



**NSS**

**NORTHEAST**  
SITE SOLUTIONS

*Turnkey Wireless Development*

Northeast Site Solutions  
Denise Sabo  
199 Brickyard Rd Farmington, CT 06032  
860-209-4690  
[denise@northeastsitesolutions.com](mailto:denise@northeastsitesolutions.com)

June 15, 2016

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification  
462 West Main Street, Meriden CT 06451  
Latitude: 41.53998  
Longitude: -72.81906  
T-Mobile Site#: CT11733B\_L1900

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 90-foot level of the existing 100-foot monopole at 462 West Main Street, Meriden CT 06451. The tower is owned by Crown Castle. The property is owned by Hunter Family Partnership. T-Mobile now intends to replace six (6) of its existing antennas with three (3) new 1900/2100 MHz antenna and (3) new 700 MHz antennas. The new antennas would be installed at the 90-foot level of the tower.

**Planned Modifications:**

Remove: NONE

Remove and Replace:

(3)AIR21 B4A /B2P (REMOVE) - (3) Commscope LNX-6515 Antenna (**REPLACE**)  
(3)AIR21 B4A /B2P (REMOVE) - (3)AIR32 B66Aa/B2a (**REPLACE**)

Install New: NONE

Existing to Remain:

(3)AIR21 B4A /B2P  
(3) RRUS11 B12  
(3) KRY 112 TMA  
(1) 1-5/8" Fiber  
(18) 7/8" Coax

This facility was approved by the CT Siting Council. Petition No.614 – The existing facility consists of a 100-foot guyed lattice tower, which is currently used by Hunter's Ambulance Company. AT&T proposes to replace the existing guyed lattice tower with a 100-foot monopole approximately 15 feet to the southeast. Existing antennas



used by the ambulance company would be relocated to the top of the monopole. AT&T proposes to install 6 panel antennas at the 100-foot level of the proposed monopole. The proposed monopole would be designed to accommodate the antennas of two additional carriers

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 Mayor Kevin Scarpati, Elected Official for the City of Meriden, as well as the property owner and the tower 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, T-Mobile 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,

**Denise Sabo**

Mobile: 860-209-4690

Fax: 413-521-0558

Office: 199 Brickyard Rd, Farmington, CT 06032

Email: [denise@northeastsitesolutions.com](mailto:denise@northeastsitesolutions.com)

Attachments

cc: Kevin Scarpati- Mayor - as elected official  
Crown Castle - as tower owner  
Hunter Family Partnership - as property owner

# Exhibit A

Petition No. 614  
AT&T Wireless PCS, LLC  
Staff Report  
March 11, 2003

On March 5, 2003, Connecticut Siting Council (Council) member Philip T. Ashton and Christina Lepage of the Council staff met with AT&T Wireless PCS, LLC (AT&T) representatives Anthony Gioffre III, and Charisma King at 450-478 West Main Street, Meriden, Connecticut for the inspection of an existing tower site. The existing property and structure are owned by Hunters Family Limited Partnership. AT&T proposes to replace the existing structure and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

The existing facility consists of a 100-foot guyed lattice tower, which is currently used by Hunter's Ambulance Company. AT&T proposes to replace the existing guyed lattice tower with a 100-foot monopole approximately 15 feet to the southeast. Existing antennas used by the ambulance company would be relocated to the top of the monopole. AT&T proposes to install 6 panel antennas at the 100-foot level of the proposed monopole. The proposed monopole would be designed to accommodate the antennas of two additional carriers.

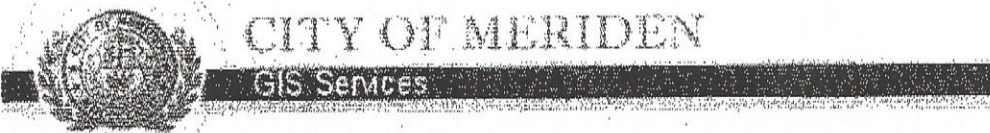
The proposed equipment would be located at the base of the tower within 7-foot by 16-foot equipment pad. An 8-foot high stockade fence would surround the equipment compound. AT&T proposes to install a retaining wall along the southern portion of the equipment compound.

Access to the site would be via an existing driveway. AT&T proposes to provide utilities to the site overhead from an existing utility pole to the south. The utility corridor would cross over property recently purchased by Hunter's Ambulance Company. Two new poles would be necessary to install a utility line to the site. AT&T submits that the proposed overhead utility installation would cause the least amount of disturbance to the site and surrounding area, due to the presence of bedrock, sidewalks and a parking lot.

Surrounding land uses include a mix of residential and commercial uses. The proposed site is zoned Commercial. The calculated cumulative worst-case radio frequency power density would not exceed the applicable standard.

AT&T contends that it would not need to construct a telecommunications tower to provide coverage to this area of Meriden, and the proposed modification of the existing structure would not cause a substantial adverse environmental effect. Staff recommends approval, with the condition that the tower be situated so as to avoid the removal of an existing tree.

# Exhibit B



96630612-0202-0001-00021

**Property Information:** Address: 450 WEST MAIN ST Map/Lot: 0612-0202-0001-0002 Card Number: 1

**Owner Information:** HUNTER FAMILY LTD PRTSHP Owner Address: 450 W MAIN ST  
MERIDEN, CT 06451

**Building Information:**

Units:	Living Area: 13948	Full Bath:	Heat Type: Forced Air
Year Built: 1980	Eff. Age:	Full Bath Rating:	Style: Mixed Use-M
Rooms:	Bedrooms:	Half Bath:	Ext Wall: Brick
		Half Bath Rating:	Roof Mat: Asphalt
			Roof Struct: Gable
			Fireplaces:
			Grade: C

**Special Features:**

Description	Condition	YearBuilt	AssessedValue
FENCE-5 CHAIN	AV	1980	\$4,100
PAVING ASPHALT	AV	1980	\$8,300

**Appraisal Information:** Tax District: 2 District Name: INNER DISTRICT District Mill Rate: 37.83

Current Building Value: \$749,100	Previous Year: 2014
Current Yard Items: \$12,400	Previous Building Value: \$1,549,300
Current Land Value: \$487,400	Previous Yard Items: \$40,500
Current Total: \$1,248,900	Previous Land Value: \$487,400
Assessment: \$1,454,040	Previous Total: \$2,077,200
<i>(Assessment is 70% of appraised value)</i>	
Special Land Value: \$0	

**Land Information:**

Type	Lot Size	Lot Unit	Zoning
Commercial Building	113,286.00 SF		C-2
Commercial Building	0.00 SF		C-2
Commercial Building	0.00 SF		C-2

Total Acreage: 2.60  
\*Confirm zoning with Planning Office. Zoning map is the official document.

**Sales Information:**

Book	Page	Grantor	Sale Date	Sale Price	Deed Type
2322	336		12/31/1997	\$650,000	

**Assessor's Permit History:**

Date	Permit Number	Notes	Type
9/24/2015	B-15-743	AT&T ADD 3 ANTENNAE/3 RRU'S/1 FIBER LINE TO EXISTING EQUIPMENT ON TOWER.	
6/22/2015	E-15-295	INSTALL NEW 160A SERVICE (VERIZON). APPROVED BY BLDG DEPT.	
5/18/2015	E-15-210	NEW 200A/3PH/4W/ SERVICE FROM MDP TO SHELTER BLDG.	
4/6/2015	P-15-64	NEW GAS SUPPLY TO GENERATOR INSTALLED. Est complete.	







# Exhibit C



# T-MOBILE NORTHEAST LLC

## SITE #: CT11733B

### SITE NAME: CT733/AT&T/HUNTER AMBULANCE

SITE ADDRESS:  
462 WEST MAIN STREET  
MERIDEN, CT 06451

### WIRELESS BROADBAND FACILITY CONSTRUCTION DRAWINGS (792DB CONFIGURATION)



T-MOBILE NORTHEAST, LLC  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
OFFICE: (860) 692-7100  
FAX: (860) 692-7139

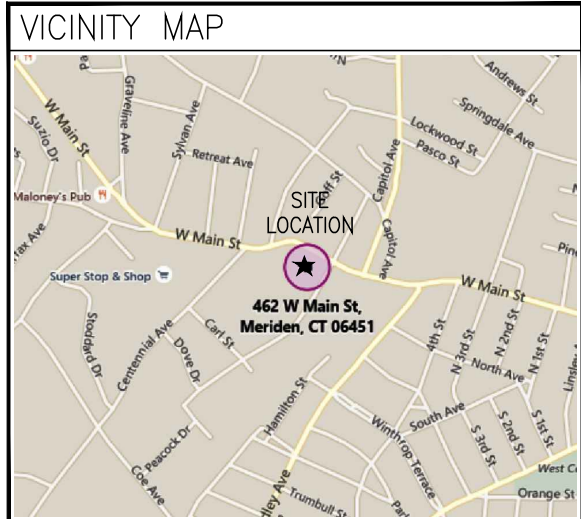


54 Jacqueline Road, Suite #7  
Waltham, MA 02452  
Phone number: 617-852-3611  
Fax Number: 781-742-2247

SUBMITTALS		
DATE	DESCRIPTION	REVISION
05/02/16	ISSUED FOR REVIEW	A
06/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11733B
DRAWN BY:	FG
CHECKED BY:	KM



**DO NOT SCALE DRAWINGS**

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

**CALL BEFORE YOU DIG:**  
WWW.CBYD.COM

**CALL 800 922 4455, OR 811**

CALL THREE WORKING DAYS PRIOR TO DIGGING  
SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

**COLOR CODE FOR UTILITY LOCATIONS**

ELECTRIC - RED	SEWER - GREEN
GAS/OIL - YELLOW	SURVEY - PINK
TEL/CATV - ORANGE	PROPOSED EXCAVATION - WHITE
WATER - BLUE	RECLAIMED WATER - PURPLE

- #### GENERAL NOTES
1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
  2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
  3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T-MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
  4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
  5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
  6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
  7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
  8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
  9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT.
  10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
  11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
  12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
  13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFETY REGULATIONS.
  14. THE CONTRACTOR SHALL NOTIFY THE T-MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T-MOBILE REPRESENTATIVE.
  15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
  16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK.
  17. ATLANTIS DESIGN GROUP, INC. HAS NOT CONDUCTED A STRUCTURAL ANALYSIS FOR THIS PROJECT AND DOES NOT ASSUME ANY LIABILITY FOR THE ADEQUACY OF THE STRUCTURE AND COMPONENTS.
  18. REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT " PREPARED BY JACOBS ENGINEERING GROUP, INC., "T-MOBILE SITE ID CT11733B", DATED MAY 11, 2016.

#### SITE INFORMATION

SITE NUMBER: CT11733B  
 SITE NAME: CT733/AT&T/HUNTER AMBULANCE  
 SITE ADDRESS: 462 WEST MAIN STREET  
 MERIDEN, CT 06451  
 LAT./LONG.: N 41.53998/ W -72.81906  
 JURISDICTION: TOWN OF MERIDEN, CT  
 PROPERTY OWNER: PATRICIA PELON  
 PROJECT MANAGER  
 T: (518) 373-3507  
 M: (518) 424-2396  
 CROWN CASTLE  
 3 CORPORATE PARK DRIVE, SUITE 101,  
 CLIFTON PARK, NY 12065

#### CODE COMPLIANCE

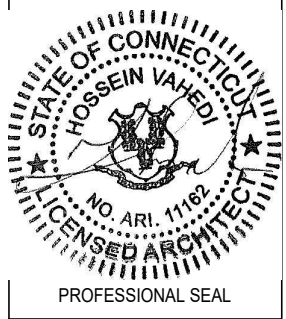
CONNECTICUT STATE BUILDING CODE  
 2005 CONNECTICUT BUILDING CODE WITH 2013 AMENDMENT  
 2011 NATIONAL ELECTRICAL CODE  
 CONSTRUCTION TYPE: 2B USE GROUP: N/A

#### PROJECT SUB-CONTRACTORS

APPLICANT: T-MOBILE NORTHEAST, LLC.  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 (860) 692-7100  
 PROJECT MANAGER LISA LIN ALLEN  
 NORTHEAST SITE SOLUTIONS  
 54 MAIN STREET  
 STURBRIDGE, MA 01566  
 (508) 434-5237  
 A&E: ATLANTIS DESIGN GROUP INC.  
 54 JACQUELINE ROAD, SUITE #7  
 WALTHAM, MA 02452  
 (617)-852-3611

#### SHEET INDEX

SHEET	DESCRIPTION
T-1	TITLE SHEET
N-1	GENERAL AND ELECTRICAL NOTES
A-1	SITE PLAN AND ELEVATION
A-2	ELEVATION AND DETAILS
E-1	GROUNDING AND COAX/FIBER DIAGRAM
E-2	GROUNDING DETAILS



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SITE NUMBER  
CT11733B

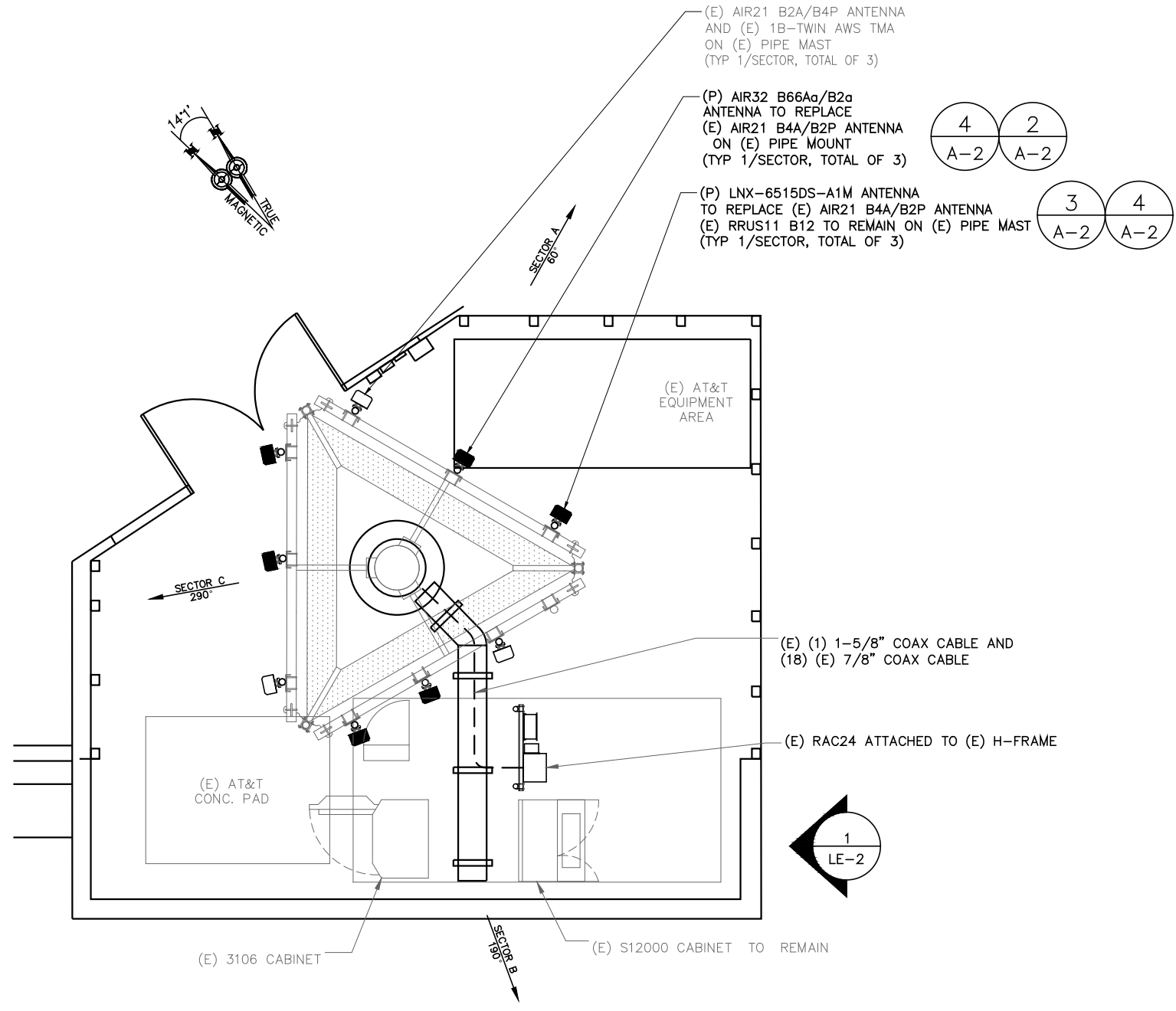
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AMBULANCE

SITE ADDRESS  
462 WEST MAIN STREET  
MERIDEN, CT 06451

SHEET TITLE  
**TITLE SHEET**

SHEET NUMBER  
**T-1**





SITE PLAN  
N.T.S. 1  
A-1

**GENERAL SITE NOTES**

1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.
5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL-BEFORE-YOU-DIG-THREE WORKING DAYS PRIOR TO COMMENCING WORK.
7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

**SITE LEGEND**

- SITE PROPERTY LINE
- STREET OR ROAD
- x-x-x- CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- BOARD ON BOARD FENCE
- DECIDUOUS TREES/SHRUBS
- EVERGREEN TREES/SHRUBS
- TREE LINE
- UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE
- PROP. LTE ANTENNA
- PROP. UMTS/GSM ANTENNA
- EX. GSM ANTENNA
- EX. UMTS ANTENNA

**T-Mobile**  
**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
 FAX: (860) 692-7139

**ATLANTIS DESIGN GROUP, INC.**  
 54 Jacqueline Road, Suite #7  
 Waltham, MA 02452  
 Phone number: 617-852-3811  
 Fax Number: 781-742-2247

SUBMITTALS		
DATE	DESCRIPTION	REVISION
05/02/16	ISSUED FOR REVIEW	A
06/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11733B  
 DRAWN BY: FG  
 CHECKED BY: KM

STATE OF CONNECTICUT  
 HOSEIN VAHEDI  
 NO. ARI. 11162  
 LICENSED ARCHITECT  
 PROFESSIONAL SEAL

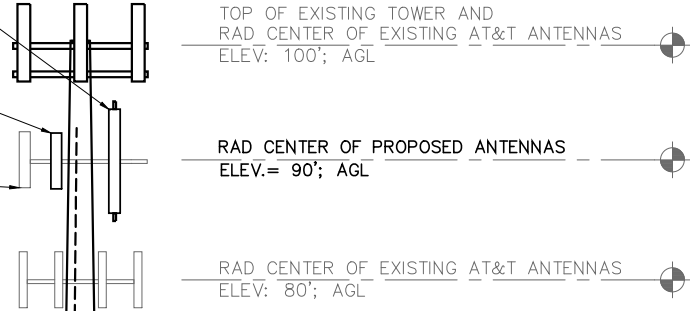
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**SITE PLAN**

SHEET NUMBER  
**A-1**

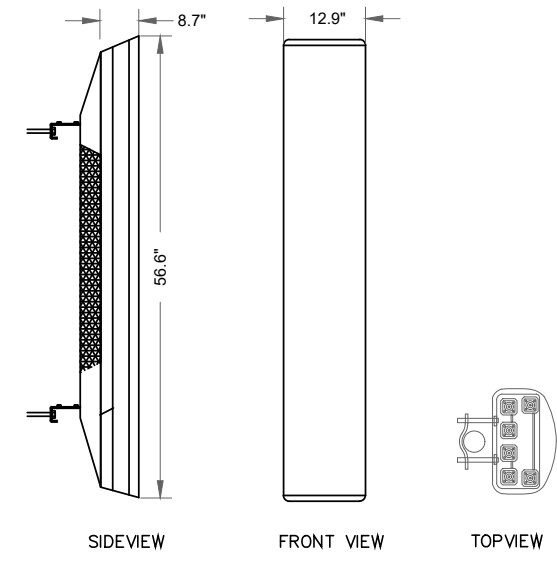
- (P) LNX-6515DS-A1M ANTENNA TO REPLACE
- (E) AIR21 B4A/B2P ANTENNA (E) RRUS11 B12 TO REMAIN ON (E) PIPE MAST (TYP 1/SECTOR, TOTAL OF 3)
- (P) AIR32 B66Aa/B2a ANTENNA TO REPLACE
- (E) AIR21 B4A/B2P ANTENNA ON (E) PIPE MOUNT (TYP 1/SECTOR, TOTAL OF 3)
- (E) AIR21 B2A/B4P ANTENNA AND (E) 1B-TWIN AWS TMA ON (E) PIPE MAST (TYP 1/SECTOR, TOTAL OF 3)



- (E) (1) 1-5/8" COAX CABLE AND (18) (E) 7/8" COAX CABLE
- (E) RAC24 AND PBC05 ATTACHED TO (E) H-FRAME
- (E) GSM CABINET (S12000) TO BE TURN-OFF AND REMAIN

ELEVATION  
SCALE: NTS

1  
A-2

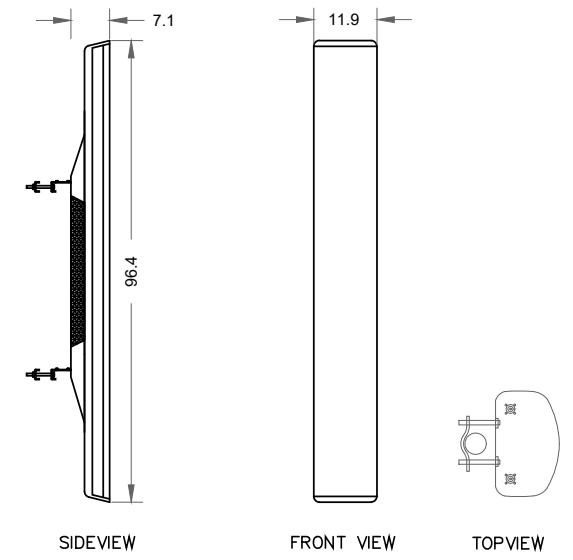


MANUFACTURER: ERICSSON  
MODEL NO.: ERICSSON AIR32 AIR32 B66Aa/B2a  
DIMENSIONS - HxWxD, (IN) 56.6"x12.9"x8.7"

ERICSSON AIR32 B66Aa/B2a  
ANTENNA DETAILS

SCALE: N.T.S

2  
A-2

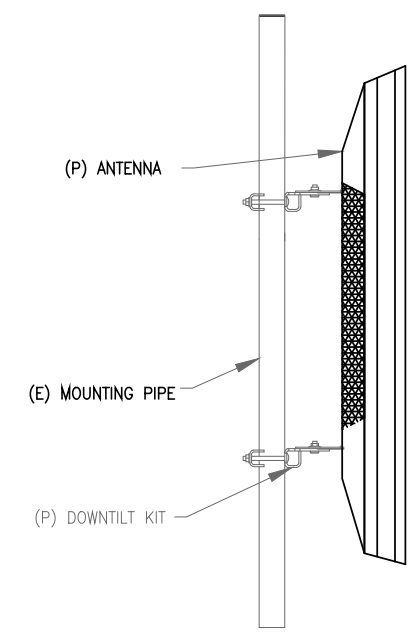


MANUFACTURE: COMMSCOPE  
MODEL NO. LNX-6515DS-VTM  
DIMENSIONS - HxWxD, (IN) 96.4x11.9x7.1  
WEIGHT - 50.3 LB

COMMSCOPE LNX-6515DS-VTM  
ANTENNA DETAILS

SCALE: N.T.S

3  
A-2



ANTENNA MOUNT DETAILS

SCALE: N.T.S

4  
A-2

**T-Mobile**  
T-MOBILE NORTHEAST, LLC  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
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DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
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CONSTR.			
SITE AC.			

PROJECT NO:	CT11733B
DRAWN BY:	FG
CHECKED BY:	KM

PROFESSIONAL SEAL

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SITE NUMBER  
CT11733B

SITE NAME  
CT733/AT&T/HUNTER  
AMBULANCE

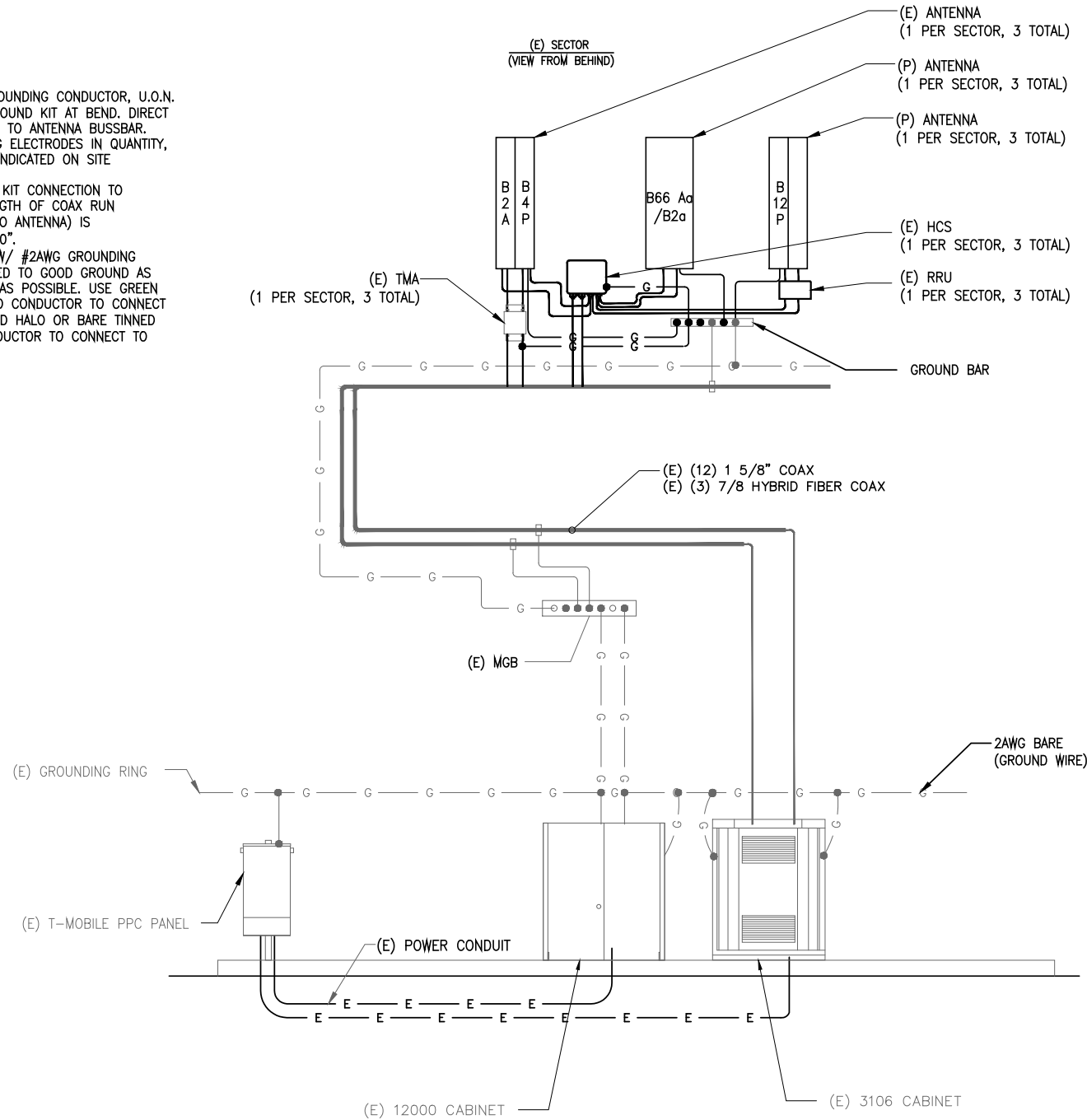
SITE ADDRESS  
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SHEET TITLE  
ELEVATION  
AND  
DETAILS

SHEET NUMBER  
**A-2**

**NOTES:**

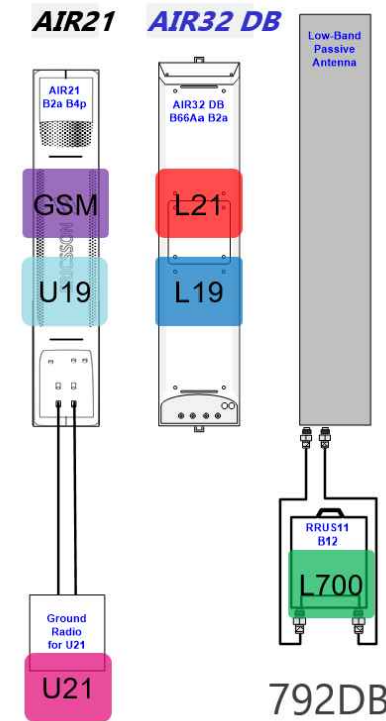
- A. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
- B. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSBAR.
- C. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
- D. ADD COAX GROUND KIT CONNECTION TO BUSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT TO ANTENNA) IS GREATER THAN 20'-0".
- E. GROUND HCS BOX W/ #2AWG GROUNDING CONDUCTOR ATTACHED TO GOOD GROUND AS DIRECT AND SHORT AS POSSIBLE. USE GREEN STRANDED INSULATED CONDUCTOR TO CONNECT TO BUSBAR/GROUND HALO OR BARE TINNED SOLID COPPER CONDUCTOR TO CONNECT TO GROUND RING.



**GROUNDING DIAGRAM**

SCALE: N.T.S

1  
E-1



**TRUNK FIBER NOTES:**

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO 3/8" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
2. THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN 3/4" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOVEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM.
10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
11. MAXIMUM HANGER SPACING 3FT (0.9 M).

**HYBRID FIBER/POWER JUMPER NOTES:**

1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A 3/8" COAXIAL CABLE.
2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN 3/4" (19MM) RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS.
4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N) LONG TERM.
9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

**792DB CONFIGURATION  
COAX/FIBER PLUMBING DIAGRAM**

SCALE: N.T.S

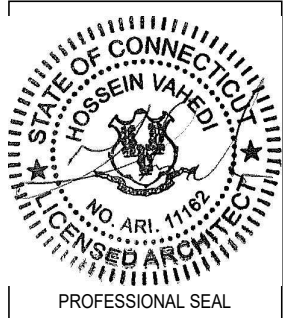
2  
E-1

**SUBMITTALS**

DATE	DESCRIPTION	REVISION
05/02/16	ISSUED FOR REVIEW	A
05/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11733B  
DRAWN BY: FG  
CHECKED BY: KM

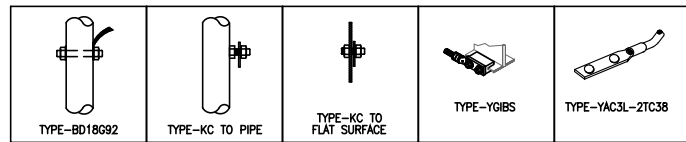


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SITE NUMBER  
CT11733B  
SITE NAME  
CT733/AT&T/HUNTER  
AMBULANCE  
SITE ADDRESS  
462 WEST MAIN STREET  
MERIDEN, CT 06451

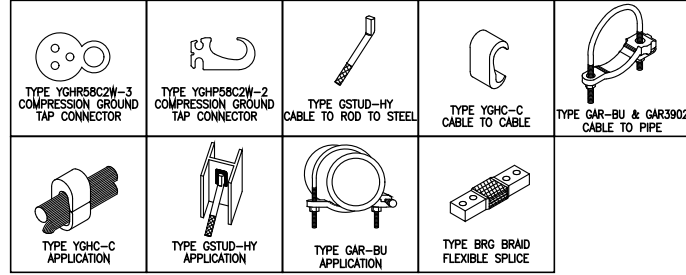
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GROUNDING AND ONE  
LINE DIAGRAM  
COAX/FIBER DIAGRAM

SHEET NUMBER  
E-1



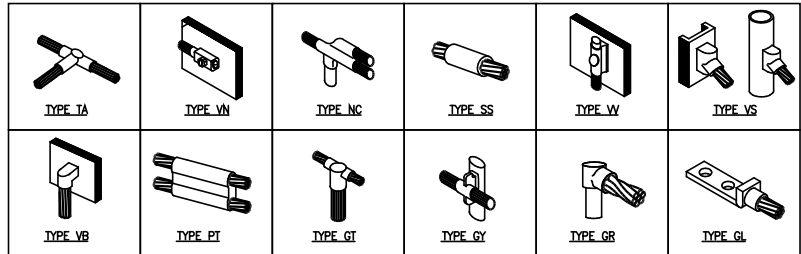
**BURNDY GROUNDING DETAILS**  
SCALE: N.T.S.

1  
E-2



**BURNDY GROUNDING PRODUCTS**  
SCALE: N.T.S.

2  
E-2



**CADWELD GROUNDING CONNECTION PRODUCTS**  
SCALE: N.T.S.

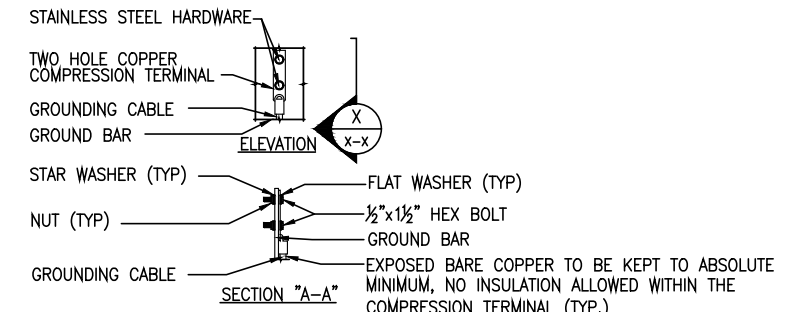
3  
E-2

**TERMINATION TYPES:**  
A. MECHANICAL COMPRESSION LUG  
B. DOUBLE BARRELL COMPRESSION CONNECTOR  
C. EXOTHERMIC TERMINATION  
D. BEAM CLAMP

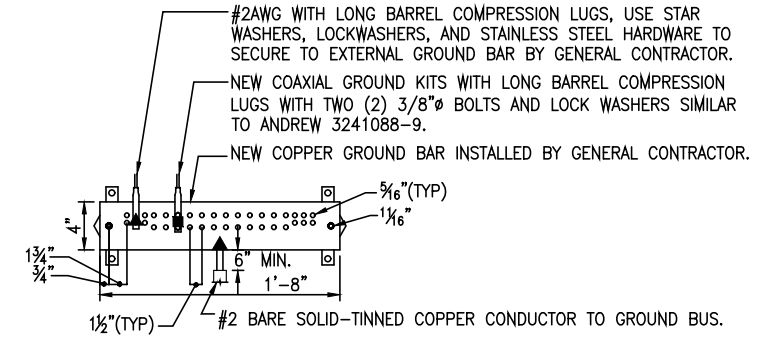
	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/0 STRANDED MAIN DOWN CONDUCTOR	MASTER GRND BAR	STRUCTURAL OR TOWER STEEL	BLDG SERVICE ENTR OR GRND RING	GROUND ROD
SOLID #2 TINNED COPPER	B OR C	B OR C	/	C	A, C, OR D	C	C
#6 GROUND LEAD	B OR C	/	/	A	A, C, OR D	/	/
#2/0 STRANDED GRNDG ELECTRODE CONDUCTOR	/	/	/	A	A, C, OR D	A	/
MASTER GROUND BAR	C	A	A	/	/	/	/
STRUCTURAL OR TOWER STEEL GROUND RING	A, C, OR D	A, C, OR D	A, C, OR D	/	/	/	/
GROUND RING	C	/	C	/	/	/	C

**GROUNDING TERMINATION MARTIX**  
SCALE: N.T.S.

4  
E-2



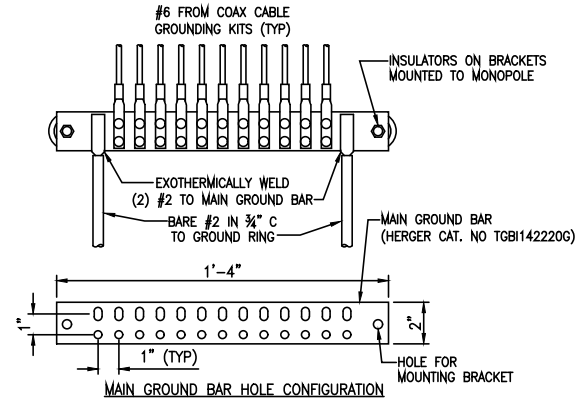
NOTES:  
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.



NOTES:  
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.  
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.  
3. ALL HOLES ARE COUNTERSUNK 1/8".

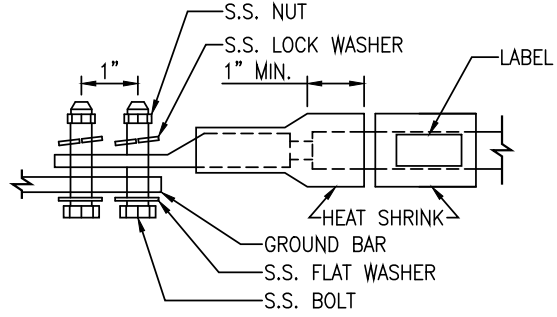
**TYPICAL GROUND BAR CONNECTIONS DETAIL**  
SCALE: N.T.S.

5  
E-2



**GROUND BAR DETAIL**  
SCALE: N.T.S.

6  
E-2



LUG NOTES:  
1. ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.  
2. ALL HARDWARE SHALL BE S.S. 3/8" OR LARGER.  
3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

**GROUND BAR DETAIL**  
SCALE: N.T.S.

7  
E-2

**T-Mobile**  
T-MOBILE NORTHEAST, LLC  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
OFFICE: (860) 692-7100  
FAX: (860) 692-7159

**ATLANTIS DESIGN GROUP, INC.**  
54 Jacqueline Road, Suite #7  
Waltham, MA 02452  
Phone number: 617-852-3611  
Fax Number: 781-742-2247

SUBMITTALS		
DATE	DESCRIPTION	REVISION
06/02/16	ISSUED FOR REVIEW	A
06/23/16	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11733B
DRAWN BY:	FG
CHECKED BY:	KM

PROFESSIONAL SEAL

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SITE NUMBER  
CT11733B  
SITE NAME  
CT733/AT&T/HUNTER AMBULANCE  
SITE ADDRESS  
462 WEST MAIN STREET  
MERIDEN, CT 06451

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
**E-2**

# Exhibit D



Date: **May 11, 2016**

Sean Dempsey  
Crown Castle  
3530 Toringdon Way Suite 300  
Charlotte, NC 28277

**JACOBS**<sup>®</sup>  
Jacobs Engineering Group, Inc.  
5449 Bells Ferry Road  
Acworth, GA 30102  
(770) 701-2500

**Subject: Structural Analysis Report**

**Carrier Designation:** *T-Mobile Co-Locate*  
**Carrier Site Number:** CT11733B  
**Carrier Site Name:** CT733/AT&THntr Amblnce FT

**Crown Castle Designation:**  
**Crown Castle BU Number:** 842869  
**Crown Castle Site Name:** MERIDEN WEST CENTRAL  
**Crown Castle JDE Job Number:** 375215  
**Crown Castle Work Order Number:** 1233547  
**Crown Castle Application Number:** 343208 Rev. 6

**Engineering Firm Designation:** **Jacobs Engineering Group, Inc. Project Number:** 1233547

**Site Data:** **450-478 WEST MAIN STREET, MERIDEN, New Haven County, CT**  
**Latitude 41° 32' 24.24", Longitude -72° 49' 9.06"**  
**100 Foot - Monopole Tower**

Dear Sean Dempsey,

Jacobs Engineering Group, Inc. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 900812, in accordance with application 343208, revision 6.

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

LC7: Existing + Reserved + Proposed Equipment

**Sufficient Capacity**

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Jacobs Engineering Group, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by:



Ankit Gupta  
Structural Engineer



Reviewed by:

Matthew E. Watkins, P.E.  
Engineering Project Manager

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## 1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by Glen Martin Engineering in December of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
86.0	90.0	3	commscope	LNx-6515DS-A1M w/ Mount Pipe	1	1-5/8	-
		3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe			

**Table 2 - Existing and Reserved Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note	
100.0	115.0	1	dbspectra	DS8A12F36U-N	8 2 4 6	1/2 3/8 3/4 1-1/4	1	
		3	decibel	DB201-A				
	106.0	1	kmw communications	HB-X-AW-19-65-00T				
		3	cci antennas	DTMABP7819VG12A				
	100.0	100.0	3	cci antennas				OPA-65R-LCUU-H6
			4	decibel				DB432-A
			3	ericsson				RRUS 11-700
			3	ericsson				RRUS A2 MODULE
			3	ericsson				RRUS-11 1900MHZ
			6	kmw communications				AM-X-CD-16-65-00T-RET
			2	raycap				DC6-48-60-18-8F
			1	tower mounts (crown)				Platform Mount [LP 1301-1]
86.0	90.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11 1	7/8 1-5/8	1	
		3	ericsson	KRY 112 71				
		3	ericsson	RRUS 11 B12				
	86.0	1	tower mounts (crown)	Platform Mount [LP 305-1]				
	88.0	3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	7	7/8	3	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
78.0	78.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	TME-800MHZ RRH			
		1	tower mounts (crown)	Side Arm Mount [SO 104-3]			
76.0	79.0	3	alcatel lucent	TD-RRH8x20-25	1 1 3	5/8 3/4 1-1/4	1
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	76.0	1	tower mounts (crown)	Platform Mount [LP 304-1]			
65.0	65.0	3	alcatel lucent	RRH2x60-700	-	-	2
		3	alcatel lucent	RRH2x60-AWS			
		6	commscope	SBNHH-1D45B w/ Mount Pipe			
		3	antel	BXA-171063/12CF w/ Mount Pipe			
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts (crown)	Platform Mount [LP 303-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Equipment To Be Removed; Not Considered in This Analysis

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
99.0	99.0	6	allgon	7920	12	1-5/8
89.0	89.0	9	generic	4' Panel Antenna	9	1-5/8
79.0	79.0	9	generic	4' Panel Antenna	9	1-5/8

**3) ANALYSIS PROCEDURE**

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Tectonic	4529388	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Glen Martin Engineering	4529387	CCISITES
TOWER MANUFACTURER DRAWINGS	Glen Martin Engineering	4713237	CCISITES

### 3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

## 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	100 - 47	Pole	TP40.72x28x0.313	1	-16.637	2019.468	48.6	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-29.004	3171.353	70.4	Pass
							Summary	
						Pole (L2)	70.4	Pass
						Rating =	70.4	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	65.7	Pass
1	Base Plate	0	50.5	Pass
1	Base Foundation Structural	0	49.5	Pass
1	Base Foundation Soil Interaction	0	83.2	Pass

<b>Structure Rating (max from all components) =</b>	<b>83.2%</b>
---	--------------

Notes:

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

### 4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved and proposed loads. No modifications are required at this time.

**APPENDIX A**  
**TNXTOWER OUTPUT**

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
HB-X-AW-19-65-00T	100	RRUS 11 B12	86
(2) AM-X-CD-16-65-00T-RET	100	RRUS 11 B12	86
(2) AM-X-CD-16-65-00T-RET	100	Platform Mount [LP 305-1]	86
(2) AM-X-CD-16-65-00T-RET	100	6' x 2" Mount Pipe	86
DS8A12F36U-N	100	TME-800MHZ RRH	78
OPA-65R-LCUU-H6	100	TME-800MHZ RRH	78
OPA-65R-LCUU-H6	100	TME-800MHZ RRH	78
OPA-65R-LCUU-H6	100	1900MHZ RRH	78
DB201-A	100	1900MHZ RRH	78
DB201-A	100	1900MHZ RRH	78
DB201-A	100	800 EXTERNAL NOTCH FILTER	78
(2) DB432-A	100	800 EXTERNAL NOTCH FILTER	78
(2) DB432-A	100	800 EXTERNAL NOTCH FILTER	78
RRUS A2 MODULE	100	6' x 2" Mount Pipe	78
RRUS A2 MODULE	100	6' x 2" Mount Pipe	78
RRUS A2 MODULE	100	6' x 2" Mount Pipe	78
RRUS-11 1900MHZ	100	Side Arm Mount [SO 104-3]	78
RRUS-11 1900MHZ	100	APXVSP18-C-A20 w/ Mount Pipe	76
RRUS-11 1900MHZ	100	APXVTM14-C-120 w/ Mount Pipe	76
RRUS 11-700	100	(2) APXVSP18-C-A20 w/ Mount Pipe	76
RRUS 11-700	100	(2) APXVTM14-C-120 w/ Mount Pipe	76
RRUS 11-700	100	TD-RRH8x20-25	76
DC6-48-60-18-8F	100	(2) TD-RRH8x20-25	76
DC6-48-60-18-8F	100	(2) 6' x 2" Mount Pipe	76
DTMABP7819VG12A	100	(4) 6' x 2" Mount Pipe	76
DTMABP7819VG12A	100	Platform Mount [LP 304-1]	76
DTMABP7819VG12A	100	(2) SBNHH-1D45B w/ Mount Pipe	65
Platform Mount [LP 1301-1]	100	(2) SBNHH-1D45B w/ Mount Pipe	65
AIR -32 B2A/B66AA w/ Mount Pipe	86	(2) SBNHH-1D45B w/ Mount Pipe	65
AIR -32 B2A/B66AA w/ Mount Pipe	86	RRH2x60-AWS	65
AIR -32 B2A/B66AA w/ Mount Pipe	86	RRH2x60-AWS	65
LNX-6515DS-A1M w/ Mount Pipe	86	RRH2x60-AWS	65
LNX-6515DS-A1M w/ Mount Pipe	86	RRH2x60-700	65
LNX-6515DS-A1M w/ Mount Pipe	86	RRH2x60-700	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	RRH2x60-700	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-70063/6CF w/ Mount Pipe	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-70063/6CF w/ Mount Pipe	65
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	86	BXA-70063/6CF w/ Mount Pipe	65
KRY 112 71	86	BXA-171063/12CF w/ Mount Pipe	65
KRY 112 71	86	BXA-171063/12CF w/ Mount Pipe	65
KRY 112 71	86	(2) DB-T1-6Z-8AB-OZ	65
RRUS 11 B12	86	Platform Mount [LP 303-1]	65

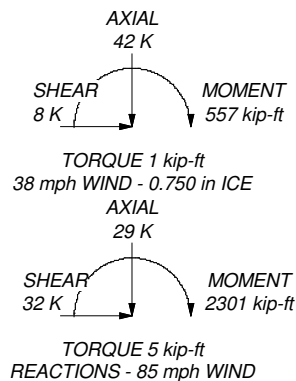
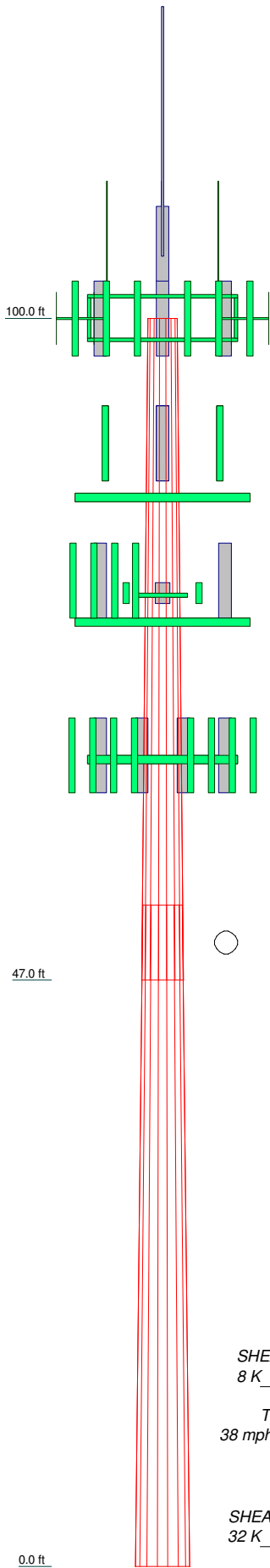
**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.4%

Section	1	2
Length (ft)	53.000	53.000
Number of Sides	16	16
Thickness (in)	0.313	0.375
Socket Length (ft)	6.000	
Top Dia (in)	28.000	38.655
Bot Dia (in)	40.720	51.370
Grade	A572-65	
Weight (K)	6.1	9.6



<p>JACOBS</p> <p>Jacobs Engineering Group, Inc.</p>	<p><b>Jacobs Engineering Group, Inc.</b></p> <p>5449 Bells Ferry Road</p> <p>Acworth, GA 30102</p> <p>Phone: (770) 701-2500</p> <p>FAX: (770) 701-2501</p>		<p>Job: <b>100' MP - MERIDEN WEST CENTRAL</b></p> <p>Project: <b>BU842869_WO1233547</b></p>	
	<p>Client: Crown Castle</p> <p>Code: TIA/EIA-222-F</p> <p>Path:</p>	<p>Drawn by: Ankit Gupta</p> <p>Date: 05/10/16</p>	<p>App'd:</p> <p>Scale: NTS</p> <p>Dwg No. E-1</p>	<p>C:\Users\gupta\Documents\842869 MERIDEN WEST CENTRAL\WO 1233547\Analysis\Model\BU842869_WO1233547.rvt</p>

## Tower Input Data

There is a pole section.  
 This tower is designed using the TIA/EIA-222-F standard.  
 The following design criteria apply:

- 1) Tower is located in New Haven County, Connecticut.
- 2) Basic wind speed of 85 mph.
- 3) Nominal ice thickness of 0.750 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56.000 pcf.
- 6) A wind speed of 38 mph is used in combination with ice.
- 7) Temperature drop of 50.000 °F.
- 8) Deflections calculated using a wind speed of 50 mph.
- 9) A non-linear (P-delta) analysis was used.
- 10) Pressures are calculated at each section.
- 11) Stress ratio used in pole design is 1.333.
- 12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	100.000- 47.000	53.000	6.000	16	28.000	40.720	0.313	1.250	A572-65 (65 ksi)
L2	47.000-0.000	53.000		16	38.655	51.370	0.375	1.500	A572-65 (65 ksi)

## Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	28.549 41.518	27.601 40.281	2673.045 8308.852	9.857 14.385	14.280 20.767	187.188 400.095	5386.564 16743.510	13.647 19.917	4.950 7.481	15.84 23.94



Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L2	40.880	45.792	8477.194	13.628	19.714	430.008	17082.742	22.642	6.946	18.523
	52.376	61.003	20040.987	18.154	26.199	764.961	40385.419	30.163	9.476	25.27

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 100.000- 47.000				1	1	1			
L2 47.000- 0.000				1	1	1			

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Shield Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	r in	r in	klf
***										

**Feed Line/Linear Appurtenances - Entered As Area**

Description	Face or Shield Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight	
				ft		ft <sup>2</sup> /ft	klf	
Safety Line 3/8	C	No	CaAa (Out Of Face)	100.000 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
LDF4-50A(1/2")	A	No	Inside Pole	100.000 - 0.000	8	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF6-50A(1-1/4")	A	No	Inside Pole	100.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-034-XXXXXX( 3/8)	A	No	Inside Pole	100.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD( 3/4)	A	No	Inside Pole	100.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
FB-L98B-034-XXXXXX( 3/8)	A	No	Inside Pole	100.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD( 3/4)	A	No	Inside Pole	100.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
2 1/4" Flex Conduit	A	No	Inside Pole	100.000 - 0.000	2	No Ice	0.000	0.002
						1/2" Ice	0.000	0.002

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
						1" Ice	0.000	0.002
						2" Ice	0.000	0.002
						4" Ice	0.000	0.002
*****								
LDF5-50A(7/8")	C	No	Inside Pole	86.000 - 0.000	11	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8)	C	No	Inside Pole	86.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	C	No	Inside Pole	86.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*****								
LDF4.5-50(5/8")	B	No	Inside Pole	76.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
EP185(3/4")	B	No	Inside Pole	76.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
HB114-13U3M12- XXXF(1-1/4")	B	No	Inside Pole	76.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
*****								
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8)	A	No	CaAa (Out Of Face)	65.000 - 0.000	1	No Ice	0.163	0.001
						1/2" Ice	0.263	0.002
						1" Ice	0.362	0.004
						2" Ice	0.562	0.010
						4" Ice	0.962	0.029
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8)	A	No	Inside Pole	65.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
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### Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	100.000-47.000	A	0.000	0.000	0.000	2.925	0.696
		B	0.000	0.000	0.000	0.000	0.096
		C	0.000	0.000	0.000	1.988	0.237
L2	47.000-0.000	A	0.000	0.000	0.000	7.638	0.683
		B	0.000	0.000	0.000	0.000	0.156
		C	0.000	0.000	0.000	1.763	0.282

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	100.000-47.000	A	0.824	0.000	0.000	0.000	5.893	0.741
		B		0.000	0.000	0.000	0.000	0.096
		C		0.000	0.000	0.000	10.726	0.283
L2	47.000-0.000	A	0.750	0.000	0.000	0.000	15.386	0.802
		B		0.000	0.000	0.000	0.000	0.156
		C		0.000	0.000	0.000	9.511	0.323

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	100.000-47.000	-0.047	-0.063	-0.227	-0.031
L2	47.000-0.000	-0.046	-0.205	-0.224	-0.289

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
**Lvl 100**									
HB-X-AW-19-65-00T	A	From Leg	4.000 0.000 6.000	0.000	100.000	No Ice	4.817	4.817	0.029
						1/2" Ice	5.265	5.265	0.062
						1" Ice	5.721	5.721	0.100
						2" Ice	6.654	6.654	0.195
						4" Ice	8.671	8.671	0.462
(2) AM-X-CD-16-65-00T-RET	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	8.260	4.642	0.049
						1/2" Ice	8.807	5.088	0.095
						1" Ice	9.364	5.542	0.147
						2" Ice	10.502	6.473	0.271
						4" Ice	12.882	8.446	0.600
(2) AM-X-CD-16-65-00T-RET	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	8.260	4.642	0.049
						1/2" Ice	8.807	5.088	0.095
						1" Ice	9.364	5.542	0.147
						2" Ice	10.502	6.473	0.271
						4" Ice	12.882	8.446	0.600
(2) AM-X-CD-16-65-00T-RET	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	8.260	4.642	0.049
						1/2" Ice	8.807	5.088	0.095
						1" Ice	9.364	5.542	0.147
						2" Ice	10.502	6.473	0.271
						4" Ice	12.882	8.446	0.600
DS8A12F36U-N	A	From Leg	4.000 0.000 15.000	0.000	100.000	No Ice	6.675	6.675	0.063
						1/2" Ice	8.933	8.933	0.111
						1" Ice	11.208	11.208	0.173
						2" Ice	15.808	15.808	0.340
						4" Ice	25.208	25.208	0.849
OPA-65R-LCUU-H6	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	10.360	5.517	0.073
						1/2" Ice	10.927	5.971	0.131
						1" Ice	11.502	6.434	0.196
						2" Ice	12.680	7.380	0.345
						4" Ice	15.137	9.574	0.728

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
OPA-65R-LCUU-H6	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	10.360	5.517	0.073
						1/2" Ice	10.927	5.971	0.131
						Ice	11.502	6.434	0.196
						1" Ice	12.680	7.380	0.345
						2" Ice	15.137	9.574	0.728
						4" Ice			
OPA-65R-LCUU-H6	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	10.360	5.517	0.073
						1/2" Ice	10.927	5.971	0.131
						Ice	11.502	6.434	0.196
						1" Ice	12.680	7.380	0.345
						2" Ice	15.137	9.574	0.728
						4" Ice			
DB201-A	A	From Leg	4.000 0.000 6.000	0.000	100.000	No Ice	1.100	1.100	0.025
						1/2" Ice	1.980	1.980	0.033
						Ice	2.860	2.860	0.040
						1" Ice	4.620	4.620	0.055
						2" Ice	8.140	8.140	0.085
						4" Ice			
DB201-A	B	From Leg	4.000 0.000 6.000	0.000	100.000	No Ice	1.100	1.100	0.025
						1/2" Ice	1.980	1.980	0.033
						Ice	2.860	2.860	0.040
						1" Ice	4.620	4.620	0.055
						2" Ice	8.140	8.140	0.085
						4" Ice			
DB201-A	C	From Leg	4.000 0.000 6.000	0.000	100.000	No Ice	1.100	1.100	0.025
						1/2" Ice	1.980	1.980	0.033
						Ice	2.860	2.860	0.040
						1" Ice	4.620	4.620	0.055
						2" Ice	8.140	8.140	0.085
						4" Ice			
(2) DB432-A	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	0.300	0.300	0.005
						1/2" Ice	0.540	0.540	0.006
						Ice	0.780	0.780	0.008
						1" Ice	1.260	1.260	0.011
						2" Ice	2.220	2.220	0.017
						4" Ice			
(2) DB432-A	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	0.300	0.300	0.005
						1/2" Ice	0.540	0.540	0.006
						Ice	0.780	0.780	0.008
						1" Ice	1.260	1.260	0.011
						2" Ice	2.220	2.220	0.017
						4" Ice			
RRUS A2 MODULE	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	1.867	0.423	0.021
						1/2" Ice	2.051	0.532	0.031
						Ice	2.244	0.650	0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS A2 MODULE	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	1.867	0.423	0.021
						1/2" Ice	2.051	0.532	0.031
						Ice	2.244	0.650	0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS A2 MODULE	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	1.867	0.423	0.021
						1/2" Ice	2.051	0.532	0.031
						Ice	2.244	0.650	0.044
						1" Ice	2.657	0.912	0.077
						2" Ice	3.585	1.540	0.177
						4" Ice			
RRUS-11 1900MHz	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice	2.942	1.190	0.044
						1/2" Ice	3.172	1.351	0.063
						Ice	3.410	1.521	0.086
						1" Ice	3.913	1.887	0.140
						2" Ice	5.023	2.721	0.291
						4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
RRUS-11 1900MHz	B	From Leg	4.000	0.000	0.000	100.000	4" Ice			
							No Ice	2.942	1.190	0.044
							1/2"	3.172	1.351	0.063
							Ice	3.410	1.521	0.086
							1" Ice	3.913	1.887	0.140
RRUS-11 1900MHz	C	From Leg	4.000	0.000	0.000	100.000	2" Ice	5.023	2.721	0.291
							4" Ice			
							No Ice	2.942	1.190	0.044
							1/2"	3.172	1.351	0.063
							Ice	3.410	1.521	0.086
RRUS 11-700	A	From Leg	4.000	0.000	0.000	100.000	1" Ice	3.913	1.887	0.151
							2" Ice	5.023	2.721	0.302
							4" Ice			
							No Ice	2.942	1.190	0.055
							1/2"	3.172	1.351	0.074
RRUS 11-700	B	From Leg	4.000	0.000	0.000	100.000	Ice	3.410	1.521	0.097
							1" Ice	3.913	1.887	0.151
							2" Ice	5.023	2.721	0.302
							4" Ice			
							No Ice	2.942	1.190	0.055
RRUS 11-700	C	From Leg	4.000	0.000	0.000	100.000	1/2"	3.172	1.351	0.074
							Ice	3.410	1.521	0.097
							1" Ice	3.913	1.887	0.151
							2" Ice	5.023	2.721	0.302
							4" Ice			
DC6-48-60-18-8F	A	From Leg	4.000	0.000	0.000	100.000	No Ice	1.467	1.467	0.033
							1/2"	1.667	1.667	0.051
							Ice	1.878	1.878	0.071
							1" Ice	2.333	2.333	0.119
							2" Ice	3.378	3.378	0.253
DC6-48-60-18-8F	C	From Leg	4.000	0.000	0.000	100.000	4" Ice			
							No Ice	1.467	1.467	0.033
							1/2"	1.667	1.667	0.051
							Ice	1.878	1.878	0.071
							1" Ice	2.333	2.333	0.119
DTMABP7819VG12A	A	From Leg	4.000	0.000	0.000	100.000	2" Ice	3.378	3.378	0.253
							4" Ice			
							No Ice	1.139	0.391	0.019
							1/2"	1.284	0.488	0.026
							Ice	1.437	0.595	0.036
DTMABP7819VG12A	B	From Leg	4.000	0.000	0.000	100.000	1" Ice	1.769	0.833	0.060
							2" Ice	2.538	1.414	0.140
							4" Ice			
							No Ice	1.139	0.391	0.019
							1/2"	1.284	0.488	0.026
DTMABP7819VG12A	C	From Leg	4.000	0.000	0.000	100.000	Ice	1.437	0.595	0.036
							1" Ice	1.769	0.833	0.060
							2" Ice	2.538	1.414	0.140
							4" Ice			
							No Ice	1.139	0.391	0.019
Platform Mount [LP 1301-1]	C	None			0.000	100.000	1/2"	62.700	62.700	2.935
							Ice	76.000	76.000	3.808
							1" Ice	92.200	92.200	4.940
							4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
						2" Ice	111.800	111.800	6.411
						4" Ice			
**Lvl 86**									
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000	0.000	86.000	No Ice	7.336	6.145	0.153
			0.000			1/2" Ice	7.868	7.014	0.214
			4.000			1" Ice	8.393	7.803	0.282
						2" Ice	9.474	9.434	0.441
						4" Ice	11.759	12.912	0.885
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	7.336	6.145	0.153
			0.000			1/2" Ice	7.868	7.014	0.214
			4.000			1" Ice	8.393	7.803	0.282
						2" Ice	9.474	9.434	0.441
						4" Ice	11.759	12.912	0.885
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000	0.000	86.000	No Ice	7.336	6.145	0.153
			0.000			1/2" Ice	7.868	7.014	0.214
			4.000			1" Ice	8.393	7.803	0.282
						2" Ice	9.474	9.434	0.441
						4" Ice	11.759	12.912	0.885
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	86.000	No Ice	11.445	9.359	0.076
			0.000			1/2" Ice	12.064	10.679	0.160
			4.000			1" Ice	12.689	11.714	0.254
						2" Ice	14.030	13.816	0.474
						4" Ice	17.045	18.222	1.078
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	11.445	9.359	0.076
			0.000			1/2" Ice	12.064	10.679	0.160
			4.000			1" Ice	12.689	11.714	0.254
						2" Ice	14.030	13.816	0.474
						4" Ice	17.045	18.222	1.078
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	86.000	No Ice	11.445	9.359	0.076
			0.000			1/2" Ice	12.064	10.679	0.160
			4.000			1" Ice	12.689	11.714	0.254
						2" Ice	14.030	13.816	0.474
						4" Ice	17.045	18.222	1.078
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0.000	86.000	No Ice	6.825	5.642	0.112
			0.000			1/2" Ice	7.347	6.480	0.169
			4.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
KRY 112 71	A	From Leg	4.000	0.000	86.000	No Ice	0.681	0.450	0.013
			0.000			1/2" Ice	0.802	0.559	0.018
			4.000			1" Ice	0.932	0.677	0.025
						2" Ice	1.219	0.939	0.044
						4" Ice	1.896	1.566	0.111
KRY 112 71	B	From Leg	4.000	0.000	86.000	No Ice	0.681	0.450	0.013
			0.000			1/2" Ice	0.802	0.559	0.018



Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			Horz ft	Lateral ft						Vert ft
1900MHz RRH	B	From Leg	2.000	0.000	0.000	78.000	2" Ice	5.050	6.152	0.407
							4" Ice			
							No Ice	2.907	3.801	0.044
							1/2" Ice	3.145	4.065	0.075
							1" Ice	3.391	4.337	0.110
1900MHz RRH	C	From Leg	2.000	0.000	0.000	78.000	2" Ice	5.050	6.152	0.407
							4" Ice			
							No Ice	2.907	3.801	0.044
							1/2" Ice	3.145	4.065	0.075
							1" Ice	3.391	4.337	0.110
800 EXTERNAL NOTCH FILTER	A	From Leg	2.000	0.000	0.000	78.000	1" Ice	3.909	4.908	0.192
							2" Ice	5.050	6.152	0.407
							4" Ice			
							No Ice	0.770	0.375	0.011
							1/2" Ice	0.890	0.465	0.017
800 EXTERNAL NOTCH FILTER	B	From Leg	2.000	0.000	0.000	78.000	Ice	1.018	0.563	0.024
							1" Ice	1.301	0.787	0.045
							2" Ice	1.970	1.337	0.114
							4" Ice			
							No Ice	0.770	0.375	0.011
800 EXTERNAL NOTCH FILTER	C	From Leg	2.000	0.000	0.000	78.000	1/2" Ice	0.890	0.465	0.017
							Ice	1.018	0.563	0.024
							1" Ice	1.301	0.787	0.045
							2" Ice	1.970	1.337	0.114
							4" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	2.000	0.000	0.000	78.000	No Ice	0.770	0.375	0.011
							1/2" Ice	0.890	0.465	0.017
							Ice	1.018	0.563	0.024
							1" Ice	1.301	0.787	0.045
							2" Ice	1.970	1.337	0.114
6' x 2" Mount Pipe	A	From Leg	2.000	0.000	0.000	78.000	4" Ice			
							No Ice	1.425	1.425	0.022
							1/2" Ice	1.925	1.925	0.033
							Ice	2.294	2.294	0.048
							1" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	2.000	0.000	0.000	78.000	2" Ice	4.702	4.702	0.231
							4" Ice			
							No Ice	1.425	1.425	0.022
							1/2" Ice	1.925	1.925	0.033
							Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	2.000	0.000	0.000	78.000	1" Ice	3.060	3.060	0.090
							2" Ice	4.702	4.702	0.231
							4" Ice			
							No Ice	1.425	1.425	0.022
							1/2" Ice	1.925	1.925	0.033
Side Arm Mount [SO 104-3]	C	None	0.000	0.000	0.000	78.000	Ice	2.294	2.294	0.048
							1" Ice	3.060	3.060	0.090
							2" Ice	4.702	4.702	0.231
							4" Ice			
							No Ice	3.300	3.300	0.287
**Lvl 76** APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	76.000	1/2" Ice	4.130	4.130	0.317
							Ice	4.960	4.960	0.347
							1" Ice	6.620	6.620	0.407
							2" Ice	9.940	9.940	0.527
							4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	76.000	No Ice	8.498	6.946	0.083
							1/2" Ice	9.149	8.127	0.151
							Ice	9.767	9.021	0.227
							1" Ice	11.031	10.844	0.406
							2" Ice	13.679	14.851	0.909
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	76.000	4" Ice			
							No Ice	7.134	4.959	0.077
							1/2"	7.662	5.754	0.131



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			3.000			Ice	8.183	6.472	0.193
						1" Ice	9.256	8.010	0.338
						2" Ice	11.526	11.412	0.752
						4" Ice			
(2) APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	8.498	6.946	0.083
						1/2"	9.149	8.127	0.151
						Ice	9.767	9.021	0.227
						1" Ice	11.031	10.844	0.406
						2" Ice	13.679	14.851	0.909
						4" Ice			
(2) APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	7.134	4.959	0.077
						1/2"	7.662	5.754	0.131
						Ice	8.183	6.472	0.193
						1" Ice	9.256	8.010	0.338
						2" Ice	11.526	11.412	0.752
						4" Ice			
TD-RRH8x20-25	A	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	4.720	1.700	0.070
						1/2"	5.014	1.917	0.097
						Ice	5.316	2.143	0.128
						1" Ice	5.948	2.620	0.200
						2" Ice	7.314	3.677	0.397
						4" Ice			
(2) TD-RRH8x20-25	C	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	4.720	1.700	0.070
						1/2"	5.014	1.917	0.097
						Ice	5.316	2.143	0.128
						1" Ice	5.948	2.620	0.200
						2" Ice	7.314	3.677	0.397
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	1.425	1.425	0.022
						1/2"	1.925	1.925	0.033
						Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
(4) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	76.000	No Ice	1.425	1.425	0.022
						1/2"	1.925	1.925	0.033
						Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
Platform Mount [LP 304-1]	C	None		0.000	76.000	No Ice	17.460	17.460	1.349
						1/2"	22.440	22.440	1.625
						Ice	27.420	27.420	1.900
						1" Ice	37.380	37.380	2.451
						2" Ice	57.300	57.300	3.554
						4" Ice			
**Lvl 65**									
(2) SBNHH-1D45B w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	12.838	6.946	0.088
						1/2"	13.529	8.127	0.172
						Ice	14.188	9.021	0.265
						1" Ice	15.532	10.844	0.478
						2" Ice	18.340	14.851	1.055
						4" Ice			
(2) SBNHH-1D45B w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	12.838	6.946	0.088
						1/2"	13.529	8.127	0.172
						Ice	14.188	9.021	0.265
						1" Ice	15.532	10.844	0.478
						2" Ice	18.340	14.851	1.055
						4" Ice			
(2) SBNHH-1D45B w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	12.838	6.946	0.088
						1/2"	13.529	8.127	0.172
						Ice	14.188	9.021	0.265
						1" Ice	15.532	10.844	0.478
						2" Ice	18.340	14.851	1.055
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
RRH2x60-AWS	A	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
RRH2x60-AWS	B	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
RRH2x60-AWS	C	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
RRH2x60-700	A	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
RRH2x60-700	B	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
RRH2x60-700	C	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						Ice	4.596	2.360	0.109
						1" Ice	5.271	2.957	0.173
						2" Ice	6.722	4.253	0.354
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	7.979	5.407	0.042
						1/2" Ice	8.621	6.558	0.101
						Ice	9.228	7.422	0.168
						1" Ice	10.473	9.198	0.328
						2" Ice	13.082	12.952	0.788
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	7.979	5.407	0.042
						1/2" Ice	8.621	6.558	0.101
						Ice	9.228	7.422	0.168
						1" Ice	10.473	9.198	0.328
						2" Ice	13.082	12.952	0.788
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	7.979	5.407	0.042
						1/2" Ice	8.621	6.558	0.101
						Ice	9.228	7.422	0.168
						1" Ice	10.473	9.198	0.328
						2" Ice	13.082	12.952	0.788
BXA-171063/12CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	5.029	5.289	0.041
						1/2" Ice	5.583	6.459	0.087
						Ice	6.103	7.348	0.140
						1" Ice	7.166	9.148	0.273
						2" Ice	9.438	12.947	0.677
BXA-171063/12CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	65.000	No Ice	5.029	5.289	0.041
						1/2" Ice	5.583	6.459	0.087
						Ice	6.103	7.348	0.140
						1" Ice	7.166	9.148	0.273
						2" Ice	9.438	12.947	0.677

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
BXA-171063/12CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	65.000	4" Ice	5.029	5.289	0.041
						No Ice	5.583	6.459	0.087
						1/2" Ice	6.103	7.348	0.140
						1" Ice	7.166	9.148	0.273
						2" Ice	9.438	12.947	0.677
(2) DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	65.000	4" Ice	5.600	2.333	0.044
						No Ice	5.915	2.558	0.080
						1/2" Ice	6.240	2.791	0.120
						1" Ice	6.914	3.284	0.213
						2" Ice	8.365	4.373	0.455
Platform Mount [LP 303-1]	C	None		0.000	65.000	4" Ice	14.660	14.660	1.250
						No Ice	18.870	18.870	1.481
						1/2" Ice	23.080	23.080	1.713
						1" Ice	31.500	31.500	2.175
						2" Ice	48.340	48.340	3.101
*****						4" Ice			

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K
*****										

### Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Leg Weight	15.751					
Bracing Weight	0.000					
Total Member Self-Weight	15.751			-0.316	2.240	
Total Weight	29.027			-0.316	2.240	
Wind 0 deg - No Ice		0.342	-31.608	-2239.492	-23.251	-4.944
Wind 30 deg - No Ice		16.162	-27.545	-1952.245	-1143.451	-5.354
Wind 60 deg - No Ice		27.652	-16.100	-1141.980	-1956.664	-4.328
Wind 90 deg - No Ice		31.732	-0.342	-25.807	-2244.991	-2.143
Wind 120 deg - No Ice		27.310	15.508	1097.196	-1931.173	0.616
Wind 150 deg - No Ice		15.570	27.203	1926.121	-1099.299	3.210
Wind 180 deg - No Ice		-0.342	31.608	2238.859	27.731	4.944
Wind 210 deg - No Ice		-16.162	27.545	1951.612	1147.932	5.354
Wind 240 deg - No Ice		-27.652	16.100	1141.347	1961.145	4.328
Wind 270 deg - No Ice		-31.732	0.342	25.174	2249.471	2.143
Wind 300 deg - No Ice		-27.310	-15.508	-1097.828	1935.654	-0.616
Wind 330 deg - No Ice		-15.570	-27.203	-1926.754	1103.780	-3.210
Member Ice	3.940					
Total Weight Ice	41.433			-0.994	5.042	
Wind 0 deg - Ice		0.061	-7.433	-536.364	0.519	-1.160

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Wind 30 deg - Ice		3.782	-6.468	-466.899	-267.384	-1.293
Wind 60 deg - Ice		6.490	-3.769	-272.596	-462.290	-1.080
Wind 90 deg - Ice		7.458	-0.061	-5.517	-531.975	-0.578
Wind 120 deg - Ice		6.428	3.663	262.773	-457.767	0.079
Wind 150 deg - Ice		3.676	6.406	460.388	-259.549	0.715
Wind 180 deg - Ice		-0.061	7.433	534.375	9.565	1.160
Wind 210 deg - Ice		-3.782	6.468	464.911	277.468	1.293
Wind 240 deg - Ice		-6.490	3.769	270.608	472.374	1.080
Wind 270 deg - Ice		-7.458	0.061	3.529	542.059	0.578
Wind 300 deg - Ice		-6.428	-3.663	-264.762	467.851	-0.079
Wind 330 deg - Ice		-3.676	-6.406	-462.376	269.633	-0.715
Total Weight	29.027			-0.316	2.240	
Wind 0 deg - Service		0.118	-10.937	-775.009	-6.612	-1.711
Wind 30 deg - Service		5.592	-9.531	-675.616	-394.224	-1.852
Wind 60 deg - Service		9.568	-5.571	-395.247	-675.613	-1.498
Wind 90 deg - Service		10.980	-0.118	-9.028	-775.380	-0.742
Wind 120 deg - Service		9.450	5.366	379.554	-666.793	0.213
Wind 150 deg - Service		5.388	9.413	666.380	-378.947	1.111
Wind 180 deg - Service		-0.118	10.937	774.593	11.029	1.711
Wind 210 deg - Service		-5.592	9.531	675.200	398.642	1.852
Wind 240 deg - Service		-9.568	5.571	394.831	680.030	1.498
Wind 270 deg - Service		-10.980	0.118	8.613	779.797	0.742
Wind 300 deg - Service		-9.450	-5.366	-379.970	671.210	-0.213
Wind 330 deg - Service		-5.388	-9.413	-666.795	383.364	-1.111

### Load Combinations

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

Comb. No.	Description
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	100 - 47	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-27.339	5.064	0.738
			Max. Mx	11	-16.651	763.736	-7.329
			Max. My	2	-16.657	-5.336	760.190
			Max. Vy	11	-25.590	763.736	-7.329
			Max. Vx	2	-25.464	-5.336	760.190
L2	47 - 0	Pole	Max. Torque	3			5.281
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-41.693	5.157	1.019
			Max. Mx	11	-29.005	2281.413	-25.516
			Max. My	2	-29.005	-23.550	2271.296
			Max. Vy	11	-31.753	2281.413	-25.516
			Max. Vx	2	-31.629	-23.550	2271.296
			Max. Torque	3			5.351

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	41.693	6.490	-3.769
	Max. H <sub>x</sub>	11	29.027	31.732	-0.342
	Max. H <sub>z</sub>	2	29.027	-0.342	31.608
	Max. M <sub>x</sub>	2	2271.296	-0.342	31.608
	Max. M <sub>z</sub>	5	2276.832	-31.732	0.342
	Max. Torsion	3	5.351	-16.162	27.545
	Min. Vert	1	29.027	0.000	0.000
	Min. H <sub>x</sub>	5	29.027	-31.732	0.342
	Min. H <sub>z</sub>	8	29.027	0.342	-31.608
	Min. M <sub>x</sub>	8	-2270.649	0.342	-31.608
	Min. M <sub>z</sub>	11	-2281.413	31.732	-0.342
	Min. Torsion	9	-5.345	16.162	-27.545

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	29.027	0.000	0.000	-0.316	2.240	0.000
Dead+Wind 0 deg - No Ice	29.027	0.342	-31.608	-2271.296	-23.551	-4.936
Dead+Wind 30 deg - No Ice	29.027	16.162	-27.545	-1979.950	-1159.647	-5.351
Dead+Wind 60 deg - No Ice	29.027	27.652	-16.100	-1158.176	-1984.399	-4.331
Dead+Wind 90 deg - No Ice	29.027	31.732	-0.342	-26.160	-2276.832	-2.151
Dead+Wind 120 deg - No Ice	29.027	27.310	15.508	1112.790	-1958.579	0.600
Dead+Wind 150 deg - No Ice	29.027	15.570	27.203	1953.485	-1114.903	3.188
Dead+Wind 180 deg - No Ice	29.027	-0.342	31.608	2270.649	28.125	4.924
Dead+Wind 210 deg - No Ice	29.027	-16.162	27.545	1979.306	1164.220	5.345
Dead+Wind 240 deg - No Ice	29.027	-27.652	16.100	1157.535	1988.976	4.336
Dead+Wind 270 deg - No Ice	29.027	-31.732	0.342	25.517	2281.413	2.163

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 300 deg - No Ice	29.027	-27.310	-15.508	-1113.438	1963.161	-0.593
Dead+Wind 330 deg - No Ice	29.027	-15.570	-27.203	-1954.135	1119.481	-3.193
Dead+Ice+Temp	41.693	-0.000	-0.000	-1.019	5.157	0.000
Dead+Wind 0 deg+Ice+Temp	41.693	0.061	-7.433	-548.705	0.612	-1.156
Dead+Wind 30 deg+Ice+Temp	41.693	3.782	-6.468	-477.641	-273.445	-1.296
Dead+Wind 60 deg+Ice+Temp	41.693	6.490	-3.769	-278.870	-472.830	-1.089
Dead+Wind 90 deg+Ice+Temp	41.693	7.458	-0.061	-5.653	-544.118	-0.589
Dead+Wind 120 deg+Ice+Temp	41.693	6.428	3.663	268.802	-468.209	0.068
Dead+Wind 150 deg+Ice+Temp	41.693	3.676	6.406	470.956	-265.440	0.707
Dead+Wind 180 deg+Ice+Temp	41.693	-0.061	7.433	546.640	9.855	1.156
Dead+Wind 210 deg+Ice+Temp	41.693	-3.782	6.468	475.577	283.912	1.297
Dead+Wind 240 deg+Ice+Temp	41.693	-6.490	3.769	276.806	483.297	1.090
Dead+Wind 270 deg+Ice+Temp	41.693	-7.458	0.061	3.589	554.586	0.591
Dead+Wind 300 deg+Ice+Temp	41.693	-6.428	-3.663	-270.866	478.676	-0.067
Dead+Wind 330 deg+Ice+Temp	41.693	-3.676	-6.406	-473.020	275.908	-0.706
Dead+Wind 0 deg - Service	29.027	0.118	-10.937	-786.323	-6.649	-1.709
Dead+Wind 30 deg - Service	29.027	5.592	-9.531	-685.489	-399.861	-1.854
Dead+Wind 60 deg - Service	29.027	9.568	-5.571	-401.067	-685.315	-1.502
Dead+Wind 90 deg - Service	29.027	10.980	-0.118	-9.266	-786.526	-0.747
Dead+Wind 120 deg - Service	29.027	9.450	5.366	384.931	-676.373	0.207
Dead+Wind 150 deg - Service	29.027	5.388	9.413	675.899	-384.372	1.105
Dead+Wind 180 deg - Service	29.027	-0.118	10.937	785.674	11.236	1.708
Dead+Wind 210 deg - Service	29.027	-5.592	9.531	684.841	404.448	1.853
Dead+Wind 240 deg - Service	29.027	-9.568	5.571	400.420	689.903	1.502
Dead+Wind 270 deg - Service	29.027	-10.980	0.118	8.619	791.114	0.749
Dead+Wind 300 deg - Service	29.027	-9.450	-5.366	-385.579	680.962	-0.206
Dead+Wind 330 deg - Service	29.027	-5.388	-9.413	-676.548	388.960	-1.106

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-29.027	0.000	0.000	29.027	0.000	0.000%
2	0.342	-29.027	-31.608	-0.342	29.027	31.608	0.000%
3	16.162	-29.027	-27.545	-16.162	29.027	27.545	0.000%
4	27.652	-29.027	-16.100	-27.652	29.027	16.100	0.000%
5	31.732	-29.027	-0.342	-31.732	29.027	0.342	0.000%
6	27.310	-29.027	15.508	-27.310	29.027	-15.508	0.000%
7	15.570	-29.027	27.203	-15.570	29.027	-27.203	0.000%
8	-0.342	-29.027	31.608	0.342	29.027	-31.608	0.000%
9	-16.162	-29.027	27.545	16.162	29.027	-27.545	0.000%
10	-27.652	-29.027	16.100	27.652	29.027	-16.100	0.000%
11	-31.732	-29.027	0.342	31.732	29.027	-0.342	0.000%
12	-27.310	-29.027	-15.508	27.310	29.027	15.508	0.000%
13	-15.570	-29.027	-27.203	15.570	29.027	27.203	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
14	0.000	-41.693	0.000	0.000	41.693	0.000	0.000%
15	0.061	-41.693	-7.433	-0.061	41.693	7.433	0.000%
16	3.782	-41.693	-6.468	-3.782	41.693	6.468	0.000%
17	6.490	-41.693	-3.769	-6.490	41.693	3.769	0.000%
18	7.458	-41.693	-0.061	-7.458	41.693	0.061	0.000%
19	6.428	-41.693	3.663	-6.428	41.693	-3.663	0.000%
20	3.676	-41.693	6.406	-3.676	41.693	-6.406	0.000%
21	-0.061	-41.693	7.433	0.061	41.693	-7.433	0.000%
22	-3.782	-41.693	6.468	3.782	41.693	-6.468	0.000%
23	-6.490	-41.693	3.769	6.490	41.693	-3.769	0.000%
24	-7.458	-41.693	0.061	7.458	41.693	-0.061	0.000%
25	-6.428	-41.693	-3.663	6.428	41.693	3.663	0.000%
26	-3.676	-41.693	-6.406	3.676	41.693	6.406	0.000%
27	0.118	-29.027	-10.937	-0.118	29.027	10.937	0.000%
28	5.592	-29.027	-9.531	-5.592	29.027	9.531	0.000%
29	9.568	-29.027	-5.571	-9.568	29.027	5.571	0.000%
30	10.980	-29.027	-0.118	-10.980	29.027	0.118	0.000%
31	9.450	-29.027	5.366	-9.450	29.027	-5.366	0.000%
32	5.388	-29.027	9.413	-5.388	29.027	-9.413	0.000%
33	-0.118	-29.027	10.937	0.118	29.027	-10.937	0.000%
34	-5.592	-29.027	9.531	5.592	29.027	-9.531	0.000%
35	-9.568	-29.027	5.571	9.568	29.027	-5.571	0.000%
36	-10.980	-29.027	0.118	10.980	29.027	-0.118	0.000%
37	-9.450	-29.027	-5.366	9.450	29.027	5.366	0.000%
38	-5.388	-29.027	-9.413	5.388	29.027	9.413	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00009481
3	Yes	4	0.0000001	0.00023022
4	Yes	4	0.0000001	0.00032346
5	Yes	4	0.0000001	0.00006217
6	Yes	4	0.0000001	0.00025091
7	Yes	4	0.0000001	0.00022495
8	Yes	4	0.0000001	0.00010785
9	Yes	4	0.0000001	0.00033741
10	Yes	4	0.0000001	0.00023269
11	Yes	4	0.0000001	0.00004961
12	Yes	4	0.0000001	0.00024994
13	Yes	4	0.0000001	0.00028729
14	Yes	4	0.0000001	0.00000444
15	Yes	4	0.0000001	0.00014506
16	Yes	4	0.0000001	0.00015178
17	Yes	4	0.0000001	0.00015201
18	Yes	4	0.0000001	0.00014202
19	Yes	4	0.0000001	0.00014774
20	Yes	4	0.0000001	0.00014808
21	Yes	4	0.0000001	0.00014414
22	Yes	4	0.0000001	0.00015531
23	Yes	4	0.0000001	0.00015490
24	Yes	4	0.0000001	0.00014683
25	Yes	4	0.0000001	0.00015306
26	Yes	4	0.0000001	0.00015285
27	Yes	4	0.0000001	0.00001850
28	Yes	4	0.0000001	0.00002110
29	Yes	4	0.0000001	0.00003133
30	Yes	4	0.0000001	0.00001104
31	Yes	4	0.0000001	0.00001809
32	Yes	4	0.0000001	0.00001599
33	Yes	4	0.0000001	0.00001930
34	Yes	4	0.0000001	0.00003429
35	Yes	4	0.0000001	0.00001967

36	Yes	4	0.00000001	0.00001036
37	Yes	4	0.00000001	0.00001803
38	Yes	4	0.00000001	0.00002516

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 47	10.201	35	0.792	0.006
L2	53 - 0	3.240	35	0.542	0.003

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.000	HB-X-AW-19-65-00T	35	10.201	0.792	0.006	43249
86.000	AIR -32 B2A/B66AA w/ Mount Pipe	35	7.867	0.732	0.005	15446
78.000	TME-800MHZ RRH	35	6.591	0.694	0.004	9829
76.000	APXVSPP18-C-A20 w/ Mount Pipe	35	6.284	0.684	0.004	9010
65.000	(2) SBNHH-1D45B w/ Mount Pipe	35	4.699	0.623	0.003	6178

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 47	29.382	10	2.281	0.018
L2	53 - 0	9.341	10	1.561	0.007

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.000	HB-X-AW-19-65-00T	10	29.382	2.281	0.018	15067
86.000	AIR -32 B2A/B66AA w/ Mount Pipe	10	22.662	2.109	0.015	5380
78.000	TME-800MHZ RRH	10	18.991	2.001	0.013	3423
76.000	APXVSPP18-C-A20 w/ Mount Pipe	10	18.105	1.972	0.012	3138
65.000	(2) SBNHH-1D45B w/ Mount Pipe	10	13.541	1.796	0.010	2150

### Compression Checks



### Pole Design Data

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	$F_a$ ksi	A $in^2$	Actual P K	Allow. $P_a$ K	Ratio $\frac{P}{P_a}$
L1	100 - 47 (1)	TP40.72x28x0.313	53.000	0.000	0.0	39.000	38.846	-16.637	1514.980	0.011
L2	47 - 0 (2)	TP51.37x38.655x0.375	53.000	0.000	0.0	39.000	61.003	-29.004	2379.110	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual $M_x$ kip-ft	Actual $f_{bx}$ ksi	Allow. $F_{bx}$ ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual $M_y$ kip-ft	Actual $f_{by}$ ksi	Allow. $F_{by}$ ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	100 - 47 (1)	TP40.72x28x0.313	769.46 3	24.823	39.000	0.636	0.000	0.000	39.000	0.000
L2	47 - 0 (2)	TP51.37x38.655x0.375	2301.2 83	36.100	39.000	0.926	0.000	0.000	39.000	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	100 - 47 (1)	TP40.72x28x0.313	25.859	0.666	26.000	0.052	4.236	0.066	26.000	0.003
L2	47 - 0 (2)	TP51.37x38.655x0.375	32.018	0.525	26.000	0.041	4.336	0.033	26.000	0.001

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 47 (1)	0.011	0.636	0.000	0.052	0.003	0.648	1.333	H1-3+VT ✓
L2	47 - 0 (2)	0.012	0.926	0.000	0.041	0.001	0.938	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF \cdot P_{allow}$ K	% Capacity	Pass Fail
L1	100 - 47	Pole	TP40.72x28x0.313	1	-16.637	2019.468	48.6	Pass
L2	47 - 0	Pole	TP51.37x38.655x0.375	2	-29.004	3171.353	70.4	Pass
Summary								
Pole (L2)							70.4	Pass
<b>RATING =</b>							<b>70.4</b>	<b>Pass</b>



**APPENDIX B**  
**BASE LEVEL DRAWING**



(INSTALLED)  
(8) 1/2" TO 100 FT LEVEL

(INSTALLED—IN (2) 2-1/4 CONDUITS)  
(2) 3/8" TO 100 FT LEVEL  
(2) 3/4" TO 100 FT LEVEL  
(INSTALLED)  
(2) 3/4" TO 100 FT LEVEL  
(6) 1-1/4" TO 100 FT LEVEL

(INSTALLED)  
(2) 1-5/8" TO 65 FT LEVEL

(INSTALLED)  
(1) 5/8" TO 76 FT LEVEL  
(1) 3/4" TO 76 FT LEVEL  
(3) 1-1/4" TO 76 FT LEVEL

(PROPOSED)  
(1) 1-5/8" TO 86 FT LEVEL  
(INSTALLED—TO BE REMOVED)  
(7) 7/8" TO 86 FT LEVEL  
(INSTALLED)  
(11) 7/8" TO 86 FT LEVEL  
(1) 1-5/8" TO 86 FT LEVEL

CLIMBING PEGS W/  
SAFETY CLIMB

BUSINESS UNIT: 842869 TOWER ID: C\_BASELEVEL

CROWN REGION ADDRESS  
USA

DATE	DESCRIPTION	BY
23/06/14	UPDATED PER WORK ORDER # 790630	JF
17/10/14	UPDATED PER WORK ORDER # 948609	ALM
17/10/14	UPDATED PER WORK ORDER # 950286	APC
05/11/14	UPDATED PER WORK ORDER # 961337	DMB
17/2/2015	UPDATED PER WORK ORDER 1010256	SLW
25/6/2015	UPDATED PER WORK ORDER 1082084	CRM
5/8/2015	UPDATED PER WORK ORDER 1093749	BMH
...	...	...

DRAWN BY: EJB  
CHECKED BY:  
DRAWING DATE: 21/04/14

SITE NUMBER: \_\_\_\_\_  
 SITE NAME: \_\_\_\_\_  
 SITE ADDRESS: \_\_\_\_\_  
 450-478 WEST MAIN STREET  
 MERIDEN, CT 06451  
 COUNTY: \_\_\_\_\_  
 USA  
 SHEET TITLE: \_\_\_\_\_  
**BASE LEVEL**  
 SHEET NUMBER: \_\_\_\_\_

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

## TIA Rev F

### Site Data

BU#:	842869
Site Name:	Meriden West Central
App #:	343208 Rev# 6
Pole Manufacturer:	Other

Reactions		
Moment:	2301	ft-kips
Axial:	29	kips
Shear:	32	kips

### Anchor Rod Data

Qty:	20	
Diam:	2.5	in
Rod Material:	Other	
Strength (Fu):	65	ksi
Yield (Fy):	50	ksi
Bolt Circle:	59	in

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

### Anchor Rod Results

Maximum Rod Tension: 92.2 Kips  
 Allowable Tension: 140.4 Kips  
 Anchor Rod Stress Ratio: 65.7% **Pass**

Rigid
Service ASD
Fty*ASIF

### Plate Data

Diam:	69	in
Thick:	3	in
Grade:	36	ksi
Single-Rod B-eff:	8.17	in

### Base Plate Results

Base Plate Stress: 18.2 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Base Plate Stress Ratio: 50.5% **Pass**

### Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
29.02

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

### Stiffener Results

Horizontal Weld : n/a  
 Vertical Weld: n/a  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a  
 Plate Comp. (AISC Bracket): n/a

### Pole Results

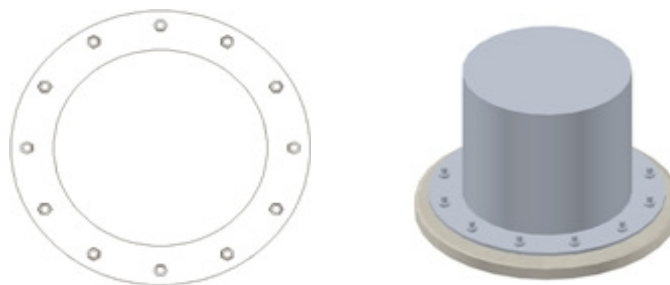
Pole Punching Shear Check: n/a

### Pole Data

Diam:	51.37	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	16	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
-------	-------



\* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

**(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)**

**Site Data**

BU#: 842869
Site Name: Meriden West Central
App #: 343208 Rev# 6

Monopole Base Reaction Forces			
TIA Revision:	F	<--Pull Down	
Unfactored DL Axial, PD:	29	kips	
Unfactored WL Axial, PW:	0	kips	
Unfactored WL Shear, V:	32	kips	
Unfactored WL Moment, M:	2301	ft-kips	

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	34.8	kips
0.90	0.9D+1.6W, Pu:	26.1	kips
1.35	Vu:	43.2	kips
	Mu:	3106.35	ft-kips

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	2.5	ft
Pad Width=Length, L:	20	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	8	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	64.00	ft^2
Pier Height:	6.00	ft
Soil (above pad) Height:	5.00	ft

**1.2D+1.6W Load Combination, Bearing Results:**

<b>(No Soil Wedges)</b> [Reaction+Conc+Soil]	505.68	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	3433.95	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 = 6.79 ft  
 Orthogonal qu= 3.94 ksf  
 qu/φ\*qn Ratio= **32.83% Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 = 4.80 ft  
 Diagonal qu= 4.68 ksf  
 qu/φ\*qn Ratio= **38.98% Pass**

<-- Press Upon Completing All Input

Soil Parameters		
Unit Weight, γ:	110.0	pcf
Ultimate Bearing Capacity, qn:	16.00	ksf
Strength Reduct. factor, φ:	0.75	
Angle of Friction, Φ:	30.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: φ*qn:	12.00	ksf
Passive Pres. Coeff., Kp	3.00	

**Overturning Stability Check**

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	43.2	kips
Pad Force Location Above D:	1.17	ft
φ(Passive Pressure Moment):	50.40	ft-kips
Factored O.T. M(WL), "1.6W":	3484.4	ft-kips
Factored OT (MW-Msoil), M1	3433.95	ft-kips

**0.9D+1.6W Load Combination, Bearing Results:**

<b>(w/ Soil Wedges)</b> [Reaction+Conc+Soil]	418.14	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	3195.33	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.89	ft
Sum of Soil Wedges Wt:	43.20	kips
Soil Wedges ecc, K1:	6.14	ft
Ftg+Soil above Pad wt:	392.4	kips
Unfactored (Total ftg-soil Wt):	435.60	kips
1.2D. <b>No Soil Wedges.</b>	505.68	kips
0.9D. <b>With Soil Wedges</b>	418.14	kips

Orthogonal ecc3 = M2/P2 = 7.64 ft  
 Ortho Non Bearing Length,NBL= **15.28 ft**  
 Orthogonal qu= 4.43 ksf  
 Diagonal qu= 4.95 ksf

Resistance due to Cohesion (Vertical)		
φ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2301.00		
M Orthogonal:	2766.25	<b>83.18%</b>	<b>Pass</b>
M Diagonal:	2766.25	<b>83.18%</b>	<b>Pass</b>

Project Name:	Meriden West Central
Project Number:	BU 842869
Job Number:	WO 1233547
Date:	5/10/2016



Created On:	6/3/2014
Checked By:	DW
Revised On:	3/4/2015
Revision No.:	1.6

## Monopole Pad & Pier Foundation

### Foundation Parameters

Load	
Code	F
Axial	29 kips
Shear	32 kips
Moment	2301 k-ft
Soil Unit Weight	110 pcf
Friction Angle	30
Cohesion	0 psf

Material	
Concrete Strength (F'c)	4000 psi
Concrete Density	150 pcf
Rebar Tensile (Fy)	60 ksi
Clear Cover	3 in

Pad	
Thickness	2.5 ft
Bearing Depth	7.5 ft
Width	20 ft
Rebar Size	9
Rebar Quantity	32

Pier	
Pier type	Square
Width	8 ft
Height above Grade	1 ft
Rebar Size	11
Rebar Quantity	60
Tie Size	4
Tie C/C Spacing	12 in

### Structural Checks

Pad Beam Shear Capacity	576.2 kips
Pad Beam Shear	285.1 kips
Pad Beam Shear Check	49.5% Pass

Pad Bending Moment Capacity	3474.9 k-ft
Pad Bending Moment	1306.6 k-ft
Pad Bending Moment Check	37.6% Pass

Punching Shear Capacity	2330.0 kips
Punching Shear	211.4 kips
Punching Shear Check	9.1% Pass

Pad-Pier Bearing Capacity	40734.7 kips
Pad-Pier Bearing	505.7 kips
Pad-Pier Bearing Check	1.2% Pass

Pier Beam Shear Capacity	927.8 kips
Pier Beam Shear	43.2 kips
Pier Beam Shear Check	4.7% Pass

Pier Bending Moment Capacity	18313.5 k-ft
Pier Bending Moment	3343.4 k-ft
Pier Bending Moment Check	18.3% Pass



# Exhibit E

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

T-Mobile Existing Facility

Site ID: CT11733B

CT733/AT&T/Hunter Ambulance  
462 West Main Street  
Meriden, CT 06451

**May 26, 2016**

**EBI Project Number: 6216002596**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>81.74 %</b>

May 26, 2016

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

Emissions Analysis for Site: **CT11733B – CT733/AT&T/Hunter Ambulance**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **462 West Main Street, Meriden, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **462 West Main Street, Meriden, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations the sample point was the top of a six-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **Ericsson AIR32 B2A/B66AA & AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B2A/B66AA & AIR21 B2A/B4P** have a maximum gain of **15.9 dBd** at their main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerline of the proposed antennas is **90 feet** above ground level (AGL).
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

### T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	90	Height (AGL):	90	Height (AGL):	90
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	4.76	Antenna B1 MPE%	4.76	Antenna C1 MPE%	4.76
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	90	Height (AGL):	90	Height (AGL):	90
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	2.38	Antenna B2 MPE%	2.38	Antenna C2 MPE%	2.38
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	90	Height (AGL):	90	Height (AGL):	90
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.94	Antenna B3 MPE%	0.94	Antenna C3 MPE%	0.94

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	<b>8.08 %</b>
AT&T	3.61 %
Hunter Yagi 1	7.43 %
Hunter Yagi 2	7.43 %
Hunter Yagi 3	22.28 %
Hunter whip	7.43 %
Sprint	10.89 %
Verizon Wireless	14.59 %
<b>Site Total MPE %:</b>	<b>81.74 %</b>

T-Mobile Sector 1 Total:	8.08 %
T-Mobile Sector 2 Total:	8.08 %
T-Mobile Sector 3 Total:	8.08 %
<b>Site Total:</b>	<b>81.74 %</b>

T-Mobile_Max per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	90	23.79	2100	1000	2.38 %
T-Mobile 1900 MHz (AWS) LTE	2	2334.27	90	23.79	1900	1000	2.38 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	90	11.89	1900	1000	1.19 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	90	11.89	2100	1000	1.19 %
T-Mobile 700 MHz LTE	1	865.21	90	4.41	700	467	0.94 %
						<b>Total:</b>	<b>8.08 %</b>

## Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	8.08 %
Sector 2:	8.08 %
Sector 3:	8.08 %
T-Mobile Per Sector Maximum:	8.08 %
Site Total:	81.74 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **81.74%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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