

2325 N. Jones
STRUCTURAL CALCS
1986

Thuc Dang 7-3-89

4 PLEX@SMOKE RANCH
& JONES

OCEAN INVESTMENTS IV

0-135

ROOF DEAD LOADS

ROOFING = 5.0 PSF
PLYWOOD = 1.5
TRUSSES = 3.0
INSULATION = 1.0
CEILING = 3.0
MISC. = 1.5
15.0 PSF

ROOF LIVE LOADS

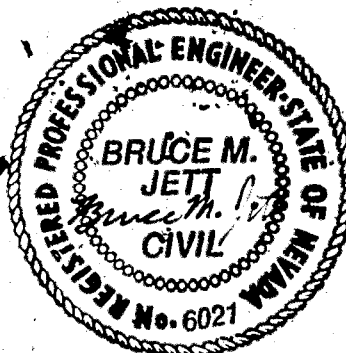
16.0 PSF

FLOOR DEAD LOADS

FLOORING = 1.0 PSF
PLYWOOD = 2.0
TRUSSES = 2.5
CEILING = 3.0
MISC. = 1.5
10.0 PSF

FLOOR LIVE LOADS

40.0 PSF



8555		SHT. 1 OF
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Thuc Dang 7-3-89

ROOF TRUSSES

USE PRE-ENGINEERED TRUSSES @ 24" O.C., MANUFACTURED
TO FURNISH CALCULATIONS FOR APPROVAL PRIOR TO
FABRICATION.

ROOF SHEATHING

USE 5/8" PLYWOOD, EXTERIOR GRADE STRUCTURAL #1, APA 30/12,
PANEL EDGES NAILED W/ 10d @ 6" O.C. & 10d @ 12" O.C. FIELD.

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SHT. 2

Thuc Dang 9-3-89

ROOF BEAMS

SPAN: 3.0'

$$w = 18.5' (15 + 16 \text{ PSF}) + 20' = 593 \text{ #/ft}$$

$$A_r = \frac{1.5 (1.5' - .5) 593 \text{ #/ft}}{85 \times 1.25} = 8.38$$

USE 6x6 D.F. #1

$$M = 593 \text{ #/ft} (3')^2 / 8 = 667 \text{ #/ft}$$

$$S_r = \frac{667 \text{ #/ft} \times 12''}{1.3 \times 1.25} = 4.93 \text{ in}^3$$

$$R = 889 \text{ #/ft}$$

SPAN: 6.0'

$$w = (15 + 16 \text{ PSF}) 2' (10.5' / 16.5') = 414 \text{ #/ft DL+LL}$$
$$6 \text{ PSF} \times 4.5' (18.7' / 16.5') = 31 \text{ #/ft STUCCO}$$
$$= 20 \text{ #/ft BM}$$
$$465 \text{ #/ft}$$

$$M = 465 \text{ #/ft} (6')^2 / 8 = 2.09 \text{ k}$$

$$S_r = \frac{2.09 \text{ k} \times 12''}{1.3 \times 1.25} = 15.4 \text{ in}^3$$

USE 6x6 D.F. #1

$$A_r = \frac{1.5 (3' - .5) 465 \text{ #/ft}}{85 \times 1.25} = 16.4$$

$$R = 1.40 \text{ k}$$

855		SHT. 3
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Three Days 7.3-89

FLOOR TRUSSES

USE PRE-ENGINEERED TRUSSES @ 24" O.C.; MANUFACTURER
TO FURNISH CALCULATIONS FOR APPROVAL PRIOR TO
FABRICATION.

FLOOR SHEATHING

USE 3/4" T&G PLYWOOD, STRUCTURAL #1, ALL PANEL
EDGES NAILED W/ 10d @ 6" O.C. & 10d @ 10" O.C. FIELD

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SHT. 4

Thuc Dang 7-3-89

FLOOR BEAMS

SPAN: 3'

$$w = 15.5' (15' \times 10 \text{ PSF}) + 8' \times 21 \text{ PSF} + 13.5' (10' \times 40 \text{ PSF}) + 20' = 1.34 \text{ k/ft}$$

$$A_r = \frac{1.5 (15' - 5') 1340 \text{ #/ft}}{85 \times 1.25} = 18.9 \text{ #}$$

$$R = 2.01 \text{ k}$$

USE 6x6 D.F. #1

ALTERNATE: SPAN 6.0'

$$w = 1.34 \text{ k/ft}$$

$$M = 1.34 \text{ k/ft} \times (6')^2 / 8 = 6.03 \text{ k-ft}$$

$$S_r = 6.03 \text{ k-ft} \times 12' / 1.3 = 55.7 \text{ in}^3$$

$$A_r = 1.5 (3' - .8) 1340 \text{ #/ft} / 85 = 52.0 \text{ #}$$

$$R = 4.02 \text{ k}$$

USE 6x10 D.F. #1

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547.5

Thuc Dang 7-3-89

FOUNDATIONS

FLOOR SLAB

USE 4" CONCRETE SLAB ($f_c = 2500$ PSI) W/ 6x6-10/10 W.W.M.
OVER 2" SAND, OVER GML VISQUEEN, OVER 6" COMPACTED
TYPE II.

PERIMETER FTG. @ SINGLE STORY

$$\text{LOAD} = 18' (15 + 16 \text{ PSF}) + 8' \times 21 \text{ PSF} + 1.5' \times 1' \times 150 \text{ PCF} = 951 \text{ K}$$

$$f_{\text{SOIL}} = 951 \text{ K} / 1' = 951 \text{ PSF OK}$$

USE 12" WIDE x 18" THICK CONT. FTG.
2 #4 @ BOTTOM

PERIMETER FTG. @ 2ND STORY

$$\text{LOAD} = 16' (16 + 15 \text{ PSF}) + 13.5' (10 + 40 \text{ PSF}) + 18' \times 21 \text{ PSF} + 2' \times 1.33' \times 150 \text{ PCF} \\ = 1.95 \text{ K}$$

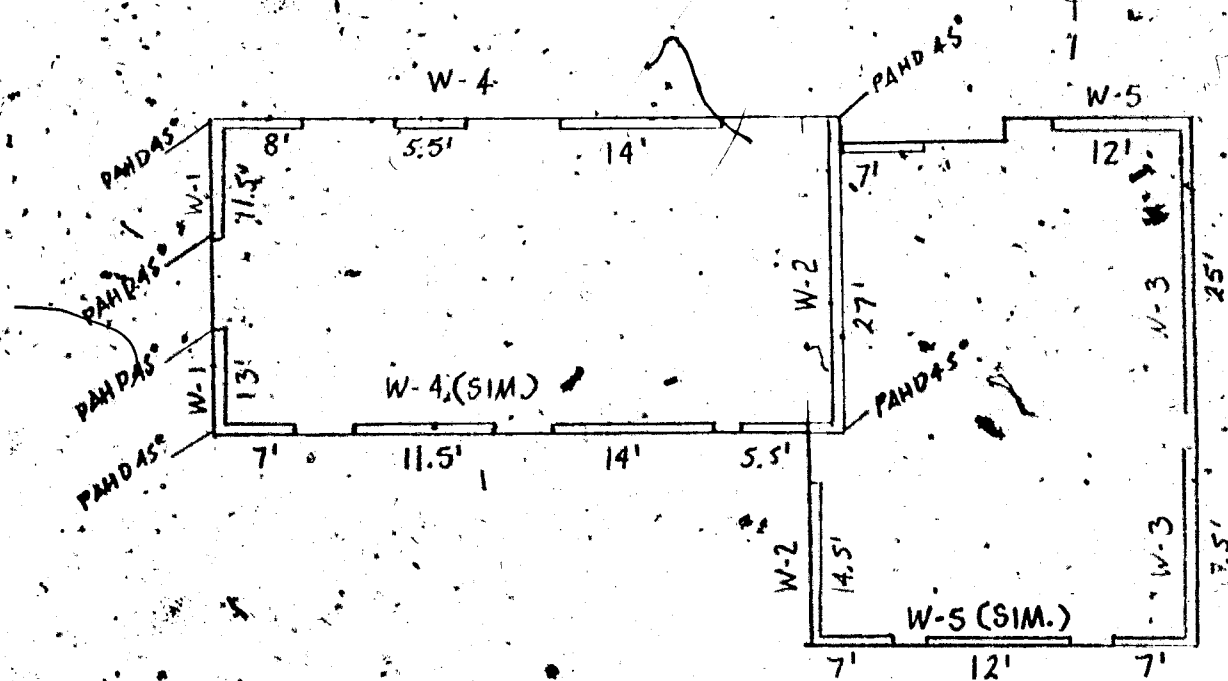
$$f_{\text{SOIL}} = 1.95 \text{ K} / 1.33' = 1460 \text{ PSF OK}$$

USE 16" WIDE x 24" THICK CONT. FTG.

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Shirley D. Aug 7-3-89

LATERAL ANALYSIS



WIND GOVERNS BY OBSERVATION

$$\text{WIND}_{HT > 20'} = C_e C_g Z_s I = 1.3 \times 1.3 \times 13.0 \text{ PSF} \times 1.0 = 22.0 \text{ PSF}$$

$$\text{WIND}_{HT < 20'} = 1.2 \times 1.3 \times 13.0 \text{ PSF} \times 1.0 = 20.3 \text{ PSF}$$

2 STORY

$$P_{1-1 \text{ RF}} = 22.0 \text{ PSF} \times 54' \times 2' + 20.3 \text{ PSF} \times 54' \times 6.5' = 9.50^k$$

$$P_{1-1 \text{ FLR}} = 20.3 \text{ PSF} \times 54' \times 9.5' = 10.4^k$$

$$P_{2-2 \text{ RF}} = 20.3 \text{ PSF} \times 27' \times 6.25' = 3.42^k$$

$$P_{2-2 \text{ FLR}} = 20.3 \text{ PSF} \times 27' \times 9.5' = 5.21^k$$

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1 STORY

$$P_{F-1} = 20.3 \text{ PSF} \times 33' \times 11.8' = 7.90 \text{ k}$$

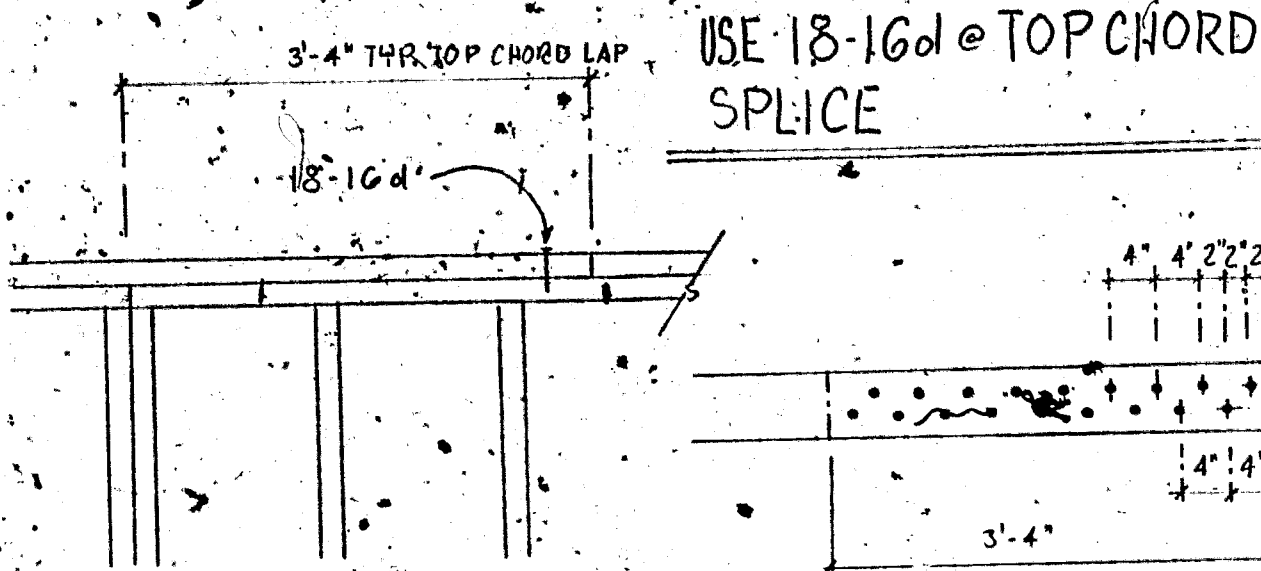
$$P_{2-2} = 20.3 \text{ PSF} \times 47' \times 7.72' = 7.52 \text{ k}$$

$$\text{ROOF SHEAR} = \frac{7.50 \text{ k}}{2 \times 27'} = 176 \text{ #} \quad \underline{\text{OK}}$$

$$\text{FLOOR SHEAR} = \frac{10.4 \text{ k}}{2 \times 27'} = 193 \text{ #} \quad \underline{\text{OK}}$$

$$\text{CHORD STRESS} = \frac{10.4 \text{ k} \times 54'}{8 \times 27'} = 2.60 \text{ k} \quad \underline{\text{OK}}$$

$$18\text{-}16\text{d NAILS} = 18 \times 108" \times 1.33 = 2.60 \text{ k} \quad \underline{\text{OK}}$$



THP TOP CHORD SPLICE

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SHT. 8

Thuc Dang 7-3-89

SHEAR WALLS

W-1 1-17' (1-11.5')

$$P_{ROOF} = 9.50 \text{ k} / 2 = 4.75 \text{ k}$$

$$P_{FLR} = 10.4 \text{ k} / 2 = 5.2 \text{ k}$$

$$V_{RF} = 4.75 \text{ k} / 24.5' = 194 \text{ lb}$$

$$V_{FLR} = 5.2 \text{ k} / 24.5' = 212 \text{ lb}$$

406 lb

$$M_{OT \text{ @ 2ND FLR}} = 4.75 \text{ k} \times 8' (11.5' / 24.5') = 17.8 \text{ k-ft}$$

$$P_{DL} = 4' \times 11.5' \times 15 \text{ PSF} + 8' \times 11.5' \times 21 \text{ PSF} = 2.62 \text{ k}$$

$$M_{DL} = 2.62 \text{ k} \times 5.75' = 15.0 \text{ k-ft}$$

$$\text{HOLDOWN} = \frac{17.8 \text{ k-ft} - 15}{11.5'} = 240 \text{ lb} \text{ NEGLIGIBLE}$$

$$M_{AT 1ST FLR} = (4.75 \text{ k} \times 17.5' + 5.2 \text{ k} \times 9.5') (11.5' / 24.5') = 62.2 \text{ k-ft}$$

$$P_{DL} = 2.62 \text{ k} + 4.5' \times 6' \times 10 \text{ PSF} + 11.5' \times 4.5' \times 21 \text{ PSF} = 4.99 \text{ k}$$

$$M_{DL} = 4.99 \text{ k} \times 5.75' = 28.7 \text{ k-ft}$$

$$\text{HOLDOWN} = \frac{62.2 \text{ k-ft} - 28.7}{11.5'} = 2.91 \text{ k}$$

USE SIMPSON PAHD 45

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Thuc Dang 7-3-89

$$M_c \text{ ETG } 4.75^k \times 19.5' + 5.2^k \times 11.5' = 152^k \cdot ft$$

$$R = 4' \times 27' \times 15 \text{ PSF} + .67' \times 27' \times 10 \text{ PSF} + 19.7' \times 27' \times 21 \text{ PSF} + 2' \times 1.33' \times 27' \times 150 \text{ PCF}$$
$$= 23.7^k$$

$$M_e = 23.7^k \times 13.5' = 320^k \cdot ft > 1.5 M_{OT} \text{ OK}$$

$$a = \frac{320^k \cdot ft - 152^k \cdot ft}{23.7^k} = 7.09'$$

$$f_{\text{SOIL}} = \frac{2 \times 23.7^k}{B \times 7.09' \times 1.33'} = 1.68 \text{ KSF} < 1.5 \text{ KSF} \times 1.33 = 2.0 \text{ KSF}$$

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SHT. 10

Thuc Dang 7-3-89

W-2 1-27' 2ND & 1ST FLRS, 1-14.5' 1ST FLR

$$P_{RF} = 9.5^k / 2 = 4.75^k$$

$$P_{FLR} = \frac{10.4^k}{2} + \frac{7.9^k}{2} = 9.15^k$$

$$V_{RF} = 4.75^k / 27' = 176 \#$$

$$V_{FLR} = 9.15^k / 41.5' = 220 \#$$

396 #

$$M_{OT @ 2ND FLR} = 4.75^k \times 8' = 38.0^k$$

$$P_{DL} = 4' \times 27' \times 15 \text{ PSF} + 6.25' \times 27' \times 21 \text{ PSF} = 5.16^k$$

$$M_{DL} = 5.16^k \times 13.5' = 69.7^k \approx 0^k$$

$$M_{OT @ 1ST FLR} = 4.75^k \times 17.5' + 9.15^k \times 9.5' (27' / 41.5') = 140^k$$

$$P_{DL} = 5.16^k + 27' \times 6.7' \times 10 \text{ PSF} + 27' \times 9.5' \times 10 \text{ PSF} = 7.91^k$$

$$M_{DL} = 7.91^k \times 13.5' = 106^k$$

$$\text{HOLDOWN} = \frac{140 - 106^k}{27'} = 1.22^k$$

USE SIMPSON PAHD 45°

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SHT. 11

Thuc Dang 7-3-89

$$M_{OT \text{ FTG}} = 4.75K \times 19.5' + 9.15K \times 11.5' (27'/41.5') = 161K'$$

$$R = 7.91K + 2' \times 1.33' \times 27' \times 15KCF = 18.7K$$

$$M_R = 18.7K \times 13.5' = 252K' > 1.5 M_{OT} \text{ OK}$$

$$a = \frac{252K' - 161}{18.7K} = 4.87'$$

$$f_{SOIL} = \frac{2 \times 18.7K}{3 \times 4.87' \times 1.33'} = 1.93KSF \text{ OK}$$

NO UPLIFT @ 14.5' SEGMENT BY OBSERVATION

B555

SHT. 1.2

Thuc Dang 7-

W-3 (1-17.5' & 1-25')

P = 7.90' / 2 = 3.95'

V = 3.95' / 42.5' = 92.9 #1

NO UPLIFT BY OBSERVATION

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SIN. 15

Thuc Dang

$$W = 4 \quad 1-8', 1-5.5', 1-14'$$

$$P_{RF} = 3.42^k / 2 = 1.71^k$$

$$P_{FLR} = 5.21^k / 2 = 2.60^k$$

$$\left. \begin{aligned} V_{RF} &= 1.71^k / 27.5' = 0.22^k \\ V_{FLR} &= 2.60^k / 27.5' = 0.09^k \end{aligned} \right\} 157.4$$

$$M_{OT \text{ 2ND FLR}} = 1.71^k \times 8' (5.5' / 27.5') = 2.74^k$$

$$P_{DL} = 5.5' \times 13.5' \times 15 \text{ PSF} + 5.5' \times 8' \times 21 \text{ PSF} = 2.04^k$$

$$M_{DL} = 2.04^k \times 2.75' = 5.60^k \quad \underline{OK}$$

$$M_{OT \text{ 1ST FLR}} = (1.71^k \times 17.5' + 2.60^k \times 9.5') (5.5' / 27.5') = 10.9^k$$

$$P_{DL} = 2.04^k + 5.5' \times 13.5' \times 10 \text{ PSF} + 5.5' \times 9.5' \times 21 \text{ PSF} = 3.88^k$$

$$M_{DL} = 3.88^k \times 2.75' = 10.7^k \approx M_{OT} \quad \underline{OK}$$

$$M_{OT \text{ E FTG}} = (1.71^k \times 17.5' + 2.60^k \times 11.5') (5.5' / 27.5') = 12.6^k$$

$$R = 3.88^k + 2' \times 1.33' \times 7.5' \times 15 \text{ KCF} = 6.87^k$$

$$M_R = 6.87^k \times 3.75' = 25.8^k > 1.5 M_{OT} \quad \underline{OK}$$

$$a = (25.8^k - 12.6^k) / 6.87^k = 1.92'$$

$$f_{SOIL} = \frac{2 \times 6.87^k}{3 \times 1.92' \times 1.33'} = 1.79 \text{ KSF} \quad \underline{OK}$$

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Thuc Dang

W-5 1-7'4 1-12'

$$P = 7.50 \text{ k}/2 = 3.78 \text{ k}$$

$$V_c = 3.78 \text{ k}/19' = 199 \text{ #/ft}$$

$$M_{OT \text{ @ FLR}} = 3.78 \text{ k} \times 8' (7'/19') = 11.1 \text{ k-ft}$$

$$P_{DL} = 15 \text{ PSF} \times 21' \times 7' (10.5'/16.5') + 7' \times 8' \times 21 \text{ PSF} = 2.58 \text{ k}$$

$$M_{DL} = 2.58 \text{ k} \times 3.5' = 9.03 \text{ k-ft}$$

$$\text{HOLDOWN} = \frac{11.1 - 9.03}{2} = 302 \text{ #} \text{ NEGLIGIBLE}$$

$$M_{OT \text{ @ FTG}} = 3.78 \text{ k} \times 9.5' (7'/19') = 13.2 \text{ k-ft}$$

$$R = 2.58 \text{ k} + 9' \times 1.5' \times 1' \times 150 \text{ KCF} = 4.60 \text{ k}$$

$$M_R = 4.60 \text{ k} \times 4.5' = 20.7 \text{ k-ft} > 1.5 M_{OT} \text{ OK}$$

$$\alpha = (20.7 \text{ k-ft} - 13.2) / 4.60 = 1.63'$$

$$f_{SOIL} = \frac{2 \times 4.60 \text{ k}}{3 \times 1.63'} = 1.87 \text{ RSF OK}$$

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SHT. 15

-Three Days

SHEAR WALL SCHEDULE

I.D.	FIRST FLOOR EXT. FACE SHT'G	FIRST FLOOR INT. FACE SHT'G	SECOND FLOOR EXT. FACE SHT'G	SECOND FLOOR INT. FACE SHT'G	ANCHOR BOLTS
W-1	7/8" PLYWOOD, EXT. GRADE STR. #1 PANEL EDGES NAIL @ 4" O.C. & 8d @ 12" O.C. (FIELD)	—	7/8" CEMENT PLASTER W/ WOVEN WIRE LATH 4 IG GA STAPLES (7/8" LEGS) @ 6" O.C.	1/2" GYP SUM WALLBOARD W/ 5d COOLER NAILS	3/4" Ø x 10" @ 48" O.C.
W-2	SIM. TO W-1	—	SIM. TO W-1	SIM. TO W-1	3/4" Ø x 10" @ 48" O.C.
W-3	7/8" CEMENT PLASTER W/ WOVEN WIRE LATH 4 IG GA STAPLES (7/8" LEGS) @ 6" O.C.	—	—	—	3/4" Ø x 10" @ 48" O.C.
W-4	SIM. TO W-3	—	SIM. TO W-1	—	3/4" Ø x 10" A.B. @ 6'-0" O.C.
W-5	SIM. TO W-3	1/2" GYP SUM WALLBOARD W/ 5d COOLER NAILS	—	—	3/4" Ø x 10" A.B. @ 6'-0" O.C.

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SHT. 16