1. Agenda

    Documents:

        2022.05.24_BOH_AGENDA.PDF

2. Meeting Materials

    Documents:

        SOUND_BARRIER_WALL_REPORT_042922.PDF

RECEIVED
By Town Clerk/jfh at 2:02 pm, May 19, 2022

Town of Southborough
Board of Health
9 Cordaville Road, Lower Level
Southborough, MA 01772-1662

Phone: (508) 481-3013

Tuesday, May 24, 2022 at 9:30AM
Meeting Agenda
Hybrid Meeting – McAuliffe Meeting Room (Town House - 17 Common Street)
& Virtual

Pursuant to Chapter 20 of the Acts of 2021, An Act Relative to Extending Certain COVID-19 Measures Adopted During the State of Emergency, signed into law on June 16, 2021, this meeting will be conducted via remote participation. This meeting may be watched or residents may participate in the meeting remotely with the meeting link at: https://www.southboroughtown.com/remotemeetings

Business Item (Board May Vote):

1. Public Comment
2. Abutters of Ken's Warehouse & Their Engineers
3. Summer Intern – Noise Complaint Policy
4. Consideration of Community Needs Assessment
5. Opiate Settlement Funds for Southborough
6. Town Continuity of Operations Plan (COOP)
7. Upcoming Meeting Schedule:
    a. Regular Meetings: 6/10/22, 7/12/22
    b. Special Meetings:
        a) 5/31/22 Representatives for Ken's Warehouse & Their Engineers
        b) *An additional meeting may be scheduled after both sides have presented their information.
8. Public Comment

Chelsea Malinowski, Dr. Safdar Medina, Nancy Sacco

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April 29, 2022

Ms. Debbie DeMuria
Mr. Kevin Farrington
58 Flagg Road
Southborough, MA 01772

Ref 4659

Re: ***Ken's Foods Sound Wall Modeling Analysis***

Dear Debbie and Kevin:

Tech Environmental, Inc. (Tech) performed an acoustic modeling analysis to determine the appropriate dimensions for a sound wall to reduce noise impacts from Ken's Foods refrigeration trucks and loading dock activities (herein referred to as the Facility) on the western side of the site abutting the parking lot.

Presented below is a summary of our modeling methodology and findings, and recommended sound wall design.

Background

Sound mitigation measures requires either reducing the noise either at the source or at the property of the aggrieved owner. Normally, the most feasible options to reduce sound impacts from trucking activities include changing operational hours to minimize trucking activities late at night; eliminating truck idling operations by complying with Massachusetts 310 CMR 7.11 anti-idling regulation[1]; providing electrification in the form of electric transport refrigeration unit (eTRU) connection for reefer trucks, or strategically locating sound barrier(s) at the Facility. Given the Facility's reluctance to change operational hours or install eTRU connection for refrigeration trucks, and the difficulty of enforcing the Massachusetts anti-idling regulation, the only feasible option is to install sound barriers. To properly evaluate a sound barrier's sound attenuation capabilities requires performing sophisticated acoustic modeling to determine if the barrier will be effective in reducing sound impacts beyond the Facility property line.

Common Measures of Environmental Sound

Noise is defined as "unwanted sound", which implies sound pressure levels that are annoying or disrupt activities that people are engaged in. The human sense of hearing is subjective and highly variable between individuals. Noise regulations and guidelines set quantitative limits to the sound pressure level (measured with sound analyzers and predicted with computer models) in order to protect people from sound exposures that most would judge to be annoying or disruptive.

The loudness of a sound is dependent on the radiated energy of the sound source and the propagation and attenuation characteristics of the air. The standard unit of sound pressure level (L_p) is the decibel (dB). A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 40 dB is added to another sound of 40 dB, the total is only a 3 dB increase, not a

[1] 310 CMR 7.11 Transportation Media, (1) Motor vehicles (b).

doubling to 80 dB. For broadband sounds, a 3 dB change is the minimum change perceptible to the human ear. Table 1 presents the perceived change in loudness of different changes in sound pressure levels.

TABLE 1

SUBJECTIVE EFFECT OF CHANGES IN SOUND PRESSURE LEVELS

Change in Sound Pressure Level	Perceived Change in Loudness
3 dB	Just perceptible
5 dB	Noticeable
10 dB	Twice (or half) as loud

Acoustic Modeling Methodology

Tech performed acoustic modeling using the CadnaA model to determine the appropriate dimensions for a sound wall to reduce noise impacts from the Facility. CadnaA is a sophisticated 3-D model for sound propagation and attenuation based on International Standard ISO 9613.[2] Absorption of sound assumed standard conditions and is significant at large distances and at high frequencies. ISO 9613 was used to calculate propagation and attenuation of sound energy by hemispherical divergence with distance, surface reflection, ground, and shielding effects by barriers, buildings, and ground topography. Offsite topography was determined using MassGIS digital terrain models.[3]

The assumptions in our acoustic modeling analysis are as follows:

1. Ground surfaces were assumed to be semi-reflective (a ground factor of 0.5), approximating worst-case, winter frozen ground conditions.
2. Site layout is based on Ken's Foods warehouse expansion plans.[4]
3. Twelve (12) receivers representing residences on Flagg Road and Eastbrook Farm Road were included in the model (see Figure 1).
4. Both first floor and second floors of each residence were included in the model.
5. The sound sources included refrigeration trucks and trucks idling in the parking lot based on refrigeration sound data provided in the David Coate[5] study and near field measurements Tech has collected from other projects. And a maximum of 16 trucks in an hour driving around the parking lot per the truck traffic data provided by David Coate[6].

[2] International Standard, ISO 9613-2, Acoustics – Attenuation of Sound During Propagation Outdoors, -- Part 2 General Method of Calculation.

[3] https://docs.digital.mass.gov/dataset/massgis-data-digital-terrain-model-dtm-files.

[4] John G. Crowe Associates, Inc., Warehouse Expansion Ken's Food, Inc. 325 Turnpike Road, Southborough, MA, August 18, 2021.

[5] Ken's Foods Facility Noise Analysis (West Side)-Southborough, Massachusetts data June 12, 2020.

6 Email from David Coate to Marc Wallace, June 29, 2021.

6. The heights of the idling truck and refrigeration trucks were 6.6 feet and 9.8 feet tall, respectively.
7. The acoustic model was calibrated based on sound measurements included in the David Coate study.
8. The sound wall is absorptive on the inside of the wall facing the Facility to reduce reflective noise.

The sound wall attenuation criterion is to achieve a minimum of 5-dBA sound reduction, which is a noticeable change (see Table 1 above). This sound reduction criterion is used by the Federal Highway Administration (FHWA) and adopted by the Massachusetts Department of Transportation (MassDOT) to assess if a sound wall is feasible.[7,8]

Iterative modeling was performed to determine the appropriate height and length of the wall to achieve a minimum of a 5-dBA sound reduction at both the first and second floors of the residences.

Findings and Sound Wall Design

The results of the acoustic modeling determined that the sound wall would need to be approximately 920 feet long and 16 feet tall to achieve a minimum of a 5-dBA sound reduction. A taller and/or longer wall provided minimal improvement. Table 2 and 3 provide the sound attenuation at each residence for the total sound at 63 Hertz (Hz), respectively. Figure 2 shows the location of the sound wall along the western side of the Facility site near the truck loading dock area and parking lot. Figures 3 and 4 present sound contour maps showing the estimated sound levels with and without the wall, respectively. The focus of these figures should not be on the estimated sound levels, but to visually show the change in sound levels with construction of a sound wall shown in Figure 2.

The sound wall design should be based on materials that can achieve a five (5) pounds per square-foot (lbs/sf) density. These materials can be pressure treated wood, concrete, and/or insulated galvanized metal with perforated metal on the inside of the wall.

If you have any questions, please call me at 781-890-2220 x30.

Sincerely,

TECH ENVIRONMENTAL, INC.

Marc C. Wallace, QEP, INCE
Vice President

4659/Sound Barrier Wall Report 042922
cc: Nathaniel Stevens, Esq., McGregor & Legere, P.C.

[7]FHWA, https://www.fhwa.dot.gov/environment/noise/noise_barriers/acceptance_criteria/evaluation_tools/et01.cfm downloaded April 21, 2022.
[8]Massachusetts Department of Transportation, Massachusetts Department of Transportation Type I and Type II Noise Abatement Policies and Procedures, July 13, 2011

Table 2
Predicted Sound Wall Reduction

Address	First Floor Sound Reduction (dBA)	Second Floor Sound Reduction (dBA)	5 dBA Change or Greater?
58 Flagg Road	-7	-8	Yes
60 Flagg Road	-7	-8	Yes
64 Flagg Road	-7	-7	Yes
68 Flagg Road	-7	-8	Yes
56 Flagg Road	-7	-8	Yes
54 Flagg Road	-7	-8	Yes
50 Flagg Road	-7	-8	Yes
24 Flagg Road	-6	-6	Yes
28 Flagg Road	-7	-7	Yes
48 Flagg Road	-7	-7	Yes
7 Eastbrook Farm Road	-7	-5	Yes
5 Eastbrook Farm Road	-7	-7	Yes

Table 3
Predicted Sound Wall Reduction at 63 Hertz

Address	First Floor Sound Reduction (dB)	Second Floor Sound Reduction (dB)	5 dB Change or Greater?
58 Flagg Road	-10	-10	Yes
60 Flagg Road	-10	-10	Yes
64 Flagg Road	-10	-8	Yes
68 Flagg Road	-10	-10	Yes
56 Flagg Road	-10	-10	Yes
54 Flagg Road	-10	-10	Yes
50 Flagg Road	-10	-10	Yes
24 Flagg Road	-2	-2	Yes
28 Flagg Road	-7	-4	Yes
48 Flagg Road	-10	-10	Yes
7 Eastbrook Farm Road	-9	-2	Yes
5 Eastbrook Farm Road	-10	-9	Yes

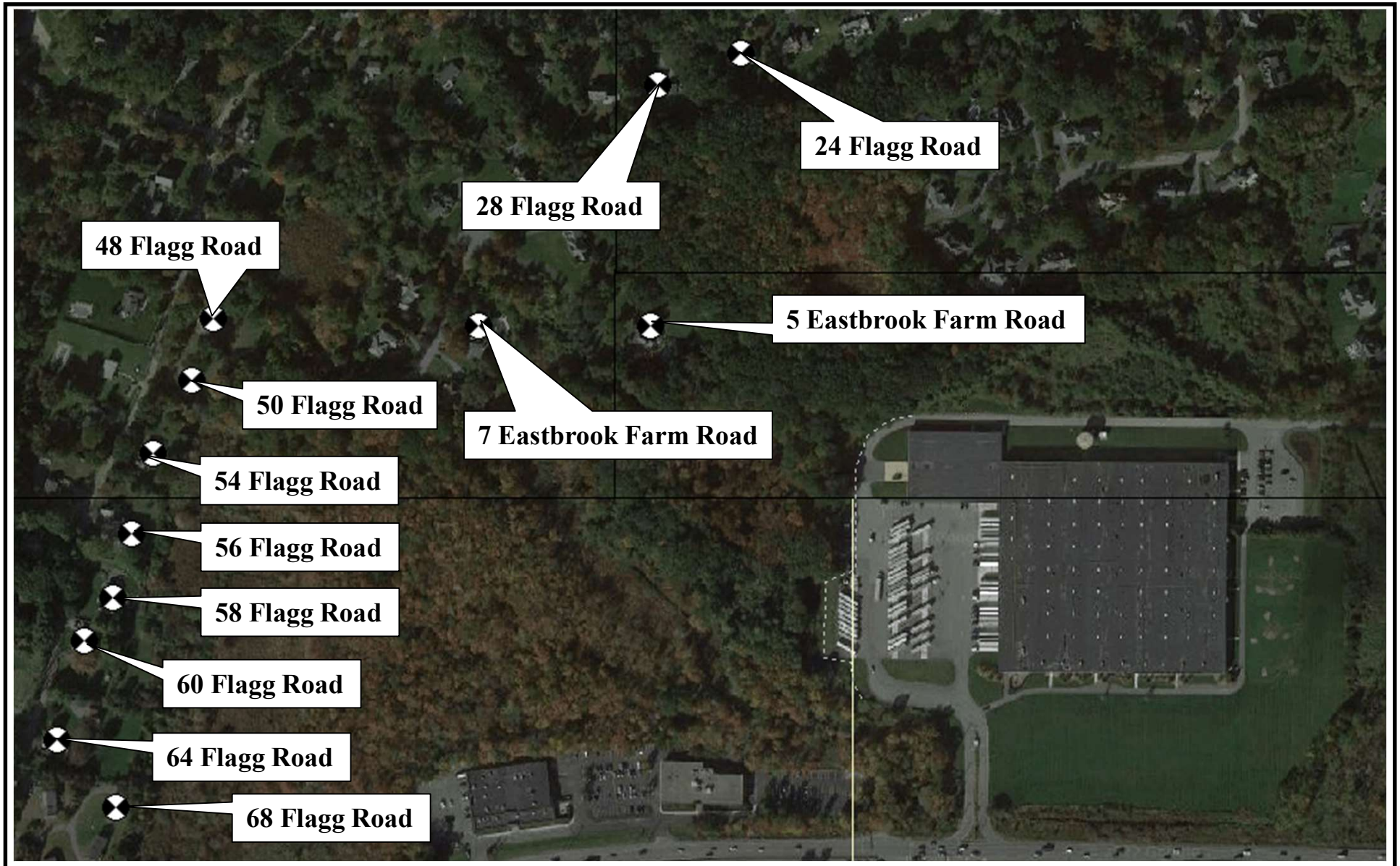

Figure 1
Receiver Locations
Ken's Foods

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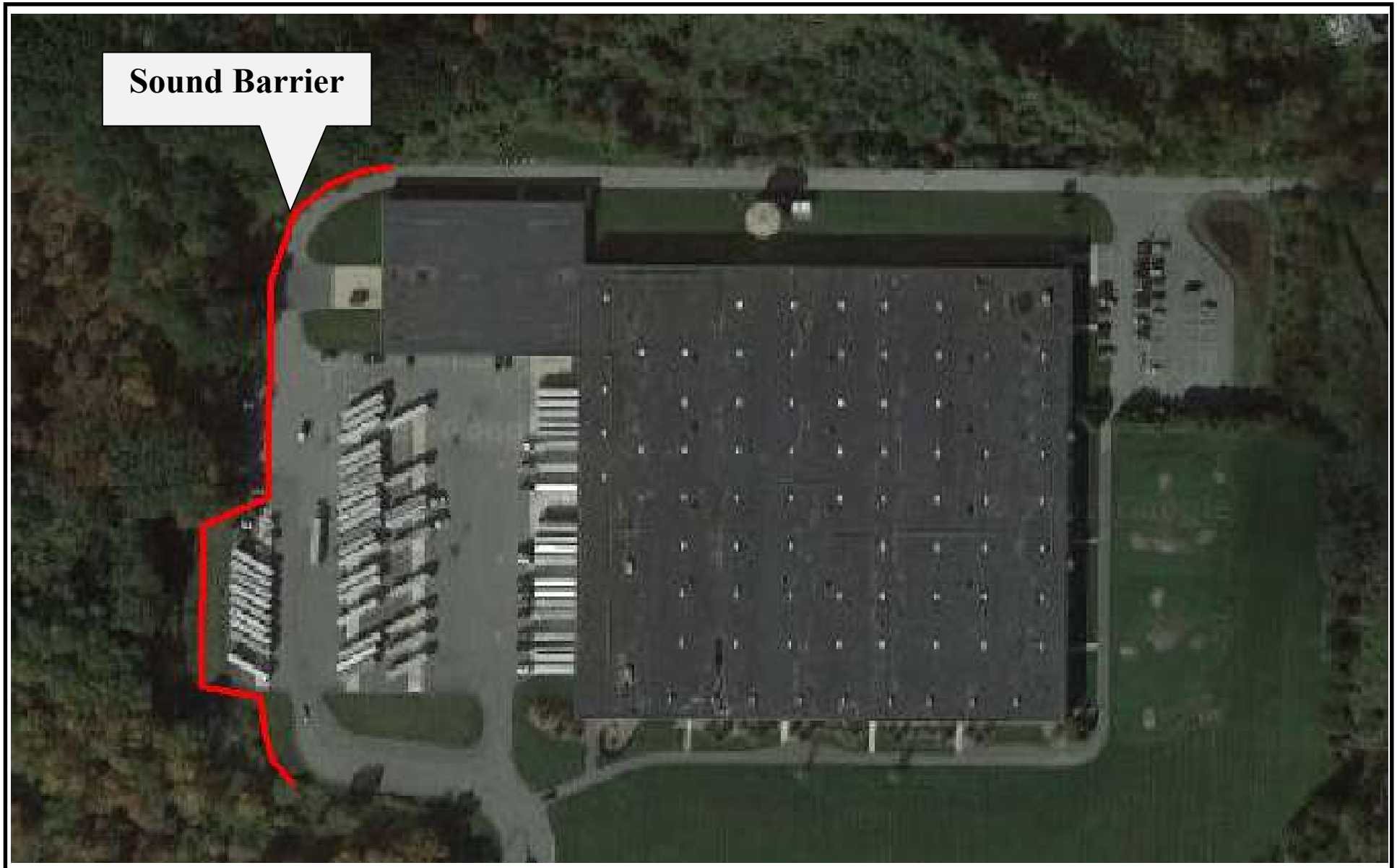

Figure 2
Proposed 16-Foot-Tall Sound Barrier
Ken's Foods

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Figure 3
Sound Level Contours without 16-Foot-Tall Sound Barrier
Ken's Foods

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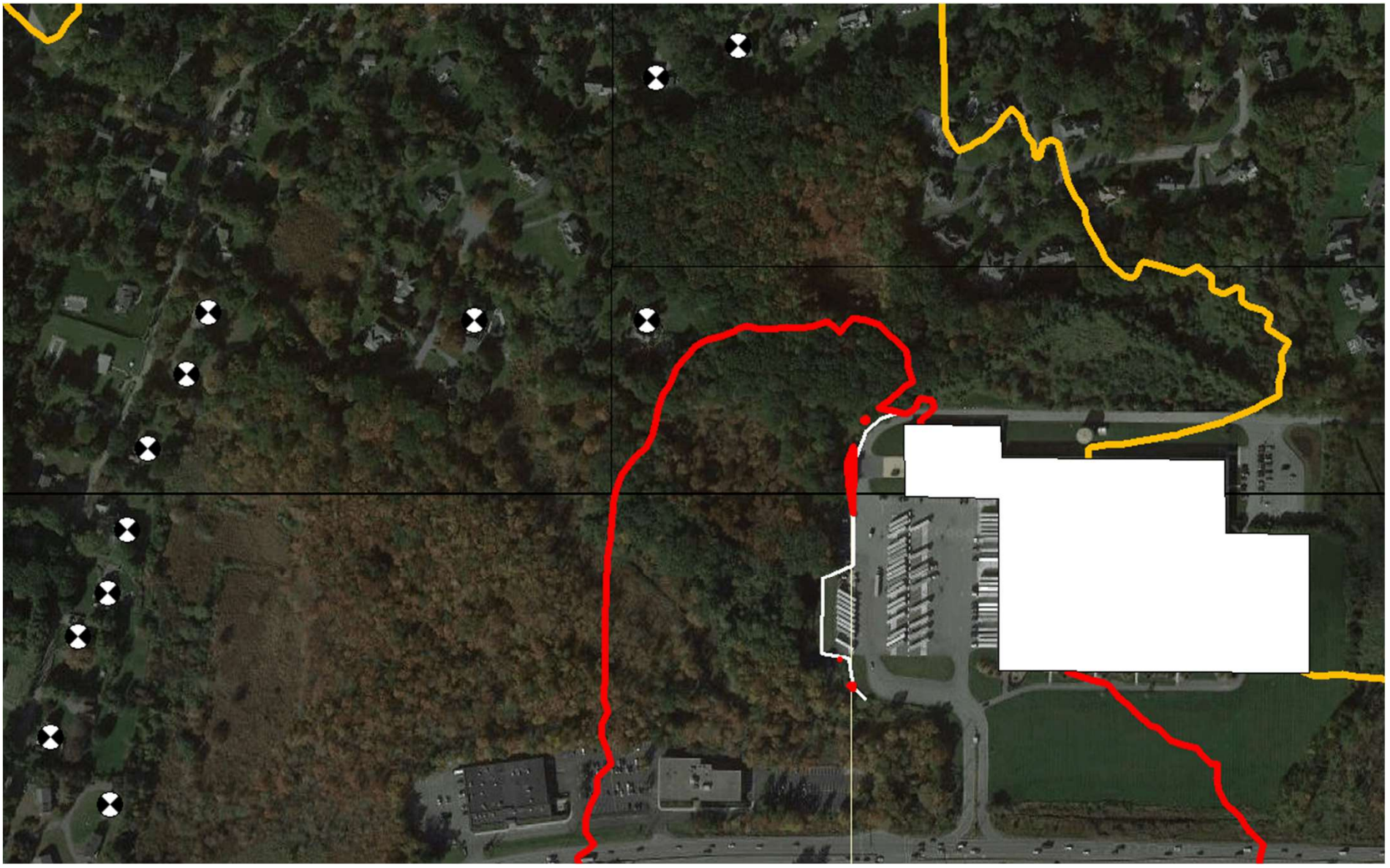

Figure 4
Sound Level Contours with 16-Foot-Tall Sound Barrier
Ken's Foods

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