



5 August 2024

prepared for :

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## BRIEF SUMMARY OF SITE VISIT ANALYSIS

**Town of Middleton Four Paws Use Permit – Town of Middleton, Wisconsin**

### Introduction

A Conditional Use Permit has been submitted to the Town of Middleton in Dane County for a dog boarding facility. The intent is to repurpose an existing horse barn into a kennel for dogs. This proposed facility is referred to as Four Paws Pets Services LLC (Four Paws). The property of interest is south of Valley View Rd and east of Meadow Rd.

Four Paws has filed three permit applications. The permits have been denied by the Town of Middleton in Dane County on the basis of concerns in part related to dog-barking noise disrupting the nearby residential communities. Four Paws has hired an acoustical consulting firm, Hankard Engineering, and they performed an acoustic study using an audio system playing back a recording of dog barking sounds to simulate a typical and expected sound condition interior to the kennel facility. The resulting noise level exposures to the surrounding residential community were deemed reasonable by Hankard as noted within their 14 August 2023 report.

Subsequently, CONSONANT DESIGN, also an acoustical consulting firm, was hired to review the situation and offer a second professional opinion. The intent was to observe the test methods used by Hankard Engineering during a repeat of the dog barking simulation, observe and measure as necessary the sound escaping from the kennel facility, and perform ambient noise measurements in adjacent areas.

Such review activities, as further elaborated below, occurred on 13 May 2024 when the author of this report visited the site along with Hankard representatives and other involved parties. This report offers the findings, opinions, and recommendations of CONSONANT DESIGN.

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**Observations at Site and Summary of Acoustic Measurements**

The analysis methods utilized by CONSONANT DESIGN can be summarized as follows :

- The Conditional Use Permit, including the 14 August 2023 Hankard report, was reviewed.
- Sound level measurements were performed on 13 May 2024 in surrounding areas to document the ambient noise conditions within select residential areas. Understanding the ambient noise conditions is important because background noise influences the audibility and the degree of disruption associated with other intruding noise events, such as dog barking sounds.
- Sound level measurements were performed within the kennel facility with the dog barking simulation audio system operating, implemented by Hankard. The sound levels observed and measured were consistent with expectations for an indoor environment associated with a moderately loud kennel facility.
- Sound level measurements were performed, with the dog barking simulation audio system operating, at other interior and exterior locations in and around the kennel facility. Preliminary conclusions regarding the sound containment capability of the kennel build were formed.
- Observations were made at a representative location within a nearby residential area with the dog barking simulation audio system operating.

A Type 1 (precision) NTi XL2 sound level meter was utilized to perform all sound level measurements. The meter was calibrated and confirmed accurate at the start and end of all measurements, and occasionally between measurements, using a Larson Davis CAL200 calibrator. The most recent calibration of the meter and calibrator by NTi occurred on 23 April 2024. While full sound spectrum data were collected, the sound pressure level results referenced within this report are average ( $L_{eq}$ ) values over the noted time period, in A-weighted decibels (dBA).

Weather conditions during measurements were as follows: Temperature ranged from 65-degrees F to 72-degrees F. Cloudy conditions existed with humidity ranging from 73% to 65%. Wind direction ranged from the west to westsouthwest at speeds typically from 7 to 8 mph with gusts up to 15 mph.

TABLE 1 : NOISE LEVELS MEASURED DURING AMBIENT NOISE CONDITION

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Measurement / Observation Location	Sound Pressure Level [ L <sub>eq</sub> dBA ]	Observations
1	47.5	Observed traffic noise, birds, construction vehicles with backup warning signals, random dog barks. [10 minutes]
1	47.3	Ditto from previous measurement plus jet flyover. [10 minutes]
1	46.7	Observed similar sounds as noted regarding previous measurements. [40 minutes]
1	53.1	Ditto from previous two measurements plus farm tractor at 150' and greater distances, and Bobcat front-loader clearing trees. [30 minutes]
2	50.0	Ambient noise conditions near street. [10 minutes]
3	42.1	Ambient noise conditions near home. [10 minutes]

All measurements and observations noted in Table 1 above occurred with no tractor plowing activities occurring within the field south of the kennel facility (except as noted for the fourth measurement above) and with no without dog barking simulation audio system operating.

See Attachment 1 which shows the locations for measurements on a site map.

TABLE 2 : NOISE LEVELS MEASURED WITH DOG BARKING SIMULATION OPERATING

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Measurement / Observation Location	Sound Pressure Level [ L <sub>eq</sub> dBA ]	Observations
1	--	Dog barking simulation sound was not audible.
2	--	Dog barking simulation was reported to be audible by Ms. Sheri Lowe.
4	96.3	Sound pressure level measured inside kennel facility near dog barking simulation system while operating. [30-second measurement]
4	92.9	Sound pressure level measured near east end inside kennel building with dog barking simulation system operating. [30-second measurement]
4	86.9	Sound pressure level measured near west end inside kennel building with door open with dog barking simulation system operating. [30-second measurement]
4	81.6	Sound pressure level measured near west end outside kennel building with door closed with dog barking simulation system operating. [30-second measurement]
5	41.4	Dog barking simulation was slightly audible at this location. [30-second measurement]
6	--	Dog barking simulation was not audible.

All measurements and observations noted in Table 2 above occurred with no plowing activities occurring within the field south of the kennel facility.

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### **General Conclusions**

Firstly, when evaluating noise levels from ambient conditions and from specific sound events, objective sound levels which reference acceptable and pass/fail conditions must be established. Preferably, this is done by reviewing and referencing the existing municipal and/or State noise ordinances in effect regarding allowable sound pressure levels and other related conditions and noise measurement methods. Communities with laws based on subjective language within rules and regulations are generally insufficient for proper noise assessment in an objective fashion and for the formulation of pass/fail determination of sound events of interest.

A web search was performed regarding the Town of Middleton and the State of Wisconsin and no objective noise ordinance reference sound pressure levels were found. Absent objective regulations to serve as a basis for acceptably, or not, regarding an intruding noise situation, CONSONANT DESIGN has applied the following objective reasoning when evaluating the expected noise emanating from the Four Paws facility :

- Predominately within the United States, 55 dBA sound pressure levels as measured at property lines are deemed acceptable during daytime, 7:00AM to 10:00PM, conditions. 45 dBA sound pressure levels as measured at property lines are deemed acceptable during nighttime conditions.
- The sound levels referenced above generally apply to continuous noise level, such as the noise from an exterior condensing unit associated with an air conditioning system. Since impulsive noise, such as a dog bark, is more noticeable (versus continuous noise) and hence is considered more disruptive, a 5-decibel reduction is proper when establishing acceptable noise levels due to dog barking sound events. Hence, in our opinion, acceptable noise levels associated with dog barking as measured at residential property lines would be 50 dBA and 40 dBA for daytime and nighttime conditions, respectively.

The results of noise measurements and observations made during the 13 May 2024 visit can be summarized by comparing the information provided within Tables 1 and 2 with the preceding basis of acceptability sound pressure levels referenced in the preceding bulleted paragraphs.

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Based on the information provided above, we offer the following general conclusions :

- The existing ambient noise level conditions (without dog barking simulation operating and without uncommon farm equipment operating) were found , on average, to be lower than the typically acceptable 55 dBA daytime conditions.
- With the dog barking simulation operating within the kennel building (and without uncommon farm equipment operating) no dog barking sound could be observed by the author within the adjacent residential community, noted as location #1 on Attachment 1. Hence the dog barking sound was unmeasurable with a precision sound level meter and no sound level data are reported for this condition. Furthermore, the inaudibility of dog barking sound suggests that dog barking events be considerably lower than (at least 5 decibels lower than) the ambient noise level within the community. Location #1 represents the worst, or nearly so, noise exposure condition to the residents to the southeast of the proposed kennel facility.
- With the dog barking simulation operating within the kennel building (and without uncommon farm equipment operating) the resident at location #2 did observe dog barking sounds when exterior to her household. While not directly observed by the author of this report and not measured, based on the information noted herein, we would expect that the intruding dog barking sound was slightly above the average ambient noise conditions (estimated to be in the mid-40s dBA). This suggests that modest precautions to reduce the sound escaping from the kennel are prudent if the goal is total inaudibility of kennel activities.
- With the dog barking simulation operating within the kennel building (and without uncommon farm equipment operating) dog barking sound was slightly audible at the southeast corner of the kennel property, noted as location #5 on Attachment 1. The sound measured at this location (representing a combination of ambient noise and dog barking sound escaping from the kennel) was found to be 41.4 dBA, which is below typically-acceptable daytime noise standards for both continuous and impulsive sound.
- With the dog barking simulation operating within the kennel building (and without uncommon farm equipment operating) dog barking sound was not audible at the northeast corner of the kennel property, noted as location #6 on Attachment 1.

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- No dog barking sound was observed at location #3, but we understand that the resident was not informed regarding the timing of testing activities. Based on the orientation of the kennel facility and its associated sound leakage (described further below) and based on the observations noted in the preceding bulleted paragraph, we would anticipate no audibility or disturbance due to dog barking sound as observed at location #3.

The influence of weather conditions on the measurements and observations note above can be summarized as follows : The wind conditions being generally from the SSW and West represented a condition where sound from the kennel would be slightly higher (a decibel or two) than neutral (no wind) conditions as measured and observed at locations East and ENE of the kennel. Overall, weather conditions were considered to be relatively neutral during the 13 May 2024 measurements and observations.

It should be noted that the Four Paws facility is intended to house dogs throughout the day, including nighttime. Considering that the sound review by both Hankard and CONSONANT DESIGN occurred during daytime conditions, this raises the question regarding if dog barking sound escaping from the proposed kennel facility might be audible and/or disruptive to nearby residents during nighttime ambient noise conditions (not measured) when ambient noise levels are expected to be lower. We turned to the measurement results at location #5 as shown on Table 2 for the best insight into this matter. The measured daytime ambient conditions of 41.4 dBA were slightly above acceptable nighttime sound levels (per the applied objective reasoning noted above) of 40 dBA. At this location, which is closer to the kennel than residents to the east, the sound from the kennel was slightly audible. Hence, with no acoustic isolation upgrades to the kennel building and assuming interior sound levels commensurate with the dog barking simulation system, we would expect dog barking sounds to be, at most, slightly audible above low ambient noise levels during nighttime conditions as heard in closest residential locations to the east. This said, with the modest upgrades implemented to the kennel facility and its operations as noted within the Preliminary Recommendations for Consideration as noted below, we would expect dog barking sounds to be inaudible, or perhaps slightly audible with attentive and intentional listening, during nighttime conditions.

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It is our opinion that the sound emanating from the proposed kennel facility is modest in level and is not excessive when compared to typically-acceptable and objective community noise standards. Furthermore, modest upgrades to the exterior envelope of the kennel are possible to further reduce the sound escaping the kennel, especially in the direction toward the residential community to the southeast. Some administrative controls might be necessary to avoid excessive dog barking sound when dogs are outside the kennel, such as during drop off and pickup time periods.

Overall, we consider this noise challenge to be manageable and, in our opinion, there are no reasonable grounds for withholding a use permit based on sound conditions.

**Preliminary Recommendations for Consideration**

As stated above, it is our professional opinion that the development of the Four Paws kennel facility can be achieved in a fashion with little or no disturbance to the surrounding residents. We consider the sound levels to be sufficiently modest that the noise impact to the community is manageable.

Below are a series of recommendations which offer the means for managing the sound from the kennel in an effective manner. A phased approach is suggested. Specifically, we recommend that recommendations one and two, and possibly also recommendation three, be requirements for the issuance of a use permit. We expect these modest building features will be sufficient to achieve peaceful coexistence of the kennel and the surrounding community. Furthermore, recommendation four should be implemented if (after the facility is under operation for an extended period of time) noise complaints from the community arise.

**1. UPGRADE ACOUSTIC ISOLATION PERFORMANCE OF BUILDING ENVELOPE – OPTION 1 :**

As described above, when the simulated dog barking sounds were active, sound was escaping from the south face of the barn facility. Modest upgrades to the building envelope should be implemented to avoid sound leaks. While this matter requires retesting and further review, likely the gaps in the construction (Junction of roof and wall?



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Perimeter of windows? Door at east end of the south exterior wall? Other leaks?) should be closed to an airtight seal using a barrier material equal to the average surface weight per square foot of the exterior wall and roof system and closed to an airtight seal using rod backer and permanently-resilient acoustical sealant. Details should be created by a qualified acoustician and the final results should be inspected and tested acoustically.

2. **UPGRADE ACOUSTIC ISOLATION PERFORMANCE OF BUILDING ENVELOPE – OPTION 2 :**  
Create a partition system within the barn facility at the west entrance so sound does not escape to the exterior when dogs are dropped off and retrieved. This would entail the construction of a complete north/south wall just interior of the barn facility and the creation of sound lock vestibules (two doors in series separated by a vestibule which includes sound absorbing materials) integral to the new wall system. The intent is to minimize the likelihood that the main interior kennel area is open directly to the exterior via door openings.
3. **CREATE A PORTE COCHERE AT THE WEST ENTRANCE :**  
Optionally, create a covering over the exterior location where dogs would be dropped off and retrieved by kennel customers to minimize the amount of sound escaping into the community. This would entail a roof system of modest weight, minimum five pounds per square foot, and the incorporation of sound absorbing materials on the bottom side of the roof system. Further acoustic design effort is required.
4. **IMPLEMENT A CALIBRATED SOUND MONITORING SYSTEM WITHIN THE BARN FACILITY :**  
The noise source of barking dogs implemented by Hankard represented a reasonable mockup of typical to possibly excessive sound levels expected interior to the kennel. The sound level generated from the basis for the measurements, observations, and preliminary conclusions shown above within this report. This said, reports of sound levels measured at other kennel facilities exist which suggest that higher sound levels may be possible within the kennel.

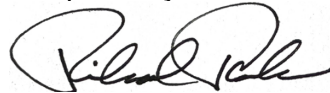
Optionally, if complaints from the community arise after the implementation of recommendations one and two, design and implement a calibrated sound monitoring system interior to the kennel which offers the kennel staff feedback if/when excessive

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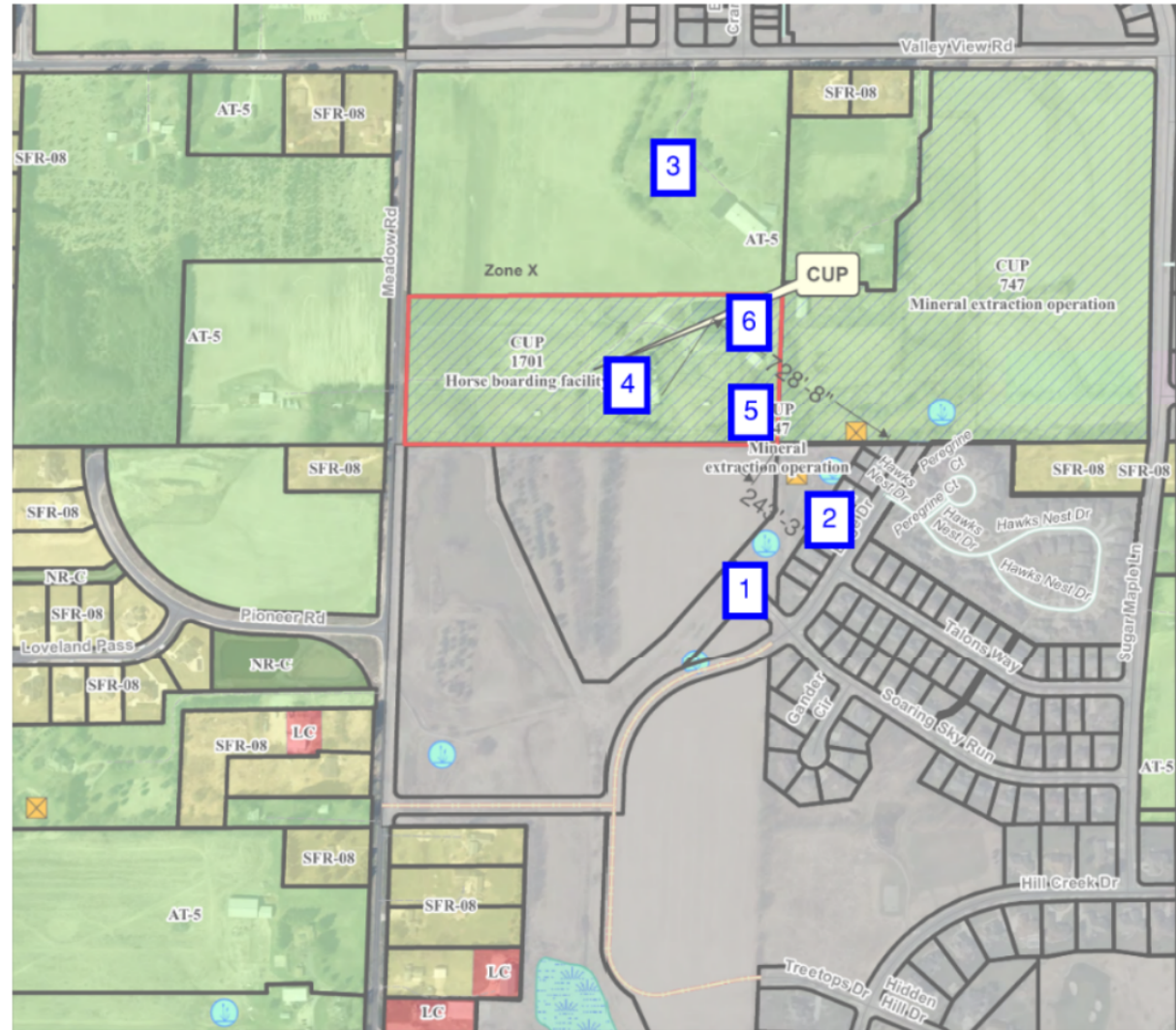
barking occurs. Such a sound monitoring system could be developed which offers the following information : 1) Green light when sound levels interior to the kennel are below acceptable values; 2) Yellow light when sound levels are approaching values which would be deemed unacceptable to the community; and 3) Red light when sound levels are excessive. The staff could use this visual input to calm the dogs by appropriate means.

Respectfully submitted by,



Richard Henry Talaske  
Principal Acoustician

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Attachment 1 - Site plan of general area showing locations of sound pressure level measurements and/observations.

Location 1: NW of Feather Edge and Soaring Sky intersection.

Location 2: 1122 Feather Edge Drive.

Location 3: 7377 Valley View Road.

Location 4: Within and exterior of proposed kennel building.

Location 5: SE corner of kennel grounds.

Location 6: NE corner of kennel grounds.