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Maggie Oldfield
Thayer Nursery
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Subject Acoustics Report
Thayer Nursery
Acentech Project Number 626238

Dear Ms. Oldfield:

On Wednesday June 3rd, I visited the Thayer Nursery at 270 Hillside Street in Milton MA, to conduct noise measurements of the typical landscaping activities that take place at the site. I recorded a series of measurements of these activities at various points on the property, including at the property lines where the proposed fences may be installed. The following report summarizes my observations and measurement results from my visit and provides recommendations on what measures will be effective in mitigating the noise experienced by neighbors.

OBSERVATIONS AND MEASUREMENTS

Observations

The primary sources of noise at the site are the Bobcats used to move landscaping materials and gardening materials and the trucks that deliver materials to the site. The most continuous source of noise is the Bobcats which can operate for long periods throughout the day and typically operate every day. The delivery trucks are usually on site for short periods at a time, deliver only between 9 am and 2 pm, and do not come every day.

The engine noise from the trucks was not significant compared to the engine noise of the Bobcats, although the more transient noises (backup alarms, and motor/ impact noise when offloading materials) were more noticeable.

The Bobcats and trucks operate mainly on the Southwest side of the barn, where the landscaping materials are offloaded. However, there are occasions where both Bobcats and trucks operate on the Northwest or North East sides of the barn (when the trucks are turning around to leave, and the Bobcats are needed for farming activities at other areas of the site.)

During my visit we discussed the placement and height of the proposed sound barrier fences at the edges of the property. At the Northeast property line there is a downward slope that appears to continue out to the neighbor's property. As a result, the elevation is slightly lower (1-2 ft.) at the proposed fence location than at the work site on the north eastern side of the barn.

Measurements

The majority of measurements were taken near the landscaping area on the Southwestern side of the barn (as indicated by the red star) and along the property lines on the Northeast and Southeast edges of the site. Noise levels were calculated at these locations (and compared to the measured levels to ensure accuracy in the calculations), and at locations further into the neighbors property where I was unable to measure at the

time of my visit. Using these calculations we could estimate noise levels at these locations with the addition of noise barriers.

Figures 1 and 2 show the measured vs. calculated typical (30 sec. L10) A-weighted sound levels at the site for typical landscaping and other on site activities. The figures also show the background sound levels resulting from other activities (street noise, street construction noise, nature sounds, etc.). While the street noise and construction noise from the street was noticeable in some locations, on the Northeast side of the property, it did not significantly affect the background sound level already present from natural sources. This street and construction noise was also occasionally noticeable on the Southeast side of the property.

Figure 1 shows the measured and calculated noise levels for typical operation of a single Bobcat in the new landscaping area (NS1) and the old landscaping area (NS2).

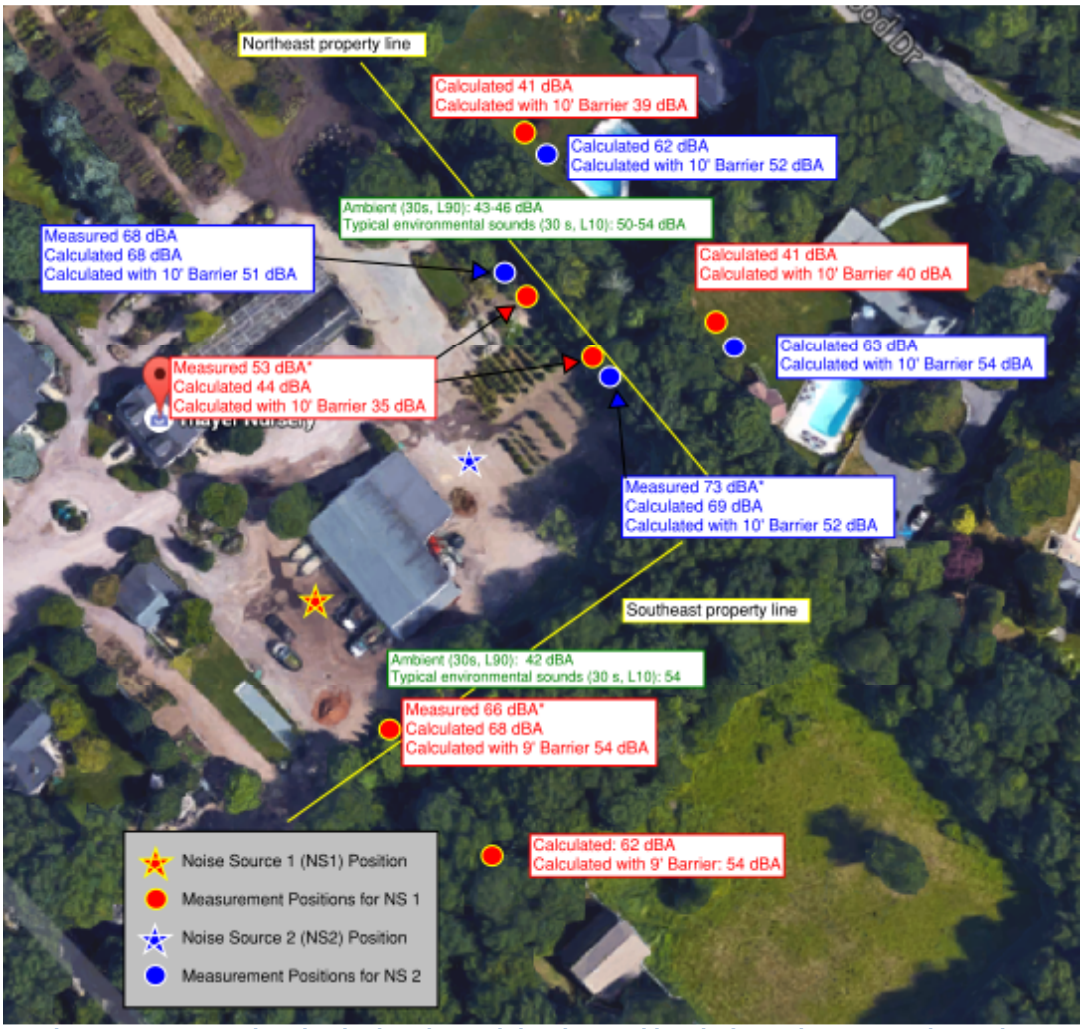

Figure 1: Measured and calculated A-weighted sound levels for Bobcat operation noise.

Figure 2 shows the measured and calculated noise levels for a typical delivery involving a heavy truck (along with 2 Bobcats idling) in the new landscaping area (NS1), and the noise levels for the truck departing (NS2).

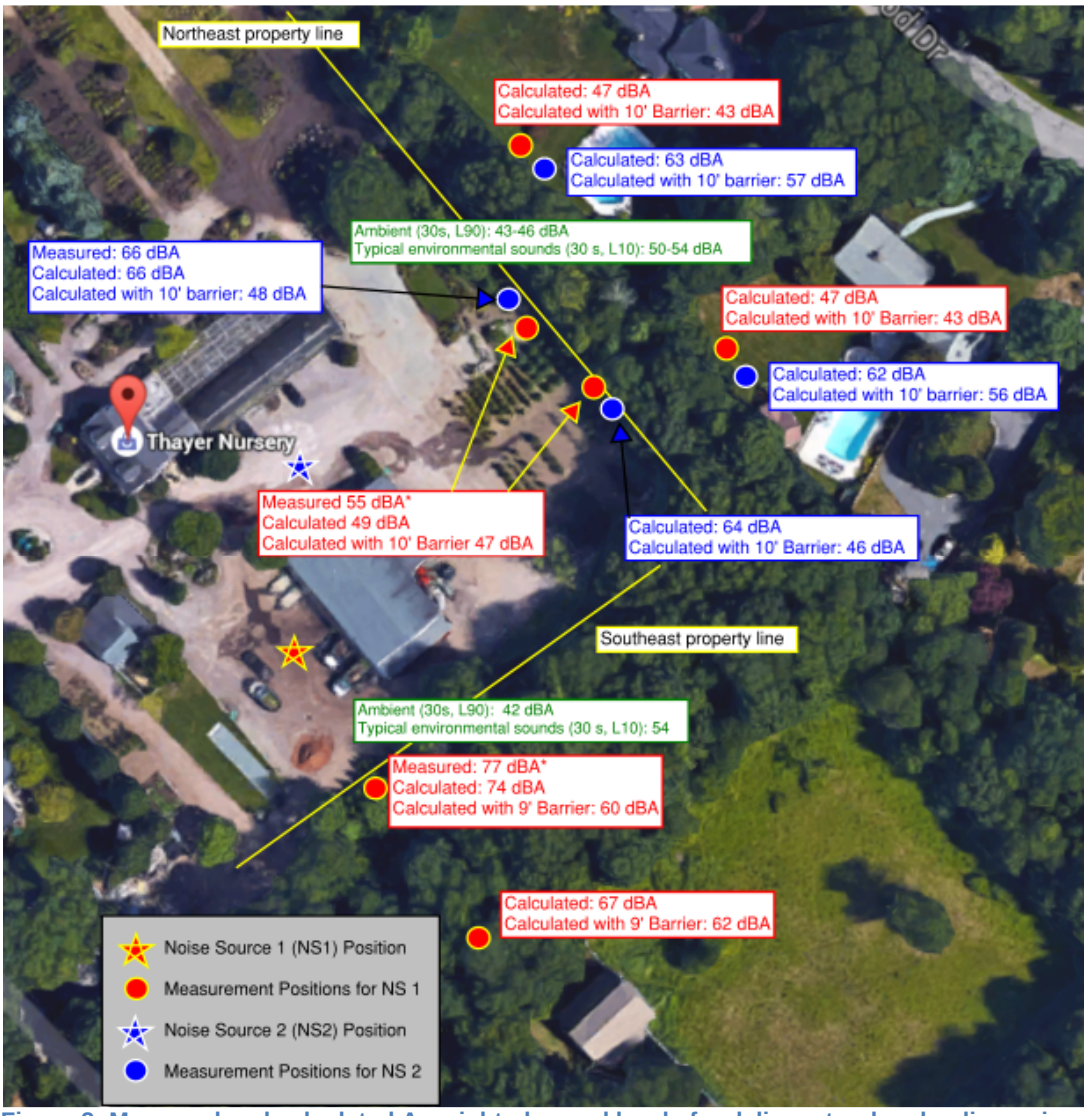

Figure 2: Measured and calculated A-weighted sound levels for delivery truck unloading noise.

*When calculated levels differ from measured levels, measured levels were controlled by unrelated noise around the site (street traffic, road construction, nature sounds.)

DISCUSSION AND RECOMMENDATIONS

The primary focus of these measurements was the noise from landscaping activities, marked by the red star in Figure 1 and both the red and blue stars in Figure 2. We understand that other Bobcat activities (marked by a blue star in Figure 1) would be considered farming activities and fall under a separate permit with different conditions.

Figures 1 and 2 above show the calculated noise levels at the property lines with and without the added sound barriers. For comparison, a standard automobile travelling 30 mph on typical pavement (as is likely common on the streets surrounding the site) will produce a noise level of approximately 63 dBA at 50 ft.

Our calculations indicate that the sound barriers will have a varying effect on the noise levels depending on the nature and location of the noise source. A reasonable goal is for new barriers to reduce landscaping noise to levels similar to typical street noise in the area.

The barriers will have the greatest effect on noise sources near the barrier and lower to the ground. Likewise, noise barriers are more effective at reducing high frequency noise, as low frequency noise is likely to diffract over the top of the barrier. This means that the actual reductions experienced are likely to be smaller at low

frequencies, and possibly higher at high frequencies, than the overall levels indicated in the figures above.

The barn is currently acting as a barrier between the new landscaping area and the neighbors to the Northeast. As a result, any additional barriers at this property line will have only a minimal effect (an additional 2-6 dB or reduction) when the noise source is located at the new landscaping area.

A barrier at the Southeast property line will be more effective for the majority of landscaping noise as there is currently no structure acting as a barrier and the elevation change between the site and the adjacent property is not as dramatic. For typical Bobcat operation, the barrier may provide 8-10 dB of attenuation depending on the listener's proximity to the site. For delivery truck noise, the barrier's benefit will drop off faster as the listener moves further from the barrier, due to the height difference of the noise sources. For each 10 dB of difference in noise level, the perceived loudness of the noise will change by a factor of 2. Therefore people then to perceive a 10dB increase as twice as loud, and a 10dB decrease as half as loud.

In some cases the calculated levels were lower than the typical environmental sound levels (30 sec. L10) measured at the site. These typical sound levels are different from the ambient noise level (30s, L90) at the site as the ambient level is determined by the quietest 10% during the given measurement time, while the typical environmental sound levels are determined by the loudest 10%. As a result the ambient levels will often be lower, and will not show the effects of some transient environmental noise, such as animal sounds or street traffic.

The typical environmental levels have been included for reference because it is likely that that some portion of the landscaping noise measured at these locations were contributed from environmental noise sources; which accounts for the discrepancy between the measured and calculated values. However, landscaping noise below the ambient level can be (and was) still audible at the site, due to the different frequency characteristics of the sound. Typically a specific noise will be audible unless it is 10 or more dB below the ambient noise level, and this can vary depending on the specific spectra of the noise and ambient level.

During my visit we discussed several possibilities for sound barriers at the northeast and southeast property lines. The calculations above were done assuming a 10ft. tall fence at the northeast property line (including the reduced effective height due to the slope), and an 8ft. barrier on a 1 ft. berm. Sound barrier can be any type of structure that provides a solid (without gaps), barrier between the noise source and the receiver. This can include a pressure treated wooden slat fence (special care must be taken to ensure there are no gaps between the slats, such as backing it with plywood) or a high tensile metal fence with an attached sound barrier treatment, such as loaded vinyl.

We trust this report provides you with the information you need at this time. If you have any questions or concerns do not hesitate to contact me at 617-499-8031.

Sincerely,

Robert Connick
Consultant

CC: Jonah Sacks, Acentech