STRUCTURAL CALCULATIONS

Prepared For: **Chang-Nguyen Project**
MD22-50

Project Address: 2838 Cascadia Ave S
Seattle, WA 98144

Prepared By: Logan Lee, P.E.
November 14, 2022

PROJECT SCOPE:

This project is a split level deck for the Chang-Nguyen Family, located in Seattle, WA. The deck structure consists of composite decking over 2x joists and wood beams with wood columns and concrete footings. The project is designed in accordance with the 2018 International Building Code along with the codes listed below and corresponding state & city/county amendments.

ANALYSIS:

The structural calculations for the proposed structure is inclusive of the entire support structure & and the existing building structures support system in the affected areas where the installations occur. This analysis is based on the specific assumptions and conditions as stated within the following report.

Latitude:	47.5777	Occupancy Category:	II
Longitude:	-122.2847	Seismic Design Category:	D
Wind Speed:	97	Mapped Parameter, Ss:	1.438
Wind Exposure:	B	Mapped Parameter, S1:	0.5
Topographic Factor, kzt:	2.00	Mapped Parameter, Sds:	1.151

Reference Documents

The following data was used to model and analyze the structure.

- "November 14, 2022 Construction Drawings". Masterdecks LLC

- "National Design Specifications for Wood Construction (2018 NDS). American Wood Council
- "Minimum Design Loads for Buildings and other Structures (ASCE 7-16), American Society of Civil Engineers
- "Washington State Building Code". State of Washington
- "Building Code Requirements for Structural Concrete" (ACI 318-14). American Concrete Institute

SITE PARAMETERS:

Risk Category =	II	(Table 1-1)	Latitude =	47.577681	(USGS)
Site Soil Classification =	D	(Table 20.3-1)	Longitude =	-122.284717	(USGS)
Seismic Design Category =	D	(Table 11.6-1)			
			Deck Area =	**483** sqft	

VERTICAL LOADS:

DL =	**10**	psf
LL =	**60**	psf
SL =	**25**	psf
Allowable Soil Bearing =	**1500**	psf

LATERAL LOADS:

SEISMIC CONTROLS
Loads Calculated per ASCE 7-16, Ch 12.14

Seismic Force Resisting System = **Knee Brace**

Sds =	1.151	(USGS)
Response Factor (Rp) =	7.00	(Table 12.2-1)
Story Factor (F) =	1.0	(Section 12.14.8.1)
Overstrength Factor Ωo=	2.5	(Table 12.2-1)
Effective Seismic Weight (W) =	25.0 psf	(Section 12.7.2)
Shear (V) =	10.28 psf	(Table 12.14-12)

DECK CONNECTIONS

TIE BACK BRACKETS

Max Lateral Load =	4,964	lbs
Tie-Back Capacity =	750	lbs/tie-back
Required Number of Tie-Backs =	6.6	(min 4 per deck per WA-SBCC)

Use 7 hold down devices, evenly distributed along deck

LEDGER SHEAR

Tributary Area =	**4.50**	ft
Deck Joist Spacing =	**16**	in
Vertical Load at Ledger =	420	lbs
Required Fasteners =	2.5	

Use 3 Ledger Lok fasteners per bay

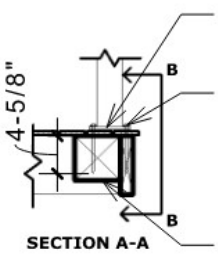
KNEE BRACE

Knee Braces in Line =	**2**				
Shear =	**1218**	**lbs**			
Fastener =	1/2" Lag				
HF SG =	0.43				
Min Embed Length =	3"				
Knee Brace Capacity =	**1,294**	**lbs**	**>**	**Shear**	**OK**

GUARDRAIL CONNECTION CHECK

Lateral Load =	200	lbs	(IRC Table R301.5)
Guardrail Height =	36	in	
Moment at Guardrail Base =	7200	in-lb	
Ts =	1029	lbs/lag	
Hem Fir SG =	0.43		
Withdraw Capacity =	234	lbs	(3/8" Lag) (NDS Table 11.2A)
Min Length =	4.3956	in	

Use 3/8" x 6" Lag Screws



5"x5"x3/8" MOUNTING PLATE

(4) 3/8" GALV. OR SS LAG SCREW PRE-DRILLED WITH 1/4" PILOT HOLES AND SOAP THREADS

6x6 BLOCKING BETWEEN JOISTS. A34 OR A35 HANGER FOR CONNECTION TO RIM JOIST

Deck Framing			
Member Name	**Results**	**Current Solution**	**Comments**
Deck Joist	Passed	1 piece(s) 2 x 8 HF No.2 @ 16" OC	
Drop Beam	Passed	1 piece(s) 6 x 10 HF No.2	
Deck Post	Passed	1 piece(s) 6 x 6 HF No.2	

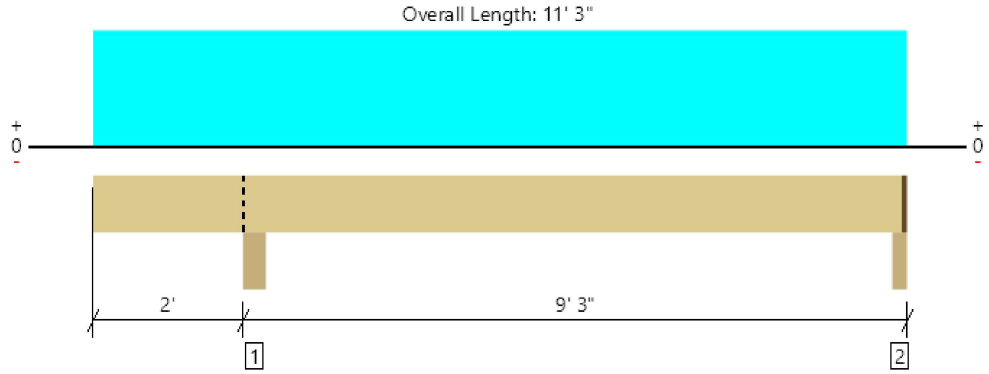
ForteWEB Software Operator	Job Notes
Logan Lee PCF Group (425) 620-6734 logan@proadminservices.net	

Weyerhaeuser

7/21/2022 6:44:40 PM UTC
ForteWEB v3.4
File Name: Chang-Nguyen Project

Deck Framing, Deck Joist

1 piece(s) 2 x 8 HF No.2 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	448 @ 11' 1/2"	1367 (2.25")	Passed (33%)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Shear (lbs)	370 @ 3' 3/4"	1088	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	912 @ 6' 8 3/16"	1284	Passed (71%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.182 @ 6' 7 3/4"	0.220	Passed (L/581)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.212 @ 6' 7 15/16"	0.441	Passed (L/499)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Beam - HF	5.50"	5.50"	1.50"	111	553	231	699	Blocking
2 - Ledger - HF	3.50"	2.25"	1.50"	69	369/-14	149	458	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 5" o/c	
Bottom Edge (Lu)	11' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 11' 3"	16"	12.0	60.0	25.0	Default Load

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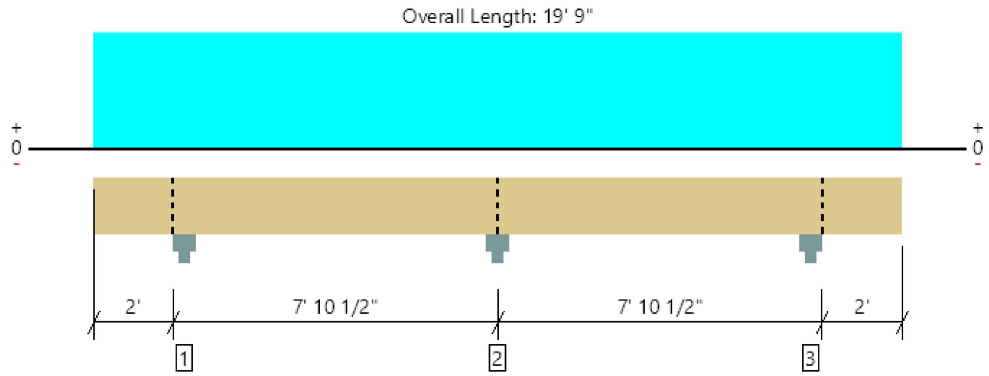
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Deck Framing, Drop Beam

1 piece(s) 6 x 10 HF No.2



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4980 @ 9' 10 1/2"	12251 (5.50")	Passed (41%)	--	1.0 D + 0.75 L + 0.75 S (Adj Spans)
Shear (lbs)	1874 @ 10' 10 3/4"	4877	Passed (38%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-3616 @ 9' 10 1/2"	4654	Passed (78%)	1.00	1.0 D + 1.0 L (Adj Spans)
Live Load Defl. (in)	0.056 @ 5' 10 13/16"	0.191	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.040 @ 0	0.223	Passed (2L/999+)	--	1.0 D + 1.0 L (Alt Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	539	2514	1009	3181	Blocking
2 - Column Cap - steel	5.50"	5.50"	2.24"	828	3964	1571	4980	Blocking
3 - Column Cap - steel	5.50"	5.50"	1.50"	539	2514	1009	3181	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 9" o/c	
Bottom Edge (Lu)	19' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 19' 9"	N/A	13.2	--	--	
1 - Uniform (PLF)	0 to 19' 9" (Front)	N/A	83.3	414.8	173.3	Linked from: Deck Joist, Support 1

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Deck Framing, Deck Post

1 piece(s) 6 x 6 HF No.2

Post Height: 12' 4"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	27	50	Passed (54%)	--	--
Compression (lbs)	4892	10518	Passed (47%)	1.00	1.0 D + 1.0 L
Base Bearing (lbs)	5059	898425	Passed (1%)	--	1.0 D + 0.75 L + 0.75 S
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Plate	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2018
Design Methodology : ASD

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	20	80	-	Default Load
2 - Point (lb)	828	3964	1571	Linked from: Drop Beam, Support 2

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: footing calcs.ec6

LIC# : KW-06018624, Build:20.22.7.7 PCF Group (c) ENERCALC INC 1983-2022

DESCRIPTION: Chang-Nguyen Deck Footing

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

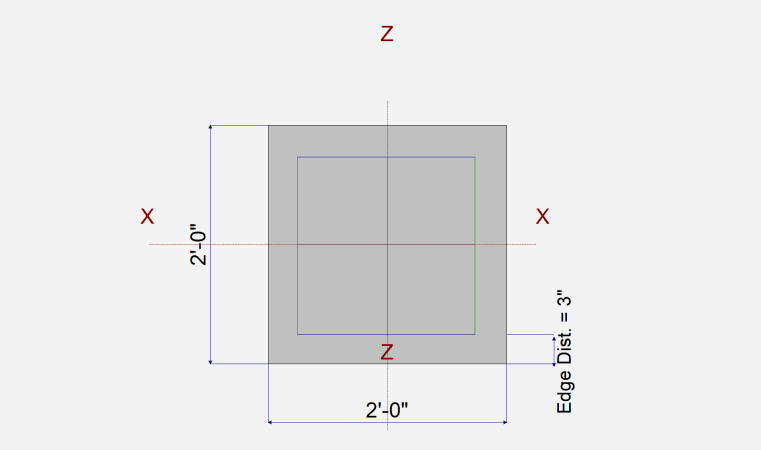
Width parallel to X-X Axis	=	2 ft
Length parallel to Z-Z Axis	=	2 ft
Footing Thickness	=	12 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

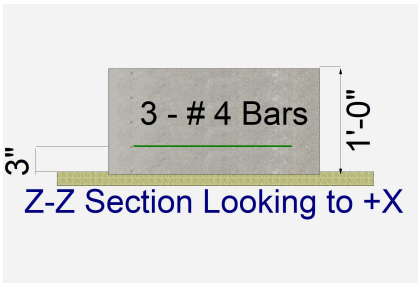


Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.8280		3.964	1.571				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: footing calcs.ec6

LIC# : KW-06018624, Build:20.22.7.7 PCF Group

DESCRIPTION: Chang-Nguyen Deck Footing

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9267	Soil Bearing	1.390 ksf	1.50 ksf	+D+0.750L+0.750S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.08697	Z Flexure (+X)	1.015 k-ft/ft	11.674 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.08697	Z Flexure (-X)	1.015 k-ft/ft	11.674 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.08697	X Flexure (+Z)	1.015 k-ft/ft	11.674 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.08697	X Flexure (-Z)	1.015 k-ft/ft	11.674 k-ft/ft	+1.20D+1.60L+0.50S
PASS	0.06016	1-way Shear (+X)	4.512 psi	75.0 psi	+1.20D+1.60L+0.50S
PASS	0.06016	1-way Shear (-X)	4.512 psi	75.0 psi	+1.20D+1.60L+0.50S
PASS	0.06016	1-way Shear (+Z)	4.512 psi	75.0 psi	+1.20D+1.60L+0.50S
PASS	0.06016	1-way Shear (-Z)	4.512 psi	75.0 psi	+1.20D+1.60L+0.50S
PASS	0.1430	2-way Punching	21.447 psi	150.0 psi	+1.20D+1.60L+0.50S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.3520	0.3520	n/a	n/a	0.235
X-X, +D+L	1.50	n/a	0.0	1.343	1.343	n/a	n/a	0.895
X-X, +D+S	1.50	n/a	0.0	0.7448	0.7448	n/a	n/a	0.497
X-X, +D+0.750L	1.50	n/a	0.0	1.095	1.095	n/a	n/a	0.730
X-X, +D+0.750L+0.750S	1.50	n/a	0.0	1.390	1.390	n/a	n/a	0.927
X-X, +0.60D	1.50	n/a	0.0	0.2112	0.2112	n/a	n/a	0.141
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.3520	0.3520	0.235
Z-Z, +D+L	1.50	0.0	n/a	n/a	n/a	1.343	1.343	0.895
Z-Z, +D+S	1.50	0.0	n/a	n/a	n/a	0.7448	0.7448	0.497
Z-Z, +D+0.750L	1.50	0.0	n/a	n/a	n/a	1.095	1.095	0.730
Z-Z, +D+0.750L+0.750S	1.50	0.0	n/a	n/a	n/a	1.390	1.390	0.927
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.2112	0.2112	0.141

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.1449	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.40D	0.1449	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+1.60L	0.9170	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+1.60L	0.9170	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+1.60L+0.50S	1.015	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+1.60L+0.50S	1.015	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L	0.3720	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L	0.3720	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D	0.1242	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D	0.1242	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+1.60S	0.6862	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+1.60S	0.6862	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+1.60S	0.4384	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: footing calcs.ec6

LIC# : KW-06018624, Build:20.22.7.7 PCF Group (c) ENERCALC INC 1983-2022

DESCRIPTION: Chang-Nguyen Deck Footing

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S	0.4384	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+0.50S	0.4701	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+0.50S	0.4701	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+0.70S	0.5094	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +1.20D+0.50L+0.70S	0.5094	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +0.90D	0.09315	+Z	Bottom	0.2592	AsMin	0.30	11.674	OK
X-X, +0.90D	0.09315	-Z	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.40D	0.1449	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.40D	0.1449	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60L	0.9170	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60L	0.9170	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60L+0.50S	1.015	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60L+0.50S	1.015	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L	0.3720	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L	0.3720	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D	0.1242	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D	0.1242	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+1.60S	0.6862	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+1.60S	0.6862	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60S	0.4384	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+1.60S	0.4384	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+0.50S	0.4701	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+0.50S	0.4701	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+0.70S	0.5094	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +1.20D+0.50L+0.70S	0.5094	+X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +0.90D	0.09315	-X	Bottom	0.2592	AsMin	0.30	11.674	OK
Z-Z, +0.90D	0.09315	+X	Bottom	0.2592	AsMin	0.30	11.674	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.64 psi	0.64 psi	0.64 psi	0.64 psi	0.64 psi	75.00 psi	0.01	OK
+1.20D+1.60L	4.08 psi	4.08 psi	4.08 psi	4.08 psi	4.08 psi	75.00 psi	0.05	OK
+1.20D+1.60L+0.50S	4.51 psi	4.51 psi	4.51 psi	4.51 psi	4.51 psi	75.00 psi	0.06	OK
+1.20D+0.50L	1.65 psi	1.65 psi	1.65 psi	1.65 psi	1.65 psi	75.00 psi	0.02	OK
+1.20D	0.55 psi	0.55 psi	0.55 psi	0.55 psi	0.55 psi	75.00 psi	0.01	OK
+1.20D+0.50L+1.60S	3.05 psi	3.05 psi	3.05 psi	3.05 psi	3.05 psi	75.00 psi	0.04	OK
+1.20D+1.60S	1.95 psi	1.95 psi	1.95 psi	1.95 psi	1.95 psi	75.00 psi	0.03	OK
+1.20D+0.50L+0.50S	2.09 psi	2.09 psi	2.09 psi	2.09 psi	2.09 psi	75.00 psi	0.03	OK
+1.20D+0.50L+0.70S	2.26 psi	2.26 psi	2.26 psi	2.26 psi	2.26 psi	75.00 psi	0.03	OK
+0.90D	0.41 psi	0.41 psi	0.41 psi	0.41 psi	0.41 psi	75.00 psi	0.01	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	3.06 psi	150.00 psi	0.02041	OK
+1.20D+1.60L	19.37 psi	150.00 psi	0.1292	OK
+1.20D+1.60L+0.50S	21.45 psi	150.00 psi	0.143	OK
+1.20D+0.50L	7.86 psi	150.00 psi	0.05239	OK
+1.20D	2.62 psi	150.00 psi	0.01749	OK
+1.20D+0.50L+1.60S	14.50 psi	150.00 psi	0.09664	OK
+1.20D+1.60S	9.26 psi	150.00 psi	0.06174	OK
+1.20D+0.50L+0.50S	9.93 psi	150.00 psi	0.06621	OK
+1.20D+0.50L+0.70S	10.76 psi	150.00 psi	0.07175	OK
+0.90D	1.97 psi	150.00 psi	0.01312	OK

Hazards by Location

Search Information

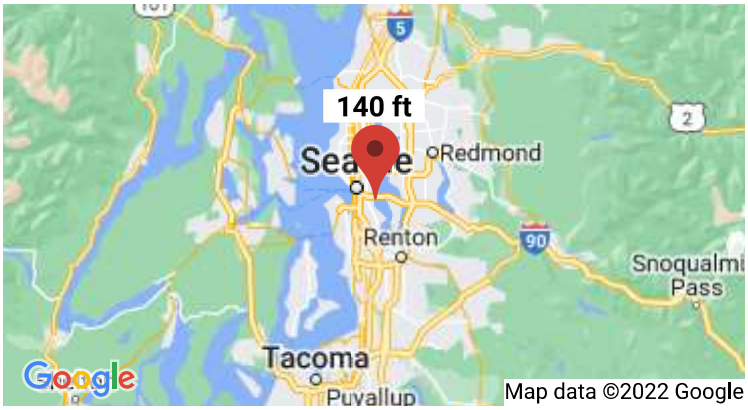
Address: 2838 Cascadia Ave S, Seattle, WA 98144, USA

Coordinates: 47.5776805, -122.2847171

Elevation: 140 ft

Timestamp: 2022-07-18T15:03:25.709Z

Hazard Type: Wind



ASCE 7-16

MRI 10-Year	67 mph
MRI 25-Year	73 mph
MRI 50-Year	78 mph
MRI 100-Year	83 mph
Risk Category I	92 mph
Risk Category II	97 mph
Risk Category III	104 mph
Risk Category IV	108 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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Hazards by Location

Search Information

Address: 2838 Cascadia Ave S, Seattle, WA 98144, USA

Coordinates: 47.5776805, -122.2847171

Elevation: 140 ft

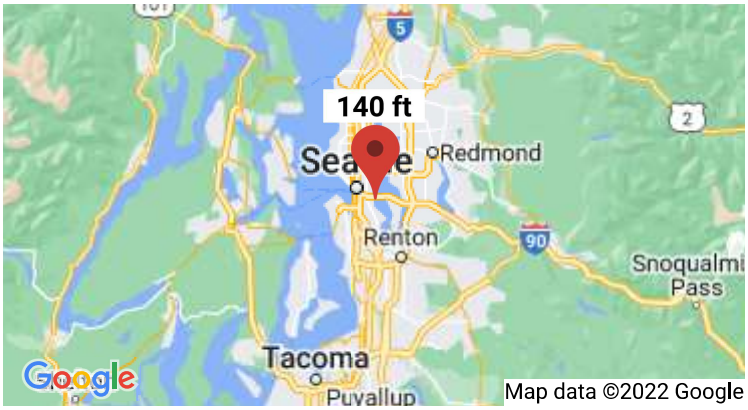
Timestamp: 2022-07-18T15:04:18.214Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D-default



Basic Parameters

Name	Value	Description
S_S	1.438	MCE_R ground motion (period=0.2s)
S_1	0.5	MCE_R ground motion (period=1.0s)
S_{MS}	1.726	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.151	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.902	Coefficient of risk (0.2s)
CR_1	0.896	Coefficient of risk (1.0s)
PGA	0.615	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.738	Site modified peak ground acceleration