Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

October 1, 2020

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

RE: Notice of Exempt Modification
1021 Straits Turnpike, Middlebury, CT 06762 (A/K/A 1 Service Road)
Latitude: 41.53576300
Longitude: -73.08921000
T-Mobile Site#: CT11128E – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 195-foot level of the existing 195-foot self-support tower at 1021 Straits Turnpike in Middlebury, CT. The 195-foot self-support tower is owned and operated by Phoenix Tower International. The property is owned by the Town of Middlebury. T-Mobile now intends to replace three (3) existing antennas with three (3) new 2500 MHz antennas. The new antennas will be installed at the same 195-foot level of the tower.

Planned Modifications:
Tower:

Remove
(12) 1-5/8" Coax
(3) TMA

Remove and Replace:
(3) RFS APX16DWV-S-E-A20 Antenna (Remove) – Ericsson AIR 6449 Antenna (Replace) 2500 MHz

Install New:
(3) Ericsson 4415 RRU
(3) Commscope SDX1926Q-43 Diplexers
(1) 1-5/8" Hybrid Cables

Existing to Remain:
(3) Ericsson AIR 32 Antenna 1900/2100 MHz
(3) RFS APXVARR24_43-U-NA20 Antenna 600/700/1900/2100 MHz
(3) Ericsson 4449 RRU
(3) TMA

(3) 1-5/8" Hybrid Cable

Ground:
Install New:
(1) 4' X 6' Concrete Slab
(1) 6160 Cabinet
(1) B160 Battery Cabinet

T-Mobile was unable to locate records for the original approval of the tower. Enclosed is a copy of a facility approval from the Town of Middlebury that is dated August 24, 1999. T-Mobile has been approved for subsequent exempt modifications by the Connecticut Siting Council. There is no reason to believe the proposed modification does not comply with any previous approvals.

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 -Edward B. St. John, Elected Official, and Curt Bosco, Zoning Enforcement Officer, as well as the tower owner.

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

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

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

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

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

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

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

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

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

Attachments
cc: Edward B. St. John – Town of Middlebury First Selectman
Curt Bosco– Town of Middlebury Zoning Enforcement Officer
Phoenix Tower International – tower owner

View/Print Label

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

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

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

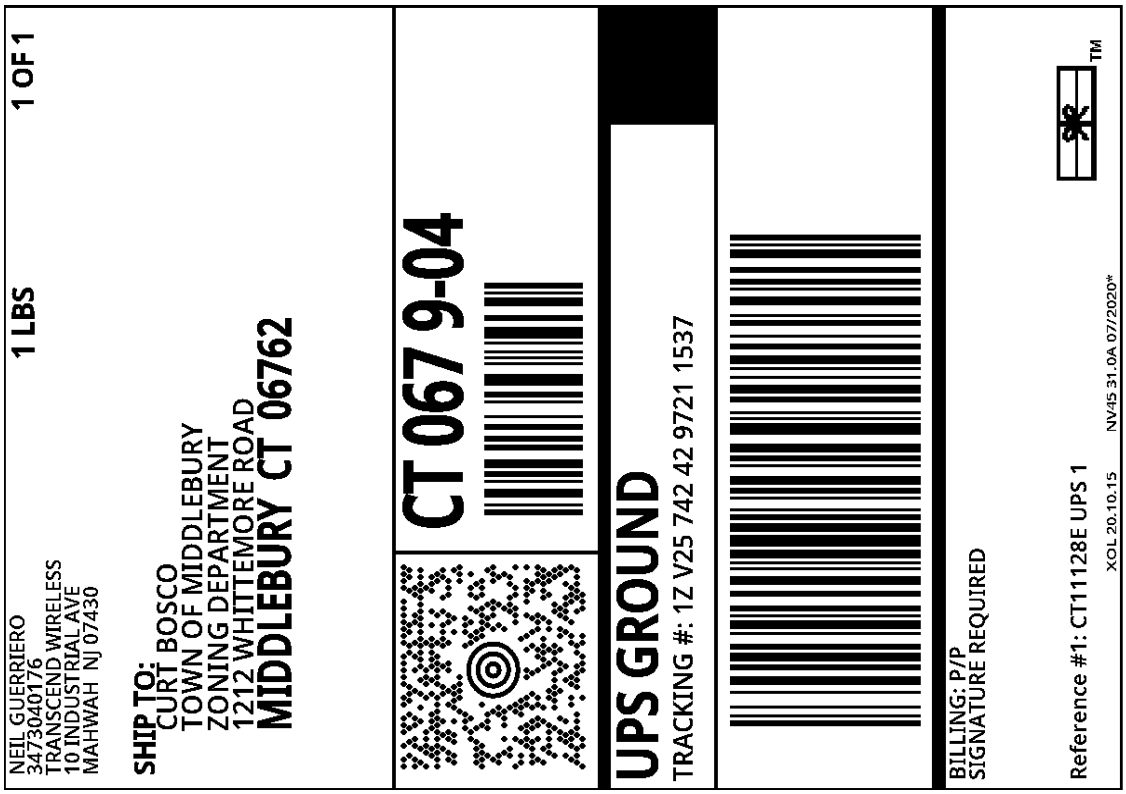
   Customers without a scheduled Pickup
   - Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
   - Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find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

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

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

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

FOLD HERE



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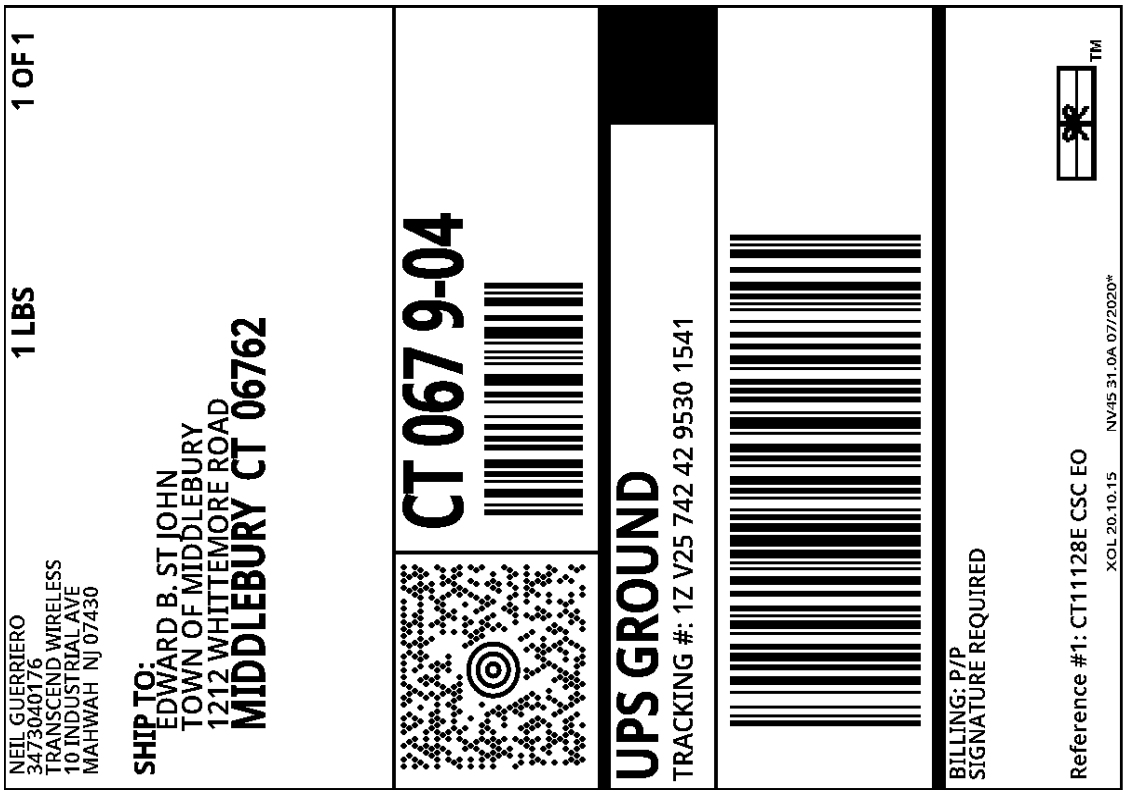

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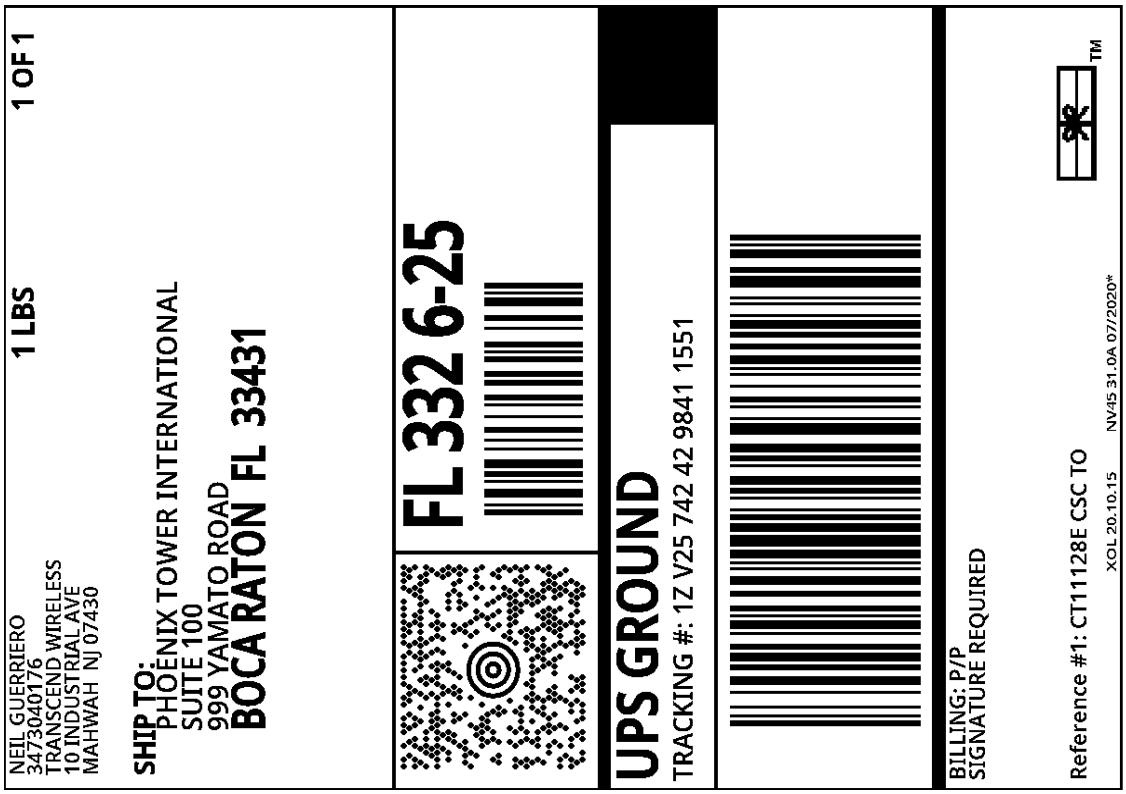


1 SERVICE ROAD

Location	1 SERVICE ROAD	**Mblu**	4-06/ / 425/ /
Acct#	M0336100	**Owner**	MIDDLEBURY TOWN OF
Assessment	$1,429,700	**Appraisal**	$2,042,300
PID	2352	**Building Count**	3

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$1,450,300	$592,000	$2,042,300
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$1,015,300	$414,400	$1,429,700

Owner of Record

Owner	MIDDLEBURY TOWN OF	**Sale Price**	$0
Co-Owner	(TOWN GARAGE/DOG POUND/TRANSFER/PUBLIC W	**Certificate**	1944
Address	1 SERVICE RD 1212 WHITTEMORE RD MIDDLEBURY, CT 06762	**Book & Page**	40/ 13
		Sale Date	07/21/1944
		Instrument	XX

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MIDDLEBURY TOWN OF	$0	1944	40/ 13	XX	07/21/1944

Building Information

Building 1 : Section 1

Year Built:	1991
Living Area:	8,160
Replacement Cost:	$244,244
Building Percent Good:	80
Replacement Cost Less Depreciation:	$195,400

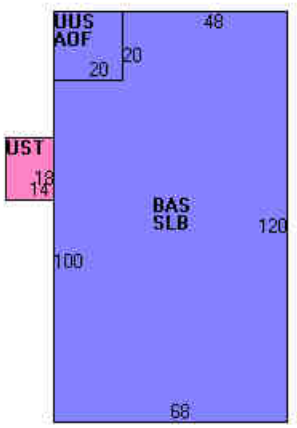
Building Attributes

Field	Description
STYLE	Pre-Eng Garage
MODEL	Comm/Ind
Grade	C
Stories	1
Occupancy	1
Exterior Wall A	Pre-finsh Metl
Exterior Wall B	
Roof Structure	Gable
Roof Cover	Enam Metal
Interior Wall A	Minimum
Interior Wall B	
Interior Floor A	Concrete
Interior Floor B	
Heating Fuel	Gas
Heating Type	Hot Air-No Duc
AC Type	Partial
Bldg Use	Mun Bldg Com
Bedrooms	
Full Baths	
Half Baths	
1st Floor Use	
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Walls	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/MiddleburyCTPhotos//\00\00\66/05.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	7,760	7,760
AOF	Office	400	400
SLB	Slab	7,760	0
UST	Utility Storage	252	0
UUS	Unfinished Upper Story	400	0
		16,572	8,160

Building 2 : Section 1

Year Built: 1991
Living Area: 952
Replacement Cost: $71,314
Building Percent Good: 80
Replacement Cost Less Depreciation: $57,100

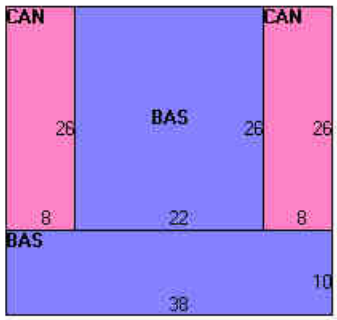
Building Attributes : Bldg 2 of 3	
Field	Description

STYLE	Vets Office
MODEL	Commercial
Grade	D+
Stories	1
Occupancy	1
Exterior Wall A	Pre-finsh Metl
Exterior Wall B	Concr/Cinder
Roof Structure	Gable
Roof Cover	Enam Metal
Interior Wall A	Minimum
Interior Wall B	Drywall
Interior Floor A	Concrete
Interior Floor B	Vinyl
Heating Fuel	Gas
Heating Type	Hot Air-No Duc
AC Type	Central
Bldg Use	Mun Bldg Com
Bedrooms	
Full Baths	
Half Baths	
1st Floor Use	
Heat/AC	HEAT/AC PKGS
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Walls	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/MiddleburyCTPhotos//\00\00\66/06.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	952	952
CAN	Canopy	416	0
		1,368	952

Building 3 : Section 1

Year Built: 1991
Living Area: 17,640
Replacement Cost: $854,224
Building Percent Good: 80
Replacement Cost Less Depreciation: $683,400

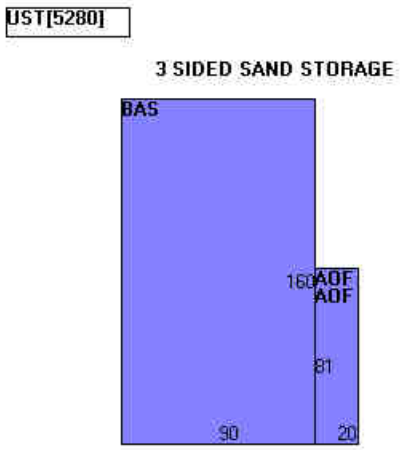
Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Pre-Eng Warehs
MODEL	Commercial
Grade	B

Stories	1
Occupancy	1
Exterior Wall A	Pre-finsh Metl
Exterior Wall B	
Roof Structure	Gable
Roof Cover	Enam Metal
Interior Wall A	Drywall
Interior Wall B	
Interior Floor A	Concrete
Interior Floor B	Vinyl
Heating Fuel	Gas
Heating Type	Hot Air-No Duc
AC Type	None
Bldg Use	Mun Bldg Com
Bedrooms	
Full Baths	
Half Baths	
1st Floor Use	
Heat/AC	HEAT/AC SPLIT
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Walls	NONE
Rooms/Prtns	AVERAGE
Wall Height	25
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/MiddleburyCTPhotos//\00\00\66/07.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	14,400	14,400
AOF	Office	3,240	3,240
UST	Utility Storage	5,280	0
		22,920	17,640

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
A/C	Partial AC	3242 S.F.	$3,900	3
SPR1	Sprinklers- Wet	17621 S.F.	$29,600	3
SPR1	Sprinklers- Wet	952 S.F.	$1,600	2
SPR1	Sprinklers- Wet	8160 S.F.	$13,700	1

Land

Land Use

Use Code	931
Description	Mun Garage
Zone	CA40
Neighborhood	C100
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	4
Frontage	0
Depth	0
Assessed Value	$414,400
Appraised Value	$592,000

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
ANTG	Guyed Tower	C	Cellular	295 L.F.	$36,800	2
IMP	Implement Shed			286 S.F.	$1,500	1
FN1	4' Chain Fence			5000 L.F.	$26,300	2
IMP	Implement Shed			360 S.F.	$1,900	1
IMP	Implement Shed			200 S.F.	$1,100	1
PAV1	Paving-Asphalt			20000 S.F.	$20,000	3
TWR	Cell Tower			1 Units	$378,000	1

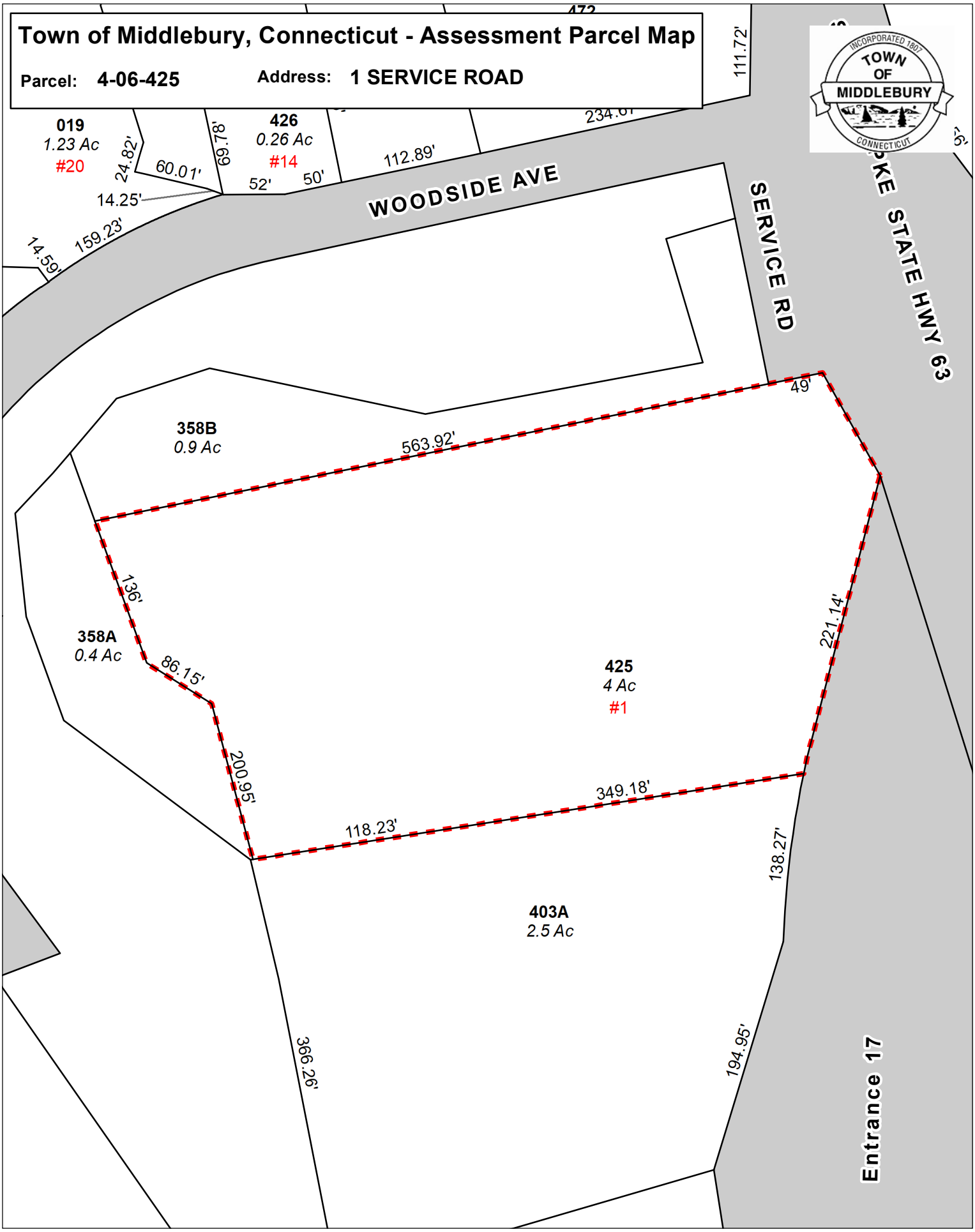
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$1,124,000	$592,000	$1,716,000
2013	$1,124,000	$592,000	$1,716,000
2012	$1,124,000	$592,000	$1,716,000

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$787,000	$414,400	$1,201,400
2013	$787,000	$414,400	$1,201,400
2012	$787,000	$414,400	$1,201,400

Town of Middlebury, Connecticut - Assessment Parcel Map

Parcel: 4-06-425 **Address:** 1 SERVICE ROAD



Map Produced May 2020

Approximate Scale: 1 inch = 100 feet

16981

APPLICATION FOR PERMIT — TOWN OF MIDDLEBURY

LOCATION OF JOB

4-06 (MAP) 425 (LOT) (BLOCK)

1021 (NO.) Straits Turnpike (STREET NAME)

Middlebury (TOWN) CT (STATE) 06762 (ZIP)

FEE SCHEDULE

BUILDING OFFICIAL MAY REQUIRE AFFIDAVIT OF ACTUAL VALUE

TYPE OF JOB

__ BUILDING __ ELECTRIC
__ PLUMBING __ MECHANICAL

__ NEW ✓ ADDITION
__ REPAIR __ ALTERATION
__ DEMOLITION
__ CHANGE OF USE

OWNER

Town of Middlebury (LAST NAME) (FIRST NAME)

PO Box 392 (NO.) (STREET NAME)

Middlebury (TOWN) CT (STATE) 06762 (ZIP)

VALUE - FEE

$100,000 CONSTRUCTION VALUE

$800.00 FEE AMOUNT

REQUIREMENTS

__ ZONING __ HEALTH DEPT.
__ FIRE MARSHAL __ PLOT PLAN
__ INSURANCE PROOF (W. C.)
__ HISTORICAL APPROVAL
__ FLOOD PLAIN APPROVAL
__ TWO SETS OF PLANS

APPLICANT

Nextel Communications (LAST NAME) (FIRST NAME)

100 Corporate Place (NO.) (STREET NAME)

Rocky Hill (TOWN) CT (STATE) 06067 (ZIP)

DECISION

APPLICATION IS HEREBY

__ APPROVED

__ DISAPPROVED

Sept. 3 1999 (DATE) DJ (CODE OFFICIAL)

TYPE OF BUILDING

CONSTRUCTION TYPE 3C - MASONRY

USE GROUP UTILITY

BUILDER / CONTRACTOR INFORMATION

~~Flaherty's Bldg. Co Inc~~ (NAME)

953 Putnam Pike (NO.) (STREET NAME)

Chepachet (TOWN) RI (STATE) 02814 (ZIP)

00900617
LICENSE OR REGISTRATION NUMBER AND CLASS

6/30/2000 (401) 567-0600
EXPIRATION DATE CONTRACTOR TELEPHONE

CONTRACTOR SIGNATURE

Need + Insurance Certificate

PERMITS EXPIRE ONE YEAR FROM DATE OF ISSUE

REMARKS OR A BRIEF DESCRIPTION OF WORK PROPOSED:
Installation of an unmanned wireless telecommunications facility at an existing Omnipoint Communications site. A 10'x 20' pre-fabricated concrete equipment shelter and 12 wireless panel antennas will be installed. New telco. and electric services will be run from the existing demarc. and meter bank.

THIS IS TO CERTIFY THAT I AM THE OWNER OR AUTHORIZED AGENT FOR THE OWNER. ALL WORK COVERED BY THIS APPLICATION HAS BEEN AUTHORIZED BY THE OWNER OF THE ABOVE DESCRIBED PROPERTY AND WILL BE DONE ACCORDING TO THE CONNECTICUT BASIC BUILDING CODE. AS THE APPLICANT I UNDERSTAND THAT A FINAL INSPECTION AND A CERTIFICATE OF USE AND OR OCCUPANCY IS REQUIRED BEFORE OCCUPANCY OR USE.

FEE PAID BY:

CK NO. 22225

AMOUNT $800.00

8/24/99 (DATE)

Acen M. Chasé, P.E. (APPLICANT SIGNATURE)

Dep 10.00 pd ck # 22279

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY I84/X17

PTI SITE NUMBER: US-CT-1003

PTI SITE NAME: STRAITS TURNPIKE

SITE ID: CT11128E

1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

T-MOBILE RF CONFIGURATION

67D5997DB_2xAIR+1OP

PROJECT SUMMARY

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

1. ADD (1) PPC CABINET
2. ADD (1) ENCLOSURE 6160
3. ADD (1) iXRe ROUTER
4. ADD (1) BB6630 FOR L2500
5. ADD (1) BB6648 FOR N2500
6. ADD (1) BATTERY CABINET B160
7. ADD (1) CONCRETE SLAB-ON-GRADE FOR NEW CABINETS
8. REMOVE (12) COAXIAL LINES
9. ADD (1) 6x12 HCS
10. REMOVE (3) RFS-APX16DWV ANTENNAS
11. INSTALL (3) ERICSSON AIR6449 B41
12. INSTALL (3) RADIO 4415 B25
13. ADD (3) COMMSCOPE DIPLEXERS
14. RELOCATE (3) TMA'S
15. ADD (3) DUAL SWIVEL MOUNT KITS

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

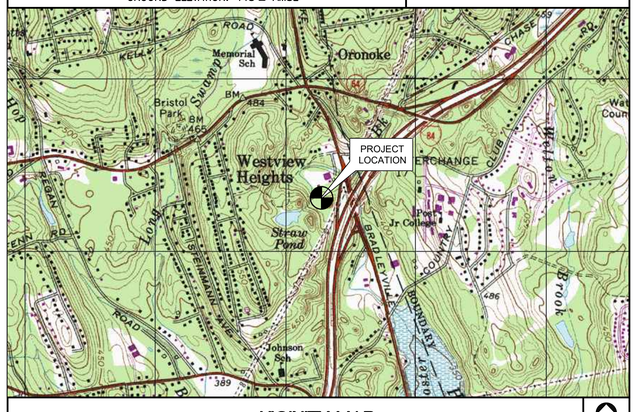
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

1.	HEAD NORTH ON GRIFFIN RD S TOWARD HARTMAN RD.	0.19 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	3.64 MI.
3.	MERGE ONTO I-91 S TOWARD HARTFORD.	7.27 MI.
4.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY.	13.29 MI.
5.	KEEP LEFT TO TAKE I-84 W TOWARD WATERBURY	19.03 MI.
6.	TAKE THE CT-64 EXIT VIA EXIT 17 TOWARD CT-63/MIDDLEBURY/WATERTOWN	0.24 MI.
7.	STAY STRAIGHT TO TAKE CT-64/CHASE PKWY.CONTINUE TO FOLLOW CT-64	0.31 MI.
8.	TURN LEFT ONTO BRADLEYVILLE RD/CT-63	0.24 MI.
9.	TURN RIGHT ONTO WOODSIDE AVE	0.02 MI.
10.	TURN LEFT ONTO SERVICE RD.	0.05 MI.

SITE COORDINATES: LATITUDE: 41°-32'-8.74" N
LONGITUDE: 73°-05'-21.15" W
GROUND ELEVATION: 448'± AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP

NORTH

PROJECT INFORMATION

SITE NAME:	MIDDLEBURY I84/X17
SITE ID:	CT11128E
SITE ADDRESS:	1021 STRAITS TURNPIKE MIDDLEBURY, CT 06762
PTI SITE NUMBER:	US-CT-1003
PTI SITE NAME	STRAITS TURNPIKE
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°-32'-8.74" N LONGITUDE: 73°-05'-21.15" W GROUND ELEVATION: 448'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

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WIRELESS COMMUNICATIONS FACILITY
MIDDLEBURY I84/X17
SITE ID: CT11128E
1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

DATE: 07/20/20
SCALE: AS NOTED
JOB NO. 20074.63

TITLE SHEET

T-1

Sheet No. 1 of 9

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 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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MIDDLEBURY I84/X17

SITE ID: CT11128E

1021 STRAITS TURNPIKE
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GENERAL NOTES AND SPECIFICATIONS

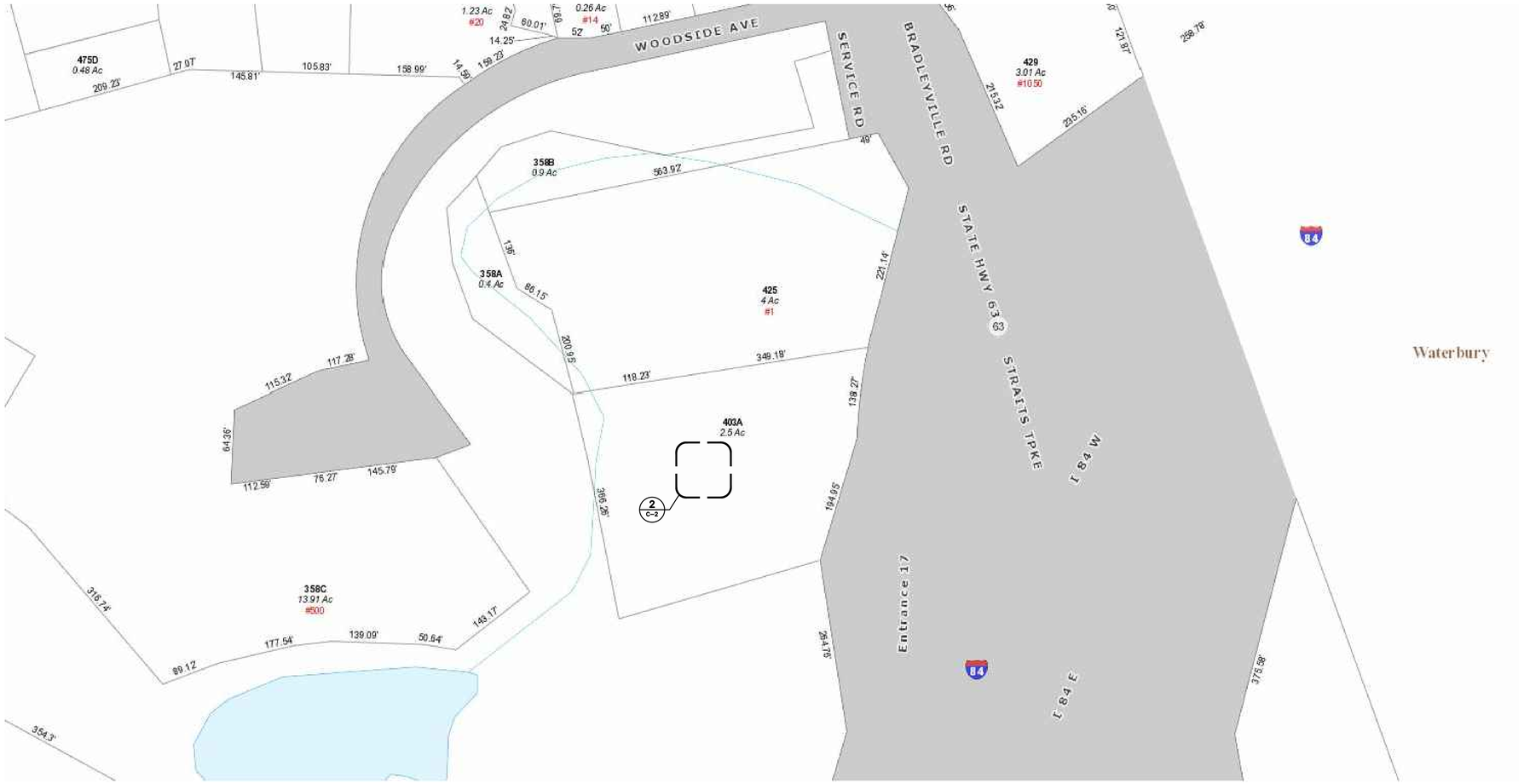
N-1

Sheet No. 2 of 9

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) DIPLEXERS (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	195'	70°				(1) 6x12 HYBRID CABLE (±200')
A2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	195'	70°	(E) RADIO 4449 B71 (1), (P) RADIO 4415 B25 (1)	(P) COMMSCOPE-SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
A3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	195'	70°				
B1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	195'	180°				
B2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	195'	180°	(E) RADIO 4449 B71 (1), (P) RADIO 4415 B25 (1)	(P) COMMSCOPE-SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
B3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	195'	180°				
C1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	195'	330°				
C2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	195'	330°	(E) RADIO 4449 B71 (1), (P) RADIO 4415 B25 (1)	(P) COMMSCOPE-SDX1926Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
C3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	195'	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 9

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

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

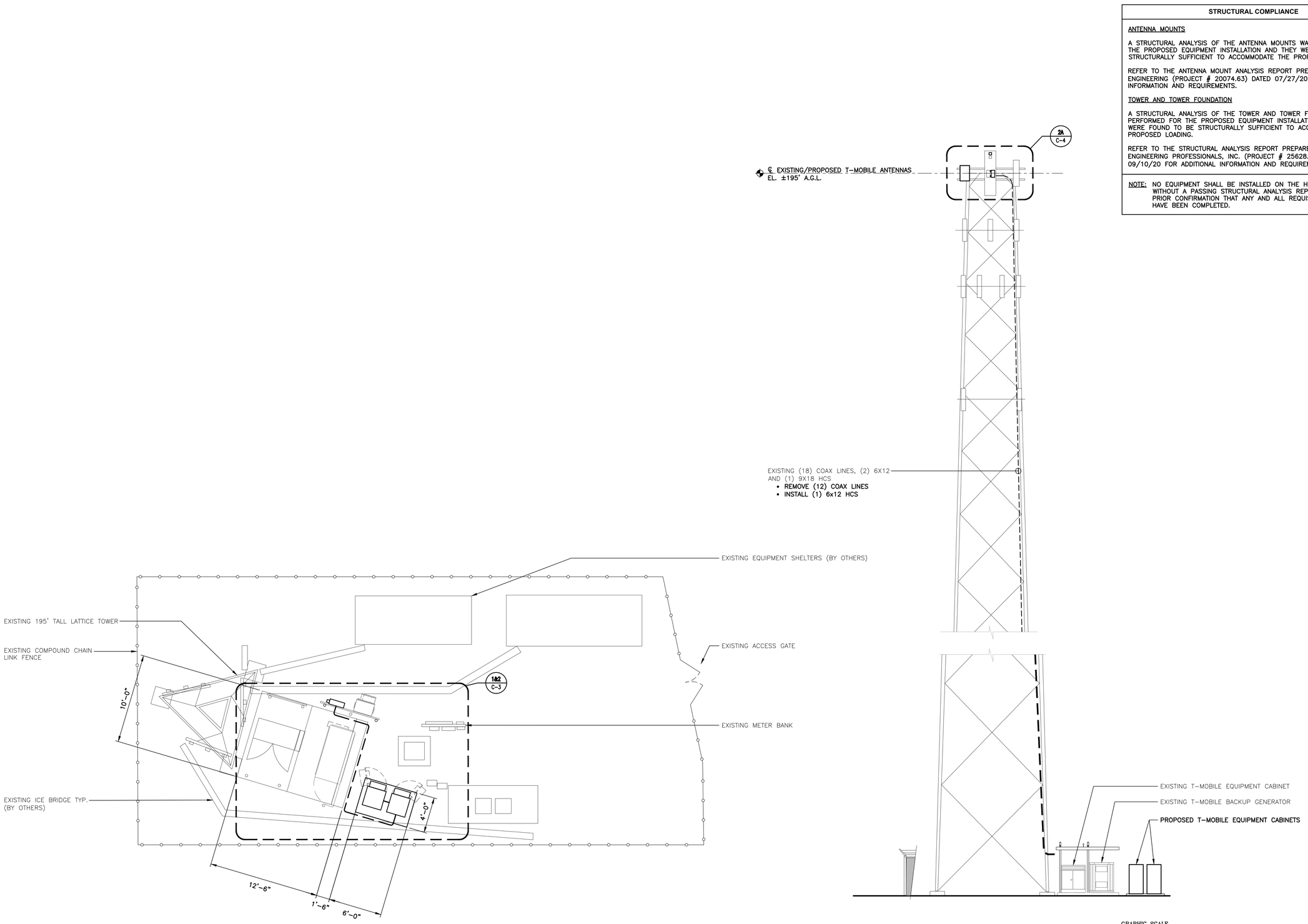
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.63) DATED 07/27/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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 TOWER ENGINEERING PROFESSIONALS, INC. (PROJECT # 25628.442076) DATED 09/10/20 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.



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

1 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 8'

GRAPHIC SCALE
8 0 4 8 16 32
1" = 8'-0"

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SCALE:	AS NOTED
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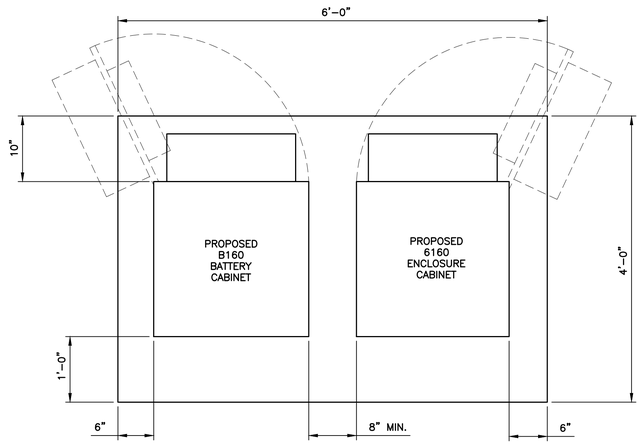
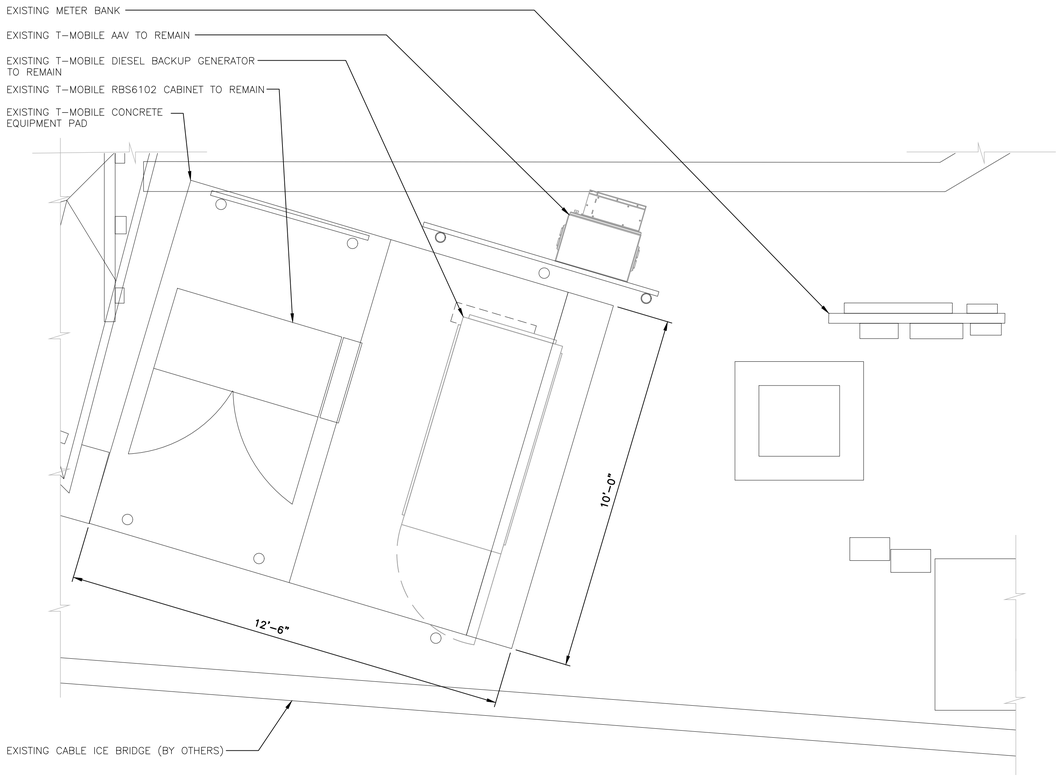
COMPOUND PLAN AND ELEVATION

C-2

Sheet No. 4 of 9

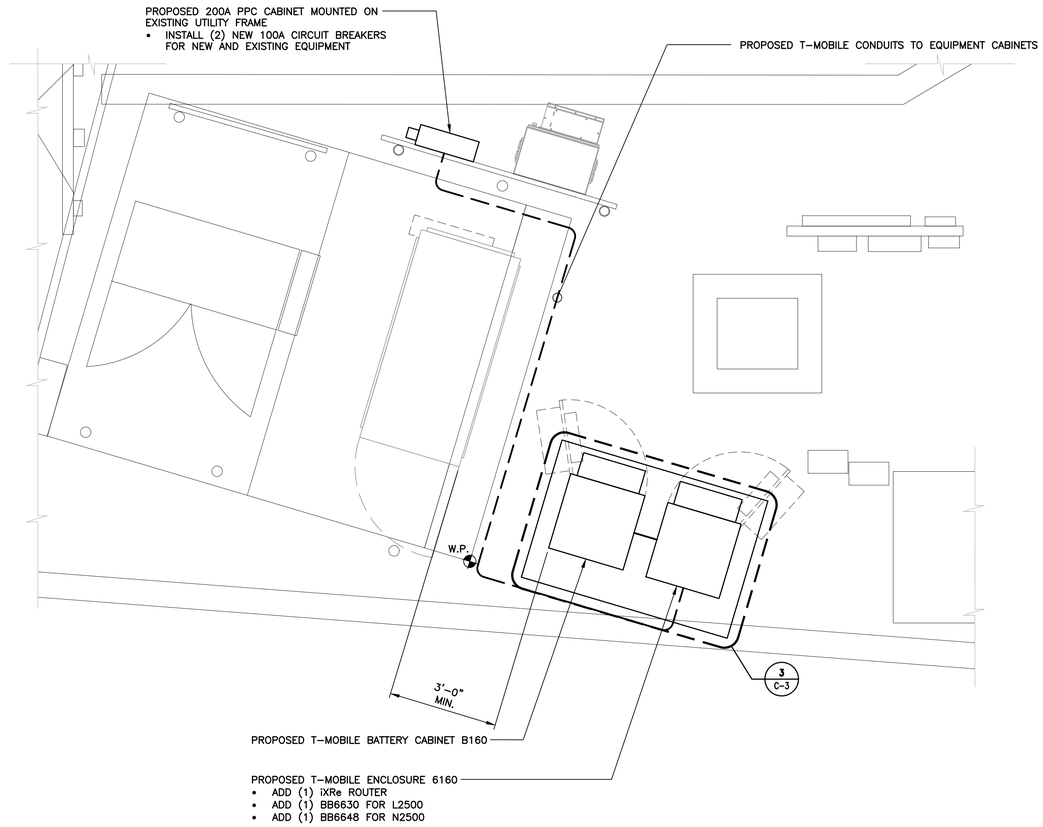


3 / C-3 **PROPOSED EQUIPMENT CABINET SLAB-ON-GRADE**
SCALE: 1/2" = 1'



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

APPROXIMATE NORTH



2 / C-3 **PROPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'

APPROXIMATE NORTH

LEGEND	
W.P.	DENOTES WORKING POINT.

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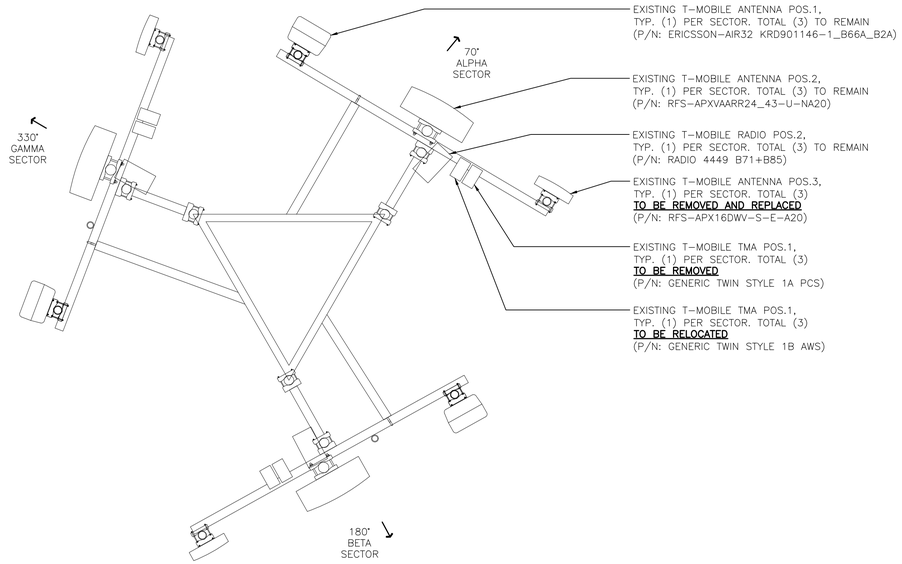
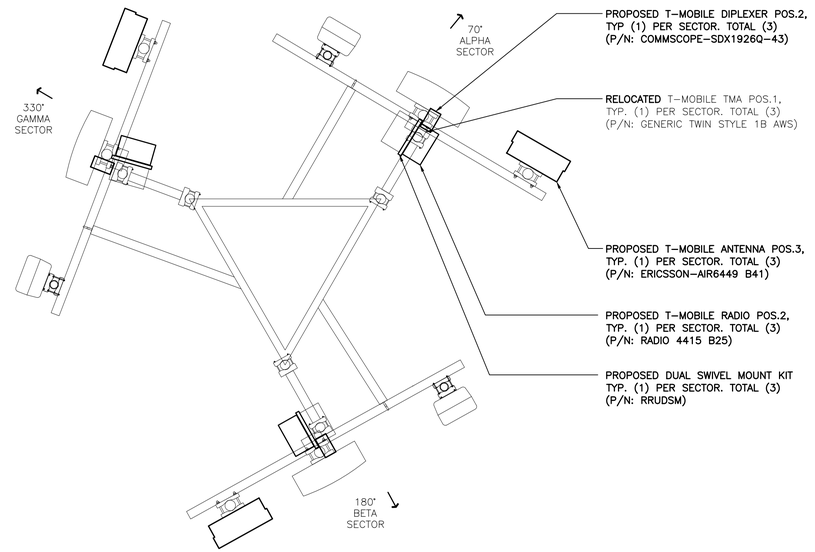
EQUIPMENT PLAN

C-3

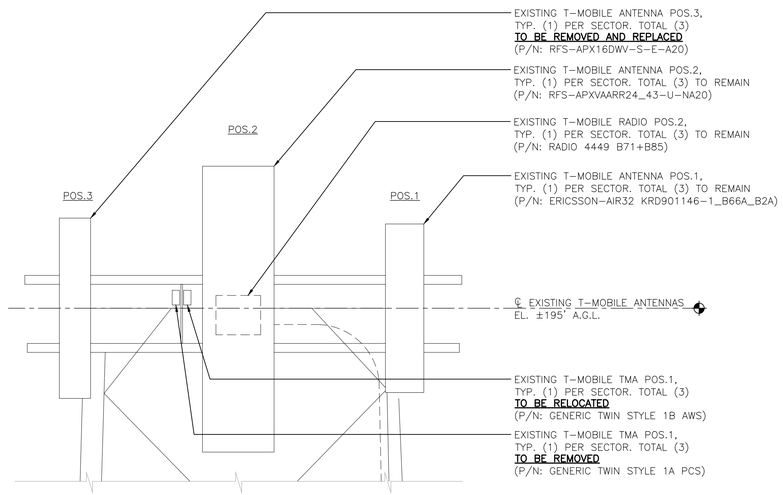
Sheet No. 5 of 9



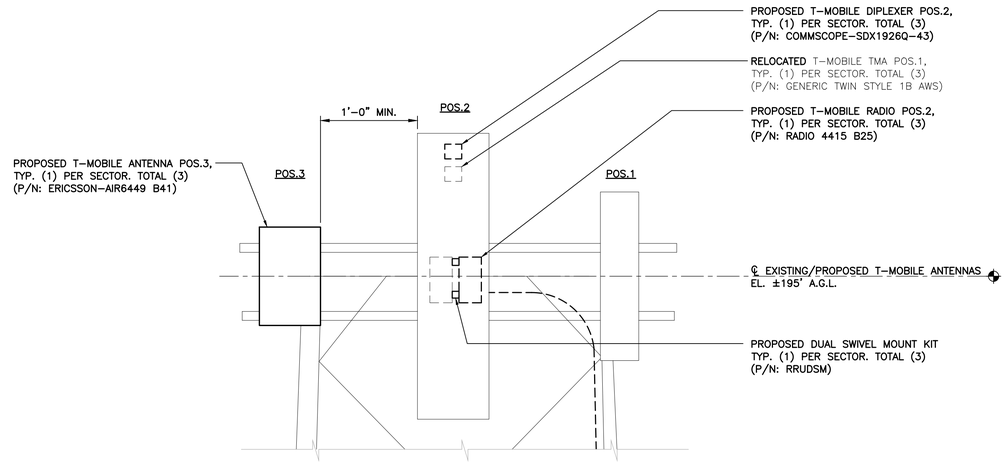
1 / C-4 **ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'



2 / C-4 **ANTENNA PLAN - PROPOSED**
SCALE: 1/2" = 1'



1A / C-4 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A / C-4 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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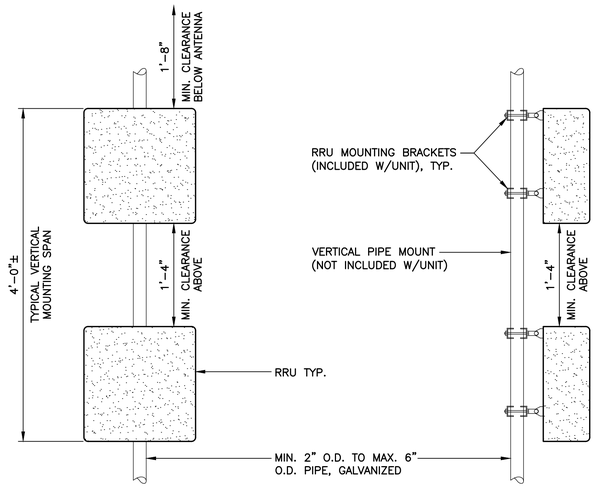
ANTENNA PLANS

C-4

Sheet No. 6 of 9

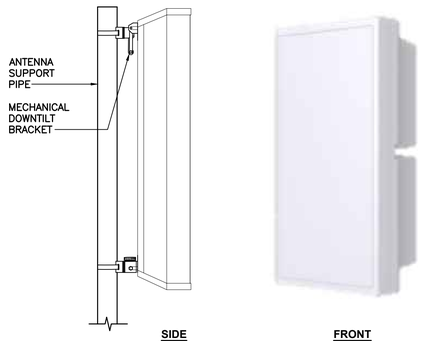


FRONT ELEVATION SIDE ELEVATION

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–5 **TYPICAL RRUS MOUNTING DETAILS**
SCALE: NOT TO SCALE



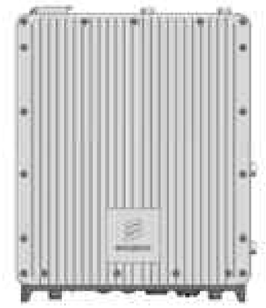
SIDE

FRONT

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.

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

2 / C–5 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE



FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B25	14.9"L x 13.2"W x 5.4"D	±46 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.

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

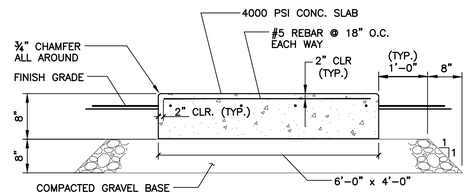
3 / C–5 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

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–5 **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–5 **BATTERY CABINET DETAIL**
NOT TO SCALE



6 / C–5 **TYPICAL CONCRETE PAD DETAIL**
NOT TO SCALE

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WIRELESS COMMUNICATIONS FACILITY
MIDDLEBURY I84/X17
SITE ID: CT11128E
1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762

DATE:	07/20/20
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JOB NO.	20074.63

TYPICAL EQUIPMENT DETAILS

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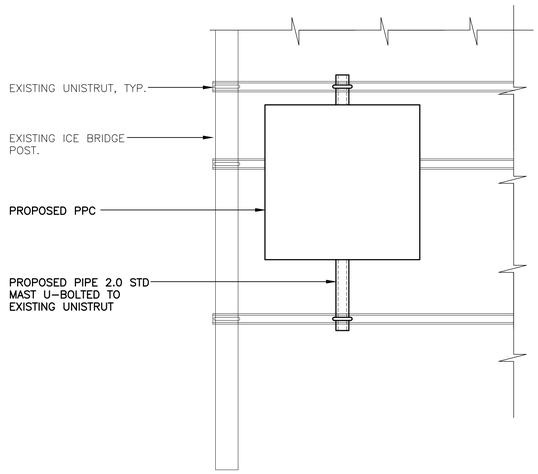
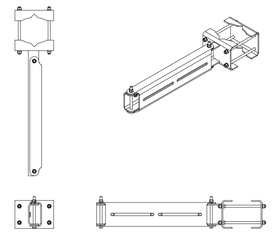
DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: SDX1926Q-43(E14F05P86)	4.2"L x 7.0"W x 3.0"D	–
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

1 / C-6 **PROPOSED DIPLEXER DETAIL**
SCALE: NOT TO SCALE

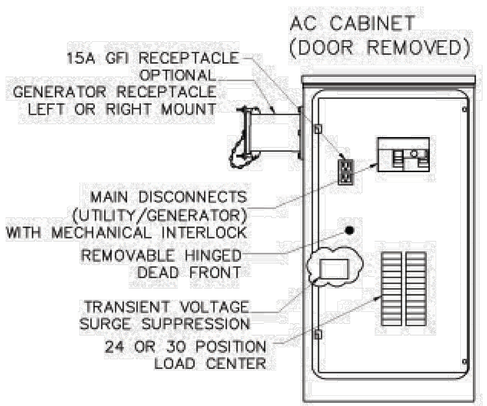


2 / C-6 **TYPICAL PPC CABINET MOUNTING DETAIL**
SCALE: NOT TO SCALE



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

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



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

4 / C-6 **PPC CABINET DETAIL**
SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

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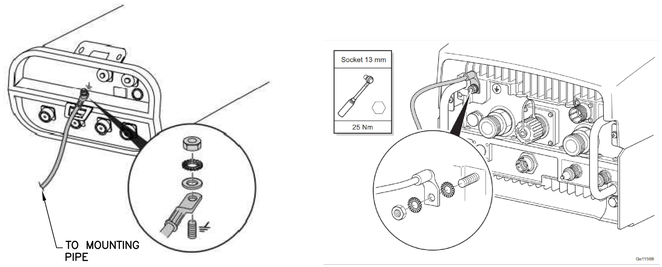
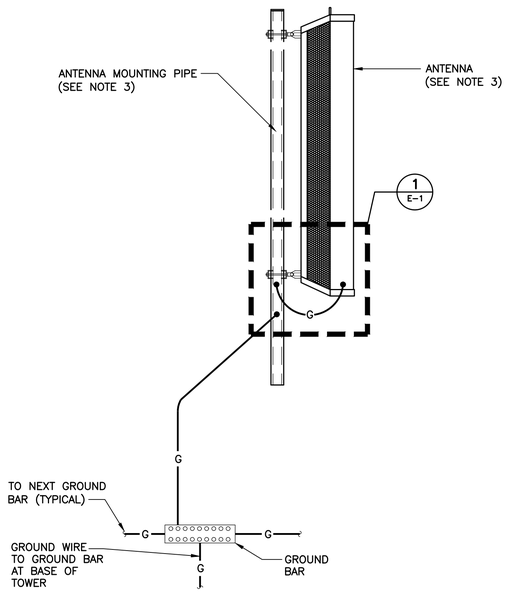


1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE

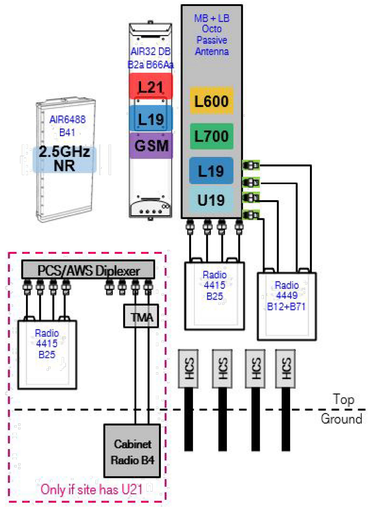


NOTES:

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.

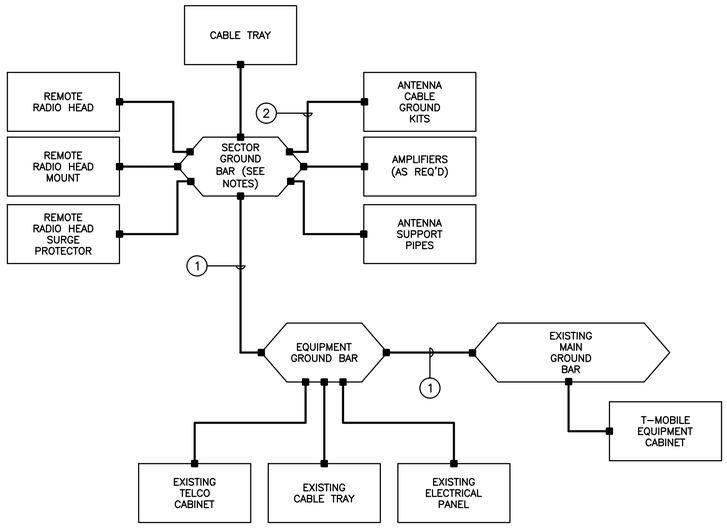
2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



3 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

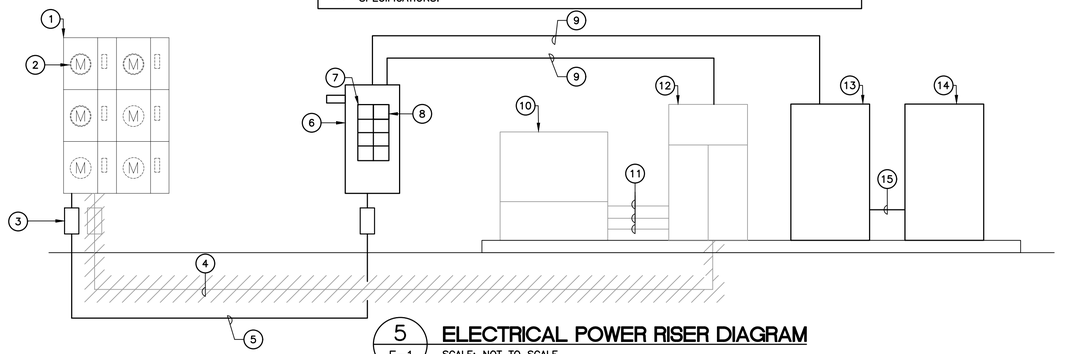
1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER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

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

(1) EXISTING MULTI METER CENTER TO REMAIN.
(2) EXISTING 200A METER AND CIRCUIT BREAKER TO REMAIN.
(3) EXPANSION COUPLING TYP.
(4) EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED
(5) (1) 3/0 AWG, (1) #6 AWG GROUND, 2-1/2" CONDUIT.
(6) NEW 200A PPC CABINET.
(7) NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT.
(8) NEW 100A/2P CIRCUIT BREAKER TO SERVE EXISTING EQUIPMENT.
(9) (3) #1 AWG, (1) #8 AWG GROUND, 1-1/2" CONDUIT.
(10) EXISTING DIESEL BACK-UP GENERATOR TO REMAIN.
(11) EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
(12) EXISTING CABINET TO REMAIN.
(13) NEW T-MOBILE EQUIPMENT CABINET.
(14) NEW T-MOBILE BATTERY CABINET.
(15) DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE

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SCALE:	AS NOTED
JOB NO.	20074.63

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 9 of 9

Date: **September 10, 2020**

David Rodriguez
Phoenix Tower International
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(561) 257-0557

Tower Engineering Professionals, Inc.
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
structures@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Reconfiguration**	
	Carrier Site Number & Name:	CT11128E / Middlebury / I-84 X17
	Carrier Project Number/Name:	Anchor
Phoenix Tower Designation:	**PTI Site Number:**	US-CT-1003
	PTI Site Name:	Straits Turnpike
Engineering Firm Designation:	**TEP Project Number:**	25628.442076
Site Data:	**1021 Straits Turnpike, Middlebury, New Haven County, CT 06762** **Latitude *41° 32' 8.75",* Longitude *-73° 05' 21.16"*** **195 Foot - Self Supporting Tower**	

Dear David Rodriguez,

Tower Engineering Professionals, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Existing + Proposed + Future Loading **Sufficient Capacity**
Note: See Table 1 for the existing, proposed, and future loading

Structure Capacity	Foundation Capacity
88.5%	53.7%

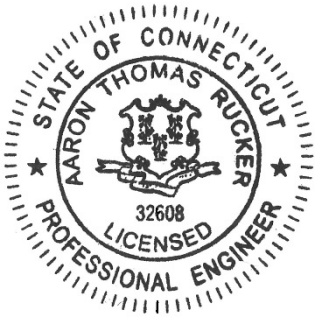
The analysis has been performed in accordance with the ANSI/TIA-222-H-2017 Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures and the 2018 Connecticut State Building Code.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 and the attached drawings for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals, Inc.,* appreciate the opportunity of providing our continuing professional services to you and *Phoenix Tower International*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Debra Ortiz

Respectfully submitted by:



Aaron T. Rucker, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 195-ft self supporting tower designed by Fred A. Nudd Corporation in May of 1998. The tower was originally designed for a wind speed of 85 mph per ANSI/EIA/TIA-222-F. TEP visited the site in June of 2010 to gather existing steel and appurtenance information. This tower has been modified multiple times in the past to accommodate additional loading. All other information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Category:	1 (Kzt = 1.0)
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Design Category:	B
Seismic Ss:	0.191
Seismic S1:	0.064
Service Wind Speed:	60 mph

Table 1 - Existing, Proposed, and Future Antenna and Cable Information

Existing/ Proposed	Elevation	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size (in)	Coax[1] Location	Owner/ Tenant
Future	***195.0***	***-***	***T-Mobile Future Loading[2]***	***-***	***2***	***1-5/8***	***AB Face***	***T-Mobile***
Proposed	***195.0***	***3***	***Ericsson AIR 6449 B41***	(3) 12.5' Sector Frames	***1***	***Hybrid***	***AB Face***	***T-Mobile***
		3	***Ericsson Radio 4415 B25***					
		3	***Commscope SDX1926Q-43***					
Existing	195.0	3	RFS APXVAAR24-43-U-NA20		18[3] 3	1-5/8[3] Hybrid	AB Face	T-Mobile
		3	Ericsson AIR 32 KRD901146-1_B66A_B2A					
		3	Ericsson Radio 4449 B71/B12					
		6[4]	Ericsson KRY-112-71[4]					
To Be Removed	*195.0*	*3*	*RFS APX16DWV-16DWV-S-E-A20*	-	-	-	-	*T-Mobile*
Reserved	***185.0***	***2***	***CCI DMP65R-BU8DA***	(3) 15.0' T-Frames with Catwalk and MT195-14 Handrail Kit	***6***	***7/8"Ø DC***	***CA Face***	***AT&T***
		4	***CCI DMP65R-BU6DA***					
		3	***Ericsson 4449 B5/B12***					
		3	***Ericsson 4478 B14***					
		3	***Ericsson 8843 B2/B66A***					
		1	***Raycap DC6-48-60-0-8C-EV***					
Existing	185.0	3	Powerwave 7770		12 2	1-5/8 3/8"Ø Fiber	CA Face	AT&T
		3	Andrew SBNHH-1D65A					
		6	Powerwave LGP 13519					
		3	Ericsson RRUS-32 B30					
		2	Raycap DC6-48-60-18-8F					

Existing/ Proposed	Elevation	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size (in)	Coax[1] Location	Owner/ Tenant
To Be Removed	*185.0*	*2*	*KMW AM-X-CD-16-65-00T-RET*	-	*2*	*3/8"Ø Power*	*CA Face*	*AT&T*
		1	*Powerwave P65-17-XLH-RR*					
		3	*Ericsson RRUS-12*					
		3	*Ericsson RRUS-11*					
Existing	169.0	2	Antel BXA-70063-6CF	(3) 15.0' T-Frames with Catwalk	12 1	1-5/8 Fiber	AB Face	Verizon
		4	Decibel DB844G65ZAXY					
		1	Antel BXA 70080/6CF					
		2	Decibel DB846F65ZAXY					
		6	RFSFD9R6004/2C-3L					
		3	Alcatel Lucent RRH2x60-AWS					
		3	Alcatel Lucent RRH2x60-PCS					
		1	RFS DB-T1-6Z-8AB-0Z					
		6	HBXX-6517DS-A2M					
Existing	153.0	3	Commscope DT465B-2XR	(3) 12.0' Sector Frames	4	1-1/4" Hybridflex	BC Face	Sprint
		3	ALU TD-RRH8x20-25 w/ Solar Shield					
		3	ALU RRH2x50-08					
		3	RFS APXVSPP18-C-A20					
		3	ALU RRH 1900 4x45 65MHz					
		3	ALU 2x50W 800 MHz RRH					
Existing	75.5	1	GPS Antenna	4.5' Standoff	1	5/8"Ø	BC Face	Unknown

Notes:
1) See "Appendix B – Coax Configuration" for feed line configuration.
2) T-Mobile Future Loading consists of 955.40 in^2 of wind area and (2) feed lines at the 195-ft level.
3) (12) 1-5/8 of the (18) 1-5/8 are considered reserved loading in this analysis.
4) (3) Ericsson KRY-112-71 are considered reserved loading in this analysis.

Table 2 - Detailed Future Loading Information

Existing/ Proposed	Elevation (ft)	Wind Area (in^2) (includes Ca factors)	Weight (lb)	Qty Coax	Coax Size	% Capacity	Owner/ Tenant
Proposed	***195***	***3,452.03***	***520.47***	***1***	***Hybrid***	***86.6***	***T-Mobile***
Existing	195	20,575.54	2,710.93	18 3	1-5/8 Hybrid	86.6	T-Mobile
To Be Removed	*195*	*2,982.97*	*187.80*	-	-	-	*T-Mobile*
Future	***195***	***955.40***	***138.18***	***2***	***1-5/8***	***-***	***T-Mobile***
Total	195	22,000.00	3,181.78	20 4	1-5/8 Hybrid	88.5	T-Mobile

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Source
Tower and Foundation Drawings	Fred A. Nudd Corporation, dated May 6, 1998 Project No. 5974	PTI
Structural Modification Drawings	Fred A. Nudd Corporation, dated April 30, 1999 Drawing No. 99-6726-1	PTI
Steel and Appurtenance Mapping	Tower Engineering Professionals, Inc., dated June 3, 2010 TEP No. 102056	TEP
Post Modification Inspection	Tower Engineering Professionals, Inc., dated April 21, 2011 TEP No. 102056	TEP
Geotechnical Report	Dr. Clarence Welti, P.E., P.C., dated April 17, 1998 Project No. 25628	PTI
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated August 29, 2011 TEP No. 102056	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated July 26, 2012 TEP No. 102056	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated August 1, 2013 TEP No. 25628.4865	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated August 24, 2016 TEP No. 25628.93911	TEP
Structural Modification Drawings	Tower Engineering Professionals, Inc., dated April 19, 2016 TEP No. 25628.47301	TEP
Post Modification Inspection	Tower Engineering Professionals, Inc., dated October 26, 2016 TEP No. 25628.58752	TEP
Previous Structural Analysis	Tower Engineering Professionals, Inc., dated February 11, 2020 TEP No. 25628.378831	TEP
Correspondence	Correspondence with Phoenix Tower International regarding the existing, proposed, and future loading.	PTI

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
2) The configuration of existing antennas, transmission cables, mounts and other appurtenances are as specified in the tower mapping report by TEP.
3) Unless specified by the client or tower mapping, the location of the existing and proposed coax is assumed by TEP and listed in Table 1.
4) All tower components are in sufficient condition to carry their full design capacity.
5) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
6) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ØP_allow (lb)	% Capacity	Pass / Fail
T1	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	1	-35505.80	74059.12	47.9	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	43	-39558.20	80957.20	48.9	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	55	-50338.60	81066.08	62.1	Pass
T4	170 - 160	Leg	2-1/2SCH40 w/ 3SCH80 Half Sleeve	67	Note 1	Note 1	75.6	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	88	-95053.60	133278.59	71.3	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	109	Note 1	Note 1	69.4	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	130	Note 1	Note 1	50.3	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	139	Note 1	Note 1	50.3	Pass
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	148	Note 1	Note 1	50.3	Pass
T10	120 - 113.333	Leg	Pipe 6 STD	157	-169825.00	282257.84	60.2	Pass
T11	113.333 - 106.667	Leg	Pipe 6 STD	169	-182505.00	282290.39	64.7	Pass
T12	106.667 - 100	Leg	Pipe 6 STD	181	-194371.00	282318.74	68.8	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	193	Note 1	Note 1	53.8	Pass
T14	80 - 60	Leg	Pipe 8 STD	223	-266353.00	411193.63	64.8	Pass
T15	60 - 50	Leg	Pipe 8 STD	244	-278579.00	421200.13	66.1	Pass
T16	50 - 40	Leg	Pipe 8 STD	256	-295688.00	421253.68	70.2	Pass
T17	40 - 20	Leg	Pipe 8 EH	268	-329381.00	576516.12	57.1	Pass
T18	20 - 0	Leg	Pipe 8 EH	283	-360201.00	577189.17	62.4 62.8 (b)	Pass
T1	195 - 180	Diagonal	5/8	15	9238.10	10437.21	88.5	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	51	-4224.48	10303.15	41.0 71.3 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ØP_allow (lb)	% Capacity	Pass / Fail
T3	175 - 170	Diagonal	L2x2x3/16	63	-3381.05	18093.28	18.7 46.7 (b)	Pass
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	83	-5241.47	29692.00	17.7 55.3 (b)	Pass
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	96	-5922.45	42662.23	13.9 65.1 (b)	Pass
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	114	-5542.56	40665.03	13.6 61.7 (b)	Pass
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	133	-5557.62	24503.64	22.7 40.9 (b)	Pass
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	142	-5710.79	22278.16	25.6 41.6 (b)	Pass
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	151	-5535.49	15425.97	35.9 66.4 (b)	Pass
T10	120 - 113.333	Diagonal	L3x3x1/4	160	-7113.28	30888.79	23.0 47.5 (b)	Pass
T11	113.333 - 106.667	Diagonal	L3x3x1/4	172	-6998.17	28895.68	24.2 47.5 (b)	Pass
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	184	-7341.78	15373.78	47.8 50.1 (b)	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	205	-7480.95	36323.59	20.6 27.8 (b)	Pass
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	226	-7141.59	28986.72	24.6 29.4 (b)	Pass
T15	60 - 50	Diagonal	L3x3x5/16	247	-9853.11	18196.81	54.1	Pass
T16	50 - 40	Diagonal	L3x3x5/16	259	-9559.33	16846.72	56.7	Pass
T17	40 - 20	Diagonal	L4x4x3/8	271	-9006.08	38479.45	23.4 31.1 (b)	Pass
T18	20 - 0	Diagonal	L5x5x5/16	286	-10127.00	51837.13	19.5 34.9 (b)	Pass
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	18	-5090.96	9640.76	52.8	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	52	686.02	19675.95	3.5 9.6 (b)	Pass
T3	175 - 170	Secondary Horizontal	L2x2x3/16	64	874.15	19675.95	4.4 12.2 (b)	Pass
T4	170 - 160	Secondary Horizontal	L2x2x3/16	76	-1273.88	19156.30	6.6 17.8 (b)	Pass
T5	160 - 150	Secondary Horizontal	L2x2x3/16	97	-1651.00	17984.61	9.2 23.0 (b)	Pass
T6	150 - 140	Secondary Horizontal	L2x2x3/16	118	-2061.48	16658.04	12.4 28.7 (b)	Pass
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	166	-2947.17	26358.46	11.2 35.8 (b)	Pass
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	178	-3168.08	25488.01	12.4 38.5 (b)	Pass
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	190	-3373.44	24590.26	13.7 41.0 (b)	Pass
T13	100 - 80	Secondary Horizontal	L3x3x1/4	202	-4010.32	27498.45	14.6 27.5 (b)	Pass
T15	60 - 50	Secondary Horizontal	L4x4x3/8	253	-4831.88	61409.77	7.9 33.3 (b)	Pass
T16	50 - 40	Secondary Horizontal	L4x4x1/4	267	-5128.82	39562.21	13.0 34.0 (b)	Pass
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	6	-1544.87	9640.76	16.0	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	9	-3089.00	9640.76	32.0	Pass
							Summary	
						Leg (T4)	75.6	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ØP_allow (lb)	% Capacity	Pass / Fail
						Diagonal (T1)	88.5	Pass
						Horizontal (T1)	52.8	Pass
						Secondary Horizontal (T12)	41.0	Pass
						Top Girt (T1)	16.0	Pass
						Bottom Girt (T1)	32.0	Pass
						Bolt Checks	71.3	Pass
						RATING =	**88.5**	**Pass**

Table 5 - Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	-	79.5	Pass
1,2	Base Foundation - Soil Interaction	-	22.4	Pass
1,2	Base Foundation - Structural	-	53.7	Pass

Notes:
1) See additional documentation in “Appendix C - Additional Calculations” for calculations supporting the % capacity listed.
2) Rating per TIA-222-H Section 15.5

Structure Rating (max from all components) =	**88.5%**

Table 6 - Dish Twist/Sway Results for 60 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
-	-	-	-	-

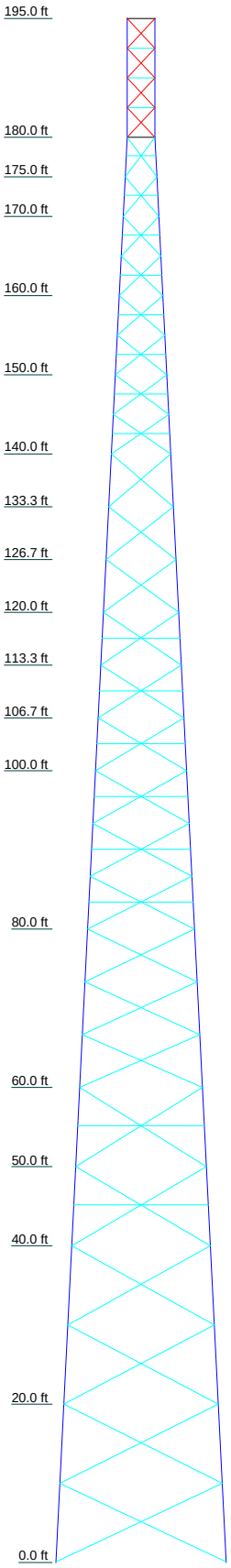
4.1) Recommendations

1) If the load differs from that described in Table 1 of this report, “Appendix B – Coax Configuration” or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, proposed, and future loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T18	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pipe 8 EH			Pipe 8 STD				Pipe 6 STD			D		C	B	A		PIPE 2.5 STD (SCH 40)	
Leg Grade	A572-55					A53-B-42		A572-55			A500-46		A500-50	A572-55	A53-B-35		A572-55	
Diagonals	L5x5x5/16	L4x4x3/8	L3x3x5/16		L3 1/2x3 1/2x1/4		J	L3x3x1/4		I	L2 1/2x2 1/2x1/4		2L2x2x3/16x1/4		H	G	F	SR 5/8
Diagonal Grade							A36											
Top Girts						N.A.												L1 1/2x1 1/2x3/16
Bottom Girts						N.A.												L1 1/2x1 1/2x3/16
Horizontals						N.A.												L1 1/2x1 1/2x3/16
Sec. Horizontals	N.A.		L4x4x1/4	L4x4x3/8	N.A.	L3x3x1/4		L3x3x3/16		8.83333	N.A.	7.5	L2x2x3/16	5.5	4.5	4		N.A.
Face Width (ft) 21.5	19.5	17.5	16.5	15.5	13.5	11.5	10.8333	10.1667	9.5	8.83333	8.16667	7.5	6.5	5.5	4.5	4		3.5
# Panels @ (ft)	2 @ 9.95833		4 @ 10			12 @ 6.66667								8 @ 5				4 @ 3.75
Weight (lb) 30525.2	5429.7	5066.4	1912.1	2011.3	3370.0	4304.0	820.6	862.9	839.1	788.4	842.1	829.5	1040.7	817.6	710.7	214.0	181.8	484.2



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2-1/2SCH40 w/ 3SCH80 Half Sleeve	F	L1 1/2x1 1/2x3/16
B	Pipe 3.5 Std (SCH40)	G	L2x2x3/16
C	3.5SCH40 w/ 4SCH40 Half Sleeve	H	2L1 1/2x1 1/2x3/16x1/4
D	5 STD w/ 6 XH Half Sleeve	I	L2 1/2x2 1/2x3/16
E	6 STD w/ 7 XH Half Sleeve	J	L2 1/2x2 1/2x1/4

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A500-50	50 ksi	62 ksi
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi
A53-B-35	35 ksi	60 ksi	A53-B-42	42 ksi	63 ksi

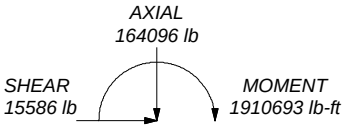
TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

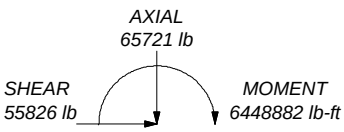
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 368256 lb
SHEAR: 35953 lb

UPLIFT: -321119 lb
SHEAR: 31599 lb



TORQUE 10912 lb-ft
50 mph WIND - 1.5000 in ICE

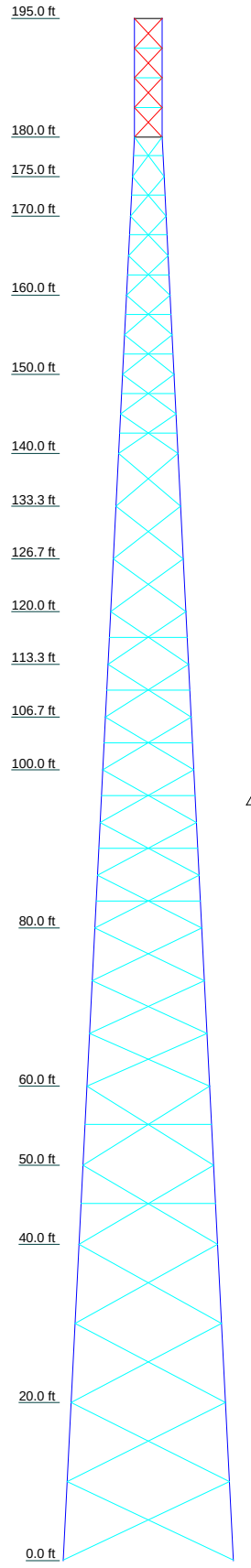


TORQUE 37441 lb-ft
REACTIONS - 120 mph WIND

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	**US-CT-1003 - Straits Turnpike**		
Project:	**TEP No. 25628.442076**		
Client: Phoenix Tower International	Drawn by: DDO	App'd:	
Code: TIA-222-H	Date: 09/10/20	Scale: NTS	
Path: C:\Users\ddorbit\Desktop\P-237833_L-442076_US-CT-1003_Straits Turnpike_Structural Analysis\Tnx\US-CT-1003.eri		Dwg No. E-1	

Section	T18	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pipe 8 EH			Pipe 8 STD				Pipe 6 STD									PIPE 2.5 STD (SCH 40)	
Leg Grade	A572-55					A53-B-42		A572-55			A500-46		A500-50	A572-55	A53-B-35		A572-55	
Diagonals	L5x5x5/16	L4x4x3/8	L3x3x5/16		L3 1/2x3 1/2x1/4		J	L3x3x1/4		I	L2 1/2x2 1/2x1/4		2L2x2x3/16x1/4	H		G	F	SR 5/8
Diagonal Grade	A36																	
Top Girts	N.A.							L3x3x3/16			N.A.			L2x2x3/16				L1 1/2x1 1/2x3/16
Bottom Girts	N.A.																	L1 1/2x1 1/2x3/16
Horizontals	N.A.																	L1 1/2x1 1/2x3/16
Sec. Horizontals	N.A.		L4x4x1/4	L4x4x3/8	N.A.	L3x3x1/4											N.A.	
Face Width (ft)	21.5	19.5	17.5	16.5	15.5	13.5	11.5	10.8333	10.1667	9.5	8.83333	8.16667	7.5	6.5	5.5	4.5	4	3.5
# Panels @ (ft)	2 @ 9.95833		4 @ 10			12 @ 6.66667								8 @ 5			4 @ 3.75	
Weight (lb)	30525.2	5429.7	5066.4	2011.3	3370.0	4304.0	820.6	862.9	839.1	788.4	842.1	829.5	1040.7	817.6	710.7	214.0	181.8	484.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Sector Mount [SM 802-3]	195	RRUS 4449 B5/B12	185
HSS Top Mount	195	RRUS 4478 B14	185
KRY 112 71	195	RRUS 4478 B14	185
KRY 112 71	195	RRUS 4478 B14	185
KRY 112 71	195	RRUS 8843 B2/B66A	185
APXVAARR24_43-U-NA20 w/ MP	195	RRUS 8843 B2/B66A	185
APXVAARR24_43-U-NA20 w/ MP	195	RRUS 8843 B2/B66A	185
APXVAARR24_43-U-NA20 w/ MP	195	(2) HBXX-6517DS-A2M w/ Mount Pipe	169
AIR -32 B2A/B66AA w/ Mount Pipe	195	RRH2x60-AWS	169
AIR -32 B2A/B66AA w/ Mount Pipe	195	RRH2x60-AWS	169
AIR -32 B2A/B66AA w/ Mount Pipe	195	RRH2x60-AWS	169
RADIO 4449 B12/B71	195	RRH2X60-PCS	169
RADIO 4449 B12/B71	195	RRH2X60-PCS	169
RADIO 4449 B12/B71	195	RRH2X60-PCS	169
KRY 112 71	195	BXA-70080/6CF w/ Mount Pipe	169
KRY 112 71	195	DB846F65ZAXY w/Mount Pipe	169
KRY 112 71	195	DB846F65ZAXY w/Mount Pipe	169
AIR6449 B41 w/ Mount Pipe	195	(2) FD9R6004	169
AIR6449 B41 w/ Mount Pipe	195	(2) FD9R6004	169
AIR6449 B41 w/ Mount Pipe	195	(2) FD9R6004	169
RADIO 4415	195	(2) HBXX-6517DS-A2M w/ Mount Pipe	169
RADIO 4415	195	(3) Sector Mounts 169-ft	169
RADIO 4415	195	(2) BXA-70063/6CF w/ Mount Pipe	169
E14 F05P85 / SDX1926Q-43	195	(2) DB844G65ZAXY w/Mount Pipe	169
E14 F05P85 / SDX1926Q-43	195	(2) DB844G65ZAXY w/Mount Pipe	169
E14 F05P85 / SDX1926Q-43	195	DB-B1/T1 w/ Mount Pipe	169
TMO Future Loading	195	(2) HBXX-6517DS-A2M w/ Mount Pipe	169
(3) Sector Mounts 185-ft	185	DT465B-2XR w/ Mount Pipe	153
Miscellaneous [NA 510-1]	185	DT465B-2XR w/ Mount Pipe	153
7770.00 w/ Mount Pipe	185	DT465B-2XR w/ Mount Pipe	153
7770.00 w/ Mount Pipe	185	RRH2x50-08	153
7770.00 w/ Mount Pipe	185	RRH2x50-08	153
(2) LGP13519	185	RRH2x50-08	153
(2) LGP13519	185	800MHZ 2X50W RRH	153
(2) LGP13519	185	800MHZ 2X50W RRH	153
RRUS-32 B30	185	800MHZ 2X50W RRH	153
RRUS-32 B30	185	PCS 1900MHz 4x45W-65MHz	153
RRUS-32 B30	185	PCS 1900MHz 4x45W-65MHz	153
DC6-48-60-18-8F	185	PCS 1900MHz 4x45W-65MHz	153
DC6-48-60-18-8F	185	TD-RRH8x20-25	153
DC6-48-60-0-8C-EV	185	TD-RRH8x20-25	153
SBNHH-1D65A w/ Mount Pipe	185	TD-RRH8x20-25	153
SBNHH-1D65A w/ Mount Pipe	185	Sector Mount [SM 502-3]	153
SBNHH-1D65A w/ Mount Pipe	185	APXVSPP18-C-A20 w/ Mount Pipe	153
(2) DMP65R-BU6D w/ Mount Pipe	185	APXVSPP18-C-A20 w/ Mount Pipe	153
(2) DMP65R-BU6D w/ Mount Pipe	185	APXVSPP18-C-A20 w/ Mount Pipe	153
(2) DMP65R-BU8D w/ Mount Pipe	185	1.75" Dia x 5-ft Pipe	75.5
RRUS 4449 B5/B12	185	GPS0015	75.5
RRUS 4449 B5/B12	185		

ALL REAC
ARE FACT

MAX. COR
DOWN:
SHEAR

UPLIFT
SHEAR

AXIA
16409

SHEAR
15586 lb

MOMENT

TORQUE 1(
50 mph WIND -

AXIA
65721 lb

SHEAR
55826 lb

TORQUE 3
REACTIONS - 120 r

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2-1/2SCH40 w/ 3SCH80 Half Sleeve	F	L1 1/2x1 1/2x3/16
B	Pipe 3.5 Std (SCH40)	G	L2x2x3/16
C	3.5SCH40 w/ 4SCH40 Half Sleeve	H	2L1 1/2x1 1/2x3/16x1/4
D	5 STD w/ 6 XH Half Sleeve	I	L2 1/2x2 1/2x3/16
E	6 STD w/ 7 XH Half Sleeve	J	L2 1/2x2 1/2x1/4

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A500-50	50 ksi	62 ksi
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi
A53-B-35	35 ksi	60 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	***US-CT-1003 - Straits Turnpike***		
Project:	***TEP No. 25628.442076***		
Client:	Phoenix Tower International	Drawn by: DDO	App'd:
Code:	TIA-222-H	Date: 09/10/20	Scale: NTS
Path:	C:\Users\dortiz\Desktop\P-237833_L-442076_US-CT-1003_Straits Turnpike_Structural Analysis\Tnx\US-CT-1003.eri		Dwg No. E-1

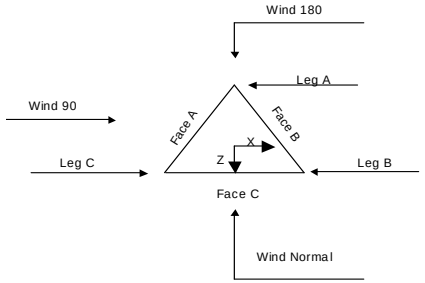
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.50 ft at the top and 21.50 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1. Tower is located in New Haven County, Connecticut.
2. Tower base elevation above sea level: 432.77 ft.
3. Basic wind speed of 120 mph.
4. Risk Category II.
5. Exposure Category B.
6. Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7. Topographic Category: 1.
8. Crest Height: 0.00 ft.
9. Nominal ice thickness of 1.5000 in.
10. Ice thickness is considered to increase with height.
11. Ice density of 56 pcf.
12. A wind speed of 50 mph is used in combination with ice.
13. Temperature drop of 50 °F.
14. Deflections calculated using a wind speed of 60 mph.
15. A non-linear (P-delta) analysis was used.
16. Pressures are calculated at each section.
17. Tower analysis based on target reliabilities in accordance with Annex S.
18. Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
19. Stress ratio used in tower member design is 1.05.
20. 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-H Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	195.00-180.00			3.50	1	15.00
T2	180.00-175.00			3.50	1	5.00
T3	175.00-170.00			4.00	1	5.00
T4	170.00-160.00			4.50	1	10.00
T5	160.00-150.00			5.50	1	10.00
T6	150.00-140.00			6.50	1	10.00
T7	140.00-133.33			7.50	1	6.67
T8	133.33-126.67			8.17	1	6.67
T9	126.67-120.00			8.83	1	6.67
T10	120.00-113.33			9.50	1	6.67
T11	113.33-106.67			10.17	1	6.67
T12	106.67-100.00			10.83	1	6.67
T13	100.00-80.00			11.50	1	20.00
T14	80.00-60.00			13.50	1	20.00
T15	60.00-50.00			15.50	1	10.00
T16	50.00-40.00			16.50	1	10.00
T17	40.00-20.00			17.50	1	20.00
T18	20.00-0.00			19.50	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	195.00-180.00	3.75	TX Brace	No	Yes	0.0000	0.0000
T2	180.00-175.00	5.00	X Brace	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	175.00-170.00	5.00	X Brace	No	Yes	0.0000	0.0000
T4	170.00-160.00	5.00	X Brace	No	Yes	0.0000	0.0000
T5	160.00-150.00	5.00	X Brace	No	Yes	0.0000	0.0000
T6	150.00-140.00	5.00	X Brace	No	Yes	0.0000	0.0000
T7	140.00-133.33	6.67	X Brace	No	No	0.0000	0.0000
T8	133.33-126.67	6.67	X Brace	No	No	0.0000	0.0000
T9	126.67-120.00	6.67	X Brace	No	No	0.0000	0.0000
T10	120.00-113.33	6.67	X Brace	No	Yes	0.0000	0.0000
T11	113.33-106.67	6.67	X Brace	No	Yes	0.0000	0.0000
T12	106.67-100.00	6.67	X Brace	No	Yes	0.0000	0.0000
T13	100.00-80.00	6.67	X Brace	No	Yes	0.0000	0.0000
T14	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T15	60.00-50.00	10.00	X Brace	No	Yes	0.0000	0.0000
T16	50.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T17	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T18	20.00-0.00	9.96	X Brace	No	No	0.0000	1.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 195.00-180.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 180.00-175.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 175.00-170.00	Pipe	PIPE 2.5 STD (SCH 40)	A572-55 (55 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 170.00-160.00	Arbitrary Shape	2-1/2SCH40 w/ 3SCH80 Half Sleeve	A53-B-35 (35 ksi)	Double Equal Angle	2L1 1/2x1 1/2x3/16x1/4	A36 (36 ksi)
T5 160.00-150.00	Pipe	Pipe 3.5 Std (SCH40)	A572-55 (55 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T6 150.00-140.00	Arbitrary Shape	3.5SCH40 w/ 4SCH40 Half Sleeve	A500-50 (50 ksi)	Double Angle	2L2x2x3/16x1/4	A36 (36 ksi)
T7 140.00-133.33	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 133.33-126.67	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T9 126.67-120.00	Arbitrary Shape	5 STD w/ 6 XH Half Sleeve	A500-46 (46 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 120.00-113.33	Pipe	Pipe 6 STD	A572-55 (55 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 113.33-106.67	Pipe	Pipe 6 STD	A572-55 (55 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T12 106.67-100.00	Pipe	Pipe 6 STD	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T13 100.00-80.00	Arbitrary Shape	6 STD w/ 7 XH Half Sleeve	A53-B-42 (42 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T14 80.00-60.00	Pipe	Pipe 8 STD	A572-55 (55 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T15 60.00-50.00	Pipe	Pipe 8 STD	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T16 50.00-40.00	Pipe	Pipe 8 STD	A572-55 (55 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T17 40.00-20.00	Pipe	Pipe 8 EH	A572-55 (55 ksi)	Equal Angle	L4x4x3/8	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T18 20.00-0.00	Pipe	Pipe 8 EH	A572-55 (55 ksi)	Equal Angle	L5x5x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 195.00-180.00	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 195.00-180.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T2 180.00-175.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 175.00-170.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 170.00-160.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 160.00-150.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 150.00-140.00	Equal Angle	L2x2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T10 120.00-113.33	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T11 113.33-106.67	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T12 106.67-100.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T13 100.00-80.00	Equal Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T15 60.00-50.00	Equal Angle	L4x4x3/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T16 50.00-40.00	Equal Angle	L4x4x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 195.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T2 180.00-175.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T3 175.00-170.00	0.00	0.2500	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T4 170.00-160.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T5 160.00-150.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T6 150.00-140.00	0.00	0.2500	A36 (36 ksi)	1	1	1	Mid-Pt	0.0000	36.0000
T7 140.00-133.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T8 133.33-126.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T9 126.67-120.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T10 120.00-113.33	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T11 113.33-106.67	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T12 106.67-100.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T13 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T14 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T15 60.00-50.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T16 50.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T17 40.00-20.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000
T18 20.00-0.00	0.00	0.4375	A36 (36 ksi)	1	1	1	0.0000	0.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 195.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T2 180.00-175.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T3 175.00-170.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T4 170.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T5 160.00-150.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T6 150.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T7 140.00-133.33	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T8 133.33-126.67	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T9 126.67-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T10 120.00-113.33	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T11 113.33-106.67	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T12 106.67-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T13 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T14 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1		
T15 60.00-50.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T16 50.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	0.5	1		
T17 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1		
T18 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1		

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 195.00-180.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-175.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 175.00-170.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 170.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 160.00-150.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 150.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 140.00-133.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 133.33-126.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 126.67-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 120.00-113.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 113.33-106.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 106.67-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 60.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 50.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T17 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T18 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 195.00-180.00	Flange	0.7500 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T2 180.00-175.00	Flange	0.7500 A325N	0	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T3 175.00-170.00	Flange	0.7500 A325N	0	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T4 170.00-160.00	Flange	0.7500 A325N	6	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T5 160.00-150.00	Flange	1.0000 A325N	0	0.5000 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T6 150.00-140.00	Flange	1.0000 A325N	6	0.5000 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T7 140.00-133.33	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T8 133.33-126.67	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T9 126.67-120.00	Flange	1.0000 A325N	8	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T10 120.00-113.33	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T11 113.33-106.67	Flange	1.0000 A325N	0	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T12 106.67-100.00	Flange	1.0000 A325N	8	0.6250 A325X	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T13 100.00-80.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.7500 A325N	1
T14 80.00-60.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.7500 A325X	0
T15 60.00-50.00	Flange	1.2500 A325N	0	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	1
T16 50.00-40.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.7500 A325X	1
T17 40.00-20.00	Flange	1.2500 A325N	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0
T18 20.00-0.00	Flange	1.5000 A36	8	0.6250 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	169.00 - 8.00	-2.0000	0.35	12	12	0.5000	1.9800		0.82
HB158-1-08U8-S8J18(1-5/8)	B	No	No	Ar (CaAa)	169.00 - 8.00	-4.0000	0.29	1	1	0.5000	0.0001		1.30
WG Rail 1.5x1.5x1/4	B	No	No	Af (CaAa)	170.00 - 8.00	-2.0000	0.35	2	2	36.5000	1.5000		2.40
****													
1 5/8" Hybrid	B	No	No	Ar (CaAa)	195.00 - 8.00	0.0000	0	4	4	0.5000	1.6250		0.75
WG Rail 1.5x1.5x3/16	B	No	No	Af (CaAa)	195.00 - 0.00	0.0000	0	2	2	36.0000	1.5000		1.81
****													
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	195.00 - 8.00	0.0000	0	20	9	0.5000	1.9800		0.82
****													
5/8" dia. coax	C	No	No	Ar (CaAa)	75.50 - 10.00	0.0000	0	1	1	0.5000	0.6250		0.15
1 1/4 Hybriflex Cable	C	No	No	Ar (CaAa)	153.00 - 10.00	0.0000	0.04	4	4	0.5000	1.2500		1.44
WG Rail 1.5x1.5x3/16	C	No	No	Af (CaAa)	160.00 - 0.00	0.0000	0.1	2	2	35.0000	1.5000		1.81
****													
LDF7-50A (1-5/8 FOAM)	A	No	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.3	12	6	0.5000	1.9800		0.82
7/16" Fiber Cable (24 fibers Max)	A	No	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.375	2	2	0.5000	0.4375		0.03
LDF5-50A (7/8 FOAM)	A	No	No	Ar (CaAa)	185.00 - 8.00	0.0000	0.3	6	3	0.5000	1.0900		0.33
WG Rail 1.5x1.5x1/8	A	No	No	Af (CaAa)	185.00 - 2.00	0.0000	0.3	2	2	34.0000	1.5000		1.23
***													
Safety Line 3/8	A	No	No	Ar (CaAa)	195.00 - 0.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
Step Pegs (5/8" SR) 7-in. w/30" step	A	No	No	Ar (CaAa)	195.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step	B	No	No	Ar (CaAa)	60.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	No	Ar (CaAa)	60.00 - 0.00	0.0000	0.5	1	1	0.3500	0.3500		0.49
*****													
Rung L1.5x1.5x1/8 (36.25"w, 34"s)	B	No	No	Af (CaAa)	170.00 - 8.00	-2.0000	0.35	1	1	0.5000	0.0001		1.31
Rung L1.5x1.5x1/8 (36"w, 34"s)	B	No	No	Af (CaAa)	181.00 - 0.00	0.0000	0	1	1	0.5000	0.0001		1.29
Rung L2x1.5x1/8 (35"w, 48"s)	C	No	No	Af (CaAa)	160.00 - 0.00	0.0000	0.1	1	1	0.5000	0.0001		1.05
Rung L1.5x1.5x1/8 (36"w, 34"s)	A	No	No	Af (CaAa)	180.00 - 2.00	0.0000	0.3	1	1	0.5000	0.0001		1.29
*****													

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 lb
T1	195.00-180.00	A	0.000	0.000	19.175	0.000	82.31
		B	0.000	0.000	76.650	0.000	346.59
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	0.000	0.000	18.450	0.000	81.71
		B	0.000	0.000	25.550	0.000	121.58
		C	0.000	0.000	0.000	0.000	0.00
T3	175.00-170.00	A	0.000	0.000	18.450	0.000	81.71
		B	0.000	0.000	25.550	0.000	121.58
		C	0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	0.000	0.000	36.900	0.000	163.42
		B	0.000	0.000	77.484	0.000	404.54
		C	0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	0.000	0.000	36.900	0.000	163.42
		B	0.000	0.000	79.860	0.000	415.68
		C	0.000	0.000	6.500	0.000	63.90
T6	150.00-140.00	A	0.000	0.000	36.900	0.000	163.42
		B	0.000	0.000	79.860	0.000	415.68
		C	0.000	0.000	10.000	0.000	104.11
T7	140.00-133.33	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T8	133.33-126.67	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T9	126.67-120.00	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T10	120.00-113.33	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T11	113.33-106.67	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T12	106.67-100.00	A	0.000	0.000	24.600	0.000	108.95
		B	0.000	0.000	53.240	0.000	277.12
		C	0.000	0.000	6.667	0.000	69.41
T13	100.00-80.00	A	0.000	0.000	73.800	0.000	326.84
		B	0.000	0.000	159.721	0.000	831.36
		C	0.000	0.000	20.000	0.000	208.22
T14	80.00-60.00	A	0.000	0.000	73.800	0.000	326.84
		B	0.000	0.000	159.721	0.000	831.36
		C	0.000	0.000	20.969	0.000	210.54
T15	60.00-50.00	A	0.000	0.000	36.900	0.000	163.42
		B	0.000	0.000	80.210	0.000	420.55
		C	0.000	0.000	10.975	0.000	110.48
T16	50.00-40.00	A	0.000	0.000	36.900	0.000	163.42
		B	0.000	0.000	80.210	0.000	420.55
		C	0.000	0.000	10.975	0.000	110.48
T17	40.00-20.00	A	0.000	0.000	73.800	0.000	326.84
		B	0.000	0.000	160.421	0.000	841.10
		C	0.000	0.000	21.950	0.000	220.96
T18	20.00-0.00	A	0.000	0.000	47.860	0.000	224.29
		B	0.000	0.000	100.533	0.000	547.88
		C	0.000	0.000	16.325	0.000	162.02

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 lb
T1	195.00-180.00	A	1.517	0.000	0.000	36.874	0.000	514.78
		B		0.000	0.000	89.575	0.000	1581.34
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-175.00	A	1.509	0.000	0.000	31.514	0.000	473.74
		B		0.000	0.000	31.222	0.000	560.42
		C		0.000	0.000	0.000	0.000	0.00
T3	175.00-170.00	A	1.504	0.000	0.000	31.471	0.000	472.46
		B		0.000	0.000	31.195	0.000	559.23
		C		0.000	0.000	0.000	0.000	0.00
T4	170.00-160.00	A	1.498	0.000	0.000	62.806	0.000	940.95
		B		0.000	0.000	115.705	0.000	1912.99
		C		0.000	0.000	0.000	0.000	0.00
T5	160.00-150.00	A	1.488	0.000	0.000	62.617	0.000	935.42
		B		0.000	0.000	119.866	0.000	1962.94
		C		0.000	0.000	17.821	0.000	294.33
T6	150.00-140.00	A	1.478	0.000	0.000	62.416	0.000	929.58
		B		0.000	0.000	119.635	0.000	1952.47
		C		0.000	0.000	26.809	0.000	416.93
T7	140.00-133.33	A	1.470	0.000	0.000	41.492	0.000	616.30
		B		0.000	0.000	79.621	0.000	1295.51
		C		0.000	0.000	17.818	0.000	276.28
T8	133.33-126.67	A	1.462	0.000	0.000	41.393	0.000	613.43
		B		0.000	0.000	79.507	0.000	1290.36
		C		0.000	0.000	17.773	0.000	274.89
T9	126.67-120.00	A	1.455	0.000	0.000	41.289	0.000	610.44
		B		0.000	0.000	79.387	0.000	1284.98
		C		0.000	0.000	17.725	0.000	273.43
T10	120.00-113.33	A	1.447	0.000	0.000	41.180	0.000	607.30
		B		0.000	0.000	79.261	0.000	1279.34
		C		0.000	0.000	17.675	0.000	271.90
T11	113.33-106.67	A	1.438	0.000	0.000	41.065	0.000	604.01
		B		0.000	0.000	79.129	0.000	1273.41
		C		0.000	0.000	17.623	0.000	270.30
T12	106.67-100.00	A	1.429	0.000	0.000	40.944	0.000	600.55
		B		0.000	0.000	78.990	0.000	1267.17
		C		0.000	0.000	17.567	0.000	268.61
T13	100.00-80.00	A	1.410	0.000	0.000	122.037	0.000	1779.03
		B		0.000	0.000	236.053	0.000	3760.69
		C		0.000	0.000	52.337	0.000	794.82
T14	80.00-60.00	A	1.375	0.000	0.000	120.617	0.000	1739.08
		B		0.000	0.000	234.420	0.000	3688.40
		C		0.000	0.000	56.917	0.000	829.77
T15	60.00-50.00	A	1.342	0.000	0.000	59.644	0.000	851.07
		B		0.000	0.000	119.479	0.000	1843.26
		C		0.000	0.000	31.882	0.000	445.08
T16	50.00-40.00	A	1.315	0.000	0.000	59.103	0.000	836.21
		B		0.000	0.000	118.804	0.000	1815.20
		C		0.000	0.000	31.528	0.000	435.82
T17	40.00-20.00	A	1.263	0.000	0.000	116.087	0.000	1615.01
		B		0.000	0.000	234.963	0.000	3521.59
		C		0.000	0.000	61.668	0.000	836.01
T18	20.00-0.00	A	1.132	0.000	0.000	77.732	0.000	1025.49
		B		0.000	0.000	148.513	0.000	2117.80
		C		0.000	0.000	43.494	0.000	576.77

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	195.00-180.00	4.9146	-6.6215	3.2072	-5.8286
T2	180.00-175.00	2.7248	-8.9238	2.0042	-8.8737
T3	175.00-170.00	2.8251	-9.4987	2.1752	-9.7215
T4	170.00-160.00	6.4497	-6.0191	5.9462	-6.6769
T5	160.00-150.00	6.4425	-5.2411	5.8969	-5.5138
T6	150.00-140.00	6.8760	-5.6463	6.3774	-5.8406
T7	140.00-133.33	7.8271	-6.3338	7.3504	-6.6599
T8	133.33-126.67	8.3629	-6.7784	7.8889	-7.1416
T9	126.67-120.00	8.8789	-7.2112	8.4107	-7.6106
T10	120.00-113.33	8.1668	-6.9064	8.1788	-7.5304
T11	113.33-106.67	8.5190	-7.2335	8.5857	-7.9128
T12	106.67-100.00	9.2059	-7.7704	9.1439	-8.3994
T13	100.00-80.00	9.0926	-7.8810	9.4449	-8.7765
T14	80.00-60.00	11.0067	-9.2455	11.1220	-9.7657
T15	60.00-50.00	11.7440	-9.6609	11.6224	-8.9652
T16	50.00-40.00	12.1490	-10.0425	12.1070	-9.3647
T17	40.00-20.00	13.5141	-11.0864	13.5218	-10.4184
T18	20.00-0.00	9.1177	-8.5782	9.7751	-9.2089

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	6	1 5/8" Hybrid	180.00 - 195.00	0.6000	0.4557
T1	9	WG Rail 1.5x1.5x3/16	180.00 - 195.00	0.6000	0.4557
T1	11	LDF7-50A (1-5/8 FOAM)	180.00 - 195.00	0.6000	0.4557
T1	21	LDF7-50A (1-5/8 FOAM)	180.00 - 185.00	0.6000	0.4557
T1	22	7/16" Fiber Cable (24 fibers Max)	180.00 - 185.00	0.6000	0.4557
T1	24	LDF5-50A (7/8 FOAM)	180.00 - 185.00	0.6000	0.4557
T1	25	WG Rail 1.5x1.5x1/8	180.00 - 185.00	0.6000	0.4557
T1	32	Safety Line 3/8	180.00 - 195.00	0.6000	0.4557
T1	33	Step Pegs (5/8" SR) 7-in. w/30" step	180.00 - 195.00	0.6000	0.4557
T1	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	180.00 - 181.00	0.6000	0.4557
T2	6	1 5/8" Hybrid	175.00 - 180.00	0.6000	0.4913
T2	9	WG Rail 1.5x1.5x3/16	175.00 - 180.00	0.6000	0.4913
T2	11	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.4913
T2	21	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.4913
T2	22	7/16" Fiber Cable (24 fibers Max)	175.00 - 180.00	0.6000	0.4913
T2	24	LDF5-50A (7/8 FOAM)	175.00 - 180.00	0.6000	0.4913

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	25	WG Rail 1.5x1.5x1/8	175.00 - 180.00	0.6000	0.4913
T2	32	Safety Line 3/8	175.00 - 180.00	0.6000	0.4913
T2	33	Step Pegs (5/8" SR) 7-in. w/30" step	175.00 - 180.00	0.6000	0.4913
T2	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	175.00 - 180.00	0.6000	0.4913
T2	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	175.00 - 180.00	0.6000	0.4913
T3	6	1 5/8" Hybrid	170.00 - 175.00	0.6000	0.5042
T3	9	WG Rail 1.5x1.5x3/16	170.00 - 175.00	0.6000	0.5042
T3	11	LDF7-50A (1-5/8 FOAM)	170.00 - 175.00	0.6000	0.5042
T3	21	LDF7-50A (1-5/8 FOAM)	170.00 - 175.00	0.6000	0.5042
T3	22	7/16" Fiber Cable (24 fibers Max)	170.00 - 175.00	0.6000	0.5042
T3	24	LDF5-50A (7/8 FOAM)	170.00 - 175.00	0.6000	0.5042
T3	25	WG Rail 1.5x1.5x1/8	170.00 - 175.00	0.6000	0.5042
T3	32	Safety Line 3/8	170.00 - 175.00	0.6000	0.5042
T3	33	Step Pegs (5/8" SR) 7-in. w/30" step	170.00 - 175.00	0.6000	0.5042
T3	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	170.00 - 175.00	0.6000	0.5042
T3	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	170.00 - 175.00	0.6000	0.5042
T4	1	LDF7-50A (1-5/8 FOAM)	160.00 - 169.00	0.6000	0.5443
T4	2	HB158-1-08U8-S8J18(1-5/8)	160.00 - 169.00	0.6000	0.5443
T4	3	WG Rail 1.5x1.5x1/4	160.00 - 170.00	0.6000	0.5443
T4	6	1 5/8" Hybrid	160.00 - 170.00	0.6000	0.5443
T4	9	WG Rail 1.5x1.5x3/16	160.00 - 170.00	0.6000	0.5443
T4	11	LDF7-50A (1-5/8 FOAM)	160.00 - 170.00	0.6000	0.5443
T4	21	LDF7-50A (1-5/8 FOAM)	160.00 - 170.00	0.6000	0.5443
T4	22	7/16" Fiber Cable (24 fibers Max)	160.00 - 170.00	0.6000	0.5443
T4	24	LDF5-50A (7/8 FOAM)	160.00 - 170.00	0.6000	0.5443
T4	25	WG Rail 1.5x1.5x1/8	160.00 - 170.00	0.6000	0.5443
T4	32	Safety Line 3/8	160.00 - 170.00	0.6000	0.5443
T4	33	Step Pegs (5/8" SR) 7-in. w/30" step	160.00 - 170.00	0.6000	0.5443
T4	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	160.00 - 170.00	0.6000	0.5443
T4	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	160.00 - 170.00	0.6000	0.5443
T4	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	160.00 - 170.00	0.6000	0.5443

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	1	LDF7-50A (1-5/8 FOAM)	150.00 - 160.00	0.6000	0.5658
T5	2	HB158-1-08U8-S8J18(1-5/8)	150.00 - 160.00	0.6000	0.5658
T5	3	WG Rail 1.5x1.5x1/4	150.00 - 160.00	0.6000	0.5658
T5	6	1 5/8" Hybrid	150.00 - 160.00	0.6000	0.5658
T5	9	WG Rail 1.5x1.5x3/16	150.00 - 160.00	0.6000	0.5658
T5	11	LDF7-50A (1-5/8 FOAM)	150.00 - 160.00	0.6000	0.5658
T5	14	1 1/4 Hybriflex Cable	150.00 - 153.00	0.6000	0.5658
T5	15	WG Rail 1.5x1.5x3/16	150.00 - 160.00	0.6000	0.5658
T5	21	LDF7-50A (1-5/8 FOAM)	150.00 - 160.00	0.6000	0.5658
T5	22	7/16" Fiber Cable (24 fibers Max)	150.00 - 160.00	0.6000	0.5658
T5	24	LDF5-50A (7/8 FOAM)	150.00 - 160.00	0.6000	0.5658
T5	25	WG Rail 1.5x1.5x1/8	150.00 - 160.00	0.6000	0.5658
T5	32	Safety Line 3/8	150.00 - 160.00	0.6000	0.5658
T5	33	Step Pegs (5/8" SR) 7-in. w/30" step	150.00 - 160.00	0.6000	0.5658
T5	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	150.00 - 160.00	0.6000	0.5658
T5	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	150.00 - 160.00	0.6000	0.5658
T5	45	Rung L2x1.5x1/8 (35"w, 48"s)	150.00 - 160.00	0.6000	0.5658
T5	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	150.00 - 160.00	0.6000	0.5658
T6	1	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5872
T6	2	HB158-1-08U8-S8J18(1-5/8)	140.00 - 150.00	0.6000	0.5872
T6	3	WG Rail 1.5x1.5x1/4	140.00 - 150.00	0.6000	0.5872
T6	6	1 5/8" Hybrid	140.00 - 150.00	0.6000	0.5872
T6	9	WG Rail 1.5x1.5x3/16	140.00 - 150.00	0.6000	0.5872
T6	11	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5872
T6	14	1 1/4 Hybriflex Cable	140.00 - 150.00	0.6000	0.5872
T6	15	WG Rail 1.5x1.5x3/16	140.00 - 150.00	0.6000	0.5872
T6	21	LDF7-50A (1-5/8 FOAM)	140.00 - 150.00	0.6000	0.5872
T6	22	7/16" Fiber Cable (24 fibers Max)	140.00 - 150.00	0.6000	0.5872
T6	24	LDF5-50A (7/8 FOAM)	140.00 - 150.00	0.6000	0.5872
T6	25	WG Rail 1.5x1.5x1/8	140.00 - 150.00	0.6000	0.5872
T6	32	Safety Line 3/8	140.00 - 150.00	0.6000	0.5872

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	33	Step Pegs (5/8" SR) 7-in. w/30" step	140.00 - 150.00	0.6000	0.5872
T6	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	140.00 - 150.00	0.6000	0.5872
T6	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	140.00 - 150.00	0.6000	0.5872
T6	45	Rung L2x1.5x1/8 (35"w, 48"s)	140.00 - 150.00	0.6000	0.5872
T6	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	140.00 - 150.00	0.6000	0.5872
T7	1	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	2	HB158-1-08U8-S8J18(1-5/8)	133.33 - 140.00	0.6000	0.6000
T7	3	WG Rail 1.5x1.5x1/4	133.33 - 140.00	0.6000	0.6000
T7	6	1 5/8" Hybrid	133.33 - 140.00	0.6000	0.6000
T7	9	WG Rail 1.5x1.5x3/16	133.33 - 140.00	0.6000	0.6000
T7	11	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	14	1 1/4 Hybriflex Cable	133.33 - 140.00	0.6000	0.6000
T7	15	WG Rail 1.5x1.5x3/16	133.33 - 140.00	0.6000	0.6000
T7	21	LDF7-50A (1-5/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	22	7/16" Fiber Cable (24 fibers Max)	133.33 - 140.00	0.6000	0.6000
T7	24	LDF5-50A (7/8 FOAM)	133.33 - 140.00	0.6000	0.6000
T7	25	WG Rail 1.5x1.5x1/8	133.33 - 140.00	0.6000	0.6000
T7	32	Safety Line 3/8	133.33 - 140.00	0.6000	0.6000
T7	33	Step Pegs (5/8" SR) 7-in. w/30" step	133.33 - 140.00	0.6000	0.6000
T7	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T7	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T7	45	Rung L2x1.5x1/8 (35"w, 48"s)	133.33 - 140.00	0.6000	0.6000
T7	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	133.33 - 140.00	0.6000	0.6000
T8	1	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	2	HB158-1-08U8-S8J18(1-5/8)	126.67 - 133.33	0.6000	0.6000
T8	3	WG Rail 1.5x1.5x1/4	126.67 - 133.33	0.6000	0.6000
T8	6	1 5/8" Hybrid	126.67 - 133.33	0.6000	0.6000
T8	9	WG Rail 1.5x1.5x3/16	126.67 - 133.33	0.6000	0.6000
T8	11	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	14	1 1/4 Hybriflex Cable	126.67 - 133.33	0.6000	0.6000
T8	15	WG Rail 1.5x1.5x3/16	126.67 - 133.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	21	LDF7-50A (1-5/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	22	7/16" Fiber Cable (24 fibers Max)	126.67 - 133.33	0.6000	0.6000
T8	24	LDF5-50A (7/8 FOAM)	126.67 - 133.33	0.6000	0.6000
T8	25	WG Rail 1.5x1.5x1/8	126.67 - 133.33	0.6000	0.6000
T8	32	Safety Line 3/8	126.67 - 133.33	0.6000	0.6000
T8	33	Step Pegs (5/8" SR) 7-in. w/30" step	126.67 - 133.33	0.6000	0.6000
T8	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T8	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T8	45	Rung L2x1.5x1/8 (35"w, 48"s)	126.67 - 133.33	0.6000	0.6000
T8	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	126.67 - 133.33	0.6000	0.6000
T9	1	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	2	HB158-1-08U8-S8J18(1-5/8)	120.00 - 126.67	0.6000	0.6000
T9	3	WG Rail 1.5x1.5x1/4	120.00 - 126.67	0.6000	0.6000
T9	6	1 5/8" Hybrid	120.00 - 126.67	0.6000	0.6000
T9	9	WG Rail 1.5x1.5x3/16	120.00 - 126.67	0.6000	0.6000
T9	11	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	14	1 1/4 Hybriflex Cable	120.00 - 126.67	0.6000	0.6000
T9	15	WG Rail 1.5x1.5x3/16	120.00 - 126.67	0.6000	0.6000
T9	21	LDF7-50A (1-5/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	22	7/16" Fiber Cable (24 fibers Max)	120.00 - 126.67	0.6000	0.6000
T9	24	LDF5-50A (7/8 FOAM)	120.00 - 126.67	0.6000	0.6000
T9	25	WG Rail 1.5x1.5x1/8	120.00 - 126.67	0.6000	0.6000
T9	32	Safety Line 3/8	120.00 - 126.67	0.6000	0.6000
T9	33	Step Pegs (5/8" SR) 7-in. w/30" step	120.00 - 126.67	0.6000	0.6000
T9	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T9	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T9	45	Rung L2x1.5x1/8 (35"w, 48"s)	120.00 - 126.67	0.6000	0.6000
T9	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	120.00 - 126.67	0.6000	0.6000
T10	1	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	2	HB158-1-08U8-S8J18(1-5/8)	113.33 - 120.00	0.6000	0.6000
T10	3	WG Rail 1.5x1.5x1/4	113.33 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	6	1 5/8" Hybrid	113.33 - 120.00	0.6000	0.6000
T10	9	WG Rail 1.5x1.5x3/16	113.33 - 120.00	0.6000	0.6000
T10	11	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	14	1 1/4 Hybriflex Cable	113.33 - 120.00	0.6000	0.6000
T10	15	WG Rail 1.5x1.5x3/16	113.33 - 120.00	0.6000	0.6000
T10	21	LDF7-50A (1-5/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	22	7/16" Fiber Cable (24 fibers Max)	113.33 - 120.00	0.6000	0.6000
T10	24	LDF5-50A (7/8 FOAM)	113.33 - 120.00	0.6000	0.6000
T10	25	WG Rail 1.5x1.5x1/8	113.33 - 120.00	0.6000	0.6000
T10	32	Safety Line 3/8	113.33 - 120.00	0.6000	0.6000
T10	33	Step Pegs (5/8" SR) 7-in. w/30" step	113.33 - 120.00	0.6000	0.6000
T10	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T10	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T10	45	Rung L2x1.5x1/8 (35"w, 48"s)	113.33 - 120.00	0.6000	0.6000
T10	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	113.33 - 120.00	0.6000	0.6000
T11	1	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	2	HB158-1-08U8-S8J18(1-5/8)	106.67 - 113.33	0.6000	0.6000
T11	3	WG Rail 1.5x1.5x1/4	106.67 - 113.33	0.6000	0.6000
T11	6	1 5/8" Hybrid	106.67 - 113.33	0.6000	0.6000
T11	9	WG Rail 1.5x1.5x3/16	106.67 - 113.33	0.6000	0.6000
T11	11	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	14	1 1/4 Hybriflex Cable	106.67 - 113.33	0.6000	0.6000
T11	15	WG Rail 1.5x1.5x3/16	106.67 - 113.33	0.6000	0.6000
T11	21	LDF7-50A (1-5/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	22	7/16" Fiber Cable (24 fibers Max)	106.67 - 113.33	0.6000	0.6000
T11	24	LDF5-50A (7/8 FOAM)	106.67 - 113.33	0.6000	0.6000
T11	25	WG Rail 1.5x1.5x1/8	106.67 - 113.33	0.6000	0.6000
T11	32	Safety Line 3/8	106.67 - 113.33	0.6000	0.6000
T11	33	Step Pegs (5/8" SR) 7-in. w/30" step	106.67 - 113.33	0.6000	0.6000
T11	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	106.67 - 113.33	0.6000	0.6000
T11	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	106.67 - 113.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	45	Rung L2x1.5x1/8 (35"w, 48"s)	106.67 - 113.33	0.6000	0.6000
T11	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	106.67 - 113.33	0.6000	0.6000
T12	1	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	2	HB158-1-08U8-S8J18(1-5/8)	100.00 - 106.67	0.6000	0.6000
T12	3	WG Rail 1.5x1.5x1/4	100.00 - 106.67	0.6000	0.6000
T12	6	1 5/8" Hybrid	100.00 - 106.67	0.6000	0.6000
T12	9	WG Rail 1.5x1.5x3/16	100.00 - 106.67	0.6000	0.6000
T12	11	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	14	1 1/4 Hybriflex Cable	100.00 - 106.67	0.6000	0.6000
T12	15	WG Rail 1.5x1.5x3/16	100.00 - 106.67	0.6000	0.6000
T12	21	LDF7-50A (1-5/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	22	7/16" Fiber Cable (24 fibers Max)	100.00 - 106.67	0.6000	0.6000
T12	24	LDF5-50A (7/8 FOAM)	100.00 - 106.67	0.6000	0.6000
T12	25	WG Rail 1.5x1.5x1/8	100.00 - 106.67	0.6000	0.6000
T12	32	Safety Line 3/8	100.00 - 106.67	0.6000	0.6000
T12	33	Step Pegs (5/8" SR) 7-in. w/30" step	100.00 - 106.67	0.6000	0.6000
T12	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T12	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T12	45	Rung L2x1.5x1/8 (35"w, 48"s)	100.00 - 106.67	0.6000	0.6000
T12	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	100.00 - 106.67	0.6000	0.6000
T13	1	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	2	HB158-1-08U8-S8J18(1-5/8)	80.00 - 100.00	0.6000	0.6000
T13	3	WG Rail 1.5x1.5x1/4	80.00 - 100.00	0.6000	0.6000
T13	6	1 5/8" Hybrid	80.00 - 100.00	0.6000	0.6000
T13	9	WG Rail 1.5x1.5x3/16	80.00 - 100.00	0.6000	0.6000
T13	11	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	14	1 1/4 Hybriflex Cable	80.00 - 100.00	0.6000	0.6000
T13	15	WG Rail 1.5x1.5x3/16	80.00 - 100.00	0.6000	0.6000
T13	21	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	22	7/16" Fiber Cable (24 fibers Max)	80.00 - 100.00	0.6000	0.6000
T13	24	LDF5-50A (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T13	25	WG Rail 1.5x1.5x1/8	80.00 - 100.00	0.6000	0.6000
T13	32	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T13	33	Step Pegs (5/8" SR) 7-in. w/30" step	80.00 - 100.00	0.6000	0.6000
T13	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	80.00 - 100.00	0.6000	0.6000
T13	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	80.00 - 100.00	0.6000	0.6000
T13	45	Rung L2x1.5x1/8 (35"w, 48"s)	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T13	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	80.00 - 100.00	0.6000	0.6000
T14	1	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	2	HB158-1-08U8-S8J18(1-5/8)	60.00 - 80.00	0.6000	0.6000
T14	3	WG Rail 1.5x1.5x1/4	60.00 - 80.00	0.6000	0.6000
T14	6	1 5/8" Hybrid	60.00 - 80.00	0.6000	0.6000
T14	9	WG Rail 1.5x1.5x3/16	60.00 - 80.00	0.6000	0.6000
T14	11	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	13	5/8" dia. coax	60.00 - 75.50	0.6000	0.6000
T14	14	1 1/4 Hybriflex Cable	60.00 - 80.00	0.6000	0.6000
T14	15	WG Rail 1.5x1.5x3/16	60.00 - 80.00	0.6000	0.6000
T14	21	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	22	7/16" Fiber Cable (24 fibers Max)	60.00 - 80.00	0.6000	0.6000
T14	24	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T14	25	WG Rail 1.5x1.5x1/8	60.00 - 80.00	0.6000	0.6000
T14	32	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T14	33	Step Pegs (5/8" SR) 7-in. w/30" step	60.00 - 80.00	0.6000	0.6000
T14	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T14	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T14	45	Rung L2x1.5x1/8 (35"w, 48"s)	60.00 - 80.00	0.6000	0.6000
T14	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	60.00 - 80.00	0.6000	0.6000
T15	1	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	2	HB158-1-08U8-S8J18(1-5/8)	50.00 - 60.00	0.6000	0.6000
T15	3	WG Rail 1.5x1.5x1/4	50.00 - 60.00	0.6000	0.6000
T15	6	1 5/8" Hybrid	50.00 - 60.00	0.6000	0.6000
T15	9	WG Rail 1.5x1.5x3/16	50.00 - 60.00	0.6000	0.6000
T15	11	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	13	5/8" dia. coax	50.00 - 60.00	0.6000	0.6000
T15	14	1 1/4 Hybriflex Cable	50.00 - 60.00	0.6000	0.6000
T15	15	WG Rail 1.5x1.5x3/16	50.00 - 60.00	0.6000	0.6000
T15	21	LDF7-50A (1-5/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	22	7/16" Fiber Cable (24 fibers Max)	50.00 - 60.00	0.6000	0.6000
T15	24	LDF5-50A (7/8 FOAM)	50.00 - 60.00	0.6000	0.6000
T15	25	WG Rail 1.5x1.5x1/8	50.00 - 60.00	0.6000	0.6000
T15	32	Safety Line 3/8	50.00 - 60.00	0.6000	0.6000
T15	33	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	34	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	35	Step Pegs (5/8" SR) 7-in. w/30" step	50.00 - 60.00	0.6000	0.6000
T15	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T15	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T15	45	Rung L2x1.5x1/8 (35"w, 48"s)	50.00 - 60.00	0.6000	0.6000
T15	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	50.00 - 60.00	0.6000	0.6000
T16	1	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	2	HB158-1-08U8-S8J18(1-5/8)	40.00 - 50.00	0.6000	0.6000
T16	3	WG Rail 1.5x1.5x1/4	40.00 - 50.00	0.6000	0.6000
T16	6	1 5/8" Hybrid	40.00 - 50.00	0.6000	0.6000
T16	9	WG Rail 1.5x1.5x3/16	40.00 - 50.00	0.6000	0.6000
T16	11	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T16	13	5/8" dia. coax	40.00 - 50.00	0.6000	0.6000
T16	14	1 1/4 Hybriflex Cable	40.00 - 50.00	0.6000	0.6000
T16	15	WG Rail 1.5x1.5x3/16	40.00 - 50.00	0.6000	0.6000
T16	21	LDF7-50A (1-5/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	22	7/16" Fiber Cable (24 fibers Max)	40.00 - 50.00	0.6000	0.6000
T16	24	LDF5-50A (7/8 FOAM)	40.00 - 50.00	0.6000	0.6000
T16	25	WG Rail 1.5x1.5x1/8	40.00 - 50.00	0.6000	0.6000
T16	32	Safety Line 3/8	40.00 - 50.00	0.6000	0.6000
T16	33	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	34	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	35	Step Pegs (5/8" SR) 7-in. w/30" step	40.00 - 50.00	0.6000	0.6000
T16	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T16	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T16	45	Rung L2x1.5x1/8 (35"w, 48"s)	40.00 - 50.00	0.6000	0.6000
T16	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	40.00 - 50.00	0.6000	0.6000
T17	1	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	2	HB158-1-08U8-S8J18(1-5/8)	20.00 - 40.00	0.6000	0.6000
T17	3	WG Rail 1.5x1.5x1/4	20.00 - 40.00	0.6000	0.6000
T17	6	1 5/8" Hybrid	20.00 - 40.00	0.6000	0.6000
T17	9	WG Rail 1.5x1.5x3/16	20.00 - 40.00	0.6000	0.6000
T17	11	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	13	5/8" dia. coax	20.00 - 40.00	0.6000	0.6000
T17	14	1 1/4 Hybriflex Cable	20.00 - 40.00	0.6000	0.6000
T17	15	WG Rail 1.5x1.5x3/16	20.00 - 40.00	0.6000	0.6000
T17	21	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	22	7/16" Fiber Cable (24 fibers Max)	20.00 - 40.00	0.6000	0.6000
T17	24	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T17	25	WG Rail 1.5x1.5x1/8	20.00 - 40.00	0.6000	0.6000
T17	32	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T17	33	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	34	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	35	Step Pegs (5/8" SR) 7-in. w/30" step	20.00 - 40.00	0.6000	0.6000
T17	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T17	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T17	45	Rung L2x1.5x1/8 (35"w, 48"s)	20.00 - 40.00	0.6000	0.6000
T17	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	20.00 - 40.00	0.6000	0.6000
T18	1	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	2	HB158-1-08U8-S8J18(1-5/8)	8.00 - 20.00	0.6000	0.6000
T18	3	WG Rail 1.5x1.5x1/4	8.00 - 20.00	0.6000	0.6000
T18	6	1 5/8" Hybrid	8.00 - 20.00	0.6000	0.6000
T18	9	WG Rail 1.5x1.5x3/16	0.00 - 20.00	0.6000	0.6000
T18	11	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	13	5/8" dia. coax	10.00 - 20.00	0.6000	0.6000
T18	14	1 1/4 Hybriflex Cable	10.00 - 20.00	0.6000	0.6000
T18	15	WG Rail 1.5x1.5x3/16	0.00 - 20.00	0.6000	0.6000
T18	21	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T18	22	7/16" Fiber Cable (24 fibers Max)	8.00 - 20.00	0.6000	0.6000
T18	24	LDF5-50A (7/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T18	25	WG Rail 1.5x1.5x1/8	2.00 - 20.00	0.6000	0.6000
T18	32	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T18	33	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	34	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	35	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 20.00	0.6000	0.6000
T18	42	Rung L1.5x1.5x1/8 (36.25"w, 34"s)	8.00 - 20.00	0.6000	0.6000
T18	44	Rung L1.5x1.5x1/8 (36"w, 34"s)	0.00 - 20.00	0.6000	0.6000
T18	45	Rung L2x1.5x1/8 (35"w, 48"s)	0.00 - 20.00	0.6000	0.6000
T18	47	Rung L1.5x1.5x1/8 (36"w, 34"s)	2.00 - 20.00	0.6000	0.6000

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 lb
1.75" Dia x 5-ft Pipe	C	From Leg	2.25 0.00 0.00	0.0000	75.50	No Ice 1/2" Ice 1" Ice 2" Ice	0.88 1.32 1.63 2.28	0.88 1.32 1.63 2.28	12.00 19.06 29.51 61.18
GPS0015	C	From Leg	4.50 0.00 0.75	0.0000	75.50	No Ice 1/2" Ice 1" Ice 2" Ice	0.08 0.13 0.19 0.33	0.08 0.13 0.19 0.33	0.50 2.29 4.89 13.15
**** ****									
Sector Mount [SM 502-3]	C	None		0.0000	153.00	No Ice 1/2" Ice 1" Ice 2" Ice	33.02 47.36 61.70 90.38	33.02 47.36 61.70 90.38	1673.10 2223.90 2774.70 3876.30
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	5.00 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	6.71 7.66 8.49 10.20	78.90 144.31 217.47 390.34
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	5.00 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	6.71 7.66 8.49 10.20	78.90 144.31 217.47 390.34
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	5.00 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	6.71 7.66 8.49 10.20	78.90 144.31 217.47 390.34
DT465B-2XR w/ Mount Pipe	A	From Leg	5.00 0.00 0.00	0.0000	153.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.34 9.91 10.44 11.53	7.63 8.82 9.72 11.54	83.52 160.00 244.63 442.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
DT465B-2XR w/ Mount Pipe	B	From Leg	5.00		0.0000	153.00	No Ice	9.34	7.63	83.52
			0.00				1/2" Ice	9.91	8.82	160.00
			0.00				1" Ice	10.44	9.72	244.63
							2" Ice	11.53	11.54	442.00
DT465B-2XR w/ Mount Pipe	C	From Leg	5.00		0.0000	153.00	No Ice	9.34	7.63	83.52
			0.00				1/2" Ice	9.91	8.82	160.00
			0.00				1" Ice	10.44	9.72	244.63
							2" Ice	11.53	11.54	442.00
RRH2x50-08	A	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
							2" Ice	2.40	1.91	137.85
RRH2x50-08	B	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
							2" Ice	2.40	1.91	137.85
RRH2x50-08	C	From Leg	5.00		0.0000	153.00	No Ice	1.70	1.28	52.90
			0.00				1/2" Ice	1.86	1.43	69.91
			0.00				1" Ice	2.03	1.58	89.61
							2" Ice	2.40	1.91	137.85
800MHZ 2X50W RRH	A	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
							2" Ice	2.92	2.51	156.61
800MHZ 2X50W RRH	B	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
							2" Ice	2.92	2.51	156.61
800MHZ 2X50W RRH	C	From Leg	5.00		0.0000	153.00	No Ice	2.13	1.77	53.00
			0.00				1/2" Ice	2.32	1.95	74.19
			0.00				1" Ice	2.51	2.13	98.39
							2" Ice	2.92	2.51	156.61
PCS 1900MHz 4x45W-65MHz	A	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
							2" Ice	3.19	3.09	172.72
PCS 1900MHz 4x45W-65MHz	B	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
							2" Ice	3.19	3.09	172.72
PCS 1900MHz 4x45W-65MHz	C	From Leg	5.00		0.0000	153.00	No Ice	2.32	2.24	60.00
			0.00				1/2" Ice	2.53	2.44	83.13
			0.00				1" Ice	2.74	2.65	109.50
							2" Ice	3.19	3.09	172.72
TD-RRH8x20-25	A	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
							2" Ice	4.72	2.02	182.59
TD-RRH8x20-25	B	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
							2" Ice	4.72	2.02	182.59
TD-RRH8x20-25	C	From Leg	5.00		0.0000	153.00	No Ice	3.70	1.29	66.00
			0.00				1/2" Ice	3.95	1.46	89.94
			0.00				1" Ice	4.20	1.64	117.22
							2" Ice	4.72	2.02	182.59
****										

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(3) Sector Mounts 169-ft	C	None			0.0000	169.00	No Ice	21.56	21.56	1395.40
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
							2" Ice	54.40	54.40	4374.20
(2) BXA-70063/6CF w/ Mount Pipe	A	From Leg	5.00		0.0000	169.00	No Ice	7.59	5.18	38.90
			0.00				1/2" Ice	8.04	6.11	95.39
			0.00				1" Ice	8.50	6.92	159.37
							2" Ice	9.44	8.59	313.07
(2) DB844G65ZAXY w/Mount Pipe	B	From Leg	5.00		0.0000	169.00	No Ice	5.05	5.28	41.55
			0.00				1/2" Ice	5.68	6.31	92.81
			0.00				1" Ice	6.19	7.06	150.42
							2" Ice	7.23	8.58	288.32
(2) DB844G65ZAXY w/Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	5.05	5.28	41.55
			0.00				1/2" Ice	5.68	6.31	92.81
			0.00				1" Ice	6.19	7.06	150.42
							2" Ice	7.23	8.58	288.32
DB-B1/T1 w/ Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	4.88	4.18	57.55
			0.00				1/2" Ice	5.61	5.12	107.53
			0.00				1" Ice	6.16	5.77	163.14
							2" Ice	7.27	7.12	294.91
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64
							2" Ice	10.99	11.02	398.47
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64
							2" Ice	10.99	11.02	398.47
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	5.00		0.0000	169.00	No Ice	8.77	6.96	67.23
			0.00				1/2" Ice	9.34	8.18	136.85
			0.00				1" Ice	9.89	9.14	214.64
							2" Ice	10.99	11.02	398.47
RRH2x60-AWS	A	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
							2" Ice	4.58	2.79	173.43
RRH2x60-AWS	B	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
							2" Ice	4.58	2.79	173.43
RRH2x60-AWS	C	From Leg	5.00		0.0000	169.00	No Ice	3.50	1.82	60.00
			0.00				1/2" Ice	3.76	2.05	82.72
			0.00				1" Ice	4.03	2.29	109.06
							2" Ice	4.58	2.79	173.43
RRH2X60-PCS	A	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
							2" Ice	3.01	2.48	155.23
RRH2X60-PCS	B	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
							2" Ice	3.01	2.48	155.23
RRH2X60-PCS	C	From Leg	5.00		0.0000	169.00	No Ice	2.20	1.72	55.00
			0.00				1/2" Ice	2.39	1.90	75.35
			0.00				1" Ice	2.59	2.09	98.71
							2" Ice	3.01	2.48	155.23
BXA-70080/6CF w/ Mount	A	From Leg	5.00		0.0000	169.00	No Ice	7.59	5.54	42.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Pipe			0.00				1/2" Ice	8.04	6.48	100.79
			0.00				1" Ice	8.50	7.30	166.25
							2" Ice	9.44	8.99	323.17
DB846F65ZAXY w/Mount Pipe	B	From Leg	5.00	0.0000	169.00		No Ice	7.27	7.82	46.55
			0.00				1/2" Ice	7.83	9.01	113.93
			0.00				1" Ice	8.35	9.91	189.25
							2" Ice	9.40	11.73	367.34
DB846F65ZAXY w/Mount Pipe	C	From Leg	5.00	0.0000	169.00		No Ice	7.27	7.82	46.55
			0.00				1/2" Ice	7.83	9.01	113.93
			0.00				1" Ice	8.35	9.91	189.25
							2" Ice	9.40	11.73	367.34
(2) FD9R6004	A	From Leg	5.00	0.0000	169.00		No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
(2) FD9R6004	B	From Leg	5.00	0.0000	169.00		No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
(2) FD9R6004	C	From Leg	5.00	0.0000	169.00		No Ice	0.37	0.08	3.10
			0.00				1/2" Ice	0.45	0.14	5.40
			0.00				1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
****										
(3) Sector Mounts 185-ft	C	None			0.0000	185.00	No Ice	21.56	21.56	1395.40
							1/2" Ice	29.77	29.77	2140.10
							1" Ice	37.98	37.98	2884.80
							2" Ice	54.40	54.40	4374.20
Miscellaneous [NA 510-1]	C	None			0.0000	185.00	No Ice	6.00	6.00	255.70
							1/2" Ice	8.50	8.50	339.50
							1" Ice	11.00	11.00	409.12
							2" Ice	16.00	16.00	562.54
7770.00 w/ Mount Pipe	A	From Leg	5.00	0.0000	185.00		No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42
			3.00				1" Ice	6.77	5.92	160.42
							2" Ice	7.71	7.41	293.10
7770.00 w/ Mount Pipe	B	From Leg	5.00	0.0000	185.00		No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42
			3.00				1" Ice	6.77	5.92	160.42
							2" Ice	7.71	7.41	293.10
7770.00 w/ Mount Pipe	C	From Leg	5.00	0.0000	185.00		No Ice	5.84	4.35	56.90
			0.00				1/2" Ice	6.32	5.20	105.42
			3.00				1" Ice	6.77	5.92	160.42
							2" Ice	7.71	7.41	293.10
(2) LGP13519	A	From Leg	5.00	0.0000	185.00		No Ice	0.30	0.29	8.04
			0.00				1/2" Ice	0.38	0.41	12.97
			3.00				1" Ice	0.47	0.54	19.68
							2" Ice	0.67	0.88	39.83
(2) LGP13519	B	From Leg	5.00	0.0000	185.00		No Ice	0.30	0.29	8.04
			0.00				1/2" Ice	0.38	0.41	12.97
			3.00				1" Ice	0.47	0.54	19.68
							2" Ice	0.67	0.88	39.83
(2) LGP13519	C	From Leg	5.00	0.0000	185.00		No Ice	0.30	0.29	8.04
			0.00				1/2" Ice	0.38	0.41	12.97
			3.00				1" Ice	0.47	0.54	19.68
							2" Ice	0.67	0.88	39.83
RRUS-32 B30	A	From Leg	5.00	0.0000	185.00		No Ice	3.31	2.42	77.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1/2" Ice	3.56	2.64	104.93
			3.00				1" Ice	3.81	2.86	136.47
							2" Ice	4.33	3.32	211.15
RRUS-32 B30	B	From Leg	5.00	0.0000	185.00		No Ice	3.31	2.42	77.00
			0.00				1/2" Ice	3.56	2.64	104.93
			3.00				1" Ice	3.81	2.86	136.47
							2" Ice	4.33	3.32	211.15
RRUS-32 B30	C	From Leg	5.00	0.0000	185.00		No Ice	3.31	2.42	77.00
			0.00				1/2" Ice	3.56	2.64	104.93
			3.00				1" Ice	3.81	2.86	136.47
							2" Ice	4.33	3.32	211.15
DC6-48-60-18-8F	A	From Leg	0.50	0.0000	185.00		No Ice	1.21	1.21	32.80
			0.00				1/2" Ice	1.89	1.89	54.76
			3.00				1" Ice	2.11	2.11	79.58
							2" Ice	2.57	2.57	138.43
DC6-48-60-18-8F	B	From Leg	0.50	0.0000	185.00		No Ice	1.21	1.21	32.80
			0.00				1/2" Ice	1.89	1.89	54.76
			3.00				1" Ice	2.11	2.11	79.58
							2" Ice	2.57	2.57	138.43
DC6-48-60-0-8C-EV	C	From Leg	0.50	0.0000	185.00		No Ice	2.74	4.78	26.20
			0.00				1/2" Ice	2.96	5.06	63.26
			3.00				1" Ice	3.20	5.35	104.40
							2" Ice	3.68	5.95	199.70
SBNHH-1D65A w/ Mount Pipe	A	From Leg	5.00	0.0000	185.00		No Ice	6.29	5.59	68.24
			0.00				1/2" Ice	6.74	6.31	126.00
			3.00				1" Ice	7.20	7.03	191.24
							2" Ice	8.14	8.51	342.55
SBNHH-1D65A w/ Mount Pipe	B	From Leg	5.00	0.0000	185.00		No Ice	6.29	5.59	68.24
			0.00				1/2" Ice	6.74	6.31	126.00
			3.00				1" Ice	7.20	7.03	191.24
							2" Ice	8.14	8.51	342.55
SBNHH-1D65A w/ Mount Pipe	C	From Leg	5.00	0.0000	185.00		No Ice	6.29	5.59	68.24
			0.00				1/2" Ice	6.74	6.31	126.00
			3.00				1" Ice	7.20	7.03	191.24
							2" Ice	8.14	8.51	342.55
(2) DMP65R-BU6D w/ Mount Pipe	A	From Leg	5.00	0.0000	185.00		No Ice	12.95	7.26	104.71
			0.00				1/2" Ice	13.55	8.43	196.98
			3.00				1" Ice	14.11	9.31	297.77
							2" Ice	15.26	11.13	528.51
(2) DMP65R-BU6D w/ Mount Pipe	B	From Leg	5.00	0.0000	185.00		No Ice	12.95	7.26	104.71
			0.00				1/2" Ice	13.55	8.43	196.98
			3.00				1" Ice	14.11	9.31	297.77
							2" Ice	15.26	11.13	528.51
(2) DMP65R-BU8D w/ Mount Pipe	C	From Leg	5.00	0.0000	185.00		No Ice	18.11	10.26	128.55
			0.00				1/2" Ice	18.84	11.78	249.84
			3.00				1" Ice	19.59	13.33	381.67
							2" Ice	21.01	15.67	681.31
RRUS 4449 B5/B12	A	From Leg	5.00	0.0000	185.00		No Ice	1.97	1.41	71.00
			0.00				1/2" Ice	2.14	1.56	89.51
			3.00				1" Ice	2.33	1.73	110.84
							2" Ice	2.72	2.07	162.74
RRUS 4449 B5/B12	B	From Leg	5.00	0.0000	185.00		No Ice	1.97	1.41	71.00
			0.00				1/2" Ice	2.14	1.56	89.51
			3.00				1" Ice	2.33	1.73	110.84
							2" Ice	2.72	2.07	162.74
RRUS 4449 B5/B12	C	From Leg	5.00	0.0000	185.00		No Ice	1.97	1.41	71.00
			0.00				1/2" Ice	2.14	1.56	89.51

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			3.00				1" Ice	2.33	1.73	110.84
							2" Ice	2.72	2.07	162.74
RRUS 4478 B14	A	From Leg	5.00		0.0000	185.00	No Ice	1.84	1.06	59.90
			0.00				1/2" Ice	2.01	1.20	75.78
			3.00				1" Ice	2.19	1.34	94.29
							2" Ice	2.57	1.66	139.98
RRUS 4478 B14	B	From Leg	5.00		0.0000	185.00	No Ice	1.84	1.06	59.90
			0.00				1/2" Ice	2.01	1.20	75.78
			3.00				1" Ice	2.19	1.34	94.29
							2" Ice	2.57	1.66	139.98
RRUS 4478 B14	C	From Leg	5.00		0.0000	185.00	No Ice	1.84	1.06	59.90
			0.00				1/2" Ice	2.01	1.20	75.78
			3.00				1" Ice	2.19	1.34	94.29
							2" Ice	2.57	1.66	139.98
RRUS 8843 B2/B66A	A	From Leg	5.00		0.0000	185.00	No Ice	1.64	1.35	72.00
			0.00				1/2" Ice	1.80	1.50	89.60
			3.00				1" Ice	1.97	1.65	109.91
							2" Ice	2.32	1.99	159.50
RRUS 8843 B2/B66A	B	From Leg	5.00		0.0000	185.00	No Ice	1.64	1.35	72.00
			0.00				1/2" Ice	1.80	1.50	89.60
			3.00				1" Ice	1.97	1.65	109.91
							2" Ice	2.32	1.99	159.50
RRUS 8843 B2/B66A	C	From Leg	5.00		0.0000	185.00	No Ice	1.64	1.35	72.00
			0.00				1/2" Ice	1.80	1.50	89.60
			3.00				1" Ice	1.97	1.65	109.91
							2" Ice	2.32	1.99	159.50
****										
Sector Mount [SM 802-3]	C	None			0.0000	195.00	No Ice	24.41	24.41	930.00
							1/2" Ice	31.39	31.39	1362.00
							1" Ice	38.37	38.37	1794.00
							2" Ice	52.33	52.33	2658.00
HSS Top Mount	C	None			0.0000	195.00	No Ice	8.08	8.08	328.90
							1/2" Ice	9.70	9.70	415.20
							1" Ice	11.32	11.32	501.50
							2" Ice	14.56	14.56	674.10
KRY 112 71	A	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
KRY 112 71	B	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
KRY 112 71	C	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
APXVAARR24_43-U-NA20 w/ MP	A	From Leg	3.00		0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00				1/2" Ice	20.89	12.21	290.89
			0.00				1" Ice	21.55	13.49	435.20
							2" Ice	22.88	15.72	759.63
APXVAARR24_43-U-NA20 w/ MP	B	From Leg	3.00		0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00				1/2" Ice	20.89	12.21	290.89
			0.00				1" Ice	21.55	13.49	435.20
							2" Ice	22.88	15.72	759.63
APXVAARR24_43-U-NA20 w/ MP	C	From Leg	3.00		0.0000	195.00	No Ice	20.24	10.79	157.20
			0.00				1/2" Ice	20.89	12.21	290.89

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1" Ice	21.55	13.49	435.20
							2" Ice	22.88	15.72	759.63
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	3.00		0.0000	195.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
			0.00				1" Ice	7.65	7.58	281.89
							2" Ice	8.57	9.06	441.43
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	3.00		0.0000	195.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
			0.00				1" Ice	7.65	7.58	281.89
							2" Ice	8.57	9.06	441.43
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	3.00		0.0000	195.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
			0.00				1" Ice	7.65	7.58	281.89
							2" Ice	8.57	9.06	441.43
RADIO 4449 B12/B71	A	From Leg	3.00		0.0000	195.00	No Ice	1.64	1.15	75.00
			0.00				1/2" Ice	1.80	1.29	91.07
			0.00				1" Ice	1.97	1.44	109.76
							2" Ice	2.33	1.75	155.77
RADIO 4449 B12/B71	B	From Leg	3.00		0.0000	195.00	No Ice	1.64	1.15	75.00
			0.00				1/2" Ice	1.80	1.29	91.07
			0.00				1" Ice	1.97	1.44	109.76
							2" Ice	2.33	1.75	155.77
RADIO 4449 B12/B71	C	From Leg	3.00		0.0000	195.00	No Ice	1.64	1.15	75.00
			0.00				1/2" Ice	1.80	1.29	91.07
			0.00				1" Ice	1.97	1.44	109.76
							2" Ice	2.33	1.75	155.77
KRY 112 71	A	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
KRY 112 71	B	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
KRY 112 71	C	From Leg	3.00		0.0000	195.00	No Ice	0.63	0.61	18.07
			0.00				1/2" Ice	0.75	0.79	26.97
			0.00				1" Ice	0.89	0.99	38.22
							2" Ice	1.18	1.44	69.33
AIR6449 B41 w/ Mount Pipe	A	From Leg	3.00		0.0000	195.00	No Ice	5.89	3.28	117.72
			0.00				1/2" Ice	6.26	3.74	166.88
			0.00				1" Ice	6.63	4.22	221.50
							2" Ice	7.41	5.21	349.57
AIR6449 B41 w/ Mount Pipe	B	From Leg	3.00		0.0000	195.00	No Ice	5.89	3.28	117.72
			0.00				1/2" Ice	6.26	3.74	166.88
			0.00				1" Ice	6.63	4.22	221.50
							2" Ice	7.41	5.21	349.57
AIR6449 B41 w/ Mount Pipe	C	From Leg	3.00		0.0000	195.00	No Ice	5.89	3.28	117.72
			0.00				1/2" Ice	6.26	3.74	166.88
			0.00				1" Ice	6.63	4.22	221.50
							2" Ice	7.41	5.21	349.57
RADIO 4415	A	From Leg	3.00		0.0000	195.00	No Ice	1.86	0.87	49.60
			0.00				1/2" Ice	2.03	1.00	64.16
			0.00				1" Ice	2.20	1.14	81.26
							2" Ice	2.58	1.44	123.89
RADIO 4415	B	From Leg	3.00		0.0000	195.00	No Ice	1.86	0.87	49.60
			0.00				1/2" Ice	2.03	1.00	64.16
			0.00				1" Ice	2.20	1.14	81.26

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 lb
						2" Ice	2.58	1.44	123.89
RADIO 4415	C	From Leg	3.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.14 1.44	49.60 64.16 81.26 123.89
E14 F05P85 / SDX1926Q-43	A	From Leg	3.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	6.17 8.64 12.22 23.45
E14 F05P85 / SDX1926Q-43	B	From Leg	3.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	6.17 8.64 12.22 23.45
E14 F05P85 / SDX1926Q-43	C	From Leg	3.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	6.17 8.64 12.22 23.45
****									
TMO Future Loading	C	None		0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.63 7.31 7.99 9.35	6.63 7.31 7.99 9.35	138.18 201.85 265.51 392.85
*****									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	7.070	42	0.4208	0.0436
T2	180 - 175	5.692	42	0.3920	0.0252
T3	175 - 170	5.284	42	0.3662	0.0248
T4	170 - 160	4.914	42	0.3380	0.0240
T5	160 - 150	4.231	42	0.3045	0.0232
T6	150 - 140	3.634	42	0.2582	0.0221
T7	140 - 133.333	3.118	42	0.2266	0.0207
T8	133.333 - 126.667	2.803	42	0.2158	0.0195
T9	126.667 - 120	2.502	42	0.2047	0.0182
T10	120 - 113.333	2.214	42	0.1935	0.0165
T11	113.333 - 106.667	1.949	42	0.1761	0.0153
T12	106.667 - 100	1.709	42	0.1586	0.0142
T13	100 - 80	1.492	42	0.1411	0.0128
T14	80 - 60	0.935	42	0.1150	0.0097
T15	60 - 50	0.502	42	0.0800	0.0063
T16	50 - 40	0.341	47	0.0626	0.0049
T17	40 - 20	0.218	47	0.0452	0.0035
T18	20 - 0	0.062	47	0.0225	0.0017

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	42	7.070	0.4208	0.0436	26368

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	(3) Sector Mounts 185-ft	42	6.133	0.4076	0.0278	13184
169.00	(3) Sector Mounts 169-ft	42	4.842	0.3335	0.0238	16626
153.00	Sector Mount [SM 502-3]	42	3.804	0.2724	0.0225	13558
75.50	1.75" Dia x 5-ft Pipe	42	0.827	0.1085	0.0089	39427

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 180	26.896	18	1.6094	0.1398
T2	180 - 175	21.649	18	1.4893	0.0960
T3	175 - 170	20.096	18	1.3922	0.0946
T4	170 - 160	18.689	18	1.2844	0.0912
T5	160 - 150	16.094	18	1.1562	0.0882
T6	150 - 140	13.830	18	0.9797	0.0841
T7	140 - 133.333	11.870	18	0.8598	0.0789
T8	133.333 - 126.667	10.672	18	0.8187	0.0742
T9	126.667 - 120	9.529	18	0.7768	0.0691
T10	120 - 113.333	8.436	18	0.7346	0.0627
T11	113.333 - 106.667	7.431	18	0.6686	0.0583
T12	106.667 - 100	6.517	18	0.6022	0.0539
T13	100 - 80	5.693	18	0.5360	0.0487
T14	80 - 60	3.575	18	0.4370	0.0368
T15	60 - 50	1.924	18	0.3042	0.0241
T16	50 - 40	1.308	18	0.2380	0.0186
T17	40 - 20	0.837	18	0.1722	0.0132
T18	20 - 0	0.238	18	0.0856	0.0063

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Sector Mount [SM 802-3]	18	26.896	1.6094	0.1398	7151
185.00	(3) Sector Mounts 185-ft	18	23.328	1.5517	0.1005	3575
169.00	(3) Sector Mounts 169-ft	18	18.417	1.2673	0.0906	4404
153.00	Sector Mount [SM 502-3]	18	14.473	1.0337	0.0855	3578
75.50	1.75" Dia x 5-ft Pipe	18	3.160	0.4123	0.0340	10441

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	0.7500	4	4624.80	30101.40	0.154	1.05	Bolt Tension
T2	180	Diagonal	A325N	0.5000	1	3511.25	4689.84	0.749	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	686.02	6830.86	0.100	1.05	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T3	175	Diagonal	A325X	0.5000	1	3553.77	7245.70	0.490	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	874.15	6830.86	0.128	1.05	Member Block Shear
T4	170	Leg	A325N	0.7500	6	10739.30	30101.40	0.357	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	4796.60	8265.00	0.580	1.05	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1273.88	6830.86	0.186	1.05	Member Block Shear
T5	160	Diagonal	A325X	0.5000	1	5650.78	8265.00	0.684	1.05	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	1651.00	6830.86	0.242	1.05	Member Block Shear
T6	150	Leg	A325N	1.0000	6	17598.60	54517.00	0.323	1.05	Bolt Tension
		Diagonal	A325N	0.5000	1	5357.72	8265.00	0.648	1.05	Gusset Bearing
		Secondary Horizontal	A325N	0.6250	1	2061.48	6830.86	0.302	1.05	Member Block Shear
T7	140	Diagonal	A325X	0.6250	1	5458.45	12712.50	0.429	1.05	Member Block Shear
T8	133.333	Diagonal	A325X	0.6250	1	5554.49	12712.50	0.437	1.05	Member Block Shear
T9	126.667	Leg	A325N	1.0000	8	17815.40	54517.00	0.327	1.05	Bolt Tension
		Diagonal	A325N	0.6250	1	5462.79	7830.00	0.698	1.05	Member Bearing
T10	120	Diagonal	A325X	0.6250	1	6508.59	13050.00	0.499	1.05	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	2947.17	7830.00	0.376	1.05	Member Bearing
T11	113.333	Diagonal	A325X	0.6250	1	6510.85	13050.00	0.499	1.05	Member Bearing
		Secondary Horizontal	A325N	0.6250	1	3168.08	7830.00	0.405	1.05	Member Bearing
T12	106.667	Leg	A325N	1.0000	8	21839.40	54517.00	0.401	1.05	Bolt Tension
		Diagonal	A325X	0.6250	1	6682.77	12712.50	0.526	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	3373.44	7830.00	0.431	1.05	Member Bearing
T13	100	Leg	A325N	1.2500	8	25812.20	87219.80	0.296	1.05	Bolt Tension
		Diagonal	A325N	0.6250	2	3397.52	11622.70	0.292	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	1	4010.32	13898.40	0.289	1.05	Member Block Shear
T14	80	Leg	A325N	1.2500	8	29625.00	87219.80	0.340	1.05	Bolt Tension
		Diagonal	A325N	0.6250	2	3585.50	11622.70	0.308	1.05	Member Block Shear
T15	60	Diagonal	A325N	0.6250	2	4926.55	13805.80	0.357	1.05	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	4831.88	13805.80	0.350	1.05	Bolt Shear
T16	50	Leg	A325N	1.2500	8	32734.00	87219.80	0.375	1.05	Bolt Tension
		Diagonal	A325N	0.6250	2	4779.67	13805.80	0.346	1.05	Bolt Shear
		Secondary Horizontal	A325X	0.7500	1	5128.82	14355.00	0.357	1.05	Member Bearing
T17	40	Leg	A325N	1.2500	8	36243.40	87219.80	0.416	1.05	Bolt Tension
		Diagonal	A325N	0.6250	2	4503.04	13805.80	0.326	1.05	Bolt Shear
T18	20	Leg	A36	1.5000	8	40302.30	61128.30	0.659	1.05	Bolt Tension
		Diagonal	A325N	0.6250	2	5063.48	13805.80	0.367	1.05	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4 K=1.00	1.7072	-35505.80	70532.50	0.503 [1]
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.67	33.8 K=1.00	1.7072	-39558.20	77102.10	0.513 [1]
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.65	33.5 K=1.00	1.7072	-50338.60	77205.80	0.652 [1]
T4	170 - 160	2-1/2SCH40 w/ 3SCH80 Half Sleeve	10.02	2.62	34.2 K=1.00	3.2590	-73389.70	96687.00	0.759 [1]
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.60	23.4 K=1.00	2.6795	-95053.60	126932.00	0.749 [1]
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.59	23.8 K=1.00	4.2666	-118794.00	184209.00	0.645 [1]
T7	140 - 133.333	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-132026.00	306442.00	0.431 [1]
T8	133.333 - 126.667	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-145555.00	306442.00	0.475 [1]
T9	126.667 - 120	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4 K=1.00	8.5023	-158942.00	306442.00	0.519 [1]
T10	120 - 113.333	Pipe 6 STD	6.68	3.45	18.4 K=1.00	5.5813	-169825.00	268817.00	0.632 [1]
T11	113.333 - 106.667	Pipe 6 STD	6.68	3.44	18.4 K=1.00	5.5813	-182505.00	268848.00	0.679 [1]
T12	106.667 - 100	Pipe 6 STD	6.68	3.44	18.4 K=1.00	5.5813	-194371.00	268875.00	0.723 [1]
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.42	19.5 K=1.00	11.1800	-231247.00	412800.00	0.560 [1]
T14	80 - 60	Pipe 8 STD	20.03	6.68	27.3 K=1.00	8.3993	-266353.00	391613.00	0.680 [1]
T15	60 - 50	Pipe 8 STD	10.02	5.16	21.1 K=1.00	8.3993	-278579.00	401143.00	0.694 [1]
T16	50 - 40	Pipe 8 STD	10.02	5.16	21.1 K=1.00	8.3993	-295688.00	401194.00	0.737 [1]
T17	40 - 20	Pipe 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-329381.00	549063.00	0.600 [1]
T18	20 - 0	Pipe 8 EH	20.03	9.97	41.6 K=1.00	12.7627	-360201.00	549704.00	0.655 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.03	124.0 K=1.00	0.5273	-4224.48	9812.52	0.431 [1]
T3	175 - 170	L2x2x3/16	6.56	3.18	102.5 K=1.06	0.7150	-3381.05	17231.70	0.196 [1]
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4	6.90	3.36	88.3 K=1.00	1.0547	-5241.47	28278.10	0.185 [1]

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T5	160 - 150	2L 'a' > 19.4307 in - 83 2L2x2x3/16x1/4	8.01	3.83	76.6 K=1.00	1.4297	-5922.45	40630.70	0.146 [1]
T6	150 - 140	2L 'a' > 22.0154 in - 96 2L2x2x3/16x1/4	8.81	4.22	84.4 K=1.00	1.4297	-5542.56	38728.60	0.143 [1]
T7	140 - 133.333	2L 'a' > 24.2504 in - 114 L2 1/2x2 1/2x1/4	10.29	4.92	120.3 K=1.00	1.1900	-5557.62	23336.80	0.238 [1]
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.18	126.7 K=1.00	1.1900	-5710.79	21217.30	0.269 [1]
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.47	132.6 K=1.00	0.9023	-5535.49	14691.40	0.377 [1]
T10	120 - 113.333	L3x3x1/4	11.88	5.67	117.3 K=1.01	1.4400	-7113.28	29417.90	0.242 [1]
T11	113.333 - 106.667	L3x3x1/4	12.44	5.95	122.1 K=1.00	1.4400	-6998.17	27519.70	0.254 [1]
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	152.5 K=1.00	1.1900	-7341.78	14641.70	0.501 [1]
T13	100 - 80	L3 1/2x3 1/2x1/4	14.17	6.72	117.1 K=1.01	1.6900	-7480.95	34593.90	0.216 [1]
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	7.88	132.4 K=0.97	1.6900	-7141.59	27606.40	0.259 [1]
T15	60 - 50	L3x3x5/16	18.87	9.11	171.5 K=0.91	1.7800	-9853.11	17330.30	0.569 [1]
T16	50 - 40	L3x3x5/16	19.73	9.54	178.2 K=0.91	1.7800	-9559.33	16044.50	0.596 [1]
T17	40 - 20	L4x4x3/8	21.47	10.41	149.5 K=0.94	2.8600	-9006.08	36647.10	0.246 [1]
T18	20 - 0	L5x5x5/16	23.24	11.30	132.5 K=0.97	3.0300	-10127.00	49368.70	0.205 [1]

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Compression)

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2 K=0.96	0.5273	-5090.96	9181.68	0.554 [1]

[1] $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	L2x2x3/16	3.73	1.63	84.8 K=1.71	0.7150	-686.02	19923.20	0.034 [1]
T3	175 - 170	L2x2x3/16	4.24	1.88	88.6 K=1.55	0.7150	-874.15	19386.80	0.045 [1]
T4	170 - 160	L2x2x3/16	5.24	2.38	96.2	0.7150	-1273.88	18244.10	0.070 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	160 - 150	L2x2x3/16	6.24	2.83	K=1.33 103.2 K=1.20	0.7150	-1651.00	17128.20	0.096 [1]
T6	150 - 140	L2x2x3/16	7.24	3.31	110.5 K=1.09	0.7150	-2061.48	15864.80	0.130 [1]
T10	120 - 113.333	L3x3x3/16	9.82	4.52	105.5 K=1.16	1.0900	-2947.17	25103.30	0.117 [1]
T11	113.333 - 106.667	L3x3x3/16	10.49	4.85	108.8 K=1.11	1.0900	-3168.08	24274.30	0.131 [1]
T12	106.667 - 100	L3x3x3/16	11.16	5.18	112.2 K=1.08	1.0900	-3373.44	23419.30	0.144 [1]
T13	100 - 80	L3x3x1/4	13.16	6.12	125.4 K=1.00	1.4400	-4010.32	26189.00	0.153 [1]
T15	60 - 50	L4x4x3/8	15.98	7.51	117.2 K=1.02	2.8600	-4831.88	58485.50	0.083 [1]
T16	50 - 40	L4x4x1/4	16.99	7.99	120.6 K=1.00	1.9400	-5128.82	37678.30	0.136 [1]

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2 K=0.96	0.5273	-1544.87	9181.68	0.168 [1]

[1] $P_u / \phi P_n$ controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	128.2 K=0.96	0.5273	-3089.00	9181.68	0.336 [1]

[1] $P_u / \phi P_n$ controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	PIPE 2.5 STD (SCH 40)	15.00	3.75	47.4	1.7072	18499.20	84508.30	0.219 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	PIPE 2.5 STD (SCH 40)	5.01	2.34	29.5	1.7072	34995.80	84508.30	0.414 [1]
T3	175 - 170	PIPE 2.5 STD (SCH 40)	5.01	2.36	29.8	1.7072	44074.40	84508.30	0.522 [1]
T4	170 - 160	2-1/2SCH40 w/ 3SCH80 Half Sleeve	10.02	2.38	31.1	3.2590	64480.80	102659.00	0.628 [1]
T5	160 - 150	Pipe 3.5 Std (SCH40)	10.02	2.40	21.6	2.6795	84218.80	132637.00	0.635 [1]
T6	150 - 140	3.5SCH40 w/ 4SCH40 Half Sleeve	10.02	2.42	22.2	4.2666	105683.00	191997.00	0.550 [1]
T7	140 - 133.333	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	117842.00	351995.00	0.335 [1]
T8	133.333 - 126.667	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	130322.00	351995.00	0.370 [1]
T9	126.667 - 120	5 STD w/ 6 XH Half Sleeve	6.68	6.68	45.4	8.5023	142523.00	351995.00	0.405 [1]
T10	120 - 113.333	Pipe 6 STD	6.68	3.23	17.2	5.5813	152774.00	276277.00	0.553 [1]
T11	113.333 - 106.667	Pipe 6 STD	6.68	3.23	17.3	5.5813	164162.00	276277.00	0.594 [1]
T12	106.667 - 100	Pipe 6 STD	6.68	3.24	17.3	5.5813	174926.00	276277.00	0.633 [1]
T13	100 - 80	6 STD w/ 7 XH Half Sleeve	20.03	3.25	18.6	11.1800	206696.00	422604.00	0.489 [1]
T14	80 - 60	Pipe 8 STD	20.03	6.68	27.3	8.3993	237000.00	415763.00	0.570 [1]
T15	60 - 50	Pipe 8 STD	10.02	4.85	19.8	8.3993	247658.00	415763.00	0.596 [1]
T16	50 - 40	Pipe 8 STD	10.02	4.86	19.9	8.3993	262175.00	415763.00	0.631 [1]
T17	40 - 20	Pipe 8 EH	20.03	10.02	41.8	12.7627	289947.00	631755.00	0.459 [1]
T18	20 - 0	Pipe 8 EH	20.03	0.08	0.3	12.7627	322418.00	631755.00	0.510 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	5/8	5.13	4.78	366.9	0.3068	9238.10	9940.20	0.929 [1]
T2	180 - 175	L1 1/2x1 1/2x3/16	6.25	3.03	82.4	0.3076	3511.25	13381.30	0.262 [1]
T3	175 - 170	L2x2x3/16	6.56	3.18	64.0	0.4484	3553.77	19503.60	0.182 [1]
T4	170 - 160	2L1 1/2x1 1/2x3/16x1/4 2L 'a' > 19.4307 in - 83	6.90	3.36	91.1	0.6152	4796.60	26762.70	0.179 [1]
T5	160 - 150	2L2x2x3/16x1/4 2L 'a' > 22.0154 in - 96	8.01	3.83	76.8	0.8965	5650.78	38997.10	0.145 [1]
T6	150 - 140	2L2x2x3/16x1/4 2L 'a' > 23.1042 in - 122	8.40	4.02	80.3	0.8965	5357.72	38997.10	0.137 [1]
T7	140 - 133.333	L2 1/2x2 1/2x1/4	10.29	4.92	78.9	0.7519	5458.45	32706.60	0.167 [1]
T8	133.333 - 126.667	L2 1/2x2 1/2x1/4	10.80	5.18	83.0	0.7519	5554.49	32706.60	0.170 [1]
T9	126.667 - 120	L2 1/2x2 1/2x3/16	11.34	5.47	86.2	0.5713	5462.79	24851.10	0.220 [1]
T10	120 - 113.333	L3x3x1/4	11.88	5.67	75.3	0.9394	6508.59	40862.80	0.159 [1]
T11	113.333 - 106.667	L3x3x1/4	12.44	5.95	78.9	0.9394	6510.85	40862.80	0.159 [1]
T12	106.667 - 100	L2 1/2x2 1/2x1/4	13.01	6.24	99.5	0.7519	6682.77	32706.60	0.204 [1]
T13	100 - 80	L3 1/2x3 1/2x1/4	14.17	6.72	76.1	1.1269	6795.03	49019.10	0.139 [1]
T14	80 - 60	L3 1/2x3 1/2x1/4	16.57	7.88	88.9	1.1269	7171.00	49019.10	0.146 [1]
T15	60 - 50	L3x3x5/16	18.87	9.11	121.6	1.1592	8831.85	50426.00	0.175 [1]
T16	50 - 40	L3x3x5/16	19.73	9.54	127.3	1.1592	8541.87	50426.00	0.169 [1]
T17	40 - 20	L4x4x3/8	20.59	9.98	99.3	1.9341	8225.59	84131.70	0.098 [1]
T18	20 - 0	L5x5x5/16	23.24	11.30	87.9	2.0967	9047.09	91207.30	0.099 [1]

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	0.5273	614.98	17085.90	0.036 [1]

[1] $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 175	L2x2x3/16	3.73	1.63	67.9	0.4308	686.02	18739.00	0.037 [1]
T3	175 - 170	L2x2x3/16	4.24	1.88	77.7	0.4308	874.15	18739.00	0.047 [1]
T4	170 - 160	L2x2x3/16	5.24	2.38	97.2	0.4308	1273.88	18739.00	0.068 [1]
T5	160 - 150	L2x2x3/16	6.24	2.83	114.9	0.4308	1651.00	18739.00	0.088 [1]
T6	150 - 140	L2x2x3/16	7.24	3.31	133.5	0.4308	2061.48	18739.00	0.110 [1]
T10	120 - 113.333	L3x3x3/16	9.82	4.52	118.5	0.7120	2947.17	30973.40	0.095 [1]
T11	113.333 - 106.667	L3x3x3/16	10.49	4.85	127.0	0.7120	3168.08	30973.40	0.102 [1]
T12	106.667 - 100	L3x3x3/16	11.16	5.18	135.5	0.7120	3373.44	30973.40	0.109 [1]
T13	100 - 80	L3x3x1/4	13.16	6.12	162.3	0.9159	4010.32	39843.30	0.101 [1]
T15	60 - 50	L4x4x3/8	15.98	7.51	148.9	1.9341	4831.88	84131.70	0.057 [1]
T16	50 - 40	L4x4x1/4	16.99	7.99	156.2	1.2909	5128.82	56155.80	0.091 [1]

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 180	L1 1/2x1 1/2x3/16	3.50	3.26	85.7	0.5273	770.53	17085.90	0.045 [1]

[1] $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	195 - 180	Leg	PIPE 2.5 STD (SCH 40)	1	-35505.80	74059.12	47.9	Pass
T2	180 - 175	Leg	PIPE 2.5 STD (SCH 40)	43	-39558.20	80957.20	48.9	Pass
T3	175 - 170	Leg	PIPE 2.5 STD (SCH 40)	55	-50338.60	81066.08	62.1	Pass
T4	170 - 160	Leg	2-1/2SCH40 w/ 3SCH80 Half Sleeve	67	Note 1	Note 1	75.6	Pass
T5	160 - 150	Leg	Pipe 3.5 Std (SCH40)	88	-95053.60	133278.59	71.3	Pass
T6	150 - 140	Leg	3.5SCH40 w/ 4SCH40 Half Sleeve	109	Note 1	Note 1	69.4	Pass
T7	140 - 133.333	Leg	5 STD w/ 6 XH Half Sleeve	130	Note 1	Note 1	50.3	Pass
T8	133.333 - 126.667	Leg	5 STD w/ 6 XH Half Sleeve	139	Note 1	Note 1	50.3	Pass

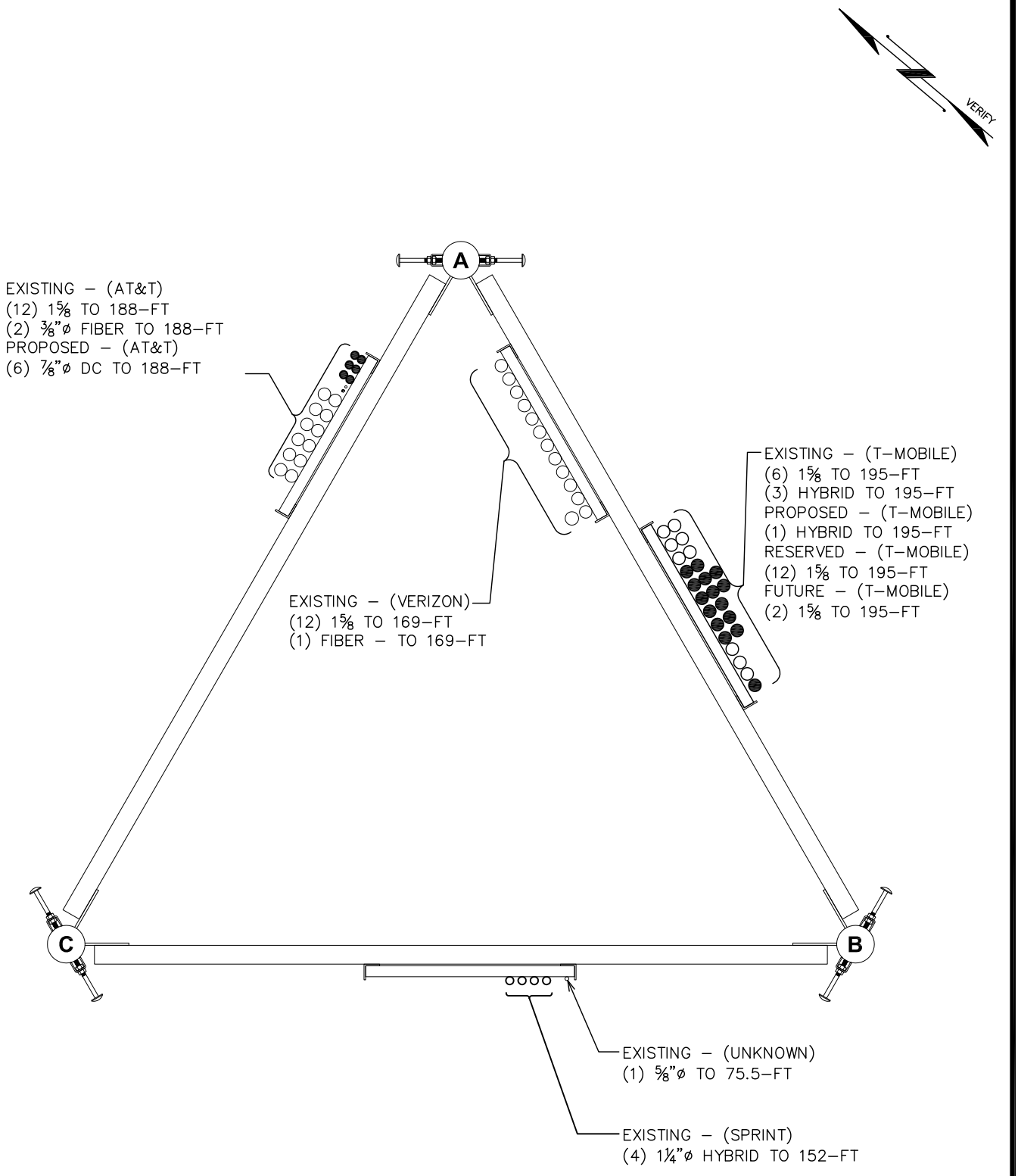
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T9	126.667 - 120	Leg	5 STD w/ 6 XH Half Sleeve	148	Note 1	Note 1	50.3	Pass
T10	120 - 113.333	Leg	Pipe 6 STD	157	-169825.00	282257.84	60.2	Pass
T11	113.333 - 106.667	Leg	Pipe 6 STD	169	-182505.00	282290.39	64.7	Pass
T12	106.667 - 100	Leg	Pipe 6 STD	181	-194371.00	282318.74	68.8	Pass
T13	100 - 80	Leg	6 STD w/ 7 XH Half Sleeve	193	Note 1	Note 1	53.8	Pass
T14	80 - 60	Leg	Pipe 8 STD	223	-266353.00	411193.63	64.8	Pass
T15	60 - 50	Leg	Pipe 8 STD	244	-278579.00	421200.13	66.1	Pass
T16	50 - 40	Leg	Pipe 8 STD	256	-295688.00	421253.68	70.2	Pass
T17	40 - 20	Leg	Pipe 8 EH	268	-329381.00	576516.12	57.1	Pass
T18	20 - 0	Leg	Pipe 8 EH	283	-360201.00	577189.17	62.4 62.8 (b)	Pass
T1	195 - 180	Diagonal	5/8	15	9238.10	10437.21	88.5	Pass
T2	180 - 175	Diagonal	L1 1/2x1 1/2x3/16	51	-4224.48	10303.15	41.0 71.3 (b)	Pass
T3	175 - 170	Diagonal	L2x2x3/16	63	-3381.05	18093.28	18.7 46.7 (b)	Pass
T4	170 - 160	Diagonal	2L1 1/2x1 1/2x3/16x1/4	83	-5241.47	29692.00	17.7 55.3 (b)	Pass
T5	160 - 150	Diagonal	2L2x2x3/16x1/4	96	-5922.45	42662.23	13.9 65.1 (b)	Pass
T6	150 - 140	Diagonal	2L2x2x3/16x1/4	114	-5542.56	40665.03	13.6 61.7 (b)	Pass
T7	140 - 133.333	Diagonal	L2 1/2x2 1/2x1/4	133	-5557.62	24503.64	22.7 40.9 (b)	Pass
T8	133.333 - 126.667	Diagonal	L2 1/2x2 1/2x1/4	142	-5710.79	22278.16	25.6 41.6 (b)	Pass
T9	126.667 - 120	Diagonal	L2 1/2x2 1/2x3/16	151	-5535.49	15425.97	35.9 66.4 (b)	Pass
T10	120 - 113.333	Diagonal	L3x3x1/4	160	-7113.28	30888.79	23.0 47.5 (b)	Pass
T11	113.333 - 106.667	Diagonal	L3x3x1/4	172	-6998.17	28895.68	24.2 47.5 (b)	Pass
T12	106.667 - 100	Diagonal	L2 1/2x2 1/2x1/4	184	-7341.78	15373.78	47.8 50.1 (b)	Pass
T13	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	205	-7480.95	36323.59	20.6 27.8 (b)	Pass
T14	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	226	-7141.59	28986.72	24.6 29.4 (b)	Pass
T15	60 - 50	Diagonal	L3x3x5/16	247	-9853.11	18196.81	54.1	Pass
T16	50 - 40	Diagonal	L3x3x5/16	259	-9559.33	16846.72	56.7	Pass
T17	40 - 20	Diagonal	L4x4x3/8	271	-9006.08	38479.45	23.4 31.1 (b)	Pass
T18	20 - 0	Diagonal	L5x5x5/16	286	-10127.00	51837.13	19.5 34.9 (b)	Pass
T1	195 - 180	Horizontal	L1 1/2x1 1/2x3/16	18	-5090.96	9640.76	52.8	Pass
T2	180 - 175	Secondary Horizontal	L2x2x3/16	52	686.02	19675.95	3.5 9.6 (b)	Pass
T3	175 - 170	Secondary Horizontal	L2x2x3/16	64	874.15	19675.95	4.4 12.2 (b)	Pass
T4	170 - 160	Secondary Horizontal	L2x2x3/16	76	-1273.88	19156.30	6.6 17.8 (b)	Pass
T5	160 - 150	Secondary Horizontal	L2x2x3/16	97	-1651.00	17984.61	9.2 23.0 (b)	Pass
T6	150 - 140	Secondary Horizontal	L2x2x3/16	118	-2061.48	16658.04	12.4 28.7 (b)	Pass
T10	120 - 113.333	Secondary Horizontal	L3x3x3/16	166	-2947.17	26358.46	11.2 35.8 (b)	Pass
T11	113.333 - 106.667	Secondary Horizontal	L3x3x3/16	178	-3168.08	25488.01	12.4 38.5 (b)	Pass
T12	106.667 - 100	Secondary Horizontal	L3x3x3/16	190	-3373.44	24590.26	13.7 41.0 (b)	Pass

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T13	100 - 80	Secondary Horizontal	L3x3x1/4	202	-4010.32	27498.45	14.6 27.5 (b)	Pass
T15	60 - 50	Secondary Horizontal	L4x4x3/8	253	-4831.88	61409.77	7.9 33.3 (b)	Pass
T16	50 - 40	Secondary Horizontal	L4x4x1/4	267	-5128.82	39562.21	13.0 34.0 (b)	Pass
T1	195 - 180	Top Girt	L1 1/2x1 1/2x3/16	6	-1544.87	9640.76	16.0	Pass
T1	195 - 180	Bottom Girt	L1 1/2x1 1/2x3/16	9	-3089.00	9640.76	32.0	Pass
							Summary	
							Leg (T4)	75.6 Pass
							Diagonal (T1)	88.5 Pass
							Horizontal (T1)	52.8 Pass
							Secondary Horizontal (T12)	41.0 Pass
							Top Girt (T1)	16.0 Pass
							Bottom Girt (T1)	32.0 Pass
							Bolt Checks	71.3 Pass
							RATING =	**88.5 Pass**

APPENDIX B

COAX CONFIGUARTION



COAX CONFIGURATION - N.T.S.

PREPARED BY:
TOWER ENGINEERING PROFESSIONALS
326 TRYON RD
RALEIGH, NC 27603
(919) 661-6351
www.tepgroup.net

PREPARED FOR:
PHOENIX TOWER INTERNATIONAL
999 YAMATO ROAD, SUITE 100
BOCA RATON, FL 33431

PROJECT INFORMATION:
STRAITS TURNPIKE
SITE #: US-CT-1003
1021 STRAITS TURNPIKE
MIDDLEBURY, CT 06762
(NEW HAVEN COUNTY)

REVISION: 0
TEP JOB #:25628.442076
SHEET NUMBER:
C-1

APPENDIX C

ADDITIONAL CALCULATIONS

Project Name:	Straits Turnpike	**Engineer:**	DO
Project Number:	TEP No. 25628.442076	**Check:**	JHJ
Client Site Number:	US-CT-1003	**Date:**	9/10/2020
Elevation:	160 - 170ft	**CODE:**	TIA-H

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc_L =	0.90	- LRFD strength reduction factor (leg, compression)
ΦT_L =	0.90	- LRFD strength reduction factor (leg, tension)
Φc_S =	0.90	- LRFD strength reduction factor (sleeve, compression)
ΦT_S =	0.90	- LRFD strength reduction factor (sleeve, tension)
Φw =	0.75	- LRFD strength reduction factor (weld shear)
Φv =	0.75	- LRFD strength reduction factor (shear)

Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$:	4.23	kips - force from initial load (no wind)
P_{wind}:	73.39	kips - force due to final loading including reinforcement
T_u:	64.48	kips - maximum load on leg

Input - Tower Leg

2.5 STD

K:	1.00	- effective length factor for leg
L_u:	2.64	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	0.95	in - minimum radius of gyration of tower leg
A_{leg}:	1.70	in^2 - area of tower leg
DI:	2.47	in - inside diameter of tower leg
t_{leg}:	0.203	in - thickness of tower leg
$f`_c$:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

3 XS Gap Check: OK

F_{y_sleeve}:	35.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	60.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.50	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	1.14	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	1.51	in^2 - area of sleeve r/f
t_{sleeve}:	0.300	in - thickness of sleeve r/f

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	3.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	5.50	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	3.50	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section

2.5 STD w/3 XS Half Sleeve

r_{x_bu}:	0.92	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	1.04	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Quick Check

Weld Size:	OK
Weld Connection:	23.0%
Crushing Check:	46.2%
Leg Comp. Check:	46.8%
Sleeve Check:	67.1%
Built-up Check:	75.6%
Slenderness Check:	OK
Leg Tension Check:	60.7%

*TIA-222-H Section 15.5 applied

Project Name:	Straits Turnpike	**Engineer:**	DO
Project Number:	TEP No. 25628.442076	**Check:**	JHJ
Client Site Number:	US-CT-1003	**Date:**	9/10/2020
Elevation:	140 - 150ft	**CODE:**	TIA-H

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc_L =	0.90	- LRFD strength reduction factor (leg, compression)	Mast St.: 1.00 - from tnxTower
ΦT_L =	0.90	- LRFD strength reduction factor (leg, tension)	
Φc_S =	0.90	- LRFD strength reduction factor (sleeve, compression)	
ΦT_S =	0.90	- LRFD strength reduction factor (sleeve, tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	6.22	kips - force from initial load (no wind)
P_{wind}:	118.79	kips - force due to final loading including reinforcement
T_u:	105.68	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	27.6%
Crushing Check:	55.2%
Leg Comp. Check:	55.6%
Sleeve Check:	57.2%
Built-up Check:	69.4%
Slenderness Check:	Decrease Connector Spacing
Leg Tension Check:	52.4%

*TIA-222-H Section 15.5 applied

Input - Tower Leg

3.5 STD

K:	1.00	- effective length factor for leg
L_u:	2.60	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	1.34	in - minimum radius of gyration of tower leg
A_{leg}:	2.68	in^2 - area of tower leg
DI:	3.55	in - inside diameter of tower leg
t_{leg}:	0.226	in - thickness of tower leg
$f`_c$:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

4 STD Gap Check: OK

F_{y_sleeve}:	50.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	62.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.66	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	1.51	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	1.59	in^2 - area of sleeve r/f
t_{sleeve}:	0.237	in - thickness of sleeve r/f

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	3.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	7.07	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	4.50	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section

3.5 STD w/4 STD Half Sleeve

r_{x_bu}:	1.31	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	1.40	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Project Name:	Straits Turnpike	**Engineer:**	DO
Project Number:	TEP No. 25628.442076	**Check:**	JHJ
Client Site Number:	US-CT-1003	**Date:**	9/10/2020
Elevation:	120 - 140ft	**CODE:**	TIA-H

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc_L =	0.90	- LRFD strength reduction factor (leg, compression)	Mast St.: 1.00 - from tnxTower
ΦT_L =	0.90	- LRFD strength reduction factor (leg, tension)	
Φc_S =	0.90	- LRFD strength reduction factor (sleeve, compression)	
ΦT_S =	0.90	- LRFD strength reduction factor (sleeve, tension)	
Φw =	0.75	- LRFD strength reduction factor (weld shear)	
Φv =	0.75	- LRFD strength reduction factor (shear)	

Input - Loads

$P_{initial}$:	7.64	kips - force from initial load (no wind)
P_{wind}:	158.94	kips - force due to final loading including reinforcement
T_u:	142.52	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	25.8%
Crushing Check:	37.7%
Leg Comp. Check:	37.9%
Sleeve Check:	41.7%
Built-up Check:	50.3%
Slenderness Check:	OK
Leg Tension Check:	38.6%

*TIA-222-H Section 15.5 applied

Input - Tower Leg

5 STD

K:	1.00	- effective length factor for leg
L_u:	6.68	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	1.88	in - minimum radius of gyration of tower leg
A_{leg}:	4.30	in^2 - area of tower leg
DI:	5.05	in - inside diameter of tower leg
t_{leg}:	0.258	in - thickness of tower leg
$f`_c$:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

6 XH Gap Check: OK

F_{y_sleeve}:	46.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	62.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	0.96	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	2.19	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	4.20	in^2 - area of sleeve r/f
t_{sleeve}:	0.432	in - thickness of sleeve r/f

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	15.50	in - spacing of connectors connecting the sleeve to the leg
D:	5.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	10.41	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	6.63	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section

5 STD w/6 XH Half Sleeve

r_{x_bu}:	1.77	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	2.04	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Project Name:	Straits Turnpike	**Engineer:**	DO
Project Number:	TEP No. 25628.442076	**Check:**	JHJ
Client Site Number:	US-CT-1003	**Date:**	9/10/2020
Elevation:	80 - 100ft	**CODE:**	TIA-H

Grouted/Un-Grouted Pipe Leg + Half Sleeve R/F

Φc_L =	0.90	- LRFD strength reduction factor (leg, compression)
ΦT_L =	0.90	- LRFD strength reduction factor (leg, tension)
Φc_S =	0.90	- LRFD strength reduction factor (sleeve, compression)
ΦT_S =	0.90	- LRFD strength reduction factor (sleeve, tension)
Φw =	0.75	- LRFD strength reduction factor (weld shear)
Φv =	0.75	- LRFD strength reduction factor (shear)

Mast St.: 1.00 - from tnxTower

Input - Loads

$P_{initial}$:	10.90	kips - force from initial load (no wind)
P_{wind}:	231.25	kips - force due to final loading including reinforcement
T_u:	206.70	kips - maximum load on leg

Quick Check

Weld Size:	OK
Weld Connection:	36.0%
Crushing Check:	41.7%
Leg Comp. Check:	41.8%
Sleeve Check:	50.0%
Built-up Check:	53.8%
Slenderness Check:	OK
Leg Tension Check:	46.6%

*TIA-222-H Section 15.5 applied

Input - Tower Leg

6 STD

K:	1.00	- effective length factor for leg
L_u:	3.43	ft - unbraced length of tower leg
F_{y_leg}:	55.00	ksi - minimum specified yield strength of tower leg
F_{u_leg}:	70.00	ksi - minimum specified ultimate strength of tower leg
r:	2.25	in - minimum radius of gyration of tower leg
A_{leg}:	5.58	in^2 - area of tower leg
DI:	6.07	in - inside diameter of tower leg
t_{leg}:	0.280	in - thickness of tower leg
$f`_c$:	0.00	ksi - minimum specified compressive strength of grout (If ungrouted enter 0)

Input - Sleeve R/F

7 XH Gap Check: OK

F_{y_sleeve}:	42.00	ksi - minimum specified yield strength of sleeve r/f
F_{u_sleeve}:	63.00	ksi - minimum specified ultimate strength of sleeve r/f
r_{x_sleeve}:	1.10	in - minimum radius of gyration of sleeve r/f about the x-axis
r_{y_sleeve}:	2.53	in - minimum radius of gyration of sleeve r/f about the y-axis
A_{sleeve}:	5.60	in^2 - area of sleeve r/f
t_{sleeve}:	0.500	in - thickness of sleeve r/f

Termination: Connected to Flange

Input - Sleeve Connection to Leg

a:	12.00	in - spacing of connectors connecting the sleeve to the leg
D:	5.00	- weld size for the weld connecting the sleeve to the leg (unit = # of 16ths)
Length //:	12.00	in - length of weld on each side of the leg at the termination
Length ⊥:	11.98	in - length of weld at the bottom/top of the leg sleeve at termination (πD/2)
No:	2.00	- number of longitudinal welds per end of the leg (typically near side & far side, so 2)
F_{EXX}:	70.00	ksi - weld electrode classification
Width:	7.63	in - maximum width of the built-up leg
Gap:	0.00	in - length of leg considered for crushing

Input - Built-up Leg Section

6 STD w/7 XH Half Sleeve

r_{x_bu}:	2.10	in - minimum radius of gyration of the built-up section about the x-axis
r_{y_bu}:	2.39	in - minimum radius of gyration of the built-up section about the y-axis

Input - Grouted Leg

Ec:	0	ksi - Modulus of Elasticity of Grout
E_leg:	29,000	ksi - Modulus of Elasticity of Leg
E_sleeve:	29,000	ksi - Modulus of Elasticity of Sleeve

Self Support Anchor Rod Capacity

Site Info	
BU #	US-CT-1003
Site Name	Straits Turnpike
Order #	25628.442076

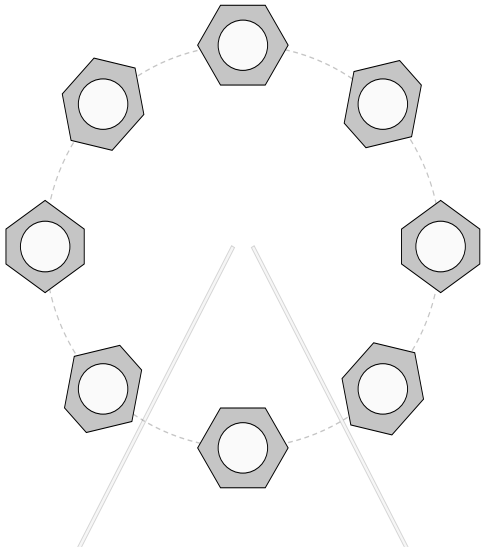
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	368.26	321.12
Shear Force (kips)	35.95	31.60

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(8) 1-1/2" ø bolts (A36 N; Fy=36 ksi, Fu=58 ksi)

l_{ar} (in): 0

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 46.03	ϕPn_c = 57.26	**Stress Rating**
Vu = 4.49	ϕVn = 25.76	**79.5%**
Mu = n/a	ϕMn = n/a	**Pass**

Pier and Pad Foundation

BU # :	US-CT-1003
Site Name:	Straits Turnpike
App. Number:	25628.442076

TIA-222 Revision:	H
Tower Type:	Self Support

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	368.256	kips
Compression Shear, Vu_comp:	35.953	kips
Uplift, P_{uplift}:	321.119	kips
Uplift Shear, V_{u_uplift}:	31.599	kips
Tower Height, **H**:	195	ft
Base Face Width, **BW**:	21.5	ft
BP Dist. Above Fdn, bp_{dist}:	0	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	4	ft
Ext. Above Grade, **E**:	0.25	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	11	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	4	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	9.416	ft
Pad Width, **W**:	33	ft
Pad Thickness, **T**:	4	ft
Pad Rebar Size (Bottom), **Sp**:	8	
Pad Rebar Quantity (Bottom), **mp**:	34	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	125	pcf
Ultimate Net Bearing, Qnet:	12.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:		
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	13	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Uplift (kips)	1365.49	321.12	**22.4%**	**Pass**
Lateral (Sliding) (kips)	540.26	31.60	**5.6%**	**Pass**
Bearing Pressure (ksf)	9.88	1.87	**18.1%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	1199.84	203.71	**16.2%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	317.69	179.04	**53.7%**	**Pass**
Pier Compression (kip)	7637.76	384.57	**4.8%**	**Pass**
*Pad Flexure (kip*ft)*	5161.39	1183.69	**21.8%**	**Pass**
Pad Shear - 1-way (kips)	1415.26	122.45	**8.2%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.023	**13.4%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	4946.30	122.23	**2.4%**	**Pass**
Pad Shear - 2-way (Uplift) (ksi)	0.164	0.024	**14.1%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	4946.30	107.42	**2.1%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**22.4%**
Structural Rating*:	**53.7%**

CENTEK engineering

Centered on Solutions℠

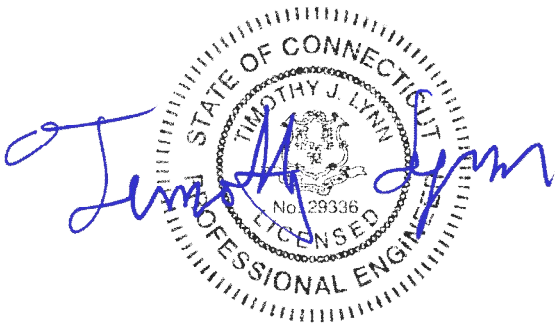
Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CT11128E

1021 Straits Turnpike
Middlebury, CT

Centek Project No. 20074.63



Date: July 27, 2020

Max Stress Ratio = 86.9%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 27, 2020

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

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11128E
1021 Straits Turnpike
Middlebury, CT 06762

Centek Project No. 20074,63

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) 12-ft sector frames to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Sector Frames: Three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) KRY112 TMAs, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on three (3) sector frames with a RAD center elevation of 195-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 93 mph for Middlebury 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 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

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Subject:	TIA-222-G Loads
Location:	Middlebury, CT
Rev. 0: 7/27/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.63

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

Wind Speeds

Basic Wind Speed: $V := 93$ 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 := Lattice (User Input)

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

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

Structure Height = $h := 195$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 195$ 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 = $G_H = 0.85$ (User Input)

Output

Wind Direction Probability Factor =

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

(Per Table 2-2 of TIA-222-G)

Importance Factors =

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

(Per Table 2-3 of TIA-222-G)

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.194$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.792$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.457$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 27.415$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.924$$

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 =	$WT_{ant} := 133$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 152$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 102$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 60$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 44$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5833$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 189$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 189$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 132$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 53$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 50$	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 =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 24$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4866$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 158$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 158$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 472$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 171$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 163$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 72$	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 =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 443$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 443$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model = Ericsson KRY112 TMA

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 7.7$ in (User Input)

TMA Width = $W_{TMA} := 7.5$ in (User Input)

TMA Thickness = $T_{TMA} := 3.4$ in (User Input)

TMA Weight = $WT_{TMA} := 11$ lbs (User Input)

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

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$

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

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$ sf

Total TMA Wind Force = $F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 11$ lbs

Surface Area for One TMA = $SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$ sf

Total TMA Wind Force = $F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 5$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 7$ lbs

Surface Area for One TMA w/ Ice = $SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 4$ lbs

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 11$ lbs

Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 677$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 22$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 22$ lbs

Development of Wind & Ice Load on RRUS's

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 = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 38$ lbs

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

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 30$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 17$ 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 = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$ 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 = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2992$

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 74$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 74$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	Ericsson 4415		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 5.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 47$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 38$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 16$	lbs

Wind Load (with ice)

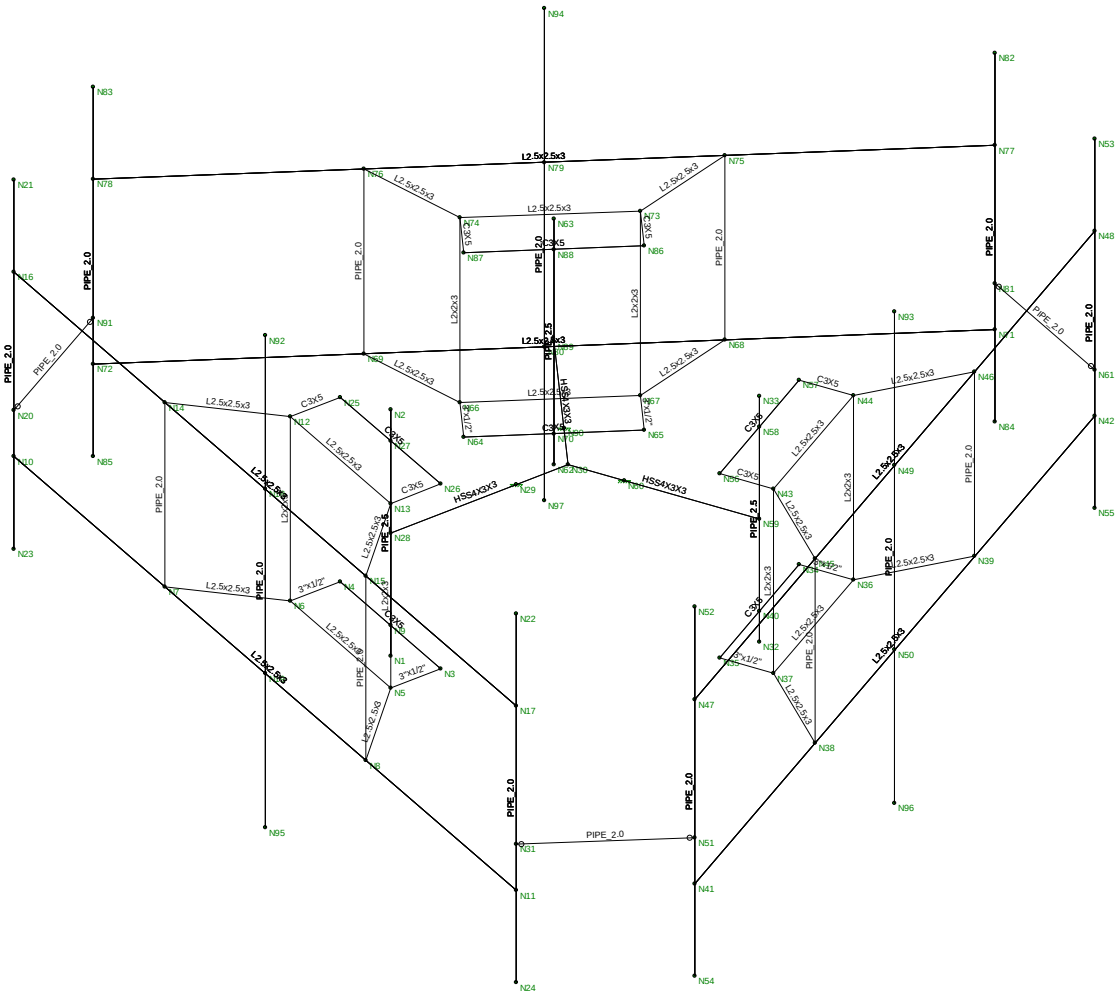
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 17$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.2$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 9$	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 =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1725$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 56$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 56$	lbs



Envelope Only Solution

Centek		
TJL	CT11128E - Mount	July 27, 2020 at 3:53 PM
20074.63	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	1
Cd X	1
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 (\...	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	Antenna Mast	PIPE 2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
2	Plate 2	3"x1/2"	Beam	Pipe	A36 Gr.36	Typical	1.5	.031	1.125	.112
3	C3	C3X5	Beam	Pipe	A36 Gr.36	Typical	1.47	.241	1.85	.043
4	L2.5x2.5x3/16	L2.5x2.5x3	Beam	Pipe	A36 Gr.36	Typical	.901	.535	.535	.011
5	Vert	PIPE 2.5	Column	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89
6	L2x2x3/16	L2x2x3	Column	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
7	Stablizer Arm	PIPE 2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
8	Outrigger	HSS4X3X3	Beam	Tube	A500 Gr.46	Typical	2.24	3.16	4.93	6.26

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	Vert	4			Lbyy						Lateral
2	M2	C3	2.4			Lbyy						Lateral
3	M3	Plate 2	.804			Lbyy						Lateral
4	M4	Plate 2	.804			Lbyy						Lateral
5	M5	L2.5x2.5x3/16	2.4			Lbyy						Lateral
6	M6	L2.5x2.5x3/16	1.697			Lbyy						Lateral
7	M7	L2.5x2.5x3/16	1.697			Lbyy						Lateral
8	M8	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
9	M9	L2.5x2.5x3/16	2.4			Lbyy						Lateral
10	M10	L2.5x2.5x3/16	1.697			Lbyy						Lateral
11	M11	L2.5x2.5x3/16	1.697			Lbyy						Lateral
12	M12	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
13	M13	L2x2x3/16	3									Lateral
14	M14	L2x2x3/16	3			Lbyy						Lateral
15	M15	Antenna Mast	6			Lbyy						Lateral
16	M18	Antenna Mast	6			Lbyy						Lateral
17	M19	Antenna Mast	8			Lbyy						Lateral
18	M20	Antenna Mast	3			Lbyy						Lateral
19	M21	Antenna Mast	3			Lbyy						Lateral
20	M22	C3	2.4			Lbyy						Lateral
21	M23	C3	.804			Lbyy						Lateral
22	M24	C3	.804			Lbyy						Lateral
23	M25	Outrigger	2.833			Lbyy						Lateral
24	M24A	Vert	4			Lbyy						Lateral
25	M25A	C3	2.4			Lbyy						Lateral
26	M26	Plate 2	.804			Lbyy						Lateral
27	M27	Plate 2	.804			Lbyy						Lateral
28	M28	L2.5x2.5x3/16	2.4			Lbyy						Lateral
29	M29	L2.5x2.5x3/16	1.697			Lbyy						Lateral
30	M30	L2.5x2.5x3/16	1.697			Lbyy						Lateral
31	M31	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
32	M32	L2.5x2.5x3/16	2.4			Lbyy						Lateral
33	M33	L2.5x2.5x3/16	1.697			Lbyy						Lateral
34	M34	L2.5x2.5x3/16	1.697			Lbyy						Lateral
35	M35	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
36	M36	L2x2x3/16	3									Lateral
37	M37	L2x2x3/16	3			Lbyy						Lateral
38	M38	Antenna Mast	6			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
39	M39	Antenna Mast	6			Lbyy						Lateral
40	M40	Antenna Mast	8			Lbyy						Lateral
41	M41	Antenna Mast	3			Lbyy						Lateral
42	M42	Antenna Mast	3			Lbyy						Lateral
43	M43	C3	2.4			Lbyy						Lateral
44	M44	C3	.804			Lbyy						Lateral
45	M45	C3	.804			Lbyy						Lateral
46	M46	Outrigger	2.833			Lbyy						Lateral
47	M47	Vert	4			Lbyy						Lateral
48	M48	C3	2.4			Lbyy						Lateral
49	M49	Plate 2	.804			Lbyy						Lateral
50	M50	Plate 2	.804			Lbyy						Lateral
51	M51	L2.5x2.5x3/16	2.4			Lbyy						Lateral
52	M52	L2.5x2.5x3/16	1.697			Lbyy						Lateral
53	M53	L2.5x2.5x3/16	1.697			Lbyy						Lateral
54	M54	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
55	M55	L2.5x2.5x3/16	2.4			Lbyy						Lateral
56	M56	L2.5x2.5x3/16	1.697			Lbyy						Lateral
57	M57	L2.5x2.5x3/16	1.697			Lbyy						Lateral
58	M58	L2.5x2.5x3/16	12	5	5	5	5	5				Lateral
59	M59	L2x2x3/16	3									Lateral
60	M60	L2x2x3/16	3			Lbyy						Lateral
61	M61	Antenna Mast	6			Lbyy						Lateral
62	M62	Antenna Mast	6			Lbyy						Lateral
63	M63	Antenna Mast	8			Lbyy						Lateral
64	M64	Antenna Mast	3			Lbyy						Lateral
65	M65	Antenna Mast	3			Lbyy						Lateral
66	M66	C3	2.4			Lbyy						Lateral
67	M67	C3	.804			Lbyy						Lateral
68	M68	C3	.804			Lbyy						Lateral
69	M69	Outrigger	2.833			Lbyy						Lateral
70	M70	Stablizer Arm	2.378			Lbyy						Lateral
71	M71	Stablizer Arm	2.378			Lbyy						Lateral
72	M72	Stablizer Arm	2.378			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			Vert	Column	Pipe	A53 Gra...	Typical
2	M2	N4	N3			C3	Beam	Pipe	A36 Gr.36	Typical
3	M3	N4	N6			Plate 2	Beam	Pipe	A36 Gr.36	Typical
4	M4	N3	N5			Plate 2	Beam	Pipe	A36 Gr.36	Typical
5	M5	N6	N5			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
6	M6	N5	N8			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
7	M7	N6	N7		270	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
8	M8	N10	N11			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
9	M9	N12	N13		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
10	M10	N13	N15		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
11	M11	N12	N14		180	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
12	M12	N16	N17		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
13	M13	N6	N12		90	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
14	M14	N13	N5		270	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical
15	M15	N21	N23			Antenna Mast	Column	Pipe	A53 Gra...	Typical
16	M18	N22	N24			Antenna Mast	Column	Pipe	A53 Gra...	Typical
17	M19	N92	N95			Antenna Mast	Column	Pipe	A53 Gra...	Typical
18	M20	N7	N14			Antenna Mast	Column	Pipe	A53 Gra...	Typical
19	M21	N8	N15			Antenna Mast	Column	Pipe	A53 Gra...	Typical
20	M22	N25	N26			C3	Beam	Pipe	A36 Gr.36	Typical
21	M23	N26	N13		180	C3	Beam	Pipe	A36 Gr.36	Typical
22	M24	N25	N12			C3	Beam	Pipe	A36 Gr.36	Typical
23	M25	N28	N30			Outrigger	Beam	Tube	A500 Gr...	Typical
24	M24A	N32	N33			Vert	Column	Pipe	A53 Gra...	Typical
25	M25A	N35	N34			C3	Beam	Pipe	A36 Gr.36	Typical
26	M26	N35	N37			Plate 2	Beam	Pipe	A36 Gr.36	Typical
27	M27	N34	N36			Plate 2	Beam	Pipe	A36 Gr.36	Typical
28	M28	N37	N36			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
29	M29	N36	N39			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
30	M30	N37	N38		270	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
31	M31	N41	N42			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
32	M32	N43	N44		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
33	M33	N44	N46		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
34	M34	N43	N45		180	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
35	M35	N47	N48		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
36	M36	N37	N43		90	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical
37	M37	N44	N36		270	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical
38	M38	N52	N54			Antenna Mast	Column	Pipe	A53 Gra...	Typical
39	M39	N53	N55			Antenna Mast	Column	Pipe	A53 Gra...	Typical
40	M40	N93	N96			Antenna Mast	Column	Pipe	A53 Gra...	Typical
41	M41	N38	N45			Antenna Mast	Column	Pipe	A53 Gra...	Typical
42	M42	N39	N46			Antenna Mast	Column	Pipe	A53 Gra...	Typical
43	M43	N56	N57			C3	Beam	Pipe	A36 Gr.36	Typical
44	M44	N57	N44		180	C3	Beam	Pipe	A36 Gr.36	Typical
45	M45	N56	N43			C3	Beam	Pipe	A36 Gr.36	Typical
46	M46	N59	N30			Outrigger	Beam	Tube	A500 Gr...	Typical
47	M47	N62	N63			Vert	Column	Pipe	A53 Gra...	Typical
48	M48	N65	N64			C3	Beam	Pipe	A36 Gr.36	Typical
49	M49	N65	N67			Plate 2	Beam	Pipe	A36 Gr.36	Typical
50	M50	N64	N66			Plate 2	Beam	Pipe	A36 Gr.36	Typical
51	M51	N67	N66			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
52	M52	N66	N69			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
53	M53	N67	N68		270	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
54	M54	N71	N72			L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
55	M55	N73	N74		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
56	M56	N74	N76		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
57	M57	N73	N75		180	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
58	M58	N77	N78		90	L2.5x2.5x3/16	Beam	Pipe	A36 Gr.36	Typical
59	M59	N67	N73		90	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical
60	M60	N74	N66		270	L2x2x3/16	Column	Single Angle	A36 Gr.36	Typical
61	M61	N82	N84			Antenna Mast	Column	Pipe	A53 Gra...	Typical
62	M62	N83	N85			Antenna Mast	Column	Pipe	A53 Gra...	Typical
63	M63	N94	N97			Antenna Mast	Column	Pipe	A53 Gra...	Typical
64	M64	N68	N75			Antenna Mast	Column	Pipe	A53 Gra...	Typical
65	M65	N69	N76			Antenna Mast	Column	Pipe	A53 Gra...	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
66	M66	N86	N87			C3	Beam	Pipe	A36 Gr.36	Typical
67	M67	N87	N74		180	C3	Beam	Pipe	A36 Gr.36	Typical
68	M68	N86	N73			C3	Beam	Pipe	A36 Gr.36	Typical
69	M69	N89	N30			Outrigger	Beam	Tube	A500 Gr....	Typical
70	M70	N20	N91			Stablizer Arm	Beam	Pipe	A53 Gra...	Typical
71	M71	N81	N61			Stablizer Arm	Beam	Pipe	A53 Gra...	Typical
72	M72	N31	N51			Stablizer Arm	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	2.833	0	
2	N2	0	4	2.833	0	
3	N3	1.2	.5	2.833	0	
4	N4	-1.2	.5	2.833	0	
5	N5	1.2	.5	3.637	0	
6	N6	-1.2	.5	3.637	0	
7	N7	-2.4	.5	4.837	0	
8	N8	2.4	.5	4.837	0	
9	N9	0	.5	2.833	0	
10	N10	-6	.5	4.837	0	
11	N11	6	.5	4.837	0	
12	N12	-1.2	3.5	3.637	0	
13	N13	1.2	3.5	3.637	0	
14	N14	-2.4	3.5	4.837	0	
15	N15	2.4	3.5	4.837	0	
16	N16	-6	3.5	4.837	0	
17	N17	6	3.5	4.837	0	
18	N18	0	3.5	4.837	0	
19	N19	0	.5	4.837	0	
20	N20	-6	1.25	4.837	0	
21	N21	-6	5	4.837	0	
22	N22	6	5	4.837	0	
23	N23	-6	-1	4.837	0	
24	N24	6	-1	4.837	0	
25	N25	-1.2	3.5	2.833	0	
26	N26	1.2	3.5	2.833	0	
27	N27	0	3.5	2.833	0	
28	N28	0	2	2.833	0	
29	N29	0	2	.833	0	
30	N30	0	2	-0.	0	
31	N31	6	1.25	4.837	0	
32	N32	2.45345	0	-1.4165	0	
33	N33	2.45345	4	-1.4165	0	
34	N34	1.85345	.5	-2.45573	0	
35	N35	3.05345	.5	-0.37727	0	
36	N36	2.549734	.5	-2.85773	0	
37	N37	3.749734	.5	-0.77927	0	
38	N38	5.388965	.5	-0.340039	0	
39	N39	2.988965	.5	-4.496961	0	
40	N40	2.45345	.5	-1.4165	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
41	N41	7.188965	.5	2.777652	0	
42	N42	1.188965	.5	-7.614652	0	
43	N43	3.749734	3.5	-0.77927	0	
44	N44	2.549734	3.5	-2.85773	0	
45	N45	5.388965	3.5	-0.340039	0	
46	N46	2.988965	3.5	-4.496961	0	
47	N47	7.188965	3.5	2.777652	0	
48	N48	1.188965	3.5	-7.614652	0	
49	N49	4.188965	3.5	-2.4185	0	
50	N50	4.188965	.5	-2.4185	0	
51	N51	7.188965	1.25	2.777652	0	
52	N52	7.188965	5	2.777652	0	
53	N53	1.188965	5	-7.614652	0	
54	N54	7.188965	-1	2.777652	0	
55	N55	1.188965	-1	-7.614652	0	
56	N56	3.05345	3.5	-0.37727	0	
57	N57	1.85345	3.5	-2.45573	0	
58	N58	2.45345	3.5	-1.4165	0	
59	N59	2.45345	2	-1.4165	0	
60	N60	0.721399	2	-0.4165	0	
61	N61	1.188965	1.25	-7.614652	0	
62	N62	-2.45345	0	-1.4165	0	
63	N63	-2.45345	4	-1.4165	0	
64	N64	-3.05345	.5	-0.37727	0	
65	N65	-1.85345	.5	-2.45573	0	
66	N66	-3.749734	.5	-0.77927	0	
67	N67	-2.549734	.5	-2.85773	0	
68	N68	-2.988965	.5	-4.496961	0	
69	N69	-5.388965	.5	-0.340039	0	
70	N70	-2.45345	.5	-1.4165	0	
71	N71	-1.188965	.5	-7.614652	0	
72	N72	-7.188965	.5	2.777652	0	
73	N73	-2.549734	3.5	-2.85773	0	
74	N74	-3.749734	3.5	-0.77927	0	
75	N75	-2.988965	3.5	-4.496961	0	
76	N76	-5.388965	3.5	-0.340039	0	
77	N77	-1.188965	3.5	-7.614652	0	
78	N78	-7.188965	3.5	2.777652	0	
79	N79	-4.188965	3.5	-2.4185	0	
80	N80	-4.188965	.5	-2.4185	0	
81	N81	-1.188965	1.25	-7.614652	0	
82	N82	-1.188965	5	-7.614652	0	
83	N83	-7.188965	5	2.777652	0	
84	N84	-1.188965	-1	-7.614652	0	
85	N85	-7.188965	-1	2.777652	0	
86	N86	-1.85345	3.5	-2.45573	0	
87	N87	-3.05345	3.5	-0.37727	0	
88	N88	-2.45345	3.5	-1.4165	0	
89	N89	-2.45345	2	-1.4165	0	
90	N90	-0.721399	2	-0.4165	0	
91	N91	-7.188965	1.25	2.777652	0	
92	N92	0	6	4.837	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
93	N93	4.188965	6	-2.4185	0	
94	N94	-4.188965	6	-2.4185	0	
95	N95	0	-2	4.837	0	
96	N96	4.188965	-2	-2.4185	0	
97	N97	-4.188965	-2	-2.4185	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	N29	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N60	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N90	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.011	%50
2	M41	Y	-.011	%50
3	M64	Y	-.011	%50
4	M19	Y	-.074	2
5	M40	Y	-.074	2
6	M63	Y	-.074	2
7	M19	Y	-.077	.5
8	M40	Y	-.077	.5
9	M63	Y	-.077	.5
10	M19	Y	-.077	7.5
11	M40	Y	-.077	7.5
12	M63	Y	-.077	7.5
13	M18	Y	-.067	.5
14	M39	Y	-.067	.5
15	M62	Y	-.067	.5
16	M18	Y	-.067	5.5
17	M39	Y	-.067	5.5
18	M62	Y	-.067	5.5
19	M19	Y	-.047	%50
20	M40	Y	-.047	%50
21	M63	Y	-.047	%50
22	M15	Y	-.052	.5
23	M38	Y	-.052	.5
24	M61	Y	-.052	.5
25	M15	Y	-.052	5.5
26	M38	Y	-.052	5.5
27	M61	Y	-.052	5.5

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.022	%50
2	M41	Y	-.022	%50
3	M64	Y	-.022	%50
4	M19	Y	-.074	2

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M40	Y	-.074	2
6	M63	Y	-.074	2
7	M19	Y	-.222	.5
8	M40	Y	-.222	.5
9	M63	Y	-.222	.5
10	M19	Y	-.222	7.5
11	M40	Y	-.222	7.5
12	M63	Y	-.222	7.5
13	M18	Y	-.095	.5
14	M39	Y	-.095	.5
15	M62	Y	-.095	.5
16	M18	Y	-.095	5.5
17	M39	Y	-.095	5.5
18	M62	Y	-.095	5.5
19	M19	Y	-.056	%50
20	M40	Y	-.056	%50
21	M63	Y	-.056	%50
22	M15	Y	-.079	.5
23	M38	Y	-.079	.5
24	M61	Y	-.079	.5
25	M15	Y	-.079	5.5
26	M38	Y	-.079	5.5
27	M61	Y	-.079	5.5

Member Point Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	.007	%50
2	M41	X	.007	%50
3	M64	X	.007	%50
4	M19	X	.015	2
5	M19	X	.036	.5
6	M19	X	.036	7.5
7	M40	X	.082	.5
8	M63	X	.082	.5
9	M40	X	.082	7.5
10	M63	X	.082	7.5
11	M18	X	.022	.5
12	M18	X	.022	5.5
13	M39	X	.03	.5
14	M62	X	.03	.5
15	M39	X	.03	5.5
16	M62	X	.03	5.5
17	M19	X	.009	%50
18	M15	X	.012	.5
19	M15	X	.012	5.5
20	M38	X	.025	.5
21	M61	X	.025	.5
22	M38	X	.025	5.5
23	M61	X	.025	5.5

Member Point Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	.011	%50
2	M41	X	.011	%50
3	M64	X	.011	%50
4	M19	X	.03	2
5	M19	X	.086	.5
6	M19	X	.086	7.5
7	M40	X	.236	.5
8	M63	X	.236	.5
9	M40	X	.236	7.5
10	M63	X	.236	7.5
11	M18	X	.051	.5
12	M18	X	.051	5.5
13	M39	X	.076	.5
14	M62	X	.076	.5
15	M39	X	.076	5.5
16	M62	X	.076	5.5
17	M19	X	.016	%50
18	M15	X	.027	.5
19	M15	X	.027	5.5
20	M38	X	.066	.5
21	M61	X	.066	.5
22	M38	X	.066	5.5
23	M61	X	.066	5.5

Member Point Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	.007	%50
2	M41	Z	.007	%50
3	M64	Z	.007	%50
4	M40	Z	.015	2
5	M63	Z	.015	2
6	M19	Z	.082	.5
7	M19	Z	.082	7.5
8	M40	Z	.036	.5
9	M63	Z	.036	.5
10	M40	Z	.036	7.5
11	M63	Z	.036	7.5
12	M18	Z	.03	.5
13	M18	Z	.03	5.5
14	M39	Z	.022	.5
15	M62	Z	.022	.5
16	M39	Z	.022	5.5
17	M62	Z	.022	5.5
18	M40	Z	.009	%50
19	M63	Z	.009	%50
20	M15	Z	.025	.5
21	M15	Z	.025	5.5
22	M38	Z	.012	.5
23	M61	Z	.012	.5
24	M38	Z	.012	5.5
25	M61	Z	.012	5.5

Member Point Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	.011	%50
2	M41	Z	.011	%50
3	M64	Z	.011	%50
4	M40	Z	.03	2
5	M63	Z	.03	2
6	M19	Z	.236	.5
7	M19	Z	.236	7.5
8	M40	Z	.086	.5
9	M63	Z	.086	.5
10	M40	Z	.086	7.5
11	M63	Z	.086	7.5
12	M18	Z	.076	.5
13	M18	Z	.076	5.5
14	M39	Z	.051	.5
15	M62	Z	.051	.5
16	M39	Z	.051	5.5
17	M62	Z	.051	5.5
18	M40	Z	.016	%50
19	M63	Z	.016	%50
20	M15	Z	.066	.5
21	M15	Z	.066	5.5
22	M38	Z	.027	.5
23	M61	Z	.027	.5
24	M38	Z	.027	5.5
25	M61	Z	.027	5.5

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M15	X	.002	.002	0	0
2	M20	X	.002	.002	0	0
3	M19	X	.002	.002	0	0
4	M21	X	.002	.002	0	0
5	M18	X	.002	.002	0	0
6	M58	X	.002	.002	0	0
7	M54	X	.002	.002	0	0
8	M35	X	.002	.002	0	0
9	M31	X	.002	.002	0	0
10	M7	X	.002	.002	0	0
11	M11	X	.002	.002	0	0
12	M24	X	.002	.002	0	0
13	M13	X	.002	.002	0	0
14	M3	X	.002	.002	0	0
15	M70	X	.002	.002	0	0
16	M72	X	.002	.002	0	0
17	M71	X	.002	.002	0	0
18	M25	X	.002	.002	0	0
19	M69	X	.002	.002	0	0
20	M52	X	.002	.002	0	0
21	M56	X	.002	.002	0	0
22	M60	X	.002	.002	0	0

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
23	M67	X	.002	.002	0	0
24	M50	X	.002	.002	0	0
25	M32	X	.002	.002	0	0
26	M28	X	.002	.002	0	0
27	M25A	X	.002	.002	0	0
28	M43	X	.002	.002	0	0
29	M24A	X	.002	.002	0	0
30	M47	X	.002	.002	0	0
31	M1	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M15	X	.007	.007	0	0
2	M20	X	.007	.007	0	0
3	M19	X	.007	.007	0	0
4	M21	X	.007	.007	0	0
5	M18	X	.007	.007	0	0
6	M58	X	.007	.007	0	0
7	M54	X	.007	.007	0	0
8	M35	X	.007	.007	0	0
9	M31	X	.007	.007	0	0
10	M7	X	.007	.007	0	0
11	M11	X	.007	.007	0	0
12	M24	X	.007	.007	0	0
13	M13	X	.007	.007	0	0
14	M3	X	.007	.007	0	0
15	M70	X	.007	.007	0	0
16	M72	X	.007	.007	0	0
17	M71	X	.007	.007	0	0
18	M25	X	.007	.007	0	0
19	M69	X	.007	.007	0	0
20	M52	X	.007	.007	0	0
21	M56	X	.007	.007	0	0
22	M60	X	.007	.007	0	0
23	M67	X	.007	.007	0	0
24	M50	X	.007	.007	0	0
25	M32	X	.007	.007	0	0
26	M28	X	.007	.007	0	0
27	M25A	X	.007	.007	0	0
28	M43	X	.007	.007	0	0
29	M24A	X	.007	.007	0	0
30	M47	X	.007	.007	0	0
31	M1	X	.007	.007	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M58	Z	.002	.002	0	0
2	M12	Z	.002	.002	0	0
3	M8	Z	.002	.002	0	0
4	M22	Z	.002	.002	0	0
5	M9	Z	.002	.002	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
6	M11	Z	.002	.002	0	0
7	M7	Z	.002	.002	0	0
8	M13	Z	.002	.002	0	0
9	M10	Z	.002	.002	0	0
10	M21	Z	.002	.002	0	0
11	M6	Z	.002	.002	0	0
12	M14	Z	.002	.002	0	0
13	M5	Z	.002	.002	0	0
14	M46	Z	.002	.002	0	0
15	M69	Z	.002	.002	0	0
16	M55	Z	.002	.002	0	0
17	M56	Z	.002	.002	0	0
18	M57	Z	.002	.002	0	0
19	M53	Z	.002	.002	0	0
20	M51	Z	.002	.002	0	0
21	M52	Z	.002	.002	0	0
22	M65	Z	.002	.002	0	0
23	M64	Z	.002	.002	0	0
24	M20	Z	.002	.002	0	0
25	M33	Z	.002	.002	0	0
26	M44	Z	.002	.002	0	0
27	M37	Z	.002	.002	0	0
28	M27	Z	.002	.002	0	0
29	M29	Z	.002	.002	0	0
30	M61	Z	.002	.002	0	0
31	M63	Z	.002	.002	0	0
32	M62	Z	.002	.002	0	0
33	M39	Z	.002	.002	0	0
34	M42	Z	.002	.002	0	0
35	M40	Z	.002	.002	0	0
36	M41	Z	.002	.002	0	0
37	M38	Z	.002	.002	0	0
38	M71	Z	.002	.002	0	0
39	M72	Z	.002	.002	0	0
40	M70	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M58	Z	.007	.007	0	0
2	M12	Z	.007	.007	0	0
3	M8	Z	.007	.007	0	0
4	M22	Z	.007	.007	0	0
5	M9	Z	.007	.007	0	0
6	M11	Z	.007	.007	0	0
7	M7	Z	.007	.007	0	0
8	M13	Z	.007	.007	0	0
9	M10	Z	.007	.007	0	0
10	M21	Z	.007	.007	0	0
11	M6	Z	.007	.007	0	0
12	M14	Z	.007	.007	0	0
13	M5	Z	.007	.007	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
14	M46	Z	.007	.007	0	0
15	M69	Z	.007	.007	0	0
16	M55	Z	.007	.007	0	0
17	M56	Z	.007	.007	0	0
18	M57	Z	.007	.007	0	0
19	M53	Z	.007	.007	0	0
20	M51	Z	.007	.007	0	0
21	M52	Z	.007	.007	0	0
22	M65	Z	.007	.007	0	0
23	M64	Z	.007	.007	0	0
24	M20	Z	.007	.007	0	0
25	M33	Z	.007	.007	0	0
26	M44	Z	.007	.007	0	0
27	M37	Z	.007	.007	0	0
28	M27	Z	.007	.007	0	0
29	M29	Z	.007	.007	0	0
30	M61	Z	.007	.007	0	0
31	M63	Z	.007	.007	0	0
32	M62	Z	.007	.007	0	0
33	M39	Z	.007	.007	0	0
34	M42	Z	.007	.007	0	0
35	M40	Z	.007	.007	0	0
36	M41	Z	.007	.007	0	0
37	M38	Z	.007	.007	0	0
38	M71	Z	.007	.007	0	0
39	M72	Z	.007	.007	0	0
40	M70	Z	.007	.007	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Weight of Appurtenances	None					27			
3	Weight of Ice Only	None					27			
4	(x) TIA Wind with Ice	None					23	31		
5	(x) TIA Wind	None					23	31		
6	(z) TIA Wind with Ice	None					25	40		
7	(z) TIA Wind	None					25	40		

Load Combinations

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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N29	max	-.006	6	1.941	3	-.1	2	-2.634	5	-.047	6	.275	3
2		min	-.925	2	.746	5	-2.054	4	-7.284	3	-1.662	2	.084	5
3	N60	max	.105	5	1.94	6	.215	1	3.824	6	1.924	2	6.228	6
4		min	-1.853	1	.745	2	-.974	5	1.332	2	.345	6	2.207	2
5	N90	max	.166	6	1.941	6	.086	3	3.469	3	1.976	1	-2.494	2
6		min	-1.711	2	.746	2	-1.101	5	.997	5	-2.187	5	-6.467	3
7	Totals:	max	0	6	5.82	6	0	3						
8		min	-4.464	1	2.241	2	-4.099	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	.038	2	-.066	5	-.064	5	1.862e-02	3	2.079e-03	2	-5.439e-04	5
2		min	-.03	6	-.185	3	-.416	3	2.124e-03	5	1.976e-04	6	-1.576e-03	3
3	N2	max	.11	1	-.066	5	.455	6	2.069e-02	6	2.79e-03	1	-4.674e-04	5
4		min	.021	5	-.185	3	.161	2	7.261e-03	2	3.522e-04	6	-2.683e-03	1
5	N3	max	.043	2	-.079	5	-.04	5	2.812e-02	3	5.699e-03	3	-1.e-03	5
6		min	-.021	6	-.22	3	-.371	3	8.968e-03	5	-1.255e-03	5	-2.702e-03	3
7	N4	max	.043	2	-.059	2	.016	5	2.735e-02	3	5.582e-03	5	-1.35e-04	5
8		min	-.021	6	-.173	6	-.36	3	9.01e-03	5	-4.856e-03	3	-7.439e-04	1
9	N5	max	.083	2	-.165	5	-.04	5	2.739e-02	3	2.737e-03	5	-6.039e-04	5
10		min	-.022	6	-.489	3	-.371	3	8.753e-03	5	-3.368e-04	6	-1.069e-03	1
11	N6	max	.083	2	-.146	2	.016	5	2.676e-02	3	2.049e-03	1	-5.326e-04	5
12		min	-.022	6	-.435	3	-.36	3	8.832e-03	5	5.017e-04	6	-2.686e-03	3
13	N7	max	.095	2	-.271	2	.051	5	2.201e-02	3	5.729e-03	4	5.087e-04	5
14		min	-.019	6	-.804	3	-.357	3	5.677e-03	5	7.e-04	2	-1.64e-03	1
15	N8	max	.095	2	-.304	5	-.07	5	2.059e-02	3	-8.792e-04	5	-1.727e-03	5
16		min	-.021	6	-.914	3	-.373	3	5.58e-03	5	-2.702e-03	6	-4.109e-03	3
17	N9	max	.043	2	-.066	5	-.051	5	1.862e-02	3	2.079e-03	2	-5.439e-04	5
18		min	-.021	6	-.185	3	-.305	3	2.124e-03	5	1.976e-04	6	-1.576e-03	3
19	N10	max	.096	2	-.287	2	.711	5	2.442e-02	3	2.108e-02	4	-1.464e-04	5
20		min	-.019	6	-.915	6	-.276	1	4.81e-03	5	-3.822e-03	2	-7.696e-04	1
21	N11	max	.095	2	-.41	5	.36	5	2.03e-02	6	-8.718e-03	3	-1.018e-03	5
22		min	-.022	6	-1.223	3	-.151	3	2.967e-03	2	-1.588e-02	4	-3.262e-03	3
23	N12	max	.133	1	-.146	2	.389	6	2.731e-02	3	3.119e-03	2	-1.113e-03	5
24		min	.032	6	-.435	6	.177	2	8.815e-03	5	-4.524e-04	6	-2.758e-03	3
25	N13	max	.133	1	-.165	5	.373	6	2.709e-02	3	4.026e-03	1	2.171e-04	5
26		min	.032	6	-.49	3	.089	2	8.898e-03	2	1.873e-03	6	-1.297e-03	1
27	N14	max	.171	1	-.271	5	.401	6	2.297e-02	3	4.527e-03	4	-4.817e-04	5
28		min	.043	6	-.804	3	.215	2	8.224e-03	5	1.013e-03	3	-9.55e-04	1
29	N15	max	.171	1	-.303	5	.365	6	2.232e-02	6	1.708e-03	1	-6.639e-04	5
30		min	.042	6	-.914	3	.053	2	7.974e-03	2	7.754e-05	6	-3.236e-03	3
31	N16	max	.171	1	-.286	2	.986	4	2.353e-02	3	1.962e-02	4	1.177e-04	5
32		min	.042	6	-.915	6	.247	2	6.556e-03	5	-2.192e-03	2	-2.063e-03	1
33	N17	max	.171	1	-.41	5	.657	6	2.04e-02	6	-5.848e-03	3	-1.351e-03	5
34		min	.042	6	-1.223	3	.197	2	1.542e-03	2	-1.444e-02	4	-4.489e-03	3
35	N18	max	.171	1	-.298	5	.416	6	2.564e-02	6	2.289e-03	1	-5.449e-04	5
36		min	.042	6	-.9	3	.142	2	8.34e-03	2	5.078e-04	6	-3.38e-03	1
37	N19	max	.095	2	-.297	5	-.037	5	2.309e-02	3	1.998e-03	5	-3.338e-04	2
38		min	-.02	6	-.9	3	-.439	3	-3.673e-03	5	2.473e-04	6	-1.664e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
39	N20	max	.106	2	-.287	2	.757	5	2.429e-02	3	2.071e-02	4	-5.302e-04	5
40		min	-.007	6	-.915	6	-.129	1	5.331e-03	5	-3.414e-03	2	-2.084e-03	3
41	N21	max	.212	1	-.287	2	1.16	4	2.355e-02	3	1.962e-02	4	1.178e-04	5
42		min	.045	6	-.915	6	.498	2	7.08e-03	5	-2.192e-03	2	-2.34e-03	1
43	N22	max	.255	1	-.41	5	1.027	6	2.057e-02	6	-5.848e-03	3	-1.352e-03	5
44		min	.097	5	-1.223	3	.225	2	1.543e-03	2	-1.444e-02	4	-4.756e-03	1
45	N23	max	.087	2	-.287	2	.632	5	2.44e-02	3	2.108e-02	4	-1.463e-04	5
46		min	-.027	6	-.915	6	-.681	3	4.286e-03	5	-3.822e-03	2	-5.232e-04	3
47	N24	max	.075	2	-.41	5	.28	5	2.013e-02	6	-8.718e-03	3	-9.951e-04	2
48		min	-.078	6	-1.223	3	-.509	3	2.966e-03	2	-1.588e-02	4	-3.15e-03	6
49	N25	max	.094	1	-.038	2	.389	6	2.771e-02	3	4.843e-03	4	-1.402e-04	5
50		min	.018	5	-.173	6	.177	2	9.008e-03	5	3.159e-03	6	-2.039e-03	1
51	N26	max	.094	1	-.077	5	.373	6	2.751e-02	3	3.007e-03	2	-7.766e-04	5
52		min	.019	5	-.225	3	.089	2	9.023e-03	2	-1.714e-03	6	-3.043e-03	1
53	N27	max	.094	1	-.066	5	.331	6	2.069e-02	6	2.79e-03	1	-4.674e-04	5
54		min	.018	5	-.185	3	.117	2	7.261e-03	2	3.522e-04	6	-2.682e-03	1
55	N28	max	.052	2	-.066	5	0	4	1.35e-02	3	2.949e-03	2	-3.468e-04	5
56		min	.002	6	-.185	3	0	2	4.798e-03	5	1.593e-04	6	-1.135e-03	3
57	N29	max	0	6	0	6	0	6	0	6	0	6	0	6
58		min	0	1	0	1	0	1	0	1	0	1	0	1
59	N30	max	0	2	0	5	0	5	0	6	6.923e-08	2	0	6
60		min	0	4	0	1	0	1	0	1	0	4	0	1
61	N31	max	.106	2	-.41	5	.41	4	2.025e-02	6	-8.e-03	3	-3.83e-04	5
62		min	-.003	6	-1.223	3	.027	3	2.526e-03	2	-1.552e-02	4	-1.445e-03	3
63	N32	max	-.02	2	-.065	2	.245	6	-1.91e-03	2	-9.053e-04	6	-2.025e-03	2
64		min	-.35	6	-.186	6	.113	2	-1.042e-02	6	-6.193e-03	1	-1.604e-02	6
65	N33	max	.386	3	-.065	2	-.005	5	-1.967e-03	5	-2.302e-04	6	-5.761e-03	5
66		min	.156	5	-.186	6	-.234	3	-1.107e-02	3	-6.215e-03	2	-1.731e-02	3
67	N34	max	.113	2	-.075	5	.205	6	-5.456e-03	2	3.672e-03	6	-7.677e-03	2
68		min	-.293	6	-.211	3	.032	2	-1.698e-02	6	-1.155e-02	2	-2.534e-02	6
69	N35	max	-.079	2	-.063	2	.224	6	-4.357e-03	2	-6.468e-03	2	-7.72e-03	2
70		min	-.326	6	-.184	6	.142	2	-1.313e-02	6	-7.988e-03	4	-2.325e-02	6
71	N36	max	.164	2	-.167	2	.229	6	-5.702e-03	5	-1.346e-03	6	-7.285e-03	2
72		min	-.279	6	-.503	6	.121	2	-1.841e-02	3	-7.463e-03	1	-2.395e-02	6
73	N37	max	-.027	2	-.148	2	.26	1	-3.534e-03	2	-1.797e-03	6	-7.741e-03	2
74		min	-.312	6	-.44	6	.202	5	-1.254e-02	6	-9.519e-03	1	-2.267e-02	6
75	N38	max	-.068	2	-.269	2	.42	1	-1.8e-03	2	1.281e-03	6	-4.631e-03	2
76		min	-.319	6	-.824	6	.249	5	-1.199e-02	6	-4.352e-03	2	-1.915e-02	6
77	N39	max	.327	2	-.322	2	.237	6	-4.501e-03	2	-8.138e-04	5	-4.578e-03	2
78		min	-.254	6	-.972	6	.165	2	-1.451e-02	6	-1.138e-02	1	-1.6e-02	6
79	N40	max	-.008	2	-.065	2	.182	6	-1.91e-03	2	-9.053e-04	6	-2.026e-03	2
80		min	-.254	6	-.186	6	.101	2	-1.042e-02	6	-6.193e-03	1	-1.604e-02	6
81	N41	max	.196	2	-.291	2	.324	4	-2.582e-03	2	1.345e-02	1	-2.459e-03	2
82		min	-.263	4	-.907	6	.181	3	-1.33e-02	6	-1.976e-03	5	-2.053e-02	6
83	N42	max	.973	2	-.448	2	.353	4	-4.404e-03	2	9.927e-03	5	-3.857e-03	2
84		min	-.314	4	-1.318	6	-.208	2	-1.358e-02	6	-2.188e-02	1	-1.506e-02	6
85	N43	max	.318	3	-.148	2	.096	2	-3.705e-03	5	-1.416e-04	6	-6.639e-03	2
86		min	.105	5	-.44	6	-.184	6	-1.276e-02	3	-9.109e-03	2	-2.233e-02	6
87	N44	max	.378	1	-.167	2	.015	5	-6.171e-03	2	5.829e-04	6	-8.354e-03	2
88		min	.181	5	-.503	6	-.192	3	-1.834e-02	6	-7.622e-03	2	-2.443e-02	6
89	N45	max	.316	3	-.269	2	.257	2	-3.919e-03	5	-6.05e-05	6	-6.968e-03	2
90		min	.09	5	-.823	6	-.191	6	-1.353e-02	3	-5.981e-03	2	-2.e-02	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
91	N46	max	.541	1	-.322	2	.03	5	-5.138e-03	5	9.368e-04	6	-5.953e-03	5
92		min	.236	5	-.972	6	-.19	3	-1.467e-02	3	-9.839e-03	2	-1.671e-02	6
93	N47	max	.562	3	-.291	2	.179	5	-1.65e-03	2	1.116e-02	1	-3.883e-03	2
94		min	-.021	5	-.907	6	-.314	3	-1.222e-02	6	-3.099e-03	5	-1.957e-02	6
95	N48	max	1.224	1	-.448	2	.122	5	-4.995e-03	2	8.994e-03	5	-6.713e-03	2
96		min	.077	5	-1.318	6	-.391	1	-1.342e-02	6	-2.074e-02	1	-1.442e-02	6
97	N49	max	.364	3	-.305	2	.138	2	-2.192e-03	5	8.295e-05	6	-6.068e-03	5
98		min	.18	5	-.936	6	-.208	6	-1.483e-02	3	-7.043e-03	2	-2.095e-02	3
99	N50	max	.101	2	-.305	2	.327	1	-1.096e-03	2	-1.129e-03	6	3.153e-03	2
100		min	-.351	6	-.936	6	.216	5	-1.44e-02	6	-7.263e-03	1	-1.932e-02	6
101	N51	max	.221	1	-.291	2	.272	4	-2.777e-03	2	1.288e-02	1	-2.654e-03	2
102		min	-.183	5	-.907	6	.057	3	-1.433e-02	6	-2.257e-03	5	-1.963e-02	6
103	N52	max	.907	3	-.291	2	.142	5	-1.65e-03	2	1.116e-02	1	-4.407e-03	2
104		min	.089	5	-.907	6	-.533	3	-1.216e-02	3	-3.099e-03	5	-1.959e-02	6
105	N53	max	1.38	1	-.448	2	.021	5	-4.997e-03	2	8.994e-03	5	-7.318e-03	2
106		min	.265	5	-1.318	6	-.588	3	-1.332e-02	6	-2.074e-02	1	-1.443e-02	6
107	N54	max	.159	2	-.291	2	.456	6	-2.581e-03	2	1.345e-02	1	-1.936e-03	2
108		min	-.59	6	-.907	6	.284	2	-1.336e-02	6	-1.976e-03	5	-2.051e-02	6
109	N55	max	.912	2	-.448	2	.521	4	-4.402e-03	2	9.927e-03	5	-3.254e-03	2
110		min	-.518	4	-1.318	6	-.128	2	-1.369e-02	6	-2.188e-02	1	-1.504e-02	6
111	N56	max	.316	3	-.072	2	.027	5	-3.269e-03	5	2.066e-03	6	-7.158e-03	2
112		min	.087	5	-.189	6	-.187	3	-1.266e-02	3	-6.753e-03	2	-2.29e-02	6
113	N57	max	.337	1	-.059	5	-.017	5	-5.47e-03	2	-1.48e-03	6	-9.007e-03	2
114		min	.163	5	-.21	3	-.196	3	-1.696e-02	6	-1.064e-02	1	-2.562e-02	6
115	N58	max	.282	3	-.065	2	.007	5	-1.967e-03	5	-2.302e-04	6	-5.761e-03	5
116		min	.121	5	-.186	6	-.168	3	-1.107e-02	3	-6.215e-03	2	-1.731e-02	3
117	N59	max	.035	2	-.064	2	.06	2	-2.371e-03	5	-6.356e-04	6	-3.926e-03	2
118		min	.006	6	-.185	6	.009	6	-7.522e-03	3	-4.668e-03	2	-1.133e-02	6
119	N60	max	0	6	0	6	0	6	0	6	0	6	0	6
120		min	0	1	0	1	0	1	0	1	0	1	0	1
121	N61	max	1.017	1	-.448	2	.28	4	-3.891e-03	2	9.694e-03	5	-4.963e-03	2
122		min	-.212	5	-1.318	6	-.244	2	-1.157e-02	6	-2.159e-02	1	-1.592e-02	6
123	N62	max	.405	3	-.067	5	.189	6	-2.378e-03	5	6.06e-03	4	1.803e-02	3
124		min	.134	5	-.187	3	.035	2	-8.05e-03	3	-6.008e-03	1	8.077e-03	5
125	N63	max	-.054	2	-.067	5	.066	5	1.692e-04	5	6.602e-03	5	1.817e-02	6
126		min	-.408	6	-.187	3	-.199	3	-8.063e-03	3	-6.481e-03	1	3.665e-03	2
127	N64	max	.352	6	-.09	2	.202	4	-2.787e-03	5	1.273e-02	4	2.502e-02	6
128		min	.16	2	-.232	6	-.009	2	-1.056e-02	3	-2.222e-03	2	9.743e-03	2
129	N65	max	.383	1	-.039	5	.167	3	-3.215e-03	5	4.85e-03	5	2.671e-02	3
130		min	.031	5	-.167	3	.078	5	-1.422e-02	3	-1.538e-02	1	9.416e-03	5
131	N66	max	.35	3	-.191	2	.289	4	-2.071e-03	5	7.468e-03	4	2.448e-02	6
132		min	.162	5	-.488	6	-.094	2	-9.956e-03	3	-8.775e-03	2	9.268e-03	2
133	N67	max	.432	1	-.133	5	.186	6	-3.309e-03	5	8.096e-03	5	2.533e-02	3
134		min	-.019	5	-.458	3	.012	2	-1.559e-02	3	-7.314e-03	1	9.349e-03	5
135	N68	max	.59	1	-.259	5	.223	4	-2.947e-03	5	6.279e-03	4	1.859e-02	6
136		min	-.159	5	-.878	3	-.029	2	-1.173e-02	3	-8.809e-03	2	7.456e-03	2
137	N69	max	.348	6	-.366	2	.431	4	-3.475e-04	5	6.835e-03	5	2.097e-02	3
138		min	.169	2	-.923	6	-.247	2	-9.171e-03	3	-6.273e-03	1	7.726e-03	5
139	N70	max	.297	3	-.067	5	.144	6	-2.378e-03	5	6.06e-03	4	1.803e-02	3
140		min	.085	5	-.187	3	.008	2	-8.05e-03	3	-6.008e-03	1	8.077e-03	5
141	N71	max	1.113	1	-.251	5	.293	1	-4.771e-03	2	4.993e-03	6	1.929e-02	6
142		min	-.099	5	-1.043	3	.131	6	-1.14e-02	6	-1.588e-02	2	8.419e-03	2

Envelope Joint Displacements (Continued)

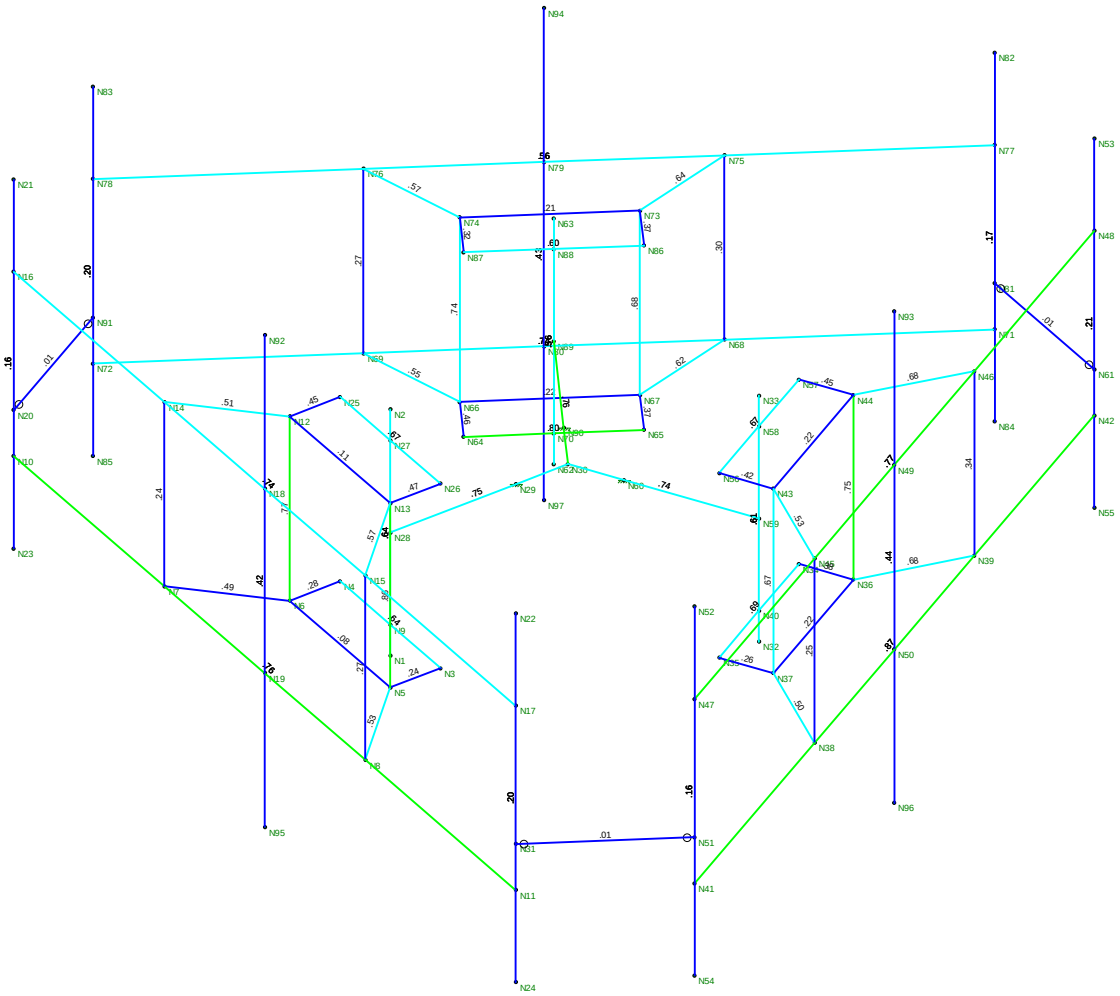
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
143	N72	max	.477	4	-.481	2	.567	4	-2.704e-04	5	8.052e-03	2	2.165e-02	3
144		min	.246	3	-1.203	6	-.147	2	-9.632e-03	3	-5.482e-03	6	5.247e-03	5
145	N73	max	.124	2	-.133	5	.086	5	-4.323e-03	5	9.313e-03	5	2.542e-02	6
146		min	-.356	6	-.458	3	-.175	3	-1.529e-02	3	-8.679e-03	1	9.693e-03	2
147	N74	max	-.077	2	-.19	2	.204	5	-1.613e-03	5	9.018e-03	5	2.45e-02	3
148		min	-.325	6	-.488	6	-.258	1	-1.016e-02	3	-9.392e-03	1	9.079e-03	5
149	N75	max	.298	2	-.259	5	.133	5	-2.923e-03	5	6.992e-03	5	1.932e-02	6
150		min	-.507	4	-.878	3	-.188	3	-1.182e-02	3	-1.041e-02	1	7.208e-03	2
151	N76	max	-.045	5	-.367	2	.379	5	-1.223e-03	5	9.325e-03	5	2.133e-02	3
152		min	-.334	3	-.923	6	-.43	1	-9.553e-03	3	-6.233e-03	1	7.966e-03	5
153	N77	max	.827	2	-.25	5	.138	2	-4.272e-03	2	3.795e-03	6	1.851e-02	6
154		min	-.631	4	-1.043	3	-.221	6	-1.079e-02	6	-1.652e-02	2	5.455e-03	2
155	N78	max	.296	5	-.481	2	.576	5	2.328e-03	5	8.602e-03	5	2.081e-02	3
156		min	-.484	3	-1.203	6	-.408	1	-8.819e-03	3	-2.922e-03	6	4.425e-03	5
157	N79	max	.076	2	-.327	5	.248	5	1.976e-04	5	7.777e-03	5	2.074e-02	6
158		min	-.385	6	-.938	3	-.317	1	-1.06e-02	3	-7.551e-03	1	-9.143e-04	2
159	N80	max	.444	3	-.327	5	.336	4	-4.163e-03	5	7.292e-03	4	2.279e-02	3
160		min	.029	5	-.938	3	-.13	2	-1.188e-02	3	-6.937e-03	1	9.519e-03	5
161	N81	max	1.018	1	-.251	5	.243	2	-4.053e-03	2	4.694e-03	6	1.994e-02	6
162		min	-.212	5	-1.043	3	.036	6	-9.957e-03	6	-1.604e-02	2	8.01e-03	2
163	N82	max	.737	2	-.25	5	.061	2	-4.244e-03	5	3.795e-03	6	1.853e-02	6
164		min	-.906	4	-1.043	3	-.414	6	-1.075e-02	3	-1.652e-02	2	4.934e-03	2
165	N83	max	.216	5	-.481	2	.625	5	2.796e-03	5	8.602e-03	5	2.068e-02	3
166		min	-.857	3	-1.203	6	-.527	1	-8.828e-03	3	-2.922e-03	6	4.427e-03	5
167	N84	max	1.314	1	-.251	5	.403	1	-4.769e-03	2	4.993e-03	6	1.927e-02	6
168		min	.122	5	-1.043	3	.337	6	-1.147e-02	6	-1.588e-02	2	8.939e-03	2
169	N85	max	.646	1	-.481	2	.599	4	-7.365e-04	5	8.052e-03	2	2.178e-02	3
170		min	.55	5	-1.203	6	-.048	2	-9.622e-03	3	-5.482e-03	6	5.245e-03	5
171	N86	max	.078	2	-.024	5	.005	5	-3.212e-03	5	9.778e-03	4	2.652e-02	6
172		min	-.348	6	-.171	3	-.153	3	-1.421e-02	3	-9.886e-03	2	9.761e-03	2
173	N87	max	-.045	5	-.081	2	.123	5	-1.221e-03	5	9.503e-03	5	2.487e-02	3
174		min	-.334	3	-.236	6	-.185	3	-1.059e-02	3	-9.117e-03	1	9.448e-03	5
175	N88	max	-.032	2	-.067	5	.065	5	1.692e-04	5	6.602e-03	5	1.817e-02	6
176		min	-.299	6	-.187	3	-.151	3	-8.063e-03	3	-6.481e-03	1	3.666e-03	2
177	N89	max	.036	1	-.067	5	.067	5	-1.045e-03	5	5.039e-03	5	1.232e-02	6
178		min	-.038	5	-.186	3	-.061	1	-5.992e-03	3	-4.75e-03	1	4.708e-03	2
179	N90	max	0	6	0	6	0	6	0	6	0	6	0	6
180		min	0	1	0	1	0	1	0	1	0	1	0	1
181	N91	max	.411	5	-.481	2	.554	5	-3.32e-04	5	7.875e-03	2	2.031e-02	3
182		min	.058	3	-1.203	6	-.203	1	-1.121e-02	3	-4.842e-03	6	4.512e-03	5
183	N92	max	.341	1	-.298	5	1.226	6	2.89e-02	4	2.289e-03	1	-5.461e-04	5
184		min	.089	5	-.901	3	.393	2	8.359e-03	2	5.078e-04	6	-6.469e-03	1
185	N93	max	1.049	1	-.305	2	.066	5	8.811e-04	5	8.295e-05	6	-6.082e-03	5
186		min	.363	5	-.936	6	-.647	3	-1.494e-02	3	-7.043e-03	2	-2.501e-02	1
187	N94	max	.27	2	-.327	5	.323	5	3.276e-03	5	7.777e-03	5	2.09e-02	6
188		min	-1.011	6	-.939	3	-.559	3	-1.068e-02	3	-7.551e-03	1	-8.405e-03	2
189	N95	max	.152	2	-.297	5	.239	5	2.298e-02	3	1.998e-03	5	2.677e-03	2
190		min	-.07	6	-.901	3	-1.129	3	-1.114e-02	5	2.473e-04	6	-1.656e-03	6
191	N96	max	.361	2	-.305	2	.74	6	-1.095e-03	2	-1.129e-03	6	1.062e-02	2
192		min	-.929	6	-.936	6	.327	2	-1.509e-02	6	-7.263e-03	1	-1.923e-02	6
193	N97	max	1.186	1	-.328	5	.607	6	-7.169e-03	5	7.292e-03	4	2.739e-02	1
194		min	.315	5	-.938	3	.106	2	-1.185e-02	6	-6.937e-03	1	9.508e-03	5

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	M31	L2.5x2.5x3	.869	3.5	1	.056	8....	y	1	12.872	29.192	.873	1.605	1	H2-1
2	M14	L2x2x3	.862	3	3	.059	0	y	3	14.903	23.393	.558	1.239	2.2...	H2-1
3	M48	C3X5	.800	1.2	1	.196	1....	z	3	36.492	47.628	.981	4.104	1.3...	H1-...
4	M13	L2x2x3	.773	3	6	.049	3	y	6	14.903	23.393	.558	1.239	2.2...	H2-1
5	M35	L2.5x2.5x3	.767	3.5	1	.049	8....	y	1	12.872	29.192	.873	1.605	1	H2-1
6	M8	L2.5x2.5x3	.765	3.5	4	.056	3....	y	4	12.872	29.192	.873	1.605	1	H2-1
7	M69	HSS4X3X3	.757	1....	3	.103	1....	y	6	87.764	92.736	8.487	10.35	1.5...	H1-...
8	M37	L2x2x3	.752	0	3	.035	0	z	6	14.903	23.393	.558	1.239	2.2...	H2-1
9	M25	HSS4X3X3	.749	1....	3	.100	1....	y	3	87.764	92.736	8.487	10.35	1.5...	H1-...
10	M54	L2.5x2.5x3	.745	8.5	2	.051	6	z	1	12.872	29.192	.873	1.605	1	H2-1
11	M46	HSS4X3X3	.744	1....	3	.093	1....	y	3	87.764	92.736	8.487	10.35	1.5...	H1-...
12	M60	L2x2x3	.743	3	6	.050	3	z	3	14.903	23.393	.558	1.239	2.2...	H2-1
13	M12	L2.5x2.5x3	.738	3.5	4	.057	3....	y	4	12.872	29.192	.873	1.605	1	H2-1
14	M25A	C3X5	.686	1.2	6	.214	1.2	y	3	36.492	47.628	.981	4.104	1.3...	H1-...
15	M59	L2x2x3	.681	3	3	.030	0	z	3	14.903	23.393	.558	1.239	2.2...	H2-1
16	M33	L2.5x2.5x3	.681	1....	3	.082	0	z	3	26.186	29.192	.873	1.972	1.7...	H2-1
17	M29	L2.5x2.5x3	.679	1....	6	.079	0	y	6	26.186	29.192	.873	1.972	1.8...	H2-1
18	M43	C3X5	.674	1.2	1	.203	1.2	z	6	36.492	47.628	.981	4.104	1.4...	H1-...
19	M36	L2x2x3	.673	0	6	.048	0	z	3	14.903	23.393	.558	1.239	2.27	H2-1
20	M22	C3X5	.668	1.2	6	.157	1.2	z	3	36.492	47.628	.981	4.104	1.36	H1-...
21	M1	PIPE_2.5	.643	2	4	.131	2		4	44.491	50.715	3.596	3.596	1.3...	H1-...
22	M57	L2.5x2.5x3	.643	1....	3	.073	0	y	3	26.186	29.192	.873	1.972	1.8...	H2-1
23	M2	C3X5	.636	1.2	3	.180	1.2	y	6	36.492	47.628	.981	4.104	1.3...	H1-...
24	M53	L2.5x2.5x3	.624	1....	3	.069	0	z	3	26.186	29.192	.873	1.972	1.7...	H2-1
25	M24A	PIPE_2.5	.610	2	3	.163	2		1	44.491	50.715	3.596	3.596	1.5...	H1-...
26	M66	C3X5	.602	1.2	3	.193	1.2	y	3	36.492	47.628	.981	4.104	1.3...	H1-...
27	M56	L2.5x2.5x3	.573	1....	6	.062	0	z	6	26.186	29.192	.873	1.972	2.1...	H2-1
28	M10	L2.5x2.5x3	.567	1....	3	.081	0	z	3	26.186	29.192	.873	1.972	2.1...	H2-1
29	M47	PIPE_2.5	.563	2	1	.170	2		1	44.491	50.715	3.596	3.596	1.6...	H1-...
30	M58	L2.5x2.5x3	.560	8.5	2	.057	3....	z	1	12.872	29.192	.873	1.605	1	H2-1
31	M52	L2.5x2.5x3	.553	1....	3	.058	0	y	3	26.186	29.192	.873	1.972	2.22	H2-1
32	M6	L2.5x2.5x3	.530	1....	3	.078	0	y	3	26.186	29.192	.873	1.972	2.2...	H2-1
33	M34	L2.5x2.5x3	.529	1....	3	.055	0	y	3	26.186	29.192	.873	1.972	2.1...	H2-1
34	M11	L2.5x2.5x3	.505	1....	6	.070	0	y	6	26.186	29.192	.873	1.972	2.1...	H2-1
35	M30	L2.5x2.5x3	.501	1....	1	.050	0	z	6	26.186	29.192	.873	1.972	1.5...	H2-1
36	M7	L2.5x2.5x3	.490	1....	3	.065	0	z	6	26.186	29.192	.873	1.972	2.2...	H2-1
37	M23	C3X5	.467	0	6	.099	.402	z	3	46.225	47.628	.981	4.104	1.7...	H1-...
38	M50	3"x1/2"	.464	0	1	.044	0	y	6	38.413	48.6	.506	3.038	1.6...	H1-...
39	M44	C3X5	.447	0	3	.089	.402	z	3	46.225	47.628	.981	4.104	1.8...	H1-...
40	M24	C3X5	.446	0	6	.092	.402	z	6	46.225	47.628	.981	4.104	1.76	H1-...
41	M40	PIPE_2.0	.436	2.5	1	.046	2.5		1	14.916	32.13	1.872	1.872	1.22	H1-...
42	M63	PIPE_2.0	.426	2.5	2	.051	2.5		1	14.916	32.13	1.872	1.872	1.2...	H1-...
43	M19	PIPE_2.0	.417	2.5	4	.041	2.5		4	14.916	32.13	1.872	1.872	3.5...	H1-...
44	M45	C3X5	.416	0	1	.065	.402	z	1	46.225	47.628	.981	4.104	1.6...	H1-...
45	M27	3"x1/2"	.383	0	6	.081	0	y	3	38.413	48.6	.506	3.038	1.8...	H1-...
46	M49	3"x1/2"	.371	0	4	.076	0	y	3	38.413	48.6	.506	3.038	2.02	H1-...
47	M68	C3X5	.366	0	6	.081	.402	z	6	46.225	47.628	.981	4.104	1.8...	H1-...
48	M42	PIPE_2.0	.338	3	3	.130	0		3	28.843	32.13	1.872	1.872	2.1...	H1-...
49	M67	C3X5	.320	0	6	.046	.402	y	1	46.225	47.628	.981	4.104	1.7...	H1-...
50	M64	PIPE_2.0	.298	3	3	.104	0		3	28.843	32.13	1.872	1.872	2.1...	H1-...
51	M3	3"x1/2"	.281	0	3	.082	0	y	3	38.413	48.6	.506	3.038	1.8...	H1-...

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
52	M65	PIPE_2.0	.270	3	6	.087	3		6	28.843	32.13	1.872	1.872	2.2...	H1-...
53	M21	PIPE_2.0	.269	3	6	.095	3		3	28.843	32.13	1.872	1.872	2.2...	H1-...
54	M26	3"x1/2"	.259	0	2	.039	0	y	1	38.413	48.6	.506	3.038	1.8...	H1-...
55	M41	PIPE_2.0	.245	3	3	.056	1.5		3	28.843	32.13	1.872	1.872	2.2...	H1-...
56	M4	3"x1/2"	.244	0	3	.083	0	y	3	38.413	48.6	.506	3.038	1.79	H1-...
57	M20	PIPE_2.0	.240	3	6	.063	3		6	28.843	32.13	1.872	1.872	2.2...	H1-...
58	M28	L2.5x2.5x3	.224	0	3	.019	0	y	3	23.874	29.192	.873	1.952	1.2...	H2-1
59	M51	L2.5x2.5x3	.217	2.4	3	.022	0	z	1	23.874	29.192	.873	1.972	1.5...	H2-1
60	M32	L2.5x2.5x3	.215	0	3	.023	2.4	y	1	23.874	29.192	.873	1.971	1.3...	H2-1
61	M55	L2.5x2.5x3	.214	2.4	3	.026	2.4	y	4	23.874	29.192	.873	1.951	1.2...	H2-1
62	M39	PIPE_2.0	.212	4.5	6	.085	3.75		3	20.867	32.13	1.872	1.872	1.3...	H1-...
63	M62	PIPE_2.0	.201	4.5	3	.080	3.75		6	20.867	32.13	1.872	1.872	1.5...	H1-...
64	M18	PIPE_2.0	.196	4.5	6	.091	3.75		1	20.867	32.13	1.872	1.872	1.4...	H1-...
65	M61	PIPE_2.0	.171	1.5	3	.062	3.75		3	20.867	32.13	1.872	1.872	1.3...	H1-...
66	M38	PIPE_2.0	.162	1.5	3	.071	3.75		1	20.867	32.13	1.872	1.872	1.4...	H1-...
67	M15	PIPE_2.0	.161	4.5	3	.058	3.75		6	20.867	32.13	1.872	1.872	1.4...	H1-...
68	M9	L2.5x2.5x3	.108	2.4	4	.014	.025	y	1	23.874	29.192	.873	1.972	1.5...	H2-1
69	M5	L2.5x2.5x3	.078	2.4	1	.012	0	y	1	23.874	29.192	.873	1.972	2.1...	H2-1
70	M72	PIPE_2.0	.008	2....	1	.045	0		3	30.024	32.13	1.872	1.872	1.1...	H1-...
71	M71	PIPE_2.0	.007	1....	5	.040	0		6	30.024	32.13	1.872	1.872	1.1...	H1-...
72	M70	PIPE_2.0	.006	0	4	.044	2....		4	30.024	32.13	1.872	1.872	1.1...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CT11128E - Mount	July 27, 2020 at 3:54 PM
20074.63	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: CT11128E

Middlebury/ I-84 X17
1021 Straits Turnpike
Middlebury, Connecticut 06762

September 30, 2020

EBI Project Number: 6220005193

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**12.58%**

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

September 30, 2020

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

Emissions Analysis for Site: CT11128E - Middlebury/ I-84 X17

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1021 Straits Turnpike** in **Middlebury, 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 1021 Straits Turnpike in Middlebury, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

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

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

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

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

8) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

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

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

12) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

13) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels

are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

14) The antenna mounting height centerline of the proposed antennas is 195 feet above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	195 feet	Height (AGL):	195 feet	Height (AGL):	195 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A1 MPE %:	**2.43%**	Antenna B1 MPE %:	**2.43%**	Antenna C1 MPE %:	**2.43%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	195 feet	Height (AGL):	195 feet	Height (AGL):	195 feet
Channel Count:	11	Channel Count:	11	Channel Count:	11
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	13,259.22	ERP (W):	13,259.22	ERP (W):	13,259.22
Antenna A2 MPE %:	**1.79%**	Antenna B2 MPE %:	**1.79%**	Antenna C2 MPE %:	**1.79%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.85 dBd
Height (AGL):	195 feet	Height (AGL):	195 feet	Height (AGL):	195 feet
Channel Count:	10	Channel Count:	10	Channel Count:	10
Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts
ERP (W):	16,954.74	ERP (W):	16,954.74	ERP (W):	16,954.74
Antenna A3 MPE %:	**1.60%**	Antenna B3 MPE %:	**1.60%**	Antenna C3 MPE %:	**1.60%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	5.81%
AT&T	2.57%
Metro PCS	0.35%
Verizon	1.74%
Sprint	2.11%
Site Total MPE % :	12.58%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	5.81%
T-Mobile Sector B Total:	5.81%
T-Mobile Sector C Total:	5.81%
Site Total MPE % :	12.58%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE	2	6412.98	195.0	12.13	2500 MHz LTE	1000	1.21%
T-Mobile 2500 MHz NR	2	6412.98	195.0	12.13	2500 MHz NR	1000	1.21%
T-Mobile 600 MHz LTE	2	591.73	195.0	1.12	600 MHz LTE	400	0.28%
T-Mobile 600 MHz NR	1	1577.94	195.0	1.49	600 MHz NR	400	0.37%
T-Mobile 700 MHz LTE	2	648.82	195.0	1.23	700 MHz LTE	467	0.26%
T-Mobile 1900 MHz UMTS	2	1101.85	195.0	2.08	1900 MHz UMTS	1000	0.21%
T-Mobile 1900 MHz LTE	2	2203.69	195.0	4.17	1900 MHz LTE	1000	0.42%
T-Mobile 2100 MHz UMTS	2	1294.56	195.0	2.45	2100 MHz UMTS	1000	0.24%
T-Mobile 1900 MHz GSM	4	1028.30	195.0	3.89	1900 MHz GSM	1000	0.39%
T-Mobile 1900 MHz LTE	4	2056.61	195.0	7.78	1900 MHz LTE	1000	0.78%
T-Mobile 2100 MHz LTE	2	2307.55	195.0	4.36	2100 MHz LTE	1000	0.44%
						Total:	**5.81%**

• 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:	5.81%
Sector B:	5.81%
Sector C:	5.81%
T-Mobile Maximum MPE % (Sector A):	5.81%
Site Total:	12.58%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.58%** 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.