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August 31, 2017

Peter Navarra
3220 Northrop Avenue
Sacramento, CA 95864

Subject: The Habit Burger Restaurant Project Noise Assessment

Dear Mr. Navarra:

HELIX Environmental Planning, Inc. (HELIX) has performed a noise assessment for the operational impacts of the proposed The Habit Burger Restaurant Project (project). This letter summarizes modeling to assess the noise impacts associated with traffic generation; heating, cooling, and air conditioning (HVAC); and operation of the drive-through speaker system planned for the exterior of the project's The Habit Burger Grill component.

PROJECT DESCRIPTION AND ENVIRONMENTAL SETTING

The project is located on a 0.75-acre site in the community of El Dorado Hills in unincorporated El Dorado County (County). The site is bounded by El Dorado Hills Boulevard to the east and Saratoga Way to the west. The project involves the expansion of an existing retail center to include two restaurants and a retail building totaling 10,400 square feet (SF). The northern building would support a 2,800 SF The Habit Burger Grill restaurant with two outdoor patio areas. The Habit Burger Grill restaurant would have an associated drive-through lane with an exterior speaker setup for the taking of customer orders. The southern building would support a 4,900 SF Chick-fil-A restaurant with associated drive-through lanes and exterior speaker setup. A 2,700 SF retail building would be located between the two restaurants, along the project's western edge with an exterior covered patio. The project also proposes 66 additional parking spaces to serve the project. The site is currently vacant with no above-ground structures. The site is in a designated Community region, and is zoned Commercial Limited with a General Plan land use designation of C (Commercial).

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, hospitals, schools, hotels, resorts, libraries, sensitive wildlife habitat, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. NSLUs in the project vicinity include multi-family residences to the west across Saratoga Way, with the nearest residences approximately 100 feet west of the project boundary.

TERMINOLOGY

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are

expressed by the symbol L_{EQ} , with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours have an added 5 dBA weighting, and noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting.

NOISE MODELING SOFTWARE

Modeling of the exterior noise environment for this report was accomplished using Computer Aided Noise Abatement (CadnaA) version 2017 and Traffic Noise Model (TNM) version 2.5. CadnaA is a model-based computer program developed by *DataKustik* for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-related information, such as noise source data, barriers, structures, and topography to create a detailed model for the prediction of outdoor noise impacts.

The TNM was released in February 2004 by the U.S. Department of Transportation (USDOT), and calculates the daytime average hourly L_{EQ} from three-dimensional model inputs and traffic data (Caltrans 2004).

For traffic noise, the one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; peak-hour traffic volumes can be estimated based on the assumption that 10 percent of the average daily traffic would occur during a peak hour. The model-calculated one-hour L_{EQ} noise output is the equivalent to the CNEL (Caltrans Technical Noise Supplement, November 2009).

NOISE STANDARDS

Table 6-1 of the County General Plan regulates the maximum allowable noise exposure from transportation noise sources to existing land uses. These noise standards include a maximum of 45 dBA L_{EQ} worst-case hour for residential interior spaces and 60 dBA CNEL for residential outdoor activity areas.

Table 6-2 of the General Plan regulates standards for operational noise exposure limits for NSLUs, not including transportation noise sources. These standards are depicted in Table 1, *Noise Level Performance Protection Standards for Noise Sensitive Land Uses Affected by Non-Transportation Sources*.

Because The Habit Burger Grill's speaker system would emit noise consisting primarily of speech, each of these standards would be lowered by 5 dBA. The drive-through order window would likely be in operation during nighttime hours (past 10 p.m.). Therefore, the drive-through speaker noise must be below the County's lowest limit of 40 dBA L_{EQ} during nighttime hours.

Table 1
NOISE LEVEL PERFORMANCE PROTECTION STANDARDS FOR NOISE SENSITIVE LAND USES AFFECTED BY NON-TRANSPORTATION SOURCES¹

Noise Level Descriptor	Daytime (7 a.m. to 7 p.m.)		Evening (7 p.m. to 10 p.m.)		Night (10 p.m. to 7 a.m.)	
	Community	Rural	Community	Rural	Community	Rural
Hourly L_{EQ} , dBA	55	50	50	45	45	40
Maximum level, dBA	70	60	60	55	55	50

Source: El Dorado County General Plan, Noise Element, Table 6-2

Each of the noise levels specified above shall be lowered by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The County can impose noise level standards which are up to 5 dBA less than those specified above based upon determination of existing low ambient noise levels in the vicinity of the project site.

In Community areas, the exterior noise level standard shall be applied to the property line of the receiving property. In Rural areas the exterior noise level standard shall be applied at a point 100 feet away from the residence. The above standards shall be measured only on property containing a noise sensitive land use as defined in Objective 6.5.1 of the Noise Element. This measurement standard may be amended to provide for measurement at the boundary of a recorded noise easement between all effected property owners and approved by the County.

¹ For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways, railroad line operations and aircraft in flight. Control of noise from these sources is preempted by Federal and State regulations. Control of noise from facilities of regulated public facilities is preempted by California Public Utilities Commission (CPUC) regulations. All other noise sources are subject to local regulations. Non-transportation noise sources may include industrial operations, outdoor recreation facilities, HVAC units, schools, hospitals, commercial land uses, other outdoor land uses, etc.

NOISE ANALYSIS AND IMPACTS

Drive-through Speaker

Existing and proposed features at the project site were included in the CadnaA noise model. These features would affect the emission, obstruction, and reflection of noise from the speaker. Because it is assumed that an idling automobile would be present when the speaker is operating, a single vehicle was included in the model directly opposite the speaker to account for any obstruction and reflection of sound that may occur. An existing 6-foot tall masonry wall is located along the eastern property boundary of the residential development and noise attenuation from this wall was taken into account in the noise modeling. To isolate noise generation from speaker noise, the model did not include traffic noise generated from vehicles along Saratoga Way. See Table 2, *Summary of Site Features Included in the Noise Model*.

Table 2
SUMMARY OF SITE FEATURES INCLUDED
IN THE NOISE MODEL

Description	Height ¹
Proposed The Habit Burger Grill Restaurant Building	20 feet
Residential Development Masonry Wall ²	6 feet
Drive-Through Menu Sign	5 feet
Automobile	4 feet

¹ Heights are estimated from visual inspection of the project area and from typical heights of objects/buildings.

² The masonry wall is located at the residential property line.

Specific planning for the proposed speaker system is not available at this point in the planning process. A speaker at a similar style restaurant was measured for this analysis (HELIX 2016). A sound level meter at approximately five feet from a typical speaker measured 86.4 dBA L_{EQ} averaged over one hour. The summed measurement time period data (20-second average) are shown in octave format in Table 3, *Octave Data of Measured Drive-through Speaker*.

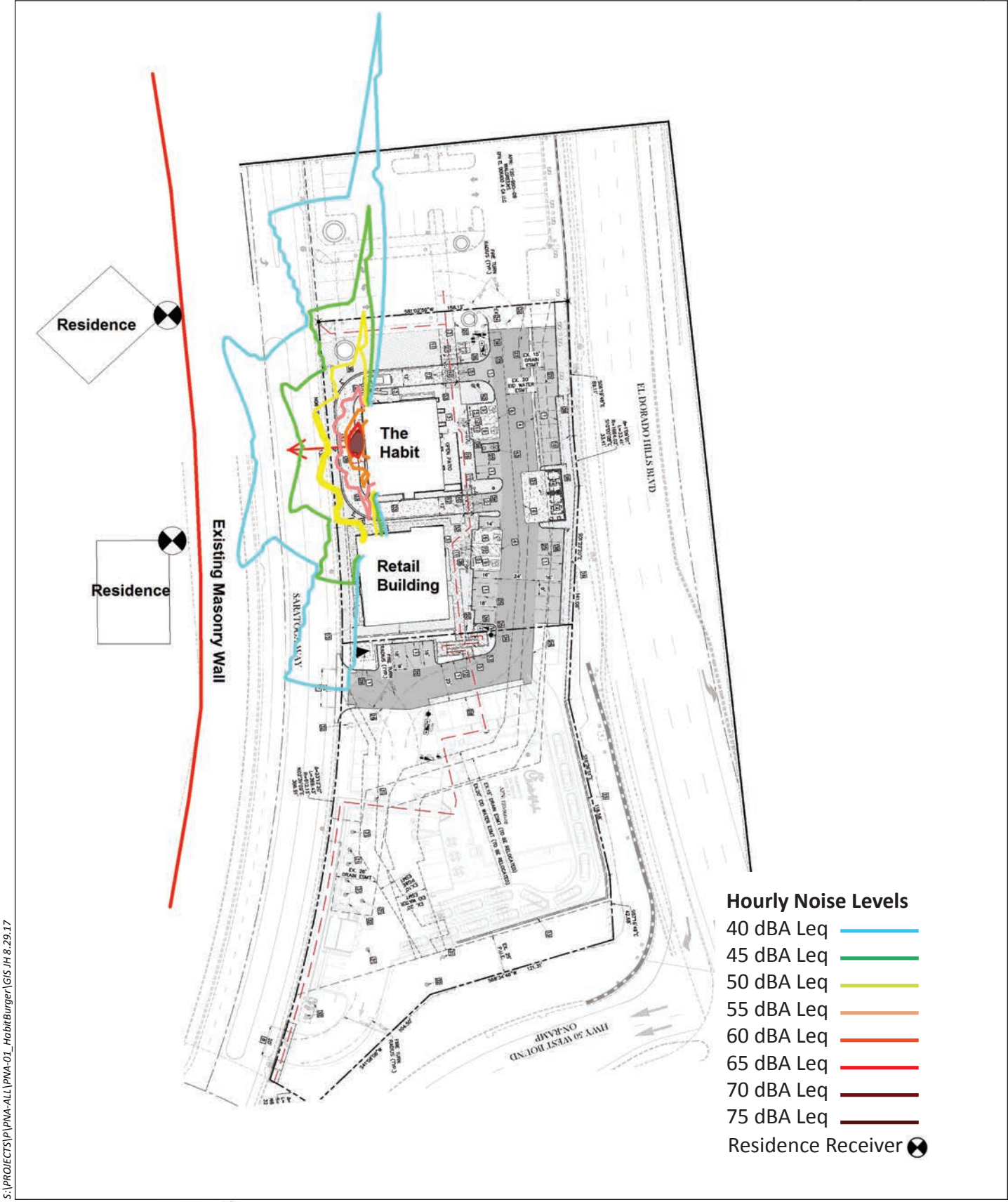
Table 3
OCTAVE DATA OF MEASURED DRIVE-THROUGH SPEAKER¹

Octave Band Center Frequency (Hz)	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA L_{EQ} *
Measured Sound Pressure	79.9	75.8	72.8	75.4	85.4	80.6	61.7	52.5	86.4

¹ Drive-through speaker measured at a distance of five feet from the source.

The measurement data in Table 3 depicts the dBA L_{EQ} during the continuous use of a speaker for one hour. For the purposes of this analysis, it is assumed that a speaker would be in use for approximately 30 minutes in each hour. The project's Traffic Impact Study (Kimley Horn 2017) measured drive-through traffic at three nearby restaurants. The study counted a maximum of 37 drive-through customers in a lunchtime hour at a nearby McDonald's restaurant. Assuming a one-minute customer order, the analysis for the proposed The Habit Burger Grill assumes a conservative 60 customers per hour, with the speaker in use for half of a single order.

Noise levels were modeled in CadnaA using the sample measurement described in the assumptions above, with the speaker located approximately 135 feet from the southern residence depicted on Figure 1, *Drive-through Speaker Noise Contours*. With these parameters, the drive-through speaker would emit noise levels of approximately 29 dBA L_{EQ} at the nearest residence west of The Habit Burger Grill. Noise levels would not exceed the County's 40 dBA L_{EQ} nighttime limit for non-transportation noise sources consisting of human speech. This represents a conservative assumption due to the assumed operational use of the speaker (30 minutes of a given hour) during the peak hour, which is not likely to occur during nighttime hours.



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- Hourly Noise Levels**
- 40 dBA Leq —
 - 45 dBA Leq —
 - 50 dBA Leq —
 - 55 dBA Leq —
 - 60 dBA Leq —
 - 65 dBA Leq —
 - 70 dBA Leq —
 - 75 dBA Leq —
 - Residence Receiver



Source: HELIX 2017

Because the drive-through speakers at the project's Chick-fil-A restaurant are directed south toward the onramp to U.S. Route 50 at a greater distance from nearby NSLUs, noise levels were determined to not be significant, and specific measurements of its speaker system were not analyzed.

HVAC

Specific planning for future HVAC systems is not available at this point in project design. Analysis using a typical rooftop commercial HVAC unit was analyzed for the project buildings. The unit used in this analysis is a Carrier Centurion Model 50 PG03-12 with a sound rating of 80 dBA sound power. This unit produces noise levels of 45 dBA L_{EQ} at 50 feet, which would be reduced by at least 5 dBA by standard parapet walls installed on a building's roofline. A single 10-ton HVAC unit is commonly required for every 350 square feet of habitable space (ASHRAE Handbook 2012). Using this calculation, two units for the Chick-fil-A restaurant, one unit for The Habit Burger Grill restaurant building, and one unit for the third retail building would be required. Based on the site plan, the closest NSLU to the project is the southern residence depicted on Figure 1. This residence is approximately 120 feet from the retail building's single HVAC unit. A single unit mounted on a rooftop with a standard parapet would emit a noise level of 40 dBA L_{EQ} at 50 feet. Noise levels at the nearest NSLU would therefore be less than the County's 45 dBA L_{EQ} nighttime limit for non-transportation noise sources.

Project Traffic

Using trip generation and distribution from the Transportation Impact Study, project traffic was calculated using Transportation Noise Model (TNM) version 2.5 software. Noise levels generated by existing traffic on Saratoga Way, the nearest roadway to the affected NSLUs, are approximately 45 dBA CNEL at the nearest residence. Additional traffic to this roadway would increase noise levels to approximately 52 dBA CNEL. Although traffic noise for nearby NSLUs would increase perceptibly, noise levels would remain below the General Plan Noise Element standards of 60 dBA CNEL for residential exterior use areas. Assuming an approximately 15 dBA CNEL reduction from standard construction materials, interior spaces at the existing residences would remain below General Plan residential standards of 45 dBA CNEL.

Conclusions

Operation of the project including HVAC units, the use of a drive-through speaker at The Habit Burger Grill, and project traffic to nearby Saratoga Way would not generate noise levels above County standards.



Jason Runyan
Noise Analyst



Charles Terry
Principal Acoustician

Attachments:

Figure 1: Drive-through Speaker Noise Contours

REFERENCES

ASHRAE. 2012. ASHRAE Handbook – HVAC Systems and Equipment.

HELIX Environmental Planning, Inc. 2016 February 18. Noise Impact Analysis Tacos El Gavilan Drive-
Through Restaurant.

Kimley-Horn. 2017, May 3. Saratoga Retail Phase 2 El Dorado Hills, California.