MAGNUSSON KLEMENCIC ASSOCIATES

Ola J. Johansson, P.E.
Principal

February 13, 2008

Mr. Daryl Dellera
Project Management Advisors, Inc.
90 New Montgomery Street, Suite 315
San Francisco, California 94105

Subject: **One Rincon Hill Phase 2**
San Francisco, California

Re: Seismic Parameters for Sway Bracing Load Calculations of Fire-Prevention Systems

Dear Daryl:

As requested, Magnusson Klemencic Associates (MKA), structural engineer of record for the One Rincon Hill Phase 2 project, San Francisco, California, is pleased to forward horizontal force factors used for the sway bracing load calculations of the fire-prevention systems.

The overall project shall be permitted under the California Building Code 2001 (Uniform Building Code 1997). However, upon discussion with the City of San Francisco Department of Building Inspection, the structure shall be in conformance with the San Francisco Building Code 2008 (International Building Code 2006). Thus, the horizontal force factors for the fire-prevention systems shall be in conformance with the International Building Code 2006, which references ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures".

Equation 13.3-1 of ASCE 7-05 has been used for the calculation of the horizontal force factors utilizing the following parameters:

- Component Importance Factor: $I_p = 1.5$ (per Section 13.1.3)
- Design Spectral Acceleration Parameter: $S_{DS} = 1.0$ (per Section 11.4.4)
- Component Response Modification Factor: $R_p = 1.0$ to 12 (per Table 13.6-1)
- Component Amplification Factor: $a_p = 1.0$ to 2.5 (per Table 13.6-1)

The two parameters (R_p, a_p) vary depending on the nature of the component, and Allied Fire Protection, the fire-prevention system designer, has indicated that the fire-prevention system will not be in accordance with ASME B31. Based on this information and Table 13.6-1, the resulting factors are $R_p = 4.5$ and $a_p = 2.5$.

Structural • Civil Engineers
1301 Fifth Avenue, Suite 3200 Seattle, Washington 98101-2699
T: 206 292 1300 F: 206 292 1301 www.mka.com

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In accordance with the parameters above, our attached calculations indicate that the horizontal force factors used in the sway bracing load calculation shall be as follows:

- Levels B1 through 20: $F_p = 0.57\ W_p$
- Levels 21 through 40: $F_p = 0.83\ W_p$
- Levels 41 through Roof: $F_p = 1.0\ W_p$

Please contact me directly should you have any further questions regarding this matter.

Sincerely,

Magnusson Klemencic Associates, Inc.

Ola J. Johansson
ojohansson@mka.com

OJJ/lak

Attachment

cc: Mr. Chris Pemberton – Solomon Cordwell Buenz and Associates
Mr. Chris Collins – Project Management Advisors

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Design Sheet

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FIRE PROTECTION

PROJECT ORH2 | SHEET 1/2
LOCATION SFCA | CLIENT | DATE 2/11/08 | BY AGT

HORIZONTAL FORCE FACTOR FOR SWAY BRACING (2006 IBC)

$$F_p = \frac{0.4\, a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)}\left(1 + 2\frac{z}{h}\right) \quad \text{[EQ: 13.3-1]}$$

$I_p = 1.5$ [PER ASCE-7 SECTION 13.1.3]

$S_{DS} = 1.0$ [PER ASCE-7 SECTION 11.4.4]

$h = 504'$ [DISTANCE FROM GRADE TO RF]

$R_p = 4.5$, $a_p = 2.5$ — PER TABLE 13.6-1 FROM ASCE-7... THESE COEFFICIENTS ASSUME THE FIRE PROTECTION PIPINGS AND THEIRS ARE NOT IN ACCORDANCE W/ ASME B31

MASSACHUSETTS PROFESSIONAL ENGINEER No. 34417 Exp. 6/30/08 DATE: 2/14/08 STRUCTURAL STATE OF CALIFORNIA

LOOK @ 3 ZONES...

1) LVLS B1-20 → $z_{max} = 181'$
2) LVLS 21-40 → $z_{max} = 369'$
3) LVLS 41-RF → $z_{max} = 504'$

NOTE: $F_{p_{MIN}} = 0.3 S_{DS} I_p W_p$
$= 0.3(1.0)(1.5) W_p = 0.45 W_p$ [EQ: 13.3-3]

Design Sheet

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PROJECT ORH2 | SHEET 2/2
LOCATION | CLIENT | DATE | BY AGT

ZONE 1 (1-20)

$$F_p = \frac{(0.4)(2.5)(1.0) W_p}{\left(\frac{4.5}{1.5}\right)}\left(1 + 2\frac{z}{h}\right)$$

$$= 0.333 W_p \left(1 + 2\frac{z}{h}\right)$$

$\frac{z}{h} = \frac{181}{504} = 0.359$ ...

$= 0.57 W_p$ ← CONTROLS

$F_{p_{MIN}} = 0.45 W_p$

ZONE 2 (21-40)

$F_p = 0.333 W_p \left(1 + 2\frac{369}{504}\right)$

$= 0.83 W_p$ ← CONTROLS

$F_{p_{MIN}} = 0.45 W_p$

ZONE 3 (41-RF)

$F_p = 0.333 W_p \left(1 + 2\frac{504}{504}\right)$

$= 1.0 W_p$ ← CONTROLS

$F_{p_{MIN}} = 0.45 W_p$

$F_{p_{MAX}} = 1.6(1.0)(1.5) W_p = 2.4 W_p$ [EQ 13.3-2]

ONE RINCON HILL

SCB

Solomon Cordwell Buenz & Associates Inc.

Architecture Planning Interior Design

625 North Michigan Avenue
Suite 800
Chicago, Illinois 60611
tel 312 896 1100 fax 312 896 1200

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02	8/24/2012	ARCHITECTURAL ADDENDUM NO.3
01	2/22/08	95% CONSTRUCTION DOCUMENTS

RECORD

One Rincon Hill
401 Harrison Street
San Francisco. CA
PHASE 2

HORIZONTAL FORCE FACTOR LETTER

Scale: NTS
Drawn By: MPK
Project Number: 2006014
Sheet Number: **A0.90**