Ohio
Noise Related Statutes and Policies

1533.84 Rules for establishing standards for shooting ranges.
The chief of the division of wildlife, in accordance with section 1531.10 of the Revised Code, shall adopt rules establishing generally accepted standards for shooting ranges. These rules shall be no more stringent than national rifle association standards, and include standards for the limitation and suppression of **noise**, standards for the hours of operation of shooting ranges of the various types and at the various locations of ranges, and standards for public safety. The rules may include standards for the reconstruction, enlargement, remodeling, or repair of any structure or facility that is part of a shooting range provided that any local laws creating standards for the reconstruction, enlargement, remodeling, or repair of structures or facilities that apply generally to all structures or facilities and not exclusively or primarily to shooting ranges also shall apply to shooting ranges. Nothing in this section limits the authority of a county or township board of zoning appeals to issue or deny conditional zoning certificates for the reconstruction, enlargement, remodeling, or repair of an existing shooting range pursuant to division (C) of section 303.14 or division (C) of section 519.14 of the Revised Code or the authority of a board of county commissioners or board of township trustees relating to the completion, restoration, reconstruction, extension, or substitution of nonconforming uses pursuant to section 303.19 or 519.19 of the Revised Code. At the time of its establishment, a shooting range shall comply with all existing local ordinances, regulations, or laws.

The chief of the division of wildlife shall consult with a representative sample of persons and organizations that own, operate, or use shooting ranges and persons and organizations that represent counties, townships, municipal corporations, and holders of real property adjoining shooting ranges prior to filing or amending the rules required or authorized under this section in accordance with section 1531.10 of the Revised Code. A draft copy of the chief's proposed rules or any subsequent amendments to the rules shall be submitted to representatives of the above-listed organizations, who shall be given thirty days to review and submit written comments on the draft rules to the chief. The chief shall consider but not be bound by the written comments and, after giving due regard to the public interests, shall file the initial rules in accordance with section 1531.10 of the Revised Code within one hundred eighty days after the effective date of this section.

4513.21 Horns, sirens, and warning devices.
(A) Every motor vehicle or trackless trolley when operated upon a highway shall be equipped with a **horn** which is in good working order and capable of emitting sound audible, under normal conditions, from a distance of not less than two hundred feet.
No motor vehicle or trackless trolley shall be equipped with, nor shall any person use upon a vehicle, any **siren, whistle, or bell**. Any vehicle may be equipped with a **theft alarm** signal device which shall be so arranged that it cannot be used as an ordinary warning signal. Every emergency vehicle shall be equipped with a **siren, whistle, or bell**, capable of emitting sound audible under normal conditions from a distance of not less than five hundred feet and of a type approved by the director of public safety. Such equipment shall not be used except when such

vehicle is operated in response to an emergency call or is in the immediate pursuit of an actual or suspected violator of the law, in which case the driver of the emergency vehicle shall sound such equipment when it is necessary to warn pedestrians and other drivers of the approach thereof.
(B) Whoever violates this section is guilty of a minor misdemeanor.

4513.22 Mufflers.
(A) Every motor vehicle and motorcycle with an internal combustion engine shall at all times be equipped with a muffler which is in good working order and in constant operation to prevent excessive or unusual **noise**, and no person shall use a muffler cutout, by-pass, or similar device upon a motor vehicle on a highway. Every motorcycle muffler shall be equipped with baffle plates.
No person shall own, operate, or have in the person's possession any motor vehicle or motorcycle equipped with a device for producing excessive smoke or gas, or so equipped as to permit oil or any other chemical to flow into or upon the exhaust pipe or muffler of such vehicle, or equipped in any other way to produce or emit smoke or dangerous or annoying gases from any portion of such vehicle, other than the ordinary gases emitted by the exhaust of an internal combustion engine under normal operation.
(B) Whoever violates this section is guilty of a minor misdemeanor.

4513.221 Local regulation of passenger car and motorcycle noise.
(A) The board of county commissioners of any county, and the board of township trustees of any township subject to section 505.17 of the Revised Code, may regulate passenger car and motorcycle **noise** on streets and highways under their jurisdiction. Such regulations shall include maximum permissible **noise** limits measured in decibels, subject to the requirements of this section.
(B) Regulations establishing maximum permissible **noise** limits measured in decibels shall prohibit the operation, within the speed limits specified herein, of a passenger car or motorcycle of a type subject to registration at any time or under any condition of load, acceleration, or deceleration in such manner as to exceed the following maximum **noise** limits, based on a distance of not less than fifty feet from the center of the line of travel:

(1) For passenger cars:

(a) When operated at a speed of thirty-five miles per hour or less, a maximum **noise** limit of seventy decibels;

(b) When operated at a speed of more than thirty-five miles per hour, a maximum **noise** limit of seventy-nine decibels.

(2) For motorcycles:

(a) When operated at a speed of thirty-five miles per hour or less, a maximum **noise** limit of eighty-two decibels;

(b) When operated at a speed of more than thirty-five miles per hour, a maximum **noise** limit of eighty-six decibels.

(C) Maximum **noise** limits established pursuant to division (B) of this section shall be measured on the "A" scale of a standard sound level meter meeting the applicable requirements for a type 2 sound level meter as defined in American national standards institute standard S1.4 – 1983, or the most recent revision thereof. Measurement practices shall be in substantial conformity with standards and recommended practice established by the society of automotive engineers,

including SAE standard J 986 A NOV81, SAE standard J 366 MAR85, SAE standard J 331 A, and such other standards and practices as may be approved by the federal government.
(D) No regulation enacted under division (B) of this section shall be effective until signs giving notice of the regulation are posted upon or at the entrance to the highway or part thereof affected, as may be most appropriate.
(E) A board of county commissioners of any county may regulate **noise** from passenger cars, motorcycles, or other devices using internal combustion engines in the unincorporated area of the county, and a board of township trustees may regulate such **noise** in the unincorporated area of the township, in any of the following ways:

(1) By prohibiting operating or causing to be operated any motor vehicle, agricultural tractor, motorcycle, all-purpose vehicle, or snowmobile not equipped with a factory-installed muffler or equivalent muffler in good working order and in constant operation;

(2) By prohibiting the removing or rendering inoperative, or causing to be removed or rendered inoperative, other than for purposes of maintenance, repair, or replacement, of any muffler;

(3) By prohibiting the discharge into the open air of exhaust of any stationary or portable internal combustion engine except through a factory-installed muffler or equivalent muffler in good working order and in constant operation;

(4) By prohibiting racing the motor of any vehicle described in division (E)(1) of this section in such a manner that the exhaust system emits a loud, cracking, or chattering **noise** unusual to its normal operation.

(F) Whoever violates any maximum **noise** limit established as provided in division (B) of this section or any of the prohibitions authorized in division (E) of this section is guilty of a minor misdemeanor. Fines collected under this section by the county shall be paid into the county general fund, and such fines collected by the township shall be paid into the township general fund.
No regulation adopted under this section shall apply to commercial racetrack operations.

DIVISON OF TRANSPORTAITON POLICY

The National Environmental Policy Act (NEPA) of 1969 was established with the purpose of encouraging productive and enjoyable harmony between humans and their environment while promoting efforts that will prevent or eliminate damage to the environment and stimulate the health and welfare of people.

Title I, Section 102 of the Act states that a detailed statement by the responsible official on the environmental impact of the proposed action shall be included in every recommendation, reports on proposals for recommendation, reports on proposals for legislation and other major federal actions significantly affecting the human environment.

The Federal Highway Administration is the agency responsible for administering the Federal-Aid Highway program. Under this program, federal funds are allotted by Congress to the individual states. However, before these monies can be used for highway projects, the projects must be approved by FHWA, which can only grant its approval for projects that are developed in accordance with federal statutes and regulations. One of these regulations requires that a noise study be accomplished to determine what noise impact, if any, will result from the

proposed highway improvement and what measures will be taken to lessen these noise impacts. If noise impacts are expected, noise reduction measures that are determined by the state highway agency and the FHWA to be practicable, reasonable and acceptable to the affected public, must be incorporated into the highway improvement and are eligible for federal funding in the same proportion as other aspects of the project.

Noise Analysis

What is Noise?

Noise is considered unwanted sound, particularly when the sound causes annoyance. Noise comes from many sources. One of the most significant sources is from transportation, particularly traffic noise.

Highway noise comes from three sources: the engine, the exhaust and the interaction of the tires and pavement. Once typical highway speeds are reached, the predominate noise from light trucks and cars is from the tire/pavement interaction. Heavy trucks produce a high volume of noise from all three sources even at high speeds.

Mitigating transportation noise in the environment is important for the health and welfare of the surrounding community. Numerous studies have demonstrated the effect of noise on the health of those suffering under its impact. Effects ranging from hearing loss to cardiac arrest have been linked to noise. Prolonged exposure to noise in excess of 75 dBA (deciBels Adjusted) may initiate hearing loss. Noise may also negatively impact the quality of life of those who must live with it. Loss of sleep and the inability to hold conversations are frequent complaints. Helping to alleviate these negative impacts is the objective of noise abatement.

Studies demonstrate a correlation between the Ldn (a measurement of the average day-night noise level) and the percentage of people annoyed by noise at a particular Ldn level. As the average noise level exceeds 50 Ldn the percentage of people annoyed by the noise increases.

Applicability

Noise analysis projects are categorized into two types by the ODOT Analysis and Abatement of Highway Traffic Noise Policy and the Federal Highway Association (FHWA), Highway Traffic Noise Analysis and Abatement - Policy and Guidance (FHWA, 1995) . A Type I project refers to projects that include Federal funding for construction of highways in a new location or the alteration of an existing highway resulting in substantial change in either alignment or the number of through-traffic lanes. A Type II project refers to voluntary projects where noise abatement is investigated due to high average noise levels at a given location, for residential units that were in existence prior to the construction of the highway. Type II projects are currently funded by ODOT from regular project funds without federal assistance.

Analysis Objectives

All noise analysis is conducted in compliance with Code of Federal Regulations (CFR), Title 23, Part 772, the United States Department of Transportation, Federal Highway Administration

(FHWA), Highway Traffic Noise Analysis and Abatement - Policy and Guidance (FHWA, 1995), and The Ohio Department of Transportation (ODOT) policy concerning analysis and abatement of highway traffic noise (ODOT, 1997).

The purpose of noise analysis is to accomplish a number of objectives:

1. Identify existing and potential noise sensitive areas within the project area.
2. Demonstrate existing noise conditions through the use of computer modeling.
3. Determine future noise levels and the impact of future noise levels on sensitive land use activities for the given design year.
4. Compare existing and projected conditions to determine the projected impact on the surrounding area.
5. Identify and evaluate reasonable and feasible noise abatement measures for reducing noise where impacts are determined to occur.
6. Address potential concerns for noise occurring during construction and mitigate when possible.

Noise Descriptors

A variety of methods are used to describe noise. Noise is typically described using the sound level in decibels (dB). Decibels are a unit of measure on a logarithmic scale used to demonstrate the amount of sound pressure at a given location from the general environment or specific sources. The decibel scale includes a range of 0-120. A change of 10 dB in either direction constitutes doubling or halving the sound pressure level respectively.

The frequency of sound is measured in cycles per second or Hertz (Hz). Humans are capable of detecting sounds in the range of 20 to 20,000 Hertz. The human ear is best attuned to frequencies in the range of 200 to 5000 Hz. People do not respond uniformly to frequency ranges perceiving sounds of equal decibel levels differently when heard at different frequency intervals. For example, a 60 dBA sound at 1000 Hz will be perceived to be much louder than at 100 Hz.

The result is that various weighting methods have been developed to account for the way people hear sounds at varying frequencies. The purpose of the weighting is to emphasize frequency ranges to which people are more attuned. The most common measure of noise level is the A-weighted sound level (dBA). This is the measure most typically used in community sound ordinances and in traffic related noise measurements. The typical person is unable to detect changes in sound pressure level of less than 3 dBA. In general, a change of 5 dBA can be readily detected.

When quantifying environmental noise, consideration must be given to the fluctuation in noise levels over a period of time. To properly measure environmental noise it is best to measure an equivalent sound level over a period of interest. The Leq(h) measure is widely accepted for calculating environmental noise based on an hourly value (h).

Noise Abatement

Noise from transportation sources in the surrounding community depends on a number of factors. Among these factors are the volume and vehicle mix of the traffic, specifically, the number of heavy trucks in the mix, the proximity of the receiver to the traffic, the speed of the traffic and the nature of the intervening terrain. Large hills or other buildings between a receiver and the roadway help reduce the amount of noise experienced at a receiver. Vegetation may also serve to reduce traffic noise provided it is dense enough (at least 100 feet) and tall enough (at least 30 feet). Otherwise, vegetation only serves to provide psychological relief.

There are several methods considered for abatement of highway noise:

Traffic Management Measures - This involves restrictions on the speed and type of vehicles permitted to use a particular roadway. Prohibiting heavy trucks from using a road or providing strict limits on speed can greatly reduce noise from a road. This measure is not feasible for use in many projects due to the nature of the roadway in question. For example, the purpose of an interstate highway is to move large volumes of traffic at high speeds. Restricting the type and speed of vehicles using the highway is counter to the purpose of the highway.

Alteration of horizontal and vertical alignments - Alignment of the road refers to the physical layout of the roadway. Placing the road at an elevated grade will typically result in greater noise than a road at grade or below grade.

Quieter Pavement - Much research is currently underway to develop quiet pavement. In general, asphalt pavement is quieter than concrete pavement, but concrete pavement is believed to have greater durability. Open-graded asphalt is a quiet pavement that depends on voids in the surface to reduce the area of the tire interacting with the pavement, resulting in less noise. The pavement requires cleaning to remain effective. The voids are subject to being filled with dust and other particles, thereby reducing the effectiveness of the pavement in providing noise abatement.

Land Use Planning and Control - State and local governments are encouraged by the FHWA and other federal agencies to practice land use planning and control near highways. Local governments should use their authority to encourage development near highways in such a way that noise sensitive land uses are developed in areas away from the highway potentially eliminating the need for such abatement measures as noise barriers. This is a highly complex issue due to the numerous agencies involved and the various layers of legislative authority with control over land use issues.

Noise Barrier Construction - Noise barriers reduce noise by blocking the path of sound between the source of the noise and the receiver. To be effective, a noise barrier should be located adjacent to either the source or the receiver. They must also be long, continuous and break the line-of-sight from the highway to the receiver. A noise barrier must generally extend four times the distance between the barrier and the last receiver to be effective at reducing noise for the last receiver. Noise barriers are typically designed to achieve a minimum reduction of 5 dBA for at least one receiver and 3 dBA for other receivers to be considered effective. A minimum reduction of 3 dBA must be achieved for a particular receiver to be considered as benefiting from a barrier. Noise

barrier construction is considered reasonable if the construction cost is less than $35,000 per receiver. Per the ODOT noise policy, construction of natural noise barriers will be explored where feasible.