BASIC PERMIT PACKAGE
REVIEWED FOR CODE COMPLIANCE
WITH IRC 2015
KITSAP COUNTY BUILDING DEPARTMENT

Reviewed for code compliance
with IRC 2015
Kitsap County Building Department
GShapiro@co.kitsap.wa.us
05/04/2020

Reviewed for code compliance
with IRC 2015
Kitsap County Building Department
PQuiriar@co.kitsap.wa.us
05/01/2020

Structural Calculations For:

Cottages on the Ridge

Building Y

12xxx Ridgetop Blvd. NW

Silverdale, WA

KITSAP COUNTY
DEPARTMENT OF
COMMUNITY
DEVELOPMENT

Approved Building Permit #s:

19-02320
19-03256
19-03257

RYAN HARRISON REICHMAN
STATE OF WASHINGTON
42141
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Prepared for: Norpoint Communities

Job #: 02329-2018-01

Date: April 2, 2019

Basic Permit Number: 20-01254

Basic Permit Number: 18-05976

Criteria Sheet

Codes:

Structural:	IBC 2015
Loading:	ASCE 7-10
Wood:	NDS 2015
Steel:	AISC 360-10
Concrete:	ACI 318-14
Masonry:	TMS 402/602-13

Project Location:

Street & Number:	12000 Ridgetop Blvd NW
City:	Silverdale State: WA
ZIP:	98311
Latitude:	47.6711 N
Longitude:	-122.6661 W

Occupancy Category

Risk Category: II ASCE 7 Table 1.5-1



Seismic Load Summary:

Analysis Procedure:	Equivalent Lateral Force Procedure		
Lateral System:	Wood Structural Panels Rated for Shear Resistance		
R:	6.50	C_d=	4
Base Shear V =	13.4 kips	Ω_o=	2.5
S_S=	1.371	S_1=	0.547
S_{DS}=	0.91	S_{D1}=	0.55
C_s=	0.141	I_E=	1.0

Wind Load Summary:

V=	110	K_{ZT}=	1.00
Exposure =	B		

Dead Loads:

Roof	
Roofing	2.5 psf
1/2" Sheathing	1.8 psf
Trusses @ 24" oc	2.5 psf
Misc./Mech.	1.5 psf
Ceiling Finish	2.8 psf
Solar Panels	4
	15.1 psf
Use	15 psf
Floor	
Finish Floor	1 psf
3/4" Sheathing	2.7 psf
Joists @ 16" oc	2.2 psf
Misc./Mech.	2 psf
Ceiling Finish	2.8
	10.7 psf
Use	12 psf

Live Loads:

Snow	25	psf
Floor	40	psf

Soils:

Allowable Bearing	1500	psf

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STRUCTURAL ENGINEERING

Silverdale Ridgetop Community
Criteria
Building 1

DATE 8/21/2018
PROJ. #
DESIGN BMB
SHEET 1

Permit Number: 20-01254

Permit Number: 18-05976

Seismic Design

ASCE 7-10 Seismic Analysis Equivalent Lateral Force Procedure

Seismic Force Resisting System: Per Table 12.2-1	System:	Bearing Wall Systems
	Type:	Light-frame (wood) Walls Sheathed with Wood Structural Panels Rated for Shear Resistance

Risk Category	II	I, II, or III, or IV per Table 1.5-1
Site Class	D	per soils report (D assumed, without soils report)
Diaphragm Flexibility	Flexible	

Ω_o	2.5		
S_S	1.371	g	2% in 50 yr, Latitude & Longitude lookup
S_1	0.547	g	2% in 50 yr, Latitude & Longitude lookup
h_n	9	ft	
R	6.50		
I_e	1.0		Table 1.5-2
C_d	4		
Ct	0.02		Table 12.8-2
x	0.075		Table 12.8-2
T	0.02	sec	Eq. 12.8-7
T_0	0.12	sec	
T_S	0.60	sec	
k	1.000		
Fa	1.00		Table 11.4-1
Fv	1.50		Table 11.4-2
S_{MS}	1.37	g	Eq. 11.4-1
S_{M1}	0.82	g	Eq. 11.4-2
S_{DS}	0.914	g	Eq. 11.4-3
S_{D1}	0.547	g	Eq. 11.4-4
Cs	0.141		Eq. 12.8-2
	3.568		Eq. 12.8-3 need not exceed, $T < T_L$
	0.010		Eq. 12.8-5 or 12.8-6 minimum
Cs, design	0.141		
Bldg. Weight	95.4	k	
$V = C_S W$	13.4	k	Eq. 12.8-1, Strength Level Base Shear
$V = C_{Sasd} W$	9	k	Eq. 12.8-1 ASD Base Shear

$$T_a = C_t h_n^x \quad \text{Eq. 12.8.7}$$

$$S_{MS} = F_a S_S \quad \text{Eq. 11.4-1}$$
$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$
$$S_{DS} = {}^2/_3\, S_{MS} \quad \text{Eq. 11.4-3}$$
$$S_{D1} = {}^2/_3\, S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_S = \frac{S_{DS}}{(R/I_e)} \quad \text{Eq. 12.8-2}$$
$$C_S = \frac{S_{D1}}{T(R/I_e)} \quad \text{Eq. 12.8-3}$$
$$C_S = \frac{S_{D1} T_L}{T^2 (R/I_e)} \quad \text{Eq. 12.8-4}$$
$$C_S \geq 0.044 S_{DS} I_e \quad \text{Eq. 12.8-5}$$
$$C_S \geq 0.01 \quad \text{Eq. 12.8-5}$$

$$C_{VX} = w_x h_x^k / \sum_{i=1}^{n} w_x h_i^k \quad \text{Eq. 12.8-12}$$

$$F_{px} = {}^{\sum_{i=x}^{n} F_i}/_{\sum_{i=x}^{n} w_i}\, w_{px} \quad \text{Eq. 12.10-1}$$
$$F_{px} \geq 0.2 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-2}$$
$$F_{px} \leq 0.4 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-3}$$

Vertical Distribution

ASD ρ= 1.0 Story Shear ASD Diaphragm Force (ρ not included)

Level	hx (ft)	Wx	hx^k (ft)	Wxhx^k	Cvx (%)	Fx (k)	SV (k)	Fpx_{calc}	Fpx_{min}	Fpx_{max}	Fpx_{design}	γ=Fpx/Fx
Roof	9.0	95.4	9.0	858.6	1.000	9.4	**9.4**	9.39	12.21	24.41	**12.21**	1.30
Roof	9.0	95.4	9.0	858.6	1.000	9.4	**18.8**	9.39	12.21	24.41	**12.21**	1.30
	S	95.4		858.6		9.4						

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Silverdale Ridgetop Community
Seismic Criteria
Building

DATE 8/21/2018
PROJ. #
DESIGN BMB
SHEET 2

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Permit Number: 20-01254
Permit Number: 18-05976

Wind Design - MWFRS

ASCE 7-10 Chapter 27 - Directional Procedure

Design Method	ASD

Wind Coefficients

Exposure	B	
V=	110	mph
K_d=	0.85	Table 26.6-1
K_h=	0.7	Table 27.3-1
G=	0.85	26.9.4

Location and Building Dimensions

Calculate Kzt?	YES	
Kzt	See Criteria Sheet	
Roof Angle - Transverse Dir	27	degrees
Roof Angle - Long Dir	0	degrees
Ground to top of roof	22	ft
Bot of roof to top of roof	11	ft
Mean Roof Height, h	16.5	ft
Short Plan Dimension	50.5	ft
Long Plan Dimension	84	ft
Parapet ?	No	
Ground to top of parapet		ft

Velocity Pressure at Mean Roof Height, q_h =	18.4	psf

Transverse Wind Pressures

L/B = 0.6 h/L = 0.3

Pressure Coefficients from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.50
Windward Roof	-0.22 / 0.27
Leeward Roof	-0.60

Wall Pressures (Unfactored): ASD

Ht	K_z	q_z	$P_{ww\ walls}$	$P_{lwwalls}$	P_{walls} (psf)
0-15	0.58	15.27	10.38	7.83	**10.93**
15-20	0.62	16.32	11.10	7.83	**11.36**
20-25	0.66	17.38	11.82	7.83	**11.79**
25-30	0.7	18.43	12.53	7.83	**12.22**
30-40	0.76	20.01	13.61	7.83	**12.86**
41-50	0.81	21.33	14.50	7.83	**13.40**
51-60	0.85	22.38	15.22	7.83	**13.83**
61-70	0.89	23.43	15.93	7.83	**14.26**
71-80	0.93	24.49	16.65	7.83	**14.69**
81-90	0.96	25.28	17.19	7.83	**15.01**
91-100	0.99	26.07	17.73	7.83	**15.33**

Roof Pressures (Unfactored) ASD

Windward		Leeward	Horiz Proj (psf)
Max	Min		
4.2	-3.4	-9.4	**3.71**

Parapet (Unf) ASD

Windward	Leeward	Total (psf)
-N/A-	-N/A-	**-N/A-**

Transverse Direction

Base Shear (kips)	**13.5**

Longitudinal Wind Pressures

L/B = 1.7 h/L = 0.2

Pressure Coefficients from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.37
Windward Roof	-0.9 / -0.18
Leeward Roof	-0.3

Wall Pressures (Unfactored): ASD

Ht	K_z	q_z	$P_{ww\ walls}$	$P_{lwwalls}$	P_{walls} (psf)
0-15	0.58	15.27	10.38	5.75	**9.68**
15-20	0.62	16.32	11.10	5.75	**10.11**
20-25	0.66	17.38	11.82	5.75	**10.54**
25-30	0.7	18.43	12.53	5.75	**10.97**
30-40	0.76	20.01	13.61	5.75	**11.62**
41-50	0.81	21.33	14.50	5.75	**12.15**
51-60	0.85	22.38	15.22	5.75	**12.58**
61-70	0.89	23.43	15.93	5.75	**13.01**
71-80	0.93	24.49	16.65	5.75	**13.44**
81-90	0.96	25.28	17.19	5.75	**13.77**
91-100	0.99	26.07	17.73	5.75	**14.09**

Roof Pressures (Unfactored) ASD

Windward		Leeward	Horiz Proj (psf)
Max	Min		
-2.8	-14.1	-4.7	**0.00**

Parapet (Unf) ASD

Windward	Leeward	Total (psf)
-N/A-	-N/A-	**-N/A-**

Longitudinal Direction

Base Shear (kips)	**5.4**

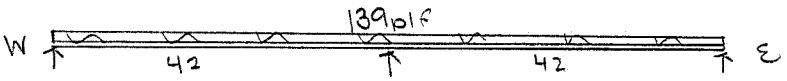
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LATERAL DESIGN

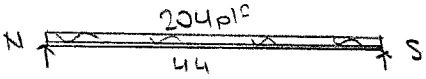
WIND LOADS GOVERN IN N-S DIRECTION
SEISMIC LOADS GOVERN IN E-W DIRECTION

N-S DIRECTION
ROOF



LOAD	2.86k	5.84k	2.85k
LENGTH	30ft	30.0ft	30ft
SHEAR	95plf	195 plf	95plf
WALL	SW1	SW1	SW1
OT	0.9 k	1.5k	0.9 k
HD	HDU4	HDU4	HDU4

EW DIRECTION
ROOF



LOAD	4.5k	4.5k
LENGTH	34.5ft	29ft
SHEAR	130plf	155plf
WALL	SW1	SW1
OT	1.2k	1.4k
HD	HDU4	HDU4

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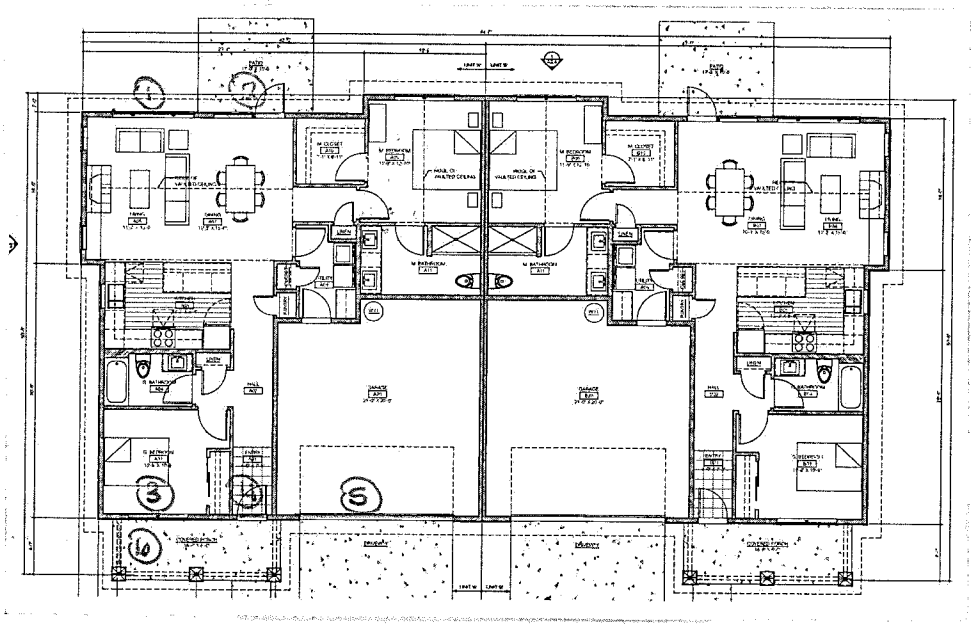
SILVERDALE RIDGETOP COMMUNITY
PROJECT
BUILDING Y

8-21-2018
DATE

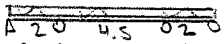
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Permit Number: 20-01254
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VERTICAL DESIGN



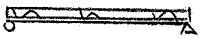
① 4x8 HDR



L = 8.5ft
TRIB = 8ft
w = 320plf
M = 0.36kft
M = 0.45kft

$R_{1,4}$ = 0.09k
$R_{2,3}$ = 1.27k
f_b = 176psi
f_v = 42psi
Δ = 0.005in = L/1699

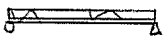
② 4x8 HDR



L = 7.5ft
TRIB = 8ft
w = 320plf
M = 2.25kft

R = 1.2k
f_b = 880psi
f_v = 60psi
Δ = 0.12in = L/746

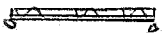
③ 4x8 HDR



L = 6.25ft
TRIB = 13ft
w = 520plf
M = 2.53kft

R = 1.6k
f_b = 993psi
f_v = 77psi
Δ = 0.09in = L/793

④ (2) 2x8 HDR



L = 3ft
TRIB = 13ft
w = 520plf
M = 0.58kft

R = 0.78k
f_b = 267psi
f_v = 32psi
Δ = 0.007in = L/4704

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STRUCTURAL ENGINEERING

PROJECT: SILVERDALE RIDGETOP COMMUNITY
BUILDING Y

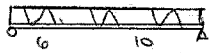
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SHEET:

Permit Number: 20-01254
Permit Number: 18-05976

VERTICAL DESIGN

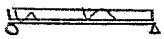
ROOF FRAMING CONT.

⑤ GLB 5 1/8x12 . HDR



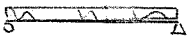
L = 16ft R = 3.68k
TRIB = 11.5ft f_b = 1.40ksi
W = 460plf f_v = 77psi
M = 14.72kft Δ = 0.49in = L/385

⑥ 4x8 HDR



L = 6ft R = 0.96k
TRIB = 8ft f_b = 563psi
W = 320plf f_v = 45psi
M = 1.44kft Δ = 0.049in = L/1467

⑦ 4x3 HDR



L = 7ft R = 1.12k
TRIB = 8ft f_b = 767psi
W = 320plf f_v = 59psi
M = 1.76kft Δ = 0.09in = L/918

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