Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 8, 2020

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

RE: Notice of Exempt Modification
100 Reef Road, Fairfield, CT 06824
Latitude: 41.13949500
Longitude: -73.25726300
T-Mobile Site#: CT11401A – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 135-foot level of the existing 145-foot monopole tower at 100 Reef Road, Fairfield, CT. The 145-foot monopole tower and property are owned by the Town of Fairfield. T-Mobile now intends to remove three (3) existing antennas and add nine (9) new 600/700/1900/2100/2500 MHz antennas. The new antennas will be installed at the same 135-foot level of the tower. Mount modifications will also be required as detailed in the enclosed mount analysis.

Planned Modifications:
Tower:

Remove
(6) 1-5/8" coax
(1) 1-5/8" hybrid

Remove and Replace:
(3) AIR 21 1900/2100 MHz for (3) AIR 32 1900/2100 MHz

Install New:
(3) AIR 6449 B41 2500 MHz
(3) APXVARR24_43 600/700/1900 MHz
(3) Ericsson Radio 4449
(3) Ericsson Radio 4415
(9) 1-5/8" Hybrid

Existing to Remain:
(3) AIR 21 1900/2100 MHz
(3) TMA

(6) 1-5/8” coax
(1) 1-5/8” Hybrid

Ground:
Install New: 6160 Cabinet

This tower facility was originally approved by the Town of Fairfield on January 6, 1994. Documentation provided by the Town of Fairfield on the original approval is enclosed. This original approval did not come with conditions. T-Mobile has been subsequently approved by the Connecticut Siting Council for equipment modifications.

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 First Selectman -Brenda Kupchick, Elected Official, and Jim Wendt, Planning Director for the Town of Fairfield.

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,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Brenda Kupchick – First Selectman of the Town of Fairfield
Jim Wendt– Planning Director for the Town of Fairfield

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog 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 Daily Pickup
   Your driver will pickup your shipment(s) as usual.

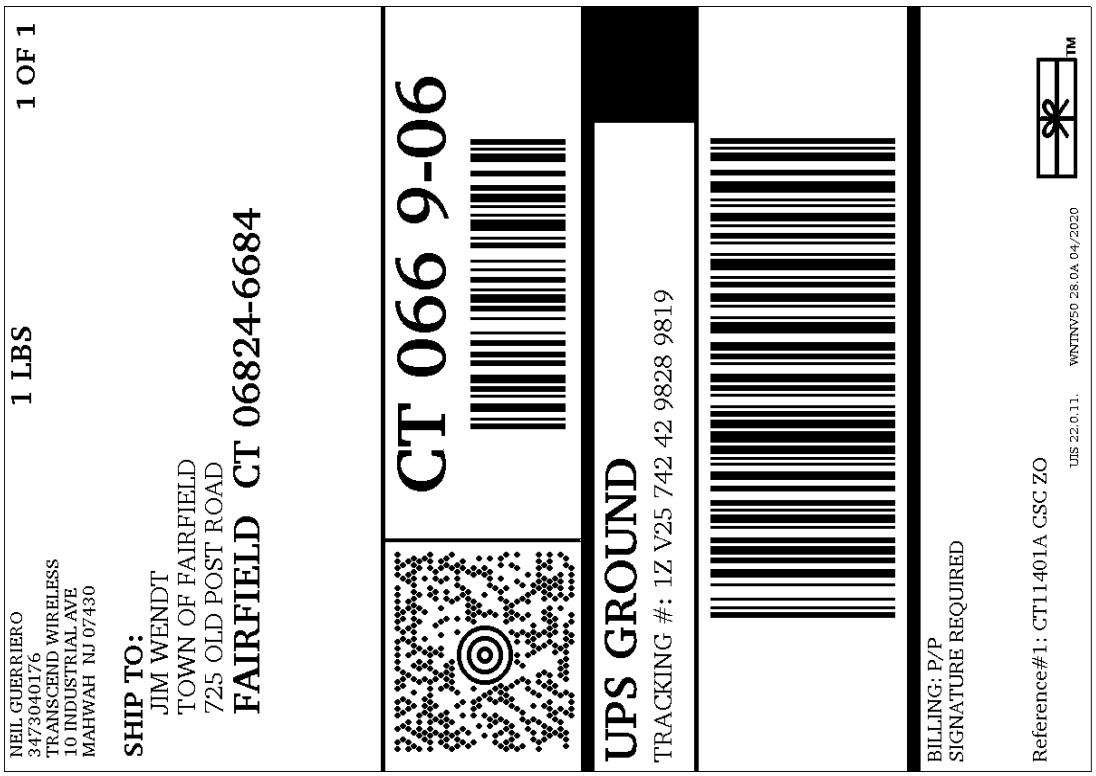
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE



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

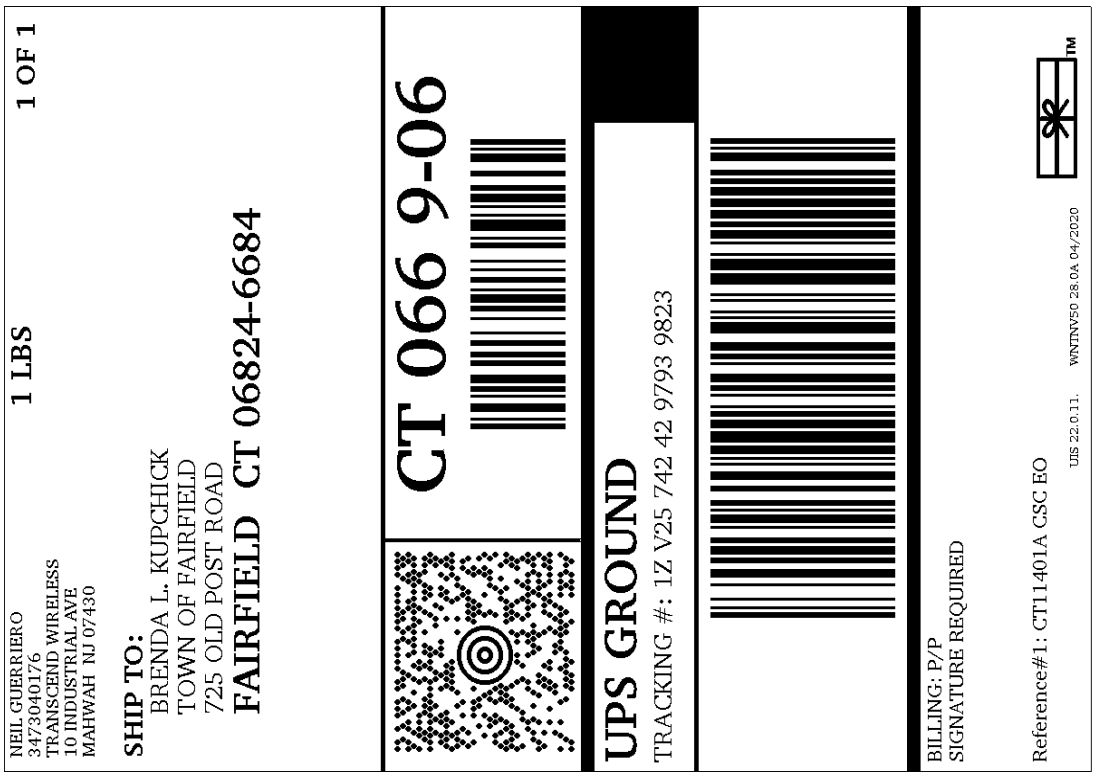
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE



100 REEF ROAD

Location	100 REEF ROAD	**Mblu**	182/ 670/ / /
Acct#	05288	**Owner**	FAIRFIELD TOWN OF
Assessment	$4,450,390	**Appraisal**	$6,357,700
PID	16390	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$4,826,700	$1,531,000	$6,357,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$3,378,690	$1,071,700	$4,450,390

Owner of Record

Owner	FAIRFIELD TOWN OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	725 OLD POST ROAD FAIRFIELD, CT 06824	**Book & Page**	0137/0640
		Sale Date	01/01/1800

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
FAIRFIELD TOWN OF	$0		0137/0640	01/01/1800

Building Information

Building 1 : Section 1

Year Built:	1975
Living Area:	24,580
Replacement Cost:	$5,708,959
Building Percent Good:	68
Replacement Cost Less Depreciation:	$3,882,100

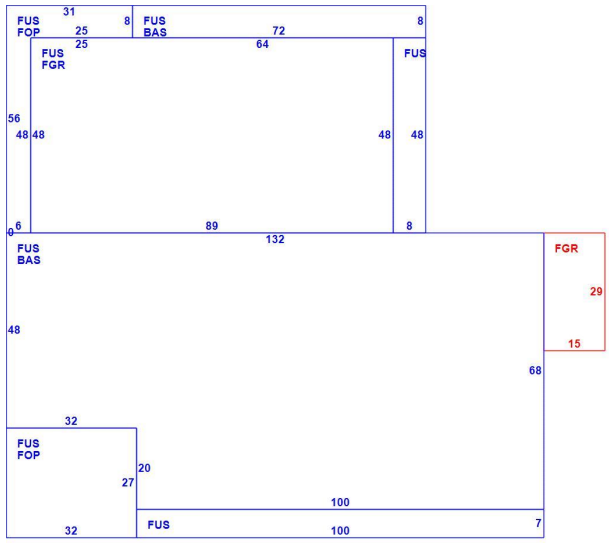
Building Attributes

Field	Description
STYLE	Police Station
MODEL	Ind/Comm
Stories:	2
Occupancy	1.00
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Minim/Masonry
Interior Wall 2	Drywall
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	Carpet
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	Police Dept
Total Rooms	
Total Bedrms	00
Total Baths	0
Liv Area	
Effect Area	
1st Floor Use:	9031
Heat/AC	Heat/AC Split
Frame Type	Fireprf Steel
Baths/Plumbing	Average

Building Photo

(http://images.vgsi.com/photos2/FairfieldCTPhotos//\02\05\41\59.jpg)

Building Layout



(ParcelSketch.ashx?pid=16390&bid=14800)

Building Sub-Areas (sq ft)			
Code	Description	Gross Area	Living Area
FUS	Upper Story, Finished	15,668	15,668
BAS	First Floor	8,912	8,912
FGR	Garage	4,707	0
FOP	Porch, Open, Finished	1,400	0
		30,687	24,580

Building 2 : Section 1

Year Built: 1953
Living Area: 8,000
Replacement Cost: $1,119,760
Building Percent Good: 56
Replacement Cost Less Depreciation: $627,100

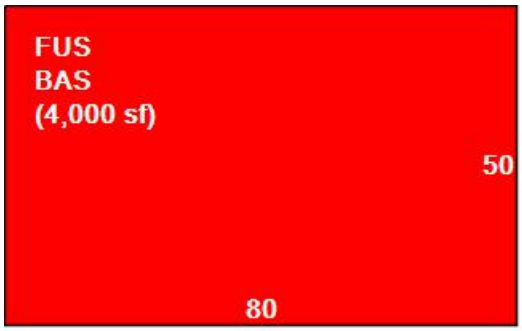
Building Attributes : Bldg 2 of 2

Field	Description
STYLE	Office
MODEL	Ind/Comm
Stories:	2
Occupancy	1.00
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Plastered
Interior Wall 2	Minim/Masonry
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	Police Dept
Total Rooms	
Total Bedrms	00
Total Baths	0
Liv Area	
Effect Area	
1st Floor Use:	9031
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Average

Building Photo

(http://images.vgsi.com/photos2/FairfieldCTPhotos//default.jpg)

Building Layout



(ParcelSketch.ashx?pid=16390&bid=14801)

Building Sub-Areas (sq ft)			
Code	Description	Gross Area	Living Area
BAS	First Floor	4,000	4,000
FUS	Upper Story, Finished	4,000	4,000
		8,000	8,000

Extra Features

Extra Features				
Code	Description	Size	Value	Bldg #
MEZ1	MEZZANINE-UNF	1760.00 S.F.	$27,500	1
SPR1	SPRINKLERS-WET	8000.00 S.F.	$10,300	2
ELV1	PASS ELEV	2.00 STOPS	$39,200	2

VLT1	VAULT-AVG	84.00 S.F.	$19,100	1
ELV1	PASS ELEV	2.00 STOPS	$47,600	1
ELV2	FREIGHT ELEV	2.00 STOPS	$34,000	1
SPAN	SOLAR PANELS	80.00 UNITS	$0	1

Land

Land Use

Use Code	9031
Description	Police Dept
Zone	A
Neighborhood	C3
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.50
Depth	0
Assessed Value	$1,071,700
Appraised Value	$1,531,000

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
LT1	LIGHTS-IN W/PL			9.00 UNITS	$6,500	1
FN3	FENCE-6' CHAIN			300.00 L.F.	$2,700	1
PAV1	PAVING-ASPHALT			40000.00 S.F.	$126,000	1
SHD2	W/LIGHTS ETC			300.00 S.F.	$4,600	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$4,826,700	$1,531,000	$6,357,700
2018	$4,826,700	$1,531,000	$6,357,700
2017	$4,826,700	$1,531,000	$6,357,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
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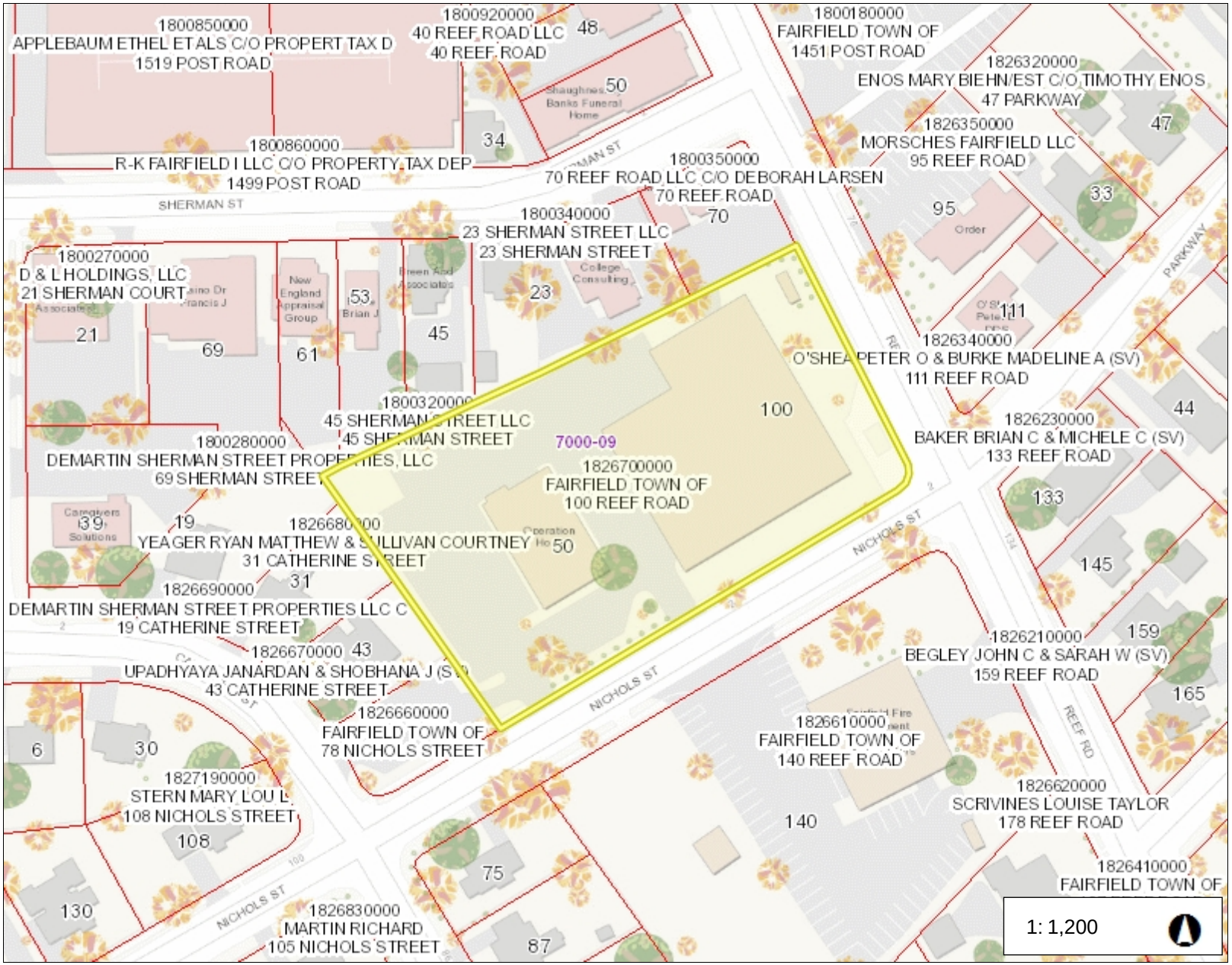
Town of Fairfield

Title



Legend

- Parcels
- Local Basin Boundary
  - Major
  - Regional
  - Subregional
  - Local
- Local Basin Area

200.0 0 100.00 200.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG
Connecticut Metropolitan Council of Governments

100 REEF ROAD

#23334

THE TOWN OF FAIRFIELD

5-25-94

Map: 182 Parcel: 67C Zone: A

Replacement of existing antenna w/150' antenna + 10' x 20' Equipment Shelter. See Site Plan & Structurals in ZBA files. 1/6/94

Revised Plans 6/22/94

100 REEF ROAD

#26225

Town of Fairfield

4-30-98

Installation of telecommunications antennas and associated equipment

Map: 182 Parcel: 670 Zone: A & B

ZBA APPROVED 4-02-98.

100 REEF ROAD

#27953

Town of Fairfield

9/28/00

Map: 182 Parcel: 670 Zone; A

Install additional panel antenna on existing nonpole structure @ 110 feet level.-Voice stream.

ZBA APPROVED: 8/3/00

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

FAIRFIELD DOWNTOWN AREA
SITE ID: CT11401A
100 REEF ROAD,
FAIRFIELD, CT 06824

T-MOBILE RF CONFIGURATION

67D5992DB_3xAIR+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

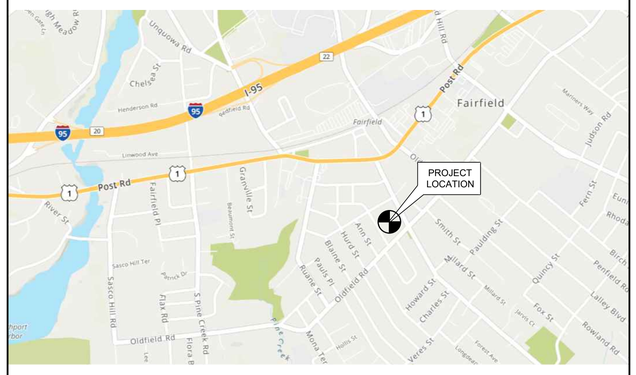
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 100 REEF ROAD
FAIRFIELD, CT 06824

1.	HEAD SOUTH ON GRIFFIN ROAD TOWARD W NEWBERRY ROAD.	
2.	TURN LEFT ONTO W NEWBERRY ROAD.	0.07 MI.
3.	TURN RIGHT ONTO WOODLAND AVE.	0.51 MI.
4.	TURN RIGHT ONTO WINTONBURY AVE.	2.49 MI.
5.	TURN LEFT ONTO TUNXIS AVE./CT-189. CONTINUE TO FOLLOW CT-189.	0.22 MI.
6.	TURN RIGHT ONTO COTTAGE GROVE RD./CT-218. CONTINUE TO FOLLOW CT-218.	1.03 MI.
7.	CT-218 BECOMES N MAIN ST.	2.69 MI.
8.	MERGE ONTO I-84 W/US-6 W TOWARD WATERBURY.	3.52 MI.
9.	MERGE ONTO CT-9 S VIA EXIT 39A TOWARDS NEW BRITAIN/NEWINGTON.	1.21 MI.
10.	TAKE THE MILL ST./CT-372 EXIT 22	8.73 MI.
11.	KEEP LEFT AT THE FORK IN THE RAMP.	0.13 MI.
12.	MERGE.	0.28 MI.
13.	TAKE CT-15 S.	0.06 MI.
14.	MERGE ONTO CT-8 S VIA EXIT 52 TOWARD BRIDGEPORT.	36.65 MI.
15.	MERGE ONTO I-95 S TOWARD NY CITY.	5.93 MI.
16.	TAKE THE CT-135/N BENSON ROAD, EXIT 22.	3.73 MI.
17.	TURN LEFT ONTO N BENSON RD./CT-135.	0.16 MI.
18.	TURN RIGHT ONTO POST ROAD/US-1 S.	0.21 MI.
19.	TURN LEFT ONTO REEF ROAD.	0.61 MI.
20.	100 REEF RD., FAIRFIELD, CT, 06824 IS ON THE RIGHT.	0.11 MI.

SITE COORDINATES: LATITUDE: 41° 8' 22.18" N
LONGITUDE: 73° 15' 26.14" W
GROUND ELEVATION: 36'± 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 EXISTING 100 AMP PANEL FOR NEW 200 AMP PPC CABINET
2. REMOVE XMU FROM EXISTING RBS6131 CABINET, IF PRESENT.
3. REPLACE BB5216 WITH (1) BB6630 FOR L2100, L1900 (BOTH CARRIERS), L700 AND L600 IN EXISTING RBS6131 CABINET, IF NOT ALREADY DONE.
4. INSTALL (1) BB6630 FOR N600 TO EXISTING RBS6131 CABINET.
5. REMOVE NORTEL CABINET.
6. INSTALL (1) ENCLOSURE 6160.
7. INSTALL (1) BATTERY CABINET B160.
8. INSTALL (1) iXRe ROUTER TO NEW ENCLOSURE 6160.
9. INSTALL (3) BB6630 FOR L2500, (1) BB6648 FOR N2500, TO NEW ENCLOSURE 6160.
10. REMOVE (6) COAXIAL LINES FOR NEW TOTAL OF (6) COAXIAL LINES.
11. REMOVE 9X18 HCS.
12. ADD (9) 6X12 HCS (3) PER SECTOR: (1) FOR AIR32 DB, (1) FOR RADIO 4449, (1) FOR ANCHOR A&L EQUIPMENT). LENGTH OF NEW HCS ON EACH SECTOR TO BE DETERMINED.
13. INSTALL STABILIZER KIT. SEE SHEET C-4 FOR DETAIL.
14. INSTALL (1) LOW-BAND/MID-BAND OCTO TO POSITION 2.
15. INSTALL (1) RADIO 4449 B71+B85 FOR L600, L700 AND N600 TO POSITION 2 ANTENNA AND CONNECT ITS PORTS TO THE LOW-BAND PORTS OF THE OCTO ANTENNA.
16. INSTALL (1) RADIO 4415 B25 FOR L1900 2ND CARRIER TO POSITION 2 AT ANTENNA AND CONNECT ITS PORTS TO THE MID-BAND PORTS OF THE OCTO ANTENNA.
17. REPLACE AIR21 B2P/B4A FOR L2100 IN POSITION 3 WITH (1) AIR32 B66A/B2A DB FOR L2100 AND L1900 1ST CARRIER IN POSITION 3.
18. INSTALL (1) AIR6449 B41 FOR L2500 AND N2500 TO NEW POSITION 4.

PROJECT SUMMARY (STRUCTURAL)

FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) C-4 FOR ADDITIONAL DETAILS. NEED TO INSTALL MOUNT STABILIZER KIT.

PROJECT INFORMATION

SITE NAME:	FAIRFIELD DOWNTOWN AREA
SITE ID:	CT11401A
SITE ADDRESS:	100 REEF ROAD FAIRFIELD, CT 06824
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° 8' 22.18" N LONGITUDE: 73° 15' 26.14" W GROUND ELEVATION: 36'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	ROOF PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C-3	ANTENNA PLANS	0
C-4	TYPICAL EQUIPMENT DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS	0

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100 REEF ROAD
FAIRFIELD, CT 06824

DATE: 06/16/20
SCALE: AS NOTED
JOB NO. 20074.37

TITLE SHEET

T-1

Sheet No. 1 of 7

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–110 MPH (3 SECOND GUST)
- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMIMAL DESIGN SPEED (OTHER STRUCTURE): 97 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.

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 CONSTRUCTION, 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 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 IT'S 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 MFR.'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 SITE OWNER'S 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 CONDUIT 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 "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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GENERAL NOTES AND SPECIFICATIONS

N–1

Sheet No. 2 of 7

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) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	135'	90°		(E) GENERIC TWIN STYLE 1B (1)	(3) 6x12 HYBRID CABLE (±180')
A2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	135'	90°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		
A3	PROPOSED	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	135'	90°			
A4	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	135'	90°			
B1	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	135'	210°		(E) GENERIC TWIN STYLE 1B (1)	(3) 6x12 HYBRID CABLE (±180')
B2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	135'	210°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		
B3	PROPOSED	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	135'	210°			
B4	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	135'	210°			
C1	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	135'	330°		(E) GENERIC TWIN STYLE 1B (1)	(3) 6x12 HYBRID CABLE (±180')
C2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	135'	330°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		
C3	PROPOSED	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	135'	330°			
C4	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	135'	330°			

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

TRUE NORTH

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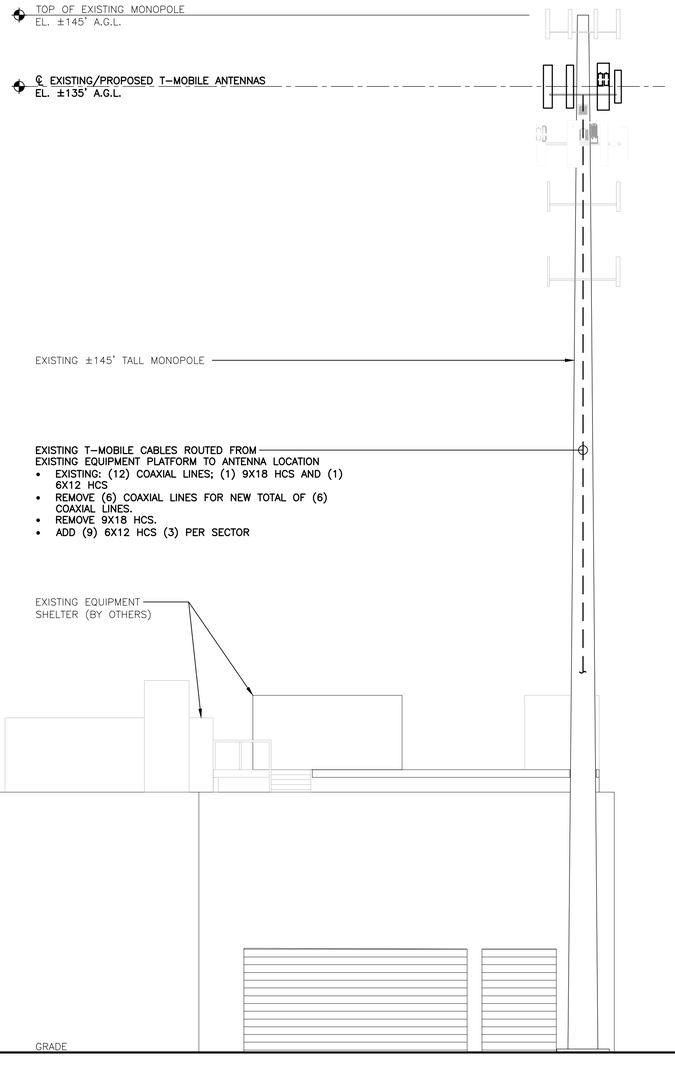
SITE LOCATION PLAN

C-1

Sheet No. 3 of 7



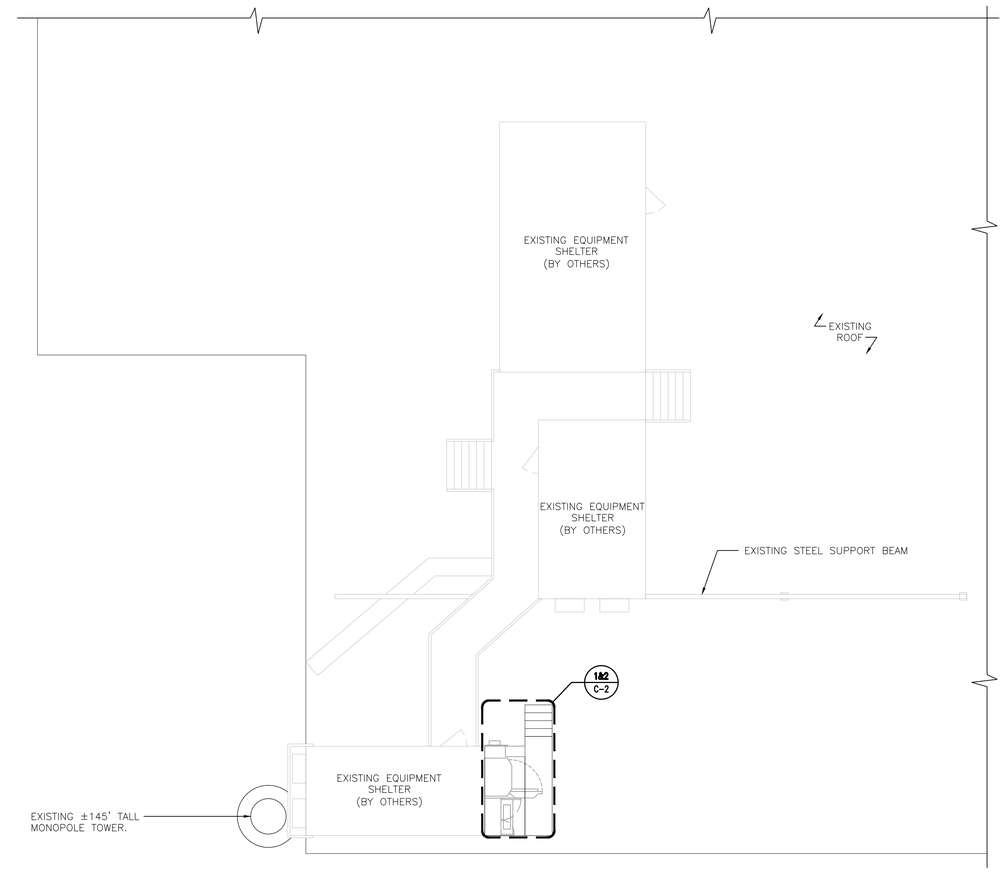
4 C-2 TOWER ELEVATION - PROPOSED

SCALE: 1" = 10'

GRAPHIC SCALE

10 0 5 10 20 40

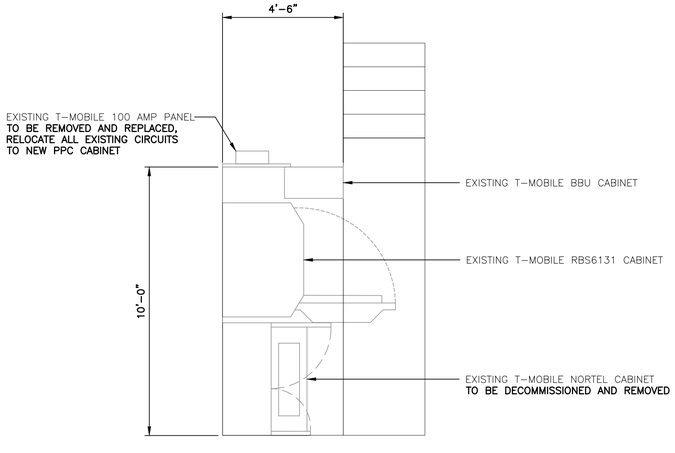
1" = 10'-0"



3 C-2 PARTIAL ROOF PLAN - PROPOSED

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

APPROXIMATE NORTH



1 C-2 EXISTING EQUIPMENT PLAN

SCALE: 1/2" = 1'

APPROXIMATE NORTH

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 DEFICIENT AND WARRANTING MODIFICATION PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT. FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) C-4 FOR ADDITIONAL DETAILS

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.37) DATED 06/15/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

EQUIPMENT PLATFORM

A STRUCTURAL ANALYSIS OF THE EQUIPMENT PLATFORM 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 # 20074.37) DATED 06/17/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

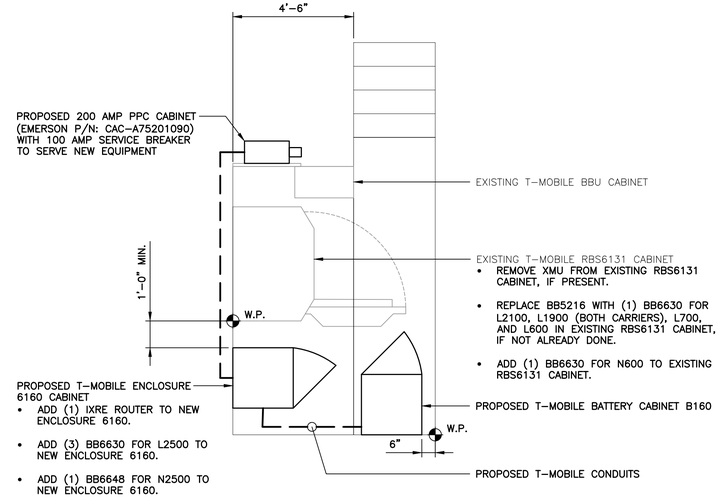
A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.37) DATED 06/15/20 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.



2 C-2 PROPOSED EQUIPMENT PLAN

SCALE: 1/2" = 1'

APPROXIMATE NORTH

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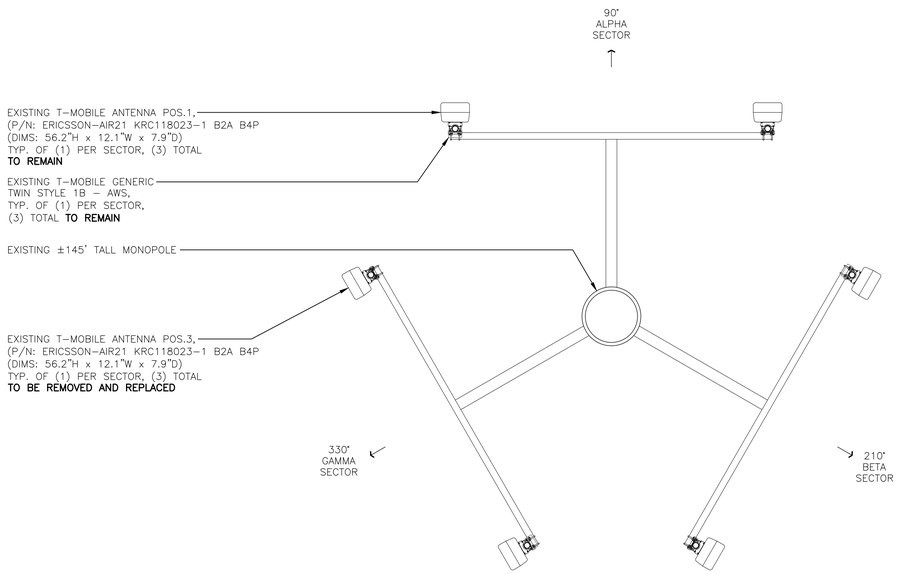
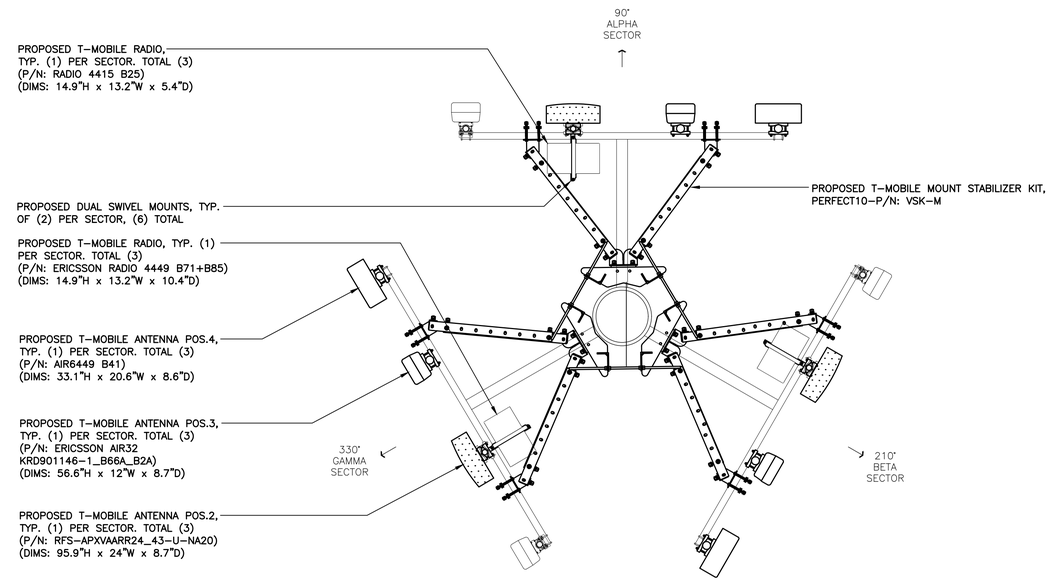
ROOF PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

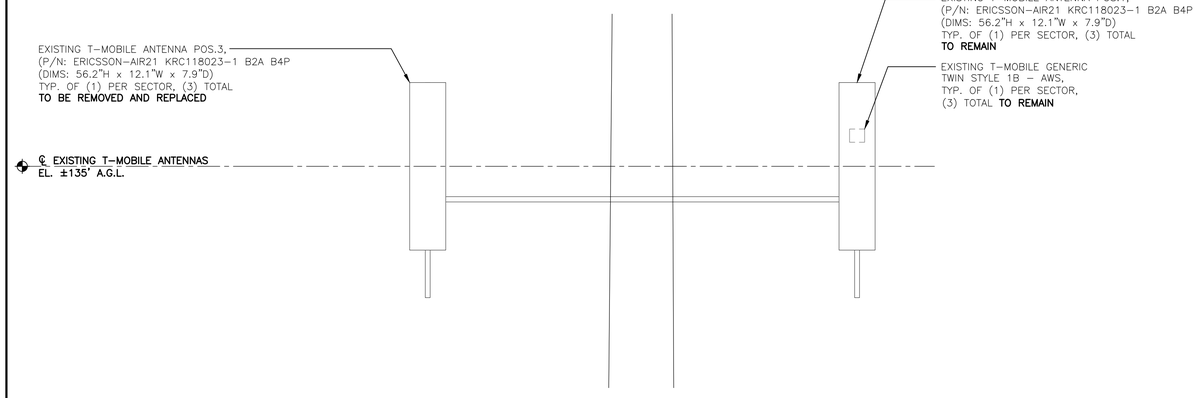
Sheet No. 4 of 7



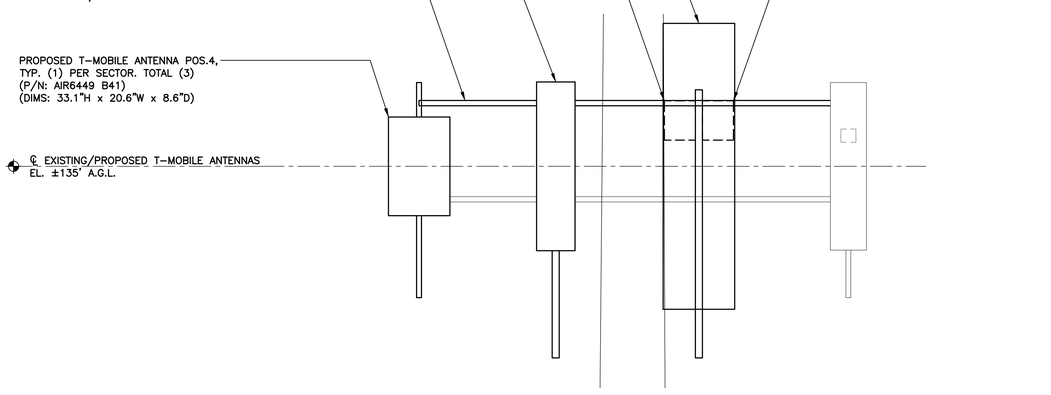
1 C-3 **EXISTING ANTENNA PLAN**
SCALE: 3/8" = 1'-0"
TRUE NORTH



2 C-3 **PROPOSED ANTENNA PLAN**
SCALE: 3/8" = 1'-0"
TRUE NORTH



1A C-3 **EXISTING ANTENNA ELEVATION**
SCALE: 3/8" = 1'-0"



2A C-3 **PROPOSED ANTENNA ELEVATION**
SCALE: 3/8" = 1'-0"

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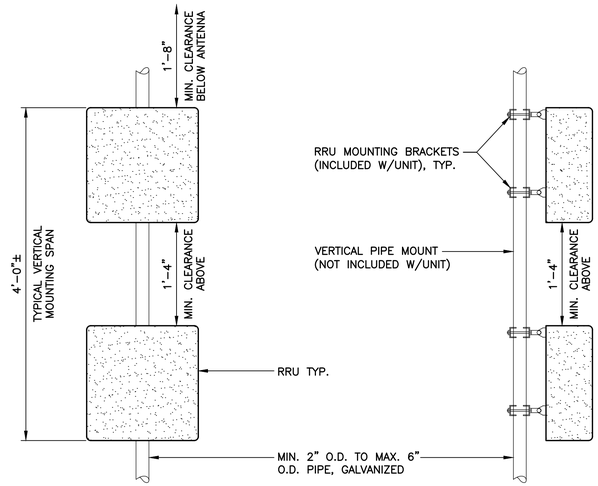
ANTENNA PLANS

C-3

Sheet No. 5 of 7



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 RRUS MOUNTING DETAILS**
SCALE: NOT TO SCALE

SIDE FRONT FRONT

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43–U–NA20	95.9"L x 24"W x 8.7"D	±128 LBS.
MAKE: ERICSSON MODEL: AIR32 B66A B2A	56.6"L x 12.9"W x 8.7"D	±132.2 LBS.
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 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

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

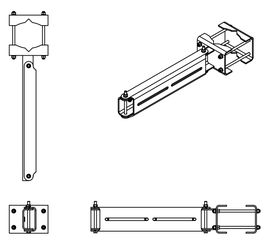
3 / C-4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

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

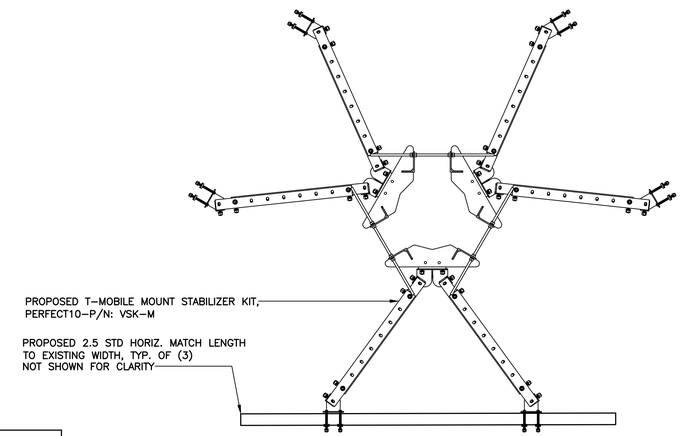
EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

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



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.

6 / C-4 **RRH DUAL SWIVEL MOUNT DETAIL**
SCALE: NOT TO SCALE



7 / C-4 **MOUNT STABILIZER DETAIL**
SCALE: NOT TO SCALE

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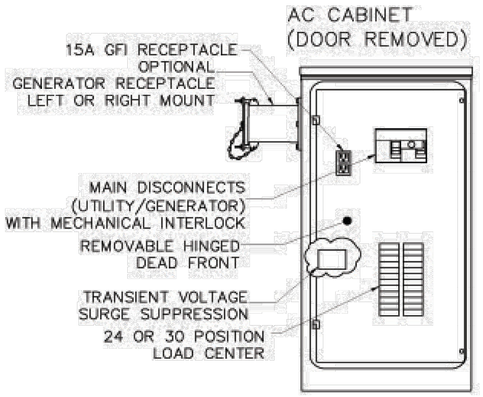
TYPICAL EQUIPMENT DETAILS

C-4

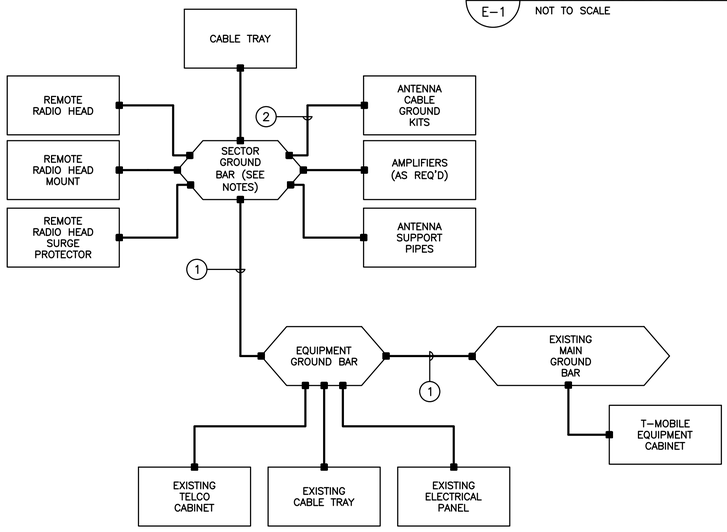
Sheet No. 6 of 7



PPC CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: CAC-A75201090	40.0"H x 20.0"W x 10.0"D	±80 LBS

1 E-1 PPC CABINET DETAIL

NOT TO SCALE



GROUNDING SCHEMATIC NOTES

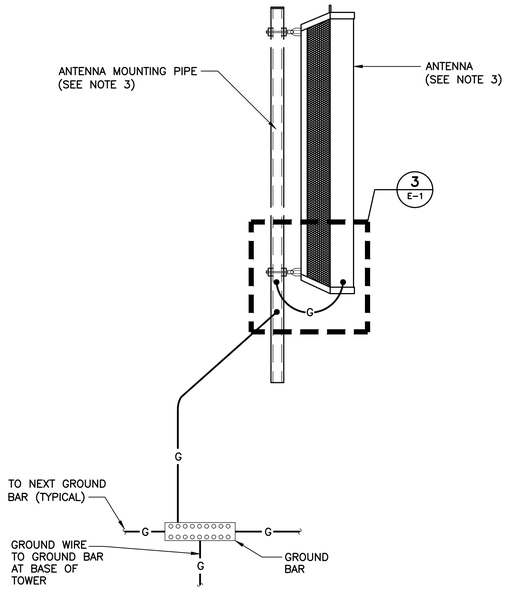
1. #2 AWG
2. #6 AWG

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

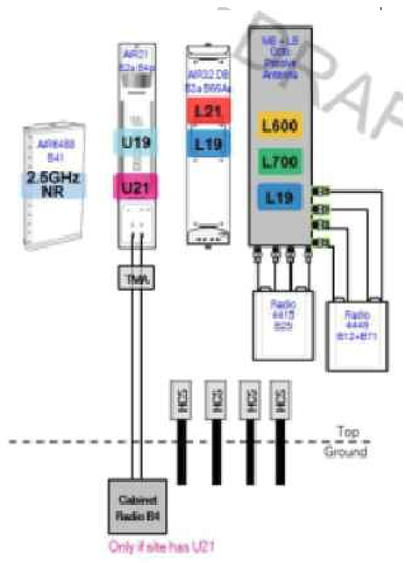


NOTES:

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.

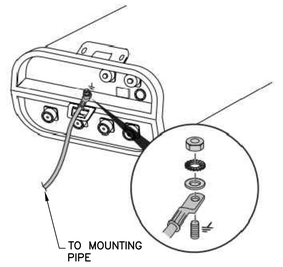
2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

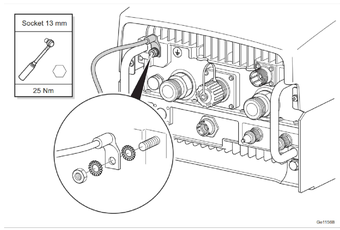
SCALE: NOT TO SCALE



5 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE



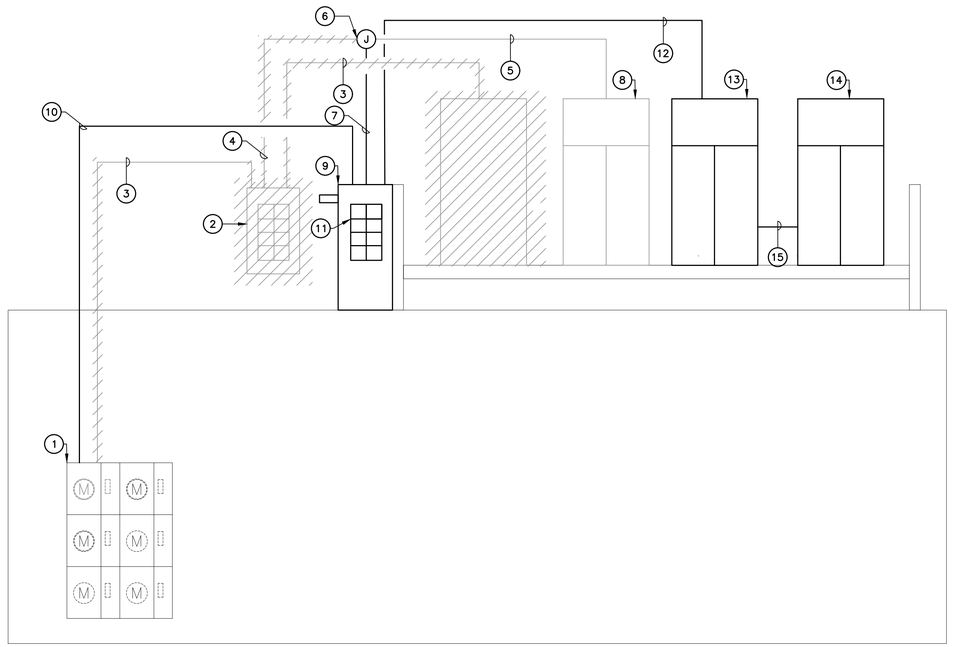


3 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

1. EXISTING 200A, METER TO REMAIN.
2. EXISTING 100A ELECTRICAL PANEL TO BE REMOVED AND REPLACED
3. EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED
4. SECTION OF EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED.
5. SECTION OF CONDUITS AND CONDUCTORS TO REMAIN.
6. JUNCTION BOX SIZED PER N.E.C. AS REQUIRED.
7. EXTEND EXISTING CONDUITS AND CONDUCTORS TO NEW PPC CABINET.
8. EXISTING CABINET TO REMAIN.
9. NEW 200A PPC CABINET.
10. (3) 300 KCMIL, (1) #3 AWG GROUND, 2–1/2" CONDUIT. CONDUIT ROUTING TO FOLLOW ROUTING OF EXISTING TO BE REMOVED CONDUIT
11. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
12. (3) #1 AWG, (1) #8 AWG GROUND, 1–1/4" CONDUIT.
13. NEW T–MOBILE EQUIPMENT CABINET
14. NEW T–MOBILE BATTERY CABINET
15. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
16. ROUTE CONDUITS ALONG ROOF ON SLEEPERS. ALL CONDUITS MUST BE ELEVATED MORE THAN 3–1/2" ABOVE ROOF (LESS THAN 3–1/2" WILL REQUIRE SIGNIFICANT INCREASE IN CONDUCTOR SIZE DUE TO DERATING REQUIREMENTS). COORDINATE ROUTING WITH CIVIL DRAWINGS AND WITH OWNER.



6 E-1 ELECTRICAL POWER RISER DIAGRAM

NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/06/20	KAWJR	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

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

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY

FAIRFIELD DOWNTOWN AREA
SITE ID: CT11401A
100 REEF ROAD
FAIRFIELD, CT 06824

DATE: 06/16/20
SCALE: AS NOTED
JOB NO. 20074.37

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 7 of 7

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

145' Existing Monopole Tower

Proposed T-Mobile
Antenna Upgrade

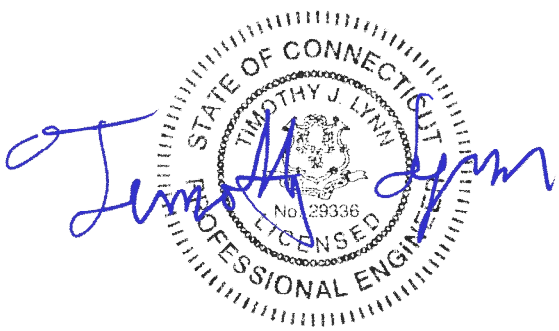
T-Mobile Site Ref: CT11401A

100 Reef Road
Fairfield, CT

Centek Project No. 20074.37

Date: June 15, 2020

Max Stress Ratio = 98.8%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

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 Fairfield, Connecticut.

The host tower is a 145-ft tall, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Valmont Industries, Inc; order no. 11635-94 dated May 19, 1994. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents. The tower was reinforced per a previous structural analysis report prepared by KMB Design Group job no. 332.1475 dated February 26, 2014.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Centek job no. 18000.61 dated February 28, 2019, a previous structural analysis report prepared by Ramaker & Associates dated April 1, 2019 and a RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 23.61-in at the top and 48.69-in at the base.

Antenna and Appurtenance Summary

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

- UNKNOWN (EXISTING):
  Antennas: Two (2) 4-bay dipole antennas and one (1) 12-ft Omni antenna mounted on (3) T-Arms (Nextel) with an elevation of 143-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- NEXTEL (EXISTING):
  Antennas: Nine (9) 5-ft panel antennas mounted on (3) T-Arms with a RAD center elevation of 143-ft above grade level.
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: One (1) 4-bay dipole antenna mounted to one (1) T-Mobile T-Arm.
  Coax Cables: One (1) 7/8" ∅ coax cable running on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: One (1) 12-ft Omni antenna mounted to one (1) Sprint T-Arm.
  Coax Cables: One (1) 7/8" ∅ coax cable running on the inside of the existing tower.

- AT&T (EXISTING TO REMAIN):
  Antennas: Three (3) Powerwave 7770 panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas, three (3) Kathrein 800-10965 panel antenna, three (3) CCI HPA-65R-BUU-H6 panel antennas, six (6) Kaelus DBCT108F1V92-1 diplexers, three (3) Ericsson RRUS-32 remote radio heads, six (6) Ericsson 4478 remote radio heads, three (3) Ericsson 4426 B66 remote radio heads, one (1) DC/Fiber squid and one (1) DC squid, six (6) LGP21401 TMAs, three (3) Ericsson RRUS-11, three (3) Ericsson RRUS-12 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on (3) T-Arms with a RAD center elevation of 127-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables, two (2) fiber cables and six (6) dc control cables running on the inside of the existing tower.
- SPRINT (EXISTING/RESERVED):
  Antennas: Three (3) Commscope NNVV-65B-R4 panel antennas, three (3) Nokia AAHC panel antennas, three (3) ALU 1900 MHz RRHs and six (6) ALU 800 MHz RRHs mounted to a low profile platform with a RAD center elevation of 110-ft above grade level.
  Coax Cables: Four (4) 1-1/4" ∅ Hybriflex cables running on the exterior of the existing tower.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) Ericsson AIR21 panel antennas and three (3) TMAs mounted on (3) T-Arms with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ and one (1) 6x12 fiber cables running on the exterior of the existing tower.
- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Three (3) Ericsson AIR21 panel antennas mounted on (3) T-Arms with a RAD center elevation of 135-ft above grade level.
  Cables: Six (6) 1-5/8" ∅ coax cables and one (1) 9x18 fiber cable running on the exterior of the existing tower.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson 4449 remote radio units and three (3) Ericsson 4415 remote radio units mounted on (3) T-Arms with a RAD center elevation of 135-ft above grade level.
  Cables: Nine (9) 6x12 fiber cables running on the exterior of the existing tower.
  Mount Modifications: One (1) Perfect10 t-arm stabilizer kit (p/n VSK-M)

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 coax cables to be installed as indicated in this report.

Analysis

The existing monopole 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:	Fairfield County; v = 90-110 mph	*[Annex B of TIA-222-G-2005]*
	Fairfield; v = 97 mph	*[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 **98.8%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	59.08'-90.83'	98.8%	**PASS**

Foundation and Anchors

The existing foundation consists of a 6.5 ∅ x 25.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural report. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure.

- 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	57 kips
	Compression	54 kips
	Moment	5501 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	76.3%	**PASS**
	Lateral Deflection	0.82 in.	**PASS**

- 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	Tension	93.5%	**PASS**
Base Plate	Bending	81.6%	**PASS**

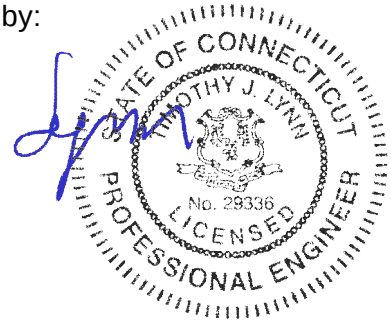
C o n c l u s i o n

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.

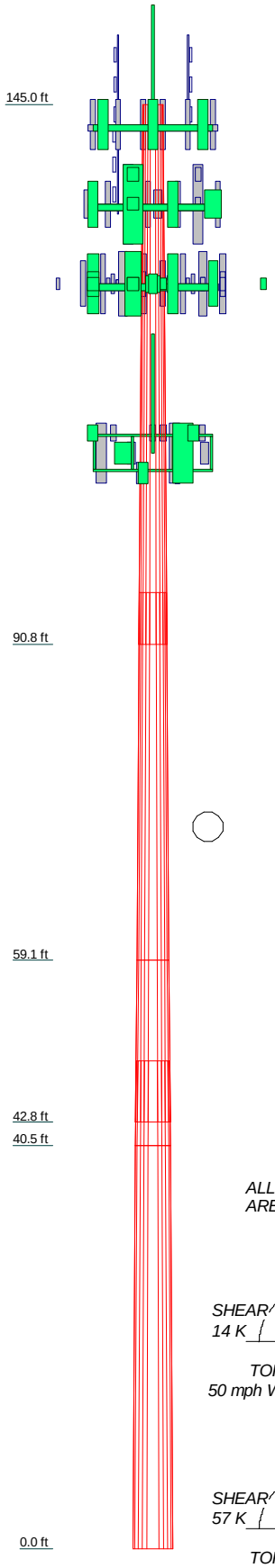
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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.

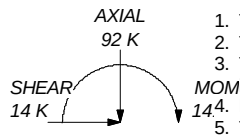
tnxTower Features:

- 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.

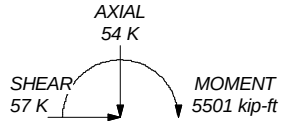
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	54.170	12	0.281	5.170	23.610	33.480	A572-65	4.7
2	36.920	12	0.375		31.976	38.686		5.3
3	16.250	12	0.481	6.170	38.686	41.640	53ksi	3.4
4	8.500	12	0.542		39.557	41.316		2.0
5	40.500	12	0.622		41.316	48.690	54ksi 57ksi	12.3
								27.7



ALL REACTIONS ARE FACTORED



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



TORQUE 1 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 3/4"x8'	143	(2) LGP21401 TMA (ATI)	127
10' Dipole	143	RRUS-11 (ATI)	127
10' Dipole	143	RRUS-11 (ATI)	127
12' x 3" Dia Omni	143	RRUS-11 (ATI)	127
(3) 5' Panel Antenna (Nextel)	143	RRUS-12 (ATI)	127
(3) 5' Panel Antenna (Nextel)	143	RRUS-12 (ATI)	127
(3) 5' Panel Antenna (Nextel)	143	RRUS-12 (ATI)	127
Valmont T-Arm (1) (Nextel)	143	80010965 (ATI)	127
Valmont T-Arm (1) (Nextel)	143	80010965 (ATI)	127
Valmont T-Arm (1) (Nextel)	143	80010965 (ATI)	127
AIR21 B2A/B4P (T-Mobile)	135	HPA-65R-BUU-H6 (ATI)	127
APXVAARR24-43 (T-Mobile - Proposed)	135	HPA-65R-BUU-H6 (ATI)	127
		HPA-65R-BUU-H6 (ATI)	127
AIR32 (T-Mobile - Proposed)	135	RRUS-32 (ATI)	127
AIR6449 (T-Mobile - Proposed)	135	RRUS-32 (ATI)	127
AIR21 B2A/B4P (T-Mobile)	135	RRUS-32 (ATI)	127
APXVAARR24-43 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
AIR32 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
AIR6449 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
AIR21 B2A/B4P (T-Mobile)	135	4426 B66 (ATI)	127
APXVAARR24-43 (T-Mobile - Proposed)	135	4426 B66 (ATI)	127
		4426 B66 (ATI)	127
AIR32 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
AIR6449 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
4449 B12,B71 (T-Mobile - Proposed)	135	B14 4478 (ATI)	127
4449 B12,B71 (T-Mobile - Proposed)	135	(2) DBCT108F1V92-1 (ATI)	127
4449 B12,B71 (T-Mobile - Proposed)	135	(2) DBCT108F1V92-1 (ATI)	127
4415 B25 (T-Mobile - Proposed)	135	(2) DBCT108F1V92-1 (ATI)	127
4415 B25 (T-Mobile - Proposed)	135	DC6-48-60-18-8F Surge Arrestor (ATI)	127
4415 B25 (T-Mobile - Proposed)	135	DC6-48-60-18-8F Surge Arrestor (ATI)	127
ATMAA1412D-1A20 TMA (T-Mobile)	135	DC6-48-60-18-8F Surge Arrestor (ATI)	127
ATMAA1412D-1A20 TMA (T-Mobile)	135	Valmont T-Arm (1) (ATI)	127
ATMAA1412D-1A20 TMA (T-Mobile)	135	Valmont T-Arm (1) (ATI)	127
T-Arm Stablizer - VSK-M (T-Mobile - Proposed)	135	Valmont T-Arm (1) (ATI)	127
		NNVV-65B-R4 (Sprint)	110
Valmont T-Arm (1) (T-Mobile)	135	NNVV-65B-R4 (Sprint)	110
Valmont T-Arm (1) (T-Mobile)	135	NNVV-65B-R4 (Sprint)	110
Valmont T-Arm (1) (T-Mobile)	135	AAHC (Sprint)	110
10' Dipole	135	AAHC (Sprint)	110
7770.00 (ATI)	127	AAHC (Sprint)	110
7770.00 (ATI)	127	(2) FD-RRH 2x50 800 (Sprint)	110
7770.00 (ATI)	127	(2) FD-RRH 2x50 800 (Sprint)	110
P65-16-XLH-RR (ATI)	127	(2) FD-RRH 2x50 800 (Sprint)	110
P65-16-XLH-RR (ATI)	127	FD-RRH 4x45 1900 (Sprint)	110
P65-16-XLH-RR (ATI)	127	FD-RRH 4x45 1900 (Sprint)	110
(2) LGP21401 TMA (ATI)	127	FD-RRH 4x45 1900 (Sprint)	110
(2) LGP21401 TMA (ATI)	127	13' Platform w/rails (Sprint)	110
		12' x 3" Dia Omni	110

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	54ksi	54 ksi	65 ksi
53ksi	53 ksi	65 ksi	57ksi	57 ksi	65 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: 98.8%

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

Job:	**20074.37 - CT11401A**		
Project:	**145-ft Valmont Monopole - 100 Reef Rd, Fairfield, CT**		
Client: T-Mobile		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 06/15/20	Scale: NTS
Path: J:\Jobs\20074\00.WI\37_CT11401A\05_Structural\Tower Analysis\Backup Documentation\ER\145' Valmont Monopole_ Fairfield 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	145.000-90.830	54.170	5.170	12	23.610	33.480	0.281	1.124	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	90.830-59.080	36.920	0.000	12	31.976	38.686	0.375	1.500	A572-65 (65 ksi)
L3	59.080-42.830	16.250	6.170	12	38.686	41.640	0.481	1.923	53ksi (53 ksi)
L4	42.830-40.500	8.500	0.000	12	39.557	41.316	0.542	2.168	54ksi (54 ksi)
L5	40.500-0.000	40.500		12	41.316	48.690	0.622	2.490	57ksi (57 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	24.344	21.109	1466.346	8.352	12.230	119.898	2971.215	10.389	5.574	19.838
	34.562	30.039	4225.938	11.885	17.343	243.673	8562.897	14.784	8.220	29.251
L2	33.944	38.158	4863.800	11.313	16.564	293.644	9855.378	18.780	7.565	20.172
	39.918	46.260	8666.428	13.715	20.039	432.472	17560.534	22.768	9.363	24.968
L3	39.881	59.136	11017.508	13.677	20.039	549.795	22324.458	29.105	9.080	18.888
	42.939	63.709	13775.897	14.735	21.570	638.674	27913.702	31.355	9.871	20.535
L4	42.083	68.103	13231.561	13.967	20.491	645.741	26810.730	33.518	9.148	16.876
	42.582	71.174	15103.388	14.597	21.402	705.707	30603.559	35.030	9.620	17.746
L5	42.554	81.556	17238.368	14.568	21.402	805.464	34929.607	40.139	9.405	15.11
	50.188	96.334	28409.836	17.208	25.221	1126.417	57566.029	47.412	11.381	18.285

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 145.000-90.830				1	1	1			
L2 90.830-59.080				1	1	1			
L3 59.080-42.830				1	1	1			
L4 42.830-40.500				1	1	1			
L5 40.500-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
HYBRIFLEX 1-1/4" (Sprint)	C	Yes	Surface Ar (CaAa)	110.000 - 12.000	4	4	0.000 0.000	1.540		0.001
1 5/8 (T-Mobile)	B	Yes	Surface Ar (CaAa)	130.000 - 12.000	6	3	0.000 0.000	1.980		0.001
HYBRIFLEX 1-5/8"	C	Yes	Surface Ar	130.000 -	9	9	0.000	1.980		0.002

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
(T-Mobile - Proposed)			(CaAa)	12.000			0.000			
Fiber Trunk	A	Yes	Surface Ar	122.000 -	1	1	0.000	0.400		0.001
(AT&T)			(CaAa)	12.000			0.000			
DC Trunk	A	Yes	Surface Ar	122.000 -	4	4	0.000	0.400		0.000
(AT&T)			(CaAa)	12.000			0.000			

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
1 5/8	A	No	Yes	Inside Pole	122.000 -	12	No Ice	0.000	0.001
(AT&T - Existing)					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 1/4	C	No	Yes	Inside Pole	143.000 -	3	No Ice	0.000	0.001
					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
7/8	C	No	Yes	Inside Pole	135.000 -	1	No Ice	0.000	0.001
					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
7/8	C	No	Yes	Inside Pole	110.000 -	1	No Ice	0.000	0.001
					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1 1/4	C	No	Yes	Inside Pole	143.000 -	12	No Ice	0.000	0.001
(Nextel)					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
Fiber Trunk	A	No	Yes	Inside Pole	122.000 -	1	No Ice	0.000	0.001
(AT&T)					12.000		1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
DC Trunk	A	No	Yes	Inside Pole	122.000 -	2	No Ice	0.000	0.000
(AT&T)					12.000		1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000

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	145.000-90.830	A	0.000	0.000	6.234	0.000	0.472
		B	0.000	0.000	23.267	0.000	0.244
		C	0.000	0.000	81.610	0.000	1.320
L2	90.830-59.080	A	0.000	0.000	6.350	0.000	0.481
		B	0.000	0.000	18.860	0.000	0.198
		C	0.000	0.000	76.136	0.000	1.057
L3	59.080-42.830	A	0.000	0.000	3.250	0.000	0.246
		B	0.000	0.000	9.652	0.000	0.101
		C	0.000	0.000	38.968	0.000	0.541
L4	42.830-40.500	A	0.000	0.000	0.466	0.000	0.035
		B	0.000	0.000	1.384	0.000	0.015
		C	0.000	0.000	5.587	0.000	0.078

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
L5	40.500-0.000	A	0.000	0.000	5.700	0.000	0.431
		B	0.000	0.000	16.929	0.000	0.178
		C	0.000	0.000	68.343	0.000	0.948

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	145.000-90.830	A	1.702	0.000	0.000	31.353	0.000	0.795
		B		0.000	0.000	45.750	0.000	1.198
		C		0.000	0.000	126.835	0.000	2.802
L2	90.830-59.080	A	1.628	0.000	0.000	31.936	0.000	0.810
		B		0.000	0.000	37.083	0.000	0.971
		C		0.000	0.000	122.189	0.000	2.476
L3	59.080-42.830	A	1.566	0.000	0.000	15.354	0.000	0.393
		B		0.000	0.000	18.429	0.000	0.469
		C		0.000	0.000	61.436	0.000	1.205
L4	42.830-40.500	A	1.535	0.000	0.000	2.201	0.000	0.056
		B		0.000	0.000	2.642	0.000	0.067
		C		0.000	0.000	8.809	0.000	0.173
L5	40.500-0.000	A	1.430	0.000	0.000	25.177	0.000	0.653
		B		0.000	0.000	31.349	0.000	0.776
		C		0.000	0.000	105.803	0.000	2.006

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	HYBRIFLEX 1-1/4"	90.83 - 110.00	1.0000	1.0000
L1	7	1 5/8	90.83 - 130.00	1.0000	1.0000
L1	8	HYBRIFLEX 1-5/8"	90.83 - 130.00	1.0000	1.0000
L1	11	Fiber Trunk	90.83 - 122.00	1.0000	1.0000
L1	12	DC Trunk	90.83 - 122.00	1.0000	1.0000
L3	1	HYBRIFLEX 1-1/4"	42.83 - 59.08	1.0000	1.0000
L3	7	1 5/8	42.83 - 59.08	1.0000	1.0000
L3	8	HYBRIFLEX 1-5/8"	42.83 - 59.08	1.0000	1.0000
L3	11	Fiber Trunk	42.83 - 59.08	1.0000	1.0000
L3	12	DC Trunk	42.83 - 59.08	1.0000	1.0000
L5	1	HYBRIFLEX 1-1/4"	12.00 - 40.50	1.0000	1.0000
L5	7	1 5/8	12.00 - 40.50	1.0000	1.0000
L5	8	HYBRIFLEX 1-5/8"	12.00 - 40.50	1.0000	1.0000
L5	11	Fiber Trunk	12.00 - 40.50	1.0000	1.0000
L5	12	DC Trunk	12.00 - 40.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 3/4"x8'	C	From Face	3.500 0.000 4.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	0.600 1.415 2.246	0.600 1.415 2.246	0.014 0.020 0.031
10' Dipole	A	From Face	3.000 0.000 4.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	4.000 6.000 8.000	4.000 6.000 8.000	0.050 0.072 0.100
10' Dipole	B	From Face	3.000 0.000 4.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	4.000 6.000 8.000	4.000 6.000 8.000	0.050 0.072 0.100
12' x 3" Dia Omni	C	From Face	3.000 0.000 6.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	3.600 4.833 6.083	3.600 4.833 6.083	0.035 0.061 0.095
(3) 5' Panel Antenna (Nextel)	A	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.556 6.947 7.345	2.292 2.654 3.024	0.024 0.057 0.095
(3) 5' Panel Antenna (Nextel)	B	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.556 6.947 7.345	2.292 2.654 3.024	0.024 0.057 0.095
(3) 5' Panel Antenna (Nextel)	C	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.556 6.947 7.345	2.292 2.654 3.024	0.024 0.057 0.095
Valmont T-Arm (1) (Nextel)	A	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	10.540 14.450 18.360	10.540 14.450 18.360	0.336 0.412 0.488
Valmont T-Arm (1) (Nextel)	B	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	10.540 14.450 18.360	10.540 14.450 18.360	0.336 0.412 0.488
Valmont T-Arm (1) (Nextel)	C	From Face	3.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	10.540 14.450 18.360	10.540 14.450 18.360	0.336 0.412 0.488
AIR21 B2A/B4P (T-Mobile)	A	From Face	3.000 6.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	6.049 6.419 6.795	4.356 4.705 5.061	0.083 0.125 0.172
APXVAARR24-43 (T-Mobile - Proposed)	A	From Face	3.000 2.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	20.243 20.890 21.544	8.889 9.487 10.092	0.153 0.266 0.387
AIR32 (T-Mobile - Proposed)	A	From Face	3.000 -2.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	6.510 6.887 7.271	4.712 5.068 5.431	0.133 0.179 0.230
AIR6449 (T-Mobile - Proposed)	A	From Face	3.000 -6.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	5.655 5.956 6.265	2.416 2.641 2.874	0.103 0.141 0.184
AIR21 B2A/B4P (T-Mobile)	B	From Face	3.000 6.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	6.049 6.419 6.795	4.356 4.705 5.061	0.083 0.125 0.172
APXVAARR24-43 (T-Mobile - Proposed)	B	From Face	3.000 2.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	20.243 20.890 21.544	8.889 9.487 10.092	0.153 0.266 0.387
AIR32 (T-Mobile - Proposed)	B	From Face	3.000 -2.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	6.510 6.887 7.271	4.712 5.068 5.431	0.133 0.179 0.230
AIR6449 (T-Mobile - Proposed)	B	From Face	3.000 -6.000 0.000	0.000	135.000	No Ice 1/2" Ice 1" Ice	5.655 5.956 6.265	2.416 2.641 2.874	0.103 0.141 0.184
AIR21 B2A/B4P (T-Mobile)	C	From Face	3.000 6.000	0.000	135.000	No Ice 1/2" Ice	6.049 6.419	4.356 4.705	0.083 0.125

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	6.795	5.061	0.172
APXVAARR24-43	C	From Face	3.000	0.000	135.000	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
AIR32	C	From Face	3.000	0.000	135.000	No Ice	6.510	4.712	0.133
(T-Mobile - Proposed)			-2.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
AIR6449	C	From Face	3.000	0.000	135.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			-6.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
4449 B12,B71	A	From Face	3.000	0.000	135.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	B	From Face	3.000	0.000	135.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	C	From Face	3.000	0.000	135.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4415 B25	A	From Face	3.000	0.000	135.000	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	135.000	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	135.000	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
ATMAA1412D-1A20 TMA	A	From Face	3.000	0.000	135.000	No Ice	0.000	0.407	0.013
(T-Mobile)			-3.000			1/2" Ice	0.000	0.497	0.021
			0.000			1" Ice	0.000	0.593	0.030
ATMAA1412D-1A20 TMA	B	From Face	3.000	0.000	135.000	No Ice	0.000	0.407	0.013
(T-Mobile)			-3.000			1/2" Ice	0.000	0.497	0.021
			0.000			1" Ice	0.000	0.593	0.030
ATMAA1412D-1A20 TMA	C	From Face	3.000	0.000	135.000	No Ice	0.000	0.407	0.013
(T-Mobile)			-3.000			1/2" Ice	0.000	0.497	0.021
			0.000			1" Ice	0.000	0.593	0.030
T-Arm Stablizer - VSK-M	C	From Face	3.000	0.000	135.000	No Ice	7.500	7.500	0.650
(T-Mobile - Proposed)			0.000			1/2" Ice	10.000	10.000	1.000
			0.000			1" Ice	12.500	12.500	1.350
Valmont T-Arm (1)	A	From Face	3.000	0.000	135.000	No Ice	10.540	10.540	0.336
(T-Mobile)			0.000			1/2" Ice	14.450	14.450	0.412
			0.000			1" Ice	18.360	18.360	0.488
Valmont T-Arm (1)	B	From Face	3.000	0.000	135.000	No Ice	10.540	10.540	0.336
(T-Mobile)			0.000			1/2" Ice	14.450	14.450	0.412
			0.000			1" Ice	18.360	18.360	0.488
Valmont T-Arm (1)	C	From Face	3.000	0.000	135.000	No Ice	10.540	10.540	0.336
(T-Mobile)			0.000			1/2" Ice	14.450	14.450	0.412
			0.000			1" Ice	18.360	18.360	0.488
10' Dipole	A	From Face	3.000	0.000	135.000	No Ice	4.000	4.000	0.050
			0.000			1/2" Ice	6.000	6.000	0.072
			4.000			1" Ice	8.000	8.000	0.100
7770.00	A	From Face	3.500	0.000	127.000	No Ice	5.508	2.928	0.035
(AT&T)			-6.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
7770.00	B	From Face	3.500	0.000	127.000	No Ice	5.508	2.928	0.035
(AT&T)			-6.000			1/2" Ice	5.867	3.273	0.068

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	6.233	3.625	0.105
7770.00	C	From Face	3.500	0.000	127.000	No Ice	5.508	2.928	0.035
(AT&T)			-6.000			1/2" Ice	5.867	3.273	0.068
			0.000			1" Ice	6.233	3.625	0.105
P65-16-XLH-RR	A	From Face	3.500	0.000	127.000	No Ice	8.133	4.700	0.060
(AT&T)			-2.000			1/2" Ice	8.590	5.147	0.107
			0.000			1" Ice	9.053	5.602	0.161
P65-16-XLH-RR	B	From Face	3.500	0.000	127.000	No Ice	8.133	4.700	0.060
(AT&T)			-2.000			1/2" Ice	8.590	5.147	0.107
			0.000			1" Ice	9.053	5.602	0.161
P65-16-XLH-RR	C	From Face	3.500	0.000	127.000	No Ice	8.133	4.700	0.060
(AT&T)			-2.000			1/2" Ice	8.590	5.147	0.107
			0.000			1" Ice	9.053	5.602	0.161
(2) LGP21401 TMA	A	From Face	3.500	0.000	127.000	No Ice	0.817	0.346	0.018
(AT&T)			-6.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
(2) LGP21401 TMA	B	From Face	3.500	0.000	127.000	No Ice	0.817	0.346	0.018
(AT&T)			-6.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
(2) LGP21401 TMA	C	From Face	3.500	0.000	127.000	No Ice	0.817	0.346	0.018
(AT&T)			-6.000			1/2" Ice	0.937	0.440	0.023
			0.000			1" Ice	1.065	0.540	0.031
RRUS-11	A	From Face	1.000	0.000	127.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	B	From Face	1.000	0.000	127.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	C	From Face	1.000	0.000	127.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-12	A	From Face	1.000	0.000	127.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	B	From Face	1.000	0.000	127.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	C	From Face	1.000	0.000	127.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
80010965	A	From Face	3.500	0.000	127.000	No Ice	13.814	5.833	0.109
(AT&T)			2.000			1/2" Ice	14.347	6.324	0.186
			0.000			1" Ice	14.888	6.821	0.269
80010965	B	From Face	3.500	0.000	127.000	No Ice	13.814	5.833	0.109
(AT&T)			2.000			1/2" Ice	14.347	6.324	0.186
			0.000			1" Ice	14.888	6.821	0.269
80010965	C	From Face	3.500	0.000	127.000	No Ice	13.814	5.833	0.109
(AT&T)			2.000			1/2" Ice	14.347	6.324	0.186
			0.000			1" Ice	14.888	6.821	0.269
HPA-65R-BUU-H6	A	From Face	3.500	0.000	127.000	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	B	From Face	3.500	0.000	127.000	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	3.500	0.000	127.000	No Ice	9.658	6.450	0.051
(AT&T)			6.000			1/2" Ice	10.128	6.913	0.114

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	10.606	7.384	0.183
RRUS-32	A	From Face	3.500	0.000	127.000	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-32	B	From Face	3.500	0.000	127.000	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-32	C	From Face	3.500	0.000	127.000	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
B14 4478	A	From Face	3.500	0.000	127.000	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
B14 4478	B	From Face	3.500	0.000	127.000	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
B14 4478	C	From Face	3.500	0.000	127.000	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
4426 B66	A	From Face	3.500	0.000	127.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	B	From Face	3.500	0.000	127.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	C	From Face	3.500	0.000	127.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
B14 4478	A	From Face	3.500	0.000	127.000	No Ice	1.843	1.059	0.060
(AT&T)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
B14 4478	B	From Face	3.500	0.000	127.000	No Ice	1.843	1.059	0.060
(AT&T)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
B14 4478	C	From Face	3.500	0.000	127.000	No Ice	1.843	1.059	0.060
(AT&T)			2.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
(2) DBCT108F1V92-1	A	From Face	3.500	0.000	127.000	No Ice	0.604	0.320	0.015
(AT&T)			6.000			1/2" Ice	0.705	0.400	0.020
			0.000			1" Ice	0.813	0.487	0.027
(2) DBCT108F1V92-1	A	From Face	3.500	0.000	127.000	No Ice	0.604	0.320	0.015
(AT&T)			6.000			1/2" Ice	0.705	0.400	0.020
			0.000			1" Ice	0.813	0.487	0.027
(2) DBCT108F1V92-1	A	From Face	3.500	0.000	127.000	No Ice	0.604	0.320	0.015
(AT&T)			6.000			1/2" Ice	0.705	0.400	0.020
			0.000			1" Ice	0.813	0.487	0.027
DC6-48-60-18-8F Surge	A	From Face	3.500	0.000	127.000	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	B	From Face	3.500	0.000	127.000	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	C	From Face	3.500	0.000	127.000	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
Valmont T-Arm (1)	A	From Face	3.000	0.000	127.000	No Ice	10.540	10.540	0.336
(AT&T)			0.000			1/2" Ice	14.450	14.450	0.412

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	18.360	18.360	0.488
Valmont T-Arm (1)	B	From Face	3.000	0.000	127.000	No Ice	10.540	10.540	0.336
(AT&T)			0.000			1/2" Ice	14.450	14.450	0.412
			0.000			1" Ice	18.360	18.360	0.488
Valmont T-Arm (1)	C	From Face	3.000	0.000	127.000	No Ice	10.540	10.540	0.336
(AT&T)			0.000			1/2" Ice	14.450	14.450	0.412
			0.000			1" Ice	18.360	18.360	0.488
NNVV-65B-R4	A	From Face	3.000	0.000	110.000	No Ice	14.612	9.168	0.108
(Sprint)			-3.000			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	110.000	No Ice	14.612	9.168	0.108
(Sprint)			-3.000			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	110.000	No Ice	14.612	9.168	0.108
(Sprint)			-3.000			1/2" Ice	15.129	9.634	0.211
			0.000			1" Ice	15.652	10.107	0.320
AAHC	A	From Face	3.000	0.000	110.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			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	110.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
AAHC	C	From Face	3.000	0.000	110.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
(2) FD-RRH 2x50 800	A	From Face	1.000	0.000	110.000	No Ice	2.058	1.932	0.064
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	B	From Face	1.000	0.000	110.000	No Ice	2.058	1.932	0.064
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 2x50 800	C	From Face	1.000	0.000	110.000	No Ice	2.058	1.932	0.064
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
FD-RRH 4x45 1900	A	From Face	1.000	0.000	110.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
FD-RRH 4x45 1900	B	From Face	1.000	0.000	110.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
FD-RRH 4x45 1900	C	From Face	1.000	0.000	110.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
13' Platform w/rails	A	None		0.000	110.000	No Ice	31.300	31.300	1.822
(Sprint)						1/2" Ice	40.200	40.200	2.452
						1" Ice	49.100	49.100	3.082
12' x 3" Dia Omni	C	From Face	3.000	0.000	110.000	No Ice	3.600	3.600	0.035
			0.000			1/2" Ice	4.833	4.833	0.061
			6.000			1" Ice	6.083	6.083	0.095

Tower Pressures - No Ice

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	116.675	1.307	0.030	132.955	A	0.000	132.955	132.955	100.00	6.234	0.000
145.000-90.83					B	0.000	132.955		100.00	23.267	0.000
0					C	0.000	132.955		100.00	81.610	0.000
L2	74.705	1.19	0.027	97.714	A	0.000	97.714	97.714	100.00	6.350	0.000
90.830-59.080					B	0.000	97.714		100.00	18.860	0.000
					C	0.000	97.714		100.00	76.136	0.000
L3	50.855	1.098	0.025	56.076	A	0.000	56.076	56.076	100.00	3.250	0.000
59.080-42.830					B	0.000	56.076		100.00	9.652	0.000
					C	0.000	56.076		100.00	38.968	0.000
L4	41.663	1.053	0.024	8.220	A	0.000	8.220	8.220	100.00	0.466	0.000
42.830-40.500					B	0.000	8.220		100.00	1.384	0.000
					C	0.000	8.220		100.00	5.587	0.000
L5	20.434	0.906	0.021	156.502	A	0.000	156.502	156.502	100.00	5.700	0.000
40.500-0.000					B	0.000	156.502		100.00	16.929	0.000
					C	0.000	156.502		100.00	68.343	0.000

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	116.675	1.307	0.008	1.702	148.320	A	0.000	148.320	148.320	100.00	31.353	0.000
145.000-90.830						B	0.000	148.320		100.00	45.750	0.000
						C	0.000	148.320		100.00	126.835	0.000
L2	74.705	1.19	0.007	1.628	106.720	A	0.000	106.720	106.720	100.00	31.936	0.000
90.830-59.080						B	0.000	106.720		100.00	37.083	0.000
						C	0.000	106.720		100.00	122.189	0.000
L3	50.855	1.098	0.007	1.566	60.318	A	0.000	60.318	60.318	100.00	15.354	0.000
59.080-42.830						B	0.000	60.318		100.00	18.429	0.000
						C	0.000	60.318		100.00	61.436	0.000
L4	41.663	1.053	0.006	1.535	8.828	A	0.000	8.828	8.828	100.00	2.201	0.000
42.830-40.500						B	0.000	8.828		100.00	2.642	0.000
						C	0.000	8.828		100.00	8.809	0.000
L5 40.500-0.000	20.434	0.906	0.006	1.430	166.154	A	0.000	166.154	166.154	100.00	25.177	0.000
						B	0.000	166.154		100.00	31.349	0.000
						C	0.000	166.154		100.00	105.803	0.000

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

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	116.675	1.307	0.010	132.955	A	0.000	132.955	132.955	100.00	6.234	0.000
145.000-90.83					B	0.000	132.955		100.00	23.267	0.000
0					C	0.000	132.955		100.00	81.610	0.000
L2	74.705	1.19	0.009	97.714	A	0.000	97.714	97.714	100.00	6.350	0.000
90.830-59.080					B	0.000	97.714		100.00	18.860	0.000
					C	0.000	97.714		100.00	76.136	0.000
L3	50.855	1.098	0.009	56.076	A	0.000	56.076	56.076	100.00	3.250	0.000
59.080-42.830					B	0.000	56.076		100.00	9.652	0.000
					C	0.000	56.076		100.00	38.968	0.000
L4	41.663	1.053	0.008	8.220	A	0.000	8.220	8.220	100.00	0.466	0.000
42.830-40.500					B	0.000	8.220		100.00	1.384	0.000
					C	0.000	8.220		100.00	5.587	0.000
L5	20.434	0.906	0.007	156.502	A	0.000	156.502	156.502	100.00	5.700	0.000
40.500-0.000					B	0.000	156.502		100.00	16.929	0.000
					C	0.000	156.502		100.00	68.343	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1.137	0.030	1	1	132.955	4.968	0.092	C
145.000-90.83			B	1	1		1	1	132.955			
0			C	1	1.137		1	1	132.955			
L2	1.735	5.303	A	1	1.183	0.027	1	1	97.714	3.457	0.109	C
90.830-59.080			B	1	1		1	1	97.714			
			C	1	1.183		1	1	97.714			
L3	0.888	3.396	A	1	1.13	0.025	1	1	56.076	1.751	0.108	C
59.080-42.830			B	1	1		1	1	56.076			
			C	1	1.13		1	1	56.076			
L4	0.127	2.014	A	1	1.121	0.024	1	1	8.220	0.244	0.105	C
42.830-40.500			B	1	1		1	1	8.220			
			C	1	1.121		1	1	8.220			
L5	1.558	12.258	A	1	1	0.021	1	1	156.502	3.601	0.089	C
40.500-0.000			B	1	1		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	1010.759 kip-ft	14.022		

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	2.037	4.714	A	1	1.2	0.030	1	1	132.955	7.923	0.146	B
145.000-90.83			B	1	1.2		1	1	132.955			
0			C	1	1		1	1	132.955			
L2	1.735	5.303	A	1	1.2	0.027	1	1	97.714	5.786	0.182	B
90.830-59.080			B	1	1.2		1	1	97.714			

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		1	1	97.714			
L3	0.888	3.396	A	1	1.2	0.025	1	1	56.076	2.936	0.181	B
59.080-42.830			B	1	1.2		1	1	56.076			
			C	1	1		1	1	56.076			
L4	0.127	2.014	A	1	1.2	0.024	1	1	8.220	0.409	0.176	B
42.830-40.500			B	1	1.2		1	1	8.220			
			C	1	1		1	1	8.220			
L5	1.558	12.258	A	1	1.2	0.021	1	1	156.502	5.894	0.146	B
40.500-0.000			B	1	1.2		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	1643.383 kip-ft	22.948		

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	2.037	4.714	A	1	1.137	0.030	1	1	132.955	4.968	0.092	B
145.000-90.83			B	1	1.137		1	1	132.955			
0			C	1	1		1	1	132.955			
L2	1.735	5.303	A	1	1.183	0.027	1	1	97.714	3.457	0.109	B
90.830-59.080			B	1	1.183		1	1	97.714			
			C	1	1		1	1	97.714			
L3	0.888	3.396	A	1	1.13	0.025	1	1	56.076	1.751	0.108	B
59.080-42.830			B	1	1.13		1	1	56.076			
			C	1	1		1	1	56.076			
L4	0.127	2.014	A	1	1.121	0.024	1	1	8.220	0.244	0.105	B
42.830-40.500			B	1	1.121		1	1	8.220			
			C	1	1		1	1	8.220			
L5	1.558	12.258	A	1	1	0.021	1	1	156.502	3.601	0.089	C
40.500-0.000			B	1	1		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	1010.759 kip-ft	14.022		

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 ft^2	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1	0.030	1	1	132.955	7.923	0.146	C
145.000-90.83			B	1	1.2		1	1	132.955			
0			C	1	1.2		1	1	132.955			
L2	1.735	5.303	A	1	1	0.027	1	1	97.714	5.786	0.182	C
90.830-59.080			B	1	1.2		1	1	97.714			
			C	1	1.2		1	1	97.714			

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
L3	0.888	3.396	A	1	1	0.025	1	1	56.076	2.936	0.181	C
59.080-42.830			B	1	1.2		1	1	56.076			
			C	1	1.2		1	1	56.076			
L4	0.127	2.014	A	1	1	0.024	1	1	8.220	0.409	0.176	C
42.830-40.500			B	1	1.2		1	1	8.220			
			C	1	1.2		1	1	8.220			
L5	1.558	12.258	A	1	1	0.021	1	1	156.502	5.894	0.146	C
40.500-0.000			B	1	1.2		1	1	156.502			
			C	1	1.2		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	1643.383 kip-ft	22.948		

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 ft^2	F K	w klf	Ctrl. Face
L1	4.795	8.206	A	1	1.2	0.008	1	1	148.320	1.554	0.029	C
145.000-90.83			B	1	1.2		1	1	148.320			
0			C	1	1.2		1	1	148.320			
L2	4.257	7.725	A	1	1.2	0.007	1	1	106.720	1.018	0.032	C
90.830-59.080			B	1	1.2		1	1	106.720			
			C	1	1.2		1	1	106.720			
L3	2.067	4.726	A	1	1.2	0.007	1	1	60.318	0.531	0.033	C
59.080-42.830			B	1	1.2		1	1	60.318			
			C	1	1.2		1	1	60.318			
L4	0.296	2.205	A	1	1.2	0.006	1	1	8.828	0.075	0.032	C
42.830-40.500			B	1	1.2		1	1	8.828			
			C	1	1.2		1	1	8.828			
L5	3.435	15.625	A	1	1.2	0.006	1	1	166.154	1.219	0.030	C
40.500-0.000			B	1	1.2		1	1	166.154			
			C	1	1.2		1	1	166.154			
Sum Weight:	14.850	38.487						OTM	312.357 kip-ft	4.397		

Tower Forces - With 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 ft^2	F K	w klf	Ctrl. Face
L1	4.795	8.206	A	1	1.2	0.008	1	1	148.320	2.904	0.054	B
145.000-90.83			B	1	1.2		1	1	148.320			
0			C	1	1.2		1	1	148.320			
L2	4.257	7.725	A	1	1.2	0.007	1	1	106.720	2.182	0.069	B
90.830-59.080			B	1	1.2		1	1	106.720			
			C	1	1.2		1	1	106.720			
L3	2.067	4.726	A	1	1.2	0.007	1	1	60.318	1.060	0.065	B

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
59.080-42.830			B	1	1.2		1	1	60.318			
			C	1	1.2		1	1	60.318			
L4	0.296	2.205	A	1	1.2	0.006	1	1	8.828	0.147	0.063	B
42.830-40.500			B	1	1.2		1	1	8.828			
			C	1	1.2		1	1	8.828			
L5	3.435	15.625	A	1	1.2	0.006	1	1	166.154	1.961	0.048	B
40.500-0.000			B	1	1.2		1	1	166.154			
			C	1	1.2		1	1	166.154			
Sum Weight:	14.850	38.487						OTM	601.883 kip-ft	8.254		

Tower Forces - With 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	4.795	8.206	A	1	1.2	0.008	1	1	148.320	1.554	0.029	C
145.000-90.83			B	1	1.2		1	1	148.320			
0			C	1	1.2		1	1	148.320			
L2	4.257	7.725	A	1	1.2	0.007	1	1	106.720	1.018	0.032	C
90.830-59.080			B	1	1.2		1	1	106.720			
			C	1	1.2		1	1	106.720			
L3	2.067	4.726	A	1	1.2	0.007	1	1	60.318	0.531	0.033	C
59.080-42.830			B	1	1.2		1	1	60.318			
			C	1	1.2		1	1	60.318			
L4	0.296	2.205	A	1	1.2	0.006	1	1	8.828	0.075	0.032	C
42.830-40.500			B	1	1.2		1	1	8.828			
			C	1	1.2		1	1	8.828			
L5	3.435	15.625	A	1	1.2	0.006	1	1	166.154	1.219	0.030	C
40.500-0.000			B	1	1.2		1	1	166.154			
			C	1	1.2		1	1	166.154			
Sum Weight:	14.850	38.487						OTM	312.357 kip-ft	4.397		

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	4.795	8.206	A	1	1.2	0.008	1	1	148.320	2.904	0.054	C
145.000-90.83			B	1	1.2		1	1	148.320			
0			C	1	1.2		1	1	148.320			
L2	4.257	7.725	A	1	1.2	0.007	1	1	106.720	2.182	0.069	C
90.830-59.080			B	1	1.2		1	1	106.720			
			C	1	1.2		1	1	106.720			
L3	2.067	4.726	A	1	1.2	0.007	1	1	60.318	1.060	0.065	C
59.080-42.830			B	1	1.2		1	1	60.318			

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
			C	1	1.2		1	1	60.318			
L4	0.296	2.205	A	1	1.2	0.006	1	1	8.828	0.147	0.063	C
42.830-40.500			B	1	1.2		1	1	8.828			
			C	1	1.2		1	1	8.828			
L5	3.435	15.625	A	1	1.2	0.006	1	1	166.154	1.961	0.048	C
40.500-0.000			B	1	1.2		1	1	166.154			
			C	1	1.2		1	1	166.154			
Sum Weight:	14.850	38.487						OTM	601.883 kip-ft	8.254		

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 ft²	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1.137	0.010	1	1	132.955	1.701	0.031	C
145.000-90.83			B	1	1		1	1	132.955			
0			C	1	1.137		1	1	132.955			
L2	1.735	5.303	A	1	1.183	0.009	1	1	97.714	1.183	0.037	C
90.830-59.080			B	1	1		1	1	97.714			
			C	1	1.183		1	1	97.714			
L3	0.888	3.396	A	1	1.13	0.009	1	1	56.076	0.600	0.037	C
59.080-42.830			B	1	1		1	1	56.076			
			C	1	1.13		1	1	56.076			
L4	0.127	2.014	A	1	1.121	0.008	1	1	8.220	0.084	0.036	C
42.830-40.500			B	1	1		1	1	8.220			
			C	1	1.121		1	1	8.220			
L5	1.558	12.258	A	1	1	0.007	1	1	156.502	1.233	0.030	C
40.500-0.000			B	1	1		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	346.020 kip-ft	4.800		

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 ft²	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1.2	0.010	1	1	132.955	2.712	0.050	B
145.000-90.83			B	1	1.2		1	1	132.955			
0			C	1	1		1	1	132.955			
L2	1.735	5.303	A	1	1.2	0.009	1	1	97.714	1.981	0.062	B
90.830-59.080			B	1	1.2		1	1	97.714			
			C	1	1		1	1	97.714			
L3	0.888	3.396	A	1	1.2	0.009	1	1	56.076	1.005	0.062	B
59.080-42.830			B	1	1.2		1	1	56.076			
			C	1	1		1	1	56.076			

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
L4	0.127	2.014	A	1	1.2	0.008	1	1	8.220	0.140	0.060	B
42.830-40.500			B	1	1.2		1	1	8.220			
			C	1	1		1	1	8.220			
L5	1.558	12.258	A	1	1.2	0.007	1	1	156.502	2.018	0.050	B
40.500-0.000			B	1	1.2		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	562.592 kip-ft	7.856		

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 ft²	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1.137	0.010	1	1	132.955	1.701	0.031	B
145.000-90.83			B	1	1.137		1	1	132.955			
0			C	1	1		1	1	132.955			
L2	1.735	5.303	A	1	1.183	0.009	1	1	97.714	1.183	0.037	B
90.830-59.080			B	1	1.183		1	1	97.714			
			C	1	1		1	1	97.714			
L3	0.888	3.396	A	1	1.13	0.009	1	1	56.076	0.600	0.037	B
59.080-42.830			B	1	1.13		1	1	56.076			
			C	1	1		1	1	56.076			
L4	0.127	2.014	A	1	1.121	0.008	1	1	8.220	0.084	0.036	B
42.830-40.500			B	1	1.121		1	1	8.220			
			C	1	1		1	1	8.220			
L5	1.558	12.258	A	1	1	0.007	1	1	156.502	1.233	0.030	C
40.500-0.000			B	1	1		1	1	156.502			
			C	1	1		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	346.020 kip-ft	4.800		

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 ft²	F K	w klf	Ctrl. Face
L1	2.037	4.714	A	1	1	0.010	1	1	132.955	2.712	0.050	C
145.000-90.83			B	1	1.2		1	1	132.955			
0			C	1	1.2		1	1	132.955			
L2	1.735	5.303	A	1	1	0.009	1	1	97.714	1.981	0.062	C
90.830-59.080			B	1	1.2		1	1	97.714			
			C	1	1.2		1	1	97.714			
L3	0.888	3.396	A	1	1	0.009	1	1	56.076	1.005	0.062	C
59.080-42.830			B	1	1.2		1	1	56.076			
			C	1	1.2		1	1	56.076			
L4	0.127	2.014	A	1	1	0.008	1	1	8.220	0.140	0.060	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
42.830-40.500			B	1	1.2		1	1	8.220			
			C	1	1.2		1	1	8.220			
L5	1.558	12.258	A	1	1	0.007	1	1	156.502	2.018	0.050	C
40.500-0.000			B	1	1.2		1	1	156.502			
			C	1	1.2		1	1	156.502			
Sum Weight:	6.345	27.685						OTM	562.592 kip-ft	7.856		

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	27.685					
Bracing Weight	0.000					
Total Member Self-Weight	27.685			2.013	0.266	
Total Weight	45.094			2.013	0.266	
Wind 0 deg - No Ice		-0.020	-26.961	-2680.057	2.775	-0.395
Wind 30 deg - No Ice		12.794	-22.160	-2214.427	-1279.396	-0.108
Wind 45 deg - No Ice		18.103	-18.087	-1806.952	-1810.749	0.051
Wind 60 deg - No Ice		22.179	-12.782	-1276.200	-2218.683	0.208
Wind 90 deg - No Ice		35.910	0.020	4.523	-3317.326	0.468
Wind 120 deg - No Ice		23.379	13.498	1345.222	-2326.239	0.602
Wind 135 deg - No Ice		21.723	21.707	2110.557	-2110.326	0.610
Wind 150 deg - No Ice		15.726	27.199	2628.636	-1519.112	0.576
Wind 180 deg - No Ice		0.020	26.961	2684.084	-2.243	0.395
Wind 210 deg - No Ice		-12.794	22.160	2218.453	1279.928	0.108
Wind 225 deg - No Ice		-18.103	18.087	1810.979	1811.280	-0.051
Wind 240 deg - No Ice		-22.179	12.782	1280.227	2219.215	-0.208
Wind 270 deg - No Ice		-35.910	-0.020	-0.496	3317.858	-0.468
Wind 300 deg - No Ice		-23.379	-13.498	-1341.195	2326.771	-0.602
Wind 315 deg - No Ice		-21.723	-21.707	-2106.530	2110.858	-0.610
Wind 330 deg - No Ice		-15.726	-27.199	-2624.609	1519.644	-0.576
Member Ice	10.802					
Total Weight Ice	82.204			6.394	0.791	
Wind 0 deg - Ice		-0.007	-9.750	-1001.730	1.618	-0.284
Wind 30 deg - Ice		4.873	-8.440	-866.253	-503.032	-0.067
Wind 45 deg - Ice		6.895	-6.890	-705.872	-712.151	0.053
Wind 60 deg - Ice		8.447	-4.869	-496.952	-872.684	0.169
Wind 90 deg - Ice		13.614	0.007	7.221	-1297.814	0.358
Wind 120 deg - Ice		8.453	4.881	511.172	-873.511	0.452
Wind 135 deg - Ice		8.195	8.189	836.094	-829.585	0.454
Wind 150 deg - Ice		5.869	10.152	1033.424	-593.120	0.425
Wind 180 deg - Ice		0.007	9.750	1014.518	-0.036	0.284
Wind 210 deg - Ice		-4.873	8.440	879.041	504.614	0.067
Wind 225 deg - Ice		-6.895	6.890	718.660	713.733	-0.053
Wind 240 deg - Ice		-8.447	4.869	509.740	874.266	-0.169
Wind 270 deg - Ice		-13.614	-0.007	5.567	1299.396	-0.358
Wind 300 deg - Ice		-8.453	-4.881	-498.384	875.093	-0.452
Wind 315 deg - Ice		-8.195	-8.189	-823.306	831.166	-0.454
Wind 330 deg - Ice		-5.869	-10.152	-1020.636	594.702	-0.425
Total Weight	45.094			2.013	0.266	
Wind 0 deg - Service		-0.007	-9.230	-916.160	1.125	-0.135

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - Service		4.380	-7.586	-756.757	-437.810	-0.037
Wind 45 deg - Service		6.197	-6.192	-617.263	-619.712	0.018
Wind 60 deg - Service		7.593	-4.376	-435.567	-759.363	0.071
Wind 90 deg - Service		12.293	0.007	2.872	-1135.470	0.160
Wind 120 deg - Service		8.003	4.621	461.844	-796.184	0.206
Wind 135 deg - Service		7.437	7.431	723.847	-722.269	0.209
Wind 150 deg - Service		5.384	9.311	901.204	-519.874	0.197
Wind 180 deg - Service		0.007	9.230	920.186	-0.593	0.135
Wind 210 deg - Service		-4.380	7.586	760.784	438.342	0.037
Wind 225 deg - Service		-6.197	6.192	621.290	620.244	-0.018
Wind 240 deg - Service		-7.593	4.376	439.594	759.895	-0.071
Wind 270 deg - Service		-12.293	-0.007	1.154	1136.002	-0.160
Wind 300 deg - Service		-8.003	-4.621	-457.817	796.716	-0.206
Wind 315 deg - Service		-7.437	-7.431	-719.820	722.800	-0.209
Wind 330 deg - Service		-5.384	-9.311	-897.178	520.406	-0.197

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

Comb. No.	Description
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
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	145 - 90.83	Pole	Max Tension	26	0.000	-0.000	0.001
			Max. Compression	34	-43.976	0.926	-7.455
			Max. Mx	26	-17.143	1014.801	-1.427
			Max. My	18	-18.024	-0.733	-909.415
			Max. Vy	26	-33.982	1014.801	-1.427
			Max. Vx	18	29.479	-0.733	-909.415
			Max. Torque	28			1.301
L2	90.83 - 59.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-59.215	0.977	-7.863
			Max. Mx	26	-27.311	2459.181	-0.287
			Max. My	18	-28.145	-1.936	-2111.267
			Max. Vy	26	-44.324	2459.181	-0.287
			Max. Vx	18	35.579	-1.936	-2111.267
			Max. Torque	14			-1.006
L3	59.08 - 42.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-63.924	0.982	-7.904
			Max. Mx	26	-30.858	2919.189	0.031
			Max. My	18	-31.594	-2.264	-2477.437
			Max. Vy	26	-47.010	2919.189	0.031
			Max. Vx	18	37.123	-2.264	-2477.437
			Max. Torque	14			-1.001
L4	42.83 - 40.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-70.300	0.982	-7.904

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	26	-35.593	3329.429	0.299
			Max. My	18	-36.287	-2.541	-2799.317
			Max. Vy	26	-49.483	3329.429	0.299
			Max. Vx	16	38.702	-1555.990	-2692.460
			Max. Torque	14			-1.000
L5	40.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-92.122	0.982	-7.903
			Max. Mx	26	-54.057	5500.654	1.587
			Max. My	18	-54.079	-3.845	-4458.405
			Max. Vy	26	-57.509	5500.654	1.587
			Max. Vx	16	43.560	-2521.153	-4361.581
			Max. Torque	14			-1.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	47	92.122	13.615	0.007
	Max. H_x	26	54.113	57.456	0.032
	Max. H_z	33	40.585	25.162	43.518
	Max. M_x	2	4453.242	0.032	43.138
	Max. M_z	10	5499.974	-57.456	-0.032
	Max. Torsion	30	0.999	34.757	34.731
	Min. Vert	23	40.585	28.965	-28.940
	Min. H_x	10	54.113	-57.456	-0.032
	Min. H_z	17	40.585	-25.162	-43.518
	Min. M_x	18	-4458.405	-0.032	-43.138
	Min. M_z	26	-5500.654	57.456	0.032
	Min. Torsion	14	-0.999	-34.757	-34.731

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	45.094	0.000	0.000	2.074	0.274	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	54.113	-0.032	-43.138	-4453.242	4.521	-0.640
0.9 Dead+1.6 Wind 0 deg - No Ice	40.585	-0.032	-43.138	-4409.371	4.385	-0.636
1.2 Dead+1.6 Wind 30 deg - No Ice	54.113	20.470	-35.455	-3681.141	-2126.471	-0.169
0.9 Dead+1.6 Wind 30 deg - No Ice	40.585	20.470	-35.455	-3644.702	-2105.124	-0.169
1.2 Dead+1.6 Wind 45 deg - No Ice	54.113	28.965	-28.940	-3003.907	-3009.585	0.092
0.9 Dead+1.6 Wind 45 deg - No Ice	40.585	28.965	-28.940	-2974.296	-2979.337	0.090
1.2 Dead+1.6 Wind 60 deg - No Ice	54.113	35.487	-20.452	-2121.785	-3687.572	0.347
0.9 Dead+1.6 Wind 60 deg - No Ice	40.585	35.487	-20.452	-2101.066	-3650.490	0.342

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
1.2 Dead+1.6 Wind 90 deg - No Ice	54.113	57.456	0.032	6.772	-5499.974	0.773
0.9 Dead+1.6 Wind 90 deg - No Ice	40.585	57.456	0.032	6.039	-5447.244	0.763
1.2 Dead+1.6 Wind 120 deg - No Ice	54.113	37.406	21.597	2234.120	-3864.771	0.988
0.9 Dead+1.6 Wind 120 deg - No Ice	40.585	37.406	21.597	2211.110	-3826.200	0.978
1.2 Dead+1.6 Wind 135 deg - No Ice	54.113	34.757	34.731	3502.382	-3502.863	0.999
0.9 Dead+1.6 Wind 135 deg - No Ice	40.585	34.757	34.731	3467.284	-3468.505	0.989
1.2 Dead+1.6 Wind 150 deg - No Ice	54.113	25.162	43.518	4361.581	-2521.153	0.941
0.9 Dead+1.6 Wind 150 deg - No Ice	40.585	25.162	43.518	4318.172	-2496.524	0.932
1.2 Dead+1.6 Wind 180 deg - No Ice	54.113	0.032	43.138	4458.405	-3.845	0.640
0.9 Dead+1.6 Wind 180 deg - No Ice	40.585	0.032	43.138	4413.166	-3.889	0.636
1.2 Dead+1.6 Wind 210 deg - No Ice	54.113	-20.470	35.455	3686.321	2127.135	0.169
0.9 Dead+1.6 Wind 210 deg - No Ice	40.585	-20.470	35.455	3648.509	2105.613	0.169
1.2 Dead+1.6 Wind 225 deg - No Ice	54.113	-28.965	28.940	3009.096	3010.250	-0.092
0.9 Dead+1.6 Wind 225 deg - No Ice	40.585	-28.965	28.940	2978.109	2979.825	-0.090
1.2 Dead+1.6 Wind 240 deg - No Ice	54.113	-35.487	20.452	2126.981	3688.241	-0.347
0.9 Dead+1.6 Wind 240 deg - No Ice	40.585	-35.487	20.452	2104.884	3650.981	-0.343
1.2 Dead+1.6 Wind 270 deg - No Ice	54.113	-57.456	-0.032	-1.587	5500.654	-0.773
0.9 Dead+1.6 Wind 270 deg - No Ice	40.585	-57.456	-0.032	-2.229	5447.744	-0.763
1.2 Dead+1.6 Wind 300 deg - No Ice	54.113	-37.406	-21.597	-2228.935	3865.467	-0.988
0.9 Dead+1.6 Wind 300 deg - No Ice	40.585	-37.406	-21.597	-2207.300	3826.711	-0.978
1.2 Dead+1.6 Wind 315 deg - No Ice	54.113	-34.757	-34.731	-3497.215	3503.562	-0.999
0.9 Dead+1.6 Wind 315 deg - No Ice	40.585	-34.757	-34.731	-3463.486	3469.018	-0.989
1.2 Dead+1.6 Wind 330 deg - No Ice	54.113	-25.162	-43.518	-4356.425	2521.846	-0.941
0.9 Dead+1.6 Wind 330 deg - No Ice	40.585	-25.162	-43.518	-4314.382	2497.033	-0.932
1.2 Dead+1.0 Ice+1.0 Temp	92.122	-0.000	0.000	7.903	0.982	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	92.122	-0.007	-9.750	-1090.657	1.909	-0.296
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	92.122	4.873	-8.441	-943.000	-548.105	-0.066
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	92.122	6.895	-6.890	-768.202	-776.021	0.060
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	92.122	8.447	-4.869	-540.501	-950.984	0.181
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	92.122	13.615	0.007	8.986	-1408.496	0.384
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	92.122	8.454	4.881	558.232	-951.888	0.477

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
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	92.122	8.195	8.189	910.523	-902.182	0.481
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	92.122	5.869	10.152	1124.996	-644.897	0.449
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	92.122	0.007	9.750	1106.812	0.095	0.296
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	92.122	-4.873	8.441	959.158	550.107	0.067
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	92.122	-6.895	6.890	784.362	778.024	-0.059
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	92.122	-8.447	4.869	556.663	952.988	-0.181
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	92.122	-13.615	-0.007	7.172	1410.503	-0.384
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	92.122	-8.454	-4.881	-542.073	953.897	-0.477
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	92.122	-8.195	-8.189	-894.369	904.191	-0.481
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	92.122	-5.869	-10.152	-1108.844	646.905	-0.449
Dead+Wind 0 deg - Service	45.094	-0.007	-9.230	-946.509	1.174	-0.138
Dead+Wind 30 deg - Service	45.094	4.380	-7.586	-782.003	-452.448	-0.037
Dead+Wind 45 deg - Service	45.094	6.197	-6.192	-637.841	-640.437	0.019
Dead+Wind 60 deg - Service	45.094	7.593	-4.376	-450.065	-784.761	0.074
Dead+Wind 90 deg - Service	45.094	12.293	0.007	3.043	-1171.685	0.167
Dead+Wind 120 deg - Service	45.094	8.003	4.621	477.254	-822.616	0.213
Dead+Wind 135 deg - Service	45.094	7.437	7.431	747.557	-745.847	0.216
Dead+Wind 150 deg - Service	45.094	5.384	9.311	930.614	-536.791	0.203
Dead+Wind 180 deg - Service	45.094	0.007	9.230	950.814	-0.606	0.138
Dead+Wind 210 deg - Service	45.094	-4.380	7.586	786.308	453.016	0.037
Dead+Wind 225 deg - Service	45.094	-6.197	6.192	642.147	641.005	-0.019
Dead+Wind 240 deg - Service	45.094	-7.593	4.376	454.371	785.329	-0.074
Dead+Wind 270 deg - Service	45.094	-12.293	-0.007	1.263	1172.254	-0.167
Dead+Wind 300 deg - Service	45.094	-8.003	-4.621	-472.949	823.185	-0.213
Dead+Wind 315 deg - Service	45.094	-7.437	-7.431	-743.252	746.416	-0.216
Dead+Wind 330 deg - Service	45.094	-5.384	-9.311	-926.309	537.360	-0.203

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-45.094	0.000	0.000	45.094	0.000	0.000%
2	-0.032	-54.113	-43.138	0.032	54.113	43.138	0.000%
3	-0.032	-40.585	-43.138	0.032	40.585	43.138	0.000%
4	20.470	-54.113	-35.455	-20.470	54.113	35.455	0.000%
5	20.470	-40.585	-35.455	-20.470	40.585	35.455	0.000%
6	28.965	-54.113	-28.940	-28.965	54.113	28.940	0.000%
7	28.965	-40.585	-28.940	-28.965	40.585	28.940	0.000%
8	35.487	-54.113	-20.452	-35.487	54.113	20.452	0.000%
9	35.487	-40.585	-20.452	-35.487	40.585	20.452	0.000%
10	57.456	-54.113	0.032	-57.456	54.113	-0.032	0.000%
11	57.456	-40.585	0.032	-57.456	40.585	-0.032	0.000%
12	37.406	-54.113	21.597	-37.406	54.113	-21.597	0.000%
13	37.406	-40.585	21.597	-37.406	40.585	-21.597	0.000%
14	34.757	-54.113	34.731	-34.757	54.113	-34.731	0.000%
15	34.757	-40.585	34.731	-34.757	40.585	-34.731	0.000%
16	25.162	-54.113	43.518	-25.162	54.113	-43.518	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
17	25.162	-40.585	43.518	-25.162	40.585	-43.518	0.000%
18	0.032	-54.113	43.138	-0.032	54.113	-43.138	0.000%
19	0.032	-40.585	43.138	-0.032	40.585	-43.138	0.000%
20	-20.470	-54.113	35.455	20.470	54.113	-35.455	0.000%
21	-20.470	-40.585	35.455	20.470	40.585	-35.455	0.000%
22	-28.965	-54.113	28.940	28.965	54.113	-28.940	0.000%
23	-28.965	-40.585	28.940	28.965	40.585	-28.940	0.000%
24	-35.487	-54.113	20.452	35.487	54.113	-20.452	0.000%
25	-35.487	-40.585	20.452	35.487	40.585	-20.452	0.000%
26	-57.456	-54.113	-0.032	57.456	54.113	0.032	0.000%
27	-57.456	-40.585	-0.032	57.456	40.585	0.032	0.000%
28	-37.406	-54.113	-21.597	37.406	54.113	21.597	0.000%
29	-37.406	-40.585	-21.597	37.406	40.585	21.597	0.000%
30	-34.757	-54.113	-34.731	34.757	54.113	34.731	0.000%
31	-34.757	-40.585	-34.731	34.757	40.585	34.731	0.000%
32	-25.162	-54.113	-43.518	25.162	54.113	43.518	0.000%
33	-25.162	-40.585	-43.518	25.162	40.585	43.518	0.000%
34	0.000	-92.122	0.000	0.000	92.122	-0.000	0.000%
35	-0.007	-92.122	-9.750	0.007	92.122	9.750	0.000%
36	4.873	-92.122	-8.440	-4.873	92.122	8.441	0.000%
37	6.895	-92.122	-6.890	-6.895	92.122	6.890	0.000%
38	8.447	-92.122	-4.869	-8.447	92.122	4.869	0.000%
39	13.614	-92.122	0.007	-13.615	92.122	-0.007	0.000%
40	8.453	-92.122	4.881	-8.454	92.122	-4.881	0.000%
41	8.195	-92.122	8.189	-8.195	92.122	-8.189	0.000%
42	5.869	-92.122	10.152	-5.869	92.122	-10.152	0.000%
43	0.007	-92.122	9.750	-0.007	92.122	-9.750	0.000%
44	-4.873	-92.122	8.440	4.873	92.122	-8.441	0.000%
45	-6.895	-92.122	6.890	6.895	92.122	-6.890	0.000%
46	-8.447	-92.122	4.869	8.447	92.122	-4.869	0.000%
47	-13.614	-92.122	-0.007	13.615	92.122	0.007	0.000%
48	-8.453	-92.122	-4.881	8.454	92.122	4.881	0.000%
49	-8.195	-92.122	-8.189	8.195	92.122	8.189	0.000%
50	-5.869	-92.122	-10.152	5.869	92.122	10.152	0.000%
51	-0.007	-45.094	-9.230	0.007	45.094	9.230	0.000%
52	4.380	-45.094	-7.586	-4.380	45.094	7.586	0.000%
53	6.197	-45.094	-6.192	-6.197	45.094	6.192	0.000%
54	7.593	-45.094	-4.376	-7.593	45.094	4.376	0.000%
55	12.293	-45.094	0.007	-12.293	45.094	-0.007	0.000%
56	8.003	-45.094	4.621	-8.003	45.094	-4.621	0.000%
57	7.437	-45.094	7.431	-7.437	45.094	-7.431	0.000%
58	5.384	-45.094	9.311	-5.384	45.094	-9.311	0.000%
59	0.007	-45.094	9.230	-0.007	45.094	-9.230	0.000%
60	-4.380	-45.094	7.586	4.380	45.094	-7.586	0.000%
61	-6.197	-45.094	6.192	6.197	45.094	-6.192	0.000%
62	-7.593	-45.094	4.376	7.593	45.094	-4.376	0.000%
63	-12.293	-45.094	-0.007	12.293	45.094	0.007	0.000%
64	-8.003	-45.094	-4.621	8.003	45.094	4.621	0.000%
65	-7.437	-45.094	-7.431	7.437	45.094	7.431	0.000%
66	-5.384	-45.094	-9.311	5.384	45.094	9.311	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	4	0.00000001	0.00059686
3	Yes	4	0.00000001	0.00030045
4	Yes	6	0.00000001	0.00004901
5	Yes	5	0.00000001	0.00045819
6	Yes	6	0.00000001	0.00005365
7	Yes	5	0.00000001	0.00050519
8	Yes	6	0.00000001	0.00004893
9	Yes	5	0.00000001	0.00045742
10	Yes	4	0.00000001	0.00068149
11	Yes	4	0.00000001	0.00033047
12	Yes	6	0.00000001	0.00005275
13	Yes	5	0.00000001	0.00049119
14	Yes	6	0.00000001	0.00006176
15	Yes	5	0.00000001	0.00057681
16	Yes	6	0.00000001	0.00005803
17	Yes	5	0.00000001	0.00053619
18	Yes	4	0.00000001	0.00052215
19	Yes	4	0.00000001	0.00024422
20	Yes	6	0.00000001	0.00004941
21	Yes	5	0.00000001	0.00046166
22	Yes	6	0.00000001	0.00005379
23	Yes	5	0.00000001	0.00050625
24	Yes	6	0.00000001	0.00004950
25	Yes	5	0.00000001	0.00046246
26	Yes	4	0.00000001	0.00057992
27	Yes	4	0.00000001	0.00026191
28	Yes	6	0.00000001	0.00005138
29	Yes	5	0.00000001	0.00047862
30	Yes	6	0.00000001	0.00006171
31	Yes	5	0.00000001	0.00057635
32	Yes	6	0.00000001	0.00005918
33	Yes	5	0.00000001	0.00054681
34	Yes	4	0.00000001	0.00012267
35	Yes	5	0.00000001	0.00076529
36	Yes	5	0.00000001	0.00089066
37	Yes	5	0.00000001	0.00092987
38	Yes	5	0.00000001	0.00089189
39	Yes	5	0.00000001	0.00093377
40	Yes	5	0.00000001	0.00092148
41	Yes	6	0.00000001	0.00012781
42	Yes	6	0.00000001	0.00012253
43	Yes	5	0.00000001	0.00079042
44	Yes	5	0.00000001	0.00092167
45	Yes	5	0.00000001	0.00096080
46	Yes	5	0.00000001	0.00092127
47	Yes	5	0.00000001	0.00093679
48	Yes	5	0.00000001	0.00089608
49	Yes	6	0.00000001	0.00012486
50	Yes	6	0.00000001	0.00012034
51	Yes	4	0.00000001	0.00008997
52	Yes	4	0.00000001	0.00036435
53	Yes	4	0.00000001	0.00042052
54	Yes	4	0.00000001	0.00036250
55	Yes	4	0.00000001	0.00010663
56	Yes	4	0.00000001	0.00042817
57	Yes	4	0.00000001	0.00059699
58	Yes	4	0.00000001	0.00052495
59	Yes	4	0.00000001	0.00009056
60	Yes	4	0.00000001	0.00037674
61	Yes	4	0.00000001	0.00042930
62	Yes	4	0.00000001	0.00037886
63	Yes	4	0.00000001	0.00010611
64	Yes	4	0.00000001	0.00039574
65	Yes	4	0.00000001	0.00058850

66	Yes	4	0.00000001	0.00054511

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 90.83	27.060	63	1.588	0.001
L2	96 - 59.08	11.883	63	1.226	0.001
L3	59.08 - 42.83	4.268	63	0.690	0.000
L4	49 - 40.5	2.956	63	0.552	0.000
L5	40.5 - 0	2.029	63	0.478	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
143.000	Lightning Rod 3/4"x8'	63	26.394	1.577	0.001	41361
135.000	AIR21 B2A/B4P	63	23.740	1.534	0.001	20680
127.000	7770.00	63	21.123	1.488	0.001	11488
110.000	NNVV-65B-R4	63	15.821	1.366	0.001	5907

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 90.83	126.839	26	7.452	0.007
L2	96 - 59.08	55.756	26	5.759	0.003
L3	59.08 - 42.83	20.032	26	3.241	0.001
L4	49 - 40.5	13.876	26	2.590	0.001
L5	40.5 - 0	9.525	26	2.245	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
143.000	Lightning Rod 3/4"x8'	26	123.722	7.403	0.007	9086
135.000	AIR21 B2A/B4P	26	111.294	7.203	0.006	4541
127.000	7770.00	26	99.039	6.987	0.005	2521
110.000	NNVV-65B-R4	26	74.207	6.415	0.004	1292

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	145 - 90.83 (1)	TP33.48x23.61x0.281	54.170	0.000	0.0	29.187	-17.143	1938.370	0.009
L2	90.83 - 59.08 (2)	TP38.686x31.976x0.375	36.920	0.000	0.0	46.260	-27.311	3225.990	0.008
L3	59.08 - 42.83 (3)	TP41.64x38.686x0.481	16.250	0.000	0.0	61.972	-30.858	3724.670	0.008
L4	42.83 - 40.5 (4)	TP41.316x39.557x0.542	8.500	0.000	0.0	71.174	-35.593	4358.390	0.008
L5	40.5 - 0 (5)	TP48.69x41.316x0.622	40.500	0.000	0.0	96.334	-54.057	6226.810	0.009

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	145 - 90.83 (1)	TP33.48x23.61x0.281	1014.800	1272.825	0.797	0.000	1272.825	0.000
L2	90.83 - 59.08 (2)	TP38.686x31.976x0.375	2459.183	2513.217	0.978	0.000	2513.217	0.000
L3	59.08 - 42.83 (3)	TP41.64x38.686x0.481	2919.192	3025.850	0.965	0.000	3025.850	0.000
L4	42.83 - 40.5 (4)	TP41.316x39.557x0.542	3329.425	3601.225	0.925	0.000	3601.225	0.000
L5	40.5 - 0 (5)	TP48.69x41.316x0.622	5500.658	6067.441	0.907	0.000	6067.441	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	145 - 90.83 (1)	TP33.48x23.61x0.281	33.982	969.186	0.035	0.780	2588.517	0.000
L2	90.83 - 59.08 (2)	TP38.686x31.976x0.375	44.324	1613.000	0.027	0.776	5112.917	0.000
L3	59.08 - 42.83 (3)	TP41.64x38.686x0.481	47.010	1862.330	0.025	0.775	6160.391	0.000
L4	42.83 - 40.5 (4)	TP41.316x39.557x0.542	49.483	2179.200	0.023	0.774	7334.941	0.000
L5	40.5 - 0 (5)	TP48.69x41.316x0.622	57.509	3113.410	0.018	0.773	12356.667	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

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	145 - 90.83 (1)	0.009	0.797	0.000	0.035	0.000	0.807 ✔	1.000	4.8.2 ✔
L2	90.83 - 59.08 (2)	0.008	0.978	0.000	0.027	0.000	0.988 ✔	1.000	4.8.2 ✔
L3	59.08 - 42.83 (3)	0.008	0.965	0.000	0.025	0.000	0.974 ✔	1.000	4.8.2 ✔
L4	42.83 - 40.5 (4)	0.008	0.925	0.000	0.023	0.000	0.933 ✔	1.000	4.8.2 ✔
L5	40.5 - 0 (5)	0.009	0.907	0.000	0.018	0.000	0.916 ✔	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	145 - 90.83	Pole	TP33.48x23.61x0.281	1	-17.143	1938.370	80.7	Pass
L2	90.83 - 59.08	Pole	TP38.686x31.976x0.375	2	-27.311	3225.990	98.8	Pass
L3	59.08 - 42.83	Pole	TP41.64x38.686x0.481	3	-30.858	3724.670	97.4	Pass
L4	42.83 - 40.5	Pole	TP41.316x39.557x0.542	4	-35.593	4358.390	93.3	Pass
L5	40.5 - 0	Pole	TP48.69x41.316x0.622	5	-54.057	6226.810	91.6	Pass
							Summary	
						Pole (L2)	98.8	Pass
						RATING =	**98.8**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	145-FT Monopole Fairfield, CT
Rev. 0: 6/15/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.37

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 5501 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 57 \cdot kips$	(Input From tnxTower)
Axial Force =	$R_u := 54 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 16$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 56.91 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1.02$	Table 2-1 Addendum 3

Base Plate Data:

ASTMA572 Grade 60

Plate Yield Strength =	$F_{yf} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 2.75 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 62.9 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 48.69 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.4375 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4}\cdot D^2 = 3.976\cdot in^2$

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

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743\cdot in}{n} = 2.033\cdot in$

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

Maximum Anchor Rod Force = $P_u := \frac{n_c\cdot\pi\cdot M_u}{N\cdot D_{BC}} + \frac{R_u}{N} = 235.7\cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 3.6\cdot kips$

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

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}}\cdot 100 = 93.5$

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

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75\cdot 0.45\cdot F_u\cdot A_g = 134.193\cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9\cdot F_y\cdot Z = 94.597\cdot in\cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65\cdot l_{ar}\cdot V_u & \text{otherwise} \end{cases} = 0\cdot in\cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right]\cdot 100 = 82.4$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2 \le 1.00, "OK", "Overstressed"\right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 48.94 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le \left(D_{BC} + 6 \cdot t_{TP}\right) \\ \left(D_{BC} + 6 \cdot t_{TP}\right) & \text{otherwise} \end{cases} = 62.9 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.196$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := \operatorname{asin}\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.619$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := \operatorname{acos}\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.376$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := \min\left(\theta_1, \theta_2, \theta_3\right) = 0.196$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot \left(D_{BC} - D_e\right) = 3.985 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot \sin(\theta) = 11.103 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := \left(D_{oe} - D_e\right) \cdot \sin(\theta) = 2.723 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 13.826 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 2.243 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 81.6 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 0.711 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 25.9 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition4 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	145-ft Monopole Fairfield, CT
Rev. 0: 6/15/20	Prepared by: TJL Checked by: C.F.C. Job No. 20074.37

Caisson Foundation:

Input Data:

Shear Force =	$S := 57k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 5501ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 54k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 5732ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 8302ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 6.5ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 25ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	*USER INPUT*
Number of Rebar =	$n := 34$	*USER INPUT*
Area of Rebar =	$Ar := 1.560in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9Mn}{Mu} = 1.304$

Factor of Safety Required = $FS_{reqd} := 1.0$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

==========

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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This program is licensed to:

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Files Used for Analysis

Path to file locations: J:\Jobs\2007400.WI\37_CT11401A\05_Structural\Tower Analysis\Backup Documentation\L-Pile\
Name of input data file: Fairfield Caisson.lpd
Name of output file: Fairfield Caisson.lpo
Name of plot output file: Fairfield Caisson.lpp
Name of runtime file: Fairfield Caisson.lpr

Time and Date of Analysis

Date: June 15, 2020 Time: 10:38:10

Problem Title

20074.37 - CT11401A

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum
bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment,
  and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 300.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	78.00000000	1816972.	4778.0000	3122018.
2	300.0000	78.00000000	1816972.	4778.0000	3122018.

Please note that because this analysis makes computations of ultimate
moment capacity and pile response using nonlinear bending stiffness
that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 114.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 114.000 in
Distance from top of pile to bottom of layer = 300.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 0.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800
2	48.00	0.05800
3	48.00	0.06900
4	114.00	0.06900

5	114.00	0.06100
6	300.00	0.06100

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	30.00	------	------
2	48.000	0.00000	30.00	------	------
3	48.000	0.00000	35.00	------	------
4	114.000	0.00000	35.00	------	------
5	114.000	0.00000	30.00	------	------
6	300.000	0.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 57000.000 lbs
Bending moment at pile head = 66012000.000 in-lbs
Axial load at pile head = 54000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head
may rotate under the applied pile-head loading, but is not a free-head
(zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head   =   22000.000 lbs
Bending moment at pile head =   25308000.000 in-lbs
Axial load at pile head   =   54000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head
may rotate under the applied pile-head loading, but is not a free-head
(zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter   =   78.0000 in

Material Properties:

Compressive Strength of Concrete   =   3.000 kip/in**2
Yield Stress of Reinforcement   =   60. kip/in**2
Modulus of Elasticity of Reinforcement =   29000. kip/in**2
Number of Reinforcing Bars   =   34
Area of Single Bar   =   1.56000 in**2
Number of Rows of Reinforcing Bars   =   17
Area of Steel   =   53.040 in**2
Area of Shaft   =   4778.362 in**2
Percentage of Steel Reinforcement   =   1.110 percent
Cover Thickness (edge to bar center)   =   3.000 in

Unfactored Axial Squash Load Capacity   =   15231.97 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement	Distance to Centroidal Axis

	in**2	in
1	3.120	35.846
2	3.120	34.626
3	3.120	32.226
4	3.120	28.729
5	3.120	24.253
6	3.120	18.952
7	3.120	13.005
8	3.120	6.615
9	3.120	0.000
10	3.120	-6.615
11	3.120	-13.005
12	3.120	-18.952
13	3.120	-24.253
14	3.120	-28.729
15	3.120	-32.226
16	3.120	-34.626
17	3.120	-35.846

Axial Thrust Force = 54000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
5577647.	6.693176E+12	8.333333E-07	0.00003589	43.07364830	110.12566	964.73523
11092188.	6.655313E+12	0.00000167	0.00006855	41.12715098	208.03926	1835.38976
16539815.	6.615926E+12	0.00000250	0.00010115	40.46094927	303.81941	2704.78502
21924203.	6.577261E+12	0.00000333	0.00013385	40.15406272	397.85271	3576.71433
21924203.	5.261809E+12	0.00000417	0.00009919	23.80480233	294.79793	6167.53005
21924203.	4.384841E+12	0.00000500	0.00011706	23.41190627	345.83681	7458.00599
21924203.	3.758435E+12	0.00000583	0.00013510	23.15921965	396.76345	8743.75314
21924203.	3.288630E+12	0.00000667	0.00015297	22.94477704	446.61955	10034.31964
21924203.	2.923227E+12	0.00000750	0.00017087	22.78207496	495.97832	11323.99730
21924203.	2.630904E+12	0.00000833	0.00018880	22.65562472	544.83744	12612.77803

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   21924203.  2.391731E+12    0.00000917    0.00020676   22.55557010     593.19453
13900.65368
   21924203.  2.192420E+12    0.00001000    0.00022475   22.47534415     641.04731
15187.61500
   21924203.  2.023773E+12    0.00001083    0.00024278   22.41039768     688.39333
16473.65360
   22447367.  1.924060E+12    0.00001167    0.00026084   22.35748091     735.23010
17758.76122
   23961695.  1.916936E+12    0.00001250    0.00027893   22.31421116     781.55512
19042.92946
   25473453.  1.910509E+12    0.00001333    0.00029705   22.27880546     827.36595
20326.14829
   26982619.  1.904655E+12    0.00001417    0.00031521   22.24989697     872.65999
21608.40913
   28489175.  1.899278E+12    0.00001500    0.00033340   22.22642568     917.43471
22889.70203
   29993098.  1.894301E+12    0.00001583    0.00035162   22.20755240     961.68744
24170.01812
   31494369.  1.889662E+12    0.00001667    0.00036988   22.19261000    1005.41562
25449.34650
   32992962.  1.885312E+12    0.00001750    0.00038817   22.18105218    1048.61638
26727.67942
   34488859.  1.881211E+12    0.00001833    0.00040649   22.17243960    1091.28713
28005.00508
   35982036.  1.877324E+12    0.00001917    0.00042486   22.16640499    1133.42503
29281.31409
   37472470.  1.873623E+12    0.00002000    0.00044325   22.16264382    1175.02724
30556.59619
   38960136.  1.870087E+12    0.00002083    0.00046169   22.16090038    1216.09091
31830.84102
   40445019.  1.866693E+12    0.00002167    0.00048015   22.16096315    1256.61332
33104.03522
   41927082.  1.863426E+12    0.00002250    0.00049866   22.16264150    1296.59118
34376.17223
   43406312.  1.860270E+12    0.00002333    0.00051720   22.16578433    1336.02180
35647.23714
   44882683.  1.857214E+12    0.00002417    0.00053578   22.17025682    1374.90214
36917.21828
   46356163.  1.854247E+12    0.00002500    0.00055440   22.17593810    1413.22892
38186.10688
   47826730.  1.851357E+12    0.00002583    0.00057305   22.18272820    1450.99906
39453.89019
   49294360.  1.848539E+12    0.00002667    0.00059175   22.19054112    1488.20952
40720.55434
   50759021.  1.845783E+12    0.00002750    0.00061048   22.19929549    1524.85684
41986.09005
   52220695.  1.843083E+12    0.00002833    0.00062925   22.20892856    1560.93802
43250.48064
   53679344.  1.840435E+12    0.00002917    0.00064807   22.21937522    1596.44944
44513.71746
   55134948.  1.837832E+12    0.00003000    0.00066692   22.23058668    1631.38793
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45775.78399
   56587476. 1.835269E+12   0.00003083   0.00068581   22.24251410   1665.74994
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48296.35732
   59483182. 1.830252E+12   0.00003250   0.00072372   22.26835415   1732.73036
49554.83682
   62366222. 1.825353E+12   0.00003417   0.00076180   22.29661408   1797.36194
52068.10962
   65236351. 1.820549E+12   0.00003583   0.00080005   22.32707074   1859.61496
54576.36785
   68093313. 1.815822E+12   0.00003750   0.00083848   22.35954514   1919.45862
57079.48766
   70936826. 1.811153E+12   0.00003917   0.00087709   22.39388850   1976.86066
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   73314538. 1.795458E+12   0.00004083   0.00091379   22.37862763   2028.80628
60000.00000
   75269917. 1.771057E+12   0.00004250   0.00094869   22.32221004   2075.84337
60000.00000
   76870741. 1.740470E+12   0.00004417   0.00098199   22.23383877   2118.58708
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   78376162. 1.710025E+12   0.00004583   0.00101494   22.14408436   2158.87072
60000.00000
   79633474. 1.676494E+12   0.00004750   0.00104882   22.08046058   2198.28300
60000.00000
   80858490. 1.644579E+12   0.00004917   0.00108023   21.97072873   2232.85530
60000.00000
   81934277. 1.611822E+12   0.00005083   0.00111080   21.85176829   2264.76069
60000.00000
   82842860. 1.577959E+12   0.00005250   0.00114040   21.72183582   2294.00545
60000.00000
   83746887. 1.546096E+12   0.00005417   0.00117009   21.60162243   2321.75681
60000.00000
   84646303. 1.516053E+12   0.00005583   0.00119987   21.49028662   2348.00062
60000.00000
   85415799. 1.485492E+12   0.00005750   0.00122880   21.37039402   2371.92451
60000.00000
   86057306. 1.454490E+12   0.00005917   0.00125686   21.24263039   2393.66693
60000.00000
   86695132. 1.425125E+12   0.00006083   0.00128500   21.12321898   2414.05401
60000.00000
   87329247. 1.397268E+12   0.00006250   0.00131322   21.01151356   2433.07370
60000.00000
   87959595. 1.370799E+12   0.00006417   0.00134153   20.90693066   2450.71342
60000.00000
   88586134. 1.345612E+12   0.00006583   0.00136992   20.80894956   2466.96050
60000.00000
   89116034. 1.320238E+12   0.00006750   0.00140088   20.75372913   2483.06936
60000.00000
   89536574. 1.294505E+12   0.00006917   0.00142700   20.63127950   2495.23447
60000.00000

89954331.	1.269944E+12	0.00007083	0.00145319	20.51564553	2506.21127
60000.00000					
90369276.	1.246473E+12	0.00007250	0.00147946	20.40637162	2515.98920
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90781365.	1.224018E+12	0.00007417	0.00150581	20.30304167	2524.55744
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91190580.	1.202513E+12	0.00007583	0.00153223	20.20528141	2531.90506
60000.00000					
91596866.	1.181895E+12	0.00007750	0.00155874	20.11274216	2538.02071
60000.00000					
92000194.	1.162108E+12	0.00007917	0.00158532	20.02511010	2542.89292
60000.00000					
92383133.	1.142884E+12	0.00008083	0.00161176	19.93930748	2546.48360
60000.00000					
92643873.	1.122956E+12	0.00008250	0.00163673	19.83909711	2548.72202
60000.00000					
92902283.	1.103790E+12	0.00008417	0.00166176	19.74368933	2549.85292
60000.00000					
93156977.	1.085324E+12	0.00008583	0.00168687	19.65281448	2547.94417
60000.00000					
93408431.	1.067525E+12	0.00008750	0.00171204	19.56622151	2544.09379
60000.00000					
93429864.	1.047812E+12	0.00008917	0.00173875	19.49999884	2547.11397
60000.00000					
93960832.	1.034431E+12	0.00009083	0.00176883	19.47337773	2549.25680
60000.00000					
94200396.	1.018383E+12	0.00009250	0.00179353	19.38948360	2549.96267
60000.00000					
94437439.	1.002875E+12	0.00009417	0.00181833	19.30974117	2547.30673
60000.00000					
94672859.	9.878907E+11	0.00009583	0.00184322	19.23360881	2543.51148
60000.00000					
94907097.	9.734061E+11	0.00009750	0.00186817	19.16074017	2545.49609
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95140138.	9.593963E+11	0.00009917	0.00189319	19.09097949	2547.71678
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95602546.	9.327078E+11	0.00010250	0.00194342	18.96020785	2549.92030
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95913009.	9.062647E+11	0.00010583	0.00199108	18.81338498	2545.12889
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96186898.	8.811014E+11	0.00010917	0.00203829	18.67132983	2544.11788
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96458374.	8.574078E+11	0.00011250	0.00208567	18.53931454	2547.98196
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96727393.	8.350566E+11	0.00011583	0.00213325	18.41650459	2549.83191
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96992435.	8.139225E+11	0.00011917	0.00218108	18.30277911	2546.57636
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97272542.	7.940616E+11	0.00012250	0.00222950	18.20000008	2540.74370
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97577460.	7.754500E+11	0.00012583	0.00228817	18.18415108	2545.59484

60000.00000
   97826599. 7.573672E+11   0.00012917   0.00233500   18.07741794   2548.44583
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   98074266. 7.401831E+11   0.00013250   0.00238197   17.97714713   2549.84797
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60000.00000
   98562481. 7.082334E+11   0.00013917   0.00247655   17.79559270   2542.44457
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   98762632. 6.930711E+11   0.00014250   0.00252300   17.70529202   2537.71722
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   98867065. 6.779456E+11   0.00014583   0.00256909   17.61663482   2541.59508
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   98970785. 6.634913E+11   0.00014917   0.00261529   17.53264770   2545.15195
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   99073768. 6.496641E+11   0.00015250   0.00266159   17.45303312   2547.74641
60000.00000
   99176016. 6.364236E+11   0.00015583   0.00270800   17.37752375   2549.36454
60000.00000
   99277493. 6.237329E+11   0.00015917   0.00275452   17.30586854   2549.99202
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   99356579. 6.114251E+11   0.00016250   0.00280281   17.24806783   2546.21446
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   99424738. 5.995462E+11   0.00016583   0.00285198   17.19789174   2541.76977
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   99492251. 5.881315E+11   0.00016917   0.00290126   17.15028664   2537.30746
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   99559105. 5.771542E+11   0.00017250   0.00295063   17.10511306   2534.47676
60000.00000
   99625311. 5.665894E+11   0.00017583   0.00300011   17.06224778   2539.27224
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   99690842. 5.564140E+11   0.00017917   0.00304970   17.02156994   2543.20153
60000.00000
   99755695. 5.466065E+11   0.00018250   0.00309939   16.98297259   2546.25166
60000.00000
   99819836. 5.371471E+11   0.00018583   0.00314920   16.94635114   2548.40911
60000.00000
   99883265. 5.280173E+11   0.00018917   0.00319911   16.91161492   2549.66009
60000.00000
   99883265. 5.188741E+11   0.00019250   0.00325325   16.89999899   2548.72475
60000.00000
   99883265. 5.100422E+11   0.00019583   0.00330958   16.89999899   2543.78412
60000.00000
   99883265. 5.015059E+11   0.00019917   0.00336592   16.89999899   2538.84350
60000.00000
   99986637. 4.937612E+11   0.00020250   0.00342225   16.89999899   2533.90288
60000.00000
1.001436E+08 4.865276E+11   0.00020583   0.00347858   16.89999899   2528.96226
60000.00000
1.002381E+08 4.792261E+11   0.00020917   0.00353473   16.89910170   2535.04806
60000.00000

1.002719E+08	4.718677E+11	0.00021250	0.00358782	16.88384548	2539.60100
60000.00000					
1.003050E+08	4.647336E+11	0.00021583	0.00364106	16.86977944	2543.35452
60000.00000					
1.003375E+08	4.578135E+11	0.00021917	0.00369446	16.85687104	2546.29041
60000.00000					
1.003692E+08	4.510977E+11	0.00022250	0.00374803	16.84509239	2548.38960
60000.00000					
1.004003E+08	4.445771E+11	0.00022583	0.00380177	16.83441791	2549.63197
60000.00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 99625.16141 in-kip

Axial Thrust Force = 54000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
5577647.	6.693176E+12	8.333333E-07	0.00003589	43.07364830	110.12566	964.73523
11092188.	6.655313E+12	0.00000167	0.00006855	41.12715098	208.03926	1835.38976
16539815.	6.615926E+12	0.00000250	0.00010115	40.46094927	303.81941	2704.78502
21924203.	6.577261E+12	0.00000333	0.00013385	40.15406272	397.85271	3576.71433
21924203.	5.261809E+12	0.00000417	0.00009919	23.80480233	294.79793	6167.53005
21924203.	4.384841E+12	0.00000500	0.00011706	23.41190627	345.83681	7458.00599
21924203.	3.758435E+12	0.00000583	0.00013510	23.15921965	396.76345	8743.75314
21924203.	3.288630E+12	0.00000667	0.00015297	22.94477704	446.61955	10034.31964
21924203.	2.923227E+12	0.00000750	0.00017087	22.78207496	495.97832	11323.99730
21924203.	2.630904E+12	0.00000833	0.00018880	22.65562472	544.83744	12612.77803
21924203.	2.391731E+12	0.00000917	0.00020676	22.55557010	593.19453	13900.65368
21924203.	2.192420E+12	0.00001000	0.00022475	22.47534415	641.04731	15187.61500

21924203.	2.023773E+12	0.00001083	0.00024278	22.41039768	688.39333
16473.65360					
22447367.	1.924060E+12	0.00001167	0.00026084	22.35748091	735.23010
17758.76122					
23961695.	1.916936E+12	0.00001250	0.00027893	22.31421116	781.55512
19042.92946					
25473453.	1.910509E+12	0.00001333	0.00029705	22.27880546	827.36595
20326.14829					
26982619.	1.904655E+12	0.00001417	0.00031521	22.24989697	872.65999
21608.40913					
28489175.	1.899278E+12	0.00001500	0.00033340	22.22642568	917.43471
22889.70203					
29993098.	1.894301E+12	0.00001583	0.00035162	22.20755240	961.68744
24170.01812					
31494369.	1.889662E+12	0.00001667	0.00036988	22.19261000	1005.41562
25449.34650					
32992962.	1.885312E+12	0.00001750	0.00038817	22.18105218	1048.61638
26727.67942					
34488859.	1.881211E+12	0.00001833	0.00040649	22.17243960	1091.28713
28005.00508					
35982036.	1.877324E+12	0.00001917	0.00042486	22.16640499	1133.42503
29281.31409					
37472470.	1.873623E+12	0.00002000	0.00044325	22.16264382	1175.02724
30556.59619					
38960136.	1.870087E+12	0.00002083	0.00046169	22.16090038	1216.09091
31830.84102					
40445019.	1.866693E+12	0.00002167	0.00048015	22.16096315	1256.61332
33104.03522					
41927082.	1.863426E+12	0.00002250	0.00049866	22.16264150	1296.59118
34376.17223					
43406312.	1.860270E+12	0.00002333	0.00051720	22.16578433	1336.02180
35647.23714					
44882683.	1.857214E+12	0.00002417	0.00053578	22.17025682	1374.90214
36917.21828					
46356163.	1.854247E+12	0.00002500	0.00055440	22.17593810	1413.22892
38186.10688					
47826730.	1.851357E+12	0.00002583	0.00057305	22.18272820	1450.99906
39453.89019					
49294360.	1.848539E+12	0.00002667	0.00059175	22.19054112	1488.20952
40720.55434					
50759021.	1.845783E+12	0.00002750	0.00061048	22.19929549	1524.85684
41986.09005					
52220695.	1.843083E+12	0.00002833	0.00062925	22.20892856	1560.93802
43250.48064					
53679344.	1.840435E+12	0.00002917	0.00064807	22.21937522	1596.44944
44513.71746					
55134948.	1.837832E+12	0.00003000	0.00066692	22.23058668	1631.38793
45775.78399					
56587476.	1.835269E+12	0.00003083	0.00068581	22.24251410	1665.74994
47036.66844					
58036897.	1.832744E+12	0.00003167	0.00070475	22.25511566	1699.53194

48296.35732
   59483182. 1.830252E+12   0.00003250   0.00072372   22.26835415   1732.73036
49554.83682
   62366222. 1.825353E+12   0.00003417   0.00076180   22.29661408   1797.36194
52068.10962
   65236351. 1.820549E+12   0.00003583   0.00080005   22.32707074   1859.61496
54576.36785
   68093313. 1.815822E+12   0.00003750   0.00083848   22.35954514   1919.45862
57079.48766
   70936826. 1.811153E+12   0.00003917   0.00087709   22.39388850   1976.86066
59577.34544
   73314538. 1.795458E+12   0.00004083   0.00091379   22.37862763   2028.80628
60000.00000
   75269917. 1.771057E+12   0.00004250   0.00094869   22.32221004   2075.84337
60000.00000
   76870741. 1.740470E+12   0.00004417   0.00098199   22.23383877   2118.58708
60000.00000
   78376162. 1.710025E+12   0.00004583   0.00101494   22.14408436   2158.87072
60000.00000
   79633474. 1.676494E+12   0.00004750   0.00104882   22.08046058   2198.28300
60000.00000
   80858490. 1.644579E+12   0.00004917   0.00108023   21.97072873   2232.85530
60000.00000
   81934277. 1.611822E+12   0.00005083   0.00111080   21.85176829   2264.76069
60000.00000
   82842860. 1.577959E+12   0.00005250   0.00114040   21.72183582   2294.00545
60000.00000
   83746887. 1.546096E+12   0.00005417   0.00117009   21.60162243   2321.75681
60000.00000
   84646303. 1.516053E+12   0.00005583   0.00119987   21.49028662   2348.00062
60000.00000
   85415799. 1.485492E+12   0.00005750   0.00122880   21.37039402   2371.92451
60000.00000
   86057306. 1.454490E+12   0.00005917   0.00125686   21.24263039   2393.66693
60000.00000
   86695132. 1.425125E+12   0.00006083   0.00128500   21.12321898   2414.05401
60000.00000
   87329247. 1.397268E+12   0.00006250   0.00131322   21.01151356   2433.07370
60000.00000
   87959595. 1.370799E+12   0.00006417   0.00134153   20.90693066   2450.71342
60000.00000
   88586134. 1.345612E+12   0.00006583   0.00136992   20.80894956   2466.96050
60000.00000
   89116034. 1.320238E+12   0.00006750   0.00140088   20.75372913   2483.06936
60000.00000
   89536574. 1.294505E+12   0.00006917   0.00142700   20.63127950   2495.23447
60000.00000
   89954331. 1.269944E+12   0.00007083   0.00145319   20.51564553   2506.21127
60000.00000
   90369276. 1.246473E+12   0.00007250   0.00147946   20.40637162   2515.98920
60000.00000

90781365.	1.224018E+12	0.00007417	0.00150581	20.30304167	2524.55744
60000.00000					
91190580.	1.202513E+12	0.00007583	0.00153223	20.20528141	2531.90506
60000.00000					
91596866.	1.181895E+12	0.00007750	0.00155874	20.11274216	2538.02071
60000.00000					
92000194.	1.162108E+12	0.00007917	0.00158532	20.02511010	2542.89292
60000.00000					
92383133.	1.142884E+12	0.00008083	0.00161176	19.93930748	2546.48360
60000.00000					
92643873.	1.122956E+12	0.00008250	0.00163673	19.83909711	2548.72202
60000.00000					
92902283.	1.103790E+12	0.00008417	0.00166176	19.74368933	2549.85292
60000.00000					
93156977.	1.085324E+12	0.00008583	0.00168687	19.65281448	2547.94417
60000.00000					
93408431.	1.067525E+12	0.00008750	0.00171204	19.56622151	2544.09379
60000.00000					
93429864.	1.047812E+12	0.00008917	0.00173875	19.49999884	2547.11397
60000.00000					
93960832.	1.034431E+12	0.00009083	0.00176883	19.47337773	2549.25680
60000.00000					
94200396.	1.018383E+12	0.00009250	0.00179353	19.38948360	2549.96267
60000.00000					
94437439.	1.002875E+12	0.00009417	0.00181833	19.30974117	2547.30673
60000.00000					
94672859.	9.878907E+11	0.00009583	0.00184322	19.23360881	2543.51148
60000.00000					
94907097.	9.734061E+11	0.00009750	0.00186817	19.16074017	2545.49609
60000.00000					
95140138.	9.593963E+11	0.00009917	0.00189319	19.09097949	2547.71678
60000.00000					
95602546.	9.327078E+11	0.00010250	0.00194342	18.96020785	2549.92030
60000.00000					
95913009.	9.062647E+11	0.00010583	0.00199108	18.81338498	2545.12889
60000.00000					
96186898.	8.811014E+11	0.00010917	0.00203829	18.67132983	2544.11788
60000.00000					
96458374.	8.574078E+11	0.00011250	0.00208567	18.53931454	2547.98196
60000.00000					
96727393.	8.350566E+11	0.00011583	0.00213325	18.41650459	2549.83191
60000.00000					
96992435.	8.139225E+11	0.00011917	0.00218108	18.30277911	2546.57636
60000.00000					
97272542.	7.940616E+11	0.00012250	0.00222950	18.20000008	2540.74370
60000.00000					
97577460.	7.754500E+11	0.00012583	0.00228817	18.18415108	2545.59484
60000.00000					
97826599.	7.573672E+11	0.00012917	0.00233500	18.07741794	2548.44583
60000.00000					
98074266.	7.401831E+11	0.00013250	0.00238197	17.97714713	2549.84797

60000.00000
   98319345. 7.238234E+11   0.00013583   0.00242917   17.88347813   2547.33506
60000.00000
   98562481. 7.082334E+11   0.00013917   0.00247655   17.79559270   2542.44457
60000.00000
   98762632. 6.930711E+11   0.00014250   0.00252300   17.70529202   2537.71722
60000.00000
   98867065. 6.779456E+11   0.00014583   0.00256909   17.61663482   2541.59508
60000.00000
   98970785. 6.634913E+11   0.00014917   0.00261529   17.53264770   2545.15195
60000.00000
   99073768. 6.496641E+11   0.00015250   0.00266159   17.45303312   2547.74641
60000.00000
   99176016. 6.364236E+11   0.00015583   0.00270800   17.37752375   2549.36454
60000.00000
   99277493. 6.237329E+11   0.00015917   0.00275452   17.30586854   2549.99202
60000.00000
   99356579. 6.114251E+11   0.00016250   0.00280281   17.24806783   2546.21446
60000.00000
   99424738. 5.995462E+11   0.00016583   0.00285198   17.19789174   2541.76977
60000.00000
   99492251. 5.881315E+11   0.00016917   0.00290126   17.15028664   2537.30746
60000.00000
   99559105. 5.771542E+11   0.00017250   0.00295063   17.10511306   2534.47676
60000.00000
   99625311. 5.665894E+11   0.00017583   0.00300011   17.06224778   2539.27224
60000.00000
   99690842. 5.564140E+11   0.00017917   0.00304970   17.02156994   2543.20153
60000.00000
   99755695. 5.466065E+11   0.00018250   0.00309939   16.98297259   2546.25166
60000.00000
   99819836. 5.371471E+11   0.00018583   0.00314920   16.94635114   2548.40911
60000.00000
   99883265. 5.280173E+11   0.00018917   0.00319911   16.91161492   2549.66009
60000.00000
   99883265. 5.188741E+11   0.00019250   0.00325325   16.89999899   2548.72475
60000.00000
   99883265. 5.100422E+11   0.00019583   0.00330958   16.89999899   2543.78412
60000.00000
   99883265. 5.015059E+11   0.00019917   0.00336592   16.89999899   2538.84350
60000.00000
   99986637. 4.937612E+11   0.00020250   0.00342225   16.89999899   2533.90288
60000.00000
1.001436E+08 4.865276E+11   0.00020583   0.00347858   16.89999899   2528.96226
60000.00000
1.002381E+08 4.792261E+11   0.00020917   0.00353473   16.89910170   2535.04806
60000.00000
1.002719E+08 4.718677E+11   0.00021250   0.00358782   16.88384548   2539.60100
60000.00000
1.003050E+08 4.647336E+11   0.00021583   0.00364106   16.86977944   2543.35452
60000.00000

```
  1.003375E+08  4.578135E+11    0.00021917    0.00369446   16.85687104    2546.29041
  60000.00000
  1.003692E+08  4.510977E+11    0.00022250    0.00374803   16.84509239    2548.38960
  60000.00000
  1.004003E+08  4.445771E+11    0.00022583    0.00380177   16.83441791    2549.63197
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =   99625.16141
in-kip



------------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  1
------------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       57000.000 lbs
Specified moment at pile head       =    66012000.000 in-lbs
Specified axial load at pile head   =       54000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.



------------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  2
------------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       22000.000 lbs
Specified moment at pile head       =    25308000.000 in-lbs
Specified axial load at pile head   =       54000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.



------------------------------------------------------------------------------
                          Summary of Pile Response(s)
------------------------------------------------------------------------------
```

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 57000.	M= 6.60E+07	54000.0000	4.1955	6.8781E+07	-468269.
1	V= 22000.	M= 2.53E+07	54000.0000	0.8164963	2.6310E+07	-158831.

Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

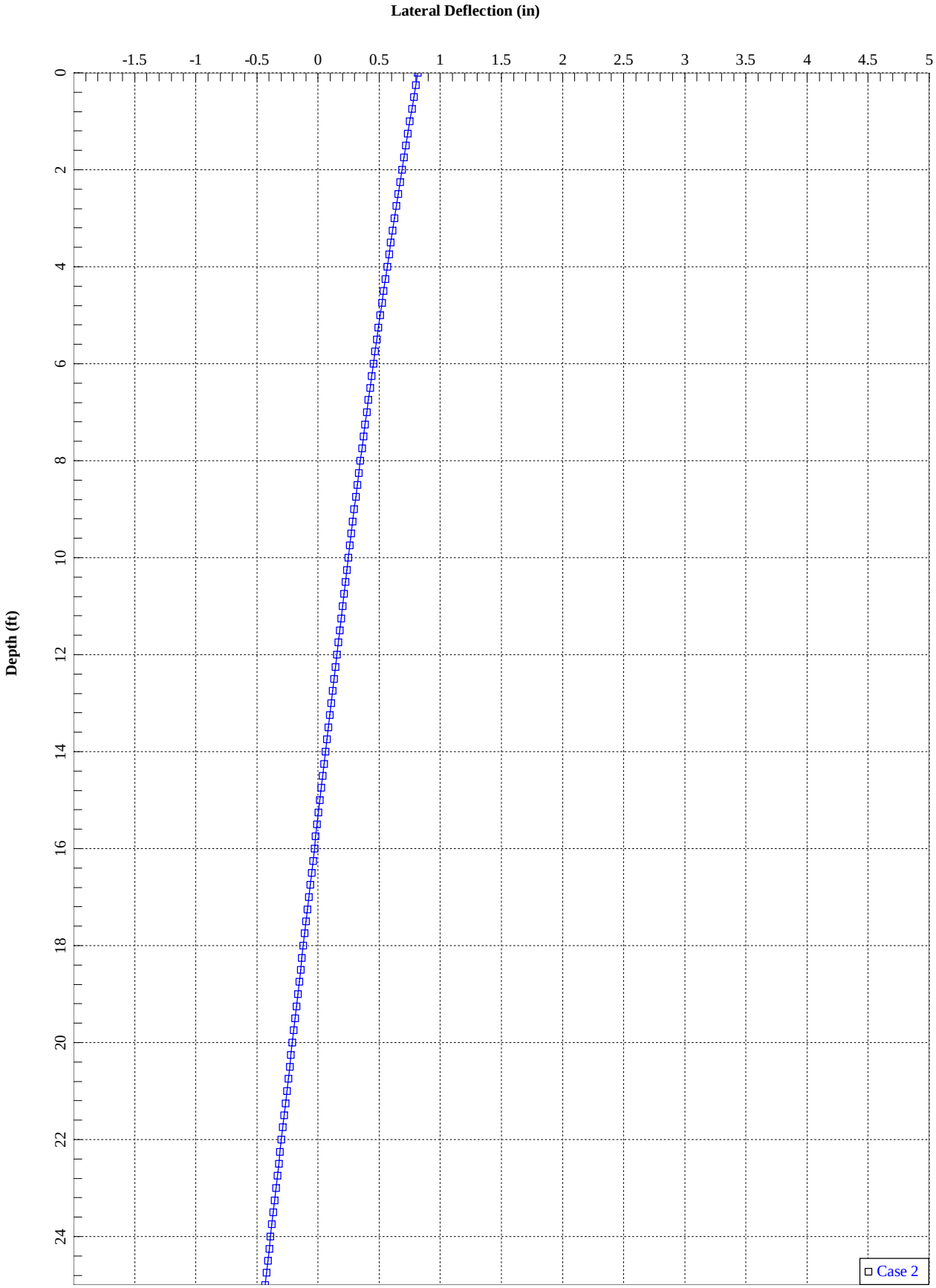
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00575129	5700.00008	920526.96178	991081.65886	1.600557E+08
0.01731311	17158.70975	2771062.	991081.65886	1.600557E+08
0.02744064	27195.91152	4392030.	991081.65886	1.600557E+08
0.03462623	34317.41951	5542124.	991081.65886	1.600557E+08
0.04020228	39841.29025	6434097.	991020.57995	1.600431E+08
0.04476104	44354.62127	7162757.	990920.15252	1.600221E+08
0.04861670	48170.58828	7778761.	990823.88949	1.600018E+08
0.05195729	51476.12926	8312329.	990739.36089	1.599839E+08
0.05490430	54391.82304	8782944.	990666.04966	1.599682E+08
0.05754075	57000.00000	9203905.	990602.23204	1.599545E+08

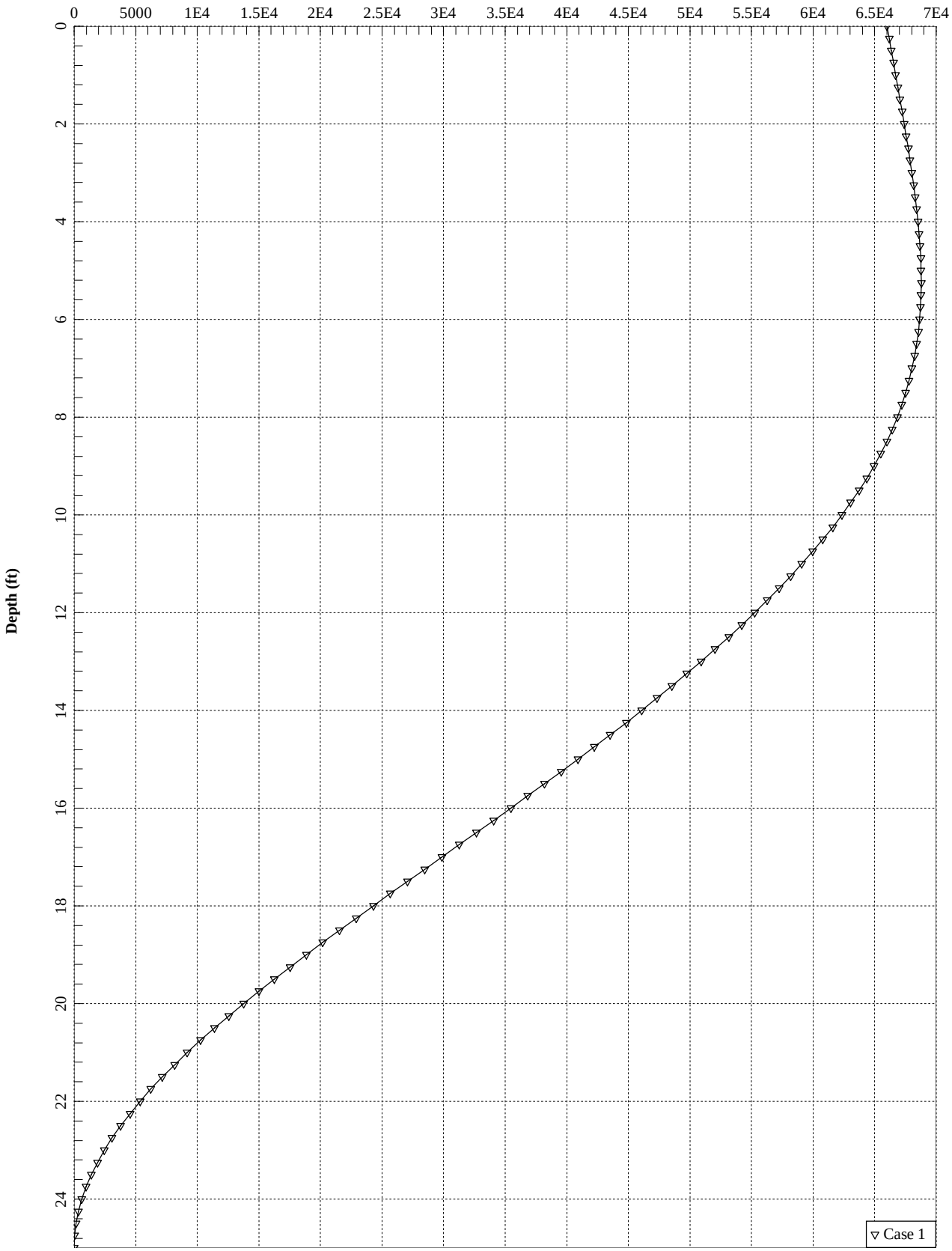
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00020174	32286.19107	6601200.	1.600349E+08	3.272056E+10
0.00060936	97212.50854	19871592.	1.595312E+08	3.261040E+10
0.00145939	157171.36409	31495728.	1.076964E+08	2.158138E+10
0.00203682	202146.40852	39743184.	99246107.	1.951237E+10
0.00245813	237165.33042	46140408.	96481996.	1.877053E+10
0.00279349	265717.92180	51367320.	95120563.	1.838825E+10
0.00307320	289794.04383	55786612.	94297095.	1.815260E+10
0.00331158	310530.89162	59614776.	93771328.	1.800193E+10
0.00352261	328860.39027	62991457.	93357066.	1.788205E+10
0.00370810	345132.87807	66012000.	93075336.	1.780210E+10

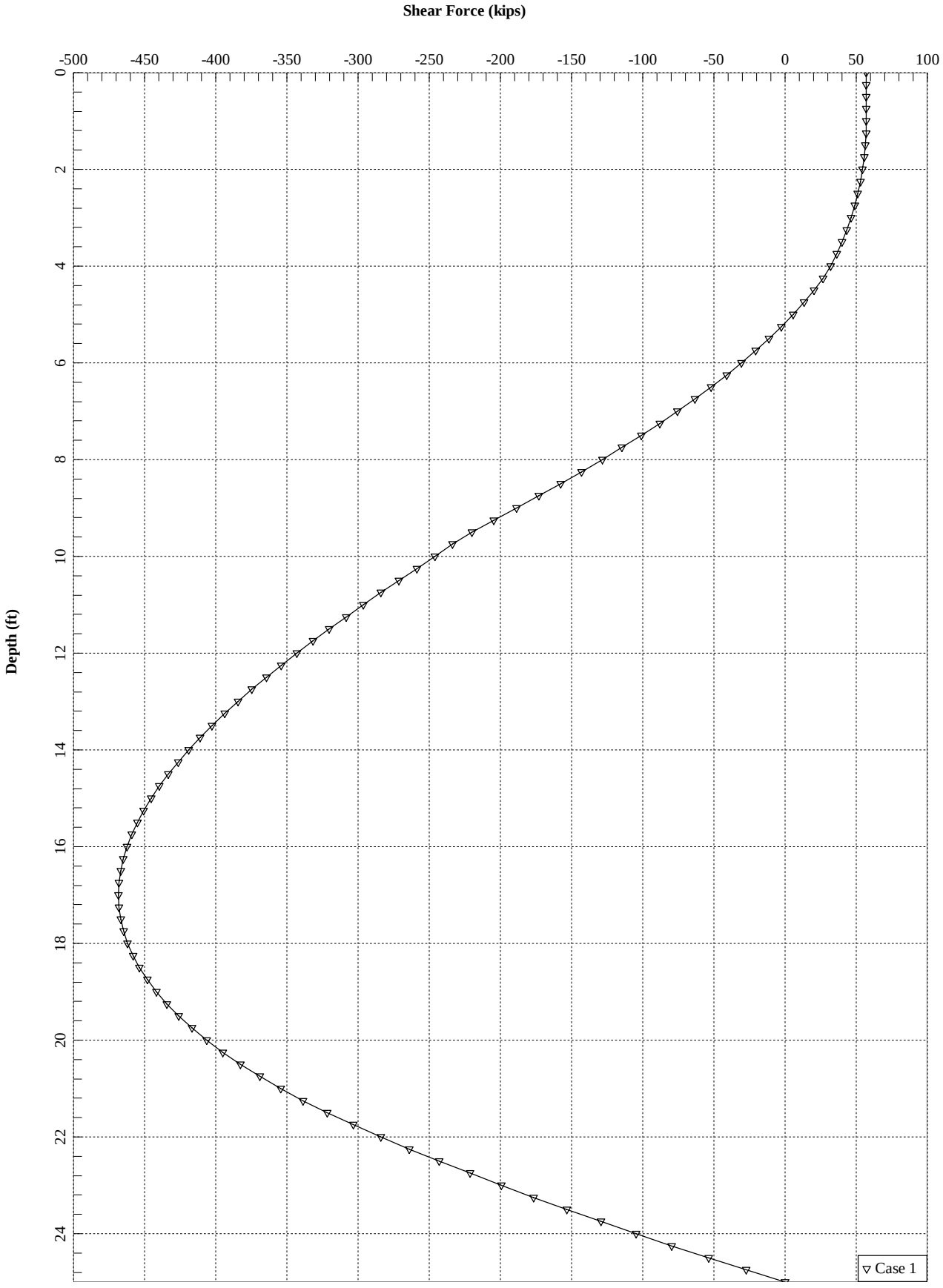
K22 = abs(Shear Reaction/Top y)

```
  K23 = abs(Shear Reaction/Top Rotation)
  K32 = abs(Moment Reaction/Top y)
  K33 = abs(Moment Reaction/Top Rotation)


The analysis ended normally.
```


Lateral Deflection (in)
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
Case 2


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
6.5E4
7E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
Case 1


Shear Force (kips)
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
Case 1

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

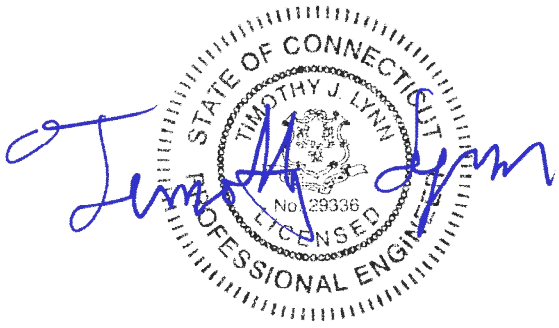
T-Mobile Site #: CT11401A

100 Reef Road
Fairfield, CT

Centek Project No. 20074.37

Date: June 15, 2020

Max Stress Ratio = 79.4%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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CENTEK engineering

Centered on Solutions℠

June 15, 2020

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11401A
100 Reef Road
Fairfield, CT 06824

Centek Project No. 20074.37

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 mount, consisting three (3) T-arms to support the proposed/existing 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:
  T-Arms: Three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) RFS AIR32 panel antennas, three (3) RFS AIR21 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) TMAs mounted on three (3) T-Arms with a RAD center elevation of 135-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 Fairfield 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 installation, it is our opinion that the subject antenna mount with the installation of one (1) stabilizer kit (Perfect10 p/n: VSK-M) has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL 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: Fairfield, CT

Rev. 0: 6/15/20

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 20074.37

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 = $h := 145$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 135$ 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)

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

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.151$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.727$$

Velocity Pressure Coefficient Antennas = $Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.348$

Velocity Pressure w/o Ice Antennas = $qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 30.85$

Velocity Pressure with Ice Antennas = $qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 8.197$

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:	Fairfield, CT
Rev. 0: 6/15/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.37

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24-43		
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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 687$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 249$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 216$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 96$	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 =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 425$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 425$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 221$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 149$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 79$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 59$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5584$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 181$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 181$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR21		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56$	in	(User Input)
Antenna Width =	$W_{ant} := 12.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 90$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 207$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 135$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 75$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 4.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 55$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 90$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5353$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5146$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 167$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 167$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 192$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 78$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 66$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 32$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4660$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 151$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 151$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

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 = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 56$ lbs

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 44$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 19$ 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 = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2189$

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 71$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4415 B25

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 = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 56$ lbs

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 23$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 12$ lbs

Gravity Load (without ice)

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

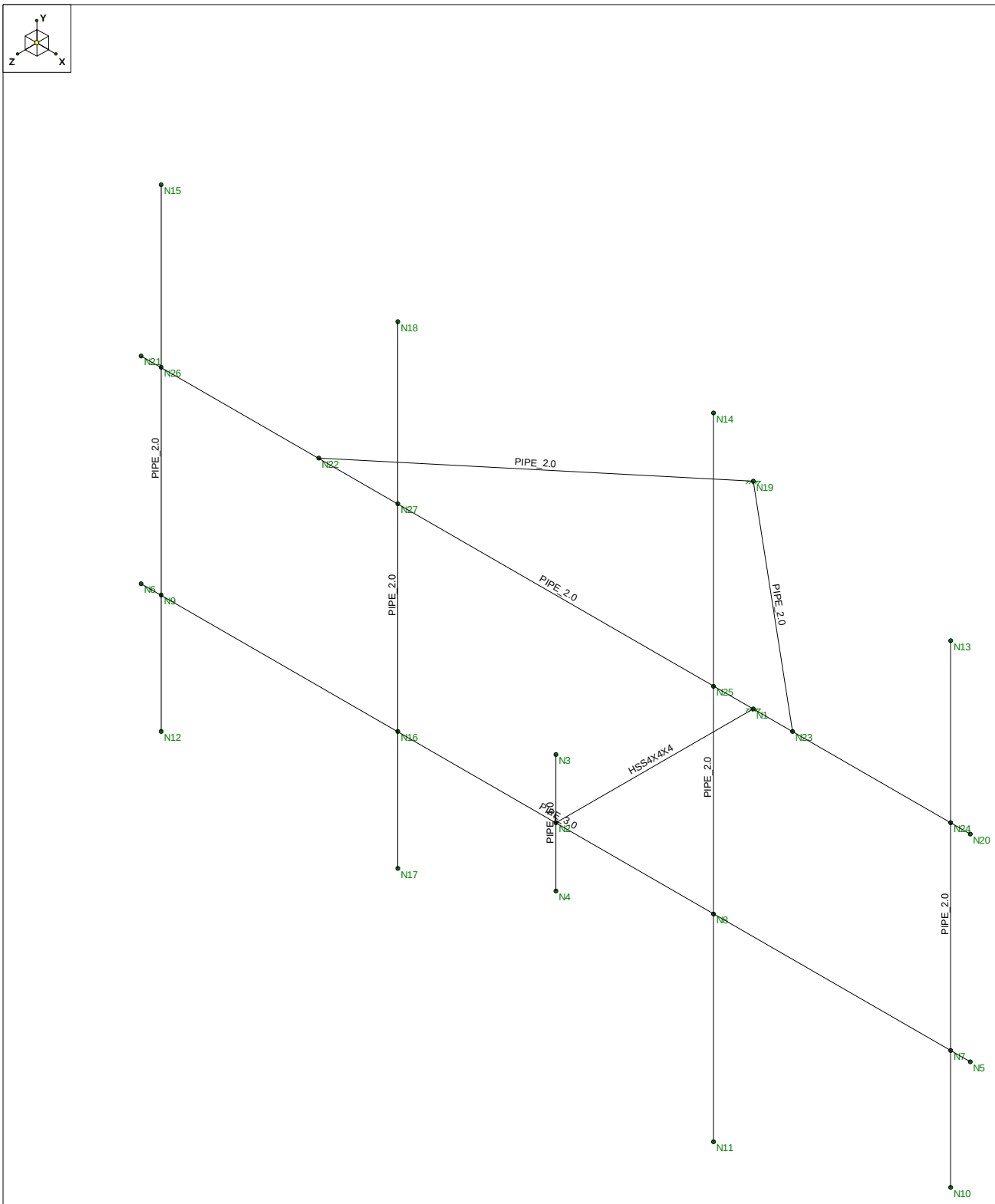
Gravity Loads (ice only)

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

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1644$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 53$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 53$ lbs



Envelope Only Solution

Centek		
TJL	CT11401A	June 15, 2020 at 7:22 AM
20074.37	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)	12
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 S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: 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?	No
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)	150.001
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	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

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	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz	PIPE_3.0	Beam	Pipe	A53 Grade B	Typical	2.07	2.85	2.85	5.69
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Vert	PIPE_4.0	Column	Pipe	A53 Grade B	Typical	2.96	6.82	6.82	13.6
5	Stabilizer Kit	PIPE_2.0	Beam	Pipe	A53 Grade 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	2.5			Lbyy						Lateral
2	M2	Vert	1.5			Lbyy						Lateral
3	M3	Horz	10.5			Lbyy						Lateral
4	M4	Antenna Mast	6			Lbyy						Lateral
5	M5	Antenna Mast	8			Lbyy						Lateral
6	M6	Antenna Mast	6			Lbyy						Lateral
7	M7	Antenna Mast	6			Lbyy						Lateral
8	M8	Stabilizer Kit	10.5			Lbyy						Lateral
9	M9	Stabilizer Kit	3.905			Lbyy						Lateral
10	M10	Stabilizer Kit	3.905			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	N2			Outrigger	Beam	Tube	A500 Gr...	Typical
2	M2	N3	N4			Vert	Column	Pipe	A53 Gra...	Typical
3	M3	N6	N5			Horz	Beam	Pipe	A53 Gra...	Typical
4	M4	N12	N15			Antenna Mast	Column	Pipe	A53 Gra...	Typical
5	M5	N11	N14			Antenna Mast	Column	Pipe	A53 Gra...	Typical
6	M6	N10	N13			Antenna Mast	Column	Pipe	A53 Gra...	Typical
7	M7	N17	N18			Antenna Mast	Column	Pipe	A53 Gra...	Typical
8	M8	N21	N20			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical
9	M9	N22	N19			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical
10	M10	N19	N23			Stabilizer Kit	Beam	Pipe	A53 Gra...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	0	2.5	0	
3	N3	0	.75	2.5	0	
4	N4	0	-.75	2.5	0	
5	N5	5.25	0	2.5	0	
6	N6	-5.25	0	2.5	0	
7	N7	5	0	2.5	0	
8	N8	2	0	2.5	0	
9	N9	-5	0	2.5	0	
10	N10	5	-1.5	2.5	0	
11	N11	2	-2.5	2.5	0	
12	N12	-5	-1.5	2.5	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
13	N13	5	4.5	2.5	0	
14	N14	2	5.5	2.5	0	
15	N15	-5	4.5	2.5	0	
16	N16	-2	0	2.5	0	
17	N17	-2	-1.5	2.5	0	
18	N18	-2	4.5	2.5	0	
19	N19	0	2.5	0	0	
20	N20	5.25	2.5	2.5	0	
21	N21	-5.25	2.5	2.5	0	
22	N22	-3	2.5	2.5	0	
23	N23	3	2.5	2.5	0	
24	N24	5	2.5	2.5	0	
25	N25	2	2.5	2.5	0	
26	N26	-5	2.5	2.5	0	
27	N27	-2	2.5	2.5	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N19	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.045	.5
2	M6	Y	-.045	5.5
3	M5	Y	-.077	.5
4	M5	Y	-.077	7.5
5	M7	Y	-.066	.5
6	M7	Y	-.066	5.5
7	M4	Y	-.052	5.5
8	M4	Y	-.052	2.5
9	M5	Y	-.074	%50
10	M5	Y	-.047	6.5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.084	.5
2	M6	Y	-.084	5.5
3	M5	Y	-.213	.5
4	M5	Y	-.213	7.5
5	M7	Y	-.091	.5
6	M7	Y	-.091	5.5
7	M4	Y	-.076	5.5
8	M4	Y	-.076	2.5
9	M5	Y	-.071	%50
10	M5	Y	-.053	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	X	.028	.5
2	M6	X	.028	5.5
3	M5	X	.048	.5
4	M5	X	.048	7.5
5	M7	X	.03	.5
6	M7	X	.03	5.5
7	M4	X	.016	5.5
8	M4	X	.016	2.5
9	M5	X	.019	%50
10	M5	X	.012	6.5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	X	.068	.5
2	M6	X	.068	5.5
3	M5	X	.125	.5
4	M5	X	.125	7.5
5	M7	X	.075	.5
6	M7	X	.075	5.5
7	M4	X	.039	5.5
8	M4	X	.039	2.5
9	M5	X	.044	%50
10	M5	X	.023	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Z	.038	.5
2	M6	Z	.038	5.5
3	M5	Z	.108	.5
4	M5	Z	.108	7.5
5	M7	Z	.04	.5
6	M7	Z	.04	5.5
7	M4	Z	.033	5.5
8	M4	Z	.033	2.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Z	.104	.5
2	M6	Z	.104	5.5
3	M5	Z	.344	.5
4	M5	Z	.344	7.5
5	M7	Z	.111	.5
6	M7	Z	.111	5.5
7	M4	Z	.096	5.5
8	M4	Z	.096	2.5

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	M4	X	.003	.003	0	0
2	M7	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M6	X	.003	.003	0	0
5	M2	X	.003	.003	0	0
6	M1	X	.003	.003	0	0
7	M9	X	.003	.003	0	0
8	M10	X	.003	.003	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	M4	X	.009	.009	0	0
2	M7	X	.009	.009	0	0
3	M5	X	.009	.009	0	0
4	M6	X	.009	.009	0	0
5	M2	X	.009	.009	0	0
6	M1	X	.009	.009	0	0
7	M9	X	.009	.009	0	0
8	M10	X	.009	.009	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	M7	Z	.003	.003	0	0
2	M5	Z	.003	.003	0	0
3	M3	Z	.003	.003	0	0
4	M8	Z	.003	.003	0	0
5	M2	Z	.003	.003	0	0
6	M9	Z	.003	.003	0	0
7	M10	Z	.003	.003	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	M7	Z	.009	.009	0	0
2	M5	Z	.009	.009	0	0
3	M3	Z	.009	.009	0	0
4	M8	Z	.009	.009	0	0
5	M2	Z	.009	.009	0	0
6	M9	Z	.009	.009	0	0
7	M10	Z	.009	.009	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Equipment Weight	DL					10			
3	Ice Weight	DL					10			
4	Wind w/ Ice X	WLX					10	8		
5	Wind X	WLZ					10	8		
6	Wind w/ Ice Z	WLX					8	7		

Basic Load Cases (Continued)

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
7	Wind Z	WLZ					8	7		

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...
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	N1	max	.208	6	1.878	6	.302	3	-.914	5	1.181	4	.639	1
2		min	-.851	2	.683	2	-.596	5	-4.021	3	-2.838	2	-.103	5
3	N19	max	-.193	5	.256	3	-.111	2	-.055	5	.492	5	.346	1
4		min	-.793	1	-.076	5	-2.175	4	-.387	3	-1.063	1	-.174	5
5	Totals:	max	0	6	2.099	6	0	3						
6		min	-1.634	1	.785	2	-2.734	4						

Envelope Joint Displacements

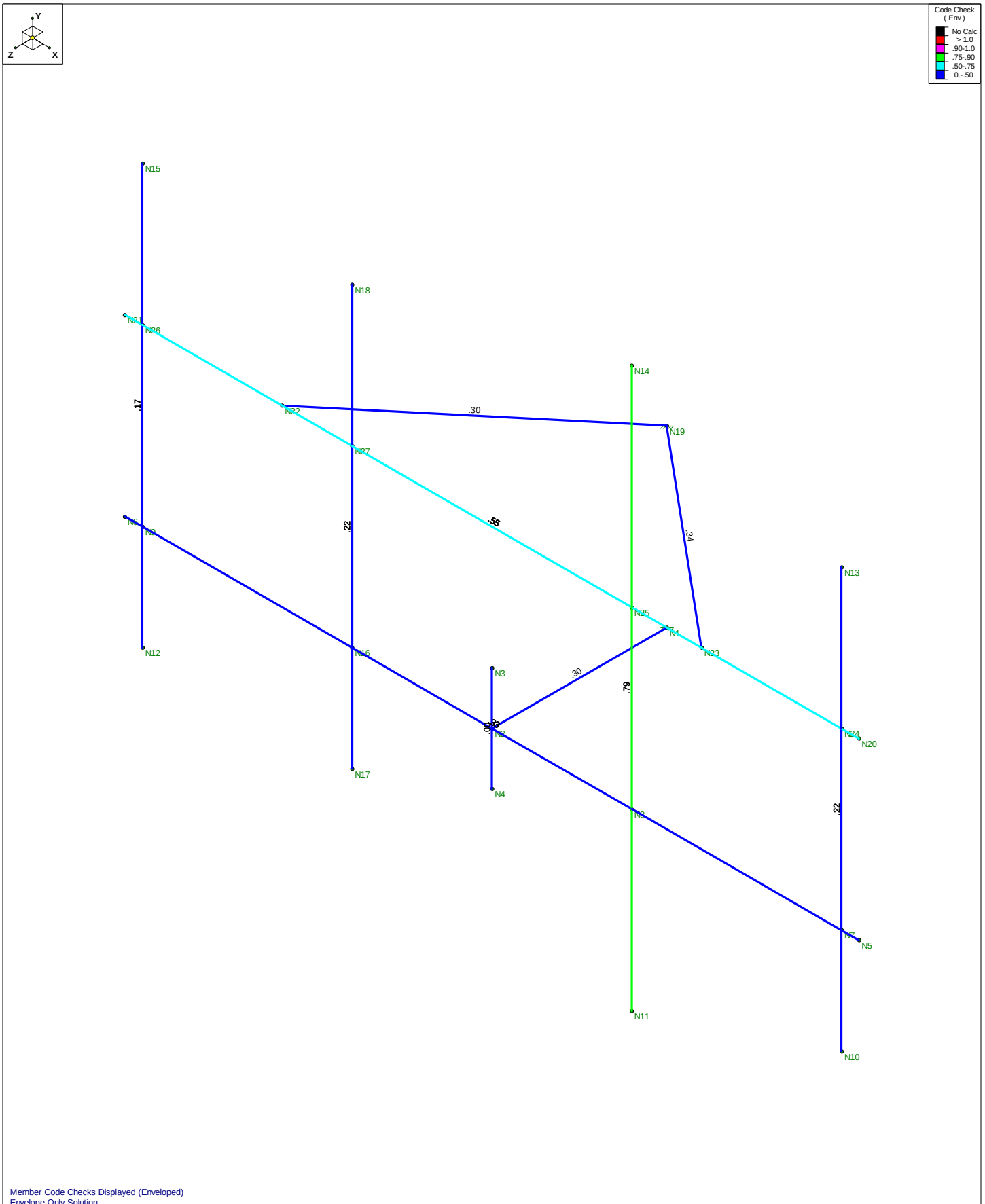
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	.065	2	-.007	5	0	5	3.443e-03	3	3.564e-03	1	2.591e-04	5
4		min	-.031	4	-.077	3	0	3	-3.025e-04	5	-1.854e-03	5	-1.612e-03	1
5	N3	max	.08	1	-.007	5	.031	3	3.443e-03	3	3.564e-03	1	2.591e-04	5
6		min	-.033	5	-.077	3	-.002	5	-3.016e-04	5	-1.854e-03	5	-1.613e-03	1
7	N4	max	.051	2	-.007	5	.003	5	3.443e-03	3	3.564e-03	1	2.591e-04	5
8		min	-.029	4	-.077	3	-.031	3	-3.035e-04	5	-1.854e-03	5	-1.611e-03	1
9	N5	max	.065	2	-.005	5	.294	5	1.207e-03	3	5.831e-03	1	6.568e-04	5
10		min	-.031	4	-.322	3	-.33	1	-4.877e-03	5	-5.758e-03	5	-3.794e-03	1
11	N6	max	.066	1	.09	2	.284	2	2.424e-03	3	4.936e-03	2	1.773e-03	4
12		min	-.03	5	-.141	6	-.047	4	-8.758e-04	5	-2.352e-04	6	-2.525e-03	2
13	N7	max	.065	2	-.007	5	.277	5	1.207e-03	3	5.831e-03	1	6.569e-04	5
14		min	-.031	4	-.312	3	-.313	1	-4.877e-03	5	-5.758e-03	5	-3.794e-03	1
15	N8	max	.065	2	-.015	5	.085	5	1.857e-03	3	5.252e-03	1	-1.622e-04	5
16		min	-.031	4	-.168	3	-.109	1	-4.88e-03	5	-4.543e-03	5	-4.226e-03	3
17	N9	max	.066	1	.082	2	.269	2	2.424e-03	3	4.936e-03	2	1.773e-03	4
18		min	-.03	5	-.138	6	-.047	4	-8.758e-04	5	-2.352e-04	6	-2.525e-03	2
19	N10	max	.01	2	-.007	5	.377	5	1.206e-03	3	5.831e-03	1	6.567e-04	5
20		min	-.049	6	-.312	3	-.309	1	-5.7e-03	5	-5.758e-03	5	-3.175e-03	1
21	N11	max	.071	2	-.016	5	.482	5	1.848e-03	3	5.252e-03	1	1.324e-03	2
22		min	-.114	6	-.168	3	-.124	1	-1.613e-02	5	-4.543e-03	5	-3.549e-03	6
23	N12	max	.024	1	.082	2	.238	2	2.424e-03	3	4.936e-03	2	1.773e-03	4
24		min	-.001	5	-.138	6	-.056	6	-8.758e-04	5	-2.352e-04	6	-2.445e-03	2
25	N13	max	.288	1	-.007	5	.298	5	3.893e-03	4	5.515e-03	1	8.208e-04	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
26		min	-.09	5	-.312	3	-.356	1	-8.786e-04	2	-6.704e-03	5	-5.417e-03	1
27	N14	max	.521	1	-.016	5	.852	4	2.614e-02	4	5.993e-03	1	7.366e-04	5
28		min	-.096	5	-.169	3	-.131	2	-2.738e-04	2	-4.904e-04	5	-1.177e-02	1
29	N15	max	.256	2	.082	2	.377	1	3.468e-03	4	5.156e-03	2	1.61e-03	4
30		min	-.104	4	-.138	6	.023	5	1.789e-03	2	7.522e-04	6	-4.039e-03	2
31	N16	max	.065	2	.007	2	.097	2	2.553e-03	3	4.464e-03	2	1.934e-03	4
32		min	-.03	4	-.089	6	-.031	4	-1.204e-03	5	-9.545e-04	4	-1.722e-03	2
33	N17	max	.048	1	.007	2	.072	2	2.551e-03	3	4.464e-03	2	1.933e-03	4
34		min	0	5	-.089	6	-.043	6	-2.162e-03	5	-9.545e-04	4	-1.048e-03	2
35	N18	max	.263	1	.007	2	.15	1	4.78e-03	4	5.277e-03	2	1.122e-03	5
36		min	-.094	5	-.09	6	.059	6	7.311e-04	2	-3.57e-03	4	-4.427e-03	1
37	N19	max	0	6	0	6	0	6	0	6	0	6	0	6
38		min	0	1	0	1	0	1	0	1	0	1	0	1
39	N20	max	.166	1	-.005	5	.239	5	2.037e-03	4	5.515e-03	1	8.203e-04	5
40		min	-.07	5	-.321	3	-.355	1	-8.781e-04	2	-6.704e-03	5	-4.012e-03	1
41	N21	max	.165	1	.092	2	.345	1	1.958e-03	1	5.156e-03	2	1.609e-03	4
42		min	-.067	5	-.139	6	-.039	5	1.583e-03	5	7.523e-04	6	-3.152e-03	2
43	N22	max	.165	1	.033	2	.198	1	2.013e-03	4	6.146e-03	2	1.98e-03	4
44		min	-.067	5	-.099	6	-.076	5	7.54e-04	2	-1.997e-03	4	-1.73e-03	2
45	N23	max	.166	1	-.012	5	.09	5	4.812e-03	4	6.64e-03	1	2.836e-04	5
46		min	-.07	5	-.21	3	-.198	1	3.827e-04	2	-2.177e-03	5	-4.576e-03	3
47	N24	max	.166	1	-.007	5	.219	5	2.037e-03	4	5.515e-03	1	8.204e-04	5
48		min	-.07	5	-.312	3	-.338	1	-8.781e-04	2	-6.704e-03	5	-4.012e-03	1
49	N25	max	.166	1	-.016	5	.085	4	8.391e-03	4	5.993e-03	1	7.346e-04	5
50		min	-.07	5	-.168	3	-.121	2	-2.73e-04	2	-4.904e-04	5	-4.499e-03	1
51	N26	max	.165	1	.082	2	.33	1	1.958e-03	1	5.156e-03	2	1.608e-03	4
52		min	-.067	5	-.138	6	-.046	5	1.583e-03	5	7.522e-04	6	-3.152e-03	2
53	N27	max	.166	1	.007	2	.13	1	2.609e-03	4	5.277e-03	2	1.121e-03	5
54		min	-.067	5	-.09	6	-.037	5	7.306e-04	2	-3.57e-03	4	-2.897e-03	1

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	M1	HSS4X4X4	.297	0	1	.092	0	y	3	135....	139....	16.181	16.181	1.8...	H1-...
2	M2	PIPE_4.0	.000	.75	1	.000	.75		1	92.571	93.24	10.631	10.631	1.5...	H1-...
3	M3	PIPE_3.0	.325	5.25	3	.241	5.25		4	36.138	65.205	5.749	5.749	1.9...	H1-...
4	M4	PIPE_2.0	.166	1.5	3	.073	2....		4	20.867	32.13	1.872	1.872	2.0...	H1-...
5	M5	PIPE_2.0	.794	5	4	.156	5		4	14.916	32.13	1.872	1.872	4.7...	H1-...
6	M6	PIPE_2.0	.224	4	4	.049	1.5		6	20.867	32.13	1.872	1.872	2.0...	H1-...
7	M7	PIPE_2.0	.221	1.5	3	.083	4		5	20.867	32.13	1.872	1.872	2.0...	H1-...
8	M8	PIPE_2.0	.548	8....	5	.315	8....		5	8.922	32.13	1.872	1.872	2.8...	H3-6
9	M9	PIPE_2.0	.295	3....	1	.046	3....		2	26.761	32.13	1.872	1.872	1.5...	H1-...
10	M10	PIPE_2.0	.340	0	1	.071	0		5	26.761	32.13	1.872	1.872	2.1...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CT11401A	June 15, 2020 at 7:22 AM
20074.37	Unity Check	Mount.r3d

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: CT11401A

Fairfield Downtown Area
100 Reef Road
Fairfield, Connecticut 06824

June 23, 2020

EBI Project Number: 6220002651

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**25.20%**

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

June 23, 2020

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

Emissions Analysis for Site: CT11401A - Fairfield Downtown Area

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **100 Reef Road** in **Fairfield, 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 100 Reef Road in Fairfield, 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) 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.

6) 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.

7) 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.

8) 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.

9) 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.

10) 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.

11) 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.

12) The antennas used in this modeling are the Ericsson AIR 21 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-UNA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the Ericsson AIR 21 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-UNA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR 21 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-UNA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 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.

13) The antenna mounting height centerline of the proposed antennas is 135 feet above ground level (AGL).

14) 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.

15) 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 21	Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts	Total TX Power (W):	180 Watts
ERP (W):	6,169.82	ERP (W):	6,169.82	ERP (W):	6,169.82
Antenna A1 MPE %:	**1.22%**	Antenna B1 MPE %:	**1.22%**	Antenna C1 MPE %:	**1.22%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-UNA20	Make / Model:	RFS APXVAARR24_43-UNA20	Make / Model:	RFS APXVAARR24_43-UNA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
Channel Count:	7	Channel Count:	7	Channel Count:	7
Total TX Power (W):	320 Watts	Total TX Power (W):	320 Watts	Total TX Power (W):	320 Watts
ERP (W):	8,466.41	ERP (W):	8,466.41	ERP (W):	8,466.41
Antenna A2 MPE %:	**2.78%**	Antenna B2 MPE %:	**2.78%**	Antenna C2 MPE %:	**2.78%**
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 / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	8,728.31	ERP (W):	8,728.31	ERP (W):	8,728.31
Antenna A3 MPE %:	**1.72%**	Antenna B3 MPE %:	**1.72%**	Antenna C3 MPE %:	**1.72%**
Antenna #:	**4**	Antenna #:	**4**	Antenna #:	**4**
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):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 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 A4 MPE %:	**5.06%**	Antenna B4 MPE %:	**5.06%**	Antenna C4 MPE %:	**5.06%**

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	10.78%
Clearwire	0.1%
AT&T	6.89%
Sprint/Nextel	5.58%
Metro PCS	1.83%
FCI900	0.01%
Fairfield	0.01%
Site Total MPE % :	25.20%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	10.78%
T-Mobile Sector B Total:	10.78%
T-Mobile Sector C Total:	10.78%
Site Total MPE % :	25.20%

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 1900 MHz GSM	4	1028.30	135.0	8.11	1900 MHz GSM	1000	0.81%
T-Mobile 2100 MHz UMTS	2	1028.30	135.0	4.06	2100 MHz UMTS	1000	0.41%
T-Mobile 600 MHz LTE	2	591.73	135.0	2.33	600 MHz LTE	400	0.58%
T-Mobile 600 MHz NR	1	1577.94	135.0	3.11	600 MHz NR	400	0.78%
T-Mobile 700 MHz LTE	2	648.82	135.0	2.56	700 MHz LTE	467	0.55%
T-Mobile 1900 MHz LTE	2	2203.69	135.0	8.69	1900 MHz LTE	1000	0.87%
T-Mobile 1900 MHz LTE	2	2056.61	135.0	8.11	1900 MHz LTE	1000	0.81%
T-Mobile 2100 MHz LTE	2	2307.55	135.0	9.10	2100 MHz LTE	1000	0.91%
T-Mobile 2500 MHz LTE	2	6412.98	135.0	25.30	2500 MHz LTE	1000	2.53%
T-Mobile 2500 MHz NR	2	6412.98	135.0	25.30	2500 MHz NR	1000	2.53%
						Total:	**10.78%**

• 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:	10.78%
Sector B:	10.78%
Sector C:	10.78%
T-Mobile Maximum MPE % (Sector A):	10.78%
Site Total:	25.20%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **25.20%** 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.