

## Appendix H:

Analysis for Comm Tower Temporary Guy Removal

Date: **March 31, 2023**

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**Subject:** **Structural Stability Analysis Letter**

**EOR Analysis / Modification Design:** **EOR:** N/A  
**Date:** N/A

**Tower Owner Designation:** **Site Number:** RFQ-CEA6  
**Site Name:** Six Mile

**Engineering Firm Designation:** **ETS Project Number:** 23117608.STR.3709

**Site Data:** **Anchorage School District, Anchorage, Anchorage Borough, AK**  
**Latitude 61° 18' 39.90", Longitude -149° 48' 47.50"**  
**180.0 Foot – Guyed Tower**

Dear Markanthony Garcia,

Engineered Tower Solutions, PLLC (ETS) is pleased to submit this “**Qualified Engineer Review Letter**” to determine the structural stability of the above mentioned tower. This construction analysis has been performed in accordance with ANSI/TIA-322, Standard for Loading, Analysis, and Design Criteria Related to the Installation, Alteration and Maintenance of Communication Structures and ANSI/ASSE A10.48-2016, Criteria for Safety Practices with the Construction, Demolition, Modification, and Maintenance of Communication Structures.

Based on our analysis, the structure possesses adequate strength and stability to support the construction activities and sequencing stated in the Table 2.1 under the following conditions:

|  |                                   |
|--|-----------------------------------|
| Temporary Bracing/Shoring                    | <b>Not Required</b>               |
| Special Load Testing and/or Field Monitoring | <b>Not Required</b>               |
| Special Requirements                         | <b>Required (See Section 4.1)</b> |
| Additional Recommendations                   | <b>Required (See Section 4.2)</b> |
| Equipment Verification                       | <b>Not Required</b>               |

Please note, the Contractor shall be fully responsible for the “means and methods” of all rigging in accordance with ANSI/TIA-322 and ANSI/ASSE A10.48-2016. In the event site conditions exist whereby the specified procedures in the referenced Rigging Plan cannot be followed, immediately contact ETS for review and approval prior to proceeding with work. If you have any questions or need further assistance please give us a call.

QERL prepared by:

Bach S. Tran, EI  
Structural Engineer III

Respectfully submitted by:

Jeffrey A. Arthur, PE  
Qualified Engineer



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## 1) INTRODUCTION

This tower is a 180.0 ft Guyed Tower designed by ROHN in January 1999.

## 2) ANALYSIS CRITERIA

The construction analysis was performed for this tower in accordance with the requirements of ANSI/TIA-322, Standard for Loading, Analysis, and Design Criteria Related to the Installation, Alteration, and Maintenance of Communication Structures and ANSI/ASSE A10.48-2016, Criteria for Safety Practices with the Construction, Demolition, Modification and Maintenance of Communication Structures, based upon a uniform Operational wind speed,  $W_1$ , of 30 mph ( $K_z$ ,  $G_h$ ,  $I$ , and  $K_d$  equal to 1.0) and a Non-Operational wind load(s),  $W_2$ , as stated in Table 2 for the various construction phases considered.

The following construction phases directly impacting the supporting structure's strength or stability were considered as part of this analysis.

**Table 2.1 – Construction Phases Considered**

| Construction Phase | Wind Load Considered |                     | Operational Construction Loads Considered | Construction Phase Description                   |
|--------------------|----------------------|---------------------|---|--|
|                    | Operational          | <sup>1</sup> Non-Op |   |  |
| Phase I            | N/A                  | 45 mph              | N/A                                       | Temporary disconnect bottom guy level at 35.0 ft |

Notes:

1. Non-Operational wind speed represents the effective 3-second gust wind speed while considering the appropriate Construction Duration Reduction Factor as specified in Section 4.5 of the ANSI/TIA-322 Standard.

For the purposes of this construction analysis, the worst-case equipment loading configuration was considered which is represented in the *Allstate Tower Tower Inspection Report dated August 2, 2022* for the following load case:

### Existing Equipment Configuration

For the purposes of this construction analysis, only currently installed equipment loading was considered as represented in the *Allstate Tower Tower Inspection Report dated August 2, 2022*. Specified equipment NOT considered in this construction analysis is identified in Table 2.2 and shall be verified as uninstalled by the Contractor prior to construction with any deviations immediately communicated back to *Engineered Tower Solutions, PLLC* for review and approval.

**Table 2.2 – Equipment Assumed Uninstalled or Removed (Must Be Verified By Contractor)**

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---------------------|----------------------------|--------------------|----------------------|---------------|----------------------|---------------------|------|
| N/A                 | N/A                        | N/A                | N/A                  | N/A           | N/A                  | N/A                 | N/A  |

Notes:

1. Proposed Equipment Specified in EOR Report **Not** Considered in this Analysis.
2. Reserve Equipment Specified in EOR Report **Not** Considered in this Analysis.
3. Equipment identified as "To BE Removed" in EOR Report **Not** Considered in this Analysis.

### 3) ANALYSIS PROCEDURE

**Table 3.1 – Documents Provided**

| Document                    | Remarks        | Reference              | Source |
|-----------------------------|----------------|------------------------|--------|
| Tower Manufacturer Drawings | ROHN           | D830115<br>1/21/1999   | Sabre  |
| Tower Inspection Report     | Allstate Tower | IN-09993<br>08/02/2022 | Sabre  |

#### 3.1) Analysis Method

If applicable, tnxTower (version 8.1.1.0) and RISA-3D (version 17.0.4), commercially available analysis software packages, were used to create a three-dimensional model of the tower and tower mount to calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in the *Allstate Tower Tower Inspection Report dated August 2, 2022*.

### 4) ANALYSIS RESULTS

Based on our analysis, the **structure** possesses adequate strength and stability to support the construction activities and sequencing stated in the Table 2.1 once all requirements listed in Section 4.1 are fully addressed.

#### 4.1) Special Requirements – Construction Phase: All Phases

In order for the structure to safely support the construction activities noted in the Contractor's Rigging Plan, the additional special requirements and/or temporary bracing/shoring is required:

- 1.) The order of the Construction Sequence can be rearranged to fit the Contractor's revised schedule once the Contractor arrives on site and determines a more suitable sequence is appropriate.
- 2.) Contractor shall not leave any structural members, or connections disconnected or uninstalled prior to taking a break or leaving at the end of the day.
- 3.) Contractor shall disconnect all bottom guy wires at 35.0 ft and shall not under any circumstances only disconnect one wire at a time with the other two fully tensioned.

#### 4.2) Additional Recommendations

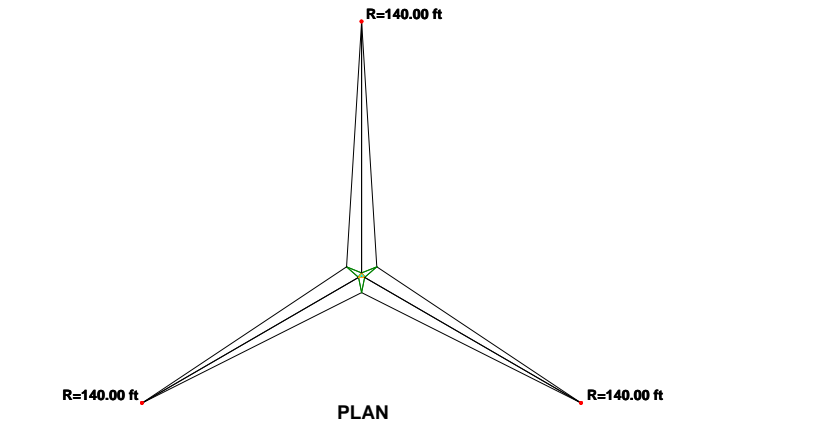
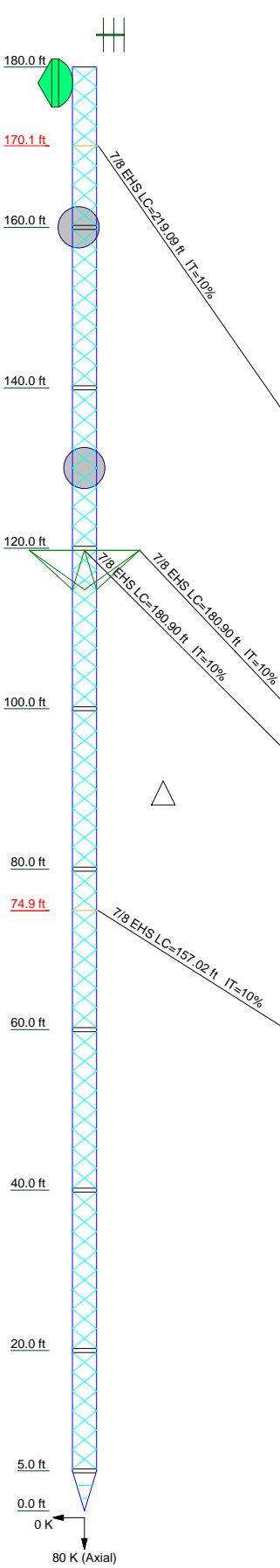
In order for the structure to safely support the construction activities noted in the Table 2.1, the additional special requirements and/or temporary bracing/shoring is required:

- 1.) The Contractor shall follow all recommendations and requirements listed within the ANSI/ASSE A10.48-2016, "Criteria for Safety Practices with the Construction, Demolition, Modification and Maintenance of Communication Structures" Standard.

## **APPENDIX A**

### **ADDITIONAL CALCULATIONS**

| Section           | T10  | T9          | T8  | T7  | T6  | T5               | T4                   | T3       | T2   | T1               |
|-------------------|------|-------------|-----|-----|-----|------------------|----------------------|----------|------|------------------|
| Legs              |      |             |     |     |     |                  |                      | SR 2 1/4 |      |                  |
| Leg Grade         |      |             |     |     |     | A572-50          |                      |          |      |                  |
| Diagonals         | N.A. |             |     |     |     | ROHN TS1.5x16 ga |                      |          |      |                  |
| Diagonal Grade    | N.A. |             |     |     |     | A53-B-35         |                      |          |      |                  |
| Top Girts         |      |             |     |     |     | ROHN TS1.5x16 ga |                      |          |      | ROHN TS1.5x16 ga |
| Bottom Girts      | N.A. |             |     |     |     |                  |                      |          |      |                  |
| Horizontal        | A    |             |     |     |     | N.A.             |                      |          |      |                  |
| Top Guy Pull-Offs |      |             |     |     |     |                  | 2L 2 x 2 x 1/4 (1/4) |          | N.A. | SR 1 3/8         |
| Face Width (ft)   |      |             |     |     |     |                  |                      |          |      | 3.41667          |
| # Panels @ (ft)   | B    | 6 @ 2.40625 |     |     |     | 56 @ 2.42969     |                      |          |      | 8 @ 2.46484      |
| Weight (K)        | 11.3 | 0.4         | 0.9 | 1.3 | 1.3 | 1.3              | 1.3                  | 1.1      | 1.1  | 1.1              |



| MARK | SIZE    | MARK | SIZE        |
|------|---------|------|-------------|
| A    | 3x1 1/4 | B    | 3 @ 1.57292 |

| GRADE   | Fy     | Fu     | GRADE    | Fy     | Fu     |
|---------|--------|--------|----------|--------|--------|
| A572-50 | 50 ksi | 65 ksi | A53-B-35 | 35 ksi | 63 ksi |

- TOWER DESIGN NOTES**
1. Tower is located in Anchorage County, Alaska.
  2. Tower designed for Exposure C to the TIA-222-G Standard.
  3. Tower designed for a 45 mph basic wind in accordance with the TIA-222-G Standard.
  4. Tower Structure Class II.
  5. Topographic Category 1 with Crest Height of 0.00 ft
  6. TOWER RATING: 45.2%

Non-Oper. Wind

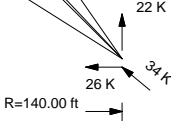
- 45 mph 3-sec gust

- Phases Considered: Phase I

- Max Tower Capacity = 45.2% < 100%, OK

- Temp. Bracing is not Required

ALL REACTIONS ARE FACTORED



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Phone: (919) 782-2710

FAX: (919) 435-0631

Job: IN-09993\_Six Mile

Project:

Client:

Code: TIA-222-G

Path:

Drawn by: Bach.Tran

Date: 03/30/23

Scale: NTS

Dwg No. E-1



## SITE LAYOUT



RFQ-CEA6

Six Mile

Legend

-  61.3110817,-149.8132037
-  Circle Measure

61.3110817,-149.8132037

Google Earth

Image Landsat / Copernicus



60 ft



**Access Road**



**Entrance and Compound**



