

# S.R. 6482

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**REVISED GEOTECHNICAL INVESTIGATION**  
**301 MISSION STREET**  
**San Francisco, California**

**RECEIVED**  
SEP 26 2005  
DEPT. OF BUILDING INSPECTION  
THIS PLAN MEETS THE QUALITY  
STANDARD FOR MICROFILMING  
ACCEPT

3719/001

**Millennium Partners**  
**San Francisco, California**

13 January 2005  
Project No. 3157.02

2005/09/26/3869

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**Treadwell & Rollo**

Environmental and Geotechnical Consultants

2005-0920-3869

**Treadwell & Rollo**

26 January 2005  
Project 3157.02

Mr. Steve Patterson  
Millennium Partners  
720 Market Street, 3rd Floor  
San Francisco, California 94103



Subject: Supplemental Shoring Recommendations  
301 Mission Street  
San Francisco, California

3719/001

Dear Mr. Patterson:

This letter presents supplemental shoring recommendations for the development of the 301 Mission Project and provides responses to a number of questions directed to us in a meeting held at your office on 21 January 2005 by WEBCOR Builders.

The recommendations in this letter are supplemental to those presented in our revised geotechnical investigation report dated 11 January 2005.

#### **ADDITIONAL SHORING CRITERIA**

In our revised geotechnical report we presented shoring criteria for an internally braced excavation for three cases. Case 1 presented shoring criteria for the three walls surrounding the 60-foot deep excavation for the podium building. Case 2 was for the three walls surrounding 25-foot deep excavation for the tower building. Case 3 was for the 35-foot high shoring wall separating the tower and podium excavations.

The attached Figures 1 and 2 provide tieback criteria for the Case 1 and 2 shoring systems, respectively. These figures include estimates of skin friction which should be used for estimation purposes only. Actual skin friction values will depend upon the drilling method, hole diameter, grout pressure, and workmanship. The shoring designer and contractor should review the soil borings and determine appropriate skin friction values for use in shoring design based on their familiarity with the installation method. Treadwell & Rollo should be given the opportunity to review these values as part of the plan review process.

We recommend against using auger-type installation equipment to install tiebacks at this site because of the tendency for sandy fill to cave and because the tiebacks will extend below the groundwater elevation. Therefore, a smooth-pipe, double-cased method, such as drilling with a Klemm rig, is recommended.



Mr. Steve Patterson  
26 January 2005  
Page 2

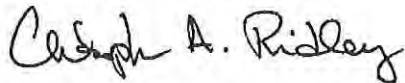
The computed bond length should be confirmed by a proof-test program under the observation of an engineer experienced in this type of work. All tiebacks should be confirmed by a proof-test to 1.25 times the design load; the first two production tiebacks and two percent of the remaining tiebacks should be performance-tested to 1.25 times the design load.

The movement of each tieback should be monitored with a free-standing, tripod-mounted dial gauge during proof and performance testing. The maximum test load should be held for a minimum of 10 minutes, with readings taken at 0, 1, 3, 6, and 10 minutes. If the difference between the 1- and 10-minute reading is more than 0.04 inches, the load shall be held for an additional 50 minutes. The tieback should not move more than 0.08 inches between the 6- and 60-minute reading.

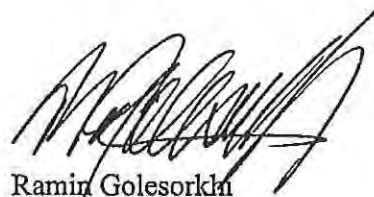
If any tiebacks fail to meet the testing requirements, additional tiebacks should be added to compensate for the deficiency as required by the shoring designer. Additionally, the tiebacks should be checked 24 hours after initial prestressing to ensure that stress relaxation has not occurred. The bottom of the excavation should not extend more than two feet below a row of unsecured tiebacks.

The attached Figure 3 presents revised lateral earth pressures for Case 3. This figure assumes dewatering wells have been installed on the back side of the shoring wall (beneath the eastern edge of the tower footprint). These wells should be designed to lower the groundwater to three feet below the bottom of the podium excavation (Elevation -59 feet), effectively eliminating the water pressure on the shoring wall. To independently monitor the effectiveness of the dewatering wells, piezometers should be installed behind the wall to verify that the water level has been effectively lowered and maintained at the recommended level.

Sincerely yours,  
TREADWELL & ROLLO, INC.



Christopher A. Ridley  
Civil Engineer

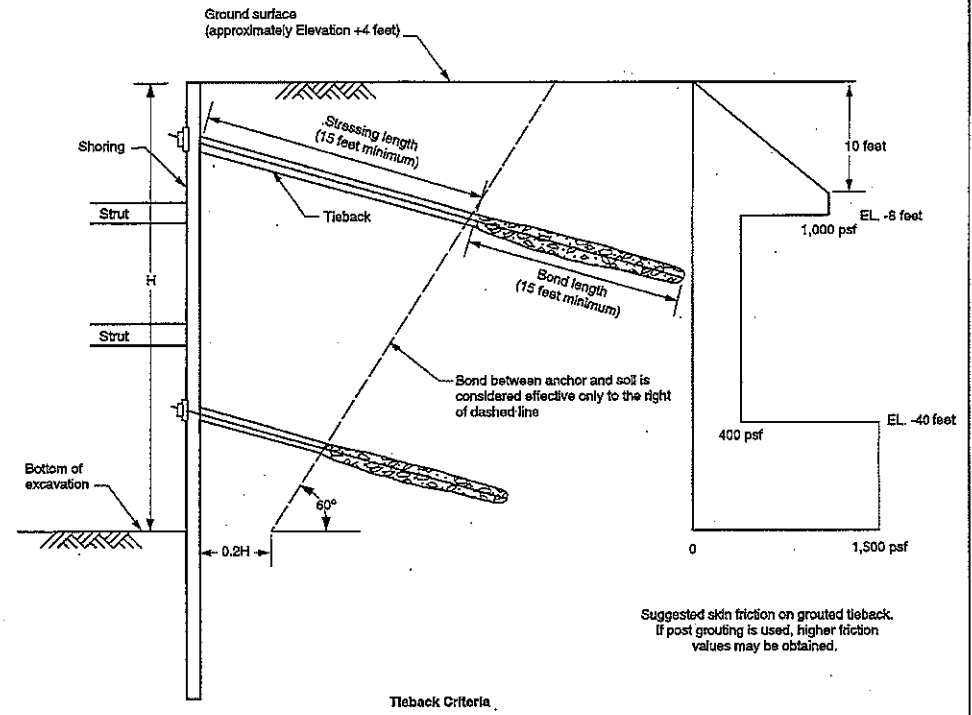
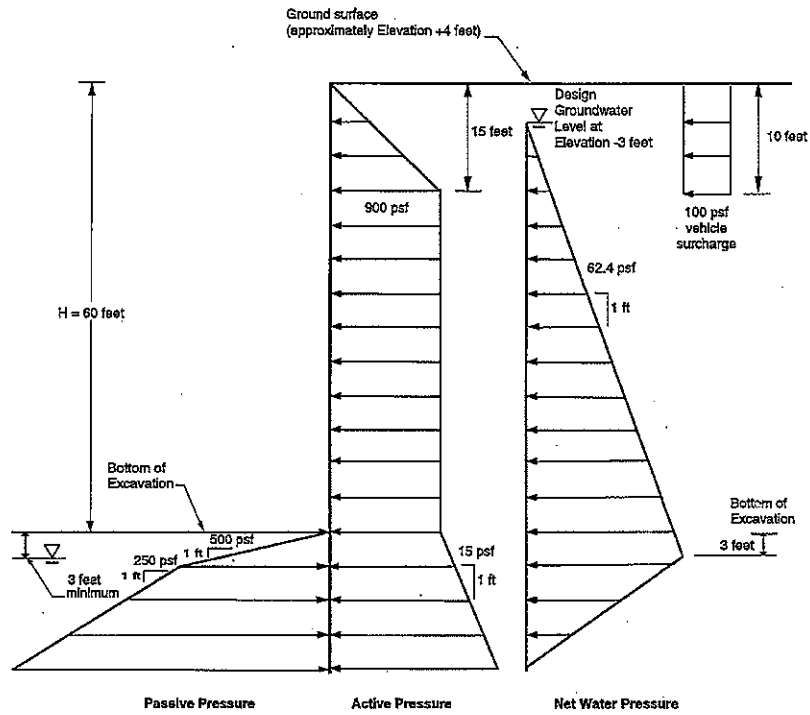


Ramin Golesorkhi  
Geotechnical Engineer

31570207.CAR

cc: Mr. Kurt Ricci – WEBCOR Builders

Attachments: Figures 1 through 3



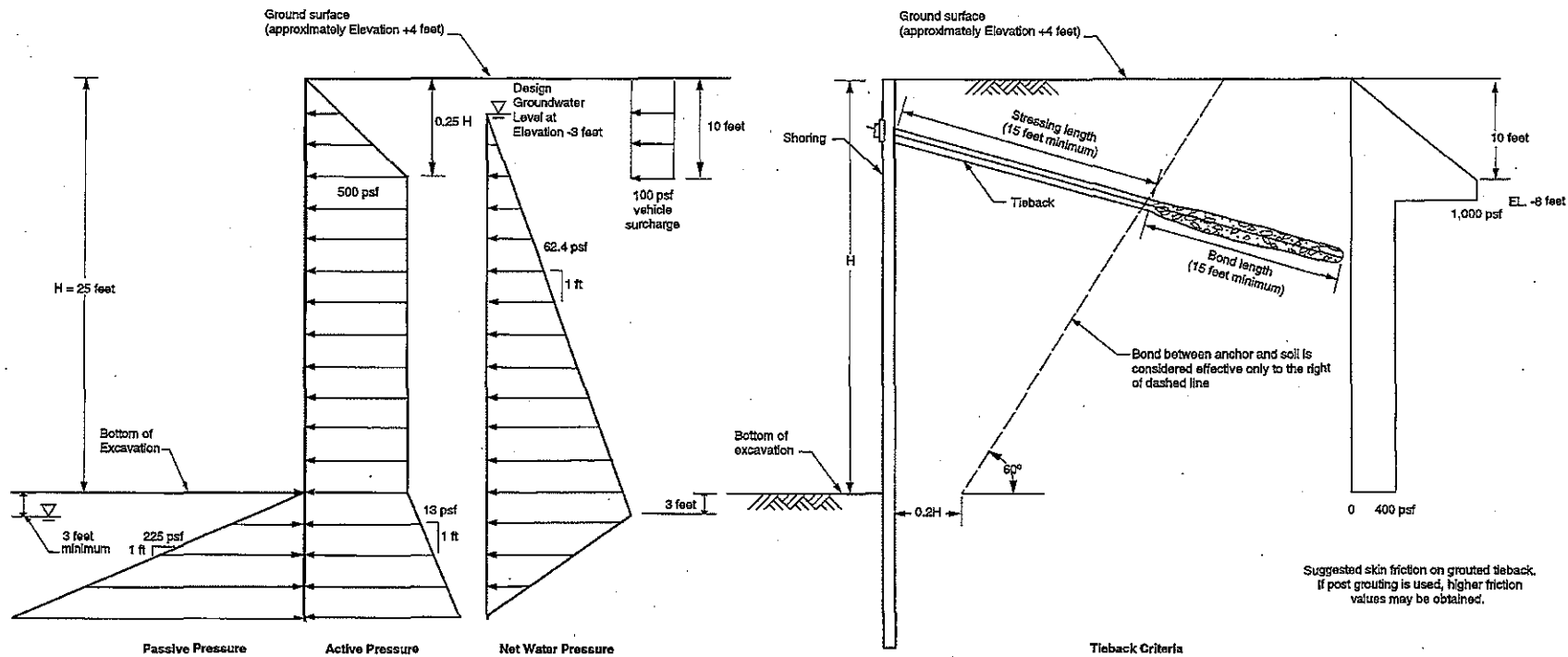
- Notes:
1. The groundwater within the site will be lowered to at least 3 feet below the base of the excavation.
  2. Passive pressure values do not include a factor of safety.
  3. All elevations refer to San Francisco City Datum.

**LATERAL EARTH PRESSURES AND TIEBACK CRITERIA FOR SOIL CEMENT WALL SHORING SYSTEM FOR THE 60 FOOT DEEP EXCAVATION**

301 MISSION STREET  
San Francisco, California

Date 01/26/05 | Project No. 3157.02 | Figure 1

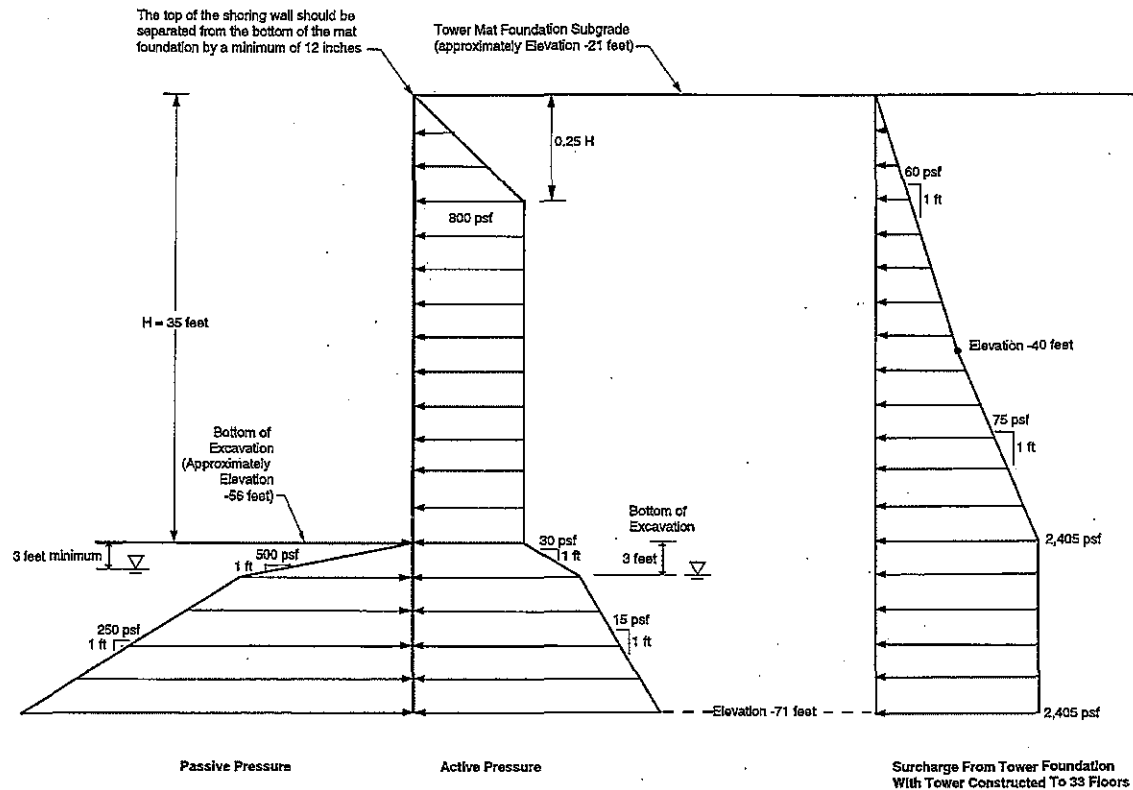
**Treadwell&Rollo**



Not to scale

- Notes:
1. The groundwater within the site will be lowered to at least 3 feet below the base of the excavation.
  2. Passive pressure values do not include a factor of safety.
  3. All elevations refer to San Francisco City Datum.

<b>LATERAL EARTH PRESSURES AND TIEBACK CRITERIA FOR SOIL-CEMENT WALL SHORING SYSTEM FOR THE 25 FOOT DEEP EXCAVATION</b>		
301 MISSION STREET San Francisco, California		
Date 01/26/05	Project No. 3157.02	Figure 2
<b>Treadwell&amp;Rollo</b>		



- Notes:
1. The groundwater on both sides of the shoring wall will be lowered to at least 3 feet below the base of the excavation.
  2. Passive pressure values do not include a factor of safety.
  3. All elevations refer to San Francisco City Datum.
  4. We assumed a 15 foot penetration of soil-mix wall below bottom of excavation. this should be checked by the shoring designer.
  5. Assumes water pressure is in equilibrium on either side of the wall below dewatered depth, therefore it is not shown.

LATERAL EARTH PRESSURES  
FOR SOIL CEMENT WALL SHORING SYSTEM WITH  
INTERNAL BRACING FOR WALL BETWEEN THE  
TOWER AND PODIUM EXCAVATIONS

301 MISSION STREET  
San Francisco, California

Date 01/26/05 | Project No. 3157.02 | Figure 3

**Treadwell&Rolo**

70  
115

175  
115,00

60,

6 mills