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To: Brian Groth/Town of Hudson

From: Benjamin Mueller, P.E., Principal
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Cc: John Grace & Brian Kutz/Hillwood
John Smolak/Smolak & Vaughan
Justin Pasay/Donahue, Tucker & Ciandella
Nathan Kirschner/Langan

Date: December 1, 2020

Re: **Response to Public Comments**
Hudson Logistics Center
Hudson, New Hampshire

On behalf of Hillwood Enterprises, L.P. ("Hillwood"), the following are the Applicant's responses to the public comment letters as related to sound or noise matters concerning the proposed Hudson Logistics Center ("HLC") received by the Planning Board with Planning Board Staff Report #1, dated May 27, 2020, through comments received with Planning Board Staff Report #6, dated October 21, 2020. Please note that we have attempted to be as responsive to the many pages of public comments received specifically related to noise or sound, with the understanding that many of the earlier comments were received well in advance of the Applicant's "Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, MA," dated May 18, 2020, as updated and supplemented by additional sound-related documents of record, including "Sound Study Update," dated July 13, 2020, and "Site Sound Evaluation and Control, Proposed Hudson Logistics Center, Hudson, MA, Revision 1" dated December 1, 2020, (collectively, the "Sound Study"). For these reasons, many of our responses refer to those supplemental documents and analyses as noted in this Memorandum. Moreover, we have edited some of the questions below so that they specifically relate to noise- or sound-related concerns, with the understanding that non-sound related responses to comments will be filed with the Board by others. Accordingly, below please find each numbered comment followed by our response which follows under each question as **Response**.

1. Operational Hours/24/7. There's a difference between noise at night and during the day. Concerns with beeping sounds.

Response: Site operations are expected to generally be the same during the day as during the night. OAA has mitigated site sound to meet nighttime criteria as this is most stringent.

2. The more you can move those buildings further away from the neighborhood the better you have a chance. I don't know if the noise studies were done in the right way.

Response: Recent plans show that buildings were shifted further north, away from residences. The sound study was performed according to professional best practices and strived to be conservative when possible.

3. Operational hours will have to be reviewed. I don't think the Town wants 24/7.

Response: The application is requesting 24/7 operation for all buildings. Ultimately the end user will determine what the actual operation hours will be.

4. That picture that shows the building far away – it's actually 200 feet away from my property; 350 feet from loading docks for Building B. Noise concerns – brakes, clanks, backup beeps.

Response: All major forms of truck activity noise was accounted for in the sound study. This includes air brakes, coupling/decoupling, movement, and standard tonal backup alarms. See response to Question No. 2 above.

5. How many trailer jockeys will be used during the day – and will they be used 24 hours? They make noise too.

Response: Trailer jockeys will be on site; however the quantity is not certain. These sources are acoustical equivalent to over-the-road line haul trucks (i.e. tractor trailers) and were accounted for in the acoustical model.

6. Were actual noise readings taken or just modeling?

Response: The ambient sound survey took actual measurements of existing conditions. The acoustical model was used to predict future site sound emissions for comparison to the noise code and existing ambient sound.

7. Have they done any background noise checking in our neighborhood?

Response: Yes, a sound survey of existing ambient sound was conducted in the neighborhood.

8. Our neighborhood is one road in and one road out – no through traffic. As a result, our background noise in the neighborhood at night is quite low.

Response: Ambient sound is dynamic and is comprised of various highs and lows. Our survey showed that nighttime sound differed day to day, but to be conservative the lowest nighttime average data were used as criteria for this project.

9. The intermittent noise is what wakes you up – and is likely over the limits in short bursts.

Response: Our sound study shows that intermittent site sound will comply with all code limits.

10. Independent truckers use the standard beep beep beep alarms. No way to control that.

Response: Based on experience, independently owned trucks utilize a variety of available backup alarms including tonal and broadband types. To be conservative, OAA analyzed all backup alarms as tonal and show that mitigation measures will result in full code compliance. We do recommend that terminal tractors be equipped with broadband alarms.

11. Coupling and uncoupling. Study says it's not a problem because it's averaged over time. But if you're in bed and you hear the coupling and decoupling – it's a problem.

Response: Our approach was to look at site maximums and not specifically average site sound over an hour period. If maximum emissions meet or are close to hourly code limits, then when averaged over an hour period, the site will ensure code compliance.

12. HVAC units on top of the buildings. 39-46 DB. 182 units on top of those buildings are going to make noise.

Response: HVAC sound was taken into account in our acoustical model and results show compliance with code limits.

13. EPA put out a chart that noise levels as low as 40 db can disturb sleep; A lot of those 50 db numbers they came up with in the report are suspect.

Response: Establishing 50 dBA criteria at a dwelling takes into account that receptors are inside and will achieve additional reduction from the façade. An open window will provide at least 10 dB reduction reducing outdoor sound to 40 dBA. A closed window will reduce exterior sound further than this.

14. Sound – I looked at what was posted for noise study. Section 249-4(d) Can't increase background noise by more than 10 dba. Above the noise threshold for nighttime hours?

Response: The intent of this code section is to acknowledge that slight deviations of existing sound is generally acceptable from a perception aspect. The town code also limits maximum sound levels contributed from site sound.

15. Section 249-4(a) [prohibition of noise pollution], (c) (nuisance), and (d) [interference with reasonable enjoyment of property] Two issues with methodology at making the noise.

- Anything above 50 db is illegal
- Bedroom windows are over the berms
- concern over noise boomerang off buildings, and redirected back toward the neighborhood
- The noise modeling only had two trucks on the southern border. Getting us right at the boundary of being illegal.
- Heightened structures – upper floor windows. Should be modeled on worst case

Response: The sound model includes upper story receptors and was expanded to include more locations. The model also accounts for any reflections that might redirect sound towards the south. All results show that worst-case modelled conditions will comply with code.

16. Construction is noisy – my daughter has trouble sleeping. Would like some consideration of noise during construction. They are raising the ground elevation behind my house by 10 feet so sound will carry; 50 dB impacts.

Response: Construction noise is limited to daytime hours, 7 a.m. to 7 p.m. Monday through Saturday, per the Hudson Noise Ordinance.

17. Sound study – measuring sound at 5 feet high doesn't cut it; I am the highest lot on Fairway – up in the bedrooms I will be looking down at the site; I can hear golfers on the green now; Noise of trucks reflecting off the buildings needs to be considered; Noise study only looks at 8 trucks on the site at a time; Town need independent noise study – should look at everyone on the street.

Response: Additional model locations were added to show full compliance at upper story receptors.

18. Almost 200 air conditioners up there – will make a lot of sound. Sound study concerns.

Response: HVAC sound was included in the sound study which shows compliance with code limits.

19. Grading and drainage – top of berm is 177-179 feet, and his lot is higher on Fairway; His home is higher than the site; His 2nd floor will be 8 feet above the berm; Concern over the noise of trucks reflecting off the 50 foot buildings. Will hear the HVAC systems in his 2nd floor windows due to the elevation differences.

Response: The model includes reflections of sound. Additional model locations were added to show full compliance at upper story receptors.

20. Can't meet the noise Code. Max. short duration limit is not addressed in the study. I did calculations – if you stepped back even 10 feet on the ground you could see buildings over the berm.

Response: The sound study was based on maximum short duration events that occur on site and compared to hourly code limits. Additional model locations were added to show full compliance at upper story receptors.

21. Has Hillwood considered install a sound wall on top of the earthen berm? Has Hillwood considered building a small sound wall on the roofs of the building that abut the neighborhoods to assist in mitigating sound from rooftop HVAC equipment? How does the proposed 15-foot sound wall truly mitigate the sound refracted of the 50-foot building?

Response: Several mitigation measures were investigated. The proposed plan includes parapets, sound fences, and earthen berms to block line-of-sight to residential receptors.

22. Today, as I look out my backyard (Fairway Drive) , I can hear the faint noise of cars on the highway. Frankly, the birds make more noise than the cars off in the distance. When the golf course is open, you can hear the chatter of players but nothing like what could be coming. A year or so from now we will hear the constant, unrelenting sounds of trucks coming and going, their backup alarms going off as they approach a loading dock, doors opening, and closing, cars, and forklifts all day and night. It has been mentioned that there would be upwards of 300 trucks every single day.

Response: The focus of the sound study is truck noise. The mitigation measures, which are not there currently, will attenuate site sound to fully comply with town code limits under the Hudson Noise Ordinance.

23. It should be no surprise that distribution centers that are intended to operate 24 hours a day, there will be significant noise; Will this proposed barrier help reduce sound? Between engines, forklifts, and backup alarms, these are not sounds we want to welcome to our neighborhood.

Response: The proposed plan and associated mitigation measures will fully comply with town code limits under the Hudson Noise Ordinance.

24. Construction zone: During the first year of development there will be noise that cannot be mitigated as the berm will need to be put in and planted before it will be a useful barrier. During this time, the outdoor space of my house will become completely unusable. Not only will there be large noisy construction vehicles, there will be emissions that may make the backyard smell horrible. I am concerned that the squirrels, birds, and other animals that my children enjoy watching will not want to come out for their usual feeding and breeding.

Response: Construction activity is limited to the daytime hours, from 7 a.m. to 7 p.m. Monday through Saturday, per the town code under the Hudson Noise Ordinance.

25. Quiet hours will need to be put in place for the construction company extending from 8 or 9pm until 7am. My children are in bed by 7 and lately the sounds of loud motorcycles on Rt 3A has been keeping my daughter up until 8 or 9 pm interrupting her much needed sleep for proper growth and development not to mention all around general household sanity. If construction starts before my children's normal waking time of 6-6:30 I am again worried that the noise will wake them early especially on weekends when we hope that she catches up on her sleep. I am lucky enough to work a part time job allowing for my children to be home during the week and this type of work will interrupt their napping schedule.

Response: Construction activity is limited to the daytime hours, from 7 a.m. to 7 p.m. Monday through Saturday, per the town code under the Hudson Noise Ordinance.

26. Sounds. Just like the construction period, noise a huge concern. Currently evenings are quiet and being outside is a peaceful place. With the addition of several hundred trucks of varying

size I will be unable to enjoy the outdoor space that my property currently affords me. I appreciate being far enough way from the Sagamore bridge along with all the hills and established trees to help mitigate any noise. Again even with all the mature trees because of the necessary clear cutting at the base of the powerlines and proximity, the noises from 3A can be rather loud when large trucks or loud motorcycles are going down the road.

Response: Construction activity is limited to the daytime hours, from 7 a.m. to 7 p.m. Monday through Saturday, per the town code under the Hudson Noise Ordinance.

27. After reviewing the site plans, there is only a 200 foot buffer with a berm will be created between the abutters and the development. In the plans I reviewed, due to the wetlands at the edge of the property the last 3-4 houses on Eagle drive will not have a berm just a 200 foot buffer. Please see attachment I. Just on the edge of that buffer will be a road and the loading docks for warehouse C. Even the beautified picture on the town website (see below) shows a gap in the berm at the pond that is at the end of my property. This mean that there will be no noise or sight protection. This buffer zone needs to be widened to accommodate extension if this berm for the entire length of the property line. I request that a larger buffer zone 500-1000 ft be required with at least a 30 ft high berm that is fully landscaped with mature vegetation.

Response: Revised plans show that buildings and on-site improvements were shifted further north, away from southern receptors. See response to Question No. 2 above.

28. Hours. Quiet hours for these facilities must be mandated. I am not opposed to 2nd and 3rd shift work as long as it is done inside the facilities and I cannot hear the goings on. Trucks cannot be pulling in, starting up and rolling out at all hours of the night. Again, with children in this neighborhood, their sleep schedules are a necessity to consider. Numerous studies have been done on the ability for students to concentrate and learn based on the amount and quality of their sleep. 8pm to 7am quiet house should be maintained for a site that will be this close to housing developments.

Response: The sound study concludes full compliance with noise code limits, even with activity in the southernmost area of the site. Southern activity will only occur a percentage of the time as site operations are distributed across the entire site.

29. Sound Concerns: Will the proposed barriers will this help reduce sound? Between engines, forklifts, back up alarms. This is extremely concerning to since this would be a 24/7 operation. Has Hillwood Development encountered this before when building next to residential homes?

Response: The sound study shows that proposed plans will fully comply with town code limits described under the Hudson Noise Ordinance. The mitigation measures proposed are to allow for this use to operate in harmony with the adjacent zone.

30. With all of the traffic, noise, congestion, ultra bright parking lot lights, trucks revving their engines, applying their brakes, and the constant beeping of them backing into the hundreds of docks. What will become of our peaceful quality of life for which we bought our home?

Response: The sound study shows that proposed plans will fully comply with town code limits. The mitigation measures proposed are to allow for this use to operate in harmony with the adjacent zone.

31. The effect of sound pollution to the abutting neighborhoods. In the event that noise ordinances are violated, how would the Town of Hudson, enforce their own ordinances against such mega companies that would own or rent space at such a facility? Would not such mega companies be experts in stalling during legal proceedings should a noise violation be issued? As you know, the time to work out noise issues is before project approval.

Response: This application has proposed mitigation measures that would allow for a variety of tenants to occupy and use this site and comply with code limits under the Hudson Noise Ordinance.

32. Please find attached “Noise Level Estimate Chart” from <http://www.paging-solutions.com/charts/noiselevel.pdf> . This chart indicates the noise from a diesel engine is 90-94 decibels. Hudson’s ordinance for evening sound level is 50 decibels. The Illinois Department of Transportation <https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Design-and-Environment/Environment/Highway%20Traffic%20Noise%20--%20Noise%20Fundamentals%20111215.pdf> states that sound lowers over 3 decibels for every doubling of distance over pavement. Therefore, the sound needs to lower at least 40 decibels (90-50) before it reaches the property line. $40/3$ is 13. 13 doublings of length are required as a sound buffer. Or over 16,000 feet are required to buffer the sound of just one diesel truck to meet the 50 decibel residential allowance.

$(1+2+4+8+16+32+64+128+256+512+1024+2048+4096+8192)=16,383$ feet buffer are required as a buffer to lower the sound of one diesel truck to meet the 50 decibel residential ordinance. If the Town of Hudson doesn’t require an appropriate setback at the beginning of this project, they will probably be unsuccessful in trying to get this facility to comply with sound ordinance complaints that could arise after construction.

Response: The noise level estimate chart does not provide a distance at which a truck engine would contribute 90-to-94 dB, and therefore is difficult to interpret. OAA has documented truck noise at 50 foot distances to be about 79 dBA. This equates to about 93 dBA at a distance of 10 feet. The Illinois DOT correctly states that traffic noise will fall off by 3 decibels for every doubling of distance, however this considers that roadways are line noise sources. For this analysis, individual truck activity is considered a point noise source and hence falls off with by 6 decibels for every doubling of distance. A level of 50 dBA is met at a distance of about 1,300 feet from truck operations. When less distance is available, mitigation measures such as what are proposed are implemented to meet this limit.

33. Did the acoustic study take into account sound reflection or refraction off the buildings and redirection of sound waves? Did the acoustic study examine the effects of multiple, if not ten or more trucks backing up at once or functioning at once, combined with other noise impacts such as HVAC systems?

Response: The model takes into account reflections from buildings as well as refraction over the sound fences. We examined worst-case conditions of multiple sources operating at the same time, combined with steady HVAC sound.

34. I am requesting that a true sound study be done for the abutting neighborhoods. Using an app on my iPhone X at about 9 pm at night, the sound dB is about 35-37 dB's. Much quieter than the 50 dB's their study shows. Study should be done during the day and night with equipment set up in yards to measure. The study should also reflect a realistic scenario of the activity this distribution center will have. (such as, much more than just 8 trucks at any one time, hundreds of HVAC units running at once, employees arriving for and after their shifts, movement of trailers etc)

Response: An ambient sound study was carried out to use as criterion for this project. Ambient sound comprises a variety of existing sound including the lows and the highs. The study also was updated to include a worst-case representation of sound sources occurring throughout the site at exactly the same time, which is a rare occurrence.

35. Has the developer ever built one of these massive centers so close to an existing residential neighborhood? If so, where? What was the decibel noise increase? Is any of it verifiable?

Response: OAA has worked with this developer and many others on various similar projects. Where zones change, there will always be an increased level of effort to harmonize different uses, however with mitigation measures implemented adjacencies can coexist.

36. What would be the acceptable level of noise for this type of facility? What does the town ordinances say for such things?

Response: The Town ordinance calls for site sound to not exceed an average hourly sound level of 50 dBA. In addition, site sound should never exceed 10 dB above the background sound level. OAA's sound survey identified that these two code approaches happen to align here, and that the projected sound from the site will comply with the Hudson Noise Ordinance.

37. Hours. If a tenant such as Amazon comes in and wants to launch their drown shipping fleet out of one or all of these warehouses is the town prepared for this type of shipping? Not only that but their 24/7, 365 work mentality may lead to Thanksgiving Day trucking noises with my turkey dinner. Can we regulate the tenants to be closed for national holidays, 4th of July, Thanksgiving and Christmas? Can enforce that the tenants keep up on green initiatives?

Response: Site sound was analyzed assuming a 24/7 operation. Results show full compliance and no negative acoustical impact, even during the nighttime hours.

38. Hours of Operation - With a project as large as this the hours of operation need to be addressed. Sound carries. There needs to be strict hours of operation without exception. This again will significantly impact the residents 7 days a week. The overnight noise will keep us and our children up at night and will degrade our quality of life. Sounds we are used to will go from silence and hearing the birds tweeting to idling trucks, brakes squealing and back up alarms beeping all hours of the day and night. This is not why we and other owners bought their homes in Green Meadow Estates.

Response: Site sound was analyzed assuming a 24/7 operation. Results show full compliance and no negative acoustical impact, even during the nighttime hours.

39. A 24/7 operation with about 200 trucks a day backing up (and beeping) will negatively impact the Green Meadows and other adjacent residential areas. Often, diesel trucks run continuously, especially in winter. Refrigerated trucks must run non-stop.

Response: Idling duration is limited on site by both the Hudson Noise Ordinance as well as by NH DES regulations on idling. In addition, idling noise is among the lowest level activities occurring on site. We do not anticipate receptors being able to hear a truck idling off-site. Regardless, sound study results show that worst-case sound comply with all code limits.

40. If these plans move forward our concerns are the noise level and if any restrictions are in place as far as time of day trucks may enter and leave. Noise carries. we hear the band practice at the far end of the Pheasant Lane Mall and we sometimes hear the traffic on the bridge. Having this so close is unimaginable and very unfair to us who bought our houses here.

Response: Sound study results show that mitigation measures meet all Town code limits under the Hudson Noise Ordinance and hence will not have any negative acoustical impact on nearby receptors.

41. 283 Lowell Road two a block away from Steele Road: Concerns: More traffic in front of my home - is there any plan for noise barriers along residential homes on Lowell Road coming up to Steel road.

Response: All mitigation measures are proposed on-site.

42. We can hear the dirtbikes across the river in Nashua, Band practice at the Pheasant Lane Mall, motorcycles on the over pass. What do you plan to do to keep us from hearing all the noise from your buildings with not one Down Day ever?!? [10 Linda Street]

Response: The project has proposed a number of mitigation measures not currently in place including a sound fence, earthen berm, and roof parapets.

43. Lowell Road is already over-crowded and to have a constant day and night stream of huge tractor trailers would bring an enormous increase in traffic problems extending to other roads in the region, as well as noise, and air pollution. This will destroy the quality of life we enjoy here in Hudson. Diesel Fumes from 24/7 engine idling—and negative health effects.

Response: The noise code regulates on-site sound emissions. Study results show full compliance with codes.

44. What kind of noise studies have been conducted? Again, these studies should be conducted by an unbiased group of professionals, and not only presented by Hillwood's "experts." In Hudson, I lived on the river. Yes, there are trees on the riverline, but those trees DO NOT block or drown out sound. Sound waves travel quickly over fresh water, and while I cannot explain the science behind it, I can attest to noise being amplified by the water due to direct experience with it. The thought of a year's worth of construction, and then incoming and outgoing tractor trailers thereafter, is cringe-worthy.

Response: The Town of Hudson has hired an acoustical consultant to peer review the project from an acoustical aspect. Trees are not effective reducers of sound and hard surfaces such as a body of water can reflect sound. Hence our mitigation measures focus on blocking the sound with a berm and fence barrier.

45. I also need to point out that vehicles are much noisier than they used to be, with lack of any state ordinances on mufflers. Almost every car, truck, and motorcycle sounds like it is intended to be raced on a track. How is it that a Hudson resident who lives in a different neighborhood can rightfully complain about a barking dog as a noise nuisance, yet my family has to be blasted with motor vehicle noise so loud and so pervasively around the clock we cannot converse and hear each other in our own home, even with closed windows? I am convinced that an independent noise study at this intersection would prove that the noise level is at a dangerous level. I would not want my fellow Hudson Residents in neighborhoods abutting Green Meadow Golf Course to have to endure the same volume of noise, either.

Response: In general, motor vehicles have decreased in sound level as vehicles become more modern. New Hampshire Title 21: Motor Vehicles, Ch 266:69 specifically requires that all motor vehicle be equipped with an exhaust muffler.

46. Will this proposed barrier help reduce sound? Between engines, forklifts, and backup alarms, these are not sounds we want to welcome to our neighborhood. Please remember how sound travels across water and think about how far these sounds will carry up and down the river. A sound coming from land to water is amplified so by default it travels much farther. The master plan does not indicate any barrier between the structures or parking lots where moving trucks will be running to the water. The river needs protection from the noise and polluted air.

Response: Yes the proposed mitigation measures are design to reduce site sound to meet noise code under the Hudson Noise Ordinance.

47. As for sound pollution, I know the sound from the Nashua side of the river travels far into Hudson, so I can surmise Hudson's noise pollution will travel well into Nashua and far into Hudson. The river carries sound much further than you can imagine.

Response: Sound can reflect off of hard surfaces, such as a body of water, and propagate further. The project proposes to mitigate sound in the direction of the nearest residences to reduce site sound to sufficient levels. In other directions, site sound will reduce to acceptable levels with distance alone.

48. When the commercial building at the site of Lowell Rd and Philbrick St was approved, our neighborhood was concerned with the potential increased noise that would be generated from the delivery trucks. There was an agreement about the noise decibels that would be allowed by the running of the business especially the loading and unloading of the delivery trucks. We neighbors presented documented decibels to the town once facility was operating. Those levels exceeded the agreed upon limit and when addressed to the town leaders, NOTHING changed. Our quiet neighborhood was compromised. Not until they moved out and office type businesses moved into the space did we no longer have the extensive disruptive truck noise. Compare to that disruption in our lives to what is being considered for beautiful Green Meadow property was a drop in the expansive ocean of disruption. The traffic and noise level will be unbearable. I cannot even begin to wrap my head around how all those trucks, and additional cars will gridlock this comfortable town. We have already voiced our concerns through an email to all town leaders involved in this decision. But this proposal is too important that another reminder to those with the voting power to stop this abominable request be once again addressed.

Response: We are not familiar with the details of the project you reference. This project has undertaken a sound study which has shown that with mitigation measures in place, all code limits will be met under the Hudson Noise Ordinance.

49. **Sound study.** The sound study indicates that they will not be able to operate the logistics center legally. There are two places as shown in Figure 3 on page 9:

- a. At the residential point C, the noise level is estimated to be 51dB(A) in violation of town code 249-4B which sets a residential nighttime limit of 50db(A) and likely in of 249-4D which prohibits any source to increase noise by 10db(A) or more.
- b. At point I (behind Sam's club), the noise is estimated to be 67 dB(A) in violation of the business nighttime limit of 55 dB(A) in 249-4B.

In addition, I find the following deficiencies in the study:

- c. Traffic noise is assumed to come solely from the northern half of the lot in contradiction to Hillwood's statement that trucks would go directly to the loading docks. Also, there is even a road on the south side of the buildings.
- d. Noise estimates were done for select sites at 5 ft above grade. However, for nighttime noise, many of us are going to be much more interested in what the noise level is coming into our bedroom windows.

- e. The noise estimates assume that "yard dogs" will be equipped with special backup alarms, which are less annoying and the trucks coming to and from the facility do not use their backup alarms. Again, this contradicts the statement that trucks will go directly to the loading docks.
- f. The study does not reference existing noise levels. The surrounding neighborhoods are very quiet and I'd expect that the ambient noise level to be below 40 dB(A), especially at night.
- g. No mention is made of town code 249-4C, which sets impulsive sound level limits.

Response: a. The sound study showed that intermittent maximum sound levels of 51 dBA were expected. Because this is a brief instance, and not a steady source such as HAC sound, over the course of an hour this maximum sound level would meet the average hourly nighttime limit of 50 dBA.

- b. The Sam's Club is in the B-1 zone but is an industrial use and also operates heavy trucks.
- c. The model was refined and made to more accurately represent site operations; driving trucks have been placed on the southernmost road.
- d. Upper story receptors were previously modelled. We have added more upper-story receptors to highlight compliance at multiple vantage points.
- e. Terminal tractors move the trailers from the docks to trailer parking areas and are responsible for the majority of back-up movements on site. This was taken into account in the study.
- f. An ambient sound survey was conducted and results are included in the updated sound study. The lowest average nighttime background ambient sound levels were about 41 dB(A), hence to comply with code, site sound must not exceed 51 dB(A) at residential receptors.
- g. Impulsive noise sources are measured using C-weighting, and limits are more permissive. In comparison, other code limits are given using A-weighting limits. The site must comply with these impulsive limits as well as others in the code. However, we conclude that using the A-weighted criteria are the most stringent of the town codes, and compliance with these levels will ensure compliance with the more permissive impulse code limits.

50. Hudson Noise Codes

[§ 249-1 Purpose.](#)

Recognizing that **people have a right to and should be ensured an environment free from excessive sound** and vibration capable of jeopardizing their health or safety or welfare or of degrading their quality of life, this chapter is enacted to protect, preserve and promote the health, safety, welfare and quality of life for the citizens of Hudson, New Hampshire, through the reduction, control and

prevention of noise by establishing maximum noise levels upon and between premises, prohibiting certain noise-producing activities and providing for inspection, definition of offenses and penalties.

NOISE POLLUTION

The presence of that amount of acoustic energy for that amount of time necessary to cause one or more of the following effects:

- A. Temporary or permanent hearing loss in persons exposed.
- B. Injury to or tendency to injure, on the basis of current information, public health or welfare.
- C. Nuisance.
- D. Interference with the comfortable and reasonable enjoyment of life and property, or interference with the conduct of business.
- E. Exceeding the limits or restrictions established herein or pursuant to the granting of any permit by the Town governing body.

§ 249-4 Prohibited noise emissions and conditions.

No person or persons owning, leasing or controlling the operations of any source or sources of noise shall willfully, negligently or through failure to provide necessary equipment or facilities or through **failure to take necessary precautions** make or permit the emission of noise levels or conditions exceeding the following noise limits for the applicable land use:

A. Noise Limit 1: General prohibition of noise emissions. No person or persons owning, leasing or controlling the operation of any source or sources of noise shall willfully, negligently or through failure to provide necessary equipment or facilities or **to take necessary precautions permit the establishment of a condition or conditions constituting noise pollution**, as defined in § 249-2 of this chapter.

B. Noise Limit 2: Continuous sound-level limits. No person shall cause the continuous sound level to exceed the following limits, as measured at the applicable locations in accordance with the provisions of § 249-3D(5) of this chapter:

Continuous
Sound-Level Limits
leq (1 hour)³

Receptor Land Use Category	Daytime	Nighttime
Residential/rural/institutional1	55	50

D. Noise Limit 4: Background referenced sound level. No person shall cause the **background noise level**, as defined in § [249-2](#) of this chapter, **to increase by more than 10 dBA in any receptor area at any time of day.**

[BACKGROUND NOISE](#)

The highest A-weighted sound-pressure level which is exceeded 90% of the time period during which measurement is taken.

E. Noise Level 6: High noise-level areas. In areas where the ambient sound level is already as high as or higher than three dB below the sound-level limits of Noise Limit 2, **no person shall cause the noise level in any area to increase by more than three dB.** This limit is in lieu of Noise Limit 2, but shall not supersede any other noise limit as defined in this chapter

J. Noise Limit 10: Prohibited noise-generating activities. The following activities are prohibited: [\(2\)](#) Truck idling. **No person shall operate an engine** or any standing motor vehicle with a weight in excess of 10,000 pounds GVW (gross vehicle weight) **for a period in excess of 10 minutes** when such vehicle is parked on a residential premises or on a town road **next to or across from a residential premises.**

[§249-6 Inspections.](#)

A.For the purpose of determining compliance with the provisions of this chapter, the governing body of the Town of Hudson or its designated representatives are hereby **authorized to make inspections of all noise sources and to take measurements and make tests whenever necessary to determine the quantity and character of noise.**

WHO Noise guidelines 4.3.1

“At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB LAeq and 60 dB LAm_{ax}, so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB”

“These values are based on annoyance studies, but most countries in Europe have

adopted 40 dB LAeq as the maximum allowable level for new developments (Gottlob 1995). Indeed, the lower value should be considered the maximum allowable sound pressure level for all new developments whenever feasible.”

GUIDANCE ON MITIGATING IMPACTS OF LARGE DISTRIBUTION CENTERS

“The November volume is about **15 percent** above average.”

“The highest days for total trips—Wednesday and Thursday—are about **16 percent** above Average.”

“The highest inbound hours are typically 9 a.m. to 3 p.m. The highest outbound hours are a little later, generally between 10 a.m. to 5 p.m. The outbound peaking is also a little more pronounced. The inbound peak hour averages about **6 percent** of daily inbound traffic. The corresponding outbound volume is a little less than **7 percent**. Of course, these are average trends, so volumes for specific days may look a little different.”

“The highest inbound peak (which shows in Figure 20 as 6 a.m. to 7 a.m. but is often 5 a.m. to 6 a.m.) **makes up over 20 percent of the daily inbound total**. Since shifts appear to be somewhat staggered, the peaks spread somewhat over a few hours, although some of the spreading effect is due to averaging several months’ worth of data (individual day count data may be more helpful in establishing a percentage for the highest hour).”

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	SPEECH INTERFERENCE
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80	LOUD	
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70		
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60	MODERATE	SLEEP DISTURBANCE
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50		
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40	FAINT	NO EFFECT
QUIET SUBURBAN NIGHTTIME	LIBRARY	30		
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. **The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source.**

TABLE 9-5: MITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location ¹	Land Use	Jurisdiction	Noise Level at Receiver Locations (dBA) ²					Threshold Exceeded? ³
			L _{eq} (E. Avg.)	L ₅₀ (30 mins)	L ₂₅ (15 mins)	L ₈ (5 mins)	L _{max} (Anytime)	
Daytime	Lowest Residential Exterior Noise Level Limits		55	50	55	60	65	-
Nighttime			45	45	50	55	60	-
R1	Residential	Temple City	40.8	-	-	-	-	No
R2	Residential		43.5	-	-	-	-	No
R3	Residential		42.4	-	-	-	-	No
R4	School ⁴	El Monte	-	41.6	43.1	47.6	63.1	No
R5	School ⁴		-	49.9	52.9	57.5	65.0	No
R6	Residential		-	36.1	39.0	43.6	52.2	No
R7	Residential		-	35.3	38.2	42.8	51.5	No
R8	Residential		-	22.5	24.0	27.9	42.7	No
R9	Residential		-	29.8	31.2	35.3	50.9	No
R10	Residential		-	33.2	34.6	38.6	54.2	No
R11	Residential		-	41.3	44.1	48.6	57.8	No

8.36.040 - Ambient noise standards.

A. The following ambient noise standards, unless otherwise specifically indicated, shall apply to all property within their assigned zoning districts and said standards shall constitute the permissible noise level:

Zone	Day 7:00 a.m. to 10:00 p.m.	Night 10:00 p.m. to 7:00 a.m.
Single-family	50 dBA	45 dBA

Introduction

Sound issues remain a significant concern to the community of Hudson, Nashua, and Tyngsboro communities.

Questions

- Will another sound study be performed by Hillwood?
- Does Hillwood have sound data from other sites including estimates from high traffic times such as
- How has Hillwood come up with the estimate for the number of trucks per day?
- Has the estimate for the number of trucks per day include full utilization of all 3 facilities?

- Does the estimate for the number of trucks per day only include estimates for the current targeted clients without foresight for future growth or potential changes to clients?
- Does the estimate for the number of trucks per day include the estimated growth of the distribution industry over the next 20 years?

Considerations

Enforcement and liability for noise violations

What reasonable measures is Hillwood proposing to ensure that the vehicles that they permit on their property will comply with reduced noise measurements.

The proposal says that there are plans to use a special type of 'beeper' for the trucks, but how will this be enforced.

If the audio study is based on the assumption that all vehicles will be using lower noise 'beepers' it is reasonable to consider that this is a hard requirement and that vehicles will be audited to have these installations and those without these installations will not be granted access. If this is not the case, then the audio study should be adjusted to model for the non-enforced levels.

Health Impacts

The EPA/ONAC provides the following information on levels of noise to Protect Public Health and Welfare with an adequate margin of Safety. Sound level studies referenced by the EPA/ONAC have shown sleep disturbance to occur at 40dBA and speech interference to occur at 55dbA.

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
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NEAR JET ENGINE		130		
		120		
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	BROADCAST/RECORDING STUDIO	10		
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Violation of Prohibited Noise Emissions and Conditions 249-4(D)

The background noise level increase must remain no more than 10db above the nighttime A-weighted response.

Quiet rural nighttime = 25 dB

Using a NIOSH audio measurement device, we have 32dba LAeq 1-hour nighttime measurements for the abutting residential properties.

Hillwood Audio Study Methodology Concerns

Planning for thresholds of illegal noise levels

Based on OAA's experience, the local limits are appropriate and meeting such limits at residential receptors will adequately minimize noise complaints. The metric of using hourly average levels allow sites to produce higher sound levels for short periods of time while still complying with the limit. To simplify things, OAA recommends that all site sound strive to not exceed maximum levels of 50 dB(A) at residences and 75 dB(A) at nearby industrial facilities. Meeting these maximum limits ensures compliance with average hourly code levels and reduces the chances for noise complaints.

The methodology of the study explicitly expects periods of heightened noise levels that will only result in compliance based on the long 1 hour weighted average

duration of Leq 1 hour per 249-4(B). per: "The metric of using hourly average levels allow sites to produce higher sounds levels for short periods while still complying with the limit." This has implications of potential violation of 249-4(A).

The design decisions behind this project appear to push every legal measurement to the threshold of being out of code. Since most of these measurements are directly related to quality of life considerations. This could have the effect of lowering each quality of life metric.

Audio Modeling Height

The audio study height assumptions also do not correspond with the WHO guidelines for considering elevated structures such as decks/balconies/top floor windows. (modeling with just 5 feet above grade)

The acoustical model shows the results graphically as A-weighted sound level contours, in 1 dB increments, at ear height, 5 feet above grade. A-weighted sound levels are also tabulated at nine discrete locations typifying nearby receptors. Locations B, C, D, F, and H are at nearby existing residential receptor locations. Locations E, G, I and J are located at nearby industrial use properties. All Locations are at ear-height, 5 feet above grade. Location A is not used and reserved for future use.

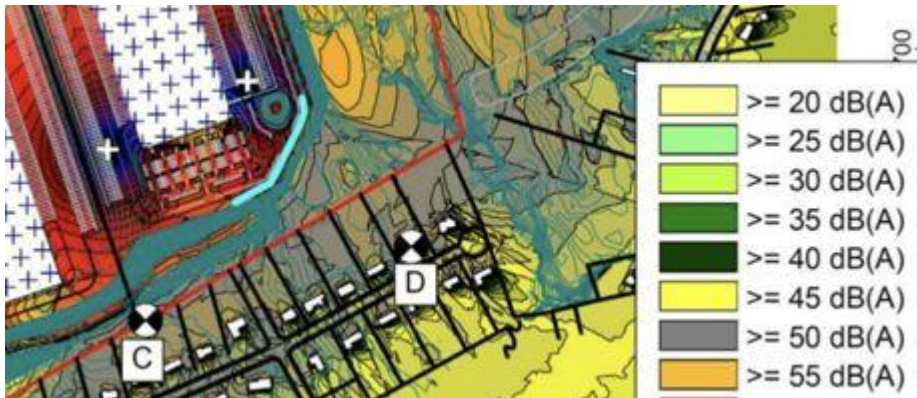
"Using a 5 foot above grade for an ear height is not sufficient to adequately determine compliance with the law. The audio model should be re-computed considering top floor window heights."

Truck Volume assumptions

In addition, the audio model makes the assumption of modeling only 8 trucks on the entire premise, among which only (3) actually modeled near the area of concern on the southern border near the residential properties.

Figure 3 shows the results of eight trucks throughout the site as well as rooftop HVAC equipment operating. Several conclusions can be drawn from this figure. Trucks in the southern areas of Lots B and C produce maximum levels in the 50-to-51 dB(A) range at residences to the south. This meets the intent of the project goal and more so, intermittent sound emissions of 51 dB(A) will meet code limits when averaged over the course of an hour. Emissions at Locations F and H will also meet code limits as well at the project goal maximum of 50 dB(A). Levels up to 67 dB(A) are produced at nearby industrial uses; this meets the project goal and code limit by wide margins.

This is another methodological concern, and unless data can be provided justifying that this limit will not be exceeded, the model should be updated with a worst case estimate of truck activity. To ensure that this facility cannot be reasonably expected to violate the Hudson laws with annual variance.



Model does not include all contributing factors

It was also noted that the addition of vehicle noise is not typically an acoustical issue, however due to the close proximity of the parking lots and the fact that the audio effects accumulate, the model should be updated with the vehicle noise at peak traffic times across the roads at the southern side of the proposed facility.

Model is missing audio baseline data

Also, it appears that the audio study does not take into consideration other contributing noise sources that are already present in the environment and the actual noise entering residential properties from external sources will be higher than simply the sources from this single facility, and the additional noise created by this facility may raise the noise limits beyond the thresholds for the town of Hudson.

Audio is using static assumptions

In order to model the impacts that this facility will actually have, the modeling must be done on a worst case basis not using idealized assumptions (such as the number and location of trucks).

Quantifying Noise Pollution

Using WHO, EPA, and ONAC formal independent study data we can easily establish a reasonable guideline to determine what constitutes noise pollution in accordance with the Hudson Noise Codes. Specifically we are able to quantifiably define the limits for what can legally be permitted for noise emissions per 249-4(A).

Response: The sound survey has been updated with additional information such as an ambient survey, second floor receptors, and addressed other questions stated above. Mitigation measures have been refined but conclusions remain the same. The WHO guidelines call for not exceeding a maximum sound level of 60 dB(A) at a façade. This project has reduced off-site sound levels to far below that. An ambient survey was carried out to collect more useful data to compare project criterion to. Results shows that the background sound level limits given in the code generally align with previously used criterion. Modelling assumptions continue to be valid. We have modelled a snapshot in time with multiple sources occurring at exactly the same time. This conservative approach shows compliance with all code limits. Actual site operations across the day will be variable but will be comprised of a makeup similar to what is shown in the model. Sources will move around and will remain variable in location and level.

51. I would also like to address the extreme noise on rte 3A in southern Hudson. it has drastically gotten worse and worse since I purchased the house in 1976. The road has been widened and people have lost part of their land. To even think this may happen again is so concerning. We have had enough reconstruction at the Pete's Gun Shop intersection. To change this up again for the ease of 18 wheelers to come and go into this monstrous facility would be horrible for all of us trying to live here.

I am pretty sure the noise here is of the highest level and probably already exceeding the limits. We can not have more noise! It will be beyond difficult to live with 18 wheelers, never mind all the other traffic going and coming to and from this facility and still be safe. Impossible!

Response: We are not familiar with historic or previous conditions of roads or on site. However, our Sound Study, as updated and peer reviewed by the Planning Board's peer review acoustical engineers, demonstrates compliance with under the Hudson Noise Ordinance and applicable provisions of the Town's Site Plan Review ordinance.

We trust these responses adequately address your comments and concerns at this time. Please feel free to contact us at 973-731-7002 or bmuller@acousticalconsultant.com with any questions or should you require additional information.