March 20, 2026

Howell Township Planning Commission
3525 Byron Road
Howell, MI 48855

To the members of the Howell Township Planning Commission,

The following addendum to the Decibel Limits and Noise Research Report is intended to supplement the report and is being provided for consideration from the Howell Township Resident Research Committee (RRC).

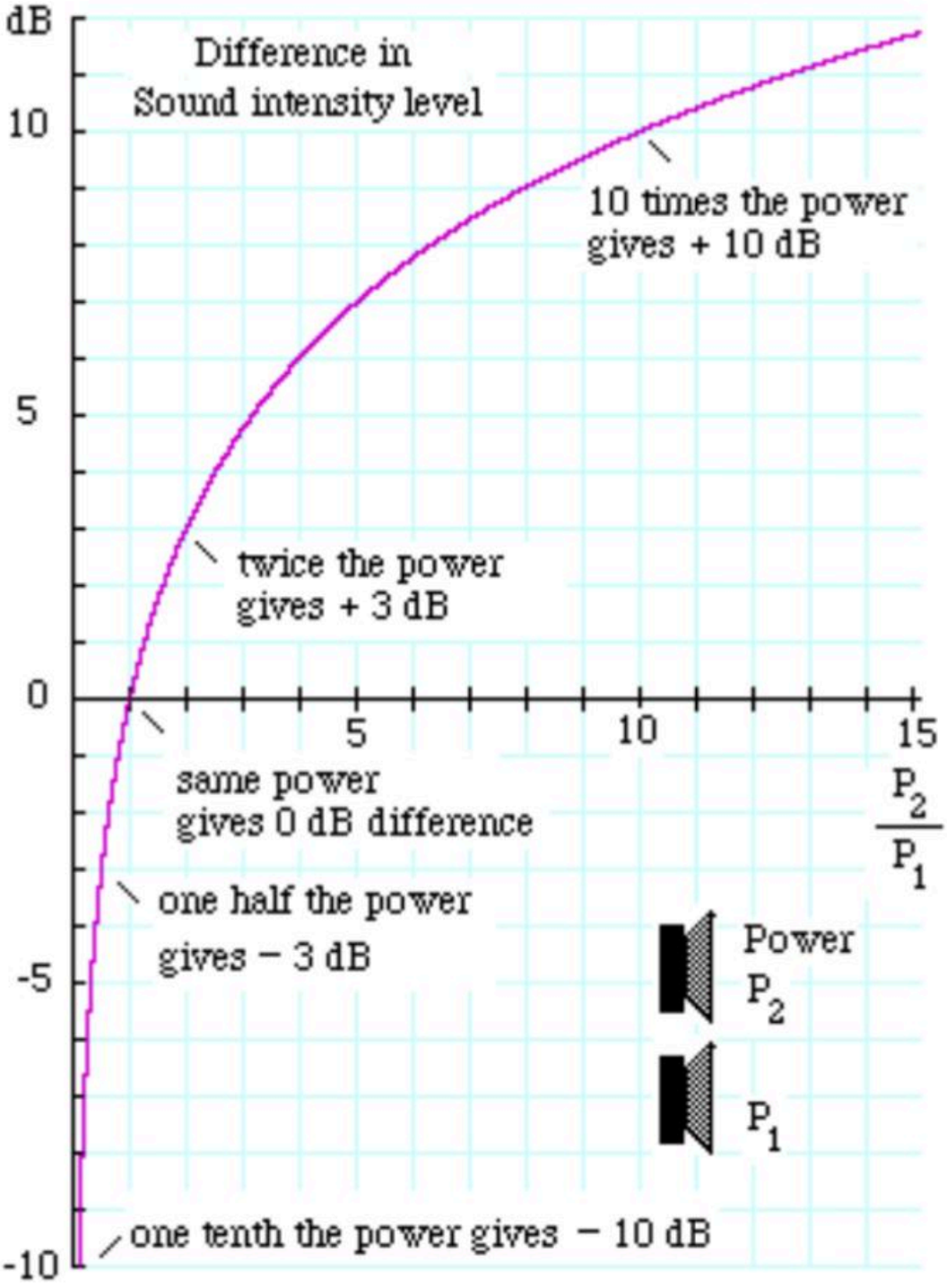
ADDENDUM/BACKGROUND INFO for DECIBEL LIMITS & NOISE RESEARCH

Addendum / Background Information:

In our written report about decibel limits, we realized we may have missed some critical background context about how decibels and frequencies work, because it is an integral piece of understanding when discussing the impacts of noise. When considering whether to allow more or fewer decibels in an ordinance, it is important to keep in mind what the actual impact is on sound levels, because even a small number of additional decibels can have a significant impact on overall noise.

Decibels are not a linear unit of measurement of sound intensity, they are logarithmic (1, 2). It is not like a scale on a measuring stick, it is more akin to an exponential increase, although the rate of logarithmic growth is not constant as with exponential growth. The prefix “deci-“ indicates a base of ten, and an increment of 10dB represents a tenfold increase in the intensity of sound, and an increment of 20dB represents a 100-times increase in intensity (1). To put in perspective of the information we are about to present: 80dB is 100 times more intense than 60dB. An increase of about 3dB is a doubling of the sound intensity, so 60dB is more than double the intensity of 55dB (1). Intensity is not quite the same as “loudness”, in terms of perception by the human ear. An increase of 10dB, to be fair, is not perceived as a tenfold increase in volume; an increase of 10dB is typically perceived as a doubling in volume, or loudness (2).

Below on page 2, are a couple of additional graphics to help put the information presented in this background information and the larger decibel limit and noise research report into context. The first is a graph illustrating how decibels are not linear (3). They are a logarithm of the ratio of two sound pressure levels:


dB
Difference in
Sound intensity level
10
5
0
-5
-10
10 times the power
gives + 10 dB
twice the power
gives + 3 dB
same power
gives 0 dB difference
one half the power
gives − 3 dB
one tenth the power gives − 10 dB
5
10
15
P2
P1
Power
P2
P1

We wanted to provide this additional information for clarity on the topic of decibels in relation to noise limits, how limit adjustments affect overall sound intensity and so that the Planning Commission would have this additional information available for reference at their convenience when diving into the topic of decibel limits and noise.

Respectfully,

The Howell Township Research Committee

Sources:

1: https://engineeryoursound.com/how-to-understand-the-unit-of-decibels-simple-explanation/

2: https://www.nps.gov/subjects/sound/understandingsound.htm

3. https://www.animations.physics.unsw.edu.au/jw/dB.htm