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4TH AVENUE WELL – NOISE TO NEIGHBORS STUDY

We appreciate the opportunity to work on the ambient noise study for the new 4th Avenue Well project in Salt Lake City, UT. The following report documents our measurements and review comments regarding the noise from HVAC equipment to surrounding neighbors. These recommendations are based on the observations and sound level measurements made on Monday, August 24 through Tuesday, August 25, 2020 and manufacturer's sound levels for the pump and information about noise migration elements from the design team.

NOISE ORDINANCE

Salt Lake Valley Health Department Health Regulation #21¹ states the maximum permissible environmental noise levels based on classifications of the property uses for each neighboring property. Since the residential areas around of the 4th Avenue Well are Class A, the maximum allowable sound pressure level at the property line is 10 dBA above ambient, not to exceed 60 dBA, during the day (7 a.m. to 10 p.m.) and 5 dBA above ambient, not to exceed 50 dBA, at night (10 p.m. to 7 a.m.).

MEASURED SOUND LEVELS

Ambient Measurements

To determine the existing ambient level for the site, hourly equivalent sound levels (L_{eq}) were measured at the south edge of the property (#1) on August 24-25. A site map showing these locations is in Appendix A and the equipment used is listed in Appendix B.

Table 1 summarizes the measured ambient levels and corresponding maximum allowable (code limit) level for each location.

Table 1: Maximum allowable levels at site property lines.

	Daytime (7 a.m – 10 p.m.)		Nighttime (10 p.m. – 7 a.m.)	
	Measured	Max Allowable	Measured	Max Allowable
South	55 dBA	60 dBA	50 dBA	50 dBA

¹ Salt Lake Valley Health Department Health Regulation #21, *Community Noise Pollution Control*, Amended August 2, 2012, Under Authority of Section 26A-1-114, Utah Code Ann.



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Predicted Sound Levels

There are a few pieces of HVAC equipment that will affect the neighboring areas. The manufacturers' sound power levels for these units operating at 100% are shown in Table 2.

Table 2: Manufacturer's sound power levels, L_w re 1×10^{-12} W for rooftop HVAC equipment and generator.

Unit	Sound Power Level
Pump Motor	86 dBA
AHU-1	81 dBA

Per a conversation with the architect, all of these mechanical units could operate at night, so they included in the predicted sound levels compared to nighttime code limits shown below.

Based on these source sound power levels, and the acoustic mitigation elements designed by the design team, and standard equations for sound propagation, the expected sound levels were predicted at the adjacent property lines, Table 3 shows the predicted sound pressure levels compared to nighttime limits, since this is most restrictive.

Table 3: Predicted sound levels at nearby residential property lines compared to nighttime limits.

Property Line	Distance from Building	Sound Pressure Level (due to Pump project*)	Nighttime Maximum Allowable Level
West	52'	33 dBA	50 dBA
East	67'	32 dBA	50 dBA

*Note that while the predicted levels are well below the code limit, since the existing site sound levels are near 50 dBA, the measured sound levels after construction will still be close to 50 dBA.



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CONCLUSIONS & RECOMMENDATIONS

As shown in Table 3, the predicted sound levels for the pump are below the county noise ordinance limits based on the ambient noise levels at this site. However, the design team will need to watch the following items closely during the submittal and construction process:

- STC 40 doors – this may be difficult to achieve, especially with the large double doors on the south side of the building, and the large area of glazing shown in these doors.
- Solid walls – maintain 2” air space between brick and the CMU, with no rigid mechanical connection between the, to achieve maximum sound attenuation for this assembly.

We can provide additional information or guidance if necessary. Please call if there are further questions.

Sincerely,

SPECTRUM ENGINEERS

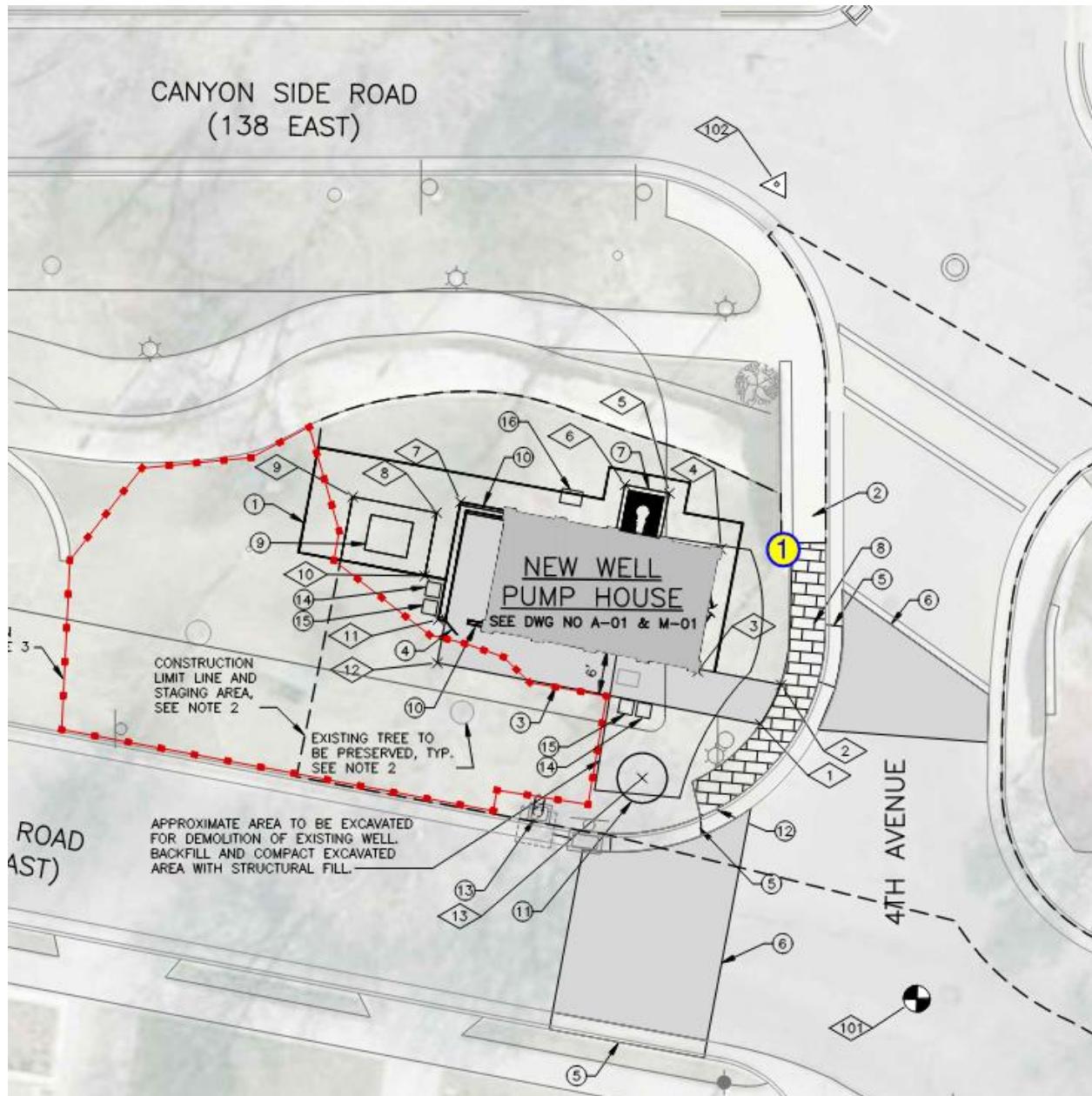
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APPENDIX A: AMBIENT SOUND LEVEL MEASUREMENT LOCATION





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APPENDIX B: MEASUREMENT EQUIPMENT

Measurements were taken with the following equipment:

Description	Manufacturer	Model	Serial Number
Type 1 Logging Sound Level Meter	Larson Davis	SoundExpert LxT	0004099
Type 1 Microphone	Larson Davis	377B02	151292
Type 1 Preamp	Larson Davis	PRMLxT1L	035971
Calibrator	Bruel & Kjaer	4231	2725454