David Ford, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 821-6509
dford@clinellc.com

May 2, 2016

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

RE: Notice of Exempt Modification // Site Number: CT5259 – FA# 10071358
1030 New Britain Avenue, West Hartford, CT 06110 (Site Name: West Hartford Elmwood)
N 41.7360919 // W -72.7204989

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC (ñAT&Tò) currently maintains (9) antennas at the 180 foot level of the existing 185 foot self-support lattice tower at 1030 New Britain Avenue, West Hartford. The tower is owned by Ten Thirty Tower Company LLC. The property is owned by Ten Thirty Tower Company LLC. AT&T now intends to replace (3) antennas for its LTE upgrade. These antennas will be installed at the 180 foot level of the tower. AT&T also intends to install (3) remote radio units, (1) surge arrestor, (2) DC power lines and (1) fiber line.

The current proposal involves an antenna swap only.

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 West Hartford Town Manager, Mr. Ron Van Winkle, as well as the tower owner, Ten Thirty Tower Company LLC ï c/o Hirschfeld Management, Inc. and the ground owner, Ten Thirty Tower Company LLC.

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

Attached to accommodate this filing are construction drawings dated April 29, 2016 by Com Ex Consultants, a structural analysis dated April 26, 2016 by Paul J. Ford & Company and an Emissions Analysis Report dated March 7, 2016 by EBI Consulting.

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 as shown in the attached structural analysis by Paul J. Ford & Company, dated April 26, 2016.

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

Sincerely,

_____

David Ford, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 821-6509
dford@centerlincommunications.com

Attachments

cc: Mr. Ron Van Winkle - West Hartford Town Manager
Ten Thirty Tower Company LLC - as tower owner and property owner

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

AT&T Existing Facility

Site ID: CT5259

West Hartford_Elmwood
1030 New Britain Avenue
West Hartford, CT 06110

March 7, 2016

EBI Project Number: 6216000900

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	4.14 %

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

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March 7, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5259 – West Hartford_Elmwood**

EBI Consulting was directed to analyze the proposed AT&T facility located at **1030 New Britain Avenue, West Hartford, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

General population/uncontrolled exposure limits apply to situations in which the general 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 ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **1030 New Britain Avenue, West Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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 UMTS channels (850 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 (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 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.

8) 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.

9) The antennas used in this modeling are the **CCI OPA-65R-LCUU-H6 and the Powerwave 7770.00** for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

10) The antenna mounting height centerline of the proposed antennas is **180 feet** above ground level (AGL).

11) 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.

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AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	180 feet	Height (AGL):	180 feet	Height (AGL):	180 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
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):	3,453.54	ERP (W):	3,453.54	ERP (W):	3,453.54
Antenna A1 MPE%	**0.49**	Antenna B1 MPE%	**0.49**	Antenna C1 MPE%	**0.49**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	15.45 dBd	Gain:	15.45 dBd	Gain:	15.45 dBd
Height (AGL):	180 feet	Height (AGL):	180 feet	Height (AGL):	180 feet
Frequency Bands	2300 MHz (WCS)	Frequency Bands	2300 MHz (WCS)	Frequency Bands	2300 MHz (WCS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,209.02	ERP (W):	4,209.02	ERP (W):	4,209.02
Antenna A2 MPE%	**0.50**	Antenna B2 MPE%	**0.50**	Antenna C2 MPE%	**0.50**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd
Height (AGL):	180 feet	Height (AGL):	180 feet	Height (AGL):	180 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
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):	5,420.52	ERP (W):	5,420.52	ERP (W):	5,420.52
Antenna A3 MPE%	**0.88**	Antenna B3 MPE%	**0.88**	Antenna C3 MPE%	**0.88**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**1.87 %**
T-Mobile	1.92 %
Clearwire	0.08 %
Nextel	0.27 %
Site Total MPE %:	**4.14 %**

AT&T Sector 1 Total:	1.87 %
AT&T Sector 2 Total:	1.87 %
AT&T Sector 3 Total:	1.87 %
Site Total:	4.14 %

AT&T _ Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	180	0.98	850	567	0.17 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	180	1.56	1900	1000	0.16 %
AT&T 1900 MHz (PCS) GSM	2	656.33	180	1.56	1900	1000	0.16 %
AT&T 2300 MHz (WCS) LTE	2	2104.51	180	5.00	2300	1000	0.50 %
AT&T 700 MHz LTE	2	877.31	180	2.08	700	467	0.45 %
AT&T 1900 MHz (PCS) LTE	2	1832.95	180	4.35	1900	1000	0.44 %
						Total:	1.87 %

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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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector 1:	1.87 %
Sector 2:	1.87 %
Sector 3 :	1.87 %
AT&T Maximum Total (per sector):	1.87 %
Site Total:	4.14 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **4.14%** 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.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

PROJECT INFORMATION

SCOPE OF WORK:
- AT&T ANTENNAS: (1) EXISTING ANTENNA PER SECTOR WILL BE REPLACED WITH (1) NEW ANTENNA; (2) EXISTING ANTENNAS PER SECTOR, FOR A TOTAL OF (6) ANTENNAS TO REMAIN.
- AT&T RRUs: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs; (2) EXISTING RRU PER SECTOR TO BE REUSED, FOR A TOTAL OF (6) EXISTING RRUs.
- AT&T SQUID: (1) NEW DC6 SURGE, FOR A TOTAL OF (1) NEW SQUID, (1) EXISTING DC-6 SURGE PROTECTOR, FOR A TOTAL OF (1) EXISTING SQUID TO REMAIN.
- AT&T CABLES: (1) NEW FIBER TRUNK & (2) NEW DC TRUNKS

SITE ADDRESS:	1030 NEW BRITAIN AVENUE WEST HARTFORD, CT 06110
LATITUDE:	41.7360919 41° 44' 9.93084"N
LONGITUDE:	-72.7204989 -72° 43' 13.79604"W
USID:	25914
TOWER OWNER:	TEN THIRTY TOWER COMPANY, LLC 1030 NEW BRITAIN AVENUE WEST HARTFORD, CT 06110
TYPE OF SITE:	LATTICE TOWER/OUTDOOR EQUIPMENT
TOWER HEIGHT: RAD CENTER:	185'-0"± 180'-0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

DRAWING INDEX

		REV.
T-1	TITLE SHEET	0
GN-1	GROUNDING & GENERAL NOTES	0
A-1	COMPOUND LAYOUT	0
A-2	EQUIPMENT LAYOUTS	0
A-3	ANTENNA LAYOUTS & ELEVATIONS	0
A-4	DETAILS	0
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS	0

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

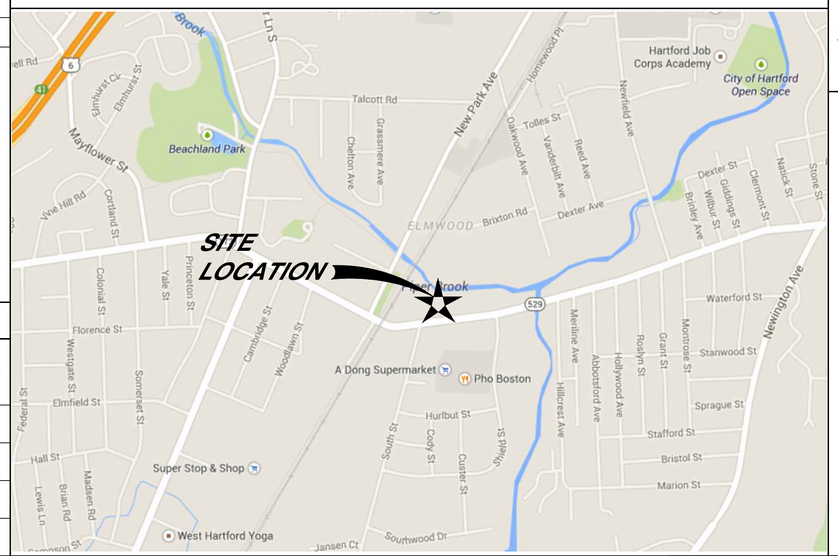
DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

FA CODE: 10071358
SITE NUMBER: CT5259
SITE NAME: WEST HARTFORD-ELMWOOD

VICINITY MAP

1. START AT 500 ENTERPRISE DR. ROCKY KILL GOING TOWARD CAPITAL BLVD; TURN LEFT ON CAPITAL BLVD; TURN LEFT ON WEST ST; TURN LEFT TO TAKE RAMP ONTO I-91 N TOWARD HARTFORD; TAKE THE WATERBURY LEFT EXIT ONTO I-84 W TOWARD #32A/WATERBURY; TAKE LEFT EXIT #45/FLATBUSH AVENUE; TURN RIGHT ON FLATBUSH AVE; TURN LEFT ON NEW PARK AVE; TURN LEFT ON NEW BRITAIN AVE (CT-71); ARRIVE AT 1030 NEW BRITAIN AVE. WEST HARTFORD, ON THE LEFT.



PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ZONING:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

GENERAL NOTES

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

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP · CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

COM-EX Consultants
115 ROUTE 46, SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5259
SITE NAME: WEST HARTFORD-ELMWOOD
1030 NEW BRITAIN AVENUE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	04/29/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

STATE OF CONNECTICUT NICHOLAS D. BARILE LICENSED PROFESSIONAL ENGINEER NO. 28543

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	T-1	0

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – EMPIRE TELECOM
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – AT&T MOBILITY
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR (EMPIRE TELECOM).

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

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

22. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

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PHONE: 862.209.4300
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BILLERICA, MA 01821

SITE NUMBER: CT5259
SITE NAME: WEST HARTFORD-ELMWOOD

1030 NEW BRITAIN AVENUE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	04/29/16	ISSUED AS FINAL	NJM	NDB	NDB

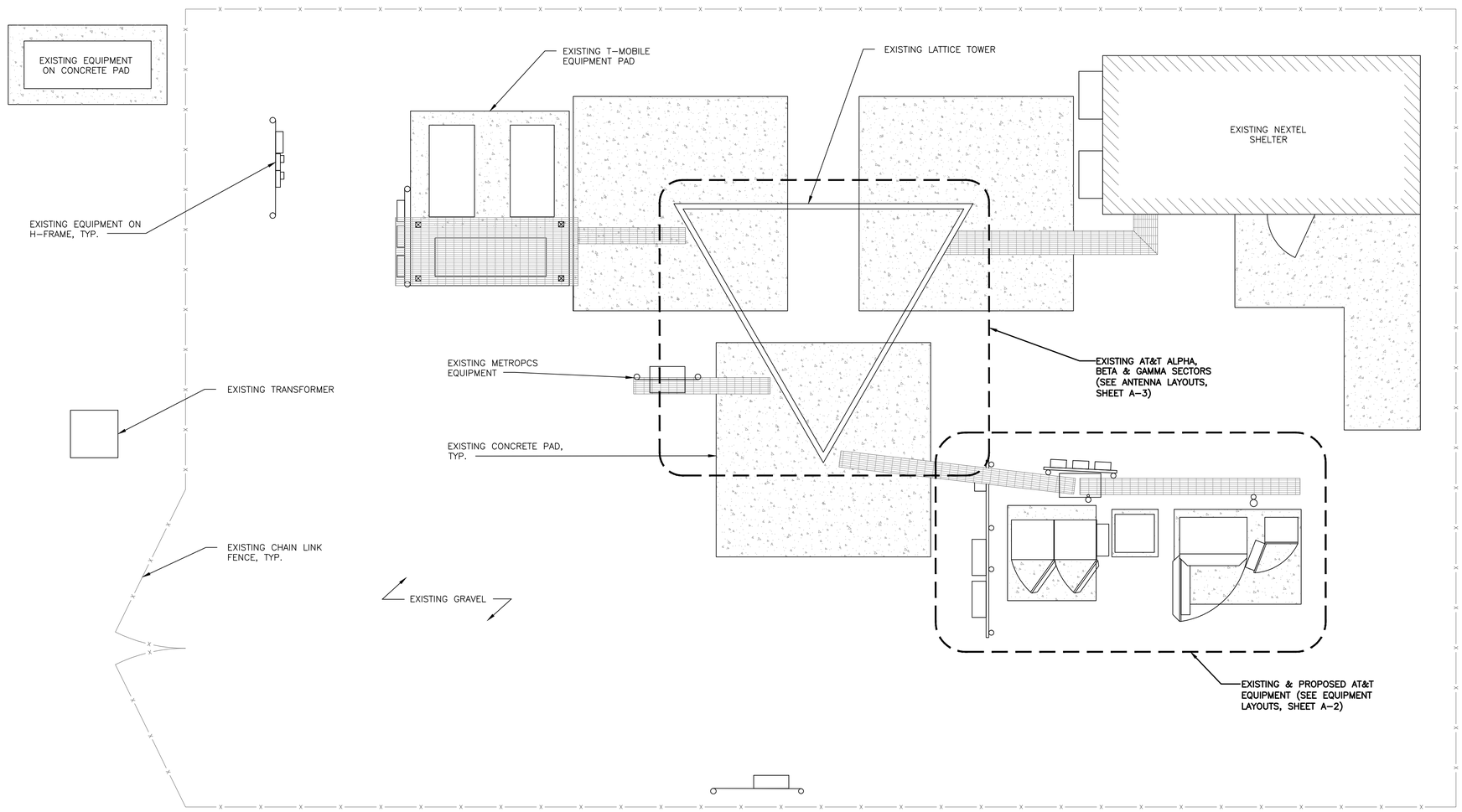
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT · NICHOLAS D. BARILLI · LICENSED PROFESSIONAL ENGINEER · NO. 28643 · PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE: GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	GN-1	0



NORTH

COMPOUND LAYOUT

SCALE: 1/4" = 1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

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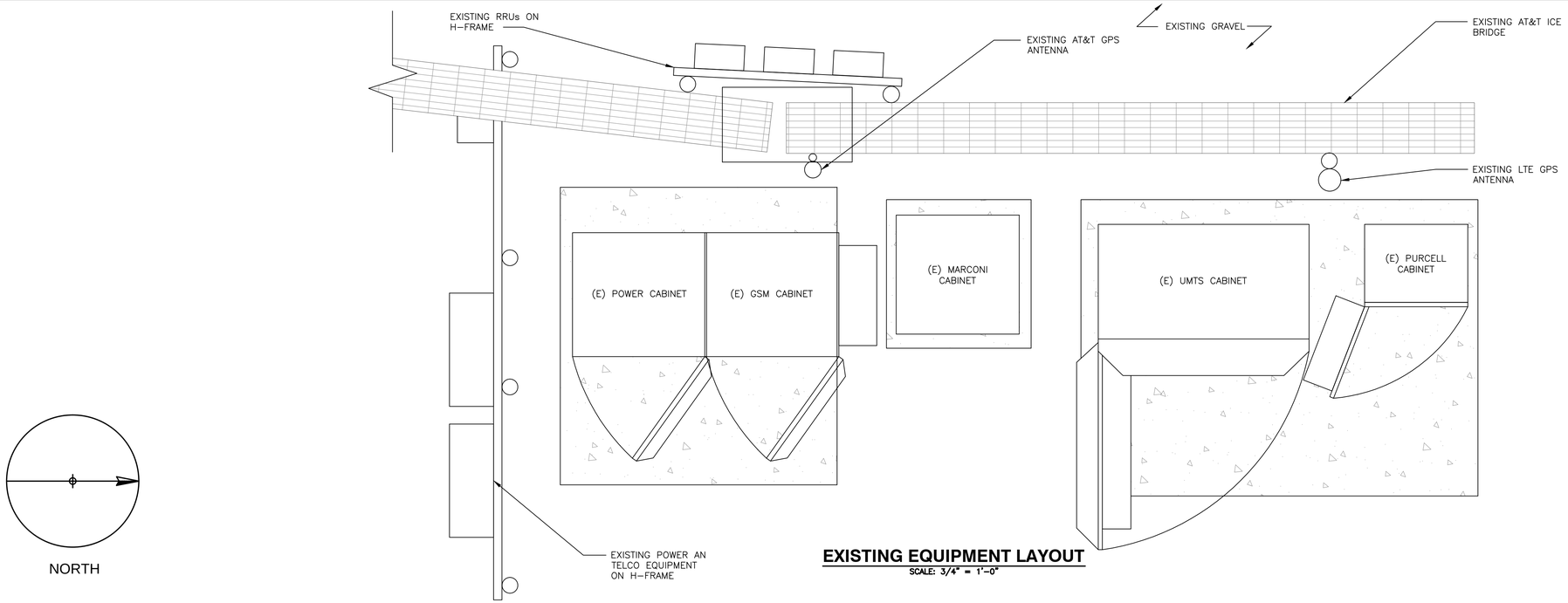
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT · NICHOLAS D. BARLOW · LICENSE NO. 28543 · PROFESSIONAL ENGINEER

AT&T

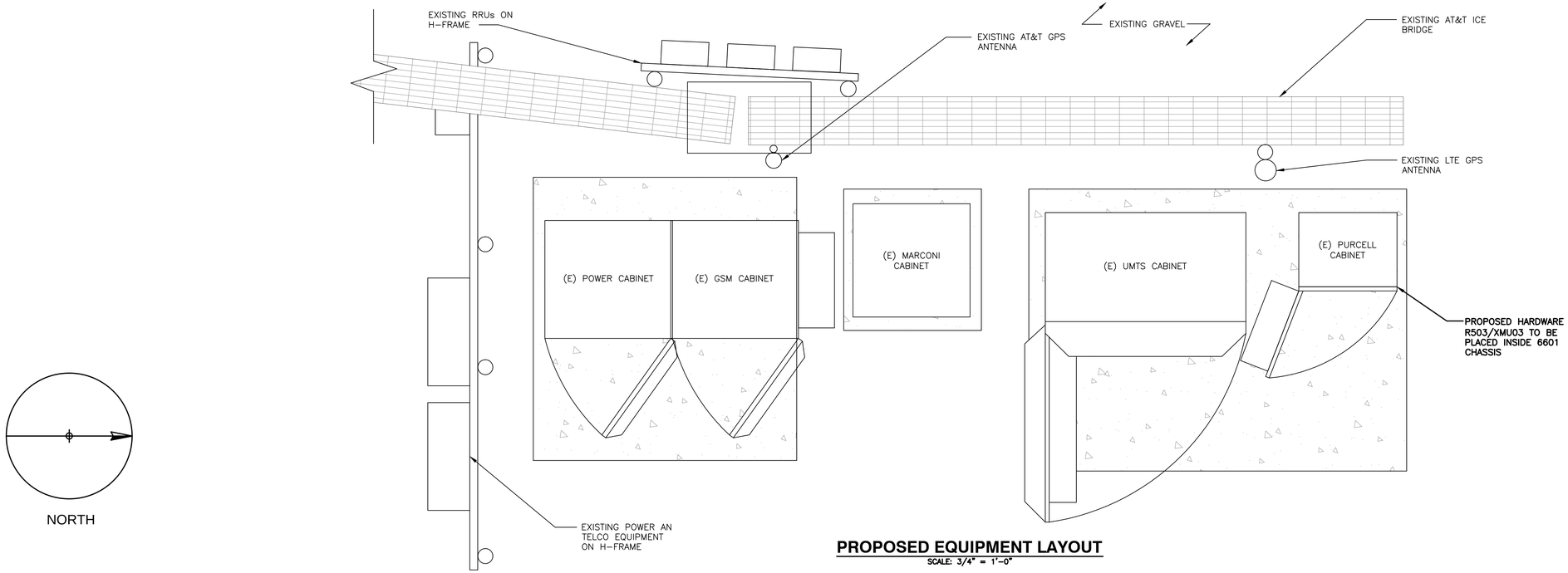
DRAWING TITLE: COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	A-1	0



EXISTING EQUIPMENT LAYOUT

SCALE: 3/4" = 1'-0"



PROPOSED EQUIPMENT LAYOUT

SCALE: 3/4" = 1'-0"

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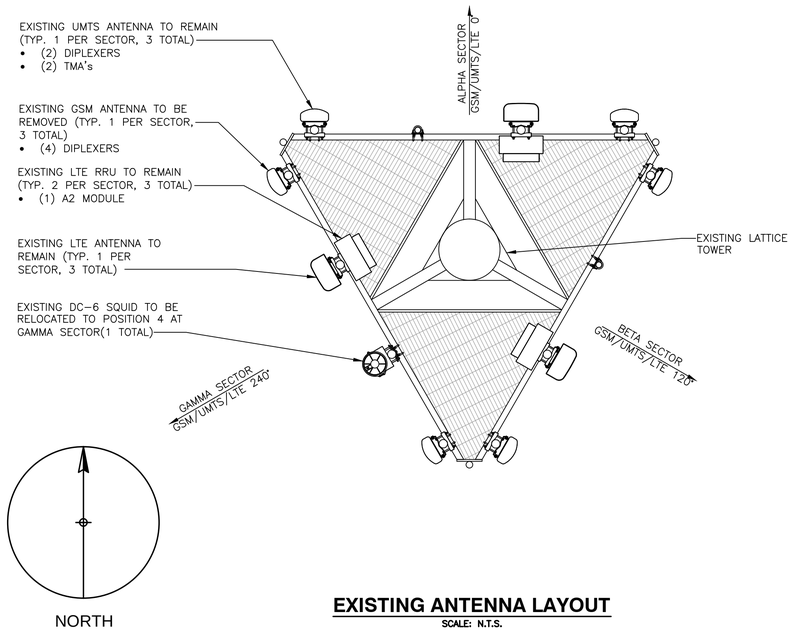
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT — NICHOLAS D. BYRNE — LICENSED PROFESSIONAL ENGINEER — LICENSE NO. 28643 — APRIL 29, 2016

AT&T

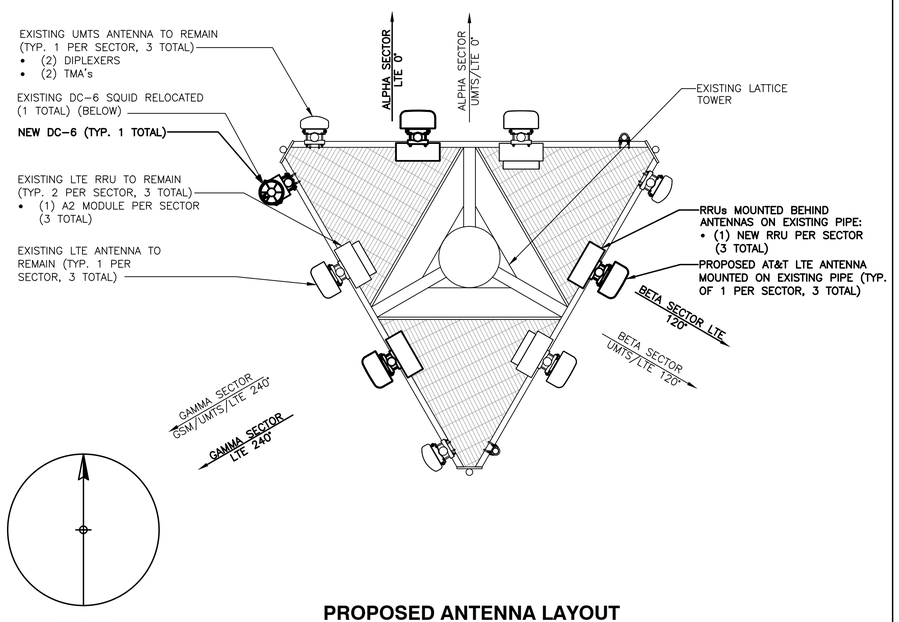
DRAWING TITLE: EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	A-2	0



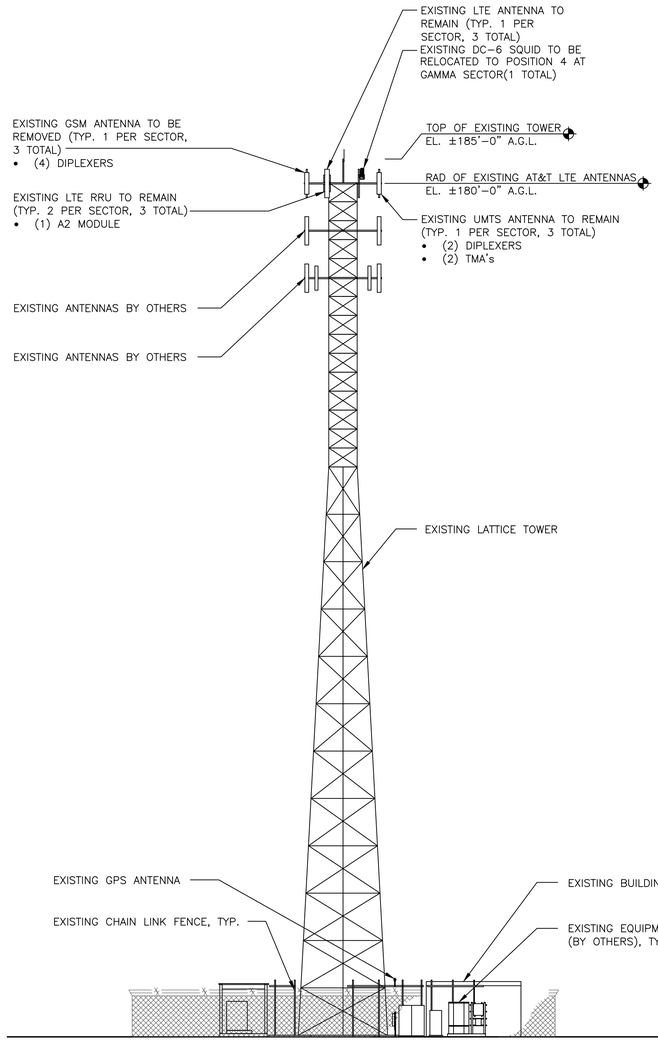
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



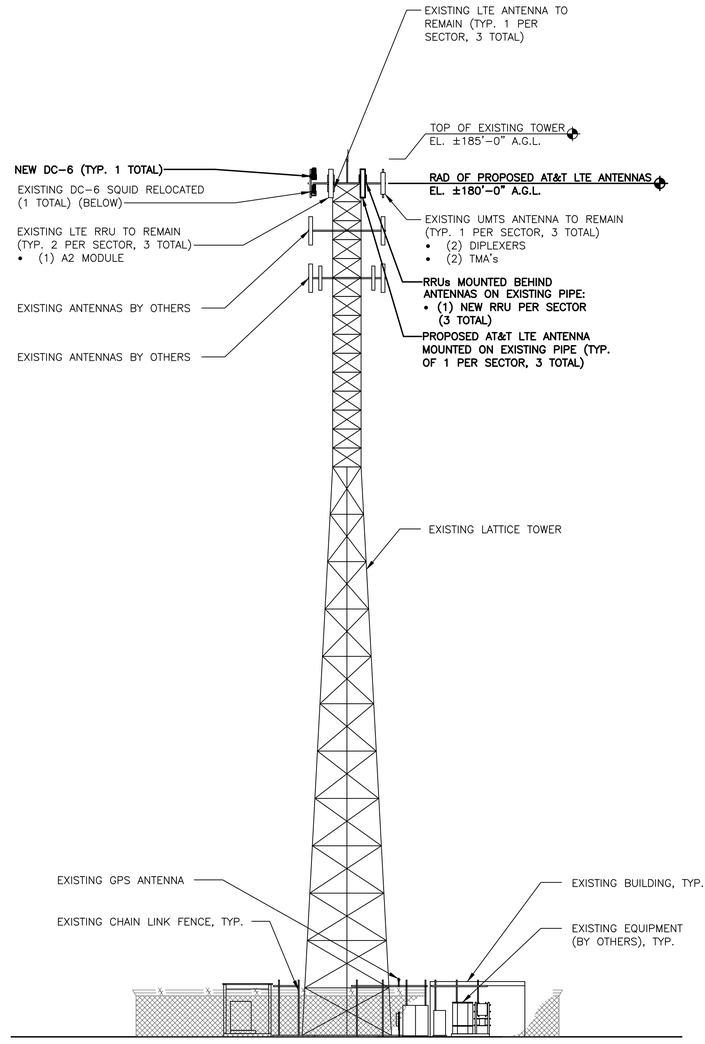
PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



EXISTING TOWER ELEVATION

SCALE: NTS



PROPOSED TOWER ELEVATION

SCALE: NTS

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

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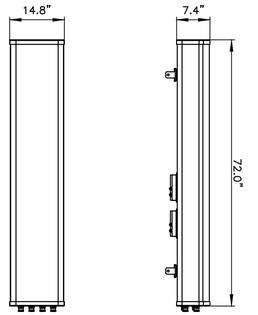
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTION — NICHOLAS D. BARILLI — LICENSED PROFESSIONAL ENGINEER — NO. 28643 — PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	A-3	0



FRONT VIEW

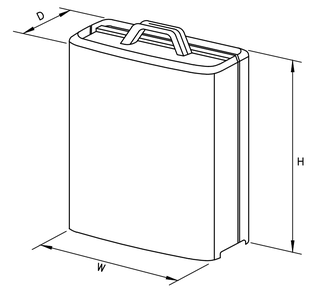
SIDE VIEW

BOTTOM VIEW

MANUFACTURER	CCI
MODEL	OPA-65R-LCUU-H6
WEIGHT	73 LBS

LTE ANTENNA DETAIL

SCALE: N.T.S.

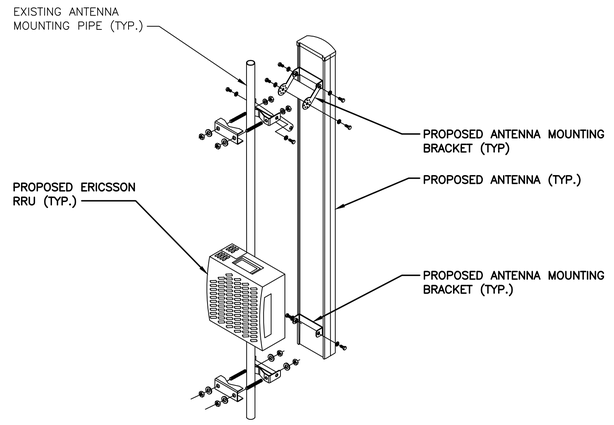


MODEL	L x W x H	WEIGHT
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
*RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
*A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*DENOTES EXISTING.

RRUS DETAIL

SCALE: N.T.S.



ANTENNA AND RRU MOUNTING DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	–	–	–
	A3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	A4	POWERWAVE	7770	55"x11"x5"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	–	–	–
	B3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	B4	POWERWAVE	7770	55"x11"x5"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	–	–	–
	G3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	G4	POWERWAVE	7770	55"x11"x5"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	**CCI**	**OPA-65R-LCUU-H6**	**72"x14.8"x7.4"**
	A3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	A4	–	–	–
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	**CCI**	**OPA-65R-LCUU-H6**	**72"x14.8"x7.4"**
	B3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	B4	–	–	–
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	**CCI**	**OPA-65R-LCUU-H6**	**72"x14.8"x7.4"**
	G3	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	G4	–	–	–

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS-32**	**29.9"x13.3"x9.5"**	–	–
	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
BETA	**ERICSSON**	**RRUS-32**	**29.9"x13.3"x9.5"**	–	–
	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
GAMMA	**ERICSSON**	**RRUS-32**	**29.9"x13.3"x9.5"**	–	–
	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		

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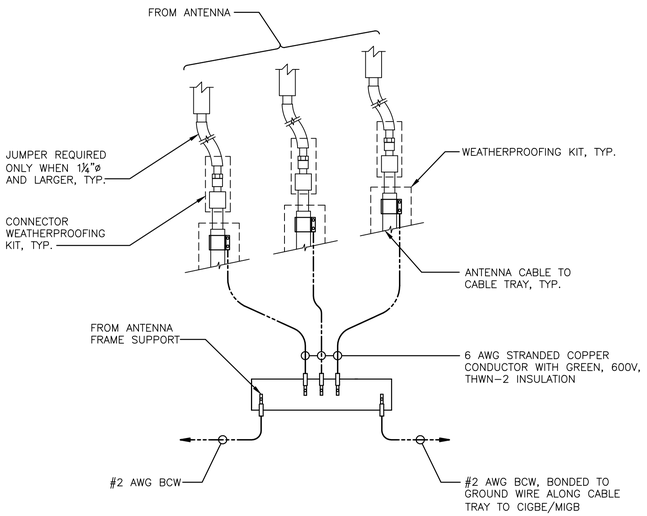
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT — NICHOLAS D. BARILLI — REG. NO. 28643 — PROFESSIONAL ENGINEER

AT&T

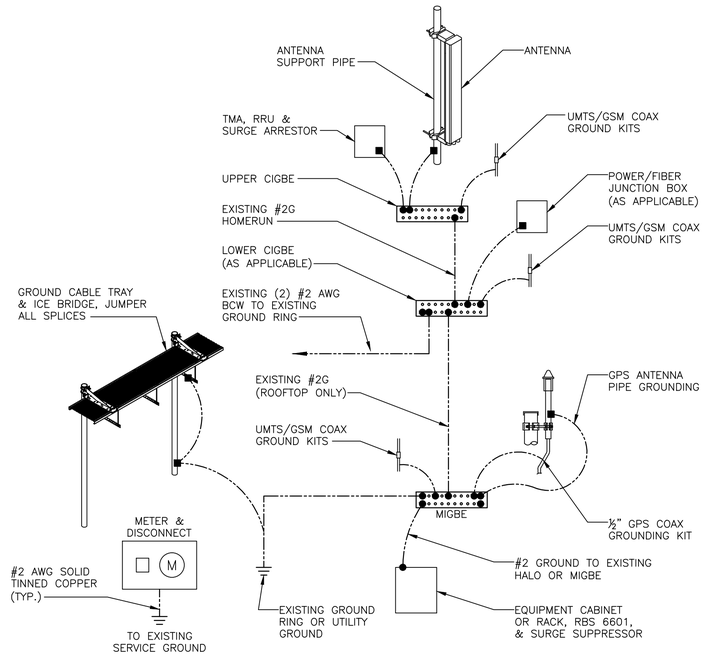
DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	A-4	0



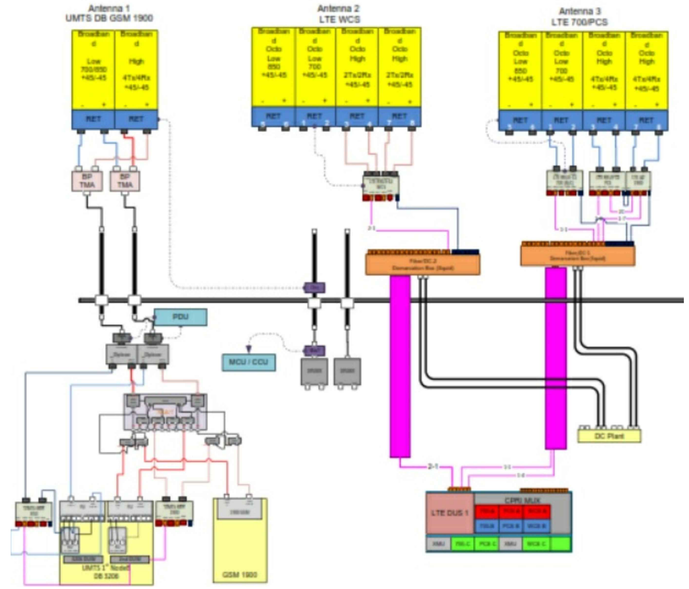
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



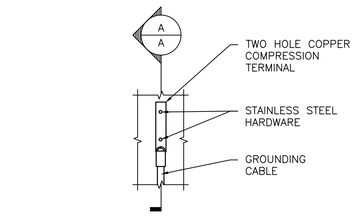
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

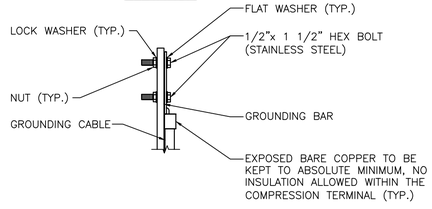


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



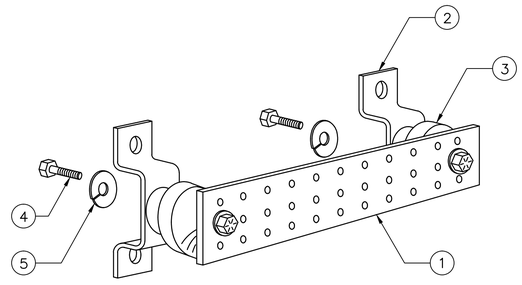
SECTION "A–A"

NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

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

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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115 ROUTE 46, SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5259
SITE NAME: WEST HARTFORD-ELMWOOD

1030 NEW BRITAIN AVENUE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	04/29/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT · NICHOLAS D. BARILE · 20143 · PROFESSIONAL ENGINEER · LICENSED PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE:
GROUNDING, ONE-LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15089-EMP	G-1	0

PAUL J. FORD & COMPANY

Report Date: April 26, 2016

Client: Hirschfeld Communications, LLC
1030 New Britain Avenue
West Hartford, CT
Attn: Ian Ormesher
Phone: 860.953.7000

Structure: Existing 180-ft Tower
Site Name: WESTHARTFORD_DEXTERST
Site Reference: CT0001
City, County, State: West Hartford, Hartford County, CT

PJF Project: 64116-0002.001.8700

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. The purpose of this analysis is to determine the acceptability of the tower stress level.

Analysis Criteria:

Reference Standard: TIA/EIA-222-F Standard, "Structural Standard for Antenna Supporting Structures and Antennas" and the 2005 CT State Building Code
Basic Wind Speed: 80 mph fastest mile wind speed without ice
Wind Speed with Ice: 69.3 mph fastest mile speed with 0.50" radial ice
Service Wind Speed: 50.0 mph (Operational) without ice

Proposed Appurtenance Loads:

The structure was analyzed with the addition of the proposed appurtenance loads shown in Table 1 combined with the existing and reserved loads shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure:	96.6%	Pass
Existing Foundation:	45.5%	Pass

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Hirschfeld Communications, LLC. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Jonathan Sommer, EI
Structural Designer
jsommer@pjfweb.com

CHH/EB

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

APR 26 2016

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by PiROD in June of 1998. The tower was originally designed for a wind speed of 80 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 80 mph with no ice, 69.3 mph with 0.5 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
180.0	180.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	-	-	-
		3	ericsson	RRUS 32			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing 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
180.0	180.0	3	powerwave technologies	7770.00 w/ Mount Pipe	-	-	3
		6	powerwave technologies	LGP21901	-	-	2
		3	powerwave technologies	7770.00 w/ Mount Pipe	12 2 4	1-5/8 Fiber DC	1
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 12			
		3	ericsson	RRUS A2 MODULE			
		1	tower mounts	Platform Mount [LP 405-1]			
165.0	165.0	3	ericsson	AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A			
		3	ericsson	KRY 112 71			
		3	ericsson	RRUS 11 B12			
		3	tower mounts	Sector Mount [SM 402-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
159.0	159.0	2	andrew	Andrew VHLP2-18	6 1 1	1/2 Ethernet DC	1
		3	kathrein	840 10045			
		3	miscl	RRH (22" x 12" x 9.4")			
		5	tower mounts	4'x2" Pipe Mount			
		3	tower mounts	Sector Mount [SM 411-3]			

Notes:
1) Existing Equipment
2) Equipment Not Installed; Rights Retained
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks
Manufacturer Drawings	PiROD Inc., 203949-B, 6/10/1998
Geotechnical Report	PiROD Inc., 6/5/1998

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. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 170	Leg	1 1/2" solid	1	-11.49	48.44	23.7	Pass
T2	170 - 150	Leg	2" solid	37	-55.61	97.53	57.0	Pass
T3	150 - 130	Leg	2 1/4" solid	101	-112.53	128.80	87.4	Pass
T4	130 - 120	Leg	Pirod 105216 (12x1.25)	165	-116.89	122.94	95.1	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	174	-150.55	184.67	81.5	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	189	-178.37	184.67	96.6	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	204	-205.12	258.24	79.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	219	-230.39	258.24	89.2	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	234	-255.47	343.62	74.3	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	249	-278.45	343.62	81.0	Pass
T1	180 - 170	Diagonal	3/4" solid	10	-2.07	5.36	38.6	Pass
T2	170 - 150	Diagonal	7/8" solid	50	-5.37	8.23	65.3	Pass
T3	150 - 130	Diagonal	1" solid	114	-5.53	11.87	46.6	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	172	-8.22	12.23	67.2	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	181	-5.89	9.65	61.0	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	196	-5.78	7.63	75.7	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	211	-5.74	10.68	53.7	Pass
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	226	-5.87	8.62	68.1	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	241	-6.24	11.34	55.1	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	256	-7.89	9.38	84.2	Pass
T1	180 - 170	Horizontal	7/8" solid	30	-0.30	5.41	5.5	Pass
T2	170 - 150	Horizontal	7/8" solid	59	-0.70	4.60	15.2	Pass
T3	150 - 130	Horizontal	7/8" solid	158	-1.40	4.22	33.3	Pass
T1	180 - 170	Top Girt	7/8" solid	6	-1.02	5.41	18.8	Pass
T2	170 - 150	Top Girt	7/8" solid	41	-1.20	5.48	21.9	Pass
T3	150 - 130	Top Girt	1" solid	105	-1.90	7.40	25.7	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-0.88	5.41	16.3	Pass
T2	170 - 150	Bottom Girt	7/8" solid	44	-2.25	4.35	51.6	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.21	6.01	36.7	Pass
							Summary	
						Leg (T6)	96.6	Pass
						Diagonal (T10)	84.2	Pass
						Horizontal (T3)	33.3	Pass
						Top Girt (T3)	25.7	Pass
						Bottom Girt (T2)	51.6	Pass
						Bolt Checks	68.4	Pass
						RATING =	96.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Component	Elevation (ft)	% Capacity	Pass / Fail
Base Foundation	0	45.5	Pass

Structure Rating (max from all components) =	96.6%

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

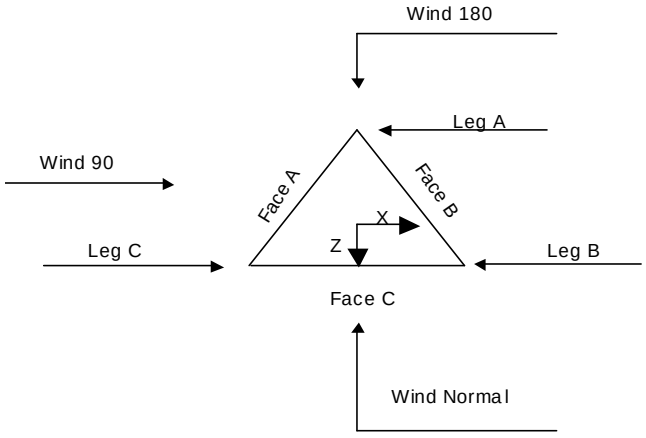
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 18.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80.0 mph.
3) Nominal ice thickness of 0.50 in.
4) Ice density of 56 pcf.
5) A wind speed of 69.3 mph is used in combination with ice.
6) Deflections calculated using a wind speed of 50.0 mph.
7) A non-linear (P-delta) analysis was used.
8) Pressures are calculated at each section.
9) Stress ratio used in tower member design is 1.333.
10) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	180.00-170.00		106778 (48)	4.00	1	10.00
T2	170.00-150.00		100246 (48/54)	4.00	1	20.00
T3	150.00-130.00		119703 (54/60)	4.50	1	20.00
T4	130.00-120.00		U06 105218 [L2.5 x 3/16]	5.00	1	10.00
T5	120.00-100.00		U08 105217 [L2.5 x 3/16]	6.00	1	20.00
T6	100.00-80.00		U10 105217 [L2.5 x 3/16]	8.00	1	20.00
T7	80.00-60.00		U12 105218 [L3 x 3/16]	10.00	1	20.00
T8	60.00-40.00		U14 105218 [L3 x 3/16]	12.00	1	20.00
T9	40.00-20.00		U16 105219 [L3 x 5/16]	14.00	1	20.00
T10	20.00-0.00		U18 105219 [L3 x 5/16]	16.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	180.00-170.00	2.25	X Brace	No	Steps	6.00	6.00
T2	170.00-150.00	2.36	X Brace	No	Steps	6.80	6.80
T3	150.00-130.00	2.36	X Brace	No	Steps	6.80	6.80
T4	130.00-120.00	10.00	X Brace	No	No	0.00	0.00
T5	120.00-100.00	10.00	X Brace	No	No	0.00	0.00
T6	100.00-80.00	10.00	X Brace	No	No	0.00	0.00
T7	80.00-60.00	10.00	X Brace	No	No	0.00	0.00
T8	60.00-40.00	10.00	X Brace	No	No	0.00	0.00
T9	40.00-20.00	10.00	X Brace	No	No	0.00	0.00
T10	20.00-0.00	10.00	X Brace	No	No	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-170.00	Solid Round	1 1/2" solid	A572-50 (50 ksi)	Solid Round	3/4" solid	A572-50 (50 ksi)
T2 170.00-150.00	Solid Round	2" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T3 150.00-130.00	Solid Round	2 1/4" solid	A572-50 (50 ksi)	Solid Round	1" solid	A572-50 (50 ksi)
T4 130.00-120.00	Truss Leg	Pirod 105216 (12x1.25)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T5 120.00-100.00	Truss Leg	Pirod 105217 (12x1.5)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T6 100.00-80.00	Truss Leg	Pirod 105217 (12x1.5)	A572-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T7 80.00-60.00	Truss Leg	Pirod 105218 (12x1.75)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T8 60.00-40.00	Truss Leg	Pirod 105218 (12x1.75)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T9 40.00-20.00	Truss Leg	Pirod 105219 (12x2)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 5/16	A36 (36 ksi)
T10 20.00-0.00	Truss Leg	Pirod 105219 (12x2)	A572-50 (50 ksi)	Single Angle	L 3 x 3 x 5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-170.00	Solid Round	7/8" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T2 170.00-150.00	Solid Round	7/8" solid	A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T3 150.00-130.00	Solid Round	1" solid	A572-50 (50 ksi)	Solid Round	1" solid	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-170.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T2 170.00-150.00	None	Solid Round		A36 (36 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)
T3 150.00-130.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/8" solid	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-170.00	0.00	0.00	A36 (36 ksi)	1	1	1.02	36.00	36.00	36.00
T2 170.00-	0.00	0.00	A36	1	1	1.03	54.00	54.00	36.00

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
150.00			(36 ksi)						
T3 150.00-130.00	0.00	0.00	A36 (36 ksi)	1	1	1.03	36.00	36.00	36.00
T4 130.00-120.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T5 120.00-100.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T6 100.00-80.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T7 80.00-60.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T8 60.00-40.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T9 40.00-20.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00
T10 20.00-0.00	0.00	0.75	A36 (36 ksi)	1	1	1.05	36.00	36.00	36.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-170.00	No	No	1	0.9 0.9	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	1 1
T2 170.00-150.00	No	No	1	0.9 0.9	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	1 1
T3 150.00-130.00	No	No	1	0.9 0.9	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	0.7 0.7	1 1
T4 130.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4 130.00-120.00	1	0.5	0.85	1	0.5	0.85

T5 120.00-100.00	1	0.5	0.85	1	0.5	0.85
T6 100.00-80.00	1	0.5	0.85	1	0.5	0.85
T7 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T8 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T9 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T10 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
	Net Width Deduct in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*
T1 180.00-170.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T2 170.00-150.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T3 150.00-130.00	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1	0.00	1
T4 130.00-120.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 120.00-100.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 100.00-80.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 80.00-60.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 60.00-40.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 40.00-20.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 20.00-0.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Connection Type*	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
		Bolt Size in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*
T1 180.00-170.00	Sleeve DS	0.63 A325N	5	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.63 A325N	0
T2 170.00-150.00	Sleeve DS	0.75 A325N	5	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T3 150.00-130.00	Flange	1.00 A325N	6	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.50 A325N	0	0.00 A325N	0	0.50 A325N	0
T4 130.00-120.00	Flange	1.00 A325N	6	1.00 A325N	1	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0
T5 120.00-100.00	Flange	1.00 A325N	6	1.00 A325N	1	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0
T6 100.00-80.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T7 80.00-60.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T8 60.00-40.00	Flange	1.00 A325N	6	1.00 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T9 40.00-20.00	Flange	1.25 A325N	6	1.25 A325N	1	1.25 A325N	0	1.25 A325N	0	1.25 A325N	0	1.25 A325N	0	1.25 A325N	0
T10 20.00-0.00	Flange	1.25 F1554-105	6	1.25 A325N	1	1.25 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0	1.00 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1 5/8" foam)	A	Yes	Ar (CfAe)	180.00 - 8.00	0.00	-0.45	12	6	1.00 0.50	1.98		0.92
FSJ4-50B(1/2")	A	Yes	Ar (CfAe)	180.00 - 8.00	0.00	-0.45	2	2	2.00 0.50	0.52		0.14
9776(3/4") ***	A	Yes	Ar (CfAe)	180.00 - 8.00	0.00	-0.45	4	4	2.00 0.50	0.73		0.31
LDF7-50A (1 5/8" foam)	A	Yes	Ar (CfAe)	165.00 - 8.00	0.00	0.45	12	6	1.00 0.50	1.98		0.92
LDF7-50A (1 5/8" foam) ***	A	Yes	Ar (CfAe)	165.00 - 8.00	0.00	0.35	1	1	1.00 0.50	1.98		0.92
LDF4-50A (1/2" foam) ***	C	Yes	Ar (CfAe)	159.00 - 8.00	0.00	-0.48	8	8	0.63	0.63		0.15

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 405-1]	C	None		0.000	180.00	No Ice 1/2" Ice	20.80 28.10	20.80 28.10	1.80 2.07
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	6.22 6.71	4.82 5.51	0.09 0.14
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	6.22 6.71	4.82 5.51	0.09 0.14
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	6.22 6.71	4.82 5.51	0.09 0.14
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.29 1.45	0.36 0.48	0.01 0.02
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.29 1.45	0.36 0.48	0.01 0.02
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.29 1.45	0.36 0.48	0.01 0.02
DC6-48-60-18-8F	A	From Leg	4.00 0.00	0.000	180.00	No Ice 1/2"	1.47 1.67	1.47 1.67	0.02 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
RRUS 11	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.26 3.50	1.38 1.56	0.05 0.07
RRUS 11	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.26 3.50	1.38 1.56	0.05 0.07
RRUS 11	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.26 3.50	1.38 1.56	0.05 0.07
RRUS 12	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.67 3.93	1.49 1.67	0.06 0.08
RRUS 12	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.67 3.93	1.49 1.67	0.06 0.08
RRUS 12	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.67 3.93	1.49 1.67	0.06 0.08
RRUS 32	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.33 3.60	1.98 2.21	0.06 0.08
RRUS 32	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.33 3.60	1.98 2.21	0.06 0.08
RRUS 32	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	3.33 3.60	1.98 2.21	0.06 0.08
GPS	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	0.20 0.27	0.20 0.27	0.02 0.02
(2) LGP21901	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
(2) LGP21901	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
(2) LGP21901	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	0.27 0.34	0.18 0.25	0.01 0.01
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	10.60 11.27	7.18 8.36	0.10 0.18
RRUS A2 MODULE	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.87 2.05	0.42 0.53	0.02 0.03
RRUS A2 MODULE	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.87 2.05	0.42 0.53	0.02 0.03
RRUS A2 MODULE	C	From Leg	4.00	0.000	180.00	No Ice	1.87	0.42	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice	2.05	0.53	0.03
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice	1.47 1.67	1.47 1.67	0.02 0.04
***									
Sector Mount [SM 402-3]	C	From Leg	0.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	18.91 26.78	18.91 26.78	0.85 1.23
ERICSSON AIR 21 B2A	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	0.07 0.11
ERICSSON AIR 21 B2A	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	0.07 0.11
ERICSSON AIR 21 B2A	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	6.53 6.98	4.36 4.77	0.07 0.11
KRY 112 71	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
KRY 112 71	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
KRY 112 71	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	0.68 0.80	0.45 0.56	0.01 0.02
RRUS 11 B12	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	0.05 0.07
RRUS 11 B12	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	0.05 0.07
RRUS 11 B12	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	0.05 0.07
AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	11.78 12.50	11.01 12.53	0.15 0.25
AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00		165.00	No Ice 1/2" Ice	11.78 12.50	11.01 12.53	0.15 0.25
AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice	11.78 12.50	11.01 12.53	0.15 0.25
***									
Sector Mount [SM 411-3]	C	From Leg	0.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	21.88 30.68	21.88 30.68	1.07 1.48
(2) 4'x2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	0.79 1.03	0.79 1.03	0.03 0.03
4'x2" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	0.79 1.03	0.79 1.03	0.03 0.03
(2) 4'x2" Pipe Mount	C	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	0.79 1.03	0.79 1.03	0.03 0.03
840 10045	A	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	2.96 3.27	2.96 3.27	0.04 0.07
840 10045	B	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	2.96 3.27	2.96 3.27	0.04 0.07
840 10045	C	From Leg	4.00	0.000	159.00	No Ice	2.96	2.96	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice	3.27	3.27	0.07
RRH (22" x 12" x 9.4")	A	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	2.57 2.79	2.01 2.22	0.01 0.03
RRH (22" x 12" x 9.4")	B	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	2.57 2.79	2.01 2.22	0.01 0.03
RRH (22" x 12" x 9.4")	C	From Leg	4.00 0.00 0.00	0.000	159.00	No Ice 1/2" Ice	2.57 2.79	2.01 2.22	0.01 0.03
***									

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^2	Weight K
Andrew VHLP2-18	A	Paraboloid w/Radome	From Leg	4.00 0.00 0.00	0.000		159.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05
Andrew VHLP2-18	C	Paraboloid w/Radome	From Leg	4.00 0.00 0.00	0.000		159.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05
***											

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105216 (12x1.25)	2176.93	3447.56	0.60	0.46	7.56	11.97	3.68
Pirod 105217 (12x1.5)	2303.92	3618.80	0.71	0.47	8.00	12.57	5.30
Pirod 105217 (12x1.5)	2303.92	3618.80	0.71	0.47	8.00	12.57	5.30
Pirod 105218 (12x1.75)	2432.86	3798.39	0.85	0.49	8.45	13.19	7.22
Pirod 105218 (12x1.75)	2432.86	3798.39	0.85	0.49	8.45	13.19	7.22
Pirod 105219 (12x2)	2608.79	4065.88	1.22	0.53	9.06	14.12	9.42
Pirod 105219 (12x2)	2608.79	4065.88	1.22	0.53	9.06	14.12	9.42

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice

Comb. No.	Description
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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	9.73	35	0.575	0.129
T2	170 - 150	8.47	35	0.564	0.128
T3	150 - 130	6.13	35	0.503	0.098
T4	130 - 120	4.17	35	0.393	0.063
T5	120 - 100	3.41	35	0.326	0.045
T6	100 - 80	2.21	35	0.242	0.027
T7	80 - 60	1.33	35	0.167	0.016
T8	60 - 40	0.72	35	0.116	0.010
T9	40 - 20	0.31	35	0.068	0.005
T10	20 - 0	0.09	35	0.033	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 405-1]	35	9.73	0.575	0.129	42603
165.00	Sector Mount [SM 402-3]	35	7.86	0.554	0.124	18760
159.00	Andrew VHLP2-18	35	7.15	0.537	0.115	16390

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	29.37	23	1.663	0.401
T2	170 - 150	25.77	23	1.636	0.396
T3	150 - 130	18.95	23	1.486	0.304
T4	130 - 120	13.10	23	1.190	0.197
T5	120 - 100	10.75	23	1.001	0.142
T6	100 - 80	7.01	23	0.755	0.084
T7	80 - 60	4.25	23	0.527	0.051
T8	60 - 40	2.31	23	0.368	0.031
T9	40 - 20	1.00	23	0.218	0.016
T10	20 - 0	0.27	23	0.107	0.007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	Platform Mount [LP 405-1]	23	29.37	1.663	0.401	16880
165.00	Sector Mount [SM 402-3]	23	24.00	1.612	0.382	7530
159.00	Andrew VHLP2-18	23	21.93	1.571	0.354	6663

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.63	5	2.13	12.89	0.166 ✔	1.333	Bolt DS
T2	170	Leg	A325N	0.75	5	9.88	18.56	0.532 ✔	1.333	Bolt DS
T3	150	Leg	A325N	1.00	6	16.68	34.52	0.483 ✔	1.333	Bolt Tension
T4	130	Leg	A325N	1.00	6	16.82	34.56	0.487 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.00	1	7.06	7.75	0.912 ✔	1.333	Member Block Shear
T5	120	Leg	A325N	1.00	6	21.23	34.56	0.614 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.00	1	6.55	7.75	0.846 ✔	1.333	Member Block Shear
T6	100	Leg	A325N	1.00	6	24.80	34.56	0.718 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.00	1	5.23	7.75	0.675 ✔	1.333	Member Block Shear
T7	80	Leg	A325N	1.00	6	28.14	34.56	0.814 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.00	1	5.39	8.43	0.639 ✔	1.333	Member Block Shear
T8	60	Leg	A325N	1.00	6	31.24	34.56	0.904 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.00	1	5.53	8.43	0.656 ✔	1.333	Member Block Shear
T9	40	Leg	A325N	1.25	6	34.14	54.00	0.632 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.25	1	5.90	14.95	0.394 ✔	1.333	Member Block Shear
T10	20	Leg	F1554-105	1.25	6	36.73	50.62	0.726 ✔	1.333	Bolt Tension
		Diagonal	A325N	1.25	1	6.52	14.95	0.436 ✔	1.333	Member Block Shear

Compression Checks

Leg Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 170	1 1/2" solid	10.00	2.25	72.0 K=1.00	20.56	1.77	-11.49	36.34	0.316 ✓
T2	170 - 150	2" solid	20.00	2.36	56.6 K=1.00	23.29	3.14	-55.61	73.16	0.760 ✓
T3	150 - 130	2 1/4" solid	20.00	2.36	50.3 K=1.00	24.30	3.98	-112.53	96.62	1.165 ✓
T4	130 - 120	Pirod 105216 (12x1.25)	10.02	10.02	45.4 K=1.00	25.05	3.68	-116.89	92.23	1.267 ✓
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	26.13	5.30	-150.55	138.54	1.087 ✓
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	26.13	5.30	-178.37	138.54	1.288 ✓
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	26.85	7.22	-205.12	193.73	1.059 ✓
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	26.85	7.22	-230.39	193.73	1.189 ✓
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	27.35	9.42	-255.47	257.78	0.991 ✓
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	27.35	9.42	-278.45	257.78	1.080 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	10.13	0.20	0.94	2.23	0.423 ✓
T5	120 - 100	0.5	1.47	120.0	10.28	0.20	0.72	2.26	0.318 ✓
T6	100 - 80	0.5	1.47	120.0	10.28	0.20	0.20	2.26	0.091 ✓
T7	80 - 60	0.5	1.46	119.0	10.42	0.20	0.19	2.29	0.082 ✓
T8	60 - 40	0.5	1.46	119.0	10.42	0.20	0.21	2.29	0.091 ✓
T9	40 - 20	0.625	1.45	94.4	13.67	0.31	0.21	4.69	0.046 ✓
T10	20 - 0	0.625	1.45	94.4	13.67	0.31	0.86	4.69	0.183 ✓

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 170	3/4" solid	4.59	2.22	128.0	9.11	0.44	-2.07	4.02	0.515

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 $\frac{P}{P_a}$
					K=0.90					✔
T2	170 - 150	7/8" solid	5.04	2.44	120.6	10.26	0.60	-5.37	6.17	0.871
					K=0.90					✔
T3	150 - 130	1" solid	5.49	2.66	114.8	11.34	0.79	-5.53	8.90	0.621
					K=0.90					✔
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	120.8	10.17	0.90	-8.22	9.17	0.896
					K=1.00					✔
T5	120 - 100	L 2.5 x 2.5 x 3/16	12.50	5.63	136.4	8.02	0.90	-5.89	7.24	0.814
					K=1.00					✔
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.80	6.33	153.4	6.35	0.90	-5.78	5.73	1.009
					K=1.00					✔
T7	80 - 60	L 3 x 3 x 3/16	15.24	7.08	142.5	7.35	1.09	-5.74	8.01	0.716
					K=1.00					✔
T8	60 - 40	L 3 x 3 x 3/16	16.80	7.88	158.6	5.94	1.09	-5.87	6.47	0.907
					K=1.00					✔
T9	40 - 20	L 3 x 3 x 5/16	18.45	8.68	176.8	4.78	1.78	-6.24	8.51	0.734
					K=1.00					✔
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	194.4	3.95	1.78	-7.89	7.03	1.122
					K=1.00					✔

Horizontal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8	6.74	0.60	-0.30	4.06	0.073
					K=0.70					✔
T2	170 - 150	7/8" solid	4.37	4.20	161.3	5.74	0.60	-0.70	3.45	0.203
					K=0.70					✔
T3	150 - 130	7/8" solid	4.57	4.39	168.4	5.27	0.60	-1.40	3.17	0.443
					K=0.70					✔

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8	6.74	0.60	-1.02	4.06	0.250
					K=0.70					✔
T2	170 - 150	7/8" solid	4.01	3.85	147.7	6.84	0.60	-1.20	4.11	0.291
					K=0.70					✔
T3	150 - 130	1" solid	4.51	4.33	145.4	7.07	0.79	-1.90	5.55	0.342
					K=0.70					✔

Bottom Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8	6.74	0.60	-0.88	4.06	0.217
					K=0.70					✔

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 $\frac{P}{P_a}$
T2	170 - 150	7/8" solid	4.49	4.32	165.9 K=0.70	5.43	0.60	-2.25	3.26	0.688 ✔
T3	150 - 130	1" solid	4.99	4.80	161.2 K=0.70	5.75	0.79	-2.21	4.51	0.489 ✔

Tension Checks

Leg Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 170	1 1/2" solid	10.00	0.50	16.0	30.00	1.77	10.67	53.01	0.201 ✔
T2	170 - 150	2" solid	20.00	0.57	13.6	32.50	2.19	49.40	71.13	0.695 # ✔
T3	150 - 130	2 1/4" solid	20.00	0.57	12.1	30.00	3.98	100.07	119.28	0.839 ✔
T4	130 - 120	Pirod 105216 (12x1.25)	10.02	10.02	45.4	30.00	3.68	100.90	110.45	0.914 ✔
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8	30.00	5.30	127.36	159.04	0.801 ✔
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8	30.00	5.30	148.83	159.04	0.936 ✔
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4	30.00	7.22	168.83	216.47	0.780 ✔
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4	30.00	7.22	187.43	216.47	0.866 ✔
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4	30.00	9.42	204.84	282.74	0.724 ✔
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4	30.00	9.42	220.41	282.74	0.780 ✔

Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	10.13	0.20	0.94	2.23	0.423 ✔
T5	120 - 100	0.5	1.47	120.0	10.28	0.20	0.72	2.26	0.318 ✔
T6	100 - 80	0.5	1.47	120.0	10.28	0.20	0.20	2.26	0.091 ✔
T7	80 - 60	0.5	1.46	119.0	10.42	0.20	0.19	2.29	0.082 ✔
T8	60 - 40	0.5	1.46	119.0	10.42	0.20	0.21	2.29	0.091 ✔
T9	40 - 20	0.625	1.45	94.4	13.67	0.31	0.21	4.69	0.046 ✔
T10	20 - 0	0.625	1.45	94.4	13.67	0.31	0.86	4.69	0.183 ✔

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 170	3/4" solid	4.59	2.22	142.3	30.00	0.44	2.06	13.25	0.156 ✔
T2	170 - 150	7/8" solid	5.04	2.44	134.0	30.00	0.60	5.42	18.04	0.300 ✔
T3	150 - 130	1" solid	5.12	2.47	118.7	30.00	0.79	5.87	23.56	0.249 ✔
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	80.0	29.00	0.52	7.06	15.03	0.470 ✔
T5	120 - 100	L 2.5 x 2.5 x 3/16	11.93	5.38	86.2	29.00	0.52	6.55	15.03	0.436 ✔
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.13	6.02	95.9	29.00	0.52	5.23	15.03	0.348 ✔
T7	80 - 60	L 3 x 3 x 3/16	14.50	6.73	88.6	29.00	0.66	5.39	19.12	0.282 ✔
T8	60 - 40	L 3 x 3 x 3/16	16.01	7.49	98.4	29.00	0.66	5.53	19.12	0.289 ✔
T9	40 - 20	L 3 x 3 x 5/16	17.62	8.27	111.0	29.00	1.01	5.90	29.37	0.201 ✔
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	127.6	29.00	1.01	6.52	29.37	0.222 ✔

Horizontal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	30.00	0.60	0.43	18.04	0.024 ✔
T2	170 - 150	7/8" solid	4.37	4.20	230.5	30.00	0.60	0.93	18.04	0.051 ✔
T3	150 - 130	7/8" solid	4.57	4.39	240.6	30.00	0.60	1.64	18.04	0.091 ✔

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	30.00	0.60	1.01	18.04	0.056 ✔
T2	170 - 150	7/8" solid	4.01	3.85	211.1	30.00	0.60	1.22	18.04	0.067 ✔
T3	150 - 130	1" solid	4.51	4.33	207.7	30.00	0.79	2.13	23.56	0.090 ✔

Bottom Girt Design Data (Tension)

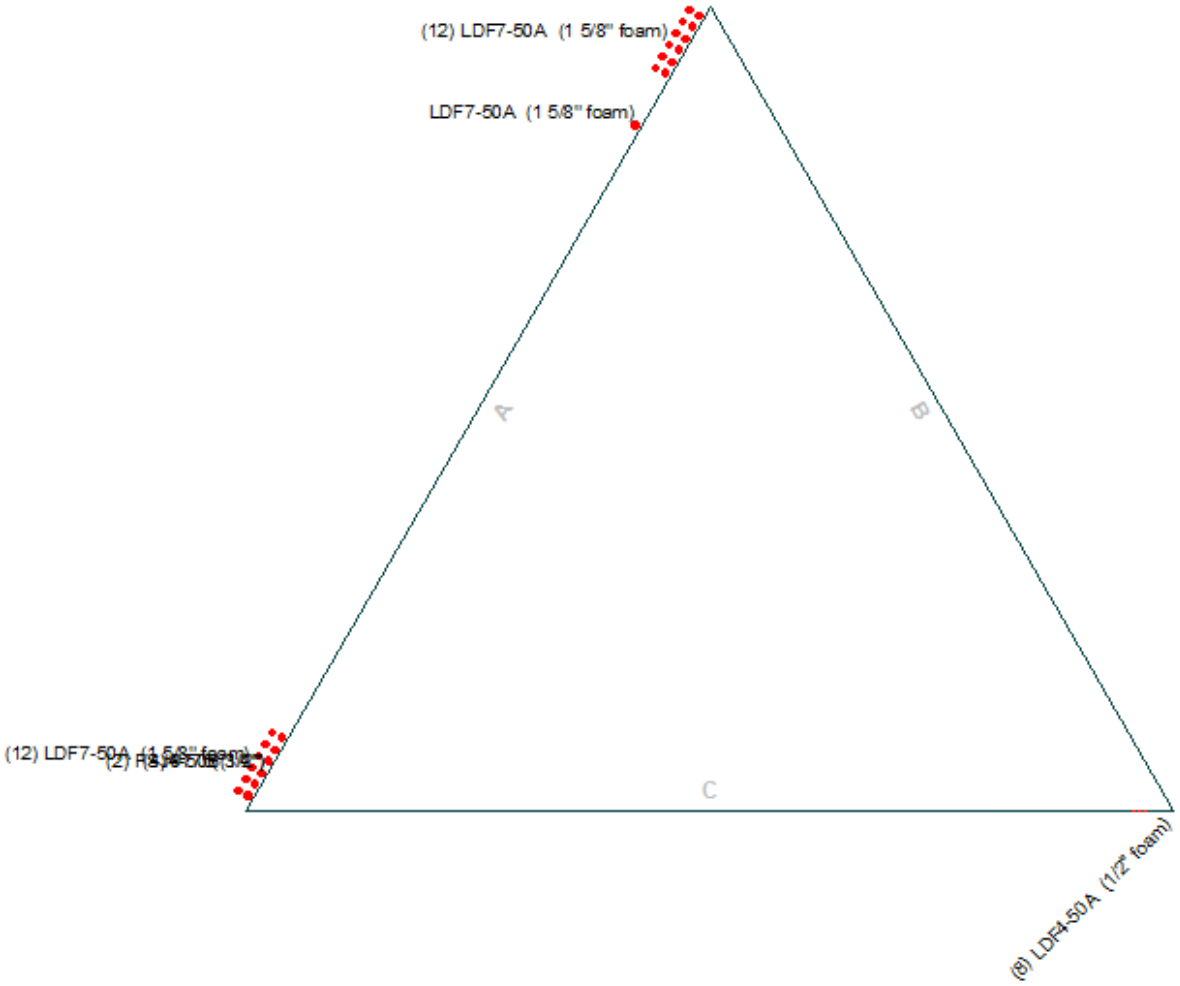
Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	30.00	0.60	0.92	18.04	0.051 ✔
T2	170 - 150	7/8" solid	4.49	4.32	236.9	30.00	0.60	2.09	18.04	0.116 ✔
T3	150 - 130	1" solid	4.99	4.80	230.3	30.00	0.79	2.43	23.56	0.103 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 170	Leg	1 1/2" solid	1	-11.49	48.44	23.7	Pass
T2	170 - 150	Leg	2" solid	37	-55.61	97.53	57.0	Pass
T3	150 - 130	Leg	2 1/4" solid	101	-112.53	128.80	87.4	Pass
T4	130 - 120	Leg	Pirod 105216 (12x1.25)	165	-116.89	122.94	95.1	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	174	-150.55	184.67	81.5	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	189	-178.37	184.67	96.6	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	204	-205.12	258.24	79.4	Pass
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	219	-230.39	258.24	89.2	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	234	-255.47	343.62	74.3	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	249	-278.45	343.62	81.0	Pass
T1	180 - 170	Diagonal	3/4" solid	10	-2.07	5.36	38.6	Pass
T2	170 - 150	Diagonal	7/8" solid	50	-5.37	8.23	65.3	Pass
T3	150 - 130	Diagonal	1" solid	114	-5.53	11.87	46.6	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	172	-8.22	12.23	67.2	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	181	-5.89	9.65	61.0	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	196	-5.78	7.63	75.7	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	211	-5.74	10.68	53.7	Pass
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	226	-5.87	8.62	68.1	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	241	-6.24	11.34	55.1	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	256	-7.89	9.38	84.2	Pass
T1	180 - 170	Horizontal	7/8" solid	30	-0.30	5.41	5.5	Pass
T2	170 - 150	Horizontal	7/8" solid	59	-0.70	4.60	15.2	Pass
T3	150 - 130	Horizontal	7/8" solid	158	-1.40	4.22	33.3	Pass
T1	180 - 170	Top Girt	7/8" solid	6	-1.02	5.41	18.8	Pass
T2	170 - 150	Top Girt	7/8" solid	41	-1.20	5.48	21.9	Pass
T3	150 - 130	Top Girt	1" solid	105	-1.90	7.40	25.7	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-0.88	5.41	16.3	Pass
T2	170 - 150	Bottom Girt	7/8" solid	44	-2.25	4.35	51.6	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.21	6.01	36.7	Pass
							Summary	
						Leg (T6)	96.6	Pass
						Diagonal (T10)	84.2	Pass
						Horizontal (T3)	33.3	Pass
						Top Girt (T3)	25.7	Pass
						Bottom Girt (T2)	51.6	Pass
						Bolt Checks	68.4	Pass
						RATING =	**96.6**	**Pass**

APPENDIX B

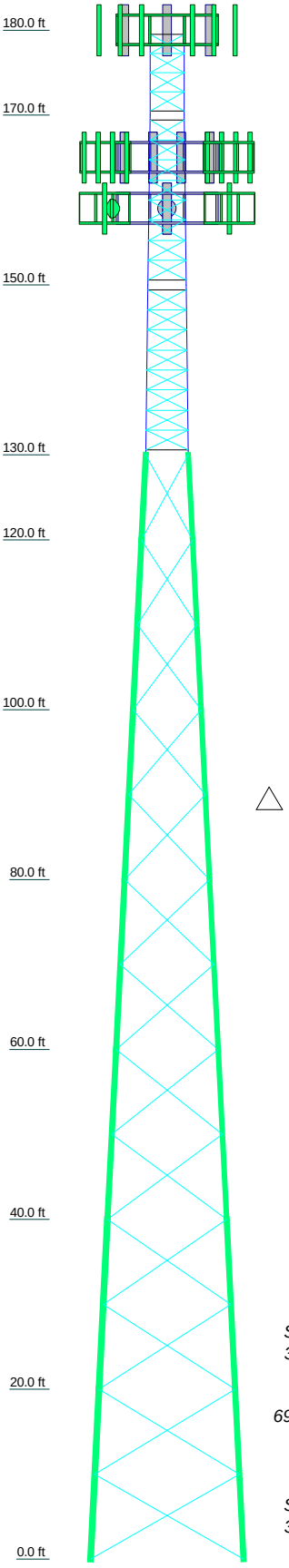
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section		T1									
Legs	A	SR 2" solid	SR 1 1/4" solid	B	Pirod 105217 (12x1.5)	Pirod 105218 (12x1.75)	Pirod 105219 (12x2)				
Leg Grade	A572-50										
Diagonals	L 2.5 x 2.5 x 3/16	SR 7/8" solid	SR 1" solid		L 3 x 3 x 3/16		L 3 x 3 x 5/16				
Diagonal Grade	A572-50				A36						
Top Girts	SR 3/4" solid	SR 7/8" solid	SR 1" solid		N.A.						
Bottom Girts	SR 7/8" solid	SR 7/8" solid	SR 1" solid		N.A.						
Horizontals	SR 7/8" solid				N.A.						
Face Width (ft)	4	4.5	5	6	8	10	12	14	16	18	
# Panels @ (ft)	4 @ 2.25	16 @ 2.35833				13 @ 10					
Weight (K)	0.4	1.3	1.7	1.1	2.6	2.7	3.2	3.3	5.0	5.2	26.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 405-1]	180	DC6-48-60-18-8F	180
7770.00 w/ Mount Pipe	180	Sector Mount [SM 402-3]	165
7770.00 w/ Mount Pipe	180	ERICSSON AIR 21 B2A	165
7770.00 w/ Mount Pipe	180	ERICSSON AIR 21 B2A	165
(2) LGP21401	180	ERICSSON AIR 21 B2A	165
(2) LGP21401	180	KRY 112 71	165
(2) LGP21401	180	KRY 112 71	165
DC6-48-60-18-8F	180	KRY 112 71	165
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 11 B12	165
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 11 B12	165
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 11 B12	165
RRUS 11	180	AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	165
RRUS 11	180		
RRUS 11	180	AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	165
RRUS 12	180		
RRUS 12	180	AIR 21 B4A/B12-B5P 2.4M w/ Mount Pipe	165
RRUS 12	180		
RRUS 32	180	Sector Mount [SM 411-3]	159
RRUS 32	180	(2) 4'x2" Pipe Mount	159
RRUS 32	180	4'x2" Pipe Mount	159
GPS	180	(2) 4'x2" Pipe Mount	159
(2) LGP21901	180	840 10045	159
(2) LGP21901	180	840 10045	159
(2) LGP21901	180	840 10045	159
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRH (22" x 12" x 9.4")	159
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRH (22" x 12" x 9.4")	159
OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRH (22" x 12" x 9.4")	159
RRUS A2 MODULE	180	Andrew VHLP2-18	159
RRUS A2 MODULE	180	Andrew VHLP2-18	159
RRUS A2 MODULE	180		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	SR 1 1/2" solid	B	Pirod 105216 (12x1.25)

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.0 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69.3 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50.0 mph wind.
5. TOWER RATING: 96.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 285 K
SHEAR: 26 K

UPLIFT: -225 K
SHEAR: 21 K

AXIAL
63 K
SHEAR 38 K *MOMENT 4120 kip-ft*

TORQUE 18 kip-ft
69.3 mph WIND - 0.50 in ICE

AXIAL
37 K
SHEAR 30 K *MOMENT 3281 kip-ft*

TORQUE 16 kip-ft
REACTIONS - 80.0 mph WIND

Paul J. Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***180-ft Self-Support Tower / WESTHARTFORD_DEXTERST***			
Project: ***PJF# 64116-0002 / CT0001***			
Client: Hirschfeld Communications, LLC	Drawn by: Jonathan Sommer	App'd:	
Code: TIA/EIA-222-F	Date: 04/26/16	Scale: NTS	
Path: G:\TOWER\641_Hirschfeld Communications\2016\64116-0002.CT001\TNX\64116-0002.001.8700.eri		Dwg No. E-1	

PAUL J. FORD & COMPANY

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

1) Paul J. Ford and Company has not performed a site visit to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.

2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.

3) It is not possible to have all the very detailed information to perform a very thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

4) The structural integrity of the existing tower foundation can only be verified if exact foundation sizes and soil conditions are known. Paul J. Ford and Company will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.

5) It is the owner's responsibility to determine the amount of ice accumulation, if any, that should be considered in the structural analysis.

6) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard TIA/EIA-222-F. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.

7) The attached sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.

8) Miscellaneous items such as antenna mounts etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

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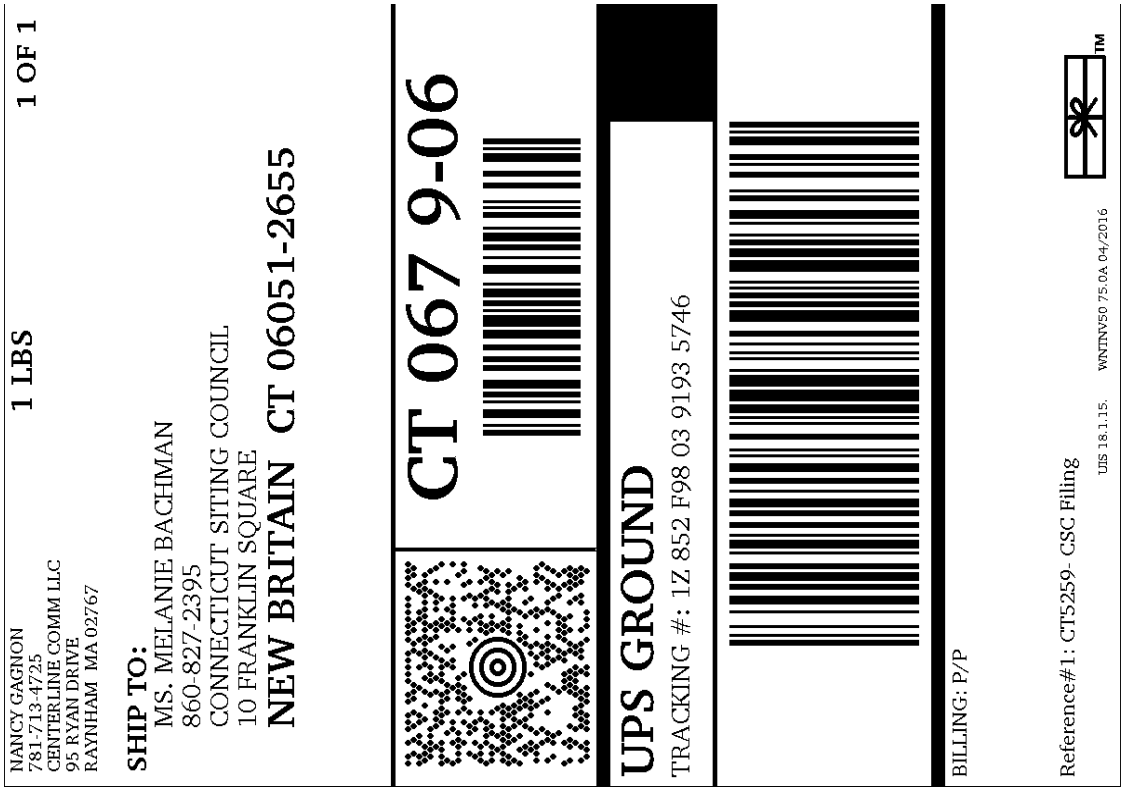

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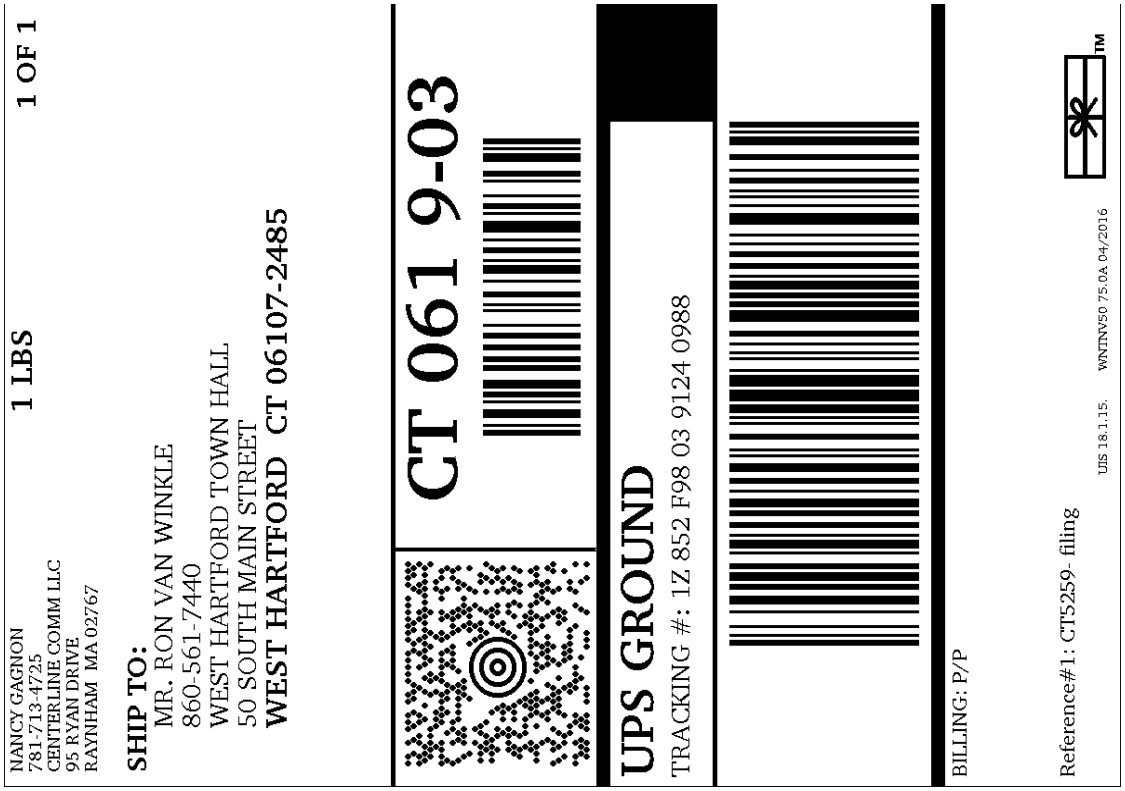

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