STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

VIA ELECTRONIC MAIL

March 7, 2019

Kyle Richers
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, New Jersey 07430

RE: **EM-T-MOBILE-145-190215 –** T-Mobile notice of intent to modify an existing telecommunications facility located at Bald Hill Road, Union, Connecticut.

Dear Mr. Richers:

The Connecticut Siting Council (Council) is in receipt of your correspondence of March 7, 2019 submitted in response to the Council's March 1, 2019 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/FOC/CW/in/emr

Robidoux, Evan

From: Kyle Richers <krichers@transcendwireless.com>
Sent: Thursday, March 07, 2019 9:04 AM
To: Robidoux, Evan
Cc: CSC-DL Siting Council; dreid@transcendwireless.com
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-145-190215-BaldHillRd-Union CT11143C
Attachments: 18127.23 - CT11143C - Structural Analysis Rev 2 19.03.06.pdf; 18127.23 - CT11143C CD Rev.1 19.03.06 S&S.pdf

Good Morning,

Please find the attached structural analysis with the updated code. Also attached are the revised drawings to reflect the latest structural. Let me know if you will need anything else here to proceed.

Thanks

From: Robidoux, Evan <Evan.Robidoux@ct.gov>
Sent: Wednesday, March 6, 2019 8:46 AM
To: 'krichers@transcendwireless.com' <krichers@transcendwireless.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Council Incomplete Letter for EM-T-MOBILE-145-190215-BaldHillRd-Union

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

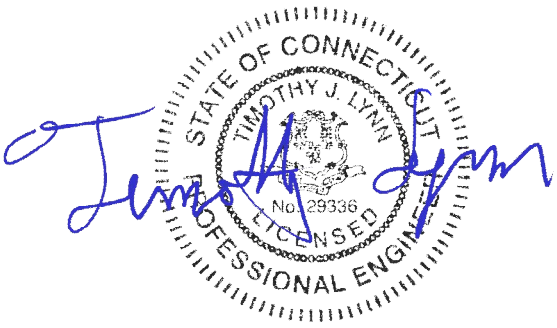
180-ft Existing Andrew Lattice Tower

T-Mobile Site #: CT11143C

Bald Hill Road
Union, CT

Centek Project No. 18127.23

~~Date: October 15, 2018~~
Rev 2: March 6, 2019



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing self-supporting lattice tower located in Union, Connecticut.

The host tower is a 180-ft, three legged, tapered lattice tower originally designed and manufactured by Andrew Corporation. The tower geometry and structure member sizes were obtained from the original tower design drawings prepared by Andrew; drawing no. LI-3089-01 approved November 12, 1993.

Antenna and appurtenance information were obtained from a previous structural report prepared by Centek job no.; 16179.00 dated December 4, 2017 and a T-Mobile RF Sheet.

The tower is made up of nine (9) tapered vertical steel sections consisting of A572-50 pipe legs. Diagonal lateral support bracing consists of A36 steel angle construction. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted and welded gusset connections. The tower face width is 9.50-ft at the top and 26.00-ft at the bottom.

Antenna and Appurtenance Summary

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

- EVERSOURCE (Existing):
  Antennas: Two (2) 20' omni (whips) leg mounted with an elevation of ±180-ft above finished grade.
  Coax Cables: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) 4-bay dipole antenna mounted on a 6' side-arm with an elevation of ±177.75-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) Db Spectra DS9A09F36D-N Omni-directional whip antenna and one (1) Bird TTA mounted on an existing 6' side-arm with an elevation of ±178-ft above finished grade.
  Coax Cables: Two (2) 1-1/4" ∅ and one (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: One (1) 10' Omni-directional (whip) mounted on a 6' side-arm with elevations of ±176.5-ft above finished grade.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- STATE POLICE (Existing:
  Antennas: One (1) Scala OGT9-806 whip on a 6' side-arm with an elevation of ±174-ft above finished grade to be relocated to the USF12 frame at 172'.
  Coax Cables: One (1) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: Three (3) Sinclair SE414-SWBP2LDF whips and one (1) TX/RX 432E-83I-01T TTAs mounted on a SitePro USF12 sector frame with elevation of ±172-ft above finished grade.
  Coax Cables: Two (2) 1-5/8" ∅ and two (2) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: One (1) RFS 6' dish mounted with a RAD center elevation of ±169.5-ft above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: One (1) Scala AP14-850/105 panel antenna mounted on a 3' side-arm with a RAD center elevation of 164-ft above finished grade to be relocated to the USF12 frame at 163'.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: Three (3) Antel WPA-700120-8CF panel antennas and one (1) TX/RX 432E-83I-01T TTA mounted on a SitePro USF12 sector frame with elevation of ±163-ft above finished grade.
  Coax Cables: Two (2) 1-5/8" ∅ and two (2) 1/2" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) folded di-pole (whip) leg mounted with a RAD center elevation of 151.92-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: Two (2) empty 1' side-arms with a RAD center elevation of ±150-ft above finished grade.
- EVERSOURCE (Existing):
  Antennas: One (1) di-pole (whip) mounted on a 3' side-arm with an elevation of 146-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- EVERSOURCE (Existing):
  Antennas: One (1) four bay di-pole and one (1) 10' Omni-directional whip mounted on a 3' side-arm with an elevation of 145-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) folded di-pole (whip) leg mounted with a RAD center elevation of 133-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) 8' microwave dish pipe mounted with a RAD center elevation of ±130-ft above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: One (1) RFS 6' dish and one (1) ice canopy mounted with a RAD center elevations of ±100.42-ft and 109-ft respectively above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- STATE POLICE (Existing):
  Antennas: One (1) RFS 6' dish and one (1) ice canopy mounted with a RAD center elevations of ±100.58-ft and 109-ft respectively above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) 6' microwave dish pipe mounted with a RAD center elevation of ±90-ft above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) 10' Omni-directional whip mounted on a 6' side-arm with an elevation of 90-ft above finished grade.
  Coax Cables: One (1) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) 8' dish mounted with a RAD center elevation of ±64-ft above finished grade.
  Coax Cables: One (1) WE-65 coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- EVERSOURCE (Existing):
  Antennas: One (1) dipole and ground plain (whip) mounted on a 4' sidearm with a RAD center elevation of ±56-ft above finished grade.
  Coax Cables: Two (2) 7/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) Decibel DB225F yagi antenna leg mounted with a RAD center elevation of ±50.67-ft above finished grade.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) Decibel folded dipole antenna mounted on a 4' sidearm with a RAD center elevation of ±50-ft above finished grade.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- EVERSOURCE (Existing):
  Antennas: One (1) Decibel DB212C folded dipole antenna leg mounted with a RAD center elevation of ±28-ft above finished grade.
  Coax Cables: One (1) 1/2" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (Existing to Relocate):**
  Antennas: Three (3) TMAs relocated to new antenna frames.
- **T-MOBILE (Existing to Remove):**
  Antennas: Three (3) EMS RR90-17-DP panel antennas mounted on three (3) 2' side arms with a RAD center elevation of ±120-ft above finished grade.
  Coax Cable: Six (6) 1-1/4" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAARR24_43 panel antennas, three (3) TMAs and three (3) Ericsson 4449 B71 B12 remote radio heads mounted on three (3) SitePro XLD WiMAX Tower Mount (SitePro P/N CWT-02) w/ XLD Sector Frame Stabilizer Kit (SitePro P/N SFS-H) with a RAD center elevation of 120-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and three (3) 6x12 fiber lines running on a leg/face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

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

Analysis

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

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

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

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Tolland County; v = 95-105 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Union; v = 97 mph (3 second gust)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **78.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T9)	0'-0"- 20'-0"	57.4%	**PASS**
Diagonal (T5)	80'-0"- 100'-0"	78.2%	**PASS**

- The combined tower deflection was found to be under the NU SUB-090 limit.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.3267	0.5	**n/a**
Twist	0.0788	0.5	**n/a**
Combined	0.3361	0.5	**PASS**

Foundation and Anchors

Tower legs are connected to three (3) reinforced concrete pad and pier foundations by means of (6) 1.375" ∅, ASTM A193 Grade B7 anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case were used in the verification of the foundation and anchor bolts:

Leg Reactions	Vector	Proposed Tower Reactions
Leg	Shear	**38 kips**
	Compression	**295 kips**
	Uplift	**251 kips**
Base	Shear	**64 kips**
	Compression	**52 kips**
	Moment	**6240 kip-ft**

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	52.5%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Original Design Reactions[(1)]	Proposed Reactions	Result
(3) Reinf. Conc. Pad and Pier	Uplift	470.3 kips	251 kips	**PASS**
	Compression	569.3 kips	295 kips	**PASS**
	Shear	62.2 kips	38 kips	**PASS**

Note 1: Original design reactions multiplied by 1.35 for comparison to proposed reactions per section 15.5 of TIA-222-G

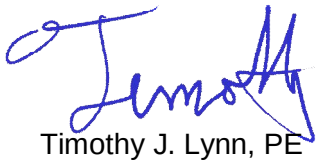
Conclusion

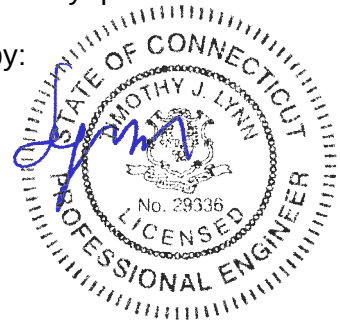
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

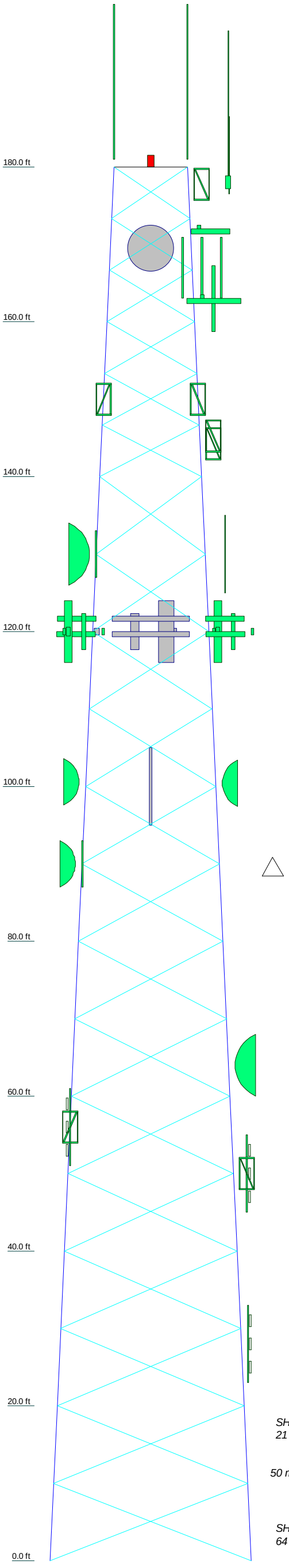
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	Andrew 5.5625x0.2580	Andrew 6.625x0.2800		Andrew 8.625x0.3220				Andrew 10.750x0.3650	
Leg Grade				A572-50					
Diagonals	L2 1/2x2 1/2x3/16	2L2x2x3/16		2L2 1/2x2 1/2x3/16		2L3x3x3/16		2L3x3x1/4	L5x5x5/16
Diagonal Grade				A36					
Top Girts				N.A.					
Face Width (ft)	9.5	11.33	13.17	15	16.83	18.67	20.5	22.33	24.17
# Panels @ (ft)	6 @ 6.66667			14 @ 10					
Weight (K)	1.6	2.3	3.0	3.1	3.2	3.6	5.2	5.4	5.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
20' x 3" Dia Omni (Eversource Existing)	180
20' x 3" Dia Omni (Eversource Existing)	180
Flash Beacon Lighting	180
DS9A09F36D-N (Eversource Existing)	178
Tower Top Amplifier (Eversource Existing)	178
4 Bay Di-Pole (Eversource Existing)	177.75
6' Side-Arm (Eversource Existing)	177.75
6' Side-Arm (Eversource Existing)	177.75
10' x 3" Dia Omni (SP Existing)	176.5
OGT9-806 (SP Existing - Relocated)	172
Site Pro USF12 (CSP)	172
(3) SE-414 (CSP)	172
TX/RX 432E-83I-01T (CSP)	172
6 FT DISH (SP Existing)	169.5
AP14-850/105 (SP Existing - Relocated)	163
Site Pro USF12 (CSP)	163
(3) WPA-700120-8CF (CSP)	163
TX/RX 432E-83I-01T (CSP)	163
Folded Di-Pole (Eversource Existing)	151.92
Sidearm (Empty)	150
Sidearm (Empty)	150
Di-Pole (Eversource Existing)	146
3' Sidearm (Eversource Existing)	145.25
4 Bay Di-Pole (Eversource Existing)	145
3' Sidearm (Eversource Existing)	144.25
10' x 3" Dia Omni (inverted) (Eversource Existing)	140
Folded Di-Pole (Eversource Existing)	133
6'x4" Pipe Mount (Eversource Existing)	130
8 FT DISH (Eversource Existing)	130
SitePro Horizontal Stabilizer SFS-H (T-Mobile Proposed)	122
SitePro Horizontal Stabilizer SFS-H (T-Mobile Proposed)	122
SitePro Horizontal Stabilizer SFS-H (T-Mobile Proposed)	122

TYPE	ELEVATION
Site Pro WiMAX Tower Mount CWT02 (T-Mobile Proposed)	120
Site Pro WiMAX Tower Mount CWT02 (T-Mobile Proposed)	120
Site Pro WiMAX Tower Mount CWT02 (T-Mobile Proposed)	120
APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	120
Radio 4449 B71 B12 (T-Mobile Proposed)	120
APXVAARR24-43 (T-Mobile Proposed)	120
(2) TMA 10"x8"x3" (T-Mobile Existing)	120
APXVAARR24-43 (T-Mobile Proposed)	120
APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	120
APXVAARR24-43 (T-Mobile Proposed)	120
(2) TMA 10"x8"x3" (T-Mobile Existing)	120
Radio 4449 B71 B12 (T-Mobile Proposed)	120
APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	120
(2) TMA 10"x8"x3" (T-Mobile Existing)	120
Radio 4449 B71 B12 (T-Mobile Proposed)	120
Ice Canopy (SP Existing)	109
Ice Canopy (SP Existing)	109
6 FT DISH (SP Existing)	100.58
6 FT DISH (SP Existing)	100.42
6'x4" Pipe Mount (Eversource Existing)	90
10' x 3" Dia Omni	90
6 FT DISH (Eversource Existing)	90
6' Side-Arm	85
8 FT DISH (Eversource Existing)	64
4' Side Mount (Eversource Existing)	56
Dipole and Ground Plain (Eversource Existing)	56
DB225-F (Eversource Existing)	50.67
Folded Di-Pole (Eversource Existing)	50
4' Side Mount (Eversource Existing)	50
DB212-2-C (Eversource Existing)	28

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 78.2%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 295 K
SHEAR: 38 K

UPLIFT: -251 K
SHEAR: 34 K

AXIAL 229 K
SHEAR 21 K *MOMENT 2338 kip-ft*
TORQUE 11 kip-ft
50 mph WIND - 1.0000 in ICE

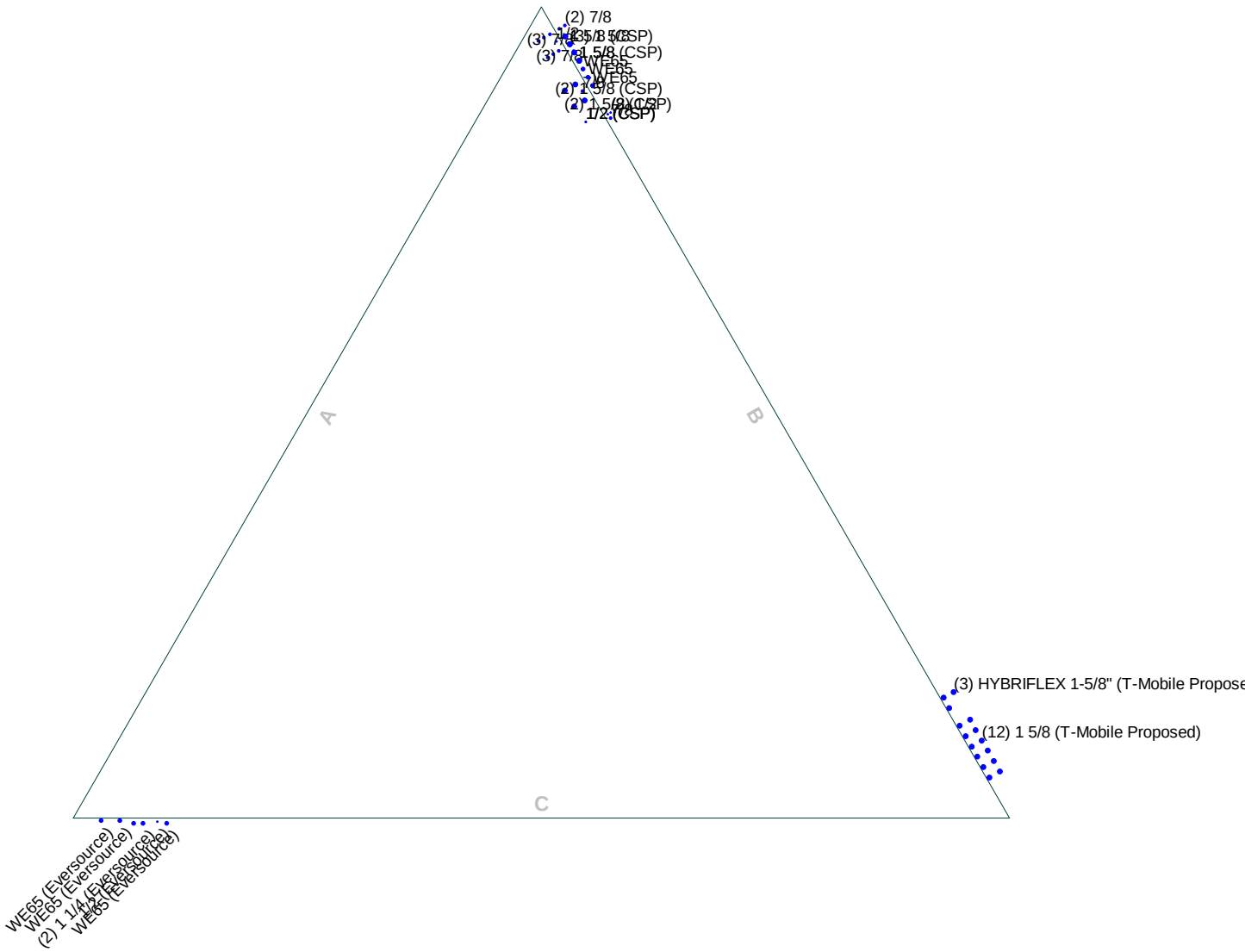
AXIAL 52 K
SHEAR 64 K *MOMENT 6240 kip-ft*
TORQUE 50 kip-ft
REACTIONS - 97 mph WIND

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

Job: **18127.23 - CT11143C**		
Project: **180' Andrew Lattice Tower - Bald Hill Road, Union, CT**		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 10/24/18	Scale: NTS
Path: J:\Jobs\18127200.WG23_CT11143C\05_Structural\Tower\Backup Documentation\Rev (1)\ER Files\180-ft_Andrew_Lattice_Tower.er		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face

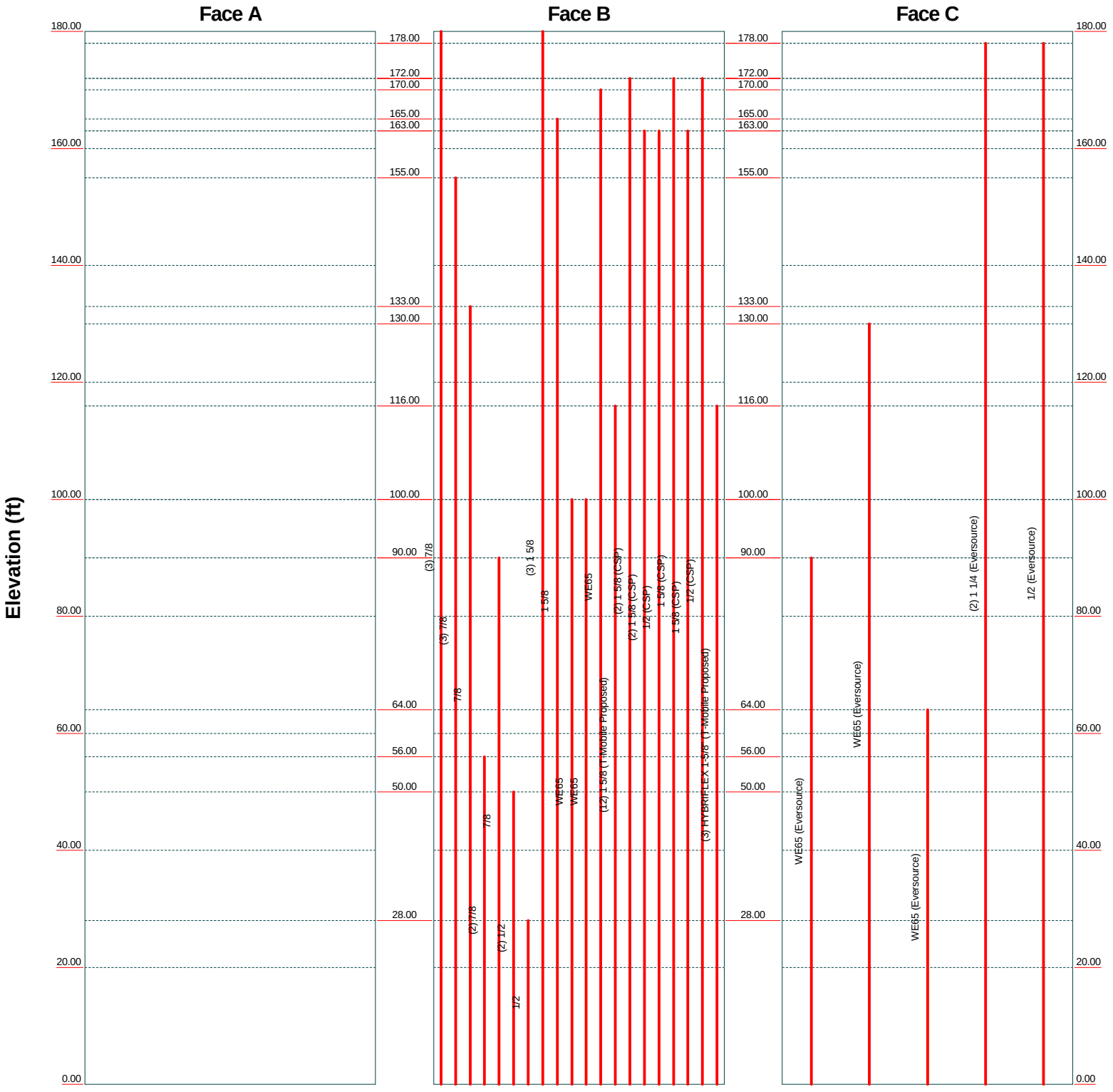


Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: ***18127.23 - CT11143C***		
Project: ***180' Andrew Lattice Tower - Bald Hill Road, Union, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 10/24/18	Scale: NTS
Path: J:\Jobs\18127\00.WI23_CT11143C\05_Structural\Tower\Backup Documentation\Rev (1)\ERI Files\180-ft_Andrew_Lattice_Tower.eri		Dwg No. E-7

Feed Line Distribution Chart
0' - 180'

Round | Flat | App In Face | App Out Face | Truss Leg



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

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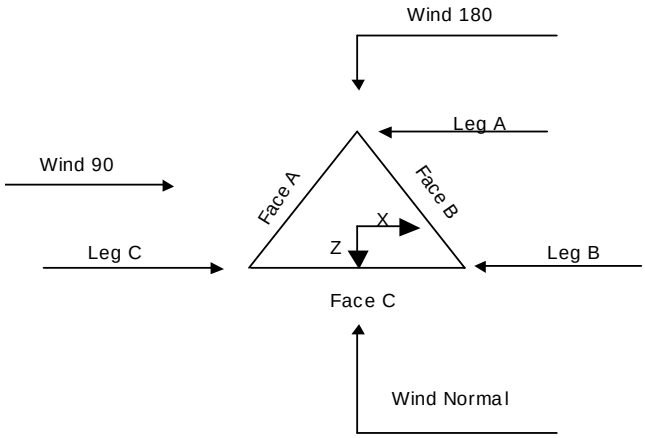
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 9.50 ft at the top and 26.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 97 mph.
Structure Class III.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180.00-160.00			9.50	1	20.00
T2	160.00-140.00			11.33	1	20.00
T3	140.00-120.00			13.17	1	20.00
T4	120.00-100.00			15.00	1	20.00
T5	100.00-80.00			16.83	1	20.00
T6	80.00-60.00			18.67	1	20.00
T7	60.00-40.00			20.50	1	20.00
T8	40.00-20.00			22.33	1	20.00
T9	20.00-0.00			24.17	1	20.00

Tower Section Geometry *(cont'd)*

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
T1	180.00-160.00	6.67	X Brace	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T5	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T6	80.00-60.00	10.00	X Brace	No	No	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
T7	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T8	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T9	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	Andrew 5.5625x0.2580	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 160.00-140.00	Pipe	Andrew 6.625x0.2800	A572-50 (50 ksi)	Double Equal Angle	2L2x2x3/16	A36 (36 ksi)
T3 140.00-120.00	Pipe	Andrew 8.625x0.3220	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 120.00-100.00	Pipe	Andrew 8.625x0.3220	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-80.00	Pipe	Andrew 8.625x0.3220	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 80.00-60.00	Pipe	Andrew 8.625x0.3220	A572-50 (50 ksi)	Double Equal Angle	2L3x3x3/16	A36 (36 ksi)
T7 60.00-40.00	Pipe	Andrew 10.750x0.3650	A572-50 (50 ksi)	Double Equal Angle	2L3x3x1/4	A36 (36 ksi)
T8 40.00-20.00	Pipe	Andrew 10.750x0.3650	A572-50 (50 ksi)	Double Equal Angle	2L3x3x1/4	A36 (36 ksi)
T9 20.00-0.00	Pipe	Andrew 10.750x0.3650	A572-50 (50 ksi)	Single 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 180.00-160.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	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 Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-160.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-160.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	0.75	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 140.00-120.00	0.0000	0.75	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 120.00-100.00	0.0000	0.75	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 100.00-80.00	0.0000	0.75	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 80.00-60.00	0.0000	0.75	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 60.00-40.00	0.0000	0.75	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 40.00-20.00	0.0000	0.75	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 20.00-0.00	0.0000	0.75	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	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 180.00-160.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T2 160.00-140.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T3 140.00-120.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T4 120.00-100.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 100.00-80.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 80.00-60.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 60.00-40.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 40.00-20.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 20.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.8750 A325N	5	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T2 160.00-140.00	Flange	1.1250 A325N	5	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.1250 A325N	5	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	1.1250 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-80.00	Flange	1.2500 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 80.00-60.00	Flange	1.2500 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.00-40.00	Flange	1.2500 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.00-20.00	Flange	1.3750 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 20.00-0.00	Flange	1.3750 A193 GR B7	6	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8	B	No	Ar (CaAa)	180.00 - 0.00	-6.0000	-0.47	3	1	1.1100	1.1100		0.54
7/8	B	No	Ar (CaAa)	155.00 - 0.00	-6.0000	-0.45	3	1	1.1100	1.1100		0.54
7/8	B	No	Ar (CaAa)	133.00 - 0.00	-1.5000	-0.4	1	1	1.1100	1.1100		0.54
7/8	B	No	Ar (CaAa)	56.00 - 0.00	1.0000	-0.47	2	1	1.1100	1.1100		0.54
7/8	B	No	Ar (CaAa)	90.00 - 0.00	1.0000	-0.36	1	1	1.1100	1.1100		0.54
1/2	B	No	Ar (CaAa)	50.00 - 0.00	1.0000	-0.365	2	1	0.5800	0.5800		0.25
1/2	B	No	Ar (CaAa)	28.00 - 0.00	-1.0000	-0.46	1	1	0.5800	0.5800		0.25
1 5/8	B	No	Ar (CaAa)	180.00 - 0.00	1.0000	-0.45	3	3	1.0000	1.9800		1.04
1 5/8	B	No	Ar (CaAa)	165.00 - 0.00	1.0000	-0.43	1	1	1.0000	1.9800		1.04
WE65	B	No	Ar (CaAa)	100.00 - 0.00	1.0000	-0.42	1	1	1.5836	1.5836		0.53
WE65	B	No	Ar (CaAa)	100.00 - 0.00	1.0000	-0.41	1	1	1.5836	1.5836		0.53
WE65	B	No	Ar (CaAa)	170.00 - 0.00	1.0000	-0.4	1	1	1.5836	1.5836		0.53
WE65 (Eversource)	C	No	Ar (CaAa)	90.00 - 0.00	0.0000	0.47	1	1	1.5836	1.5836		0.53
WE65 (Eversource)	C	No	Ar (CaAa)	130.00 - 0.00	0.0000	0.45	1	1	1.5836	1.5836		0.53
WE65 (Eversource)	C	No	Ar (CaAa)	64.00 - 0.00	1.0000	0.4	1	1	1.5836	1.5836		0.53
1 1/4 (Eversource)	C	No	Ar (CaAa)	178.00 - 0.00	1.0000	0.43	2	2	1.5500	1.5500		0.66
1/2 (Eversource)	C	No	Ar (CaAa)	178.00 - 0.00	1.0000	0.41	1	1	0.5800	0.5800		0.25
1 5/8 (T-Mobile Proposed)	B	No	Ar (CaAa)	116.00 - 0.00	0.0000	0.42	12	6	1.9800	1.9800		1.04
1 5/8 (CSP)	B	No	Ar (CaAa)	172.00 - 0.00	-6.0000	-0.41	2	1	1.9800	1.9800		1.04
1 5/8 (CSP)	B	No	Ar (CaAa)	163.00 - 0.00	-6.0000	-0.39	2	1	1.9800	1.9800		1.04
1/2 (CSP)	B	No	Ar (CaAa)	163.00 - 0.00	-6.0000	-0.37	1	1	0.5800	0.5800		0.25

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (CSP)	B	No	Ar (CaAa)	172.00 - 0.00	1.0000	-0.45	1	1	1.0000	1.9800		1.04
1 5/8 (CSP)	B	No	Ar (CaAa)	163.00 - 0.00	1.0000	-0.43	1	1	1.0000	1.9800		1.04
1/2 (CSP)	B	No	Ar (CaAa)	172.00 - 0.00	-6.0000	-0.37	1	1	0.5800	0.5800		0.25
HYBRIFLEX 1-5/8" (T-Mobile Proposed)	B	No	Ar (CaAa)	116.00 - 0.00	0.0000	0.36	3	2	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	30.894	0.000	0.16
		C	0.000	0.000	6.624	0.000	0.03
T2	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	56.742	0.000	0.29
		C	0.000	0.000	7.360	0.000	0.03
T3	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	59.850	0.000	0.30
		C	0.000	0.000	8.944	0.000	0.04
T4	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	108.147	0.000	0.60
		C	0.000	0.000	10.527	0.000	0.04
T5	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	127.471	0.000	0.69
		C	0.000	0.000	12.111	0.000	0.05
T6	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	128.581	0.000	0.70
		C	0.000	0.000	14.328	0.000	0.05
T7	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	133.293	0.000	0.72
		C	0.000	0.000	16.861	0.000	0.06
T8	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	135.805	0.000	0.73
		C	0.000	0.000	16.861	0.000	0.06
T9	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	136.501	0.000	0.74
		C	0.000	0.000	16.861	0.000	0.06

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	2.945	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	132.879	0.000	2.94
		C		0.000	0.000	40.677	0.000	0.70
T2	160.00-140.00	A	2.909	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	255.489	0.000	5.69

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	44.795	0.000	0.76
T3	140.00-120.00	A	2.867	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	270.293	0.000	5.98
		C		0.000	0.000	51.660	0.000	0.90
T4	120.00-100.00	A	2.820	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	364.402	0.000	8.46
		C		0.000	0.000	58.268	0.000	1.04
T5	100.00-80.00	A	2.764	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	418.298	0.000	9.62
		C		0.000	0.000	64.541	0.000	1.16
T6	80.00-60.00	A	2.695	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	418.901	0.000	9.45
		C		0.000	0.000	73.141	0.000	1.32
T7	60.00-40.00	A	2.606	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	443.626	0.000	9.66
		C		0.000	0.000	82.253	0.000	1.48
T8	40.00-20.00	A	2.476	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	451.453	0.000	9.41
		C		0.000	0.000	79.275	0.000	1.37
T9	20.00-0.00	A	2.219	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	430.843	0.000	8.31
		C		0.000	0.000	73.366	0.000	1.17

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	-0.8054	-5.4927	-0.6765	-5.2092
T2	160.00-140.00	-0.5681	-9.0750	-0.3311	-9.4738
T3	140.00-120.00	-0.7887	-9.6461	-0.6319	-10.8645
T4	120.00-100.00	5.3783	-5.0028	1.4893	-8.8998
T5	100.00-80.00	6.6415	-5.2044	1.9059	-9.9519
T6	80.00-60.00	6.7223	-5.4320	1.6752	-10.4725
T7	60.00-40.00	6.5082	-5.9721	1.4194	-11.5588
T8	40.00-20.00	6.9496	-6.7355	1.6814	-12.9710
T9	20.00-0.00	6.7572	-6.6602	1.9616	-13.4400

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	7/8	160.00 - 180.00	0.6000	0.5836
T1	8	1 5/8	160.00 - 180.00	0.6000	0.5836
T1	9	1 5/8	160.00 - 165.00	0.6000	0.5836
T1	12	WE65	160.00 - 170.00	0.6000	0.5836
T1	16	1 1/4	160.00 -	0.6000	0.5836

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	17	1/2	178.00 160.00 -	0.6000	0.5836
T1	19	1 5/8	178.00 160.00 -	0.6000	0.5836
T1	20	1 5/8	172.00 160.00 -	0.6000	0.5836
T1	21	1/2	163.00 160.00 -	0.6000	0.5836
T1	22	1 5/8	163.00 160.00 -	0.6000	0.5836
T1	23	1 5/8	172.00 160.00 -	0.6000	0.5836
T1	24	1/2	163.00 160.00 -	0.6000	0.5836
T2	1	7/8	172.00 140.00 -	0.6000	0.6000
T2	2	7/8	160.00 140.00 -	0.6000	0.6000
T2	8	1 5/8	155.00 140.00 -	0.6000	0.6000
T2	9	1 5/8	160.00 140.00 -	0.6000	0.6000
T2	12	WE65	160.00 140.00 -	0.6000	0.6000
T2	16	1 1/4	160.00 140.00 -	0.6000	0.6000
T2	17	1/2	160.00 140.00 -	0.6000	0.6000
T2	19	1 5/8	160.00 140.00 -	0.6000	0.6000
T2	20	1 5/8	160.00 140.00 -	0.6000	0.6000
T2	21	1/2	160.00 140.00 -	0.6000	0.6000
T2	22	1 5/8	160.00 140.00 -	0.6000	0.6000
T2	23	1 5/8	160.00 140.00 -	0.6000	0.6000
T2	24	1/2	160.00 140.00 -	0.6000	0.6000
T3	1	7/8	160.00 120.00 -	0.6000	0.6000
T3	2	7/8	140.00 120.00 -	0.6000	0.6000
T3	3	7/8	140.00 120.00 -	0.6000	0.6000
T3	8	1 5/8	133.00 120.00 -	0.6000	0.6000
T3	9	1 5/8	140.00 120.00 -	0.6000	0.6000
T3	12	WE65	140.00 120.00 -	0.6000	0.6000
T3	14	WE65	140.00 120.00 -	0.6000	0.6000
T3	16	1 1/4	130.00 120.00 -	0.6000	0.6000
T3	17	1/2	140.00 120.00 -	0.6000	0.6000
T3	19	1 5/8	140.00 120.00 -	0.6000	0.6000
T3	20	1 5/8	140.00 120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	21	1/2	120.00 - 140.00	0.6000	0.6000
T3	22	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	23	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	24	1/2	120.00 - 140.00	0.6000	0.6000
T4	1	7/8	100.00 - 120.00	0.6000	0.6000
T4	2	7/8	100.00 - 120.00	0.6000	0.6000
T4	3	7/8	100.00 - 120.00	0.6000	0.6000
T4	8	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	9	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	12	WE65	100.00 - 120.00	0.6000	0.6000
T4	14	WE65	100.00 - 120.00	0.6000	0.6000
T4	16	1 1/4	100.00 - 120.00	0.6000	0.6000
T4	17	1/2	100.00 - 120.00	0.6000	0.6000
T4	18	1 5/8	100.00 - 116.00	0.6000	0.6000
T4	19	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	20	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	21	1/2	100.00 - 120.00	0.6000	0.6000
T4	22	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	23	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	24	1/2	100.00 - 120.00	0.6000	0.6000
T4	25	HYBRIFLEX 1-5/8"	100.00 - 116.00	0.6000	0.6000
T5	1	7/8	80.00 - 100.00	0.6000	0.6000
T5	2	7/8	80.00 - 100.00	0.6000	0.6000
T5	3	7/8	80.00 - 100.00	0.6000	0.6000
T5	5	7/8	80.00 - 90.00	0.6000	0.6000
T5	8	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	9	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	10	WE65	80.00 - 100.00	0.6000	0.6000
T5	11	WE65	80.00 - 100.00	0.6000	0.6000
T5	12	WE65	80.00 - 100.00	0.6000	0.6000
T5	13	WE65	80.00 - 90.00	0.6000	0.6000
T5	14	WE65	80.00 - 100.00	0.6000	0.6000
T5	16	1 1/4	80.00 - 100.00	0.6000	0.6000
T5	17	1/2	80.00 - 100.00	0.6000	0.6000
T5	18	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	19	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	20	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	21	1/2	80.00 - 100.00	0.6000	0.6000
T5	22	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	23	1 5/8	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
T5	24	1/2	80.00 - 100.00	0.6000	0.6000
T5	25	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T6	1	7/8	60.00 - 80.00	0.6000	0.6000
T6	2	7/8	60.00 - 80.00	0.6000	0.6000
T6	3	7/8	60.00 - 80.00	0.6000	0.6000
T6	5	7/8	60.00 - 80.00	0.6000	0.6000
T6	8	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	9	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	10	WE65	60.00 - 80.00	0.6000	0.6000
T6	11	WE65	60.00 - 80.00	0.6000	0.6000
T6	12	WE65	60.00 - 80.00	0.6000	0.6000
T6	13	WE65	60.00 - 80.00	0.6000	0.6000
T6	14	WE65	60.00 - 80.00	0.6000	0.6000
T6	15	WE65	60.00 - 64.00	0.6000	0.6000
T6	16	1 1/4	60.00 - 80.00	0.6000	0.6000
T6	17	1/2	60.00 - 80.00	0.6000	0.6000
T6	18	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	19	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	20	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	21	1/2	60.00 - 80.00	0.6000	0.6000
T6	22	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	23	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	24	1/2	60.00 - 80.00	0.6000	0.6000
T6	25	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T7	1	7/8	40.00 - 60.00	0.6000	0.6000
T7	2	7/8	40.00 - 60.00	0.6000	0.6000
T7	3	7/8	40.00 - 60.00	0.6000	0.6000
T7	4	7/8	40.00 - 56.00	0.6000	0.6000
T7	5	7/8	40.00 - 60.00	0.6000	0.6000
T7	6	1/2	40.00 - 50.00	0.6000	0.6000
T7	8	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	9	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	10	WE65	40.00 - 60.00	0.6000	0.6000
T7	11	WE65	40.00 - 60.00	0.6000	0.6000
T7	12	WE65	40.00 - 60.00	0.6000	0.6000
T7	13	WE65	40.00 - 60.00	0.6000	0.6000
T7	14	WE65	40.00 - 60.00	0.6000	0.6000
T7	15	WE65	40.00 - 60.00	0.6000	0.6000
T7	16	1 1/4	40.00 - 60.00	0.6000	0.6000
T7	17	1/2	40.00 - 60.00	0.6000	0.6000
T7	18	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	19	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	20	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	21	1/2	40.00 - 60.00	0.6000	0.6000
T7	22	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	23	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	24	1/2	40.00 - 60.00	0.6000	0.6000
T7	25	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T8	1	7/8	20.00 - 40.00	0.6000	0.6000
T8	2	7/8	20.00 - 40.00	0.6000	0.6000
T8	3	7/8	20.00 - 40.00	0.6000	0.6000
T8	4	7/8	20.00 - 40.00	0.6000	0.6000
T8	5	7/8	20.00 - 40.00	0.6000	0.6000
T8	6	1/2	20.00 - 40.00	0.6000	0.6000
T8	7	1/2	20.00 - 28.00	0.6000	0.6000
T8	8	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	9	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	10	WE65	20.00 - 40.00	0.6000	0.6000
T8	11	WE65	20.00 - 40.00	0.6000	0.6000
T8	12	WE65	20.00 - 40.00	0.6000	0.6000
T8	13	WE65	20.00 - 40.00	0.6000	0.6000
T8	14	WE65	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	15	WE65	20.00 - 40.00	0.6000	0.6000
T8	16	1 1/4	20.00 - 40.00	0.6000	0.6000
T8	17	1/2	20.00 - 40.00	0.6000	0.6000
T8	18	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	19	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	20	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	21	1/2	20.00 - 40.00	0.6000	0.6000
T8	22	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	23	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	24	1/2	20.00 - 40.00	0.6000	0.6000
T8	25	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T9	1	7/8	0.00 - 20.00	0.6000	0.6000
T9	2	7/8	0.00 - 20.00	0.6000	0.6000
T9	3	7/8	0.00 - 20.00	0.6000	0.6000
T9	4	7/8	0.00 - 20.00	0.6000	0.6000
T9	5	7/8	0.00 - 20.00	0.6000	0.6000
T9	6	1/2	0.00 - 20.00	0.6000	0.6000
T9	7	1/2	0.00 - 20.00	0.6000	0.6000
T9	8	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	9	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	10	WE65	0.00 - 20.00	0.6000	0.6000
T9	11	WE65	0.00 - 20.00	0.6000	0.6000
T9	12	WE65	0.00 - 20.00	0.6000	0.6000
T9	13	WE65	0.00 - 20.00	0.6000	0.6000
T9	14	WE65	0.00 - 20.00	0.6000	0.6000
T9	15	WE65	0.00 - 20.00	0.6000	0.6000
T9	16	1 1/4	0.00 - 20.00	0.6000	0.6000
T9	17	1/2	0.00 - 20.00	0.6000	0.6000
T9	18	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	19	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	20	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	21	1/2	0.00 - 20.00	0.6000	0.6000
T9	22	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	23	1 5/8	0.00 - 20.00	0.6000	0.6000
T9	24	1/2	0.00 - 20.00	0.6000	0.6000
T9	25	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
20' x 3" Dia Omni (Eversource Existing)	B	From Leg	0.00 0.00 11.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	6.00 8.03 10.08	6.00 8.03 10.08	0.05 0.09 0.15
20' x 3" Dia Omni (Eversource Existing)	C	From Leg	0.00 0.00 11.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	6.00 8.03 10.08	6.00 8.03 10.08	0.05 0.09 0.15
4 Bay Di-Pole (Eversource Existing)	A	From Leg	3.50 0.00 5.00	0.0000	177.75	No Ice 1/2" Ice 1" Ice	3.15 5.67 8.19	3.15 5.67 8.19	0.03 0.04 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6' Side-Arm	A	From Leg	2.00	0.0000	177.75	No Ice	0.00	0.00	0.00
(Eversource Existing)			0.00			1/2" Ice	0.00	0.00	0.00
			0.00			1" Ice	0.00	0.00	0.00
6' Side-Arm	B	From Leg	2.00	0.0000	177.75	No Ice	0.00	0.00	0.00
(Eversource Existing)			0.00			1/2" Ice	0.00	0.00	0.00
			0.00			1" Ice	0.00	0.00	0.00
10' x 3" Dia Omni	B	From Leg	6.00	0.0000	176.50	No Ice	3.00	3.00	0.03
(SP Existing)			0.00			1/2" Ice	4.03	4.03	0.05
			5.00			1" Ice	5.03	5.03	0.08
OGT9-806	B	From Leg	6.00	0.0000	172.00	No Ice	2.27	2.27	0.02
(SP Existing - Relocated)			0.00			1/2" Ice	3.44	3.44	0.04
			5.00			1" Ice	4.61	4.61	0.06
AP14-850/105	B	From Leg	3.00	0.0000	163.00	No Ice	10.61	5.64	0.03
(SP Existing - Relocated)			0.00			1/2" Ice	11.25	6.28	0.08
			0.00			1" Ice	11.89	6.89	0.14
Sidearm	C	From Leg	0.00	0.0000	150.00	No Ice	1.05	1.05	0.09
(Empty)			0.00			1/2" Ice	1.40	1.40	0.10
			0.00			1" Ice	1.75	1.75	0.11
Sidearm	B	From Leg	0.00	0.0000	150.00	No Ice	1.05	1.05	0.09
(Empty)			0.00			1/2" Ice	1.40	1.40	0.10
			0.00			1" Ice	1.75	1.75	0.11
Folded Di-Pole	A	From Leg	2.00	0.0000	151.92	No Ice	3.10	3.10	0.03
(Eversource Existing)			0.00			1/2" Ice	6.22	6.22	0.06
			0.00			1" Ice	9.35	9.35	0.10
Di-Pole	B	From Leg	3.50	0.0000	146.00	No Ice	3.33	3.33	0.03
(Eversource Existing)			0.00			1/2" Ice	5.99	5.99	0.04
			10.00			1" Ice	8.66	8.66	0.05
3' Sidearm	B	From Leg	2.00	0.0000	145.25	No Ice	5.90	5.90	0.13
(Eversource Existing)			0.00			1/2" Ice	6.60	6.60	0.15
			0.00			1" Ice	7.30	7.30	0.16
4 Bay Di-Pole	B	From Leg	3.50	0.0000	145.00	No Ice	3.15	3.15	0.03
(Eversource Existing)			0.00			1/2" Ice	5.67	5.67	0.04
			10.00			1" Ice	8.19	8.19	0.05
3' Sidearm	B	From Leg	2.00	0.0000	144.25	No Ice	5.90	5.90	0.13
(Eversource Existing)			0.00			1/2" Ice	6.60	6.60	0.15
			0.00			1" Ice	7.30	7.30	0.16
10' x 3" Dia Omni (inverted)	B	From Leg	3.50	0.0000	140.00	No Ice	3.00	3.00	0.03
(Eversource Existing)			0.00			1/2" Ice	4.03	4.03	0.05
			-10.00			1" Ice	5.03	5.03	0.08
Folded Di-Pole	A	From Leg	2.00	0.0000	133.00	No Ice	3.10	3.10	0.03
(Eversource Existing)			0.00			1/2" Ice	6.22	6.22	0.06
			0.00			1" Ice	9.35	9.35	0.10
APX16DWV-16DWVS-E-A	A	From Leg	2.50	0.0000	120.00	No Ice	6.46	2.15	0.04
20			-2.00			1/2" Ice	6.83	2.49	0.07
(T-Mobile Proposed)			0.00			1" Ice	7.21	2.84	0.11
APXVAARR24-43	A	From Leg	2.50	0.0000	120.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APX16DWV-16DWVS-E-A	B	From Leg	2.50	0.0000	120.00	No Ice	6.46	2.15	0.04
20			-2.00			1/2" Ice	6.83	2.49	0.07
(T-Mobile Proposed)			0.00			1" Ice	7.21	2.84	0.11
APXVAARR24-43	B	From Leg	2.50	0.0000	120.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APX16DWV-16DWVS-E-A	C	From Leg	2.50	0.0000	120.00	No Ice	6.46	2.15	0.04
20			-2.00			1/2" Ice	6.83	2.49	0.07
(T-Mobile Proposed)			0.00			1" Ice	7.21	2.84	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVAARR24-43	C	From Leg	2.50	0.0000	120.00	No Ice	20.24	8.89	0.16
(T-Mobile Proposed)			2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
(2) TMA 10"x8"x3"	A	From Leg	2.50	0.0000	120.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
(2) TMA 10"x8"x3"	B	From Leg	2.50	0.0000	120.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
(2) TMA 10"x8"x3"	C	From Leg	2.50	0.0000	120.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			-2.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
Radio 4449 B71 B12	A	From Leg	2.50	0.0000	120.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Leg	2.50	0.0000	120.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Leg	2.50	0.0000	120.00	No Ice	1.64	1.29	0.07
(T-Mobile Proposed)			2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Site Pro WiMAX Tower	A	From Leg	2.50	0.0000	120.00	No Ice	2.85	2.85	0.15
Mount CWT02			0.00			1/2" Ice	4.05	4.05	0.20
(T-Mobile Proposed)			0.00			1" Ice	5.25	5.25	0.25
Site Pro WiMAX Tower	B	From Leg	2.50	0.0000	120.00	No Ice	2.85	2.85	0.15
Mount CWT02			0.00			1/2" Ice	4.05	4.05	0.20
(T-Mobile Proposed)			0.00			1" Ice	5.25	5.25	0.25
Site Pro WiMAX Tower	C	From Leg	2.50	0.0000	120.00	No Ice	2.85	2.85	0.15
Mount CWT02			0.00			1/2" Ice	4.05	4.05	0.20
(T-Mobile Proposed)			0.00			1" Ice	5.25	5.25	0.25
SitePro Horizontal Stabilizer	A	From Leg	2.50	0.0000	122.00	No Ice	2.00	2.00	0.07
SFS-H			0.00			1/2" Ice	3.50	3.50	0.10
(T-Mobile Proposed)			0.00			1" Ice	5.00	5.00	0.13
SitePro Horizontal Stabilizer	B	From Leg	2.50	0.0000	122.00	No Ice	2.00	2.00	0.07
SFS-H			0.00			1/2" Ice	3.50	3.50	0.10
(T-Mobile Proposed)			0.00			1" Ice	5.00	5.00	0.13
SitePro Horizontal Stabilizer	C	From Leg	2.50	0.0000	122.00	No Ice	2.00	2.00	0.07
SFS-H			0.00			1/2" Ice	3.50	3.50	0.10
(T-Mobile Proposed)			0.00			1" Ice	5.00	5.00	0.13
Ice Canopy	C	From Leg	0.00	0.0000	109.00	No Ice	80.00	2.67	0.13
(SP Existing)			0.00			1/2" Ice	82.00	4.04	0.33
			0.00			1" Ice	84.00	5.41	0.53
Ice Canopy	B	From Leg	0.00	0.0000	109.00	No Ice	80.00	2.67	0.13
(SP Existing)			0.00			1/2" Ice	82.00	4.04	0.33
			0.00			1" Ice	84.00	5.41	0.53
Dipole and Ground Plain	C	From Leg	0.00	0.0000	56.00	No Ice	1.05	1.05	0.03
(Eversource Existing)			0.00			1/2" Ice	1.91	1.91	0.03
			0.00			1" Ice	2.79	2.79	0.05
4' Side Mount	C	From Leg	0.00	0.0000	56.00	No Ice	0.00	0.00	0.00
(Eversource Existing)			0.00			1/2" Ice	0.00	0.00	0.00
			0.00			1" Ice	0.00	0.00	0.00
DB225-F	B	From Leg	2.00	0.0000	50.67	No Ice	1.36	1.36	0.03
(Eversource Existing)			0.00			1/2" Ice	2.45	2.45	0.04
			0.00			1" Ice	3.54	3.54	0.04
Folded Di-Pole	B	From Leg	2.00	0.0000	50.00	No Ice	3.10	3.10	0.03
(Eversource Existing)			0.00			1/2" Ice	6.22	6.22	0.06
			0.00			1" Ice	9.35	9.35	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4' Side Mount	B	From Leg	2.00	0.0000	50.00	No Ice	0.00	0.00	0.00
(Eversource Existing)			0.00			1/2" Ice	0.00	0.00	0.00
			0.00			1" Ice	0.00	0.00	0.00
DB212-2-C	B	From Leg	1.00	0.0000	28.00	No Ice	3.10	3.10	0.03
(Eversource Existing)			0.00			1/2" Ice	6.22	6.22	0.06
			0.00			1" Ice	9.35	9.35	0.10
Flash Beacon Lighting	A	From Leg	0.00	0.0000	180.00	No Ice	2.70	2.70	0.05
			0.00			1/2" Ice	3.10	3.10	0.07
			0.00			1" Ice	3.50	3.50	0.09
10' x 3" Dia Omni	A	From Leg	5.00	0.0000	90.00	No Ice	3.00	3.00	0.03
			0.00			1/2" Ice	4.03	4.03	0.05
			10.00			1" Ice	5.03	5.03	0.08
6' Side-Arm	A	From Leg	0.00	0.0000	85.00	No Ice	0.00	0.00	0.00
			0.00			1/2" Ice	0.00	0.00	0.00
			0.00			1" Ice	0.00	0.00	0.00
6'x4" Pipe Mount	C	From Leg	0.00	0.0000	130.00	No Ice	1.91	1.91	0.05
(Eversource Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00			1" Ice	2.83	2.83	0.09
6'x4" Pipe Mount	C	From Leg	0.00	0.0000	90.00	No Ice	1.99	1.99	0.05
(Eversource Existing)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00			1" Ice	2.83	2.83	0.09
DS9A09F36D-N	B	From Leg	6.00	0.0000	178.00	No Ice	5.76	5.76	0.05
(Eversource Existing)			0.00			1/2" Ice	7.72	7.72	0.09
			10.00			1" Ice	9.69	9.69	0.15
Tower Top Amplifier	B	From Leg	6.00	0.0000	178.00	No Ice	2.67	1.03	0.04
(Eversource Existing)			0.00			1/2" Ice	2.87	1.17	0.06
			0.00			1" Ice	3.08	1.32	0.08
Site Pro USF12	B	From Leg	3.00	0.0000	172.00	No Ice	12.00	12.00	0.50
(CSP)			0.00			1/2" Ice	15.00	15.00	0.75
			0.00			1" Ice	18.00	18.00	1.00
(3) SE-414	B	From Leg	3.00	0.0000	172.00	No Ice	4.80	4.80	0.02
(CSP)			0.00			1/2" Ice	5.70	5.70	0.03
			2.00			1" Ice	6.60	6.60	0.03
TX/RX 432E-83I-01T	B	From Leg	3.00	0.0000	172.00	No Ice	1.20	0.75	0.03
(CSP)			3.00			1/2" Ice	1.34	0.86	0.04
			0.00			1" Ice	1.48	0.98	0.05
Site Pro USF12	B	From Leg	3.00	0.0000	163.00	No Ice	12.00	12.00	0.50
(CSP)			0.00			1/2" Ice	15.00	15.00	0.75
			0.00			1" Ice	18.00	18.00	1.00
(3) WPA-700120-8CF	B	From Leg	3.00	0.0000	163.00	No Ice	6.45	6.45	0.02
(CSP)			3.00			1/2" Ice	7.02	7.02	0.06
			4.00			1" Ice	7.61	7.61	0.10
TX/RX 432E-83I-01T	B	From Leg	3.00	0.0000	163.00	No Ice	1.20	0.75	0.03
(CSP)			3.00			1/2" Ice	1.34	0.86	0.04
			0.00			1" Ice	1.48	0.98	0.05

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
6 FT DISH	C	Paraboloid w/o	From	1.00	Worst		100.58	6.00	No Ice	28.27	0.14
(SP Existing)		Radome	Leg	0.00					1/2" Ice	29.05	0.29
				0.00					1" Ice	29.83	0.44
6 FT DISH	B	Paraboloid w/o	From	1.00	Worst		100.42	6.00	No Ice	28.27	0.14
(SP Existing)		Radome	Leg	0.00					1/2" Ice	29.05	0.29
				0.00					1" Ice	29.83	0.44
8 FT DISH	B	Paraboloid w/o	From	1.00	Worst		64.00	8.00	No Ice	50.30	0.25
(Eversource Existing)		Radome	Leg	0.00					1/2" Ice	51.29	0.51
				0.00					1" Ice	52.28	0.78
6 FT DISH	A	Paraboloid w/o	From	1.00	Worst		169.50	6.00	No Ice	28.27	0.14
(SP Existing)		Radome	Leg	0.00					1/2" Ice	29.05	0.29
				0.00					1" Ice	29.83	0.44
8 FT DISH	C	Paraboloid w/o	From	1.00	Worst		130.00	8.00	No Ice	50.30	0.25
(Eversource Existing)		Radome	Leg	0.00					1/2" Ice	51.29	0.51
				0.00					1" Ice	52.28	0.78
6 FT DISH	C	Paraboloid w/o	From	1.00	Worst		90.00	6.00	No Ice	28.27	0.14
(Eversource Existing)		Radome	Leg	0.00					1/2" Ice	29.05	0.29
				0.00					1" Ice	29.83	0.44

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	170.00	1.15	27	217.581	A	16.823	18.568	18.568	52.46	0.000	0.000
180.00-160.00					B	16.823	18.568		52.46	30.894	0.000
					C	16.823	18.568		52.46	6.624	0.000
T2	150.00	1.11	26	256.053	A	13.513	22.114	22.114	62.07	0.000	0.000
160.00-140.00					B	13.513	22.114		62.07	56.742	0.000
					C	13.513	22.114		62.07	7.360	0.000
T3	130.00	1.065	25	296.090	A	14.061	28.790	28.790	67.19	0.000	0.000
140.00-120.00					B	14.061	28.790		67.19	59.850	0.000
					C	14.061	28.790		67.19	8.944	0.000
T4	110.00	1.016	24	332.690	A	15.315	28.790	28.790	65.28	0.000	0.000
120.00-100.00					B	15.315	28.790		65.28	108.147	0.000
					C	15.315	28.790		65.28	10.527	0.000
T5	90.00	0.959	23	369.390	A	16.618	28.791	28.791	63.40	0.000	0.000
100.00-80.00					B	16.618	28.791		63.40	127.471	0.000
					C	16.618	28.791		63.40	12.111	0.000
T6 80.00-60.00	70.00	0.892	21	406.090	A	21.549	28.790	28.790	57.19	0.000	0.000
					B	21.549	28.790		57.19	128.581	0.000
					C	21.549	28.790		57.19	14.328	0.000
T7 60.00-40.00	50.00	0.811	19	446.235	A	23.185	35.883	35.883	60.75	0.000	0.000
					B	23.185	35.883		60.75	133.293	0.000
					C	23.185	35.883		60.75	16.861	0.000
T8 40.00-20.00	30.00	0.701	16	482.936	A	24.853	35.884	35.884	59.08	0.000	0.000
					B	24.853	35.884		59.08	135.805	0.000
					C	24.853	35.884		59.08	16.861	0.000
T9 20.00-0.00	10.00	0.7	16	519.635	A	44.238	35.883	35.883	44.79	0.000	0.000
					B	44.238	35.883		44.79	136.501	0.000
					C	44.238	35.883		44.79	16.861	0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.15	6	2.9453	227.409	A	16.823	77.870	38.230	40.37	0.000	0.000
180.00-160.00						B	16.823	77.870		40.37	132.879	0.000
						C	16.823	77.870		40.37	40.677	0.000
T2	150.00	1.11	6	2.9087	265.759	A	13.513	80.838	41.533	44.02	0.000	0.000
160.00-140.00						B	13.513	80.838		44.02	255.489	0.000
						C	13.513	80.838		44.02	44.795	0.000
T3	130.00	1.065	6	2.8674	305.658	A	14.061	80.186	47.933	50.86	0.000	0.000
140.00-120.00						B	14.061	80.186		50.86	270.293	0.000
						C	14.061	80.186		50.86	51.660	0.000
T4	110.00	1.016	6	2.8199	342.099	A	15.315	82.164	47.615	48.85	0.000	0.000
120.00-100.00						B	15.315	82.164		48.85	364.402	0.000
						C	15.315	82.164		48.85	58.268	0.000
T5 100.00-80.00	90.00	0.959	5	2.7638	378.613	A	16.618	83.987	47.242	46.96	0.000	0.000
						B	16.618	83.987		46.96	418.298	0.000
						C	16.618	83.987		46.96	64.541	0.000
T6 80.00-60.00	70.00	0.892	5	2.6952	415.084	A	21.549	85.503	46.783	43.70	0.000	0.000
						B	21.549	85.503		43.70	418.901	0.000
						C	21.549	85.503		43.70	73.141	0.000
T7 60.00-40.00	50.00	0.811	4	2.6061	454.931	A	23.185	93.562	53.281	45.64	0.000	0.000
						B	23.185	93.562		45.64	443.626	0.000
						C	23.185	93.562		45.64	82.253	0.000
T8 40.00-20.00	30.00	0.701	4	2.4763	491.199	A	24.853	93.444	52.416	44.31	0.000	0.000
						B	24.853	93.444		44.31	451.453	0.000
						C	24.853	93.444		44.31	79.275	0.000
T9 20.00-0.00	10.00	0.7	4	2.2186	527.039	A	44.238	89.954	50.695	37.78	0.000	0.000
						B	44.238	89.954		37.78	430.843	0.000
						C	44.238	89.954		37.78	73.366	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.15	9	217.581	A	16.823	18.568	18.568	52.46	0.000	0.000
180.00-160.00					B	16.823	18.568		52.46	30.894	0.000
					C	16.823	18.568		52.46	6.624	0.000
T2	150.00	1.11	9	256.053	A	13.513	22.114	22.114	62.07	0.000	0.000
160.00-140.00					B	13.513	22.114		62.07	56.742	0.000
					C	13.513	22.114		62.07	7.360	0.000
T3	130.00	1.065	8	296.090	A	14.061	28.790	28.790	67.19	0.000	0.000
140.00-120.00					B	14.061	28.790		67.19	59.850	0.000
					C	14.061	28.790		67.19	8.944	0.000
T4	110.00	1.016	8	332.690	A	15.315	28.790	28.790	65.28	0.000	0.000
120.00-100.00					B	15.315	28.790		65.28	108.147	0.000
					C	15.315	28.790		65.28	10.527	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T5	90.00	0.959	8	369.390	A	16.618	28.791	28.791	63.40	0.000	0.000
100.00-80.00					B	16.618	28.791		63.40	127.471	0.000
					C	16.618	28.791		63.40	12.111	0.000
T6 80.00-60.00	70.00	0.892	7	406.090	A	21.549	28.790	28.790	57.19	0.000	0.000
					B	21.549	28.790		57.19	128.581	0.000
					C	21.549	28.790		57.19	14.328	0.000
T7 60.00-40.00	50.00	0.811	6	446.235	A	23.185	35.883	35.883	60.75	0.000	0.000
					B	23.185	35.883		60.75	133.293	0.000
					C	23.185	35.883		60.75	16.861	0.000
T8 40.00-20.00	30.00	0.701	5	482.936	A	24.853	35.884	35.884	59.08	0.000	0.000
					B	24.853	35.884		59.08	135.805	0.000
					C	24.853	35.884		59.08	16.861	0.000
T9 20.00-0.00	10.00	0.7	5	519.635	A	44.238	35.883	35.883	44.79	0.000	0.000
					B	44.238	35.883		44.79	136.501	0.000
					C	44.238	35.883		44.79	16.861	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	27	1	1	25.744	2.13	106.65	C
180.00-160.00			B	0.163	2.725		1	1	25.744			
			C	0.163	2.725		1	1	25.744			
T2	0.32	2.32	A	0.139	2.812	26	1	1	23.023	2.29	114.59	C
160.00-140.00			B	0.139	2.812		1	1	23.023			
			C	0.139	2.812		1	1	23.023			
T3	0.34	2.96	A	0.145	2.791	25	1	1	26.038	2.43	121.46	C
140.00-120.00			B	0.145	2.791		1	1	26.038			
			C	0.145	2.791		1	1	26.038			
T4	0.64	3.07	A	0.133	2.837	24	1	1	27.120	3.01	150.53	C
120.00-100.00			B	0.133	2.837		1	1	27.120			
			C	0.133	2.837		1	1	27.120			
T5	0.74	3.18	A	0.123	2.874	23	1	1	28.292	3.17	158.37	C
100.00-80.00			B	0.123	2.874		1	1	28.292			
			C	0.123	2.874		1	1	28.292			
T6	0.75	3.64	A	0.124	2.87	21	1	1	33.236	3.24	161.75	C
80.00-60.00			B	0.124	2.87		1	1	33.236			
			C	0.124	2.87		1	1	33.236			
T7	0.79	5.16	A	0.132	2.837	19	1	1	37.895	3.21	160.31	C
60.00-40.00			B	0.132	2.837		1	1	37.895			
			C	0.132	2.837		1	1	37.895			
T8	0.80	5.36	A	0.126	2.863	16	1	1	39.450	2.87	143.39	C
40.00-20.00			B	0.126	2.863		1	1	39.450			
			C	0.126	2.863		1	1	39.450			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	16	1	1	59.339	3.58	179.01	C
			B	0.154	2.756		1	1	59.339			
			C	0.154	2.756		1	1	59.339			
Sum Weight:	5.35	33.03						OTM	2147.00 kip-ft	25.92		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	27	0.825	1	22.800	1.95	97.41	C
180.00-160.00			B	0.163	2.725		0.825	1	22.800			
			C	0.163	2.725		0.825	1	22.800			
T2	0.32	2.32	A	0.139	2.812	26	0.825	1	20.659	2.14	107.20	C
160.00-140.00			B	0.139	2.812		0.825	1	20.659			
			C	0.139	2.812		0.825	1	20.659			
T3	0.34	2.96	A	0.145	2.791	25	0.825	1	23.578	2.28	114.14	C
140.00-120.00			B	0.145	2.791		0.825	1	23.578			
			C	0.145	2.791		0.825	1	23.578			
T4	0.64	3.07	A	0.133	2.837	24	0.825	1	24.440	2.86	142.81	C
120.00-100.00			B	0.133	2.837		0.825	1	24.440			
			C	0.133	2.837		0.825	1	24.440			
T5	0.74	3.18	A	0.123	2.874	23	0.825	1	25.383	3.01	150.36	C
100.00-80.00			B	0.123	2.874		0.825	1	25.383			
			C	0.123	2.874		0.825	1	25.383			
T6	0.75	3.64	A	0.124	2.87	21	0.825	1	29.465	3.04	152.09	C
80.00-60.00			B	0.124	2.87		0.825	1	29.465			
			C	0.124	2.87		0.825	1	29.465			
T7	0.79	5.16	A	0.132	2.837	19	0.825	1	33.838	3.02	150.97	C
60.00-40.00			B	0.132	2.837		0.825	1	33.838			
			C	0.132	2.837		0.825	1	33.838			
T8	0.80	5.36	A	0.126	2.863	16	0.825	1	35.101	2.69	134.66	C
40.00-20.00			B	0.126	2.863		0.825	1	35.101			
			C	0.126	2.863		0.825	1	35.101			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	16	0.825	1	51.598	3.28	164.07	C
			B	0.154	2.756		0.825	1	51.598			
			C	0.154	2.756		0.825	1	51.598			
Sum Weight:	5.35	33.03						OTM	2011.90 kip-ft	24.27		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	27	0.8	1	22.379	1.92	96.09	C
180.00-160.00			B	0.163	2.725		0.8	1	22.379			
			C	0.163	2.725		0.8	1	22.379			
T2	0.32	2.32	A	0.139	2.812	26	0.8	1	20.321	2.12	106.15	C
160.00-140.00			B	0.139	2.812		0.8	1	20.321			
			C	0.139	2.812		0.8	1	20.321			
T3	0.34	2.96	A	0.145	2.791	25	0.8	1	23.226	2.26	113.09	C
140.00-120.00			B	0.145	2.791		0.8	1	23.226			
			C	0.145	2.791		0.8	1	23.226			
T4	0.64	3.07	A	0.133	2.837	24	0.8	1	24.057	2.83	141.70	C
120.00-100.00			B	0.133	2.837		0.8	1	24.057			
			C	0.133	2.837		0.8	1	24.057			
T5	0.74	3.18	A	0.123	2.874	23	0.8	1	24.968	2.98	149.21	C
100.00-80.00			B	0.123	2.874		0.8	1	24.968			
			C	0.123	2.874		0.8	1	24.968			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T6	0.75	3.64	A	0.124	2.87	21	0.8	1	28.926	3.01	150.71	C
80.00-60.00			B	0.124	2.87		0.8	1	28.926			
			C	0.124	2.87		0.8	1	28.926			
T7	0.79	5.16	A	0.132	2.837	19	0.8	1	33.258	2.99	149.64	C
60.00-40.00			B	0.132	2.837		0.8	1	33.258			
			C	0.132	2.837		0.8	1	33.258			
T8	0.80	5.36	A	0.126	2.863	16	0.8	1	34.479	2.67	133.41	C
40.00-20.00			B	0.126	2.863		0.8	1	34.479			
			C	0.126	2.863		0.8	1	34.479			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	16	0.8	1	50.492	3.24	161.93	C
			B	0.154	2.756		0.8	1	50.492			
			C	0.154	2.756		0.8	1	50.492			
Sum Weight:	5.35	33.03						OTM	1992.60 kip-ft	24.04		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	27	0.85	1	23.220	1.97	98.73	C
180.00-160.00			B	0.163	2.725		0.85	1	23.220			
			C	0.163	2.725		0.85	1	23.220			
T2	0.32	2.32	A	0.139	2.812	26	0.85	1	20.996	2.17	108.26	C
160.00-140.00			B	0.139	2.812		0.85	1	20.996			
			C	0.139	2.812		0.85	1	20.996			
T3	0.34	2.96	A	0.145	2.791	25	0.85	1	23.929	2.30	115.18	C
140.00-120.00			B	0.145	2.791		0.85	1	23.929			
			C	0.145	2.791		0.85	1	23.929			
T4	0.64	3.07	A	0.133	2.837	24	0.85	1	24.823	2.88	143.91	C
120.00-100.00			B	0.133	2.837		0.85	1	24.823			
			C	0.133	2.837		0.85	1	24.823			
T5	0.74	3.18	A	0.123	2.874	23	0.85	1	25.799	3.03	151.50	C
100.00-80.00			B	0.123	2.874		0.85	1	25.799			
			C	0.123	2.874		0.85	1	25.799			
T6	0.75	3.64	A	0.124	2.87	21	0.85	1	30.003	3.07	153.47	C
80.00-60.00			B	0.124	2.87		0.85	1	30.003			
			C	0.124	2.87		0.85	1	30.003			
T7	0.79	5.16	A	0.132	2.837	19	0.85	1	34.418	3.05	152.31	C
60.00-40.00			B	0.132	2.837		0.85	1	34.418			
			C	0.132	2.837		0.85	1	34.418			
T8	0.80	5.36	A	0.126	2.863	16	0.85	1	35.722	2.72	135.91	C
40.00-20.00			B	0.126	2.863		0.85	1	35.722			
			C	0.126	2.863		0.85	1	35.722			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	16	0.85	1	52.703	3.32	166.20	C
			B	0.154	2.756		0.85	1	52.703			
			C	0.154	2.756		0.85	1	52.703			
Sum Weight:	5.35	33.03						OTM	2031.20 kip-ft	24.51		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	3.64	9.15	A	0.416	2.032	6	1	1	66.932	1.26	63.10	C
180.00-160.00			B	0.416	2.032		1	1	66.932			
			C	0.416	2.032		1	1	66.932			
T2	6.45	10.33	A	0.355	2.16	6	1	1	63.467	1.63	81.39	C
160.00-140.00			B	0.355	2.16		1	1	63.467			
			C	0.355	2.16		1	1	63.467			
T3	6.88	10.96	A	0.308	2.274	6	1	1	62.298	1.65	82.46	C
140.00-120.00			B	0.308	2.274		1	1	62.298			
			C	0.308	2.274		1	1	62.298			
T4	9.50	11.38	A	0.285	2.337	6	1	1	64.152	1.89	94.74	C
120.00-100.00			B	0.285	2.337		1	1	64.152			
			C	0.285	2.337		1	1	64.152			
T5	10.78	11.77	A	0.266	2.391	5	1	1	66.088	1.99	99.26	C
100.00-80.00			B	0.266	2.391		1	1	66.088			
			C	0.266	2.391		1	1	66.088			
T6	10.77	13.28	A	0.258	2.414	5	1	1	71.737	1.93	96.65	C
80.00-60.00			B	0.258	2.414		1	1	71.737			
			C	0.258	2.414		1	1	71.737			
T7	11.14	15.34	A	0.257	2.418	4	1	1	78.074	1.89	94.52	C
60.00-40.00			B	0.257	2.418		1	1	78.074			
			C	0.257	2.418		1	1	78.074			
T8	10.78	15.41	A	0.241	2.465	4	1	1	79.313	1.67	83.25	C
40.00-20.00			B	0.241	2.465		1	1	79.313			
			C	0.241	2.465		1	1	79.313			
T9 20.00-0.00	9.47	15.85	A	0.255	2.424	4	1	1	96.964	1.74	87.00	C
			B	0.255	2.424		1	1	96.964			
			C	0.255	2.424		1	1	96.964			
Sum Weight:	79.41	113.46						OTM	1357.38 kip-ft	15.65		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	3.64	9.15	A	0.416	2.032	6	0.825	1	63.988	1.23	61.51	C
180.00-160.00			B	0.416	2.032		0.825	1	63.988			
			C	0.416	2.032		0.825	1	63.988			
T2	6.45	10.33	A	0.355	2.16	6	0.825	1	61.102	1.60	80.08	C
160.00-140.00			B	0.355	2.16		0.825	1	61.102			
			C	0.355	2.16		0.825	1	61.102			
T3	6.88	10.96	A	0.308	2.274	6	0.825	1	59.837	1.62	81.08	C
140.00-120.00			B	0.308	2.274		0.825	1	59.837			
			C	0.308	2.274		0.825	1	59.837			
T4	9.50	11.38	A	0.285	2.337	6	0.825	1	61.472	1.87	93.27	C
120.00-100.00			B	0.285	2.337		0.825	1	61.472			
			C	0.285	2.337		0.825	1	61.472			
T5	10.78	11.77	A	0.266	2.391	5	0.825	1	63.180	1.95	97.72	C
100.00-80.00			B	0.266	2.391		0.825	1	63.180			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.266	2.391		0.825	1	63.180			
T6	10.77	13.28	A	0.258	2.414	5	0.825	1	67.966	1.90	94.77	C
80.00-60.00			B	0.258	2.414		0.825	1	67.966			
			C	0.258	2.414		0.825	1	67.966			
T7	11.14	15.34	A	0.257	2.418	4	0.825	1	74.016	1.85	92.68	C
60.00-40.00			B	0.257	2.418		0.825	1	74.016			
			C	0.257	2.418		0.825	1	74.016			
T8	10.78	15.41	A	0.241	2.465	4	0.825	1	74.964	1.63	81.51	C
40.00-20.00			B	0.241	2.465		0.825	1	74.964			
			C	0.241	2.465		0.825	1	74.964			
T9 20.00-0.00	9.47	15.85	A	0.255	2.424	4	0.825	1	89.223	1.68	83.96	C
			B	0.255	2.424		0.825	1	89.223			
			C	0.255	2.424		0.825	1	89.223			
Sum Weight:	79.41	113.46						OTM	1332.33 kip-ft	15.33		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	3.64	9.15	A	0.416	2.032	6	0.8	1	63.567	1.23	61.28	C
180.00-160.00			B	0.416	2.032		0.8	1	63.567			
			C	0.416	2.032		0.8	1	63.567			
T2	6.45	10.33	A	0.355	2.16	6	0.8	1	60.765	1.60	79.89	C
160.00-140.00			B	0.355	2.16		0.8	1	60.765			
			C	0.355	2.16		0.8	1	60.765			
T3	6.88	10.96	A	0.308	2.274	6	0.8	1	59.486	1.62	80.88	C
140.00-120.00			B	0.308	2.274		0.8	1	59.486			
			C	0.308	2.274		0.8	1	59.486			
T4	9.50	11.38	A	0.285	2.337	6	0.8	1	61.089	1.86	93.06	C
120.00-100.00			B	0.285	2.337		0.8	1	61.089			
			C	0.285	2.337		0.8	1	61.089			
T5	10.78	11.77	A	0.266	2.391	5	0.8	1	62.764	1.95	97.50	C
100.00-80.00			B	0.266	2.391		0.8	1	62.764			
			C	0.266	2.391		0.8	1	62.764			
T6	10.77	13.28	A	0.258	2.414	5	0.8	1	67.428	1.89	94.50	C
80.00-60.00			B	0.258	2.414		0.8	1	67.428			
			C	0.258	2.414		0.8	1	67.428			
T7	11.14	15.34	A	0.257	2.418	4	0.8	1	73.437	1.85	92.42	C
60.00-40.00			B	0.257	2.418		0.8	1	73.437			
			C	0.257	2.418		0.8	1	73.437			
T8	10.78	15.41	A	0.241	2.465	4	0.8	1	74.343	1.63	81.27	C
40.00-20.00			B	0.241	2.465		0.8	1	74.343			
			C	0.241	2.465		0.8	1	74.343			
T9 20.00-0.00	9.47	15.85	A	0.255	2.424	4	0.8	1	88.117	1.67	83.53	C
			B	0.255	2.424		0.8	1	88.117			
			C	0.255	2.424		0.8	1	88.117			
Sum Weight:	79.41	113.46						OTM	1328.75 kip-ft	15.29		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	3.64	9.15	A	0.416	2.032	6	0.85	1	64.408	1.23	61.74	C
180.00-160.00			B	0.416	2.032		0.85	1	64.408			
			C	0.416	2.032		0.85	1	64.408			
T2	6.45	10.33	A	0.355	2.16	6	0.85	1	61.440	1.61	80.27	C
160.00-140.00			B	0.355	2.16		0.85	1	61.440			
			C	0.355	2.16		0.85	1	61.440			
T3	6.88	10.96	A	0.308	2.274	6	0.85	1	60.189	1.63	81.28	C
140.00-120.00			B	0.308	2.274		0.85	1	60.189			
			C	0.308	2.274		0.85	1	60.189			
T4	9.50	11.38	A	0.285	2.337	6	0.85	1	61.855	1.87	93.48	C
120.00-100.00			B	0.285	2.337		0.85	1	61.855			
			C	0.285	2.337		0.85	1	61.855			
T5	10.78	11.77	A	0.266	2.391	5	0.85	1	63.595	1.96	97.94	C
100.00-80.00			B	0.266	2.391		0.85	1	63.595			
			C	0.266	2.391		0.85	1	63.595			
T6	10.77	13.28	A	0.258	2.414	5	0.85	1	68.505	1.90	95.04	C
80.00-60.00			B	0.258	2.414		0.85	1	68.505			
			C	0.258	2.414		0.85	1	68.505			
T7	11.14	15.34	A	0.257	2.418	4	0.85	1	74.596	1.86	92.94	C
60.00-40.00			B	0.257	2.418		0.85	1	74.596			
			C	0.257	2.418		0.85	1	74.596			
T8	10.78	15.41	A	0.241	2.465	4	0.85	1	75.585	1.64	81.76	C
40.00-20.00			B	0.241	2.465		0.85	1	75.585			
			C	0.241	2.465		0.85	1	75.585			
T9 20.00-0.00	9.47	15.85	A	0.255	2.424	4	0.85	1	90.329	1.69	84.39	C
			B	0.255	2.424		0.85	1	90.329			
			C	0.255	2.424		0.85	1	90.329			
Sum Weight:	79.41	113.46						OTM	1335.91 kip-ft	15.38		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	9	1	1	25.744	0.71	35.48	C
180.00-160.00			B	0.163	2.725		1	1	25.744			
			C	0.163	2.725		1	1	25.744			
T2	0.32	2.32	A	0.139	2.812	9	1	1	23.023	0.76	38.12	C
160.00-140.00			B	0.139	2.812		1	1	23.023			
			C	0.139	2.812		1	1	23.023			
T3	0.34	2.96	A	0.145	2.791	8	1	1	26.038	0.81	40.41	C
140.00-120.00			B	0.145	2.791		1	1	26.038			
			C	0.145	2.791		1	1	26.038			
T4	0.64	3.07	A	0.133	2.837	8	1	1	27.120	1.00	50.08	C
120.00-100.00			B	0.133	2.837		1	1	27.120			
			C	0.133	2.837		1	1	27.120			
T5	0.74	3.18	A	0.123	2.874	8	1	1	28.292	1.05	52.69	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
100.00-80.00			B	0.123	2.874		1	1	28.292			
			C	0.123	2.874		1	1	28.292			
T6	0.75	3.64	A	0.124	2.87	7	1	1	33.236	1.08	53.82	C
80.00-60.00			B	0.124	2.87		1	1	33.236			
			C	0.124	2.87		1	1	33.236			
T7	0.79	5.16	A	0.132	2.837	6	1	1	37.895	1.07	53.34	C
60.00-40.00			B	0.132	2.837		1	1	37.895			
			C	0.132	2.837		1	1	37.895			
T8	0.80	5.36	A	0.126	2.863	5	1	1	39.450	0.95	47.71	C
40.00-20.00			B	0.126	2.863		1	1	39.450			
			C	0.126	2.863		1	1	39.450			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	5	1	1	59.339	1.19	59.56	C
			B	0.154	2.756		1	1	59.339			
			C	0.154	2.756		1	1	59.339			
Sum Weight:	5.35	33.03						OTM	714.32 kip-ft	8.62		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	9	0.825	1	22.800	0.65	32.41	C
180.00-160.00			B	0.163	2.725		0.825	1	22.800			
			C	0.163	2.725		0.825	1	22.800			
T2	0.32	2.32	A	0.139	2.812	9	0.825	1	20.659	0.71	35.67	C
160.00-140.00			B	0.139	2.812		0.825	1	20.659			
			C	0.139	2.812		0.825	1	20.659			
T3	0.34	2.96	A	0.145	2.791	8	0.825	1	23.578	0.76	37.97	C
140.00-120.00			B	0.145	2.791		0.825	1	23.578			
			C	0.145	2.791		0.825	1	23.578			
T4	0.64	3.07	A	0.133	2.837	8	0.825	1	24.440	0.95	47.51	C
120.00-100.00			B	0.133	2.837		0.825	1	24.440			
			C	0.133	2.837		0.825	1	24.440			
T5	0.74	3.18	A	0.123	2.874	8	0.825	1	25.383	1.00	50.02	C
100.00-80.00			B	0.123	2.874		0.825	1	25.383			
			C	0.123	2.874		0.825	1	25.383			
T6	0.75	3.64	A	0.124	2.87	7	0.825	1	29.465	1.01	50.60	C
80.00-60.00			B	0.124	2.87		0.825	1	29.465			
			C	0.124	2.87		0.825	1	29.465			
T7	0.79	5.16	A	0.132	2.837	6	0.825	1	33.838	1.00	50.23	C
60.00-40.00			B	0.132	2.837		0.825	1	33.838			
			C	0.132	2.837		0.825	1	33.838			
T8	0.80	5.36	A	0.126	2.863	5	0.825	1	35.101	0.90	44.80	C
40.00-20.00			B	0.126	2.863		0.825	1	35.101			
			C	0.126	2.863		0.825	1	35.101			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	5	0.825	1	51.598	1.09	54.59	C
			B	0.154	2.756		0.825	1	51.598			
			C	0.154	2.756		0.825	1	51.598			
Sum Weight:	5.35	33.03						OTM	669.37 kip-ft	8.08		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	9	0.8	1	22.379	0.64	31.97	C
180.00-160.00			B	0.163	2.725		0.8	1	22.379			
			C	0.163	2.725		0.8	1	22.379			
T2	0.32	2.32	A	0.139	2.812	9	0.8	1	20.321	0.71	35.32	C
160.00-140.00			B	0.139	2.812		0.8	1	20.321			
			C	0.139	2.812		0.8	1	20.321			
T3	0.34	2.96	A	0.145	2.791	8	0.8	1	23.226	0.75	37.63	C
140.00-120.00			B	0.145	2.791		0.8	1	23.226			
			C	0.145	2.791		0.8	1	23.226			
T4	0.64	3.07	A	0.133	2.837	8	0.8	1	24.057	0.94	47.15	C
120.00-100.00			B	0.133	2.837		0.8	1	24.057			
			C	0.133	2.837		0.8	1	24.057			
T5	0.74	3.18	A	0.123	2.874	8	0.8	1	24.968	0.99	49.64	C
100.00-80.00			B	0.123	2.874		0.8	1	24.968			
			C	0.123	2.874		0.8	1	24.968			
T6	0.75	3.64	A	0.124	2.87	7	0.8	1	28.926	1.00	50.14	C
80.00-60.00			B	0.124	2.87		0.8	1	28.926			
			C	0.124	2.87		0.8	1	28.926			
T7	0.79	5.16	A	0.132	2.837	6	0.8	1	33.258	1.00	49.79	C
60.00-40.00			B	0.132	2.837		0.8	1	33.258			
			C	0.132	2.837		0.8	1	33.258			
T8	0.80	5.36	A	0.126	2.863	5	0.8	1	34.479	0.89	44.39	C
40.00-20.00			B	0.126	2.863		0.8	1	34.479			
			C	0.126	2.863		0.8	1	34.479			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	5	0.8	1	50.492	1.08	53.88	C
			B	0.154	2.756		0.8	1	50.492			
			C	0.154	2.756		0.8	1	50.492			
Sum Weight:	5.35	33.03						OTM	662.95 kip-ft	8.00		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.18	1.63	A	0.163	2.725	9	0.85	1	23.220	0.66	32.85	C
180.00-160.00			B	0.163	2.725		0.85	1	23.220			
			C	0.163	2.725		0.85	1	23.220			
T2	0.32	2.32	A	0.139	2.812	9	0.85	1	20.996	0.72	36.02	C
160.00-140.00			B	0.139	2.812		0.85	1	20.996			
			C	0.139	2.812		0.85	1	20.996			
T3	0.34	2.96	A	0.145	2.791	8	0.85	1	23.929	0.77	38.32	C
140.00-120.00			B	0.145	2.791		0.85	1	23.929			
			C	0.145	2.791		0.85	1	23.929			
T4	0.64	3.07	A	0.133	2.837	8	0.85	1	24.823	0.96	47.88	C
120.00-100.00			B	0.133	2.837		0.85	1	24.823			
			C	0.133	2.837		0.85	1	24.823			
T5	0.74	3.18	A	0.123	2.874	8	0.85	1	25.799	1.01	50.41	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
100.00-80.00			B	0.123	2.874		0.85	1	25.799			
			C	0.123	2.874		0.85	1	25.799			
T6	0.75	3.64	A	0.124	2.87	7	0.85	1	30.003	1.02	51.06	C
80.00-60.00			B	0.124	2.87		0.85	1	30.003			
			C	0.124	2.87		0.85	1	30.003			
T7	0.79	5.16	A	0.132	2.837	6	0.85	1	34.418	1.01	50.67	C
60.00-40.00			B	0.132	2.837		0.85	1	34.418			
			C	0.132	2.837		0.85	1	34.418			
T8	0.80	5.36	A	0.126	2.863	5	0.85	1	35.722	0.90	45.22	C
40.00-20.00			B	0.126	2.863		0.85	1	35.722			
			C	0.126	2.863		0.85	1	35.722			
T9 20.00-0.00	0.80	5.72	A	0.154	2.756	5	0.85	1	52.703	1.11	55.30	C
			B	0.154	2.756		0.85	1	52.703			
			C	0.154	2.756		0.85	1	52.703			
Sum Weight:	5.35	33.03						OTM	675.79 kip-ft	8.15		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	16.19					
Bracing Weight	16.84					
Total Member Self-Weight	33.03			-1.60	-31.36	
Total Weight	43.68			-1.60	-31.36	
Wind 0 deg - No Ice		-0.07	-38.70	-3723.93	-18.95	21.63
Wind 30 deg - No Ice		19.40	-32.25	-3118.74	-1916.48	29.91
Wind 45 deg - No Ice		27.31	-26.15	-2529.38	-2690.09	31.41
Wind 60 deg - No Ice		33.28	-18.34	-1774.82	-3275.46	30.84
Wind 90 deg - No Ice		38.94	0.07	10.81	-3823.09	23.27
Wind 120 deg - No Ice		34.98	19.41	1870.31	-3421.59	8.67
Wind 135 deg - No Ice		28.39	27.22	2622.88	-2786.80	0.80
Wind 150 deg - No Ice		19.53	32.33	3127.95	-1937.97	-6.64
Wind 180 deg - No Ice		0.07	36.81	3566.32	-43.77	-20.93
Wind 210 deg - No Ice		-19.40	32.25	3115.53	1853.75	-29.91
Wind 225 deg - No Ice		-27.31	26.15	2526.17	2627.37	-31.41
Wind 240 deg - No Ice		-34.91	19.28	1848.81	3346.45	-30.30
Wind 270 deg - No Ice		-38.94	-0.07	-14.02	3760.37	-23.27
Wind 300 deg - No Ice		-33.35	-18.47	-1796.32	3225.15	-9.91
Wind 315 deg - No Ice		-28.39	-27.22	-2626.09	2724.08	-0.80
Wind 330 deg - No Ice		-19.53	-32.33	-3131.15	1875.25	6.64
Member Ice	80.43					
Total Weight Ice	220.60			-285.38	-179.83	
Wind 0 deg - Ice		-0.02	-20.51	-2274.09	-176.64	11.12
Wind 30 deg - Ice		10.30	-17.52	-1987.46	-1183.17	8.76
Wind 45 deg - Ice		14.55	-14.27	-1671.64	-1597.89	6.67
Wind 60 deg - Ice		17.79	-10.06	-1262.66	-1914.65	4.15
Wind 90 deg - Ice		20.64	0.02	-282.19	-2192.03	-1.70
Wind 120 deg - Ice		18.12	10.27	711.74	-1942.63	-7.24
Wind 135 deg - Ice		14.76	14.48	1120.07	-1617.07	-9.20
Wind 150 deg - Ice		10.34	17.54	1419.90	-1188.69	-10.46
Wind 180 deg - Ice		0.02	20.15	1674.71	-183.01	-11.09

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 210 deg - Ice		-10.30	17.52	1416.71	823.51	-8.76
Wind 225 deg - Ice		-14.55	14.27	1100.89	1238.23	-6.67
Wind 240 deg - Ice		-18.10	10.24	706.22	1579.79	-3.88
Wind 270 deg - Ice		-20.64	-0.02	-288.56	1832.37	1.70
Wind 300 deg - Ice		-17.81	-10.09	-1268.18	1558.18	6.94
Wind 315 deg - Ice		-14.76	-14.48	-1690.82	1257.41	9.20
Wind 330 deg - Ice		-10.34	-17.54	-1990.65	829.03	10.46
Total Weight	43.68			-1.60	-31.36	
Wind 0 deg - Service		-0.02	-12.87	-1224.26	-9.07	7.20
Wind 30 deg - Service		6.46	-10.73	-1022.90	-640.39	9.95
Wind 45 deg - Service		9.09	-8.70	-826.82	-897.78	10.45
Wind 60 deg - Service		11.07	-6.10	-575.77	-1092.54	10.26
Wind 90 deg - Service		12.96	0.02	18.32	-1274.74	7.74
Wind 120 deg - Service		11.64	6.46	636.99	-1141.15	2.89
Wind 135 deg - Service		9.44	9.05	887.37	-929.96	0.27
Wind 150 deg - Service		6.50	10.76	1055.41	-647.55	-2.21
Wind 180 deg - Service		0.02	12.25	1201.26	-17.33	-6.96
Wind 210 deg - Service		-6.46	10.73	1051.28	613.99	-9.95
Wind 225 deg - Service		-9.09	8.70	855.19	871.37	-10.45
Wind 240 deg - Service		-11.61	6.42	629.83	1110.62	-10.08
Wind 270 deg - Service		-12.96	-0.02	10.06	1248.33	-7.74
Wind 300 deg - Service		-11.10	-6.15	-582.92	1070.26	-3.30
Wind 315 deg - Service		-9.44	-9.05	-859.00	903.55	-0.27
Wind 330 deg - Service		-6.50	-10.76	-1027.03	621.14	2.21

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice

Comb. No.	Description
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	9	7.06	-0.80	-0.55
			Max. Compression	40	-15.90	0.18	-0.01
			Max. Mx	28	1.65	-1.05	-0.29
			Max. My	26	-0.63	0.01	1.46
			Max. Vy	28	0.60	-1.05	-0.29
			Max. Vx	10	-0.87	-0.02	0.90
		Diagonal	Max Tension	32	3.58	0.00	0.00
			Max. Compression	32	-3.60	0.00	0.00
			Max. Mx	38	0.55	0.12	0.01
			Max. My	35	-0.10	0.10	-0.02
			Max. Vy	39	0.09	0.12	0.01
			Max. Vx	35	-0.00	0.00	0.00
		Top Girt	Max Tension	13	0.01	0.00	0.00
			Max. Compression	48	-0.10	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	38	-0.08	-0.30	0.00
			Max. My	36	-0.07	0.00	0.01
			Max. Vy	38	0.13	0.00	0.00
			Max. Vx	36	-0.00	0.00	0.00
T2	160 - 140	Leg	Max Tension	9	22.72	-0.95	-0.18
			Max. Compression	12	-29.33	1.01	0.08
			Max. Mx	2	-26.86	1.03	-0.24
			Max. My	4	-4.06	-0.02	-1.06
			Max. Vy	3	-0.34	1.03	-0.24
			Max. Vx	20	-0.37	0.01	1.06
		Diagonal	Max Tension	32	4.85	0.00	0.00
			Max. Compression	32	-4.89	0.00	0.00
			Max. Mx	39	0.39	-0.17	0.02
			Max. My	35	-0.02	-0.16	0.02
			Max. Vy	38	-0.12	-0.17	0.02
			Max. Vx	35	0.01	0.00	0.00
T3	140 - 120	Leg	Max Tension	9	40.06	0.69	0.22
			Max. Compression	12	-49.68	1.79	-0.12
			Max. Mx	2	-47.43	1.90	-0.02
			Max. My	2	12.07	-0.81	-0.99
			Max. Vy	8	-0.91	0.67	0.22
			Max. Vx	16	-2.07	-0.08	0.34
		Diagonal	Max Tension	26	6.75	0.00	0.00
			Max. Compression	26	-6.81	0.00	0.00
			Max. Mx	38	1.76	-0.28	-0.04
			Max. My	35	0.14	-0.25	0.04
			Max. Vy	37	-0.16	-0.28	0.04
			Max. Vx	35	0.01	0.00	0.00
T4	120 - 100	Leg	Max Tension	9	66.31	0.61	0.05
			Max. Compression	12	-81.41	2.95	-0.23
			Max. Mx	12	-81.41	2.95	-0.23
			Max. My	4	-6.33	0.15	-1.58
			Max. Vy	25	-1.55	2.92	0.23
			Max. Vx	22	-1.59	-0.79	1.38
		Diagonal	Max Tension	26	9.69	0.00	0.00
			Max. Compression	26	-9.74	0.00	0.00
			Max. Mx	38	1.97	-0.34	0.04
			Max. My	35	0.19	-0.30	0.04
			Max. Vy	38	-0.17	-0.34	0.04
			Max. Vx	35	0.01	0.00	0.00
T5	100 - 80	Leg	Max Tension	9	101.00	1.44	0.16
			Max. Compression	12	-120.33	3.24	-0.20
			Max. Mx	12	-120.33	3.24	-0.20
			Max. My	16	-4.80	-0.01	-1.59
			Max. Vy	24	-0.61	3.23	0.09
			Max. Vx	16	-0.97	-0.03	0.21
		Diagonal	Max Tension	26	12.53	0.00	0.00
			Max. Compression	26	-12.64	0.00	0.00
			Max. Mx	38	2.76	-0.40	-0.05
			Max. My	35	0.32	-0.36	0.05
			Max. Vy	38	-0.19	-0.40	0.05
			Max. Vx	35	0.01	0.00	0.00
T6	80 - 60	Leg	Max Tension	9	136.73	0.76	-0.26
			Max. Compression	12	-160.92	4.19	-0.14
			Max. Mx	24	-157.32	4.20	0.95
			Max. My	4	-13.80	0.13	-3.53
			Max. Vy	24	-1.11	4.20	0.95
			Max. Vx	20	-1.34	-0.01	3.52
		Diagonal	Max Tension	26	13.31	0.00	0.00
			Max. Compression	26	-13.46	0.00	0.00
			Max. Mx	38	2.50	-0.53	0.06

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	35	0.52	-0.48	0.06
			Max. Vy	38	-0.23	-0.53	0.06
			Max. Vx	35	0.01	0.00	0.00
T7	60 - 40	Leg	Max Tension	9	173.42	0.66	0.33
			Max. Compression	12	-203.18	3.94	-0.08
			Max. Mx	12	-203.18	3.94	-0.08
			Max. My	4	-17.11	0.19	-2.23
			Max. Vy	24	-0.62	3.93	0.22
			Max. Vx	20	-0.32	0.04	2.22
		Diagonal	Max Tension	26	14.59	0.00	0.00
			Max. Compression	26	-14.72	0.00	0.00
			Max. Mx	38	3.50	-0.64	-0.07
			Max. My	36	-2.38	-0.63	0.07
			Max. Vy	38	-0.27	-0.64	0.07
			Max. Vx	36	0.01	0.00	0.00
T8	40 - 20	Leg	Max Tension	9	208.66	0.40	0.11
			Max. Compression	12	-244.30	4.40	-0.05
			Max. Mx	48	6.22	-7.12	-0.05
			Max. My	4	-18.75	-0.00	-2.71
			Max. Vy	43	1.12	-7.10	0.06
			Max. Vx	4	0.33	-0.00	-2.71
		Diagonal	Max Tension	26	14.83	0.00	0.00
			Max. Compression	26	-15.05	0.00	0.00
			Max. Mx	38	4.39	-0.69	0.07
			Max. My	35	-0.37	-0.62	0.08
			Max. Vy	38	-0.27	-0.69	0.07
			Max. Vx	35	0.01	0.00	0.00
T9	20 - 0	Leg	Max Tension	9	242.46	0.12	0.06
			Max. Compression	12	-284.27	2.29	-0.04
			Max. Mx	46	-136.11	8.68	0.10
			Max. My	10	-14.95	-0.16	4.27
			Max. Vy	46	-1.45	8.68	0.10
			Max. Vx	4	0.54	-0.08	-4.26
		Diagonal	Max Tension	26	15.56	0.00	0.00
			Max. Compression	26	-15.92	0.00	0.00
			Max. Mx	38	0.00	0.89	0.10
			Max. My	36	-6.20	0.86	-0.10
			Max. Vy	38	0.30	0.89	0.10
			Max. Vx	36	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	290.10	33.61	-18.06
	Max. H_x	24	290.10	33.61	-18.06
	Max. H_z	7	-241.79	-28.27	16.58
	Min. Vert	9	-251.01	-30.00	15.94
	Min. H_x	9	-251.01	-30.00	15.94
	Min. H_z	24	290.10	33.61	-18.06
Leg B	Max. Vert	12	294.53	-33.37	-18.83
	Max. H_x	29	-250.37	29.71	16.62
	Max. H_z	31	-241.32	27.82	17.57
	Min. Vert	29	-250.37	29.71	16.62
	Min. H_x	12	294.53	-33.37	-18.83
	Min. H_z	14	274.48	-30.07	-18.86

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Max. Vert	2	282.55	0.80	37.07
	Max. H_x	26	18.44	4.85	1.64
	Max. H_z	2	282.55	0.80	37.07
	Min. Vert	19	-240.71	-0.74	-32.82
	Min. H_x	13	-120.03	-4.81	-16.73
	Min. H_z	19	-240.71	-0.74	-32.82

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	43.68	-0.00	-0.00	-1.61	-31.35	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	52.42	-0.12	-61.91	-5968.74	-17.84	34.74
0.9 Dead+1.6 Wind 0 deg - No Ice	39.31	-0.12	-61.91	-5965.38	-8.41	34.71
1.2 Dead+1.6 Wind 30 deg - No Ice	52.42	31.05	-51.60	-4998.58	-3059.51	47.96
0.9 Dead+1.6 Wind 30 deg - No Ice	39.31	31.05	-51.60	-4995.70	-3048.62	47.93
1.2 Dead+1.6 Wind 45 deg - No Ice	52.42	43.70	-41.83	-4053.83	-4299.60	50.34
0.9 Dead+1.6 Wind 45 deg - No Ice	39.31	43.70	-41.83	-4051.39	-4288.10	50.32
1.2 Dead+1.6 Wind 60 deg - No Ice	52.42	53.24	-29.35	-2844.27	-5237.92	49.41
0.9 Dead+1.6 Wind 60 deg - No Ice	39.31	53.24	-29.35	-2842.41	-5225.97	49.39
1.2 Dead+1.6 Wind 90 deg - No Ice	52.42	62.30	0.12	18.06	-6115.73	37.25
0.9 Dead+1.6 Wind 90 deg - No Ice	39.31	62.30	0.12	18.53	-6103.35	37.25
1.2 Dead+1.6 Wind 120 deg - No Ice	52.42	55.97	31.06	2998.76	-5472.14	13.84
0.9 Dead+1.6 Wind 120 deg - No Ice	39.31	55.97	31.06	2997.79	-5460.06	13.85
1.2 Dead+1.6 Wind 135 deg - No Ice	52.42	43.87	42.00	4078.21	-4327.73	1.19
0.9 Dead+1.6 Wind 135 deg - No Ice	39.31	43.87	42.00	4076.71	-4316.20	1.22
1.2 Dead+1.6 Wind 150 deg - No Ice	52.42	31.25	51.72	5014.68	-3093.96	-10.73
0.9 Dead+1.6 Wind 150 deg - No Ice	39.31	31.25	51.72	5012.73	-3083.05	-10.72
1.2 Dead+1.6 Wind 180 deg - No Ice	52.42	0.12	58.90	5717.38	-57.64	-33.62
0.9 Dead+1.6 Wind 180 deg - No Ice	39.31	0.12	58.90	5715.08	-48.19	-33.59
1.2 Dead+1.6 Wind 210 deg - No Ice	52.41	-31.05	51.60	4994.81	2984.03	-47.96
0.9 Dead+1.6 Wind 210 deg - No Ice	39.31	-31.05	51.60	4992.87	2992.02	-47.93
1.2 Dead+1.6 Wind 225 deg - No Ice	52.42	-43.70	41.83	4050.11	4224.14	-50.34
0.9 Dead+1.6 Wind 225 deg - No Ice	39.31	-43.70	41.83	4048.62	4231.51	-50.33

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 240 deg - No Ice	52.42	-55.85	30.85	2964.34	5376.80	-48.58
0.9 Dead+1.6 Wind 240 deg - No Ice	39.31	-55.85	30.85	2963.38	5383.62	-48.56
1.2 Dead+1.6 Wind 270 deg - No Ice	52.42	-62.30	-0.12	-21.72	6040.31	-37.25
0.9 Dead+1.6 Wind 270 deg - No Ice	39.31	-62.30	-0.12	-21.23	6046.81	-37.25
1.2 Dead+1.6 Wind 300 deg - No Ice	52.42	-53.36	-29.55	-2878.74	5182.39	-15.80
0.9 Dead+1.6 Wind 300 deg - No Ice	39.31	-53.36	-29.55	-2876.87	5189.31	-15.81
1.2 Dead+1.6 Wind 315 deg - No Ice	52.42	-43.87	-42.00	-4081.99	4252.30	-1.20
0.9 Dead+1.6 Wind 315 deg - No Ice	39.31	-43.87	-42.00	-4079.54	4259.67	-1.22
1.2 Dead+1.6 Wind 330 deg - No Ice	52.42	-31.25	-51.72	-5018.51	3018.53	10.74
0.9 Dead+1.6 Wind 330 deg - No Ice	39.31	-31.25	-51.72	-5015.60	3026.50	10.73
1.2 Dead+1.0 Ice+1.0 Temp	229.33	-0.00	0.00	-287.96	-187.78	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	229.33	-0.02	-20.51	-2295.12	-184.65	11.32
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	229.33	10.30	-17.52	-2005.86	-1200.42	8.80
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	229.33	14.55	-14.27	-1687.13	-1618.95	6.62
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	229.33	17.79	-10.06	-1274.38	-1938.64	4.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	229.33	20.64	0.02	-284.88	-2218.57	-1.97
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	229.33	18.12	10.27	718.20	-1966.90	-7.58
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	229.33	14.57	14.29	1115.09	-1622.96	-9.53
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	229.33	10.33	17.53	1432.38	-1205.61	-10.77
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	229.33	0.02	20.15	1689.44	-191.06	-11.29
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	229.33	-10.30	17.51	1429.16	824.36	-8.80
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	229.33	-14.55	14.26	1110.55	1242.74	-6.62
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	229.33	-18.10	10.24	712.37	1587.32	-3.75
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	229.33	-20.64	-0.02	-291.21	1842.15	1.97
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	229.33	-17.80	-10.09	-1279.51	1565.55	7.28
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	229.33	-14.57	-14.29	-1691.09	1247.33	9.53
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	229.33	-10.34	-17.54	-2009.09	830.25	10.77
Dead+Wind 0 deg - Service	43.68	-0.02	-12.87	-1241.67	-27.27	7.22
Dead+Wind 30 deg - Service	43.68	6.45	-10.73	-1040.05	-659.42	9.97
Dead+Wind 45 deg - Service	43.68	9.09	-8.70	-843.71	-917.14	10.46
Dead+Wind 60 deg - Service	43.68	11.07	-6.10	-592.46	-1112.41	10.27
Dead+Wind 90 deg - Service	43.68	12.95	0.02	2.54	-1294.89	7.75
Dead+Wind 120 deg - Service	43.68	11.64	6.46	622.16	-1161.10	2.88
Dead+Wind 135 deg - Service	43.68	9.12	8.73	846.56	-923.20	0.25
Dead+Wind 150 deg - Service	43.68	6.50	10.75	1041.23	-666.73	-2.23

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 180 deg - Service	43.68	0.02	12.25	1187.03	-35.54	-6.99
Dead+Wind 210 deg - Service	43.68	-6.45	10.73	1036.86	596.61	-9.97
Dead+Wind 225 deg - Service	43.68	-9.09	8.70	840.52	854.34	-10.47
Dead+Wind 240 deg - Service	43.68	-11.61	6.41	614.86	1093.89	-10.10
Dead+Wind 270 deg - Service	43.68	-12.95	-0.02	-5.73	1231.79	-7.75
Dead+Wind 300 deg - Service	43.68	-11.09	-6.14	-599.49	1053.48	-3.29
Dead+Wind 315 deg - Service	43.68	-9.12	-8.73	-849.56	860.18	-0.25
Dead+Wind 330 deg - Service	43.68	-6.50	-10.75	-1044.19	603.77	2.24

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-43.68	0.00	0.00	43.68	0.00	0.000%
2	-0.12	-52.42	-61.92	0.12	52.42	61.91	0.004%
3	-0.12	-39.31	-61.92	0.12	39.31	61.91	0.005%
4	31.05	-52.42	-51.60	-31.05	52.42	51.60	0.004%
5	31.05	-39.31	-51.60	-31.05	39.31	51.60	0.005%
6	43.70	-52.42	-41.83	-43.70	52.42	41.83	0.004%
7	43.70	-39.31	-41.83	-43.70	39.31	41.83	0.005%
8	53.24	-52.42	-29.35	-53.24	52.42	29.35	0.004%
9	53.24	-39.31	-29.35	-53.24	39.31	29.35	0.005%
10	62.30	-52.42	0.12	-62.30	52.42	-0.12	0.004%
11	62.30	-39.31	0.12	-62.30	39.31	-0.12	0.005%
12	55.97	-52.42	31.06	-55.97	52.42	-31.06	0.004%
13	55.97	-39.31	31.06	-55.97	39.31	-31.06	0.006%
14	43.87	-52.42	42.00	-43.87	52.42	-42.00	0.004%
15	43.87	-39.31	42.00	-43.87	39.31	-42.00	0.005%
16	31.25	-52.42	51.72	-31.25	52.42	-51.72	0.004%
17	31.25	-39.31	51.72	-31.25	39.31	-51.72	0.005%
18	0.12	-52.42	58.90	-0.12	52.42	-58.90	0.004%
19	0.12	-39.31	58.90	-0.12	39.31	-58.90	0.005%
20	-31.05	-52.42	51.60	31.05	52.41	-51.60	0.005%
21	-31.05	-39.31	51.60	31.05	39.31	-51.60	0.005%
22	-43.70	-52.42	41.83	43.70	52.42	-41.83	0.004%
23	-43.70	-39.31	41.83	43.70	39.31	-41.83	0.005%
24	-55.85	-52.42	30.85	55.85	52.42	-30.85	0.004%
25	-55.85	-39.31	30.85	55.85	39.31	-30.85	0.005%
26	-62.30	-52.42	-0.12	62.30	52.42	0.12	0.004%
27	-62.30	-39.31	-0.12	62.30	39.31	0.12	0.005%
28	-53.36	-52.42	-29.55	53.36	52.42	29.55	0.004%
29	-53.36	-39.31	-29.55	53.36	39.31	29.55	0.005%
30	-43.87	-52.42	-42.00	43.87	52.42	42.00	0.004%
31	-43.87	-39.31	-42.00	43.87	39.31	42.00	0.005%
32	-31.25	-52.42	-51.72	31.25	52.42	51.72	0.004%
33	-31.25	-39.31	-51.72	31.25	39.31	51.72	0.005%
34	0.00	-229.33	0.00	0.00	229.33	-0.00	0.001%
35	-0.02	-229.33	-20.51	0.02	229.33	20.51	0.001%
36	10.30	-229.33	-17.52	-10.30	229.33	17.52	0.001%
37	14.55	-229.33	-14.27	-14.55	229.33	14.27	0.001%
38	17.79	-229.33	-10.06	-17.79	229.33	10.06	0.001%
39	20.64	-229.33	0.02	-20.64	229.33	-0.02	0.001%
40	18.12	-229.33	10.27	-18.12	229.33	-10.27	0.001%
41	14.58	-229.33	14.29	-14.57	229.33	-14.29	0.003%
42	10.34	-229.33	17.54	-10.33	229.33	-17.53	0.003%
43	0.02	-229.33	20.15	-0.02	229.33	-20.15	0.003%
44	-10.30	-229.33	17.52	10.30	229.33	-17.51	0.002%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
45	-14.55	-229.33	14.27	14.55	229.33	-14.26	0.002%
46	-18.10	-229.33	10.24	18.10	229.33	-10.24	0.002%
47	-20.64	-229.33	-0.02	20.64	229.33	0.02	0.003%
48	-17.81	-229.33	-10.09	17.80	229.33	10.09	0.003%
49	-14.58	-229.33	-14.29	14.57	229.33	14.29	0.003%
50	-10.34	-229.33	-17.54	10.34	229.33	17.54	0.001%
51	-0.02	-43.68	-12.87	0.02	43.68	12.87	0.006%
52	6.46	-43.68	-10.73	-6.45	43.68	10.73	0.006%
53	9.09	-43.68	-8.70	-9.09	43.68	8.70	0.006%
54	11.07	-43.68	-6.10	-11.07	43.68	6.10	0.002%
55	12.96	-43.68	0.02	-12.95	43.68	-0.02	0.002%
56	11.64	-43.68	6.46	-11.64	43.68	-6.46	0.002%
57	9.12	-43.68	8.73	-9.12	43.68	-8.73	0.002%
58	6.50	-43.68	10.76	-6.50	43.68	-10.75	0.002%
59	0.02	-43.68	12.25	-0.02	43.68	-12.25	0.006%
60	-6.46	-43.68	10.73	6.45	43.68	-10.73	0.006%
61	-9.09	-43.68	8.70	9.09	43.68	-8.70	0.006%
62	-11.61	-43.68	6.42	11.61	43.68	-6.41	0.006%
63	-12.96	-43.68	-0.02	12.95	43.68	0.02	0.006%
64	-11.10	-43.68	-6.15	11.09	43.68	6.14	0.006%
65	-9.12	-43.68	-8.73	9.12	43.68	8.73	0.006%
66	-6.50	-43.68	-10.76	6.50	43.68	10.75	0.006%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00010372
2	Yes	5	0.00000001	0.00027500
3	Yes	5	0.00000001	0.00026730
4	Yes	5	0.00000001	0.00027756
5	Yes	5	0.00000001	0.00026976
6	Yes	5	0.00000001	0.00027916
7	Yes	5	0.00000001	0.00027131
8	Yes	5	0.00000001	0.00027967
9	Yes	5	0.00000001	0.00027178
10	Yes	5	0.00000001	0.00027722
11	Yes	5	0.00000001	0.00026930
12	Yes	5	0.00000001	0.00027504
13	Yes	5	0.00000001	0.00026712
14	Yes	5	0.00000001	0.00027599
15	Yes	5	0.00000001	0.00026810
16	Yes	5	0.00000001	0.00027793
17	Yes	5	0.00000001	0.00027004
18	Yes	5	0.00000001	0.00028050
19	Yes	5	0.00000001	0.00027265
20	Yes	5	0.00000001	0.00027725
21	Yes	5	0.00000001	0.00026947
22	Yes	5	0.00000001	0.00027503
23	Yes	5	0.00000001	0.00026732
24	Yes	5	0.00000001	0.00027399
25	Yes	5	0.00000001	0.00026629
26	Yes	5	0.00000001	0.00027626
27	Yes	5	0.00000001	0.00026861
28	Yes	5	0.00000001	0.00027900
29	Yes	5	0.00000001	0.00027137

30	Yes	5	0.00000001	0.00027868
31	Yes	5	0.00000001	0.00027105
32	Yes	5	0.00000001	0.00027726
33	Yes	5	0.00000001	0.00026965
34	Yes	4	0.00000001	0.00023379
35	Yes	5	0.00000001	0.00028189
36	Yes	5	0.00000001	0.00028697
37	Yes	5	0.00000001	0.00028812
38	Yes	5	0.00000001	0.00028765
39	Yes	5	0.00000001	0.00028183
40	Yes	5	0.00000001	0.00027013
41	Yes	4	0.00000001	0.00098182
42	Yes	4	0.00000001	0.00094822
43	Yes	4	0.00000001	0.00087888
44	Yes	4	0.00000001	0.00084216
45	Yes	4	0.00000001	0.00084065
46	Yes	4	0.00000001	0.00086253
47	Yes	4	0.00000001	0.00090958
48	Yes	4	0.00000001	0.00096973
49	Yes	4	0.00000001	0.00099789
50	Yes	5	0.00000001	0.00027077
51	Yes	4	0.00000001	0.00099151
52	Yes	4	0.00000001	0.00099545
53	Yes	4	0.00000001	0.00099942
54	Yes	5	0.00000001	0.00025763
55	Yes	5	0.00000001	0.00025856
56	Yes	5	0.00000001	0.00025911
57	Yes	5	0.00000001	0.00025813
58	Yes	5	0.00000001	0.00025812
59	Yes	4	0.00000001	0.00099896
60	Yes	4	0.00000001	0.00099161
61	Yes	4	0.00000001	0.00098693
62	Yes	4	0.00000001	0.00098878
63	Yes	4	0.00000001	0.00098413
64	Yes	4	0.00000001	0.00098386
65	Yes	4	0.00000001	0.00098457
66	Yes	4	0.00000001	0.00098516

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	180 - 160	1.902	56	0.0714	0.0164
T2	160 - 140	1.583	56	0.0703	0.0138
T3	140 - 120	1.274	56	0.0660	0.0108
T4	120 - 100	0.987	56	0.0613	0.0091
T5	100 - 80	0.718	56	0.0545	0.0080
T6	80 - 60	0.479	56	0.0451	0.0061
T7	60 - 40	0.288	56	0.0331	0.0046
T8	40 - 20	0.146	56	0.0232	0.0028
T9	20 - 0	0.048	56	0.0121	0.0013

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	20' x 3" Dia Omni	56	1.902	0.0714	0.0164	Inf
178.00	DS9A09F36D-N	56	1.870	0.0714	0.0161	Inf
177.75	4 Bay Di-Pole	56	1.866	0.0714	0.0161	Inf
176.50	10' x 3" Dia Omni	56	1.846	0.0714	0.0159	Inf
172.00	OGT9-806	56	1.774	0.0713	0.0153	Inf
169.50	6 FT DISH	56	1.734	0.0712	0.0150	853298
163.00	AP14-850/105	56	1.630	0.0707	0.0142	526647
151.92	Folded Di-Pole	56	1.456	0.0688	0.0124	298699
150.00	Sidearm	56	1.426	0.0684	0.0121	276782
146.00	Di-Pole	56	1.365	0.0674	0.0115	240082
145.25	3' Sidearm	56	1.354	0.0672	0.0114	234258
145.00	4 Bay Di-Pole	56	1.350	0.0672	0.0114	232380
144.25	3' Sidearm	56	1.338	0.0670	0.0113	226950
140.00	10' x 3" Dia Omni (inverted)	56	1.274	0.0660	0.0108	207638
133.00	Folded Di-Pole	56	1.171	0.0644	0.0101	223796
130.00	8 FT DISH	56	1.128	0.0638	0.0098	235670
122.00	SitePro Horizontal Stabilizer SFS-H	56	1.014	0.0619	0.0093	272246
120.00	APX16DWV-16DWVS-E-A20	56	0.987	0.0613	0.0091	275253
109.00	Ice Canopy	56	0.836	0.0579	0.0086	221310
100.58	6 FT DISH	56	0.726	0.0547	0.0081	184705
100.42	6 FT DISH	56	0.724	0.0547	0.0080	183777
90.00	6 FT DISH	56	0.594	0.0502	0.0071	121855
85.00	6' Side-Arm	56	0.535	0.0478	0.0066	103834
64.00	8 FT DISH	56	0.322	0.0354	0.0049	91475
56.00	Dipole and Ground Plain	56	0.256	0.0310	0.0043	97804
50.67	DB225-F	56	0.216	0.0284	0.0038	107254
50.00	Folded Di-Pole	56	0.211	0.0280	0.0038	108574
28.00	DB212-2-C	56	0.081	0.0168	0.0019	89711

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.907	12	0.3267	0.0788
T2	160 - 140	7.440	12	0.3240	0.0664
T3	140 - 120	6.008	12	0.3073	0.0519
T4	120 - 100	4.661	12	0.2871	0.0440
T5	100 - 80	3.400	12	0.2560	0.0385
T6	80 - 60	2.270	12	0.2123	0.0293
T7	60 - 40	1.366	12	0.1562	0.0223
T8	40 - 20	0.696	12	0.1097	0.0137
T9	20 - 0	0.231	12	0.0572	0.0063

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	20' x 3" Dia Omni	12	8.907	0.3267	0.0788	464269
178.00	DS9A09F36D-N	12	8.760	0.3268	0.0775	464269
177.75	4 Bay Di-Pole	12	8.741	0.3268	0.0774	464269

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.50	10' x 3" Dia Omni	12	8.650	0.3269	0.0766	464269
172.00	OGT9-806	12	8.319	0.3269	0.0738	290167
169.50	6 FT DISH	12	8.135	0.3267	0.0723	221080
163.00	AP14-850/105	12	7.659	0.3253	0.0685	136942
151.92	Folded Di-Pole	12	6.854	0.3184	0.0598	83212
150.00	Sidearm	12	6.716	0.3168	0.0581	74085
146.00	Di-Pole	12	6.430	0.3131	0.0554	60305
145.25	3' Sidearm	12	6.377	0.3123	0.0550	58273
145.00	4 Bay Di-Pole	12	6.360	0.3121	0.0548	57625
144.25	3' Sidearm	12	6.306	0.3114	0.0544	55776
140.00	10' x 3" Dia Omni (inverted)	12	6.008	0.3073	0.0519	49205
133.00	Folded Di-Pole	12	5.527	0.3007	0.0485	52179
130.00	8 FT DISH	12	5.324	0.2979	0.0473	54679
122.00	SitePro Horizontal Stabilizer SFS-H	12	4.792	0.2895	0.0446	62172
120.00	APX16DWV-16DWVS-E-A20	12	4.661	0.2871	0.0440	62583
109.00	Ice Canopy	12	3.956	0.2715	0.0413	49476
100.58	6 FT DISH	12	3.435	0.2570	0.0387	40876
100.42	6 FT DISH	12	3.425	0.2568	0.0387	40657
90.00	6 FT DISH	12	2.812	0.2361	0.0340	26285
85.00	6' Side-Arm	12	2.534	0.2248	0.0316	22232
64.00	8 FT DISH	12	1.527	0.1670	0.0237	19459
56.00	Dipole and Ground Plain	12	1.215	0.1462	0.0207	20807
50.67	DB225-F	12	1.028	0.1338	0.0184	22828
50.00	Folded Di-Pole	12	1.005	0.1323	0.0181	23111
28.00	DB212-2-C	12	0.388	0.0792	0.0091	19027

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.8750	5	1.41	40.59	0.035 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	3.58	9.79	0.366 ✔	1	Member Bearing
		Top Girt	A325N	0.6250	1	0.10	12.43	0.008 ✔	1	Bolt Shear
T2	160	Leg	A325N	1.1250	5	4.54	67.10	0.068 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	4.85	21.53	0.225 ✔	1	Member Bearing
T3	140	Leg	A325N	1.1250	5	7.97	67.10	0.119 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	6.75	21.53	0.313 ✔	1	Member Bearing
T4	120	Leg	A325N	1.1250	6	11.05	67.10	0.165 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	9.69	21.53	0.450 ✔	1	Member Bearing
T5	100	Leg	A325N	1.2500	6	16.82	82.83	0.203 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	1	12.53	21.53	0.582 ✔	1	Member Bearing
T6	80	Leg	A325N	1.2500	6	22.79	82.83	0.275 ✔	1	Bolt Tension
		Diagonal	A325N	0.8750	1	13.31	26.10	0.510 ✔	1	Member Bearing
T7	60	Leg	A325N	1.2500	6	28.90	82.83	0.349 ✔	1	Bolt Tension
		Diagonal	A325N	0.8750	1	14.60	34.80	0.419 ✔	1	Member Bearing
T8	40	Leg	A325N	1.3750	6	34.78	100.23	0.347 ✔	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T9	20	Diagonal	A325N	0.8750	1	14.83	34.80	0.426 ✔	1	Member Bearing
		Leg	A193 GR B7	1.3750	6	40.41	104.41	0.387 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	15.56	25.56	0.609 ✔	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $P_u / \phi P_n$
T1	180 - 160	Andrew 5.5625x0.2580	20.03	6.68	42.7 K=1.00	4.2995	-15.90	169.36	0.094 [1] ✔
T2	160 - 140	Andrew 6.625x0.2800	20.03	6.68	35.7 K=1.00	5.5813	-29.33	228.84	0.128 [1] ✔
T3	140 - 120	Andrew 8.625x0.3220	20.03	10.01	40.9 K=1.00	8.3993	-49.67	334.44	0.149 [1] ✔
T4	120 - 100	Andrew 8.625x0.3220	20.03	10.01	40.9 K=1.00	8.3993	-81.41	334.44	0.243 [1] ✔
T5	100 - 80	Andrew 8.625x0.3220	20.03	10.01	40.9 K=1.00	8.3993	-120.33	334.44	0.360 [1] ✔
T6	80 - 60	Andrew 8.625x0.3220	20.03	10.01	40.9 K=1.00	8.3993	-160.92	334.44	0.481 [1] ✔
T7	60 - 40	Andrew 10.750x0.3650	20.03	10.01	32.7 K=1.00	11.9083	-203.18	495.55	0.410 [1] ✔
T8	40 - 20	Andrew 10.750x0.3650	20.03	10.01	32.7 K=1.00	11.9083	-244.30	495.55	0.493 [1] ✔
T9	20 - 0	Andrew 10.750x0.3650	20.03	10.01	32.7 K=1.00	11.9083	-284.27	495.55	0.574 [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 K	ϕP_n K	Ratio $P_u / \phi P_n$
T1	180 - 160	L2 1/2x2 1/2x3/16	12.46	6.27	151.9 K=1.00	0.9020	-3.60	8.83	0.408 [1] ✔
T2	160 - 140	2L2x2x3/16	14.05	7.05	137.0 K=1.00	1.4300	-4.89	17.21	0.284 [1] ✔
T3	140 - 120	2L2 1/2x2 1/2x3/16	17.24	8.75	134.9	1.8000	-6.81	22.35	0.305 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	120 - 100	2L2 1/2x2 1/2x3/16	18.76	9.50	146.5 K=1.00	1.8000	-9.74	18.95	0.514 [1]
T5	100 - 80	2L2 1/2x2 1/2x3/16	20.34	10.28	158.6 K=1.00	1.8000	-12.64	16.17	0.782 [1]
T6	80 - 60	2L3x3x3/16	21.95	11.06	141.4 K=1.00	2.1800	-13.46	24.65	0.546 [1]
T7	60 - 40	2L3x3x1/4	23.60	11.88	153.3 K=1.00	2.8800	-14.72	27.69	0.531 [1]
T8	40 - 20	2L3x3x1/4	25.27	12.72	164.1 K=1.00	2.8800	-15.05	24.17	0.623 [1]
T9	20 - 0	L5x5x5/16	26.97	13.54	163.4 K=1.00	3.0300	-15.92	25.63	0.621 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2 1/2x2 1/2x3/16 KL/R > 200 (C) - 6	9.50	8.80	213.3 K=1.00	0.9020	-0.10	4.48	0.021 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	Andrew 5.5625x0.2580	20.03	6.68	42.7	4.2995	7.06	193.48	0.036 [1]
T2	160 - 140	Andrew 6.625x0.2800	20.03	6.68	35.7	5.5813	22.72	251.16	0.090 [1]
T3	140 - 120	Andrew 8.625x0.3220	20.03	10.01	40.9	8.3993	39.83	377.97	0.105 [1]
T4	120 - 100	Andrew 8.625x0.3220	20.03	10.01	40.9	8.3993	66.31	377.97	0.175 [1]
T5	100 - 80	Andrew 8.625x0.3220	20.03	10.01	40.9	8.3993	100.92	377.97	0.267 [1]
T6	80 - 60	Andrew 8.625x0.3220	20.03	10.01	40.9	8.3993	136.73	377.97	0.362 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	60 - 40	Andrew 10.750x0.3650	20.03	10.01	32.7	11.9083	173.42	535.87	0.324 [1]
T8	40 - 20	Andrew 10.750x0.3650	20.03	10.01	32.7	11.9083	208.66	535.87	0.389 [1]
T9	20 - 0	Andrew 10.750x0.3650	20.03	10.01	32.7	11.9083	242.46	535.87	0.452 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2 1/2x2 1/2x3/16	12.46	6.27	98.8	0.5710	3.58	24.84	0.144 [1]
T2	160 - 140	2L2x2x3/16	14.05	7.05	139.9	0.8264	4.85	35.95	0.135 [1]
T3	140 - 120	2L2 1/2x2 1/2x3/16	17.24	8.75	137.1	1.1039	6.75	48.02	0.141 [1]
T4	120 - 100	2L2 1/2x2 1/2x3/16	18.76	9.50	148.7	1.1039	9.69	48.02	0.202 [1]
T5	100 - 80	2L2 1/2x2 1/2x3/16	20.34	10.28	160.8	1.1039	12.53	48.02	0.261 [1]
T6	80 - 60	2L3x3x3/16	21.95	11.06	143.5	1.3537	13.31	58.89	0.226 [1]
T7	60 - 40	2L3x3x1/4	23.60	11.88	155.4	1.7850	14.60	77.65	0.188 [1]
T8	40 - 20	2L3x3x1/4	25.27	12.72	166.2	1.7850	14.83	77.65	0.191 [1]
T9	20 - 0	L5x5x5/16	26.97	13.54	104.9	2.0088	15.56	87.38	0.178 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2 1/2x2 1/2x3/16	9.50	8.80	139.4	0.5710	0.01	24.84	0.000 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	Andrew 5.5625x0.2580	2	-15.90	169.36	9.4	Pass
T2	160 - 140	Leg	Andrew 6.625x0.2800	26	-29.33	228.84	12.8	Pass
T3	140 - 120	Leg	Andrew 8.625x0.3220	47	-49.67	334.44	14.9	Pass
T4	120 - 100	Leg	Andrew 8.625x0.3220	62	-81.41	334.44	24.3	Pass
T5	100 - 80	Leg	Andrew 8.625x0.3220	77	-120.33	334.44	36.0	Pass
T6	80 - 60	Leg	Andrew 8.625x0.3220	92	-160.92	334.44	48.1	Pass
T7	60 - 40	Leg	Andrew 10.750x0.3650	107	-203.18	495.55	41.0	Pass
T8	40 - 20	Leg	Andrew 10.750x0.3650	122	-244.30	495.55	49.3	Pass
T9	20 - 0	Leg	Andrew 10.750x0.3650	137	-284.27	495.55	57.4	Pass
T1	180 - 160	Diagonal	L2 1/2x2 1/2x3/16	10	-3.60	8.83	40.8	Pass
T2	160 - 140	Diagonal	2L2x2x3/16	31	-4.89	17.21	28.4	Pass
T3	140 - 120	Diagonal	2L2 1/2x2 1/2x3/16	49	-6.81	22.35	30.5 31.3 (b)	Pass
T4	120 - 100	Diagonal	2L2 1/2x2 1/2x3/16	64	-9.74	18.95	51.4	Pass
T5	100 - 80	Diagonal	2L2 1/2x2 1/2x3/16	79	-12.64	16.17	78.2	Pass
T6	80 - 60	Diagonal	2L3x3x3/16	94	-13.46	24.65	54.6	Pass
T7	60 - 40	Diagonal	2L3x3x1/4	109	-14.72	27.69	53.1	Pass
T8	40 - 20	Diagonal	2L3x3x1/4	124	-15.05	24.17	62.3	Pass
T9	20 - 0	Diagonal	L5x5x5/16	139	-15.92	25.63	62.1	Pass
T1	180 - 160	Top Girt	L2 1/2x2 1/2x3/16	6	-0.10	4.48	2.1	Pass
							Summary	
						Leg (T9)	57.4	Pass
						Diagonal (T5)	78.2	Pass
						Top Girt (T1)	2.1	Pass
						Bolt Checks	60.9	Pass
						RATING =	**78.2**	**Pass**

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Subject:	Anchor Bolt Analysis
Location:	180-ft Andrew Lattice Tower Union, CT
Rev. 1: 10/24/18	Prepared by: T.J.L. Checked by: C.A.G. Job No. 18127.23

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 251·kips	(Input From tnxTower)
Compression Force =	Compression := 295·kips	(Input From tnxTower)
Shear Force =	Shear := 38·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA193 Gr B7

Number of Anchor Bolts =	N := 6	(User Input)
Bolt Ultimate Strength =	F_u := 125·ksi	(User Input)
Bolt Yield Strength =	F_y := 94·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.375·in	(User Input)
Threads per Inch =	n := 6	(User Input)
	η := 0.55	For grouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 1.485 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 1.155 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.213 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.303 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.175 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := \frac{Tension}{N} = 41.8 \cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression}{N} = 49.2 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 6.3 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 115.488 \cdot k$

Bolt % of Capacity = $\frac{\left(C_{Max} + \frac{V_{Max}}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 52.5$

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

Condition1 = "OK"

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Section 1 - Site Information

Site ID: CT11143C
Status: Draft
Version: 1.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 9/13/2018 2:28:00 PM
Last Modified By: GSM1900\VJaini

Site Name: Union/ I-84 X72_1
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Solution Type:
Plan Year: 2019
Market: CONNECTICUT
Vendor: Ericsson
Landlord: <undefined>

Latitude: 41.9742100000
Longitude: -72.1988120000
Address: Bald Hill Road
City, State: Union, CT
Region: NORTHEAST

RAN Template: 67D94E			AL Template: 67D94E_1DP+1OP	
Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 12	**TMA Count:** 6	**RRU Count:** 3

Section 2 - Existing Template Images

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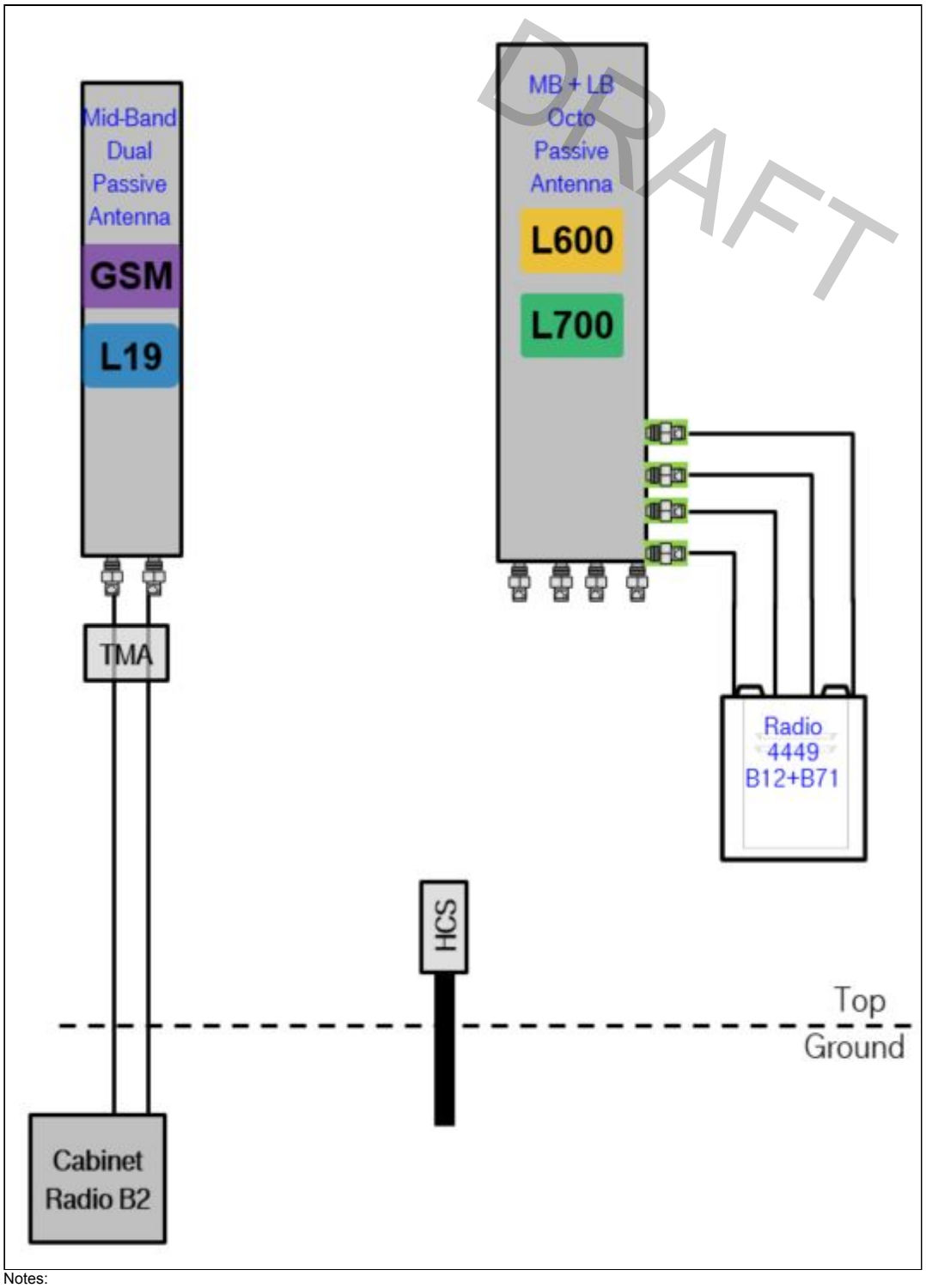
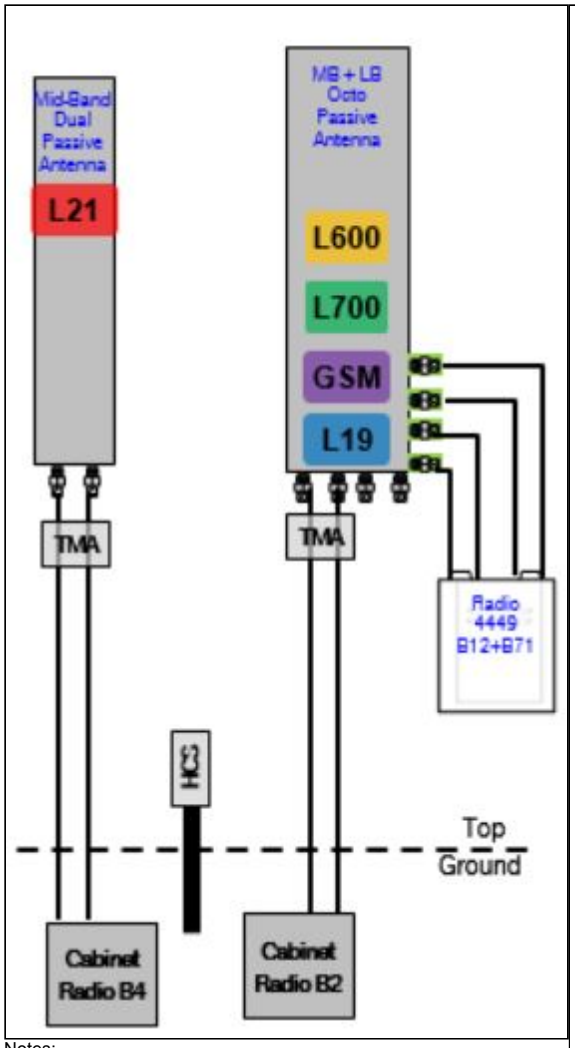
Section 3 - Proposed Template Images

Capture.JPG

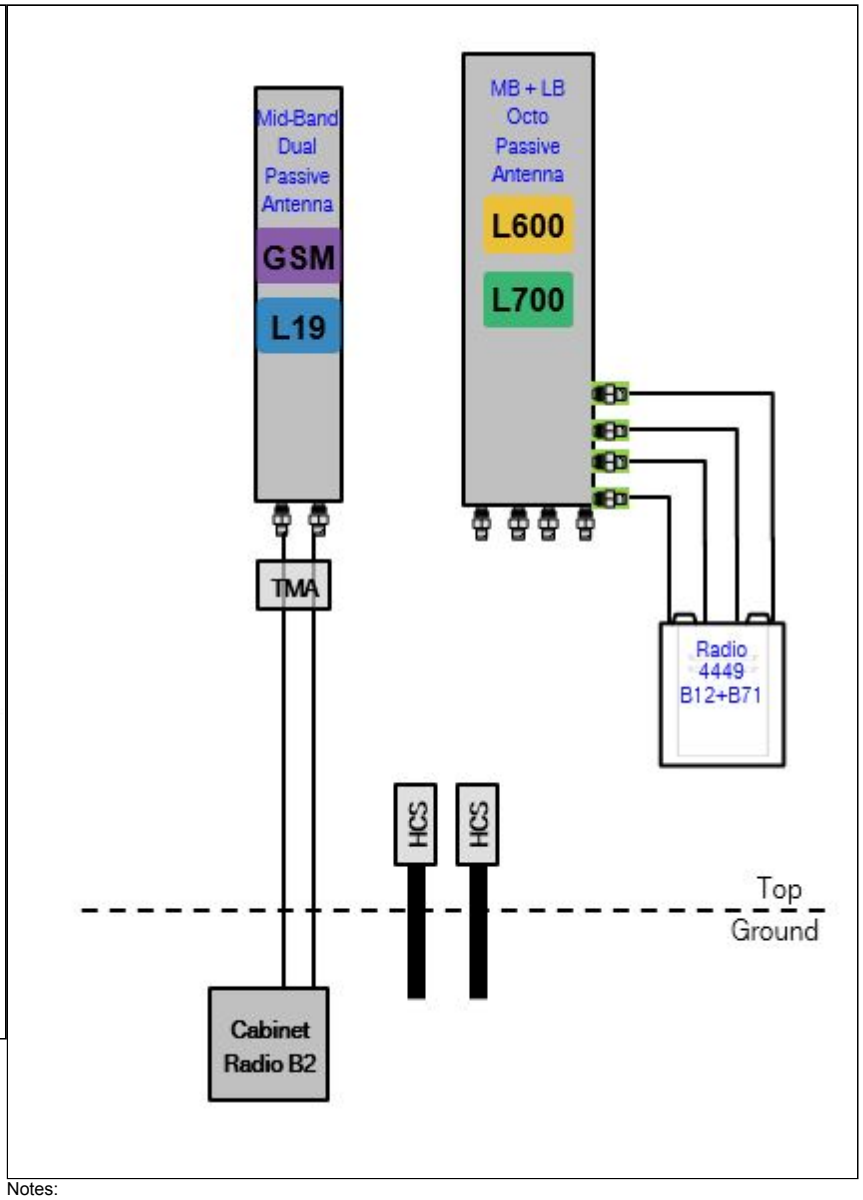


Notes:

Capture.JPG 4Sec-67D04G_1DP+1OP.JPG


Mid-Band Dual Passive Antenna
L21
MB + LB Octo Passive Antenna
L600
L700
GSM
L19
TMA
TMA
Radio 4449 B12+B71
HCS
Top
Ground
Cabinet Radio B4
Cabinet Radio B2

Notes:


Mid-Band Dual Passive Antenna
GSM
L19
MB + LB Octo Passive Antenna
L600
L700
TMA
Radio 4449 B12+B71
HCS
HCS
Top
Ground
Cabinet Radio B2

Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 4G

Enclosure	1
Enclosure Type	RBS 6201 ODE
Baseband	DUS41
Radio	RUS01 B2 (x6)

Proposed RAN Equipment

Template: 67D94E

	1	2
Enclosure		
Enclosure Type	RBS 6201 ODE	RBS 6102 MU AC
Baseband	DUG20; BB 6630 (N600 (DARK)); BB 6630	
Hybrid Cable System		Ericsson 6x12 HCS *Select AWG & Length* (x3)
Radio	RUS01 B2 (x3) L1900; RUS01 B2 (x3) L1900, G1900; RUS01 B4 (x6) L2100	

RAN Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Section 6 - A&L Equipment

Existing Template: 4G
Proposed Template: 67D94E_1DP+1OP

Sector 1 (Existing) view from behind				
Address	**Address:** **City, State:** ,	**Latitude:** 41.9742100000 **Longitude:** -72.1988120000		
Coverage Type	A - Outdoor Macro			
Antenna	**1**	**2**	**3**	**4**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	EMS - RR90-17-XXDP (Dual)
Azimuth	70			70
M. Tilt	0			0
Height	120			120
Ports	**P1**			**P2**
Active Tech.	L1900 G1900			L1900 G1900
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				
E. Tilt	2			2
Cables	1-1/4" Coax - 160 ft.			1-1/4" Coax - 160 ft.
TMAs	Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1A - PCS (AtAntenna)
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Sector 1 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	70		70			
M. Tilt	0		0			
Height	120		120			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900 G1900			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 160 ft. **(x2)**	1-5/8" Coax - 160 ft. **(x2)**			Coax Jumper **(x2)**	Coax Jumper **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners						
Radio						Radio 4449 B71+B12 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Sector 2 (Existing) view from behind				
Address	**Address:** **City, State:** ,	**Latitude:** 41.9742100000 **Longitude:** -72.1988120000		
Coverage Type	A - Outdoor Macro			
Antenna	**1**	**2**	**3**	**4**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	EMS - RR90-17-XXDP (Dual)
Azimuth	170			170
M. Tilt	0			0
Height	120			120
Ports	**P1**			**P2**
Active Tech.	L1900 G1900			L1900 G1900
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				
E. Tilt	2			2
Cables	1-1/4" Coax - 160 ft.			1-1/4" Coax - 160 ft.
TMAs	Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1A - PCS (AtAntenna)
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Sector 2 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	170		170			
M. Tilt	0		0			
Height	120		120			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900 G1900			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 160 ft. **(x2)**	1-5/8" Coax - 160 ft. **(x2)**			Coax Jumper **(x2)**	Coax Jumper **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners						
Radio						Radio 4449 B71+B12 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Sector 3 (Existing) view from behind				
Address	**Address:** **City, State:** ,	**Latitude:** 41.9742100000 **Longitude:** -72.1988120000		
Coverage Type	A - Outdoor Macro			
Antenna	**1**	**2**	**3**	**4**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	EMS - RR90-17-XXDP (Dual)
Azimuth	290			290
M. Tilt	0			0
Height	120			120
Ports	**P1**			**P2**
Active Tech.	L1900 G1900			L1900 G1900
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				
E. Tilt	2			2
Cables	1-1/4" Coax - 160 ft.			1-1/4" Coax - 160 ft.
TMAs	Generic Twin Style 1A - PCS (AtAntenna)			Generic Twin Style 1A - PCS (AtAntenna)
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Sector 3 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	290		290			
M. Tilt	0		0			
Height	120		120			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900 G1900			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 160 ft. **(x2)**	1-5/8" Coax - 160 ft. **(x2)**			Coax Jumper **(x2)**	Coax Jumper **(x2)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers / Combiners						
Radio						Radio 4449 B71+B12 (At Antenna)
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94E	67D94E_1DP+1OP	Custom

CT11143C_L600_1.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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Proposed Power Systems Equipment

Product Data Sheet **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

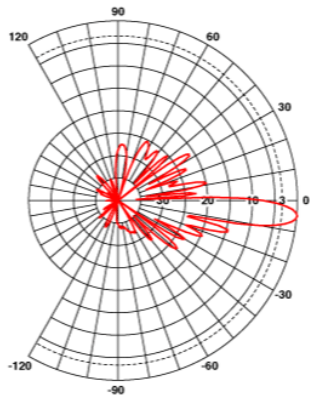
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

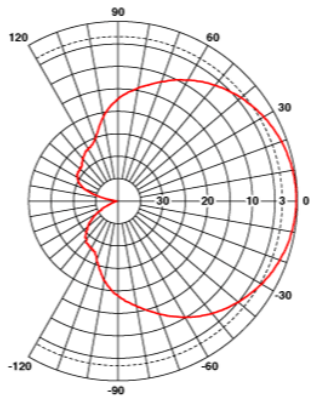
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



Horizontal Pattern

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

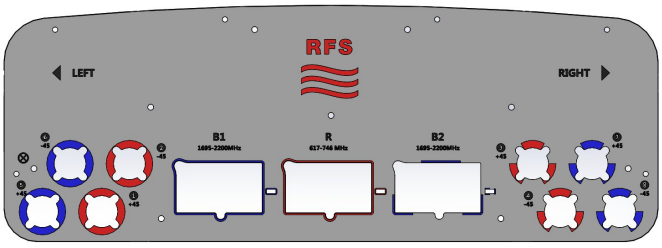
Impedance	Ohm	50.0
Polarization	Deg	±45°

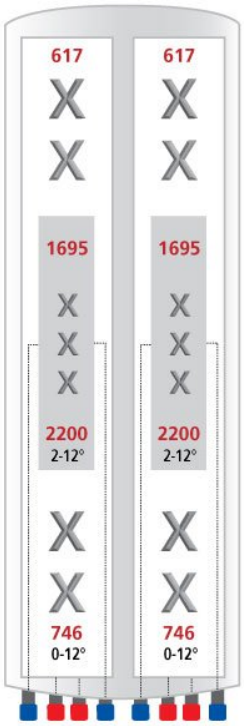
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

UNION/I-84 X72_1
SITE ID: CT11143C
BALD HILL ROAD
UNION, CT 06076

T-MOBILE RF CONFIGURATION

67D94E_1DP+1OP

PROJECT SUMMARY

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

   A. REMOVE (3) EXISTING PANEL ANTENNAS, TYPICAL OF ONE (1) PER SECTOR.
   B. INSTALL (3) NEW T-ARM MOUNTS ON EXISTING LATTICE TOWER.
   C. INSTALL SIX (6) NEW ANTENNAS, TYPICAL OF TWO (2) PER SECTOR.
   D. RELOCATE THREE (3) EXISTING TOWER MOUNTED AMPLIFIERS TO NEW MOUNTS, TYPICAL OF ONE (1) PER SECTOR.
   D. INSTALL THREE (3) TOWER MOUNTED AMPLIFIERS ON NEW MOUNTS, TYPICAL OF ONE (1) PER SECTOR.
   E. INSTALL THREE (3) NEW REMOTE RADIO UNITS ON NEW MOUNTS, TYPICAL OF ONE (1) PER SECTOR.
   F. REMOVE SIX (6) EXISTING 1-1/4" COAX CABLES.
   G. INSTALL TWELVE (12) NEW 1-5/8"ø COAX CABLES.
   H. INSTALL THREE (3) NEW 6X12 HYBRID CABLES.
   I. INSTALL PPU ON EXISTING CONCRETE PAD AT GRADE.

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." 2016 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 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 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 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 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 "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 OWNERS 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

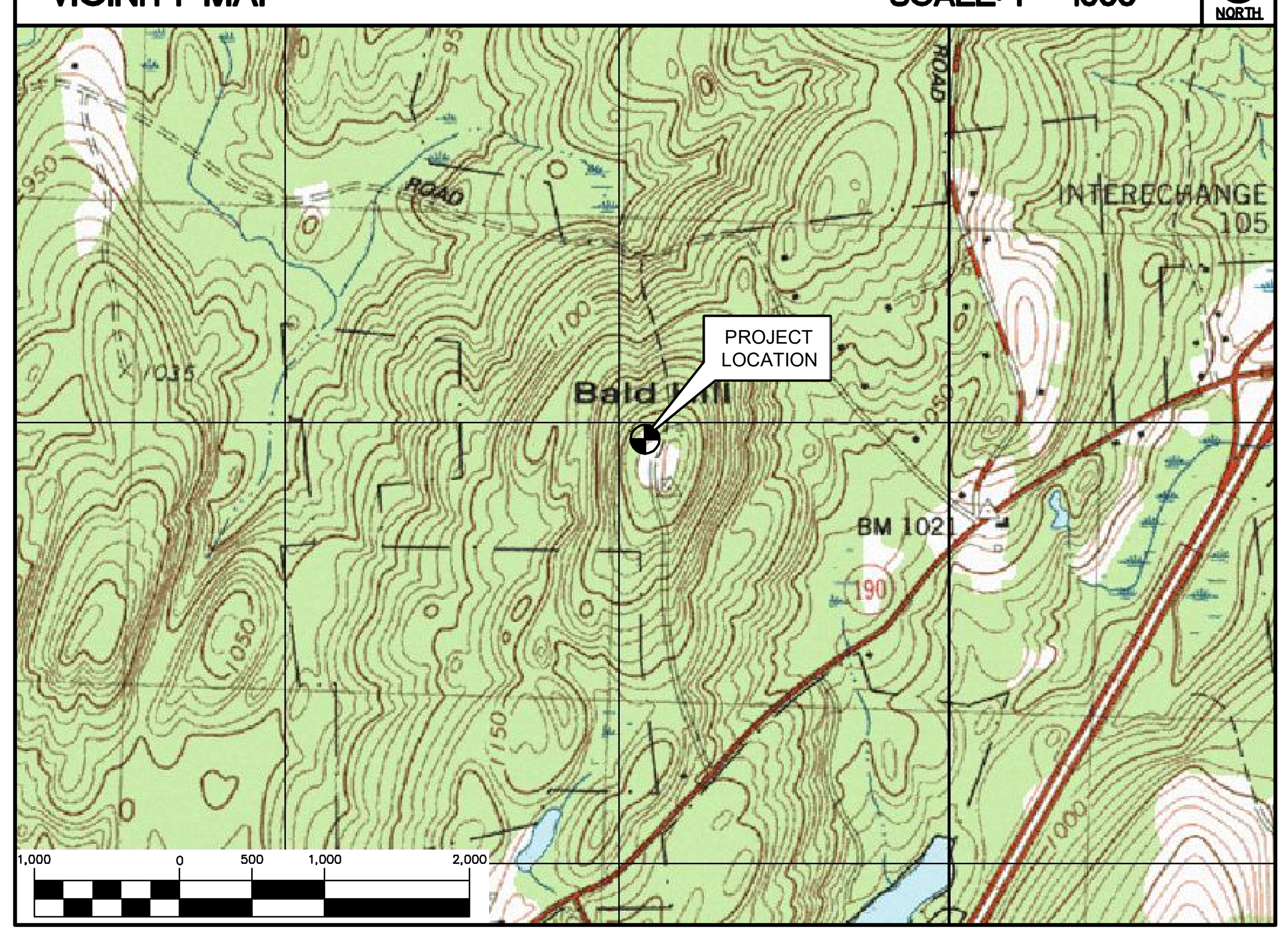
TO: BALD HILL RD
UNION, CT 06076

1.	HEAD SOUTHEAST ON W NEWBERRY RD TOWARD GRIFFIN RD S.	0.01 MI.
2.	TURN LEFT ONTO GRIFFIN RD S.	0.60 MI.
3.	TURN RIGHT ONTO DAY HILL RD.	3.60 MI.
4.	USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD.	0.40 MI.
5.	MERGE ONTO I-91 S.	3.60 MI.
6.	TAKE EXIT 35A FOR I-291 TOWARD MANCHESTER.	0.60 MI.
7.	CONTINUE ONTO I-291 E.	5.60 MI.
8.	USE THE LEFT LANE TO MERGE ONTO I-84 E TOWARD BOSTON.	23.40 MI.
9.	TAKE EXIT 72 FOR CT-89 TOWARD WESTFORD/ASHFORD.	0.20 MI.
10.	TURN LEFT ONTO CT-89 N.	0.60 MI.
11.	TURN RIGHT ONTO CT-190 E.	0.20 MI.
12.	TURN LEFT ONTO BALD HILL RD.	0.20 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT INFORMATION

SITE NAME:	UNION/I-84 X72_1
SITE ID:	CT11143C
SITE ADDRESS:	BALD HILL ROAD UNION, CT 06076
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:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-58'-27.16" N LONGITUDE: 72°-11'-55.72" W GROUND ELEVATION: ±1241' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	3/6/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	1/14/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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BALD HILL ROAD
UNION, CT 06076

DATE:	10/23/18
SCALE:	AS NOTED
JOB NO.	18127.23

TITLE SHEET

T-1

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95-105 MPH (3 SECOND GUST)
- RISK CATEGORY: III (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. 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.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. 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. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. 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.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	1/14/19	TJL	CAG	ISSUED FOR CONSTRUCTION
1	3/6/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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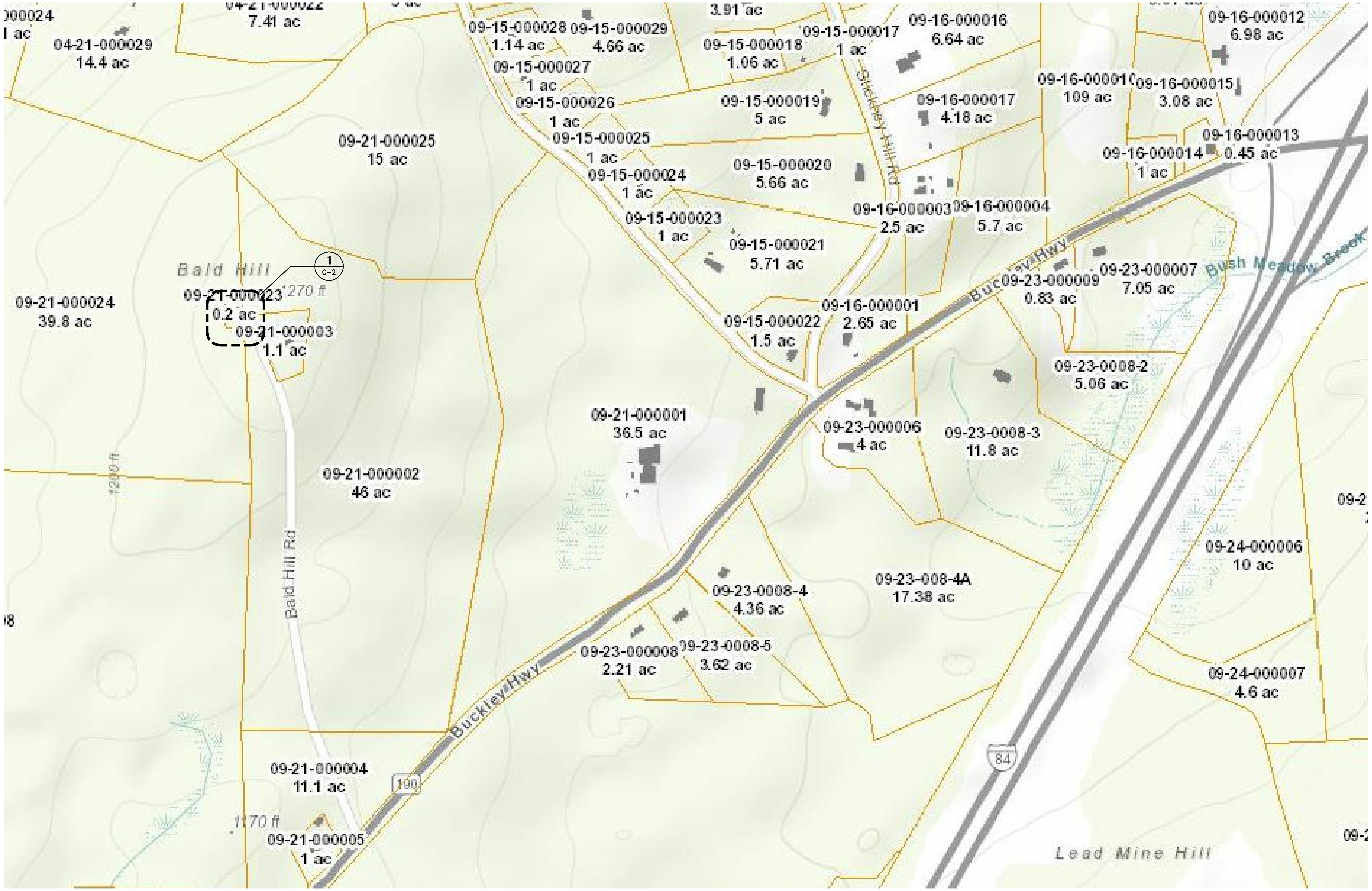
SITE ID: CT11143C
BALD HILL ROAD
UNION, CT 06076

DATE: 10/23/18
SCALE: AS NOTED
JOB NO. 18127.23

DESIGN BASIS AND SITE NOTES

N-1

Sheet No. 2 of 6



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 50'

APPROX. NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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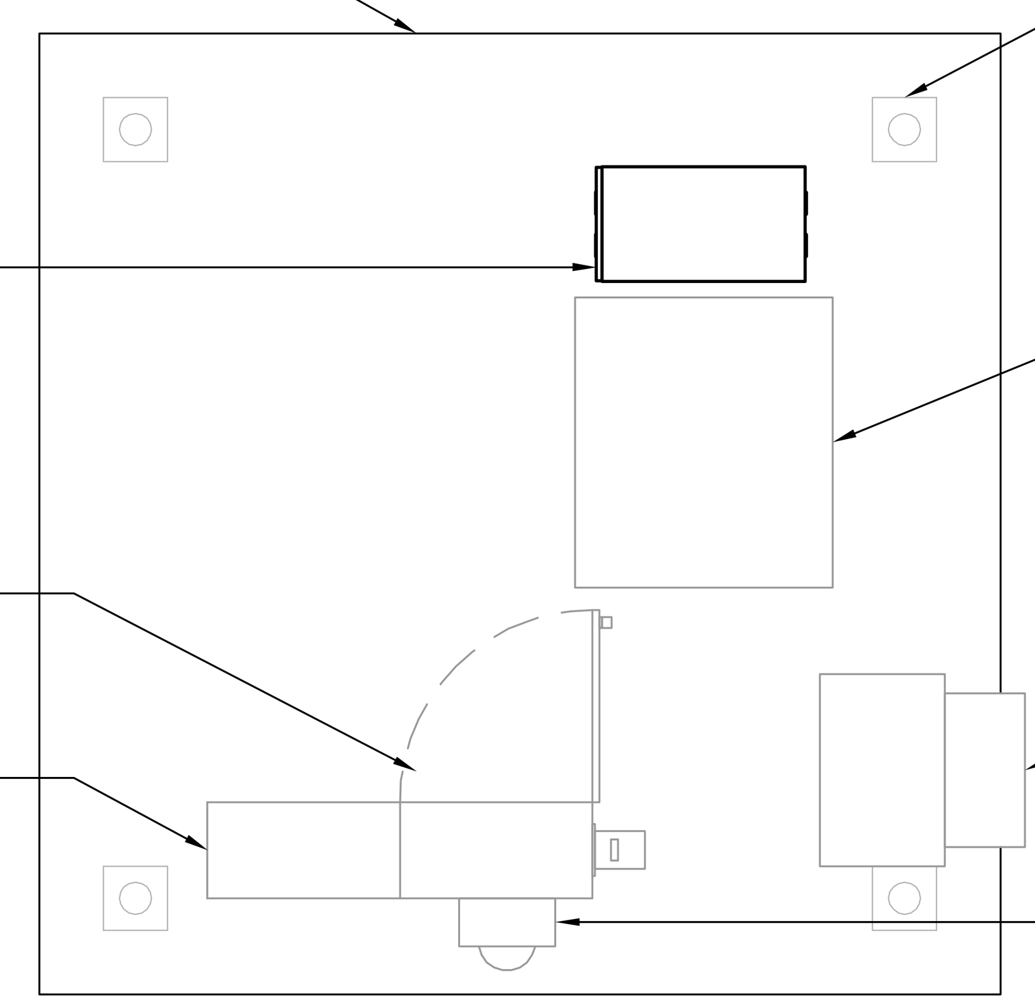
JOB NO. 18127.23

SITE LOCATION PLAN

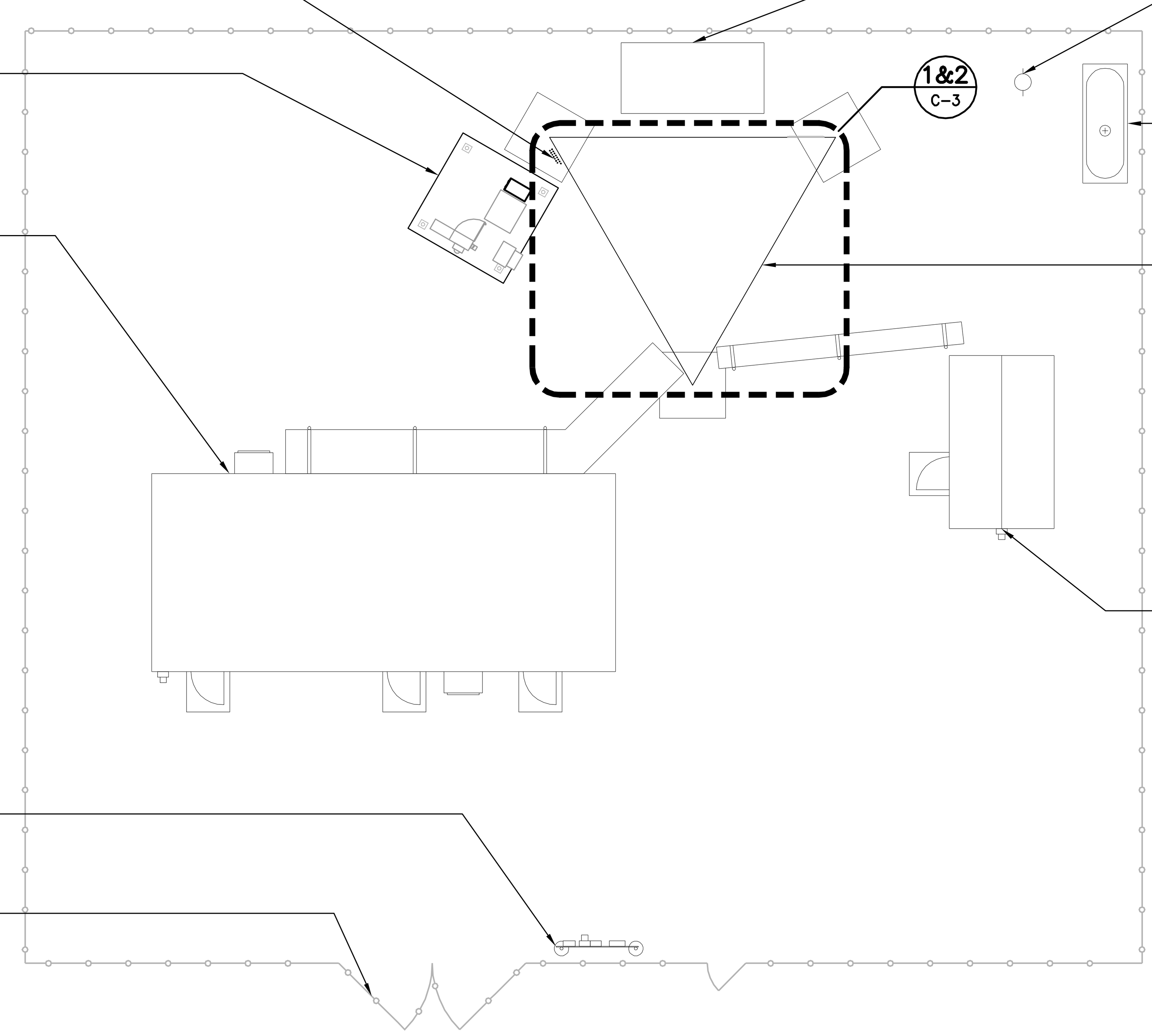
C-1

Sheet No. 3 of 6



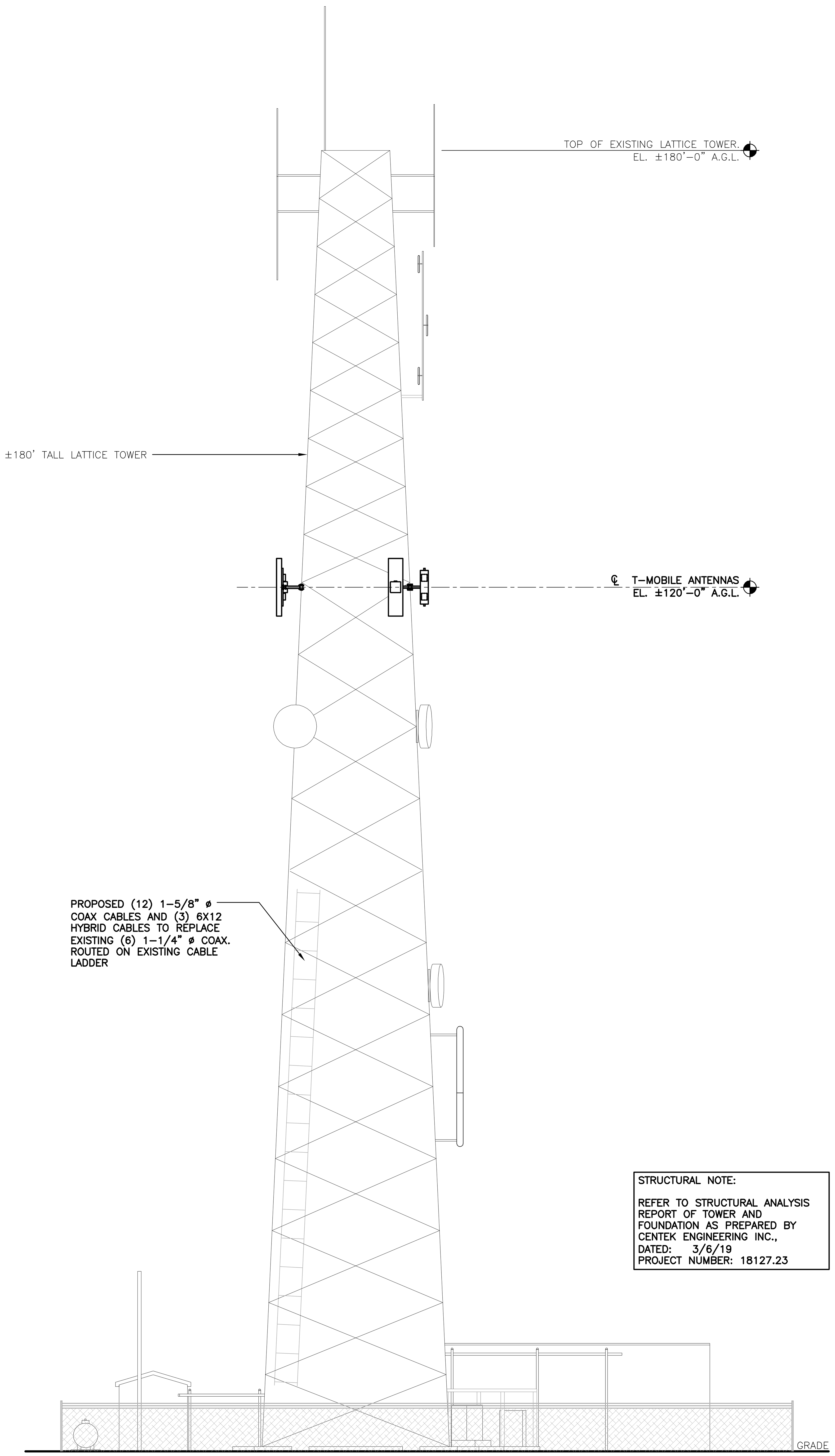
3
C-2
EQUIPMENT PLAN
SCALE: 1/2" = 1'-0"
TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1/2 inch = 1 ft.



1
C-2
COMPOUND PLAN
SCALE: 1" = 10'
TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AND FOUNDATION AS PREPARED BY CENTEK ENGINEERING INC., DATED: 3/6/19 PROJECT NUMBER: 18127.23

2
C-2
SOUTH TOWER ELEVATION
SCALE: 1" = 10'

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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SCALE:	AS NOTED
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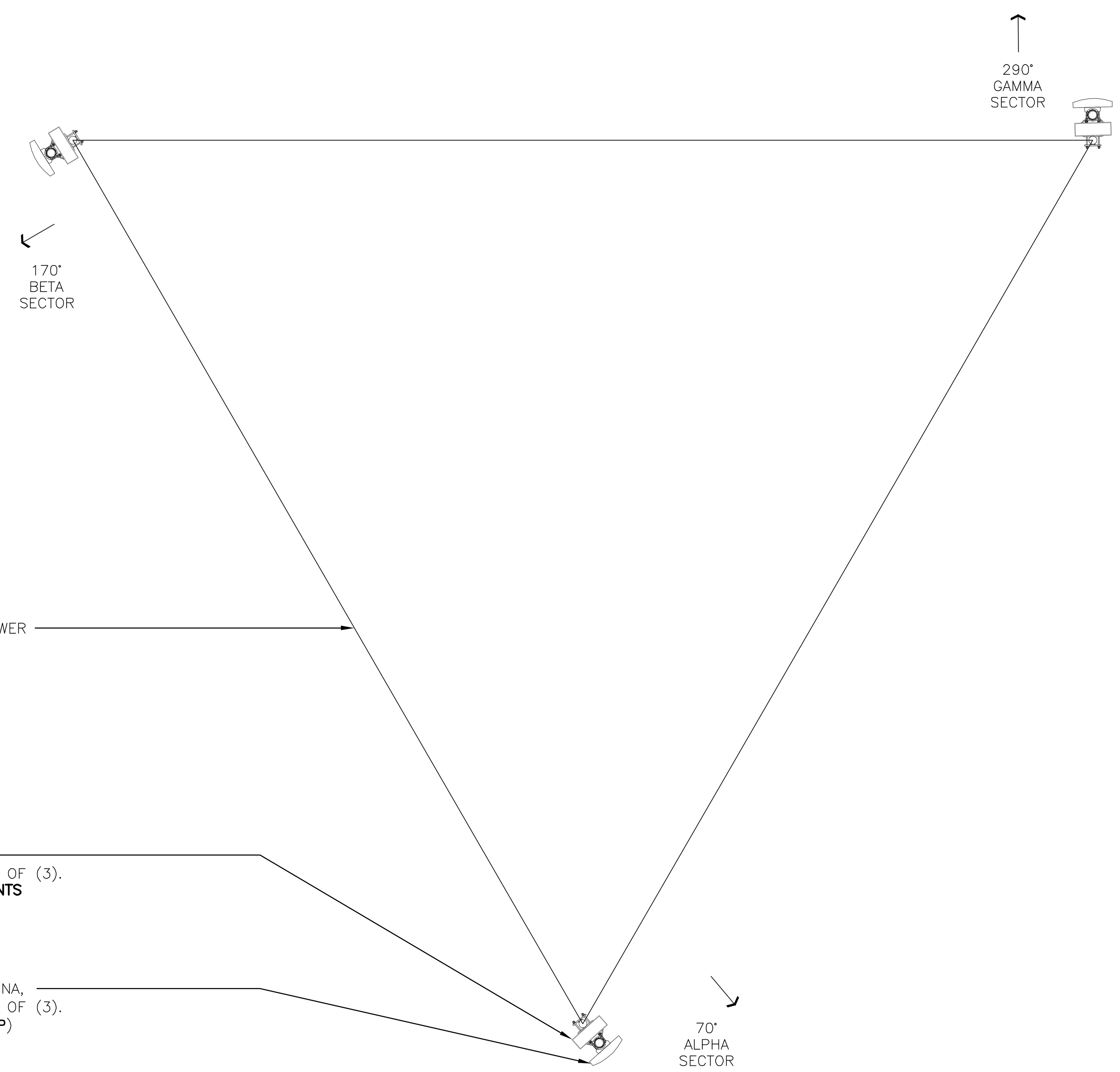
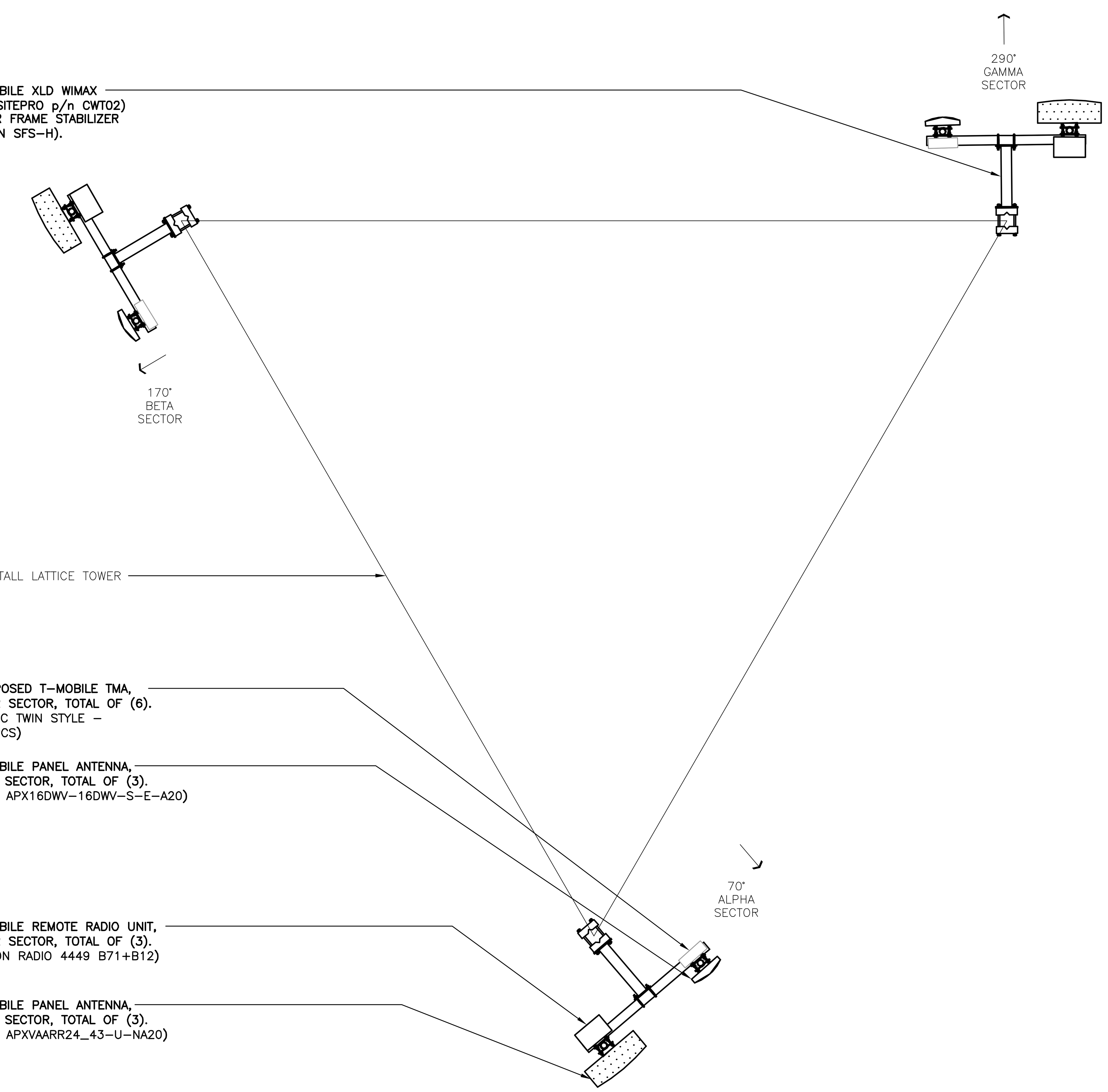
COMPOUND PLAN, AND ELEVATION

C-2

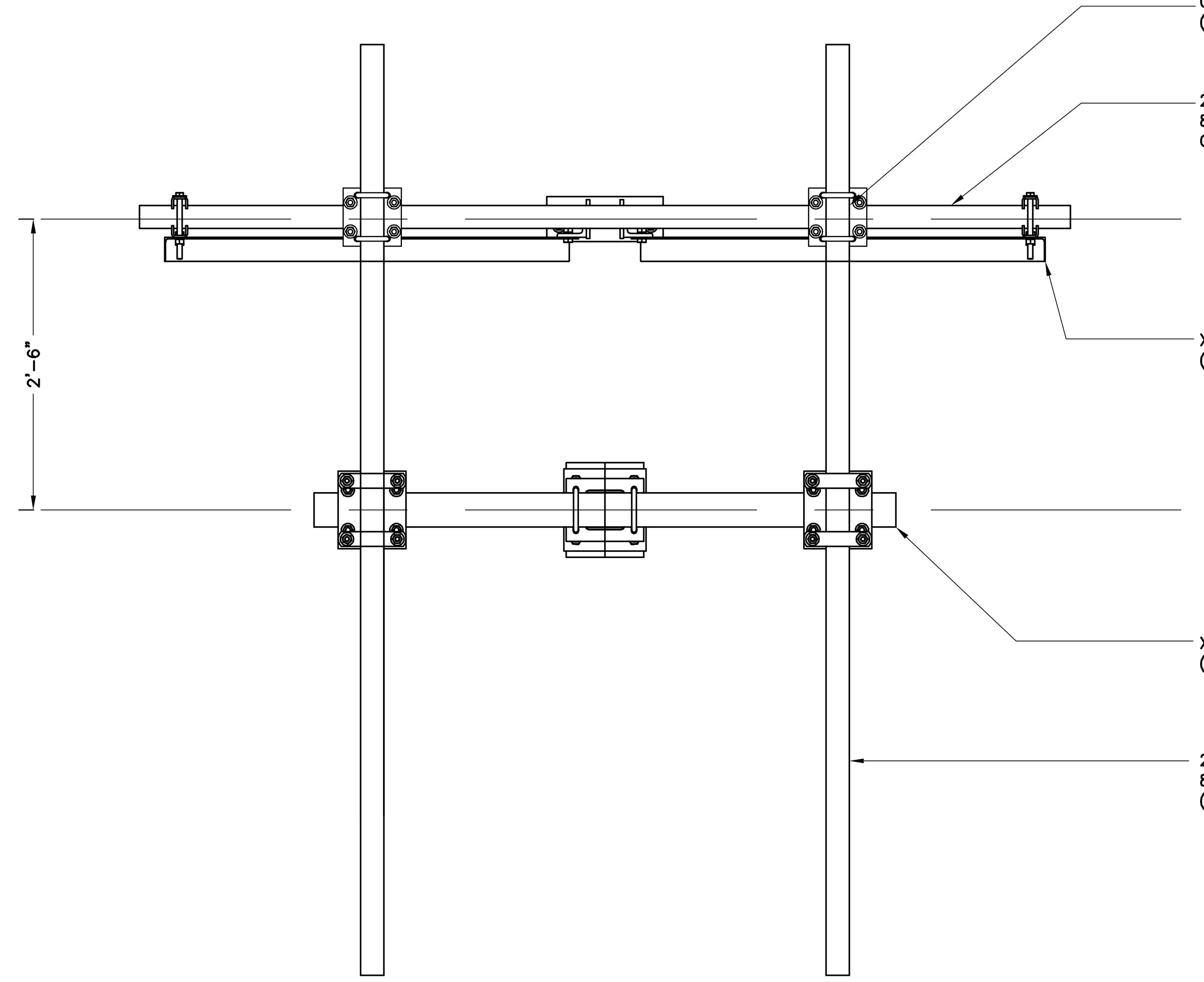
Sheet No. 4 of 6



1 / C-3 — EXISTING ANTENNA MOUNTING CONFIGURATION
SCALE: 3/8" = 1'
TRUE NORTH



2 / C-3 — PROPOSED ANTENNA MOUNTING CONFIGURATION
SCALE: 3/8" = 1'
TRUE NORTH



3 / C-3 — PROPOSED TOWER MOUNT DETAIL
SCALE: 1" = 1'

ISOMETRIC VIEW

SMALL FOOTPRINT BATTERY CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: PTS MODEL: PTS8003	32.25"H x 14.04"W x 26.31"D	60 LBS.

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

4 / C-3 — SMALL FOOTPRINT BATTERY CABINET DETAIL
SCALE: NTS

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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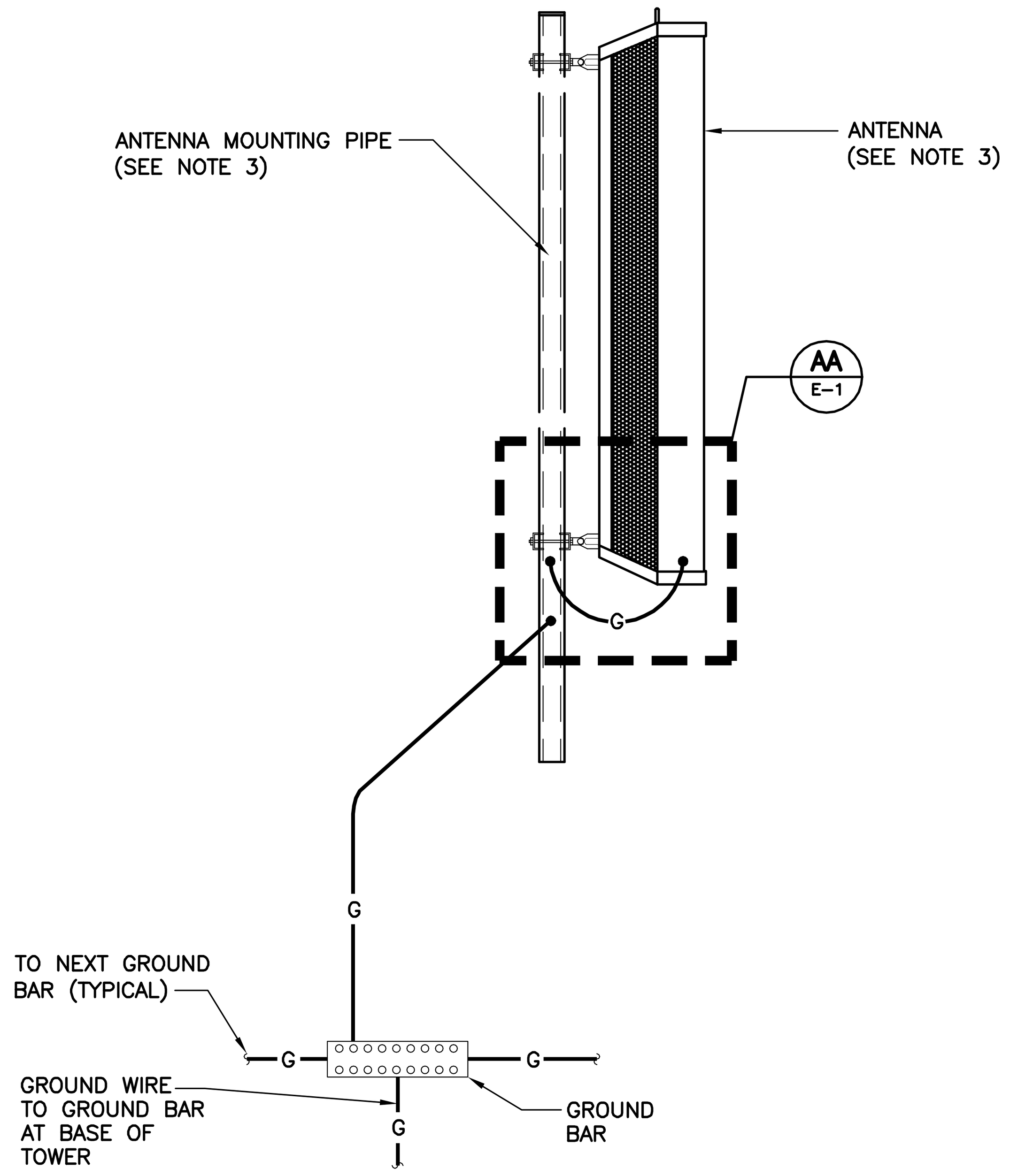
JOB NO. 18127.23

ANTENNA MOUNTING CONFIGURATION

C-3

Sheet No. 5 of 6

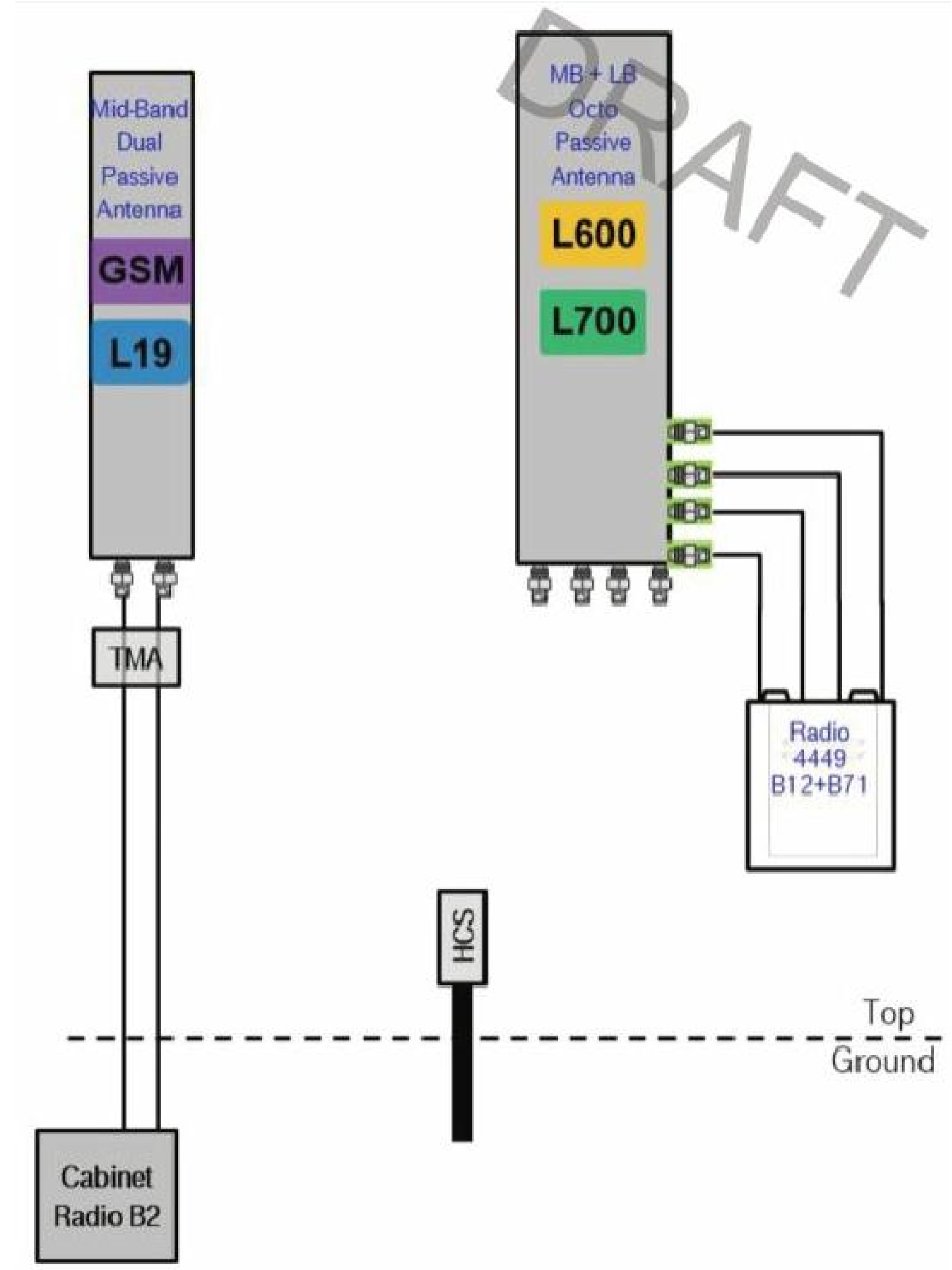


NOTES:

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.

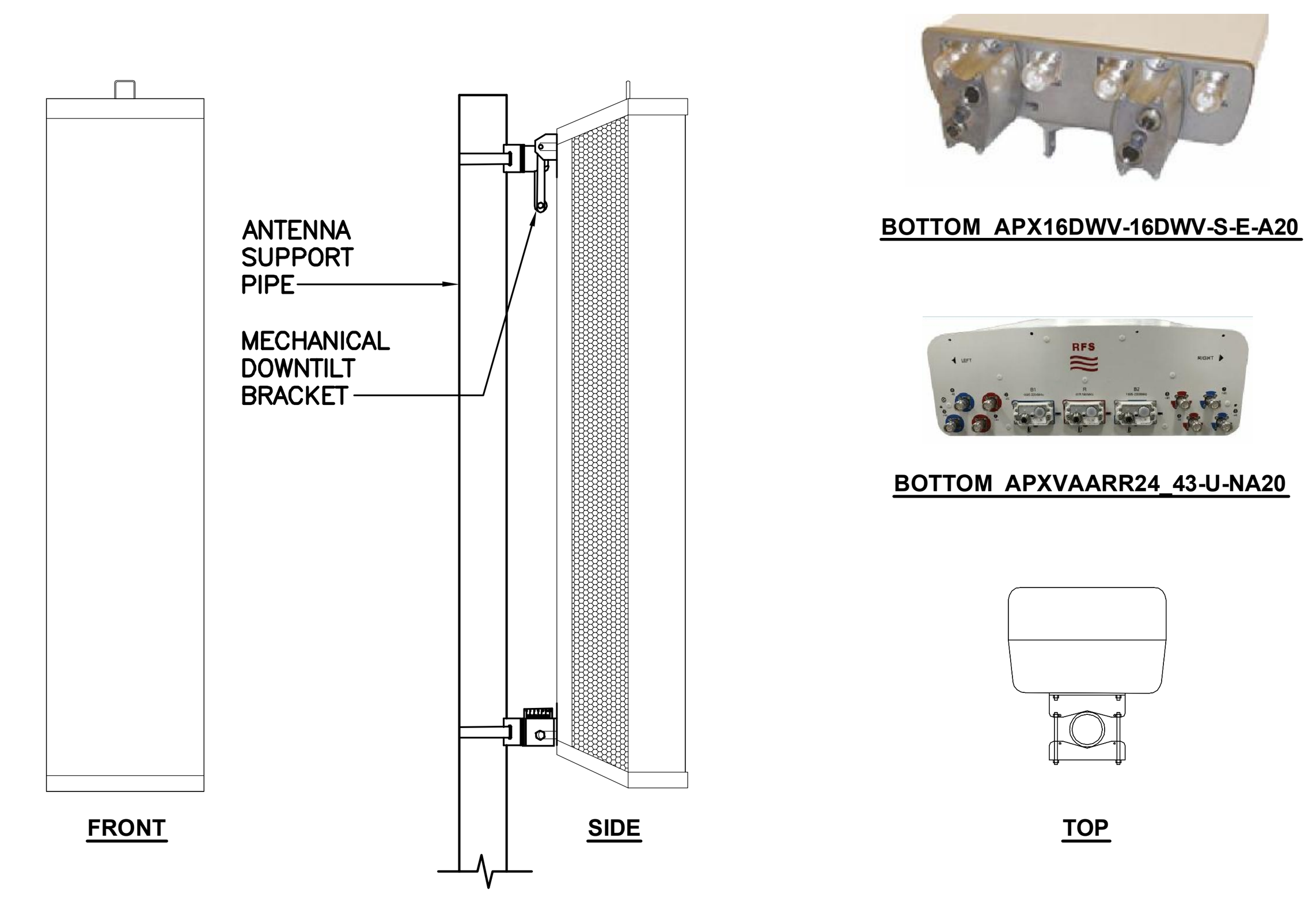
1 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



2 E-1 PROPOSED PLUMBING DIAGRAM

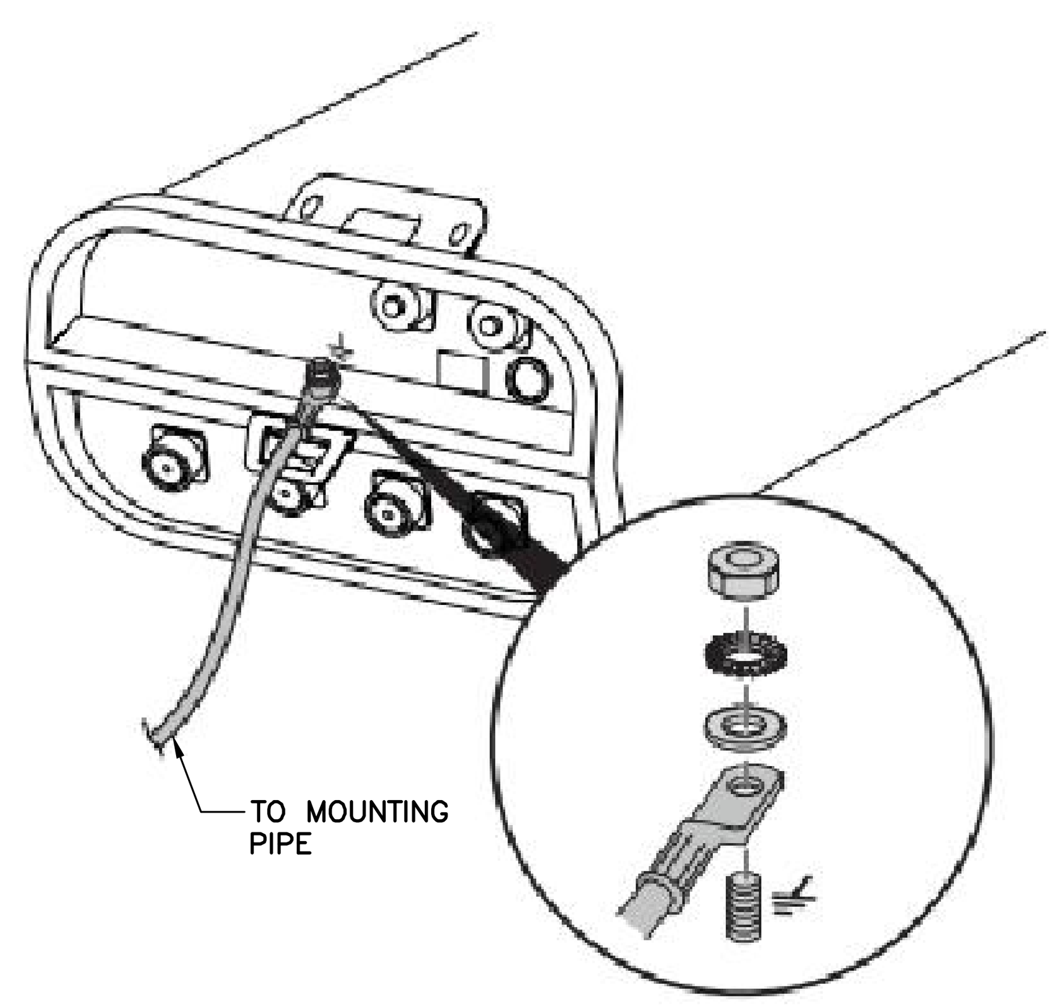
SCALE: NONE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APX16DWV-16DWV-S-E-A20	55.9"L x 13"W x 3.15"D	40.7 LBS.
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"L x 24"W x 8.7"D	128 LBS.

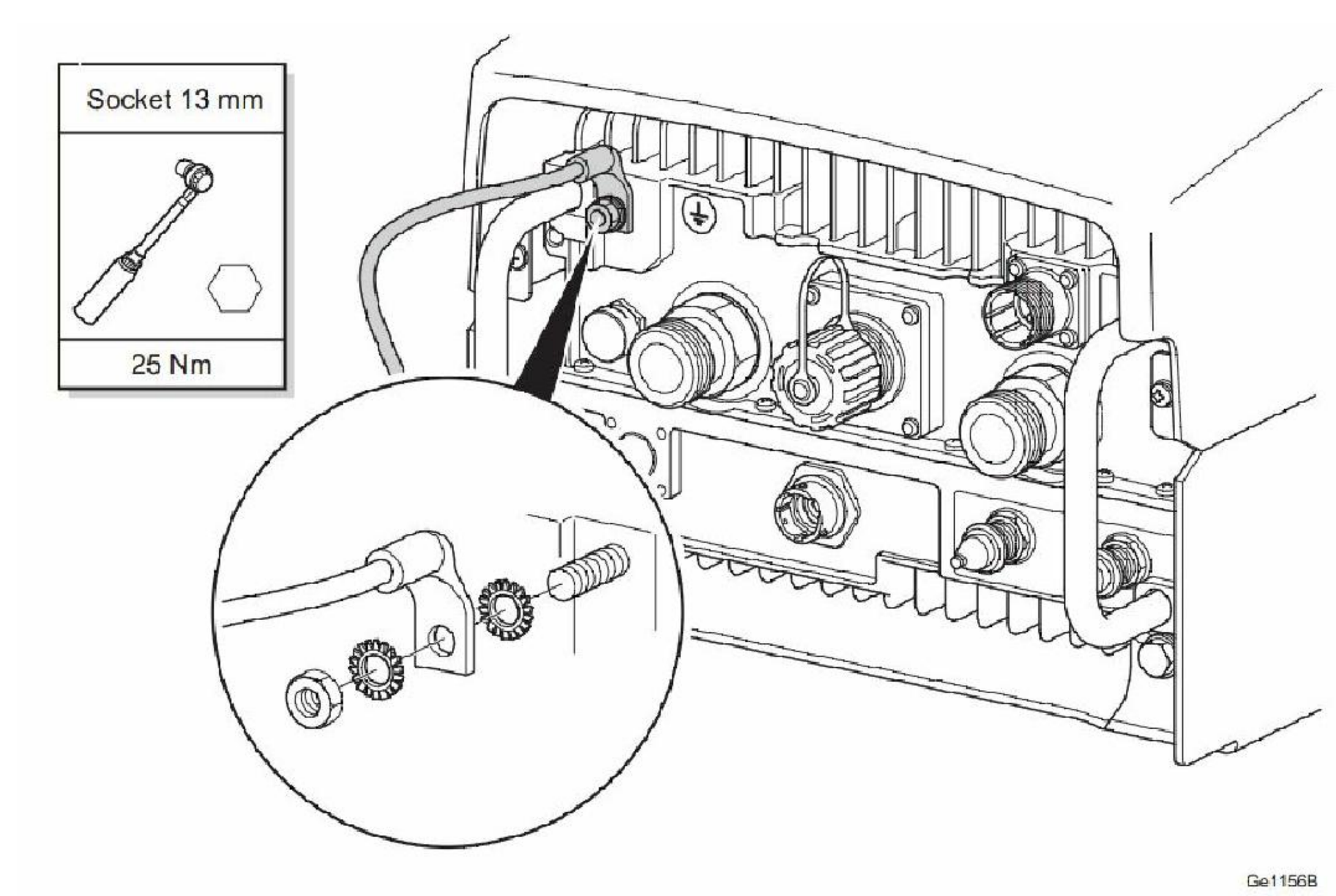
3 E-1 PROPOSED ANTENNA DETAIL

SCALE: NONE



AA E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



4 E-1 TYPICAL RRU GROUNDING DETAIL

NOT TO SCALE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

5 E-1 REMOTE RADIO UNIT (RRU) DETAIL

SCALE: NTS

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 6