STRUCTURAL CALCULATIONS

Project

A NEW BATHROOM AT NORTH ALBANY PARK
FOR
BENTON COUNTY PARKS
2800 HILLCREST ST., NW
ALBANY, OR

Client

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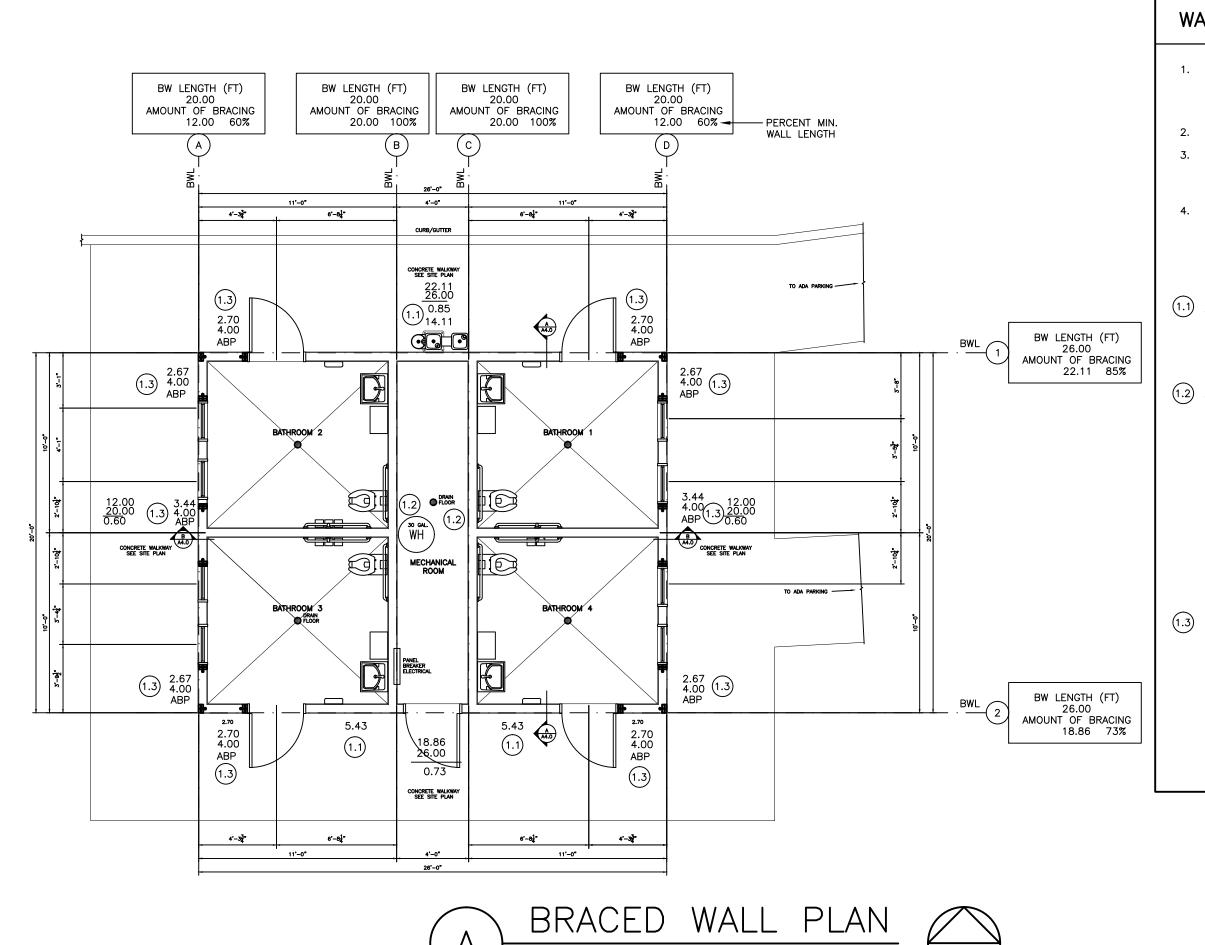
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WILLIAM E. BARLOW

EXPIRES: 12/31/25

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by

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WALL BRACING NOTES

1. LATERAL DESIGN IN ACCORDANCE WITH 2022 OSSC WALL BRACING PROVISIONS. SECTION 2308 CONVENTIONAL LIGHT-FRAME CONSTRUCTION. TABLE 2308.6.1. SDS=0.663

2. WOOD STRUCTURAL PANEL (WSP)

3. TOP PLATE LAPS IN BRACED WALL PANELS SHALL BE FACED NAILED WITH AT LEAST (8) 16d NAILS ON EACH SIDE OF THE SPLICE. SEE 2/A6.0

4. A BOTTOM CHORD OF A TRUSS PARALLEL AND DIRECTLY ABOVE A TOP PLATE SHALL BE TOE NAILED TO THE TOP PLATE OF A BRACED WALL PANEL WITH AT LEAST 8d NAILS SPACED A MAXIMUM OF 6 INCHES ON CENTER.

(1.1) EXTERIOR WALL PANELS
7/16" SHEATHING ON 2x6s @ 24"OC w/8 GALV. COMMON (2 1/2"x0.131) NAILS @ 6" OC EDGES AND 12" OC INTERMEDIATE SUPPORTS. (APPLY HARDIE ARCHITECTURAL PANEL)

(1.2) INTERIOR WALL PANELS
7/16" SHEATHING ONE FACE AND 1/2" GYP. BD. ONE FACE (MECHANICAL ROOM SIDE) w/o ADHESIVE. FASTEN SCREWS @ 12" OC MAX. @ EDGES & INTERMEDIATE SUPPORTS WITH TYPE S OR W (ASTM C 1002). FASTEN NAILS @ 7" OC MAX. @ EDGES & INTERMEDIATE SUPPORTS WITH 13 GAGE, 1 3/8" LONG, 19/64" HEAD; 0.098" DIA., 1 1/4" LONG, ANNULAR-RINGED; 5d COOLER NAIL, 0.086" DIA., 1 5/8" LONG, 15/64" HEAD; OR GYPSUM BOARD NAIL, 0.086" DIA, 1 5/8" LONG, 9/32" HEAD. (APPLY HARDIE ARCHITECTURAL PANEL & FRP)

(1.3) ALTERNATE BRACED PANEL (ABP)
7/16" SHEATHING ON 2x6s @ 12"OC w/8d GALV. COMMON (2 1/2"x0.131") NAILS @ 6" OC EDGES AND 8" OC INTERMEDIATE SUPPORTS BLOCK ALL PANEL EDGES. AT EACH END OF PANEL INSTALL (1) SIMPSON DDT2Z HOLD DOWN EACH END WITH SIMPSON PAB4x24" TO (2) 2x6; USE (8) 1/4x1 1/2" SDS TO 2x6. (APPLY HARDIE ARCHITECTURAL PANEL & FRP) FOOTING REBAR: (1) #4 TOP AND (2) #4 BOTTOM; LAPS 15" MIN.

BW LENGTH (FT) 20.00 AMOUNT OF BRACING 12.00 60% — A

BW LENGTH (FT) 20.00 AMOUNT OF BRACING 20.00 100% — B

BW LENGTH (FT) 20.00 AMOUNT OF BRACING 20.00 100% — C

BW LENGTH (FT) 20.00 AMOUNT OF BRACING 12.00 60% — D — PERCENT MIN. WALL LENGTH

BW LENGTH (FT) 26.00 AMOUNT OF BRACING 22.11 85% — 1

BW LENGTH (FT) 26.00 AMOUNT OF BRACING 18.86 73% — 2

BRACED WALL PLAN
SCALE: 3/16"=1'-0"

REVISIONS | BY

ATC Hazards by Location

Search Information

Address:	2800 Hillcrest St NW, Albany, OR 97321, USA
Coordinates:	44.66872619999999, -123.1344144
Elevation:	342 ft
Timestamp:	2023-12-18T22:45:57.137Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	0.829	MCE_R ground motion (period=0.2s)
S_1	0.432	MCE_R ground motion (period=1.0s)
S_{MS}	0.995	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.663	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▼Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.875	Coefficient of risk (0.2s)
CR_1	0.863	Coefficient of risk (1.0s)
PGA	0.391	MCE_G peak ground acceleration
F_{PGA}	1.209	Site amplification factor at PGA
PGA_M	0.472	Site modified peak ground acceleration
T_L	16	Long-period transition period (s)
SsRT	0.829	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.948	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.432	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.501	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.695	Factored deterministic acceleration value (1.0s)
PGAd	0.58	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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 provided by the U.S. Geological Survey Seismic Design Web Services.

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2021 ORSC, 2022 OSSC & ASCE 7-16					Project:	Benton Co., North Albany Park				
EQUIVALENT LATERAL FORCE PROCEDURE (12.8.1), p. 71					Date:	12.18.2023				
								Input	Results	

Code:	OSSC	<= Pull Down								
Occupancy Category	II	<= Pull Down, (OSSC Table 1604.5), p. 350: I, II, III OR IV								
$T_a = C_t(h_n)^x$	Equation (12.8-7)				**Table 11.4-1 Short-Period Site Coefficient, Fa**					
Structure Type	All other Structures					Ss<=	Ss=	Ss=	Ss=	Ss=	Ss>=
$C_t =$	0.020 (Table 12.8-2), p. 102				Site Class	0;.25	0.5	0.75	1	1.25	1.5
x =	0.75 (Table 12.8-2), p. 102				A	0.8	0.8	0.8	0.8	0.8	0.8
$h_n =$	9.8 ft				B	0.9	0.9	0.9	0.9	0.9	0.9
$T_a =$	0.11 sec				C	1.3	1.3	1.2	1.2	1.2	1.2
					D	1.6	1.4	1.2	1.1	1	1
ASCE 7-16, 20.3 SITE CLASS DEFINITIONS, 20.3.1, Exception					E			See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8
Site Class =	D				F	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8
$S_s =$	0.829 From ATC Basic Parameters				Find: Fa=	Linear Interpolation				
$S_1 =$	0.432 From ATC Basic Parameters	S1>0.2, SITE SPECIFIC REQ'D; Use Exception			Ssa=	0.750	Fa1=	1.2		
				$S_s = 0.829$	$S_s =$	0.829		**Fa= 1.2**	<= NA	
$F_a =$	1.2 From ATC Additional Information				Ssb=	1.000	Fa2=	1.2		
$F_v =$	1.9 From Table 11.4.2 See right=>									
					Table 11.4-2 Long-Period Site Coefficient, Fv					
$S_{MS} = F_a \cdot S_s$	0.995 (11.4-1)					S1<=	S1=	S1=	S1=	S1=	S1>=
$S_{M1} = F_v \cdot S_1$	1.231 (11.4-2)	Increased 50%, Supplement 3, Chapter 11			Site Class	0.1	0.2	0.3	0.4	0.5	0.6
					A	0.8	0.8	0.8	0.8	0.8	0.8
$S_{DS} = 2/3 \cdot S_{MS}$	0.663 (11.4-3)				B	0.8	0.8	0.8	0.8	0.8	0.8
$S_{D1} = 2/3 \cdot S_{M1}$	0.821 (11.4-4)				C	1.5	1.5	1.5	1.5	1.5	1.4
					D	2.4	2.2	2	1.9	1.8	1.7
ASCE 7-16, 20.1 [p. 203],	Where the soil properties are not known in sufficient detail				E	4.2	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8
	to determine the site class, Site Class D, subject to the				F	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8	See 11.4.8
	requirements of Section 11.4.4, shall be used unless the									
	Authority Having Jurisdiction or geotechnical data determine				Find: Fv=	Linear Interpolation				
	that Site Class E or F soils are present at the site.				S1a=	0.400	Fv1=	1.9		
				$S_1 = 0.432$	$S_1 =$	0.432		**Fv= 1.9**	<= NA	
					S1b=	0.500	Fv2=	1.8		

$S_1 =$	0.432 S1>0.2, OKAY!			S_S = mapped MCE, 5 percent damped, spectral response acceleration parameter at short periods as defined in Section 11.4.1	
$T_a =$	0.111 s				
$T_s = S_{D1}/S_{DS} =$	1.238			S_1 = mapped MCE, 5 percent damped, spectral response acceleration parameter at a period of 1 s as defined in Section 11.4.1	
Ta/Ts =	0.090 <=1.5 OKAY!	IF Ta/Ts<=1.5, THEN USE Cs Equation 12.8-2, p. 101			
$T_L > (T >= 1.5\ Ts)$	$T_L = 16 s$			S_{aM} = the site-specific MCE spectral response acceleration at any period	
$1.5\ T_s = 1.856$				S_{DS} = design, 5 percent damped, spectral response acceleration parameter at short periods as defined in Section 11.4.4	
V=Cs(W) (12.8-1)		Considered Earthquake (MCER) Spectral Response			
Calculation of Seismic Response Coefficient (12.8.1.1), p. 101		Acceleration Parameters. The MCER spectral response		S_{D1} = design, 5 percent damped, spectral response acceleration parameter at a period of 1 s as defined in Section 11.4.4	
$S_{DS} =$	0.663 g, EXCEPTION 2. ABOVE	acceleration parameters for short periods (S_{MS}) and at 1 s			
$S_{D1} =$	0.821 g, EXCEPTION 2. ABOVE	(SM1), adjusted for site class effects, shall be determined by		S_{MS} = the MCE, 5 percent damped, spectral response acceleration at short periods adjusted for site class effects as defined in Section 11.4.3	
R =	6.5 (Table 12.2-1), p. 92	Eqs. (11.4-1) and (11.4-2), respectively.			
I =	1.00 (Table 1.5.-2), p. 4	$S_{MS} = FaS_s$ (11.4-1)			
		$S_{M1} = FvS_1$ (11.4-2) Increased 50% per Exception Supplement 3, Chapter 11			
Cs =	0.1020 (12.8-2), p. 101	where			
$T_L =$	16 sec (Figure 22-14), p. 225	S_S = the mapped MCER spectral response acceleration parameter			
Cs |> =	1.1373 for T<T_L (12.8-3), p. 101	at short periods as determined in accordance with			
or		Section 11.4.2, and			
Cs |> =	163.89 for T>T_L (12.8-4), p. 101	S_1 = the mapped MCER spectral response acceleration parameter			
Cs |< =	0.0292 (12.8-5), p. 101	at a period of 1 s as determined in accordance with			
Cs |< =	0.0695 (12.8-6), p. 101	Section 11.4.2			
		where site coefficients Fa and Fv are defined in Tables 11.4-1 and			
		11.4-2, respectively. Where Site Class D is selected as the default			
Seismic Design Category		site class per Section 11.4.3, the value of Fa shall not be less than			
SDC DS:	D	1.2.			
SDC D1:	D				

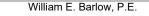|			
Note:			
$C_t =$	(Table 12.8-2), p. 102	Steel frame: 0.028, Concrete frame: 0.016, Steel ecc. braced frame: Table 12.2.1, Steel buckling-restrained braced frame: 0.03, All others: 0.02	
x =	(Table 12.8-2), p. 102	Steel frame: 0.8, Concrete frame: 0.9, Steel ecc. braced frame: Table 12.8.2, Steel buckling-restrained braced frame: 0.75, All others: 0.75	

Project: Benton-County_Bathrooms

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Location: MLB0
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
(2) 1.5 IN x 5.5 IN x 3.5 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 129.0%
Controlling Factor: Moment

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DEFLECTIONS   Center
Live Load   0.02   IN L/2760
Dead Load   0.01   in
Total Load   0.02   IN L/1712
Live Load Deflection Criteria: L/240   Total Load Deflection Criteria: L/180

REACTIONS   A   B
Live Load   525 lb   525 lb
Dead Load   321 lb   321 lb
Total Load   846 lb   846 lb
Bearing Length 0.45 in   0.45 in

BEAM DATA   Center
Span Length   3.5   ft
Unbraced Length-Top   0   ft
Unbraced Length-Bottom   3.5   ft
Live Load Duration Factor 1.15
Notch Depth   0.00

MATERIAL PROPERTIES
#2 - Douglas-Fir-Larch

	Base Values		Adjusted	
Bending Stress:	F_b =	900 psi	F_b' =	1346 psi
	Cd=1.15 CF=1.30			
Shear Stress:	F_v =	180 psi	F_v' =	207 psi
	Cd=1.15			
Modulus of Elasticity:	E =	1600 ksi	E' =	1600 ksi
Comp. $\perp$ to Grain:	Fc-$\perp$ =	625 psi	Fc-$\perp'$ =	625 psi

Controlling Moment: 740 ft-lb
  1.75 Ft from left support of span 2 (Center Span)
  Created by combining all dead loads and live loads on span(s) 2
Controlling Shear: 846 lb
  At left support of span 2 (Center Span)
  Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	6.6 in3	15.13 in3
Area (Shear):	6.13 in2	16.5 in2
Moment of Inertia (deflection):	4.37 in4	41.59 in4
Moment:	740 ft-lb	1696 ft-lb
Shear:	846 lb	2277 lb

LOADING DIAGRAM

UNIFORM LOADS   Center
Uniform Live Load   300 plf
Uniform Dead Load   180 plf
Beam Self Weight   4 plf
Total Uniform Load   484 plf