Development Services

From Concept to Construction

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APPEAL SUMMARY

Status: Decision Rendered

Appeal ID: 20721	**Project Address:** 1406 NE Holman St
Hearing Date: 8/14/19	**Appellant Name:** Michael Lobdell
Case No.: B-004	**Appellant Phone:** 503-349-1423
Appeal Type: Building	**Plans Examiner/Inspector:** David Wood, Amit Kumar, Ronald Tiland
Project Type: residential	**Stories:** 1 **Occupancy:** R-3 **Construction Type:** V-B
Building/Business Name:	**Fire Sprinklers:** No
Appeal Involves: Erection of a new structure	**LUR or Permit Application No.:** 19-167401-RS
Plan Submitted Option: pdf [File 1] [File 2] [File 3] [File 4]	**Proposed use:** Dwelling

APPEAL INFORMATION SHEET

Appeal item 1

Code Section R703, ASTME2392

Requires The applicable building codes and standards related to the Light Straw Clay Recommendation include:

2008 Oregon Residential Specialty Code: R703 Exterior Wall Covering. Exterior walls shall provide the building with a weather-resistant exterior wall envelope and a means of draining water that enters the assembly to the exterior. Protection against condensation in the exterior wall assembly shall be provided in accordance with Chapter 11 of this code.

N1104.2 Insulation Materials. Insulation materials shall be installed per manufacturer's listing and specifications and this section. Insulation R-values shall be specified as required in 16 CFR Ch.I (1-1-91 Edition)Part 460 - Labeling and Advertising of Home Insulation.

N1104.9 Moisture Control. To ensure the effectiveness of insulation materials and reduce the hazard of decay and other degradation due to condensation within the structure, moisture-control measures shall be included in all buildings and structures or portions thereof regulated by this chapter.

Appendix R Straw-bale Structures: The purpose of this appendix chapter is to establish minimum prescriptive standards of safety for the construction of structures that use baled straw as a load-bearing or non-load bearing material. The provisions of this chapter shall apply to single family detached structures and related accessory structures, utilizing straw-bales in the construction of wall systems.

ASTM E2392 – Standard Guide for Design of Earthen Wall Building Systems

Proposed Design	I am proposing the use of Light Straw Clay design for a 308ft2 ADU in NE Portland. This system will have an 8" wall (R-15) with an additional rock wool batting added (R-12) to meet the minimum R-21 requirements. These walls are non load bearing. The exterior will have building paper, under 1x10 lapped wood siding. The interior will be clay plaster over permalath 1000 over the rock wool sheets. The thinner wall system, compare to the 12" wall that has been previously permitted, allows for quicker drying. Previous building projects prolong drying of the 12' wall and rotting has occurred. Please see the attached files for more information.
Reason for alternative	The reason for the alternative building process is that LSC is non toxic, and will not off-gas materials known to be carcinogenic into the enclosed spaces and into the environment. It is also using materials that are readily available and abundant in the surrounding areas while also being unadulterated. These wall are highly vapor permeable. This is important because vapor permeable walls allow moisture to exit a building instead of being trapped inside the structure and inside the wall cavities.

Appeal item 2

Code Section	chapter 24.85
Requires	LSC buildings allowed in allowed in Seismic design categories A and B. This building is proposed for Seismic zone D1.
Proposed Design	The Light Straw Clay design contains walls that are much heavier than conventional walls. The heavy timers are also very heavy. This adds to the seismic durability. Please see files (ADU lateral load calcs) attached for more information regarding specific wall calculations.
Reason for alternative	The weight of these walls will provide the needed structural capacity for the zone where the building is located.

APPEAL DECISION

1. Use of light straw clay construction with 8 inch walls as an alternate method: Granted as proposed.

2. Use of light straw clay construction in Seismic Zone D1: Granted as proposed.

Note: Structural calculations will be reviewed at time of plan review.

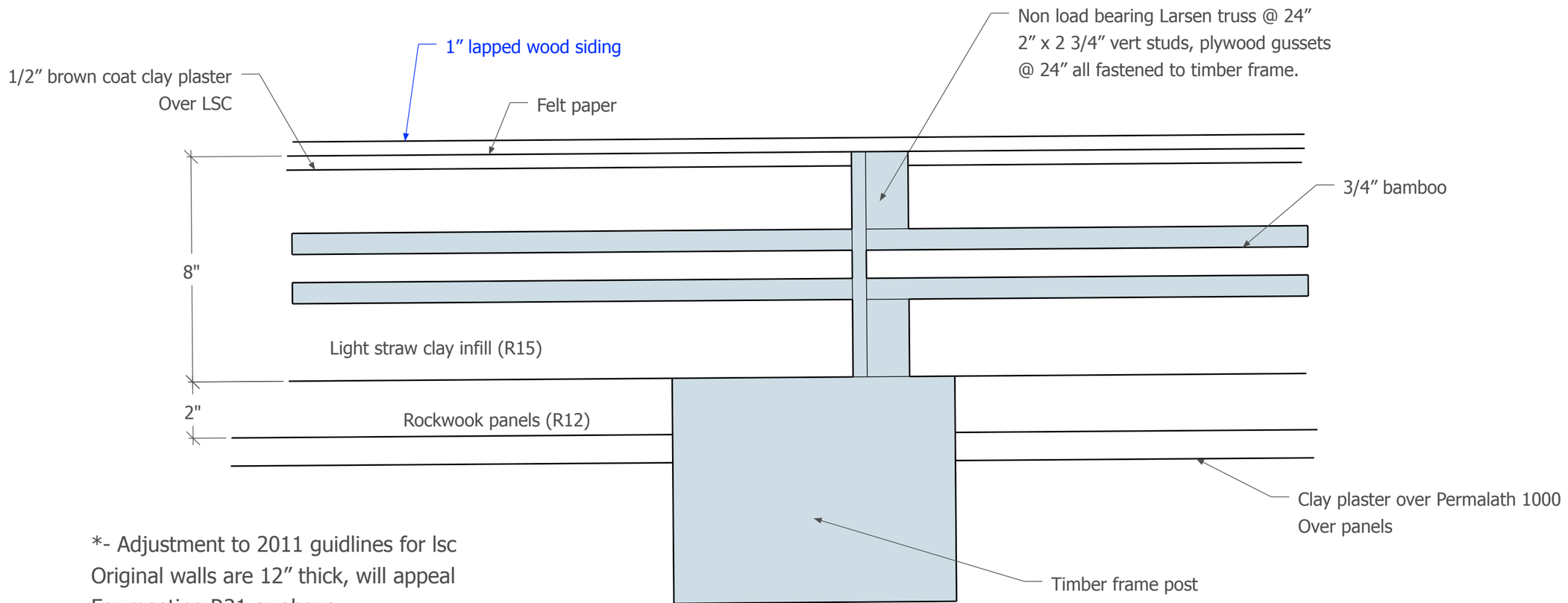
The Administrative Appeal Board finds that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.

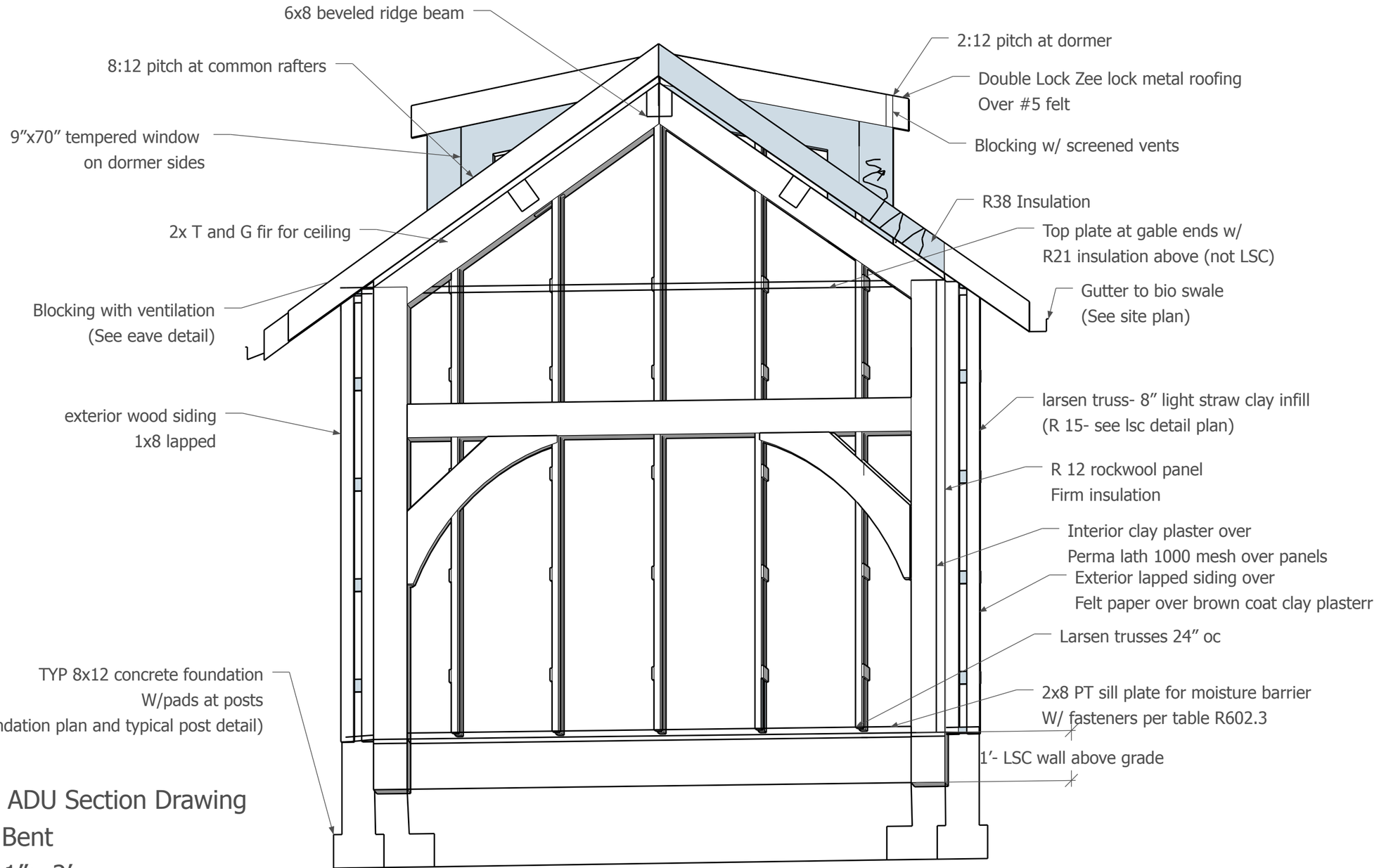
Lobdell ADU Light Straw Clay Wall Detail *

Scale: 1": 4'

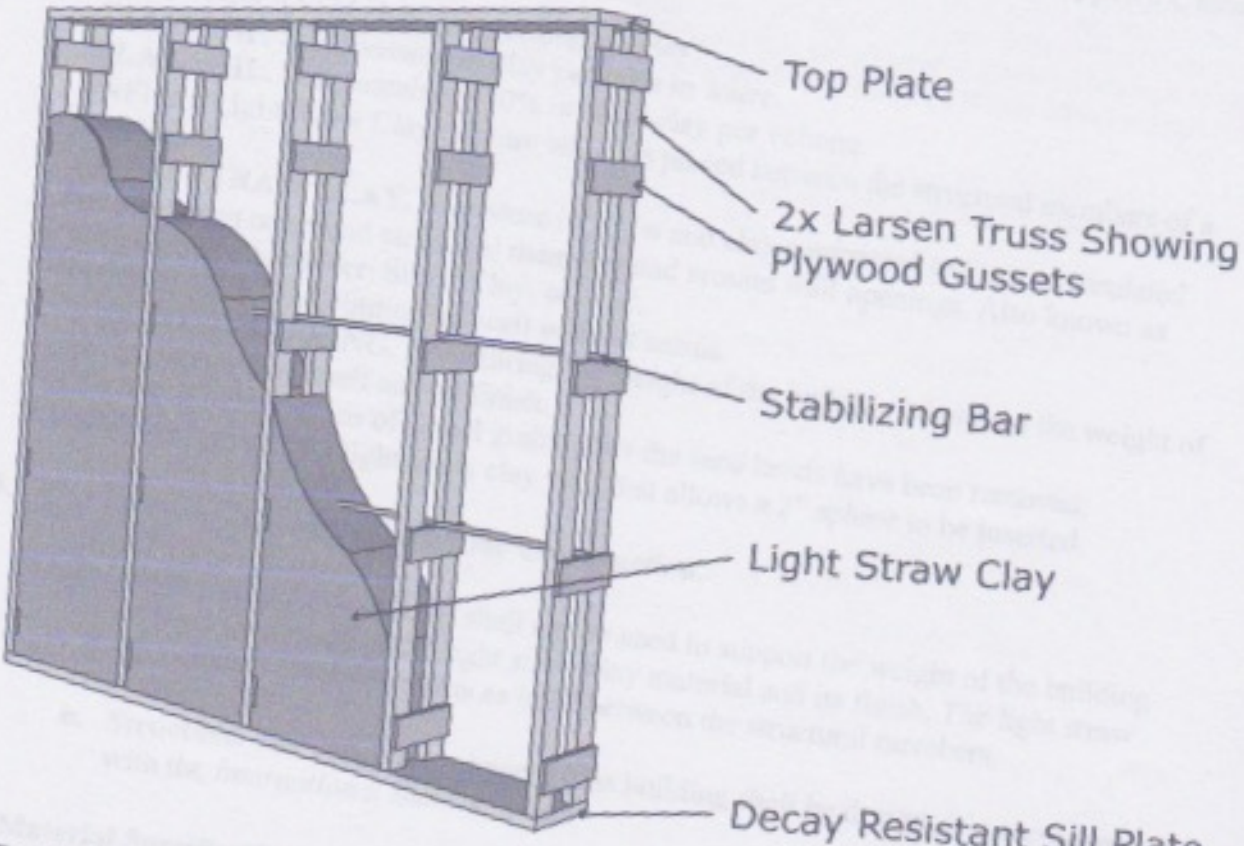
Oat straw and clay slip to be mixed at 40lbs/ft3
Clay= "particle size less then .00008" having characteristics of high to very
High dry strength and medium to high plasticity" (per AR102).



*- Adjustment to 2011 guidlines for lsc
Original walls are 12" thick, will appeal
For meeting R21 or above.



Lobdell ADU Section Drawing
At 2nd Bent
Scale: 1”: 2’



Typical Light Straw Clay Wall
(for illustration purposes only)

Lateral Analysis

L 1 – 4

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WIND 120MPH EXP B ULTIMATE 2a = 6'

$P = 0.6 \times \lambda K_{zt} P_{S30}$ (0.6 allowable stress) $\lambda = 1$ $K_{zt} = 1$

Θ =	A	B	C	D
0°	22.8	—	15.1	—
9.46°	25.8	-10.7	17.1	-6.2
33.69	25.7	17.6	20.4	14.0

WIND ON LONG

$P = .6((5.3 \times 9/2 + 3.6 \times 5.67) \times 6' + 20.4 \times 9/2 \times 12.17 + 14 \times 5.67 \times 13.17 + 17.1 \times 7.5 \times 12.17 - 6.2 \times 1.35 \times 13.17) = 2327\#$

$P_{min} = 10PSF \times (12.17 \times (9/2 + 7.5) + 13.17 \times (5.67 + 2.17)) = 2492\#$

WIND ON SHORT

$P = .6(7.7 \times 6 + 15.1 \times 12.67) \times 8.83' = 1259\#$

$P_{min} = 10 \times 12.67 \times 8.83 = 1119\#$

SEISMIC: (allowable stress)

$V_{design} = 0.7 \times F S_{DS} W/R$ $F = 1.0$ $S_{DS} = .663$ $R = 1.5$ timber frame

$V_{design} = \frac{.7 \times 1.0 \times .663 W}{1.5} = 0.31 W$

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SEISMIC (CONT.)

$W = 40PSF \times 8/12 \times (9\frac{1}{2} \times 12.17 \times 3 \text{ walls} + 11.83/2 \times 12.17 + 11.39 \times 12.67 + 11.67'/2 \times 12.67) + 14 \times 18.67' \times 26.33'/12 + 7 \times 11.33 \times 11.33) = 17,974\#$

$V_{Design} = .31 \times 17974 = 5572\#$

∴ SEISMIC GOVERNS BOTH DIRECTIONS

LOADS TO BENTS

LINE ①

$W = 40 \times 8/12 \times (9'/2 \times 12.17' \times 3/2 + 11.37/2 \times 12.67) + 14 \times 13.17'/2 \times 12.17 \times 18.67 = 5244\#$

$V = 1625\#$ $P_{FL} = 515\#$ $W_{wall} = 84$ PLF Proj.

LINE ②

$W = 40 \times 8/12 \times (9/2 \times 12.17 \times 3/2 + 11.83/2 \times 12.17/2) + 14 \times 18.67 \times 24.33/2 + 7 \times 11.33^2/2) = 6779\#$

$V = 2102\#$ $P_{FL} = 981\#$ $P_{FLR} = 13$ PLF

LINE ③

$W = 40 \times 8/2 \times ((9/2 + 11.83/2) \times 12.17/2 + 11.67/2 \times 12.67) + 14 \times 18.67 \times 13.17^2/2 \times 12.17 + 7 \times 11.33^2/2 = 5973\#$

$V = 1851\#$ $P_{FL} = 551\#$ $P_{FLR} = 8$ PLF $W_{wall} = 86$ PLF

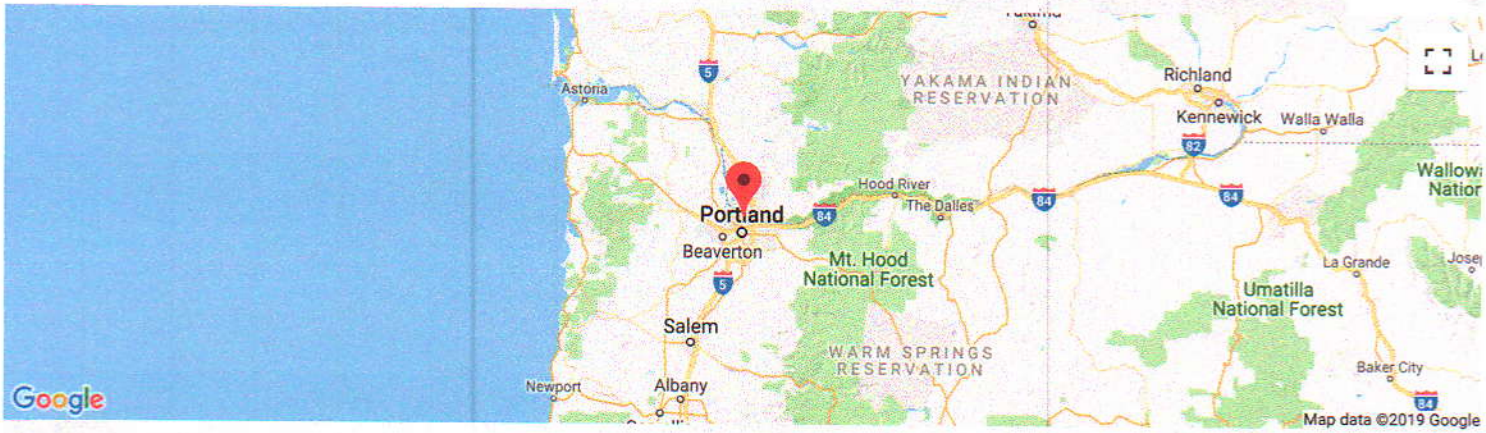
LINES (A) = (B) = 2786# OR 12 SPLF

ATC Hazards by Location

Search Information

Address:	1406 NE Holman St, Portland, OR 97211, USA
Coordinates:	45.5683269, -122.6507684
Timestamp:	2019-02-08T23:06:00.575Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D
Report Title:	Not specified

Map Results



Text Results

Basic Parameters

Name	Value	Description
S_S	0.861	MCE_R ground motion (period=0.2s)
S_1	0.385	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	1.155	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
PGA	0.39	MCE_G peak ground acceleration
F_{PGA}	1.21	Site amplification factor at PGA

L3

PGA_M	0.472	Site modified peak ground acceleration
T_L	16	Long-period transition period (s)
SsRT	0.861	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.975	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.385	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.444	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	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 United States Geological Survey Seismic Design Web Services.

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