

## 4.6 NOISE

### 4.6.1 Impact Methodology

Noise impacts associated with project alternatives have been evaluated using available noise data for various weapons types, available monitoring data for actual live fire training exercises, and modeling analyses for various types of noise sources. The major noise sources associated with project alternatives include construction activity, ordnance firing and detonations, military vehicle use, aircraft and helicopter operations, and personal vehicle use.

Noise modeling for construction activities used generalized equipment numbers, estimated daily operating hours per item, and generalized equipment noise generation data. Noise modeling for major ordnance firing and detonation noise employed the Army's blast noise model. Modeling of heavy weapons and demolition charges was based on 24-hour Ldn conditions, which includes a 10 dB penalty factor for nighttime (10 PM to 7 AM) noise. Noise modeling for small arms firing employed data and equations published by the Army Environmental Hygiene Agency (now CHPPM) plus information from various other sources to produce a spreadsheet model for instantaneous peak dB and 1/8 second maximum dB from small arms firing. Noise modeling for military vehicle traffic employed generalized noise data for medium and heavy trucks, tractors and related construction equipment items, and various tactical vehicle types. Noise modeling for aircraft operations employed a proprietary flyover event simulation model using aircraft noise data from the US Air Force OMEGA108R program.

### 4.6.2 Factors Considered for Impact Analysis

Results from noise monitoring and noise source modeling have been compared to various standards and guidelines in order to evaluate the significance of predicted noise levels. The noise criteria considered include the State of Hawai'i community noise standards (Hawai'i Administrative Rules, Title 11, Chapter 46), Army land use compatibility guidelines (US Army 1997; US Departments of the Air Force, the Army, and the Navy 1978), and CHPPM guidelines for evaluating the significance of short-term blast noise events (CHPPM 2001). The noise evaluations have considered both longer-term average noise level conditions and short-term noise levels associated with discrete noise events. Other relevant noise exposure conditions (time-of-day, background noise levels, the repetition pattern of brief noise events, and the duration of individual noise events, etc.) also have been considered in the evaluation of noise impacts. Specific considerations used in evaluating noise impact significance include the following:

- Whether noise levels would exceed the State of Hawai'i community noise standards at the boundaries of Army installations;
- Whether land use compatibility problems would be created in terms of DOD guidelines (AR 200-1 and DA PAM 200-1); or
- Whether impulse or other short-term event noise levels would be likely to cause significant annoyance to more than 15% of exposed individuals at locations accessible to the general public (the underlying context for DOD noise guidelines and CHPPM evaluations of blast noise complaints).

In addition to these factors, public concerns expressed during the scoping process were also considered in the impact analysis. These concerns included noise from ordnance use, aircraft and helicopter flight operations, and vehicle traffic on paved roads, unpaved roads, and off-road maneuver areas.

### 4.6.3 Summary of Impacts

Table 4-5 lists the types of noise impacts associated with the Proposed Action, Reduced Land Acquisition, and No Action Alternative at the relevant installations.

**Table 4-5**  
**Summary of Potential Noise Impacts**

Impact Issues	SBMR			DMR			KTA/KLOA			PTA			Project-wide Impact		
	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA
Noise from construction activities	⊙	⊙	○	⊙	⊙	○	⊙/○	⊙/○	○/○	⊙	⊙	○	⊙	⊙	○
Noise from ordnance use	⊗*	⊗*	⊗	⊙	⊙	⊙	⊙/○	⊙/○	⊙/○	⊗	⊗	⊙	⊗	⊗	⊗
Noise from military vehicle use	⊙	⊙	⊙	⊙	⊙	⊙	⊙/○	⊙/○	⊙/○	⊙	⊙	⊙	⊙	⊙	⊙
Noise from aircraft operations	⊙	⊙	⊙	⊙	⊙	⊙	⊙/○	⊙/○	⊙/○	⊙	⊙	⊙	⊙	⊙	⊙
Noise from added personal vehicle traffic	⊙	⊙	○	○	○	○	○/○	○/○	○/○	○	○	○	⊙	⊙	○

This table summarizes project-wide impacts. For installation-specific impacts see Chapters 5 – 8.

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

\* The PA and RLA would have a minor increase in noise impacts over No Action. The determination of significance is based on existing No Action noise levels.

#### LEGEND:

⊗ = Significant	N/A = Not applicable
⊗ = Significant but mitigable to less than significant	PA = Proposed Action
⊙ = Less than significant	RLA = Reduced Land Acquisition
○ = No impact	NA = No Action
+ = Beneficial impact	

### ***Proposed Action***

The Army was concerned about the accuracy of significant adverse noise impacts that had been identified in the Draft EIS. As such, the noise model input parameters that were used for the Draft EIS were more closely evaluated, and it was found that certain incorrect assumptions had been made. Namely, it was found that two noise model input parameters were incorrect:

- For the SBMR blast noise model input parameters used in the Draft EIS, it was assumed that approximately 33 percent of the overall volume of large-caliber weapons fire would occur between the hours of 10:00 PM and 7:00 AM. Under closer evaluation, it was determined that a more accurate estimate of weapons firing volumes for the 10:00 PM to 7:00 AM time period was approximately 10 percent of the overall firing volume.

- The blast noise modeling efforts were found to reference a slightly outdated and inaccurate equipment package; the input parameters were corrected to include the correct SBCT equipment package.

Correction of these blast noise model input parameters reduced the lateral noise contours slightly but did not change the overall conclusion of a significant adverse impact to the local noise environment at SBMR. For PTA, the correction of these input parameters resulted in a modification of the environmental impact determination to significant but mitigable to less than significant.

### Significant Impacts

Impact 1: Noise From Ordnance Use. Large caliber weapons firing and explosives use under the Proposed Action would cause noise levels to exceed the Army's acceptable noise level criteria (as provided in Section 3.6) in the cantonment area of SBMR. At SBMR, the Proposed Action would result in expansion of Zone II and Zone III noise contours. The Zone III noise contour would not change much from existing conditions, but would expand eastward by about 650 to 820 feet (200 to 250 meters) in the southwestern portion of the cantonment area. The Zone II noise contour would expand eastward by about 985 to 1,300 feet (300 to 400 meters). Some additional on-post housing would be encompassed by the expanded Zone III and Zone II noise contours. Two on-post schools (Solomon Elementary School and Hale Kula Elementary School) would remain exposed to Zone II noise conditions. The primary cause for increased Zone III and Zone II noise exposure would be due to increased training and munitions use under the Proposed Action, with increases in both daytime and nighttime training. The increase in nighttime training would probably result in an increase in noise complaints from surrounding communities.

Additional Mitigation 1. Although there are likely no mitigation measures that are available to reduce the identified significant impacts to a level below significance thresholds, certain mitigation measures may be available to reduce these identified impacts. Potential mitigation measures for identified impacts to the local noise environment include the following:

- The Army proposes to evaluate training techniques, scheduling and location to reduce overall noise impacts at SBMR. In this evaluation, the Army would consider, as feasible, the benefit of timing restrictions on training and moving certain training activities to PTA, and
- The Army proposes to provide noise-insulating measures whenever new buildings are constructed or existing buildings are renovated, such as modifications to window materials and cooling systems to noise-sensitive land uses that are or that may become exposed to Zone II and Zone III noise conditions.

### Significant Impacts Mitigable to Less Than Significant

Impact 2: Noise from Ordnance Use. At PTA, large caliber weapons firing and explosives use would result in Zone II noise contours that extend slightly beyond the installation boundaries. Zone II noise conditions would affect BAAF and the western portion of the cantonment area, but most of the on-post temporary troop housing would remain outside the Zone II contour. The Zone II noise contour at Mauna Kea State Park would expand slightly to include a small amount of land on the west side of Saddle Road, but there would be very little

change in the location of the Zone II noise contour near the picnic area and rental cabins that are east of Saddle Road.

The use of blanks and other training munitions on the WPAA would produce peak noise levels exceeding Army Zone II criteria when blank ammunition firing occurs within about 3,500 feet (1,067 meters) of the WPAA boundary. Thus, noise from small arms firing with blank ammunition could potentially cause significant noise impacts at Waiki'i Ranch and the Kilohana Girl Scout Camp when training activities occur within a few thousand feet of these locations.

*Additional Mitigation 2.* The Army proposes to establish a minimum 1,000-foot (305-meter) noise buffer around the Waiki'i Ranch property and the Kilohana Girl Scout Camp. In addition, the Army will consider training guidelines that minimize nighttime training activities that involve weapons fire or aviation activity within a minimum of 2,000 feet (610 meters) of those properties. The Army will continue to work with affected communities on noise buffers and may adjust the buffer size dependent upon these discussions.

#### *Less than Significant Impacts*

*Noise from Construction Activities.* Numerous construction projects would occur at various installations under the Proposed Action. Individual items of construction equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet (15 meters). With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active construction sites. The zone of relatively high construction noise levels typically extends to distances of 400 to 800 feet (122 to 244 meters) from the site of major equipment operations. Locations more than 1,000 feet (305 meters) from construction sites seldom experience significant levels of construction noise. Except for a few housing areas at the SBMR and PTA cantonment areas, no noise-sensitive land uses are close enough to proposed construction sites to result in significant noise impacts. A limited amount of family housing at SBMR is close to a small portion of the proposed motor pool facility, and would experience a brief period of high construction noise. But most of the motor pool facility site is far enough from the family housing area to avoid significant noise impacts. Housing facilities at the PTA cantonment are used on a temporary basis by troops visiting PTA for training exercises. Since no personnel are housed at PTA for long durations, limited exposure to daytime construction noise is considered a less than significant impact.

*Noise from Military Vehicle Use.* Military vehicles use a mixture of public roads, on-post roads, military vehicle trails, and on-post off-road maneuver areas. Vehicle convoys using public roads on O'ahu are limited to no more than 24 vehicles in a group. Vehicles within a convoy group (also called convoy serials) typically are spaced about 165 to 330 feet (50 to 101 meters) apart. Convoy serials generally are spaced at least 15 to 30 minutes apart. These convoy procedures prevent situations where convoy vehicles dominate local traffic flow for significant periods of time. Instead of creating conditions where military vehicle traffic dominates traffic noise conditions for a noticeable amount of time, existing convoy procedures result in noise from convoy traffic occurring as a sequence of multiple individual vehicle pass-by events within a background of normal traffic noise conditions. Consequently, noise from vehicle convoy activity is a less than significant impact.

Training activities include vehicle travel along military vehicle trails, on-post unpaved roadways, and in off-road vehicle maneuver areas. Noise generated by this vehicle activity is a combination of individual vehicle pass-by events and periods of more sustained vehicle traffic. Noise levels from individual vehicle pass-bys vary with vehicle type and speed. Vehicle speeds would be relatively low on unpaved roads and during off-road vehicle maneuvers. Noise levels generated by HMMWVs and two-axle military trucks would be comparable to noise from medium trucks (about 65 to 70 dBA at 50 feet [15 meters]). Multi-axle heavy trucks would generate noise levels comparable to other heavy duty trucks (about 78 to 80 dBA at 50 feet [15 meters]). The Stryker vehicle is expected to produce peak pass-by noise levels a few decibels higher than the noise generated by multi-axle heavy trucks (about 85 dBA at 50 feet [15 meters]). Peak pass-by noise levels would drop by 15 dBA at a distance of 500 feet (152 meters) from the travel path.

The maximum number of vehicles employed in any training exercise would be at PTA where approximately 800 vehicles could be used during a single brigade level exercise. Military vehicle convoys between Kawaihae Harbor and PTA would involve groups of up to 24 vehicles spaced at least 15 minutes apart to minimize traffic problems where the proposed PTA Trail crosses public roadways. Consequently, convoy traffic generally would involve no more than 100 vehicles per hour. Predicted military convoy traffic on the proposed PTA Trail would produce hourly average noise levels of about 65 dBA at a distance of 100 feet (30 meters) from the trail, about 55 dBA at 500 feet (152 meters) from the trail, and about 50 dBA at 1,000 feet (305 meters). If the duration of convoy traffic were not to exceed five hours during the daytime, the resulting Ldn level (a 24-hour weighted average noise level) would be about 58.5 dBA at a distance of 1,000 feet (305 meters) from the trail. Even in areas such as Kawaihae, where residential development is close to PTA Trail, predicted convoy traffic would not have a significant noise impact. The closest segment of PTA Trail is about 1.25 miles (2 kilometers) from Waiki'i Ranch and about 1.8 miles (3 kilometers) from the Kilohana Girl Scout Camp. Noise from predicted convoy traffic on PTA Trail would be about 37 dBA at a distance of 1 mile (1.6 kilometers) and about 31 dBA at a distance of 2 miles (3.1 kilometers). Predicted military convoy traffic on PTA Trail would not produce any significant noise impacts at Waiki'i Ranch or the Kilohana Girl Scout Camp. Noise levels along military vehicle trails on O'ahu would be no greater than noise levels along PTA Trail. Consequently, noise from military vehicle traffic on established trails would be a less than significant impact.

Troops training at WPAA would use PTA Trail as a major access corridor from the cantonment area. Vehicle traffic between the cantonment area at PTA and WPAA might not be limited to 100 vehicles per hour, but as a practical matter, it is unlikely that traffic volumes would exceed 400 vehicles per hour on the PTA Trail segment in WPAA. If 400 vehicles traveled along PTA Trail in a single hour, the resulting hourly average noise level would be about 71 dBA at a distance of 100 feet (30 meters) from the vehicle trail, about 65 dBA at 300 feet (91 meters) from the vehicle trail, about 61 dBA at 500 feet (152 meters) from the trail, and about 56 dBA at 1,000 feet (305 meters) from the trail. This noise level would drop to about 43 dBA at a distance of 1 mile (1.6 kilometers) and to less than 37 dBA at a distance of 2 miles (3.1 kilometers). Training exercise traffic on PTA Trail would not generate noise levels above typical daytime background conditions at Waiki'i Ranch or the Kilohana Girl Scout Camp. Consequently, vehicle traffic on PTA Trail would have a less than significant noise impact.

Vehicle maneuver activity would include use of unpaved roads and use of off-road maneuver areas at various installations. Because vehicle speeds are low during most maneuver activities and because vehicles tend to be relatively dispersed during off-road maneuvers, maneuver activities would be expected to produce hourly average noise levels of less than 55 dBA at a distance of about 500 feet (152 meters), with brief peaks of 65 to 70 dBA. Such noise levels would not cause significant noise impacts at off-post noise-sensitive land uses during daytime hours. These noise levels would be more disturbing during nighttime hours. As long as nighttime vehicle maneuver activity is minimized within 1,000 feet (305 meters) of noise-sensitive areas near SBMR and PTA, vehicle noise from training and maneuver activities would be a less than significant impact under the Proposed Action. The Army has established a 1,000-foot (305-meter) noise buffer along those portions of SBMR that border residential areas of Wahiawā. As long as nighttime vehicle maneuver activity is minimized in this buffer area, vehicle noise from training and maneuver activities at SBMR would be a less than significant impact under the Proposed Action.

The Army will establish a minimum 1,000-foot (305-meter) noise buffer around the Waikiʻi Ranch property and the Kilohana Girl Scout Camp. In addition, the Army will consider training guidelines that minimize nighttime training activities that involve weapons fire or aviation activity within a minimum of 2,000 feet (610 meters) of those properties. The Army will continue to work with affected communities on noise buffers and may adjust the buffer size dependent upon these discussions.

*Noise from Aircraft Operations.* The Proposed Action would not result in any meaningful changes in flight operations at WAAF. Improvements to WAAF and BAAF under the Proposed Action would allow increased use by C-17 cargo aircraft. Increased use of these airfields by fixed wing aircraft would cause a minor increase in airfield vicinity noise levels. However, noise conditions in the vicinity of WAAF and BAAF would continue to be dominated by helicopter flight operations. Overall changes in airfield vicinity noise levels would be less than significant under the Proposed Action.

Introduction of the Shadow 200 UAV would add an additional aircraft type to those currently using airspace over Army installations. Because the UAV has relatively low noise generation and normally would be flown at altitudes above those used by helicopters and other aircraft, the use of UAVs would not have significant noise impacts.

While overall USARHAW helicopter flight activity would not change under the Proposed Action, there would be changes in the geographic distribution of flight operations due to changes in the locations and types of training conducted by the 25th ID(L). A portion of helicopter flight operations at PTA would be shifted into WPAA to support maneuver training exercises. Current estimates are that helicopter flight operations over WPAA would average 426 flight operations (totaling about 1,000 flight hours) per month. Less than half of the flight activity would occur at night (US Army CHPPM 2004). Helicopter noise modeling indicates that Ldn noise levels from helicopter activity over WPAA would result in Zone I noise exposure conditions at surrounding off-post locations such as Waikiʻi Ranch and the Kilohana Girl Scout Camp. Smaller helicopters, such as the OH-58 and UH-60, produce maximum noise levels of 75 dBA at distances of 500 to 700 feet (152 to 213 meters) from the flight path. Large helicopters, such as the CH-47, produce peak noise levels of 75 dBA at distances of about 1,300 feet (400 meters) from the flight path. About 15 percent of people

are highly annoyed by individual aircraft or helicopter flyovers when the peak noise level reaches 75 dBA. Most helicopter flight activity over WPAA would be well over 1,000 feet (305 meters) from the boundaries of Waiki'i Ranch and the Kilohana Girl Scout Camp. Noise from increased aircraft operations would be a less than significant impact under the Proposed Action.

*Noise from Added Personal Vehicle Traffic.* The Proposed Action would result in a 5.5 percent increase in combined military and civilian personnel based at SBMR. (No additional personnel would be stationed at the other installations.) A 5.5 percent increase in traffic volumes would produce a change in traffic noise levels of only 0.23 dBA. Most people cannot detect a noise level change of less than 1.5 dBA. Consequently, noise from added personal vehicle traffic would be a less than significant impact under the Proposed Action.

### **Reduced Land Acquisition**

#### Significant Impacts

*Impact 1: Noise From Ordnance Use.* Noise levels from weapons firing and ordnance detonations under Reduced Land Acquisition would be essentially the same as under the Proposed Action.

*Additional Mitigation 1.* Mitigation measures would be the same as those described above for noise impacts of the Proposed Action.

#### Less than Significant Impacts

*Noise from Construction Activities.* Reduced Land Acquisition would require the same new facilities as the Proposed Action. As noted in the discussion for the Proposed Action, noise-sensitive land uses would be far enough from construction sites to avoid significant noise impacts. Consequently, construction activities would have a less than significant noise impact under Reduced Land Acquisition.

*Noise from Military Vehicle Use.* Military vehicle use would be the same under Reduced Land Acquisition as under the Proposed Action. As would be the case for the Proposed Action, military vehicle use would have a less than significant noise impact under Reduced Land Acquisition.

*Noise from Aircraft Operations.* Aircraft, helicopter, and UAV use would be the same under Reduced Land Acquisition as previously discussed under the Proposed Action. Although residents of areas near SBMR and PTA would continue to file occasional complaints about low flying aircraft and helicopters, the complaints generally would be about discrete flyover events rather than overall average noise levels. As noted in the discussion of the Proposed Action, aircraft operations would have a less than significant noise impact under Reduced Land Acquisition.

*Noise from Added Personal Vehicle Traffic.* Personnel increases under Reduced Land Acquisition would be the same as for the Proposed Action. As would be the case for the Proposed Action, added personal vehicle traffic would have a less than significant noise impact under Reduced Land Acquisition.

## **No Action**

### Significant Impacts

Noise from Ordnance Use. Existing live-fire training would continue under No Action. Much of the cantonment area at SBMR would remain impacted by Zone III and Zone II noise conditions. A large portion of the family and troop housing and two elementary schools on the Main Post are exposed to undesirable noise levels. Continued exposure of troop housing and family housing areas at SBMR to Zone III and Zone II noise conditions would be a significant and unavoidable impact under No Action.

Noise conditions at PTA would remain essentially the same as present conditions. The WPAA acquisition would not occur, so there would be no added small arms firing near Waiki'i Ranch or the Kilohana Girl Scout Camp. While individual detonation events would continue to produce occasional events of high noise levels in the cantonment area and at off-post noise-sensitive areas, overall noise conditions would remain acceptable for current land use patterns. Consequently, noise from ordnance use under No Action would be a less than significant impact at PTA.

Additional Mitigation 1. No additional mitigation measures have been identified.

### Less than Significant Impacts

Noise from Military Vehicle Use. Military vehicle use would be less under No Action than under the Proposed Action or Reduced Land Acquisition. No Stryker vehicles would be used under No Action. Noise levels produced by a continuation of existing vehicle use patterns would have a less than significant noise impact under No Action.

Noise from Aircraft Operations. Existing patterns of aircraft and helicopter use would continue under No Action. Although residents of areas near SBMR and PTA would continue to file occasional complaints about low flying aircraft and helicopters, the complaints generally would be about discrete flyover events rather than overall average noise levels. Noise levels produced by a continuation of existing aircraft operations would have a less than significant noise impact under No Action.

### No Impact

Emissions From Construction Activities. No construction projects are associated with No Action. Consequently, there would be no noise impact from construction under No Action.

Noise from Added Personal Vehicle Traffic. There would be no added personnel based at SBMR under No Action. Consequently, there would be no noise impact from added personal vehicle traffic.