

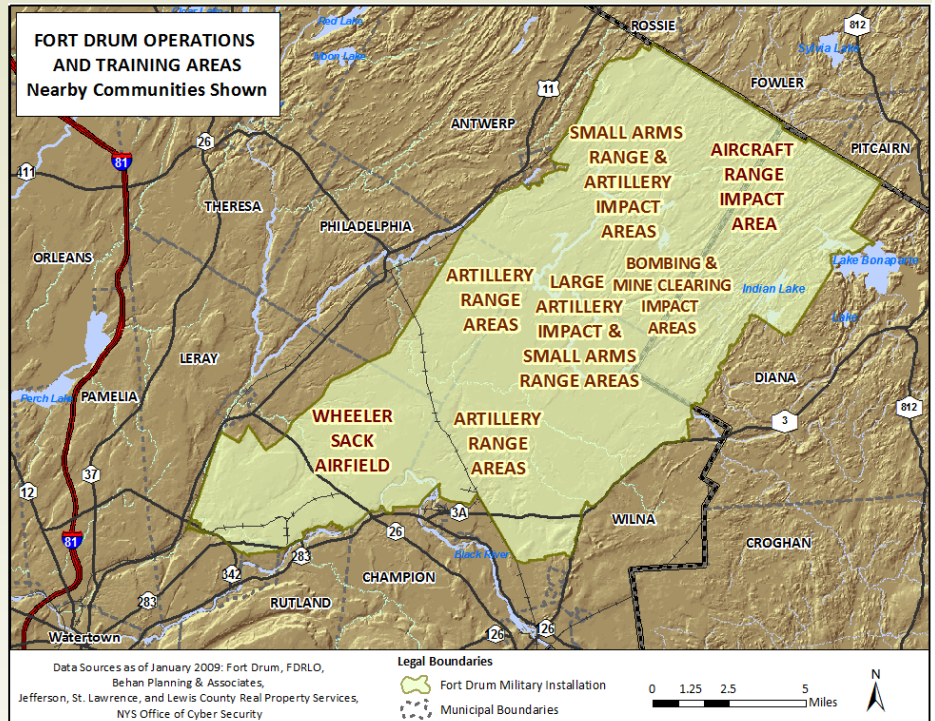
FORT DRUM COMPATIBILITY

MAINTAINING COMPATIBLE COMMUNITY GROWTH

Major employers often attract secondary development. Growth is drawn to areas surrounding military installations because a variety of business services are required to support operations and personnel. Similarly, living near the base offers convenient access to work for soldiers and other employees. High traffic levels at main gates also offer a convenient market for commercial enterprises. However, some development in certain areas may not be compatible with the mission of the installation and thus can affect the way the facility operates. This can, at times, bring nearby development into conflict with military facilities.

While Fort Drum is currently well positioned in terms of compatibility, recognizing long term development pressure surrounding Fort Drum enables communities to identify necessary steps to allow the base to continue its mission while helping the surrounding communities to grow compatibly. Such steps involve local plans recognizing Fort Drum, installation information sharing, and zoning actions to address daily operations and training proximity to local areas.

The list below identifies routine base activities and equipment types, while the following pages provide detail on safety, noise and land use compatibility of these installation activities near adjacent off-base areas. Airfield operations, training and range impacts and land use compatibility guidelines are reviewed on pages 2 and 3; peak noise, lighting and night training, pages 4 and 5; implementation tools are on pages 6 and 7. More detailed local land use and impact area maps are available at www.fdrlo.org/.



ROUTINE BASE OPERATIONS & TRAINING ACTIVITIES

- **Infantry Small Arms** Small arms range target practice; day & night field exercises
- **Light and Heavy Artillery** Range and impact areas - detonations of shells and bombs
- **Wheeler-Sack Army Airfield** - Operations, training, supply delivery, and rapid deployment
- **Aircraft Range** - Range activities include air-to-ground bombing and gunnery practice
- **Drone or unmanned aircraft** - MQ-9 Reaper, RQ-7B Shadow, Predator B flights & maneuvers
- **Fixed Wing Aircraft** - C-5 Galaxy, C-17, F-16, F-22, potentially F-35A in the future
- **Helicopter Flights** - UH-60 Black Hawk, Apache, OH-58 Kiowa Warrior, CH-47 Chinook
- **Night Training** - many of the above listed weaponry and flights use night vision technology

“Growth and development adjacent to Fort Drum should be compatible with military aircraft, artillery, and training operations. Efforts to ensure appropriate development types and scale should be incorporated into municipal planning and land use regulations.”

Growth and Development Guidelines, Jefferson County Planning Board - 2005

OPERATIONS, AIRFIELD & TRAINING NOISE

Noise generated at Fort Drum emanates from many sources, including small arms firing, mortar, tank gun and artillery firing and impacts, pyrotechnic devices, aircraft and heavy-tracked vehicles during training and operations. If overexposure to noise occurs, it can have a negative impact on nearby communities. The Federal Aviation Administration (FAA) and the Department of Defense (DOD) have developed a standard to measure sound associated with military airfields and other training activities, defined zones of noise based on typical flight and training operations, and established recommendations for compatible development within each noise area. When determining potential noise impacts on communities near training operations, a day-night average sound level (DNL) is used, represents a 24-hr average, and includes factors such as changes in sound levels for specific events, weather, and how the time of day affects perceived noise. It provides an assessment of the actual sound impacts of training operations in an area. At Fort Drum, sound levels were taken at various points around the base were used to generate noise contours to predict where significant noise levels occur most often.

Noise areas include three zones: Land Use Planning Zone (**LUPZ**), **Noise Zone II**, and **Noise Zone III**. **LUPZ** includes DNL noise levels between 60 - 64 dB. While noise in the LUPZ Zone can reach Noise Zone II levels during periods of increased operations, the LUPZ Zone is also meant to act as a buffer to limit noise exposure to the civilian community. In general, low-density, compatible land uses such as agriculture should be encouraged in the LUPZ. Expansion of services should be avoided in the LUPZ, as this would encourage higher-density growth. It is advisable to treat the LUPZ areas as Noise Zone II, limiting the same types of land uses in the LUPZ that are considered incompatible to Noise Zone II. **Noise Zone II** is where DNL Noise levels are between 65 - 75 dB and is considered to have significant noise exposure impact. It is normally unacceptable for noise sensitive land uses such as schools, churches, high-density housing or other uses where high densities of people live or congregate to be exposed to such noise levels. **Noise Zone III** is an area where DNL noise levels exceed 75 dB, and is considered to be an area of severe noise exposure unacceptable for noise sensitive activities. **Refer to the table below for compatible uses within each zone.**

AIRFIELD SAFETY is an issue around military installations both for members of the Armed Forces who are training for readiness and for those who live close to these facilities. The DOD established the Air Installation Compatible Use Zone (AICUZ) program to balance the needs of the military and aircraft operations with the quality of life for surrounding communities. AICUZ guidelines define zones of accident potential and recommend compatible land uses within these zones. The DOD compiled and analyzed crash data from all Military Airfields. However unlikely, the data showed that accidents are more likely in three distinct areas: **Clear Zone**, **Accident Potential Zone 1 (APZ 1)**, and **Accident Potential Zone 2 (APZ 2)**. The Clear & APZ's extend from each runway and define areas where the potential for an accident is greatest. The probability of incidents decrease farther away from the runway. It is important to note that some land uses within these zones are not compatible with aircraft maneuvers and potential hazards

LAND USE * COMPATIBILITY GUIDELINES for Noise and Airport Zones

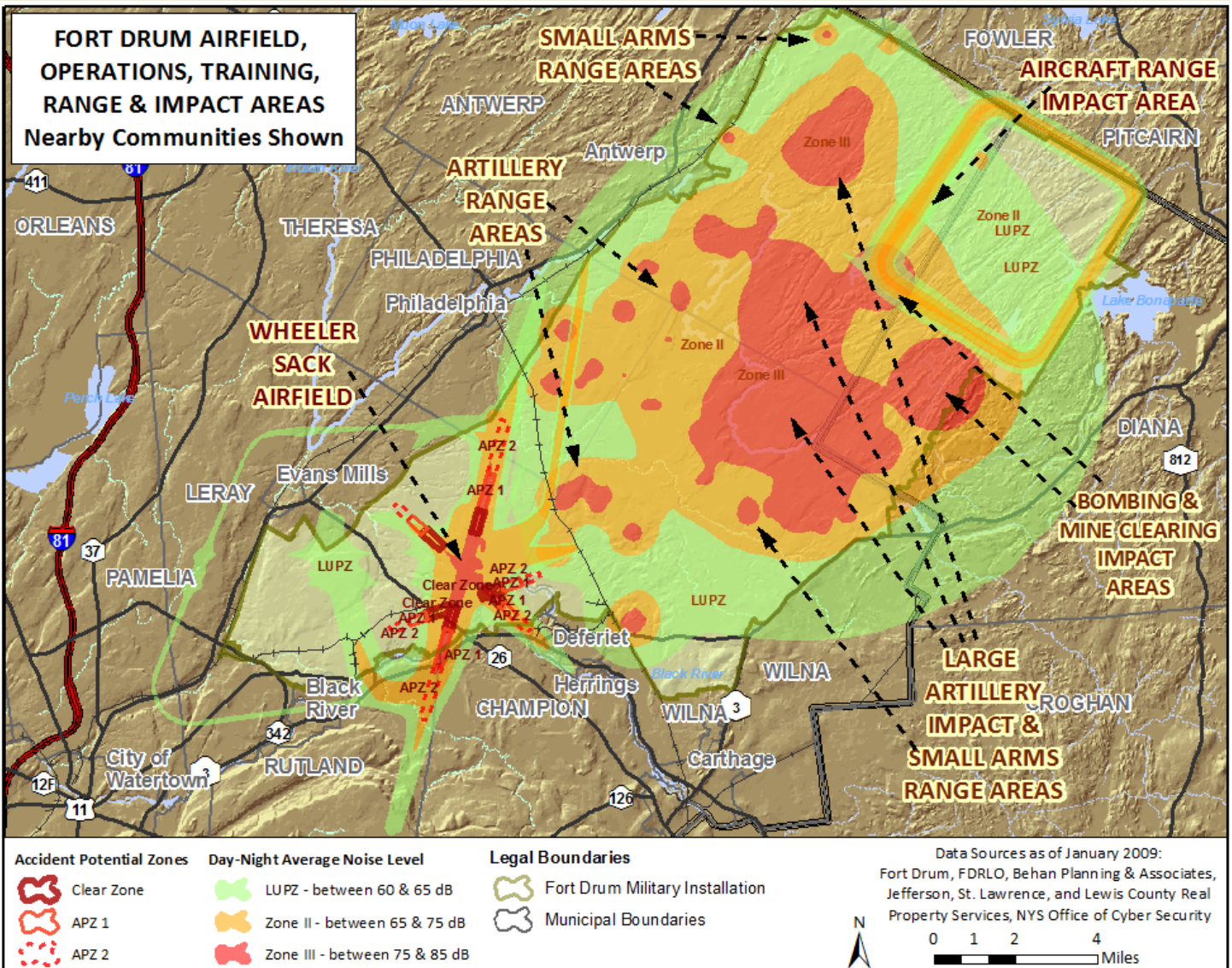
LAND USE EXAMPLE	Day Night Average Noise Zones					Airport Accident Potential Zones		
	LUPZ 60 to 64 dB	Noise Zone II		Noise Zone III		APZs		
		65 to 69 dB	70 to 75 dB	75 to 80 dB	80 to 85 dB	APZ 2	APZ 1	Clear Zone
Public Assembly	Y	Y	N	N	N	N	N	N
Churches, Schools	Y	P	P	N	N	N	N	N
Medical Services, Hospitals	Y	P	P	N	N	N	N	N
Government Services	Y	P	P	P	N	N	N	N
Single Family Dwellings	Y	P	P	N	N	N	N	N
Multifamily Dwellings	Y	P	P	N	N	N	N	N
Manufacturing	Y	Y	P	P	P	Y	N	N
Retail - General	Y	Y	P	P	N	Y	N	N
Restaurants, Personal Services	Y	Y	P	P	N	Y	N	N
Parks	Y	P	P	N	N	Y	P	N
Livestock Farming	Y	P	P	N	N	Y	Y	N
Agriculture\Open Space	Y	Y	Y	Y	Y	Y	Y	Y

* Y = Compatible, N = Not compatible, P = Possibly compatible - depending on the specific use within the category.

COMPATIBLE USE GUIDELINE DESIGNATIONS

Land Use refers to the primary function of a parcel of land. General land use categories include residential, industrial, commercial, vacant, and agricultural. Local governments determine permitted land uses through the use of zoning laws, to guide growth and development in appropriate areas in each community. Land use near military installations can complement or compromise the utility and effectiveness of the installation and its mission. Incompatible development (too close to operations or training areas) could over time force reduced hours of operation and changes in training capacity of a facility, reducing the overall effectiveness of the installation. Incompatible development can also affect the residents around a base by placing them in high noise or high accident potential areas. The noise can be a nuisance to residents, and building in specific zones can create a potential safety hazard. People-intensive and noise sensitive development should be avoided in certain Noise Zones and Accident Potential Zones.

Maintaining compatible land use in strategic locations helps protect residents' safety and quality of life and enhance the long-term viability of the base by ensuring the nearby communities remain compatible over time. Ultimately, a clearer understanding of the locations of potential conflict areas serves as a good foundation for both the communities and Fort Drum to take appropriate actions to minimize potential conflicts and encroachment into the future. Guidance for land use compatibility is drawn from the Federal Interagency Committee on Urban Noise land use guidelines (1980). The designation of uses as "compatible" in each zone reflect various Federal agencies consideration of general cost and feasibility factors as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.



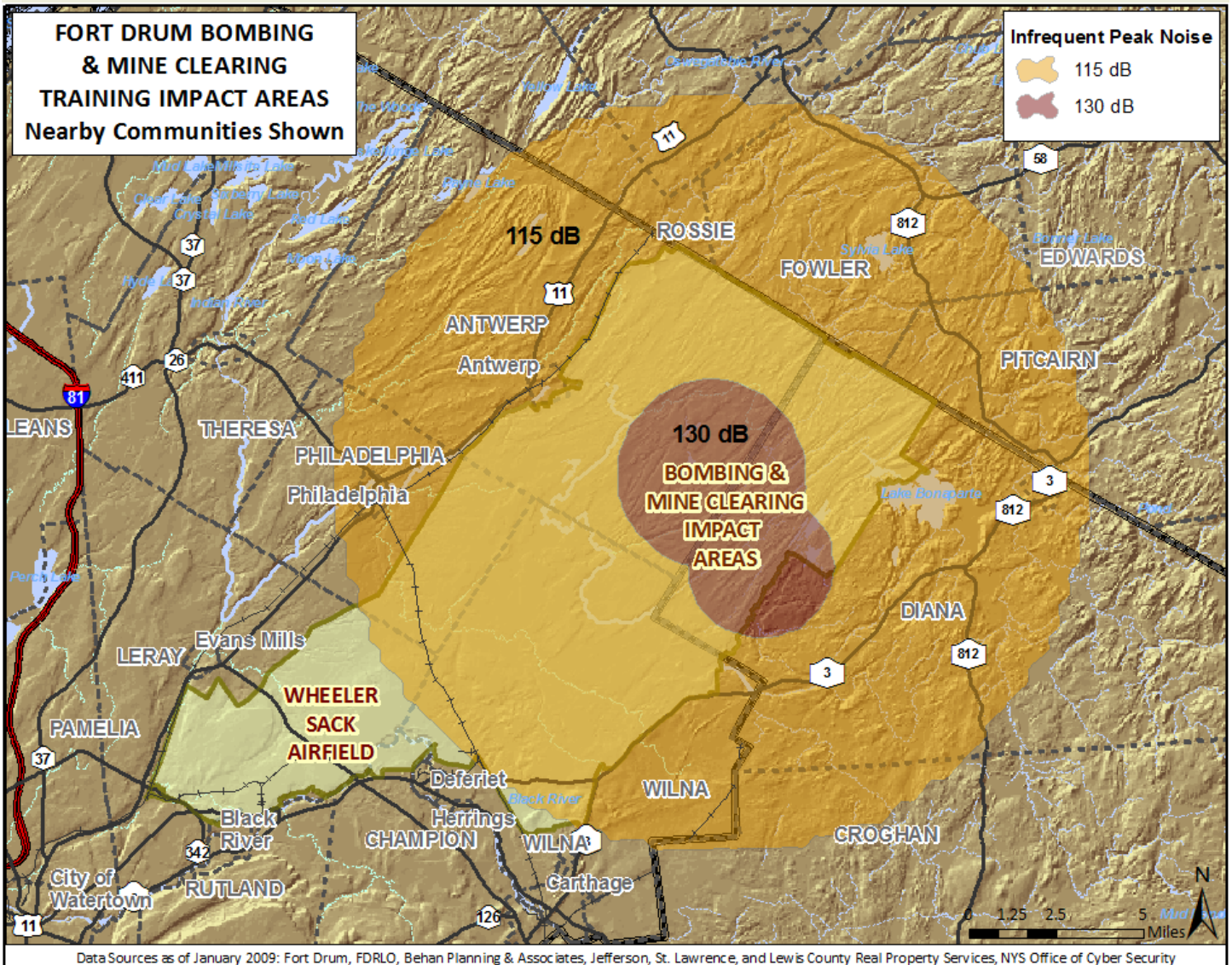
These zones are standardized and used to model all military airfield and training operational impact areas. More detailed maps are available at www.fdrlo.org, including an index map and a series of Town inset maps.

PEAK NOISE VS DNL (AVERAGE) NOISE LEVELS

In addition to modeling Noise Zones based on DNL (day and night noise levels averaged over the year), Fort Drum also modeled Peak Noise Levels. Peak Noise activities include daily operations, as well as infrequent, but very loud activities, such as dropping of live bombs and mine clearing practice (which also involves live bombing). Peak noise from large caliber artillery have a smaller 115 dB footprint than the bombing and mine clearing activities. Peak Noise levels are significantly louder and extend further from Fort Drum than the DNL Noise Zones described on Pages 2 and 3.

However, decision making and actions to avoid encroachment should be based on DNL described on the previous page, as it represents an average noise level at any given time rather than the less frequent Peak Noise level. For more information regarding peak noise on Fort Drum, refer to the latest Installation Noise Management Plan.

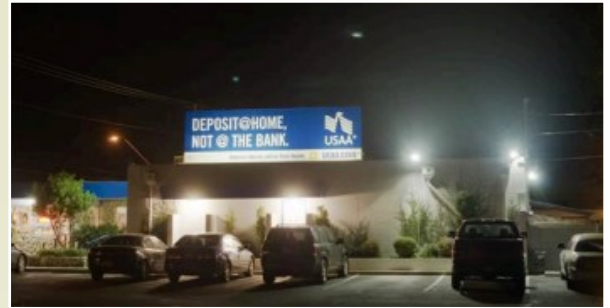
Photo by US Army



More detailed maps are available at www.fdrlo.org, including an index map and a series of Town inset maps.

LIGHT ENCROACHMENT

Also called “light trespass” or “light pollution,” light encroachment is the direction of light fixtures and the resulting brightness transmitted toward areas not intended to be illuminated. For example, street lights that spillover onto military training lands instead of shining downward on roadways where intended. In addition to street lights, outdoor lighting systems associated with buildings and development often allow significant light to travel upward into an otherwise dark sky. The resulting “light pollution” can obscure pilot vision or interfere with the use of night-vision training devices. Two typically large contributors to light pollution are major highway interchanges/ramps and exterior security lighting associated with buildings and parking lots. Light pollution can be created by the cumulative impact of light from both large and small sources.



Reducing light pollution can be as simple as installing ‘dark sky’ compliant fixtures, which include full cutoff designs with downward shielding devices that orient the light only toward the object intended to be lit. Other techniques include shorter light poles, keeping exterior lights turned on only during business hours, and installing lights only in locations where needed. For further information on glare reduction methods, refer to the section [Standards for Outdoor Lighting](#) on page 7.

NIGHT TRAINING MISSIONS

Night training missions provide the modern Army with a tactical advantage, especially in the Global War on Terrorism. Night vision training, in which aviators and infantry personnel use night vision goggles or other types of night vision systems, is essential to the modern military. Night vision systems are designed to operate away from civilization and electric lights and lighting. In fact, exposure to stray light can cause the vision screen to white-out, temporarily robbing the user of vision. In extreme cases, light pollution can hinder night training to such an extent that training facilities and operations must be relocated or discontinued.



Photos by US Army

AIRSPACE ENCROACHMENT (tall structures)

Radio communications towers, cell towers, and wind turbines can physically intrude into active air space, particularly for aircraft in low altitude operations. Communication towers may also be a source of electromagnetic “noise” which may affect military avionics and radio frequency dependent weapons systems and communications.



Adequate radio frequency spectrum is essential to almost all aviation and military operations. Civilian radio frequency devices (e.g., radios, radars, even keyless entry devices) can sometimes transmit in military assigned frequencies, affecting electronic systems and communications equipment. Large radio spectrum users like radio stations can significantly affect military operations and should be coordinated with the Fort prior to approval. Wind turbines can also affect radar coverage and effectiveness as the movement of the blades can disrupt accurate tracking and radar signatures. Citing of any tall structures within the region should involve input from Fort Drum to avoid potential disruption of operations and training activities.

PLANNING TOOLS FOR PREVENTING ENCROACHMENT

There is no one-size fits all approach to addressing potential encroachment issues. Fort Drum encompasses more than 100,000 acres, and along its borders are many diverse communities and Towns. Those adjacent to training areas have unique challenges related to training activities, while gate neighbor communities where daily access occurs have another set of opportunities and challenges. However, there are a number of tools used in military communities across the nation that have helped to solve and limit encroachment. Used alone or in combination, such tools have yielded results often mutually beneficial to installations, adjoining communities and individual landowners. Examples of some of the more commonly used and innovative tools, as well as those most applicable to the Fort Drum area, are briefly described below. The Fort Drum Growth Management Strategy has more examples\ndetailed descriptions.

Army Compatible Use Buffer Program

The Army Compatible Use Buffer (ACUB) program is one tool being used by the Army to mitigate potential encroachment impacts. Currently in place at many installations throughout the US, the program enables the Army to partner with communities, interested landowners and nonprofit conservation organizations to identify and preserve areas with voluntary conservation easements in potential encroachment areas or environmentally sensitive resource areas. This tool is actively being used for some properties near Fort Drum.

Noise or Navigation Easement Program

An easement is the right granted to a third party to use private real property in a specified manner. It may be given or purchased for overhead wires, underground gas lines, or roads. A noise or navigation easement is a property right acquired from a landowner that grants the rights of military training activities in proximity to the affected parcel, including the right to: cause noise, vibration, dust, etc; ensure unobstructed airspace over the property above a specified height; and\or restrict or prohibit certain lights, electromagnetic signals, or land uses that interfere with communications technology and safe aircraft operation.

Military Installation Zoning Overlay District (MIZOD)

Communities who use this technique typically designate all areas (depending on the community) within close proximity to a military installation, or along a primary access route to the installation, as being part of this district. Inside the district, an enhanced set of land use regulations can be put into effect that can accomplish a variety of goals and objectives. Some of these land use tools might include: limiting allowable densities and\or uses, and designating strategic areas for the acquisition of open space for parks or other uses that would benefit the post and the community. Other MIZOD requirements, such as indoor noise-level reduction construction standards (noise attenuation), and real estate disclosure statements, could be used mitigate impacts of development on military installations or protect the welfare of citizens near a military base can be included in the Overlay District as well. Outdoor lighting standards would apply either to the MIZOD or municipality-wide in all nearby communities.

Tall Structure Limits

In the Fort Drum region, typical rural uses and development patterns have resulted in predominant building heights have been limited to no greater than 40 feet, with a few exceptions. Taller structures are usually limited to the City and larger Villages with fire fighting equipment able to handle taller buildings. However, certain uses, such as farm silos, cell towers, or wind turbines, may have the potential to present a conflict, particularly in proximity to airfield activities or in relation to other training areas or activities on base. By working to identify possible conflict areas, a community can avoid having these structures in areas that could affect training and operational activities as part of a MIZOD process.

Early Real Estate Disclosure

As part of a real estate closing, localities require signature of a disclosure form documenting the proximity of the property to a military installation, airport, or other potentially conflicting land use. The disclosure form describes the issues that might occur as the result of the proximity of the property to the nearby conflicting land use. By providing the disclosure, potential property owners are made aware of the nuisances or issues that may occur do to their proximity of the installation.

Standards for Outdoor Lighting

Communities establish outdoor lighting standards for a variety of reasons. In some cases, the use of lighting certain fixtures at particular locations and heights leads to light spillover resulting in excessive glare onto adjacent roads and properties, sometimes affecting neighborhoods. In many cases excessive light pollution fills the night sky, limiting the ability to see stars at night. As mentioned in the previous pages, training impact from outdoor lighting is related to night training needs, since excessive lighting can interfere with the use of night vision weaponry, night vision goggles and other equipment utilized on base for training activities. Some training involves traditional star navigation which is limited by glare and excessive light spillover that can fill the night sky.

Lighting standards provide a variety of solutions to existing and potential light pollution issues. Some of these requirements may restrict the height of light poles, require shielded lighting, require lighting to be directed toward the ground surface or building face in a downward fashion, limit the use of on-site lighting to business hours, or limit dispersion of light from properties. Balancing safety and security, and the needs of businesses, institutions and homes in a municipality with the military's training needs is essential for mutual success. By having reasonable standards in place, the goals of both the military and civilian communities are attainable. Refer to the Lighting Primer in the Jefferson County Planning Principle primer series. Sample lighting standards from the Town of LeRay can be found in the [Fort Drum Growth Management Strategy](#) - 2009, Appendix E - available at www.fdrlo.org.

Sound Attenuation and Noise Reduction Measures

Sound attenuation refers to special design and construction practices intended to lower the amount of noise and vibration that penetrates the windows, doors, and walls of a building to provide an overall noise level reduction for outdoor to indoor sound. In some states, local governments have required attenuation as part of building code enforcement for new construction in certain noise-affected areas.

Restrictions on Uses that Could Cause Electromagnetic Interference

Military and aviation equipment can be highly sensitive to both natural and man-made electromagnetic interference such as that generated by cell tower facilities, commercial wind farms, broadcasting towers, microwave transmitters, or other transmission devices. Because of these concerns, military posts typically provide input or in some cases seek restrictions on the location of cell towers and other uses that may cause interference with military machinery or in proximity to post areas. Areas underneath flight patterns are other sensitive locations for aviation activities. By working to ensure that the location of such facilities in communities would provide minimal interference with military activities while still being beneficial to the community, both military and civilian needs can be achieved.

CONCLUSION - Fostering Compatibility Into the Future with Installation Information and Related Planning Tools

One of the primary goals of [Planning Principles—Fort Drum Compatibility](#) and the [Fort Drum Growth Management Strategy—Implementation Tools](#) are to help coordinate community planning efforts related to the installation. Avoiding encroachment conflicts starts with knowing where such conflicts are most likely to arise. Important areas are near gates, where increased levels of commercial and residential development pressure may occur. But perhaps more importantly, potential development in areas near the training ranges and airfield should be examined to ensure communities allow compatible uses and at appropriate densities. Also, future projects should avoid light spillover, and take into account hazardous areas where routine operations and training noise levels may infringe. Tall structures such as radio towers, cell towers, and wind turbines, can not only affect airspace but they may also be a source of electromagnetic interference with weapons systems and communications. They also can disrupt radar systems important for operations and training activities. Maintaining compatibility into the future will involve continued communication to foster an updated understanding of on-base activities, and a local willingness to incorporate the information and tools into the planning and zoning process. As previously mentioned, the full [Fort Drum Growth Management Strategy](#) and individual local land use and impact area maps can be located at www.fdrlo.org

