

2025-02-20 | 03:22AM

## 0101-[1] Project Summary

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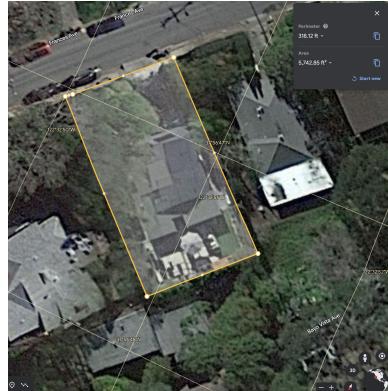
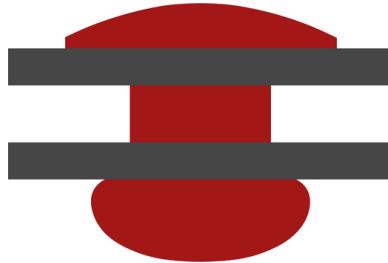
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## 0101-[2] Overview and Codes

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This report describes the structural design of a solar canopy covering a residential patio located in the City of Larkspur, California. It includes the design of a concrete slab and stem wall, steel tube frame, and clip attachments of solar panels to the frame.



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### Building Codes and Jurisdiction

- City of Larkspur, California
- 2019 California Building Code [CBC]
- 2019 California Residential Code [CRC]

**Table	01:	Loading	[from	file:
Standard	Year			
c:gitrvt-solar-canopy-structural-calculations	01-loadsins	01cbc2019A_stds.csv		
=====	=====	=====	=====	Category
Standard	Year			
ASCE-7 2016	Concrete ACI-318 2014	Wood-National Design Specifications	AWC-NDS 2018	
Wood-Special Design Provisions for Wind and Seismic	AWC-SDPWS 2015	Wood Frame Construction	Manual AWC-WFCM 2018	
=====	=====	=====	=====	=====

Design loads for the project are from the California Building and Residential Codes and are summarized in the following tables.

```
[from      file:  c:gitrvvt-solar-canopy-structural-calculationsd01-loadsins01load_types01.csv] =====
===== Sym Load
Effect    Notes   =====
===== D Dead load See IBC 1606 and Chapter 3 of this
publication
```

**E Combined effect of horizontal and vertical earthquake-induced forces** See IBC 1613, ASCE/SEI 12.4.2 and vertical earthquake-induced forces as Chapter 6 of this publication defined in ASCE/SEI 12.4.2

**Em Maximum seismic load effect** See IBC 1613, ASCE/SEI 12.4.3 and horizontal and vertical forces as set Chapter 6 of this publication forth in ASCE/SEI 12.4.3

**H Load due to lateral earth pressures**, See IBC 1610 for soil lateral loads ground water pressure or pressure of bulk materials

**L Live load, except roof live load**, See IBC 1607 and Chapter 3 of this including any permitted live load publication reduction

**Li Roof live load including any permitted** See IBC 1607 and Chapter 3 of this live load reduction publication

**R Rain load** See IBC 1611 and Chapter 3 of this publication

**W Load due to wind pressure** See IBC 1609 and Chapter 5 of this publication  
CBC 2019 reference Equation

Equation 16-1	1.4(D +F)
Equation 16-2	1.2(D + F) + I.6(L + H) + 0.5(L or S or R)
Equation 16-3	1.2(D + F) + I.6(Lr or S or R) + I.6H + (f1L or 0.5W)
Equation 16-4	1.2(D + F) + 1.0W + f1L +1.6H + 0.5(Lr or S or R)
Equation 16-5	1.2(D + F) + 1.0E + f1L + I.6H + f2S
Equation 16-6	0.9D+ I.0W+ I.6H
Equation 16-7	0.9(D + F) + 1.0E+ I.6H

### 0101-[3] Gravity Loads and Seismic Mass

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First floor dimensions Eq-01

variable	value	[value]	description
area1	10700.00 sf	994.06 SM	roof area
area2	100000.00 sf	9290.30 SM	floor area
area3	25.00 sf	2.32 SM	floor area
ht1	9.00 ft	2.74 m	wall height
len1	110.00 ft	33.53 m	interior wall length
len2	155.00 ft	47.24 m	exterior wall length
udl1	12.20 psf	584.14 Pa	description

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[from      file:  c:gitrvvt-solar-canopy-structural-calculationsvals01test1.csv] =====
===== =====
===== ===== variable value [value] description ===== =====
```

===== ===== floordl1 50.00 psf 2394.01 Pa interior wall length floordl2 10.00 psf  
478.80 Pa exterior wall length ===== ===== =====

Equation for floor area Eq-02 .. raw:: math

$$wt = area \cdot floordl$$

wt2	floordl1	area2
5000.00 kips	50.00 psf	100000.00 sf
22241108.00 N	2394.01 Pa	9290.30 SM

Equation for wall area Eq-03 .. raw:: math

$$wt = area \cdot floordl \cdot 0.1$$

wt3	area3	floordl2
25.0 lbs	25.00 sf	10.00 psf
111.2 N	2.32 SM	478.80 Pa

Exterior wall - total area load Eq-04 [from file: c:gitrvvt-solar-canopy-structural-calculationsvalsv01test2.csv]  
===== ===== ===== ===== variable value [value] description  
===== ===== ===== ===== len1 410.00 ft 124.97 m interior wall length  
len2 455.00 ft 138.68 m exterior wall length ===== ===== =====