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**Tower Structural Analysis Report for
SBA Network Services, Inc.**



Existing 350' Self Support Tower

SBA Site Name: Cleary Tower (Edward)
SBA Site ID: CT20021-A-11
Carrier Name: Dish Network
Carrier Site ID/Name: CT0100001A / EA010
App # 93365, v4

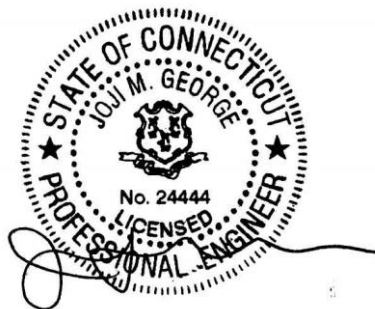
Site Location: 1233 Wolcott Road (Rt-69)
Wolcott, CT 06716
New Haven County
Latitude: 41.621581°
Longitude: -72.973633°

ACGI Job # 19-0197

(Refer to Previous ACGI Job # 18-5441, dated 08/22/2018)

| ANALYSIS RESULTS | | |
|-----------------------------------|---------------|--|
| Tower Components | 98.1 % | Pass |
| Tower Foundation | 41.6 % | Pass |
| Net change in tower stress | +6.5 % | Change from previous SA by Allpro Consulting Group, Inc. ACGI#17-0832 Rev.2 dated 07/14/2017. |

Prepared By:
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01/15/2019
Approved By:
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CT PE # 24444

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1. ANALYSIS SUMMARY

The existing 350' Self-Supported Tower located in Wolcott, Connecticut was analyzed by Allpro Consulting Group, Inc. (ACGI) for the existing loads and the proposed Dish Network antennas, dishes and coaxes per application#93365, v4 as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with below mentioned proposed and existing loading is found to be **in compliance** with TIA-222-G, *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures* and *International Building Code 2015*.

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional proposed loads.

| SOURCE OF INFORMATION | | |
|-----------------------------|-------------------------------|--|
| Tower Data: | Paul J. Ford & Co. | Structural analysis by Paul J. Ford & Co., Job No. A03-T143 dated 12/22/2003. |
| | FDH Engineering | Previous structural analysis by FDH Engineering, project #1462GQ1400, dated 04/09/2014. |
| | Allpro Consulting Group, Inc. | Previous structural analysis by Allpro Consulting Group, Inc., ACGI Job #16-4376, dated 12/14/2016. |
| | | Previous modification design by Allpro Consulting Group, Inc., ACGI#17-0832 Rev.2 dated 07/14/2017. |
| | | Previous structural analysis by Allpro Consulting Group, Inc., ACGI Job #18-5441, dated 08/22/2018 |
| Foundation Data: | Paul J. Ford & Co. | Structural analysis by Paul J. Ford & Co., Job No. A03-T143 dated 12/22/2003. |
| Geotechnical Report: | Osman Pekin | Soil report by Osman Pekin, Ph.D., P.E. dated 12/12/1991. |
| Loading Data: | Allpro Consulting Group, Inc. | Previous modification design SA by Allpro Consulting Group, Inc., ACGI#17-0832 Rev.2 dated 07/14/2017. |
| | sbsite.com | SBA site summary dated 7/26/2018. |
| | | Proposed final loading for Dish Network as per sbsite.com, Application ID 93365, v4. |
| Authorization: | SBA Communication Corp. | |

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G-Addendum 2. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

| SITE DATA | |
|------------------------------------|---|
| SBA Site Name: | Cleary Tower (Edward) |
| SBA Site Number: | CT20021-A-11 |
| Carrier Site Name: | Dish Network: CT0100001A / EA010 |
| City, State: | Wolcott, CT |
| County: | New Haven |
| Code Wind Load Requirement: | TIA-222-G & 2015 International Building Code (Ultimate wind speed of 125 mph 3 sec gust equivalent to Nominal design wind speed of 97 mph) |
| Wind Load Used: | TIA-222-G Code: <ul style="list-style-type: none"> • Nominal wind speed of 97 mph (3 second gust wind speed) • Structure Class II*. • Exposure Category B. • Topographic Category 1. • A wind speed of 50 mph is used in combination with 0.75 in ice thickness. |
| Seismic Check: | Spectral Response Acceleration at Short Period (Ss) is 0.186 g which less than 1.000 g. Therefore, no seismic check is required as per TIA-222-G section 2.7.3 |

*This structural analysis is based upon the tower being classified as a class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

| TOWER DATA | |
|----------------------------|-------------------------------|
| Tower Type: | Self-Supported Tower |
| Height: | 350' |
| Cross Section: | Triangular |
| Steel Strength: | Legs – 50 ksi, Braces – 36ksi |
| Type of Foundation: | Pad and Pier Foundation |

| TOWER HISTORY | |
|------------------------------------|---|
| Tower Manufacturer / Model: | FWT, Inc. |
| Date of Original Design: | 1992 |
| Previous Modifications: | Previous modification design by Allpro Consulting Group, Inc., ACGI#17-0832 Rev.2 dated 07/14/2017. |
| Original Design Code Reqt: | EIA/TIA 222-E, 85mph basic wind speed without ice and 74 mph basic wind speed with 0.5" thick ice |

4. CONCLUSIONS

| RESULT SUMMARY | | |
|------------------------------|------------|-----------|
| MEMBER | % Capacity | Pass/Fail |
| Leg | 45.3 % | Pass |
| Diagonal | 51.6 % | Pass |
| Horizontal | 50.1 % | Pass |
| Top Girt | 3.1 % | Pass |
| Redundant Horizontal Bracing | 98.1 % | Pass |
| Redundant Diagonal Bracing | 68.9 % | Pass |
| Inner Bracing | 0.9 % | Pass |
| Bolts | 48.1 % | Pass |
| Anchor Bolts | 46.4 % | Pass |

| Foundation Type | Reaction Direction | Current Analysis Reaction (TIA-222-G) | Original Design Reaction (EIA/TIA-222-E) | Original Design Reaction equivalent to TIA-222-G (multiply by 1.35) | % Capacity |
|-----------------------|--------------------|---------------------------------------|--|---|------------|
| Individual Foundation | Uplift | 306 k | 631 k | 851.8 k | 35.9% |
| | Compression | 422 k | 751 k | 1013.8 k | 41.6% |

*Note: Soil data available as per Soil report by Osman Pekin, Ph.D., P.E. dated 12/12/1991 is not sufficient for the detail analysis of the foundation. Therefore, reactions are compared based upon the original tower design. Foundation is estimated to be acceptable based on the tower member loads and stresses. However, it is recommended to provide detailed geotechnical investigation report for rigorous analysis of the tower foundation.

| MAXIMUM DISH ROTATION AT SERVICE WIND SPEED | | | | |
|--|----------|------------|-------------|-------------------|
| Twist and Sway (deg), 10 dB degradation limit* | | | | |
| Elev. (ft) | MW Dish | Tilt (deg) | Twist (deg) | Allowable (deg) |
| 165± | SPD3-2.4 | 0.0670 | 0.0029 | Carrier to verify |

As per the results of the analysis, the existing tower **is in code compliance** for the proposed and existing antenna loads.

Maximum tower member stress **is less than allowable making it in code compliance** under the TIA-222-G code and International Building Code 2015 requirements.

Overall tower stress ratio increased by 6.5% compared to previous SA by Allpro Consulting Group, Inc. ACGI#17-0832 Rev.2 dated 07/14/2017 due to addition of Dish Network loadings (new carrier).

5.

ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained
- Tower erection was in accordance to manufacturer drawings
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction
- Foundation was constructed in accordance to manufacturer drawings
- Foundation does not have structural damage
- Bolts have been properly tightened according to manufacturer specifications
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information

6.

DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

7.

APPURTENANCE LISTING

| EXISTING LOAD DESCRIPTION | | | | | |
|---------------------------|------------------------------|-----------------------------------|---------------------------------|---|---------------|
| <u>ELEV (ft.)</u> | <u>Qty.</u> | <u>Antenna Description</u> | <u>Mount Type & Qty.</u> | <u>TX. LINE (in)</u> | <u>TENANT</u> |
| 350± | 1 | Celwave PD200 Omni | (1) Star Mount w/ (9) Standoffs | (1) 7/8" | LoJack |
| 350± | 1 | 101 Omni | | (1) 1 1/4" | Marcus |
| 320± | 2 | 101 Omni | (2) 6' Standoffs | (2) 1 1/4" | Marcus |
| 186± | 3 | Powerwave 7770 Antenna | (3) 13.5' T-Frames | (12) 1-5/8" (2) 3/4" DC Power (1) 1/2" Fiber [DC Power & Fiber inside 2" interduct] | AT&T |
| | 4 | KMW AM-X-CD-16-65-00T-RET Antenna | | | |
| | 2 | Kathrein 800 10121 Antenna | | | |
| | 3 | CCI HPA-65R-BUU-H6 Antenna | | | |
| | 6 | CCI DTMABP7819VG12A TMA | | | |
| | 4 | Kathrein 860 10025 RET | | | |
| | 3 | Ericsson RRUS 11 Remote Radio | | | |
| | 3 | Ericsson RRUS 32 Remote Radio | | | |
| | 6 | Powerwave LGP 13519 Diplexer | | | |
| 1 | Raycap DC6-48-60-18-8F Surge | | | | |
| 165± | 3 | SPD3-2.4 Radiowaves Dish | Pipe Mount | (6) 1/2" | Marcus |
| | 3 | SPD2-5.8 Radiowaves Dish | Pipe Mount | | |
| 158± | 1 | Decibel DB408 Omni | (1) 17" Standoff | (1) 7/8" | Wolcott |
| 134± | 3 | APXVTM14-C-I20 | (3) 15' T-Frames | (4) 1-1/4" | Sprint |
| | 3 | RFS APXVSP18 | | | |
| | 3 | RRH 1900 MHz | | | |
| | 3 | RRH 800 MHz | | | |
| | 3 | RRH TD-8x20-25 | | | |
| | 3 | RRH 800 MHz Filter | | | |
| | 4 | RFS ACU-A20-N | | | |

| FINAL DISH NETWORK LOAD DESCRIPTION | | | | | |
|-------------------------------------|-------------|-------------------------------|--|----------------------|---------------|
| <u>ELEV (ft.)</u> | <u>Qty.</u> | <u>Antenna Description</u> | <u>Mount Type & Qty.</u> | <u>TX. LINE (in)</u> | <u>TENANT</u> |
| 341± | 3 | Comba ODI2-065R18K-GQ Antenna | (3) Commscope SF-SU7-2-96 Sector Frame | (1) 1-1/4" Hybrid | Dish Network |
| | 2 | Ericsson 4415 Radio | | | |
| | 3 | Ericsson 0208 Radio | | | |

Notes:

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify ACGI if any potential physical and other interference with existing antennas for a redesign.

8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail |
|-------------|--------------|-----------------------|------------------------|------------------|----------|--------------------|------------|-----------|
| T1 | 350 - 340 | Leg | 2 | 3 | -6.382 | 49.286 | 12.9 | Pass |
| | | Diagonal | L2x1 1/2x3/16 | 9 | -2.159 | 10.346 | 20.9 | Pass |
| | | Top Girt | L3x3x1/4 | 4 | -0.319 | 28.598 | 31.5 (b) | Pass |
| T2 | 340 - 320 | Leg | 2 | 21 | -32.202 | 72.063 | 44.7 | Pass |
| | | Diagonal | L2x1 1/2x3/16 | 24 | -3.324 | 11.584 | 28.7 | Pass |
| T3 | 320 - 300 | Leg | 2 1/2 | 54 | -50.868 | 112.346 | 45.3 | Pass |
| | | Diagonal | L2x2x3/16 | 75 | -2.765 | 13.174 | 21.0 | Pass |
| T4 | 300 - 280 | Leg | 3 1/4 | 81 | -65.500 | 183.313 | 35.7 | Pass |
| | | Diagonal | L2-1/2x2-1/2x3/16 | 84 | -2.331 | 13.474 | 17.3 | Pass |
| T5 | 280 - 260 | Leg | 3 1/4 | 102 | -80.898 | 183.313 | 44.1 | Pass |
| | | Diagonal | L2-1/2x2-1/2x3/16 | 108 | -2.509 | 10.341 | 24.3 | Pass |
| T6 | 260 - 240 | Leg | 3 1/2 | 123 | -97.180 | 234.484 | 41.4 | Pass |
| | | Diagonal | L3x3x3/16 | 128 | -2.967 | 13.820 | 21.5 | Pass |
| T7 | 240 - 220 | Leg | 3 1/2 | 144 | -113.117 | 306.641 | 36.9 | Pass |
| | | Diagonal | 2L2 1/2x2 1/2x3/16x3/8 | 152 | -3.870 | 25.202 | 15.4 | Pass |
| | | Horizontal | L2 1/2x2 1/2x3/16 | 148 | -2.151 | 8.246 | 26.1 | Pass |
| T8 | 220 - 200 | Inner Bracing | L2 1/2x2 1/2x3/16 | 154 | -0.012 | 7.609 | 0.6 | Pass |
| | | Leg | 3 3/4 | 183 | -131.235 | 368.015 | 35.7 | Pass |
| | | Diagonal | 2L2 1/2x2 1/2x3/16x3/8 | 191 | -4.377 | 21.196 | 20.6 | Pass |
| | | Horizontal | L2 1/2x2 1/2x3/16 | 190 | -2.380 | 6.207 | 38.3 | Pass |
| T9 | 200 - 180 | Inner Bracing | L2 1/2x2 1/2x3/16 | 194 | -0.014 | 5.772 | 0.7 | Pass |
| | | Leg | 4 | 222 | -151.396 | 434.236 | 34.9 | Pass |
| | | Diagonal | 2L3x3x3/16x3/8 | 230 | -6.340 | 30.555 | 20.7 | Pass |
| T10 | 180 - 160 | Horizontal | L3x3x3/16 | 226 | -2.628 | 8.488 | 31.0 | Pass |
| | | Inner Bracing | L3x3x3/16 | 233 | -0.017 | 7.941 | 0.7 | Pass |
| | | Leg | 4 1/4 | 261 | -176.483 | 505.220 | 34.9 | Pass |
| | | Diagonal | 2L3x3x3/16x3/8 | 269 | -7.295 | 26.278 | 27.8 | Pass |
| T11 | 160 - 140 | Horizontal | L3x3x3/16 | 268 | -3.061 | 6.804 | 45.0 | Pass |
| | | Inner Bracing | L3x3x3/16 | 272 | -0.018 | 6.396 | 0.8 | Pass |
| | | Leg | 4 1/4 | 300 | -203.541 | 505.220 | 40.3 | Pass |
| T12 | 140 - 120 | Diagonal | 2L3x3x3/16x3/8 | 308 | -8.149 | 22.339 | 36.5 | Pass |
| | | Horizontal | L3 1/2x3 1/2x1/4 | 304 | -3.530 | 11.687 | 30.2 | Pass |
| | | Inner Bracing | L3 1/2x3 1/2x1/4 | 312 | -0.021 | 11.050 | 0.7 | Pass |
| | | Leg | 4 1/2 | 339 | -224.660 | 580.902 | 38.7 | Pass |
| T13 | 120 - 100 | Diagonal | 2L3x3x1/4x3/8 | 358 | -12.130 | 31.416 | 38.6 | Pass |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 347 | -3.896 | 13.682 | 28.5 | Pass |
| | | Redund Horz 1 Bracing | L2x2x3/16 | 356 | -3.896 | 5.620 | 69.3 | Pass |
| | | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 378 | -2.646 | 6.069 | 43.6 | Pass |
| | | Inner Bracing | L3 1/2x3 1/2x1/4 | 362 | -0.030 | 9.656 | 0.7 | Pass |
| T13 | 120 - 100 | Leg | 4 3/4 | 384 | -255.903 | 661.231 | 38.7 | Pass |
| | | Diagonal | 2L3x3x1/4x3/8 | 400 | -12.127 | 28.916 | 41.9 | Pass |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 392 | -4.438 | 11.547 | 38.4 | Pass |
| | | Redund Horz 1 | L2x2x3/16 | 401 | -4.438 | 4.748 | 93.5 | Pass |

CT20021-A-11/Cleary Tower (Edward) -350' SST

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail | | | |
|-------------|--------------|-----------------------|---|------------------|--------------------|--------------------|-----------------------------|--------------|----------------|------|------|
| T14 | 100 - 80 | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 420 | -2.912 | 5.494 | 53.0 | Pass | | | |
| | | Inner Bracing Leg | L4x4x1/4 4 3/4 | 407 429 | -0.031 -284.832 | 12.311 661.231 | 0.8 43.1 | Pass Pass | | | |
| | | Diagonal | 2L3x3x1/4x3/8 | 448 | -13.230 | 26.593 | 49.8 | Pass | | | |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 437 | -4.940 | 9.860 | 50.1 | Pass | | | |
| | | Redund Horz 1 Bracing | L2x2x3/8 | 442 | -4.940 | 7.521 | 65.7 | Pass | | | |
| T15 | 80 - 60 | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 465 | -3.148 | 4.968 | 63.4 | Pass | | | |
| | | Inner Bracing Leg | L4x4x1/4 5 | 452 474 | -0.033 -315.885 | 10.555 746.168 | 0.8 42.3 | Pass Pass | | | |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 490 | -13.332 | 38.008 | 35.1 | Pass | | | |
| | | Horizontal | 2L3x3x3/16x3/8 | 482 | -5.478 | 15.048 | 36.4 | Pass | | | |
| | | Redund Horz 1 Bracing | L2-1/2x2-1/2x3/16 | 509 | -5.478 | 6.992 | 78.3 | Pass | | | |
| T16 | 60 - 40 | Redund Diag 1 Bracing | L3x3x3/16 | 510 | -3.406 | 7.925 | 43.0 | Pass | | | |
| | | Inner Bracing Leg | 2L3x3x3/16x3/8 5 1/4 | 496 519 | -0.038 -345.609 | 14.343 835.679 | 0.8 41.4 | Pass Pass | | | |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 538 | -14.571 | 35.047 | 41.6 | Pass | | | |
| | | Horizontal | 2L3x3x3/16x3/8 | 527 | -5.994 | 13.146 | 45.6 | Pass | | | |
| | | Redund Horz 1 Bracing | L2-1/2x2-1/2x3/16 | 536 | -5.994 | 6.113 | 98.1 | Pass | | | |
| T17 | 40 - 20 | Redund Diag 1 Bracing | L3x3x3/16 | 558 | -3.648 | 7.227 | 50.5 | Pass | | | |
| | | Inner Bracing Leg | 2L3x3x3/16x3/8 5 1/4 | 541 564 | -0.039 -376.952 | 12.552 835.679 | 0.9 45.1 | Pass Pass | | | |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 580 | -14.537 | 32.326 | 45.0 | Pass | | | |
| | | Horizontal | 2L3 1/2x3 1/2x1/4x3/8 | 572 | -6.537 | 24.167 | 27.0 | Pass | | | |
| | | Redund Horz 1 Bracing | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower | 577 | -6.537 | 14.963 | 43.7 | Pass | | | |
| T18 | 20 - 0 | Redund Diag 1 Bracing | L3x3x3/16 | 600 | -3.907 | 6.591 | 59.3 | Pass | | | |
| | | Inner Bracing Leg | 2L3 1/2x3 1/2x1/4x3/8 5 1/2 | 587 607 | -0.044 -407.859 | 23.141 929.740 | 0.7 43.9 | Pass Pass | | | |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 628 | -15.421 | 29.896 | 51.6 | Pass | | | |
| | | Horizontal | 2L3 1/2x3 1/2x1/4x3/8 | 610 | -7.073 | 21.456 | 33.0 | Pass | | | |
| | | Redund Horz 1 Bracing | L3x3x3/16 | 612 | -7.073 | 8.374 | 84.5 | Pass | | | |
| | | Redund Diag 1 Bracing | L3x3x3/16 | 636 | -4.162 | 6.043 | 68.9 | Pass | | | |
| | | Inner Bracing | 2L3 1/2x3 1/2x1/4x3/8 | 631 | -0.043 | 20.572 | 0.7 | Pass | | | |
| | | | | | | | | | Summary | | |
| | | | | | | | | | Leg (T3) | 45.3 | Pass |
| | | | | | | | | | Diagonal (T18) | 51.6 | Pass |
| | | | | | | | Horizontal (T14) | 50.1 | Pass | | |
| | | | | | | | Top Girt (T1) | 3.1 | Pass | | |
| | | | | | | | Redund Horz 1 Bracing (T16) | 98.1 | Pass | | |
| | | | | | | | Redund Diag 1 Bracing (T18) | 68.9 | Pass | | |
| | | | | | | | Inner Bracing (T16) | 0.9 | Pass | | |
| | | | | | | | Bolt Checks | 48.1 | Pass | | |
| | | | | | | | RATING = | 98.1 | Pass | | |

APPENDIX

SITE DATA

| (APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS | | | | | | | | | | | | |
|--|-----------------------------------|--|----------------------|---|---------------------|------------------------|--|---------------------|-------------------------|--|--|--------------------------------|
| Municipality | Ground Snow Load (psf) | MCE Spectral Accelerations (%g) | | Wind Design Parameters | | | | | | | | |
| | | S_s | S₁ | Ultimate Design Wind Speeds, V_{ult} (mph) | | | Nominal Design Wind Speeds, V_{asd} (mph) | | | Wind-Borne Debris Regions¹ | | Hurricane-Prone Regions |
| | | | | Risk Cat. I | Risk Cat. II | Risk Cat III-IV | Risk Cat. I | Risk Cat. II | Risk Cat. III-IV | Risk Cat. II & III except Occup I-2 | Risk Cat III Occup I-2 & Risk Cat. IV | |
| Montville | 30 | 0.165 | 0.059 | 125 | 135 | 145 | 97 | 105 | 112 | | Type A | Yes |
| Morris | 35 | 0.187 | 0.065 | 110 | 120 | 125 | 85 | 93 | 97 | | | Yes |
| Naugatuck | 30 | 0.190 | 0.064 | 110 | 125 | 135 | 85 | 97 | 105 | | | Yes |
| New Britain | 30 | 0.183 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| New Canaan | 30 | 0.240 | 0.068 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| New Fairfield | 35 | 0.212 | 0.067 | 105 | 115 | 125 | 81 | 89 | 97 | | | |
| New Hartford | 40 | 0.180 | 0.065 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| New Haven | 30 | 0.186 | 0.062 | 115 | 125 | 135 | 89 | 97 | 105 | | Type C | Yes |
| Newington | 30 | 0.182 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| New London | 30 | 0.161 | 0.058 | 125 | 135 | 145 | 97 | 105 | 112 | Type B | Type A | Yes |
| New Milford | 35 | 0.198 | 0.066 | 105 | 115 | 125 | 81 | 89 | 97 | | | |
| Newtown | 30 | 0.208 | 0.066 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| Norfolk | 40 | 0.175 | 0.065 | 105 | 115 | 125 | 81 | 89 | 97 | | | |
| North Branford | 30 | 0.179 | 0.061 | 120 | 130 | 140 | 93 | 101 | 108 | | | Yes |
| North Canaan | 40 | 0.173 | 0.065 | 105 | 115 | 120 | 81 | 89 | 93 | | | |
| North Haven | 30 | 0.184 | 0.062 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| North Stonington | 30 | 0.163 | 0.059 | 125 | 135 | 145 | 97 | 105 | 112 | | Type A | Yes |
| Norwalk | 30 | 0.232 | 0.067 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| Norwich | 30 | 0.168 | 0.060 | 125 | 135 | 145 | 97 | 105 | 112 | | Type A | Yes |
| Old Lyme | 30 | 0.164 | 0.059 | 125 | 135 | 145 | 97 | 105 | 112 | Type B | Type A | Yes |
| Old Saybrook | 30 | 0.164 | 0.059 | 125 | 135 | 145 | 97 | 105 | 112 | Type B | Type A | Yes |
| Orange | 30 | 0.192 | 0.063 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Oxford | 30 | 0.196 | 0.064 | 110 | 125 | 130 | 85 | 97 | 101 | | | Yes |
| Plainfield | 35 | 0.170 | 0.061 | 125 | 135 | 145 | 97 | 105 | 112 | | Type A | Yes |
| Plainville | 35 | 0.184 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Plymouth | 35 | 0.186 | 0.064 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| Pomfret | 40 | 0.172 | 0.063 | 120 | 130 | 140 | 93 | 101 | 108 | | | Yes |
| Portland | 30 | 0.180 | 0.063 | 115 | 130 | 135 | 89 | 101 | 105 | | | Yes |
| Preston | 30 | 0.167 | 0.060 | 125 | 135 | 145 | 97 | 105 | 112 | | Type A | Yes |
| Prospect | 30 | 0.188 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Putnam | 40 | 0.172 | 0.063 | 120 | 130 | 140 | 93 | 101 | 108 | | | Yes |
| Redding | 30 | 0.220 | 0.067 | 110 | 120 | 130 | 85 | 93 | 101 | | | Yes |
| Ridgefield | 30 | 0.230 | 0.068 | 110 | 120 | 125 | 85 | 93 | 97 | | | Yes |
| Rocky Hill | 30 | 0.181 | 0.063 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Roxbury | 35 | 0.197 | 0.065 | 110 | 120 | 125 | 85 | 93 | 97 | | | Yes |
| Salem | 30 | 0.170 | 0.060 | 120 | 135 | 140 | 93 | 105 | 108 | | Type A | Yes |
| Salisbury | 40 | 0.173 | 0.065 | 105 | 115 | 120 | 81 | 89 | 93 | | | |
| Scotland | 30 | 0.172 | 0.061 | 120 | 130 | 140 | 93 | 101 | 108 | | | Yes |
| Seymour | 30 | 0.194 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Sharon | 40 | 0.179 | 0.065 | 105 | 115 | 120 | 81 | 89 | 93 | | | |
| Shelton | 30 | 0.199 | 0.064 | 115 | 125 | 135 | 89 | 97 | 105 | | | Yes |
| Sherman | 35 | 0.202 | 0.066 | 105 | 115 | 120 | 81 | 89 | 93 | | | |

USGS Design Maps Summary Report

User-Specified Input

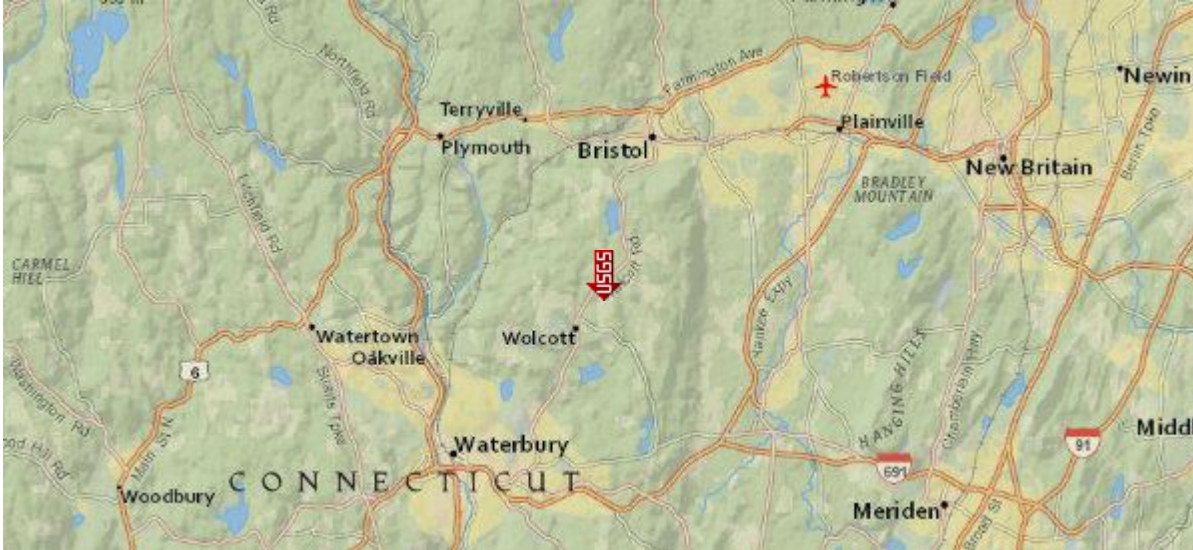
Report Title CT20021-A-08 Cleary Tower (Edward)
Tue October 30, 2018 17:03:46 UTC

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 41.62158°N, 72.97363°W

Site Soil Classification Site Class D – “Stiff Soil”

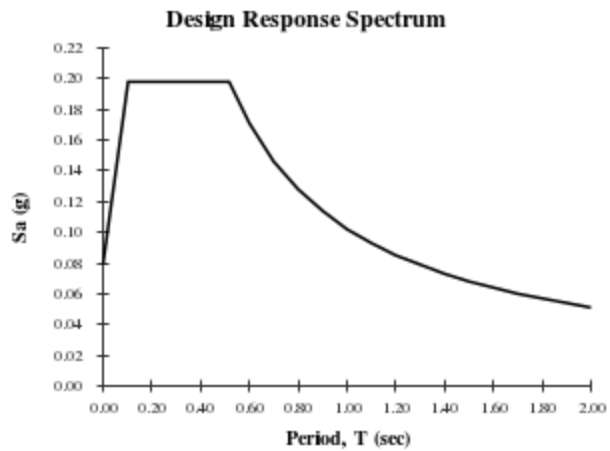
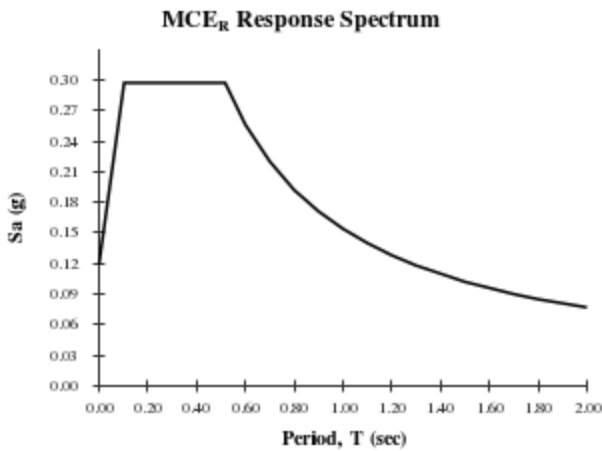
Risk Category I/II/III



USGS-Provided Output

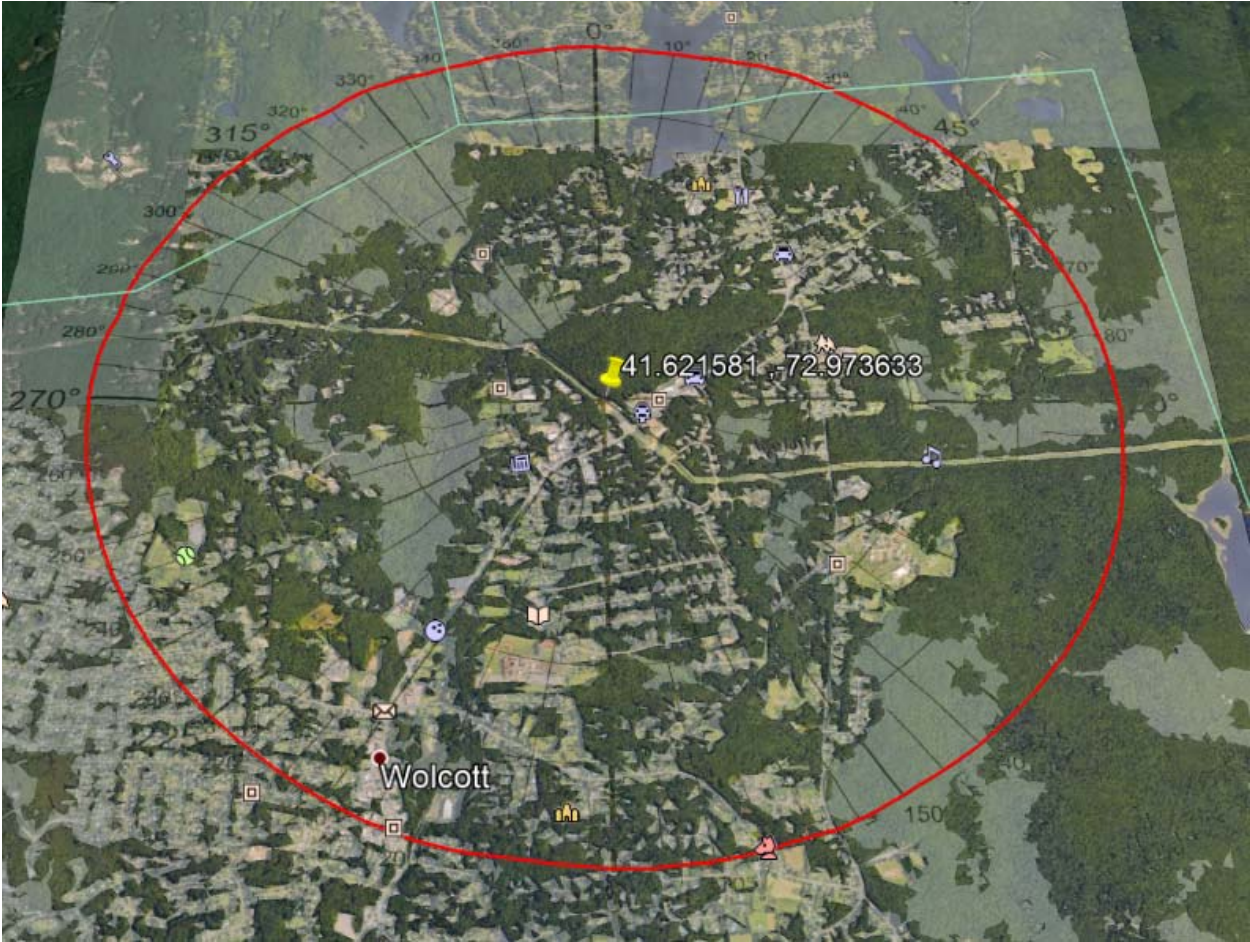
| | | |
|-------------------------|----------------------------|----------------------------|
| $S_s = 0.186 \text{ g}$ | $S_{MS} = 0.297 \text{ g}$ | $S_{DS} = 0.198 \text{ g}$ |
| $S_1 = 0.064 \text{ g}$ | $S_{M1} = 0.154 \text{ g}$ | $S_{D1} = 0.102 \text{ g}$ |

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.



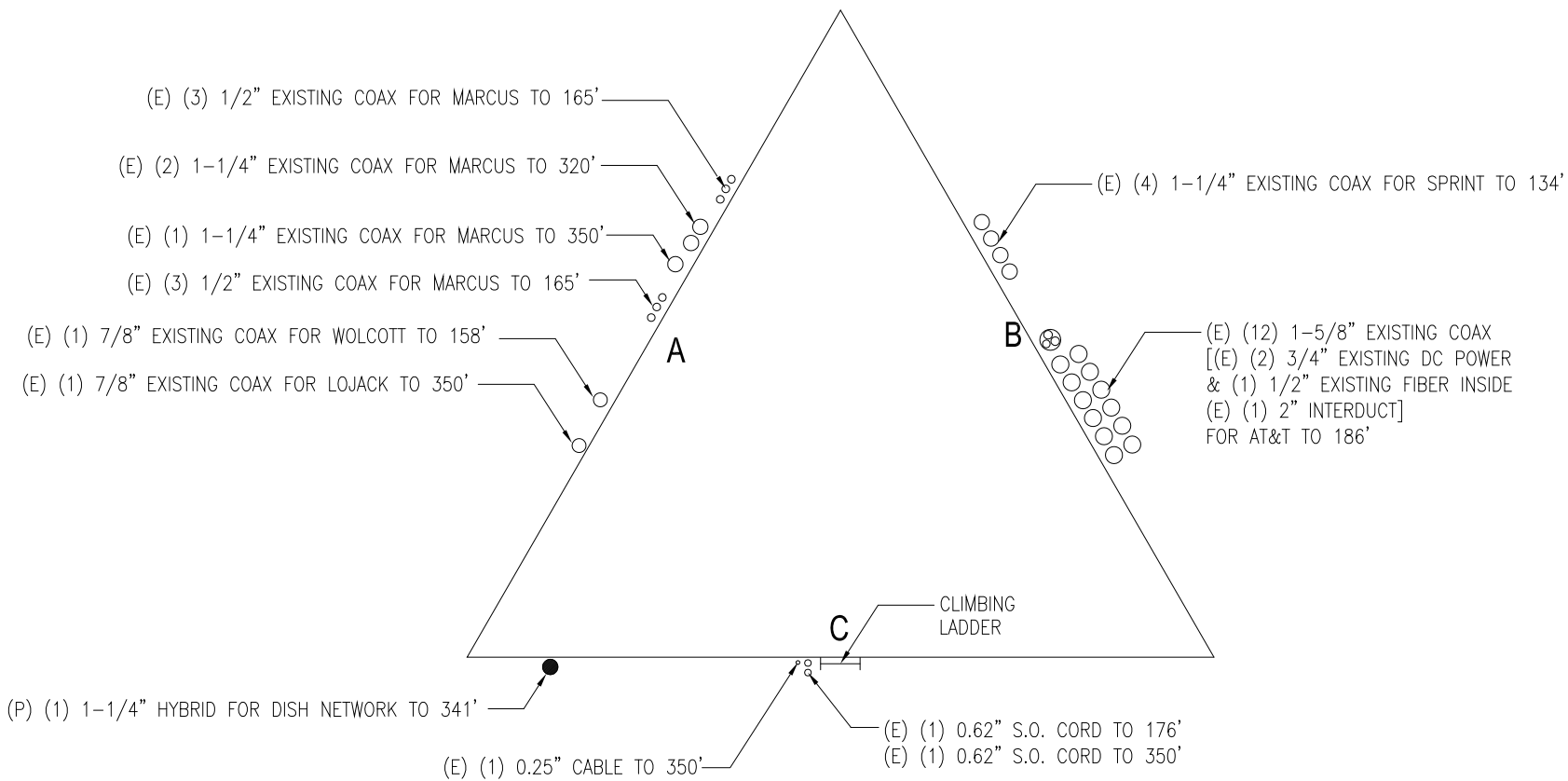
Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

CT20021-A-08 Cleary Tower (Edward)



Structure Class II*.
Exposure Category B.
Topographic Category 1.

COAX LAYOUT

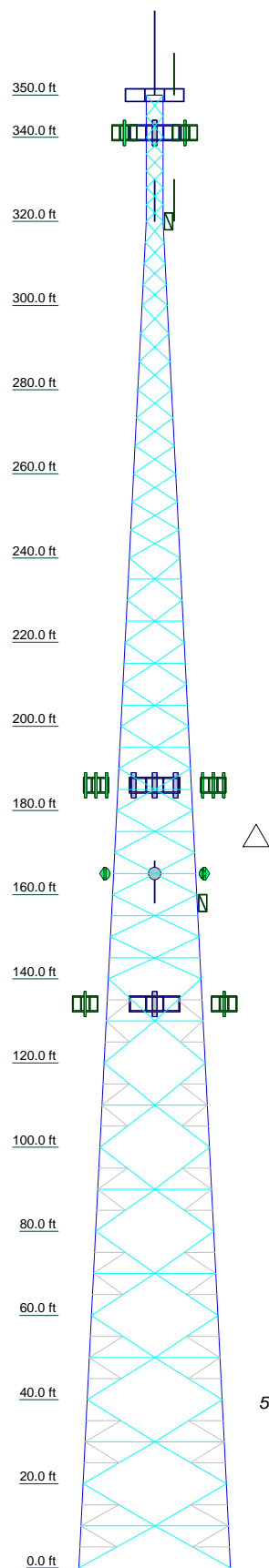


COAX LAYOUT

N.T.S

TOWER ELEVATION DRAWING

| Section | T18 | T17 | T16 | T15 | T14 | T13 | T12 | T11 | T10 | T9 | T8 | T7 | T6 | T5 | T4 | T3 | T2 | T1 |
|------------------|-----------------------|----------|----------|------|----------|----------|----------|----------|------|----------|----------|----------|----------|----------|----------|------|-------|-------|
| Legs | SR 5 1/2 | SR 5 1/4 | SR 5 1/4 | SR 5 | SR 4 3/4 | SR 4 3/4 | SR 4 1/2 | SR 4 1/4 | SR 4 | SR 3 3/4 | SR 3 1/2 | SR 3 1/2 | SR 3 1/2 | SR 3 1/4 | SR 2 1/2 | SR 2 | SR 2 | |
| Leg Grade | 2L3 1/2x3 1/2x1/4x3/8 | | | | | | | | | | | | | | | | | |
| Diagonals | 2L3x3x3/16x3/8 | | | | | | | | | | | | | | | | | |
| Diagonal Grade | A572-50 | | | | | | | | | | | | | | | | | |
| Top Girts | A36 | | | | | | | | | | | | | | | | | |
| Horizontals | N.A. | | | | | | | | | | | | | | | | | |
| Red. Horizontals | 2L3 1/2x3 1/2x1/4x3/8 | | | | | | | | | | | | | | | | | |
| Red. Diagonals | L3x3x3/16 | | | | | | | | | | | | | | | | | |
| Inner Bracing | 2L3 1/2x3 1/2x1/4x3/8 | | | | | | | | | | | | | | | | | |
| Face Width (ft) | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 5 @ 4 | 2 @ 5 |
| # Panels @ (ft) | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 5 @ 4 | 2 @ 5 |
| Weight (K) | 95.3 | 100.8 | 100.1 | 99.1 | 98.5 | 97.4 | 96.4 | 95.7 | 95.1 | 94.2 | 93.7 | 93.0 | 92.4 | 91.5 | 90.6 | 89.6 | 88.6 | 87.6 |



SYMBOL LIST

| MARK | SIZE | MARK | SIZE |
|------|------------------|------|---|
| A | L3x3x1/4 | C | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower |
| B | L3 1/2x3 1/2x1/4 | | |

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

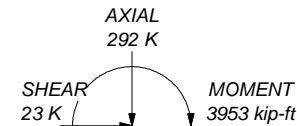
1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 98.1%

ALL REACTIONS ARE FACTORED

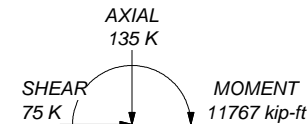
MAX. CORNER REACTIONS AT BASE:

DOWN: 422 K
SHEAR: 47 K

UPLIFT: -306 K
SHEAR: 36 K



TORQUE 10 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 29 kip-ft
REACTIONS - 97 mph WIND

Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Fwy, Suite#204
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

| | | |
|-----------------|---|-------------|
| Job: 19-0197 | Project: CT20021-A-11 Cleary Tower (Edward) | |
| Client: SBA | Drawn by: Anita Lama | App'd: |
| Code: TIA-222-G | Date: 01/15/19 | Scale: NTS |
| Path: | | Dwg No. E-1 |

DESIGNED APPURTENANCE LOADING

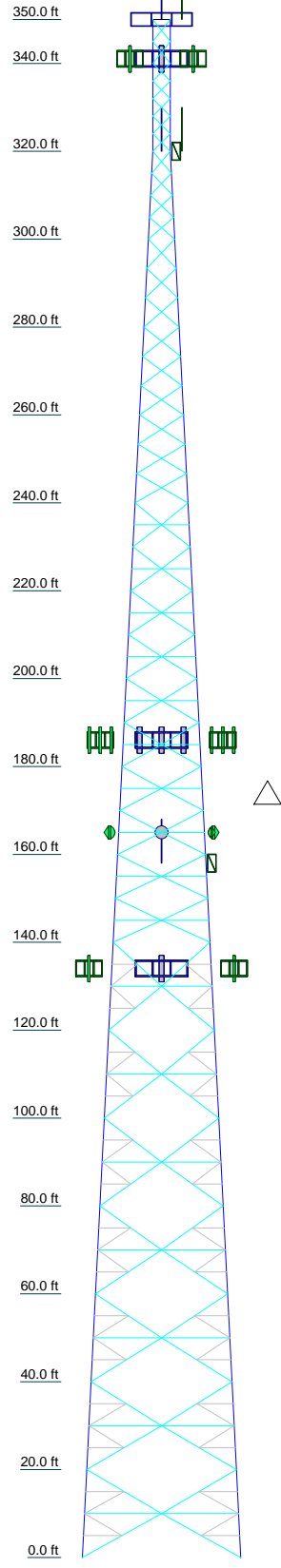
| TYPE | ELEVATION | TYPE | ELEVATION |
|---|-----------|---|-----------|
| Celwave PD200 Omni (LoJack) | 350 | 800-10121 (ATI) | 186 |
| 101 Omni (Marcus) | 350 | 800-10121 (ATI) | 186 |
| Star Mount w/ (9) Standoffs (Marcus/LoJack) | 350 | HPA-65R-BUU-H6 (ATI) | 186 |
| | | HPA-65R-BUU-H6 (ATI) | 186 |
| ODI2-065R18K-GQ (Dish Network) | 341 | HPA-65R-BUU-H6 (ATI) | 186 |
| ODI2-065R18K-GQ (Dish Network) | 341 | (2) CCI DTMA-BP7819VG12A (ATI) | 186 |
| ODI2-065R18K-GQ (Dish Network) | 341 | (2) CCI DTMA-BP7819VG12A (ATI) | 186 |
| 4415 (Dish Network) | 341 | (2) CCI DTMA-BP7819VG12A (ATI) | 186 |
| 4415 (Dish Network) | 341 | (2) Pipe Mounts (5.25' x 4.5") (Marcus) | 165 |
| 0208 (Dish Network) | 341 | (2) Pipe Mounts (5.25' x 4.5") (Marcus) | 165 |
| 0208 (Dish Network) | 341 | (2) Pipe Mounts (5.25' x 4.5") (Marcus) | 165 |
| 0208 (Dish Network) | 341 | Radiowaves SPD3-2.4 Dish (Marcus) | 165 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | 341 | Radiowaves SPD3-2.4 Dish (Marcus) | 165 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | 341 | Radiowaves SPD2-5.8 Dish (Marcus) | 165 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | 341 | Radiowaves SPD2-5.8 Dish (Marcus) | 165 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | 341 | Radiowaves SPD2-5.8 Dish (Marcus) | 165 |
| 101 Omni (Marcus) | 320 | Decibel DB408 Omni (Wolcott Ambulance) | 158 |
| 101 Omni (Marcus) | 320 | | |
| 6' Standoff (Marcus) | 320 | 17" Standoff Mount (Wolcott) | 158 |
| 6' Standoff (Marcus) | 320 | ACU-A20-N (Sprint) | 134 |
| RRUS 11 (ATI) | 186 | 15' T-Frames (Sprint) | 134 |
| RRUS 11 (ATI) | 186 | 15' T-Frames (Sprint) | 134 |
| RRUS 32 (ATI) | 186 | 15' T-Frames (Sprint) | 134 |
| RRUS 32 (ATI) | 186 | RRH 800 MHz (Sprint) | 134 |
| RRUS 32 (ATI) | 186 | RRH 800 MHz (Sprint) | 134 |
| (2) LGP13519 Diplexer (ATI) | 186 | RRH 800 MHz (Sprint) | 134 |
| (2) LGP13519 Diplexer (ATI) | 186 | (2) ACU-A20-N (Sprint) | 134 |
| (2) LGP13519 Diplexer (ATI) | 186 | ACU-A20-N (Sprint) | 134 |
| DC6-48-60-18-8F (ATI) | 186 | APXVTM14-C-I20 (Sprint) | 134 |
| 13.5' T-Frames (ATI) | 186 | APXVTM14-C-I20 (Sprint) | 134 |
| 13.5' T-Frames (ATI) | 186 | RFS APXVSP18 (Sprint) | 134 |
| 13.5' T-Frames (ATI) | 186 | RFS APXVSP18 (Sprint) | 134 |
| 7770 (ATI) | 186 | RFS APXVSP18 (Sprint) | 134 |
| 7770 (ATI) | 186 | RRH 1900 MHz (Sprint) | 134 |
| 7770 (ATI) | 186 | RRH 1900 MHz (Sprint) | 134 |
| 860 10025 RET (ATI) | 186 | RRH 1900 MHz (Sprint) | 134 |
| (2) 860 10025 RET (ATI) | 186 | TD-RRH8x20-25 (Sprint) | 134 |
| 860 10025 RET (ATI) | 186 | TD-RRH8x20-25 (Sprint) | 134 |
| RRUS 11 (ATI) | 186 | TD-RRH8x20-25 (Sprint) | 134 |
| AM-X-CD-16-65-00T-RET (ATI) | 186 | RRH 800 MHz Filter (Sprint) | 134 |
| AM-X-CD-16-65-00T-RET (ATI) | 186 | RRH 800 MHz Filter (Sprint) | 134 |
| (2) AM-X-CD-16-65-00T-RET (ATI) | 186 | RRH 800 MHz Filter (Sprint) | 134 |

SYMBOL LIST

| MARK | SIZE | MARK | SIZE |
|------|------------------|------|---|
| A | L3x3x1/4 | C | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower |
| B | L3 1/2x3 1/2x1/4 | | |

MATERIAL STRENGTH

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



| Section | T18 | T17 | T16 | T16 | T15 | T14 | T13 | T12 | T11 | T10 | T9 | T8 | T7 | T6 | T5 | T4 | T3 | T2 | T1 |
|------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|------|----------|----------|----------|----------|----------|----------|----------|-------|-------|
| Legs | SR 5 1/2 | SR 5 1/2 | SR 5 1/4 | SR 5 1/4 | SR 4 3/4 | SR 4 3/4 | SR 4 1/2 | SR 4 1/2 | SR 4 1/4 | SR 4 | SR 3 3/4 | SR 3 3/4 | SR 3 1/2 | SR 3 1/2 | SR 3 1/4 | SR 2 1/2 | SR 2 1/2 | SR 2 | |
| Leg Grade | 2L3 1/2x3 1/2x1/4x3/8 | | | | | | | | | | | | | | | | | | |
| Diagonals | 2L3x3x1/4x3/8 | | | | | | | | | | | | | | | | | | |
| Diagonal Grade | A36 | | | | | | | | | | | | | | | | | | |
| Top Girts | N.A. | | | | | | | | | | | | | | | | | | |
| Horizontals | 2L2 1/2x2 1/2x3/16 | | | | | | | | | | | | | | | | | | |
| Red. Horizontals | L2x2x3/8 | | | | | | | | | | | | | | | | | | |
| Red. Diagonals | L2 1/2x2 1/2x3/16 | | | | | | | | | | | | | | | | | | |
| Inner Bracing | L4x4x1/4 | | | | | | | | | | | | | | | | | | |
| Face Width (ft) | 36 | 34 | 32 | 30 | 28 | 26 | 24 | 22 | 20 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 @ 5 | 5 @ 4 | 2 @ 5 |
| # Panels @ (ft) | 95.3 | 10.8 | 10.1 | 9.1 | 8.5 | 7.4 | 6.4 | 6.4 | 6.4 | 5.7 | 5.1 | 4.2 | 3.7 | 3.0 | 2.4 | 2.3 | 1.5 | 1.1 | 0.6 |
| Weight (K) | | | | | | | | | | | | | | | | | | | |

Allpro Consulting Group, Inc.
 9221 Lyndon B. Johnson Fwy, Suite#204
 Dallas, TX 75243
 Phone: 972-231-8893
 FAX: 866-364-8375

Job: **19-0197**
 Project: **CT20021-A-11 Cleary Tower (Edward)**
 Client: SBA
 Code: TIA-222-G
 Path:

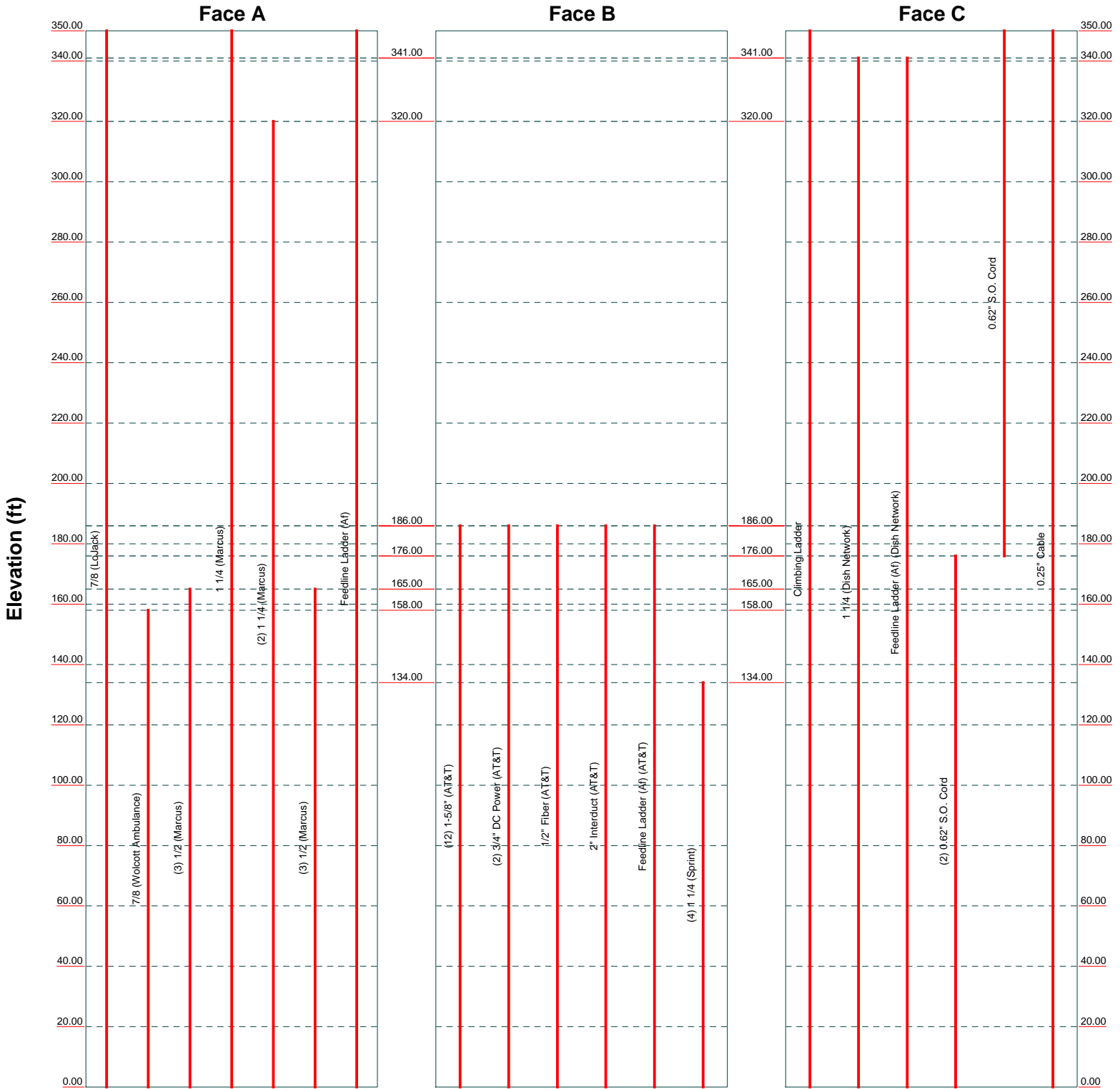
Drawn by: Anita Lama
 Date: 01/15/19
 App'd:
 Scale: NTS
 Dwg No. E-1

MISCELLANEOUS PLOTS

Feed Line Distribution Chart

0' - 350'

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

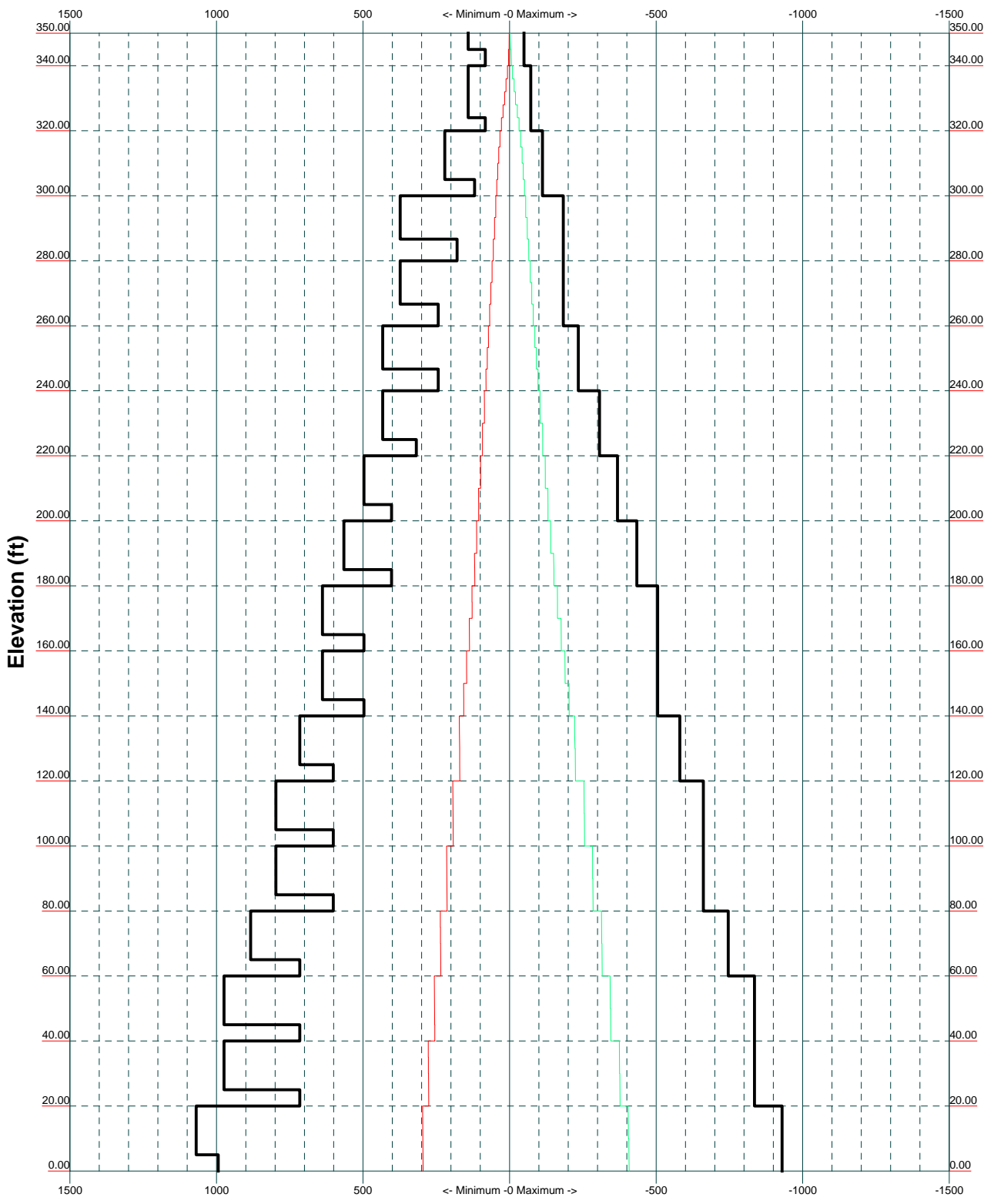


| | | |
|--|----------------------|-------------|
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| Dallas, TX 75243 | | |
| Phone: 972-231-8893 | | |
| FAX: 866-364-8375 | | |
| Job: 19-0197 | | |
| Project: CT20021-A-11 Cleary Tower (Edward) | | |
| Client: SBA | Drawn by: Anita Lama | App'd: |
| Code: TIA-222-G | Date: 01/15/19 | Scale: NTS |
| Path: | | Dwg No. E-7 |

TIA-222-G - 97 mph/50 mph 0.7500 in Ice Exposure B

Leg Capacity ———

Leg Compression (K)



| | | |
|---|--|-------------|
| Allpro Consulting Group, Inc. | | |
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| Job: 19-0197 | Project: CT20021-A-11 Cleary Tower (Edward) | |
| Client: SBA | Drawn by: Anita Lama | App'd: |
| Code: TIA-222-G | Date: 01/15/19 | Scale: NTS |
| Path: | | Dwg No. E-3 |

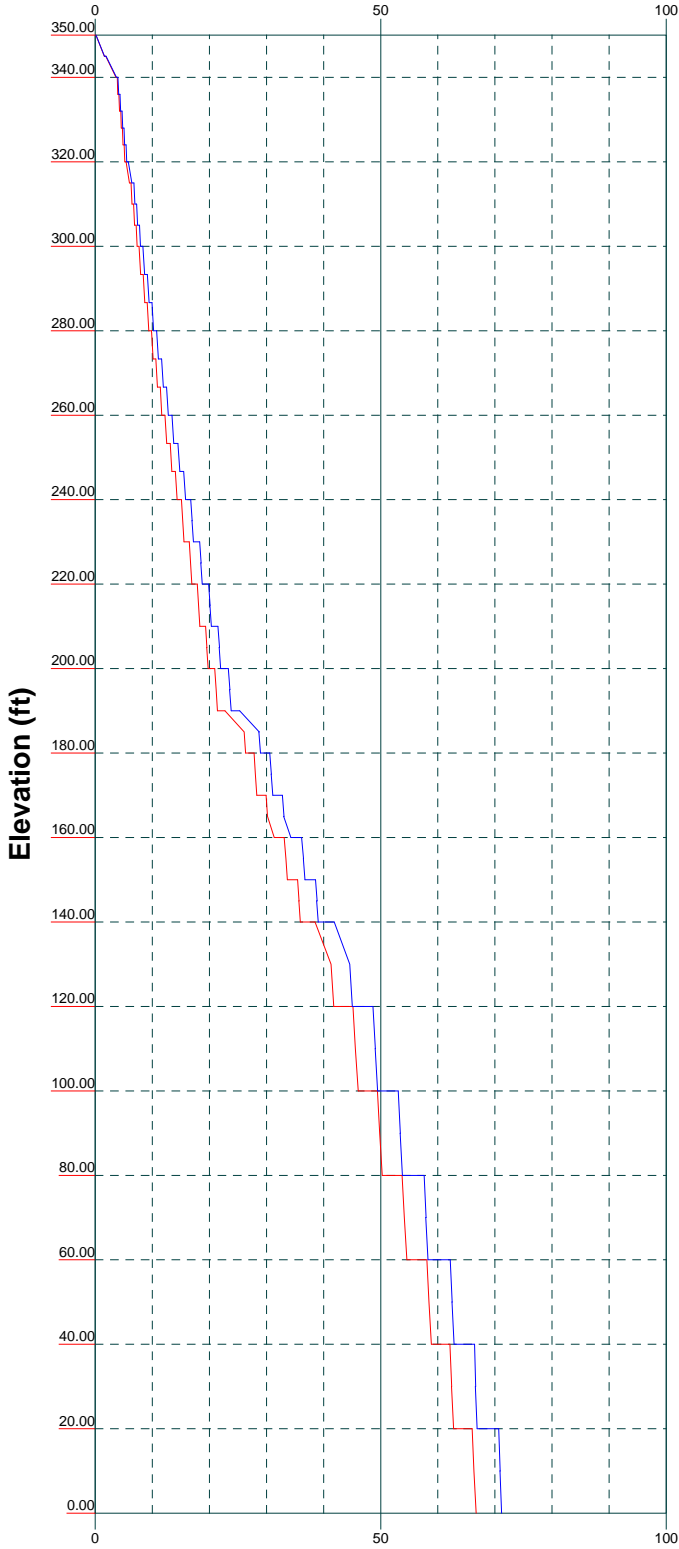
Vx

Vz

Mx

Mz

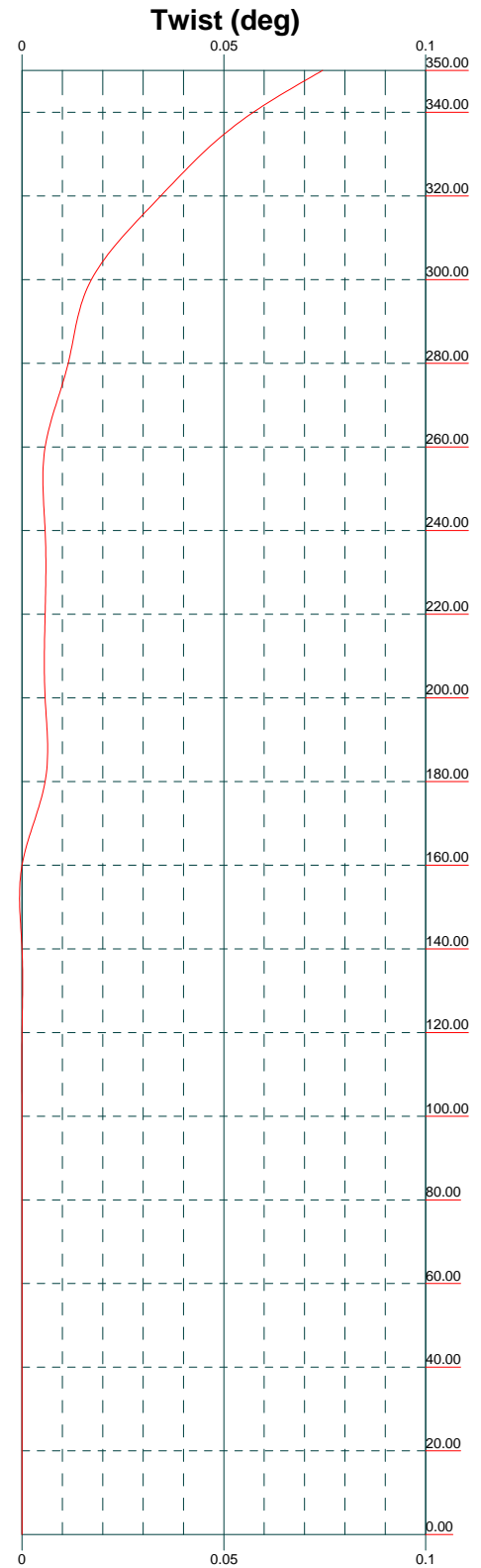
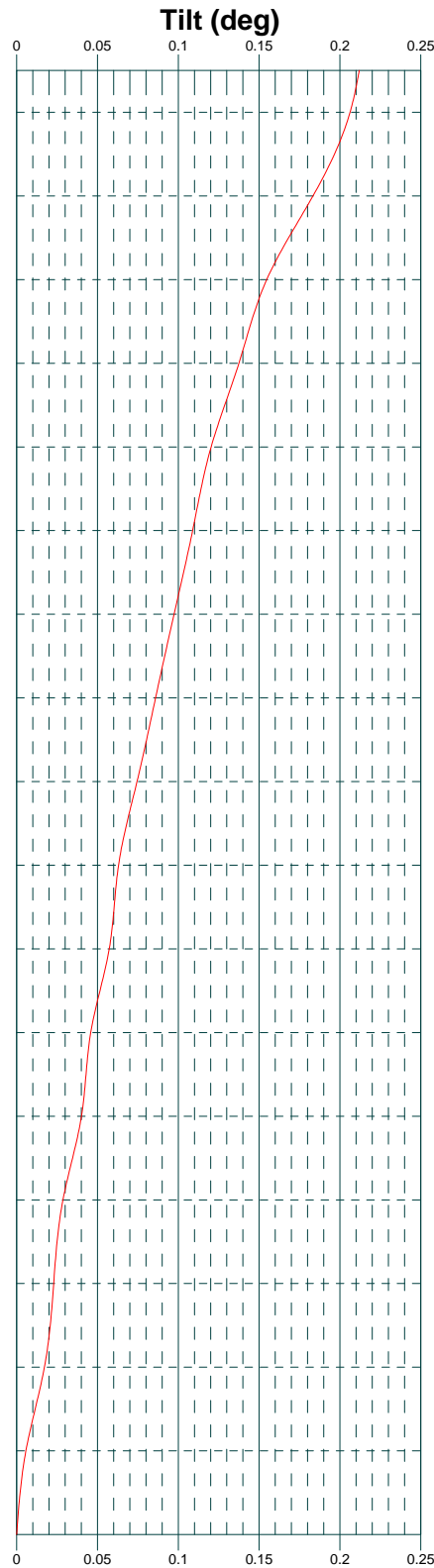
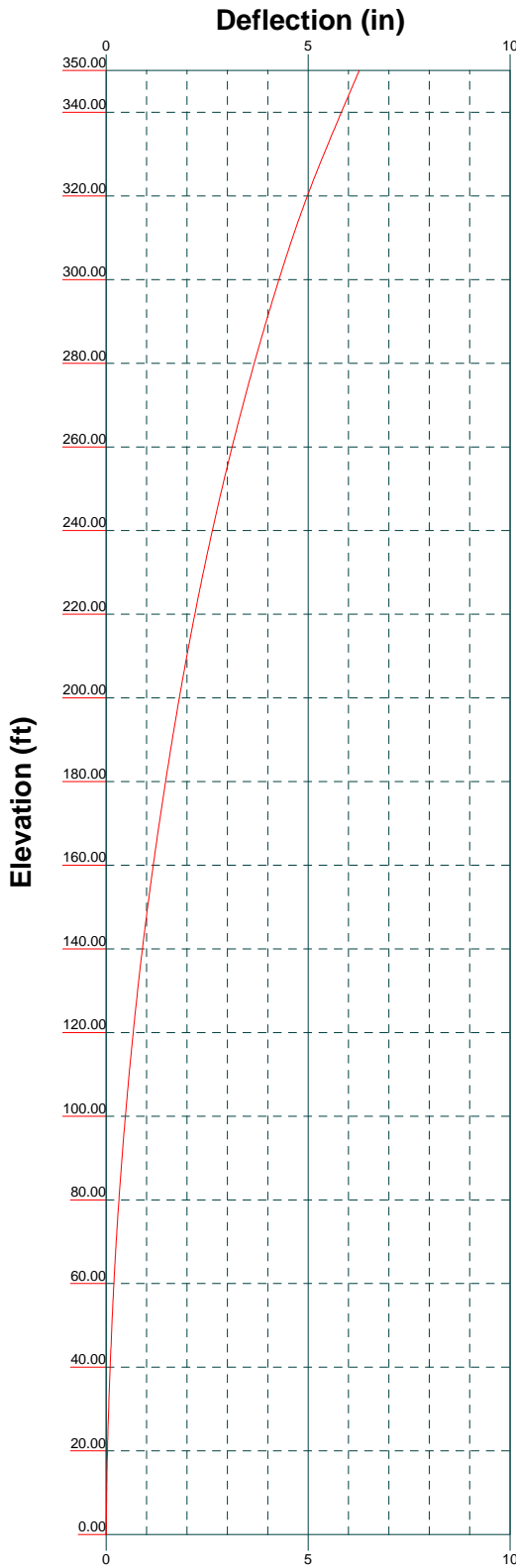
Global Mast Shear (K)



Global Mast Moment (kip-ft)



| | | | | | |
|--|--|----------------------|--|-------------|--|
| <p>Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | | | Job: 19-0197 | | |
| | | | Project: CT20021-A-11 Cleary Tower (Edward) | | |
| Client: SBA | | Drawn by: Anita Lama | | App'd: | |
| Code: TIA-222-G | | Date: 01/15/19 | | Scale: NTS | |
| Path: | | | | Dwg No. E-4 | |



| | | |
|---|--|-------------|
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| Job: 19-0197 | Project: CT20021-A-11 Cleary Tower (Edward) | |
| Client: SBA | Drawn by: Anita Lama | App'd: |
| Code: TIA-222-G | Date: 01/15/19 | Scale: NTS |
| Path: | | Dwg No. E-5 |

CALCULATION PRINTOUT

| | | |
|--|--|----------------------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 1 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 350.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 4.00 ft at the top and 36.00 ft at the base.

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

The following design criteria apply:

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 97 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

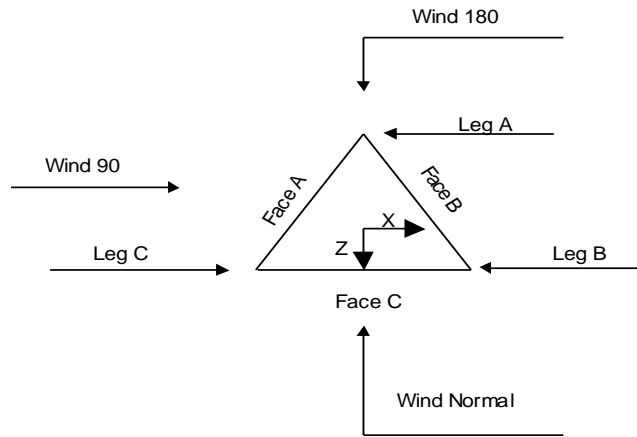
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

| | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r √ Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component √ Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque √ Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

| | | |
|--|--|----------------------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 2 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |



Triangular Tower

Tower Section Geometry

| <i>Tower Section</i> | <i>Tower Elevation</i> | <i>Assembly Database</i> | <i>Description</i> | <i>Section Width</i> | <i>Number of Sections</i> | <i>Section Length</i> |
|----------------------|------------------------|--------------------------|--------------------|----------------------|---------------------------|-----------------------|
| | <i>ft</i> | | | <i>ft</i> | | <i>ft</i> |
| T1 | 350.00-340.00 | | | 4.00 | 1 | 10.00 |
| T2 | 340.00-320.00 | | | 4.00 | 1 | 20.00 |
| T3 | 320.00-300.00 | | | 4.00 | 1 | 20.00 |
| T4 | 300.00-280.00 | | | 6.00 | 1 | 20.00 |
| T5 | 280.00-260.00 | | | 8.00 | 1 | 20.00 |
| T6 | 260.00-240.00 | | | 10.00 | 1 | 20.00 |
| T7 | 240.00-220.00 | | | 12.00 | 1 | 20.00 |
| T8 | 220.00-200.00 | | | 14.00 | 1 | 20.00 |
| T9 | 200.00-180.00 | | | 16.00 | 1 | 20.00 |
| T10 | 180.00-160.00 | | | 18.00 | 1 | 20.00 |
| T11 | 160.00-140.00 | | | 20.00 | 1 | 20.00 |
| T12 | 140.00-120.00 | | | 22.00 | 1 | 20.00 |
| T13 | 120.00-100.00 | | | 24.00 | 1 | 20.00 |
| T14 | 100.00-80.00 | | | 26.00 | 1 | 20.00 |
| T15 | 80.00-60.00 | | | 28.00 | 1 | 20.00 |
| T16 | 60.00-40.00 | | | 30.00 | 1 | 20.00 |
| T17 | 40.00-20.00 | | | 32.00 | 1 | 20.00 |
| T18 | 20.00-0.00 | | | 34.00 | 1 | 20.00 |

Tower Section Geometry (cont'd)

| | | | | | |
|---|----------------|------------------------------------|-------------|--------------------|-------------------|
| <p style="text-align: center;">tnxTower</p> <p>Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | Job | 19-0197 | Page | 3 of 38 | |
| | Project | CT20021-A-11 Cleary Tower (Edward) | | Date | 16:29:29 01/15/19 |
| | Client | SBA | | Designed by | Anita Lama |

| Tower Section | Tower Elevation ft | Diagonal Spacing ft | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset in | Bottom Girt Offset in |
|---------------|-----------------------|------------------------|--------------|------------------------|-----------------|-----------------------|--------------------------|
| T1 | 350.00-340.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T2 | 340.00-320.00 | 4.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T3 | 320.00-300.00 | 5.00 | X Brace | No | No | 0.0000 | 0.0000 |
| T4 | 300.00-280.00 | 6.67 | X Brace | No | No | 0.0000 | 0.0000 |
| T5 | 280.00-260.00 | 6.67 | X Brace | No | No | 0.0000 | 0.0000 |
| T6 | 260.00-240.00 | 6.67 | X Brace | No | No | 0.0000 | 0.0000 |
| T7 | 240.00-220.00 | 5.00 | Double K | No | Yes | 0.0000 | 0.0000 |
| T8 | 220.00-200.00 | 5.00 | Double K | No | Yes | 0.0000 | 0.0000 |
| T9 | 200.00-180.00 | 5.00 | Double K | No | Yes | 0.0000 | 0.0000 |
| T10 | 180.00-160.00 | 5.00 | Double K | No | Yes | 0.0000 | 0.0000 |
| T11 | 160.00-140.00 | 5.00 | Double K | No | Yes | 0.0000 | 0.0000 |
| T12 | 140.00-120.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T13 | 120.00-100.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T14 | 100.00-80.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T15 | 80.00-60.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T16 | 60.00-40.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T17 | 40.00-20.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |
| T18 | 20.00-0.00 | 10.00 | Double K1 | No | Yes | 0.0000 | 0.0000 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Type | Leg Size | Leg Grade | Diagonal Type | Diagonal Size | Diagonal Grade |
|-----------------------|-------------|----------|---------------------|--------------------|------------------------|-----------------|
| T1 350.00-340.00 | Solid Round | 2 | A572-50 (50 ksi) | Single Angle | L2x1 1/2x3/16 | A36 (36 ksi) |
| T2 340.00-320.00 | Solid Round | 2 | A572-50 (50 ksi) | Single Angle | L2x1 1/2x3/16 | A36 (36 ksi) |
| T3 320.00-300.00 | Solid Round | 2 1/2 | A572-50 (50 ksi) | Equal Angle | L2x2x3/16 | A36 (36 ksi) |
| T4 300.00-280.00 | Solid Round | 3 1/4 | A572-50 (50 ksi) | Equal Angle | L2-1/2x2-1/2x3/16 | A36 (36 ksi) |
| T5 280.00-260.00 | Solid Round | 3 1/4 | A572-50 (50 ksi) | Equal Angle | L2-1/2x2-1/2x3/16 | A36 (36 ksi) |
| T6 260.00-240.00 | Solid Round | 3 1/2 | A572-50 (50 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T7 240.00-220.00 | Solid Round | 3 1/2 | A572-50 (50 ksi) | Double Equal Angle | 2L2 1/2x2 1/2x3/16x3/8 | A36 (36 ksi) |
| T8 220.00-200.00 | Solid Round | 3 3/4 | A572-50 (50 ksi) | Double Equal Angle | 2L2 1/2x2 1/2x3/16x3/8 | A36 (36 ksi) |
| T9 200.00-180.00 | Solid Round | 4 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T10 180.00-160.00 | Solid Round | 4 1/4 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T11 160.00-140.00 | Solid Round | 4 1/4 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T12 140.00-120.00 | Solid Round | 4 1/2 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x1/4x3/8 | A36 (36 ksi) |
| T13 120.00-100.00 | Solid Round | 4 3/4 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x1/4x3/8 | A36 (36 ksi) |
| T14 100.00-80.00 | Solid Round | 4 3/4 | A572-50 (50 ksi) | Double Equal Angle | 2L3x3x1/4x3/8 | A36 (36 ksi) |
| T15 80.00-60.00 | Solid Round | 5 | A572-50 (50 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |
| T16 60.00-40.00 | Solid Round | 5 1/4 | A572-50 (50 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |
| T17 40.00-20.00 | Solid Round | 5 1/4 | A572-50 | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 4 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Tower Elevation ft | Leg Type | Leg Size | Leg Grade | Diagonal Type | Diagonal Size | Diagonal Grade |
|-----------------------|-------------|----------|---------------------------------|--------------------------------|-----------------------|-----------------------------|
| T18 20.00-0.00 | Solid Round | 5 1/2 | (50 ksi) A572-50 (50 ksi) | Angle Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | (36 ksi) A36 (36 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation ft | No. of Mid Girts | Mid Girt Type | Mid Girt Size | Mid Girt Grade | Horizontal Type | Horizontal Size | Horizontal Grade |
|-----------------------|------------------|---------------|---------------|-----------------|--------------------|------------------------|------------------|
| T7 240.00-220.00 | None | Flat Bar | | A36 (36 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T8 220.00-200.00 | None | Flat Bar | | A36 (36 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T9 200.00-180.00 | None | Flat Bar | | A36 (36 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T10 180.00-160.00 | None | Flat Bar | | A36 (36 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T11 160.00-140.00 | None | Flat Bar | | A36 (36 ksi) | Equal Angle | L3 1/2x3 1/2x1/4 | A36 (36 ksi) |
| T12 140.00-120.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L2 1/2x2 1/2x3/16x3/8 | A36 (36 ksi) |
| T13 120.00-100.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L2 1/2x2 1/2x3/16x3/8 | A36 (36 ksi) |
| T14 100.00-80.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L2 1/2x2 1/2x3/16x3/8 | A36 (36 ksi) |
| T15 80.00-60.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T16 60.00-40.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T17 40.00-20.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |
| T18 20.00-0.00 | None | Flat Bar | | A36 (36 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Secondary Horizontal Type | Secondary Horizontal Size | Secondary Horizontal Grade | Inner Bracing Type | Inner Bracing Size | Inner Bracing Grade |
|-----------------------|---------------------------|---------------------------|----------------------------|--------------------|--------------------|---------------------|
| T7 240.00-220.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T8 220.00-200.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T9 200.00-180.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T10 180.00-160.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T11 160.00-140.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L3 1/2x3 1/2x1/4 | A36 (36 ksi) |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 5 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
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| Tower Elevation <i>ft</i> | Secondary Horizontal Type | Secondary Horizontal Size | Secondary Horizontal Grade | Inner Bracing Type | Inner Bracing Size | Inner Bracing Grade |
|------------------------------|---------------------------|---------------------------|----------------------------|--------------------|-----------------------|---------------------|
| T12 140.00-120.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L3 1/2x3 1/2x1/4 | A36 (36 ksi) |
| T13 120.00-100.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L4x4x1/4 | A36 (36 ksi) |
| T14 100.00-80.00 | Equal Angle | | A36 (36 ksi) | Equal Angle | L4x4x1/4 | A36 (36 ksi) |
| T15 80.00-60.00 | Equal Angle | | A36 (36 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T16 60.00-40.00 | Equal Angle | | A36 (36 ksi) | Double Equal Angle | 2L3x3x3/16x3/8 | A36 (36 ksi) |
| T17 40.00-20.00 | Equal Angle | | A36 (36 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |
| T18 20.00-0.00 | Equal Angle | | A36 (36 ksi) | Double Equal Angle | 2L3 1/2x3 1/2x1/4x3/8 | A36 (36 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation <i>ft</i> | Redundant Bracing Grade | Redundant Type | Redundant Type | Redundant Size | K Factor |
|------------------------------|-------------------------|----------------|-----------------|---|----------|
| T12 140.00-120.00 | A36 (36 ksi) | Horizontal (1) | Equal Angle | L2x2x3/16 | 1 |
| T13 120.00-100.00 | A36 (36 ksi) | Diagonal (1) | Equal Angle | L2-1/2x2-1/2x3/16 | 1 |
| T14 100.00-80.00 | A36 (36 ksi) | Horizontal (1) | Equal Angle | L2x2x3/16 | 1 |
| T15 80.00-60.00 | A36 (36 ksi) | Diagonal (1) | Equal Angle | L2-1/2x2-1/2x3/16 | 1 |
| T16 60.00-40.00 | A36 (36 ksi) | Horizontal (1) | Equal Angle | L2x2x3/8 | 1 |
| T17 40.00-20.00 | A36 (36 ksi) | Diagonal (1) | Equal Angle | L2-1/2x2-1/2x3/16 | 1 |
| T18 20.00-0.00 | A36 (36 ksi) | Diagonal (1) | Equal Angle | L3x3x3/16 | 1 |
| | | | Arbitrary Shape | L2.5x2.5x3/16 + | 1 |
| | | | Equal Angle | L2.5x2.5x1/4 (C-Shape) - Cleary Tower L3x3x3/16 | 1 |
| | | | Equal Angle | L3x3x3/16 | 1 |
| | | | Equal Angle | L3x3x3/16 | 1 |

Tower Section Geometry (cont'd)

| Tower Elevation <i>ft</i> | Gusset Area (per face) <i>ft²</i> | Gusset Thickness <i>in</i> | Gusset Grade | Adjust. Factor <i>A_f</i> | Adjust. Factor <i>A_r</i> | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals <i>in</i> | Double Angle Stitch Bolt Spacing Horizontals <i>in</i> | Double Angle Stitch Bolt Spacing Redundants <i>in</i> |
|------------------------------|--|-------------------------------|-----------------|--|--|--------------|--|--|---|
| T1 350.00-340.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1 | 1 | 1.05 | 36.0000 | 36.0000 | 36.0000 |
| T2 340.00-320.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1 | 1 | 1.05 | 36.0000 | 36.0000 | 36.0000 |
| T3 320.00-300.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1 | 1 | 1.05 | 36.0000 | 36.0000 | 36.0000 |
| T4 | 0.00 | 0.0000 | A36 | 1 | 1 | 1.05 | 36.0000 | 36.0000 | 36.0000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
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| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| Tower Elevation ft | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|----------------------|---------------------|---|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|---------------------|------|
| | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U |
| T12 140.00-120.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T13 120.00-100.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T14 100.00-80.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T15 80.00-60.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T16 60.00-40.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T17 40.00-20.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |
| T18 20.00-0.00 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|----------------------|---------------------|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T1 350.00-340.00 | Flange | 0.6250 | 4 | 0.6250 | 1 | 0.6250 | 1 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T2 340.00-320.00 | Flange | 0.6250 | 4 | 0.6250 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T3 320.00-300.00 | Flange | 0.7500 | 4 | 0.6250 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T4 300.00-280.00 | Flange | 0.7500 | 6 | 0.6250 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T5 280.00-260.00 | Flange | 0.8750 | 6 | 0.6250 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T6 260.00-240.00 | Flange | 0.8750 | 6 | 0.6250 | 1 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 | 0.6250 | 0 |
| T7 240.00-220.00 | Flange | 1.0000 | 6 | 0.6250 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 1 | 0.6250 | 0 |
| T8 220.00-200.00 | Flange | 1.1250 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 1 | 0.6250 | 1 |
| T9 200.00-180.00 | Flange | 1.1250 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 1 | 0.6250 | 1 |
| T10 180.00-160.00 | Flange | 1.2500 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 1 | 0.6250 | 1 |
| T11 160.00-140.00 | Flange | 1.2500 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.6250 | 1 | 0.6250 | 1 |
| T12 140.00-120.00 | Flange | 1.3750 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.7500 | 1 | 0.6250 | 1 |
| T13 120.00-100.00 | Flange | 1.3750 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.7500 | 1 | 0.6250 | 1 |
| T14 100.00-80.00 | Flange | 1.3750 | 6 | 0.7500 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.7500 | 1 | 0.6250 | 1 |
| T15 80.00-60.00 | Flange | 1.5000 | 6 | 0.8750 | 1 | 0.6250 | 0 | 0.0000 | 0 | 0.6250 | 0 | 0.7500 | 1 | 0.6250 | 1 |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 9 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|--------------------|---------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T16 60.00-40.00 | Flange | 1.5000 A325N | 6 | 0.8750 A325N | 1 | 0.6250 A325N | 0 | 0.0000 A325N | 0 | 0.6250 A325N | 0 | 0.7500 A325N | 1 | 0.6250 A325N | 1 |
| T17 40.00-20.00 | Flange | 1.5000 A325N | 6 | 0.8750 A325N | 1 | 0.6250 A325N | 0 | 0.0000 A325N | 0 | 0.6250 A325N | 0 | 0.7500 A325N | 1 | 0.6250 A325N | 1 |
| T18 20.00-0.00 | Flange | 2.5000 A307 | 6 | 0.8750 A325N | 1 | 0.6250 A325N | 0 | 0.0000 A325N | 0 | 0.6250 A325N | 0 | 0.7500 A325N | 1 | 0.6250 A325N | 1 |

Feed Line/Linear Appurtenances - Entered As Round Or Flat

| Description | Face or Leg | Allow Shield | Exclude From Torque Calculation | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | # Per Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight plf |
|-----------------------------|-------------|--------------|---------------------------------|----------------|---------------|----------------|--------------------------|----|-----------|------------------|----------------------|--------------|------------|
| 7/8 (LoJack) | A | No | No | Ar (CaAa) | 350.00 - 0.00 | 0.0000 | -0.15 | 1 | 1 | 0.5000 | 1.1100 | | 0.54 |
| 7/8 (Wolcott Ambulance) | A | No | No | Ar (CaAa) | 158.00 - 0.00 | 0.0000 | -0.1 | 1 | 1 | 0.5000 | 1.1100 | | 0.54 |
| 1/2 (Marcus) | A | No | No | Ar (CaAa) | 165.00 - 0.00 | 0.0000 | 0.05 | 3 | 3 | 0.5000 | 0.5800 | | 0.25 |
| 1 1/4 (Marcus) | A | No | No | Ar (CaAa) | 350.00 - 0.00 | 0.0000 | 0.1 | 1 | 1 | 0.5000 | 1.5500 | | 0.66 |
| 1 1/4 (Marcus) | A | No | No | Ar (CaAa) | 320.00 - 0.00 | 0.0000 | 0.12 | 2 | 2 | 0.5000 | 1.5500 | | 0.66 |
| 1/2 (Marcus) | A | No | No | Ar (CaAa) | 165.00 - 0.00 | 0.0000 | 0.15 | 3 | 3 | 0.5000 | 0.5800 | | 0.25 |
| Feedline Ladder (Af) | A | No | No | Af (CaAa) | 350.00 - 0.00 | 0.0000 | 0 | 1 | 1 | 1.5000 | 1.5000 | | 4.20 |
| **** | | | | | | | | | | | | | |
| 1-5/8" (AT&T) | B | No | No | Ar (CaAa) | 186.00 - 0.00 | 0.0000 | 0.15 | 12 | 6 | 0.5000 | 1.9800 | | 0.82 |
| 3/4" DC Power (AT&T) | B | No | No | Ar (CaAa) | 186.00 - 0.00 | 0.0000 | 0.05 | 2 | 1 | 0.5000 | 0.8650 | | 0.15 |
| 1/2" Fiber (AT&T) | B | No | No | Ar (CaAa) | 186.00 - 0.00 | 0.0000 | 0.05 | 1 | 1 | 0.5000 | 0.6400 | | 0.11 |
| 2" Interduct (AT&T) | B | No | No | Ar (CaAa) | 186.00 - 0.00 | 0.0000 | 0.05 | 1 | 1 | 0.0000 | 2.0000 | | 0.00 |
| Feedline Ladder (Af) (AT&T) | B | No | No | Af (CaAa) | 186.00 - 0.00 | 0.0000 | 0 | 1 | 1 | 1.5000 | 1.5000 | | 4.20 |
| **** | | | | | | | | | | | | | |
| 1 1/4 (Sprint) | B | No | No | Ar (CaAa) | 134.00 - 0.00 | 0.0000 | -0.15 | 4 | 4 | 0.5000 | 1.5500 | | 0.66 |
| **** | | | | | | | | | | | | | |
| Climbing Ladder | C | No | No | Af (CaAa) | 350.00 - 0.00 | 0.0000 | 0 | 1 | 1 | 0.5000 | 1.5000 | | 7.90 |
| **** | | | | | | | | | | | | | |
| 1 1/4 (Dish Network) | C | No | No | Ar (CaAa) | 341.00 - 0.00 | 0.0000 | 0.4 | 1 | 1 | 0.5000 | 1.5500 | | 0.66 |
| Feedline Ladder (Af) (Dish) | C | No | No | Af (CaAa) | 341.00 - 0.00 | 0.0000 | 0.4 | 1 | 1 | 1.5000 | 1.5000 | | 4.20 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 10 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Description | Face or Leg | Allow Shield | Exclude From Torque Calculation | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | # Per Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight plf |
|--------------------|-------------------|-----------------|--|-------------------|--------------------|----------------------|--------------------------------|---|-----------------|------------------------|----------------------------|-----------------|---------------|
| Network) | | | | | | | | | | | | | |
| **** | | | | | | | | | | | | | |
| 0.62" S.O. Cord | C | No | No | Ar (CaAa) | 176.00 - 0.00 | 0.0000 | 0 | 2 | 2 | 0.0000 | 0.6200 | | 0.31 |
| 0.62" S.O. Cord | C | No | No | Ar (CaAa) | 350.00 - 176.00 | 0.0000 | 0 | 1 | 1 | 0.0000 | 0.6200 | | 0.31 |
| 0.25" Cable | C | No | No | Ar (CaAa) | 350.00 - 0.00 | 0.0000 | 0 | 1 | 1 | 0.5000 | 0.2500 | | 0.13 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight K |
|------------------|--------------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| T1 | 350.00-340.00 | A | 0.000 | 0.000 | 5.160 | 0.000 | 0.054 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 3.775 | 0.000 | 0.088 |
| T2 | 340.00-320.00 | A | 0.000 | 0.000 | 10.320 | 0.000 | 0.108 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T3 | 320.00-300.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T4 | 300.00-280.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T5 | 280.00-260.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T6 | 260.00-240.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T7 | 240.00-220.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T8 | 220.00-200.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T9 | 200.00-180.00 | A | 0.000 | 0.000 | 16.520 | 0.000 | 0.134 |
| | | B | 0.000 | 0.000 | 18.378 | 0.000 | 0.087 |
| | | C | 0.000 | 0.000 | 14.840 | 0.000 | 0.264 |
| T10 | 180.00-160.00 | A | 0.000 | 0.000 | 18.260 | 0.000 | 0.142 |
| | | B | 0.000 | 0.000 | 61.260 | 0.000 | 0.289 |
| | | C | 0.000 | 0.000 | 15.832 | 0.000 | 0.269 |
| T11 | 160.00-140.00 | A | 0.000 | 0.000 | 25.478 | 0.000 | 0.174 |
| | | B | 0.000 | 0.000 | 61.260 | 0.000 | 0.289 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T12 | 140.00-120.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 69.940 | 0.000 | 0.326 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T13 | 120.00-100.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T14 | 100.00-80.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 11 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| T15 | 80.00-60.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T16 | 60.00-40.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T17 | 40.00-20.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |
| T18 | 20.00-0.00 | A | 0.000 | 0.000 | 25.700 | 0.000 | 0.175 |
| | | B | 0.000 | 0.000 | 73.660 | 0.000 | 0.342 |
| | | C | 0.000 | 0.000 | 16.080 | 0.000 | 0.270 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------------|------------------------|-----------------------------------|-----------------------------------|---|--|-------------|
| T1 | 350.00-340.00 | A | 1.897 | 0.000 | 0.000 | 16.541 | 0.000 | 0.282 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 15.915 | 0.000 | 0.291 |
| T2 | 340.00-320.00 | A | 1.888 | 0.000 | 0.000 | 32.981 | 0.000 | 0.561 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 52.608 | 0.000 | 0.950 |
| T3 | 320.00-300.00 | A | 1.877 | 0.000 | 0.000 | 55.505 | 0.000 | 0.810 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 52.372 | 0.000 | 0.943 |
| T4 | 300.00-280.00 | A | 1.864 | 0.000 | 0.000 | 55.268 | 0.000 | 0.803 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 52.123 | 0.000 | 0.935 |
| T5 | 280.00-260.00 | A | 1.851 | 0.000 | 0.000 | 55.016 | 0.000 | 0.796 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 51.857 | 0.000 | 0.927 |
| T6 | 260.00-240.00 | A | 1.837 | 0.000 | 0.000 | 54.747 | 0.000 | 0.789 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 51.574 | 0.000 | 0.919 |
| T7 | 240.00-220.00 | A | 1.821 | 0.000 | 0.000 | 54.457 | 0.000 | 0.780 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 51.269 | 0.000 | 0.909 |
| T8 | 220.00-200.00 | A | 1.805 | 0.000 | 0.000 | 54.144 | 0.000 | 0.772 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | | 0.000 | 0.000 | 50.939 | 0.000 | 0.900 |
| T9 | 200.00-180.00 | A | 1.787 | 0.000 | 0.000 | 53.803 | 0.000 | 0.762 |
| | | B | | 0.000 | 0.000 | 29.749 | 0.000 | 0.515 |
| | | C | | 0.000 | 0.000 | 50.579 | 0.000 | 0.889 |
| T10 | 180.00-160.00 | A | 1.767 | 0.000 | 0.000 | 62.807 | 0.000 | 0.842 |
| | | B | | 0.000 | 0.000 | 98.658 | 0.000 | 1.699 |
| | | C | | 0.000 | 0.000 | 56.195 | 0.000 | 0.897 |
| T11 | 160.00-140.00 | A | 1.745 | 0.000 | 0.000 | 98.503 | 0.000 | 1.216 |
| | | B | | 0.000 | 0.000 | 98.095 | 0.000 | 1.678 |
| | | C | | 0.000 | 0.000 | 57.190 | 0.000 | 0.889 |
| T12 | 140.00-120.00 | A | 1.720 | 0.000 | 0.000 | 98.510 | 0.000 | 1.207 |
| | | B | | 0.000 | 0.000 | 118.823 | 0.000 | 1.924 |
| | | C | | 0.000 | 0.000 | 56.619 | 0.000 | 0.874 |
| T13 | 120.00-100.00 | A | 1.692 | 0.000 | 0.000 | 97.461 | 0.000 | 1.182 |
| | | B | | 0.000 | 0.000 | 127.061 | 0.000 | 2.007 |
| | | C | | 0.000 | 0.000 | 55.962 | 0.000 | 0.858 |
| T14 | 100.00-80.00 | A | 1.658 | 0.000 | 0.000 | 96.225 | 0.000 | 1.153 |

| | | |
|--|--|----------------------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 12 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|-----------------------------------|-----------------------------------|---|--|-------------|
| | | B | | 0.000 | 0.000 | 125.979 | 0.000 | 1.969 |
| | | C | | 0.000 | 0.000 | 55.187 | 0.000 | 0.839 |
| T15 | 80.00-60.00 | A | 1.617 | 0.000 | 0.000 | 94.711 | 0.000 | 1.117 |
| | | B | | 0.000 | 0.000 | 124.655 | 0.000 | 1.922 |
| | | C | | 0.000 | 0.000 | 54.238 | 0.000 | 0.816 |
| T16 | 60.00-40.00 | A | 1.564 | 0.000 | 0.000 | 92.744 | 0.000 | 1.072 |
| | | B | | 0.000 | 0.000 | 122.934 | 0.000 | 1.863 |
| | | C | | 0.000 | 0.000 | 53.005 | 0.000 | 0.787 |
| T17 | 40.00-20.00 | A | 1.486 | 0.000 | 0.000 | 89.883 | 0.000 | 1.008 |
| | | B | | 0.000 | 0.000 | 120.432 | 0.000 | 1.779 |
| | | C | | 0.000 | 0.000 | 51.210 | 0.000 | 0.746 |
| T18 | 20.00-0.00 | A | 1.331 | 0.000 | 0.000 | 84.211 | 0.000 | 0.887 |
| | | B | | 0.000 | 0.000 | 115.474 | 0.000 | 1.617 |
| | | C | | 0.000 | 0.000 | 47.647 | 0.000 | 0.669 |

Feed Line Center of Pressure

| Section | Elevation ft | CP _X in | CP _Z in | CP _X Ice in | CP _Z Ice in |
|---------|-----------------|-----------------------|-----------------------|------------------------------|------------------------------|
| T1 | 350.00-340.00 | -1.3372 | -0.3057 | -2.1515 | 0.9539 |
| T2 | 340.00-320.00 | -2.8616 | 0.4458 | -3.9371 | 2.2178 |
| T3 | 320.00-300.00 | -3.8281 | -0.7662 | -5.6618 | 1.4449 |
| T4 | 300.00-280.00 | -4.3542 | -0.8678 | -7.3378 | 1.8853 |
| T5 | 280.00-260.00 | -5.0290 | -1.0051 | -8.6858 | 2.2377 |
| T6 | 260.00-240.00 | -5.0100 | -1.0061 | -9.4059 | 2.4364 |
| T7 | 240.00-220.00 | -5.8037 | -1.1649 | -10.5384 | 2.7177 |
| T8 | 220.00-200.00 | -6.1329 | -1.2319 | -11.3049 | 2.9100 |
| T9 | 200.00-180.00 | -3.2441 | -1.5962 | -8.4081 | 2.1229 |
| T10 | 180.00-160.00 | 1.4817 | -2.8076 | -3.2712 | -0.0807 |
| T11 | 160.00-140.00 | 0.0638 | -4.0768 | -6.3264 | -2.8964 |
| T12 | 140.00-120.00 | 1.0708 | -7.3816 | -5.8157 | -5.8520 |
| T13 | 120.00-100.00 | 1.5483 | -8.7512 | -5.4707 | -7.2267 |
| T14 | 100.00-80.00 | 1.5965 | -9.1063 | -5.6470 | -7.6001 |
| T15 | 80.00-60.00 | 1.4801 | -8.6054 | -5.4996 | -7.6346 |
| T16 | 60.00-40.00 | 1.5081 | -8.8292 | -5.5452 | -7.9465 |
| T17 | 40.00-20.00 | 1.5087 | -8.9064 | -5.4126 | -8.2066 |
| T18 | 20.00-0.00 | 1.5076 | -8.9672 | -5.1049 | -8.5587 |

Shielding Factor Ka

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|----------------------|-----------------------------|--------------------------|-----------------------|
| T1 | 1 | | 7/8 340.00 - 350.00 | 0.6000 | 0.4718 |
| T1 | 4 | | 1 1/4 340.00 - 350.00 | 0.6000 | 0.4718 |
| T1 | 7 | Feedline Ladder (Af) | 340.00 - 350.00 | 0.6000 | 0.4718 |
| T1 | 17 | Climbing Ladder | 340.00 - 350.00 | 0.6000 | 0.4718 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
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| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|----------------------|-------------------------|-----------------------|--------------------|
| T1 | 19 | 1 1/4 | 340.00 - 341.00 | 0.6000 | 0.4718 |
| T1 | 20 | Feedline Ladder (Af) | 340.00 - 341.00 | 0.6000 | 0.4718 |
| T1 | 23 | 0.62" S.O. Cord | 340.00 - 350.00 | 0.6000 | 0.4718 |
| T1 | 24 | 0.25" Cable | 340.00 - 350.00 | 0.6000 | 0.4718 |
| T2 | 1 | 7/8 | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 4 | 1 1/4 | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 7 | Feedline Ladder (Af) | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 17 | Climbing Ladder | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 19 | 1 1/4 | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 20 | Feedline Ladder (Af) | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 23 | 0.62" S.O. Cord | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T2 | 24 | 0.25" Cable | 320.00 - 340.00 | 0.6000 | 0.4940 |
| T3 | 1 | 7/8 | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 4 | 1 1/4 | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 5 | 1 1/4 | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 7 | Feedline Ladder (Af) | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 17 | Climbing Ladder | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 19 | 1 1/4 | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 20 | Feedline Ladder (Af) | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 23 | 0.62" S.O. Cord | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T3 | 24 | 0.25" Cable | 300.00 - 320.00 | 0.6000 | 0.5750 |
| T4 | 1 | 7/8 | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 4 | 1 1/4 | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 5 | 1 1/4 | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 7 | Feedline Ladder (Af) | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 17 | Climbing Ladder | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 19 | 1 1/4 | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 20 | Feedline Ladder (Af) | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 23 | 0.62" S.O. Cord | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T4 | 24 | 0.25" Cable | 280.00 - 300.00 | 0.6000 | 0.6000 |
| T5 | 1 | 7/8 | 260.00 - 280.00 | 0.6000 | 0.6000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
| Job | 19-0197 | Page | 14 of 38 |
| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| <i>Tower Section</i> | <i>Feed Line Record No.</i> | <i>Description</i> | <i>Feed Line Segment Elev.</i> | <i>K_a No Ice</i> | <i>K_a Ice</i> |
|----------------------|-----------------------------|----------------------|--------------------------------|-----------------------------|--------------------------|
| T5 | 4 | 1 1/4 | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 5 | 1 1/4 | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 7 | Feedline Ladder (Af) | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 17 | Climbing Ladder | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 19 | 1 1/4 | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 20 | Feedline Ladder (Af) | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 23 | 0.62" S.O. Cord | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T5 | 24 | 0.25" Cable | 260.00 - 280.00 | 0.6000 | 0.6000 |
| T6 | 1 | 7/8 | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 4 | 1 1/4 | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 5 | 1 1/4 | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 7 | Feedline Ladder (Af) | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 17 | Climbing Ladder | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 19 | 1 1/4 | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 20 | Feedline Ladder (Af) | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 23 | 0.62" S.O. Cord | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T6 | 24 | 0.25" Cable | 240.00 - 260.00 | 0.6000 | 0.6000 |
| T7 | 1 | 7/8 | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 4 | 1 1/4 | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 5 | 1 1/4 | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 7 | Feedline Ladder (Af) | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 17 | Climbing Ladder | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 19 | 1 1/4 | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 20 | Feedline Ladder (Af) | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 23 | 0.62" S.O. Cord | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T7 | 24 | 0.25" Cable | 220.00 - 240.00 | 0.6000 | 0.6000 |
| T8 | 1 | 7/8 | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 4 | 1 1/4 | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 5 | 1 1/4 | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 7 | Feedline Ladder (Af) | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 17 | Climbing Ladder | 200.00 - 220.00 | 0.6000 | 0.6000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
| Job | 19-0197 | Page | 15 of 38 |
| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| <i>Tower Section</i> | <i>Feed Line Record No.</i> | <i>Description</i> | <i>Feed Line Segment Elev.</i> | <i>K_a No Ice</i> | <i>K_a Ice</i> |
|----------------------|-----------------------------|----------------------|--------------------------------|-----------------------------|--------------------------|
| T8 | 19 | 1 1/4 | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 20 | Feedline Ladder (Af) | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 23 | 0.62" S.O. Cord | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T8 | 24 | 0.25" Cable | 200.00 - 220.00 | 0.6000 | 0.6000 |
| T9 | 1 | 7/8 | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 4 | 1 1/4 | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 5 | 1 1/4 | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 7 | Feedline Ladder (Af) | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 9 | 1-5/8" | 180.00 - 186.00 | 0.6000 | 0.6000 |
| T9 | 10 | 3/4" DC Power | 180.00 - 186.00 | 0.0000 | 0.0000 |
| T9 | 11 | 1/2" Fiber | 180.00 - 186.00 | 0.0000 | 0.0000 |
| T9 | 12 | 2" Interduct | 180.00 - 186.00 | 0.6000 | 0.6000 |
| T9 | 13 | Feedline Ladder (Af) | 180.00 - 186.00 | 0.6000 | 0.6000 |
| T9 | 17 | Climbing Ladder | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 19 | 1 1/4 | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 20 | Feedline Ladder (Af) | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 23 | 0.62" S.O. Cord | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T9 | 24 | 0.25" Cable | 180.00 - 200.00 | 0.6000 | 0.6000 |
| T10 | 1 | 7/8 | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 3 | 1/2 | 160.00 - 165.00 | 0.6000 | 0.6000 |
| T10 | 4 | 1 1/4 | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 5 | 1 1/4 | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 6 | 1/2 | 160.00 - 165.00 | 0.6000 | 0.6000 |
| T10 | 7 | Feedline Ladder (Af) | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 9 | 1-5/8" | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 10 | 3/4" DC Power | 160.00 - 180.00 | 0.0000 | 0.0000 |
| T10 | 11 | 1/2" Fiber | 160.00 - 180.00 | 0.0000 | 0.0000 |
| T10 | 12 | 2" Interduct | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 13 | Feedline Ladder (Af) | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 17 | Climbing Ladder | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 19 | 1 1/4 | 160.00 - 180.00 | 0.6000 | 0.6000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
| Job | 19-0197 | Page | 16 of 38 |
| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| <i>Tower Section</i> | <i>Feed Line Record No.</i> | <i>Description</i> | <i>Feed Line Segment Elev.</i> | <i>K_a No Ice</i> | <i>K_a Ice</i> |
|----------------------|-----------------------------|----------------------|--------------------------------|-----------------------------|--------------------------|
| T10 | 20 | Feedline Ladder (Af) | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 22 | 0.62" S.O. Cord | 160.00 - 176.00 | 0.6000 | 0.6000 |
| T10 | 23 | 0.62" S.O. Cord | 176.00 - 180.00 | 0.6000 | 0.6000 |
| T10 | 24 | 0.25" Cable | 160.00 - 180.00 | 0.6000 | 0.6000 |
| T11 | 1 | 7/8 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 2 | 7/8 | 140.00 - 158.00 | 0.6000 | 0.6000 |
| T11 | 3 | 1/2 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 4 | 1 1/4 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 5 | 1 1/4 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 6 | 1/2 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 7 | Feedline Ladder (Af) | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 9 | 1-5/8" | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 10 | 3/4" DC Power | 140.00 - 160.00 | 0.0000 | 0.0000 |
| T11 | 11 | 1/2" Fiber | 140.00 - 160.00 | 0.0000 | 0.0000 |
| T11 | 12 | 2" Interduct | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 13 | Feedline Ladder (Af) | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 17 | Climbing Ladder | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 19 | 1 1/4 | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 20 | Feedline Ladder (Af) | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 22 | 0.62" S.O. Cord | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T11 | 24 | 0.25" Cable | 140.00 - 160.00 | 0.6000 | 0.6000 |
| T12 | 1 | 7/8 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 2 | 7/8 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 3 | 1/2 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 4 | 1 1/4 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 5 | 1 1/4 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 6 | 1/2 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 7 | Feedline Ladder (Af) | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 9 | 1-5/8" | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 10 | 3/4" DC Power | 120.00 - 140.00 | 0.0000 | 0.0000 |
| T12 | 11 | 1/2" Fiber | 120.00 - 140.00 | 0.0000 | 0.0000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
| Job | 19-0197 | Page | 17 of 38 |
| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|----------------------|-------------------------|-----------------------|--------------------|
| T12 | 12 | 2" Interduct | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 13 | Feedline Ladder (Af) | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 15 | 1 1/4 | 120.00 - 134.00 | 0.6000 | 0.6000 |
| T12 | 17 | Climbing Ladder | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 19 | 1 1/4 | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 20 | Feedline Ladder (Af) | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 22 | 0.62" S.O. Cord | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T12 | 24 | 0.25" Cable | 120.00 - 140.00 | 0.6000 | 0.6000 |
| T13 | 1 | 7/8 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 2 | 7/8 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 3 | 1/2 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 4 | 1 1/4 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 5 | 1 1/4 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 6 | 1/2 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 7 | Feedline Ladder (Af) | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 9 | 1-5/8" | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 10 | 3/4" DC Power | 100.00 - 120.00 | 0.0000 | 0.0000 |
| T13 | 11 | 1/2" Fiber | 100.00 - 120.00 | 0.0000 | 0.0000 |
| T13 | 12 | 2" Interduct | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 13 | Feedline Ladder (Af) | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 15 | 1 1/4 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 17 | Climbing Ladder | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 19 | 1 1/4 | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 20 | Feedline Ladder (Af) | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 22 | 0.62" S.O. Cord | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T13 | 24 | 0.25" Cable | 100.00 - 120.00 | 0.6000 | 0.6000 |
| T14 | 1 | 7/8 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 2 | 7/8 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 3 | 1/2 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 4 | 1 1/4 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 5 | 1 1/4 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 6 | 1/2 | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 7 | Feedline Ladder (Af) | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 9 | 1-5/8" | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 10 | 3/4" DC Power | 80.00 - 100.00 | 0.0000 | 0.0000 |
| T14 | 11 | 1/2" Fiber | 80.00 - 100.00 | 0.0000 | 0.0000 |

| | | | |
|----------------|------------------------------------|--------------------|-------------------|
| Job | 19-0197 | Page | 18 of 38 |
| Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| Client | SBA | Designed by | Anita Lama |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K _a No Ice | K _a Ice |
|---------------|----------------------|----------------------|-------------------------|-----------------------|--------------------|
| T14 | 12 | 2" Interduct | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 13 | Feedline Ladder (Af) | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 15 | 1 1/4" | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 17 | Climbing Ladder | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 19 | 1 1/4" | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 20 | Feedline Ladder (Af) | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 22 | 0.62" S.O. Cord | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T14 | 24 | 0.25" Cable | 80.00 - 100.00 | 0.6000 | 0.6000 |
| T15 | 1 | 7/8" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 2 | 7/8" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 3 | 1/2" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 4 | 1 1/4" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 5 | 1 1/4" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 6 | 1/2" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 7 | Feedline Ladder (Af) | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 9 | 1-5/8" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 10 | 3/4" DC Power | 60.00 - 80.00 | 0.0000 | 0.0000 |
| T15 | 11 | 1/2" Fiber | 60.00 - 80.00 | 0.0000 | 0.0000 |
| T15 | 12 | 2" Interduct | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 13 | Feedline Ladder (Af) | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 15 | 1 1/4" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 17 | Climbing Ladder | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 19 | 1 1/4" | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 20 | Feedline Ladder (Af) | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 22 | 0.62" S.O. Cord | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T15 | 24 | 0.25" Cable | 60.00 - 80.00 | 0.6000 | 0.6000 |
| T16 | 1 | 7/8" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 2 | 7/8" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 3 | 1/2" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 4 | 1 1/4" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 5 | 1 1/4" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 6 | 1/2" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 7 | Feedline Ladder (Af) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 9 | 1-5/8" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 10 | 3/4" DC Power | 40.00 - 60.00 | 0.0000 | 0.0000 |
| T16 | 11 | 1/2" Fiber | 40.00 - 60.00 | 0.0000 | 0.0000 |
| T16 | 12 | 2" Interduct | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 13 | Feedline Ladder (Af) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 15 | 1 1/4" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 17 | Climbing Ladder | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 19 | 1 1/4" | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 20 | Feedline Ladder (Af) | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 22 | 0.62" S.O. Cord | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T16 | 24 | 0.25" Cable | 40.00 - 60.00 | 0.6000 | 0.6000 |
| T17 | 1 | 7/8" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 2 | 7/8" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 3 | 1/2" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 4 | 1 1/4" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 5 | 1 1/4" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 6 | 1/2" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 7 | Feedline Ladder (Af) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 9 | 1-5/8" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 10 | 3/4" DC Power | 20.00 - 40.00 | 0.0000 | 0.0000 |
| T17 | 11 | 1/2" Fiber | 20.00 - 40.00 | 0.0000 | 0.0000 |
| T17 | 12 | 2" Interduct | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 13 | Feedline Ladder (Af) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 15 | 1 1/4" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 17 | Climbing Ladder | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 19 | 1 1/4" | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 20 | Feedline Ladder (Af) | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 22 | 0.62" S.O. Cord | 20.00 - 40.00 | 0.6000 | 0.6000 |
| T17 | 24 | 0.25" Cable | 20.00 - 40.00 | 0.6000 | 0.6000 |

| | | |
|--|--|----------------------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 19 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Tower Section | Feed Line Record No. | Description | Feed Line Segment Elev. | K_a No Ice | K_a Ice |
|---------------|----------------------|----------------------|-------------------------|--------------|-----------|
| T18 | 1 | 7/8 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 2 | 7/8 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 3 | 1/2 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 4 | 1 1/4 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 5 | 1 1/4 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 6 | 1/2 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 7 | Feedline Ladder (Af) | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 9 | 1-5/8" | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 10 | 3/4" DC Power | 0.00 - 20.00 | 0.0000 | 0.0000 |
| T18 | 11 | 1/2" Fiber | 0.00 - 20.00 | 0.0000 | 0.0000 |
| T18 | 12 | 2" Interduct | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 13 | Feedline Ladder (Af) | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 15 | 1 1/4 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 17 | Climbing Ladder | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 19 | 1 1/4 | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 20 | Feedline Ladder (Af) | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 22 | 0.62" S.O. Cord | 0.00 - 20.00 | 0.6000 | 0.6000 |
| T18 | 24 | 0.25" Cable | 0.00 - 20.00 | 0.6000 | 0.6000 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | C_{AA} Front ft ² | C_{AA} Side ft ² | Weight K | |
|--|-------------|-------------|--|-------------------------|-----------------|-----------------------------------|----------------------------------|-------------|-------|
| 7770 (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 5.51 | 2.93 | 0.035 |
| | | | 0.00 | | | 1/2" Ice | 5.87 | 3.27 | 0.068 |
| | | | 0.00 | | | 1" Ice | 6.23 | 3.63 | 0.105 |
| 7770 (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 5.51 | 2.93 | 0.035 |
| | | | 0.00 | | | 1/2" Ice | 5.87 | 3.27 | 0.068 |
| | | | 0.00 | | | 1" Ice | 6.23 | 3.63 | 0.105 |
| 7770 (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 5.51 | 2.93 | 0.035 |
| | | | 0.00 | | | 1/2" Ice | 5.87 | 3.27 | 0.068 |
| | | | 0.00 | | | 1" Ice | 6.23 | 3.63 | 0.105 |
| AM-X-CD-16-65-00T-RET (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 6.04 | 4.11 | 0.033 |
| | | | 0.00 | | | 1/2" Ice | 6.41 | 4.45 | 0.074 |
| | | | 0.00 | | | 1" Ice | 6.77 | 4.80 | 0.121 |
| AM-X-CD-16-65-00T-RET (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 6.04 | 4.11 | 0.033 |
| | | | 0.00 | | | 1/2" Ice | 6.41 | 4.45 | 0.074 |
| | | | 0.00 | | | 1" Ice | 6.77 | 4.80 | 0.121 |
| (2) AM-X-CD-16-65-00T-RET (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 6.04 | 4.11 | 0.033 |
| | | | 0.00 | | | 1/2" Ice | 6.41 | 4.45 | 0.074 |
| | | | 0.00 | | | 1" Ice | 6.77 | 4.80 | 0.121 |
| 800-10121 (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 5.16 | 3.29 | 0.046 |
| | | | 0.00 | | | 1/2" Ice | 5.51 | 3.64 | 0.079 |
| | | | 0.00 | | | 1" Ice | 5.87 | 3.99 | 0.117 |
| 800-10121 (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 5.16 | 3.29 | 0.046 |
| | | | 0.00 | | | 1/2" Ice | 5.51 | 3.64 | 0.079 |
| | | | 0.00 | | | 1" Ice | 5.87 | 3.99 | 0.117 |
| HPA-65R-BUU-H6 (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 9.49 | 5.49 | 0.043 |
| | | | 0.00 | | | 1/2" Ice | 9.96 | 5.94 | 0.100 |
| | | | 0.00 | | | 1" Ice | 10.43 | 6.41 | 0.164 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 20 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | CAAA Front | CAAA Side | Weight |
|---------------------------------------|-------------|-------------|----------|--------|--------------------|-----------|-----------------|-----------------|--------|
| | | | Horz | Vert | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K |
| HPA-65R-BUU-H6 (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 9.49 | 5.49 | 0.043 |
| | | | 0.00 | | | 1/2" Ice | 9.96 | 5.94 | 0.100 |
| | | | 0.00 | | | 1" Ice | 10.43 | 6.41 | 0.164 |
| HPA-65R-BUU-H6 (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 9.49 | 5.49 | 0.043 |
| | | | 0.00 | | | 1/2" Ice | 9.96 | 5.94 | 0.100 |
| | | | 0.00 | | | 1" Ice | 10.43 | 6.41 | 0.164 |
| (2) CCI DTMA-BP7819VG12A (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.56 | 0.34 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 0.66 | 0.43 | 0.025 |
| | | | 0.00 | | | 1" Ice | 0.77 | 0.52 | 0.030 |
| (2) CCI DTMA-BP7819VG12A (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.56 | 0.34 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 0.66 | 0.43 | 0.025 |
| | | | 0.00 | | | 1" Ice | 0.77 | 0.52 | 0.030 |
| (2) CCI DTMA-BP7819VG12A (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.56 | 0.34 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 0.66 | 0.43 | 0.025 |
| | | | 0.00 | | | 1" Ice | 0.77 | 0.52 | 0.030 |
| 860 10025 RET (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.14 | 0.12 | 0.001 |
| | | | 0.00 | | | 1/2" Ice | 0.20 | 0.17 | 0.003 |
| | | | 0.00 | | | 1" Ice | 0.26 | 0.23 | 0.005 |
| (2) 860 10025 RET (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.14 | 0.12 | 0.001 |
| | | | 0.00 | | | 1/2" Ice | 0.20 | 0.17 | 0.003 |
| | | | 0.00 | | | 1" Ice | 0.26 | 0.23 | 0.005 |
| 860 10025 RET (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.14 | 0.12 | 0.001 |
| | | | 0.00 | | | 1/2" Ice | 0.20 | 0.17 | 0.003 |
| | | | 0.00 | | | 1" Ice | 0.26 | 0.23 | 0.005 |
| RRUS 11 (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.52 | 1.02 | 0.055 |
| | | | 0.00 | | | 1/2" Ice | 2.72 | 1.16 | 0.074 |
| | | | 0.00 | | | 1" Ice | 2.92 | 1.30 | 0.097 |
| RRUS 11 (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.52 | 1.02 | 0.055 |
| | | | 0.00 | | | 1/2" Ice | 2.72 | 1.16 | 0.074 |
| | | | 0.00 | | | 1" Ice | 2.92 | 1.30 | 0.097 |
| RRUS 11 (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.52 | 1.02 | 0.055 |
| | | | 0.00 | | | 1/2" Ice | 2.72 | 1.16 | 0.074 |
| | | | 0.00 | | | 1" Ice | 2.92 | 1.30 | 0.097 |
| RRUS 32 (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.32 | 1.65 | 0.077 |
| | | | 0.00 | | | 1/2" Ice | 2.51 | 1.83 | 0.098 |
| | | | 0.00 | | | 1" Ice | 2.71 | 2.01 | 0.122 |
| RRUS 32 (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.32 | 1.65 | 0.077 |
| | | | 0.00 | | | 1/2" Ice | 2.51 | 1.83 | 0.098 |
| | | | 0.00 | | | 1" Ice | 2.71 | 2.01 | 0.122 |
| RRUS 32 (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.32 | 1.65 | 0.077 |
| | | | 0.00 | | | 1/2" Ice | 2.51 | 1.83 | 0.098 |
| | | | 0.00 | | | 1" Ice | 2.71 | 2.01 | 0.122 |
| (2) LGP13519 Diplexer (AT&T) | A | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.29 | 0.18 | 0.005 |
| | | | 0.00 | | | 1/2" Ice | 0.36 | 0.24 | 0.008 |
| | | | 0.00 | | | 1" Ice | 0.44 | 0.31 | 0.012 |
| (2) LGP13519 Diplexer (AT&T) | B | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.29 | 0.18 | 0.005 |
| | | | 0.00 | | | 1/2" Ice | 0.36 | 0.24 | 0.008 |
| | | | 0.00 | | | 1" Ice | 0.44 | 0.31 | 0.012 |
| (2) LGP13519 Diplexer (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 0.29 | 0.18 | 0.005 |
| | | | 0.00 | | | 1/2" Ice | 0.36 | 0.24 | 0.008 |
| | | | 0.00 | | | 1" Ice | 0.44 | 0.31 | 0.012 |
| DC6-48-60-18-8F (AT&T) | C | From Leg | 3.00 | 0.0000 | 186.00 | No Ice | 2.20 | 3.70 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 2.40 | 3.94 | 0.030 |
| | | | 0.00 | | | 1" Ice | 2.60 | 4.19 | 0.040 |
| 13.5' T-Frames (AT&T) | A | From Leg | 1.50 | 0.0000 | 186.00 | No Ice | 10.12 | 9.05 | 0.240 |
| | | | 0.00 | | | 1/2" Ice | 14.43 | 11.89 | 0.340 |
| | | | 0.00 | | | 1" Ice | 18.74 | 14.73 | 0.440 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 21 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | CAAA Front | CAAA Side | Weight |
|---|-------------|-------------|----------|---------|--------------------|-----------|------------|-----------|--------|
| | | | Horz | Lateral | | | | | |
| 13.5' T-Frames (AT&T) | B | From Leg | 1.50 | 0.0000 | 186.00 | No Ice | 10.12 | 9.05 | 0.240 |
| | | | 0.00 | | | 1/2" Ice | 14.43 | 11.89 | 0.340 |
| | | | 0.00 | | | 1" Ice | 18.74 | 14.73 | 0.440 |
| 13.5' T-Frames (AT&T) | C | From Leg | 1.50 | 0.0000 | 186.00 | No Ice | 10.12 | 9.05 | 0.240 |
| | | | 0.00 | | | 1/2" Ice | 14.43 | 11.89 | 0.340 |
| | | | 0.00 | | | 1" Ice | 18.74 | 14.73 | 0.440 |
| ***** | | | | | | | | | |
| Celwave PD200 Omni (LoJack) | A | From Leg | 3.00 | 0.0000 | 350.00 | No Ice | 2.73 | 2.73 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 3.91 | 3.91 | 0.040 |
| | | | 10.00 | | | 1" Ice | 5.09 | 5.10 | 0.068 |
| 101 Omni (Marcus) | B | From Leg | 3.00 | 0.0000 | 350.00 | No Ice | 2.14 | 2.14 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 3.06 | 3.06 | 0.040 |
| | | | 5.00 | | | 1" Ice | 5.10 | 3.99 | 0.068 |
| Star Mount w/ (9) Standoffs (Marcus/LoJack) | A | From Leg | 1.50 | 0.0000 | 350.00 | No Ice | 28.57 | 28.57 | 0.568 |
| | | | 0.00 | | | 1/2" Ice | 35.34 | 35.34 | 0.863 |
| | | | 0.00 | | | 1" Ice | 42.11 | 42.11 | 1.158 |
| ***** | | | | | | | | | |
| 101 Omni (Marcus) | A | From Leg | 3.00 | 0.0000 | 320.00 | No Ice | 2.14 | 2.14 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 3.06 | 3.06 | 0.040 |
| | | | 5.00 | | | 1" Ice | 5.10 | 3.99 | 0.068 |
| 101 Omni (Marcus) | B | From Leg | 3.00 | 0.0000 | 320.00 | No Ice | 2.14 | 2.14 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 3.06 | 3.06 | 0.040 |
| | | | 5.00 | | | 1" Ice | 5.10 | 3.99 | 0.068 |
| 6' Standoff (Marcus) | A | From Leg | 1.50 | 0.0000 | 320.00 | No Ice | 4.97 | 3.20 | 0.070 |
| | | | 0.00 | | | 1/2" Ice | 6.12 | 5.12 | 0.130 |
| | | | 0.00 | | | 1" Ice | 7.27 | 7.04 | 0.190 |
| 6' Standoff (Marcus) | B | From Leg | 1.50 | 0.0000 | 320.00 | No Ice | 4.97 | 3.20 | 0.070 |
| | | | 0.00 | | | 1/2" Ice | 6.12 | 5.12 | 0.130 |
| | | | 0.00 | | | 1" Ice | 7.27 | 7.04 | 0.190 |
| ***** | | | | | | | | | |
| Decibel DB408 Omni (Wolcott Ambulance) | A | From Leg | 3.00 | 0.0000 | 158.00 | No Ice | 1.60 | 1.60 | 0.020 |
| | | | 0.00 | | | 1/2" Ice | 2.42 | 2.42 | 0.032 |
| | | | 5.00 | | | 1" Ice | 3.24 | 3.24 | 0.050 |
| 17" Standoff Mount (Wolcott) | B | From Leg | 1.50 | 0.0000 | 158.00 | No Ice | 0.73 | 0.73 | 0.027 |
| | | | 0.00 | | | 1/2" Ice | 0.91 | 0.91 | 0.035 |
| | | | 0.00 | | | 1" Ice | 1.09 | 1.09 | 0.046 |
| ***** | | | | | | | | | |
| APXVTM14-C-I20 (Sprint) | A | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 6.34 | 3.61 | 0.056 |
| | | | 0.00 | | | 1/2" Ice | 6.72 | 3.97 | 0.096 |
| | | | 0.00 | | | 1" Ice | 7.10 | 4.33 | 0.140 |
| APXVTM14-C-I20 (Sprint) | B | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 6.34 | 3.61 | 0.056 |
| | | | 0.00 | | | 1/2" Ice | 6.72 | 3.97 | 0.096 |
| | | | 0.00 | | | 1" Ice | 7.10 | 4.33 | 0.140 |
| APXVTM14-C-I20 (Sprint) | C | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 6.34 | 3.61 | 0.056 |
| | | | 0.00 | | | 1/2" Ice | 6.72 | 3.97 | 0.096 |
| | | | 0.00 | | | 1" Ice | 7.10 | 4.33 | 0.140 |
| RFS APXVSPP18 (Sprint) | A | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 8.02 | 5.28 | 0.057 |
| | | | 0.00 | | | 1/2" Ice | 8.48 | 5.74 | 0.107 |
| | | | 0.00 | | | 1" Ice | 8.94 | 6.20 | 0.162 |
| RFS APXVSPP18 (Sprint) | B | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 8.02 | 5.28 | 0.057 |
| | | | 0.00 | | | 1/2" Ice | 8.48 | 5.74 | 0.107 |
| | | | 0.00 | | | 1" Ice | 8.94 | 6.20 | 0.162 |
| RFS APXVSPP18 (Sprint) | C | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 8.02 | 5.28 | 0.057 |
| | | | 0.00 | | | 1/2" Ice | 8.48 | 5.74 | 0.107 |
| | | | 0.00 | | | 1" Ice | 8.94 | 6.20 | 0.162 |
| RRH 1900 MHz (Sprint) | A | From Leg | 3.00 | 0.0000 | 134.00 | No Ice | 1.22 | 1.87 | 0.043 |
| | | | 0.00 | | | 1/2" Ice | 1.37 | 2.05 | 0.059 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 23 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | CAAA Front | CAAA Side | Weight | |
|---|-------------|-------------|--------------|--------|--------------------|-----------|------------|-----------|--------|-------|
| | | | Horz Lateral | Vert | | | | | | ft |
| (Marcus) | | | | 0.00 | | | 1/2" Ice | 2.21 | 2.21 | 0.074 |
| | | | | 0.00 | | | 1" Ice | 2.54 | 2.54 | 0.094 |
| (2) Pipe Mounts (5.25' x 4.5") | C | From Leg | 0.50 | 0.0000 | 165.00 | | No Ice | 1.69 | 1.69 | 0.057 |
| (Marcus) | | | 0.00 | | | | 1/2" Ice | 2.21 | 2.21 | 0.074 |
| | | | 0.00 | | | | 1" Ice | 2.54 | 2.54 | 0.094 |
| **** | | | | | | | | | | |
| ODI2-065R18K-GQ (Dish Network) | A | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 4.85 | 1.70 | 0.025 |
| | | | 0.00 | | | | 1/2" Ice | 5.19 | 2.02 | 0.049 |
| | | | 0.00 | | | | 1" Ice | 5.54 | 2.35 | 0.078 |
| ODI2-065R18K-GQ (Dish Network) | B | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 4.85 | 1.70 | 0.025 |
| | | | 0.00 | | | | 1/2" Ice | 5.19 | 2.02 | 0.049 |
| | | | 0.00 | | | | 1" Ice | 5.54 | 2.35 | 0.078 |
| ODI2-065R18K-GQ (Dish Network) | C | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 4.85 | 1.70 | 0.025 |
| | | | 0.00 | | | | 1/2" Ice | 5.19 | 2.02 | 0.049 |
| | | | 0.00 | | | | 1" Ice | 5.54 | 2.35 | 0.078 |
| 4415 (Dish Network) | A | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 1.86 | 0.83 | 0.046 |
| | | | 0.00 | | | | 1/2" Ice | 2.03 | 0.96 | 0.061 |
| | | | 0.00 | | | | 1" Ice | 2.20 | 1.09 | 0.077 |
| 4415 (Dish Network) | B | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 1.86 | 0.83 | 0.046 |
| | | | 0.00 | | | | 1/2" Ice | 2.03 | 0.96 | 0.061 |
| | | | 0.00 | | | | 1" Ice | 2.20 | 1.09 | 0.077 |
| 0208 (Dish Network) | A | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 1.36 | 0.48 | 0.020 |
| | | | 0.00 | | | | 1/2" Ice | 1.50 | 0.58 | 0.029 |
| | | | 0.00 | | | | 1" Ice | 1.66 | 0.68 | 0.041 |
| 0208 (Dish Network) | B | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 1.36 | 0.48 | 0.020 |
| | | | 0.00 | | | | 1/2" Ice | 1.50 | 0.58 | 0.029 |
| | | | 0.00 | | | | 1" Ice | 1.66 | 0.68 | 0.041 |
| 0208 (Dish Network) | C | From Leg | 3.00 | 0.0000 | 341.00 | | No Ice | 1.36 | 0.48 | 0.020 |
| | | | 0.00 | | | | 1/2" Ice | 1.50 | 0.58 | 0.029 |
| | | | 0.00 | | | | 1" Ice | 1.66 | 0.68 | 0.041 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | A | From Leg | 1.50 | 0.0000 | 341.00 | | No Ice | 11.06 | 8.76 | 0.395 |
| | | | 0.00 | | | | 1/2" Ice | 17.63 | 14.51 | 0.553 |
| | | | 0.00 | | | | 1" Ice | 24.20 | 20.26 | 0.711 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | B | From Leg | 1.50 | 0.0000 | 341.00 | | No Ice | 11.06 | 8.76 | 0.395 |
| | | | 0.00 | | | | 1/2" Ice | 17.63 | 14.51 | 0.553 |
| | | | 0.00 | | | | 1" Ice | 24.20 | 20.26 | 0.711 |
| Commscope SF-SU7-2-96 Sector Frame (Dish Network) | C | From Leg | 1.50 | 0.0000 | 341.00 | | No Ice | 11.06 | 8.76 | 0.395 |
| | | | 0.00 | | | | 1/2" Ice | 17.63 | 14.51 | 0.553 |
| | | | 0.00 | | | | 1" Ice | 24.20 | 20.26 | 0.711 |

Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: | | Azimuth Adjustment | 3 dB Beam Width | Elevation | Outside Diameter | Aperture Area | Weight | |
|-----------------------------------|-------------|---------------------|-------------|--------------|--------|--------------------|-----------------|-----------|------------------|---------------|--------|-------|
| | | | | Horz Lateral | Vert | | | | | | | ft |
| Radiowaves SPD3-2.4 Dish (Marcus) | A | Paraboloid w/Radome | From Leg | 1.00 | 0.0000 | 0.0000 | | 165.00 | 3.00 | No Ice | 7.10 | 0.035 |
| | | | | 0.00 | | | | | | 1/2" Ice | 7.46 | 0.073 |
| | | | | 0.00 | | | | | | 1" Ice | 7.83 | 0.112 |
| Radiowaves | B | Paraboloid | From | 1.00 | 0.0000 | 0.0000 | | 165.00 | 3.00 | No Ice | 7.10 | 0.035 |

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 24 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Description | Face or Leg | Dish Type | Offset Type | Offsets: Horz Lateral Vert ft | Azimuth Adjustment ° | 3 dB Beam Width ° | Elevation ft | Outside Diameter ft | Aperture Area ft ² | Weight K |
|---------------------------|-------------------|--------------|----------------|---|----------------------------|----------------------------|-----------------|---------------------------|-------------------------------------|-------------|
| SPD3-2.4 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | 1/2" Ice 7.46 | 0.073 |
| Radiowaves | C | Paraboloid | From | 0.00 | 0.0000 | | 165.00 | 3.00 | 1" Ice 7.83 | 0.112 |
| SPD3-2.4 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | No Ice 7.10 | 0.035 |
| Radiowaves | A | Paraboloid | From | 0.00 | 0.0000 | | 165.00 | 2.00 | 1/2" Ice 7.46 | 0.073 |
| SPD2-5.8 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | 1" Ice 7.83 | 0.112 |
| Radiowaves | B | Paraboloid | From | 0.00 | 0.0000 | | 165.00 | 2.00 | No Ice 3.14 | 0.022 |
| SPD2-5.8 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | 1/2" Ice 3.41 | 0.039 |
| Radiowaves | C | Paraboloid | From | 0.00 | 0.0000 | | 165.00 | 2.00 | 1" Ice 3.67 | 0.057 |
| SPD2-5.8 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | No Ice 3.14 | 0.022 |
| Radiowaves | | | | 0.00 | | | | | 1/2" Ice 3.41 | 0.039 |
| SPD2-5.8 Dish (Marcus) | | w/Radome | Leg | 0.00 | | | | | 1" Ice 3.67 | 0.057 |

Load Combinations

| Comb. No. | Description |
|--------------|--|
| 1 | Dead Only |
| 2 | 1.2 Dead+1.6 Wind 0 deg - No Ice |
| 3 | 0.9 Dead+1.6 Wind 0 deg - No Ice |
| 4 | 1.2 Dead+1.6 Wind 30 deg - No Ice |
| 5 | 0.9 Dead+1.6 Wind 30 deg - No Ice |
| 6 | 1.2 Dead+1.6 Wind 60 deg - No Ice |
| 7 | 0.9 Dead+1.6 Wind 60 deg - No Ice |
| 8 | 1.2 Dead+1.6 Wind 90 deg - No Ice |
| 9 | 0.9 Dead+1.6 Wind 90 deg - No Ice |
| 10 | 1.2 Dead+1.6 Wind 120 deg - No Ice |
| 11 | 0.9 Dead+1.6 Wind 120 deg - No Ice |
| 12 | 1.2 Dead+1.6 Wind 150 deg - No Ice |
| 13 | 0.9 Dead+1.6 Wind 150 deg - No Ice |
| 14 | 1.2 Dead+1.6 Wind 180 deg - No Ice |
| 15 | 0.9 Dead+1.6 Wind 180 deg - No Ice |
| 16 | 1.2 Dead+1.6 Wind 210 deg - No Ice |
| 17 | 0.9 Dead+1.6 Wind 210 deg - No Ice |
| 18 | 1.2 Dead+1.6 Wind 240 deg - No Ice |
| 19 | 0.9 Dead+1.6 Wind 240 deg - No Ice |
| 20 | 1.2 Dead+1.6 Wind 270 deg - No Ice |
| 21 | 0.9 Dead+1.6 Wind 270 deg - No Ice |
| 22 | 1.2 Dead+1.6 Wind 300 deg - No Ice |
| 23 | 0.9 Dead+1.6 Wind 300 deg - No Ice |
| 24 | 1.2 Dead+1.6 Wind 330 deg - No Ice |
| 25 | 0.9 Dead+1.6 Wind 330 deg - No Ice |
| 26 | 1.2 Dead+1.0 Ice+1.0 Temp |
| 27 | 1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp |
| 28 | 1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp |
| 29 | 1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp |
| 30 | 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp |
| 31 | 1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp |
| 32 | 1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp |
| 33 | 1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp |
| 34 | 1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp |
| 35 | 1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp |
| 36 | 1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp |
| 37 | 1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp |

| | | |
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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 25 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Comb. No. | Description |
|-----------|--|
| 38 | 1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp |
| 39 | Dead+Wind 0 deg - Service |
| 40 | Dead+Wind 30 deg - Service |
| 41 | Dead+Wind 60 deg - Service |
| 42 | Dead+Wind 90 deg - Service |
| 43 | Dead+Wind 120 deg - Service |
| 44 | Dead+Wind 150 deg - Service |
| 45 | Dead+Wind 180 deg - Service |
| 46 | Dead+Wind 210 deg - Service |
| 47 | Dead+Wind 240 deg - Service |
| 48 | Dead+Wind 270 deg - Service |
| 49 | Dead+Wind 300 deg - Service |
| 50 | Dead+Wind 330 deg - Service |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| T1 | 350 - 340 | 6.266 | 39 | 0.2119 | 0.0741 |
| T2 | 340 - 320 | 5.823 | 39 | 0.2084 | 0.0596 |
| T3 | 320 - 300 | 4.982 | 39 | 0.1806 | 0.0342 |
| T4 | 300 - 280 | 4.277 | 39 | 0.1519 | 0.0177 |
| T5 | 280 - 260 | 3.666 | 39 | 0.1360 | 0.0113 |
| T6 | 260 - 240 | 3.118 | 39 | 0.1207 | 0.0076 |
| T7 | 240 - 220 | 2.628 | 39 | 0.1078 | 0.0054 |
| T8 | 220 - 200 | 2.195 | 39 | 0.0948 | 0.0045 |
| T9 | 200 - 180 | 1.811 | 39 | 0.0835 | 0.0037 |
| T10 | 180 - 160 | 1.471 | 39 | 0.0735 | 0.0032 |
| T11 | 160 - 140 | 1.166 | 39 | 0.0644 | 0.0028 |
| T12 | 140 - 120 | 0.897 | 47 | 0.0550 | 0.0024 |
| T13 | 120 - 100 | 0.669 | 47 | 0.0462 | 0.0020 |
| T14 | 100 - 80 | 0.476 | 47 | 0.0380 | 0.0017 |
| T15 | 80 - 60 | 0.316 | 47 | 0.0295 | 0.0013 |
| T16 | 60 - 40 | 0.191 | 47 | 0.0216 | 0.0010 |
| T17 | 40 - 20 | 0.099 | 47 | 0.0143 | 0.0007 |
| T18 | 20 - 0 | 0.032 | 47 | 0.0068 | 0.0003 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 350.00 | Celwave PD200 Omni | 39 | 6.266 | 0.2119 | 0.0741 | 279813 |
| 341.00 | ODI2-065R18K-GQ | 39 | 5.867 | 0.2091 | 0.0610 | 148012 |
| 320.00 | 101 Omni | 39 | 4.982 | 0.1806 | 0.0342 | 28942 |
| 186.00 | 7770 | 39 | 1.569 | 0.0764 | 0.0033 | 129439 |
| 165.00 | Radiowaves SPD3-2.4 Dish | 39 | 1.239 | 0.0667 | 0.0029 | 143909 |
| 158.00 | Decibel DB408 Omni | 39 | 1.137 | 0.0635 | 0.0027 | 140097 |
| 134.00 | APXVTM14-C-120 | 47 | 0.825 | 0.0522 | 0.0022 | 117496 |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 26 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| T1 | 350 - 340 | 26.172 | 2 | 0.8670 | 0.3103 |
| T2 | 340 - 320 | 24.352 | 2 | 0.8575 | 0.2494 |
| T3 | 320 - 300 | 20.873 | 2 | 0.7510 | 0.1433 |
| T4 | 300 - 280 | 17.933 | 2 | 0.6351 | 0.0742 |
| T5 | 280 - 260 | 15.374 | 2 | 0.5697 | 0.0473 |
| T6 | 260 - 240 | 13.078 | 2 | 0.5062 | 0.0317 |
| T7 | 240 - 220 | 11.023 | 2 | 0.4523 | 0.0227 |
| T8 | 220 - 200 | 9.205 | 2 | 0.3978 | 0.0186 |
| T9 | 200 - 180 | 7.594 | 2 | 0.3504 | 0.0155 |
| T10 | 180 - 160 | 6.167 | 2 | 0.3084 | 0.0134 |
| T11 | 160 - 140 | 4.889 | 2 | 0.2703 | 0.0116 |
| T12 | 140 - 120 | 3.757 | 2 | 0.2307 | 0.0098 |
| T13 | 120 - 100 | 2.795 | 18 | 0.1937 | 0.0085 |
| T14 | 100 - 80 | 1.992 | 18 | 0.1593 | 0.0071 |
| T15 | 80 - 60 | 1.321 | 18 | 0.1237 | 0.0056 |
| T16 | 60 - 40 | 0.801 | 18 | 0.0906 | 0.0042 |
| T17 | 40 - 20 | 0.412 | 18 | 0.0600 | 0.0028 |
| T18 | 20 - 0 | 0.133 | 19 | 0.0286 | 0.0014 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 350.00 | Celwave PD200 Omni | 2 | 26.172 | 0.8670 | 0.3103 | 107247 |
| 341.00 | ODI2-065R18K-GQ | 2 | 24.533 | 0.8597 | 0.2554 | 53450 |
| 320.00 | 101 Omni | 2 | 20.873 | 0.7510 | 0.1433 | 7262 |
| 186.00 | 7770 | 2 | 6.578 | 0.3204 | 0.0139 | 30824 |
| 165.00 | Radiowaves SPD3-2.4 Dish | 2 | 5.195 | 0.2798 | 0.0120 | 34234 |
| 158.00 | Decibel DB408 Omni | 2 | 4.769 | 0.2664 | 0.0114 | 33339 |
| 134.00 | APXVTM14-C-I20 | 2 | 3.450 | 0.2192 | 0.0094 | 28009 |

Bolt Design Data

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load per Bolt K | Ratio Load Allowable | Allowable Ratio | Criteria |
|-------------|-----------------|----------------|------------|-----------------|-----------------|----------------------------|------------------------------|----------------------|-----------------|--------------------|
| T1 | 350 | Leg | A325N | 0.6250 | 4 | 0.951 | 20.709 | 0.046 ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 2.150 | 6.831 | 0.315 ✓ | 1 | Member Block Shear |
| | | Top Girt | A325N | 0.6250 | 1 | 0.328 | 10.440 | 0.031 ✓ | 1 | Member Bearing |
| T2 | 340 | Leg | A325N | 0.6250 | 4 | 6.936 | 20.709 | 0.335 ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 3.105 | 6.831 | 0.455 ✓ | 1 | Member Block Shear |
| T3 | 320 | Leg | A325N | 0.7500 | 4 | 10.931 | 29.821 | 0.367 ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 2.504 | 6.831 | 0.367 ✓ | 1 | Member Block |

| | | | | | |
|---|----------------|------------------------------------|-------------|--------------------|-------------------|
| <p style="text-align: center;">tnxTower</p> <p>Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | Job | 19-0197 | Page | 27 of 38 | |
| | Project | CT20021-A-11 Cleary Tower (Edward) | | Date | 16:29:29 01/15/19 |
| | Client | SBA | | Designed by | Anita Lama |

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load per Bolt K | Ratio Load Allowable | Allowable Ratio | Criteria | |
|-------------|--------------|----------------|------------|--------------|-----------------|-------------------------|---------------------------|----------------------|-----------------|----------|-----------------------|
| T4 | 300 | Leg | A325N | 0.7500 | 6 | 9.279 | 29.821 | 0.311 | ✓ | 1 | Shear Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 2.207 | 7.830 | 0.282 | ✓ | 1 | Member Bearing |
| T5 | 280 | Leg | A325N | 0.8750 | 6 | 11.337 | 40.589 | 0.279 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 2.449 | 7.830 | 0.313 | ✓ | 1 | Member Bearing |
| T6 | 260 | Leg | A325N | 0.8750 | 6 | 13.444 | 40.589 | 0.331 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 2.929 | 7.830 | 0.374 | ✓ | 1 | Member Bearing |
| T7 | 240 | Leg | A325N | 1.0000 | 6 | 15.402 | 53.014 | 0.291 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 1 | 3.789 | 15.660 | 0.242 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.6250 | 1 | 2.151 | 7.830 | 0.275 | ✓ | 1 | Member Bearing |
| T8 | 220 | Leg | A325N | 1.1250 | 6 | 17.609 | 67.096 | 0.262 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 4.270 | 17.944 | 0.238 | ✓ | 1 | Member Block Shear |
| | | Horizontal | A325N | 0.6250 | 1 | 2.380 | 7.830 | 0.304 | ✓ | 1 | Member Bearing |
| T9 | 200 | Leg | A325N | 1.1250 | 6 | 19.808 | 67.096 | 0.295 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 6.068 | 18.922 | 0.321 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.6250 | 1 | 2.628 | 7.830 | 0.336 | ✓ | 1 | Member Bearing |
| T10 | 180 | Leg | A325N | 1.2500 | 6 | 22.828 | 82.835 | 0.276 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 7.009 | 18.922 | 0.370 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.6250 | 1 | 3.061 | 7.830 | 0.391 | ✓ | 1 | Member Bearing |
| T11 | 160 | Leg | A325N | 1.2500 | 6 | 26.078 | 82.835 | 0.315 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 8.127 | 18.922 | 0.429 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.6250 | 1 | 3.530 | 10.440 | 0.338 | ✓ | 1 | Member Bearing |
| T12 | 140 | Leg | A325N | 1.3750 | 6 | 28.354 | 100.230 | 0.283 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 10.933 | 25.230 | 0.433 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 3.896 | 17.944 | 0.217 | ✓ | 1 | Member Block Shear |
| T13 | 120 | Leg | A325N | 1.3750 | 6 | 32.092 | 100.230 | 0.320 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 11.901 | 25.230 | 0.472 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 4.438 | 17.944 | 0.247 | ✓ | 1 | Member Block Shear |
| T14 | 100 | Leg | A325N | 1.3750 | 6 | 35.597 | 100.230 | 0.355 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 1 | 12.079 | 25.230 | 0.479 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 4.940 | 17.944 | 0.275 | ✓ | 1 | Member Block Shear |
| T15 | 80 | Leg | A325N | 1.5000 | 6 | 39.174 | 119.282 | 0.328 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.8750 | 1 | 12.842 | 29.580 | 0.434 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 5.478 | 18.922 | 0.290 | ✓ | 1 | Member Bearing |
| T16 | 60 | Leg | A325N | 1.5000 | 6 | 42.557 | 119.282 | 0.357 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.8750 | 1 | 13.210 | 29.580 | 0.447 | ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 5.994 | 18.922 | 0.317 | ✓ | 1 | Member Bearing |
| T17 | 40 | Leg | A325N | 1.5000 | 6 | 46.016 | 119.282 | 0.386 | ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.8750 | 1 | 13.858 | 29.580 | 0.468 | ✓ | 1 | Member Bearing |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 28 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load per Bolt K | Ratio Load Allowable | Allowable Ratio | Criteria |
|-------------|--------------|----------------|------------|--------------|-----------------|-------------------------|---------------------------|----------------------|-----------------|----------------|
| T18 | 20 | Horizontal | A325N | 0.7500 | 1 | 6.537 | 25.230 | 0.259 ✓ | 1 | Member Bearing |
| | | Leg | A307 | 2.5000 | 6 | 49.243 | 165.670 | 0.297 ✓ | 1 | Bolt Tension |
| | | Diagonal | A325N | 0.8750 | 1 | 14.228 | 29.580 | 0.481 ✓ | 1 | Member Bearing |
| | | Horizontal | A325N | 0.7500 | 1 | 7.073 | 25.230 | 0.280 ✓ | 1 | Member Bearing |

Compression Checks

Leg Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio P _u / φP _n |
|-------------|--------------|-------|-------|-------------------|-----------------|-------------------|------------------|-------------------|--|
| T1 | 350 - 340 | 2 | 10.00 | 5.00 | 120.0 K=1.00 | 3.1416 | -6.382 | 49.286 | 0.129 ¹ ✓ |
| T2 | 340 - 320 | 2 | 20.00 | 4.00 | 96.0 K=1.00 | 3.1416 | -32.202 | 72.063 | 0.447 ¹ ✓ |
| T3 | 320 - 300 | 2 1/2 | 20.03 | 5.01 | 96.2 K=1.00 | 4.9087 | -50.868 | 112.346 | 0.453 ¹ ✓ |
| T4 | 300 - 280 | 3 1/4 | 20.03 | 6.68 | 98.6 K=1.00 | 8.2958 | -65.500 | 183.313 | 0.357 ¹ ✓ |
| T5 | 280 - 260 | 3 1/4 | 20.03 | 6.68 | 98.6 K=1.00 | 8.2958 | -80.898 | 183.313 | 0.441 ¹ ✓ |
| T6 | 260 - 240 | 3 1/2 | 20.03 | 6.68 | 91.6 K=1.00 | 9.6211 | -97.180 | 234.484 | 0.414 ¹ ✓ |
| T7 | 240 - 220 | 3 1/2 | 20.03 | 5.01 | 68.7 K=1.00 | 9.6211 | -113.117 | 306.641 | 0.369 ¹ ✓ |
| T8 | 220 - 200 | 3 3/4 | 20.03 | 5.01 | 64.1 K=1.00 | 11.0447 | -131.235 | 368.015 | 0.357 ¹ ✓ |
| T9 | 200 - 180 | 4 | 20.03 | 5.01 | 60.1 K=1.00 | 12.5664 | -151.396 | 434.236 | 0.349 ¹ ✓ |
| T10 | 180 - 160 | 4 1/4 | 20.03 | 5.01 | 56.6 K=1.00 | 14.1863 | -176.483 | 505.220 | 0.349 ¹ ✓ |
| T11 | 160 - 140 | 4 1/4 | 20.03 | 5.01 | 56.6 K=1.00 | 14.1863 | -203.541 | 505.220 | 0.403 ¹ ✓ |
| T12 | 140 - 120 | 4 1/2 | 20.03 | 5.01 | 53.4 K=1.00 | 15.9043 | -224.660 | 580.902 | 0.387 ¹ ✓ |
| T13 | 120 - 100 | 4 3/4 | 20.03 | 5.01 | 50.6 K=1.00 | 17.7205 | -255.903 | 661.231 | 0.387 ¹ ✓ |
| T14 | 100 - 80 | 4 3/4 | 20.03 | 5.01 | 50.6 K=1.00 | 17.7205 | -284.832 | 661.231 | 0.431 ¹ ✓ |
| T15 | 80 - 60 | 5 | 20.03 | 5.01 | 48.1 K=1.00 | 19.6350 | -315.885 | 746.168 | 0.423 ¹ ✓ |
| T16 | 60 - 40 | 5 1/4 | 20.03 | 5.01 | 45.8 K=1.00 | 21.6475 | -345.609 | 835.679 | 0.414 ¹ ✓ |
| T17 | 40 - 20 | 5 1/4 | 20.03 | 5.01 | 45.8 | 21.6475 | -376.952 | 835.679 | 0.451 ¹ ✓ |

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| <p style="text-align: center;">tnxTower</p> <p>Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | <p>Job</p> <p style="text-align: center;">19-0197</p> | <p>Page</p> <p style="text-align: center;">29 of 38</p> |
| | <p>Project</p> <p style="text-align: center;">CT20021-A-11 Cleary Tower (Edward)</p> | <p>Date</p> <p style="text-align: center;">16:29:29 01/15/19</p> |
| | <p>Client</p> <p style="text-align: center;">SBA</p> | <p>Designed by</p> <p style="text-align: center;">Anita Lama</p> |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------|---------|----------------------|--------------------------|----------------------|---------------------|----------------------|---------------------------------|
| T18 | 20 - 0 | 5 1/2 | 20.03 | 5.01 | K=1.00 43.7 K=1.00 | 23.7583 | -407.859 | 929.740 | 0.439 ¹ ✓ ✓ |

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------------|---------|----------------------|-----------------|----------------------|---------------------|----------------------|---------------------------------|
| T1 | 350 - 340 | L2x1 1/2x3/16 | 6.40 | 2.95 | 112.4 K=1.02 | 0.6211 | -2.159 | 10.346 | 0.209 ¹ ✓ |
| T2 | 340 - 320 | L2x1 1/2x3/16 | 5.66 | 2.59 | 102.4 K=1.06 | 0.6211 | -3.324 | 11.584 | 0.287 ¹ ✓ |
| T3 | 320 - 300 | L2x2x3/16 | 6.56 | 3.22 | 103.5 K=1.06 | 0.7148 | -2.765 | 13.174 | 0.210 ¹ ✓ |
| T4 | 300 - 280 | L2-1/2x2-1/2x3/16 | 10.16 | 5.00 | 121.3 K=1.00 | 0.9023 | -2.331 | 13.474 | 0.173 ¹ ✓ |
| T5 | 280 - 260 | L2-1/2x2-1/2x3/16 | 11.74 | 5.79 | 140.4 K=1.00 | 0.9023 | -2.509 | 10.341 | 0.243 ¹ ✓ |
| T6 | 260 - 240 | L3x3x3/16 | 13.44 | 6.62 | 133.3 K=1.00 | 1.0898 | -2.967 | 13.820 | 0.215 ¹ ✓ |
| T7 | 240 - 220 | 2L2 1/2x2 1/2x3/16x3/8 | 8.60 | 8.18 | 126.2 K=1.00 | 1.8000 | -3.870 | 25.202 | 0.154 ¹ ✓ |
| T8 | 220 - 200 | 2L2 1/2x2 1/2x3/16x3/8 | 9.44 | 8.98 | 138.5 K=1.00 | 1.8000 | -4.377 | 21.196 | 0.206 ¹ ✓ |
| T9 | 200 - 180 | 2L3x3x3/16x3/8 | 10.30 | 9.84 | 125.7 K=1.00 | 2.1800 | -6.340 | 30.555 | 0.207 ¹ ✓ |
| T10 | 180 - 160 | 2L3x3x3/16x3/8 | 11.18 | 10.71 | 136.9 K=1.00 | 2.1800 | -7.295 | 26.278 | 0.278 ¹ ✓ |
| T11 | 160 - 140 | 2L3x3x3/16x3/8 | 12.08 | 11.62 | 148.5 K=1.00 | 2.1800 | -8.149 | 22.339 | 0.365 ¹ ✓ |
| T12 | 140 - 120 | 2L3x3x1/4x3/8 | 15.62 | 15.11 | 143.9 K=1.00 | 2.8800 | -12.130 | 31.416 | 0.386 ¹ ✓ |
| T13 | 120 - 100 | 2L3x3x1/4x3/8 | 16.40 | 15.88 | 150.0 K=1.00 | 2.8800 | -12.127 | 28.916 | 0.419 ¹ ✓ |
| T14 | 100 - 80 | 2L3x3x1/4x3/8 | 17.21 | 16.69 | 156.4 K=1.00 | 2.8800 | -13.230 | 26.593 | 0.498 ¹ ✓ |
| T15 | 80 - 60 | 2L3 1/2x3 1/2x1/4x3/8 | 18.03 | 17.48 | 141.7 K=1.00 | 3.3800 | -13.332 | 38.008 | 0.351 ¹ ✓ |
| T16 | 60 - 40 | 2L3 1/2x3 1/2x1/4x3/8 | 18.87 | 18.31 | 147.6 K=1.00 | 3.3800 | -14.571 | 35.047 | 0.416 ¹ ✓ |
| T17 | 40 - 20 | 2L3 1/2x3 1/2x1/4x3/8 | 19.73 | 19.17 | 153.7 K=1.00 | 3.3800 | -14.537 | 32.326 | 0.450 ¹ ✓ |
| T18 | 20 - 0 | 2L3 1/2x3 1/2x1/4x3/8 | 20.59 | 20.03 | 159.8 K=1.00 | 3.3800 | -15.421 | 29.896 | 0.516 ¹ ✓ |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 30 of 38 |
| | Project CT20021-A-11 Cleary Tower (Edward) | Date 16:29:29 01/15/19 |
| | Client SBA | Designed by Anita Lama |

¹ $P_u / \phi P_n$ controls

Horizontal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in ² | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------------|---------|-------------|-----------------|----------------------|------------|-----------------|---------------------------------|
| T7 | 240 - 220 | L2 1/2x2 1/2x3/16 | 13.50 | 6.48 | 157.2 K=1.00 | 0.9023 | -2.151 | 8.246 | 0.261 ¹ ✓ |
| T8 | 220 - 200 | L2 1/2x2 1/2x3/16 | 15.50 | 7.47 | 181.2 K=1.00 | 0.9023 | -2.380 | 6.207 | 0.383 ¹ ✓ |
| T9 | 200 - 180 | L3x3x3/16 | 17.50 | 8.46 | 170.3 K=1.00 | 1.0898 | -2.628 | 8.488 | 0.310 ¹ ✓ |
| T10 | 180 - 160 | L3x3x3/16 | 19.50 | 9.45 | 190.2 K=1.00 | 1.0898 | -3.061 | 6.804 | 0.450 ¹ ✓ |
| T11 | 160 - 140 | L3 1/2x3 1/2x1/4 | 21.50 | 10.45 | 180.7 K=1.00 | 1.6900 | -3.530 | 11.687 | 0.302 ¹ ✓ |
| T12 | 140 - 120 | 2L2 1/2x2 1/2x3/16x3/8 | 23.00 | 11.18 | 172.4 K=1.00 | 1.8000 | -3.896 | 13.682 | 0.285 ¹ ✓ |
| T13 | 120 - 100 | 2L2 1/2x2 1/2x3/16x3/8 | 25.00 | 12.17 | 187.7 K=1.00 | 1.8000 | -4.438 | 11.547 | 0.384 ¹ ✓ |
| T14 | 100 - 80 | 2L2 1/2x2 1/2x3/16x3/8 | 27.00 | 13.17 | 203.1 K=1.00 | 1.8000 | -4.940 | 9.860 | 0.501 ¹ ✓ |
| T15 | 80 - 60 | 2L3x3x3/16x3/8 | 29.00 | 14.16 | 180.9 K=1.00 | 2.1800 | -5.478 | 15.048 | 0.364 ¹ ✓ |
| T16 | 60 - 40 | 2L3x3x3/16x3/8 | 31.00 | 15.15 | 193.6 K=1.00 | 2.1800 | -5.994 | 13.146 | 0.456 ¹ ✓ |
| T17 | 40 - 20 | 2L3 1/2x3 1/2x1/4x3/8 | 33.00 | 16.15 | 177.8 K=1.00 | 3.3800 | -6.537 | 24.167 | 0.270 ¹ ✓ |
| T18 | 20 - 0 | 2L3 1/2x3 1/2x1/4x3/8 | 35.00 | 17.14 | 188.6 K=1.00 | 3.3800 | -7.073 | 21.456 | 0.330 ¹ ✓ |

¹ $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in ² | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|----------|---------|-------------|----------------|----------------------|------------|-----------------|---------------------------------|
| T1 | 350 - 340 | L3x3x1/4 | 4.00 | 3.59 | 96.4 K=1.32 | 1.4400 | -0.319 | 28.598 | 0.011 ¹ ✓ |

¹ $P_u / \phi P_n$ controls

Redundant Horizontal (1) Design Data (Compression)

| | | | | |
|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 31 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|---|---------|----------------------|-----------------|----------------------|---------------------|----------------------|---------------------------------|
| T12 | 140 - 120 | L2x2x3/16 | 5.75 | 5.56 | 169.5 K=1.00 | 0.7148 | -3.896 | 5.620 | 0.693 ¹ ✓ |
| T13 | 120 - 100 | L2x2x3/16 | 6.25 | 6.05 | 184.4 K=1.00 | 0.7148 | -4.438 | 4.748 | 0.935 ¹ ✓ |
| T14 | 100 - 80 | L2x2x3/8 | 6.75 | 6.55 | 202.1 K=1.00 | 1.3600 | -4.940 | 7.521 | 0.657 ¹ ✓ |
| T15 | 80 - 60 | L2-1/2x2-1/2x3/16 | 7.25 | 7.04 | 170.7 K=1.00 | 0.9023 | -5.478 | 6.992 | 0.783 ¹ ✓ |
| T16 | 60 - 40 | L2-1/2x2-1/2x3/16 | 7.75 | 7.53 | 182.6 K=1.00 | 0.9023 | -5.994 | 6.113 | 0.981 ¹ ✓ |
| T17 | 40 - 20 | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower | 8.25 | 8.03 | 125.4 K=1.00 | 1.0565 | -6.537 | 14.963 | 0.437 ¹ ✓ |
| T18 | 20 - 0 | L3x3x3/16 | 8.75 | 8.52 | 171.5 K=1.00 | 1.0898 | -7.073 | 8.374 | 0.845 ¹ ✓ |

¹ P_u / φP_n controls

Redundant Diagonal (1) Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|----------------------|---------------------|----------------------|---------------------------------|
| T12 | 140 - 120 | L2-1/2x2-1/2x3/16 | 7.81 | 7.56 | 183.3 K=1.00 | 0.9023 | -2.646 | 6.069 | 0.436 ¹ ✓ |
| T13 | 120 - 100 | L2-1/2x2-1/2x3/16 | 8.20 | 7.94 | 192.6 K=1.00 | 0.9023 | -2.912 | 5.494 | 0.530 ¹ ✓ |
| T14 | 100 - 80 | L2-1/2x2-1/2x3/16 | 8.60 | 8.35 | 202.6 K=1.00 | 0.9023 | -3.148 | 4.968 | 0.634 ¹ ✓ |
| T15 | 80 - 60 | L3x3x3/16 | 9.02 | 8.76 | 176.3 K=1.00 | 1.0898 | -3.406 | 7.925 | 0.430 ¹ ✓ |
| T16 | 60 - 40 | L3x3x3/16 | 9.44 | 9.17 | 184.6 K=1.00 | 1.0898 | -3.648 | 7.227 | 0.505 ¹ ✓ |
| T17 | 40 - 20 | L3x3x3/16 | 9.86 | 9.60 | 193.3 K=1.00 | 1.0898 | -3.907 | 6.591 | 0.593 ¹ ✓ |
| T18 | 20 - 0 | L3x3x3/16 | 10.30 | 10.03 | 201.9 K=1.00 | 1.0898 | -4.162 | 6.043 | 0.689 ¹ ✓ |

¹ P_u / φP_n controls

Inner Bracing Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|----------------------|---------------------|----------------------|---------------------------------|
| T7 | 240 - 220 | L2 1/2x2 1/2x3/16 | 6.75 | 6.75 | 163.7 K=1.00 | 0.9023 | -0.012 | 7.609 | 0.002 ¹ ✓ |

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|--|----------------|------------------------------------|--------------------|-------------------|
| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job | 19-0197 | Page | 32 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-----------------------|---------|----------------------|-----------------|----------------------|---------------------|----------------------|---------------------------------|
| T8 | 220 - 200 | L2 1/2x2 1/2x3/16 | 7.75 | 7.75 | 187.9 K=1.00 | 0.9023 | -0.014 | 5.772 | 0.002 ¹ ✓ |
| T9 | 200 - 180 | L3x3x3/16 | 8.75 | 8.75 | 176.1 K=1.00 | 1.0898 | -0.017 | 7.941 | 0.002 ¹ ✓ |
| T10 | 180 - 160 | L3x3x3/16 | 9.75 | 9.75 | 196.2 K=1.00 | 1.0898 | -0.018 | 6.396 | 0.003 ¹ ✓ |
| T11 | 160 - 140 | L3 1/2x3 1/2x1/4 | 10.75 | 10.75 | 185.9 K=1.00 | 1.6900 | -0.021 | 11.050 | 0.002 ¹ ✓ |
| T12 | 140 - 120 | L3 1/2x3 1/2x1/4 | 11.50 | 11.50 | 198.8 K=1.00 | 1.6900 | -0.030 | 9.656 | 0.003 ¹ ✓ |
| T13 | 120 - 100 | L4x4x1/4 | 12.50 | 12.50 | 188.7 K=1.00 | 1.9400 | -0.031 | 12.311 | 0.003 ¹ ✓ |
| T14 | 100 - 80 | L4x4x1/4 | 13.50 | 13.50 | 203.8 K=1.00 | 1.9400 | -0.033 | 10.555 | 0.003 ¹ ✓ |
| T15 | 80 - 60 | 2L3x3x3/16x3/8 | 14.50 | 14.50 | 185.3 K=1.00 | 2.1800 | -0.038 | 14.343 | 0.003 ¹ ✓ |
| T16 | 60 - 40 | 2L3x3x3/16x3/8 | 15.50 | 15.50 | 198.1 K=1.00 | 2.1800 | -0.039 | 12.552 | 0.003 ¹ ✓ |
| T17 | 40 - 20 | 2L3 1/2x3 1/2x1/4x3/8 | 16.50 | 16.50 | 181.7 K=1.00 | 3.3800 | -0.044 | 23.141 | 0.002 ¹ ✓ |
| T18 | 20 - 0 | 2L3 1/2x3 1/2x1/4x3/8 | 17.50 | 17.50 | 192.7 K=1.00 | 3.3800 | -0.043 | 20.572 | 0.002 ¹ ✓ |

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------|---------|----------------------|-------|----------------------|---------------------|----------------------|---------------------------------|
| T1 | 350 - 340 | 2 | 10.00 | 5.00 | 120.0 | 3.1416 | 3.802 | 141.372 | 0.027 ¹ ✓ |
| T2 | 340 - 320 | 2 | 20.00 | 4.00 | 96.0 | 3.1416 | 27.746 | 141.372 | 0.196 ¹ ✓ |
| T3 | 320 - 300 | 2 1/2 | 20.03 | 5.01 | 96.2 | 4.9087 | 43.722 | 220.893 | 0.198 ¹ ✓ |
| T4 | 300 - 280 | 3 1/4 | 20.03 | 6.68 | 98.6 | 8.2958 | 55.672 | 373.310 | 0.149 ¹ ✓ |
| T5 | 280 - 260 | 3 1/4 | 20.03 | 6.68 | 98.6 | 8.2958 | 68.020 | 373.310 | 0.182 ¹ ✓ |
| T6 | 260 - 240 | 3 1/2 | 20.03 | 6.68 | 91.6 | 9.6211 | 80.661 | 432.951 | 0.186 ¹ ✓ |
| T7 | 240 - 220 | 3 1/2 | 20.03 | 5.01 | 68.7 | 9.6211 | 92.584 | 432.951 | 0.214 ¹ ✓ |
| T8 | 220 - 200 | 3 3/4 | 20.03 | 5.01 | 64.1 | 11.0447 | 105.850 | 497.010 | 0.213 ¹ ✓ |

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| tnxTower Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375 | Job 19-0197 | Page 33 of 38 |
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| | Client SBA | Designed by Anita Lama |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------|---------|----------------------|------|----------------------|---------------------|----------------------|---------------------------------|
| T9 | 200 - 180 | 4 | 20.03 | 5.01 | 60.1 | 12.5664 | 119.590 | 565.487 | 0.211 ¹ |
| T10 | 180 - 160 | 4 1/4 | 20.03 | 5.01 | 56.6 | 14.1863 | 137.384 | 638.381 | 0.215 ¹ |
| T11 | 160 - 140 | 4 1/4 | 20.03 | 5.01 | 56.6 | 14.1863 | 156.763 | 638.381 | 0.246 ¹ |
| T12 | 140 - 120 | 4 1/2 | 20.03 | 5.01 | 53.4 | 15.9043 | 171.483 | 715.694 | 0.240 ¹ |
| T13 | 120 - 100 | 4 3/4 | 20.03 | 5.01 | 50.6 | 17.7205 | 193.650 | 797.425 | 0.243 ¹ |
| T14 | 100 - 80 | 4 3/4 | 20.03 | 5.01 | 50.6 | 17.7205 | 214.751 | 797.425 | 0.269 ¹ |
| T15 | 80 - 60 | 5 | 20.03 | 5.01 | 48.1 | 19.6350 | 236.367 | 883.573 | 0.268 ¹ |
| T16 | 60 - 40 | 5 1/4 | 20.03 | 5.01 | 45.8 | 21.6475 | 256.753 | 974.139 | 0.264 ¹ |
| T17 | 40 - 20 | 5 1/4 | 20.03 | 5.01 | 45.8 | 21.6475 | 277.612 | 974.139 | 0.285 ¹ |
| T18 | 20 - 0 | 5 1/2 | 20.03 | 5.01 | 43.7 | 23.7583 | 296.844 | 1069.120 | 0.278 ¹ |

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------------|---------|----------------------|-------|----------------------|---------------------|----------------------|---------------------------------|
| T1 | 350 - 340 | L2x1 1/2x3/16 | 6.40 | 2.95 | 83.8 | 0.3604 | 2.150 | 15.675 | 0.137 ¹ |
| T2 | 340 - 320 | L2x1 1/2x3/16 | 5.66 | 2.59 | 74.0 | 0.3604 | 3.105 | 15.675 | 0.198 ¹ |
| T3 | 320 - 300 | L2x2x3/16 | 6.56 | 3.22 | 64.9 | 0.4307 | 2.504 | 18.734 | 0.134 ¹ |
| T4 | 300 - 280 | L2-1/2x2-1/2x3/16 | 9.67 | 4.77 | 75.3 | 0.5713 | 2.207 | 24.851 | 0.089 ¹ |
| T5 | 280 - 260 | L2-1/2x2-1/2x3/16 | 11.74 | 5.79 | 91.1 | 0.5713 | 2.449 | 24.851 | 0.099 ¹ |
| T6 | 260 - 240 | L3x3x3/16 | 13.44 | 6.62 | 86.1 | 0.7119 | 2.929 | 30.968 | 0.095 ¹ |
| T7 | 240 - 220 | 2L2 1/2x2 1/2x3/16x3/8 | 8.20 | 7.78 | 123.7 | 1.1391 | 3.789 | 49.549 | 0.076 ¹ |
| T8 | 220 - 200 | 2L2 1/2x2 1/2x3/16x3/8 | 9.02 | 8.56 | 136.2 | 1.1039 | 4.270 | 48.020 | 0.089 ¹ |
| T9 | 200 - 180 | 2L3x3x3/16x3/8 | 10.30 | 9.84 | 129.1 | 1.3889 | 6.068 | 60.417 | 0.100 ¹ |
| T10 | 180 - 160 | 2L3x3x3/16x3/8 | 11.18 | 10.71 | 140.4 | 1.3889 | 7.009 | 60.417 | 0.116 ¹ |
| T11 | 160 - 140 | 2L3x3x3/16x3/8 | 11.63 | 11.17 | 146.1 | 1.3889 | 8.127 | 60.417 | 0.135 ¹ |

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| <p style="text-align: center;">tnxTower</p> <p>Allpro Consulting Group, Inc. 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | Job 19-0197 | Page 34 of 38 |
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| | Client SBA | Designed by Anita Lama |

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-----------------------|---------|----------------------|-------|----------------------|---------------------|----------------------|---------------------------------|
| T12 | 140 - 120 | 2L3x3x1/4x3/8 | 15.62 | 15.11 | 132.8 | 1.8319 | 10.933 | 79.687 | 0.137 ¹ ✓ |
| T13 | 120 - 100 | 2L3x3x1/4x3/8 | 15.62 | 15.10 | 132.7 | 1.8319 | 11.901 | 79.687 | 0.149 ¹ ✓ |
| T14 | 100 - 80 | 2L3x3x1/4x3/8 | 16.40 | 15.89 | 139.5 | 1.8319 | 12.079 | 79.687 | 0.152 ¹ ✓ |
| T15 | 80 - 60 | 2L3 1/2x3 1/2x1/4x3/8 | 17.21 | 16.65 | 128.0 | 2.1600 | 12.842 | 93.960 | 0.137 ¹ ✓ |
| T16 | 60 - 40 | 2L3 1/2x3 1/2x1/4x3/8 | 18.03 | 17.47 | 134.1 | 2.1600 | 13.210 | 93.960 | 0.141 ¹ ✓ |
| T17 | 40 - 20 | 2L3 1/2x3 1/2x1/4x3/8 | 18.87 | 18.31 | 140.5 | 2.1600 | 13.858 | 93.960 | 0.147 ¹ ✓ |
| T18 | 20 - 0 | 2L3 1/2x3 1/2x1/4x3/8 | 19.73 | 19.16 | 146.9 | 2.1600 | 14.228 | 93.960 | 0.151 ¹ ✓ |

¹ P_u / φP_n controls

Horizontal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | A in ² | P _u K | φP _n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|------------------------|---------|----------------------|-------|----------------------|---------------------|----------------------|---------------------------------|
| T7 | 240 - 220 | L2 1/2x2 1/2x3/16 | 13.50 | 6.48 | 101.8 | 0.5713 | 2.151 | 24.851 | 0.087 ¹ ✓ |
| T8 | 220 - 200 | L2 1/2x2 1/2x3/16 | 15.50 | 7.47 | 117.1 | 0.5713 | 2.380 | 24.851 | 0.096 ¹ ✓ |
| T9 | 200 - 180 | L3x3x3/16 | 17.50 | 8.46 | 109.7 | 0.7119 | 2.628 | 30.968 | 0.085 ¹ ✓ |
| T10 | 180 - 160 | L3x3x3/16 | 19.50 | 9.45 | 122.3 | 0.7119 | 3.061 | 30.968 | 0.099 ¹ ✓ |
| T11 | 160 - 140 | L3 1/2x3 1/2x1/4 | 21.50 | 10.45 | 116.4 | 1.1269 | 3.530 | 49.019 | 0.072 ¹ ✓ |
| T12 | 140 - 120 | 2L2 1/2x2 1/2x3/16x3/8 | 23.00 | 11.18 | 174.5 | 1.1039 | 3.896 | 48.020 | 0.081 ¹ ✓ |
| T13 | 120 - 100 | 2L2 1/2x2 1/2x3/16x3/8 | 25.00 | 12.17 | 189.7 | 1.1039 | 4.438 | 48.020 | 0.092 ¹ ✓ |
| T14 | 100 - 80 | 2L2 1/2x2 1/2x3/16x3/8 | 27.00 | 13.17 | 205.2 | 1.1039 | 4.940 | 48.020 | 0.103 ¹ ✓ |
| T15 | 80 - 60 | 2L3x3x3/16x3/8 | 29.00 | 14.16 | 182.6 | 1.3889 | 5.478 | 60.417 | 0.091 ¹ ✓ |
| T16 | 60 - 40 | 2L3x3x3/16x3/8 | 31.00 | 15.15 | 195.3 | 1.3889 | 5.994 | 60.417 | 0.099 ¹ ✓ |
| T17 | 40 - 20 | 2L3 1/2x3 1/2x1/4x3/8 | 33.00 | 16.15 | 179.2 | 2.2069 | 6.537 | 95.999 | 0.068 ¹ ✓ |
| T18 | 20 - 0 | 2L3 1/2x3 1/2x1/4x3/8 | 35.00 | 17.14 | 190.1 | 2.2069 | 7.073 | 95.999 | 0.074 ¹ ✓ |

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| | Client SBA | Designed by Anita Lama |

¹ $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in ² | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|----------|---------|-------------|------|----------------------|------------|-----------------|---------------------------------|
| T1 | 350 - 340 | L3x3x1/4 | 4.00 | 3.59 | 49.5 | 0.9394 | 0.328 | 40.863 | 0.008 ¹ ✓ |

¹ $P_u / \phi P_n$ controls

Redundant Horizontal (1) Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in ² | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|---|---------|-------------|-------|----------------------|------------|-----------------|---------------------------------|
| T12 | 140 - 120 | L2x2x3/16 | 5.75 | 5.56 | 108.1 | 0.7148 | 3.896 | 23.161 | 0.168 ¹ ✓ |
| T13 | 120 - 100 | L2x2x3/16 | 6.25 | 6.05 | 117.6 | 0.7148 | 4.438 | 23.161 | 0.192 ¹ ✓ |
| T14 | 100 - 80 | L2x2x3/8 | 6.75 | 6.55 | 132.4 | 1.3600 | 4.940 | 44.064 | 0.112 ¹ ✓ |
| T15 | 80 - 60 | L2-1/2x2-1/2x3/16 | 7.25 | 7.04 | 108.6 | 0.9023 | 5.478 | 29.236 | 0.187 ¹ ✓ |
| T16 | 60 - 40 | L2-1/2x2-1/2x3/16 | 7.75 | 7.53 | 116.1 | 0.9023 | 5.994 | 29.236 | 0.205 ¹ ✓ |
| T17 | 40 - 20 | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower | 8.25 | 8.03 | 125.4 | 1.0565 | 6.537 | 34.229 | 0.191 ¹ ✓ |
| T18 | 20 - 0 | L3x3x3/16 | 8.75 | 8.52 | 108.9 | 1.0898 | 7.073 | 35.311 | 0.200 ¹ ✓ |

¹ $P_u / \phi P_n$ controls

Redundant Diagonal (1) Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in ² | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-------------------|---------|-------------|-------|----------------------|------------|-----------------|---------------------------------|
| T12 | 140 - 120 | L2-1/2x2-1/2x3/16 | 7.81 | 7.56 | 116.5 | 0.9023 | 2.646 | 29.236 | 0.091 ¹ ✓ |
| T13 | 120 - 100 | L2-1/2x2-1/2x3/16 | 8.20 | 7.94 | 122.5 | 0.9023 | 2.912 | 29.236 | 0.100 ¹ ✓ |
| T14 | 100 - 80 | L2-1/2x2-1/2x3/16 | 8.60 | 8.35 | 128.8 | 0.9023 | 3.148 | 29.236 | 0.108 ¹ ✓ |
| T15 | 80 - 60 | L3x3x3/16 | 9.02 | 8.76 | 111.9 | 1.0898 | 3.406 | 35.311 | 0.096 ¹ ✓ |

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| | Client SBA | Designed by Anita Lama |

| Section No. | Elevation ft | Size | L ft | L_u ft | Kl/r | A in^2 | P_u K | ϕP_n K | Ratio $\frac{P_u}{\phi P_n}$ |
|-------------|-----------------|-----------|---------|-------------|--------|-------------|------------|-----------------|---------------------------------|
| T16 | 60 - 40 | L3x3x3/16 | 9.44 | 9.17 | 117.2 | 1.0898 | 3.648 | 35.311 | 0.103 ¹ |
| T17 | 40 - 20 | L3x3x3/16 | 9.86 | 9.60 | 122.7 | 1.0898 | 3.907 | 35.311 | 0.111 ¹ ✓ |
| T18 | 20 - 0 | L3x3x3/16 | 10.30 | 10.03 | 128.1 | 1.0898 | 4.162 | 35.311 | 0.118 ¹ ✓ |

¹ $P_u / \phi P_n$ controls

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|-------------------|------------------------|---------------------|----------|-----------------------|------------------|--------------|
| T1 | 350 - 340 | Leg | 2 | 3 | -6.382 | 49.286 | 12.9 | Pass |
| | | Diagonal | L2x1 1/2x3/16 | 9 | -2.159 | 10.346 | 20.9 | Pass |
| | | Top Girt | L3x3x1/4 | 4 | -0.319 | 28.598 | 31.5 (b) 1.1 | Pass |
| T2 | 340 - 320 | Leg | 2 | 21 | -32.202 | 72.063 | 44.7 | Pass |
| | | Diagonal | L2x1 1/2x3/16 | 24 | -3.324 | 11.584 | 28.7 | Pass |
| T3 | 320 - 300 | Leg | 2 1/2 | 54 | -50.868 | 112.346 | 45.3 | Pass |
| | | Diagonal | L2x2x3/16 | 75 | -2.765 | 13.174 | 21.0 | Pass |
| T4 | 300 - 280 | Leg | 3 1/4 | 81 | -65.500 | 183.313 | 35.7 | Pass |
| | | Diagonal | L2-1/2x2-1/2x3/16 | 84 | -2.331 | 13.474 | 17.3 | Pass |
| T5 | 280 - 260 | Leg | 3 1/4 | 102 | -80.898 | 183.313 | 44.1 | Pass |
| | | Diagonal | L2-1/2x2-1/2x3/16 | 108 | -2.509 | 10.341 | 24.3 | Pass |
| T6 | 260 - 240 | Leg | 3 1/2 | 123 | -97.180 | 234.484 | 41.4 | Pass |
| | | Diagonal | L3x3x3/16 | 128 | -2.967 | 13.820 | 21.5 | Pass |
| T7 | 240 - 220 | Leg | 3 1/2 | 144 | -113.117 | 306.641 | 36.9 | Pass |
| | | Diagonal | 2L2 1/2x2 1/2x3/16x3/8 | 152 | -3.870 | 25.202 | 15.4 | Pass |
| | | Horizontal | L2 1/2x2 1/2x3/16 | 148 | -2.151 | 8.246 | 24.2 (b) 26.1 | Pass |
| T8 | 220 - 200 | Inner Bracing | L2 1/2x2 1/2x3/16 | 154 | -0.012 | 7.609 | 0.6 | Pass |
| | | Leg | 3 3/4 | 183 | -131.235 | 368.015 | 35.7 | Pass |
| | | Diagonal | 2L2 1/2x2 1/2x3/16x3/8 | 191 | -4.377 | 21.196 | 20.6 | Pass |
| | | Horizontal | L2 1/2x2 1/2x3/16 | 190 | -2.380 | 6.207 | 38.3 | Pass |
| T9 | 200 - 180 | Inner Bracing | L2 1/2x2 1/2x3/16 | 194 | -0.014 | 5.772 | 0.7 | Pass |
| | | Leg | 4 | 222 | -151.396 | 434.236 | 34.9 | Pass |
| | | Diagonal | 2L3x3x3/16x3/8 | 230 | -6.340 | 30.555 | 20.7 | Pass |
| | | Horizontal | L3x3x3/16 | 226 | -2.628 | 8.488 | 32.1 (b) 31.0 | Pass |
| T10 | 180 - 160 | Inner Bracing | L3x3x3/16 | 233 | -0.017 | 7.941 | 0.7 | Pass |
| | | Leg | 4 1/4 | 261 | -176.483 | 505.220 | 34.9 | Pass |
| | | Diagonal | 2L3x3x3/16x3/8 | 269 | -7.295 | 26.278 | 27.8 | Pass |
| | | Horizontal | L3x3x3/16 | 268 | -3.061 | 6.804 | 45.0 | Pass |
| | | Inner Bracing | L3x3x3/16 | 272 | -0.018 | 6.396 | 0.8 | Pass |

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| | Client SBA | Designed by Anita Lama |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail |
|-------------|--------------|-----------------------|---|------------------|----------|--------------------|------------------|-----------|
| T11 | 160 - 140 | Leg | 4 1/4 | 300 | -203.541 | 505.220 | 40.3 | Pass |
| | | Diagonal | 2L3x3x3/16x3/8 | 308 | -8.149 | 22.339 | 36.5 | Pass |
| | | Horizontal | L3 1/2x3 1/2x1/4 | 304 | -3.530 | 11.687 | 42.9 (b) 30.2 | Pass |
| T12 | 140 - 120 | Inner Bracing | L3 1/2x3 1/2x1/4 | 312 | -0.021 | 11.050 | 0.7 | Pass |
| | | Leg | 4 1/2 | 339 | -224.660 | 580.902 | 38.7 | Pass |
| | | Diagonal | 2L3x3x1/4x3/8 | 358 | -12.130 | 31.416 | 38.6 | Pass |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 347 | -3.896 | 13.682 | 43.3 (b) 28.5 | Pass |
| | | Redund Horz 1 Bracing | L2x2x3/16 | 356 | -3.896 | 5.620 | 69.3 | Pass |
| | | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 378 | -2.646 | 6.069 | 43.6 | Pass |
| T13 | 120 - 100 | Inner Bracing | L3 1/2x3 1/2x1/4 | 362 | -0.030 | 9.656 | 0.7 | Pass |
| | | Leg | 4 3/4 | 384 | -255.903 | 661.231 | 38.7 | Pass |
| | | Diagonal | 2L3x3x1/4x3/8 | 400 | -12.127 | 28.916 | 41.9 | Pass |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 392 | -4.438 | 11.547 | 47.2 (b) 38.4 | Pass |
| | | Redund Horz 1 Bracing | L2x2x3/16 | 401 | -4.438 | 4.748 | 93.5 | Pass |
| | | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 420 | -2.912 | 5.494 | 53.0 | Pass |
| T14 | 100 - 80 | Inner Bracing | L4x4x1/4 | 407 | -0.031 | 12.311 | 0.8 | Pass |
| | | Leg | 4 3/4 | 429 | -284.832 | 661.231 | 43.1 | Pass |
| | | Diagonal | 2L3x3x1/4x3/8 | 448 | -13.230 | 26.593 | 49.8 | Pass |
| | | Horizontal | 2L2 1/2x2 1/2x3/16x3/8 | 437 | -4.940 | 9.860 | 50.1 | Pass |
| | | Redund Horz 1 Bracing | L2x2x3/8 | 442 | -4.940 | 7.521 | 65.7 | Pass |
| | | Redund Diag 1 Bracing | L2-1/2x2-1/2x3/16 | 465 | -3.148 | 4.968 | 63.4 | Pass |
| T15 | 80 - 60 | Inner Bracing | L4x4x1/4 | 452 | -0.033 | 10.555 | 0.8 | Pass |
| | | Leg | 5 | 474 | -315.885 | 746.168 | 42.3 | Pass |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 490 | -13.332 | 38.008 | 35.1 | Pass |
| | | Horizontal | 2L3x3x3/16x3/8 | 482 | -5.478 | 15.048 | 43.4 (b) 36.4 | Pass |
| | | Redund Horz 1 Bracing | L2-1/2x2-1/2x3/16 | 509 | -5.478 | 6.992 | 78.3 | Pass |
| | | Redund Diag 1 Bracing | L3x3x3/16 | 510 | -3.406 | 7.925 | 43.0 | Pass |
| T16 | 60 - 40 | Inner Bracing | 2L3x3x3/16x3/8 | 496 | -0.038 | 14.343 | 0.8 | Pass |
| | | Leg | 5 1/4 | 519 | -345.609 | 835.679 | 41.4 | Pass |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 538 | -14.571 | 35.047 | 41.6 | Pass |
| | | Horizontal | 2L3x3x3/16x3/8 | 527 | -5.994 | 13.146 | 44.7 (b) 45.6 | Pass |
| | | Redund Horz 1 Bracing | L2-1/2x2-1/2x3/16 | 536 | -5.994 | 6.113 | 98.1 | Pass |
| | | Redund Diag 1 Bracing | L3x3x3/16 | 558 | -3.648 | 7.227 | 50.5 | Pass |
| T17 | 40 - 20 | Inner Bracing | 2L3x3x3/16x3/8 | 541 | -0.039 | 12.552 | 0.9 | Pass |
| | | Leg | 5 1/4 | 564 | -376.952 | 835.679 | 45.1 | Pass |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 580 | -14.537 | 32.326 | 45.0 | Pass |
| | | Horizontal | 2L3 1/2x3 1/2x1/4x3/8 | 572 | -6.537 | 24.167 | 46.8 (b) 27.0 | Pass |
| | | Redund Horz 1 Bracing | L2.5x2.5x3/16 + L2.5x2.5x1/4 (C-Shape) - Cleary Tower | 577 | -6.537 | 14.963 | 43.7 | Pass |
| | | Redund Diag 1 Bracing | L3x3x3/16 | 600 | -3.907 | 6.591 | 59.3 | Pass |
| T18 | 20 - 0 | Inner Bracing | 2L3 1/2x3 1/2x1/4x3/8 | 587 | -0.044 | 23.141 | 0.7 | Pass |
| | | Leg | 5 1/2 | 607 | -407.859 | 929.740 | 43.9 | Pass |
| | | Diagonal | 2L3 1/2x3 1/2x1/4x3/8 | 628 | -15.421 | 29.896 | 51.6 | Pass |

| | | | | |
|---|----------------|------------------------------------|--------------------|-------------------|
| <p>tnxTower</p> <p><i>Allpro Consulting Group, Inc.</i> 9221 Lyndon B. Johnson Fwy, Suite#204 Dallas, TX 75243 Phone: 972-231-8893 FAX: 866-364-8375</p> | Job | 19-0197 | Page | 38 of 38 |
| | Project | CT20021-A-11 Cleary Tower (Edward) | Date | 16:29:29 01/15/19 |
| | Client | SBA | Designed by | Anita Lama |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | ϕP_{allow} K | % Capacity | Pass Fail |
|-------------|--------------|-----------------------|-----------------------|------------------|--------|-----------------------------|----------------|-------------|
| | | Horizontal | 2L3 1/2x3 1/2x1/4x3/8 | 610 | -7.073 | 21.456 | 33.0 | Pass |
| | | Redund Horz 1 Bracing | L3x3x3/16 | 612 | -7.073 | 8.374 | 84.5 | Pass |
| | | Redund Diag 1 Bracing | L3x3x3/16 | 636 | -4.162 | 6.043 | 68.9 | Pass |
| | | Inner Bracing | 2L3 1/2x3 1/2x1/4x3/8 | 631 | -0.043 | 20.572 | 0.7 | Pass |
| | | | | | | | Summary | |
| | | | | | | Leg (T3) | 45.3 | Pass |
| | | | | | | Diagonal (T18) | 51.6 | Pass |
| | | | | | | Horizontal (T14) | 50.1 | Pass |
| | | | | | | Top Girt (T1) | 3.1 | Pass |
| | | | | | | Redund Horz 1 Bracing (T16) | 98.1 | Pass |
| | | | | | | Redund Diag 1 Bracing (T18) | 68.9 | Pass |
| | | | | | | Inner Bracing (T16) | 0.9 | Pass |
| | | | | | | Bolt Checks | 48.1 | Pass |
| | | | | | | RATING = | 98.1 | Pass |

MATHCAD CALCULATION PRINTOUT

EXISTING 350' SELF SUPPORT TOWER ANCHOR BOLT CHECK**REACTIONS ON THE FOUNDATION**

As per Tnx output (see attached)

Down load; $P_v := 422 \cdot \text{kips}$ Shear; $V_u := 47 \cdot \text{kips}$ Uplift load; $P_{up} := 306 \cdot \text{kips}$ Moment; $M := 0 \cdot \text{kips} \cdot \text{ft}$

Anchor Rod Data is as per Structural Analysis by Paul J. Ford & Co., Job No. A03-T143 dated 12/22/2003.

Number of Anchor Rods: $N_{\text{anchors}} := 6$ Diameter of Anchors: $D_{\text{anchors}} := 2.5 \text{in}$ $n := 4 \text{in}^{-1}$ Area of anchor bolts $A_b := \frac{\pi \cdot (D_{\text{anchors}}^2)}{4} = 4.909 \cdot \text{in}^2$ Net Tensile Area of Anchors: $A_{\text{net}} := \frac{\pi}{4} \cdot \left(D_{\text{anchors}} - \frac{0.9743}{n} \right)^2 = 3.999 \cdot \text{in}^2$ Minimum Yield Stress $F_{Y\text{anchors}} := 36 \text{ksi}$ (Grade A36)Ultimate Tensile Stress: $F_{U\text{anchors}} := 58 \text{ksi}$ Safety Factor for Anchor: $\phi_t := 0.8$ (Section 4.9.9, TIA-222-G Addendum 2)Allowable Axial Load per Anchor: $T_{\text{cap}} := \phi_t \cdot F_{U\text{anchors}} \cdot A_{\text{net}}$
 $T_{\text{cap}} = 185.545 \cdot \text{kips}$

Interaction Equation for Anchor Rods as per Section 4.9.9, TIA-222-G Addendum 1 and Figure 4.4

For detail type (D) as per Figure 4.4 $\eta := 0.50$ $P_u := \text{if}(\eta > 0.5, P_{up}, P_v) = 422 \cdot \text{kips}$ Maximum Load on Anchor: $T_{\text{max}} := \frac{P_u + \frac{V_u}{\eta}}{N_{\text{anchors}}}$ $T_{\text{max}} = 86 \cdot \text{kips}$ Anchor Rod Capacity: $\frac{T_{\text{max}}}{T_{\text{cap}}} = 46.35\%$ OK!Anchor_Rod_Check := if($T_{\text{max}} < T_{\text{cap}}$, "OK", "Not OK")**Anchor_Rod_Check = "OK"**

For detail type (d), when the clear distance from top of concrete to the bottom of leveling nut exceeds 1.0 times the diameter of the anchor rod, the interaction equation as per section 4.9.9., TIA-222-G Addendum 1 shall also be satisfied.

Clear distance: $I_{ar} := 2.0\text{in}$ (estimated from photo)

Clear distance: $I_{ar} = 2\cdot\text{in} < \text{Diameter of Anchors: } D_{anchors} = 2.5\cdot\text{in}$ OK!

Summary

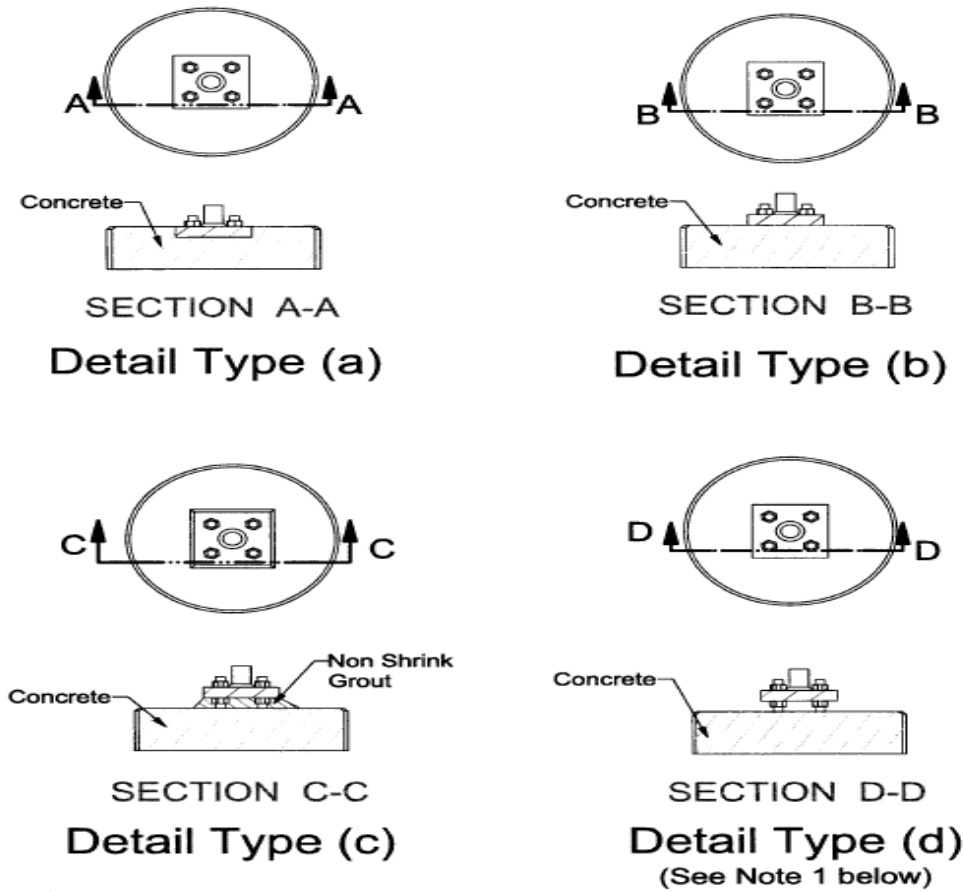
-Foundation Reactions from Tower Base-

| | | |
|------------------|--------------------------------------|---------------------------------------|
| Shear | $V_u = 47\cdot\text{kips}$ | |
| Down load | $P_v = 422\cdot\text{kips}$ | |
| Uplift load | $P_{up} = 306\cdot\text{kips}$ | |
| Moment | $M = 0\cdot\text{ft}\cdot\text{kip}$ | |
| Anchor Rod Check | $T_{max} = 86\cdot\text{kips}$ | $< T_{cap} = 185.545\cdot\text{kips}$ |

Anchor_Rod_Check := if($T_{max} < T_{cap}$, "OK", "Not OK")

Anchor_Rod_Check = "OK"

ANSI/TIA-222-G



Note:

1. When clear distance from top of concrete to the bottom face of the leveling nut exceeds 1.5 times the diameter of the anchor rod, bending of the anchor rod shall be considered (refer to 4.9.9).

Figure 4-4: Anchor Rod Detail Types

4.9.9 Anchor Rods

For anchor rods, the following interaction equation shall be satisfied:

$$\left(\frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1$$

where:

$$\phi = 0.80$$

P_u = tension force for detail types (a), (b) & (c) and larger of compression or tension force for type (d) as depicted in Figure 4-4.

V_u = shear force (direct shear and torsion components) corresponding to P_u

R_{nt} = nominal tensile strength of anchor rod as per 4.9.6.1

η = 0.90 for detail type (a)
 = 0.70 for detail type (b)
 = 0.55 for detail type (c)
 = 0.50 for detail type (d)

For detail type (d), when the clear distance from the top of concrete to the bottom leveling nut exceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied:

$$\left(\frac{V_u}{\phi R_{nv}} \right)^2 + \left(\left| \frac{P_u}{\phi R_{nt}} \right| + \left| \frac{M_u}{\phi R_{nm}} \right| \right)^2 \leq 1$$

where:

M_u = bending moment corresponding to V_u
 = $0.65 l_{ar} V_u$

l_{ar} = length from top of concrete to bottom of anchor rod leveling nut

Addendum 1

ϕR_{nv} = design shear strength of anchor rod as per 4.9.6.3

ϕR_{nm} = design flexural strength of anchor rod in accordance with 4.7.1 using the tensile root diameter for the determination of z

d_r = tensile root diameter of rod, in [mm]
 = $d - 0.9743/n$ inches
 = $d - 0.9382(p)$ mm

d = nominal rod diameter, in [mm]

n = number of threads per inch

p = pitch of threads, mm

4.9.6.3 Design Shear Strength

The design shear strength of a bolt, ϕR_{nv} , shall be taken as:

$$\phi = 0.75$$

(a) When threads are excluded from the shear plane:

$$R_{nv} = 0.55 F_{ub} A_b$$

(b) When threads are included in the shear plane:

$$R_{nv} = 0.45 F_{ub} A_b$$

where:

F_{ub} = Specified minimum tensile strength of bolt

A_b = nominal unthreaded area of bolt

4.7.1 Solid Round Members

For solid round members, M_n shall be determined as follows:

$$M_n = F_y' Z$$

where:

F_y' = effective yield stress as determined from 4.5.4.1

Z = plastic section modulus

4.5.4.1 Effective Yield Stress

For 60° and 90° angle members, the effective yield stress for axial compression, F_y' , shall be determined as follows:

$$w/t \leq 0.47 \sqrt{\frac{E}{F_y}} \quad F_y' = F_y$$

$$0.47 \sqrt{\frac{E}{F_y}} < w/t \leq 0.85 \sqrt{\frac{E}{F_y}} \quad F_y' = \left[1.677 - 0.677 \left(\frac{w/t}{0.47 \sqrt{E/F_y}} \right) \right] F_y$$

$$0.85 \sqrt{\frac{E}{F_y}} < w/t \leq 25 \quad F_y' = [0.0332 \pi^2 E / (w/t)^2]$$

The width to thickness ratio (w/t) shall not exceed 25 for angle members (refer to Figure 4-3).

For solid round members, the effective yield stress, F_y' , shall be equal to F_y .

For tubular round members, the diameter to thickness ratio (D/t) shall not exceed 400. The effective yield stress, F_y' , shall be determined as follows:

$$D/t \leq 0.114 E/F_y \quad F_y' = F_y$$

$$0.114 E/F_y < D/t \leq 0.448 E/F_y \quad F_y' = \left(\frac{0.0379E}{(D/t)F_y} + \frac{2}{3} \right) F_y$$

$$0.448 E/F_y < D/t \leq 400 \quad F_y' = \frac{0.337E}{(D/t)}$$