# Structural Calculations

## Holiday Inn Express Revision
## 1855 Main St.
## Watsonville, CA

for

Lotus Management, Inc.
1510 N. First Street #400
San Jose, CA 95112

Project # 09-232
December 3, 2009

REGISTERED PROFESSIONAL ENGINEER
ROMEO C. CABALAR
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STATE OF CALIFORNIA

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Project:
Holiday Inn Express
1855 Main Street
Watsonville, CA

Sht. of
Date: 12-3-09
Project# 09-232
By: RC

PROJECT DESCRIPTION:

DESIGN CRITERIA: 2007 CALIFORNIA BUILDING CODE (C.B.C.) based on 2006 international building code

BASIC WIND SPEED = 85 mph ; Exposure = C

SOILS REPORT: **NOT APPLICABLE**

Client elected to use minimum 'code design parameters per Table 1804A.2 and 1805A.2 of the California Building Code. Therefore, the homeowner assumes fu responsibility for the adequacy for these design assumptions.

ASP = 1000 psf
ASP =

CONST. Concrete :
MATERIALS:

Lumber :

| | | | | |
|---|---|---|---|---|
| 2"-4" thick | DF | No.2 | Fb = 875 x Cf psi | |
| 2"-6" wide | | | | |
| Roof Joist/ | DF | No.2 | FB = 875 x Cf psi | |
| Ceiling Joist | | | | |
| Beam/Post | | | | |
| 4x | DF | No.2 | Fb = 875 | psi |
| | DF | No.2 | Fc = 1300 | psi |
| 6x | DF | No.1 | Fb = 1350 | psi |
| | DF | No.1 | Fc = 1000 | psi |
| sill | DF | Pressure Treated | | |
| Glu-lam Beam | DF/DF | Simple Span | 24F-V4 | |
| | DF/DF | Cantilever | 24F-V8 | |
| Parallam(PSL) | 2.0E(ner-292) | Trus Joist MacMillan | | |
| Micro-Lam(ML) | 1.8E | Trus Joist MacMillan | | |

Plywood :

1/2" CDX 32/16 at Roof
3/4" T&G CDX 48/24 at Floor

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**DEAD LOADS:**

| | | | |
|---|---|---|---|
| ROOFS: Roofing = | 10.0 | psf | |
| 1/2 in. Plywood Sheathing = | 1.5 | | |
| Framing = | 3.5 | | |
| Insulation = | 1.0 | | |
| Ceiling = | 2.0 | | |
| Misc. = | 1.0 | | |
| **Total:** | **19.0** | psf | |
| Beams/headers | 1.0 | | |
| | **20.0** | psf | |

| | Typ. Floor | | Deck | |
|---|---|---|---|---|
| FLOORS: Finish Floor = | 0.0 | psf | 0.0 | psf |
| 3/4 in. Plywood Sheathing = | 0.0 | | 0.0 | |
| Framing = | 0.0 | | 0.0 | |
| Ceiling = | 0.0 | | 0.0 | |
| Insulation = | 0.0 | | 0.0 | |
| Misc. = | 0.0 | | 0.0 | |
| **Total:** | **0.0** | psf | **0.0** | psf |
| Beams/headers = | 0.0 | | 0.0 | |
| | **0.0** | psf | **0.0** | psf |

| | | |
|---|---|---|
| WALLS: | | |
| EXT. Stucco | 10.0 | |
| Plywood | 1.5 | |
| Studs | 1.5 | |
| Gypboard | 2.0 | |
| Misc. | 1.0 | psf |
| **Total:** | **16.0** | psf |
| INT. Studs | 0.0 | psf |
| Gypboard | 0.0 | |
| Misc. | 0.0 | |
| **Total:** | **0.0** | psf |

**LIVE LOADS:**

| | |
|---|---|
| 0 | |
| 20 | psf roof live load |

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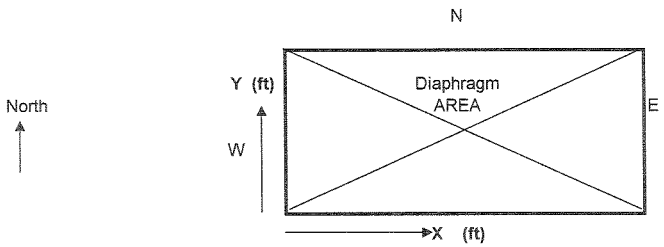
**AREAS TO CALCULATE BUILDING WEIGHTS:**

area = diaphragm areas - see key plans




BUILDING PARAMETERS

| Roof | X | Y |
|---|---|---|
| length (ft) = | 52 | 36 |
| wall height (ft) = | 9 | 9 |
| Floor/ Low roof | | |
| length (ft) = | 0 | 0 |
| wall height (ft) = | 0 | 0 |

**0 ft at floor/ low roof indicates one story condition only**

Total Ridge Height: 26
16 rf ht abv. top plate
First floor height: 0

**ROOF**

| Area | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Y | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | roof area |
| X*Y | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | = | **0.00** |
| Xst | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Yst | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Xcen | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Ycen | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Wall | 14.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | |
| Ext | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | exterior wall area |
| area | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | = | **0.00** |
| Int | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | interior wall area |
| area | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | = | **0.00** |
| W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| S | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

NOTE: NO SIGNIFICANT LOAD ADDED TO LATERAL FORCES. THEREFORE, LATERAL BRACING IS O.K. EXISTING STEEL MOMENT FRAME.

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**WIND FORCES:** EXPOSURE C WIND SPEED 85 MPH

| | | | | |
|---|---|---|---|---|
| Kd = | 0.85 | table 6-4 | | |
| I = | 1 | table 6-1 | | |
| Kz = | 0.7 | table 6-3 (@ mean roof ht) | | |
| h = | 18 | mean roof ht. | | |
| Kzt = | 1 | sec 6.5.7 | | |

$qz=0.00256KzKztKdV^2I$
qz = 11.00512 psf
GCpi = 0.18 fig 6-5

(but for analysis of global effect on structure, internal pressure will cancel out each other, hence, no need to consider)

| | | 2nd floor roof X | height | area (ft^2) | 2nd floor / low roof X | height | area (ft^2) |
|---|---|---|---|---|---|---|---|
| North-South Elevation Area = | wall | 52 | 4.5 | 234 | 0 | 1 | 0 |
| | roof | 52 | 10.67 | 554.6666667 | | | |

note: roof ht taken 2/3 of actual ht (conservative for slope no more than 45 deg)

| | | 2nd floor roof Y | height | area (ft^2) | 2nd floor / low roof Y | height | area (ft^2) |
|---|---|---|---|---|---|---|---|
| East-West Elevation Area = | wall | 36 | 4.5 | 162 | 0 | 1 | 0 |
| | roof | 36 | 10.67 | 384.00 | | | |

**N TO S** HIGH ROOF

| | roof not corner | roof corner | | | FLOOR not corner | FLOOR corner |
|---|---|---|---|---|---|---|
| GCpf = | 0.96 | 1.44 | | | 0.96 | 1.44 |
| qh = | 11.01 | 11.01 | | | 11.01 | 11.01 |
| width X = | 44.8 | 7.2 | | | 0 | 0 |
| height = | 15.17 | ~~15.17~~ | | | 1 | 1.00 |
| P= | 10.56 | 15.85 | | | 10.56 | 15.85 |
| trib area = | 679.466667 | 109.2 | | | 0 | 0 |
| wind force = | 7,179 | 1,731 | 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| 8,909 | lbs. | 0 | lbs. |
| | psf | 0.00 | psf |

**E TO W** HIGH ROOF

| | roof not corner | roof corner | | | FLOOR not corner | FLOOR corner |
|---|---|---|---|---|---|---|
| GCpf = | 0.96 | 1.44 | | | 0.96 | 1.44 |
| qh = | 11.01 | 11.01 | | | 11.01 | 11.01 |
| width Y = | 28.8 | 7.2 | | | 0 | 0 |
| height = | 15.17 | 15.17 | | | 1 | 1.00 |
| P= | 10.56 | 15.85 | | | 10.56 | 15.85 |
| trib area = | 436.8 | 109.2 | | | 0 | 0 |
| wind force = | 4,615 | 1,731 | 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| 6,345 | lbs. | 0 | lbs. |
| | psf | 0.00 | psf |

for low-rise buildings: figure 6-10

roof a = 3.6 ft 2a = 7.2 ft
2nd floor a = 0 ft 2a = 0 ft

WALLS

| roof angle | building surface 1 | 4 | 1E | 4E | total Gcpf on bldg (taken as a whole) | | (at corners) |
|---|---|---|---|---|---|---|---|
| 5 | 0.4 | 0.29 | 0.61 | 0.43 | 0.69 | | 1.04 |
| 20 | 0.53 | 0.43 | 0.8 | 0.64 | 0.96 | :====== USE | 1.44 |
| 30 | 0.56 | 0.37 | 0.69 | 0.48 | 0.93 | | 1.17 |
| 45 | 0.56 | 0.37 | 0.69 | 0.48 | 0.93 | | 1.17 |
| 90 | 0.56 | 0.37 | 0.69 | 0.48 | 0.93 | | 1.17 |

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| Project | Sht. 5 of |
|---|---|
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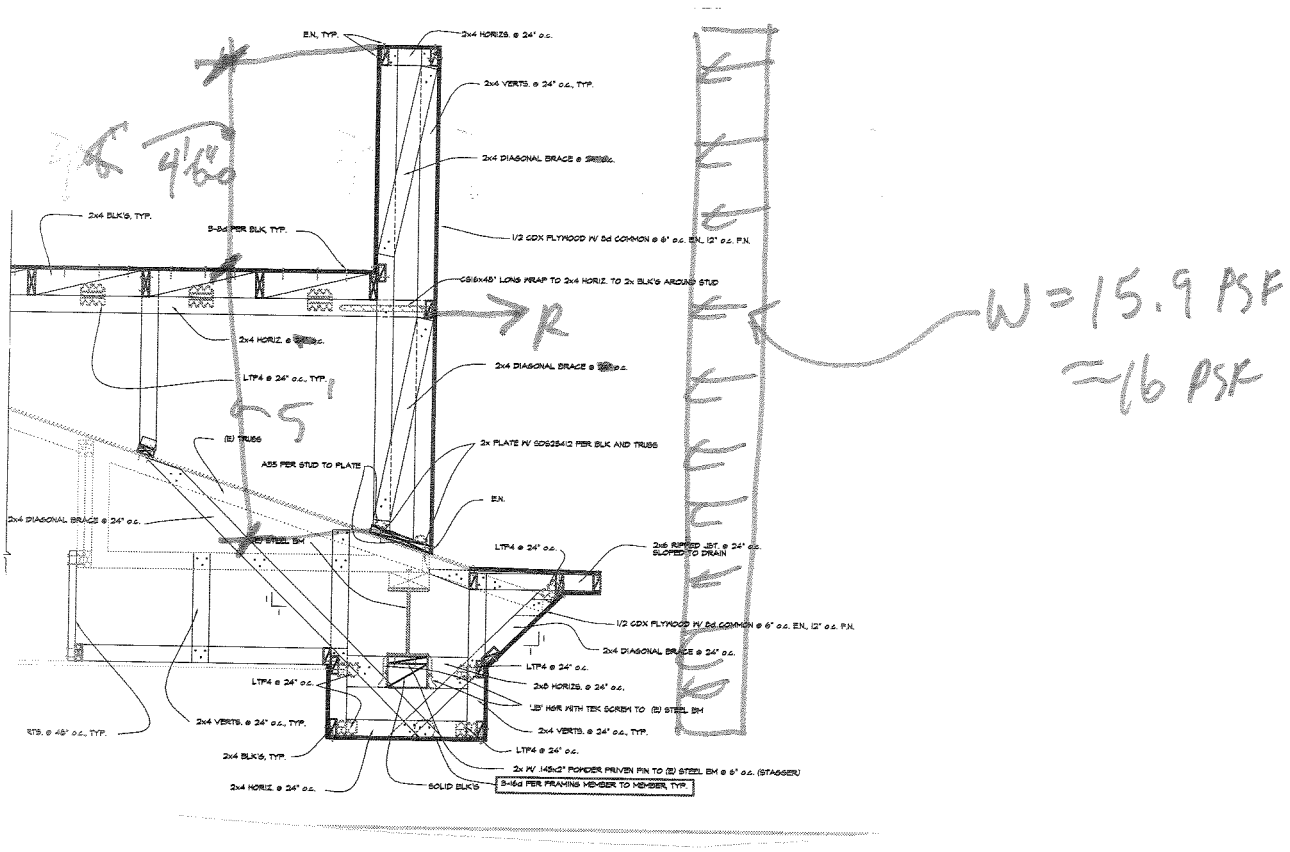


Tiny 4'-0" o.c.

$R = [(16\ PSF)(4')(9.5')^2/2]/(5' - .75')$

$= 679\#$ (-CS16 STRAP @ ~~[illegible]~~ . 48" o.c.)

TO LTP4'S @ 24" o.c., 3-16d PER BLOCK.