ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
1 Willowbrook Court, Suite 120
Petaluma, California 94954
Tel: 707-794-0400 *Fax: 707-794-0405*
www.illingworthrodkin.com *illro@illingworthrodkin.com*

August 23, 2017

Hayes Shair, AIA, LEED GA
Wanmei Properties, Inc.

VIA E-Mail: hshair@gmail.com

SUBJECT: Omaha Subdivision, Fremont, CA - Environmental Noise Assessment

Dear Hayes,

This letter presents the results of the environmental noise assessment completed for the Omaha property proposed west of Interstate 680 (I-680) in Fremont. The analysis is based on the Preliminary Grading and Drainage Plan, dated July 5th, 2017. The proposed project would construct 17 single-family homes on the site, each two stories high. This study evaluates the compatibility of the proposed residential uses with the noise environment at the project site. Included in the report are the fundamentals of environmental noise, a summary of the applicable objectives and policies contained in the City of Fremont Health and Safety Element of the General Plan, and a description of existing noise levels at the project site. The report then summarizes future noise levels expected at the project site and describes measures necessary to reduce noise levels to acceptable levels.

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.\

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level* (*dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (L_{dn} or *DNL*) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

Regulatory Background

City of Fremont General Plan

Goal 10-8 of the Health and Safety chapter of The City's 2030 General Plan is an acceptable noise environment, defined as a noise environment which meets acceptable standards as defined by the State of California Building Code and local policies contained herein throughout the community. Objectives and policies supporting Goal 10-8 are as follows:

Implementation 10-8.1.A: Noise Standards

1. Require new development projects to meet acceptable exterior noise level standards. The maximum acceptable noise levels in residential areas is an L_{dn} of 60 dB(A). This level shall guide the design and location of future development, and is a goal for the reduction of noise in existing development. A 60 dB(A) goal will be applied where outdoor use is a major consideration (e.g., backyards in single family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to small decks associated with apartments and condominiums, but these will be evaluated on a case by case basis. When the City determines that providing an outdoor L_{dn} of 60 dB(A) or lower cannot be achieved after the application of feasible mitigation measures, an L_{dn} of 65 dB(A) may be permitted at the discretion of the City Council.

2. Indoor noise level shall not exceed an L_{dn} of 45 dB(A) in new housing units. Typical noise levels in bedrooms should not exceed 50 dB(A). Typical noise levels in other rooms should not exceed 55 dB(A). A noise insulation study, conforming to the requirements of the State Building Code, shall be prepared for all new residential, hotels, and motels exposed to an exterior L_{dn} of 60 dB(A) or greater and submitted to the Plans and Permits Division prior to issuance of a permit.

Implementation 10-8.1.D: Noise Mitigation

Encourage the use of setbacks, earth berms and other non-structural methods to reduce and mitigate the effects of traffic noise and other sources. Building placement should also be utilized to mitigate noise impacts on outdoor areas. In general, the use and construction of sound walls is discouraged unless no other alternative exists. If landscaping is used then appropriate controls for irrigation and maintenance shall be provided.

Existing Noise Environment

The project site is located west of I-680 in Fremont, between Warren Avenue and Iroquois Way. The existing noise environment at the site results primarily from traffic along I-680. The topography of the site slopes significantly downward from I-680, with the portion of the site adjacent to I-680 being approximately at-grade with the highway and the western portion of the site being about 40 to 45 feet below grade of the highway. Single-family residential subdivisions are located north, west, and south of the site and east of the site, across I-680.

Illingworth & Rodkin, Inc. visited the project site in July 2016 and completed a series of noise measurements to quantify existing ambient noise levels. The noise monitoring survey consisted of one long-term (5-day) measurement and eight short-term (10-minute) noise measurements. Noise monitoring locations are shown on Figure 1. The short-term noise data were compared to the long-term data during corresponding time periods to estimate L_{dn} noise levels at each of the short-term noise measurement sites. A summary of the measured short-term noise data is presented in Table 3. The long-term noise measurement data is provided in Appendix A.

The noise environment at the site varies depending on the proximity of the receptor to adjacent I-680 and Warren Avenue, and the elevation of the receptor with respect to the elevation of I-680 travel lanes. Existing noise levels at ground level exposures at the site fall within the City's "conditionally acceptable" range for residential noise land use compatibility (65 dBA L_{dn} or less), ranging from 59 to 63 dBA L_{dn}. Exterior noise levels at an elevation of fifteen feet above the ground (representative of second story window exposure) are 3 to 6 dBA higher, and range from 63 to 68 dBA L_{dn}.

TABLE 3 Summary of Short-Term Noise Measurement Data

Noise Measurement Location	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	L_{dn}
ST-1a: 55 feet from the edge of I-680, south end of site, 5 feet above the ground. (7/7/2016, 12:10 p.m.-12:20 p.m.)	60	56	53	57-58	63
ST-1b: 55 feet from the edge of I-680, south end of site, 15 feet above the ground. (7/7/2016, 12:10 p.m.-12:20 p.m.)	62-63	58	55-56	59-60	66
ST-2a: 150 feet from the edge of I-680, south end of site, 5 feet above the ground. (7/7/2016, 12:40 p.m.-12:50 p.m.)	54-55	53	51	53	59
ST-2b: 150 feet from the edge of I-680, south end of site, 15 feet above the ground. (7/7/2016, 12:40 p.m.-12:50 p.m.)	61-62	59	56-57	59-60	64
ST-3a: 200 feet from the edge of I-680, center of site, 5 feet above the ground. (7/7/2016, 1:10 p.m.-1:20 p.m.)	56	53-54	51-52	54	59
ST-3b: 200 feet from the edge of I-680, center of site, 15 feet above the ground. (7/7/2016, 1:10 p.m.-1:20 p.m.)	58	56	54	56-57	63
ST-4a: 170 feet from the edge of I-680, south end of site, 5 feet above the ground. (7/7/2016, 1:40 p.m.-1:50 p.m.)	58	56-57	54-55	56-57	63
ST-4b: 170 feet from the edge of I-680, south end of site, 15 feet above the ground. (7/7/2016, 1:40 p.m.-1:50 p.m.)	63-64	60	58-59	61	68

Note: L_{dn} approximated by correlating to corresponding period at long-term site and through noise modeling, as described below.

Future Exterior Noise Environment

The future noise environment at the project site would continue to result primarily from vehicular traffic along Interstate 680. Exterior noise levels resulting from traffic were calculated with FHWA's Traffic Noise Model (TNM v.2.5), and are summarized below in Table 5. Roadway, barrier, terrain features, and receptor locations were digitized and input into the traffic noise model in a three-dimensional reference coordinate system. The geometrical input was based on the topography provided for the I-680 Northbound Express Lane project[1] in 2013 and the 17-Lot Layout Map dated July 5th, 2017[2]. Roadway traffic volumes, including the vehicle mix ratio, and traffic speeds were input into the model based on the existing and future traffic volumes supplied for the I-680 Northbound Express Lane project. Future noise levels assume that the I-680 Northbound Express Lane project will be built. TNM predicts noise levels assuming calm wind conditions with moderate temperatures and humidity.

Noise levels were calculated at backyards and upper stories at all 17 lot locations, which are shown in Figure 2. As summarized in Table 4, future noise levels in proposed residential backyards are calculated to range from 60 to 68 dBA L_{dn}. Exterior noise levels at the second-floor facades of these same homes, assumed to have floor elevations 10 feet above the ground elevation, are calculated to be 3 to 5 dB higher than ground level receptors, in the range of 64 to 72 dBA L_{dn}.

TABLE 4 Traffic Noise Modeling Results (dBA, L_{dn})

Receptor Location	Future Noise Level (First-floor)	Future Noise Level (Second-floor)
Lot 1	68	72
Lot 2	66	71
Lot 3	65	70
Lot 4	63	68
Lot 5	63	68
Lot 6	62	66
Lot 7	62	66
Lot 8	61	66
Lot 9	61	66
Lot 10	62	66
Lot 11	62	66
Lot 12	62	67
Lot 13	63	67
Lot 14	62	67
Lot 15	61	64
Lot 16	60	65
Lot 17	64	67

[1] See the Interstate 680 Northbound Express Lane Project, Noise Technical Report, prepared by Illingworth & Rodkin, Inc., September 2013.
[2] Option A - Preliminary Grading and Drainage Plan, Omaha Way, Carlson, Barbee, & Gibson, Inc., July 5, 2017.

Goal 10-8 of the Health and Safety Chapter of General Plan (see description above) discourages residential land uses in noise environments exceeding 60 dBA L_{dn}. When the City determines that providing an outdoor L_{dn} of 60 dBA or lower cannot be achieved after the application of feasible mitigation measures, an L_{dn} of 65 dBA may be permitted at the discretion of the City Council.

Without further mitigation, only Lot 16 would have noise levels meeting the 60 dBA L_{dn} threshold. Backyards of all lots except Lots 1 and 2 would meet the conditionally acceptable 65 dBA L_{dn} criteria. Backyards of Lots 1 and 2 would exceed the conditionally acceptable 65 dBA L_{dn} criteria by 1 to 3 dB.

Preliminary Noise Barrier Evaluation – Property Boundary Barrier

Table 5 shows the traffic noise modeling results assuming the construction of a noise barrier along the property's eastern boundary, as shown in Figure 2. The Grey highlights indicate receptors that exceed 65 dBA L_{dn}. Bold text indicates receptors that exceed 60 dBA L_{dn}.

TABLE 5 Barrier Insertion Loss for Ground Level Receptors (dBA, L_{dn})

Location	Future Noise Level w/o Wall	6 ft Barrier		8 ft Barrier		10 ft Barrier		12 ft Barrier		14 ft Barrier	
		L_{dn}	I.L.	L_{dn}	I.L.	L_{dn}	I.L.	L_{dn}	I.L.	L_{dn}	I.L.
Lot 1	**68**	**68**	0	**67**	1	**67**	1	**66**	2	**66**	2
Lot 2	**66**	**65**	1	**64**	2	**64**	2	**63**	3	**62**	4
Lot 3	**65**	**63**	2	**63**	2	**62**	3	**62**	3	**61**	4
Lot 4	**63**	**61**	2	**61**	2	**61**	2	**61**	2	**61**	2
Lot 5	**63**	**61**	2	**61**	2	**61**	2	**61**	2	**61**	2
Lot 6	**62**	59	3	59	3	59	3	59	3	59	3
Lot 7	**62**	59	3	59	3	59	3	59	3	59	3
Lot 8	**61**	59	2	59	2	59	2	59	2	59	2
Lot 9	**61**	59	2	59	2	59	2	59	2	59	2
Lot 10	**62**	60	2	60	2	60	2	60	2	60	2
Lot 11	**62**	**61**	1	**61**	1	**61**	1	60	2	60	2
Lot 12	**62**	**61**	1	**61**	1	60	2	60	2	60	2
Lot 13	**63**	**62**	1	**61**	2	**61**	2	60	3	60	3
Lot 14	**62**	**61**	1	**61**	1	**61**	1	60	2	60	2
Lot 15	**61**	59	2	59	2	59	2	59	2	59	2
Lot 16	60	60	0	60	0	60	0	60	0	59	1
Lot 17	**64**	**61**	3	**61**	3	60	4	59	5	59	5

Bold text indicates noise levels exceeding 60 dBA L_{dn} Grey highlights indicate noise levels exceeding 65 dBA L_{dn}.

Proposed residences at the project site benefit from noise reduction provided by the existing topography and proposed future site grading. A barrier located at the site's eastern property line provides limited additional noise reduction to proposed residences, with only Lot 17 achieving a noise reduction of 5 dB at barrier heights up to 14 feet. With a 6 foot high barrier, located as shown in Figure 2, noise levels in the backyards of all residences except Lot 1 would be below 65 dBA L_{dn} and about half of the backyards would be exposed to levels of 60 dBA L_{dn} or less. Increasing the height of the barrier would provide minimal additional noise reduction, as summarized in Table 5. Sound barriers must be constructed with a solid material with no gaps in the face of the wall or at the base. Openings or gaps between sound wall materials or the ground substantially decrease the effectiveness of the sound wall. Suitable materials for sound wall construction should have a minimum surface weight of 3 pounds per square foot (such as 1-inch-thick wood, ½-inch laminated glass, masonry block, concrete, or metal one-inch). An example of a suitable noise barrier plan and section is attached as Figure 3.

Due to the depressed topography in the area north of Lot 1, a barrier along the property line provides minimal noise reduction to this home and noise levels in Lot 1 continue to exceed 65 dBA L_{dn}, even with the placement of a 14 foot high barrier at the property line. Extending the northwestern portion of the barrier along the Interstate 680 edge of shoulder, into the Caltrans ROW, would reduce levels at Lot 1 to less than 65 dBA L_{dn}. However, a wall in this location may not be feasible to construct. Alternately, partial enclosure of this backyard could be used to reduce noise levels to meet the 65 dBA L_{dn} discretionary criteria. The detailed design plans of partial yard enclosures should be reviewed by an acoustical specialist prior to the issuance of building permits to ensure that exterior noise levels would be maintained at or below 65 dBA L_{dn}.

Future Interior Noise Environment

Interior noise levels within new residential units are required to be maintained at or below 45 dBA L_{dn}. Residential buildings throughout the project site would be exposed to future noise levels greater than 60 dBA L_{dn}, with higher future noise exposures occurring at upper stories facing nearest I-680, where noise sensitive sleeping areas are likely to be located. Interior noise levels would vary depending on the final design of the buildings (relative window area to wall area) and construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior to interior noise reduction assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces.

Exterior noise levels at facing I-680 would range from 60 to 68 dBA L_{dn} at ground level and 64 to 72 dBA L_{dn} at second floor exposures. In exterior noise environments ranging from 60 dBA L_{dn} to 65 dBA L_{dn}, interior noise levels can typically be maintained below City standards with the incorporation of an adequate forced air mechanical ventilation system in each residential unit. In noise environments of 65 dBA L_{dn} or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA L_{dn} with proper wall construction techniques, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

Preliminary calculations show that windows/doors with ratings of STC 28 to 30 would likely be required for homes in noise environments of up to 72 dBA L_{dn}. Noise insulation features to be included in the project's design will need to be developed once detailed floor plans and building elevations are available. The noise control treatments should be designed to reduce interior noise levels to 45 dBA L_{dn} or less. The detailed design plans of units proposed by the project should be reviewed by an acoustical specialist prior to the issuance of building permits to ensure that interior noise levels would be maintained at or below 45 dBA L_{dn}.

♦ ♦ ♦

This concludes our environmental noise assessment for the Omaha Property residential project. If you have any questions or comments regarding this analysis, please do not hesitate to call.

Sincerely yours,

Dana M. Lodico, PE, INCE Bd. Cert.
Senior Consultant
ILLINGWORTH & RODKIN, INC.
(16-092)

Figure 1: Aerial Photo Showing Site and Noise Measurement Locations

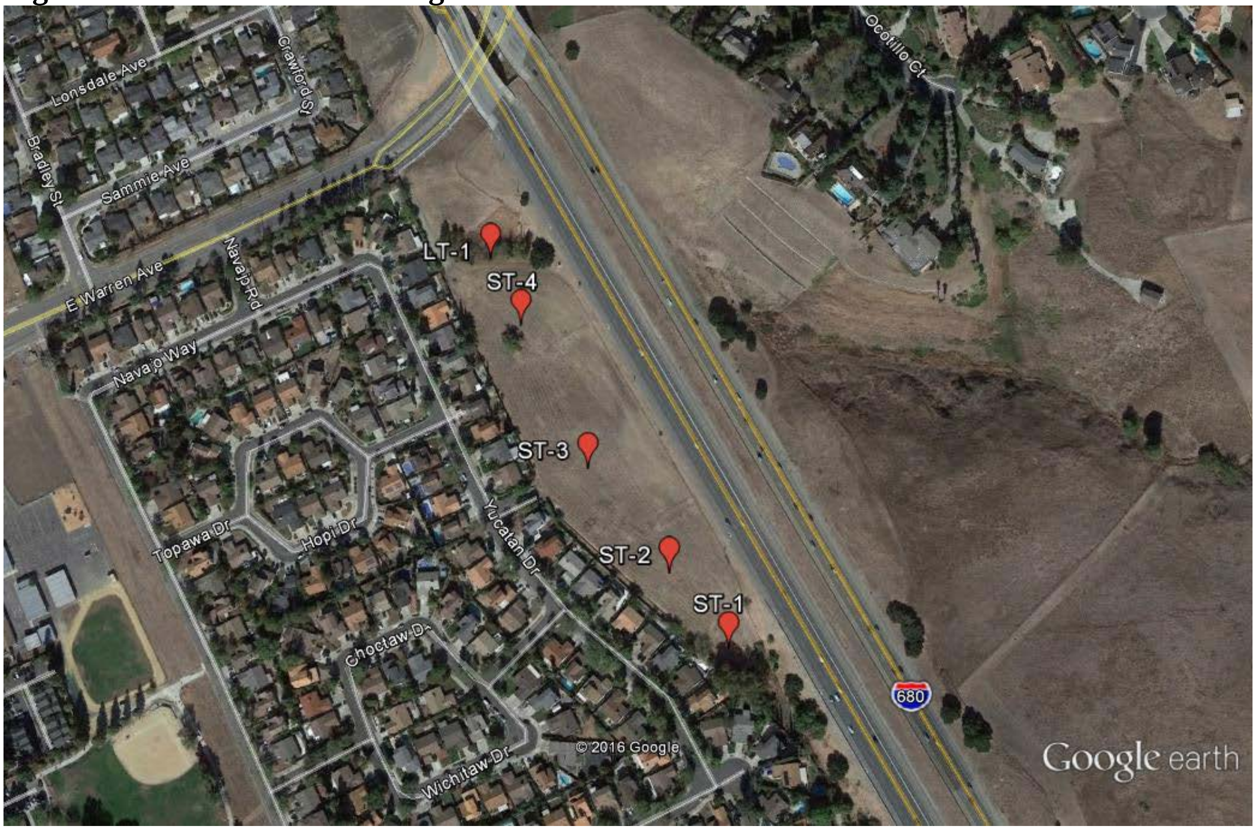


Figure 2: Preliminary Noise Barrier Location at Property Boundary (Lot 1 does not achieve 65 dBA L_{dn})

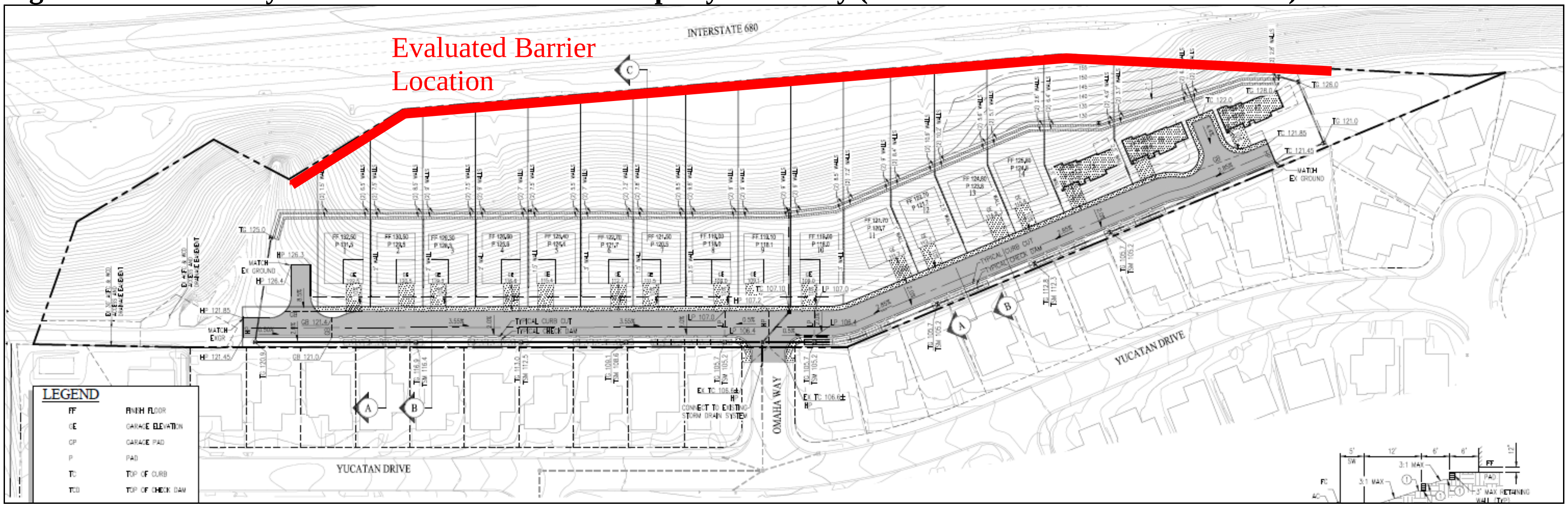
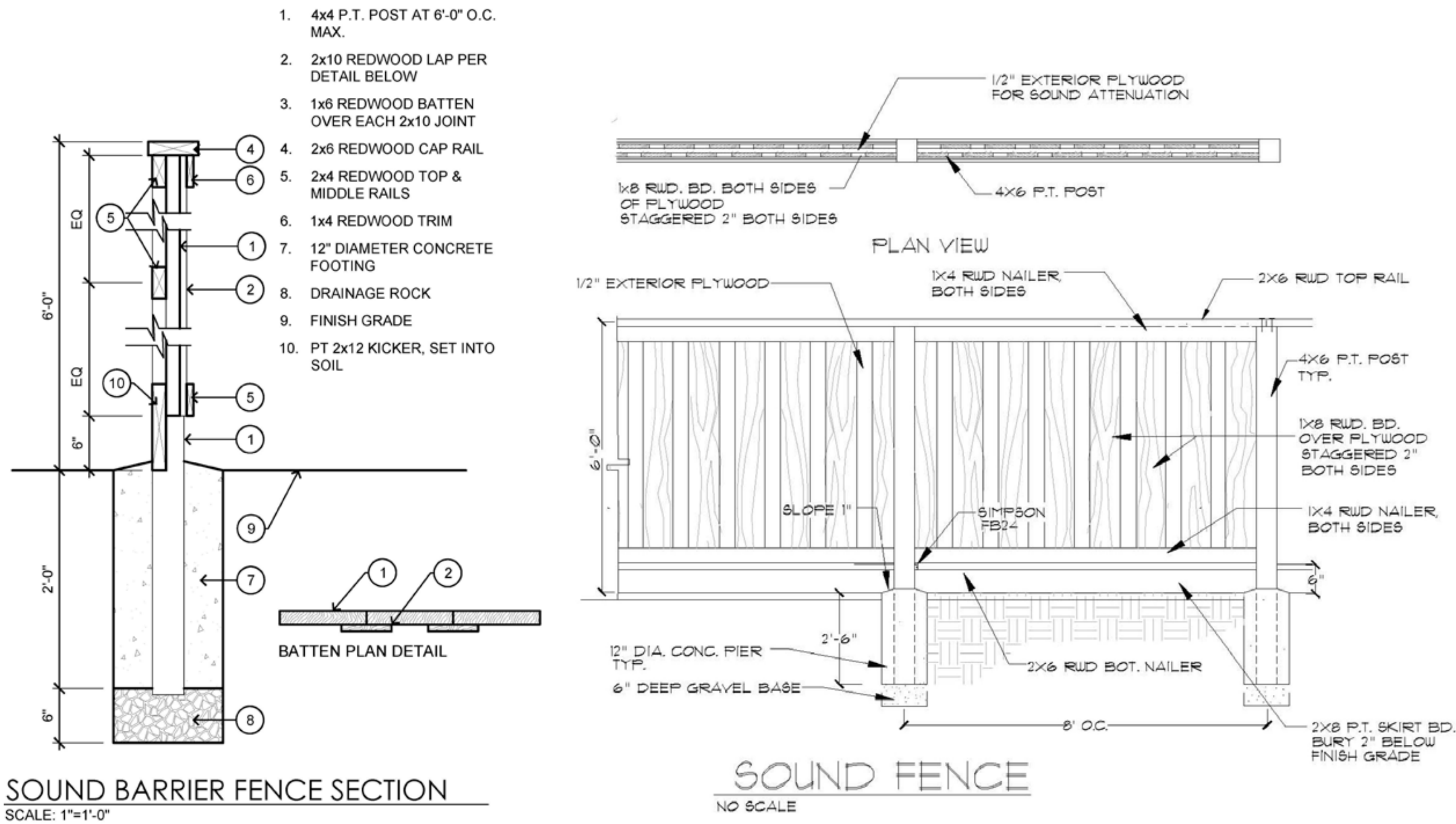


Figure 3: Example of Wood Sound Barrier



ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 E. Cotati Ave
Cotati, California 94931
Tel: 707-794-0400 *Fax: 707-794-0405*
www.Illingworthrodkin.com *illro@illingworthrodkin.com*

February 13, 2020

Hayes Shair, AIA, LEED GATITLE
Envisuality Group, Inc.
(415) 855-0384
Via Email: hayes@envisualitygroup.com

Subject: Environmental TAC Assessment for the Omaha Subdivision, Fremont, CA – 2020 Update

Dear Hayes:

Illingworth & Rodkin, Inc. conducted a screening Environmental Toxic Air Contaminant (TAC) analysis for the Omaha Subdivision project and reported results in a letter to you dated November 22, 2016. That study identified Interstate 680 as the source of TACs affecting the project site and evaluated impacts to the project site that would be caused by the freeway traffic. Since TAC and fine particulate matter (PM2.5) exposure would exceed the City's thresholds, measures to reduce TAC exposure were identified. Our understanding is that the project has not changed in that it places residences closer to the freeway.

The screening procedures and thresholds used in our 2016 analysis have not changed. Therefore, the prediction in our Nov. 22, 2016 letter are valid. We note that the building code ventilation requirements have changed since the measures to reduce TAC exposure were identified. To avoid conflicts with the ventilation designs, we recommend clarifying the "Mechanical Ventilation with Filtration" recommendations as follows:

> *Maintained ventilation systems with high-efficiency air filtration of the fresh air supply could reduce overall concentrations of DPM and $PM_{2.5}$, substantially lowering cancer risk and annual $PM_{2.5}$ concentrations.*

The U.S. EPA reports particle size removal efficiency for filters rated MERV13 of 90 percent for particles in the size range of 1 to 3 µm and less than 75 percent for particles 0.3 to 1 µm.[1,2] *The BAAQMD's Planning Healthy Places guidance indicates that MERV13 air filtration devices installed on an HVAC air intake system can remove 80-90 percent of indoor particulate matter (greater than 0.3 microns in diameter).*[3] *The following measures would minimize long-term toxic air contaminant (TAC) and fine particulate matter ($PM_{2.5}$) exposure for new residences:*

a. *Install air filtration in all residential dwellings at the site that are within 300 feet of the project site. Air filtration devices shall be rated MERV13 or higher. To ensure adequate health protection to sensitive receptors, all outside air entering the system shall be filtered and the positive pressure shall be maintained to reduce unfiltered air intrusion.*

b. *As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. Recognizing that emissions from air pollution sources are decreasing, the maintenance period shall last as long as $PM_{2.5}$ exposures or excess cancer risk above the thresholds are predicted. Subsequent studies could be conducted by an air quality expert approved by the City to identify the ongoing need for the filtered ventilation systems as future information becomes available.*

c. *For non-owner occupied units, ensure that the lease agreement and other property documents (1) require cleaning, maintenance, and monitoring of the affected units for air flow leaks; (2) include assurance that new owners and tenants are provided information on the ventilation system; and (3) include provisions that fees associated with owning or leasing a unit(s) in the building include funds for cleaning, maintenance, monitoring, and replacements of the filters, as needed.*

This concludes our review of the Omaha Subdivision TAC analysis. Please feel free to contact us if there are questions or if you require further information.

Sincerely,

James A. Reyff
Senior Consultant, Principal
Illingworth & Rodkin, Inc.

JOB #16-092

[1] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 2007. *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. ANSI/ASHRAE Addendum b to Standard 52.2-2007

[2] United States Environmental Protection Agency (U.S. EPA), 2009. *Residential Air Cleaners (Second Edition): A Summary of Available Information*. U.S. EPA 402-F-09-002. Revised August 2009.

[3] Bay Area Air Quality Management District (BAAQMD), 2016. *Planning Healthy Places A Guidebook for addressing local sources of air pollutants in community planning*. May.