EXHIBIT K

EDWARD L. PACK ASSOCIATES, INC.

1975 HAMILTON AVENUE
SUITE 26
SAN JOSE, CA 95125

Acoustical Consultants

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www.packassociates.com

June 11, 2013
Project No. 44-065-1

PUD-97

RECEIVED
JUN 13 2013
CITY OF PLEASANTON
PLANNING DIVISION

Ms. Pam Hardy
Ponderosa Homes
6130 Stoneridge Mall Road
Suite 185
Pleasanton, CA 94588

Subject: Revised Noise Mitigation Measures, Wagner Property Single-Family Development, Stanley Boulevard, Pleasanton

Dear Pam:

This letter will provide you with updated noise mitigation measures for the planned single-family development at the Wagner Property along Stanley Boulevard in Pleasanton to reflect revisions to the site plan, dated May 22, 2013. Since the original Noise Assessment Study, the plans indicate that the number of homes is being reduced to twelve, the rear yard of the most impacted home is being setback from 35 ft. to 47 ft. from the centerline of the road and the existing home on the site will remain.

As the minimum building setbacks will not change, the only modification will be to the noise control barrier at Lot 12. The noise control barrier at Lot 1 of the previous plan will no longer be necessary. Table I, below, provides the exterior noise exposures at the most impacted rear yard and at the most impacted planned building setback from Stanley Boulevard and the railroad.

TABLE I

Exterior Noise Exposures

		Stanley Blvd		UPRR/ACE		TOTAL	
Lots 1 & 14	Setback	Existing	Future	Typical Day	Busy Day	Existing	Future
Rear Yard and Planned Building Setback (Lot 12)	47 ft. to Stanley Blvd C_L, 452 ft. to RR Tracks	62	64	59	62	64	66

Table II, below, provides the interior noise exposures in the most impacted living spaces closest to Stanley Boulevard and the railroad. Note that this analysis did not change from the previous noise study.

TABLE II Interior Noise Exposures							
		Stanley Blvd		UPRR/ACE		TOTAL	
Lots 1 & 14	Setback	Existing	Future	Typical Day	Busy Day	Existing	Future
Living Spaces	47 ft. to Stanley Blvd. CL, 452 ft. to RR Tracks	37	39	34	37	39	41

As shown above, the interior noise exposures will be within the 45 dB DNL limit of the City of Pleasanton Noise Element standards.

To achieve compliance with the 60 dB DNL standard of the City of Pleasanton Noise Element for the exterior living areas impacted by Stanley Boulevard traffic, the following noise control barrier will be required:

- Construct a 6 ft. high acoustically-effective barrier along the rear yard of Lot 12 facing Stanley Boulevard. Continue the barrier along the easterly property line of Lot 12. The barrier may terminate at the property boundary with Lot 11. Turn the barrier to connect air-tight to the sides of the house. The barrier height is in reference to the nearest building pad elevation.

- Please see Figure 1 for the location and height of the required noise control barrier.

All other provisions, recommendations and noise control measures outlined in the original noise study remain in effect.

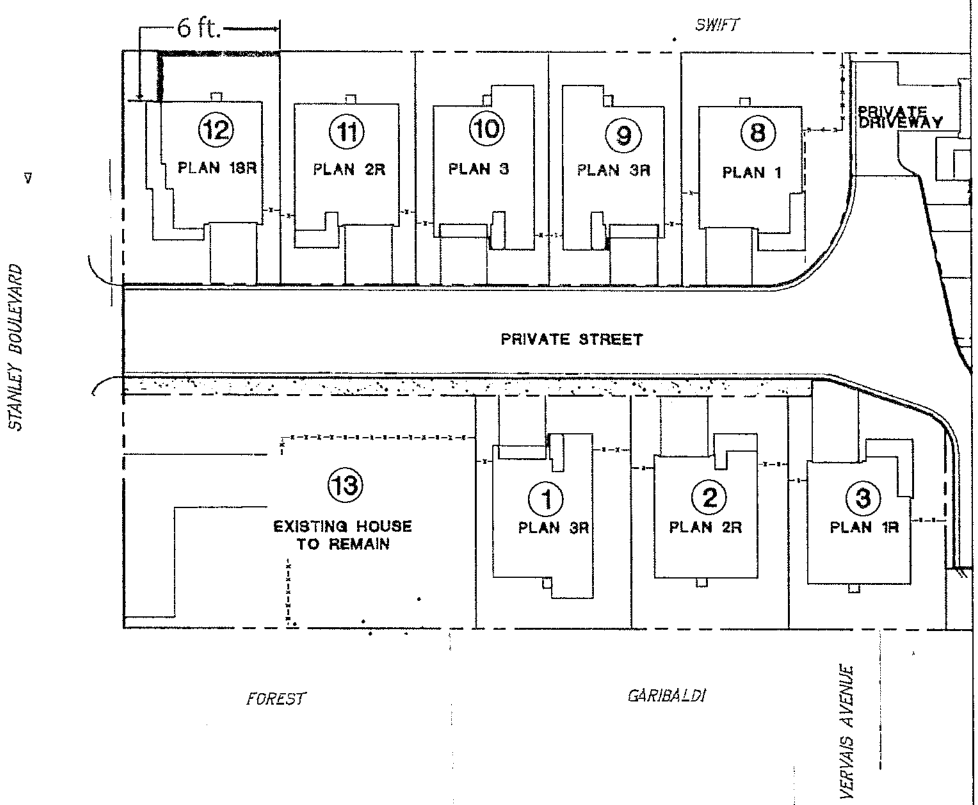

FIGURE 1

Location of the recommended 6 ft. high acoustically-effective barrier. The barrier height is in reference to the nearest building pad elevation.

If you have any questions or need additional information, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

EDWARD L. PACK ASSOCIATES, INC.

PUD - 97

1975 HAMILTON AVENUE
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December 20, 2012
Project No. 44-065

Mr. Jeff Schroeder
Ponderosa Homes
6130 Stoneridge Mall Road
Suite 185
Pleasanton, CA 94588

Subject: Noise Assessment Study for the Planned Single-Family Development, Wagner Property, Stanley Boulevard, Pleasanton

Dear Mr. Schroeder:

This report presents the results of a noise assessment study for the planned single-family development along Stanley in Pleasanton, as shown on the Site Plan, Ref. (a). The noise exposures and noise levels at the site were evaluated against the standards of the City of Pleasanton General Plan Noise Element, Ref. (b). An analysis of the on-site noise measurements indicates that the noise environment is created primarily by traffic sources on Stanley Boulevard and railroad operations on the adjacent Union Pacific Railroad/Altamont Commuter Express line. The results of the study reveal that noise exposure and noise level excesses occur and mitigation measures will be required.

Sections I and II of this report contain a summary of our findings and recommendations, respectively. Subsequent sections contain site, traffic, railroad and project descriptions, analyses and evaluations. Appendices A, B and C contain the list of references, descriptions of the standards, definitions of the terminology, descriptions of the instrumentation used for the field survey, general building shell controls and the on-site noise measurement data and calculation tables.

I. Summary of the Findings

The noise exposures presented herein were evaluated against the noise standards of the City of Pleasanton Noise Element, which utilizes the Day-Night Level (DNL) 24-hour descriptor to define acceptable noise levels for various land uses. The standards specify a limit of 60 dB DNL for single-family residential exterior areas and 45 dB DNL for residential interior living spaces. However, when the noise source is a railroad, the exterior noise exposure standard is 70 dB DNL as the noise environment is characterized by few loud events rather than a relatively constant source such as vehicular traffic. Because of the less restrictive exterior noise levels, short-term interior noise limits are applied to bedrooms and other interior spaces. The limit for bedrooms is 50 dBA instantaneous maximum (L_{max}) while the limit for other interior spaces is 55 dBA L_{max}.

It is important to note that using the "instantaneous maximum" (termed the L_{max} value) noise limit as a design criterion is not a recommended method to preclude noise impacts to residences. Because of its very short duration, being a one second rms value of a peak noise event, the L_{max} does not properly address the effects of noise on people. L_{max} values are usually very high, but often don't have any real effect because of the very short duration. Using L_{max} values for noise limits usually prohibits any noise sensitive land uses within close proximity to any significant noise source.

We advise against the use of the L_{max} noise descriptor as a noise limiting design criterion.

The noise exposures and noise levels shown below are without the application of mitigation measures, and represent the noise environment for the existing site conditions.

A. Exterior Noise Exposures

Table I, below, provides the exterior noise exposures at the most impacted side and rear yards, and at the most impacted planned building setback from Stanley Boulevard and the railroad.

TABLE I Exterior Noise Exposures								
		Stanley Blvd		UPRR/ACE		TOTAL	
Lots 1 & 14	Setback	Existing	Future	Typical Day	Busy Day	Existing	Future
Side and Rear Yards	35 ft. to Stanley Blvd. CL, 440 ft. to RR Tracks	64	66	59	62	65	67
Building Setback	47 ft. to Stanley Blvd C_L, 452 ft. to RR Tracks	62	64	59	62	64	66

As shown above, the exterior noise exposures will be up to 6 dB in excess of the 60 dB DNL standard of the City of Pleasanton Noise Element for traffic noise, but within the 70 dB DNL limit of the Noise Element for railroad noise.

B. Exterior Railroad Maximum Noise Levels

- The exterior maximum noise level at the most impacted planned building setback from railroad operations was measured to be 89 dBA.

C. Interior Noise Exposures

Table II, below, provides the interior noise exposures in the most impacted living spaces closest to Stanley Boulevard and the railroad.

TABLE II							
Interior Noise Exposures							
		Stanley Blvd		UPRR/ACE		TOTAL	
Lots 1 & 14	Setback	Existing	Future	Typical Day	Busy Day	Existing	Future
Living Spaces	47 ft. to Stanley Blvd. CL, 452 ft. to RR Tracks	37	39	34	37	39	41

As shown above, the interior noise exposures will be within the 45 dB DNL limit of the City of Pleasanton Noise Element standards.

D. Interior Railroad Maximum Noise Levels

- The interior maximum noise level in the most impacted bedrooms and living spaces from railroad operations will be up to 64 dBA. L_{max}. Thus, the noise levels will be up to 14 dB in excess of the 50 dBA L_{max} limit for bedrooms and up to 9 dB in excess of the 55 dBA L_{max} limit of other living spaces.

The findings reveal that exterior noise exposures and interior noise level excesses will occur at the site and mitigation measures will be required. The mitigation measures necessary to achieve the City of Pleasanton Noise Element standards are described in Section II of this report.

II. Noise Mitigation Measures

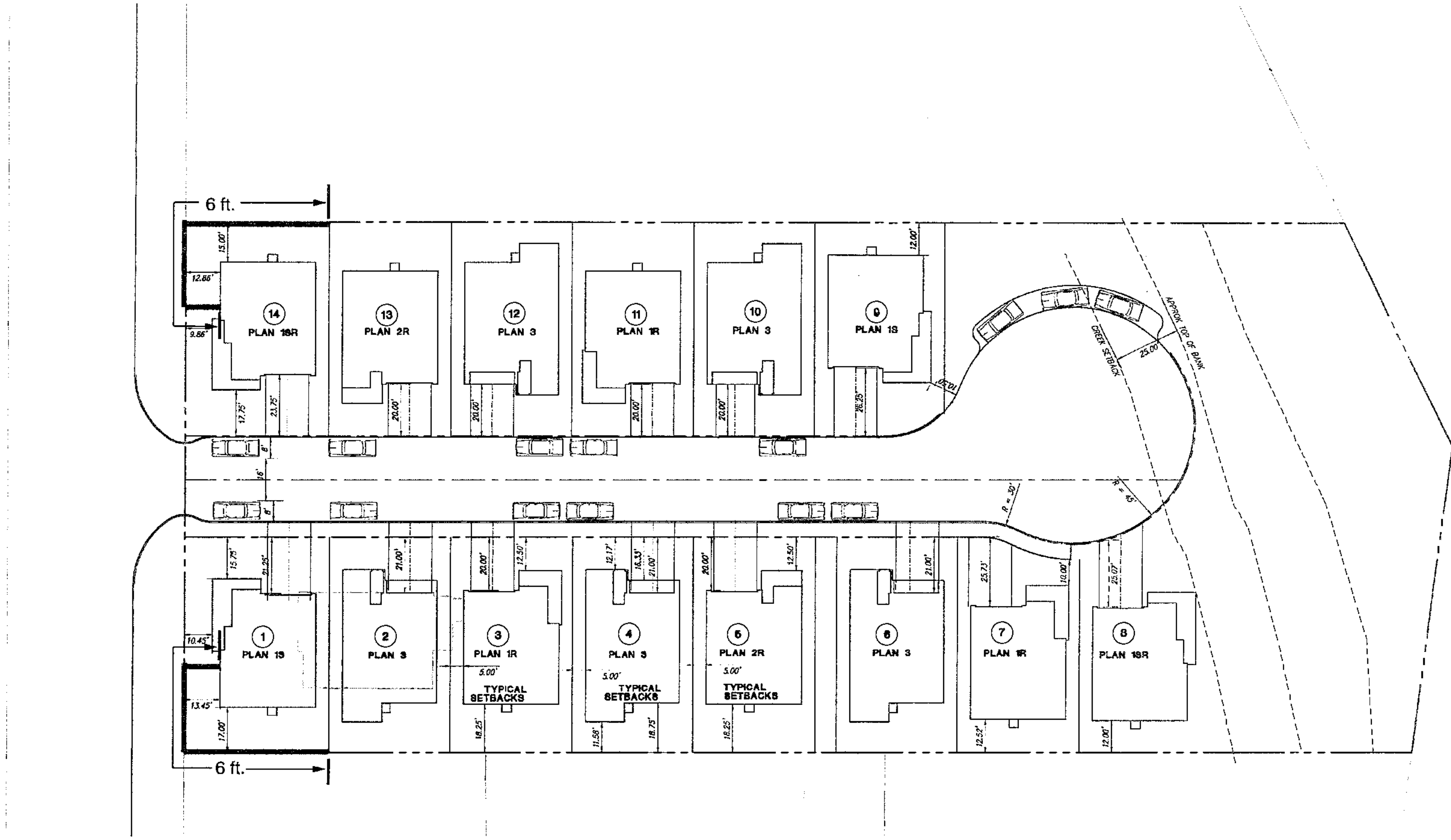
A. Exterior Noise

To achieve compliance with the 60 dB DNL standard of the City of Pleasanton Noise Element for the exterior living areas impacted by Stanley Boulevard traffic, the following noise control barrier will be required:

- Construct a 6 ft. high acoustically-effective barrier along the property lines of Lots 1 and 14 contiguous with Stanley Boulevard. Continue the barriers along the westerly property line of Lot 1 and along the easterly property line of Lot 14. The barriers may terminate at the property boundaries with Lots 2 and 13, respectively. Turn the barriers to connect air-tight to the sides of the houses. The barrier height is in reference to the nearest building pad elevation.

- Please see Figure 1 for the locations and heights of the required noise control barriers.

To achieve an acoustically-effective barrier, it must be made air-tight, i.e., without cracks, gaps, or other openings and must provide for long-term durability. The barriers can be constructed of wood, concrete, stucco, masonry, metal, earth berm or a combination thereof. If wood fencing is used, homogeneous sheet materials are preferable to conventional wood fencing as the latter has a tendency to warp and form openings with age. However, high quality, air-tight, tongue-and-groove, shiplap, or board and batten construction can be used, provided the minimum surface weight requirement is met and the construction is air-tight. Gates may be incorporated into the barrier return segments at the sides of Lots 1 and 14. The gates must be of the same height as the main barrier and must fit tight to the main barrier when closed. The gaps at the hinge and closure jambs shall be covered with astragals/stops. The gap below the gate shall be no more than 1" high. The noise control barriers must be constructed so that all joints, including connections with posts, pilasters or the building shell are sealed air-tight and no openings are permitted between the upper barrier components and the ground.



FOOTPRINTS USED FOR THIS SITE PLAN RECEIVED FROM WHA 8/22/12 (PLANS 1, 2 AND 3) AND 8/29/12 (PLAN 1S)

FIGURE 1

Locations of the recommended 6 ft. high noise control barriers. The barrier height is in reference to the nearest building pad elevation.

WAGNER PROPERTY

SITE PLAN

PLEASANTON, ALAMEDA COUNTY, CA

N

0 20 40 60

(IN FEET)
1 inch = 20 ft.

RJA
RUGGERI-JENSEN-AZAR
ENGINEERS • PLANNERS • SURVEYORS

DATE: AUGUST 29, 2012 JOB NO. 171001A SHEET 1 OF 1

B. Interior Noise Controls

To achieve compliance with the 50 dBA maximum standard for the bedrooms and the 55 dBA maximum standard for other living spaces, the following window controls will be required.

- Install windows and exterior doors per the Sound Transmission Class (STC) schedule shown in Table III, below.

TABLE III

Exterior Door and Window Sound Transmission Class Ratings

		North		West		South		East	
Lot	Floor	Bed	Living Space	Bed	Living Space	Bed	Living Space	Bed	Living Space
1, 14 (unshielded)	2	42	37	42	37	37	32	42	37
	1	42	37	42	37	37	32	42	37
1 (behind noise barrier)	1	37	32	37	32	28	28	28	28
14 (behind noise barrier)	1	37	32	28	28	28	28	37	32
2,3,4,5,10, 11,12,13	2	42	37	42	37	37	32	42	37
	1	42	37	42	37	37	32	42	37
6,7,8,9	2	37	32	37	32	32	28	37	32
	1	37	32	37	32	32	28	37	32

Note: Residential front doors with STC ratings higher than 28 are non-standard doors and may be difficult to appropriate. Glass doors rated higher than STC 37 are difficult to appropriate and could be cost prohibitive for this type of project.

All windows and doors must be of good quality and provide tight seals to prevent sound infiltration. To achieve an acoustically-effective window construction, sliding panels must form an air-tight seal when in the closed position. In addition, the window and door frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound or acoustical sealant.

When windows are maintained closed for noise control, they are to be operable, as the requirement does not imply a "fixed" condition. Also, under the closed window requirement some type of mechanical ventilation should be provided to assure a habitable environment, as specified by the Uniform Building Code (UBC) and described in Appendix B. In addition, general construction measures to assure an acceptable acoustical environment are recommended, as described in Appendix B.

The implementation of the above recommended measures will reduce interior noise levels to 50 dBA maximum in the bedrooms and to 55 dBA maximum in other interior spaces to comply with the standards of the City of Pleasanton Noise Element.

III. Site, Traffic, Railroad and Project Descriptions

The planned project site is located along Stanley Boulevard between Main Street and First Street in Pleasanton, and currently contains a single-family structure, several vacant mobile homes, one occupied mobile home and one occupied recreational vehicle. The site is relatively flat and at-grade with Stanley Boulevard. The railroad tracks are on a 2 ft. high gravel berm. Surrounding land uses include single-family residential adjacent to the south, commercial uses adjacent to the west, single-family residential and commercial uses across Stanley Boulevard to the north and single-family residential adjacent to the east.

The primary sources of noise at the site are traffic on Stanley Boulevard and rail operations on the UPRR/ACE rail line. Stanley Boulevard carries an existing Average Daily Traffic (ADT) of 8,951 vehicles. This traffic volume was calculated as an interpolation of 2008 and 2025 traffic volumes provided in the City of Pleasanton Noise Element.

The UPPR rail line operated 3 daytime freight trains and 5 nighttime freight trains on the day of the noise measurements. Freight operations are typically unscheduled and can vary from day to day, depending upon the demand for goods and services. The UPRR does not provide projections of future operations. Past studies of this rail lien indicate that some days carry more trains, which can increase the railroad noise exposure by approximately 3 decibels. Therefore, for the purposes of this study, we are assuming that future or "busy day" freight operations will be 3 dB higher than the currently measured operations.

The ACE rail line services 4 westbound trains in the morning and 4 eastbound trains in the afternoon, as reported by Altamont Commuter Express, Ref. (c). Note that two of the westbound trains occur during the nighttime hours before 7:00 a.m.

The planned project includes the construction of 14 two story single-family homes. Ingress and egress to the development will be by way of a project access street off of Stanley Boulevard.

IV. Analysis of the Noise Levels

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at two locations. Location 1 was 35 ft. from the centerline of Stanley Boulevard corresponding to the planned minimum setback the homes from the road. Location 2 was 90 ft. from the centerline of Stanley Boulevard. This location was chosen for security of the sound measuring equipment. The measurements were made on December 3-4, 2012 using Larson-Davis 812 Precision Integrating Sound Level Meters. The meters yield, by direct readout, a series of descriptors of the sound levels versus time. The measured descriptors included the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels that are exceeded 1%, 10%, 50%, and 90% of the time. Also measured were the maximum and minimum levels, and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL. The measurements were made for a total period of 24 hours at each location and included recordings of the noise levels during representative hours of the daytime and nighttime periods of the DNL index. The results of the measurements are shown in the data table in Appendix C.

As shown in the tables, the L_{eq}'s at Location 1, 35 ft. from the centerline of Stanley Boulevard, ranged from 59.0 to 66.9 dBA during the daytime and from 44.7 to 59.2 dBA at night.

The L_{eq} noise levels at measurement Location 2, 90ft. from the centerline of Stanley Boulevard ranged from 53.6 to 64.6 dBA during the daytime and from 40.7 to 60.1 dBA at night.

Noise levels generated by rail traffic only were derived from 1 minute time-history data measured at the site. Table IV, below, provide the L_{eq} noise levels for each train passby, the hourly L_{eq} for the train passby hour (which does not include other sources) and the resulting DNL.

TABLE IV

Railroad Noise Levels @ 440 ft., dBA L_{eq}

Time	Passby L_{eq}	Hourly L_{eq}	Train Type
2:54 PM	69.3 dBA	51.5 dBA	Freight
4:22 PM	66.0 dBA	51.2 dBA	ACE
5:18 PM	67.1 dBA	54.2 dBA	ACE
5:30 PM	67.3 dBA		ACE
12:46 AM	68.4 dBA	59.8 dBA	Freight
12:59 AM	76.4 dBA		Freight
2:11 AM	72.1 dBA	58.7 dBA	Freight
2:34 AM	66.0 dBA		Freight
5:29 AM	67.8 dBA	51.9 dBA	ACE
5:30 AM	60.5 dBA		Freight
6:46 AM	70.4 dBA	52.6 dBA	ACE
7:07 AM	70.7 dBA	58.6 dBA	Freight
7:52 AM	73.1 dBA		ACE
10:52 AM	69.1 dBA	51.3 dBA	ACE
12:42 PM	69.6 dBA	56.2 dBA	ACE

12:58 PM	72.0 dBA		Freight
DNL = 59 dB			

Traffic and rail noise diminish at a rate of 3-6 dB for each doubling of the distance from the source to the receiver. Thus, other locations on the site at greater distances from the roadways or railroad will have lower noise levels.

Table V, below, provides the measured L_{max} values at 440 ft. from the centerline of the tracks for each hour of the measurement period.

TABLE V		
Railroad Maximum Noise Levels @ 440 ft., dBA L_{max}		
Time	Maximum Noise Level, dBA	Train Type
2:54 PM	88.4	Freight
4:22 PM	82.2	ACE
5:18 PM	80.8	ACE
5:30 PM	82.6	ACE
12:46 AM	88.3	Freight
12:59 AM	86.2	Freight
2:11 AM	**88.8**	**Freight**
2:34 AM	85.5	Freight
5:29 AM	80.5	ACE
5:30 AM	81.1	Freight
6:46 AM	85.8	ACE
7:07 AM	85.9	Freight
7:52 AM	85.7	ACE
10:52 AM	80.2	ACE
12:42 PM	83.2	ACE
12:58 PM	87.7	Freight

B. Future Noise Levels

Future traffic volume data for Stanley Boulevard were acquired from information contained the City of Pleasanton Noise Element. The Noise Element provides traffic volume data for many roadways throughout the City for year 2008 (time of the General Plan) and for future year 2025. The traffic volume for Stanley Boulevard is predicted to increase from the existing 7,800 ADT to 14,000 ADT for 2025. Thus, traffic on Stanley Boulevard is expected to grow at a rate of 3.5% per year. Applying this growth rate from 2008 to 2012, the current traffic volume on Stanley Boulevard was calculated to be 8,951 vehicles ADT. From 2012 to 2025, the increase in traffic volume from 8,951 vehicles to 14,000 yields a 2 dB increase in the traffic noise levels.

V. Evaluation of the Noise Exposures

A. Exterior Noise Exposures

To evaluate the on-site noise exposures against the City of Pleasanton Noise Element standards, the DNL's for the survey locations were calculated by decibel averaging of the L_{eq}'s as they apply to the daily subperiods of the DNL index. A 10 decibel nighttime weighting factor was applied to account for the increased human sensitivity to noise at night. Adjustments were made to the measured noise levels to account for the difference in distance between the measurement locations and the various building setbacks, using methods established by the Highway Research Board, Ref. (d), and Wyle Laboratories, Ref. (e). The DNL formula is shown in Appendix B. The results of the calculations are shown in Appendix C.

The calculations show that the existing noise exposure at measurement Location 1, 35 ft. from the centerline of Stanley Boulevard, was 65 dB DNL. However, these noise exposures are a combination of both Stanley Boulevard traffic noise and rail noise. To segregate the two sources, the noise exposure generated by railroad sources only (Table IV) was subtracted from the total measured noise exposure. The difference resulted in the Stanley Boulevard traffic noise exposure of 64 dB DNL. Note that 65 dB – 59 dB = 64 dB.

Under future traffic and busy day rail operations, representing a worst-case scenario, the noise exposures were calculated to be 66 dB DNL from traffic and 62 dB DNL from rail operations. The total noise exposure is expected to be up to 67 dB DNL at the measurement location and most impacted property line. Thus, the noise exposures in the most impacted side and rear yards of the project will be up to 6 dB in excess of the 60 dB DNL limit of the City of Pleasanton Noise Element for traffic noise. The exterior noise exposures throughout the project will be within the 70 dB DNL limit of the standards for rail noise.

At the planned minimum building setback of 47 ft. from the centerline of Stanley Boulevard and 452 ft. from the railroad tracks, the traffic noise exposure reduces to 62 dB DNL, but railroad noise does not change. The total noise exposure is 64 dB DNL under existing conditions. Under future/busy day conditions, the noise exposure is expected to increase to 64 dB DNL from traffic and 62 dB DNL from rail operations, yielding a total noise exposure of 66 dB DNL.

The 60 dB DNL future noise contour from Stanley Boulevard traffic will be 87 ft. from the centerline of the road.

The noise exposures at measurement Location 2, 90 ft. from the centerline of Stanley Boulevard and 450 ft. from the UPRR/ACE rail tracks was calculated to be 62 dB DNL, with 60 dB DNL due to traffic and 59 dB due to rail operations.

B. Interior Noise Exposures and Noise Levels

Noise Exposures

To determine the interior noise exposures, a 25 dB reduction was applied to the exterior noise exposures at the minimum building setbacks to represent the attenuation provided by a typical building shell under a closed window condition. This condition assumes that residential dwellings have standard dual-pane, thermal insulating windows (nom. STC 28) that are kept closed all of the time, as adequate supplementary ventilation will be required by the Mechanical Code.

The interior noise exposures in living spaces of homes closest to Stanley Boulevard will be 39 and 41 dB DNL under existing and future conditions, respectively. Thus, the interior noise exposures will be within the 45 dB DNL standard of the City of Pleasanton Noise Element standard.

Noise Levels

To determine the interior L_{max} noise levels, a 25 dB reduction was applied to the exterior L_{max} values at the minimum building setbacks to represent the attenuation provided by a typical building shell under the closed window condition, as described above.

The highest exterior L_{max} value at the most impacted planned building setback is 89 dBA. The highest interior L_{max} value in the most impacted living spaces will be 64 dBA. Thus, the maximum noise levels will be up to 14 dB in excess of the 50 dBA L_{max} limit for bedrooms and up to 9 dB in excess of the 55 dBA L_{max} limit for other living spaces.

As shown by the above evaluations, exterior noise exposure and interior noise level excesses will occur and mitigation measures will be required. The required noise mitigation measures are described in Section II of this report.

The above report presents the results of a noise assessment study for the planned single-family development at the Wagner Property along Stanley Boulevard in Pleasanton. The study findings for present conditions are based on field measurements and other data and are correct to the best of our knowledge. The future noise level predictions are based on estimates made by Edward L. Pack Associates, Inc. from published information. Significant deviations in the predicted traffic or rail volumes, future changes in motor vehicle or railroad technology, speed limits, noise regulations, or other changes beyond our control may produce long-range noise results different from our estimates.

If you need any additional information or would like an elaboration on this report, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

Attachment: Appendices A, B and C

APPENDIX A

References:

(a) Site Plan, Wagner Property, by Ruggeri, Jensen, Azar, August 29, 2012

(b) Noise Element of the General Plan, City of Pleasanton, July 21, 2009

(c) http://www.acerail.com/schedules/train-schedule.htm

(d) Highway Research Board, "Highway Noise-A Design Guide for Highway Engineers", Report 117, 1971

(e) Wyle Laboratories Report WCR 73-5, "Assessment of Noise Environments Around Railroad Operations", July, 1973

APPENDIX B

Noise Standards, Terminology, Instrumentation and Building Shell Controls

1. Noise Standards

A. City of Pleasanton Noise Element Standards

The City of Pleasanton Noise Element, Chapter VIII, Adopted July 21, 2009 specifies exterior and interior noise exposure standards.

Residential Exterior

Source	Standard
Traffic	
Single-Family	60 dB DNL
Multi-Family (common areas)	65 dB DNL
Railroad	70 dB DNL
Aircraft	55 dB DNL 50 dBA L_{max} Bedrooms 55 dBA L_{max} Living Spaces

Residential Interior

	45 dB DNL
For railroad sources:	50 dBA L_{max} Bedrooms 55 dBA L_{max} Other Interior Spaces
If more than 4 trains daytime or any trains nighttime	
Aircraft	50 dBA L_{max} Bedrooms 55 dBA L_{max} Living Spaces

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Community Noise Analyzer. Some of the statistical levels used to describe community noise are defined as follows:

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing an "average" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous-equivalent level is that level of a steady noise having the same energy as a given time-varying noise. The L_{eq} thus represents the decibel level of the time-averaged value of sound energy or sound pressure squared. The L_{eq} is the noise descriptor used to calculate the DNL and CNEL descriptors.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = [(L_d+10\log_{10}15)\ \&\ (L_n+10+10\log_{10}9)] - 10\log_{10}24$$

Where:

L_d = L_{eq} for the daytime (7:00 a.m. to 10:00 p.m.)
L_n = L_{eq} for the nighttime (10:00 p.m. to 7:00 a.m.)
24 indicates the 24-hour period
& denotes decibel addition.

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the sound analyzer listed below. The instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters were provided by microphones extended to a height of 5 ft. above the ground. The "A" weighting network and the "Fast" response setting of the meters were used in conformance with the applicable standards. The Larson-Davis meters were factory modified to conform with the Type 1 performance standards of ANSI S1.4. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer

4. Building Shell Controls

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required:

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter. Mail slots should not be used in these doors or in the wall of a living space, as a significant noise leakage can occur through them.
- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.
- Fireplaces should be provided with tight-fitting dampers.

APPENDIX C

On-Site Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: PONDEROSA HOMES
FILE: 44-065
PROJECT: STANLEY BLVD SINGLE-FAMILY
DATE: 12/3-4/2012
SOURCE: STANLEY BLVD, UPRR/ACE RAIL

LOCATION 1	Stanley Blvd/UPRR			
Dist. To Source	35 ft., 440 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	65.7	3715352.3		
8:00 AM	64.5	2818382.9		
9:00 AM	63.3	2137962.1		
10:00 AM	62.8	1905460.7		
11:00 AM	63.5	2238721.1		
12:00 PM	63.9	2454708.9		
1:00 PM	63.3	2137962.1		
2:00 PM	63.4	2187761.6		
3:00 PM	66.9	4897788.2		
4:00 PM	64.8	3019951.7		
5:00 PM	64.8	3019951.7		
6:00 PM	63.2	2089296.1		
7:00 PM	62.6	1819700.9		
8:00 PM	60.3	1071519.3		
9:00 PM	59.0	794328.2	SUM=	36308848
10:00 PM	56.3	426579.5	Ld=	63.8
11:00 PM	52.8	190546.1		
12:00 AM	57.4	549540.9		
1:00 AM	48.2	66069.3		
2:00 AM	58.8	758577.6		
3:00 AM	44.7	29512.1		
4:00 AM	46.3	42658.0		
5:00 AM	55.4	346736.9		
6:00 AM	59.2	831763.8	SUM=	3241984
			Ld=	55.6
	Daytime Level=	75.6		
	Nighttime Level=	75.1		
	DNL=	**65**		
	24-Hour Leq=	62.2		

LOCATION 2	Stanley Blvd/UPRR			
Dist. To Source	90 ft., 450 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	62.3	1698243.7		
8:00 AM	63.6	2290867.7		
9:00 AM	62.3	1698243.7		
10:00 AM	61.0	1258925.4		
11:00 AM	59.0	794328.2		
12:00 PM	62.1	1621810.1		
1:00 PM	58.2	660693.4		
2:00 PM	62.1	1621810.1		
3:00 PM	64.6	2884031.5		
4:00 PM	60.6	1148153.6		
5:00 PM	60.7	1174897.6		
6:00 PM	58.5	707945.8		
7:00 PM	57.8	602559.6		
8:00 PM	55.0	316227.8		
9:00 PM	53.6	229086.8	SUM=	18707825
10:00 PM	53.6	229086.8	Ld=	61.0
11:00 PM	49.7	93325.4		
12:00 AM	54.9	309029.5		
1:00 AM	43.4	21877.6		
2:00 AM	60.1	1023293.0		
3:00 AM	40.7	11749.0		
4:00 AM	42.2	16595.9		
5:00 AM	52.0	158489.3		
6:00 AM	56.6	457088.2	SUM=	2320535
			Ld=	54.1
	Daytime Level=	72.8		
	Nighttime Level=	73.6		
	DNL=	**62**		
	24-Hour Leq=	59.4		