Vinson Engineering, Inc.
P.O. Box 1651 Sebastopol, CA 95473
Phone (707) 824-1134

DCV	Structural Calculations for interior remodel: Anatoliy Kreshchenovskiy 7170 Bennett Valley Road Santa Rosa, California	Job #: 21010
Date: 5.19.21		1 of 5

DESIGN CRITERIA

***California Residential Building Code* - 2019 Edition / ASCE 7-10**

Lateral Loads-

Wind: N/A

Seismic: S_s = 2.401 / S_1 = 0.914 SDC=E C_s = 0.246

.6- [S_{DS} *.14] = 0.331 Site Class C

Vertical Loads-

	Dead	Live
Interior Walls (gyp)	10 psf	--------

Foundation Design

Vinson Engineering has not made a field review to ascertain the soil conditions of the building site and is not responsible for the general site stability or soil suitability for the proposed project. A Review by a soil engineer or geologist may be desirable by the owner.

Foundation design is based on minimum footing dimensions as set forth in Sections 1809.7, 1807.1.6 and 1905 of the California Building Code. Assume class 5 soil with an allowable soil bearing pressure of 1500 psf and a constant expansion index less than 20.

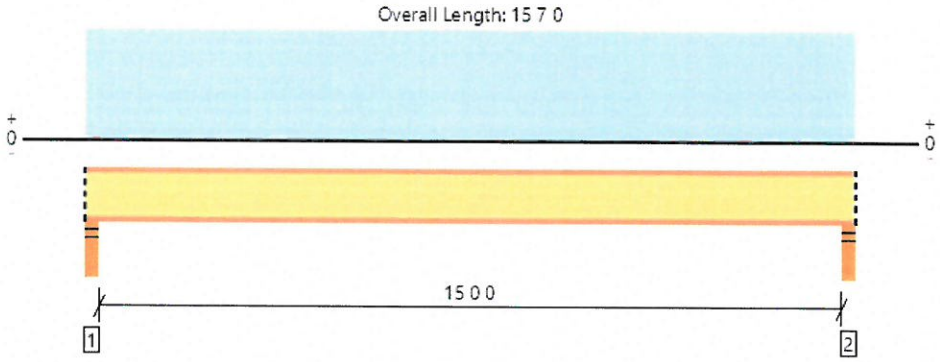
FORTE WEB

MEMBER REPORT

2 PASSED

ceiling, ceiling Joist

1 piece(s) 9 1/2" TJI® 110 @ 24" 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)	112 @ 0 2 8	1719 (3.50")	Passed (7%)	1.25	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	108 @ 0 3 8	1525	Passed (7%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	414 @ 7 9 8	3125	Passed (13%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.082 @ 7 9 8	0.758	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.118 @ 7 9 8	1.011	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Total	
1 - Stud wall - DF	3.50"	3.50"	1.75"	34	78	112	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.75"	34	78	112	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)	7 4 0 o/c	
Bottom Edge (Lu)	15 7 0 o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Comments
1 - Uniform (PSF)	0 0 0 to 15 7 0	24"	2.2	5.0	ceiling

Member Notes

ceiling joist

Weyerhaeuser Notes

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

ForteWEB Software Operator	Job Notes
David Vinson Vinson Engineering (707) 824-1134 dave@vinsonengineering.com	Kreshchenovskiy Project 7170 Bennett Valley Road Santa Rosa, CA #21010

Weyerhaeuser

5/24/2021 9:37:33 PM UTC
ForteWEB v3.2, Engine: V8.2.0.17, Data: V8.1.0.16
File Name: 21010 - 7170 Bennett Valley Road

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Soil Site Class	D	Table 20-3-1, Default = D	
Response Spectral Acc. (0.2 sec) S_s =	228.30%g	= 2.283g	Figure 22-1 through 22-14
Response Spectral Acc.(1.0 sec) S_1 =	86.70%g	= 0.867g	Figure 22-1 through 22-14
Site Coefficient F_a =	1.000		Table 11.4-1
Site Coefficient F_v =	1.500		Table 11.4-2
Max Considered Earthquake Acc. S_{MS} =	$F_a.S_s$	= 2.283	(11.4-1)
Max Considered Earthquake Acc. S_{M1} =	$F_v.S_1$	= 1.301	(11.4-2)
@ 5% Damped Design S_{DS} =	$2/3(S_{MS})$	= 1.522	(11.4-3)
S_{D1} =	$2/3(S_{M1})$	= 0.867	(11.4-4)
Building Occupancy Categories	II, Standard		Table 1-1
Design Category Consideration:	Flexible Diaphragm		with dist. between seismic resisting system >40ft
Seismic Design Category for 0.1sec	D		Table 11.6-1
Seismic Design Category for 1.0sec	D		Table 11.6-2
S1 ≥ .75g	E		Section 11.6
SDC =	E		

Comply with Seismic Design Category E — IRC, Seismic Design Category = E — T-R301.2.2.1.1

12.8 Equivalent lateral force procedure

A. BEARING WALL SYSTEMS — T-12.2-

Seismic Force Resisting Systems: 14. Light-framed walls with shear panels of all other materials

C_t =	0.02	x = 0.75		T-12.8-2
Building ht. H_n =	15	ft	Limited Building Height (ft) =	NP
C_u =	1.400	for S_{D1} of 0.867g	Table 12.8-1	
Approx Fundamental period, T_a =	$C_t(h_n)^x$	= 0.152	12.8-7	T_L = 8 Sec
Calculated T shall not exceed ≤	Cu.Ta	= 0.213	Use T = 0.152	sec.
0.8Ts =	$0.8(S_{D1}/S_{DS})$	= 0.694		
Is structure Regular & ≤ 5 stories ?	Yes		12.8.1.3	
Response Spectral Acc.(0.2 sec) S_s =	1.500g		*Max Ss ≤ 0.15g*	
F_a =	1.00			
@ 5% Damped Design S_{DS} =	$⅔(F_a.S_s)$	= 1.000g	(11.4-3)	
Response Modification Coef. R =	2		Table-12.2-1	
Over Strength Factor Ω_o =	2		foot note g	
Importance factor I =	1		Table 11.5-1	
Seismic Base Shear V =	$C_s W$			
C_s =	$S_{DS}/R/I$	=0.761		(12.8-2)
or need not to exceed, C_s =	$S_{D1}/(R/I).T$	= 2.844	For T≤ T_L	(12.8-3)
or C_s =	$S_{D1}T_L/T^2(R/I)$	N/A	For T > T_L	(12.8-4)
C_s shall not be less than =	0.01			(12.8-5)
Min C_s =	$0.5S_1I/R$	= 0.217	For S_1 ≥ 0.6g	(12.8-6)
Use C_s =	0.761			
Design base shear V =	0.761 W	**Control**		

12.14 Simplified Seismic base shear — T-12.14 — 14. Light-framed walls with shear panels of all other materials

@ 5% Damped Design S_{DS} =	1.522	SDC = D	Limitations: P
F =	1	For one-story buuilding	R = 2
V =	$FS_{DS}(W)/R$	= 0.761 W	

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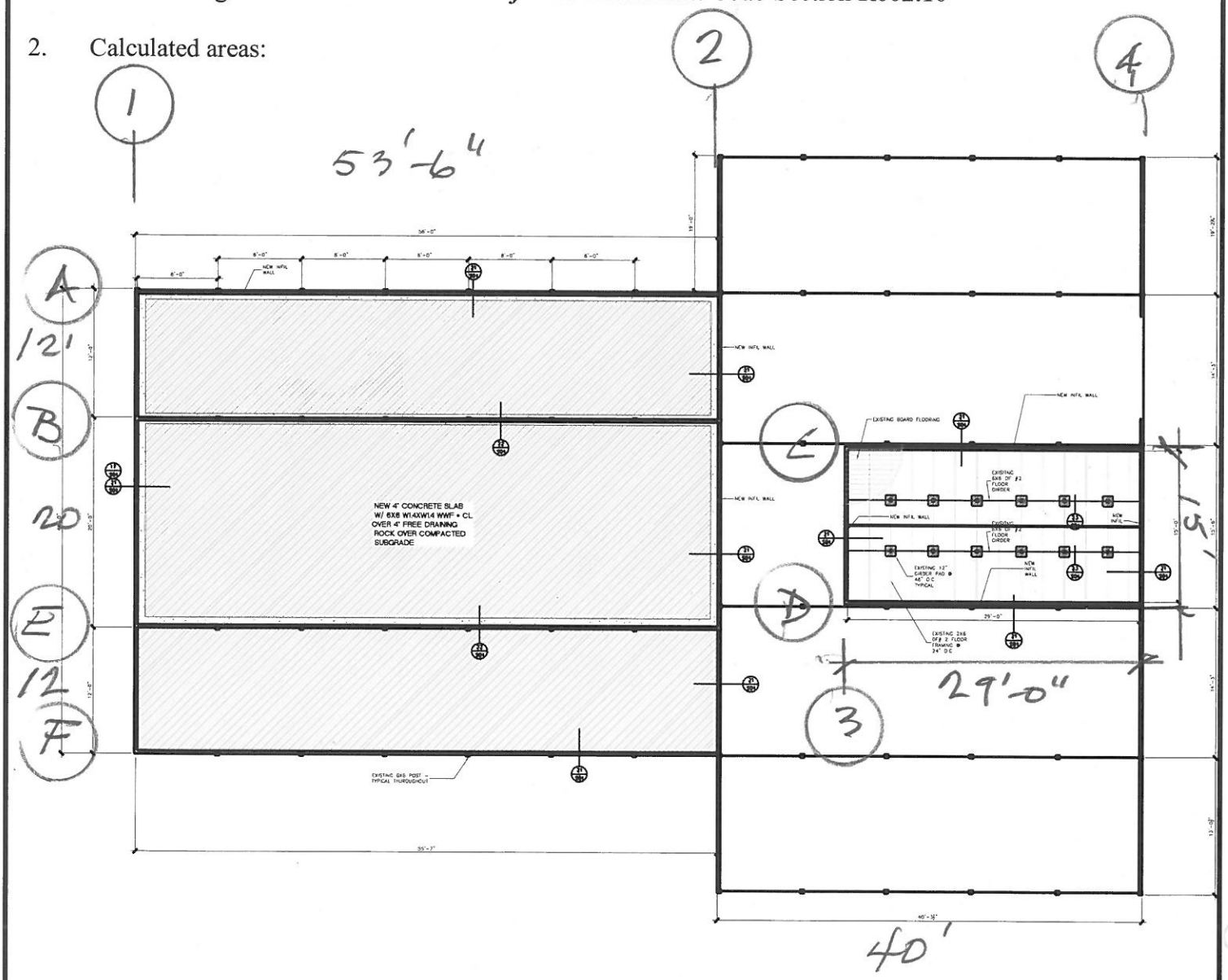
Lateral Review

1. All exterior walls except as noted below conform to the bracing requirements of the Wall Bracing Provisions of the ***2019California Residential Code*** Section **R602.10**

2. Calculated areas:



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$F_s = 0.761\ W$

CEILING - JOIST @ 14" - 1.1 psf
1/2" GYP BRD - 2.2 psf / 3.3 psf

WALL - 2x4 STUDS @ 16" o.c. - 1.1 psf
2 LAYERS GYP - 4.4
INSUL 1.0
6.5 psf

GRID 1

$F_s = 0.761\left[24(2.2) + 3.3(20) + 10/2\,(2)6.5 + 6/2\,(2)6.5\right]\frac{52.5 + 46 + (65) + 39}{2}$

$= 4335^{\#}$

$v_{roof/wall} = 4335/44 = 103\ plf$ (G4)

GRID 2

$v = \frac{4335}{7+16+4+7} = 120\ plf$ (A6)

GRIDS A, B, C, D - OK BY INSP.

GRIDS C & D OK BY INSP.

GRID 3

$F_{G3} = .761\left[29(7.5)3.3 + 10/2\,(6.5)2(7.5)\right] = 917^{\#}$

$v = 917/6+6 = 76\ plf$ (G4)