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Modeling Specialties
Environmental Analyses in: Air Quality - Noise - Visual
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Verizon Wireless – Head End Facility

RE: Environmental Sound Evaluation – Verizon Wireless Head End Facility

Modeling Specialties was requested to analyze the projected sound from the Head End Facility that is planned for 1531 Congress Street in Portland, Maine. This facility is proposed for construction within the City's R-5 zoning district. Although there are no noise standards for uses within the R-5 zone, the City's land use code establishes maximum permissible sound levels for several zoning districts in which residential and non-residential land uses coexist, including B-5, B-6, I-L, I-Lb, and others. The most stringent sound levels require that uses not exceed 60 dBA during the day (7 am to 10 pm) and 50 dBA at night (10 pm to 7 am). For that reason, 50 dBA at the nearest residences is considered a design goal for this sound analysis. Zoning plans prepared by Dewberry Engineers, Inc. dated 9/28/16 were used as a basis for this analysis.

A daytime and nighttime survey of the ambient sound levels in the area was conducted on October 3, 2016 using standardized and calibrated instruments. Traffic sounds on Congress Street dominates the sound in the area even though the Portland International Jetport, Interstate 95 and Interstate 295 are all within about a mile of the site. Because of the nearby busy Congress Roadway, the sound levels peak during the pass-by. By using the common statistical metrics, the reported sound levels represent the background sound (when no nearby cars or planes are affecting the levels). The daytime background (L90) level is 58 dBA, which includes sound from background traffic, but excludes the sound from direct pass-byes. The time average (Leq) level is 69 dBA, which averages all moment-to-moment levels including the pass-byes. The highest individual pass-byes observed during the 20 minute sample was a motorcycle at 74 dBA and a medium truck (3 axels) at 71 dBA. The nighttime sound is exposed to the same traffic sounds as the daytime, but pass-byes are much less frequent. The background nighttime level is 39 dBA.

Most of the electronic support equipment will be located within the planned 40' x 30' equipment building and will emit no outdoor sound. There are two sources planned that will generate sound outside the building. The only routine source will be the condensers that support the cooling of the equipment building. The units are specified to be from the Liebert MC series. Because of the critical environmental needs of the building electronics, cooling capacity will be installed to meet future load with redundancy to assure availability. They are expected to operate at 20% power except for the hottest weeks of the summer. For this worst-case noise study, three units were assumed to be operating at 80% capacity.

An infrequent source will be the generator that is planned to the north of the equipment building. The planned equipment is an MTU 100-150 natural gas fired generator. It will be installed on a concrete pad with the top of the unit at approximately 6 feet above grade. The generator will be installed within a sound attenuating enclosure that is configured specifically to operate with low sound emissions. The MTU equipment will be installed within an enclosure designed for quiet operation. The generator will emit sound in the low 60's dBA at a distance of 23 feet in this configuration. The generator will always be tested during the daytime for only one half hour per week. These tests are a maintenance operation to assure the equipment availability in case of an emergency. The only other reason that the equipment would operate is to support the facility during a loss of utility power.

The purpose of this study is to determine the potential effect of the facility equipment at the nearby community locations. To predict the facility's sound at sensitive residences, the facility equipment was incorporated into a sound propagation model to account for the 3 dimensional orientations of the project and community. The model calculates the sound at specific locations that are shown in Figure 1. The equipment orientation is an important factor in sound propagation. Figure 2 shows the specific configuration and features that were assumed in the study. The modeling results provide a conservative estimate of the equipment sound during its limited operation. The worst case analysis (all equipment) is expected to be 48 dBA at the nearest residence. The property line will be closer to 50 dBA. The more typical operation is with condensers only, which will be 43 dBA at the residence. It is important to note that during daytime hours the facility sound will be below background levels. Based on the above design, a summary of measurements and modeling results at the site and nearest residential use is provided in Tables 1 and 2, respectively. The modeling results at each nearby residence is also shown graphically in Figure 3.

Table 1: Ambient Sound Levels Measured at Residential Setback

	Background (L90)	Time Average (Leq)	Truck	Motorcycle
Daytime	58 dBA	69 dBA	71 dBA	74 dBA
Nighttime	39 dBA	50 dBA	72 dBA	

Table 2: Predicted Equipment Sound Levels at the Based on Manufacturer Data

All Equipment (Gen plus HVAC)	Residential (dBA)	Res Prop/Line (dBA)
	48 or less	50 or less
(HVAC only)	43 or less	45 or less

The City's code also states that uses should employ best practicable sound abatement techniques to minimize sound impacts. In addition to the fencing and plantings, an acoustical barrier is proposed on the inside of the 9-foot stockade fence to the northwest of the generator. In conjunction with the acoustical enclosure for the generator, these features are expected to reduce the sound from facility to 50 dBA or below at the nearby residential use under all operating conditions.

I certify that the analysis of sound levels is accurate and consistent with analysis and prediction methods that are common to the acoustic analysis of such sources. I have reviewed the requirements of the City of Portland and certify that the compliance is indicated. I am qualified to make this statement based on training and experience in conducting analyses of environmental sounds. I am a Certified Consulting Meteorologist with more than 20 years' experience conducting environmental analyses in the technical areas of air quality, noise, and visual aesthetics. I have published many refereed papers on various aspects of environmental noise. I have analyzed the noise emissions of major industrial projects such as power plants, wastewater treatment plants and manufacturing plants. Related to these analyses, I have testified as a technical expert before the Energy Facility Siting Boards of Massachusetts, Rhode Island and Connecticut and Maine. I have also testified before many regional and municipal approval boards in Massachusetts, Rhode Island, New Hampshire, Maine, New York, Michigan, Illinois, and California. I request that you also accept my statement pertaining to this project on behalf of Verizon Wireless.

Thank you for your attention.

Respectfully,

Modeling Specialties

Douglas L. Sheadel

Douglas L. Sheadel, CCM
Principal

Figure 1: Overview of the Project Area Showing Sources, Receptor and Distances to the Nearest Residences

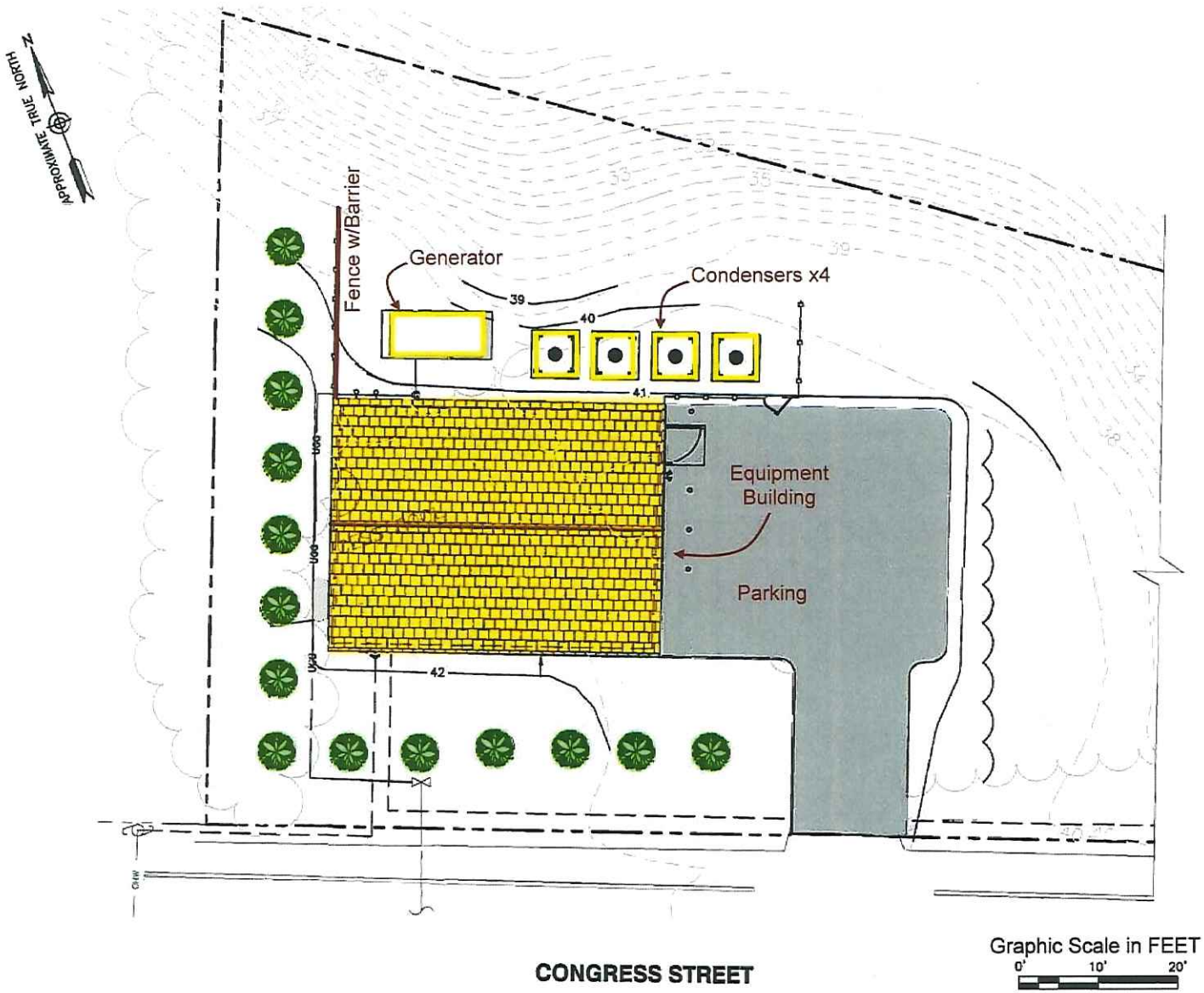

Figure 2: Equipment and Configuration of the Sources Included in the Sound Level Modeling

Figure 3: Graphical Summary of the Modeling Results, Showing Sound Levels at the Nearest Residences