Transcend Wireless

10 Industrial Avenue,
Suite 3
Mahwah, NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

August 20, 2020

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

Notice of Exempt Modification
69 Wheeler Street, New Haven, CT
Latitude: 41.29596944
Longitude: -72.897925
T-Mobile site: CTNH039A / Anchor

T-Mobile currently maintains (6) antennas at the 98 foot level of the existing 98 -foot monopole tower at 69 Wheeler Street in New Haven CT. The monopole is owned by Landmark Dividend LLC and the property is owned by Whitney Realty Enterprises. T-Mobile now intends to replace (3) 1900 MHz / 2100 MHz antennas and add (3) 2500 MHz Antennas at the 98 foot level of the tower.

PLANNED MODIFICATIONS

Remove:
12 1-5/8" coax

Remove and Replace:
Antennas:
3 Andrew SBNH-1D65C-SR (REMOVE) - APXVAARR24_43-U-NA20 (REPLACE) 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
RRUs:
3 Ericsson RRUS-11 (REMOVE) - Ericsson 4449 B71 +B85 RRU (REPLACE)

Existing to Remain:
3 Ericsson Air 32 KRD901145-1_B66_B2A - 1900 MHz / 2100 MHz
3 TMAs
6 Coax Cables:

Install New:
3 Air 6449 B41 - 2500 MHz Antennas
3 Ericsson 4415 B25 RRU
2 6x12 hybrid
3 Commscope SDX1926Q-43 diplexers

Ground
Remove: 1 RBS3106 Cabinet, add 1 6160 enclosure, and 1 Battery cabinet

This online Connecticut Siting Council database does not include a docket or petition number for the approval of this structure, but does include the approval of Petition 753, T-Mobile's request for an extension of ten feet on the existing facility. T-Mobile's proposed modifications are consistent with that approval and a copy is attached.

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 Hon. Justin Elicker, Mayor, Aicha Woods, Executive Director City Planning, and the tower and property owner.

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

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

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

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

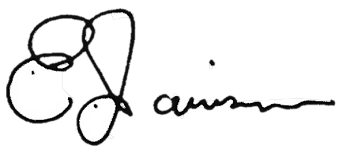
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

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

For the foregoing reasons, 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,



Elizabeth Jamieson
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
860-605-7808
EJamieson@TranscendWireless.com

cc:
Hon. Justin Elicker, Mayor
Aicha Woods, Executive Director City Planning
Landmark Dividend, LLC as Tower owner
Whitney Realty Enterprises LLC, as Land Owner

Exhibit A

Original Facility Approval

PETITION NO. 753 - Omnipoint Communications, Inc. (T-Mobile) petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction of a ten foot (10') extension to an existing wireless communication monopole located at 69 Wheeler Street, **New Haven**, Connecticut. **Staff Report.** **Approved 1/25/06.**

Petition No. 753
Omnipoint/T-Mobile
New Haven, Connecticut
Staff Report
January 13, 2006

T-Mobile is seeking approval to add a ten-foot extension onto an existing 88-foot tall monopole located at 69 Wheeler Street in New Haven.

Council member Gerry Heffernan and staff member David Martin conducted the field review for this petition. Christine Farrell and Bill Abbott represented T-Mobile.

The existing monopole is located on the side of an industrial building and has three carriers at centerline heights of 88, 78, and 68 feet. T-Mobile wants to install antennas on the pole to cover an existing gap along I-95 and the Q bridge. T-Mobile would need to add ten feet onto the existing pole to enable its antennas to achieve its coverage objectives. T-Mobile would install six antennas on a low-profile platform. With T-Mobile's antennas installed at the top of the ten-foot extension, the antennas would extend to an overall height of 101 feet AGL.

The pole's base plate would need to be reinforced to support the proposed extension. Engineering plans for the required reinforcement were submitted as part of the petition. T-Mobile's equipment and battery cabinets would fit inside an existing fenced compound.

Staff calculates that the power density of all four carriers on this monopole would equal 0.3802 mW/cm^2 or 55.12% of the FCC standard for Maximum Permissible Exposure.

The site is located in a heavily industrialized area of New Haven, two blocks north of I-95 and just east of the Quinnnipiac River. The addition of a ten-foot extension with antennas attached should have little discernable impact on the surrounding neighborhood.

Exhibit B

Property card

69 WHEELER ST

Location	69 WHEELER ST	**Mblu**	077/ 0975/ 00200/ /
Acct#	077 0975 00200	**Owner**	WHITNEY REALTY ENTERPRISES LLC
Assessment	$269,523	**Appraisal**	$385,033
PID	3459	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$254,933	$130,100	$385,033

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$178,453	$91,070	$269,523

Owner of Record

Owner	WHITNEY REALTY ENTERPRISES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	51 LONGHINI LANE NEW HAVEN, CT 06519	**Book & Page**	8954/ 126
		Sale Date	03/01/2013
		Instrument	3

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
WHITNEY REALTY ENTERPRISES LLC	$0		8954/ 126	3	03/01/2013
ELMER LAYDON SPRAY TRUST	$0		8826/ 20	25	05/04/2012
LAYDON ELMER F & WILLIAM M	$0		2868/ 345		09/11/1980

Building Information

Building 1 : Section 1

Year Built:	1920
Living Area:	8,816
Replacement Cost:	$444,431
Building Percent Good:	60

Building Photo

Building Photo
(http://images.vgsi.com/photos/NewHavenCTPhotos//\00\05\09/

Building Layout

Replacement Cost
Less Depreciation: $266,700

Building Attributes	
Field	**Description**
STYLE	Warehouse
MODEL	Ind/Lg Com
Grade	Above Average
Stories:	2
Occupancy	1
Exterior Wall 1	Brick
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil/Gas
Heating Type	FA/HW/ST
AC Type	None
Bldg Use	IND WHSES MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
NBHD Code	
1st Floor Use:	4010
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & MIN WL
Rooms/Prtns	AVERAGE
Wall Height	14
% Comn Wall	

(http://images.vgsi.com/photos/NewHavenCTPhotos//Sketches/3

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	7,656	7,656
AOF	Office	1,160	1,160
		8,816	8,816

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
MEZ1	MEZZANINE-UNF	250 S.F.	$1,900	1

Land

Land Use

Use Code	4010
Description	IND WHSES MDL-96
Zone	IH
Neighborhood	IND5
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.3
Frontage	1
Depth	0
Assessed Value	$91,070
Appraised Value	$130,100

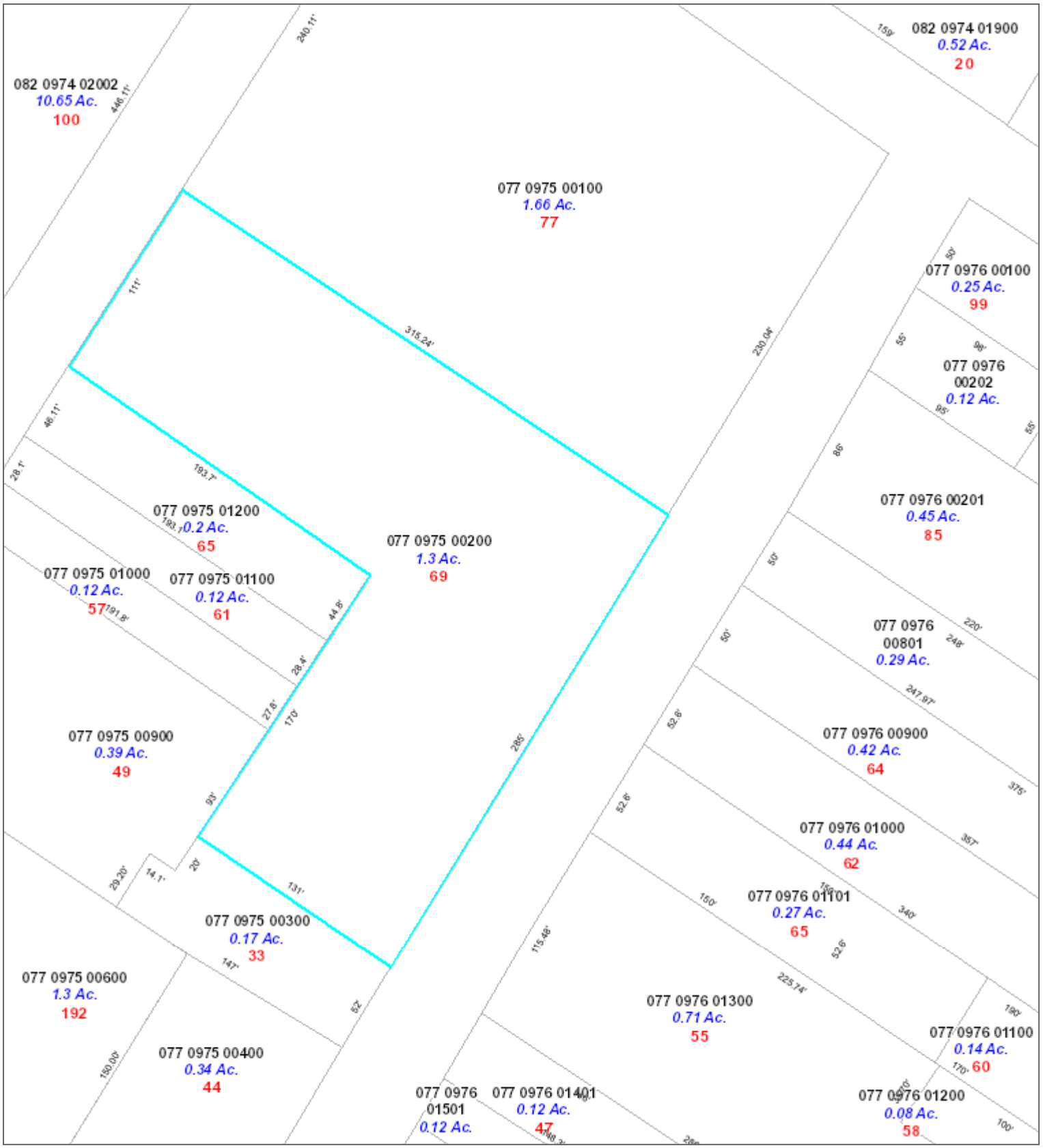
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAVING-ASPHALT			11760 S.F.	$24,100	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$292,700	$130,100	$422,800
2016	$540,200	$130,100	$670,300
2015	$340,800	$115,200	$456,000

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$204,890	$91,070	$295,960
2016	$378,140	$91,070	$469,210
2015	$238,560	$80,640	$319,200



Legend

New Haven Parcels

MY MAP

This map is for reference purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The City of New Haven assumes no legal responsibility for the information contained herein.

Date: 8/19/2020

0 0.0075 0.015 0.03 mi

Exhibit C

Construction Drawings

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

NH039/LAYDON CONSTRUC

SITE ID: CTNH039A

69 WHEELER STREET

NEW HAVEN, CT 06512

T-MOBILE RF CONFIGURATION

67D5997DB_2XAIR+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTON, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

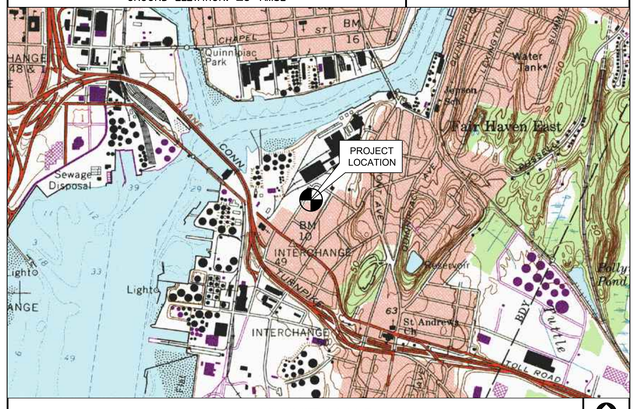
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 69 WHEELER STREET
NEW HAVEN, CT 06512

1.	GO NORTH ON GRIFFIN RD TOWARD HARTMAN RD.	0.30 MI.
2.	TURN RIGHT ONTO DAY HILL RD.	3.64 MI.
3.	MERGE ONTO I-91 S TOWARD HARTFORD	45.7 MI.
4.	MERGE ONTO I-95 N VIA THE EXIT ON THE LEFT TOWARD NEW LONDON	1.40 MI.
5.	TAKE EXIT 50 TOWARD LIGHTHOUSE PT/WOODWARD AVE.	0.22 MI.
6.	TURN SLIGHT RIGHT	0.30 MI.
7.	TAKE THE 2ND RIGHT ONTO STILES ST.	0.17 MI.
8.	STILES ST BECOMES WHEELER ST.	0.14 MI.
9.	69 WHEELER ST, NEW HAVEN CT, 06512 IS ON THE RIGHT	

SITE COORDINATES: LATITUDE: 41° 17' 45.60" N
LONGITUDE: 72° 53' 52.35" W
GROUND ELEVATION: ±5' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. REMOVE RBS3106 CABINET
2. INSTALL (1) ENCLOSURE 6160
3. INSTALL (1) BATTERY CABINET B160
4. ADD (1) iXRe ROUTER
5. ADD (1) BB6630 FOR L2500
6. ADD (1) BB6648 FOR N2500
7. ADD (1) BB6630 IN RBS6102
8. ADD (1) EMERSON CABINET WITH H FRAME
9. REMOVE (12) COAX LINES FOR NEW TOTAL OF (6) COAXIAL LINES
10. ADD (2) 6X12 HYBRID CABLES
11. INSTALL (3) AIR6449 B41 ANTENNAS
12. INSTALL (3) COMMSCOPE DIPLEXERS
13. INSTALL (3) RADIO 4415 B25
14. INSTALL (3) RADIO 4449 B71+B85
15. INSTALL (3) VERTICAL PIPE MASTS
16. INSTALL (3) DUAL SWIVEL MOUNT KITS

PROJECT INFORMATION

SITE NAME:	NH039/LAYDON CONSTRUC
SITE ID:	CTNH039A
SITE ADDRESS:	69 WHEELER STREET NEW HAVEN, CT 06512
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 17' 45.60" N LONGITUDE: 72° 53' 52.35" W GROUND ELEVATION: ±5' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	08/12/20	ASC	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile — Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
NH039/LAYDON CONSTRUC
SITE ID: CTNH039A
69 WHEELER STREET
NEW HAVEN, CT 06512

DATE: 07/21/20
SCALE: AS NOTED
JOB NO. 20074.60

TITLE SHEET

T-1

Sheet No. 1 of 8

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY III (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 136 MPH (Vasd) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

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18. THE CONTRACTOR SHALL CONTACT "DIG SAFE" (DIAL 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
20. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
21. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

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NEW HAVEN, CT 06512

DATE: 07/21/20
SCALE: AS NOTED
JOB NO. 20074.60

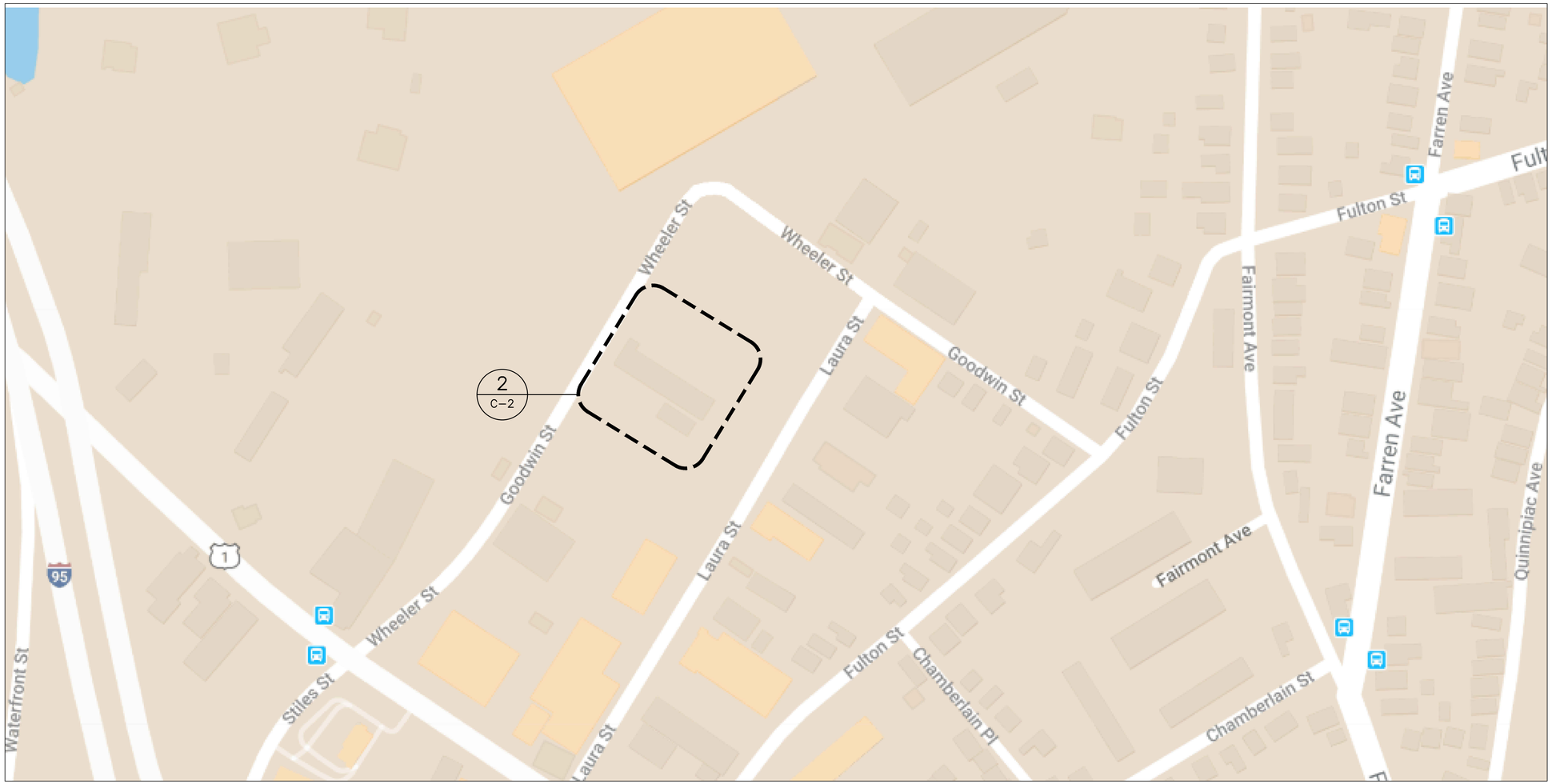
GENERAL NOTES AND SPECIFICATIONS

N-1

NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) DIPLEXER (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	98'	50°				(2) 6X12 HYBRID CABLE (±100FT)
A2	PROPOSED	RFS APXVAALL24_43-U-NA20	95.9 x 24.0 x 8.5	98'	50°	(P) RRU 4449 B71+B85, (P) RRU 4415 B25	(P) COMMSCOPE SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
A3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	98'	50°				
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	98'	160°				
B2	PROPOSED	RFS APXVAALL24_43-U-NA20	95.9 x 24.0 x 8.5	98'	160°	(P) RRU 4449 B71+B85, (P) RRU 4415 B25	(P) COMMSCOPE SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
B3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	98'	160°				
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	98'	280°				
C2	PROPOSED	RFS APXVAALL24_43-U-NA20	95.9 x 24.0 x 8.5	98'	280°	(P) RRU 4449 B71+B85, (P) RRU 4415 B25	(P) COMMSCOPE SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
C3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	98'	280°				



1 C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

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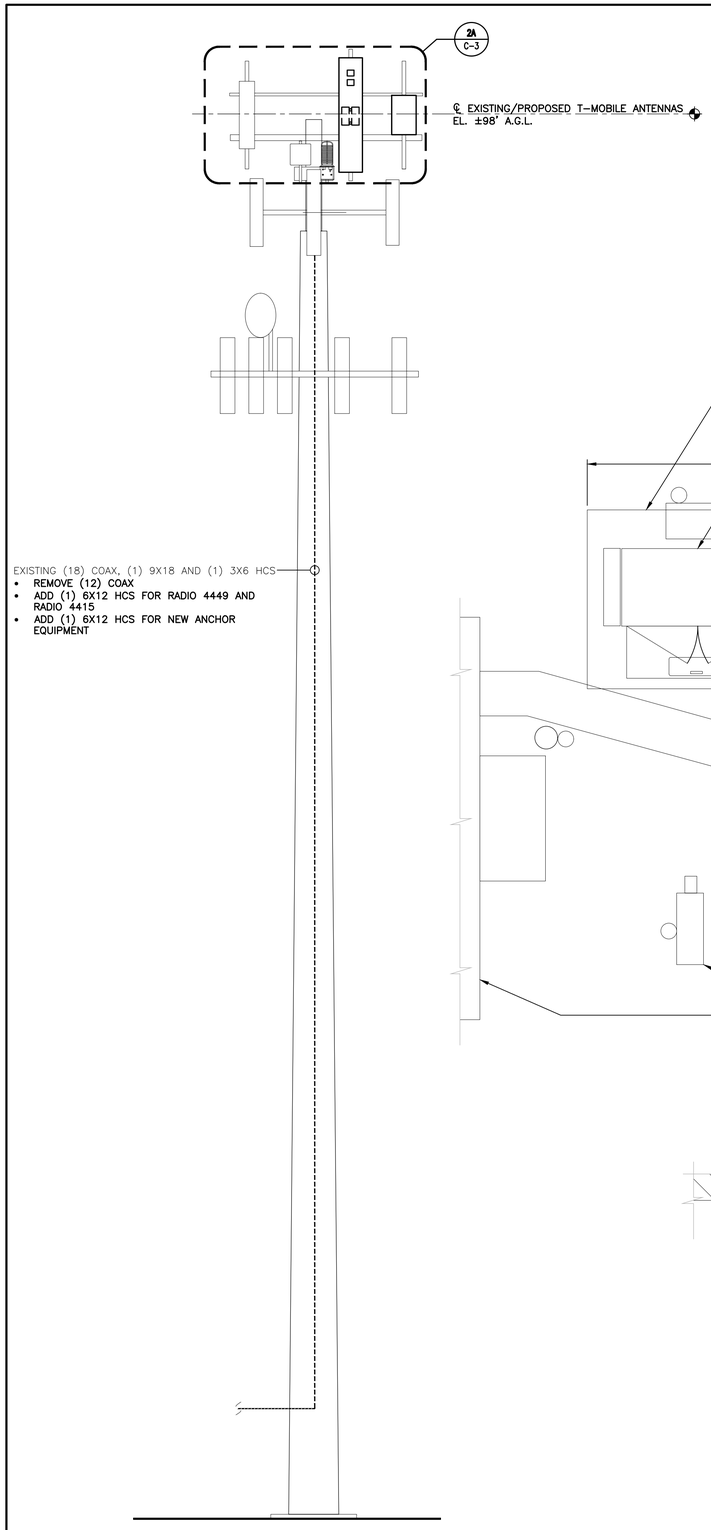
SITE LOCATION PLAN

C-1

Sheet No. 3 of 8



STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.60) DATED 07/30/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

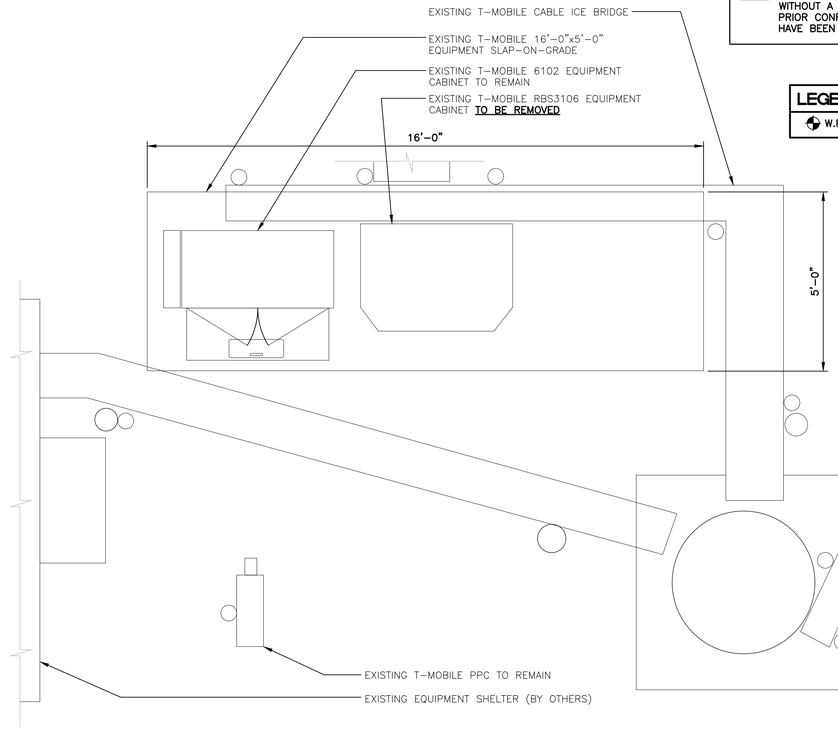
A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.60) DATED 07/31/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

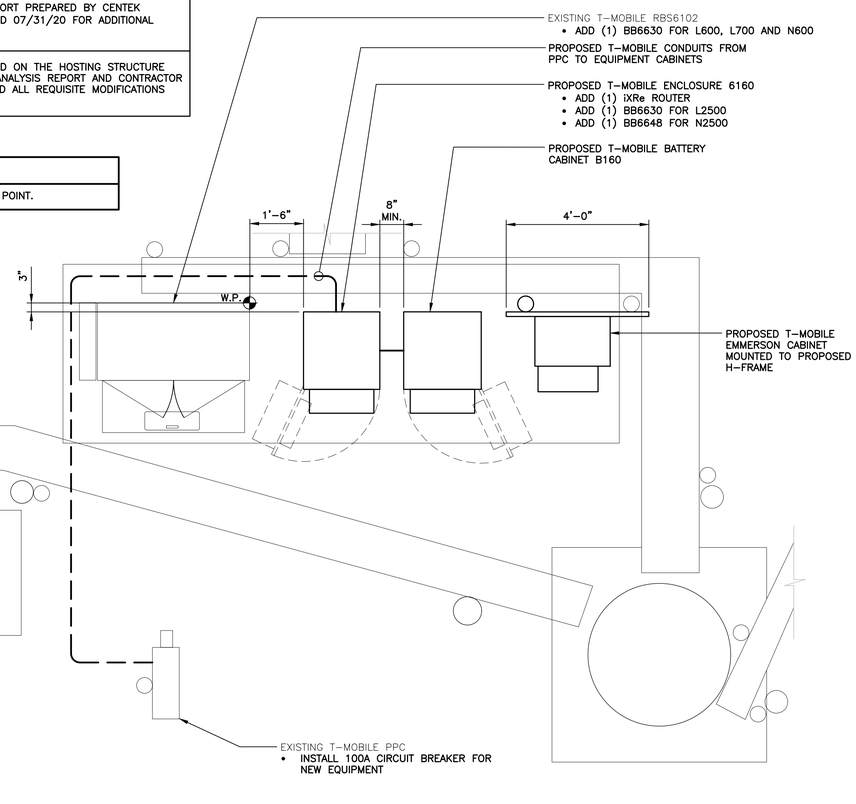
NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

LEGEND

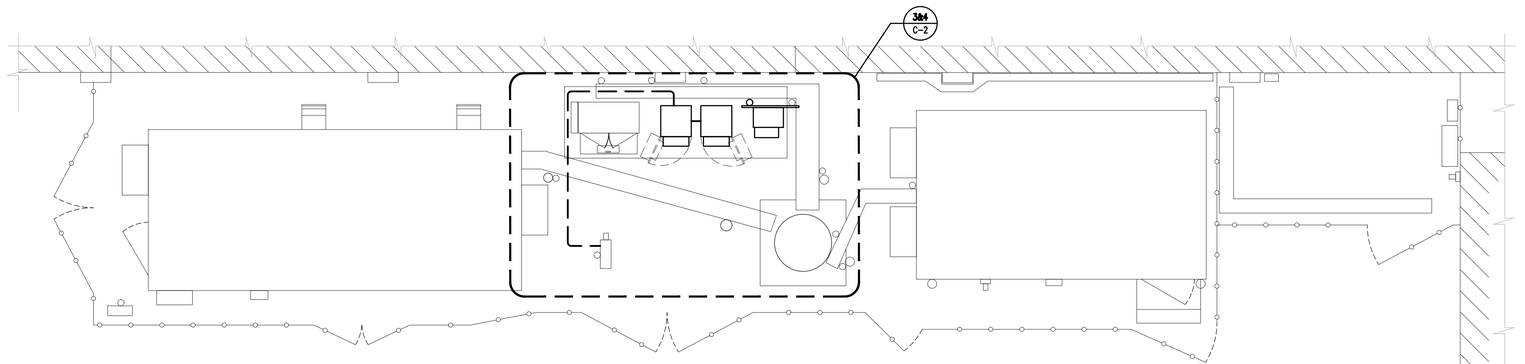
W.P. DENOTES WORKING POINT.



3 C-2 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'
APPROXIMATE NORTH



4 C-2 **PROPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'
APPROXIMATE NORTH



1 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 5'

GRAPHIC SCALE
5 0 2.5 5 10 20
1" = 5'-0"

2 C-2 **PATIAL COMPOUND PLAN - PROPOSED**
SCALE: 1" = 5'
APPROXIMATE NORTH

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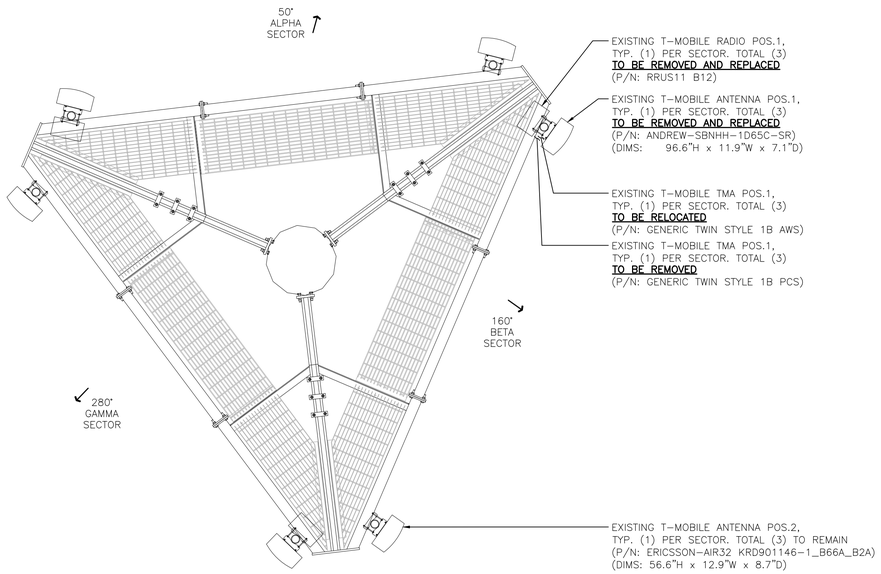
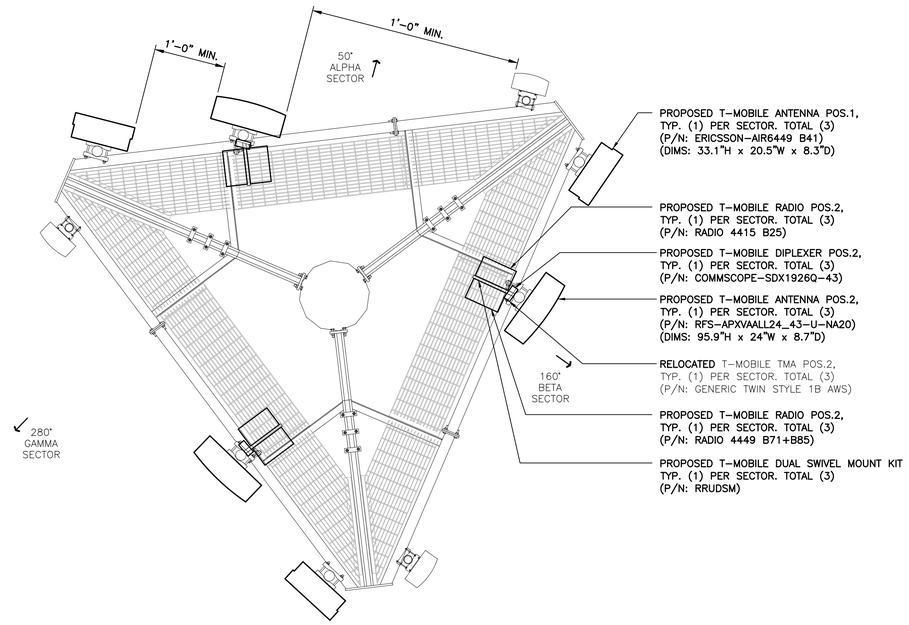
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

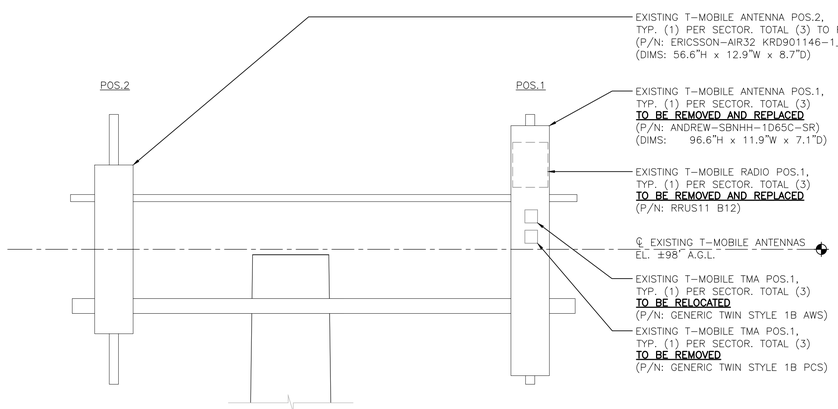
Sheet No. 4 of 8



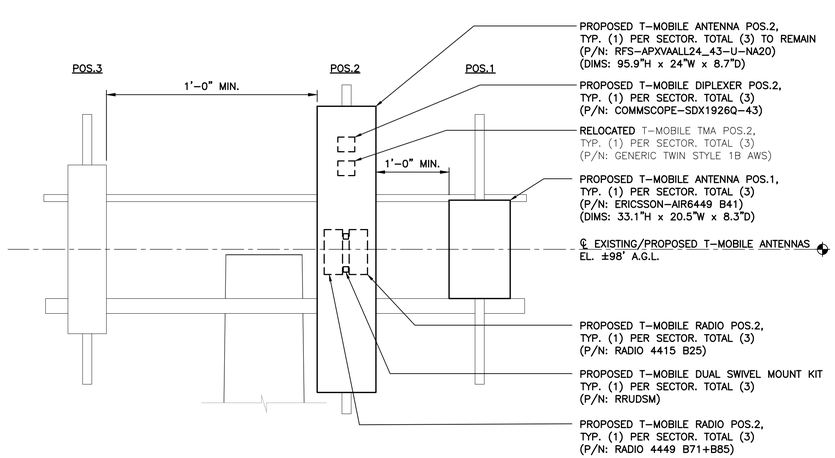
1 / C-3 **ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'
APPROXIMATE NORTH



2 / C-3 **ANTENNA PLAN - PROPOSED**
SCALE: 1/2" = 1'
APPROXIMATE NORTH



1A / C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A / C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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ANTENNA PLANS

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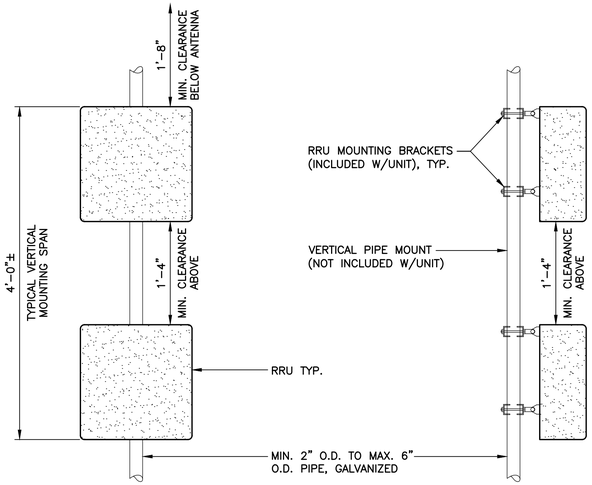


FRONT ELEVATION SIDE ELEVATION

NOTES:

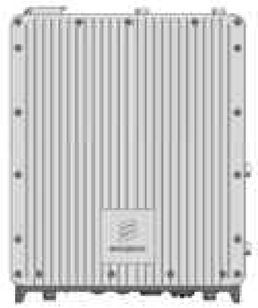
1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / C–4 **TYPICAL RRU MOUNTING DETAIL**
SCALE: NOT TO SCALE

SIDE FRONT FRONT

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43–U–NA20	95.9"L x 24.0"W x 8.5"D	±172 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C–4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE



FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B25	14.9"L x 13.2"W x 5.4"D	±46 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4449 B71+B85	13.2"L x 14.9"W x 9.3"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

3 / C–4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

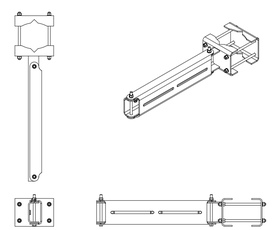
4 / C–4 **ENCLOSURE 6160 (OUTDOOR)**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 / C–4 **BATTERY CABINET DETAIL**
NOT TO SCALE

DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: SDX1926Q–43(E14F05P86)	4.2"L x 7.0"W x 3.0"D	–
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

6 / C–4 **PROPOSED DIPLEXER DETAIL**
SCALE: NOT TO SCALE



RRU DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

7 / C–4 **RRH DUAL SWIVEL MOUNT DETAIL**
SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

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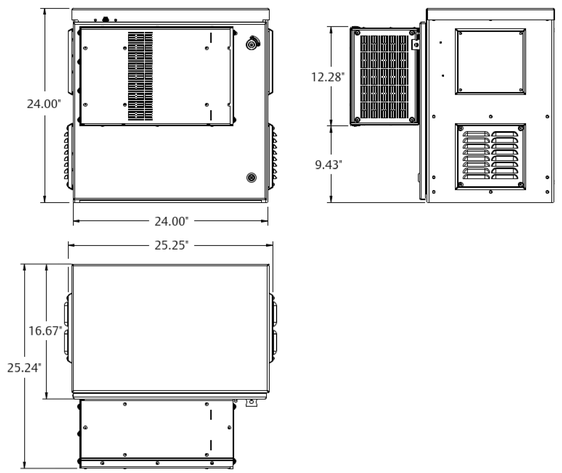
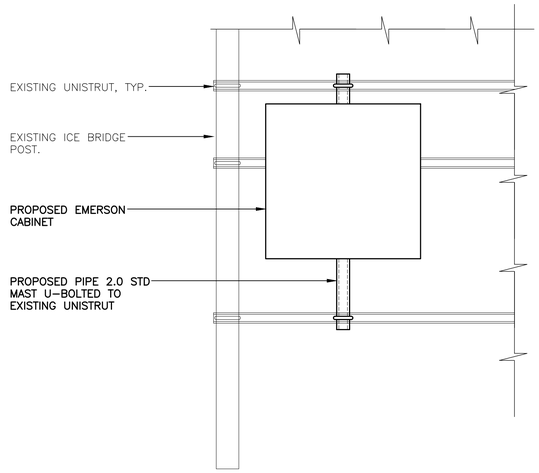
Sheet No. 6 of 8



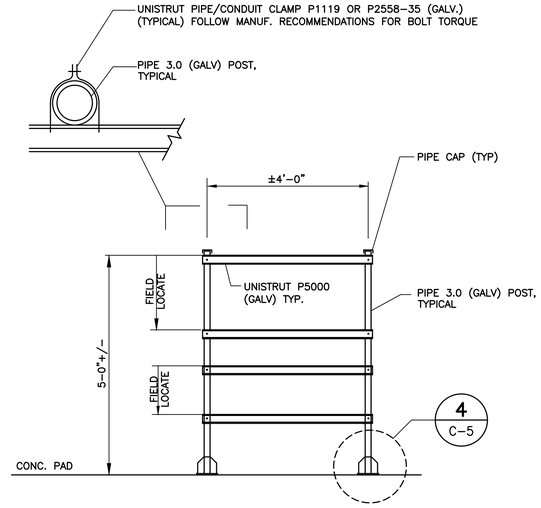
EMERSON CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: COMPACT 2416	24"L x 24"W x 16"D	±64 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

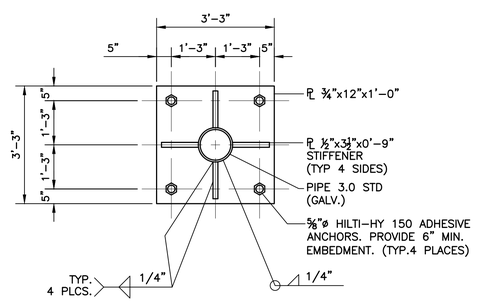
1 / C–5 **PROPOSED EMERSON CABINET**
SCALE: NOT TO SCALE

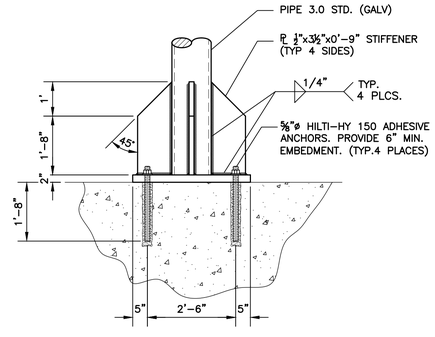


2 / C–5 **TYPICAL EMERSON CABINET MOUNTING DETAIL**
SCALE: NOT TO SCALE



3 / C–5 **EQUIPMENT MOUNTING FRAME DETAIL**
SCALE: NOT TO SCALE





4 / C–5 **FRAME TO CONCRETE CONNECTION DETAIL**
SCALE: NOT TO SCALE

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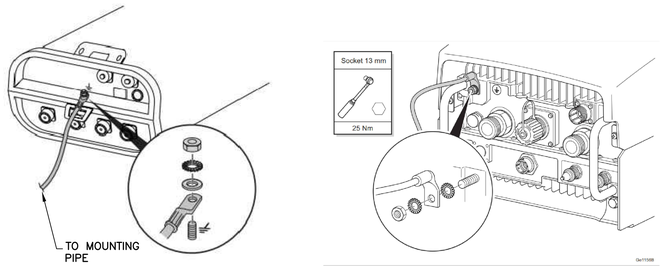
TYPICAL EQUIPMENT DETAILS

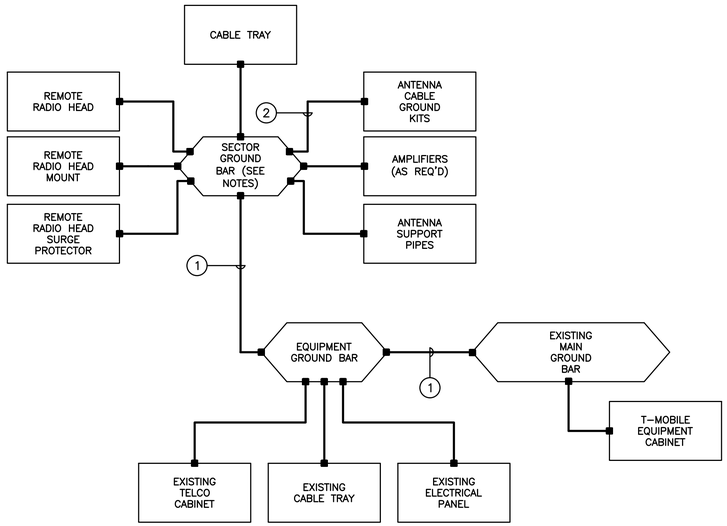
C-5

Sheet No. 7 of 8



1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

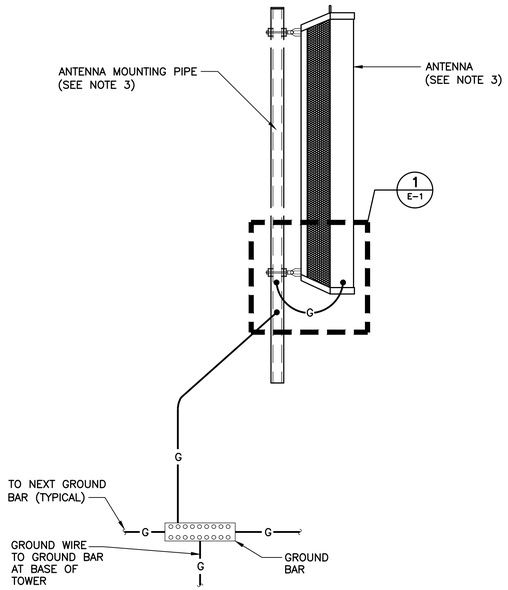
1. #2 AWG
2. #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE



NOTES:

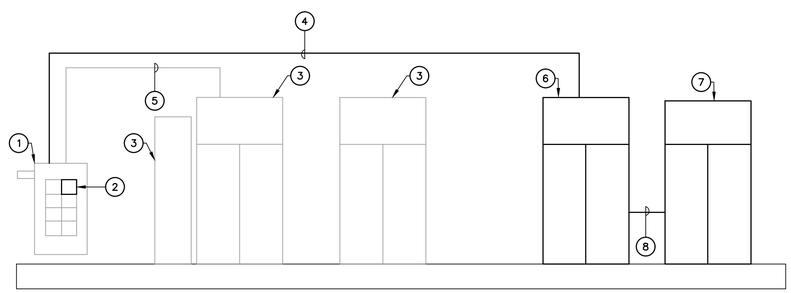
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

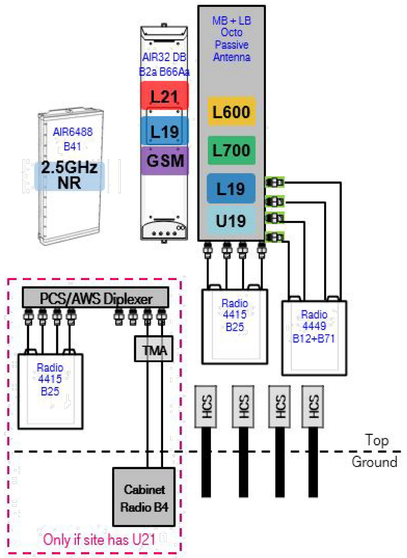
RISER DIAGRAM NOTES

1. EXISTING 200A, PPC CABINET TO REMAIN.
2. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
3. EXISTING CABINETS TO REMAIN.
4. (3) #1 AWG, (1) #8 AWG GROUND, 1–1/4" CONDUIT.
5. EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
6. NEW T–MOBILE EQUIPMENT CABINET
7. NEW T–MOBILE BATTERY CABINET
8. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE



3 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

NH039/LAYDON CONSTRUC

SITE ID: CTNH039A

69 WHEELER STREET

NEW HAVEN, CT 06512

DATE:	07/21/20
SCALE:	AS NOTED
JOB NO.	20074.60

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 8 of 8

Exhibit D

Structural Analysis Report

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

98-ft Existing EEI Monopole

Proposed T-Mobile
Antenna Upgrade

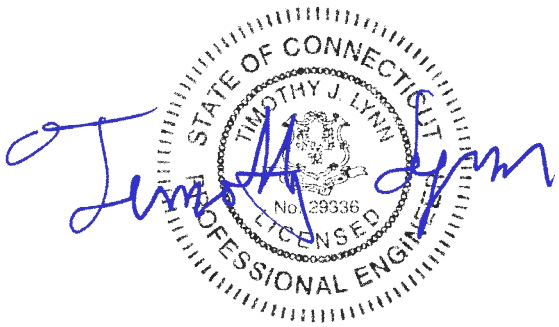
T-Mobile Site Ref: CTNH039A

69 Wheeler Street
New Haven, CT

Centek Project No. 20074.60

Date: July 31, 2020

Max Stress Ratio = 93.7%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing monopole (tower) located in New Haven, CT.

The host tower is a 88-ft tall, two-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Inc., job no; 5052, dated May 26, 1999 with a 10-ft extension originally designed and manufactured by Engineered Endeavors Inc., job no; 14368, dated August 1, 2006. The tower geometry, structure member sizes and foundation system information were obtained from the original EEI design documents. This analysis takes into account monopole reinforcements designed by Structural Components job no. 120229, dated April 26, 2012 and reinforcements designed by Bennett & Pless job no. 16709.003, dated January 17, 2017.

Antenna and appurtenance information were obtained from a previous structural report prepared by Malouf job no; CT06121M-20V0 dated June 9 2020, visual verification from grade by Centek personnel on July 7, 2020 and a T-Mobile RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The bottom two vertical tower sections are slip joint connected and the top vertical tower section is flange connected. The diameter of the pole (flat-flat) is 12.75-in at the top and 34.00-in at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- AT&T (Existing):
  Antennas: Two (2) Andrew SBNHH-1D65A panel antennas, one (1) CCI OPA65R-BU4D panel antenna, two (2) CCI OPA65R-BU6D panel antennas, one (1) Quintel QS46512-2 panel antennas, two (2) Qunitel QS66512-2 panel antennas, four (4) CCI HPA-65R-BUU-H6 panel antennas, twenty-one (21) remote radio heads and three (3) surge arrestors mounted on three (3) V-frames with a RAD center elevation of 91-ft above grade.
  Cables: Six (6) 7/8" ∅ coax cables, two (2) fiber cables and eight (8) DC cables running on the inside of the existing tower.
- SPRINT/CLEARWIRE (Existing):
  Antennas: Three (3) Nokia AAHC panel antennas, three (3) Andrew NNVV-65B-R4 panel antennas, three (3) LLPX310R panel antennas, twelve (12) remote radio heads, three (3) ODUs and two (2) microwave dishes mounted on three (3) T-Arms with a RAD center elevation of 80-ft above grade.
  Cables: Six (6) 7/8" ∅ coax cables, three (3) 1-5/8" ∅ fiber cables and one (1) 2" ∅ conduit running on the inside of the existing tower.

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) Ericsson AIR32 panel antennas and three (3) TMAs mounted on one (1) platform w/ handrail with a RAD center elevation of 98-ft above existing grade.
  Cables: Six (6) 1-5/8" ∅ coax cables and one (1) 9x18 fiber cable running on the inside of the existing tower.
- **T-MOBILE (Existing to Remove):**
  Antennas: Three (3) Andrew SBNHH-1D65C panel antennas, three (3) TMAs and three (3) Ericsson RRUS-11 remote radio units mounted on one (1) platform w/ handrail with a RAD center elevation of 98-ft above existing grade.
  Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on one (1) platform w/ handrail with a RAD center elevation of 98-ft above existing grade.
  Coax Cables: Two (2) 6x12 fiber cables running on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	New Haven; v = 97 mph (3 second gust)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **93.7%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L6)	5'-20.00'	93.7%	**PASS**

Foundation and Anchors

The existing foundation consists of a 6-ft square x 2.0-ft long reinforced concrete pier on a 26-ft x 18-ft x 3.25-ft thick reinforced concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from a previous structural report prepared by All-Points Technology Corp. job no. CT198740 dated December 10, 2008. The base of the tower is connected to the foundation by means of (6) 2.25"∅, ASTM A615-75 anchor bolts and five (5) additional 2.75"∅ anchor bolts.

- The tower base reactions developed from the governing Load Case were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	34 kips
	Compression	33 kips
	Moment	2479 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinforced Concrete Pad w/ Caisson	OTM[(2)]	1.0	1.06	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment.

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Shear	87.6%	**PASS**
Base Plate	Bending	75.1%	**PASS**

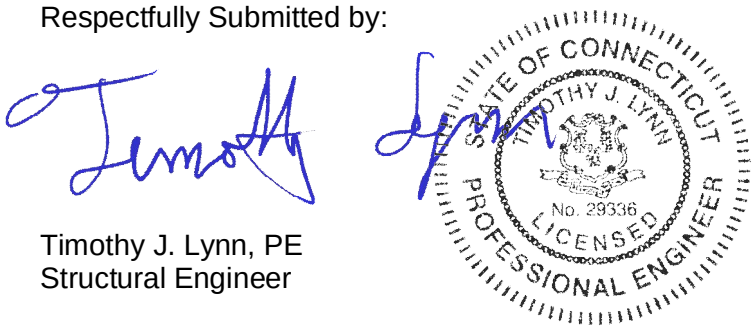
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

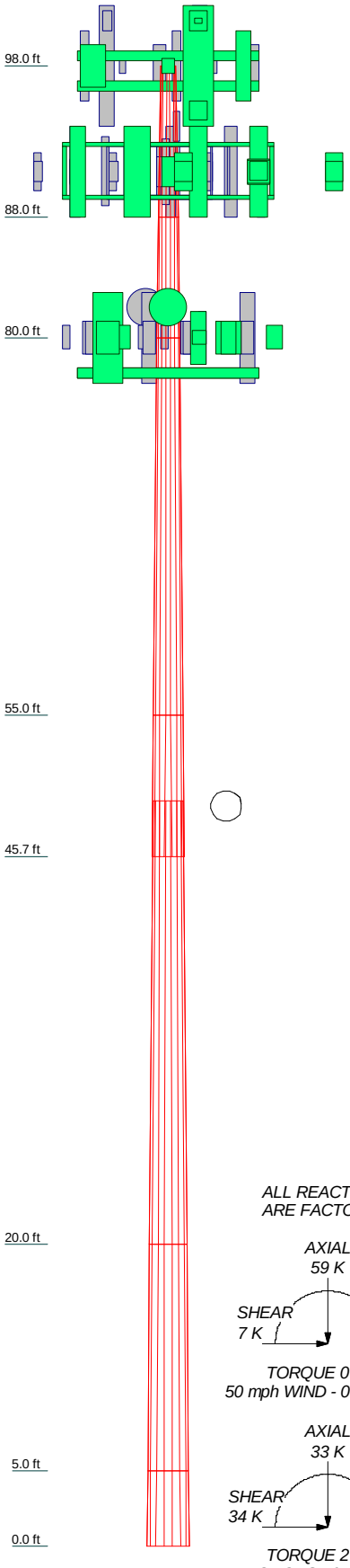
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

TnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, TnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

TnxTower Features:

- TnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- TnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	10.000	18	0.188		12.750	16.500		0.3
2	8.000	18	0.188		16.500	18.140		0.3
3	25.000	18	0.495		18.140	23.250		2.7
4	9.320	18	0.588	3.640	23.250	25.150	A572-65	1.4
5	29.320	18	0.600		23.232	29.910		4.9
6	15.000	18	0.490		29.910	32.980		2.5
7	5.000	18	0.500		32.980	34.000		0.9
								12.9



ALL REACTIONS ARE FACTORED

AXIAL 59 K

SHEAR 7 K

MOMENT 584 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL 33 K

SHEAR 34 K

MOMENT 2479 kip-ft

TORQUE 2 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
SitePro 12' Handrail Kit HRK12 (T-Mobile - Existing)	99
APXVAALL24-43 (T-Mobile - Proposed)	98
AIR6449 (T-Mobile - Proposed)	98
AIR32 (T-Mobile - Existing)	98
APXVAALL24-43 (T-Mobile - Proposed)	98
AIR6449 (T-Mobile - Proposed)	98
AIR32 (T-Mobile - Existing)	98
APXVAALL24-43 (T-Mobile - Proposed)	98
AIR6449 (T-Mobile - Proposed)	98
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98
ATMAA1412D-1A20 TMA (T-Mobile - Existing)	98
4415 B25 (T-Mobile - Proposed)	98
4415 B25 (T-Mobile - Proposed)	98
4415 B25 (T-Mobile - Proposed)	98
4449 B12,B71 (T-Mobile - Proposed)	98
4449 B12,B71 (T-Mobile - Proposed)	98
4449 B12,B71 (T-Mobile - Proposed)	98
SDX1926Q-43 (T-Mobile - Proposed)	98
SDX1926Q-43 (T-Mobile - Proposed)	98
SDX1926Q-43 (T-Mobile - Proposed)	98
AIR32 (T-Mobile - Existing)	98
EEI 12-ft Low Profile Platform (T-Mobile - Existing)	97
DC6-48-60-18-8F Surge Arrestor (ATI)	94
SBNHH-1D65A (ATI)	91
OPA65R-BU4D (ATI)	91
QS46512-2 (ATI)	91
(2) RRUS-32 (ATI)	91
RRUS-E2 (ATI)	91
(2) 4478 B14 (ATI)	91
RRUS-11 (ATI)	91
4426 B66 (ATI)	91
HPA-65R-BUU-H6 (ATI)	91
SBNHH-1D65A (ATI)	91
OPA65R-BU6D (ATI)	91
QS66512-2 (ATI)	91

TYPE	ELEVATION
(2) RRUS-32 (ATI)	91
RRUS-E2 (ATI)	91
(2) 4478 B14 (ATI)	91
RRUS-11 (ATI)	91
4426 B66 (ATI)	91
HPA-65R-BUU-H6 (ATI)	91
HPA-65R-BUU-H6 (ATI)	91
HPA-65R-BUU-H6 (ATI)	91
OPA65R-BU6D (ATI)	91
QS66512-2 (ATI)	91
(2) RRUS-32 (ATI)	91
RRUS-E2 (ATI)	91
(2) 4478 B14 (ATI)	91
RRUS-11 (ATI)	91
4426 B66 (ATI)	91
DC6-48-60-18-8F Surge Arrestor (ATI)	91
DC6-48-60-18-8F Surge Arrestor (ATI)	91
MCG23HDX-14 (V-Frame) (ATI)	91
MCG23HDX-14 (V-Frame) (ATI)	91
MCG23HDX-14 (V-Frame) (ATI)	91
ANT-18G-2-C (Clearwire - Existing)	82
ANT-18G-2-C (Clearwire - Existing)	82
AAHC (Sprint)	80
NNVV-65B-R4 (Sprint)	80
NNVV-65B-R4 (Sprint)	80
NNVV-65B-R4 (Sprint)	80
LLPX310R (Sprint)	80
LLPX310R (Sprint)	80
LLPX310R (Sprint)	80
FD-RRH 4x45 1900 (Sprint)	80
FD-RRH 4x45 1900 (Sprint)	80
FD-RRH 4x45 1900 (Sprint)	80
(2) FD-RRH 2x50 800 (Sprint)	80
(2) FD-RRH 2x50 800 (Sprint)	80
(2) FD-RRH 2x50 800 (Sprint)	80
TD-RRH8x20-25 (Sprint)	80
TD-RRH8x20-25 (Sprint)	80
TD-RRH8x20-25 (Sprint)	80
ODU (Sprint)	80
ODU (Sprint)	80
ODU (Sprint)	80
AAHC (Sprint)	80
AAHC (Sprint)	80
Valmont T-Arm (3) (Sprint)	78

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 93.7%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **20074.60 - CTNH039A**		
Project: **98-ft EEI Monopole - 69 Wheeler St., New Haven, CT**		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 07/31/20	Scale: NTS
Path: J:\Jobs\20074\00.WI\60_CTNH039A\05_Structural\Tower Analysis\CalcsIER Files\98' EEI Monopole_New Haven, CT.eri		Dwg No. E-1

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 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		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	98.000-88.000	10.000	0.000	18	12.750	16.500	0.188	0.750	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
L2	88.000-80.000	8.000	0.000	18	16.500	18.140	0.188	0.750	A572-65 (65 ksi)
L3	80.000-55.000	25.000	0.000	18	18.140	23.250	0.495	1.980	A572-65 (65 ksi)
L4	55.000-45.680	9.320	3.640	18	23.250	25.150	0.588	2.352	A572-65 (65 ksi)
L5	45.680-20.000	29.320	0.000	18	23.232	29.910	0.600	2.400	A572-65 (65 ksi)
L6	20.000-5.000	15.000	0.000	18	29.910	32.980	0.490	1.960	A572-65 (65 ksi)
L7	5.000-0.000	5.000		18	32.980	34.000	0.500	2.000	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	12.918	7.476	149.064	4.460	6.477	23.014	298.325	3.739	1.914	10.208
	16.726	9.708	326.368	5.791	8.382	38.937	653.165	4.855	2.574	13.728
L2	16.726	9.708	326.368	5.791	8.382	38.937	653.165	4.855	2.574	13.728
	18.391	10.684	435.031	6.373	9.215	47.208	870.635	5.343	2.863	15.267
L3	18.343	27.723	1090.472	6.264	9.215	118.335	2182.379	13.864	2.321	4.69
	23.532	35.751	2338.730	8.078	11.811	198.013	4680.537	17.879	3.221	6.507
L4	23.518	42.294	2744.204	8.045	11.811	232.343	5492.019	21.151	3.057	5.199
	25.447	45.840	3493.919	8.720	12.776	273.471	6992.436	22.925	3.392	5.768
L5	24.340	43.100	2789.080	8.034	11.802	236.326	5581.830	21.554	3.033	5.055
	30.279	55.818	6058.193	10.405	15.194	398.715	12124.357	27.914	4.208	7.014
L6	30.296	45.756	5003.437	10.444	15.194	329.297	10013.458	22.882	4.402	8.983
	33.413	50.530	6738.909	11.534	16.754	402.231	13486.685	25.270	4.942	10.086
L7	33.412	51.546	6870.090	11.530	16.754	410.061	13749.220	25.778	4.924	9.849
	34.447	53.164	7537.873	11.893	17.272	436.422	15085.664	26.587	5.104	10.208

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 98.000-88.000				1	1	1			
L2 88.000-80.000				1	1	1			
L3 80.000-55.000				1	1	1			
L4 55.000-45.680				1	1	1			
L5 45.680-20.000				1	1	1			
L6 20.000-5.000				1	1	1			
L7 5.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
RG6-Fiber (AT&T)	C	No	Yes	Inside Pole	98.000 - 3.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
#8 AWG Copper WIre (AT&T)	C	No	Yes	Inside Pole	98.000 - 3.000	8	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
1 5/8 (T-Mobile)	C	No	Yes	Inside Pole	98.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
7/8 (AT&T)	C	No	Yes	Inside Pole	98.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
7/8 (Sprint)	C	No	Yes	Inside Pole	98.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
2" Rigid Conduit (Clearwire)	C	No	Yes	Inside Pole	98.000 - 3.000	2	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
1 1/4 (Sprint)	C	No	Yes	Inside Pole	98.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 5/8 (T-Mobile)	C	No	Yes	CaAa (Out Of Face)	98.000 - 0.000	3	No Ice	0.198	0.001
							1/2" Ice	0.298	0.003
							1" Ice	0.398	0.005
Switchblade	A	No	Yes	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.350	0.005
							1/2" Ice	0.050	0.009
							1" Ice	0.000	0.013
Switchblade	B	No	Yes	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.350	0.005
							1/2" Ice	0.050	0.009
							1" Ice	0.000	0.013
Switchblade	C	No	Yes	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.350	0.005
							1/2" Ice	0.050	0.009
							1" Ice	0.000	0.013

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	98.000-88.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	5.940	0.258
L2	88.000-80.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.752	0.207
L3	80.000-55.000	A	0.000	0.000	0.000	8.750	0.125
		B	0.000	0.000	0.000	8.750	0.125
		C	0.000	0.000	0.000	23.600	0.770
L4	55.000-45.680	A	0.000	0.000	0.000	3.262	0.047
		B	0.000	0.000	0.000	3.262	0.047
		C	0.000	0.000	0.000	8.798	0.287
L5	45.680-20.000	A	0.000	0.000	0.000	8.988	0.128
		B	0.000	0.000	0.000	8.988	0.128

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
		C	0.000	0.000	0.000	24.242	0.791
L6	20.000-5.000	A	0.000	0.000	0.000	5.250	0.075
		B	0.000	0.000	0.000	5.250	0.075
		C	0.000	0.000	0.000	14.160	0.462
L7	5.000-0.000	A	0.000	0.000	0.000	1.750	0.025
		B	0.000	0.000	0.000	1.750	0.025
		C	0.000	0.000	0.000	4.720	0.130

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	98.000-88.000	A	1.663	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	15.920	0.489
L2	88.000-80.000	A	1.647	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	12.657	0.388
L3	80.000-55.000	A	1.610	0.000	0.000	0.000	0.000	0.447
		B		0.000	0.000	0.000	0.000	0.447
		C		0.000	0.000	0.000	39.001	1.644
L4	55.000-45.680	A	1.565	0.000	0.000	0.000	0.000	0.163
		B		0.000	0.000	0.000	0.000	0.163
		C		0.000	0.000	0.000	14.285	0.602
L5	45.680-20.000	A	1.497	0.000	0.000	0.000	0.000	0.450
		B		0.000	0.000	0.000	0.000	0.450
		C		0.000	0.000	0.000	39.360	1.658
L6	20.000-5.000	A	1.360	0.000	0.000	0.000	0.000	0.238
		B		0.000	0.000	0.000	0.000	0.238
		C		0.000	0.000	0.000	21.149	0.888
L7	5.000-0.000	A	1.158	0.000	0.000	0.000	0.000	0.071
		B		0.000	0.000	0.000	0.000	0.071
		C		0.000	0.000	0.000	6.445	0.245

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
AIR32	A	From Face	3.000	0.000	98.000	No Ice	6.510	4.712	0.133
(T-Mobile - Existing)			-5.000			1/2" Ice	6.887	5.068	0.179

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	7.271	5.431	0.230
APXVAALL24-43	A	From Face	3.000	0.000	98.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			-2.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	A	From Face	3.000	0.000	98.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			5.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
AIR32	B	From Face	3.000	0.000	98.000	No Ice	6.510	4.712	0.133
(T-Mobile - Existing)			-5.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAALL24-43	B	From Face	3.000	0.000	98.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			-2.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	B	From Face	3.000	0.000	98.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			5.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
AIR32	C	From Face	3.000	0.000	98.000	No Ice	6.510	4.712	0.133
(T-Mobile - Existing)			-5.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAALL24-43	C	From Face	3.000	0.000	98.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			-2.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	C	From Face	3.000	0.000	98.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			5.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
ATMAA1412D-1A20 TMA	A	From Face	3.000	0.000	98.000	No Ice	1.000	0.407	0.013
(T-Mobile - Existing)			0.000			1/2" Ice	1.126	0.497	0.021
			0.000			1" Ice	1.259	0.593	0.030
ATMAA1412D-1A20 TMA	B	From Face	3.000	0.000	98.000	No Ice	1.000	0.407	0.013
(T-Mobile - Existing)			0.000			1/2" Ice	1.126	0.497	0.021
			0.000			1" Ice	1.259	0.593	0.030
ATMAA1412D-1A20 TMA	C	From Face	3.000	0.000	98.000	No Ice	1.000	0.407	0.013
(T-Mobile - Existing)			0.000			1/2" Ice	1.126	0.497	0.021
			0.000			1" Ice	1.259	0.593	0.030
4415 B25	A	From Face	3.000	0.000	98.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			-2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4415 B25	B	From Face	3.000	0.000	98.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			-2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4415 B25	C	From Face	3.000	0.000	98.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			-2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4449 B12,B71	A	From Face	3.000	0.000	98.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			-2.000			1/2" Ice	1.810	1.295	0.096
			-3.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	B	From Face	3.000	0.000	98.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			-2.000			1/2" Ice	1.810	1.295	0.096
			-3.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	C	From Face	3.000	0.000	98.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			-2.000			1/2" Ice	1.810	1.295	0.096
			-3.000			1" Ice	1.978	1.441	0.115
SDX1926Q-43	A	From Face	3.000	0.000	98.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-2.000			1/2" Ice	0.306	0.144	0.032
			3.000			1" Ice	0.379	0.195	0.036
SDX1926Q-43	B	From Face	3.000	0.000	98.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-2.000			1/2" Ice	0.306	0.144	0.032

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
			3.000			1" Ice	0.379	0.195	0.036
SDX1926Q-43	C	From Face	3.000	0.000	98.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-2.000			1/2" Ice	0.306	0.144	0.032
			3.000			1" Ice	0.379	0.195	0.036
SitePro 12' Handrail Kit	A	None		0.000	99.000	No Ice	5.000	5.000	0.265
HRK12						1/2" Ice	8.000	8.000	0.350
(T-Mobile - Existing)						1" Ice	11.000	11.000	0.435
EEI 12-ft Low Profile	A	None		0.000	97.000	No Ice	15.000	15.000	1.500
Platform						1/2" Ice	18.400	18.400	1.750
(T-Mobile - Existing)						1" Ice	21.800	21.800	2.000
HPA-65R-BUU-H6	A	From Face	3.000	0.000	91.000	No Ice	9.658	6.450	0.051
(AT&T)			-6.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
SBNHH-1D65A	A	From Face	3.000	0.000	91.000	No Ice	5.883	3.864	0.040
(AT&T)			-2.000			1/2" Ice	6.246	4.220	0.079
			0.000			1" Ice	6.617	4.572	0.123
OPA65R-BU4D	A	From Face	3.000	0.000	91.000	No Ice	8.400	3.542	0.060
(AT&T)			2.000			1/2" Ice	8.787	3.847	0.113
			0.000			1" Ice	9.181	4.158	0.170
QS46512-2	A	From Face	3.000	0.000	91.000	No Ice	5.553	5.081	0.075
(AT&T)			6.000			1/2" Ice	5.901	5.423	0.120
			0.000			1" Ice	6.255	5.771	0.170
(2) RRUS-32	A	From Face	3.000	0.000	91.000	No Ice	3.314	2.424	0.077
(AT&T)			-6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
RRUS-E2	A	From Face	3.000	0.000	91.000	No Ice	3.145	1.285	0.058
(AT&T)			-6.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) 4478 B14	A	From Face	3.000	0.000	91.000	No Ice	1.843	1.059	0.060
(AT&T)			-6.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
RRUS-11	A	From Face	3.000	0.000	91.000	No Ice	2.566	1.068	0.050
(AT&T)			-6.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
4426 B66	A	From Face	3.000	0.000	91.000	No Ice	1.650	0.727	0.049
(AT&T)			-6.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
HPA-65R-BUU-H6	B	From Face	3.000	0.000	91.000	No Ice	9.658	6.450	0.051
(AT&T)			-6.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
SBNHH-1D65A	B	From Face	3.000	0.000	91.000	No Ice	5.883	3.864	0.040
(AT&T)			-2.000			1/2" Ice	6.246	4.220	0.079
			0.000			1" Ice	6.617	4.572	0.123
OPA65R-BU6D	B	From Face	3.000	0.000	91.000	No Ice	12.871	5.673	0.070
(AT&T)			2.000			1/2" Ice	13.369	6.125	0.145
			0.000			1" Ice	13.873	6.585	0.227
QS66512-2	B	From Face	3.000	0.000	91.000	No Ice	8.133	6.800	0.112
(AT&T)			6.000			1/2" Ice	8.590	7.267	0.169
			0.000			1" Ice	9.053	7.723	0.233
(2) RRUS-32	B	From Face	3.000	0.000	91.000	No Ice	3.314	2.424	0.077
(AT&T)			-6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
RRUS-E2	B	From Face	3.000	0.000	91.000	No Ice	3.145	1.285	0.058
(AT&T)			-6.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) 4478 B14	B	From Face	3.000	0.000	91.000	No Ice	1.843	1.059	0.060
(AT&T)			-6.000			1/2" Ice	2.012	1.197	0.076

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	2.190	1.342	0.094
RRUS-11	B	From Face	3.000	0.000	91.000	No Ice	2.566	1.068	0.050
(AT&T)			-6.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
4426 B66	B	From Face	3.000	0.000	91.000	No Ice	1.650	0.727	0.049
(AT&T)			-6.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
DC6-48-60-18-8F Surge	B	From Face	0.000	0.000	94.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
HPA-65R-BUU-H6	C	From Face	3.000	0.000	91.000	No Ice	9.658	6.450	0.051
(AT&T)			-6.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
HPA-65R-BUU-H6	C	From Face	3.000	0.000	91.000	No Ice	9.658	6.450	0.051
(AT&T)			-2.000			1/2" Ice	10.128	6.913	0.114
			0.000			1" Ice	10.606	7.384	0.183
OPA65R-BU6D	C	From Face	3.000	0.000	91.000	No Ice	12.871	5.673	0.070
(AT&T)			2.000			1/2" Ice	13.369	6.125	0.145
			0.000			1" Ice	13.873	6.585	0.227
QS66512-2	C	From Face	3.000	0.000	91.000	No Ice	8.133	6.800	0.112
(AT&T)			6.000			1/2" Ice	8.590	7.267	0.169
			0.000			1" Ice	9.053	7.723	0.233
(2) RRUS-32	C	From Face	3.000	0.000	91.000	No Ice	3.314	2.424	0.077
(AT&T)			-6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
RRUS-E2	C	From Face	3.000	0.000	91.000	No Ice	3.145	1.285	0.058
(AT&T)			-6.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) 4478 B14	C	From Face	3.000	0.000	91.000	No Ice	1.843	1.059	0.060
(AT&T)			-6.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
RRUS-11	C	From Face	3.000	0.000	91.000	No Ice	2.566	1.068	0.050
(AT&T)			-6.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
4426 B66	C	From Face	3.000	0.000	91.000	No Ice	1.650	0.727	0.049
(AT&T)			-6.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
DC6-48-60-18-8F Surge	C	From Face	0.000	0.000	91.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	A	From Face	0.000	0.000	91.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
MCG23HDX-14 (V-Frame)	A	From Face	0.000	0.000	91.000	No Ice	27.000	27.000	1.000
(AT&T)			0.000			1/2" Ice	32.000	32.000	1.400
			0.000			1" Ice	37.000	37.000	1.800
MCG23HDX-14 (V-Frame)	B	From Face	0.000	0.000	91.000	No Ice	27.000	27.000	1.000
(AT&T)			0.000			1/2" Ice	32.000	32.000	1.400
			0.000			1" Ice	37.000	37.000	1.800
MCG23HDX-14 (V-Frame)	C	From Face	0.000	0.000	91.000	No Ice	27.000	27.000	1.000
(AT&T)			0.000			1/2" Ice	32.000	32.000	1.400
			0.000			1" Ice	37.000	37.000	1.800
AAHC	A	From Face	3.000	0.000	80.000	No Ice	4.203	2.061	0.104
(Sprint)			-4.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
AAHC	B	From Face	3.000	0.000	80.000	No Ice	4.203	2.061	0.104
(Sprint)			-4.000			1/2" Ice	4.458	2.252	0.136

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	4.721	2.454	0.172
AAHC	C	From Face	3.000	0.000	80.000	No Ice	4.203	2.061	0.104
(Sprint)			-4.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
NNVV-65B-R4	A	From Face	3.000	0.000	80.000	No Ice	14.612	9.168	0.108
(Sprint)			4.000			1/2" Ice	15.129	9.634	0.211
			0.000			1" Ice	15.652	10.107	0.320
NNVV-65B-R4	B	From Face	3.000	0.000	80.000	No Ice	14.612	9.168	0.108
(Sprint)			4.000			1/2" Ice	15.129	9.634	0.211
			0.000			1" Ice	15.652	10.107	0.320
NNVV-65B-R4	C	From Face	3.000	0.000	80.000	No Ice	14.612	9.168	0.108
(Sprint)			4.000			1/2" Ice	15.129	9.634	0.211
			0.000			1" Ice	15.652	10.107	0.320
LLPX310R	A	From Face	3.000	0.000	80.000	No Ice	4.304	1.945	0.029
(Sprint)			-2.000			1/2" Ice	4.596	2.214	0.055
			0.000			1" Ice	4.896	2.489	0.084
LLPX310R	B	From Face	3.000	0.000	80.000	No Ice	4.304	1.945	0.029
(Sprint)			-2.000			1/2" Ice	4.596	2.214	0.055
			0.000			1" Ice	4.896	2.489	0.084
LLPX310R	C	From Face	3.000	0.000	80.000	No Ice	4.304	1.945	0.029
(Sprint)			-2.000			1/2" Ice	4.596	2.214	0.055
			0.000			1" Ice	4.896	2.489	0.084
FD-RRH 4x45 1900	A	From Face	3.000	0.000	80.000	No Ice	2.319	2.384	0.060
(Sprint)			-4.000			1/2" Ice	2.524	2.590	0.084
			0.000			1" Ice	2.736	2.804	0.111
FD-RRH 4x45 1900	B	From Face	3.000	0.000	80.000	No Ice	2.319	2.384	0.060
(Sprint)			-4.000			1/2" Ice	2.524	2.590	0.084
			0.000			1" Ice	2.736	2.804	0.111
FD-RRH 4x45 1900	C	From Face	3.000	0.000	80.000	No Ice	2.319	2.384	0.060
(Sprint)			-4.000			1/2" Ice	2.524	2.590	0.084
			0.000			1" Ice	2.736	2.804	0.111
(2) FD-RRH 2x50 800	A	From Face	3.000	0.000	80.000	No Ice	2.058	1.932	0.064
(Sprint)			-2.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	B	From Face	3.000	0.000	80.000	No Ice	2.058	1.932	0.064
(Sprint)			-2.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	C	From Face	3.000	0.000	80.000	No Ice	2.058	1.932	0.064
(Sprint)			-2.000			1/2" Ice	2.240	2.109	0.086
			0.000			1" Ice	2.429	2.293	0.111
TD-RRH8x20-25	A	From Face	3.000	0.000	80.000	No Ice	4.045	1.533	0.070
(Sprint)			4.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
TD-RRH8x20-25	B	From Face	3.000	0.000	80.000	No Ice	4.045	1.533	0.070
(Sprint)			4.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
TD-RRH8x20-25	C	From Face	3.000	0.000	80.000	No Ice	4.045	1.533	0.070
(Sprint)			4.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
ODU	A	From Face	3.000	0.000	80.000	No Ice	1.008	0.596	0.000
(Sprint)			-2.000			1/2" Ice	1.134	0.697	0.010
			0.000			1" Ice	1.268	0.805	0.021
ODU	B	From Face	3.000	0.000	80.000	No Ice	1.008	0.596	0.000
(Sprint)			-2.000			1/2" Ice	1.134	0.697	0.010
			0.000			1" Ice	1.268	0.805	0.021
ODU	C	From Face	3.000	0.000	80.000	No Ice	1.008	0.596	0.000
(Sprint)			-2.000			1/2" Ice	1.134	0.697	0.010

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
Valmont T-Arm (3) (Sprint)	C	None	0.000	0.000	78.000	1" Ice No Ice 1/2" Ice 1" Ice	1.268 21.000 29.000 37.000	0.805 21.000 29.000 37.000	0.021 1.008 1.236 1.464

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
ANT-18G-2-C (Clearwire - Existing)	A	Paraboloid w/Radome	From Face	1.000 0.000 0.000	Worst		82.000	2.500	No Ice 1/2" Ice 1" Ice	4.910 5.240 5.570	0.040 0.070 0.100
ANT-18G-2-C (Clearwire - Existing)	C	Paraboloid w/Radome	From Face	1.000 0.000 0.000	Worst		82.000	2.500	No Ice 1/2" Ice 1" Ice	4.910 5.240 5.570	0.040 0.070 0.100

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 98.000-88.000	92.786	1.246	0.029	12.351	A	0.000	12.351	12.351	100.00	0.000	0.000
					B	0.000	12.351		100.00	0.000	0.000
					C	0.000	12.351		100.00	0.000	5.940
L2 88.000-80.000	83.937	1.22	0.028	11.706	A	0.000	11.706	11.706	100.00	0.000	0.000
					B	0.000	11.706		100.00	0.000	0.000
					C	0.000	11.706		100.00	0.000	4.752
L3 80.000-55.000	66.986	1.163	0.027	43.621	A	0.000	43.621	43.621	100.00	0.000	8.750
					B	0.000	43.621		100.00	0.000	8.750
					C	0.000	43.621		100.00	0.000	23.600
L4 55.000-45.680	50.279	1.095	0.025	19.015	A	0.000	19.015	19.015	100.00	0.000	3.262
					B	0.000	19.015		100.00	0.000	3.262
					C	0.000	19.015		100.00	0.000	8.798
L5 45.680-20.000	32.376	0.998	0.023	58.442	A	0.000	58.442	58.442	100.00	0.000	8.988
					B	0.000	58.442		100.00	0.000	8.988
					C	0.000	58.442		100.00	0.000	24.242
L6 20.000-5.000	12.378	0.85	0.019	39.818	A	0.000	39.818	39.818	100.00	0.000	5.250
					B	0.000	39.818		100.00	0.000	5.250
					C	0.000	39.818		100.00	0.000	14.160
L7 5.000-0.000	2.487	0.85	0.019	14.137	A	0.000	14.137	14.137	100.00	0.000	1.750
					B	0.000	14.137		100.00	0.000	1.750

Section Elevation ft	z ft	K_Z	q_z ksf	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
					C	0.000	14.137		100.00	0.000	4.720

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	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	92.786	1.246	0.008	1.663	15.124	A	0.000	15.124	15.124	100.00	0.000	0.000
98.000-88.000						B	0.000	15.124		100.00	0.000	0.000
						C	0.000	15.124		100.00	0.000	15.920
L2	83.937	1.22	0.007	1.647	13.901	A	0.000	13.901	13.901	100.00	0.000	0.000
88.000-80.000						B	0.000	13.901		100.00	0.000	0.000
						C	0.000	13.901		100.00	0.000	12.657
L3	66.986	1.163	0.007	1.610	50.329	A	0.000	50.329	50.329	100.00	0.000	0.000
80.000-55.000						B	0.000	50.329		100.00	0.000	0.000
						C	0.000	50.329		100.00	0.000	39.001
L4	50.279	1.095	0.007	1.565	21.445	A	0.000	21.445	21.445	100.00	0.000	0.000
55.000-45.680						B	0.000	21.445		100.00	0.000	0.000
						C	0.000	21.445		100.00	0.000	14.285
L5	32.376	0.998	0.006	1.497	65.138	A	0.000	65.138	65.138	100.00	0.000	0.000
45.680-20.000						B	0.000	65.138		100.00	0.000	0.000
						C	0.000	65.138		100.00	0.000	39.360
L6 20.000-5.000	12.378	0.85	0.005	1.360	43.218	A	0.000	43.218	43.218	100.00	0.000	0.000
						B	0.000	43.218		100.00	0.000	0.000
						C	0.000	43.218		100.00	0.000	21.149
L7 5.000-0.000	2.487	0.85	0.005	1.158	15.103	A	0.000	15.103	15.103	100.00	0.000	0.000
						B	0.000	15.103		100.00	0.000	0.000
						C	0.000	15.103		100.00	0.000	6.445

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	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	92.786	1.246	0.010	12.351	A	0.000	12.351	12.351	100.00	0.000	0.000
98.000-88.000					B	0.000	12.351		100.00	0.000	0.000
					C	0.000	12.351		100.00	0.000	5.940
L2	83.937	1.22	0.010	11.706	A	0.000	11.706	11.706	100.00	0.000	0.000
88.000-80.000					B	0.000	11.706		100.00	0.000	0.000
					C	0.000	11.706		100.00	0.000	4.752
L3	66.986	1.163	0.009	43.621	A	0.000	43.621	43.621	100.00	0.000	8.750
80.000-55.000					B	0.000	43.621		100.00	0.000	8.750
					C	0.000	43.621		100.00	0.000	23.600
L4	50.279	1.095	0.009	19.015	A	0.000	19.015	19.015	100.00	0.000	3.262
55.000-45.680					B	0.000	19.015		100.00	0.000	3.262
					C	0.000	19.015		100.00	0.000	8.798

Section Elevation ft	z ft	K_Z	q_z ksf	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
L5	32.376	0.998	0.008	58.442	A	0.000	58.442	58.442	100.00	0.000	8.988
45.680-20.000					B	0.000	58.442		100.00	0.000	8.988
					C	0.000	58.442		100.00	0.000	24.242
L6	12.378	0.85	0.007	39.818	A	0.000	39.818	39.818	100.00	0.000	5.250
20.000-5.000					B	0.000	39.818		100.00	0.000	5.250
					C	0.000	39.818		100.00	0.000	14.160
L7 5.000-0.000	2.487	0.85	0.007	14.137	A	0.000	14.137	14.137	100.00	0.000	1.750
					B	0.000	14.137		100.00	0.000	1.750
					C	0.000	14.137		100.00	0.000	4.720

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.029	1	1	12.351	0.651	0.065	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.028	1	1	11.706	0.577	0.072	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.027	1	1	43.621	2.736	0.109	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.025	1	1	19.015	1.051	0.113	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.023	1	1	58.442	2.823	0.110	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.019	1	1	39.818	1.550	0.103	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.019	1	1	14.137	0.539	0.108	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	456.901 kip-ft	9.927		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.029	1	1	12.351	0.651	0.065	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.028	1	1	11.706	0.577	0.072	C
88.000-80.000			B	1	1.2		1	1	11.706			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.027	1	1	43.621	2.736	0.109	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.025	1	1	19.015	1.051	0.113	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.023	1	1	58.442	2.823	0.110	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.019	1	1	39.818	1.550	0.103	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.019	1	1	14.137	0.539	0.108	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	456.901 kip-ft	9.927		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.029	1	1	12.351	0.651	0.065	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.028	1	1	11.706	0.577	0.072	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.027	1	1	43.621	2.736	0.109	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.025	1	1	19.015	1.051	0.113	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.023	1	1	58.442	2.823	0.110	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.019	1	1	39.818	1.550	0.103	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.019	1	1	14.137	0.539	0.108	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	456.901 kip-ft	9.927		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.029	1	1	12.351	0.651	0.065	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.028	1	1	11.706	0.577	0.072	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.027	1	1	43.621	2.736	0.109	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.025	1	1	19.015	1.051	0.113	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.023	1	1	58.442	2.823	0.110	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.019	1	1	39.818	1.550	0.103	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.019	1	1	14.137	0.539	0.108	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	456.901 kip-ft	9.927		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.489	0.627	A	1	1.2	0.008	1	1	15.124	0.284	0.028	C
98.000-88.000			B	1	1.2		1	1	15.124			
			C	1	1.2		1	1	15.124			
L2	0.388	0.586	A	1	1.2	0.007	1	1	13.901	0.239	0.030	C
88.000-80.000			B	1	1.2		1	1	13.901			
			C	1	1.2		1	1	13.901			
L3	2.538	3.808	A	1	1.2	0.007	1	1	50.329	0.773	0.031	C
80.000-55.000			B	1	1.2		1	1	50.329			
			C	1	1.2		1	1	50.329			
L4	0.928	1.861	A	1	1.2	0.007	1	1	21.445	0.293	0.031	C
55.000-45.680			B	1	1.2		1	1	21.445			
			C	1	1.2		1	1	21.445			
L5	2.558	6.286	A	1	1.2	0.006	1	1	65.138	0.785	0.031	C
45.680-20.000			B	1	1.2		1	1	65.138			
			C	1	1.2		1	1	65.138			
L6	1.364	3.283	A	1	1.2	0.005	1	1	43.218	0.415	0.028	C
20.000-5.000			B	1	1.2		1	1	43.218			
			C	1	1.2		1	1	43.218			
L7	0.388	1.138	A	1	1.2	0.005	1	1	15.103	0.140	0.028	C
5.000-0.000			B	1	1.2		1	1	15.103			
			C	1	1.2		1	1	15.103			

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
Sum Weight:	8.653	17.590						OTM	143.848 kip-ft	2.929		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.489	0.627	A	1	1.2	0.008	1	1	15.124	0.284	0.028	C
98.000-88.000			B	1	1.2		1	1	15.124			
			C	1	1.2		1	1	15.124			
L2	0.388	0.586	A	1	1.2	0.007	1	1	13.901	0.239	0.030	C
88.000-80.000			B	1	1.2		1	1	13.901			
			C	1	1.2		1	1	13.901			
L3	2.538	3.808	A	1	1.2	0.007	1	1	50.329	0.773	0.031	C
80.000-55.000			B	1	1.2		1	1	50.329			
			C	1	1.2		1	1	50.329			
L4	0.928	1.861	A	1	1.2	0.007	1	1	21.445	0.293	0.031	C
55.000-45.680			B	1	1.2		1	1	21.445			
			C	1	1.2		1	1	21.445			
L5	2.558	6.286	A	1	1.2	0.006	1	1	65.138	0.785	0.031	C
45.680-20.000			B	1	1.2		1	1	65.138			
			C	1	1.2		1	1	65.138			
L6	1.364	3.283	A	1	1.2	0.005	1	1	43.218	0.415	0.028	C
20.000-5.000			B	1	1.2		1	1	43.218			
			C	1	1.2		1	1	43.218			
L7	0.388	1.138	A	1	1.2	0.005	1	1	15.103	0.140	0.028	C
5.000-0.000			B	1	1.2		1	1	15.103			
			C	1	1.2		1	1	15.103			
Sum Weight:	8.653	17.590						OTM	143.848 kip-ft	2.929		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.489	0.627	A	1	1.2	0.008	1	1	15.124	0.284	0.028	C
98.000-88.000			B	1	1.2		1	1	15.124			
			C	1	1.2		1	1	15.124			
L2	0.388	0.586	A	1	1.2	0.007	1	1	13.901	0.239	0.030	C
88.000-80.000			B	1	1.2		1	1	13.901			
			C	1	1.2		1	1	13.901			
L3	2.538	3.808	A	1	1.2	0.007	1	1	50.329	0.773	0.031	C
80.000-55.000			B	1	1.2		1	1	50.329			
			C	1	1.2		1	1	50.329			
L4	0.928	1.861	A	1	1.2	0.007	1	1	21.445	0.293	0.031	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
55.000-45.680			B	1	1.2		1	1	21.445			
			C	1	1.2		1	1	21.445			
L5	2.558	6.286	A	1	1.2	0.006	1	1	65.138	0.785	0.031	C
45.680-20.000			B	1	1.2		1	1	65.138			
			C	1	1.2		1	1	65.138			
L6	1.364	3.283	A	1	1.2	0.005	1	1	43.218	0.415	0.028	C
20.000-5.000			B	1	1.2		1	1	43.218			
			C	1	1.2		1	1	43.218			
L7	0.388	1.138	A	1	1.2	0.005	1	1	15.103	0.140	0.028	C
5.000-0.000			B	1	1.2		1	1	15.103			
			C	1	1.2		1	1	15.103			
Sum Weight:	8.653	17.590						OTM	143.848 kip-ft	2.929		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.489	0.627	A	1	1.2	0.008	1	1	15.124	0.284	0.028	C
98.000-88.000			B	1	1.2		1	1	15.124			
			C	1	1.2		1	1	15.124			
L2	0.388	0.586	A	1	1.2	0.007	1	1	13.901	0.239	0.030	C
88.000-80.000			B	1	1.2		1	1	13.901			
			C	1	1.2		1	1	13.901			
L3	2.538	3.808	A	1	1.2	0.007	1	1	50.329	0.773	0.031	C
80.000-55.000			B	1	1.2		1	1	50.329			
			C	1	1.2		1	1	50.329			
L4	0.928	1.861	A	1	1.2	0.007	1	1	21.445	0.293	0.031	C
55.000-45.680			B	1	1.2		1	1	21.445			
			C	1	1.2		1	1	21.445			
L5	2.558	6.286	A	1	1.2	0.006	1	1	65.138	0.785	0.031	C
45.680-20.000			B	1	1.2		1	1	65.138			
			C	1	1.2		1	1	65.138			
L6	1.364	3.283	A	1	1.2	0.005	1	1	43.218	0.415	0.028	C
20.000-5.000			B	1	1.2		1	1	43.218			
			C	1	1.2		1	1	43.218			
L7	0.388	1.138	A	1	1.2	0.005	1	1	15.103	0.140	0.028	C
5.000-0.000			B	1	1.2		1	1	15.103			
			C	1	1.2		1	1	15.103			
Sum Weight:	8.653	17.590						OTM	143.848 kip-ft	2.929		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.010	1	1	12.351	0.223	0.022	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.010	1	1	11.706	0.198	0.025	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.009	1	1	43.621	0.937	0.037	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.009	1	1	19.015	0.360	0.039	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.008	1	1	58.442	0.966	0.038	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.007	1	1	39.818	0.531	0.035	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.007	1	1	14.137	0.184	0.037	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	156.414 kip-ft	3.398		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.010	1	1	12.351	0.223	0.022	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.010	1	1	11.706	0.198	0.025	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.009	1	1	43.621	0.937	0.037	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.009	1	1	19.015	0.360	0.039	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.008	1	1	58.442	0.966	0.038	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.007	1	1	39.818	0.531	0.035	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.007	1	1	14.137	0.184	0.037	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	156.414 kip-ft	3.398		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.010	1	1	12.351	0.223	0.022	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.010	1	1	11.706	0.198	0.025	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.009	1	1	43.621	0.937	0.037	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.009	1	1	19.015	0.360	0.039	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.008	1	1	58.442	0.966	0.038	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.007	1	1	39.818	0.531	0.035	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			
L7	0.180	0.891	A	1	1.2	0.007	1	1	14.137	0.184	0.037	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	156.414 kip-ft	3.398		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.258	0.292	A	1	1.2	0.010	1	1	12.351	0.223	0.022	C
98.000-88.000			B	1	1.2		1	1	12.351			
			C	1	1.2		1	1	12.351			
L2	0.207	0.278	A	1	1.2	0.010	1	1	11.706	0.198	0.025	C
88.000-80.000			B	1	1.2		1	1	11.706			
			C	1	1.2		1	1	11.706			
L3	1.021	2.700	A	1	1.2	0.009	1	1	43.621	0.937	0.037	C
80.000-55.000			B	1	1.2		1	1	43.621			
			C	1	1.2		1	1	43.621			
L4	0.380	1.398	A	1	1.2	0.009	1	1	19.015	0.360	0.039	C
55.000-45.680			B	1	1.2		1	1	19.015			
			C	1	1.2		1	1	19.015			
L5	1.048	4.935	A	1	1.2	0.008	1	1	58.442	0.966	0.038	C
45.680-20.000			B	1	1.2		1	1	58.442			
			C	1	1.2		1	1	58.442			
L6	0.612	2.457	A	1	1.2	0.007	1	1	39.818	0.531	0.035	C
20.000-5.000			B	1	1.2		1	1	39.818			
			C	1	1.2		1	1	39.818			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L7	0.180	0.891	A	1	1.2	0.007	1	1	14.137	0.184	0.037	C
5.000-0.000			B	1	1.2		1	1	14.137			
			C	1	1.2		1	1	14.137			
Sum Weight:	3.706	12.950						OTM	156.414 kip-ft	3.398		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	12.950					
Bracing Weight	0.000					
Total Member Self-Weight	12.950			0.370	0.012	
Total Weight	27.816			0.370	0.012	
Wind 0 deg - No Ice		0.035	-21.253	-1474.301	-3.140	-0.010
Wind 30 deg - No Ice		10.622	-18.423	-1278.309	-736.882	0.517
Wind 45 deg - No Ice		15.004	-15.053	-1044.609	-1040.482	0.737
Wind 60 deg - No Ice		18.363	-10.657	-739.695	-1273.174	0.906
Wind 90 deg - No Ice		21.184	-0.035	-2.782	-1468.317	1.053
Wind 120 deg - No Ice		18.328	10.597	734.977	-1270.022	0.917
Wind 135 deg - No Ice		14.955	15.004	1040.892	-1036.025	0.752
Wind 150 deg - No Ice		10.562	18.389	1275.898	-731.423	0.535
Wind 180 deg - No Ice		-0.035	21.253	1475.042	3.164	0.010
Wind 210 deg - No Ice		-10.622	18.423	1279.050	736.906	-0.517
Wind 225 deg - No Ice		-15.004	15.053	1045.350	1040.506	-0.737
Wind 240 deg - No Ice		-18.363	10.657	740.436	1273.198	-0.906
Wind 270 deg - No Ice		-21.184	0.035	3.522	1468.341	-1.053
Wind 300 deg - No Ice		-18.328	-10.597	-734.236	1270.046	-0.917
Wind 315 deg - No Ice		-14.955	-15.004	-1040.151	1036.048	-0.752
Wind 330 deg - No Ice		-10.562	-18.389	-1275.157	731.447	-0.535
Member Ice	4.640					
Total Weight Ice	53.737			1.376	-0.189	
Wind 0 deg - Ice		0.009	-7.124	-519.062	-0.991	-0.001
Wind 30 deg - Ice		3.561	-6.174	-449.738	-260.283	0.160
Wind 45 deg - Ice		5.031	-5.044	-367.197	-367.602	0.227
Wind 60 deg - Ice		6.158	-3.570	-259.538	-449.883	0.278
Wind 90 deg - Ice		7.106	-0.009	0.573	-518.988	0.322
Wind 120 deg - Ice		6.150	3.554	260.900	-449.081	0.280
Wind 135 deg - Ice		5.019	5.031	368.814	-366.468	0.229
Wind 150 deg - Ice		3.545	6.165	451.687	-258.893	0.162
Wind 180 deg - Ice		-0.009	7.124	521.814	0.614	0.001
Wind 210 deg - Ice		-3.561	6.174	452.490	259.905	-0.160
Wind 225 deg - Ice		-5.031	5.044	369.949	367.225	-0.227
Wind 240 deg - Ice		-6.158	3.570	262.290	449.505	-0.278
Wind 270 deg - Ice		-7.106	0.009	2.178	518.610	-0.322
Wind 300 deg - Ice		-6.150	-3.554	-258.148	448.703	-0.280
Wind 315 deg - Ice		-5.019	-5.031	-366.062	366.090	-0.229
Wind 330 deg - Ice		-3.545	-6.165	-448.936	258.515	-0.162
Total Weight	27.816			0.370	0.012	
Wind 0 deg - Service		0.012	-7.276	-504.465	-1.067	-0.004
Wind 30 deg - Service		3.636	-6.307	-437.369	-252.255	0.177
Wind 45 deg - Service		5.136	-5.153	-357.365	-356.188	0.252

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 60 deg - Service		6.286	-3.648	-252.982	-435.847	0.310
Wind 90 deg - Service		7.252	-0.012	-0.709	-502.652	0.360
Wind 120 deg - Service		6.274	3.628	251.854	-434.768	0.314
Wind 135 deg - Service		5.120	5.136	356.580	-354.662	0.257
Wind 150 deg - Service		3.616	6.295	437.031	-250.386	0.183
Wind 180 deg - Service		-0.012	7.276	505.206	1.091	0.004
Wind 210 deg - Service		-3.636	6.307	438.110	252.278	-0.177
Wind 225 deg - Service		-5.136	5.153	358.106	356.212	-0.252
Wind 240 deg - Service		-6.286	3.648	253.723	435.871	-0.310
Wind 270 deg - Service		-7.252	0.012	1.449	502.676	-0.360
Wind 300 deg - Service		-6.274	-3.628	-251.113	434.792	-0.314
Wind 315 deg - Service		-5.120	-5.136	-355.839	354.686	-0.257
Wind 330 deg - Service		-3.616	-6.295	-436.290	250.409	-0.183

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	98 - 88	Pole	Max Tension	34	0.000	0.000	0.000
			Max. Compression	34	-23.907	-0.418	-1.377
			Max. Mx	10	-8.826	-82.592	-0.050
			Max. My	18	-8.798	0.167	-83.310
			Max. Vy	10	15.973	-82.592	-0.050
			Max. Vx	18	16.091	0.167	-83.310
			Max. Torque	10			-1.546
L2	88 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-25.271	-0.207	-1.563
			Max. Mx	26	-9.565	214.551	-0.958
			Max. My	18	-9.540	0.669	-216.293
			Max. Vy	26	-17.254	214.551	-0.958
			Max. Vx	18	17.371	0.669	-216.293
			Max. Torque	10			-1.727
L3	80 - 55	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-39.113	-0.224	-1.698
			Max. Mx	26	-16.892	805.684	-2.549
			Max. My	18	-16.871	2.156	-810.396
			Max. Vy	26	-25.932	805.684	-2.549
			Max. Vx	18	26.051	2.156	-810.396
			Max. Torque	10			-1.726
L4	55 - 45.68	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-41.013	-0.224	-1.698
			Max. Mx	26	-18.315	955.602	-2.899
			Max. My	18	-18.296	2.491	-960.986

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	26	-26.894	955.602	-2.899
			Max. Vx	18	27.012	2.491	-960.986
			Max. Torque	26			1.716
L5	45.68 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-52.490	-0.224	-1.698
			Max. Mx	26	-27.311	1812.591	-4.657
			Max. My	18	-27.301	4.206	-1821.421
			Max. Vy	26	-31.539	1812.591	-4.657
			Max. Vx	18	31.655	4.206	-1821.421
			Max. Torque	26			1.713
L6	20 - 5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-57.751	-0.224	-1.698
			Max. Mx	26	-31.794	2298.534	-5.507
			Max. My	18	-31.791	5.059	-2309.080
			Max. Vy	26	-33.321	2298.534	-5.507
			Max. Vx	18	33.434	5.059	-2309.080
			Max. Torque	26			1.706
L7	5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-59.492	-0.224	-1.698
			Max. Mx	26	-33.352	2466.501	-5.782
			Max. My	18	-33.352	5.337	-2477.607
			Max. Vy	26	-33.921	2466.501	-5.782
			Max. Vx	18	34.033	5.337	-2477.607
			Max. Torque	26			1.704

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	43	59.492	0.009	-7.124
	Max. H_x	26	33.380	33.894	-0.055
	Max. H_z	3	25.035	-0.055	34.005
	Max. M_x	2	2476.633	-0.055	34.005
	Max. M_z	10	2466.471	-33.894	0.055
	Max. Torsion	26	1.703	33.894	-0.055
	Min. Vert	23	25.035	24.006	-24.085
	Min. H_x	10	33.380	-33.894	0.055
	Min. H_z	19	25.035	0.055	-34.005
	Min. M_x	18	-2477.607	0.055	-34.005
	Min. M_z	26	-2466.501	33.894	-0.055
	Min. Torsion	10	-1.703	-33.894	0.055

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	27.816	0.000	0.000	0.374	0.012	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	33.380	0.055	-34.005	-2476.633	-5.306	-0.018
0.9 Dead+1.6 Wind 0 deg - No Ice	25.035	0.055	-34.005	-2444.257	-5.233	-0.018

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 30 deg - No Ice	33.380	16.995	-29.477	-2147.419	-1237.781	0.836
0.9 Dead+1.6 Wind 30 deg - No Ice	25.035	16.995	-29.477	-2119.363	-1221.549	0.829
1.2 Dead+1.6 Wind 45 deg - No Ice	33.380	24.006	-24.085	-1754.879	-1747.752	1.191
0.9 Dead+1.6 Wind 45 deg - No Ice	25.035	24.006	-24.085	-1731.969	-1724.832	1.181
1.2 Dead+1.6 Wind 60 deg - No Ice	33.380	29.381	-17.051	-1242.715	-2138.631	1.466
0.9 Dead+1.6 Wind 60 deg - No Ice	25.035	29.381	-17.051	-1226.521	-2110.585	1.453
1.2 Dead+1.6 Wind 90 deg - No Ice	33.380	33.894	-0.055	-4.861	-2466.471	1.703
0.9 Dead+1.6 Wind 90 deg - No Ice	25.035	33.894	-0.055	-4.908	-2434.124	1.689
1.2 Dead+1.6 Wind 120 deg - No Ice	33.380	29.325	16.955	1234.463	-2133.388	1.484
0.9 Dead+1.6 Wind 120 deg - No Ice	25.035	29.325	16.955	1218.150	-2105.409	1.472
1.2 Dead+1.6 Wind 135 deg - No Ice	33.380	23.927	24.006	1748.353	-1740.305	1.217
0.9 Dead+1.6 Wind 135 deg - No Ice	25.035	23.927	24.006	1725.294	-1717.483	1.207
1.2 Dead+1.6 Wind 150 deg - No Ice	33.380	16.899	29.422	2143.114	-1228.619	0.867
0.9 Dead+1.6 Wind 150 deg - No Ice	25.035	16.899	29.422	2114.872	-1212.512	0.860
1.2 Dead+1.6 Wind 180 deg - No Ice	33.380	-0.055	34.005	2477.607	5.337	0.018
0.9 Dead+1.6 Wind 180 deg - No Ice	25.035	-0.055	34.005	2444.968	5.256	0.018
1.2 Dead+1.6 Wind 210 deg - No Ice	33.380	-16.995	29.477	2148.379	1237.835	-0.836
0.9 Dead+1.6 Wind 210 deg - No Ice	25.035	-16.995	29.477	2120.064	1221.588	-0.829
1.2 Dead+1.6 Wind 225 deg - No Ice	33.380	-24.006	24.085	1755.826	1747.809	-1.191
0.9 Dead+1.6 Wind 225 deg - No Ice	25.035	-24.006	24.085	1732.661	1724.874	-1.181
1.2 Dead+1.6 Wind 240 deg - No Ice	33.380	-29.381	17.051	1243.648	2138.684	-1.466
0.9 Dead+1.6 Wind 240 deg - No Ice	25.035	-29.381	17.051	1227.204	2110.624	-1.453
1.2 Dead+1.6 Wind 270 deg - No Ice	33.380	-33.894	0.055	5.782	2466.501	-1.703
0.9 Dead+1.6 Wind 270 deg - No Ice	25.035	-33.894	0.055	5.581	2434.146	-1.689
1.2 Dead+1.6 Wind 300 deg - No Ice	33.380	-29.325	-16.955	-1233.529	2133.395	-1.484
0.9 Dead+1.6 Wind 300 deg - No Ice	25.035	-29.325	-16.955	-1217.467	2105.414	-1.472
1.2 Dead+1.6 Wind 315 deg - No Ice	33.380	-23.927	-24.006	-1747.405	1740.308	-1.217
0.9 Dead+1.6 Wind 315 deg - No Ice	25.035	-23.927	-24.006	-1724.601	1717.487	-1.207
1.2 Dead+1.6 Wind 330 deg - No Ice	33.380	-16.899	-29.422	-2142.153	1228.627	-0.867
0.9 Dead+1.6 Wind 330 deg - No Ice	25.035	-16.899	-29.422	-2114.170	1212.518	-0.860
1.2 Dead+1.0 Ice+1.0 Temp	59.492	0.000	0.000	1.698	-0.224	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	59.492	0.009	-7.124	-580.529	-1.147	0.006
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	59.492	3.561	-6.174	-502.963	-291.270	0.192
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	59.492	5.031	-5.044	-410.607	-411.350	0.268
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	59.492	6.159	-3.570	-290.144	-503.414	0.326
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	59.492	7.106	-0.009	0.907	-580.733	0.373
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	59.492	6.150	3.554	292.202	-502.510	0.320
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	59.492	5.019	5.031	412.954	-410.071	0.259
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	59.492	3.545	6.165	505.688	-289.702	0.181
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	59.492	-0.009	7.124	584.160	0.667	-0.006
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	59.492	-3.561	6.174	506.594	290.792	-0.192
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	59.492	-5.031	5.044	414.236	410.872	-0.268
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	59.492	-6.159	3.570	293.772	502.936	-0.326
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	59.492	-7.106	0.009	2.720	580.253	-0.373
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	59.492	-6.150	-3.554	-288.574	502.028	-0.320
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	59.492	-5.019	-5.031	-409.325	409.588	-0.259
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	59.492	-3.545	-6.165	-502.058	289.220	-0.181
Dead+Wind 0 deg - Service	27.816	0.012	-7.276	-526.449	-1.119	-0.004
Dead+Wind 30 deg - Service	27.816	3.636	-6.307	-456.433	-263.257	0.182
Dead+Wind 45 deg - Service	27.816	5.136	-5.153	-372.940	-371.721	0.260
Dead+Wind 60 deg - Service	27.816	6.286	-3.648	-264.005	-454.853	0.319
Dead+Wind 90 deg - Service	27.816	7.252	-0.012	-0.728	-524.565	0.371
Dead+Wind 120 deg - Service	27.816	6.274	3.628	262.853	-453.723	0.323
Dead+Wind 135 deg - Service	27.816	5.120	5.136	372.149	-370.123	0.265
Dead+Wind 150 deg - Service	27.816	3.616	6.295	456.110	-261.299	0.189
Dead+Wind 180 deg - Service	27.816	-0.012	7.276	527.258	1.144	0.004
Dead+Wind 210 deg - Service	27.816	-3.636	6.307	457.241	263.283	-0.182
Dead+Wind 225 deg - Service	27.816	-5.136	5.153	373.748	371.747	-0.260
Dead+Wind 240 deg - Service	27.816	-6.286	3.648	264.812	454.879	-0.319
Dead+Wind 270 deg - Service	27.816	-7.252	0.012	1.535	524.590	-0.371
Dead+Wind 300 deg - Service	27.816	-6.274	-3.628	-262.046	453.747	-0.323
Dead+Wind 315 deg - Service	27.816	-5.120	-5.136	-371.341	370.147	-0.265
Dead+Wind 330 deg - Service	27.816	-3.616	-6.295	-455.302	261.323	-0.189

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	0.000	-27.816	0.000	0.000	27.816	0.000	0.000%
2	0.055	-33.380	-34.005	-0.055	33.380	34.005	0.000%
3	0.055	-25.035	-34.005	-0.055	25.035	34.005	0.000%
4	16.995	-33.380	-29.477	-16.995	33.380	29.477	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
5	16.995	-25.035	-29.477	-16.995	25.035	29.477	0.000%
6	24.006	-33.380	-24.085	-24.006	33.380	24.085	0.000%
7	24.006	-25.035	-24.085	-24.006	25.035	24.085	0.000%
8	29.381	-33.380	-17.051	-29.381	33.380	17.051	0.000%
9	29.381	-25.035	-17.051	-29.381	25.035	17.051	0.000%
10	33.894	-33.380	-0.055	-33.894	33.380	0.055	0.000%
11	33.894	-25.035	-0.055	-33.894	25.035	0.055	0.000%
12	29.325	-33.380	16.955	-29.325	33.380	-16.955	0.000%
13	29.325	-25.035	16.955	-29.325	25.035	-16.955	0.000%
14	23.927	-33.380	24.006	-23.927	33.380	-24.006	0.000%
15	23.927	-25.035	24.006	-23.927	25.035	-24.006	0.000%
16	16.899	-33.380	29.422	-16.899	33.380	-29.422	0.000%
17	16.899	-25.035	29.422	-16.899	25.035	-29.422	0.000%
18	-0.055	-33.380	34.005	0.055	33.380	-34.005	0.000%
19	-0.055	-25.035	34.005	0.055	25.035	-34.005	0.000%
20	-16.995	-33.380	29.477	16.995	33.380	-29.477	0.000%
21	-16.995	-25.035	29.477	16.995	25.035	-29.477	0.000%
22	-24.006	-33.380	24.085	24.006	33.380	-24.085	0.000%
23	-24.006	-25.035	24.085	24.006	25.035	-24.085	0.000%
24	-29.381	-33.380	17.051	29.381	33.380	-17.051	0.000%
25	-29.381	-25.035	17.051	29.381	25.035	-17.051	0.000%
26	-33.894	-33.380	0.055	33.894	33.380	-0.055	0.000%
27	-33.894	-25.035	0.055	33.894	25.035	-0.055	0.000%
28	-29.325	-33.380	-16.955	29.325	33.380	16.955	0.000%
29	-29.325	-25.035	-16.955	29.325	25.035	16.955	0.000%
30	-23.927	-33.380	-24.006	23.927	33.380	24.006	0.000%
31	-23.927	-25.035	-24.006	23.927	25.035	24.006	0.000%
32	-16.899	-33.380	-29.422	16.899	33.380	29.422	0.000%
33	-16.899	-25.035	-29.422	16.899	25.035	29.422	0.000%
34	0.000	-59.492	0.000	-0.000	59.492	-0.000	0.000%
35	0.009	-59.492	-7.124	-0.009	59.492	7.124	0.000%
36	3.561	-59.492	-6.174	-3.561	59.492	6.174	0.000%
37	5.031	-59.492	-5.044	-5.031	59.492	5.044	0.000%
38	6.158	-59.492	-3.570	-6.159	59.492	3.570	0.000%
39	7.106	-59.492	-0.009	-7.106	59.492	0.009	0.000%
40	6.150	-59.492	3.554	-6.150	59.492	-3.554	0.000%
41	5.019	-59.492	5.031	-5.019	59.492	-5.031	0.000%
42	3.545	-59.492	6.165	-3.545	59.492	-6.165	0.000%
43	-0.009	-59.492	7.124	0.009	59.492	-7.124	0.000%
44	-3.561	-59.492	6.174	3.561	59.492	-6.174	0.000%
45	-5.031	-59.492	5.044	5.031	59.492	-5.044	0.000%
46	-6.158	-59.492	3.570	6.159	59.492	-3.570	0.000%
47	-7.106	-59.492	0.009	7.106	59.492	-0.009	0.000%
48	-6.150	-59.492	-3.554	6.150	59.492	3.554	0.000%
49	-5.019	-59.492	-5.031	5.019	59.492	5.031	0.000%
50	-3.545	-59.492	-6.165	3.545	59.492	6.165	0.000%
51	0.012	-27.816	-7.276	-0.012	27.816	7.276	0.000%
52	3.636	-27.816	-6.307	-3.636	27.816	6.307	0.000%
53	5.136	-27.816	-5.153	-5.136	27.816	5.153	0.000%
54	6.286	-27.816	-3.648	-6.286	27.816	3.648	0.000%
55	7.252	-27.816	-0.012	-7.252	27.816	0.012	0.000%
56	6.274	-27.816	3.628	-6.274	27.816	-3.628	0.000%
57	5.120	-27.816	5.136	-5.120	27.816	-5.136	0.000%
58	3.616	-27.816	6.295	-3.616	27.816	-6.295	0.000%
59	-0.012	-27.816	7.276	0.012	27.816	-7.276	0.000%
60	-3.636	-27.816	6.307	3.636	27.816	-6.307	0.000%
61	-5.136	-27.816	5.153	5.136	27.816	-5.153	0.000%
62	-6.286	-27.816	3.648	6.286	27.816	-3.648	0.000%
63	-7.252	-27.816	0.012	7.252	27.816	-0.012	0.000%
64	-6.274	-27.816	-3.628	6.274	27.816	3.628	0.000%
65	-5.120	-27.816	-5.136	5.120	27.816	5.136	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
66	-3.616	-27.816	-6.295	3.616	27.816	6.295	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00003762
3	Yes	4	0.00000001	0.00047279
4	Yes	6	0.00000001	0.00025664
5	Yes	6	0.00000001	0.00007108
6	Yes	6	0.00000001	0.00026415
7	Yes	6	0.00000001	0.00006916
8	Yes	6	0.00000001	0.00024427
9	Yes	6	0.00000001	0.00006691
10	Yes	5	0.00000001	0.00022154
11	Yes	5	0.00000001	0.00009405
12	Yes	6	0.00000001	0.00025889
13	Yes	6	0.00000001	0.00007212
14	Yes	6	0.00000001	0.00026334
15	Yes	6	0.00000001	0.00006917
16	Yes	6	0.00000001	0.00024644
17	Yes	6	0.00000001	0.00006789
18	Yes	5	0.00000001	0.00003508
19	Yes	4	0.00000001	0.00045249
20	Yes	6	0.00000001	0.00024772
21	Yes	6	0.00000001	0.00006800
22	Yes	6	0.00000001	0.00026429
23	Yes	6	0.00000001	0.00006915
24	Yes	6	0.00000001	0.00026029
25	Yes	6	0.00000001	0.00007228
26	Yes	5	0.00000001	0.00027672
27	Yes	5	0.00000001	0.00011692
28	Yes	6	0.00000001	0.00024291
29	Yes	6	0.00000001	0.00006677
30	Yes	6	0.00000001	0.00026320
31	Yes	6	0.00000001	0.00006919
32	Yes	6	0.00000001	0.00025517
33	Yes	6	0.00000001	0.00007088
34	Yes	4	0.00000001	0.00004071
35	Yes	6	0.00000001	0.00014517
36	Yes	6	0.00000001	0.00021943
37	Yes	6	0.00000001	0.00023681
38	Yes	6	0.00000001	0.00021487
39	Yes	6	0.00000001	0.00014671
40	Yes	6	0.00000001	0.00022281
41	Yes	6	0.00000001	0.00023941
42	Yes	6	0.00000001	0.00021853
43	Yes	6	0.00000001	0.00014717
44	Yes	6	0.00000001	0.00021910
45	Yes	6	0.00000001	0.00024026
46	Yes	6	0.00000001	0.00022373
47	Yes	6	0.00000001	0.00014649
48	Yes	6	0.00000001	0.00021312
49	Yes	6	0.00000001	0.00023475
50	Yes	6	0.00000001	0.00021731

51	Yes	4	0.00000001	0.00010920
52	Yes	5	0.00000001	0.00007670
53	Yes	5	0.00000001	0.00008429
54	Yes	5	0.00000001	0.00006721
55	Yes	4	0.00000001	0.00029245
56	Yes	5	0.00000001	0.00007917
57	Yes	5	0.00000001	0.00008364
58	Yes	5	0.00000001	0.00006878
59	Yes	4	0.00000001	0.00010949
60	Yes	5	0.00000001	0.00006979
61	Yes	5	0.00000001	0.00008482
62	Yes	5	0.00000001	0.00008028
63	Yes	4	0.00000001	0.00030447
64	Yes	5	0.00000001	0.00006617
65	Yes	5	0.00000001	0.00008313
66	Yes	5	0.00000001	0.00007554

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 88	19.535	60	1.764	0.008
L2	88 - 80	15.889	60	1.695	0.006
L3	80 - 55	13.190	60	1.507	0.004
L4	55 - 45.68	6.375	60	1.061	0.002
L5	49.32 - 20	5.173	60	0.958	0.001
L6	20 - 5	0.868	60	0.422	0.000
L7	5 - 0	0.053	60	0.101	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
99.000	SitePro 12' Handrail Kit HRK12	60	19.535	1.764	0.008	6475
98.000	AIR32	60	19.535	1.764	0.008	6475
97.000	EEI 12-ft Low Profile Platform	60	19.164	1.762	0.007	6475
94.000	DC6-48-60-18-8F Surge Arrestor	60	18.056	1.754	0.007	6475
91.000	HPA-65R-BUU-H6	60	16.961	1.734	0.007	4658
82.000	ANT-18G-2-C	60	13.842	1.558	0.004	3130
80.000	AAHC	60	13.190	1.507	0.004	3102
78.000	Valmont T-Arm (3)	60	12.554	1.459	0.003	3082

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 88	91.621	18	8.291	0.035
L2	88 - 80	74.551	18	7.968	0.029

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	80 - 55	61.911	18	7.086	0.017
L4	55 - 45.68	29.948	20	4.991	0.007
L5	49.32 - 20	24.308	20	4.508	0.006
L6	20 - 5	4.082	20	1.983	0.002
L7	5 - 0	0.247	20	0.473	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
99.000	SitePro 12' Handrail Kit HRK12	18	91.621	8.291	0.035	1443
98.000	AIR32	18	91.621	8.291	0.035	1443
97.000	EEI 12-ft Low Profile Platform	18	89.885	8.282	0.035	1443
94.000	DC6-48-60-18-8F Surge Arrestor	18	84.697	8.241	0.034	1443
91.000	HPA-65R-BUU-H6	18	79.570	8.148	0.032	1037
82.000	ANT-18G-2-C	18	64.965	7.324	0.020	690
80.000	AAHC	18	61.911	7.086	0.017	682
78.000	Valmont T-Arm (3)	18	58.929	6.864	0.015	677

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	98 - 88 (1)	TP16.5x12.75x0.188	10.000	0.000	0.0	9.708	-8.793	721.254	0.012
L2	88 - 80 (2)	TP18.14x16.5x0.188	8.000	0.000	0.0	10.684	-9.535	793.766	0.012
L3	80 - 55 (3)	TP23.25x18.14x0.495	25.000	0.000	0.0	35.751	-16.867	2656.130	0.006
L4	55 - 45.68 (4)	TP25.15x23.25x0.588	9.320	0.000	0.0	44.455	-18.292	3302.820	0.006
L5	45.68 - 20 (5)	TP29.91x23.232x0.6	29.320	0.000	0.0	55.818	-27.300	4147.000	0.007
L6	20 - 5 (6)	TP32.98x29.91x0.49	15.000	0.000	0.0	50.530	-31.791	3754.160	0.008
L7	5 - 0 (7)	TP34x32.98x0.5	5.000	0.000	0.0	53.165	-33.352	3949.860	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	98 - 88 (1)	TP16.5x12.75x0.188	83.293	241.068	0.346	0.000	241.068	0.000
L2	88 - 80 (2)	TP18.14x16.5x0.188	216.474	292.279	0.741	0.000	292.279	0.000
L3	80 - 55 (3)	TP23.25x18.14x0.495	811.108	1225.950	0.662	0.000	1225.950	0.000
L4	55 - 45.68 (4)	TP25.15x23.25x0.588	961.817	1591.208	0.604	0.000	1591.208	0.000
L5	45.68 - 20 (5)	TP29.91x23.232x0.6	1822.875	2468.550	0.738	0.000	2468.550	0.000
L6	20 - 5 (6)	TP32.98x29.91x0.49	2310.842	2490.308	0.928	0.000	2490.308	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L7	5 - 0 (7)	TP34x32.98x0.5	2479.467	2701.992	0.918	0.000	2701.992	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 kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	98 - 88 (1)	TP16.5x12.75x0.188	16.112	360.627	0.045	1.033	483.558	0.002
L2	88 - 80 (2)	TP18.14x16.5x0.188	17.392	396.883	0.044	0.847	586.193	0.001
L3	80 - 55 (3)	TP23.25x18.14x0.495	26.073	1328.060	0.020	0.842	2462.858	0.000
L4	55 - 45.68 (4)	TP25.15x23.25x0.588	27.034	1651.410	0.016	0.841	3198.017	0.000
L5	45.68 - 20 (5)	TP29.91x23.232x0.6	31.676	2073.500	0.015	0.837	4958.242	0.000
L6	20 - 5 (6)	TP32.98x29.91x0.49	33.455	1877.080	0.018	0.836	4997.992	0.000
L7	5 - 0 (7)	TP34x32.98x0.5	34.053	1974.930	0.017	0.836	5422.717	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	98 - 88 (1)	0.012	0.346	0.000	0.045	0.002	0.360 ✔	1.000	4.8.2 ✔
L2	88 - 80 (2)	0.012	0.741	0.000	0.044	0.001	0.755 ✔	1.000	4.8.2 ✔
L3	80 - 55 (3)	0.006	0.662	0.000	0.020	0.000	0.668 ✔	1.000	4.8.2 ✔
L4	55 - 45.68 (4)	0.006	0.604	0.000	0.016	0.000	0.610 ✔	1.000	4.8.2 ✔
L5	45.68 - 20 (5)	0.007	0.738	0.000	0.015	0.000	0.745 ✔	1.000	4.8.2 ✔
L6	20 - 5 (6)	0.008	0.928	0.000	0.018	0.000	0.937 ✔	1.000	4.8.2 ✔
L7	5 - 0 (7)	0.008	0.918	0.000	0.017	0.000	0.926 ✔	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	98 - 88	Pole	TP16.5x12.75x0.188	1	-8.793	721.254	36.0	Pass
L2	88 - 80	Pole	TP18.14x16.5x0.188	2	-9.535	793.766	75.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L3	80 - 55	Pole	TP23.25x18.14x0.495	3	-16.867	2656.130	66.8	Pass
L4	55 - 45.68	Pole	TP25.15x23.25x0.588	4	-18.292	3302.820	61.0	Pass
L5	45.68 - 20	Pole	TP29.91x23.232x0.6	5	-27.300	4147.000	74.5	Pass
L6	20 - 5	Pole	TP32.98x29.91x0.49	6	-31.791	3754.160	93.7	Pass
L7	5 - 0	Pole	TP34x32.98x0.5	7	-33.352	3949.860	92.6	Pass
							Summary	
						Pole (L6)	93.7	Pass
						RATING =	**93.7**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	98-ft EEI Monopole New Haven, CT
Rev. 0: 7/31/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.60

Reinforced Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 2479·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 34·kips	(Input From tnxTower)
Axial Force =	Axial := 33·kips	(Input From tnxTower)

Original ROHN Anchor Bolt Data: AST MA615 Grade 75

Number of Anchor Bolts =	N := 6	(User Input)
Diameter of Bolt Circle =	D_{bc} := 42·in	(User Input)
Bolt "Column" Distance =	l := 3·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Existing Structural Components Anchor Bolt Reinf. Data:

Number of Anchor Bolts =	No := 5	(User Input)
Diameter of Bolt Circle =	D_{bco} := 51.125·in	(User Input)
Bolt Ultimate Strength =	F_{uo} := 115·ksi	(User Input)
Bolt Yield Strength =	F_{yo} := 95·ksi	(User Input)
Bolt Modulus =	Eo := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	Do := 2.75·in	(User Input)
Threads per Inch =	no := 4.0	(User Input)

Base Plate Data:

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 1.5·in	(User Input)
Base Plate Diameter =	D_{bp} := 48·in	(User Input)
Outer Pole Diameter =	D_{pole} := 34·in	(User Input)
	η := 0.55	per TIA-222-G Section 4.9.9

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 7.875in$ (User Input)

$d_2 := 10.5in$ (User Input)

$d_3 := 20.625in$ (User Input)

$d_4 := 21in$ (User Input)

$d_5 := 25.5 \cdot in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 4in$ (User Input)

(User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 38.125in$ (User Input)

Anchor Bolt Analysis (Inner Bolts):

Calculated Anchor Bolt Properties:

Total Polar Moment of Inertia = $I_p := \left[\left(d_1\right)^2 \cdot 2 + \left(d_2\right)^2 \cdot 4 + \left(d_3\right)^2 \cdot 2 + \left(d_4\right)^2 \cdot 2 + \left(d_5\right)^2 \cdot 1\right] = 2948.06 \cdot in^2$

Gross Area of Inner Bolts = $A_{gi} := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Inner Bolt = $A_{ni} := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter of Inner Bolt = $D_{ni} := \frac{2 \cdot \sqrt{A_{ni}}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Inner Bolt = $ri := \frac{D_{ni}}{4} = 0.508 \cdot in$

Section Modulus of Inner Bolt = $S_{xi} := \frac{\pi \cdot D_{ni}^3}{32} = 0.826 \cdot in^3$

Plastic Section Modulus = $Z := \frac{D_{ni}^3}{6} = 1.401 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_4}{I_p} - \frac{Axial}{N} = 206.4 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{d_4}{I_p} + \frac{Axial}{N} = 217.4 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 5.7 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_{ni} = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 87.6$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

Base Plate Analysis:

Force from Bolts =

$$C_1 := \frac{OM \cdot d_4}{I_p} + \frac{Axial}{N} = 217.405 \cdot kips$$

Applied Bending Stress in Plate =

$$f_{bp} := \frac{4 \cdot \left(C_1 \cdot ma_1\right)}{B_{eff} t_{bp}^2} = 40.55 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} \cdot 100 = 75.1$$

Condition5 =

$$Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$$

Condition1 = "Ok"

Anchor Bolt Analysis (Outer Bolts):

Calculated Anchor Bolt Properties:

Gross Area of Inner Bolts =

$$A_{go} := \frac{\pi}{4} \cdot Do^2 = 5.94 \cdot in^2$$

Net Area of Inner Bolt =

$$A_{no} := \frac{\pi}{4} \cdot \left(Do - \frac{0.9743 \cdot in}{n}\right)^2 = 5.041 \cdot in^2$$

Check Anchor Bolt Tension Force:

Maximum Tensile Force =

$$T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 251.8 \cdot kips$$

Maximum Compressive Force =

$$P_u := OM \cdot \frac{d_5}{I_p} + \frac{Axial}{N} = 262.8 \cdot kips$$

Design Tensile Strength =

$$\Phi R_{nt} := 0.8 \cdot F_u \cdot A_{no} = 403.29 \cdot k$$

Bolt % of Capacity =

$$\frac{T_{Max}}{\Phi R_{nt}} \cdot 100 = 62.4$$

Condition1 =

$$Condition1 := if\left(\frac{T_{Max}}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

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Subject:	FOUNDATION ANALYSIS
Location:	98-ft EEI Monopole New Haven, CT
Rev. 0: 7/31/20	Prepared by: T.J.L Checked by: C.F.C. Job no. 20074.60

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 2479 \cdot ft \cdot kips$	(User Input)	
Shear Force =	$Shear := 34 \cdot kip$	(User Input)	
Axial Force =	$Axial := 33 \cdot kip$	(User Input)	
Tower Height =	$H_t := 98 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 4.25 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 2 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 1 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 6 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 3.25 \cdot ft$	(User Input)	
Width of Footing 1 =	$W_{f1} := 26 \cdot ft$	(User Input)	
Width of Footing 2 =	$W_{f2} := 18 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_u := 8000 \cdot psf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := \frac{q_u}{2} = 4000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 110 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$		

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 110 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0.33 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 0.33 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.403 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.866 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 3.25$

$A_p := W_{f1} \cdot T_p = 84.5$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 73.198 \cdot kip$

Weight of Concrete Pad = $WT_c := [(W_{f1} \cdot W_{f2} \cdot T_f) + d_p^2 L_p] \cdot \gamma_c = 238.95 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := [((W_{f1} \cdot W_{f2} - d_p^2) \cdot (|L_p - L_{pag} - n|)] \cdot \gamma_s = 47.52 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := 0$

Weight of Equipment at Grade = $WT_{eq} := 30 \cdot kips$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + Axial + WT_{eq} = 349.47 \cdot kip$

Resisting Weight = $WT_R := 0.9 \cdot WT_c + 0.75 \cdot WT_{s1} + 0.75 \cdot Axial + WT_{eq} = 305.445 \cdot kip$

Resisting Moment = $M_r := (WT_R) \cdot \frac{W_{f2}}{2} + 0.75 \cdot S_u \cdot \frac{T_f}{3} = 2808 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + Shear \cdot (L_p + T_f) = 2658 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.06$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_{f1} \cdot W_{f2} = 468$

Section Modulus of Mat = $S := \frac{\left(W_{f1} \cdot W_{f2}^{2}\right)}{6} = 1404 \cdot ft^{3}$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{\frac{M_{ot}}{1.6}}{S} = 1.93 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_a, "Okay", "No Good"\right)$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{\frac{M_{ot}}{1.6}}{S} = -0.436 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_a\right), "Okay", "No Good"\right]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_{f2}}} \cdot \frac{1}{3} = 4.894$

Distance to Kern = $X_k := \frac{W_{f2}}{6} = 3$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{\frac{M_{ot}}{1.6}}{WT_{tot}} = 4.753$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_{f1} \cdot \left(\frac{W_{f2}}{2} - e\right)} = 2.11 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 2.11 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_a, "Okay", "No Good"\right)$

$Pressure\_Check = "Okay"$

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Section 1 - Site Information

Site ID: CTNH039A
Status: Draft
Version: 5
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 7/15/2020 9:47:47 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

Site Name: NH039/Laydon Construc
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2020
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Elmer & William Laydon

Latitude: 41.29603000
Longitude: -72.89792000
Address: 69 Wheeler Street
City, State: New Haven, CT
Region: NORTHEAST

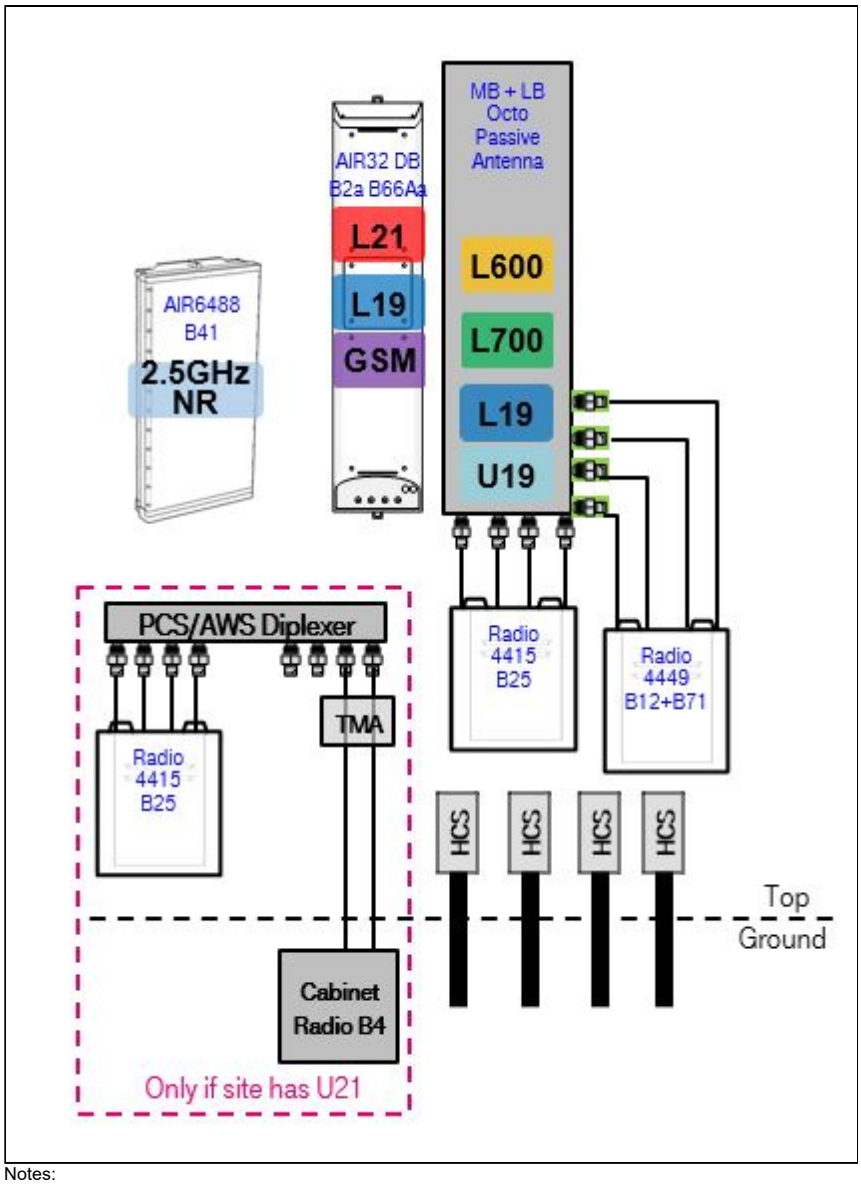
RAN Template: 67D5A997DB Outdoor		**AL Template:** 67D5997DB_2xAIR+1OP (U21 Market)		
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 3	**RRU Count:** 6

Section 2 - Existing Template Images

----- This section is intentionally blank. -----

Section 3 - Proposed Template Images

67D5997DB_2xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 794DB Outdoor (evolved from 4B)

Enclosure	1	2
Enclosure Type	RBS 6102	RBS 3106
Baseband	DUW30 (U1900); DUW30 (U2100); DUG20 (G1900); BB 6630 (L700, L2100, L1900)	
Hybrid Cable System	Ericsson 9x18 HCS *Select Length*; Ericsson 3x6 HCS *Select Length*	
Radio	RUS01 B2 **(x 3)** (G1900); RUS01 B2 **(x 3)** (U1900); RUS01 B4 **(x 3)** (U2100)	

Proposed RAN Equipment

Template: 67D5A997DB Outdoor

Enclosure	1	2	3
Enclosure Type	RBS 6102	Enclosure 6160	B160
Baseband	DUW30 (U1900); DUW30 (U2100); DUG20 (G1900); BB 6630 (L1900, L2100); BB 6630 (L700, L600, N600)	BB 6630 (L2500); BB 6648 (N2500)	
Hybrid Cable System	Ericsson 9x18 HCS 30m	Ericsson 6x12 HCS *Select AWG & Length* **(x 2)**	
Radio	RUS01 B2 **(x 6)**; RUS01 B4 **(x 3)** (U2100)		

RAN Scope of Work:

Remove Existing RBS3106. Relocate AAV to new Emerson Cabinet (location to be determined).

Add (1) BB6630 for L600, L700, and N600 (MMBB- Mixed Mode Baseband) to new Existing RBS6102 Base Station Cabinet.

B2 Cabinet Radios for GSM and U1900 in Existing RBS6102 Cabinet will become unused. GSM will move to the B2 Radios in the AIR32 Dual Band (shared with L1900 1st Carrier). U1900 will move to the new Radio 4415 B25 (shared with L1900 2md Carrier).

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) BB6630 for L2500 to new Enclosure 6160.

Add (1) BB6648 for N2500 to new Enclosure 6160.

Existing: (18) Coaxial Lines; (1) 9X18 AND (1) 3X6 HCS

Remove (12) Coaxial Lines for new total of (6) Coaxial Lines.

Add (1) 6X12 HCS for the Radio 4449 (DC and Fiber) and Radio 4415 (Fiber) at the site.

Add (1) 6X12 HCS for new Anchor A&L Equipment. Length of new HCS will match that of existing HCS.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Section 6 - A&L Equipment

Existing Template: 794DB_1xAIR+1QP+1DP
Proposed Template: 67D5997DB_2xAIR+1OP (U21 Market)

Sector 1 (Existing) view from behind							
Coverage Type	A - Outdoor Macro						
Antenna	1			2			
Antenna Model	Andrew - SBNHH-1D65C-SR (Hex)			Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	50			50			
M. Tilt	0			0			
Height	98			98			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	U1900, G1900	U2100	L700	L2100	L2100	L1900	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	7	7	2	7	7	2	2
Cables	1-1/4" Coax - 145 ft.	1-1/4" Coax - 145 ft.	Fiber Jumper				
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Cable: 1-1/4" Coax - 145 ft.
Cable: 1-1/4" Coax - 145 ft.

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	50		50				50			
M. Tilt	0		0				0			
Height	98		98				98			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900 U1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt			2	2	7	7	7	7	2	2
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** 1-1/4" Coax - 145 ft. **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Add new mount for new Position 2.

*** L600 Scope of Work ***

Replace (1) Low-Band/Mid-Band Hex Port 8' antenna in Position 1 with (1) Low-Band/Mid-Band Octo antenna in Position 2.

Replace (1) RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect it to the Low-Band ports of the Octo antenna.

***

*** Anchor Scope of Work ***

Remove PCS TMA and disconnect coaxial lines for GSM.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect its ports to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of PCS/AWS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

***

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1			2			
Antenna Model	Andrew - SBNHH-1D65C-SR (Hex)			Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	160			160			
M. Tilt	0			0			
Height	98			98			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	U1900, G1900	U2100	L700	L2100	L2100	L1900	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	7	7	2	7	7	2	2
Cables	1-1/4" Coax - 145 ft.	1-1/4" Coax - 145 ft.	Fiber Jumper				
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Cable: 1-1/4" Coax - 145 ft.
Cable: 1-1/4" Coax - 145 ft.

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	160		160				160			
M. Tilt	0		0				0			
Height	98		98				98			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900 U1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt			2	2	7	7	7	7	2	2
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** 1-1/4" Coax - 145 ft. **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Add new mount for new Position 2.

*** L600 Scope of Work ***

Replace (1) Low-Band/Mid-Band Hex Port 8' antenna in Position 1 with (1) Low-Band/Mid-Band Octo antenna in Position 2.

Replace (1) RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect it to the Low-Band ports of the Octo antenna.

***

*** Anchor Scope of Work ***

Remove PCS TMA and disconnect coaxial lines for GSM.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect its ports to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of PCS/AWS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

***

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1			2			
Antenna Model	Andrew - SBNHH-1D65C-SR (Hex)			Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	280			280			
M. Tilt	0			0			
Height	98			98			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	U1900, G1900	U2100	L700	L2100	L2100	L1900	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.							
E. Tilt	7	7	2	7	7	2	2
Cables	1-1/4" Coax - 145 ft.	1-1/4" Coax - 145 ft.	Fiber Jumper				
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Cable: 1-1/4" Coax - 145 ft.
Cable: 1-1/4" Coax - 145 ft.

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	280		280				280			
M. Tilt	0		0				0			
Height	98		98				98			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900 U1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt			2	2	7	7	7	7	2	2
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** 1-1/4" Coax - 145 ft. **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Add new mount for new Position 2.

*** L600 Scope of Work ***

Replace (1) Low-Band/Mid-Band Hex Port 8' antenna in Position 1 with (1) Low-Band/Mid-Band Octo antenna in Position 2.

Replace (1) RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect it to the Low-Band ports of the Octo antenna.

***

*** Anchor Scope of Work ***

Remove PCS TMA and disconnect coaxial lines for GSM.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier and U1900 to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect its ports to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of PCS/AWS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

***

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTNH039A_Anchor_5_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: Anchor_Phase 3
L600_5G POPs

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

Exhibit E

Mount Analysis

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

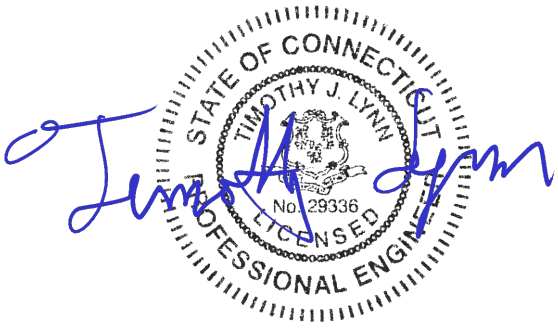
T-Mobile Site #: CTNH039A

69 Wheeler Street
New Haven, CT

Centek Project No. 20074.60

Date: July 30, 2020

Max Stress Ratio =69.9%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 30, 2020

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNH039A
69 Wheeler Street
New Haven, CT 06512

Centek Project No. 20074.60

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) platform w/ handrail to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

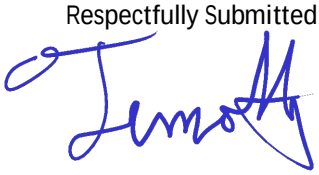
- T-Mobile:
  Platform w/ Handrail: Three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) TMAs, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on one (1) platform w/ handrail with a RAD center elevation of 98-ft +/- AGL.

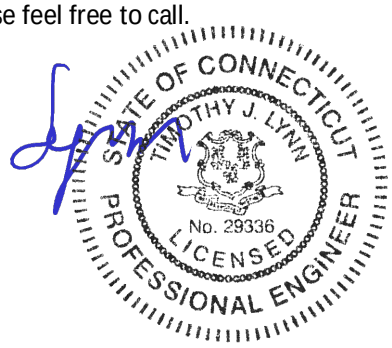
The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 97 mph for New Haven as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the equipment upgrade, it is our opinion that the existing antenna mount is structurally adequate to support the proposed antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: New Haven, CT

Rev. 0: 7/30/20

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 20074.60

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed: $V := 97$ mph (User Input - 2018 CSBC Appendix N)

Basic Wind Speed with Ice: $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Pole$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 98$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 98$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor = (Per Table 2-2 of TIA-222-G)

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

Importance Factors = (Per Table 2-3 of TIA-222-G)

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.115$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.672$$

Velocity Pressure Coefficient Antennas = $Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.26$

Velocity Pressure w/o Ice Antennas = $qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 28.838$

Velocity Pressure with Ice Antennas = $qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.662$

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: New Haven, CT

Rev. 0: 7/30/20

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 20074.60

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 642$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 233$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 201$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 89$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 410$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 410$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 207$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 139$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 73$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 54$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 132$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5377$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 174$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 174$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 179$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 73$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 61$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 30$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 103$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4488$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 145$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 145$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 41$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 21$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 18$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2104$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 68$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 68$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4415

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 47$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 21$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 21$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 11$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 47$ lbs

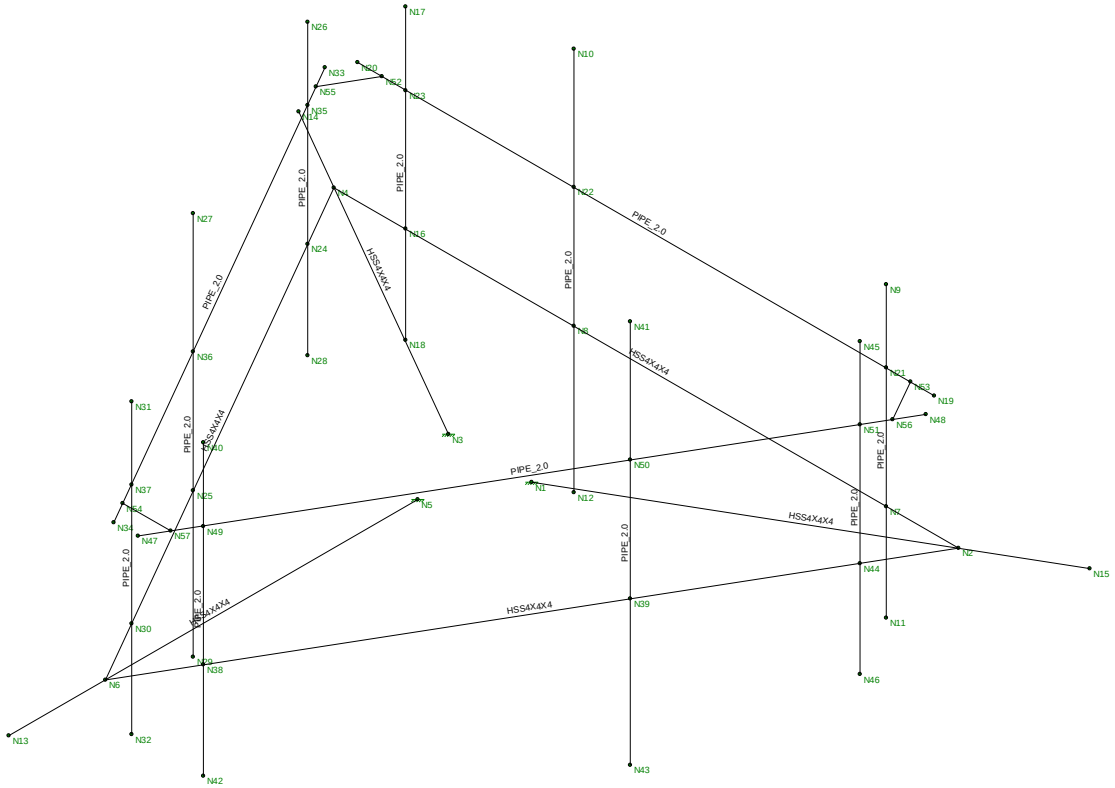
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1578$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 51$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 51$ lbs



Envelope Only Solution

Centek		
TJL	CTNH039A - Mount	July 30, 2020 at 10:29 AM
20074.60	Member Framing	Mount.R3D

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	.145
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#6
Footing Top Bar Cover (in)	1.5
Footing Bottom Bar	#6
Footing Bottom Bar Cover (in)	3
Pedestal Bar	#6
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#4

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
2	Horz	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
4	Hand Rail	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Outrigger	8.5			Lbyy						Lateral
2	M2	Outrigger	8.5			Lbyy						Lateral
3	M3	Outrigger	8.5			Lbyy						Lateral
4	M4	Horz	12.99			Lbyy						Lateral
5	M5	Horz	12.99			Lbyy						Lateral
6	M6	Horz	12.99			Lbyy						Lateral
7	M7	Antenna Mast	8									Lateral
8	M8	Antenna Mast	6									Lateral
9	M9	Antenna Mast	6									Lateral
10	M10	Hand Rail	12			Lbyy						Lateral
11	M11	Antenna Mast	8									Lateral
12	M12	Antenna Mast	6									Lateral
13	M13	Antenna Mast	6									Lateral
14	M14	Hand Rail	12			Lbyy						Lateral
15	M15	Antenna Mast	8									Lateral
16	M16	Antenna Mast	6									Lateral
17	M17	Antenna Mast	6									Lateral
18	M18	Hand Rail	12			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N15			Outrigger	Beam	None	A500 Gr....	Typical
2	M2	N5	N13			Outrigger	Beam	None	A500 Gr....	Typical
3	M3	N3	N14			Outrigger	Beam	None	A500 Gr....	Typical
4	M4	N6	N2			Horz	Beam	None	A500 Gr....	Typical
5	M5	N2	N4			Horz	Beam	None	A500 Gr....	Typical
6	M6	N4	N6			Horz	Beam	None	A500 Gr....	Typical
7	M7	N12	N10			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
8	M8	N18	N17			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
9	M9	N11	N9			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
10	M10	N19	N20			Hand Rail	Beam	Pipe	A53 Gr.B	Typical
11	M11	N29	N27			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
12	M12	N32	N31			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
13	M13	N28	N26			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
14	M14	N33	N34			Hand Rail	Beam	Pipe	A53 Gr.B	Typical
15	M15	N43	N41			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
16	M16	N46	N45			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
17	M17	N42	N40			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
18	M18	N47	N48			Hand Rail	Beam	Pipe	A53 Gr.B	Typical
19	M19	N55	N52			RIGID	None	None	RIGID	Typical
20	M20	N56	N53			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
21	M21	N57	N54			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0.866025	0	-.5	0	
2	N2	6.495191	0	-3.750001	0	
3	N3	-0.866025	0	-.5	0	
4	N4	-6.495191	0	-3.750001	0	
5	N5	0	0	1	0	
6	N6	0	0	7.5	0	
7	N7	5	0	-3.75	0	
8	N8	-1.5	0	-3.75	0	
9	N9	5	4	-3.75	0	
10	N10	-1.5	5	-3.75	0	
11	N11	5	-2	-3.75	0	
12	N12	-1.5	-3	-3.75	0	
13	N13	0	0	9.5	0	
14	N14	-8.227241	0	-4.75	0	
15	N15	8.227241	0	-4.75	0	
16	N16	-5	0	-3.75	0	
17	N17	-5	4	-3.75	0	
18	N18	-5	-2	-3.75	0	
19	N19	6	2.5	-3.750001	0	
20	N20	-6	2.5	-3.750001	0	
21	N21	5	2.5	-3.75	0	
22	N22	-1.5	2.5	-3.75	0	
23	N23	-5	2.5	-3.75	0	
24	N24	-5.747595	0	-2.455127	0	
25	N25	-2.497595	0	3.174038	0	
26	N26	-5.747595	4	-2.455127	0	
27	N27	-2.497595	5	3.174038	0	
28	N28	-5.747595	-2	-2.455127	0	
29	N29	-2.497595	-3	3.174038	0	
30	N30	-0.747595	0	6.205127	0	
31	N31	-0.747595	4	6.205127	0	
32	N32	-0.747595	-2	6.205127	0	
33	N33	-6.247596	2.5	-3.321152	0	
34	N34	-0.247596	2.5	7.071153	0	
35	N35	-5.747595	2.5	-2.455127	0	
36	N36	-2.497595	2.5	3.174038	0	
37	N37	-0.747595	2.5	6.205127	0	
38	N38	0.747595	0	6.205127	0	
39	N39	3.997595	0	0.575962	0	
40	N40	0.747595	4	6.205127	0	
41	N41	3.997595	5	0.575962	0	
42	N42	0.747595	-2	6.205127	0	
43	N43	3.997595	-3	0.575962	0	
44	N44	5.747595	0	-2.455127	0	
45	N45	5.747595	4	-2.455127	0	
46	N46	5.747595	-2	-2.455127	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
47	N47	0.247596	2.5	7.071153	0	
48	N48	6.247596	2.5	-3.321152	0	
49	N49	0.747595	2.5	6.205127	0	
50	N50	3.997595	2.5	0.575962	0	
51	N51	5.747595	2.5	-2.455127	0	
52	N52	-5.5	2.5	-3.750001	0	
53	N53	5.5	2.5	-3.750001	0	
54	N54	-0.497596	2.5	6.63814	0	
55	N55	-5.997596	2.5	-2.888139	0	
56	N56	5.997596	2.5	-2.888139	0	
57	N57	0.497596	2.5	6.63814	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	Y	-.066	.5
2	M13	Y	-.066	.5
3	M17	Y	-.066	.5
4	M9	Y	-.066	5.5
5	M13	Y	-.066	5.5
6	M17	Y	-.066	5.5
7	M8	Y	-.052	2.5
8	M12	Y	-.052	2.5
9	M16	Y	-.052	2.5
10	M8	Y	-.052	5.5
11	M12	Y	-.052	5.5
12	M16	Y	-.052	5.5
13	M7	Y	-.077	.5
14	M11	Y	-.077	.5
15	M15	Y	-.077	.5
16	M7	Y	-.077	7.5
17	M11	Y	-.077	7.5
18	M15	Y	-.077	7.5
19	M7	Y	-.074	2.5
20	M11	Y	-.074	2.5
21	M15	Y	-.074	2.5
22	M7	Y	-.047	5
23	M11	Y	-.047	5
24	M15	Y	-.047	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	Y	-.087	.5

Member Point Loads (BLC 3 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M13	Y	-.087	.5
3	M17	Y	-.087	.5
4	M9	Y	-.087	5.5
5	M13	Y	-.087	5.5
6	M17	Y	-.087	5.5
7	M8	Y	-.073	2.5
8	M12	Y	-.073	2.5
9	M16	Y	-.073	2.5
10	M8	Y	-.073	5.5
11	M12	Y	-.073	5.5
12	M16	Y	-.073	5.5
13	M7	Y	-.205	.5
14	M11	Y	-.205	.5
15	M15	Y	-.205	.5
16	M7	Y	-.205	7.5
17	M11	Y	-.205	7.5
18	M15	Y	-.205	7.5
19	M7	Y	-.068	2.5
20	M11	Y	-.068	2.5
21	M15	Y	-.068	2.5
22	M7	Y	-.051	5
23	M11	Y	-.051	5
24	M15	Y	-.051	5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	X	.027	.5
2	M9	X	.027	5.5
3	M13	X	.037	.5
4	M17	X	.037	.5
5	M13	X	.037	5.5
6	M17	X	.037	5.5
7	M8	X	.015	2.5
8	M8	X	.015	5.5
9	M12	X	.031	2.5
10	M16	X	.031	2.5
11	M12	X	.031	5.5
12	M16	X	.031	5.5
13	M7	X	.045	.5
14	M7	X	.045	7.5
15	M11	X	.101	.5
16	M15	X	.101	.5
17	M11	X	.101	7.5
18	M15	X	.101	7.5
19	M7	X	.018	2.5
20	M7	X	.011	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	X	.07	.5
2	M9	X	.07	5.5

Member Point Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
3	M13	X	.104	.5
4	M17	X	.104	.5
5	M13	X	.104	5.5
6	M17	X	.104	5.5
7	M8	X	.037	2.5
8	M8	X	.037	5.5
9	M12	X	.09	2.5
10	M16	X	.09	2.5
11	M12	X	.09	5.5
12	M16	X	.09	5.5
13	M7	X	.117	.5
14	M7	X	.117	7.5
15	M11	X	.321	.5
16	M15	X	.321	.5
17	M11	X	.321	7.5
18	M15	X	.321	7.5
19	M7	X	.041	2.5
20	M7	X	.021	5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	Z	.037	.5
2	M9	Z	.037	5.5
3	M13	Z	.027	.5
4	M17	Z	.027	.5
5	M13	Z	.027	5.5
6	M17	Z	.027	5.5
7	M8	Z	.031	2.5
8	M8	Z	.031	5.5
9	M12	Z	.015	2.5
10	M16	Z	.015	2.5
11	M12	Z	.015	5.5
12	M16	Z	.015	5.5
13	M7	Z	.101	.5
14	M7	Z	.101	7.5
15	M11	Z	.045	.5
16	M15	Z	.045	.5
17	M11	Z	.045	7.5
18	M15	Z	.045	7.5
19	M11	Z	.018	2.5
20	M15	Z	.018	2.5
21	M11	Z	.011	5
22	M15	Z	.011	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M9	Z	.104	.5
2	M9	Z	.104	5.5
3	M13	Z	.07	.5
4	M17	Z	.07	.5
5	M13	Z	.07	5.5

Member Point Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
6	M17	Z	.07	5.5
7	M8	Z	.09	2.5
8	M8	Z	.09	5.5
9	M12	Z	.037	2.5
10	M16	Z	.037	2.5
11	M12	Z	.037	5.5
12	M16	Z	.037	5.5
13	M7	Z	.321	.5
14	M7	Z	.321	7.5
15	M11	Z	.117	.5
16	M15	Z	.117	.5
17	M11	Z	.117	7.5
18	M15	Z	.117	7.5
19	M11	Z	.041	2.5
20	M15	Z	.041	2.5
21	M11	Z	.021	5
22	M15	Z	.021	5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M6	X	.004	.004	0	0
2	M2	X	.004	.004	0	0
3	M3	X	.004	.004	0	0
4	M8	X	.002	.002	0	0
5	M7	X	.002	.002	0	0
6	M9	X	.002	.002	0	0
7	M14	X	.002	.002	0	0
8	M18	X	.002	.002	0	0
9	M4	X	.004	.004	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M6	X	.01	.01	0	0
2	M2	X	.01	.01	0	0
3	M3	X	.01	.01	0	0
4	M8	X	.007	.007	0	0
5	M7	X	.007	.007	0	0
6	M9	X	.007	.007	0	0
7	M14	X	.007	.007	0	0
8	M18	X	.007	.007	0	0
9	M4	X	.01	.01	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M5	Z	.004	.004	0	0
2	M3	Z	.004	.004	0	0
3	M1	Z	.004	.004	0	0
4	M4	Z	.004	.004	0	0
5	M6	Z	.004	.004	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
6	M10	Z	.002	.002	0	0
7	M14	Z	.002	.002	0	0
8	M18	Z	.002	.002	0	0
9	M16	Z	.002	.002	0	0
10	M15	Z	.002	.002	0	0
11	M17	Z	.002	.002	0	0
12	M12	Z	.002	.002	0	0
13	M11	Z	.002	.002	0	0
14	M13	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M5	Z	.01	.01	0	0
2	M3	Z	.01	.01	0	0
3	M1	Z	.01	.01	0	0
4	M4	Z	.01	.01	0	0
5	M6	Z	.01	.01	0	0
6	M10	Z	.007	.007	0	0
7	M14	Z	.007	.007	0	0
8	M18	Z	.007	.007	0	0
9	M16	Z	.007	.007	0	0
10	M15	Z	.007	.007	0	0
11	M17	Z	.007	.007	0	0
12	M12	Z	.007	.007	0	0
13	M11	Z	.007	.007	0	0
14	M13	Z	.007	.007	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Equipment Weight	None					24			
3	Ice Weight	None					24			
4	Wind w/ Ice X	None					20	9		
5	Wind X	None					20	9		
6	Wind w/ Ice Z	None					22	14		
7	Wind Z	None					22	14		

Load Combinations

	Description	Solve	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direc...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direc...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direc...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-direc...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N5	max	-.004	6	2.017	6	.088	1	-2.853	2	-.029	6	.787	2
2		min	-.776	2	.787	2	-2.782	5	-7.396	6	-2.205	2	-.057	6
3	N3	max	-.297	6	1.861	6	-.294	6	3.36	3	-.091	3	-.489	2
4		min	-2.295	1	.351	2	-1.313	1	.357	5	-1.199	5	-5.84	6
5	N1	max	1.117	4	2.01	3	1.232	2	3.565	3	.587	5	6.445	3
6		min	-2.231	2	.563	5	-1.045	4	.382	5	-.436	1	1.833	5
7	Totals:	max	0	6	5.741	6	0	3						
8		min	-5.292	1	2.395	2	-5.027	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	-.002	6	-.122	5	-.002	6	3.274e-03	5	3.138e-03	2	-2.008e-03	5
4		min	-.053	2	-.628	3	-.097	2	-1.687e-03	3	4.602e-04	6	-6.321e-03	1
5	N3	max	0	6	0	6	0	6	0	6	0	6	0	6
6		min	0	1	0	1	0	1	0	1	0	1	0	1
7	N4	max	-.002	6	-.01	2	.097	2	3.322e-03	5	2.721e-03	2	3.596e-03	6
8		min	-.053	2	-.556	6	.005	6	-2.475e-03	3	-1.81e-03	4	-2.475e-03	2
9	N5	max	0	6	0	6	0	6	0	6	0	6	0	6
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N6	max	.12	2	-.243	2	.003	5	6.023e-03	4	5.269e-04	5	3.713e-04	6
12		min	.004	6	-.632	6	0	1	1.934e-03	2	-1.064e-03	1	-5.157e-03	2
13	N7	max	-.002	6	-.093	5	.034	4	3.525e-03	5	3.263e-03	4	-1.17e-03	5
14		min	-.053	2	-.57	3	-.049	2	-1.35e-03	3	4.976e-04	3	-4.346e-03	1
15	N8	max	-.002	6	-.079	5	.185	4	3.265e-03	5	3.926e-04	2	4.929e-05	5
16		min	-.053	2	-.551	3	.007	3	-1.606e-03	3	-1.09e-03	4	-2.495e-03	2
17	N9	max	.24	2	-.092	5	.398	4	8.832e-03	4	5.61e-03	5	8.088e-04	4
18		min	-.026	4	-.571	3	.004	2	6.845e-04	2	6.556e-04	3	-6.331e-03	2
19	N10	max	.385	1	-.079	5	1.493	5	3.228e-02	5	-1.823e-04	3	1.166e-04	5
20		min	-.015	5	-.552	3	-.028	3	-3.096e-04	3	-3.086e-03	5	-9.622e-03	2
21	N11	max	-.036	6	-.093	5	.031	6	1.671e-03	5	3.263e-03	4	-1.169e-03	5
22		min	-.132	1	-.57	3	-.047	2	-1.348e-03	3	4.976e-04	3	-2.948e-03	1
23	N12	max	.026	1	-.079	5	.49	4	-6.669e-04	2	3.926e-04	2	3.874e-03	1
24		min	-.012	4	-.552	3	.042	2	-1.282e-02	4	-1.09e-03	4	-1.142e-04	6
25	N13	max	.095	2	-.289	2	.003	5	6.039e-03	4	5.269e-04	5	3.713e-04	6
26		min	.006	6	-.751	6	0	1	1.946e-03	2	-1.047e-03	1	-5.157e-03	2
27	N14	max	.007	4	.026	2	.153	2	3.316e-03	5	2.713e-03	2	3.61e-03	6
28		min	-.086	2	-.649	6	-.009	4	-2.483e-03	3	-1.796e-03	4	-2.465e-03	2
29	N15	max	-.007	6	-.125	5	-.012	6	3.268e-03	5	3.138e-03	2	-2.018e-03	5
30		min	-.091	2	-.746	3	-.162	2	-1.695e-03	3	4.565e-04	6	-6.334e-03	1
31	N16	max	-.002	6	-.064	2	.076	4	3.869e-03	5	1.76e-03	2	1.293e-03	4
32		min	-.053	2	-.518	6	.011	3	-2.018e-03	3	-3.113e-03	4	-3.333e-03	2
33	N17	max	.235	1	-.064	2	.469	5	9.419e-03	4	3.193e-03	1	-8.336e-04	6
34		min	.005	5	-.519	6	-.004	3	-5.278e-08	2	-6.622e-03	5	-6.057e-03	1
35	N18	max	.019	6	-.064	2	.089	1	3.869e-03	5	1.76e-03	2	1.293e-03	4
36		min	-.13	2	-.518	6	-.017	5	-2.018e-03	3	-3.113e-03	4	-3.185e-03	2
37	N19	max	.128	1	-.084	5	.181	4	5.505e-03	4	6.358e-03	1	6.597e-04	4
38		min	-.012	5	-.582	3	-.078	2	-3.474e-04	2	9.855e-04	6	-6.221e-03	2

Envelope Joint Displacements (Continued)

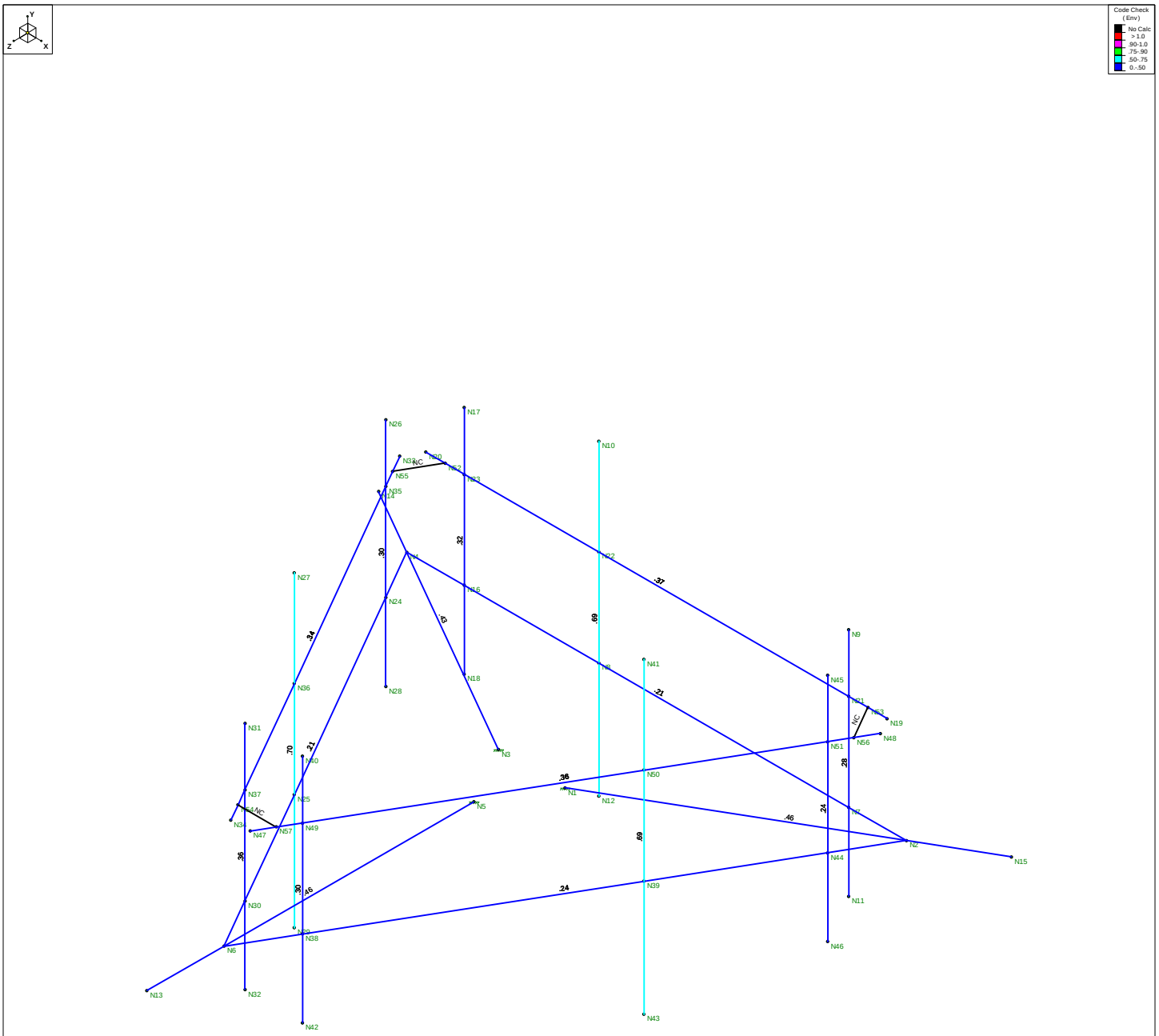
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
39	N20	max	.127	1	.011	2	.232	5	5.571e-03	5	4.519e-03	1	-1.02e-03	6
40		min	-.012	5	-.506	6	.005	3	-9.046e-07	3	-5.572e-03	4	-6.535e-03	1
41	N21	max	.128	1	-.092	5	.242	4	8.004e-03	4	5.61e-03	5	8.084e-04	4
42		min	-.012	5	-.57	3	-.008	2	6.842e-04	2	6.556e-04	3	-5.712e-03	2
43	N22	max	.128	1	-.079	5	.604	5	2.207e-02	5	-1.823e-04	3	1.164e-04	5
44		min	-.012	5	-.552	3	-.018	3	-3.081e-04	3	-3.086e-03	5	-5.617e-03	2
45	N23	max	.127	1	-.064	2	.302	5	8.703e-03	4	3.193e-03	1	-8.329e-04	6
46		min	-.012	5	-.518	6	-.005	3	-5.278e-08	2	-6.622e-03	5	-5.7e-03	1
47	N24	max	.002	3	-.018	2	.067	2	3.941e-03	5	3.773e-03	1	2.271e-03	4
48		min	-.042	5	-.525	6	.008	6	-9.556e-04	1	-1.561e-03	5	-2.967e-03	2
49	N25	max	.193	1	-.096	2	.047	5	3.25e-03	4	1.391e-03	5	1.951e-03	4
50		min	-.048	5	-.577	6	-.043	1	-7.916e-04	2	-9.93e-06	3	-3.468e-03	2
51	N26	max	.359	1	-.018	2	.365	5	6.719e-03	5	5.528e-03	2	8.275e-04	5
52		min	-.109	5	-.526	6	0	3	-2.527e-04	1	-4.287e-03	4	-8.973e-03	1
53	N27	max	1.392	2	-.096	2	.568	4	1.14e-02	4	3.029e-03	4	3.595e-03	4
54		min	-.222	4	-.578	6	-.343	2	-6.422e-03	2	-8.454e-04	2	-2.968e-02	2
55	N28	max	.044	6	-.018	2	.09	1	2.544e-03	5	3.773e-03	1	2.269e-03	4
56		min	-.038	2	-.525	6	-.025	5	-9.548e-04	1	-1.561e-03	5	-1.113e-03	2
57	N29	max	.491	1	-.096	2	.101	5	4.544e-04	3	1.391e-03	5	1.259e-02	1
58		min	.015	5	-.577	6	-.028	3	-3.212e-03	5	-9.93e-06	3	1.674e-03	6
59	N30	max	.147	1	-.175	2	.012	5	4.514e-03	4	1.397e-03	5	1.405e-03	6
60		min	.002	6	-.586	6	-.016	1	6.973e-04	2	-2.02e-03	1	-5.155e-03	2
61	N31	max	.568	2	-.174	2	.286	5	5.717e-03	5	1.969e-03	4	5.573e-04	4
62		min	-.018	6	-.587	6	-.097	1	-2.659e-03	1	-5.375e-03	2	-9.173e-03	2
63	N32	max	.036	4	-.175	2	-.032	2	4.366e-03	4	1.397e-03	5	1.405e-03	6
64		min	.023	2	-.586	6	-.093	4	6.972e-04	2	-2.02e-03	1	-5.155e-03	2
65	N33	max	.151	1	.027	2	.215	5	5.57e-03	5	4.517e-03	1	-1.021e-03	6
66		min	-.04	5	-.509	6	.008	3	-1.648e-06	3	-5.573e-03	4	-6.535e-03	1
67	N34	max	.351	2	-.199	2	.177	5	5.453e-03	5	8.451e-04	4	4.883e-04	6
68		min	-.008	6	-.59	6	-.018	2	-7.733e-04	1	-5.172e-03	1	-5.731e-03	2
69	N35	max	.2	1	-.018	2	.246	5	6.1e-03	5	5.528e-03	2	8.272e-04	5
70		min	-.095	5	-.525	6	.003	3	-2.526e-04	1	-4.287e-03	4	-8.146e-03	1
71	N36	max	.581	2	-.096	2	.257	4	7.388e-03	4	3.029e-03	4	3.589e-03	4
72		min	-.115	4	-.578	6	-.15	2	-6.414e-03	2	-8.454e-04	2	-1.948e-02	2
73	N37	max	.405	2	-.174	2	.184	5	5.36e-03	5	1.969e-03	4	5.571e-04	4
74		min	-.01	6	-.587	6	-.049	2	-2.658e-03	1	-5.375e-03	2	-8.458e-03	2
75	N38	max	.144	2	-.27	2	.014	2	4.285e-03	4	-3.244e-05	6	-6.438e-04	5
76		min	.004	6	-.578	6	0	6	1.206e-03	2	-1.714e-03	2	-5.787e-03	1
77	N39	max	.152	2	-.275	5	.028	5	3.447e-03	4	2.733e-03	2	-1.567e-03	6
78		min	.011	6	-.589	3	.003	3	1.165e-03	3	2.087e-05	6	-4.645e-03	1
79	N40	max	.562	2	-.272	2	.278	5	6.17e-03	5	-2.645e-04	5	4.916e-04	6
80		min	-.017	6	-.578	6	.002	3	-4.521e-04	3	-5.012e-03	1	-8.94e-03	2
81	N41	max	1.359	1	-.275	5	.56	4	1.165e-02	4	5.361e-03	1	-1.021e-03	6
82		min	.075	6	-.589	3	.087	3	1.541e-03	3	-7.606e-07	6	-2.95e-02	1
83	N42	max	.041	2	-.271	2	-.015	2	2.887e-03	4	-3.244e-05	6	-6.434e-04	5
84		min	-.013	6	-.578	6	-.075	4	1.205e-03	2	-1.714e-03	2	-3.93e-03	1
85	N43	max	.406	2	-.275	5	.076	5	1.686e-03	1	2.733e-03	2	1.141e-02	2
86		min	-.045	6	-.589	3	-.042	1	-3.029e-03	5	2.087e-05	6	-1.951e-03	4
87	N44	max	.022	5	-.166	5	.002	5	4.22e-03	5	4.309e-03	2	-1.62e-03	5
88		min	.001	3	-.588	3	-.063	1	5.165e-04	3	3.398e-04	6	-5.587e-03	1
89	N45	max	.387	2	-.167	5	.301	4	5.999e-03	4	7.762e-03	1	1.376e-04	6
90		min	.017	6	-.589	3	-.04	2	7.038e-04	3	9.913e-04	6	-8.798e-03	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
91	N46	max	-.016	5	-.166	5	-.024	3	4.072e-03	5	4.309e-03	2	-1.62e-03	5
92		min	-.127	1	-.588	3	-.097	4	5.165e-04	3	3.398e-04	6	-5.587e-03	1
93	N47	max	.351	2	-.233	2	.173	5	5.453e-03	5	8.474e-04	4	4.891e-04	6
94		min	-.008	6	-.587	6	.003	3	-7.733e-04	1	-5.172e-03	1	-5.73e-03	2
95	N48	max	.161	1	-.11	5	.166	4	5.504e-03	4	6.356e-03	1	6.601e-04	4
96		min	.009	6	-.588	3	-.097	2	-3.479e-04	2	9.857e-04	6	-6.221e-03	2
97	N49	max	.404	2	-.272	2	.169	5	5.551e-03	5	-2.645e-04	5	4.912e-04	6
98		min	-.008	6	-.578	6	.01	3	-4.517e-04	3	-5.012e-03	1	-8.113e-03	2
99	N50	max	.554	1	-.275	5	.241	4	7.634e-03	4	5.361e-03	1	-1.017e-03	6
100		min	.044	6	-.589	3	.041	3	1.534e-03	3	-7.606e-07	6	-1.929e-02	1
101	N51	max	.231	1	-.167	5	.194	4	5.641e-03	4	7.762e-03	1	1.375e-04	6
102		min	.02	6	-.589	3	-.057	2	7.032e-04	3	9.913e-04	6	-8.083e-03	2
103	N52	max	.127	1	-.028	2	.265	5	5.571e-03	5	4.519e-03	1	-1.021e-03	6
104		min	-.012	5	-.513	6	0	3	-9.046e-07	3	-5.574e-03	4	-6.536e-03	1
105	N53	max	.128	1	-.087	5	.21	4	5.505e-03	4	6.358e-03	1	6.605e-04	4
106		min	-.012	5	-.576	3	-.04	2	-3.474e-04	2	9.859e-04	6	-6.221e-03	2
107	N54	max	.378	2	-.185	2	.18	5	5.452e-03	5	8.462e-04	4	4.887e-04	6
108		min	-.008	6	-.588	6	-.033	2	-7.741e-04	1	-5.174e-03	1	-5.73e-03	2
109	N55	max	.174	1	.005	2	.232	5	5.571e-03	5	4.519e-03	1	-1.021e-03	6
110		min	-.069	5	-.517	6	.005	3	-9.046e-07	3	-5.574e-03	4	-6.536e-03	1
111	N56	max	.194	1	-.14	5	.181	4	5.505e-03	4	6.358e-03	1	6.605e-04	4
112		min	.014	6	-.589	3	-.078	2	-3.474e-04	2	9.859e-04	6	-6.221e-03	2
113	N57	max	.378	2	-.254	2	.17	5	5.452e-03	5	8.462e-04	4	4.887e-04	6
114		min	-.008	6	-.582	6	.006	3	-7.741e-04	1	-5.174e-03	1	-5.73e-03	2

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...			phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
1	M11	PIPE_2.0	.699	3	1	.078	5.5		2	14.916	32.13	1.872	1.872	1.4...	H1-...
2	M7	PIPE_2.0	.694	3	4	.100	5.5		5	14.916	32.13	1.872	1.872	4.1...	H1-...
3	M15	PIPE_2.0	.690	3	1	.115	5.5		1	14.916	32.13	1.872	1.872	1.53	H1-...
4	M1	HSS4X4X4	.461	0	3	.069	0	y	1	103....	139....	16.181	16.181	1.9...	H1-...
5	M2	HSS4X4X4	.461	0	6	.085	0	y	1	103....	139....	16.181	16.181	1.9...	H1-...
6	M3	HSS4X4X4	.431	0	6	.065	0	y	4	103....	139....	16.181	16.181	1.9...	H1-...
7	M10	PIPE_2.0	.371	11	4	.435	11.5		4	6.831	32.13	1.872	1.872	3.3...	H3-6
8	M18	PIPE_2.0	.364	11	2	.432	1		2	6.831	32.13	1.872	1.872	2.6...	H3-6
9	M12	PIPE_2.0	.359	2	1	.127	2		1	20.867	32.13	1.872	1.872	2.3...	H1-...
10	M14	PIPE_2.0	.336	11.5	1	.471	11.5		1	6.831	32.13	1.872	1.872	1.8...	H3-6
11	M8	PIPE_2.0	.321	2	4	.121	2		4	20.867	32.13	1.872	1.872	2.0...	H1-...
12	M13	PIPE_2.0	.300	2	1	.099	2		4	20.867	32.13	1.872	1.872	1.9...	H1-...
13	M17	PIPE_2.0	.296	2	2	.111	2		1	20.867	32.13	1.872	1.872	1.8...	H1-...
14	M9	PIPE_2.0	.278	2	4	.082	2		2	20.867	32.13	1.872	1.872	2.1...	H1-...
15	M16	PIPE_2.0	.244	2	4	.111	2		2	20.867	32.13	1.872	1.872	2.0...	H1-...
16	M4	HSS4X4X4	.241	12...	1	.047	12...	y	3	68.852	139....	16.181	16.181	3.4...	H1-...
17	M5	HSS4X4X4	.212	12...	6	.055	12...	z	4	68.852	139....	16.181	16.181	3.0...	H1-...
18	M6	HSS4X4X4	.208	12...	3	.057	12...	z	1	68.852	139....	16.181	16.181	3.02	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTNH039A - Mount	July 30, 2020 at 10:29 AM
20074.60	Unity Check	Mount.R3D

Exhibit F

Power Density/RF Emissions Report

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: CTNH039A

NH039/Laydon Construc
69 Wheeler Street
New Haven, Connecticut 06512

August 18, 2020

EBI Project Number: 6220004030

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**42.07%**

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

August 18, 2020

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

Emissions Analysis for Site: CTNH039A - NH039/Laydon Construc

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **69 Wheeler Street** in **New Haven, Connecticut** 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 ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 69 Wheeler Street in New Haven, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 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.

5) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

8) 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.

9) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

10) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

11) 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.

12) 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

13) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels

are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

14) The antenna mounting height centerline of the proposed antennas is 98 feet above ground level (AGL).

15) 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.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A1 MPE %:	**9.60%**	Antenna B1 MPE %:	**9.60%**	Antenna C1 MPE %:	**9.60%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 15.45 dBd / 16.45 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	13,114.79	ERP (W):	13,114.79	ERP (W):	13,114.79
Antenna A2 MPE %:	**7.05%**	Antenna B2 MPE %:	**7.05%**	Antenna C2 MPE %:	**7.05%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A3 MPE %:	**4.81%**	Antenna B3 MPE %:	**4.81%**	Antenna C3 MPE %:	**4.81%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	21.46%
Sprint	9.69%
AT&T	10.92%
Site Total MPE % :	42.07%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	21.46%
T-Mobile Sector B Total:	21.46%
T-Mobile Sector C Total:	21.46%
Site Total MPE % :	42.07%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE	2	6412.98	98.0	48.01	2500 MHz LTE	1000	4.80%
T-Mobile 2500 MHz NR	2	6412.98	98.0	48.01	2500 MHz NR	1000	4.80%
T-Mobile 600 MHz LTE	2	591.73	98.0	4.43	600 MHz LTE	400	1.11%
T-Mobile 600 MHz NR	1	1577.94	98.0	5.91	600 MHz NR	400	1.48%
T-Mobile 700 MHz LTE	2	695.22	98.0	5.20	700 MHz LTE	467	1.11%
T-Mobile 1900 MHz UMTS	2	1052.26	98.0	7.88	1900 MHz UMTS	1000	0.79%
T-Mobile 1900 MHz LTE	2	2104.51	98.0	15.76	1900 MHz LTE	1000	1.58%
T-Mobile 2100 MHz UMTS	2	1324.71	98.0	9.92	2100 MHz UMTS	1000	0.99%
T-Mobile 1900 MHz GSM	4	1028.30	98.0	15.40	1900 MHz GSM	1000	1.54%
T-Mobile 1900 MHz LTE	2	2056.61	98.0	15.40	1900 MHz LTE	1000	1.54%
T-Mobile 2100 MHz LTE	2	2307.55	98.0	17.28	2100 MHz LTE	1000	1.73%
						Total:	**21.46%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	21.46%
Sector B:	21.46%
Sector C:	21.46%
T-Mobile Maximum MPE % (Sector A):	21.46%
Site Total:	42.07%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **42.07%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Mailing Receipts/Proof of Notice

View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialogue box that appears. Note: If your browser does not support this function, select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a scheduled Pickup
   - Your driver will pickup your shipment(s) as usual.

   Customers without a scheduled Pickup
   - Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY NJ

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH NJ

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ

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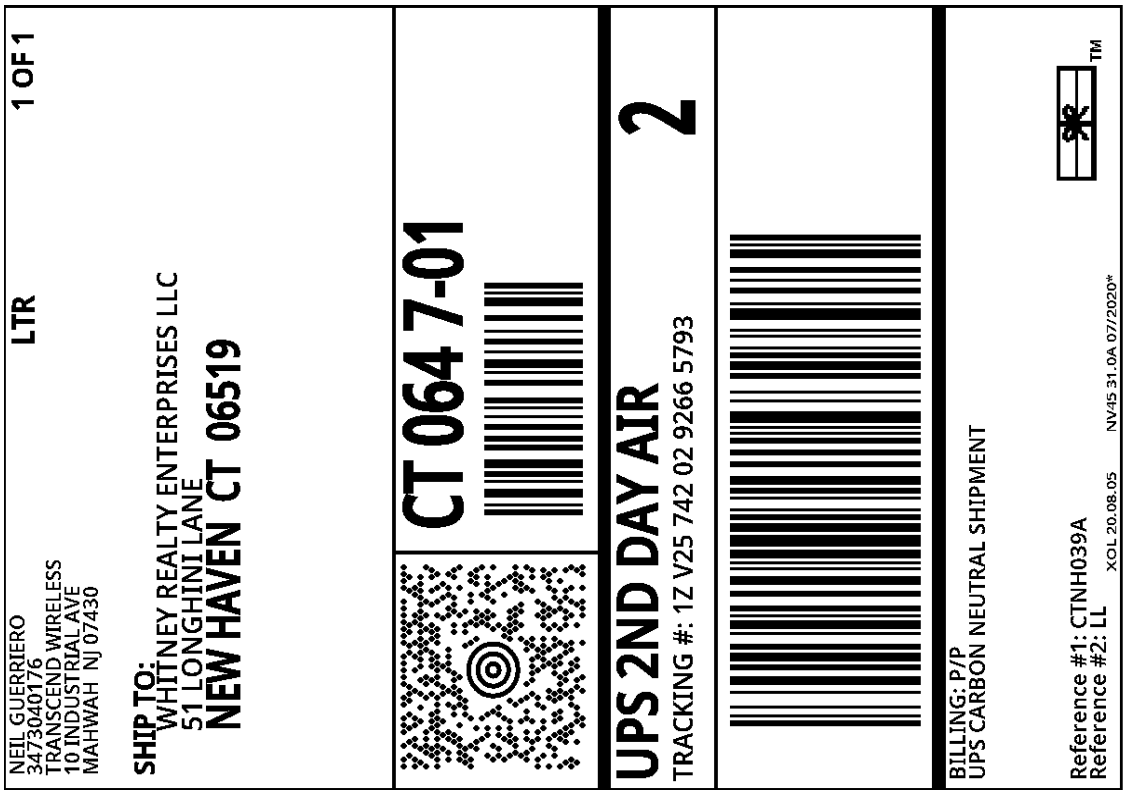


View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialogue box that appears. Note: If your browser does not support this function, select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a scheduled Pickup
   - Your driver will pickup your shipment(s) as usual.

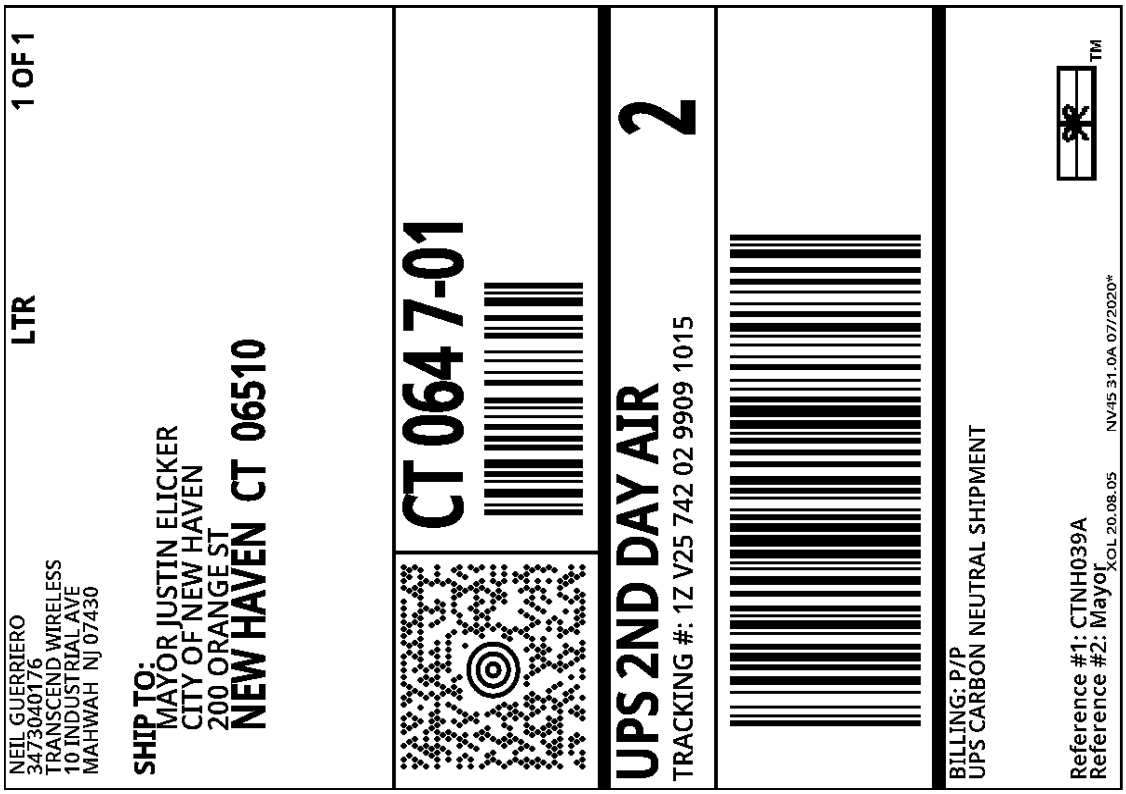
   Customers without a scheduled Pickup
   - Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY NJ

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH NJ

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY NJ

FOLD HERE



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