



Greg Milano  
SAI Group, LLC  
12 Industrial Way  
Salem, NH 03079  
860-707-9001  
gmilano@saigrp.com

January 29, 2020

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

**Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T) CT2223  
131-133 Gifford Lane, Bozrah, Connecticut 06334  
N 41.552517  
W -72.150708**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 182-foot level of the existing 195-foot self-support lattice tower at 131-133 Gifford Lane, Bozrah, CT. The property and tower are owned by SBA Communications Corp. AT&T now intends to remove three (3) Powerwave antennas and replace them with three (3) DMP65R-BU8DA CCI antennas. These antennas would be installed at the 182-foot level of the tower. AT&T also intends to remove three (3) Ericsson RRUS-11 remote radio units and install three (3) Ericsson 4449 B5/B12 RRUS at the 182-foot level of the tower. AT&T intends to install two (2) Ericsson 4478 B14 RRUS at ground level within the existing shelter.

This facility was approved during the February 11, 1999 meeting of the Bozrah Planning and Zoning Commission. The commission approved a tower height of 196 feet. No change to the existing tower height is proposed, therefore this modification complies with the aforementioned condition.

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 Carl Zorn - First Selectman for the Town of Bozrah, Bozrah Town Planner as well as the property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications 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 Communications 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, AT&T respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Greg Milano



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860-707-9001  
gmilano@saigrp.com

Attachments

cc: Carl Zorn - First Selectman  
Sam Alexander – Town Planner  
SBA Properties Inc. – Property/Tower Owner

## Power Density

### Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm <sup>2</sup> )	Freq. Band (MHz <sup>**</sup> )	Limit S (mW/cm <sup>2</sup> )	%MPE
Other Carriers*							3.91%
AT&T UMTS	4	349	187	0.0162	850	0.5667	0.29%
AT&T LTE	5	703	187	0.0408	700	0.4667	0.87%
AT&T LTE	3	869	187	0.0303	700	0.4667	0.65%
Site Total							5.72%

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

### Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm <sup>2</sup> )	Freq. Band (MHz <sup>**</sup> )	Limit S (mW/cm <sup>2</sup> )	%MPE
Other Carriers*							3.91%
AT&T UMTS	1	284	182	0.0033	850	0.5667	0.06%
AT&T LTE	1	1000	182	0.0116	850	0.5667	0.20%
AT&T LTE	1	2951	182	0.0343	700	0.4667	0.73%
AT&T LTE	1	1475	182	0.0171	700	0.4667	0.37%
AT&T LTE	2	3664	182	0.0851	1900	1.0000	0.85%
AT&T 5G	1	1000	182	0.0116	850	0.5667	0.20%
Site Total							6.33%

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

**PROJECT INFORMATION**

SCOPE OF WORK: ITEMS TO BE MOUNTED ON THE EXISTING SELF SUPPORT TOWER:

- NEW AT&T ANTENNAS: DMP65R-BU8DA (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T ALPHA SECTOR LTE ANTENNA (HPA-65R-BUU-H8) @ POS. 1 TO BE RELOCATED @ POS. 2.
- EXISTING AT&T BETA & GAMMA SECTOR LTE ANTENNA (HPA-65R-BUU-H8) @ POS. 4. TO BE RELOCATED @ POS. 3.
- NEW AT&T RRUS: 4449 B5/B12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T DC ONLY SURGE ARRESTOR DC6-48-60-18-8C-EV (TOTAL OF 1) WITH (2) DC POWER RUN.

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:

- SWAP DUS WITH 6630.
- ADD IDLE.
- ADD 6630 FOR 5G.
- ADD 4478 B14 (700) (TOTAL OF 2) WITH TSXDC-4310FM SURGE ARRESTORS (TYP. OF 4 PER RRU, TOTAL OF 8).
- ADD EQUIPMENT RACK (TOTAL OF 1).
- ADD DC-12.
- HOME RUN UMS RETS.
- NEW NETSURE 7100 POWER PLANT WITH BATTERIES (TO REPLACE EXISTING TYCO GALAXY GPS2424).

ITEMS TO BE REMOVED:

- EXISTING AT&T ANTENNAS: 7770 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T RRUS-11 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T ANTENNAS: 7770 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T DIPLEXERS: LGP21901 (TOTAL OF 12).
- EXISTING TYCO GALAXY GPS2424.

SITE ADDRESS: 133 GIFFORD LANE  
BOZRAH, CT 06334

LATITUDE: 41.552508° N, 41° 33' 09.03" N  
LONGITUDE: 72.150713° W, 72° 09' 02.56" W  
TYPE OF SITE: SELF SUPPORT TOWER / EQUIPMENT SHELTER  
STRUCTURE HEIGHT: 195'-0"±  
RAD CENTER: 182'-0"±  
CURRENT USE: TELECOMMUNICATIONS FACILITY  
PROPOSED USE: TELECOMMUNICATIONS FACILITY



SITE NUMBER: CT2223

SITE NAME: BOZRAH EAST

FA CODE: 10042309

PACE ID: MRCTB040702, MRCTB040543, & MRCTB040402

PROJECT: LTE 3C\_4C 2020 UPGRADE

**DRAWING INDEX**

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	2
GN-1	GENERAL NOTES	2
A-1	COMPOUND & EQUIPMENT PLANS	2
A-2	ANTENNA LAYOUTS & ELEVATION	2
A-3	DETAILS	2
G-1	GROUNDING DETAILS	2
RF-1	RF PLUMBING DIAGRAM	2

**VICINITY MAP**

DIRECTIONS TO SITE:

HEAD SOUTH TOWARD ENTERPRISE DR, TURN LEFT ONTO ENTERPRISE DR, TURN LEFT ONTO CAPITAL BLVD, USE THE LEFT LANE TO TURN LEFT ONTO STATE HWY 411, TURN LEFT TO MERGE ONTO I-91 N, MERGE ONTO I-91 N, TAKE EXIT 25-26 TO MERGE ONTO CT-3 N TOWARD GLASTONBURY, TAKE THE EXIT ONTO CT-2 E TOWARD NORWICH, KEEP LEFT AT THE FORK TO STAY ON CT-2 E, FOLLOW SIGNS FOR 2 E, TAKE EXIT 23 FOR CT-163 TOWARD BOZRAH/MONTEVILLE, CONTINUE ONTO CT-163 S/BOZRAH RD, TURN LEFT ONTO GAGER RD, TURN LEFT ONTO GIFFORD LN, DESTINATION WILL BE ON THE LEFT.



**GENERAL NOTES**

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

**SBA SITE NAME: BOZRAH**  
**SBA SITE #: CT01105-S**

**72 HOURS**



CALL BEFORE YOU DIG



CALL TOLL FREE 1-800-922-4455

OR CALL 811

**UNDERGROUND SERVICE ALERT**



45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586



12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2223  
SITE NAME: BOZRAH EAST  
SBA SITE # ID: CT01105-S

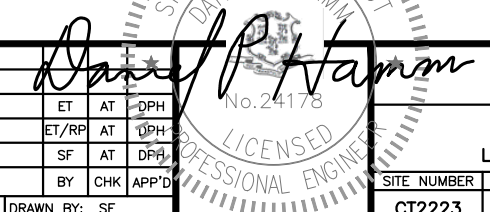
133 GIFFORD LANE  
BOZRAH, CT 06334  
NEW LONDON COUNTY



500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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1	11/25/19	ISSUED FOR CONSTRUCTION	ET/RP	AT	OPH
A	10/11/19	ISSUED FOR REVIEW	SF	AT	OPH

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: SF



AT&T

TITLE SHEET  
LTE 3C\_4C 2020 UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CT2223	T-1	2

**GROUNDING NOTES**

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

**GENERAL NOTES**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
 CONTRACTOR – SAI  
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)  
 OWNER – AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. **APPLICABLE BUILDING CODES:**  
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

**BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS  
 ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)**

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

**AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;**

**AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;**

**TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL**

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

**ABBREVIATIONS**

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

**HGD HUDSON Design Group LLC**  
 45 BEECHWOOD DRIVE NORTH ANDOVER, MA 01845  
 TEL: (978) 557-5553 FAX: (978) 336-5586

**SAI**  
 12 INDUSTRIAL WAY SALEM, NH 03079

SITE NUMBER: CT2223  
 SITE NAME: BOZRAH EAST  
 SBA SITE # ID: CT01105-S  
 133 GIFFORD LANE BOZRAH, CT 06334  
 NEW LONDON COUNTY

**at&t**  
 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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A	10/11/19	ISSUED FOR REVIEW	SF	AT	DPH
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: SF		

*Daniel P. Hamm*  
 No. 24178  
**LICENSED PROFESSIONAL ENGINEER**  
 STATE OF CONNECTICUT

AT&T

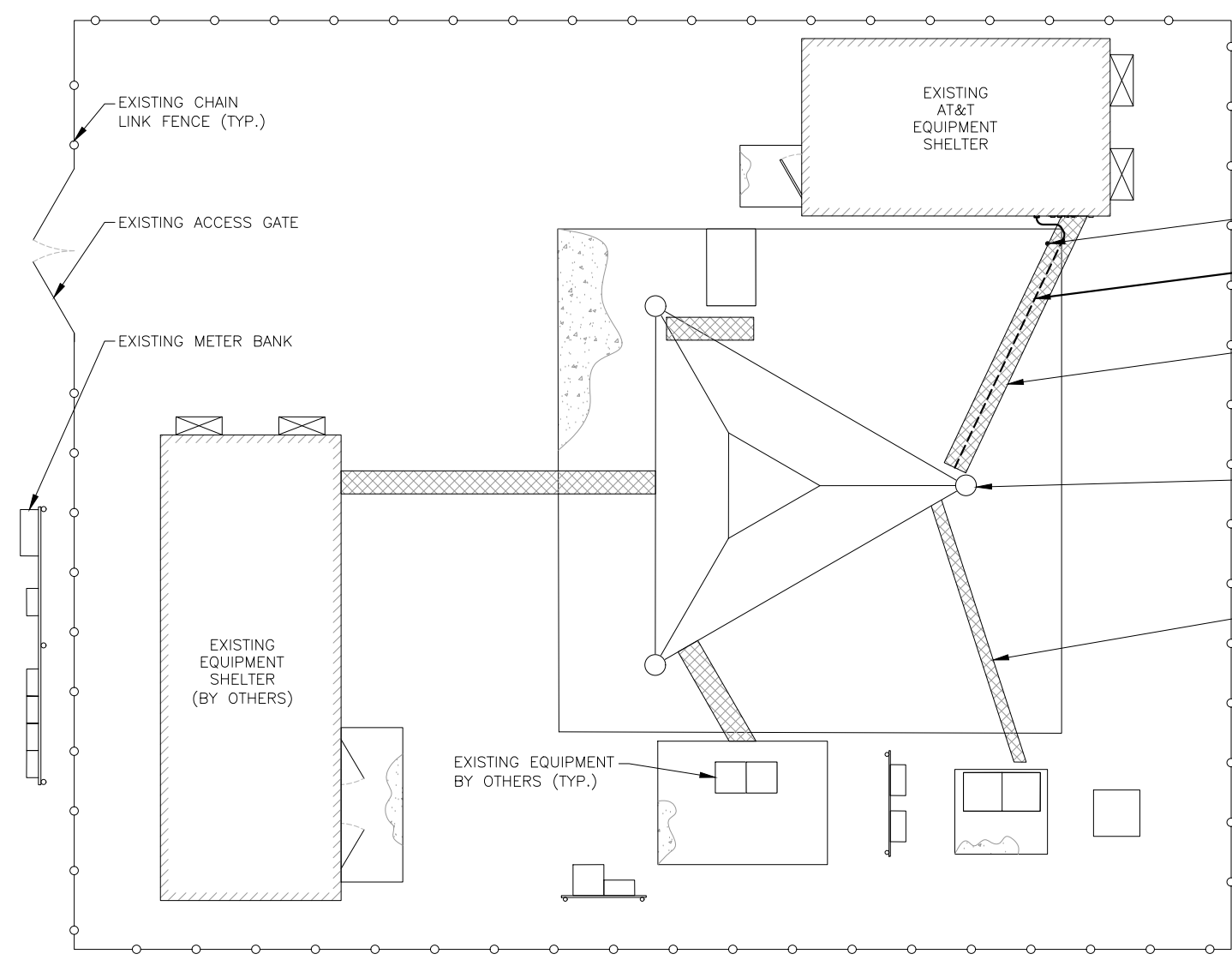
GENERAL NOTES		
LTE 3C_4C 2020 UPGRADE		
SITE NUMBER	DRAWING NUMBER	REV
CT2223	GN-1	2

NOTE:  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

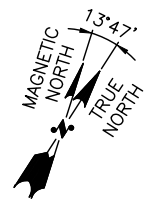
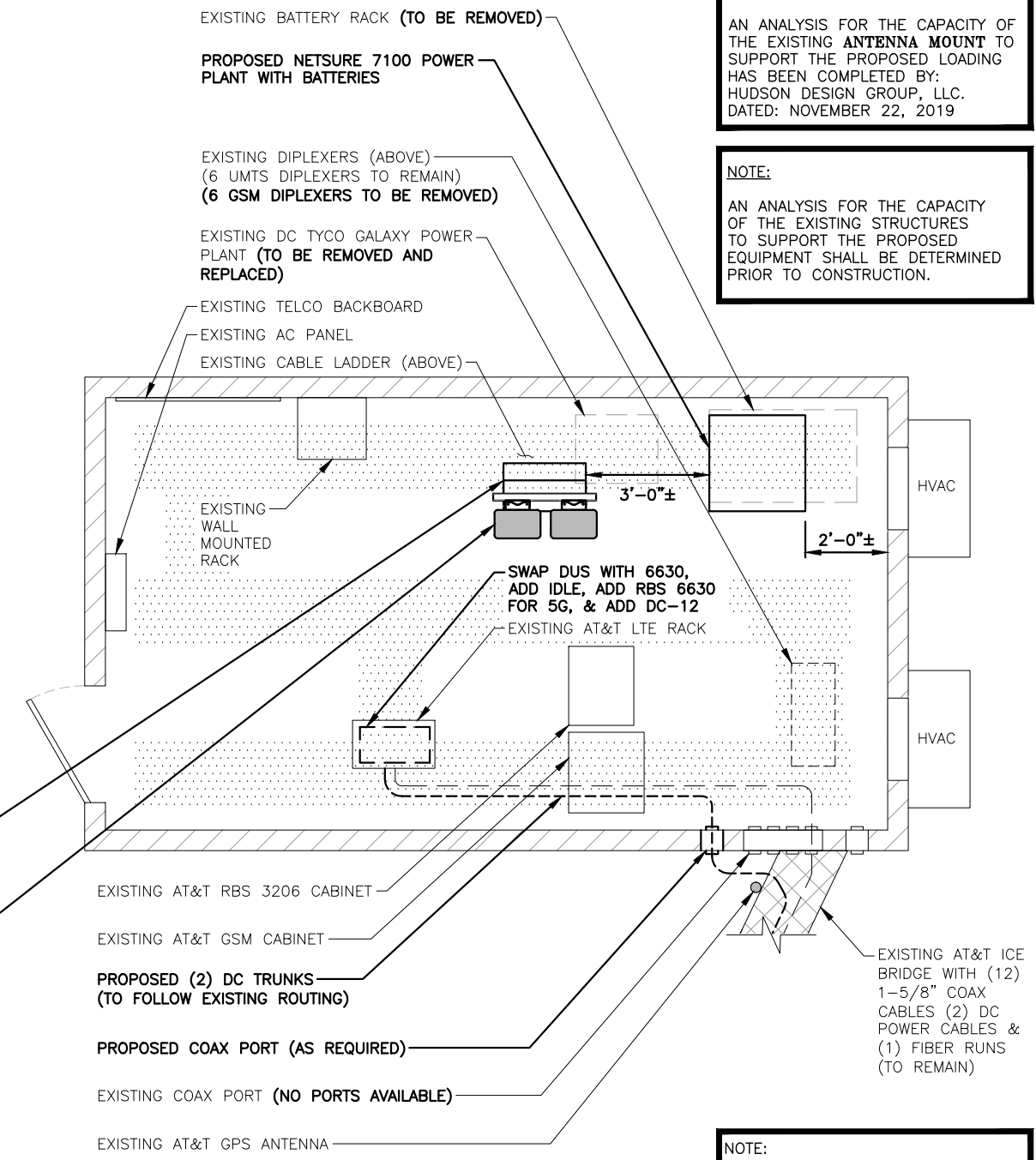
NOTE:  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: NOVEMBER 22, 2019

NOTE:  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

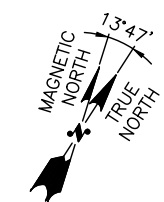
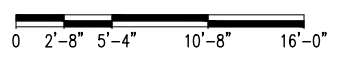
NOTE:  
GSM HARDLINES TO BE REUSED.



- PROPOSED (2) DC TRUNKS (TO FOLLOW EXISTING ROUTING)
- EXISTING AT&T RBS 3206 CABINET
- EXISTING AT&T GSM CABINET
- PROPOSED (2) DC TRUNKS (TO FOLLOW EXISTING ROUTING)
- PROPOSED COAX PORT (AS REQUIRED)
- EXISTING COAX PORT (NO PORTS AVAILABLE)
- EXISTING AT&T GPS ANTENNA
- PROPOSED EQUIPMENT RACK (TOTAL OF 1)
- PROPOSED AT&T RRU 4478 B14 (700) (TOTAL OF 2) WITH TSXDC-4310FM SURGE ARRESTORS (TYP. OF 4 PER RRU, TOTAL OF 8)



**COMPOUND PLAN**  
22x34 SCALE: 3/16"=1'-0"  
11x17 SCALE: 3/32"=1'-0"  
1  
A-1



**EQUIPMENT PLAN**  
22x34 SCALE: 1/2"=1'-0"  
11x17 SCALE: 1/4"=1'-0"  
1  
A-1



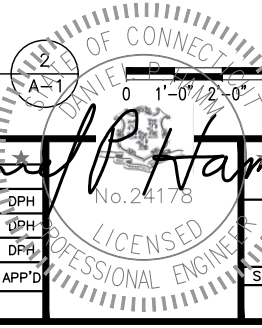
**HDG HUDSON Design Group LLC**  
45 BEECHWOOD DRIVE NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553 FAX: (978) 336-5586

**SAI**  
12 INDUSTRIAL WAY SALEM, NH 03079

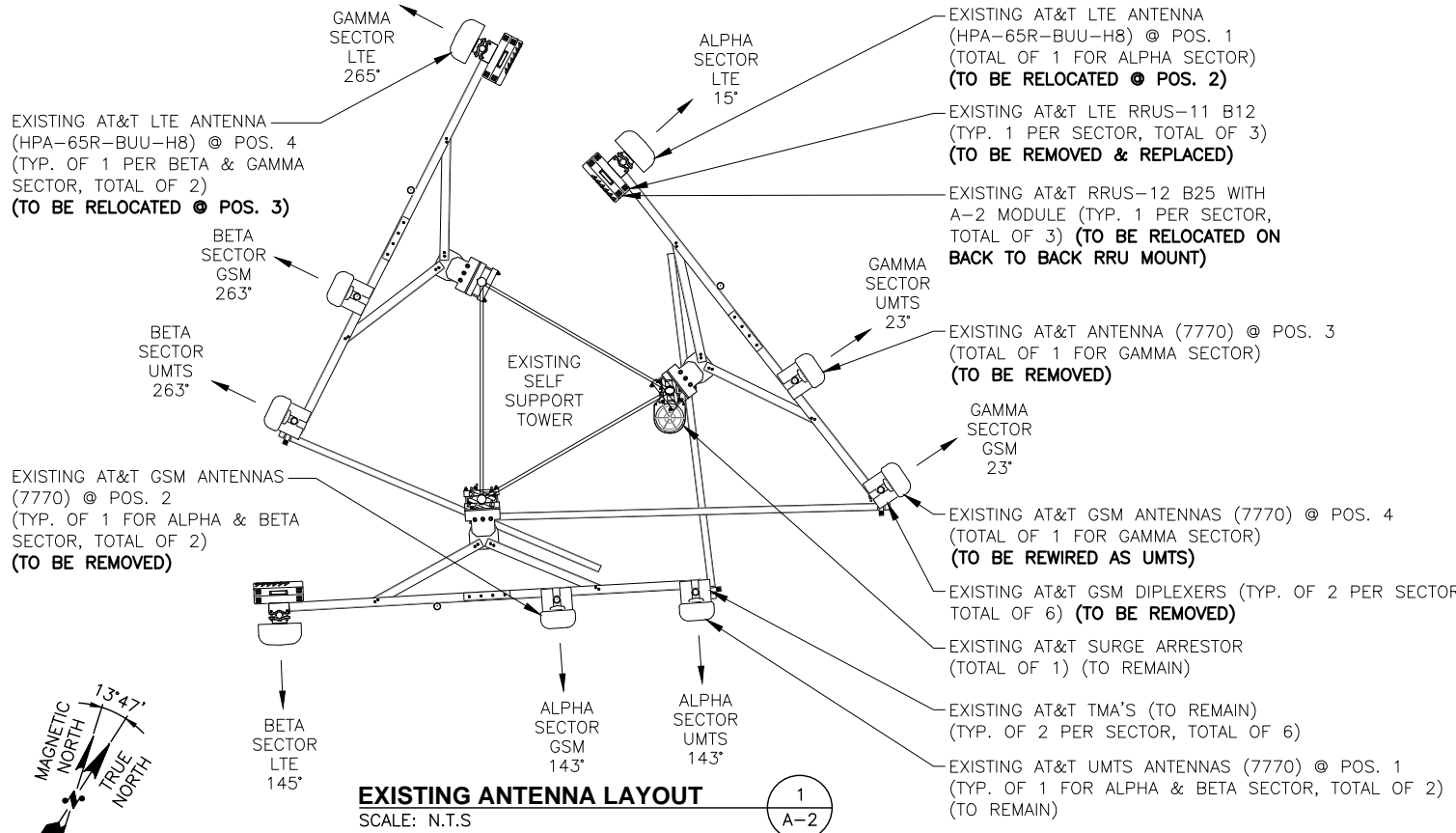
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**at&t**  
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NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: SF		

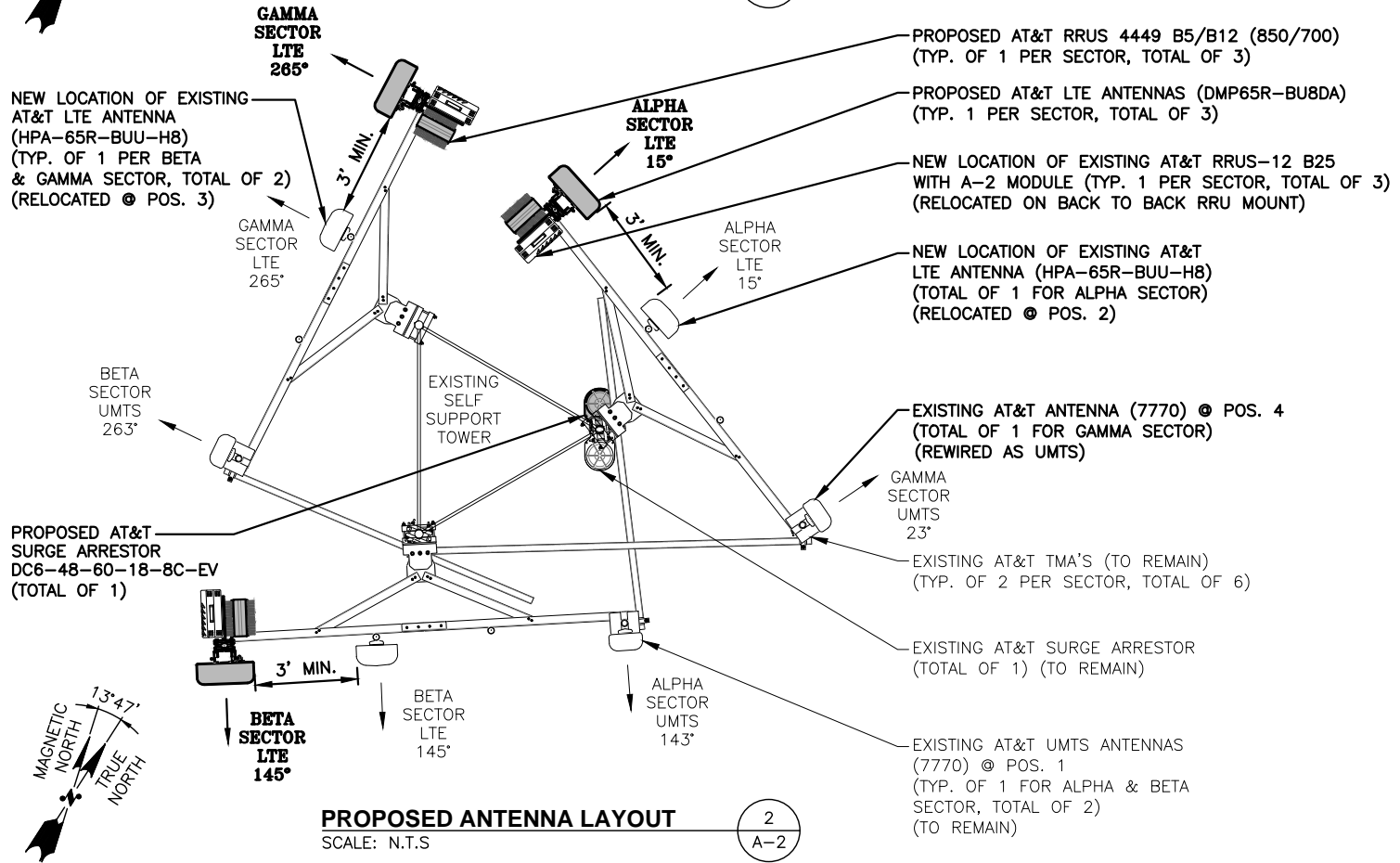


**AT&T**  
COMPOUND & EQUIPMENT PLANS  
LTE 3C\_4C DRAWING UPGRADE  
SITE NUMBER: CT2223  
DRAWING NUMBER: A-1  
REV: 2



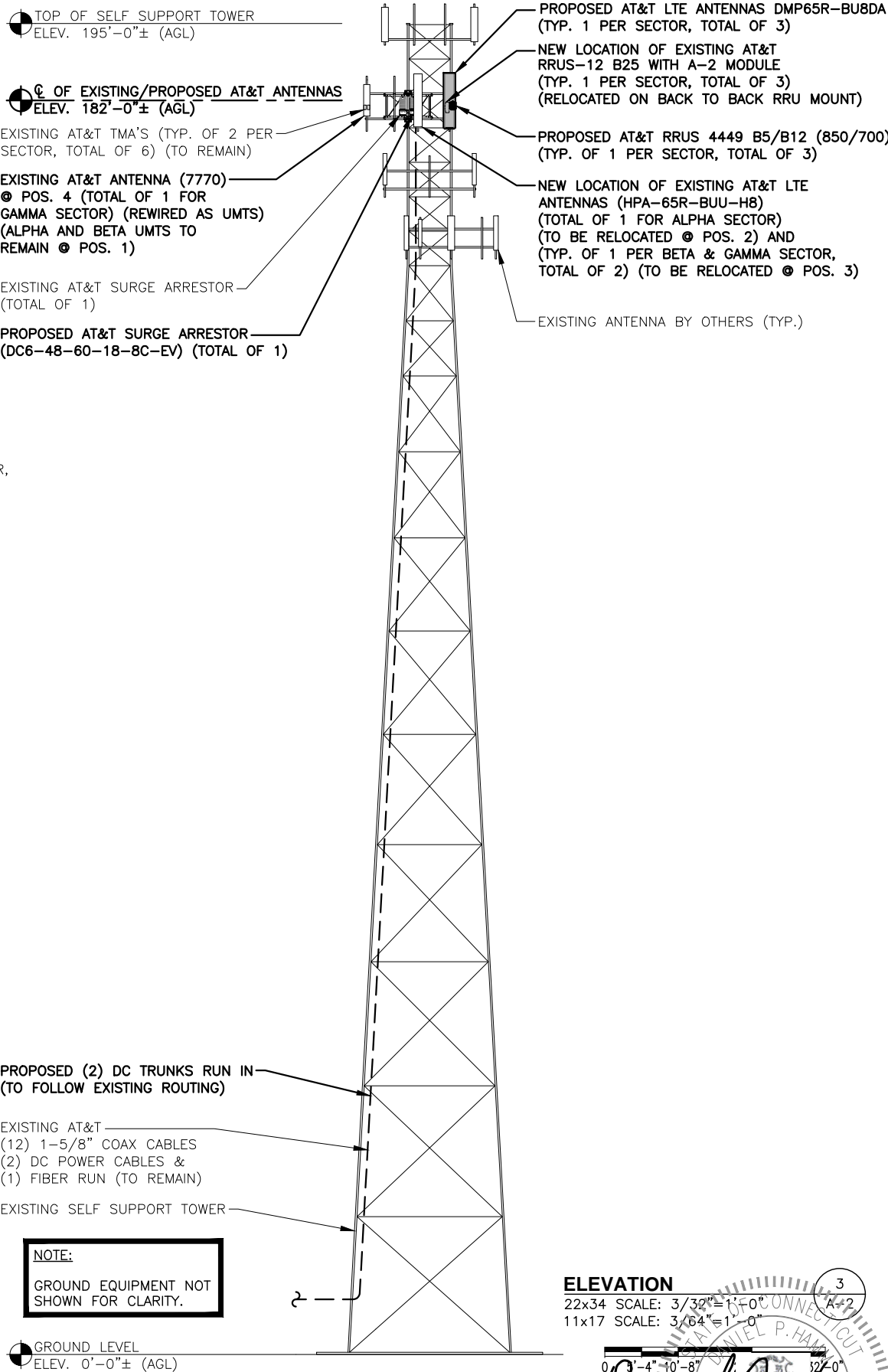
**EXISTING ANTENNA LAYOUT**  
SCALE: N.T.S

1  
A-2



**PROPOSED ANTENNA LAYOUT**  
SCALE: N.T.S

2  
A-2



**NOTE:**  
GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

**ELEVATION**  
22x34 SCALE: 3/32" = 1'-0"  
11x17 SCALE: 3/64" = 1'-0"

**NOTE:**  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

**NOTE:**  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: NOVEMBER 22, 2019

**NOTE:**  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

**HGD HUDSON Design Group LLC**  
45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2223  
SITE NAME: BOZRAH EAST  
SBA SITE # ID: CT01105-S  
133 GIFFORD LANE  
BOZRAH, CT 06334  
NEW LONDON COUNTY

**at&t**  
500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	12/19/19	ISSUED FOR CONSTRUCTION	ET	AT	DPH
1	11/25/19	ISSUED FOR CONSTRUCTION	ET/RP	AT	DPH
A	10/11/19	ISSUED FOR REVIEW	SF	AT	DPH

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: SF

*Daniel P. Hamm*  
No. 24178  
**LICENSED PROFESSIONAL ENGINEER**

AT&T	
ANTENNA LAYOUTS & ELEVATION	
LTE 3C_4C 2020 UPGRADE	
SITE NUMBER	DRAWING NUMBER
CT2223	A-2
REV	2

ANTENNA SCHEDULE											
SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (LxWxD)	ANTENNA CL HEIGHT	AZIMUTH	TMA/DIPLEXER	RRU	SIZE (INCHES) (LxWxD)	FEEDER	RAYCAP
A1	PROPOSED	700 BC/850/PCS	DMP65R-BU8DA	96x20.7x7.7	182'-0"±	15°	-	(P)(1) RRU-4449 B5/B12 (E)(1) RRU-12 & A2 B25	17.9"x13.19"x9.44" 20.4"x18.5"x7.5"	(4) DC (1) FIBER	(E)(1) RAYCAP DC6-48-60-18-8F
A2	RELOCATED	700 B14	HPS-65R-BUU-H8	92.4x14.8x7.4	182'-0"±	15°	-	(P)(1) RRU-4478 B14	18.1"x13.4"x8.26"	(2)1-5/8 COAX	
A3	-	-	-	-	-	-	-	-	-	-	
A4	EXISTING	UMTS 850	7770	55x11x5	182'-0"±	143°	(2)(E) LGP21401 (2)(E)(G) LGP21901	-	-	(2)1-5/8 COAX	
B1	EXISTING	UMTS 850	7770	54.5x10.3x5.9	182'-0"±	263°	(2)(E) LGP21401 (2)(E)(G) LGP21901	-	-	(2)1-5/8 COAX	(E)(1) RAYCAP DC6-48-60-18-8C-EV
B2	-	-	-	-	-	-	-	-	-	-	
B3	RELOCATED	700 B14	HPS-65R-BUU-H8	92.4x14.8x7.4	182'-0"±	145°	-	(P)(1)RRU-4478 B14	18.1"x13.4"x8.26"	(2)1-5/8 COAX	
B4	PROPOSED	700 BC/850/PCS	DMP65R-BU8DA	96x20.7x7.7	182'-0"±	145°	-	(P)(1) RRU-4449 B5/B12 (E)(1) RRU-12 & A2 B25	17.9"x13.19"x9.44" 20.4"x18.5"x7.5"	(4) DC (1) FIBER	
C1	EXISTING	UMTS 850	7770	54.5x10.3x5.9	182'-0"±	23°	(2)(E) LGP21401 (2)(E)(G) LGP21901	-	-	(2)1-5/8 COAX	
C2	-	-	-	-	-	-	-	-	-	-	
C3	RELOCATED	700 B14	HPS-65R-BUU-H8	92.4x14.8x7.4	182'-0"±	265°	-	RRU-4478 B14 (SHARED)	-	(2)1-5/8 COAX	
C4	PROPOSED	700 BC/850/PCS	DMP65R-BU8DA	96x20.7x7.7	182'-0"±	265°	-	(P)(1) RRU-4449 B5/B12 (E)(1) RRU-12 & A2 B25	17.9"x13.19"x9.44" 20.4"x18.5"x7.5"	(4) DC (1) FIBER	

RRU CHART		
QUANTITY	MODEL	SIZE (LxWxD)
3(P)	4449 (850/700)	17.9"x13.19"x9.44"
2(P)(G)	4478 B14 (700)	18.1"x13.4"x8.26"
3(E)	RRU-12 WITH A-2 MODULE	20.4"x18.5"x7.5"

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:  
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER

PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

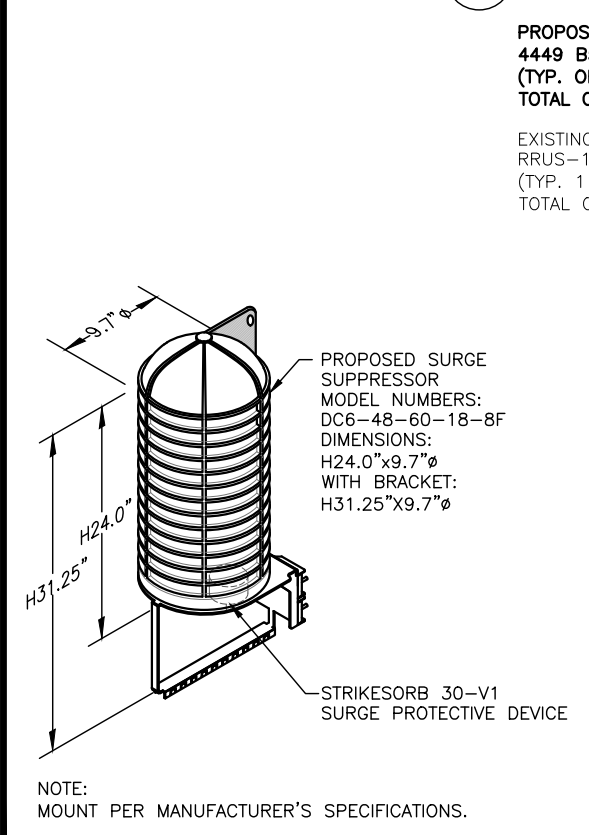
**PROPOSED RRUS DETAIL**  
SCALE: N.T.S.

NOTE:  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

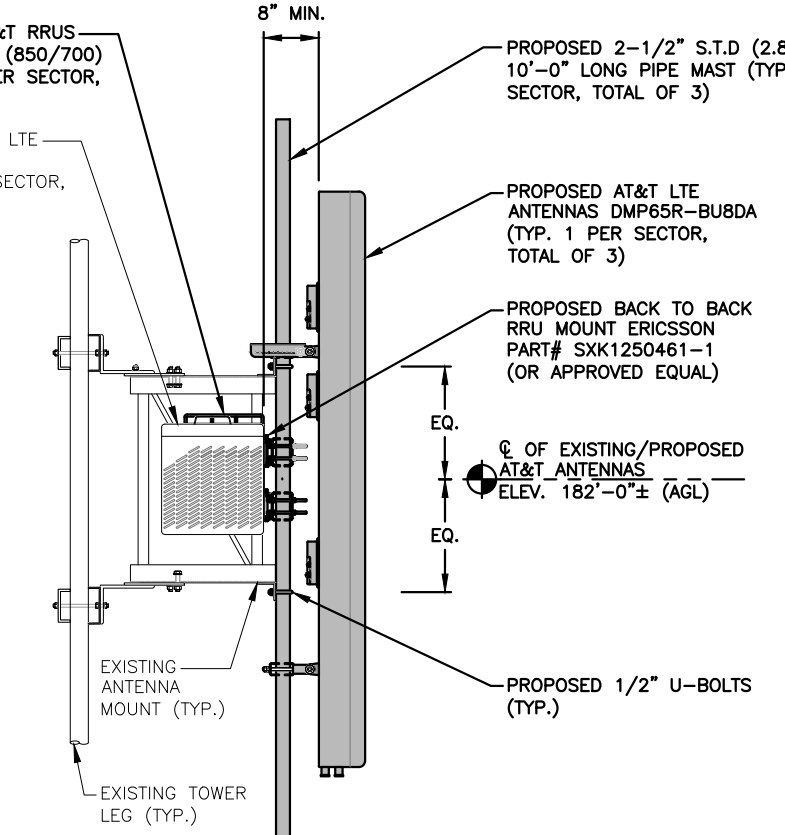
NOTE:  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:  
HUDSON DESIGN GROUP, LLC.  
DATED: NOVEMBER 22, 2019

NOTE:  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

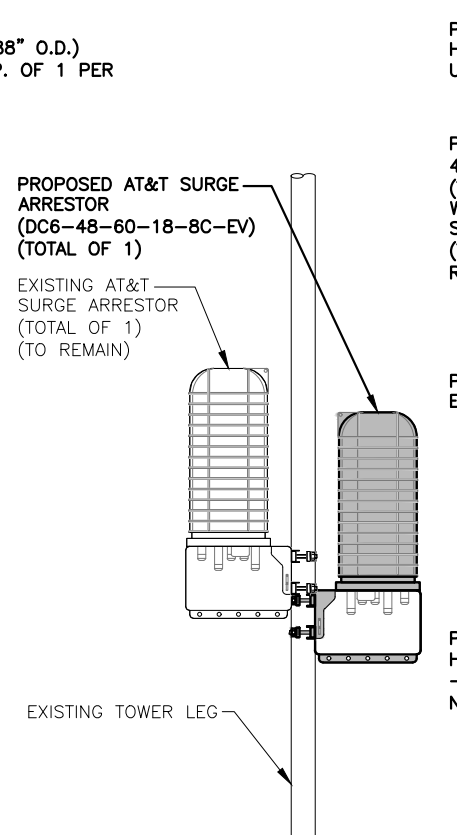
**FINAL ANTENNA SCHEDULE**  
SCALE: N.T.S.



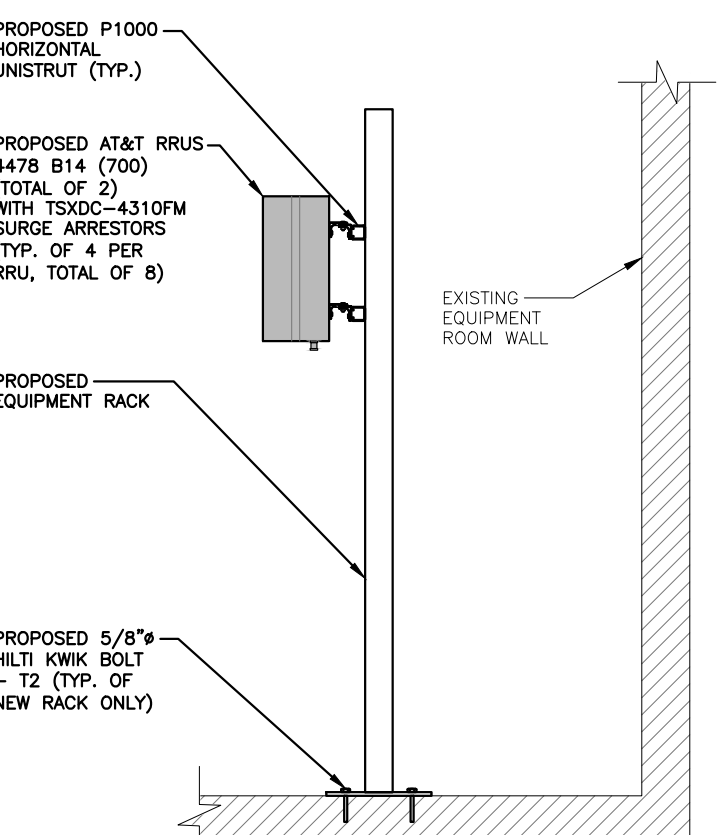
**DC SURGE SUPPRESSOR DETAIL**  
SCALE: N.T.S.



**PROPOSED LTE ANTENNA & RRU MOUNTING DETAIL**  
22x34 SCALE: 1"=1'-0"  
11x17 SCALE: 1/2"=1'-0"



**PROPOSED SURGE ARRESTOR MOUNTING DETAIL**  
22x34 SCALE: 1"=1'-0"  
11x17 SCALE: 1/2"=1'-0"



**PROPOSED EQUIPMENT RACK DETAIL**  
SCALE: N.T.S.



**PROPOSED NETSURE 7100 PHOTO DETAIL**  
SCALE: N.T.S.

**HGD HUDSON Design Group LLC**  
45 BEECHWOOD DRIVE  
NORTH ANDOVER, MA 01845  
TEL: (978) 557-5553  
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**SAI**  
12 INDUSTRIAL WAY  
SALEM, NH 03079

SITE NUMBER: CT2223  
SITE NAME: BOZRAH EAST  
SBA SITE # ID: CT01105-S  
133 GIFFORD LANE  
BOZRAH, CT 06334  
NEW LONDON COUNTY

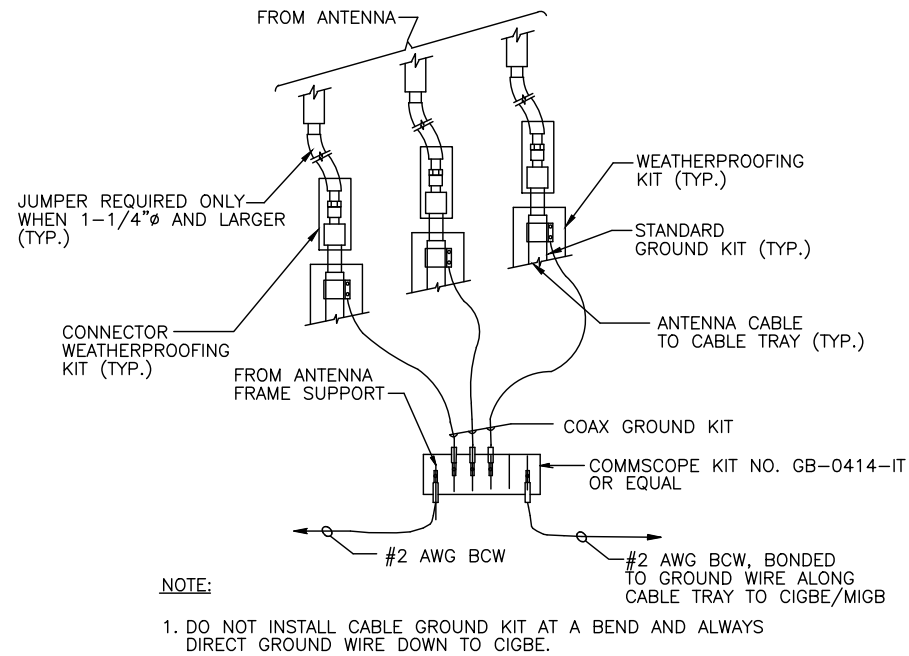
**at&t**  
500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

2	12/19/19	ISSUED FOR CONSTRUCTION	ET	AT	OPH
1	11/25/19	ISSUED FOR CONSTRUCTION	ET/RP	AT	OPH
A	10/11/19	ISSUED FOR REVIEW	SF	AT	DPH
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: SF		

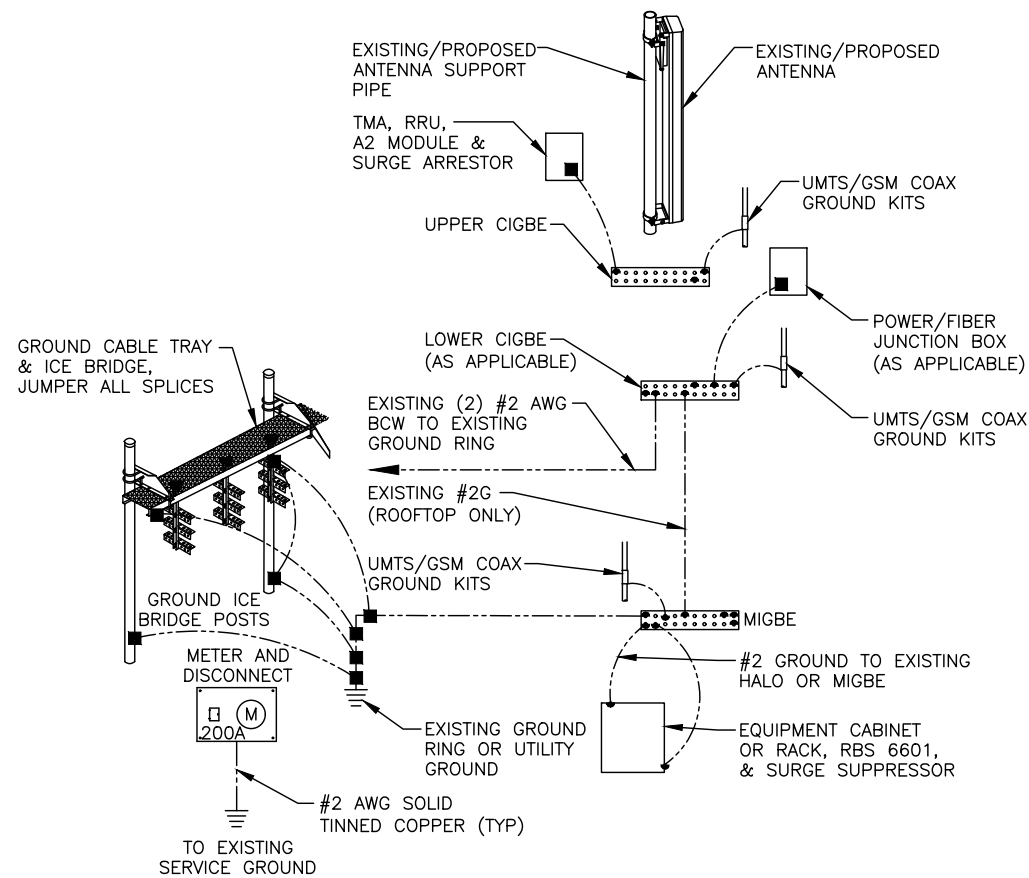
**Daniel P. Hamm**  
STATE OF CONNECTICUT  
No. 24178  
LICENSED PROFESSIONAL ENGINEER

AT&T	
DETAILS	
LTE 3C_4C DRAWING UPGRADE	
SITE NUMBER	DRAWING NUMBER
CT2223	A-3
REV	
2	

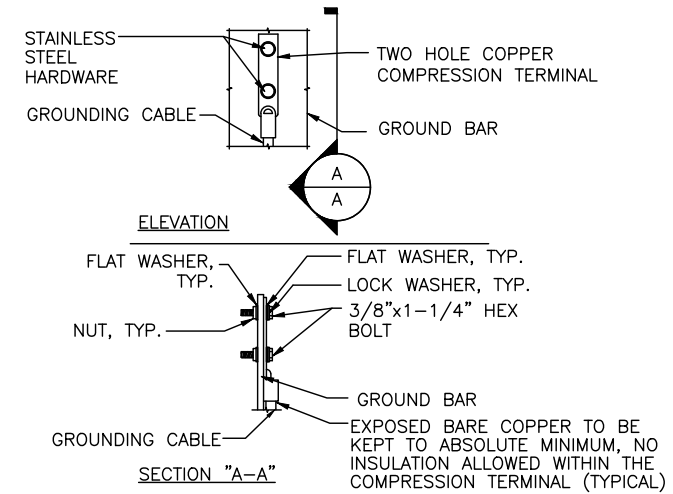




**GROUND WIRE TO GROUND BAR CONNECTION DETAIL** 1  
SCALE: N.T.S. G-1



**GROUNDING RISER DIAGRAM** 2  
SCALE: N.T.S. G-1



- NOTES:
- "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
  - OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
  - CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

**TYPICAL GROUND BAR CONNECTION DETAIL** 3  
SCALE: N.T.S. G-1

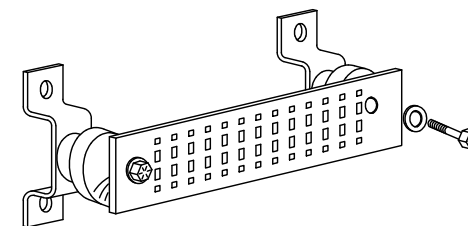
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

**SECTION "P" - SURGE PRODUCERS**

- CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
- +24V POWER SUPPLY RETURN BAR (#2 AWG)
- 48V POWER SUPPLY RETURN BAR (#2 AWG)
- RECTIFIER FRAMES.

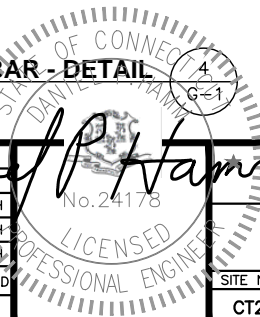
**SECTION "A" - SURGE ABSORBERS**

- INTERIOR GROUND RING (#2 AWG)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
- BUILDING STEEL (IF AVAILABLE) (#2 AWG)

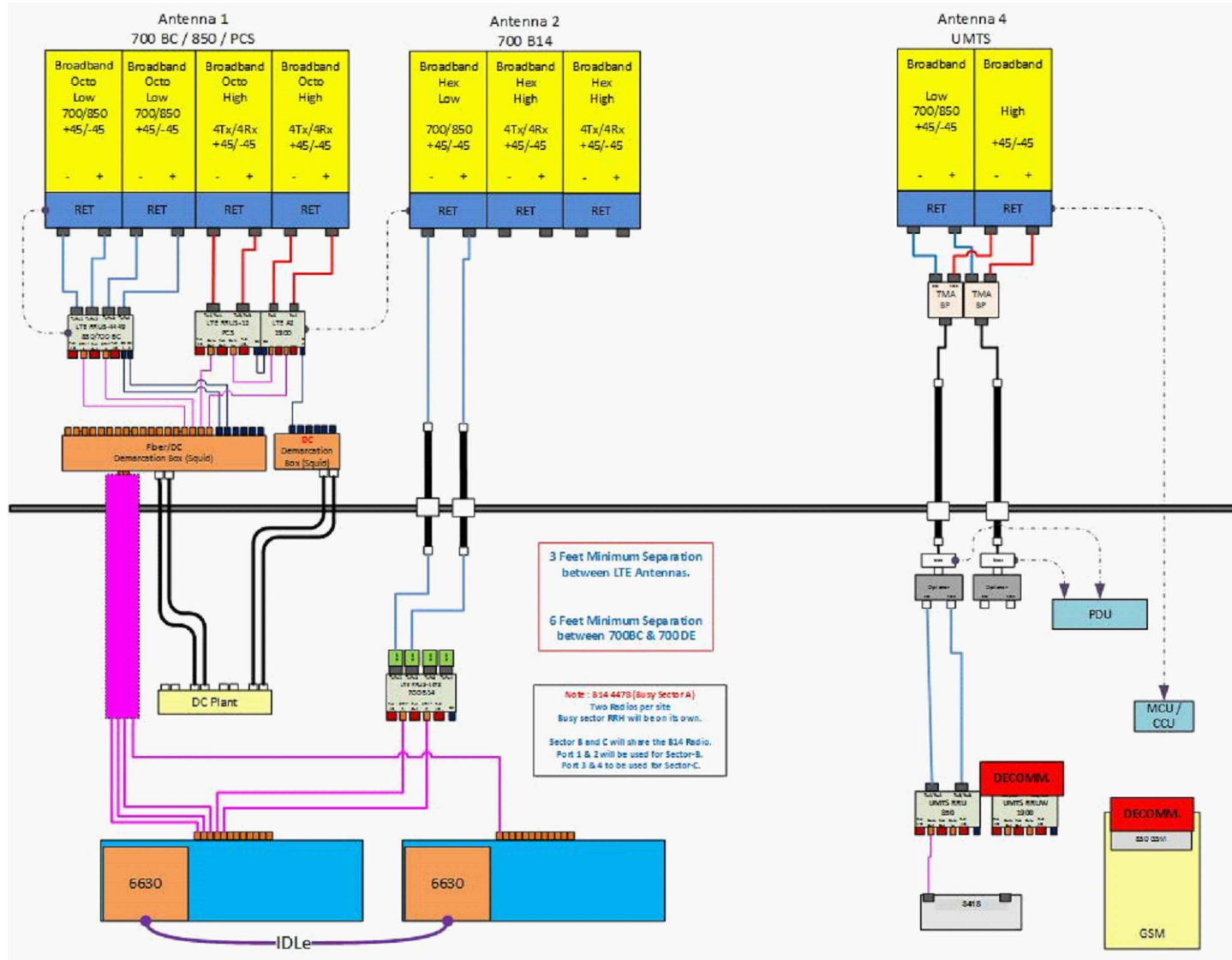


**GROUND BAR - DETAIL** 4  
SCALE: N.T.S. G-1

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	12/19/19	ISSUED FOR CONSTRUCTION	ET	AT	DPH
1	11/25/19	ISSUED FOR CONSTRUCTION	ET/RP	AT	DPH
A	10/11/19	ISSUED FOR REVIEW	SF	AT	DPH
		REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: SF		



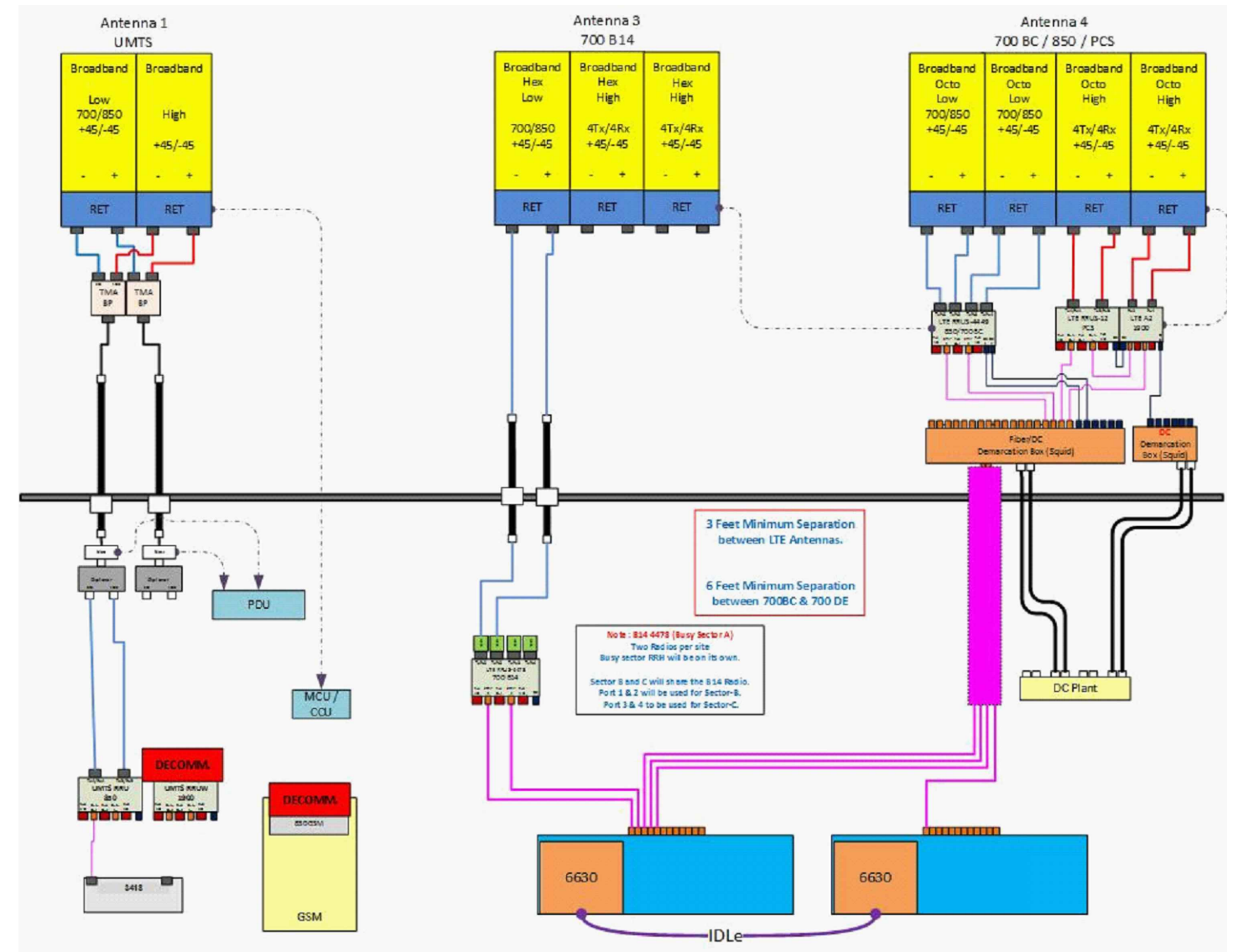
AT&T		
GROUNDING DETAILS		
LTE 3C_4C 2020 UPGRADE		
SITE NUMBER	DRAWING NUMBER	REV
CT2223	G-1	2



RF PLUMBING DIAGRAM (ALPHA SECTOR)

SCALE: N.T.S

1  
RF-1



RF PLUMBING DIAGRAM (BETA & GAMMA SECTORS)

SCALE: N.T.S

2  
RF-1

**NOTE:**  
1. CONTRACTOR TO CONFIRM ALL PARTS.  
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

**NOTE:**  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

2	12/19/19	ISSUED FOR CONSTRUCTION	ET	AT	DPH
1	11/25/19	ISSUED FOR CONSTRUCTION	ET/RP	AT	DPH
A	10/11/19	ISSUED FOR REVIEW	SF	AT	DPH
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: SF		

SITE NUMBER	DRAWING NUMBER	REV
CT2223	RF-1	2

November 22, 2019



SAI Communications  
12 Industrial Way  
Salem NH, 03079

RE:      Site Number:            CT2223 (LTE 3C/4C)  
            FA Number:             110042309  
            PACE Number:            MRCTB040402  
            PT Number:              2051A0PQVJ  
            Site Name:                BOZRAH EAST  
            Site Address:            133 Gifford Lane  
    Bozrah, CT 06334

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by SAI Communications to perform a mount analysis on the existing AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- (3) HPA-65R-BUU-H8 Antennas (92.4"x14.8"x7.4" – Wt. = 68 lbs. /each)
- (3) 7770 Antennas (55.0"x11.0"x5.0" - Wt. = 35 lbs. /each)
- (3) RRUS-12 + A2 B25 Module RRH's (20.4"x18.5"x10.9" – Wt. = 80 lbs. /each)
- (6) LGP21401 TMA's (14.4"x9.0"x2.7" – Wt. = 19 lbs. /each)
- (1) Squid Surge Arrestor (24.0"x9.7"  $\Phi$  – Wt. = 33 lbs. /each) (Tower Mount)
- **(3) DMP65R-BU8DA Antennas (96.0"x20.7"x7.7" – Wt. = 96 lbs. /each)**
- **(3) B5/B12 4449 RRH's (14.9"x13.2"x10.4" – Wt. = 73 lbs. /each)**
- **(1) Squid Surge Arrestor (24.0"x9.7"  $\Phi$  – Wt. = 33 lbs. /each)**

*\*Proposed equipment shown in bold*

No original structural design documents or fabrication drawings were available for the existing mounts. HDG's subconsultant, ProVertic LLC, conducted a survey climb and mapping of the existing AT&T antenna mounts on November 7, 2019.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 135 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.19 in was used for this analysis.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 1.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The existing mount is secured to the existing tower with clamps and threaded rods. The connection is considered OK by visual inspection.

Based on our evaluation, we have determined that the existing mounts **ARE CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
<b>Existing (LTE 3C/4C) Mount Rating</b>	2	LC7	76%	<b>PASS</b>

Reference Documents:

- Mount mapping report prepared by ProVertic LLC.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,  
Hudson Design Group LLC



Michael Cabral  
Vice President



Daniel P. Hamm, PE  
Principal

FIELD PHOTOS:







**HUDSON**  
Design Group LLC

## Wind & Ice Calculations



Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**2.6.5.2 Velocity Pressure Coeff:**

$$K_z = 2.01 (z/z_g)^{2/\alpha}$$

$K_z =$  **1.184**       $z =$  188 (ft)  
 $z_g =$  1200 (ft)  
 $\alpha =$  7.0

$K_{zmin} \leq K_z \leq 2.01$

**Table 2-4**

Exposure	$Z_g$	$\alpha$	$K_{zmin}$	$K_c$
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

**2.6.6.2 Topographic Factor:**

**Table 2-5**

Topo. Category	$K_t$	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$$K_{zt} = [1 + (K_c K_t / K_h)]^2$$

$$K_h = e^{(f \cdot z / H)}$$

$K_{zt} =$  **#DIV/0!**

$K_h =$  **#DIV/0!**

*(If Category 1 then  $K_{zt} = 1.0$ )*

Category = **1**

$K_c =$  0.9 (from Table 2-4)

$K_t =$  0 (from Table 2-5)

f = 0 (from Table 2-5)

z = 188

$z_s =$  450 (Mean elevation of base of structure above sea level)

H = 0 (Ht. of the crest above surrounding terrain)

$K_{zt} =$  1.00 (from 2.6.6.2.1)

$K_e =$  0.98 (from 2.6.8)

**2.6.10 Design Ice Thickness**

Max Ice Thickness =

$t_i =$  1.00 in

Importance Factor =

I = 1.0 (from Table 2-3)

$K_{iz} =$  1.19 (from Sec. 2.6.10)

$$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$$

$t_{iz} =$  1.19 in

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**2.6.9 Gust Effect Factor**

2.6.9.1 Self Supporting Lattice Structures

$G_h = 1.0$  Latticed Structures > 600 ft

$G_h = 0.85$  Latticed Structures 450 ft or less

$G_h = 0.85 + 0.15 [h/150 - 3.0]$   $h =$  ht. of structure

$h = 195$   $G_h = 0.85$

2.6.9.2 Guyed Masts

$G_h = 0.85$

2.6.9.3 Pole Structures

$G_h = 1.1$

2.6.9 Appurtenances

$G_h = 1.0$

2.6.9.4 Structures Supported on Other Structures

*(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)*

$G_h = 1.35$   $G_h = 1.00$

**2.6.11.2 Design Wind Force on Appurtenances**

$F = q_z * G_h * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

- $K_z = 1.184$  (from 2.6.5.2)
- $K_{zt} = 1.0$  (from 2.6.6.2.1)
- $K_s = 1.0$  (from 2.6.7)
- $K_e = 0.98$  (from 2.6.8)
- $K_d = 0.85$  (from Table 2-2)
- $V_{max} = 135$  mph (Ultimate Wind Speed)
- $V_{max(ice)} = 50$  mph
- $V_{30} = 30$  mph

$q_z = 46.18$   
 $q_z(ice) = 6.33$   
 $q_z(30) = 2.28$

**Table 2-2**

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**Determine Ca:**

**Table 2-9**

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r <sub>s</sub> ) ≥ 0.85	1.4 - 4.0(r <sub>s</sub> ) ≥ 0.90	2.0 - 6.0(r <sub>s</sub> ) ≥ 1.25
Round	C < 39 (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	4.14/(C <sup>0.485</sup> )	3.66/(C <sup>0.415</sup> )	46.8/(C <sup>1.0</sup> )
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.  
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance.)

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness =

1.19 in

Angle = 0 (deg)

Equivalent Angle = 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	4.64	1.30	825	129	41
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	6.24	1.37	599	98	30
7770 Antenna	55.0	11.0	5.0	4.20	5.00	1.31	254	44	13
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.10	1.20	145	25	7
RRUS-12 + A2 RRH (Side)	20.4	10.9	18.5	1.54	1.87	1.20	86	16	4
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.13	1.20	76	14	4
B5/B12 4449 RRH (Side)	14.9	10.4	13.2	1.08	1.43	1.20	60	12	3
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	17	5	1
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	52	10	3
1-1/2" Pipe	1.9	12.0		0.16	0.16	1.20	9	3	0
2" Pipe	2.4	12.0		0.20	0.20	1.20	11	4	1
2-1/2" Pipe	2.9	12.0		0.24	0.24	1.20	13	4	1
3/4" Round Bar	0.8	12.0		0.06	0.06	1.20	3	2	0
3x3 Angle	3.0	12.0		0.25	0.25	2.00	23	7	1

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**WIND LOADS**

Angle = 30 (deg)

Ice Thickness = 1.19 in.

Equivalent Angle = 210 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	825	375	713
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	599	347	536
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	254	135	225
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	145	86	130
RRUS-12 + A2 RRH (Side)	20.4	9.3	18.5	1.31	2.62	2.21	1.10	1.20	1.20	73	145	91
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	76	60	72
B5/B12 4449 RRH (Side)	14.9	6.6	13.2	0.68	1.37	2.26	1.13	1.20	1.20	38	76	47
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	17	50	25

**WIND LOADS WITH ICE:**

DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.77	6.89	4.26	9.76	1.28	1.49	128	65	112
HPA-65R-BUU-H8 Antenna	94.8	17.2	9.8	11.31	6.44	5.52	9.69	1.33	1.49	96	61	87
7770 Antenna	57.4	13.4	7.4	5.33	2.94	4.29	7.77	1.28	1.43	43	27	39
RRUS-12 + A2 RRH	22.8	20.9	13.3	3.30	2.10	1.09	1.72	1.20	1.20	25	16	23
RRUS-12 + A2 RRH (Side)	22.8	10.4	20.9	1.65	3.30	2.18	1.09	1.20	1.20	13	25	16
B5/B12 4449 RRH	17.3	15.6	12.8	1.87	1.53	1.11	1.35	1.20	1.20	14	12	14
B5/B12 4449 RRH (Side)	17.3	7.8	15.6	0.93	1.87	2.22	1.11	1.20	1.20	7	14	9
LGP21401 TMA	16.8	5.1	11.4	0.59	1.33	3.30	1.47	1.24	1.20	5	10	6

**WIND LOADS AT 30 MPH:**

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	41	19	35
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	30	17	26
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	11
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	7	4	6
RRUS-12 + A2 RRH (Side)	20.4	9.3	18.5	1.31	2.62	2.21	1.10	1.20	1.20	4	7	4
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	4	3	4
B5/B12 4449 RRH (Side)	14.9	6.6	13.2	0.68	1.37	2.26	1.13	1.20	1.20	2	4	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	2	1

Date: 11/22/2019  
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 Designed By: LBW Checked By: MSC



**WIND LOADS**

Angle = 60 (deg)      Ice Thickness = 1.19 in.      Equivalent Angle = 240 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area		Ratio		Ca		Force (lbs)		
				(normal)	(side)	(normal)	(side)	(normal)	(side)	(normal)	(side)	(angle)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	825	375	488
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	599	347	410
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	254	135	165
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	145	86	100
RRUS-12 + A2 RRH (Side)	20.4	13.9	18.5	1.97	2.62	1.47	1.10	1.20	1.20	109	145	136
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	76	60	64
B5/B12 4449 RRH (Side)	14.9	9.9	13.2	1.02	1.37	1.51	1.13	1.20	1.20	57	76	71
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	17	50	42

**WIND LOADS WITH ICE:**

DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.77	6.89	4.26	9.76	1.28	1.49	128	65	81
HPA-65R-BUU-H8 Antenna	94.8	17.2	9.8	11.31	6.44	5.52	9.69	1.33	1.49	96	61	69
7770 Antenna	57.4	13.4	7.4	5.33	2.94	4.29	7.77	1.28	1.43	43	27	31
RRUS-12 + A2 RRH	22.8	20.9	13.3	3.30	2.10	1.09	1.72	1.20	1.20	25	16	18
RRUS-12 + A2 RRH (Side)	22.8	15.7	20.9	2.48	3.30	1.45	1.09	1.20	1.20	19	25	24
B5/B12 4449 RRH	17.3	15.6	12.8	1.87	1.53	1.11	1.35	1.20	1.20	14	12	12
B5/B12 4449 RRH (Side)	17.3	11.7	15.6	1.40	1.87	1.48	1.11	1.20	1.20	11	14	13
LGP21401 TMA	16.8	5.1	11.4	0.59	1.33	3.30	1.47	1.24	1.20	5	10	9

**WIND LOADS AT 30 MPH:**

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	41	19	24
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	30	17	20
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	8
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	7	4	5
RRUS-12 + A2 RRH (Side)	20.4	13.9	18.5	1.97	2.62	1.47	1.10	1.20	1.20	5	7	7
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	4	3	3
B5/B12 4449 RRH (Side)	14.9	9.9	13.2	1.02	1.37	1.51	1.13	1.20	1.20	3	4	4
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	2	2

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
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 Designed By: LBW Checked By: MSC



**WIND LOADS**

Angle = 90 (deg)      Ice Thickness = 1.19 in.      Equivalent Angle = 270 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	825	375	375
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	599	347	347
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	254	135	135
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	145	86	86
RRUS-12 + A2 RRH (Side)	20.4	10.9	18.5	1.54	2.62	1.87	1.10	1.20	1.20	86	145	145
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	76	60	60
B5/B12 4449 RRH (Side)	14.9	10.4	13.2	1.08	1.37	1.43	1.13	1.20	1.20	60	76	76
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	17	50	50

**WIND LOADS WITH ICE:**

DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.77	6.89	4.26	9.76	1.28	1.49	128	65	65
HPA-65R-BUU-H8 Antenna	94.8	17.2	9.8	11.31	6.44	5.52	9.69	1.33	1.49	96	61	61
7770 Antenna	57.4	13.4	7.4	5.33	2.94	4.29	7.77	1.28	1.43	43	27	27
RRUS-12 + A2 RRH	22.8	20.9	13.3	3.30	2.10	1.09	1.72	1.20	1.20	25	16	16
RRUS-12 + A2 RRH (Side)	22.8	13.3	20.9	2.10	3.30	1.72	1.09	1.20	1.20	16	25	25
B5/B12 4449 RRH	17.3	15.6	12.8	1.87	1.53	1.11	1.35	1.20	1.20	14	12	12
B5/B12 4449 RRH (Side)	17.3	12.8	15.6	1.53	1.87	1.35	1.11	1.20	1.20	12	14	14
LGP21401 TMA	16.8	5.1	11.4	0.59	1.33	3.30	1.47	1.24	1.20	5	10	10

**WIND LOADS AT 30 MPH:**

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	41	19	19
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	30	17	17
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	7
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	7	4	4
RRUS-12 + A2 RRH (Side)	20.4	10.9	18.5	1.54	2.62	1.87	1.10	1.20	1.20	4	7	7
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	4	3	3
B5/B12 4449 RRH (Side)	14.9	10.4	13.2	1.08	1.37	1.43	1.13	1.20	1.20	3	4	4
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	2	2

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**WIND LOADS**

Angle = 120 (deg)      Ice Thickness = 1.19 in.      Equivalent Angle = 300 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	825	375	488
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	599	347	410
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	254	135	165
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	145	86	100
RRUS-12 + A2 RRH (Side)	20.4	13.9	18.5	1.97	2.62	1.47	1.10	1.20	1.20	109	145	136
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	76	60	64
B5/B12 4449 RRH (Side)	14.9	9.9	13.2	1.02	1.37	1.51	1.13	1.20	1.20	57	76	71
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	17	50	42

**WIND LOADS WITH ICE:**

DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.77	6.89	4.26	9.76	1.28	1.49	128	65	81
HPA-65R-BUU-H8 Antenna	94.8	17.2	9.8	11.31	6.44	5.52	9.69	1.33	1.49	96	61	69
7770 Antenna	57.4	13.4	7.4	5.33	2.94	4.29	7.77	1.28	1.43	43	27	31
RRUS-12 + A2 RRH	22.8	20.9	13.3	3.30	2.10	1.09	1.72	1.20	1.20	25	16	18
RRUS-12 + A2 RRH (Side)	22.8	15.7	20.9	2.48	3.30	1.45	1.09	1.20	1.20	19	25	24
B5/B12 4449 RRH	17.3	15.6	12.8	1.87	1.53	1.11	1.35	1.20	1.20	14	12	12
B5/B12 4449 RRH (Side)	17.3	11.7	15.6	1.40	1.87	1.48	1.11	1.20	1.20	11	14	13
LGP21401 TMA	16.8	5.1	11.4	0.59	1.33	3.30	1.47	1.24	1.20	5	10	9

**WIND LOADS AT 30 MPH:**

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	41	19	24
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	30	17	20
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	8
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	7	4	5
RRUS-12 + A2 RRH (Side)	20.4	13.9	18.5	1.97	2.62	1.47	1.10	1.20	1.20	5	7	7
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	4	3	3
B5/B12 4449 RRH (Side)	14.9	9.9	13.2	1.02	1.37	1.51	1.13	1.20	1.20	3	4	4
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	2	2

Date: 11/22/2019  
 Project Name: BOZRAH EASY  
 Project No.: CT2223  
 Designed By: LBW Checked By: MSC



**WIND LOADS**

Angle = 150 (deg)      Ice Thickness = 1.19 in.      Equivalent Angle = 330 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area	Flat Area	Ratio	Ratio	Ca	Ca	Force (lbs)	Force (lbs)	Force (lbs)
				(normal)	(side)	(normal)	(side)	(normal)	(side)	(normal)	(side)	(angle)
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	825	375	713
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	599	347	536
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	254	135	225
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	145	86	130
RRUS-12 + A2 RRH (Side)	20.4	9.3	18.5	1.31	2.62	2.21	1.10	1.20	1.20	73	145	91
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	76	60	72
B5/B12 4449 RRH (Side)	14.9	6.6	13.2	0.68	1.37	2.26	1.13	1.20	1.20	38	76	47
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	17	50	25

**WIND LOADS WITH ICE:**

DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.77	6.89	4.26	9.76	1.28	1.49	128	65	112
HPA-65R-BUU-H8 Antenna	94.8	17.2	9.8	11.31	6.44	5.52	9.69	1.33	1.49	96	61	87
7770 Antenna	57.4	13.4	7.4	5.33	2.94	4.29	7.77	1.28	1.43	43	27	39
RRUS-12 + A2 RRH	22.8	20.9	13.3	3.30	2.10	1.09	1.72	1.20	1.20	25	16	23
RRUS-12 + A2 RRH (Side)	22.8	10.4	20.9	1.65	3.30	2.18	1.09	1.20	1.20	13	25	16
B5/B12 4449 RRH	17.3	15.6	12.8	1.87	1.53	1.11	1.35	1.20	1.20	14	12	14
B5/B12 4449 RRH (Side)	17.3	7.8	15.6	0.93	1.87	2.22	1.11	1.20	1.20	7	14	9
LGP21401 TMA	16.8	5.1	11.4	0.59	1.33	3.30	1.47	1.24	1.20	5	10	6

**WIND LOADS AT 30 MPH:**

DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	41	19	35
HPA-65R-BUU-H8 Antenna	92.4	14.8	7.4	9.50	4.75	6.24	12.49	1.37	1.58	30	17	26
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	11
RRUS-12 + A2 RRH	20.4	18.5	10.9	2.62	1.54	1.10	1.87	1.20	1.20	7	4	6
RRUS-12 + A2 RRH (Side)	20.4	9.3	18.5	1.31	2.62	2.21	1.10	1.20	1.20	4	7	4
B5/B12 4449 RRH	14.9	13.2	10.4	1.37	1.08	1.13	1.43	1.20	1.20	4	3	4
B5/B12 4449 RRH (Side)	14.9	6.6	13.2	0.68	1.37	2.26	1.13	1.20	1.20	2	4	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	2	1



Date: 11/22/2019

Project Name: BOZRAH EASY

Project No.: CT2223

Designed By: LBW Checked By: MSC



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Design Group LLC

### ICE WEIGHT CALCULATIONS

Thickness of ice: 1.19 in.  
Density of ice: 56 pcf

#### DMP65R-BU8DA Antenna

Weight of ice based on total radial SF area:

Height (in): 96.0  
Width (in): 20.7  
Depth (in): 7.7  
Total weight of ice on object: 271 lbs  
Weight of object: 96.0 lbs

Combined weight of ice and object:	367 lbs
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#### HPA-65R-BUU-H8 Antenna

Weight of ice based on total radial SF area:

Height (in): 92.4  
Width (in): 14.8  
Depth (in): 7.4  
Total weight of ice on object: 199 lbs  
Weight of object: 68.0 lbs

Combined weight of ice and object:	267 lbs
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#### 7770 Antenna

Weight of ice based on total radial SF area:

Height (in): 55.0  
Width (in): 11.0  
Depth (in): 5.0  
Total weight of ice on object: 88 lbs  
Weight of object: 35.0 lbs

Combined weight of ice and object:	123 lbs
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#### RRUS-12 + A2 RRH

Weight of ice based on total radial SF area:

Height (in): 20.4  
Width (in): 18.5  
Depth (in): 10.9  
Total weight of ice on object: 56 lbs  
Weight of object: 80.0 lbs

Combined weight of ice and object:	136 lbs
------------------------------------	---------

#### B5/B12 4449 RRH

Weight of ice based on total radial SF area:

Height (in): 14.9  
Width (in): 13.2  
Depth (in): 10.4  
Total weight of ice on object: 32 lbs  
Weight of object: 73.0 lbs

Combined weight of ice and object:	105 lbs
------------------------------------	---------

#### LGP21401 TMA

Weight of ice based on total radial SF area:

Height (in): 14.4  
Width (in): 2.7  
Depth (in): 9.0  
Total weight of ice on object: 18 lbs  
Weight of object: 19.0 lbs

Combined weight of ice and object:	37 lbs
------------------------------------	--------

#### Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in): 24.0  
Diameter(in): 9.7  
Total weight of ice on object: 32 lbs  
Weight of object: 33 lbs

Combined weight of ice and object:	65 lbs
------------------------------------	--------

#### 1-1/2" Pipe

Per foot weight of ice:

diameter (in): 1.9  
Per foot weight of ice on object: 4 plf

#### 2" pipe

Per foot weight of ice:

diameter (in): 2.38  
Per foot weight of ice on object: 5 plf

#### 3/4" Round Bar

Per foot weight of ice:

diameter (in): 0.75  
Per foot weight of ice on object: 3 plf

#### L 3x3 Angles

Weight of ice based on total radial SF area:

Height (in): 3  
Width (in): 3  
Per foot weight of ice on object: 8 plf

#### 2-1/2" pipe

Per foot weight of ice:

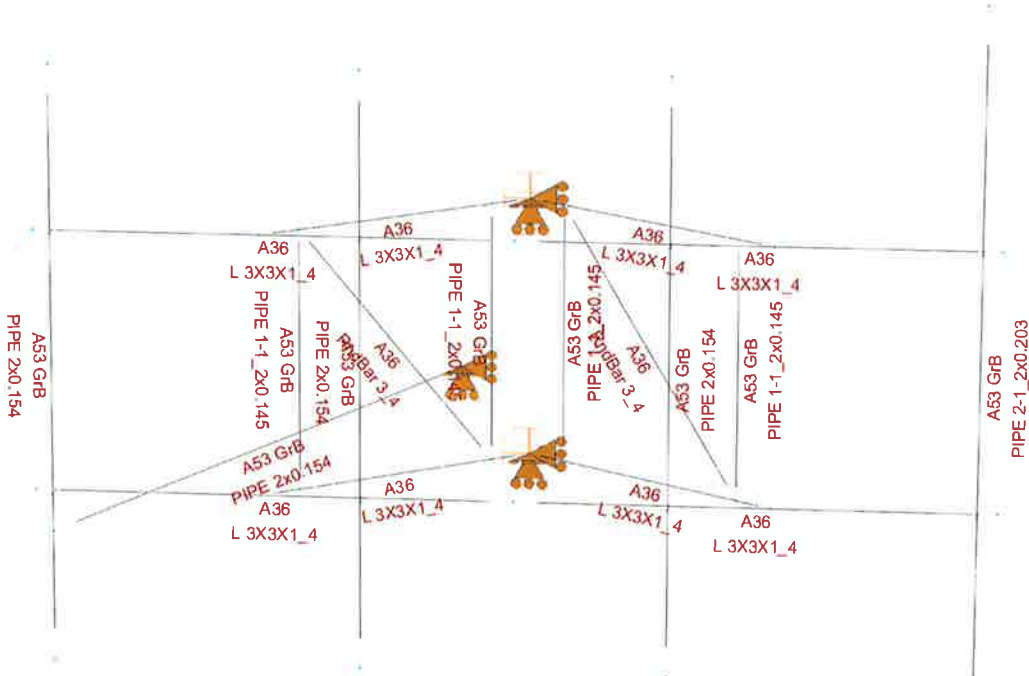
diameter (in): 2.88  
Per foot weight of ice on object: 6 plf



**HUDSON**  
Design Group LLC

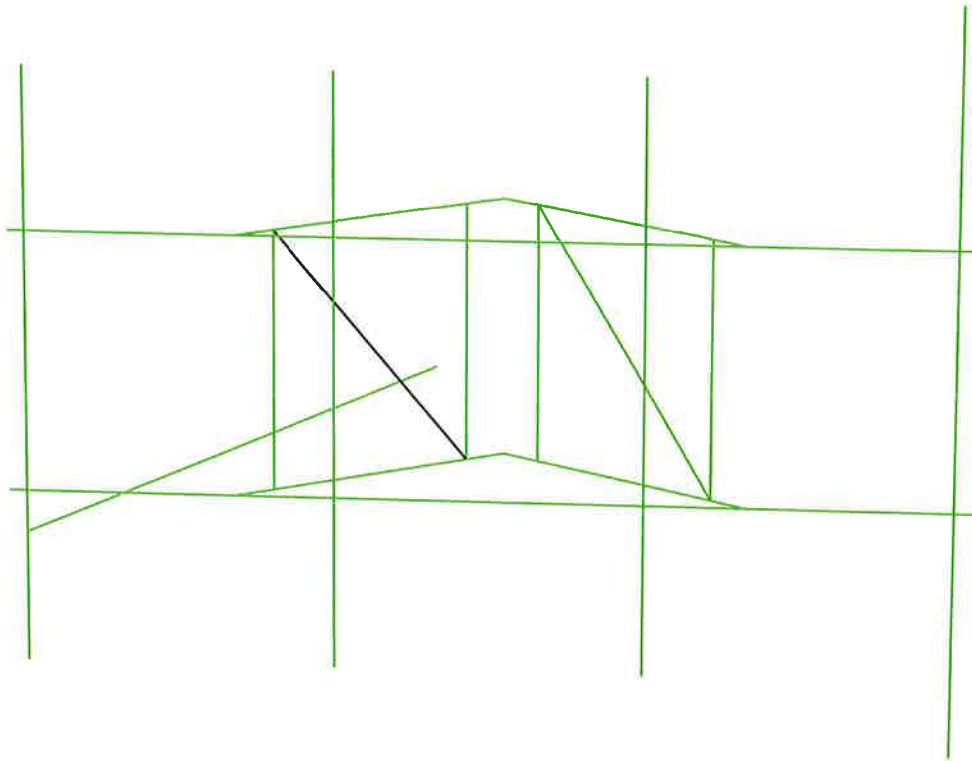
**Mount Calculations  
(Existing Conditions)**

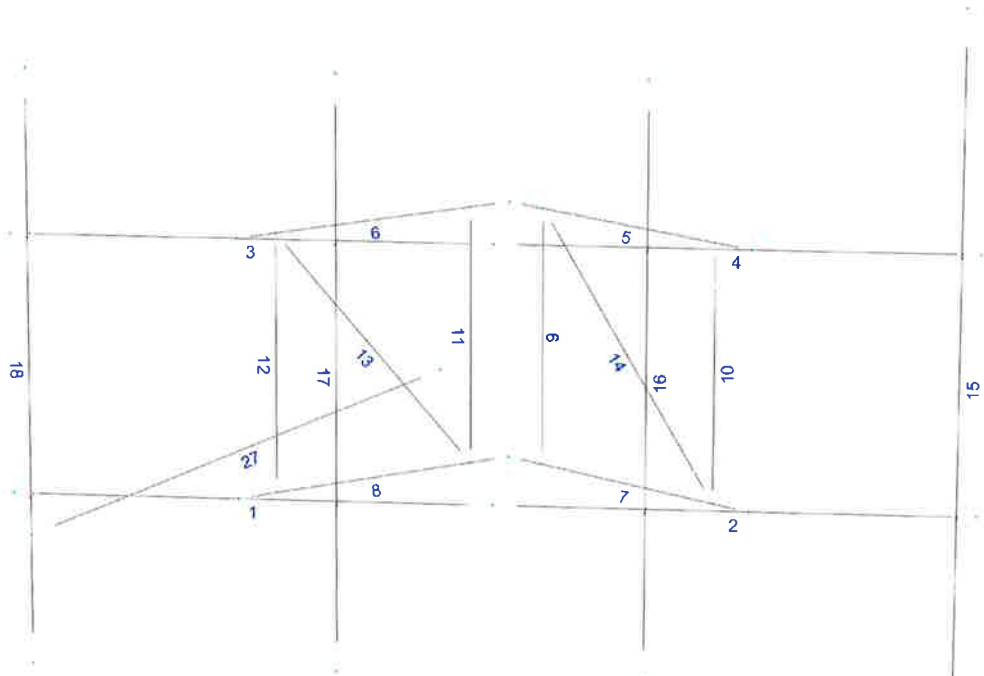




Design status

- Not designed
- Error on design
- Design O.K.
- With warnings





Current Date: 11/22/2019 1:18 PM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2223\LTE 3C-4\CT2223 (LTE 3C-4C).retx

## Load data

### GLOSSARY

Comb : Indicates if load condition is a load combination

### Load Conditions

Condition	Description	Comb.	Category																																																																																							
D	Dead Load	No	DL																																																																																							
Wo	Wind Load (NO ICE)	No	WIND																																																																																							
W30	WL 30deg	No	WIND																																																																																							
W60	WL 60deg	No	WIND																																																																																							
W90	WL 90deg	No </tr <tr> <td>W120</td> <td>WL 120deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>W150</td> <td>WL 150deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>Di</td> <td>Ice Load</td> <td>No</td> <td>LL</td> </tr> <tr> <td>WI0</td> <td>WL ICE 0deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WI30</td> <td>WL ICE 30deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WI60</td> <td>WL ICE 60deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WI90</td> <td>WL ICE 90deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WI120</td> <td>WL ICE 120deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WI150</td> <td>WL ICE 150deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL0</td> <td>WL 30 mph 0deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL30</td> <td>WL 30 mph 30deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL60</td> <td>WL 30 mph 60deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL90</td> <td>WL 30 mph 90deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL120</td> <td>WL 30 mph 120deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>WL150</td> <td>WL 30 mph 150deg</td> <td>No</td> <td>WIND</td> </tr> <tr> <td>LL1</td> <td>250 lb Live Load Center of Mount</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LL2</td> <td>250 lb Live Load Right End of Mount</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LL3</td> <td>250 lb Live Load Left End of Mount</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LLa1</td> <td>250 lb Live Load Antenna 1</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LLa2</td> <td>250 lb Live Load Antenna 2</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LLa3</td> <td>250 lb Live Load Antenna 3</td> <td>No</td> <td>LL</td> </tr> <tr> <td>LLa4</td> <td>250 lb Live Load Antenna 4</td> <td>No</td> <td>LL</td> </tr>	W120	WL 120deg	No	WIND	W150	WL 150deg	No	WIND	Di	Ice Load	No	LL	WI0	WL ICE 0deg	No	WIND	WI30	WL ICE 30deg	No	WIND	WI60	WL ICE 60deg	No	WIND	WI90	WL ICE 90deg	No	WIND	WI120	WL ICE 120deg	No	WIND	WI150	WL ICE 150deg	No	WIND	WL0	WL 30 mph 0deg	No	WIND	WL30	WL 30 mph 30deg	No	WIND	WL60	WL 30 mph 60deg	No	WIND	WL90	WL 30 mph 90deg	No	WIND	WL120	WL 30 mph 120deg	No	WIND	WL150	WL 30 mph 150deg	No	WIND	LL1	250 lb Live Load Center of Mount	No	LL	LL2	250 lb Live Load Right End of Mount	No	LL	LL3	250 lb Live Load Left End of Mount	No	LL	LLa1	250 lb Live Load Antenna 1	No	LL	LLa2	250 lb Live Load Antenna 2	No	LL	LLa3	250 lb Live Load Antenna 3	No	LL	LLa4	250 lb Live Load Antenna 4	No	LL
W120	WL 120deg	No	WIND																																																																																							
W150	WL 150deg	No	WIND																																																																																							
Di	Ice Load	No	LL																																																																																							
WI0	WL ICE 0deg	No	WIND																																																																																							
WI30	WL ICE 30deg	No	WIND																																																																																							
WI60	WL ICE 60deg	No	WIND																																																																																							
WI90	WL ICE 90deg	No	WIND																																																																																							
WI120	WL ICE 120deg	No	WIND																																																																																							
WI150	WL ICE 150deg	No	WIND																																																																																							
WL0	WL 30 mph 0deg	No	WIND																																																																																							
WL30	WL 30 mph 30deg	No	WIND																																																																																							
WL60	WL 30 mph 60deg	No	WIND																																																																																							
WL90	WL 30 mph 90deg	No	WIND																																																																																							
WL120	WL 30 mph 120deg	No	WIND																																																																																							
WL150	WL 30 mph 150deg	No	WIND																																																																																							
LL1	250 lb Live Load Center of Mount	No	LL																																																																																							
LL2	250 lb Live Load Right End of Mount	No	LL																																																																																							
LL3	250 lb Live Load Left End of Mount	No	LL																																																																																							
LLa1	250 lb Live Load Antenna 1	No	LL																																																																																							
LLa2	250 lb Live Load Antenna 2	No	LL																																																																																							
LLa3	250 lb Live Load Antenna 3	No	LL																																																																																							
LLa4	250 lb Live Load Antenna 4	No	LL																																																																																							

### Distributed force on members



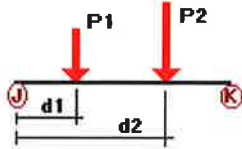
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wo	1	z	-0.023	0.00	0.00	No	0.00	No
	2	z	-0.023	0.00	0.00	No	0.00	No
	3	z	-0.023	0.00	0.00	No	0.00	No
	4	z	-0.023	0.00	0.00	No	0.00	No
	5	z	-0.023	0.00	0.00	No	0.00	No
	6	z	-0.023	0.00	0.00	No	0.00	No
	7	z	-0.023	0.00	0.00	No	0.00	No
	8	z	-0.023	0.00	0.00	No	0.00	No
	9	z	-0.009	0.00	0.00	No	0.00	No
	10	z	-0.009	0.00	0.00	No	0.00	No
	11	z	-0.009	0.00	0.00	No	0.00	No
	12	z	-0.009	0.00	0.00	No	0.00	No
	13	z	-0.003	0.00	0.00	No	0.00	No
	14	z	-0.003	0.00	0.00	No	0.00	No
	17	z	-0.011	0.00	0.00	No	0.00	No
	27	z	-0.011	0.00	0.00	No	0.00	No
	W30	1	z	-0.023	0.00	0.00	No	0.00
2		z	-0.023	0.00	0.00	No	0.00	No
3		z	-0.023	0.00	0.00	No	0.00	No
4		z	-0.023	0.00	0.00	No	0.00	No
5		z	-0.023	0.00	0.00	No	0.00	No
6		z	-0.023	0.00	0.00	No	0.00	No
7		z	-0.023	0.00	0.00	No	0.00	No
8		z	-0.023	0.00	0.00	No	0.00	No
9		z	-0.009	0.00	0.00	No	0.00	No
10		z	-0.009	0.00	0.00	No	0.00	No
11		z	-0.009	0.00	0.00	No	0.00	No
12		z	-0.009	0.00	0.00	No	0.00	No
13		z	-0.003	0.00	0.00	No	0.00	No
14		z	-0.003	0.00	0.00	No	0.00	No
17		z	-0.011	0.00	0.00	No	0.00	No
27		z	-0.011	0.00	0.00	No	0.00	No
W60		1	x	-0.023	0.00	0.00	No	0.00
	2	x	-0.023	0.00	0.00	No	0.00	No
	3	x	-0.023	0.00	0.00	No	0.00	No
	4	x	-0.023	0.00	0.00	No	0.00	No
	5	x	-0.023	0.00	0.00	No	0.00	No
	6	x	-0.023	0.00	0.00	No	0.00	No
	7	x	-0.023	0.00	0.00	No	0.00	No
	8	x	-0.023	0.00	0.00	No	0.00	No
	9	x	-0.009	0.00	0.00	No	0.00	No
	10	x	-0.009	0.00	0.00	No	0.00	No
	11	x	-0.009	0.00	0.00	No	0.00	No
	12	x	-0.009	0.00	0.00	No	0.00	No
	13	x	-0.003	0.00	0.00	No	0.00	No
	14	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.011	0.00	0.00	No	0.00	No
	17	x	-0.011	0.00	0.00	No	0.00	No
18	x	-0.011	0.00	0.00	No	0.00	No	
27	x	-0.011	0.00	0.00	No	0.00	No	
W90	1	x	-0.023	0.00	0.00	No	0.00	No
	2	x	-0.023	0.00	0.00	No	0.00	No
	3	x	-0.023	0.00	0.00	No	0.00	No
	4	x	-0.023	0.00	0.00	No	0.00	No
	5	x	-0.023	0.00	0.00	No	0.00	No
	6	x	-0.023	0.00	0.00	No	0.00	No
	7	x	-0.023	0.00	0.00	No	0.00	No
	8	x	-0.023	0.00	0.00	No	0.00	No
	9	x	-0.009	0.00	0.00	No	0.00	No



	10	x	-0.009	0.00	0.00	No	0.00	No
	11	x	-0.009	0.00	0.00	No	0.00	No
	12	x	-0.009	0.00	0.00	No	0.00	No
	13	x	-0.003	0.00	0.00	No	0.00	No
	14	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.011	0.00	0.00	No	0.00	No
	17	x	-0.011	0.00	0.00	No	0.00	No
	18	x	-0.011	0.00	0.00	No	0.00	No
	27	x	-0.011	0.00	0.00	No	0.00	No
W120	1	x	-0.023	0.00	0.00	No	0.00	No
	2	x	-0.023	0.00	0.00	No	0.00	No
	3	x	-0.023	0.00	0.00	No	0.00	No
	4	x	-0.023	0.00	0.00	No	0.00	No
	5	x	-0.023	0.00	0.00	No	0.00	No
	6	x	-0.023	0.00	0.00	No	0.00	No
	7	x	-0.023	0.00	0.00	No	0.00	No
	8	x	-0.023	0.00	0.00	No	0.00	No
	9	x	-0.009	0.00	0.00	No	0.00	No
	10	x	-0.009	0.00	0.00	No	0.00	No
	11	x	-0.009	0.00	0.00	No	0.00	No
	12	x	-0.009	0.00	0.00	No	0.00	No
	13	x	-0.003	0.00	0.00	No	0.00	No
	14	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.011	0.00	0.00	No	0.00	No
	17	x	-0.011	0.00	0.00	No	0.00	No
	18	x	-0.011	0.00	0.00	No	0.00	No
	27	x	-0.011	0.00	0.00	No	0.00	No
W150	1	z	0.023	0.00	0.00	No	0.00	No
	2	z	0.023	0.00	0.00	No	0.00	No
	3	z	0.023	0.00	0.00	No	0.00	No
	4	z	0.023	0.00	0.00	No	0.00	No
	5	z	0.023	0.00	0.00	No	0.00	No
	6	z	0.023	0.00	0.00	No	0.00	No
	7	z	0.023	0.00	0.00	No	0.00	No
	8	z	0.023	0.00	0.00	No	0.00	No
	9	z	0.009	0.00	0.00	No	0.00	No
	10	z	0.009	0.00	0.00	No	0.00	No
	11	z	0.009	0.00	0.00	No	0.00	No
	12	z	0.009	0.00	0.00	No	0.00	No
	13	z	0.003	0.00	0.00	No	0.00	No
	14	z	0.003	0.00	0.00	No	0.00	No
	17	z	0.011	0.00	0.00	No	0.00	No
	27	z	0.011	0.00	0.00	No	0.00	No
Di	1	y	-0.008	0.00	0.00	No	0.00	No
	2	y	-0.008	0.00	0.00	No	0.00	No
	3	y	-0.008	0.00	0.00	No	0.00	No
	4	y	-0.008	0.00	0.00	No	0.00	No
	5	y	-0.008	0.00	0.00	No	0.00	No
	6	y	-0.008	0.00	0.00	No	0.00	No
	7	y	-0.008	0.00	0.00	No	0.00	No
	8	y	-0.008	0.00	0.00	No	0.00	No
	9	y	-0.004	0.00	0.00	No	0.00	No
	10	y	-0.004	0.00	0.00	No	0.00	No
	11	y	-0.004	0.00	0.00	No	0.00	No
	12	y	-0.004	0.00	0.00	No	0.00	No
	13	y	-0.003	0.00	0.00	No	0.00	No
	14	y	-0.003	0.00	0.00	No	0.00	No
	15	y	-0.006	0.00	0.00	No	0.00	No

16	y	-0.005	0.00	0.00	No	0.00	No
17	y	-0.005	0.00	0.00	No	0.00	No
18	y	-0.005	0.00	0.00	No	0.00	No
27	y	-0.005	0.00	0.00	No	0.00	No

### Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	15	y	-0.048	1.50	No
		y	-0.048	8.50	No
		y	-0.153	5.00	No
	17	y	-0.034	0.50	No
		y	-0.034	7.50	No
		y	-0.018	1.00	No
		y	-0.018	4.50	No
Wo	15	z	-0.413	1.50	No
		z	-0.413	8.50	No
		z	-0.145	5.00	No
	17	z	-0.30	0.50	No
		z	-0.30	7.50	No
		z	-0.128	1.00	No
		z	-0.128	4.50	No
W30	15	3	-0.357	1.50	No
		3	-0.357	8.50	No
		3	-0.091	5.00	No
	17	3	-0.269	0.50	No
		3	-0.269	7.50	No
		3	-0.113	1.00	No
		3	-0.113	4.50	No
W60	15	3	-0.244	1.50	No
		3	-0.244	8.50	No
		3	-0.136	5.00	No
	17	3	-0.206	0.50	No
		3	-0.206	7.50	No
		3	-0.083	1.00	No
		3	-0.083	4.50	No
W90	15	x	-0.188	1.50	No
		x	-0.188	8.50	No
		x	-0.145	5.00	No
	17	x	-0.174	0.50	No
		x	-0.174	7.50	No
		x	-0.068	1.00	No
		x	-0.068	4.50	No
W120	15	2	-0.244	1.50	No
		2	-0.05	7.00	No

		2	-0.244	8.50	No
		2	-0.136	5.00	No
	17	2	-0.206	0.50	No
		2	-0.206	7.50	No
	18	2	-0.083	1.00	No
		2	-0.083	4.50	No
W150	15	2	-0.042	7.00	No
		2	-0.357	1.50	No
		2	-0.357	8.50	No
		2	-0.091	5.00	No
	17	2	-0.269	0.50	No
		2	-0.269	7.50	No
	18	2	-0.113	1.00	No
		2	-0.113	4.50	No
Di	15	2	-0.025	7.00	No
		y	-0.135	1.50	No
		y	-0.135	8.50	No
		y	-0.153	5.00	No
	17	y	-0.099	0.50	No
		y	-0.099	7.50	No
	18	y	-0.044	1.00	No
		y	-0.088	4.50	No
WI0	15	y	-0.037	7.00	No
		z	-0.065	1.50	No
		z	-0.065	8.50	No
		z	-0.028	5.00	No
	17	z	-0.049	0.50	No
		z	-0.049	7.50	No
	18	z	-0.023	1.00	No
		z	-0.023	4.50	No
WI30	15	z	-0.005	7.00	No
		3	-0.057	1.50	No
		3	-0.057	8.50	No
		3	-0.016	5.00	No
	17	3	-0.044	0.50	No
		3	-0.044	7.50	No
	18	3	-0.02	1.00	No
		3	-0.02	4.50	No
WI60	15	3	-0.006	7.00	No
		3	-0.041	1.50	No
		3	-0.041	8.50	No
		3	-0.024	5.00	No
	17	3	-0.035	0.50	No
		3	-0.035	7.50	No
	18	3	-0.016	1.00	No
		3	-0.016	4.50	No
WI90	15	3	-0.009	7.00	No
		x	-0.033	1.50	No
		x	-0.033	8.50	No
		x	-0.025	5.00	No
	17	x	-0.031	0.50	No
		x	-0.031	7.50	No
	18	x	-0.014	1.00	No
		x	-0.014	4.50	No
WI120	15	x	-0.01	7.00	No
		2	-0.041	1.50	No
		2	-0.041	8.50	No
		2	-0.024	5.00	No
	17	2	-0.035	0.50	No
		2	-0.035	7.50	No

	18	2	-0.016	1.00	No
		2	-0.016	4.50	No
		3	-0.009	7.00	No
WL150	15	2	-0.057	1.50	No
		2	-0.057	8.50	No
		2	-0.016	5.00	No
	17	2	-0.044	0.50	No
		2	-0.044	7.50	No
	18	2	-0.02	1.00	No
		2	-0.02	4.50	No
		2	-0.006	7.00	No
WL0	15	z	-0.021	1.50	No
		z	-0.021	8.50	No
		z	-0.007	5.00	No
	17	z	-0.015	0.50	No
		z	-0.015	7.50	No
	18	z	-0.007	1.00	No
		z	-0.007	4.50	No
		z	-0.001	7.00	No
WL30	15	3	-0.018	1.50	No
		3	-0.018	8.50	No
		3	-0.004	5.00	No
	17	3	-0.014	0.50	No
		3	-0.014	7.50	No
	18	3	-0.006	1.00	No
		3	-0.006	4.50	No
		3	-0.001	7.00	No
WL60	15	3	-0.013	1.50	No
		3	-0.013	8.50	No
		3	-0.007	5.00	No
	17	3	-0.011	0.50	No
		3	-0.011	7.50	No
	18	3	-0.005	1.00	No
		3	-0.005	4.50	No
		3	-0.002	7.00	No
WL90	15	x	-0.01	1.50	No
		x	-0.01	8.50	No
		x	-0.007	5.00	No
	17	x	-0.009	0.50	No
		x	-0.009	7.50	No
	18	x	-0.004	1.00	No
		x	-0.004	4.50	No
		x	-0.002	7.00	No
WL120	15	2	-0.013	1.50	No
		2	-0.013	8.50	No
		2	-0.007	5.00	No
	17	2	-0.011	0.50	No
		2	-0.011	7.50	No
	18	2	-0.005	1.00	No
		2	-0.005	4.50	No
		2	-0.002	7.00	No
WL150	15	2	-0.018	1.50	No
		2	-0.018	8.50	No
		2	-0.004	5.00	No
	17	2	-0.014	0.50	No
		2	-0.014	7.50	No
	18	2	-0.006	1.00	No
		2	-0.006	4.50	No
		2	-0.001	7.00	No
LL1	2	y	-0.25	0.00	No

LL2	2	y	-0.25	6.25	No
LL3	1	y	-0.25	0.00	No
LLa1	15	y	-0.25	5.00	No
LLa2	16	y	-0.25	4.00	No
LLa3	17	y	-0.25	4.00	No
LLa4	18	y	-0.25	4.00	No

### Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
D	Dead Load	No	0.00	-1.00	0.00
Wo	Wind Load (NO ICE)	No	0.00	0.00	0.00
W30	WL 30deg	No	0.00	0.00	0.00
W60	WL 60deg	No	0.00	0.00	0.00
W90	WL 90deg	No	0.00	0.00	0.00
W120	WL 120deg	No	0.00	0.00	0.00
W150	WL 150deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
WI0	WL ICE 0deg	No	0.00	0.00	0.00
WI30	WL ICE 30deg	No	0.00	0.00	0.00
WI60	WL ICE 60deg	No	0.00	0.00	0.00
WI90	WL ICE 90deg	No	0.00	0.00	0.00
WI120	WL ICE 120deg	No	0.00	0.00	0.00
WI150	WL ICE 150deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30deg	No	0.00	0.00	0.00
WL60	WL 30 mph 60deg	No	0.00	0.00	0.00
WL90	WL 30 mph 90deg	No	0.00	0.00	0.00
WL120	WL 30 mph 120deg	No	0.00	0.00	0.00
WL150	WL 30 mph 150deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load Right End of Mount	No	0.00	0.00	0.00
LL3	250 lb Live Load Left End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	250 lb Live Load Antenna 4	No	0.00	0.00	0.00

### Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
D	0.00	0.00	0.00
Wo	0.00	0.00	0.00
W30	0.00	0.00	0.00
W60	0.00	0.00	0.00
W90	0.00	0.00	0.00
W120	0.00	0.00	0.00
W150	0.00	0.00	0.00
Di	0.00	0.00	0.00

WI0	0.00	0.00	0.00
WI30	0.00	0.00	0.00
WI60	0.00	0.00	0.00
WI90	0.00	0.00	0.00
WI120	0.00	0.00	0.00
WI150	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
WL60	0.00	0.00	0.00
WL90	0.00	0.00	0.00
WL120	0.00	0.00	0.00
WL150	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LL3	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

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## Steel Code Check

Report: Summary - Group by member

### Load conditions to be included in design :

LC1=1.2D+W<sub>o</sub>  
LC2=1.2D+W30  
LC3=1.2D+W60  
LC4=1.2D+W90  
LC5=1.2D+W120  
LC6=1.2D+W150  
LC7=1.2D-W<sub>o</sub>  
LC8=1.2D-W30  
LC9=1.2D-W60  
LC10=1.2D-W90  
LC11=1.2D-W120  
LC12=1.2D-W150  
LC13=0.9D+W<sub>o</sub>  
LC14=0.9D+W30  
LC15=0.9D+W60  
LC16=0.9D+W90  
LC17=0.9D+W120  
LC18=0.9D+W150  
LC19=0.9D-W<sub>o</sub>  
LC20=0.9D-W30  
LC21=0.9D-W60  
LC22=0.9D-W90  
LC23=0.9D-W120  
LC24=0.9D-W150  
LC25=1.2D+Di+W<sub>o</sub>  
LC26=1.2D+Di+W130  
LC27=1.2D+Di+W160  
LC28=1.2D+Di+W190  
LC29=1.2D+Di+W120  
LC30=1.2D+Di+W150  
LC31=1.2D+Di-W<sub>o</sub>  
LC32=1.2D+Di-W130  
LC33=1.2D+Di-W160  
LC34=1.2D+Di-W190  
LC35=1.2D+Di-W120  
LC36=1.2D+Di-W150  
LC38=1.2D+1.5LL1  
LC39=1.2D+1.5LL2  
LC40=1.2D+1.5LL3  
LC41=1.2D+W<sub>L0</sub>+1.5LLa1  
LC42=1.2D+W<sub>L30</sub>+1.5LLa1  
LC43=1.2D+W<sub>L60</sub>+1.5LLa1  
LC44=1.2D+W<sub>L90</sub>+1.5LLa1  
LC45=1.2D+W<sub>L120</sub>+1.5LLa1  
LC46=1.2D+W<sub>L150</sub>+1.5LLa1  
LC47=1.2D-W<sub>L0</sub>+1.5LLa1  
LC48=1.2D-W<sub>L30</sub>+1.5LLa1  
LC49=1.2D-W<sub>L60</sub>+1.5LLa1  
LC50=1.2D-W<sub>L90</sub>+1.5LLa1  
LC51=1.2D-W<sub>L120</sub>+1.5LLa1  
LC52=1.2D-W<sub>L150</sub>+1.5LLa1  
LC53=1.2D+W<sub>L0</sub>+1.5LLa2

LC54=1.2D+WL30+1.5LLa2  
 LC55=1.2D+WL60+1.5LLa2  
 LC56=1.2D+WL90+1.5LLa2  
 LC57=1.2D+WL120+1.5LLa2  
 LC58=1.2D+WL150+1.5LLa2  
 LC59=1.2D-WL0+1.5LLa2  
 LC60=1.2D-WL30+1.5LLa2  
 LC61=1.2D-WL60+1.5LLa2  
 LC62=1.2D-WL90+1.5LLa2  
 LC63=1.2D-WL120+1.5LLa2  
 LC64=1.2D-WL150+1.5LLa2  
 LC65=1.2D+WL0+1.5LLa3  
 LC66=1.2D+WL30+1.5LLa3  
 LC67=1.2D+WL60+1.5LLa3  
 LC68=1.2D+WL90+1.5LLa3  
 LC69=1.2D+WL120+1.5LLa3  
 LC70=1.2D+WL150+1.5LLa3  
 LC71=1.2D-WL0+1.5LLa3  
 LC72=1.2D-WL30+1.5LLa3  
 LC73=1.2D-WL60+1.5LLa3  
 LC74=1.2D-WL90+1.5LLa3  
 LC75=1.2D-WL120+1.5LLa3  
 LC76=1.2D-WL150+1.5LLa3  
 LC77=1.2D+WL0+1.5LLa4  
 LC78=1.2D+WL30+1.5LLa4  
 LC79=1.2D+WL60+1.5LLa4  
 LC80=1.2D+WL90+1.5LLa4  
 LC81=1.2D+WL120+1.5LLa4  
 LC82=1.2D+WL150+1.5LLa4  
 LC83=1.2D-WL0+1.5LLa4  
 LC84=1.2D-WL30+1.5LLa4  
 LC85=1.2D-WL60+1.5LLa4  
 LC86=1.2D-WL90+1.5LLa4  
 LC87=1.2D-WL120+1.5LLa4  
 LC88=1.2D-WL150+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	<b><i>L 3X3X1_4</i></b>	<b>1</b>	LC6 at 46.88%	0.49	OK	
		<b>2</b>	LC7 at 53.13%	<b>0.76</b>	<b>OK</b>	
		<b>3</b>	LC7 at 46.88%	0.35	OK	
		<b>4</b>	LC1 at 53.13%	0.76	OK	
		<b>5</b>	LC11 at 100.00%	0.45	OK	
		<b>6</b>	LC5 at 0.00%	0.64	OK	
		<b>7</b>	LC1 at 0.00%	0.46	OK	
		<b>8</b>	LC11 at 0.00%	0.61	OK	
	<b><i>PIPE 1-1_2x0.145</i></b>	<b>9</b>	LC25 at 0.00%	0.05	OK	
		<b>10</b>	LC25 at 100.00%	0.22	OK	
		<b>11</b>	LC30 at 100.00%	0.20	OK	
		<b>12</b>	LC40 at 0.00%	<b>0.52</b>	<b>OK</b>	
	<b><i>PIPE 2-1_2x0.203</i></b>	<b>15</b>	LC1 at 31.25%	<b>0.27</b>	<b>OK</b>	
	<b><i>PIPE 2x0.154</i></b>	<b>16</b>	LC38 at 70.83%	0.09	OK	
		<b>17</b>	LC7 at 27.08%	<b>0.40</b>	<b>OK</b>	
		<b>18</b>	LC40 at 70.31%	0.30	OK	
		<b>27</b>	LC5 at 43.75%	0.14	OK	
	<b><i>RndBar 3_4</i></b>	<b>13</b>	LC3 at 100.00%	0.06	With warnings	
		<b>14</b>	LC32 at 0.00%	<b>0.14</b>	<b>OK</b>	



## Geometry data

### GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member    0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

### Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.25	0.00	0
2	0.00	0.25	2.24	0
3	6.25	0.25	2.24	0
4	-6.25	0.25	2.24	0
5	0.00	3.75	0.00	0
6	0.00	3.75	2.24	0
7	6.25	3.75	2.24	0
8	-6.25	3.75	2.24	0
9	-3.32	0.25	2.24	0
10	-3.32	3.75	2.24	0
11	3.32	0.25	2.24	0
12	3.32	3.75	2.24	0
19	0.4743	3.75	0.32	0
54	2.8457	3.75	1.92	0
61	-0.4743	3.75	0.32	0
96	-2.8457	3.75	1.92	0
97	2.8457	0.25	1.92	0
98	0.4743	0.25	0.32	0
99	-0.4743	0.25	0.32	0
100	-2.8457	0.25	1.92	0
118	6.00	-3.00	2.44	0

119	2.00	6.00	2.44	0
120	-2.00	6.00	2.44	0
121	-6.00	6.00	2.44	0
122	2.00	-2.00	2.44	0
123	-2.00	-2.00	2.44	0
124	-6.00	-2.00	2.44	0
125	-6.00	-0.25	2.44	0
126	-1.50	-0.25	-5.96	0

### Restraints

Node	TX	TY	TZ	RX	RY	RZ
1	1	1	1	1	1	1
5	1	1	1	1	1	1
126	1	1	1	0	0	0

### Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
1	4	2		L 3X3X1_4	A36	0.00	0.00	0.00
2	2	3		L 3X3X1_4	A36	0.00	0.00	0.00
3	8	6		L 3X3X1_4	A36	0.00	0.00	0.00
4	6	7		L 3X3X1_4	A36	0.00	0.00	0.00
5	12	5		L 3X3X1_4	A36	0.00	0.00	0.00
6	5	10		L 3X3X1_4	A36	0.00	0.00	0.00
7	11	1		L 3X3X1_4	A36	0.00	0.00	0.00
8	1	9		L 3X3X1_4	A36	0.00	0.00	0.00
9	19	98		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
10	54	97		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
11	61	99		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
12	96	100		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
13	99	96		RndBar 3_4	A36	0.00	0.00	0.00
14	19	97		RndBar 3_4	A36	0.00	0.00	0.00
15	117	118		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
16	119	122		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
17	120	123		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
18	121	124		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
27	125	126		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

### Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
1	180.00	0	0.00	0.00	0.00
2	180.00	0	0.00	0.00	0.00
3	270.00	0	0.00	0.00	0.00
4	270.00	0	0.00	0.00	0.00
5	180.00	0	0.00	0.00	0.00
6	180.00	0	0.00	0.00	0.00
7	270.00	0	0.00	0.00	0.00
8	270.00	0	0.00	0.00	0.00
15	315.00	0	0.00	0.00	0.00
17	315.00	0	0.00	0.00	0.00
18	315.00	0	0.00	0.00	0.00

### Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
1	0.00	-1.50	0.00	0.00	-1.50	0.00
2	0.00	-1.50	0.00	0.00	-1.50	0.00
3	0.00	1.50	0.00	0.00	1.50	0.00
4	0.00	1.50	0.00	0.00	1.50	0.00
27	-2.00	0.00	0.00	-2.00	0.00	0.00

### Hinges

Member	Node-J				Node-K				TOR	AXL	Axial rigidity
	M33	M22	V3	V2	M33	M22	V3	V2			
13	0	0	0	0	0	0	0	0	0	0	Tension only
14	0	0	0	0	0	0	0	0	0	0	Tension only



**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
1320 Greenway Drive, Suite 600, Irving, Texas 75038

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## Structural Analysis Report

**Existing 193 ft PIROD Self Supporting Tower**

**Customer Name: SBA Communications Corp**

**Customer Site Number: CT01105-S**

**Customer Site Name: Bozrah**

**Carrier Name: AT&T (App#: 122884, V2)**

**Carrier Site ID / Name: CT2223 / BOZRAH EAST**

**Site Location: 131 Gifford Lane**

**Bozrah, Connecticut**

**New London County**

**Latitude: 41.552517**

**Longitude: -72.150708**

**Analysis Result:**

**Max Structural Usage: 83.2% [Pass]**

**Max Foundation Usage: 67.0% [Pass]**

**Additional Usage Caused by New Mount/Mount Modification: N/A**

**Report Prepared By: Sital Shrestha**





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**Additional Usage Caused by New Mount/Mount Modification: N/A**

**Report Prepared By: Sital Shrestha**

## Introduction

The purpose of this report is to summarize the analysis results on the 193 ft PIROD Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

## Sources of Information

<b>Tower Drawings</b>	PIROD Inc, dwg# 105243-b, date: 04/07/1999
<b>Foundation Drawing</b>	PIROD Inc, dwg# 204669-B, date: 04/07/1999
<b>Geotechnical Report</b>	JGI, Project# C98492G, Date: 12/4/1998
<b>Modification Drawings</b>	N/A

## Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G. In accordance with this standard, the structure was analyzed using **TESTowers**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

<b>Wind Speed Used in the Analysis:</b>	Ultimate Design Wind Speed $V_{ult} = 136.0$ mph (3-Sec. Gust)/ Nominal Design Wind Speed $V_{asd} = 105.0$ mph (3-Sec. Gust)
<b>Wind Speed with Ice:</b>	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
<b>Operational Wind Speed:</b>	60 mph + 0" Radial ice
<b>Standard/Codes:</b>	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	B
<b>Structure Class:</b>	II
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Seismic Parameters:</b>	$S_S = 0.17$ , $S_1 = 0.061$

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

## Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	195.0	9	EMS RR90-17-02DP panels	Low profile Platform	(12) 1 5/8"	T-Mobile
-	182.0	6	CCI HPA-65R-BUU-H8 Antennas - Panel	(3) Sector Frame w/ Handrails (Commscope MTC 3615)	(12) 1 5/8" (4) 3/4" DC (2) 5/8" Fiber	AT&T
-		3	Powerwave 7770 Antennas - Panel			
-		6	Powerwave LGP21401 TMAs			
-		6	Ericsson RRUS 11 - RRU			
-		3	Ericsson RRUS 12 – RRU			
-		3	Ericsson RRUS A2 – RRU			
-		3	Ericsson RRUS 32 - RRU			
-		3	Polyphases 1000860 - Panel			
-		6	Powerwave LGP21903 - TMA/TTA			
-		2	Raycap DC6-48-60-18-8F - SP			
14		175.0	3			
15	3		Commscope NNVV-65B-R4 Antenna			
16	3		ALU 1900 MHz RRH			
17	6		ALU 800 MHz RRH			
18	3		ALU TD-RRH 8X20-25			
19	162.0	6	Commscope HBXX-6517DS-A2M - Panel	(3) Sector Frame w/ Handrails	(12) 1 5/8" (2) 1 5/8" Hybrid	Verizon
20		3	Commscope LNX-6514DS-A1M - Panel			
21		3	Amphenol QUAD656C0000x - Panel			
22		3	Alcatel Lucent RRH2x60-AWS – RRU			
23		3	Alcatel Lucent RRH2x60-1900 – RRU			
24		3	Alcatel Lucent RRH2x60-700 – RRU			
25		6	RFS FD9R6004/2CL-3CL - TMA/TTA			
26	2	RFS DB-T1-6Z-8AB-OZ – SP				
27	100.0	1	Lucent KS24019-L112A GPS	Direct Mount	(1) GPS Line	
28	30.0	2	Andrew PC1NOF-0190B-002ME911 Omnis	Direct mount	(2) 1/2"	T-Mobile

**Proposed Carrier’s Final Configuration of Antennas, Mounts and Transmission Lines**

Information pertaining to the proposed carrier’s final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
2	182.0	3	Powerwave 7770	(3) Sector Frame (Commscope MTC3615)	(12) 1 5/8" Coax (4) 3/4" DC (3) 3/8" RET (2) 5/8" Fiber	AT&T
3		3	Cci HPA-65R-BUU-H8			
4		3	Cci DMP65R-BU8DA			
5		6	Powerwave LGP21401 TMA			
6		6	Powerwave LGP21902 Diplexer			
7		3	Ericsson 4449 B5/B12			
8		3	Ericsson RRUS 12			
9		3	Ericsson RRUS 11			
10		3	Ericsson RRUS 32			
11		3	Ericsson RRUS A2			
12		1	Raycap DC6-48-60-18-8F			
13		1	Raycap DC6-48-60-0-8C-EV			

See the attached coax layout for the line placement considered in the analysis.



## **Analysis Results**

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	<b>68.8%</b>	<b>83.2%</b>	<b>3.6%</b>
Pass/Fail	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>

## **Foundations**

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	397.0	344.5	42.4

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

## **Operational Condition (Rigidity):**

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.2197 degrees under the operational wind speed as specified in the Analysis Criteria.

## **Conclusions**

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

## Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

## Structure: CT01105-S-SBA

**Site Name:** Bozrah  
**Type:** Self Support  
**Height:** 193.00 (ft)  
**Base Elev:** 0.00 (ft)

**Base Shape:** Triangle  
**Base Width:** 22.00  
**Top Width:** 5.00

**Code:** EIA/TIA-222-G  
**Basic WS:** 105.00  
**Basic Ice WS:** 50.00  
**Operational WS:** 60.00

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### Section Properties

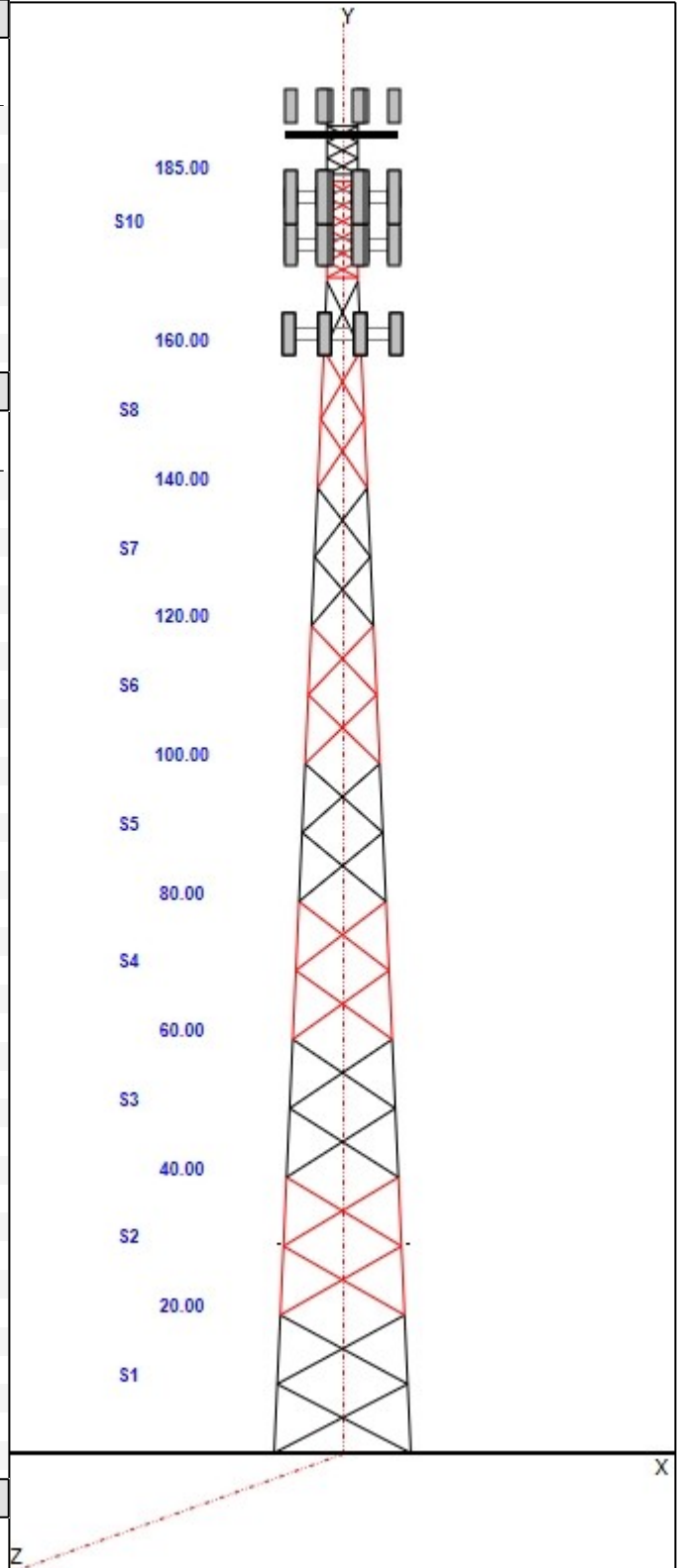
Sect	Leg Members	Diagonal Members	Horizontal Members
1	18B 18"BD 2.5"	DAE 3.5X3.5X0.3125	
2-3	12B 12"BD 2.25"	SAE 3.5X3.5X0.3125	
4	12B 12"BD 2"	SAE 3.5X3.5X0.3125	
5	12B 12"BD 2"	SAE 3X3X0.3125	SAE
6	12B 12"BD 1.75"	SAE 3X3X0.3125	
7	12B 12"BD 1.5"	SAE 3X3X0.1875	SAE
8	12B 12"BD 1.5"	SAE 3X3X0.1875	
9	12B 12"BD 1.25"	SAE 2.5X2.5X0.1875	SAE
10-11	SOL 2" SOLID	SOL 1" SOLID	SOL 1 1/4" SOLID

### Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
191.00	191.00	1	Low Profile Platform
191.00	195.00	9	RR90-17-02DP
182.00	182.00	3	Sector Frame w/ Handrails
182.00	182.00	3	DMP65R-BU8DA
182.00	182.00	3	4449 B5/B12
182.00	182.00	1	DC6-48-60-0-8C-EV
182.00	182.00	3	CCI HPA-65R-BUU-H8 Antennas
182.00	182.00	3	Powerwave 7770 Antennas
182.00	182.00	6	Powerwave LGP21401 TMAs
182.00	182.00	3	Ericsson RRUS 11
182.00	182.00	3	Ericsson RRUS 12
182.00	182.00	3	Ericsson RRUS A2
182.00	182.00	3	Ericsson RRUS 32
182.00	182.00	6	Powerwave LGP21903
182.00	182.00	1	Raycap DC6-48-60-18-8F
175.00	175.00	1	(3) SFS-H-L (V-Braces)
175.00	175.00	3	RFS APXVTM14-C-I20 Antennas
175.00	175.00	3	Commscope NNVV-65B-R4 Antenna
175.00	175.00	3	ALU 1900 MHz RRH
175.00	175.00	6	ALU 800 MHz RRH
175.00	175.00	3	ALU TD-RRH 8X20-25
175.00	175.00	3	Sector Frame w/ Handrails
162.00	162.00	6	RFS FD9R6004/2CL-3CL
162.00	162.00	2	RFS DB-T1-6Z-8AB-0Z
162.00	162.00	3	Sector Frame w/ Handrails
162.00	162.00	6	Commscope HBXX-6517DS-A2M
162.00	162.00	3	Commscope LNX-6514DS-A1M
162.00	162.00	3	Amphenol QUAD656C0000x
162.00	162.00	3	Alcatel Lucent RRH2x60-AWS
162.00	162.00	3	Alcatel Lucent RRH2x60-1900
162.00	162.00	3	Alcatel Lucent RRH2x60-700
100.00	100.00	1	Direct Mount
100.00	100.00	1	Lucent KS24019-L112A GPS
30.00	30.00	2	Andrew PC1N0F-0190B-002M
30.00	30.00	1	Direct Mount

### Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	191.00	12	1 5/8" Coax
0.00	191.00	1	W/G Ladder



**Structure: CT01105-S-SBA**

<b>Site Name:</b> Bozrah	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Type:</b> Self Support	<b>Base Shape:</b> Triangle	<b>Basic WS:</b> 105.00
<b>Height:</b> 193.00 (ft)	<b>Base Width:</b> 22.00	<b>Basic Ice WS:</b> 50.00
<b>Base Elev:</b> 0.00 (ft)	<b>Top Width:</b> 5.00	<b>Operational WS:</b> 60.00



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0.00	182.00	12	1 5/8" Coax
0.00	182.00	4	3/4" DC
0.00	182.00	3	3/8" RET
0.00	182.00	2	5/8" Fiber
0.00	182.00	1	W/G Ladder
0.00	175.00	4	1 1/4" Coax
0.00	162.00	12	1 5/8" Coax
0.00	162.00	2	1 5/8" Hybrid
0.00	100.00	1	GPS Line
0.00	100.00	1	W/G Ladder
0.00	30.00	2	1/2" Coax

**Base Reactions**

Leg		Overturning	
Max Uplift:	-344.52 (kips)	Moment:	7113.48 (ft-kips)
Max Down:	396.98 (kips)	Total Down:	70.86 (kips)
Max Shear:	42.38 (kips)	Total Shear:	62.86 (kips)

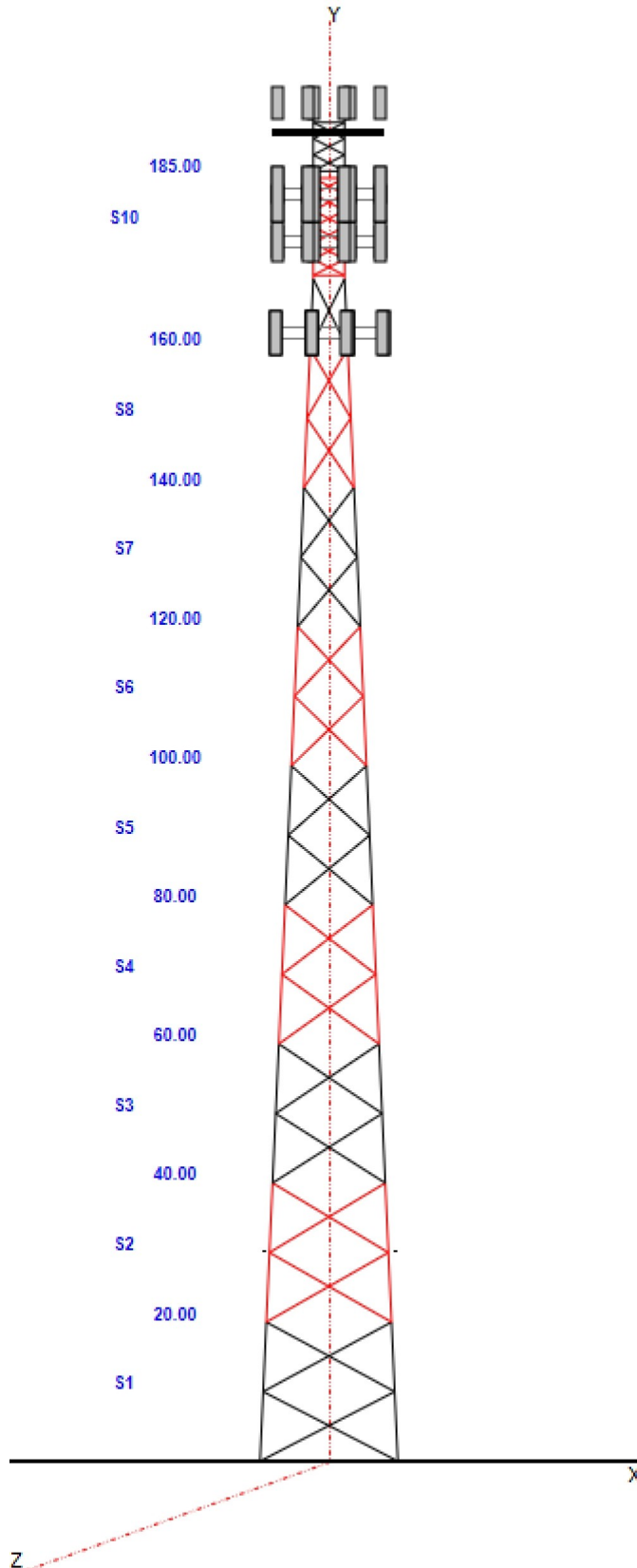
Structure: CT01105-S-SBA

Site Name: Bozrah  
Type: Self Support  
Height: 193.00 (ft)  
Base Elev: 0.00 (ft)

Base Shape: Triangle  
Base Width: 22.00  
Top Width: 5.00

Code: EIA/TIA-222-G  
Basic WS: 105.00  
Basic Ice WS: 50.00  
Operational WS: 60.00

12/12/2019  
Page: 3



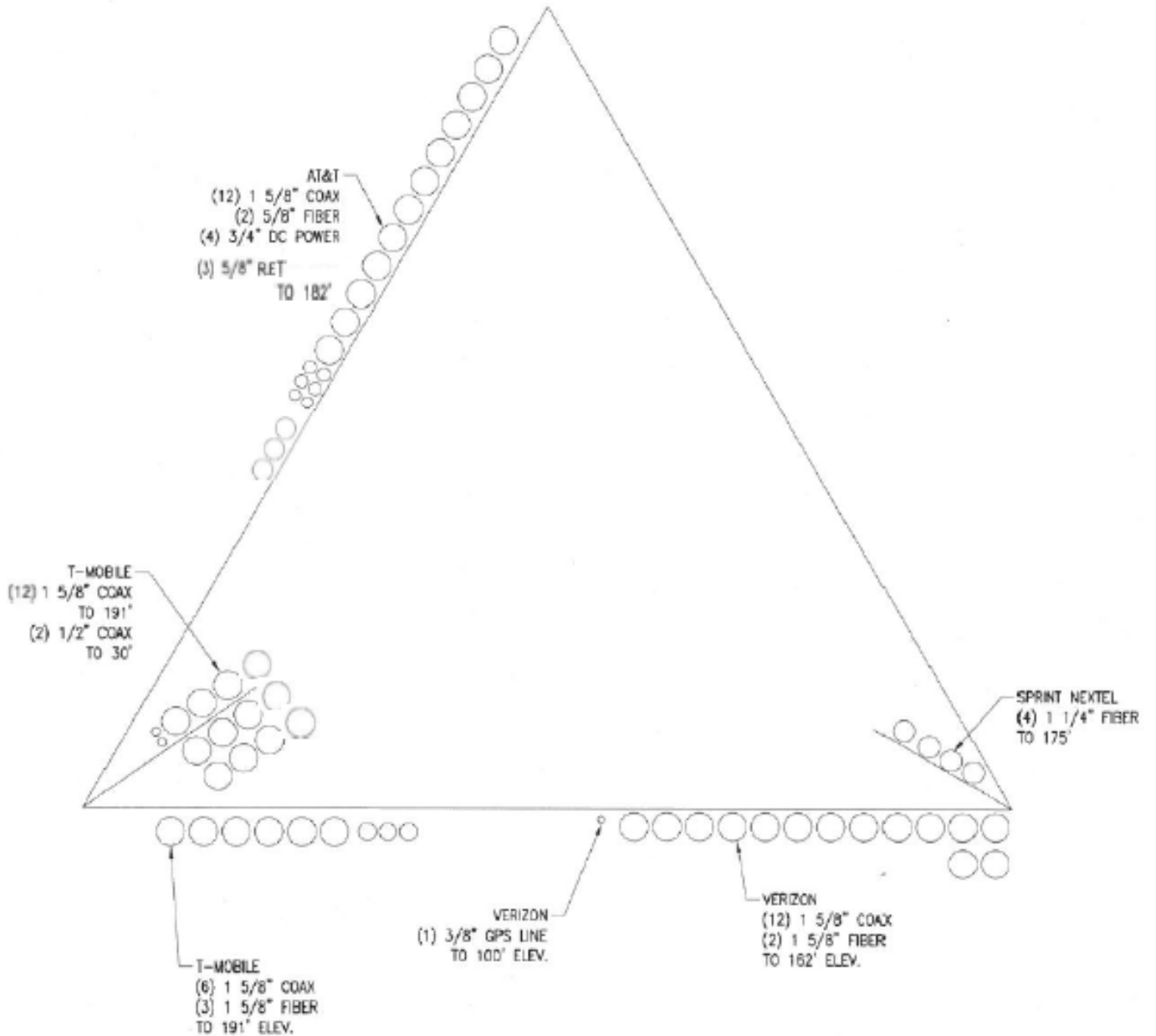
Structure: CT01105-S-SBA - Coax Line Placement

Type: Self Support  
Site Name: Bozrah  
Height: 193.00 (ft)

12/12/2019



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## Loading Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice		Ice		Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
			Weight (lb)	CaAa (sf)	Weight (lb)	CaAa (sf)						
191.00	Low Profile Platform	1	1500.0	22.000	2839.51	40.075	0.000	0.000	0.000	1.00	1.00	0.000
191.00	RR90-17-02DP	9	13.50	4.360	115.20	5.371	56.000	8.000	2.800	0.75	0.68	4.000
182.00	Sector Frame w/ Handrails	3	550.00	21.500	1252.84	41.343	0.000	0.000	0.000	0.75	0.75	0.000
182.00	DMP65R-BU8DA	3	39.00	12.850	393.79	38.448	96.000	20.500	8.500	0.80	0.50	0.000
182.00	4449 B5/B12	3	71.00	1.970	125.29	2.527	17.900	13.200	9.400	0.80	0.67	0.000
182.00	DC6-48-60-0-8C-EV	1	16.00	4.780	141.83	5.679	31.400	18.300	10.200	0.80	0.50	0.000
182.00	CCI HPA-65R-BUU-H8 Antennas	3	68.00	12.980	364.82	14.624	92.400	14.800	7.400	0.80	0.79	0.000
182.00	Powerwave 7770 Antennas	3	16.00	1.730	72.03	2.339	28.000	7.000	4.000	0.80	0.79	0.000
182.00	Powerwave LGP21401 TMAs	6	14.10	1.290	39.53	2.140	14.400	9.200	2.600	0.80	1.00	0.000
182.00	Ericsson RRUS 11	3	51.00	2.520	124.50	3.164	17.000	17.800	7.200	0.80	0.67	0.000
182.00	Ericsson RRUS 12	3	60.00	2.700	135.57	3.795	18.200	17.800	8.000	0.80	0.67	0.000
182.00	Ericsson RRUS A2	3	21.20	1.860	57.92	2.850	12.800	15.000	3.400	0.80	0.67	0.000
182.00	Ericsson RRUS 32	3	77.00	1.650	126.59	2.240	20.900	9.500	3.300	0.80	0.67	0.000
182.00	Powerwave LGP21903	6	5.50	0.270	14.07	0.674	4.400	6.300	3.000	0.80	0.84	0.000
182.00	Raycap DC6-48-60-18-8F	1	31.80	0.920	94.67	1.365	24.000	11.000	11.000	0.80	1.00	0.000
175.00	(3) SFS-H-L (V-Braces)	1	230.00	6.700	556.57	13.835	0.000	0.000	0.000	0.75	0.75	0.000
175.00	RFS APXVTM14-C-120 Antennas	3	56.00	6.340	219.69	7.473	56.300	12.600	6.300	0.80	0.79	0.000
175.00	Commscope NNVV-65B-R4 Antenna	3	77.40	12.270	367.81	13.751	72.000	19.600	7.800	0.80	0.74	0.000
175.00	ALU 1900 MHz RRH	3	44.00	3.800	155.02	5.214	23.000	13.000	17.000	0.80	0.67	0.000
175.00	ALU 800 MHz RRH	6	53.00	2.490	128.22	3.653	19.700	13.000	10.800	0.80	0.67	0.000
175.00	ALU TD-RRH 8X20-25	3	70.00	4.050	182.74	4.878	26.100	18.600	6.700	0.80	0.67	0.000
175.00	Sector Frame w/ Handrails	3	550.00	21.500	1252.84	41.343	0.000	0.000	0.000	0.75	0.75	0.000
162.00	RFS FD9R6004/2CL-3CL	6	3.10	0.370	11.13	0.826	5.800	6.500	1.500	0.80	0.62	0.000
162.00	RFS DB-T1-6Z-8AB-0Z	2	18.90	4.800	162.63	5.674	24.000	24.000	10.000	0.80	0.71	0.000
162.00	Sector Frame w/ Handrails	3	550.00	21.500	1241.11	41.011	0.000	0.000	0.000	0.75	0.75	0.000
162.00	Commscope HBXX-6517DS-A2M	6	40.80	8.550	217.05	11.469	74.900	12.000	6.500	0.80	0.77	0.000
162.00	Commscope LNX-6514DS-A1M	3	38.40	8.170	214.68	10.993	72.700	11.900	7.100	0.80	0.83	0.000
162.00	Amphenol QUAD656C0000x	3	54.00	13.240	345.50	14.771	74.400	20.500	7.200	0.80	0.71	0.000
162.00	Alcatel Lucent RRH2x60-AWS	3	55.00	3.500	135.01	4.289	37.000	11.000	6.000	0.80	0.67	0.000
162.00	Alcatel Lucent RRH2x60-1900	3	19.50	1.510	79.37	2.061	20.100	9.000	7.200	0.80	0.67	0.000
162.00	Alcatel Lucent RRH2x60-700	3	19.50	1.510	79.37	2.061	20.100	9.000	7.200	0.80	0.67	0.000
100.00	Direct Mount	1	87.00	4.310	213.96	9.428	0.000	0.000	0.000	1.00	1.00	0.000
100.00	Lucent KS24019-L112A GPS	1	0.50	0.120	6.82	0.315	6.000	3.600	3.600	1.00	1.00	0.000
30.00	Andrew PC1N0F-0190B-002M	2	0.40	0.030	2.15	0.123	3.900	1.600	1.600	1.00	1.00	0.000
30.00	Direct Mount	1	87.00	4.310	200.75	8.895	0.000	0.000	0.000	1.00	1.00	0.000
<b>Totals:</b>		<b>110</b>	<b>10,272.40</b>		<b>28,659.85</b>						<b>Number of Appurtenances :</b>	<b>35</b>

## Loading Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	191.00	1 5/8" Coax	12	1.98	1.04	33.30	1,3	Block		N	1.00	1.00	
0.00	191.00	W/G Ladder	1	3.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	182.00	1 5/8" Coax	12	1.98	1.04	100.00	3	Individual NR		N	1.00	1.00	
0.00	182.00	3/4" DC	4	0.75	0.40	50.00	3	Block		N	1.00	1.00	
0.00	182.00	3/8" RET	3	0.38	0.06	100.00	1	Individual NR		N	1.00	1.00	
0.00	182.00	5/8" Fiber	2	1.11	0.52	50.00	3	Block		N	1.00	1.00	
0.00	182.00	W/G Ladder	1	3.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	175.00	1 1/4" Coax	4	1.55	0.66	100.00	2	Individual NR		N	1.00	1.00	
0.00	162.00	1 5/8" Coax	12	1.98	1.04	100.00	1	Individual NR		N	1.00	1.00	
0.00	162.00	1 5/8" Hybrid	2	2.00	1.10	50.00	1	Block		N	1.00	1.00	
0.00	100.00	GPS Line	1	0.96	0.40	100.00	1	Individual NR		N	1.00	1.00	
0.00	100.00	W/G Ladder	1	3.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	30.00	1/2" Coax	2	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	



## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

12/12/2019



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**Load Case:** 1.2D + 1.6W Normal Wind

1.2D + 1.6W 105 mph Wind at Normal To Face

<b>Wind Load Factor:</b> 1.60	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	<b>Ice Importance Factor:</b> 1.00
<b>Ice Dead Load Factor:</b> 0.00	

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	1.00	1.00	0.00	37.84	138.56	0.00	12,211.	0.0	2488.69	2539.02	5,027.70	
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	1.00	1.00	0.00	35.36	137.47	0.00	7,720.9	0.0	2324.19	2523.33	4,847.52	
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	32.95	136.39	0.00	7,535.9	0.0	2478.56	2899.22	5,377.77	
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	1.00	1.00	0.00	30.47	136.39	0.00	6,711.1	0.0	2503.61	3191.77	5,695.38	
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	25.76	136.39	0.00	6,282.7	0.0	2263.75	3429.38	5,693.13	
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	23.49	129.79	0.00	5,222.6	0.0	2171.62	3394.78	5,566.40	
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	1.00	1.00	0.00	21.68	129.79	0.00	4,181.1	0.0	2059.88	3560.74	5,620.62	
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	1.00	1.00	0.00	20.58	129.79	0.00	4,114.5	0.0	1945.67	3709.34	5,655.01	
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	8.73	47.72	0.00	1,626.0	0.0	832.11	1436.94	2,269.05	
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	1.00	1.00	0.00	6.56	51.98	0.00	2,019.9	0.0	693.43	1645.64	2,339.07	
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	1.00	1.00	0.00	3.67	6.96	0.00	909.8	0.0	391.80	259.66	651.46	
														<b>58,536.0</b>	<b>0.0</b>				<b>48,743.13</b>

**Load Case:** 1.2D + 1.6W 60° Wind

1.2D + 1.6W 105 mph Wind at 60° From Face

<b>Wind Load Factor:</b> 1.60	<b>Wind Importance Factor:</b> 1.00
<b>Dead Load Factor:</b> 1.20	<b>Ice Importance Factor:</b> 1.00
<b>Ice Dead Load Factor:</b> 0.00	

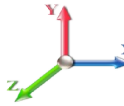
Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	0.80	1.00	0.00	32.57	138.56	0.00	12,211.	0.0	2141.77	2539.02	4,680.79	
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	0.80	1.00	0.00	30.49	137.47	0.00	7,720.9	0.0	2004.16	2523.33	4,527.49	
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	28.48	136.39	0.00	7,535.9	0.0	2142.67	2899.22	5,041.88	
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	0.80	1.00	0.00	26.39	136.39	0.00	6,711.1	0.0	2168.58	3191.77	5,360.35	
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	22.58	136.39	0.00	6,282.7	0.0	1985.02	3429.38	5,414.40	
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	20.61	129.79	0.00	5,222.6	0.0	1905.64	3394.78	5,300.42	
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	0.80	1.00	0.00	19.08	129.79	0.00	4,181.1	0.0	1812.47	3560.74	5,373.21	
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	0.80	1.00	0.00	18.22	129.79	0.00	4,114.5	0.0	1722.76	3709.34	5,432.10	
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	7.82	47.72	0.00	1,626.0	0.0	744.71	1436.94	2,181.65	
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	0.80	1.00	0.00	6.56	51.98	0.00	2,019.9	0.0	693.43	1645.64	2,339.07	
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	0.80	1.00	0.00	3.67	6.96	0.00	909.8	0.0	391.80	259.66	651.46	
														<b>58,536.0</b>	<b>0.0</b>				<b>46,302.81</b>

## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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 Page: 8



**Load Case:** 1.2D + 1.6W 90° Wind

1.2D + 1.6W 105 mph Wind at 90° From Face

**Wind Load Factor:** 1.60  
**Dead Load Factor:** 1.20  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	0.85	1.00	0.00	33.89	138.56	0.00	12,211.1	0.0	2228.50	2539.02	4,767.52
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	0.85	1.00	0.00	31.71	137.47	0.00	7,720.9	0.0	2084.17	2523.33	4,607.50
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	29.60	136.39	0.00	7,535.9	0.0	2226.64	2899.22	5,125.86
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	0.85	1.00	0.00	27.41	136.39	0.00	6,711.1	0.0	2252.33	3191.77	5,444.10
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	23.38	136.39	0.00	6,282.7	0.0	2054.70	3429.38	5,484.08
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	21.33	129.79	0.00	5,222.6	0.0	1972.13	3394.78	5,366.91
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	0.85	1.00	0.00	19.73	129.79	0.00	4,181.1	0.0	1874.32	3560.74	5,435.06
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	0.85	1.00	0.00	18.81	129.79	0.00	4,114.5	0.0	1778.49	3709.34	5,487.83
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.04	47.72	0.00	1,626.0	0.0	766.56	1436.94	2,203.50
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	0.85	1.00	0.00	6.56	51.98	0.00	2,019.9	0.0	693.43	1645.64	2,339.07
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	0.85	1.00	0.00	3.67	6.96	0.00	909.8	0.0	391.80	259.66	651.46
														<b>58,536.0</b>	<b>0.0</b>			

**Load Case:** 0.9D + 1.6W Normal Wind

0.9D + 1.6W 105 mph Wind at Normal To Face

**Wind Load Factor:** 1.60  
**Dead Load Factor:** 0.90  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

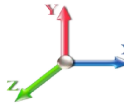
Sect Seq	Wind Height (ft)	qz (psf)	Total	Total	Ice	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear	Linear	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
			Flat Area (sqft)	Round Area (sqft)	Round Area (sqft)							Area (sqft)	Area (sqft)					
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	1.00	1.00	0.00	37.84	138.56	0.00	9,158.6	0.0	2488.69	2539.02	5,027.70
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	1.00	1.00	0.00	35.36	137.47	0.00	5,790.7	0.0	2324.19	2523.33	4,847.52
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	32.95	136.39	0.00	5,651.9	0.0	2478.56	2899.22	5,377.77
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	1.00	1.00	0.00	30.47	136.39	0.00	5,033.3	0.0	2503.61	3191.77	5,695.38
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	25.76	136.39	0.00	4,712.0	0.0	2263.75	3429.38	5,693.13
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	23.49	129.79	0.00	3,917.0	0.0	2171.62	3394.78	5,566.40
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	1.00	1.00	0.00	21.68	129.79	0.00	3,135.8	0.0	2059.88	3560.74	5,620.62
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	1.00	1.00	0.00	20.58	129.79	0.00	3,085.9	0.0	1945.67	3709.34	5,655.01
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	8.73	47.72	0.00	1,219.5	0.0	832.11	1436.94	2,269.05
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	1.00	1.00	0.00	6.56	51.98	0.00	1,515.0	0.0	693.43	1645.64	2,339.07
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	1.00	1.00	0.00	3.67	6.96	0.00	682.4	0.0	391.80	259.66	651.46
														<b>43,902.0</b>	<b>0.0</b>			

## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 0.9D + 1.6W 60° Wind

0.9D + 1.6W 105 mph Wind at 60° From Face

**Wind Load Factor:** 1.60  
**Dead Load Factor:** 0.90  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	Total		Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
		Flat Area (sqft)	Round Area (sqft)								Linear Area (sqft)	Linear Area (sqft)						
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	0.80	1.00	0.00	32.57	138.56	0.00	9,158.6	0.0	2141.77	2539.02	4,680.79
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	0.80	1.00	0.00	30.49	137.47	0.00	5,790.7	0.0	2004.16	2523.33	4,527.49
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	28.48	136.39	0.00	5,651.9	0.0	2142.67	2899.22	5,041.88
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	0.80	1.00	0.00	26.39	136.39	0.00	5,033.3	0.0	2168.58	3191.77	5,360.35
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	22.58	136.39	0.00	4,712.0	0.0	1985.02	3429.38	5,414.40
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	20.61	129.79	0.00	3,917.0	0.0	1905.64	3394.78	5,300.42
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	0.80	1.00	0.00	19.08	129.79	0.00	3,135.8	0.0	1812.47	3560.74	5,373.21
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	0.80	1.00	0.00	18.22	129.79	0.00	3,085.9	0.0	1722.76	3709.34	5,432.10
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	7.82	47.72	0.00	1,219.5	0.0	744.71	1436.94	2,181.65
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	0.80	1.00	0.00	6.56	51.98	0.00	1,515.0	0.0	693.43	1645.64	2,339.07
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	0.80	1.00	0.00	3.67	6.96	0.00	682.4	0.0	391.80	259.66	651.46
													<b>43,902.0</b>	<b>0.0</b>			<b>46,302.81</b>	

**Load Case:** 0.9D + 1.6W 90° Wind

0.9D + 1.6W 105 mph Wind at 90° From Face

**Wind Load Factor:** 1.60  
**Dead Load Factor:** 0.90  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

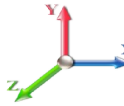
Sect Seq	Wind Height (ft)	Total		Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
		Flat Area (sqft)	Round Area (sqft)								Linear Area (sqft)	Linear Area (sqft)						
1	10.0	16.79	26.376	26.21	0.00	0.12	2.88	0.85	1.00	0.00	33.89	138.56	0.00	9,158.6	0.0	2228.50	2539.02	4,767.52
2	30.0	16.81	24.346	23.64	0.00	0.12	2.88	0.85	1.00	0.00	31.71	137.47	0.00	5,790.7	0.0	2084.17	2523.33	4,607.50
3	50.0	19.45	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	29.60	136.39	0.00	5,651.9	0.0	2226.64	2899.22	5,125.86
4	70.0	21.41	20.384	22.04	0.00	0.14	2.82	0.85	1.00	0.00	27.41	136.39	0.00	5,033.3	0.0	2252.33	3191.77	5,444.10
5	90.0	23.01	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	23.38	136.39	0.00	4,712.0	0.0	2054.70	3429.38	5,484.08
6	110.0	24.36	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	21.33	129.79	0.00	3,917.0	0.0	1972.13	3394.78	5,366.91
7	130.0	25.55	13.022	17.23	0.00	0.16	2.73	0.85	1.00	0.00	19.73	129.79	0.00	3,135.8	0.0	1874.32	3560.74	5,435.06
8	150.0	26.62	11.787	17.23	0.00	0.20	2.61	0.85	1.00	0.00	18.81	129.79	0.00	3,085.9	0.0	1778.49	3709.34	5,487.83
9	165.0	27.35	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.04	47.72	0.00	1,219.5	0.0	766.56	1436.94	2,203.50
10	177.5	27.93	0.000	11.36	0.00	0.15	2.78	0.85	1.00	0.00	6.56	51.98	0.00	1,515.0	0.0	693.43	1645.64	2,339.07
11	189.0	28.44	0.000	6.35	0.00	0.15	2.76	0.85	1.00	0.00	3.67	6.96	0.00	682.4	0.0	391.80	259.66	651.46
													<b>43,902.0</b>	<b>0.0</b>			<b>46,912.89</b>	

## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

12/12/2019  
  
 Page: 10



**Load Case:** 1.2D + 1.0Di + 1.0Wi Normal Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.20  
**Ice Dead Load Factor:** 1.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.81	26.376	55.74	29.53	0.19	2.64	1.00	1.00	1.33	58.29	168.79	150.8	21,761.	9549.6	497.61	1018.23	1,515.84
2	30.0	3.81	24.346	54.83	31.19	0.20	2.60	1.00	1.00	1.49	55.84	171.31	163.4	16,722.	9002.0	469.88	1055.48	1,525.37
3	50.0	4.41	22.326	54.64	31.01	0.22	2.54	1.00	1.00	1.56	53.88	172.04	166.7	16,849.	9313.4	513.94	1217.78	1,731.73
4	70.0	4.86	20.384	52.28	30.24	0.23	2.50	1.00	1.00	1.62	50.72	173.29	172.5	16,164.	9453.2	523.27	1349.66	1,872.93
5	90.0	5.22	15.857	51.25	29.21	0.24	2.46	1.00	1.00	1.66	45.75	174.25	176.8	15,581.	9299.0	498.93	1453.81	1,952.74
6	110.0	5.52	14.383	46.91	28.07	0.26	2.41	1.00	1.00	1.69	41.95	162.80	174.8	14,164.	8941.8	473.87	1440.71	1,914.58
7	130.0	5.79	13.022	44.16	26.93	0.29	2.31	1.00	1.00	1.72	39.39	163.37	177.7	13,089.	8908.7	448.44	1473.56	1,922.00
8	150.0	6.04	11.787	43.10	25.87	0.36	2.16	1.00	1.00	1.75	38.43	163.86	180.3	13,039.	8925.4	425.66	1446.35	1,663.81
9	165.0	6.20	4.586	20.40	12.59	0.40	2.06	1.00	1.00	1.76	17.60	62.58	62.84	5,087.7	3461.7	190.81	520.79	711.60
10	177.5	6.33	0.000	42.78	31.42	0.52	1.87	1.00	1.00	1.77	29.96	71.00	59.16	6,380.4	4360.5	302.12	454.46	756.58
11	189.0	6.45	0.000	23.94	17.59	0.55	1.85	1.00	1.00	1.79	17.13	10.53	0.00	2,208.7	1298.9	173.28	43.24	216.52
														<b>141,050.0</b>	<b>82514.0</b>			<b>15,783.69</b>

**Load Case:** 1.2D + 1.0Di + 1.0Wi 60° Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.20  
**Ice Dead Load Factor:** 1.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

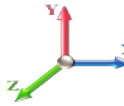
Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.81	26.376	55.74	29.53	0.19	2.64	0.80	1.00	1.33	53.01	168.79	150.8	21,761.	9549.6	452.57	1018.23	1,470.80
2	30.0	3.81	24.346	54.83	31.19	0.20	2.60	0.80	1.00	1.49	50.97	171.31	163.4	16,722.	9002.0	428.91	1055.48	1,484.39
3	50.0	4.41	22.326	54.64	31.01	0.22	2.54	0.80	1.00	1.56	49.41	172.04	166.7	16,849.	9313.4	471.35	1217.78	1,689.13
4	70.0	4.86	20.384	52.28	30.24	0.23	2.50	0.80	1.00	1.62	46.64	173.29	172.5	16,164.	9453.2	481.21	1349.66	1,830.87
5	90.0	5.22	15.857	51.25	29.21	0.24	2.46	0.80	1.00	1.66	42.58	174.25	176.8	15,581.	9299.0	464.34	1453.81	1,918.16
6	110.0	5.52	14.383	46.91	28.07	0.26	2.41	0.80	1.00	1.69	39.07	162.80	174.8	14,164.	8941.8	441.37	1440.71	1,882.08
7	130.0	5.79	13.022	44.16	26.93	0.29	2.31	0.80	1.00	1.72	36.79	163.37	177.7	13,089.	8908.7	418.79	1473.56	1,892.35
8	150.0	6.04	11.787	43.10	25.87	0.36	2.16	0.80	1.00	1.75	36.07	163.86	180.3	13,039.	8925.4	399.54	1446.35	1,845.89
9	165.0	6.20	4.586	20.40	12.59	0.40	2.06	0.80	1.00	1.76	16.68	62.58	62.84	5,087.7	3461.7	180.87	520.79	701.65
10	177.5	6.33	0.000	42.78	31.42	0.52	1.87	0.80	1.00	1.77	29.96	71.00	59.16	6,380.4	4360.5	302.12	454.46	756.58
11	189.0	6.45	0.000	23.94	17.59	0.55	1.85	0.80	1.00	1.79	17.13	10.53	0.00	2,208.7	1298.9	173.28	43.24	216.52
														<b>141,050.0</b>	<b>82514.0</b>			<b>15,688.43</b>

## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 1.2D + 1.0Di + 1.0Wi 90° Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.20  
**Ice Dead Load Factor:** 1.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.81	26.376	55.74	29.53	0.19	2.64	0.85	1.00	1.33	54.33	168.79	150.8	21,761.	9549.6	463.83	1018.23	1,482.06
2	30.0	3.81	24.346	54.83	31.19	0.20	2.60	0.85	1.00	1.49	52.19	171.31	163.4	16,722.	9002.0	439.15	1055.48	1,494.64
3	50.0	4.41	22.326	54.64	31.01	0.22	2.54	0.85	1.00	1.56	50.53	172.04	166.7	16,849.	9313.4	482.00	1217.78	1,699.78
4	70.0	4.86	20.384	52.28	30.24	0.23	2.50	0.85	1.00	1.62	47.66	173.29	172.5	16,164.	9453.2	491.73	1349.66	1,841.38
5	90.0	5.22	15.857	51.25	29.21	0.24	2.46	0.85	1.00	1.66	43.37	174.25	176.8	15,581.	9299.0	472.99	1453.81	1,926.80
6	110.0	5.52	14.383	46.91	28.07	0.26	2.41	0.85	1.00	1.69	39.79	162.80	174.8	14,164.	8941.8	449.50	1440.71	1,890.21
7	130.0	5.79	13.022	44.16	26.93	0.29	2.31	0.85	1.00	1.72	37.44	163.37	177.7	13,089.	8908.7	426.20	1473.56	1,899.77
8	150.0	6.04	11.787	43.10	25.87	0.36	2.16	0.85	1.00	1.75	36.66	163.86	180.3	13,039.	8925.4	406.07	1446.35	1,852.42
9	165.0	6.20	4.586	20.40	12.59	0.40	2.06	0.85	1.00	1.76	16.91	62.58	62.84	5,087.7	3461.7	183.35	520.79	704.14
10	177.5	6.33	0.000	42.78	31.42	0.52	1.87	0.85	1.00	1.77	29.96	71.00	59.16	6,380.4	4360.5	302.12	454.46	756.58
11	189.0	6.45	0.000	23.94	17.59	0.55	1.85	0.85	1.00	1.79	17.13	10.53	0.00	2,208.7	1298.9	173.28	43.24	216.52
														<b>141,050.0</b>	<b>82514.0</b>			<b>15,764.30</b>

**Load Case:** 1.0D + 1.0W Normal Wind

1.0D + 1.0W 60 mph Wind at Normal To Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.00  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.48	26.376	26.21	0.00	0.12	2.88	1.00	1.00	0.00	41.08	138.56	0.00	10,176.	0.0	551.35	518.17	1,069.52
2	30.0	5.49	24.346	23.64	0.00	0.12	2.88	1.00	1.00	0.00	37.71	137.47	0.00	6,434.1	0.0	505.82	514.97	1,020.78
3	50.0	6.35	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	35.70	136.39	0.00	6,279.9	0.0	548.09	591.68	1,139.77
4	70.0	6.99	20.384	22.04	0.00	0.14	2.82	1.00	1.00	0.00	32.86	136.39	0.00	5,592.6	0.0	551.16	651.38	1,202.54
5	90.0	7.51	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	28.31	136.39	0.00	5,235.6	0.0	507.79	699.87	1,207.66
6	110.0	7.96	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	25.06	129.79	0.00	4,352.2	0.0	472.91	692.81	1,165.73
7	130.0	8.34	13.022	17.23	0.00	0.16	2.73	1.00	1.00	0.00	22.82	129.79	0.00	3,484.2	0.0	442.42	726.68	1,169.10
8	150.0	8.69	11.787	17.23	0.00	0.20	2.61	1.00	1.00	0.00	21.67	129.79	0.00	3,428.8	0.0	418.19	757.01	1,175.20
9	165.0	8.93	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	9.09	47.72	0.00	1,355.0	0.0	176.75	293.25	470.01
10	177.5	9.12	0.000	11.36	0.00	0.15	2.78	1.00	1.00	0.00	6.56	51.98	0.00	1,683.3	0.0	141.52	335.84	477.36
11	189.0	9.29	0.000	6.35	0.00	0.15	2.76	1.00	1.00	0.00	3.67	6.96	0.00	758.2	0.0	79.96	52.99	132.95
														<b>48,780.0</b>	<b>0.0</b>			<b>10,230.62</b>

## Section Forces

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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**Load Case:** 1.0D + 1.0W 60° Wind

1.0D + 1.0W 60 mph Wind at 60° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.00  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
												Linear Area (sqft)	Linear Area (sqft)						
1	10.0	5.48	26.376	26.21	0.00	0.12	2.88	0.80	1.00	0.00	35.81	138.56	0.00	10,176.0	0.0	480.55	518.17	998.72	
2	30.0	5.49	24.346	23.64	0.00	0.12	2.88	0.80	1.00	0.00	32.84	137.47	0.00	6,434.1	0.0	440.50	514.97	955.47	
3	50.0	6.35	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	31.24	136.39	0.00	6,279.9	0.0	479.54	591.68	1,071.22	
4	70.0	6.99	20.384	22.04	0.00	0.14	2.82	0.80	1.00	0.00	28.79	136.39	0.00	5,592.6	0.0	482.79	651.38	1,134.17	
5	90.0	7.51	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	25.14	136.39	0.00	5,235.6	0.0	450.91	699.87	1,150.78	
6	110.0	7.96	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	22.18	129.79	0.00	4,352.2	0.0	418.63	692.81	1,111.44	
7	130.0	8.34	13.022	17.23	0.00	0.16	2.73	0.80	1.00	0.00	20.22	129.79	0.00	3,484.2	0.0	391.93	726.68	1,118.61	
8	150.0	8.69	11.787	17.23	0.00	0.20	2.61	0.80	1.00	0.00	19.31	129.79	0.00	3,428.8	0.0	372.70	757.01	1,129.71	
9	165.0	8.93	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	8.17	47.72	0.00	1,355.0	0.0	158.92	293.25	452.17	
10	177.5	9.12	0.000	11.36	0.00	0.15	2.78	0.80	1.00	0.00	6.56	51.98	0.00	1,683.3	0.0	141.52	335.84	477.36	
11	189.0	9.29	0.000	6.35	0.00	0.15	2.76	0.80	1.00	0.00	3.67	6.96	0.00	758.2	0.0	79.96	52.99	132.95	
														<b>48,780.0</b>	<b>0.0</b>				<b>9,732.60</b>

**Load Case:** 1.0D + 1.0W 90° Wind

1.0D + 1.0W 60 mph Wind at 90° From Face

**Wind Load Factor:** 1.00  
**Dead Load Factor:** 1.00  
**Ice Dead Load Factor:** 0.00

**Wind Importance Factor:** 1.00  
**Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice		Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
												Linear Area (sqft)	Linear Area (sqft)						
1	10.0	5.48	26.376	26.21	0.00	0.12	2.88	0.85	1.00	0.00	37.12	138.56	0.00	10,176.0	0.0	498.25	518.17	1,016.42	
2	30.0	5.49	24.346	23.64	0.00	0.12	2.88	0.85	1.00	0.00	34.06	137.47	0.00	6,434.1	0.0	456.83	514.97	971.80	
3	50.0	6.35	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	32.35	136.39	0.00	6,279.9	0.0	496.68	591.68	1,088.36	
4	70.0	6.99	20.384	22.04	0.00	0.14	2.82	0.85	1.00	0.00	29.81	136.39	0.00	5,592.6	0.0	499.88	651.38	1,151.26	
5	90.0	7.51	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	25.93	136.39	0.00	5,235.6	0.0	465.13	699.87	1,165.00	
6	110.0	7.96	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	22.90	129.79	0.00	4,352.2	0.0	432.20	692.81	1,125.01	
7	130.0	8.34	13.022	17.23	0.00	0.16	2.73	0.85	1.00	0.00	20.87	129.79	0.00	3,484.2	0.0	404.55	726.68	1,131.23	
8	150.0	8.69	11.787	17.23	0.00	0.20	2.61	0.85	1.00	0.00	19.90	129.79	0.00	3,428.8	0.0	384.07	757.01	1,141.08	
9	165.0	8.93	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.40	47.72	0.00	1,355.0	0.0	163.38	293.25	456.63	
10	177.5	9.12	0.000	11.36	0.00	0.15	2.78	0.85	1.00	0.00	6.56	51.98	0.00	1,683.3	0.0	141.52	335.84	477.36	
11	189.0	9.29	0.000	6.35	0.00	0.15	2.76	0.85	1.00	0.00	3.67	6.96	0.00	758.2	0.0	79.96	52.99	132.95	
														<b>48,780.0</b>	<b>0.0</b>				<b>9,857.10</b>

## Force/Stress Compression Summary

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II  
**Topography:** 1

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### LEG MEMBERS

Sect	Top Elev	Member	Force		Len (ft)	Bracing %			Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
			(kips)	Load Case		X	Y	Z				
1	20	18B - 18"BD 2.5"	-386.88	1.2D + 1.6W Normal Wind	10.02	100	100	100	16.30	50.00	649.66	59.6 Member X
2	40	12B - 12"BD 2.25"	-353.84	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.38	50.00	514.03	68.8 Member X
3	60	12B - 12"BD 2.25"	-316.37	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.38	50.00	514.03	61.5 Member X
4	80	12B - 12"BD 2"	-277.16	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.41	50.00	405.83	68.3 Member X
5	100	12B - 12"BD 2"	-236.89	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.41	50.00	405.83	58.4 Member X
6	120	12B - 12"BD 1.75"	-194.96	1.2D + 1.6W Normal Wind	10.02	100	100	100	25.99	50.00	308.82	63.1 Member X
7	140	12B - 12"BD 1.5"	-151.05	1.2D + 1.6W Normal Wind	10.02	100	100	100	30.32	50.00	222.99	67.7 Member X
8	160	12B - 12"BD 1.5"	-102.17	1.2D + 1.6W Normal Wind	10.02	100	100	100	30.32	50.00	222.99	45.8 Member X
9	170	12B - 12"BD 1.25"	-44.47	1.2D + 1.6W Normal Wind	10.02	100	100	100	36.38	50.00	150.33	29.6 Member X
10	185	SOL - 2" SOLID	-31.47	1.2D + 1.6W Normal Wind	2.33	100	100	100	56.00	50.00	112.40	28.0 Member X
11	193	SOL - 2" SOLID	-3.67	1.2D + 1.6W Normal Wind	2.33	100	100	100	56.00	50.00	112.40	3.3 Member X

### Splices

Sect	Top Elev	Load Case	Top Splice				Load Case	Bottom Splice				Num Bolts
			Force (kips)	Cap (kips)	Use %	Bolt Type		Force (kips)	Cap (kips)	Use %	Bolt Type	
1	20	1.2D + 1.6W Normal Wind	362.84	0.00	0.0		1.2D + 1.6W Normal Wind	397.37	0.00			
2	40	1.2D + 1.6W Normal Wind	326.17	0.00	0.0		1.2D + 1.6W Normal Wind	362.84	0.00	1/4 A325	6	
3	60	1.2D + 1.6W Normal Wind	287.52	0.00	0.0		1.2D + 1.6W Normal Wind	326.17	0.00	1/4 A325	6	
4	80	1.2D + 1.6W Normal Wind	247.48	0.00	0.0		1.2D + 1.6W Normal Wind	287.52	0.00	1/4 A325	6	
5	100	1.2D + 1.6W Normal Wind	206.36	0.00	0.0		1.2D + 1.6W Normal Wind	247.48	0.00	1/4 A325	6	
6	120	1.2D + 1.6W Normal Wind	163.12	0.00	0.0		1.2D + 1.6W Normal Wind	206.36	0.00	1 A325	6	
7	140	1.2D + 1.6W Normal Wind	116.02	0.00	0.0		1.2D + 1.6W Normal Wind	163.12	0.00	1 A325	6	
8	160	1.2D + 1.6W Normal Wind	60.55	0.00	0.0		1.2D + 1.6W Normal Wind	116.02	0.00	1 A325	6	
9	170	1.2D + 1.6W Normal Wind	35.41	0.00	0.0		1.2D + 1.6W Normal Wind	60.55	0.00	1 A325	6	
10	185	1.2D + 1.6W Normal Wind	4.47	0.00	0.0		1.2D + 1.6W Normal Wind	35.41	0.00	1 A325	6	
11	193	1.2D + 1.0E	0.19	0.00	0.0		1.2D + 1.6W Normal Wind	4.47	0.00	5/8 A325	4	

### HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force		Len (ft)	Bracing %			Fy (ksi)	Mem		Shear Bear		Use %	Controls
			(kips)	Load Case		X	Y	Z		Cap (kips)	Num Bolts	Num Holes	Cap (kips)		
1	20								0.00	0	0				
2	40								0.00	0	0				
3	60								0.00	0	0				
4	80								0.00	0	0				
5	100								0.00	0	0				
6	120								0.00	0	0				
7	140								0.00	0	0				
8	160								0.00	0	0				
9	170								0.00	0	0				
10	185	SOL - 1 1/4" SOLID	-0.49	0.9D + 1.6W Normal Wind	5.00	100	100	100	134.40	50.00	15.35	0	0	3	Member X
11	193	SOL - 1 1/4" SOLID	-0.55	1.2D + 1.6W 90° Wind	5.00	100	100	100	134.40	50.00	15.35	0	0	4	Member X

### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force		Len (ft)	Bracing %			Fy (ksi)	Mem		Shear Bear		Use %	Controls
			(kips)	Load Case		X	Y	Z		Cap (kips)	Num Bolts	Num Holes	Cap (kips)		
1	20	DAE - 3.5X3.5X0.3125	-11.2	1.2D + 1.6W Normal Wind	23.71	50	50	25	134.95	36.00	51.85	4	2	127.24	278.22 Member Y
2	40	SAE - 3.5X3.5X0.3125	-10.1	1.2D + 1.6W 90° Wind	21.92	50	50	50	190.58	36.00	13.00	1	1	43.49	37.578 Member Z
3	60	SAE - 3.5X3.5X0.3125	-10.2	1.2D + 1.6W 90° Wind	20.16	50	50	50	175.28	36.00	15.37	4	2	127.24	139.66 Member Z

## Force/Stress Compression Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Bear		Controls
						X	Y	Z					Cap (kips)	Use %	
4	80	SAE - 3.5X3.5X0.3125	-9.83	1.2D + 1.6W 90° Wind	18.45	50	50	50	160.42	36.00	18.35	1	43.49	37.5	54 Member Z
5	100	SAE - 3X3X0.3125	-9.25	1.2D + 1.6W 90° Wind	16.80	50	50	50	171.17	36.00	13.73	1	43.49	33.1	67 Member Z
6	120	SAE - 3X3X0.3125	-8.91	1.2D + 1.6W 90° Wind	15.24	50	50	50	155.27	36.00	16.68	1	31.81	29.9	53 Member Z
7	140	SAE - 3X3X0.1875	-8.79	1.2D + 1.6W 90° Wind	13.80	50	50	50	138.89	36.00	12.77	1	31.81	17.9	69 Member Z
8	160	SAE - 3X3X0.1875	-9.43	1.2D + 1.6W 90° Wind	12.50	50	50	50	125.87	36.00	15.34	1	31.81	17.9	61 Member Z
9	170	SAE - 2.5X2.5X0.1875	-8.43	1.2D + 1.6W Normal Wind	11.42	50	50	50	138.38	36.00	10.64	1	31.81	17.9	79 Member Z
10	185	SOL - 1" SOLID	-4.83	1.2D + 1.6W 90° Wind	5.52	50	50	50	132.42	50.00	10.12	0			48 Member X
11	193	SOL - 1" SOLID	-1.13	1.2D + 1.6W 90° Wind	5.52	50	50	50	119.18	50.00	12.49	0			9 Member X



## Force/Stress Tension Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	18B - 18"BD 2.5"	337.72	0.9D + 1.6W 60° Wind	50	662.40	51.0	Member
2	40	12B - 12"BD 2.25"	310.69	0.9D + 1.6W 60° Wind	50	536.85	57.9	Member
3	60	12B - 12"BD 2.25"	279.32	0.9D + 1.6W 60° Wind	50	536.85	52.0	Member
4	80	12B - 12"BD 2"	246.10	0.9D + 1.6W 60° Wind	50	423.90	58.1	Member
5	100	12B - 12"BD 2"	211.15	0.9D + 1.6W 60° Wind	50	423.90	49.8	Member
6	120	12B - 12"BD 1.75"	174.28	0.9D + 1.6W 60° Wind	50	324.45	53.7	Member
7	140	12B - 12"BD 1.5"	134.61	0.9D + 1.6W 60° Wind	50	238.50	56.4	Member
8	160	12B - 12"BD 1.5"	89.02	0.9D + 1.6W 60° Wind	50	238.50	37.3	Member
9	170	12B - 12"BD 1.25"	36.44	0.9D + 1.6W 60° Wind	50	165.60	22.0	Member
10	185	SOL - 2" SOLID	26.95	0.9D + 1.6W 60° Wind	50	141.37	19.1	Member
11	193	SOL - 2" SOLID	1.68	0.9D + 1.6W 60° Wind	50	141.37	1.2	Member

### Splices

Sect	Top Elev	Top Splice					Bottom Splice						
		Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	0.9D + 1.6W 60° Wind	316.64	0.00	0.0		0.9D + 1.6W 60° Wind	347.1	0.00				
2	40	0.9D + 1.6W 60° Wind	286.24	0.00	0.0		0.9D + 1.6W 60° Wind	316.6	457.92	69.1	1 1/4	A325	6
3	60	0.9D + 1.6W 60° Wind	253.58	0.00	0.0		0.9D + 1.6W 60° Wind	286.2	457.92	62.5	1 1/4	A325	6
4	80	0.9D + 1.6W 60° Wind	219.14	0.00	0.0		0.9D + 1.6W 60° Wind	253.5	457.92	55.4	1 1/4	A325	6
5	100	0.9D + 1.6W 60° Wind	183.11	0.00	0.0		0.9D + 1.6W 60° Wind	219.1	457.92	47.9	1 1/4	A325	6
6	120	0.9D + 1.6W 60° Wind	144.45	0.00	0.0		0.9D + 1.6W 60° Wind	183.1	318.06	57.6	1	A325	6
7	140	0.9D + 1.6W 60° Wind	101.04	0.00	0.0		0.9D + 1.6W 60° Wind	144.4	318.06	45.4	1	A325	6
8	160	0.9D + 1.6W 60° Wind	48.58	0.00	0.0		0.9D + 1.6W 60° Wind	101.0	318.06	31.8	1	A325	6
9	170	0.9D + 1.6W 60° Wind	26.34	0.00	0.0		0.9D + 1.6W 60° Wind	48.58	318.06	15.3	1	A325	6
10	185	0.9D + 1.6W 60° Wind	1.62	0.00	0.0		0.9D + 1.6W 60° Wind	26.34	318.06	8.3	1	A325	6
11	193		0.00	0.00	0.0		0.9D + 1.6W 60° Wind	1.62	82.80	2.0	5/8	A325	4

### HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	SAE -			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	SAE -			36	0.00	0	0					
8	160	-			36	0.00	0	0					
9	170	SAE -			36	0.00	0	0					
10	185	SOL - 1 1/4" SOLID	0.54	1.2D + 1.6W 60° Wind	50	55.22	0	0				1.0	Member
11	193	SOL - 1 1/4" SOLID	0.57	1.2D + 1.6W 60° Wind	50	55.22	0	0				1.0	Member

### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	DAE - 3.5X3.5X0.3125	11.72	0.9D + 1.0E	36	113.43	4	2	127.24	278.40	134.33	10.3	Member
2	40	SAE - 3.5X3.5X0.3125	10.23	0.9D + 1.6W 90° Wind	36	54.17	1	1	43.49	37.52	23.70	43.2	Blck Shear
3	60	SAE - 3.5X3.5X0.3125	9.92	0.9D + 1.6W 90° Wind	36	45.25	4	2	127.24	139.20	67.17	21.9	Member
4	80	SAE - 3.5X3.5X0.3125	9.49	0.9D + 1.6W 90° Wind	36	54.17	1	1	43.49	37.52	23.70	40.0	Blck Shear

## Force/Stress Tension Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



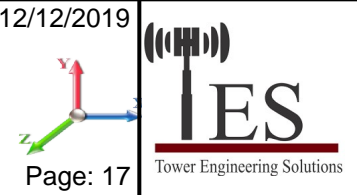
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### DIAGONAL MEMBERS

Sect	Top Elev	Member	Force		Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
			(kips)	Load Case									
5	100	SAE - 3X3X0.3125	8.94	0.9D + 1.6W 90° Wind	36	44.05	1	1	43.49	33.17	19.04	46.9	Blck Shear
6	120	SAE - 3X3X0.3125	8.56	0.9D + 1.6W 90° Wind	36	46.60	1	1	31.81	29.91	19.47	44.0	Blck Shear
7	140	SAE - 3X3X0.1875	8.75	1.2D + 1.6W 90° Wind	36	28.68	1	1	31.81	17.94	11.68	74.9	Blck Shear
8	160	SAE - 3X3X0.1875	9.72	1.2D + 1.6W 90° Wind	36	28.68	1	1	31.81	17.94	11.68	83.2	Blck Shear
9	170	SAE - 2.5X2.5X0.1875	7.88	0.9D + 1.6W 60° Wind	36	22.55	1	1	31.81	17.94	10.66	73.9	Blck Shear
10	185	SOL - 1" SOLID	4.78	1.2D + 1.6W 90° Wind	50	35.34	0	0				13.5	Member
11	193	SOL - 1" SOLID	1.12	1.2D + 1.6W 90° Wind	50	35.34	0	0				3.2	Member

## Seismic Section Forces

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Load Case: 1.2D + 1.0E

<b>Dead Load Factor</b>	1.20	<b>Sds</b> 0.181	<b>Ss</b> 0.1700	<b>Fa</b> 1.6000	<b>Ke</b> 0.0000
<b>Seismic Load Factor</b>	1.00	<b>Sd1</b> 0.097	<b>S1</b> 0.0610	<b>Fv</b> 2.4000	<b>Kg</b> 0.0000
<b>Seismic Importance Factor</b>	1.00	<b>SA</b> 0.142	<b>R</b> 3.0000	<b>Vs</b> 3.3642	<b>f1</b> 1.4585

Sect #	Elev (ft)	Wz (lb)	Lateral			Fsz (lb)
			a	b	c	
1	10.00	10176.	0.01	0.04	0.03	36.83
2	30.00	6521.8	0.05	0.07	0.04	48.10
3	50.00	6279.8	0.13	0.07	0.03	69.60
4	70.00	5592.5	0.25	0.06	0.02	88.70
5	90.00	5323.0	0.41	0.01	0.01	109.30
6	110.00	4352.2	0.61	-0.06	0.02	106.03
7	130.00	3484.2	0.86	-0.12	0.07	103.79
8	150.00	3428.7	1.14	-0.04	0.21	150.26
9	165.00	3865.4	1.38	0.25	0.41	253.67
10	177.50	7648.4	1.60	0.77	0.67	718.05
11	189.00	2379.7	1.81	1.60	1.00	307.18

### Load Case: 0.9D + 1.0E

<b>Dead Load Factor</b>	0.90	<b>Sds</b> 0.181	<b>Ss</b> 0.1700	<b>Fa</b> 1.6000	<b>Ke</b> 0.0000
<b>Seismic Load Factor</b>	1.00	<b>Sd1</b> 0.097	<b>S1</b> 0.0610	<b>Fv</b> 2.4000	<b>Kg</b> 0.0000
<b>Seismic Importance Factor</b>	1.00	<b>SA</b> 0.142	<b>R</b> 3.0000	<b>Vs</b> 3.3642	<b>f1</b> 1.4585

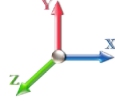
Sect #	Elev (ft)	Wz (lb)	Lateral			Fsz (lb)
			a	b	c	
1	10.00	10176.	0.01	0.04	0.03	36.83
2	30.00	6521.8	0.05	0.07	0.04	48.10
3	50.00	6279.8	0.13	0.07	0.03	69.60
4	70.00	5592.5	0.25	0.06	0.02	88.70
5	90.00	5323.0	0.41	0.01	0.01	109.30
6	110.00	4352.2	0.61	-0.06	0.02	106.03
7	130.00	3484.2	0.86	-0.12	0.07	103.79
8	150.00	3428.7	1.14	-0.04	0.21	150.26
9	165.00	3865.4	1.38	0.25	0.41	253.67
10	177.50	7648.4	1.60	0.77	0.67	718.05
11	189.00	2379.7	1.81	1.60	1.00	307.18

## Support Forces Summary

**Structure:** CT01105-S-SBA  
**Site Name:** Bozrah  
**Height:** 193.00 (ft)  
**Base Elev:** 0.000 (ft)  
**Gh:** 0.85

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** B  
**Crest Height:** 0.00  
**Site Class:** D - Stiff Soil  
**Struct Class:** II

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Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	0.00	396.98	-42.38	
	1a	15.16	-163.06	-10.24	
	1b	-15.16	-163.06	-10.24	
1.2D + 1.6W 60° Wind	1	-1.05	205.14	-21.50	
	1a	-19.14	204.89	9.84	
	1b	-32.14	-339.17	-18.55	
1.2D + 1.6W 90° Wind	1	-1.30	23.63	-2.01	
	1a	-31.52	339.96	17.49	
	1b	-28.21	-292.73	-15.48	
0.9D + 1.6W Normal Wind	1	0.00	390.51	-41.85	
	1a	15.59	-168.68	-10.50	
	1b	-15.59	-168.68	-10.50	
0.9D + 1.6W 60° Wind	1	-1.06	198.96	-20.98	
	1a	-18.70	198.71	9.57	
	1b	-32.57	-344.52	-18.80	
0.9D + 1.6W 90° Wind	1	-1.32	17.72	-1.50	
	1a	-31.07	333.57	17.23	
	1b	-28.64	-298.15	-15.72	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	165.52	-4.79	
	1a	11.38	1.22	-7.08	
	1b	-11.38	1.22	-7.08	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.41	110.98	1.28	
	1a	0.91	110.94	-1.00	
	1b	-16.83	-53.96	-9.72	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.48	55.99	7.33	
	1a	-2.87	151.46	1.38	
	1b	-15.58	-39.49	-8.71	
1.2D + 1.0E	1	0.00	39.29	22.77	
	1a	21.56	15.79	-12.36	
	1b	-21.56	15.79	-12.36	
0.9D + 1.0E	1	0.00	33.36	23.29	
	1a	22.00	9.90	-12.62	
	1b	-22.00	9.90	-12.62	
1.0D + 1.0W Normal Wind	1	0.00	96.86	-10.11	
	1a	2.04	-18.90	-1.50	
	1b	-2.04	-18.90	-1.50	
1.0D + 1.0W 60° Wind	1	-0.24	57.26	-5.76	
	1a	-5.11	57.21	2.67	
	1b	-5.57	-55.42	-3.22	
1.0D + 1.0W 90° Wind	1	-0.29	19.68	-1.70	
	1a	-7.69	85.14	4.27	
	1b	-4.75	-45.77	-2.57	

### Max Reactions

---

Leg		Overturning	
Max Uplift:	-344.52 (kips)	Moment:	7113.48 (ft-kips)
Max Down:	396.98 (kips)	Total Down:	70.86 (kips)
Max Shear:	42.38 (kips)	Total Shear:	62.86 (kips)

## Analysis Summary

<b>Structure:</b> CT01105-S-SBA	<b>Code:</b> EIA/TIA-222-G	12/12/2019
<b>Site Name:</b> Bozrah	<b>Exposure:</b> B	
<b>Height:</b> 193.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 0.85	<b>Topography:</b> 1	<b>Struct Class:</b> II
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### Max Reactions

	Leg	Overturning
Max Uplift:	-344.52 (kips)	Moment: 7113.48 (ft-kips)
Max Down:	396.98 (kips)	Total Down: 70.86 (kips)
Max Shear:	42.38 (kips)	Total Shear: 62.86 (kips)

### Anchor Bolts

Bolt Size (in.): 2.00	Number Bolts: 6
Yield Strength (Ksi): 105.00	Tensile Strength (Ksi): 150.00
Detail Type: C	

**Interaction Ratio: 0.23**


### Max Usages

Max Leg: 68.8% (1.2D + 1.6W Normal Wind - Sect 2)  
 Max Diag: 83.2% (1.2D + 1.6W 90° Wind - Sect 8)  
 Max Horiz: 3.6% (1.2D + 1.6W 90° Wind - Sect 11)

### Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0E - Normal To Face	30.00	0.0051	0.0002	0.0125
	100.00	0.0211	0.0008	0.0255
	160.00	0.0632	-0.0018	0.0585
	175.17	0.0804	0.0017	0.0672
	182.17	0.0886	0.0013	0.0637
	190.17	0.0983	0.0011	0.0675
0.9D + 1.6W 105 mph Wind at 60° From Face	30.00	0.0392	0.0066	0.1466
	100.00	0.4310	0.0215	0.5122
	160.00	1.2265	0.0387	0.9942
	175.17	1.5026	0.0811	1.0828
	182.17	1.6339	0.1368	1.0497
	190.17	1.7858	0.1981	1.0156
0.9D + 1.6W 105 mph Wind at 90° From Face	30.00	0.0390	-0.0073	0.1477
	100.00	0.4325	-0.0227	0.5139
	160.00	1.2306	-0.0386	0.9993
	175.17	1.5079	-0.0382	1.0825
	182.17	1.6393	-0.0381	1.0508
	190.17	1.7909	-0.0380	0.9354
0.9D + 1.6W 105 mph Wind at Normal To Face	30.00	0.0407	0.0065	0.1512
	100.00	0.4417	0.0201	0.5238
	160.00	1.2522	0.0344	1.0106
	175.17	1.5334	-0.0339	1.1017
	182.17	1.6672	0.0339	1.0690
	190.17	1.8224	-0.0339	1.2382

1.0D + 1.0W 60 mph Wind at 60° From Face	30.00	0.0080	0.0013	0.0305
	100.00	0.0890	0.0041	0.1057
	160.00	0.2528	0.0070	0.2045
	175.17	0.3098	0.0083	0.2231
	182.17	0.3367	0.0101	0.2157
	190.17	0.3679	0.0123	0.2087
-----				
1.0D + 1.0W 60 mph Wind at 90° From Face	30.00	0.0082	-0.0015	0.0307
	100.00	0.0896	-0.0047	0.1062
	160.00	0.2542	-0.0079	0.2055
	175.17	0.3108	-0.0073	0.2229
	182.17	0.3378	-0.0067	0.2160
	190.17	0.3690	-0.0063	0.1926
-----				
1.0D + 1.0W 60 mph Wind at Normal To Face	30.00	0.0086	0.0013	0.0314
	100.00	0.0915	0.0041	0.1081
	160.00	0.2586	0.0070	0.2077
	175.17	0.3159	0.0063	0.2261
	182.17	0.3434	0.0056	0.2197
	190.17	0.3752	0.0052	0.2542
-----				
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	30.00	0.0136	0.0020	0.0485
	100.00	0.1301	0.0061	0.1513
	160.00	0.3593	0.0102	0.2830
	175.17	0.4385	0.0122	0.3082
	182.17	0.4758	0.0147	0.2981
	190.17	0.5188	0.0175	0.2940
-----				
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	30.00	0.0133	-0.0023	0.0481
	100.00	0.1301	-0.0070	0.1520
	160.00	0.3605	-0.0115	0.2840
	175.17	0.4391	-0.0113	0.3078
	182.17	0.4763	-0.0111	0.2982
	190.17	0.5193	-0.0109	0.2806
-----				
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	30.00	0.0123	0.0020	0.0466
	100.00	0.1282	0.0060	0.1506
	160.00	0.3570	0.0099	0.2804
	175.17	0.4345	0.0096	0.3048
	182.17	0.4715	0.0093	0.2963
	190.17	0.5144	0.0091	0.3279
-----				
1.2D + 1.0E - Normal To Face	30.00	0.0051	-0.0002	0.0125
	100.00	0.0211	0.0009	0.0255
	160.00	0.0633	-0.0018	0.0589
	175.17	0.0806	-0.0017	0.0674
	182.17	0.0888	0.0013	0.0639
	190.17	0.0986	0.0011	0.0676
-----				
1.2D + 1.6W 105 mph Wind at 60° From Face	30.00	0.0392	0.0066	0.1468
	100.00	0.4318	0.0216	0.5133
	160.00	1.2293	0.0388	0.9971
	175.17	1.5064	0.0813	1.0864
	182.17	1.6381	0.1372	1.0529
	190.17	1.7905	0.1987	1.0190
-----				
1.2D + 1.6W 105 mph Wind at 90° From Face	30.00	0.0391	-0.0073	0.1480
	100.00	0.4333	-0.0228	0.5151
	160.00	1.2335	-0.0387	1.0023
	175.17	1.5117	-0.0383	1.0860
	182.17	1.6435	-0.0382	1.0540
	190.17	1.7956	-0.0381	0.9389
-----				
1.2D + 1.6W 105 mph Wind at Normal To Face	30.00	0.0407	0.0065	0.1514
	100.00	0.4426	0.0202	0.5250
	160.00	1.2553	0.0344	1.0135
	175.17	1.5372	0.0340	1.1050
	182.17	1.6714	0.0340	1.0723
	190.17	1.8271	0.0340	1.2417
-----				

	<b>Mat Foundation Design for Self Supporting Tower</b>			Date
				12/12/2019
	Customer Name:	SBA Communications Corp	EIA/TIA Standard:	EIA-222-G
	Site Name:		Structure Height (Ft.):	193
	Site Number:	CT01105-S-SBA	Engineer Name:	J. Tibbetts
Engr. Number:	90457	Engineer Login ID:		

**Foundation Info Obtained from:**

**Analysis or Design?**

**Number of Tower Legs:**

**Base Reactions (Factored):**

(1). Individual Leg:

Axial Load (Kips):	397.0	Uplift Force (Kips):	344.5
Shear Force (Kips):	42.4		

(2). Tower Base:

Total Vertical Load (Kips):	70.9	Total Shear Force (Kips):	62.9
Moment (Kips-ft):	7113.5		

**Foundation Geometries:**

Leg distance (Center-to-Center ft.):	22.0	Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	Round 3.0	Pier Height A. G. (ft.):	0.00
Tower center to mat center (ft):	3.17	Depth of Base BG (ft.):	5.0
Length of Pad (ft.):	32.5	Width of Pad (ft.):	32.5
Thickness of Pad (ft):	4.99		

**Material Properties and Rebar Info:**

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi):	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	12	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	49	Qty. of Rebar in Pad (W):	49
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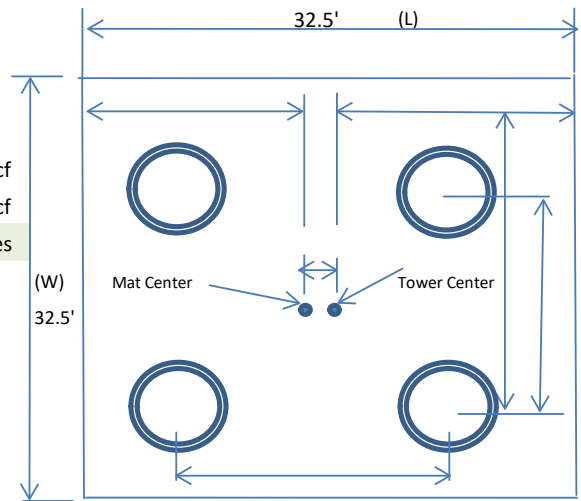
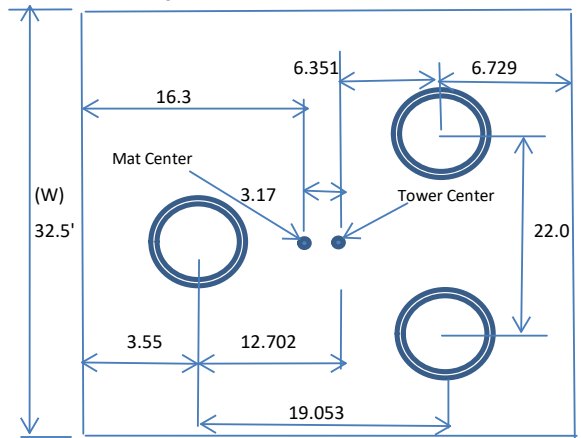
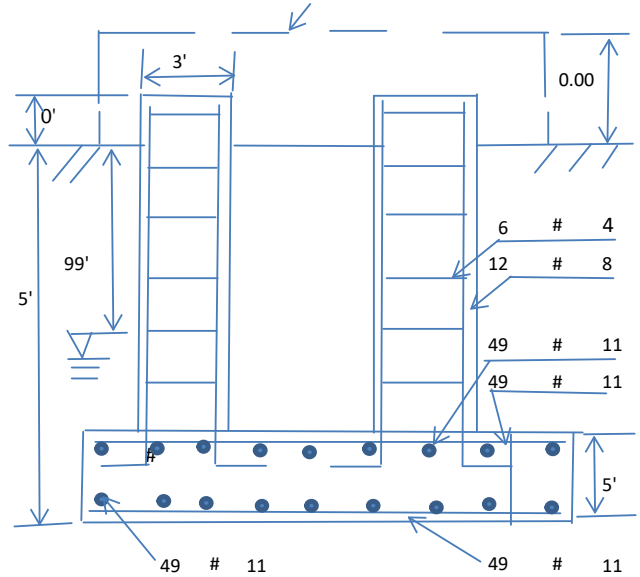
Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	49	Qty. of Rebar in Pad (W):	49
---------------------------	----	---------------------------	----

**Soil Design Parameters:**

Soil Unit Weight (pcf):	100.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	40000	Consider ties in concrete shear strength:	Yes	

Drawings/Calculations
Analysis
3 Legs





Allowable overstress %: 5.00%  
 Apply 1.35 for e/w per G/H: 1

TES Engr. Number: 90457

Page 2/2 Date: 12/12/2019

<b>Foundation Analysis and Design:</b>	Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	10.35	Total Dry Soil Weight (Kips):	1.04	
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00	
Total Effective Soil Weight (Kips):	1.04	Weight from the Concrete Block at Top (K):	0.00	
Total Dry Concrete Volume (cu. Ft.):	5271.01	Total Dry Concrete Weight (Kips):	790.65	
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00	
Total Effective Concrete Weight (Kips):	790.65	Total Vertical Load on Base (Kips):	862.55	

**Check Soil Capacities:**

Calculated Maxium Net Soil Pressure under the base (psf):	2643.96	<	Allowable Factored Soil Bearing (psf):	30000	0.09	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	12729.9	>	Design Factored Momont (kips-ft):	7602	0.60	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.67					OK!

**Check the capacities of Reinforcing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75			
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00			
				Load/ Capacity Ratio		
<b>(1) Concrete Pier:</b>						
Vertical Steel Rebar Area (sq. in./each):	0.79	Tie / Stirrup Area (sq. in./each):	0.20			
Calculated Moment Capacity (Mn,Kips-Ft):	222.4	>	Design Factored Moment (Mu, Kips-Ft)	0.6	0.00	OK!
Calculated Shear Capacity (Kips):	66.7	>	Design Factored Shear (Kips):	42.4	0.64	OK!
Calculated Tension Capacity (Tn, Kips):	511.9	>	Design Factored Tension (Tu Kips):	344.5	0.67	OK!
Calculated Compression Capacity (Pn, Kips):	1337.1	>	Design Factored Axial Load (Pu Kips):	397.0	0.30	OK!
Moment & Tension Strength Combination:	0.00	OK!	Check Tie Spacing (Design/Req'd):	1		OK!
Pier Reinforcement Ratio:	0.009		Reinforcement Ratio is satisfied per ACI			

**(2).Concrete Pad:**

One-Way Design Shear Capacity (L or W Direction, Kips):	1800.5	>	One-Way Factored Shear (L/W-Dir Kips	270.9	0.15	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	1288.0	>	One-Way Factored Shear (Dia. Dir, Kips	345.4	0.27	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct. ):	0.0035		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0032		
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	18535.9	>	Moment at Bottom ( L-Direct. K-Ft):	1570.3	0.08	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	17748.5	>	Moment at Bottom ( Dia. Dir. K-Ft):	2635.7	0.15	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0035		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0032		
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	18535.9	>	Moment at the top (L-Dir Kips-Ft):	694.4	0.04	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	17748.5	>	Moment at the top (Dia. Dir., K-Ft):	967.3	0.05	OK!
Punching Failure Capacity (Kips):	2674.3	>	Punch. Failure Factored Shear (K):	397.0	0.15	OK!

# Details

Property	
ID	13-07/119
Account	24000633

Ownership	
Name 1	NGA CAPITAL LLC
Address	38 BOZRAH ST, , CT
Last Sale	\$0 on 2009-02-18

Valuation	
Total	\$17,140
Building	\$0
Land	\$17,140

Land	
Area	61.21
Zone	R-1
State Class	600

# 131 Gifford Lane, Bozrah, CT



**Property Information**

Property ID 13-07/119  
Location  
Owner NGA CAPITAL LLC



**MAP FOR REFERENCE ONLY  
NOT A LEGAL DOCUMENT**

SCCOG makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 05/31/2017  
Data updated 10/1/2013

**TOWN OF BOZRAH  
PLANNING & ZONING COMMISSION  
TOWN HALL, 1 RIVER ROAD  
BOZRAH, CONNECTICUT 06334**

Notice of Decision

At their regular meeting of February 11, 1999 the Bozrah Planning & Zoning Commission rendered the following decisions:

Fargo Family Partnership, Stockhouse Road. Subdivision creating two building lots on Stockhouse Road which is zoned for Industrial use. **ACTION - Approved.**

SBA Inc., Boca Raton, Florida. Application for a special permit to construct a 196' telecommunications tower at 131 Gifford Lane on property owned by John and Betty Orr. **ACTION - Approved with conditions.**

Town of Bozrah. Proposal to extend a 16" water main northeasterly along Stockhouse Road. This application is submitted in accordance with Section 8-24 of the Connecticut General Statutes as a municipal improvement. **ACTION - The Commission approved the plan and strongly supports the proposal to extend this water main along Stockhouse Road.**

Seymour Adelman, Chairman  
Stephen Seder, Vice-Chairman  
Planning & Zoning Commission

\*\*\*\*\*

PLEASE PUBLISH THE "BULLETIN" "ONCE AS SOON AS POSSIBLE"

cc:: First Selectman  
Applicant by "Certified Mail"  
Bulletin Board  
Town Clerk  
File

Post-It* Fax Note	7671	Date	2/12/99	# of pages	1
To	R. Barber, First Selectman		From	R. Seder	
Co./Dept	Town of Bozrah		Co.	SCCOG	
Phone #			Phone #	860-2324	
Fax #	887-5449		Fax #	889-1222	

TRANSMISSION VERIFICATION REPORT

TIME : 02/12/1999 10:09  
NAME : SCCOG  
FAX : 860-889-1222  
TEL : 860-889-2324

DATE, TIME	02/12 10:09
FAX NO. /NAME	BULLETIN
DURATION	00:00:37
PAGE(S)	01
RESULT	OK
MODE	STANDARD
	ECM

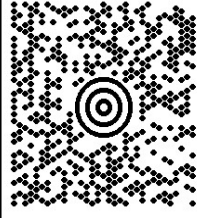
JHANA ARSENAULT  
6034210470  
SAI COMMUNICATIONS  
12 INDUSTRIAL WAY  
SALEM NH 03079

1 LBS

1 OF 1

**SHIP TO:**

MELANIE BACHMAN  
6035606185  
CONNECTICUT SITING COUNCIL  
10 FRANKLIN SQUARE  
NEW BRITAIN CT 06051

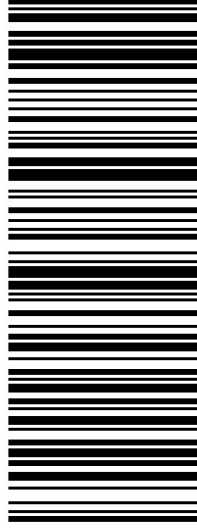


**CT 067 9-06**



**UPS GROUND**

TRACKING #: 1Z 9V0 F66 03 9359 0803



BILLING: P/P

Reference No.1: CT2223 CT-103-19010

XOL 20.01.29

NV45 83.0A 12/2019



TM

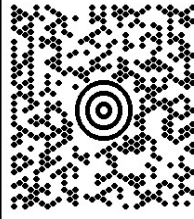
JHANA ARSENAULT  
6034210470  
SAI COMMUNICATIONS  
12 INDUSTRIAL WAY  
SALEM NH 03079

1 LBS

1 OF 1

**SHIP TO:**

MARK BENDER  
5612269283  
SBA PROPERTIES INC.  
8051 CONGRESS AVENUE  
**BOCA RATON FL 33487**



**FL 332 6-07**



**UPS GROUND**

TRACKING #: 1Z 9V0 F66 03 9212 0018



BILLING: P/P

Reference No.1: CT2223 CT-103-19010

XOL 20.01.29

NV45 83.0A 12/2019



TM

JHANA ARSENAULT  
6034210470  
SAI COMMUNICATIONS  
12 INDUSTRIAL WAY  
SALEM NH 03079

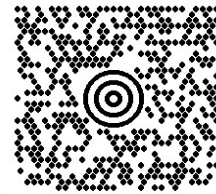
1 LBS

1 OF 1

**SHIP TO:**

SAM ALEXANDER-TOWN PLANNER  
6034210470  
HON. CARL ZORN - 1ST SELECTMAN  
BOZRAH TOWN HALL  
1 RIVER RD.

**BOZRAH CT 06334**



**CT 063 0-03**



**UPS GROUND**

TRACKING #: 1Z 9V0 F66 03 9394 8623



BILLING: P/P

Reference No.1: CT2223 CT-103-19010

XOL 20.01.29

NV45 83.0A 12/2019

