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November 1, 2021

Via Email and Hand Delivery

Planning and Zoning Commission
Town Hall Annex
238 Danbury Road
Wilton, CT 06897

Attn: Mr. Michael E. Wrinn – Director of Planning and Land Use Management

Re: Connecticut Humane Society – Application for Special Permit and Site Plan Review
(SP#480) and Application for Regulation Amendment (REG#21388)
Premises: 863-875 Danbury Road, Wilton, CT

Dear Mr. Chairman and Members of the Commission:

As a supplement to the materials to address questions raised by members of the Commission and members of the public at the most recent hearing, we are pleased to submit the following:

1. SHAcoustics response letter dated October 29, 2021 which includes a focus on the Donath property line.
2. Proposed Wall Envelope and Proposed Roof Envelope details letter prepared by Amenta Emma Architects (“AE”) dated October 28, 2021.
3. Typical Wall and Roof Assemblies Exhibit prepared by AE dated October 28, 2021.
4. Connecticut Humane Society letter dated October 26, 2021 detailing the Society’s procedures on handling dogs and thus minimizing the potential for barking dogs.

We look forward to providing evidence and testimony at the public hearing.

Respectfully submitted,
Gregory and Adams, P.C.

By: *James D'Alton Murphy*
James D'Alton Murphy

JD'AM/ko
Enclosures
cc: Mr. James Bias – Connecticut Humane Society
Mr. Thomas Quarticelli, Mr. Michael Tyre and Ms. Debra Seay – Amenta Emma Architects
Mr. Michael Galante and Mr. Steve Cipolla – Hardesty & Hanover
Mr. Craig Flaherty and Mr. Vincent Hynes – Redniss & Mead
Ms. Kate Throckmorton – Environmental Land Solutions
Mr. Kevin Peterson – SH Acoustics
Ms. Heather Lewis – Animal Arts Design



SHAcoustics

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29 October 2021

Connecticut Humane Society

Care of:

James Murphy
Gregory and Adams, P.C.
190 Old Ridgefield Road
Wilton, CT 06897

RE: 863 Danbury Road, Wilton, CT – Connecticut Humane Society –
Response to Commission's Concerns

This letter in response to some questions and concerns that were raised by the Town of Wilton Planning and Zoning Commission and some members of the public after our initial acoustic analysis report (dated October 7, 2021) and subsequent presentation (occurring at the October 12, 2021 Planning and Zoning meeting) regarding the proposed Connecticut Humane Society (CHS) facility to be located at 863 Danbury Road. Please refer to that report for a more in-depth picture of the acoustic analysis.

Included in this letter is additional information regarding our analysis and results of additional testing we have performed on site, and a complete analysis of HVAC noise from mechanical units planned for the rooftop of the building.

SHA visited the site again to perform additional testing on the morning of October 27, 2021 to play full frequency test tones at the site of the two outdoor play areas.

It should be stressed that the levels used in our analysis and testing assume high levels of dog barks in order to remain conservative in our calculations. It is likely that most dogs will not reach these levels.

We also note that many of the procedures at the CHS facility prevent dogs from barking in the first place. These procedures are more closely outlined in a separate letter from CHS, but in essence, any dog outside is supervised by a staff member or a volunteer and is only off leash when in a play area. The

dogs are only brought out one at a time or in very small groups that are approved by the Behavior Management Team to ensure barking is minimized.

With these procedures in place along with the data from the analysis we have completed, we are confident that the proposed facility will not have a negative impact on the wellbeing of the neighbors.

A. Sound Level of dog barks

SH Acoustics has previously assessed the sound pressure levels of dogs barking for other projects and has measured a group of approximately 45 intentionally excited dogs to be 99 dBA as a group. Other measurements from reliable sources in the industry such as Purdue University agree with this range, stating that a dog's bark can range from 85-100 dBA. The higher end of this range was used for calculations and testing throughout the analysis.

B. Attenuation to the West and North Properties

Some questions were raised about the properties to the north and west of the facility and their proximity to the outdoor play areas. A study was completed previously where SHA modeled the property in a computer program and calculated the propagation of sound from the two outdoor play areas, accounting for distance, terrain and ground effects compliant with the calculation techniques per the ISO 9613-2:1996 standard (Titled: 'Acoustics - Attenuation of sound during propagation outdoors — Part 2: General method of calculation'). In addition to the computer modeling, SHA performed various tests to calibrate the model.

There were also some questions regarding noise transmission through the forest when the leaves are no longer on the trees. To be clear, the majority of the sound attenuation is due to **distance loss** defined by the inverse square law (that is, the sound pressure is inversely proportional to the square of the distance from the source of noise).

Terrain can play a big role in how far a noise is able to travel either by blocking it or by reinforcing it in the case of a reflective ground surface such as a parking lot or an open lake. In this case, the sound is mostly traveling along ground that has soft surfaces like dirt, leaves, and underbrush vegetation. There is a pond to the northwest of the building, which was accounted for in the model, though it has only a minor effect due to its relatively small size in comparison to the distances in which sound has to travel to reach the property lines.

Other factors such as the effects of trees scattering sound and air absorption also affect the sound pressure levels, though only by a few decibels and mostly at higher frequencies.

Previous Findings

We previously found that a dog barking in one of the two outdoor play areas will create a noise level of less than 59 dBA at all residential property lines. 59 dBA is significant because it was measured to be the lowest of the existing ambient level on site which ranged from 59-80 dBA. The dog barks would be perceptible, but comparable to the existing background noise. With the anti-barking procedures in place at CHS and the hours of operation limited to between 8am and 6pm, an occasional bark may be heard during these hours, though it would be infrequent and would not exceed the background noise.

Additional Testing

Additional testing was performed by SHA by placing speakers in the locations of the proposed Outdoor Play Areas and playing test levels at the same level of a dog bark – 99 dBA. After finding that the in-situ testing agreed with our computer modeling, we also increased the ‘send’ noise to a level of 105 dBA to simulate unusually loud dogs. We found that the ‘receive’ levels at the closest property lines to the north and west were still comparable to the background noise, though slightly higher as expected.

The following table shows the results of our 10/27/2021 testing from both play areas to both the north and west property lines.

	Outdoor Play Area 1		Outdoor Play Area 2	
	99 dBA Send Level	105 dBA Send Level	99 dBA Send Level	105 dBA Send Level
Level @ North Property Line	52 dBA	58 dBA	55 dBA	61 dBA
Level @ West Property Line	57 dBA	63 dBA	44 dBA	50 dBA

Figure 1 – Measured Noise Levels @ neighboring Property Lines

For these and all previous testing, a sound level meter set up was used consisting of an Earthworks QTC-1 measurement microphone with proper wind protection, an iPad and an iAudio interface. These specific components were lab-certified as a Type 1 Sound Level Meter per the ANSI/ASA S1.4 - 2014.

Acoustic Fabric Along Fencing

There was some discussion about potentially adding an acoustic fabric to the north side of the fence at the northern play area. This would not be effective because the fence is lower in elevation than a large portion of the play area, therefore not being able to affect any propagating sound.

C. Building Envelope

Some concern was raised regarding the acoustic isolation performance of the building envelope. The envelope consists the exterior walls, windows and roof, each of which is explained in depth below.

Exterior Wall:

The exterior wall assembly will consist of the following build up (listed from interior to exterior):

- o 5/8" gypsum wall board
- o 6" metal stud framing with R-15 batt insulation
- o Exterior gypsum sheathing
- o Air/vapor barrier
- o 2" rigid XPS continuous insulation
- o 1" air space
- o 8mm fiber cement panel (rainscreen)

We have modeled this assembly in an acoustic isolation modeling software and calculated that the partition will perform at a Sound Transmission Class (STC) Rating of STC 60. The higher the STC rating, the greater the soundproofing capabilities of the partition or structure. An STC rating of 60 is a very high level of sound attenuation, particularly in the mid-frequencies where sound energy from a dog bark is concentrated.

Below is a chart with several STC ratings and accompanying descriptions for reference to help provide a better understanding of the STC rating scale.

STC Rating	Subjective description of which sounds are heard through the boundary
25	Normal Speech can be heard clearly
30	Normal speech is audible, but not easily understood. Loud speech is audible but not understood
40	Loud speech can sometimes be heard but is not intelligible.
45	Loud Speech is inaudible
50	Loud Music is barely audible
60	Only very loud sounds are audible

Figure 2 – STC Comparison Chart

Roof

The roof assembly will consist of the following build up (listed from interior ceiling to roof):

- o Suspended ACT ceiling
- o Steel open-web joist
- o Corrugated metal roof deck
- o (3) 2" layers of rigid polyiso insulation
- o 3/8" gypsum roof board
- o EPDM roof membrane

We have modeled this assembly in an acoustic isolation modeling software and calculated that the partition will perform at a Sound Transmission Class (STC) Rating of STC 57. This is a very high level of sound attenuation and like the exterior wall assembly offers very high performance at the mid-frequencies where sound energy from a dog bark is concentrated.

Windows:

The idea of using triple glazed windows was brought up as a potential way to increase the acoustic performance of the previously specified double pane, inoperable windows. While triple pane windows do have a significant thermal benefit, there are diminishing returns acoustically beyond double pane. This is because of resonances in the air in the now two air cavities created by the three panes.

Instead, if any measure were to be taken to increase the acoustic performance, we recommend laminating one pane of the double window in rooms where dogs are to be kept overnight. Lamination reduces the naturally occurring resonance in a windowpane and is far more effective at increasing acoustic isolation. The following chart shows the Sound Transmission Class comparison between the three glass configurations and the resulting Sound Pressure Level (SPL) at the nearest residential property line.

Window Configuration	Sound Transmission Class Rating (Higher number = better isolation)	Resulting SPL @ Nearest Property Line
Double Pane	STC 34	21 dBA
Triple Pane	STC 37	20 dBA
Double w/ Lamination	STC 40	18 dBA

Figure 3 – Window Assembly Comparison

Please note that the sound levels at the nearest property line (property to the North) only decrease by 3 decibels. Even with the double pane unlaminated windows, these levels are very quiet (near the background noise level of a recording studio) and will be inaudible to the neighbors even when enjoying outdoor areas of their property, especially when considering the background noise of the area. Given the extremely low levels of noise from dogs barking inside, no change from the originally specified double pane windows is recommended.

D. HVAC

The mechanical engineer for the project has specified several preliminary units and has provided the manufacturers’ published noise data for each unit. Collectively, these units have a sound pressure level of about 81 dBA on top of the roof, resulting in 34 dBA at the nearest residential property line due to distance attenuation and shadowing that the building provides.

All calculations were performed in accordance with ASHRAE Standards Algorithms for HVAC Acoustics, 1991.

Unit Type	Sound Pressure Level by Octave Band							dBA @ 5'
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
10-Ton RTU	57	66	70	73	74	72	70	78
DOAS (Dedicated Outdoor Air System)	30	57	62	73	74	70	65	78
Exhaust Fans (5 Units, collective)	74	75	67	64	62	58	53	67
TOTAL On Rooftop	74.1	75.6	72.2	76.3	77.1	74.2	71.3	81.2
Total @ Property Line	25.7	27.2	23.8	27.9	28.7	25.8	22.9	33.9

Figure 4 – Mechanical Unit Noise Analysis

With a low sound level of 34 dBA from the HAVC equipment, no acoustic screening or other type of sound mitigation will be required.

E. CONCLUSION

Our testing shows that with particularly loud dogs barking at levels of 99 to 105 dBA in the play areas, the distance and terrain of the property attenuate these levels down to near current background noise levels. We are confident that with the procedures in place at CHS, dog barking from the two outdoor play areas will be infrequent and inconsequential.

With the proposed building envelope construction and double pane windows, dog barking from inside the facility will be inaudible at the neighboring residential property lines.

The noise from HVAC units on top of the building will be attenuated to acceptable levels. This is because of the selection of relatively small units and from the acoustic shadowing plus the distance attenuation to the nearest property line.

We are confident that the proposed facility will not have a negative acoustic impact on the wellbeing of the residential neighbors.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kevin Peterson', with a stylized, flowing script.

Kevin Peterson
Senior Acoustic/Audio Consultant
SH Acoustics

HARTFORD
BOSTON
NEW YORK



Design. Precisely.

October 28, 2021

Mr. James D'Alton Murphy, Esq.
Attorney
Gregory and Adams, P.C.
190 Old Ridgefield Road
Wilton, CT, 06897

RE: Connecticut Humane Society

Dear Mr. Murphy,

We have developed a building envelope, in coordination with the acoustical engineer, for mitigating sound transmission to the exterior of the building. Our proposed envelope is as follows:

Proposed wall envelope (from interior to exterior):

1. 5/8" gypsum wall board
2. 6" metal stud framing with R-15 batt insulation
3. 1/2" Exterior gypsum sheathing
4. Air/vapor barrier
5. 2" rigid XPS continuous insulation
6. 1" air space
7. 8mm fiber cement panel (rainscreen)

Proposed roof envelope (from interior to exterior):

1. Suspended ACT ceiling
2. Steel open-web joist
3. Corrugated metal roof deck
4. (3) 2" layers of rigid polyiso insulation
5. 3/8" gypsum roof board
6. EPDM roof membrane

Building Glass: Standard 1" Insulated Glazing Unit (IGU) 1/4" glass, 1/2" air space, 1/4" glass

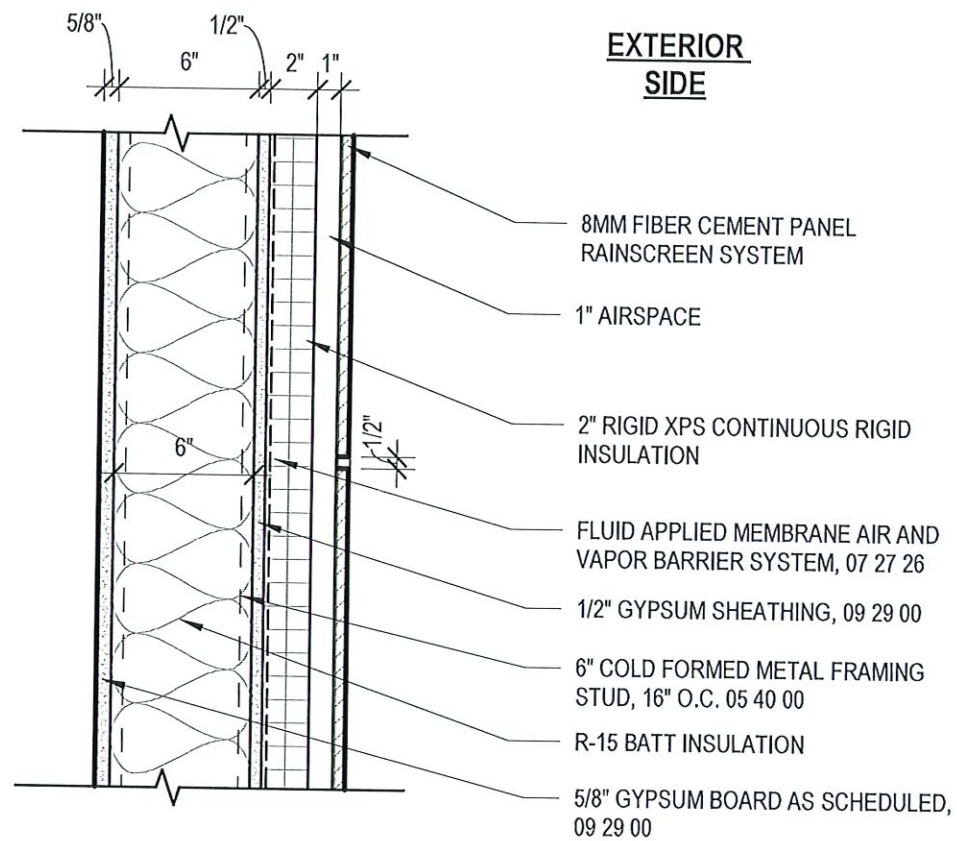
Attached please also find a preliminary wall/roof section sketch delineating these components.
Please contact us if you have any questions

Sincerely,

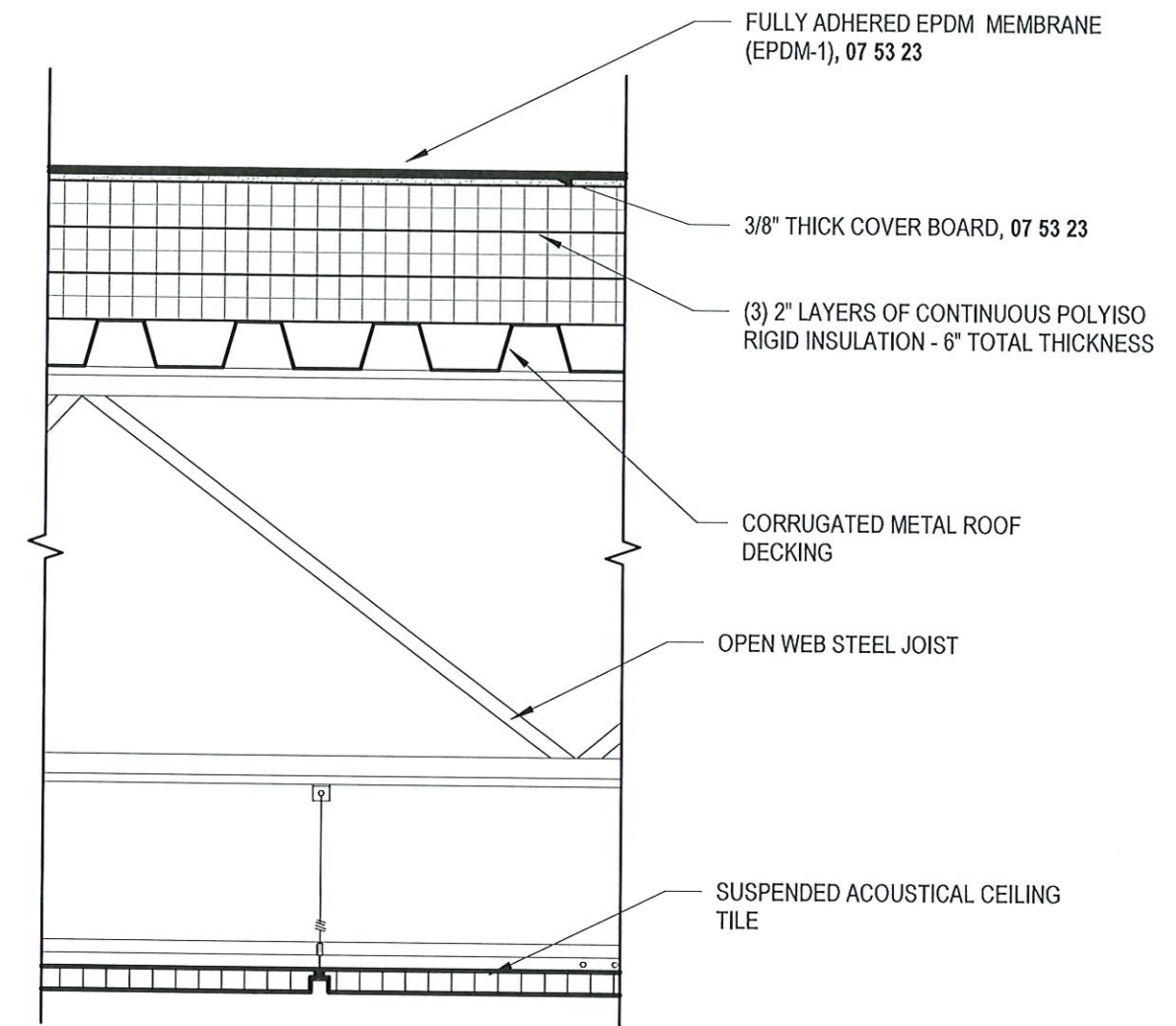
AMENTA EMMA ARCHITECTS, PC

A handwritten signature in black ink, appearing to read "TJ Quarticelli", written over a horizontal line.

Thomas J. Quarticelli, AIA, LEED AP
Principal



FIBER CEMENT RAINSCREEN WALL ASSEMBLY



EPDM ROOF ASSEMBLY



October 26, 2021

To: James D'Alton Murphy, Esq.
Gregory and Adams, Attorneys at Law

Connecticut Humane Society wanted to be sure these points were brought to the Commission to ensure all questions have been answered regarding our procedures on handling dogs and thus minimizing potential barking dogs.

1. We expect to have on average 3-5 dogs in our care at one time.
2. These dogs are walked by a staff or volunteer during operating hours (8am-6pm) only.
3. If in a play yard each dog is accompanied by either a staff or volunteer.
4. No dogs are ever left alone outside in play areas.
5. Our walks are treated more like training sessions, where each dog is expected to have good leash manners and good behaviors are reinforced with treats. Good manners includes not barking.
6. Barking is a behavior we discourage to increase their adoptability.
7. Barking is seldom an issue while walking on a leash or in a play yard, but if it does occur the dog is brought back into the building.
8. At no times are dogs left outside at night.
9. Our dog walking and enrichment protocols are designed to reduce stress in dogs, which minimizes barking and other negative behaviors.
10. We create a routine for the dogs, they are walked, fed and lights out at the same time each day before 6 pm, so they know what to expect. This also minimizes stress which in turn minimized negative behaviors like excessive barking.

Please don't hesitate to contact me if there are any questions.

Sincerely,

Theresa Geary
Connecticut Humane Society
Director of Operations