

CHAPTER 6.

NOISE

6.1 INTRODUCTION

This chapter describes the potential environmental consequences associated with implementation of the alternatives within the region of influence (ROI) for noise. For a description of the affected environment for all resources, refer to the respective chapters of Volume 2 (Marine Corps Relocation – Guam). The locations described in that volume include the ROI for the Army Air and Missile Defense Task Force (AMDTF) component of the proposed action, and the chapters are presented in the same order as in this volume.

6.2 ENVIRONMENTAL CONSEQUENCES

6.2.1 Approach to Analysis

Potential sound-generating events associated with the proposed action were identified and the potential sound levels from these activities were estimated on the basis of published military sound sources information. These estimated sound levels were reviewed to determine: if they would represent a significant increase in the current ambient sound level, would have an adverse impact on a substantial population of sensitive receptors, or would be inconsistent with any relevant and applicable standards.

Noise impacts in this section are relative to the noise source where the activity generating the noise occurs. For example, noise impacts to non-Department of Defense (DoD) lands from construction activities on Naval Computer Telecommunications Station (NCTS) Finegayan are found in the NCTS Finegayan section. Unless specifically stated as an on-base receptor, sensitive receptors are assumed to be located on non-DoD lands.

6.2.1.1 Methodology

Construction noise is generated by the use of heavy equipment on job sites. Table 6.2-1 in Volume 4 provides a list of representative samples of construction equipment and their associated noise levels. Impact devices typically generate more noise than non-impact devices. Acoustical Usage Factor refers to the percentage of time the equipment is running at full power on the job site. The Federal Highway Administration (FHWA) published a Roadway Construction Noise Model to predict noise levels adjusted from empirical data for construction operations to the actual distance of a receptor.

The decibel (dB) level of a sound decreases (or attenuates) exponentially as the distance from the source increases. For a single point source, like a construction bulldozer, the sound level decreases by approximately six dBs for each doubling of distance from the source. Sound that originates from a linear, or 'line' source, such as a passing aircraft, attenuates by about three dBs for each doubling of distance where no other features such as vegetation, topography, or walls absorb or deflect the sound. Depending upon their nature, such features can range from having minimal to substantial noise levels reduction capabilities.

Operational activities produce potential noise impacts from the operation of stationary and non-stationary sources. Vehicle operational impacts are addressed in Volume 6 through evaluation of the overall on-road vehicular traffic noise impacts on Guam. Vehicle trips generated from all proposed activities, including

the action described here, are covered in Volume 6. Therefore, only noise from construction activity is analyzed in this chapter.

6.2.1.2 Determination of Significance

Noise impacts result from perceptible changes in the overall noise environment that increase annoyance or affect human health. Annoyance is a subjective impression of noise and is subject to various physical and emotional variables. Annoyance levels generally increase as the cumulative noise energy also increases. Human health effects such as hearing loss and noise-related awakenings can result from noise.

For this EIS/OEIS, noise is evaluated for both construction and operation activities. It is not anticipated that maintenance activities would noticeably contribute to the noise environment due to their intermittent nature and short duration. The threshold level of significant impacts for construction noise for construction is: noise resulting in an hourly equivalent sound level (L_{eq}) of 75 A-weighted decibels (dBA), based on United States (U.S.) Environmental Protection Agency (USEPA) data for construction noise at a sensitive receptor. Such noise exposure would be equivalent to noise Zone III or consistent exposure to noise levels at 85 dBA over an 8-hour period under the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (NIOSH 1998).

The significance criteria expressed in this section applies to human receptors, but noise could also affect biological resources, land use, and cultural resources. Please refer to the specific resource sections for details about potential noise impacts to biological resources and other resources.

6.2.1.3 Issues Identified During Public Scoping Process

As part of the analysis, concerns related to noise pollution that were mentioned by the public, including regulatory stakeholders, during the public scoping meetings were addressed. These include: AMDTF associated activities.

6.2.2 Headquarters/Housing Alternatives

This description of environmental consequences addresses all components of the proposed actions for the Army AMDTF. This includes the headquarters/housing component and the munitions storage component, each of which has three alternatives. A full analysis of each alternative is presented beneath the individual headings of this chapter. The weapons emplacement component has four alternatives. Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L). A summary of impacts specific to each set of alternatives (including an unclassified summary of weapons emplacement impacts) is presented at the end of this chapter.

6.2.2.1 Headquarters/Housing Alternative 1 (Preferred Alternative)

This description of environmental consequences addresses all components of the proposed actions for the Army AMDTF. The major component is headquarters/administrative and housing, for which there are three alternatives. The two lesser components (the Modular Storage Magazines [MSMs] and the weapons emplacement sites) each have their own set of alternatives. A full analysis of each alternative is presented beneath the respective headings of this chapter. The components addressed include: Headquarters/Administrative/Housing, Modular Storage Magazines (MSMs), and weapons emplacement sites. There are multiple alternatives for each component. A full analysis of each alternative of the Headquarters/Administrative components is presented beneath the three subheadings of this chapter. The MSM alternatives are all located on Andersen AFB, so those alternatives are discussed in the “North” portion of the chapter. The weapons emplacement sites analysis is classified. However, a summary of

impacts specific to each alternative (including an unclassified summary of weapons emplacement sites) is presented at the end of this chapter.

Alternative 1 would co-locate the administration/headquarters (HQ) and maintenance facility with the Marine Corps in the northern portion of NCTS Finegayan and are compatible with adjacent proposed Marine Corps land uses. Unaccompanied personnel housing facilities would be located within NCTS Finegayan. Accompanied personnel housing facilities would be co-located with the Main Cantonment housing areas in South Finegayan, while recreational and quality of life (QOL) facilities would be co-located within and adjacent to the housing areas. This alternative is compatible with Marine Corps Alternatives 1 and 8 (refer to Volume 2).

The proposed action would include: administration/HQ and maintenance facility; munitions storage; weapons emplacement sites; and family housing, unaccompanied personnel housing, and associated QOL facilities. Housing and QOL facilities would be shared between the Army and Marine Corps and is addressed in Volume 2.

The administration/HQ and maintenance facility would comprise approximately 28 acres (ac) (11 hectares [ha]) of developed land including a battalion headquarters, company facilities, and tactical vehicle maintenance facilities. Training operations for AMDTF units would involve gunnery tables that are non-missile live-fire in nature, but would involve maneuvering and emplacement battle-drills in accordance with standard Army Gunnery Tables. Missile live-fire training will be conducted at an off-island location suitable for Patriot and Terminal High Altitude Area Defense (THAAD).

Eight earth-covered magazines (ECMs) are proposed within Munitions Storage Area (MSA) 1 to store Army missiles and provide safe storage of the system launchers during inclement weather. The new earth-covered magazines would be located in the eastern area of Andersen Air Force Base (AFB) near the intersection of Routes 3, 3A and 9. This location is remote from most of the existing ECMs in MSA 1. A typical munitions storage module would have 2,000 square feet (ft²) (186 square meters [m²]) of physical capacity and dimensions of 80 ft (24 m) in length and a maximum width of 30 ft (9.1 m). Each ECM would be covered with a minimum of 2 ft (0.6 m) of earth.

In accordance with established ammunitions storage requirements, native grassy vegetation would be established on and around the magazines and would be maintained (e.g., periodically mowed) to minimize a potential fire hazard.

North

NCTS Finegayan

Construction. To characterize construction activity noise levels, the FHWA Handbook (U.S. Department of Transportation [USDOT] 2006) was used. Noise from construction activity varies with the types of equipment used and the duration of use. Noise impacts are reduced by 6 dBA as distance from the noise producing activity is doubled. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 feet (ft) (15 meters [m]).

AMDTF facilities proposed in NCTS Finegayan include the administration/HQ and maintenance facilities. These facilities would be sited in the north-central part of NCTS Finegayan approximately 200 ft (61 m) to the west of Route 3. During construction of facilities, use of heavy equipment would occur sporadically throughout the daytime hours. Generally, heavy equipment would generate the highest noise levels throughout the construction phase; however, this noise would be temporary in nature and would diminish the farther sensitive noise receptors are from the construction site. Although some heavy

equipment would be used throughout the construction process, the noisiest heavy equipment is associated with site preparation and their use would tail off as construction of the structures begins. The type of equipment necessary for site preparation would be graders, pavers, dump trucks, and concrete mixers. Use of heavy equipment also depends on the construction schedule, and would not be permanent. A compressed schedule versus a long-term schedule would likely use more pieces of heavy equipment for longer daily periods raising noise levels; however, the duration would be shorter.

This analysis assumes the use of 20 pieces of heavy equipment, including multiple graders, excavators, dump trucks, and pavers. Under this assumption, the noise level would be approximately 91 dBA at 50 ft (15 m) from the source. The proposed construction would be approximately 2,000 ft (610 m) from Route 3 and the nearest off-base receptor; therefore, the noise level would attenuate down to approximately 59 dBA L_{eq} . On-base receptors would be much closer and would experience noise levels as high as 76 dBA at 300 ft (92 m) away. Outdoor noise levels would be reduced due to the effects of terrain and distance from the construction site.

Temporary increases in truck traffic used to transport materials on- and off-site would result in a temporary increase in localized noise. Greater noise disturbance would occur within and near the construction corridors. Construction traffic would not create any permanent, adverse noise impacts to human health or the local environment. Therefore, noise impacts would be less than significant.

Operation. As described in the methodology (Section 6.2.1.1), only noise from construction activity is analyzed here. Information on operation noise is presented in Volume 6.

South Finegayan

Construction. Construction in South Finegayan would include housing projects co-located with the Marine Corps housing. Noise impacts would be to the same as those described above for NCTS Finegayan; however, sensitive receptors would be much closer to the construction activities. Although the area across Route 3 is low density residential, sensitive receptors on non-DoD lands could receive higher than the 75 dBA L_{eq} USEPA acceptable level for residential areas during construction in the areas closest to Route 3. These noise levels would be considered significant, but can be reduced to less than significant levels by using Best Management Practices (BMPs).

Operation. As described in the methodology (Section 6.2.1.1), only noise from construction activity is analyzed here. Information on operation noise is presented in Volume 6.

Central

Navy Barrigada

Construction. Under Alternative 1, no construction activities for the AMDTF would occur at Navy Barrigada. Therefore, there would be no noise impacts from construction.

Operation. As described in the methodology (Section 6.2.1.1), only noise from construction activity is analyzed here. Information on operation noise is presented in Volume 6.

Air Force Barrigada

Construction. Under Alternative 1, no construction activities for the AMDTF would occur at Air Force Barrigada. Therefore, there would be no noise impacts from construction.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Alternative 1 Potential Mitigation Measures

No noise mitigation measures would be required for the housing construction portion of the AMDTF facilities for this alternative.

However, BMPs would be implemented to reduce noise to a less than significant impact. The perimeter fence design has not been completed; however, construction of a concrete block wall as a sound barrier would reduce noise levels by 5 to 10 dBA (USDOT 2006). Other minor practices would be to place stationary equipment, such as generators, as far in from the fence line as practicable. Furthermore, sequencing the project work such that fewer pieces of heavy equipment are working adjacent to sensitive on-base and off-base receptors at a time would reduce the noise levels below the USEPA standard.

6.2.2.2 Headquarters/Housing Alternative 2

Under Alternative 2, all AMDTF projects would occur on Navy Barrigada. Proposed construction would include administrative/HQ and maintenance facility, accompanied and unaccompanied personnel housing, and recreational and QOL facilities.

North

NCTS Finegayan

Construction. Under Alternative 2, no construction activities for the AMDTF would occur at NCTS Finegayan. Noise generated by construction activities on Navy Barrigada would not reach NCTS Finegayan. Therefore, there would be no noise impacts from construction.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

South Finegayan

Construction. Under Alternative 2, no construction activities for the AMDTF would occur at South Finegayan. Noise generated by construction activities on Navy Barrigada would not reach South Finegayan. Therefore, there would be no noise impacts from construction.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Central

Navy Barrigada

Construction. Under Alternative 2, construction-related noise levels at Navy Barrigada would be the same as those described for Alternative 1 at NCTS Finegayan in Section 6.2.2.1. However, the nearest sensitive receptors would be located in residential areas located adjacent to the property line along the northern boundary of Navy Barrigada. This analysis assumes there would be at least a 150 ft (46 m) distance to the nearest off-base receptor and a limited number of heavy equipment (i.e., one grader, backhoe, paver, dump truck, and concrete mixer) would be used in the areas adjacent to the residences. Under these assumptions, noise levels would be approximately 74 dBA L_{eq} , which is just under the USEPA limit for residences. BMPs would reduce the noise levels to acceptable levels. There are no on-base receptors at Navy Barrigada. Therefore, noise impacts would be considered less than significant.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Air Force Barrigada

Construction. Under Alternative 2, no construction projects would occur at Air Force Barrigada. Noise generated by construction activities on Navy Barrigada would not impact Air force Barrigada. Therefore, there would be no noise impacts from construction.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Noise impacts from construction activities at Navy Barrigada would affect off-base receptors. BMPs, such as sound walls and project sequencing, would reduce impacts to a less than significant level. Noise levels due to operation would be similar to traffic noise, and therefore, would result in less than significant impacts.

Alternative 2 Potential Mitigation Measures

No noise mitigation measures would be required for any aspect of the AMDTF actions for Alternative 2.

6.2.2.3 Headquarters/Housing Alternative 3

Under Alternative 3, the administration/HQ, maintenance facility, and unaccompanied housing would be co-located with the Marine Corps facilities in the northern portion of NCTS Finegayan. Accompanied housing, recreational, and QOL facilities would be co-located with Marine Corps housing within Navy Barrigada and Air Force Barrigada.

North

NCTS Finegayan

Construction. Under Alternative 3, construction related noise levels at NCTS Finegayan would be the same as those described for Alternative 1 in Section 6.2.2.1. Off-base sensitive receptors would be located approximately 800 ft (244 m) from the proposed construction area. Construction activities would generate noise levels of approximately 72 dBA L_{eq} for off-base sensitive receptors and approximately 76 dBA for on-base receptors. These levels are considered significant; however, BMPs (i.e., sound walls and project sequencing) would reduce impacts to a less than significant level.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

South Finegayan

Construction. Under Alternative 3, no construction activities would occur at South Finegayan. Due to the distance of sensitive receptors, noise generated by construction activities on NCTS Finegayan would result in less than significant impacts.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Central

Navy Barrigada

Construction. Construction related noise impacts would be the same as those described for Navy Barrigada (refer to Section 6.2.2.1). Implementation of BMPs would reduce noise impacts to a less than significant level.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Air Force Barrigada

Construction. Residential areas line the west edge of Air Force Barrigada; therefore, construction related noise impacts and BMPs would be the same as those described above for Navy Barrigada, in Section 6.2.3.2. These BMPs (i.e., sound walls and project sequencing) would reduce noise impacts to a less than significant level.

Operation. As described in the methodology (Section 6.2.1.1), only construction noise is analyzed here. Information on operational noise is presented in Volume 6.

Alternative 3 Potential Mitigation Measures

No noise mitigation measures would be required for any aspect of the AMDTF actions for Alternative 3.

6.2.3 Munitions Storage Alternatives

6.2.3.1 Munitions Storage Alternative 1 (Preferred Alternative)

Construction

Proposed construction for munitions storage in earth-covered magazines (ECM) would be at the Andersen Air Force Base (AFB) Munitions Storage Area (MSA). The proposed ECM would be located away from any inhabited facility in accordance with required explosive safety distances. Noise generated by construction of the ECM would be barely audible to any off-base receptor and would be considered less than significant.

Operation

Noise impacts associated with the operation of munitions storage in the ECMs would be limited to occasional vehicular noise when loading and unloading the magazines. Noise generated by operation of the ECM would be barely audible to any off-base receptor and would be considered less than significant.

6.2.3.2 Munitions Storage Alternative 2

Existing conditions do not vary between the three munitions storage alternatives at MSA 1. Noise generated by munitions storage construction and operation on Andersen AFB would be the same as described in Alternative 1. Therefore, impacts for Munitions Storage Alternative 2 are identical those described for Munitions Storage Alternative 1.

6.2.3.3 Munitions Storage Alternative 3

Existing conditions do not vary between the three munitions storage alternatives at MSA 1. Noise generated by munitions storage construction and operation on Andersen AFB would be the same as described in Alternative 1. Therefore, impacts for Munitions Storage Alternative 3 are identical those described for Munitions Storage Alternative 1.

6.2.4 Weapons Emplacement Alternatives

Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L). An unclassified summary of impacts specific to each set of alternatives is presented at the end of this chapter.

6.2.5 No-Action Alternative

Under the no-action alternative, there would be no construction to support the proposed AMDTF. Under the no-action alternative, areas proposed for AMDTF facilities would continue to be used for existing DoD functions. Therefore, there would be no noise impacts from implementation of the no-action alternative.

6.2.6 Summary of Impacts

Tables 6.2-1, 6.2-2, 6.2-3 summarize the potential impacts of each major component – headquarters/housing, munitions storage, and weapons emplacement, respectively. A text summary is provided below.

Table 6.2-1. Summary of Headquarters/Housing Impacts – Alternatives 1, 2, and 3

<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Construction		
LSI <ul style="list-style-type: none"> At NCTS Finegayan off-base receptors would receive up to 59 dBA and on base would be as high as 76 dBA. BMPs would reduce to noise impacts to a less than significant level At South Finegayan construction noise impacts would be just over 75 dBA. BMPs would reduce the impacts to a less than significant level 	LSI <ul style="list-style-type: none"> Construction noise levels for Navy Barrigada would be approximately 74 dBA; therefore, would be less than significant. BMPs would further reduce noise levels 	LSI <ul style="list-style-type: none"> The impacts for Navy Barrigada and Air Force Barrigada would be the same as Alternative 2 The impacts for NCTS Finegayan would be the same as Alternative 1
NI <ul style="list-style-type: none"> There would be no impacts for Navy Barrigada or Air Force Barrigada 	NI <ul style="list-style-type: none"> There would be no impacts for NCTS or South Finegayan 	NI <ul style="list-style-type: none"> There would be no impacts for South Finegayan
Operation		
SI <ul style="list-style-type: none"> Operational noise is discussed in Volume 6 	SI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	SI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1

Legend: LSI = Less than significant impact, SI = Significant impact, NI = No impact.

Table 6.2-2. Summary of Munitions Storage Impacts – Alternatives 1, 2, and 3

<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Construction		
LSI <ul style="list-style-type: none"> Construction of the ECMs would be well away from any sensitive receptor, and therefore, would be less than significant impacts. 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1
Operation		
LSI <ul style="list-style-type: none"> Operations at the ECMs would be well away from any sensitive receptor, and therefore, would be less than significant impacts. 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1

Legend: LSI = Less than significant impact.

Table 6.2-3. Summary of Weapons Emplacements Impacts – Alternatives 1, 2, 3, and 4

<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>
Construction			
LSI <ul style="list-style-type: none"> There are no sensitive receptors in or near the project location. Construction noise levels would attenuate down to almost ambient levels (71 dBA) at the nearest receptor off Andersen AFB. Therefore the noise impacts would be less than significant. 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1
Operation			
LSI <ul style="list-style-type: none"> The primary noise impacts would be traffic noise from increased vehicle trips and temporary intermittent generator use, creating noise levels of approximately 81 dBA at a distance of 50 ft (15 m) from the source. The impacts of these operational noise levels would be less than significant. 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1 	LSI <ul style="list-style-type: none"> The impacts would be the same as Alternative 1

Legend: LSI = Less than significant impact.

Noise impacts associated with the proposed Army AMDTF action would be primarily due to construction activities. Noise impacts from operations would be similar to traffic noise. These impacts would be localized around NCTS Finegayan, South Finegayan, Navy Barrigada, and Air Force Barrigada depending upon the alternative selected. Although the noise impacts would be limited to the construction period and would cease once construction has been completed, noise levels could exceed acceptable

USEPA standards. These levels would be reduced to less than significant levels through implementation of BMPs, such as project sequencing and sound barriers.

6.2.7 Summary of Potential Mitigation Measures

Table 6.2-4 summarizes the potential mitigation measures proposed for each action alternative.

Table 6.2-4. Summary of Potential Mitigation Measures

<i>Headquarters/Housing Alternatives</i>	<i>Munitions Storage Alternatives</i>	<i>Weapons Emplacement Alternatives</i>
Construction		
• No mitigation required	• No mitigation required	• No mitigation required
Operation		
• No mitigation required	• No mitigation required	• No mitigation required