MEMORANDUM

To:	Shawn Shamlou (Dudek)
From:	Mark Storm, INCE Bd. Cert. (Dudek)
Subject:	Desert Valley Hospital (Victorville, CA) – Emergency Department Helipad Noise Analyses
Date:	March 7, 2025
cc:	Erin Lucett (Dudek)

1 Introduction and Purpose

The purpose of this technical memorandum is to supplement the Noise Assessment Technical Report (NATR) prepared in June 2024 for the proposed Desert Valley Hospital Emergency Department Project (Project) by quantitatively contrasting helicopter operations under existing conditions associated with the Desert Valley Hospital (DVH) in Victorville, California (City) and those of the proposed Project that includes relocating the helipad.

The contents and organization of this memorandum are as follows: (2) project description; (3) environmental setting; (4) regulatory setting; (5) assessment methodology and results; and (6) references cited.

2 Project Description

The proposed Project consists of adding a 2-story building addition to DVH, which will include a new Emergency Department on the first floor and a new Medical - Surgery Department on the second floor. Part of the Project includes relocating the helipad from its current location east of DVH to the roof of the proposed new 2-story structure. The proposed helicopter flight zones within which approaches to and takeoffs from the new helipad are expected to occur appear in Exhibit A. For purposes of comparison, existing helicopter operation zones to and from the existing helipad appear in Exhibit B.

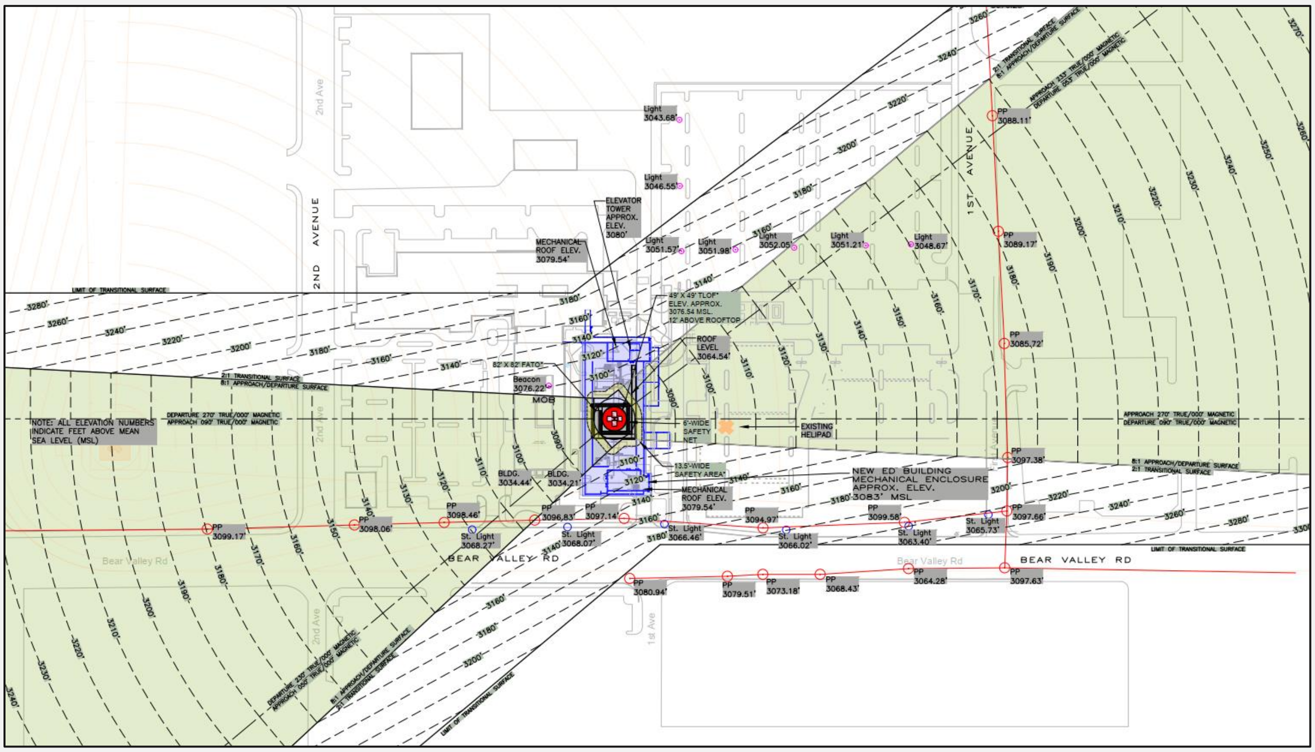
3 Environmental Setting

Table 2 of the NATR presents samples of daytime outdoor ambient sound pressure levels (SPL) measured on November 1, 2023 in the DVH vicinity, which included four nearest apparent noise-sensitive receptors (NSR): ST1 (southeast corner of Bear Valley Road and Bornite Avenue); ST2 (northwest of project site, southwest side of Jasmine Street and 2nd Avenue); ST3 (north side of Jasmine Street in front of High Desert Villas); and ST4 (northeast corner of Jasmine Street and 1st Avenue). Energy-equivalent sound levels (L_{eq}) over the 15-minute duration sampling periods at each of the four NSR ranged between 63.6 and 67.6 dBA and seem consistent with the presence of local and distant traffic, as well as nearby commercial activities and DVH operations.

The Community Noise Equivalent Level (CNEL) at each of these NSR can be estimated with a technique comparable to Federal Transit Administration (FTA) guidance, by calculating the 24-hour value from the following assumptions: the daytime empirical L_{eq} sample is representative of all twelve daytime hours, the three evening hours (7:00 p.m. to 10:00 p.m.) each have hourly L_{eq} values that are 5 dB less than those of the daytime period (7:00 a.m. to 7:00

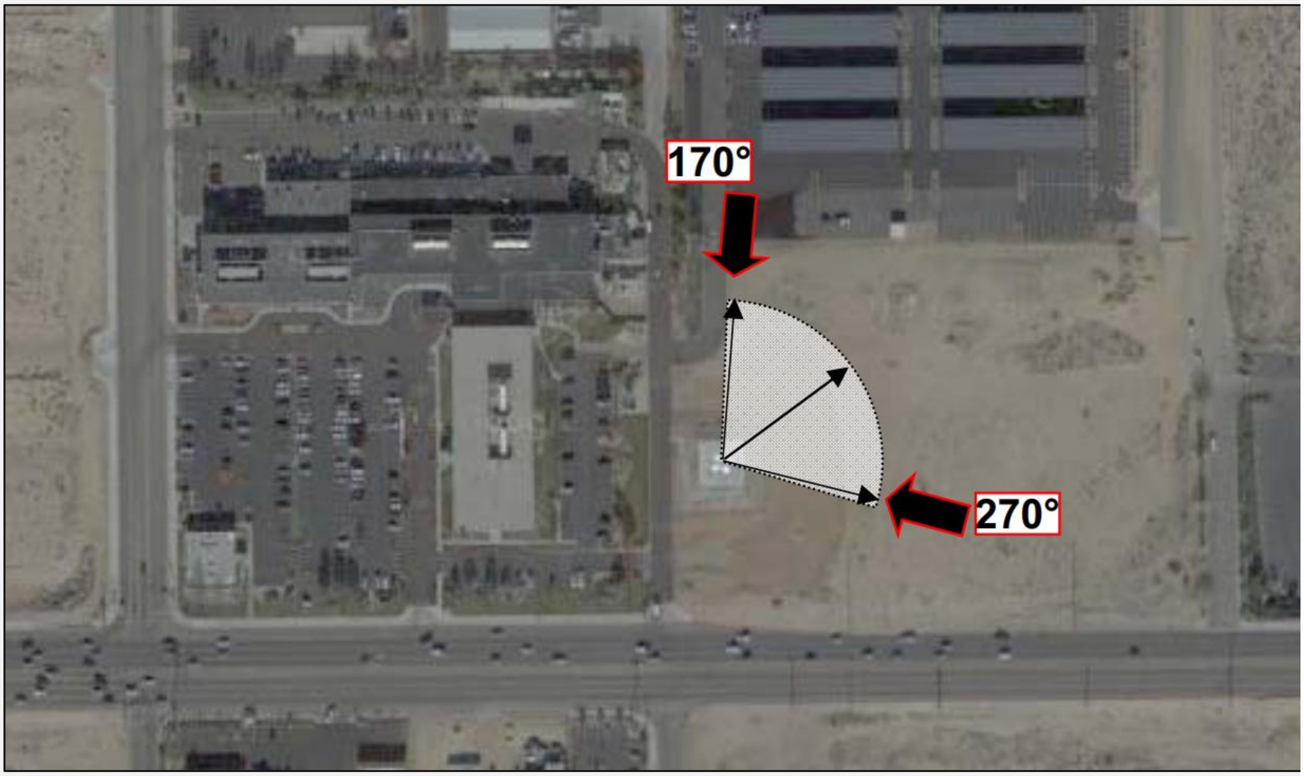
p.m.), and nine nighttime hours have hourly L_{eq} values that are 10 dB less than those during the day. Thus, after applying the CNEL dB-weighting adjustments, the measured daytime L_{eq} functions as a reasonable approximation of CNEL for the NSR location and consequently means that the four aforesaid nearest receptors (ST1, ST2, ST3, and ST4) experience CNEL ranging between 63.6 and 67.6 dBA.

Exhibit A. Proposed DVH Emergency Department Helipad Approach/Takeoff Zones



Source: Heliplanners 2024

Exhibit B. Existing DVH Helipad Approach/Takeoff Zones



Source: HMC Architects 2025

4 Regulatory Setting

In 1992 the Federal Interagency Committee on Noise (FICON) assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. For purposes of this helicopter noise assessment, the following FICON impact significance criteria will be applied:

- when the existing outdoor ambient noise level is less than 60 dBA CNEL, an increase due to the Project of more than 5 dB;
- when the existing outdoor ambient noise level is between 60 and 65 dBA CNEL, an increase due to the Project of more than 3 dB; and
- when the existing outdoor ambient noise level is greater than 65 dBA CNEL, an increase due to the Project of more than 1.5 dB.

5 Assessment Methodology and Results

This technical memorandum evaluates the average daily noise level, as a CNEL value, from existing helipad operations and proposed operations from the proposed relocated helipad position atop the new two-story

Emergency Department structure. The following describes the predictive modeling methodology and summarizes the results for assessment vis-à-vis the FICON-based impact significance criteria from the preceding section.

5.1 Methodology

Prediction Method and Parameters

The Datakustik CadnaA sound propagation program was used to model noise from helicopter operations and is based on algorithms and reference data per International Organization of Standardization (ISO) Standard 9613-2, "Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation" (ISO 1996). Among its other capabilities, CadnaA allows one to define a mobile point-type source as it traverses a specific path—in this case, approach or take-off movement of a studied helicopter. The following assumptions and parameters were included in this CadnaA-supported predictive modeling effort:

- Ground effect acoustical absorption coefficient equal to 0.75, which intends to represent an average or blending of ground covers that are characterized by a mix of reflective and absorptive ground surfaces across the Project site and the surroundings;
- Reflection order of 1, which allows for a single reflection of sound paths on encountered structural surfaces such as the modeled structures;
- Calm meteorological conditions (i.e., wind less than five miles per hour [mph]) with 68 degrees Fahrenheit and 70% relative humidity;
- The modeled helicopter is a Eurocopter 135P (a.k.a., Airbus H135), with a reference fly-over (FO) sound exposure level (SEL) of 81.6 dBA per AC 36-1H (FAA 2012), converted to a sound power level (PWL) of 126 dBA (on the basis of the SEL at 150 meters distance, a 10 dB conversion from SEL to L_{max}, and an SPL to PWL adjustment of 11 dB for a spherical point source);
- One helicopter flight modeled, taking off or approaching the helipad (at its elevation with respect to local grade) along an approximate 2,100-foot track that rises one foot per eight feet traversed (1:8 climb/descent ratio) at a speed of 35 miles per hour; and
- Topography and off-site buildings were not modeled, representing a conservative modeling approach.

Studied Scenarios

A total of seven helicopter operations were modeled with CadnaA: four flight tracks under proposed conditions (see Exhibit A) and three under current existing conditions (see Exhibit B).

CNEL Assessment

Because current DVH helicopter operations only occur 279 times per year, and this quantity is not expected to change due to the Project, such flights occur (on average) less than once per day. Thus, assessing the change in outdoor ambient sound level at a nearby NSR, expressed in terms of CNEL and due to proposed Project helicopter operations in contrast with existing flight operations from the current DVH helipad, requires logarithmically adding the existing ambient (i.e., the "background", comprising roadway traffic, etc. and as measured and reported in the NATR) CNEL to each of the CadnaA-predicted helicopter flight noise emission cases. The three resulting background-plus-existing-helicopter CNEL values can then be contrasted with the four background-plus-Project-helicopter CNEL to evaluate the decibel difference and compare with appropriate FICON impact significance assessment criteria.

Due to the seven flight scenarios studied herein, the CadnaA model includes a total of eighteen (18) NSR locations, with four approximately co-located with the aforesaid ambient sound level survey positions ST1 through ST4. The estimated background CNEL values for ST1 through ST4 are based on daytime L_{eq} measurement samples as discussed in Section 3. For purposes of this assessment, the background CNEL values at the other NSR locations are assumed to be comparable to those at ST1 through ST4 on the basis of sharing similar perpendicular distances to the nearest common roadway segment(s) on which roadway traffic flows—and tends to produce the largest or even dominant measured noise source throughout a typical 24-hour period. This pattern is supported by FTA guidance in its estimation techniques for background sound level (FTA 2018). By way of example, other NSR located along Jasmine Street would likely have CNEL comparable to those of ST2, ST3, and ST4; and, NSR sharing similar distance to Bear Valley Road as ST1 would likely have comparable CNEL. For NSR that are further away from these larger roadways (e.g., Bear Valley Road), it is assumed that CNEL would be less on the basis of roadway noise attenuation with distance (at a rate of roughly 3 dB per doubling, consistent with a line-type source of sound emission).

For purposes of this assessment, it is assumed there are two operations (one take-off, and one approach) comprising a single helicopter “flight” per 24-hour period; and, each of these two operations occur during a nighttime hour—either the same hour or different hours within the same diurnal period.

5.2 Prediction Results

The CadnaA-predicted hourly L_{eq} helicopter flight noise emission levels, depicted as noise contours at approximately four meters above grade for all seven scenarios (see Figures N, NE, and SE for the existing helipad conditions; and Figures 1, 2, 3, and 4 for the proposed helipad conditions), were converted to CNEL values and then logarithmically added to the background CNEL values for each of the 18 NSR listed in Table 1.

Table 1 also presents the decibel difference between the loudest proposed helipad conditions case and the existing helipad conditions case, then states whether or not an appropriate FICON-based criterion has been exceeded and would thus beget a significant impact. Although NSR represented by model positions “R13” and “R14” are anticipated to experience a 3 dB change in CNEL, such increases and all others listed are compliant with FICON and therefore impacts would be less than significant.

Table 1. Predicted CNEL by Modeled Helicopter Flight Path Scenario and FICON-based Impact Significance Assessment

Studied Nearby Noise Sensitive Receiver (NSR)	Estimated Background CNEL	CNEL including *Existing* DVH Helicopter Operation (by flight path direction from helipad)			CNEL including *Proposed* DVH Helicopter Operation (by flight path direction from helipad)				Largest dBA Change between Existing and Proposed CNEL including Helicopter Operations	Predicted Impact per FICON?
		North	Northeast	Southeast	Northeast	East	Southwest	West		
R01 - Wimbledon Luxury Apts - east	66	66	67	66	67	66	66	66	0	no
R02 - Wimbledon Luxury Apts – west [4]	66	67	67	66	67	66	66	66	0	no
R03 - High Desert Villas - east	65	66	66	65	66	65	65	65	-1	no
R04 - High Desert Villas – west [3]	64	67	64	64	65	64	64	64	-3	no
R05 - 12340 Highgate Avenue	65	66	65	65	65	65	65	65	-1	no
R06 - 16687 Jasmine Street [2]	65	65	65	65	65	65	65	65	0	no
R07 - 12336 Pismo Lane	59	59	59	59	59	59	59	60	1	no
R08 - 12222 Jason Lane	61	61	61	61	61	61	61	63	2	no
R09 - 12081 Third Avenue	68	68	68	68	68	68	68	68	0	no
R10 - Desert Meadow Apts - north	65	65	65	65	65	65	66	66	1	no
R11 - Desert Meadow Apts - southeast	63	63	63	63	63	63	65	64	2	no
R12 - 16632 Sequoia Street - north	65	65	65	65	65	65	67	66	2	no
R13 - 16632 Sequoia Street - south	63	63	63	63	63	63	66	64	3	no
R14 - 12001 Second Avenue	64	64	64	64	64	64	67	65	3	no

Table 1. Predicted CNEL by Modeled Helicopter Flight Path Scenario and FICON-based Impact Significance Assessment

Studied Nearby Noise Sensitive Receiver (NSR)	Estimated Background CNEL	CNEL including *Existing* DVH Helicopter Operation (by flight path direction from helipad)			CNEL including *Proposed* DVH Helicopter Operation (by flight path direction from helipad)				Largest dBA Change between Existing and Proposed CNEL including Helicopter Operations	Predicted Impact per FICON?
		North	Northeast	Southeast	Northeast	East	Southwest	West		
R15 - 16723 Sequoia Street	62	62	62	62	62	62	64	63	1	no
R16 - 11985 Bornite Avenue	62	62	62	63	62	63	63	62	0	no
R17 - 12048 Bornite Avenue [1]	68	68	68	69	68	68	68	68	0	no
R18 - 16868 Sequoia Street	64	64	64	65	64	65	64	64	0	no

Notes: DVH = Desert Valley Hospital; CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel; FICON = Federal Interagency Committee on Noise;
1 = Noise Assessment Technical Report (NATR) ST1 position; 2 = NATR ST2; 3 = NATR ST3; 4 = NATR ST4.

6 References Cited

Federal Aviation Administration (FAA). 2012. *Advisory Circular No. 36-1H*. Noise Levels for U.S. Certificated and Foreign Aircraft.

Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues*. August.

Federal Transit Administration (FTA). September 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123.

International Organization of Standardization (ISO). 1996. *Standard 9613-2 (Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation)*. Geneva.