CORE ONE CONSULTING USA

CORE ONE CONSULTING US LTD.
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Bellevue, WA 98006

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City of Puyallup
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City of Puyallup
Development & Permitting Services
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Building | Planning
Engineering | Public Works
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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 14th Ave SE Puyallup, WA 98371 47.1795000° N NAD83 122.290558° W NAD83
Structure Type	Penthouse Wall
Mount Usage Ratio	**79%**
Overall Result	**Pass**
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.

Michael Leeper

Digitally signed by Michael Leeper
DN: CN=US
Email=mleeper@coreoneconsultants.com, O=Core One Consultants, CN=Michael Leeper
Date: 2024.10.31 12:11:02-07'00'

MICHAEL B. LEEPER
STATE OF WASHINGTON
56058
REGISTERED
PROFESSIONAL ENGINEER

10/31/2024

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

Summary of Contents

Introduction
- Opening Statement
- Project Description
- Criteria46
- Conclusion

Calculations

Appendix A
- Design Tables & Resources Used

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

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

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

***Bold items denote appurtenances to be installed**

Structure Usages

Summary		
Wall*	79%	Pass
RATING =	**79%**	**Pass**

*Each mount is supported by (3) 12’-0” long 2x6 at 16” OC

APPENDIX A
Design Tables & Resources

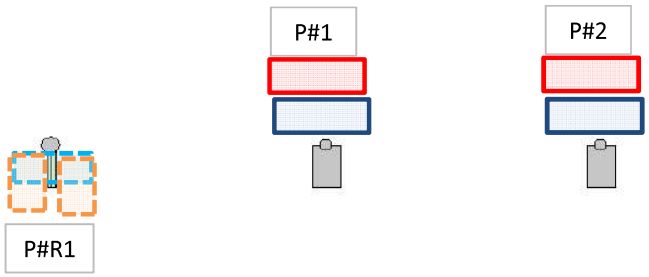
ANSI/TIA-222H - WIND, ICE & SEISMIC LOAD CALCULATIONS

Site Code/Name		WA6659 - GOOD SAMARITAN		
State		Washington		
County		Pierce		*Reference*
Structure Class		IV		*Table 2-1*
Exposure Category		C		*Section 2.6.5.1.2*
Topographic Factor	K_{zt}	1.00		*Section 2.6.6.2.2*
Mean Elevation of base of structure	z_s	89.6	ft	*ASCE7 Hazard Tool or Site Specific*
Height Above Ground	z	80	ft	
Rooftop Wind Speed-Up Factor	K_s	1.00		*Section 2.6.7*
Wind Parameters				
Basic wind speed	V	108	mph	*ASCE7-16 Hazards Tool*
Wind direction probability factor	K_d	0.95		*Section 16.6*
Gust effect factor	G_h	1.00		*Section 16.6*
Velocity Pressure (Ka = 0.9)		30.73	psf	*Section 2.6.11.6*
Wind & Ice Parameters				
Base windspeed in conjunction with ice, V_i		30	mph	*ASCE7 Hazards Tool*
Base Ice thickness	t_i	1.00	in	*ASCE7 Hazards Tool*
Ice Velocity Pressure (Ka = 0.9)	q_{ice}	2.37	psf	*Section 2.6.11.6*
Design Ice Thickness	t_{iz}	1.37	in	*Section 2.6.10*
Seismic Parameters				
Site Soil Class		D - Default		*Table 2-10*
Seismic Design Category		D		*ASCE7 Hazards Tool*
Spectral Response at Short Periods	S_s	1.267		*ASCE7 Hazards Tool*
Spectral Response at 1sec	S_1	0.436		*ASCE7 Hazards Tool*
Long Period Transition Period	T_L	6		*ASCE7 Hazards Tool*
Seismic Importance Factor	I_s	1.5		*Table 2-3*
Response modification coefficient	R	2		*Section 16.7*
Short-Period Site Coefficient	F_a	1.2		*Table 2-11*
Design Spectral Response at Short Periods	S_{DS}	1.014		*Section 2.7.5*
Seismic Response Coefficient	C_s	0.760		*Section 2.7.7.1*

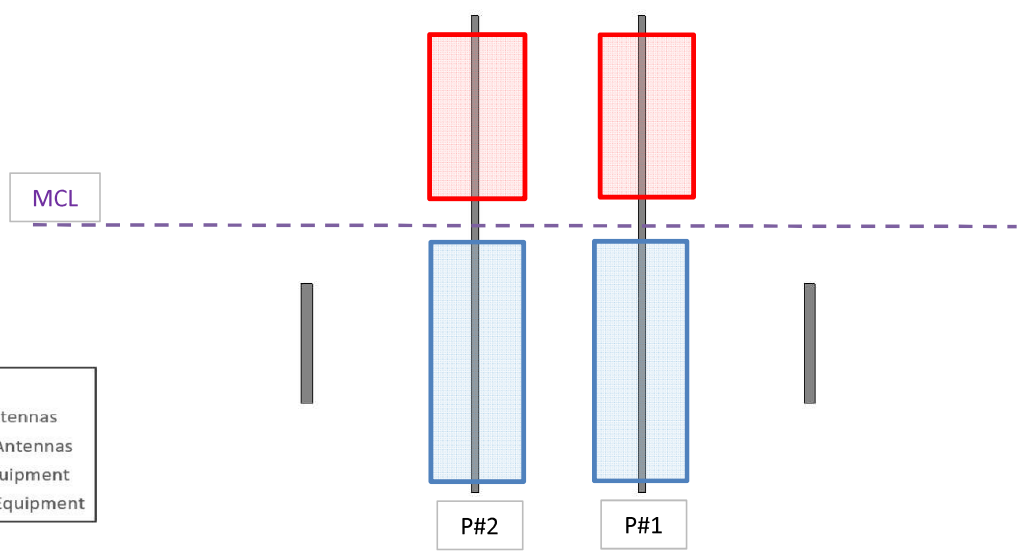
TYPICAL SECTOR

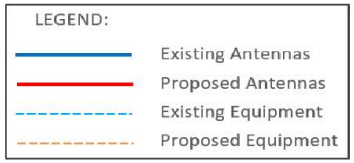
Position	Appurtenance properties						Wind		Ice	Seismic	EPA	
	Manufacturer	Model	L [in]	W [in]	D [in]	Weight [lbs]	0^o [lbs]	90^o [lbs]	Weight [lbs	E_H [lbs]	A_N [sqft]	A_T [sqft]
1	Ericsson	AIR 6419 B77D	28.2	16.1	7.3	64.0	116.3	55.4	78.3	48.7	3.8	1.8
2	Ericsson	AIR 6419 B77G	28.3	16.1	7.9	64.0	116.7	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

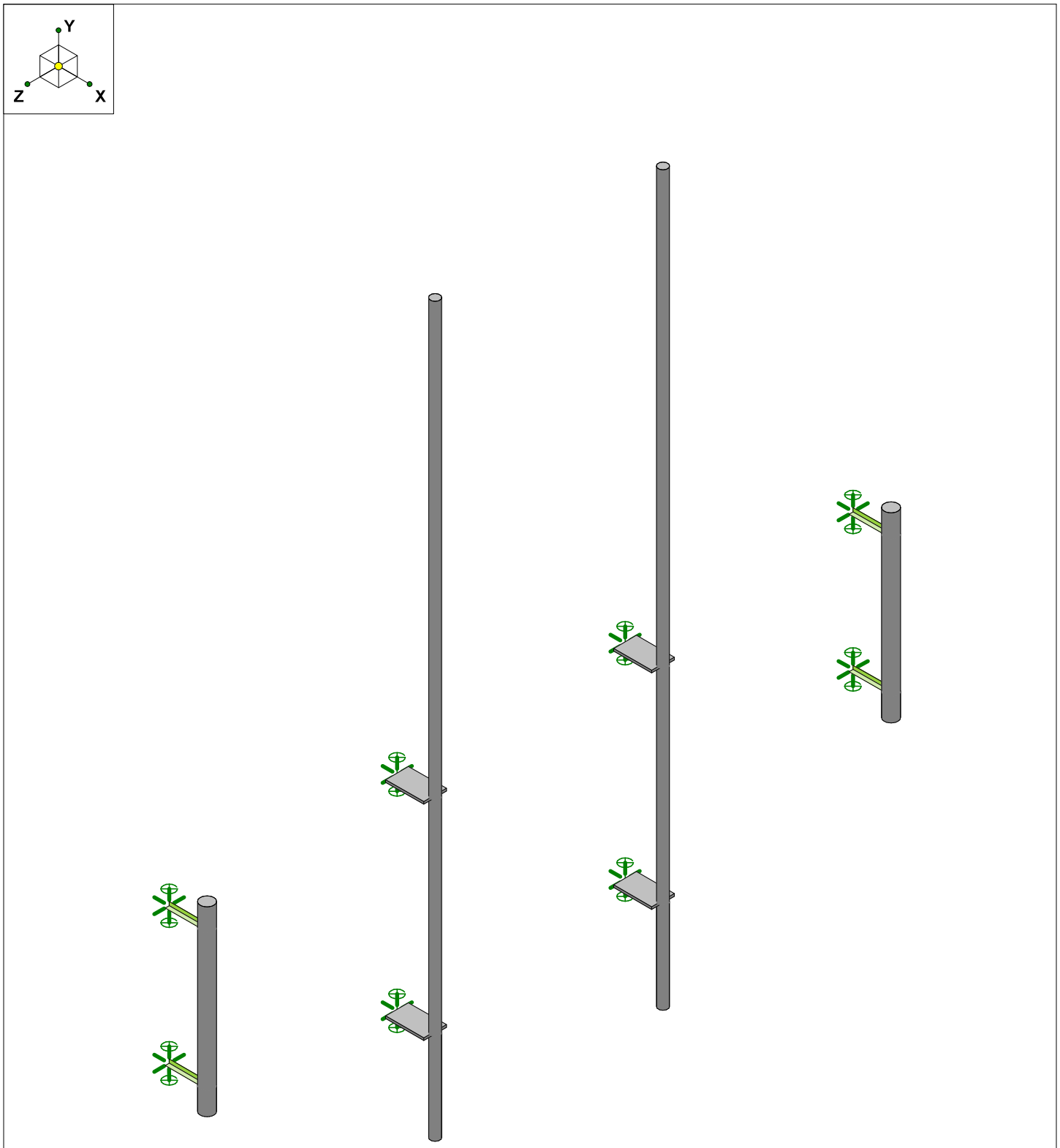
Plan View
(N.T.S.)



Elevation
(N.T.S.)







Envelope Only Solution

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

FORTEWEB

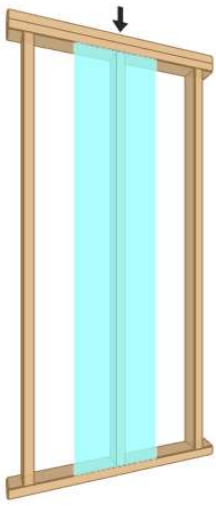
MEMBER REPORT

PASSED

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.

Weyerhaeuser Notes

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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 Core One Consulting USA (727) 798-4974 alexander.bazeley@coreoneconsultants.com	

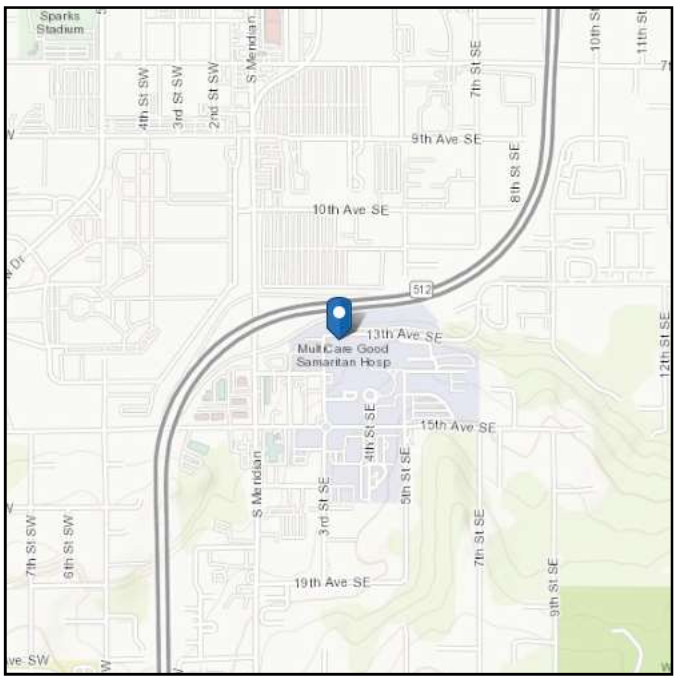
Weyerhaeuser

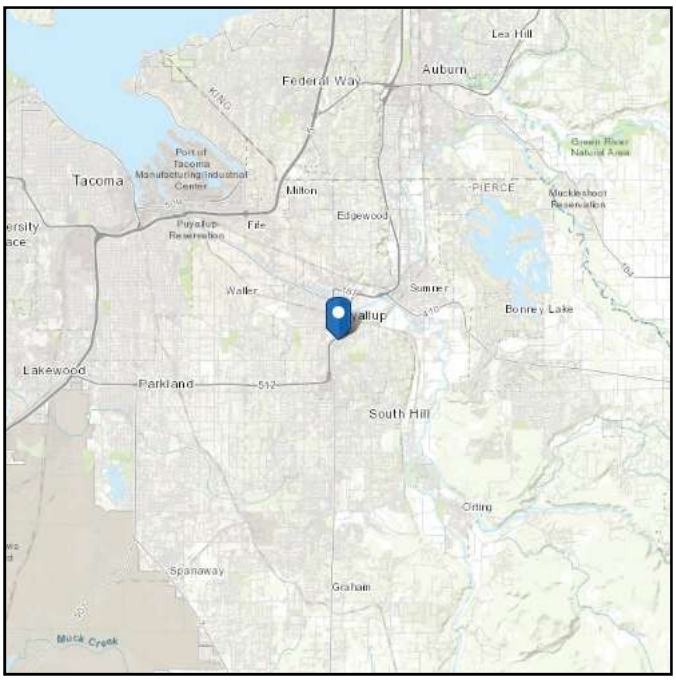
10/31/2024 3:46:04 AM UTC
ForteWEB v3.8, Engine: V8.4.1.24, Data: V8.1.6.3
File Name: WA6659 Good Samaritan

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	47.1795
Risk Category:	IV	**Longitude:**	-122.290558
Soil Class:	D - Default (see Section 11.4.3)	**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.

Seismic

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_M :	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

Ice

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.