



Zoning Committee Review

Rural Use ZOAM 2017-0004 Outdoor Shooting Ranges

**Topics For Discussion:
ZOAG Rural Use Subcommittee
January, 2018
Updated August, 2018**

Primary purposes of sharing/reviewing this information are:

- to ensure ZOAG members have a clear and common view of the uses being proposed;
- to determine applicability of the use for the underlying area; and
- to confirm any recommended performance standards adequately address any associated impacts for:
 - Sport Shooting Ranges

Outdoor Shooting Ranges

Topics for Discussion: ZOAG Rural Subcommittee

- **Overall consistency with Zoning Ordinance Goals, Purpose, Intent**
- **Shooting Range – Proposed Zoning Ordinance Amendments Draft comments**
- **Considerations: Location, Business, Safety, Noise Standards compliance**
- **Consistency with Rural Agriculture and Rural Economy**
- **Lead Management**
- **Outdoor Shooting Range Comparisons – Albemarle & Greene Counties**

Overall consistency with Zoning Ordinance

§ 1-100: Goals, Purpose, Intent - Discussion

Section 1-102: *Promote the health, safety and welfare of the residents of Loudoun County:*

- A. Guide/regulate orderly growth
- B. Protect character and social/economic well being of private and public property
- C. Promote best utilization of land
- D. Provide light, air and safety from fire, flood and other dangers
- E. Reduce/prevent congestion in public streets
- H. Protect against destruction/encroachment upon historic areas
- J. Encourage economic development with desirable employment
- L. Provide for preservation of agricultural and forestal land for protection of natural environment

A SUSTAINABLE RURAL COMMUNITY



in ***requires***

BALANCE

between:

Environment & Heritage

- Heritage & Archaeology
- Parks, Greenways & Trails
- Plant & Wildlife Habitats
- Forests, Trees & Vegetation
- Surface & Groundwater
- Open space easements
- Air, Dark Skies & Noise
- Farm & Historic assets
- Mountainsides
- Rivers & Streams
- Agricultural Soils

Social Interests

- Residents (Rural & Suburban, new & long term)
- Land Stewards / Property Owners
- Towns and Villages
- Patrons & Visitors

Rural Economy

- Traditional farming & farm leasing
- Equine/Animal Husbandry
- Wineries/Breweries/Craft Beverages
- Direct PYO Fruits/Veges
- Horticulture/Ornamentals
- Arts/Recreation/Tourism
- B&B's/Rural Lodging
- Commercial Restaurants & Event Centers
- Professional/Home Businesses & Services
- Education/Public & Institutional Uses



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Outdoor Shooting Range – Proposed Zoning Ordinance Amendments Draft

- Who is the Stakeholder requesting use?
- Quantified market demand?
- Draft text still states, “retail sales or repair of firearms shall be *permitted* at a Shooting Range, Outdoor” (vs. “prohibited”)
- Edits/comments from “BC” request Shooting Ranges be “Permitted” vs. “Special Exception Use” for AR-1 & AR-2
 - HOWEVER – C. Design(6) indicates “special use permit application”
- Comments C. Design(2) have allowed “cannons, artillery or rockets”
- Compliance with Road/Access Standards Section 5-654 may necessitate Special Exception Review (6-1300) for any facility with more than 600 Vehicle Trips/Day.

Sport Shooting Range, Outdoor

➤ Does not comply with Purpose and Intent for AR-1 and AR-1 Zoning:

■ AR-1, Section 2-100.

- B. Allow for a broad range of rural economy uses, including (agriculture, horticulture and animal husbandry), agriculture support and services associated with on-going agricultural activities, and other uses that can be developed in ways consistent with the rural character of the AR-1 district through mitigation or other standards.

■ AR-2, Section 2-200.

- Support the use of land for rural economy uses consistent with the pattern of rural and agricultural land uses in the district, including sustaining and nurturing the economically significant equine industry.
- Allow residential uses at densities consistent with the general open and rural character of the rural economy uses, and consistent with the land use patterns in the district, which are marked by low density and large parcels relative to the other portions of the County.
- Allow for a broad range of rural economy uses, including traditional and new agricultural uses (agriculture, horticulture and animal husbandry), agriculture support and basic services directly associated with on-going agricultural activities, and other uses that can be developed in ways that are consistent with the rural character of the AR-2 District through mitigation or other standards.

Sport Shooting Range, Outdoor

➤ Intensity/Character

- **Size of Use of 100 acres** – based on noise studies from other Virginia jurisdictions, will NOT be in compliance with noise standards

➤ **REDC Motion: Rejected the performance standard to allow outdoor gun ranges in AR1 or AR1 for following reasons:**

- Insufficient land to adequately buffer adjacent parcels from noise
- Noise will negatively impact local tourism
- Negatively impact equestrian businesses (boarding, training and show facilities)
- Property values for adjacent parcels will be negatively impacted
- Volume of traffic
- Cost of lead clean up if/when business closes
- Economic feasibility (business case) – likelihood of requests for exceptions.

Sport Shooting Range, Outdoor

➤ DRAFT TEXT:

- Setbacks: **800' from all lot lines and 2,500' from existing or approved residential dwellings – compliance with noise standards?**
- **Parking: 100' from lot lines** insufficient in residential areas
- Design: Identify source of BMPs and requirements.
- Landscaping/buffering (5-653 A&B) –
 - 1 canopy per 10 parking spaces – **Visual only? Sufficient?**
- **“Must comply with Road Access Standards 5-654” – HOW?**
 - How is compliance tested before zoning approval?
 - Since 1992 Enforcement is By “complaint only” therefore violates Zoning Goals:
 - Reduce or prevent congestion in the public streets.
- **Compliance with Noise standards 5-652 and Section 5-1507 – what will be done to evaluate if proposed location can ever comply?**

Sport Shooting Range, Outdoor

- **ZOAG Due Diligence:** June 13th meeting requests were made to
 - Determine **market demand**, and required change to rural landscape
 - Staff to research what **other counties allow in zoning** for sport shooting ranges

- **DEFINITION:** “Retail sales or repair of firearms shall not be permitted at a Shooting Range.” However, no reference to RENTAL of firearms or accessories
 - Must have Federal firearms Licensing (FLL) to **rent firearms or accessories**.
 - “Most range owners find that your range will **not be profitable enough without adding an FFL to capture sales** from this side of the business as well.”

Berm Examples



Source: <https://skyaboveus.com/hunting-shooting/Shooting-Range-Sound-Reduction>

Berm Example



Consideration: Business requirements

- Must have Federal firearms Licensing (FLL) to **rent firearms or accessories**.
- “Most range owners find that your range will not be profitable enough without adding an FFL to **capture sales** from this side of the business as well.” (<https://www.ffl123.com/setting-up-a-shooting-range-should-you-have-a-ffl-license/>)

Consideration: Location, Location, Location

- **Most important site selection criteria to consider when selecting a new range location include: topography; surface water flow patterns; and depth to groundwater.** (*BMP for Lead at Outdoor Shooting Ranges, Chapter II - Page II-5*)

Business obstacle: NOISE

- Outdoor ranges almost always in rural and remote locations to follow the laws for noise. Remoteness may limit customer base.
- Requires projection of land use surrounding shooting range (compliance with noise ordinances – adjacent land should not be by-right residential).

Considerations: Issues & Safety

- Greatest challenge: NOISE
- Typically can only be open sunrise to sunset (USDA regulation)
- Bullet / Lead containment
- Environmental: water/soil lead contamination
 - Lead not water soluble and can pollute water if comes into contact (direct or rain runoff).
 - Harmful to wildlife (direct, or indirect from contaminated grass or water)

Outdoor Shooting Range – Noise Compliance

Code of Virginia § 15.2-917. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution relating to noise resulting...if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved

Proposed “5-6XX Sports Shooting Range, Outdoor” shall comply with:
H. Noise Standards, **Section 5-1507** & Section 5-652

Section 5-1507, Noise Standards

(F) Exemptions states, “sound levels in Table 5-1507(E) **shall NOT apply to** . . .

(2) Sounds produced by activities listed in **Chapter 654.02(e)** of Codified Ordinances of Loudoun County.”

Chapter 654: Offenses Against Public Peace and Safety,

- **Codified Ord 654.02**, Excessive Sound in Residential Areas and Dwellings
- **(e)** Exemptions: Sounds produce by the following activities are **not prohibited**:
 - **#13**: “Lawful discharge of firearms”

If commercial Sport Shooting Range, Outdoor is made a permitted use, then will all Noise Standards and ordinances be nullified?*

**Update: Per County Attorney, use can be added to Table 5-1507(E) for noise ordinance compliance.*

Outdoor Shooting Range – Noise Compliance

If commercial Sport Shooting Range, Outdoor is made a permitted use, then per County Attorney, use can be added to Table 5-1507(E)* for noise ordinance compliance.

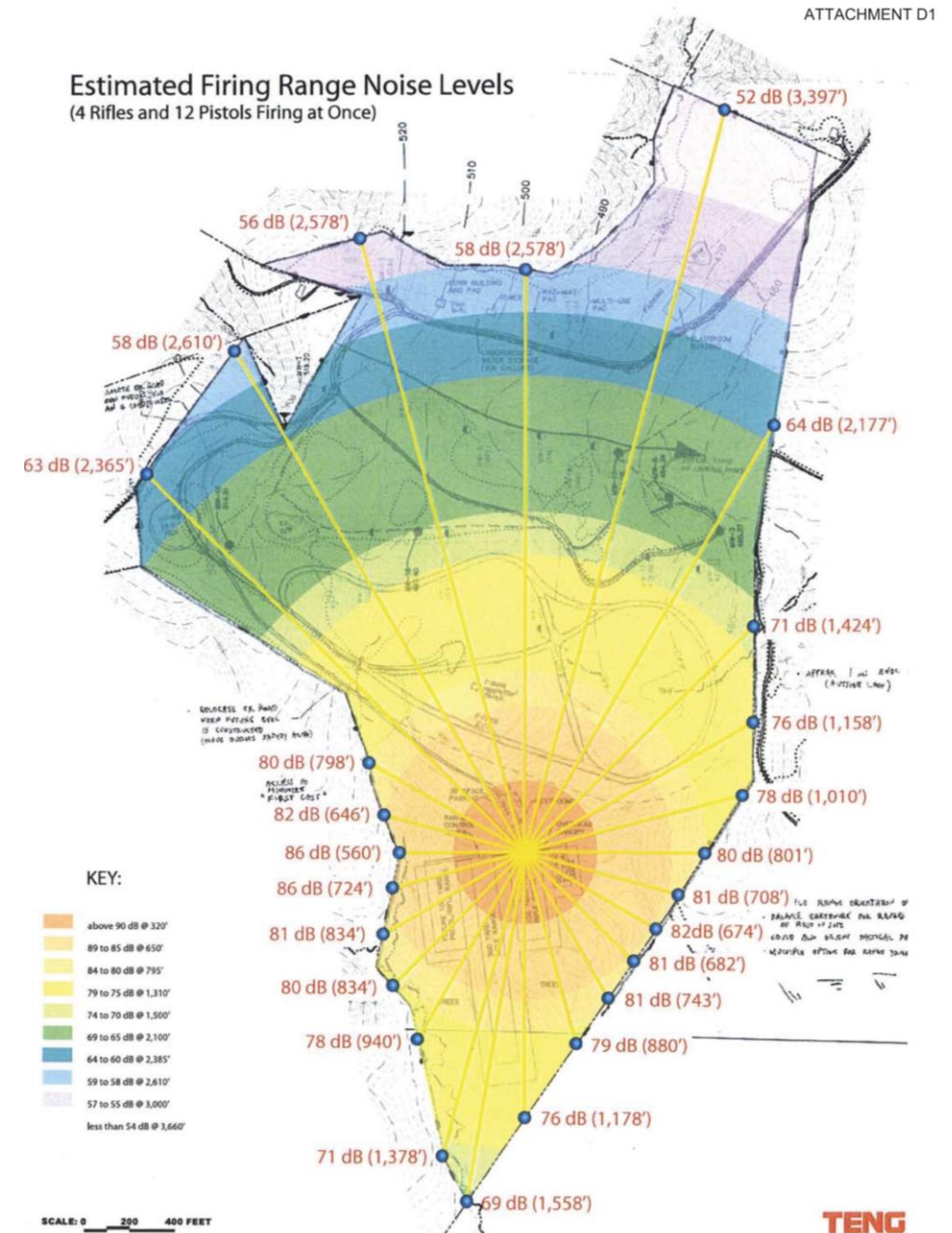
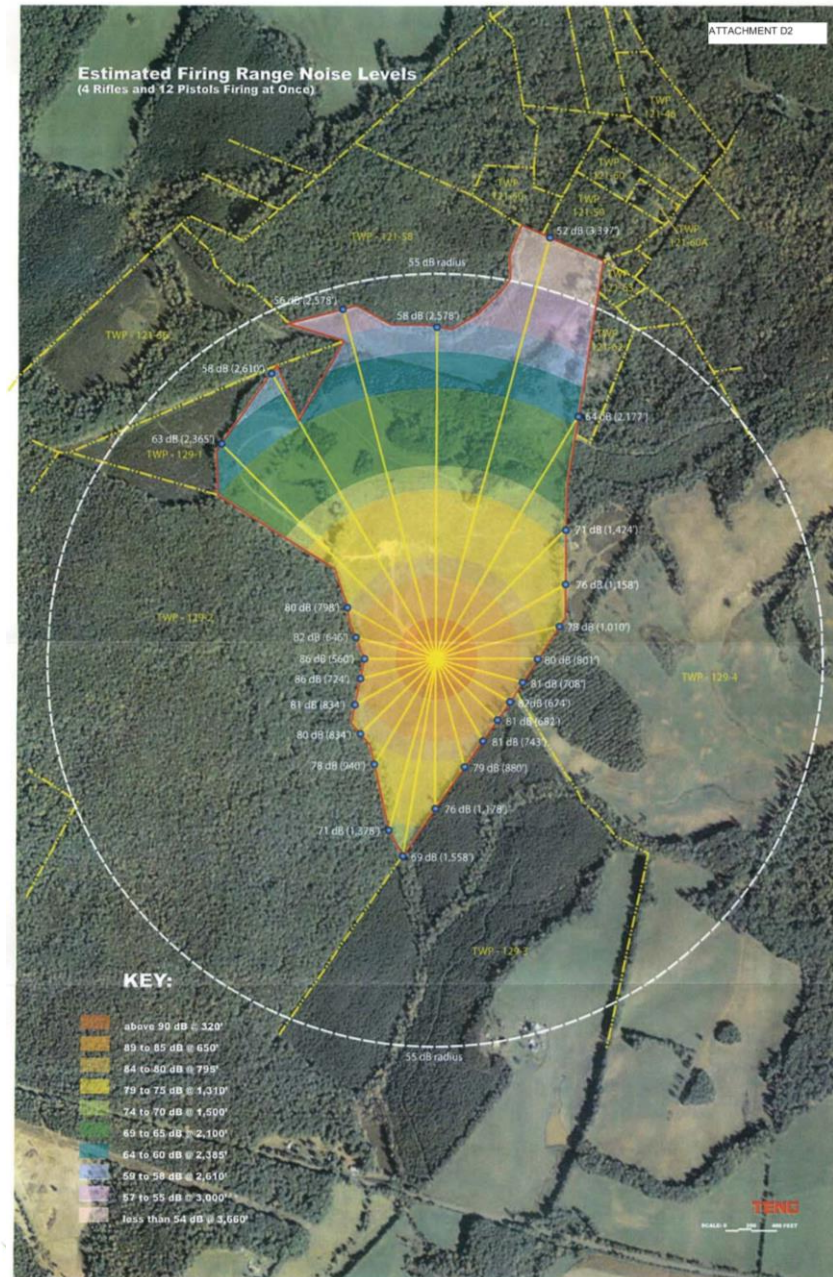
Table 5-1507(E)				
Receiving Development Type	Mixed - Use Residential	Residential and Rural Economy Uses	Commercial, Civic, and Institutional Uses	Industrial Uses
Maximum A-Weighted Sound Level (decibels)	60	55	65	70

* As of January 1, 2017

2013 Proposed Firing Range: Albemarle County

Status: **Not Approved**

Noise Test Results:
To comply with Loudoun §5-1507(E) 55dB in Residential & Rural, would require ~2600' (~1/2 mile) buffer



Sound Comparisons

Common Sounds & Loudness

Sound Source	Sound Pressure Level	Evaluation
Jet Engine	140 dB	Deafening
Rock Concert	120 dB	Painful
Football Stadium	100 dB	Very Loud
Loud Alarm	80 dB	Loud
Conversational Speech	60 dB	Moderate

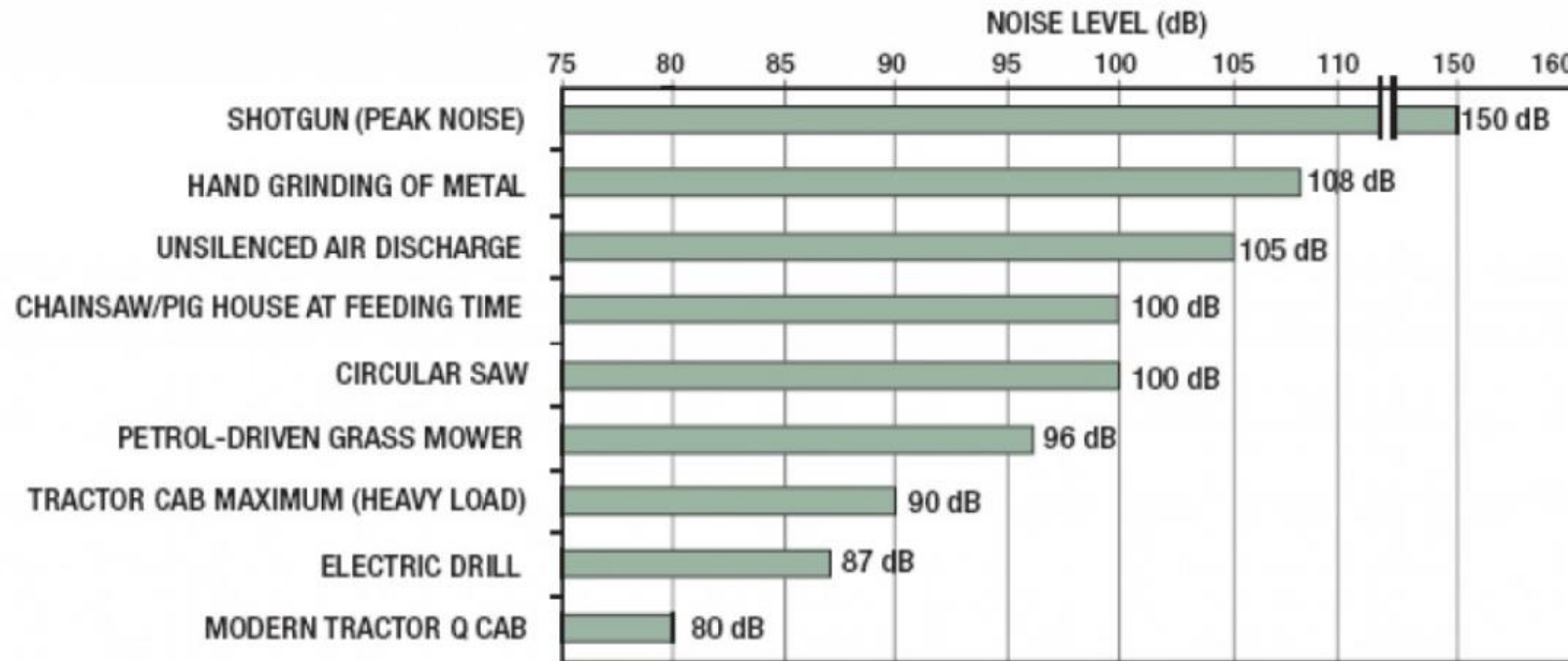
dB Level Of Common Calibers

Caliber	Decibels (dB)
.22 Long Rifle	130 dB
5.56mm	155 dB
.308	156 dB
.30-06	163 dB
9mm	159 dB
.45 ACP	157 dB

Human ear does not register short sound (less than .02 second) as loud as long or constant sound.
Key Point: “gunshots are actually louder than we think they are.”

Source: <https://skyaboveus.com/hunting-shooting/Shooting-Range-Sound-Reduction>

Consistency with Rural Agriculture and Rural Economy: Agricultural Activity Noise



Source: <https://skyaboveus.com/hunting-shooting/Shooting-Range-Sound-Reduction>

Outdoor Shooting Range EPA Regulations

➤ Regulated through Resource Recovery and Conservation Act (RCRA)

- Lead in bullets/shotgun shot – categorized as hazardous waste by EPA
- Shooting ranges only excluded if reclaimed lead from site is recycled or reused. Regular inspections required.
- RCRA enables EPA, state governments & citizens right to sue shooting ranges that are a substantial or imminent threat to public health or the environment.

➤ Clean Water Act (CWA)

- Shooting ranges near wetlands or bodies of water subject to provisions of CWA.
- Potential violations for shot and clay introduced to water source protected by CWA.

Lead -- Information*

Lead exposure dangerous to everyone

- Children are especially vulnerable
 - 10 micrograms per deciliter: children can suffer from brain damage, learning and behavioral problems, slowed growth, and impaired motor functions.
- Major pathways for lead exposure are ingestion or breathing lead dust.
- Lead dust is fired out of all guns using lead bullets.

Lead management requires managing these factors:

- Soil Characteristics
- Topography and Runoff
- Ground Water Depth
- Vegetation
- Accessibility for Reclamation
- Volume of lead fired into the berms
- Shooter hygiene

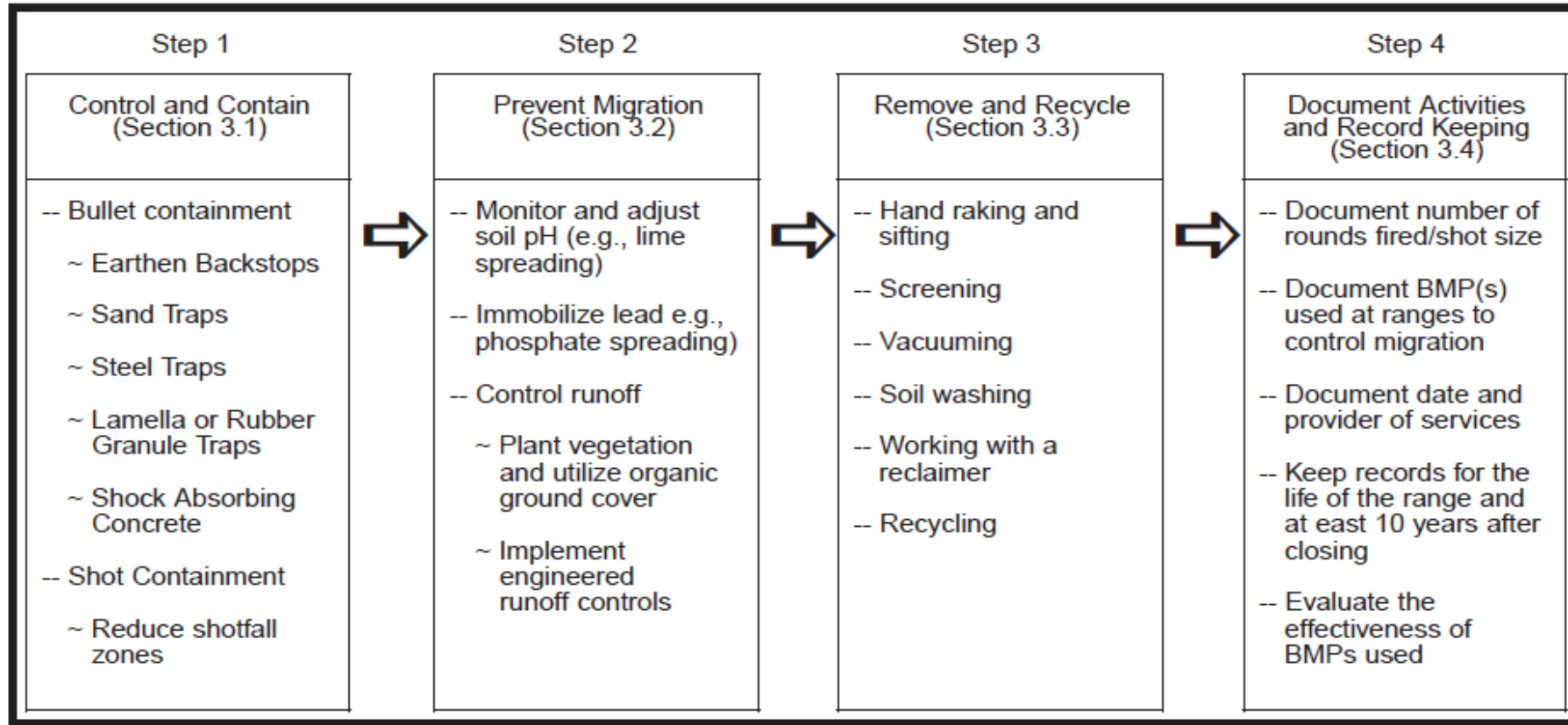
*Source: <https://skyaboveus.com/hunting-shooting/Shooting-Range-Sound-Reduction>

Lead Management*

- Required by EPA for new commercial shooting ranges
- Important when ranges are near wetlands or populated areas reliant on well water.
- Estimated 80,000 tons of lead made into civilian bullets are fired each year in US
- 160 million pounds of lead wind up in shooting range berms or blanketing range as lead dust particles
- Acidic soils at higher risk for lead contamination
- Topography and runoff direction determine drainage of contaminated water
- Ground water depth is factor for well or communal water system contamination

*Source: <https://skyaboveus.com/hunting-shooting/Shooting-Range-Sound-Reduction>

Figure 3-1 – 4 Steps to Build a Successful Lead Management Program*



*EPA: Best Practices for Lead at Outdoor Shooting Ranges

Outdoor Shooting Range: Comparisons

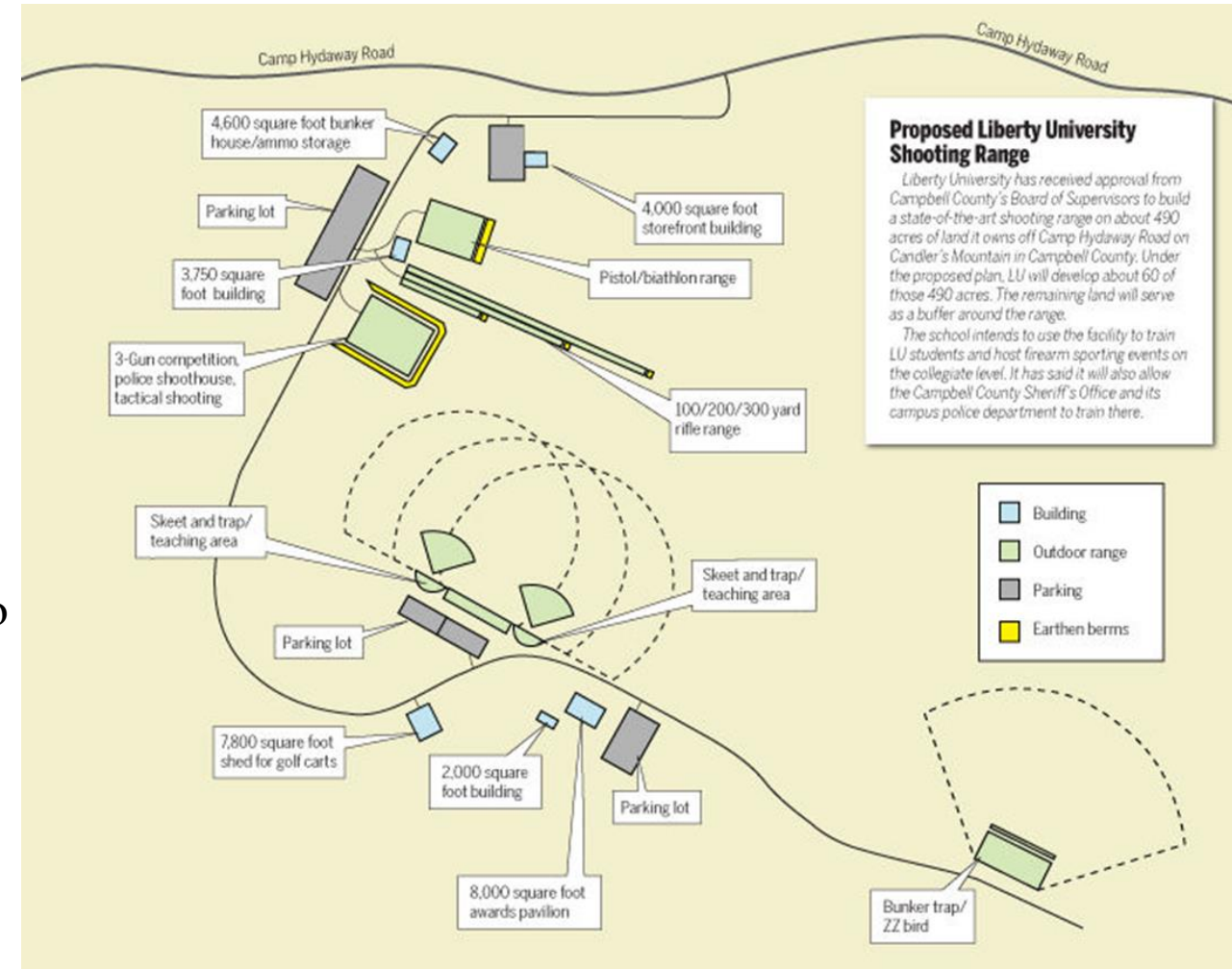
Shooting Range	Address	Parcel Size	Hours
Izaak Walton League of America, Inc. (IWLA)	19237 Mountain Spring Lane Leesburg VA 20177	55 acre	Autumn/Winter Hours: Mon-Sat 9AM-5PM Spring/Summer Hours: Mon-Sat 9AM-7:PM Range is Closed on Sundays
340 Defense	459 Berryville Pike, Summit Hills	88.6	
Bull Run Shooting Center NOVA Parks	7700 Bull Run Drive Centreville, VA 20121	238 acre	Mar-Nov: Wed-Fri 3p-8p Nov-Mar: Wed-Fri 3p-7p Sat-Sun: 9a-5p. Closed Mon-Tue
Liberty Mtn Gun Club, Liberty University	822 Second Amendment Drive, Lynchburg, VA 24501	~600 acres	"Total estimated cost of the project is \$3.2 million"
C.F. Phelps Wildlife Management Area (WMA)	5669 Sumerduck Road Remington, VA 22734	1333 acre (including other outdoor activities)	Tues-Sat: 9 AM – Sept: 6:30 PM, Oct: 4:30, Feb: 5:30 Sunday: 1 PM – Sept: 6:30 PM, Oct: 4:30, Feb: 5:30 Closed on Mondays
Proposed 2013 Albemarle Keene Landfill-Not Approved	Rte. 704 Fortune Lane	169 acre	Former land fill Zoned Rural
Proposed 2015 Greene County Ruckersville-Not Approved	US 29 & US 33 300 homes w/ 1 mile	2 acre tract	Part of 105 acre cattle farm Zoned Agricultural

340 Defense – Berryville, VA

- 340 Defense is an outdoor shooting range and firearms training center serving the Washington, DC area including Northern Virginia, central Maryland and the eastern panhandle of West Virginia. We are a one hour drive from Washington, DC.
- There are 4 shooting ranges including pistol, 50 yard, 100 yard and 300 yard range (You are able to shoot at 200, 250 and 300 yards on our 300 yard range).
- 340 Defense also offers all types of firearms training from NRA certified instructors.
- ***Hourly Individual Membership:*** \$75 per year..... plus \$20 per hour for range time.
- ***Annual Unlimited Memberships are Available:***
 - Unlimited Individual – \$300 per year (unlimited range time for one year, for one person)
 - Family – \$500 per year (unlimited range time for one year, for up to 3 family members.)
- **Hours of operation:**
 - * **Monday thru Saturday 9:00am to 6:00pm**
 - * **Sunday 12:00pm to 6:00pm**

Liberty University

- “Liberty has made reasonable accommodations. They have chosen the center section of 490 acres, 1,400 feet away from residents.”
- “Borland noted a skeet shooting event with 50 participants could shoot off up to 25,000 rounds in a day or two.”
- “To give an idea of potential costs, Liberty University’s outdoor range on a 500 acre plot and it will cost \$3 million.”



- *“I cannot say noise will not be an issue. It will be a range with a high volume of shots; it is the university’s intent to adhere to current codes. We do intend to do similar testing where [Liberty University Police Department] would take various guns and do that testing,” Thompson said.*

Start Up Costs Example (Southaven – Mississippi)

“Regardless of how big or small the shooting range is or what type of shooting range it is, certain amount of the capital will still be spent on aspects such as procuring the firearms, *leasing the land** meant for the shooting range and paying employee salaries as well as certain utility bills.”

*Land Purchase not included in example

Total fee for incorporating the business in the United States of America	\$ 750
Other legal expenses, obtaining of several licenses and permits, and accounting software	\$ 4,250
<i>Cost of leasing a land and building shooting stalls, gun rooms and administrative offices</i>	\$ 280,000
Cost of purchasing different guns for sale and rent	\$ 300,000
Cost of hiring a business consultant	\$ 2,000
Insurance coverage (General liability and workers' compensation)	\$ 5,000
Marketing and publicity expenses (grand opening promotion/general marketing/publicity)	\$ 5,000
Operational cost for the first 3 months (employee salaries and utility bills)	\$ 100,000
Other start-up expenses (furniture, phones, stationeries, computers and printers)	\$ 5,000
Cost of store equipment (security, cash register, signage)	\$ 7,500
Cost of gun cleaning tools and related accessories	\$ 30,000
Cost of official vehicle	\$ 40,000
Cost of launching a website	\$ 500
Cost of throwing an opening party	\$ 5,000
Miscellaneous	\$ 15,000
	<hr/>
	\$ 800,000

Chris Hart, Action Target Range Consultant

- Building an outdoor range requires [expensive earthwork and soil engineering](#). Not all sites are immediately suitable for an outdoor shooting range and may require extensive excavation to ensure bullet containment.
- You also may have to bring in [power, water, and sewage hook ups](#) from a long distance away, thus increasing the cost and adding to the needed infrastructure of [roads, parking lots, and other development](#).
- Due to the open-air nature of outdoor ranges, [complete bullet containment is usually impractical due to expense](#). Outdoor shooting ranges must be built in an area where an errant shot that goes over the backstop is incapable of doing damage; this is referred to as Surface Danger Zone (SDZ).
- [Inherently difficult to contain lead and noise at an outdoor range](#). As housing encroaches on formerly uninhabited areas, more and more outdoor shooting ranges are being shut down.

How to Start a Gun Range Business

by Victoria Duff; Updated July 19, 2017

- *“Average shooting range use fees are around \$10 per hour*
- *so you will need 100 daily customers to make \$30,000 per month, which may only cover your costs of rent, salaries, utilities and insurance.*
- *Gun rentals and sales of ammunition, guns and gun accessories will be important factors in the profitability of your operation.”*

COUNTY COMPARISON –ALBEMARLE COUNTY

2013 Proposal – *Firearms Training Facility.* **Not Approved.**

- **Character of Site/Area:** Firing range on rural agricultural 169 acre parcel; closed Keene Landfill.
 - “Consensus of Committee was that the proposed firing range was not a use that complemented or was otherwise conducive to agricultural or forestal uses.”
- **Specifics:** Proposed 350’ x 150’ outdoor firing range surrounded by 20 ‘ tall side and rear berms; accommodate handguns and rifles; 100 yard range with 12 firing lanes, expandable to 24 lanes.
- **Site access:** Gravel public road
- **Frequency of Use:** 3 - 4 days /week, 10-20 police vehicles, up to 20 people per use; Not anticipated site would be used on weekends; no later than 10pm.
- **Facility Users:** Primarily serve Albemarle County Police & Sheriff’s Departments

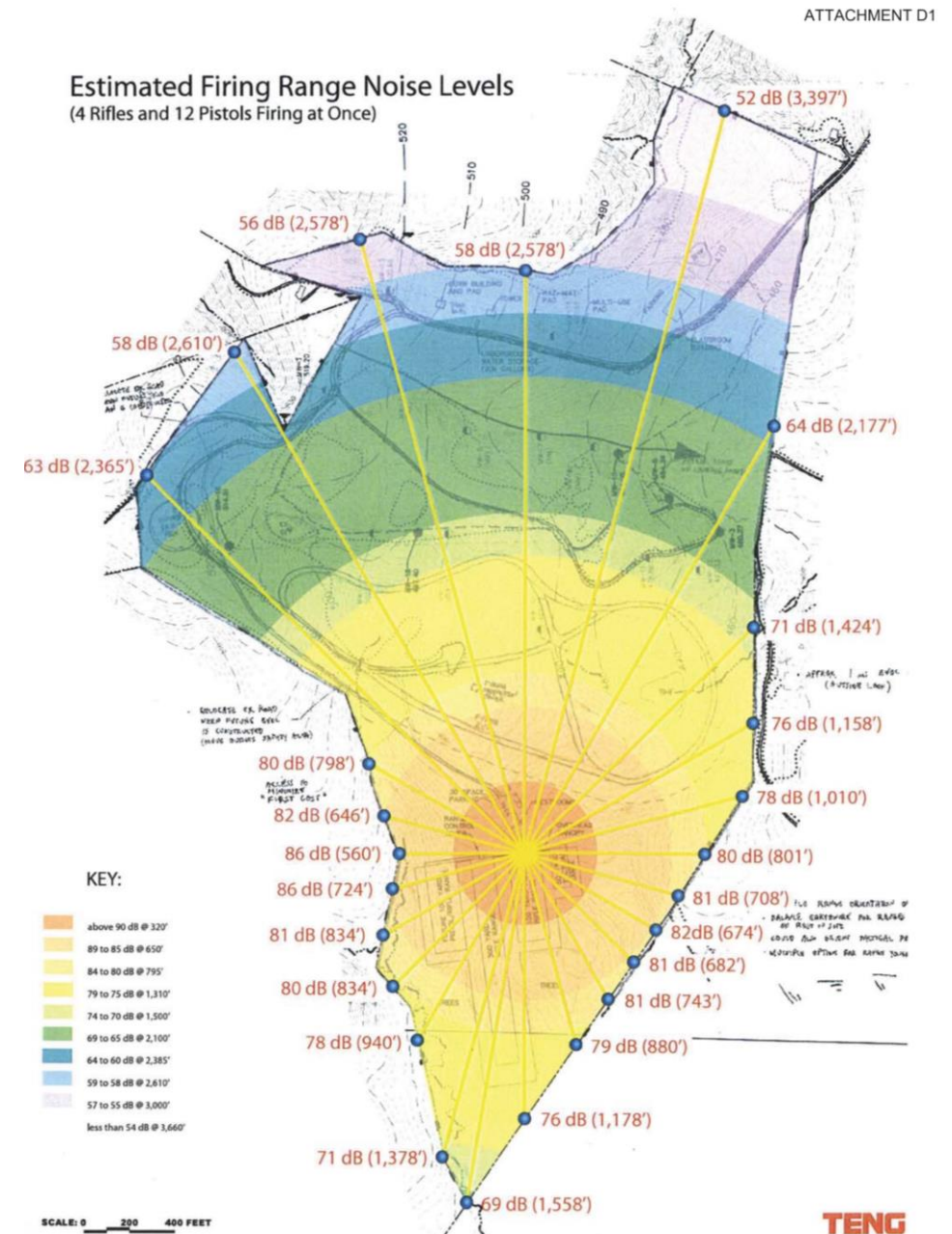
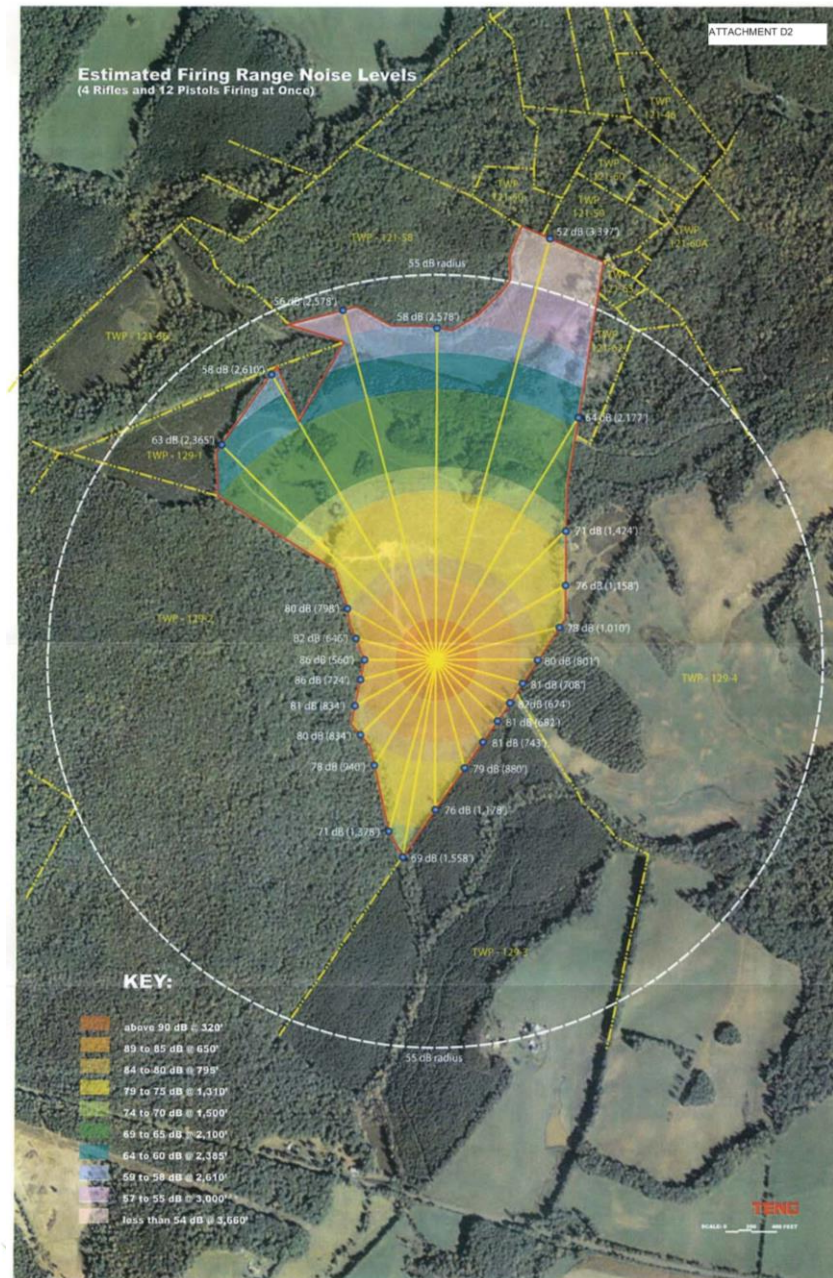
COUNTY COMPARISON –ALBEMARLE COUNTY

2013 Proposal – *Firearms Training Facility.* **Not Approved.**

- **Noise Measures:** (Albemarle Rural & Residential - 60 dB daytime / 55 dB nighttime)
 - Calculations for 4 rifles and 12 handguns firing simultaneously produced decibel level of 90 for 320' radius from firing line at range site.
 - At west property line: noise levels range 71 to 86 decibels; at east property line noise levels range 69 to 82 decibels.
 - "Staff determined as a public use, proposed firing range is exempt from noise ordinance provisions of zoning ordinance" (p. 6 of Staff Report, 4/3/2013)
 - Staff comment: "As an outdoor firing range, the facility will have difficulty in meeting the noise standards desired in the zoning ordinance."
- Other safety/security: Outdoor lighting to be minimal.
- Lead Abatement: Will occur once fired round count exceeds one million lead bullets.

2013 Proposed Firing Range: Albemarle County

Status:
Not Approved



COUNTY COMPARISON –GREENE COUNTY 2015 Proposal – **Not Approved.**

- 2 acre parcel on 105.37 acre cattle farm zoned as agriculture
- Adjacent land zoned residential
- More than 300 homes within a mile of site (near US 33 and US 29 intersection)
- Property abuts Ruckersville growth area in county's Comprehensive Plan
- Outdoor gun range allowed in ag zoning through special-use permit

Full Text: *Code of Virginia § 15.2-917. Applicability of local noise ordinances to certain sport shooting ranges.*

A. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. The operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth, which has been condemned through an eminent domain proceeding by any condemning entity, and which relocates to another site within the same locality within two years of the final condemnation order, shall not be subjected to any noise control standard more stringent than those in effect at the effective date of such sport shooting range.

C. For purposes of this section, "sport shooting range" means an area or structure designed for the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar sport shooting.

For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.