LAWRENCE STATION ROAD PRESCHOOL CENTER NOISE ASSESSMENT

Sunnyvale, California

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Prepared for:

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INTRODUCTION

Tulip Kids, Inc. plans to open a Preschool Center serving children aged two to five years on the lower floor of an existing mixed-use building located at 1271 Lawrence Station Road in Sunnyvale, California. The Childcare Center would operate from 8:00 am to 6:00 pm with a capacity of 85 children and 11 teachers and supporting staff members. The existing outdoor area would be used for outdoor play for a period of about 30 minutes in the morning and 30 minutes in the afternoon with a maximum of about 43 children attending each outdoor session. This report summarizes the assessment of potential noise impacts resulting from the proposed childcare center. Potential environmental noise impacts upon adjacent noise sensitive uses are also assessed.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency Section discusses noise and land use compatibility utilizing policies in the City's General Plan; and 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

SETTING

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.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical residential structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older residential structure and 25 dBA for a newer dwelling. A typical commercial structure provides about 30 dBA of noise reduction with the windows in the closed position. Sleep and speech interference is therefore possible in residential structures when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to

have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a L_{dn} of 60 to 70 dBA. Between a L_{dn} of 70 to 80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

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 Criteria

The proposed project would be subject to noise-related regulations, plans, and policies established within documents prepared by the State of California and the City of Sunnyvale. These planning documents are implemented during the environmental review process to limit noise exposure at existing and proposed noise sensitive land uses.

Applicable planning documents include: (1) the California Environmental Quality Act (CEQA) Guidelines, Appendix G, (2) the Santa Clara County Airport Land Use Commission Plan, (3) the City of Sunnyvale General Plan, and (4) the City of Sunnyvale Municipal Code. Regulations, plans, and policies presented within these documents form the basis of the significance criteria used to assess project impacts.

State CEQA Guidelines. The CEQA includes qualitative guidelines for determining the significance of environmental noise impacts. A project will typically have a significant impact if it would:

(a) Expose people to or generate noise levels in excess of established in the local general plan, noise ordinance, or applicable standards of other agencies.

(b) Expose people to or generate excessive groundborne vibration or groundborne noise levels.

(c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

(d) Result in a substantial temporary or periodic increase in the ambient noise levels in the project vicinity above levels existing without the project.

(e) Where projects within an area covered by an airport land use plan or within two miles of a public airport or public use airport when such an airport land use plan has not been adopted, or within the vicinity of a private airstrip, expose people residing or working in the project area to excessive aircraft noise levels.

(f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

With regard to the impact assessment of the proposed project, Guidelines (b) and (d) would be applied to temporary noise or vibration resulting from construction. The existing building will only require interior tenant improvements to accommodate the school program. No expansion of the existing building footprint is needed. Improvements to the outdoor play area, such as the placement of playground equipment and any extension of the existing 10-foot tall sound wall, would occur over a period of a few weeks. The use of heavy construction equipment and substantial noise or excessive groundborne vibration due to project construction is not anticipated. Therefore, Guidelines (b) and (d) are not applicable in the assessment. Guideline (f) is not applicable because the project is not located in the vicinity of a private airstrip and would not expose persons in the

project area to excessive airport-related noise. CEQA checklist items (b), (d), and (f) are not carried forward for further analysis.

Pursuant to recent court decisions, the purpose of this EIR Section is to identify the significant effects of the Project on the environment, not the significant effects of the environment on the Project. As a result, the impacts of site constraints such as exposure of the proposed project to excessive levels of noise and vibration are not included in the Impacts and Mitigation Section of this report. As a result, items (a) and (e) are discussed in a separate section addressing Noise and Land Use Compatibility for consistency with the policies set forth in the City's General Plan. Checklist item (c) is described in the Impacts and Mitigation Section of the report.

Santa Clara County Airport Land Use Commission. The Santa Clara County Airport Land Use Commission (ALUC) prepares an ALUC plan that provides for orderly growth of the area surrounding each public airport in Santa Clara County (Moffett Federal Airfield, San Jose International Airport, Palo Alto Airport, Reid-Hillview Airport, and South County Airport). The plan is intended to minimize the public's exposure to excessive noise and safety hazards The ALUC has established provisions for regulating land use, building height, safety, and noise insulation within these areas that are adjacent to each of the airports ("referral boundaries").

The ALUC also reviews the general and specific plans prepared by local agencies (including Sunnyvale) for consistency with the ALUC plan. Recommendations made by the ALUC are advisory in nature to the local jurisdictions, not mandatory.

City of Sunnyvale Safety and Noise Element of the General Plan. The Safety and Noise Element of the Sunnyvale General Plan identifies noise and land use compatibility standards for various land uses. The Safety and Noise Element establishes goals, policies, and standards for evaluating the compatibility of proposed land uses with the noise environment. Relevant goals and policies of the element are as follows:

GOAL SN-8 – Maintain or achieve a compatible noise environment for all land uses in the community.

Policy SN-8.4:	Prevent significant noise impacts from new development by applying state noise guidelines and Sunnyvale Municipal Code noise regulations in the evaluation of land use issues and proposals.
Policy SN-8.5:	Comply with "State of California Noise Guidelines for Land Use Planning" (Figure 6-5 of the Safety-Noise Element) for the compatibility of land uses with their noise environments, except where the City determines that there are prevailing circumstances of a unique or special nature.
Policy SN-8.6:	Use Figure 6-6 (of the Safety-Noise Element), "Significant Noise Impacts from New Development on Existing Land Use" to

determine if proposed development results in a "significant noise impact" on existing development.

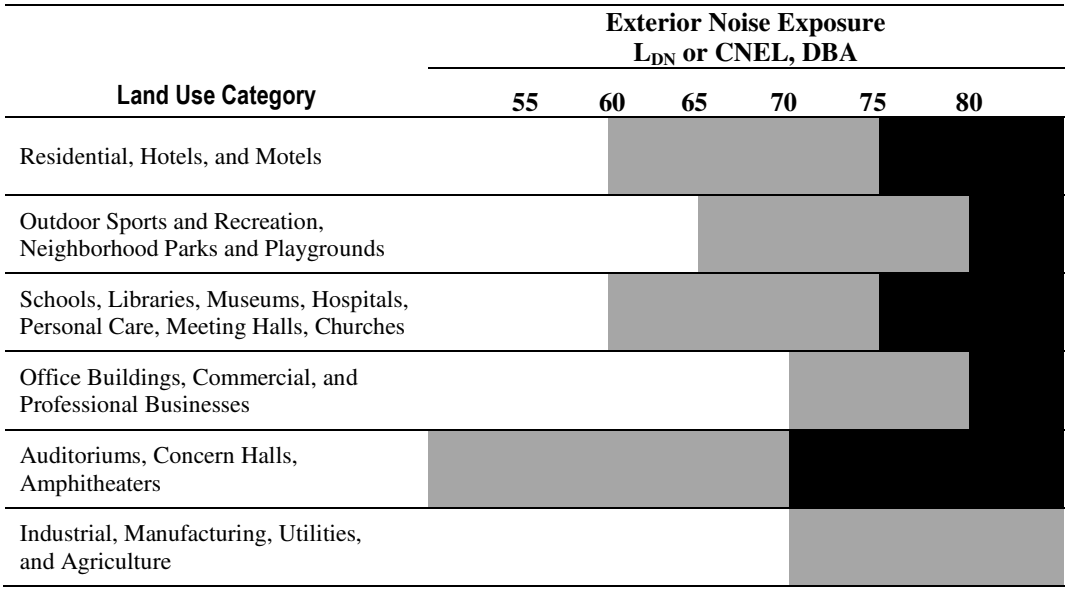
Policy SN-8.9: Consider techniques that block the path of noise and insulate people from noise.

GOAL SN-9 – Maintain or achieve acceptable limits for the levels of noise generated by land use operations and single-events.

Policy SN-9.1: Regulate land use operation noise.

Policy SN-9.3: Apply conditions to discretionary land use permits which limit hours of operation, hours of delivery, and other factors which affect noise.

TABLE 3 Land Use Compatibility Guidelines for Community Noise in Sunnyvale



Normally Acceptable
Specified land use is satisfactory, based on the assumption that any key buildings involved are of normal conventional construction, without any special insulation requirements.

Conditionally Acceptable
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design.

Unacceptable
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

City of Sunnyvale Municipal Code. Operational noise standards enforced on residentially zoned property lines are presented in Title 19 on the Municipal Code. Chapter 19.42.030, states the following:

(a) Operational noise shall not exceed seventy-five dBA at any point on the property line of the premises upon which the noise or sound is generated or produced; provided, however, that the noise or sound level shall not exceed fifty dBA during nighttime or sixty dBA during daytime hours at any point on adjacent residentially zoned property. If the noise occurs during nighttime hours and the enforcing officer has determined that the noise involves a steady, audible tone such as a whine, screech or hum, or is a staccato or intermittent noise (e.g., hammering) or includes music or speech, the allowable noise or sound level shall not exceed forty-five dBA.

(b) Powered equipment used on a temporary, occasional, or infrequent basis which produces a noise greater than the applicable operational noise limit set forth in subsection (a) shall be used only during daytime hours when used adjacent to a property with a residential zoning district. Powered equipment used on other than a temporary, occasional or infrequent basis shall comply with the operational noise requirements. For the purpose of this section, powered equipment does not include leaf blowers. Construction activity regulated by Title 16 of this code shall not be governed by this section.

(c) It is unlawful for any person to make or allow to be made a nighttime delivery to a commercial or industrial establishment when the loading/unloading area of the establishment is adjacent to a property in a residential zoning district. Businesses legally operating at a specific location as of February 1, 1995, are exempt from this requirement.

(d) A "leaf blower" is a small, combustion engine-powered device used for property or landscape maintenance that can be hand-held or carried on the operator's back and which operates by propelling air under pressure through a cylindrical tube. It is unlawful for any person to operate a leaf blower on private property in or adjacent to a residential area except between the hours of 8:00 am and 8:00 pm. Effective January 1, 2000, all leaf blowers operated in or adjacent to a residential area shall operate at or below a noise level of sixty-five dBA at a distance of fifty feet, as determined by a test conducted by the American National Standards Institute or an equivalent. The dBA rating shall be prominently displayed on the leaf blower. (Ord. 2623-99 § 1 (part): prior zoning code § 19.24.020(b)--(d)).

The City's Code does not define the acoustical time descriptor such as L_{eq} (the average noise level) or L_{max} (the maximum instantaneous noise level) that is associated with the above limits. A reasonable interpretation of the City Code would identify the ambient base noise level criteria as an average or median noise level (L_{eq}/L_{50}).

Existing Noise Environment

The project would open a Preschool Center serving children aged two to five years on the lower floor of an existing mixed-use building located at 1271 Lawrence Station Road in Sunnyvale,

California. The project site fronts Lawrence Expressway, just north of Elko Drive. A noise monitoring survey was conducted on Wednesday, February 17, 2016 to document ambient noise levels at the project site and at a nearby operational Tulips Kids Preschool facility. The noise survey at the site included three simultaneous short-term (20-minute) noise measurement locations as depicted in Figure 1. The results of the noise monitoring survey conducted at Tulip Kids Academy, located at 1159 Willow Avenue in Sunnyvale, are described in Impact 2.

The primary noise source in the project vicinity was vehicle traffic along Lawrence Expressway. Noise measurements ST-1a and ST-1b were located in the existing outdoor use area at heights of 5 and 17 feet above the ground, respectfully. These heights were representative of ground level receptors and receptors utilizing existing second floor residential patios. Location ST-2 was located inside of the facility, which is currently unfinished with a dirt floor and exposed walls. The short-term measurement results are shown in Table 4.

FIGURE 1 Noise Measurement Locations

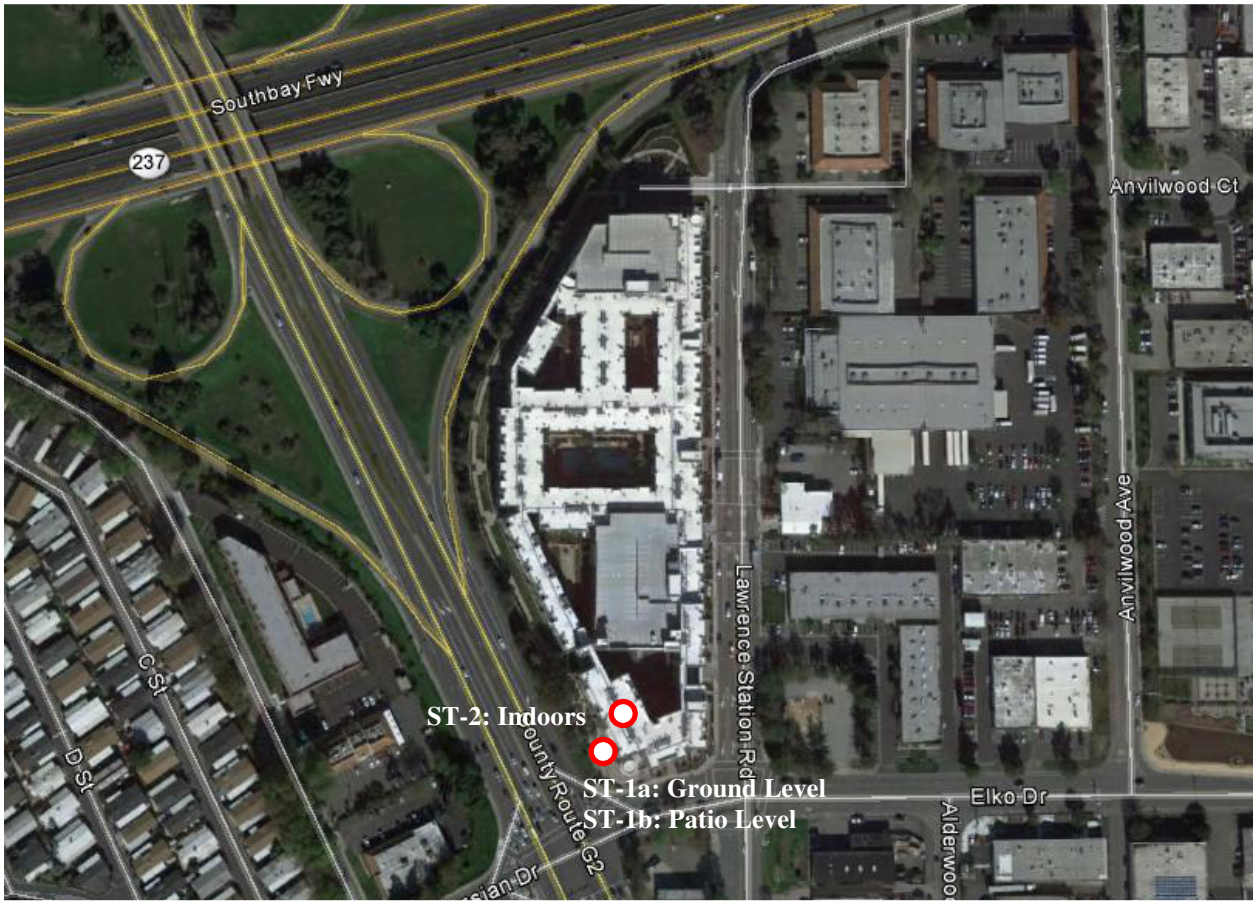


TABLE 4 Summary of Short-Term Noise Measurement Data

Location	Time	Measured Daytime Noise Levels, dBA				
		L_1	L_{10}	L_{50}	L_{90}	L_{eq}
ST-1a: Center of Outdoor Use Area	12:10 pm	77	75	69	65	71
	12:20 pm	80	75	70	64	72

ST-1b: Second Floor Patio Exposure	12:10 pm	78	75	70	65	72
	12:20 pm	81	75	70	65	72
ST-2: Inside Existing Unfinished Building	12:10 pm	61	55	51	46	52
	12:20 pm	60	57	51	47	53

GENERAL PLAN CONSISTENCY ANALYSIS –
COMPATIBILITY OF PROJECT WITH THE NOISE ENVIRONMENT

Noise and Land Use Compatibility

The City of Sunnyvale General Plan sets forth policies to control noise within the community. The City of Sunnyvale considers schools and churches to be "normally acceptable" in exterior noise environments of up to 60 dBA L_{dn} and "conditionally acceptable" in exterior noise environments of up to 75 dBA L_{dn}. The City of Sunnyvale considers neighborhood parks and playgrounds to be "normally acceptable" in exterior noise environments of up to 65 dBA L_{dn}.

Tulip Kids, Inc. plans to open a Preschool Center serving children aged two to five years on the lower floor of an existing mixed-use building located at 1271 Lawrence Station Road in Sunnyvale, California. The existing enclosed outdoor area, fronting Lawrence Expressway, would be used for outdoor play for a period of about 30 minutes in the morning and 30 minutes in the afternoon. All other Center activities would be located inside.

Future Exterior Noise Environment

As described in the Setting Section, the existing daytime noise level in the outdoor play area was measured to be about 72 dBA L_{eq}. Noise monitoring and modeling conducted for the project site previously,[1,2] specified the day-night average noise levels in the play area as 72 dBA L_{dn}. This exterior noise level would be considered "conditionally acceptable" for school uses. As a result, the specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design.

Based on the results of noise modeling conducted for the project site,[2] an extension of the existing 10-foot tall sound wall located along Lawrence Expressway would reduce noise levels in the outdoor play area by 12 dBA, resulting in an exterior noise exposure of 60 dBA L_{dn} with daytime average noise levels of about 60 dBA L_{eq}. Given that the extension of this wall would reduce the view of the retail uses from Lawrence Expressway and would be mitigating noise levels in an area that would only receive about 1 hour of use per weekday, the extension may not be desirable. If desired, use of a transparent wall material would reduce noise levels in the outdoor use area without sacrificing visibility.

Future Interior Noise Environment

Based on the noise monitoring survey, the existing unfinished structure provides about 19 dBA of noise reduction from the exterior to the interior. The building is mechanically ventilated and

[1] Lawrence Station Project, Environmental Noise Assessment, Illingworth & Rodkin, Inc., May 16, 2007.
[2] Lawrence Station Project, Traffic Noise Modeling Results at Perimeter Common Use Areas, Illingworth & Rodkin, Inc., March 26, 2008.

windows and doors can remain closed to control noise levels indoors. With the development of the project, the interior space would be finished with insulation, drywall, and flooring, resulting in an interior to exterior noise reduction similar to typical office structure construction. A typical commercial structure provides about 30 dBA of noise reduction with the windows in the closed position. With exterior noise levels at the building facades of 72 dBA L_{dn} or less, interior noise levels would be 42 dBA L_{dn} or less with the windows and doors closed. Interior noise levels would be compatible with the proposed use as day-night average noise levels would be less than 45 dBA L_{dn} and hourly average noise levels would be 42 dBA L_{eq} or less. With an extension of the existing 10-foot tall sound wall to shield the play area, interior noise levels would be about 12 dBA lower, resulting in an interior noise exposure of about 30 dBA L_{dn} with daytime average noise levels of about 30 dBA L_{eq}. Assuming standard commercial construction methods with windows closed, interior noise levels would be considered compatible with the land use with or without the extension of the wall.

Aircraft Noise

The Santa Clara County ALUC has jurisdiction over new land uses in the vicinity of airports. Schools are considered "generally acceptable" in noise environments of 60 dBA CNEL or less. Mineta San Jose International Airport is about 3.5 miles southeast, which places the project site well outside the airport's 65 CNEL noise contour. Moffett Federal Airfield is located about 2.5 miles west of the project site. The project site is located outside the 60 dBA CNEL noise contour established for Moffett Federal Airfield (Figure 5 from the ALUC Plan). Exterior and interior noise levels resulting from aircraft would be compatible with the proposed project.

Recommended Conditions of Approval

For consistency with the General Plan, the following Condition of Approval is suggested for consideration by the City:

- An extension of the existing 10-foot tall sound barrier along the playground enclosure, as indicated in Figure 2, would reduce exterior noise levels in the outdoor play areas to acceptable levels. To be effective, the sound barrier 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, masonry block, concrete, or metal). Use of a transparent wall would reduce noise levels in the outdoor use area without sacrificing visibility of the retail areas from Lawrence Expressway.

FIGURE 2 Noise Barrier Extension Location

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

Development of the project would present a significant impact if the projects would:

- Create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Impact 1: **Project Operational Noise.** Operational noise levels attributable to the project would not exceed the City's Municipal Code noise limit or result in a substantial permanent noise increase at the nearest noise sensitive land uses. **This is a less-than-significant impact.**

The proposed Preschool Center would be located on the lower floor of an existing mixed-use building. The Center would operate from 8:00 am to 6:00 pm with a capacity of 85 children and 11 teachers and supporting staff members. The existing enclosed outdoor area would be used for outdoor play for a period of about 30 minutes in the morning and 30 minutes in the afternoon with a maximum of 43 children attending each outdoor session. The existing parking lot would be used for parent parking during drop off and pick-ups.

Residential units are located directly above the proposed space within the mixed use building. These residences have patios fronting Lawrence Expressway and directly above the proposed outdoor play area. The patios are exposed to midday exterior noise levels of about 72 dBA L_{eq}, generated by traffic along Lawrence Expressway (see Setting Section). A significant noise impact would occur if project operations would exceed ambient hourly average noise levels (L_{eq}) during daytime hours or cause the day-night average noise levels at these residences to increase by 3 dBA L_{dn} or more.

The primary noise source associated with preschool and childcare operations is anticipated to be children playing in the outdoor play area. Low speed vehicle operations associated with parking and student drop-offs before school and pick-ups after school are not anticipated to be noticeable above existing ambient traffic noise levels at the site. Existing roof-top mechanical systems would not change with the project, and therefore, the noise attributable to these systems would be expected to remain the same as existing conditions.

A noise monitoring survey was performed by Illingworth & Rodkin, Inc. on Wednesday, February 17, 2016 at Tulip Kids Academy, located at 1159 Willow Avenue in Sunnyvale. Tulip Kids Academy is considered similar to the proposed facility. Noise levels were measured between 10:20 am and 11:20 am during use of the outdoor play area. The measurement position was located about 25 feet from edge of the play area. Attendance at the outdoor play area ranged from about 20 to about 40 children. The noise associated with the use of the outdoor play area was characterized by children yelling and playing and the sounds of various roller type toys moving around the hardscape area. Ambient noise from local traffic on Willow Road and an adjacent Automotive Shop also contributed to the noise environment at the site. Average and maximum noise levels measured at this located are shown in Table 5. 10-minute average noise

levels were in the range of 66 to 68 dBA. Occasionally, maximum noise levels reached 75 dBA L_{max}.

TABLE 5 Measured Noise Levels at 25 feet from Edge of Outdoor Play Area

Activity	Average L_{eq}, dBA	Typical Maximum, L_{max} (dBA)
Children Playing	66 to 68 dBA	71 to 75 dBA

Source: Illingworth & Rodkin, Inc.

The ear height of a person utilizing a second story patio above the outdoor play area is approximately 17 feet above the ground. Most of the noise sources associated with aged two to five children playing and pushing of roller toys would be at source heights of 0 to 3 feet above the ground. Occasionally, yelling from the top of the toddler slide would occur at a height of around 5 feet above the ground. Taking these distances into account as well as the propagation of the play area noise directly through the air (as opposed to over a hardscape area), noise levels would be anticipated to be about 3 dBA higher than those shown in Table 5, resulting in average noise levels in the range of 69 to 71 dBA L_{eq}. These noise levels would be different in character, but similar in level to existing ambient noise levels generated at these patios by traffic along Lawrence Expressway. With the play area in use approximately 1-hour per day, the L_{dn} is calculated to increase by less than 1 dBA. Increases of less than 1 dBA are not considered measureable under typical environmental conditions and would not be considered substantial.

Slow moving vehicles entering, exiting, and parking in the existing parking lot would be similar in character, but considerably lower in level, to noise levels resulting from existing traffic along Lawrence Expressway. Such noise levels would also be similar to the noise levels generated by parking for existing uses at the project site, such as the existing residences. Vehicular traffic associated with the school would be concentrated during the drop-off and pick-up hours, with an estimated total of 65 trips between the hours of 7:00 am to 9:00 am and again between the hours of 4:00 pm to 6:00 pm. The project is not expected to cause a noticeable or substantial increase in noise during other hours of the day. On a 24-hour average basis, the L_{dn} is calculated to increase by less than 1 dBA, which would not be considered substantial. Given the existing volume of traffic and associated noise levels along Lawrence Expressway, the incremental increase in noise resulting from the noise of project's vehicular traffic would also be insignificant.

This is a less-than-significant impact.

Mitigation Measures: None Required