Exhibit E

STRUCTURAL FOCUS

February 10, 2015

Ms. Pamela Seager
Executive Director
Rancho Los Alamitos Foundation
6400 Bixby Hill Road
Long Beach, California 90815

Dear Pamela,

We are sending this letter in order to describe the nature and impact of the proposed structural improvements at the adobe Ranch House at the Rancho Los Alamitos in Long Beach, California.

Originally constructed of adobe over 175 years ago, the Ranch House has evolved over time. The home has expanded into a U-shaped structure, with wood-framed additions, balconies and porches, and a second story with a stucco exterior. Following the damaging Long Beach earthquake of 1933, concrete was applied to several of the adobe walls in order to strengthen against future quakes.

Over the course of these many renovations, several layers of roofing material have been placed on the roof, adding significant weight to the roof structure. All this added weight increases the potential for failure. As part of the proposed Seismic Phase 3 Program, all the added layers of roofing will be removed and replaced with a new layer of wood shingles placed over a layer of oriented strand board (OSB), a product similar to plywood. These will be placed over the original skip board sheathing. This approach will significantly reduce the weight of the roof, reducing the overall seismic demands to the building below, including the historic adobe walls. At the same time, the new OSB will provide essential continuity to the roof diaphragm, helping the building distribute and resist lateral forces during an earthquake.

In addition, the proposed structural improvements will create a new plywood "bond beam", inside the attic space at the second story. The bond beam is attached to the top of the original 1st floor ceiling joists, and secures to the tops of the adobe walls. In the event of an earthquake, the bond beam ties perpendicular adobe walls together, helping to prevent them from tipping over. This method has been proposed as an alternate to the concrete bond beam system previously approved and permitted by the city building department. The plywood design and concept proposed for the Phase 3 Seismic Strengthening Program has been preliminarily reviewed and approved by the City Engineer in 2007. Recent research has demonstrated that using the plywood version of the bond beam provides equivalent or better strengthening of adobe wall buildings while reducing the seismic weight at the top of the

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adobe wall. The plywood system is more flexible than a concrete design and will not react to shatter the adobe walls in a seismic event.

Finally, vertical rods will be placed into grout-filled cores at the top of the adobe walls. These anchors serve two purposes, first to tie the adobe walls to the new plywood bond beam described above, and second to add overall shear strength to the adobe walls.

We feel the structural strengthening measures being proposed will help protect the adobe Ranch House against the very real seismic risk our community faces. The methods are cost-effective and demonstrated to be effective through research and real-world scenarios. The seismic strengthening as currently proposed will increase the safety of the Ranch House in the event of a major seismic event.

We appreciate the opportunity to participate in the preservation of this treasured cultural resource. Please do not hesitate to contact our office if you have any questions or would like additional information.

Sincerely,

STRUCTURAL FOCUS

Samuel Mengelkoch, S.E.
Associate

David W. Cocke, S.E.
Managing Principal

Exhibit E

March 10, 2003

Pamela L. Seager
Executive Director
Rancho Los Alamitos Foundation
6400 Bixby Hill Road
Long Beach, California 90815

Reference: **RANCHO LOS ALAMITOS FOUNDATION, RANCH HOUSE RISK ASSESSMENT REVIEW [SF PROJECT #2060.01]**

Dear Pamela:

We are pleased to present this report of our findings of the risk assessment of the Ranch House at the Rancho Los Alamitos. We have based this assessment on our December 16 proposal to you. We understand that the need for this risk assessment is driven by the Board of Director's desire to understand the potential risks associated with future earthquake shaking. The scope of this review includes the study of the existing building before any retrofit is completed, an assessment of the risks if the building is retrofit according to the April 17, 1996 documents prepared by Architectural Resources Group and GFDS Engineers, and the proposed alternative strengthening scheme prepared by Roy Tolles of ELT & Associates, and dated January 17, 2003 and based on the guidelines presented as part of the Getty Seismic Adobe Project.

The purpose of our study is to identify the risks associated with the building if subjected to earthquake shaking. We will present to you the risks associated with the different earthquake scenarios in terms of: 1) expected damage (as we can best describe it), 2) a relative measure of expected earthquake repair costs, and 3) the potential risk to life safety.

1) **Expected Damage**: For each scenario, we will attempt to describe the type and extent of the damage that can be expect in the event of the earthquake shaking. Obviously, these descriptions are qualitative in nature.

2) **Relative Cost of Repair**: To better quantify the level of damage and be able to compare the levels of damage between schemes, we can consider the costs required to repair the damage. For this report, a common industry method involving the use of "probable maximum loss" has been incorporated. In the lending and insurance industry, a methodology has been developed that provides a statistical estimate of the costs of repairs in the event on an earthquake. The method is based on cost data taken from previous

earthquakes and includes common building types of generally modern building construction techniques. For that reason, we have to make some adjustments to the method to accommodate the historical construction of the Ranch House. Even with those adjustments, for this report, the calculated PML is probably not a good absolute value to consider, but a comparison between the PML for the building as unstrengthened and as strengthened according to the two different schemes can provide valuable information to consider.

We will call those values for comparison the ***Relative Cost of Repair*** and it is based on a comparison of the calculated Probable Maximum Loss (PML) of the building for each scenario. We have set the Relative Cost of Repair for the 575 Year Earthquake at 1.0, and the repair costs for higher shaking will be larger than 1.0, while the repair costs for strengthened buildings will be less than 1.0. (Specifically, for this report, the PML is calculated using ST-Risk and is defined as the percentage monetary loss (damage/ replacement cost x 100) that has a 10 percent chance of being exceeded given a ground shaking intensity. More technical information can be provided at your request.)

3) **Life Safety Risk**: For this study, we use the definition of life safety risk found in the recently published *Seismic Stabilization of Historic Adobe Structures – Final Report of the Getty Seismic Adobe Project*. In that report, it states that the "first objective of the seismic retrofit measures developed as part of the GSAP was to minimize the life-loss hazard. Structural damage may occur, and cracks in the walls may develop, but it is essential to provide for public safety by preventing structural instability and other damage that may cause injury or loss of life." Therefore for this study, we will determine a life safety hazard to exist when the damage may cause structural instability or has the potential to cause injury of loss of life.

It should be noted that it is not the intent of either strengthening scheme to prevent damage to the building, nor is it all intended to imply that the building will not require any repairs after an earthquake. Both schemes are designed to meet the intent of the California Historical Building Code and that is to reduce the risk to life safety. While this intent may be met, the building may even be damaged by a significant earthquake beyond reasonable repairs. In fact, repairs even to the new strengthening elements may require repair, such as epoxy injection of cracks in the new concrete bond beam.

Building Description

The Ranch House is constructed in a U-shaped plan that has evolved in several phases over the last 175 years. The original adobe structure was built in the early 19th century and several additions have been built, the latest of which was constructed in the early 20th century. The original structure is an adobe bearing wall building, one-story tall and approximately 42 feet by 60 feet in plan. The structure has been expanded both vertically and horizontally with the addition of wood framing. The north wing, constructed on a brick foundation around 1850, was the first major addition. In the years between 1878 and 1887, the adobe was extended to the south with another wooden addition. The crawlspace in the south wing is approximately 3.5 feet tall, and less than 1 foot tall in the north wing. In 1925, a second story of stucco-over-frame construction was added over the original adobe. An open porch with a simple stick railing was added on the west side of this second story. The wood framed second story is approximately 36 feet by 33 feet in plan, and is partially supported by the central and western adobe walls below.

The building was damaged as a result of the 1933 Long Beach earthquake. Reportedly, the chimneys collapsed and some portions of the adobe walls were damaged. Repairs were completed but the exact details of those repairs are not completely known.

Site Seismicity

Rancho Los Alamos is located in a highly active seismic region. Based on the information gathered from the ST-Risk software program produced by Risk Engineering Inc., the site is located 3 km from the Newport Inglewood fault, 7 km from the Compton blind thrust fault, 14 km from the Palos Verdes fault, and 19 km from the Elysian Park blind thrust fault. (See the attached map showing the site location relative to the nearby faults). The maximum magnitude earthquake predicted on those faults is 6.9, 6.8, 7.1 and 6.7 on the Richter scale respectively. The shaking intensities from those various earthquake scenarious range from Modified Mercalli Intensity (MMI) Levels of IX to VII 1/2. (See the attached Modfied Mercalli Table for more information regarding intensity levels.) For reference, the strongest shaking experienced anywhere during the Northridge earthquake of 1994 was MMI level IX.

Because of the near proximity of the faults noted above, the probability of strong shaking from an earthquake in the future is relatively high. In considering all the faults that can affect the site, our analysis shows that an earthquake on any of those faults with a 10% probability of exceedance (only a 10% chance that it could be bigger, and a 475 year return period) will yield a shaking intensity at the Rancho Los Alamitos site of MMI level VIII-½ and an earthquake with a 2% probability of exceedance in 50 years (only 2% chance that it could be bigger, a 2475 year return period) will yield MMI level shaking of IX- ½.

The site does not appear to be subject to any significant local geologic issues during an earthquake. It is unlikely that it will experience liquefaction, slope instability or local fault rupture.

Because the shaking predicted from the largest earthquakes on the nearby faults falls within the range of the to probabilistic earthquake "scenarios", we will use the MMI shaking intensity levels of VII – ½ and IX – ½ as our range of potential shaking to consider in this study.

Findings

Original Structure – Before Retrofit

The structure without retrofit is most susceptible to earthquake damage in three areas: the adobe walls, the chimneys (if not already retrofit) and the foundations. The adobe walls in the Ranch House are thicker than usual and not very tall, therefore less susceptible to overturning out-of-plane than those found in some other adobe structures. They also have the additional advantage of being somewhat "captured" at their top by the second floor wood framing members, although not mechanically attached as would be preferred. However, the adobe is a brittle material and of course can vary in quality depending on the original workmanship, existing damage due to previous earthquakes, settlement, and water infiltration, quality of previous repairs and modifications made throughout the years. Damage that can be expected from future earthquake shaking includes some minor cracking due to in-plane (parallel) earthquake forces and cracking due to out-of-plane forces. Especially because of the thickness of the adobe walls, it is not likely that the walls will overturn, but some working at the top and bottom is possible resulting in broken pieces dislodging from the walls and damage to the wood framing. At higher shaking, it is possible that some support of the wood framing (second floor framing) could be lost and a partial collapse of the structure above could occur, although complete collapse if very unlikely.

The chimneys have be retrofit according to the documents prepared by GFDS. Before retrofit, they were unreinforced masonry and therefore susceptible throughout the range of our shaking scenarios to cracking and crumbling as well as toppling from the roof, or inside the attic space thus possibly falling through the ceiling framing. Without the retrofit in place, the chimneys would be considered as life safety hazards.

The wood framed wings of the building bear on footings that have apparently been undermined during previous modifications for utility installations in the early 20th century. In the event of earthquake shaking it is likely that some of the framing may dislodge from the stem walls and thus lose support of the floor framing, bearing walls and possibly the roof may occur. This is of more concern in the south wing where the crawlspace and thus the potential drop is about 3.5 feet, while in the north wing the crawlspace is less than 1 foot.

Therefore in summary of the results of earthquake shaking to the existing building before retrofit:

EQ Return Period	MMI Level	Expected Damage	Life Safety Hazard	*Relative Cost of Repair
475 Years	VIII-½	In-plane shear cracks in adobe walls	Minimal	1.0
		Out-of-plane cracks in adobe walls	Yes	
		Permanent displacement of walls	Minimal	
		Damage to second floor framing at top of adobe walls	Yes	
		Retrofit chimneys – minor cracking	Minimal	

		Collapsed stem walls and first floor framing in South wing	Yes	
		Collapsed stem walls and first floor framing in North wing	Minimal	
2450 Years	**IX-½**	In-plane shear cracks in adobe walls	Minimal	**1.3**
		Out-of-plane cracks in adobe walls	Yes	
		Permanent displacement of walls	Yes	
		Damage to second floor framing at top of adobe walls	Yes	
		Retrofit chimneys- minor cracking	Minimal	
		Collapsed stem walls and first floor framing in South wing	Yes	
		Collapsed stem walls and first floor framing in North wing	Minimal	

For your information, we have also reviewed the February 25, 2002 letter from GFDS Engineers to Architectural Resources Group. In that letter, they stated "the failure of the adobe would also damage wood-framed parts of the structure and that the central, main part of the Ranch House has a special life-safety concern because it is the part most heavily used by the public." We are in general agreement with the statements in the GFDS letter.

Retrofit Building - 1996 Scheme

The 1996 documents by GFDS were completed in an effort by the City to comply with its own ordinance to retrofit all unreinforced masonry bearing wall buildings (URM buildings) in the City. If retrofit by the scheme outlined in the 1996 construction documents, the Ranch House will perform much better during an earthquake than the structure without strengthening. The retrofit scheme addresses those elements most susceptible to damage as described above. It follows the provisions of the 1990 California Historical Building Code.

In this scheme, the adobe walls are captured at their top (at the second floor level) with the installation of a reinforced concrete bond beam that ties the top of the walls together and provides for some resistance to rocking of the walls and spreading at the top. It is particularly effective at reducing the amount of displacement at the top of the walls dues to its stiffness and strength, but as research shows is more effective when installed on taller thinner walls than exist in this building. The stiffness of the bond beam scheme does tend to reduce the amount of out-of-plane displacements at the top of the walls and therefore minimizes the damage to the adjacent wood framing compared to walls with no or less restraint at the top.

This approach has also been observed in other adobe buildings to lose its effectiveness because of the disparity in stiffness of the new bond beam and the adobe walls after the walls begin to crack. In some cases, the adobe walls have been observed to pull out from underneath the bond beams during an earthquake because of the differences in stiffness between the bond beam and the cracked wall sections, and the lack of a positive connection between the beam and the top of the adobe walls. In fact, because of the constriction of the concrete bond beam at the top of the walls, research has shown that the adobe walls may be even more susceptible to in-plane shear cracking and if they were to crack in-plane, the bond beam may prevent the cracking from "recentering" and thus may result in a permanent in-plane displacement.

The chimneys are reported to have been strengthened using a variety of methods ranging from complete reconstruction from foundation to top with new construction techniques of reinforced masonry (chimney #1 in the documents), to repair and repointing above the roof line (chimney #6) to the addition of new liners, reinforcing steel, grout and exterior bracing (chimney #3 and #7) to total reconstruction above the first floor line (chimneys #2, #4 and #5). All measures are reasonable and should be effective.

The undermined foundations in the wings are to be replaced with new continuous reinforced concrete wall footings and the damaged wood framing is to be replaced.

Therefore in summary of the results of earthquake shaking to the existing building after retrofit:

EQ Return Period	MMI Level	Expected Damage	Life Safety Hazard	*Relative Cost of Repair
475 Years	VIII-½	In-plane shear cracks in adobe walls	Minimal	0.5
		Out-of-plane cracks in adobe walls	Minimal	
		Permanent displacement of walls	Minimal	
		Damage to second floor framing at top of adobe walls	Minimal	
		Retrofit chimneys – minor cracking	Minimal	
		Collapsed stem walls and first floor framing in South wing	Minimal	
		Collapsed stem walls and first floor framing in North wing	Minimal	
2450 Years	IX-½	In-plane shear cracks in adobe walls	Minimal	0.7
		Out-of-plane cracks in adobe walls	Minimall	
		Permanent displacement of walls	Minimal	
		Damage to second floor framing at top of adobe walls	Minimal	
		Retrofit chimneys- minor cracking	Minimal	
		Collapsed stem walls and first floor framing in South wing	Minimal	
		Collapsed stem walls and first floor framing in North wing	Minimal	

Proposed Alternate Retrofit Scheme

As an alternative to the 1996 retrofit scheme, a preliminary scheme has been developed by Roy Tolles of ELT & Associates for consideration. Roy was involved in the research for the Getty report noted earlier and has developed a retrofit scheme consistent with the objectives and the guidelines included in that report.

The 2001 California Historical Building Code states in section 8-806.3, 4. "*A bond beam of reinforced concrete or an equivalent design of other materials shall be provided at the top of all adobe walls...*" In section 8-806.1, it also states, "*Alternative approaches which provide an equiavalent or greatler level of safety mby be used, subjet to the concurrence of the enforcing agency.*" In our opinion the proposed scheme by ELT meets the provisions of the code.

The scheme generally includes the installation of a plywood "bond beam" in lieu of a concrete bond beam at the top of most of adobe walls at the second floor level. The system is obviously more flexible than the concrete bond beam system, but based on the Getty research, for thicker adobe walls, a more flexible bond beam system is very effective in reducing damage to the adobe walls. In fact, the research shows that although it will allow more out-of-plane displacements at the top of the walls, it tends to reduce the potential of in-plane shear cracking and the possibility of permanent in-plane offsets than that observed with the installation of a concrete bond beam.

The repairs the north and south wing foundation stem walls will be completed per the GFDS documents with this scheme. The chimneys reportedly have been strengthened already per the GFDS documents.

EQ Return Period	MMI Level	Expected Damage	Life Safety Hazard	*Relative Cost of Repair
475 Years	VIII-½	In-plane shear cracks in adobe walls	Minimal	0.6
		Out-of-plane cracks in adobe walls	Minimal	
		Permanent displacement of walls	Minimal	
		Damage to second floor framing at top of adobe walls	Minimal	
		Retrofit chimneys – minor cracking	Minimal	
		Collapsed stem walls and first floor framing in wings	Minimal	
2450 Years	IX-½	In-plane shear cracks in adobe walls	Minimal	0.8
		Out-of-plane cracks in adobe walls	Minimal	
		Permanent displacement of walls	Minimal	
		Damage to second floor framing at top of adobe walls	Minimal	
		Retrofit chimneys- minor cracking	Minimal	
		Collapsed stem walls and first floor framing in South Wing	Minimal	
		Collapsed stem walls and first floor framing in North Wing	Minimal	

March 10, 2003

As can be seen from the information provided above, it appears that either proposed retrofit scheme will greatly decrease the risk from earthquake shaking both in terms of costs of repairs, as well as life safety of people in the building. There are differences in the types of damage that may be expected between the two retrofit schemes. A comparison of the relative degree of damage that might be expected if not retrofit, and retrofit according to each of the two proposed schemes is provided:

Expected Damage Before Retrofit for Either EQ Scenario	Expected Damage after Retrofit GFDS scheme	Expected Damage after Retrofit ELT Scheme
Significant In-plane shear cracks in adobe walls	Minor	Less than GFDS
Significant Out-of-plane cracks in adobe walls	Minor	More than GFDS
Significant Permanent displacement of walls	Moderate	Less than GFDS
Significant Damage to second floor framing at top of adobe walls	Minor	More than GFDS
Retrofit chimneys – minor cracking	Same	Same
Collapsed stem walls and first floor framing in South Wing	Negligible	Negligible
Collapsed stem walls and first floor framing in North Wing	Negligible	Negligible

In our opinion, the costs and disruptions to the building for the 1996 retrofit scheme will be much greater than the newly proposed alternative retrofit scheme, but both schemes would be effective to substantially reduce the risks from future earthquakes.

We trust that you find this information useful for your decision process. We would be pleased to provide more details regarding this information at your request and at your convenience. If you would like to schedule a phone conversation or a meeting, please do not hesitate to call. It is our pleasure to have assisted you on this project.

Sincerely,
STRUCTURAL FOCUS

David W. Cocke, S.E.
S3005

Attachments

cc: Steve Farneth

RANCHO LOS ALAMITOS

Company Name:	Structural Focus	**Date:**	December 24, 2002
Building Name:	Rancho Los Alamitos - Ranchouse	**Job Number:**	2060.1
Street Address:	6400 E. Bixby Hill Road	**Engineer:**	D. Cocke
	Long Beach, CA 90815	**PE Number/State:**	S3005