NORTHEAST
SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
860-209-4690
denise@northeastsitesolutions.com

October 15, 2018

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

RE: Notice of Exempt Modification
1030 New Britain Avenue, West Hartford CT 06110
Latitude: 41.73130
Longitude: -72.72380
T-Mobile Site#: CT11170C_L700 4x2

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 165-foot level of the existing 180-foot lattice tower at 1030 New Britain Avenue, West Hartford CT 06110. The tower is owned by Ten Thirty Building Co LLC. The property is owned by Ten Thirty Building Co LLC c/o Hirschfeld MGMT Inc. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 600/700 MHz antenna, replace (3) RRU and add (1) hybrid cable. The new antennas would be installed at the 165-foot level of the tower.

Planned Modifications:

Remove: (12) 1-5/8" Coax

Remove and Replace:
(3) LNX-6515 Antenna (REMOVE) - (3) RFS-APXAARR24_43-U-NA20 Antenna **(REPLACE)**
(3) RRUS11 B12 (REMOVE) – 4449 B12/B71 **(REPLACE)**

Install New:
(1) Hybrid Cable

Existing to Remain:
(3)AIR32 B66Aa/B2a Antenna
(3)AIR21 B2A /B4P
(3) Twin TMA
(6) 1-5/8" Coax
(2) 1-5/8" Hybrid Cable

This facility was approved by Town of West Hartford PZC. Site plan approval was granted in 1997 for the construction of a 199 foot communication tower.

Please see attached.
Also attached is most recent T-Mobile Exempt Modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Shari Cantor, Elected Official and Todd Dumais, Town Planner for the Town of West Hartford, 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: 420 Main Street, Sturbridge, MA 01566
Email: denise@northeastsitesolutions.com

Attachments
cc: Honorable Shari Cantor- Mayor of West Hartford
Todd Dumais– West Hartford Town Planner
Ten Thirty Building Co LLC c/o Hirschfeld MGMT Inc – as tower and property owner

Exhibit A

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

June 23, 1999

Ronald C. Clark
Manager, Real Estate Operations
Nextel Communications
100 Corporate Place
Rocky Hill, CT 06067

RE: TS-NEXTEL-155-990527 – Nextel Communications request for an order to approve tower sharing at an existing telecommunications facility located at 1030 New Britain Avenue in West Hartford, Connecticut.

Dear Mr. Clark:

At a public meeting held June 16, 1999, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures.

This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequency now used on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

This decision applies only to this request for tower sharing and is not applicable to any other request or construction.

The proposed shared use is to be implemented as specified in your letter dated May 27, 1999. Please notify the Council when all work is complete.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/tsg

c: Barry M. Feldman, Town Manager, Town of West Hartford

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STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

September 6, 2016

Denise Sabo
Northeast Site Solutions
199 Brickyard Road
Farmington, CT 06032

RE: **EM-T-MOBILE-155-160816** - T-Mobile notice of intent to modify an existing telecommunications facility located at 1030 New Britain Avenue, West Hartford, Connecticut.

Dear Ms. Sabo:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

1. Fiber cables and feed lines to the 165-foot level shall be installed in accordance with the structural analysis report performed by Paul J. Ford & Company dated July 26, 2016 and stamped by Joseph Jacobs;

2. Within 45 days following completion of equipment installation, T-Mobile shall provide documentation that its installation complied with the recommendations of the structural analysis;

3. Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;

4. Any material changes to this modification as proposed shall require the filing of a new notice with the Council;

5. Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;

6. Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by T-Mobile shall be removed within 60 days of the date the antenna ceased to function;

7. The validity of this action shall expire one year from the date of this letter; and

8. The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated August 15, 2016. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and Environmental Protection pursuant to Connecticut General Statutes § 22a-162. This facility has also been

carefully modeled to ensure that radio frequency emissions are conservatively below state and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/FOC/lm

c: The Honorable Shari Cantor, Mayor, Town of West Hartford
Ronald Van Winkle, Town Manager, Town of West Hartford
Todd Dumais, Town Planner, Town of West Hartford
Ten Thirty Building Co. LLC c/o Hirschfeld MGMT Inc.

Exhibit B

1030 NEW BRITAIN AVENUE

Location	1030 NEW BRITAIN AVENUE	Mblu	H15/ 3771/ 1030/ /
Parcel ID	3771 2 1030 0001	Owner	TEN THIRTY BUILDING COMPANY LLC
Assessment	$1,088,220	Appraisal	$1,554,600
Vision Id #	18633	**Building Count**	2

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2013	$865,700	$688,900	$1,554,600
Assessment			
Valuation Year	Improvements	Land	Total
2013	$605,990	$482,230	$1,088,220

Owner of Record

Owner	TEN THIRTY BUILDING COMPANY LLC	Sale Price	$1
Co-Owner		Certificate	1
Address	C/O HIRSCHFELD MGMT INC #106 1030 NEW BRITAIN AVENUE W HARTFORD, CT 06110	Book & Page	2004/ 148
		Sale Date	04/21/1995
		Instrument	U

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
TEN THIRTY BUILDING COMPANY LLC	$1	1	2004/ 148	U	04/21/1995
HIRSCHFELD HELENE FERN TR	$0	1	911/ 85	U	04/18/1984
RUBIN LUCILLE AND	$650,000	1	685/ 183	U	05/17/1979
LINCOLN ICE CREAM CO INC	$0	1	627/ 47	U	10/09/1978
	$0	1	534/ 67	U	

Building Information

Building 1 : Section 1

Year Built:	1957
Living Area:	11,520
Replacement Cost:	$425,877

Building Percent Good:	33
Replacement Cost Less Depreciation:	$140,500

Building Attributes	
Field	Description
STYLE	Distribution Whse
MODEL	Comm/Ind
Grade	D 0.75
Stories:	1
Occupancy	
Exterior Wall 1	Concrete Block
Exterior Wall 2	
Roof Structure	Curved Roof
Roof Cover	Metal Ribbed
Interior Wall 1	Typical
Interior Wall 2	
Floor Type	Concrete Slab
Floor Cover	Carpet
Heating Fuel	Typical
Heating Type	Forced Hot Air
AC Type	Central - Zone
As Built Use	TSGR
Bldg Use	Commercial
# of Bedrooms	
Total Baths	
Type	01
Wet Sprinkler	100
Dry Sprinkler	
1st Floor Use:	
Class	Class C
Frame Type	Rigid Steel
Plumbing	LIGHT
Ceiling	Acoustic Panel
Group	IND
Wall Height	15
Adjustment	

Building Photo

(http://images.vgsi.com/photos/WestHartfordCTPhotos//\00\01

Building Layout

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
DST	DISTRIBUTION WHSE	11,520	11,520
COM	COMMERCIAL - NV	11,520	0
		23,040	11,520

Building 2 : Section 1

Year Built:	1960
Living Area:	24,386
Replacement Cost:	$1,988,911
Building Percent	34

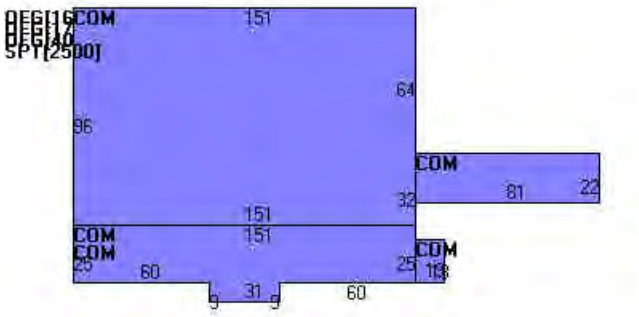
Good:
Replacement Cost
Less Depreciation: $676,200

Building Attributes : Bldg 2 of 2	
Field	Description
STYLE	Office Gen Lowrise
MODEL	Comm/Ind
Grade	D 0.75
Stories:	2
Occupancy	
Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Built Up
Interior Wall 1	Typical
Interior Wall 2	
Floor Type	Concrete Slab
Floor Cover	None
Heating Fuel	Typical
Heating Type	None
AC Type	None
As Built Use	LNDP
Bldg Use	Commercial
# of Bedrooms	
Total Baths	
Type	01
Wet Sprinkler	
Dry Sprinkler	
1st Floor Use:	
Class	Class C
Frame Type	Rigid Steel
Plumbing	LIGHT
Ceiling	Not Applicable
Group	OFF
Wall Height	8
Adjustment	

Building Photo

(http://images.vgsi.com/photos/WestHartfordCTPhotos//default

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
OFG	OFFICE GENERAL LOWRISE	21,886	21,886
SPT	MISC SPORT FACILITY	2,500	2,500
COM	COMMERCIAL - NV	24,633	0
		49,019	24,386

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	201
Description	Commercial
Zone	BG
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	2.82
Frontage	
Depth	
Assessed Value	$482,230
Appraised Value	$688,900

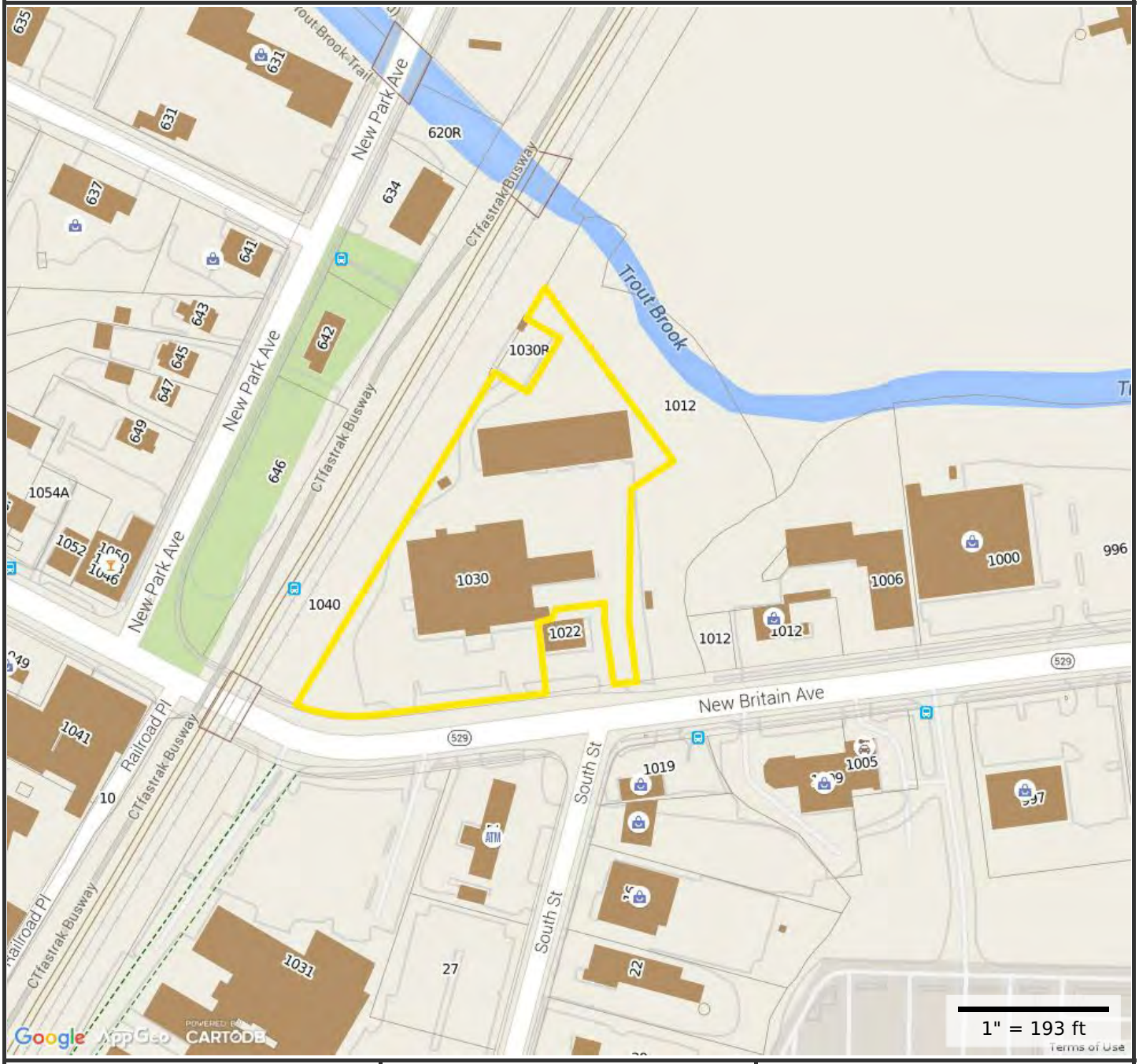
Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
CLP4	Paving, Asphalt			5700 SF	$5,300	1
COH1	Overhead Door Commercial			100 UNIT	$400	1
COH3	Overhead Metal Door			330 UNIT	$2,000	1
CLP4	Paving, Asphalt			39375 SF	$36,800	1
CLD2	Loading Dock - Stl/Conc			330 SF	$1,100	1
CCP5	Canopy-roof only			594 SF	$3,000	1
CFC5	Shed - Concrete Block			169 SF	$400	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2014	$865,700	$688,900	$1,554,600
2013	$865,700	$688,900	$1,554,600
2012	$865,700	$688,900	$1,554,600

Assessment			
Valuation Year	Improvements	Land	Total
2014	$605,990	$482,230	$1,088,220
2013	$605,990	$482,230	$1,088,220
2012	$605,990	$482,230	$1,088,220



Property Information

Property ID	3771 2 1030 0001
Location	1030 NEW BRITAIN AVENUE
Owner	TEN THIRTY BUILDING COMPANY LLC

TOWN OF WEST HARTFORD

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

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

Parcels updated 5/22/2015
Properties updated Daily

Exhibit C

ANTENNA UPGRADES BY

T-Mobile

T-MOBILE NORTHEAST LLC

PROJECT: L700 4X2

SITE NUMBER: CT11170C

SITE NAME: HARTFORD/ N. BRITAIN AVE_1

SITE ADDRESS: 1030 NEW BRITAIN AVE
WEST HARTFORD, CT 06110

(RF CONFIGURATION 67D92DB)

PROJECT SCOPE:

UPGRADE OF EXISTING WIRELESS FACILITY AS FOLLOWS:
REPLACE (3) EXISTING ANTENNAS,
ADD (3) REMOTE RADIO UNITS (RRU),
ADD (1) 6X12 HYBRID CABLES.

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAPPED ACCESS IS NOT REQUIRED.
   POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   NO OUTDOOR STORAGE OR ANY
   SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
4. REFER TO STRUCTURAL ANALYSIS REPORT TITLED "STRUCTURAL ANALYSIS REPORT" SITE NAME: WESTHARTFORD_DEXTERST, SITE ID: CT11170C, DATED SEPTEMBER 11, 2018, PREPARED BY PAUL J. FORD & COMPANY.

APPLICABLE STATE ADOPTION CODES:

2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

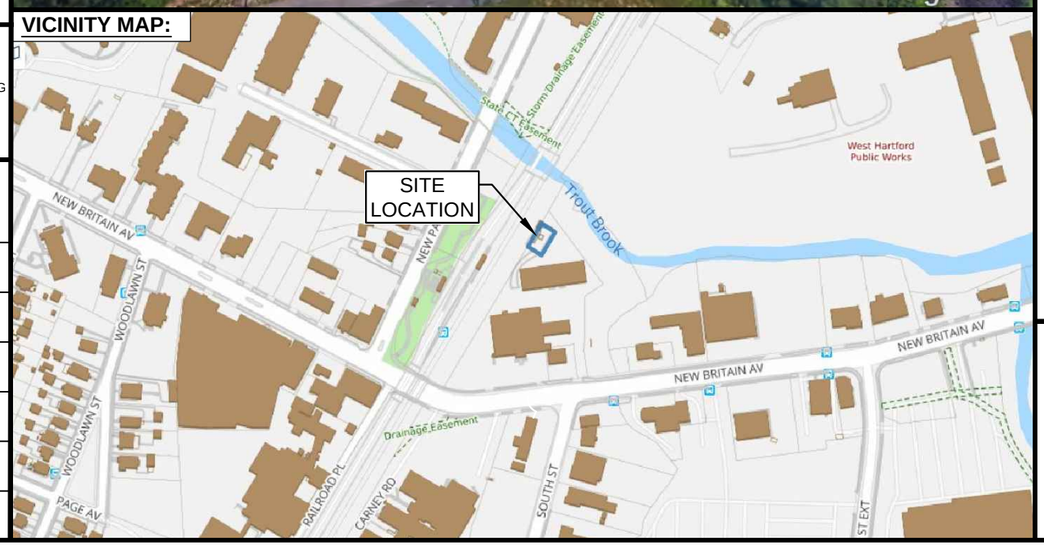
2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:

VICINITY MAP:



PROJECT INFORMATION:

ADDRESS:	1030 NEW BRITAIN AVE WEST HARTFORD, CT 06110
STRUCTURE TYPE:	LATTICE TOWER
COORDINATES:	41.73130 N -72.72380 W

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	HIRSCHFELD COMMUNICATIONS LLC 1030 NEW BRITAIN AVENUE WEST HARTFORD, CONNECTICUT 06110 860.953.7000 FAX 860.953.9300
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

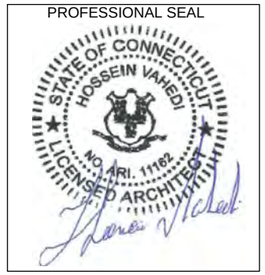
T-1:	TITLE SHEET
N-1:	GENERAL NOTES
A-1:	PLAN
A-2:	ELEVATION
A-3:	ANTENNA PLAN
A-4:	ANTENNA DETAILS
E-1:	GROUNDING DETAILS

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	09/20/18
0	SIGNED AND SEALED	09/24/18

SITE NUMBER: CT11170C
SITE NAME: HARTFORD/ N. BRITAIN AVE_1
SITE ADDRESS: 1030 NEW BRITAIN AVE
WEST HARTFORD, CT 06110

SHEET TITLE:

T-1: TITLE SHEET

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 HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT 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 CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

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 CONSTRUCTION DOCUMENTS.

6. 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.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING 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 CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

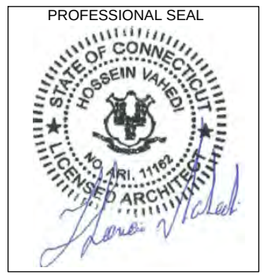
J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

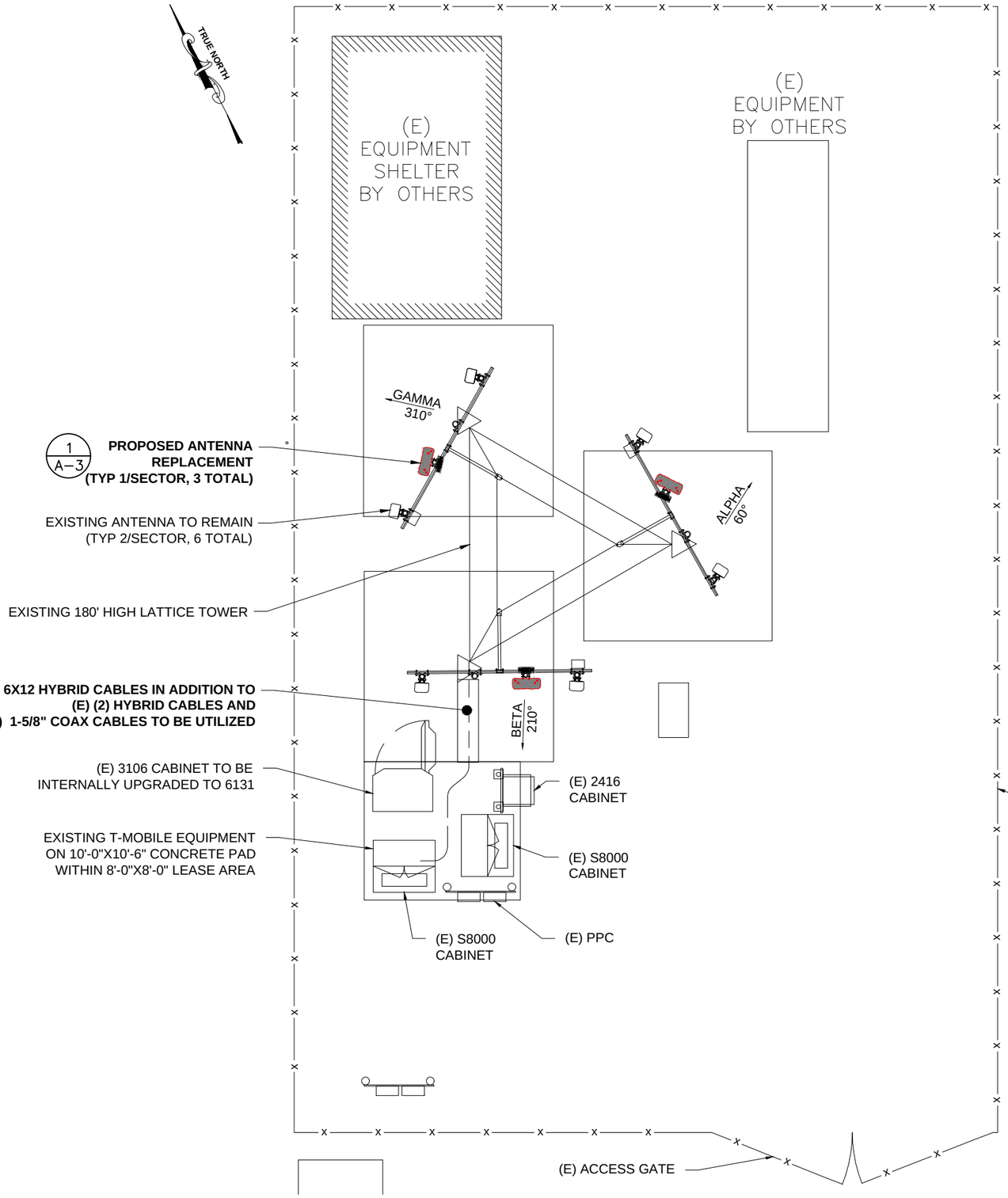
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	09/20/18
0	SIGNED AND SEALED	09/24/18

SITE NUMBER: CT11170C
SITE NAME: HARTFORD/ N. BRITAIN AVE_1
SITE ADDRESS: 1030 NEW BRITAIN AVE
WEST HARTFORD, CT 06110

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



SITE PLAN
SCALE: 1/8" = 1'-0"

1 / A-1

APPLICANT:
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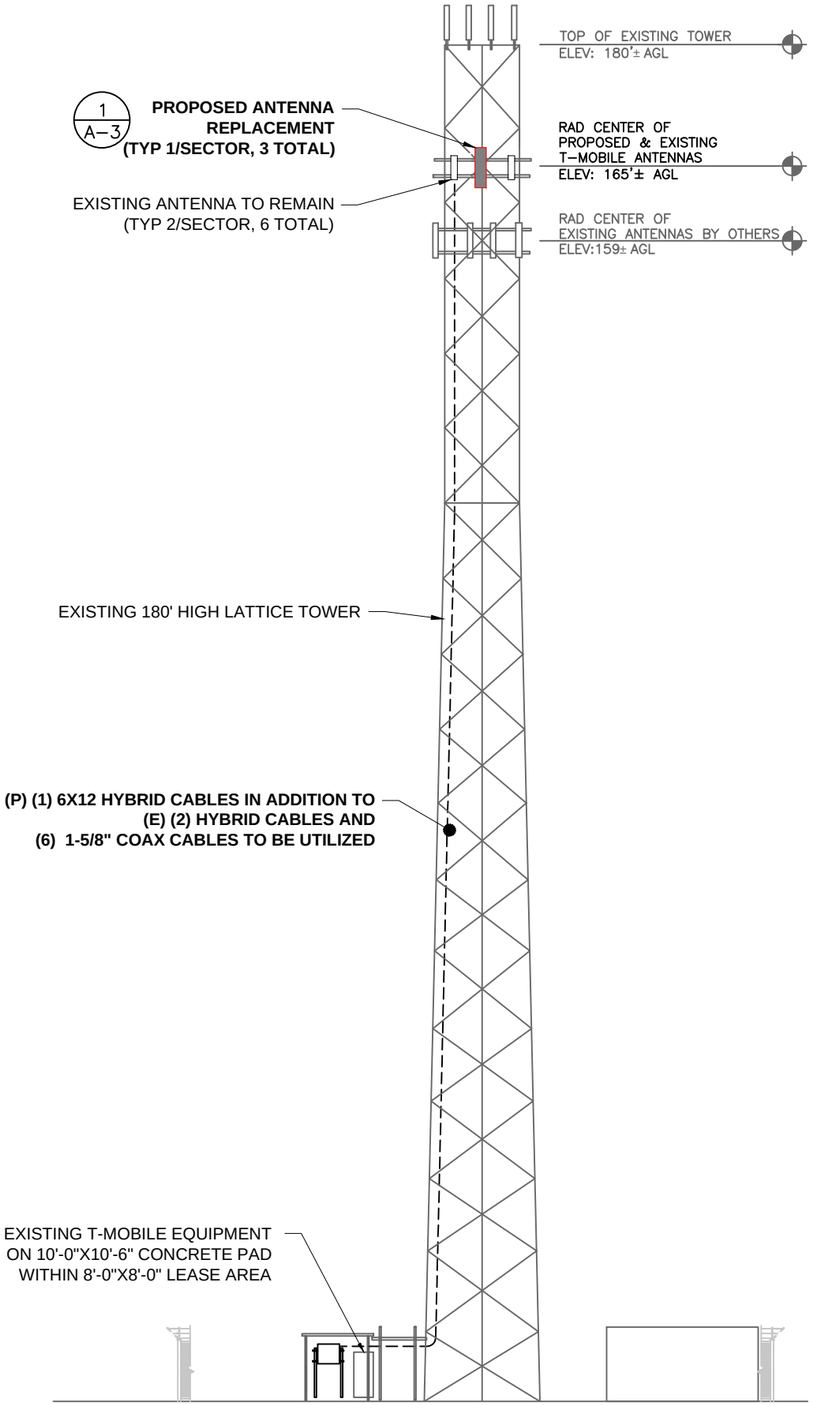
SHEET TITLE:
A-1: PLAN



ELEVATION
SCALE: 1/30" = 1'-0"

1
A-2

APPLICANT:

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
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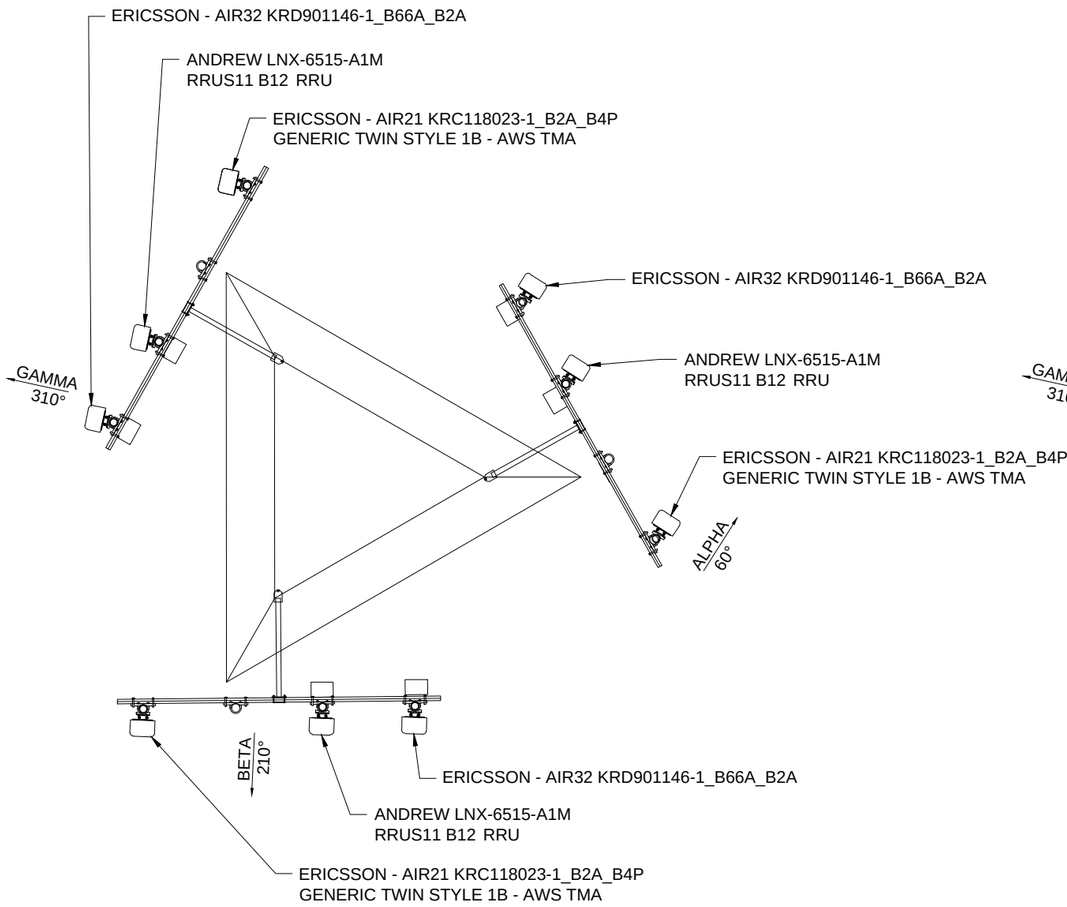
WEST HARTFORD, CT 06110

SHEET TITLE:

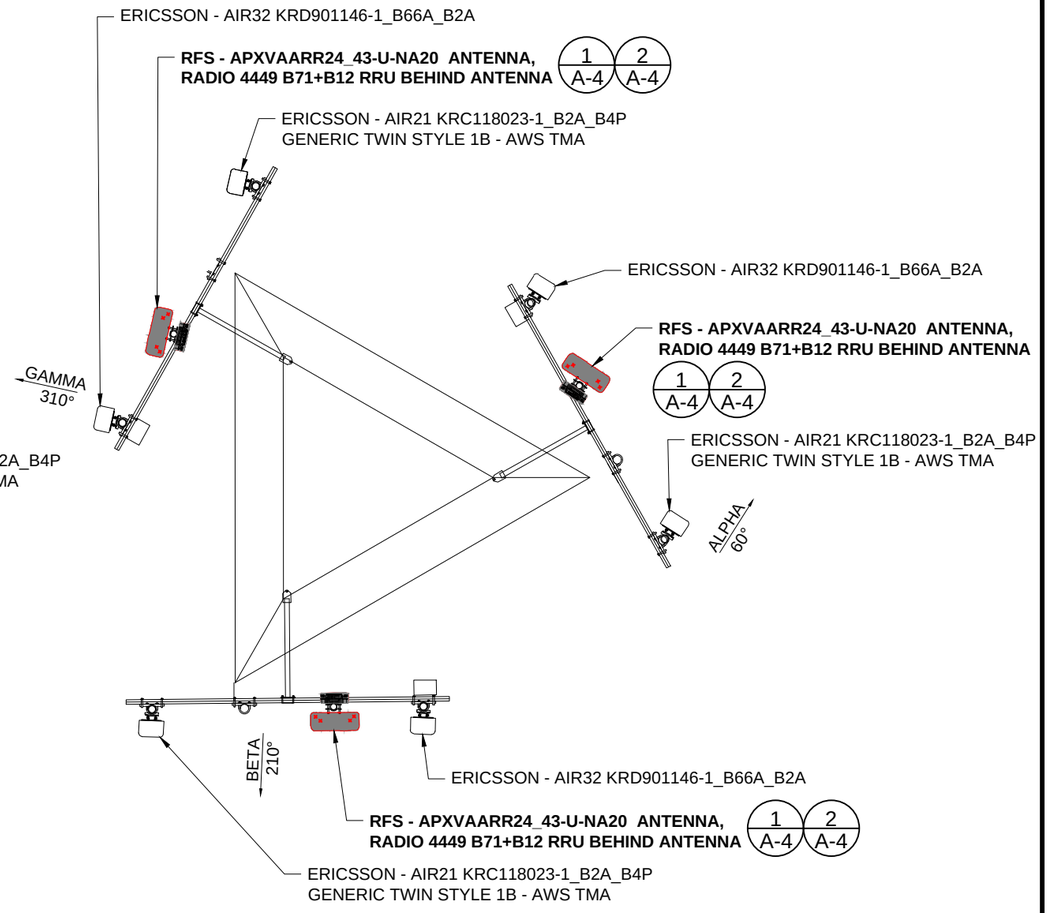
A-2: ELEVATION

TRUE NORTH

EXISTING ANTENNA PLAN



FINAL ANTENNA PLAN



ANTENNA PLAN (1 / A-3)
SCALE: NTS

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
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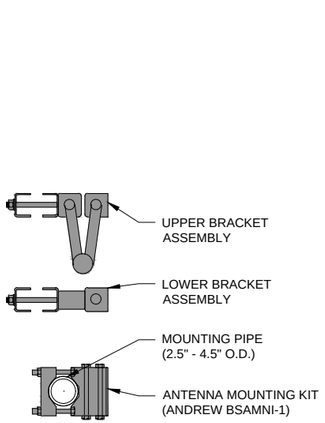
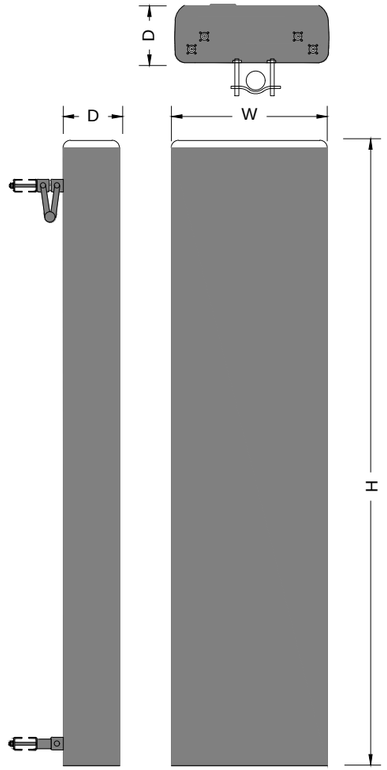
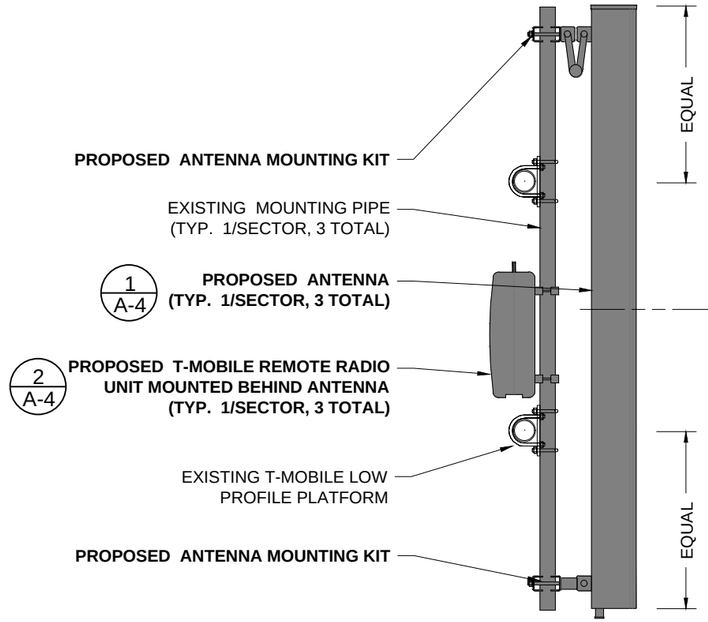
SHEET TITLE:
A-3: ANTENNA PLAN



APX ANTENNA SPECIFICATIONS	
MODEL #	APXVAARR24_43-U-NA20
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.7"
WEIGHT	128 LB



RFS ANTENNA
N.T.S
1 / A-4



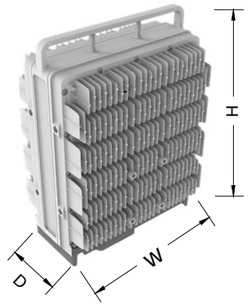
ANTENNA MOUNTING DETAIL
N.T.S
3 / A-4

STRUCTURAL NOTES:

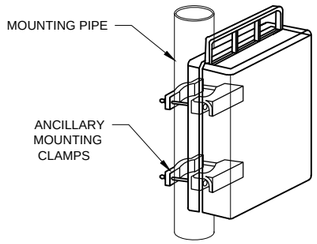
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS REPORT AND MOUNT ASSESSMENT TO DETERMINE IF THERE IS ANY SUPPLEMENTAL OF SPECIAL INSTALLATION REQUIRED FOR LATTICE TOWER EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS.

ANTENNA INSTALLATION SPECIAL WORK NOTE:
ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE, VERTICALLY CENTERED PROPOSED PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 4449 B71+B12
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	10.4"
WEIGHT	74 LB



REMOTE RADIO UNIT
N.T.S
2 / A-4



REMOTE RADIO UNIT MOUNTING DETAIL

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
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203-275-6669

CONSULTANT:
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617-212-3123

PROFESSIONAL SEAL

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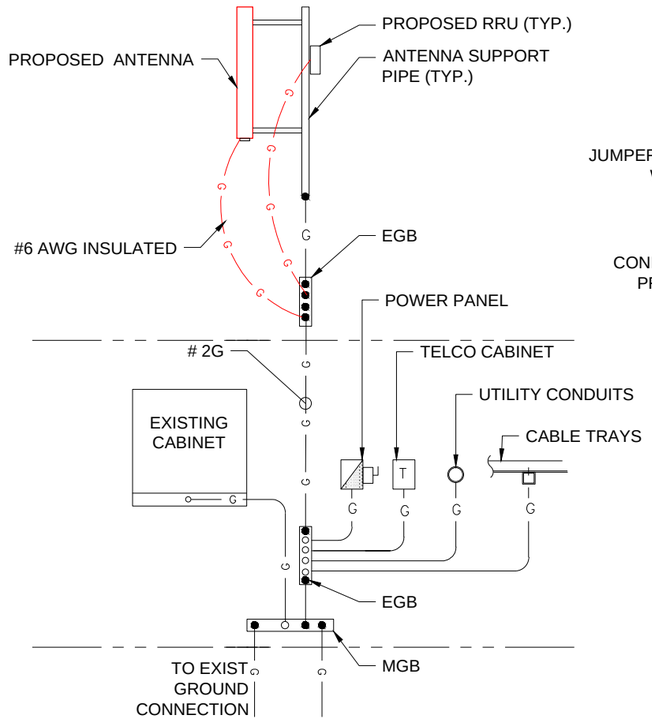
WEST HARTFORD, CT 06110

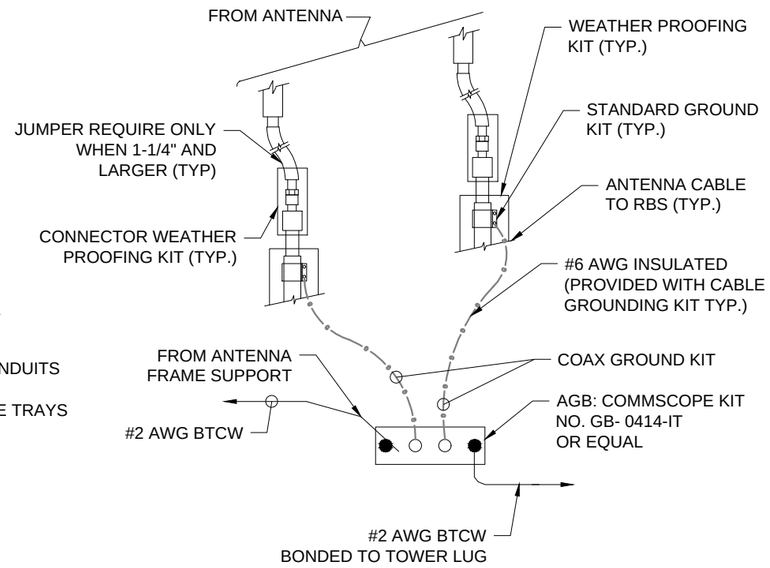
SHEET TITLE:
A-4: ANTENNA DETAILS

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) ND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLING BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE ARE PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELECOM CABINET AND RBS CABINET AS INDICATED ON DRAWING A -1. PROVIDE FULL LENGTH PULL ROPE INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NAME 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUNDING COAX CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURES COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSTALLATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE GROUND.
14. ALL GROUND CONNECTION TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AS RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY BOND ANY METER OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PROCEDURES (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN RBS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTION.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20 BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

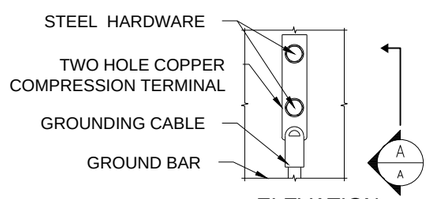


GROUNDING RISER DIAGRAM (1 / E-1)
SCALE: N.T.S

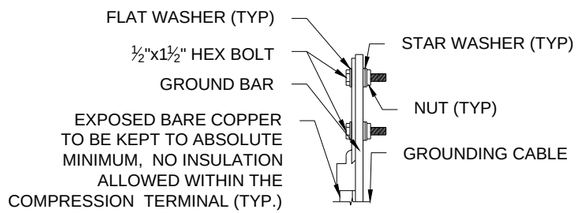


NOTES:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

TOWER TOP CABLE GROUNDING DETAIL (2 / E-1)
SCALE: N.T.S



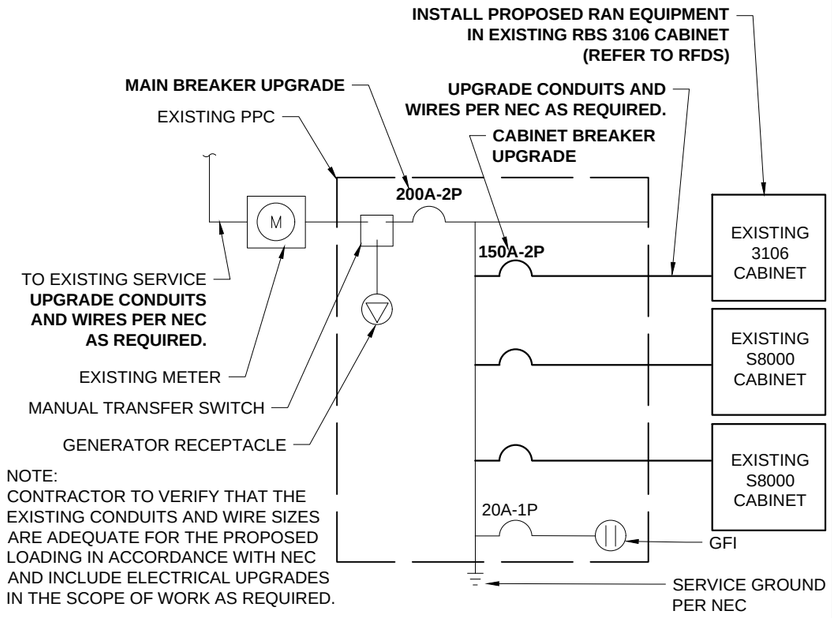
ELEVATION



SECTION A-A

NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E-1)
SCALE: N.T.S



NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ONE LINE DIAGRAM (4 / E-1)
SCALE: N.T.S

APPLICANT:
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CONSULTANT:
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617-212-3123

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

REV	DESCRIPTION	DATE
A	PRELIMINARY	09/20/18
0	SIGNED AND SEALED	09/24/18

SITE NUMBER: CT11170C
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WEST HARTFORD, CT 06110

SHEET TITLE:
E-1: GROUNDING AND ELECTRICAL DETAILS

Exhibit D

PAUL J. FORD & COMPANY

Report Date:	September 11, 2018
Client:	Hirschfeld Communications LLC 1030 New Britain Avenue West Hartford, CT 06110 Attn: Ian Ormesher (703) 447-1350 iormesher@hirschfeldcos.com
Structure:	Existing 180-ft Self Support
Site Name:	WestHartford_DEXTERST
Site Reference #:	CT001
Site Address:	1030 New Britain Ave
City, County, State:	West Hartford, Hartford County, CT
Latitude, Longitude:	41.736092, -72.720499
PJF Project:	A64118-0001.002.8700

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**" to determine the tower stress level.

Analysis Criteria:

Reference Standard:	2016 Connecticut State Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1.
Ultimate Wind Speed:	122 mph 3-second gust wind speed without ice
Nominal Wind Speed:	95 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 1" ice
Service Wind Speed:	60.0 mph (Serviceability) without ice
IBC Site Criteria:	Risk Category II, Topographic Category 1, Exposure Category C

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:	95.0%	Pass
Existing Foundation:	32.8%	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:
Paul J. Ford and Company

Jonathan Sommer, EI
Structural Designer
jsommer@pjfweb.com

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

SEP 11 2018

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Phone 614.221.6679

Orlando
1801 Lee Rd, Suite 230
Winter Park, FL 32789
Phone 407.898.9039

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 EIA/TIA-222-F.

2) ANALYSIS CRITERIA

Building Code: 2016 Connecticut State Building Code (2012 IBC)
TIA-222 Revision: TIA-222-G
Risk Category: II
Nominal Wind Speed: 95 mph
Exposure Category: C
Topographic Factor: 1
Ice Thickness: 1 in
Wind Speed with Ice: 50 mph
Service Wind Speed: 60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165.0	165.0	3	ericsson	RADIO 4449 B12/B71	1	1-5/8	-
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	180.0	6	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	12 2 4	1-5/8 1/2 3/4	1
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 12			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		3	ericsson	RRUS 32 B66			
		3	ericsson	RRUS 4478 B14			
		3	ericsson	RRUS A2 MODULE			
		3	kathrein	80010965 w/ Mount Pipe			
		1	miscl	GPS			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		3	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 405-1]			
		6	powerwave technologies	LGP21901	-	-	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165.0	165.0	3	ericsson	AIR 21 B2A/B4P w/ Mount Pipe	8	1-5/8	1
		3	ericsson	AIR 32 B4A/B2P w/ Mount Pipe			
		3	ericsson	KRY 112 71			
		1	tower mounts	Sector Mount [SM 402-3]			
		3	commscope	LNX-6515DS-A1M w/ Mount Pipe	-	-	3
		3	ericsson	RRUS 11 B12			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) 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
Pile Driving Report	Simeon Beer, 7/13/1998
Construction Drawings	AT&T, 2/13/2018

3.1) Analysis Method

tnxTower (version 8.0.4.0), 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) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked.
5) Feedlines are stacked as shown in Appendix B of this report.

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	2	-18.83	54.43	34.6	Pass
T2	170 - 150	Leg	2" solid	38	73.14	106.69	68.6	Pass
T3	150 - 130	Leg	2 1/4" solid	102	-134.28	148.69	90.3	Pass
T4	130 - 120	Leg	Pirod 105216 (12x1.25)	166	-135.33	142.49	95.0	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	175	-162.15	214.86	75.5	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	190	-184.27	214.86	85.8	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	205	-207.00	300.68	68.8	Pass
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	220	-229.69	300.68	76.4	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	235	-253.30	399.87	63.3	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	250	-275.59	399.87	68.9	Pass
T1	180 - 170	Diagonal	3/4" solid	32	-3.32	6.09	54.6	Pass
T2	170 - 150	Diagonal	7/8" solid	48	-5.23	9.34	56.0	Pass
T3	150 - 130	Diagonal	1" solid	160	-5.97	15.16	39.4	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	173	-6.90	13.56	50.9 61.0 (b)	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	186	-4.84	11.92	40.6 42.5 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	195	-4.81	8.66	55.5	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	210	-5.22	12.12	43.1	Pass
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	225	-5.72	9.79	58.4	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	240	-6.36	12.87	49.4	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	254	-7.53	10.64	70.8	Pass
T1	180 - 170	Horizontal	7/8" solid	30	-0.56	6.14	9.1	Pass
T2	170 - 150	Horizontal	7/8" solid	59	-1.03	5.22	19.7	Pass
T3	150 - 130	Horizontal	7/8" solid	158	-1.83	4.79	38.2	Pass
T1	180 - 170	Top Girt	7/8" solid	6	-1.75	6.14	28.5	Pass
T2	170 - 150	Top Girt	7/8" solid	42	-1.93	6.22	31.0	Pass
T3	150 - 130	Top Girt	1" solid	106	-2.13	8.40	25.3	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-1.45	6.14	23.6	Pass
T2	170 - 150	Bottom Girt	7/8" solid	45	-2.61	4.94	52.9	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.70	6.83	39.5	Pass
							Summary	
						Leg (T4)	95.0	Pass
						Diagonal (T10)	70.8	Pass
						Horizontal (T3)	38.2	Pass
						Top Girt (T2)	31.0	Pass
						Bottom Girt (T2)	52.9	Pass
						Bolt Checks	65.5	Pass
						Rating =	95.0	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	41.7	Pass
1	Base Foundation Structural	0	9.1	Pass
1	Base Foundation Soil Interaction	0	32.8	Pass

Structure Rating (max from all components) =	95.0%

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

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

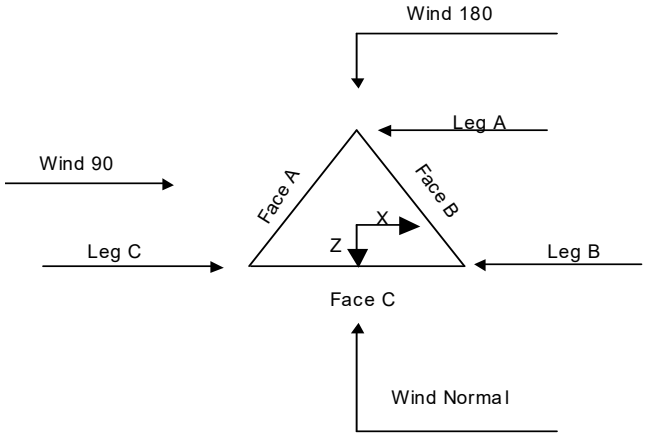
Tower Input Data

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-222-G standard.
The following design criteria apply:

4) Tower is located in Hartford County, Connecticut.
5) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
6) Basic wind speed of 95.0 mph.
7) Structure Class II.
8) Exposure Category C.
9) Topographic Category 1.
10) Crest Height 0.00 ft.
11) Nominal ice thickness of 1.00 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50.0 mph is used in combination with ice.
15) Deflections calculated using a wind speed of 60.0 mph.
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in tower member design is 1.
19) 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		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



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	Mid-Pt	Mid-Pt	Mid-Pt
T2 170.00-150.00	0.00	0.00	A36 (36 ksi)	1	1	1.03	Mid-Pt	Mid-Pt	Mid-Pt

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
T3 150.00-130.00	0.00	0.00	A36 (36 ksi)	1	1	1.03	Mid-Pt	Mid-Pt	Mid-Pt
T4 130.00-120.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 120.00-100.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 100.00-80.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 80.00-60.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 60.00-40.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 40.00-20.00	0.00	0.50	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T10 20.00-0.00	0.00	0.75	A36 (36 ksi)	1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

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	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 170.00-150.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 150.00-130.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	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			Truss-Legs Used As Inner Members		
	Leg Panels	X Brace Diagonals	Z Brace Diagonals	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

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.
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	0.00 A325N	0	0.00 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	0.00 A325N	0	0.00 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
T9 40.00-20.00	Flange	1.25 A325N	6	1.25 A325N	1	0.00 A325N	0	0.00 A325N	0	1.25 A325N	0	1.25 A325N	0	1.25 A325N	0
T10 20.00-0.00	Flange	1.25 F1554-105	0	1.25 A325N	1	0.00 A325N	0	0.00 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	Exclude From Torque Calculation	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	No	No	Ar (CaAa)	180.00 - 8.00	0.00	0.2	12	6	1.00 0.50	1.98		0.92
FSJ4-50B(1/2")	A	No	No	Ar (CaAa)	180.00 - 8.00	0.00	0.2	2	2	2.00 0.50	0.52		0.14
9776(3/4") ***	A	No	No	Ar (CaAa)	180.00 - 8.00	0.00	0.2	4	4	2.00 0.50	0.73		0.31
T-Brackets (Af)	C	No	No	Ar (CaAa)	165.00 - 8.00	0.00	-0.45	1	1	1.00	1.00		8.40
LDF7-50A (1 5/8" foam) ******	C	No	No	Ar (CaAa)	165.00 - 8.00	0.00	-0.45	9	9	1.00 0.50	1.98		0.92

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert 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 1" Ice	20.80 28.10 35.40	20.80 28.10 35.40	1.80 2.07 2.33
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000	180.00	No Ice	5.75	4.25	0.06

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			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) 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 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
(2) 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 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
(2) 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 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.35 0.44 0.54	0.01 0.02 0.03
RRUS 32	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 11	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
RRUS 11	C	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.10
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
RRUS 12	A	From Leg	4.00 0.00 0.00	0.000	180.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	B	From Leg	4.00 0.00	0.000	180.00	No Ice	3.15 3.36	1.29 1.44	0.06 0.08

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			1/2" Ice	3.59	1.60	0.11
						1" Ice			
RRUS 12	C	From Leg	4.00	0.000	180.00	No Ice	3.15	1.29	0.06
			0.00			1/2" Ice	3.36	1.44	0.08
			0.00			1" Ice	3.59	1.60	0.11
RRUS A2 MODULE	A	From Leg	4.00	0.000	180.00	No Ice	1.60	0.38	0.02
			0.00			1/2" Ice	1.76	0.47	0.03
			0.00			1" Ice	1.92	0.57	0.04
RRUS A2 MODULE	B	From Leg	4.00	0.000	180.00	No Ice	1.60	0.38	0.02
			0.00			1/2" Ice	1.76	0.47	0.03
			0.00			1" Ice	1.92	0.57	0.04
RRUS A2 MODULE	C	From Leg	4.00	0.000	180.00	No Ice	1.60	0.38	0.02
			0.00			1/2" Ice	1.76	0.47	0.03
			0.00			1" Ice	1.92	0.57	0.04
GPS	C	From Leg	4.00	0.000	180.00	No Ice	0.13	0.13	0.02
			0.00			1/2" Ice	0.24	0.24	0.02
			0.00			1" Ice	0.31	0.31	0.02
80010965 w/ Mount Pipe	A	From Leg	4.00	0.000	180.00	No Ice	14.05	7.63	0.13
			0.00			1/2" Ice	14.69	8.90	0.22
			0.00			1" Ice	15.30	9.96	0.33
80010965 w/ Mount Pipe	B	From Leg	4.00	0.000	180.00	No Ice	14.05	7.63	0.13
			0.00			1/2" Ice	14.69	8.90	0.22
			0.00			1" Ice	15.30	9.96	0.33
80010965 w/ Mount Pipe	C	From Leg	4.00	0.000	180.00	No Ice	14.05	7.63	0.13
			0.00			1/2" Ice	14.69	8.90	0.22
			0.00			1" Ice	15.30	9.96	0.33
DC6-48-60-18-8F	C	From Leg	4.00	0.000	180.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.64	1.64	0.06
RRUS 4478 B14	A	From Leg	4.00	0.000	180.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 4478 B14	B	From Leg	4.00	0.000	180.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 4478 B14	C	From Leg	4.00	0.000	180.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 32 B66	A	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B66	B	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B66	C	From Leg	4.00	0.000	180.00	No Ice	2.74	1.67	0.05
			0.00			1/2" Ice	2.96	1.86	0.07
			0.00			1" Ice	3.19	2.05	0.10
RRUS 32 B2	A	From Leg	4.00	0.000	180.00	No Ice	2.73	1.67	0.05
			0.00				2.95	1.86	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	180.00	No Ice	2.73	1.67	0.05
			0.00			1/2" Ice	2.95	1.86	0.07
			0.00			1" Ice	3.18	2.05	0.10
RRUS 32 B2	C	From Leg	4.00	0.000	180.00	No Ice	2.73	1.67	0.05
			0.00			1/2" Ice	2.95	1.86	0.07
			0.00			1" Ice	3.18	2.05	0.10
(2) LGP21901	A	From Leg	4.00	0.000	180.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP21901	B	From Leg	4.00	0.000	180.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP21901	C	From Leg	4.00	0.000	180.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
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Sector Mount [SM 402-3]	C	From Leg	0.00	0.000	165.00	No Ice	18.91	18.91	0.85
			0.00			1/2" Ice	26.78	26.78	1.23
			0.00			1" Ice	34.65	34.65	1.62
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	4.00	0.000	165.00	No Ice	6.16	5.55	0.10
			0.00			1/2" Ice	6.60	6.30	0.16
			0.00			1" Ice	7.03	7.00	0.22
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	4.00	0.000	165.00	No Ice	6.16	5.55	0.10
			0.00			1/2" Ice	6.60	6.30	0.16
			0.00			1" Ice	7.03	7.00	0.22
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	4.00	0.000	165.00	No Ice	6.16	5.55	0.10
			0.00			1/2" Ice	6.60	6.30	0.16
			0.00			1" Ice	7.03	7.00	0.22
AIR 32 B4A/B2P w/ Mount Pipe	A	From Leg	4.00	0.000	165.00	No Ice	7.09	6.37	0.13
			0.00			1/2" Ice	7.56	7.23	0.19
			0.00			1" Ice	8.02	7.97	0.26
AIR 32 B4A/B2P w/ Mount Pipe	B	From Leg	4.00	0.000	165.00	No Ice	7.09	6.37	0.13
			0.00			1/2" Ice	7.56	7.23	0.19
			0.00			1" Ice	8.02	7.97	0.26
AIR 32 B4A/B2P w/ Mount Pipe	C	From Leg	4.00	0.000	165.00	No Ice	7.09	6.37	0.13
			0.00			1/2" Ice	7.56	7.23	0.19
			0.00			1" Ice	8.02	7.97	0.26
KRY 112 71	A	From Leg	4.00	0.000	165.00	No Ice	0.58	0.40	0.01
			0.00			1/2" Ice	0.69	0.49	0.02
			0.00			1" Ice	0.80	0.59	0.03
KRY 112 71	B	From Leg	4.00	0.000	165.00	No Ice	0.58	0.40	0.01
			0.00			1/2" Ice	0.69	0.49	0.02
			0.00			1" Ice	0.80	0.59	0.03
KRY 112 71	C	From Leg	4.00	0.000	165.00	No Ice	0.58	0.40	0.01
			0.00			1/2" Ice	0.69	0.49	0.02
			0.00			1" Ice	0.80	0.59	0.03

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
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.16 1.30 1.45	0.07 0.09 0.11
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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	6534.58	0.60	1.96	7.56	22.69	3.68
Pirod 105217 (12x1.5)	2303.92	6585.93	0.71	1.94	8.00	22.87	5.30
Pirod 105217 (12x1.5)	2303.92	6554.05	0.71	1.88	8.00	22.76	5.30
Pirod 105218 (12x1.75)	2432.86	6587.02	0.85	1.83	8.45	22.87	7.22
Pirod 105218 (12x1.75)	2432.86	6536.27	0.85	1.74	8.45	22.70	7.22
Pirod 105219 (12x2)	2608.79	6534.42	1.22	1.70	9.06	22.69	9.42
Pirod 105219 (12x2)	2608.79	6387.80	1.22	1.38	9.06	22.18	9.42

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice

Comb. No.	Description
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	256.22	20.56	-11.85
	Max. H_x	18	256.22	20.56	-11.85
	Max. H_z	7	-227.18	-18.22	10.51
	Min. Vert	7	-227.18	-18.22	10.51
	Min. H_x	7	-227.18	-18.22	10.51
	Min. H_z	18	256.22	20.56	-11.85
Leg B	Max. Vert	10	282.28	-22.51	-13.43
	Max. H_x	23	-249.25	20.03	12.01
	Max. H_z	23	-249.25	20.03	12.01
	Min. Vert	23	-249.25	20.03	12.01
	Min. H_x	10	282.28	-22.51	-13.43
	Min. H_z	10	282.28	-22.51	-13.43
Leg A	Max. Vert	2	273.01	0.49	25.39
	Max. H_x	21	11.20	1.01	0.90
	Max. H_z	2	273.01	0.49	25.39
	Min. Vert	15	-238.70	-0.49	-22.35
	Min. H_x	11	-121.85	-1.00	-11.62
	Min. H_z	15	-238.70	-0.49	-22.35

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	8.03	44	0.484	0.039
T2	170 - 150	6.96	44	0.472	0.036
T3	150 - 130	5.01	44	0.416	0.031
T4	130 - 120	3.40	44	0.323	0.026
T5	120 - 100	2.77	44	0.266	0.022
T6	100 - 80	1.79	44	0.197	0.016
T7	80 - 60	1.08	44	0.136	0.011
T8	60 - 40	0.59	44	0.094	0.008
T9	40 - 20	0.26	44	0.056	0.004
T10	20 - 0	0.07	44	0.027	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]	44	8.03	0.484	0.039	35217
165.00	Sector Mount [SM 402-3]	44	6.45	0.462	0.035	16985

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 170	32.21	12	1.943	0.156
T2	170 - 150	27.92	12	1.895	0.147
T3	150 - 130	20.09	12	1.670	0.125
T4	130 - 120	13.62	12	1.294	0.105
T5	120 - 100	11.11	12	1.068	0.090
T6	100 - 80	7.18	12	0.790	0.066
T7	80 - 60	4.33	12	0.544	0.046
T8	60 - 40	2.35	12	0.378	0.031
T9	40 - 20	1.02	12	0.222	0.017
T10	20 - 0	0.28	12	0.109	0.008

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]	12	32.21	1.943	0.156	8868
165.00	Sector Mount [SM 402-3]	12	25.86	1.856	0.141	4287

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.63	5	4.34	24.85	0.175	1	Bolt DS
T2	170	Leg	A325N	0.75	5	15.77	35.78	0.441	1	Bolt DS
T3	150	Leg	A325N	1.00	6	21.71	53.01	0.410	1	Bolt Tension
T4	130	Leg	A325N	1.00	6	21.38	53.01	0.403	1	Bolt Tension
		Diagonal	A325N	1.00	1	6.50	10.66	0.610	1	Member Block Shear
T5	120	Leg	A325N	1.00	6	25.26	53.01	0.477	1	Bolt Tension
		Diagonal	A325N	1.00	1	4.53	10.66	0.425	1	Member Block Shear
T6	100	Leg	A325N	1.00	6	28.40	53.01	0.536	1	Bolt Tension
		Diagonal	A325N	1.00	1	4.26	10.66	0.400	1	Member Block Shear
T7	80	Leg	A325N	1.00	6	31.56	53.01	0.595	1	Bolt Tension
		Diagonal	A325N	1.00	1	4.85	11.68	0.416	1	Member Block Shear
T8	60	Leg	A325N	1.00	6	34.70	53.01	0.655	1	Bolt Tension
		Diagonal	A325N	1.00	1	5.32	11.68	0.455	1	Member Block Shear
T9	40	Leg	A325N	1.25	6	37.81	82.83	0.456	1	Bolt Tension
		Diagonal	A325N	1.25	1	6.01	20.30	0.296	1	Member Block Shear
T10	20	Diagonal	A325N	1.25	1	6.88	20.30	0.339	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	1 1/2" solid	10.00	2.25	72.0 K=1.00	1.77	-18.83	54.43	0.346 [1]
T2	170 - 150	2" solid	20.00	2.36	56.6 K=1.00	3.14	-74.22	111.84	0.664 [1]
T3	150 - 130	2 1/4" solid	20.00	2.36	50.3 K=1.00	3.98	-134.28	148.69	0.903 [1]
T4	130 - 120	Pirod 105216 (12x1.25)	10.02	10.02	45.4 K=1.00	3.68	-135.33	142.49	0.950 [1]
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	5.30	-162.15	214.86	0.755 [1]
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8 K=1.00	5.30	-184.27	214.86	0.858 [1]
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	7.22	-207.00	300.68	0.688 [1]
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4 K=1.00	7.22	-229.69	300.68	0.764 [1]
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	9.42	-253.30	399.87	0.633 [1]
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4 K=1.00	9.42	-275.59	399.87	0.689 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	165.67	0.20	1.12	3.29	0.340
T5	120 - 100	0.5	1.47	120.0	238.57	0.20	0.91	3.34	0.274
T6	100 - 80	0.5	1.47	120.0	238.57	0.20	0.28	3.34	0.084
T7	80 - 60	0.5	1.46	119.0	324.71	0.20	0.23	3.38	0.070
T8	60 - 40	0.5	1.46	119.0	324.71	0.20	0.24	3.38	0.072
T9	40 - 20	0.625	1.45	94.4	424.12	0.31	0.27	6.96	0.039
T10	20 - 0	0.625	1.45	94.4	424.12	0.31	0.92	6.96	0.133

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.59	2.22	128.0 K=0.90	0.44	-3.32	6.09	0.546 [1]
T2	170 - 150	7/8" solid	5.04	2.44	120.6 K=0.90	0.60	-5.23	9.34	0.560 [1]
T3	150 - 130	1" solid	5.12	2.47	107.6 K=0.91	0.79	-5.97	15.16	0.394 [1]
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	120.8 K=1.00	0.90	-6.90	13.56	0.509 [1]
T5	120 - 100	L 2.5 x 2.5 x 3/16	11.93	5.38	130.5 K=1.00	0.90	-4.84	11.92	0.406 [1]
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.80	6.33	153.4 K=1.00	0.90	-4.81	8.66	0.555 [1]
T7	80 - 60	L 3 x 3 x 3/16	15.24	7.08	142.5 K=1.00	1.09	-5.22	12.12	0.431 [1]
T8	60 - 40	L 3 x 3 x 3/16	16.80	7.88	158.6 K=1.00	1.09	-5.72	9.79	0.584 [1]
T9	40 - 20	L 3 x 3 x 5/16	18.45	8.68	176.8 K=1.00	1.78	-6.36	12.87	0.494 [1]
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	194.4 K=1.00	1.78	-7.53	10.64	0.708 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8 K=0.70	0.60	-0.56	6.14	0.091 [1]
T2	170 - 150	7/8" solid	4.37	4.20	161.3 K=0.70	0.60	-1.03	5.22	0.197 [1]
T3	150 - 130	7/8" solid	4.57	4.39	168.4 K=0.70	0.60	-1.83	4.79	0.382 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8 K=0.70	0.60	-1.75	6.14	0.285 [1]
T2	170 - 150	7/8" solid	4.01	3.85	147.7 K=0.70	0.60	-1.93	6.22	0.310 [1]
T3	150 - 130	1" solid	4.51	4.33	145.4 K=0.70	0.79	-2.13	8.40	0.253 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	148.8 K=0.70	0.60	-1.45	6.14	0.236 [1]
T2	170 - 150	7/8" solid	4.49	4.32	165.9 K=0.70	0.60	-2.61	4.94	0.529 [1]
T3	150 - 130	1" solid	4.99	4.80	161.2 K=0.70	0.79	-2.70	6.83	0.395 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	1 1/2" solid	10.00	0.50	16.0	1.77	18.59	79.52	0.234 [1]
T2	170 - 150	2" solid	20.00	0.57	13.6	2.19	73.14	106.69	0.686 [1] [#]
T3	150 - 130	2 1/4" solid	20.00	0.57	12.1	3.98	130.27	178.92	0.728 [1]
T4	130 - 120	Pirod 105216 (12x1.25)	10.02	10.02	45.4	3.68	128.26	165.67	0.774 [1]
T5	120 - 100	Pirod 105217 (12x1.5)	20.03	10.02	37.8	5.30	151.59	238.57	0.635 [1]
T6	100 - 80	Pirod 105217 (12x1.5)	20.03	10.02	37.8	5.30	170.40	238.57	0.714 [1]
T7	80 - 60	Pirod 105218 (12x1.75)	20.03	10.02	32.4	7.22	189.34	324.71	0.583 [1]
T8	60 - 40	Pirod 105218 (12x1.75)	20.03	10.02	32.4	7.22	208.21	324.71	0.641 [1]
T9	40 - 20	Pirod 105219 (12x2)	20.03	10.02	28.4	9.42	226.86	424.12	0.535 [1]
T10	20 - 0	Pirod 105219 (12x2)	20.03	10.02	28.4	9.42	244.18	424.12	0.576 [1]

[1] P_u / ϕP_n controls
[#] Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	130 - 120	0.5	1.48	121.0	165.67	0.20	1.12	3.29	0.340
T5	120 - 100	0.5	1.47	120.0	238.57	0.20	0.91	3.34	0.274
T6	100 - 80	0.5	1.47	120.0	238.57	0.20	0.28	3.34	0.084

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T7	80 - 60	0.5	1.46	119.0	324.71	0.20	0.23	3.38	0.070
T8	60 - 40	0.5	1.46	119.0	324.71	0.20	0.24	3.38	0.072
T9	40 - 20	0.625	1.45	94.4	424.12	0.31	0.27	6.96	0.039
T10	20 - 0	0.625	1.45	94.4	424.12	0.31	0.92	6.96	0.133

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	3/4" solid	4.59	2.22	142.3	0.44	3.31	19.88	0.167 [1]
T2	170 - 150	7/8" solid	5.04	2.44	134.0	0.60	5.33	27.06	0.197 [1]
T3	150 - 130	1" solid	5.12	2.47	118.7	0.79	5.66	35.34	0.160 [1]
T4	130 - 120	L 2.5 x 2.5 x 3/16	11.42	4.98	80.0	0.52	6.50	22.55	0.288 [1]
T5	120 - 100	L 2.5 x 2.5 x 3/16	11.93	5.38	86.2	0.52	4.53	22.55	0.201 [1]
T6	100 - 80	L 2.5 x 2.5 x 3/16	13.80	6.33	100.7	0.52	4.26	22.55	0.189 [1]
T7	80 - 60	L 3 x 3 x 3/16	15.24	7.08	93.1	0.66	4.85	28.67	0.169 [1]
T8	60 - 40	L 3 x 3 x 3/16	16.80	7.88	103.4	0.66	5.32	28.67	0.185 [1]
T9	40 - 20	L 3 x 3 x 5/16	18.45	8.68	116.3	1.01	6.01	44.05	0.137 [1]
T10	20 - 0	L 3 x 3 x 5/16	20.16	9.54	127.6	1.01	6.88	44.05	0.156 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	0.60	0.73	27.06	0.027 [1]
T2	170 - 150	7/8" solid	4.37	4.20	230.5	0.60	1.23	27.06	0.045 [1]
T3	150 - 130	7/8" solid	4.57	4.39	240.6	0.60	2.03	27.06	0.075 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	0.60	1.74	27.06	0.064 [1]
T2	170 - 150	7/8" solid	4.01	3.85	211.1	0.60	1.99	27.06	0.074 [1]
T3	150 - 130	1" solid	4.51	4.33	207.7	0.79	2.34	35.34	0.066 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 170	7/8" solid	4.00	3.88	212.6	0.60	1.45	27.06	0.054 [1]
T2	170 - 150	7/8" solid	4.49	4.32	236.9	0.60	2.46	27.06	0.091 [1]
T3	150 - 130	1" solid	4.99	4.80	230.3	0.79	2.93	35.34	0.083 [1]

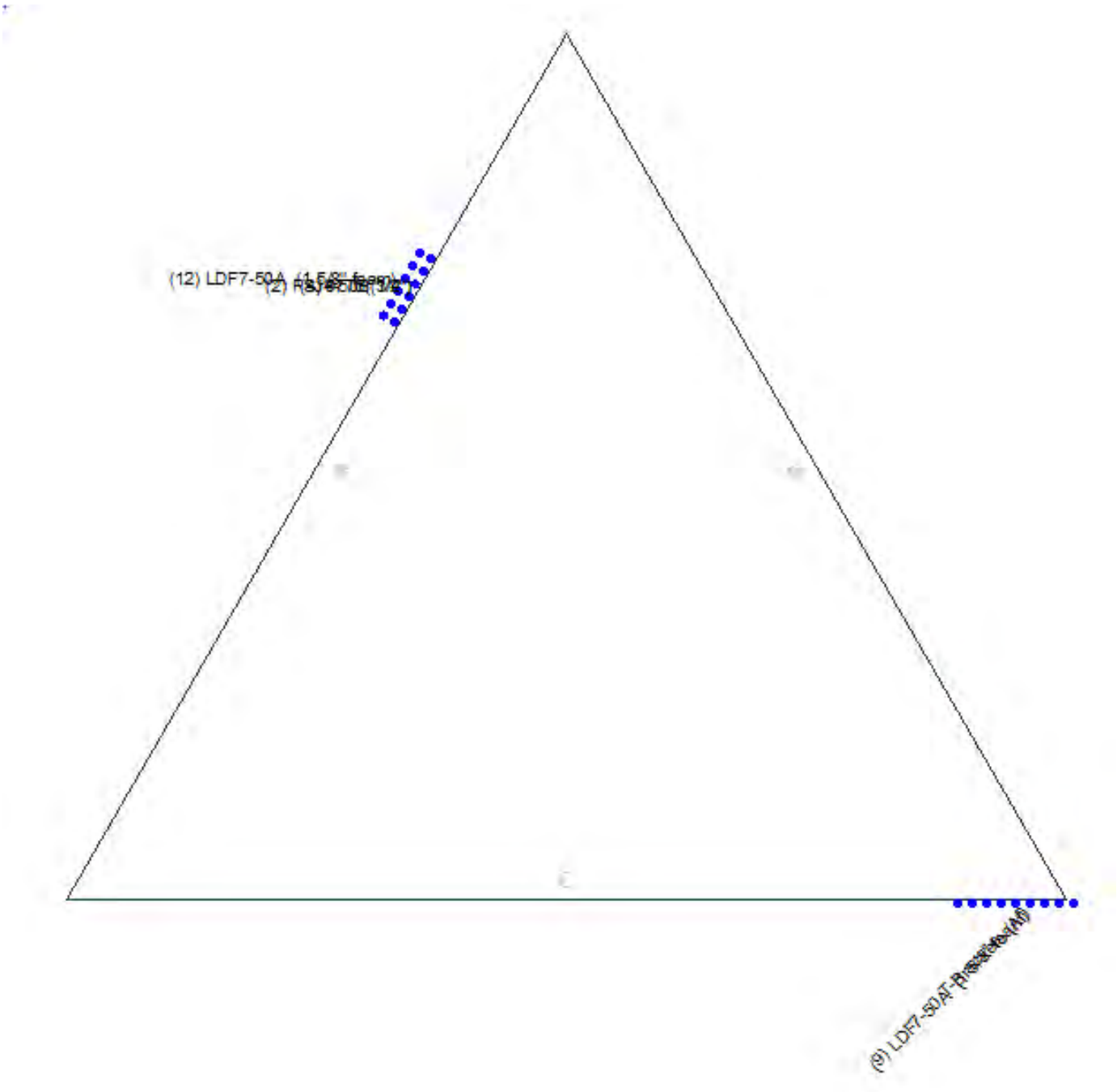
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 170	Leg	1 1/2" solid	2	-18.83	54.43	34.6	Pass
T2	170 - 150	Leg	2" solid	38	73.14	106.69	68.6	Pass
T3	150 - 130	Leg	2 1/4" solid	102	-134.28	148.69	90.3	Pass
T4	130 - 120	Leg	Pirod 105216 (12x1.25)	166	-135.33	142.49	95.0	Pass
T5	120 - 100	Leg	Pirod 105217 (12x1.5)	175	-162.15	214.86	75.5	Pass
T6	100 - 80	Leg	Pirod 105217 (12x1.5)	190	-184.27	214.86	85.8	Pass
T7	80 - 60	Leg	Pirod 105218 (12x1.75)	205	-207.00	300.68	68.8	Pass
T8	60 - 40	Leg	Pirod 105218 (12x1.75)	220	-229.69	300.68	76.4	Pass
T9	40 - 20	Leg	Pirod 105219 (12x2)	235	-253.30	399.87	63.3	Pass
T10	20 - 0	Leg	Pirod 105219 (12x2)	250	-275.59	399.87	68.9	Pass
T1	180 - 170	Diagonal	3/4" solid	32	-3.32	6.09	54.6	Pass
T2	170 - 150	Diagonal	7/8" solid	48	-5.23	9.34	56.0	Pass
T3	150 - 130	Diagonal	1" solid	160	-5.97	15.16	39.4	Pass
T4	130 - 120	Diagonal	L 2.5 x 2.5 x 3/16	173	-6.90	13.56	50.9	Pass
T5	120 - 100	Diagonal	L 2.5 x 2.5 x 3/16	186	-4.84	11.92	61.0 (b) 40.6 42.5 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	195	-4.81	8.66	55.5	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	210	-5.22	12.12	43.1	Pass
T8	60 - 40	Diagonal	L 3 x 3 x 3/16	225	-5.72	9.79	58.4	Pass
T9	40 - 20	Diagonal	L 3 x 3 x 5/16	240	-6.36	12.87	49.4	Pass
T10	20 - 0	Diagonal	L 3 x 3 x 5/16	254	-7.53	10.64	70.8	Pass
T1	180 - 170	Horizontal	7/8" solid	30	-0.56	6.14	9.1	Pass
T2	170 - 150	Horizontal	7/8" solid	59	-1.03	5.22	19.7	Pass
T3	150 - 130	Horizontal	7/8" solid	158	-1.83	4.79	38.2	Pass
T1	180 - 170	Top Girt	7/8" solid	6	-1.75	6.14	28.5	Pass
T2	170 - 150	Top Girt	7/8" solid	42	-1.93	6.22	31.0	Pass
T3	150 - 130	Top Girt	1" solid	106	-2.13	8.40	25.3	Pass
T1	180 - 170	Bottom Girt	7/8" solid	7	-1.45	6.14	23.6	Pass
T2	170 - 150	Bottom Girt	7/8" solid	45	-2.61	4.94	52.9	Pass
T3	150 - 130	Bottom Girt	1" solid	107	-2.70	6.83	39.5	Pass
						Summary		
						Leg (T4)	95.0	Pass
						Diagonal (T10)	70.8	Pass
						Horizontal (T3)	38.2	Pass
						Top Girt (T2)	31.0	Pass
						Bottom Girt (T2)	52.9	Pass
						Bolt Checks	65.5	Pass
						RATING =	**95.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

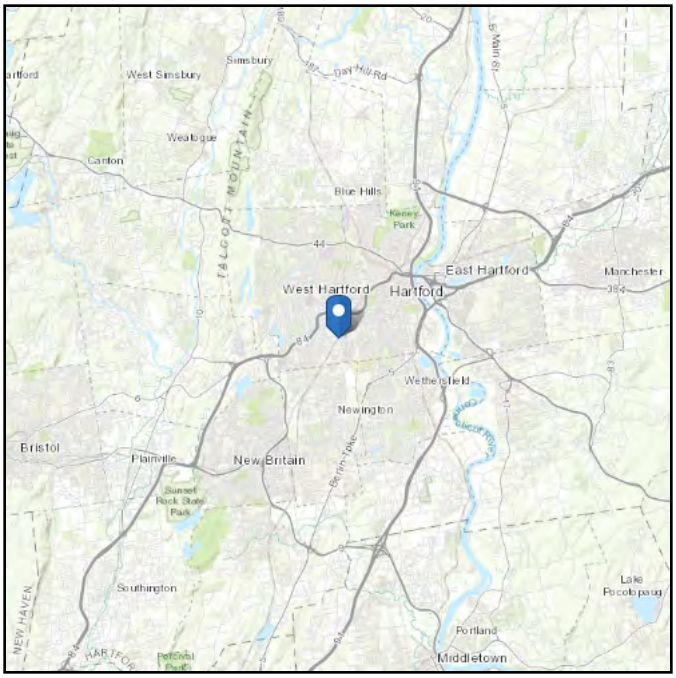
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 66.72 ft (NAVD 88)
Latitude: 41.736092
Longitude: -72.720499



Wind

Results:

Wind Speed:	122 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	100 Vmph

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

Date Accessed: Tue Sep 04 2018

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

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

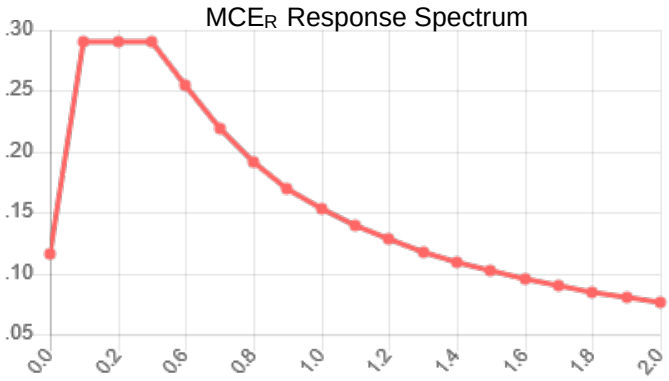
Seismic

Site Soil Class: D - Stiff Soil

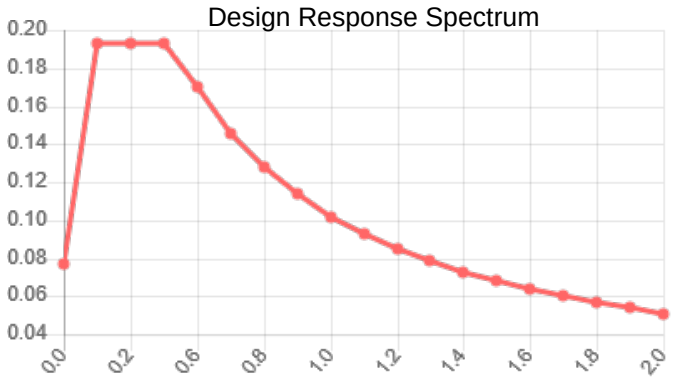
Results:

S_S :	0.181	S_{DS} :	0.193
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.091
S_{MS} :	0.290	PGA_M :	0.146
S_{M1} :	0.153	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B



Sa(g) vs T(s)



Sa(g) vs T(s)

Data Accessed: Tue Sep 04 2018

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

Ice

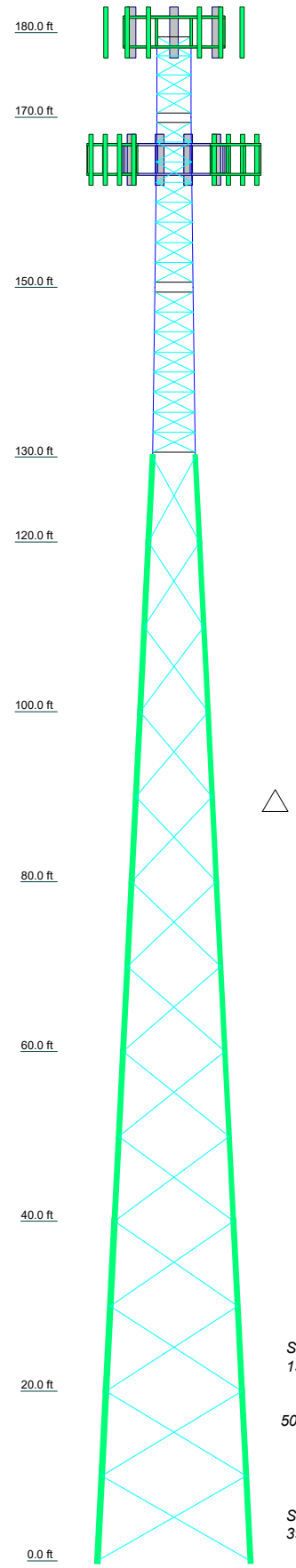
Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Sep 04 2018

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

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
Legs	SR 1 1/2" solid	SR 2" solid	SR 2 1/4" solid	A	Pirod 105217 (12x1.5)		Pirod 105218 (12x1.75)		Pirod 105219 (12x2)		
Leg Grade	A572-50										
Diagonals	SR 3/4" solid	SR 7/8" solid	SR 1" solid	L 2.5 x 2.5 x 3/16			L 3 x 3 x 3/16		L 3 x 3 x 5/16		
Diagonal Grade	A572-50			A36							
Top Girts	SR 7/8" solid		SR 1" solid	N.A.							
Bottom Girts	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	RRUS 4478 B14	180
7770.00 w/ Mount Pipe	180	RRUS 4478 B14	180
7770.00 w/ Mount Pipe	180	RRUS 4478 B14	180
7770.00 w/ Mount Pipe	180	RRUS 32 B66	180
(2) OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 32 B66	180
(2) OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 32 B66	180
(2) OPA-65R-LCUU-H6 w/ Mount Pipe	180	RRUS 32 B2	180
(2) LGP21401	180	RRUS 32 B2	180
(2) LGP21401	180	RRUS 32 B2	180
(2) LGP21401	180	(2) LGP21901	180
RRUS 32	180	(2) LGP21901	180
RRUS 32	180	(2) LGP21901	180
RRUS 32	180	Sector Mount [SM 402-3]	165
RRUS 11	180	AIR 21 B2A/B4P w/ Mount Pipe	165
RRUS 11	180	AIR 21 B2A/B4P w/ Mount Pipe	165
RRUS 11	180	AIR 21 B2A/B4P w/ Mount Pipe	165
DC6-48-60-18-8F	180	AIR 32 B4A/B2P w/ Mount Pipe	165
DC6-48-60-18-8F	180	AIR 32 B4A/B2P w/ Mount Pipe	165
RRUS 12	180	AIR 32 B4A/B2P w/ Mount Pipe	165
RRUS 12	180	KRY 112 71	165
RRUS 12	180	KRY 112 71	165
RRUS A2 MODULE	180	KRY 112 71	165
RRUS A2 MODULE	180	APXVAARR24_43-U-NA20 w/ Mount Pipe	165
RRUS A2 MODULE	180	APXVAARR24_43-U-NA20 w/ Mount Pipe	165
GPS	180	APXVAARR24_43-U-NA20 w/ Mount Pipe	165
80010965 w/ Mount Pipe	180	RADIO 4449 B12/B71	165
80010965 w/ Mount Pipe	180	RADIO 4449 B12/B71	165
80010965 w/ Mount Pipe	180	RADIO 4449 B12/B71	165
DC6-48-60-18-8F	180		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105216 (12x1.25)		

MATERIAL STRENGTH

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

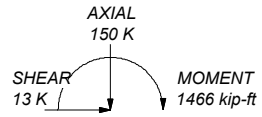
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 95%

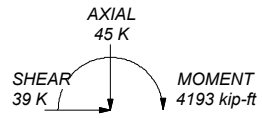
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 282 K
SHEAR: 26 K

UPLIFT: -249 K
SHEAR: 23 K



TORQUE 5 kip-ft
50.0 mph WIND - 1.00 in ICE



TORQUE 21 kip-ft
REACTIONS - 95.0 mph WIND

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job: *180-ft Self-Support Tower / WESTHARTFORD_DEXTERS*			
Project: *PJF# 64118-0001 / CT0001*			
Client: Hirschfeld Communications, LLC	Drawn by: jsommer	App'd:	
Code: TIA-222-G	Date: 09/04/18	Scale: NTS	
Path: G:\TOWER\641..\Hirschfeld Communications\2018\64118-0001.CT0001\64118-0001-002.8700..\SA\TN\064118-0001-002.8700.eri		Dwg No. E-1	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Page	1	of	1
By	JRS	Date	9/4/2018
Project #	64118-0001		

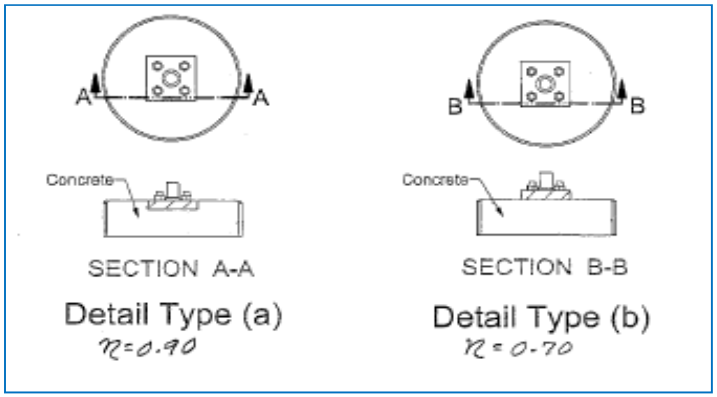
Self-Support Tower Anchor Rod Capacity - TIA-G

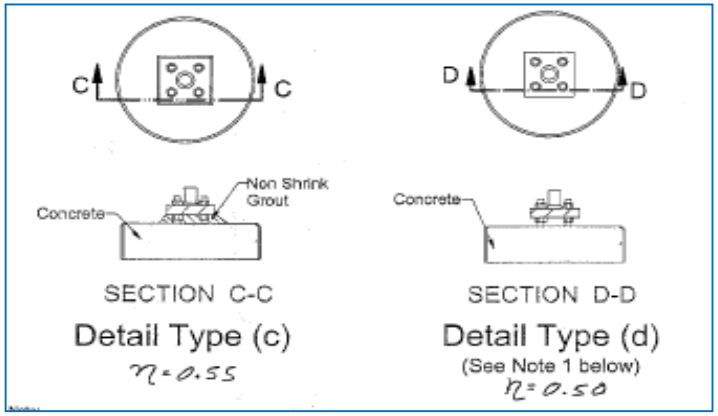
Loads

Uplift :	249	kips	1.00	Maximum Ratio
Shear :	23	kips		

Existing Anchor Rods

Anchor Rod Condition (n) :	0.55	
Anchor Rod ø :	1 1/4	in
Anchor Rod Quantity :	6	
Anchor Rod Grade :	A687	
F_y :	105	ksi
F_u :	150	ksi
Threads per Inch	7	
Total Net Tensile Area	5.81	in^2
ϕ :	0.8	
Total Anchor Rod Capacity ϕR_{nt} :	697.76	kip
Anchor Rod Ratio :	0.417	





PJF Job No. **64118-0001** Project Name: **West Hartford** Engineer: JRS

Factored Foundation Loads:

	Comp	Uplift	
Factored Axial Load (+Comp, -Ten) =	**282**	**-249**	kips
Factored Horiz. Load at Top of Pier =	**26**	**23**	kips
Factored OTM at Top of Pier =	**0**	**0**	k-ft

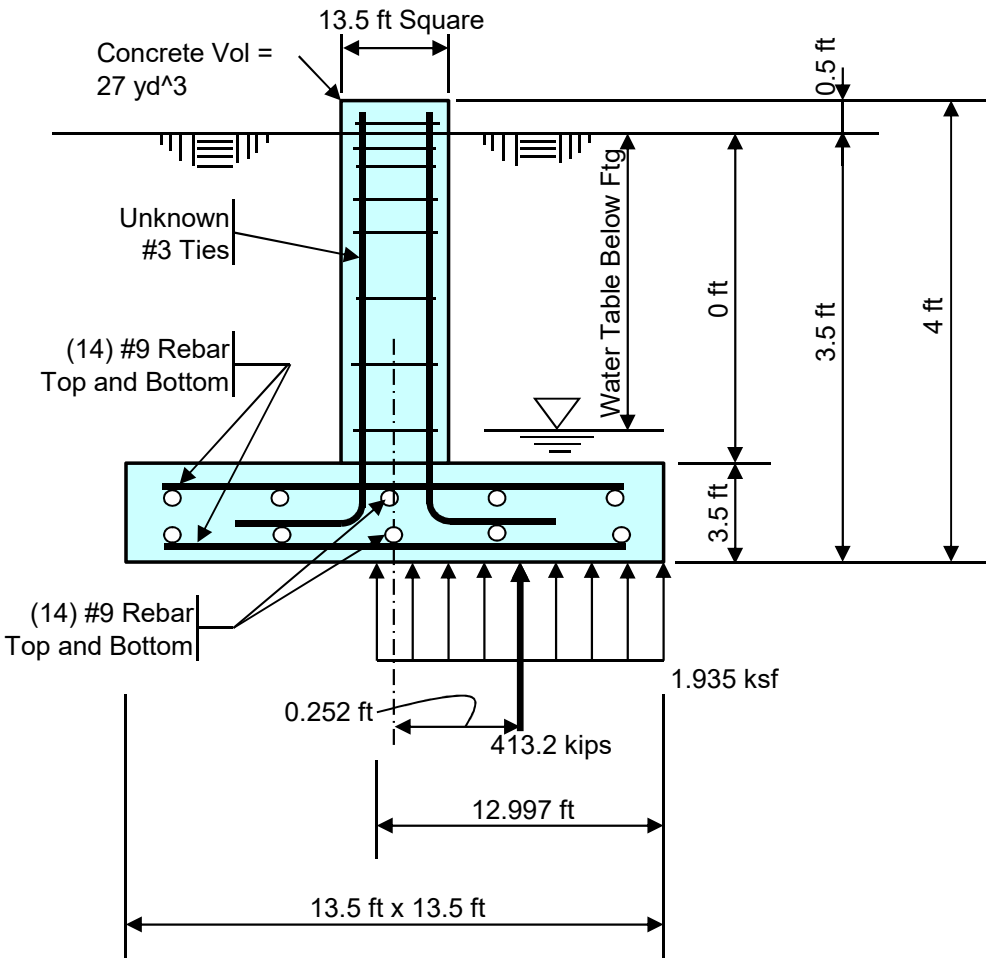
LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	**0.75**		
Soil Weight =	**0.75**	1.2	0.9
Concrete Weight =	**0.75**	1.2	0.9

Soil Properties:

Depth to Water Table =	**99**	ft
Uplift Cone from	**Top**	of footing
Depth to Ignore for Uplift and PP =	**3.33**	ft

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
3.5	**100**	**0**	**28**	**12**	**3.50**



Dimensions:

Pier Shape =	**Square**	
Pier Width =	**13.5**	ft Square
Pier Height above Grade =	**0.5**	ft
Depth to Bottom of Footing =	**3.5**	ft
Footing Thickness =	**3.5**	ft
Footing Width, B =	**13.5**	ft
Footing Length, L =	**13.5**	ft

Concrete:

Concrete Strength =	**3**	ksi
Rebar Strength =	**60**	ksi

Total Pad Reinf Stl =	**28.00**	in^2 >= 12.25 in^2 = Min Stl, OK
Total Pier Reinf Stl =		
Footing Thickness =	**3.50**	ft >= 0.75 ft = Min Ftg Thk, OK

Summary Results:

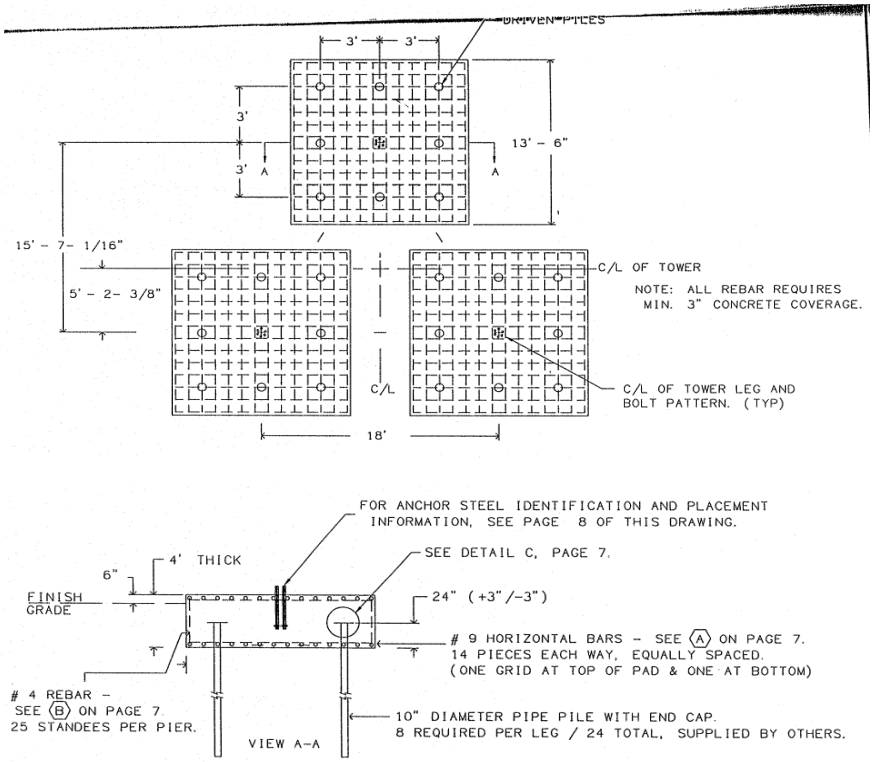
	Required		Available			
Maximum Net Soil Bearing =	**1.935**	ksf	**9.000**	ksf	Stress Ratio =	**21.5%** in Soil Bearing
Uplift =	**249.0**	kips	**96.4**	kips	Stress Ratio =	**258.3%** in Uplift
Punching Shear Stress =	**0.000**	ksi	**0.159**	ksi	Stress Ratio =	**0.0%** in Punching Shear
Bending Shear Stress =	**-4.7**	kips	**496.6**	kips	Stress Ratio =	**0.9%** in Bending Shear
Bending Moment =	**0.004**	in / in	**0.0**	in / in	Stress Ratio =	**9.1%** in Bending Moment
Conc Pier Reinforcing Steel =				Rebar Unknown	Stress Ratio =	in Pier Rebar

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

By JRS Date 9/4/2018
Project # 64118-0001

West Hartford Foundation Analysis

Uplift (kips):	249
Compression (kips):	282
Concrete Weight (kcf):	0.15
Mat Length/Width (ft):	13.5
Mat Depth (ft):	4
Mat Weight (kips):	109.4
Mat Bearing Area (ft^2):	182.3
Pile Quantity	8
Pile Diameter (in):	10
Pile Length (ft):	50
Depth to Ignore (ft):	8
Total Pile Surface Area (ft^2):	879.6
Ultimate Bearing Pressure (ksf):	12
Ultimate Skin Friction (ksf):	1
$Ø_{soil}$:	0.75
Mat Bearing Capacity (kips):	1640.3
Skin Friction Capcity (kips):	659.7
Total Uplift Load (kips):	249.0
Total Compression Load (kips):	413.2



Uplift Capacity (kips):	758.1
Compression Capacity (kips):	2300.0
Uplift Usage Capacity:	**32.8%**
Compression Usage Capacity:	**18.0%**

PAUL J. FORD & COMPANY

50 Years 1965 - 2015

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 made a field inspection 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 detailed information to perform a 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) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-G. 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.

5) The enclosed 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.

6) 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.

Exhibit E

July 30, 2018

To: T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Subject: Mount Assessment – CT11170C (Destek Job #: 1875060)

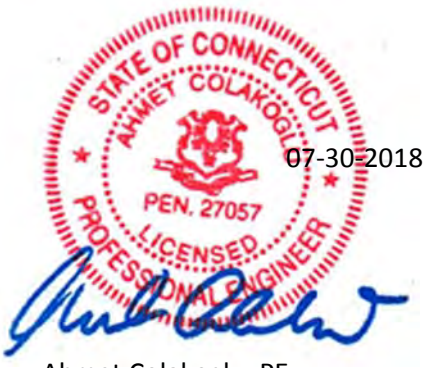
Per your request, Destek Engineering, LLC (Destek) has performed a structural assessment of the antenna mounting system which supports the T-Mobile Equipment at the referenced site. We have evaluated the subject mount for the additions and alterations specified in the RFDS, which is referenced in Table 1. This assessment is based on the documents and information listed in Table 1 and is in accordance with the mount loading and evaluation criteria stated in Table 2.

Based on our experience with similar mount structures and with respect to the changes in applied loads, Destek opines that the mount **WILL BE ADEQUATE.**

This assessment is only valid for the loading scenario described herein. Variations between this document and actual field conditions will void this assessment. It is assumed that all structural members and connections of the subject mount are in good condition and the mount has been properly designed, constructed and assembled. Discrepancies between this document and field conditions should be immediately brought to our attention. It is assumed that the tower and other components of the site have been analyzed and qualified by others.

We at *Destek Engineering, LLC* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other project, please do not hesitate to contact us.

Sincerely,
Destek Engineering, LLC
License No: PEC00001429



07-30-2018

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

References and Loading

Table 1: Documents and Information Provided

DOCUMENT	PREPARED BY	DATE
Structural Analysis Report	Paul J. Ford & Company	07/26/2016
RFDS	T-Mobile	05/14/2018
Site Photos	ForeSite LLC	04/17/2018

Table 2: Mount Loading and Evaluation Criteria

LOCATION	West Hartford, Hartford County, CT
BUILDING CODE AND TOWER STANDARD	2016 Connecticut State Building Code and TIA-222-G
RAD CENTER	165 ft
STRUCTURE TYPE	Self-Support Tower
EXPOSURE CATEGORY	B
WIND LOADING	125 mph ultimate basic wind (97 mph nominal wind speed)
ICE LOADING	1.00 inch ice with 50 mph basic wind. Ice is considered to increase in thickness with height
CLASS	II
TOPOGRAPHIC CATEGORY	1

Table 2.1 –Existing Appurtenance Configuration

QTY	MODEL
3	AIR32 KRD901146-1 B66A B2A – Antennas
3	LNX-6515DS-A1M - Antennas
3	AIR21 KRC118023-1 B2A B4P – Antennas
3	RRUS11 B12 - RRUs
3	Generic Twin Style 1B – AWS - TMAs

Table 2.2 – Proposed and Final Appurtenance Configuration

QTY	MODEL
3	AIR32 KRD901146-1 B66A B2A – Antennas
3	AIR21 KRC118023-1 B2A B4P - Antennas
3	APXVAARR24-43-U-NA20 – Antennas
3	Generic Twin Style 1B – AWS - TMAs
3	Radio 4449 B71 + B12 – RRUs*

***To be mounted behind the antenna**

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

Mount Photos

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

Exhibit F

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11170C

Hartford/ N. Britain Ave_1
1030 New Britain Avenue
West Hartford, CT 06110

October 1, 2018

EBI Project Number: 6218006463

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	6.79 %

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

October 1, 2018

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

Emissions Analysis for Site: **CT11170C – Hartford/ N. Britain Ave_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1030 New Britain Avenue, West Hartford, 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 97-01and 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 population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **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 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 for directional panel antennas, 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) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 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 40 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) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 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 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 **Ericsson AIR32 KRD901146-1 B66A/B2A** & **Ericsson AIR21 KRC118023-1 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels, the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 **165 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 feet
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):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.12**	Antenna B1 MPE%	**1.12**	Antenna C1 MPE%	**1.12**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P	Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P	Make / Model:	Ericsson AIR21 KRC118023-1 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 feet
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	2	Channel Count	2	Channel Count	2
Total TX Power(W):	55	Total TX Power(W):	55	Total TX Power(W):	55
ERP (W):	2,139.75	ERP (W):	2,139.75	ERP (W):	2,139.75
Antenna A2 MPE%	**0.30**	Antenna B2 MPE%	**0.30**	Antenna C2 MPE%	**0.30**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
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):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**0.82**	Antenna B3 MPE%	**0.82**	Antenna C3 MPE%	**0.82**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.24 %**
AT&T	**4.20** %
Clearwire	**0.08** %
Nextel	**0.27** %
Site Total MPE %:	**6.79 %**

T-Mobile Sector A Total:	2.24 %
T-Mobile Sector B Total:	2.24 %
T-Mobile Sector C Total:	2.24 %
Site Total:	6.79 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (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
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	165	4.43	PCS - 1900 MHz	1000.00	0.45%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	165	6.65	AWS - 2100 MHz	1000.00	0.67%
T-Mobile PCS - 1900 MHz GSM	1	583.57	165	0.83	PCS - 1900 MHz	1000.00	0.08%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	165	2.21	AWS - 2100 MHz	1000.00	0.22%
T-Mobile 600 MHz LTE	2	788.97	165	2.24	600 MHz	400.00	0.56%
T-Mobile 700 MHz LTE	2	432.54	165	1.23	700 MHz	467.00	0.26%
						Total:	**2.24%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	2.24 %
Sector B:	2.24 %
Sector C:	2.24 %
T-Mobile Maximum MPE % (Per Sector):	2.24 %
Site Total:	6.79 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.79%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

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WEST HARTFORD CT 06107-2485

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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 1929 68

Trans. #:	446479045
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/18/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE Ref#: 170C-L74X2
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: TODD DUMAIS
TOWN PLANNER- WEST HARTFORD
50 S MAIN ST
WEST HARTFORD CT 06107-2485

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UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0310 1929 75 0067 0000 0010 6110

usps.com
$6.70
US POSTAGE
Flat Rate Env

10/16/2018 Mailed from 01566 062S0000001310

P

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 10/18/18
Ref#: 170C-L704X

0006

Carrier -- Leave if No Response

C014

SHIP TO: IAN ORMESHER
HIRSCHFELD COMMUNICATIONS LLC
1030 NEW BRITAIN AVE
WEST HARTFORD CT 06110-2261

USPS TRACKING #

9405 5036 9930 0310 1929 75

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 1929 75

Trans. #:	446479045
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/18/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE Ref#: 170C-L704X
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: IAN ORMESHER
HIRSCHFELD COMMUNICATIONS LLC
1030 NEW BRITAIN AVE
WEST HARTFORD CT 06110-2261

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0310 1929 51 0067 0000 0010 6107

usps.com
$6.70
US POSTAGE
Flat Rate Env

10/16/2018 Mailed from 06002 062S0000001308

P

PRIORITY MAIL 1-DAY™

DEBORAH CHASE
T-MOBILE/NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Expected Delivery Date: 10/17/18
Ref#: 170CL74X2

0024

Carrier -- Leave if No Response

C024

SHIP TO: SHARI CANTOR
MAYOR OF WEST HARTFORD
50 S MAIN ST
WEST HARTFORD CT 06107-2485

USPS TRACKING #

9405 5036 9930 0310 1929 51

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
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4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0310 1929 51

Trans. #:	446479045
Print Date:	10/16/2018
Ship Date:	10/16/2018
Expected Delivery Date:	10/17/2018

Priority Mail® Postage:	**$6.70**
Total	**$6.70**

From: DEBORAH CHASE
T-MOBILE/NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Ref#: 170CL74X2

To: SHARI CANTOR
MAYOR OF WEST HARTFORD
50 S MAIN ST
WEST HARTFORD CT 06107-2485

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com