Robinson+Cole

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March 21, 2019

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
370 West Main Street, Stamford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at a height of 81.5 feet above ground level ("AGL") on the existing roof-mounted tower at 370 West Main Street in Stamford, Connecticut (the "Property"). The tower and Property are owned by Storage Works LLC. The Council approved Cellco's shared use of this tower in 1995. Cellco intends to replace three (3) of its existing remote radio heads ("RRHs") with three (3) newer model RRHs. Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of Stamford, David Martin; David Woods, Stamford's Deputy Director of Planning; and Storage Works LLC, the owner of the Property and the tower.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's proposed replacement RRHs will be located at the same level on the tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

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

4. The installation of new RRHs will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A worst-case General Power Density table for Cellco's modified facility is included in Attachment 2.

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

6. The tower can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

A copy of the parcel map and Property owner information is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
David Martin, Stamford Mayor
David Woods, Ph.D., AICP, Deputy Director of Planning
Storage Works LLC
Tim Parks

ATTACHMENT 1

SAMSUNG

Dual-Band Radio Unit
700/850MHz (B13/B5)
RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
B13: DL(746-756MHz)/UL(777-787MHz)
B5: DL(869-894MHz)/UL(824-849MHz)
Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 207mm (29.9L)
Weight: 31.9kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

ATTACHMENT 2

Site Name: STAMFORD W CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	1	5062.175	5062.175	81.5	0.2741	1.0	27.41%
VZW Cellular	869	1	1094.652	1094.652	81.5	0.0593	0.579333333	10.23%
VZW AWS	2145	1	7770.146	7770.146	81.5	0.4207	1.0	42.07%
VZW 700	746	1	1695.416	1695.416	81.5	0.0918	0.497333333	18.46%
Total Percentage of Maximum Permissible Exposure								98.16%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:
1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Report Date:	February 4, 2019
Client:	On Air Engineering, LLC 88 Foundry Pond Road Cold Spring, NY 10516 Attn: David Weinpahl (201) 456-4624 dweinpahl@onaireng.com
Structure:	Existing 40-ft Self Support
Site Name:	Verizon - Stamford W CT
Site Address:	370 W Main St
City, County, State:	Stamford, Fairfield County, CT
Latitude, Longitude:	41.047824, -73.553628
PJF Project:	A42919-0001.001.8700

Paul J. Ford and Company is pleased to submit this "**Structural Analysis Report**". The purpose of this analysis is to determine if the structure has sufficient capacity to support the proposed equipment described herein.

Analysis Criteria:

Reference Standard:	2018 Connecticut State Building Code with the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.3 and Appendix N.
Ultimate Wind Speed:	120 mph 3-second gust wind speed without ice
Nominal Wind Speed:	93 mph 3-second gust wind speed without ice
Ice Wind Speed:	50 mph 3-second gust wind speed with 0.75" ice
Service Wind Speed:	60 mph 3-second gust wind speed (Serviceability) without ice
TIA-222 Criteria:	Risk Category II, Topographic Category I, Exposure Category C

Proposed Appurtenance Loads:

The structure was analyzed with the addition of the proposed appurtenances loads shown in Table 1 combined with the existing loads shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure:	**Acceptable**
Existing Foundation:	**Acceptable - See Note 2, Table 5**

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and On Air Engineering, LLC. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company

Kurt J. Swarts, P.E.
Project Manager
kswarts@pauljford.com

STATE OF CONNECTICUT
JOSEPH PACHICARAN JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

FEB 05 2019

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250 E Broad St, Suite 600
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Orlando
1801 Lee Rd, Suite 230
Winter Park, FL 32789
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TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 40 ft Self Support tower mounted on top of a roof. The roof elevation is at 54-ft above ground. Original tower design drawings were not available at the time of this analysis. Tower dimensions and member sizes were obtained from a March 17, 2015 "Structural Analysis Report" prepared by Centek Engineering.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	II
Wind Speed:	93 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	0.75 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
81.5	81.5	12	commscope	CBC78T-DS-43	-	-	-
		3	nokia	B13/B5 RRH 4x40			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90.0	103.5	1	antennae	2.5"OD x 16' Omni Whip	3	1/2	1
	96.0	1	antennae	3' Yagi			
	93.0	1	antennae	3' Yagi			
	90.0	1	tower mount	2.375" OD x 12' Mount Pipe			
91.0	91.0	1	tower mount	13-Ft Wireless Frame	-	-	1
		3	tower mounts	2.375" OD x 6' Mount Pipe			
87.5	87.5	1	antennae	3' Yagi	1	1/2	1
85.5	87.0	1	miscl	GPS	1	1/2	1
	85.5	1	tower mount	4-Ft Standoff Mount			
		1	scala	PR-850			
81.5	81.5	3	tower mounts	15-Ft Sector Mounts	18 2	7/8 1-1/4 hybrid	1
		6	commscope	JAHH-65B-R3B w/ Mount Pipe			
		6	decibel	DB844G65ZAXY w/ Mount Pipe			
		3	nokia	B25 RRH4X30			
		3	nokia	B66A RRH4X45			
		6	pole mounts	2.375" OD x 8' Mount Pipe			
		3	nokia	B13 RRH 4x30	-	-	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
67.0	67.0	1	tower mounts	2.375" OD x 6' Side Arm-Pipe	1	1/2	1
		1	antennae	3' Yagi			

Notes:
1) Existing Equipment
2) Equipment To Be Removed not considered in analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Structural Analysis	Centek Engineering: 14067.006: 3/17/2015	-	-

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Original tower manufacturers drawing were not available at the time of the analysis. Tower dimensions and member sizes were obtained from a March 17, 2015 "Structural Analysis Report" prepared by Centek Engineering. The analysis assumes that Centek analysis accurately presents the current "as is" conditions of the tower.
5) The analysis has been completed assuming the following material specifications for the tower members and connections; tower legs = ASTM A572 GR 50 (Fy = 50 ksi), tower diagonals = ASTM A36 (Fy = 36 ksi), and diagonal and flange bolts = ASTM A325N.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	94 - 74	Leg	ROHN 2.5 STD	3	-8.378	45.449	18.4	Pass
		Diagonal	L 1.75 x 1.75 x 1/4	11	-2.775	4.048	68.6	Pass
		Top Girt	L3x3x1/4	4	-0.470	11.430	4.1	Pass
T2	74 - 54	Leg	ROHN 2.5 STD	27	-24.020	45.484	52.8	Pass
		Diagonal	L 2 x 2 x 1/4	30	-3.195	5.035	63.5	Pass
							Summary	
						Leg (T2)	52.8	Pass
						Diagonal (T1)	68.6	Pass
						Top Girt (T1)	4.1	Pass
						Bolt Checks	40.5	Pass
						Rating =	68.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	54	25.0	Pass
2	Base Foundation (Compared w/ Design Loads)	54	80.0	Pass

Structure Rating (max from all components) =	80%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) An analysis of the roof mounted steel support frame was not part of the scope of service for this analysis. For information purposes only, a comparison of the current analysis reactions to the analysis reactions listed in the 3/17/2015 analysis report by Centek Engineering has been provided

4.1) Recommendations

The tower has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

1) Paul J. Ford and Company has not made a field inspection to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.

2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.

3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

4) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-G. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.

5) The enclosed sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.

6) Miscellaneous items such as antenna mounts etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

APPENDIX A

TNXTOWER OUTPUT

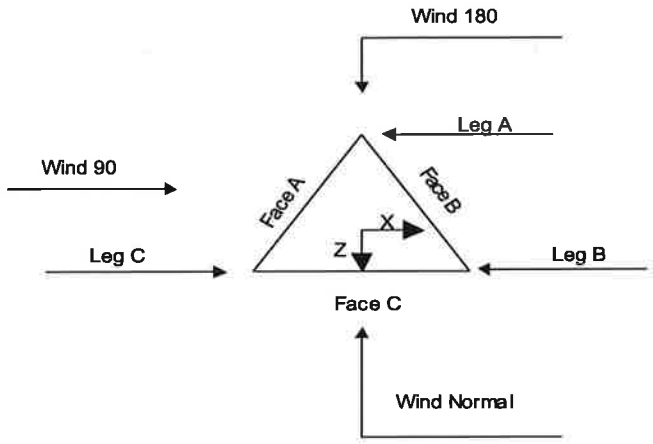
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 94.000 ft above the ground line.
The base of the tower is set at an elevation of 54.000 ft above the ground line.
The face width of the tower is 8.563 ft at the top and 12.063 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93.000 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.000 ft.
8) Nominal ice thickness of 0.750 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.000 pcf.
11) A wind speed of 50.000 mph is used in combination with ice.
12) Deflections calculated using a wind speed of 60.000 mph.
13) Pressures are calculated at each section.
14) Stress ratio used in tower member design is 1.
15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
√ SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	94.000-74.000			8.563	1	20.000
T2	74.000-54.000			10.563	1	20.000

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	94.000-74.000	6.667	X Brace	No	No	0.000	0.000
T2	74.000-54.000	6.667	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 94.000-74.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 1.75 x 1.75 x 1/4	A36 (36 ksi)
T2 74.000-54.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 94.000-74.000	0.000	0.000	A36 (36 ksi)	1	1	1.15	36.000	36.000	36.000
T2 74.000-54.000	0.000	0.000	A36 (36 ksi)	1	1	1.15	36.000	36.000	36.000

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 94.000-74.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 74.000-54.000	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 Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 94.000-74.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 74.000-54.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 94.000-74.000	Flange	0.750 A325N	4	0.500 A325N	1	0.000 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 74.000-54.000	Flange	0.750 A325N	4	0.500 A325N	1	0.000 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF4-50A (1/2" foam) ****	A	No	No	Ar (CaAa)	94.000 - 57.000	0.000	0.45	6	3	0.630	0.630		0.150
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	81.500 - 57.000	0.000	-0.3	2	2	30.000 1.500	1.500		1.800
LDF5-50A (7/8" foam)	C	No	No	Ar (CaAa)	81.500 - 57.000	0.000	-0.33	18	12	0.500 1.090	1.090		0.330
HFT1206-24S49-150(1-1/4")	C	No	No	Ar (CaAa)	81.500 - 57.000	0.000	-0.23	2	2	0.500 1.560	1.560		1.781

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	94.000-74.000	A	0.000	0.000	7.560	0.000	0.018
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	20.805	0.000	0.098
T2	74.000-54.000	A	0.000	0.000	6.426	0.000	0.015
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	47.158	0.000	0.223

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	94.000-74.000	A	1.647	0.000	0.000	20.675	0.000	0.238
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	38.020	0.000	0.601
T2	74.000-54.000	A	1.603	0.000	0.000	17.310	0.000	0.196
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	85.384	0.000	1.330

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	94.000-74.000	6.892	-2.446	6.487	-2.301
T2	74.000-54.000	13.687	1.014	13.140	2.202

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_e No Ice	K_a Ice
T1	1	LDF4-50A (1/2" foam)	74.00 - 94.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	3	1.5" flat Cable Ladder Rail	74.00 - 81.50	0.6000	0.6000
T1	4	LDF5-50A (7/8" foam)	74.00 - 81.50	0.6000	0.6000
T1	5	HFT1206-24S49-150(1-1/4")	74.00 - 81.50	0.6000	0.6000
T2	1	LDF4-50A (1/2" foam)	57.00 - 74.00	0.6000	0.6000
T2	3	1.5" flat Cable Ladder Rail	57.00 - 74.00	0.6000	0.6000
T2	4	LDF5-50A (7/8" foam)	57.00 - 74.00	0.6000	0.6000
T2	5	HFT1206-24S49-150(1-1/4")	57.00 - 74.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
2.5"OD x 16' Omni Whip	A	From Leg	0.000 0.000 9.500	0.000	94.000	No Ice 1/2" Ice 1" Ice	4.000 5.629 7.275	4.000 5.629 7.275	0.050 0.080 0.119
3' Yagi	A	From Leg	0.000 0.000 2.000	0.000	94.000	No Ice 1/2" Ice 1" Ice	2.083 3.787 5.517	2.083 3.787 5.517	0.031 0.053 0.085
3' Yagi	A	From Leg	0.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	2.083 3.787 5.517	2.083 3.787 5.517	0.031 0.053 0.085
3' Yagi	A	From Leg	0.000 0.000 0.000	0.000	87.500	No Ice 1/2" Ice 1" Ice	2.083 3.787 5.517	2.083 3.787 5.517	0.031 0.053 0.085
2.375" OD x 12' Mount Pipe ****	A	From Leg	0.000 0.000 0.000	0.000	90.000	No Ice 1/2" Ice 1" Ice	2.850 4.078 5.323	2.850 4.078 5.323	0.109 0.130 0.159
PR-850	C	From Leg	4.000 0.000 0.000	0.000	85.500	No Ice 1/2" Ice 1" Ice	6.350 11.430 16.510	6.350 11.430 16.510	0.038 0.049 0.061
GPS	C	From Leg	4.000 0.000 1.500	0.000	85.500	No Ice 1/2" Ice 1" Ice	0.146 0.238 0.311	0.146 0.238 0.311	0.015 0.018 0.023
4-Ft Standoff Mount	C	From Leg	2.000 0.000 0.000	0.000	85.500	No Ice 1/2" Ice 1" Ice	1.670 2.510 3.350	3.270 4.990 6.710	0.055 0.088 0.121
**** [SO 302-1] 3' Yagi	A	From Leg	6.000 0.000 0.000	0.000	67.000	No Ice 1/2" Ice 1" Ice	2.083 3.787 5.517	2.083 3.787 5.517	0.031 0.053 0.085

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
2.375" OD x 6' Side Arm-Pipe	A	From Leg	3.000 0.000 0.000	0.000	67.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
****									
13-Ft Wireless Frame	B	From Face	0.000 0.000 0.000	0.000	91.000	No Ice 1/2" Ice 1" Ice	17.890 24.350 30.810	5.840 9.070 12.300	0.361 0.497 0.632
**** SM 201-1									
(3) 2.375" OD x 6' Mount Pipe	B	From Face	0.000 0.000 0.000	0.000	91.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
****									
(3) 15-Ft Sector Mounts	C	None		0.000	81.500	No Ice 1/2" Ice 1" Ice	40.100 57.330 74.560	40.100 57.330 74.560	2.396 3.089 3.782
**** SM 510-3									
DB844G65ZAXY w/ Mount Pipe	A	From Leg	5.000 7.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	4.578 4.955 5.340	4.802 5.416 6.040	0.034 0.080 0.132
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	5.000 5.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
JAHH-65B-R3B w/ Mount Pipe	A	From Leg	5.000 -4.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
DB844G65ZAXY w/ Mount Pipe	A	From Leg	5.000 -7.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	4.578 4.955 5.340	4.802 5.416 6.040	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	B	From Leg	5.000 7.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	4.578 4.955 5.340	4.802 5.416 6.040	0.034 0.080 0.132
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	5.000 5.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
JAHH-65B-R3B w/ Mount Pipe	B	From Leg	5.000 -4.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
DB844G65ZAXY w/ Mount Pipe	B	From Leg	5.000 -7.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	4.578 4.955 5.340	4.802 5.416 6.040	0.034 0.080 0.132
DB844G65ZAXY w/ Mount Pipe	C	From Leg	5.000 7.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	4.578 4.955 5.340	4.802 5.416 6.040	0.034 0.080 0.132
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	5.000 5.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
JAHH-65B-R3B w/ Mount Pipe	C	From Leg	5.000 -4.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	9.470 10.091 10.673	7.765 9.002 10.016	0.091 0.169 0.255
DB844G65ZAXY w/ Mount	C	From Leg	5.000	0.000	81.500	No Ice	4.578	4.802	0.034

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
Pipe			-7.000 0.000			1/2" Ice 1" Ice	4.955 5.340	5.416 6.040	0.080 0.132
(2) 2.375" OD x 8' Mount Pipe	A	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.043 0.063
(2) 2.375" OD x 8' Mount Pipe	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.043 0.063
(2) 2.375" OD x 8' Mount Pipe	C	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.043 0.063
B25 RRH4X30 (UHFA)	A	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.115 2.303 2.498	1.290 1.445 1.607	0.053 0.070 0.090
B25 RRH4X30 (UHFA)	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.115 2.303 2.498	1.290 1.445 1.607	0.053 0.070 0.090
B25 RRH4X30 (UHFA)	C	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.115 2.303 2.498	1.290 1.445 1.607	0.053 0.070 0.090
B66A RRH4X45 (UHIE)	A	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.537 2.750 2.970	1.610 1.791 1.978	0.057 0.077 0.100
B66A RRH4X45 (UHIE)	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.537 2.750 2.970	1.610 1.791 1.978	0.057 0.077 0.100
B66A RRH4X45 (UHIE)	C	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.537 2.750 2.970	1.610 1.791 1.978	0.057 0.077 0.100
B13/B5 RRH 4x40	A	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.860 3.083 3.313	1.848 2.037 2.233	0.073 0.096 0.122
B13/B5 RRH 4x40	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.860 3.083 3.313	1.848 2.037 2.233	0.073 0.096 0.122
B13/B5 RRH 4x40	C	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	2.860 3.083 3.313	1.848 2.037 2.233	0.073 0.096 0.122
(4) CBC78T-DS-43	A	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	0.362 0.439 0.524	0.270 0.338 0.414	0.011 0.015 0.020
(4) CBC78T-DS-43	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	0.362 0.439 0.524	0.270 0.338 0.414	0.011 0.015 0.020
(4) CBC78T-DS-43	B	From Leg	5.000 0.000 0.000	0.000	81.500	No Ice 1/2" Ice 1" Ice	0.362 0.439 0.524	0.270 0.338 0.414	0.011 0.015 0.020

Tower Pressures - No Ice

$G_H = 0.850$

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 94.000-74.000	84.000	1.22	22.961	196.048	A	12.346	9.599	9.599	43.74	7.560	0.000
					B	12.346	9.599		43.74	0.000	0.000
					C	12.346	9.599		43.74	20.805	0.000
T2 74.000-54.000	64.000	1.152	21.683	231.045	A	13.133	9.592	9.592	42.21	6.426	0.000
					B	13.133	9.592		42.21	0.000	0.000
					C	13.133	9.592		42.21	47.158	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 94.000-74.000	84.000	1.22	6.637	1.647	201.544	A	12.346	42.155	20.597	37.79	20.675	0.000
						B	12.346	42.155		37.79	0.000	0.000
						C	12.346	42.155		37.79	38.020	0.000
T2 74.000-54.000	64.000	1.152	6.268	1.603	236.391	A	13.133	41.336	20.287	37.25	17.310	0.000
						B	13.133	41.336		37.25	0.000	0.000
						C	13.133	41.336		37.25	85.384	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 94.000-74.000	84.000	1.22	9.557	196.048	A	12.346	9.599	9.599	43.74	7.560	0.000
					B	12.346	9.599		43.74	0.000	0.000
					C	12.346	9.599		43.74	20.805	0.000
T2 74.000-54.000	64.000	1.152	9.025	231.045	A	13.133	9.592	9.592	42.21	6.426	0.000
					B	13.133	9.592		42.21	0.000	0.000
					C	13.133	9.592		42.21	47.158	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 94.000-74.000	0.116	1.213	A	0.112	2.917	22.96	1	1	17.767	1.319	65.974	C
			B	0.112	2.917	1	1	1	17.767			
			C	0.112	2.917		1	1	17.767			
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	21.68	1	1	18.546	1.589	79.436	C
			B	0.098	2.971	3	1	1	18.546			

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
			C	0.098	2.971		1	1	18.546			
Sum Weight:	0.354	2.481						OTM	55.472 kip-ft	2.908		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.116	1.213	A	0.112	2.917	22.96	0.8	1	15.298	1.179	58.947	A
			B	0.112	2.917	1	0.8	1	15.298			
			C	0.112	2.917		0.8	1	15.298			
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	21.68	0.8	1	15.920	1.445	72.246	A
			B	0.098	2.971	3	0.8	1	15.920			
			C	0.098	2.971		0.8	1	15.920			
Sum Weight:	0.354	2.481						OTM	49.817 kip-ft	2.624		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.116	1.213	A	0.112	2.917	22.96	0.85	1	15.915	1.222	61.108	B
			B	0.112	2.917	1	0.85	1	15.915			
			C	0.112	2.917		0.85	1	15.915			
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	21.68	0.85	1	16.576	1.474	73.675	B
			B	0.098	2.971	3	0.85	1	16.576			
			C	0.098	2.971		0.85	1	16.576			
Sum Weight:	0.354	2.481						OTM	51.400 kip-ft	2.696		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.838	3.805	A	0.27	2.378	6.637	1	1	37.229	0.667	33.333	C
			B	0.27	2.378		1	1	37.229			
			C	0.27	2.378		1	1	37.229			
T2 74.000-54.000	1.526	3.846	A	0.23	2.498	6.268	1	1	37.127	0.787	39.355	C
			B	0.23	2.498		1	1	37.127			
			C	0.23	2.498		1	1	37.127			
Sum Weight:	2.364	7.651						OTM	27.870 kip-ft	1.454		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.838	3.805	A	0.27	2.378	6.637	0.8	1	34.760	0.634	31.677	A
			B	0.27	2.378		0.8	1	34.760			
			C	0.27	2.378		0.8	1	34.760			
T2 74.000-54.000	1.526	3.846	A	0.23	2.498	6.268	0.8	1	34.501	0.752	37.607	A
			B	0.23	2.498		0.8	1	34.501			
			C	0.23	2.498		0.8	1	34.501			
Sum Weight:	2.364	7.651						OTM	26.527 kip-ft	1.386		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.838	3.805	A	0.27	2.378	6.637	0.85	1	35.377	0.633	31.668	B
			B	0.27	2.378		0.85	1	35.377			
			C	0.27	2.378		0.85	1	35.377			
T2 74.000-54.000	1.526	3.846	A	0.23	2.498	6.268	0.85	1	35.157	0.736	36.783	B
			B	0.23	2.498		0.85	1	35.157			
			C	0.23	2.498		0.85	1	35.157			
Sum Weight:	2.364	7.651						OTM	26.358 kip-ft	1.369		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.116	1.213	A	0.112	2.917	9.557	1	1	17.767	0.549	27.460	C
			B	0.112	2.917		1	1	17.767			
			C	0.112	2.917		1	1	17.767			
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	9.025	1	1	18.546	0.661	33.064	C
			B	0.098	2.971		1	1	18.546			
			C	0.098	2.971		1	1	18.546			
Sum Weight:	0.354	2.481						OTM	23.089 kip-ft	1.210		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.116	1.213	A	0.112	2.917	9.557	0.8	1	15.298	0.491	24.536	A
			B	0.112	2.917		0.8	1	15.298			
			C	0.112	2.917		0.8	1	15.298			

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
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	9.025	0.8	1	15.920	0.601	30.071	A
			B	0.098	2.971		0.8	1	15.920			
			C	0.098	2.971		0.8	1	15.920			
Sum Weight:	0.354	2.481						OTM	20.736 kip-ft	1.092		

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 ft²	F K	w plf	Ctrl. Face
T1 94.000-74.000	0.116	1.213	A	0.112	2.917	9.557	0.85	1	15.915	0.509	25.435	B
			B	0.112	2.917		0.85	1	15.915			
			C	0.112	2.917		0.85	1	15.915			
T2 74.000-54.000	0.238	1.268	A	0.098	2.971	9.025	0.85	1	16.576	0.613	30.666	B
			B	0.098	2.971		0.85	1	16.576			
			C	0.098	2.971		0.85	1	16.576			
Sum Weight:	0.354	2.481						OTM	21.394 kip-ft	1.122		

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	0.801					
Bracing Weight	1.680					
Total Member Self-Weight	2.481			-1.152	-2.011	
Total Weight	7.689			-1.152	-2.011	
Wind 0 deg - No Ice		0.085	-6.261	-154.710	-5.279	1.872
Wind 30 deg - No Ice		3.125	-5.238	-131.334	-81.024	1.703
Wind 60 deg - No Ice		5.040	-2.907	-75.389	-130.729	-0.175
Wind 90 deg - No Ice		5.639	-0.085	-4.420	-147.009	-1.597
Wind 120 deg - No Ice		5.238	2.923	70.708	-133.147	-1.147
Wind 150 deg - No Ice		3.003	5.196	126.673	-75.889	-1.471
Wind 180 deg - No Ice		-0.085	5.977	146.752	1.258	-1.872
Wind 210 deg - No Ice		-3.125	5.238	129.030	77.003	-1.703
Wind 240 deg - No Ice		-5.286	3.049	75.913	131.605	0.175
Wind 270 deg - No Ice		-5.639	0.085	2.117	142.988	1.597
Wind 300 deg - No Ice		-4.992	-2.781	-70.184	124.229	1.147
Wind 330 deg - No Ice		-3.003	-5.196	-128.976	71.868	1.471
Member Ice	5.170					
Total Weight Ice	22.879			-3.247	-8.915	
Wind 0 deg - Ice		0.044	-3.389	-88.918	-10.609	0.298
Wind 30 deg - Ice		1.709	-2.871	-76.713	-53.316	-0.140
Wind 60 deg - Ice		2.831	-1.633	-45.815	-82.696	-0.811
Wind 90 deg - Ice		3.182	-0.044	-4.941	-92.236	-1.186
Wind 120 deg - Ice		2.858	1.599	37.211	-82.429	-0.727
Wind 150 deg - Ice		1.640	2.839	68.788	-50.534	-0.436
Wind 180 deg - Ice		-0.044	3.320	81.080	-7.221	-0.298
Wind 210 deg - Ice		-1.709	2.871	70.219	35.487	0.140
Wind 240 deg - Ice		-2.889	1.667	39.992	66.030	0.811
Wind 270 deg - Ice		-3.182	0.044	-1.554	74.407	1.186
Wind 300 deg - Ice		-2.799	-1.565	-43.034	63.436	0.727

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 330 deg - Ice		-1.640	-2.839	-75.283	32.705	0.436
Total Weight	7.689			-1.152	-2.011	
Wind 0 deg - Service		0.035	-2.606	-65.923	-2.352	0.779
Wind 30 deg - Service		1.301	-2.180	-56.193	-33.880	0.709
Wind 60 deg - Service		2.098	-1.210	-32.907	-54.569	-0.073
Wind 90 deg - Service		2.347	-0.035	-3.368	-61.345	-0.665
Wind 120 deg - Service		2.180	1.217	27.903	-55.575	-0.477
Wind 150 deg - Service		1.250	2.163	51.198	-31.742	-0.612
Wind 180 deg - Service		-0.035	2.488	59.555	0.369	-0.779
Wind 210 deg - Service		-1.301	2.180	52.179	31.896	-0.709
Wind 240 deg - Service		-2.200	1.269	30.070	54.624	0.073
Wind 270 deg - Service		-2.347	0.035	-0.647	59.361	0.665
Wind 300 deg - Service		-2.078	-1.158	-30.741	51.554	0.477
Wind 330 deg - Service		-1.250	-2.163	-55.212	29.759	0.612

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 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service

Comb. No.	Description
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	94 - 74	Leg	Max Tension	7	3.645	-0.510	-0.014
			Max. Compression	27	-8.378	-0.046	-0.010
			Max. Mx	22	-0.955	0.607	0.040
			Max. My	4	-0.605	0.004	0.665
			Max. Vy	22	1.374	-0.536	0.040
			Max. Vx	12	1.291	-0.026	-0.464
		Diagonal	Max Tension	16	2.767	0.000	0.000
			Max. Compression	4	-2.775	0.000	0.000
			Max. Mx	31	-0.010	0.049	-0.006
			Max. My	28	-0.935	0.043	0.008
			Max. Vy	31	0.040	0.049	-0.006
			Max. Vx	28	-0.002	0.000	0.000
		Top Girt	Max Tension	3	0.378	0.000	0.000
			Max. Compression	14	-0.470	0.000	0.000
			Max. Mx	26	-0.153	-0.171	0.000
			Max. My	26	-0.148	0.000	0.005
			Max. Vy	26	-0.080	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T2	74 - 54	Leg	Max Tension	7	18.277	-0.050	-0.018
			Max. Compression	2	-24.020	0.000	-0.000
			Max. Mx	2	-18.164	0.120	-0.024
			Max. My	4	-3.281	-0.010	-0.158
			Max. Vy	18	0.082	0.117	0.011
			Max. Vx	20	-0.107	0.009	-0.008
		Diagonal	Max Tension	12	3.219	0.000	0.000
			Max. Compression	12	-3.195	0.000	0.000
			Max. Mx	28	0.625	0.072	0.007
			Max. My	30	0.854	0.071	0.007
			Max. Vy	28	0.050	0.071	-0.007
			Max. Vx	30	-0.002	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	26.434	4.505	-2.615
	Max. H_x	18	26.434	4.505	-2.615
	Max. H_z	5	-18.343	-3.401	2.653
	Min. Vert	7	-20.652	-4.042	2.349
	Min. H_x	7	-20.652	-4.042	2.349
	Min. H_z	16	23.259	3.655	-2.799
Leg B	Max. Vert	10	26.107	-4.387	-2.624
	Max. H_x	23	-19.624	3.920	2.349
	Max. H_z	25	-17.181	3.168	2.803
	Min. Vert	23	-19.624	3.920	2.349
	Min. H_x	10	26.107	-4.387	-2.624
	Min. H_z	12	22.798	-3.426	-2.957
Leg A	Max. Vert	2	26.727	0.136	5.330
	Max. H_x	20	2.707	1.492	0.091
	Max. H_z	2	26.727	0.136	5.330

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	15	-20.247	-0.131	-4.789
	Min. H_x	9	2.906	-1.488	0.209
	Min. H_z	15	-20.247	-0.131	-4.789

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	7.689	0.000	0.000	-1.151	-2.010	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	9.227	0.136	-10.018	-247.074	-7.642	2.996
0.9 Dead+1.6 Wind 0 deg - No Ice	6.920	0.136	-10.018	-246.728	-7.039	2.996
1.2 Dead+1.6 Wind 30 deg - No Ice	9.227	5.000	-8.381	-209.672	-128.833	2.725
0.9 Dead+1.6 Wind 30 deg - No Ice	6.920	5.000	-8.381	-209.327	-128.230	2.725
1.2 Dead+1.6 Wind 60 deg - No Ice	9.227	8.063	-4.651	-120.161	-208.362	-0.279
0.9 Dead+1.6 Wind 60 deg - No Ice	6.920	8.063	-4.651	-119.816	-207.759	-0.279
1.2 Dead+1.6 Wind 90 deg - No Ice	9.227	9.022	-0.136	-6.611	-234.409	-2.554
0.9 Dead+1.6 Wind 90 deg - No Ice	6.920	9.022	-0.136	-6.266	-233.806	-2.554
1.2 Dead+1.6 Wind 120 deg - No Ice	9.227	8.381	4.677	113.593	-212.231	-1.834
0.9 Dead+1.6 Wind 120 deg - No Ice	6.920	8.381	4.677	113.939	-211.628	-1.834
1.2 Dead+1.6 Wind 150 deg - No Ice	9.227	4.804	8.314	203.137	-120.617	-2.354
0.9 Dead+1.6 Wind 150 deg - No Ice	6.920	4.804	8.314	203.483	-120.014	-2.354
1.2 Dead+1.6 Wind 180 deg - No Ice	9.227	-0.136	9.563	235.264	2.817	-2.996
0.9 Dead+1.6 Wind 180 deg - No Ice	6.920	-0.136	9.563	235.609	3.420	-2.996
1.2 Dead+1.6 Wind 210 deg - No Ice	9.227	-5.000	8.381	206.909	124.008	-2.725
0.9 Dead+1.6 Wind 210 deg - No Ice	6.920	-5.000	8.381	207.255	124.611	-2.725
1.2 Dead+1.6 Wind 240 deg - No Ice	9.227	-8.457	4.878	121.922	211.372	0.279
0.9 Dead+1.6 Wind 240 deg - No Ice	6.920	-8.457	4.878	122.267	211.975	0.279
1.2 Dead+1.6 Wind 270 deg - No Ice	9.227	-9.022	0.136	3.848	229.584	2.554
0.9 Dead+1.6 Wind 270 deg - No Ice	6.920	-9.022	0.136	4.193	230.187	2.554
1.2 Dead+1.6 Wind 300 deg - No Ice	9.227	-7.987	-4.450	-111.833	199.571	1.834
0.9 Dead+1.6 Wind 300 deg - No Ice	6.920	-7.987	-4.450	-111.487	200.174	1.834
1.2 Dead+1.6 Wind 330 deg - No Ice	9.227	-4.804	-8.314	-205.900	115.792	2.354
0.9 Dead+1.6 Wind 330 deg - No Ice	6.920	-4.804	-8.314	-205.555	116.395	2.354
1.2 Dead+1.0 Ice	24.416	0.000	0.000	-3.476	-9.316	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	24.416	0.044	-3.389	-89.146	-11.010	0.299
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	24.416	1.709	-2.871	-76.941	-53.717	-0.139
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	24.416	2.831	-1.633	-46.044	-83.098	-0.811

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	24.416	3.182	-0.044	-5.169	-92.637	-1.185
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	24.416	2.858	1.599	36.982	-82.830	-0.727
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	24.416	1.640	2.839	68.560	-50.936	-0.436
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	24.416	-0.044	3.320	80.851	-7.622	-0.299
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	24.416	-1.709	2.871	69.990	35.085	0.139
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	24.416	-2.889	1.667	39.764	65.628	0.811
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	24.416	-3.182	0.044	-1.782	74.005	1.185
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	24.416	-2.799	-1.565	-43.262	63.035	0.727
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	24.416	-1.640	-2.839	-75.511	32.303	0.436
Dead+Wind 0 deg - Service	7.689	0.035	-2.606	-65.067	-3.371	0.779
Dead+Wind 30 deg - Service	7.689	1.301	-2.180	-55.337	-34.898	0.709
Dead+Wind 60 deg - Service	7.689	2.098	-1.210	-32.051	-55.587	-0.073
Dead+Wind 90 deg - Service	7.689	2.347	-0.035	-2.512	-62.363	-0.664
Dead+Wind 120 deg - Service	7.689	2.180	1.217	28.759	-56.594	-0.477
Dead+Wind 150 deg - Service	7.689	1.250	2.163	52.054	-32.761	-0.612
Dead+Wind 180 deg - Service	7.689	-0.035	2.488	60.411	-0.650	-0.779
Dead+Wind 210 deg - Service	7.689	-1.301	2.180	53.035	30.877	-0.709
Dead+Wind 240 deg - Service	7.689	-2.200	1.269	30.926	53.605	0.073
Dead+Wind 270 deg - Service	7.689	-2.347	0.035	0.209	58.343	0.664
Dead+Wind 300 deg - Service	7.689	-2.078	-1.158	-29.885	50.535	0.477
Dead+Wind 330 deg - Service	7.689	-1.250	-2.163	-54.356	28.740	0.612

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-7.689	0.000	0.000	7.689	0.000	0.000%
2	0.136	-9.227	-10.018	-0.136	9.227	10.018	0.000%
3	0.136	-6.920	-10.018	-0.136	6.920	10.018	0.000%
4	5.000	-9.227	-8.381	-5.000	9.227	8.381	0.000%
5	5.000	-6.920	-8.381	-5.000	6.920	8.381	0.000%
6	8.063	-9.227	-4.651	-8.063	9.227	4.651	0.000%
7	8.063	-6.920	-4.651	-8.063	6.920	4.651	0.000%
8	9.022	-9.227	-0.136	-9.022	9.227	0.136	0.000%
9	9.022	-6.920	-0.136	-9.022	6.920	0.136	0.000%
10	8.381	-9.227	4.677	-8.381	9.227	-4.677	0.000%
11	8.381	-6.920	4.677	-8.381	6.920	-4.677	0.000%
12	4.804	-9.227	8.314	-4.804	9.227	-8.314	0.000%
13	4.804	-6.920	8.314	-4.804	6.920	-8.314	0.000%
14	-0.136	-9.227	9.563	0.136	9.227	-9.563	0.000%
15	-0.136	-6.920	9.563	0.136	6.920	-9.563	0.000%
16	-5.000	-9.227	8.381	5.000	9.227	-8.381	0.000%
17	-5.000	-6.920	8.381	5.000	6.920	-8.381	0.000%
18	-8.457	-9.227	4.878	8.457	9.227	-4.878	0.000%
19	-8.457	-6.920	4.878	8.457	6.920	-4.878	0.000%
20	-9.022	-9.227	0.136	9.022	9.227	-0.136	0.000%
21	-9.022	-6.920	0.136	9.022	6.920	-0.136	0.000%
22	-7.987	-9.227	-4.450	7.987	9.227	4.450	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
23	-7.987	-6.920	-4.450	7.987	6.920	4.450	0.000%
24	-4.804	-9.227	-8.314	4.804	9.227	8.314	0.000%
25	-4.804	-6.920	-8.314	4.804	6.920	8.314	0.000%
26	0.000	-24.416	0.000	0.000	24.416	0.000	0.000%
27	0.044	-24.416	-3.389	-0.044	24.416	3.389	0.000%
28	1.709	-24.416	-2.871	-1.709	24.416	2.871	0.000%
29	2.831	-24.416	-1.633	-2.831	24.416	1.633	0.000%
30	3.182	-24.416	-0.044	-3.182	24.416	0.044	0.000%
31	2.858	-24.416	1.599	-2.858	24.416	-1.599	0.000%
32	1.640	-24.416	2.839	-1.640	24.416	-2.839	0.000%
33	-0.044	-24.416	3.320	0.044	24.416	-3.320	0.000%
34	-1.709	-24.416	2.871	1.709	24.416	-2.871	0.000%
35	-2.889	-24.416	1.667	2.889	24.416	-1.667	0.000%
36	-3.182	-24.416	0.044	3.182	24.416	-0.044	0.000%
37	-2.799	-24.416	-1.565	2.799	24.416	1.565	0.000%
38	-1.640	-24.416	-2.839	1.640	24.416	2.839	0.000%
39	0.035	-7.689	-2.606	-0.035	7.689	2.606	0.000%
40	1.301	-7.689	-2.180	-1.301	7.689	2.180	0.000%
41	2.098	-7.689	-1.210	-2.098	7.689	1.210	0.000%
42	2.347	-7.689	-0.035	-2.347	7.689	0.035	0.000%
43	2.180	-7.689	1.217	-2.180	7.689	-1.217	0.000%
44	1.250	-7.689	2.163	-1.250	7.689	-2.163	0.000%
45	-0.035	-7.689	2.488	0.035	7.689	-2.488	0.000%
46	-1.301	-7.689	2.180	1.301	7.689	-2.180	0.000%
47	-2.200	-7.689	1.269	2.200	7.689	-1.269	0.000%
48	-2.347	-7.689	0.035	2.347	7.689	-0.035	0.000%
49	-2.078	-7.689	-1.158	2.078	7.689	1.158	0.000%
50	-1.250	-7.689	-2.163	1.250	7.689	2.163	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	94 - 74	0.126	40	0.017	0.002
T2	74 - 54	0.048	40	0.014	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
94.000	2.5"OD x 16' Omni Whip	40	0.126	0.017	0.002	421653
93.000	3' Yagi	40	0.121	0.017	0.002	421653
91.000	13-Ft Wireless Frame	40	0.113	0.017	0.002	421653
90.000	2.375" OD x 12' Mount Pipe	40	0.108	0.017	0.002	421653
87.500	3' Yagi	40	0.098	0.017	0.002	324347
85.500	PR-850	40	0.090	0.017	0.002	248031
81.500	(3) 15-Ft Sector Mounts	40	0.074	0.017	0.001	168661
67.000	3' Yagi	39	0.028	0.010	0.001	162174

Maximum Tower Deflections - Design Wind

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

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	94 - 74	0.467	4	0.063	0.008
T2	74 - 54	0.181	2	0.054	0.004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
94.000	2.5"OD x 16' Omni Whip	4	0.467	0.063	0.008	117970
93.000	3' Yagi	4	0.451	0.063	0.008	117970
91.000	13-Ft Wireless Frame	4	0.420	0.063	0.008	117970
90.000	2.375" OD x 12' Mount Pipe	4	0.404	0.063	0.008	117970
87.500	3' Yagi	4	0.366	0.063	0.007	90746
85.500	PR-850	4	0.336	0.063	0.006	69394
81.500	(3) 15-Ft Sector Mounts	2	0.277	0.061	0.006	47188
67.000	3' Yagi	2	0.108	0.039	0.002	45373

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	94	Leg	A325N	0.750	4	0.911	29.821	0.031 ✔	1	Bolt Tension
		Diagonal	A325N	0.500	1	2.767	7.612	0.363 ✔	1	Member Block Shear
T2	74	Leg	A325N	0.750	4	4.569	29.821	0.153 ✔	1	Bolt Tension
		Diagonal	A325N	0.500	1	3.219	7.952	0.405 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	94 - 74	ROHN 2.5 STD	20.033	6.678	84.6 K=1.00	1.704	-8.378	45.449	0.184 [1] ✔
T2	74 - 54	ROHN 2.5 STD	20.019	6.673	84.5 K=1.00	1.704	-24.020	45.484	0.528 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	94 - 74	L 1.75 x 1.75 x 1/4	12.211	6.058	212.9 K=1.00	0.813	-2.775	4.048	0.686 [1] ✔
T2	74 - 54	KL/R > 200 (C) - 11 L 2 x 2 x 1/4 KL/R > 200 (C) - 30	13.565	6.684	205.1 K=1.00	0.938	-3.195	5.035	0.635 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	94 - 74	L3x3x1/4	8.563	8.323	168.7 K=1.00	1.440	-0.470	11.430	0.041 [1] ✔

[1] $P_u / \phi P_n$ controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	94 - 74	ROHN 2.5 STD	20.033	6.678	84.6	1.704	3.645	76.682	0.048 [1] ✔
T2	74 - 54	ROHN 2.5 STD	20.019	6.673	84.5	1.704	18.277	76.682	0.238 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	94 - 74	L 1.75 x 1.75 x 1/4	12.211	6.058	139.8	0.492	2.767	21.410	0.129 [1] ✔
T2	74 - 54	L 2 x 2 x 1/4	13.565	6.684	133.8	0.586	3.219	25.505	0.126 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	94 - 74	L3x3x1/4	8.563	8.323	107.4	1.440	0.378	46.656	0.008 [1] ✔

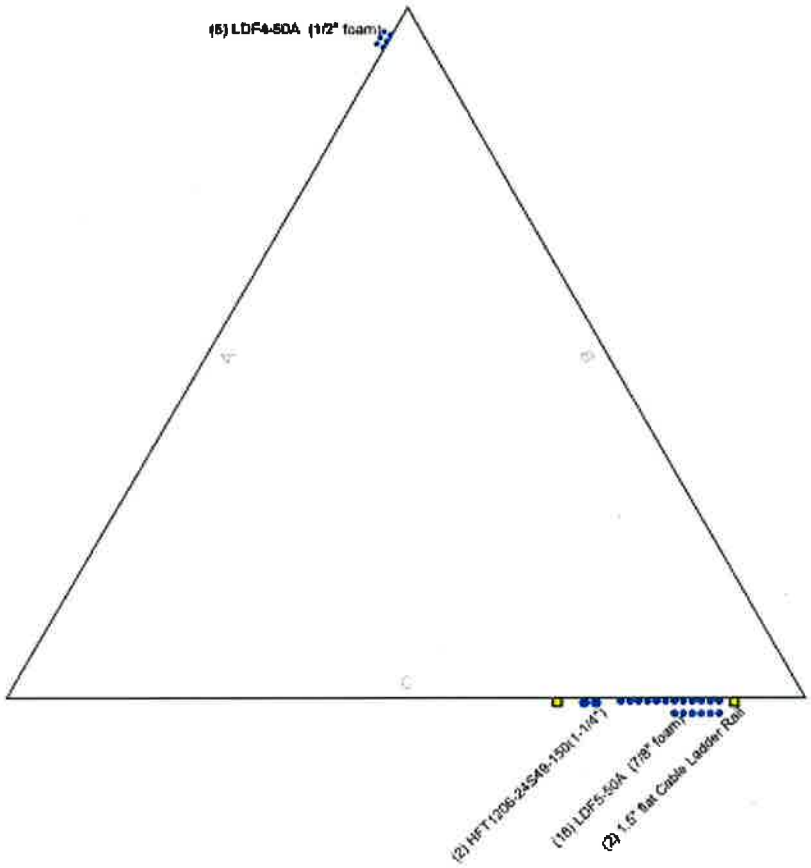
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	94 - 74	Leg	ROHN 2.5 STD	3	-8.378	45.449	18.4	Pass
		Diagonal	L 1.75 x 1.75 x 1/4	11	-2.775	4.048	68.6	Pass
		Top Girt	L3x3x1/4	4	-0.470	11.430	4.1	Pass
T2	74 - 54	Leg	ROHN 2.5 STD	27	-24.020	45.484	52.8	Pass
		Diagonal	L 2 x 2 x 1/4	30	-3.195	5.035	63.5	Pass
							Summary	
						Leg (T2)	52.8	Pass
						Diagonal (T1)	68.6	Pass
						Top Girt (T1)	4.1	Pass
						Bolt Checks	40.5	Pass
						RATING =	**68.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

DESIGNED APPURTENANCE LOADING

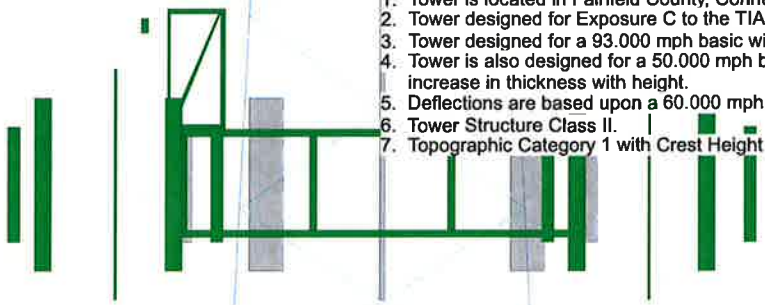
TYPE	ELEVATION	TYPE	ELEVATION
2.5"OD x 16' Omni Whip	94	JAHH-65B-R3B w/ Mount Pipe	81.5
3' Yagi	94	JAHH-65B-R3B w/ Mount Pipe	81.5
3' Yagi	93	DB844G65ZAXY w/ Mount Pipe	81.5
13-Ft Wireless Frame	91	(2) 2.375" OD x 8' Mount Pipe	81.5
(3) 2.375" OD x 6' Mount Pipe	91	(2) 2.375" OD x 8' Mount Pipe	81.5
2.375" OD x 12' Mount Pipe	90	(2) 2.375" OD x 8' Mount Pipe	81.5
3' Yagi	87.5	B25 RRH4X30 (UHFA)	81.5
4-Ft Standoff Mount	85.5	B25 RRH4X30 (UHFA)	81.5
GPS	85.5	B25 RRH4X30 (UHFA)	81.5
PR-850	85.5	B66A RRH4X45 (UHIE)	81.5
(3) 15-Ft Sector Mounts	81.5	B66A RRH4X45 (UHIE)	81.5
DB844G65ZAXY w/ Mount Pipe	81.5	B66A RRH4X45 (UHIE)	81.5
JAHH-65B-R3B w/ Mount Pipe	81.5	B13/B5 RRH 4x40	81.5
JAHH-65B-R3B w/ Mount Pipe	81.5	B13/B5 RRH 4x40	81.5
DB844G65ZAXY w/ Mount Pipe	81.5	B13/B5 RRH 4x40	81.5
DB844G65ZAXY w/ Mount Pipe	81.5	(4) CBC78T-DS-43	81.5
JAHH-65B-R3B w/ Mount Pipe	81.5	(4) CBC78T-DS-43	81.5
JAHH-65B-R3B w/ Mount Pipe	81.5	(4) CBC78T-DS-43	81.5
DB844G65ZAXY w/ Mount Pipe	81.5	3' Yagi	67
DB844G65ZAXY w/ Mount Pipe	81.5	2.375" OD x 6' Side Arm- Pipe	67

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93.000 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.000 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.000 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft



94.0 ft

74.0 ft

54.0 ft

Section	T1	T2
Legs	ROHN 2.5 STD	
Leg Grade	A572-50	
Diagonals	L 1.75 x 1.75 x 1/4	L 2 x 2 x 1/4
Diagonal Grade	A36	
Top Girts	L3x3x1/4	N.A.
Face Width (ft)	8.5625	10.5625 12.0625
# Panels @ (ft)	6 @ 6.66667	
Weight (K)	1.2	1.3 2.5

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

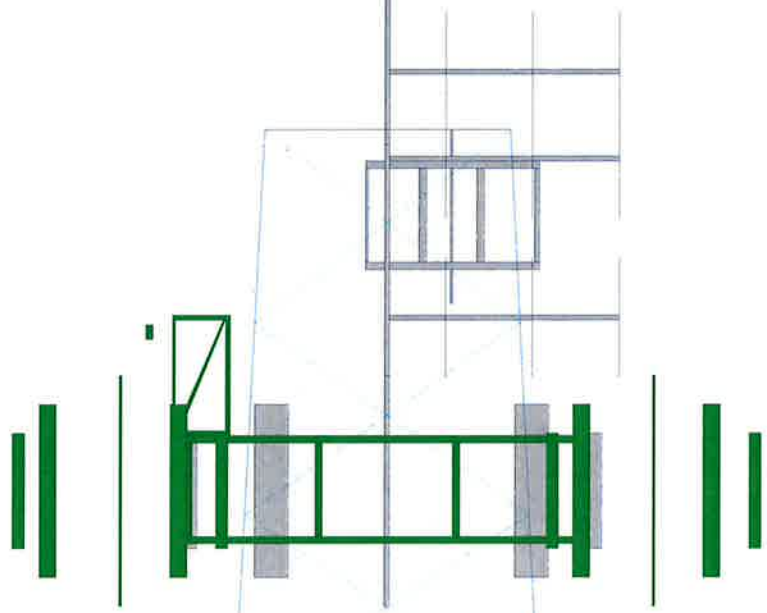
Job: 40-Ft Roof Mounted S/S: Stamford West: Stamford,
Project: 42919-0001.001.8700
Client: On-Air Engieering, LLC | Drawn by: kswarts | App'd:
Code: TIA-222-G | Date: 02/05/19 | Scale: NTS
Path: | Dwg No. E-1

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93.000 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.000 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.000 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 68.6%



94.0 ft

74.0 ft

54.0 ft

Section	T1	T2	
Legs	ROHN 2.5 STD		
Leg Grade	A572-50		
Diagonals	L 1.75 x 1.75 x 1/4	L 2 x 2 x 1/4	
Diagonal Grade	A36		
Top Girts	L3x3x1/4	N.A.	
Face Width (ft)	8.5625	10.5625	12.0625
# Panels @ (ft)	6 @ 6.66667		
Weight (K)	12	13	2.5

△ *ALL REACTIONS ARE FACTORED*

MAX. CORNER REACTIONS AT BASE:
DOWN: 27 K
SHEAR: 5 K

UPLIFT: -21 K
SHEAR: 5 K

AXIAL 24 K
SHEAR 3 K *MOMENT 95 kip-ft*

TORQUE 1 kip-ft
50.000 mph WIND - 0.750 in ICE

AXIAL 9 K
SHEAR 10 K *MOMENT 247 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 93.000 mph WIND

PJF
Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job:	***40-Ft Roof Mounted S/S: Stamford West: Stamford,***		
Project:	***42919-0001.001.8700***		
Client: On-Air Engieering, LLC	Drawn by: kswarts	App'd:	
Code: TIA-222-G	Date: 02/05/19	Scale: NTS	
Path: G:\TOWERS\42919_On Air Engineering\[2019\42919-0001 - Stamford WT CT\1.001.001_SAIT\TOA\42919-0001.001.8700.eri		Dwg No. E-1	

PAUL J. FORD
& COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Page	1	of	1
By	PJF	Date	2/5/2019
Project #	42919-0001.001.8700		

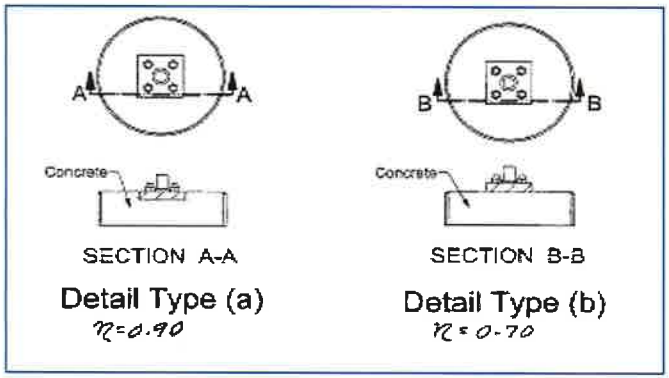
Self-Support Tower Anchor Rod Capacity - TIA-G

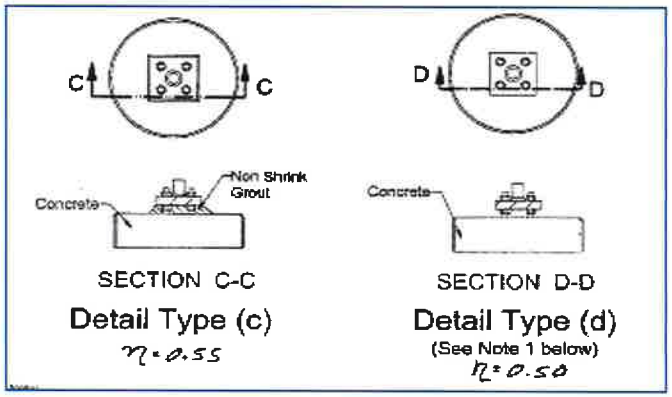
Loads

Compression :	27	kips	Tension :	21	kips	Code:	TIA-G
Comp. Shear :	5	kips	Ten.Shear :	5	kips	Maximum Ratio:	1.00

Existing Anchor Rods

Anchor Rod Condition (n) :	0.7	
Anchor Rod ø :	3/4	in
Anchor Rod Quantity :	4	
Anchor Rod Grade :	User Defined	
F_y :	81	ksi
F_u :	105	ksi
Threads per Inch	10	
Net Tensile Area	0.33	in^2
ϕ_t :	0.80	
$\phi_t R_{nt}$:	112.38	kip
Anchor Rod Ratio :	0.250	





PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

By KJS Date 2/4/2019
Project # 42919-0001.001.8700

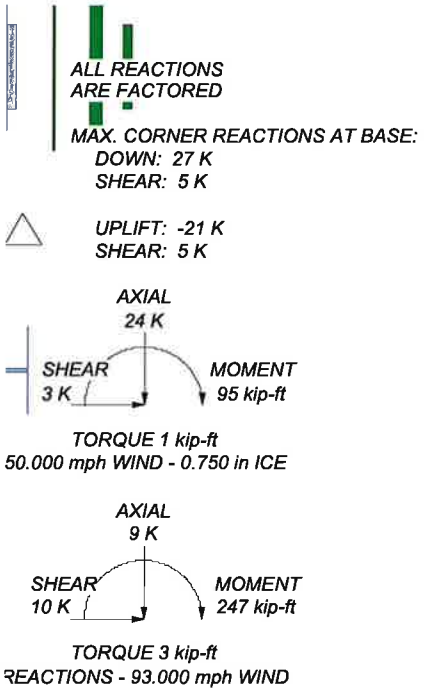
Foundation Reaction Comparison

Previous Structural Analysis

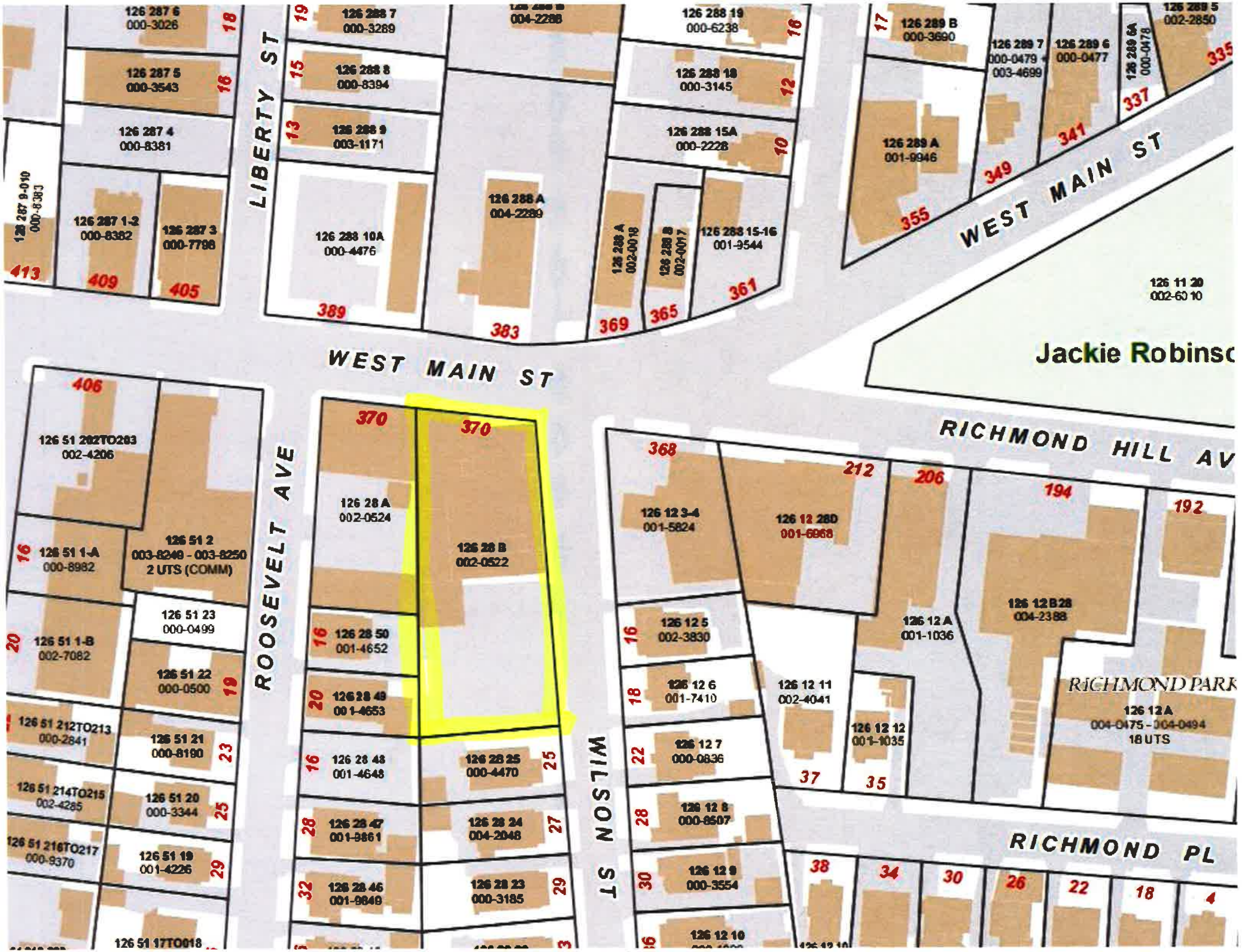
Firm:	Centek Engieering, Inc
Document #:	Structural Analysis #14067.006
Drawings Date:	3/17/2015

Reactions	Previous Analysis	Modified Original Design*	Current Analysis	Ratio
Compression (kips)	25	**33.75**	27.00	0.8
Tension (kips)	20	**27**	21.00	0.77778
Shear (kips)	10	**13.5**	10.00	0.74074
OTM (kip-ft)	238	**321.3**	247.00	0.76875

* The original tower design was completed in accordance with TIA/EIA-222-F standard. Per section 15.5.1 of the TIA-222-G standard, the reactions from the original design shall be multiplied by 1.35 for comparison to the reactions from this analysis.



ATTACHMENT 4


LIBERTY ST
WEST MAIN ST
WEST MAIN ST
ROOSEVELT AVE
WILSON ST
RICHMOND HILL AV
RICHMOND PL
RICHMOND PARK
Jackie Robinso
126 287 6
000-3026
126 287 5
000-3543
126 287 4
000-8381
126 287 9-010
000-8383
126 287 1-2
000-8382
126 287 3
000-7798
126 288 7
000-3289
126 288 8
000-8394
126 288 9
003-1171
126 288 10A
000-4476
126 288 A
004-2289
126 288 19
000-6238
126 288 18
000-3145
126 288 15A
000-2228
126 288 A
002-0018
126 288 B
002-0017
126 288 15-16
001-9544
126 289 B
000-3690
126 289 A
001-9946
126 289 7
000-0479
003-4699
126 289 6
000-0477
126 289 6A
000-0478
126 289 5
002-2850
126 11 20
002-6010
126 51 202TO203
002-4206
126 51 2
003-8249 - 003-8250
2 UTS (COMM)
126 51 1-A
000-8982
126 51 23
000-0499
126 51 1-B
002-7082
126 51 22
000-0500
126 51 212TO213
000-2841
126 51 21
000-8190
126 51 214TO215
002-4285
126 51 20
000-3344
126 51 216TO217
000-9370
126 51 19
001-4226
126 51 17TO018
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001-1035
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126 12A
004-0475 - 004-0494
18 UTS
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370 WEST MAIN STREET

Location	370 WEST MAIN STREET	**Mblu**	002/ 0522/ / /
Acct#	002-0522	**Owner**	STORAGE WORKS LLC
Assessment	$3,471,820	**Appraisal**	$4,959,740
PID	7392	**Building Count**	2

Current Value

Appraisal

Valuation Year	Improvements	Land	Total
2015	$3,942,550	$1,017,190	$4,959,740

Assessment

Valuation Year	Improvements	Land	Total
2015	$2,759,790	$712,030	$3,471,820

Owner of Record

Owner	STORAGE WORKS LLC
Co-Owner	
Address	370 WEST MAIN STREET STAMFORD, CT 06902

Sale Price	$0
Certificate	
Book & Page	6354/ 164
Sale Date	08/07/2002
Instrument	03

Ownership History

Ownership History

Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
STORAGE WORKS LLC	$0		6354/ 164	03	08/07/2002
WESTSIDE STORAGE COMPANY	$0		1763/ 183	25	07/26/1978

Building Information

Building 1 : Section 1

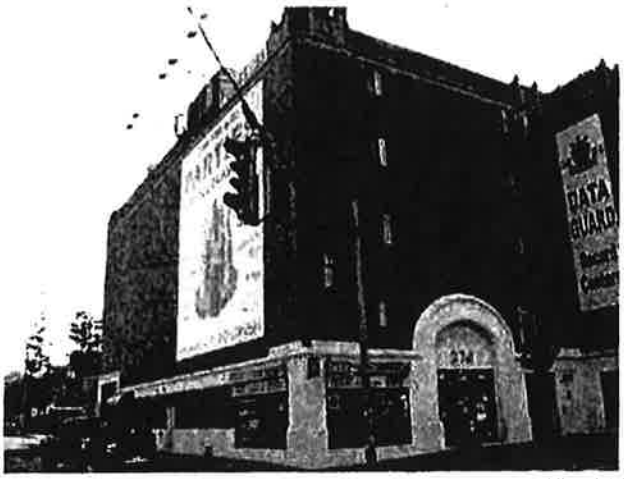
Year Built: 1925
Living Area: 25,900

Building Attributes

Field	Description
STYLE	Mini Warehouse
Stories:	5

Occupancy	3
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Plaste
Interior Wall 2	
Interior Floor 1	Concrete Slab
Interior Floor 2	Carpet
Heating Fuel	Gas/LP
Heating Type	Hot Wtr Bbd
AC Type	Central
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300
Heat/AC	Heat/AC Pkgs
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Sus-Ceil&Wall
Rooms/Prtns	Average
Wall Height	9
% Comn Wall	

Building Photo



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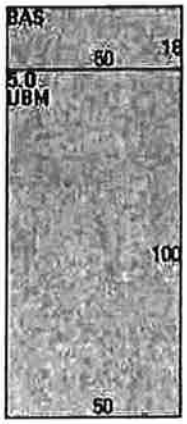
Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
5.0	5 Story	5,000	25,000
BAS	First Floor	900	900
UBM	Basement, Unfinished	5,000	0
		10,900	25,900

Building 2 : Section 1

Year Built: 1925
Living Area: 31,435

Building Attributes : Bldg 2 of 2	
Field	Description
STYLE	Mini Warehouse
Stories:	5
Occupancy	2
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	

Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Plaste
Interior Wall 2	
Interior Floor 1	Concrete Slab
Interior Floor 2	
Heating Fuel	Gas/LP
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Sus-Ceil&Wall
Rooms/Prtns	Average
Wall Height	9
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/StamfordCTPhotos//\00\11\78/

Building Layout

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
FUS	Upper Story, Finished	24,748	24,748
BAS	First Floor	6,687	6,687
		31,435	31,435

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
EL2	Elev Pass	6 STOPS	$172,800	1
OH1	Door Overhd Co	2 UNITS	$5,040	1
SPR1	Sprinklers - Wet	25900 S.F.	$27,970	1
EL2	Elev Pass	6 STOPS	$172,800	1

Land

Land Use

Land Line Valuation

Use Code	200	**Size (Acres)**	0.59
Description	Commercial MDL-94	**Depth**	
Zone	MZN	**Assessed Value**	$712,030
Neighborhood	0300	**Appraised Value**	$1,017,190
Alt Land Appr	No		
Category			

Outbuildings

Outbuildings — Legend

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
AP1	Fence Chn Lk			300 L.F.	$3,710	1
LP4	Pavng Asphlt			12000 S.F	$13,500	1
CEL1	Cell Tower			1 SITES	$158,530	1

Valuation History

Appraisal

Valuation Year	Improvements	Land	Total
2016	$3,942,550	$1,017,190	$4,959,740
2015	$3,942,550	$1,017,190	$4,959,740
2014	$3,942,550	$1,017,190	$4,959,740

Assessment

Valuation Year	Improvements	Land	Total
2016	$2,759,790	$712,030	$3,471,820
2015	$2,759,790	$712,030	$3,471,820
2014	$2,759,790	$712,030	$3,471,820

ATTACHMENT 5

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™
3	3

Postmaster, per *(name of receiving employee)*

Affix Stamp Here
Postmark with Date of Receipt.

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03/21/2019
US POSTAGE $002.79⁰

ZIP 06103
041L12203937

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	David Martin, Mayor City of Stamford 888 Washington Boulevard Stamford, CT 06901				
2.	David Woods, Ph.D., AICP Deputy Director of Planning City of Stamford 888 Washington Boulevard Stamford, CT 06901				
3.	Storage Works LLC 370 West Main Street Stamford, CT 06902				
4.					
5.					
6.					

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MAR 21 2019
USPS