

May 27, 2020

KFA, LLP

3573 Hayden Avenue
Century City, California 90232

Attention: Wade Killefer

**Subject: Carlthorp Support Space Improvements
Santa Monica, CA
Carlthorp Property Line Noise
Veneklasen Project No. 3055-046**

Dear Wade:

Veneklasen Associates (Veneklasen) has completed a noise impact assessment of the Support Space Improvements proposed for Carlthorp School located in Santa Monica, California. The purpose of this evaluation was to model potential noise impacts on adjacent residential uses as a result of activity that will occur on the proposed rooftop playground and determine if modifications are needed to reduce noise levels to City Municipal Code Noise Limits. This report sets forth the results of our findings.

History and Project Manager

Founded in 1947, Veneklasen Associates is one of the largest acoustical consulting firms in the United States. Our services encompass architectural acoustics, audio-visual (AV), information technology (IT), environmental noise and vibration mitigation. As a sole source for building sound quality and data management, our technical and professional standards have been developed through the design of literally thousands of buildings worldwide:

- Civic & Government Agencies
- Courthouses & Public Safety
- Education - College & University + K-12
- Commercial Buildings & Corporate Interiors
- Transportation, including Airports & Rail
- Museums & Cultural Centers
- Hotels, Resorts & Casinos
- Studios & Entertainment Facilities
- Condominiums & Apartments
- Concert Halls & Performing Arts Complexes
- Medical Centers & Hospitals
- Places of Worship

Our staff is carefully balanced, consisting of professionals with degrees in acoustics, physics, engineering, and architecture. With approximately 60 employees we are large enough to have a wealth of expertise to be shared, and small enough to ensure that each project is directed by a principal or senior associate. We are unique in that we own and maintain a comprehensive complement of scientific measurement and analysis tools including sound level meters, noise monitors, logging devices, field computers, vibration measurement equipment and data analytic software. Finally, Veneklasen Associates is a State of California (DGS) Certified Small Business and a qualified SBE within GSA guidelines.

John LoVerde is known throughout the country for his work as an acoustical consultant as well as his leadership in testing, research, and reporting methodology, particularly in the fields of building and environmental acoustics. John has lent his expertise to the design of educational buildings, multifamily residential developments, performance venues, hotels and resorts, office campuses and hospitals. He has served as Project Manager for many notable projects and is often called upon to provide expert testimony. On average, John manages the design and construction of approximately 200 projects per year.

After obtaining a Bachelor of Science degree in Mechanical Engineering from California State Polytechnic University, Pomona (1989), John went on to earn a Master's Degree in Acoustics from the University of California, Los Angeles. At UCLA he worked on the link between acoustical energy and listener reaction to sound within auditoria. Since his consultant career began at Veneklasen Associates in 1989, John has published over 100 technical papers. He teaches and lectures internationally, presenting at the last fourteen meetings of the Acoustical Society of America (ASA). In November

2009 he was appointed to ASA's Technical Committee on Architectural Acoustics, and in 2013 John was further recognized in the field as a full Member of the ASA. In June of 2018, John became a Fellow of the Acoustical Society of America with citing the following: "For contribution to quantification and understanding of building response to sound and impact."

1.0 INTRODUCTION

This study was conducted to assess the potential acoustical impact of the support space changes proposed to the Carlthorp campus, a private non-profit K-6 school that has been operating in this multifamily neighborhood since 1941. Veneklasen's scope of work included (A) measuring the exterior noise levels currently occurring at the site, (B) calculating future conditions assuming the proposed outdoor improvements and (C) developing method(s), if any, required to reduce the future exterior sound levels to comport with the applicable Municipal Code requirements for residential districts of the City of Santa Monica.

The Support Space Improvements proposed for Carlthorp campus include the following: relocating the playset and court areas of the current outdoor playground to a new roof above classrooms at the rear of the property, expanding the ground level Playturf area, enclosing the plastic blue-tented unenclosed lunch area (while constructing new administrative offices above), and expanding the subterranean multi-purpose room under a portion of the Playturf along San Vicente Boulevard. Of these, the play court area on the roof has the potential to disturb adjacent residential neighbors due to noise from outdoor exercises, school events and playtime by the supervised elementary students (Grades K-6) who will be using it from 8 am to 5:30 pm, Monday through Friday.

Figure 1: Campus Views Current (left) and Future (right)



The school campus is surrounded by residential buildings to the east (3-story condominium), west (2-story apartment building), and south (single family homes along the north side of Georgina Avenue across the 20'-wide alley (Georgina Place) behind the school). The city considers residential uses as noise sensitive receptors. The campus fronts on the 130' wide San Vicente Boulevard and center median to the north.

2.0 NOISE THRESHOLDS OF SIGNIFICANCE

Santa Monica Municipal Code section 4.12.060 states that the allowable noise level in Noise Zone I is 60 dBA for a 15-minute period during the hours of 7 AM to 10 PM Monday through Friday, unless the ambient noise conditions are higher. There is a 5-dBA penalty for noises consisting of speech or music, which would apply here to the elementary play court. For a maximum event, or instantaneous noise, the noise limit increases by 20 dBA above the specified threshold.

Therefore, the noise limit for playground noise impacting residential neighbors is 55 dBA for continuous noise and 75 dBA for instantaneous sounds. For this playground, the sound generated is expected to be a combination of verbal communication and balls bouncing off of surfaces. The school also has an outdoor speaker system. Two speakers face one another in the school's interior courtyard; those speakers are used for a brief morning greeting from the school administrator on school days before classes begin. The remainder of the exterior speakers will be used only in the event of emergencies and are not relevant to this study.

3.0 ACOUSTIC MEASUREMENTS

Veneklasen measured existing outdoor playground conditions, the ambient conditions, and the PA system.

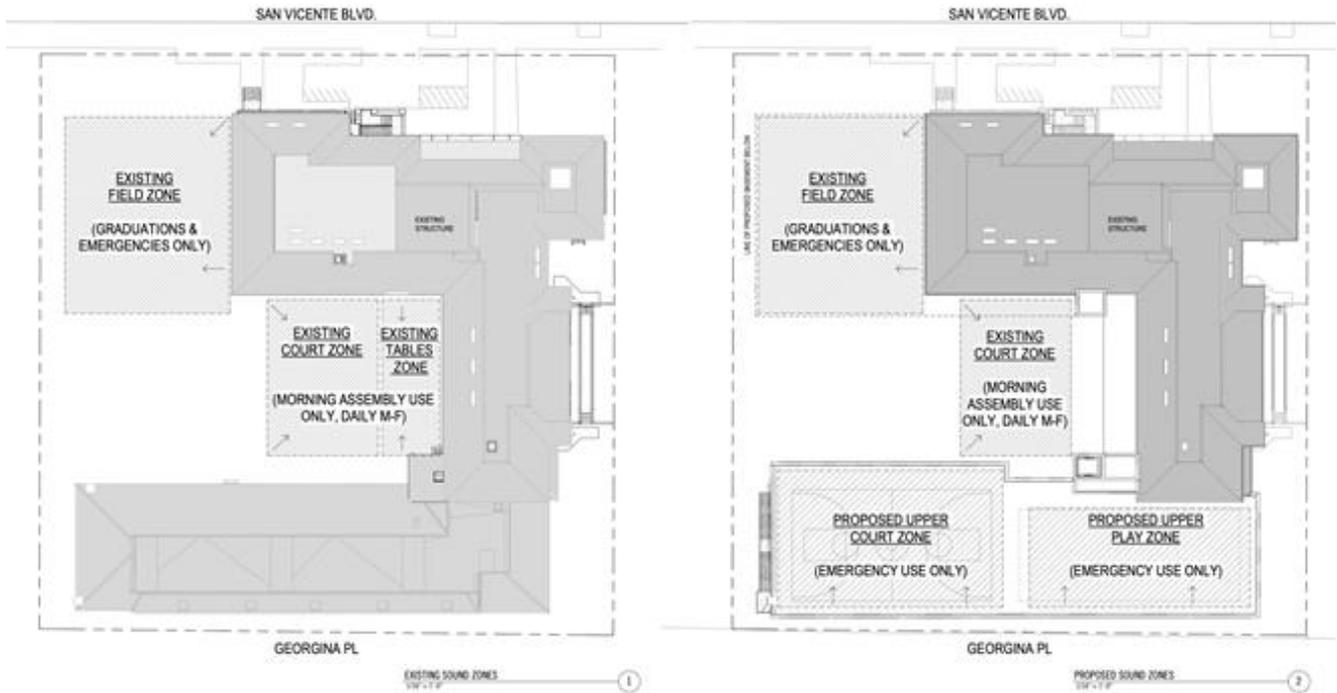
On November 6, 2019, Veneklasen measured existing playground conditions at the outdoor play areas for a continuous period of 40 minutes, which included lunch hour with outdoor playtime, encompassing two playgroups, 5th and 3rd grades followed by 6th and 4th grades. The continuous 15-minute average for the entire playground was 76 dBA, with loudest events of 90-94 dBA measured directly with no barriers or other attenuation measures.

The noise level on the turf playfield is lower due to the open environment, foliage, and soft artificial turf groundcover, on average 72 dBA and 86-90 dBA events. Any acoustical difference in the surface, between a prior natural grass field and the current artificial turf would be negligible and generally not acoustically detectable. A minimum detectable change for exterior noise is 3 dBA and the difference between these two surfaces would be less than 3 dBA.

On November 1, 2019, Veneklasen measured the ambient conditions in the alley behind the school, which represents the closest property lines to the roof-playground area, was 44 dBA for a 15-minute period during lunchtime. Traffic noise in the alley/Georgina Place is limited, as it only serves parking spaces on the backside of the school and single and multi-family residential buildings. Since the ambient sound measured is currently below the exterior noise level allowed for residential districts of 60 dBA; the reduced 55 dBA threshold for school-related activities remains the criteria per the City Municipal Code.

On May 4, 2020, Veneklasen measured the PA system on the grounds of the school, using a news podcast broadcast over the system. The current system consists of three sets of two small wall-mounted loudspeakers. One set faces west over the current playground and is rarely used (Existing Field Zone), one set is on either side of the current lunch area and will be removed with the enclosure of the lunchroom (Existing Tables Zone), and the third set is on either side of the current basketball court (Existing Court Zone); the latter two are used for morning announcements only, with all in attendance on the court. Figure 2 displays these sound zones. Each set can be activated independently. All three were active during testing.

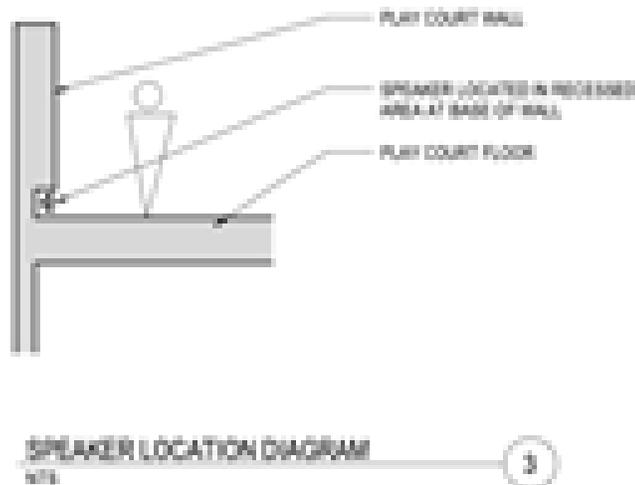
Figure 2: Sound Zones



The Tables and Court Zones ranged from 50 – 70 dBA on the court during the podcast, depending on the newscaster inflections and distance from the loudspeaker; the levels were communicated to be at a typical volume. The average noise level was 60 dBA and the loudest events were 72 dBA measured directly with no barriers or other attenuation measures.

At the time of the morning announcements, the students are not at play, so the sound level is not elevated above 55 dBA and 75 dBA, which is within the limits of the Municipal Code.

Figure 3: Rooftop Playground Speakers



4.0 ENCLOSURE AND SURFACE ANALYSIS

Upper Area

The proposed rooftop play court area will have a continuous 8 foot high perimeter enclosure for safety. When a plexiglass panel is modeled, not an open fence, it will act as a barrier for noise in addition to its safety function. Based on computer modelling, this barrier, combined with distance from the play court to the nearest residential uses, will provide suitable noise reduction to the nearby receivers including noise from the surface. Our analysis indicates absorptive panels are not required to ensure that the noise limits established by the Municipal Code for residential zones are not exceeded.

Our quantitative analysis is depicted below in Figure 4 along with the proposed plexiglass detail show in Figure 5. Sound level prediction detail is presented in Table 1: calibrated for distance from noise source and difference in elevation. Elevations match the elevations on the drawings provided by KFA Architects as closely as possible.

Figure 4: Analysis Process

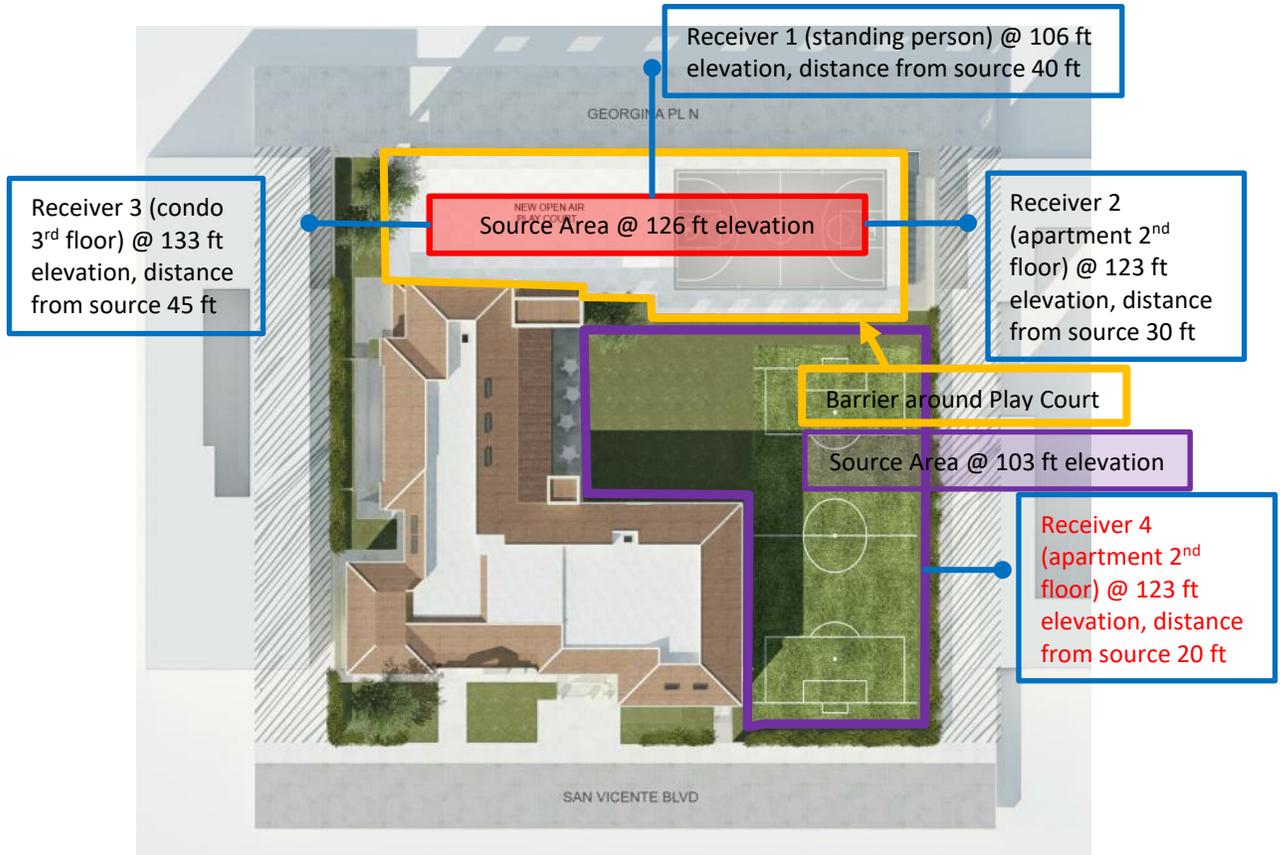


Figure 5: Proposed Plexiglass Detail

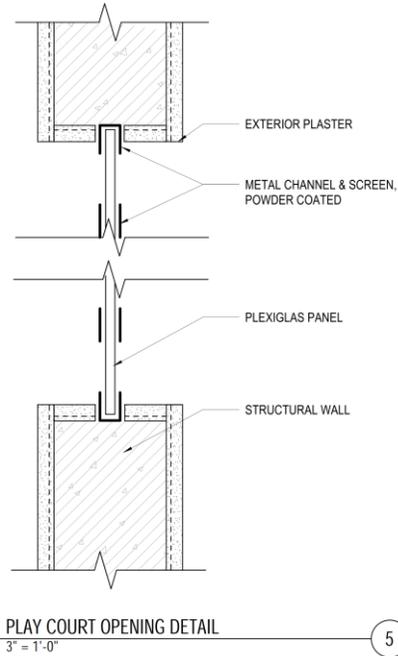


Table 1: Upper Enclosure Analysis (Typical Activity)

Receiver	Barrier Height/Elevation	Calculated Level, dBA	Code Limit, dBA	Compliance?
1	8 ft / 132 ft	34 avg / 51 max	55 avg / 75 max	Yes / Yes
2		40 avg / 57 max		Yes / Yes
3		44 avg / 61 max		Yes / Yes

With the barrier as shown and including 2 layers of plexiglass, all calculated average and maximum noise levels from activities on the proposed rooftop play court would be well within the noise limits of the Municipal Code under typical activity.

Field Area

For the field, the surrounding conditions remain. In 2000, the surface of the playfield was changed from natural grass to artificial turf, which does not produce a calculable noise effect at the property line. Therefore, the field conditions did not alter the noise at the property line. The calculation to the property line is shown in Table 2.

Table 2: Field Analysis

Receiver	Calculated Level, dBA	Code Limit, dBA	Compliance?
4 (typical activity)	54 avg / 71 max	55 avg / 75 max	Yes / Yes

5.0 RECOMMENDATIONS

Based on our analysis, a minimum solid parapet barrier as shown in Figure 4 of 8 feet around the perimeter of the rooftop play court area is recommended; Veneklasen understands that such a parapet wall is currently planned. The parapet wall can be any solid material 2 pounds per square foot (such as stucco or wood). The proposed detail shown in Figure 5 for intermittent transparency is acoustically acceptable as long as there are 2 layers of plexiglass installed; any openings for water drainage are recommended to flow interior to the campus. The plexiglass panel will be approved in the submittal process.

Based on our analysis, absorptive panels such as <https://kineticsnoise.com/knp/perforated-metal-panels.html> could be incorporated into the design of the play court walls, but are not required to remain below the noise limits established by the Municipal Code for residential districts such as this location.

6.0 CONCLUSIONS

Veneklasen analyzed the potential noise impact of the proposed play areas on adjacent sensitive receptors. Analysis included noise from children's activity and use of loudspeaker (PA) system. The Santa Monica Noise Ordinance was used to assess impact and calculate compliance. Veneklasen measured the existing ambient noise level, the sound level with the presence of children playing outdoors during typical recess and PA system use. This recess activity and PA system use constitutes comparable conditions to the proposed play areas, except that the rooftop location is elevated which establishes greater distance from most of the sensitive receptors. This collected data was then used to construct a computer model assessing the noise level of the proposed play areas at the sensitive receptors on the east, west and south. The field areas comply with the Code requirements, while the rooftop play court should be compliant if surrounded with the 8 foot high barrier of intermittent transparent plexiglass panel having two layers with detailing shown in Figure 5.

Based on study, with such a perimeter wall, the noise levels predicted for the rooftop play court area will not exceed the noise limits of Santa Monica Noise Ordinance at all sensitive receptor residential locations. In Veneklasen's professional opinion the incorporation of a described barrier that is 8 feet tall will ensure full compliance with the residential limits imposed by the Santa Monica Noise Ordinance.

Please feel free to contact us with any follow up questions or comments.

Respectfully submitted,



John LoVerde, FASA
Principal