



Final

Environmental Impact Statement

GUAM AND CNMI MILITARY RELOCATION

Relocating Marines from Okinawa,
Visiting Aircraft Carrier Berthing, and
Army Air and Missile Defense Task Force

Executive Summary

July 2010

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FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)

Lead Agency: Department of the Navy
Title of Proposed Action: Guam and the Commonwealth of the Northern Mariana Islands (CNMI) Military Relocation
Affected Jurisdictions: Guam, CNMI
Designation: EIS

Abstract

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to examine the environmental effects of their proposed actions. On behalf of the Department of Defense, the Department of the Navy (DoN) is preparing this Final Environmental Impact Statement (EIS) to assess the potential environmental effects associated with the proposed military activities. The DoN is the lead agency for preparation of this Final EIS. The Office of the Secretary of Defense directed the DoN to establish a Joint Guam Program Office that serves as the NEPA proponent of the proposed actions. A number of federal agencies were invited to be cooperating agencies in the preparation of this Final EIS. These agencies have either jurisdiction or technical expertise for certain components of the proposed actions or a potentially affected resource. The agencies that have accepted the invitation to participate as cooperating agencies are Department of Transportation Federal Highways Administration, Federal Aviation Administration, United States (U.S.) Environmental Protection Agency Region 9, U.S. Office of Insular Affairs, U.S. Department of Agriculture, U.S. Army Corps of Engineers, and U.S. Air Force.

The proposed actions are complex, multi-service projects involving components of the U.S. Marine Corps, Navy, and Army. Each Volume evaluates a discrete portion of the proposed actions. Volume 1 presents an overview of the proposed actions and alternatives. The analyses presented in Volumes 2 through 6 each include the details of alternatives and a no-action alternative. The no-action alternative represents status quo. The proposed actions would not occur and there would be no changes to military facilities, training, or operations on Guam and on Tinian. Volume 2 analyzes the effects of the proposed facilities and infrastructure to accommodate the Marine Corps relocation to Guam, including the associated training and operations on Guam. Volume 3 analyzes the effects of the proposed development of live-fire training ranges to support training and operations that would occur on Tinian in the CNMI associated with the Marine Corps relocation to Guam. Volume 4 analyzes the effects of the Navy's proposed deep-draft wharf with shoreside improvements creating a new capability in Apra Harbor, Guam, to support a transient nuclear-powered aircraft carrier. Volume 5 analyzes the effects of the Army's proposed Air and Missile Defense Task Force. Volume 6 evaluates related actions such as utilities and roadway projects on Guam. Volume 7 summarizes the Best Management Practices, proposed mitigation measures, and preferred alternatives' impacts from Volumes 2 through 6. In addition, Volume 7 includes an assessment of cumulative impacts. Volume 8 presents other environmental and regulatory considerations that were evaluated and addressed. Volume 9 contains the supporting appendices, and Volume 10 includes all of the public comments and associated responses.

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NOTICE

Volume 4 of this Final Environmental Impact Statement (EIS) presents the analysis of impacts associated with construction and use of a deep draft berthing capability in Guam for transient (visiting) nuclear powered aircraft carriers. The Final EIS identifies site specific alternatives within Apra Harbor for location of the transient berth and analyzes the impacts associated with development and use of a transient aircraft carrier berth at those alternative locations. Apra Harbor is the only deep water port on the Island of Guam and is the only location with sufficient road, utility, and naval infrastructure to support a transient aircraft carrier berth. The Draft EIS identified several alternatives within Apra Harbor as potential transient aircraft carrier berth locations. Some of those alternatives were eliminated from detailed analysis based on operational and environmental factors. Volume 4 contains a brief explanation regarding why a particular alternative initially considered was eliminated from detailed analysis. Polaris Point was identified as the preferred transient aircraft carrier berth site in the Draft EIS and remains the Navy's preferred site for construction of a berth to accommodate transient aircraft carriers. Final site selection will occur only after completion of project (site-specific) level National Environmental Policy Act (NEPA) analysis and Clean Water Act (CWA) permitting processes.

Comments received on the Draft EIS from Federal agencies, Guam agencies, the Guam legislature and private parties were critical of the marine resources analysis and other analyses presented in the Draft EIS regarding the proposed transient aircraft carrier berth. Some commenters also suggested consideration of other sites or reconsideration of alternative sites that had been eliminated from detailed analysis. Those comments were carefully considered and some changes/additions were made to the analysis that was presented in the Draft EIS. In the view of the Department of the Navy, the analysis now presented in the Final EIS, including the marine resources impacts analysis, provides the information necessary to allow the decision-maker to fully consider the direct, indirect and cumulative environmental impacts of locating a transient aircraft carrier berth within Apra Harbor, the only deep draft harbor on the island of Guam. Department of Defense (DoD) and the Navy engaged in lengthy discussions with the Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and Department of Interior (DOI), explaining the basis for the Navy's analysis and discussing changes to be incorporated in the Final EIS. Based on those discussions, EPA, NOAA, and DOI acknowledged that the Navy's analysis would be sufficient to support a programmatic decision to locate a deep draft transient berth for a CVN on Guam.

The discussions with EPA, NOAA, and DOI also led to a better understanding on the part of the Navy regarding the concerns of the regulatory agencies and the public about the analysis presented in the Draft EIS. The discussions also clarified concerns about the sufficiency of the information that would be required to support future site selection and Federal permitting actions to allow for construction of the proposed transient aircraft carrier berth once a specific site for the transient berth is selected. Based on the level of concern expressed in comments on the Draft EIS, continued discussions with cooperating agencies under NEPA, and the Navy's continuing commitment to environmental stewardship, the Navy has elected to forego selection of a specific site for the transient aircraft carrier berth within Apra Harbor for the near term. The Navy will continue to proceed toward a decision whether to locate a transient aircraft carrier berth generally within Apra Harbor but will defer a decision on a specific site for the transient berth. Discussions with EPA, NOAA and DOI identified additional data these agencies would prefer were available for use in analyzing specific sites for the CVN transient berth. The Navy will voluntarily collect additional data on marine resources in Apra Harbor at the alternative transient aircraft carrier berth sites still under consideration by the Navy as set out in Volume 4 of the Final EIS. The type and scope of the additional data to be collected has been developed cooperatively with EPA, NOAA, and DOI and is described in the "Final Scope of Work Elements for Marine Surveys of the CVN Transient Berth Project Area, Potential Mitigation sites, and Habitat Equivalency Analysis" included in Volume 9, Appendix J. The additional data collected, associated analysis, and any other data that may be required by the United States Army Corps of Engineers (USACE) during the CWA permitting process, will be used in the future to inform the subsequent selection of a specific site for the transient aircraft carrier berth and to support any future CWA permitting decisions for the selected site, including compensatory mitigation. The additional data collected and analyzed for specific sites will be used by the Navy as provided in the Council of Environmental Quality (CEQ) regulations governing supplemental and tiered environmental impact analysis (40 CFR §§ 1502.09 and 1502.20).

The election by the Navy to defer a decision on a specific site for a transient aircraft carrier berth does not affect the discussion and analysis that follows in the remainder of Volume 4 or other portions of this Final EIS. The analysis will remain the foundation for the conclusions reached in the Final EIS and for the decision regarding whether to create a transient berth on Guam for a CVN.

EXECUTIVE SUMMARY

ES-1 INTRODUCTION

As a result of redefining the United States (U.S.) defense posture in the Pacific region and the U.S. alliance with Japan, a portion of U.S. Marine Corps (Marine Corps) forces currently located in Okinawa, Japan would be relocated to Guam. This relocation is proposed to occur during the same timeframe as a proposed wharf construction in Guam's Apra Harbor to support U.S. Navy (Navy) transiting nuclear aircraft carriers. A U.S. Army (Army) Air and Missile Defense Task Force (AMDTF) is also proposed for Guam to protect against the threat of harm from ballistic missile attacks. For the purposes of this Final Environmental Impact Statement (EIS), these three proposed actions are referred to as the Guam and the Commonwealth of the Northern Mariana Islands (CNMI) military relocation.

This Final EIS was prepared in compliance with the National Environmental Policy Act (NEPA) (42 United States Code § 4321, as amended); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] § 1500-1508, July 1, 1986); and the Department of the Navy (DoN) Procedures for Implementing NEPA (32 CFR § 775). It was prepared to inform decisions based on an understanding of the environmental consequences of the proposed Guam and the CNMI military relocation and take measures to protect, restore, and enhance the environment. The decisions to be made are whether and how to implement the proposed actions.

Actions with the potential to significantly harm the environment beyond U.S. territorial waters (i.e., beyond 12 nautical miles (nm) (22.2 kilometers [km]) must be analyzed using the procedures set forth in Executive Order (EO) 12114 and associated implementing regulations. An impact statement prepared under EO12114 is identified as an Overseas Environmental Impact Statement (OEIS). Although this document was initiated as an EIS/OEIS, the proposed actions are not subject to EO 12114. Accordingly, after the public comment period, it was re-titled as an EIS and developed solely under NEPA. The proposed actions include components involving the U.S. Marine Corps (Marine Corps), the Navy and the U.S. Army (Army). Given their temporal and geographic proximity, these cumulative actions were addressed in the same EIS in order to best assess their potentially significant cumulative impacts. As discussed below and in the respective Volume for the Marine Corps, Navy, and Army components, each component is based upon a differing national security objective. Likewise, each component has an independent need for and independent utility from each other. The decisions will be reached on each component independent of the others. The three main components of the proposed actions are briefly stated as follows:

1. *Marine Corps.* (a) Develop and construct facilities and infrastructure to support approximately 8,600 Marines and their 9,000 dependents relocated from Okinawa to Guam. (b) Develop and construct facilities and infrastructure to support training and operations on Guam and Tinian (CNMI) for the relocated Marines.
2. *Navy.* Construct a new deep-draft wharf with shoreside infrastructure improvements creating the capability in Apra Harbor, Guam to support a transient nuclear powered aircraft carrier.
3. *Army.* Develop facilities and infrastructure on Guam to support relocating approximately 600 military personnel and their 900 dependents to establish and operate an Army AMDTF.

The proposed action for the Marine Corps include personnel from the units being relocated and the associated base support personnel that must also be present at an installation to support the military mission.

The project locations addressed in this Final EIS are Guam and Tinian. Guam and Tinian are part of the Mariana Islands archipelago. They are located within the Mariana Islands Range Complex (MIRC), an area used by the Department of Defense (DoD) for readiness training. Figure ES-1 depicts the region for the proposed actions.

ES-2 OVERARCHING PURPOSE AND NEED

The overarching purpose of the proposed actions is to locate U.S. military forces to meet international agreement and treaty requirements and to fulfill U.S. national security policy requirements to provide mutual defense, deter aggression, and dissuade coercion in the Western Pacific Region. The need for the proposed actions is to meet the following criteria based on U.S. policy, international agreements, and treaties:

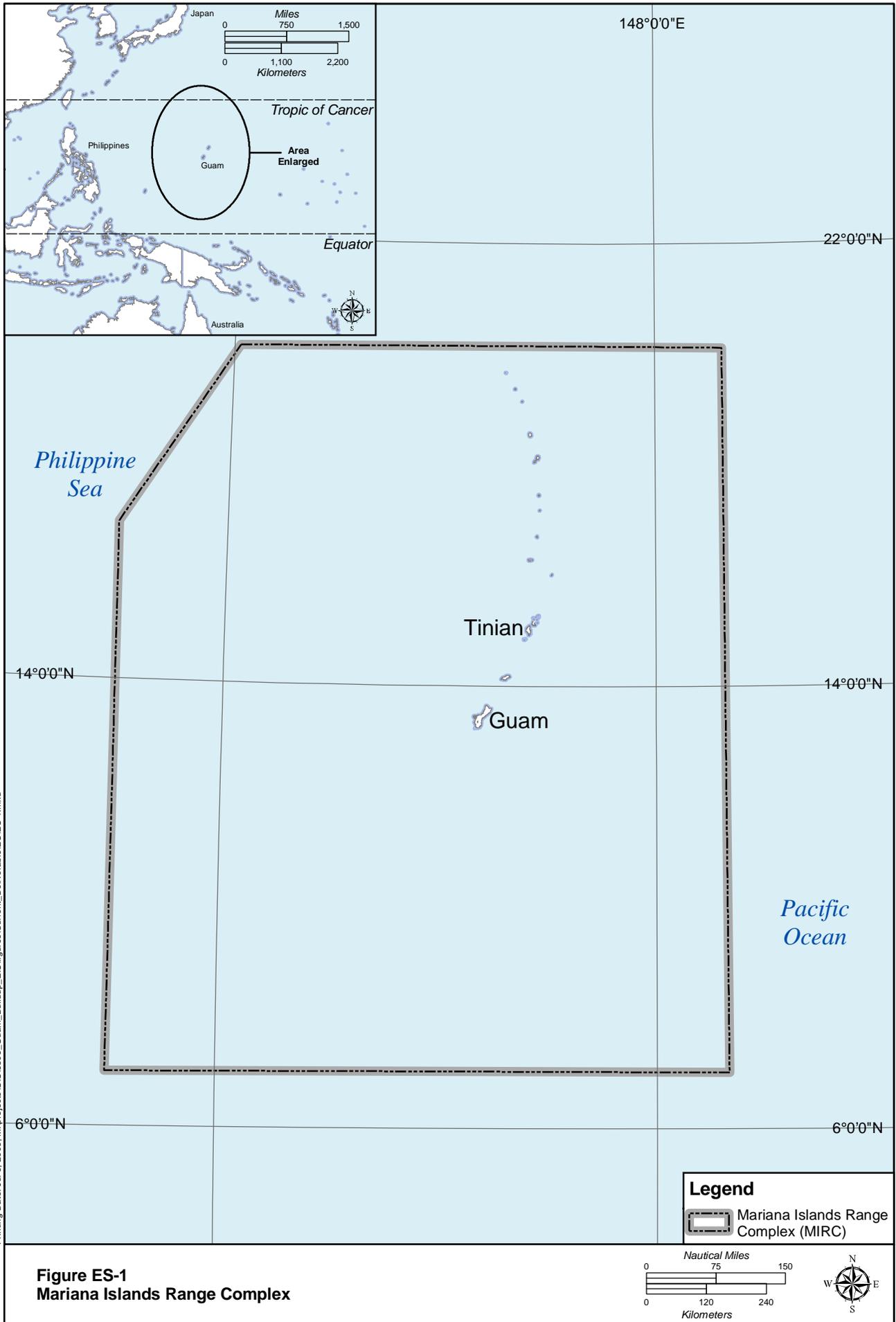
- Position U.S. forces to defend the homeland including the U.S. Pacific territories
- Location within a timely response range
- Maintain regional stability, peace and security
- Maintain flexibility to respond to regional threats
- Provide powerful U.S. presence in the Pacific region
- Increase aircraft carrier presence in the Western Pacific
- Defend U.S., Japan, and other allies' interests
- Provide capabilities that enhance global mobility to meet contingencies around the world
- Have a strong local command and control structure

ES-3 GLOBAL STRATEGIC PERSPECTIVE

The U.S. maintains military capabilities in the Western Pacific to support U.S. and regional security; economic and political interests; and to fulfill treaty and alliance agreements.

Relocation of Marines to Guam

In response to the evolving security environment in the Pacific region, the Integrated Global Presence and Basing Strategy (IGPBS) and Quadrennial Defense Review (QDR) initiatives began to focus on posture changes in the Pacific region. These initiatives included reduction of overseas forces while striving to base forces in locations that support flexibility and speed of response to anywhere in an unpredictable environment. Based on the QDR recommendations for global repositioning and operational realignments in the Pacific Region, the Department of Defense began to identify suitable locations to relocate the Marine Corps from Okinawa that met: (1) treaty and alliance requirements; (2) response times to potential areas of conflict; and (3) freedom of action (use of base without restrictions).



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Figure ES-1
Mariana Islands Range Complex

In a parallel initiative with the IGPBS that began in December 2002, the U.S. engaged the Government of Japan in discussions to coordinate changes in U.S. force posture in Japan and the options on how best to coordinate those changes with other force realignments in the Pacific. Over a three and one-half-year period, the U.S. engaged with the Government of Japan in a series of sustained security consultations under the auspices of the U.S.-Japan Security Consultative Committee (SCC), the pre-eminent treaty oversight body, composed of the U.S. Secretary of State and Secretary of Defense and the Japanese Minister of Foreign Affairs and Minister of Defense. These talks, which came to be known as the Defense Policy Review Initiative (DPRI), were aimed at evolving the U.S.-Japan Security Alliance to reflect today's rapidly changing global security environment. The DPRI, which served as the primary venue for accomplishing IGPBS objectives regarding Japan, focused on alliance transformation at the strategic and operational levels, with particular attention to the posture of U.S. and Japanese forces in Japan, as well as transforming capabilities in the Western Pacific around the U.S. and Japanese alliance.

Ultimately, these discussions and negotiations resulted in an agreement known as the Alliance Transformation and Realignment Agreement (ATARA). In development of the ATARA, the U.S. and Japan confirmed several basic concepts relevant to bilateral defense cooperation, the defense of Japan and responses to situations in areas surrounding Japan. These concepts include the following: (1) bilateral defense cooperation remains vital to the security of Japan as well as to peace and stability of the region; (2) the U.S. will maintain forward-deployed forces, and augment them as needed, for the defense of Japan and to deter and respond to situations in areas surrounding Japan; (3) the U.S. will provide all necessary support for the defense of Japan; (4) U.S. and Japanese operations in the defense of Japan, and responses to situations in areas surrounding Japan, must be consistent to ensure appropriate responses when situations in areas surrounding Japan threaten to develop into armed attacks against Japan, or when an armed attack against Japan may occur; and (5) U.S. strike capabilities and the nuclear deterrence provided by the U.S. remain an essential complement to Japan's defense capabilities and preparedness in ensuring the defense of Japan and contribute to peace and security in the region.

At the May 1, 2006, SCC meeting, the two nations recognized that the realignment initiatives described in the SCC document *U.S.-Japan Roadmap for Realignment Implementation* (the "Roadmap") would lead to a new phase in alliance cooperation. The Roadmap outlined details of different realignment initiatives, including the relocation of the Marines and associated cost sharing arrangements with the Japanese government. The Mutual Security Treaty and follow-on U.S.-Japan agreements require the U.S. to respond quickly to areas of potential conflict in the Asia-Pacific region. Consistent with these obligations, the ATARA and Roadmap initiatives require relocating approximately 8,000 III Marine Expeditionary Force personnel and 9,000 dependents from Okinawa to Guam with a target completion date of 2014. Moving these forces to Guam would place them on the furthest forward element of sovereign U.S. territory in the Pacific capable of supporting such a presence, thereby maximizing their freedom of action while minimizing the increase in their response time relative to their previous stationing in Okinawa.

Under the ATARA and Roadmap, Japan has agreed to a cost-sharing arrangement with the U.S. that would assist in funding up to \$6.09 billion of the facilities construction costs for the relocation of the Marines from Okinawa to Guam. This cost-sharing agreement acknowledges that the Marine Corps forces on Guam would continue to support U.S. commitments to provide for the defense and security of Japan. These international commitments for funding, and locations of the repositioned forces were re-affirmed on February 17, 2009 in the document titled: *Agreement Between the Government of the U.S. and the Government of Japan Concerning the Implementation of the Relocation of the III Marine Expeditionary Force Personnel and Their Dependents from Okinawa to Guam* (Guam International Agreement), signed by the U.S. Secretary of State and the Japanese Foreign Minister. The Agreement was approved by the

Japanese Diet on May 13, 2009 and transmitted to the U.S. Congress in accordance with each party's respective legal procedures.

In 2010, the U.S. and the Government of Japan continue their commitment to the Roadmap agreement. In the 2010 QDR, DoD reaffirmed its commitment with Japan to continue to implement the Roadmap agreement ensuring a long-term presence of U.S. forces in Japan and transforming Guam into a hub for security activities in the region. (DoD 2010). On May 28, 2010, the SCC issued a statement reconfirming that, in the 50th anniversary year of the signing of the Treaty of Mutual Cooperation and Security, the U.S.-Japan Alliance remains indispensable not only to the defense of Japan, but also to the peace, security, and prosperity of the Asia-Pacific region. Further, the SCC confirmed the commitment to implement the realignment initiatives described in the Roadmap.

Training on Tinian

Guam cannot accommodate all training for the relocating Marines. Tinian is approximately 100 mi (160 km) away and provides the best opportunities for training groups of 200 Marines or larger due to greater land availability. It provides reliable access and maximum opportunity to realistically train with their weapons and equipment while minimizing "down time" lost when travelling to distant training locations. The northern two-thirds of Tinian are leased to the DoD. Company and battalion level non-live-fire training areas already exist and are utilized on these leased parcels. The land, however, could be developed to accommodate live-fire ranges.

Development of a Navy Transient Aircraft Capability on Guam

The 2006 QDR states that the U.S. realignment strategy included the need for greater availability of aircraft carriers in the Pacific to support engagement, presence, and deterrence, supplementing current ship deployments, port visits in the region, and the aircraft carrier base (homeport) in Japan. The most current QDR in 2010 reconfirms that the Navy must continue to have the capability for a "robust forward presence" (DoD 2010).

Port visits are generally of short duration with limited availability for maintenance support. In contrast, a transient capable port has greater support for vessel maintenance and crew quality of life enabling longer stays in a region to meet the QDR strategy. Based upon the QDR treaty and alliance requirements, DoD began to identify suitable locations for a new transient carrier capability in the Pacific that met: (1) treaty and alliance requirements; (2) response times to potential areas of conflict; and (3) freedom of action (use of a base without restrictions, including implementation of force protection measures to deter/avoid terrorist attacks). The QDR concept is that the U.S. should strive to position forces in locations that support flexibility and speed of response to anywhere in an unpredictable environment. The proposed action to create a transient carrier capability on Guam meets all of these requirements.

Development of an Army AMDTF

The proposed Army AMDTF would be placed on Guam to defend U.S. interests on Guam. Its defensive umbrella would ensure that local military assets are protected and remain available to meet their military missions.

ES-4 PROPOSED ACTIONS

The main components of the proposed actions are as follows:

1. *Marine Corps.* (a) Develop and construct facilities and infrastructure to support approximately 8,600 Marines and their 9,000 dependents relocated from Okinawa (Japan) to Guam,

- (b) Develop and construct facilities and infrastructure to support training and operations on Guam and Tinian for the relocated Marines.
2. *Navy*. Construct a new deep-draft wharf with shoreside infrastructure improvements creating the capability in Apra Harbor, Guam to support a transient nuclear powered aircraft carrier.
 3. *Army*. Develop facilities and infrastructure on Guam to support relocating approximately 600 military personnel and their 900 dependents to establish and operate an AMDTF.

The proposed actions are a complex, multi-service proposal involving components of the Marine Corps, Navy, and Army, as well as existing Air Force assets on Guam. Facilities construction and improvements would be necessary to accommodate the three major elements of the proposed actions. The proposed actions would entail increased operational activities associated with Marine Corps and Army basing, more frequent ship berthing, and the establishment of aviation maintenance operations and facilities. There would also be increased opportunities for additional military personnel to meet critical training requirements. Training could take the form of communications/control, combat skills, aviation, amphibious vehicle maneuvers, and weapons firing activities. Thus, required construction would include the facilities and infrastructure for maintaining a permanent presence on Guam, and the creation of new training ranges to accommodate training a larger population of military personnel. These training facilities would be located on Guam and on Tinian. In summary, implementation of the proposed actions would result in the following:

- Temporary increase in population related to the construction-related work force
- Permanent increase in number of military and civilian personnel and dependents on Guam
- Increase in transient presence on Guam and Tinian
- Increase in number and type of major equipment assets to support military personnel and operations (e.g., aircraft, ships, amphibious watercraft)
- Increase in number and type of training activities
- Construction of new facilities
- Improvements to existing facilities
- Improvements to infrastructure (including roads and utilities)
- Establishment of new special use airspace supporting training activities and the AMDTF
- Acquisition of additional land (required for three of the Marine Corps Relocation – Guam action alternatives)

Proposed Population Changes

Even though Guam currently hosts some permanent Navy and Air Force population, the proposed actions would increase the direct military population on Guam as summarized in Table ES-1. The proposed action for the Marine Corps relocation includes personnel from the units being relocated and the associated base support personnel that must also be present at an installation to support the military mission. The transient population would increase due to the Navy's transient berthing of the aircraft carrier during the proposed 63 visit-days per year. An aircraft carrier is usually accompanied by supply and combatant escort ships. Collectively, the aircraft carrier and accompanying ships are referred to as a carrier strike group (CSG). Table ES-1 portrays the maximum potential loading of permanent and transient personnel. Given the transient cycle of both the Navy and the Marine Corps, however, the projected average daily loading is 2,178, much less than the potential 9,222 transient loading for both services.

Table ES-1. Summary of Direct Military Population Changes on Guam

<i>Service</i>	<i>Permanent Military Personnel</i>	<i>Dependents</i>	<i>Transient Military Personnel</i>	<i>DoD Civilian Workforce (from off island)</i>	<i>Subtotals by Service</i>
Marines	8,552	9,000	2,000	1,710	21,262
Navy*	0	0	7,222*	0	7,222*
Army	630	950	0	126	1,706
Subtotals by Population Type	9,182	9,950	9,222*	1,836	Total Proposed Actions Population = 30,190*

*Note: Up to 7,222 personnel on the aircraft carrier and CSG could be in port at a given time, currently planned for a cumulative total of up to 63 visit-days per year with an anticipated length of 21 days or less per visit. Marine Corps vessels would be berthed at Apra Harbor when in port. These vessels could include up to 6,213 personnel. However, this group would not be in port at the same time as the CSG, so the larger of the two personnel numbers is used in this table for conservative analysis purposes.

Uniformed military personnel would be supported by civilian personnel, some of whom would likely be newly relocated to Guam and some of whom would be current Guam residents. For purposes of this analysis it was assumed that of the DoD civilian workforce: 75% would be coming from off island and 25% would be current Guam residents. It is also assumed that 25% would live on base (because they are military dependents) and 75% would live off base.

Table ES-2 presents the estimated total population increase on Guam from off-island that would result from the proposed actions. The population numbers in Table ES-2 are larger than the numbers presented in ES-1 because they additionally include: (1) the dependents of off-island DoD civilian workforce and; (2) the off-island population increase related to indirect and induced jobs. Project-related construction work is expected to begin in 2010 and reach its peak in 2014. It is also assumed in this analysis that most of the Marines and their families would arrive on Guam in 2014. Since the peak in construction activities and expenditures would coincide with the arrival of Marines and their families, 2014 represents the peak year for population increase. At this peak, the total increase in Guam residents from off-island would be an estimated 79,178 people.

After the 2014 peak, project-related construction expenditures and the associated influx of construction workers would decline rapidly because 2014 is the last year that any new construction would begin. By the time construction is completed and military operational spending reaches a steady state, the off-island population increase is projected to level off to an estimated 33,608 persons, approximately 58% below the peak level.

Table ES-2. Estimated Total Population Increase on Guam from Off-Island (Direct, Indirect, and Induced)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Direct DoD Population¹											
Active Duty Marine Corps	510	1,570	1,570	1,570	10,552	10,552	10,552	10,552	10,552	10,552	10,552
Marine Corps Dependents	537	1,231	1,231	1,231	9,000	9,000	9,000	9,000	9,000	9,000	9,000
Active Duty Navy ²	0	0	0	0	0	0	0	0	0	0	0
Navy Dependents	0	0	0	0	0	0	0	0	0	0	0
Active Duty Army	0	50	50	50	50	630	630	630	630	630	630
Army Dependents	0	0	0	0	0	950	950	950	950	950	950
Civilian Military Workers	102	244	244	244	1,720	1,836	1,836	1,836	1,836	1,836	1,836
Civilian Military Worker Dependents	97	232	232	232	1,634	1,745	1,745	1,745	1,745	1,745	1,745
Off-Island Construction Workers (DoD Projects) ³	3,238	8,202	14,217	17,834	18,374	12,140	3,785	0	0	0	0
Dependents of Off-Island Construction Workers (DoD Projects)	1,162	2,583	3,800	3,964	4,721	2,832	1,047	0	0	0	0
Direct DoD Subtotal	5,646	14,112	21,344	25,125	46,052	39,685	29,545	24,713	24,713	24,713	24,713
Indirect and Induced Population											
Off-Island Workers for Indirect/Induced Jobs ³	2,766	7,038	11,773	14,077	16,988	12,940	6,346	4,346	4,346	4,482	4,482
Dependents of Off-Island Workers for Indirect/Induced Jobs	2,627	6,685	11,184	13,373	16,138	12,293	6,028	4,372	4,372	4,413	4,413
Indirect/Induced Subtotal	5,393	13,723	22,957	27,450	33,126	25,233	12,374	8,718	8,718	8,895	8,895
Total Population	11,038	27,835	44,301	52,575	79,178	64,918	41,919	33,431	33,431	33,608	33,608

Notes: ¹ DoD population includes military personnel, DoD civilian workers and dependents from off-island.

² The Navy rows do not include increases from the transient presence of aircraft carrier crew with its CSG.

³ Population figures do not include Guam residents who obtain employment as a result of the proposed actions.

ES-5 ALTERNATIVES DEVELOPMENT

To accomplish the Guam and CNMI proposed actions, the DoD has considered many development and operational alternatives. Analysis of alternative actions is a key aspect of the NEPA process. This analysis begins with establishing a set of possible alternatives and then separating those into the ones that were considered but dismissed from further analysis and the ones that were considered and brought forward for analysis. The no-action alternative represents the baseline and is addressed throughout the NEPA process. This section summarizes the alternatives that have been considered to accomplish the proposed actions.

Alternatives Considered but Dismissed

The DoN identified criteria to generate potential alternatives for consideration. After a thorough review, the DoN eliminated several alternatives from further consideration. These alternatives were not considered reasonable due to factors such as significant constraints on land use, time frame for land acquisition, geographic constraints, or presence of protected species or cultural resources. A description of the alternatives considered but dismissed from further analysis is presented in Chapter 2 of Volumes 2-6 of this Final EIS.

Alternatives Considered

Several action alternatives for each of the proposed actions were carried forward for evaluation. The no-action alternative was also carried forward. Presented below are summaries of the action alternatives for each Volume.

Marine Corps Relocation – Guam (Volume 2)

The proposed action for the Marine Corps relocation involves constructing and utilizing all required facilities, infrastructure, and training assets necessary to establish a Marine Corps base of operations on Guam. Under the proposed action, the relocated Marines would also conduct training operations in support of mission objectives and sustainment.

The facilities and operational and training requirements of the military elements associated with the relocation to Guam were analyzed. The requirements could be grouped into four functional components:

1. *Main Cantonment Area functions.* Main cantonment military support functions (also known as base operations and support) include headquarters and administrative support, bachelor housing, family housing, supply, maintenance, open storage, community support (e.g., retail, education, recreation, medical, day care, etc.), some site-specific training functions, and open space (e.g. parade grounds, open training areas, open green space in communities, etc), as well as the utilities and infrastructure required to support the cantonment area.
2. *Training functions.* There are three subclasses of training support functions required by Marine Corps units that would be stationed on Guam:
 - *Firing ranges* are required for live and inert munitions practice, which generates the need for safety buffers called Surface Danger Zones (SDZs), and special use airspace (SUA) for certain weapons.
 - *Non-fire maneuver ranges* are required for vehicle and foot maneuver training, including urban warfare training. Urban warfare training is conducted in buildings that simulate an urban environment. There could be multi-story buildings arranged close together where Marines can practice entering and maneuvering in tight spaces.
 - *Aviation training ranges* are either improved (paved runway) or unimproved (unpaved landing sites) used to practice landing/takeoff and air field support (including loading/unloading of fuel, munitions, cargo, and personnel).
3. *Airfield functions.* The proposed relocation would include aviation units and aviation support units that require runway and hangar space, and maintenance, supply and administrative facilities. The capability to conduct air embarkation operations would also be required. This capability refers to loading and unloading cargo and passengers to and from aircraft, comparable to a civilian airport terminal.

4. *Waterfront functions.* Transient vessels support Marine Corps operations and the transient forces that presently train on Guam and on Tinian. The proposed Marine Corps relocation would increase the need for ships and amphibious assault craft due to the increase in personnel being trained in the region. The waterfront capabilities must be upgraded to accommodate this increased traffic. Although the requirements are indirectly related to training, planning criteria for harbors are unique. Therefore, the proposed waterfront requirements are being discussed separately from other training actions.

Figure ES-2 depicts the geographic locations of the alternatives carried forward for the Marine Corps relocation on Guam and Figure ES-2a summarizes the proposed action and each of the alternatives. The distinct facility and operational requirements of the above functions were used to develop the alternatives below.

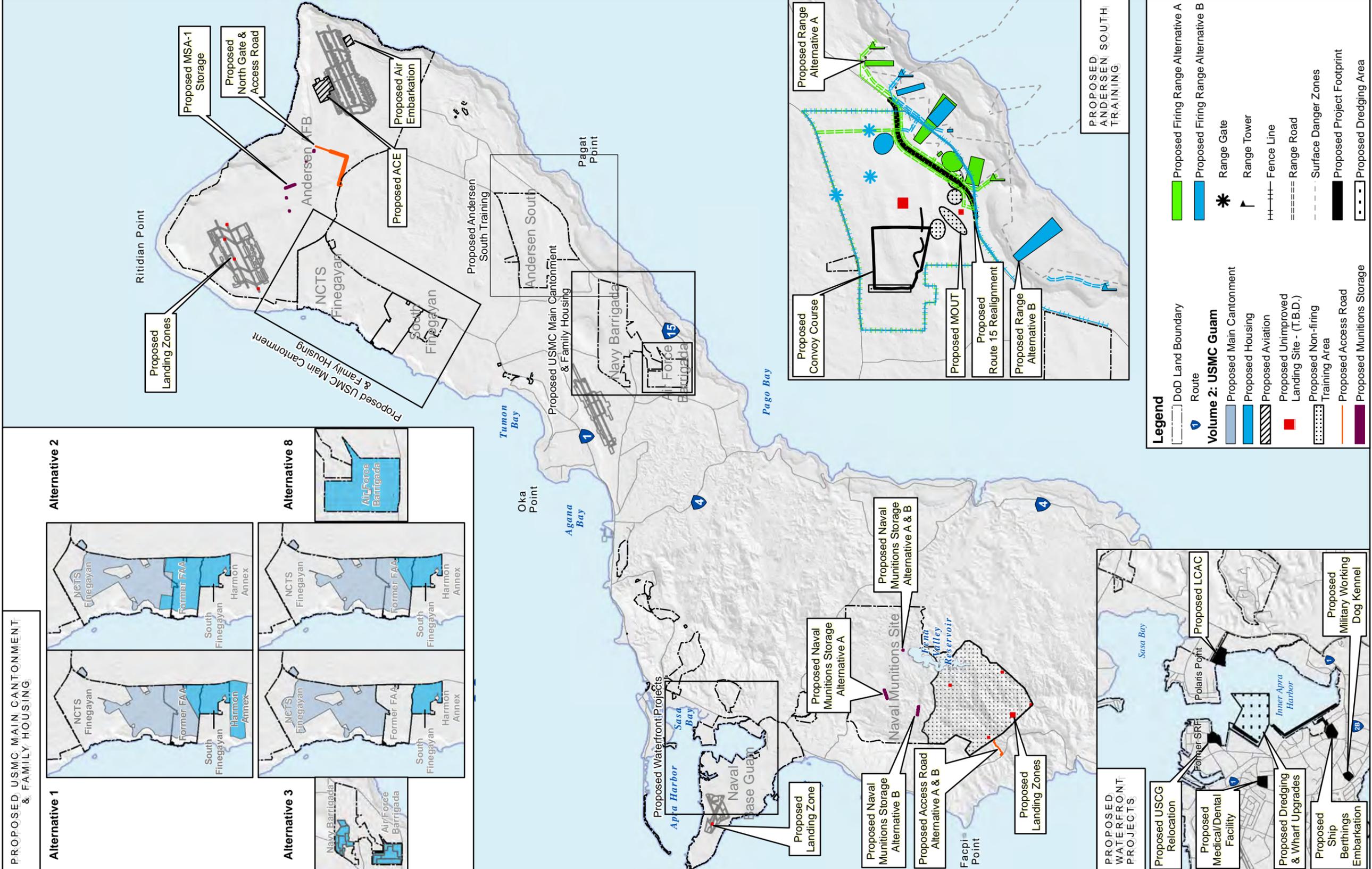


Figure ES-2
Volume 2: Marine Corps Relocation Alternatives (Guam)

LEGEND

Preferred Alternative

PROPOSED ACTION

All decisions also include relocation of 8,600 Marines and 9,000 dependents to Guam

Main Cantonment Area/Housing

• Main Cantonment Area

Training Functions

- Construct High Explosive ECM at NMS High 12 Group Area
- Construct 12 Standard ECM's and Support Facilities at Andersen AFB MSAI
- Air Traffic Control Detachment Training at NWF and North Ramp
- Tactical Air Operations Center at NWF and North Ramp
- Improved Airfield Training at NWF and North Ramp
- Training Range Complex
- NMS Maneuver Area Access Road
- NMS Ammunition Storage
- Construct 12 New Landing Zones at NWF Orote Airfield, Andersen South, and NMS
- Use demolition range at NWF
- Establish Restricted Area Airspace for Machine Gun Range Component of Training Range Complex

Airfield Functions

- Beddown Marine Corps Air Combat Element (ACE) Squadron and Construct Associated Facilities at Andersen AFB North Ramp
- Construct Air Embarkation Facilities at Andersen AFB South Ramp
- Construct North Gate and Access Road, Andersen AFB

Waterfront Functions

- Construct or Improve Required Ship Berths and Embarkation/ Staging Areas at Naval Base Guam
- Relocate Coast Guard Berthing and Crew Support Building at Oscar/Papa Wharves
- Relocate Military Working Dog Kennels, Naval Base Guam
- Construct Apra Medical/Dental Clinic at Naval Base Guam
- Mechanical Dredging in Apra Harbor*
- Dredged Material Management

ALTERNATIVES CARRIED FORWARD
(excludes no-action alternative)

Main Cantonment Area

- 1) One contiguous location from NCTS Finegayan to Harmon Annex, includes South Finegayan; acquire non-DoD lands at the Former FAA parcel and Harmon Annex.
- 2) One contiguous location from NCTS Finegayan to South Finegayan; acquire non-DoD lands at the Former FAA parcel.
- 3) Four non-contiguous areas on DoD properties: cantonment at NCTS Finegayan and South Finegayan; housing at Navy Barrigada and Air Force Barrigada.
- 8) Three non-contiguous areas requiring non-DoD land acquisition. Main Cantonment at NCTS Finegayan; housing at the Former FAA parcel, South Finegayan, and Air Force Barrigada

Training Range Complex

- A) East coast of Guam with land acquisition of 1,090 acres; all ranges would be located east of Andersen South on non-DoD land to the east of Route 15. Requires realignment of 1.7 miles of Route 15.
- B) East coast of Guam with land acquisition of 1,800 acres; no realignment of Route 15.

NMS Access Road

- A) Improve existing Hiking Trail
- B) Use existing Hiking Trail

NMS Ammunition Storage

- A) Parson's Road
- B) High Road Area

Dredged Material Management

- 1) Beneficial Reuse (Priority)
- 2) Ocean Disposal
- 3) Upland Placement

Choose One

Choose One

Choose One

Choose One

Choose Any or All

VOLUME 2:
Marine Corps
Relocation

*Note: Analysis assumed dredging by mechanical means as an environmental maximum potential adverse affect method and is the method historically used at Apra Harbor. Hydraulic dredge may be used in final design and permitting.

Figure ES-2a
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation, Guam

Main Cantonment Alternatives

Eight Main Cantonment alternatives were developed and evaluated. Alternatives 4 through 7 were dismissed from further consideration. Alternatives 1, 2, 3, and 8 were retained for further analysis and are being evaluated for the Main Cantonment and training areas. Figure ES-2a shows the proposed action and the alternatives carried forward for the Marine Corps relocation on Guam.

Table ES-3 provides a summary of information on the needed land for each of the candidate alternatives to meet the requirements of the Main Cantonment. As depicted, the total area needed would be approximately 2,500 acres (ac) (1.012 hectares [ha]). Alternatives 1, 2, and 8 would need both DoD and non-DoD controlled lands. Alternative 3 would be accommodated solely on DoD lands. Each alternative would need DoD lands that are currently designated as Overlay Refuge. The Overlay Refuge is land established by DoD, U.S. Fish and Wildlife Service, and Government of Guam (GovGuam) for the protection of endangered and threatened species and other native flora and fauna, maintenance of native ecosystems, and the conservation of native biological diversity. As noted in Table ES-3, the alternatives under consideration would take from approximately 600 ac (243 ha) to 1,100 ac (445 ha) of Overlay Refuge in the Finegayan area.

Table ES-3. Summary of Parcels for Each Main Cantonment Alternative

Alternative	Total Land (ac/ha)	DoD Lands				Private Lands		Finegayan Overlay Refuge ¹ (ac/ha)
		NCTS Finegayan ¹ ² (ac/ha)	South Finegayan ³ (ac/ha)	Navy Barrigada ² (ac/ha)	Air Force Barrigada ⁴ (ac/ha)	Former FAA ⁵ (ac/ha)	Harmon Land ⁶ (ac/ha)	
1	2,388/966	1,090/441	290/117			680/275	328/133	599/242
2	2,580/1,044	1,610/652	290/117			680/275		1,106/448
3	2,707/1,096	1,610/652	290/117	377/153	430/174			1,106/448
8	2,490/1,008	1,090/441	290/117		430/174	680/275		599/242

Notes: ¹Based on calculations for vegetation cover in Volume 2 Chapter 10.

²Proposed developed area only.

³Assumes entire parcel is developed.

⁴Excludes NEXRAD (weather radar system).

⁵Total acquisition area, including planned open space.

⁶Total acquisition area.

The following provides additional detail about each of the Main Cantonment alternatives.

Alternative 1. Alternative 1 would require land parcels from the Naval Computer Telecommunications Station (NCTS) Finegayan and DoD parcels in South Finegayan as well as acquisition of Federal Aviation Administration (FAA) land, and acquisition of Harmon Annex, for a total of 2,388 ac [966 ha]. Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 29% (599 ac [242 ha]). The Overlay Refuge is managed pursuant to a Memorandum of Agreement with the U.S. Fish and Wildlife Service (DoD 1994). “Overlay Refuge” refers to designated areas on Guam, consistent with the national defense mission of the Navy and Air Force, to be managed for the protection of endangered and threatened species and other native flora and fauna, maintenance of native ecosystems, and the conservation of native biological diversity. The areas were established in cooperation with Guam Department of Agriculture Division of Aquatic and Wildlife Resources.

This alternative is bounded to the north by Andersen Air Force Base (AFB) Northwest Field (NWF) and Route 3; on the west by a cliff line (within DoD property) and the Philippine Sea; on the east by limited residential development; and to the south by the Harmon Village residential area (non-DoD property).

Although DoD property goes down to the waterline, the Main Cantonment area would be situated on the upper area of NCTS Finegayan and would not encroach on the cliff line leading to the ocean.

Alternative 2 (Preferred Alternative). Alternative 2 would include land parcels from NCTS Finegayan, South Finegayan, and acquisition of FAA land, for a total of 2,580 ac [1,044 ha]. Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 53% (1,106 ac [448 ha]). Under Alternative 2, the Main Cantonment area would also be configured such that all facilities would be on one contiguous parcel of land, including the family housing area.

The site of Alternative 2 is bounded on the north by Andersen AFB NWF, and by Route 3; on the west by a cliff line (within DoD property) and the Philippine Sea; on the east by a limited residential development; and to the south by the Harmon Village residential area (non-DoD property).

Alternative 3. Alternative 3 would include land parcels from NCTS Finegayan, South Finegayan, and portions of the military housing and quality of life (QOL) services at Air Force and Navy Barrigada, for a total of 2,707 ac (1,096 ha). Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 53% (1,106 ac [448 ha]). Under this alternative, the Main Cantonment area would be configured such that the housing would be located non-contiguous to the Main Cantonment.

This configuration of the Main Cantonment area is bounded on the north by Andersen AFB, on the west by a cliff line and the Philippine Sea, by Route 3 and limited residential development to the east, and by the former FAA area to the south. South Finegayan would be used for housing; it is located south of the former FAA area. Navy and Air Force Barrigada are located on the eastern side of Guam, approximately 9 miles (mi) (14 km) from the Main Cantonment under this alternative. Navy and Air Force Barrigada have Route 15 bordering the site to the east, and Routes 10 and 16 bordering the site to the west. Navy Barrigada is largely used to support DoD communication high frequency transmitting activities. Headquarter facilities for the Guam Army National Guard are located adjacent to Navy land at Barrigada. Navy Barrigada is 1,418 ac (574 ha), and of that 250 ac (101 ha) are available for development. The Air Force Barrigada property is a 433 ac (175 ha) parcel that is used by the Air Force to accommodate the NEXRAD weather satellite receiver. It has been estimated that 400 ac (162 ha) of this parcel is available for development. Navy Barrigada and Air Force Barrigada are currently connected by the existing Navy Golf Course. The golf courses would need to be removed if it was determined that the two parcels should be connected.

Alternative 8. Alternative 8 would include parcels from NCTS Finegayan, acquisition of the FAA parcel (680 ac [275 ha]), South Finegayan, and portions of military housing and QOL services at Air Force Barrigada, for a total of 2,490 ac (1,008 ha). Of the total Overlay Refuge (2,095 ac [848 ha]) in the Finegayan area, this alternative would develop approximately 29% (599 ac [242 ha]). In Alternative 8, as with Alternative 3, a portion of the housing would be located non-contiguous to the Main Cantonment.

Airfield Alternatives. Four sites on Guam were analyzed for the Marine Corps airfield functions: Andersen AFB North Ramp, Won Pat International Airport, Orote Airfield at Naval Base Guam, and NWF at Andersen AFB. Suitability criteria included: land availability, operational capability, training capability, encroachment, anti-terrorism/force protection, and compliance with military vision. Feasibility was a qualitative assessment of compatibility with future missions, environmental considerations (including cultural and historical significance), and anticipated public concerns.

Based on existing land availability and Air Force operations, the only reasonable alternative for the air combat element airfield functions was Andersen AFB North Ramp. An area on South Ramp is the only

reasonable alternative for an air embarkation facility. It would be co-located with the Air Force air embarkation facility.

Waterfront Alternatives. The only reasonable alternative for the waterfront functions was Apra Harbor. Inner Apra Harbor has existing wharf infrastructure that would be improved to support the Marine Corps waterfront functions. Administrative and operational facilities would be constructed in addition to the wharf upgrades. Based on existing land availability and Navy operations, there was only one alternative within Apra Harbor for these Marine Corps facilities. An embarkation and staging area, including a port support buildings and an area for equipment cleaning and inspections related to bio-hazard and customs requirements, would be created.

Other projects proposed for the Apra Harbor Navy Base to support the Marine Corps include a new medical/dental clinic to replace the existing clinic, and relocation of the Military Working Dog Kennel and a portion of the U.S. Coast Guard facilities (ship berthing and crew support building). These proposed projects are depicted in Figure ES-2.

Training Range Complex Alternatives. There was an extensive screening analysis for firing ranges and non-firing training ranges that examined various geographic alternatives on Guam. Based on the analysis, the only geographic alternative that met the purpose and need was a combined firing and non-firing range complex located on the east coast of Guam. Andersen South would continue to be the non-firing training location and adjacent land east of Andersen South would be acquired to site new firing ranges. The SDZs would extend over the ocean.

There are two alternatives for the training ranges on the east coast. Range Alternative A would require the realignment of approximately 1.7 mi (2.8 km) of Route 15 to the interior of the existing Andersen South parcel. The total land area, not including submerged lands, is estimated at 1,090 ac (441 ha).

Range Alternative B would not require realignment of Route 15 and would require more land (1,800 ac [728 ha]) than Alternative A. These alternatives are depicted in Figure ES-2.

Land acquisition would be required for control of lands associated with the SDZs east of Route 15.

During live-fire training activities, there is a potential hazard to military and civilian aircraft. Therefore, Special Use Airspace is proposed that would cover firing ranges. The SUA would consist of a proposed restricted area (to be called R-7202) to accommodate vertical hazards associated with direct fire weapons. R-7202 would be from the surface up to 3,000 feet above mean sea level. The FAA would be notified of scheduling training periods, and would issue a Notice to Airmen prior to scheduled use of the R-7202.

The training ranges represent the largest development projects for the training function; however, there are other smaller projects not described in this Executive Summary, e.g., ammunition storage and an access road for the Naval Munitions Site.

Development of Future Training Ranges. All Marine units, to include those relocating from Okinawa to Guam, are required to complete core competency Marine Air Ground Task Force (MAGTF) training to ensure that forward deployed Marines sustain operational readiness in core competencies to meet all readiness requirements and are able to support operational requirements assigned by the Combatant Commander. This level of training involves integration of ground, aviation, and logistics elements under a common command element in preparation for large scale combat operations, which is beyond individual live-fire qualification and requalification training which would be conducted on training ranges being constructed on Guam and Tinian. The training ranges currently planned for Guam and Tinian only replicate existing individual-skills training capabilities on Okinawa and do not provide for all requisite

collective, combined arms, live and maneuver training the Marine Corps forces must meet to sustain core competencies. As with Marine Corps forces currently in Okinawa who must now travel to mainland Japan, other partner nations and the U.S. to accomplish this requisite core competency training, the Marine Corps forces relocating from Okinawa to Guam would also have to use alternate locations to accomplish requisite core competency training.

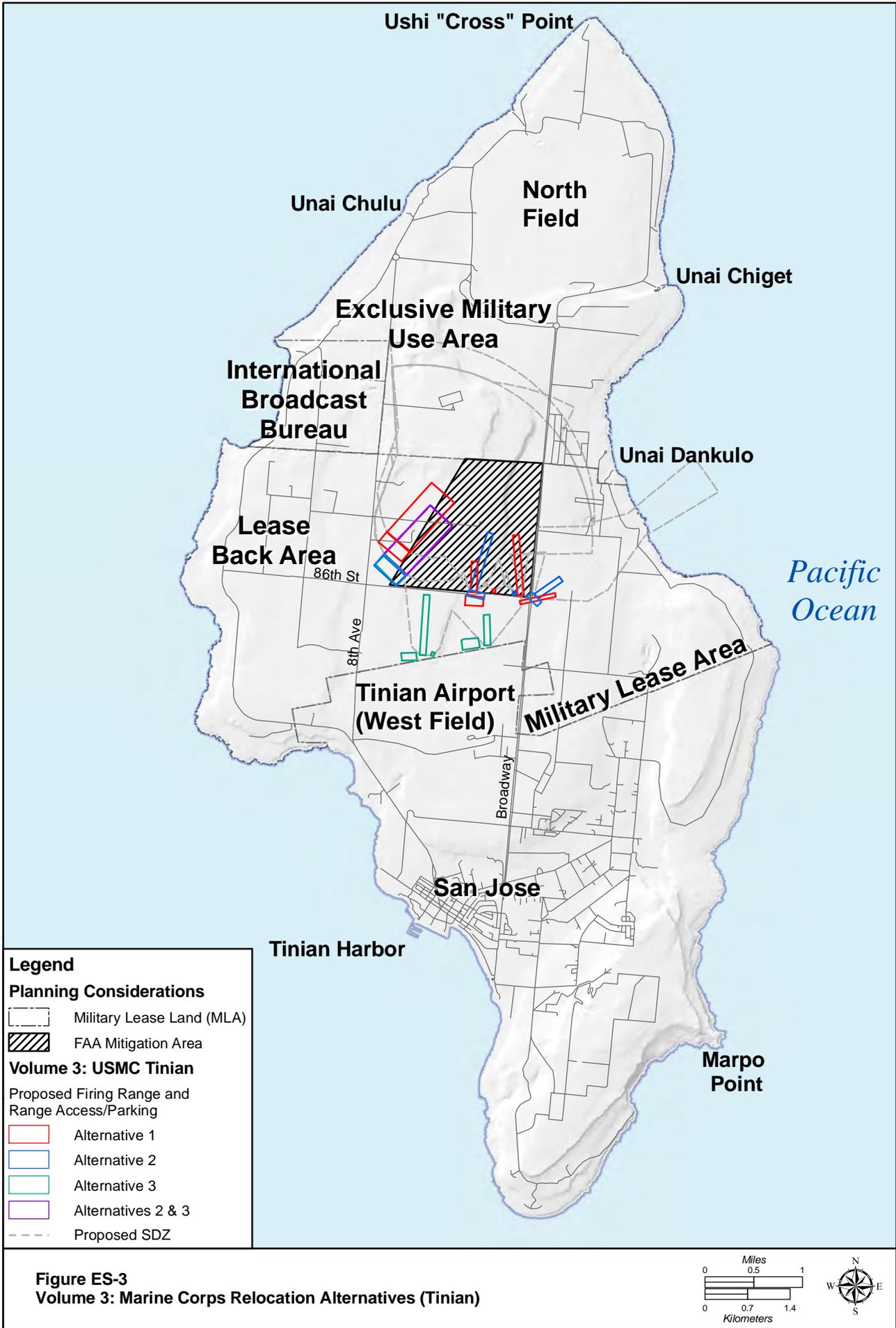
The Marine Corps ultimately desires to conduct core competency training in areas that limit the time Marines must travel to train and thereby reduce operational non-availability. There is an ongoing need to reassess current training locations and to develop additional training capacity for higher level integrated core competency training in the Western Pacific. Future joint training needs, to include Marine Corps training and the suitability of the CNMI to meet these future requirements, were evaluated during the 2010 QDR process.

To the extent that the QDR process or analyses result in recommendations and proposals subject to NEPA or EO 12114, the DoD will conduct additional NEPA/EO 12114 analysis as necessary prior to implementation. Such proposals, and any associated NEPA/EO 12114 analysis, are separate and distinct from the ongoing proposed relocation of Marine Corps forces from Okinawa to Guam and have independent utility from the proposed relocation. Further, such actions are not connected to the relocation of Marine Corps forces from Okinawa to Guam.

Marine Corps Relocation – Training on Tinian (Volume 3)

Training operations proposed on Tinian would support individual up to company level sustainment training for the relocated Marines. Sustainment training is training that enables Marine Corps forces to maintain combat readiness. The training that would take place on Tinian is essential to sustaining combat readiness of Guam-based Marines. The proposed Tinian ranges would provide a training capability not available on Guam. They would enable tactical scenarios training in combination with the battalion landing and maneuver exercises, and other larger unit training.

Tinian was considered for maximum utilization because Guam and Tinian possess the most available DoD properties for exclusive military use within the Marianas. The DoD leases the Military Lease Area (MLA) from the CNMI. The MLA 15,353 ac (6,213 ha) covers the northern portion of Tinian. Training on Tinian is conducted on two parcels within the MLA: the Exclusive Military Use Area (EMUA) encompassing 7,574 ac (3,065 ha) on the northern third of Tinian, and the Leaseback Area (LBA) encompassing 7,779 ac (3,148 ha) on the middle third of Tinian. Company and battalion level non-live-fire training areas already exist on these lease parcels; however, the land could be developed to accommodate live-fire ranges. The training requirements analysis resulted in the alternatives graphically depicted in Figure ES-3. Figure ES-3a shows the proposed action and alternatives carried forward for Marine Corps training on Tinian.



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LEGEND
Preferred Alternative

PROPOSED ACTION

Live-Fire Training Ranges
(All within the Military Lease Area)

- Rifle Known Distance Range (KD)
- Automated Combat Pisto//Military Police Firearm Qualification Course (Pisto//MP)
- Platoon Battle Course (Platoon)
- Field Firing Range (Field)
- Surface Danger Zones (SDZs)

Airspace Use

- The vertical hazard area associated with the proposed firing ranges would be managed to ensure threat aircraft could safely operate in airspace overlying the proposed firing ranges.

**VOLUME 3:
Training on Tinian**

Choose One

ALTERNATIVES CARRIED FORWARD
(excludes no-action alternative)

Alternative 1

- KD – alignment north/northeast
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – none over ocean or south of 86th Street

Alternative 2

- KD – alignment north/northeast
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – one over ocean, none south of 86th Street

Alternative 3

- KD – alignment north
- Pisto//MP – alignment north
- Platoon – alignment northeast
- Field – alignment north
- SDZs – none over ocean, some south of 86th Street

Figure ES-3a
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation – Training, Tinian

Alternative 1 (Preferred Alternative)

This alternative includes development of four live-fire training ranges within the LBA on the island of Tinian. The analysis for range locations would be based upon lands identified as “preferred for development” or “less preferred for development” by virtue of the potential presence of archaeological, historical, or ecologically important resources. The Rifle Known Distance (KD) Range, the Automated Combat Pistol/Military Police Firearms Qualification Course, and Field Firing Range are located along 86th Street and west of Broadway. All three are generally aligned to the north. The Platoon Battle Course is located northwest of the other ranges and is generally aligned toward the northeast. All four range footprints partially overlay the FAA Mitigation Area. The associated notional SDZs for these ranges would overlap to a large extent. They would extend over the FAA Mitigation Area, DoD “No Wildlife Disturbance” Mount Lasso escarpment area, and a segment of Broadway. No SDZs would extend beyond land and into the ocean.

Alternative 2

Under the Range Training Area Alternative 2, no ranges would be located south of 86th Street. Compared to Alternative 1, there would be more range footprint encroachment on the FAA Mitigation Area. The Platoon Battle Course would be located south of its Alternative 1 location. The orientation would be aligned toward the northeast, similar to Alternative 1. The Field Firing Range would be located east of Broadway and oriented to the northeast with the SDZ extending over the ocean.

Alternative 3

Alternative 3 configuration is notably different from Alternatives 1 and 2 due to three of the ranges being sited south of 86th Street and north of West Field. These three ranges are the Field Firing Range, Automated Combat Pistol/Military Police Firearms Qualification Course, and the Rifle KD Range. All three ranges are sited along the southern MLA boundary and aligned generally to the north. None of these range footprints is within the FAA Mitigation Area. None of the SDZs under Alternative 3 extend into the ocean.

Aircraft Carrier Berthing (Volume 4)

The analysis and selection of reasonable alternatives for a new deep-draft wharf for transient carrier visits were based on consideration of the following criteria:

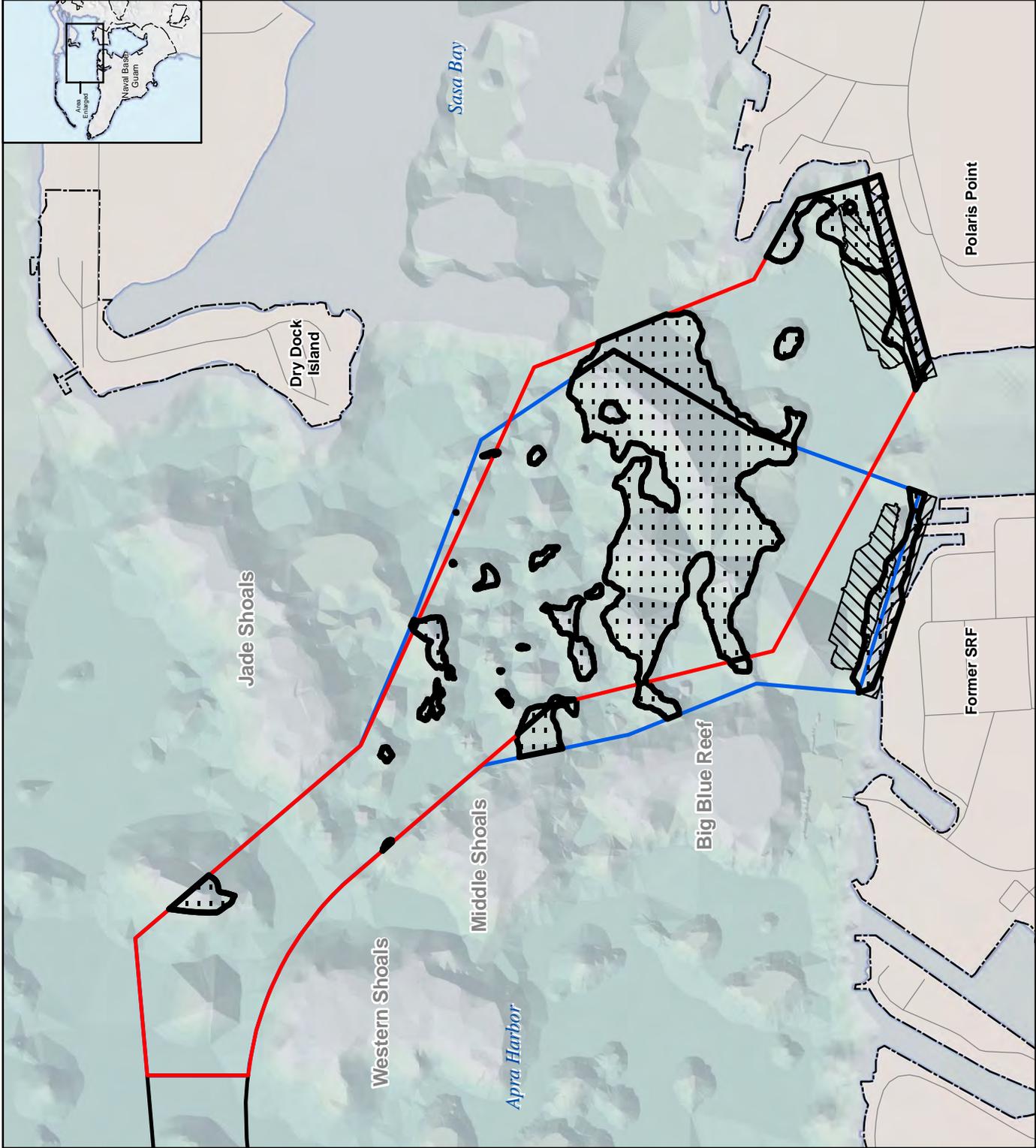
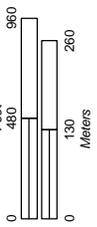
- Practicability (with subcriteria)
 - Meets security/force protection requirements
 - Meets operational/navigational characteristics
 - Available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purpose
- Avoids/Minimizes environmental impacts to the extent practicable

The two alternatives being evaluated for the deep draft aircraft carrier wharf with shoreside infrastructure improvements are depicted in Figure ES-4: Polaris Point (Alternative 1) (Preferred Alternative) and Former Ship Repair Facility (SRF) (Alternative 2). Figure ES-4a shows the proposed action and alternatives carried forward for the Navy aircraft carrier berthing.

Figure ES-4

Volume 4: Aircraft Carrier Berthing Alternatives

- Legend**
-  Military Installation
 -  Proposed Dredge Area
 - Aircraft Carrier Proposed Alternatives**
 -  Alternative 1 - Polaris Point
 -  Alternative 2 - Former SRF
 -  Proposed Harbor Area
 -  Proposed Aircraft Carrier Footprint



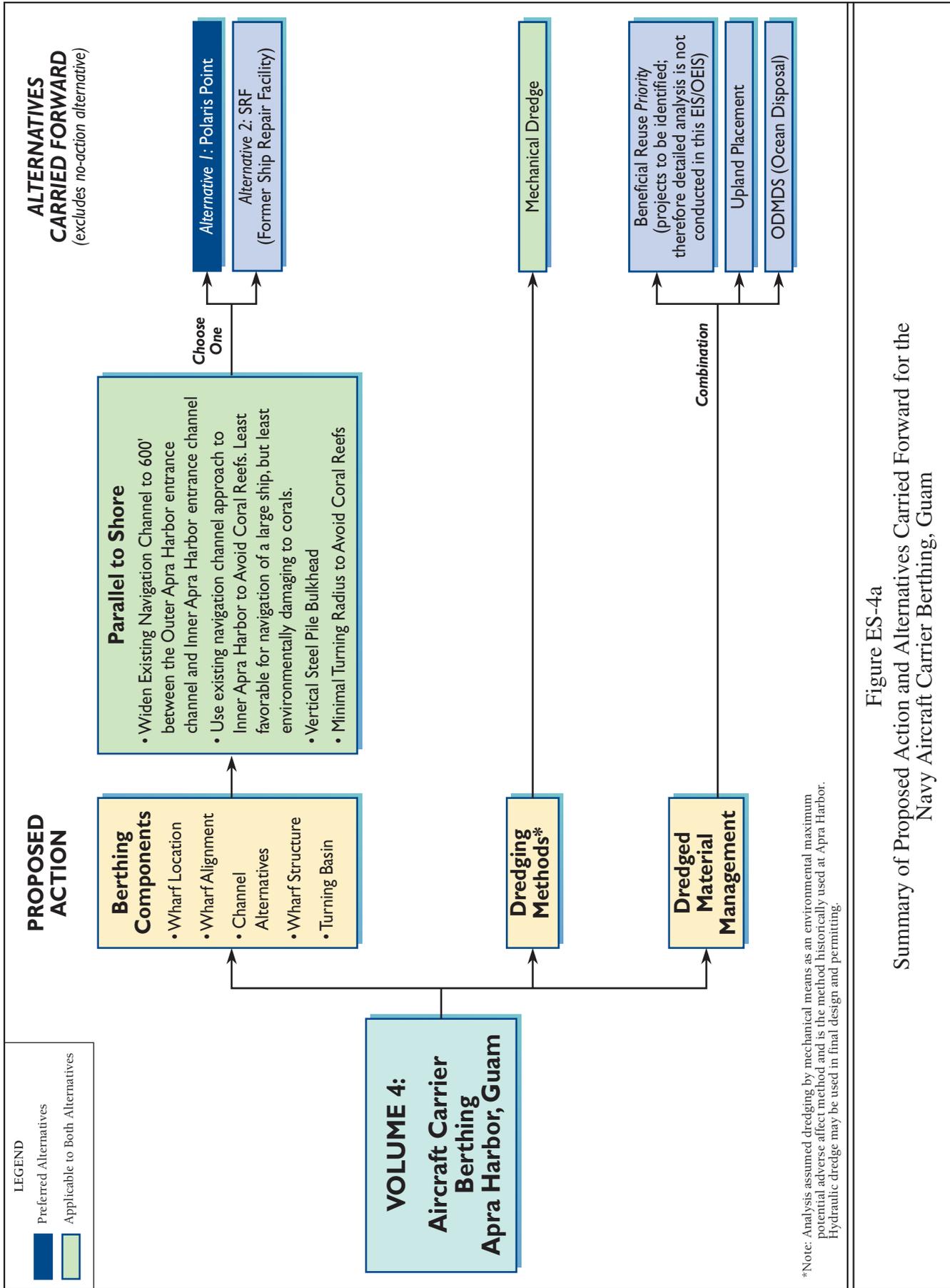


Figure ES-4a
Summary of Proposed Action and Alternatives Carried Forward for the Navy Aircraft Carrier Berthing, Guam

The wharf alternatives are located on either side of the entrance to the Inner Apra Harbor channel. Each shares the same navigational approach through Outer Apra Harbor. The aircraft carrier would come through Outer Apra Harbor using the minimum power required to achieve forward motion and assisted by tugboats to provide lateral guidance. Ship navigation into the new berth would require a turning basin in front of the wharf. The turning basin for either alternative are similarly aligned.

Alternative 1 (Polaris Point) (Preferred Alternative)

This alternative would construct a new deep-draft wharf at Polaris Point with shoreside infrastructure improvements. For both alternatives, the existing Outer Apra Harbor Channel would be widened to 600 feet (ft) (183 meters [m]) with minor adjustments to centerline and navigational aids. No dredging would be required to widen the Outer Apra Harbor east-west portion of the navigation channel. There is a sharp southward bend in the existing channel toward Inner Apra Harbor that would require widening to 600 ft (183 m) and dredging to meet aircraft carrier requirements. A new ship turning basin would be established and would require dredging to -49.5 ft (-15 m) Mean Lower Low Water plus 2 ft (0.6 m) overdraft. The turning basin would be located near the wharf and north of the Inner Apra Harbor entrance channel.

The shoreside utility and operational support requirements would be the same. It is anticipated that a transient aircraft carrier and its escort ships would rely on shoreside utility infrastructure for water, wastewater, and solid waste after 2015. Electric power would be provided in accordance with customer service agreements (CSA) between Guam Power Authority (GPA) and the U.S. Navy. Any GPA commitments for additional power to support the aircraft carrier and its escort ships will be determined by future CSA modifications. Any required changes in the shoreside power infrastructure or their operations to meet the requirements for the aircraft carrier and its escort ships may require additional NEPA review. A new Port Operations support building and various utility buildings would be constructed on a staging area at the wharf. There would be an area established for Morale, Welfare, and Recreation activities and vehicle parking. The aircraft carrier would be assisted by tug boats, pivoted within the minimum radius turning basin to be aligned starboard (i.e., right side when facing the front or “bow” of the ship) to the wharf and the bow would be facing east. On departure, the aircraft carrier would follow the same route.

Alternative 2 (Former SRF)

This alternative would have the aircraft carrier berthing at the Former SRF. The Outer Apra Harbor channel improvements would be as described in Alternative 1. The turning basin location would be similar to Alternative 1, with a slight shift to the west. Unlike Alternative 1, the full 600-ft (183-m) approach distance in front of the wharf would be accommodated. The aircraft carrier would be pivoted within the minimum radius turning basin to be aligned starboard to the wharf and the bow would be facing east. On departure, the aircraft carrier would follow the same route with assistance by tugs. Both alternatives are on Navy submerged lands and affect manmade coastlines. They have the same security/force protection requirements and satisfactorily meet those requirements.

Army Air and Missile Defense Task Force (Volume 5)

The Navy and Army identified three action alternatives for the proposed AMDTF facilities and operations on Guam and three action alternatives for munitions storage. All action alternatives have been evaluated to ensure they satisfy the stated purpose and need for the proposed AMDTF action. Alternatives being evaluated for the Army AMDTF are graphically shown in Figure ES-5. Figure ES-5a shows the proposed action and alternatives carried forward for the AMDTF. Weapons platform siting is classified and is assessed in Classified Appendix L to this public Final EIS.

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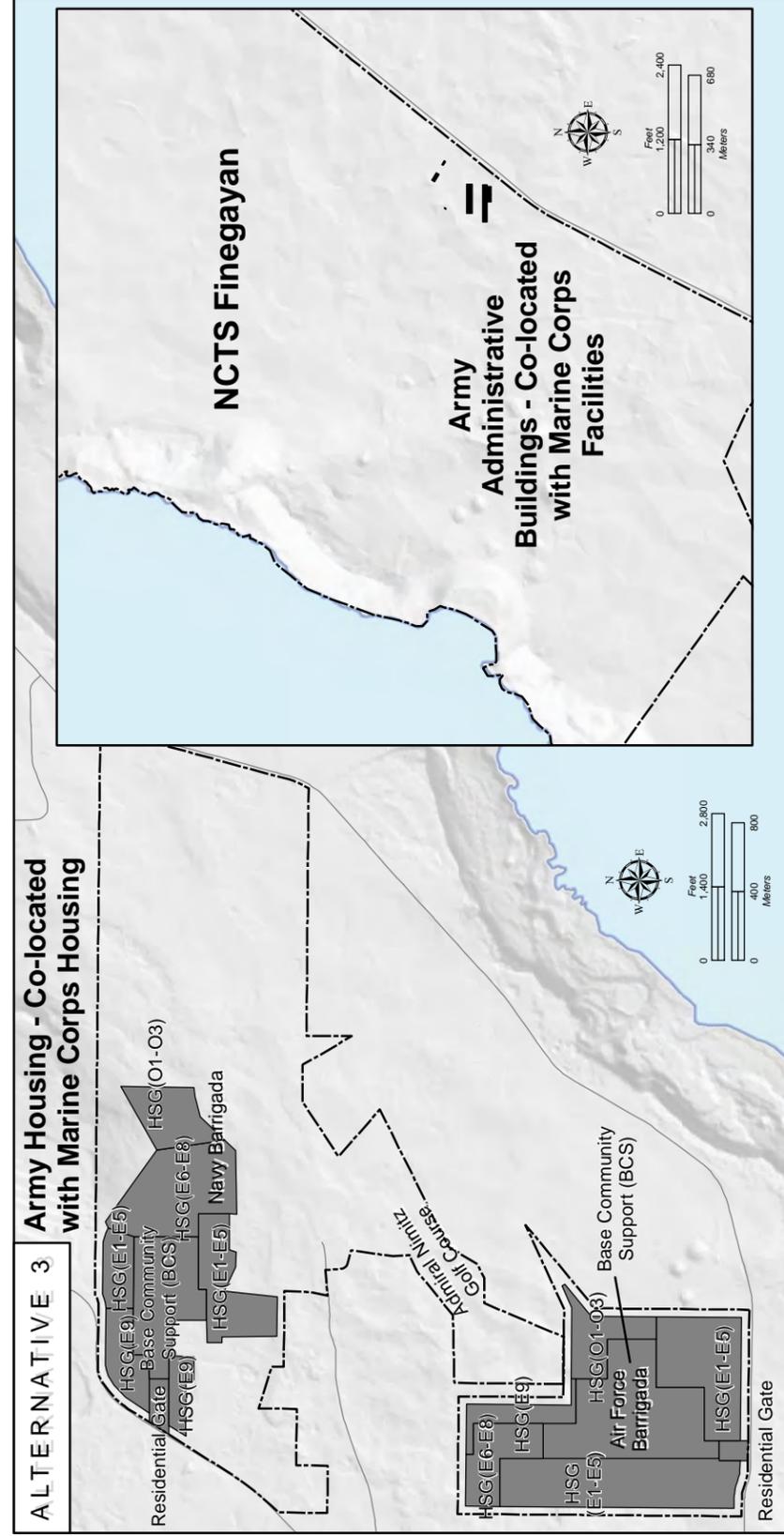
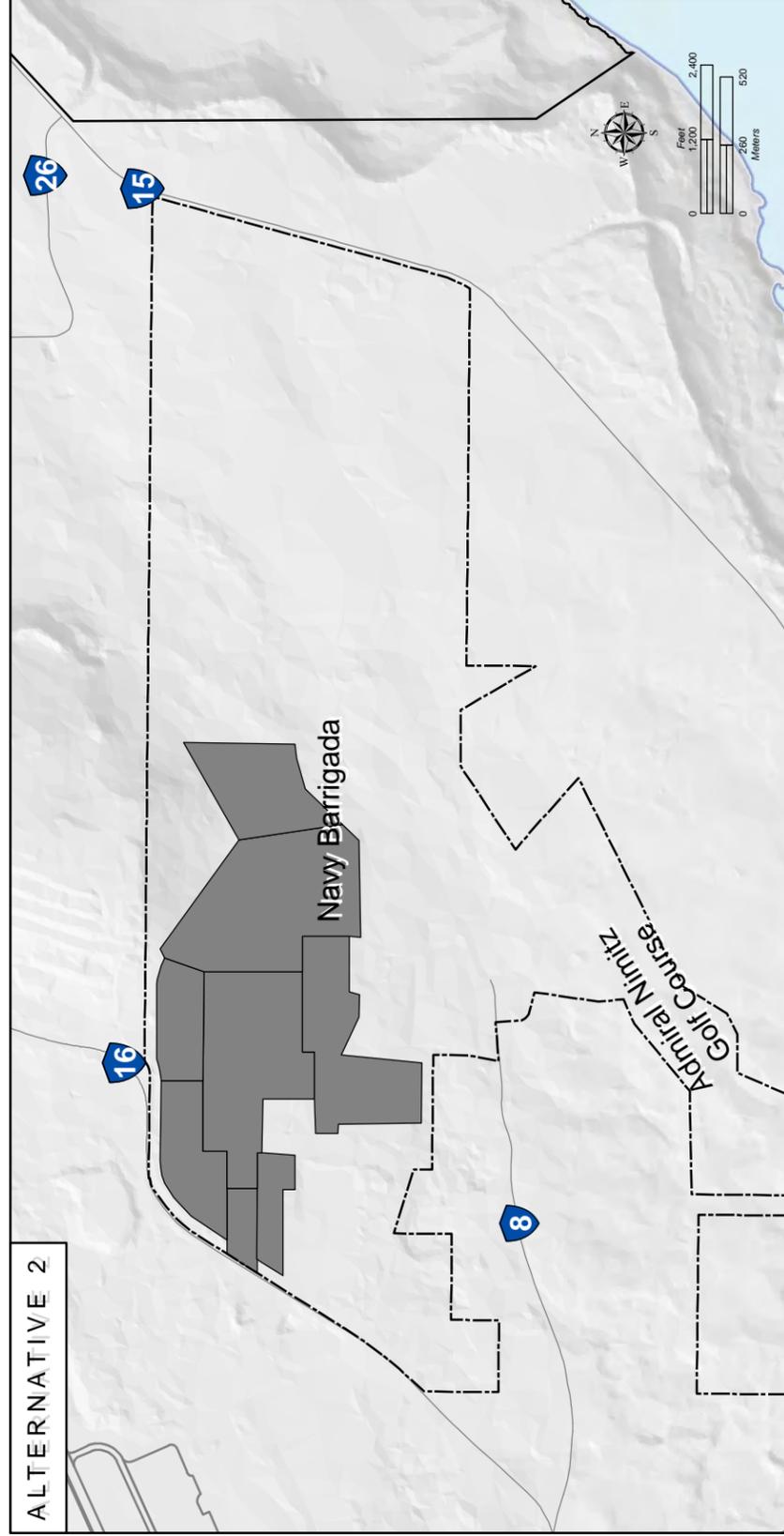
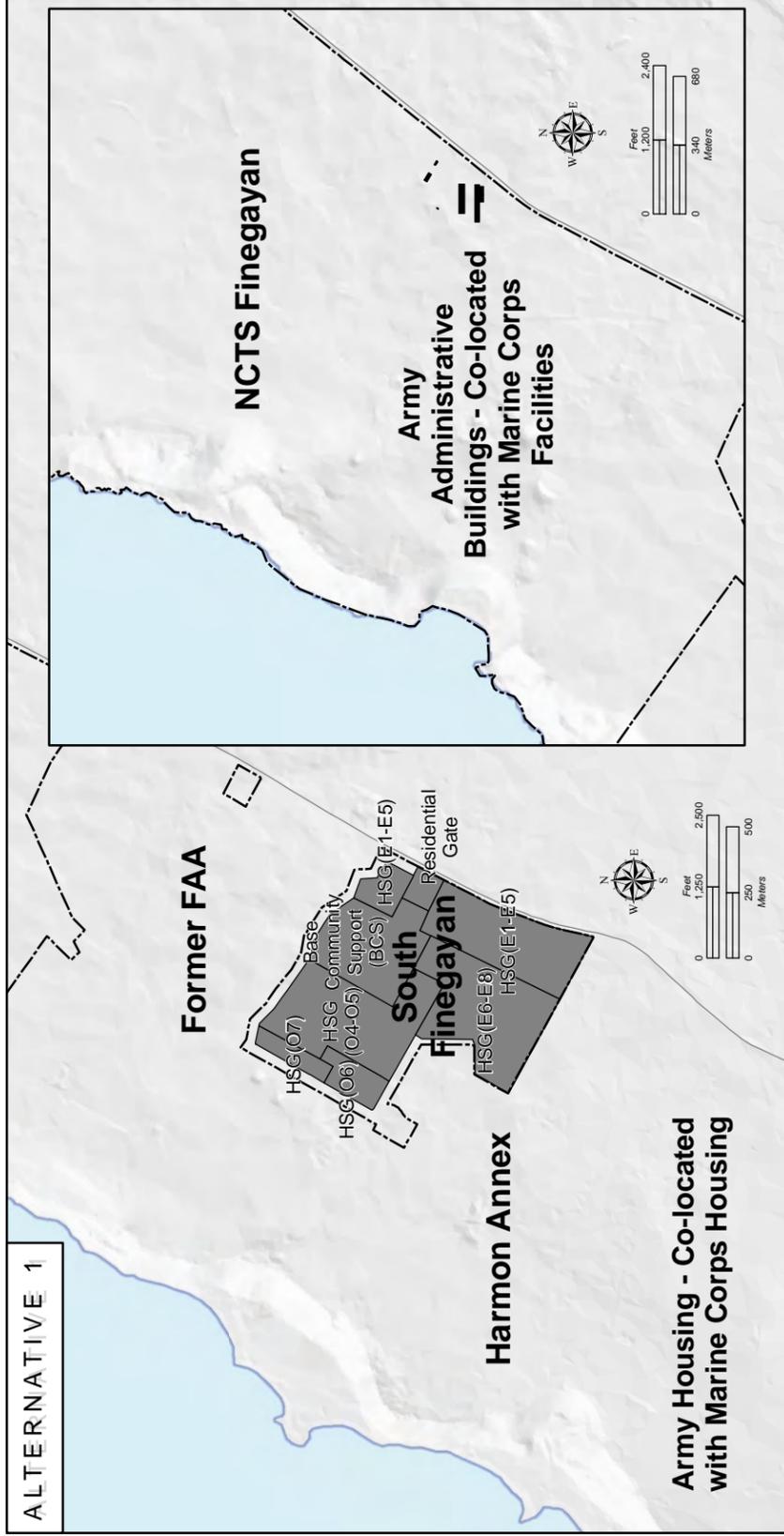


Figure ES-5
Volume 5: Army AMDTF Alternatives

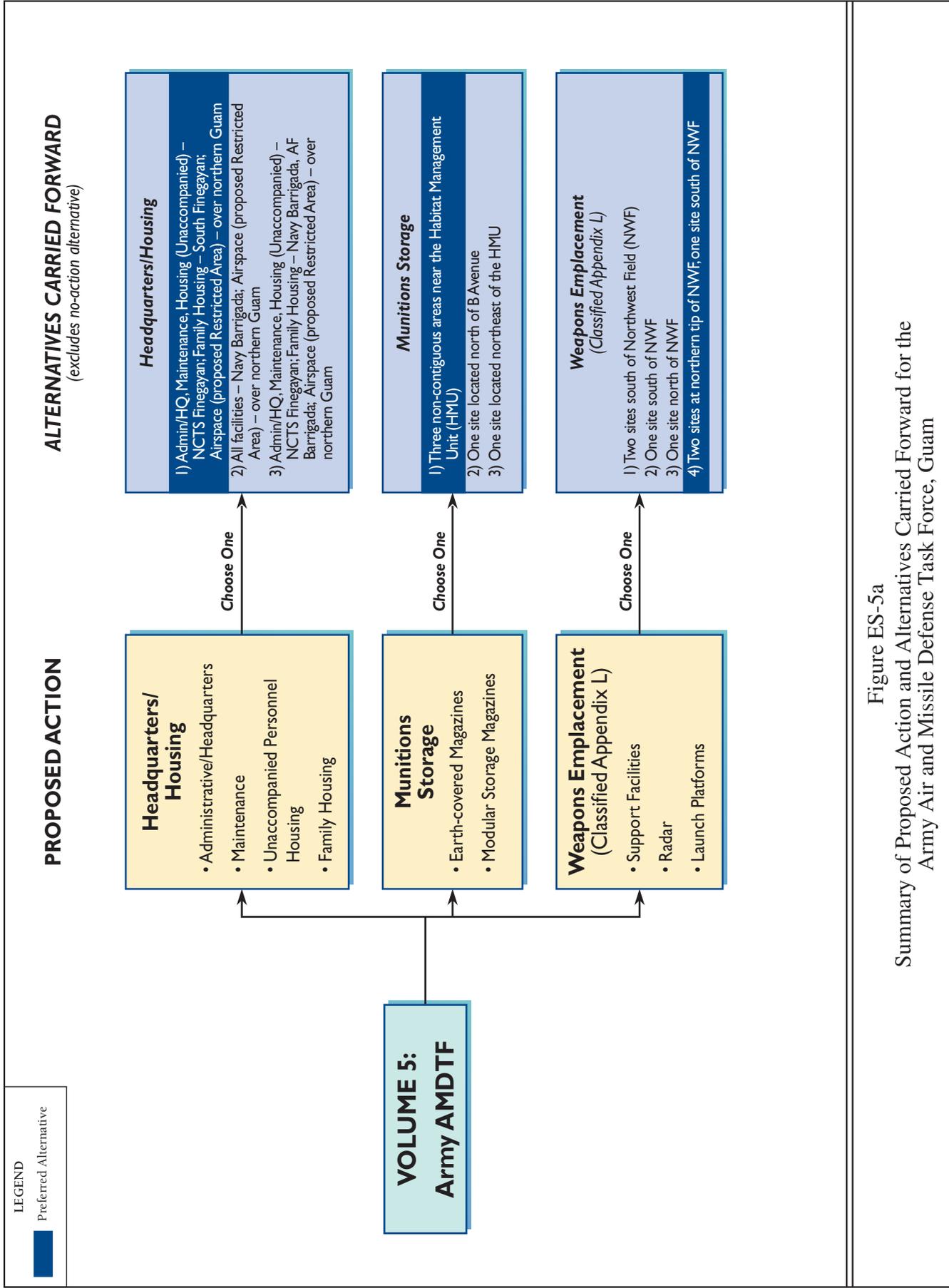


Figure ES-5a
Summary of Proposed Action and Alternatives Carried Forward for the Army Air and Missile Defense Task Force, Guam

Headquarters/Housing Alternative 1 (Preferred Alternative)

This alternative would co-locate Army AMDTF support facilities with the proposed Marine Corps units at Finegayan. The Administration/headquarters (HQ) and Maintenance operations would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed Marine Corps land uses. Housing facilities for unaccompanied personnel 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 QOL facilities would be co-located within and adjacent to the housing areas.

Headquarters/Housing Alternative 2

This alternative has the Army AMDTF support facilities located at Navy Barrigada. The Administration/HQ and Maintenance element would be located within Navy Barrigada adjacent to the NCTS antenna farms. Accompanied and unaccompanied housing facilities would be located within Navy Barrigada.

Headquarters/Housing Alternative 3

This alternative would co-locate Army AMDTF with the proposed Marine Corps units at Finegayan. The Administration/HQ, Maintenance, and unaccompanied housing would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed Marine Corps land uses. Accompanied housing facilities would be co-located with Marine Corps housing within Navy Barrigada and Air Force Barrigada. Recreational and QOL facilities would be included in the housing areas.

Munitions Storage Alternatives

Munitions Storage Alternative 1 (Preferred Alternative). Munitions storage would be in three non-contiguous areas near the Habitat Management Unit (HMU) at Munitions Storage Area (MSA) 1 at Andersen AFB. The proposed magazines would be constructed at these two sites (requiring demolition) and at a third site located east of the HMU across an unnamed roadway. The area of ground disturbance including a buffer is estimated to be 6.2 ac (2.5 ha). The existing Explosive Safety Quantity-Distance (ESQD) arc(s) at MSA 1 would be expanded approximately 400 ft (122 m) to the north to provide the required safety distances for the new munitions storage facilities.

Munitions Storage Alternative 2. Munitions storage magazines would be consolidated at one site that is located north of B Avenue at MSA 1. The area of ground disturbance including a buffer is estimated 2.3 ac (0.9 ha). The existing ESQD arc(s) at MSA 1 would be expanded approximately 1,100 ft (330 m) to the north to provide the required safety distances for the new munitions storage facilities.

Munitions Storage Alternative 3. Munitions storage magazines would be consolidated at a site located northeast of the HMU and an unnamed road at MSA 1. The area of ground disturbance including a buffer is estimated 2.3 ac (0.9 ha). The existing ESQD arc(s) at MSA 1 would be expanded approximately 200 ft (60 m) to the south to provide the required safety distances for the new munitions storage facilities.

Weapons Emplacement Alternatives (Analysis in Classified Appendix)

There are four alternatives for weapons emplacement sites near NWF at Andersen AFB for the weapons emplacement sites. The general areas of the proposed weapons emplacement sites are not classified, but the proposed configurations within the areas are classified. The alternatives are:

- 1) Two sites south of NWF
- 2) One site south of NWF

- 3) One site north of NWF
- 4) Two sites at the northern tip of NWF and one site south of NWF

Detailed information on the weapons emplacements is contained in a Classified Appendix (Appendix L).

Airspace

During Terminal High-Altitude Area Defense (THAAD) radar operations, there is a potential hazard to military and civilian aircraft. Therefore, proposed SUA would be located along and off the northwest coast of Guam. The SUA would consist of a proposed restricted area (to be called R-7205) to accommodate hazards associated with THAAD radar operations. R-7205 would be from the surface up to 22,000 ft (6,700 m) above mean sea level (Flight Level 220) and would be activated based on FAA approved airspace periods required for system maintenance, training, certification, and contingency operations. Planned preventive maintenance would require a minimum continuous period of 45 minutes daily Monday-Friday. Training and certification periods would be processed to the FAA for approval to use the R-7205 airspace. The FAA would issue a Notice to Airmen prior to scheduled use of the airspace.

Utilities and Roadway Projects – Guam (Volume 6)

The activities related to the Marine Corps relocation to Guam increase demand on existing utilities and roadway infrastructure. In addition to Marine Corps personnel there would be a temporary surge in construction personnel and construction activities. This Final EIS analyzes the related actions and presents alternatives to reduce the effects of the increased population. It must be understood that utility and roadway alternatives are tied to the alternatives for the main NEPA actions: the Marine Corps Relocation, the Marine Corps Relocation CNMI, the Aircraft Carrier Berthing, and the Army Air & Missile Defense Task Force. The utility and roadway alternatives are evaluated as options for the best approach considering their impacts to the various resource categories, but are not independent alternatives in and of themselves. Since the utilities are related actions, the “no-action” alternative is not really pertinent to their analyses and presentation. Thus, in Volume 6, “no action” is not evaluated for utilities. However, Chapters 3 and 4, Affected Environment, characterize the existing utility and roadway conditions that would likely continue in the absence of the proposed Marine Corps, Navy and Army actions.

The alternatives presented may be either basic alternatives to meet both immediate and long-term needs; or long-term alternatives that would meet needs beyond the temporary surge of the proposed relocation. In addition, while basic alternatives are addressed with known or project-specific information, long-term alternatives are dealt with more generally. This approach anticipates that long-term alternatives may not be implemented in time to accommodate the Marine Corps relocation schedule. However, basic alternatives would be initiated after signature of the Record of Decision and completed soon enough to support the DoD relocation.

The Navy prepared a Sustainability Summary Report as part of the master planning process (NAVFAC Pacific 2010a). This report is included in Appendix N and summarized in Volume 8 of the EIS. The foundations of the Sustainability Program are the federal mandates and targets related to energy, water, transportation, green building/Leadership in Energy and Environmental Design (LEED) and greenhouse gas emissions. Each primary system – water, energy (building, district, renewable and public realm), green building/LEED, transportation, and ecosystem services – was optimized to achieve the maximum environmental benefit in the most cost-effective manner. By applying the Sustainability Program that meets the federal mandates, the baseline program achieves the following improvements: 30% energy use reduction, 26% water use reduction, 30% reduction of petroleum use in fleet vehicles, 7.5% of total

energy from renewable sources, and 7.6% reduction of vehicle miles traveled, as well as a target of 34% reduction in greenhouse gas emissions. These reductions are applied to the analysis presented in Volume 6 of the EIS.

Alternatives being evaluated for the related actions are listed below and shown in Figure ES-6. Figure ES-6a shows the proposed action and alternatives carried forward for utilities on Guam.

Power

Basic Alternative 1 (Preferred Alternative). Basic Alternative 1 would recondition up to five existing combustion turbines to provide peaking power/reserve capacity and upgrade transmission and distribution (T&D) systems. This effort would not require new construction or enlargement of the existing footprint of the facility. This work would be undertaken by GPA on its existing permitted facilities. Reconditioning would be made to existing permitted facilities at the Marbo, Yigo, Dededo (2 units), and Macheche combustion turbines. These combustion turbines are not currently being used up to permit limits. T&D system upgrades would be on existing above ground and underground transmission lines. This alternative supports Main Cantonment Alternatives 1 and 2. Main Cantonment Alternatives 3 and 8 would require additional upgrades to the T&D system.

The other power alternatives presented in the DEIS were deemed unnecessary after the reevaluation of current power demand on the GPA system and estimated increases in power demand from the proposed DoD relocation.

Potable Water

Basic Alternative 1 (Preferred Alternative). Basic Alternative 1 would provide additional water capacity of 11.3 million gallons per day (MGd), which is anticipated to be met by an estimated 22 new wells at Andersen AFB, rehabilitation of existing wells, interconnect with the Guam Waterworks Authority (GWA) water system, and associated treatment, storage and distribution systems. Two new 2.5 million gallon (MG) (9.5 million liter [MI]) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 MI) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Basic Alternative 2. Basic Alternative 2 would provide additional water capacity of 11.7 MGd, which is anticipated to be met by an estimated 20 new wells at Andersen AFB and 11 new wells at Air Force Barrigada, rehabilitation of existing wells, interconnect with the GWA water system, and associated treatment, storage and distribution systems. Two new 1.8 MG (6.8 MI) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 MI) water storage tank would be constructed at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 MI) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

Long-Term Alternative 1. Develop Lost River by constructing a retention dam and pumping facilities to pump excess water from Lost River to either Fena Reservoir or the pumphouse at the Reservoir that pumps water to the Navy water treatment plant.

Long-Term Alternative 2. Install brackish water supply wells, a desalination plant, and facilities to handle brine production. Additional storage and distribution facilities would be required.

Long-Term Alternative 3. Dredge Fena Reservoir to increase storage capacity.

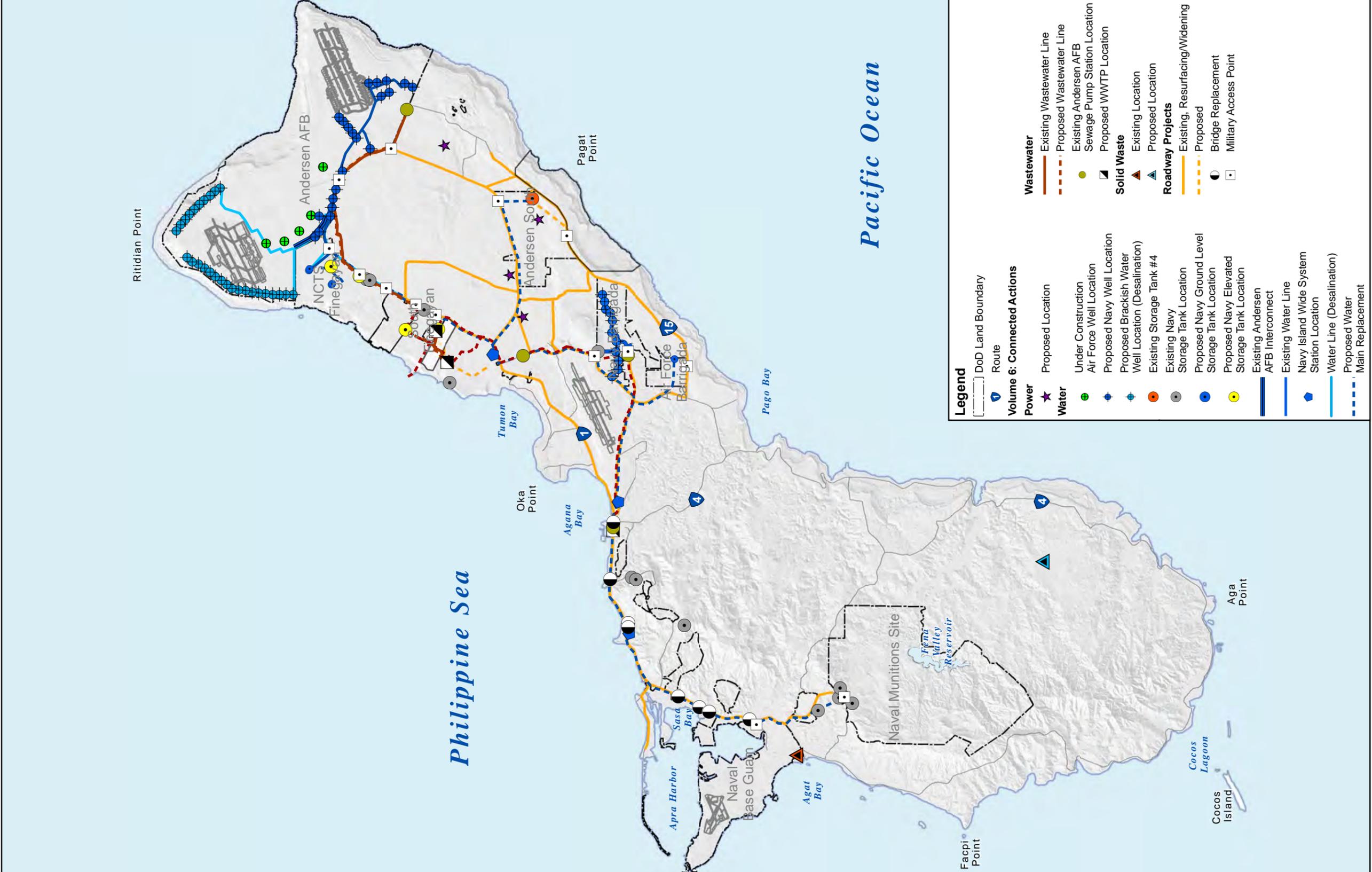


Figure ES-6
Volume 6: Related Actions – Utilities and Roadway Projects (Guam)

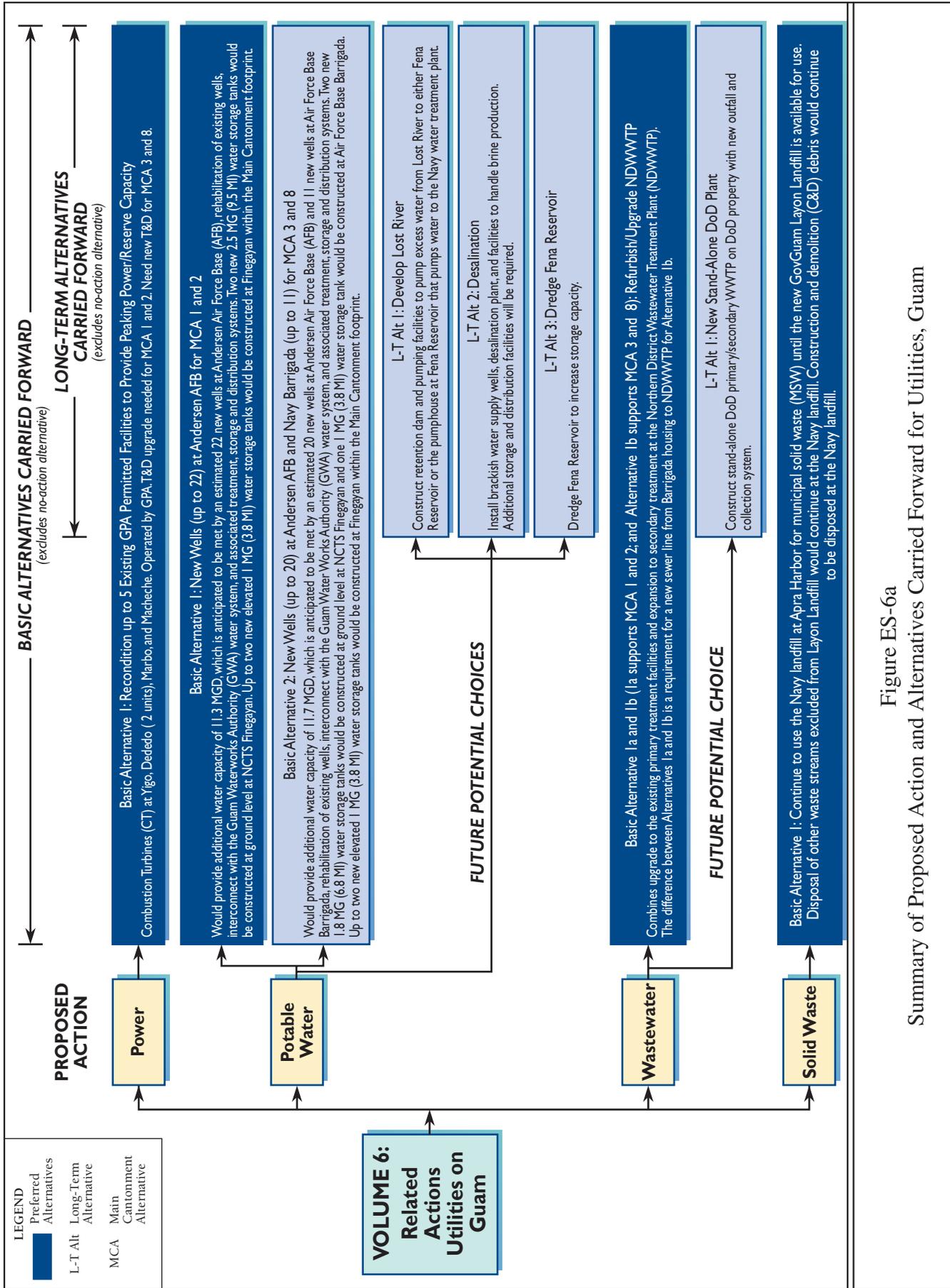


Figure ES-6a
 Summary of Proposed Action and Alternatives Carried Forward for Utilities, Guam

Wastewater

Basic Alternative 1a (Preferred Alternative) and 1b. Basic Alternative 1 (Basic Alternative 1a supports Main Cantonment Alternatives 1 and 2; and Basic Alternative 1b supports Main Cantonment Alternatives 3 and 8) combines upgrades to the existing primary treatment facilities and expansion to secondary treatment at the Northern District Wastewater Treatment Plant (NDWWTP). The difference between Basic Alternatives 1a & 1b is a requirement for a new sewer line from new proposed DoD housing at Barrigada to NDWWTP for Basic Alternative 1b.

Long-Term Alternative 1. Construct a stand-alone DoD primary/secondary wastewater treatment plant (WWTP) on DoD property with a new outfall and collection system.

Solid Waste

Basic Alternative 1 (Preferred Alternative). The Preferred Alternative for solid waste would be to continue to use the Navy landfill at Apra Harbor for municipal solid waste (MSW) until the new GovGuam Layon Landfill at Dandan is available for use. Disposal of other waste streams excluded from Layon Landfill would continue at the Navy landfill. Construction and demolition (C&D) debris would continue to be disposed at the Navy landfill.

Funding for Utilities - Power, Water and Wastewater

It is anticipated that some solutions would be implemented by Special Purpose Entities (SPEs), which would likely be private business entities formed to finance, operate, manage, upgrade, or develop utility plants and associated infrastructure such as collection or distribution systems. It is anticipated that the SPEs would utilize Government of Japan financing provided in accordance with the Realignment Roadmap. Alternatively, Government of Japan financing could be provided to Guam utilities to conduct the upgrades. The precise manner in which these SPEs would operate is not known. DoD will not exercise any authority or control over the SPEs but is committed to facilitate discussions between the Government of Japan, the SPEs, and Guam to focus SPE efforts on addressing utility impacts associated with the realignment, including short-term construction work force and long-term population growth. The U.S. Government would then likely purchase utilities from the SPE or utility under a Utilities Service Contract. Fees generated through utilities service contracts could be used to repay financing costs or a portion thereof. The DoD rate structure that would be established would reflect current rates adjusted for inflation. Given that these SPEs have yet to be formed, these business arrangements are not currently defined in detail. Therefore, they are presented as “conceptual” business arrangements.

During production of the EIS and on a continuing basis, DoD representatives have also been meeting regularly with GPA and GWA to discuss the utility needs both on and off base related to the proposed military relocation. Discussions have centered on defining needed utility upgrades, identifying the best technical solutions for these upgrades, and developing business options to implement the technical solutions, and lead toward viable utility solutions both on base and off base. These meetings have resulted in significant progress, and draft Memoranda of Understanding (MOU) have been developed to solidify cooperative arrangements discussed for both the future utility needs of DoD and to address GWA utility shortfalls related to the proposed military relocation. The following summarizes the discussions to-date.

Power:

- Concurrence has been obtained on the proposed reconditioning to existing GPA generating facilities for reliability/reserve power capacity and upgrades to the GPA transmission and distribution system to meet increased power demand from the proposed DoD relocation. This was

accompanied by a reassessment of current demands on the GPA system and estimated new demand associated with the proposed DoD relocation.

- Discussions continue on the best business approach to facilitate the required power system upgrades. This could involve the use of a SPE, which would likely be a private business entity formed to finance and refurbish and upgrade the GPA utility systems. It is anticipated that this SPE would utilize Government of Japan financing provided in accordance with the Realignment Roadmap. Alternatively, Government of Japan financing could be provided to GPA to conduct the refurbishment and upgrades. The precise manner in which these SPE business entities would operate is under development, and therefore is not known at this time.
- It is anticipated that a transient aircraft carrier and its escort ships would rely on shoreside utility infrastructure for water, wastewater, and solid waste after 2015. Electric power would be provided in accordance with CSAs between GPA and the U.S. Navy. Any GPA commitments for additional power to support the aircraft carrier and its escort ships will be determined by future CSA modifications. Any changes in the shoreside power requirements for the aircraft carrier and its escort ships may require additional NEPA review.
- The power facilities associated with the military relocation may be operated by the SPE or by GPA. Fees generated through utilities service contracts could be used to repay financing costs or a portion thereof. The DoD rate structure that would be would reflect current rates adjusted for inflation.

Water:

- GWA and DoD have agreed to develop a joint management team to properly manage the use of the Northern Guam Lens aquifer. This team would include experts from DoD, GWA, GEPA, USEPA Region 9, the U.S. Geological Service, and the University of Guam (UoG) Water and Environmental Research Institute. The draft MOU between DoD and GWA includes provisions related to this joint management team and the cooperative management of the Northern Guam Lens aquifer.
- Discussions continue on the best business approach to facilitate the required water system upgrades. This could involve the use of a SPE, which would likely be a private business entity formed to finance, develop, upgrade, operate and manage on and off base potable water infrastructure associated with the military relocation. It is anticipated that this SPE would utilize Government of Japan financing provided in accordance with the Realignment Roadmap. The precise manner in which these SPEs would operate is under development, and therefore is not known at this time.
- DoD is proposing to transfer currently available excess water capacity, and additional excess water capacity from newly developed wells, from the DoD-operated systems to GWA. This would alleviate water shortages in the GWA system during the construction phase of the proposed military relocation that may result from civilian population growth and the construction workforce accompanying the military relocation. The draft MOU between DoD and GWA includes provisions related to the cooperative use of water resources on Guam.
- DoD is proposing to expedite the installation of new DoD water extraction wells in order to assist GWA in alleviating water shortages in the GWA system during the construction phase of the proposed military relocation

Wastewater:

- Discussions continue on the best business approach to facilitate the required wastewater system upgrades. This could involve the use of a SPE, which would likely be a private business entity

formed to finance, operate, manage, upgrade, or develop wastewater infrastructure). It is anticipated that this SPE would utilize Government of Japan financing provided in accordance with the Realignment Roadmap. Alternatively, Government of Japan financing could be provided to GWA to conduct the upgrades. The precise manner in which these SPEs would operate is under development, and therefore is not known at this time.

- The NDWWTP may be operated by the SPE and fees generated through utilities service contracts could be used to repay financing costs or a portion thereof. The DoD rate structure that would be established would reflect current rates adjusted for inflation.
- Although the U.S. Government has not yet ordered the implementation of secondary treatment for Guam's wastewater treatment plants, DoD, USEPA Region 9 and GWA have agreed in principle to the upgrades that would be required at the NDWWTP to achieve secondary treatment standards. Discussions regarding technical solutions and financing for other GWA wastewater treatment plants requiring secondary treatment and collection system upgrades, including the Hagatna WWTP, are on-going.

DoD will continue to coordinate with GWA and USEPA Region 9 to ensure that GWA implements planned Capital Improvement Program projects to repair, refurbish, and improve existing water and wastewater infrastructure in order to meet the needs associated with the proposed DoD relocation and civilian population growth. However, the ability of GWA to secure necessary funding for the required Capital Improvement Program projects remains a key concern and a potential impediment to the Guam military relocation effort and the return of GWA to full compliance with the Clean Water Act and the Safe Drinking Water Act.

The Realignment Roadmap Agreement, described above, states “Japan will provide \$6.09 billion (in U.S. fiscal year 2008 dollars), including \$2.8 billion in direct cash contributions to develop facilities and infrastructure on Guam to enable the III MEF relocation.” Of this amount, the Government of Japan will provide \$740 million of financing for utilities upgrades, expansion, and development associated with the Marine Corps relocation. Currently, the Government of Japan is considering approximately \$575 to \$600 million of financing for water and wastewater improvement projects. This funding is part of the \$740 million mentioned above. Specific utilities projects the Government of Japan is considering funding include:

Power:

- Refurbish GPA Combustion Turbines (CTs), and construct T&D lines. Approximately \$160 to \$170 million to cover necessary refurbishment of 3 of the 5 GPA CTs, and construction of new T&D lines to meet Marine Corps realignment needs. Construction/refurbishment is planned to begin in June 2012, with completion by December 2014.
 - If the DoD should fail to secure necessary financing from the Government of Japan, impacts to GPA system reliability would occur as outlined in Volume 6, Chapter 3. Consistent with the Navy's commitment to keep from significantly impacting utilities on Guam, the DoD would apply force flow reductions and/or adaptive program management of construction as explained in Volume 7, Chapter 2. Failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary projects are implemented. Such action would impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.

Water:

- Install new wells, treatment and distribution - Approximately \$160 to \$165 million to cover installation of 11.3 gallons per day of water system capacity, estimated to be met by installation of 22 new DoD wells, and associated treatment and distribution systems. DoD transmission and distribution systems include connection into GWAs distribution system. Construction is planned to begin in September 2011, with completion by January 2013.
 - If the DoD should fail to secure necessary financing from the Government of Japan, significant environmental impacts will continue to occur as outlined in Volume 6, Chapter 3. These may include water supply shortage for both DoD and Guam's civilian population, low water pressure, and loss of reliable water service to portions of the island. Consistent with the Navy's commitment to keep from significantly impacting utilities on Guam, the DoD would apply force flow reductions and/or adaptive program management of construction as explained in Volume 7, Chapter 2. Failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary projects are implemented. Such action would severely impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.

Wastewater:

- Northern District Wastewater Treatment Plant
 - Primary treatment repairs and upgrades - Approximately \$60 to \$65 million to cover necessary refurbishment and upgrade of primary treatment capabilities at the GWA NDWWTP to 12 MGd. Construction is planned to begin in January 2011 and be completed by December 2012.
 - If the DoD should fail to secure necessary financing from the Government of Japan, significant environmental impacts will continue to occur as outlined in Volume 6, Chapter 3. These will include increased flows to already non-compliant treatment plants, resulting in further impacts to receiving waters due to poorly treated wastewater, and adverse impacts to fishing and recreational use of these waters. Consistent with the Navy's commitment to keep from significantly impacting utilities on Guam, the DoD would apply force flow reductions and/or adaptive program management of construction as explained in Volume 7, Chapter 2. Failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary improvements to the NDWWTP primary treatment capability are implemented. Such action would severely impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.
 - Secondary treatment upgrades - Approximately \$130 to \$135 million to expand the GWA NDWWTP capacity up to 18 MGd, and upgrade to secondary treatment capability. Construction is planned to begin in December 2012 and be completed by July 2013.
 - Failure to secure funding will result in failure to meet an impending enforcement order regarding secondary treatment requirements. As with primary treatment,

failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary improvements to the GWA NDWWTP secondary treatment capability are implemented. Such action would severely impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.

- Collection System Upgrades

- Approximately \$80 to \$85 million to repair and expand the collection systems associated with GWAs northern and central wastewater treatment systems. Construction is planned to begin in December 2011, with completion by July 2013.
 - If the DoD should fail to secure necessary financing from the Government of Japan, significant environmental impacts will continue to occur as outlined in Volume 6, Chapter 3. These will include continued and more frequent sewer overflows that can impact surface waters, groundwater and public health and safety. Failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary improvements to the GWA northern and central collection systems are implemented. Such action would severely impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.

- Hagatna WWTP Upgrades

- Approximately \$145 to \$150 million to repair and upgrade the primary treatment plant capability, and upgrade the plant to secondary treatment plant capability. Construction is planned to begin in July 2012 and be completed by December 2014.
 - If the DoD should fail to secure necessary financing from the Government of Japan, significant environmental impacts will continue to occur as outlined in Volume 6, Chapter 3. These will include increased flows to an already non-compliant primary treatment plant, resulting in further impacts to receiving waters due to poorly treated wastewater, and adverse impacts to fishing and recreational use of these waters. It would also result in failure to meet an impending enforcement order regarding secondary treatment requirements. Failure to secure necessary funding may require that DoD delay or not issue construction contracts or task orders until such time as the financing is received from the Government of Japan and the necessary improvements to the GWA Hagatna treatment capability are implemented. Such action would severely impact the construction pace and the ability of Navy to complete required construction to support the Marine Corps relocation.

DoD will continue to coordinate with the relevant Government of Japan agencies, Guam Consolidated Commission on Utilities, and other local authorities who are involved in the process of finalizing business structures and technical solutions to meet these program requirements.

In addition to DoD's efforts to secure funding with the Government of Japan, the Council on Environmental Quality has also facilitated interagency discussions with DoD and appropriate federal

agencies to identify the specific projects, the level of funding, and source of funding for necessary water and wastewater infrastructure improvements that must be accomplished in the first five years of the military relocation effort. Although no validated estimates are yet available, a preliminary estimate has these various projects totaling approximately \$1.3 billion over the five year period. These estimates are based on a conceptual cost analysis conducted by USEPA Region 9, and continue to be refined.

The Economic Adjustment Committee (EAC) is evaluating overall Guam civilian hard (e.g.: facilities) and soft (e.g., manpower, operations & management) infrastructure needs, including those associated with the proposed DoD relocation. As part of this evaluation the EAC is specifically examining federal funding options for the remaining portion of the estimated \$1.3 billion water and wastewater improvements that may not be provided by Government of Japan financing.

Roadway Projects

The roadway improvements sections have been prepared jointly by the Federal Highway Administration (FHWA) as a federal cooperating agency, the Navy's Joint Guam Program Office as the federal lead agency for the Guam and CNMI military relocation, and the Guam Department of Public Works as a participating agency.

The purpose of the proposed construction of the Guam Road Network (GRN) is to improve the existing network through the Defense Access Road Program and provide mission-critical transportation infrastructure as part of the planned military relocation. The improvements proposed for the GRN would result in strengthened roadways, bridge replacement, increased roadway capacity, roadway realignment (Route 15), new access, and enhanced roadway safety on Guam as a response to construction for military relocation and growth.

The off base roadway projects may be funded through the DAR program and annual allocations through the U.S. Department of Transportation FHWA and/or other DoD/FHWA special funding allotments. The Defense Access Road Program provides the means for DoD to pay a fair share for public highway improvements required as a result of a sudden or unusual defense-generated traffic impact or unique defense-related public highway requirement.

Individual projects have been identified from recent transportation and traffic studies on the island of Guam. These consist of 43 GRN (off-base) projects and 15 intersection improvement projects at military access points (MAPs) (i.e., gates). The 43 GRN (off-base) projects are composed of six types of roadway improvements:

- Intersection improvement projects
- Bridge replacement projects (involving eight bridges)
- Pavement strengthening (combined with roadway widening at some locations)
- Roadway relocation (Route 15)
- Roadway widening
- Construction of a new road (Finegayan Connection)

Since the DEIS, three additional bridges were identified as having rating factors below the appropriate load-bearing capacities for many of the military vehicles and would require replacement. These bridge replacement projects have been included in the analysis presented in this Final EIS.

The 58 projects cover four geographic regions on Guam: North, Central, Apra Harbor, and South. Not all 58 projects would be implemented since only a specific combination of roadway projects support each cantonment alternative.

- Main Cantonment Alternative 1 — There are 49 GRN projects that would be required for Alternative 1. These projects include 29 pavement strengthening, 8 roadway widening, 14 intersection improvements (includes 8 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.
- Main Cantonment Alternative 2 (Preferred Alternative) — A different combination of 49 GRN projects would be required for Alternative 2. These projects include 29 pavement strengthening, 8 roadway widening, 14 intersection improvements (includes 8 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.
- Main Cantonment Alternative 3 — There are 51 GRN projects that would be required for Alternative 3. These projects include 29 pavement strengthening, 10 roadway widening, 17 intersection improvements (includes 11 MAPs), 8 bridge replacements, and 1 road relocation.
- Main Cantonment Alternative 8 — A different combination of 51 GRN projects would be required for Alternative 8. These projects include 28 pavement strengthening, 8 roadway widening, 15 intersection improvements (includes 9 MAPs), 8 bridge replacements, 1 road relocation, and 1 new road.

ES-6 PREFERRED ALTERNATIVES FOR THE MAJOR ACTIONS

The preferred alternatives that comprise the proposed actions and the Volume of the full Final EIS which provides further details are:

- Volume 2, Marine Corps Guam: Alternative 2 (use of NCTS and South Finegayan with acquisition of the former FAA parcel), Range Complex Alternative A (east of Andersen South with the realignment of Route 15).
- Volume 3, Marine Corps Tinian: Alternative 1, development of four live-fire training ranges within the LBA, three oriented north and the Platoon Battle Course oriented northeast.
- Volume 4, Aircraft Carrier Berthing: Alternative 1, construction of a deep-draft wharf at Polaris Point.
- Volume 5, Army AMDTF: Alternative 1, administration, headquarters, unaccompanied housing and maintenance would be located at NCTS Finegayan with the Marine Corps. Family housing would be located at South Finegayan. Munitions storage in three non-contiguous areas near the Habitat Management Unit. Two weapons emplacement sites at the northern tip of Andersen AFB NWF; one site south of NWF. Restricted airspace over the coastal area of Guam.
- Volume 6, Related Actions:
 - Power: Basic Alternative 1: recondition up to 5 existing GPA permitted facilities to provide peaking power/reserve capacity. Upgrades to appropriate transmission and distribution systems to support increased loads would also be done.
 - Potable Water: Basic Alternative 1: provide additional water capacity of 11.3 MGd, which is anticipated to be met by 22 new wells at Andersen AFB, interconnection with GWA water system, rehabilitation of existing wells, and distribution upgrades.
 - Wastewater: Basic Alternative 1a: combine upgrade to existing primary treatment and expansion to secondary treatment at NDWWTP.
 - Solid Waste: Basic Alternative 1: continue utilizing the Navy sanitary landfill at Apra Harbor until the new Layon Landfill is opened. Continue to use the Navy sanitary landfill for waste streams not accepted by the Layon Landfill.

- Roadway Projects: Alternative 2: implement the 49 individual projects that have been identified to support DoD Alternative 2.

ES-7 ENVIRONMENTAL IMPACTS FROM PROPOSED GUAM MILITARY RELOCATION

The Final EIS provides information on the affected environment and impacts of the proposed actions for eighteen distinct resource areas. Volumes 2 through 5 of the Final EIS provide details on the impacts of individual proposed Marine Corps, Navy and Army actions while Volume 6 addresses island-wide impacts of proposed utilities and roadway improvement projects. Volume 7, Chapter 3 provides a summary of the impacts of all of the proposed actions should the preferred alternatives in each case be implemented. Table ES-4 in Section ES-10 provides a brief summary of the significant environmental impacts, as well as proposed mitigation measures, on several key resource areas on Guam and Tinian as a result of the proposed Guam and CNMI military relocation program.

ES-8 INDIRECT AND INDUCED DEVELOPMENT FROM THE PROPOSED GUAM MILITARY RELOCATION

The three major locations where people are expected to reside are on-base, in workforce housing, and on the regular Guam housing market – determinations of direct, indirect and induced development are thus classified according to these locations:

- Direct – Development that would occur from population that would live in on-base housing. This population includes military personnel and the dependents of military personnel. Development of on-base facilities was previously discussed and is not repeated in this chapter.
- Indirect – Development that would occur from population that would live in workforce housing. Only H-2B workers are considered in this population; however, it is expected that some other temporary construction workers would reside in workforce housing.
- Induced – Development that would occur from population that would live in housing provided by the Guam housing market. This population set includes civilian military workers, non-H-2B construction workers, and all other workers employed in jobs that would be generated by economic activity related to the proposed actions and the dependents of these groups.

Estimates on the demands for potable water, wastewater, power and traffic include the needs of the workforce housing and induced population as well as the direct population associated with the proposed actions on Guam. The indirect impact of workforce housing and other induced populations effects on socioeconomics are also analyzed in the EIS.

Indirect Development - Workforce Housing

DoD would not provide workforce housing, but DoD construction contracts would require the contractor to accommodate the workforce in accordance with specified health and safety standards. It is the responsibility of the contractor to demonstrate it can meet these basic requirements. GovGuam would attach conditions to Guam Land Use Commission (GLUC) land use approvals. DoD has no decision-making authority on the current proposals for construction workforce housing, and the Record of Decision would not endorse any specific proposals for workforce housing.

Several of the applications for development of workforce housing have received approval from GovGuam land development regulatory authorities and several were still under review. If all applications were approved, nearly 23,000 people could be accommodated in this housing. All temporary workforce

housing land use permits are for temporary land uses. One workforce housing project has begun construction. It is likely that additional projects would begin in advance of the Record of Decision.

The sites of the current workforce housing applications were assessed for affects on resources. The size of the workforce was generally a greater concern and has greater impact on resources than the location of the workforce housing site.

The increased population would produce similar effects on the resources that Marines and their dependents would have on non-DoD properties throughout Guam. For example, recreational resources would experience crowding, deterioration of resources, competition for use/space, etc. associated with simply having more users on those resources.

Significant adverse impacts to archaeological sites could result from construction at the workforce housing sites proposed by private sector applicants. Ground excavation and soil removal associated with this construction could result in significant adverse impacts to archaeological sites. The addition of workforce personnel could also increase site vandalism.

Potable water and wastewater distribution and/or treatment systems would need new facilities, upgrades, or repairs depending on the location of the selected workforce facilities. DoD does not know enough specifics of the GWA water system to evaluate in detail which workforce housing facility locations would face the largest challenges in providing adequate water service. The financial and technical capabilities of GWA are deemed marginal and may not allow GWA to successfully prepare the infrastructure to provide adequate water or wastewater service to some of the proposed workforce housing facilities. For these reasons, the impacts of workforce housing on these utilities are assessed as significant.

There would be impacts to roadways and traffic from workforce housing, although these impacts would be minimized by GovGuam's requirements for employers to provide transportation to and from worksites and contract requirements imposed by the DoD.

Induced Development – Housing, Businesses, and Employment

Induced development refers to the segment of the population growth not attributed to the military and their dependents or the H-2B construction workforce. Additional housing units would be required for this segment of the population - these additional required housing units are considered induced housing units. At the projected population peak in 2014, an estimated 46,300 people would require housing that would be considered induced housing units. This creates a peak demand for about 9,000 additional housing units. After the population peak is reached, the population declines every year until steady-state which results in an incremental demand of 272 units. The peak in housing demand could be reduced by controlling the pace of growth and construction discussed in the next section.

The proposed actions are also expected to induce development of business establishments and employment. Construction spending, operational base spending and personal spending related to the proposed actions would generate increased demand for goods and services. Approximately 1,295 business establishments with 18,727 full time equivalent (FTE) jobs would be induced by the proposed actions. After the peak in induced economic activity is reached, the number of business establishments and jobs would decline until a steady-state is reached. At steady-state, there would be 220 induced business establishments with 3,187 induced FTE jobs. While the steady-state levels of business establishments and jobs are lower than peak, they are higher than projected without the proposed military relocation.

ES-9 CONSTRUCTION-PHASE MEASURES TO REDUCE IMPACTS OF THE PROPOSED ACTIONS

In response to comments on the Draft EIS, the DoD has evaluated ways to reduce impacts from the anticipated pace of the proposed military relocation program and associated construction projects. The Final EIS (Volume 7) includes discussion of two mitigation measures. The first mitigation measure is force flow reduction and the second is adaptive program management. These mitigation measures would not apply to Tinian. Neither measure represents a current DoD proposal nor should either be viewed as the only possible means to manage the pace of population growth associated with the relocation.

Force Flow Reduction

The first mitigation measure is rescheduling the arrival time of Marines and their dependent to Guam. The proposed relocation of the Marines to Guam is referred to as “force flow.” Force flow is the rate at which the military population, including military personnel, their dependents, and civilian workers for the military, would arrive on Guam. Extending the arrival of the military population over a greater period of time (e.g. beyond 2014) would lessen the need for various infrastructure upgrades to meet peak loading demands in 2014. The proposed force flow reduction mitigation measure would both lower the overall peak population and decrease the rate of short-term population increase resulting from the proposed action, thereby reducing demands on utilities and many island services.

The force flow depicted in the Draft EIS and associated with the Preferred Alternatives showed the arrival of the military population between the proposed start of construction in 2010 and the targeted completion date of 2014. Project-related construction work is expected to begin in 2010, reach its peak in 2014, and end in 2016. Since the peak in construction activities and expenditures would coincide with the completed arrival of Marines and their families, 2014 represents the peak year for population increase. Reducing the force flow so that military personnel and their dependents would continue to arrive beyond 2014 would both lower the peak population currently associated with 2014 and decrease the growth rate of short-term population change largely associated with construction activity resulting from the proposed action, thereby reducing demand on utilities and many island services. Any actual force flow reduction would be decided in the future and would be dependent upon a number of factors including, but not limited to funding for necessary construction, mutual defense treaty obligations with the Government of Japan, ongoing military operations worldwide, and Congressional direction.

Force flow reductions, in one notional scenario associated with delaying the complete arrival of the Marine Corps military population until 2017, would lower the rate of arrival per year of the entire operations-related force flow reduction and decrease the current total peak population from 79,187 to 57,593 in 2014. Force flow reduction in and of itself does not affect the proposed action’s construction schedule. Therefore, the estimated population growth and shrinkage rate of off-island construction workers and their dependents on Guam would be unaffected by implementation of the force flow reduction mitigation measure.

Adaptive Program Management

The second mitigation measure which would alter the short-term population growth associated with the proposed actions is adaptive program management. This additional mitigation measure would be implemented by DoD to potentially reduce and avoid environmental impacts sensitive to construction tempo and sequencing. It involves the creation and support of a Civil-Military Coordination Council, consisting of, but not limited to participation by DoD, GovGuam agencies, and federal agencies as required to monitor impacts and advise DoD on the tempo and sequencing of proposed construction in order to avoid and reduce environmental impacts before unacceptable conditions arise:

- *Slowing construction tempo.* Construction tempo refers to the overall pace of proposed DoD construction on Guam and regions of Guam (i.e., Apra Harbor, Andersen AFB, and Finegayan). DoD would slow the timing and execution of short-term (0 to 3 months), mid-term (3 to 12 months), or long-term (12 to 24 months) construction contract awards in response to known infrastructure limitations and monitoring of data on impacted resources to reduce construction-related population increases and avoid or lessen impacts to environmental resources served by utilities systems (i.e., groundwater, surface waters, and ocean waters).
- *Adjusting construction sequencing.* Construction sequencing involves redirecting the sequence of construction to projects that require fewer construction workers (e.g., re-sequencing from horizontal to vertical projects that require fewer workers), thus controlling the workforce population rate of increase. Construction sequencing would also include the regional re-distribution of construction projects to avoid the concentration of construction activities with the potential to overburden local utilities systems at a particular location.

The result of implementing both the force flow reduction mitigation measure and the use of adaptive program management of construction tempo would be that the peak population would be reduced from 79,187 to 41,178 in 2014. This reduction associated with slowing construction tempo shows additional population reduction from the peak 57,593 population described for the notional force flow mitigation measure. Under the notional adaptive program management scenario, the full complement of DoD population would not be relocated to Guam until after 2014.

Again, this does not represent a current DoD proposal nor should it be viewed as the only possible means in which construction could be managed.

ES-10 PROPOSED BEST MANAGEMENT PRACTICES (BMPs) AND MITIGATION MEASURES

Mitigation refers to actions that would be taken to avoid, minimize, rectify, reduce/eliminate, or provide compensation for an impact that would result from an alternative. In 40 CFR 1500, CEQ defines mitigation as:

- **Avoidance:** Avoid the impact by changing the action. Do not take certain actions that would cause the environmental effect.
- **Minimization:** Minimize impacts by changing the intensity, timing, magnitude, or duration of the action and its implementation.
- **Rectifying:** Rehabilitate, repair, or restore damage that may be caused by implementing the proposed actions.
- **Reducing/Eliminating:** Reduce or eliminate the impact over time.
- **Replacement:** Compensate for an impact by replacing the damage and improving the environment elsewhere, or by providing other substitute resources such as funds to pay for the environmental impact.

For the purposes of this Final EIS, BMPs are management actions that are implemented by the DoN on an ongoing basis as part of standard operating procedures. These BMPs serve to minimize, and reduce/eliminate potentially adverse impacts. Additional detail on the BMPs is provided in Volumes 2 through 6. A summary table of key BMPs is in Volume 7, Chapter 2.

The following is a list of BMPs that would be implemented:

- Erosion Control
- Stormwater Management under the Clean Water Act: Stormwater Management Plan and Stormwater Pollution Prevention Plan
- Water Quality Monitoring Plan
- LEED Certification
- Low Impact Development design technology
- Energy Policy Act of 2005
- Water Conservation Plan
- Hazardous Materials Management Plans
- Hazardous Waste Management Program
- Spill Prevention Control and Counter-measures Plans
- Integrated Pest Management Plan
- Munitions and explosives of concern procedures
- Land Use Planning and Project Design measures
- Natural Resource Management (Terrestrial and Marine)
- Public Outreach/Education
- Army Corps of Engineers permit conditions
- Federal Highway Administration site-specific BMPs such as avoidance of contaminated sites and erosion and sediment controls
- Noise Abatement
- Utilities (planning and coordination with utility providers for roadway projects).
- Cultural Resources (archaeological monitoring, adherence to the ICRMP)
- Range Training Area Management Plan
- Environmental Protection Plan
- Seismic Design for Buildings
- Armed Forces Ballast Water Management Program
- Awareness Training
- Domestic Animal Control

In addition to the listed BMPs that DoD would implement, there are a number of proposed mitigation measures that would further minimize significant adverse impacts.

Table ES-4 presents the impacts by resource area that have been deemed significant in the context of NEPA. A full list of impacts is found in Volume 7, Chapter 3. A full list of mitigation measures proposed are listed in Volume 7, Chapter 2. Table ES-4 contains only those proposed mitigation measures that would reduce the adverse impacts to below the level of significant. They are listed with each identified significant impact that they affect. Mitigation measures for the selected alternative will be identified in the Record of Decision. These measures would be funded, and efforts to ensure their successful completion or implementation would be treated as compliance requirements and tracked as part of annual data calls.

Table ES-4. Summary of Significant Impacts of the Preferred Alternatives

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
Geological Resources	<p>Construction SI-M (Guam and Tinian)</p> <ul style="list-style-type: none"> Most impacts on geological and soil resources are less than significant during construction. During site planning, avoidance of known sinkholes was required to prevent significant impacts to unique geological features. A buffer zone of vegetation would remain around them through construction to prevent further erosion or expansion. With mitigation, impacts to soil and geological resources would be less than significant. <p>Operation (Guam only) SI-M</p> <ul style="list-style-type: none"> Most impacts on geological and soil resources are less than significant during operation. Sinkholes deemed dangerous would be fenced off and educational warning signs put in place to warn of potential danger as a proposed mitigation measure for potential impacts during operations. With mitigation, impacts to soil and geological resources would be less than significant.
Water Resources	<p>Construction SI-M (Guam only)</p> <ul style="list-style-type: none"> Temporary water quality impacts on nearshore waters and coral in Apra Harbor during dredging and nearshore construction. Proper implementation of a suite of mitigation measures required by dredging permits, such as physical barriers to limit sediment dispersal, would reduce impacts to less than significant.
Noise	<p>Construction SI-M (Guam only)</p> <ul style="list-style-type: none"> Noise generation during multiple construction activities adjacent to each other, within a compressed time period, and in proximity to sensitive receptors would be significant. Proper implementation of mitigation (e.g., temporary noise barriers) would reduce impacts to less than significant. <p>Operation SI (Guam only)</p> <ul style="list-style-type: none"> Ground based training, specifically hand grenade range operations at Andersen South would be incompatible with residential use; currently no mitigation effectively reduces low frequency sound.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
<p>Land and Submerged Land Use</p>	<p>Construction (Guam only) SI-M (Land Use)</p> <ul style="list-style-type: none"> • Off-base roadway construction on Guam would have a significant adverse impact on roadway use during construction. Mitigation would include a Traffic Management Plan implemented by the Federal Highway Administration that would identify measures to reduce impacts during the construction period. <p>Operation Land Ownership (Guam only) SI</p> <ul style="list-style-type: none"> • Federal acquisition of land for main cantonment, firing ranges, and roadway improvements on Guam. <p>Land/Submerged Land Use (Guam and Tinian) SI</p> <ul style="list-style-type: none"> • Access to DoD lands (acquired) and non-DoD submerged lands would be restricted during training.(Guam) • Noise generated by training ranges in vicinity of Andersen South would not be compatible with residential land use and future development. (Guam) • Agricultural/grazing permits within the Tinian LBA located in the range footprints or SDZs would not be renewed, causing significant impact on agricultural use. The permits are subject to non-renewal at military discretion.(Tinian)
<p>Recreational Resources</p>	<p>Construction (Guam only) SI</p> <ul style="list-style-type: none"> • Construction activities could reduce access to recreational resources such as, Marbo Cave (spelunking and offshore fishing), Pagat Trail, and associated trails. • During construction the population increase on Guam could reduce recreational resource use through a reduction in recreational opportunities. • Prior to the refurbishment of the NDWWTP increased wastewater flow from the workforce and induced population would temporarily exceed the design capacity of the treatment facility, resulting in significant indirect impacts to recreational resources. <p>Operation (Guam only) SI</p> <ul style="list-style-type: none"> • Operation activities could reduce access to recreational resources such as, Marbo Cave (spelunking and offshore fishing), Pagat Trail and associated trails. • During operations the population increase on Guam could reduce recreational resource use through a reduction in recreational opportunities. • Prior to the refurbishment of the NDWWTP increased wastewater flow from the workforce and induced population would temporarily exceed the design capacity of the treatment facility, resulting in significant indirect impacts to recreational resources.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
<p>Terrestrial Biological Resources</p>	<p>Construction SI (Guam only)</p> <ul style="list-style-type: none"> • Loss of habitat for special-status species on Guam would result in significant impacts to federal threatened and endangered species. • 27 acres of limestone forest, an important vegetation type on Guam, would be cleared under the preferred alternatives for the Marine Corps relocation on Guam. <p>SI-M (Tinian only)</p> <ul style="list-style-type: none"> • Loss of a portion of a previously designated habitat mitigation area would result in a significant impact, offset by adding new mitigation area. <p>Operation (SI-M) (Guam and Tinian)</p> <ul style="list-style-type: none"> • Indirect potential impacts to protected species might occur from spread and new introductions of non-native species such as the BTS (also applicable for construction), reduced to less than significant by specific plans and procedures. • Indirect potential impacts to protected species might occur from wildfire caused by training, reduced to less than significant by specific plans and procedures. <p>(SI-M) (Guam only)</p> <ul style="list-style-type: none"> • Indirect significant impacts might occur to protected species from noise, lighting, and human activity, reduced to less than significant to less than significant through compensation of habitat loss.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
Marine Biological Resources	<p>Construction SI (Guam only)</p> <ul style="list-style-type: none"> • Special Status Species: Pile driving activities would result in significant noise-related adverse effects to sea turtles. • EFH: Dredging in Outer Apra Harbor would result in short-term and long-term adverse effects to EFH, specifically coral and live/hard bottom communities. <p>SI-M</p> <ul style="list-style-type: none"> • Special Status Species: In-water construction activities and increased vessel movements would result in short-term, potentially significant effects, mitigated to less than significant through proper implementation of mitigation measures and BMPs (see Volume 7). • Long-term, potentially significant impacts associated with non-native invasive marine species introduction. This impact would be reduced to less than significant through proper implementation of existing vessel hull and ballast water management policies (see Volume 2, Chapter 11) and the Marianas Biosecurity Plan (MBP) being prepared by the Navy. <p>Operation SI-M (Guam only)</p> <ul style="list-style-type: none"> • Long-term, potentially adverse effects on special status species (sea turtles) from increased recreational activities at Haputo ERA and island-wide, mitigated to less than significant. • Long-term, potentially significant impacts associated with non-native invasive marine species introduction. This impact would be reduced to less than significant through proper implementation of existing vessel hull and ballast water management policies (see Volume 2, Chapter 11) and the MBP being prepared by the Navy.
Cultural Resources	<p>Construction (Guam and Tinian) and Operations (Guam only) SI-M</p> <ul style="list-style-type: none"> • Potential significant adverse direct impacts to approximately 31 historic properties on Guam and 9 on Tinian. If properly implemented mitigation would be conducted in accordance with Section 106 consultation with State Historic Preservation Offices that would require avoidance, survey, monitoring during construction, data recovery, building and cultural landscape documentation, public education, and training of military personnel, thereby reducing impacts to less than significant. • Potential significant adverse impacts to four traditional cultural properties. Proper execution of mitigation would reduce impacts to less than significant through education, public access, and implementation of preservation plans. • Impacts during operation would include accidental or inadvertent damage to archaeological historic properties. Proposed mitigation would include awareness training for military personnel

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
Visual Resources	<p>Construction SI-M (Tinian and Guam)</p> <ul style="list-style-type: none"> • Off-base roadways and intersections widened by the GRN projects would add an increased urban character to the views of the roadways. These effects would be reduced to a level of less than significant with implementation of appropriate mitigation measures, including notable grading and re-vegetation. • The viewshed from the overlook at Mount Lasso would be affected. Impacts could be mitigated through minimizing land clearing and grading to the extent possible on lands proposed for range use. <p>Operations SI-M (Guam and Tinian)</p> <ul style="list-style-type: none"> • Proposed actions may result in the alteration of visual resources. The following areas would be impacted: NCTS Finegayan, Non-DoD lands (North), Non-DoD lands (Central), Andersen South, views along Highway 3 adjacent to/near Finegayan, views from Mount Lasso, views along Broadway, views along 8th Avenue, and existing visual quality changes to a more urban visual character. A suite of mitigation measures would be used to reduce impacts, to include but not limited to design guidelines for all buildings, development of a landscape plan, using native flora to create a natural-appearing “screen”.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
<p>Utilities and Off-base Roadways Capacity</p>	<p>Construction and Operation - Utilities SI-M and (SI) (Guam only)</p> <ul style="list-style-type: none"> • Impact to existing overburdened utilities infrastructure on Guam would be exacerbated by workforce and induced population. A suite of mitigation measures are under consideration to mitigate impacts to utilities on Guam, including adaptive program management techniques to adjust construction tempo. The projected water demand for the Guam civilian population throughout 2010-2019, not including the effects of the military relocation and associated workforce and induced population, exceeds the current GWA water system capacity. Projected potable water demand would not exceed sustainable yield of the Northern Guam Lens Aquifer. Impacts could be mitigated through improvements to the potable water infrastructure to provide excess DoD water production capacity to GWA to meet the shortfall, and provide new connections from the DoD transmission system to GWA's distribution system to more effectively deliver water to impacted areas. • The proposed actions would result in higher than currently permitted wastewater flow to NDWWTP with a temporary increased load from the workforce. The proposed action includes upgrades the NDWWTP primary and addition of secondary treatment in order to mitigate these impacts. Required repairs and upgrades to other wastewater plants and their collection systems by the GWA would be needed to fully mitigate impacts to recreational resources from increased wastewater flows. <p>Construction and Operation - On-base Roadways SI-M (Guam only)</p> <ul style="list-style-type: none"> • On-base roadway impacts would result in significant impacts due to traffic at Andersen AFB and the Navy base. The proposed mitigation measures for Andersen AFB and Apra Harbor may include road widening, restriping, traffic signal and other traffic control devices to help improve traffic operations. <p>Operation - Off-base Roadways SI (Guam only)</p> <ul style="list-style-type: none"> • Off-base roadway impacts would be significant due to traffic in the north and central regions of Guam.

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<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
Socioeconomics and General Services	<p>Construction SI (Guam only)</p> <ul style="list-style-type: none"> • Population increases on Guam during construction both beneficial and adverse, because population growth fuels economic expansion but sudden growth also strains government services and the social fabric. <p>SI (Guam and Tinian)</p> <ul style="list-style-type: none"> • Beneficial economic and tourism impacts on Guam, with significant economic impact due to termination of currently used agricultural/grazing permits on Tinian LBA lands. • Adverse impacts to public services on Guam and Tinian. • Adverse sociocultural impacts on Guam and Tinian. • Rate payer increase for utilities and off-base roads due to indirect population (workforce population and induced). <p>Operation SI (Guam only)</p> <ul style="list-style-type: none"> • Population increases on Guam during operations both beneficial and adverse, because population growth fuels economic expansion but sudden growth also strains government services and the social fabric. • Adverse impacts to public services on Guam. • Beneficial economic and tourism impacts on Guam. • Rate payer increase for utilities due to induced population. • Adverse impact on Guam due to land acquisition. <p>SI (Guam and Tinian)</p> <ul style="list-style-type: none"> • Significant economic impact due to termination of currently used agricultural/grazing permits on Tinian LBA lands. • Adverse sociocultural impacts on Guam and Tinian.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
Public Health and Safety	<p>Construction SI (Guam only)</p> <ul style="list-style-type: none"> • The population increase would also have a potential effect on health care service providers, public services (i.e., police and fire service), and social services. • Proposed actions on Guam would have a significant impact to water quality, health care services, notifiable diseases, mental illness, and public services as a result of the population increase. <p>Operation SI and (SI) (Guam only)</p> <ul style="list-style-type: none"> • The proposed actions would also have a significant impact on ambient noise, water quality, health care services, notifiable diseases, mental illness, and public services as a result of the population increase. • The population increase would also have a potential effect on health care service providers, public services (i.e., police and fire service), and social services. • Due to indirect population (workforce population and induced), existing water supply distribution inadequacies could result in significant water quality impacts that could be exacerbated by the workforce and induced population. • Due to indirect population (workforce population and induced), existing wastewater treatment facilities are not adequate for the proposed action which would have a significant impact on notifiable diseases, and health care services.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

<i>Potentially Impacted Resource</i>	<i>Significant Impacts and Proposed Mitigation of Preferred Alternatives</i>
<p>Environmental Justice and the Protection of Children</p>	<p>Construction SI (Guam only)</p> <ul style="list-style-type: none"> • The “boom and then bust” cycle of population growth and decline may stress the Guam economy. This would be felt more severely by low-income people, who often do not have resources to buffer hard economic times. • Guam’s public health care services would not be able to handle potential increases in illnesses of the medically underserved and low income. In addition access to public health and social services would be strained by an increase in uninsured and underinsured workers coming to Guam. Construction-related impacts are considered short-term but significant and would have a corresponding significant impact on low-income people. <p>Operation SI and (SI) (Guam only)</p> <ul style="list-style-type: none"> • The proposed action would likely have disproportionate significant public health services effects on low-income populations. Guam’s public health services would not be able to handle potential increases in illnesses of the medically underserved and low income. In addition ,access to public health and social services would be strained by an increase in uninsured and underinsured workers coming to Guam. • The “boom and then bust” cycle of population growth and decline may stress the Guam economy. This would be felt more severely by low-income people, who often do not have resources to buffer hard economic times. • Due to indirect population (workforce population and induced), existing water supply distribution and wastewater inadequacies could worsen and result in illnesses and significant impacts to health care services that would disproportionately affect low-income populations. <p>SI (Tinian only)</p> <ul style="list-style-type: none"> • Ranchers and agricultural workers would lose access to leased lands needed to perform their work. This would result in a disproportionately high and adverse impact to low-income groups, and this impact would be significant. There would be no disproportionate health and safety impacts to children.

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant; (SI or SI-M) = Indirect (workforce population and induced) population impact.

ES-11 CHANGES BETWEEN THE DRAFT AND FINAL EIS

The purpose of this section is to identify information and analysis that has been added to this EIS between publication of the Draft EIS in November 2009 and the Final EIS. This additional information further supports the disclosure of environmental impacts related to the proposed military relocation on Guam and CNMI. The reasons for adding this information are to provide:

- the latest status of coordination and discussions between DoD, GovGuam and federal agencies on critical issues such as infrastructure upgrades associated with the proposed military relocation;
- updated information on additional scientific surveys and studies prepared by the DoD that were not available or completed at the time of the Draft EIS; and
- more discussion of the proposed actions, alternatives, existing conditions, environmental impacts or proposed mitigation measures to appropriately respond to comments submitted on the published Draft EIS.

The following changes are incorporated into the Final EIS:

One Guam

Numerous comments were received on the Draft EIS that the Island of Guam cannot support the off base impacts of the proposed military relocation program. The term “One Guam” has been used to denote the need to identify funding for improvements of existing off base deficiencies in infrastructure and public services so that citizens of Guam and its natural and cultural resources are not overwhelmed by the pace and scale of the proposed military relocation. Numerous examples of existing poor infrastructure, and under-funded and under-staffed public services were cited by state and federal resource agencies, GovGuam, and citizens of Guam.

As documented in this EIS, DoD acknowledges the existing sub-standard conditions of key public infrastructure systems and social services on Guam and the desire by many for DoD to fund improvements to these systems and services. DoD also recognizes the constraints on GovGuam to be able to address these indirect impacts of the proposed military relocation. GovGuam has identified the need for \$1.3 billion (B) in funding to implement necessary water and wastewater infrastructure improvements that must be accomplished in the first five years to accommodate the military relocation. The Council on Environmental Quality has facilitated interagency meetings with DoD and appropriate federal agencies to identify funding sources to meet this need. DoD is seeking from the Government of Japan approximately \$580 million for water and wastewater improvement projects from the Government of Japan pursuant to the terms of the Realignment Roadmap Agreement. The EAC is evaluating overall Guam civilian hard (e.g.: facilities) and soft (e.g.: manpower, operations and management) infrastructure needs, including those associated with the proposed DoD military relocation. As part of this evaluation the EAC is specifically examining federal funding options for water and wastewater infrastructure improvements that may not be funded through Government of Japan financing. This would reduce adverse impacts associated with the proposed military relocation as they relate to utilities infrastructure.

Progress on DoD-Guam Utility Systems Cooperation

During production of the EIS and on a continuing basis, DoD representatives have also been meeting regularly with GPA and GWA to discuss the utility needs both on and off base related to the proposed military relocation. Discussions have centered on defining needed utility upgrades, identifying the best technical solutions for these upgrades, and developing business options to implement the technical

solutions, and lead toward viable utility solutions both on base and off base. These meetings have resulted in significant progress, and draft MOU have been developed to solidify cooperative arrangements discussed for both the future utility needs of DoD and to address GWA utility shortfalls related to the proposed military relocation.

Additional Survey of Coral Reefs in Apra Harbor and Southern Guam

During the spring of 2010, DoD sponsored additional marine resources surveys for Apra Harbor and four watersheds in southwestern Guam. The surveys were undertaken to complement previous surveys of Apra Harbor that were reported in the November 2009 Draft EIS done in association with proposed development of berthing facilities to accommodate visiting aircraft carriers. The survey locations in these latest efforts included all of outer Apra Harbor (excluding Sasa Bay, Sumay Cove and Guam commercial port) and the marine environment adjacent to discharge points of the Ugum, Umatac, Toguam and Geus watersheds in southwestern Guam.

Debate on Methodologies to Assess Impacts to Coral

Impacts to coral reef resources are an unavoidable consequence of developing berthing accommodations for transient aircraft carriers in Apra Harbor on Guam. The assessment of the existing condition of the system of coral reefs that would be impacted is an important initial step. There are various methods that are used to assess coral reef ecosystem structure and function. Historically, one of the more commonly used methods has been to calculate the area of benthic habitat and component coral communities using photographic evidence collected on-site. The DoD used this method in April and May 2009 to analyze ecosystem structure and function of coral reef communities in the region of Apra Harbor, Guam that would be affected by proposed dredging activities required for safe passage of nuclear aircraft carriers (CVN). Another assessment method, proposed by Federal Resource Agencies, involves the collection of size measurements of individually sampled coral colonies to produce size-frequency distributions of each different population of coral species.

As a component of this Final EIS, a technical paper was prepared and provides a comparative analysis of the two referenced coral assessment methods and explains why the DoD's method of calculating photographic percent cover is the more scientifically sound choice, and in the case of Apra Harbor, the more practicable site-specific method. The technical paper is provided in its entirety in Volume 9, Appendix J.

Watershed Assessment Surveys

Sedimentation and run-off from non-point sources contribute to the degradation of coral resources located in coastal waters off Guam. Control of these sedimentation sources would remove suspended sediment from stream and stormwater flows. DoD sponsored field surveys of four watershed areas during the spring of 2010 as complimentary assessments to the offshore survey of coral habitat in southwestern Guam.

Rapid Watershed Assessments were conducted to assist in the selection of potential upland mitigation sites and strategies within and near the Bolanos Conservation Area in southern Guam. The purpose of the upland mitigation within and near the Bolanos Conservation Area is to reduce sediment deposition into the marine environments of southern Guam.

Information from these watershed assessment studies including proposed conservation projects that would reduce accelerated erosion and sedimentation within the four watersheds studied has been incorporated

into the compensation options discussion included in Volume 4. The Final Rapid Watershed Assessment report is included in Volume 9 (Appendix) of the Final EIS.

Stormwater Management Planning

A comprehensive drainage and low impact development (LID) implementation study was prepared for the proposed Finegayan main cantonment area, the preferred alternative. The LID study was to determine the pre- and post-development hydrology of the site and to determine the stormwater runoff quantities and qualities that would need to be accommodated. Utilization of LID would protect resource through reuse, treatment, and infiltration of stormwater runoff to reduce impact to Guam's natural resources including the underlying groundwater aquifer.

Storm water management requirements for the Finegayan installation include meeting Leadership in Energy and Environmental Design (LEED) for water quality and quantity. This would be best achieved by utilizing Best Management Practices (BMPs) that act to both meet volume and flow requirements and also provide high levels of water quality treatment.

Also included in this Final EIS is the Final Storm Water Implementation Plan for the Guam Road Network (May 2010). A copy of this Plan is included in Appendix G of Volume 9. The Plan is for the Guam Department of Public Works to implement measures for federally funded projects related to the proposed actions included in this Final EIS.

Sustainability Studies for Main Cantonment

The DoN prepared a Sustainability Summary Report as part of the master planning process. This report is included in Appendix N and summarized in Volume 8 of the EIS. The foundations of the Sustainability Program are the federal mandates and targets related to energy, water, transportation, green building/LEED and greenhouse gas emissions. Each primary system – water, energy (building, district, renewable and public realm), green building/LEED, transportation, and ecosystem services – was optimized to achieve the maximum environmental benefit in the most cost-effective manner. By applying the Sustainability Program that meets the federal mandates, the baseline program achieves the following improvements: 30% energy use reduction, 26% water use reduction, 30% reduction of petroleum use in fleet vehicles, 7.5% of total energy from renewable sources, and 7.6% reduction of vehicle miles traveled, as well as a target of 34% reduction in greenhouse gas emissions. These reductions are applied to the analysis presented in Volume 6 of the EIS.

Completed Natural Resources Surveys

In order to assess the potential impacts to natural resources resulting from the relocation on DoD lands and non-DoD lands, a variety of natural resource surveys were conducted. These surveys included avian, butterfly, fruit bat, reptiles and amphibians (herpetofauna), marine waters, tree snail, and vegetation at specific locations, such as utilities' corridors and an area that may be developed.

Wetlands Remote Sensing Surveys

Wetland areas within the vicinity of project alternatives were identified in the Draft EIS using best available information including maps of field delineated wetlands on military properties and National Wetlands Inventory mapping for non military properties. Field biologists also verified the location of wetland and waters of the United States for certain project alternatives. To further examine the possible presence of wetland areas, DoD has sponsored the preparation of maps using remote sensing and field verification of wetland areas within the vicinity of project alternatives. The remote sensing and field verification surveys of wetland areas were undertaken during the spring of 2010 between the publication

of the Draft and Final EIS. DoD coordinated with both the U.S. Army Corps of Engineers and EPA during the wetlands remote sensing surveys.

The results are depicted on new project maps that portray the boundaries of any wetlands located in the vicinity of the proposed project alternatives. It is acknowledged that additional field surveys to fully delineate and assess value and functions of wetlands and waters of the U.S. would be needed during the Section 404 permitting stage of the proposed project. Updated wetland maps and related information have been included in the water resources chapters of the various Volumes. The full Wetlands Remote Sensing Surveys are also included in Volume 9 of this EIS.

Land Acquisition Information

A Land Acquisition Baseline Report was compiled, which provides basic real estate and land use data for the various parcels of land to be potentially acquired. That Baseline Report is available in Volume 9 Appendix F and information from the Report has been added to Chapter 8 of Volume 2.

Information from the Land Acquisition Baseline Report was also used to perform economic and sociocultural impact analysis; these analyses have been added to Chapter 16 of Volume 2, as well as the Socioeconomic Impact Assessment Study, which is also available in Volume 9 Appendix F.

Land acquisition type has not yet been determined, is subject to negotiations with land owners, and is subject to Congressional funding and approval. The Department of Navy has no intent to use eminent domain (condemnation) as means to acquire property and will seek to work cooperatively with landowners, both public and private. It is anticipated that acquisition of real estate ownership would involve either:

- Negotiated purchase (including cash purchase or land exchange)
- Long-term leasing

While the government is authorized to acquire property through its powers of eminent domain (condemnation), it has been the consistent policy of the DoN to acquire real estate through negotiation with owners. Use of the condemnation process may be necessary even with willing sellers in order to clear problems with title.

In certain cases, most notably in conjunction with the training ranges, it may be necessary for DoD to acquire additional land outside of the proposed boundaries noted in the Baseline Report, in order to avoid severing a unitary land holding.

CEQ Draft Monitoring Guidance

The Council on Environmental Quality drafted a *Guidance for NEPA Mitigation and Monitoring* (February 18, 2010) that outlines goals to improve agency mitigation and monitoring. The DoD would meet those goals. The Final EIS, Volume 7, Chapter 2 includes a summary table of mitigation measures proposed in Volume 2 through 6. Mitigation measures coordinated with agencies continue to evolve as regulatory agency consultations and permit application reviews (i.e., Biological Opinions, Programmatic Agreements, etc.) proceed. The Final EIS proposes mitigation measures to reduce or avoid environmental impacts identified during the NEPA environmental review process. Commitment to a mitigation measure would be established in the Record of Decision (ROD), which is informed by the Final EIS. Environmental requirements can also change or emerge post-ROD as a result of agency consultations and coordination, permit conditions, and new laws, regulations, and policies.

A Post-ROD Mitigation Monitoring Plan would be developed with the ROD to track the implementation of mitigation measures committed within the ROD. Naval Facilities Engineering Command Marianas (NAVFAC MAR) would ultimately be responsible for preparing and implementing the post-ROD monitoring plan. As a matter of policy, the DoN adaptively manages its construction programs to monitor the effectiveness of mitigation measures and adjusts them as necessary to improve effectiveness during and after construction.

Mitigation measures committed to by the DoD will be published in the ROD. The DoD intends to work collaboratively with members of the public and agencies throughout implementation of the proposed action and mitigation measures. Virtually all monitoring reports and documents are available to the public and access is provided under the Freedom of Information Act (FOIA), within a reasonable timeframe, upon request to DoD public affairs or community planning and liaison offices. Additional information on mitigation and monitoring is presented in Volume 7, Chapter 2.

CEQ Guidelines on Climate Change

A *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* was issued by CEQ on February 18, 2010. The greenhouse gas emissions associated with the proposed actions are described in Volume 7. The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Climate change could result in impacts to marine resources, aquifers and waterfront facilities. The potential cumulative impact of the proposed action in conjunction with these climate change impacts are described in Volume 7, Chapter 4.

Indirect and Induced Impacts on Development, Including Workforce Housing

Indirect and induced development are expected as a result of the proposed action. Sections were added to discuss the potential impacts and ways to mitigate adverse effects. Sections ES-8 and ES-9 summarize the discussion contained in the Final EIS.

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