

Acceptability of OHM and ATV Noise - Case Studies of Environmental Noise Produced by OHM and ATV Riding Areas

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ABSTRACT

Acceptability of Off-Highway Motorcycle (OHM) and All Terrain Vehicle (ATV) noise is increasingly becoming an issue. Increasing numbers of riders combined with a decrease in available riding areas, due to liability concerns and increasing rural development, has raised issues with land compatibility. Lack of clear noise regulations in typical rural Midwestern communities makes enforcement difficult or subjective.

This paper reviews two case studies of OHM and ATV riding area noise at neighboring residential property lines. One study was performed as part of the defense for nuisance tickets, for excessive noise, issued to a group of riders at a new private riding area. The other study was performed to help an established riding club obtain a conditional use permit for their land, which they had been legally riding on for decades, due to noise and dust complaints from new residential development next to their property.

An issue immediately raised with both of these studies was determining applicable noise regulations. A review of related state and federal standards along with peer community standards was used to determine an approach for evaluating acceptability of property noise levels. Compliance with these related standards was evaluated by performing property line noise measurements of select groups of riders comprising a typical vehicle mix for each respective

riding club. These measurement results were also compared to measured background noise levels to develop operating controls for the maximum numbers of riders allowed to meet acceptable property line noise levels. In addition, maximum noise levels for select OHM and ATV riding events were compared to other observed noise events to help convey the relative level of noise experienced at the neighboring residences.

INTRODUCTION

One of the biggest challenges currently facing off highway motorcycle and all terrain vehicle riding areas is excessive noise. The trend away from small two stroke to larger four stroke engines in modern high performance off highway motorcycles (OHMs) and all terrain vehicles (ATVs) has increased noise levels produced at many riding areas significantly over the last eight years. In addition, the noise produced by the larger high performance four stroke engines has stronger low frequency content which carries further than the higher frequency dominated sound produced by typical smaller displacement (250cc or less) two stroke engines.

Continued growth in popularity of OHM and ATV riding is being met with a decrease in riding areas, as litigation over the years has all but eliminated the ability to go riding on unused commercial, industrial or farm land. Also, public riding opportunities are very limited in South-East Wisconsin. This has forced OHM and ATV riding into fewer and smaller areas,

resulting in higher rider density and further increased noise levels at riding areas.

Urban sprawl is yet another challenge currently facing OHM and ATV riding. The last 10 years has seen a significant increase in rural residential development in South-East Wisconsin. Former farm and woodland areas are being divided up into 5 to 40 acre residential tracts for those trying to get away from the noise and stress of the city. This has put residences alongside long active farming, mining and OHM-ATV riding areas, resulting in a clash between rural and metro cultures where previously there were no compatibility issues.

BACKGROUND

Over the last couple of years, I have helped a couple of private off highway motorcycle (OHM) and all terrain vehicle (ATV) clubs resolve noise complaints raised by residents neighboring their properties. There are many similarities between the cause and events leading up to the complaints, as well as the tactics used to successfully resolve the concerns and allow the clubs to continue OHM and ATV riding. Please note that although this information is of public record and both clubs have given permission to publish their stories, actual club, neighbor or key landmark names are not used to protect the identities of the neighboring residents.

Club M is a group of OHM and ATV riders who purchased an approximate 60 acre gravel pit, which had not been mined for several years, to use as a private riding area. The land was still zoned for an operating gravel pit when purchased by the club. Approximately a year after the club began riding on their property, a group of riders were issued nuisance citations while on the club property. The citations were issued due to complaints about noise from the club's neighbors to the south.

Club R is a group of OHM riders who have been riding on the same property for approximately 20 years. Prior to the current club, OHM riding and events have been reported as far back as 40 years on the same property. Noise complaints from a new residence and development north and north-west of the club property lead to the club having to stop riding on their property unless they could obtain a special use permit for their land, which was already zoned for recreational use.

In both cases, the OHM & ATV riding areas were shut down until they could prove they would not produce excessive noise at the neighboring

residential properties. In neither case was a noise measurement made before the riding areas were shut down. This is in part due to the lack of clear noise regulations for residential noise exposure in rural areas of Wisconsin and many other states. In order to prove the clubs could ride without exposing their respective neighbors to excessive noise, a relevant measure of acceptable noise needed to be identified.

STANDARDS

Previous consulting experience with environmental noise led to a review of several Midwestern Community, State and Federal standards to find a convincing relevant measure. The state of Wisconsin has no specific residential or environmental noise standards. A search of the Wisconsin Government web site [1] brings up various Department documents with references to the Federal Department of Housing and Urban Development (HUD) noise requirements for environmental noise. HUD requirements [2] for new housing construction, assisted or supported by the Department, state that average daytime exterior noise levels of $Leq = 65$ dBA or less are "acceptable" and daytime exterior noise levels at $Leq = 75$ dBA or more are "normally unacceptable". Equivalent Sound Level or Leq is the level of a steady state sound which, in a stated time period, has the same A-weighted sound energy as the time varying sound. [3] HUD further states that average nighttime exterior noise levels, between 10pm and 7am, must be 10 dB lower than the $Leq = 65$ dBA allowed in daytime (nighttime $Leq = 55$ dBA or less). HUD's regulations do not contain standards for interior noise levels. Rather a goal of 45 dBA is set forth and it is assumed that with standard construction, any building will be sufficient to provide interior levels $Leq = 45$ dBA or less with exterior levels $Leq = 65$ dBA or less. The noise standards utilized by the Federal Aviation Administration (FAA) [4] are similar to HUD standards.

For comparison with peer communities, noise standards for St. Louis, Missouri and the state of Minnesota were reviewed for relevant measures. The St. Louis County, Missouri Noise Control Code [5] allows daytime residential exposure from a stationary noise source not to exceed 55 dBA during Daytime Hours from 7:00am to 10:00pm, which is equivalent to the HUD nighttime noise limit. The Minnesota Pollution Control Agency Rules [6] allow residential noise exposure not to exceed $L50 = 60$ dBA and $L10 = 65$ dBA during daytime hours from 7:00am to 10:00pm. This is essentially between the HUD and St. Louis County daytime limits.

Based on the above standards, property line noise measurements in Leq are required. The Wisconsin state references to HUD standards imply Leq = 65 dBA or less is acceptable at neighboring property lines during daytime hours (7am to 10 pm). The review of the above standards shows the St. Louis daytime requirement of Leq = 55 dBA, equivalent to HUD nighttime requirements, is the most stringent measure for acceptable daytime noise levels at neighboring residential properties.

CASE 1

The Club M property is located in South-East Wisconsin, a little over an hour north of Milwaukee, along the east side of a paved two lane Highway. No construction was evident on or along the Highway during the measurements.

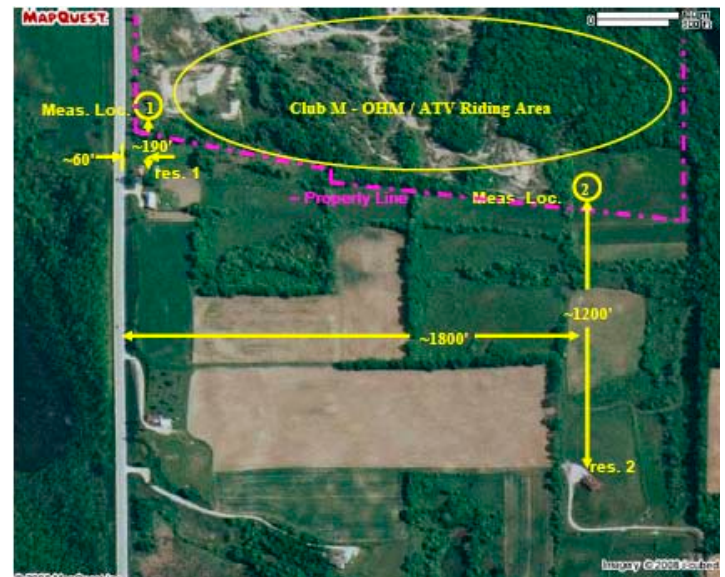
Measurement of OHM and ATV noise was performed at the Club M grounds in August of 2005. The goal was to obtain noise measurements of typical OHM and ATV use along the property line adjacent to the two closest neighbors at the Club M grounds. Noise measurements of both A-weighted hourly average (Leq) and individual vehicle pass-by maximum noise levels (slow), were obtained both with and without OHMs & ATVs in use at the Club M property. This is to allow comparison with Federal (HUD) and other regional environmental noise standards, since there are no other applicable township, county or state environmental noise standards.

The Club M property is the site of a former gravel operation that had not been used for several years, with many man made and natural hills. The perimeter of the site is wooded with a small field in the south-east corner that overlooks Residence #2 to the south. A one way OHM & ATV trail runs about the wooded perimeter of the Club M property and was used for OHM & ATV operation during all the measurements to provide worst case noise at the property line. Prior to receiving the nuisance tickets, the area along the south-west corner of the property was often used as a Motocross (MX) track.

To address the noise concerns of the neighbors, Club M has stopped using the area at the south-west corner, near residence #1, as a MX track and has moved their OHM-ATV trail back approximately 100 feet in this area. A berm, from the former mining operation, is also located along the south-west corner of the property which blocks the direct line of site from the residence to the OHM & ATV trail. Club M is also now requiring all OHMs & ATVs meet the Wisconsin DNR and U.S. Forestry Service required

96 dBA or less stationary exhaust noise limit, as measured per the SAE J1287 procedure [7]. Prior to the property line noise measurements, stationary exhaust noise measurements were performed by Club M to ensure all member bikes were compliant with the new requirement.

Measurements were obtained at 2 different locations along the property line adjacent to the closest neighbors. The temperature was 72° F at the beginning of the measurements with winds less than 5 mph. Humidity was relatively high with occasional light drizzle or sprinkles. The measurements were made during a period of drought which significantly reduced the normal level of insect noise.



Club M Property - Noise Measurement Locations

Measurement Location #1 was located at the South-West corner of the Club M property. Measurements were obtained at the top of the noise barrier (berm), that runs along the south and west sides of the property at this area, approximately 60 ft. back from the south property line and 30 ft. back from the ditch along the Highway at the west property line. Measuring on top of the noise barrier yields a worst case (loudest) noise measurement since no barrier attenuation is realized along the top of the barrier, as should be at the property line and residence. The OHM & ATV trail runs approximately 40 ft. back from the top of the barrier at this location.