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Technical Memorandum

TO: Nyssa Hughes, Corgan Architecture and Planning

FROM: Amy Maule and Kristen Wallace

DATE: July 21, 2022

RE: **Noise Mitigation Assessment**
STACK SVY05/06 Data Center Development
San Jose, California
Landau Project No. 2016001.010

Introduction

At the request of Corgan Architecture and Planning (Corgan), Landau Associates, Inc. (Landau) prepared this noise analysis, which describes modeled noise levels and recommended noise control measures for the proposed SVY05/06 Data Center (Facility), to be located at 2400 Ringwood Avenue and 2000 Trade Zone Boulevard in San Jose, California.

This technical memorandum supplements the Trade Zone Park Environmental Noise and Vibration Assessment (Illingworth & Rodkin 2022) and specifically addresses noise levels from data center buildings SVY05 and SVY06 and associated equipment on the property located southeast of the Facility, currently used for commercial purposes (offices). This study did not include an evaluation of noise associated with the planned parking garage and substation to be located immediately east of the SVY05 building.

Facility Information

Land Use and Applicable Regulatory Noise Limits

The proposed Facility will be located on a San Jose parcel zoned Industrial Park. Land use surrounding the Facility to the east, west, and south is also zoned Industrial Park. Land adjacent to the southeast is currently used as an office facility. As described in Illingworth & Rodkin's report, the City of San Jose's Municipal Code contains a Zoning Ordinance that limits noise levels at adjacent properties. Chapter 20.50.300 states that sound pressure levels generated by any use or combination of uses on a property zoned for industrial use shall not exceed 60 A-weighted decibels (dBA) at any property line shared with land used or zoned for commercial purposes. Chapter 20.80.2030 limits testing of generators to the hours of 7 a.m. to 7 p.m., Monday through Friday.

Emergency work is exempt from the sound-level limits. Therefore, noise generated by the emergency generators to deliver electricity to the Facility during power outages would be exempt from the noise requirements noted above (Galati 2022).

Facility Configuration

Figure 1 shows the modeled plan for future full buildout of the Facility. The noise model was developed based on architectural plans provided by Corgan, which identify the following numbers and locations of the primary noise-producing equipment:

- 69 cooling units on the roofs of the three northern buildings (Advanced Manufacturing, SVY05, and associated offices)
- 15 emergency backup generators plus one house generator in the SVY05 generator yard
- 52 cooling units on the roof of the SVY06 building
- 21 data center generators plus one house generator in the SVY06 generator yard.

The equipment sound levels are provided in Table 1 (attached).

Emergency Generators

Each planned emergency generator will be housed in an enclosure rated to attenuate noise from the generator to a maximum level of 70 dBA at 23 feet (7 meters) from the enclosure. Emergency generators will be stacked two-high, with the exception of the house generators (located at ground level) and the easternmost SVY05 and SVY06 generators, which are single units.

Vendor-supplied noise specifications for generator exhaust stacks were provided to Landau by STACK (Table 1). Each exhaust stack will be equipped with a diesel particulate filter (DPF) and selective catalytic reduction (SCR) emission controls. Noise reduction associated with the SCR was conservatively modeled at 35 dBA.

House generators were assumed to have the same maximum noise level as the large generators. The size of house generators was roughly estimated based on plan drawings.

Rooftop Cooling Units

Model numbers and vendor-supplied noise specifications for proposed rooftop equipment were provided to Landau by Corgan. A visual screen wall surrounding all rooftop equipment is not expected to provide noise attenuation, and was not included in the model.

Noise Modeling Approach

Modeled Noise Sources

This study included noise emission calculations and computerized noise propagation modeling for the Facility. Figure 1 shows the locations of the noise-generating equipment at the Facility relative to the property boundaries and nearby receivers. Table 1 lists the noise sources and the octave-band sound

power level (PWL) noise emissions from each piece of equipment, calculated based on information provided by the project design team and Landau's experience with typical equipment noise levels.

For the loudest-case operations scenario, all rooftop cooling equipment was assumed to operate at maximum rated cooling capacity, in anticipation of an exceptionally hot day. Based on preliminary modeling by Landau and Illingworth & Rodkin, the interior southeast corner of the Facility was identified as a location where modeled noise levels exceeded the relevant noise threshold (60 dBA) during generator maintenance operation of a single generator at a time.

Screening models were run to identify maximally affected receiver locations for the purposes of identifying maximum noise levels. Partial levels, or noise contributions from each source at the receiver, were used to determine the noise levels associated with single-generator operations at those receivers (generator maintenance scenario). In the maintenance scenario, all rooftop cooling equipment was assumed to operate at maximum rated cooling capacity during maintenance of a single generator.

Model Assumptions

The ambient sound pressure levels (SPLs) at the commercial property were modeled using the Computer-Aided Noise Abatement (CadnaA) computer model. The following modeling assumptions were used:

- The building layout and building heights for the data center were determined based on site plans and dimensions provided by the data center design team.
- The building walls, rooftops, and parapets of the data center building were assumed to be hard, reflective surfaces.
- The ground between the Facility yard and surrounding properties was assumed to be a combination of reflective pavement and absorptive vegetation.
- All rooftop equipment was modeled to serve as noise barriers for other nearby equipment. The sidewalls of all rooftop equipment were assumed to be reflective.
- The structure surrounding and supporting the stacked generator enclosures was assumed to be acoustically transparent; however, the enclosures themselves were modeled to serve as noise barriers and were assumed to be reflective.
- The topography of the surrounding area, including undeveloped portions of the Facility and adjacent and nearby land, was estimated using Google Earth to be relatively flat.

Receivers were placed at approximately 5 feet (1.5 meters) above the ground surface, to approximate human standing height.

Identification of Potential Mitigation Measures

To identify mitigation strategies that could be employed to reduce noise levels at the adjacent commercial property to 60 dBA or below during maintenance operation of a single generator, Landau modeled a selection of potential mitigation measures individually and in combination and analyzed the noise levels of each strategy on maximally affected receivers located southeast of the interior southeastern corner of the Facility (R1 and R5, shown on Figure 1).

Potential mitigation measures included mitigation of noise produced by rooftop units, extension of the parapet wall on the sides of the buildings facing the commercial property, mitigation of generator exhaust noise, and addition of a noise wall along the central-eastern property line (see Figure 1).

Conclusions and Recommendations

The detailed modeling analysis for the Facility demonstrated that a reduction of noise levels to below 60 dBA at the southeast-adjacent commercial property during business hours can be achieved using a combination of the following measures:

- Mitigation of noise produced by some or all of the York YVFA0359 rooftop units by approximately 3 dBA
- Extension of the parapet wall on the sides of the data center buildings facing the commercial property to approximately 16 feet (5 meters) above roof height
- Mitigation of generator exhaust noise using SCR controls and additional silencers on some or all generator exhaust stacks (approximately 45 dBA reduction)
- Addition of an approximately 16-foot (5-meter)-high noise wall along the central-eastern property line
- Addition of a parapet wall on the northern and eastern sides of the single-story portion of SVY06, approximately 6.6 feet (2 meters) above roof height.

Through a combination of the above-described measures, noise levels can be reduced to below 60 dBA at the east-adjacent commercial property during individual maintenance operation of all but a limited number of emergency generators. Those remaining generators (generators SVY0619, 20, and 21—upper-level units in the eastern portion of the SVY06 generator yard, as shown on Figure 1) whose individual operation results in noise levels above 60 dBA will be operated for scheduled maintenance only between 5 p.m. and 7 p.m. on weekdays, to avoid impacts to employees during work hours.

* * * * *

We trust this report meets your needs. If you have any questions, please do not hesitate to call the undersigned at 206.631.8680 if Landau can be of further assistance.

LANDAU ASSOCIATES, INC.

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AEM/KLW/ccy
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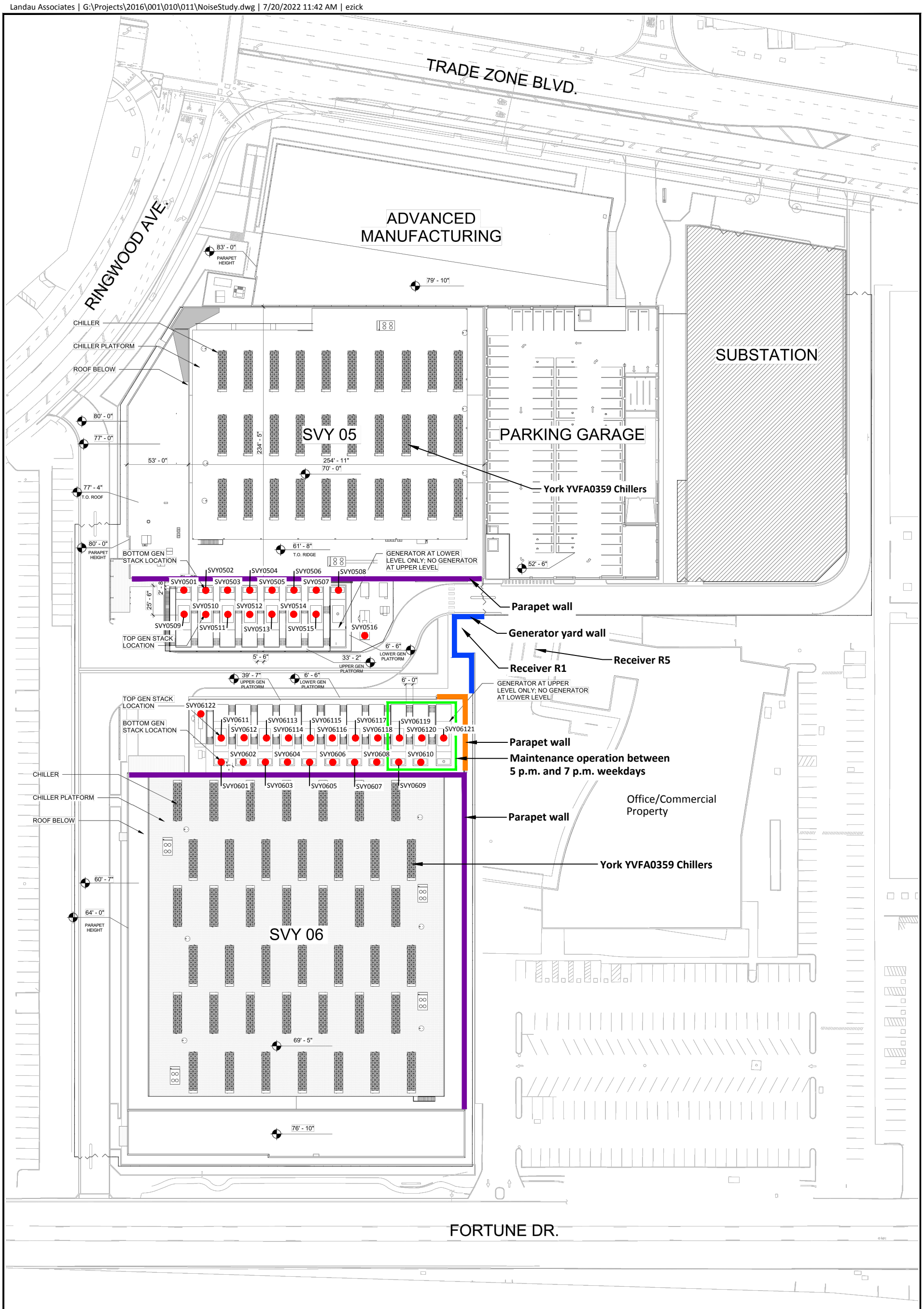
References

Galati, S. 2022. "Re: Stack - SVY04/05 - Acoustical Consultant." From Scott Galati, President, DayZen, LLC, to Nyssa Hughes, Corgan Architecture and Planning; Kimberly Wight, Critical Project Services, LLC; Michael Lisenbee, David J. Powers & Associates, Inc.; Joseph Oberto, Stack Infrastructure; Desiree DeiRossi, David J. Powers & Associates, Inc. January 3.

Illingworth & Rodkin. 2022. Report: Trade Zone Park Environmental Noise and Vibration Assessment, San Jose, California. Illingworth & Rodkin, Inc. March 30.

Attachments

Figure 1: Facility Layout, Noise Sources, and Modeled Receivers
Table 1: Modeled Noise Sources and Sound Power Levels



Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: CEQA Site Plan - Corgan 2022

LANDAU ASSOCIATES

Noise Mitigation Assessment STACK SVY05/06 Data Center Development	**Facility Layout, Noise Sources and Modeled Receivers**	Figure 1

Table 1
Modeled Noise Sources and Sound Power Levels
STACK SVY05/06 Data Center Development
San Jose, California

Equipment ID* (number per building)	Model No.	Noise Level at Source by Octave Band (unweighted dB, without mitigation)								dBA
		63	125	250	500	1K	2K	4K	8K	
Generators										
Generator Enclosures (35)	TBD	-	118	-	-	-	-	-	-	102
Generator Enclosures (1)	TBD (SVY05 House Gen)	-	116	-	-	-	-	-	-	100
Generator Exhaust Stacks	CAT 3516E - 3MW	-	136.3	130.3	128.6	125.1	119.4	120.2	117.3	139
SVY05 Rooftop Cooling Units										
ODU 2-2 (1)	Daikin REYQ72XAYDA	-	-	79	-	-	-	-	-	70
ODU 1-2 and 3-2 (2)	Daikin REYQ96XAYDA	-	-	80	-	-	-	-	-	71
ODU 1-1 and 2-1 (2)	Daikin REYQ120XAYDA	-	-	81	-	-	-	-	-	72
ODU 3-1 and 4-1 (2)	Daikin REYQ144XAYDA	-	-	87	-	-	-	-	-	78
MAU-1-01 and 1-02 (2)	AAON RN-050	90	89	91	94	90	86	81	77	95
SCP-ACC-#-0# and ACC-#-0# (30)	York YVFA0359	104	97	100	97	97	90	86	83	100
RTU 1-01 (1)	AAON RN-015	96	92	98	88	81	78	76	70	92
RTU 1-02 (1)	AAON RN-013	90	87	89	85	78	74	72	66	86
RTU 1-03 (1)	AAON RN-006	80	75	77	73	66	64	60	54	74
RTU 1-04 (1)	AAON RN-030	91	89	91	88	85	85	84	80	91
DOAS-01 (1)	AAON RN-040	85	83	88	89	85	81	76	71	90
DOAS-02 (1)	AAON RN-016	91	91	92	86	83	84	82	78	91
ACCU-0#-0#X (24)	Daikin REYQ144XAYDA	-	-	87	-	-	-	-	-	78
SVY06 Rooftop Cooling Units										
MAU-1-01 and 1-02 (4)	AAON RN-050	90	89	91	94	90	86	81	77	95
SCP-ACC-#-0# and ACC-#-0# (48)	York YVFA0359	104	97	100	97	97	90	86	83	100

*Equipment ID as shown on mechanical plan drawings.

Abbreviations and Acronyms:

db = decibels

dBA = A-weight decibels

TBD = to be determined