2015 IBC LATERAL ANALYSIS AND GRAVITY LOAD ENGINEERING

FOR: LEVI HENDERSON
PLAN: EDWARDS RESIDENCE

John Hodge, P.E.
2615 Jahn Ave. N.W.
Suite E-5
Gig Harbor, WA 98335
Phone: (253) 857-7055
Fax: (253) 857-7599

PROJECT NUMBER
190390

DATE
07.11.19

SITE CRITERIA

DESIGN ROOF SNOW LOAD	WIND SPEED (V-ULT)	WIND EXPOSURE	(IBC) SEISMIC DESIGN CATEGORY	SITE SOIL CLASS.	RISK CATEGORY	
25 PSF	110 MPH	B	D	D	II	
SLOPE PER OWNER	SPECIAL SITE CONDITIONS PER OWNER	GEOTECH REPORT PER OWNER	FROST DEPTH	SEISMIC SPECTRAL RESPONSE S1	SEISMIC SPECTRAL RESPONSE Ss	APPROX. ELEVATION
<15%	NONE	NONE	12"	0.598g	1.573g	230 FT

VALUES OBTAINED FROM JURISDICTION, STATE, AND NATIONAL AGENCIES

07/11/2019
190390

JOHN E. HODGE
STATE OF WASHINGTON
37886
REGISTERED
PROFESSIONAL ENGINEER

SITE:
4457 SE SALMONBERRY RD
PORT ORCHARD, WA 98366

TRUSS MANUFACTURER SHOP DRAWINGS PROVIDED FOR ENGINEERING REVIEW: NONE

SINGLE SITE ENGINEERING
THIS ENGINEERING IS FOR THE SITE AND CONDITIONS LISTED ABOVE ONLY

TABLE OF CONTENTS

[1] 2015 International Building Code (IBC)

Hodge engineering inc.

2015 IBC Lateral and Gravity Engineering Calculations Package For Plans Examiner

This engineering calculations package contains the lateral and gravity load engineering as noted in the engineering scope.

All engineered load bearing structural members are specified on the full size engineering sheets. The enclosed engineering calculations document the engineering analysis. The engineering calculations are not required to be referenced onsite for construction. These calculations are to demonstrate to the Plans Examiner that the engineering was completed following the 2015 IBC. The cover sheet of the engineering specifies the engineering scope as lateral and gravity load engineering.

LATERAL ENGINEERING: Lateral engineering involves determining what the seismic and wind loads are according to ASCE 7-10. Applying these loads to the structure, and determining the design of the lateral structural elements to resist these loads. The structural elements are sheathing, nailing, holdowns, and the connections between loaded members and shear resisting elements.

Lateral load modeling was completed with Wood Works Design Office 10 (www.woodworks-software.com 800-844-1275). Wood Works was developed in conjunction with the American Forest & Paper Association. The AF&PA is the same professional organization that produces the *National Design Specification (NDS) for Wood Construction*, the *Allowable Stress Design* (ASD) *manual for engineered wood construction*, *Wood Frame Construction Manual* (WFCM) *for one-and two-family dwellings*, and the *Load and Resistance Factor Design* (LFRD) *manual for engineered wood construction*. The AF&PA "wrote the manuals" all engineers use.

Seismic: Seismic load engineering follows the ASCE 7-10 12.8 equivalent lateral force procedure. Per ASCE 7 the analysis consists of the application of equivalent static lateral forces to a linear mathematical model of the structure. The total forces applied in each direction are the total base shear. Refer to ASCE 7-10 12.8 for a detailed description of this procedure. The engineering calculations include a USGS determination of the seismic spectral response accelerations. These numbers, S_1 and Ss, are used in the lateral model to determine seismic loading to the shearwalls. Woodworks Design Office was used to make the linear mathematical model specified by ASCE 7-10 section 12.8.

Wind: Wind load engineering follows the ASCE 7-10 Directional method for all heights. The wind loading is determined from the wind exposure and wind speed. This loading is applied to surfaces of the structure as modeled. Total loadings for each shear line, wall line, and full height shearwall are determined. Required shear strengths for each shearwall are calculated then sheathing and nailing patterns are chosen to resist design loads. Holdowns are applied where the nailing of the OSB sheathing to the mudsill or lower floor is not adequate to resist shear panel overturning.

GRAVITY LOAD ENGINEERING: Gravity loads from snow, structure, occupants, etc. meeting the requirements of the 2015 IBC have been traced through the structure. Refer to the legend on the engineering sheets showing how the point and line loads are depicted. All loads are supported and traced through the structure. Load supporting members have been numbered for reference back to the engineering calculations. Loads to the foundation or soil have reinforced footings specified where required.

Edwards Residence

Hodge
Project Number: #190390
Site Address:
4457 SE Salmonberry Rd
Port Orchard, WA 98366
Kitsap County
Jurisdiction: Kitsap County

Approximate Elevation: ~230 FT

Hodge engineering inc.

Permit Number: 19-02196

Hazards by Location

Search Information

Coordinates: 47.512821, -122.593403

Elevation: 227 ft

Timestamp: 2019-06-14T15:02:44.135Z

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	98 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.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the

Hazards by Location

Search Information

Coordinates: 47.512821, -122.593403

Elevation: 227 ft

Timestamp: 2019-06-14T15:03:23.666Z

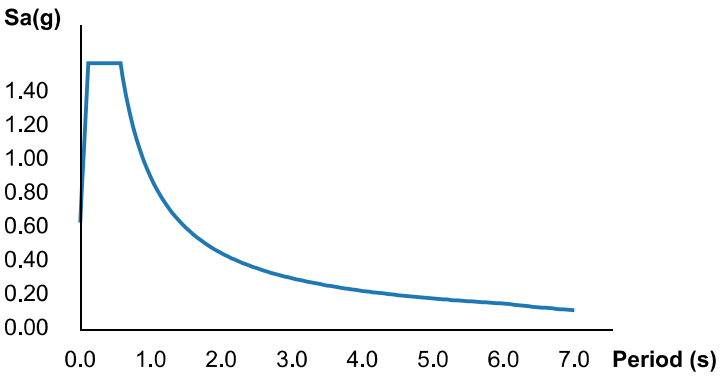
Hazard Type: Seismic

Reference Document: ASCE7-10

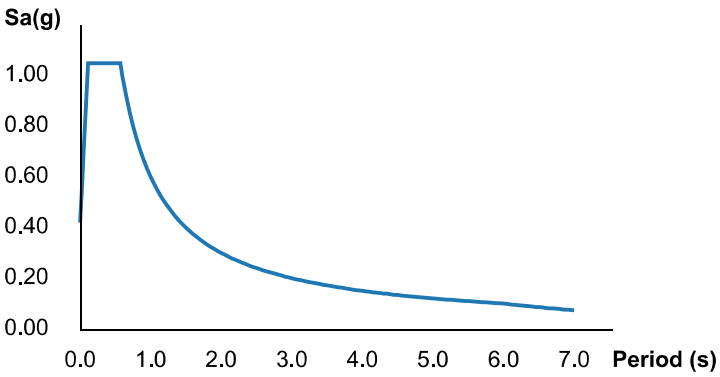
Risk Category: II

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.573	MCE_R ground motion (period=0.2s)
S_1	0.598	MCE_R ground motion (period=1.0s)
S_{MS}	1.573	Site-modified spectral acceleration value
S_{M1}	0.897	Site-modified spectral acceleration value
S_{DS}	1.048	Numeric seismic design value at 0.2s SA
S_{D1}	0.598	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s
CR_S	0.941	Coefficient of risk (0.2s)

14.04.535 Design criteria.

IRC Table R301.2(1) is amended by filling in the blanks of the table to reflect specific Kitsap County criteria as follows:

Ground Snow Load = 25[a].

Wind Speed = Ultimate. 110

Wind Debris = No

Special Wind Region = No

Seismic Design Category = D2

Weathering = Moderate

Frost Line Depth = 12"

Termite = Slight to Moderate

Decay = Moderate to Severe

Winter Design Temp = 26

Ice Barrier Underlayment Required = No

Flood Hazards = (a) 1980, (b) 1980

Air Freezing Index = 148

Mean Annual Temp = 51.4

Topographic Effects = Yes

a. Roof live load may not be reduced to less than 25#psf.

(Ord. 552 (2018) § 8, 2018: Ord. 464 (2010) § 12, 2010: Ord. 391 (2007) § 12, 2007: Ord. 323 (2004) § 53, 2004)

Snow Loading Calculation

Site: 4457 SE Salmonberry Rd, Port Orchard, WA 98366
Plan: Edwards Residence
Job: 190390

Three resources for determining snow load:

1. Snow Load Analysis for Washington; 2nd Edition by the Structural Engineers Association of Washington (SEAW). "This edition provides a large color map for each half of the state, with normalized ground snow load isolines and elevation contours to help readily determine the ground snow load anywhere in the state".
2. WABO/SEAW White Paper #8 "Guidelines for Determining Snow Loads in Washington State" available on www.seaw.org/publications
3. ASCE 7-10 Chapter 7 Snow Loads

Ground Snow Load p_g:
(ASCE 7-10 7.2 Extreme value statistical analysis using 2% annual probability of being exceeded)
Normalized ground snow load (NGSL) = 0.050
Lot Elevation = 230 ft. from Google Earth

1. Ground snow load = NGSL x elevation = 0.050 * 230 = 12 psf = p_g
2. SEAW Snow Load Analysis for Washington Appendix A = Port Orchard – 15 PSF (@140 FT)

Roof Snow Load p_f:
ASCE 7-10 7.3 Flat roof snow load $p_f = 0.7C_eC_tIp_g$
ASCE 7-10 7.3.1 C_e is the exposure factor = 1.0 for partially exposed structure (table 7.2)
ASCE 7-10 7.3.2 C_t is the thermal factor = 1.1 for heated residences (table 7.3)
ASCE 7-10 7.3.3 I is the importance factor = 1.0 for residences (table 1.5-2)
ASCE 7-10 7.4 Sloped roof snow loads - no roof slope reduction Cs taken
ASCE 7-10 7.6 Trussed roof or slope exceeding 7:12 – no unbalanced snow loading

$p_f = 0.7C_eC_tIp_g$
$= 0.7 * 1.0 * 1.1 * 1.0 * 12\ p_g = 9$ psf

Kitsap County minimum roof snow load 25 psf. "Snow load to be approved by the authority having jurisdiction…" ASCE 7-10 7.2

Hodge Engineering, Inc.
John E. Hodge P. E.
2615 Jahn Ave NW Ste. E5 Gig Harbor, WA 98335
(253) 857-7055 Fax (253) 857-7599

WoodWorks® Shearwalls 11.1

LATERAL ANALYSIS - 190390.wsw **Jun. 24, 2019 09:29:04**

Project Information

COMPANY AND PROJECT INFORMATION

Company	Project
Hodge Engineering 2615 Jahn Ave NW Suite E-5 Gig Harbor, WA 98335	

DESIGN SETTINGS

Design Code	Wind Standard	Seismic Standard
IBC 2015/AWC SDPWS 2015	ASCE 7-10 Directional (All heights)	ASCE 7-10

Load Combinations		Building Code Capacity Modification	
For Design (ASD)	For Deflection (Strength)	Wind	Seismic
0.70 Seismic	1.00 Seismic	1.00	1.00
0.60 Wind	1.00 Wind		

Service Conditions and Load Duration				Max Shearwall Offset [ft]	
Duration Factor	Temperature Range	Moisture Content Fabrication	Moisture Content Service	Plan (within story)	Elevation (between stories)
1.60	T<=100F	19% <=19%	10% <=19%	4.00	-

Maximum Height-to-width Ratio						
Wood panels		Fiberboard	Lumber		Gypsum	
Wind	Seismic		Wind	Seismic	Blocked	Unblocked
3.5	3.5	-	-	-	-	-

Ignore non-wood-panel shear resistance contribution...		Collector forces based on...	
Wind	Seismic	Hold-downs	Applied loads
Never	Never	Drag struts	Applied loads

Shearwall Relative Rigidity:	Wall capacity
Perforated shearwall Co factor:	SDPWS Equation 4.3-5
Non-identical materials and construction on the shearline:	Not allowed
Deflection Equation:	4-term from SDPWS C4.3.2-2
Drift limit for wind design:	1 / 500 story height

SITE INFORMATION

Wind	Seismic
ASCE 7-10 Directional (All heights)	ASCE 7-10 12.8 Equivalent Lateral Force Procedure

Design Wind Speed	110 mph	**Risk Category**	Category II - All others
Serviceability Wind Speed	85 mph	**Structure Type**	Regular
Exposure	Exposure B	**Building System**	Bearing Wall
Enclosure	Enclosed	**Design Category**	D
Min Wind Loads: Walls	16 psf	**Site Class**	D
Roofs	8 psf		

Topographic Information [ft]

Shape	Height	Length
-	-	-

Site Location: -

Elev: 230ft Avg Air density: 0.076 lb/cu ft
Rigid building - Static analysis

Spectral Response Acceleration

S1: 0.598g **Ss:** 1.573g

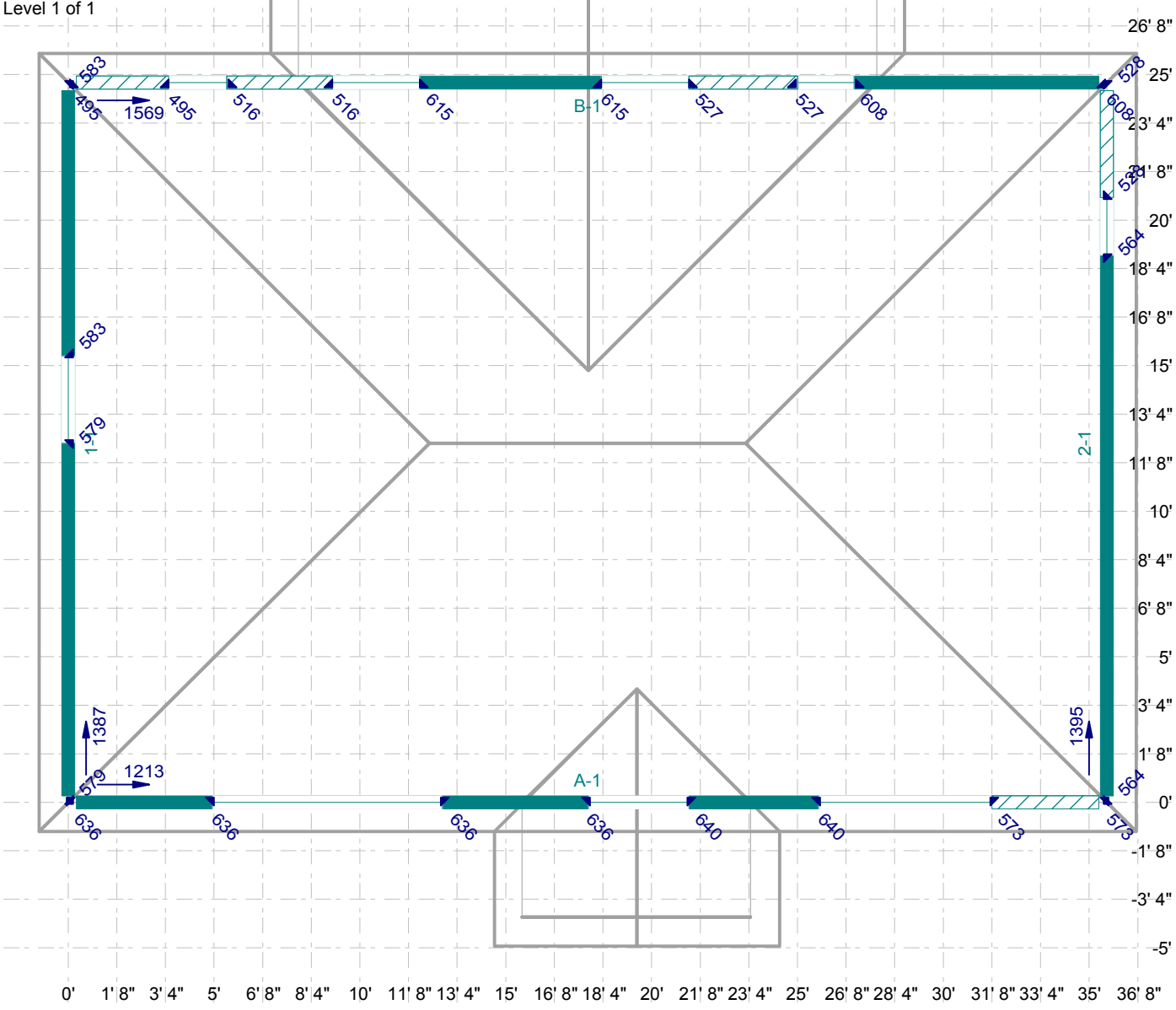
Fundamental Period	E-W	N-S
T Used	0.130s	0.130s
Approximate Ta	0.130s	0.130s
Maximum T	0.182s	0.182s
Response Factor R	6.50	6.50

Case 2	E-W loads	N-S loads
Eccentricity (%)	15	15
Loaded at	75%	

Fa: 1.00 **Fv:** 1.50

Permit Number: 19-02196

Level 1 of 1

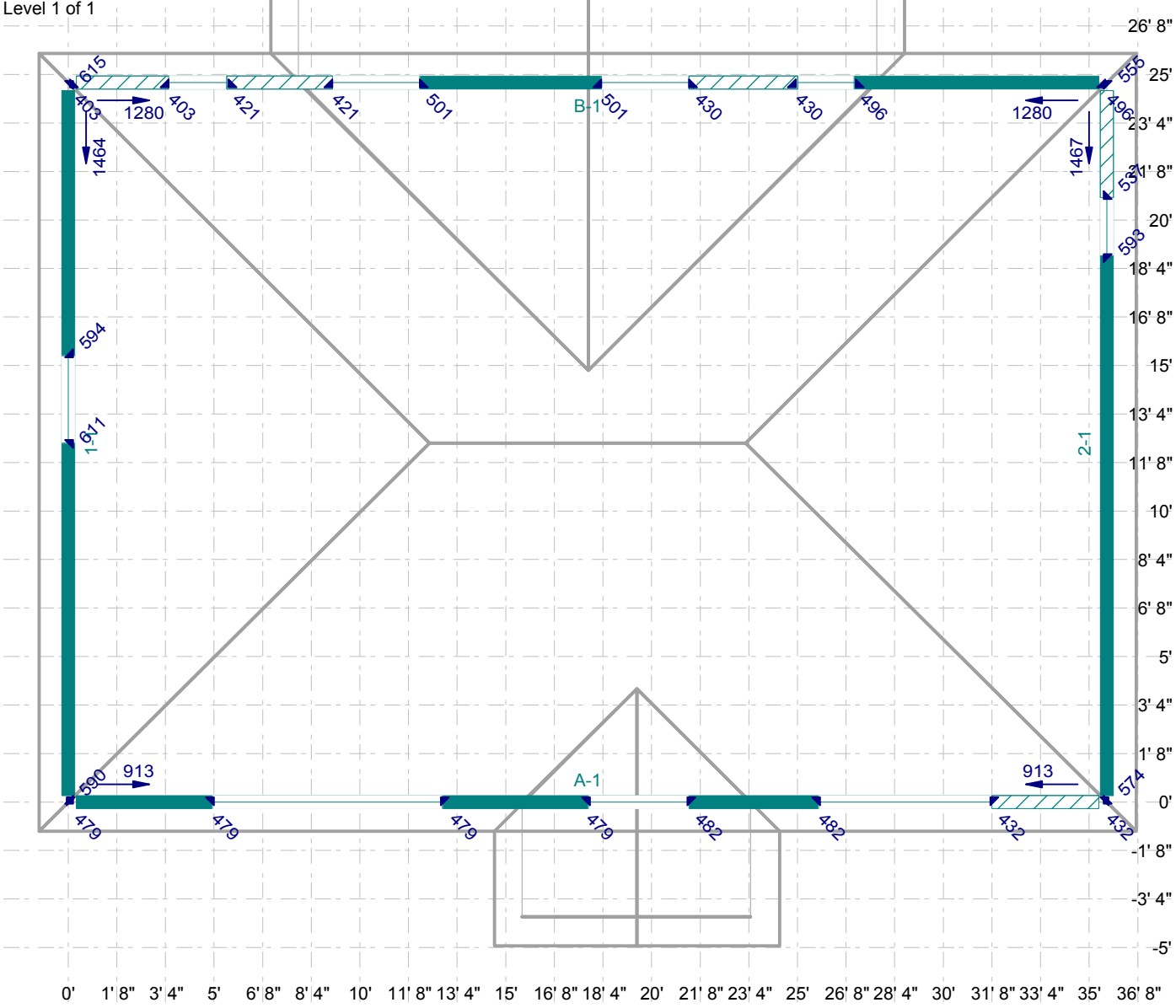


SEISMIC DESIGN SHEAR LINE LOADS AND OVERTURNING VALUES

- Factored shearline force (lbs)
- Factored holddown force (lbs)
- C Compression force exists
- Vertical element required
- Unfactored applied shear load (plf)
- Unfactored dead load (plf,lbs)
- Applied point load or discontinuous shearline force (lbs)

Loads: Seismic (Qe); Forces: 0.7E + 0.6D; E = pQe + 0.2 Sds D; p(NS) = 1.0; p(EW) = 1.0; Sds = 1.05; Flexible distribution

Level 1 of 1



WIND DESIGN SHEAR LINE LOADS AND OVERTURNING VALUES

- Factored shearline force (lbs)
- Factored holddown force (lbs)
- C Compression force exists
- Vertical element required
- Unfactored applied shear load (plf)
- Unfactored dead load (plf,lbs)
- Unfactored uplift wind load (plf,lbs)
- Applied point load or discontinuous shearline force (lbs)

Loads: Directional Case 1 Wind (W); Forces: 0.6W + 0.6D; Flexible distribution

Structural Data

STORY INFORMATION

	Story Elev [ft]	Floor/Ceiling Depth [in]	Wall Height [ft]	Hold-down Length subject to shrinkage [in]	Hold-down Bolt length [in]
Ceiling	12.00	0.0			
Level 1	3.00	10.0	9.00	14.0	14.5
Foundation	2.00				

BLOCK and ROOF INFORMATION

Block Dimensions [ft]			Roof Panels Face	Type	Slope	Overhang [ft]
Block 1	1 Story	E-W Ridge				
Location X,Y =	0.00	0.00	**North**	Side	26.6	1.00
Extent X,Y =	36.00	25.00	**South**	Side	26.6	1.00
Ridge Y Location, Offset	12.50	0.00	**East**	Hip	26.6	1.00
Ridge Elevation, Height	18.00	6.50	**West**	Hip	26.6	1.00
Block 2	1 Story	N-S Ridge				
Location X,Y =	8.00	25.00	**North**	Gable	90.0	1.00
Extent X,Y =	20.00	10.00	**South**	Joined	153.4	1.00
Ridge X Location, Offset	18.00	0.00	**East**	Side	26.6	1.00
Ridge Elevation, Height	17.00	5.00	**West**	Side	26.6	1.00
Block 3	1 Story	N-S Ridge				
Location X,Y =	16.00	-4.00	**North**	Joined	153.4	1.00
Extent X,Y =	8.00	4.00	**South**	Gable	90.0	1.00
Ridge X Location, Offset	19.50	0.00	**East**	Side	26.6	1.00
Ridge Elevation, Height	14.00	2.00	**West**	Side	26.6	1.00

SHEATHING MATERIALS by WALL GROUP

Grp	Surf	Material	Ratng	Sheathing Thick in	GU in	Ply	Or	Gvtv lbs/in	Fasteners Size	Type	Df	Eg in	Fd in	Bk	Apply Notes
1	Ext	Struct Sh OSB	24/16	7/16	-	3	Vert	83500	8d	Nail	N	6	12	Y	1,3

Legend:
Grp – Wall Design Group number, used to reference wall in other tables
Surf – Exterior or interior surface when applied to exterior wall
Ratng – Span rating, see SDPWS Table C4.2.2.2C
Thick – Nominal panel thickness
GU - Gypsum underlay thickness
Ply – Number of plies (or layers) in construction of plywood sheets
Or – Orientation of longer dimension of sheathing panels
Gvtv – Shear stiffness in lb/in. of depth from SDPWS Tables C4.2.2A-B
Type – Fastener type from SDPWS Tables 4.3A-D: Nail – common wire nail for structural panels and lumber, cooler or gypsum wallboard nail for GWB, plasterboard nail for gypsum lath, galvanised nail for gypsum sheathing; Box - box nail; Casing – casing nail; Roof – roofing nail; Screw – drywall screw
Size - Common, box, and casing nails: refer to SDPWS Table A1 (casing sizes = box sizes).
Gauges: 11 ga = 0.120" x 1-3/4" (gypsum sheathing, 25/32" fiberboard), 1-1/2" (lath & plaster, 1/2" fiberboard); 13 ga plasterboard = 0.92" x 1-1/8".
Cooler or gypsum wallboard nail: 5d = .086" x 1-5/8"; 6d = .092" x 1-7/8"; 8d = .113" x 2-3/8"; 6/8d = 6d base ply, 8d face ply for 2-ply GWB.
Drywall screws: No. 6, 1-1/4" long.
5/8" gypsum sheathing can also use 6d cooler or GWB nail
Df – Deformed nails (threaded or spiral), with increased withdrawal capacity
Eg – Panel edge fastener spacing
Fd – Field spacing interior to panels
Bk – Sheathing is nailed to blocking at all panel edges; Y(es) or N(o)
Apply Notes – Notes below table legend which apply to sheathing side

Notes:
1.Capacity has been reduced for framing specific gravity according to SDPWS T4.3A Note 3.
3. Shear capacity for current design has been increased to the value for 15/32" sheathing with same nailing because stud spacing is 16" max. or panel orientation is horizontal. See SDPWS T4.3A Note 2.

FRAMING MATERIALS and STANDARD WALL by WALL GROUP

Wall Grp	Species	Grade	b in	d in	Spcg in	SG	E psi^6	Standard Wall
1	Hem-Fir	Stud	1.50	5.50	16	0.43	1.20	

Legend:
Wall Grp – Wall Design Group
b – Stud breadth (thickness)
d – Stud depth (width)
Spcg – Maximum on-centre spacing of studs for design, actual spacing may be less.
SG – Specific gravity
E – Modulus of elasticity
Standard Wall - Standard wall designed as group.

Notes:
Check manufacture requirements for stud size, grade and specific gravity (G) for all shearwall hold-downs.

SHEARLINE, WALL and OPENING DIMENSIONS

North-south Shearlines	Type	Wall Group	Location X [ft]	Extent [ft] Start	Extent [ft] End	Length [ft]	FHS [ft]	Aspect Ratio	Height [ft]
Line 1									
Level 1									
Line 1		1	0.00	0.00	25.00	25.00	22.00	-	9.00
Wall 1-1	Seg	1	0.00	0.00	25.00	25.00	22.00	-	-
Segment 1		-	-	0.00	12.50	12.50	-	0.72	-
Opening 1		-	-	12.50	15.50	3.00	-	-	5.00
Segment 2		-	-	15.50	25.00	9.50	-	0.95	-
Line 2									
Level 1									
Line 2		1	36.00	0.00	25.00	25.00	23.00	-	9.00
Wall 2-1	Seg	1	36.00	0.00	25.00	25.00	23.00	-	-
Segment 1		-	-	0.00	19.00	19.00	-	0.47	-
Opening 1		-	-	19.00	21.00	2.00	-	-	5.00
Segment 2		-	-	21.00	25.00	4.00	-	2.25	-

East-west Shearlines	Type	Wall Group	Location Y [ft]	Extent [ft] Start	Extent [ft] End	Length [ft]	FHS [ft]	Aspect Ratio	Height [ft]
Line A									
Level 1									
Line A		1	0.00	0.00	36.00	36.00	18.50	-	9.00
Wall A-1	Seg	1	0.00	0.00	36.00	36.00	18.50	-	-
Segment 1		-	-	0.00	5.00	5.00	-	1.80	-
Opening 1		-	-	5.00	13.00	8.00	-	-	5.00
Segment 2		-	-	13.00	18.00	5.00	-	1.80	-
Opening 2		-	-	18.00	21.50	3.50	-	-	5.00
Segment 3		-	-	21.50	26.00	4.50	-	2.00	-
Opening 3		-	-	26.00	32.00	6.00	-	-	5.00
Segment 4		-	-	32.00	36.00	4.00	-	2.25	-
Line B									
Level 1									
Line B		1	25.00	0.00	36.00	36.00	26.00	-	9.00
Wall B-1	Seg	1	25.00	0.00	36.00	36.00	26.00	-	-
Segment 1		-	-	0.00	3.50	3.50	-	2.57	-
Opening 1		-	-	3.50	5.50	2.00	-	-	5.00
Segment 2		-	-	5.50	9.17	3.67	-	2.45	-
Opening 2		-	-	9.17	12.17	3.00	-	-	5.00
Segment 3		-	-	12.17	18.50	6.33	-	1.42	-
Opening 3		-	-	18.50	21.50	3.00	-	-	5.00
Segment 4		-	-	21.50	25.25	3.75	-	2.40	-
Opening 4		-	-	25.25	27.25	2.00	-	-	5.00
Segment 5		-	-	27.25	36.00	8.75	-	1.03	-

Legend:
Type - Seg = segmented, Prf = perforated, NSW = non-shearwall
Location - Dimension perpendicular to wall
FHS - Length of full-height sheathing used to resist shear force. For perforated walls, it is based on the factored segments Li defined in SDPWS 4.3.4.3
Aspect Ratio – Ratio of wall height to segment length (h/bs)
Wall Group - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall

Design Summary

SHEARWALL DESIGN

Wind Shear Loads, Flexible Diaphragm
All shearwalls have sufficient design capacity.

Wind Shear Loads, Rigid Diaphragm
All shearwalls have sufficient design capacity.

Components and Cladding Wind Loads, Out-of-plane Sheathing
All shearwalls have sufficient design capacity.

Components and Cladding Wind Loads, Nail Withdrawal
All shearwalls have sufficient design capacity.

Seismic Loads, Flexible Diaphragm
All shearwalls have sufficient design capacity.

Seismic Loads, Rigid Diaphragm
All shearwalls have sufficient design capacity.

HOLDDOWN DESIGN

Wind Loads, Flexible Diaphragm
All hold-downs have sufficient design capacity.

Wind Loads, Rigid Diaphragm
All hold-downs have sufficient design capacity.

Seismic Loads, Flexible Diaphragm
All hold-downs have sufficient design capacity.

Seismic Loads, Rigid Diaphragm
All hold-downs have sufficient design capacity.

This Design Summary does not include failures that occur due to excessive story drift from ASCE 7 CC1.2 (wind) or 12.12 (seismic).
Refer to Story Drift table in this report to verify this design criterion.
Refer to the Deflection table for possible issues regarding fastener slippage (SDPWS Table C4.2.2D).

Flexible Diaphragm Wind Design
ASCE 7 Directional (All Heights) Loads

SHEAR RESULTS

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf] v	vmax	V [lbs]	Asp-Cub Int	Asp-Cub Ext	Allowable Shear [plf] Int	Ext	Co	C	Cmb	V [lbs]	Resp. Ratio
Line 1														
Level 1														
Ln1, Lev1	-	S->N	-	-	1414	-	-	-	339	-		-	7447	-
	-	N->S	-	-	1464	-	-	-	339	-		-	7447	-
Wall 1-1	1	S->N	-	-	1414	-	1.0	-	339	-		-	7447	-
	1	N->S	-	-	1464	-	1.0	-	339	-		-	7447	-
Seg. 1	-	S->N	64.3	-	804	-	1.0	-	339	-		339	4232	0.19
	-	N->S	66.5	-	832	-	1.0	-	339	-		339	4232	0.20
Seg. 2	-	S->N	64.3	-	611	-	1.0	-	339	-		339	3216	0.19
	-	N->S	66.5	-	632	-	1.0	-	339	-		339	3216	0.20
Line 2														
Ln2, Lev1	-	S->N	-	-	1419	-	-	-	339	-		-	7636	-
	-	N->S	-	-	1467	-	-	-	339	-		-	7636	-
Wall 2-1	1	S->N	-	-	1419	-	1.0	-	339	-		-	7636	-
	1	N->S	-	-	1467	-	1.0	-	339	-		-	7636	-
Seg. 1	-	S->N	62.9	-	1195	-	1.0	-	339	-		339	6432	0.19
	-	N->S	65.0	-	1235	-	1.0	-	339	-		339	6432	0.19
Seg. 2	-	S->N	55.9	-	224	-	.89	-	301	-		301	1204	0.19
	-	N->S	57.8	-	231	-	.89	-	301	-		301	1204	0.19

E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf] v	vmax	V [lbs]	Asp-Cub Int	Asp-Cub Ext	Allowable Shear [plf] Int	Ext	Co	C	Cmb	V [lbs]	Resp. Ratio
Line A														
Level 1														
LnA, Lev1	-	Both	-	-	913	-	-	-	339	-		-	6112	-
Wall A-1	1	Both	-	-	913	-	1.0	-	339	-		-	6112	-
Seg. 1	-	Both	50.6	-	253	-	1.0	-	339	-		339	1693	0.15
Seg. 2	-	Both	50.6	-	253	-	1.0	-	339	-		339	1693	0.15
Seg. 3	-	Both	50.6	-	228	-	1.0	-	339	-		339	1523	0.15
Seg. 4	-	Both	44.9	-	180	-	.89	-	301	-		301	1204	0.15
Line B														
LnB, Lev1	-	Both	-	-	1280	-	-	-	339	-		-	8097	-
Wall B-1	1	Both	-	-	1280	-	1.0	-	339	-		-	8097	-
Seg. 1	-	Both	41.6	-	146	-	.78	-	263	-		263	922	0.16
Seg. 2	-	Both	43.6	-	160	-	.81	-	276	-		276	1011	0.16
Seg. 3	-	Both	53.5	-	339	-	1.0	-	339	-		339	2144	0.16
Seg. 4	-	Both	44.6	-	167	-	.83	-	282	-		282	1058	0.16
Seg. 5	-	Both	53.5	-	468	-	1.0	-	339	-		339	2962	0.16

Legend:
W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "^" means that this wall is critical for all walls in the Standard Wall group.
For Dir - Direction of wind force along shearline.
v - Design shear force on segment = ASD factored shear force per unit FHS
vmax - Collector shear force for perforated walls as per SDPWS eqn. 4.3-8 = V/FHS/Co. Full height sheathing (FHS) factored for narrow segments as per 4.3.4.3
V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment
Asp/Cub – For wall: Unblocked structural wood panel factor Cub from SDPWS 4.3.3.2. For segment: Aspect ratio adjustment from SDPWS 4.3.3.4.1
Int - Unit shear capacity of interior sheathing; Ext - Unit shear capacity of exterior sheathing. For wall: Unfactored. For segment: Include Cub factor and aspect ratio adjustments.
Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-5.
C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using SDPWS 4.3-3.
Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.
V – Total factored shear capacity of shearline, wall or segment.
Crit Resp – Response ratio = v/Cmb = design shear force/unit shear capacity. "S" indicates that the wind design criterion was critical in selecting wall.

Notes:
Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2,4.

Flexible Diaphragm Seismic Design

SEISMIC INFORMATION

Level	Mass [lbs]	Area [sq.ft]	Story Shear [lbs] E-W	Story Shear [lbs] N-S	Diaphragm Force Fpx [lbs] E-W	Diaphragm Force Fpx [lbs] N-S
1	25833	900.0	3974	3974	5418	5418
All	**25833**	**-**	**3974**	**3974**	**-**	**-**

Legend:
Building mass – Sum of all generated and input building masses on level = wx in ASCE 7 equation 12.8-12.
Storey shear – Total unfactored (strength-level) shear force induced at level x, = Fx in ASCE 7 equation 12.8-11.
Diaphragm force Fpx - Unfactored force intended for diaphragm design from Eqn 12.10-1; used by Shearwalls only for drag strut forces, see 12.10.2.1 Exception 2.

Redundancy Factor p (rho):
E-W 1.00, N-S 1.00
Automatically calculated according to ASCE 7 12.3.4.2.

Vertical Earthquake Load Ev
Ev = 0.2 Sds D; Sds = 1.05; Ev = 0.210 D unfactored; 0.147 D factored; total dead load factor: 0.6 - 0.147 = 0.453 tension, 1.0 + 0.147 = 1.147 compression.

SHEAR RESULTS (flexible seismic design)

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf] v	vmax	V [lbs]	Asp-Cub Int	Asp-Cub Ext	Allowable Shear [plf] Int	Ext	Co	C	Cmb	V [lbs]	Resp. Ratio
Line 1														
Level 1														
Ln1, Lev1	-	Both	-	-	1387	-	-	-	242	-		-	5320	-
Wall 1-1	1	Both	-	-	1387	-	1.0	-	242	-		-	5320	-
Seg. 1	-	Both	63.0	-	788	-	1.0	-	242	-		242	3023	0.26
Seg. 2	-	Both	63.0	-	599	-	1.0	-	242	-		242	2297	0.26
Line 2														
Ln2, Lev1	-	Both	-	-	1395	-	-	-	242	-		-	5454	-
Wall 2-1	1	Both	-	-	1395	-	1.0	-	242	-		-	5454	-
Seg. 1	-	Both	61.9	-	1175	-	1.0	-	242	-		242	4594	0.26
Seg. 2	-	Both	55.0	-	220	-	.89	-	215	-		215	860	0.26

E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf] v	vmax	V [lbs]	Asp-Cub Int	Asp-Cub Ext	Allowable Shear [plf] Int	Ext	Co	C	Cmb	V [lbs]	Resp. Ratio
Line A														
Level 1														
LnA, Lev1	-	Both	-	-	1213	-	-	-	242	-		-	4366	-
Wall A-1	1	Both	-	-	1213	-	1.0	-	242	-		-	4366	-
Seg. 1	-	Both	67.2	-	336	-	1.0	-	242	-		242	1209	0.28
Seg. 2	-	Both	67.2	-	336	-	1.0	-	242	-		242	1209	0.28
Seg. 3	-	Both	67.2	-	302	-	1.0	-	242	-		242	1088	0.28
Seg. 4	-	Both	59.7	-	239	-	.89	-	215	-		215	860	0.28
Line B														
LnB, Lev1	-	Both	-	-	1569	-	-	-	242	-		-	5783	-
Wall B-1	1	Both	-	-	1569	-	1.0	-	242	-		-	5783	-
Seg. 1	-	Both	51.0	-	179	-	.78	-	188	-		188	658	0.27
Seg. 2	-	Both	53.5	-	196	-	.81	-	197	-		197	722	0.27
Seg. 3	-	Both	65.6	-	415	-	1.0	-	242	-		242	1531	0.27
Seg. 4	-	Both	54.7	-	205	-	.83	-	202	-		202	756	0.27
Seg. 5	-	Both	65.6	-	574	-	1.0	-	242	-		242	2116	0.27

Legend:
W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "^" means that this wall is critical for all walls in the Standard Wall group.
For Dir – Direction of seismic force along shearline.
v - Design shear force on segment = ASD factored shear force per unit FHS
vmax - Collector shear force for perforated walls as per SDPWS eqn. 4.3-8 = V/FHS/Co. Full height sheathing (FHS) factored for narrow segments as per 4.3.4.3
V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment
Asp/Cub – For wall: Unblocked structural wood panel factor Cub from SDPWS 4.3.3.2. For segment: Aspect ratio adjustment from SDPWS 4.3.3.4.1
Int - Unit shear capacity of interior sheathing; Ext - Unit shear capacity of exterior sheathing. For wall: Unfactored. For segment: Include Cub factor and aspect ratio adjustments.
Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-5.
C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using SDPWS 4.3-3.
Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.
V – Total factored shear capacity of shearline, wall or segment.
Crit Resp – Response ratio = v/Cmb = design shear force/unit shear capacity. "W" indicates that the wind design criterior was critical in selecting wall.

Notes:
Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2,4.

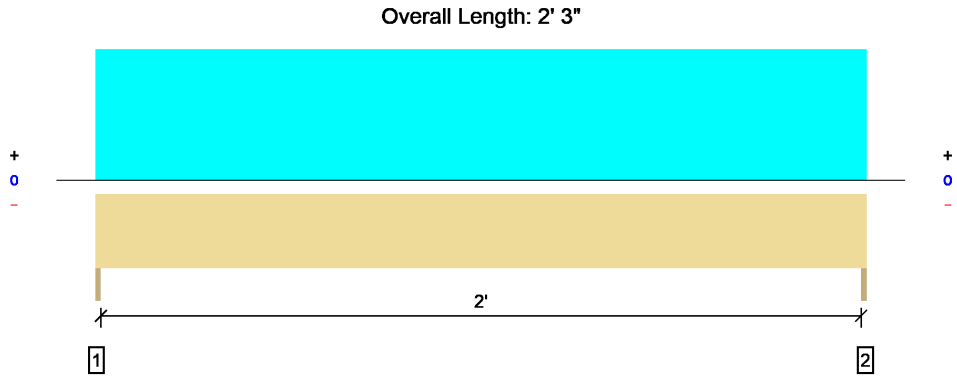
01: ROOF FRAMING			
Member Name	**Results**	**Current Solution**	**Comments**
R1	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R2	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R3	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R4	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R5	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R6	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
R7	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
GT1 FOR LOAD REF ONLY	Passed	1 Piece(s) 5 1/2" x 13 1/2" 24F-V4 DF Glulam	
R8	Passed	1 Piece(s) 6 x 12 Douglas Fir-Larch No. 2	
R9	Passed	1 Piece(s) 6 x 12 Douglas Fir-Larch No. 2	
R10	Passed	1 Piece(s) 6 x 10 Douglas Fir-Larch No. 2	
R11	Passed	1 Piece(s) 4 x 8 Douglas Fir-Larch No. 2	
02: FLOOR FRAMING			
Member Name	**Results**	**Current Solution**	**Comments**
M1	Passed	1 Piece(s) 4 x 10 Hem-Fir No. 2	
M2	Passed	1 Piece(s) 9 1/2" TJI® 110 @ 16" OC	

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

MEMBER REPORT *ROOF FRAMING, R1*

PASSED

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	101 @ 0	3281 (1.50")	Passed (3%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	36 @ 8 3/4"	3502	Passed (1%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	57 @ 1' 1 1/2"	3438	Passed (2%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.000 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.000 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	45	56	101	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	45	56	101	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 2' 3"	2'	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

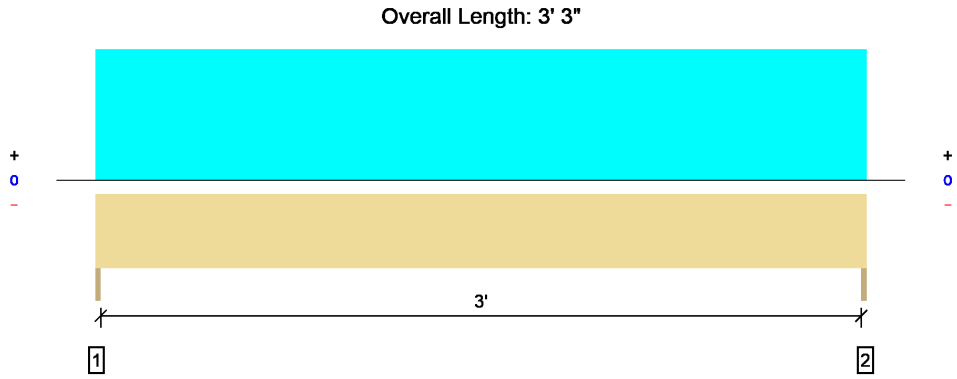
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

MEMBER REPORT *ROOF FRAMING, R2*

PASSED

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	265 @ 0	3281 (1.50")	Passed (8%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	146 @ 8 3/4"	3502	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	215 @ 1' 7 1/2"	3438	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.001 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.002 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	113	152	265	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	113	152	265	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 3' 3"	3' 9"	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2

PASSED

Overall Length: 3' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1164 @ 0	3281 (1.50")	Passed (35%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	642 @ 8 3/4"	3502	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	946 @ 1' 7 1/2"	3438	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.006 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	474	691	1165	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	474	691	1165	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 3' 3"	17'	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

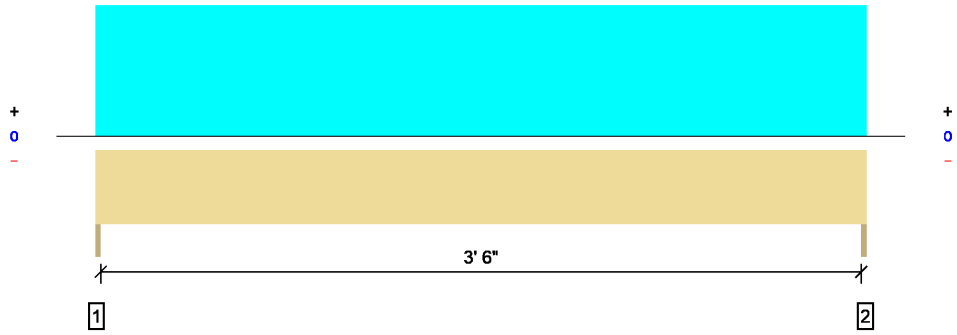
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2

PASSED

Overall Length: 3' 9"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1343 @ 0	3281 (1.50")	Passed (41%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	821 @ 8 3/4"	3502	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1260 @ 1' 10 1/2"	3438	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 1' 10 1/2"	0.125	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 1' 10 1/2"	0.188	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 9" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 3' 9" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	547	797	1344	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	547	797	1344	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 9"	N/A	6.4		
1 - Uniform (PSF)	0 to 3' 9"	17'	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2

PASSED

Overall Length: 2' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	806 @ 0	3281 (1.50")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	284 @ 8 3/4"	3502	Passed (8%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	453 @ 1' 1 1/2"	3438	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.001 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.002 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	328	478	806	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	328	478	806	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 2' 3"	17'	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2

PASSED

Overall Length: 2' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	183 @ 0	3281 (1.50")	Passed (6%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	65 @ 8 3/4"	3502	Passed (2%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	103 @ 1' 1 1/2"	3438	Passed (3%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.000 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.001 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 2' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	78	105	183	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	78	105	183	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 2' 3"	3' 9"	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

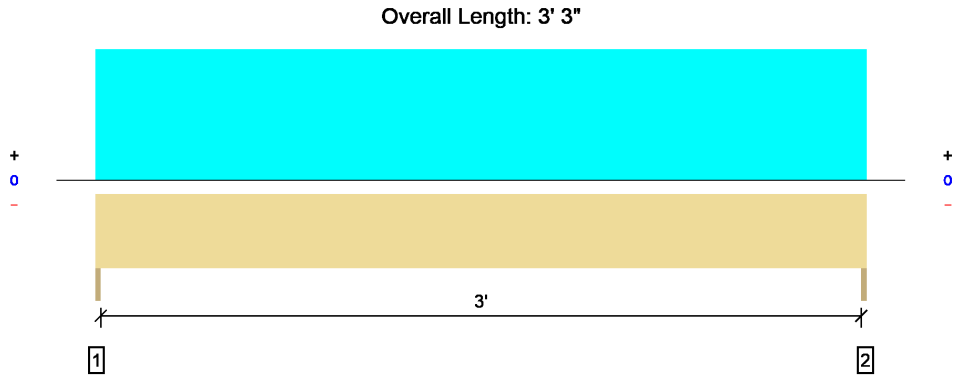
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

MEMBER REPORT *ROOF FRAMING, R7*

PASSED

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	961 @ 0	3281 (1.50")	Passed (29%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	530 @ 8 3/4"	3502	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	781 @ 1' 7 1/2"	3438	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.005 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.008 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 3' 3" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	392	569	961	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	392	569	961	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	6.4		
1 - Uniform (PSF)	0 to 3' 3"	14'	16.8	25.0	ROOF

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

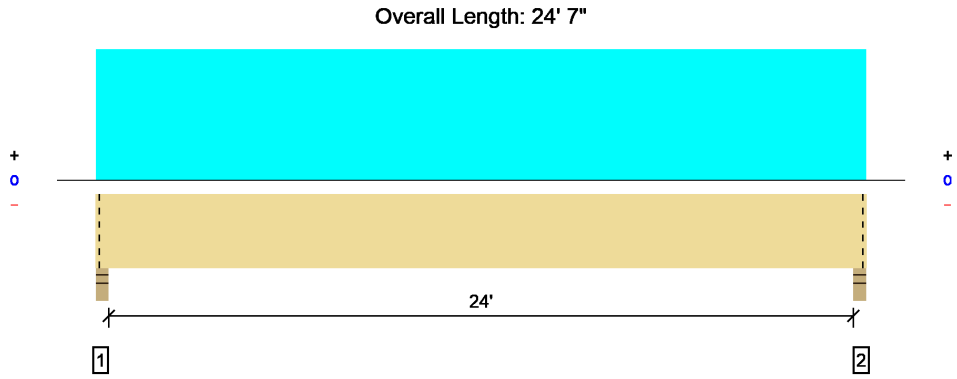
SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

PASSED

1 piece(s) 5 1/2" x 13 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3559 @ 2"	8181 (3.50")	Passed (44%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3149 @ 1' 5"	15085	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	21285 @ 12' 3 1/2"	37169	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.623 @ 12' 3 1/2"	0.808	Passed (L/467)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.110 @ 12' 3 1/2"	1.212	Passed (L/262)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch: 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 24' 7" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 24' 7" o/c unless detailed otherwise.
- Critical positive moment adjusted by a volume factor of 0.97 that was calculated using length L = 24' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.52"	1562	1997	3559	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.52"	1562	1997	3559	Blocking

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

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 24' 7"	N/A	18.0		
1 - Uniform (PSF)	0 to 24' 7" (Front)	6' 6"	16.8	25.0	Roof

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

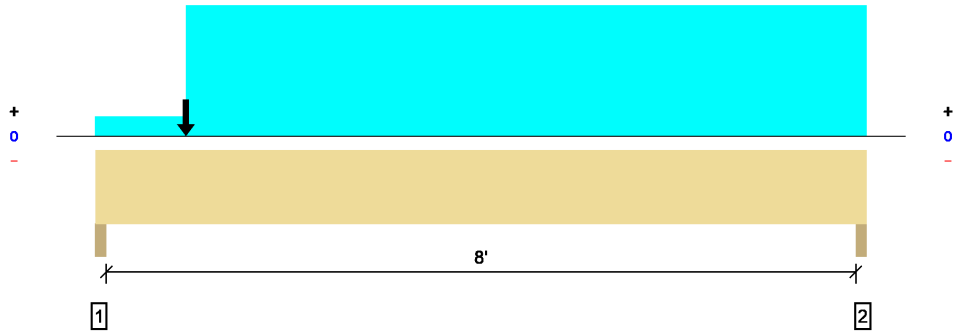
Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 6 x 12 Douglas Fir-Larch No. 2

PASSED

Overall Length: 8' 6"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5119 @ 1 1/2"	10313 (3.00")	Passed (50%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4130 @ 1' 2 1/2"	8244	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6339 @ 3' 7 3/8"	10166	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.051 @ 4' 1 5/16"	0.275	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.088 @ 4' 1 1/4"	0.412	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 8' 6" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 8' 6" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	3.00"	3.00"	1.50"	2215	2904	5119	None
2 - Trimmer - SPF	3.00"	3.00"	1.50"	1152	1580	2732	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 6"	N/A	16.0		
1 - Uniform (PSF)	0 to 1'	2'	16.8	25.0	ROOF
2 - Uniform (PSF)	1' to 8' 6"	13'	16.8	25.0	ROOF
3 - Point (lb)	1'	N/A	1562	1997	Linked from: GT1 FOR LOAD REF ONLY, Support 1

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

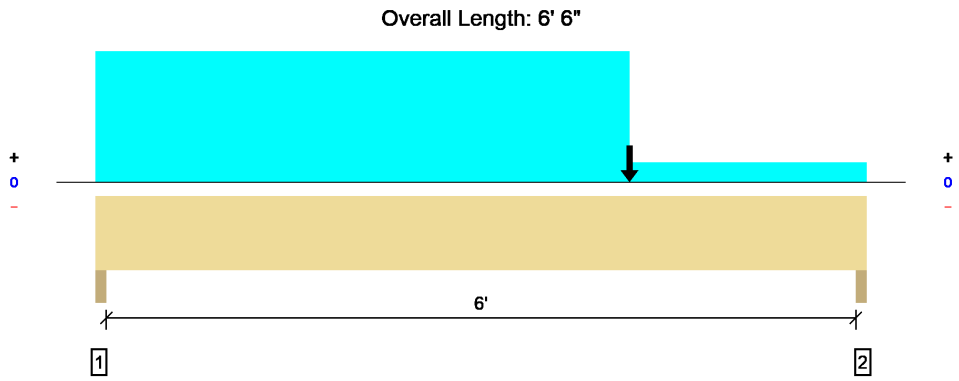
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 6 x 12 Douglas Fir-Larch No. 2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3518 @ 6' 4 1/2"	10313 (3.00")	Passed (34%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3398 @ 5' 3 1/2"	8244	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6399 @ 4' 6"	10166	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.026 @ 3' 4 5/8"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.045 @ 3' 4 11/16"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 6' 6" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 6' 6" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	3.00"	3.00"	1.50"	1177	1578	2755	None
2 - Trimmer - SPF	3.00"	3.00"	1.50"	1537	1981	3518	None

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	16.0		
1 - Uniform (PSF)	4' 6" to 6' 6"	2'	16.8	25.0	ROOF
2 - Uniform (PSF)	0 to 4' 6"	13'	16.8	25.0	ROOF
3 - Point (lb)	4' 6"	N/A	1562	1997	Linked from: GT1 FOR LOAD REF ONLY, Support 1

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

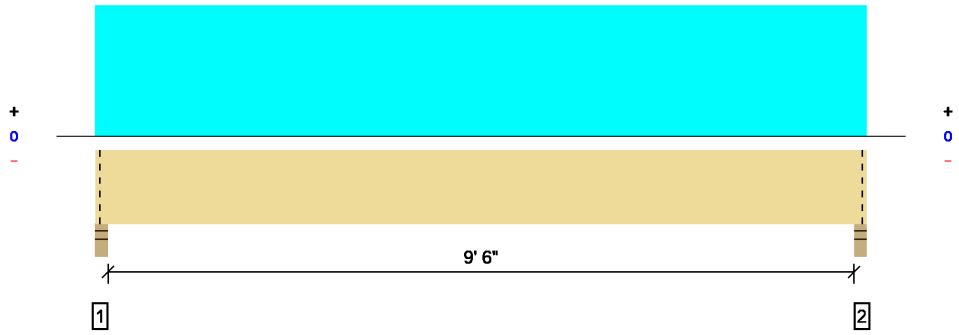
Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 6 x 10 Douglas Fir-Larch No. 2

PASSED

Overall Length: 10' 1"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2331 @ 2"	8181 (3.50")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1830 @ 1' 1"	6810	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5493 @ 5' 1/2"	6937	Passed (79%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.107 @ 5' 1/2"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.184 @ 5' 1/2"	0.488	Passed (L/636)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch: 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 10' 1" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 10' 1" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	976	1355	2331	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	976	1355	2331	Blocking

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

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 1"	N/A	13.2		
1 - Uniform (PSF)	0 to 10' 1" (Front)	10' 9"	16.8	25.0	Roof

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

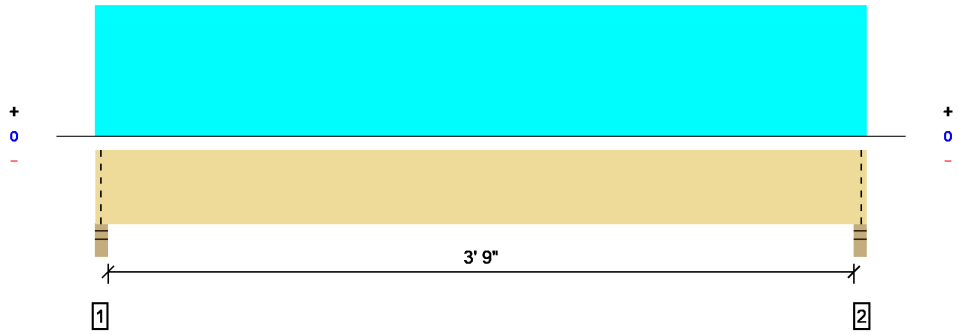
Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 4 x 8 Douglas Fir-Larch No. 2

PASSED

Overall Length: 4' 4"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	421 @ 2"	5206 (3.50")	Passed (8%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	247 @ 10 3/4"	3502	Passed (7%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	389 @ 2' 2"	3438	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 2' 2"	0.133	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.006 @ 2' 2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch: 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 4" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 4' 4" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	177	244	421	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	177	244	421	Blocking

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

Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 4"	N/A	6.4		
1 - Uniform (PSF)	0 to 4' 4" (Front)	4' 6"	16.8	25.0	Roof

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

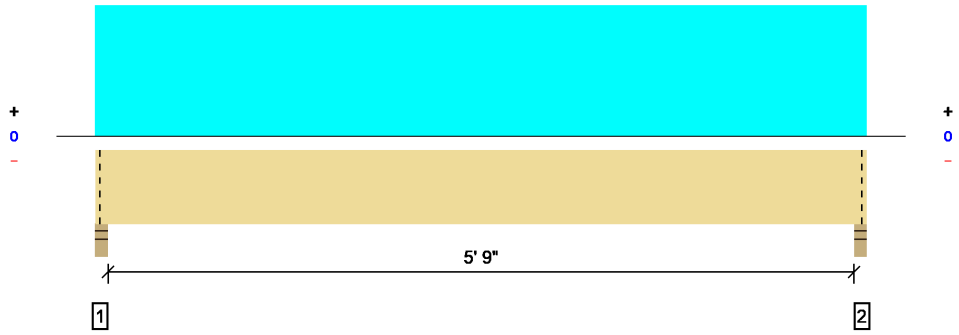
Permit Number: 19-02196

MEMBER REPORT *FLOOR FRAMING, M1*

PASSED

1 piece(s) 4 x 10 Hem-Fir No. 2

Overall Length: 6' 4"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1926 @ 2"	4961 (3.50")	Passed (39%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1280 @ 1' 3/4"	3238	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2737 @ 3' 2"	4242	Passed (65%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.047 @ 3' 2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.059 @ 3' 2"	0.300	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 6' 4" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 6' 4" o/c unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	406	1520	1926	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	406	1520	1926	Blocking

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

Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 4"	N/A	8.2		
1 - Uniform (PSF)	0 to 6' 4" (Front)	12'	10.0	40.0	FLOOR

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

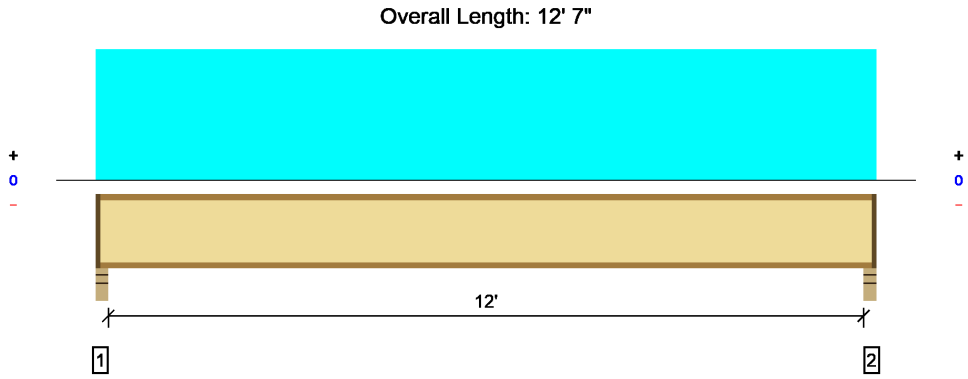
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

1 piece(s) 9 1/2" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	413 @ 2 1/2"	1041 (2.25")	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	400 @ 3 1/2"	1220	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1234 @ 6' 3 1/2"	2500	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.153 @ 6' 3 1/2"	0.304	Passed (L/956)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.191 @ 6' 3 1/2"	0.608	Passed (L/765)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	47	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 6" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 12' 5" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	84	336	420	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	84	336	420	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 12' 7"	16"	10.0	40.0	FLOOR

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC ES under technical reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

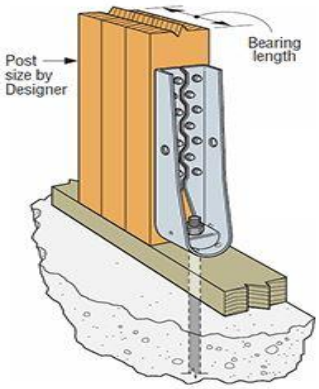
The product application, input design loads, dimensions and support information have been provided by Forte Software Operator

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Alec Hodge Hodge Engineering (253) 857-7055 alec@hodgeengineering.com	

Permit Number: 19-02196

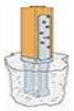
Post Capacities



roll over images below to see larger image


HD3B Vertical Installation


HTT4 Vertical Installation


Typical CBSQ-SDS2 Installation


HDU Vertical Installation

Post Allowable Compression Loads for Douglas-Fir-Larch

Framing	Lumber		Perp to Grain, $P_{c\perp}$	Compression Capacity Parallel to Grain, P_c (100)					Compression Capacity Parallel to Grain, P_c (160)				
				Nominal Top Plate Height (ft.)					Nominal Top Plate Height (ft.)				
	Size	Grade		8	9	10	11	12	8	9	10	11	12
4-Inch Wall	2x4	#2	3280	3170	2565	2105	1755	1485	3345	2665	2170	1795	1510
	3x4	#2	5470	5285	4275	3510	2930	2475	5570	4440	3615	2995	2520
	2-2x4	#2	6565	6340	5130	4215	3515	2970	6685	5330	4335	3590	3020
	4x4	#2	7655	7395	5985	4915	4100	3465	7800	6215	5060	4190	3525
	3-2x4	#2	9845	9510	7695	6320	5270	4455	10030	7995	6505	5390	4535
	4x6	#2	12030	11540	9360	7700	6425	5430	12215	9745	7935	6575	5535
	4x8	#2	15860	15090	12270	10105	8440	7140	16035	12805	10435	8650	7285
	4x10	#2	20235	19080	15555	12835	10730	9085	20365	16285	13280	11015	9280
6-Inch Wall	2x6	#2	5155	8970	7940	6935	6025	5235	11030	9230	7740	6535	5575
	3x6	#2	8595	14945	13235	11560	10040	8725	18385	15380	12895	10895	9290
	2-2x6	#2	10315	17935	15885	13875	12050	10470	22060	18455	15475	13075	11145
	4x6	#2	12030	20925	18530	16185	14060	12215	25735	21530	18055	15255	13005
	3-2x6	#2	15470	26905	23825	20810	18075	15705	33090	27685	23215	19610	16720
	6x6	#1	18905	25260	23500	21505	19415	17375	34255	30035	26025	22475	19450
	6x8	#1	25780	34450	32045	29320	26475	23690	46715	40955	35485	30645	26520

Post Allowable Compression Loads for Hem-Fir

Framing	Lumber		Perp to Grain, $P_{c\perp}$	Compression Capacity Parallel to Grain, P_c (100)					Compression Capacity Parallel to Grain, P_c (160)				
				Nominal Top Plate Height (ft.)					Nominal Top Plate Height (ft.)				
	Size	Grade		8	9	10	11	12	8	9	10	11	12
4-Inch Wall	2x4	#2	2125	2630	2115	1730	1435	1210	2745	2180	1770	1465	1230
	3x4	#2	3545	4385	3525	2880	2395	2020	4570	3630	2950	2440	2050
	2-2x4	#2	4255	5260	4230	3460	2875	2425	5485	4355	3540	2925	2460
	4x4	#2	4960	6140	4935	4035	3355	2830	6400	5085	4125	3415	2870
	3-2x4	#2	6380	7890	6340	5185	4310	3635	8230	6535	5305	4390	3690
	4-2x4	#2	8505	10525	8455	6915	5750	4850	10970	8715	7075	5855	4920
6-Inch Wall	2x6	#2	3340	7950	6880	5905	5065	4365	9385	7735	6425	5395	4580
	3x6	#2	5570	13250	11470	9840	8440	7270	15640	12890	10710	8995	7635
	2-2x6	#2	6685	15900	13765	11810	10130	8725	18765	15470	12850	10790	9165
	3-2x6	#2	10025	23855	20645	17715	15195	13090	28150	23205	19275	16185	13745
	4-2x6	#2	13365	31805	27525	23620	20260	17455	37535	30935	25700	21585	18325

1. The allowable (ASD) loads are based on the 2012 National Design Specification for Wood Construction (NDS) including the March 2013 Addendum, for lumber with a moisture content of 19% or less.
2. Post heights are based on standard precut stud heights and associated top plate heights. For Douglas Fir, wall height is nominal height plus 3/4" (California stud height). For all other species, wall height is nominal height plus 1 1/8". Effective post lengths, le, are the actual wall height s minus the thickness of 3-2x plates (4 1/2").
3. Shaded values are limited by the Perpendicular to Grain bearing capacity, $P_{c\perp}$, when posts bear on wood sill plates. Where posts and sill plates are different species, Designer shall limit allowable load to the lower of the post capacity or the perpendicular to grain capacity for each species used.
4. Perpendicular to grain allowable loads do not include the NDS Bearing Area Factor, C_b. For posts whose bearing area is not closer than 3" from the end of a sill plate, the $P_{c\perp}$ values may be multiplied by C_b.

T (in.)	1.5	2.5	3	3.5	4.5	5.5	≥6
C_b	1.25	1.15	1.13	1.11	1.08	1.07	1

T = Bearing Length (post thickness)
C_b = Bearing Area Factor per NDS 3.10.4

5. Allowable tension loads are based on net section assuming hole size equal to bolt diameter plus 1/16" with the hole drilled on the 3 1/2" face of post for a 4-inch wall and on the 5 1/2" face of post for a 6-inch wall. Tension loads have been increased for wind or seismic loading with no further increase allowed. Reduce where other loads govern.
6. Values do not consider combined axial and out-of-plane bending.
7. Bolt diameter "None" indicates full cross section.

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 24" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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
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

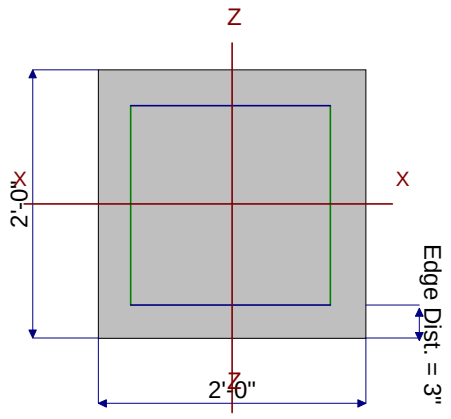
Width parallel to X-X Axis	=	2.0 ft
Length parallel to Z-Z Axis	=	2.0 ft
Footing Thickness	=	8.0 in

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

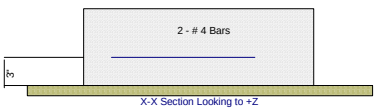


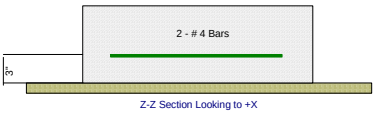
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		2.0
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	=	2.50			3.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Permit Number: 19-02196

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 24" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9813	Soil Bearing	1.472 ksf	1.50 ksf	0.0 deg CCW
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	0.2570	Z Flexure (+X)	1.102 k-ft	4.288 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.2570	Z Flexure (-X)	1.102 k-ft	4.288 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.2570	X Flexure (+Z)	1.102 k-ft	4.288 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.2570	X Flexure (-Z)	1.102 k-ft	4.288 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.2938	1-way Shear (+X)	22.037 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2775	1-way Shear (-X)	20.813 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2938	1-way Shear (+Z)	22.037 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2775	1-way Shear (-Z)	20.813 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.5289	2-way Punching	79.334 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.472	1.472	1.472	1.472	0.981
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.7217	0.7217	0.7217	0.7217	0.481
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.4330	0.4330	0.4330	0.4330	0.289
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.4330	0.4330	0.4330	0.4330	0.289

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 30" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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
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

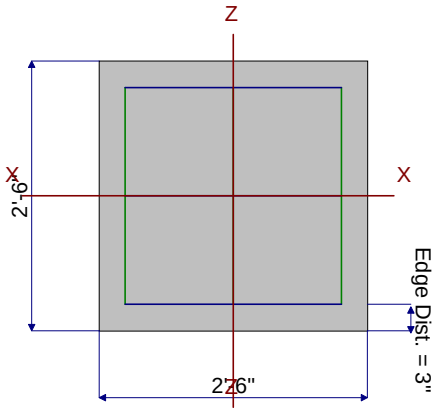
Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	2.50 ft
Footing Thickness	=	8.0 in

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

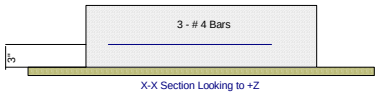


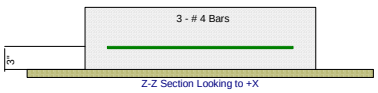
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		3.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		3.0
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	=	3.0			5.50				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Permit Number: 19-02196

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 30" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9713	Soil Bearing	1.457 ksf	1.50 ksf	0.0 deg CCW
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	0.3435	Z Flexure (+X)	1.750 k-ft	5.095 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3435	Z Flexure (-X)	1.750 k-ft	5.095 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3435	X Flexure (+Z)	1.750 k-ft	5.095 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3435	X Flexure (-Z)	1.750 k-ft	5.095 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4148	1-way Shear (+X)	31.111 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.4148	1-way Shear (-X)	31.111 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.4148	1-way Shear (+Z)	31.111 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.4148	1-way Shear (-Z)	31.111 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.8507	2-way Punching	127.604 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
. +D+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+L+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+Lr+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+S+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.457	1.457	1.457	1.457	0.971
. +D+0.750Lr+0.750L+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+0.750L+0.750S+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.237	1.237	1.237	1.237	0.825
. +D+0.60W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+0.70E+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+0.750Lr+0.750L+0.450W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.5767	0.5767	0.5767	0.5767	0.385
. +D+0.750L+0.750S+0.450W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.237	1.237	1.237	1.237	0.825
. +D+0.750L+0.750S+0.5250E+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.237	1.237	1.237	1.237	0.825
. +0.60D+0.60W+0.60H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.3460	0.3460	0.3460	0.3460	0.231
. +0.60D+0.70E+0.60H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.3460	0.3460	0.3460	0.3460	0.231

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				

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — Licensee : HODGE ENGINEERING INC

Description : 36" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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
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

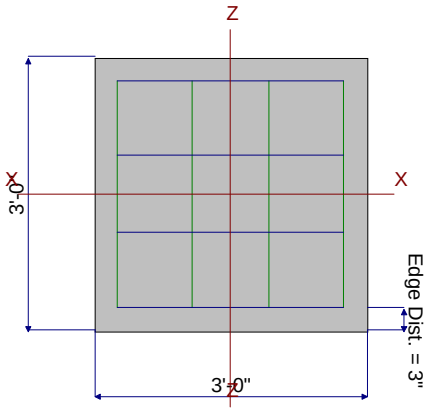
Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

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

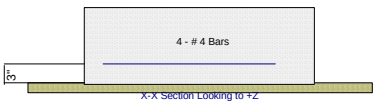
Rebar Centerline to Edge of Concrete...

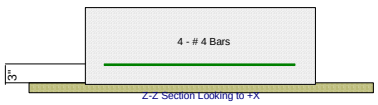
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
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	=	4.0			8.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 36" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9853	Soil Bearing	1.478 ksf	1.50 ksf	0.0 deg CCW
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	0.2452	Z Flexure (+X)	2.555 k-ft	10.424 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.2452	Z Flexure (-X)	2.555 k-ft	10.424 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.2452	X Flexure (+Z)	2.555 k-ft	10.424 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.2452	X Flexure (-Z)	2.555 k-ft	10.424 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.2103	1-way Shear (+X)	15.774 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2103	1-way Shear (-X)	15.774 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2103	1-way Shear (+Z)	15.774 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2103	1-way Shear (-Z)	15.774 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3729	2-way Punching	55.934 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.478	1.478	1.478	1.478	0.985
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.256	1.256	1.256	1.256	0.837
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5894	0.5894	0.5894	0.5894	0.393
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.256	1.256	1.256	1.256	0.837
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.256	1.256	1.256	1.256	0.837
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3537	0.3537	0.3537	0.3537	0.236
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3537	0.3537	0.3537	0.3537	0.236

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 42" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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
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

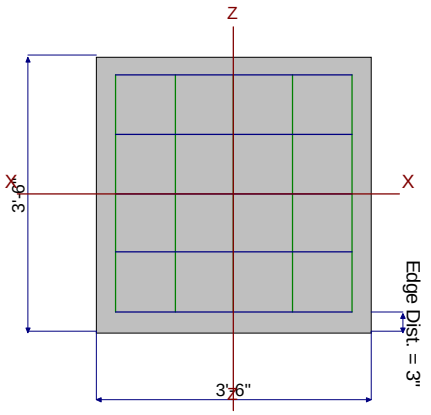
Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axis	=	3.50 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

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

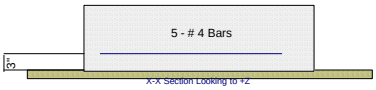
Rebar Centerline to Edge of Concrete...

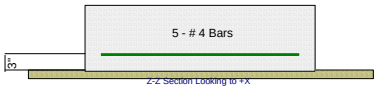
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		5.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		5.0
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	=	6.50			10.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Permit Number: 19-02196

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 42" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9947	Soil Bearing	1.492 ksf	1.50 ksf	0.0 deg CCW
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	0.3104	Z Flexure (+X)	3.458 k-ft	11.139 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3104	Z Flexure (-X)	3.458 k-ft	11.139 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3104	X Flexure (+Z)	3.458 k-ft	11.139 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3104	X Flexure (-Z)	3.458 k-ft	11.139 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.2764	1-way Shear (+X)	20.733 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2764	1-way Shear (-X)	20.733 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2764	1-way Shear (+Z)	20.733 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2764	1-way Shear (-Z)	20.733 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.5122	2-way Punching	76.834 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.492	1.492	1.492	1.492	0.995
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.288	1.288	1.288	1.288	0.859
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6756	0.6756	0.6756	0.6756	0.450
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.288	1.288	1.288	1.288	0.859
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.288	1.288	1.288	1.288	0.859
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.4054	0.4054	0.4054	0.4054	0.270
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.4054	0.4054	0.4054	0.4054	0.270

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 48" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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	:	No
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
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

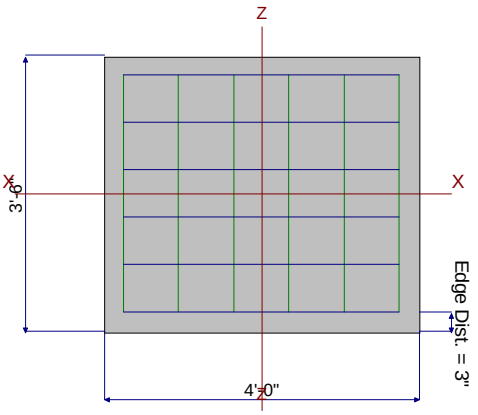
Width parallel to X-X Axis	=	4.0 ft
Length parallel to Z-Z Axis	=	3.50 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

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

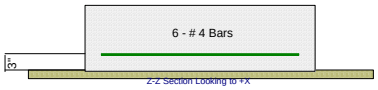
Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		6.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		6.0
Reinforcing Bar Size	=	#	4



Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	ıg Z-Z Axis
# Bars required within zone	93.3 %
# Bars required on each side of zone	6.7 %

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	8.0			13.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 48" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	1.0	Soil Bearing	1.50 ksf	1.50 ksf	0.0 deg CCW
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	0.3493	Z Flexure (+X)	4.632 k-ft	13.263 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3493	Z Flexure (-X)	4.632 k-ft	13.263 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3038	X Flexure (+Z)	3.547 k-ft	11.674 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.3038	X Flexure (-Z)	3.547 k-ft	11.674 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.3622	1-way Shear (+X)	27.165 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3622	1-way Shear (-X)	27.165 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2836	1-way Shear (+Z)	21.267 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.2836	1-way Shear (-Z)	21.267 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.6005	2-way Punching	90.074 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.50	1.50	1.50	1.50	1.000
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.268	1.268	1.268	1.268	0.845
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.5714	0.5714	0.5714	0.5714	0.381
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.268	1.268	1.268	1.268	0.845
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.268	1.268	1.268	1.268	0.845
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3429	0.3429	0.3429	0.3429	0.229
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3429	0.3429	0.3429	0.3429	0.229

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 54" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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	:	No
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
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

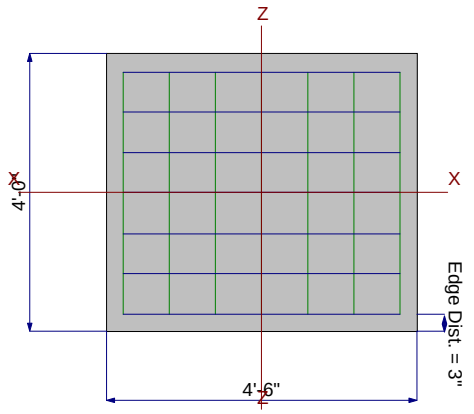
Width parallel to X-X Axis	=	4.50 ft
Length parallel to Z-Z Axis	=	4.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

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

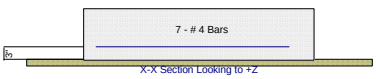
Rebar Centerline to Edge of Concrete...

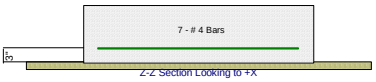
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		7.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		7.0
Reinforcing Bar Size	=	#	4





Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	ıg Z-Z Axis
# Bars required within zone	94.1 %
# Bars required on each side of zone	5.9 %

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	9.0			18.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 54" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	1.0	Soil Bearing	1.50 ksf	1.50 ksf	0.0 deg CCW
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	0.4391	Z Flexure (+X)	5.940 k-ft	13.526 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4391	Z Flexure (-X)	5.940 k-ft	13.526 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3883	X Flexure (+Z)	4.693 k-ft	12.088 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.3883	X Flexure (-Z)	4.693 k-ft	12.088 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.4346	1-way Shear (+X)	32.593 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.4346	1-way Shear (-X)	32.593 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3670	1-way Shear (+Z)	27.523 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3670	1-way Shear (-Z)	27.523 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.7877	2-way Punching	118.148 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.50	1.50	1.50	1.50	1.000
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.250	1.250	1.250	1.250	0.833
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.50	0.50	0.50	0.50	0.333
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.250	1.250	1.250	1.250	0.833
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.250	1.250	1.250	1.250	0.833
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.30	0.30	0.30	0.30	0.200
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.30	0.30	0.30	0.30	0.200

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 60" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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	:	No
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
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

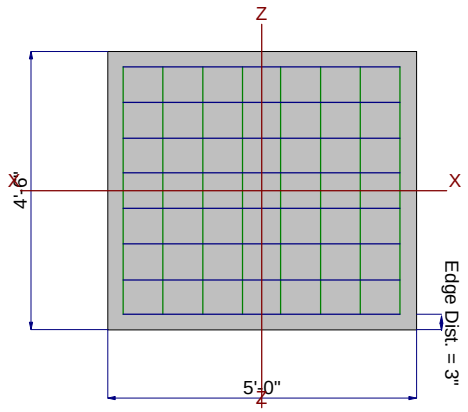
Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	4.50 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

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

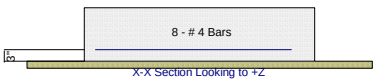
Rebar Centerline to Edge of Concrete...

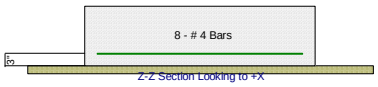
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		8.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		8.0
Reinforcing Bar Size	=	#	4





Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	ıg Z-Z Axis
# Bars required within zone	94.7 %
# Bars required on each side of zone	5.3 %

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	10.0			23.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 60" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9780	Soil Bearing	1.467 ksf	1.50 ksf	0.0 deg CCW
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	0.4270	Z Flexure (+X)	7.230 k-ft	16.931 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4270	Z Flexure (-X)	7.230 k-ft	16.931 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3828	X Flexure (+Z)	5.856 k-ft	15.298 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3828	X Flexure (-Z)	5.856 k-ft	15.298 k-ft	+1.20D+1.60S+0.50W+1.60H
PASS	0.370	1-way Shear (+X)	27.750 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.370	1-way Shear (-X)	27.750 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3155	1-way Shear (+Z)	23.661 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3155	1-way Shear (-Z)	23.661 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.6453	2-way Punching	96.793 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
. +D+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+L+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+Lr+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+S+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.467	1.467	1.467	1.467	0.978
. +D+0.750Lr+0.750L+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+0.750L+0.750S+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.211	1.211	1.211	1.211	0.807
. +D+0.60W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+0.70E+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+0.750Lr+0.750L+0.450W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.4444	0.4444	0.4444	0.4444	0.296
. +D+0.750L+0.750S+0.450W+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.211	1.211	1.211	1.211	0.807
. +D+0.750L+0.750S+0.5250E+H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	1.211	1.211	1.211	1.211	0.807
. +0.60D+0.60W+0.60H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.2667	0.2667	0.2667	0.2667	0.178
. +0.60D+0.70E+0.60H								0.000
. 0.0 deg CCW	1.50	0.0	0.0	0.2667	0.2667	0.2667	0.2667	0.178

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

Residential Footing

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 — **Licensee : HODGE ENGINEERING INC**

Description : 72" footing - 1500 psf soil

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

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
j 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
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

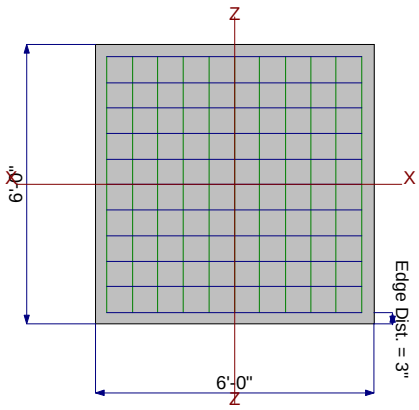
Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	16.0 in

Pedestal dimensions...

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

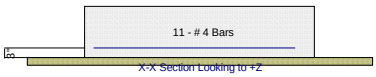
Rebar Centerline to Edge of Concrete...

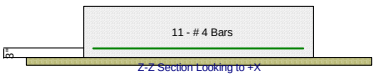
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	11.0
Reinforcing Bar Size	=	# 4
Bars parallel to Z-Z Axis		
Number of Bars	=	11.0
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	=	16.0			31.0				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Permit Number: 19-02196

Hodge Engineering Inc.
2615 Jahn Ave NW Ste. E5
Gig Harbor, WA 98332
253-857-7055
John@HodgeEngineering.com

Project Title:
Engineer:
Project Descr:

Project ID:

General Footing

File = C:\Users\JOHNHO~1\DOCUME~1\ENERCA~1\2015FO~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.4.30

Lic. # : KW-06007122 **Licensee : HODGE ENGINEERING INC**

Description : 72" footing - 1500 psf soil

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9993	Soil Bearing	1.499 ksf	1.50 ksf	0.0 deg CCW
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	0.4960	Z Flexure (+X)	10.287 k-ft	20.738 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4960	Z Flexure (-X)	10.287 k-ft	20.738 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4960	X Flexure (+Z)	10.287 k-ft	20.738 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.4960	X Flexure (-Z)	10.287 k-ft	20.738 k-ft	+1.20D+0.50L+1.60S+1.60H
PASS	0.3712	1-way Shear (+X)	27.842 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3712	1-way Shear (-X)	27.842 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3712	1-way Shear (+Z)	27.842 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.3712	1-way Shear (-Z)	27.842 psi	75.0 psi	+1.20D+0.50L+1.60S+1.60H
PASS	0.7397	2-way Punching	110.960 psi	150.0 psi	+1.20D+0.50L+1.60S+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom Left	Top Left	Top Right	Bottom Right	Actual / Allow Ratio
, +D+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+Lr+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.499	1.499	1.499	1.499	0.999
, +D+0.750Lr+0.750L+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+0.750L+0.750S+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +D+0.60W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+0.70E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+0.750Lr+0.750L+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.6378	0.6378	0.6378	0.6378	0.425
, +D+0.750L+0.750S+0.450W+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +D+0.750L+0.750S+0.5250E+H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	1.284	1.284	1.284	1.284	0.856
, +0.60D+0.60W+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3827	0.3827	0.3827	0.3827	0.255
, +0.60D+0.70E+0.60H								0.000
, 0.0 deg CCW	1.50	0.0	0.0	0.3827	0.3827	0.3827	0.3827	0.255

Overturning Stability

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

Sliding Stability

All units k

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

Hodge Engineering, Inc
3733 Rosedale Street
Gig Harbor, WA. 98332

Concrete Beam

Lic. # : KW-06007122 HODGE ENGINEERING INC

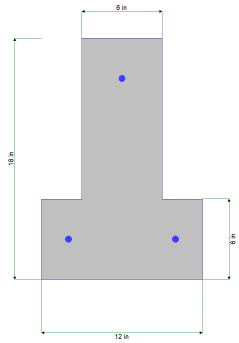
DESCRIPTION: 12" footing with 6" stem wall 1500 psf soil, 2500 psi concrete

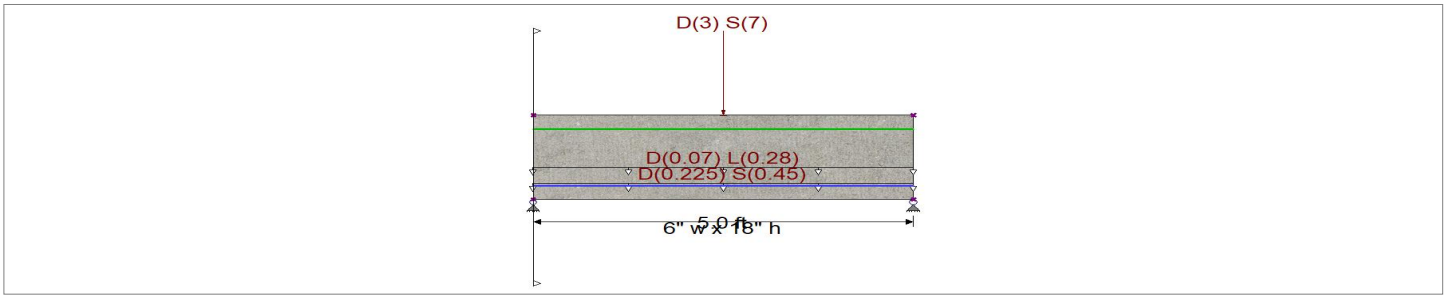
CODE REFERENCES

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

f'c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	375.0 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		





Cross Section & Reinforcing Details

Inverted Tee Section, Stem Width = 6.0 in, Total Height = 18.0 in, Top Flange Width = 12.0 in, Flange Thickness = 6.0 in
Span #1 Reinforcing....
2-#4 at 3.0 in from Bottom, from 0.0 to 5.0 ft in this span
1-#4 at 3.0 in from Top, from 0.0 to 5.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.030 ksf, Tributary Width = 15.0 ft, (Roof)
Uniform Load : D = 0.010, L = 0.040 ksf, Tributary Width = 7.0 ft, (Floor)
Point Load : D = 3.0, S = 7.0 k @ 2.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.892** : 1	Maximum Deflection			
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.003 in	Ratio =	19795 >=360
Mu : Applied		22.804 k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Mn * Phi : Allowable		25.551 k-ft	Max Downward Total Deflection	0.006 in	Ratio =	9596 >=180
Location of maximum on span		2.505 ft	Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0
Span # where maximum occurs		Span # 1				

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	7.225	7.225
Overall MINimum	0.700	0.700
+D+H	2.600	2.600
+D+L+H	3.300	3.300
+D+Lr+H	2.600	2.600
+D+S+H	7.225	7.225
+D+0.750Lr+0.750L+H	3.125	3.125
+D+0.750L+0.750S+H	6.594	6.594
+D+0.60W+H	2.600	2.600
+D+0.70E+H	2.600	2.600

Hodge Engineering, Inc
3733 Rosedale Street
Gig Harbor, WA. 98332

Concrete Beam

Lic. # : KW-06007122 HODGE ENGINEERING INC

DESCRIPTION: 12" footing with 6" stem wall 1500 psf soil, 2500 psi concrete

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	5.000	22.80	25.55	0.89
+1.40D+1.60H					
Span # 1	1	5.000	7.17	25.55	0.28
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	5.000	7.54	25.55	0.30
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	5.000	12.61	25.55	0.49
+1.20D+1.60Lr+0.50L+1.60H					
Span # 1	1	5.000	6.58	25.55	0.26
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	5.000	6.14	25.55	0.24
+1.20D+0.50L+1.60S+1.60H					
Span # 1	1	5.000	22.80	25.55	0.89
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	5.000	22.37	25.55	0.88
+1.20D+0.50Lr+0.50L+W+1.60H					
Span # 1	1	5.000	6.58	25.55	0.26
+1.20D+0.50L+0.50S+W+1.60H					
Span # 1	1	5.000	11.65	25.55	0.46
+1.20D+0.50L+0.70S+E+1.60H					
Span # 1	1	5.000	13.68	25.55	0.54
+0.90D+W+0.90H					
Span # 1	1	5.000	4.61	25.55	0.18
+0.90D+E+0.90H					
Span # 1	1	5.000	4.61	25.55	0.18

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+S+H	1	0.0063	2.500		0.0000	0.000

Hodge Engineering, Inc
3733 Rosedale Street
Gig Harbor, WA. 98332

Concrete Beam

Lic. # : KW-06007122 HODGE ENGINEERING INC

DESCRIPTION: 15" footing with 6" stem wall 1500 psf soil, 2500 psi concrete

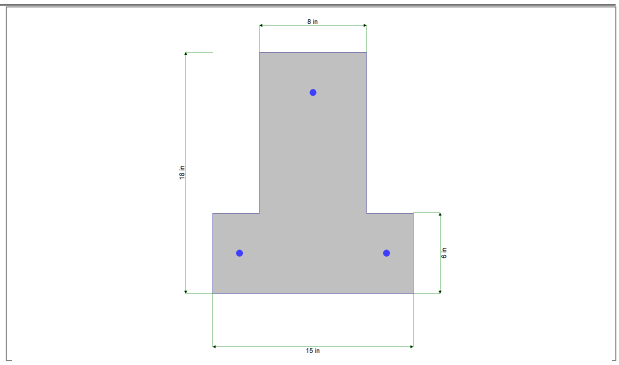
CODE REFERENCES

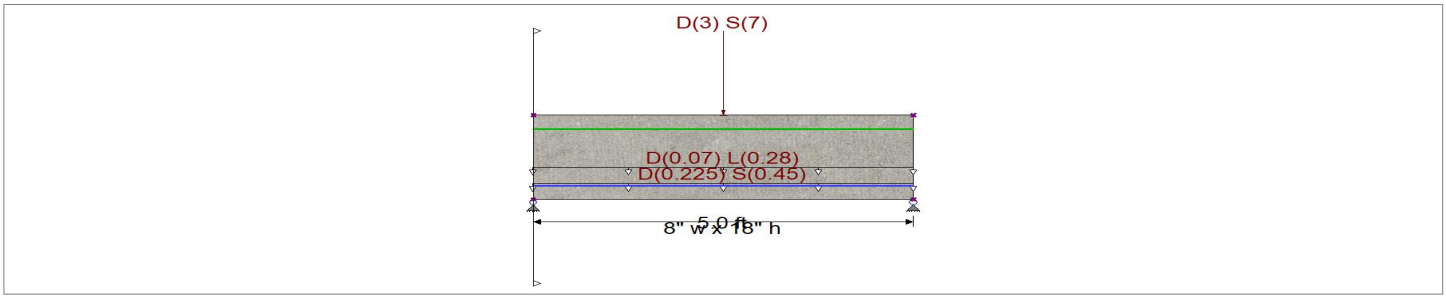
Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

f'c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	375.0 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3

Number of Resisting Legs Per Stirrup =





Cross Section & Reinforcing Details

Inverted Tee Section, Stem Width = 8.0 in, Total Height = 18.0 in, Top Flange Width = 15.0 in, Flange Thickness = 6.0 in
Span #1 Reinforcing....
2-#4 at 3.0 in from Bottom, from 0.0 to 5.0 ft in this span
1-#4 at 3.0 in from Top, from 0.0 to 5.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.030 ksf, Tributary Width = 15.0 ft, (Roof)
Uniform Load : D = 0.010, L = 0.040 ksf, Tributary Width = 7.0 ft, (Floor)
Point Load : D = 3.0, S = 7.0 k @ 2.50 ft, (Point Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.868** : 1	Maximum Deflection			
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.002 in	Ratio =	25683 >=360
Mu : Applied		22.962 k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Mn * Phi : Allowable		26.452 k-ft	Max Downward Total Deflection	0.004 in	Ratio =	16719 >=180
Location of maximum on span		2.495 ft	Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0
Span # where maximum occurs		Span # 1				

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Overall MAXimum	7.331	7.331
Overall MINimum	0.700	0.700
+D+H	2.706	2.706
+D+L+H	3.406	3.406
+D+Lr+H	2.706	2.706
+D+S+H	7.331	7.331
+D+0.750Lr+0.750L+H	3.231	3.231
+D+0.750L+0.750S+H	6.699	6.699
+D+0.60W+H	2.706	2.706
+D+0.70E+H	2.706	2.706

Hodge Engineering, Inc
3733 Rosedale Street
Gig Harbor, WA. 98332

Concrete Beam

Lic. # : KW-06007122 HODGE ENGINEERING INC

DESCRIPTION: 15" footing with 6" stem wall 1500 psf soil, 2500 psi concrete

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	5.000	22.96	26.45	0.87
+1.40D+1.60H					
Span # 1	1	5.000	7.35	26.45	0.28
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	5.000	7.70	26.45	0.29
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	5.000	12.77	26.45	0.48
+1.20D+1.60Lr+0.50L+1.60H					
Span # 1	1	5.000	6.74	26.45	0.25
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	5.000	6.30	26.45	0.24
+1.20D+0.50L+1.60S+1.60H					
Span # 1	1	5.000	22.96	26.45	0.87
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	5.000	22.52	26.45	0.85
+1.20D+0.50Lr+0.50L+W+1.60H					
Span # 1	1	5.000	6.74	26.45	0.25
+1.20D+0.50L+0.50S+W+1.60H					
Span # 1	1	5.000	11.81	26.45	0.45
+1.20D+0.50L+0.70S+E+1.60H					
Span # 1	1	5.000	13.84	26.45	0.52
+0.90D+W+0.90H					
Span # 1	1	5.000	4.73	26.45	0.18
+0.90D+E+0.90H					
Span # 1	1	5.000	4.73	26.45	0.18

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+S+H	1	0.0036	2.500		0.0000	0.000