



# 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

### VIA ELECTRONIC MAIL

June 25, 2019

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

RE: **EM-VER-107-190418** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at Red Cedar Road (a/k/a South Orange Center Road), Orange, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) is in receipt of your correspondence of June 19, 2019 submitted in response to the Council's April 22, 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/IN/emr



## Robidoux, Evan

---

**From:** Mayo, Rachel <rmayo@RC.com>  
**Sent:** Wednesday, June 19, 2019 2:53 PM  
**To:** Robidoux, Evan; CSC-DL Siting Council  
**Cc:** Dandeneau, Kathleen; Baldwin, Kenneth; Mayo, Rachel  
**Subject:** RE: Council Extension Letter for EM-VER-107-190418-RedCedarRd-a/k/a-SouthOrangeCenterRd-Orange  
**Attachments:** Orange\_Transfer\_Station\_PassingSA\_20190604.pdf

As requested.

Hard copy is being mailed to your office

**Rachel A. Mayo**  
Land Use Analyst

Robinson & Cole LLP  
280 Trumbull Street  
Hartford, CT 06103  
Direct 860.275.8213 | Fax 860.275.8299  
[rmayo@rc.com](mailto:rmayo@rc.com) | [www.rc.com](http://www.rc.com)  
[Bio](#) | [Contact Card](#)

---

### Robinson+Cole

Boston | Hartford | New York | Providence | Miami | Stamford  
Los Angeles | Wilmington | Philadelphia | Albany | New London

**From:** Robidoux, Evan [<mailto:Evan.Robidoux@ct.gov>]  
**Sent:** Thursday, May 30, 2019 4:03 PM  
**To:** Baldwin, Kenneth  
**Cc:** CSC-DL Siting Council; Mayo, Rachel; Dandeneau, Kathleen  
**Subject:** Council Extension Letter for EM-VER-107-190418-RedCedarRd-a/k/a-SouthOrangeCenterRd-Orange

Please see the attached correspondence.

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

This transmittal may be a confidential R+C attorney-client communication or may otherwise be privileged or confidential. If it is not clear that you are the intended recipient, you are hereby notified that you have received this transmittal in error; any review, dissemination, distribution, or copying of this transmittal is strictly prohibited. If you suspect that you have received this communication in error, please notify us immediately by telephone at 1-860-275-8200, or e-mail at [it-admin@rc.com](mailto:it-admin@rc.com), and immediately delete this message and all its attachments.

KENNETH C. BALDWIN

280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

Also admitted in Massachusetts



June 19, 2019

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

Re: **EM-VER-107-190418 – Cellco Partnership d/b/a Verizon Wireless  
Notice of Intent to Modify an Existing Telecommunications Facility Located at Red  
Cedar Road (a/k/a South Orange Road), Orange, Connecticut**

Dear Ms. Bachman:

Pursuant to your request, enclosed is a hard copy of the updated Structural Analysis Report regarding the above-referenced facility modifications. An electronic copy of this filing has also been provided to your office.

Please do not hesitate to contact me if you have any questions or need any additional information.

Sincerely,

Handwritten signature of Kenneth C. Baldwin.

Kenneth C. Baldwin

KCB/kmd  
Enclosure

19499705-v1

Date: **June 4, 2019**

Heather Simeone  
Crown Castle  
3530 Toringdon Way Suite 300  
Charlotte, NC 28277



**GPD GROUP**<sup>®</sup>  
ENGINEERING AND ARCHITECTURE  
PROFESSIONAL CORPORATION  
520 South Main Street, Suite 2531  
Akron, OH 44311  
(216) 927-8663

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Carrier Site Name:** Orange 4

**Crown Castle Designation:** **Crown Castle BU Number:** 842871  
**Crown Castle Site Name:** ORANGE TRANSFER STATION  
**Crown Castle JDE Job Number:** 555034  
**Crown Castle Work Order Number:** 1750384  
**Crown Castle Order Number:** 476406, Rev. 2

**Engineering Firm Designation:** **GPD Group Project Number:** 2019777.842871.04

**Site Data:** **617 South Orange Center Road, Orange, CT 06477, New Haven County**  
**Latitude 41° 15' 19.98", Longitude -73° 0' 39.20"**  
**180 Foot - Rohn Monopole Tower**

Dear Heather Simeone,

We are pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above mentioned tower.

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

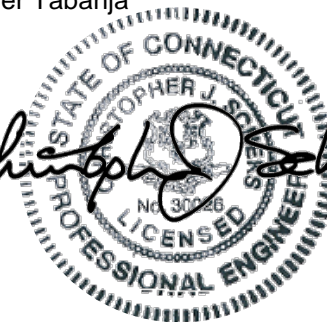

LC7: Proposed Equipment Configuration

**Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Naser Tabanja

Respectfully submitted by:



Christopher J Scheks, P.E.  
Connecticut #: 0030026

6/4/2019

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 – Proposed Equipment Configuration  
Table 2 – Other Considered Equipment

### 3) ANALYSIS PROCEDURE

Table 3 – Documents Provided  
3.1) Analysis Method  
3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 4 – Section Capacity (Summary)  
Table 5 – Tower Component Stresses vs. Capacity –LC7  
4.1) Recommendations

### 5) DISCLAIMER OF WARRANTIES

### 6) APPENDIX A

tnxTower Output

### 7) APPENDIX B

Base Level Drawing

### 8) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

The existing 180' monopole consists of five major sections that are connected with slip joints. It has an 18-sided cross section and is evenly tapered from 64.750" (flat-flat) at the base to 24.000" (flat-flat) at the top. The structure is galvanized and does not have aviation lighting.

The tower was designed for AT&T by Paul J. Ford and Company Structural Engineers of Columbus, Ohio in August of 2001. The tower was also designed for a basic wind speed of 85 mph with ½" radial ice (with a reduced wind speed of 74 mph when wind and ice loads were considered simultaneously) in accordance with the TIA/EIA-222-F 1996 standard. The tower was later manufactured by Rohn Industries, Inc. of Peoria, Illinois.

Information on the steel reinforcement in the tower's base foundation was unavailable at the time of the analysis. Therefore, the quantity and size of the steel reinforcement has been assumed based on minimum requirements.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	125 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
115.0	117.0	3	Antel	BXA-70063/4CF	2 12	1-1/4 1-5/8
		6	Commscope	JAHH-65B-R3B		
		1	Commscope	RC3DC-3315-PF-48		
		1	RFS/Celwave	DB-T1-6Z-8AB-0Z		
		3	RFS/Celwave	FDJ85020Q4-S1		
		3	Samsung Telecommunications	B5/B13 RRH-BR04C		
	3	Samsung Telecommunications	PCS/AWS DULA-BAND RRH B2/B66			
	115.0	3	Commscope	BSAMNT-SBS-2-2		
1			Platform Mount [LP 1201-1]			

**Table 2 – Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
177.0	177.0	3	Powerwave Tech.	7770.00	1 2 6 12	1/4 3/8 3/4 1-5/8
		3	CCI Antennas	OPA-65R-LCUU-H4		
		3	Kathrein	80010964		
		3	Andrew	SBNHH-1D65A		
		6	Powerwave Technologies	LGP21401		
		6	Powerwave Technologies	7020.00		
		2	Raycap	DC6-48-60-18-8F		
		3	Ericsson	RRUS 32		
		6	CCI Antennas	TPX-070821		
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS 32 B66		
		1	Raycap	DC6-48-60-0-8F		
		3	Ericsson	RRUS 11		
		3	Ericsson	RRUS 32 B2		
		1	Commscope	WCS-IMFT-AMT		
				1		
148.0	150.0	3	Ericsson	AIR 21 B2A/B4P	15	1-5/8
		3	Ericsson	AIR 32 B2A/B66AA		
		3	RFS/CELWAVE	APXVAARR24_43-U-NA20		
		3	Ericsson	RADIO 4449 B12/B71		
		3	Ericsson	KRY 112 144/1		
	148.0	1	-	Platform Mount [LP 303-1]		
134.0	134.0	1	-	Collar Mount [SO 102-3]	-	-
		1	-	Pipe Mount [601-3]		
	132.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER		
		3	Alcatel Lucent	TME-800MHZ RRH		
		3	Alcatel Lucent	PCS 1900MHZ 4X45W-65MHZ		
131.0	134.0	1	-	Handrail Kit [NA510-1]	1 3	5/8 1-1/4
	131.0	1	-	Platform Mount [LP 714-1]		
		130.0	3	RFS/Celwave		
	3		RFS/Celwave	APXVTM14-C-120		
	127.0		9	RFS/Celwave		
3		Alcatel Lucent	TD-RRH8X20-25			
44.0	45.0	1	PCTEL	GPS-TMG-HR-26NCM	1	1/2
	44.0	1	-	Side Arm Mount [SO 701-1]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
Tower Drawings / Specifications	PJF Job #: 20501-0701, Dated 08/07/2001	4705360	CCI sites
Foundation Exploration Report	WEI Project #: 2010-1056, Dated 03/31/2010	4529422	CCI sites
Geotechnical Report	WEI Project #: 2010-1056, Dated 03/31/2010	4529423	CCI sites

#### 3.1) Analysis Method

tnxTower (version 8.0.5.0), 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 and maintained in accordance with the manufacturer's specifications.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. GPD Group 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 <sub>allow</sub> (K)	% Capacity	Pass / Fail	
L1	180 - 170.583	Pole	TP26.25x24x0.1875	1	-3.79	922.89	4.1	Pass	
L2	170.583 - 126	Pole	TP36.525x25.0586x0.25	2	-15.70	1712.76	35.7	Pass	
L3	126 - 82.75	Pole	TP46.357x34.8903x0.3125	3	-29.50	2717.98	58.9	Pass	
L4	82.75 - 40.75	Pole	TP55.765x44.2987x0.375	4	-43.18	3923.00	63.1	Pass	
L5	40.75 - 0	Pole	TP64.75x53.2831x0.4375	5	-64.71	5485.62	62.4	Pass	
							<b>Summary</b>		
							Pole (L4)	63.1	Pass
							Rating =	63.1	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	65.2	Pass
1,2	Base Plate	0	Adequate	Pass
1,2	Base Foundation (Reinforcement)	0	68.1	Pass
1,2	Base Foundation (Soil Interaction)	0	15.4	Pass

<b>Structure Rating (Maximum From All Components) =</b>	<b>68.1%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H Section 15.5

#### 4.1) Recommendations

The tower and foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.



## 5) DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

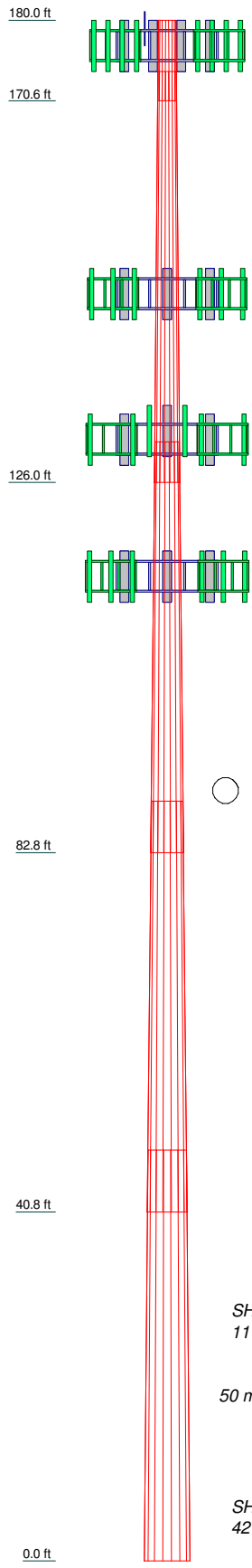
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5	
Length (ft)	9.42	48.00	48.00	48.00	48.00	
Number of Sides	18	18	18	18	18	
Thickness (in)	0.1875	0.2500	0.3125	0.3750	0.4375	
Socket Length (ft)	3.42	4.75	6.00	7.25		
Top Dia (in)	24.0000	25.0586	34.8903	44.2987	53.2831	
Bot Dia (in)	26.2500	36.5250	46.3570	55.7650	64.7500	
Grade			A572-65			
Weight (K)	0.5	4.0	6.5	9.7	13.3	33.9



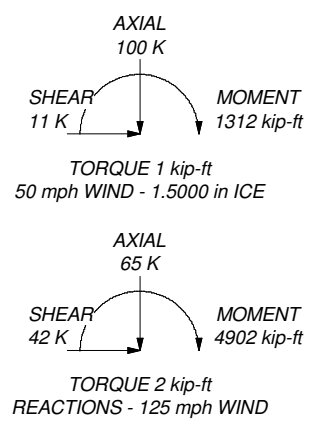
**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 63.1%

ALL REACTIONS ARE FACTORED

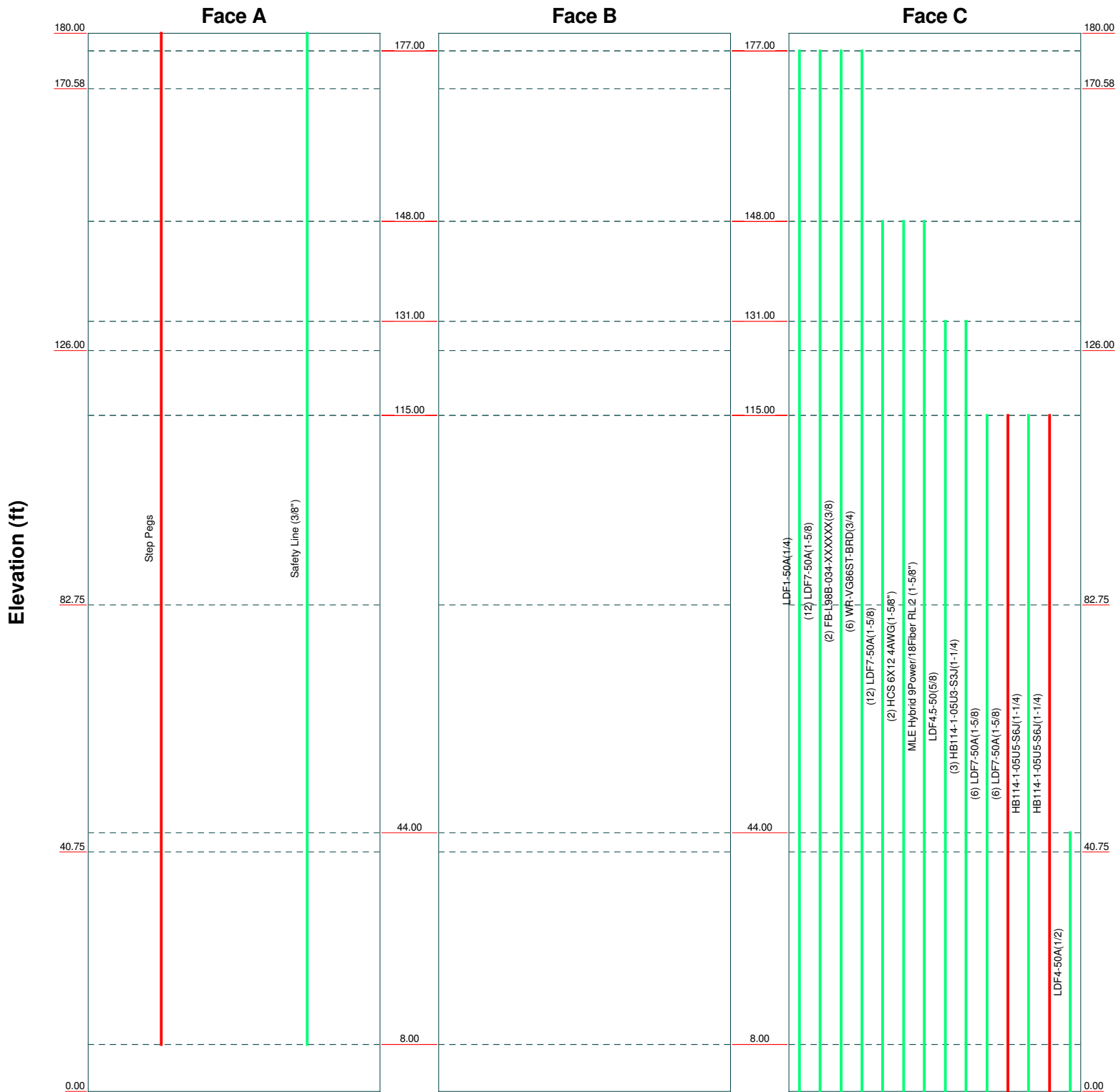


**GPD**  
520 South Main Street Suite 2531  
Akron, Ohio 44311  
Phone: (555) 555-1234  
FAX: (555) 555-1235

Job: **ORANGE TRANSFER STATION (BU #: 842871)**  
Project: **2019777.842871.04**  
Client: Crown Castle USA, Inc. Drawn by: ntabanja App'd:  
Code: TIA-222-H Date: 06/04/19 Scale: NTS  
Path: \\AKRN05.gpdco.com\TELECOM\Crown\842871\04\Rev.0\Inx\842871.eri Dwg No. E-1

# Feed Line Distribution Chart 0' - 180'

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



**GPD**

520 South Main Street Suite 2531  
Akron, Ohio 44311  
Phone: (555) 555-1234  
FAX: (555) 555-1235

<b>Job: ORANGE TRANSFER STATION (BU #: 842871)</b>		
Project: 2019777.842871.04		
Client: Crown Castle USA, Inc.	Drawn by: ntabanja	App'd:
Code: TIA-222-H	Date: 06/04/19	Scale: NTS
Path: \\AKRN05.gpdco.com\TELECOM\Crown\842871\04\Rev.0\Inx\842871.erl		Dwg No: E-7

## Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 1) Tower is located in New Haven County, Connecticut.
- 2) Tower base elevation above sea level: 39.00 ft.
- 3) Basic wind speed of 125 mph.
- 4) Risk Category II.
- 5) Exposure Category C.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.00 ft.
- 9) Nominal ice thickness of 1.5000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Tower analysis based on target reliabilities in accordance with Annex S.
- 19) Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- 20) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
--	---	---

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	180.00-170.58	9.42	3.42	18	24.0000	26.2500	0.1875	0.7500	A572-65 (65 ksi)
L2	170.58-126.00	48.00	4.75	18	25.0586	36.5250	0.2500	1.0000	A572-65 (65 ksi)
L3	126.00-82.75	48.00	6.00	18	34.8903	46.3570	0.3125	1.2500	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	82.75-40.75	48.00	7.25	18	44.2987	55.7650	0.3750	1.5000	A572-65 (65 ksi)
L5	40.75-0.00	48.00		18	53.2831	64.7500	0.4375	1.7500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	24.3413	14.1714	1015.2211	8.4534	12.1920	83.2694	2031.7780	7.0871	3.8940	20.768
	26.6260	15.5104	1331.0484	9.2522	13.3350	99.8162	2663.8483	7.7567	4.2900	22.88
L2	26.2354	19.6856	1530.7090	8.8071	12.7298	120.2463	3063.4321	9.8447	3.9703	15.881
	37.0499	28.7842	4785.2722	12.8776	18.5547	257.9008	9576.8409	14.3948	5.9884	23.954
L3	36.5326	34.2969	5180.6796	12.2751	17.7243	292.2929	10368.176	17.1517	5.5907	17.89
	47.0239	45.6704	12232.850	16.3458	23.5494	519.4559	24481.797	22.8395	7.6088	24.348
L4	46.3796	52.2801	12742.988	15.5929	22.5037	566.2614	25502.744	26.1450	7.1366	19.031
	56.5674	65.9279	25554.638	19.6635	28.3286	902.0785	51142.901	32.9702	9.1546	24.412
L5	55.7963	73.3827	25891.013	18.7602	27.0678	956.5239	51816.095	36.6983	8.6078	19.675
	65.6814	89.3059	46666.862	22.8309	32.8930	1418.7475	93395.131	44.6615	10.6260	24.288

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 180.00- 170.58				1	1	1			
L2 170.58- 126.00				1	1	1			
L3 126.00- 82.75				1	1	1			
L4 82.75- 40.75				1	1	1			
L5 40.75-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	Number Per Row	Start/En d Position	Width or Diamete r in	Perimete r in	Weight plf
Step Pegs	A	No	Surface Ar (CaAa)	180.00 - 8.00	1	1	0.000 0.000	0.8000		2.72
LDF7-50A(1-5/8)	C	No	Surface Ar (CaAa)	115.00 - 0.00	6	6	0.350 0.500	1.9800		0.82
HB114-1-05U5-S6J(1- 1/4)	C	No	Surface Ar (CaAa)	115.00 - 0.00	1	1	0.350 0.350	0.0000		1.30

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Shield Leg	Allow	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
-------------	-----------------------------	-------	--	-----------------------	-----------------	-----------------	--	---------------

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
Safety Line (3/8")	A	No	No	CaAa (Out Of Face)	180.00 - 8.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
							2" Ice	0.44	2.34
							No Ice	0.00	0.06
LDF1-50A(1/4)	C	No	No	Inside Pole	177.00 - 0.00	1	1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
LDF7-50A(1-5/8)	C	No	No	Inside Pole	177.00 - 0.00	12	1" Ice	0.00	0.82
							2" Ice	0.00	0.82
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
FB-L98B-034-XXXXXX(3/8)	C	No	No	Inside Pole	177.00 - 0.00	2	2" Ice	0.00	0.05
							No Ice	0.00	0.05
							1/2" Ice	0.00	0.05
							1" Ice	0.00	0.05
							2" Ice	0.00	0.05
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	177.00 - 0.00	6	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
							No Ice	0.00	0.82
LDF7-50A(1-5/8)	C	No	No	Inside Pole	148.00 - 0.00	12	1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
							No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
HCS 6X12 4AWG(1-5/8")	C	No	No	Inside Pole	148.00 - 0.00	2	1" Ice	0.00	2.40
							2" Ice	0.00	2.40
							No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
MLE Hybrid 9Power/18Fiber RL 2 (1-5/8")	C	No	No	Inside Pole	148.00 - 0.00	1	2" Ice	0.00	1.07
							No Ice	0.00	1.07
							1/2" Ice	0.00	1.07
							1" Ice	0.00	1.07
							2" Ice	0.00	1.07
LDF4.5-50(5/8)	C	No	No	Inside Pole	131.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
							No Ice	0.00	0.90
HB114-1-05U3-S3J(1-1/4)	C	No	No	Inside Pole	131.00 - 0.00	3	1/2" Ice	0.00	0.90
							1" Ice	0.00	0.90
							2" Ice	0.00	0.90
							No Ice	0.00	0.90
							1/2" Ice	0.00	0.90
LDF7-50A(1-5/8)	C	No	No	Inside Pole	115.00 - 0.00	6	2" Ice	0.00	0.82
							No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
HB114-1-05U5-S6J(1-1/4)	C	No	No	Inside Pole	115.00 - 0.00	1	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
							No Ice	0.00	1.30
LDF4-50A(1/2)	C	No	No	Inside Pole	44.00 - 0.00	1	2" Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							No Ice	0.00	0.15
							2" Ice	0.00	0.15

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
4' Lightning Rod	A	From Centroid-Face	3.00	0.000	177.00	No Ice	0.10	0.10	0.01
			0.00			1/2" Ice	0.51	0.51	0.01
			2.00			Ice	0.89	0.89	0.02
						1" Ice	1.41	1.41	0.03
						2" Ice			
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000	177.00	No Ice	5.84	4.35	0.06
			0.00			1/2" Ice	6.32	5.20	0.11
			0.00			Ice	6.77	5.92	0.16
						1" Ice	7.71	7.41	0.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	177.00	2" Ice			
						No Ice	5.84	4.35	0.06
						1/2"	6.32	5.20	0.11
						Ice	6.77	5.92	0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	177.00	1" Ice	7.71	7.41	0.29
						2" Ice			
						No Ice	5.84	4.35	0.06
						1/2"	6.32	5.20	0.11
OPA-65R-LCUU-H4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	177.00	Ice	6.77	5.92	0.16
						1" Ice	7.71	7.41	0.29
						2" Ice			
						No Ice	6.18	4.55	0.08
OPA-65R-LCUU-H4 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	177.00	1/2"	6.57	5.16	0.13
						Ice	6.98	5.78	0.19
						1" Ice	7.82	7.07	0.33
						2" Ice			
OPA-65R-LCUU-H4 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	177.00	No Ice	6.18	4.55	0.08
						1/2"	6.57	5.16	0.13
						Ice	6.98	5.78	0.19
						1" Ice	7.82	7.07	0.33
80010964 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	177.00	2" Ice			
						No Ice	10.23	5.51	0.11
						1/2"	10.74	6.37	0.18
						Ice	11.24	7.12	0.26
80010964 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	177.00	1" Ice	12.25	8.64	0.45
						2" Ice			
						No Ice	10.23	5.51	0.11
						1/2"	10.74	6.37	0.18
80010964 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	177.00	Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
						No Ice	10.23	5.51	0.11
SBNHH-1D65A w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	177.00	1/2"	10.74	6.37	0.18
						Ice	11.24	7.12	0.26
						1" Ice	12.25	8.64	0.45
						2" Ice			
SBNHH-1D65A w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	177.00	No Ice	3.04	2.45	0.05
						1/2"	3.34	2.75	0.10
						Ice	3.65	3.05	0.16
						1" Ice	4.31	3.68	0.31
SBNHH-1D65A w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	177.00	2" Ice			
						No Ice	3.04	2.45	0.05
						1/2"	3.34	2.75	0.10
						Ice	3.65	3.05	0.16
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.000	177.00	1" Ice	4.31	3.68	0.31
						2" Ice			
						No Ice	1.10	0.35	0.01
						1/2"	1.24	0.44	0.02
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.000	177.00	Ice	1.38	0.54	0.03
						1" Ice	1.69	0.77	0.05
						2" Ice			
						No Ice	1.10	0.35	0.01
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.000	177.00	1/2"	1.24	0.44	0.02
						Ice	1.38	0.54	0.03
						1" Ice	1.69	0.77	0.05
						2" Ice			
(2) LGP21401	C	From Leg	4.00 0.00	0.000	177.00	No Ice	1.10	0.35	0.01
						1/2"	1.24	0.44	0.02



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
			0.00			Ice	1.38	0.54	0.03
						1" Ice	1.69	0.77	0.05
						2" Ice			
(2) 7020.00	A	From Leg	4.00	0.000	177.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			0.00			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	B	From Leg	4.00	0.000	177.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			0.00			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	C	From Leg	4.00	0.000	177.00	No Ice	0.10	0.17	0.00
			0.00			1/2"	0.15	0.24	0.01
			0.00			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
RRUS 32	A	From Leg	4.00	0.000	177.00	No Ice	3.31	2.42	0.08
			0.00			1/2"	3.56	2.64	0.10
			0.00			Ice	3.81	2.86	0.14
						1" Ice	4.33	3.32	0.21
						2" Ice			
RRUS 32	B	From Leg	4.00	0.000	177.00	No Ice	3.31	2.42	0.08
			0.00			1/2"	3.56	2.64	0.10
			0.00			Ice	3.81	2.86	0.14
						1" Ice	4.33	3.32	0.21
						2" Ice			
RRUS 32	C	From Leg	4.00	0.000	177.00	No Ice	3.31	2.42	0.08
			0.00			1/2"	3.56	2.64	0.10
			0.00			Ice	3.81	2.86	0.14
						1" Ice	4.33	3.32	0.21
						2" Ice			
(2) TPX-070821	A	From Leg	4.00	0.000	177.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
(2) TPX-070821	B	From Leg	4.00	0.000	177.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
(2) TPX-070821	C	From Leg	4.00	0.000	177.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
						1" Ice	0.87	0.33	0.03
						2" Ice			
RRUS 4478 B14	A	From Leg	4.00	0.000	177.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	B	From Leg	4.00	0.000	177.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	C	From Leg	4.00	0.000	177.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			0.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 32 B66	A	From Leg	4.00	0.000	177.00	No Ice	2.74	1.67	0.05
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz Lateral	Vert					
RRUS 32 B66	B	From Leg	4.00	0.000	177.00	No Ice	2.74	1.67	0.05
			0.00	0.00		1/2"	2.96	1.86	0.07
			0.00	0.00		Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			
RRUS 32 B66	C	From Leg	4.00	0.000	177.00	No Ice	2.74	1.67	0.05
			0.00	0.00		1/2"	2.96	1.86	0.07
			0.00	0.00		Ice	3.19	2.05	0.10
						1" Ice	3.68	2.46	0.16
						2" Ice			
DC6-48-60-0-8F Surge Suppression Unit	A	From Leg	4.00	0.000	177.00	No Ice	0.85	0.85	0.03
			0.00	0.00		1/2"	1.36	1.36	0.05
			0.00	0.00		Ice	1.54	1.54	0.07
						1" Ice	1.92	1.92	0.11
						2" Ice			
(2) DC6-48-60-18-8F Surge Suppression Unit	A	From Leg	4.00	0.000	177.00	No Ice	0.92	0.92	0.02
			0.00	0.00		1/2"	1.46	1.46	0.04
			0.00	0.00		Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
RRUS 11	A	From Leg	4.00	0.000	177.00	No Ice	2.78	1.19	0.05
			0.00	0.00		1/2"	2.99	1.33	0.07
			0.00	0.00		Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS 11	B	From Leg	4.00	0.000	177.00	No Ice	2.78	1.19	0.05
			0.00	0.00		1/2"	2.99	1.33	0.07
			0.00	0.00		Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS 11	C	From Leg	4.00	0.000	177.00	No Ice	2.78	1.19	0.05
			0.00	0.00		1/2"	2.99	1.33	0.07
			0.00	0.00		Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS 32 B2	A	From Leg	4.00	0.000	177.00	No Ice	2.73	1.67	0.05
			0.00	0.00		1/2"	2.95	1.86	0.07
			0.00	0.00		Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	B	From Leg	4.00	0.000	177.00	No Ice	2.73	1.67	0.05
			0.00	0.00		1/2"	2.95	1.86	0.07
			0.00	0.00		Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	C	From Leg	4.00	0.000	177.00	No Ice	2.73	1.67	0.05
			0.00	0.00		1/2"	2.95	1.86	0.07
			0.00	0.00		Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
WCS-IMFT-AMT	C	From Leg	4.00	0.000	177.00	No Ice	0.64	0.47	0.02
			0.00	0.00		1/2"	0.75	0.56	0.02
			0.00	0.00		Ice	0.86	0.66	0.03
						1" Ice	1.11	0.89	0.05
						2" Ice			
Platform Mount [LP 303-1]	C	None		0.000	177.00	No Ice	14.66	14.66	1.25
				0.000		1/2"	18.87	18.87	1.48
				0.000		Ice	23.08	23.08	1.71
				0.000		1" Ice	31.50	31.50	2.18
				0.000		2" Ice			
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	4.00	0.000	148.00	No Ice	6.16	5.55	0.10
			0.00	0.00		1/2"	6.60	6.30	0.16
			2.00	0.00		Ice	7.03	7.00	0.22
						1" Ice	7.92	8.44	0.37
						2" Ice			
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	4.00	0.000	148.00	No Ice	6.16	5.55	0.10
			0.00	0.00		1/2"	6.60	6.30	0.16
			2.00	0.00		Ice	7.03	7.00	0.22
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
						1" Ice	7.92	8.44	0.37
						2" Ice			
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	6.16	5.55	0.10
						1/2"	6.60	6.30	0.16
						Ice	7.03	7.00	0.22
						1" Ice	7.92	8.44	0.37
						2" Ice			
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	6.75	6.07	0.15
						1/2"	7.20	6.87	0.21
						Ice	7.65	7.58	0.28
						1" Ice	8.57	9.06	0.44
						2" Ice			
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	6.75	6.07	0.15
						1/2"	7.20	6.87	0.21
						Ice	7.65	7.58	0.28
						1" Ice	8.57	9.06	0.44
						2" Ice			
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	6.75	6.07	0.15
						1/2"	7.20	6.87	0.21
						Ice	7.65	7.58	0.28
						1" Ice	8.57	9.06	0.44
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	14.69	6.87	0.19
						1/2"	15.46	7.55	0.31
						Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
KRY 112 144/1	A	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	0.35	0.17	0.01
						1/2"	0.43	0.23	0.01
						Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
KRY 112 144/1	B	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	0.35	0.17	0.01
						1/2"	0.43	0.23	0.01
						Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
KRY 112 144/1	C	From Leg	4.00 0.00 2.00	0.000	148.00	No Ice	0.35	0.17	0.01
						1/2"	0.43	0.23	0.01
						Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
Platform Mount [LP 303-1]	C	None		0.000	148.00	No Ice	14.66	14.66	1.25

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz Lateral	Vert						ft
						1/2"	18.87	18.87	1.48	
						Ice	23.08	23.08	1.71	
						1" Ice	31.50	31.50	2.18	
						2" Ice				
TME-800MHZ RRH	A	From Leg	1.00	0.00	0.000	134.00	No Ice	2.13	1.77	0.05
			0.00				1/2"	2.32	1.95	0.07
			-2.00				Ice	2.51	2.13	0.10
							1" Ice	2.92	2.51	0.16
							2" Ice			
TME-800MHZ RRH	B	From Leg	1.00	0.00	0.000	134.00	No Ice	2.13	1.77	0.05
			0.00				1/2"	2.32	1.95	0.07
			-2.00				Ice	2.51	2.13	0.10
							1" Ice	2.92	2.51	0.16
							2" Ice			
TME-800MHZ RRH	C	From Leg	1.00	0.00	0.000	134.00	No Ice	2.13	1.77	0.05
			0.00				1/2"	2.32	1.95	0.07
			-2.00				Ice	2.51	2.13	0.10
							1" Ice	2.92	2.51	0.16
							2" Ice			
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	1.00	0.00	0.000	134.00	No Ice	2.32	2.24	0.06
			0.00				1/2"	2.53	2.44	0.08
			-7.00				Ice	2.74	2.65	0.11
							1" Ice	3.19	3.09	0.17
							2" Ice			
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	1.00	0.00	0.000	134.00	No Ice	2.32	2.24	0.06
			0.00				1/2"	2.53	2.44	0.08
			-7.00				Ice	2.74	2.65	0.11
							1" Ice	3.19	3.09	0.17
							2" Ice			
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	1.00	0.00	0.000	134.00	No Ice	2.32	2.24	0.06
			0.00				1/2"	2.53	2.44	0.08
			-7.00				Ice	2.74	2.65	0.11
							1" Ice	3.19	3.09	0.17
							2" Ice			
800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.00	0.000	134.00	No Ice	0.66	0.32	0.01
			0.00				1/2"	0.76	0.40	0.02
			-2.00				Ice	0.87	0.48	0.02
							1" Ice	1.11	0.67	0.04
							2" Ice			
800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.00	0.000	134.00	No Ice	0.66	0.32	0.01
			0.00				1/2"	0.76	0.40	0.02
			-2.00				Ice	0.87	0.48	0.02
							1" Ice	1.11	0.67	0.04
							2" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.00	0.000	134.00	No Ice	0.66	0.32	0.01
			0.00				1/2"	0.76	0.40	0.02
			-2.00				Ice	0.87	0.48	0.02
							1" Ice	1.11	0.67	0.04
							2" Ice			
Pipe Mount [PM 601-3]	C	None			0.000	134.00	No Ice	4.39	4.39	0.20
							1/2"	5.48	5.48	0.24
							Ice	6.57	6.57	0.28
							1" Ice	8.75	8.75	0.36
							2" Ice			
Side Arm Mount [SO 102-3]	C	None			0.000	134.00	No Ice	3.00	3.00	0.08
							1/2"	3.48	3.48	0.11
							Ice	3.96	3.96	0.14
							1" Ice	4.92	4.92	0.20
							2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	131.00	No Ice	4.60	4.01	0.10
			0.00				1/2"	5.05	4.45	0.16
			-1.00				Ice	5.50	4.89	0.23
							1" Ice	6.44	5.82	0.42
							2" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	131.00	No Ice	4.60	4.01	0.10
			0.00				1/2"	5.05	4.45	0.16
			-1.00				Ice	5.50	4.89	0.23
							1" Ice	6.44	5.82	0.42

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.000	131.00	2" Ice			
			0.00			No Ice	4.60	4.01	0.10
			-1.00			1/2"	5.05	4.45	0.16
						Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
						No Ice	4.09	2.86	0.08
						1/2"	4.48	3.23	0.13
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.000	131.00	Ice	4.88	3.61	0.19
			0.00			1" Ice	5.71	4.40	0.33
			-1.00			2" Ice			
						No Ice	4.09	2.86	0.08
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	0.000	131.00	1/2"	4.48	3.23	0.13
			0.00			Ice	4.88	3.61	0.19
			-1.00			1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	0.000	131.00	No Ice	4.09	2.86	0.08
			0.00			1/2"	4.48	3.23	0.13
			-1.00			Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
(3) ACU-A20-N	A	From Leg	4.00	0.000	131.00	2" Ice			
			0.00			No Ice	0.07	0.12	0.00
			-4.00			1/2"	0.10	0.16	0.00
						Ice	0.15	0.21	0.00
						1" Ice	0.26	0.34	0.01
						2" Ice			
						No Ice	0.07	0.12	0.00
						1/2"	0.10	0.16	0.00
(3) ACU-A20-N	B	From Leg	4.00	0.000	131.00	Ice	0.15	0.21	0.00
			0.00			1" Ice	0.26	0.34	0.01
			-4.00			2" Ice			
						No Ice	0.07	0.12	0.00
(3) ACU-A20-N	C	From Leg	4.00	0.000	131.00	1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
			-4.00			1" Ice	0.26	0.34	0.01
						2" Ice			
TD-RRH8X20-25	A	From Leg	4.00	0.000	131.00	No Ice	3.70	1.29	0.07
			0.00			1/2"	3.95	1.46	0.09
			-4.00			Ice	4.20	1.64	0.12
						1" Ice	4.72	2.02	0.18
						2" Ice			
						No Ice	3.70	1.29	0.07
						1/2"	3.95	1.46	0.09
						Ice	4.20	1.64	0.12
TD-RRH8X20-25	B	From Leg	4.00	0.000	131.00	1" Ice	4.72	2.02	0.18
			0.00			2" Ice			
			-4.00			No Ice	3.70	1.29	0.07
						1/2"	3.95	1.46	0.09
TD-RRH8X20-25	C	From Leg	4.00	0.000	131.00	Ice	4.20	1.64	0.12
			0.00			1" Ice	4.72	2.02	0.18
			-4.00			2" Ice			
						No Ice	3.70	1.29	0.07
Miscellaneous [NA 510-1]	C	None		0.000	134.00	1/2"	8.50	8.50	0.34
						Ice	11.00	11.00	0.45
						1" Ice	16.00	16.00	0.68
						2" Ice			
Platform Mount [LP 714-1]	C	None		0.000	131.00	No Ice	37.47	37.47	1.60
						1/2"	44.23	44.23	2.04
						Ice	50.99	50.99	2.48
						1" Ice	64.51	64.51	3.36
BXA-70063/4CF w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	2" Ice			
			0.00			No Ice	5.19	3.87	0.03
			2.00			1/2"	5.68	4.67	0.08
						Ice	6.14	5.34	0.13
						1" Ice	7.07	6.74	0.25
						2" Ice			
						No Ice	5.19	3.87	0.03
						1/2"	5.68	4.67	0.08
BXA-70063/4CF w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	Ice			
			0.00			1/2"			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
			2.00			Ice 6.14	5.34	0.13	
						1" Ice 7.07	6.74	0.25	
						2" Ice No Ice			
BXA-70063/4CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	115.00	5.19 5.68 6.14 7.07	3.87 4.67 5.34 6.74	0.03 0.08 0.13 0.25	
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	115.00	9.35 9.92 10.46 11.55	7.65 8.83 9.73 11.56	0.09 0.16 0.25 0.45	
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	115.00	9.35 9.92 10.46 11.55	7.65 8.83 9.73 11.56	0.09 0.16 0.25 0.45	
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	115.00	9.35 9.92 10.46 11.55	7.65 8.83 9.73 11.56	0.09 0.16 0.25 0.45	
RC3DC-3315-PF-48	C	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.79 4.04 4.30 4.84	2.51 2.72 2.94 3.41	0.03 0.06 0.10 0.18
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 5.07 5.35 5.93	2.00 2.19 2.39 2.81	0.04 0.08 0.12 0.21
(2) FDJ85020Q4-S1	B	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.96 1.09 1.24 1.54	0.36 0.43 0.52 0.71	0.02 0.03 0.04 0.08
FDJ85020Q4-S1	C	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.96 1.09 1.24 1.54	0.36 0.43 0.52 0.71	0.02 0.03 0.04 0.08
(3) B5/B13 RRH-BR04C	A	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
PCS/AWS DULA-BAND RRH B2/B66	A	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
(2) PCS/AWS DULA-BAND RRH B2/B66	B	From Leg	4.00 0.00 2.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
BSAMNT-SBS-2-2	C	From Leg	4.00 0.00 0.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.27 1.47 1.67 2.10	0.97 1.13 1.30 1.65	0.07 0.10 0.14 0.22
BSAMNT-SBS-2-2	C	From Leg	4.00 0.00 0.00	0.000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.27 1.47 1.67 2.10	0.97 1.13 1.30 1.65	0.07 0.10 0.14 0.22

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz Lateral	Vert					
BSAMNT-SBS-2-2	C	From Leg	4.00	0.000	115.00	No Ice	1.27	0.97	0.07
			0.00			1/2"	1.47	1.13	0.10
			0.00			Ice	1.67	1.30	0.14
						1" Ice	2.10	1.65	0.22
(2) 2" x 8' Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	1.60	1.60	0.03
			0.00			1/2"	2.42	2.42	0.04
			0.00			Ice	3.24	3.24	0.06
						1" Ice	4.23	4.23	0.11
(2) 2" x 8' Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	1.60	1.60	0.03
			0.00			1/2"	2.42	2.42	0.04
			0.00			Ice	3.24	3.24	0.06
						1" Ice	4.23	4.23	0.11
(2) 2" x 8' Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	1.60	1.60	0.03
			0.00			1/2"	2.42	2.42	0.04
			0.00			Ice	3.24	3.24	0.06
						1" Ice	4.23	4.23	0.11
Platform Mount [LP 1201-1]	C	None		0.000	115.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice	37.90	37.90	3.70
GPS-TMG-HR-26NCM	B	From Leg	4.00	0.000	44.00	No Ice	0.13	0.13	0.00
			0.00			1/2"	0.18	0.18	0.00
			1.00			Ice	0.24	0.24	0.01
						1" Ice	0.37	0.37	0.01
Side Arm Mount [SO 701-1]	C	None		0.000	44.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
		2" Ice							

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp

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

**Maximum Tower Deflections - Service Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 170.583	22.954	39	1.090	0.002
L2	174 - 126	21.584	39	1.088	0.002
L3	130.75 - 82.75	12.345	39	0.909	0.001
L4	88.75 - 40.75	5.545	39	0.604	0.000
L5	48 - 0	1.596	39	0.302	0.000

**Critical Deflections and Radius of Curvature - Service Wind**

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	4' Lightning Rod	39	22.268	1.090	0.002	51526
148.00	AIR 21 B2A/B4P w/ Mount Pipe	39	15.837	1.009	0.001	12862
134.00	TME-800MHZ RRH	39	12.976	0.929	0.001	9392
131.00	APXVSP18-C-A20 w/ Mount Pipe	39	12.393	0.910	0.001	8966
115.00	BXA-70063/4CF w/ Mount Pipe	39	9.494	0.801	0.001	8343
44.00	GPS-TMG-HR-26NCM	39	1.362	0.275	0.000	7312

**Maximum Tower Deflections - Design Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 170.583	106.348	2	5.049	0.008
L2	174 - 126	100.013	2	5.041	0.007
L3	130.75 - 82.75	57.231	2	4.214	0.004
L4	88.75 - 40.75	25.711	2	2.800	0.002
L5	48 - 0	7.401	2	1.401	0.001

**Critical Deflections and Radius of Curvature - Design Wind**

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	4' Lightning Rod	2	103.178	5.047	0.008	11639



Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	AIR 21 B2A/B4P w/ Mount Pipe	2	73.407	4.677	0.005	2823
134.00	TME-800MHZ RRH	2	60.154	4.309	0.004	2052
131.00	APXVSP18-C-A20 w/ Mount Pipe	2	57.454	4.221	0.004	1957
115.00	BXA-70063/4CF w/ Mount Pipe	2	44.019	3.713	0.003	1816
44.00	GPS-TMG-HR-26NCM	2	6.317	1.275	0.001	1577

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	A $in^2$	$P_u$ K	$\phi P_n$ K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 170.583 (1)	TP26.25x24x0.1875	9.42	0.00	0.0	15.024 6	-3.79	878.94	0.004
L2	170.583 - 126 (2)	TP36.525x25.0586x0.25	48.00	0.00	0.0	27.883 8	-15.70	1631.20	0.010
L3	126 - 82.75 (3)	TP46.357x34.8903x0.312 5	48.00	0.00	0.0	44.248 7	-29.50	2588.55	0.011
L4	82.75 - 40.75 (4)	TP55.765x44.2987x0.375	48.00	0.00	0.0	63.866 6	-43.18	3736.19	0.012
L5	40.75 - 0 (5)	TP64.75x53.2831x0.4375	48.00	0.00	0.0	89.305 9	-64.71	5224.40	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	$M_{ux}$ kip-ft	$\phi M_{nx}$ kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	$M_{uy}$ kip-ft	$\phi M_{ny}$ kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	180 - 170.583 (1)	TP26.25x24x0.1875	19.90	522.20	0.038	0.00	522.20	0.000
L2	170.583 - 126 (2)	TP36.525x25.0586x0.25	482.81	1327.15	0.364	0.00	1327.15	0.000
L3	126 - 82.75 (3)	TP46.357x34.8903x0.312 5	1607.80	2657.33	0.605	0.00	2657.33	0.000
L4	82.75 - 40.75 (4)	TP55.765x44.2987x0.375	2996.07	4609.00	0.650	0.00	4609.00	0.000
L5	40.75 - 0 (5)	TP64.75x53.2831x0.4375	4902.03	7639.82	0.642	0.00	7639.82	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 170.583 (1)	TP26.25x24x0.1875	6.50	263.68	0.025	0.20	582.98	0.000
L2	170.583 - 126 (2)	TP36.525x25.0586x0.25	20.50	482.00	0.043	0.12	1505.97	0.000
L3	126 - 82.75 (3)	TP46.357x34.8903x0.312 5	31.36	767.96	0.041	0.63	3033.90	0.000
L4	82.75 - 40.75 (4)	TP55.765x44.2987x0.375	36.72	1111.22	0.033	0.63	5267.03	0.000
L5	40.75 - 0 (5)	TP64.75x53.2831x0.4375	42.32	1567.32	0.027	0.60	8827.42	0.000

### Pole Interaction Design Data

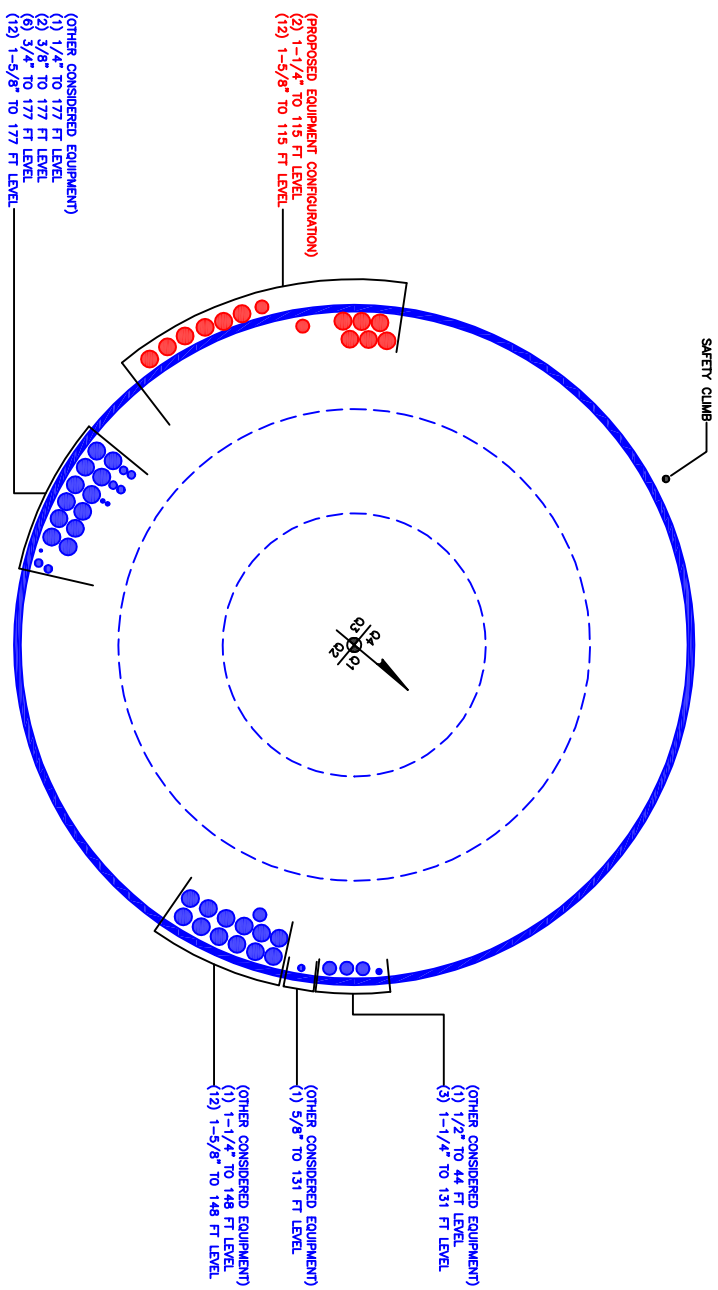
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\frac{P_u}{\phi P_n}$	$\frac{M_{ux}}{\phi M_{nx}}$	$\frac{M_{uy}}{\phi M_{ny}}$	$\frac{V_u}{\phi V_n}$	$\frac{T_u}{\phi T_n}$			
L1	180 - 170.583 (1)	0.004	0.038	0.000	0.025	0.000	0.043	1.050	4.8.2
L2	170.583 - 126 (2)	0.010	0.364	0.000	0.043	0.000	0.375	1.050	4.8.2
L3	126 - 82.75 (3)	0.011	0.605	0.000	0.041	0.000	0.618	1.050	4.8.2
L4	82.75 - 40.75 (4)	0.012	0.650	0.000	0.033	0.000	0.663	1.050	4.8.2
L5	40.75 - 0 (5)	0.012	0.642	0.000	0.027	0.000	0.655	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	180 - 170.583	Pole	TP26.25x24x0.1875	1	-3.79	922.89	4.1	Pass
L2	170.583 - 126	Pole	TP36.525x25.0586x0.25	2	-15.70	1712.76	35.7	Pass
L3	126 - 82.75	Pole	TP46.357x34.8903x0.3125	3	-29.50	2717.98	58.9	Pass
L4	82.75 - 40.75	Pole	TP55.765x44.2987x0.375	4	-43.18	3923.00	63.1	Pass
L5	40.75 - 0	Pole	TP64.75x53.2831x0.4375	5	-64.71	5485.62	62.4	Pass
Summary							ELC:	Load Case 7
Pole (L4) Rating =							63.1 63.1	Pass Pass

**APPENDIX B**  
**BASE LEVEL DRAWING**



BUSINESS UNIT: 842871 TOWER ID: C\_BASELEVEL

CROWN REGION ADDRESS  
USA

10/12/2014	UPDATED PER WORK ORDER	975590
1/6/2015	UPDATED PER WORK ORDER	1062797
30/9/2015	UPDATED PER WORK ORDER	1108324 1129129
08/01/17	UPDATED PER WORK ORDER	1324705
07/02/17	UPDATED PER WORK ORDER	1359953
30/01/18	UPDATED PER WORK ORDER	1519443
18/04/18	UPDATED PER WORK ORDER	1507147
18/12/18	UPDATED PER WORK ORDER	1670673
31/01/19	UPDATED PER WORK ORDER	1689080

DRAWN BY: MH  
 CHECKED BY: MH  
 DRAWING DATE: 200314

SITE NUMBER:

SITE NAME:

ORANGE TRANSFER STATION

BUSINESS UNIT NUMBER: 842871

SITE ADDRESS: 617 SOUTH ORANGE CENTER ROAD  
 ORANGE, CT 06477  
 NEW HAVEN COUNTY  
 USA

SHEET TITLE:

BASE LEVEL

SHEET NUMBER:

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Monopole Base Plate Connection

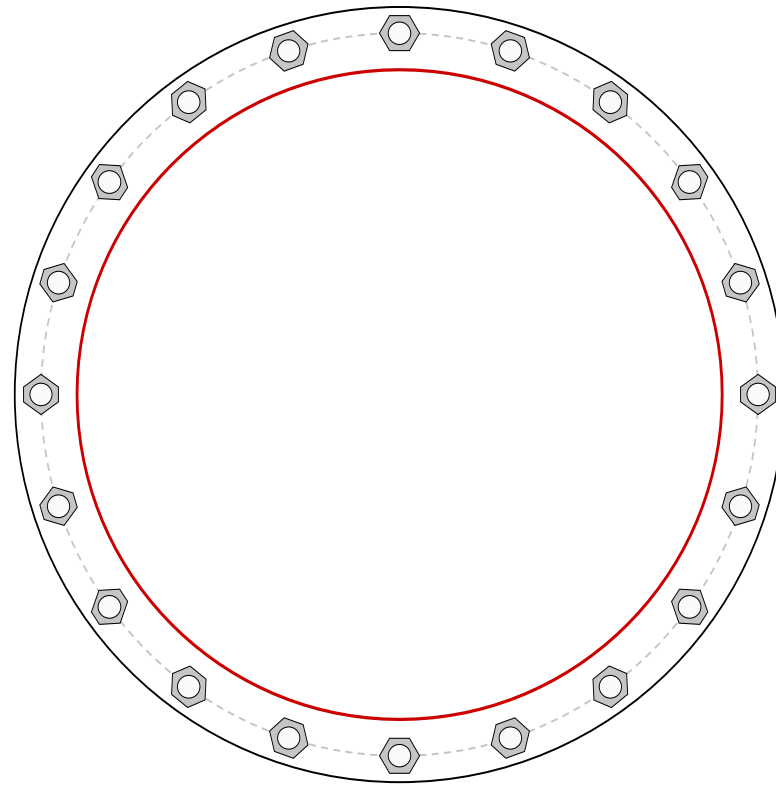


Site Info	
BU #	842871
Site Name	ANGLE TRANSFER STATIC
Order #	476406 Rev.2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.75

Applied Loads	
Moment (kip-ft)	4902.03
Axial Force (kips)	64.71
Shear Force (kips)	42.32

\*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
<b>Anchor Rod Data</b>		<b>Anchor Rod Summary</b> <i>(units of kips, kip-in)</i>	
(20) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 72" BC		$Pu_c = 166.57$	$\phi Pn_c = 243.75$ <b>Stress Rating</b>
<b>Base Plate Data</b>		$Vu = 2.12$	$\phi Vn = 73.13$ <b>65.2%</b>
77.25" OD x 2.75" Plate (A633 GR. E; $F_y=60$ ksi, $F_u=80$ ksi)		$Mu = n/a$	$\phi Mn = n/a$ <b>Pass</b>
<b>Stiffener Data</b>		<b>Base Plate Summary</b>	
N/A		Max Stress (ksi):	-
<b>Pole Data</b>		Allowable Stress (ksi):	-
64.75" x 0.4375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)		Stress Rating:	<b>Rohn OK</b>

## Pier and Pad Foundation



BU #: 842871  
 Site Name: ORANGE TRANSFER  
 App. Number: 476406 Rev.2

TIA-222 Revision: H  
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	64.71	kips
Base Shear, $V_{u\_comp}$ :	42.32	kips
Moment, $M_u$ :	4902.03	ft-kips
Tower Height, $H$ :	180	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	851.28	42.32	4.7%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	1.46	15.4%	Pass
<i>Overturning (kip*ft)</i>	46829.26	5252.05	11.2%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	6971.25	4986.67	68.1%	Pass
<i>Pier Compression (kip)</i>	23994.73	82.81	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	22022.22	2290.46	9.9%	Pass
<i>Pad Shear - 1-way (kips)</i>	3165.21	160.72	4.8%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.012	6.9%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	23669.28	2992.00	12.0%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$ :	8	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	11	
Pier Rebar Quantity, $mc$ :	24	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	4	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Soil Rating*:	15.4%
Structural Rating*:	68.1%

Pad Properties		
Depth, $D$ :	7	ft
Pad Width, $W$ :	48	ft
Pad Thickness, $T$ :	6	ft
Pad Rebar Size (Bottom), $Sp$ :	11	
Pad Rebar Quantity (Bottom), $mp$ :	48	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60	ksi
Concrete Compressive Strength, $F'c$ :	3	ksi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	12.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	32	degrees
SPT Blow Count, $N_{blows}$ :	50	
Base Friction, $\mu$ :	0.35	
Neglected Depth, $N$ :	3.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, $gw$ :	7	ft

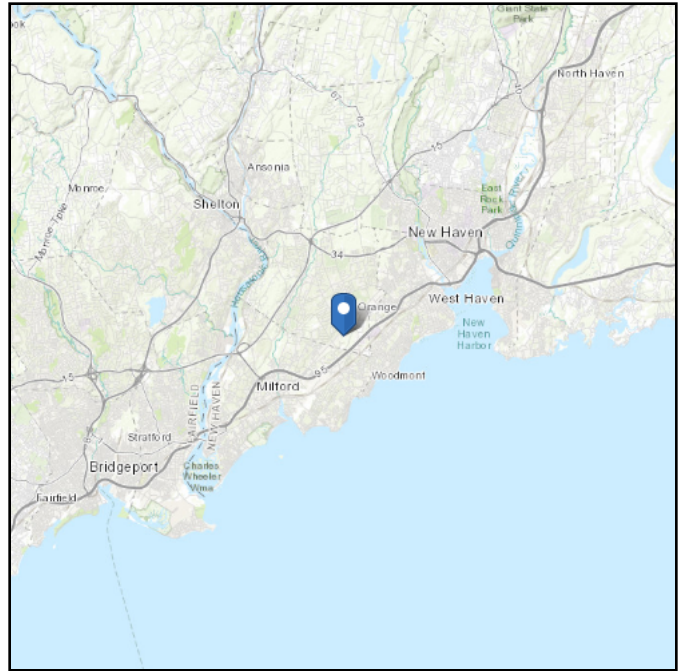
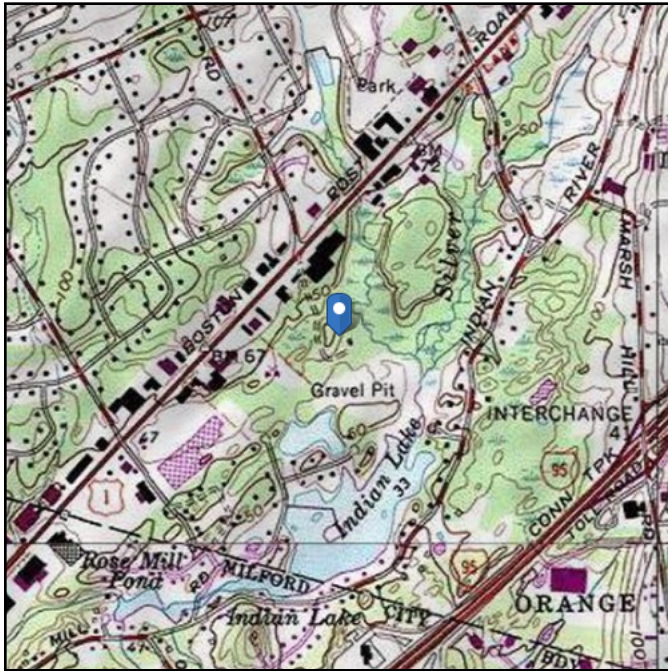
<--Toggle between Gross and Net

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 39.34 ft (NAVD 88)  
**Latitude:** 41.25555  
**Longitude:** -73.010889



## Wind

### Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 Vmph

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

**Date Accessed:** Tue Feb 05 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

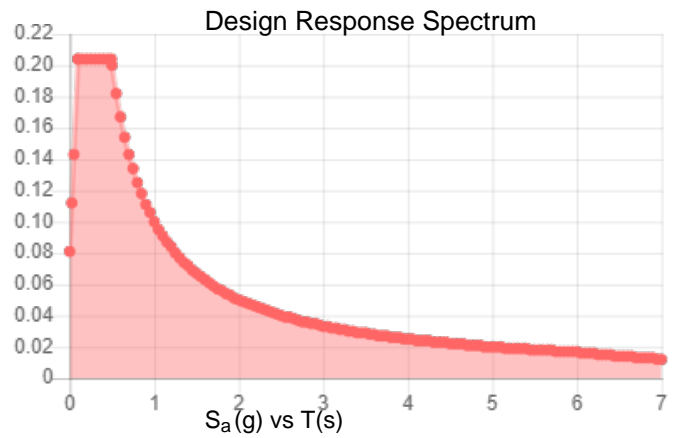
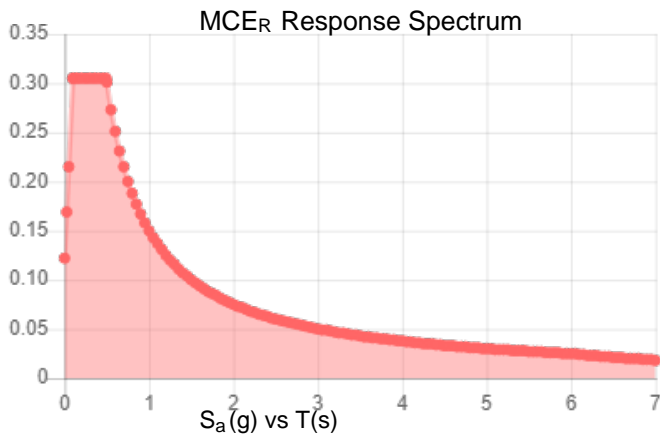


**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.191	$S_{DS}$ :	0.204
$S_1$ :	0.063	$S_{D1}$ :	0.1
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.101
$S_{MS}$ :	0.305	PGA <sub>M</sub> :	0.161
$S_{M1}$ :	0.15	F <sub>PGA</sub> :	1.599
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Tue Feb 05 2019

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

## Ice

---

**Results:**

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Tue Feb 05 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.