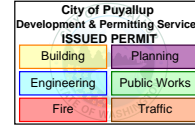


**PRCTI20260524**

# Structural Analysis Report AT&T

October 30, 2024

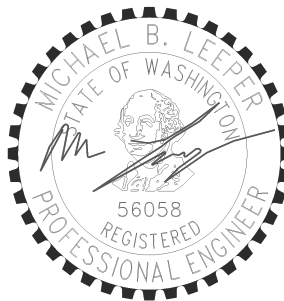


|                   |   |
|-------------------|---|
| Site Name         | GOOD SAMARITAN  |
| Site ID           | WA6659  |
| FA #              | 10029581  |
| PTN #             | 3801A1A1YK  |
| Pace #            | MRWOR073518   |
| IWM #             | WSWOR0029871  |
| Client            | Mastec  |
| Proposed Carrier  | AT&T  |
| Site Location     | 407 14 <sup>th</sup> Ave SE<br>Puyallup, WA 98371<br>47.1795000° N NAD83<br>122.290558° W NAD83 |
| Structure Type    | Penthouse Wall  |
| Mount Usage Ratio | <b>79%</b>  |
| Overall Result    | <b>Pass</b>   |
| Recommendation    | --  |

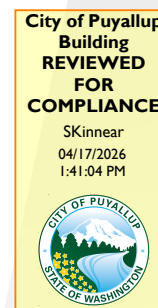
Upon reviewing the results of this analysis, it is our opinion that the structure does meet the specified IBC/TIA/ASCE code and minimum design requirements. The existing structure is therefore deemed adequate to support the existing and proposed loading as listed in this report.

Calculations required to be provided by the Permittee on site for all Inspections

Michael Leeper  
Digitally signed by Michael Leeper  
DN: cn=Michael Leeper, o=coreoneconsulting.com,  
c=US, email=Michael.Leeper@coreoneconsulting.com,  
date=2024.10.31 12:11:02-0700



10/31/2024



## **Summary of Contents**

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- Introduction
  - Opening Statement
  - Project Description
  - Criteria46
  - Conclusion
- Calculations
- Appendix A
  - Design Tables & Resources Used

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## **Assumptions and Limitations**

Our structural calculations are completed assuming all information provided to CORE ONE CONSULTING USA is accurate and applicable to this site. For the purposes of calculations, we assume an overall structure condition of “like new” and all members and connections to be free of corrosion and/or structural defects. The structure owner and/or contractor shall verify the structure’s condition prior to installation of any proposed equipment. If actual conditions differ from those described in this report CORE ONE CONSULTING USA should be notified immediately to complete a revised evaluation.

Our evaluation is completed using standard TIA, AISC, ACI, and ASCE methods and procedures. Our structural results are proprietary and should not be used by others as their own. CORE ONE CONSULTING USA is not responsible for decisions made by others that are or are not based on our supplied assumptions and conclusions.

This report is an evaluation of the antenna mount only and does not reflect the adequacy of the other mounts, or coax mounting attachments. These elements are assumed to be adequate for the purposes of this analysis and are assumed to have been installed per their manufacturer requirements.

## INTRODUCTION

At the request of **AT&T**, CORE ONE CONSULTING USA has performed a structural analysis on the existing antenna mount supporting structure. All supporting documents have been obtained from the client and are assumed to be accurate and applicable to this site. The structure was analyzed using RISA 3D version 22.0 engineering software.

## Supporting Documentation

|                               |   |
|-------------------------------|---|
| <b>Antenna Loading</b>        | DE130 Scoping Document, dated 01/29/2024  |
| <b>Construction Documents</b> | Core One Consulting USA, Project # 2401U410, Rev A dated 09/16/2024   |
| <b>Previous SA</b>            | Ryka Land Services Site# WA6659, dated 05/30/2024<br>Morrison Hershfield Proj.# SML-052R5/2000479, dated 08/31/2021 |
| <b>Photos</b>                 | Provided by Mastec  |

## Analysis Code Requirements

|                         |  |
|-------------------------|--|
| Wind Speed              | 108 mph (3-Second Gust)                        |
| Wind Speed w/ ice       | 30 mph wind w/ 1" Ice                          |
| TIA Revision            | ANSI/TIA-222-H                                 |
| Adopted IBC             | 2021 IBC/2021 WBC                              |
| Structure Class         | IV   |
| Exposure Category       | C  |
| Topographic Category    | $K_{zt}:1.0$                                   |
| Calculated Crest Height | 0 ft   |
| Site Class              | D - Stiff Soil                                 |
| Spectral Response       | $S_s=1.267g$ , $S_1=0.436g$ , $S_{Ds}= 1.014g$ |

## CONCLUSION

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified IBC/TIA/ASCE code and minimum design requirements. The existing structure are therefore deemed adequate to support the proposed loading as listed in this report. The additional equipment proposed for the referenced project will not increase the design gravity loading by more than 5 percent or the lateral loading by more than 10 percent, therefore the proposed installation is acceptable per the requirements listed in sections 502.4 and 502.5 of the 2021 IEBC. See appendix for details.

Alexander Bazeley  
Structural Lead | **Core One Consulting USA**  
2875 W Ray Road, Suite 6, Chandler, AZ 85224  
(O) 1+(855) 708-2195 |  
[alex.bazeley@coreoneconsulting.com](mailto:alex.bazeley@coreoneconsulting.com)

## Final Configuration

| RAD Height (ft) | Qty.                               | Appurtenance                 | Sector                 | Cable   | Mount type | Carrier |
|-----------------|------------------------------------|------------------------------|------------------------|---|------------|---------|
| 88'-9"          | <b>3</b>                           | <b>Air6419 B77D</b>          | Alpha<br>Beta<br>Gamma | <b>(6) 6AWG DC Trunks</b><br><b>(3) Fiber Trunk</b> | Pipe Mount | AT&T    |
|                 | <b>3</b>                           | <b>Air6419 B77G</b>          |                        |   |            |         |
| 80'-0"          | <b>6</b>                           | <b>KMW EPBQ-654L8H8-L2</b>   |                        |   |            |         |
|                 | <b>3</b>                           | <b>Ericsson 4490 B5/B12A</b> |                        |   |            |         |
|                 | <b>3</b>                           | <b>Ericsson 4415 B30</b>     |                        |   |            |         |
|                 | <b>3</b>                           | <b>Ericsson 4478 B14</b>     |                        |   |            |         |
|                 | <b>3</b>                           | <b>Ericsson 4890 B25/B66</b> |                        |   |            |         |
| <b>3</b>        | <b>Raycap DC9-48-60-24-PC16-EV</b> |                              |                        |   |            |         |

\*Bold items denote appurtenances to be installed

## Structure Usages

| Summary         |            |             |
|-----------------|------------|-------------|
| Wall*           | 79%        | Pass        |
| <b>RATING =</b> | <b>79%</b> | <b>Pass</b> |

\*Each mount is supported by (3) 12'-0" long 2x6 at 16" OC

**APPENDIX A**  
Design Tables & Resources

## ANSI/TIA-222H - WIND, ICE & SEISMIC LOAD CALCULATIONS

|                                     |
|-------------------------------------|
| Site Code/Name                      |
| State                               |
| County                              |
| Structure Class                     |
| Exposure Category                   |
| Topographic Factor                  |
| Mean Elevation of base of structure |
| Height Above Ground                 |
| Rooftop Wind Speed-Up Factor        |

|                         |         |
|-------------------------|---------|
| WA6659 - GOOD SAMARITAN |         |
| Washington              |         |
| Pierce                  |         |
| IV                      |         |
| C                       |         |
| $K_{zt}$                | 1.00    |
| $z_s$                   | 89.6 ft |
| $z$                     | 80 ft   |
| $K_s$                   | 1.00    |

*Reference*

*Table 2-1*

*Section 2.6.5.1.2*

*Section 2.6.6.2.2*

*ASCE7 Hazard Tool or Site Specific*

*Section 2.6.7*

|                                   |  |
|-----------------------------------|--|
| <b>Wind Parameters</b>            |  |
| Basic wind speed                  |  |
| Wind direction probability factor |  |
| Gust effect factor                |  |
| Velocity Pressure ( $K_a = 0.9$ ) |  |

|       |       |     |                              |
|-------|-------|-----|------------------------------|
| $V$   | 108   | mph | <i>ASCE7-16 Hazards Tool</i> |
| $K_d$ | 0.95  |     | <i>Section 16.6</i>          |
| $G_h$ | 1.00  |     | <i>Section 16.6</i>          |
|       | 30.73 | psf | <i>Section 2.6.11.6</i>      |

|   |  |
|---|--|
| <b>Wind &amp; Ice Parameters</b>            |  |
| Base windspeed in conjunction with ice, $V$ |  |
| Base Ice thickness                          |  |
| Ice Velocity Pressure ( $K_a = 0.9$ )       |  |
| Design Ice Thickness                        |  |

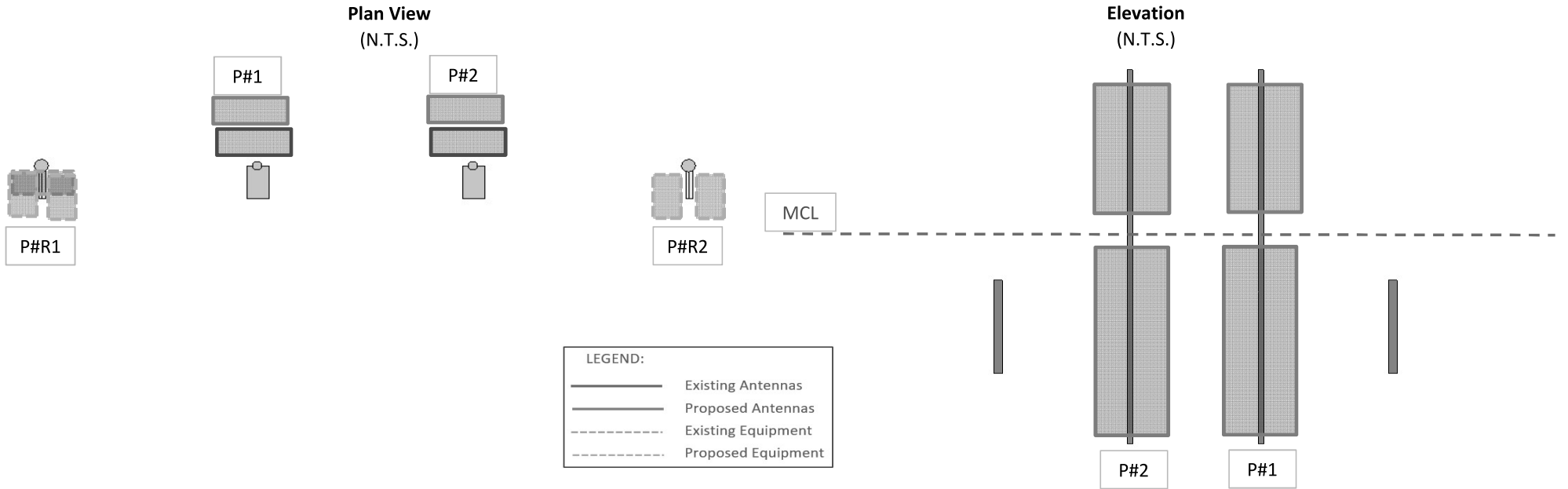
|           |      |     |                           |
|-----------|------|-----|---------------------------|
|           | 30   | mph | <i>ASCE7 Hazards Tool</i> |
| $t_i$     | 1.00 | in  | <i>ASCE7 Hazards Tool</i> |
| $q_{ice}$ | 2.37 | psf | <i>Section 2.6.11.6</i>   |
| $t_{iz}$  | 1.37 | in  | <i>Section 2.6.10</i>     |

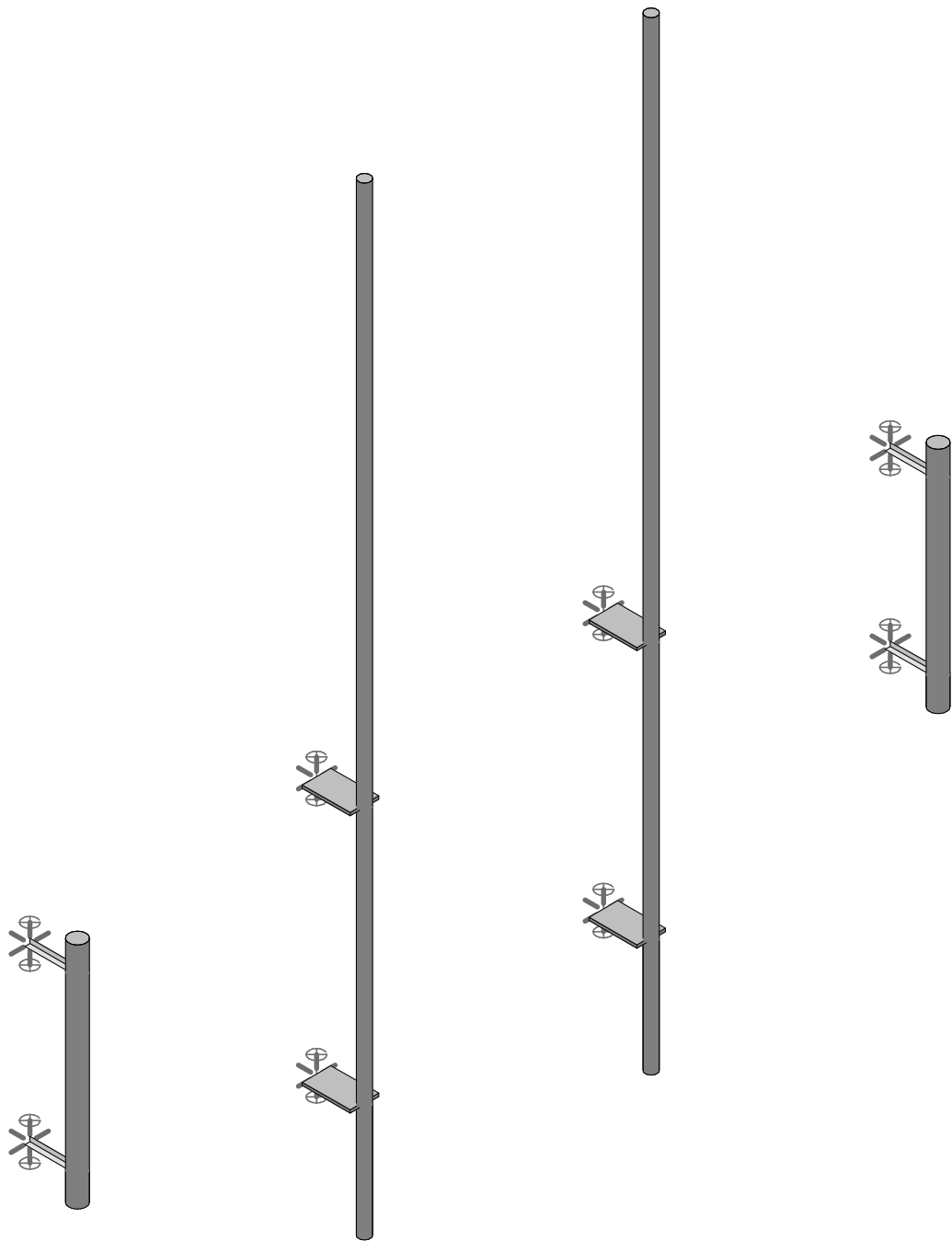
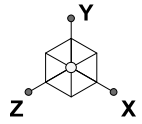
|   |  |
|---|--|
| <b>Seismic Parameters</b>                 |  |
| Site Soil Class                           |  |
| Seismic Design Category                   |  |
| Spectral Response at Short Periods        |  |
| Spectral Response at 1sec                 |  |
| Long Period Transition Period             |  |
| Seismic Importance Factor                 |  |
| Response modification coefficient         |  |
| Short-Period Site Coefficient             |  |
| Design Spectral Response at Short Periods |  |
| Seismic Response Coefficient              |  |

|          |             |  |                           |
|----------|-------------|--|---------------------------|
|          | D - Default |  | <i>Table 2-10</i>         |
|          | D           |  | <i>ASCE7 Hazards Tool</i> |
| $S_s$    | 1.267       |  | <i>ASCE7 Hazards Tool</i> |
| $S_1$    | 0.436       |  | <i>ASCE7 Hazards Tool</i> |
| $T_L$    | 6           |  | <i>ASCE7 Hazards Tool</i> |
| $I_s$    | 1.5         |  | <i>Table 2-3</i>          |
| $R$      | 2           |  | <i>Section 16.7</i>       |
| $F_a$    | 1.2         |  | <i>Table 2-11</i>         |
| $S_{Ds}$ | 1.014       |  | <i>Section 2.7.5</i>      |
| $C_s$    | 0.760       |  | <i>Section 2.7.7.1</i>    |

# TYPICAL SECTOR

| Position | Appurtenance properties |                    |        |        |        |              | Wind     |           | Ice          | Seismic              | EPA                   |                       |
|----------|-------------------------|--------------------|--------|--------|--------|--------------|----------|-----------|--------------|----------------------|-----------------------|-----------------------|
|          | Manufacturer            | Model              | L [in] | W [in] | D [in] | Weight [lbs] | 0° [lbs] | 90° [lbs] | Weight [lbs] | E <sub>H</sub> [lbs] | A <sub>N</sub> [sqft] | A <sub>T</sub> [sqft] |
| 1        | Ericsson                | AIR 6419 B77D      | 28.2   | 16.1   | 7.3    | 64.0         | 116.3    | 55.4      | 78.3         | 48.7                 | 3.8                   | 1.8                   |
| 2        | Ericsson                | AIR 6419 B77G      | 28.3   | 16.1   | 7.9    | 64.0         | 116.7    | 59.5      | 79.6         | 48.7                 | 3.8                   | 1.9                   |
| 1        | KMW                     | EPBQ-654L8H8-L2    | 96.0   | 21.0   | 6.3    | 80.0         | 555.9    | 216.1     | 315.3        | 60.8                 | 18.1                  | 7.0                   |
| 2        | KMW                     | EPBQ-654L8H8-L2    | 96.0   | 21.0   | 6.3    | 80.0         | 555.9    | 216.1     | 315.3        | 60.8                 | 18.1                  | 7.0                   |
| R1       | Ericsson                | RRU 4490 B5/B12A   | 20.6   | 15.6   | 7.0    | 68.4         | 37.5     | 82.3      | 56.4         | 52.0                 | 2.7                   | 1.2                   |
| R1       | Ericsson                | RRU 4415 B30       | 15.0   | 13.2   | 5.1    | 46.3         | 19.9     | 50.7      | 35.3         | 35.2                 | 1.7                   | 0.6                   |
| R2       | Ericsson                | RRU 4478 B14       | 15.0   | 13.2   | 7.3    | 59.4         | 28.0     | 50.7      | 37.4         | 45.2                 | 1.7                   | 0.9                   |
| R2       | Ericsson                | RRU 4890 B25/B66   | 20.6   | 15.7   | 7.0    | 69.5         | 37.5     | 82.8      | 56.7         | 52.8                 | 2.7                   | 1.2                   |
| R1       | Raycap                  | DC9-48-60-24-8C-EV | 22.3   | 11.0   | 11.0   | 32.8         | 62.8     | 62.8      | 55.7         | 24.9                 | 2.0                   | 2.0                   |





Envelope Only Solution

|                         |                |                         |
|-------------------------|----------------|-------------------------|
| Core One Consulting USA | GOOD SAMARITAN | SK - 1                  |
| SR                      |                | Oct 22, 2024 at 5:06 PM |
| WA6659                  |                | Pipe Mount.r3d          |

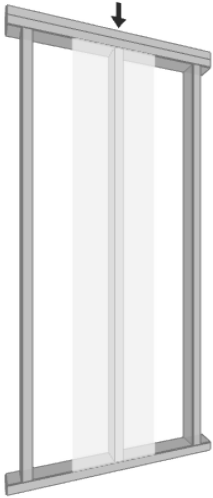
Level, Wall: Stud

**1 piece(s) 2 x 6 DF No.2 @ 16" OC**

Wall Height: 16'

Member Height: 15' 7 1/2"

O. C. Spacing: 16.00"



Drawing is Conceptual

| Design Results          | Actual          | Allowed | Result         | LDF  | Load: Combination |
|-------------------------|-----------------|---------|----------------|------|-------------------|
| Slenderness             | 34              | 50      | Passed (68%)   | —    | --                |
| Compression (lbs)       | 600             | 3135    | Passed (19%)   | 0.90 | 1.0 D             |
| Plate Bearing (lbs)     | 600             | 6445    | Passed (9%)    | —    | 1.0 D             |
| Lateral Reaction (lbs)  | 178             | --      | —              | 1.60 | 1.0 D + 0.6 W     |
| Lateral Shear (lbs)     | 167             | 1584    | Passed (11%)   | 1.60 | 1.0 D + 0.6 W     |
| Lateral Moment (ft-lbs) | 695 @ mid-span  | 1342    | Passed (52%)   | 1.60 | 1.0 D + 0.6 W     |
| Total Deflection (in)   | 0.75 @ mid-span | 1.56    | Passed (L/249) | —    | 1.0 D + 0.6 W     |
| Bending/Compression     | 0.79            | 1       | Passed (79%)   | 1.60 | 1.0 D + 0.6 W     |

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 50% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

| Supports | Type   | Material          |
|----------|--------|-------------------|
| Top      | Dbl 2X | Douglas Fir-Larch |
| Base     | 2X     | Douglas Fir-Larch |

System : Wall  
 Member Type : Stud  
 Building Code : IBC 2021  
 Design Methodology : ASD

| Max Unbraced Length | Comments |
|---------------------|----------|
| 1'                  |          |

| Lateral Connections |           |                            |          |                   |
|---------------------|-----------|----------------------------|----------|-------------------|
| Supports            | Connector | Type/Model                 | Quantity | Connector Nailing |
| Top                 | Nails     | 8d (0.113" x 2 1/2") (Toe) | 2        | N/A               |
| Base                | Nails     | 8d (0.113" x 2 1/2") (Toe) | 2        | N/A               |

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

| Vertical Load  | Spacing | Dead (0.90) | Comments     |
|----------------|---------|-------------|--------------|
| 1 - Point (lb) | N/A     | 600         | Default Load |

| Lateral Load      | Location    | Spacing | Wind (1.60) | Comments |
|-------------------|-------------|---------|-------------|----------|
| 1 - Uniform (PSF) | Full Length | 16.00"  | 28.5        |          |

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (108), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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The product application, input design loads, dimensions and support information have been provided by APB

| Forteweb Software Operator  | Job Notes |
|---|-----------|
| Alex Bazeley<br>Core One Consulting USA<br>(727) 798-4974<br>alexander.bazeley@coreoneconsultants.com |           |

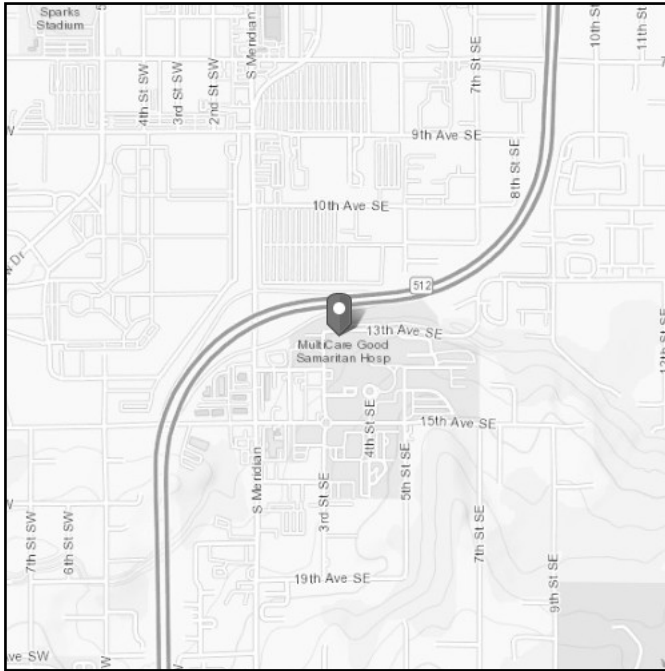


# ASCE Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** IV  
**Soil Class:** D - Default (see Section 11.4.3)

**Latitude:** 47.1795  
**Longitude:** -122.290558  
**Elevation:** 89.60877477364868 ft (NAVD 88)



## Wind

### Results:

|              |          |
|--------------|----------|
| Wind Speed   | 108 Vmph |
| 10-year MRI  | 67 Vmph  |
| 25-year MRI  | 73 Vmph  |
| 50-year MRI  | 78 Vmph  |
| 100-year MRI | 83 Vmph  |

Data Source: ASCE/SEI 7-16, Fig. 26.5-1D and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Oct 22 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

**Site Soil Class:** D - Default (see Section 11.4.3)

**Results:**

|            |       |                    |       |
|------------|-------|--------------------|-------|
| $S_s$ :    | 1.267 | $S_{D1}$ :         | N/A   |
| $S_1$ :    | 0.436 | $T_L$ :            | 6     |
| $F_a$ :    | 1.2   | PGA :              | 0.5   |
| $F_v$ :    | N/A   | PGA <sub>M</sub> : | 0.6   |
| $S_{MS}$ : | 1.52  | $F_{PGA}$ :        | 1.2   |
| $S_{M1}$ : | N/A   | $I_e$ :            | 1.5   |
| $S_{DS}$ : | 1.014 | $C_v$ :            | 1.353 |

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

**Data Accessed:** Tue Oct 22 2024

**Date Source:** [USGS Seismic Design Maps](#)

**Results:**

Ice Thickness: 1.00 in.

Concurrent Temperature: 25 F

Gust Speed 30 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Tue Oct 22 2024

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

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

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