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Robbins Schwartz
55 W. Monroe Street, Suite 800
Chicago, IL 60603

December 20, 2019

Attn: Mr. Kenneth Florey

Re: New Trier High School December 13, 2019 Environmental Noise Measurements

Dear Ken:

On the early morning of Friday, December 13, 2019, we returned to the school to conduct additional acoustical testing. The purpose of this testing was to reduce interference due to traffic noise and document property line sound levels due to New Trier rooftop and loading dock mechanical equipment operated during the nighttime and daytime hours. Previous dust collector readings were conducted on November 15, 2019, July 12, 2019, July 25, 2015 and May 31, 2018.

Acoustical Measurements

We again conducted sound level readings at the west edge of the public sidewalk at the north property line of 124 Woodland Ave. on Friday, December 13, 2019 between 4:20 a.m. and 5:20 a.m. This time was chosen to be a period when car traffic would be at a minimum.

We used the following instrumentation for these measurements:

- Norsonic 140 integrating sound level meter/real time analyzer
- Norr 1225 1/2 inch condenser microphone
- Norr 1209 preamplifier
- Nor 1251 Sound Calibrator
- Windscreen

A fiberglass mast was used to elevate the microphone to a height of 15 feet above ground level in order to simulate noise heard at the second floor of the 124 Woodland Avenue residence. Conditions were dry with no precipitation. Roadways were dry. The temperature decreased from 37° F to 36° F during the measurements. The wind was WSW at 6-7 mph. Traffic noise from the Edens Expressway, 2 miles to the west was audible. As the study progressed, noise from local and expressway traffic increased.

Because of experience with previous interference due to transportation noise in the area, 15 second readings were taken with various pieces of mechanical equipment operating. Ambient sound level readings were conducted at the beginning and end of the study (early morning and late morning ambient readings). Reported sound level data were corrected for ambient conditions. Although Illinois requires a measurement duration of one hour, noise from fans and blowers is steady state and does not vary with time.

The following mechanical equipment was measured:

- dock condensing unit,
- rooftop energy recovery units (ERU's),
- rooftop cafeteria fans (with normally operating nighttime equipment),
- normally operating daytime equipment,
- fume hoods (with normally operating daytime equipment) and
- dust collector (with normally operating daytime equipment).

1. Dock Condensing Unit – This condensing unit periodically cycles on during the day and night. Although audible, we found the condensing unit to be in substantial compliance with the Illinois nighttime regulation limits. Sound levels in the 500 and 1000 Hz bands exceeded the Illinois limits but were at or below the early morning measured ambient.

2. Energy Recovery Units (ERU's) – Energy recovery units operate continuously during the night. Sound levels in the 500 and 1000 Hz bands exceeded the Illinois limits but were at or below the early morning measured ambient. We believe that these units are in compliance with the Illinois limits.

3. Cafeteria Fans (with ERU's operating) – Cafeteria fans run from approximately 4:30 a.m. to 9:30 a.m. when there is cooking in the kitchen. Sound levels measured at 4:40 a.m. in the 500 and 1000 Hz bands exceeded the Illinois nighttime limits but were below the late morning ambient.

4. Fume Hoods and Normal Daytime Equipment - When measured at 4:59 a.m., fume hood equipment that operates normally during the daytime was below the Illinois limits in all frequency bands. We believe that fume hoods are in compliance with Illinois daytime limits.

5. Normal Daytime Equipment – When measured at 4:55 a.m., corrected equipment that operates normally during the daytime was below the Illinois limits in all frequency bands.

6. Dust Collector and Normal Daytime Equipment – With all normally operating daytime equipment running, dust collector noise exceeded the Illinois daytime limits by 3 dB and 2 dB in the 2000 and 4000 Hz octave bands.

Results of our study are shown in the table below and graphed in Figures 1-6.

Conclusion

The December 13, 2019 dust collector measurements (test 6) were conducted during early morning hours when ambient sound levels were low. Property line sound level emissions exceeded the Illinois daytime limits in the 2000 and 4000 Hz frequency bands. As previous testing has shown, daytime operation of the dust collector will likely be at or below ambient sound levels in those frequencies due to increased transportation noise in the area.

The dust collector and associated duct work are partially enclosed by a barrier wall. There are minimal areas of sound absorptive treatment behind the barrier wall and on the east dock wall. It order to reduce the 2000 and 4000 Hz emissions further, we recommend increasing the area of sound absorptive treatment in the dock area to approximately 70% of available wall surface area on the east, north (behind the dust collector) and south walls.

Should sound absorptive treatment not result in the desired attenuation, we recommend treating radiated noise from the motor and associated ductwork. Lag the inlet and discharge round and rectangular ducts for a distance of 15-20 ft on each side of the motor enclosure. Wrap duct with 2" thick 5 pcf fiberglass and lag with 2 psf mass loaded vinyl (e.g., Kinetics KNM-200AL). Follow the manufacturer's instructions and tape or band all seams. The baghouse should also be treated in a similar manner.

If you have questions concerning this report, please do not hesitate to contact us.

Respectfully submitted,

Shiner Acoustics, LLC

Brian L. Homans

BLH/mt/13

Table 1. Results of December 13, 2019 Environmental Noise Measurements (4:20 a.m. to 5:20 a.m.)

Octave Band Sound Pressure Level, dB re 20 µPa

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
All Off 4:27 a.m. (early ambient)	51	51	48	44	44	39	26	14	14	43
1. Condensing Unit 4:29 a.m.	49	52	53	46	43	39	27	16	14	45
2. Energy Recovery Units 4:37 a.m.	51	51	50	45	44	39	22	16	18	45
3. Cafeteria Fans 4:40 a.m.	54	43	53	48	45	41	26	17	17	46
Illinois Nighttime Limit	63	61	55	47	40	35	30	25	25	44
4. Normal day equipment 4:55 a.m.	51	53	53	48	45	41	27	16	13	46
5. Fume Hoods 4:59 a.m.	50	51	53	48	44	41	27	18	18	46
6. Dust Collector 5:04 a.m.	58	65	56	56	49	44	42	36	27	52
All Off 5:16 a.m. (late ambient)	51	54	53	48	46	43	34	25	15	47
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

Figure 1. Condensing Unit
New Trier High School - 124 Woodland Ave. - December 13, 2019

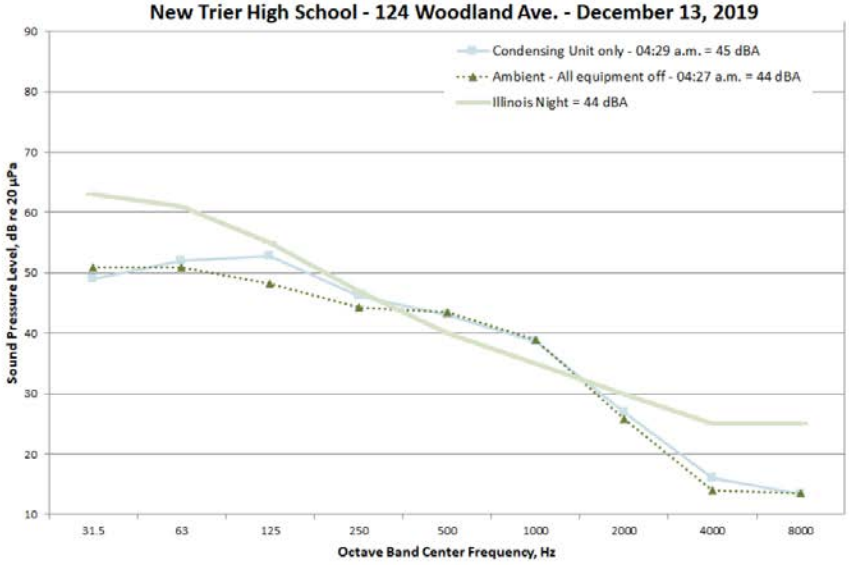

Figure 2. Energy Recovery Unitss
New Trier High School - 124 Woodland Ave. - December 13, 2019

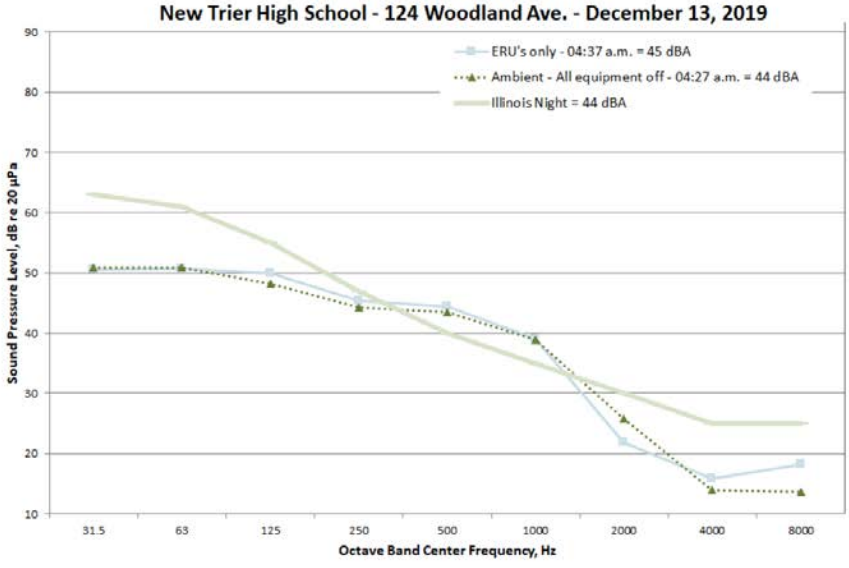

Figure 3. Cafeteria Fans and Night Equipment
New Trier High School - 124 Woodland Ave. - December 13, 2019

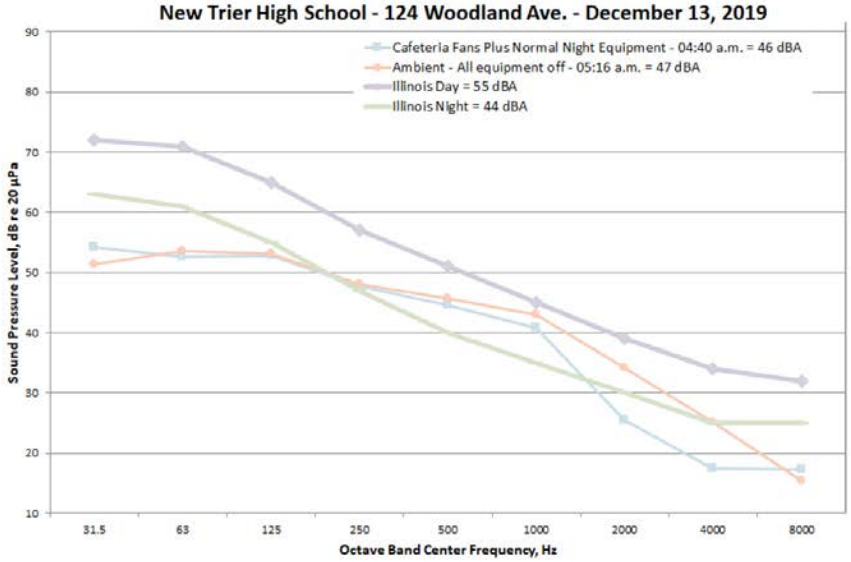

Figure 4. All Daytime Equipment
New Trier High School - 124 Woodland Ave. - December 13, 2019

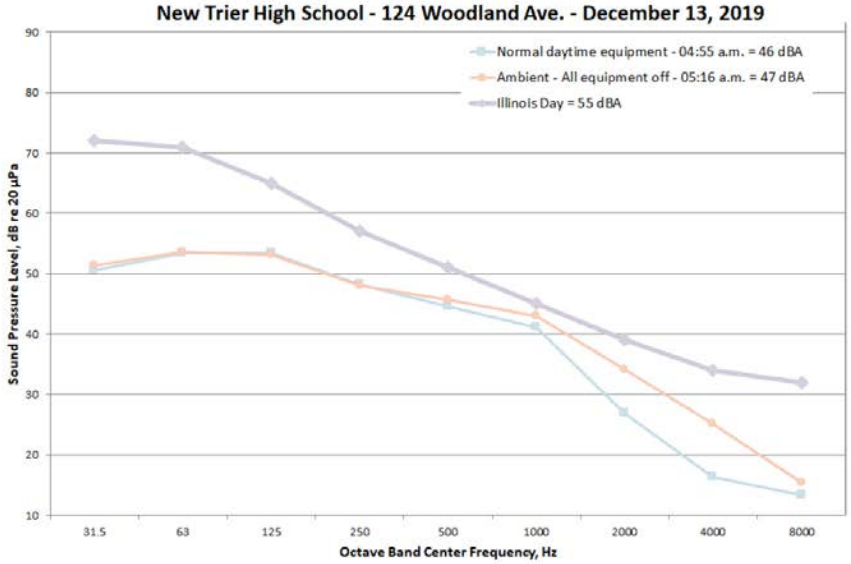

Figure 5. Fume Hoods and Daytime Equipment
New Trier High School - 124 Woodland Ave. - December 13, 2019

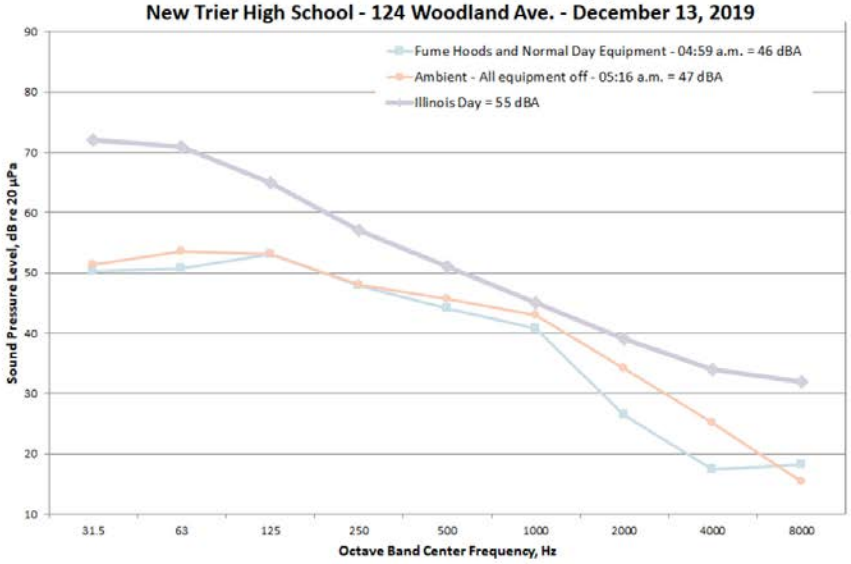

Figure 6. Dust Collector and Daytime Equipment
New Trier High School - 124 Woodland Ave. - December 13, 2019