NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

January 30, 2017

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

RE: Notice of Exempt Modification
33 Boardman Road, New Milford CT 06776
Latitude: 41.59955439
Longitude: -73.43760920
T-Mobile Site#: CTNH362B_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 140-foot level of the existing 154-foot monopine at 33 Boardman Road, New Milford CT 06776. The tower is owned by Quarry Stone and Gravel, LLC. The property is owned by Quarry Stone and Gravel, LLC. T-Mobile now intends to install three (3) new 700 MHz antenna. The new antennas would be installed at the 140-foot level of the tower. T-Mobile also intends to make the following modifications.

Planned Modifications:

Remove: None

Remove and Replace: None

Install New:
(3) Commscope LNX-6515DS-A1M Antenna
(3) Smart Bias Tees
(6) 1-5/8" Coax

Existing to Remain:
(3) RFS- APX18D-209014C Antenna
(6) 1-5/8" Coax
(3) TMA-1A-TwinPCS

This facility was approved by the Connecticut Siting Council. Docket No.285 – Approval was received for the installation of a telecommunication tower. Please see attached.

NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

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 David Gronbach, Elected Official and Laura Regan, Zoning Enforcement Officer for the Town of New Milford, as well as the property owner and the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: David Gronbach- Mayor - as elected official
Laura Regan- Zoning Enforcement Officer
Quarry Stone and Gravel, LLC - as tower owner & property owner

Exhibit A

Filing Guides
Meetings & Minutes
Public Participation
Audio Link to New Britain Hearing Rooms
Programs & Services
Telecommunications Database
Publications
Other Resources
Statutes & Regulations
Electric Transmission Upgrade Projects
Frequently Asked Questions

Decisions

Printable Version

DOCKET NO. 285 - Sprint Spectrum, L.P. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at 33 Boardman Road, New Milford, Connecticut.	} } }	Connecticut Siting Council July 13, 2004

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Sprint Spectrum, L.P. for the construction, maintenance and operation of a wireless telecommunications facility at 33 Boardman Road, New Milford, Connecticut.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of Sprint Spectrum L.P., Nextel

Robert Stein,
Chairman

Melanie Bachman,
Acting Executive Director

Communications, Inc., and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level. The height at the top of the antennas shall not exceed a height of 153 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of New Milford, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction. The D&M shall include:

a. a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and

b. construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Prior to submission of the D&M plan to the Council, the Certificate Holder shall discuss the appropriateness and feasibility of stealth tower designs for this site with the Town. The Town and Certificate Holder shall agree upon the final tower design.

4. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case

modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

5. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

6. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

7. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

8. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

9. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

10. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved. Any request for extension of this period shall be filed with the Council no later than sixty days prior to expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list. Any proposed modifications to this Decision and Order shall likewise be so served.

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

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

The parties and intervenors to this proceeding are:

Applicant	Its Representative
Sprint Spectrum, L.P. -	Thomas J. Regan, Esquire Brown Rudnick Berlack Isreals LLP CityPlace I, 38th Floor 185 Asylum Street Hartford, CT 06103-3402
Intervenor	Its Representative
Nextel Communications, Inc.	Julie Donaldson Kohler Hurwitz & Sagarin P.O. Box 112 Milford, CT 06460

Content Last Modified on 7/15/2004 12:58:33 PM

Exhibit B

33 BOARDMAN RD

Location	33 BOARDMAN RD	Mblu	47/ / 73/ /
Acct#	005304	Owner	QUARRY STONE AND GRAVEL LLC
Assessment	$2,871,680	Appraisal	$4,896,500
PID	8323	Building Count	1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2015	$1,205,300	$3,691,200	$4,896,500
Assessment			
Valuation Year	Improvements	Land	Total
2015	$843,710	$2,027,970	$2,871,680

Owner of Record

Owner	QUARRY STONE AND GRAVEL LLC	Sale Price	$0
Co-Owner	% O + G INDUSTRIES	Certificate	
Address	112 WALL ST TORRINGTON, CT 06790	Book & Page	778/ 681
		Sale Date	09/11/2003
		Instrument	03

Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
QUARRY STONE AND GRAVEL LLC	$0		778/ 681	03	09/11/2003
QUARRY STONE AND GRAVEL LLC	$0		765/ 512	03	07/08/2003
KOVACS ROBERT G + KOVACS PAUL B + KOVACS	$0		705/ 499	29	05/23/2002
QUARRY STONE AND GRAVEL LLC	$0		690/ 804	03	01/09/2002
KOVACS ROGER P + PAUL B + ROBERT G	$0		361/ 142		12/24/1986

Building Information

Building 1 : Section 1

Year Built: 1989
Living Area: 9,000
Replacement Cost: $305,640
Building Percent Good: 66
Replacement Cost Less Depreciation: $201,700

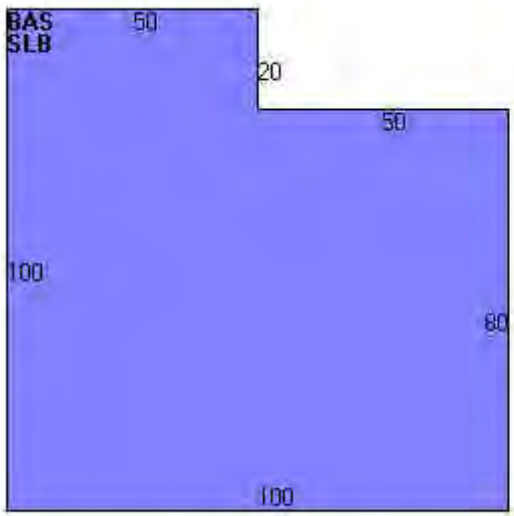
Building Attributes	
Field	Description
STYLE	Pre-Eng Whse
MODEL	Ind/Comm
Grade	C
Stories:	1

Occupancy	1
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Minimum
Roof Structure	Gable
Roof Cover	Enamel Metal
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Sand+Gravl
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	410I
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	20
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/NewMilfordCTPhotos//\00\01\5

Building Layout



Building Sub-Areas (sq ft) Legend

Code	Description	Gross Area	Living Area
BAS	First Floor	9,000	9,000
SLB	Slab	9,000	0
		18,000	9,000

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	410
Description	Sand+Gravl
Zone	I/R40
Neighborhood	C100
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	342.45
Frontage	0
Depth	0
Assessed Value	$2,027,970
Appraised Value	$3,691,200

Outbuildings

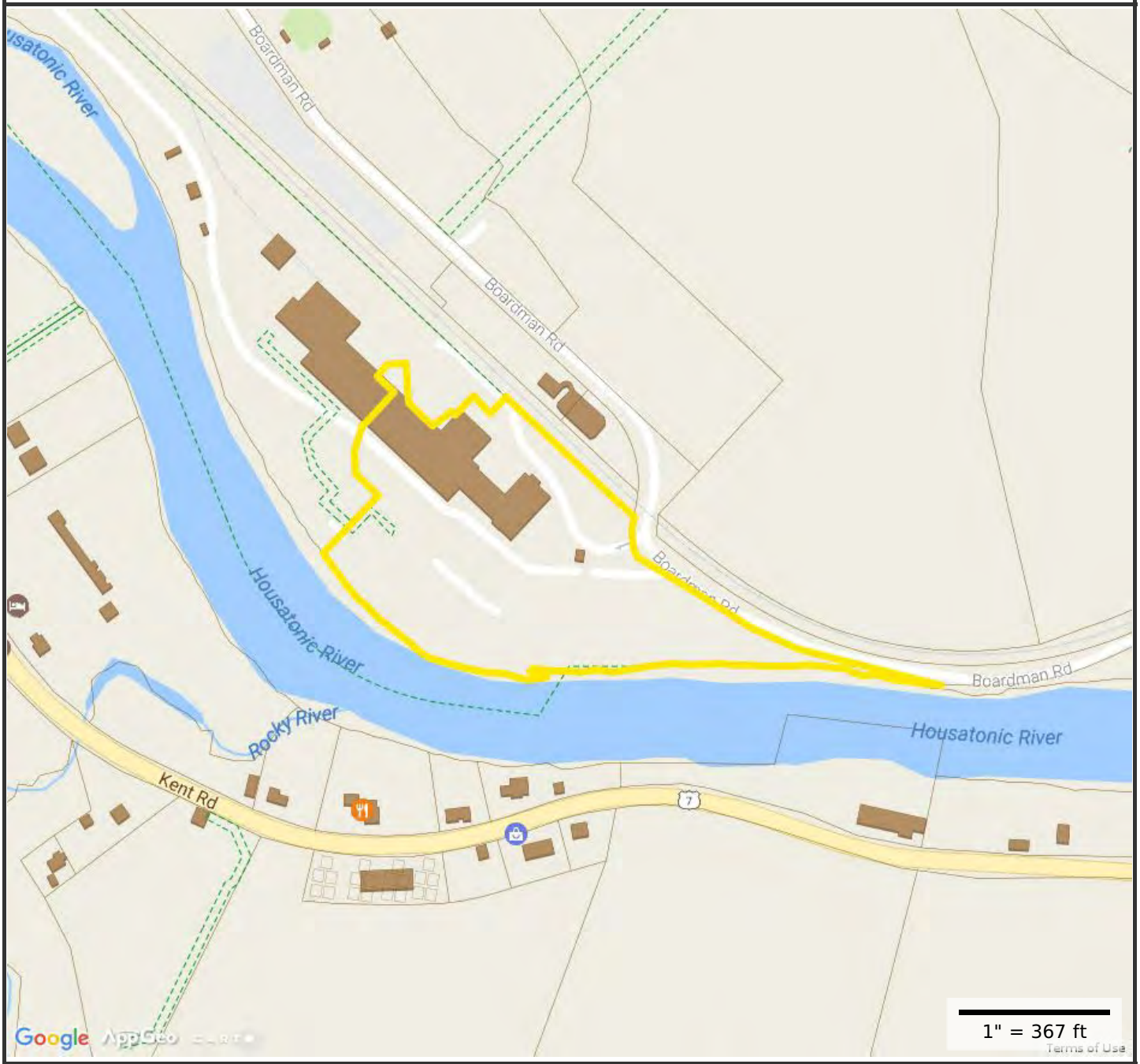
Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD1	Shed	CB	CindBk/Frame	200 S.F.	$1,600	1

SHD1	Shed	FR	Frame	400 S.F.	$3,200	1
LT1	Light (1)			100 Units	$93,600	1
SCL1	Scale			60 TONS	$21,600	1
SCL1	Scale			60 TONS	$21,600	1
SITE	Cell Site Tenant	TW	Tower	4 Units	$862,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2014	$1,086,200	$3,691,200	$4,777,400
2009	$219,200	$9,275,200	$9,494,400
2009	$219,200	$9,275,200	$9,494,400

Assessment			
Valuation Year	Improvements	Land	Total
2014	$760,340	$2,010,550	$2,770,890
2009	$153,440	$2,038,320	$2,191,760
2009	$153,440	$2,038,320	$2,191,760



Property Information

Property ID	34/37.A
Location	HOUSATONIC AVE
Owner	HOUSATONIC REAL ESTATE LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of New Milford, 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 10/1/2014
Properties updated 01/16/2017

Exhibit C

ANTENNA UPGRADES
BY

T··Mobile·

T-MOBILE NORTHEAST LLC

SITE NUMBER: CTNH362B
SITE NAME: NH362/Boardman_MP
SITE ADDRESS: 33 Boardman Road, New Milford, CT 06776

(704G CONFIGURATION)

PROJECT SCOPE:

T-MOBILE, A WIRELESS TELECOMMUNICATIONS PROVIDER PROPOSES TO UPGRADE THEIR EXISTING FACILITY AS FOLLOWS:
ADD: (3) ANTENNAS, (1) BACKUP BATTERY UNIT
(6) COAX CABLES AND (3) SMART BIAS TEE .

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.

APPLICABLE STATE ADOPTION CODES:

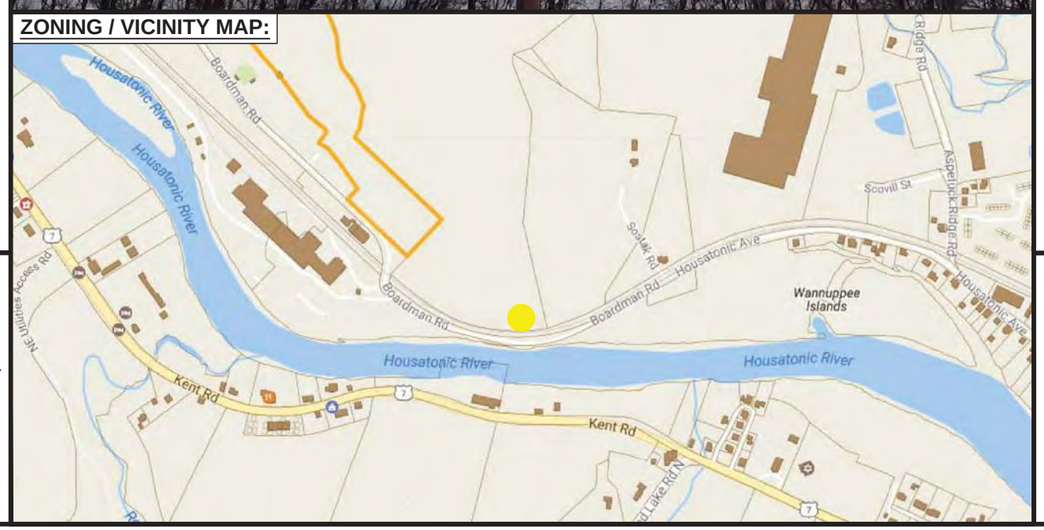
2016 CONNECTICUT STATE BUILDING CODE (CSBC).

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

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

SITE IMAGE:

ZONING / VICINITY MAP:



PROJECT INFORMATION:

ADDRESS:	33 BOARDMAN ROAD NEW MILFORD, CT 06776
STRUCTURE TYPE:	MONOPINE
ZONING DISTRICT:	I
COORDINATES:	N 41.59955439 , W-73.43760920
STRUCTURE HEIGHT:	154' AGL

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLOARD:	SPRINT SITES USA 6550 SPRINT PARKWAY OVERLAND PARK, KS 66251
DEVELOPER:	NORTHEAST SITE SOLUTIONS 199 BRICKYARD RD FARMINGTON, CT 06032 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 203-376-9186
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

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

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
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	01/17/17
0	FINAL ISSUED	01/25/17

SITE NUMBER: CTNH362B
SITE NAME: NH362/Boardman_MP
SITE ADDRESS: 33 Boardman Road
New Milford, CT 06776

SHEET TITLE:
T-1: TITLE SHEET

NOTES AND DISCLAIMERS:

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

TURNKEY DEVELOPER:
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199 Brickyard road
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CONSULTANT:
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PROFESSIONAL SEAL

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New Milford, CT 06776

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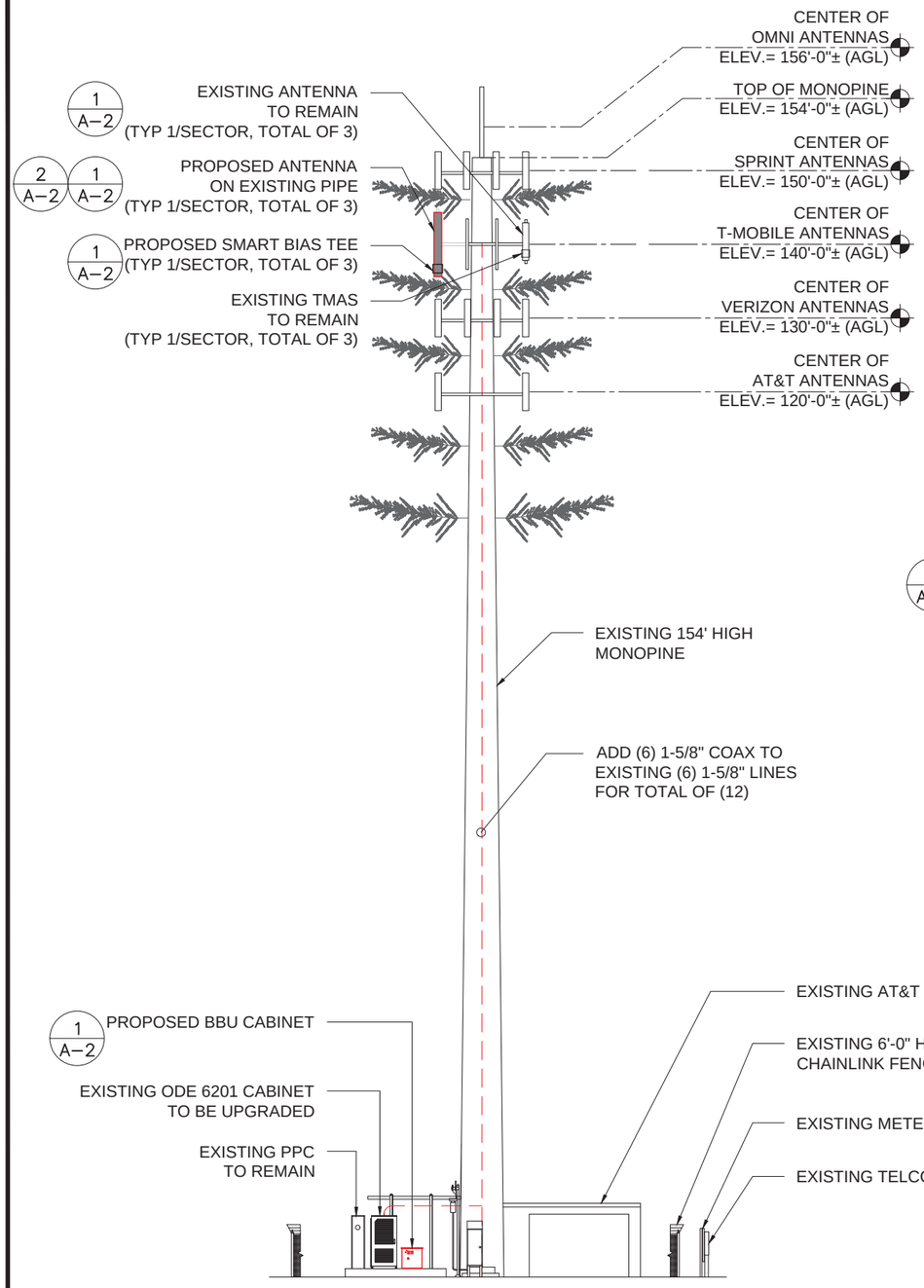
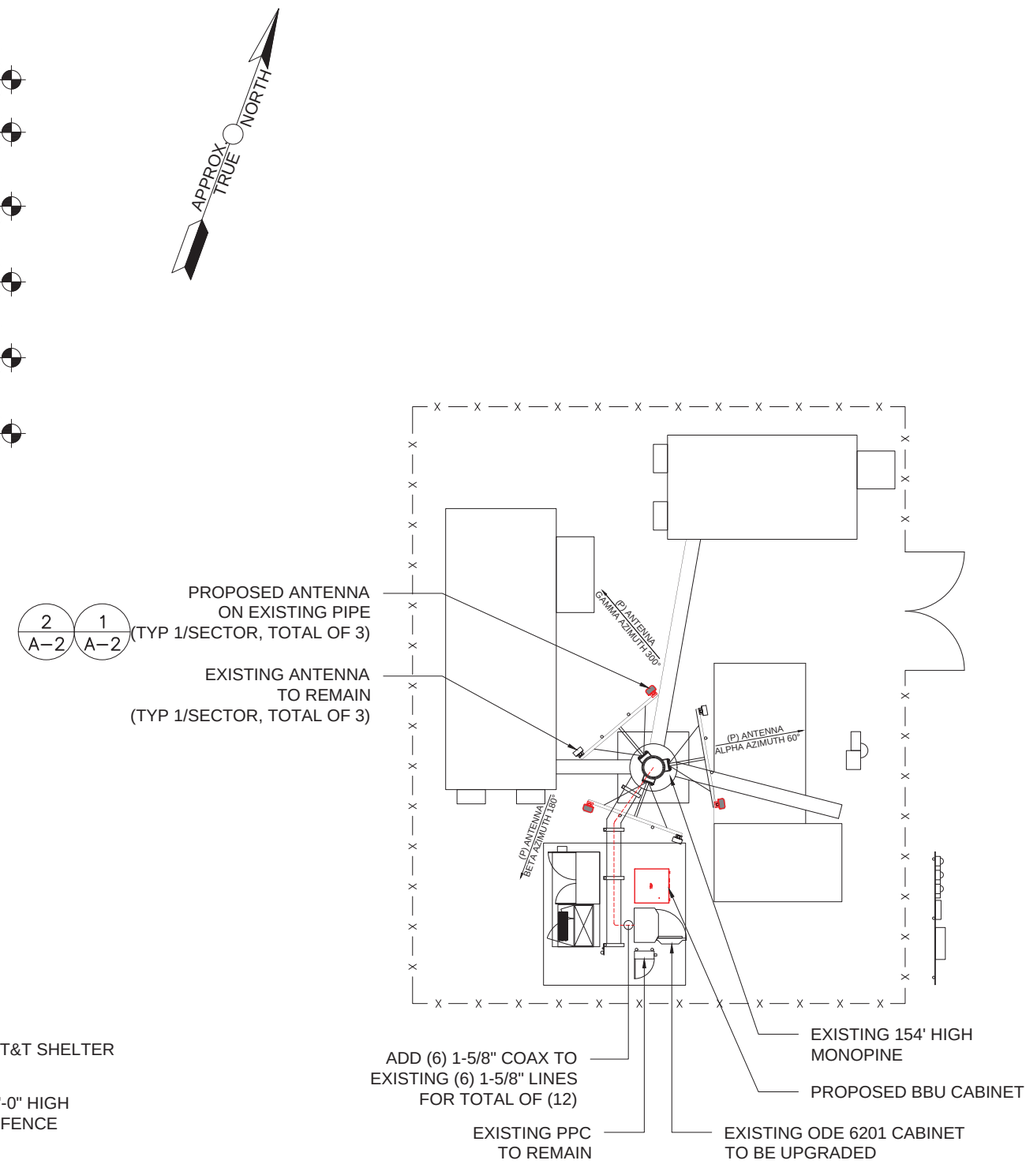


ELEVATION
SCALE 1"=20'
1 A–1



SITE PLAN
SCALE 1"=16'
2 A–1

APPLICANT:

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

TURNKEY DEVELOPER:

NSS NORTHEAST SITE SOLUTIONS
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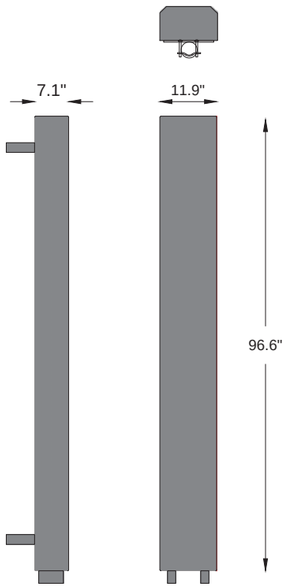
REV	DESCRIPTION	DATE
A	PRELIMINARY	01/17/17
0	FINAL ISSUED	01/25/17

SITE NUMBER: CTNH362B
SITE NAME: NH362/Boardman_MP
SITE ADDRESS: 33 Boardman Road
New Milford, CT 06776

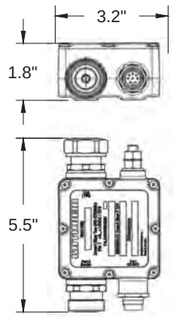
SHEET TITLE:
A-1: PLANS AND ELEVATIONS

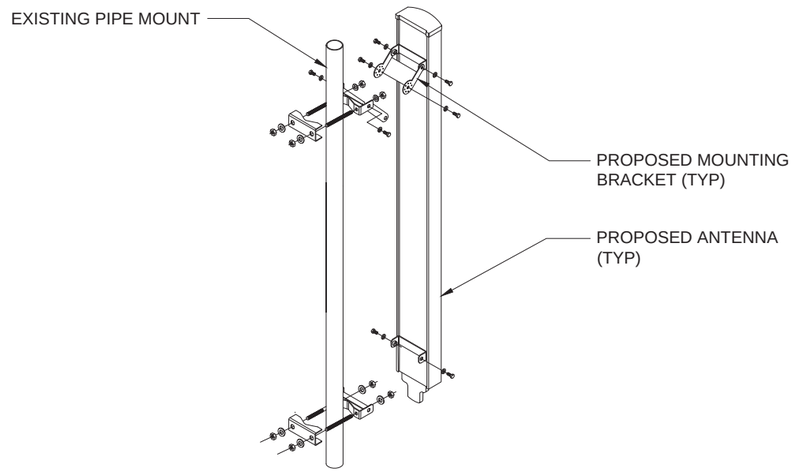
ADD:
(3) ANTENNAS

Manufacturer:	COMMSCOPE
Model	LNX-6515DS-A1M
Footprint:	96.6"Hx11.9"Wx7.1"D
weight:	43.7 lbs
Frequency band	698-896 MHZ
Antenna type	Single Sector
Wind loading lateral	150 km/h
Wind loading rear	150 km/h
Wind loading maximum	241 km/h



ADD:
(3) SMART BIAS TEES AT ANTENNA LEVEL

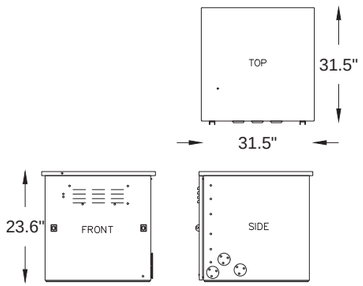




ANTENNA MOUNTING DETAIL
N.T.S
2
A–2

ADD:
(1) BATTERY BACKUP UNIT

Manufacturer:	ALCATEL LUCENT
Footprint:	30.55"Hx30.55"Wx29.67"D
weight:	100 lbs



ANTENNA AND EQUIPMENT DETAILS
N.T.S
1
A–2

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

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
203-275-6669

CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 Walnut street
Newton, MA 02460
617-212-3123

PROFESSIONAL SEAL

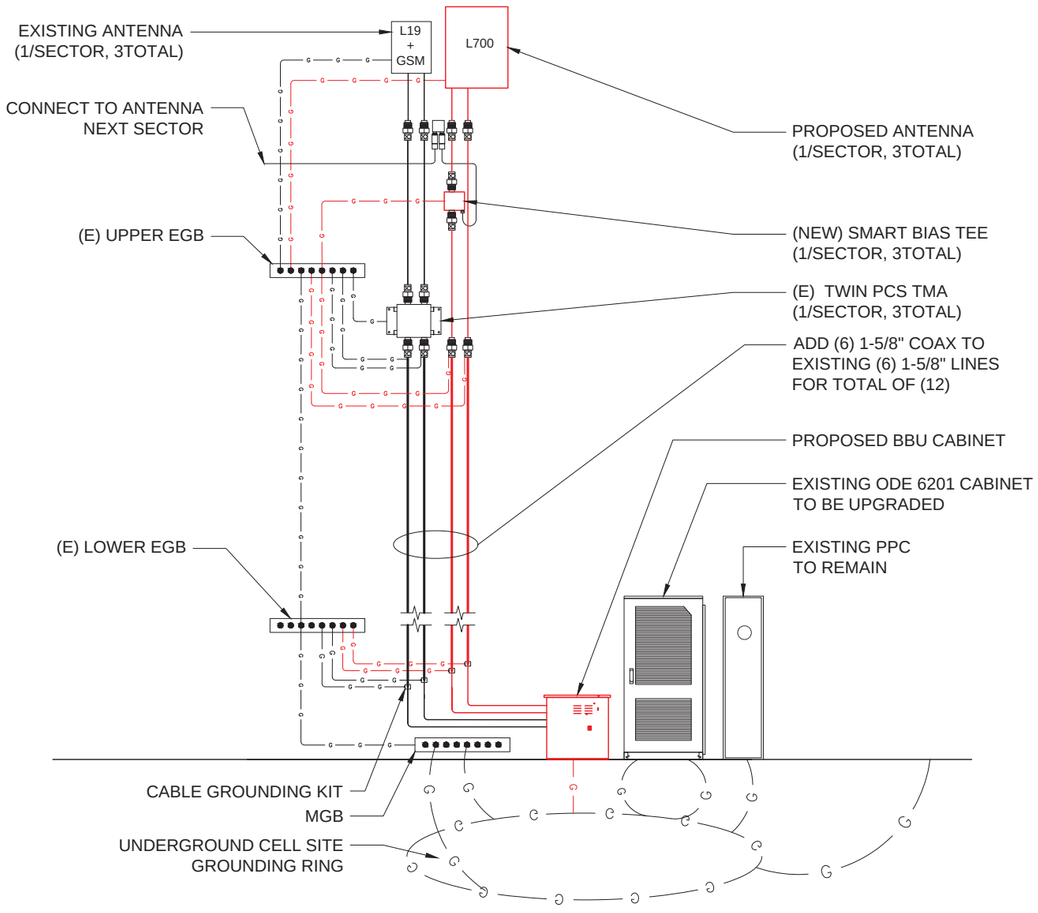
REV	DESCRIPTION	DATE
A	PRELIMINARY	01/17/17
0	FINAL ISSUED	01/25/17

SITE NUMBER: CTNH362B
SITE NAME: NH362/Boardman_MP
SITE ADDRESS: 33 Boardman Road
New Milford, CT 06776

SHEET TITLE:
A-2: ANTENNAS, EQUIPMENT AND DETAILS

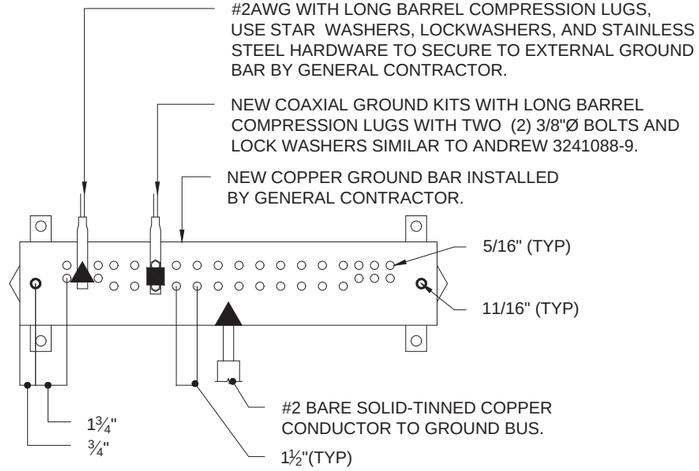
NOTES TO CONTRACTOR

1. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
2. ALL GROUNDING WORK SHALL BE IN ACCORDANCE WITH T-MOBILE STANDARD PRACTICE.
3. ALL BUS CONNECTORS SHALL BE TWO-HOLE, LONG-BARREL TYPE COMPRESSION LUGS, T&B OR EQUAL, UNLESS OTHERWISE NOTED ON DRAWINGS. ALL LUGS SHALL BE ATTACHED TO BUSSES USING BOLTS, NUTS, AND LOCK WASHERS. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED.
4. ALL CONNECTORS SHALL BE CRIMPED USING HYDRAULIC CRIMPING TOOLS, T&B #TBM 8 OR EQUIVALENT.
5. ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FILED TO ENSURE PROPER CONTACT . NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLAT ION.
6. ALL COPPER BUSSES SHALL BE CLEANED, POLISHED, AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
7. ALL BENDS SHALL BE AS SHALLOW AS POSSIBLE, WITH NO TURN SHORTER THAN AN 8-INCH NOMINAL
8. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2. ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS, OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
9. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 10 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE
10. ALL ROOF TOP ANTENNA MOUNTS SHALL BE GROUNDED WITH A #2 GROUND WIRE CONNECTED TO THE NEAREST GROUND BUS. ALL CONNECTIONS ARE TO BE CAD-WELDED IF POSSIBLE.
11. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE PROJECT MANAGER.
12. GROUNDING CONNECTION TO TRAVEL IN A DOWNWARD DIRECTION.
13. ALL EXPOSED #2 WIRE MUST BE TINN NOT BTW.



GROUNDING DIAGRAM
SCALE: N.T.S

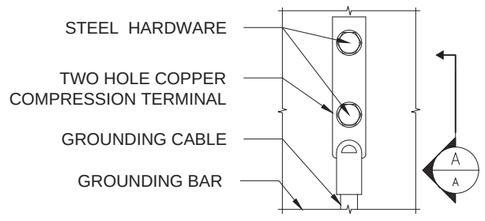
1
E–1



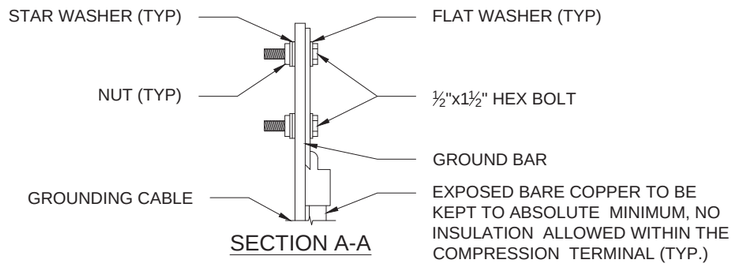
NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

GROUND BAR DETAILS
SCALE: N.T.S

2
E–1



ELEVATION



SECTION A-A

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

TYPICAL GROUND BAR CONNECTIOS DETAIL
SCALE: N.T.S

3
E–1

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

TURNKEY DEVELOPER:
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
199 Brickyard road
Farmington, CT 06032
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	01/17/17
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SITE NUMBER: CTNH362B
SITE NAME: NH362/Boardman_MP
SITE ADDRESS: 33 Boardman Road
New Milford, CT 06776

SHEET TITLE:
E-1: GROUNDING DETAILS

Exhibit D

Structural Analysis report

Date: January 6, 2017

Site Number: CTNH362B
Site Name: NH362/Boardman_MP

Site Address:
33 Boardman Road
New Milford, CT 06776

PREPARED FOR:

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

CONSULTANT:

FORESITE LLC
Architects . Engineers . Surveyors

462 Walnut street
Newton, MA 02460
Contact: Saeed Mossavat
email:smossavat@Foresitellc.com
617-527-3031

TURNKEY DEVELOPER:

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

199 Brickyard road
Farmington, CT 06032
Contact: Sheldon Freincle
sheldon@northeastsitesolution.com
203-275-6669

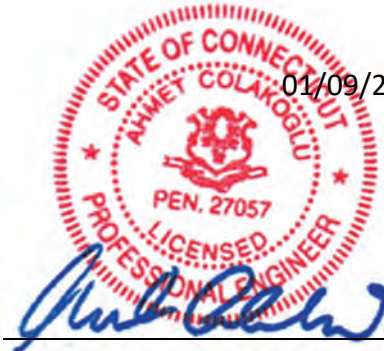
STRUCTURAL ANALYSIS REPORT – REV.1
MONOPOLE

Prepared For:

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

Structure Rating	
Monopole:	**Pass (90.6%)**
Foundation:	**Pass**

Destek Engineering, LLC
License No: PEC0001429



01/09/2017

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

Site Name: NH362/Boardman_MP
Site ID: CTNH362B
33 Boardman Road
New Milford, CT 06776

Destek Job No: 1675009

January 09, 2017

CONTENTS

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

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 154' monopine located at 33 Boardman Road, New Milford, CT 06776 for the additions and alterations proposed by T-Mobile.

The structural analysis is based on the following documentation provided to Destek Engineering, LLC (Destek):

- RFDS provided by T-Mobile, dated 12/01/2016.
- Structural Analysis Report prepared by Centek, dated 12/01/2014.

1.1 STRUCTURE

The structure is a 154'-0" (18) sided monopine, which is attached to the foundation with anchor bolts and base plate. Please refer to the software output in Appendix A, for monopole geometry, member sizes, and other details.

Section Length (Feet)	Lap Splice (feet)	Shaft Thickness (Inches)	Top Diameter (Inches)	Bottom Diameter (Inches)	Yield Strength (ksi)
19.17	4.33	0.1875	25.250	30.03	65
50.00	5.67	0.3125	28.575	40.91	65
50.29	6.92	0.5000	38.886	51.28	65
50.49	0	0.5625	48.575	61.00	65

2.0 EXISTING AND PROPOSED APPURTENANCES

Existing Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mount
140	(3) APXV18-209014-C (3) TMA – 1A - Twin PCS	(6) 1-5/8"	(3) Sector Mounts

Proposed and Final Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax	Mount
140	(3) APXV18-209014-C (3) LNX-6515DS-A1M (3) TMA – 1A - Twin PCS (3) Smart Bias Tee	(12) 1-5/8"	(3) Sector Mounts

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Existing Configuration of Appurtenances by Others:

Rad Center (ft.) Carrier	Antennas & Equipment	Coax	Mount
156.0 Motorola	(1) HP2-4.7 (1) HP3-4.7	(3) 7/8”	(3) Pipe Mounts
154.0 Motorola	(1) BA40-41		
150.0 Sprint	(6) 72”x6.5”x8” Panel (3) APXVSPP18-C-A20 (3) FD-RRH 2x50 800 (3) FD-RRH4x40 1900	(9) 1-5/8” (3) 1-1/4”	(3) Sector Mounts
130.0 Verizon	(3) BXA-70063/6CF (3) LNX-8513DS (6) HBXX-6517DS (3) RRH2x60AWS (6) FD9R6004/2C-3L Diplexer (1) DB-T1-6Z-8AB-0Z	(12) 1-5/8”	(3) Sector Mounts
120.0 AT&T	(6) Powerwave 7770.00 (2) AM-X-CD-16-65-00T-RET (1) AM-X-CD-17-65-00T-RET (6) RRUS-11 (6) LGP21401 (3) LGP21901 (1) DC6-48-60-18-8F	(12) 1-5/8” (1)RG6-Fiber (2)#8 AWG Copper Wire	(3) Sector Mounts

DESTEK ENGINEERING, LLC
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3.0 CODES AND LOADING

The monopole was analyzed per *TIA/EIA-222-G* as referenced by the *2016 Connecticut State Building Code* with all of the adopted Addendums and Supplements. The following wind loading was used in compliance with the standard for New Milford, CT:

- Ultimate wind speed 115 mph converted to a Basic wind speed 89 mph without ice (W_0)
- Basic wind speed 50 mph with 1" escalating ice (W_i)
- Exposure Category C
- Topographic Category 1
- Structure Class II (I_w = 1.0)

The following load combinations were used with wind blowing at 0°, 30°, 45°, 60°, and 90° measured from a line normal to the face of the monopole.

- 1.2 D + 1.6 W_0
- 0.9 D + 1.6 W_0
- 1.2 D + 1.0 D_i + 1.0 W_i

D: Dead Load of structure and appurtenances
W_0: Wind Load, without ice
W_i: Wind Load, with ice
D_i: Weight of Ice

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

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and placement, etc., will require Destek to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

The monopole was analyzed by utilizing tnxTower, a 3-Dimensional finite element software, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix-A of this report.

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

6.0 CONCLUSION AND RESULTS

Based on an analysis per *TIA/EIA-222-G*, the existing monopole has **adequate** structural capacity for the proposed modifications by T-Mobile. For the code specified load combinations and as a maximum, the monopole shaft between 89.16 feet to 134.83 feet is stressed to **90.6%** of its capacity.

Based on the reactions comparison, the monopole foundation is found to have **adequate** capacity for the proposed loading by T-Mobile.

Reactions Comparison:

Maximums	Destek Analysis	Centek Reactions*
Moment (kip-ft)	8422	9033
Shear (kips)	75	78.3
Compression(kips)	72	83.7

***Reactions have been multiplied by 1.35 as per Section 15.5.1 of ANSI/TIA-222-G.**

Therefore, the proposed additions and alterations by T-Mobile **can** be implemented as intended with the conditions outlined in this report.

Should you have any questions about this report, please contact us at (770) 693-0835.

DESTEK ENGINEERING, LLC
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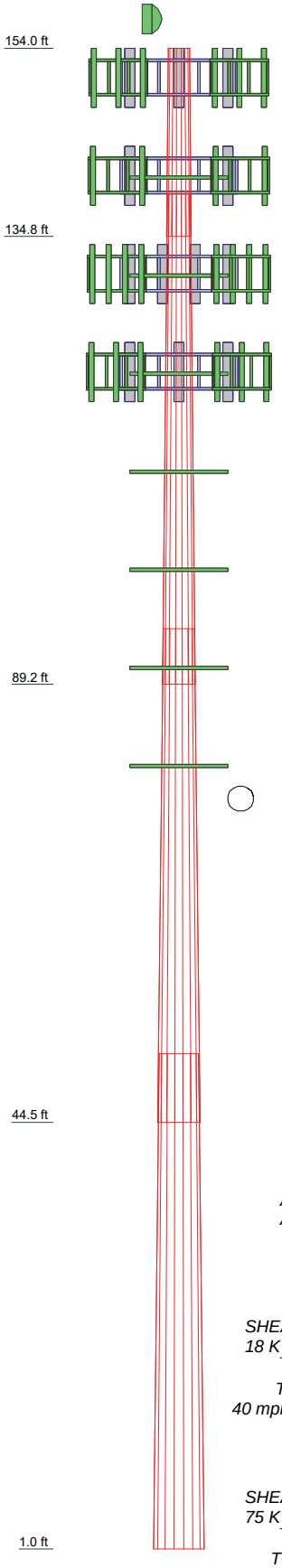
APPENDIX A
SOFTWARE OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	19.17	18	0.1875	4.33	25.2500	30.0300		1.1
2	50.00	18	0.3125	5.67	28.5753	40.9100		5.8
3	50.29	18	0.5000	6.92	38.8862	51.2800	A572-65	12.1
4	50.46	18	0.5625		48.5746	61.0000		16.6



ALL REACTIONS ARE FACTORED

AXIAL
129 K

SHEAR
18 K

MOMENT
2095481 lb-ft

TORQUE 285 lb-ft
40 mph WIND - 1.0000 in ICE

AXIAL
72 K

SHEAR
75 K

MOMENT
8422383 lb-ft

TORQUE 2012 lb-ft
REACTIONS - 100 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BA4041	157	(2) HBXX-6517DS-A2M w/ Mount Pipe	131
HP2-4.7	157	(2) HBXX-6517DS-A2M w/ Mount Pipe	131
HP3-4.7	157	(2) HBXX-6517DS-A2M w/ Mount Pipe	131
Pipe Mount [PM 601-3]	155	RRH2X60-AWS BAND 4	131
(2) 72"x6.5"x8" Panel	151	RRH2X60-AWS BAND 4	131
(2) 72"x6.5"x8" Panel	151	RRH2X60-AWS BAND 4	131
(2) 72"x6.5"x8" Panel	151	(2) FD9R6004/2C-3L	131
APXVSPP18-C-A20 w/ Mount Pipe	151	(2) FD9R6004/2C-3L	131
APXVSPP18-C-A20 w/ Mount Pipe	151	(2) FD9R6004/2C-3L	131
APXVSPP18-C-A20 w/ Mount Pipe	151	DB-T1-6Z-8AB-0Z	131
FD-RRH-2x50-800	151	EEI 10' Universal T-Arm	131
FD-RRH-2x50-800	151	EEI 10' Universal T-Arm	131
FD-RRH-2x50-800	151	EEI 10' Universal T-Arm	131
FD-RRH-4x40-1900	151	EEI Pine Braches	131
FD-RRH-4x40-1900	151	(2) 7770.00 w/ Mount Pipe	121
FD-RRH-4x40-1900	151	(2) 7770.00 w/ Mount Pipe	121
EEI 10' Universal T-Arm	151	(2) 7770.00 w/ Mount Pipe	121
EEI 10' Universal T-Arm	151	AM-X-CD-16-65-00T-RET w/ Mount Pipe	121
EEI 10' Universal T-Arm	151		
EEI Pine Braches	141	AM-X-CD-16-65-00T-RET w/ Mount Pipe	121
APXV18-209014-C w/ Mount Pipe	141		
APXV18-209014-C w/ Mount Pipe	141	AM-X-CD-17-65-00T-RET w/ Mount Pipe	121
APXV18-209014-C w/ Mount Pipe	141		
TMA-1A Twin AWS	141	(2) RRUS 11	121
TMA-1A Twin AWS	141	(2) RRUS 11	121
TMA-1A Twin AWS	141	(2) RRUS 11	121
EEI 10' Universal T-Arm	141	(2) LGP21401	121
EEI 10' Universal T-Arm	141	(2) LGP21401	121
EEI 10' Universal T-Arm	141	(2) LGP21401	121
LNX-6515DS-A1M w/ Mount Pipe	141	(2) LGP21901	121
LNX-6515DS-A1M w/ Mount Pipe	141	(2) LGP21901	121
LNX-6515DS-A1M w/ Mount Pipe	141	(2) LGP21901	121
Smart Bias Tee	141	DC6-48-60-18-8F	121
Smart Bias Tee	141	EEI 10' Universal T-Arm	121
Smart Bias Tee	141	EEI 10' Universal T-Arm	121
BXA-70063/6CF w/ Mount Pipe	131	EEI 10' Universal T-Arm	121
BXA-70063/6CF w/ Mount Pipe	131	EEI Pine Braches	121
BXA-70063/6CF w/ Mount Pipe	131	EEI Pine Braches	111
LNX-8513DS-A1M w/ Mount Pipe	131	EEI Pine Braches	101
LNX-8513DS-A1M w/ Mount Pipe	131	EEI Pine Braches	91
LNX-8513DS-A1M w/ Mount Pipe	131	EEI Pine Braches	81

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 90.6%

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693 0835
FAX:

Job: **1675009**			
Project: **CTNH362B**			
Client: Foresite LLC	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 01/09/17	Scale: NTS	
Path: \\FILESERVER\Destek\Projects\2016\75 - Foresite LLC\009 - CTNH362B (Monopole)\Tnx\CTNH362B G code Rev 1.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 100 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	154.00-134.83	19.17	4.33	18	25.2500	30.0300	0.1875	0.7500	A572-65 (65 ksi)
L2	134.83-89.16	50.00	5.67	18	28.5753	40.9100	0.3125	1.2500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	89.16-44.54	50.29	6.92	18	38.8862	51.2800	0.5000	2.0000	A572-65 (65 ksi)
L4	44.54-1.00	50.46		18	48.5746	61.0000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	25.6395	14.9153	1183.6378	8.8972	12.8270	92.2771	2368.8330	7.4591	4.1140	21.941
	30.4933	17.7600	1998.2566	10.5941	15.2552	130.9882	3999.1425	8.8817	4.9553	26.428
L2	30.1008	28.0332	2829.0525	10.0333	14.5163	194.8885	5661.8276	14.0193	4.4793	14.334
	41.5411	40.2676	8384.7915	14.4121	20.7823	403.4587	16780.6158	20.1376	6.6502	21.281
L3	40.9050	60.9190	11340.7394	13.6271	19.7542	574.0922	22696.4013	30.4653	5.9640	11.928
	52.0711	80.5879	26253.8178	18.0269	26.0502	1007.8148	52542.1810	40.3016	8.1453	16.291
L4	51.0542	85.7196	24964.2715	17.0443	24.6759	1011.6866	49961.3916	42.8679	7.5591	13.438
	61.9410	107.9036	49795.0730	21.4553	30.9880	1606.9147	99655.6677	53.9621	9.7460	17.326

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 154.00-134.83				1	1	1			
L2 134.83-89.16				1	1	1			
L3 89.16-44.54				1	1	1			
L4 44.54-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF5-50A(7/8")	B	No	Inside Pole	152.00 - 5.00	3	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LDF7-50A(1-5/8")	B	No	Inside Pole	152.00 - 5.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	142.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	132.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	122.00 - 5.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
RG6-Fiber	C	No	Inside Pole	122.00 - 5.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.82
#8 AWG Copper Wire	C	No	Inside Pole	122.00 - 5.00	2	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF6-50A(1-1/4")	C	No	Inside Pole	152.00 - 5.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	154.00-134.83	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	0.000	0.03
L2	134.83-89.16	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	1.58
		C	0.000	0.000	0.000	0.000	0.17
L3	89.16-44.54	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	1.69
		C	0.000	0.000	0.000	0.000	0.20
L4	44.54-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	1.50
		C	0.000	0.000	0.000	0.000	0.18

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	154.00-134.83	A	2.318	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.03
L2	134.83-89.16	A	2.258	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	1.58
		C		0.000	0.000	0.000	0.000	0.17
L3	89.16-44.54	A	2.145	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	1.69
		C		0.000	0.000	0.000	0.000	0.20
L4	44.54-1.00	A	1.929	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	1.50
		C		0.000	0.000	0.000	0.000	0.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	154.00-134.83	0.0000	0.0000	0.0000	0.0000
L2	134.83-89.16	0.0000	0.0000	0.0000	0.0000

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L3	89.16-44.54	0.0000	0.0000	0.0000	0.0000
L4	44.54-1.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
EEI Pine Braches	C	None			0.0000	141.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	131.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	121.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	111.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	101.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	91.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
EEI Pine Braches	C	None			0.0000	81.00	No Ice	90.00	90.00	1.50
							1/2" Ice	130.00	130.00	1.90
							1" Ice	170.00	170.00	2.30
BA4041	C	None			0.0000	157.00	No Ice	0.22	0.22	0.00
							1/2" Ice	0.58	0.58	0.00
							1" Ice	0.94	0.94	0.01
Pipe Mount [PM 601-3]	C	None			0.0000	155.00	No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
							1" Ice	6.57	6.57	0.28
150ft										
(2) 72"x6.5"x8" Panel	A	From Face	3.00		0.0000	151.00	No Ice	5.09	6.06	0.01
			0.00				1/2" Ice	5.55	6.53	0.06
			0.00				1" Ice	6.00	6.99	0.10
(2) 72"x6.5"x8" Panel	B	From Face	3.00		0.0000	151.00	No Ice	5.09	6.06	0.01
			0.00				1/2" Ice	5.55	6.53	0.06
			0.00				1" Ice	6.00	6.99	0.10
(2) 72"x6.5"x8" Panel	C	From Face	3.00		0.0000	151.00	No Ice	5.09	6.06	0.01
			0.00				1/2" Ice	5.55	6.53	0.06
			0.00				1" Ice	6.00	6.99	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	151.00	No Ice	8.26	6.95	0.08
			0.00				1/2" Ice	8.82	8.13	0.15
			0.00				1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	151.00	No Ice	8.26	6.95	0.08
			0.00				1/2" Ice	8.82	8.13	0.15
			0.00				1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	151.00	No Ice	8.26	6.95	0.08
			0.00				1/2" Ice	8.82	8.13	0.15
			0.00				1" Ice	9.35	9.02	0.23
FD-RRH-2x50-800	A	From Face	3.00	0.00	0.0000	151.00	No Ice	1.36	3.01	0.05
			0.00				1/2" Ice	1.52	3.22	0.08
			0.00				1" Ice	1.68	3.45	0.10
FD-RRH-2x50-800	B	From Face	3.00	0.00	0.0000	151.00	No Ice	1.36	3.01	0.05
			0.00				1/2" Ice	1.52	3.22	0.08
			0.00				1" Ice	1.68	3.45	0.10
FD-RRH-2x50-800	C	From Face	3.00	0.00	0.0000	151.00	No Ice	1.36	3.01	0.05
			0.00				1/2" Ice	1.52	3.22	0.08
			0.00				1" Ice	1.68	3.45	0.10
FD-RRH-4x40-1900	A	From Face	3.00	0.00	0.0000	151.00	No Ice	2.32	2.24	0.06
			0.00				1/2" Ice	2.53	2.44	0.08
			0.00				1" Ice	2.74	2.65	0.11
FD-RRH-4x40-1900	B	From Face	3.00	0.00	0.0000	151.00	No Ice	2.32	2.24	0.06
			0.00				1/2" Ice	2.53	2.44	0.08
			0.00				1" Ice	2.74	2.65	0.11
FD-RRH-4x40-1900	C	From Face	3.00	0.00	0.0000	151.00	No Ice	2.32	2.24	0.06
			0.00				1/2" Ice	2.53	2.44	0.08
			0.00				1" Ice	2.74	2.65	0.11
EEI 10' Universal T-Arm	A	None			0.0000	151.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60
							1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	B	None			0.0000	151.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60
							1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	C	None			0.0000	151.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60
							1" Ice	20.26	20.26	0.75
140ft										
APXV18-209014-C w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	141.00	No Ice	3.72	3.31	0.04
			0.00				1/2" Ice	4.13	4.02	0.07
			0.00				1" Ice	4.54	4.68	0.11
APXV18-209014-C w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	141.00	No Ice	3.72	3.31	0.04
			0.00				1/2" Ice	4.13	4.02	0.07
			0.00				1" Ice	4.54	4.68	0.11
APXV18-209014-C w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	141.00	No Ice	3.72	3.31	0.04
			0.00				1/2" Ice	4.13	4.02	0.07
			0.00				1" Ice	4.54	4.68	0.11
TMA-1A Twin AWS	A	From Face	3.00	0.00	0.0000	141.00	No Ice	0.67	0.31	0.01
			0.00				1/2" Ice	0.79	0.39	0.02
			0.00				1" Ice	0.91	0.49	0.02
TMA-1A Twin AWS	B	From Face	3.00	0.00	0.0000	141.00	No Ice	0.67	0.31	0.01
			0.00				1/2" Ice	0.79	0.39	0.02
			0.00				1" Ice	0.91	0.49	0.02
TMA-1A Twin AWS	C	From Face	3.00	0.00	0.0000	141.00	No Ice	0.67	0.31	0.01
			0.00				1/2" Ice	0.79	0.39	0.02
			0.00				1" Ice	0.91	0.49	0.02
EEI 10' Universal T-Arm	A	None			0.0000	141.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	B	None			0.0000	141.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60
							1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	C	None			0.0000	141.00	No Ice	13.34	13.34	0.45
							1/2" Ice	16.80	16.80	0.60
							1" Ice	20.26	20.26	0.75
LNX-6515DS-A1M w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	141.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
LNX-6515DS-A1M w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	141.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
LNX-6515DS-A1M w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	141.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
Smart Bias Tee	A	From Face	3.00	0.00	0.0000	141.00	No Ice	0.15	0.08	0.00
			0.00				1/2" Ice	0.20	0.13	0.00
			0.00				1" Ice	0.26	0.18	0.01
Smart Bias Tee	B	From Face	3.00	0.00	0.0000	141.00	No Ice	0.15	0.08	0.00
			0.00				1/2" Ice	0.20	0.13	0.00
			0.00				1" Ice	0.26	0.18	0.01
Smart Bias Tee	C	From Face	3.00	0.00	0.0000	141.00	No Ice	0.15	0.08	0.00
			0.00				1/2" Ice	0.20	0.13	0.00
			0.00				1" Ice	0.26	0.18	0.01
130ft										
BXA-70063/6CF w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	131.00	No Ice	7.82	5.41	0.04
			0.00				1/2" Ice	8.37	6.56	0.10
			0.00				1" Ice	8.89	7.42	0.17
BXA-70063/6CF w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	131.00	No Ice	7.82	5.41	0.04
			0.00				1/2" Ice	8.37	6.56	0.10
			0.00				1" Ice	8.89	7.42	0.17
BXA-70063/6CF w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	131.00	No Ice	7.82	5.41	0.04
			0.00				1/2" Ice	8.37	6.56	0.10
			0.00				1" Ice	8.89	7.42	0.17
LNX-8513DS-A1M w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	131.00	No Ice	8.41	7.08	0.06
			0.00				1/2" Ice	8.97	8.27	0.13
			0.00				1" Ice	9.50	9.18	0.21
LNX-8513DS-A1M w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	131.00	No Ice	8.41	7.08	0.06
			0.00				1/2" Ice	8.97	8.27	0.13
			0.00				1" Ice	9.50	9.18	0.21
LNX-8513DS-A1M w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	131.00	No Ice	8.41	7.08	0.06
			0.00				1/2" Ice	8.97	8.27	0.13
			0.00				1" Ice	9.50	9.18	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	131.00	No Ice	8.77	6.96	0.07
			0.00				1/2" Ice	9.34	8.18	0.14
			0.00				1" Ice	9.89	9.14	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	131.00	No Ice	8.77	6.96	0.07
			0.00				1/2" Ice	9.34	8.18	0.14
			0.00				1" Ice	9.89	9.14	0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	131.00	No Ice	8.77	6.96	0.07
			0.00				1/2" Ice	9.34	8.18	0.14
			0.00				1" Ice	9.89	9.14	0.21
RRH2X60-AWS BAND 4	A	From Face	3.00	0.00	0.0000	131.00	No Ice	3.36	2.00	0.06
			0.00				1/2" Ice	3.61	2.24	0.08
			0.00				1" Ice	3.88	2.48	0.11
RRH2X60-AWS BAND 4	B	From Face	3.00	0.00	0.0000	131.00	No Ice	3.36	2.00	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00					1/2" Ice	3.61	2.24	0.08
			0.00					1" Ice	3.88	2.48	0.11
RRH2X60-AWS BAND 4	C	From Face	3.00			0.0000	131.00	No Ice	3.36	2.00	0.06
			0.00					1/2" Ice	3.61	2.24	0.08
			0.00					1" Ice	3.88	2.48	0.11
(2) FD9R6004/2C-3L	A	From Face	3.00			0.0000	131.00	No Ice	0.31	0.08	0.00
			0.00					1/2" Ice	0.39	0.12	0.01
			0.00					1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	B	From Face	3.00			0.0000	131.00	No Ice	0.31	0.08	0.00
			0.00					1/2" Ice	0.39	0.12	0.01
			0.00					1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	C	From Face	3.00			0.0000	131.00	No Ice	0.31	0.08	0.00
			0.00					1/2" Ice	0.39	0.12	0.01
			0.00					1" Ice	0.47	0.17	0.01
DB-T1-6Z-8AB-0Z	C	From Face	3.00			0.0000	131.00	No Ice	4.80	2.00	0.04
			0.00					1/2" Ice	5.07	2.19	0.08
			0.00					1" Ice	5.35	2.39	0.12
EEI 10' Universal T-Arm	A	None				0.0000	131.00	No Ice	13.34	13.34	0.45
								1/2" Ice	16.80	16.80	0.60
								1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	B	None				0.0000	131.00	No Ice	13.34	13.34	0.45
								1/2" Ice	16.80	16.80	0.60
								1" Ice	20.26	20.26	0.75
EEI 10' Universal T-Arm	C	None				0.0000	131.00	No Ice	13.34	13.34	0.45
								1/2" Ice	16.80	16.80	0.60
								1" Ice	20.26	20.26	0.75
120ft											
(2) 7770.00 w/ Mount Pipe	A	From Face	3.00			0.0000	121.00	No Ice	5.75	4.25	0.06
			0.00					1/2" Ice	6.18	5.01	0.10
			0.00					1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	B	From Face	3.00			0.0000	121.00	No Ice	5.75	4.25	0.06
			0.00					1/2" Ice	6.18	5.01	0.10
			0.00					1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	C	From Face	3.00			0.0000	121.00	No Ice	5.75	4.25	0.06
			0.00					1/2" Ice	6.18	5.01	0.10
			0.00					1" Ice	6.61	5.71	0.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	3.00			0.0000	121.00	No Ice	8.26	6.30	0.07
			0.00					1/2" Ice	8.82	7.48	0.14
			0.00					1" Ice	9.35	8.37	0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	3.00			0.0000	121.00	No Ice	8.26	6.30	0.07
			0.00					1/2" Ice	8.82	7.48	0.14
			0.00					1" Ice	9.35	8.37	0.21
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Face	3.00			0.0000	121.00	No Ice	11.55	8.94	0.09
			0.00					1/2" Ice	12.27	10.45	0.18
			0.00					1" Ice	13.00	11.99	0.27
(2) RRUS 11	A	From Face	3.00			0.0000	121.00	No Ice	2.78	1.19	0.05
			0.00					1/2" Ice	2.99	1.33	0.07
			0.00					1" Ice	3.21	1.49	0.10
(2) RRUS 11	B	From Face	3.00			0.0000	121.00	No Ice	2.78	1.19	0.05
			0.00					1/2" Ice	2.99	1.33	0.07
			0.00					1" Ice	3.21	1.49	0.10
(2) RRUS 11	C	From Face	3.00			0.0000	121.00	No Ice	2.78	1.19	0.05
			0.00					1/2" Ice	2.99	1.33	0.07
			0.00					1" Ice	3.21	1.49	0.10
(2) LGP21401	A	From Face	3.00			0.0000	121.00	No Ice	1.10	0.21	0.01
			0.00					1/2" Ice	1.24	0.27	0.02
			0.00					1" Ice	1.38	0.35	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
(2) LGP21401	B	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(2) LGP21401	C	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(2) LGP21901	A	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) LGP21901	B	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) LGP21901	C	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
DC6-48-60-18-8F	C	From Face	3.00 0.00 0.00	0.0000	121.00	No Ice 1/2" Ice 1" Ice	2.20 2.40 2.60	2.20 2.40 2.60	0.02 0.04 0.07
EEI 10' Universal T-Arm	A	None		0.0000	121.00	No Ice 1/2" Ice 1" Ice	13.34 16.80 20.26	13.34 16.80 20.26	0.45 0.60 0.75
EEI 10' Universal T-Arm	B	None		0.0000	121.00	No Ice 1/2" Ice 1" Ice	13.34 16.80 20.26	13.34 16.80 20.26	0.45 0.60 0.75
EEI 10' Universal T-Arm	C	None		0.0000	121.00	No Ice 1/2" Ice 1" Ice	13.34 16.80 20.26	13.34 16.80 20.26	0.45 0.60 0.75

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-4.7	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	0.0000		157.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.03 0.04 0.06
HP3-4.7	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	0.0000		157.00	3.00	No Ice 1/2" Ice 1" Ice	7.88 8.30 8.72	0.05 0.05 0.07

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	144.14	1.367	33	44.836	A	0.000	44.836	44.836	100.00	0.000	0.000
154.00-134.83					B	0.000	44.836		100.00	0.000	0.000
					C	0.000	44.836		100.00	0.000	0.000
L2	111.02	1.294	31	136.329	A	0.000	136.329	136.329	100.00	0.000	0.000
134.83-89.16					B	0.000	136.329		100.00	0.000	0.000
					C	0.000	136.329		100.00	0.000	0.000
L3 89.16-44.54	66.35	1.161	28	172.858	A	0.000	172.858	172.858	100.00	0.000	0.000
					B	0.000	172.858		100.00	0.000	0.000
					C	0.000	172.858		100.00	0.000	0.000
L4 44.54-1.00	22.98	0.929	22	204.992	A	0.000	204.992	204.992	100.00	0.000	0.000
					B	0.000	204.992		100.00	0.000	0.000
					C	0.000	204.992		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	144.14	1.367	5	2.3177	52.241	A	0.000	52.241	52.241	100.00	0.000	0.000
154.00-134.83						B	0.000	52.241		100.00	0.000	0.000
						C	0.000	52.241		100.00	0.000	0.000
L2 134.83-89.16	111.02	1.294	5	2.2580	153.970	A	0.000	153.970	153.970	100.00	0.000	0.000
						B	0.000	153.970		100.00	0.000	0.000
						C	0.000	153.970		100.00	0.000	0.000
L3 89.16-44.54	66.35	1.161	5	2.1447	189.650	A	0.000	189.650	189.650	100.00	0.000	0.000
						B	0.000	189.650		100.00	0.000	0.000
						C	0.000	189.650		100.00	0.000	0.000
L4 44.54-1.00	22.98	0.929	4	1.9289	220.555	A	0.000	220.555	220.555	100.00	0.000	0.000
						B	0.000	220.555		100.00	0.000	0.000
						C	0.000	220.555		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	144.14	1.367	11	44.836	A	0.000	44.836	44.836	100.00	0.000	0.000
154.00-134.83					B	0.000	44.836		100.00	0.000	0.000
					C	0.000	44.836		100.00	0.000	0.000
L2	111.02	1.294	10	136.329	A	0.000	136.329	136.329	100.00	0.000	0.000
134.83-89.16					B	0.000	136.329		100.00	0.000	0.000
					C	0.000	136.329		100.00	0.000	0.000
L3 89.16-44.54	66.35	1.161	9	172.858	A	0.000	172.858	172.858	100.00	0.000	0.000
					B	0.000	172.858		100.00	0.000	0.000
					C	0.000	172.858		100.00	0.000	0.000
L4 44.54-1.00	22.98	0.929	7	204.992	A	0.000	204.992	204.992	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	0.000	204.992		100.00	0.000	0.000
					C	0.000	204.992		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	33	1	1	44.836	1.07	55.59	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	31	1	1	136.329	3.06	67.07	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	28	1	1	172.858	3.48	77.92	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	22	1	1	204.992	3.29	75.63	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	789147.24 lb-ft	10.90		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	33	1	1	44.836	1.07	55.59	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	31	1	1	136.329	3.06	67.07	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	28	1	1	172.858	3.48	77.92	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	22	1	1	204.992	3.29	75.63	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	789147.24 lb-ft	10.90		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	33	1	1	44.836	1.07	55.59	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	31	1	1	136.329	3.06	67.07	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	28	1	1	172.858	3.48	77.92	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	22	1	1	204.992	3.29	75.63	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	789147.24 lb-ft	10.90		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	2.71	A	1	1.2	5	1	1	52.241	0.37	19.13	C
154.00-134.83			B	1	1.2		1	1	52.241			
			C	1	1.2		1	1	52.241			
L2	1.75	10.59	A	1	1.2	5	1	1	153.970	1.02	22.37	C
134.83-89.16			B	1	1.2		1	1	153.970			
			C	1	1.2		1	1	153.970			
L3	1.89	17.77	A	1	1.2	5	1	1	189.650	1.13	25.25	C
89.16-44.54			B	1	1.2		1	1	189.650			
			C	1	1.2		1	1	189.650			
L4 44.54-1.00	1.67	22.59	A	1	1.2	4	1	1	220.555	1.05	24.04	C
			B	1	1.2		1	1	220.555			
			C	1	1.2		1	1	220.555			
Sum Weight:	5.56	53.66						OTM	261568.45 lb-ft	3.56		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	2.71	A	1	1.2	5	1	1	52.241	0.37	19.13	C
154.00-134.83			B	1	1.2		1	1	52.241			
			C	1	1.2		1	1	52.241			
L2	1.75	10.59	A	1	1.2	5	1	1	153.970	1.02	22.37	C
134.83-89.16			B	1	1.2		1	1	153.970			
			C	1	1.2		1	1	153.970			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L3	1.89	17.77	A	1	1.2	5	1	1	189.650	1.13	25.25	C
89.16-44.54			B	1	1.2		1	1	189.650			
			C	1	1.2		1	1	189.650			
L4 44.54-1.00	1.67	22.59	A	1	1.2	4	1	1	220.555	1.05	24.04	C
			B	1	1.2		1	1	220.555			
			C	1	1.2		1	1	220.555			
Sum Weight:	5.56	53.66						OTM	261568.45 lb-ft	3.56		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	2.71	A	1	1.2	5	1	1	52.241	0.37	19.13	C
154.00-134.83			B	1	1.2		1	1	52.241			
			C	1	1.2		1	1	52.241			
L2	1.75	10.59	A	1	1.2	5	1	1	153.970	1.02	22.37	C
134.83-89.16			B	1	1.2		1	1	153.970			
			C	1	1.2		1	1	153.970			
L3	1.89	17.77	A	1	1.2	5	1	1	189.650	1.13	25.25	C
89.16-44.54			B	1	1.2		1	1	189.650			
			C	1	1.2		1	1	189.650			
L4 44.54-1.00	1.67	22.59	A	1	1.2	4	1	1	220.555	1.05	24.04	C
			B	1	1.2		1	1	220.555			
			C	1	1.2		1	1	220.555			
Sum Weight:	5.56	53.66						OTM	261568.45 lb-ft	3.56		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	11	1	1	44.836	0.34	17.91	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	10	1	1	136.329	0.99	21.60	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	9	1	1	172.858	1.12	25.10	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	7	1	1	204.992	1.06	24.36	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	254188.48	3.51		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									lb-ft			

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	11	1	1	44.836	0.34	17.91	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	10	1	1	136.329	0.99	21.60	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	9	1	1	172.858	1.12	25.10	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	7	1	1	204.992	1.06	24.36	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	254188.48 lb-ft	3.51		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.25	1.07	A	1	0.65	11	1	1	44.836	0.34	17.91	C
154.00-134.83			B	1	0.65		1	1	44.836			
			C	1	0.65		1	1	44.836			
L2	1.75	5.81	A	1	0.65	10	1	1	136.329	0.99	21.60	C
134.83-89.16			B	1	0.65		1	1	136.329			
			C	1	0.65		1	1	136.329			
L3	1.89	12.11	A	1	0.65	9	1	1	172.858	1.12	25.10	C
89.16-44.54			B	1	0.65		1	1	172.858			
			C	1	0.65		1	1	172.858			
L4 44.54-1.00	1.67	16.62	A	1	0.65	7	1	1	204.992	1.06	24.36	C
			B	1	0.65		1	1	204.992			
			C	1	0.65		1	1	204.992			
Sum Weight:	5.56	35.61						OTM	254188.48 lb-ft	3.51		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	35.61					
Bracing Weight	0.00					
Total Member Self-Weight	35.61			428.16	142.17	
Total Weight	60.36			428.16	142.17	
Wind 0 deg - No Ice		0.26	-46.61	-5091080.13	-40504.93	-299.57
Wind 30 deg - No Ice		23.48	-40.42	-4416865.98	-2573606.99	281.36
Wind 60 deg - No Ice		40.45	-23.40	-2560401.14	-4424391.97	728.88
Wind 90 deg - No Ice		46.67	-0.17	-25333.09	-5102736.36	981.09
Wind 120 deg - No Ice		40.41	23.08	2510980.88	-4418604.59	1028.45
Wind 150 deg - No Ice		23.18	40.33	4404122.07	-2527924.96	1056.24
Wind 180 deg - No Ice		-0.16	46.59	5088333.33	25547.93	484.09
Wind 210 deg - No Ice		-23.40	40.34	4406348.98	2561692.65	-204.07
Wind 240 deg - No Ice		-40.36	23.35	2553381.96	4411035.55	-728.88
Wind 270 deg - No Ice		-46.56	0.13	21311.69	5087071.79	-1058.38
Wind 300 deg - No Ice		-40.34	-23.15	-2521522.40	4408147.87	-1212.97
Wind 330 deg - No Ice		-23.26	-40.28	-4396265.31	2540334.42	-1056.24
Member Ice	18.05					
Total Weight Ice	115.06			2519.93	380.83	
Wind 0 deg - Ice		0.05	-17.89	-1944677.55	-8019.58	-61.93
Wind 30 deg - Ice		8.98	-15.50	-1685439.07	-979437.67	73.53
Wind 60 deg - Ice		15.52	-8.96	-974194.34	-1689826.34	177.46
Wind 90 deg - Ice		17.91	-0.03	-2804.07	-1950034.73	233.84
Wind 120 deg - Ice		15.51	8.90	968843.70	-1688630.28	239.39
Wind 150 deg - Ice		8.92	15.49	1687668.22	-969996.70	233.58
Wind 180 deg - Ice		-0.03	17.88	1948972.77	5631.36	99.84
Wind 210 deg - Ice		-8.97	15.49	1688128.44	977678.27	-57.79
Wind 240 deg - Ice		-15.50	8.95	977606.60	1687768.92	-177.46
Wind 270 deg - Ice		-17.89	0.03	6835.87	1947500.28	-249.59
Wind 300 deg - Ice		-15.49	-8.91	-966159.39	1687172.13	-277.30
Wind 330 deg - Ice		-8.94	-15.48	-1681181.59	973264.23	-233.58
Total Weight	60.36			428.16	142.17	
Wind 0 deg - Service		0.08	-15.01	-1639573.46	-12950.47	-96.49
Wind 30 deg - Service		7.56	-13.02	-1422405.53	-828875.98	90.63
Wind 60 deg - Service		13.03	-7.54	-824428.44	-1425023.56	234.78
Wind 90 deg - Service		15.03	-0.05	-7869.68	-1643521.86	316.01
Wind 120 deg - Service		13.02	7.43	809090.40	-1423159.42	331.27
Wind 150 deg - Service		7.47	12.99	1418881.14	-814161.56	340.22
Wind 180 deg - Service		-0.05	15.01	1639269.19	8325.50	155.93
Wind 210 deg - Service		-7.54	13.00	1419598.44	825231.06	-65.73
Wind 240 deg - Service		-13.00	7.52	822748.01	1420914.15	-234.78
Wind 270 deg - Service		-15.00	0.04	7154.85	1638668.98	-340.91
Wind 300 deg - Service		-12.99	-7.46	-811905.39	1419984.01	-390.70
Wind 330 deg - Service		-7.49	-12.98	-1415769.95	818351.47	-340.22

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

Comb. No.	Description
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
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+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	154 - 134.83	Pole	Max Tension	14	0.00	-4.26	0.02
			Max. Compression	26	-21.10	413.56	-252.97
			Max. Mx	8	-5.81	-118119.92	4665.66
			Max. My	2	-5.85	-7378.30	113796.58
			Max. Vy	8	18.13	-118119.92	4665.66
			Max. Vx	2	-17.88	-7378.30	113796.58
			Max. Torque	24			1056.95
L2	134.83 - 89.16	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	26	-68.31	425.65	-2694.33
			Max. Mx	8	-24.39	-1860734.12	16538.12
			Max. My	2	-24.41	-26673.98	1850253.40
			Max. Vy	8	55.91	-1860734.12	16538.12
			Max. Vx	2	-55.81	-26673.98	1850253.40
			Max. Torque	22			2029.66
L3	89.16 - 44.54	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-96.91	420.53	-2666.89
			Max. Mx	8	-44.88	-4730372.95	28531.19
			Max. My	2	-44.89	-45670.49	4715792.16
			Max. Vy	8	70.49	-4730372.95	28531.19
			Max. Vx	2	-70.40	-45670.49	4715792.16
			Max. Torque	22			2023.27
L4	44.54 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-129.25	413.74	-2630.48
			Max. Mx	8	-72.36	-8406715.87	42188.06
			Max. My	2	-72.36	-67227.50	8387524.79
			Max. Vy	8	74.73	-8406715.87	42188.06
			Max. Vx	2	-74.64	-67227.50	8387524.79
			Max. Torque	22			2015.30

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	129.25	-0.00	0.00
	Max. H_x	21	54.32	74.50	-0.21
	Max. H_z	3	54.32	-0.42	74.58
	Max. M_x	2	8387524.78	-0.42	74.57
	Max. M_z	8	8406715.87	-74.66	0.26
	Max. Torsion	22	2012.14	64.55	37.04
	Min. Vert	9	54.32	-74.66	0.26
	Min. H_x	9	54.32	-74.66	0.26
	Min. H_z	15	54.32	0.26	-74.54
	Min. M_x	14	-8382658.31	0.26	-74.54
	Min. M_z	20	-8380766.76	74.50	-0.21
	Min. Torsion	12	-1707.28	-37.09	-64.53

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	60.36	-0.00	0.00	428.16	142.17	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	72.43	0.42	-74.57	-8387524.78	-67227.61	-349.24

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	lb-ft	lb-ft	lb-ft
0.9 Dead+1.6 Wind 0 deg - No Ice	54.32	0.42	-74.58	-8321828.53	-66620.80	-346.06
1.2 Dead+1.6 Wind 30 deg - No Ice	72.43	37.56	-64.67	-7277042.60	-4240422.41	518.73
0.9 Dead+1.6 Wind 30 deg - No Ice	54.32	37.56	-64.67	-7219932.98	-4207025.46	521.41
1.2 Dead+1.6 Wind 60 deg - No Ice	72.43	64.72	-37.44	-4218593.80	-7289478.97	1142.78
0.9 Dead+1.6 Wind 60 deg - No Ice	54.32	64.72	-37.44	-4185510.73	-7232136.26	1144.41
1.2 Dead+1.6 Wind 90 deg - No Ice	72.43	74.66	-0.26	-42188.49	-8406715.87	1461.36
0.9 Dead+1.6 Wind 90 deg - No Ice	54.32	74.66	-0.26	-41913.01	-8340719.74	1461.45
1.2 Dead+1.6 Wind 120 deg - No Ice	72.43	64.66	36.93	4136409.20	-7280115.29	1493.64
0.9 Dead+1.6 Wind 120 deg - No Ice	54.32	64.66	36.93	4103852.99	-7222855.25	1492.05
1.2 Dead+1.6 Wind 150 deg - No Ice	72.43	37.09	64.53	7255818.17	-4164826.95	1707.28
0.9 Dead+1.6 Wind 150 deg - No Ice	54.32	37.09	64.53	7198638.29	-4132156.76	1702.52
1.2 Dead+1.6 Wind 180 deg - No Ice	72.43	-0.26	74.54	8382658.31	42305.43	869.33
0.9 Dead+1.6 Wind 180 deg - No Ice	54.32	-0.26	74.54	8316737.62	41851.46	863.59
1.2 Dead+1.6 Wind 210 deg - No Ice	72.43	-37.44	64.55	7259376.16	4220626.42	-235.96
0.9 Dead+1.6 Wind 210 deg - No Ice	54.32	-37.44	64.55	7202164.47	4187328.17	-240.49
1.2 Dead+1.6 Wind 240 deg - No Ice	72.43	-64.58	37.36	4206667.78	7267343.10	-1143.98
0.9 Dead+1.6 Wind 240 deg - No Ice	54.32	-64.58	37.36	4173430.57	7210119.69	-1145.56
1.2 Dead+1.6 Wind 270 deg - No Ice	72.43	-74.50	0.21	35160.50	8380766.76	-1745.08
0.9 Dead+1.6 Wind 270 deg - No Ice	54.32	-74.50	0.21	34686.70	8314927.51	-1743.32
1.2 Dead+1.6 Wind 300 deg - No Ice	72.43	-64.55	-37.04	-4154268.67	7262680.00	-2012.14
0.9 Dead+1.6 Wind 300 deg - No Ice	54.32	-64.55	-37.04	-4121804.83	7205500.29	-2008.04
1.2 Dead+1.6 Wind 330 deg - No Ice	72.43	-37.22	-64.46	-7243143.06	4185276.71	-1706.19
0.9 Dead+1.6 Wind 330 deg - No Ice	54.32	-37.22	-64.46	-7186354.19	4152322.05	-1701.42
1.2 Dead+1.0 Ice+1.0 Temp	129.25	0.00	-0.00	2630.48	413.74	0.05
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	129.25	0.05	-17.89	-2088174.65	-8722.27	-69.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	129.25	8.98	-15.50	-1809885.27	-1051986.75	65.85
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	129.25	15.52	-8.96	-1046042.74	-1814899.61	170.82
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	129.25	17.91	-0.03	-2820.65	-2094252.13	230.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	129.25	15.51	8.90	1040684.14	-1813591.47	239.88
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	129.25	8.92	15.48	1812827.47	-1041649.64	243.92
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	129.25	-0.03	17.88	2093376.69	6225.13	114.24

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	lb-ft	lb-ft	lb-ft
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	129.25	-8.97	15.49	1813330.52	1050178.61	-44.95
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	129.25	-15.50	8.95	1050279.57	1812765.70	-170.79
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	129.25	-17.89	0.03	7734.87	2091596.61	-250.81
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	129.25	-15.49	-8.91	-1037245.60	1812113.66	-284.88
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	129.25	-8.94	-15.48	-1805225.65	1045345.84	-243.73
Dead+Wind 0 deg - Service	60.36	0.08	-15.01	-1682278.56	-13366.20	-94.08
Dead+Wind 30 deg - Service	60.36	7.56	-13.02	-1459467.72	-850532.01	91.77
Dead+Wind 60 deg - Service	60.36	13.03	-7.54	-845926.75	-1462190.98	233.80
Dead+Wind 90 deg - Service	60.36	15.03	-0.05	-8116.27	-1686376.88	313.22
Dead+Wind 120 deg - Service	60.36	13.02	7.43	830109.61	-1460268.58	327.93
Dead+Wind 150 deg - Service	60.36	7.47	12.99	1455847.31	-835343.46	344.30
Dead+Wind 180 deg - Service	60.36	-0.05	15.00	1681980.73	8597.46	162.60
Dead+Wind 210 deg - Service	60.36	-7.54	12.99	1456586.81	846775.88	-60.48
Dead+Wind 240 deg - Service	60.36	-13.00	7.52	844208.28	1457955.80	-233.84
Dead+Wind 270 deg - Service	60.36	-15.00	0.04	7393.90	1681374.19	-344.52
Dead+Wind 300 deg - Service	60.36	-12.99	-7.46	-833000.17	1456996.44	-396.38
Dead+Wind 330 deg - Service	60.36	-7.49	-12.97	-1452619.82	839674.26	-344.26

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-60.36	0.00	0.00	60.36	-0.00	0.000%
2	0.42	-72.43	-74.58	-0.42	72.43	74.57	0.003%
3	0.42	-54.32	-74.58	-0.42	54.32	74.58	0.002%
4	37.56	-72.43	-64.67	-37.56	72.43	64.67	0.000%
5	37.56	-54.32	-64.67	-37.56	54.32	64.67	0.000%
6	64.72	-72.43	-37.44	-64.72	72.43	37.44	0.000%
7	64.72	-54.32	-37.44	-64.72	54.32	37.44	0.000%
8	74.67	-72.43	-0.26	-74.66	72.43	0.26	0.003%
9	74.67	-54.32	-0.26	-74.66	54.32	0.26	0.002%
10	64.66	-72.43	36.93	-64.66	72.43	-36.93	0.000%
11	64.66	-54.32	36.93	-64.66	54.32	-36.93	0.000%
12	37.09	-72.43	64.53	-37.09	72.43	-64.53	0.000%
13	37.09	-54.32	64.53	-37.09	54.32	-64.53	0.000%
14	-0.26	-72.43	74.54	0.26	72.43	-74.54	0.003%
15	-0.26	-54.32	74.54	0.26	54.32	-74.54	0.002%
16	-37.44	-72.43	64.55	37.44	72.43	-64.55	0.000%
17	-37.44	-54.32	64.55	37.44	54.32	-64.55	0.000%
18	-64.58	-72.43	37.36	64.58	72.43	-37.36	0.000%
19	-64.58	-54.32	37.36	64.58	54.32	-37.36	0.000%
20	-74.50	-72.43	0.21	74.50	72.43	-0.21	0.003%
21	-74.50	-54.32	0.21	74.50	54.32	-0.21	0.002%
22	-64.55	-72.43	-37.04	64.55	72.43	37.04	0.000%
23	-64.55	-54.32	-37.04	64.55	54.32	37.04	0.000%
24	-37.22	-72.43	-64.46	37.22	72.43	64.46	0.000%
25	-37.22	-54.32	-64.46	37.22	54.32	64.46	0.000%
26	0.00	-129.25	0.00	-0.00	129.25	0.00	0.001%
27	0.05	-129.25	-17.89	-0.05	129.25	17.89	0.000%
28	8.98	-129.25	-15.50	-8.98	129.25	15.50	0.000%
29	15.52	-129.25	-8.96	-15.52	129.25	8.96	0.000%
30	17.91	-129.25	-0.03	-17.91	129.25	0.03	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
31	15.51	-129.25	8.90	-15.51	129.25	-8.90	0.000%
32	8.92	-129.25	15.49	-8.92	129.25	-15.48	0.000%
33	-0.03	-129.25	17.88	0.03	129.25	-17.88	0.001%
34	-8.97	-129.25	15.49	8.97	129.25	-15.49	0.000%
35	-15.50	-129.25	8.95	15.50	129.25	-8.95	0.000%
36	-17.89	-129.25	0.03	17.89	129.25	-0.03	0.001%
37	-15.49	-129.25	-8.91	15.49	129.25	8.91	0.000%
38	-8.94	-129.25	-15.48	8.94	129.25	15.48	0.000%
39	0.08	-60.36	-15.01	-0.08	60.36	15.01	0.003%
40	7.56	-60.36	-13.02	-7.56	60.36	13.02	0.003%
41	13.03	-60.36	-7.54	-13.03	60.36	7.54	0.003%
42	15.03	-60.36	-0.05	-15.03	60.36	0.05	0.003%
43	13.02	-60.36	7.43	-13.02	60.36	-7.43	0.003%
44	7.47	-60.36	12.99	-7.47	60.36	-12.99	0.003%
45	-0.05	-60.36	15.01	0.05	60.36	-15.00	0.003%
46	-7.54	-60.36	13.00	7.54	60.36	-12.99	0.003%
47	-13.00	-60.36	7.52	13.00	60.36	-7.52	0.003%
48	-15.00	-60.36	0.04	15.00	60.36	-0.04	0.003%
49	-12.99	-60.36	-7.46	12.99	60.36	7.46	0.003%
50	-7.49	-60.36	-12.98	7.49	60.36	12.97	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	12	0.00003624	0.00009493
3	Yes	12	0.00002433	0.00007326
4	Yes	15	0.00000001	0.00013692
5	Yes	15	0.00000001	0.00009463
6	Yes	15	0.00000001	0.00013543
7	Yes	15	0.00000001	0.00009357
8	Yes	12	0.00003621	0.00006447
9	Yes	12	0.00002430	0.00005182
10	Yes	15	0.00000001	0.00013375
11	Yes	15	0.00000001	0.00009257
12	Yes	15	0.00000001	0.00013073
13	Yes	15	0.00000001	0.00009039
14	Yes	12	0.00003625	0.00013494
15	Yes	12	0.00002433	0.00010307
16	Yes	15	0.00000001	0.00013514
17	Yes	15	0.00000001	0.00009340
18	Yes	15	0.00000001	0.00013588
19	Yes	15	0.00000001	0.00009396
20	Yes	12	0.00003624	0.00014765
21	Yes	12	0.00002433	0.00011281
22	Yes	15	0.00000001	0.00013052
23	Yes	15	0.00000001	0.00009026
24	Yes	15	0.00000001	0.00013471
25	Yes	15	0.00000001	0.00009324
26	Yes	6	0.00000001	0.00000614
27	Yes	13	0.00000001	0.00010135
28	Yes	14	0.00000001	0.00005843
29	Yes	14	0.00000001	0.00005815
30	Yes	13	0.00000001	0.00010190
31	Yes	14	0.00000001	0.00005843

32	Yes	14	0.00000001	0.00005790
33	Yes	13	0.00000001	0.00010199
34	Yes	14	0.00000001	0.00005873
35	Yes	14	0.00000001	0.00005889
36	Yes	13	0.00000001	0.00010184
37	Yes	14	0.00000001	0.00005743
38	Yes	14	0.00000001	0.00005815
39	Yes	11	0.00009827	0.00006571
40	Yes	11	0.00009809	0.00012767
41	Yes	11	0.00009809	0.00012184
42	Yes	11	0.00009827	0.00006668
43	Yes	11	0.00009810	0.00013060
44	Yes	11	0.00009810	0.00011375
45	Yes	11	0.00009828	0.00006670
46	Yes	11	0.00009810	0.00012484
47	Yes	11	0.00009810	0.00012984
48	Yes	11	0.00009828	0.00006750
49	Yes	11	0.00009810	0.00011309
50	Yes	11	0.00009810	0.00013211

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	154 - 134.83	24.258	41	1.3358	0.0022
L2	139.16 - 89.16	20.129	41	1.3126	0.0014
L3	94.83 - 44.54	9.269	41	0.9317	0.0005
L4	51.46 - 1	2.679	41	0.4857	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HP2-4.7	41	24.258	1.3358	0.0022	43749
155.00	Pipe Mount [PM 601-3]	41	24.258	1.3358	0.0022	43749
151.00	(2) 72"x6.5"x8" Panel	41	23.417	1.3337	0.0020	43749
141.00	EEI Pine Braches	41	20.634	1.3182	0.0015	16930
131.00	EEI Pine Braches	41	17.921	1.2735	0.0012	10984
121.00	EEI Pine Braches	41	15.317	1.1994	0.0010	8369
111.00	EEI Pine Braches	41	12.857	1.1048	0.0008	6760
101.00	EEI Pine Braches	41	10.574	0.9988	0.0006	5670
91.00	EEI Pine Braches	41	8.502	0.8904	0.0005	5100
81.00	EEI Pine Braches	41	6.665	0.7846	0.0004	4956

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	154 - 134.83	120.726	6	6.6654	0.0105
L2	139.16 - 89.16	100.200	6	6.5481	0.0079
L3	94.83 - 44.54	46.187	6	4.6474	0.0024
L4	51.46 - 1	13.357	6	2.4224	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HP2-4.7	6	120.726	6.6654	0.0105	9022
155.00	Pipe Mount [PM 601-3]	6	120.726	6.6654	0.0105	9022
151.00	(2) 72"x6.5"x8" Panel	6	116.548	6.6547	0.0099	9022
141.00	EEI Pine Braches	6	102.715	6.5763	0.0082	3489
131.00	EEI Pine Braches	6	89.226	6.3527	0.0066	2259
121.00	EEI Pine Braches	6	76.278	5.9827	0.0052	1718
111.00	EEI Pine Braches	6	64.040	5.5109	0.0039	1384
101.00	EEI Pine Braches	6	52.682	4.9823	0.0029	1158
91.00	EEI Pine Braches	6	42.372	4.4414	0.0024	1038
81.00	EEI Pine Braches	6	33.223	3.9136	0.0020	1005

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.1875	19.17	153.00	179.8	17.1175	-5.80	119.61	0.048
L2	134.83 - 89.16 (2)	TP40.91x28.5753x0.3125	50.00	153.00	131.9	38.8803	-24.37	504.57	0.048
L3	89.16 - 44.54 (3)	TP51.28x38.8862x0.5	50.29	153.00	105.4	77.8814	-44.87	1584.16	0.028
L4	44.54 - 1 (4)	TP61x48.5746x0.5625	50.46	153.00	85.6	107.9040	-72.36	3304.30	0.022

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.1875	119235.00	652442.50	0.183	0.00	652442.50	0.000
L2	134.83 - 89.16 (2)	TP40.91x28.5753x0.3125	1866016.67	2179983.33	0.856	0.00	2179983.33	0.000

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L3	89.16 - 44.54 (3)	TP51.28x38.8862x0.5	4740400.00	5825591.33	0.814	0.00	5825591.33	0.000
L4	44.54 - 1 (4)	TP61x48.5746x0.5625	8422416.67	9764666.67	0.863	0.00	9764666.67	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	154 - 134.83 (1)	TP30.03x25.25x0.1875	18.20	550.82	0.033	0.27	1306483.33	0.000
L2	134.83 - 89.16 (2)	TP40.91x28.5753x0.3125	56.02	1352.41	0.041	1150.09	4365300.00	0.000
L3	89.16 - 44.54 (3)	TP51.28x38.8862x0.5	70.60	2893.10	0.024	1145.24	11665416.00	0.000
L4	44.54 - 1 (4)	TP61x48.5746x0.5625	74.85	3934.15	0.019	518.65	19553166.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	154 - 134.83 (1)	0.048	0.183	0.000	0.033	0.000	0.232 ✔	1.000	4.8.2 ✔
L2	134.83 - 89.16 (2)	0.048	0.856	0.000	0.041	0.000	0.906 ✔	1.000	4.8.2 ✔
L3	89.16 - 44.54 (3)	0.028	0.814	0.000	0.024	0.000	0.843 ✔	1.000	4.8.2 ✔
L4	44.54 - 1 (4)	0.022	0.863	0.000	0.019	0.000	0.885 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	154 - 134.83	Pole	TP30.03x25.25x0.1875	1	-5.80	119.61	23.2	Pass
L2	134.83 - 89.16	Pole	TP40.91x28.5753x0.3125	2	-24.37	504.57	90.6	Pass
L3	89.16 - 44.54	Pole	TP51.28x38.8862x0.5	3	-44.87	1584.16	84.3	Pass
L4	44.54 - 1	Pole	TP61x48.5746x0.5625	4	-72.36	3304.30	88.5	Pass
							Summary	
						Pole (L2)	90.6	Pass
						RATING =	**90.6**	**Pass**

Exhibit E

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: CTNH362B

NH362/Boardman_MP
33 Boardman Road
New Milford, CT 06776

January 22, 2017

EBI Project Number: 6217000227

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	11.87 %

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

EBI Consulting
environmental | engineering | due diligence

January 22, 2017

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

Emissions Analysis for Site: **CTNH362B – NH362/Boardman_MP**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **33 Boardman Road, New Milford, 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) 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 **33 Boardman Road, New Milford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

3) 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

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 1.12 dB of additional cable loss for all ground mounted 700 MHz Channels and 1.95 dB of additional cable loss for all ground mounted 1900 MHz channels has been added to the calculations. This is based on manufacturers Specifications for 160 feet of 1-1/4” coax cable on each path.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a 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 was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXV18-209014-C** for 1900 MHz (PCS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APXV18-209014-C** has a maximum gain of **14.4 dBd** at its main lobe at 1900 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **140 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXV18-209014-C	Make / Model:	RFS APXV18-209014-C	Make / Model:	RFS APXV18-209014-C
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	140	Height (AGL):	140	Height (AGL):	140
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	3,164.26	ERP (W):	3,164.26	ERP (W):	3,164.26
Antenna A1 MPE%	0.63	Antenna B1 MPE%	0.63	Antenna C1 MPE%	0.63
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	140	Height (AGL):	140	Height (AGL):	140
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	668.53	ERP (W):	668.53	ERP (W):	668.53
Antenna A2 MPE%	0.29	Antenna B2 MPE%	0.29	Antenna C2 MPE%	0.29

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**0.92 %**
Sprint	0.54 %
AT&T	6.96 %
Verizon Wireless	3.45 %
Site Total MPE %:	**11.87 %**

T-Mobile Sector A Total:	0.92 %
T-Mobile Sector B Total:	0.92 %
T-Mobile Sector C Total:	0.92 %
Site Total:	11.87 %

T-Mobile _Max Values 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 - 1950 MHz LTE	2	1,054.75	140	4.22	PCS - 1950 MHz	1000	0.42%
T-Mobile PCS - 1950 MHz GSM	2	527.38	140	2.11	PCS - 1950 MHz	1000	0.21%
T-Mobile 700 MHz LTE	1	668.53	140	1.34	700 MHz	467	0.29%
						Total:	**0.92%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	0.92 %
Sector B:	0.92 %
Sector C:	0.92 %
T-Mobile Per Sector Maximum:	0.92 %
Site Total:	11.87 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.87%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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