

# Fort Carson Training Noise Management Guide



August 2014

## **GENERAL**

The information in this document summarizes Fort Carson's Operational Noise Management Plan. The Operational Noise Management program helps the Army analyze noise associated with military operations and provides land use guidelines designed to help achieve compatibility between the noise generated by Army combat training and the surrounding communities.

The Army has an obligation to citizens and local government decision makers to recommend land uses on and around its installations that protect citizens from noise and other hazards, and protect the public's investment in the installation and the military readiness it provides our nation.

The goal in developing this document is to help our neighbors understand the nature of noise emanating from Fort Carson and how we can work together to share information to better manage that noise in a way that ensures our military readiness.

Fort Carson is the home of the 4th Infantry Division, the 10th Special Forces Group, the 71st Ordnance Group (EOD), the 4th Engineer Battalion, 52nd Engineer Battalion, the 759th Military Police Battalion, the 10th Combat Support Hospital, the 43rd Sustainment Brigade, and the 13th Air Support Operations Squadron of the United States Air Force. The post also hosts units of the Army Reserve, Navy Reserve and the Colorado Army National Guard.

Our mission is to provide the best opportunity in the Army for soldiers to train, leaders to lead, families to grow and people to work. We are a first rate power projection platform (air and rail) and Post Mobilization Maneuver Training Center; a premier installation and committed community partner, providing combat-ready forces for the 21st Century.

Fort Carson, along with the Piñon Canyon Maneuver Site, supply the means for evaluating the maneuvering capability for mechanized/armored vehicles, attack helicopter gunnery, and other aircraft air-to-ground gunnery as well as small arms ranges, mortar, artillery, and tank firing exercises.

## **NOISE MODELING AND NOISE CONTOURS**

Noise is defined as any unwanted sound, a concept which is highly subjective in nature. Noise from Fort Carson is primarily generated by weapons firing and aircraft operations. These activities produce very different types of sound and we measure and assess them differently.

A human ear is not uniformly sensitive to all frequencies of sound. Most common sound sources are measured using *A-weighted* decibels (dBA). The *A-weighting* corresponds to the ear's sensitivity. In military environments, this includes sounds from generators, aircraft, and general transportation. *C-weighted* decibels (dBC) quantify sounds containing large amounts of low frequency energy. Although people cannot hear low frequencies well, they may feel vibrations

that low frequency energy can generate. At Fort Carson, large caliber weapons firing, and detonations are assessed with C-weighted decibels. In addition, *unweighted* peak levels correlate well with community perception of individual shots or blasts.

We analyze aviation, demolition and large caliber weapons noise using “*Day-Night average Levels*” (*DNL*). The *DNL* is a 24-hour cumulative average noise level that includes a 10-decibel adjustment, or penalty, for activity occurring between 10 p.m. and 7 a.m. The 10-decibel penalty considers that people are more sensitive to noise during these hours. Additionally, sounds may seem louder since background noise levels are generally lower at night. For land use planning, *DNL* is usually averaged over a year. Therefore, *DNL* will include days of light and heavy training loads, as well as periods with no activity at all.

Small caliber weapons (.50 caliber and below) are analyzed using “*peak*” levels and therefore the Noise Zones will not vary based on number of rounds fired.

Army Regulation (AR) 200-1 lists housing, schools, and medical facilities as examples of noise-sensitive land uses. The noise exposure on a community is translated into Noise Zones, defined by the decibel level within those zones. The program defines four Noise Zones:

- Noise-sensitive land uses are not recommended in *Zone III*.
- Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in *Zone II*, this type of land use is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in *Zone II* to non-sensitive activities such as industry, manufacturing, transportation and agriculture.
- Noise-sensitive land uses are generally acceptable within the *Zone I*. However, though an area may only receive *Zone I* levels, military operations may be loud enough to be heard- or even judged loud on occasion. *Zone I* is not one of the contours shown on the map; rather it is the entire area outside of the *Zone II* contour.
- A *Land Use Planning Zone (LUPZ)* is a subdivision of *Zone I*. The *LUPZ* is 5 dB lower than the *Zone II*. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures out beyond the *Zone II* limits. Additionally, implementing planning controls within the *LUPZ* can develop a buffer to avert the possibility of future noise conflicts.

Often, some communities have existing “noise-sensitive” land uses that would be inadvisable under the guidelines. In most cases, this is not a risk to community quality of life or mission sustainment. This is because long-term neighbors often acknowledge hearing military training, but they are usually not alarmed or bothered. AR 200-1 offers land use recommendations, which

if adopted both on and off the installation, facilitate future development that mitigates the potential for conflict and citizen concern. Table 1 lists the land use guidelines as they appear in AR 200-1.

Table 1. Land Use Guidelines (Army Regulation 200-1)

Noise Zone	Aviation (ADNL)	Small Arms (dBP)	Large Arms, Demolitions, Etc. (CDNL)
<b>Land Use Planning Zone (LUPZ)</b>	60-65	N/A	57 – 62
<b>Zone I</b>	<65	<87	<62
<b>Zone II</b>	65-75	87 – 104	62 – 70
<b>Zone III</b>	>75	>104	>70
Legend: > = greater than, < = less than, N/A = not applicable			

Weather conditions significantly affect sound propagation. Weather conditions influence how far sound travels and how loud it will be at the receiver’s location. Sound levels are typically higher downwind than upwind from the source.

When temperature inversions are present, training operations may sound much louder, being heard at further distances than normal. The inversion layer acts as a boundary for the sound, trapping it close to the ground. This can create areas of high intensity sound far from the source.

As a result, on most days it may be possible to conduct demolition training without disturbing the community (neutral weather conditions), while on another day with a temperature inversion, the detonation of as little as one pound of explosives at the same location may cause some annoyance (unfavorable weather conditions).

Figure 1 illustrates how a temperature inversion bends (refracts) the sound created by a typical explosion. The sound waves from the explosion initially travel upward, but the inversion reflects the sound back down toward the ground, generating high noise levels many miles away. Noise levels at that distance would otherwise be much lower.

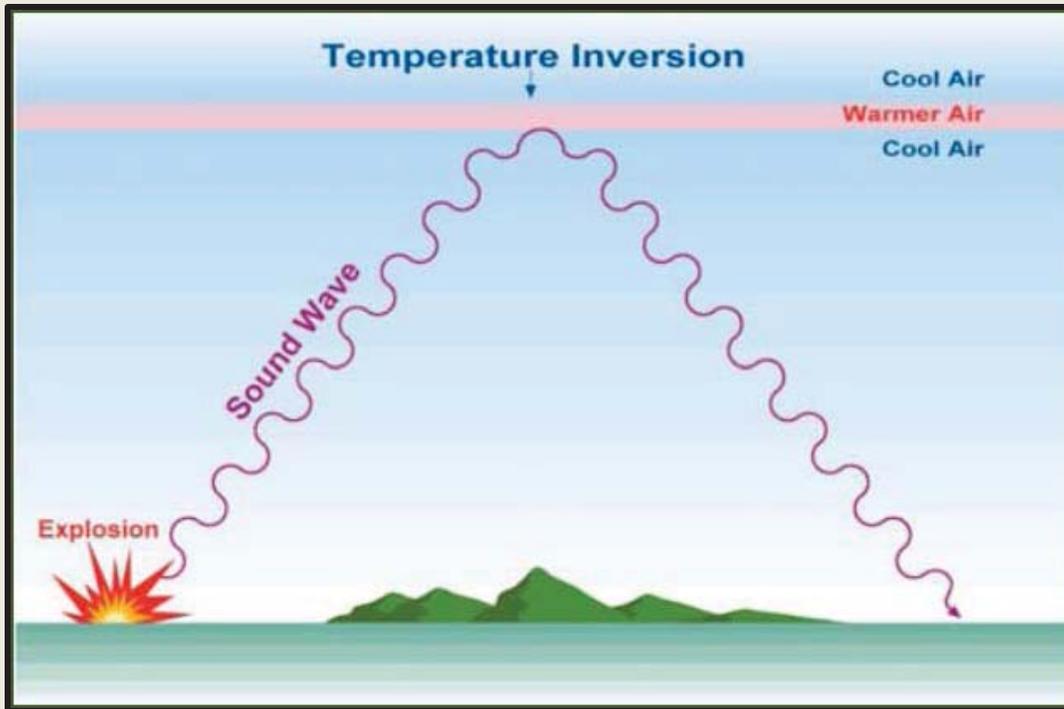


Figure 1. Temperature Inversion Illustration

## **NOISE EXPOSURE IN THE COMMUNITY**

We strive to train our Soldiers in the same type of environment and under the same physical and mental stresses they will face in combat. Live training gives America's fighting men and women hands-on experience in firing and handling the weapons and ammunition they use on the battlefield, flying aircraft at night, and operating armored vehicles under combat-like conditions. All of these activities take place on Fort Carson and to a lesser degree at the Piñon Canyon Maneuver Site. If you live in a community that surrounds Fort Carson, you've undoubtedly heard the sounds of training noise, or have seen a low flying aircraft at one time or another.

### **DEMOLITION AND LARGE CALIBER WEAPON ACTIVITY:**

Some of the noisiest activities on Fort Carson are training with medium and large caliber weapons (20mm and greater) and detonations. These activities can produce noise both by firing the weapon itself and the subsequent explosion of the ammunition. These activities often require large areas for accurate training and safety concerns. Thus, these activities are spread out across Fort Carson to maximize available training space.

Figure 2 depicts the annual average Noise Zones (CDNL) at Fort Carson. The Zones extend beyond the boundary into local communities and open spaces. Implementing land use planning controls in these areas would help avert the possibility of future noise conflicts.

No demolition or large caliber weapons operations occur on the Piñon Canyon Maneuver Site.

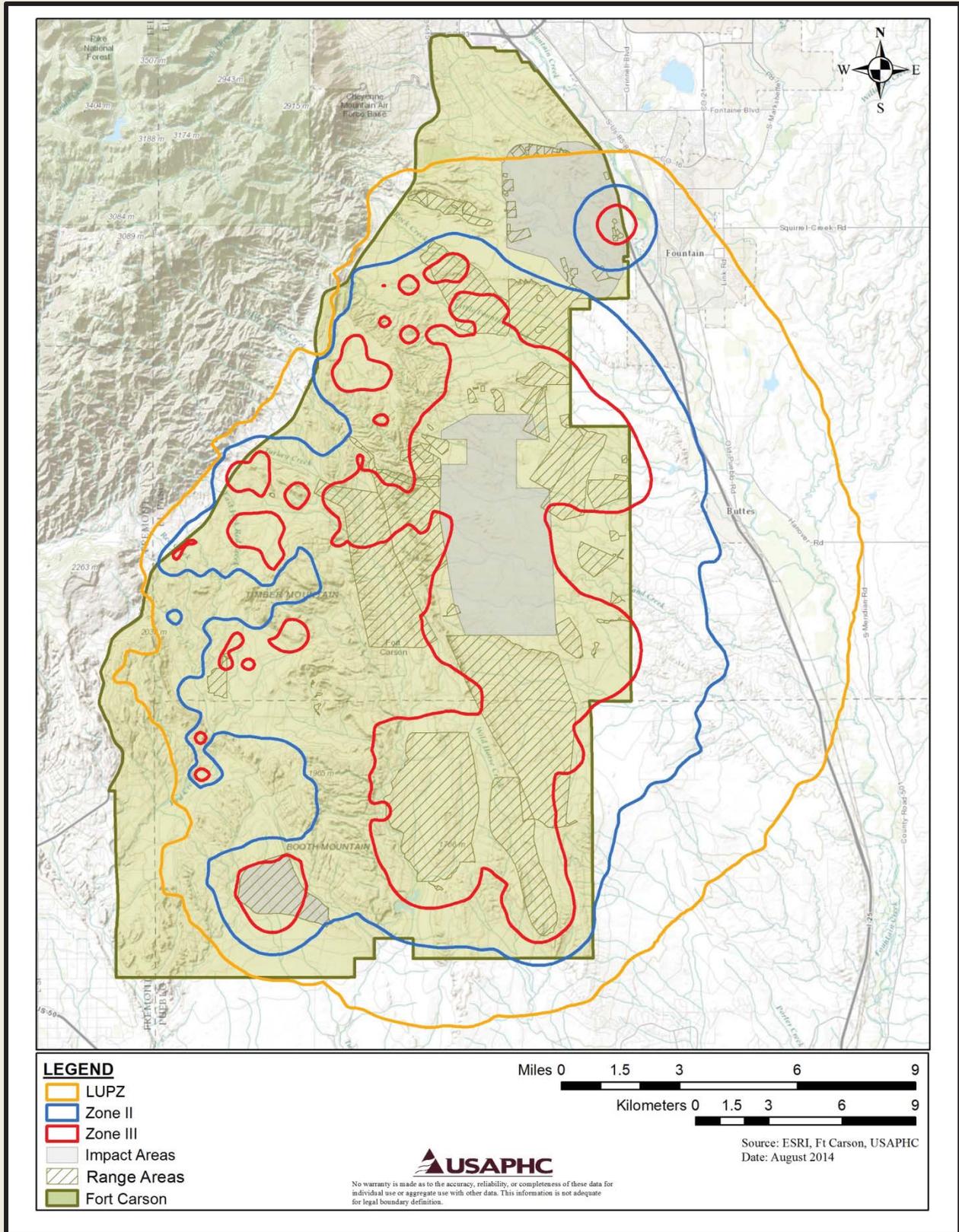


Figure 2. Demolition and Large Caliber Weapons Noise Zones

In addition to annual average noise levels, using Peak level (unweighted) assessments, we can forecast where sound may focus under adverse weather conditions. Figure 3 depicts where noise from demolition charges and large caliber weapons may be noticeable, and some may find objectionable, when weather conditions enhance sound propagation. Under neutral or favorable weather conditions, noise levels from the ranges will be lower than indicated on the map. Table 2 provides the complaint risk guidelines for singular noise events.

Table 2. Complaint risk Guidelines (Army Regulation 200-1)

<b>Perceptibility</b>	<b>dB Peak</b>	<b>Risk of Receiving Noise Complaints</b>
Audible	< 115	Low
Noticeable, Distinct	115 - 130	Moderate
Very Loud, May Startle	> 130	High

Interestingly, vibration that sometimes accompanies noise from large caliber weapons and demolition activity is air-borne (not ground-borne). Neighbors located near the “loud” area in the map below may occasionally notice picture or window rattling from air-borne vibration; however, this rattling does not indicate damage.

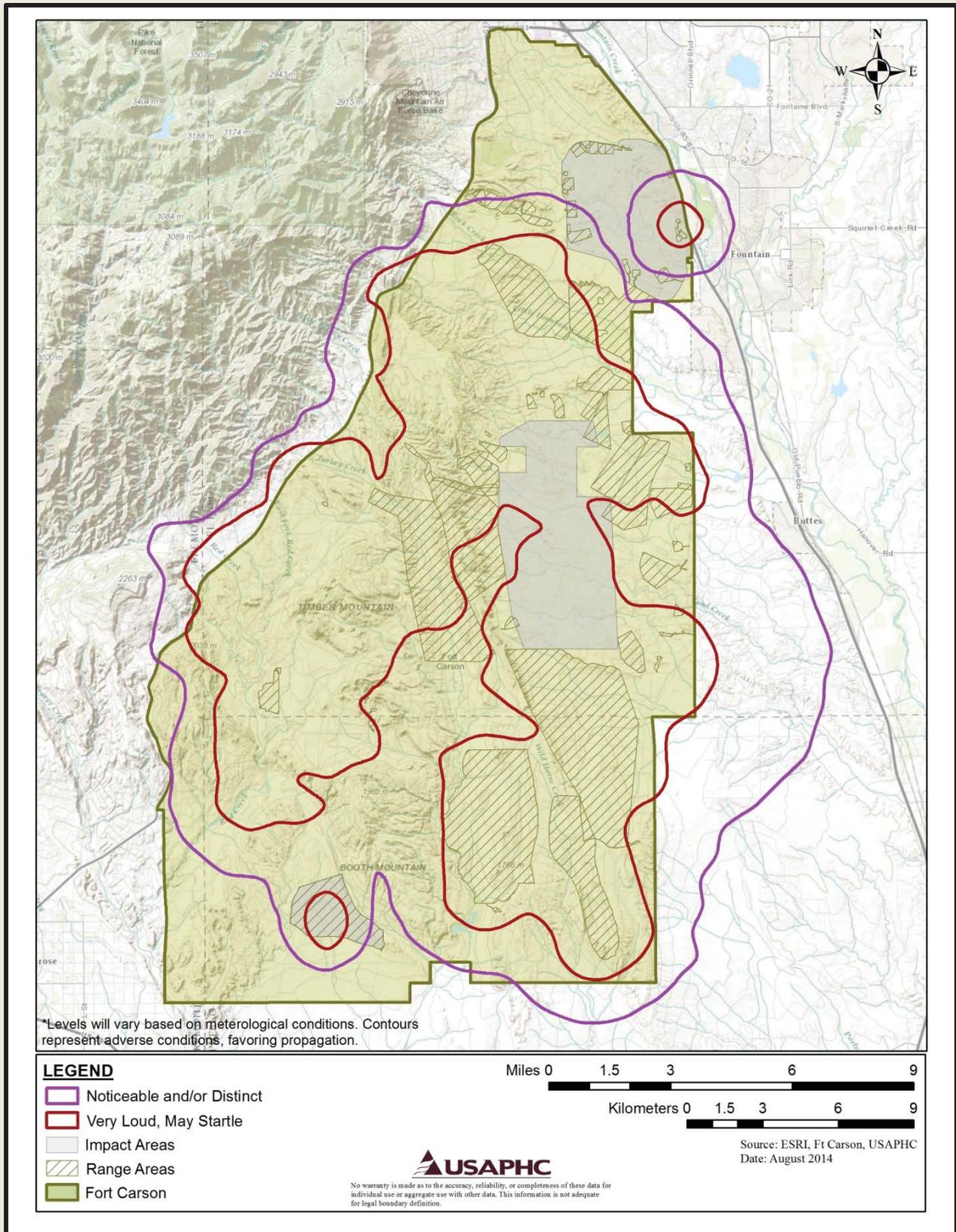


Figure 3. Perceptibility of Noise Generated by Demolition and Large Caliber Weapons Activity

## SMALL CALIBER WEAPON ACTIVITY:

The live-fire small caliber range areas are located in the northeast portion of Fort Carson. The ranges are utilized year round depending upon training mission requirements, such as the type of training to be completed; the unit being trained; and deployment status.

Figure 4 depicts the small caliber weapons Noise Zones which are delineated based on Peak (dBP) levels. The Zone II, and to a much lesser extent, Zone III extend just beyond the Fort Carson boundary to the east. Individuals living within or near the Noise Zones will routinely hear the sounds of small caliber weapons firing.

Small caliber activities at Piñon Canyon Maneuver Site occur at three ranges along the western boundary. Figure 5 depicts the small caliber Noise Zones for Piñon Canyon. The Zone II extends just west of the boundary, while Zone III remains contained within the boundary. The areas west of the Piñon Canyon ranges are uninhabited open space.

Additional small caliber activities at Fort Carson and Piñon Canyon involve soldiers training in urban warfare scenarios. These scenarios take place at designated facilities designed to provide realistic individual and small-unit collective task training in urban environments. The majority of weapons firing at these facilities involve blank ammunition or use of a multiple integrated laser engagement system.

All of these facilities by virtue of the type of activity and/or the interior location of the facility would not be problematic with regards to noise. The majority of the noise generated at these facilities does not reach the installation boundary or would be well below the normally incompatible (Zone II) level in Army guidelines.

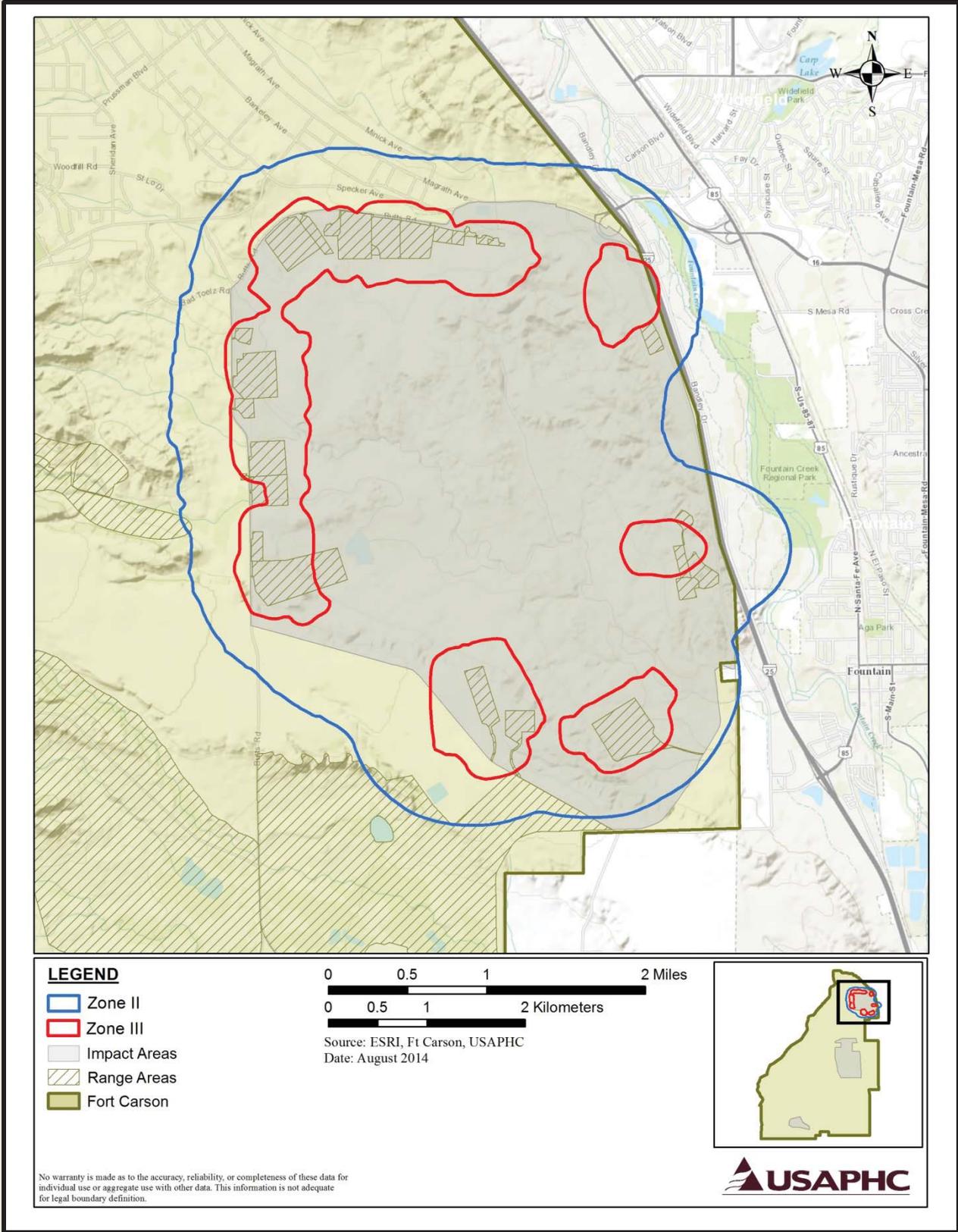


Figure 4. Fort Carson Small Caliber Weapons Noise Zones

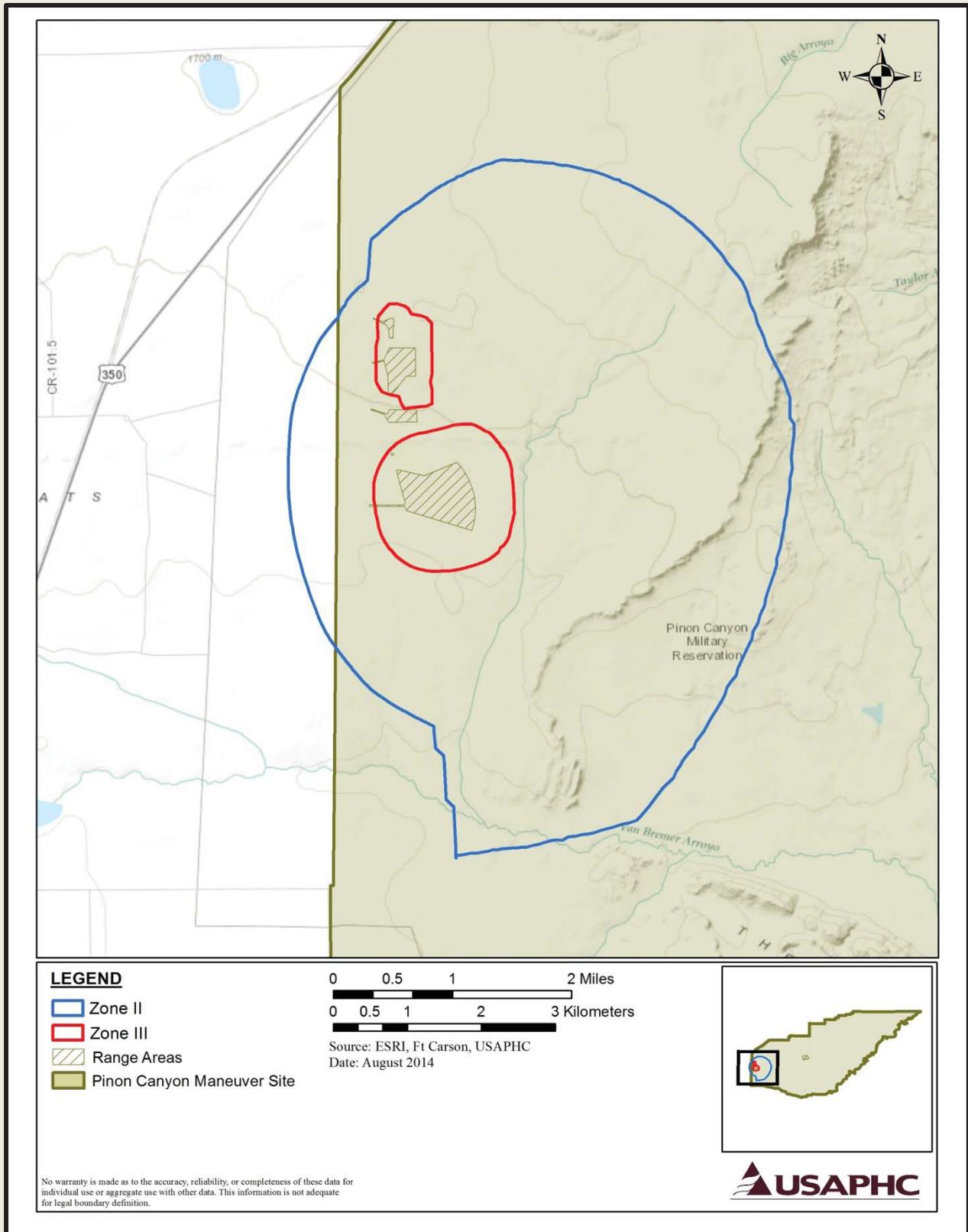


Figure 5. Piñon Canyon Maneuver Site Small Caliber Weapons Noise Zones

## AVIATION ACTIVITY:

Fort Carson supports a broad spectrum of aviation training, the majority of which stems from the Butts Army Airfield (BAAF), located in the northeastern portion of the installation just below the small arms range and impact area. Additionally, the installation airspace is utilized by fixed-wing aircraft from the Colorado Air National Guard and the U.S. Air Force Academy.

Permanent aircraft stationed at BAAF are primarily helicopter aircraft, associated with the 4<sup>th</sup> Combat Aviation Brigade (4<sup>th</sup> Infantry Division). To maintain proficiency, a specific number of flight hours are required to be logged by applicable Soldiers and units. Flight hours are based upon a model that includes all aviation training required to meet individual aviator qualification training, aircrew training, and collective training at the flying company and battalion level.

Figure 6 depicts the annual average Noise Zones (ADNL) for operations at BAAF. As seen in the figure, only an LUPZ and a Zone II are generated based on the amount of flights taking place at BAAF. The Noise Zones remain contained within the Fort Carson boundary.

Fort Carson Regulation 95-1 prescribes specific noise abatement requirements for aviation personnel, including minimum off-post altitudes, minimum slant range distances from noise-sensitive areas and restricted areas. All aircraft are directed to comply with the local flying rules per Fort Carson 95-1 and AR 95-1, as well as all FAA guidelines under 14 CFR 91.155 for Visual Flight Rules (VFR) and AC 91-36D VFR operations for noise-sensitive areas.

As a general rule, Fort Carson 95-1 off-military reservation restrictions dictate aircraft maintain a minimum altitude of 500 feet (152.4 m) Above Ground Level, and a ½ nautical mile (3,038 feet) standoff distance along the flight corridors outside of Fort Carson. This includes flying through the mountain passes until clear of inhabited areas (weather permitting), unless aircraft are operating in a designated low-level training route.

Aircraft activity at the Piñon Canyon Maneuver Site primarily involves aviation task force support for brigade level and some battalion level maneuver rotations. Units also conduct their own aviation collective training apart from ground unit rotations to maintain proficiency of flight skills. Dedicated Drop Zones (DZ) within Piñon Canyon and a Combat Assault Landing Strip (CALs) on the southeast corner of the installation are available for aviation training. The CALs is primarily utilized by C-130 fixed-wing aircraft. The drop zones on Piñon Canyon also serve as the primary Landing Zones (LZ) for rotary-wing aircraft.

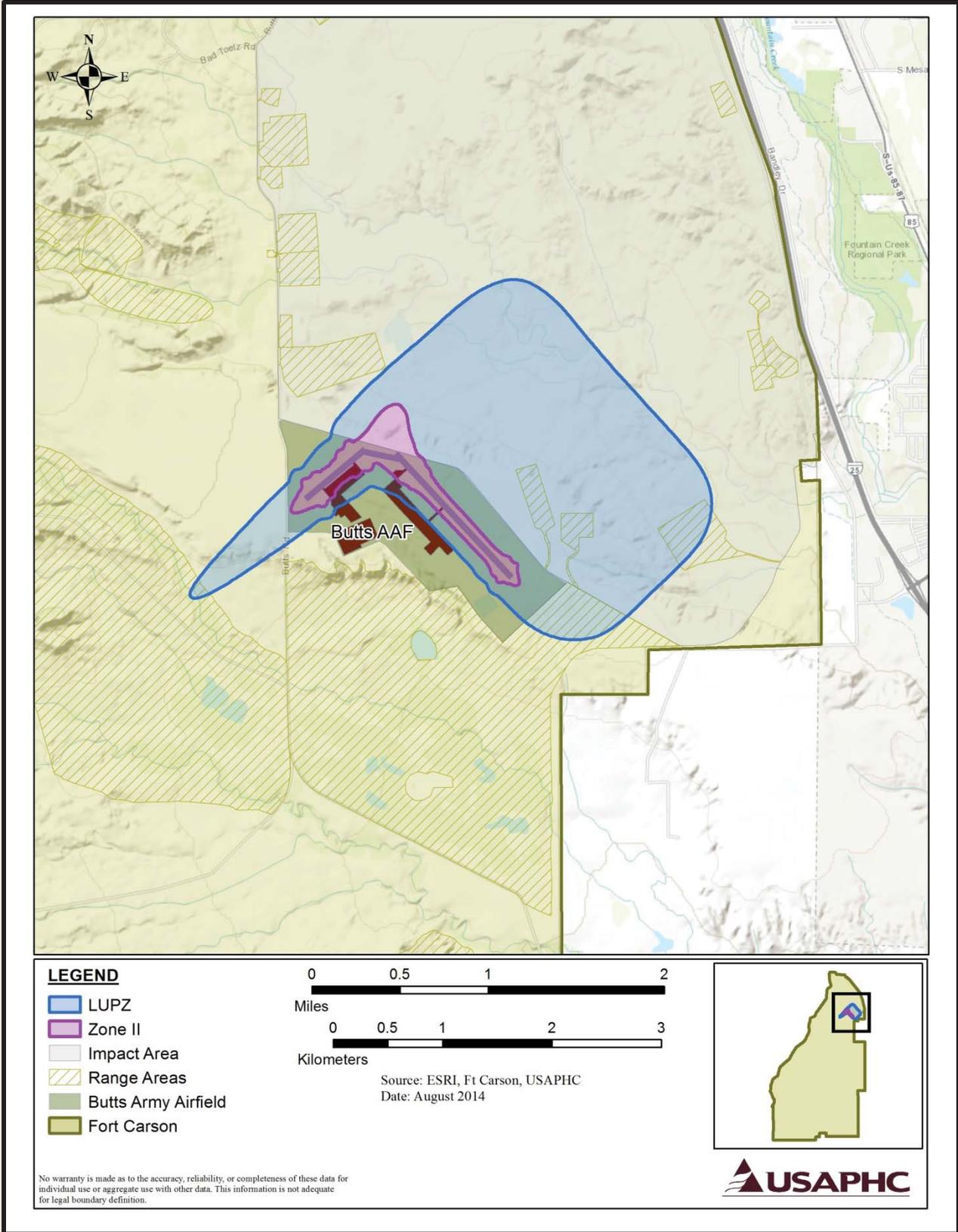


Figure 6. Butts Army Airfield Noise Zones

## **NOISE MANAGEMENT AT FORT CARSON**

The Department of Defense's Environmental Planning Program promotes development and implementation of noise programs on military installations. The noise programs strive to guide compatibility between both the activities and operations within the installation, and between the activities and operations of the installation and neighboring civilian communities.

Army Regulation 200-1 outlines the noise management policy. The policy includes:

- Evaluate and document the impact of noise produced by ongoing and proposed actions/activities and minimize annoyance to humans to the extent practicable.
- Develop installation noise management plans as appropriate. The noise plan is a tool used by the installation and local planning committees to facilitate compatible development.

Fort Carson's noise management practices are intended to minimize noise levels and/or impacts on our local communities. Key components of the management program are:

- Joint Planning Commission and stakeholder committees
- Aircraft Fly-neighborly procedures
- Installation Operational Noise Management Plan
- Fort Carson Community Relations Complaint Process Standing Operating Procedure (SOP)
- Army Compatible Use Buffer (ACUB) program

The ACUB program was borne out of a 2002 expansion of the Private Lands Initiative (10 USC §2684a) and allows military departments to partner with private organizations and landowners to establish buffer areas around active installations, with the intent to limit encroachment.

Through good will and cooperation between Fort Carson, The Nature Conservancy (TNC), El Paso County, the U.S. Fish and Wildlife Service, and private land owners, Fort Carson has put into motion mechanisms to protect its borders from incompatible development. To date, there are permanent conservation easements established along the southern and eastern boundaries totaling 22,292 acres. In addition, the acquisition (fee simple) of 937 acres of residential development (along the eastern boundary) from El Paso County is currently ongoing.

Conservation easements limit development and protect natural resources, while also preventing incompatibilities with military training at Fort Carson. Landowners are allowed to maintain their interest in the property, as well as use the land for traditional purposes.

## **SUMMARY**

This document summarizes Fort Carson's Operational Noise Management Plan. The goal in developing this document is to help our neighbors understand the nature of noise emanating from Fort Carson and the assessment techniques used to quantify this noise. This training noise management guide also serves as a quick reference to Fort Carson's Noise Zones, which are used to help achieve compatibility between the noise generated by combat training and our surrounding communities.

## **NOISE & ENVIRONMENTAL CONCERNS PROCESS:**

The Fort Carson Public Affairs office handles all civilian noise and environmental concerns for the installation. To ensure proper procedures are followed, we ask that if community members have a concern during regular business hours (Monday – Friday, 7:30 a.m. to 4:30 p.m.), to contact one of the following:

**526-9849/1256/1246 or**

[usarmy.carson.hqda-ocpa.list.pao-comrel@mail.mil](mailto:usarmy.carson.hqda-ocpa.list.pao-comrel@mail.mil)

**After business hours:** Contact the Fort Carson Emergency Operations Center at 526-3400/5500. The EOC will have the Public Affairs on-call officer return the call to collect the details. A Public Affairs Community Relations representative will contact the community member the next business day.