EVERSOURCE ENERGY

56 Prospect Street
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

September 28, 2021

Melanie Bachman, Esq.
Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: **PETITION NO. 1455** - The Connecticut Light and Power Company d/b/a Eversource Energy petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for proposed modifications to its existing Mystic Substation located at 148 Greenmanville Avenue, Stonington, Connecticut and related electric transmission line structure improvements.

Dear Ms. Bachman,

On July 29, 2021 the Connecticut Siting Council ("Council") ruled that the subject project would not have a substantial environmental effect. Conditional with the Council's ruling included:

- Condition 2, which required submittal of a visual mitigation plan; and

- Condition 4, which required that verification that noise levels from the proposed series reactors would comply with DEEP Noise Control Regulations be submitted to the Council prior to construction.

Attached, please find copies of the visual mitigation plan, developed with the abutter to the proposed modifications, and a sound study that was conducted by an outside consultant verifying that the substation/series reactor would be in compliance with applicable noise regulations.. Please do not hesitate to contact me at Kathleen.shanley@eversource.com or at (860) 728-4517 if you have any questions or concerns.

Sincerely,

Kathleen M. Shanley
Manager – Transmission Siting

Attachments

September 27, 2021

Mr. Thanh Nguyen
Eversource Energy
107 Selden Street
Berlin, CT 06037

SUBJECT: Environmental Sound Evaluation
Mystic 13K Substation – Series Reactors
Stonington, CT

Dear Mr. Nguyen,

Cavanaugh Tocci Associates has evaluated environmental sound impacts associated with proposed modifications at the Mystic 13K Substation in Stonington, Connecticut. The objectives of this evaluation were:

- To quantify and characterize existing background sound in the community surrounding the project,
- To define acoustic design goals based on applicable noise regulations,
- To estimate the acoustic impact of the proposed project in the surrounding community.

Results of the evaluation are summarized herein. Appendix A of this report is a glossary of relevant acoustic terminology.

Existing Background Sound

Sound is a feature of all environments. Sound is only objectionable when it is inconsistent with its environment; by being either too loud or by being distinctive in character (i.e. tonally or temporally varying). The goal of acoustical design is to render facility noise consistent with the level and character of other sounds in the environment. To this end, the following environmental noise analysis evaluates sound produced by the proposed Project in light of existing environmental sound levels.

An environmental sound survey was conducted to quantify and characterize the existing acoustic environment in the vicinity of the project site. To document typical background sound levels in the project area, the sound monitoring program consisted of continuous sound monitoring for a planned weeklong period beginning at 12:00 noon on August 18, 2021. The results of the survey allow both quantitative and qualitative analyses of the acoustic environment surrounding the Project. For this survey two sound monitors were located at substation fence lines. Figure 1 is an aerial photograph of the substation that indicates the two sound monitoring locations.

Sound levels were monitored using Rion NL52 sound level meters outfitted with ½ inch electret microphones and windscreens. The instruments were calibrated before the measurement period using a Larson Davis CAL-200 acoustical calibrator. During the measurements, the microphones were mounted on the substation fence approximately 5 feet above the ground. These instruments and their use conform to ANSI S1.4 for Type 1 precision sound measurement instrumentation and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

For this study, the sound monitors were programmed to record the following hourly A-weighted and one-third octave band environmental noise descriptors:

- Maximum and minimum sound levels (L_{max}, L_{min})
- Percentile sound levels (L_{99}, L_{90}, L_{50}, L_{10}, L_{01})
- Equivalent sound level (L_{eq})

Figure 2 and 3 present selected results of the environmental sound survey. Due to severe weather on August 22, 2021, the measurements performed at location SM-2 end after approximately 4.5 days because of an unintended instrumentation shutdown. The data at both locations indicate nearly constant hourly background sound levels (fair weather) which typically range between 46 dBA and 52 dBA. For the most part background sound levels in this area are dominated by sources at the substation, which can be characterized as containing audible discrete tones.

State of Connecticut Noise Regulation

The State of Connecticut Noise Regulation (Section 22a-69-1 to 7.4) defines limits for environmental sound produced by this project. The sound level limits are based on both emitter and receptor land use classifications, and are listed below in Table 1:

TABLE 1
Connecticut Regulations for the Control of Noise Sound Level Limits (dBA)

	Receptor Class			
Emitter Class	**C**	**B**	**A/Day**	**A/Night**
C	70	66	61	51
B	62	62	55	45
A	62	55	55	45

Definitions

In the above table, day is defined as the time interval 7:00 a.m. to 10:00 p.m. Night is defined as the time interval 10:00 p.m. to 7:00 a.m. Noise Zone Classifications are based on the actual use of the land. Where multiple land uses exist on the same property, the least restrictive limits apply.

A Class A noise zone is land generally designated for residential use or areas where serenity and tranquility are essential to the intended use.

A Class B noise zone includes land uses generally of a commercial nature but also include undeveloped land, and parks.

A Class C noise zone includes uses generally of an industrial nature but also includes utilities such as the substation.

Exceptions and Other Limit Provisions

Section 22a-69-3.3 Prominent Discrete Tones

To offset the undesirable nature of tonal sound in the environment, the regulation penalizes sources of prominent, audible discrete tones. If a facility produces such sounds, the applicable limits in Table 1 are reduced by 5 dBA. In its definitions (Section 22a-69-1.2), the regulation defines a method for identifying prominent discrete tones based on measuring one-third octave band sound levels.

Section 22a-69-3.7. Existing noise sources

Existing noise sources constructed between the effective date of these Regulations and January 1, 1960 shall be provided a permanent five (5) dBA maximum noise level allowance over levels otherwise herein required regardless of subsequent changes in ownership or facility utilization processes at the location of the existing noise source. Existing noise sources constructed prior to 1960 shall be provided a permanent ten (10) dBA maximum noise level allowance over levels otherwise herein required regardless of subsequent changes in ownership or facility utilization processes at the location of the existing noise source. Additionally, all existing noise sources shall be provided twenty-four (24) months in order to achieve compliance with these Regulations if a notice of violation has been, or may be, issued to the source. This time period begins with the effective date of these Regulations, not with the date of the notice of violation.

Facility Acoustic Requirements

Our interpretation of the above referenced regulation follows:

- The substation is classified as a Class C emitter (Utility).
- The north, east, and west property boundaries of the substation abut undeveloped conservation land (Class B receptor).
- The south property boundary of the substation abuts Residential land uses along Pleasant Street (Class A receptors).

- The substation produces sound continuously during daytime and nighttime hours. As such, where the regulations provide more stringent limits for nighttime operation, these will apply.
- Sound produced by the substation can characterized as producing a prominent discrete tone, thus the limits in Table 1 should be reduced by 5 dBA.
- The 2X transformer on the site was installed prior to the effective date of the Regulations (June 15, 1978) but after 1960. As such, sound produced by the 2X transformer is provided a permanent 5 dBA allowance over the Table 1 limits.

Based on our interpretation of the regulations, and our understanding of the various land uses surrounding the site, we have determined that the following limits apply to sound produced by the substation.

- At the nearest residential property boundary south of the substation, the most stringent nighttime limit for a Class C emitter is 51 dBA. This is determined based on the following adjustments:
  - Limit reduced by 5 dBA for containing a prominent discrete tone.
  - Limit increased by 5 dBA for an existing source (Transformer 2X) installed prior to 1978. Note this limit increase only applies to sound produced by the 2X transformer.
- At the property boundaries north, east, and west of the substation, the most stringent limit is 66dBA (based on similar adjustment that are discussed above).

Facility Sound Analysis

Facility related sound impacts that are associated with equipment at the substation have been calculated using CadnaA environmental sound modeling software (Version 2021 DataKustic GmbH). The CadnaA sound modeling software uses algorithms and procedures described in International Standard ISO 9613-2:1996 “Acoustics- Attenuation of sound during propagation outdoors – Part 2: General method of calculation”. This standard and its associated methodology are the most universally accepted approach for environmental sound modeling of industrial and transit sound sources. The methodology described in this standard provides estimates of A-weighted sound levels for meteorological conditions that are favorable for the propagation of sound (downwind with a wind speed of 1-5 meters/sec). This methodology is also valid for sound propagation under well-developed moderate ground-based temperature profile inversions, which commonly occur on clear calm nights.

Our analysis considers the following three scenarios:

1. ***Existing Conditions***

   The model considers all existing sound sources currently at the substation (4 transformers) with sound source data based on fence line and nearfield sound measurements conducted at the facility on August 18, 2021.

2. ***With New Series Reactors***

   The model considers adding three new series reactors at the southeast corner of the site. Sound emission data for the reactors was provided by the equipment manufacturer. These units are very quiet with a worst-case sound emission of 30 dBA when measured at a distance of 50 feet. Under normal operating conditions, the reactors are expected be 10 dBA quieter.

Figures 4 & 5 present the results of the acoustic modeling for the two scenarios described above. Table 2 below provides a summary of our estimates of facility A-weighted sound levels at relevant property boundaries and nearest residences.

TABLE 2
Estimate of Facility Sound Levels at Property Boundaries and Residences(dBA)

Location	Existing Conditions	Series Reactors	Existing With Series Reactors	CT DEEP Nighttime Limit*
West Boundary	37	10	37	66
North Boundary	47	19	47	66
Northeast Boundary	46	22	46	66
East Boundary	45	32	45	66
11 Pleasant St.	39	18	39	51
13 Pleasant St.	43	19	43	51
15 Pleasant St.	49	25	49	51
17 Pleasant St.	49	28	49	51
19 Pleasant St.	47	31	47	51
21 Pleasant St.	43	25	43	51
23 Pleasant St.	41	24	41	51
* Includes adjustments for prominent discrete tone (-5 dBA), and sources installed prior to the effective date of the regulation but not before 1960 (+ 5dBA)				

Conclusion

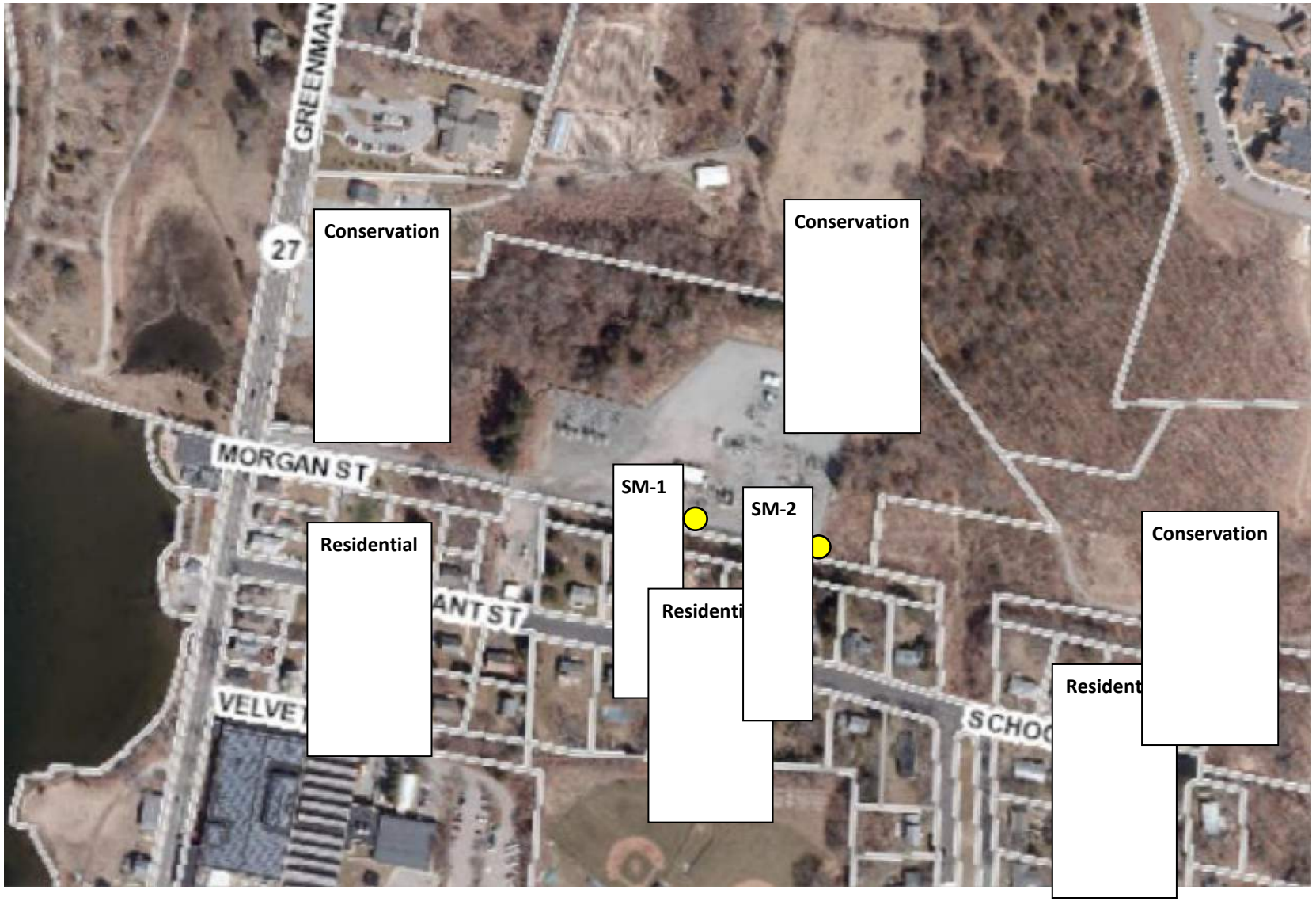
Based on our review of the data presented in Table 2, it is our opinion that sound produced by the substation is currently in compliance with the state noise regulation. Furthermore, sound produced the proposed series reactors will have little or no impact on facility sound emissions.

Sincerely,
CAVANAUGH TOCCI

Douglas Bell

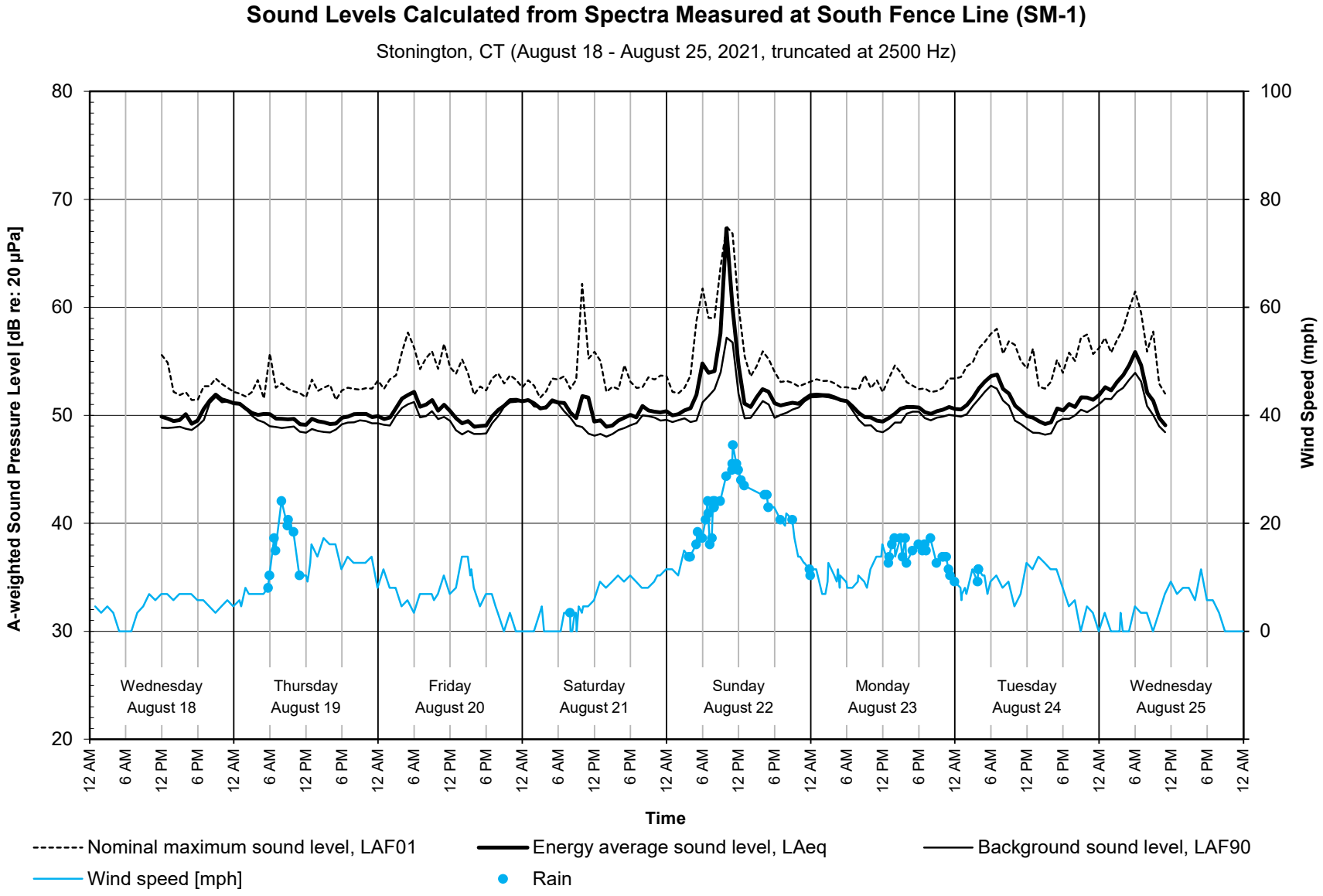
Douglas H. Bell
21232/Mystic SS - Series Reactors - Acoustic Evaluation - Rev 3.docx

FIGURES



Aerial Photograph of Project Area Indicating Property Lines and Sound Monitoring Locations

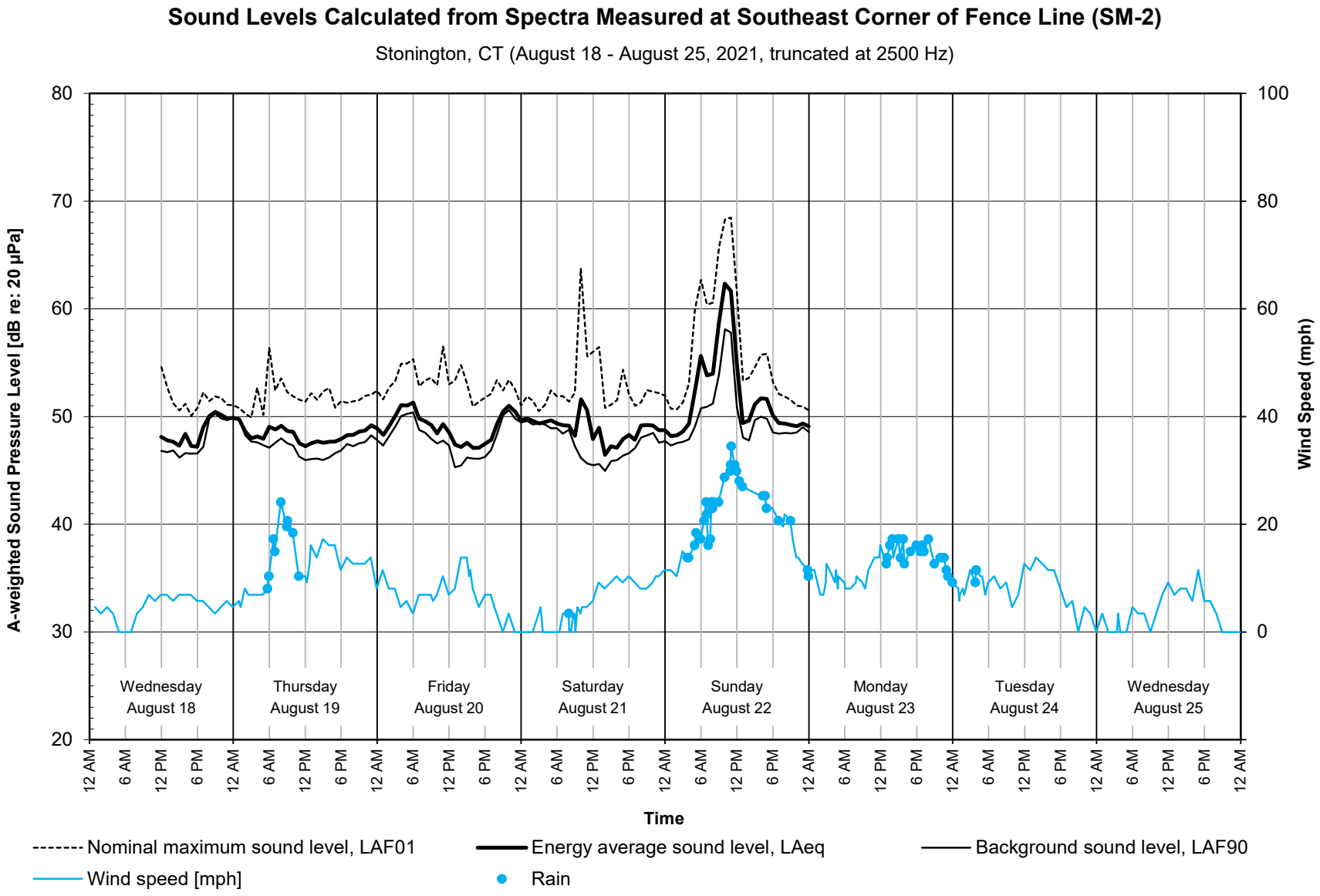
Figure 1



S11

Figure 2

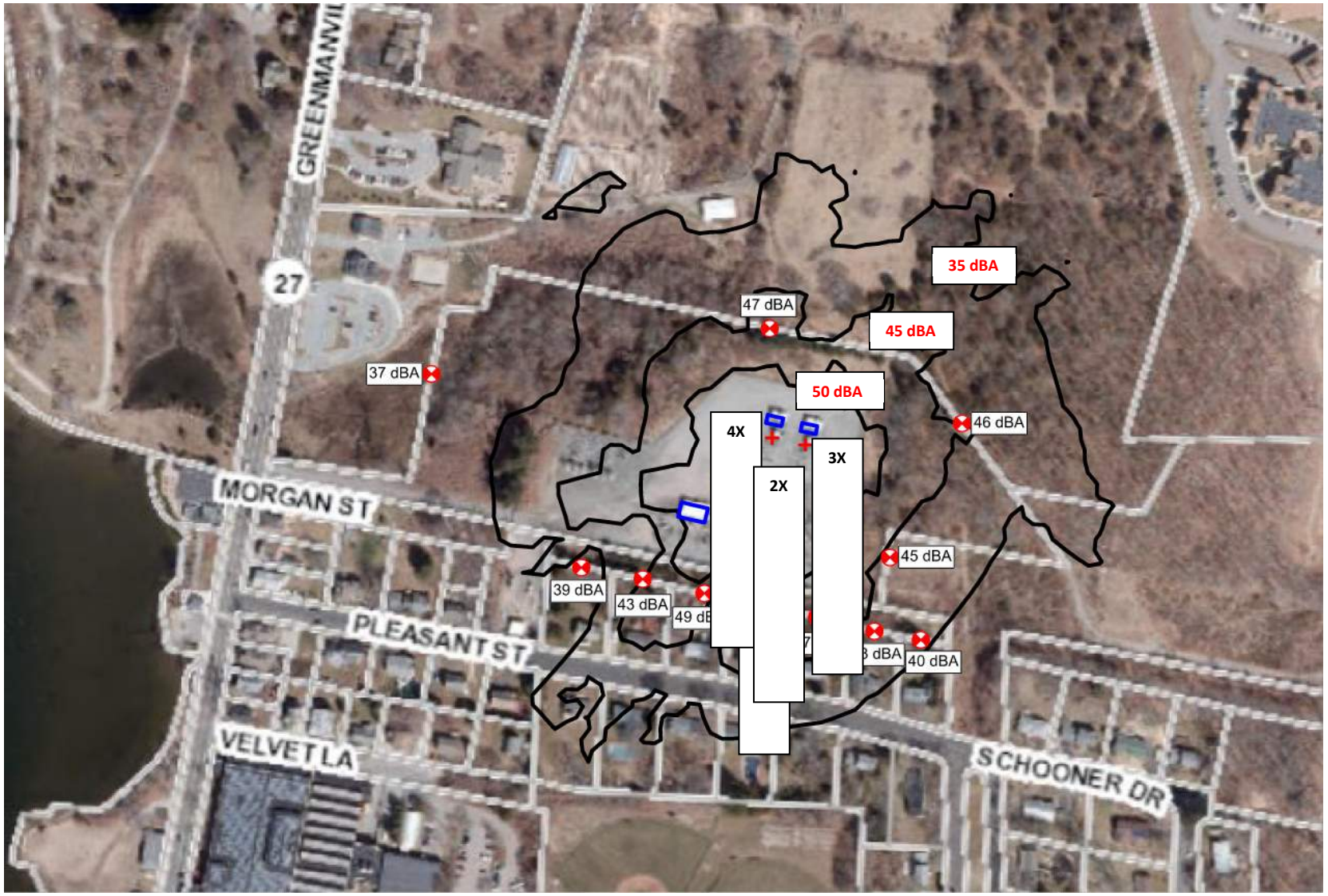
CAVANAUGHTOCCI



S10

Figure 3

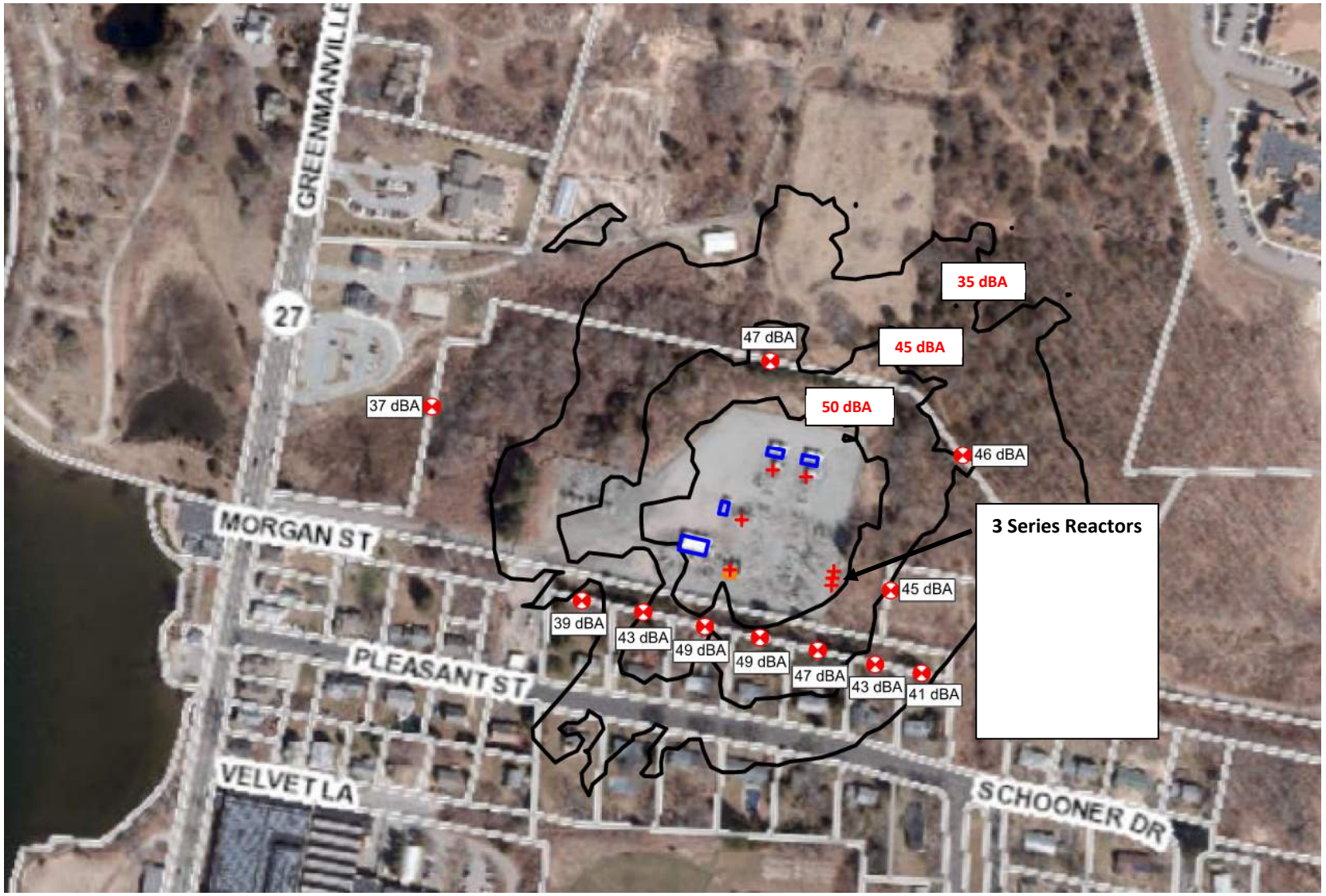
CAVANAUGHTOCCI



Estimates of Facility Sound – Existing Conditions

Figure 4

CAVANAUGHTOCCI



Estimates of Facility Sound – with Series Reactors

Figure 5

CAVANAUGHTOCCI

Appendix A

Sound Measurement Terminology

SOUND MEASUREMENT TERMINOLOGY

In order to quantify the amplitude, frequency, and temporal characteristics of sound, various acoustical descriptors are used. The following is an introduction to acoustic terminology that is used in this report.

Sound Level

Sound levels are typically quantified using a logarithmic decibel (dB) scale. The use of a logarithmic scale helps to compress the wide range of human sensitivity to sound amplitude into a scale that ranges from approximately 0 to 180 dB. Note however, that the use of the logarithmic scale prevents simple arithmetic operations when combining the cumulative impact of sources. For example, two sources of equal sound level operated simultaneously results in a combined sound level that is only 3 dB higher than if only one source was operated alone. An important feature of the human perception of continuous sound is that an increase or decrease in sound pressure level by 3 dB or less is barely perceptible, and an increase or decrease by 10 dB is perceived as a doubling or halving of noise level.

A-weighting

Generally, the sensitivity of human hearing is restricted to the frequency range of 20 Hz to 20,000 Hz. However, the human ear is most sensitive to sound in the 500 Hz to 5,000 Hz frequency range. Above and below this range, the ear becomes progressively less sensitive. To account for this feature of human hearing, sound level meters incorporate filtering of acoustic signals that corresponds to the varying sensitivity of the human ear to sound at different frequencies. This filtering is called A-weighting. Sound level measurements that are obtained using this filtering are referred to as A-weighted sound levels and are signified by the identifier, dBA. A-weighted sound levels are widely used for evaluating human exposure to environmental sounds. To help place A-weighted sound levels in perspective, Figure A-1 contains a scale showing typical sound levels for common interior and environmental sound sources.

Spectral Characteristics – Octave and 1/3 Octave Band Sound Levels

To characterize a sound, it is often necessary to evaluate the frequency distribution of the sound energy. As mentioned before, the frequencies of most interest where human exposure is concerned range between 20 Hz and 20,000 Hz. This frequency range is commonly divided into octave bands, where an octave band is a range of frequencies. Each octave band is referred to by its center frequency and has a bandwidth of one octave (a doubling of frequency). To cover the full range of human hearing, it is necessary to measure sound in 10 separate octave bands. Typically, the lowest frequency band measured has a center frequency of 31.5 Hz. The next frequency band has a center frequency of 63 Hz. This geometric series continues to the highest frequency band that has a center frequency of 16,000 Hz. A set of octave band sound levels to describe a particular sound is called an octave band spectrum. Covering the full range of

hearing, an octave band spectrum would have 10 values, one for each band. Under certain circumstances, more frequency resolution in acoustical data is needed to identify the presence of tonal sounds. A 1/3 octave band spectrum uses filters that divide each octave band into 3 separate frequency bands. Note that octave band and 1/3 octave band sound levels are not usually A-weighted, with their units being dB.

Environmental Noise Descriptors

Sound levels in the environment are continuously fluctuating and it is difficult to quantify these time-varying levels with single number descriptors. Statistical approaches, which use *percentile sound levels* and *equivalent sound levels*, are often used to quantify the temporal characteristics of environmental sound.

Percentile sound levels (L_n) are the A-weighted sound levels that are exceeded for specific percentages of time within a noise measurement interval. For example if a measurement interval is one hour long, the 50th percentile sound level (L_{50}) is the A-weighted sound level that is exceeded for 30 minutes of that interval.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The 90th percentile sound level represents the nominally lowest level reached during the monitoring interval and is typically influenced by sound of relatively low level, but nearly constant duration, such as distant traffic or continuously operating industrial equipment. The L_{90} is often used in standards to quantify the existing background or residual sound level.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the intrusive sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

By using percentile sound levels, it is possible to characterize the sound environment in terms of the steady-state background sound (L_{90}) and occasional transient sound (L_{10}).

The equivalent sound level (L_{eq}) is the energy average of the A weighted sound level for the measurement interval. Sounds of low level and long duration, as well as sounds of high level and short duration influence this sound level descriptor.

Noise levels at night generally produce greater annoyance than do the same levels which occur during the day. It is generally agreed that a given level of environmental noise during the day would appear to be 10 dBA louder at night – at least in terms of potential for causing community concern. The day night average sound level (Ldn) is a 24 hour average A-weighted

sound level where a 10 dB "penalty" is applied to sound occurring between the hours of 10:00 p.m. and 7:00 a.m. The 10 dB penalty accounts for the heightened sensitivity of a community to noise occurring at night.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

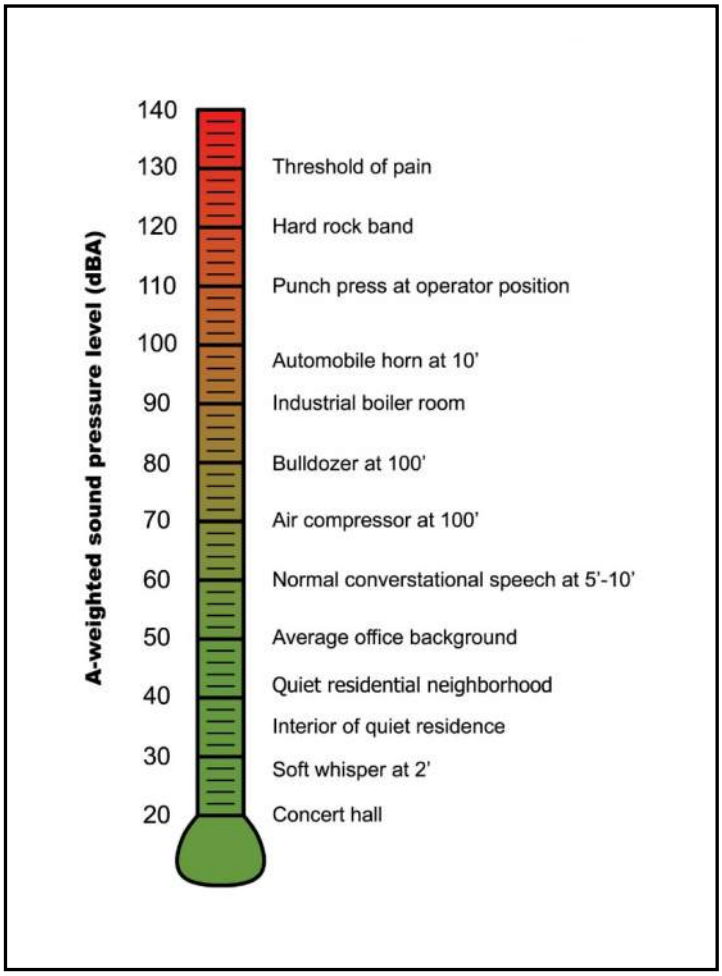
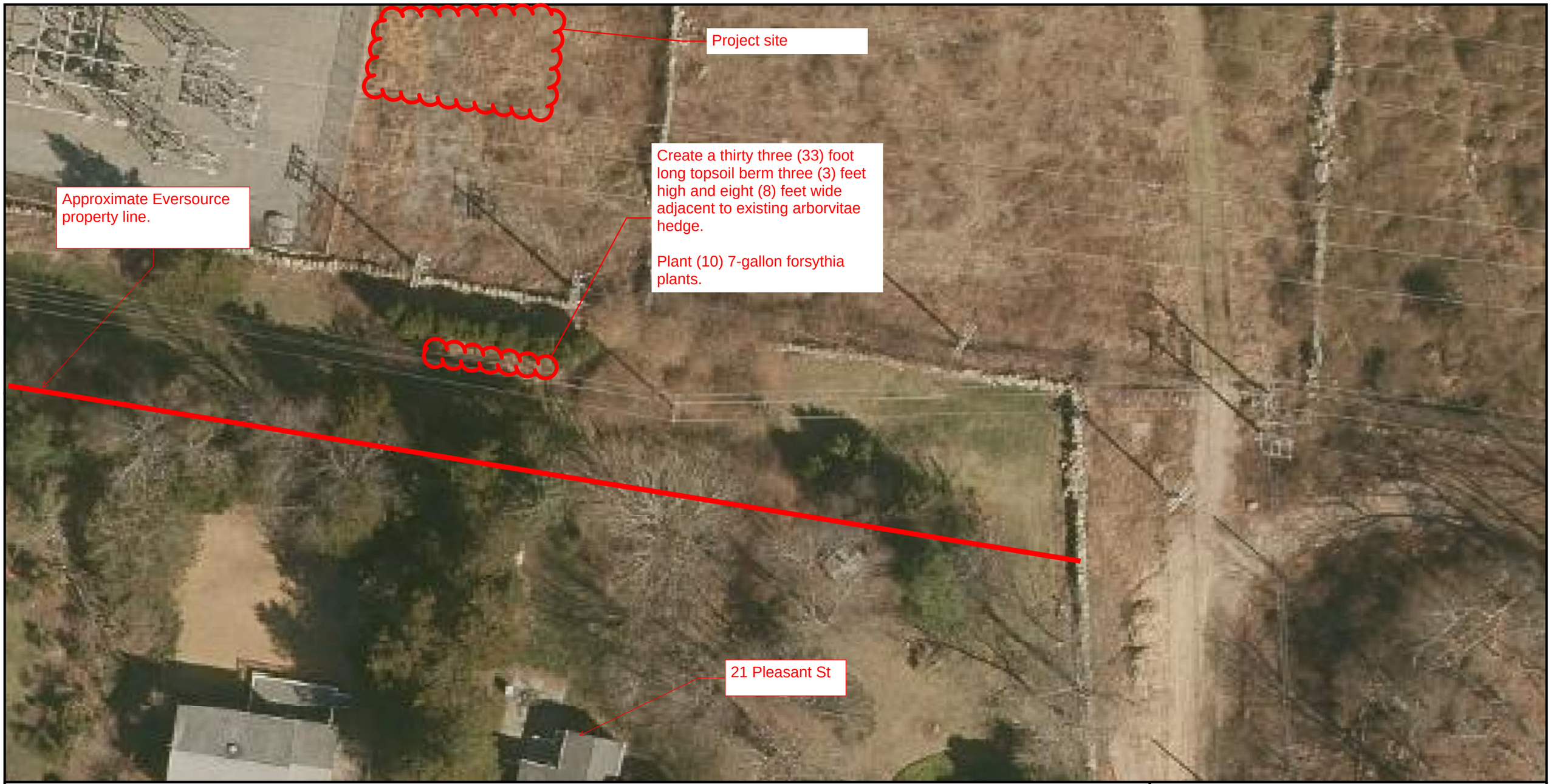
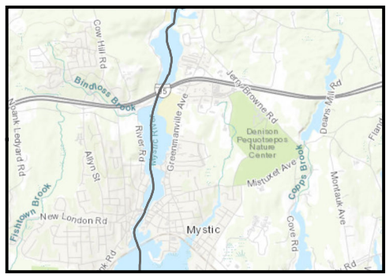


Figure A-1
Typical Sound Levels for Common Interior and Environmental Sources





PROPOSED PLANT SCHEDULE:

Quan.	Botanic Name	Common Name	Size at install.
10	Forsythia x intermedia Lynwood	Lynwood gold forsythia	7 gal

1 inch = 26 feet

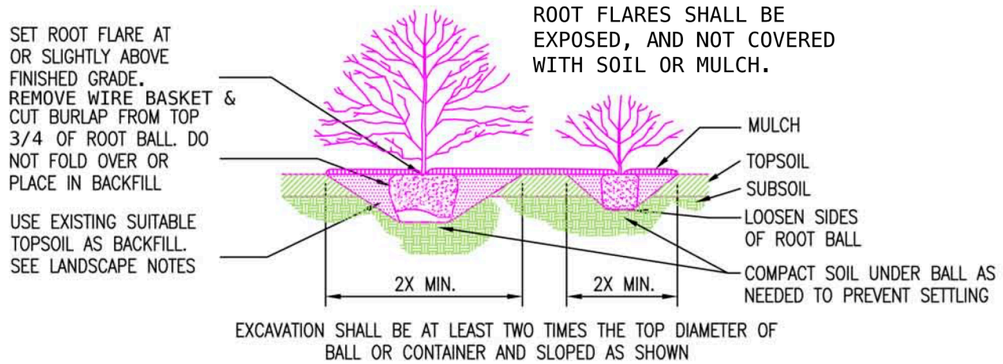
20 10 0 20
Feet

N

EVERSOURCE ENERGY

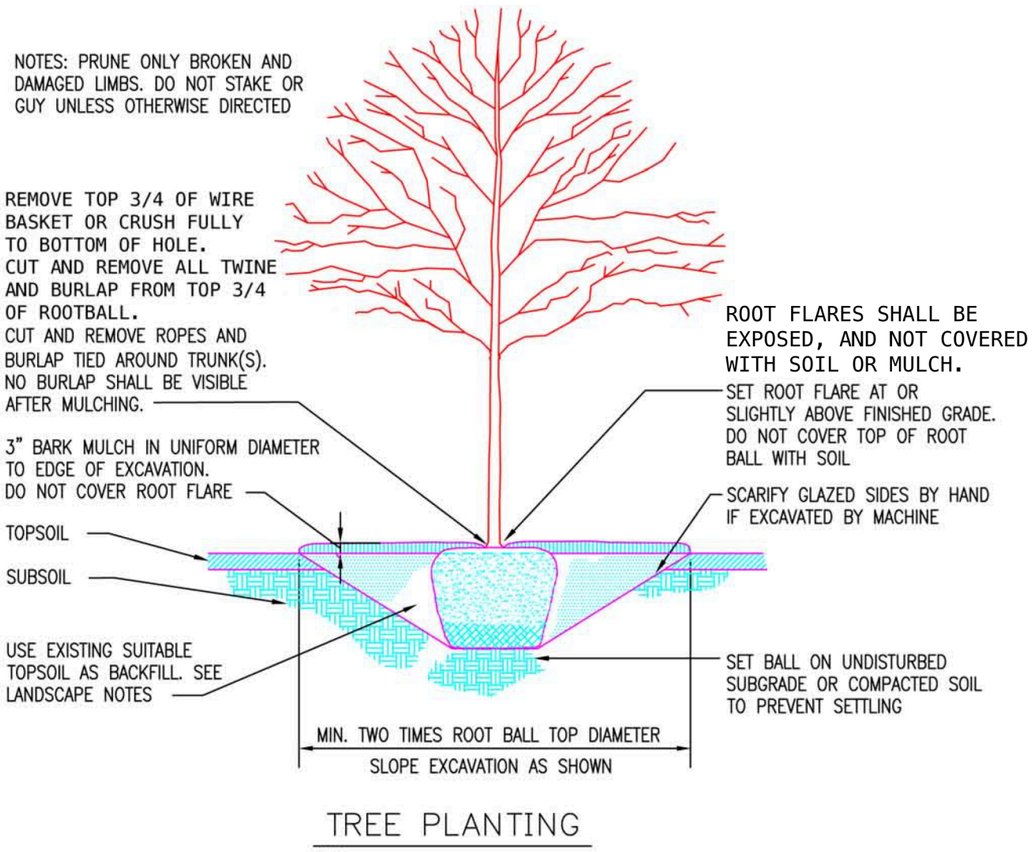
21 Pleasant St.
Mystic, CT

BY TD	CHKD TD	APP	APP
DATE 9/1/21	DATE 9/15/21	DATE	DATE



SHRUB PLANTING

N.T.S.



TREE PLANTING

N.T.S.

EVERSOURCE ENERGY

LANDSCAPING NOTES:

1: Contractor shall obtain CBYD ticket(s) to verify locations of all underground utilities prior to start of work, and shall excavate with caution and within all CBYD guidelines. Contractor shall exercise care while working near overhead conductors. This plan is not to be considered a reference for any utility locations.

2: Proposed planting locations shown are subject to adjustments due to site conditions.

3: All plants shall be legibly tagged for scientific name upon delivery to site.

4: All plants shall be in accordance with the American Standard for Nursery Stock, ANSI Z60.1 latest edition and shall be free of disease, insects, girdling roots, and bark damage. All plants are subject to inspection and approval by the Eversource Designer. Plants specified by height shall be measured from the top of the root ball (or top of roots in the container) to the top of plant.

5: Mulch for all proposed plants shall be shredded natural mulch, brown in color (unless specified otherwise) applied at minimum 3" thickness under each plant, and not applied against the main stem(s). Mulch shall be installed as an individual mulch ring around each plant. Only where plant spacing results in a mulch ring being less than 20 inches from another mulch ring will the area between those plants be mulched to produce a continuous mulched planting bed. Clean wood chips may be used as mulch only when approved by Eversource Designer. No landscape fabrics, weed mat, or geotextiles will be installed under this Plan unless specifically noted.

6: Substitutions: No plant substitutions may be made by the Contractor without prior approval by the Eversource Designer. The Contractor shall notify the Eversource Designer in writing of any plants or materials that will not be available, prior to starting this project, and thereafter in any cases of further unavailability.

7: All plants shall be thoroughly watered once by the Contractor immediately after planting. If a water source is not available at the site, the Contractor shall be responsible, at the Contractor's sole effort and expense, for obtaining the water, hoses, tank(s) and any necessary labor, materials or equipment required to perform this one-time initial watering work.

8: Existing planting pit soil shall be used as planting backfill unless otherwise specified on the Plan. Rocks over 2", roots, sod, wood chips, or any debris shall not be included in the planting backfill. Should supplemental topsoil backfill be required, it is the planting Contractor's responsibility to provide and install clean, screened topsoil as necessary.

9: Contractor shall observe correct planting depth. All plant root flares shall be exposed by carefully removing excess soil, and the root flares shall be placed level with, or slightly above the adjacent finish grade level.

10: Contractor shall supply all plants, labor, and materials in quantities sufficient to complete the work shown on the Plan and Schedule(s). When quantities listed in the Schedule differ from those shown on the Plan, the Plan quantities shall be required.

11: Contractor shall restore all lawn ruts and/or lawn damage caused during associated planting and/or mitigation activities, using clean screened topsoil, lawn grass seed, and seed establishment mulch as necessary.

12: Unless otherwise noted on Plan, lawn grass seed mixtures shall consist of a minimum of 70% Turf Type Tall Fescue and Fine Fescue, with the balance to consist of Perennial Ryegrass and Kentucky Bluegrass. Seed mixtures not specified on the Plan shall be submitted to the Eversource Designer for review prior to installation. Lawn grass seed installation dates: April 1 through June 1, and August 15 through October 1. Seed not installed within hydromulch fiber by hydroseeding equipment shall be properly incorporated into prepared soil surface by raking seed 1/8" min. depth into soil, and shall be lightly covered with chopped straw mulch or seed establishment cellulose mulch.