212

F: (724) 416-4461

CROWN CASTLE

4545 East River Road, Suite 320

West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 19, 2021 12:52 PM
To: zoning@staffordct.org
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 175 Stafford St.pdf

Good afternoon Mr. Perkins,

Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 175 Stafford Street in Stafford.

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

Thank you,

RICH ZAJAC

Site Acquisition Specialist

T: (585) 445-5896 M: (607) 346-7212

F: (724) 416-4461

CROWN CASTLE

4545 East River Road, Suite 320

West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Friday, March 19, 2021 12:53 PM
To: hpragl@cox.net
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 175 Stafford St.pdf

Good afternoon Mr. & Mrs. Pragl,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 175 Stafford Street in Stafford.

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

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

Exhibit A

Original Facility Approval

DOCKET NO. 212 - Sprint Spectrum, L.P. d/b/a Sprint PCS application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telecommunications facility adjacent to 156 Stafford Street or 159 Stafford Street, Stafford, Connecticut.	} } } } }	Connecticut Siting Council June 3, 2002
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Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility at the proposed alternate D (deer stand) site located at 159 Stafford Street, in Stafford, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Sprint Spectrum d/b/a Sprint PCS for the construction, maintenance, and operation of a wireless telecommunications facility at the proposed alternate D (deer stand) site located at 159 Stafford Street Stafford, Connecticut. We deny certification of the proposed prime site and alternate A, B, and C sites located off Stafford Street, Stafford, Connecticut.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas for Sprint PCS, and other telecommunications entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level including all appurtenances.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include: a final site plan(s) for development of the proposed alternate site including a compound reduced in size, the location and specifications for the tower foundation, antennas, equipment and foundation for equipment, security fence, access road to be no closer than 25 feet to any inland wetlands, and utility line that shall be underground; construction plans for site clearing, tree trimming, water drainage, and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended; landscaping; and provisions for the prevention and containment of spills and/or other discharge into adjacent inland wetlands.
3. The Certificate Holder shall not construct during the months of May, June, and July for the protection of a State species of special concern, the whip-poor-wills (*Caprimulgus vociferus*).
4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall provide electromagnetic radio frequency power density measurements within sixty days following commencement of commercial operation.
6. The Certificate Holder shall provide the Council with a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

7. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
8. Following completion of construction, if the facility does not initially provide or permanently ceases to provide wireless services this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment within sixty days, or reapply for any continued or new use to the Council before any such use is made.
9. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.
10. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant, Stafford Reminder and the Journal Inquirer.

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

The parties and intervenors to this proceeding are:

Applicant

Sprint Spectrum, d/b/a Sprint PCS

Thomas J. Regan, Esq.
Brown, Rudnick, Freed & Gesmer, P.C.
CityPlace 1, 38th Floor
185 Asylum Street
Hartford, CT 06103-3402

Intervenor

Citizens for Neighborhood Preservation

Glen E. Coe, Esq.
Lewis B. Rome, Esq.
Rome McGuigan Sabanosh, P.C.
Attorneys At Law
One State Street
Hartford, CT 06103-3101

Party

Town of Stafford

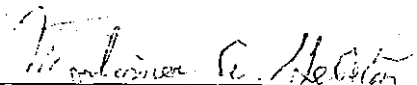
Gordon J. Frassinelli, Jr.
First Selectman
Town of Stafford
Warren Memorial Town
1 Main Street, P.O. Box 11
Stafford Springs, CT 06076

CERTIFICATION


The undersigned members of the Connecticut Siting Council (Council) hereby certify that they have heard this case, or read the record thereof, in Docket No. 212 – Sprint Spectrum, L.P. d/b/a Sprint PCS application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a wireless telecommunications facility adjacent to 156 Stafford Street or 159 Stafford Street, Stafford, Connecticut, and voted as follows to approve the alternate D (deer stand) site at 159 Stafford Street, and deny the prime site (156 Stafford Street), and alternate sites A, B and C:

Council Members

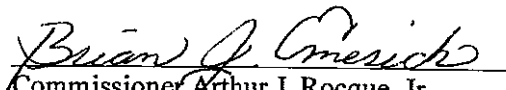
Vote Cast


Mortimer A. Gelston, Chairman

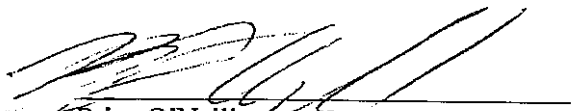
Yes


Commissioner Donald W. Downes
Designee: Gerald J. Heffernan

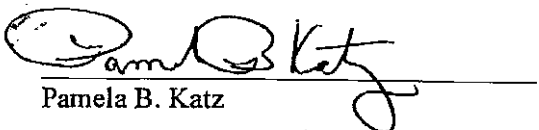
Yes


Commissioner Arthur J. Rocque, Jr.
Designee: Brian J. Emerick

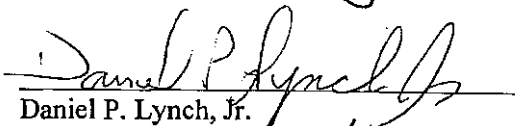
Yes


Brian O'Neill

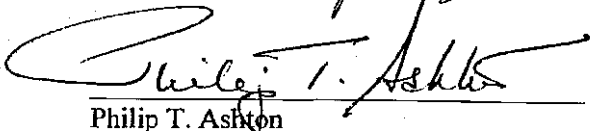
Yes


Pamela B. Katz

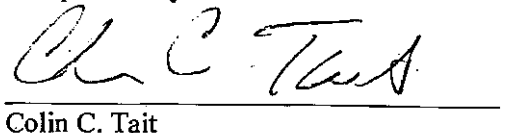
Yes


Daniel P. Lynch, Jr.

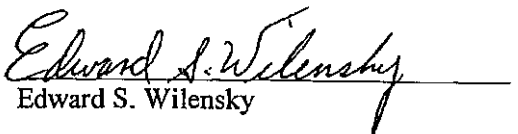
Yes


Philip T. Ashton

Yes


Colin C. Tait

Yes


Edward S. Wilensky

Yes

Dated at New Britain, Connecticut, June 3, 2002.

STATE OF CONNECTICUT)
ss. New Britain, Connecticut):
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the Findings of Fact, Opinion, and Decision and Order issued by the Connecticut Siting Council, State of Connecticut.

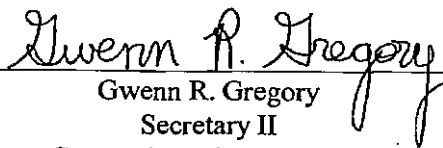
ATTEST:



S. Derek Phelps
Executive Director
Connecticut Siting Council

I certify that a copy of the Findings of Fact, Opinion, and Decision and Order in Docket No. 212 has been forwarded by Certified First Class Return Receipt Requested mail on June 5, 2002, to all parties and intervenors of record as listed on the attached service list, dated January 18, 2002.

ATTEST:



Gwenn R. Gregory
Secretary II
Connecticut Siting Council

Exhibit B

Property Card

175 STAFFORD ST

Location 175 STAFFORD ST

Mblu 30 / 12 / 1

Acct# 00142200

Owner PRAGL HARRY J+NANCY C

Assessment \$181,790

Appraisal \$259,700

PID 1596

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2020	\$206,300	\$53,400	\$259,700

Assessment			
Valuation Year	Improvements	Land	Total
2020	\$144,410	\$37,380	\$181,790

Owner of Record

Owner PRAGL HARRY J+NANCY C
Co-Owner
Address PO BOX 154 B
STAFFORDVILLE, CT 06077

Sale Price \$0
Certificate 1
Book & Page 340 / 409
Sale Date 09/03/1998
Instrument

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
PRAGL HARRY J+NANCY C	\$0	1	340 / 409		09/03/1998

Building Information

Building 1 : Section 1

Year Built: 1972
Living Area: 2,295
Replacement Cost: \$239,154
Building Percent Good: 80
Replacement Cost
Less Depreciation: \$191,300

Building Attributes

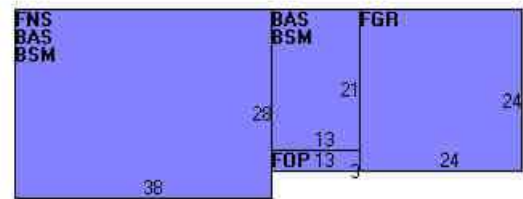
Field	Description
Style	Colonial
Model	Residential
Grade:	C+
Stories	2
Occupancy	1
Exterior Wall 1	Aluminum Sidng
Exterior Wall 2	Brick
Roof Structure	Gambrel
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	4
Full Bthrms:	1
Half Baths:	1
Extra Fixtures	0
Total Rooms:	8
Bath Style:	Average
Kitchen Style:	Average
Num Kitchens	1
Fireplaces	1
Extra Openings	
Prefab Fpl(s)	
Attic Type	None
Bsmt Type	Full
Bsmt Garage(s)	0
Fin Bsmnt	0
Fn. Bmt. Qual.	
Unfin Area	0.00
Fndtn Cndtn	
Basement	

Building Photo



(<http://images.vgsi.com/photos2/StaffordCTPhotos/\00\00\94\84.jpg>)

Building Layout



(http://images.vgsi.com/photos2/StaffordCTPhotos/Sketches/1596_1596.jr)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,337	1,337
FNS	Finished 90% Story	1,064	958
BSM	Basement	1,337	0
FGR	Garage	576	0
FOP	Open Porch	39	0
		4,353	2,295

Extra Features

Extra Features

Legend

No Data for Extra Features

Land

Land Use

Use Code 101
Description Res Dwelling
Zone AA
Neighborhood 240
Alt Land Appr Category No

Land Line Valuation

Size (Acres) 3.98
Frontage
Depth
Assessed Value \$37,380
Appraised Value \$53,400

Outbuildings

Outbuildings						<u>Legend</u>
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
BRN6	2S Barn w/ Bsmt			748.00 S.F.	\$15,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$198,700	\$61,900	\$260,600
2018	\$198,700	\$61,900	\$260,600
2017	\$198,700	\$61,900	\$260,600

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$139,090	\$43,330	\$182,420
2018	\$139,090	\$43,330	\$182,420
2017	\$139,090	\$43,330	\$182,420

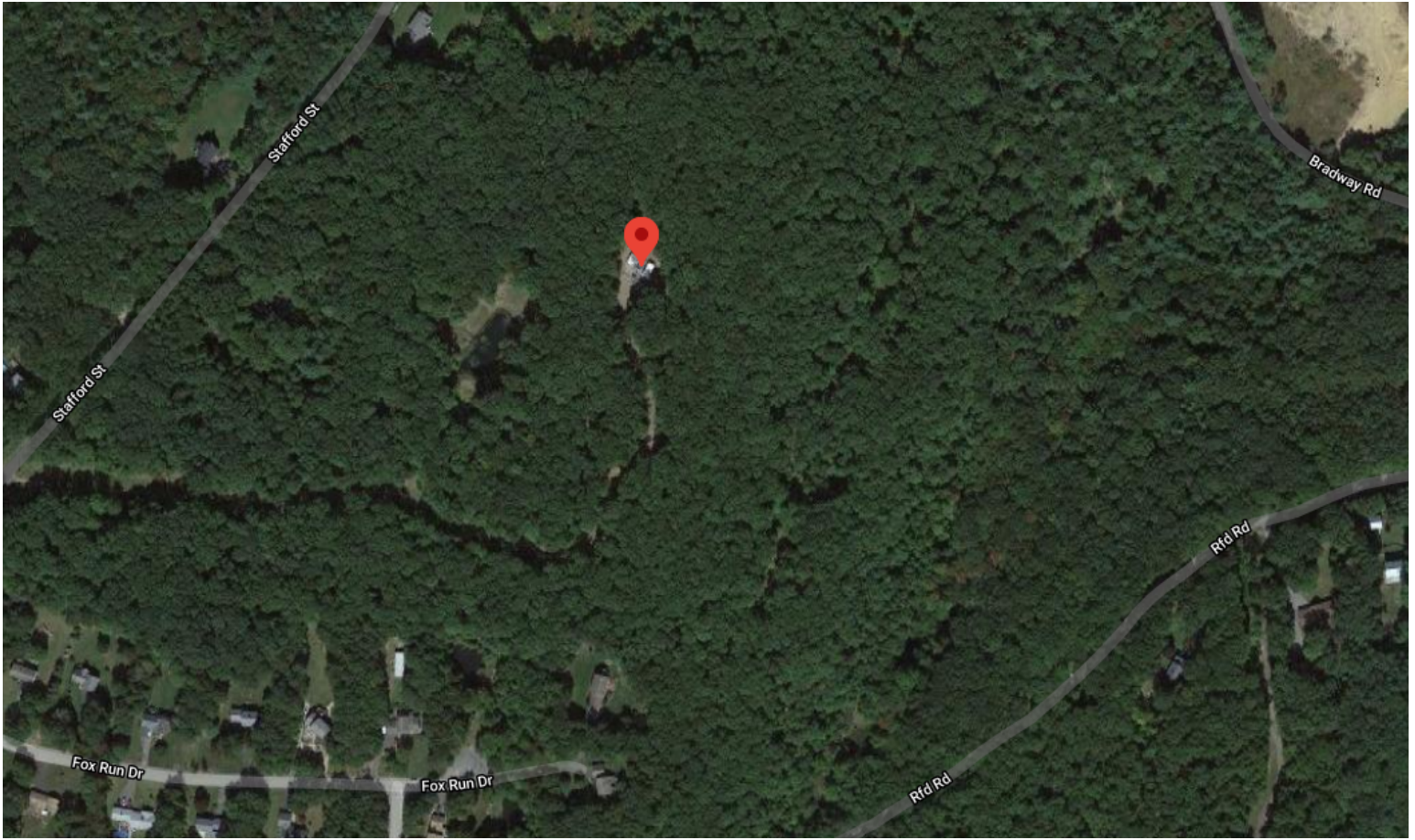


Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CTHA628A
T-MOBILE SITE NAME: CTHA628A
SITE TYPE: MONOPOLE
TOWER HEIGHT: 150'-0"

BUSINESS UNIT #: 876402
SITE ADDRESS: 175 STAFFORD ST
STAFFORD SPRINGS, CT 06077
COUNTY: TOLLAND
JURISDICTION: TOWN OF STAFFORD

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

T-Mobile
 4 SYLVAN WAY
 PARSIPPANY, NJ 07054

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

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

T-MOBILE SITE NUMBER
: CTHA628A
 BU #: **876402**
STAFFORD/PRAGYL/SSUSA
 175 STAFFORD ST
 STAFFORD SPRINGS, CT 06077
 EXISTING
 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ

SITE INFORMATION	
CROWN CASTLE USA INC. SITE NAME:	STAFFORD/PRAGYL/SSUSA
SITE ADDRESS:	175 STAFFORD ST STAFFORD SPRINGS, CT 06077
COUNTY:	TOLLAND
MAP/PARCEL #:	09013134-30/7
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.98705
LONGITUDE:	-72.2613
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	962'
CURRENT ZONING:	ST, AA
JURISDICTION:	TOWN OF STAFFORD
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	PRAGL HARRY J+NANCY B PO BOX 154 B STAFFORDVILLE, CT 06077
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

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

PROJECT DESCRIPTION
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.
TOWER SCOPE OF WORK:
<ul style="list-style-type: none"> REMOVE (6) ANTENNAS REMOVE (9) RADIOS REMOVE (4) 1 5/8" HYBRID CABLES INSTALL (9) ANTENNAS INSTALL (9) RADIOS INSTALL (4) 1 5/8" HYBRID CABLE
GROUND SCOPE OF WORK:
<ul style="list-style-type: none"> RETAIN (2) CABINET INSTALL (1) 6160 SSC CABINET INSTALL (1) B160 BATTERY CABINET INSTALL (1) RBS 6601 IN NEW 6160 SSC CABINET INSTALL (1) BB 6648 IN NEW 6160 SSC CABINET INSTALL (3) RB 6630 IN NEW 6160 SSC CABINET INSTALL (1) DUG 20 IN NEW 6160 SSC CABINET INSTALL (1) PSU 4813 VOLTAGE BOOSTER INSTALL (1) CSR IXRE V2
NOTE: PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

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	2015/18 IBC
MECHANICAL	2015/18 IMC
ELECTRICAL	2017/18 NEC
REFERENCE DOCUMENTS:	
STRUCTURAL ANALYSIS:	BY OTHERS
DATED:	
MOUNT ANALYSIS:	BY OTHERS
DATED:	
RFDS REVISION:	1
DATED:	1/15/21
ORDER ID:	538764
REVISION:	0

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.

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.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED.
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...

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.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
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...

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.
4. CONCRETE EXPOSED TO FREEZE--THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185.
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS.
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.
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).
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 THE 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.

Table with 3 columns: SYSTEM, CONDUCTOR, COLOR. It lists color codes for various systems like 120/240V, 120/208V, 277/480V, and DC VOLTAGE.

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

ABBREVIATIONS:

Table listing abbreviations such as ANT (ANTENNA), (E) (EXISTING), FIF (FACILITY INTERFACE FRAME), GEN (GENERATOR), GPS (GLOBAL POSITIONING SYSTEM), GSM (GLOBAL SYSTEM FOR MOBILE), etc.

APWA UNIFORM COLOR CODE:

Color key for 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)

T-Mobile logo with address: 4 SYLVAN WAY PARSIPPANY, NJ 07054

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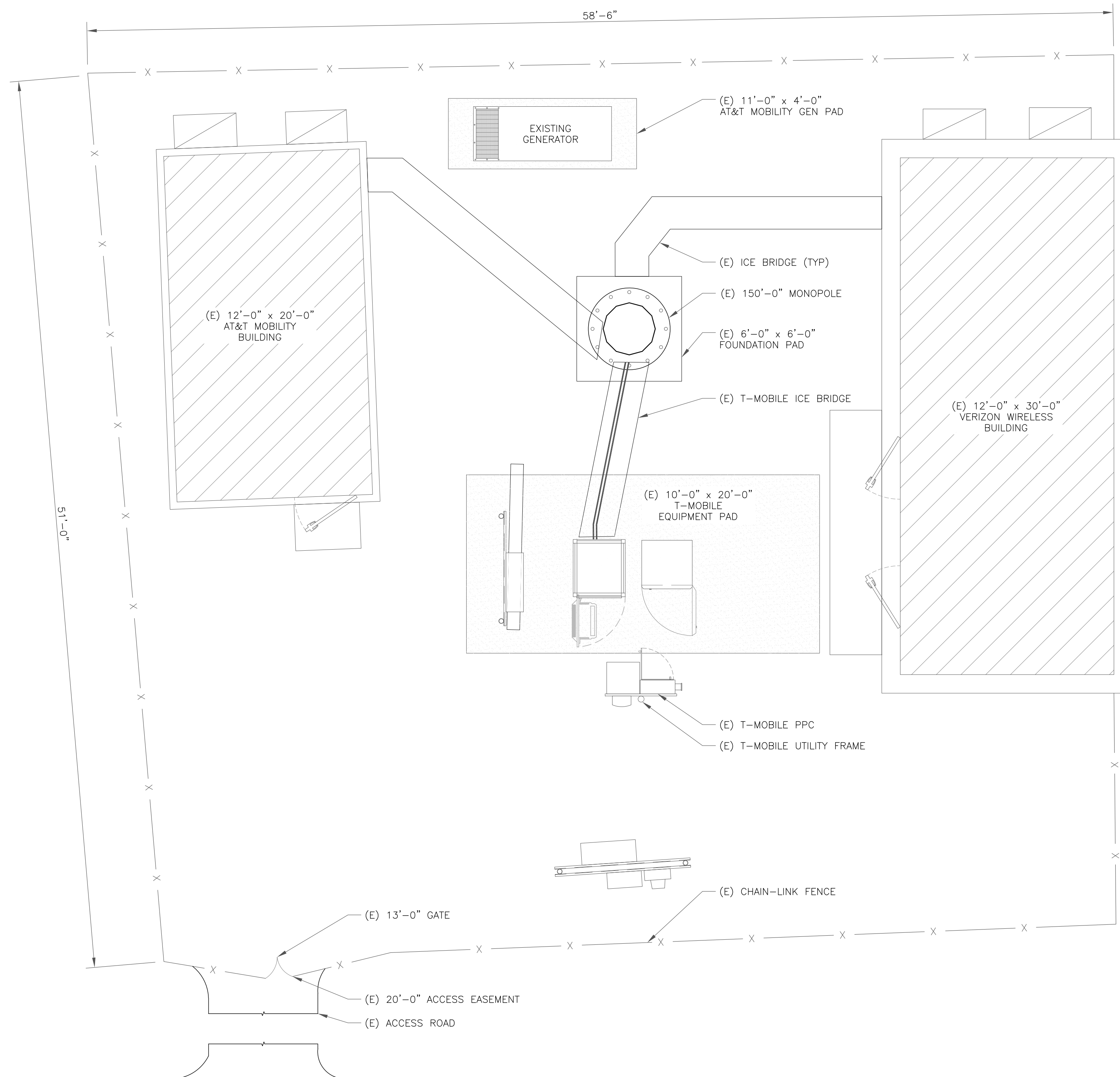
T-MOBILE SITE NUMBER : CTHA628A BU #: 876402 STAFFORD/PRAGYL/SSUSA 175 STAFFORD ST STAFFORD SPRINGS, CT 06077 EXISTING 150'-0" MONOPOLE

ISSUED FOR: Table with 5 columns: REV, DATE, DRWN, DESCRIPTION, DES./QA. Shows two revisions from 2/22/21 to 3/5/21.

Professional Engineer Seal for B&T ENGINEERING, INC. License No. 23924, expires 2/10/21. Statement: 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

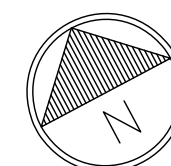
SITE PLAN DISCLAIMER:
 PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS OR FROM ASSESSORS MAPS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET



STAFFORD ST

APN: 09013134-30/7
 ZONING: ST, AA

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



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 : CTHA628A
 BU #: 876402
STAFFORD/PRAGYL/SSUSA
 175 STAFFORD ST
 STAFFORD SPRINGS, CT 06077
 EXISTING
 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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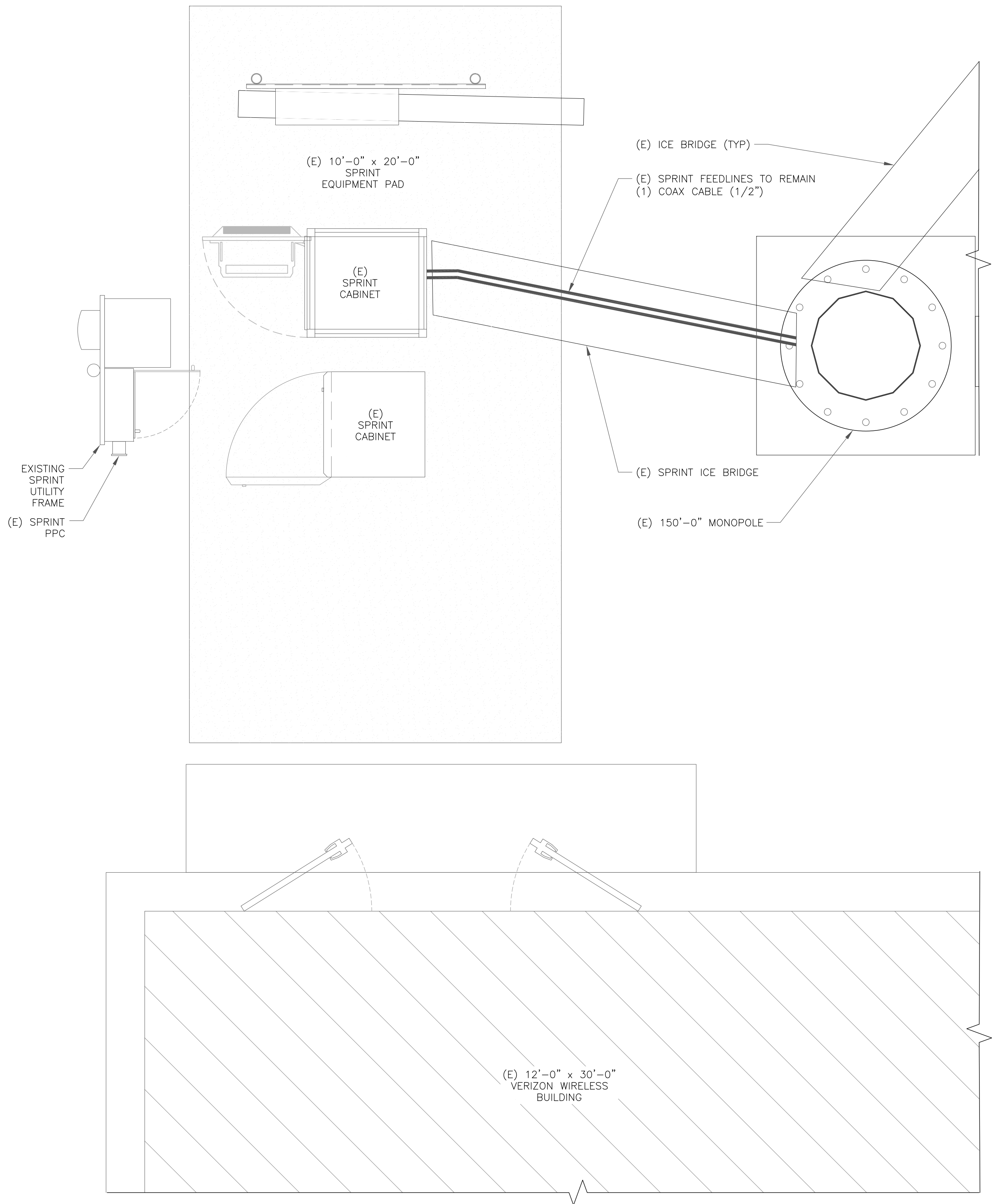
SHEET NUMBER: **C-1.1** REVISION: **1**

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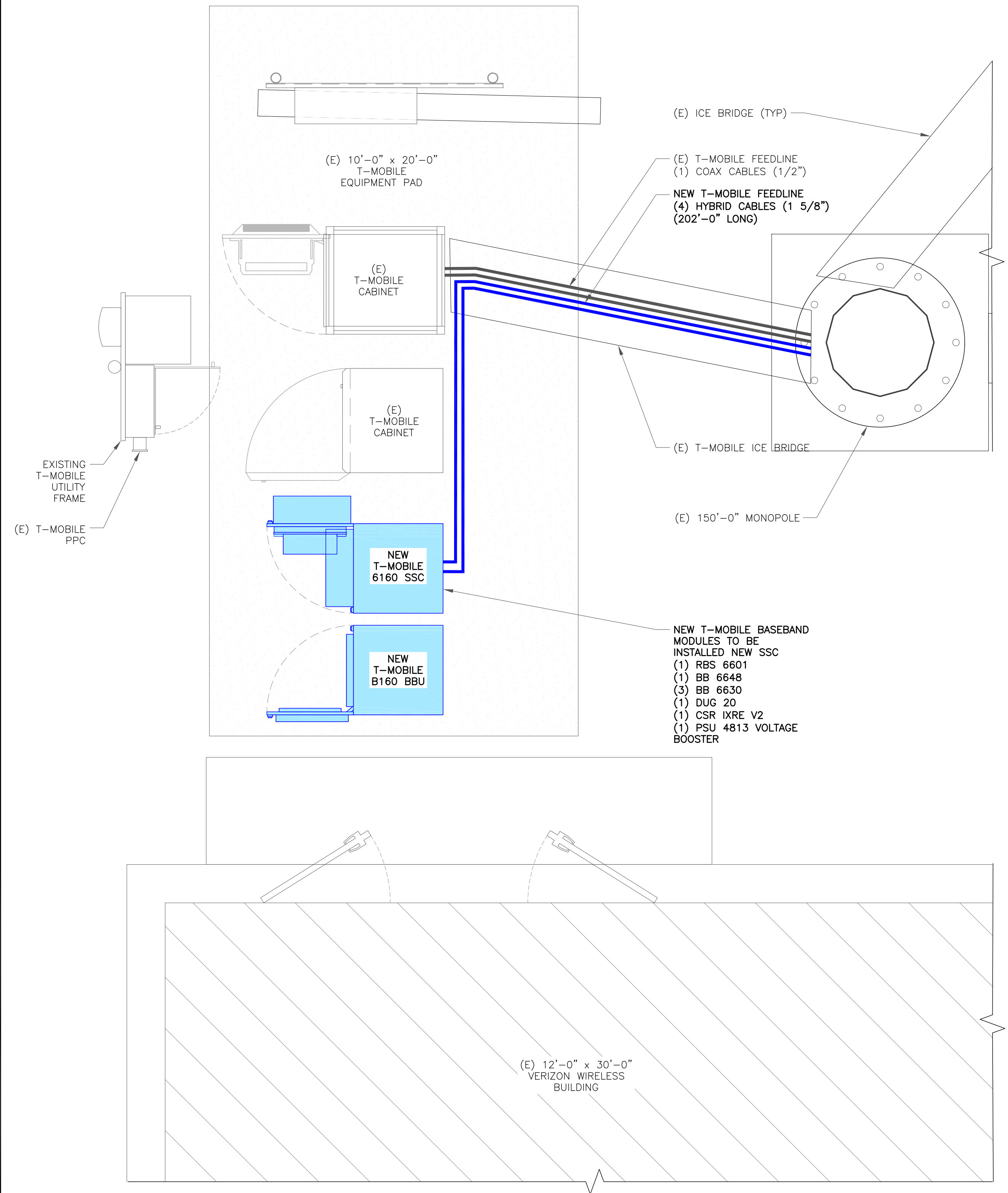
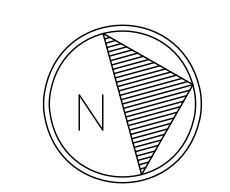
84466.004.01 STAFFORD_CC_TMO_NE_CD Upgrades.dwg - Sheet-C-1.2 - User: jdurbar - Mar 05, 2021 - 4:20pm

EQUIPMENT LEGEND:

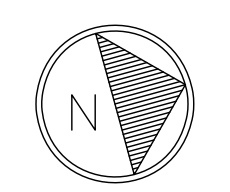
- EXISTING
- TO BE RELOCATED/REMOVED
- NEW



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



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



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T-MOBILE SITE NUMBER : CTHA628A

BU #: 876402

STAFFORD/PRAGYL/SSUSA

175 STAFFORD ST
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EXISTING 150'-0" MONOPOLE

ISSUED FOR:

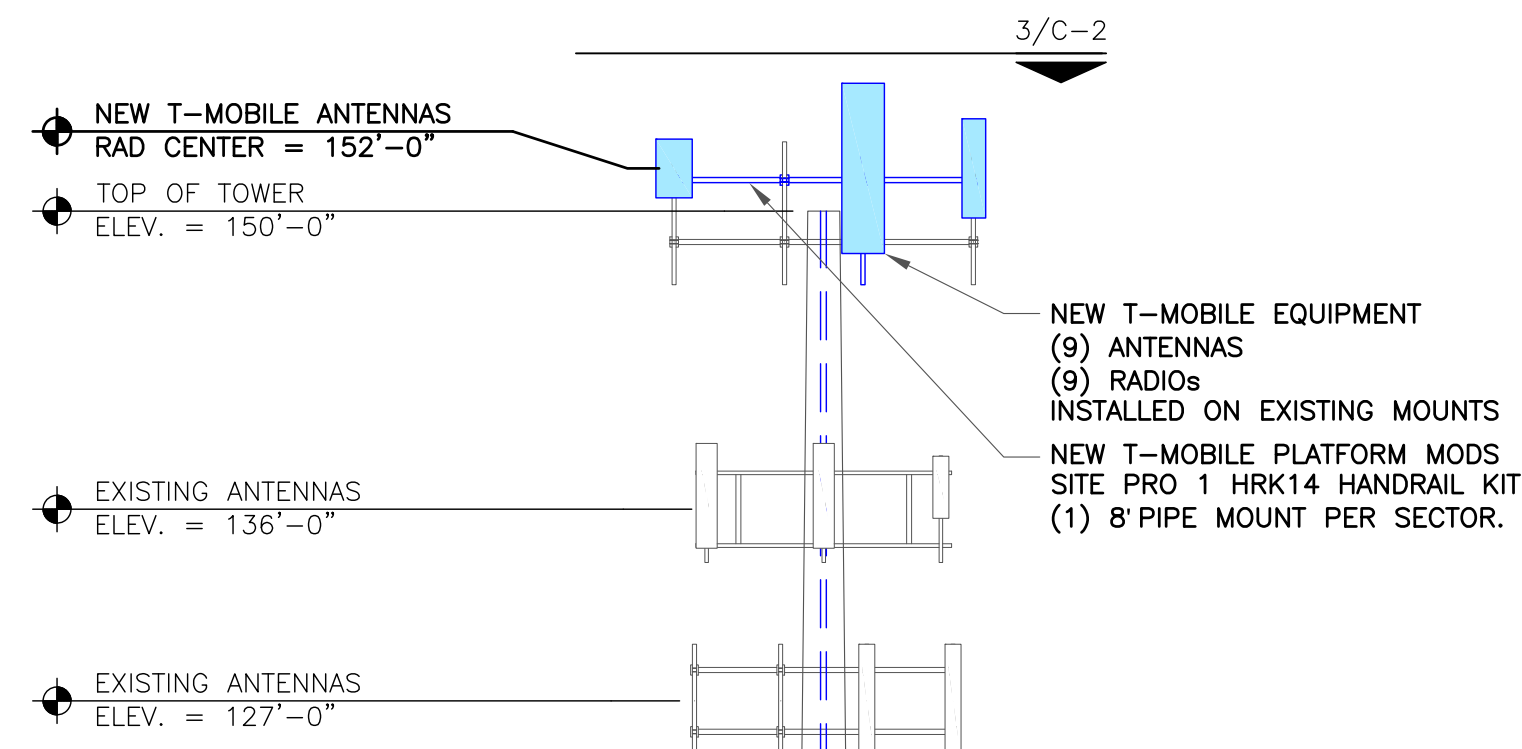
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ

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SHEET NUMBER: C-1.2

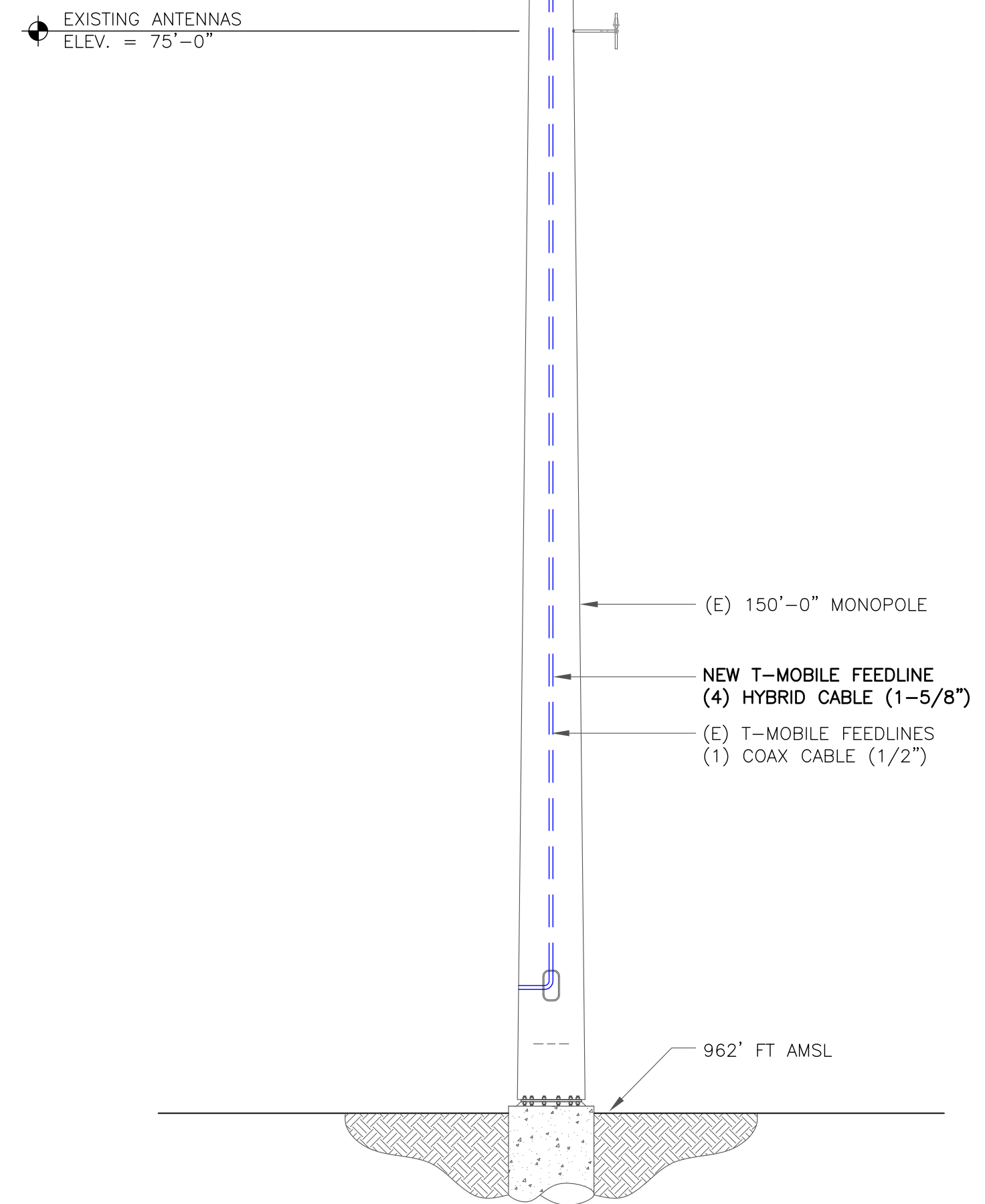
REVISION: 1



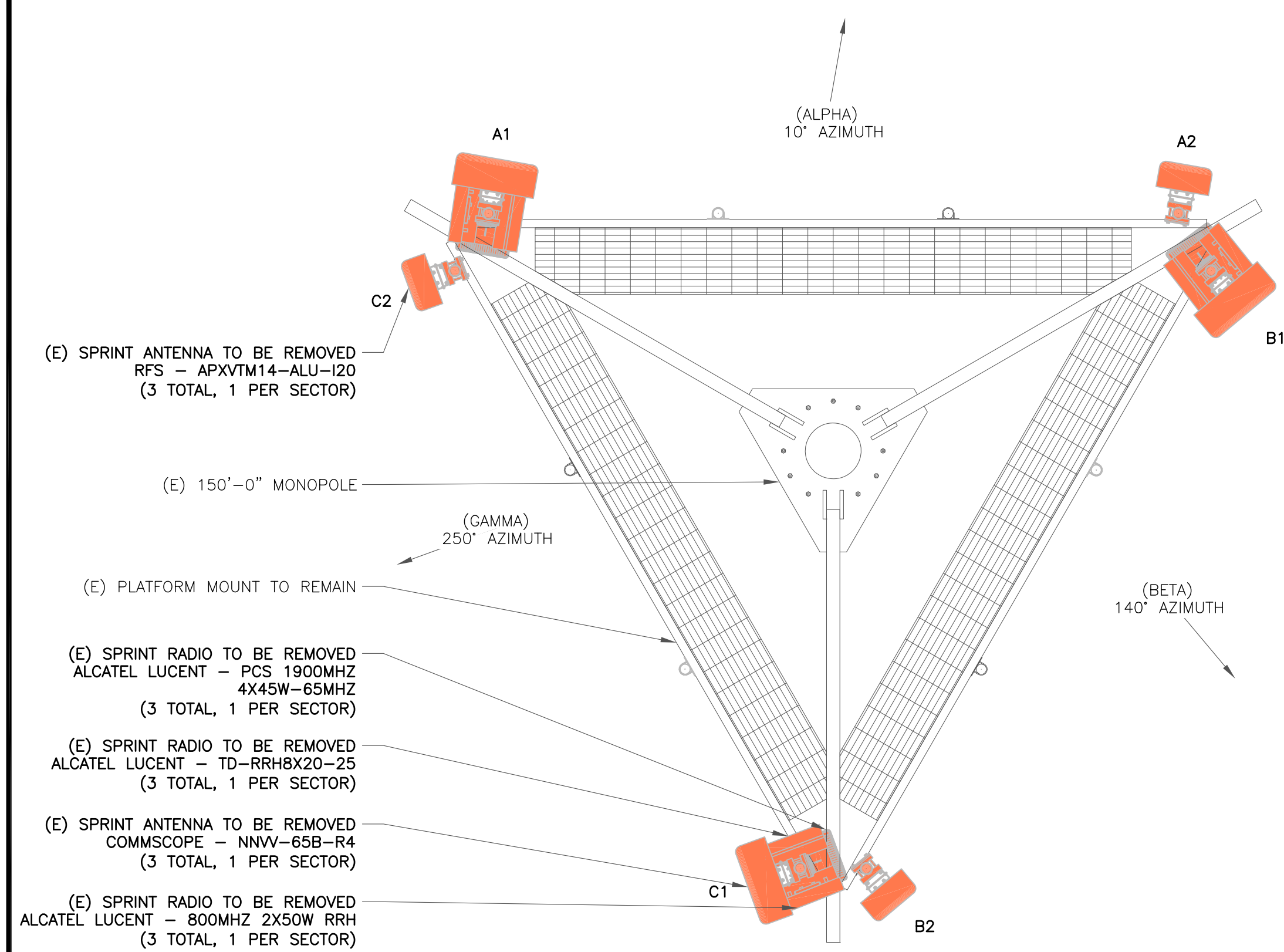
T-MOBILE EQUIPMENT

ANTENNA CL: 152'-0"
MOUNT CL: 150'-0"

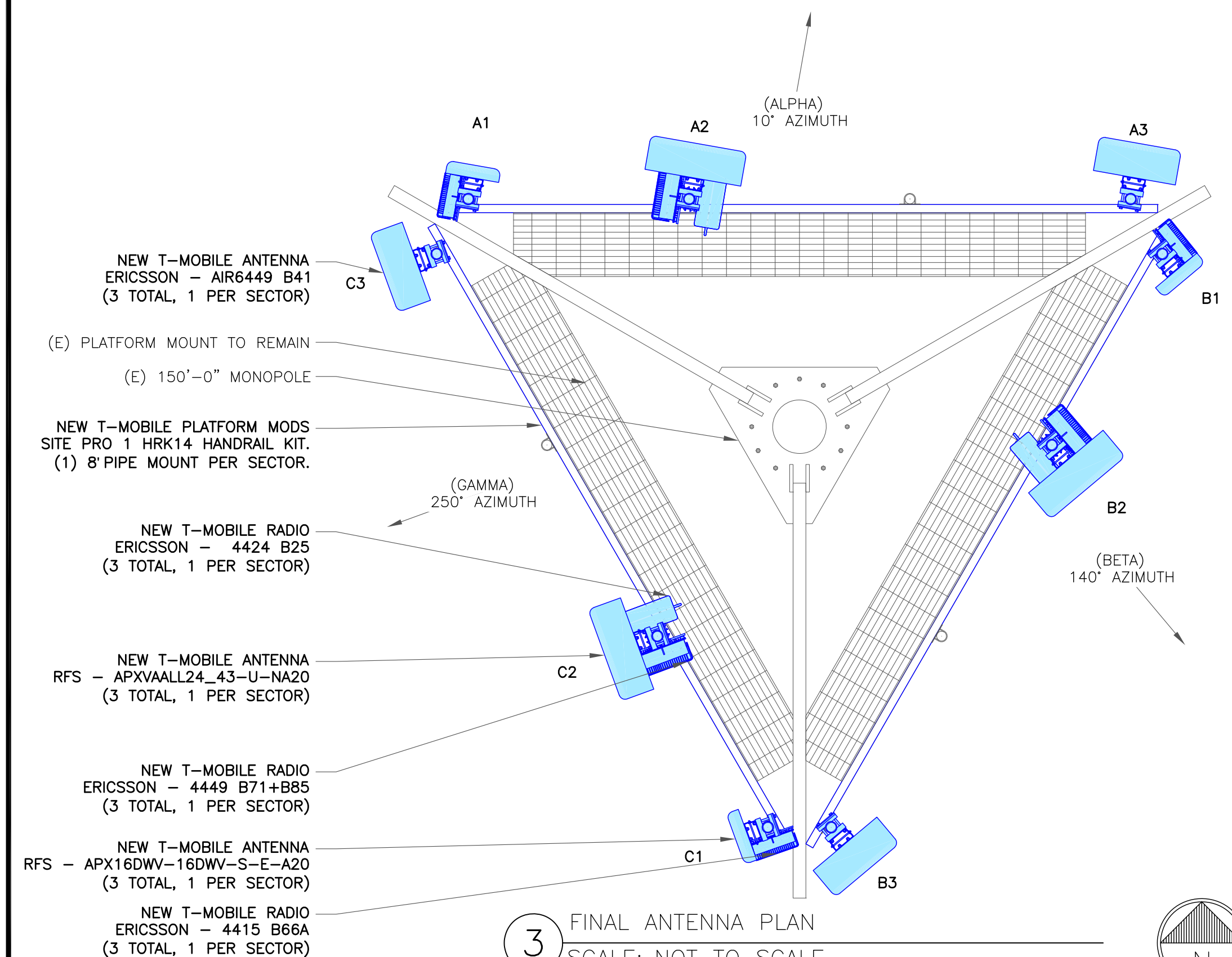
ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB



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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SHEET NUMBER: **C-2** REVISION: **1**

84466.004.01 STAFFORD_CC_TMO_NE_CD Upgrades.dwg - Sheet-C-2 - User: jdurbin - Mar 05, 2021 - 4:21pm

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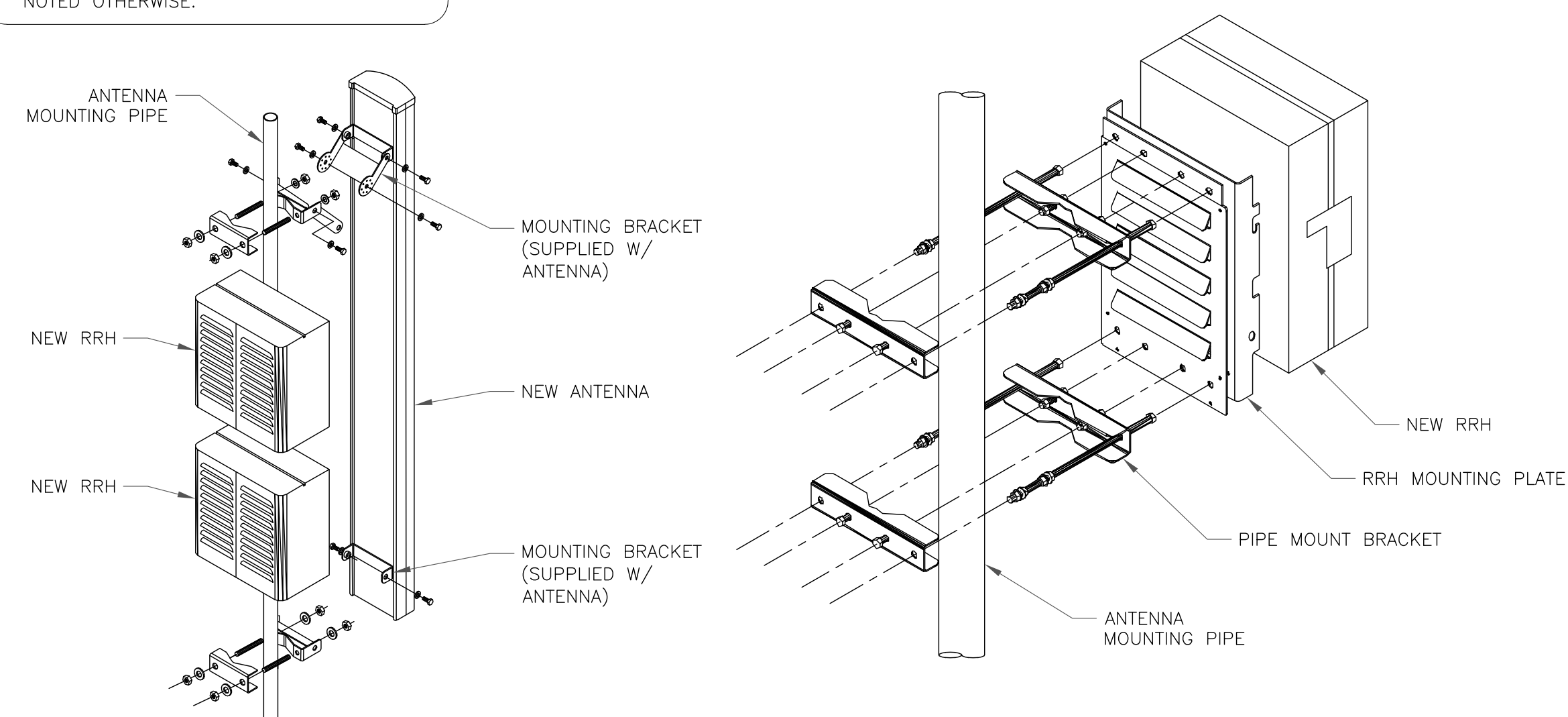
EXISTING
150'-0" MONOPOLE

RF SYSTEM SCHEDULE												
SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	CABLE TYPE	CABLE DIAMETER	CABLE LENGTH
ALPHA	A-1	L2100	RFS	APX16DW-16DW-S-E-A20	10°	-	-	152'-0"	(1) 4415 B66A	(1) COAX	1/2"	202'
	A-2	L700/L600/N600 /L1900/G1900	RFS	APXVAARR24_43-U-NA20	10°	-	-	152'-0"	(1) 4449 B71+B85 (1) 4424 B25	(1) HYBRID	1 5/8"	202'
	A-3	L2500/N2500	ERICSSON	AIR6449 B41	10°	-	-	152'-0"	-	-	-	-
BETA	B-1	L2100	RFS	APX16DW-16DW-S-E-A20	140°	-	-	152'-0"	(1) 4415 B66A	-	-	-
	B-2	L700/L600/N600 /L1900/G1900	RFS	APXVAARR24_43-U-NA20	140°	-	-	152'-0"	(1) 4449 B71+B85 (1) 4424 B25	(1) HYBRID	1 5/8"	202'
	B-3	L2500/N2500	ERICSSON	AIR6449 B41	140°	-	-	152'-0"	-	-	-	-
GAMMA	C-1	L2100	RFS	APX16DW-16DW-S-E-A20	250°	-	-	152'-0"	(1) 4415 B66A	-	-	-
	C-2	L700/L600/N600 /L1900/G1900	RFS	APXVAARR24_43-U-NA20	250°	-	-	152'-0"	(1) 4449 B71+B85 (1) 4424 B25	(1) HYBRID	1 5/8"	202'
	C-3	L2500/N2500	ERICSSON	AIR6449 B41	250°	-	-	152'-0"	-	-	-	-

1 ANTENNA & FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

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



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ

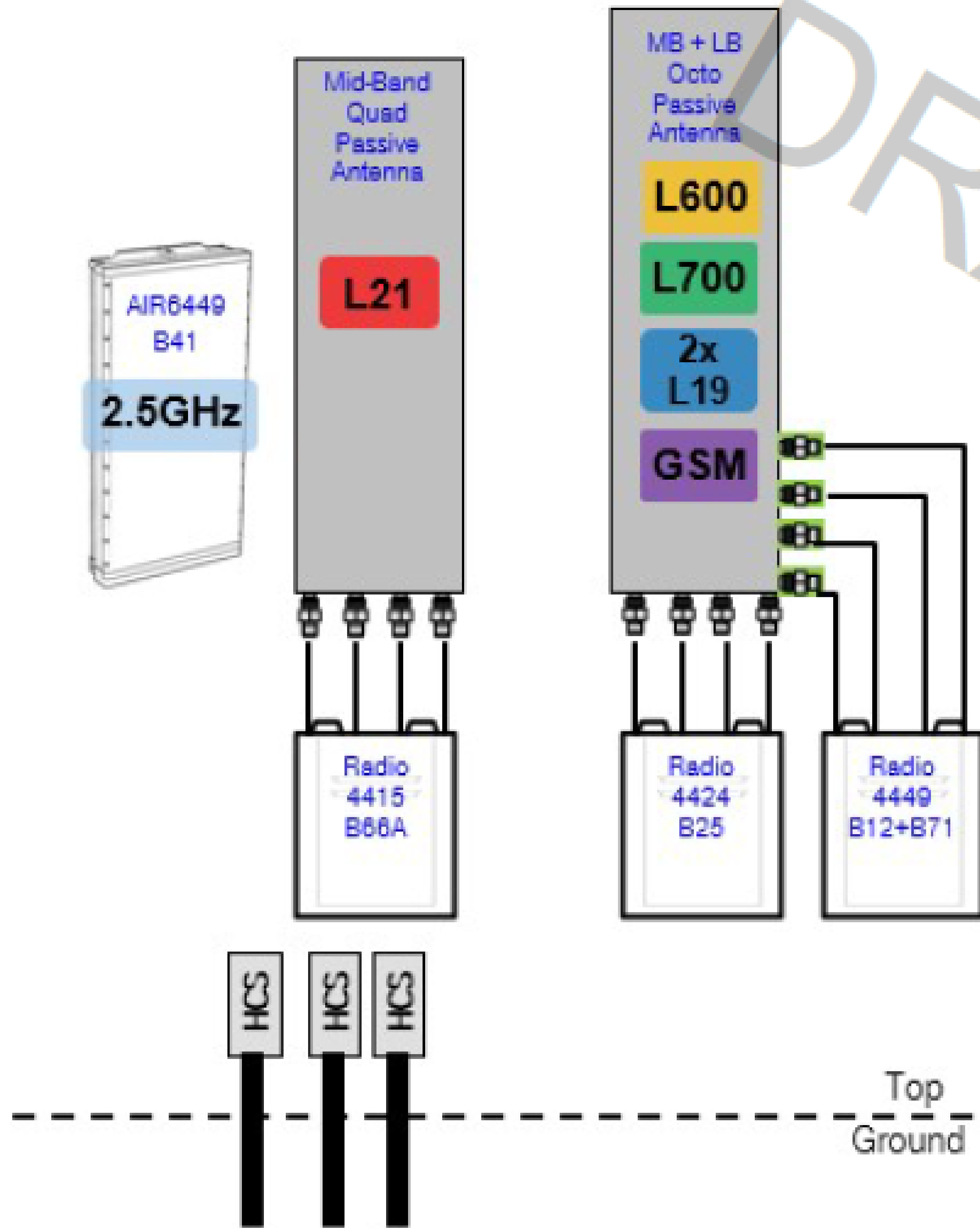


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C-3

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1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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T-MOBILE SITE NUMBER
: CTHA628A

BU #: 876402
STAFFORD/PRAGYL/SSUSA

175 STAFFORD ST
STAFFORD SPRINGS, CT 06077

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

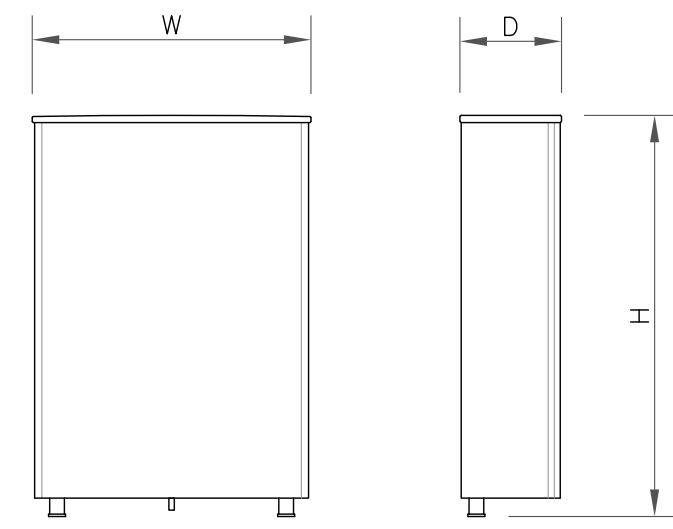
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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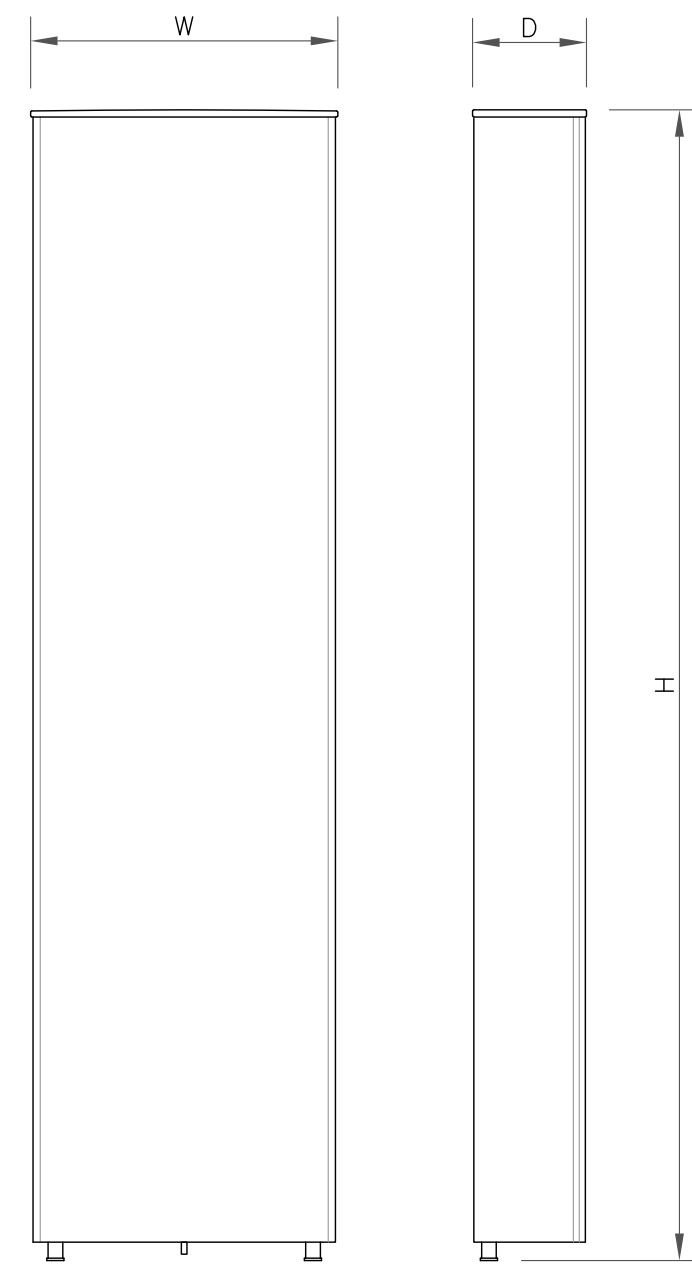
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SHEET NUMBER: **C-4** REVISION: **1**



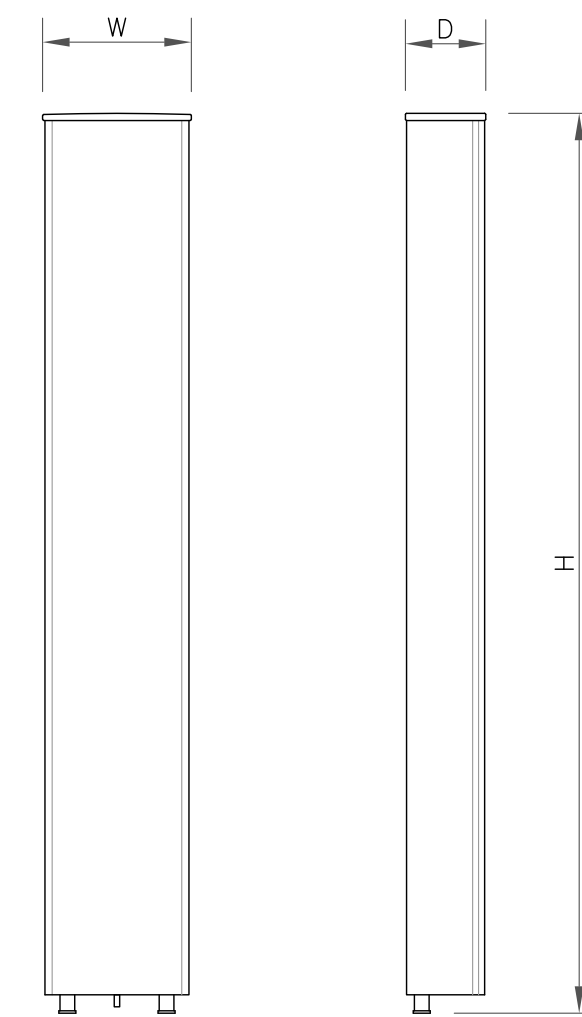
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APX16DWV-16DWV-S-E-A20
WIDTH	13.30"
DEPTH	3.15"
HEIGHT	55.90"
WEIGHT	40.70 LBS

1 ANTENNA SPECS RFS
SCALE: NOT TO SCALE



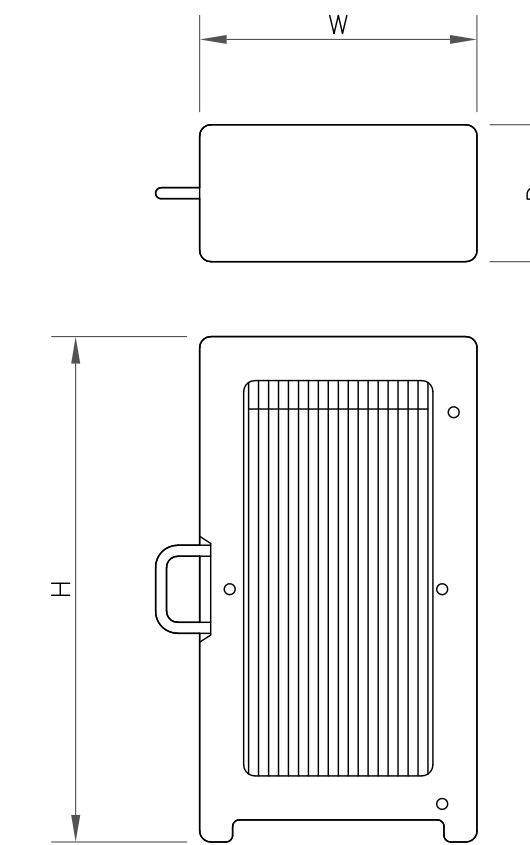
ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAALL24_43-U-NA20
WIDTH	24.00"
DEPTH	8.50"
HEIGHT	95.90"
WEIGHT	149.90 LBS

2 ANTENNA SPECS RFS
SCALE: NOT TO SCALE



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

3 ANTENNA SPECS ERICSSON
SCALE: NOT TO SCALE



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

4 RADIO SPECS ERICSSON
SCALE: NOT TO SCALE

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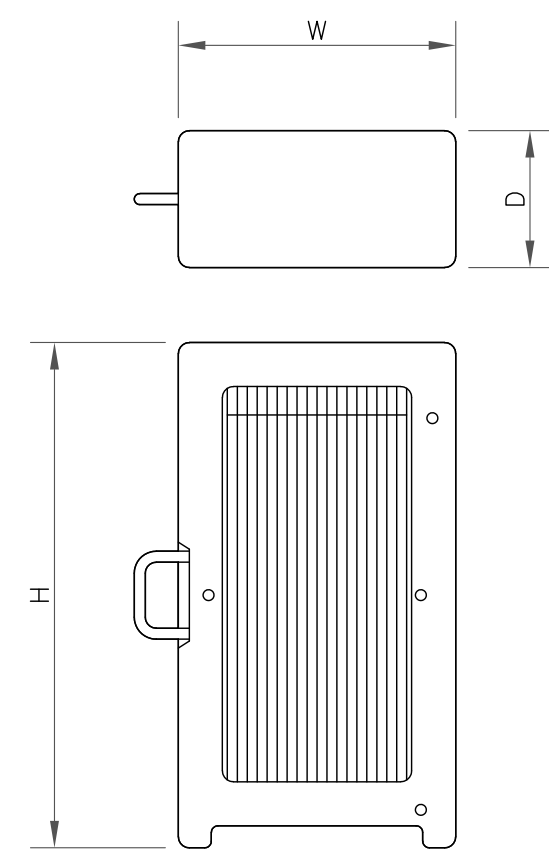
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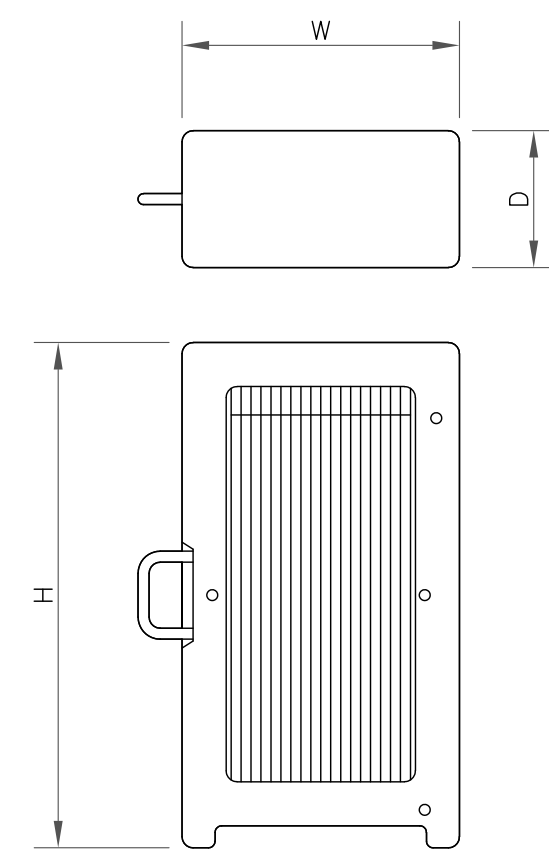
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EXISTING
150'-0" MONOPOLE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449 B71+B85
WIDTH	13.20"
DEPTH	10.63"
HEIGHT	17.91"
WEIGHT	73.21 LBS

5 RADIO SPECS ERICSSON
SCALE: NOT TO SCALE



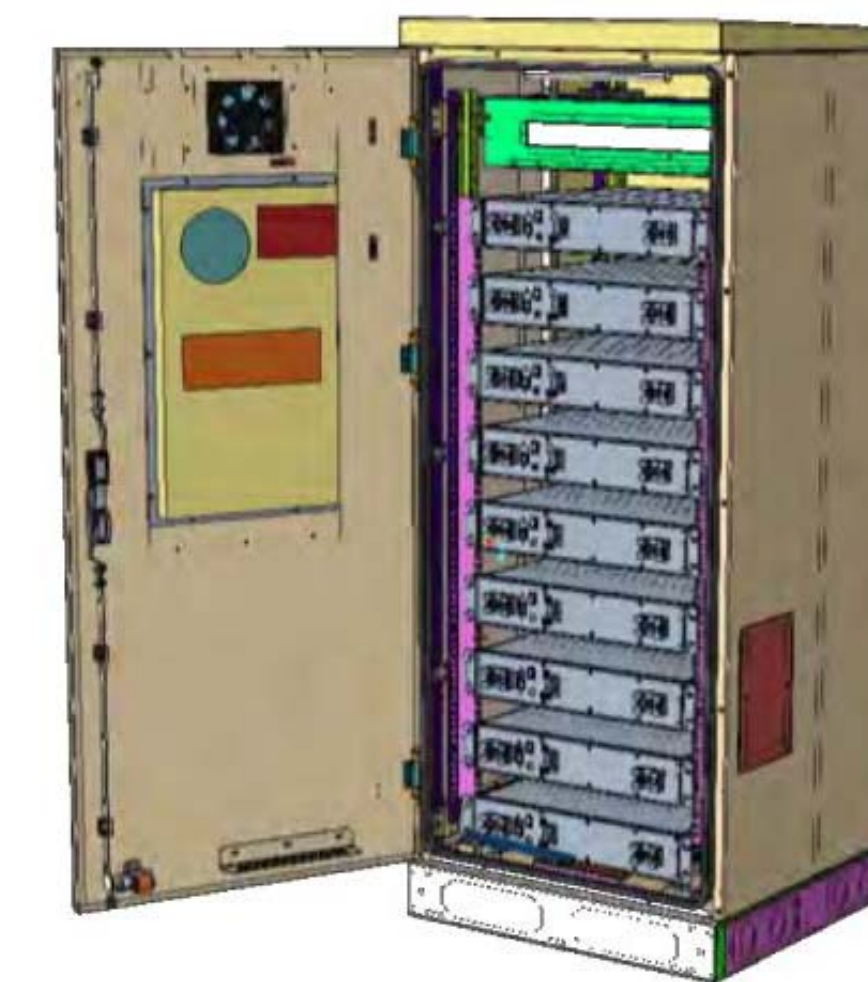
RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4424 B25
WIDTH	14.40"
DEPTH	11.30"
HEIGHT	17.10"
WEIGHT	86 LBS

6 RADIO SPECS ERICSSON
SCALE: NOT TO SCALE



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

7 ERICSSON 6160 SSC
SCALE: NOT TO SCALE



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

8 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE

ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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EXISTING
150'-0" MONOPOLE

ISSUED FOR:

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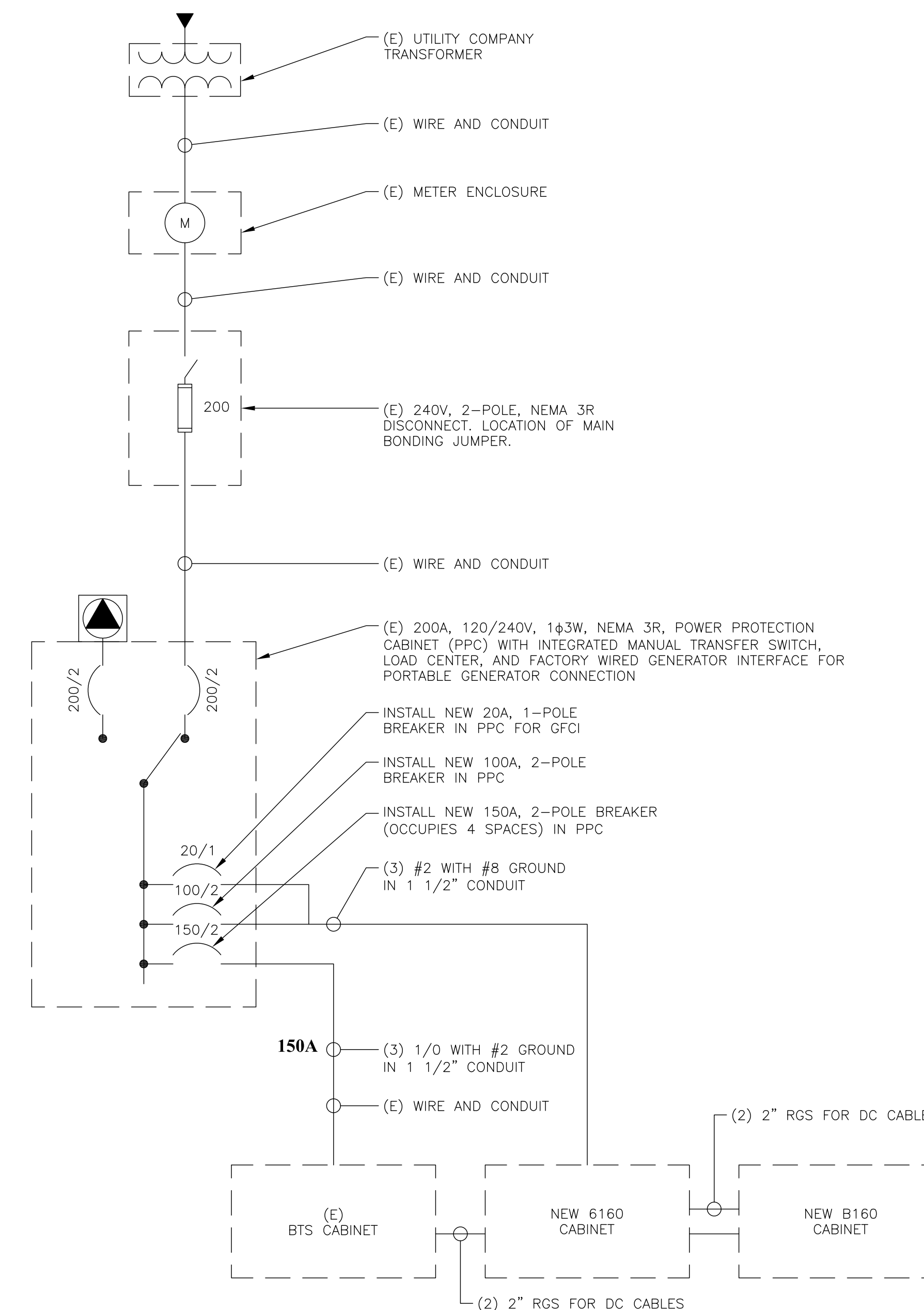
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SHEET NUMBER:

E-1

REVISION:

1



NOTES:

- 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.
- CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD
			L1	L2			
BTS	2	100A	1	2	60A	2	SURGE SUPPRESSOR
LGT. PNL. BRD.	1	20A	3	4			
GFCI TELC BRD.	1	20A	5	6	150A	2	6160
TELC CAB. FAN	1	10A	7	8	15A	1	GFCI TELC CAB.
			9	10	20A	1	GFCI
			11	12			

RATED VOLTAGE: 120/240 480 1 PHASE, 3 WIRE
 RATED AMPS: 100 200 400
 MAIN LUGS ONLY MAIN 200 AMPS BREAKER FUSED SWITCH HINGED DOOR
 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

BRANCH POLES: 12 24 30 42
 APPROVED MF'RS
 CABINET: SURFACE FLUSH NEMA 1 3R 4X
 KEYPED DOOR LATCH

REPLACE EXISTING BREAKER IN POSITION 6 AND 8 WITH A NEW 2P 150A BREAKER
 REPLACE EXISTING WIRES FOR EXISTING CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
 IF 150A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL Q012040M200RB (OR APPROVED EQUAL).
 UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
 FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

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

T-Mobile

4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP

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

T-MOBILE SITE NUMBER
: **CTHA628A**

BU #: **876402**
STAFFORD/PRAGYL/SSUSA

175 STAFFORD ST
STAFFORD SPRINGS, CT 06077

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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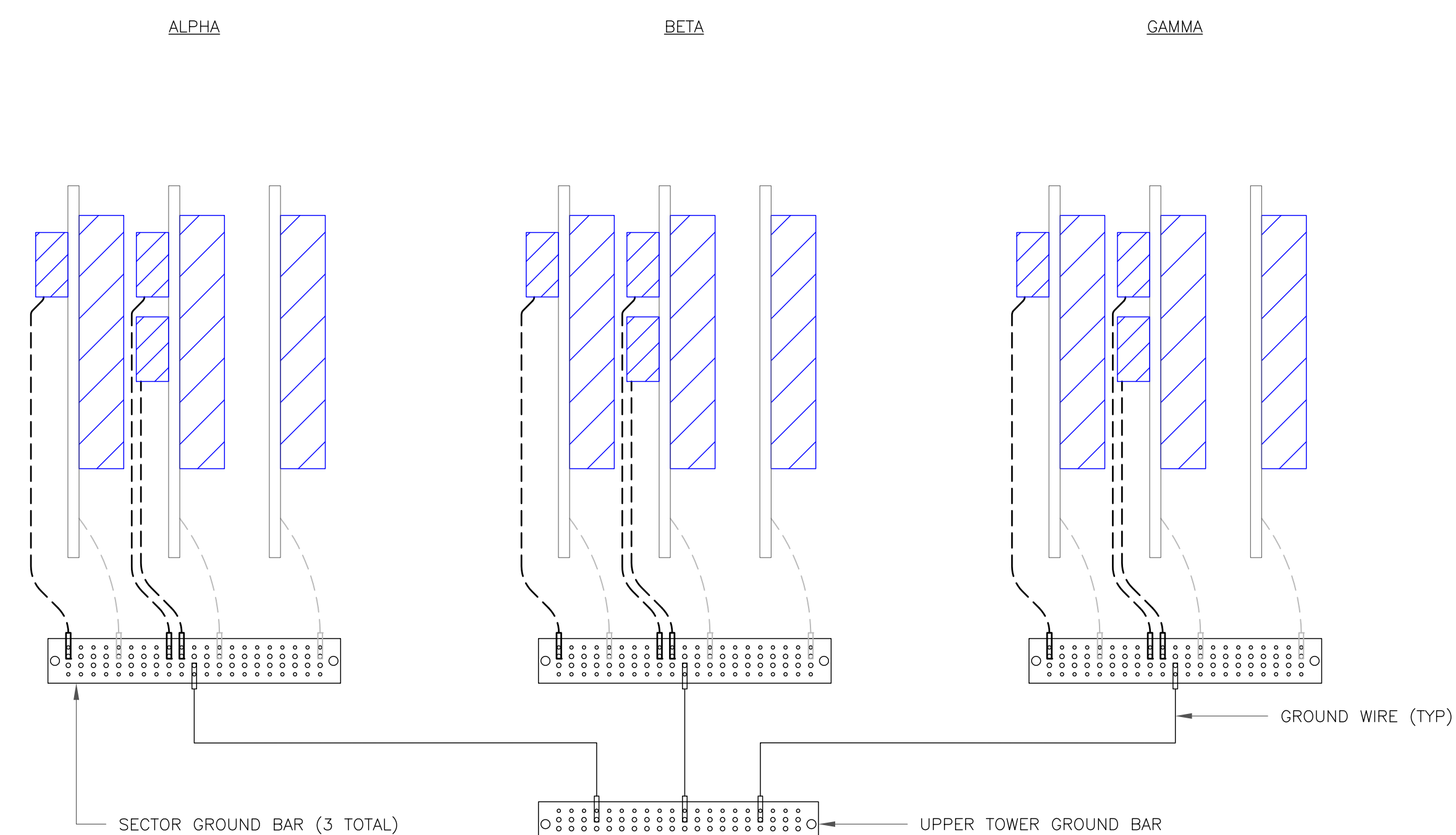
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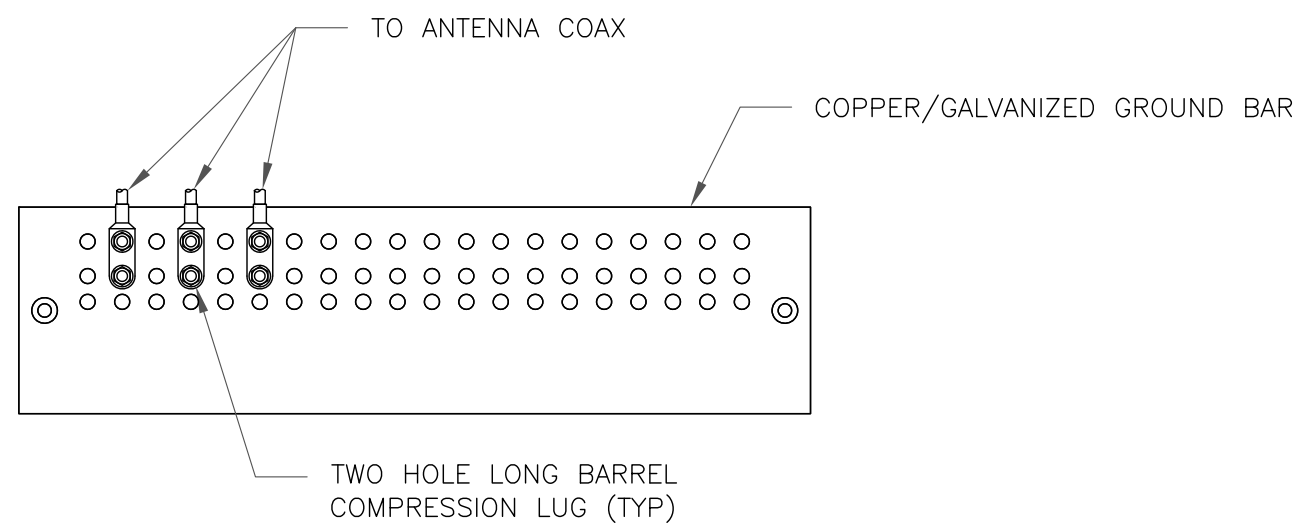
REVISION:

1



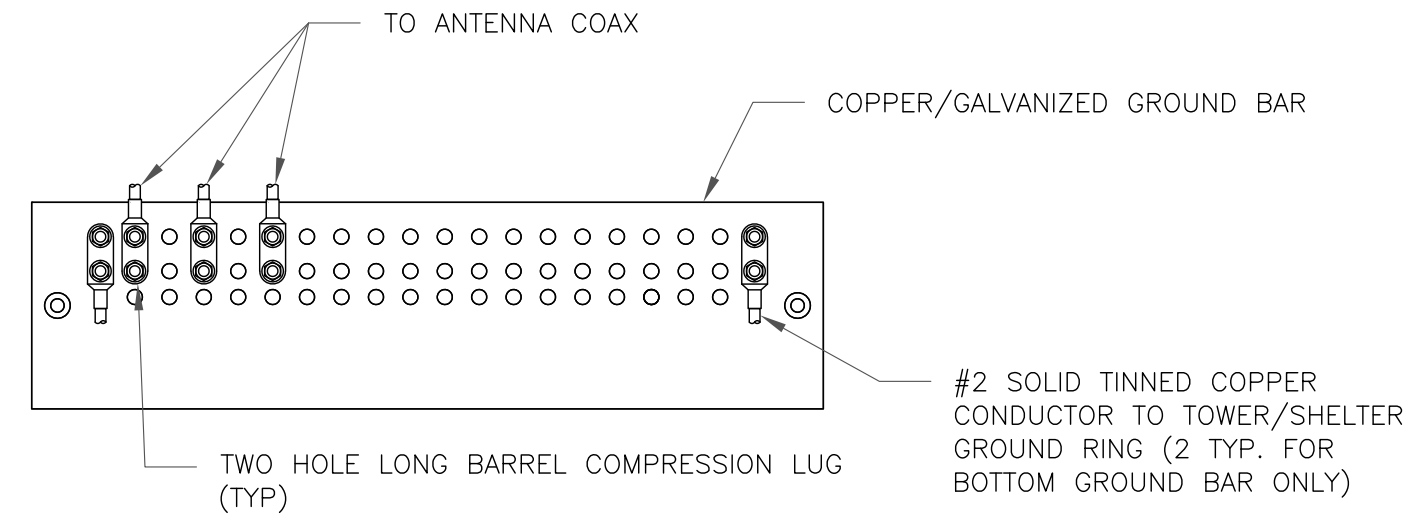
NOTE:
ALL NEW GROUNDS TO BE #6 STRANDED
COPPER WITH GREEN INSULATION UNLESS
NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE



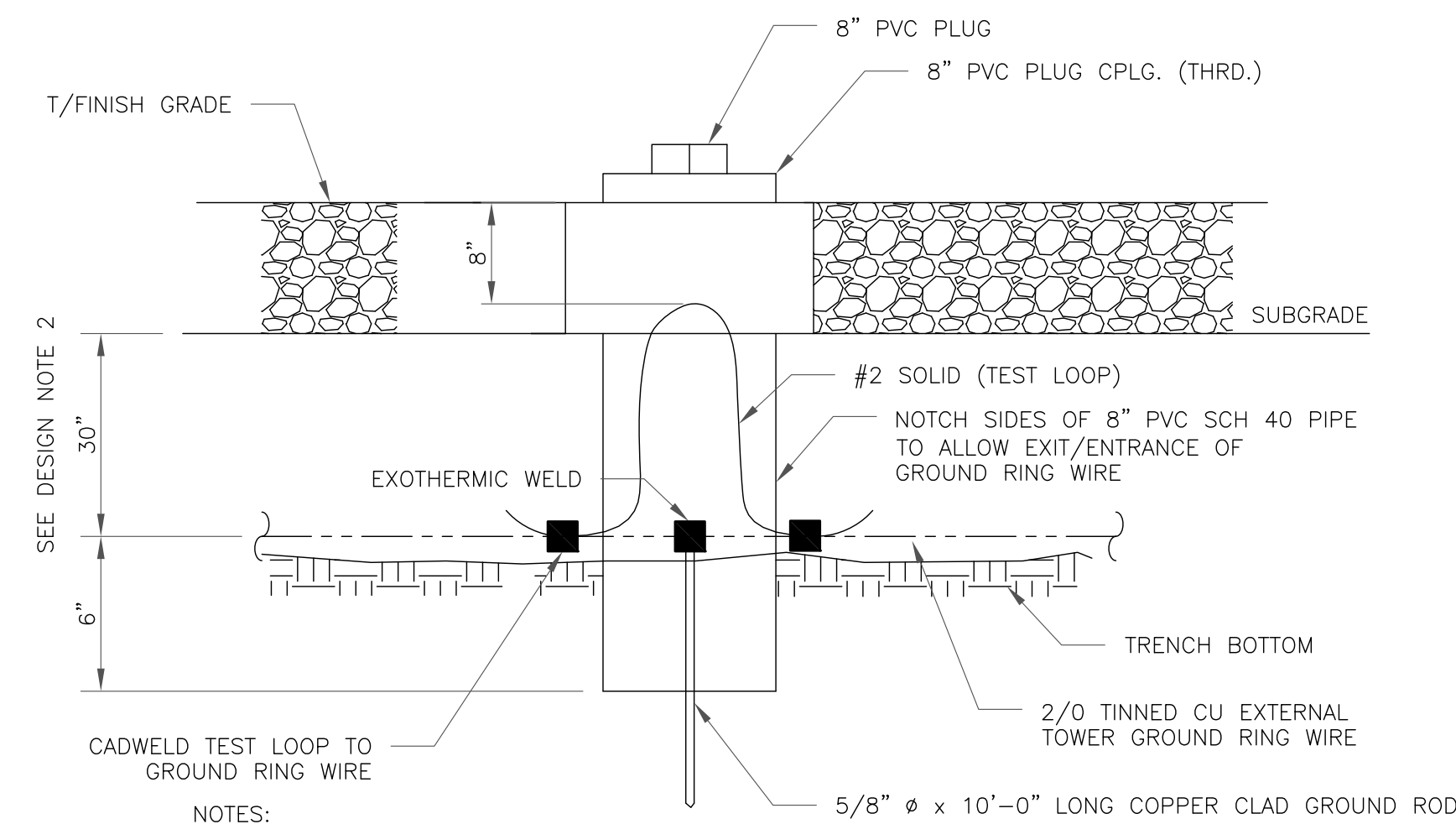
- NOTES:
1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
 2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
 3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



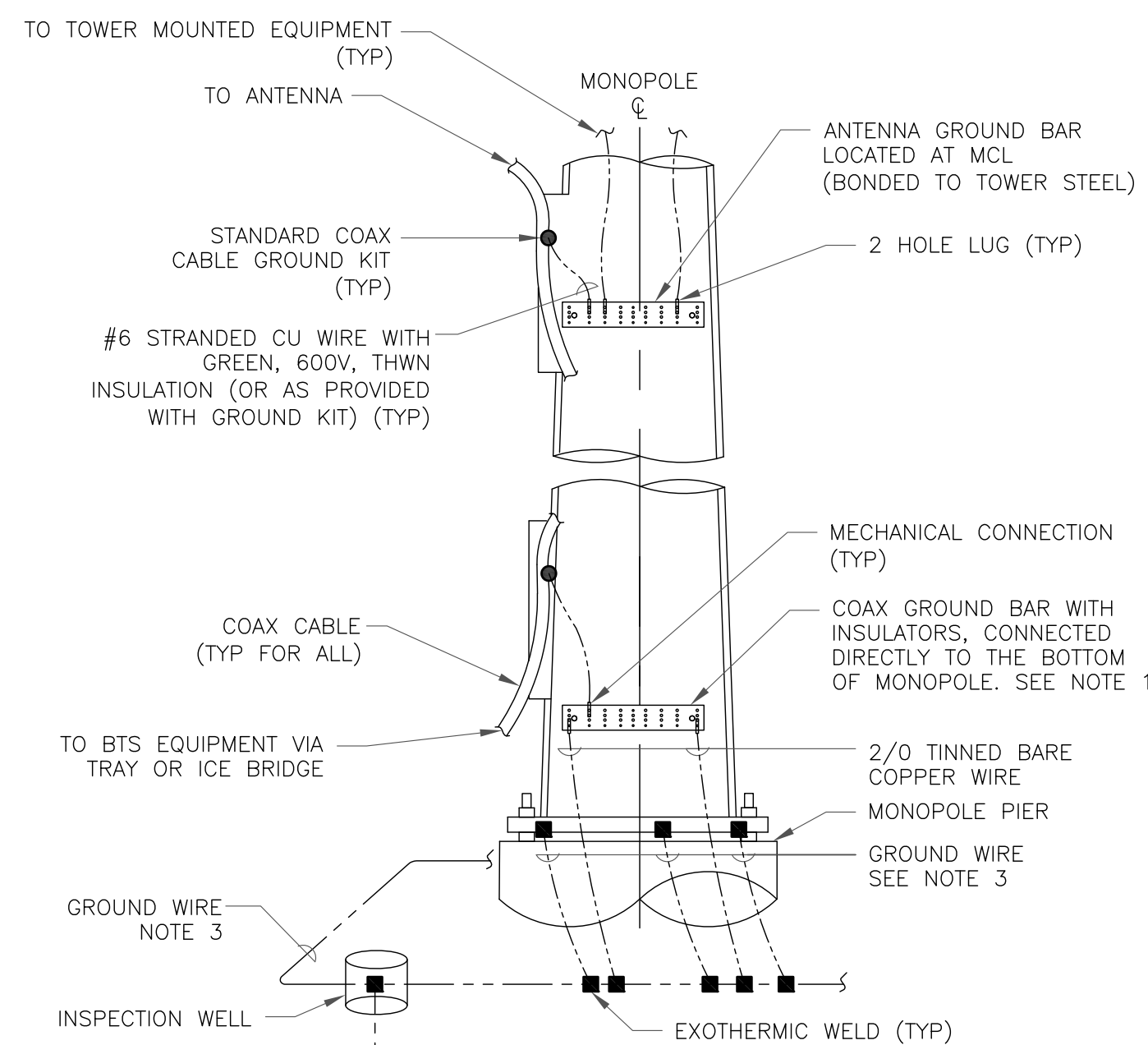
- NOTES:
1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
 2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
 3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

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



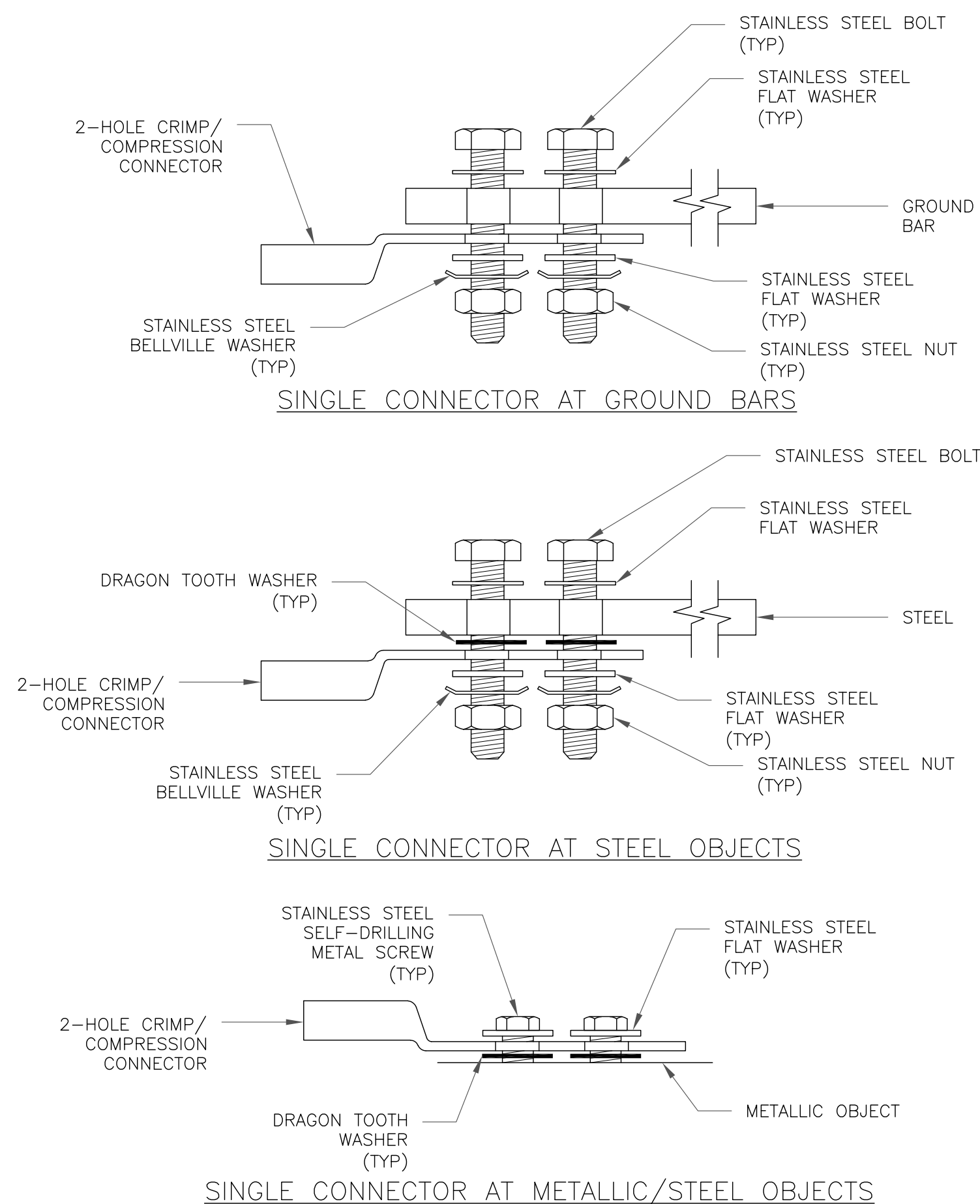
- NOTES:
1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
 2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D).

3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE

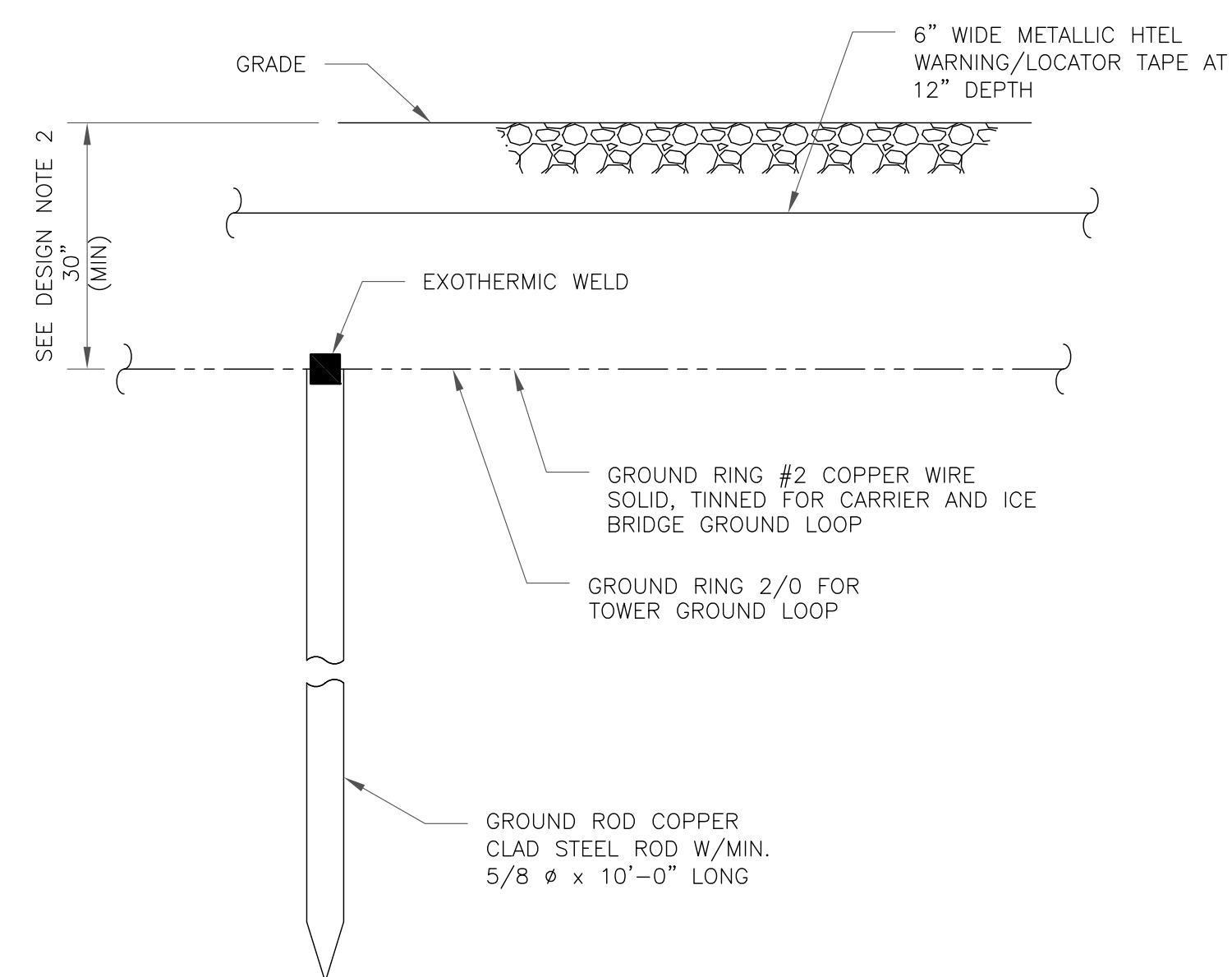


- NOTES:
1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
 2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE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

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



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

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

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

T-MOBILE SITE NUMBER
: CTHA628A

BU #: 876402
STAFFORD/PRAGYL/SSUSA

175 STAFFORD ST
STAFFORD SPRINGS, CT 06077

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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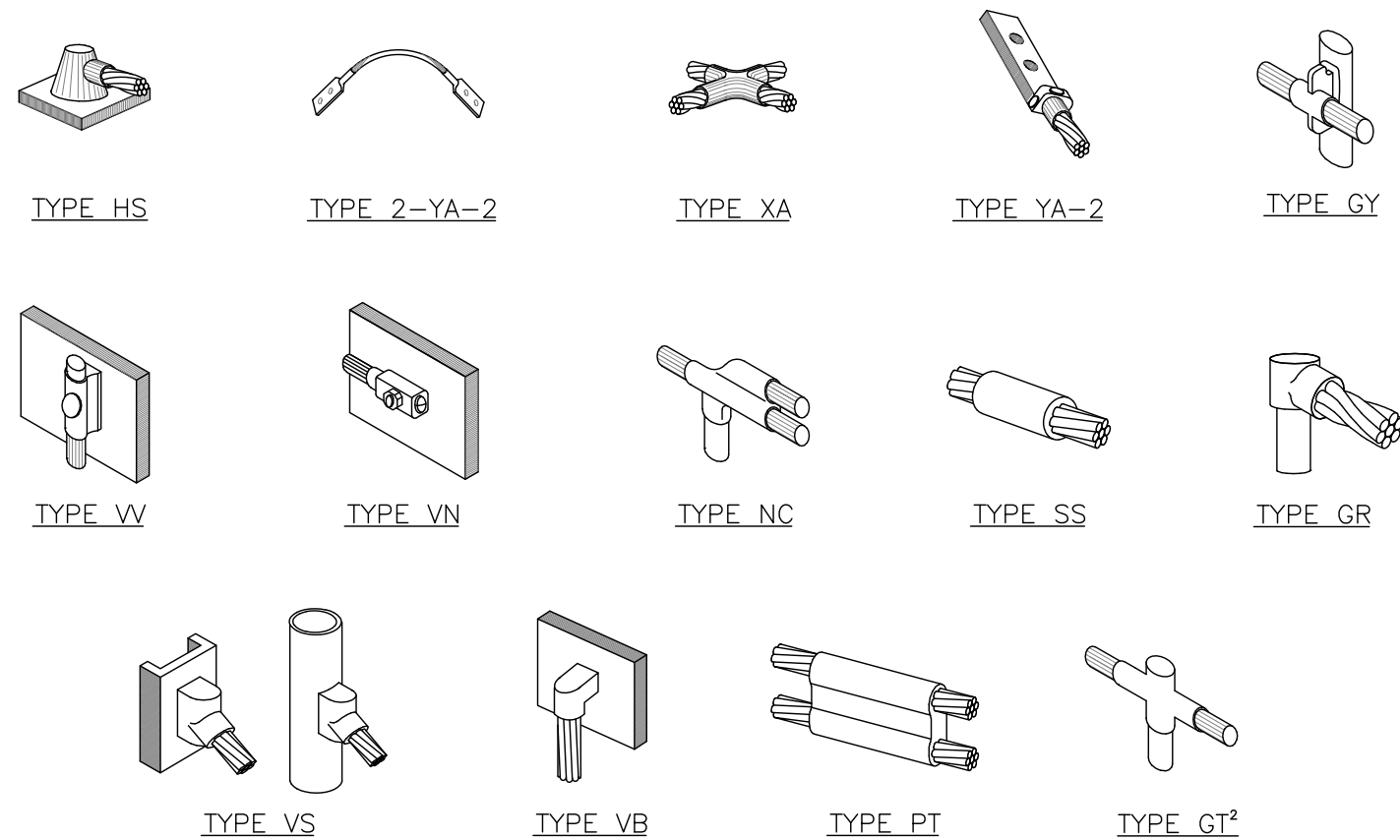
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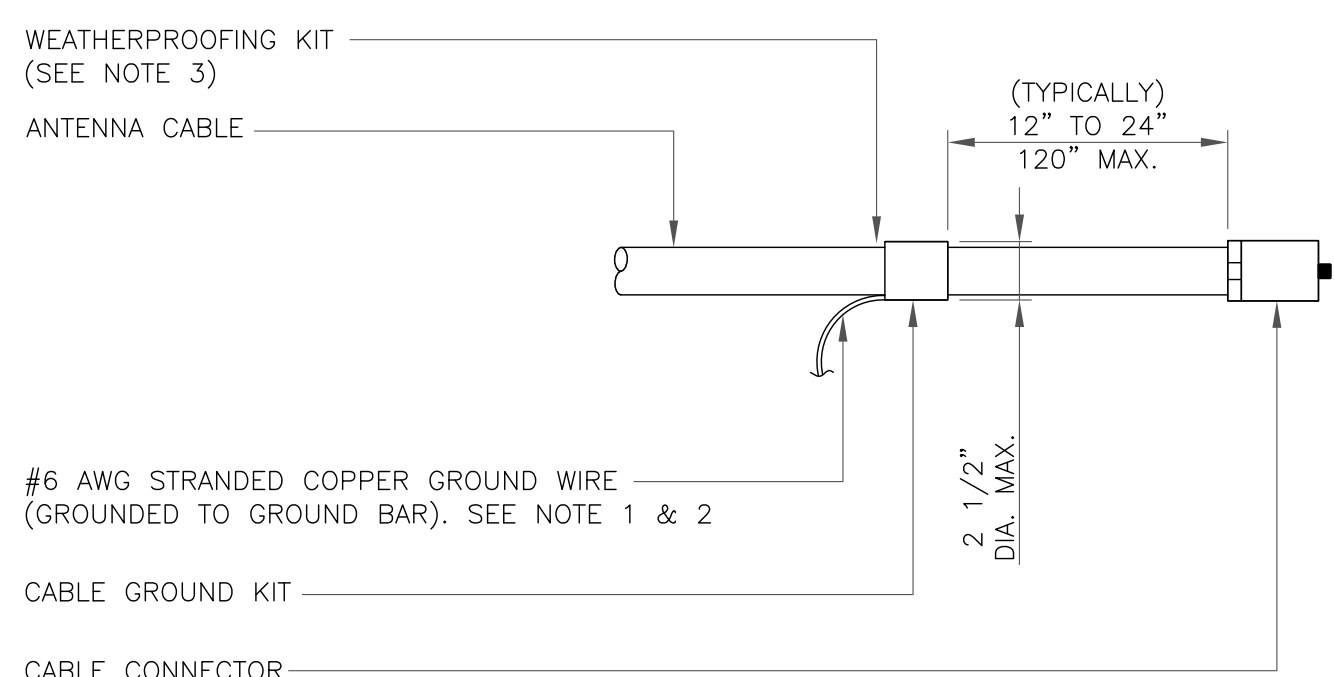
1



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.

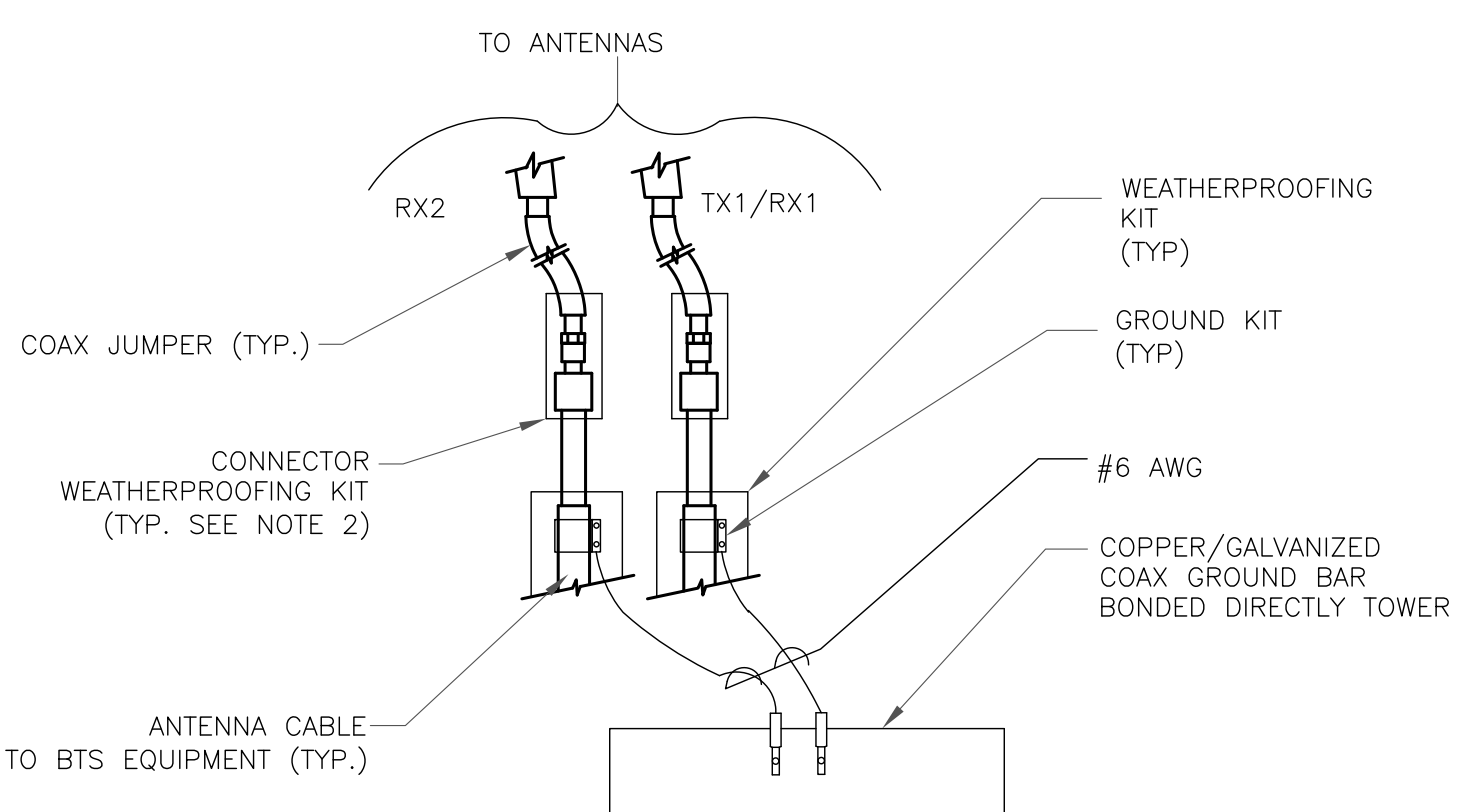
1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE



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.

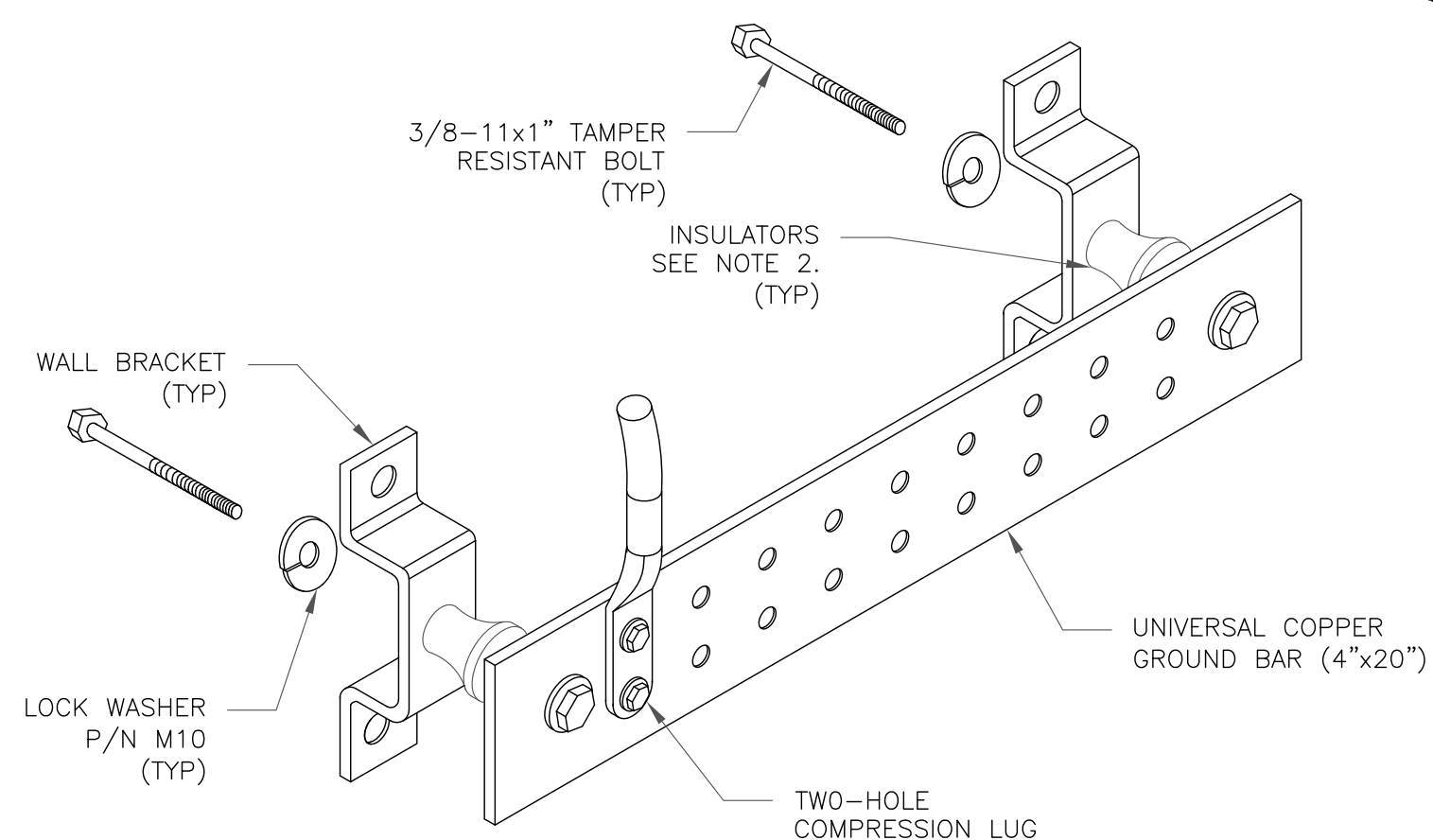
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



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.

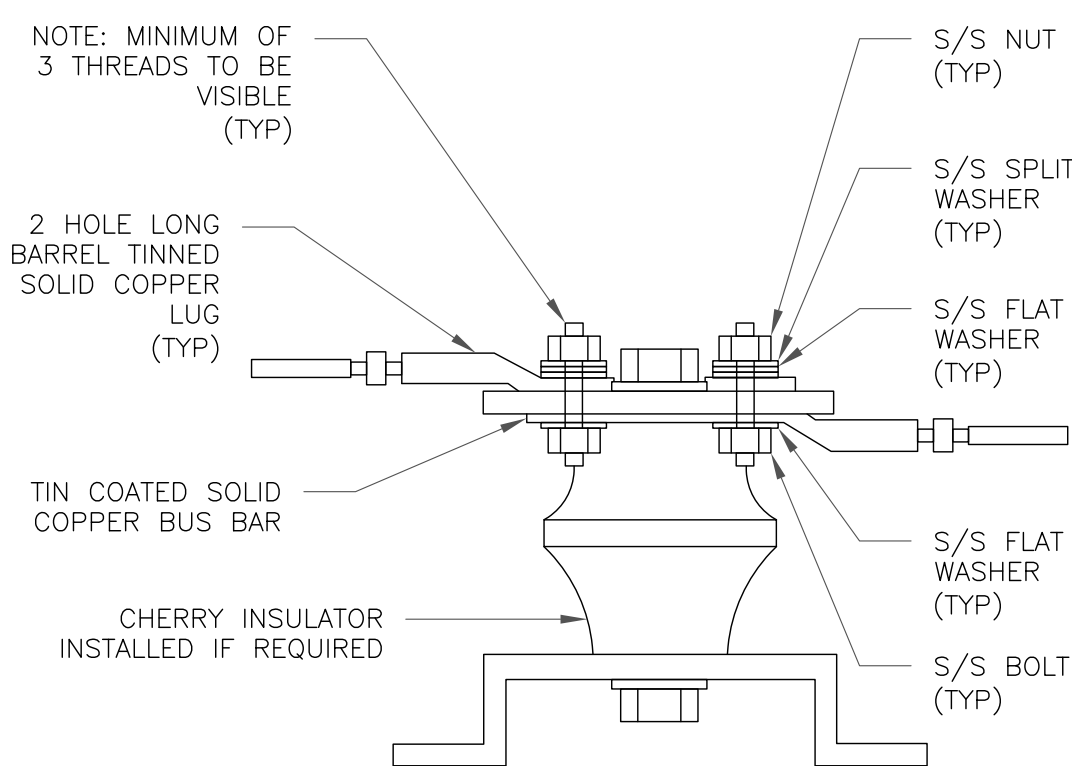
4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



NOTES:

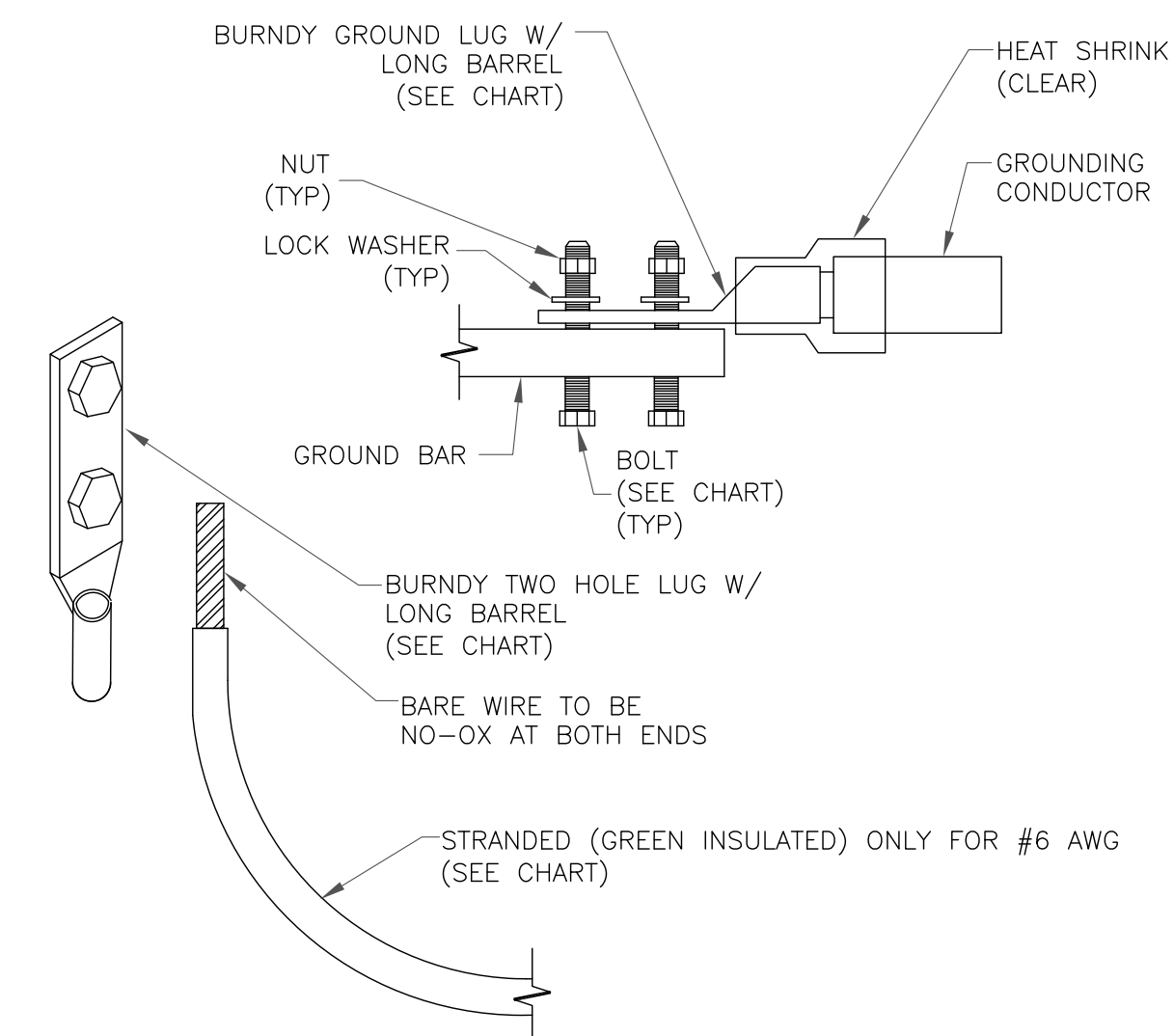
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR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

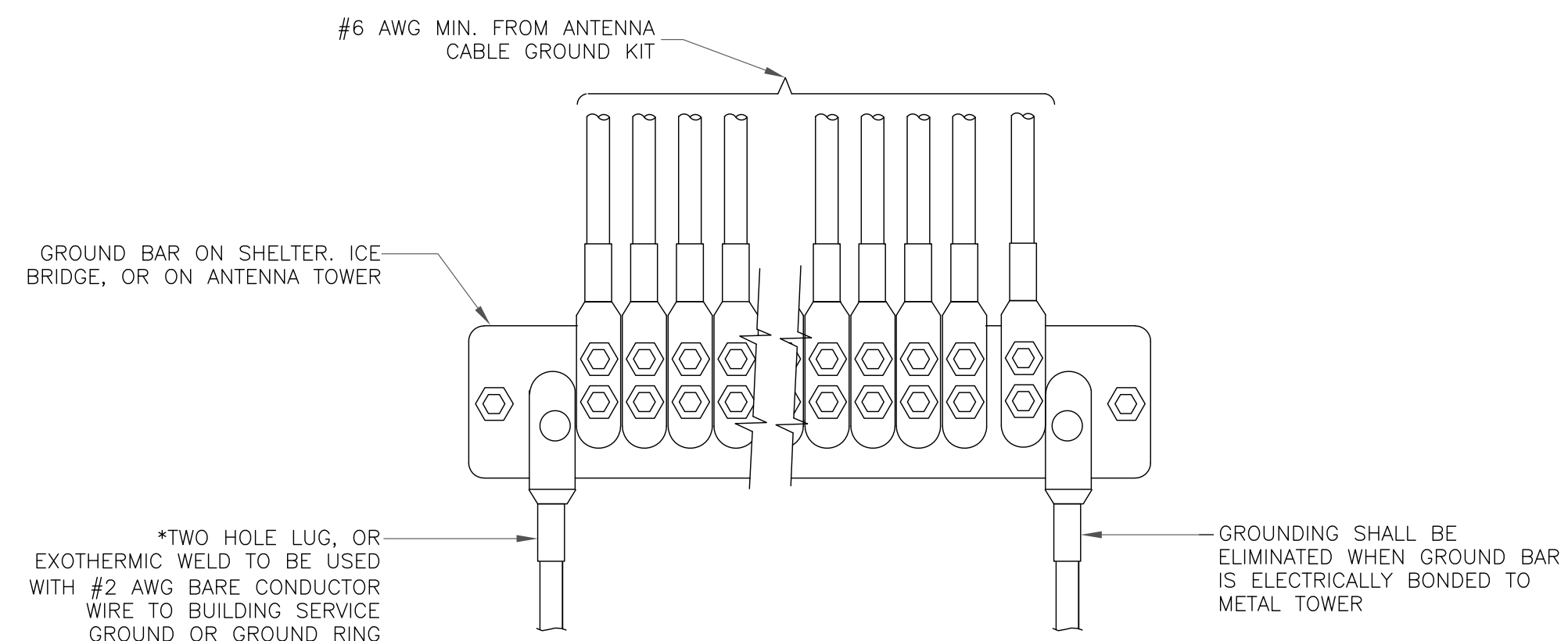
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



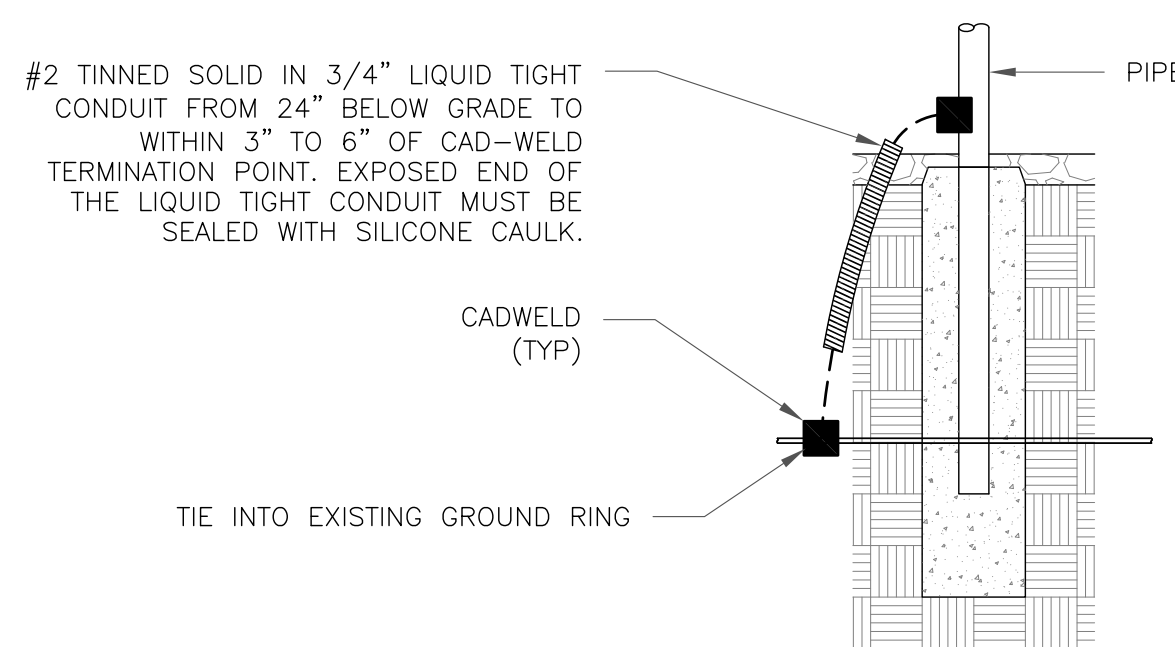
NOTES:

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



5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

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

B+T GRP
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T-MOBILE SITE NUMBER
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STAFFORD/PRAGYL/SSUSA

175 STAFFORD ST
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EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	2/22/21	LHT	CONSTRUCTION	MTJ
1	3/5/21	JJD	CONSTRUCTION	MTJ



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G-3

REVISION:

1

Exhibit D

Structural Analysis Report

Date: **February 18, 2021**



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

Subject: Structural Analysis Report

Carrier Designation: **Sprint PCS Co-Locate**
Site Number: CTHA628A
Site Name: N/A

Crown Castle Designation: **BU Number:** 876402
Site Name: STAFFORD/PRAGYL/SSUSA
JDE Job Number: 628859
Work Order Number: 1919214
Order Number: 538764 Rev. 1

Engineering Firm Designation: **TEP Project Number:** 22178.500440

Site Data: **175 Stafford Street, Stafford, Tolland County, CT 06077**
Latitude 41° 59' 13.38", Longitude -72° 15' 40.78"
150 Foot - Monopole Tower

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

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

LC5: Proposed Equipment Configuration

Sufficient Capacity – 78.1%

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

Structural analysis prepared by: Clint Oestreich / RLM

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

02/18/2021

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3.2) Assumptions

4) ANALYSIS RESULTS

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tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This is a 150-ft monopole tower mapped by Tower Engineering Professionals in December of 2007. The tower has been modified per reinforcement drawings prepared by Paul J. Ford and Company in June of 2013.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	152.0	3	Ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe	4	1-5/8
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
		3	RFS Celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	Ericsson	RADIO 4415 B66A		
		3	Ericsson	RADIO 4424 B25_TMO		
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE		
150.0	150.0	1	Tower Mounts (CCI)	Platform Mount [LP 1201-1]	1	1/2
		1	SitePro1	HRK14 Handrail Kit		
75.0	75.0	1	Lucent	KS24019-L112A	1	1/2
		1	Tower Mounts	Side Arm Mount [SO 701-1]		

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)
136.0	138.0	4	Cci Antennas	DMP65R-BU8D w/ Mount Pipe	2 5 6	3/8 3/4 1-5/8
		2	Cci Antennas	DMP65R-BU6D w/ Mount Pipe		
		3	Powerwave Technologies	7770.00 w/ Mount Pipe		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS 8843 B2/B66A		
		6	Powerwave Technologies	LGP21401		
		1	Raycap	DC6-48-60-18-8F		
	1	Raycap	DC9-48-60-24-8C-EV			
	136.0	1	Tower Mounts	T-Arm Mount [TA 602-3]		
127.0	127.0	6	Commscope	SBNHH-1D65B w/ Mount Pipe	2	1-5/8
		3	Alcatel Lucent	B13 RRH 4X30		
		3	Alcatel Lucent	B66A RRH4X45		
		2	Raycap	RXXDC-3315-PF-48		
		1	Tower Mounts	Platform Mount [LP 303-HR-1]		
		1	Tower Mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Geotechnical Report	2194187	CCISites
Tower Foundation Drawings	2208777	CCISites
Tower Manufacturer Drawings	2175539	CCISites
Tower Reinforcement Drawings	3888429	CCISites
Post-Modification Inspection	5639214	CCISites

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

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

- 3) The foundation steel reinforcement was assumed to be the minimum required per ACI 318.
- 4) The following material grades were assumed:
 - a) Pole shaft: ASTM A572-65
 - b) Base plate: ASTM A572-50
 - c) Anchor bolts: A615-75 N
 - d) Concrete compressive strength: $f'c = 3$ ksi
 - e) Foundation flexural reinforcement: $f_y = 60$ ksi

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
L1	150 - 123	Pole	TP22.69x17x0.25	1	-10.98	1065.50	35.3	Pass
L2	123 - 85	Pole	TP28.36x21.6105x0.375	2	-16.81	2003.63	53.5	Pass
L3	85 - 44	Pole	TP36.86x27.0303x0.4063	3	-25.02	2773.06	55.6	Pass
L4	44 - 0	Pole	TP42.53x35.0535x0.4375	4	-38.80	3590.34	60.1	Pass
							Summary	
						Pole (L4)	60.1	Pass
						RATING =	60.1	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	65.6	Pass
1,2	Base Plate	-	78.1	Pass
1,2	Base Foundation Soil Interaction	-	46.1	Pass
1,2	Base Foundation Structural	-	44.5	Pass

Structure Rating (max from all components) =	78.1%
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Notes:

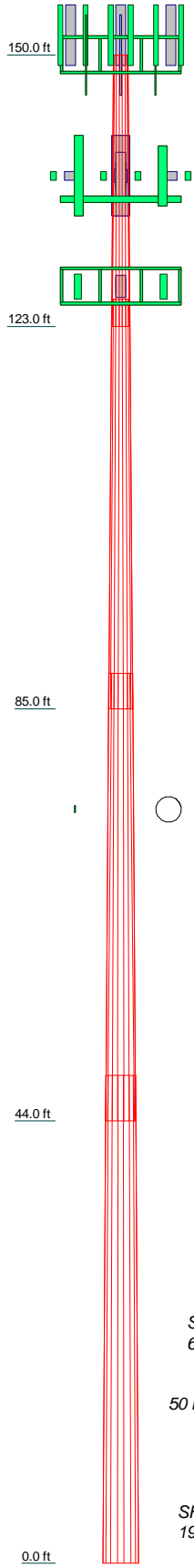
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) Rating per TIA-222-H Section 15.5

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	27.00	40.75	44.50	48.50
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3750	0.4063	0.4375
Socket Length (ft)	2.75	3.50	4.50	
Top Dia (in)	17.0000	21.6105	27.0303	35.0535
Bot Dia (in)	22.6900	28.3600	36.8800	42.5900
Grade	A572-65			
Weight (K)	1.4	4.1	6.2	8.8



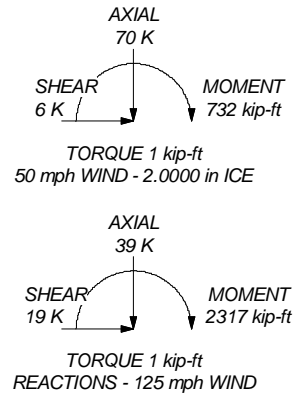
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 60.1%

ALL REACTIONS
ARE FACTORED



 <p>Tower Engineering Professionals</p>	Tower Engineering Professionals, Inc.		Job: Stafford/Pragy/SSUSA (BU 876402)		
	326 Tyron Road		Project: TEP No. 22178.500440		
	Raleigh, NC 27603		Client: Crown Castle	Drawn by: Clint Oestreich	App'd:
	Phone: (919) 661-6351		Code: TIA-222-H	Date: 02/18/21	Scale: NTS
	FAX: (919) 661-6350		Path:		Dwg No. E-1

tnxTower Tower Engineering Professionals, Inc. 326 Tyron Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Stafford/Pragy/SSUSA (BU 876402)	Page 1 of 18
	Project TEP No. 22178.500440	Date 14:41:36 02/18/21
	Client Crown Castle	Designed by Clint Oestreich

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower base elevation above sea level: 962.00 ft.
- Basic wind speed of 125 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 2.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.05.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets √ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

Tapered Pole Section Geometry

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-123.00	27.00	2.75	18	17.0000	22.6900	0.2500	1.0000	A572-65 (65 ksi)
L2	123.00-85.00	40.75	3.50	18	21.6105	28.3600	0.3750	1.5000	A572-65 (65 ksi)
L3	85.00-44.00	44.50	4.50	18	27.0303	36.8600	0.4063	1.6250	A572-65 (65 ksi)
L4	44.00-0.00	48.50		18	35.0535	42.5300	0.4375	1.7500	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	17.2237	13.2911	471.1170	5.9463	8.6360	54.5527	942.8540	6.6468	2.5520	10.208
	23.0015	17.8061	1132.7992	7.9662	11.5265	98.2776	2267.0890	8.9048	3.5534	14.214
L2	22.3485	25.2755	1439.9945	7.5386	10.9781	131.1696	2881.8839	12.6402	3.1434	8.383
	28.7396	33.3091	3295.7296	9.9347	14.4069	228.7608	6595.7958	16.6577	4.3314	11.55
L3	28.1697	34.3300	3074.3929	9.4515	13.7314	223.8953	6152.8312	17.1683	4.0423	9.95
	37.3660	47.0048	7891.5876	12.9411	18.7249	421.4493	15793.5591	23.5069	5.7724	14.209
L4	36.2311	48.0686	7277.0017	12.2887	17.8072	408.6557	14563.5786	24.0389	5.3994	12.342
	43.1186	58.4507	13083.8812	14.9428	21.6052	605.5883	26184.9785	29.2309	6.7153	15.349

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.00-123.00				1	1	1			
L2 123.00-85.00				1	1	1			
L3 85.00-44.00				1	1	1			
L4 44.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
136									
FB-L98B-002-75000 (3/8)	C	No	No	Inside Pole	136.00 - 0.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.06 0.06 0.06 0.06
WR-VG86ST-BRD (3/4)	C	No	No	Inside Pole	136.00 - 0.00	5	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.58 0.58 0.58 0.58
FXL 1873 PE(1-5/8)	C	No	No	Inside Pole	136.00 - 0.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.67 0.67 0.67

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight plf
2" (Nominal) Conduit	C	No	No	Inside Pole	136.00 - 0.00	1	2" Ice	0.00	0.67
							No Ice	0.00	0.72
							1/2" Ice	0.00	0.72
							1" Ice	0.00	0.72
							2" Ice	0.00	0.72
127									
HB158-1-08U8-S8J 18(1-5/8)	C	No	No	Inside Pole	127.00 - 0.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
							75		
LDF4-50A(1/2)	C	No	No	Inside Pole	75.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
							150		
HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	150.00 - 0.00	4	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
							2" Ice	0.00	2.50
							Misc		
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.03	0.49
							1/2" Ice	0.14	1.01
							1" Ice	0.23	2.07
							2" Ice	0.43	6.09
							Safety Line 3/8	C	No
1/2" Ice	0.14	0.75							
1" Ice	0.24	1.28							
2" Ice	0.44	2.34							

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	150.00-123.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.958	0.40
L2	123.00-85.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.755	0.80
L3	85.00-44.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.973	0.87
L4	44.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.190	0.93

Feed Line/Linear Appurtenances Section Areas - With Ice

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	150.00-123.00	A	1.958	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	23.108	0.60
L2	123.00-85.00	A	1.906	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	32.523	1.09
L3	85.00-44.00	A	1.816	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	34.227	1.17
L4	44.00-0.00	A	1.629	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	35.159	1.23

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	150.00-123.00	-0.5521	0.3188	-2.4046	1.3883
L2	123.00-85.00	-0.5599	0.3233	-2.6345	1.5210
L3	85.00-44.00	-0.5662	0.3269	-2.8017	1.6176
L4	44.00-0.00	-0.5700	0.3291	-2.8603	1.6514

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} Front ft ²	C _{AA} Side ft ²	Weight K	
150									
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	5.87	3.27	0.13
			0.00			1/2" Ice	6.23	3.73	0.18
			2.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	5.87	3.27	0.13
			0.00			1/2" Ice	6.23	3.73	0.18
			2.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	5.87	3.27	0.13
			0.00			1/2" Ice	6.23	3.73	0.18
			2.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			2.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			2.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	14.69	6.87	0.18
			0.00			1/2" Ice	15.46	7.55	0.31
			2.00			1" Ice	16.23	8.25	0.45
						2" Ice	17.82	9.67	0.78
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	6.29	2.76	0.06
			0.00			1/2" Ice	6.86	3.27	0.11
			2.00			1" Ice	7.45	3.79	0.16
						2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	6.29	2.76	0.06
			0.00			1/2" Ice	6.86	3.27	0.11
			2.00			1" Ice	7.45	3.79	0.16
						2" Ice	8.68	4.90	0.29
APX16DWV-16DWV-S-E-A 20 w/ Mount Pipe	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	6.29	2.76	0.06
			0.00			1/2" Ice	6.86	3.27	0.11
			2.00			1" Ice	7.45	3.79	0.16
						2" Ice	8.68	4.90	0.29
RADIO 4415 B66A	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.86	0.87	0.05
			0.00			1/2" Ice	2.03	1.00	0.06
			2.00			1" Ice	2.20	1.13	0.08
						2" Ice	2.58	1.43	0.12
RADIO 4415 B66A	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.86	0.87	0.05
			0.00			1/2" Ice	2.03	1.00	0.06
			2.00			1" Ice	2.20	1.13	0.08
						2" Ice	2.58	1.43	0.12
RADIO 4415 B66A	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.86	0.87	0.05
			0.00			1/2" Ice	2.03	1.00	0.06
			2.00			1" Ice	2.20	1.13	0.08
						2" Ice	2.58	1.43	0.12
RADIO 4424 B25_TMO	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	2.05	1.61	0.09
			0.00			1/2" Ice	2.23	1.77	0.11
			2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	2.05	1.61	0.09
			0.00			1/2" Ice	2.23	1.77	0.11
			2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4424 B25_TMO	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	2.05	1.61	0.09
			0.00			1/2" Ice	2.23	1.77	0.11
			2.00			1" Ice	2.42	1.94	0.13
						2" Ice	2.81	2.30	0.19
RADIO 4449 B71 B85A_T-MOBILE	A	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.97	1.59	0.07
			0.00			1/2" Ice	2.15	1.75	0.09
			2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.97	1.59	0.07
			0.00			1/2" Ice	2.15	1.75	0.09
			2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Centroid-Le g	4.00	0.0000	150.00	No Ice	1.97	1.59	0.07
			0.00			1/2" Ice	2.15	1.75	0.09
			2.00			1" Ice	2.33	1.92	0.12
						2" Ice	2.72	2.28	0.17
Platform Mount [LP	C	None		0.0000	150.00	No Ice	26.39	26.39	2.36

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	CAAA		Weight
			Horz Lateral	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
1201-1_HR-1]						1/2" Ice	31.40	31.40	3.06
						1" Ice	36.20	36.20	3.86
						2" Ice	45.40	45.40	5.76
2 3/8" Dia. x 8'	A	From Centroid-Le g	4.00	0.00	0.0000	150.00	No Ice	1.90	1.90
			0.00	0.00			1/2" Ice	2.73	2.73
			0.00	0.00			1" Ice	3.40	3.40
			0.00	0.00			2" Ice	4.40	4.40
2 3/8" Dia. x 8'	B	From Centroid-Le g	4.00	0.00	0.0000	150.00	No Ice	1.90	1.90
			0.00	0.00			1/2" Ice	2.73	2.73
			0.00	0.00			1" Ice	3.40	3.40
			0.00	0.00			2" Ice	4.40	4.40
2 3/8" Dia. x 8'	C	From Centroid-Le g	4.00	0.00	0.0000	150.00	No Ice	1.90	1.90
			0.00	0.00			1/2" Ice	2.73	2.73
			0.00	0.00			1" Ice	3.40	3.40
			0.00	0.00			2" Ice	4.40	4.40
136									
DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	136.00	No Ice	18.11	10.26
			0.00	0.00			1/2" Ice	18.84	11.78
			2.00	0.00			1" Ice	19.59	13.33
			0.00	0.00			2" Ice	21.01	15.67
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	136.00	No Ice	12.95	7.26
			0.00	0.00			1/2" Ice	13.55	8.43
			2.00	0.00			1" Ice	14.11	9.31
			0.00	0.00			2" Ice	15.26	11.13
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	136.00	No Ice	18.11	10.26
			0.00	0.00			1/2" Ice	18.84	11.78
			2.00	0.00			1" Ice	19.59	13.33
			0.00	0.00			2" Ice	21.01	15.67
OPA65R-BU8D w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	136.00	No Ice	18.33	10.34
			0.00	0.00			1/2" Ice	19.06	11.86
			2.00	0.00			1" Ice	19.81	13.41
			0.00	0.00			2" Ice	21.23	15.75
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	136.00	No Ice	13.11	7.32
			0.00	0.00			1/2" Ice	13.71	8.49
			2.00	0.00			1" Ice	14.28	9.37
			0.00	0.00			2" Ice	15.43	11.19
OPA65R-BU8D w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	136.00	No Ice	18.33	10.34
			0.00	0.00			1/2" Ice	19.06	11.86
			2.00	0.00			1" Ice	19.81	13.41
			0.00	0.00			2" Ice	21.23	15.75
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	136.00	No Ice	5.75	4.25
			0.00	0.00			1/2" Ice	6.18	5.01
			2.00	0.00			1" Ice	6.61	5.71
			0.00	0.00			2" Ice	7.49	7.16
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	136.00	No Ice	5.75	4.25
			0.00	0.00			1/2" Ice	6.18	5.01
			2.00	0.00			1" Ice	6.61	5.71
			0.00	0.00			2" Ice	7.49	7.16
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	136.00	No Ice	5.75	4.25
			0.00	0.00			1/2" Ice	6.18	5.01
			2.00	0.00			1" Ice	6.61	5.71
			0.00	0.00			2" Ice	7.49	7.16
RRUS 4449 B5/B12	A	From Leg	4.00	0.00	0.0000	136.00	No Ice	1.97	1.41
			0.00	0.00			1/2" Ice	2.14	1.56
			2.00	0.00			1" Ice	2.33	1.73
			0.00	0.00			2" Ice	2.72	2.07
RRUS 4449 B5/B12	B	From Leg	4.00	0.00	0.0000	136.00	No Ice	1.97	1.41

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
			0.00			1/2" Ice	2.14	1.56	0.09
			2.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	136.00	No Ice	1.97	1.41	0.07
			0.00			1/2" Ice	2.14	1.56	0.09
			2.00			1" Ice	2.33	1.73	0.11
						2" Ice	2.72	2.07	0.16
RRUS 4478 B14	A	From Leg	4.00	0.0000	136.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			2.00			1" Ice	2.19	1.34	0.09
						2" Ice	2.57	1.66	0.14
RRUS 4478 B14	B	From Leg	4.00	0.0000	136.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			2.00			1" Ice	2.19	1.34	0.09
						2" Ice	2.57	1.66	0.14
RRUS 4478 B14	C	From Leg	4.00	0.0000	136.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			2.00			1" Ice	2.19	1.34	0.09
						2" Ice	2.57	1.66	0.14
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	136.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	136.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	136.00	No Ice	1.64	1.35	0.07
			0.00			1/2" Ice	1.80	1.50	0.09
			2.00			1" Ice	1.97	1.65	0.11
						2" Ice	2.32	1.99	0.16
(2) LGP21401	A	From Leg	4.00	0.0000	136.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	B	From Leg	4.00	0.0000	136.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
(2) LGP21401	C	From Leg	4.00	0.0000	136.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			2.00			1" Ice	1.38	0.35	0.03
						2" Ice	1.69	0.52	0.05
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	136.00	No Ice	1.21	1.21	0.03
			0.00			1/2" Ice	1.89	1.89	0.05
			2.00			1" Ice	2.11	2.11	0.08
						2" Ice	2.57	2.57	0.14
DC9-48-60-24-8C-EV	A	From Leg	4.00	0.0000	136.00	No Ice	1.14	1.14	0.03
			0.00			1/2" Ice	1.79	1.79	0.05
			2.00			1" Ice	2.00	2.00	0.07
						2" Ice	2.45	2.45	0.13
T-Arm Mount [TA 602-3]	C	None		0.0000	136.00	No Ice	13.40	13.40	0.77
						1/2" Ice	16.44	16.44	1.00
						1" Ice	19.70	19.70	1.29
						2" Ice	25.86	25.86	2.05

SBNHH-1D65B w/ Mount	A	From Leg	4.00	0.0000	127.00	No Ice	4.09	3.30	0.07

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	Client		Crown Castle		Designed by		Clint Oestreich	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
Pipe			0.00			1/2" Ice	4.49	3.68	0.13
			0.00			1" Ice	4.89	4.07	0.20
						2" Ice	5.72	4.87	0.39
SBNHH-1D65B	A	From Leg	4.00		0.0000	127.00	No Ice	4.16	2.49
			0.00				1/2" Ice	4.57	2.88
			0.00				1" Ice	4.99	3.27
							2" Ice	5.85	4.09
SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00		0.0000	127.00	No Ice	4.09	3.30
			0.00				1/2" Ice	4.49	3.68
			0.00				1" Ice	4.89	4.07
							2" Ice	5.72	4.87
SBNHH-1D65B	B	From Leg	4.00		0.0000	127.00	No Ice	4.16	2.49
			0.00				1/2" Ice	4.57	2.88
			0.00				1" Ice	4.99	3.27
							2" Ice	5.85	4.09
SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00		0.0000	127.00	No Ice	4.09	3.30
			0.00				1/2" Ice	4.49	3.68
			0.00				1" Ice	4.89	4.07
							2" Ice	5.72	4.87
SBNHH-1D65B	C	From Leg	4.00		0.0000	127.00	No Ice	4.16	2.49
			0.00				1/2" Ice	4.57	2.88
			0.00				1" Ice	4.99	3.27
							2" Ice	5.85	4.09
B13 RRH 4X30	A	From Leg	4.00		0.0000	127.00	No Ice	2.06	1.32
			0.00				1/2" Ice	2.24	1.48
			0.00				1" Ice	2.43	1.64
							2" Ice	2.84	2.00
B13 RRH 4X30	B	From Leg	4.00		0.0000	127.00	No Ice	2.06	1.32
			0.00				1/2" Ice	2.24	1.48
			0.00				1" Ice	2.43	1.64
							2" Ice	2.84	2.00
B13 RRH 4X30	C	From Leg	4.00		0.0000	127.00	No Ice	2.06	1.32
			0.00				1/2" Ice	2.24	1.48
			0.00				1" Ice	2.43	1.64
							2" Ice	2.84	2.00
B66A RRH4X45	A	From Leg	4.00		0.0000	127.00	No Ice	2.54	1.61
			0.00				1/2" Ice	2.75	1.79
			0.00				1" Ice	2.97	1.98
							2" Ice	3.43	2.37
B66A RRH4X45	B	From Leg	4.00		0.0000	127.00	No Ice	2.54	1.61
			0.00				1/2" Ice	2.75	1.79
			0.00				1" Ice	2.97	1.98
							2" Ice	3.43	2.37
B66A RRH4X45	C	From Leg	4.00		0.0000	127.00	No Ice	2.54	1.61
			0.00				1/2" Ice	2.75	1.79
			0.00				1" Ice	2.97	1.98
							2" Ice	3.43	2.37
RXXDC-3315-PF-48	B	From Leg	4.00		0.0000	127.00	No Ice	3.92	2.61
			0.00				1/2" Ice	4.18	2.83
			0.00				1" Ice	4.45	3.05
							2" Ice	5.00	3.53
RXXDC-3315-PF-48	C	From Leg	4.00		0.0000	127.00	No Ice	3.92	2.61
			0.00				1/2" Ice	4.18	2.83
			0.00				1" Ice	4.45	3.05
							2" Ice	5.00	3.53
Platform Mount [LP 303-1_HR-1]	C	None			0.0000	127.00	No Ice	17.09	17.09
							1/2" Ice	21.47	21.47

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
2.375" OD x 5' Mount Pipe	A	From Leg	4.00	0.00	0.0000	127.00	1" Ice	25.72	25.72	2.35
							2" Ice	33.96	33.96	3.52
							No Ice	1.19	1.19	0.02
							1/2" Ice	1.50	1.50	0.03
							1" Ice	1.81	1.81	0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.00	0.00	0.0000	127.00	2" Ice	2.46	2.46	0.08
							No Ice	1.19	1.19	0.02
							1/2" Ice	1.50	1.50	0.03
							1" Ice	1.81	1.81	0.04
							2" Ice	2.46	2.46	0.08
2.375" OD x 5' Mount Pipe	C	From Leg	4.00	0.00	0.0000	127.00	No Ice	1.19	1.19	0.02
							1/2" Ice	1.50	1.50	0.03
							1" Ice	1.81	1.81	0.04
							2" Ice	2.46	2.46	0.08

KS24019-L112A	C	From Leg	4.00	0.00	0.0000	75.00	No Ice	0.08	0.08	0.01
			0.00				1/2" Ice	0.13	0.13	0.01
			0.00				1" Ice	0.19	0.19	0.01
							2" Ice	0.35	0.35	0.02
Side Arm Mount [SO 701-1]	C	None			0.0000	75.00	No Ice	0.85	1.67	0.07
							1/2" Ice	1.14	2.34	0.08
							1" Ice	1.43	3.01	0.09
							2" Ice	2.01	4.35	0.12

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation	z	K _Z	q _z	A _G	F _a	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	ft ²	e	ft ²	ft ²	ft ²		ft ²	ft ²
L1 150.00-123.00	135.85	1.079	37.61	45.253	A	0.000	45.253	45.253	100.00	0.000	0.000
					B	0.000	45.253	100.00	0.000	0.000	
					C	0.000	45.253	100.00	0.000	1.958	
L2 123.00-85.00	103.46	0.998	34.74	80.890	A	0.000	80.890	80.890	100.00	0.000	0.000
					B	0.000	80.890	100.00	0.000	0.000	
					C	0.000	80.890	100.00	0.000	2.755	
L3 85.00-44.00	64.01	0.87	30.19	111.957	A	0.000	111.957	111.957	100.00	0.000	0.000
					B	0.000	111.957	100.00	0.000	0.000	
					C	0.000	111.957	100.00	0.000	2.973	
L4 44.00-0.00	21.51	0.7	24.72	145.475	A	0.000	145.475	145.475	100.00	0.000	0.000
					B	0.000	145.475	100.00	0.000	0.000	
					C	0.000	145.475	100.00	0.000	3.190	

Tower Pressure - With Ice

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$$G_H = 1.100$$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 150.00-123.00	135.85	1.079	6.02	1.9584	54.066	A	0.000	54.066	54.066	100.00	0.000	0.000
						B	0.000	54.066		100.00	0.000	0.000
						C	0.000	54.066		100.00	0.000	23.108
L2 123.00-85.00	103.46	0.998	5.56	1.9058	93.293	A	0.000	93.293	93.293	100.00	0.000	0.000
						B	0.000	93.293		100.00	0.000	0.000
						C	0.000	93.293		100.00	0.000	32.523
L3 85.00-44.00	64.01	0.87	4.83	1.8164	124.979	A	0.000	124.979	124.979	100.00	0.000	0.000
						B	0.000	124.979		100.00	0.000	0.000
						C	0.000	124.979		100.00	0.000	34.227
L4 44.00-0.00	21.51	0.7	3.96	1.6288	158.795	A	0.000	158.795	158.795	100.00	0.000	0.000
						B	0.000	158.795		100.00	0.000	0.000
						C	0.000	158.795		100.00	0.000	35.159

Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 150.00-123.00	135.85	1.079	8.16	45.253	A	0.000	45.253	45.253	100.00	0.000	0.000
					B	0.000	45.253		100.00	0.000	0.000
					C	0.000	45.253		100.00	0.000	1.958
L2 123.00-85.00	103.46	0.998	7.54	80.890	A	0.000	80.890	80.890	100.00	0.000	0.000
					B	0.000	80.890		100.00	0.000	0.000
					C	0.000	80.890		100.00	0.000	2.755
L3 85.00-44.00	64.01	0.87	6.55	111.957	A	0.000	111.957	111.957	100.00	0.000	0.000
					B	0.000	111.957		100.00	0.000	0.000
					C	0.000	111.957		100.00	0.000	2.973
L4 44.00-0.00	21.51	0.7	5.36	145.475	A	0.000	145.475	145.475	100.00	0.000	0.000
					B	0.000	145.475		100.00	0.000	0.000
					C	0.000	145.475		100.00	0.000	3.190

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

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Comb. No.	Description
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	150 - 123	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.31	1.62	1.17
			Max. Mx	20	-11.00	204.88	-0.58
			Max. My	2	-10.99	-0.66	205.80
			Max. Vy	20	-13.45	204.88	-0.58
			Max. Vx	2	-13.49	-0.66	205.80
			Max. Torque	4			1.22
L2	123 - 85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.63	2.21	1.14
			Max. Mx	20	-16.82	744.84	-3.15
			Max. My	2	-16.82	-3.16	746.96
			Max. Vy	8	15.49	-744.28	3.75
			Max. Vx	14	15.53	3.74	-746.42
			Max. Torque	4			1.06
L3	85 - 44	Pole	Max Tension	1	0.00	0.00	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	44 - 0	Pole	Max. Compression	26	-52.38	2.79	0.92
			Max. Mx	20	-25.45	1406.95	-5.91
			Max. My	2	-25.44	-5.81	1410.28
			Max. Vy	8	17.55	-1406.33	6.48
			Max. Vx	14	17.59	6.58	-1409.89
			Max. Torque	4			1.12
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.66	3.28	0.61
			Max. Mx	20	-38.80	2304.71	-9.12
			Max. My	2	-38.80	-8.93	2309.47
			Max. Vy	8	19.33	-2304.07	9.63
			Max. Vx	14	19.36	9.82	-2309.25
			Max. Torque	14			-1.25

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	69.66	-0.00	-0.00
	Max. H _x	21	29.12	19.29	-0.06
	Max. H _z	3	29.12	-0.06	19.32
	Max. M _x	2	2309.47	-0.06	19.32
	Max. M _z	8	2304.07	-19.29	0.06
	Max. Torsion	2	1.24	-0.06	19.32
	Min. Vert	3	29.12	-0.06	19.32
	Min. H _x	8	38.82	-19.29	0.06
	Min. H _z	15	29.12	0.06	-19.32
	Min. M _x	14	-2309.25	0.06	-19.32
	Min. M _z	20	-2304.71	19.29	-0.06
	Min. Torsion	14	-1.25	0.06	-19.32

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	32.35	-0.00	-0.00	-0.18	0.35	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	38.82	0.06	-19.32	-2309.47	-8.93	-1.24
0.9 Dead+1.0 Wind 0 deg - No Ice	29.12	0.06	-19.32	-2264.33	-8.86	-1.23
1.2 Dead+1.0 Wind 30 deg - No Ice	38.82	9.70	-16.77	-2005.30	-1160.09	-1.20
0.9 Dead+1.0 Wind 30 deg - No Ice	29.12	9.70	-16.77	-1965.89	-1137.43	-1.19
1.2 Dead+1.0 Wind 60 deg - No Ice	38.82	16.74	-9.72	-1163.29	-2000.28	-0.84
0.9 Dead+1.0 Wind 60 deg - No Ice	29.12	16.74	-9.72	-1140.39	-1961.16	-0.82
1.2 Dead+1.0 Wind 90 deg - No Ice	38.82	19.29	-0.06	-9.63	-2304.07	-0.24
0.9 Dead+1.0 Wind 90 deg - No Ice	29.12	19.29	-0.06	-9.36	-2258.95	-0.24

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Tower Engineering Professionals, Inc. 326 Tyron Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350</p>	<p style="text-align: center;">Job</p> <p style="text-align: center;">Stafford/Pragy/SSUSA (BU 876402)</p>	<p style="text-align: center;">Page</p> <p style="text-align: center;">13 of 18</p>
	<p style="text-align: center;">Project</p> <p style="text-align: center;">TEP No. 22178.500440</p>	<p style="text-align: center;">Date</p> <p style="text-align: center;">14:41:36 02/18/21</p>
	<p style="text-align: center;">Client</p> <p style="text-align: center;">Crown Castle</p>	<p style="text-align: center;">Designed by</p> <p style="text-align: center;">Clint Oestreich</p>

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
Ice						
1.2 Dead+1.0 Wind 120 deg - No Ice	38.82	16.68	9.61	1146.58	-1990.98	0.42
0.9 Dead+1.0 Wind 120 deg - No Ice	29.12	16.68	9.61	1124.16	-1952.05	0.42
1.2 Dead+1.0 Wind 150 deg - No Ice	38.82	9.59	16.70	1995.49	-1143.89	0.97
0.9 Dead+1.0 Wind 150 deg - No Ice	29.12	9.59	16.70	1956.41	-1121.57	0.96
1.2 Dead+1.0 Wind 180 deg - No Ice	38.82	-0.06	19.32	2309.25	9.82	1.25
0.9 Dead+1.0 Wind 180 deg - No Ice	29.12	-0.06	19.32	2264.15	9.50	1.24
1.2 Dead+1.0 Wind 210 deg - No Ice	38.82	-9.70	16.77	2004.81	1160.98	1.19
0.9 Dead+1.0 Wind 210 deg - No Ice	29.12	-9.70	16.77	1965.54	1138.09	1.18
1.2 Dead+1.0 Wind 240 deg - No Ice	38.82	-16.74	9.72	1162.80	2001.19	0.82
0.9 Dead+1.0 Wind 240 deg - No Ice	29.12	-16.74	9.72	1140.04	1961.82	0.81
1.2 Dead+1.0 Wind 270 deg - No Ice	38.82	-19.29	0.06	9.12	2304.71	0.23
0.9 Dead+1.0 Wind 270 deg - No Ice	29.12	-19.29	0.06	9.00	2259.63	0.22
1.2 Dead+1.0 Wind 300 deg - No Ice	38.82	-16.68	-9.61	-1147.11	1991.91	-0.41
0.9 Dead+1.0 Wind 300 deg - No Ice	29.12	-16.68	-9.61	-1124.54	1952.72	-0.42
1.2 Dead+1.0 Wind 330 deg - No Ice	38.82	-9.59	-16.70	-1996.03	1144.79	-0.95
0.9 Dead+1.0 Wind 330 deg - No Ice	29.12	-9.59	-16.70	-1956.80	1122.23	-0.95
1.2 Dead+1.0 Ice+1.0 Temp	69.66	0.00	0.00	-0.61	3.28	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	69.66	0.01	-5.82	-728.80	2.57	-0.97
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	69.66	2.92	-5.04	-631.72	-361.38	-0.73
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	69.66	5.05	-2.92	-365.57	-627.56	-0.29
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	69.66	5.82	-0.01	-1.65	-724.64	0.23
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	69.66	5.04	2.91	362.53	-626.61	0.68
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	69.66	2.91	5.04	629.39	-359.73	0.95
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	69.66	-0.01	5.82	727.42	4.48	0.97
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	69.66	-2.92	5.04	630.35	368.44	0.73
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	69.66	-5.05	2.92	364.19	634.62	0.29
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	69.66	-5.82	0.01	0.26	731.70	-0.23
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	69.66	-5.04	-2.91	-363.93	633.67	-0.68
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	69.66	-2.91	-5.04	-630.78	366.79	-0.95
Dead+Wind 0 deg - Service	32.35	0.01	-4.19	-496.00	-1.63	-0.27
Dead+Wind 30 deg - Service	32.35	2.10	-3.64	-430.58	-248.72	-0.26
Dead+Wind 60 deg - Service	32.35	3.63	-2.11	-249.85	-429.06	-0.18

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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+Wind 90 deg - Service	32.35	4.19	-0.01	-2.22	-494.33	-0.05
Dead+Wind 120 deg - Service	32.35	3.62	2.08	245.94	-427.05	0.09
Dead+Wind 150 deg - Service	32.35	2.08	3.62	428.14	-245.23	0.21
Dead+Wind 180 deg - Service	32.35	-0.01	4.19	495.57	2.39	0.27
Dead+Wind 210 deg - Service	32.35	-2.10	3.64	430.16	249.48	0.26
Dead+Wind 240 deg - Service	32.35	-3.63	2.11	249.42	429.82	0.18
Dead+Wind 270 deg - Service	32.35	-4.19	0.01	1.80	495.10	0.05
Dead+Wind 300 deg - Service	32.35	-3.62	-2.08	-246.36	427.81	-0.09
Dead+Wind 330 deg - Service	32.35	-2.08	-3.62	-428.57	246.00	-0.21

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-32.35	0.00	0.00	32.35	0.00	0.000%
2	0.06	-38.82	-19.32	-0.06	38.82	19.32	0.011%
3	0.06	-29.12	-19.32	-0.06	29.12	19.32	0.009%
4	9.70	-38.82	-16.77	-9.70	38.82	16.77	0.000%
5	9.70	-29.12	-16.77	-9.70	29.12	16.77	0.000%
6	16.74	-38.82	-9.72	-16.74	38.82	9.72	0.000%
7	16.74	-29.12	-9.72	-16.74	29.12	9.72	0.000%
8	19.29	-38.82	-0.06	-19.29	38.82	0.06	0.006%
9	19.29	-29.12	-0.06	-19.29	29.12	0.06	0.009%
10	16.68	-38.82	9.61	-16.68	38.82	-9.61	0.000%
11	16.68	-29.12	9.61	-16.68	29.12	-9.61	0.000%
12	9.59	-38.82	16.70	-9.59	38.82	-16.70	0.000%
13	9.59	-29.12	16.70	-9.59	29.12	-16.70	0.000%
14	-0.06	-38.82	19.32	0.06	38.82	-19.32	0.006%
15	-0.06	-29.12	19.32	0.06	29.12	-19.32	0.005%
16	-9.70	-38.82	16.77	9.70	38.82	-16.77	0.000%
17	-9.70	-29.12	16.77	9.70	29.12	-16.77	0.000%
18	-16.74	-38.82	9.72	16.74	38.82	-9.72	0.000%
19	-16.74	-29.12	9.72	16.74	29.12	-9.72	0.000%
20	-19.29	-38.82	0.06	19.29	38.82	-0.06	0.011%
21	-19.29	-29.12	0.06	19.29	29.12	-0.06	0.009%
22	-16.68	-38.82	-9.61	16.68	38.82	9.61	0.000%
23	-16.68	-29.12	-9.61	16.68	29.12	9.61	0.000%
24	-9.59	-38.82	-16.70	9.59	38.82	16.70	0.000%
25	-9.59	-29.12	-16.70	9.59	29.12	16.70	0.000%
26	0.00	-69.66	0.00	-0.00	69.66	-0.00	0.001%
27	0.01	-69.66	-5.82	-0.01	69.66	5.82	0.001%
28	2.92	-69.66	-5.05	-2.92	69.66	5.04	0.001%
29	5.05	-69.66	-2.92	-5.05	69.66	2.92	0.001%
30	5.82	-69.66	-0.01	-5.82	69.66	0.01	0.001%
31	5.04	-69.66	2.91	-5.04	69.66	-2.91	0.001%
32	2.91	-69.66	5.04	-2.91	69.66	-5.04	0.001%
33	-0.01	-69.66	5.82	0.01	69.66	-5.82	0.001%
34	-2.92	-69.66	5.05	2.92	69.66	-5.04	0.001%
35	-5.05	-69.66	2.92	5.05	69.66	-2.92	0.001%
36	-5.82	-69.66	0.01	5.82	69.66	-0.01	0.001%
37	-5.04	-69.66	-2.91	5.04	69.66	2.91	0.001%
38	-2.91	-69.66	-5.04	2.91	69.66	5.04	0.001%
39	0.01	-32.35	-4.19	-0.01	32.35	4.19	0.003%
40	2.11	-32.35	-3.64	-2.10	32.35	3.64	0.003%
41	3.63	-32.35	-2.11	-3.63	32.35	2.11	0.003%
42	4.19	-32.35	-0.01	-4.19	32.35	0.01	0.003%
43	3.62	-32.35	2.08	-3.62	32.35	-2.08	0.003%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
44	2.08	-32.35	3.62	-2.08	32.35	-3.62	0.003%
45	-0.01	-32.35	4.19	0.01	32.35	-4.19	0.003%
46	-2.11	-32.35	3.64	2.10	32.35	-3.64	0.003%
47	-3.63	-32.35	2.11	3.63	32.35	-2.11	0.003%
48	-4.19	-32.35	0.01	4.19	32.35	-0.01	0.003%
49	-3.62	-32.35	-2.08	3.62	32.35	2.08	0.003%
50	-2.08	-32.35	-3.62	2.08	32.35	3.62	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	18	0.00012776	0.00014801
3	Yes	18	0.00008100	0.00011747
4	Yes	24	0.00000001	0.00012211
5	Yes	23	0.00000001	0.00014904
6	Yes	24	0.00000001	0.00012617
7	Yes	24	0.00000001	0.00008350
8	Yes	19	0.00007170	0.00008755
9	Yes	18	0.00008103	0.00011948
10	Yes	24	0.00000001	0.00012154
11	Yes	23	0.00000001	0.00014872
12	Yes	24	0.00000001	0.00011994
13	Yes	23	0.00000001	0.00014661
14	Yes	19	0.00007167	0.00011896
15	Yes	19	0.00004453	0.00009105
16	Yes	24	0.00000001	0.00012679
17	Yes	24	0.00000001	0.00008392
18	Yes	24	0.00000001	0.00012246
19	Yes	23	0.00000001	0.00014952
20	Yes	18	0.00012780	0.00012042
21	Yes	18	0.00008103	0.00009545
22	Yes	24	0.00000001	0.00012134
23	Yes	23	0.00000001	0.00014829
24	Yes	24	0.00000001	0.00012319
25	Yes	24	0.00000001	0.00008157
26	Yes	13	0.00000001	0.00001314
27	Yes	22	0.00010646	0.00002582
28	Yes	22	0.00010616	0.00006653
29	Yes	22	0.00010611	0.00007081
30	Yes	22	0.00010635	0.00002401
31	Yes	22	0.00010606	0.00006893
32	Yes	22	0.00010606	0.00006531
33	Yes	22	0.00010635	0.00002577
34	Yes	22	0.00010610	0.00007303
35	Yes	22	0.00010614	0.00006837
36	Yes	22	0.00010646	0.00002436
37	Yes	22	0.00010620	0.00006926
38	Yes	22	0.00010620	0.00007332
39	Yes	18	0.00010340	0.00003031
40	Yes	18	0.00010324	0.00003704
41	Yes	18	0.00010323	0.00004416
42	Yes	18	0.00010337	0.00002965
43	Yes	18	0.00010322	0.00003999
44	Yes	18	0.00010322	0.00003717

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45	Yes	18	0.00010337	0.00003045
46	Yes	18	0.00010322	0.00004525
47	Yes	18	0.00010323	0.00003762
48	Yes	18	0.00010339	0.00002964
49	Yes	18	0.00010325	0.00003940
50	Yes	18	0.00010325	0.00004274

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123	27.4967	40	1.6587	0.0036
L2	125.75 - 85	19.3670	40	1.4987	0.0025
L3	88.5 - 44	9.3064	40	1.0355	0.0011
L4	48.5 - 0	2.7519	40	0.5260	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	AIR6449 B41_T-MOBILE w/ Mount Pipe	40	27.4967	1.6587	0.0036	24921
136.00	DMP65R-BU8D w/ Mount Pipe	40	22.7152	1.5776	0.0030	8900
127.00	SBNHH-1D65B w/ Mount Pipe	40	19.7643	1.5097	0.0026	5490
75.00	KS24019-L112A	40	6.5788	0.8546	0.0008	4200

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123	127.9932	4	7.7423	0.0165
L2	125.75 - 85	90.2221	4	6.9977	0.0115
L3	88.5 - 44	43.3913	4	4.8351	0.0051
L4	48.5 - 0	12.8314	4	2.4541	0.0020

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	AIR6449 B41_T-MOBILE w/ Mount Pipe	4	127.9932	7.7423	0.0165	5542
136.00	DMP65R-BU8D w/ Mount Pipe	4	105.7823	7.3652	0.0136	1977
127.00	SBNHH-1D65B w/ Mount Pipe	4	92.0688	7.0492	0.0117	1217

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
75.00	KS24019-L112A	4	30.6777	3.9900	0.0037	909

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 P _u / φP _n
L1	150 - 123 (1)	TP22.69x17x0.25	27.00	0.00	0.0	17.3463	-10.98	1014.76	0.011
L2	123 - 85 (2)	TP28.36x21.6105x0.375	40.75	0.00	0.0	32.6191	-16.81	1908.22	0.009
L3	85 - 44 (3)	TP36.86x27.0303x0.4063	44.50	0.00	0.0	45.1455	-25.02	2641.01	0.009
L4	44 - 0 (4)	TP42.53x35.0535x0.4375	48.50	0.00	0.0	58.4507	-38.80	3419.37	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{nx} kip-ft	Ratio M _{ux} / φM _{nx}	M _{uy} kip-ft	φM _{ny} kip-ft	Ratio M _{uy} / φM _{ny}
L1	150 - 123 (1)	TP22.69x17x0.25	206.19	577.27	0.357	0.00	577.27	0.000
L2	123 - 85 (2)	TP28.36x21.6105x0.375	749.38	1357.87	0.552	0.00	1357.87	0.000
L3	85 - 44 (3)	TP36.86x27.0303x0.4063	1379.28	2405.87	0.573	0.00	2405.87	0.000
L4	44 - 0 (4)	TP42.53x35.0535x0.4375	2316.71	3738.54	0.620	0.00	3738.54	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _n K	Ratio V _u / φV _n	Actual T _u kip-ft	φT _n kip-ft	Ratio T _u / φT _n
L1	150 - 123 (1)	TP22.69x17x0.25	13.55	304.43	0.044	1.22	582.80	0.002
L2	123 - 85 (2)	TP28.36x21.6105x0.375	15.58	572.47	0.027	1.06	1373.93	0.001
L3	85 - 44 (3)	TP36.86x27.0303x0.4063	17.64	802.44	0.022	1.12	2429.33	0.000
L4	44 - 0 (4)	TP42.53x35.0535x0.4375	19.41	1025.81	0.019	1.19	3781.39	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P _u / φP _n	Ratio M _{ux} / φM _{nx}	Ratio M _{uy} / φM _{ny}	Ratio V _u / φV _n	Ratio T _u / φT _n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123 (1)	0.011	0.357	0.000	0.044	0.002	0.370	1.050	4.8.2

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Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L2	123 - 85 (2)	0.009	0.552	0.000	0.027	0.001	0.561	1.050	4.8.2
L3	85 - 44 (3)	0.009	0.573	0.000	0.022	0.000	0.583	1.050	4.8.2
L4	44 - 0 (4)	0.011	0.620	0.000	0.019	0.000	0.631	1.050	4.8.2

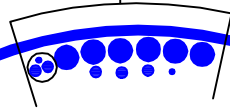
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	150 - 123	Pole	TP22.69x17x0.25	1	-10.98	1065.50	35.3	Pass	
L2	123 - 85	Pole	TP28.36x21.6105x0.375	2	-16.81	2003.63	53.5	Pass	
L3	85 - 44	Pole	TP36.86x27.0303x0.4063	3	-25.02	2773.06	55.6	Pass	
L4	44 - 0	Pole	TP42.53x35.0535x0.4375	4	-38.80	3590.34	60.1	Pass	
							Summary		
							Pole (L4)	60.1	Pass
							RATING =	60.1	Pass

APPENDIX B
BASE LEVEL DRAWING

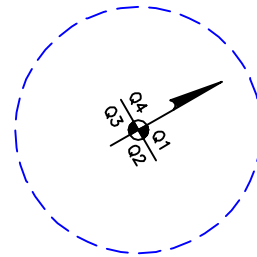
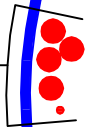
(OTHER CONSIDERED EQUIPMENT)

- (1) 3/8" TO 136 FT LEVEL
- (2) 3/4" TO 136 FT LEVEL
- (1) 3/8" TO 136 FT LEVEL
- (3) 3/4" TO 136 FT LEVEL
- (6) 1-5/8" TO 136 FT LEVEL



(PROPOSED EQUIPMENT CONFIGURATION)

- (4) 1-5/8" TO 150 FT LEVEL
- (1) 1/2" TO 75 FT LEVEL



(OTHER CONSIDERED EQUIPMENT)
(2) 1-5/8" TO 127 FT LEVEL

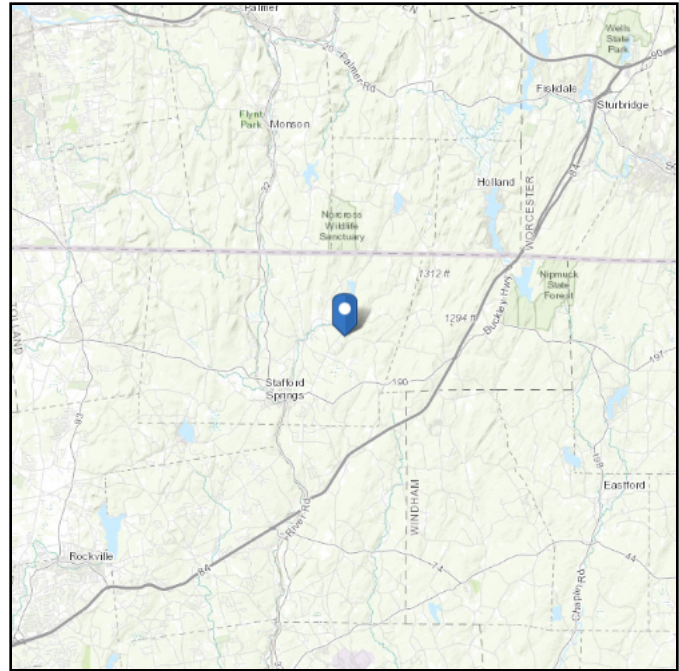
APPENDIX C
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 962.45 ft (NAVD 88)
Latitude: 41.987106
Longitude: -72.261328



Wind

Results:

Wind Speed:	124 Vmph	*125 mph required by jurisdiction.
10-year MRI	77 Vmph	
25-year MRI	87 Vmph	
50-year MRI	94 Vmph	
100-year MRI	101 Vmph	

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

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

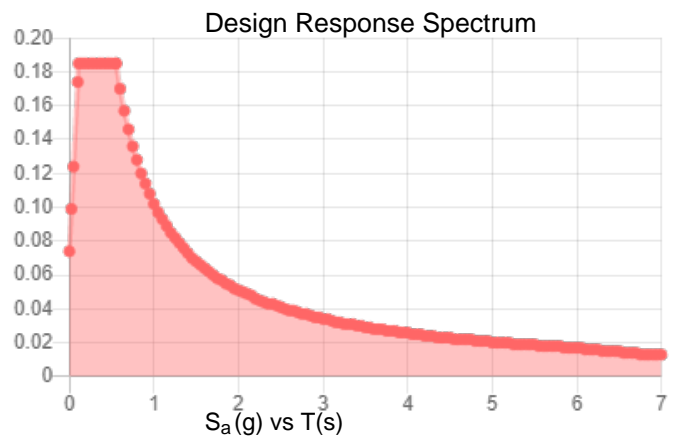
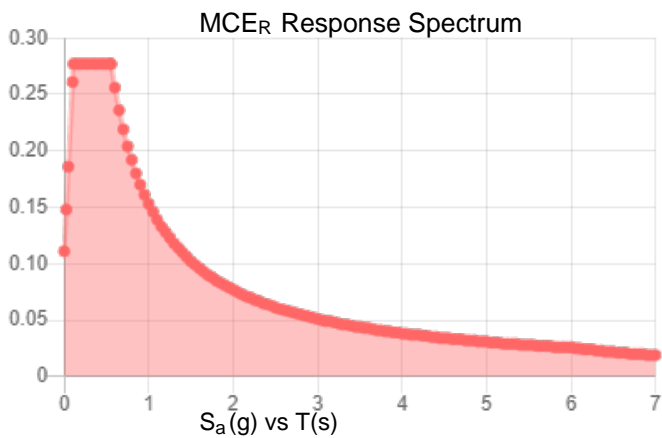
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.173	S_{DS} :	0.185
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.277	PGA _M :	0.136
S_{M1} :	0.153	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Wed Feb 17 2021

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Wed Feb 17 2021

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

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

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ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Monopole Base Plate Connection

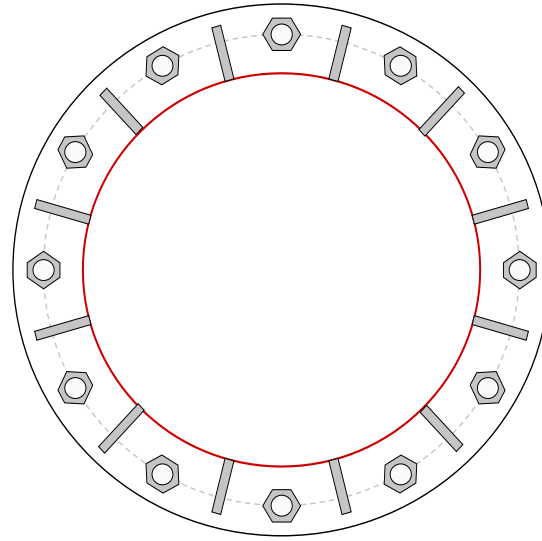


Site Info	
BU #	876402
Site Name	Stafford/Pragy/SSUSA
Order #	538764 Rev.1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	2316.71
Axial Force (kips)	38.80
Shear Force (kips)	19.41

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
 (12) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 51.03" BC

Base Plate Data
 57.53" OD x 1.75" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)

Stiffener Data
 (12) 18"H x 6"W x 1"T, Notch: 0.75"
 plate: $F_y=50$ ksi ; weld: $F_y=80$ ksi
 horiz. weld: 0.5" groove, 45° dbl bevel, 0.625" fillet
 vert. weld: 0.375" fillet

Pole Data
 42.53" x 0.4375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary		<i>(units of kips, kip-in)</i>	
$Pu_c = 184.68$	$\phi Pn_c = 268.39$		Stress Rating
$Vu = 1.62$	$\phi Vn = 120.77$		65.6%
$Mu = n/a$	$\phi Mn = n/a$		Pass

Base Plate Summary		
Max Stress (ksi):	36.92	(Roark's Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	78.1%	Pass

Stiffener Summary		
Horizontal Weld:	48.3%	Pass
Vertical Weld:	37.2%	Pass
Plate Flexure+Shear:	12.0%	Pass
Plate Tension+Shear:	49.5%	Pass
Plate Compression:	50.6%	Pass

Pole Summary		
Punching Shear:	9.9%	Pass

Pier and Pad Foundation



BU # : 876402
Site Name: Stafford/Pragyl/SS
App. Number: 538764 Rev. 1

TIA-222 Revision: H
Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	38.8	kips
Base Shear, V_{u_comp} :	19.41	kips
Moment, M_u :	2316.71	ft-kips
Tower Height, H :	150	ft
BP Dist. Above Fdn, bp_{dist} :	4	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	347.84	19.41	5.3%	Pass
<i>Bearing Pressure (ksf)</i>	45.14	2.18	4.8%	Pass
<i>Overtuning (kip*ft)</i>	5353.93	2468.76	46.1%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	5168.62	2404.06	44.3%	Pass
<i>Pier Compression (kip)</i>	17184.96	67.96	0.4%	Pass
<i>Pad Flexure (kip*ft)</i>	2337.11	877.71	35.8%	Pass
<i>Pad Shear - 1-way (kips)</i>	679.06	147.33	20.7%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.030	17.2%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	3085.23	1442.43	44.5%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	6	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	11	
Pier Rebar Quantity, mc :	26	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Soil Rating*:	46.1%
Structural Rating*:	44.5%

Pad Properties		
Depth, D :	7	ft
Pad Width, W_1 :	22	ft
Pad Thickness, T :	3	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	17	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	113	pcf
Ultimate Net Bearing, Q_{net} :	59.400	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	45	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.5	
Neglected Depth, N :	3.30	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

<-- Toggle between Gross and Net

Exhibit E

Mount Analysis

Date: **February 2, 2021**

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

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

Subject: **Mount Analysis Report**

Carrier Designation: **Sprint PCS Retain**
Carrier Site Number: CTHA628A
Carrier Site Name: N/A

Crown Castle Designation: **Crown Castle BU Number:** 876402
Crown Castle Site Name: STAFFORD/PRAGYL/SSUSA
Crown Castle JDE Job Number: 628859
Crown Castle Order Number: 538764 Rev. 0

Engineering Firm Designation: **Infinigy Engineering, PLLC Report Designation: 1039-Z0001-B**

Site Data: **175 Stafford Street, Stafford, Tolland County, CT, 06077**
Latitude 41°59'13.38", Longitude -72°15'40.78"

Structure Information: **Tower Height & Type:** **150.0 ft Monopole**
Mount Elevation: **150.0 ft**
Mount Type: **14.0 ft Platform**

Dear Darcy Tarr,

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

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

Platform **Sufficient - 98.9%**
***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

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

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

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



2/3/21

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2) ANALYSIS CRITERIA

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3) ANALYSIS PROCEDURE

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Software Input Calculations

7) APPENDIX C

Software Analysis Output

8) APPENDIX D

Additional Calculations

1) INTRODUCTION

This is an existing 3 sector 14.0 ft Platform, designed by Engineered Endeavors Incorporated.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Connecticut State Building Code and Appendix N
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.173
Seismic S₁:	0.064
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
150.0	152.0	3	Ericsson	AIR6449 B41 T-MOBILE	14.0 ft Platform
		3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	
		3	RFS/Celwave	APXVAALL24 43-U-NA20 TMO	
		3	Ericsson	RADIO 4415 B66A	
		3	Ericsson	RADIO 4424 B25 TMO	
		3	Ericsson	RADIO 4449 B71 B85A_ T-MOBILE	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Sprint PCS Application	538764 Rev. 0	CCI Sites
Loading Document	Sprint PCS	RFDS Version: 1	TSA
Tower Mapping Documents	Tower Engineering Professionals	2175539	CCI Sites

3.1) Analysis Method

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

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

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

3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
- 5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
- 6) Steel grades have been assumed as follows, unless noted otherwise:

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

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

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP3	150.0	39.5	Pass
	Horizontal(s)	M10		54.9	Pass
	Handrail(s)	M38		34.0	Pass
	Standoff(s)	M1		98.9	Pass
	Mount Connection(s)	-		3.3	Pass

Structure Rating (max from all components) =	98.9%
---	--------------

Notes:

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

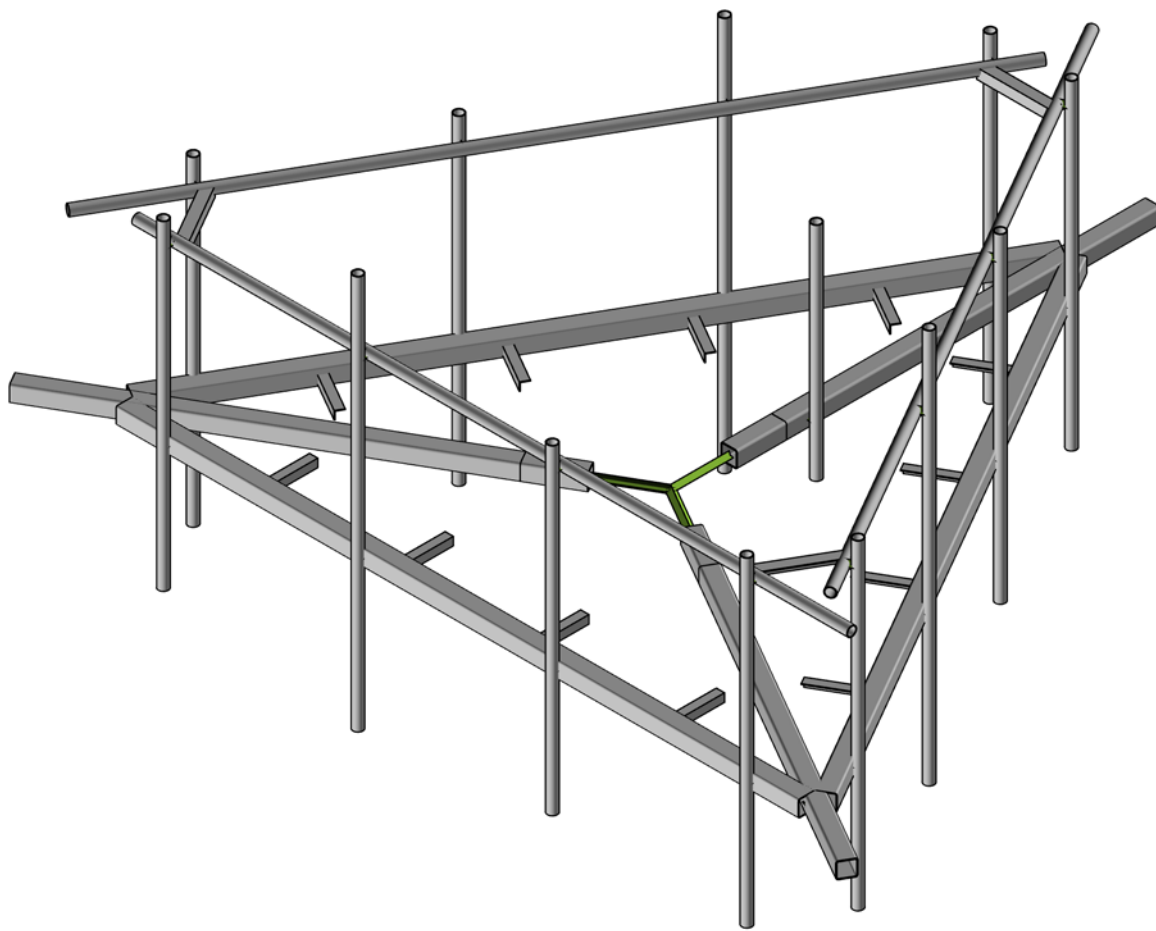
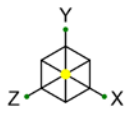
4.1) Recommendations

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

1. Installation of proposed Site Pro 1 HRK14 handrail kit.
2. Addition of (1) 8' pipe mount per sector.

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

APPENDIX A
WIRE FRAME AND RENDERED MODELS



Infinigy Engineering, PLLC

JG

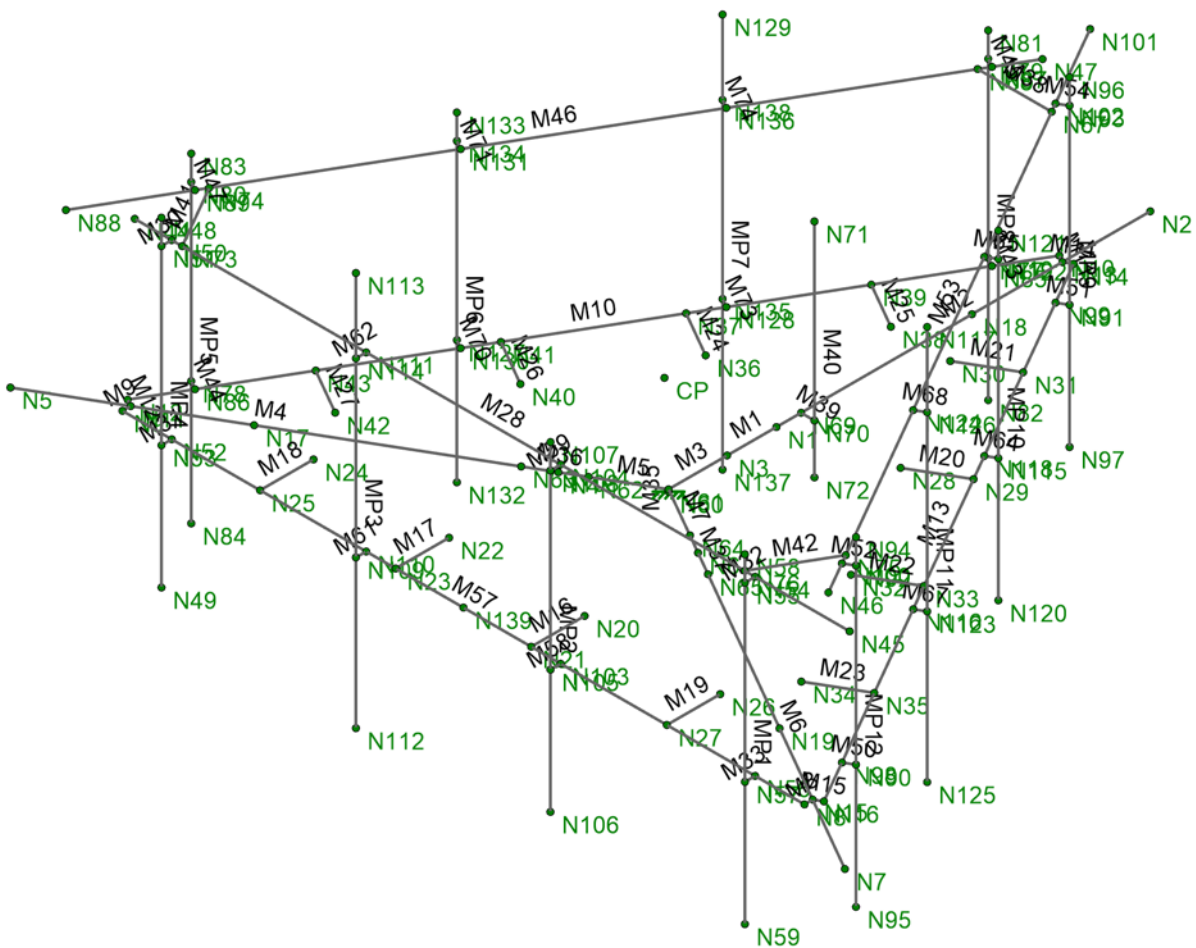
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Render

Feb 02, 2021

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Infinigy Engineering, PLLC

876402

Wireframe

JG

Feb 02, 2021

1039-Z0001-B

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APPENDIX B
SOFTWARE INPUT CALCULATIONS

Program Inputs

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

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	B	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil	
Ground Elevation:	962.45	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	150.0	ft
Tower Height AGL:	150.0	ft

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

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

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

WIND AND ICE DATA		
Ultimate Wind (V_{ult}):	125	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	2	in
Flat Pressure:	81.44	psf
Round Pressure:	48.87	psf
Ice Wind Pressure:	7.82	psf

SEISMIC DATA		
Short-Period Accel. (S_s):	0.173	g
1-Second Accel. (S_1):	0.064	g
Short-Period Design (S_{DS}):	0.18	
1-Second Design (S_{D1}):	0.10	
Short-Period Coeff. (F_a):	1.60	
1-Second Coeff. (F_v):	2.40	
Amplification Factor (a_p):	1.00	
Response Mod. (R_p):	2.50	
Overstrength (Ω_o):	1.00	



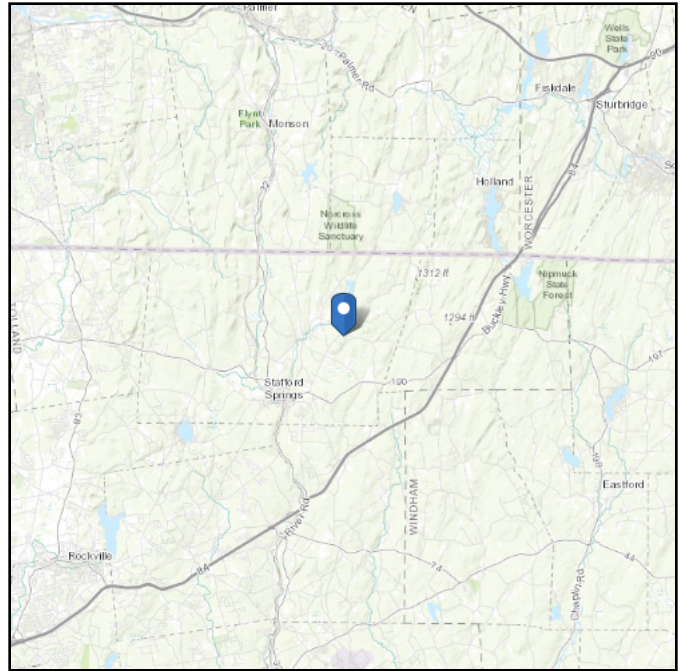
Infinigy Load Calculator V2.1.4

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 962.45 ft (NAVD 88)
Latitude: 41.98705
Longitude: -72.261328



Wind

Results:

Wind Speed:	125 Vmph per 2018 Connecticut State Building Code and Appendix N
10-year MRI	77 Vmph
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100-year MRI	101 Vmph

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

Date Accessed: Sun Jan 31 2021

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

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

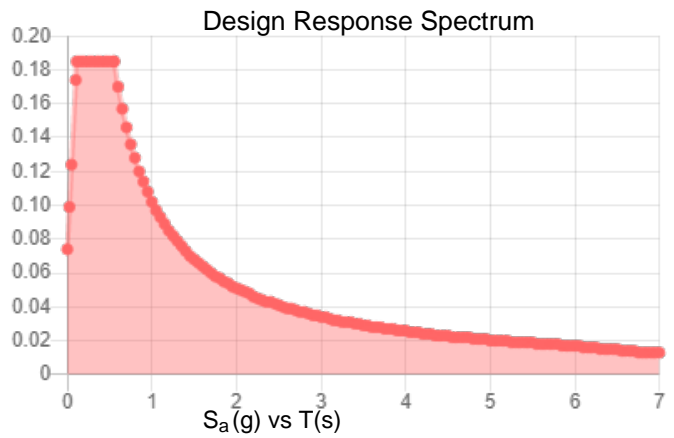
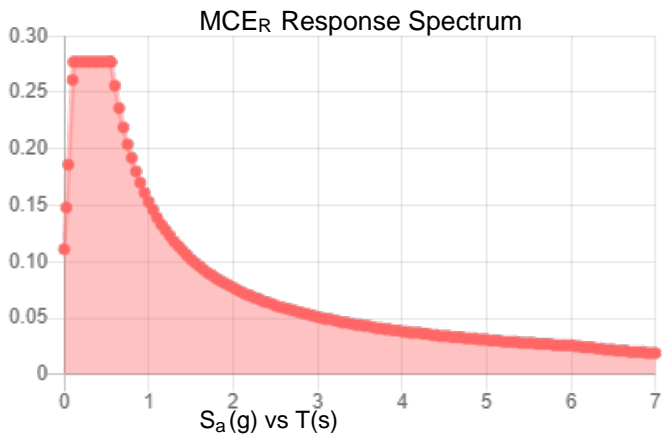
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.173	S_{DS} :	0.185
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.277	PGA _M :	0.136
S_{M1} :	0.153	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Sun Jan 31 2021

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.

Concurrent Temperature: 5 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Sun Jan 31 2021

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

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APPENDIX C
SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N3	N1		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
2	M2	N1	N2		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
3	M3	N61	N3		RIGID	None	None	RIGID	Typical
4	M4	N63	N5		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
5	M5	N61	N62		RIGID	None	None	RIGID	Typical
6	M6	N65	N7		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
7	M7	N61	N64		RIGID	None	None	RIGID	Typical
8	M8	N15	N8		RIGID	None	None	RIGID	Typical
9	M9	N11	N9		RIGID	None	None	RIGID	Typical
10	M10	N10	N12		Horizontal	Beam	Tube	A500 Gr.B Rect	Typical
11	M11	N13	N10		RIGID	None	None	RIGID	Typical
12	M12	N11	N12		RIGID	None	None	RIGID	Typical
13	M13	N14	N16		Horizontal	Beam	Tube	A500 Gr.B Rect	Typical
14	M14	N13	N14		RIGID	None	None	RIGID	Typical
15	M15	N15	N16		RIGID	None	None	RIGID	Typical
16	M16	N20	N21	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
17	M17	N22	N23	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N24	N25	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N26	N27	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N28	N29	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
21	M21	N30	N31	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
22	M22	N32	N33	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
23	M23	N34	N35	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
24	M24	N36	N37	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
25	M25	N38	N39	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N40	N41	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
27	M27	N42	N43	90	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
28	M28	N45	N44		Handrail	Beam	Pipe	A53 Gr.B	Typical
29	MP4	N48	N49		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
30	M30	N50	N51		RIGID	None	None	RIGID	Typical
31	M31	N52	N53		RIGID	None	None	RIGID	Typical
32	M32	N54	N55		RIGID	None	None	RIGID	Typical
33	M33	N56	N57		RIGID	None	None	RIGID	Typical
34	MP1	N58	N59		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
35	M35	N60	N61		RIGID	None	None	RIGID	Typical
36	M36	N62	N63		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
37	M37	N64	N65		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
38	M38	N68	N67	180	Corner Angle	HBrace	Single Angle	A36 Gr.36	Typical
39	M39	N69	N70		RIGID	None	None	RIGID	Typical
40	M40	N71	N72		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
41	M41	N73	N74	180	Corner Angle	HBrace	Single Angle	A36 Gr.36	Typical
42	M42	N75	N76	180	Corner Angle	HBrace	Single Angle	A36 Gr.36	Typical
43	M43	N85	N77		RIGID	None	None	RIGID	Typical
44	M44	N86	N78		RIGID	None	None	RIGID	Typical
45	M45	N87	N79		RIGID	None	None	RIGID	Typical
46	M46	N88	N47		Handrail	Beam	Pipe	A53 Gr.B	Typical
47	M47	N89	N80		RIGID	None	None	RIGID	Typical
48	MP8	N81	N82		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
49	MP5	N83	N84		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
50	M50	N98	N90		RIGID	None	None	RIGID	Typical
51	M51	N99	N91		RIGID	None	None	RIGID	Typical
52	M52	N100	N92		RIGID	None	None	RIGID	Typical
53	M53	N101	N46		Handrail	Beam	Pipe	A53 Gr.B	Typical
54	M54	N102	N93		RIGID	None	None	RIGID	Typical
55	MP12	N94	N95		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
56	MP9	N96	N97		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
57	M57	N8	N9		Horizontal	Beam	Tube	A500 Gr.B Rect	Typical
58	M58	N103	N105		RIGID	None	None	RIGID	Typical
59	M59	N104	N108		RIGID	None	None	RIGID	Typical
60	MP2	N107	N106		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
61	M61	N110	N109		RIGID	None	None	RIGID	Typical
62	M62	N111	N114		RIGID	None	None	RIGID	Typical
63	MP3	N113	N112		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
64	M64	N118	N115		RIGID	None	None	RIGID	Typical
65	M65	N119	N122		RIGID	None	None	RIGID	Typical
66	MP10	N121	N120		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
67	M67	N116	N123		RIGID	None	None	RIGID	Typical
68	M68	N124	N126		RIGID	None	None	RIGID	Typical
69	MP11	N117	N125		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
70	M70	N130	N127		RIGID	None	None	RIGID	Typical
71	M71	N131	N134		RIGID	None	None	RIGID	Typical
72	MP6	N133	N132		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
73	M73	N128	N135		RIGID	None	None	RIGID	Typical
74	M74	N136	N138		RIGID	None	None	RIGID	Typical
75	MP7	N129	N137		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General Members				
2	RIGID		35	118.5	0
3	Total General		35	118.5	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	L2x2x3	12	156	31.938
7	A36 Gr.36	L2.5x2.5x3	3	54	13.805
8	A500 Gr.B Rect	HSS4X4X3	3	498	391.846
9	A500 Gr.B Rect	HSS4X4X4	6	309	317.582
10	A53 Gr.B	PIPE_2.0	16	1566	452.944
11	Total HR Steel		40	2583	1208.115

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
1	Self Weight	DL		-1			36		3
2	Wind Load AZI 0	WLZ					72		
3	Wind Load AZI 30	None					72		
4	Wind Load AZI 60	None					72		
5	Wind Load AZI 90	WLX					72		



Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
6	Wind Load AZI 120	None					72		
7	Wind Load AZI 150	None					72		
8	Wind Load AZI 180	None					72		
9	Wind Load AZI 210	None					72		
10	Wind Load AZI 240	None					72		
11	Wind Load AZI 270	None					72		
12	Wind Load AZI 300	None					72		
13	Wind Load AZI 330	None					72		
14	Distr. Wind Load Z	WLZ						75	
15	Distr. Wind Load X	WLX						75	
16	Ice Weight	OL1					36	75	3
17	Ice Wind Load AZI 0	OL2					72		
18	Ice Wind Load AZI 30	None					72		
19	Ice Wind Load AZI 60	None					72		
20	Ice Wind Load AZI 90	OL3					72		
21	Ice Wind Load AZI 120	None					72		
22	Ice Wind Load AZI 150	None					72		
23	Ice Wind Load AZI 180	None					72		
24	Ice Wind Load AZI 210	None					72		
25	Ice Wind Load AZI 240	None					72		
26	Ice Wind Load AZI 270	None					72		
27	Ice Wind Load AZI 300	None					72		
28	Ice Wind Load AZI 330	None					72		
29	Distr. Ice Wind Load Z	OL2						75	
30	Distr. Ice Wind Load X	OL3						75	
31	Seismic Load Z	ELZ			-0.092		36		
32	Seismic Load X	ELX	-0.092				36		
33	Service Live Loads	LL				1			
34	Maintenance Load 1	LL				1			
35	Maintenance Load 2	LL				1			
36	Maintenance Load 3	LL				1			
37	Maintenance Load 4	LL				1			
38	Maintenance Load 5	LL				1			
39	Maintenance Load 6	LL				1			
40	Maintenance Load 7	LL				1			
41	Maintenance Load 8	LL				1			
42	Maintenance Load 9	LL				1			
43	Maintenance Load 10	LL				1			
44	Maintenance Load 11	LL				1			
45	Maintenance Load 12	LL				1			
46	BLC 1 Transient Area Loads	None						51	
47	BLC 16 Transient Area Loads	None						51	

Load Combinations

	Description	Solve	P	Delta	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor
1	1.4DL	Yes	Y	1	1.4				
2	1.2DL + 1WL AZI 0	Yes	Y	1	1.2	2	1	14	15
3	1.2DL + 1WL AZI 30	Yes	Y	1	1.2	3	1	14	0.866 15 0.5



Load Combinations (Continued)

	Description	Solve	P	Delta	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor
4	1.2DL + 1WL AZI 60	Yes	Y	1	1.2	4	1	14	0.5	15	0.866			
5	1.2DL + 1WL AZI 90	Yes	Y	1	1.2	5	1	14		15	1			
6	1.2DL + 1WL AZI 120	Yes	Y	1	1.2	6	1	14	-0.5	15	0.866			
7	1.2DL + 1WL AZI 150	Yes	Y	1	1.2	7	1	14	-0.866	15	0.5			
8	1.2DL + 1WL AZI 180	Yes	Y	1	1.2	8	1	14	-1	15				
9	1.2DL + 1WL AZI 210	Yes	Y	1	1.2	9	1	14	-0.866	15	-0.5			
10	1.2DL + 1WL AZI 240	Yes	Y	1	1.2	10	1	14	-0.5	15	-0.866			
11	1.2DL + 1WL AZI 270	Yes	Y	1	1.2	11	1	14		15	-1			
12	1.2DL + 1WL AZI 300	Yes	Y	1	1.2	12	1	14	0.5	15	-0.866			
13	1.2DL + 1WL AZI 330	Yes	Y	1	1.2	13	1	14	0.866	15	-0.5			
14	0.9DL + 1WL AZI 0	Yes	Y	1	0.9	2	1	14	1	15				
15	0.9DL + 1WL AZI 30	Yes	Y	1	0.9	3	1	14	0.866	15	0.5			
16	0.9DL + 1WL AZI 60	Yes	Y	1	0.9	4	1	14	0.5	15	0.866			
17	0.9DL + 1WL AZI 90	Yes	Y	1	0.9	5	1	14		15	1			
18	0.9DL + 1WL AZI 120	Yes	Y	1	0.9	6	1	14	-0.5	15	0.866			
19	0.9DL + 1WL AZI 150	Yes	Y	1	0.9	7	1	14	-0.866	15	0.5			
20	0.9DL + 1WL AZI 180	Yes	Y	1	0.9	8	1	14	-1	15				
21	0.9DL + 1WL AZI 210	Yes	Y	1	0.9	9	1	14	-0.866	15	-0.5			
22	0.9DL + 1WL AZI 240	Yes	Y	1	0.9	10	1	14	-0.5	15	-0.866			
23	0.9DL + 1WL AZI 270	Yes	Y	1	0.9	11	1	14		15	-1			
24	0.9DL + 1WL AZI 300	Yes	Y	1	0.9	12	1	14	0.5	15	-0.866			
25	0.9DL + 1WL AZI 330	Yes	Y	1	0.9	13	1	14	0.866	15	-0.5			
26	1.2D + 1.0Di	Yes	Y	1	1.2	16	1							
27	1.2D + 1.0Di + 1.0Wi AZI 0	Yes	Y	1	1.2	16	1	17	1	29	1	30		
28	1.2D + 1.0Di + 1.0Wi AZI 30	Yes	Y	1	1.2	16	1	18	1	29	0.866	30	0.5	
29	1.2D + 1.0Di + 1.0Wi AZI 60	Yes	Y	1	1.2	16	1	19	1	29	0.5	30	0.866	
30	1.2D + 1.0Di + 1.0Wi AZI 90	Yes	Y	1	1.2	16	1	20	1	29		30	1	
31	1.2D + 1.0Di + 1.0Wi AZI 120	Yes	Y	1	1.2	16	1	21	1	29	-0.5	30	0.866	
32	1.2D + 1.0Di + 1.0Wi AZI 150	Yes	Y	1	1.2	16	1	22	1	29	-0.866	30	0.5	
33	1.2D + 1.0Di + 1.0Wi AZI 180	Yes	Y	1	1.2	16	1	23	1	29	-1	30		
34	1.2D + 1.0Di + 1.0Wi AZI 210	Yes	Y	1	1.2	16	1	24	1	29	-0.866	30	-0.5	
35	1.2D + 1.0Di + 1.0Wi AZI 240	Yes	Y	1	1.2	16	1	25	1	29	-0.5	30	-0.866	
36	1.2D + 1.0Di + 1.0Wi AZI 270	Yes	Y	1	1.2	16	1	26	1	29		30	-1	
37	1.2D + 1.0Di + 1.0Wi AZI 300	Yes	Y	1	1.2	16	1	27	1	29	0.5	30	-0.866	
38	1.2D + 1.0Di + 1.0Wi AZI 330	Yes	Y	1	1.2	16	1	28	1	29	0.866	30	-0.5	
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.237	31	1	32						
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.237	31	0.866	32	0.5					
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.237	31	0.5	32	0.866					
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.237	31		32	1					
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.237	31	-0.5	32	0.866					
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.237	31	-0.866	32	0.5					
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.237	31	-1	32						
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.237	31	-0.866	32	-0.5					
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.237	31	-0.5	32	-0.866					
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.237	31		32	-1					
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.237	31	0.5	32	-0.866					
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.237	31	0.866	32	-0.5					
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.863	31	1	32						
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.863	31	0.866	32	0.5					



Load Combinations (Continued)

Description	Solve	PD	Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
53 (0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.863	31	0.5	32	0.866					
54 (0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.863	31		32	1					
55 (0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.863	31	-0.5	32	0.866					
56 (0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.863	31	-0.866	32	0.5					
57 (0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.863	31	-1	32						
58 (0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.863	31	-0.866	32	-0.5					
59 (0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.863	31	-0.5	32	-0.866					
60 (0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.863	31		32	-1					
61 (0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.863	31	0.5	32	-0.866					
62 (0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.863	31	0.866	32	-0.5					
63 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 0	Yes	Y	1	1	2	0.23	14	0.23	15		33	1.5	
64 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 30	Yes	Y	1	1	3	0.23	14	0.2	15	0.115	33	1.5	
65 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 60	Yes	Y	1	1	4	0.23	14	0.115	15	0.2	33	1.5	
66 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 90	Yes	Y	1	1	5	0.23	14		15	0.23	33	1.5	
67 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 120	Yes	Y	1	1	6	0.23	14	-0.115	15	0.2	33	1.5	
68 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 150	Yes	Y	1	1	7	0.23	14	-0.2	15	0.115	33	1.5	
69 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 180	Yes	Y	1	1	8	0.23	14	-0.23	15		33	1.5	
70 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 210	Yes	Y	1	1	9	0.23	14	-0.2	15	-0.115	33	1.5	
71 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 240	Yes	Y	1	1	10	0.23	14	-0.115	15	-0.2	33	1.5	
72 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 270	Yes	Y	1	1	11	0.23	14		15	-0.23	33	1.5	
73 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 300	Yes	Y	1	1	12	0.23	14	0.115	15	-0.2	33	1.5	
74 1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 330	Yes	Y	1	1	13	0.23	14	0.2	15	-0.115	33	1.5	
75 1.2DL + 1.5LL	Yes	Y	1	1.2	33	1.5							
76 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.058	14	0.058	15		
77 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.058	14	0.05	15	0.029	
78 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.058	14	0.029	15	0.05	
79 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.058	14		15	0.058	
80 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.058	14	-0.029	15	0.05	
81 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.058	14	-0.05	15	0.029	
82 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.058	14	-0.058	15		
83 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.058	14	-0.05	15	-0.029	
84 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.058	14	-0.029	15	-0.05	
85 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.058	14		15	-0.058	
86 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.058	14	0.029	15	-0.05	
87 1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.058	14	0.05	15	-0.029	
88 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.058	14	0.058	15		
89 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.058	14	0.05	15	0.029	
90 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.058	14	0.029	15	0.05	
91 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.058	14		15	0.058	
92 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.058	14	-0.029	15	0.05	
93 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.058	14	-0.05	15	0.029	
94 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.058	14	-0.058	15		
95 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.058	14	-0.05	15	-0.029	
96 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.058	14	-0.029	15	-0.05	
97 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.058	14		15	-0.058	
98 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.058	14	0.029	15	-0.05	
99 1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.058	14	0.05	15	-0.029	
100 1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.058	14	0.058	15		
101 1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.058	14	0.05	15	0.029	



Load Combinations (Continued)

	Description	Solve	PD	Delta	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor
102	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.058	14	0.029	15	0.05
103	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.058	14		15	0.058
104	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.058	14	-0.029	15	0.05
105	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.058	14	-0.05	15	0.029
106	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.058	14	-0.058	15	
107	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.058	14	-0.05	15	-0.029
108	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.058	14	-0.029	15	-0.05
109	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.058	14		15	-0.058
110	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.058	14	0.029	15	-0.05
111	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.058	14	0.05	15	-0.029
112	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.058	14	0.058	15	
113	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.058	14	0.05	15	0.029
114	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.058	14	0.029	15	0.05
115	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.058	14		15	0.058
116	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.058	14	-0.029	15	0.05
117	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.058	14	-0.05	15	0.029
118	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.058	14	-0.058	15	
119	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.058	14	-0.05	15	-0.029
120	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.058	14	-0.029	15	-0.05
121	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.058	14		15	-0.058
122	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.058	14	0.029	15	-0.05
123	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.058	14	0.05	15	-0.029
124	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.058	14	0.058	15	
125	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.058	14	0.05	15	0.029
126	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.058	14	0.029	15	0.05
127	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.058	14		15	0.058
128	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.058	14	-0.029	15	0.05
129	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.058	14	-0.05	15	0.029
130	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.058	14	-0.058	15	
131	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.058	14	-0.05	15	-0.029
132	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.058	14	-0.029	15	-0.05
133	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.058	14		15	-0.058
134	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.058	14	0.029	15	-0.05
135	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.058	14	0.05	15	-0.029
136	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.058	14	0.058	15	
137	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.058	14	0.05	15	0.029
138	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.058	14	0.029	15	0.05
139	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.058	14		15	0.058
140	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.058	14	-0.029	15	0.05
141	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.058	14	-0.05	15	0.029
142	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.058	14	-0.058	15	
143	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.058	14	-0.05	15	-0.029
144	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.058	14	-0.029	15	-0.05
145	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.058	14		15	-0.058
146	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.058	14	0.029	15	-0.05
147	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.058	14	0.05	15	-0.029
148	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	40	1.5	2	0.058	14	0.058	15	
149	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	40	1.5	3	0.058	14	0.05	15	0.029
150	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	40	1.5	4	0.058	14	0.029	15	0.05



Company : Infinigy Engineering, PLLC
 Designer : JG
 Job Number : 1039-Z0001-B
 Model Name : 876402

2/2/2021
 4:26:27 PM
 Checked By : _____

Load Combinations (Continued)

	Description	Solve	PD	Delta	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor	BLCFactor
151	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	40	1.5	5	0.058	14		15	0.058
152	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	40	1.5	6	0.058	14	-0.029	15	0.05
153	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	40	1.5	7	0.058	14	-0.05	15	0.029
154	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	40	1.5	8	0.058	14	-0.058	15	
155	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	40	1.5	9	0.058	14	-0.05	15	-0.029
156	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	40	1.5	10	0.058	14	-0.029	15	-0.05
157	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	40	1.5	11	0.058	14		15	-0.058
158	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	40	1.5	12	0.058	14	0.029	15	-0.05
159	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	40	1.5	13	0.058	14	0.05	15	-0.029
160	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	41	1.5	2	0.058	14	0.058	15	
161	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	41	1.5	3	0.058	14	0.05	15	0.029
162	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	41	1.5	4	0.058	14	0.029	15	0.05
163	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	41	1.5	5	0.058	14		15	0.058
164	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	41	1.5	6	0.058	14	-0.029	15	0.05
165	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	41	1.5	7	0.058	14	-0.05	15	0.029
166	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	41	1.5	8	0.058	14	-0.058	15	
167	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	41	1.5	9	0.058	14	-0.05	15	-0.029
168	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	41	1.5	10	0.058	14	-0.029	15	-0.05
169	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	41	1.5	11	0.058	14		15	-0.058
170	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	41	1.5	12	0.058	14	0.029	15	-0.05
171	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	41	1.5	13	0.058	14	0.05	15	-0.029
172	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	42	1.5	2	0.058	14	0.058	15	
173	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	42	1.5	3	0.058	14	0.05	15	0.029
174	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	42	1.5	4	0.058	14	0.029	15	0.05
175	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	42	1.5	5	0.058	14		15	0.058
176	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	42	1.5	6	0.058	14	-0.029	15	0.05
177	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	42	1.5	7	0.058	14	-0.05	15	0.029
178	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	42	1.5	8	0.058	14	-0.058	15	
179	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	42	1.5	9	0.058	14	-0.05	15	-0.029
180	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	42	1.5	10	0.058	14	-0.029	15	-0.05
181	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	42	1.5	11	0.058	14		15	-0.058
182	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	42	1.5	12	0.058	14	0.029	15	-0.05
183	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	42	1.5	13	0.058	14	0.05	15	-0.029
184	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	43	1.5	2	0.058	14	0.058	15	
185	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	43	1.5	3	0.058	14	0.05	15	0.029
186	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	43	1.5	4	0.058	14	0.029	15	0.05
187	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	43	1.5	5	0.058	14		15	0.058
188	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	43	1.5	6	0.058	14	-0.029	15	0.05
189	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	43	1.5	7	0.058	14	-0.05	15	0.029
190	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	43	1.5	8	0.058	14	-0.058	15	
191	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	43	1.5	9	0.058	14	-0.05	15	-0.029
192	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	43	1.5	10	0.058	14	-0.029	15	-0.05
193	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	43	1.5	11	0.058	14		15	-0.058
194	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	43	1.5	12	0.058	14	0.029	15	-0.05
195	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	43	1.5	13	0.058	14	0.05	15	-0.029
196	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	44	1.5	2	0.058	14	0.058	15	
197	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	44	1.5	3	0.058	14	0.05	15	0.029
198	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	44	1.5	4	0.058	14	0.029	15	0.05
199	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	44	1.5	5	0.058	14		15	0.058

Load Combinations (Continued)

Description		Solve	PD	Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
200	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	44	1.5	6	0.058	14	-0.029	15	0.05	
201	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	44	1.5	7	0.058	14	-0.05	15	0.029	
202	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	44	1.5	8	0.058	14	-0.058	15		
203	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	44	1.5	9	0.058	14	-0.05	15	-0.029	
204	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	44	1.5	10	0.058	14	-0.029	15	-0.05	
205	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	44	1.5	11	0.058	14		15	-0.058	
206	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	44	1.5	12	0.058	14	0.029	15	-0.05	
207	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	44	1.5	13	0.058	14	0.05	15	-0.029	
208	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	45	1.5	2	0.058	14	0.058	15		
209	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	45	1.5	3	0.058	14	0.05	15	0.029	
210	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	45	1.5	4	0.058	14	0.029	15	0.05	
211	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	45	1.5	5	0.058	14		15	0.058	
212	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	45	1.5	6	0.058	14	-0.029	15	0.05	
213	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	45	1.5	7	0.058	14	-0.05	15	0.029	
214	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	45	1.5	8	0.058	14	-0.058	15		
215	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	45	1.5	9	0.058	14	-0.05	15	-0.029	
216	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	45	1.5	10	0.058	14	-0.029	15	-0.05	
217	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	45	1.5	11	0.058	14		15	-0.058	
218	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	45	1.5	12	0.058	14	0.029	15	-0.05	

Envelope Node Reactions

Node Label	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1 N60 max	4729.913	5	11959.372	35	4805.627	14	5845.612	100	4914.727	23	5367.28	133
2 min	-4729.907	23	2579.813	53	-4805.629	8	-5234.584	20	-4918.53	17	-5356.71	115
3 Totals: max	4729.913	5	11959.372	35	4805.627	14						
4 min	-4729.907	23	2579.813	53	-4805.629	8						

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

Member	Shape	Code Check	Loc[in]	LC	Shear	Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1 M1	HSS4X4X4	0.989	0	29	0.125	0	y	30	138935.324	139518	16180.5	16180.5	1.117	H1-1b	
2 M37	HSS4X4X4	0.98	0	35	0.123	0	y	38	138935.324	139518	16180.5	16180.5	1.115	H1-1b	
3 M36	HSS4X4X4	0.979	0	31	0.122	0	y	33	138935.324	139518	16180.5	16180.5	1.115	H1-1b	
4 M2	HSS4X4X4	0.731	0	28	0.124	0	y	30	109675.001	139518	16180.5	16180.5	1.7	H1-1b	
5 M6	HSS4X4X4	0.729	0	35	0.122	0	y	38	109675.001	139518	16180.5	16180.5	1.696	H1-1b	
6 M4	HSS4X4X4	0.729	0	31	0.122	0	y	34	109675.001	139518	16180.5	16180.5	1.696	H1-1b	
7 M10	HSS4X4X3	0.549	0	35	0.125	0	y	36	49449.972	106812	12661.5	12661.5	3	H1-1b	
8 M57	HSS4X4X3	0.548	166	27	0.124	166	y	28	49449.972	106812	12661.5	12661.5	3	H1-1b	
9 M13	HSS4X4X3	0.545	166	31	0.124	166	y	32	49449.972	106812	12661.5	12661.5	3	H1-1b	
10 MP3	PIPE_2.0	0.395	60	8	0.058	60		7	14916.096	32130	1871.625	1871.625	2.386	H1-1b	
11 MP11	PIPE_2.0	0.394	60	12	0.059	60		11	14916.096	32130	1871.625	1871.625	1.97	H1-1b	
12 MP7	PIPE_2.0	0.394	60	4	0.056	60		3	14916.096	32130	1871.625	1871.625	2.016	H1-1b	
13 MP9	PIPE_2.0	0.382	47.938	33	0.069	47.938		11	19360.206	32130	1871.625	1871.625	1.763	H1-1b	
14 MP5	PIPE_2.0	0.381	47.938	37	0.067	47.938		3	19360.206	32130	1871.625	1871.625	2.075	H1-1b	
15 MP1	PIPE_2.0	0.38	47.938	28	0.067	47.938		7	19360.206	32130	1871.625	1871.625	2.144	H1-1b	
16 MP8	PIPE_2.0	0.38	47.938	34	0.098	47.938		10	19360.206	32130	1871.625	1871.625	2.212	H1-1b	
17 MP4	PIPE_2.0	0.378	47.938	38	0.097	47.938		2	19360.206	32130	1871.625	1871.625	2.056	H1-1b	
18 MP12	PIPE_2.0	0.378	47.938	30	0.097	47.938		6	19360.206	32130	1871.625	1871.625	2.109	H1-1b	
19 M38	L2.5x2.5x3	0.34	0	11	0.057	18.011	y	11	27044.913	29192.4	872.574	1971.83	1.5	H2-1	

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

Member	Shape	Code	Check	Loc[in]	LC	Shear	Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
20	M42	L2.5x2.5x3	0.329	0	7	0.056	18.011	y	7	27044.913	29192.4	872.574	1971.83	1.5	H2-1	
21	M41	L2.5x2.5x3	0.328	0	3	0.056	18.011	y	3	27044.913	29192.4	872.574	1971.83	1.5	H2-1	
22	MP10	PIPE_2.0	0.3	47.938	4	0.066	47.938	13	19360.206	32130	1871.625	1871.625	2.358	H1-1b		
23	MP6	PIPE_2.0	0.294	47.938	8	0.07	47.938	5	19360.206	32130	1871.625	1871.625	2.321	H1-1b		
24	MP2	PIPE_2.0	0.286	47.938	12	0.067	47.938	9	19360.206	32130	1871.625	1871.625	2.219	H1-1b		
25	M28	PIPE_2.0	0.24	117.813	8	0.141	161.313	8	4678.524	32130	1871.625	1871.625	3	H1-1b		
26	M53	PIPE_2.0	0.238	117.812	12	0.141	25.375	4	4678.524	32130	1871.625	1871.625	3	H1-1b		
27	M46	PIPE_2.0	0.234	117.812	4	0.142	25.375	8	4678.524	32130	1871.625	1871.625	3	H1-1b		
28	M20	L2x2x3	0.054	13	28	0.007	13	z	28	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
29	M26	L2x2x3	0.054	13	34	0.007	13	z	34	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
30	M22	L2x2x3	0.054	13	32	0.007	13	z	31	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
31	M24	L2x2x3	0.054	13	29	0.007	13	z	27	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
32	M17	L2x2x3	0.054	13	30	0.007	13	z	36	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
33	M16	L2x2x3	0.054	13	28	0.007	13	z	37	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
34	M23	L2x2x3	0.049	13	27	0.007	13	z	27	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
35	M25	L2x2x3	0.049	13	30	0.007	13	z	30	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
36	M18	L2x2x3	0.049	13	35	0.007	13	z	35	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
37	M19	L2x2x3	0.049	13	35	0.007	13	z	35	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
38	M21	L2x2x3	0.049	13	34	0.007	13	z	34	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
39	M27	L2x2x3	0.049	13	38	0.007	13	z	38	22057.073	23392.8	557.717	1239.29	1.5	H2-1	
40	M40	PIPE_2.0	0.031	41.625	2	0.003	41.625	2	25203.832	32130	1871.625	1871.625	1.391	H1-1b		

APPENDIX D
ADDITIONAL CALCUATIONS

Bolt Calculation Tool, V1.4

PROJECT DATA	
Site Name:	STAFFORD/PRAGYL/SSUSA
Site Number:	876402
Job Code:	1039-Z0001-B
Connection Description:	Platform to Tower

APPLIED LOADS		
Bolt Tension:	626.99	lbs
Bolt Shear:	1034.75	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	1	in
Bolt Grade:	A325	-
# of Bolts:	9	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	54516.96	
Shear Strength	31808.63	
Tensile Usage	1.2%	
Shear Usage	3.3%	
Interaction Check	0.00	≤1.05
Result	Pass	

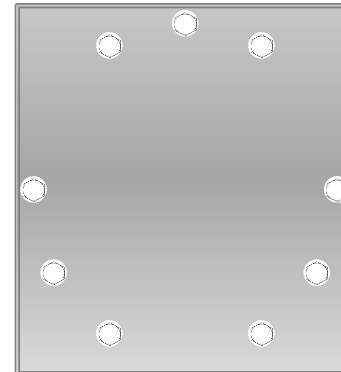


Exhibit F

Power Density/RF Emissions Report

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

T-Mobile Existing Facility

Site ID: CTHA628A

175 Stafford Street
Stafford Springs, Connecticut 06077

March 12, 2021

EBI Project Number: 6221001148

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	17.18%

March 12, 2021

T-Mobile

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

Emissions Analysis for Site: CTHA628A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **175 Stafford Street in Stafford Springs, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately $400 \mu\text{W}/\text{cm}^2$ and $467 \mu\text{W}/\text{cm}^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is $1000 \mu\text{W}/\text{cm}^2$. 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 175 Stafford Street in Stafford Springs, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

- 1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.
- 3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 5) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

- 6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 7) 1 LTE channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 8) 1 NR channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.
- 9) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 10) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 11) The antennas used in this modeling are the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the RFS APX16DWV-16DWV-S-E-A20 for the 2100 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 12) The antenna mounting height centerline of the proposed antennas is 152 feet above ground level (AGL).
- 13) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 14) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	152 feet	Height (AGL):	152 feet	Height (AGL):	152 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna AI MPE %:	0.79%	Antenna BI MPE %:	0.79%	Antenna CI MPE %:	0.79%
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd
Height (AGL):	152 feet	Height (AGL):	152 feet	Height (AGL):	152 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	12,569.87	ERP (W):	12,569.87	ERP (W):	12,569.87
Antenna A2 MPE %:	3.09%	Antenna B2 MPE %:	3.09%	Antenna C2 MPE %:	3.09%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd	Gain:	17.3 dBd / 17.3 dBd
Height (AGL):	152 feet	Height (AGL):	152 feet	Height (AGL):	152 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	12,888.76	ERP (W):	12,888.76	ERP (W):	12,888.76
Antenna A3 MPE %:	2.17%	Antenna B3 MPE %:	2.17%	Antenna C3 MPE %:	2.17%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	6.05%
Sprint	2.59%
AT&T	6%
Verizon	2.54%
Site Total MPE % :	17.18%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	6.05%
T-Mobile Sector B Total:	6.05%
T-Mobile Sector C Total:	6.05%
Site Total MPE % :	17.18%

T-Mobile Maximum MPE Power Values (Sector A)							
T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz LTE	2	2334.27	152.0	7.87	2100 MHz LTE	1000	0.79%
T-Mobile 600 MHz LTE	2	591.73	152.0	2.00	600 MHz LTE	400	0.50%
T-Mobile 600 MHz NR	1	1577.94	152.0	2.66	600 MHz NR	400	0.67%
T-Mobile 700 MHz LTE	2	695.22	152.0	2.35	700 MHz LTE	467	0.50%
T-Mobile 1900 MHz GSM	4	1052.26	152.0	7.10	1900 MHz GSM	1000	0.71%
T-Mobile 1900 MHz LTE	2	2104.51	152.0	7.10	1900 MHz LTE	1000	0.71%
T-Mobile 2500 MHz LTE	1	6444.38	152.0	10.87	2500 MHz LTE	1000	1.09%
T-Mobile 2500 MHz NR	1	6444.38	152.0	10.87	2500 MHz NR	1000	1.09%
						Total:	6.05%

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

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	6.05%
Sector B:	6.05%
Sector C:	6.05%
T-Mobile Maximum MPE % (Sector A):	6.05%
Site Total:	17.18%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **17.18%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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