Alex Murshteyn, Site Acquisition
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

May 29, 2018

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

**RE: Notice of Exempt Modification // Site: Harwinton N CT (ATC: 302502)**
**159 Weingart Road Harwinton, CT 06791**
**N 41.7877 // W 73.0925**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless currently maintains 12 antennas at the 175-foot mount on the existing 181.9-foot monopole tower, located at 159 Weingart Road, Harwinton, CT. The tower and property is owned by American Tower. Verizon Wireless now intends to replace 6 of its existing antennas and install side-by-side mounts for 6 LTE (700/850/1900/2100 MHz) replacements for its PCS/AWS/LTE upgrade. Additionally, Verizon Wireless will install 9 new remote radio heads (RRHs), with its new antennas, 1 new over voltage protector (OVP) surge arrestor box, as well as 1 new hybrid fiber cable; while removing certain unused coax cabling and updating leased equipment rights, as more fully reflected by the final configuration proposed hereby.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §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 Michael R. Criss, First Selectman for the Town of Harwinton, Polly Redmond, the Town's Land Use Coordinator and American Tower, the tower and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2). Enclosed to accommodate this filing are construction drawings dated May 23, 2018 and a structural analysis dated April 13, 2018 by A.T. Engineering Service, PLLC and radio frequency (RF) analysis table showing worst-case RF emission calculation by Verizon Wireless RF Design Engineering.

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

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

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

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

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

6. The existing structure and its foundation can support the proposed loading, as shown in the attached structural analysis by A.T. Engineering Service, PLLC, dated April 13, 2018.

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

Sincerely,

Alex Murshteyn, Site Acquisition
c/o Cellco Partnership d/b/a Verizon Wireless
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 821-0159
AMurshteyn@centerlinecommunications.com

Attachments

cc: Michael R. Criss, First Selectman, Town of Harwinton - as elected official - 1Z9Y45030339662815
Polly Redmond, Land Use Coordinate, Town of Harwinton - as P&Z official - 1Z9Y45030321335425
American Tower Corporation - as tower & property owner - 1Z9Y45030337401038

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# Structural Analysis Report

| | | |
|---|---|---|
| **Structure** | : | **181.9 ft Monopole** |
| **ATC Site Name** | : | **Harwinton, CT** |
| **ATC Site Number** | : | **302502** |
| **Engineering Number** | : | **OAA727133_C3_01** |
| **Proposed Carrier** | : | **Verizon** |
| **Carrier Site Name** | : | **Harwinton N CT** |
| **Carrier Site Number** | : | **PSLC# 467932 / PROJ# 2566422** |
| **Site Location** | : | **159 Weingart Road**<br>**Harwinton, CT 06791-1109**<br>**41.787800,-73.092500** |
| **County** | : | **Litchfield** |
| **Date** | : | **April 13, 2018** |
| **Max Usage** | : | **100%** |
| **Result** | : | **Pass** |

Prepared By:
Parvin NikpoorParizi
Structural Engineer I

Reviewed By:

STATE OF CONNECTICUT
ESHA KAUSHAL MODI
32598
LICENSED
PROFESSIONAL ENGINEER

Authorized by "EOR"
Apr 17 2018 1:38 PM cosign

**COA: PEC.0001553**

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## Table of Contents

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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 181.9 ft monopole to reflect the change in loading by Verizon.

## Supporting Documents

| | |
|---|---|
| **Tower Drawings** | Mapping by Smith Cullum Inc. Site #CT-0038, dated February 13, 2002 |
| **Foundation Drawing** | Girard & Co. Engineers Job #3C237, dated April 24, 1990 |
| **Geotechnical Report** | Johnson Soils Engineering Co. Report #14974-H dated January 28, 2002 |
| **Modifications** | Hutter Trunkina Engineering Project #03320B, dated August 4, 2003<br>ATC Project #42504234, dated February 27, 2009<br>ATC Job #OAA684307_C6_06, dated November 16, 2016 |

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

| | |
|---|---|
| **Basic Wind Speed:** | 93 mph (3-Second Gust, $V_{ASD}$) / 120 mph (3-Second Gust, $V_{ULT}$) |
| **Basic Wind Speed w/ Ice:** | 40 mph (3-Second Gust) w/ 1" radial ice concurrent |
| **Code:** | ANSI/TIA-222-G / 2012 IBC / 2016 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.18, $S_1$ = 0.06 |
| **Site Class:** | D - Stiff Soil |

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

## Existing and Reserved Equipment

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 181.9 | 186.0 | 6 | Powerwave LGP21401 | Platform w/ Handrails | (12) 1 1/4" Coax<br>(5) 0.39" Fiber Trunk<br>(4) 0.78" 8 AWG 6<br>(1) 3" Conduit | AT&T Mobility |
| | | 6 | Ericsson RRUS 11 (Band 12) | | | |
| | | 3 | Ericsson RRUS 32 (50.8 lbs) | | | |
| | | 3 | Ericsson RRUS 12 | | | |
| | | 3 | Powerwave 7770.00 | | | |
| | | 3 | KMW AM-X-CD-16-65-00T-RET | | | |
| | | 3 | Quintel QS66512-2 | | | |
| | 185.0 | 3 | Kaelus DBC0061F1V51-2 | | | |
| | | 1 | Raycap DC6-48-60-0-8F | | | |
| | | 1 | Raycap DC6-48-60-18-8F ("Squid") | | | |
| 175.0 | 175.0 | 3 | Alcatel-Lucent B13 RRH4x30-4R | Low Profile Platform | (6) 1 5/8" Coax<br>(1) 1 5/8" Hybriflex | Verizon |
| | | 6 | Antel LPA-80063/6CF | | | |
| 166.0 | 166.0 | 3 | Ericsson AIR 21, 1.3 M, B2A B4P | Low Profile Platform | (6) 1 5/8" Coax<br>(1) 1 5/8" Fiber | Metro PCS |
| | | 3 | Ericsson AIR 21, 1.3M, B4A B2P | | | |
| | | 3 | Andrew LNX-6515DS-A1M | | | |
| 146.0 | 146.0 | 3 | KMW TTA (HB-X-WM-17-65-00T) | Side Arms | (6) 1 5/8" Coax | Clearwire |
| | | 3 | KMW HB-X-WM-17-65-00T | | | |

## Equipment to be Removed

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 175.0 | 175.0 | 2 | RFS DB-T1-6Z-8AB-0Z | - | (4) 1 5/8" Coax<br>(1) 1 5/8" Hybriflex | Verizon |
| | | 3 | Alcatel-Lucent B66A RRH4x45-4R w/o Solar Shield | | | |
| | | 6 | RFS FD9R6004/2C-3L | | | |
| | | 6 | Commscope SBNHH-1D65B (72.9") | | | |

## Proposed Equipment

| Elevation[1] (ft) | | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|---|
| Mount | RAD | | | | | |
| 175.0 | 175.0 | 3 | Nokia B5 RRH4x40-850 | Low Profile Platform | - | Verizon |
| | | 3 | Alcatel-Lucent B25 RRH4x30 | | | |
| | | 1 | RFS DB-B1-6C-12AB-0Z | | | |
| | | 3 | Nokia B66a RRH4x45 (UHIE) | | | |
| | | 6 | Commscope JAHH-65B-R3B | | | |

**[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).**

## Structure Usages

| Structural Component | Controlling Usage | Pass/Fail |
|---|---|---|
| Anchor Bolts | 83% | Pass |
| Shaft | 80% | Pass |
| Base Plate | 35% | Pass |
| Flanges | 32% | Pass |
| Reinforcement | 100% | Pass |

## Foundations

| Reaction Component | Analysis Reactions | % of Usage |
|---|---|---|
| Moment (Kips-Ft) | 3,879.7 | 93% |
| Axial (Kips) | 64.2 | 34% |
| Shear (Kips) | 30.9 | 49% |

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

## Deflection and Sway*

| Antenna Elevation (ft) | Antenna | Carrier | Deflection (ft) | Sway (Rotation) (°) |
|---|---|---|---|---|
| 175.0 | Nokia B5 RRH4x40-850 | Verizon | 3.004 | 2.091 |
| | Alcatel-Lucent B25 RRH4x30 | | | |
| | RFS DB-B1-6C-12AB-0Z | | | |
| | Nokia B66a RRH4x45 (UHIE) | | | |
| | Commscope JAHH-65B-R3B | | | |

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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**Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

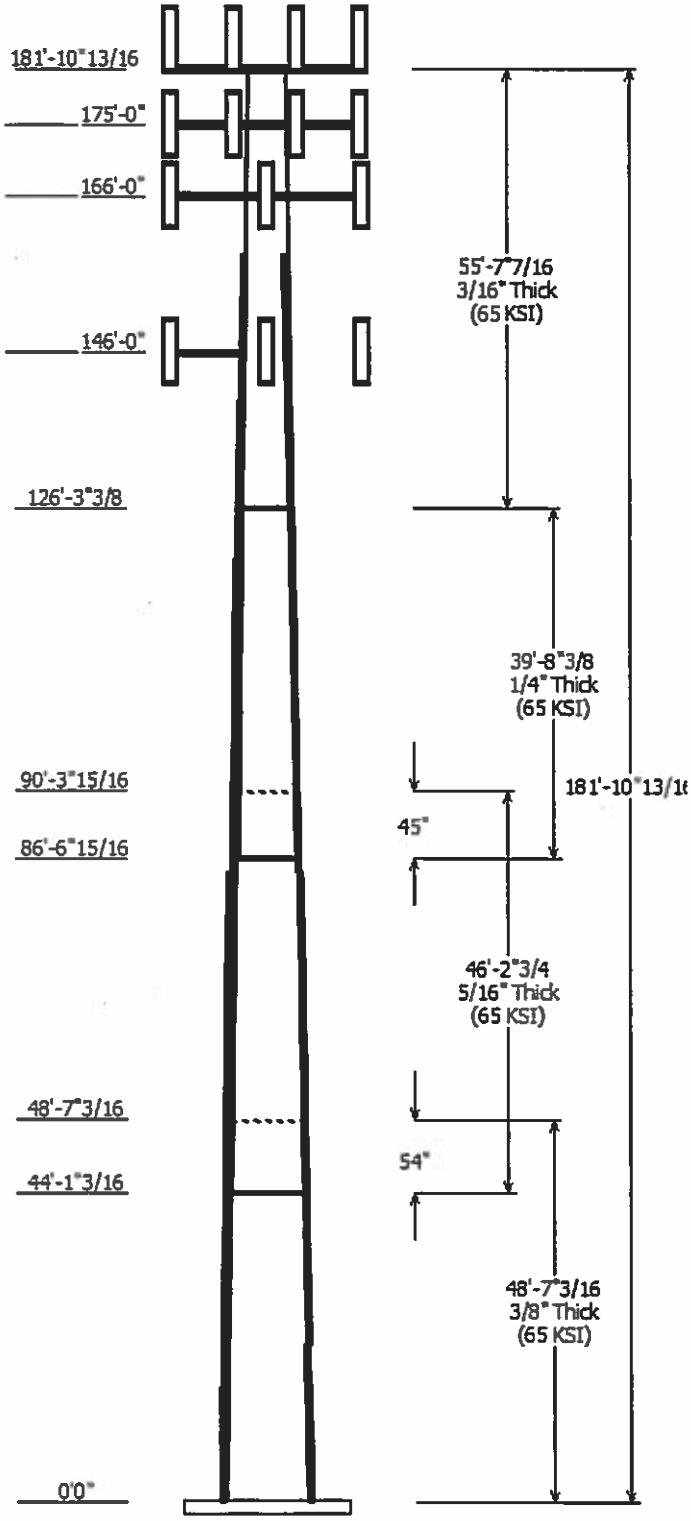
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.




## Job Information

| | |
|---|---|
| Pole : 302502 | Code: ANSI/TIA-222-G |
| Location : Harwinton, CT | |
| Description : 182 ft Monopole | |
| Client : VERIZON WIRELESS | Struct Class : II |
| Shape : 12 Sides | Exposure : B |
| Height : 181.90 (ft) | Topo : 1 |
| Base Elev (ft): 0.00 | |
| Taper: 0.162864(in/ft) | |

## Sections Properties

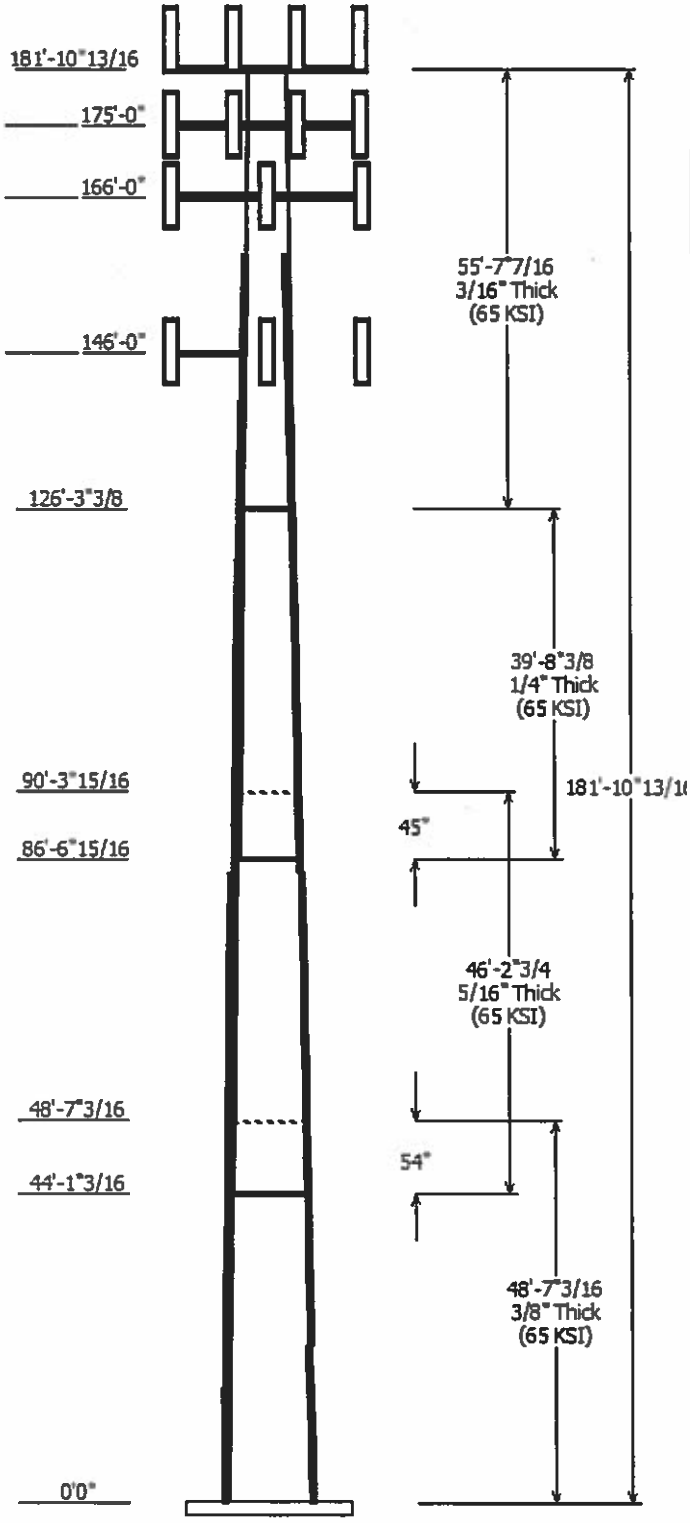
| Shaft Section | Length (ft) | Diameter (in) Accross Flats Top | Bottom | Thick (in) | Joint Type | Overlap Length (in) | Shape | Steel Grade (ksi) |
|---|---|---|---|---|---|---|---|---|
| 1 | 48.600 | 35.08 | 43.00 | 0.375 | | 0.000 | 12 Sides | 65 |
| 2 | 46.230 | 28.91 | 36.44 | 0.313 | Slip Joint | 54.000 | 12 Sides | 65 |
| 3 | 39.700 | 23.55 | 30.02 | 0.250 | Slip Joint | 45.000 | 12 Sides | 65 |
| 4 | 55.620 | 14.50 | 23.55 | 0.188 | Butt Joint | 0.000 | 12 Sides | 65 |

## Discrete Appurtenance

| Attach Elev (ft) | Force Elev (ft) | Qty | Description |
|---|---|---|---|
| 181.900 | 186.000 | 3 | Quintel QS66512-2 |
| 181.900 | 186.000 | 3 | Ericsson RRUS 12 |
| 181.900 | 186.000 | 3 | Ericsson RRUS 32 (50.8 lbs) |
| 181.900 | 185.000 | 1 | Raycap DC6-48-60-18-8F |
| 181.900 | 185.000 | 1 | Raycap DC6-48-60-0-8F |
| 181.900 | 185.000 | 3 | Kaelus DBC0061F1V51-2 |
| 181.900 | 181.900 | 1 | Flat Platform w/ Handrails |
| 181.900 | 186.000 | 6 | Ericsson RRUS 11 (Band 12) |
| 181.900 | 186.000 | 3 | KMW AM-X-CD-16-65-00T-RET |
| 181.900 | 186.000 | 6 | Powerwave Allgon LGP21401 |
| 181.900 | 186.000 | 3 | Powerwave Allgon 7770.00 |
| 175.000 | 175.000 | 6 | Commscope JAHH-65B-R3B |
| 175.000 | 175.000 | 3 | Nokia B66a RRH4x45 (UHIE) |
| 175.000 | 175.000 | 1 | RFS DB-B1-6C-12AB-0Z |
| 175.000 | 175.000 | 3 | Alcatel-Lucent B25 RRH4x30 |
| 175.000 | 175.000 | 3 | Nokia B5 RRH4x40-850 |
| 175.000 | 175.000 | 1 | Flat Low Profile Platform |
| 175.000 | 175.000 | 6 | Antel LPA-80063/6CF |
| 175.000 | 175.000 | 3 | Alcatel-Lucent B13 RRH4x30-4R |
| 166.000 | 166.000 | 1 | Round Low Profile Platform |
| 166.000 | 166.000 | 3 | Andrew LNX-6515DS-A1M |
| 166.000 | 166.000 | 3 | Ericsson AIR 21, 1.3M, B4A B2P |
| 166.000 | 166.000 | 3 | Ericsson AIR 21, 1.3 M, B2A B4 |
| 146.000 | 146.000 | 1 | Side Arms |
| 146.000 | 146.000 | 3 | KMW HB-X-WM-17-65-00T |
| 146.000 | 146.000 | 3 | KMW TTA (HB-X-WM-17-65-00T) |

## Linear Appurtenance

| Elev (ft) From | To | Description | Exposed To Wind |
|---|---|---|---|
| 140.0 | 160.0 | 3" Solid Rod | Yes |
| 120.0 | 140.0 | 3.5" Solid Rod | Yes |
| 80.000 | 120.0 | 4.0" Solid Rod | Yes |
| 5.000 | 146.0 | 1 5/8" Coax | Yes |
| 5.000 | 166.0 | 1 5/8" Coax | No |
| 5.000 | 166.0 | 1 5/8" Fiber | No |
| 5.000 | 175.0 | 1 5/8" Coax | No |
| 5.000 | 175.0 | 1 5/8" Hybriflex | No |
| 5.000 | 181.9 | 0.39" Fiber Trunk | No |
| 5.000 | 181.9 | 0.78" 8 AWG 6 | No |




| | | | |
|---|---|---|---|
| 5.000 | 181.9 | 1 1/4" Coax | No |
| 5.000 | 181.9 | 3" Conduit | No |
| 0.000 | 19.500 | #20Dywidag | Yes |
| 0.000 | 80.000 | 4.25" Solid Rod | Yes |

## Load Cases

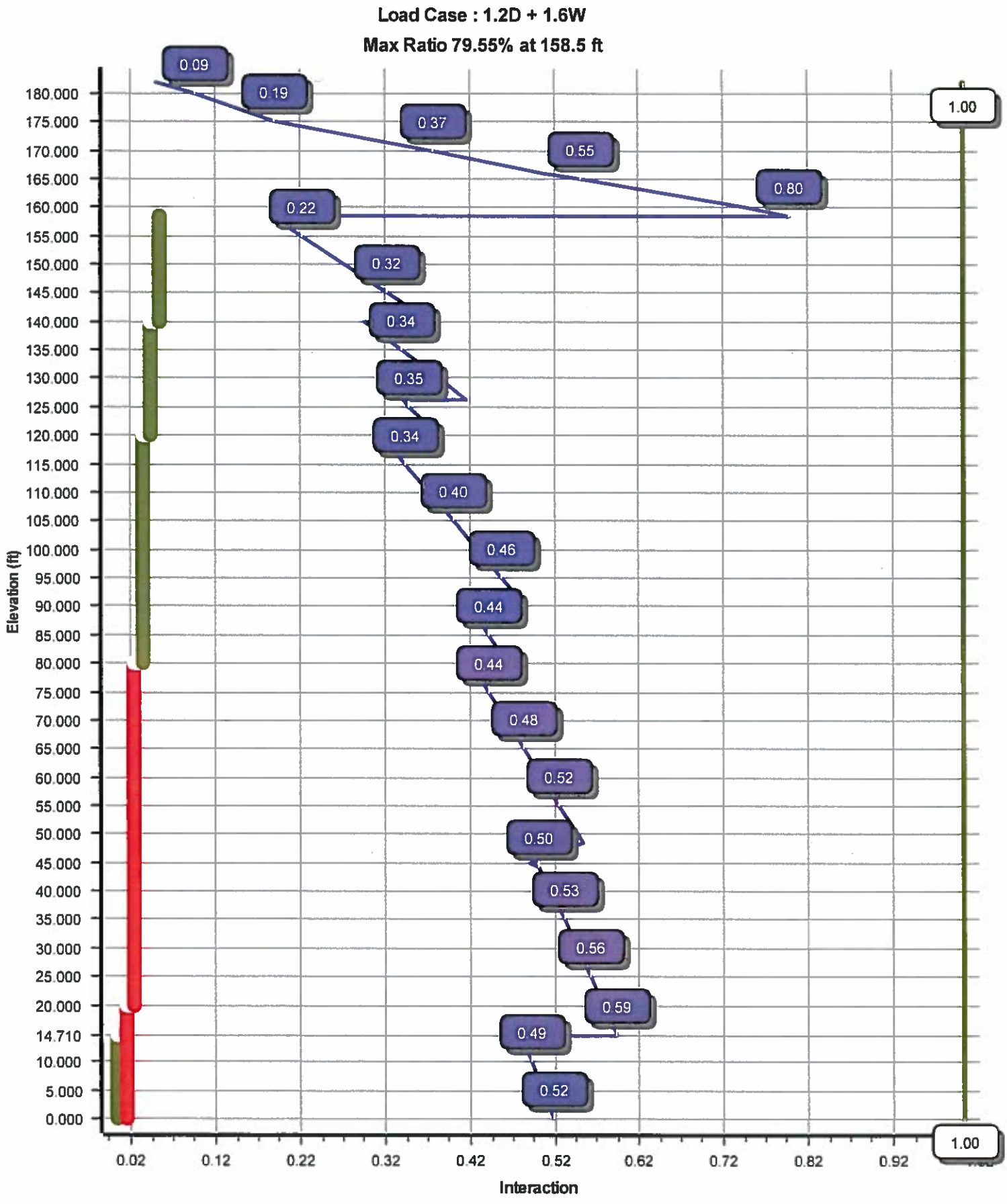
| | |
|---|---|
| 1.2D + 1.6W | 93 mph with No Ice |
| 0.9D + 1.6W | 93 mph with No Ice (Reduced DL) |
| 1.2D + 1.0Di + 1.0Wi | 40 mph with 1.00 in Radial Ice |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Lateral Forces Method |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Modal Analysis Method |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Lateral |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Modal |
| 1.0D + 1.0W | Serviceability 60 mph |

## Reactions

| Load Case | Moment (kip-ft) | Shear (kip) | Axial (kip) |
|---|---|---|---|
| 1.2D + 1.6W | 3879.75 | 30.93 | 64.22 |
| 0.9D + 1.6W | 3807.90 | 30.70 | 48.16 |
| 1.2D + 1.0Di + 1.0Wi | 710.70 | 5.02 | 105.10 |
| (1.2 + 0.2Sds) * DL + E ELFM | 246.55 | 1.61 | 64.07 |
| (1.2 + 0.2Sds) * DL + E EMAM | 360.13 | 2.50 | 64.07 |
| (0.9 - 0.2Sds) * DL + E ELFM | 240.94 | 1.61 | 44.54 |
| (0.9 - 0.2Sds) * DL + E EMAM | 351.35 | 2.50 | 44.54 |
| 1.0D + 1.0W | 1028.96 | 8.31 | 53.56 |

## Dish Deflections

| Load Case | Attach Elev (ft) | Deflection (in) | Rotation (deg) |
|---|---|---|---|
| | 0.00 | 0.000 | 0.000 |


Load Case : 1.2D + 1.6W
Max Ratio 79.55% at 158.5 ft
0.09
0.19
0.37
0.55
0.80
0.22
0.32
0.34
0.35
0.34
0.40
0.46
0.44
0.44
0.48
0.52
0.50
0.53
0.56
0.59
0.49
0.52
1.00
1.00
180.000
175.000
170.000
165.000
160.000
155.000
150.000
145.000
140.000
135.000
130.000
125.000
120.000
115.000
110.000
105.000
100.000
95.000
90.000
85.000
80.000
75.000
70.000
65.000
60.000
55.000
50.000
45.000
40.000
35.000
30.000
25.000
20.000
14.710
10.000
5.000
0.000
Elevation (ft)
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Interaction

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number:OAA727133_C3_01 4/13/2018 4:43:15 PM

Customer: VERIZON WIRELESS

## Analysis Parameters

| | | | |
|---|---|---|---|
| Location : | LITCHFIELD County, CT | Height (ft) : | 181.9 |
| Code : | ANSI/TIA-222-G | Base Diameter (in) : | 43.00 |
| Shape : | 12 Sides | Top Diameter (in) : | 14.50 |
| Pole Type : | Taper | Taper (in/ft) : | 0.163 |
| Pole Manfacturer : | Mapped | Rotation (deg) : | 0.00 |

## Ice & Wind Parameters

| | | | |
|---|---|---|---|
| Structure Class: | II | Design Wind Speed Without Ice: | 93 mph |
| Exposure Category: | B | Design Wind Speed With Ice: | 40 mph |
| Topographic Category: | 1 | Operational Wind Speed: | 60 mph |
| Crest Height: | 0 ft | Design Ice Thickness: | 1.00 in |

## Seismic Parameters

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | Equivalent Modal Analysis & Equivalent Lateral Force Methods | | | | |
| Site Class: | D - Stiff Soil | | | | |
| Period Based on Rayleigh Method (sec): | 3.20 | | | | |
| $T_L$ (sec): | 6 | p: | 1 | $C_s$: | 0.030 |
| $S_s$: | 0.182 | $S_1$: | 0.065 | $C_s$ Max: | 0.030 |
| $F_a$: | 1.600 | $F_v$: | 2.400 | $C_s$ Min: | 0.030 |
| $S_{ds}$: | 0.194 | $S_{d1}$: | 0.104 | | |

## Load Cases

| | |
|---|---|
| 1.2D + 1.6W | 93 mph with No Ice |
| 0.9D + 1.6W | 93 mph with No Ice (Reduced DL) |
| 1.2D + 1.0Di + 1.0Wi | 40 mph with 1.00 in Radial Ice |
| (1.2 + 0.2Sds) * DL + E ELFM | Seismic Equivalent Lateral Forces Method |
| (1.2 + 0.2Sds) * DL + E EMAM | Seismic Equivalent Modal Analysis Method |
| (0.9 - 0.2Sds) * DL + E ELFM | Seismic (Reduced DL) Equivalent Lateral Forces Method |
| (0.9 - 0.2Sds) * DL + E EMAM | Seismic (Reduced DL) Equivalent Modal Analysis Method |
| 1.0D + 1.0W | Serviceability 60 mph |

| | | | |
|---|---|---|---|
| Site Number: 302502 | | Code: ANSI/TIA-222-G |  |
| Site Name: Harwinton, CT | | Engineering Number:OAA727133_C3_01 | 4/13/2018 4:43:15 PM |
| Customer: VERIZON WIRELESS | | | |

## Shaft Section Properties

| | | | | | | | Bottom | | | | | | Top | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sect Info | Length (ft) | Thick (in) | Fy (ksi) | Slip Joint Type | Slip Joint Len (in) | Weight (lb) | Dia (in) | Elev (ft) | Area (in²) | Ix (in⁴) | W/t Ratio | D/t Ratio | Dia (in) | Elev (ft) | Area (in²) | Ix (in⁴) | W/t Ratio | D/t Ratio | Taper (in/ft) |
| 1-12 | 48.600 | 0.3750 | 65 | | 0.00 | 7,722 | 43.00 | 0.00 | 51.47 | 11936.2 | 28.05 | 114.67 | 35.08 | 48.60 | 41.91 | 6445.1 | 22.39 | 93.56 | 0.162864 |
| 2-12 | 46.230 | 0.3125 | 65 | Slip | 54.00 | 5,123 | 36.44 | 44.10 | 36.36 | 6057.6 | 28.57 | 116.62 | 28.91 | 90.33 | 28.78 | 3004.9 | 22.11 | 92.52 | 0.162864 |
| 3-12 | 39.700 | 0.2500 | 65 | Slip | 45.00 | 2,886 | 30.02 | 86.58 | 23.97 | 2712.1 | 29.50 | 120.10 | 23.55 | 126.28 | 18.76 | 1301.1 | 22.57 | 94.23 | 0.162864 |
| 4-12 | 55.620 | 0.1875 | 65 | Butt | 0.00 | 2,153 | 23.55 | 126.28 | 14.11 | 983.7 | 30.99 | 125.65 | 14.50 | 181.90 | 8.64 | 225.9 | 18.04 | 77.33 | 0.162864 |
| | | | | Shaft Weight | | 17,884 | | | | | | | | | | | | | |

## Discrete Appurtenance Properties

| Attach Elev (ft) | Description | Qty | Distance From Face (ft) | Vert Ecc (ft) | Weight (lb) | No Ice EPAa (sf) | Orientation Factor |
|---|---|---|---|---|---|---|---|
| 181.90 | Ericsson RRUS 11 (Band 12) | 6 | 0.000 | 4.100 | 50.00 | 2.570 | 0.50 |
| 181.90 | Ericsson RRUS 12 | 3 | 0.000 | 4.100 | 50.00 | 3.150 | 0.50 |
| 181.90 | Ericsson RRUS 32 (50.8 lbs) | 3 | 0.000 | 4.100 | 50.80 | 2.690 | 0.50 |
| 181.90 | Flat Platform w/ Handrails | 1 | 0.000 | 0.000 | 2000.00 | 34.000 | 1.00 |
| 181.90 | Kaelus DBC0061F1V51-2 | 3 | 0.000 | 3.100 | 25.50 | 0.510 | 0.33 |
| 181.90 | KMW AM-X-CD-16-65-00T-RET | 3 | 0.000 | 4.100 | 48.50 | 8.020 | 0.67 |
| 181.90 | Powerwave Allgon 7770.00 | 3 | 0.000 | 4.100 | 35.00 | 5.510 | 0.65 |
| 181.90 | Powerwave Allgon LGP21401 | 6 | 0.000 | 4.100 | 14.10 | 1.100 | 0.33 |
| 181.90 | Quintel QS66512-2 | 3 | 0.000 | 4.100 | 111.00 | 8.130 | 0.74 |
| 181.90 | Raycap DC6-48-60-0-8F | 1 | 0.000 | 3.100 | 32.80 | 1.190 | 0.67 |
| 181.90 | Raycap DC6-48-60-18-8F ("Squid | 1 | 0.000 | 3.100 | 31.80 | 1.280 | 0.67 |
| 175.00 | Alcatel-Lucent B13 RRH4x30-4R | 3 | 0.000 | 0.000 | 57.80 | 2.140 | 0.50 |
| 175.00 | Alcatel-Lucent B25 RRH4x30 | 3 | 0.000 | 0.000 | 53.00 | 2.120 | 0.50 |
| 175.00 | Antel LPA-80063/6CF | 6 | 0.000 | 0.000 | 27.00 | 9.590 | 0.76 |
| 175.00 | Commscope JAHH-65B-R3B | 6 | 0.000 | 0.000 | 60.60 | 9.110 | 0.69 |
| 175.00 | Flat Low Profile Platform | 1 | 0.000 | 0.000 | 1500.00 | 26.100 | 1.00 |
| 175.00 | Nokia B5 RRH4x40-850 | 3 | 0.000 | 0.000 | 48.50 | 1.320 | 0.50 |
| 175.00 | Nokia B66a RRH4x45 (UHIE) | 3 | 0.000 | 0.000 | 56.80 | 2.540 | 0.50 |
| 175.00 | RFS DB-B1-6C-12AB-0Z | 1 | 0.000 | 0.000 | 21.40 | 2.510 | 0.50 |
| 166.00 | Andrew LNX-6515DS-A1M | 3 | 0.000 | 0.000 | 49.80 | 11.450 | 0.70 |
| 166.00 | Ericsson AIR 21, 1.3 M, B2A B4 | 3 | 0.000 | 0.000 | 83.00 | 6.050 | 0.71 |
| 166.00 | Ericsson AIR 21, 1.3M, B4A B2P | 3 | 0.000 | 0.000 | 90.40 | 6.090 | 0.70 |
| 166.00 | Round Low Profile Platform | 1 | 0.000 | 0.000 | 1500.00 | 21.700 | 1.00 |
| 146.00 | KMW HB-X-WM-17-65-00T | 3 | 0.000 | 0.000 | 30.00 | 3.360 | 0.79 |
| 146.00 | KMW TTA (HB-X-WM-17-65-00T) | 3 | 0.000 | 0.000 | 15.90 | 0.650 | 0.50 |
| 146.00 | Side Arms | 1 | 0.000 | 0.000 | 560.00 | 8.500 | 0.67 |
| Totals | Num Loadings:26 | 76 | | | 8974.20 | | |

## Linear Appurtenance Properties

| Elev From (ft) | Elev To (ft) | Qty | Description | Coax Diameter (in) | Coax Weight (lb/ft) | Flat | Projected Width (in) | Exposed To Wind | Carrier |
|---|---|---|---|---|---|---|---|---|---|
| 5.00 | 181.90 | 5 | 0.39" Fiber Trunk | 0.39 | 0.06 | N | 0.00 | N | AT&T Mobility |
| 5.00 | 181.90 | 4 | 0.78" 8 AWG 6 | 0.78 | 0.59 | N | 0.00 | N | AT&T Mobility |
| 5.00 | 181.90 | 12 | 1 1/4" Coax | 1.55 | 0.63 | N | 0.00 | N | AT&T Mobility |
| 5.00 | 181.90 | 1 | 3" Conduit | 3.50 | 7.58 | N | 0.00 | N | AT&T Mobility |
| 5.00 | 175.00 | 6 | 1 5/8" Coax | 1.98 | 0.82 | N | 0.00 | N | Verizon |
| 5.00 | 175.00 | 1 | 1 5/8" Hybriflex Cable | 1.98 | 1.30 | N | 0.00 | N | Verizon |
| 5.00 | 166.00 | 6 | 1 5/8" Coax | 1.98 | 0.82 | N | 0.00 | N | Metro PCS |
| 5.00 | 166.00 | 1 | 1 5/8" Fiber | 1.63 | 1.61 | N | 0.00 | N | Metro PCS |
| 140.00 | 160.00 | 3 | 3" Solid Rod | 3.00 | 0.00 | N | 6.00 | Y | -- |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5.00 | 146.00 | 6 | 1 5/8" Coax | 1.98 | 0.82 | N | 0.00 | Y | Clearwire |
| 120.00 | 140.00 | 3 | 3.5" Solid Rod | 3.50 | 0.00 | N | 7.00 | Y | -- |
| 80.00 | 120.00 | 3 | 4.0" Solid Rod | 4.00 | 0.00 | N | 8.00 | Y | -- |
| 0.00 | 80.00 | 3 | 4.25" Solid Rod | 4.25 | 0.00 | N | 8.50 | Y | -- |
| 0.00 | 19.50 | 3 | #20Dywidag | 2.50 | 0.00 | N | 0.00 | Y | -- |

## Additional Steel

| Elev From (ft) | Elev To (ft) | Qty | Description | Fy (ksi) | Offset (in) | Intermediate Connections Description | Spacing (in) | Len (in) | Connectors | Continuation? |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 14.71 | 3 | SOL #20 All Thread | 80 | 5.15 | 6" T Bracket | 30.0 | 3.31 | 5/8" Hollo Bolt | No |
| 0.00 | 20.00 | 3 | SOL 4 1/4" SOLID | 50 | 1.00 | AJAX M20 Class | 16.5 | 3.50 | 5/8" A36 U-Bolt | No |
| 20.00 | 80.00 | 3 | SOL 4 1/4" SOLID | 50 | 1.00 | AJAX M20 Class | 33.0 | 3.50 | 5/8" Hollo Bolt | No |
| 80.00 | 120.0 | 3 | SOL 4" SOLID | 50 | 0.88 | AJAX M20 Class | 66.0 | 3.50 | 5/8" Hollo Bolt | No |
| 120.0 | 140.0 | 3 | SOL 3 1/2" SOLID | 50 | 1.13 | AJAX M20 Class | 66.0 | 3.50 | 5/8" Hollo Bolt | No |
| 140.0 | 158.5 | 3 | SOL 3" SOLID | 50 | 1.38 | AJAX M20 Class | 66.0 | 3.50 | 5/8" Hollo Bolt | No |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number:OAA727133_C3_01 4/13/2018 4:43:15 PM

Customer: VERIZON WIRELESS

## Segment Properties (Max Len : 5. ft)

| Seg Top Elev (ft) | Description | Thick (in) | Flat Dia (in) | Area ($in^2$) | Ix ($in^4$) | W/t Ratio | D/t Ratio | F'y (ksi) | S ($in^3$) | Z ($in^3$) | Weight (lb) | Additional Reinforcing Area ($in^2$) | Additional Reinforcing Ix ($in^4$) | Additional Reinforcing Weight (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 0.3750 | 43.000 | 51.470 | 11,936.2 | 28.05 | 114.67 | 74.1 | 536.3 | 0.0 | 0.0 | 57.28 | 18,69 | 0.0 |
| 5.00 | | 0.3750 | 42.186 | 50.486 | 11,265.1 | 27.46 | 112.50 | 74.8 | 515.9 | 0.0 | 867.3 | 57.28 | 18,10 | 974.5 |
| 10.00 | | 0.3750 | 41.371 | 49.503 | 10,619.6 | 26.88 | 110.32 | 75.4 | 495.9 | 0.0 | 850.6 | 57.28 | 17,52 | 974.5 |
| 14.71 | Reinf. Top | 0.3750 | 40.604 | 48.577 | 10,034.6 | 26.33 | 108.28 | 76.0 | 477.4 | 0.0 | 786.0 | 57.28 | 16,98 | 918.0 |
| 15.00 | | 0.3750 | 40.557 | 48.520 | 9,999.3 | 26.30 | 108.15 | 76.0 | 476.3 | 0.0 | 47.9 | 42.55 | 11,70 | 42.0 |
| 20.00 | Reinf. Top Reinf | 0.3750 | 39.743 | 47.537 | 9,403.6 | 25.72 | 105.98 | 76.7 | 457.1 | 0.0 | 817.1 | 42.55 | 11,30 | 724.0 |
| 25.00 | | 0.3750 | 38.928 | 46.553 | 8,832.0 | 25.14 | 103.81 | 77.3 | 438.3 | 0.0 | 800.4 | 42.55 | 10,90 | 724.0 |
| 30.00 | | 0.3750 | 38.114 | 45.570 | 8,284.1 | 24.55 | 101.64 | 77.9 | 419.9 | 0.0 | 783.7 | 42.55 | 10,51 | 724.0 |
| 35.00 | | 0.3750 | 37.300 | 44.587 | 7,759.4 | 23.97 | 99.47 | 78.6 | 401.9 | 0.0 | 767.0 | 42.55 | 10,13 | 724.0 |
| 40.00 | | 0.3750 | 36.485 | 43.603 | 7,257.2 | 23.39 | 97.29 | 79.2 | 384.3 | 0.0 | 750.2 | 42.55 | 9,763 | 724.0 |
| 44.10 | Bot - Section 2 | 0.3750 | 35.818 | 42.797 | 6,862.0 | 22.91 | 95.51 | 79.7 | 370.1 | 0.0 | 602.7 | 42.55 | 9,462 | 593.7 |
| 45.00 | | 0.3750 | 35.671 | 42.620 | 6,777.3 | 22.81 | 95.12 | 79.8 | 367.0 | 0.0 | 241.9 | 42.55 | 9,677 | 130.3 |
| 48.60 | Top - Section 1 | 0.3125 | 35.710 | 35.619 | 5,696.4 | 27.94 | 114.27 | 74.2 | 308.2 | 0.0 | 957.7 | 42.55 | 9,414 | 521.3 |
| 50.00 | | 0.3125 | 35.482 | 35.389 | 5,587.1 | 27.74 | 113.54 | 74.5 | 304.2 | 0.0 | 169.1 | 42.55 | 9,312 | 202.7 |
| 55.00 | | 0.3125 | 34.667 | 34.570 | 5,207.9 | 27.05 | 110.94 | 75.2 | 290.2 | 0.0 | 595.1 | 42.55 | 8,954 | 724.0 |
| 60.00 | | 0.3125 | 33.853 | 33.750 | 4,846.3 | 26.35 | 108.33 | 76.0 | 276.6 | 0.0 | 581.2 | 42.55 | 8,603 | 724.0 |
| 65.00 | | 0.3125 | 33.039 | 32.931 | 4,501.8 | 25.65 | 105.72 | 76.7 | 263.2 | 0.0 | 567.3 | 42.55 | 8,259 | 724.0 |
| 70.00 | | 0.3125 | 32.225 | 32.111 | 4,174.0 | 24.95 | 103.12 | 77.5 | 250.2 | 0.0 | 553.3 | 42.55 | 7,922 | 724.0 |
| 75.00 | | 0.3125 | 31.410 | 31.292 | 3,862.6 | 24.25 | 100.51 | 78.3 | 237.6 | 0.0 | 539.4 | 42.55 | 7,593 | 724.0 |
| 80.00 | Reinf. Top Reinf | 0.3125 | 30.596 | 30.473 | 3,567.0 | 23.55 | 97.91 | 79.0 | 225.2 | 0.0 | 525.4 | 42.55 | 7,270 | 724.0 |
| 85.00 | | 0.3125 | 29.782 | 29.653 | 3,286.9 | 22.86 | 95.30 | 79.8 | 213.2 | 0.0 | 511.5 | 37.69 | 5,986 | 641.4 |
| 86.58 | Bot - Section 3 | 0.3125 | 29.524 | 29.394 | 3,201.6 | 22.64 | 94.48 | 80.0 | 209.5 | 0.0 | 158.7 | 37.69 | 5,901 | 202.7 |
| 90.00 | | 0.3125 | 28.967 | 28.834 | 3,021.9 | 22.16 | 92.70 | 80.5 | 201.5 | 0.0 | 615.1 | 37.69 | 5,882 | 438.7 |
| 90.33 | Top - Section 2 | 0.2500 | 29.413 | 23.477 | 2,548.6 | 28.85 | 117.65 | 73.3 | 167.4 | 0.0 | 58.7 | 37.69 | 5,864 | 42.3 |
| 95.00 | | 0.2500 | 28.653 | 22.864 | 2,354.3 | 28.03 | 114.61 | 74.1 | 158.7 | 0.0 | 368.2 | 37.69 | 5,614 | 599.1 |
| 100.0 | | 0.2500 | 27.839 | 22.209 | 2,157.6 | 27.16 | 111.35 | 75.1 | 149.7 | 0.0 | 383.4 | 37.69 | 5,354 | 641.4 |
| 105.0 | | 0.2500 | 27.024 | 21.553 | 1,972.1 | 26.29 | 108.10 | 76.0 | 141.0 | 0.0 | 372.3 | 37.69 | 5,099 | 641.4 |
| 110.0 | | 0.2500 | 26.210 | 20.898 | 1,797.6 | 25.41 | 104.84 | 77.0 | 132.5 | 0.0 | 361.1 | 37.69 | 4,851 | 641.4 |
| 115.0 | | 0.2500 | 25.396 | 20.242 | 1,633.7 | 24.54 | 101.58 | 78.0 | 124.3 | 0.0 | 350.0 | 37.69 | 4,608 | 641.4 |
| 120.0 | Reinf. Top Reinf | 0.2500 | 24.581 | 19.587 | 1,480.1 | 23.67 | 98.33 | 78.9 | 116.3 | 0.0 | 338.8 | 37.69 | 4,372 | 641.4 |
| 125.0 | | 0.2500 | 23.767 | 18.931 | 1,336.4 | 22.79 | 95.07 | 79.9 | 108.6 | 0.0 | 327.7 | 28.86 | 3,165 | 491.1 |
| 126.2 | Top - Section 3 | 0.2500 | 23.559 | 18.763 | 1,301.1 | 22.57 | 94.23 | 80.1 | 106.7 | 0.0 | 82.1 | 28.86 | 3,121 | 125.7 |
| 126.2 | Bot - Section 4 | 0.1875 | 23.559 | 14.110 | 983.7 | 30.99 | 125.65 | 70.9 | 80.7 | 0.0 | | 28.86 | 3,121 | |
| 130.0 | | 0.1875 | 22.953 | 13.744 | 909.2 | 30.12 | 122.41 | 71.9 | 76.5 | 0.0 | 176.3 | 28.86 | 2,994 | 365.4 |
| 135.0 | | 0.1875 | 22.138 | 13.253 | 815.1 | 28.96 | 118.07 | 73.1 | 71.1 | 0.0 | 229.7 | 28.86 | 2,828 | 491.1 |
| 140.0 | Reinf. Top Reinf | 0.1875 | 21.324 | 12.761 | 727.7 | 27.79 | 113.73 | 74.4 | 65.9 | 0.0 | 221.3 | 28.86 | 2,666 | 491.1 |
| 145.0 | | 0.1875 | 20.510 | 12.270 | 646.8 | 26.63 | 109.39 | 75.7 | 60.9 | 0.0 | 212.9 | 21.20 | 1,839 | 360.8 |
| 146.0 | | 0.1875 | 20.347 | 12.171 | 631.4 | 26.40 | 108.52 | 75.9 | 59.9 | 0.0 | 41.6 | 21.20 | 1,817 | 72.1 |
| 150.0 | | 0.1875 | 19.695 | 11.778 | 572.1 | 25.47 | 105.04 | 76.9 | 56.1 | 0.0 | 163.0 | 21.20 | 1,728 | 288.6 |
| 155.0 | | 0.1875 | 18.881 | 11.286 | 503.4 | 24.30 | 100.70 | 78.2 | 51.5 | 0.0 | 196.2 | 21.20 | 1,620 | 360.8 |
| 158.5 | Reinf. Top | 0.1875 | 18.311 | 10.942 | 458.7 | 23.49 | 97.66 | 79.1 | 48.4 | 0.0 | 132.4 | 21.20 | 1,546 | 252.5 |
| 160.0 | | 0.1875 | 18.067 | 10.795 | 440.4 | 23.14 | 96.36 | 79.5 | 47.1 | 0.0 | 55.5 | | | |
| 165.0 | | 0.1875 | 17.252 | 10.303 | 383.0 | 21.98 | 92.01 | 80.7 | 42.9 | 0.0 | 179.5 | | | |
| 166.0 | | 0.1875 | 17.090 | 10.205 | 372.1 | 21.74 | 91.14 | 81.0 | 42.1 | 0.0 | 34.9 | | | |
| 170.0 | | 0.1875 | 16.438 | 9.811 | 330.7 | 20.81 | 87.67 | 81.9 | 38.9 | 0.0 | 136.2 | | | |
| 175.0 | | 0.1875 | 15.624 | 9.320 | 283.4 | 19.65 | 83.33 | 81.9 | 35.0 | 0.0 | 162.7 | | | |
| 180.0 | | 0.1875 | 14.809 | 8.828 | 240.9 | 18.48 | 78.98 | 81.9 | 31.4 | 0.0 | 154.4 | | | |
| 181.9 | | 0.1875 | 14.500 | 8.641 | 225.9 | 18.04 | 77.33 | 81.9 | 30.1 | 0.0 | 56.5 | | | |
| | | | | | | | | | | | 17,884.1 | | | 20,752. |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number:OAA727133_C3_01 4/13/2018 4:43:15 PM

Customer: VERIZON WIRELESS

**Load Case:** 1.2D + 1.6W — 93 mph with No Ice — 28 Iterations

Gust Response Factor :1.10 — Wind Importance Factor :1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 304.1 | 0.0 | | | | | 0.0 | 0.0 | 304.1 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 604.9 | 1,040.8 | | | | | 0.0 | 1,169.5 | 604.9 | 2,210.3 | 0.0 | 0.0 |
| 10.00 | | 559.6 | 1,020.7 | | | | | 0.0 | 1,382.3 | 559.6 | 2,403.0 | 0.0 | 0.0 |
| 14.71 | Reinf. Top | 274.5 | 943.2 | | | | | 60.2 | 1,302.1 | 334.7 | 2,245.3 | 0.0 | 0.0 |
| 15.00 | | 284.8 | 57.5 | | | | | 3.7 | 62.7 | 288.5 | 120.2 | 0.0 | 0.0 |
| 20.00 | Reinf. Top Reinf | 532.7 | 980.6 | | | | | 63.9 | 1,081.7 | 596.6 | 2,062.2 | 0.0 | 0.0 |
| 25.00 | | 521.7 | 960.5 | | | | | 63.9 | 1,081.7 | 585.7 | 2,042.2 | 0.0 | 0.0 |
| 30.00 | | 516.9 | 940.4 | | | | | 63.9 | 1,081.7 | 580.8 | 2,022.1 | 0.0 | 0.0 |
| 35.00 | | 522.5 | 920.3 | | | | | 64.7 | 1,081.7 | 587.2 | 2,002.0 | 0.0 | 0.0 |
| 40.00 | | 482.7 | 900.3 | | | | | 66.0 | 1,081.7 | 548.7 | 1,981.9 | 0.0 | 0.0 |
| 44.10 | Bot - Section 2 | 268.1 | 723.2 | | | | | 55.0 | 887.0 | 323.1 | 1,610.2 | 0.0 | 0.0 |
| 45.00 | | 246.6 | 290.3 | | | | | 12.2 | 194.7 | 258.8 | 485.0 | 0.0 | 0.0 |
| 48.60 | Top - Section 1 | 274.5 | 1,149.2 | | | | | 49.1 | 778.8 | 323.5 | 1,928.0 | 0.0 | 0.0 |
| 50.00 | | 353.1 | 203.0 | | | | | 19.2 | 302.9 | 372.3 | 505.8 | 0.0 | 0.0 |
| 55.00 | | 552.8 | 714.2 | | | | | 69.3 | 1,081.7 | 622.0 | 1,795.8 | 0.0 | 0.0 |
| 60.00 | | 553.4 | 697.4 | | | | | 70.2 | 1,081.7 | 623.6 | 1,779.1 | 0.0 | 0.0 |
| 65.00 | | 552.6 | 680.7 | | | | | 71.0 | 1,081.7 | 623.6 | 1,762.4 | 0.0 | 0.0 |
| 70.00 | | 550.5 | 664.0 | | | | | 71.8 | 1,081.7 | 622.3 | 1,745.6 | 0.0 | 0.0 |
| 75.00 | | 547.3 | 647.2 | | | | | 72.5 | 1,081.7 | 619.8 | 1,728.9 | 0.0 | 0.0 |
| 80.00 | Reinf. Top Reinf | 543.0 | 630.5 | | | | | 73.2 | 1,081.7 | 616.3 | 1,712.2 | 0.0 | 0.0 |
| 85.00 | | 355.2 | 613.8 | | | | | 73.9 | 982.5 | 429.1 | 1,596.3 | 0.0 | 0.0 |
| 86.58 | Bot - Section 3 | 270.6 | 190.5 | | | | | 23.5 | 310.5 | 294.1 | 500.9 | 0.0 | 0.0 |
| 90.00 | | 203.6 | 738.2 | | | | | 51.0 | 672.0 | 254.6 | 1,410.2 | 0.0 | 0.0 |
| 90.33 | Top - Section 2 | 268.9 | 70.5 | | | | | 4.9 | 64.8 | 273.8 | 135.3 | 0.0 | 0.0 |
| 95.00 | | 516.3 | 441.8 | | | | | 70.2 | 917.6 | 586.5 | 1,359.5 | 0.0 | 0.0 |
| 100.00 | | 526.7 | 460.1 | | | | | 75.7 | 982.5 | 602.3 | 1,442.6 | 0.0 | 0.0 |
| 105.00 | | 518.4 | 446.7 | | | | | 76.2 | 982.5 | 594.6 | 1,429.2 | 0.0 | 0.0 |
| 110.00 | | 509.5 | 433.4 | | | | | 76.7 | 982.5 | 586.3 | 1,415.8 | 0.0 | 0.0 |
| 115.00 | | 500.0 | 420.0 | | | | | 77.2 | 982.5 | 577.3 | 1,402.5 | 0.0 | 0.0 |
| 120.00 | Reinf. Top Reinf | 489.9 | 406.6 | | | | | 77.7 | 982.5 | 567.6 | 1,389.1 | 0.0 | 0.0 |
| 125.00 | | 303.5 | 393.2 | | | | | 78.2 | 802.1 | 381.7 | 1,195.3 | 0.0 | 0.0 |
| 126.28 | Top - Section 3 | 236.9 | 98.5 | | | | | 20.1 | 205.3 | 257.0 | 303.9 | 0.0 | 0.0 |
| 130.00 | | 406.9 | 211.6 | | | | | 58.5 | 596.8 | 465.4 | 808.3 | 0.0 | 0.0 |
| 135.00 | | 456.3 | 275.6 | | | | | 79.1 | 802.1 | 535.4 | 1,077.7 | 0.0 | 0.0 |
| 140.00 | Reinf. Top Reinf | 444.1 | 265.6 | | | | | 79.5 | 802.1 | 523.6 | 1,067.7 | 0.0 | 0.0 |
| 145.00 | | 262.0 | 255.5 | | | | | 79.9 | 645.7 | 341.9 | 901.2 | 0.0 | 0.0 |
| 146.00 | Appurtenance(s) | 212.5 | 49.9 | 523.2 | 0.0 | 0.0 | 837.2 | 16.0 | 129.1 | 751.7 | 1,016.3 | 0.0 | 0.0 |
| 150.00 | | 375.4 | 195.6 | | | | | 64.3 | 492.9 | 439.6 | 688.5 | 0.0 | 0.0 |
| 155.00 | | 345.9 | 235.4 | | | | | 80.7 | 616.2 | 426.6 | 851.6 | 0.0 | 0.0 |
| 158.50 | Reinf. Top | 199.0 | 158.8 | | | | | 56.7 | 431.3 | 255.7 | 590.2 | 0.0 | 0.0 |
| 160.00 | | 218.9 | 66.6 | | | | | 24.3 | 55.0 | 243.3 | 121.6 | 0.0 | 0.0 |
| 165.00 | | 191.2 | 215.4 | | | | | 0.0 | 183.3 | 191.2 | 398.7 | 0.0 | 0.0 |
| 166.00 | Appurtenance(s) | 153.9 | 41.9 | 2,597.3 | 0.0 | 0.0 | 2,603.5 | 0.0 | 36.7 | 2,751.2 | 2,682.0 | 0.0 | 0.0 |
| 170.00 | | 270.3 | 163.5 | | | | | 0.0 | 115.3 | 270.3 | 278.8 | 0.0 | 0.0 |
| 175.00 | Appurtenance(s) | 289.0 | 195.3 | 4,375.1 | 0.0 | 0.0 | 3,234.4 | 0.0 | 144.1 | 4,664.1 | 3,573.8 | 0.0 | 0.0 |
| 180.00 | | 193.3 | 185.3 | | | | | 0.0 | 106.8 | 193.3 | 292.1 | 0.0 | 0.0 |
| 181.90 | | 52.0 | 67.8 | | | | | 0.0 | 40.6 | 52.0 | 108.3 | 0.0 | 0.0 |

| | | | | |
|---|---|---|---|---|
| Site Number: | 302502 | Code: | ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: | OAA727133_C3_01 | 4/13/2018 4:43:20 PM |
| Customer: | VERIZON WIRELESS | | | |

Load Case: 1.2D + 1.6W — 93 mph with No Ice — 28 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

| | | | | |
|---|---|---|---|---|
| Totals: | 27,506.2 | 60,179.5 | 0.00 | 0.00 |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number: OAA727133_C3_01 4/13/2018 4:43:20 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W 93 mph with No Ice 28 Iterations

Gust Response Factor : 1.10 Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -64.22 | -30.93 | 0.00 | -3,879.75 | 0.00 | 3,879.75 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.516 |
| 5.00 | -61.92 | -30.51 | 0.00 | -3,725.10 | 0.00 | 3,725.10 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.10 | -0.18 | 0.503 |
| 10.00 | -59.43 | -30.12 | 0.00 | -3,572.54 | 0.00 | 3,572.54 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.38 | -0.35 | 0.489 |
| 14.71 | -57.14 | -29.86 | 0.00 | -3,430.68 | 0.00 | 3,430.68 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.81 | -0.52 | 0.476 |
| 14.71 | -57.14 | -29.86 | 0.00 | -3,430.68 | 0.00 | 3,430.68 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.81 | -0.52 | 0.591 |
| 15.00 | -56.96 | -29.68 | 0.00 | -3,422.02 | 0.00 | 3,422.02 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.84 | -0.53 | 0.590 |
| 20.00 | -54.80 | -29.27 | 0.00 | -3,273.62 | 0.00 | 3,273.62 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 1.52 | -0.75 | 0.575 |
| 20.00 | -54.80 | -29.27 | 0.00 | -3,273.62 | 0.00 | 3,273.62 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 1.52 | -0.75 | 0.575 |
| 25.00 | -52.65 | -28.86 | 0.00 | -3,127.26 | 0.00 | 3,127.26 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 2.42 | -0.97 | 0.560 |
| 30.00 | -50.53 | -28.43 | 0.00 | -2,982.97 | 0.00 | 2,982.97 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 3.55 | -1.19 | 0.544 |
| 35.00 | -48.44 | -27.99 | 0.00 | -2,840.80 | 0.00 | 2,840.80 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 4.92 | -1.41 | 0.528 |
| 40.00 | -46.38 | -27.55 | 0.00 | -2,700.87 | 0.00 | 2,700.87 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 6.51 | -1.63 | 0.512 |
| 44.10 | -44.72 | -27.26 | 0.00 | -2,587.92 | 0.00 | 2,587.92 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 8.00 | -1.81 | 0.499 |
| 45.00 | -44.20 | -27.07 | 0.00 | -2,563.38 | 0.00 | 2,563.38 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 8.34 | -1.85 | 0.488 |
| 48.60 | -42.23 | -26.76 | 0.00 | -2,465.95 | 0.00 | 2,465.95 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 9.80 | -2.01 | 0.550 |
| 50.00 | -41.68 | -26.47 | 0.00 | -2,428.49 | 0.00 | 2,428.49 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 10.40 | -2.07 | 0.545 |
| 55.00 | -39.80 | -25.94 | 0.00 | -2,296.13 | 0.00 | 2,296.13 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 12.69 | -2.30 | 0.524 |
| 60.00 | -37.95 | -25.39 | 0.00 | -2,166.43 | 0.00 | 2,166.43 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 15.21 | -2.52 | 0.503 |
| 65.00 | -36.13 | -24.83 | 0.00 | -2,039.49 | 0.00 | 2,039.49 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 17.97 | -2.74 | 0.482 |
| 70.00 | -34.32 | -24.25 | 0.00 | -1,915.37 | 0.00 | 1,915.37 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 20.96 | -2.96 | 0.461 |
| 75.00 | -32.54 | -23.66 | 0.00 | -1,794.13 | 0.00 | 1,794.13 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 24.18 | -3.18 | 0.441 |
| 80.00 | -30.78 | -23.06 | 0.00 | -1,675.83 | 0.00 | 1,675.83 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 27.63 | -3.40 | 0.420 |
| 80.00 | -30.78 | -23.06 | 0.00 | -1,675.83 | 0.00 | 1,675.83 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 27.63 | -3.40 | 0.462 |
| 85.00 | -29.16 | -22.61 | 0.00 | -1,560.53 | 0.00 | 1,560.53 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 31.30 | -3.61 | 0.440 |
| 86.58 | -28.63 | -22.34 | 0.00 | -1,524.81 | 0.00 | 1,524.81 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 32.50 | -3.68 | 0.433 |
| 90.00 | -27.20 | -22.04 | 0.00 | -1,448.40 | 0.00 | 1,448.40 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 35.20 | -3.84 | 0.410 |
| 90.33 | -27.05 | -21.81 | 0.00 | -1,441.13 | 0.00 | 1,441.13 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 35.46 | -3.86 | 0.482 |
| 95.00 | -25.65 | -21.23 | 0.00 | -1,339.29 | 0.00 | 1,339.29 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 39.34 | -4.07 | 0.455 |
| 100.00 | -24.17 | -20.62 | 0.00 | -1,233.16 | 0.00 | 1,233.16 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 43.72 | -4.30 | 0.427 |
| 105.00 | -22.72 | -20.00 | 0.00 | -1,130.08 | 0.00 | 1,130.08 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 48.34 | -4.52 | 0.398 |
| 110.00 | -21.28 | -19.38 | 0.00 | -1,030.08 | 0.00 | 1,030.08 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 53.18 | -4.74 | 0.370 |
| 115.00 | -19.86 | -18.76 | 0.00 | -933.17 | 0.00 | 933.17 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 58.25 | -4.95 | 0.342 |
| 120.00 | -18.47 | -18.14 | 0.00 | -839.38 | 0.00 | 839.38 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 63.54 | -5.15 | 0.314 |
| 120.00 | -18.47 | -18.14 | 0.00 | -839.38 | 0.00 | 839.38 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 63.54 | -5.15 | 0.380 |
| 125.00 | -17.27 | -17.68 | 0.00 | -748.70 | 0.00 | 748.70 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 69.03 | -5.34 | 0.347 |
| 126.28 | -16.96 | -17.43 | 0.00 | -726.07 | 0.00 | 726.07 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 70.47 | -5.40 | 0.339 |
| 126.28 | -16.96 | -17.43 | 0.00 | -726.07 | 0.00 | 726.07 | 900.61 | 450.31 | 868.79 | 429.06 | 70.47 | -5.40 | 0.413 |
| 130.00 | -16.14 | -16.95 | 0.00 | -661.22 | 0.00 | 661.22 | 888.95 | 444.47 | 835.13 | 412.44 | 74.74 | -5.57 | 0.381 |
| 135.00 | -15.06 | -16.37 | 0.00 | -576.48 | 0.00 | 576.48 | 872.29 | 436.14 | 789.93 | 390.12 | 80.68 | -5.79 | 0.337 |
| 140.00 | -14.00 | -15.78 | 0.00 | -494.65 | 0.00 | 494.65 | 854.50 | 427.25 | 744.88 | 367.87 | 86.85 | -6.00 | 0.295 |
| 140.00 | -14.00 | -15.78 | 0.00 | -494.65 | 0.00 | 494.65 | 854.50 | 427.25 | 744.88 | 367.87 | 86.85 | -6.00 | 0.372 |
| 145.00 | -13.11 | -15.38 | 0.00 | -415.73 | 0.00 | 415.73 | 835.60 | 417.80 | 700.09 | 345.75 | 93.24 | -6.19 | 0.320 |
| 146.00 | -12.15 | -14.54 | 0.00 | -400.35 | 0.00 | 400.35 | 831.68 | 415.84 | 691.17 | 341.34 | 94.54 | -6.24 | 0.309 |
| 150.00 | -11.47 | -14.07 | 0.00 | -342.18 | 0.00 | 342.18 | 815.57 | 407.78 | 655.68 | 323.81 | 99.83 | -6.41 | 0.269 |
| 155.00 | -10.64 | -13.57 | 0.00 | -271.86 | 0.00 | 271.86 | 794.42 | 397.21 | 611.76 | 302.12 | 106.64 | -6.60 | 0.219 |
| 158.50 | -10.06 | -13.26 | 0.00 | -224.35 | 0.00 | 224.35 | 778.94 | 389.47 | 581.37 | 287.12 | 111.51 | -6.72 | 0.184 |
| 158.50 | -10.06 | -13.26 | 0.00 | -224.35 | 0.00 | 224.35 | 778.94 | 389.47 | 581.37 | 287.12 | 111.51 | -6.72 | 0.795 |
| 160.00 | -9.90 | -13.06 | 0.00 | -204.46 | 0.00 | 204.46 | 772.14 | 386.07 | 568.44 | 280.73 | 113.63 | -6.76 | 0.742 |
| 165.00 | -9.45 | -12.88 | 0.00 | -139.14 | 0.00 | 139.14 | 748.74 | 374.37 | 525.85 | 259.70 | 121.01 | -7.32 | 0.550 |
| 166.00 | -7.11 | -9.83 | 0.00 | -126.26 | 0.00 | 126.26 | 743.93 | 371.96 | 517.43 | 255.54 | 122.55 | -7.42 | 0.504 |
| 170.00 | -6.82 | -9.56 | 0.00 | -86.94 | 0.00 | 86.94 | 723.19 | 361.60 | 483.41 | 238.74 | 128.89 | -7.74 | 0.374 |

Load Case: 1.2D + 1.6W 93 mph with No Ice 28 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.60
Wind Importance Factor : 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 175.00 | -3.90 | -4.47 | 0.00 | -39.13 | 0.00 | 39.13 | 686.95 | 343.48 | 435.91 | 215.28 | 137.13 | -8.01 | 0.188 |
| 180.00 | -3.64 | -4.24 | 0.00 | -16.80 | 0.00 | 16.80 | 650.71 | 325.36 | 390.87 | 193.04 | 145.58 | -8.15 | 0.093 |
| 181.90 | 0.00 | -3.68 | 0.00 | -8.75 | 0.00 | 8.75 | 636.94 | 318.47 | 374.40 | 184.90 | 148.82 | -8.18 | 0.047 |

Load Case: 0.9D + 1.6W — 93 mph with No Ice (Reduced DL) — 27 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 237.9 | 0.0 | | | | | 0.0 | 0.0 | 237.9 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 471.2 | 780.6 | | | | | 0.0 | 877.1 | 471.2 | 1,657.7 | 0.0 | 0.0 |
| 10.00 | | 492.1 | 765.5 | | | | | 0.0 | 1,036.7 | 492.1 | 1,802.2 | 0.0 | 0.0 |
| 14.71 | Reinf. Top | 274.5 | 707.4 | | | | | 60.2 | 976.6 | 334.7 | 1,683.9 | 0.0 | 0.0 |
| 15.00 | | 284.8 | 43.1 | | | | | 3.7 | 47.1 | 288.5 | 90.2 | 0.0 | 0.0 |
| 20.00 | Reinf. Top Reinf | 532.7 | 735.4 | | | | | 63.9 | 811.2 | 596.6 | 1,546.7 | 0.0 | 0.0 |
| 25.00 | | 521.7 | 720.4 | | | | | 63.9 | 811.2 | 585.7 | 1,531.6 | 0.0 | 0.0 |
| 30.00 | | 516.9 | 705.3 | | | | | 63.9 | 811.2 | 580.8 | 1,516.6 | 0.0 | 0.0 |
| 35.00 | | 522.5 | 690.3 | | | | | 64.7 | 811.2 | 587.2 | 1,501.5 | 0.0 | 0.0 |
| 40.00 | | 482.7 | 675.2 | | | | | 66.0 | 811.2 | 548.7 | 1,486.5 | 0.0 | 0.0 |
| 44.10 | Bot - Section 2 | 268.1 | 542.4 | | | | | 55.0 | 665.2 | 323.1 | 1,207.7 | 0.0 | 0.0 |
| 45.00 | | 246.6 | 217.7 | | | | | 12.2 | 146.0 | 258.8 | 363.7 | 0.0 | 0.0 |
| 48.60 | Top - Section 1 | 274.5 | 861.9 | | | | | 49.1 | 584.1 | 323.5 | 1,446.0 | 0.0 | 0.0 |
| 50.00 | | 353.1 | 152.2 | | | | | 19.2 | 227.1 | 372.3 | 379.4 | 0.0 | 0.0 |
| 55.00 | | 552.8 | 535.6 | | | | | 69.3 | 811.2 | 622.0 | 1,346.9 | 0.0 | 0.0 |
| 60.00 | | 553.4 | 523.1 | | | | | 70.2 | 811.2 | 623.6 | 1,334.3 | 0.0 | 0.0 |
| 65.00 | | 552.6 | 510.5 | | | | | 71.0 | 811.2 | 623.6 | 1,321.8 | 0.0 | 0.0 |
| 70.00 | | 550.5 | 498.0 | | | | | 71.8 | 811.2 | 622.3 | 1,309.2 | 0.0 | 0.0 |
| 75.00 | | 547.3 | 485.4 | | | | | 72.5 | 811.2 | 619.8 | 1,296.7 | 0.0 | 0.0 |
| 80.00 | Reinf. Top Reinf | 543.0 | 472.9 | | | | | 73.2 | 811.2 | 616.3 | 1,284.1 | 0.0 | 0.0 |
| 85.00 | | 355.2 | 460.3 | | | | | 73.9 | 736.9 | 429.1 | 1,197.2 | 0.0 | 0.0 |
| 86.58 | Bot - Section 3 | 270.6 | 142.9 | | | | | 23.5 | 232.8 | 294.1 | 375.7 | 0.0 | 0.0 |
| 90.00 | | 203.6 | 553.6 | | | | | 51.0 | 504.0 | 254.6 | 1,057.6 | 0.0 | 0.0 |
| 90.33 | Top - Section 2 | 268.9 | 52.9 | | | | | 4.9 | 48.6 | 273.8 | 101.5 | 0.0 | 0.0 |
| 95.00 | | 516.3 | 331.4 | | | | | 70.2 | 688.2 | 586.5 | 1,019.6 | 0.0 | 0.0 |
| 100.00 | | 526.7 | 345.1 | | | | | 75.7 | 736.9 | 602.3 | 1,082.0 | 0.0 | 0.0 |
| 105.00 | | 518.4 | 335.1 | | | | | 76.2 | 736.9 | 594.6 | 1,071.9 | 0.0 | 0.0 |
| 110.00 | | 509.5 | 325.0 | | | | | 76.7 | 736.9 | 586.3 | 1,061.9 | 0.0 | 0.0 |
| 115.00 | | 500.0 | 315.0 | | | | | 77.2 | 736.9 | 577.3 | 1,051.8 | 0.0 | 0.0 |
| 120.00 | Reinf. Top Reinf | 489.9 | 304.9 | | | | | 77.7 | 736.9 | 567.6 | 1,041.8 | 0.0 | 0.0 |
| 125.00 | | 303.5 | 294.9 | | | | | 78.2 | 601.6 | 381.7 | 896.5 | 0.0 | 0.0 |
| 126.28 | Top - Section 3 | 236.9 | 73.9 | | | | | 20.1 | 154.0 | 257.0 | 227.9 | 0.0 | 0.0 |
| 130.00 | | 406.9 | 158.7 | | | | | 58.5 | 447.6 | 465.4 | 606.3 | 0.0 | 0.0 |
| 135.00 | | 456.3 | 206.7 | | | | | 79.1 | 601.6 | 535.4 | 808.3 | 0.0 | 0.0 |
| 140.00 | Reinf. Top Reinf | 444.1 | 199.2 | | | | | 79.5 | 601.6 | 523.6 | 800.8 | 0.0 | 0.0 |
| 145.00 | | 262.0 | 191.6 | | | | | 79.9 | 484.3 | 341.9 | 675.9 | 0.0 | 0.0 |
| 146.00 | Appurtenance(s) | 212.5 | 37.4 | 523.2 | 0.0 | 0.0 | 627.9 | 16.0 | 96.9 | 751.7 | 762.2 | 0.0 | 0.0 |
| 150.00 | | 375.4 | 146.7 | | | | | 64.3 | 369.7 | 439.6 | 516.4 | 0.0 | 0.0 |
| 155.00 | | 345.9 | 176.6 | | | | | 80.7 | 462.1 | 426.6 | 638.7 | 0.0 | 0.0 |
| 158.50 | Reinf. Top | 199.0 | 119.1 | | | | | 56.7 | 323.5 | 255.7 | 442.6 | 0.0 | 0.0 |
| 160.00 | | 218.9 | 49.9 | | | | | 24.3 | 41.2 | 243.3 | 91.2 | 0.0 | 0.0 |
| 165.00 | | 191.2 | 161.5 | | | | | 0.0 | 137.5 | 191.2 | 299.0 | 0.0 | 0.0 |
| 166.00 | Appurtenance(s) | 153.9 | 31.4 | 2,597.3 | 0.0 | 0.0 | 1,952.6 | 0.0 | 27.5 | 2,751.2 | 2,011.5 | 0.0 | 0.0 |
| 170.00 | | 270.3 | 122.6 | | | | | 0.0 | 86.5 | 270.3 | 209.1 | 0.0 | 0.0 |
| 175.00 | Appurtenance(s) | 289.0 | 146.5 | 4,375.1 | 0.0 | 0.0 | 2,425.8 | 0.0 | 108.1 | 4,664.1 | 2,680.3 | 0.0 | 0.0 |
| 180.00 | | 193.3 | 138.9 | | | | | 0.0 | 80.1 | 193.3 | 219.0 | 0.0 | 0.0 |
| 181.90 | | 52.0 | 50.8 | | | | | 0.0 | 30.4 | 52.0 | 81.3 | 0.0 | 0.0 |

| | | | | |
|---|---|---|---|---|
| Site Number: | 302502 | Code: | ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: | OAA727133_C3_01 | 4/13/2018 4:43:26 PM |
| Customer: | VERIZON WIRELESS | | | |

Load Case: 0.9D + 1.6W — 93 mph with No Ice (Reduced DL) — 27 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

| | | | | |
|---|---|---|---|---|
| Totals: | 27,238.7 | 45,134.6 | 0.00 | 0.00 |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number: OAA727133_C3_01 4/13/2018 4:43:26 PM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W 93 mph with No Ice (Reduced DL) 27 Iterations

Gust Response Factor : 1.10 Wind Importance Factor : 1.00

Dead Load Factor : 0.90

Wind Load Factor : 1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -48.16 | -30.70 | 0.00 | -3,807.90 | 0.00 | 3,807.90 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.505 |
| 5.00 | -46.41 | -30.37 | 0.00 | -3,654.40 | 0.00 | 3,654.40 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.09 | -0.17 | 0.491 |
| 10.00 | -44.52 | -30.00 | 0.00 | -3,502.57 | 0.00 | 3,502.57 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.37 | -0.35 | 0.478 |
| 14.71 | -42.79 | -29.72 | 0.00 | -3,361.28 | 0.00 | 3,361.28 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.79 | -0.51 | 0.465 |
| 14.71 | -42.79 | -29.72 | 0.00 | -3,361.28 | 0.00 | 3,361.28 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.79 | -0.51 | 0.577 |
| 15.00 | -42.65 | -29.51 | 0.00 | -3,352.66 | 0.00 | 3,352.66 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.83 | -0.52 | 0.576 |
| 20.00 | -41.00 | -29.05 | 0.00 | -3,205.11 | 0.00 | 3,205.11 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 1.49 | -0.74 | 0.561 |
| 20.00 | -41.00 | -29.05 | 0.00 | -3,205.11 | 0.00 | 3,205.11 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 1.49 | -0.74 | 0.561 |
| 25.00 | -39.37 | -28.59 | 0.00 | -3,059.86 | 0.00 | 3,059.86 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 2.37 | -0.95 | 0.545 |
| 30.00 | -37.76 | -28.12 | 0.00 | -2,916.90 | 0.00 | 2,916.90 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 3.48 | -1.17 | 0.530 |
| 35.00 | -36.17 | -27.64 | 0.00 | -2,776.28 | 0.00 | 2,776.28 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 4.82 | -1.38 | 0.514 |
| 40.00 | -34.60 | -27.17 | 0.00 | -2,638.08 | 0.00 | 2,638.08 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 6.38 | -1.60 | 0.499 |
| 44.10 | -33.35 | -26.88 | 0.00 | -2,526.68 | 0.00 | 2,526.68 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 7.83 | -1.77 | 0.486 |
| 45.00 | -32.95 | -26.66 | 0.00 | -2,502.50 | 0.00 | 2,502.50 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 8.17 | -1.81 | 0.475 |
| 48.60 | -31.47 | -26.35 | 0.00 | -2,406.52 | 0.00 | 2,406.52 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 9.60 | -1.97 | 0.535 |
| 50.00 | -31.04 | -26.04 | 0.00 | -2,369.63 | 0.00 | 2,369.63 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 10.18 | -2.03 | 0.530 |
| 55.00 | -29.62 | -25.48 | 0.00 | -2,239.44 | 0.00 | 2,239.44 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 12.42 | -2.25 | 0.509 |
| 60.00 | -28.22 | -24.91 | 0.00 | -2,112.03 | 0.00 | 2,112.03 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 14.89 | -2.46 | 0.489 |
| 65.00 | -26.84 | -24.33 | 0.00 | -1,987.48 | 0.00 | 1,987.48 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 17.59 | -2.68 | 0.468 |
| 70.00 | -25.47 | -23.74 | 0.00 | -1,865.83 | 0.00 | 1,865.83 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 20.51 | -2.90 | 0.448 |
| 75.00 | -24.12 | -23.14 | 0.00 | -1,747.14 | 0.00 | 1,747.14 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 23.66 | -3.11 | 0.428 |
| 80.00 | -22.79 | -22.54 | 0.00 | -1,631.43 | 0.00 | 1,631.43 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 27.03 | -3.32 | 0.407 |
| 80.00 | -22.79 | -22.54 | 0.00 | -1,631.43 | 0.00 | 1,631.43 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 27.03 | -3.32 | 0.449 |
| 85.00 | -21.57 | -22.09 | 0.00 | -1,518.75 | 0.00 | 1,518.75 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 30.61 | -3.52 | 0.427 |
| 86.58 | -21.17 | -21.81 | 0.00 | -1,483.85 | 0.00 | 1,483.85 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 31.79 | -3.60 | 0.420 |
| 90.00 | -20.10 | -21.52 | 0.00 | -1,409.24 | 0.00 | 1,409.24 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 34.42 | -3.75 | 0.397 |
| 90.33 | -19.97 | -21.28 | 0.00 | -1,402.14 | 0.00 | 1,402.14 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 34.68 | -3.77 | 0.468 |
| 95.00 | -18.92 | -20.70 | 0.00 | -1,302.76 | 0.00 | 1,302.76 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 38.47 | -3.97 | 0.441 |
| 100.00 | -17.81 | -20.09 | 0.00 | -1,199.27 | 0.00 | 1,199.27 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 42.74 | -4.19 | 0.414 |
| 105.00 | -16.71 | -19.48 | 0.00 | -1,098.83 | 0.00 | 1,098.83 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 47.25 | -4.41 | 0.386 |
| 110.00 | -15.63 | -18.87 | 0.00 | -1,001.44 | 0.00 | 1,001.44 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 51.98 | -4.62 | 0.358 |
| 115.00 | -14.56 | -18.26 | 0.00 | -907.11 | 0.00 | 907.11 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 56.92 | -4.83 | 0.331 |
| 120.00 | -13.52 | -17.65 | 0.00 | -815.84 | 0.00 | 815.84 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 62.08 | -5.02 | 0.304 |
| 120.00 | -13.52 | -17.65 | 0.00 | -815.84 | 0.00 | 815.84 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 62.08 | -5.02 | 0.368 |
| 125.00 | -12.62 | -17.21 | 0.00 | -727.61 | 0.00 | 727.61 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 67.44 | -5.21 | 0.336 |
| 126.28 | -12.38 | -16.96 | 0.00 | -705.58 | 0.00 | 705.58 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 68.84 | -5.27 | 0.328 |
| 126.28 | -12.38 | -16.96 | 0.00 | -705.58 | 0.00 | 705.58 | 900.61 | 450.31 | 868.79 | 429.06 | 68.84 | -5.27 | 0.400 |
| 130.00 | -11.77 | -16.48 | 0.00 | -642.49 | 0.00 | 642.49 | 888.95 | 444.47 | 835.13 | 412.44 | 73.00 | -5.43 | 0.368 |
| 135.00 | -10.96 | -15.91 | 0.00 | -560.09 | 0.00 | 560.09 | 872.29 | 436.14 | 789.93 | 390.12 | 78.80 | -5.65 | 0.326 |
| 140.00 | -10.16 | -15.34 | 0.00 | -480.55 | 0.00 | 480.55 | 854.50 | 427.25 | 744.88 | 367.87 | 84.82 | -5.85 | 0.285 |
| 140.00 | -10.16 | -15.34 | 0.00 | -480.55 | 0.00 | 480.55 | 854.50 | 427.25 | 744.88 | 367.87 | 84.82 | -5.85 | 0.360 |
| 145.00 | -9.50 | -14.95 | 0.00 | -403.84 | 0.00 | 403.84 | 835.60 | 417.80 | 700.09 | 345.75 | 91.04 | -6.04 | 0.309 |
| 146.00 | -8.79 | -14.14 | 0.00 | -388.89 | 0.00 | 388.89 | 831.68 | 415.84 | 691.17 | 341.34 | 92.31 | -6.08 | 0.299 |
| 150.00 | -8.28 | -13.67 | 0.00 | -332.33 | 0.00 | 332.33 | 815.57 | 407.78 | 655.68 | 323.81 | 97.47 | -6.25 | 0.260 |
| 155.00 | -7.66 | -13.20 | 0.00 | -263.97 | 0.00 | 263.97 | 794.42 | 397.21 | 611.76 | 302.12 | 104.11 | -6.43 | 0.212 |
| 158.50 | -7.23 | -12.90 | 0.00 | -217.77 | 0.00 | 217.77 | 778.94 | 389.47 | 581.37 | 287.12 | 108.86 | -6.55 | 0.178 |
| 158.50 | -7.23 | -12.90 | 0.00 | -217.77 | 0.00 | 217.77 | 778.94 | 389.47 | 581.37 | 287.12 | 108.86 | -6.55 | 0.769 |
| 160.00 | -7.10 | -12.69 | 0.00 | -198.42 | 0.00 | 198.42 | 772.14 | 386.07 | 568.44 | 280.73 | 110.92 | -6.59 | 0.717 |
| 165.00 | -6.76 | -12.50 | 0.00 | -134.97 | 0.00 | 134.97 | 748.74 | 374.37 | 525.85 | 259.70 | 118.11 | -7.13 | 0.530 |
| 166.00 | -5.07 | -9.54 | 0.00 | -122.47 | 0.00 | 122.47 | 743.93 | 371.96 | 517.43 | 255.54 | 119.61 | -7.23 | 0.487 |
| 170.00 | -4.85 | -9.27 | 0.00 | -84.32 | 0.00 | 84.32 | 723.19 | 361.60 | 483.41 | 238.74 | 125.79 | -7.54 | 0.361 |

| | | | |
|---|---|---|---|
| Site Number: | 302502 | Code: ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: OAA727133_C3_01 | 4/13/2018 4:43:26 PM |
| Customer: | VERIZON WIRELESS | | |

Load Case: 0.9D + 1.6W — 93 mph with No Ice (Reduced DL) — 27 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60
Wind Importance Factor : 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 175.00 | -2.81 | -4.30 | 0.00 | -37.98 | 0.00 | 37.98 | 686.95 | 343.48 | 435.91 | 215.28 | 133.82 | -7.80 | 0.181 |
| 180.00 | -2.61 | -4.08 | 0.00 | -16.50 | 0.00 | 16.50 | 650.71 | 325.36 | 390.87 | 193.04 | 142.05 | -7.94 | 0.090 |
| 181.90 | 0.00 | -3.68 | 0.00 | -8.75 | 0.00 | 8.75 | 636.94 | 318.47 | 374.40 | 184.90 | 145.21 | -7.97 | 0.047 |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number: OAA727133_C3_01 4/13/2018 4:43:26 PM

Customer: VERIZON WIRELESS

**Load Case:** 1.2D + 1.0Di + 1.0Wi — 40 mph with 1.00 in Radial Ice — 27 Iterations

Gust Response Factor: 1.10 | Ice Dead Load Factor: 1.00 | Wind Importance Factor: 1.00

Dead Load Factor: 1.20 | Ice Importance Factor: 1.00

Wind Load Factor: 1.00

## Applied Segment Forces Summary

| | | Shaft Forces | | Discrete Forces | | | | Linear Forces | | Sum of Forces | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg Elev (ft) | Description | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Torsion MY (lb-ft) | Moment MZ (lb-ft) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Torsion MY (lb-ft) | Moment MZ (lb) |
| 0.00 | | 35.3 | 0.0 | | | | | 0.0 | 0.0 | 35.3 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 70.3 | 1,478.3 | | | | | 0.0 | 1,350.7 | 70.3 | 2,829.0 | 0.0 | 0.0 |
| 10.00 | | 67.5 | 1,501.8 | | | | | 0.0 | 1,692.5 | 67.5 | 3,194.3 | 0.0 | 0.0 |
| 14.71 | Reinf. Top | 34.5 | 1,412.0 | | | | | 17.1 | 1,610.1 | 51.6 | 3,022.1 | 0.0 | 0.0 |
| 15.00 | | 35.9 | 86.9 | | | | | 1.1 | 82.1 | 37.0 | 169.0 | 0.0 | 0.0 |
| 20.00 | Reinf. Top Reinf | 67.3 | 1,486.2 | | | | | 18.4 | 1,412.6 | 85.7 | 2,898.8 | 0.0 | 0.0 |
| 25.00 | | 66.2 | 1,469.4 | | | | | 18.5 | 1,343.7 | 84.7 | 2,813.1 | 0.0 | 0.0 |
| 30.00 | | 65.8 | 1,449.8 | | | | | 18.6 | 1,349.3 | 84.4 | 2,799.1 | 0.0 | 0.0 |
| 35.00 | | 66.8 | 1,428.1 | | | | | 19.2 | 1,354.1 | 85.9 | 2,782.2 | 0.0 | 0.0 |
| 40.00 | | 61.9 | 1,405.0 | | | | | 20.1 | 1,358.3 | 81.9 | 2,763.3 | 0.0 | 0.0 |
| 44.10 | Bot - Section 2 | 34.4 | 1,134.9 | | | | | 17.1 | 1,116.6 | 51.5 | 2,251.5 | 0.0 | 0.0 |
| 45.00 | | 31.7 | 382.4 | | | | | 3.8 | 245.4 | 35.5 | 627.8 | 0.0 | 0.0 |
| 48.60 | Top - Section 1 | 35.3 | 1,513.7 | | | | | 15.5 | 982.7 | 50.8 | 2,496.5 | 0.0 | 0.0 |
| 50.00 | | 45.6 | 344.6 | | | | | 6.1 | 382.6 | 51.7 | 727.2 | 0.0 | 0.0 |
| 55.00 | | 71.5 | 1,212.4 | | | | | 22.3 | 1,368.4 | 93.8 | 2,580.8 | 0.0 | 0.0 |
| 60.00 | | 71.8 | 1,189.3 | | | | | 23.0 | 1,371.2 | 94.8 | 2,560.6 | 0.0 | 0.0 |
| 65.00 | | 71.9 | 1,165.7 | | | | | 23.6 | 1,373.8 | 95.6 | 2,539.5 | 0.0 | 0.0 |
| 70.00 | | 71.9 | 1,141.6 | | | | | 24.2 | 1,376.3 | 96.1 | 2,517.9 | 0.0 | 0.0 |
| 75.00 | | 71.8 | 1,117.1 | | | | | 24.7 | 1,378.5 | 96.5 | 2,495.6 | 0.0 | 0.0 |
| 80.00 | Reinf. Top Reinf | 71.5 | 1,092.2 | | | | | 25.3 | 1,380.7 | 96.8 | 2,472.9 | 0.0 | 0.0 |
| 85.00 | | 46.9 | 1,067.0 | | | | | 24.8 | 1,274.6 | 71.7 | 2,341.6 | 0.0 | 0.0 |
| 86.58 | Bot - Section 3 | 35.8 | 333.1 | | | | | 7.9 | 403.2 | 43.7 | 736.3 | 0.0 | 0.0 |
| 90.00 | | 26.9 | 1,047.3 | | | | | 17.3 | 873.3 | 44.3 | 1,920.6 | 0.0 | 0.0 |
| 90.33 | Top - Section 2 | 35.7 | 100.3 | | | | | 1.7 | 84.3 | 37.4 | 184.6 | 0.0 | 0.0 |
| 95.00 | | 68.7 | 855.3 | | | | | 24.0 | 1,194.0 | 92.7 | 2,049.2 | 0.0 | 0.0 |
| 100.00 | | 70.4 | 893.4 | | | | | 26.2 | 1,280.0 | 96.6 | 2,173.4 | 0.0 | 0.0 |
| 105.00 | | 69.6 | 870.5 | | | | | 26.6 | 1,281.7 | 96.2 | 2,152.2 | 0.0 | 0.0 |
| 110.00 | | 68.8 | 847.4 | | | | | 27.0 | 1,283.2 | 95.8 | 2,130.7 | 0.0 | 0.0 |
| 115.00 | | 67.8 | 824.2 | | | | | 27.4 | 1,284.7 | 95.2 | 2,108.9 | 0.0 | 0.0 |
| 120.00 | Reinf. Top Reinf | 66.8 | 800.7 | | | | | 27.8 | 1,286.2 | 94.6 | 2,086.9 | 0.0 | 0.0 |
| 125.00 | | 41.6 | 777.1 | | | | | 25.9 | 1,089.3 | 67.5 | 1,866.3 | 0.0 | 0.0 |
| 126.28 | Top - Section 3 | 32.6 | 196.3 | | | | | 6.7 | 279.1 | 39.3 | 475.3 | 0.0 | 0.0 |
| 130.00 | | 56.2 | 489.5 | | | | | 19.6 | 811.5 | 75.8 | 1,301.1 | 0.0 | 0.0 |
| 135.00 | | 63.4 | 638.5 | | | | | 26.6 | 1,091.8 | 90.0 | 1,730.3 | 0.0 | 0.0 |
| 140.00 | Reinf. Top Reinf | 62.2 | 617.7 | | | | | 26.9 | 1,093.1 | 89.1 | 1,710.8 | 0.0 | 0.0 |
| 145.00 | | 36.8 | 596.8 | | | | | 24.9 | 920.2 | 61.7 | 1,517.1 | 0.0 | 0.0 |
| 146.00 | Appurtenance(s) | 30.1 | 117.8 | 104.7 | 0.0 | 0.0 | 1,886.2 | 5.0 | 184.2 | 139.8 | 2,188.2 | 0.0 | 0.0 |
| 150.00 | | 53.4 | 460.0 | | | | | 20.2 | 593.4 | 73.5 | 1,053.4 | 0.0 | 0.0 |
| 155.00 | | 49.5 | 554.7 | | | | | 25.4 | 742.2 | 75.0 | 1,296.9 | 0.0 | 0.0 |
| 158.50 | Reinf. Top | 28.7 | 377.0 | | | | | 18.0 | 519.8 | 46.6 | 896.8 | 0.0 | 0.0 |
| 160.00 | | 36.4 | 159.1 | | | | | 7.7 | 93.0 | 44.2 | 252.1 | 0.0 | 0.0 |
| 165.00 | | 33.4 | 512.1 | | | | | 0.0 | 183.3 | 33.4 | 695.4 | 0.0 | 0.0 |
| 166.00 | Appurtenance(s) | 27.1 | 100.8 | 470.7 | 0.0 | 0.0 | 5,869.3 | 0.0 | 36.7 | 497.9 | 6,006.8 | 0.0 | 0.0 |
| 170.00 | | 48.0 | 391.8 | | | | | 0.0 | 115.3 | 48.0 | 507.1 | 0.0 | 0.0 |
| 175.00 | Appurtenance(s) | 51.9 | 469.1 | 721.3 | 0.0 | 0.0 | 9,775.7 | 0.0 | 144.1 | 773.2 | 10,388.9 | 0.0 | 0.0 |
| 180.00 | | 35.0 | 447.5 | | | | | 0.0 | 106.8 | 35.0 | 554.3 | 0.0 | 0.0 |
| 181.90 | | 9.5 | 165.8 | | | | | 0.0 | 40.6 | 9.5 | 206.4 | 0.0 | 0.0 |

| | | | | |
|---|---|---|---|---|
| Site Number: | 302502 | Code: | ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: | OAA727133_C3_01 | 4/13/2018 4:43:32 PM |
| Customer: | VERIZON WIRELESS | | | |

Load Case: 1.2D + 1.0Di + 1.0Wi — 40 mph with 1.00 in Radial Ice — 27 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.00

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00
Ice Importance Factor : 1.00

| | | | | |
|---|---|---|---|---|
| Totals: | 4,415.01 | 95,072.9 | 0.00 | 0.00 |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number: OAA727133_C3_01 4/13/2018 4:43:32 PM

Customer: VERIZON WIRELESS

**Load Case:** 1.2D + 1.0Di + 1.0Wi 40 mph with 1.00 in Radial Ice 27 Iterations

Gust Response Factor : 1.10 Ice Dead Load Factor : 1.00 Wind Importance Factor : 1.00

Dead Load Factor : 1.20 Ice Importance Factor : 1.00

Wind Load Factor : 1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -105.10 | -5.02 | 0.00 | -710.70 | 0.00 | 710.70 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.107 |
| 5.00 | -102.27 | -5.01 | 0.00 | -685.58 | 0.00 | 685.58 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.02 | -0.03 | 0.105 |
| 10.00 | -99.07 | -5.00 | 0.00 | -660.53 | 0.00 | 660.53 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.07 | -0.07 | 0.103 |
| 14.71 | -96.05 | -4.97 | 0.00 | -637.00 | 0.00 | 637.00 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.15 | -0.10 | 0.100 |
| 14.71 | -96.05 | -4.97 | 0.00 | -637.00 | 0.00 | 637.00 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.15 | -0.10 | 0.123 |
| 15.00 | -95.88 | -4.97 | 0.00 | -635.56 | 0.00 | 635.56 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.15 | -0.10 | 0.123 |
| 20.00 | -92.98 | -4.94 | 0.00 | -610.74 | 0.00 | 610.74 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.28 | -0.14 | 0.121 |
| 20.00 | -92.98 | -4.94 | 0.00 | -610.74 | 0.00 | 610.74 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.28 | -0.14 | 0.121 |
| 25.00 | -90.16 | -4.91 | 0.00 | -586.04 | 0.00 | 586.04 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.45 | -0.18 | 0.118 |
| 30.00 | -87.36 | -4.88 | 0.00 | -561.48 | 0.00 | 561.48 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.66 | -0.22 | 0.115 |
| 35.00 | -84.57 | -4.85 | 0.00 | -537.07 | 0.00 | 537.07 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 0.91 | -0.26 | 0.112 |
| 40.00 | -81.81 | -4.80 | 0.00 | -512.85 | 0.00 | 512.85 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 1.21 | -0.30 | 0.109 |
| 44.10 | -79.56 | -4.77 | 0.00 | -493.15 | 0.00 | 493.15 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 1.49 | -0.34 | 0.107 |
| 45.00 | -78.93 | -4.76 | 0.00 | -488.86 | 0.00 | 488.86 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 1.55 | -0.35 | 0.105 |
| 48.60 | -76.43 | -4.72 | 0.00 | -471.74 | 0.00 | 471.74 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 1.82 | -0.38 | 0.118 |
| 50.00 | -75.70 | -4.70 | 0.00 | -465.14 | 0.00 | 465.14 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 1.94 | -0.39 | 0.117 |
| 55.00 | -73.12 | -4.64 | 0.00 | -441.65 | 0.00 | 441.65 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 2.37 | -0.43 | 0.113 |
| 60.00 | -70.55 | -4.58 | 0.00 | -418.45 | 0.00 | 418.45 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 2.84 | -0.47 | 0.109 |
| 65.00 | -68.01 | -4.51 | 0.00 | -395.56 | 0.00 | 395.56 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 3.36 | -0.52 | 0.105 |
| 70.00 | -65.49 | -4.44 | 0.00 | -373.01 | 0.00 | 373.01 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 3.93 | -0.56 | 0.101 |
| 75.00 | -62.99 | -4.37 | 0.00 | -350.81 | 0.00 | 350.81 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 4.54 | -0.60 | 0.097 |
| 80.00 | -60.52 | -4.29 | 0.00 | -328.98 | 0.00 | 328.98 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 5.19 | -0.65 | 0.093 |
| 80.00 | -60.52 | -4.29 | 0.00 | -328.98 | 0.00 | 328.98 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 5.19 | -0.65 | 0.102 |
| 85.00 | -58.18 | -4.22 | 0.00 | -307.56 | 0.00 | 307.56 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 5.89 | -0.69 | 0.097 |
| 86.58 | -57.44 | -4.19 | 0.00 | -300.90 | 0.00 | 300.90 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 6.12 | -0.70 | 0.096 |
| 90.00 | -55.52 | -4.13 | 0.00 | -286.58 | 0.00 | 286.58 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 6.63 | -0.73 | 0.091 |
| 90.33 | -55.33 | -4.12 | 0.00 | -285.22 | 0.00 | 285.22 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 6.69 | -0.74 | 0.108 |
| 95.00 | -53.28 | -4.04 | 0.00 | -266.00 | 0.00 | 266.00 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 7.43 | -0.78 | 0.102 |
| 100.00 | -51.11 | -3.95 | 0.00 | -245.82 | 0.00 | 245.82 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 8.27 | -0.82 | 0.096 |
| 105.00 | -48.95 | -3.86 | 0.00 | -226.07 | 0.00 | 226.07 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 9.15 | -0.87 | 0.091 |
| 110.00 | -46.82 | -3.77 | 0.00 | -206.77 | 0.00 | 206.77 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 10.08 | -0.91 | 0.085 |
| 115.00 | -44.71 | -3.67 | 0.00 | -187.94 | 0.00 | 187.94 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 11.06 | -0.95 | 0.079 |
| 120.00 | -42.62 | -3.57 | 0.00 | -169.60 | 0.00 | 169.60 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 12.08 | -0.99 | 0.073 |
| 120.00 | -42.62 | -3.57 | 0.00 | -169.60 | 0.00 | 169.60 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 12.08 | -0.99 | 0.088 |
| 125.00 | -40.76 | -3.49 | 0.00 | -151.76 | 0.00 | 151.76 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 13.15 | -1.03 | 0.081 |
| 126.28 | -40.28 | -3.45 | 0.00 | -147.29 | 0.00 | 147.29 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 13.43 | -1.05 | 0.079 |
| 126.28 | -40.28 | -3.45 | 0.00 | -147.29 | 0.00 | 147.29 | 900.61 | 450.31 | 868.79 | 429.06 | 13.43 | -1.05 | 0.097 |
| 130.00 | -38.98 | -3.38 | 0.00 | -134.45 | 0.00 | 134.45 | 888.95 | 444.47 | 835.13 | 412.44 | 14.25 | -1.08 | 0.090 |
| 135.00 | -37.25 | -3.29 | 0.00 | -117.54 | 0.00 | 117.54 | 872.29 | 436.14 | 789.93 | 390.12 | 15.41 | -1.13 | 0.081 |
| 140.00 | -35.54 | -3.19 | 0.00 | -101.10 | 0.00 | 101.10 | 854.50 | 427.25 | 744.88 | 367.87 | 16.61 | -1.17 | 0.072 |
| 140.00 | -35.54 | -3.19 | 0.00 | -101.10 | 0.00 | 101.10 | 854.50 | 427.25 | 744.88 | 367.87 | 16.61 | -1.17 | 0.090 |
| 145.00 | -34.02 | -3.11 | 0.00 | -85.16 | 0.00 | 85.16 | 835.60 | 417.80 | 700.09 | 345.75 | 17.86 | -1.21 | 0.079 |
| 146.00 | -31.83 | -2.94 | 0.00 | -82.05 | 0.00 | 82.05 | 831.68 | 415.84 | 691.17 | 341.34 | 18.11 | -1.22 | 0.076 |
| 150.00 | -30.78 | -2.86 | 0.00 | -70.30 | 0.00 | 70.30 | 815.57 | 407.78 | 655.68 | 323.81 | 19.15 | -1.25 | 0.068 |
| 155.00 | -29.48 | -2.77 | 0.00 | -56.00 | 0.00 | 56.00 | 794.42 | 397.21 | 611.76 | 302.12 | 20.48 | -1.29 | 0.057 |
| 158.50 | -28.59 | -2.71 | 0.00 | -46.29 | 0.00 | 46.29 | 778.94 | 389.47 | 581.37 | 287.12 | 21.44 | -1.31 | 0.049 |
| 158.50 | -28.59 | -2.71 | 0.00 | -46.29 | 0.00 | 46.29 | 778.94 | 389.47 | 581.37 | 287.12 | 21.44 | -1.31 | 0.198 |
| 160.00 | -28.33 | -2.70 | 0.00 | -42.22 | 0.00 | 42.22 | 772.14 | 386.07 | 568.44 | 280.73 | 21.85 | -1.32 | 0.187 |
| 165.00 | -27.64 | -2.68 | 0.00 | -28.74 | 0.00 | 28.74 | 748.74 | 374.37 | 525.85 | 259.70 | 23.30 | -1.44 | 0.148 |
| 166.00 | -21.64 | -2.04 | 0.00 | -26.06 | 0.00 | 26.06 | 743.93 | 371.96 | 517.43 | 255.54 | 23.61 | -1.46 | 0.131 |
| 170.00 | -21.13 | -2.01 | 0.00 | -17.88 | 0.00 | 17.88 | 723.19 | 361.60 | 483.41 | 238.74 | 24.86 | -1.53 | 0.104 |

| | | | |
|---|---|---|---|
| Site Number: | 302502 | Code: ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: OAA727133_C3_01 | 4/13/2018 4:43:32 PM |
| Customer: | VERIZON WIRELESS | | |

Load Case: 1.2D + 1.0Di + 1.0Wi — 40 mph with 1.00 in Radial Ice — 27 Iterations

Gust Response Factor: 1.10 — Ice Dead Load Factor: 1.00 — Wind Importance Factor: 1.00

Dead Load Factor: 1.20 — Ice Importance Factor: 1.00

Wind Load Factor: 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 175.00 | -10.77 | -0.96 | 0.00 | -7.85 | 0.00 | 7.85 | 686.95 | 343.48 | 435.91 | 215.28 | 26.49 | -1.58 | 0.052 |
| 180.00 | -10.22 | -0.91 | 0.00 | -3.06 | 0.00 | 3.06 | 650.71 | 325.36 | 390.87 | 193.04 | 28.16 | -1.61 | 0.032 |
| 181.90 | 0.00 | -0.62 | 0.00 | -1.33 | 0.00 | 1.33 | 636.94 | 318.47 | 374.40 | 184.90 | 28.80 | -1.61 | 0.007 |

**Load Case:** 1.0D + 1.0W — Serviceability 60 mph — 26 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.00
Wind Load Factor : 1.00
Wind Importance Factor : 1.00

## Applied Segment Forces Summary

| | | Shaft Forces | | Discrete Forces | | | | Linear Forces | | Sum of Forces | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg Elev (ft) | Description | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Torsion MY (lb-ft) | Moment MZ (lb-ft) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Torsion MY (lb-ft) | Moment MZ (lb) |
| 0.00 | | 61.9 | 0.0 | | | | | 0.0 | 0.0 | 61.9 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 122.7 | 867.3 | | | | | 0.0 | 974.5 | 122.7 | 1,841.9 | 0.0 | 0.0 |
| 10.00 | | 128.1 | 850.6 | | | | | 0.0 | 1,151.9 | 128.1 | 2,002.5 | 0.0 | 0.0 |
| 14.71 | Reinf. Top | 71.5 | 786.0 | | | | | 24.3 | 1,085.1 | 95.8 | 1,871.0 | 0.0 | 0.0 |
| 15.00 | | 74.2 | 47.9 | | | | | 1.5 | 52.3 | 75.7 | 100.2 | 0.0 | 0.0 |
| 20.00 | Reinf. Top Reinf | 138.7 | 817.1 | | | | | 25.8 | 901.4 | 164.5 | 1,718.5 | 0.0 | 0.0 |
| 25.00 | | 135.8 | 800.4 | | | | | 25.8 | 901.4 | 161.6 | 1,701.8 | 0.0 | 0.0 |
| 30.00 | | 134.6 | 783.7 | | | | | 25.8 | 901.4 | 160.4 | 1,685.1 | 0.0 | 0.0 |
| 35.00 | | 136.0 | 767.0 | | | | | 26.1 | 901.4 | 162.1 | 1,668.3 | 0.0 | 0.0 |
| 40.00 | | 125.7 | 750.2 | | | | | 26.6 | 901.4 | 152.3 | 1,651.6 | 0.0 | 0.0 |
| 44.10 | Bot - Section 2 | 69.8 | 602.7 | | | | | 22.2 | 739.1 | 92.0 | 1,341.8 | 0.0 | 0.0 |
| 45.00 | | 64.2 | 241.9 | | | | | 4.9 | 162.2 | 69.1 | 404.2 | 0.0 | 0.0 |
| 48.60 | Top - Section 1 | 71.5 | 957.7 | | | | | 19.8 | 649.0 | 91.3 | 1,606.7 | 0.0 | 0.0 |
| 50.00 | | 91.9 | 169.1 | | | | | 7.8 | 252.4 | 99.7 | 421.5 | 0.0 | 0.0 |
| 55.00 | | 143.9 | 595.1 | | | | | 27.9 | 901.4 | 171.9 | 1,496.5 | 0.0 | 0.0 |
| 60.00 | | 144.1 | 581.2 | | | | | 28.3 | 901.4 | 172.4 | 1,482.6 | 0.0 | 0.0 |
| 65.00 | | 143.9 | 567.3 | | | | | 28.6 | 901.4 | 172.5 | 1,468.6 | 0.0 | 0.0 |
| 70.00 | | 143.3 | 553.3 | | | | | 29.0 | 901.4 | 172.3 | 1,454.7 | 0.0 | 0.0 |
| 75.00 | | 142.5 | 539.4 | | | | | 29.3 | 901.4 | 171.8 | 1,440.8 | 0.0 | 0.0 |
| 80.00 | Reinf. Top Reinf | 141.4 | 525.4 | | | | | 29.5 | 901.4 | 170.9 | 1,426.8 | 0.0 | 0.0 |
| 85.00 | | 92.5 | 511.5 | | | | | 29.8 | 818.7 | 122.3 | 1,330.2 | 0.0 | 0.0 |
| 86.58 | Bot - Section 3 | 70.5 | 158.7 | | | | | 9.5 | 258.7 | 79.9 | 417.5 | 0.0 | 0.0 |
| 90.00 | | 53.0 | 615.1 | | | | | 20.6 | 560.0 | 73.6 | 1,175.2 | 0.0 | 0.0 |
| 90.33 | Top - Section 2 | 70.0 | 58.7 | | | | | 2.0 | 54.0 | 72.0 | 112.8 | 0.0 | 0.0 |
| 95.00 | | 134.4 | 368.2 | | | | | 28.3 | 764.7 | 162.7 | 1,132.9 | 0.0 | 0.0 |
| 100.00 | | 137.1 | 383.4 | | | | | 30.5 | 818.7 | 167.7 | 1,202.2 | 0.0 | 0.0 |
| 105.00 | | 135.0 | 372.3 | | | | | 30.7 | 818.7 | 165.7 | 1,191.0 | 0.0 | 0.0 |
| 110.00 | | 132.7 | 361.1 | | | | | 31.0 | 818.7 | 163.6 | 1,179.9 | 0.0 | 0.0 |
| 115.00 | | 130.2 | 350.0 | | | | | 31.2 | 818.7 | 161.3 | 1,168.7 | 0.0 | 0.0 |
| 120.00 | Reinf. Top Reinf | 127.6 | 338.8 | | | | | 31.4 | 818.7 | 158.9 | 1,157.6 | 0.0 | 0.0 |
| 125.00 | | 79.0 | 327.7 | | | | | 31.5 | 668.4 | 110.6 | 996.1 | 0.0 | 0.0 |
| 126.28 | Top - Section 3 | 61.7 | 82.1 | | | | | 8.1 | 171.1 | 69.8 | 253.2 | 0.0 | 0.0 |
| 130.00 | | 105.9 | 176.3 | | | | | 23.6 | 497.3 | 129.5 | 673.6 | 0.0 | 0.0 |
| 135.00 | | 118.8 | 229.7 | | | | | 31.9 | 668.4 | 150.7 | 898.1 | 0.0 | 0.0 |
| 140.00 | Reinf. Top Reinf | 115.6 | 221.3 | | | | | 32.1 | 668.4 | 147.7 | 889.7 | 0.0 | 0.0 |
| 145.00 | | 68.2 | 212.9 | | | | | 31.6 | 538.1 | 99.8 | 751.0 | 0.0 | 0.0 |
| 146.00 | Appurtenance(s) | 55.3 | 41.6 | 136.2 | 0.0 | 0.0 | 697.7 | 6.4 | 107.6 | 197.9 | 846.9 | 0.0 | 0.0 |
| 150.00 | | 97.7 | 163.0 | | | | | 25.5 | 410.8 | 123.3 | 573.8 | 0.0 | 0.0 |
| 155.00 | | 90.1 | 196.2 | | | | | 32.2 | 513.5 | 122.3 | 709.7 | 0.0 | 0.0 |
| 158.50 | Reinf. Top | 51.8 | 132.4 | | | | | 22.7 | 359.4 | 74.5 | 491.8 | 0.0 | 0.0 |
| 160.00 | | 57.0 | 55.5 | | | | | 9.8 | 45.8 | 66.8 | 101.3 | 0.0 | 0.0 |
| 165.00 | | 49.8 | 179.5 | | | | | 0.0 | 152.7 | 49.8 | 332.2 | 0.0 | 0.0 |
| 166.00 | Appurtenance(s) | 40.1 | 34.9 | 676.3 | 0.0 | 0.0 | 2,169.6 | 0.0 | 30.5 | 716.3 | 2,235.0 | 0.0 | 0.0 |
| 170.00 | | 70.4 | 136.2 | | | | | 0.0 | 96.1 | 70.4 | 232.3 | 0.0 | 0.0 |
| 175.00 | Appurtenance(s) | 75.3 | 162.7 | 1,139.1 | 0.0 | 0.0 | 2,695.3 | 0.0 | 120.1 | 1,214.4 | 2,978.1 | 0.0 | 0.0 |
| 180.00 | | 50.3 | 154.4 | | | | | 0.0 | 89.0 | 50.3 | 243.4 | 0.0 | 0.0 |
| 181.90 | | 13.5 | 56.5 | | | | | 0.0 | 33.8 | 13.5 | 90.3 | 0.0 | 0.0 |

| | | | | |
|---|---|---|---|---|
| Site Number: | 302502 | Code: | ANSI/TIA-222-G |  |
| Site Name: | Harwinton, CT | Engineering Number: | OAA727133_C3_01 | 4/13/2018 4:43:37 PM |
| Customer: | VERIZON WIRELESS | | | |

**Load Case:** 1.0D + 1.0W — Serviceability 60 mph — 26 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.00
Wind Load Factor : 1.00

Wind Importance Factor : 1.00

| | | | | |
|---|---|---|---|---|
| Totals: | 7,404.35 | 50,149.5 | 0.00 | 0.00 |

Site Number: 302502 Code: ANSI/TIA-222-G 

Site Name: Harwinton, CT Engineering Number: OAA727133_C3_01 4/13/2018 4:43:37 PM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W Serviceability 60 mph 26 Iterations

Gust Response Factor : 1.10 Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -53.56 | -8.31 | 0.00 | -1,028.96 | 0.00 | 1,028.96 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.142 |
| 5.00 | -51.71 | -8.23 | 0.00 | -987.42 | 0.00 | 987.42 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.03 | -0.05 | 0.138 |
| 10.00 | -49.70 | -8.14 | 0.00 | -946.29 | 0.00 | 946.29 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.10 | -0.09 | 0.134 |
| 14.71 | -47.83 | -8.06 | 0.00 | -907.97 | 0.00 | 907.97 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.21 | -0.14 | 0.131 |
| 14.71 | -47.83 | -8.06 | 0.00 | -907.97 | 0.00 | 907.97 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.21 | -0.14 | 0.162 |
| 15.00 | -47.72 | -8.01 | 0.00 | -905.63 | 0.00 | 905.63 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.22 | -0.14 | 0.161 |
| 20.00 | -46.00 | -7.88 | 0.00 | -865.61 | 0.00 | 865.61 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.40 | -0.20 | 0.157 |
| 20.00 | -46.00 | -7.88 | 0.00 | -865.61 | 0.00 | 865.61 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.40 | -0.20 | 0.157 |
| 25.00 | -44.29 | -7.76 | 0.00 | -826.19 | 0.00 | 826.19 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.64 | -0.26 | 0.153 |
| 30.00 | -42.59 | -7.63 | 0.00 | -787.40 | 0.00 | 787.40 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.94 | -0.31 | 0.148 |
| 35.00 | -40.92 | -7.50 | 0.00 | -749.23 | 0.00 | 749.23 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 1.30 | -0.37 | 0.144 |
| 40.00 | -39.26 | -7.38 | 0.00 | -711.72 | 0.00 | 711.72 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 1.72 | -0.43 | 0.139 |
| 44.10 | -37.92 | -7.29 | 0.00 | -681.48 | 0.00 | 681.48 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 2.12 | -0.48 | 0.136 |
| 45.00 | -37.51 | -7.24 | 0.00 | -674.92 | 0.00 | 674.92 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 2.21 | -0.49 | 0.133 |
| 48.60 | -35.90 | -7.15 | 0.00 | -648.87 | 0.00 | 648.87 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 2.59 | -0.53 | 0.149 |
| 50.00 | -35.48 | -7.07 | 0.00 | -638.86 | 0.00 | 638.86 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 2.75 | -0.55 | 0.148 |
| 55.00 | -33.97 | -6.92 | 0.00 | -603.52 | 0.00 | 603.52 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 3.36 | -0.61 | 0.142 |
| 60.00 | -32.49 | -6.76 | 0.00 | -568.94 | 0.00 | 568.94 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 4.02 | -0.67 | 0.136 |
| 65.00 | -31.01 | -6.60 | 0.00 | -535.14 | 0.00 | 535.14 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 4.75 | -0.72 | 0.131 |
| 70.00 | -29.56 | -6.44 | 0.00 | -502.13 | 0.00 | 502.13 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 5.54 | -0.78 | 0.125 |
| 75.00 | -28.11 | -6.28 | 0.00 | -469.93 | 0.00 | 469.93 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 6.39 | -0.84 | 0.119 |
| 80.00 | -26.68 | -6.11 | 0.00 | -438.55 | 0.00 | 438.55 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 7.30 | -0.89 | 0.113 |
| 80.00 | -26.68 | -6.11 | 0.00 | -438.55 | 0.00 | 438.55 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 7.30 | -0.89 | 0.125 |
| 85.00 | -25.35 | -5.98 | 0.00 | -408.00 | 0.00 | 408.00 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 8.26 | -0.95 | 0.119 |
| 86.58 | -24.93 | -5.91 | 0.00 | -398.55 | 0.00 | 398.55 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 8.58 | -0.97 | 0.117 |
| 90.00 | -23.75 | -5.82 | 0.00 | -378.34 | 0.00 | 378.34 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 9.29 | -1.01 | 0.110 |
| 90.33 | -23.64 | -5.76 | 0.00 | -376.42 | 0.00 | 376.42 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 9.36 | -1.02 | 0.130 |
| 95.00 | -22.50 | -5.60 | 0.00 | -349.51 | 0.00 | 349.51 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 10.38 | -1.07 | 0.123 |
| 100.00 | -21.30 | -5.43 | 0.00 | -321.50 | 0.00 | 321.50 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 11.54 | -1.13 | 0.115 |
| 105.00 | -20.11 | -5.26 | 0.00 | -294.33 | 0.00 | 294.33 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 12.75 | -1.19 | 0.107 |
| 110.00 | -18.93 | -5.09 | 0.00 | -268.02 | 0.00 | 268.02 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 14.03 | -1.24 | 0.099 |
| 115.00 | -17.76 | -4.92 | 0.00 | -242.55 | 0.00 | 242.55 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 15.36 | -1.30 | 0.092 |
| 120.00 | -16.60 | -4.75 | 0.00 | -217.94 | 0.00 | 217.94 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 16.75 | -1.35 | 0.084 |
| 120.00 | -16.60 | -4.75 | 0.00 | -217.94 | 0.00 | 217.94 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 16.75 | -1.35 | 0.102 |
| 125.00 | -15.60 | -4.63 | 0.00 | -194.18 | 0.00 | 194.18 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 18.19 | -1.40 | 0.093 |
| 126.28 | -15.35 | -4.56 | 0.00 | -188.26 | 0.00 | 188.26 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 18.57 | -1.42 | 0.091 |
| 126.28 | -15.35 | -4.56 | 0.00 | -188.26 | 0.00 | 188.26 | 900.61 | 450.31 | 868.79 | 429.06 | 18.57 | -1.42 | 0.111 |
| 130.00 | -14.68 | -4.42 | 0.00 | -171.31 | 0.00 | 171.31 | 888.95 | 444.47 | 835.13 | 412.44 | 19.69 | -1.46 | 0.102 |
| 135.00 | -13.78 | -4.26 | 0.00 | -149.18 | 0.00 | 149.18 | 872.29 | 436.14 | 789.93 | 390.12 | 21.25 | -1.52 | 0.091 |
| 140.00 | -12.89 | -4.10 | 0.00 | -127.86 | 0.00 | 127.86 | 854.50 | 427.25 | 744.88 | 367.87 | 22.87 | -1.57 | 0.079 |
| 140.00 | -12.89 | -4.10 | 0.00 | -127.86 | 0.00 | 127.86 | 854.50 | 427.25 | 744.88 | 367.87 | 22.87 | -1.57 | 0.100 |
| 145.00 | -12.14 | -3.99 | 0.00 | -107.34 | 0.00 | 107.34 | 835.60 | 417.80 | 700.09 | 345.75 | 24.55 | -1.62 | 0.086 |
| 146.00 | -11.30 | -3.77 | 0.00 | -103.35 | 0.00 | 103.35 | 831.68 | 415.84 | 691.17 | 341.34 | 24.89 | -1.63 | 0.083 |
| 150.00 | -10.72 | -3.64 | 0.00 | -88.26 | 0.00 | 88.26 | 815.57 | 407.78 | 655.68 | 323.81 | 26.28 | -1.68 | 0.073 |
| 155.00 | -10.01 | -3.51 | 0.00 | -70.04 | 0.00 | 70.04 | 794.42 | 397.21 | 611.76 | 302.12 | 28.06 | -1.73 | 0.059 |
| 158.50 | -9.52 | -3.42 | 0.00 | -57.77 | 0.00 | 57.77 | 778.94 | 389.47 | 581.37 | 287.12 | 29.34 | -1.76 | 0.050 |
| 158.50 | -9.52 | -3.42 | 0.00 | -57.77 | 0.00 | 57.77 | 778.94 | 389.47 | 581.37 | 287.12 | 29.34 | -1.76 | 0.214 |
| 160.00 | -9.42 | -3.36 | 0.00 | -52.64 | 0.00 | 52.64 | 772.14 | 386.07 | 568.44 | 280.73 | 29.90 | -1.77 | 0.200 |
| 165.00 | -9.08 | -3.32 | 0.00 | -35.82 | 0.00 | 35.82 | 748.74 | 374.37 | 525.85 | 259.70 | 31.83 | -1.91 | 0.150 |
| 166.00 | -6.87 | -2.53 | 0.00 | -32.51 | 0.00 | 32.51 | 743.93 | 371.96 | 517.43 | 255.54 | 32.23 | -1.94 | 0.137 |
| 170.00 | -6.64 | -2.46 | 0.00 | -22.38 | 0.00 | 22.38 | 723.19 | 361.60 | 483.41 | 238.74 | 33.89 | -2.02 | 0.103 |

Load Case: 1.0D + 1.0W Serviceability 60 mph 26 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.00
Wind Load Factor : 1.00
Wind Importance Factor : 1.00

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 175.00 | -3.71 | -1.15 | 0.00 | -10.07 | 0.00 | 10.07 | 686.95 | 343.48 | 435.91 | 215.28 | 36.05 | -2.09 | 0.052 |
| 180.00 | -3.46 | -1.09 | 0.00 | -4.34 | 0.00 | 4.34 | 650.71 | 325.36 | 390.87 | 193.04 | 38.26 | -2.13 | 0.028 |
| 181.90 | 0.00 | -0.96 | 0.00 | -2.28 | 0.00 | 2.28 | 636.94 | 318.47 | 374.40 | 184.90 | 39.11 | -2.13 | 0.012 |

## Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

| | | |
|---|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.18 | |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 | |
| Long-Period Transition Period ($T_L$): | 6 | |
| Importance Factor ($I_E$): | 1.00 | |
| Site Coefficient $F_a$: | 1.60 | |
| Site Coeffiecient $F_v$: | 2.40 | |
| Response Modification Coefficient (R): | 1.50 | |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.19 | |
| Design Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 | |
| Seismic Response Coefficient ($C_s$): | 0.03 | |
| Upper Limit $C_s$ | 0.03 | |
| Lower Limit $C_s$ | 0.03 | |
| Period based on Rayleigh Method (sec): | 3.20 | |
| Redundancy Factor (p): | 1.00 | |
| Seismic Force Distribution Exponent (k): | 2.00 | |
| Total Unfactored Dead Load: | 53.56 | k |
| Seismic Base Shear (E): | 1.61 | k |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 46 | 180.95 | 90 | 2,956 | 0.005 | 8 | 112 |
| 45 | 177.50 | 243 | 7,668 | 0.013 | 21 | 301 |
| 44 | 172.50 | 283 | 8,416 | 0.014 | 23 | 350 |
| 43 | 168.00 | 232 | 6,556 | 0.011 | 18 | 288 |
| 42 | 165.50 | 65 | 1,792 | 0.003 | 5 | 81 |
| 41 | 162.50 | 332 | 8,773 | 0.015 | 24 | 412 |
| 40 | 159.25 | 101 | 2,569 | 0.004 | 7 | 125 |
| 39 | 156.75 | 492 | 12,084 | 0.021 | 33 | 609 |
| 38 | 152.50 | 710 | 16,505 | 0.028 | 45 | 879 |
| 37 | 148.00 | 574 | 12,568 | 0.022 | 35 | 711 |
| 36 | 145.50 | 149 | 3,159 | 0.005 | 9 | 185 |
| 35 | 142.50 | 751 | 15,250 | 0.026 | 42 | 930 |
| 34 | 137.50 | 890 | 16,822 | 0.029 | 46 | 1,102 |
| 33 | 132.50 | 898 | 15,767 | 0.027 | 43 | 1,113 |
| 32 | 128.14 | 674 | 11,061 | 0.019 | 30 | 834 |
| 31 | 125.64 | 253 | 3,997 | 0.007 | 11 | 314 |
| 30 | 122.50 | 996 | 14,948 | 0.026 | 41 | 1,234 |
| 29 | 117.50 | 1,158 | 15,982 | 0.027 | 44 | 1,434 |
| 28 | 112.50 | 1,169 | 14,791 | 0.025 | 41 | 1,448 |
| 27 | 107.50 | 1,180 | 13,635 | 0.023 | 38 | 1,462 |
| 26 | 102.50 | 1,191 | 12,513 | 0.021 | 34 | 1,475 |
| 25 | 97.50 | 1,202 | 11,428 | 0.020 | 31 | 1,489 |
| 24 | 92.67 | 1,133 | 9,728 | 0.017 | 27 | 1,403 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 23 | 90.17 | 113 | 917 | 0.002 | 3 | 140 |
| 22 | 88.29 | 1,175 | 9,160 | 0.016 | 25 | 1,456 |
| 21 | 85.79 | 417 | 3,072 | 0.005 | 8 | 517 |
| 20 | 82.50 | 1,330 | 9,054 | 0.016 | 25 | 1,648 |
| 19 | 77.50 | 1,427 | 8,570 | 0.015 | 24 | 1,768 |
| 18 | 72.50 | 1,441 | 7,573 | 0.013 | 21 | 1,785 |
| 17 | 67.50 | 1,455 | 6,628 | 0.011 | 18 | 1,802 |
| 16 | 62.50 | 1,469 | 5,737 | 0.010 | 16 | 1,819 |
| 15 | 57.50 | 1,483 | 4,902 | 0.008 | 13 | 1,837 |
| 14 | 52.50 | 1,497 | 4,125 | 0.007 | 11 | 1,854 |
| 13 | 49.30 | 422 | 1,025 | 0.002 | 3 | 522 |
| 12 | 46.80 | 1,607 | 3,519 | 0.006 | 10 | 1,990 |
| 11 | 44.55 | 404 | 802 | 0.001 | 2 | 501 |
| 10 | 42.05 | 1,342 | 2,373 | 0.004 | 7 | 1,662 |
| 9 | 37.50 | 1,652 | 2,323 | 0.004 | 6 | 2,046 |
| 8 | 32.50 | 1,668 | 1,762 | 0.003 | 5 | 2,067 |
| 7 | 27.50 | 1,685 | 1,274 | 0.002 | 4 | 2,088 |
| 6 | 22.50 | 1,702 | 862 | 0.001 | 2 | 2,108 |
| 5 | 17.50 | 1,719 | 526 | 0.001 | 1 | 2,129 |
| 4 | 14.85 | 100 | 22 | 0.000 | 0 | 124 |
| 3 | 12.35 | 1,871 | 286 | 0.000 | 1 | 2,318 |
| 2 | 7.50 | 2,002 | 113 | 0.000 | 0 | 2,481 |
| 1 | 2.50 | 1,842 | 12 | 0.000 | 0 | 2,282 |
| Kaelus DBC0061F1V51- | 181.90 | 76 | 2,531 | 0.004 | 7 | 95 |
| Powerwave Allgon LGP | 181.90 | 85 | 2,799 | 0.005 | 8 | 105 |
| Raycap DC6-48-60-0-8 | 181.90 | 33 | 1,085 | 0.002 | 3 | 41 |
| Raycap DC6-48-60-18- | 181.90 | 32 | 1,052 | 0.002 | 3 | 39 |
| Ericsson RRUS 11 (Ba | 181.90 | 300 | 9,926 | 0.017 | 27 | 372 |
| Ericsson RRUS 32 (50 | 181.90 | 152 | 5,043 | 0.009 | 14 | 189 |
| Ericsson RRUS 12 | 181.90 | 150 | 4,963 | 0.009 | 14 | 186 |
| Powerwave Allgon 777 | 181.90 | 105 | 3,474 | 0.006 | 10 | 130 |
| KMW AM-X-CD-16-65-00 | 181.90 | 146 | 4,814 | 0.008 | 13 | 180 |
| Quintel QS66512-2 | 181.90 | 333 | 11,018 | 0.019 | 30 | 413 |
| Flat Platform w/ Han | 181.90 | 2,000 | 66,175 | 0.113 | 182 | 2,478 |
| Nokia B5 RRH4x40-850 | 175.00 | 146 | 4,456 | 0.008 | 12 | 180 |
| Alcatel-Lucent B25 R | 175.00 | 159 | 4,869 | 0.008 | 13 | 197 |
| Alcatel-Lucent B13 R | 175.00 | 173 | 5,310 | 0.009 | 15 | 215 |
| RFS DB-B1-6C-12AB-0Z | 175.00 | 21 | 655 | 0.001 | 2 | 27 |
| Nokia B66a RRH4x45 ( | 175.00 | 170 | 5,219 | 0.009 | 14 | 211 |
| Commscope JAHH-65B-R | 175.00 | 364 | 11,135 | 0.019 | 31 | 450 |
| Antel LPA-80063/6CF | 175.00 | 162 | 4,961 | 0.008 | 14 | 201 |
| Flat Low Profile Pla | 175.00 | 1,500 | 45,938 | 0.079 | 126 | 1,858 |
| Ericsson AIR 21, 1.3 | 166.00 | 249 | 6,861 | 0.012 | 19 | 308 |
| Ericsson AIR 21, 1.3 | 166.00 | 271 | 7,473 | 0.013 | 21 | 336 |
| Andrew LNX-6515DS-A1 | 166.00 | 149 | 4,117 | 0.007 | 11 | 185 |
| Round Low Profile Pl | 166.00 | 1,500 | 41,334 | 0.071 | 114 | 1,858 |
| KMW TTA (HB-X-WM-17- | 146.00 | 48 | 1,017 | 0.002 | 3 | 59 |
| KMW HB-X-WM-17-65-00 | 146.00 | 90 | 1,918 | 0.003 | 5 | 111 |
| Side Arms | 146.00 | 560 | 11,937 | 0.020 | 33 | 694 |
| | | 53,561 | 583,685 | 1.000 | 1,607 | 66,353 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 46 | 180.95 | 90 | 2,956 | 0.005 | 8 | 78 |
| 45 | 177.50 | 243 | 7,668 | 0.013 | 21 | 210 |
| 44 | 172.50 | 283 | 8,416 | 0.014 | 23 | 244 |
| 43 | 168.00 | 232 | 6,556 | 0.011 | 18 | 200 |
| 42 | 165.50 | 65 | 1,792 | 0.003 | 5 | 56 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 41 | 162.50 | 332 | 8,773 | 0.015 | 24 | 286 |
| 40 | 159.25 | 101 | 2,569 | 0.004 | 7 | 87 |
| 39 | 156.75 | 492 | 12,084 | 0.021 | 33 | 424 |
| 38 | 152.50 | 710 | 16,505 | 0.028 | 45 | 611 |
| 37 | 148.00 | 574 | 12,568 | 0.022 | 35 | 494 |
| 36 | 145.50 | 149 | 3,159 | 0.005 | 9 | 128 |
| 35 | 142.50 | 751 | 15,250 | 0.026 | 42 | 647 |
| 34 | 137.50 | 890 | 16,822 | 0.029 | 46 | 766 |
| 33 | 132.50 | 898 | 15,767 | 0.027 | 43 | 773 |
| 32 | 128.14 | 674 | 11,061 | 0.019 | 30 | 580 |
| 31 | 125.64 | 253 | 3,997 | 0.007 | 11 | 218 |
| 30 | 122.50 | 996 | 14,948 | 0.026 | 41 | 858 |
| 29 | 117.50 | 1,158 | 15,982 | 0.027 | 44 | 997 |
| 28 | 112.50 | 1,169 | 14,791 | 0.025 | 41 | 1,006 |
| 27 | 107.50 | 1,180 | 13,635 | 0.023 | 38 | 1,016 |
| 26 | 102.50 | 1,191 | 12,513 | 0.021 | 34 | 1,026 |
| 25 | 97.50 | 1,202 | 11,428 | 0.020 | 31 | 1,035 |
| 24 | 92.67 | 1,133 | 9,728 | 0.017 | 27 | 976 |
| 23 | 90.17 | 113 | 917 | 0.002 | 3 | 97 |
| 22 | 88.29 | 1,175 | 9,160 | 0.016 | 25 | 1,012 |
| 21 | 85.79 | 417 | 3,072 | 0.005 | 8 | 359 |
| 20 | 82.50 | 1,330 | 9,054 | 0.016 | 25 | 1,146 |
| 19 | 77.50 | 1,427 | 8,570 | 0.015 | 24 | 1,229 |
| 18 | 72.50 | 1,441 | 7,573 | 0.013 | 21 | 1,241 |
| 17 | 67.50 | 1,455 | 6,628 | 0.011 | 18 | 1,253 |
| 16 | 62.50 | 1,469 | 5,737 | 0.010 | 16 | 1,265 |
| 15 | 57.50 | 1,483 | 4,902 | 0.008 | 13 | 1,277 |
| 14 | 52.50 | 1,497 | 4,125 | 0.007 | 11 | 1,289 |
| 13 | 49.30 | 422 | 1,025 | 0.002 | 3 | 363 |
| 12 | 46.80 | 1,607 | 3,519 | 0.006 | 10 | 1,384 |
| 11 | 44.55 | 404 | 802 | 0.001 | 2 | 348 |
| 10 | 42.05 | 1,342 | 2,373 | 0.004 | 7 | 1,156 |
| 9 | 37.50 | 1,652 | 2,323 | 0.004 | 6 | 1,422 |
| 8 | 32.50 | 1,668 | 1,762 | 0.003 | 5 | 1,437 |
| 7 | 27.50 | 1,685 | 1,274 | 0.002 | 4 | 1,451 |
| 6 | 22.50 | 1,702 | 862 | 0.001 | 2 | 1,466 |
| 5 | 17.50 | 1,719 | 526 | 0.001 | 1 | 1,480 |
| 4 | 14.85 | 100 | 22 | 0.000 | 0 | 86 |
| 3 | 12.35 | 1,871 | 286 | 0.000 | 1 | 1,611 |
| 2 | 7.50 | 2,002 | 113 | 0.000 | 0 | 1,724 |
| 1 | 2.50 | 1,842 | 12 | 0.000 | 0 | 1,586 |
| Kaelus DBC0061F1V51- | 181.90 | 76 | 2,531 | 0.004 | 7 | 66 |
| Powerwave Allgon LGP | 181.90 | 85 | 2,799 | 0.005 | 8 | 73 |
| Raycap DC6-48-60-0-8 | 181.90 | 33 | 1,085 | 0.002 | 3 | 28 |
| Raycap DC6-48-60-18- | 181.90 | 32 | 1,052 | 0.002 | 3 | 27 |
| Ericsson RRUS 11 (Ba | 181.90 | 300 | 9,926 | 0.017 | 27 | 258 |
| Ericsson RRUS 32 (50 | 181.90 | 152 | 5,043 | 0.009 | 14 | 131 |
| Ericsson RRUS 12 | 181.90 | 150 | 4,963 | 0.009 | 14 | 129 |
| Powerwave Allgon 777 | 181.90 | 105 | 3,474 | 0.006 | 10 | 90 |
| KMW AM-X-CD-16-65-00 | 181.90 | 146 | 4,814 | 0.008 | 13 | 125 |
| Quintel QS66512-2 | 181.90 | 333 | 11,018 | 0.019 | 30 | 287 |
| Flat Platform w/ Han | 181.90 | 2,000 | 66,175 | 0.113 | 182 | 1,722 |
| Nokia B5 RRH4x40-850 | 175.00 | 146 | 4,456 | 0.008 | 12 | 125 |
| Alcatel-Lucent B25 R | 175.00 | 159 | 4,869 | 0.008 | 13 | 137 |
| Alcatel-Lucent B13 R | 175.00 | 173 | 5,310 | 0.009 | 15 | 149 |
| RFS DB-B1-6C-12AB-0Z | 175.00 | 21 | 655 | 0.001 | 2 | 18 |
| Nokia B66a RRH4x45 ( | 175.00 | 170 | 5,219 | 0.009 | 14 | 147 |
| Commscope JAHH-65B-R | 175.00 | 364 | 11,135 | 0.019 | 31 | 313 |
| Antel LPA-80063/6CF | 175.00 | 162 | 4,961 | 0.008 | 14 | 140 |
| Flat Low Profile Pla | 175.00 | 1,500 | 45,938 | 0.079 | 126 | 1,292 |
| Ericsson AIR 21, 1.3 | 166.00 | 249 | 6,861 | 0.012 | 19 | 214 |
| Ericsson AIR 21, 1.3 | 166.00 | 271 | 7,473 | 0.013 | 21 | 234 |
| Andrew LNX-6515DS-A1 | 166.00 | 149 | 4,117 | 0.007 | 11 | 129 |
| Round Low Profile Pl | 166.00 | 1,500 | 41,334 | 0.071 | 114 | 1,292 |

| | | | | | | |
|---|---|---|---|---|---|---|
| KMW TTA (HB-X-WM-17- | 146.00 | 48 | 1,017 | 0.002 | 3 | 41 |
| KMW HB-X-WM-17-65-00 | 146.00 | 90 | 1,918 | 0.003 | 5 | 78 |
| Side Arms | 146.00 | 560 | 11,937 | 0.020 | 33 | 482 |
| | | 53,561 | 583,685 | 1.000 | 1,607 | 46,125 |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -64.07 | -1.61 | 0.00 | -246.55 | 0.00 | 246.55 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.041 |
| 5.00 | -61.59 | -1.62 | 0.00 | -238.49 | 0.00 | 238.49 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.01 | -0.01 | 0.040 |
| 10.00 | -59.27 | -1.63 | 0.00 | -230.37 | 0.00 | 230.37 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.02 | -0.02 | 0.039 |
| 14.71 | -59.15 | -1.64 | 0.00 | -222.67 | 0.00 | 222.67 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.05 | -0.03 | 0.039 |
| 14.71 | -59.15 | -1.64 | 0.00 | -222.67 | 0.00 | 222.67 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.05 | -0.03 | 0.047 |
| 15.00 | -57.02 | -1.64 | 0.00 | -222.20 | 0.00 | 222.20 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.05 | -0.03 | 0.047 |
| 20.00 | -54.91 | -1.65 | 0.00 | -213.97 | 0.00 | 213.97 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.10 | -0.05 | 0.046 |
| 20.00 | -54.91 | -1.65 | 0.00 | -213.97 | 0.00 | 213.97 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.10 | -0.05 | 0.046 |
| 25.00 | -52.82 | -1.66 | 0.00 | -205.70 | 0.00 | 205.70 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.16 | -0.06 | 0.045 |
| 30.00 | -50.75 | -1.67 | 0.00 | -197.39 | 0.00 | 197.39 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.23 | -0.08 | 0.044 |
| 35.00 | -48.71 | -1.67 | 0.00 | -189.05 | 0.00 | 189.05 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 0.32 | -0.09 | 0.043 |
| 40.00 | -47.05 | -1.67 | 0.00 | -180.69 | 0.00 | 180.69 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 0.42 | -0.11 | 0.041 |
| 44.10 | -46.54 | -1.68 | 0.00 | -173.84 | 0.00 | 173.84 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 0.52 | -0.12 | 0.041 |
| 45.00 | -44.55 | -1.67 | 0.00 | -172.33 | 0.00 | 172.33 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 0.54 | -0.12 | 0.040 |
| 48.60 | -44.03 | -1.67 | 0.00 | -166.33 | 0.00 | 166.33 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 0.64 | -0.13 | 0.045 |
| 50.00 | -42.18 | -1.66 | 0.00 | -163.99 | 0.00 | 163.99 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 0.68 | -0.14 | 0.044 |
| 55.00 | -40.34 | -1.65 | 0.00 | -155.69 | 0.00 | 155.69 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 0.83 | -0.15 | 0.043 |
| 60.00 | -38.52 | -1.64 | 0.00 | -147.43 | 0.00 | 147.43 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 0.99 | -0.17 | 0.041 |
| 65.00 | -36.72 | -1.63 | 0.00 | -139.22 | 0.00 | 139.22 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 1.18 | -0.18 | 0.039 |
| 70.00 | -34.93 | -1.61 | 0.00 | -131.08 | 0.00 | 131.08 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 1.38 | -0.20 | 0.038 |
| 75.00 | -33.16 | -1.59 | 0.00 | -123.03 | 0.00 | 123.03 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 1.59 | -0.21 | 0.036 |
| 80.00 | -31.52 | -1.57 | 0.00 | -115.09 | 0.00 | 115.09 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 1.82 | -0.23 | 0.034 |
| 80.00 | -31.52 | -1.57 | 0.00 | -115.09 | 0.00 | 115.09 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 1.82 | -0.23 | 0.038 |
| 85.00 | -31.00 | -1.56 | 0.00 | -107.26 | 0.00 | 107.26 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 2.07 | -0.24 | 0.036 |
| 86.58 | -29.54 | -1.53 | 0.00 | -104.79 | 0.00 | 104.79 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 2.15 | -0.25 | 0.035 |
| 90.00 | -29.40 | -1.53 | 0.00 | -99.55 | 0.00 | 99.55 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 2.33 | -0.26 | 0.034 |
| 90.33 | -28.00 | -1.50 | 0.00 | -99.04 | 0.00 | 99.04 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 2.34 | -0.26 | 0.040 |
| 95.00 | -26.51 | -1.47 | 0.00 | -92.02 | 0.00 | 92.02 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 2.60 | -0.27 | 0.037 |
| 100.00 | -25.03 | -1.44 | 0.00 | -84.66 | 0.00 | 84.66 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 2.90 | -0.29 | 0.035 |
| 105.00 | -23.57 | -1.40 | 0.00 | -77.47 | 0.00 | 77.47 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 3.21 | -0.30 | 0.033 |
| 110.00 | -22.13 | -1.36 | 0.00 | -70.48 | 0.00 | 70.48 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 3.54 | -0.32 | 0.030 |
| 115.00 | -20.69 | -1.31 | 0.00 | -63.70 | 0.00 | 63.70 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 3.88 | -0.33 | 0.028 |
| 120.00 | -19.46 | -1.26 | 0.00 | -57.15 | 0.00 | 57.15 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 4.23 | -0.35 | 0.026 |
| 120.00 | -19.46 | -1.26 | 0.00 | -57.15 | 0.00 | 57.15 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 4.23 | -0.35 | 0.031 |
| 125.00 | -19.14 | -1.25 | 0.00 | -50.83 | 0.00 | 50.83 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 4.60 | -0.36 | 0.029 |
| 126.28 | -18.31 | -1.22 | 0.00 | -49.22 | 0.00 | 49.22 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 4.70 | -0.36 | 0.028 |
| 126.28 | -18.31 | -1.22 | 0.00 | -49.22 | 0.00 | 49.22 | 900.61 | 450.31 | 868.79 | 429.06 | 4.70 | -0.36 | 0.034 |
| 130.00 | -17.20 | -1.18 | 0.00 | -44.68 | 0.00 | 44.68 | 888.95 | 444.47 | 835.13 | 412.44 | 4.99 | -0.38 | 0.031 |
| 135.00 | -16.09 | -1.13 | 0.00 | -38.80 | 0.00 | 38.80 | 872.29 | 436.14 | 789.93 | 390.12 | 5.39 | -0.39 | 0.028 |
| 140.00 | -15.16 | -1.08 | 0.00 | -33.17 | 0.00 | 33.17 | 854.50 | 427.25 | 744.88 | 367.87 | 5.81 | -0.40 | 0.025 |
| 140.00 | -15.16 | -1.08 | 0.00 | -33.17 | 0.00 | 33.17 | 854.50 | 427.25 | 744.88 | 367.87 | 5.81 | -0.40 | 0.031 |
| 145.00 | -14.98 | -1.07 | 0.00 | -27.77 | 0.00 | 27.77 | 835.60 | 417.80 | 700.09 | 345.75 | 6.24 | -0.42 | 0.027 |
| 146.00 | -13.40 | -0.99 | 0.00 | -26.70 | 0.00 | 26.70 | 831.68 | 415.84 | 691.17 | 341.34 | 6.33 | -0.42 | 0.026 |
| 150.00 | -12.53 | -0.94 | 0.00 | -22.75 | 0.00 | 22.75 | 815.57 | 407.78 | 655.68 | 323.81 | 6.68 | -0.43 | 0.023 |
| 155.00 | -11.92 | -0.90 | 0.00 | -18.06 | 0.00 | 18.06 | 794.42 | 397.21 | 611.76 | 302.12 | 7.14 | -0.44 | 0.019 |
| 158.50 | -11.79 | -0.90 | 0.00 | -14.90 | 0.00 | 14.90 | 778.94 | 389.47 | 581.37 | 287.12 | 7.47 | -0.45 | 0.017 |
| 158.50 | -11.79 | -0.90 | 0.00 | -14.90 | 0.00 | 14.90 | 778.94 | 389.47 | 581.37 | 287.12 | 7.47 | -0.45 | 0.067 |
| 160.00 | -11.38 | -0.87 | 0.00 | -13.56 | 0.00 | 13.56 | 772.14 | 386.07 | 568.44 | 280.73 | 7.61 | -0.46 | 0.063 |
| 165.00 | -11.30 | -0.87 | 0.00 | -9.20 | 0.00 | 9.20 | 748.74 | 374.37 | 525.85 | 259.70 | 8.11 | -0.49 | 0.051 |
| 166.00 | -8.32 | -0.66 | 0.00 | -8.33 | 0.00 | 8.33 | 743.93 | 371.96 | 517.43 | 255.54 | 8.21 | -0.50 | 0.044 |
| 170.00 | -7.97 | -0.64 | 0.00 | -5.67 | 0.00 | 5.67 | 723.19 | 361.60 | 483.41 | 238.74 | 8.64 | -0.52 | 0.035 |
| 175.00 | -4.34 | -0.36 | 0.00 | -2.47 | 0.00 | 2.47 | 686.95 | 343.48 | 435.91 | 215.28 | 9.20 | -0.54 | 0.018 |
| 180.00 | -4.22 | -0.35 | 0.00 | -0.67 | 0.00 | 0.67 | 650.71 | 325.36 | 390.87 | 193.04 | 9.76 | -0.55 | 0.010 |
| 181.90 | 0.00 | -0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 636.94 | 318.47 | 374.40 | 184.90 | 9.98 | -0.55 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -44.54 | -1.61 | 0.00 | -240.94 | 0.00 | 240.94 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.038 |
| 5.00 | -42.81 | -1.62 | 0.00 | -232.88 | 0.00 | 232.88 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.01 | -0.01 | 0.037 |
| 10.00 | -41.20 | -1.62 | 0.00 | -224.79 | 0.00 | 224.79 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.02 | -0.02 | 0.036 |
| 14.71 | -41.12 | -1.63 | 0.00 | -217.14 | 0.00 | 217.14 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.05 | -0.03 | 0.035 |
| 14.71 | -41.12 | -1.63 | 0.00 | -217.14 | 0.00 | 217.14 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.05 | -0.03 | 0.043 |
| 15.00 | -39.64 | -1.63 | 0.00 | -216.67 | 0.00 | 216.67 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.05 | -0.03 | 0.043 |
| 20.00 | -38.17 | -1.64 | 0.00 | -208.51 | 0.00 | 208.51 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.09 | -0.05 | 0.042 |
| 20.00 | -38.17 | -1.64 | 0.00 | -208.51 | 0.00 | 208.51 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.09 | -0.05 | 0.042 |
| 25.00 | -36.72 | -1.64 | 0.00 | -200.32 | 0.00 | 200.32 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.15 | -0.06 | 0.041 |
| 30.00 | -35.28 | -1.64 | 0.00 | -192.11 | 0.00 | 192.11 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.22 | -0.08 | 0.040 |
| 35.00 | -33.86 | -1.64 | 0.00 | -183.89 | 0.00 | 183.89 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 0.31 | -0.09 | 0.039 |
| 40.00 | -32.70 | -1.64 | 0.00 | -175.67 | 0.00 | 175.67 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 0.41 | -0.10 | 0.038 |
| 44.10 | -32.35 | -1.64 | 0.00 | -168.94 | 0.00 | 168.94 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 0.51 | -0.12 | 0.037 |
| 45.00 | -30.97 | -1.63 | 0.00 | -167.46 | 0.00 | 167.46 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 0.53 | -0.12 | 0.036 |
| 48.60 | -30.61 | -1.64 | 0.00 | -161.57 | 0.00 | 161.57 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 0.62 | -0.13 | 0.041 |
| 50.00 | -29.32 | -1.63 | 0.00 | -159.28 | 0.00 | 159.28 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 0.66 | -0.13 | 0.041 |
| 55.00 | -28.04 | -1.62 | 0.00 | -151.16 | 0.00 | 151.16 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 0.81 | -0.15 | 0.039 |
| 60.00 | -26.78 | -1.60 | 0.00 | -143.08 | 0.00 | 143.08 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 0.97 | -0.16 | 0.038 |
| 65.00 | -25.52 | -1.59 | 0.00 | -135.06 | 0.00 | 135.06 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 1.15 | -0.18 | 0.036 |
| 70.00 | -24.28 | -1.57 | 0.00 | -127.11 | 0.00 | 127.11 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 1.34 | -0.19 | 0.035 |
| 75.00 | -23.05 | -1.55 | 0.00 | -119.26 | 0.00 | 119.26 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 1.55 | -0.21 | 0.033 |
| 80.00 | -21.91 | -1.52 | 0.00 | -111.52 | 0.00 | 111.52 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 1.77 | -0.22 | 0.032 |
| 80.00 | -21.91 | -1.52 | 0.00 | -111.52 | 0.00 | 111.52 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 1.77 | -0.22 | 0.035 |
| 85.00 | -21.55 | -1.52 | 0.00 | -103.90 | 0.00 | 103.90 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 2.01 | -0.23 | 0.033 |
| 86.58 | -20.54 | -1.49 | 0.00 | -101.50 | 0.00 | 101.50 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 2.09 | -0.24 | 0.033 |
| 90.00 | -20.44 | -1.49 | 0.00 | -96.40 | 0.00 | 96.40 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 2.26 | -0.25 | 0.031 |
| 90.33 | -19.46 | -1.46 | 0.00 | -95.91 | 0.00 | 95.91 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 2.28 | -0.25 | 0.036 |
| 95.00 | -18.43 | -1.43 | 0.00 | -89.09 | 0.00 | 89.09 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 2.53 | -0.26 | 0.034 |
| 100.00 | -17.40 | -1.40 | 0.00 | -81.93 | 0.00 | 81.93 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 2.82 | -0.28 | 0.032 |
| 105.00 | -16.39 | -1.36 | 0.00 | -74.96 | 0.00 | 74.96 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 3.12 | -0.30 | 0.030 |
| 110.00 | -15.38 | -1.32 | 0.00 | -68.17 | 0.00 | 68.17 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 3.44 | -0.31 | 0.028 |
| 115.00 | -14.38 | -1.27 | 0.00 | -61.59 | 0.00 | 61.59 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 3.77 | -0.32 | 0.026 |
| 120.00 | -13.52 | -1.23 | 0.00 | -55.25 | 0.00 | 55.25 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 4.12 | -0.34 | 0.024 |
| 120.00 | -13.52 | -1.23 | 0.00 | -55.25 | 0.00 | 55.25 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 4.12 | -0.34 | 0.029 |
| 125.00 | -13.31 | -1.22 | 0.00 | -49.12 | 0.00 | 49.12 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 4.48 | -0.35 | 0.026 |
| 126.28 | -12.73 | -1.18 | 0.00 | -47.56 | 0.00 | 47.56 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 4.57 | -0.35 | 0.026 |
| 126.28 | -12.73 | -1.18 | 0.00 | -47.56 | 0.00 | 47.56 | 900.61 | 450.31 | 868.79 | 429.06 | 4.57 | -0.35 | 0.031 |
| 130.00 | -11.95 | -1.14 | 0.00 | -43.16 | 0.00 | 43.16 | 888.95 | 444.47 | 835.13 | 412.44 | 4.85 | -0.36 | 0.029 |
| 135.00 | -11.19 | -1.09 | 0.00 | -37.48 | 0.00 | 37.48 | 872.29 | 436.14 | 789.93 | 390.12 | 5.24 | -0.38 | 0.026 |
| 140.00 | -10.54 | -1.05 | 0.00 | -32.03 | 0.00 | 32.03 | 854.50 | 427.25 | 744.88 | 367.87 | 5.64 | -0.39 | 0.022 |
| 140.00 | -10.54 | -1.05 | 0.00 | -32.03 | 0.00 | 32.03 | 854.50 | 427.25 | 744.88 | 367.87 | 5.64 | -0.39 | 0.028 |
| 145.00 | -10.41 | -1.04 | 0.00 | -26.80 | 0.00 | 26.80 | 835.60 | 417.80 | 700.09 | 345.75 | 6.06 | -0.40 | 0.025 |
| 146.00 | -9.32 | -0.95 | 0.00 | -25.77 | 0.00 | 25.77 | 831.68 | 415.84 | 691.17 | 341.34 | 6.15 | -0.41 | 0.024 |
| 150.00 | -8.71 | -0.91 | 0.00 | -21.95 | 0.00 | 21.95 | 815.57 | 407.78 | 655.68 | 323.81 | 6.49 | -0.42 | 0.021 |
| 155.00 | -8.28 | -0.87 | 0.00 | -17.41 | 0.00 | 17.41 | 794.42 | 397.21 | 611.76 | 302.12 | 6.94 | -0.43 | 0.017 |
| 158.50 | -8.19 | -0.86 | 0.00 | -14.36 | 0.00 | 14.36 | 778.94 | 389.47 | 581.37 | 287.12 | 7.26 | -0.44 | 0.015 |
| 158.50 | -8.19 | -0.86 | 0.00 | -14.36 | 0.00 | 14.36 | 778.94 | 389.47 | 581.37 | 287.12 | 7.26 | -0.44 | 0.061 |
| 160.00 | -7.91 | -0.84 | 0.00 | -13.06 | 0.00 | 13.06 | 772.14 | 386.07 | 568.44 | 280.73 | 7.40 | -0.44 | 0.057 |
| 165.00 | -7.85 | -0.84 | 0.00 | -8.86 | 0.00 | 8.86 | 748.74 | 374.37 | 525.85 | 259.70 | 7.88 | -0.48 | 0.045 |
| 166.00 | -5.78 | -0.64 | 0.00 | -8.02 | 0.00 | 8.02 | 743.93 | 371.96 | 517.43 | 255.54 | 7.98 | -0.48 | 0.039 |
| 170.00 | -5.54 | -0.62 | 0.00 | -5.46 | 0.00 | 5.46 | 723.19 | 361.60 | 483.41 | 238.74 | 8.39 | -0.50 | 0.031 |
| 175.00 | -3.01 | -0.35 | 0.00 | -2.37 | 0.00 | 2.37 | 686.95 | 343.48 | 435.91 | 215.28 | 8.93 | -0.52 | 0.015 |
| 180.00 | -2.93 | -0.34 | 0.00 | -0.64 | 0.00 | 0.64 | 650.71 | 325.36 | 390.87 | 193.04 | 9.48 | -0.53 | 0.008 |
| 181.90 | 0.00 | -0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 636.94 | 318.47 | 374.40 | 184.90 | 9.69 | -0.53 | 0.000 |

## Equivalent Modal Forces Analysis

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

| | |
|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.18 |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 |
| Importance Factor ($I_E$): | 1.00 |
| Site Coefficient $F_a$: | 1.60 |
| Site Coefficient $F_v$ | 2.40 |
| Response Modification Coefficient (R): | 1.50 |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.19 |
| Desing Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 |
| Period Based on Rayleigh Method (sec): | 3.20 |
| Redundancy Factor (p): | 1.00 |

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|
| 46 | 180.95 | 90 | 1.870 | 1.878 | 1.103 | 0.352 | 21 | 112 |
| 45 | 177.50 | 243 | 1.800 | 1.537 | 0.977 | 0.307 | 50 | 301 |
| 44 | 172.50 | 283 | 1.700 | 1.121 | 0.814 | 0.247 | 47 | 350 |
| 43 | 168.00 | 232 | 1.612 | 0.817 | 0.687 | 0.198 | 31 | 288 |
| 42 | 165.50 | 65 | 1.565 | 0.673 | 0.623 | 0.172 | 8 | 81 |
| 41 | 162.50 | 332 | 1.508 | 0.522 | 0.553 | 0.144 | 32 | 412 |
| 40 | 159.25 | 101 | 1.449 | 0.382 | 0.484 | 0.115 | 8 | 125 |
| 39 | 156.75 | 492 | 1.403 | 0.290 | 0.435 | 0.094 | 31 | 609 |
| 38 | 152.50 | 710 | 1.328 | 0.162 | 0.362 | 0.062 | 29 | 879 |
| 37 | 148.00 | 574 | 1.251 | 0.058 | 0.295 | 0.032 | 12 | 711 |
| 36 | 145.50 | 149 | 1.209 | 0.014 | 0.262 | 0.017 | 2 | 185 |
| 35 | 142.50 | 751 | 1.160 | -0.030 | 0.226 | 0.001 | 1 | 930 |
| 34 | 137.50 | 890 | 1.080 | -0.081 | 0.175 | -0.022 | -13 | 1,102 |
| 33 | 132.50 | 898 | 1.003 | -0.109 | 0.133 | -0.039 | -23 | 1,113 |
| 32 | 128.14 | 674 | 0.938 | -0.120 | 0.103 | -0.050 | -23 | 834 |
| 31 | 125.64 | 253 | 0.902 | -0.122 | 0.088 | -0.055 | -9 | 314 |
| 30 | 122.50 | 996 | 0.857 | -0.120 | 0.072 | -0.059 | -39 | 1,234 |
| 29 | 117.50 | 1,158 | 0.789 | -0.110 | 0.051 | -0.061 | -47 | 1,434 |
| 28 | 112.50 | 1,169 | 0.723 | -0.094 | 0.035 | -0.057 | -44 | 1,448 |
| 27 | 107.50 | 1,180 | 0.660 | -0.074 | 0.023 | -0.048 | -38 | 1,462 |
| 26 | 102.50 | 1,191 | 0.600 | -0.053 | 0.015 | -0.034 | -27 | 1,475 |
| 25 | 97.50 | 1,202 | 0.543 | -0.032 | 0.009 | -0.017 | -13 | 1,489 |
| 24 | 92.67 | 1,133 | 0.490 | -0.013 | 0.007 | 0.001 | 1 | 1,403 |
| 23 | 90.17 | 113 | 0.464 | -0.003 | 0.006 | 0.010 | 1 | 140 |
| 22 | 88.29 | 1,175 | 0.445 | 0.003 | 0.006 | 0.017 | 13 | 1,456 |
| 21 | 85.79 | 417 | 0.420 | 0.012 | 0.006 | 0.025 | 7 | 517 |
| 20 | 82.50 | 1,330 | 0.389 | 0.022 | 0.007 | 0.034 | 30 | 1,648 |
| 19 | 77.50 | 1,427 | 0.343 | 0.035 | 0.009 | 0.045 | 42 | 1,768 |
| 18 | 72.50 | 1,441 | 0.300 | 0.045 | 0.012 | 0.052 | 50 | 1,785 |
| 17 | 67.50 | 1,455 | 0.260 | 0.053 | 0.016 | 0.056 | 54 | 1,802 |
| 16 | 62.50 | 1,469 | 0.223 | 0.060 | 0.020 | 0.058 | 57 | 1,819 |
| 15 | 57.50 | 1,483 | 0.189 | 0.064 | 0.025 | 0.059 | 58 | 1,837 |
| 14 | 52.50 | 1,497 | 0.157 | 0.067 | 0.029 | 0.058 | 58 | 1,854 |
| 13 | 49.30 | 422 | 0.139 | 0.069 | 0.032 | 0.058 | 16 | 522 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12 | 46.80 | 1,607 | 0.125 | 0.070 | 0.034 | 0.057 | 61 | 1,990 |
| 11 | 44.55 | 404 | 0.113 | 0.070 | 0.035 | 0.057 | 15 | 501 |
| 10 | 42.05 | 1,342 | 0.101 | 0.071 | 0.037 | 0.056 | 50 | 1,662 |
| 9 | 37.50 | 1,652 | 0.080 | 0.072 | 0.040 | 0.055 | 61 | 2,046 |
| 8 | 32.50 | 1,668 | 0.060 | 0.072 | 0.041 | 0.054 | 60 | 2,067 |
| 7 | 27.50 | 1,685 | 0.043 | 0.071 | 0.042 | 0.053 | 59 | 2,088 |
| 6 | 22.50 | 1,702 | 0.029 | 0.068 | 0.040 | 0.051 | 58 | 2,108 |
| 5 | 17.50 | 1,719 | 0.017 | 0.062 | 0.037 | 0.048 | 55 | 2,129 |
| 4 | 14.85 | 100 | 0.013 | 0.058 | 0.034 | 0.046 | 3 | 124 |
| 3 | 12.35 | 1,871 | 0.009 | 0.053 | 0.030 | 0.043 | 53 | 2,318 |
| 2 | 7.50 | 2,002 | 0.003 | 0.038 | 0.021 | 0.033 | 45 | 2,481 |
| 1 | 2.50 | 1,842 | 0.000 | 0.015 | 0.008 | 0.016 | 19 | 2,282 |
| Kaelus DBC0061F1V51- | 181.90 | 76 | 1.890 | 1.980 | 1.140 | 0.365 | 19 | 95 |
| Powerwave Allgon LGP | 181.90 | 85 | 1.890 | 1.980 | 1.140 | 0.365 | 21 | 105 |
| Raycap DC6-48-60-0-8 | 181.90 | 33 | 1.890 | 1.980 | 1.140 | 0.365 | 8 | 41 |
| Raycap DC6-48-60-18- | 181.90 | 32 | 1.890 | 1.980 | 1.140 | 0.365 | 8 | 39 |
| Ericsson RRUS 11 (Ba | 181.90 | 300 | 1.890 | 1.980 | 1.140 | 0.365 | 73 | 372 |
| Ericsson RRUS 32 (50 | 181.90 | 152 | 1.890 | 1.980 | 1.140 | 0.365 | 37 | 189 |
| Ericsson RRUS 12 | 181.90 | 150 | 1.890 | 1.980 | 1.140 | 0.365 | 37 | 186 |
| Powerwave Allgon 777 | 181.90 | 105 | 1.890 | 1.980 | 1.140 | 0.365 | 26 | 130 |
| KMW AM-X-CD-16-65-00 | 181.90 | 146 | 1.890 | 1.980 | 1.140 | 0.365 | 35 | 180 |
| Quintel QS66512-2 | 181.90 | 333 | 1.890 | 1.980 | 1.140 | 0.365 | 81 | 413 |
| Flat Platform w/ Han | 181.90 | 2,000 | 1.890 | 1.980 | 1.140 | 0.365 | 487 | 2,478 |
| Nokia B5 RRH4x40-850 | 175.00 | 146 | 1.749 | 1.318 | 0.892 | 0.277 | 27 | 180 |
| Alcatel-Lucent B25 R | 175.00 | 159 | 1.749 | 1.318 | 0.892 | 0.277 | 29 | 197 |
| Alcatel-Lucent B13 R | 175.00 | 173 | 1.749 | 1.318 | 0.892 | 0.277 | 32 | 215 |
| RFS DB-B1-6C-12AB-0Z | 175.00 | 21 | 1.749 | 1.318 | 0.892 | 0.277 | 4 | 27 |
| Nokia B66a RRH4x45 ( | 175.00 | 170 | 1.749 | 1.318 | 0.892 | 0.277 | 31 | 211 |
| Commscope JAHH-65B- | 175.00 | 364 | 1.749 | 1.318 | 0.892 | 0.277 | 67 | 450 |
| Antel LPA-80063/6CF | 175.00 | 162 | 1.749 | 1.318 | 0.892 | 0.277 | 30 | 201 |
| Flat Low Profile Pla | 175.00 | 1,500 | 1.749 | 1.318 | 0.892 | 0.277 | 277 | 1,858 |
| Ericsson AIR 21, 1.3 | 166.00 | 249 | 1.574 | 0.700 | 0.635 | 0.177 | 29 | 308 |
| Ericsson AIR 21, 1.3 | 166.00 | 271 | 1.574 | 0.700 | 0.635 | 0.177 | 32 | 336 |
| Andrew LNX-6515DS-A1 | 166.00 | 149 | 1.574 | 0.700 | 0.635 | 0.177 | 18 | 185 |
| Round Low Profile Pl | 166.00 | 1,500 | 1.574 | 0.700 | 0.635 | 0.177 | 177 | 1,858 |
| KMW TTA (HB-X-WM-17- | 146.00 | 48 | 1.218 | 0.022 | 0.268 | 0.020 | 1 | 59 |
| KMW HB-X-WM-17-65-00 | 146.00 | 90 | 1.218 | 0.022 | 0.268 | 0.020 | 1 | 111 |
| Side Arms | 146.00 | 560 | 1.218 | 0.022 | 0.268 | 0.020 | 7 | 694 |
| | | 53,561 | 75.099 | 42.836 | 31.122 | 9.341 | 2,514 | 66,353 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|
| 46 | 180.95 | 90 | 1.870 | 1.878 | 1.103 | 0.352 | 21 | 78 |
| 45 | 177.50 | 243 | 1.800 | 1.537 | 0.977 | 0.307 | 50 | 210 |
| 44 | 172.50 | 283 | 1.700 | 1.121 | 0.814 | 0.247 | 47 | 244 |
| 43 | 168.00 | 232 | 1.612 | 0.817 | 0.687 | 0.198 | 31 | 200 |
| 42 | 165.50 | 65 | 1.565 | 0.673 | 0.623 | 0.172 | 8 | 56 |
| 41 | 162.50 | 332 | 1.508 | 0.522 | 0.553 | 0.144 | 32 | 286 |
| 40 | 159.25 | 101 | 1.449 | 0.382 | 0.484 | 0.115 | 8 | 87 |
| 39 | 156.75 | 492 | 1.403 | 0.290 | 0.435 | 0.094 | 31 | 424 |
| 38 | 152.50 | 710 | 1.328 | 0.162 | 0.362 | 0.062 | 29 | 611 |
| 37 | 148.00 | 574 | 1.251 | 0.058 | 0.295 | 0.032 | 12 | 494 |
| 36 | 145.50 | 149 | 1.209 | 0.014 | 0.262 | 0.017 | 2 | 128 |
| 35 | 142.50 | 751 | 1.160 | -0.030 | 0.226 | 0.001 | 1 | 647 |
| 34 | 137.50 | 890 | 1.080 | -0.081 | 0.175 | -0.022 | -13 | 766 |
| 33 | 132.50 | 898 | 1.003 | -0.109 | 0.133 | -0.039 | -23 | 773 |
| 32 | 128.14 | 674 | 0.938 | -0.120 | 0.103 | -0.050 | -23 | 580 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 31 | 125.64 | 253 | 0.902 | -0.122 | 0.088 | -0.055 | -9 | 218 |
| 30 | 122.50 | 996 | 0.857 | -0.120 | 0.072 | -0.059 | -39 | 858 |
| 29 | 117.50 | 1,158 | 0.789 | -0.110 | 0.051 | -0.061 | -47 | 997 |
| 28 | 112.50 | 1,169 | 0.723 | -0.094 | 0.035 | -0.057 | -44 | 1,006 |
| 27 | 107.50 | 1,180 | 0.660 | -0.074 | 0.023 | -0.048 | -38 | 1,016 |
| 26 | 102.50 | 1,191 | 0.600 | -0.053 | 0.015 | -0.034 | -27 | 1,026 |
| 25 | 97.50 | 1,202 | 0.543 | -0.032 | 0.009 | -0.017 | -13 | 1,035 |
| 24 | 92.67 | 1,133 | 0.490 | -0.013 | 0.007 | 0.001 | 1 | 976 |
| 23 | 90.17 | 113 | 0.464 | -0.003 | 0.006 | 0.010 | 1 | 97 |
| 22 | 88.29 | 1,175 | 0.445 | 0.003 | 0.006 | 0.017 | 13 | 1,012 |
| 21 | 85.79 | 417 | 0.420 | 0.012 | 0.006 | 0.025 | 7 | 359 |
| 20 | 82.50 | 1,330 | 0.389 | 0.022 | 0.007 | 0.034 | 30 | 1,146 |
| 19 | 77.50 | 1,427 | 0.343 | 0.035 | 0.009 | 0.045 | 42 | 1,229 |
| 18 | 72.50 | 1,441 | 0.300 | 0.045 | 0.012 | 0.052 | 50 | 1,241 |
| 17 | 67.50 | 1,455 | 0.260 | 0.053 | 0.016 | 0.056 | 54 | 1,253 |
| 16 | 62.50 | 1,469 | 0.223 | 0.060 | 0.020 | 0.058 | 57 | 1,265 |
| 15 | 57.50 | 1,483 | 0.189 | 0.064 | 0.025 | 0.059 | 58 | 1,277 |
| 14 | 52.50 | 1,497 | 0.157 | 0.067 | 0.029 | 0.058 | 58 | 1,289 |
| 13 | 49.30 | 422 | 0.139 | 0.069 | 0.032 | 0.058 | 16 | 363 |
| 12 | 46.80 | 1,607 | 0.125 | 0.070 | 0.034 | 0.057 | 61 | 1,384 |
| 11 | 44.55 | 404 | 0.113 | 0.070 | 0.035 | 0.057 | 15 | 348 |
| 10 | 42.05 | 1,342 | 0.101 | 0.071 | 0.037 | 0.056 | 50 | 1,156 |
| 9 | 37.50 | 1,652 | 0.080 | 0.072 | 0.040 | 0.055 | 61 | 1,422 |
| 8 | 32.50 | 1,668 | 0.060 | 0.072 | 0.041 | 0.054 | 60 | 1,437 |
| 7 | 27.50 | 1,685 | 0.043 | 0.071 | 0.042 | 0.053 | 59 | 1,451 |
| 6 | 22.50 | 1,702 | 0.029 | 0.068 | 0.040 | 0.051 | 58 | 1,466 |
| 5 | 17.50 | 1,719 | 0.017 | 0.062 | 0.037 | 0.048 | 55 | 1,480 |
| 4 | 14.85 | 100 | 0.013 | 0.058 | 0.034 | 0.046 | 3 | 86 |
| 3 | 12.35 | 1,871 | 0.009 | 0.053 | 0.030 | 0.043 | 53 | 1,611 |
| 2 | 7.50 | 2,002 | 0.003 | 0.038 | 0.021 | 0.033 | 45 | 1,724 |
| 1 | 2.50 | 1,842 | 0.000 | 0.015 | 0.008 | 0.016 | 19 | 1,586 |
| Kaelus DBC0061F1V51- | 181.90 | 76 | 1.890 | 1.980 | 1.140 | 0.365 | 19 | 66 |
| Powerwave Allgon LGP | 181.90 | 85 | 1.890 | 1.980 | 1.140 | 0.365 | 21 | 73 |
| Raycap DC6-48-60-0-8 | 181.90 | 33 | 1.890 | 1.980 | 1.140 | 0.365 | 8 | 28 |
| Raycap DC6-48-60-18- | 181.90 | 32 | 1.890 | 1.980 | 1.140 | 0.365 | 8 | 27 |
| Ericsson RRUS 11 (Ba | 181.90 | 300 | 1.890 | 1.980 | 1.140 | 0.365 | 73 | 258 |
| Ericsson RRUS 32 (50 | 181.90 | 152 | 1.890 | 1.980 | 1.140 | 0.365 | 37 | 131 |
| Ericsson RRUS 12 | 181.90 | 150 | 1.890 | 1.980 | 1.140 | 0.365 | 37 | 129 |
| Powerwave Allgon 777 | 181.90 | 105 | 1.890 | 1.980 | 1.140 | 0.365 | 26 | 90 |
| KMW AM-X-CD-16-65-00 | 181.90 | 146 | 1.890 | 1.980 | 1.140 | 0.365 | 35 | 125 |
| Quintel QS66512-2 | 181.90 | 333 | 1.890 | 1.980 | 1.140 | 0.365 | 81 | 287 |
| Flat Platform w/ Han | 181.90 | 2,000 | 1.890 | 1.980 | 1.140 | 0.365 | 487 | 1,722 |
| Nokia B5 RRH4x40-850 | 175.00 | 146 | 1.749 | 1.318 | 0.892 | 0.277 | 27 | 125 |
| Alcatel-Lucent B25 R | 175.00 | 159 | 1.749 | 1.318 | 0.892 | 0.277 | 29 | 137 |
| Alcatel-Lucent B13 R | 175.00 | 173 | 1.749 | 1.318 | 0.892 | 0.277 | 32 | 149 |
| RFS DB-B1-6C-12AB-0Z | 175.00 | 21 | 1.749 | 1.318 | 0.892 | 0.277 | 4 | 18 |
| Nokia B66a RRH4x45 ( | 175.00 | 170 | 1.749 | 1.318 | 0.892 | 0.277 | 31 | 147 |
| Commscope JAHH-65B- | 175.00 | 364 | 1.749 | 1.318 | 0.892 | 0.277 | 67 | 313 |
| Antel LPA-80063/6CF | 175.00 | 162 | 1.749 | 1.318 | 0.892 | 0.277 | 30 | 140 |
| Flat Low Profile Pla | 175.00 | 1,500 | 1.749 | 1.318 | 0.892 | 0.277 | 277 | 1,292 |
| Ericsson AIR 21, 1.3 | 166.00 | 249 | 1.574 | 0.700 | 0.635 | 0.177 | 29 | 214 |
| Ericsson AIR 21, 1.3 | 166.00 | 271 | 1.574 | 0.700 | 0.635 | 0.177 | 32 | 234 |
| Andrew LNX-6515DS-A1 | 166.00 | 149 | 1.574 | 0.700 | 0.635 | 0.177 | 18 | 129 |
| Round Low Profile Pl | 166.00 | 1,500 | 1.574 | 0.700 | 0.635 | 0.177 | 177 | 1,292 |
| KMW TTA (HB-X-WM-17- | 146.00 | 48 | 1.218 | 0.022 | 0.268 | 0.020 | 1 | 41 |
| KMW HB-X-WM-17-65-00 | 146.00 | 90 | 1.218 | 0.022 | 0.268 | 0.020 | 1 | 78 |
| Side Arms | 146.00 | 560 | 1.218 | 0.022 | 0.268 | 0.020 | 7 | 482 |
| | | 53,561 | 75.099 | 42.836 | 31.122 | 9.341 | 2,514 | 46,125 |

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -64.07 | -2.50 | 0.00 | -360.13 | 0.00 | 360.13 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.056 |
| 5.00 | -61.59 | -2.48 | 0.00 | -347.61 | 0.00 | 347.61 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.01 | -0.02 | 0.055 |
| 10.00 | -59.27 | -2.44 | 0.00 | -335.23 | 0.00 | 335.23 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.03 | -0.03 | 0.053 |
| 14.71 | -59.15 | -2.44 | 0.00 | -323.75 | 0.00 | 323.75 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.08 | -0.05 | 0.052 |
| 14.71 | -59.15 | -2.44 | 0.00 | -323.75 | 0.00 | 323.75 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.08 | -0.05 | 0.064 |
| 15.00 | -57.02 | -2.40 | 0.00 | -323.04 | 0.00 | 323.04 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.08 | -0.05 | 0.064 |
| 20.00 | -54.91 | -2.36 | 0.00 | -311.05 | 0.00 | 311.05 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.14 | -0.07 | 0.063 |
| 20.00 | -54.91 | -2.36 | 0.00 | -311.05 | 0.00 | 311.05 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.14 | -0.07 | 0.063 |
| 25.00 | -52.82 | -2.32 | 0.00 | -299.26 | 0.00 | 299.26 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.23 | -0.09 | 0.061 |
| 30.00 | -50.75 | -2.27 | 0.00 | -287.68 | 0.00 | 287.68 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.33 | -0.11 | 0.060 |
| 35.00 | -48.71 | -2.22 | 0.00 | -276.33 | 0.00 | 276.33 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 0.46 | -0.13 | 0.058 |
| 40.00 | -47.04 | -2.19 | 0.00 | -265.21 | 0.00 | 265.21 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 0.61 | -0.16 | 0.057 |
| 44.10 | -46.54 | -2.18 | 0.00 | -256.25 | 0.00 | 256.25 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 0.76 | -0.17 | 0.056 |
| 45.00 | -44.55 | -2.12 | 0.00 | -254.29 | 0.00 | 254.29 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 0.79 | -0.18 | 0.055 |
| 48.60 | -44.03 | -2.11 | 0.00 | -246.66 | 0.00 | 246.66 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 0.93 | -0.19 | 0.063 |
| 50.00 | -42.17 | -2.05 | 0.00 | -243.71 | 0.00 | 243.71 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 0.99 | -0.20 | 0.062 |
| 55.00 | -40.34 | -2.01 | 0.00 | -233.44 | 0.00 | 233.44 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 1.21 | -0.22 | 0.060 |
| 60.00 | -38.52 | -1.96 | 0.00 | -223.41 | 0.00 | 223.41 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 1.45 | -0.24 | 0.058 |
| 65.00 | -36.71 | -1.91 | 0.00 | -213.62 | 0.00 | 213.62 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 1.72 | -0.27 | 0.057 |
| 70.00 | -34.93 | -1.87 | 0.00 | -204.08 | 0.00 | 204.08 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 2.01 | -0.29 | 0.055 |
| 75.00 | -33.16 | -1.83 | 0.00 | -194.75 | 0.00 | 194.75 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 2.33 | -0.31 | 0.053 |
| 80.00 | -31.51 | -1.80 | 0.00 | -185.62 | 0.00 | 185.62 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 2.67 | -0.34 | 0.052 |
| 80.00 | -31.51 | -1.80 | 0.00 | -185.62 | 0.00 | 185.62 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 2.67 | -0.34 | 0.057 |
| 85.00 | -30.99 | -1.80 | 0.00 | -176.61 | 0.00 | 176.61 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 3.04 | -0.36 | 0.055 |
| 86.58 | -29.54 | -1.78 | 0.00 | -173.77 | 0.00 | 173.77 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 3.16 | -0.37 | 0.055 |
| 90.00 | -29.40 | -1.79 | 0.00 | -167.67 | 0.00 | 167.67 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 3.43 | -0.39 | 0.053 |
| 90.33 | -27.99 | -1.78 | 0.00 | -167.08 | 0.00 | 167.08 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 3.46 | -0.39 | 0.062 |
| 95.00 | -26.50 | -1.80 | 0.00 | -158.75 | 0.00 | 158.75 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 3.85 | -0.41 | 0.060 |
| 100.00 | -25.03 | -1.83 | 0.00 | -149.76 | 0.00 | 149.76 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 4.30 | -0.44 | 0.057 |
| 105.00 | -23.57 | -1.86 | 0.00 | -140.62 | 0.00 | 140.62 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 4.78 | -0.47 | 0.055 |
| 110.00 | -22.12 | -1.91 | 0.00 | -131.30 | 0.00 | 131.30 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 5.29 | -0.50 | 0.052 |
| 115.00 | -20.68 | -1.95 | 0.00 | -121.77 | 0.00 | 121.77 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 5.82 | -0.52 | 0.049 |
| 120.00 | -19.45 | -1.99 | 0.00 | -112.02 | 0.00 | 112.02 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 6.39 | -0.55 | 0.046 |
| 120.00 | -19.45 | -1.99 | 0.00 | -112.02 | 0.00 | 112.02 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 6.39 | -0.55 | 0.056 |
| 125.00 | -19.13 | -2.00 | 0.00 | -102.09 | 0.00 | 102.09 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 6.98 | -0.58 | 0.052 |
| 126.28 | -18.30 | -2.02 | 0.00 | -99.53 | 0.00 | 99.53 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 7.14 | -0.59 | 0.051 |
| 126.28 | -18.30 | -2.02 | 0.00 | -99.53 | 0.00 | 99.53 | 900.61 | 450.31 | 868.79 | 429.06 | 7.14 | -0.59 | 0.062 |
| 130.00 | -17.18 | -2.04 | 0.00 | -92.03 | 0.00 | 92.03 | 888.95 | 444.47 | 835.13 | 412.44 | 7.60 | -0.61 | 0.058 |
| 135.00 | -16.08 | -2.05 | 0.00 | -81.84 | 0.00 | 81.84 | 872.29 | 436.14 | 789.93 | 390.12 | 8.25 | -0.64 | 0.053 |
| 140.00 | -15.15 | -2.04 | 0.00 | -71.60 | 0.00 | 71.60 | 854.50 | 427.25 | 744.88 | 367.87 | 8.94 | -0.67 | 0.047 |
| 140.00 | -15.15 | -2.04 | 0.00 | -71.60 | 0.00 | 71.60 | 854.50 | 427.25 | 744.88 | 367.87 | 8.94 | -0.67 | 0.059 |
| 145.00 | -14.96 | -2.04 | 0.00 | -61.38 | 0.00 | 61.38 | 835.60 | 417.80 | 700.09 | 345.75 | 9.66 | -0.70 | 0.053 |
| 146.00 | -13.39 | -2.01 | 0.00 | -59.34 | 0.00 | 59.34 | 831.68 | 415.84 | 691.17 | 341.34 | 9.81 | -0.70 | 0.051 |
| 150.00 | -12.51 | -1.97 | 0.00 | -51.31 | 0.00 | 51.31 | 815.57 | 407.78 | 655.68 | 323.81 | 10.41 | -0.73 | 0.045 |
| 155.00 | -11.90 | -1.94 | 0.00 | -41.44 | 0.00 | 41.44 | 794.42 | 397.21 | 611.76 | 302.12 | 11.19 | -0.76 | 0.038 |
| 158.50 | -11.77 | -1.93 | 0.00 | -34.66 | 0.00 | 34.66 | 778.94 | 389.47 | 581.37 | 287.12 | 11.75 | -0.78 | 0.033 |
| 158.50 | -11.77 | -1.93 | 0.00 | -34.66 | 0.00 | 34.66 | 778.94 | 389.47 | 581.37 | 287.12 | 11.75 | -0.78 | 0.136 |
| 160.00 | -11.36 | -1.90 | 0.00 | -31.76 | 0.00 | 31.76 | 772.14 | 386.07 | 568.44 | 280.73 | 12.00 | -0.78 | 0.128 |
| 165.00 | -11.28 | -1.91 | 0.00 | -22.23 | 0.00 | 22.23 | 748.74 | 374.37 | 525.85 | 259.70 | 12.87 | -0.87 | 0.101 |
| 166.00 | -8.30 | -1.58 | 0.00 | -20.33 | 0.00 | 20.33 | 743.93 | 371.96 | 517.43 | 255.54 | 13.05 | -0.89 | 0.091 |
| 170.00 | -7.95 | -1.53 | 0.00 | -14.02 | 0.00 | 14.02 | 723.19 | 361.60 | 483.41 | 238.74 | 13.82 | -0.94 | 0.070 |
| 175.00 | -4.32 | -0.93 | 0.00 | -6.35 | 0.00 | 6.35 | 686.95 | 343.48 | 435.91 | 215.28 | 14.83 | -0.98 | 0.036 |
| 180.00 | -4.21 | -0.90 | 0.00 | -1.72 | 0.00 | 1.72 | 650.71 | 325.36 | 390.87 | 193.04 | 15.87 | -1.00 | 0.015 |
| 181.90 | 0.00 | -0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 636.94 | 318.47 | 374.40 | 184.90 | 16.27 | -1.01 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -44.54 | -2.50 | 0.00 | -351.35 | 0.00 | 351.35 | 3,433.77 | 1,716.88 | 6,036.76 | 2,981.33 | 0.00 | 0.00 | 0.052 |
| 5.00 | -42.81 | -2.47 | 0.00 | -338.84 | 0.00 | 338.84 | 3,397.00 | 1,698.50 | 5,857.04 | 2,892.57 | 0.01 | -0.02 | 0.051 |
| 10.00 | -41.20 | -2.43 | 0.00 | -326.50 | 0.00 | 326.50 | 3,359.11 | 1,679.56 | 5,677.90 | 2,804.10 | 0.03 | -0.03 | 0.050 |
| 14.71 | -41.12 | -2.43 | 0.00 | -315.08 | 0.00 | 315.08 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.07 | -0.05 | 0.049 |
| 14.71 | -41.12 | -2.43 | 0.00 | -315.08 | 0.00 | 315.08 | 3,322.40 | 1,661.20 | 5,509.81 | 2,721.09 | 0.07 | -0.05 | 0.060 |
| 15.00 | -39.63 | -2.38 | 0.00 | -314.38 | 0.00 | 314.38 | 3,320.10 | 1,660.05 | 5,499.48 | 2,715.99 | 0.08 | -0.05 | 0.060 |
| 20.00 | -38.17 | -2.33 | 0.00 | -302.48 | 0.00 | 302.48 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.14 | -0.07 | 0.058 |
| 20.00 | -38.17 | -2.33 | 0.00 | -302.48 | 0.00 | 302.48 | 3,279.97 | 1,639.98 | 5,321.88 | 2,628.28 | 0.14 | -0.07 | 0.058 |
| 25.00 | -36.72 | -2.29 | 0.00 | -290.82 | 0.00 | 290.82 | 3,238.71 | 1,619.36 | 5,145.22 | 2,541.03 | 0.22 | -0.09 | 0.057 |
| 30.00 | -35.28 | -2.24 | 0.00 | -279.39 | 0.00 | 279.39 | 3,196.33 | 1,598.17 | 4,969.60 | 2,454.30 | 0.33 | -0.11 | 0.056 |
| 35.00 | -33.86 | -2.18 | 0.00 | -268.22 | 0.00 | 268.22 | 3,152.83 | 1,576.41 | 4,795.15 | 2,368.14 | 0.45 | -0.13 | 0.055 |
| 40.00 | -32.70 | -2.14 | 0.00 | -257.30 | 0.00 | 257.30 | 3,108.20 | 1,554.10 | 4,621.97 | 2,282.62 | 0.60 | -0.15 | 0.053 |
| 44.10 | -32.35 | -2.13 | 0.00 | -248.51 | 0.00 | 248.51 | 3,070.77 | 1,535.38 | 4,481.00 | 2,213.00 | 0.74 | -0.17 | 0.052 |
| 45.00 | -30.97 | -2.07 | 0.00 | -246.60 | 0.00 | 246.60 | 3,062.45 | 1,531.23 | 4,450.19 | 2,197.78 | 0.77 | -0.17 | 0.051 |
| 48.60 | -30.60 | -2.06 | 0.00 | -239.14 | 0.00 | 239.14 | 2,379.97 | 1,189.99 | 3,474.54 | 1,715.94 | 0.90 | -0.19 | 0.058 |
| 50.00 | -29.32 | -2.00 | 0.00 | -236.26 | 0.00 | 236.26 | 2,371.43 | 1,185.72 | 3,439.58 | 1,698.68 | 0.96 | -0.19 | 0.058 |
| 55.00 | -28.04 | -1.95 | 0.00 | -226.23 | 0.00 | 226.23 | 2,340.22 | 1,170.11 | 3,315.01 | 1,637.16 | 1.17 | -0.22 | 0.056 |
| 60.00 | -26.77 | -1.90 | 0.00 | -216.47 | 0.00 | 216.47 | 2,307.88 | 1,153.94 | 3,191.02 | 1,575.92 | 1.41 | -0.24 | 0.055 |
| 65.00 | -25.52 | -1.85 | 0.00 | -206.96 | 0.00 | 206.96 | 2,274.42 | 1,137.21 | 3,067.70 | 1,515.02 | 1.67 | -0.26 | 0.053 |
| 70.00 | -24.28 | -1.81 | 0.00 | -197.71 | 0.00 | 197.71 | 2,239.83 | 1,119.92 | 2,945.16 | 1,454.51 | 1.96 | -0.28 | 0.052 |
| 75.00 | -23.05 | -1.77 | 0.00 | -188.68 | 0.00 | 188.68 | 2,204.12 | 1,102.06 | 2,823.54 | 1,394.44 | 2.27 | -0.31 | 0.050 |
| 80.00 | -21.90 | -1.74 | 0.00 | -179.85 | 0.00 | 179.85 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 2.60 | -0.33 | 0.049 |
| 80.00 | -21.90 | -1.74 | 0.00 | -179.85 | 0.00 | 179.85 | 2,167.29 | 1,083.65 | 2,702.93 | 1,334.88 | 2.60 | -0.33 | 0.053 |
| 85.00 | -21.54 | -1.74 | 0.00 | -171.16 | 0.00 | 171.16 | 2,129.34 | 1,064.67 | 2,583.46 | 1,275.87 | 2.95 | -0.35 | 0.052 |
| 86.58 | -20.53 | -1.72 | 0.00 | -168.42 | 0.00 | 168.42 | 2,117.11 | 1,058.55 | 2,545.96 | 1,257.35 | 3.07 | -0.36 | 0.051 |
| 90.00 | -20.43 | -1.72 | 0.00 | -162.54 | 0.00 | 162.54 | 2,090.26 | 1,045.13 | 2,465.23 | 1,217.49 | 3.34 | -0.38 | 0.050 |
| 90.33 | -19.46 | -1.72 | 0.00 | -161.97 | 0.00 | 161.97 | 1,547.78 | 773.89 | 1,862.15 | 919.64 | 3.36 | -0.38 | 0.058 |
| 95.00 | -18.42 | -1.73 | 0.00 | -153.94 | 0.00 | 153.94 | 1,525.71 | 762.86 | 1,787.32 | 882.69 | 3.74 | -0.40 | 0.056 |
| 100.00 | -17.39 | -1.76 | 0.00 | -145.27 | 0.00 | 145.27 | 1,500.99 | 750.50 | 1,707.51 | 843.28 | 4.18 | -0.43 | 0.054 |
| 105.00 | -16.38 | -1.80 | 0.00 | -136.46 | 0.00 | 136.46 | 1,475.16 | 737.58 | 1,628.14 | 804.08 | 4.64 | -0.46 | 0.051 |
| 110.00 | -15.37 | -1.84 | 0.00 | -127.46 | 0.00 | 127.46 | 1,448.19 | 724.10 | 1,549.32 | 765.15 | 5.14 | -0.48 | 0.049 |
| 115.00 | -14.37 | -1.89 | 0.00 | -118.25 | 0.00 | 118.25 | 1,420.11 | 710.05 | 1,471.16 | 726.55 | 5.66 | -0.51 | 0.046 |
| 120.00 | -13.51 | -1.92 | 0.00 | -108.82 | 0.00 | 108.82 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 6.20 | -0.53 | 0.043 |
| 120.00 | -13.51 | -1.92 | 0.00 | -108.82 | 0.00 | 108.82 | 1,390.90 | 695.45 | 1,393.78 | 688.34 | 6.20 | -0.53 | 0.052 |
| 125.00 | -13.29 | -1.94 | 0.00 | -99.20 | 0.00 | 99.20 | 1,360.57 | 680.28 | 1,317.29 | 650.56 | 6.78 | -0.56 | 0.049 |
| 126.28 | -12.71 | -1.96 | 0.00 | -96.72 | 0.00 | 96.72 | 1,352.62 | 676.31 | 1,297.87 | 640.97 | 6.93 | -0.57 | 0.048 |
| 126.28 | -12.71 | -1.96 | 0.00 | -96.72 | 0.00 | 96.72 | 900.61 | 450.31 | 868.79 | 429.06 | 6.93 | -0.57 | 0.059 |
| 130.00 | -11.94 | -1.98 | 0.00 | -89.44 | 0.00 | 89.44 | 888.95 | 444.47 | 835.13 | 412.44 | 7.38 | -0.59 | 0.055 |
| 135.00 | -11.17 | -1.99 | 0.00 | -79.56 | 0.00 | 79.56 | 872.29 | 436.14 | 789.93 | 390.12 | 8.01 | -0.62 | 0.050 |
| 140.00 | -10.52 | -1.98 | 0.00 | -69.62 | 0.00 | 69.62 | 854.50 | 427.25 | 744.88 | 367.87 | 8.68 | -0.65 | 0.044 |
| 140.00 | -10.52 | -1.98 | 0.00 | -69.62 | 0.00 | 69.62 | 854.50 | 427.25 | 744.88 | 367.87 | 8.68 | -0.65 | 0.056 |
| 145.00 | -10.39 | -1.98 | 0.00 | -59.70 | 0.00 | 59.70 | 835.60 | 417.80 | 700.09 | 345.75 | 9.38 | -0.68 | 0.049 |
| 146.00 | -9.30 | -1.95 | 0.00 | -57.71 | 0.00 | 57.71 | 831.68 | 415.84 | 691.17 | 341.34 | 9.52 | -0.68 | 0.048 |
| 150.00 | -8.69 | -1.92 | 0.00 | -49.90 | 0.00 | 49.90 | 815.57 | 407.78 | 655.68 | 323.81 | 10.10 | -0.71 | 0.042 |
| 155.00 | -8.26 | -1.89 | 0.00 | -40.30 | 0.00 | 40.30 | 794.42 | 397.21 | 611.76 | 302.12 | 10.86 | -0.74 | 0.035 |
| 158.50 | -8.18 | -1.88 | 0.00 | -33.70 | 0.00 | 33.70 | 778.94 | 389.47 | 581.37 | 287.12 | 11.41 | -0.75 | 0.030 |
| 158.50 | -8.18 | -1.88 | 0.00 | -33.70 | 0.00 | 33.70 | 778.94 | 389.47 | 581.37 | 287.12 | 11.41 | -0.75 | 0.128 |
| 160.00 | -7.89 | -1.85 | 0.00 | -30.88 | 0.00 | 30.88 | 772.14 | 386.07 | 568.44 | 280.73 | 11.65 | -0.76 | 0.120 |
| 165.00 | -7.83 | -1.85 | 0.00 | -21.62 | 0.00 | 21.62 | 748.74 | 374.37 | 525.85 | 259.70 | 12.49 | -0.85 | 0.094 |
| 166.00 | -5.77 | -1.53 | 0.00 | -19.77 | 0.00 | 19.77 | 743.93 | 371.96 | 517.43 | 255.54 | 12.67 | -0.86 | 0.085 |
| 170.00 | -5.52 | -1.49 | 0.00 | -13.63 | 0.00 | 13.63 | 723.19 | 361.60 | 483.41 | 238.74 | 13.42 | -0.91 | 0.065 |
| 175.00 | -3.00 | -0.90 | 0.00 | -6.19 | 0.00 | 6.19 | 686.95 | 343.48 | 435.91 | 215.28 | 14.40 | -0.95 | 0.033 |
| 180.00 | -2.92 | -0.88 | 0.00 | -1.67 | 0.00 | 1.67 | 650.71 | 325.36 | 390.87 | 193.04 | 15.41 | -0.97 | 0.013 |
| 181.90 | 0.00 | -0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 636.94 | 318.47 | 374.40 | 184.90 | 15.80 | -0.98 | 0.000 |

## Analysis Summary

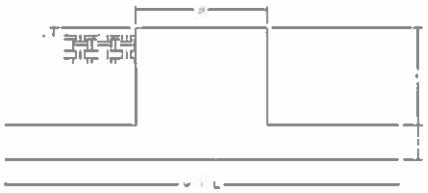
| Load Case | Reactions Shear FX (kips) | Shear FZ (kips) | Axial FY (kips) | Moment MX (ft-kips) | Moment MY (ft-kips) | Moment MZ (ft-kips) | Max Usage Elev (ft) | Interaction Ratio |
|---|---|---|---|---|---|---|---|---|
| 1.2D + 1.6W | 30.93 | 0.00 | 64.22 | 0.00 | 0.00 | 3879.75 | 158.50 | 0.80 |
| 0.9D + 1.6W | 30.70 | 0.00 | 48.16 | 0.00 | 0.00 | 3807.90 | 158.50 | 0.77 |
| 1.2D + 1.0Di + 1.0Wi | 5.02 | 0.00 | 105.10 | 0.00 | 0.00 | 710.70 | 158.50 | 0.20 |
| (1.2 + 0.2Sds) * DL + E ELFM | 1.61 | 0.00 | 64.07 | 0.00 | 0.00 | 246.55 | 158.50 | 0.07 |
| (1.2 + 0.2Sds) * DL + E EMAM | 2.50 | 0.00 | 64.07 | 0.00 | 0.00 | 360.13 | 158.50 | 0.14 |
| (0.9 - 0.2Sds) * DL + E ELFM | 1.61 | 0.00 | 44.54 | 0.00 | 0.00 | 240.94 | 158.50 | 0.06 |
| (0.9 - 0.2Sds) * DL + E EMAM | 2.50 | 0.00 | 44.54 | 0.00 | 0.00 | 351.35 | 158.50 | 0.13 |
| 1.0D + 1.0W | 8.31 | 0.00 | 53.56 | 0.00 | 0.00 | 1028.96 | 158.50 | 0.21 |

## Additional Steel Summary

| Elev From (ft) | Elev To (ft) | Member | Intermediate Connectors VQ/I (lb/in) | Shear Applied (kips) | Shear phiVn (kips) | Upper Termination Connectors MQ/I (kips) | phiVn (kips) | Num Reqd | Num Actual | Lower Termination Connectors MQ/I (kips) | phiVn (kips) | Num Reqd | Num Actual | Max Member Pu (kip) | phiPn (kip) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 14.7 | (3) SOL-#20 All Thre | 144.9 | 4.3 | 16.8 | 199.8 | 25.3 | 8 | 12 | 0.0 | 25.3 | 0 | 0 | 211.1 | 330.5 | 0.639 |
| 0.00 | 20.0 | (3) SOL-4 1/4" SOLID | 461.2 | 7.6 | 38.3 | 619.0 | 12.0 | 52 | 0 | 0.0 | 12.0 | 0 | 0 | 637.6 | 635.6 | 1.003 |
| 20.0 | 80.0 | (3) SOL-4 1/4" SOLID | 556.1 | 18.4 | 38.3 | 485.0 | 25.3 | 20 | 0 | 619.0 | 25.3 | 25 | 0 | 627.6 | 627.2 | 1.001 |
| 80.0 | 120. | (3) SOL-4" SOLID | 590.5 | 39.0 | 38.3 | 328.0 | 25.3 | 13 | 0 | 467.2 | 25.3 | 19 | 0 | 472.9 | 522.2 | 0.906 |
| 120. | 140. | (3) SOL-3 1/2" SOLID | 605.6 | 40.0 | 38.3 | 227.8 | 25.3 | 10 | 0 | 304.8 | 25.3 | 13 | 0 | 308.5 | 390.2 | 0.791 |
| 140. | 158. | (3) SOL-3" SOLID | 573.9 | 37.9 | 38.3 | 114.2 | 25.3 | 5 | 0 | 211.7 | 25.3 | 9 | 0 | 214.6 | 276.1 | 0.777 |

| | |
|---|---|
| Site Name: | Harwinton, CT |
| Site Number: | 302502 |
| Engineering Number: | OAA727133 |
| Engineer: | Parvin.NikpoorParizi |
| Date: | 04/12/18 |
| Tower Type: | MP |

*Program Last Updated:* *5/13/2014*



**Design Loads (Factored) - Analysis per TIA-222-G Standards**

| | | | | | |
|---|---|---|---|---|---|
| Design / Analysis / Mapping: | Analysis | | | | |
| Compression/Leg: | 64.2 | k | Concrete Strength ($f'_c$): | 3000 | psi |
| Uplift/Leg: | 0.0 | k | Pad Tension Steel Depth: | 32.00 | in |
| Total Shear: | 30.9 | k | $\phi_{Shear}$: | 0.75 | |
| Moment: | 3879.8 | k-ft | $\phi_{Flexure\ /\ Tension}$: | 0.90 | |
| Tower + Appurtenance Weight: | 64.2 | k | $\phi_{Compression}$: | 0.65 | |
| Depth to Base of Foundation (l + t - h): | 8.00 | ft | β: | 0.85 | |
| Diameter of Pier (d): | 6.00 | ft | Bottom Pad Rebar Size #: | 10 | |
| Height of Pier above Ground (h): | 0.50 | | # of Bottom Pad Rebar: | 40 | |
| Width of Pad (W): | 20.00 | ft | Pad Bottom Steel Area: | 50.80 | $in^2$ |
| Length of Pad (L): | 20.00 | ft | Pad Steel $F_y$: | 60000 | psi |
| Thickness of Pad (t): | 3.00 | ft | Top Pad Rebar Size #: | 5 | |
| Tower Leg Center to Center: | 0.00 | ft | # of Top Pad Rebar: | 40 | |
| Number of Tower Legs: | 1.0 | (1 if MP or GT) | Pad Top Steel Area: | 12.40 | $in^2$ |
| Tower Center from Mat Center: | 0.00 | ft | Pier Rebar Size #: | 11 | |
| Depth Below Ground Surface to Water Table: | 99.00 | ft | Pier Steel Area (Single Bar): | 1.56 | $in^2$ |
| Unit Weight of Concrete: | 150.0 | pcf | # of Pier Rebar: | 52 | |
| Unit Weight of Soil Above Water Table: | 105.0 | pcf | Pier Steel $F_y$: | 60000 | psi |
| Unit Weight of Water: | 62.4 | pcf | Pier Cage Diameter: | 64.0 | in |
| Unit Weight of Soil Below Water Table: | 50.0 | pcf | Rebar Strain Limit: | 0.008 | |
| Friction Angle of Uplift: | 15.0 | Degrees | Steel Elastic Modulus: | 29000 | ksi |
| Ultimate Coefficient of Shear Friction: | 0.50 | | Tie Rebar Size #: | 4 | |
| Ultimate Compressive Bearing Pressure: | 24000.0 | psf | Tie Steel Area (Single Bar): | 0.20 | $in^2$ |
| Ultimate Passive Pressure on Pad Face: | 1000.0 | psf | Tie Spacing: | 12 | in |
| $\phi_{Soil\ and\ Concrete\ Weight}$: | 0.9 | | Tie Steel $F_y$: | 60000 | psi |
| $\phi_{Soil}$: | 0.75 | | | | |

**Overturning Moment Usage**

| | | |
|---|---|---|
| Design OTM: | 4142.7 | k-ft |
| OTM Resistance: | 4476.4 | k-ft |
| Design OTM / OTM Resistance: | 0.93 | Result: OK |

**Soil Bearing Pressure Usage**

| | | |
|---|---|---|
| Net Bearing Pressure: | 6141 | psf |
| Factored Nominal Bearing Pressure: | 18000 | psf |
| Net Bearing Pressure/Factored Nominal Bearing Pressure: | 0.34 | Result: OK |
| Load Direction Controling Design Bearing Pressure: | Diagonal to Pad Edge | |

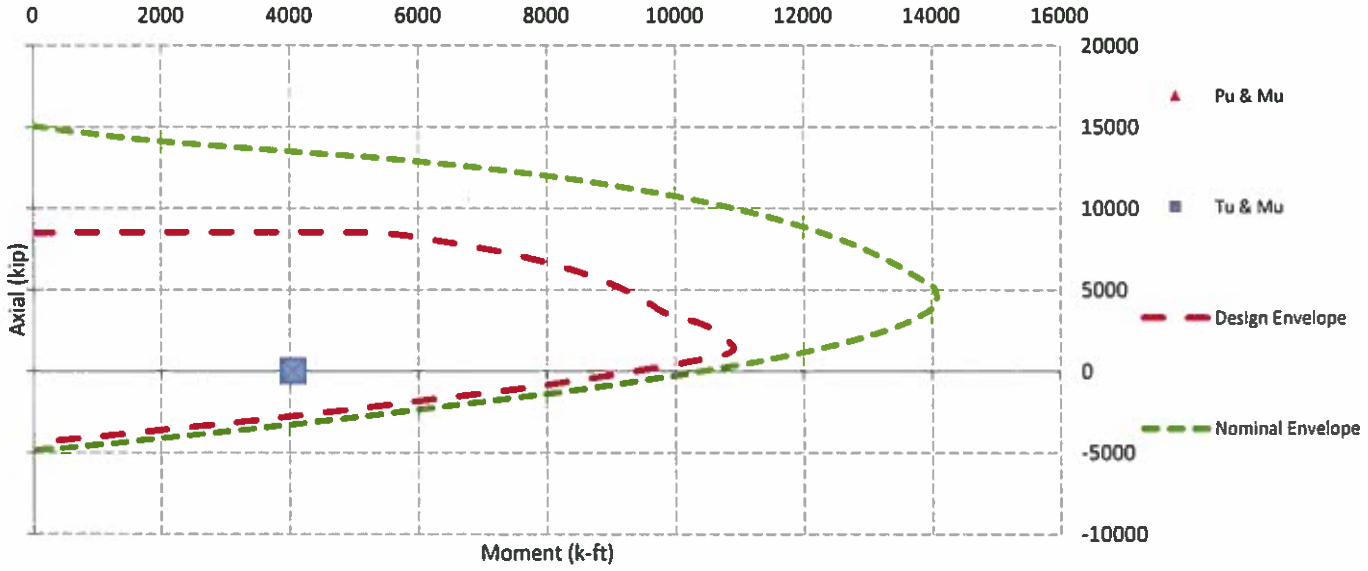
**Sliding Factor of Safety**

| | | |
|---|---|---|
| Total Factored Sliding Resistance: | 210.0 | k |
| Sliding Design / Sliding Resistance: | 0.15 | Result: OK |

## One Way Shear, Flexual Capacity, and Punching Shear

| | | |
|---|---|---|
| Factored One Way Shear ($V_u$): | 263.3 | k |
| One Way Shear Capacity ($\phi V_c$): | 534.8 | k - ACI11.3.1.1 |
| $V_u / \phi V_c$: | 0.49 | Result: OK |
| Load Direction Controling Shear Capacity: | Diagonal to Pad Edge | |
| Lower Steel Pad Factored Moment ($M_u$): | 1596.9 | k-ft |
| Lower Steel Pad Moment Capacity ($\phi M_n$): | 6831.3 | k-ft - ACI10.3 |
| $M_u / \phi M_n$: | 0.23 | Result: OK |
| Load Direction Controling Flexural Capacity: | Parallel to Pad Edge | |
| Upper Steel Pad Factored Moment ($M_u$): | 764.4 | k-ft |
| Upper Steel Pad Moment Capacity ($\phi M_n$): | 1756.8 | k-ft |
| $M_u / \phi M_n$: | 0.44 | Result: OK |
| Lower Pad Flexural Reinforcement Ratio: | 0.0066 | OK - Minimum Reinforcement Ratio Met - ACI10.5.1 |
| Upper Pad Flexural Reinforcement Ratio: | 0.0016 | OK - Minimum Reinforcement Ratio Met - ACI10.5.1 |
| Lower Pad Reinforcement Spacing: | 6 | in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4 |
| Upper Pad Reinforcement Spacing: | 6 | in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4 |
| Factored Punching Shear ($V_u$): | 0.0 | k |
| Nominal Punching Shear Capacity ($\phi_c V_n$): | 1718.0 | k - ACI11.12.2.1 |
| $V_u / \phi V_c$: | 0.00 | Result: OK |
| Factored Moment in Pier ($M_u$): | 4049.9 | k-ft |
| Pier Moment Capacity ($\phi M_n$): | 11423.2 | k-ft |
| $M_u / \phi M_n$: | 0.35 | Result: OK |
| Factored Shear in Pier ($V_u$): | 30.9 | k |
| Pier Shear Capacity ($\phi V_n$): | 337.1 | k |
| $V_u / \phi V_c$: | 0.09 | Result: OK |
| Pier Shear Reinforcement Ratio: | 0.0005 | No Ties Necessary for Shear - ACI11.5.6.1 |
| Factored Tension in Pier ($T_u$): | 0.0 | k |
| Pier Tension Capacity ($\phi T_n$): | 4380.5 | k |
| $T_u / \phi T_n$: | 0.00 | Result: OK |
| Factored Compression in Pier ($P_u$): | 64.2 | k |
| Pier Compression Capacity ($\phi P_n$): | 5291.2 | k - ACI10.3.6.2 |
| $P_u / \phi P_n$: | 0.01 | Result: OK |
| Pier Compression Reinforcement Ratio: | 0.020 | OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4 |
| $M_u/\phi_B M_n + T_u/\phi_T T_n$: | 0.35 | Result: OK |

Nominal and Design Moment Capacity and Factored Design Loads



# Base Plate & Anchor Rod Analysis

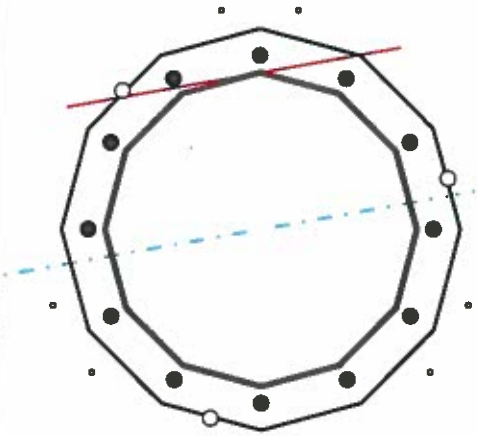
| Pole Dimensions | | |
|---|---|---|
| Number of Sides | 12 | - |
| Diameter | 43.00 | in |
| Thickness | 0.375 | in |
| Orientation Offset | | ° |

| Base Reactions | | |
|---|---|---|
| Moment, Mu | 3879.8 | k-ft |
| Axial, Pu | 64.2 | k |
| Shear, Vu | 30.9 | k |
| Neutral Axis | 10 | ° |

| Report Capacities | | |
|---|---|---|
| Component | Capacity | Result |
| Base Plate | 35% | Pass |
| Anchor Rods | 83% | Pass |
| Dywidag | 70% | Pass |

| Base Plate | | |
|---|---|---|
| Number of Sides | 12 | - |
| Diameter, ø | 55 | in |
| Thickness | 2 1/2 | in |
| Grade | A572-50 | - |
| Yield Strength, Fy | 50 | ksi |
| Tensile Strength, Fu | 65 | ksi |
| Clip | N/A | in |
| Orientation Offset | 0 | ° |
| Anchor Rod Detail | c | η=0.55 |
| Clear Distance | N/A | in |
| Applied Moment, Mu | 796.0 | k |
| Bending Stress, ϕMn | 2288.2 | k |

| Original Anchor Rods | | |
|---|---|---|
| Arrangement | Radial | - |
| Quantity | 12 | - |
| Diameter, ø | 2 1/4 | in |
| Bolt Circle | 49.25 | in |
| Grade | A615-75 | |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Spacing | 12.9 | in |
| Orientation Offset | 0 | ° |
| Applied Force, Pu | 184.4 | k |
| Anchor Rods, ϕPn | 259.8 | k |



| Dywidag Reinforcement | | |
|---|---|---|
| Quantity | 3 | - |
| Bar Size | #20 | in |
| Diameter, ø | 2.5 | in |
| Bracket Type | W5x19 | - |
| Circle | 55.50 | in |
| Orientation Offset | 15 | ° |
| Applied Force, Pu | 275.6 | k |
| Dywidag Bar, ϕPn | 392.7 | k |

| Additional Dywidag Reinforcement | | |
|---|---|---|
| Quantity | 6 | - |
| Diameter, ø | 1 | in |
| Bolt Circle | 63 | in |
| Grade | Other | |
| Yield Strength, Fy | 109 | ksi |
| Tensile Strength, Fu | 125 | ksi |
| Bypass Base? | Yes (Dywidag) | |
| Orientation Offset | 0 | ° |
| Applied Force, Pu | 61.0 | k |
| Additional Rod, ϕPn | 78.5 | k |

# Calculations for Monopole Base Plate & Anchor Rod Analysis

**Reaction Distribution**

| Reaction | Shear Vu | Moment Mu | Factor |
|---|---|---|---|
| - | k | k-ft | - |
| Base Forces | 30.9 | 2268.0 | 0.58 |
| Anchor Rod Forces | 30.9 | 2268.0 | 0.58 |
| Additional Bolt (Grp1) Forces | | 470.3 | 0.12 |
| Additional Bolt (Grp2) Forces | | | |
| Dywidag Forces | | 1141.5 | 0.29 |
| Stiffener Forces | | | |

**Geometric Properties**

| Section | Gross Area | Net Area | Individual Inertia | Threads per Inch | Moment of Inertia |
|---|---|---|---|---|---|
| - | $in^2$ | $in^2$ | $in^4$ | # | $in^4$ |
| Pole | 49.6447 | 4.1371 | 0.1948 | | 11277.22 |
| Bolt | 3.9761 | 3.2477 | 0.8393 | 4.5 | 11826.28 |
| Bolt1 | 0.7854 | 0.7854 | 0.0491 | 8 | 2338.23 |
| Bolt2 | | | | | |
| Dywidag | 4.9087 | 4.9087 | 1.9175 | | 5675.81 |
| Stiffener | | | | | |

| Base Plate | | |
|---|---|---|
| Shape | 12 | - |
| Width, W | 55 | in |
| Thickness, t | 2.5 | in |
| Yield Strength, Fy | 50 | ksi |
| Tensile Strength, Fu | 65 | ksi |
| Base Plate Chord | 34.293 | in |
| Detail Type | C | - |
| Detail Factor | 0.55 | - |
| Clear Distance | N/A | - |

| External Base Plate | | |
|---|---|---|
| Chord Length AA | 34.782 | in |
| Additional AA | 5.000 | in |
| Section Modulus, Z | 62.159 | $in^3$ |
| Applied Moment, Mu | 796.0 | k-ft |
| Bending Capacity, ϕMn | 2797.2 | k-ft |
| Capacity, Mu/ϕMn | 0.285 | OK |
| | | |
| Chord Length AB | 33.265 | in |
| Additional AB | 5.000 | in |
| Section Modulus, Z | 59.789 | $in^3$ |
| Applied Moment, Mu | 522.6 | k-ft |
| Bending Capacity, ϕMn | 2690.5 | k-ft |
| Capacity, Mu/ϕMn | 0.194 | OK |
| | | |
| Bend Line Length | 32.543 | in |
| Additional Bend Line | 0.000 | in |
| Section Modulus, Z | 50.849 | $in^3$ |
| Applied Moment, Mu | 796.0 | k-ft |
| Bending Capacity, ϕMn | 2288.2 | k-ft |
| Capacity, Mu/ϕMn | 0.348 | OK |

| Internal Base Plate | | |
|---|---|---|
| Arc Length | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Moment Arm | 0.000 | in |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

| Anchor Rods | | |
|---|---|---|
| Anchor Rod Quantity, N | 12 | - |
| Rod Diameter, d | 2.25 | in |
| Bolt Circle, BC | 49.25 | in |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Applied Axial, Pu | 184.4 | k |
| Applied Shear, Vu | 0.8 | k |
| Compressive Capacity, ϕPn | 259.8 | k |
| Tensile Capacity, ϕRnt | 0.710 | OK |
| Interaction Capacity | 0.715 | OK |

| Additional Bolt Group 1 | | |
|---|---|---|
| Bolt Quantity, N | 6 | - |
| Bolt Diameter, d | 1 | in |
| Bolt Circle, BC | 63 | in |
| Yield Strength, Fy | 109 | ksi |
| Tensile Strength, Fu | 125 | ksi |
| Applied Axial, Pu | 61.0 | k |
| Applied Shear, Vu | 0.2 | k |
| Compressive Capacity, ϕPn | 78.5 | k |
| Compressive Capacity, ϕPn | 0.777 | OK |
| Interaction Capacity | 0.829 | OK |

| Additional Bolt Group 2 | | |
|---|---|---|
| Bolt Quantity, N | 0 | - |
| Bolt Diameter, d | 0 | in |
| Bolt Circle, BC | 0 | in |
| Yield Strength, Fy | 0 | ksi |
| Tensile Strength, Fu | 0 | ksi |
| Applied Axial, Pu | 0.0 | k |
| Applied Shear, Vu | 0.0 | k |
| Compressive Capacity, ϕPn | 0.0 | k |
| Compressive Capacity, ϕPn | | |
| Interaction Capacity | | |

| Dywidag Reinforcement | | |
|---|---|---|
| Dywidag Quantity, N | 3 | - |
| Dywidag Diameter, d | 2.5 | in |
| Bolt Circle, BC | 55.5 | in |
| Yield Strength, Fy | 80 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Applied Axial, Pu | 275.6 | k |
| Compressive Capacity, ϕPn | 392.7 | k |
| Capacity, Pu/ϕPn | 0.702 | OK |

| Base Plate Stiffeners | | |
|---|---|---|
| Applied Axial Force, Pu | 0.0 | k |
| Applied Horizontal Force, Vu | 0.00 | k |

| Vertical Weld | | |
|---|---|---|
| Vert.-to-Stiffener $a=e_x/l$ | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Compressive Capacity, ϕPn | #DIV/0! | k |
| Vert.-to-Plate $a=e_x/l$ | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Shear Capacity, ϕVn | #DIV/0! | k |
| $P_u/\phi_P P_n + V_u/\phi_V V_n$ | | |

| Horizontal Weld | | |
|---|---|---|
| Horz.-to-Stiffener $a=e_x/l$ | 0.000 | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Effective Fillet | 0.000 | in |
| Compressive Capacity, ϕPn | #DIV/0! | k |
| Horz.-to-Pole $a=e_x/l$ | #DIV/0! | - |
| Spacing Ratio, k | #DIV/0! | - |
| Weld Coefficient, C | #DIV/0! | - |
| Shear Capacity, ϕVn | #DIV/0! | k |
| $P_u/\phi_P P_n + V_u/\phi_V V_n$ | | |

| Plate Tension | | |
|---|---|---|
| Gross Cross Section | 0.000 | $in^2$ |
| Net Cross Section | 0.000 | $in^2$ |
| Tensile Capacity, ϕTn | 0.0 | k |
| Capacity, Tu/ϕTn | | |

| Plate Compression | | |
|---|---|---|
| Radius of Gyration | #DIV/0! | $in^3$ |
| kl/r | #DIV/0! | - |
| $4.71\sqrt{(E/Fy)}$ | 0.00 | - |
| Buckling Stress(Fe) | 0.0 | - |
| Crit. Buckling Stress(Fcr) | 0.0 | ksi |
| Compressive Capacity, ϕPn | 0.0 | k |
| Capacity, Pu/ϕPn | | |

| | | |
|---|---|---|
| Code Rev. | G | |
| Moment | 726.1 k-ft | |
| Axial | 17.0 k | |

| | |
|---|---|
| Date | 4/13/2018 |
| Engineer | Parvin.NikpoorParizi |
| Site # | 302502 |
| Carrier | VERIZON WIRELESS |

Required Flange Thickness:
0.68 in OK

**Base/Flange Plate**

| | | |
|---|---|---|
| Plate Type | *Flange @ 126.3 ft* | |
| Pole Diameter | 23.55 | in |
| Pole Thickness | 0.1875 | in |
| Plate Diameter | 30 | in |
| Plate Thickness | 1.25 | in |
| Plate Fy | 36 | ksi |
| Weld Length | 0.1875 | in |
| $\phi_s$ Resistance | 58.52 | k-in |
| Applied | 17.11 | k-in |

**Stiffeners**

| | | |
|---|---|---|
| # | | |

**Bolts**

| | | |
|---|---|---|
| # | *16* | |
| Bolt Circle | 27 | in |
| (R)adial / (S)quare | R | |
| Diameter | 1 | in |
| Hole Diameter | 1.125 | in |
| Type | A325 | |
| Fy | 92 | ksi |
| Fu | 120 | ksi |
| $\phi_s$ Resistance | 54.52 | k |
| Applied | 17.55 | k |

**Reinforcement**

| | | |
|---|---|---|
| # | *3* | |
| DYW. Circle | 29.35 | in |
| Offset Angle | 45 | ° |
| Type | Other | |
| Diameter | 3.5 | in |
| Fu | 65 | ksi |
| $\phi_s$ Resistance | 500.30 | k |
| Applied | 292.02 | k |

**Extra Bolts O**

| | | |
|---|---|---|
| # | *0* | |

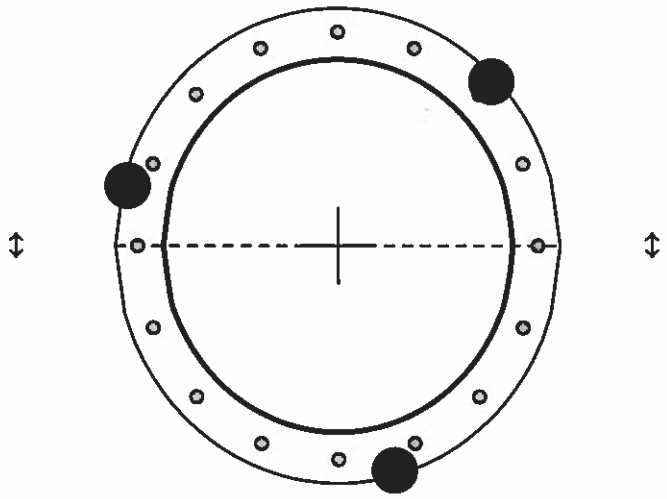


Plate Stress Ratio:
0.29 (Pass)

Bolt Stress Ratio:
0.32 (Pass)

Reinforcement Stress Ratio:
0.58 (Pass)

**Site Name:** Harwinton N, 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 | 5551 | 5551 | 175 | 0.0652 | 1.0 | 6.52% |
| VZW Cellular | 869 | 9 | 564 | 5076 | 175 | 0.0596 | 0.579333333 | 10.29% |
| VZW 850 LTE | 869 | 1 | 3306 | 3306 | 175 | 0.0388 | 0.579333333 | 6.70% |
| VZW AWS | 2145 | 1 | 8326 | 8326 | 175 | 0.0978 | 1.0 | 9.78% |
| VZW 700 | 746 | 1 | 2262 | 2262 | 175 | 0.0266 | 0.497333333 | 5.34% |
| **Total Percentage of Maximum Permissible Exposure** | | | | | | | | 38.63% |

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 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.




| Owner and Parcel Information | | | |
|---|---|---|---|
| **Owner Name** | SBC TOWER HOLDINGS LLC<br>C/O AMERICAN TOWER | **Today's Date** | May 29, 2018 |
| **Mailing Address** | PO BOX 723597 | **Parcel ID** | 593 (Account #: 3057) |
| | ATLANTA, GA 31139 | | |
| **Location Address** | 159 WEINGART RD | **Census Tract** | 298300000000 |
| **Map / Block / Lot** | B8 / 05 / 0022 | **Acreage** | 5.35 |
| **Use Class / Description** | 3-1 IND LAND | | |
| **Assessing Neighborhood** | 0001A | **Utilities** | |

| Current Appraised Value Information | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Building Value** | **XF Value** | **OB Value** | **Land Value** | **Special Land Value** | **Total Appraised Value** | **Net Appraised Value** | **Current Assessment** |
| $ 24,600 | $ 0 | $ 19,500 | $ 129,170 | | $ 173,270 | $ 173,270 | $ 121,290 |

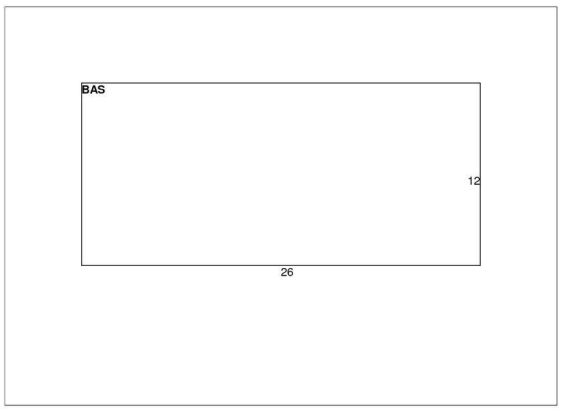
| Assessment History | | | | |
|---|---|---|---|---|
| **Year** | **Building** | **OB/Misc** | **Land** | **Total Assessment** |
| Current | $ 17,220 | $ 13,650 | $ 90,420 | $ 121,290 |
| 2017 | $ 17,220 | $ 13,650 | $ 90,420 | $ 121,290 |
| 2016 | $ 17,220 | $ 13,650 | $ 90,420 | $ 121,290 |

| Land Information | | | | |
|---|---|---|---|---|
| **Use** | **Class** | **Zoning** | **Area** | **Value** |
| IND LAND | I | TR1.5 | 1.5 AC | $ 105,300 |
| EX ACRES | R | | 3.85 AC | $ 23,870 |

| Commercial Building Information | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Style** | **Year Built** | **Eff Year Built** | **Gross Area** | **Stories** | **Grade** | **Exterior Wall** | **Interior Wall** | **Wall Height** | **# Units** |
| Warehouse | 1995 | 1995 | 312 | 1 | Average +20 | Concr/Cinder | Drywall/Sheet | 9 | 1 |
| **Roof Cover** | **Roof Structure** | **Floor Type** | **Heat Type** | **Heat Fuel** | **AC Type** | **Sprinkler** | **Construction** | **Plumbing** | **Comm Walls** |
| Concrete Tile | Flat | Average | Solar Assisted | None | NONE | % | MASONRY | NONE | 0% |

| Building Sub Areas | | | | |
|---|---|---|---|---|
| **Code** | **Description** | **Living Area** | **Gross Area** | **Effective Area** |
| BAS | First Floor | 312 | 312 | |
| | **Totals** | **312** | **312** | **312** |

**Building Sketch** Enlarge




| Building Photo |
|---|
| NA |

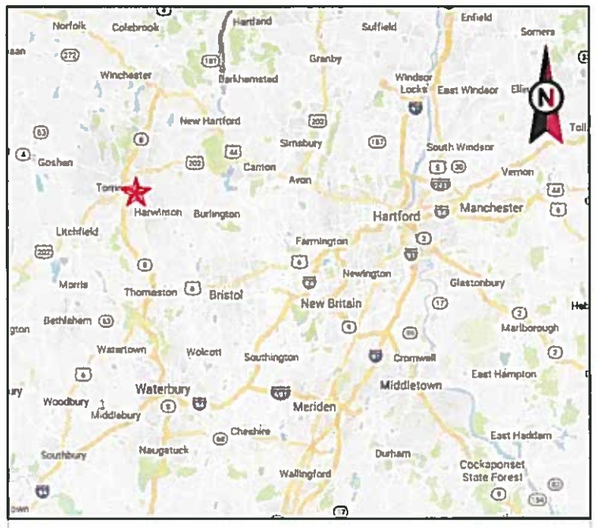
| Out Buildings / Extra Features | | | | |
|---|---|---|---|---|
| **Description** | **Sub Description** | **Area** | **Year Built** | **Value** |
| PAVING | | 3,900 S.F. | 1995 | $ 19,500 |

| Sale Information | | | | | | |
|---|---|---|---|---|---|---|
| **Sale Date** | **Sale Price** | **Deed Book/Page** | **Sale Qualification** | **Reason** | **Vacant or Improved** | **Owner** |
| 08/19/2013 | | 0240/1013 | Unqualified | | Improved | SBC TOWER HOLDINGS LLC C/O AMERICAN TOWER |

| | | | | | | |
|---|---|---|---|---|---|---|
| 06/26/2013 | $ 394,000 | 0240/0205 | Qualified | | Vacant | AMERICAN TOWER ASSET SUB II LLC |
| 06/05/2002 | | 0171/0811 | Qualified | | | CLEMENTE JAMIE L + LAURA DOROTHY M |

**Permit Information**

| Permit ID | Issue Date | Type | Description | Amount | Inspection Date | % Complete | Date Complete | Comments |
|---|---|---|---|---|---|---|---|---|
| 1718CA | 08/14/2017 | | CO ISSUED | | | 0 | | |
| 1737B | 04/06/2017 | | REINFORCEMENT BARS | $ 11,000 | | 100 | | |
| 1720B | 02/17/2017 | | 3 ANTENNAS | $ 15,000 | | 100 | | |
| 9520 | 04/01/2015 | | ADDING 3 REMOTE RADI | $ 4,750 | | 0 | | |
| 9447 | 11/13/2014 | | MODIFICATIONS | $ 13,000 | | 0 | | |
| 9035 | 09/20/2013 | | GENERATOR | $ 10,000 | | 0 | | |
| 8867 | 04/30/2013 | EL | Electric | $ 12,500 | | 0 | | |
| 8815 | 03/21/2013 | | | $ 20,000 | | 0 | | CABINETS & CONCRETE SLAB |
| 8709 | 11/21/2012 | | ANTENNAS | $ 10,000 | | 0 | | |
| 7995 | 01/25/2011 | | CELLUAR SITE | $ 12,000 | | 0 | | |
| 7986 | 12/22/2010 | EL | Electric | $ 15,000 | | 0 | | |




VICINITY MAP

# AMERICAN TOWER®

ATC SITE NAME: HARWINTON
ATC SITE NUMBER: 302502
VERIZON SITE NAME: HARWINTON N CT
SITE ADDRESS: 159 WEINGART ROAD
HARWINTON, CT 06791


LOCATION MAP

## VERIZON WIRELESS
## ANTENNA AMENDMENT DRAWINGS

### COMPLIANCE CODE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE (IBC)
2. NATIONAL ELECTRIC CODE (NEC)
3. LOCAL BUILDING CODE
4. CITY/COUNTY ORDINANCES

### PROJECT SUMMARY

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791
COUNTY: LITCHFIELD

GEOGRAPHIC COORDINATES:
LATITUDE: 41.78775
LONGITUDE: -73.0925
GROUND ELEVATION: 1051' AMSL

### PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:

REMOVE (6) PANELS AND (6) 1-5/8" COAX CABLES

INSTALL (6) NEW PANELS, (9) RRUs, (1) 1-5/8" HYBRID CABLES, AND (1) OVPs

EXISTING (6) PANELS AND (4) 1-5/8" COAX CABLES TO REMAIN

RELOCATE (3) RRUs FROM SHELTER TO TOWER

### PROJECT NOTES

1. THE FACILITY IS UNMANNED.
2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE.
3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE.
4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED.
5. HANDICAP ACCESS IS NOT REQUIRED.

### PROJECT LOCATION DIRECTIONS

FROM HARTFORD, CT:

TAKE I-84 WEST TO RT 4 WEST. FOLLOW TO HARWINTON, TURN LEFT ON BREEZY HILL RD (JUST PAST JCT W/ RT 183) STAY TO RIGHT AT FORK (WEINGHART BEGINS). ACCESS ROAD AHEAD ON LEFT JUST AFTER OVERHEAD POWER LINE EASEMENT.

### SHEET INDEX

| SHEET NO: | DESCRIPTION: | REV: | DATE: | BY: |
|---|---|---|---|---|
| G-001 | COVER SHEET | 0 | 05/23/18 | NW |
| G-002 | GENERAL NOTES | 0 | 05/23/18 | NW |
| C-101 | DETAILED SITE PLAN AND TOWER ELEVATION | 0 | 05/23/18 | NW |
| C-501 | RF SCHEDULE AND ANTENNA INSTALLATION | 0 | 05/23/18 | NW |
| C-502 | CONSTRUCTION DETAILS | 0 | 05/23/18 | NW |

### UTILITY COMPANIES

POWER COMPANY: EVERSOURCE
PHONE: (877) 659-6326

TELEPHONE COMPANY: FRONTIER COMMUNICATIONS
PHONE: (800) 376-6843

811
Know what's below.
Call before you dig.

### PROJECT TEAM

TOWER OWNER:
AMERICAN TOWER
10 PRESIDENTIAL WAY
WOBURN, MA 01801

ENGINEER:
ATC TOWER SERVICES, LLC
3500 REGENCY PKWY STE 100
CARY, NC 27518

PROPERTY OWNER:
AMERICAN TOWER
116 HUNTINGTON AVE
BOSTON, MA 02116

APPLICANT:
VERIZON WIRELESS
20 ALEXANDER DRIVE, 2ND FLOOR
WALLINGFORD, CT 06492


AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553




| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | NW | 05/23/18 |

ATC SITE NUMBER:
302502

ATC SITE NAME:
HARWINTON

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791

SEAL:


Authorized by "EOR"
May 24 2018 8:47 AM cosign

verizon

| | |
|---|---|
| DRAWN BY: | NW |
| APPROVED BY: | PPB |
| DATE DRAWN: | 05/23/18 |
| ATC JOB NO: | 12478535 |
| CUSTOMER ID: | HARWINTON N CT |
| CUSTOMER #: | 467932 |

COVER SHEET

| SHEET NUMBER: | REVISION: |
|---|---|
| G-001 | 0 |

## GENERAL CONSTRUCTION NOTES:

1. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC MASTER SPECIFICATIONS.
2. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
4. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
5. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
6. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
7. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
9. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
10. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE VERIZON WIRELESS REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE VERIZON WIRELESS REP PRIOR TO PROCEEDING.
11. EACH CONTRACTOR SHALL COOPERATE WITH THE VERIZON WIRELESS REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
12. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE VERIZON WIRELESS CONSTRUCTION MANAGER.
13. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
14. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE VERIZON WIRELESS REP IMMEDIATELY.
15. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
16. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
17. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH LANDLORD AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
18. CONTRACTOR SHALL FURNISH VERIZON WIRELESS WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
19. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON WIRELESS REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.
20. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH VERIZON WIRELESS REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY VERIZON WIRELESS MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
21. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH VERIZON WIRELESS SPECIFICATIONS AND REQUIREMENTS.
22. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO VERIZON WIRELESS FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
23. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO VERIZON WIRELESS SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
24. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
25. CONTRACTOR SHALL NOTIFY VERIZON WIRELESS REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
26. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.
27. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLECT ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
28. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE VERIZON WIRELESS REP. ANY WORK FOUND BY THE VERIZON WIRELESS REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
29. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.

## STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2. STRUCTURAL STEEL ROLLED SHAPES, PLATES AND BARS SHALL CONFORM TO THE FOLLOWING ASTM DESIGNATIONS:
   - A. ASTM A-572, GRADE 50 - ALL W SHAPES, UNLESS NOTED OR A992 OTHERWISE
   - B. ASTM A-36 - ALL OTHER ROLLED SHAPES, PLATES AND BARS UNLESS NOTED OTHERWISE.
   - C. ASTM A-500, GRADE B - HSS SECTION (SQUARE, RECTANGULAR, AND ROUND)
   - D. ASTM A-325, TYPE SC OR N - ALL BOLTS FOR CONNECTING STRUCTURAL MEMBERS
   - E. ASTM F-1554 07 - ALL ANCHOR BOLTS, UNLESS NOTED OTHERWISE
3. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
4. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES AND GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.
5. DO NOT DRILL HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON STRUCTURAL DRAWINGS.
6. CONNECTIONS:
   - A. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
   - B. ALL WELDS SHALL BE INSPECTED VISUALLY. 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. REPAIR ALL WELDS AS NECESSARY.
   - C. INSPECTION SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
   - D. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE BURNING/WELDING PERMITS AS REQUIRED BY LOCAL GOVERNING AUTHORITY AND IF REQUIRED SHALL HAVE FIRE DEPARTMENT DETAIL FOR ANY WELDING ACTIVITY.
   - E. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNLESS NOTED OTHERWISE.
   - F. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
   - G. PRIOR TO FIELD WELDING GALVANIZING MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING ½" BEYOND ALL FIELD WELD SURFACES. AFTER WELD AND WELD INSPECTION IS COMPLETE, REPAIR ALL GROUND AND WELDED SURFACES WITH ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS RECOMMENDATIONS.


AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
COA: PEC.0001553




| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | NW | 05/23/18 |

ATC SITE NUMBER:
302502

ATC SITE NAME:
HARWINTON

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791

SEAL:


Authorized by "EOR"
May 24 2018 8:47 AM cosign

verizon

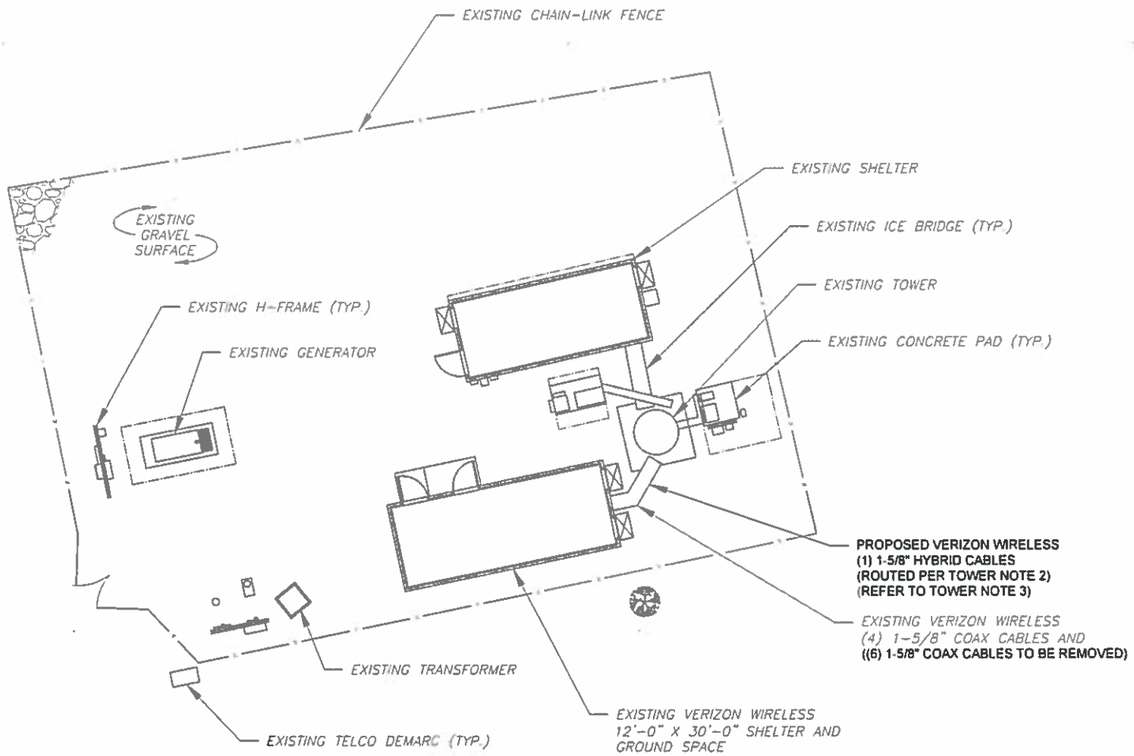
| | |
|---|---|
| DRAWN BY: | NW |
| APPROVED BY: | PPB |
| DATE DRAWN: | 05/23/18 |
| ATC JOB NO: | 12478535 |
| CUSTOMER ID: | HARWINTON N CT |
| CUSTOMER #: | 467932 |

GENERAL NOTES

| SHEET NUMBER: | REVISION: |
|---|---|
| G-002 | 0 |

**SITE PLAN NOTES:**

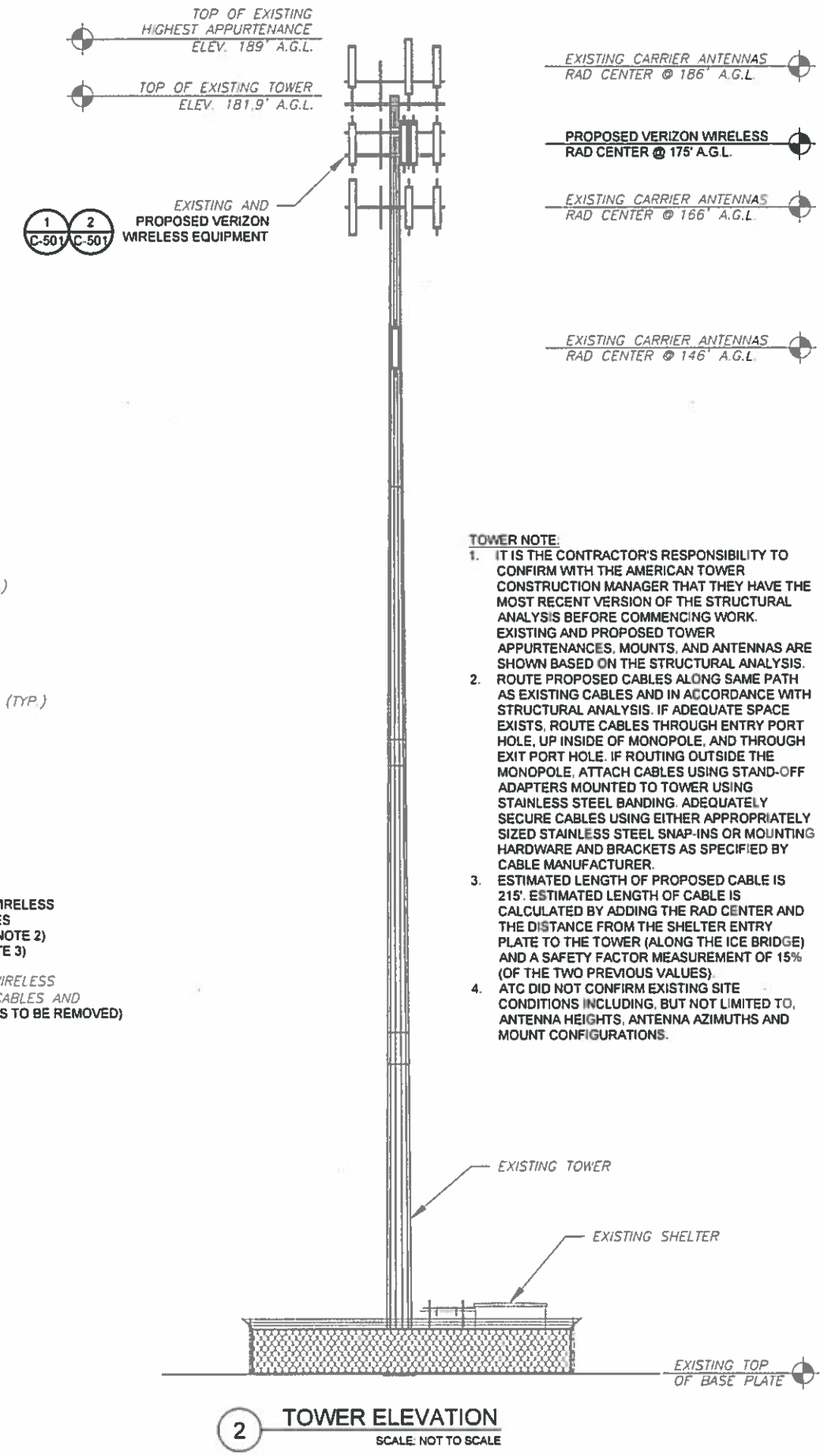
1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.
2. ICE BRIDGE, CABLE LADDER, COAX PORT, CABLE SUPPORTS, AND CABLES ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL PROPOSED AND EXISTING EQUIPMENT AND STRUCTURES DEPICTED ON THIS PLAN. BEFORE INSTALLING NEW CABLE SUPPORT STRUCTURES, COAX PORTS, OR ANY OTHER EQUIPMENT, CONTRACTOR SHALL VERIFY ALL ASPECTS OF THE COMPONENTS MEET THE ATC SPECIFICATIONS.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE ATC CONSTRUCTION MANAGER AND LOCAL UTILITY COMPANY FOR THE INSTALLATION OF CONDUITS, CONDUCTORS, BREAKERS, DISCONNECTS, OR ANY OTHER EQUIPMENT REQUIRED FOR ELECTRICAL SERVICE. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE STATE AND NATIONAL CODES, ORDINANCES AND REGULATIONS APPLICABLE TO THIS PROJECT.




1 DETAILED SITE PLAN

0 20' 40'

SCALE: 1"=20' (11X17)
1"=10' (22X34)




**TOWER NOTE:**

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE AMERICAN TOWER CONSTRUCTION MANAGER THAT THEY HAVE THE MOST RECENT VERSION OF THE STRUCTURAL ANALYSIS BEFORE COMMENCING WORK. EXISTING AND PROPOSED TOWER APPURTENANCES, MOUNTS, AND ANTENNAS ARE SHOWN BASED ON THE STRUCTURAL ANALYSIS.
2. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.
3. ESTIMATED LENGTH OF PROPOSED CABLE IS 215'. ESTIMATED LENGTH OF CABLE IS CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES).
4. ATC DID NOT CONFIRM EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO, ANTENNA HEIGHTS, ANTENNA AZIMUTHS AND MOUNT CONFIGURATIONS.

2 TOWER ELEVATION

SCALE: NOT TO SCALE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CARY, NC 27518
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| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| 0 | FOR CONSTRUCTION | NW | 05/23/18 |
| | | | |
| | | | |
| | | | |
| | | | |

ATC SITE NUMBER:
302502

ATC SITE NAME:
HARWINTON

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791

SEAL:

STATE OF CONNECTICUT
PATRICK P. BAUDRY
26959
LICENSED
PROFESSIONAL ENGINEER

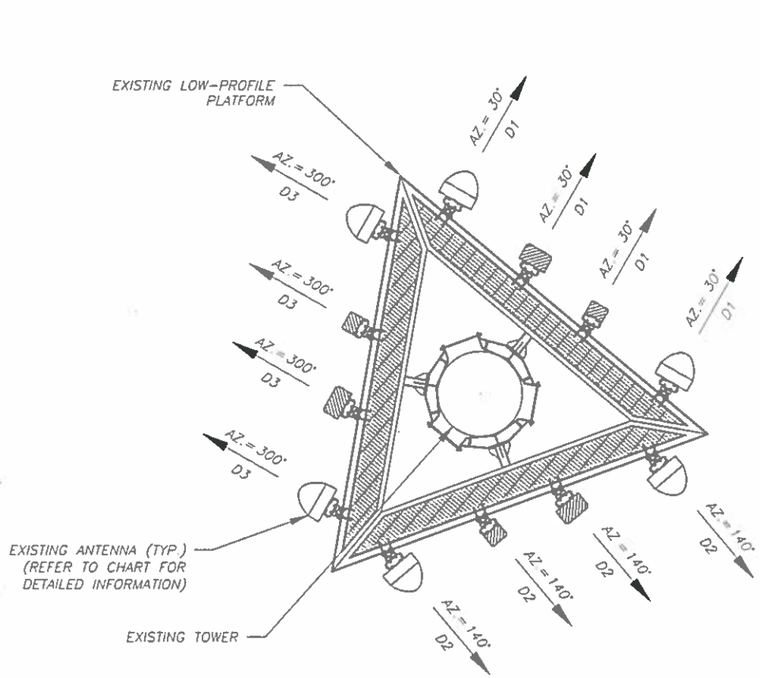
Authorized by "EOR"
May 24 2018 8:47 AM cosign

verizon

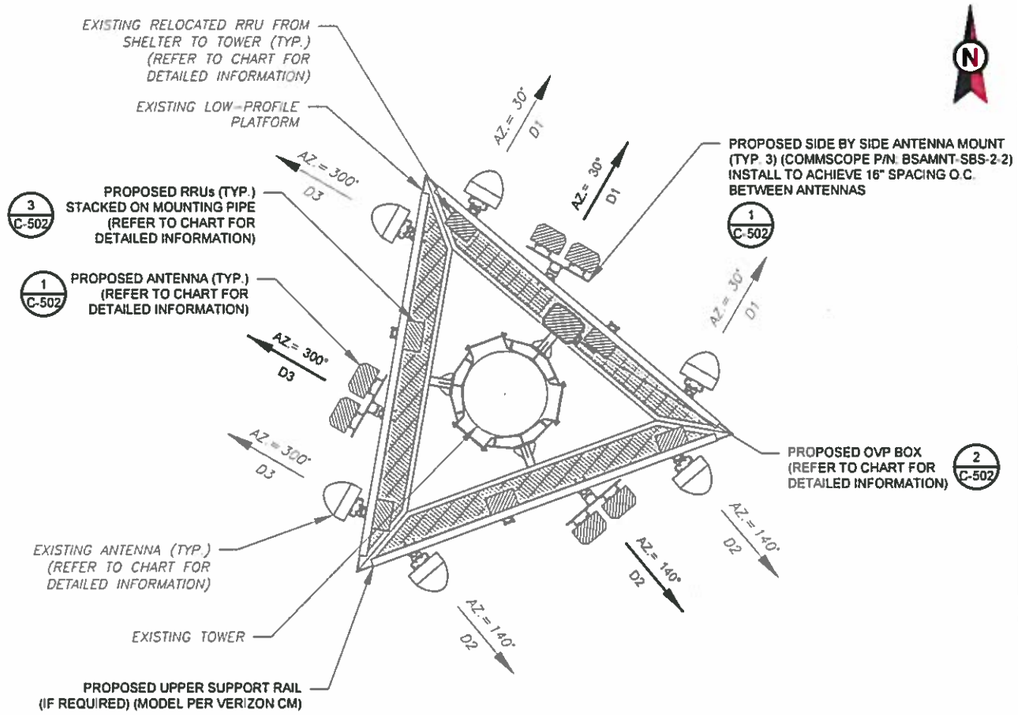
| | |
|---|---|
| DRAWN BY: | NW |
| APPROVED BY: | PPB |
| DATE DRAWN: | 05/23/18 |
| ATC JOB NO: | 12478535 |
| CUSTOMER ID: | HARWINTON N CT |
| CUSTOMER #: | 467932 |

DETAILED SITE PLAN AND TOWER ELEVATION

| SHEET NUMBER: | REVISION: |
|---|---|
| C-101 | 0 |




1 CURRENT ANTENNA PLAN




2 PROPOSED ANTENNA PLAN

**CURRENT ANTENNA AND RF EQUIPMENT SCHEDULE**

| LOCATION | | | ANTENNA SUMMARY | | | | NON ANTENNA SUMMARY | | |
|---|---|---|---|---|---|---|---|---|---|
| SECTOR | RAD | AZ | POS | BAND | MODEL NUMBER | STATUS | POS | MODEL NUMBER | STATUS |
| D1 | 175' | 30° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | – | – |
| | | | 2 | 700 LTE | SBNHH-1D65B | RMV | 2 | – | – |
| | | | 3 | 1900 CDMA | BXA-171063-12BF | RMV | 3 | – | – |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | 4 | – | – |
| | | | – | – | – | – | – | – | – |
| D2 | 175' | 140° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | – | – |
| | | | 2 | 700 LTE | SBNHH-1D65B | RMV | 2 | – | – |
| | | | 3 | 1900 CDMA | BXA-171063-12BF | RMV | 3 | – | – |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | 4 | – | – |
| | | | – | – | – | – | – | – | – |
| D3 | 175' | 300° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | – | – |
| | | | 2 | 700 LTE | SBNHH-1D65B | RMV | 2 | – | – |
| | | | 3 | 1900 CDMA | BXA-171063-12BF | RMV | 3 | – | – |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | 4 | – | – |
| | | | – | – | – | – | – | – | – |

**CURRENT FIBER DISTRIBUTION / OVP BOX**

| LOCATION | POS | BAND | MODEL NUMBER | STATUS |
|---|---|---|---|---|
| – | – | – | – | – |
| – | – | – | – | – |

**CURRENT CABLING SUMMARY**

| COAX | HYBRID | STATUS |
|---|---|---|
| (4) 1-5/8" | – | RMN |
| (6) 1-5/8" | – | RMV |

**NOTES**

1. BASED ON APPROVED ATC APPLICATION OAA727133 , DATED 03/22/18 CONFIRM WITH VERIZON WIRELESS REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS.
2. ATC HAS NOT YET VERIFIED ANY EXISTING ANTENNA CONFIGURATION OR MOUNT CONFIGURATION. CONTRACTOR TO VERIFY MOUNT CONFIGURATION HAS SUFFICIENT SPACE FOR PROPOSED LESSEE EQUIPMENT (I.E. CLEARANCES, MOUNT PIPE OR SUFFICIENT LENGTH, ETC.) ATC DID NOT ANALYZE ANTENNA MOUNT TO DETERMINE ADEQUATE STRUCTURAL CAPACITY FOR ANY LESSEE LOADING.
3. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS ON FILE WITH THE ATC CM.
4. CONFIRM SPACING OF PROPOSED EQUIPMENT DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.
5. POSITIONS START WITH FIRST PIPE ON THE LEFT SIDE (AS VIEWED FROM BEHIND THE MOUNT).
6. CABLE LENGTHS SHOWN ESTIMATE MAXIMUM TYPICAL RUN AND INCORPORATE A 15% SAFETY FACTOR.

**PROPOSED ANTENNA AND RF EQUIPMENT SCHEDULE**

| LOCATION | | | ANTENNA SUMMARY | | | | NON ANTENNA SUMMARY | | |
|---|---|---|---|---|---|---|---|---|---|
| SECTOR | RAD | AZ | POS | BAND | MODEL NUMBER | STATUS | POS | MODEL NUMBER | STATUS |
| D1 | 175' | 30° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | B13 RRH4X30-4R | REL |
| | | | 2 | 700 / 850 / 1900 / 2100 LTE | (2) JAHH-65B-R3B | ADD | 2 | B66A RRH4X45 | ADD |
| | | | 3 | - | - | - | 4 | B25 RRH4X30 | ADD |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | | B5 RRH4X40-850 | ADD |
| | | | - | - | - | - | - | - | - |
| D2 | 175' | 140° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | B13 RRH4X30-4R | REL |
| | | | 2 | 700 / 850 / 1900 / 2100 LTE | (2) JAHH-65B-R3B | ADD | 2 | B66A RRH4X45 | ADD |
| | | | 3 | - | - | - | 4 | B25 RRH4X30 | ADD |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | | B5 RRH4X40-850 | ADD |
| | | | - | - | - | - | - | - | - |
| D3 | 175' | 300° | 1 | 850 CDMA | LPA-80063-6CF | RMN | 1 | B13 RRH4X30-4R | REL |
| | | | 2 | 700 / 850 / 1900 / 2100 LTE | (2) JAHH-65B-R3B | ADD | 2 | B66A RRH4X45 | ADD |
| | | | 3 | - | - | - | 4 | B25 RRH4X30 | ADD |
| | | | 4 | 850 CDMA | LPA-80063-6CF | RMN | | B5 RRH4X40-850 | ADD |
| | | | - | - | - | - | - | - | - |

**PROPOSED FIBER DISTRIBUTION / OVP BOX**

| LOCATION | POS | BAND | MODEL NUMBER | STATUS |
|---|---|---|---|---|
| TOWER | - | - | DB-B1-6C-12AB-0Z | ADD |
| - | - | - | - | - |

**PROPOSED CABLING SUMMARY**

| COAX | HYBRID | STATUS |
|---|---|---|
| - | (1) 1-5/8" | ADD |
| (4) 1-5/8" | – | RMN |

**STATUS ABBREVIATIONS**

RMV: TO BE REMOVED
RMN: TO REMAIN
REL: TO BE RELOCATED
DSC: TO BE DISCONNECTED AND TO REMAIN

**CABLE LENGTHS FOR FOR FIBER AND DC JUMPERS**

FROM FIBER DISTRIBUTION / OVP BOX TO RRU: 15' JUMPERS
FROM RRU TO ANTENNA: 10' JUMPERS

3 ANTENNA AND RF EQUIPMENT SCHEDULES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| 0 | FOR CONSTRUCTION | NW | 05/23/18 |
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ATC SITE NUMBER:
302502

ATC SITE NAME:
HARWINTON

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791

SEAL:


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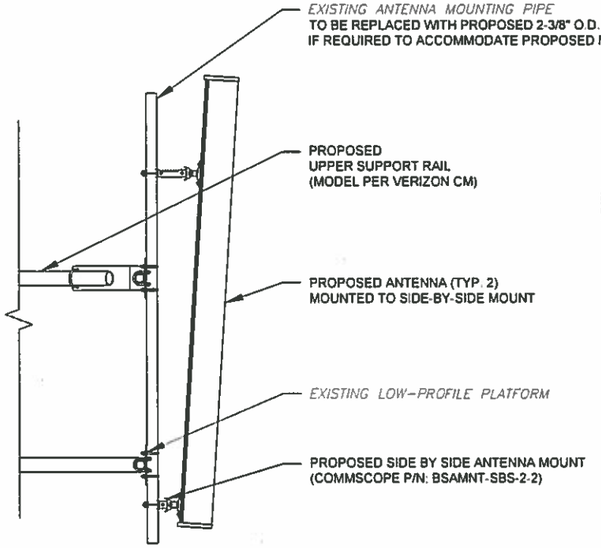
May 24 2018 8:47 AM cosign

verizon

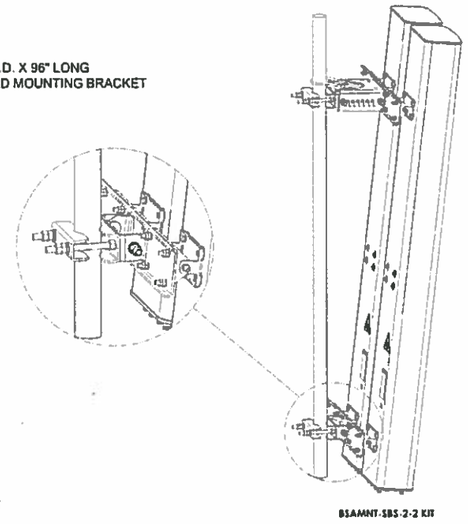
| | |
|---|---|
| DRAWN BY: | NW |
| APPROVED BY: | PPB |
| DATE DRAWN: | 05/23/18 |
| ATC JOB NO: | 12478535 |
| CUSTOMER ID: | HARWINTON N CT |
| CUSTOMER #: | 467932 |

RF SCHEDULE AND ANTENNA INSTALLATION

| SHEET NUMBER: | REVISION: |
|---|---|
| C-501 | 0 |



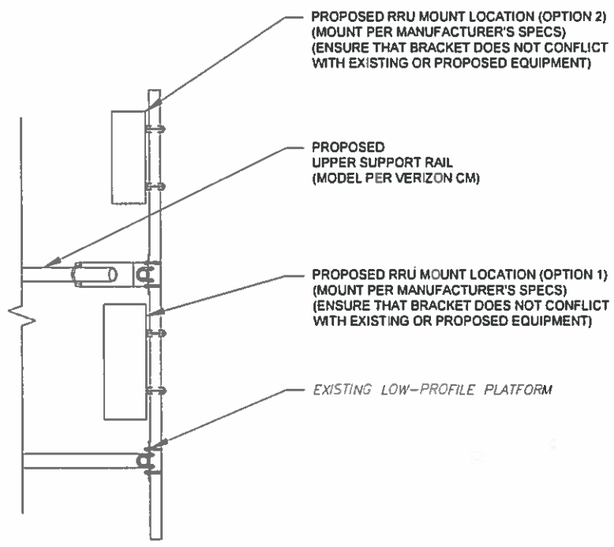

PROFILE VIEW




ISOMETRIC VIEW (BY MANUFACTURER)

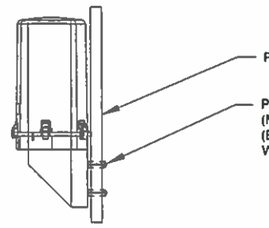
## 1 PROPOSED SIDE-BY-SIDE MOUNT

SCALE: NOT TO SCALE



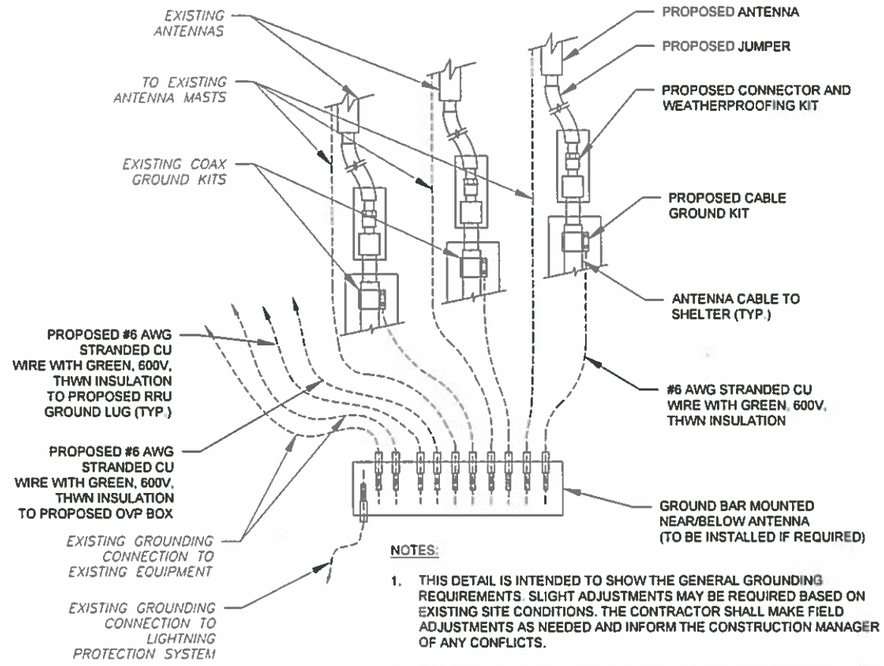

## 3 PROPOSED RRU MOUNTING DETAIL - TYPICAL

SCALE: NOT TO SCALE




## 2 PROPOSED OVP MOUNTING

SCALE: NOT TO SCALE




NOTES:

1. THIS DETAIL IS INTENDED TO SHOW THE GENERAL GROUNDING REQUIREMENTS. SLIGHT ADJUSTMENTS MAY BE REQUIRED BASED ON EXISTING SITE CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD ADJUSTMENTS AS NEEDED AND INFORM THE CONSTRUCTION MANAGER OF ANY CONFLICTS.
2. SITE GROUNDING SHALL COMPLY WITH VERIZON WIRELESS GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH VERIZON WIRELESS GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.

## 4 TYPICAL ANTENNA GROUNDING DIAGRAM

SCALE: NOT TO SCALE

AMERICAN TOWER®
A.T. ENGINEERING SERVICE, PLLC
3500 REGENCY PARKWAY
SUITE 100
CARY, NC 27518
PHONE: (919) 468-0112
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| REV. | DESCRIPTION | BY | DATE |
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HARWINTON

SITE ADDRESS:
159 WEINGART ROAD
HARWINTON, CT 06791

SEAL:


Authorized by "EOR"
May 24 2018 8:48 AM cosign

verizon

| | |
|---|---|
| DRAWN BY: | NW |
| APPROVED BY: | PPB |
| DATE DRAWN: | 05/23/18 |
| ATC JOB NO: | 12478535 |
| CUSTOMER ID: | HARWINTON N CT |
| CUSTOMER #: | 467932 |

CONSTRUCTION DETAILS

| SHEET NUMBER: | REVISION: |
|---|---|
| C-502 | 0 |