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

Reader's Guide

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Guam and CNMI Military Relocation EIS
Reader's Guide

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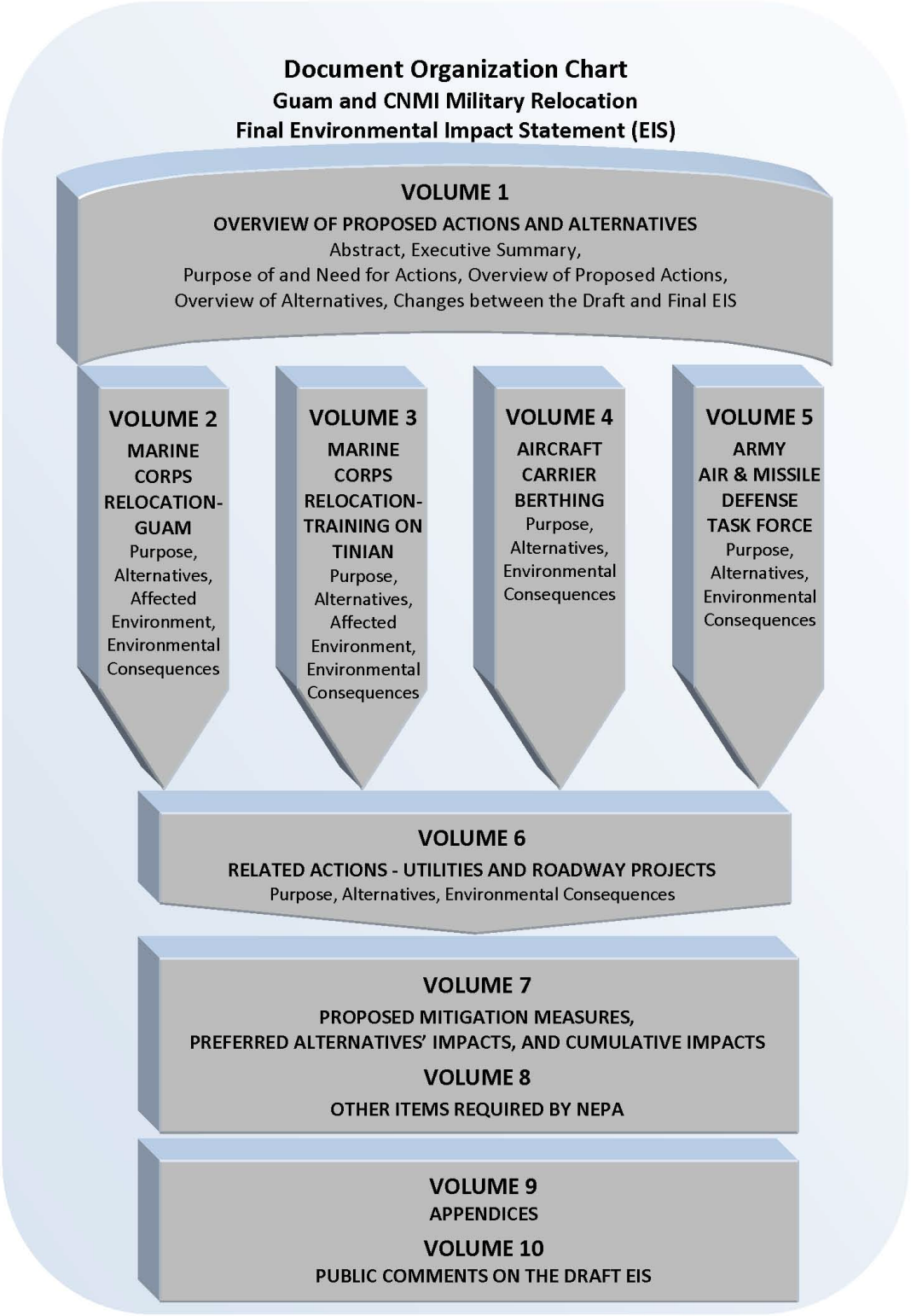

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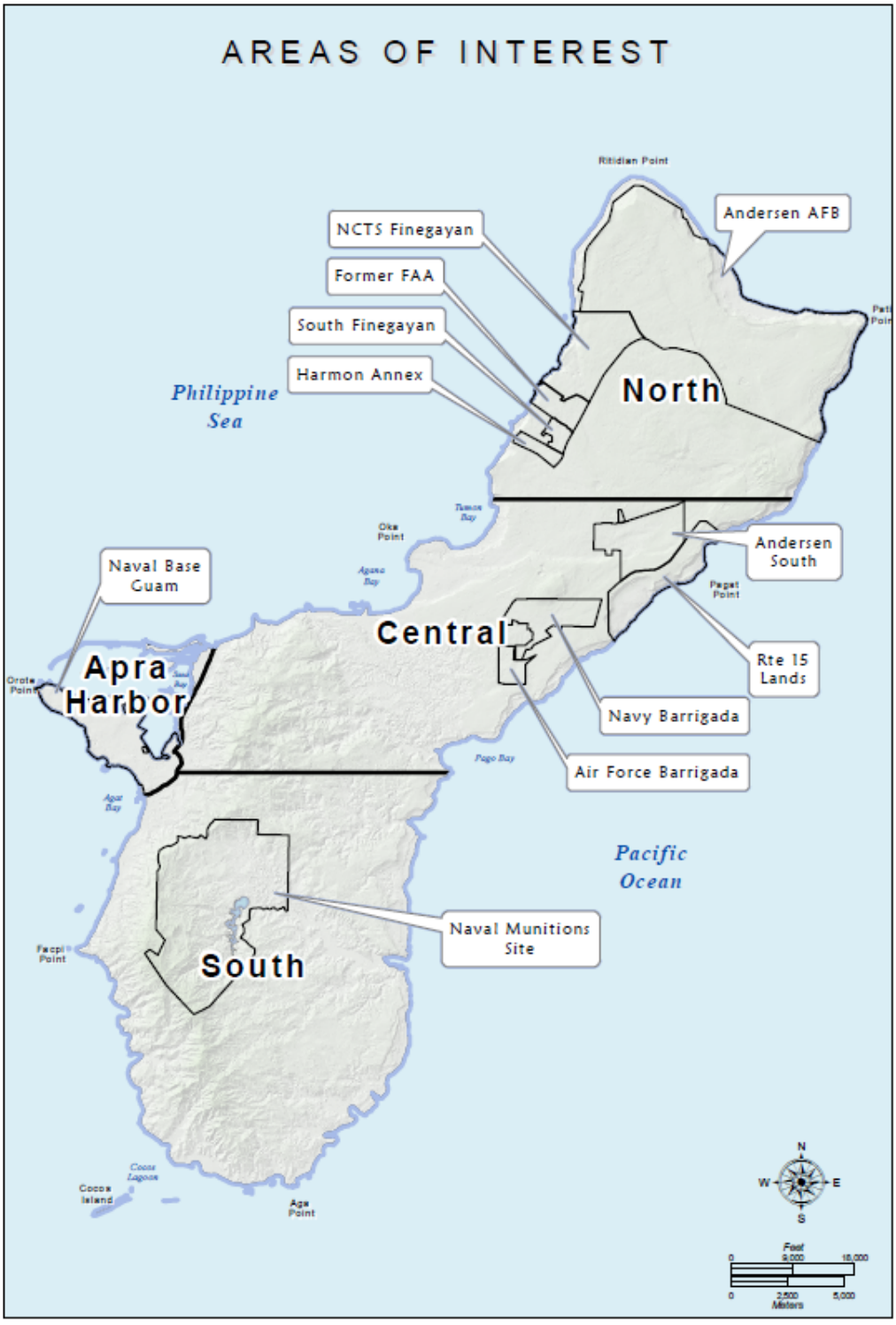

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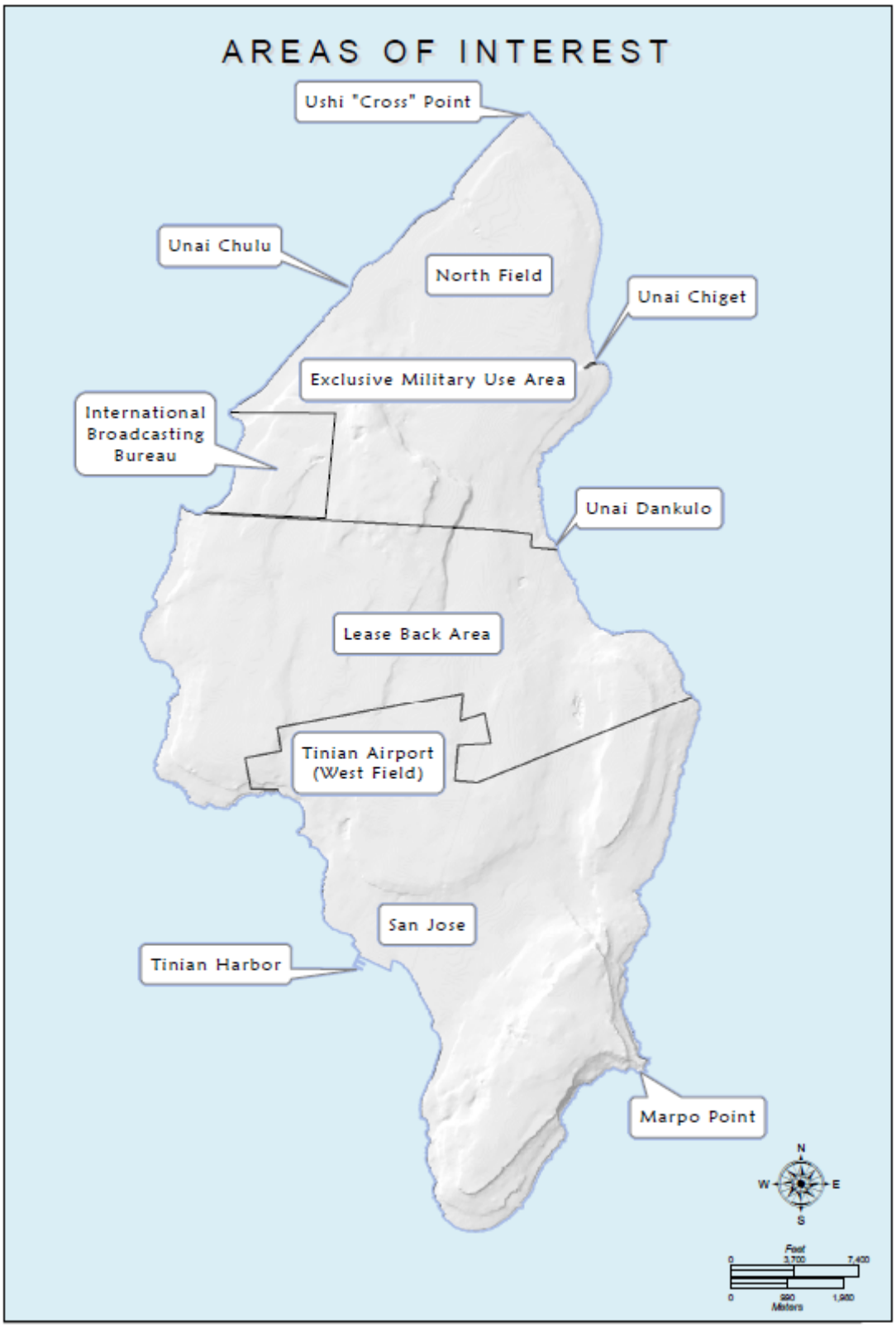
AREAS OF INTEREST
Ushi "Cross" Point
Unai Chulu
North Field
Unai Chiget
Exclusive Military Use Area
International Broadcasting Bureau
Unai Dankulo
Lease Back Area
Tinian Airport (West Field)
San Jose
Tinian Harbor
Marpo Point
N
W
E
S
Feet
0
3,700
7,400
0
990
1,980
Meters

CHAPTER 4. GLOSSARY

Access—the right to transit to and from and to make use of an area.

Activity—an individual scheduled training function or action such as missile launching, bombardment, vehicle driving, or Field Carrier Landing Practice.

Air Traffic Control Assigned Airspace (ATCAA)—Federal Aviation Administration-defined airspace not over an Operating Area (OPAREA) within which specified activities, such as military flight training, are segregated from other Instrument Flight Rules air traffic.

Airfield—usually an active and/or inactive airfield, or infrequently used landing strip, with or without a hard surface, without Federal Aviation Administration-approved instrument approach procedures. An airfield has no control tower and is usually private.

Airport—usually an active airport with hard-surface runways of 3,000 feet or more, with Federal Aviation Administration-approved instrument approach procedures regardless of runway length or composition. An airport may or may not have a control tower. Airports may be public or private.

Airspace, Controlled—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Airspace, Special Use—airspace of defined dimensions identified as the space or portion thereof over an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon non-participating aircraft.

Airspace, Uncontrolled—airspace, or Class G airspace, refers to airspace not otherwise designated and operations below 1,200 feet above ground level. No air traffic control service to either Instrument Flight Rules or Visual Flight Rules aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

Airspace—the space lying above the earth or above a certain land or water area (such as the Pacific Ocean); more specifically, the space lying above a nation and coming under its jurisdiction.

Amphibious Craft Laydown— location for storing, maintaining and deploying amphibious vehicles.

Army Air and Missile Defense Task Force (AMDTF)—a ground force that includes command and control, missile field teams, maintenance, and logistics/supplies support. They also include Weapons Emplacement Sites that would accommodate Terminal High-Altitude Area Defense (THAAD) and Patriot Missile operations.

Base load power—the minimum load over a given time period. The generation capacity needed to meet the continuous (24/7) demand for the system.

Battalion—in general, a battalion is a group of 5 companies, approximately 960 individuals.

Biosecurity Risk Assessment—a risk assessment to evaluate the proposed actions described in this EIS to determine the potential for invasive species to cause harm to ecological or economic systems on Guam or at locations where they may be inadvertently exported.

Biosecurity Plan—a plan that includes an invasive species risk assessment (biosecurity risk assessment) and management of risks and damage from invasive plant and animal species.

Biosecurity—a multi-level, multi-disciplinary, collaborative program to prevent the introduction and establishment of new invasive species.

Booster—an auxiliary or initial propulsion system that travels with a missile or aircraft and that may not separate from the parent craft when its impulse has been delivered; may consist of one or more units. Boosters contain high explosives sensitive enough to be detonated by a small initiator and powerful enough to set off a less sensitive main explosive charge.

Carrier Vessel Nuclear (CVN)—a nuclear powered aircraft carrier.

Coastal Zone—a region occupying the area near the coastline in depths of water less than 538.2 ft (164.0 m). The coastal zone typically extends from the high tide mark on the land to the gently sloping, relatively shallow edge of the continental shelf. The sharp increase in water depth at the edge of the continental shelf separates the coastal zone from the offshore zone. Although comprising less than 10% of the ocean's area, this zone contains 90% of all marine species and is the site of most large commercial marine fisheries. This differs from the way the term "coastal zone" is defined in the Federal Coastal Zone Management Act where "coastal zone" typically extends from the low tide mark to several hundred feet upland.

Continental United States (CONUS)—the United States and its territorial waters between Mexico and Canada, but excluding Alaska, Hawaii, U.S. territories, and possessions.

Company—in general, a company is a group of 4 platoons, approximately 192 individuals.

Controlled Access—area where public access is prohibited or limited due to periodic training operations or sensitive natural or cultural resources.

Controlled Airspace—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Controlled Firing Area—area where ordnance firing is conducted under controlled conditions so as to eliminate hazard to aircraft in flight.

Council on Environmental Quality (CEQ)—established by the National Environmental Policy Act, the CEQ consists of three members appointed by the President. A CEQ regulation (Title 40 Code of Federal Regulations 1500-1508, as of July 1, 1986) describes the process for implementing the National Environmental Policy Act, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Cumulative Impact—the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Discarded Military Munitions—military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.

Distance X—the maximum distance a projectile (including guided missiles and rockets) will travel when fired or launched at a given quadrant elevation with a given charge or propulsion system.

Economic Adjustment Committee (EAC)—established by Executive Order 12788 (as amended), the EAC coordinates Federal interagency and intergovernmental assistance to support the Defense Economic Adjustment Program and help communities respond to economic impacts caused by significant Defense program changes. The EAC is chaired by the Secretary of Defense. The Secretaries of Labor and Commerce serve as the Vice Chair men and there are a total of twenty-two federal agencies and departments represented on the EAC.

Encroachment (per Navy instruction)—any non-Navy action planned or executed that inhibits, curtails, or possesses the potential to impede the performance of Navy activities. Additionally, the lack of action by the Navy to work proactively with local communities, to monitor development plans, or to adequately manage its facilities and real property could also impact the Navy mission and thereby result in encroachment." Therefore, encroachment may stem from both internal (Navy) and external (civilian) sources.

Explosive Ordnance Disposal (EOD)—the detection, identification, field evaluation, rendering-safe recovery, and final disposal of conventional, nuclear, and chemical/biological ordnance. EOD activities are performed by specially trained active duty military personnel.

Explosive Safety Quantity-Distance (ESQD)—for a given quantity of explosive material, the distance separation relationships providing defined types of protection based on levels of risk considered acceptable. The size of the ESQD arc is proportional to the net explosive weight present.

Facilities—physical elements that can include roads, buildings, structures, and utilities. These elements are generally permanent or, if temporary, have been placed in one location for an extended period of time.

Fleet Area Control and Surveillance Facility (FACSFAC)—Navy facility that provides air traffic control services and controls and manages Navy-controlled off-shore operating areas and instrumented ranges.

Hardfill—a disposal facility for demolition debris (e.g. reinforced and non-reinforced concrete, asphalt, brick, block, tile, stone, roofing material, drywall, wood, and metal) that is not contaminated with solid waste, infectious waste, or hazardous waste.

High Explosive (HE)—an explosive substance designed to function by detonation (e.g., main charge, booster, or primary explosive). High Explosives when initiated change from basic form at a velocity greater than that of sound throughout the material exploding. The reaction, which generates a large volume of gas at high temperature and results in intense shattering effect, is usually referred to as a detonation. Examples: RDX, TNT, dynamite, and HBX.

Impact Area—the identified area within a range intended to capture or contain ammunition, munitions, or explosives and resulting debris, fragments, and components from various weapons systems (e.g., the ground and associated airspace within the training complex) A weapon system impact area is the area within the surface danger zone used to contain fired, or launched ammunition and explosives, and the resulting fragments, debris, and components. Indirect fire weapon system impact areas include probable error for range and deflection. Direct fire weapon system impact areas encompass the total surface danger zone from the firing point or position downrange to distance X.

Instrument Flight Rules (IFR)—regulations and procedures for flying aircraft by referring only to the aircraft instrument panel for navigation.

Major Exercise—a significant operational employment of live, virtual, and/or constructive forces during which live training is accomplished. A Major Exercise includes multiple training objectives, usually occurring over an extended period of days or weeks. An exercise can have multiple training operations (sub-events each with its own mission, objective and time period. Examples include C2X, JTFEX, SACEX, and CAX. Events [JTFEX] are composed of specific operations [e.g., Air-to-Air Missile], which consist of individual activities [e.g., missile launch]).

Maneuver Element—basic element of a larger force independently capable of maneuver. Normally, a Marine Division recognizes its infantry battalions, tank battalion, and light armored reconnaissance (LAR) battalion as maneuver elements. A rifle (or tank/LAR) battalion would recognize its companies as maneuver elements. A rifle (or tank/LAR) company would recognize its platoons as maneuver elements. Maneuver below the platoon level is not normally possible since fire and movement can be combined only at the platoon level or higher. The Army and National Guard recognize a squad and platoon as maneuver elements.

Maneuver—employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage with respect to the enemy in order to accomplish the mission.

Marine Air-Ground Task Force (MAGTF)— This is how the Marine Corps is set up to perform all types of their military actions. It insures that ground forces and air forces are working together under single leadership and a clear goal.

Marine Expeditionary Force (MEF)—A MEF is the largest MAGTF group, and is comprised of a MEF Headquarters Group, Marine Division, Marine Air Wing and Marine Logistics Group.

Marine Expeditionary Brigade (MEB)—A MEB is larger than a Marine Expeditionary Unit (MEU) but smaller than a Marine Expeditionary Force (MEF). It is comprised of a reinforced infantry regiment, a composite Marine aircraft group, and a brigade service support group. It can function as part of a joint task force, as the lead echelon of the MEF, or alone.

Marine Expeditionary Unit (MEU)—A MEU is the smallest MAGTF group, and is comprised of an air and ground combat team, and combat service support. The specific makeup of the MEU can be customized with additional artillery, armor, or air units.

Marine Corps Ground Unit—Marine Expeditionary Unit Ground Combat Element, or Battalion Landing Team, composed of an infantry battalion of about 1,200 personnel reinforced with artillery, amphibious assault vehicles, light armored reconnaissance assets and other units as the mission and circumstances require.

Material Potentially Presenting an Explosive Hazard (MPPEH)— material owned or controlled by the Department of Defense that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are munitions within the DoD-established munitions management system and other items that may present explosion hazards (e.g., gasoline cans and compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Munitions and Explosives of Concern (MEC)—this term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded Ordnance (UXO), as defined in 10 U.S.C. 101(e)(5)(A) through (C): (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2): or (C) munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

National Environmental Policy Act (NEPA)—42 U.S.C. 4321, et seq passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities, such as population growth, high-density urbanization, or industrial development, on the natural environment. The NEPA procedures require that environmental information be made available to the public and the decision-makers before decisions are made. Information contained in the NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

Outside the Continental United States (OCONUS)—the areas of Alaska, Hawaii, U.S. territories, and possessions and their territorial waters excluding the U.S. and its territorial waters between Mexico and Canada.

Operation—A combination of activities accomplished together for a scheduled period of time for an intended military mission or task. An operation can range in size from a single unit exercise to a Joint or Combined event with many participants (e.g., aircraft, ships, submarines, troops).

Operational Range—a range that is under the jurisdiction, custody, or control of the Secretary of Defense and is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities per 10 U.S.C. 101(e)(3).

Ordnance—broadly encompasses all weapons, ammunition, missiles, shells, and expendables (e.g., chaff and flares).

Peak load—the maximum load consumed or produced by a unit or group of units in a stated time period. It may be the maximum instantaneous load or the maximum average load over a designated period of time. The peak system demand during a period of time (peak demand for a day, hour, month).

Platoon—in general, a platoon is a group of 42 individuals.

Range—a land or sea area designated and equipped for firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, exclusionary areas. Also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration [10 U.S.C. 101 (e)(3)].

Range Activity—an individual training or test function performed on a range or in an Operating Area. Examples include missile launching, bombardment, and vehicle driving. Individual RDT&E functions are also included in this category.

Range Complex—a geographically integrated set of ranges, operational areas, and associated special use airspace, designated and equipped with a command and control system and supporting infrastructure for freedom of maneuver and practice in munitions firing and live ordnance use against scored and/or tactical targets and/or Electronic Warfare tactical combat training environment.

Range Operation—a live training exercise, a research, development test and evaluation (RDT&E) test, or a field maneuver conducted for a specific strategic, operational or tactical military mission, or task. A military action. Operations may occur independently, or multiple operations may be accomplished as part of a larger event. One operation consists of a combination of activities accomplished together. The type of operation can include air, land, sea, and undersea warfare training or testing. Participants can include a specific number and type of aircraft, ships, submarines, amphibious or other vehicles and personnel.

Range Safety Zone—area around air-to-ground ranges designed to provide safety of flight and personnel safety relative to dropped ordnance and crash sites. Land use restrictions can vary depending on the degree of safety hazard, usually decreasing in magnitude from the weapons impact area (including potential ricochet) to the area of armed overflight and aircraft maneuvering.

Readiness—the ability of forces, units, weapon systems, or equipment to deliver the outputs for which they were designed (includes the ability to deploy and employ without unacceptable delays).

Regiment—a Regiment is a unit of three Battalions, approximately 2,880 individuals.

Restricted Area—a designated airspace in which flights are prohibited during published periods of use unless permission is obtained from the controlling authority.

Safety Zone—administratively designated/implied areas designated to limit hazards to personnel and the public, and resolve conflicts between operations. Can include range safety zones, ESQDS, surface danger zones, special use airspace, hazards of electromagnetic radiation to ordnance/hazards of electromagnetic radiation to personnel areas, etc.

Scoping—a process initiated early during preparation of an Environmental Impact Statement to identify the scope of issues to be addressed, including the significant issues related to the Proposed Action. During scoping, input is solicited from affected agencies as well as the interested public.

Sortie—a single operational training or RDT&E event conducted by one aircraft in a range or operating area. A single aircraft sortie is one complete flight (i.e., one take-off and one final landing).

Special Use Airspace—consists of several types of airspace used by the military to meet its particular needs. Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of these activities, or both. Special use airspace, except for Control Firing Areas, are charted on instrument flight rules or visual flight rules charts and include hours of operation, altitudes, and the controlling agency.

Stakeholder—those people or organizations that are affected by or have the ability to influence the outcome of an issue. In general, this includes regulators, the regulated entity, and the public. It also includes those individuals who meet the above criteria and do not have a formal or statutorily defined decision-making role.

Submerged Lands—the areas in coastal waters extending from the Guam coastline into the ocean 3 nautical miles (nm) (5.6 kilometers [km]).

Surface Danger Zone (SDZ)—the area surrounding a range that allows for the probability of a munition not landing within the designated target or impact area within which access is controlled for safety during firing.

Sustainable Range Management—management of an operational range in a manner that supports national security objectives, maintains the operational readiness of the Armed Forces, and ensures the long-term viability of operational ranges while protecting human health and the environment.

Targets—earthwork, materials, actual or simulated weapons platforms (tanks, aircraft, EW systems, vehicles, ships, etc.) comprising tactical target scenarios within the range/range complex impact areas.

Uncontrolled Airspace—airspace of defined dimensions in which no air traffic control services to either instrument flight rules or visual flight rules aircraft will be provided, other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

Unexploded Ordnance (UXO)—military munitions that (A) have been primed, fused, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, property, installations, personnel or material; and (C) remained unexploded either by malfunction, design or any other cause [10 U.S.C. 101 (e)(5)(A) through (C)].

Ungulate—any animal having hoofs such as deer, pigs, cattle, etc.

Upland—an area of land of higher elevation.

U.S. Territorial Waters—sea areas within 12 nm of the U.S. coastline, normally measured from the low water mark on the shoreline.

Visual Flight Rules (VFR)—regulations which allow a pilot to operate an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.

Wholly Inert—ordnance with no explosive, propellant, or pyrotechnic component (non-reactive); example: BDU-50, BDU-56 (both are non-reactive heavy-weights with no explosive charges).

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CHAPTER 5.
ACRONYM AND ABBREVIATION LIST

°F	degrees Fahrenheit
36 WG	36th Wing
III MEF	Third Marine Expeditionary Force
AAV	Amphibious Assault Vehicle
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ac	acre(s)
ACE	Air Combat Element
ACHP	Advisory Council for Historic Preservation
ACM	asbestos-containing material
A.D.	Anno Domini
AD/ADFM	Active Duty/Active Duty Family Members
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADNL	A-weighted Day Night Average Level
ADT	Average Daily Traffic
AFB	Air Force Base
AFI	Air Force Instruction
A-G	air-to-ground
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AIDS	Acquired Immune Deficiency Syndrome
AIP	Agreed Implementation Plan
ALPCD	Alien Labor Processing and Certification Division
AMC	Air Mobility Command
AMDTF	Air and Missile Defense Task Force
AMVOC	Advanced Motor Vehicle Operators Course
AOC	Area of Concern
AOR	Area of Responsibility
APC	Areas of Particular Concern
APCSR	Air Pollution Control Standards and Regulations
APE	Area of Potential Effect
APZ	Accident Potential Zone
ARG	Amphibious Readiness Group
APHIS	Agricultural Animal Plant and Health Inspection Service
ARPA	Archaeological Resource Protection Act
A-S	air-to-surface
ASHRAE	American Society of Heating Refrigeration and Air Conditioning Engineers
ASN	Assistant Secretary of the Navy
AST	Aboveground Storage Tank
ASTM	American Standards Society for Testing and Measurements
ATARA	Alliance Transformation and Realignment Agreement
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
AT/FP	Antiterrorism/Force Protection
AUPM	Above and Underground Storage Tank and Pesticide Management
B	billion
BA	Biological Assessment
BACT	Best Available Control Technology
BASH	Bird Airstrike Hazard Plan
B.C.	Before Christ
BCD	Base Command Officer
BCDC	Bureau of Communicable Disease Control
BDDT	BASH Detection and Dispersal Team
BEQ	Bachelor Enlisted Quarters
BFHNS	Bureau of Family Health and Nursing Services
BFR	Basic Facility Requirements
BHC	Bird Hazard Condition
BI	Beneficial Impact
BMD	Ballistic Missile Defense
BMDTF	Ballistic Missile Defense Task Force
BMP	Best Management Practice
BMUS	Bottomfish Management Unit Species
BO	Biological Opinion
BOD	biological oxygen demand
BOMBEX	Bombing Exercise
BOQ	Bachelor Officer Quarters
BOW	Bilge Oily Waste
BOWTS	Bilge Oily Waste Treatment System
B.P.	Before Present
BPC	Bureau of Primary Care
BFR	Basic Facility Requirements
BQ	Bachelors Quarters
BRAC	Base Realignment and Closure
BRD	Biological Resources Discipline
BRS	Biennial Reporting System
BRSA	Biological Resource Study Area
BS 0	Battle Site Zero
BSP	Bureau of Statistics and Plans
BSTF	Battle Staff Training Facility
BSTS	Battle Staff Training and Simulation
BTS	brown tree snake
Btu	British Thermal Units
BUMED	Bureau of Medicine and Surgery
C&D	Construction and Demolition
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAL	Confined Area Landings
CAST	Combined Arms Staff Trainer

CATEX	Categorical Exclusion
$CBOD_5$	Chemical Biological Oxygen Demand – Five Day
CCU	Consolidated Commission on Utilities
CDC	Center for Disease Control
CDF	Confined Disposal Facility
CDL	Clandestine Drug Labs
CDNL	C-weighted DNL
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Act Information Systems
CESQG	Conditionally Exempts Small Quantity Generators
CEQ	Council on Environmental Quality
CFA	Controlled Firing Area
CFR	Code of Federal Regulations
cfs	cubic feet per second
CG	Guided Missile Cruiser
CGC	Coast Guard Cutter
CGP	Construction General Permit
CH_4	methane
CHC	Community Health Clinic
CHCRT	Currently Harvested Coral Reef Taxa
CIP	Capital Improvements Program
CLOMR	Conditional Letter of Map Revision
CLTC	Chamorro Land Trust Commission
cm	centimeter(s)
cm/s	centimeters per second
CMCC	Civil-Military Coordination Council
CMP	Coastal Management Program
CMUS	Crustacean Management Unit Species
CNM	Commander Navy Region Marianas
CNMI	Commonwealth of the Northern Mariana Islands
CNO	Chief of Naval Operations
CO	carbon monoxide
CO_2	carbon dioxide
COFA	Compact of Free Association
COMNAV	Commander Navy Region
COMPACFLT	Commander, U.S. Pacific Fleet
COMSCINST	Commander, Military Sealift Command Instruction
CONOPS	Concept of Operations
CONSENT	Superfund Consent Decrees
CONUS	Continental United States
CORRACTS	Corrective Action Sites
CPA	Commonwealth Ports Authority
CPF	Commander U.S. Pacific Fleet
CPI	Consumer Price Index
CQC	Close Quarters Combat
CREMUS	Coral Reef Ecosystem Management Unit Species
CRM	Coastal Resources Management
CRMO	Coastal Resources Management Office
CRMP	Coastal Resources Management Program
CRRC	Combat Rubber Raiding Craft
CSA	Customer Service Agreement
CSAR	Combat Search and Rescue
CSG	Carrier Strike Group
CSS	Commander Submarine Squadron
CT	Combustion Turbine
CUC	Commonwealth Utilities Corporation
CVN	Carrier Vessel Nuclear
CVW	Carrier Air Wing
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
CY	cubic yard(s)
CZ	Clear Zone
CZMA	Coastal Zone Management Act
DAMOS	Disposal Area Monitoring System
DAR	Defense Access Road
dB	decibel(s)
dBA	A-weighted decibel(s)
dBC	C-weighted decibel(s)
DD	Destroyer
DDESB	Department of Defense Explosive Safety Board
DDESS	Dependent Elementary and Secondary Schools
DDG	Guided Missile Destroyer
DEH	Division of Environmental Health
DELISTED NPL	National Priority List Deletions
DEQ	Division of Environmental Quality
DERP	Defense Environmental Restoration Program
DISID	Department of Integrated Services for Individuals with Disabilities
DLM	Department of Land Management
DLNR	Department of Lands and Natural Resources
DM	Defensive Maneuvers
DMHSA	Department of Mental Health and Substance Abuse
DMM	Discarded Military Munitions
DMR	Discharge Monitoring Report
DNL	Day-Night Sound Level
DO	dissolved oxygen
DoC	Department of Corrections
DoD	Department of Defense
DoDEA	Department of Defense Education Activity
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DoN	Department of the Navy
DOPAA	Description of Proposed Action and Alternatives
DOT	Department of Transportation

DOT OPS	Department of Transportation Office of Pipeline Safety Incident and Accident Data
DPHSS	Department of Public Health and Social Services
DPL	Department of Public Lands
DPRI	Defense Policy Review Initiative
DPS	Department of Public Safety
DPW	Department of Public Works
DRMO	Defense Reutilization and Marketing Office
DRS	Demand Response Service
DSAY	Discount Service Acre Year
DSMOA	DoD & State/Territorial Memorandum of Agreement
DU	dwelling unit
DU/ac	dwelling units per acre
DYA	Department of Youth Affairs
E&ECR	Erosion and Sediment Control Regulation
EA	Environmental Assessment
EAC	Economic Adjustment Committee
EC	Electronic Combat
ECM	earth-covered magazine
ECO	Environmental Compliance Officer
EC-OPS	Electronic Combat Operations
ECHO	Enforcement and Compliance History Online
ECP	entry control point
EDR	Environmental Data Resources
EET	Energy Efficient Transport
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMI	Electromagnetic Interference
EMR	Electromagnetic Radiation
EMUA	Exclusive Military Use Area
ENSO	El Niño Southern Oscillation
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPACT	Energy Policy Act of 2005
EPCRA	Emergency Planning & Community Right-To-Know Act
EPP	Environmental Protection Plan
ERA	Ecological Reserve Area
ERNS	Emergency Response Notification System
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESA	Endangered Species Act
ESAL	Equivalent Single Axle Loading
ESG	Expeditionary Strike Group
ESQD	Explosive Safety Quantity Distance
ESS	Explosive Safety Submission
FAA	Federal Aviation Administration
FACSFAC	Fleet Area Control and Surveillance Facility
FAM	Familiarization and Instrument Flight
FARP	Forward Arming and Refueling Point
FAS	Freely Associated States of Micronesia
FCLP	Field Carrier Landing Practice
FDC	Fire Direction Center
FDM	Farallon de Medinilla
FEMA	Federal Emergency Management Agency
FEP	Fishery Ecosystem Plan
FEPCA	Federal Pesticide Control Act
FFCA	Federal Facilities Compliance Act
FHWA	Federal Highway Administration
FINDS	Facility Index System
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FIP	Flight Information Public
FIREX	Firing Exercise
FIRM	Flood Insurance Rate Map
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FOC	Full Operational Capability
FPPA	Farmland Protection Policy Act
FR	Federal Register
FSM	Federated States of Micronesia
ft	foot/feet
ft^2	square foot/feet
FTA	Federal Transit Administration
FTE	full time equivalent
FTTS	FIFRA/TSCA Tracking System
FTX	Field Training Exercise
FUDS	Formerly Used Defense Sites
FWCA	Fish and Wildlife Coordination Act
FY	Fiscal Year
GAIN	Guam Animals in Need
GALC	Guam Ancestral Lands Commission
GAR	Guam Administrative Regulations
GBB	Gershman, Brickner, & Bratton, Inc.
GBSP	Guam Bureau of Statistics and Plans
GCA	Guam Code Annotated
GCC	Guam Community College
GCE	Ground Combat Element
GCMP	Guam Coastal Management Plan
GCR	General Conformity Rule
GCWCS	Guam Comprehensive Wildlife Conservation Strategy
GDAWR	Guam Division of Aquatic and Wildlife Resources
GDISID	Guam Department of Integrated Services for Individuals with Disabilities
GDLM	Guam Department of Land Management
GDMHSA	Guam Department of Mental Health and Substance Abuse
GDoC	Guam Department of Corrections
GDoL	Guam Department of Labor
GDP	Guam Police Department
GDPHSS	Guam Department of Public Health and Social Services

GDPR	Guam Department of Parks and Recreation
GDPW	Guam Department of Public Works
GDYA	Guam Department of Youth Affairs
GEDA	Guam Economic Development Authority
GEPA	Guam Environmental Protection Agency
GFD	Guam Fire Department
GHG	greenhouse gas
GHMP	Guam Hazard Mitigation Plan
GHPO	Guam Historic Preservation Office
GHRA	Guam Hotel and Restaurant Association
GIAA	Guam International Airport Authority
GIMDP	Guam Integrated Military Development Plan
GIP	Gross Island Product
GIS	Geographic Information System
GJMMP	Guam Joint Military Master Plan
GLUC	Guam Land Use Commission
GLUP	Guam Land Use Plan
GMH	Guam Memorial Hospital
GMHA	Guam Memorial Hospital Authority
GNWR	Guam National Wildlife Refuge
GoJ	Government of Japan
GovGuam	Government of Guam
GPA	Guam Power Authority
gpcd	gallons per capita per day
gpd	gallons per day
GPD	Guam Police Department
GPLS	Guam Public Library System
gpm	gallons per minute
GPSS	Guam Public School System
GRHP	Guam Register of Historic Places
GRN	Guam Road Network
GRT	Gross Receipts Tax
GSCSCR	Government of Guam Soil Erosion And Sediment Control Regulations
GSF	gross square feet
GSM	gross square meters
GTP	2030 Guam Transportation Plan
GTR	Ground Threat Reaction
GUNEX	Gunnery Exercise
GVB	Guam Visitors Bureau
GW	groundwater
GWA	Guam Waterworks Authority
GWMPZ	ground water management protection zone
GWP	global warming potential
GWQS	Guam Water Quality Standards
GWUDI	groundwater under the direct influence of surface water
ha	hectare(s)
HACCP	Hazard Analysis and Critical Control Points
HAP	Hazardous Air Pollutant(s)
HAPC	Habitat Area of Particular Concern
HC	hydrocarbon
HCF	hydroflurocarbon
HCM	Highway Capacity Manual
HDPE	high-density polyethylene
HDD	Horizontal Directional Drilling
HE	high explosive
HEA	Habitat Equivalency Analysis
HERO	Hazards of Electromagnetic Radiation to Ordnance
HERP	Hazards of Electromagnetic Radiation to Personnel
HFC	hydrofluorocarbons
HIE	Helicopter Insertion/Extraction
HIV	Human Immunodeficiency Virus
HMIRS	Hazardous Materials Information Reporting System
HMMP	Hazardous Materials Management Plan
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HMU	Habitat Management Unit
HPO	Historic Preservation Office(r)
HPV	high-priority violation
HQ	Headquarters
hr	hour(s)
HSC	Helicopter Sea Combat Squadron
HSIP	Highway Safety Improvement Program
HSV	High Speed Vessel
HSWA	Hazardous and Solid Waste Amendments
HUBZone	Historically Underutilized Business Zone
HVAC	heating, ventilation, and air conditioning
HWMP	Hazardous Waste Management Program
Hz	hertz
IAP	International Airport
IAS	invasive alien species
IBB	International Broadcasting Bureau
ICC	information coordination central
ICIS	Integrated Compliance Information System
ICRMP	Integrated Cultural Resources Management Plan
IGPBS	Integrated Global Presence and Basing Strategy
IFR	Instrument Flight Rules
IMP	Integrated Management Practice
IMS	invasive marine species
in	inch(es)
INRMP	Integrated Natural Resources Management Plan
INST CONTROLS	Sites with Institutional Controls
IOC	Initial Operational Capability
IPCC	Intergovernmental Panel on Climate Change
IPMP	Integrated Pest Management Plan
IPP	Independent Power Producers
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
ISA	Inter-Service Agreement
ISO	International Organization for Standardization
ISR	Intelligence, Surveillance, and Reconnaissance
ISWMP	Integrated Solid Waste Management Plan

ITC	International Trade Center
IWPS	Island-Wide Power System
JBIC	Joint Bank of International Cooperation
JGPO	Joint Guam Program Office
JSDF	Japanese Self-Defense Force
JRC	Joint Region Commander
JRM	Joint Region Marianas
KD	known distance
kg	kilogram
kg/day	kilograms per day
km	kilometer(s)
km^2	square kilometer(s)
knots	nautical miles per hour
kph	kilometers per hour
kV	kilovolts
kW	kilowatt(s)
kW/hr	kilowatts per hour
L	liter(s)
LAER	Lowest Achievable Emission Rate
LandGEM	Landfill Gas Emissions Model
LAV	Light Armored Vehicle
lb	pound(s)
LBA	Leaseback Area
LBP	lead-based paint
LCAC	Landing Craft Air Cushion
LCE	Logistic Combat Element
LCU	Landing Craft Utility
LEDPA	Least Environmentally Damaging Practicable Alternative
LEED	Leadership in Energy and Environmental Design
L_{eq}	equivalent sound level
LF	linear feet
LFG	Landfill Gas
LHA/LHD	Amphibious Assault Ship
LID	Low Impact Development
LIDAR	Light Detection and Ranging
LLDP	linear low-density polyethylene
L_{max}	Maximum Sound Level
LNG	Liquefied Natural Gas
LOS	Level of Service
LPD	Amphibious Transport Dock
lpm	liters per minute
LQG	large quantity generator
LSD	Dock Landing Ship
LSI	Less than significant impact
LUCIS	Land Use Control Information Systems
LZ	Landing Zone
m	meter(s)
m^2	square meter(s)
m^3	cubic meters(s)
M	million
MAGC	Marine Air Control Group
MAGTF	Marine Air Ground Task Force
MALS	Marine Aviation Logistics Squadron
MAP	Military Access Point
Marine Corps	United States Marine Corps
MARFORPAC	Marine Forces Pacific
MAW	Marine Aircraft Wing
MBP	Micronesia Biosecurity Plan
MBTA	Migratory Bird Treaty Act
MCB	Marine Corps Base
MCMEX	Mine Counter Measures Exercise
MC	Munitions Constituents
MCCS	Marine Corps Community Service
MCL	Maximum Concentration Level
MCMEX	Mine Counter Measures Exercise
MCO	Marine Corps Order
MCP	Mariana Islands Concept Plan
MCTL	Marine Corps Task List
MDA	Missile Defense Agency
MEB	Marine Expeditionary Brigade
MEC	Munitions and Explosives of Concern
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MFP/CPF	Marine Forces Pacific/Commander Pacific Fleet
MFR	multi-family residential
MG	million gallons
mg/cm^2	milligrams per square centimeter
MGd	million gallons per day
mg/L	milligrams per liter
mi	mile(s)
mi^2	square miles
MILCON	Military Construction
MIP	Medically Indigent Program
MIRC	Mariana Islands Range Complex
MISSILEX	Missile Exercise
ML	million liters
MLA	Military Lease Area
MLd	million liters per day
MLG	Marine Logistic Group
MLLW	mean lower low water
MLTS	Material Licensing Tracking System
mm	millimeter(s)
MMPA	Marine Mammal Protection Act
MMR	Military Munitions Rule
MMRP	Military Munitions Response Program
MMT	Marine Monitoring Team
MOA	Memorandum of Agreement
MOS	Military Occupational Specialty
MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
MP	Military Police
MPA	microscopic particulate analyses
MPA	Marine Protected Area
mph	miles per hour
MPLA	Marianas Public Land Authority
MPPEH	material potentially presenting an explosive hazard
MPRSA	Marine Protection, Research, and Sanctuaries Act

MRA	Munitions Response Area
MRC	Marine Research Consultants
MRP	Marine Resource Preserve
MRS	Munitions Response Sites
MSA	Munitions Storage Area
M-SA	Magnuson-Stevens Fishery Conservation and Management Act
MSAT	Mobile Source Air Toxics
MSC	Military Sealift Command
msl	mean sea level
MSM	modular storage magazine
MSWLF	Municipal Solid Waste Landfill Facility
MTVR	Medium Tactical Vehicle Replacement
MUS	Management Unit Species
MUSE	Mobile Utilities Support Equipment
MUTCD	Manual on Uniform Traffic Control Devices
MVA	mega volt ampere
MW	megawatts
MWDK	Military Working Dog Kennel
MWR	Morale, Welfare, and Recreation
N_2O	nitrous oxide
NA	not applicable
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NATA	National Air Toxics Assessment
NAV	Navy Ashore Vision
NAVCAMS	Naval Communication Area Master Station
NAVFAC	Naval Facilities Engineering Command
NC	New Construction
NCP	National Contingency Plan
NCTMS	Naval Computer and Telecommunications Main Station
NCTS	Naval Computer and Telecommunications Station
ND	Neighborhood Development
NDAA	National Defense Authorization Act
NDWWTP	Northern District Wastewater Treatment Plant
NELHA	National Energy Laboratory of Hawaii Authority
NEO	Noncombatant Evacuation Operations
NEPA	National Environmental Policy Act
NEW	net explosive weight
NEXRAD	Next Generation Weather Radar
NFIP	National Flood Insurance Program
NFRAP	No Further Remedial Action Planned List
NGL	Northern Guam Lens
NGLA	Northern Guam Lens Aquifer
NGO	Non-Governmental Organization
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NHP	National Historic Park
NI	No impact
NIOSH	National Institute for Occupational Safety and Health
NISC	National Invasive Species Council
NITTS	Noise Induced Temporary Threshold Shift
NLNA	northern land navigation area
nm	nautical mile(s)
nm^2	square nautical mile(s)
NMC-DET	Navy Munitions Command Detachment
NMFS	National Marine Fisheries Service
NMS	Naval Munitions Site
NNPP	Naval Nuclear Propulsion Program
NO_2	nitrogen dioxides
NO_X	nitrogen oxides
NOA	notice of availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOPH	notice of public hearing
NOSSA	Naval Ordnance Safety and Security Activity
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRCHC	Northern Region Community Health Center
NRCS	Natural Resources Conservation District
NRHP	National Register of Historic Places
NRMC	Navy Regional Medical Center
NSR	New Source Review
NSV	North San Vitoris
NTU	nephelometric turbidity unit
NW	nearshore waters
NWF	Northwest Field
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
O_3	ozone
O&M	Operations and Maintenance
ODMDS	Ocean Dredged Material Disposal Site
OEA	Overseas Environmental Assessment
OEIS	Overseas Environmental Impact Statement
OHA	Overseas Housing Allowance
OIA	Office of Insular Affairs
OPA	Oil Pollution Act
OPNAVINST	Office of the Chief of Naval Operations Instruction
OSD	Office of the Secretary of Defense
OSHA	Occupational Safety and Health Administration
OTEC	Ocean Thermal Energy Conversion
P2	Pollution Prevention
PA	Programmatic Agreement
PAC-3	Patriot Advanced Capability-3

PACAF	Pacific Air Forces
PACOM	U.S. Pacific Command
PAG	Port Authority of Guam
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethylene
PE	private entity
PFC	perfluorocarbon
PHCRT	potentially harvested coral reef taxa
PHL	Potential Hearing Loss
PI	potential impact
PK-15	Unweighted Peak, 15% Metric
PL	Public Law
PLS	Public Library System
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PMO	Personnel Management Office
PMUS	Pelagic Management Unit Species
POL	petroleum, oil, and lubricants
POV	privately-owned vehicle
PPA	Pollution Prevention Act
PPE	personal protective equipment
ppm	parts per million
ppt	parts per thousand
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PUC	Public Utilities Commission
pv	photovoltaic
PVC	polyvinyl chloride
PYE	person years of employment
PWC	Public Works Center
QDR	Quadrennial Defense Review
QOL	Quality of Life
RA	Restricted Area
RAATS	RCRA Administrative Action Tracking System
RAB	Restoration Advisory Board
RADINFO	Radiation Information Database
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Act Information System
REA	Rapid Ecological Assessment
REC	Regional Environmental Coordinator
REDHORSE	Rapid Engineer Deployable Heavy Operations
Req'd	required
RHA	Rivers and Harbors Act
RHIB	Rigid Hull Inflatable Boat
RIA	Regulatory Impact Analysis
RO	reverse osmosis
ROD	Record of Decision
ROI	region of influence
RORO	roll-on roll-off
ROW	right-of-way
RPM	revolutions per minute
RSE	Repair Squadron Engineer
RTA	Range Training Area
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users
SAIA	Sikes Act Improvement Act
SARA	Superfund Amendments and Reauthorization Act
SAR	Second Assessment Report
SARNAM	Small Arms Range Noise Assessment Model
SAS	Special Aquatic Sites
SAT	Stationary Armor Target
SBHSR	Ship-Borne Hazardous Substance Regulations
SCC	Security Consultative Committee
SCH	school
SCR	Selective Catalytic Reduction
SCS	Soil Conservation Service
SCUBA	self-contained underwater breathing apparatus
SDWA	Safe Drinking Water Act
SDZ	Surface Danger Zone
SEABEE	Construction Battalion
SECNAV	Secretary of the Navy
SEI	Sea Engineering Inc.
SEL	Sound Exposure Level
SF_6	sulfur hexafluoride
SFR	single-family residential
SHSP	Strategic Highway Safety Plan
SHPO	State Historic Preservation Office
SI	Significant impact
SIAS	Socioeconomic Impact Assessment Study
SI-M	Significant impact mitigable to less than significant
SINKEX	Sink Exercise
SIP	State Implementation Plan
SIT	Stationary Infantry Target
SLAMRAAM	Surface-Launched Advanced Medium-Range Air-to-Air Missile
SLC	Submarine Learning Center
SMMP	Site Management and Monitoring Plan
SNC	Significant Non-Compliance
SNU	Skilled Nursing Unit
SO	stipulated order
SO_2	sulfur dioxide
SOC	species of concern
SOFA	Status of Forces Agreement
SOGCN	Species of Greatest Conservation Need
SOP	Standard Operating Procedure
SPAWAR	Space and Naval Warfare Systems Command
SPCC	Spill Prevention, Control and Countermeasure

SPE	Special Purpose Entity
SPS	Sewage Pump Station
SQG	small quantity generator
SRBM	Short-range Ballistic Missile
SRCHC	Southern Region Community Health Center
SRF	Ship Repair Facility
S-S	surface-to-surface
SSTS	Section Seven Tracking System
STD	sexually transmitted disease
STOM	Ship-to-Objective Maneuver
STP	sewage treatment plant
SUA	Special Use Airspace
SW	surface water/stormwater
SWMD	Solid Waste Management Division
SWMP	Stormwater Management Plan
SWMU	solid waste management unit
SWPPP	Stormwater Pollution Prevention Plan
T&D	Transmission and Distribution
T-AKE	Auxiliary Dry Cargo/Ammunition Ship
T-AKR	Sealift Ship
TAOC	Tactical Air Operations Center
TB	tuberculosis
TBD	To Be Determined
TBP	To Be Provided
TBT	tribulyl tin
TCE	trichloroethylene
TCP	Training Concept Plan
TDS	total dissolved solids
TEC JV	TEC Inc. Joint Venture
TERF	Terrain Flights
THAAD	Terminal High-Altitude Area Defense
TJS	Tactical Jamming System
TMDL	Total Maximum Daily Load
TMP	Traffic Management Plan
TNAP	Traffic Noise Abatement Policy
TNM	Traffic Noise Model
TOC	total organic carbon
TORPEX	Torpedo Exercise
TPFD	Time-Phased Force Deployment
TPY	tons per year
TRIS	Toxic Release Inventory System List
TSCA	Toxic Substance Control Act
TSS	total suspended solids
TTIP	Territorial Transportation Improvement Plan
TTLC	total threshold limit concentration
UAV	Unmanned Aerial Vehicle
UD	unknown distance
UF	usage factor
UFC	Unified Facilities Criteria
UFW	Unaccounted for Water
µg/L	micrograms per liter
UoG	University of Guam
UNFCC	United Nations Framework Convention on Climate Change
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USCRTF	U.S. Coral Reef Task Force
USDA	U.S. Department of Agriculture
USDA-APHIS	U.S. Department of Agriculture Animal and Plant Health Inspection Service
USDA-WS	U.S. Department of Agriculture-Wildlife Services
US ENG CONTROLS	Engineering Controls Site List
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Service
USLE	Universal Soil Loss Equation
UST	underground storage tank
UXO	unexploded ordnance
v	volt(s)
VA	Veterans Affairs
v/c	volume to capacity
VCO	Volunteer Conservation Officer
VCP	vitrified clay pipe
VFR	Visual Flight Rules
VHF	very high frequency
VHT	vehicle hours traveled
VIF	Vehicle Inspection Facility
VMT	vehicle miles traveled
VOC	volatile organic compound
vpd	vehicles per day
VQCF	Vehicle Queuing Control Facility
VWP	Visa Waiver Program
WA	Warning Area
WPC	Watershed Planning Committee
WPCP	Water Pollution Control Program
WPRFMC	Western Pacific Regional Fisheries Management Council
WQC	Water Quality Certification
WQMP	Water Quality Monitoring Plan
WRDA	Water Resource Development Acts
WRMP	Water Resources Master Plan
WTE	Waste-to-Energy
WTP	Water Treatment Plant
WWII	World War II
WL	wetlands
WWTP	Wastewater Treatment Plant
yd	yard
ZID	zone of initial dilution

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

Volume 1: Overview of Proposed Actions and Alternatives

July 2010

Point of Contact:

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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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July 2010

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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).

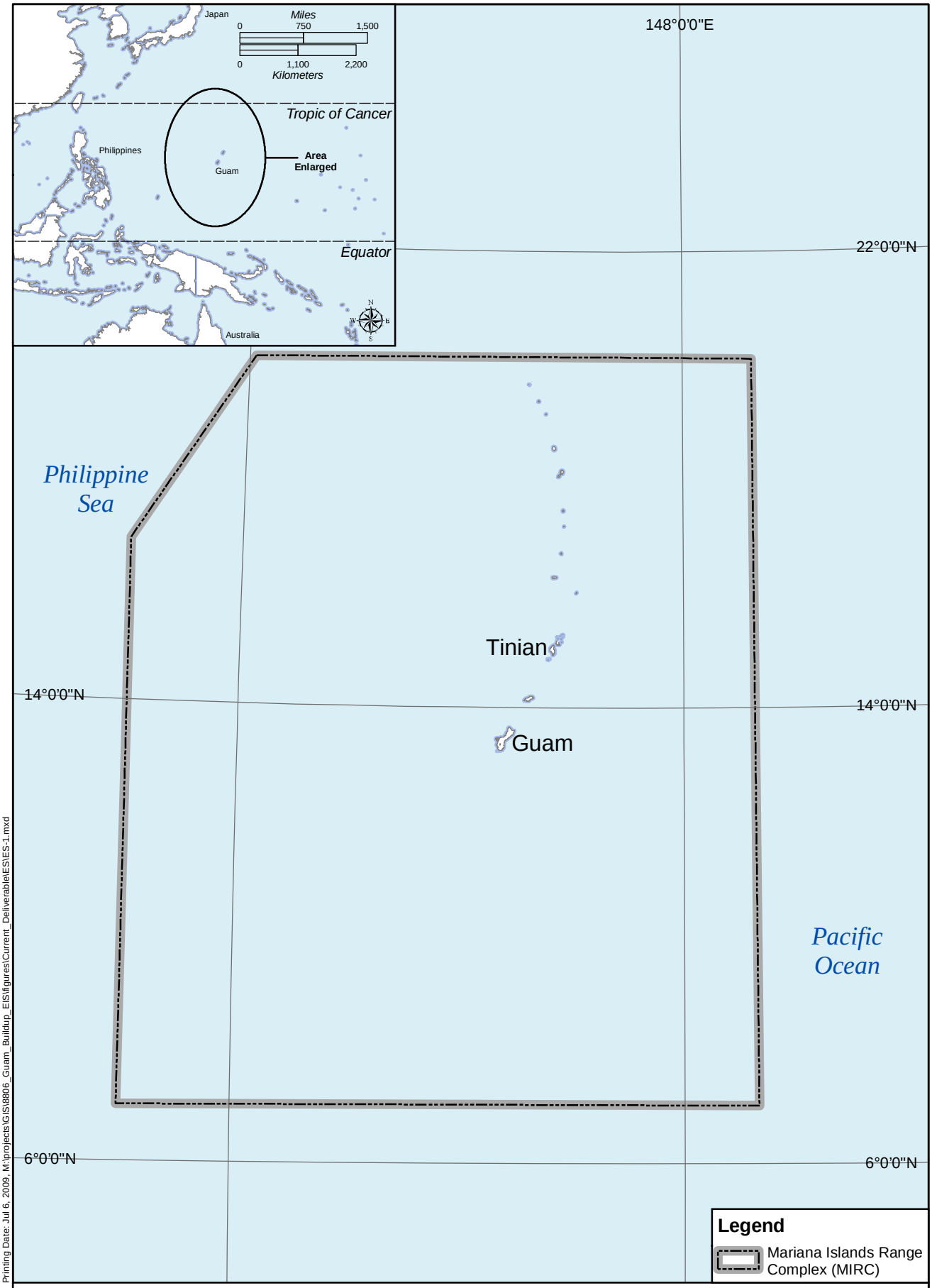

Figure ES-1
Mariana Islands Range Complex

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

Service	*Permanent Military Personnel*	*Dependents*	*Transient Military Personnel*	*DoD Civilian Workforce (from off island)*	*Subtotals by Service*
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 Population[1]											
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.

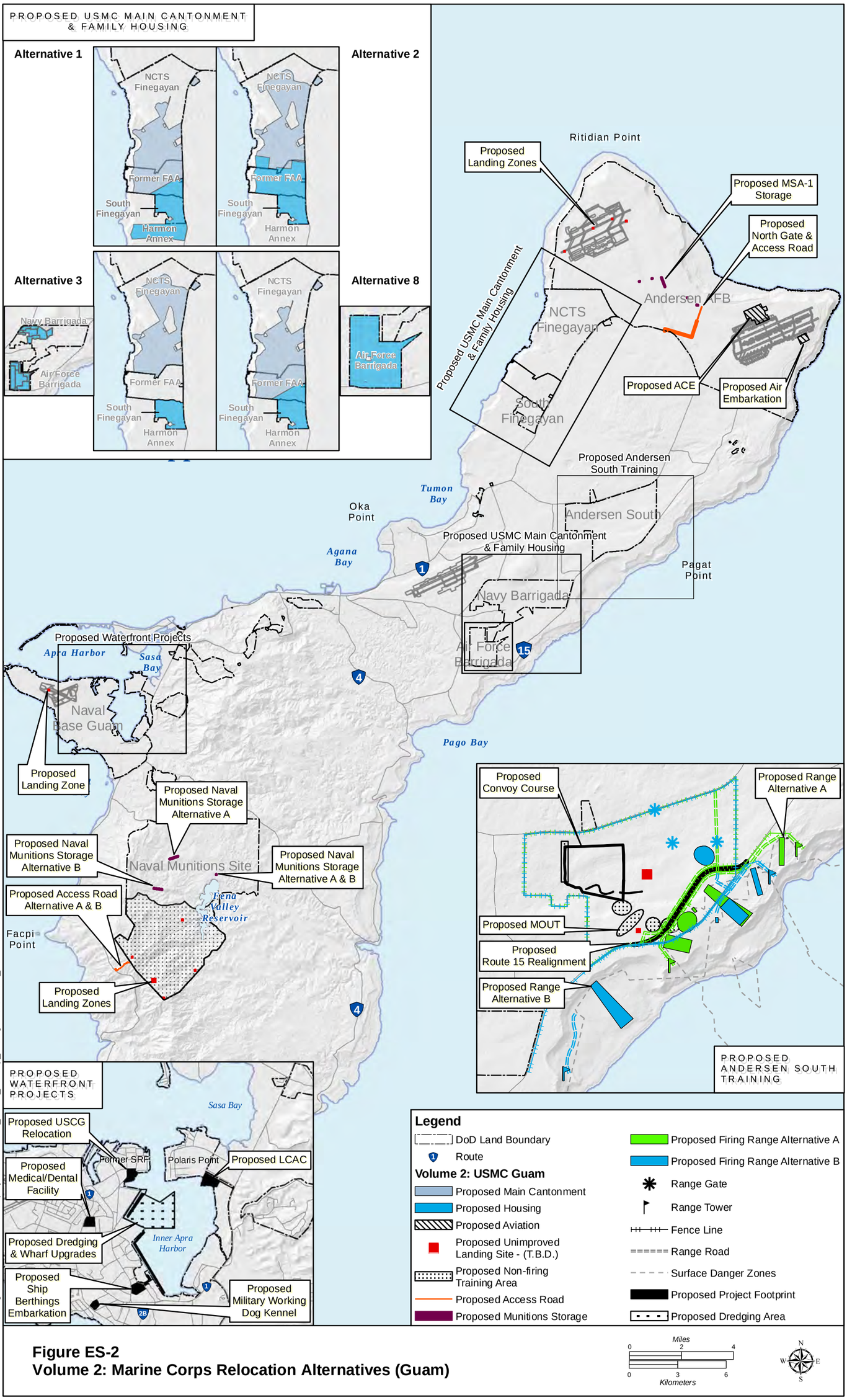

Figure ES-2
Volume 2: Marine Corps Relocation Alternatives (Guam)

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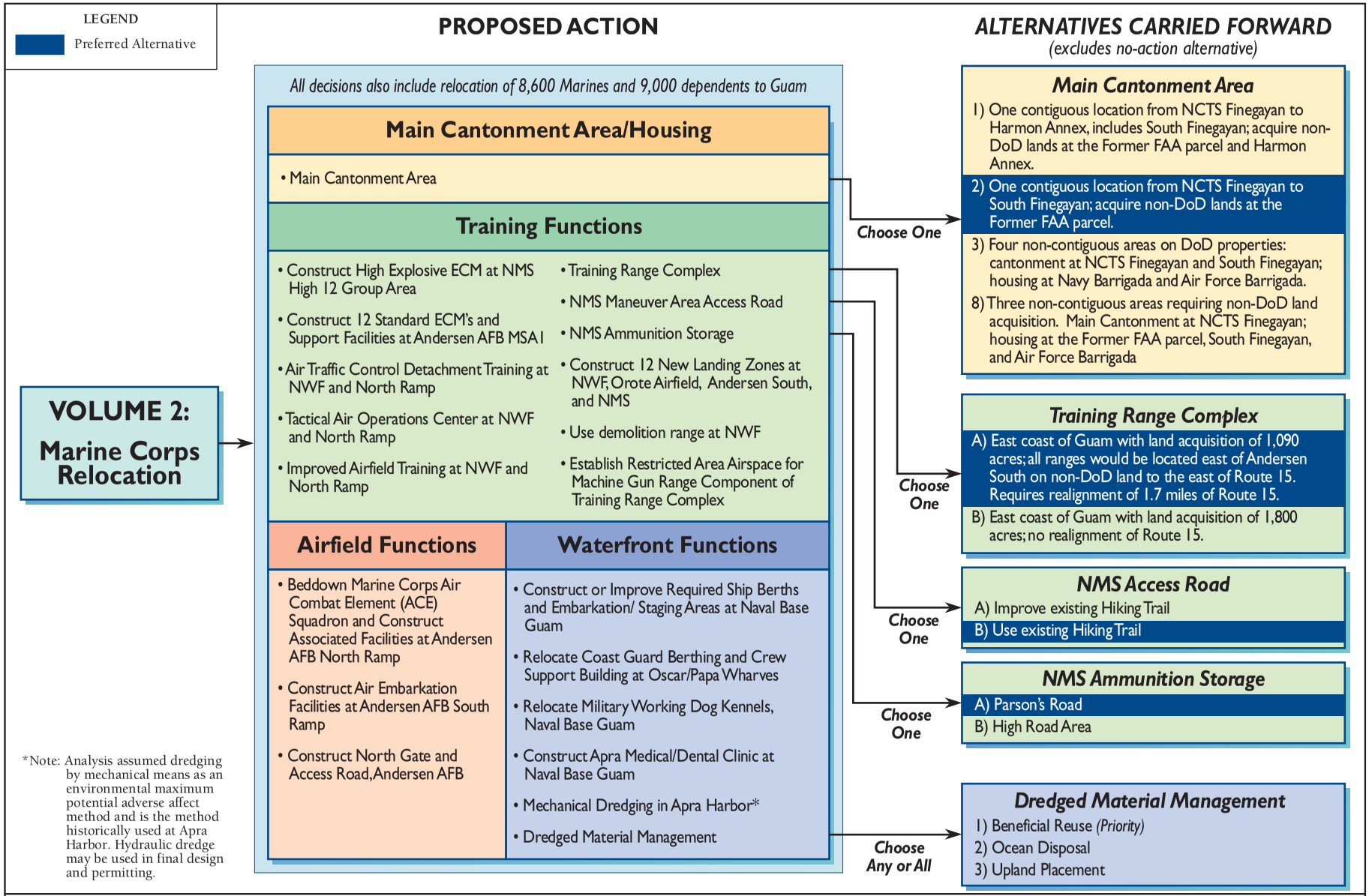


Figure ES-2a
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation, Guam

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: [1] Based on calculations for vegetation cover in Volume 2 Chapter 10.
[2] Proposed developed area only.
[3] Assumes entire parcel is developed.
[4] Excludes NEXRAD (weather radar system).
[5] Total acquisition area, including planned open space.
[6] Total 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.

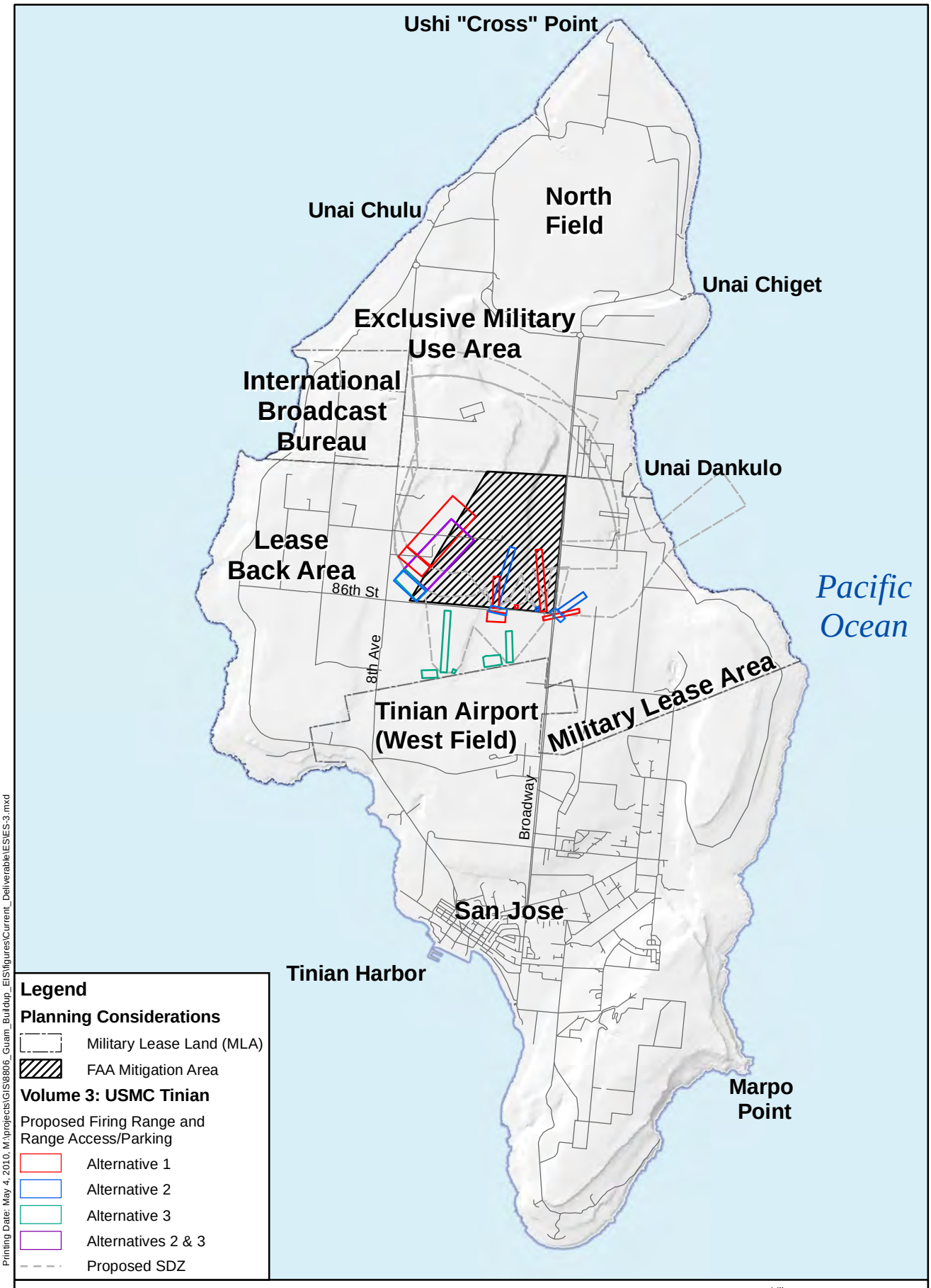


Figure ES-3
Volume 3: Marine Corps Relocation Alternatives (Tinian)

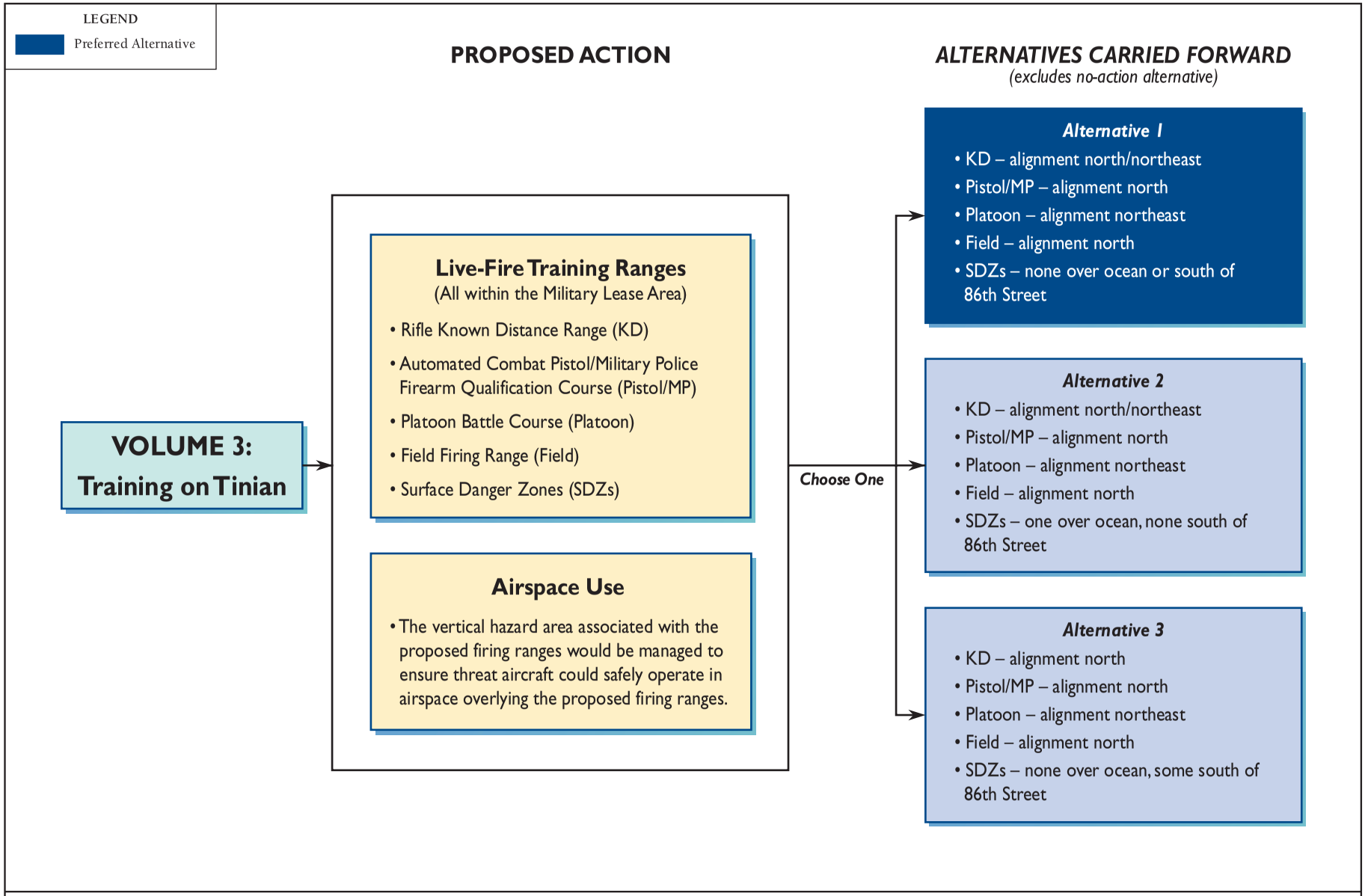


Figure ES-3a
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation – Training, Tinian

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

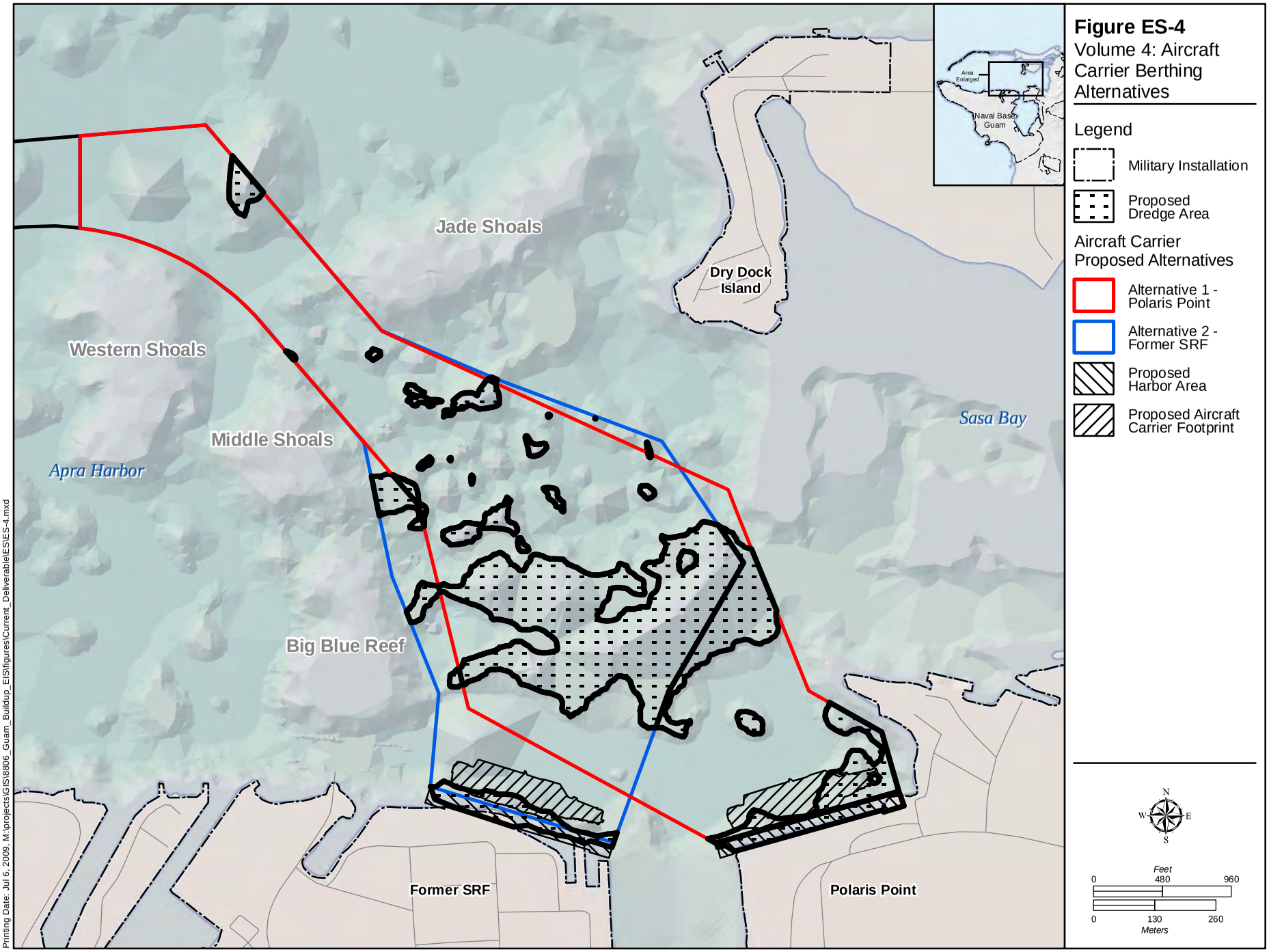
Alternative 3 configuration is notably different from Alternatives 1 and 2 due to three of the ranges being sited south of 86th Street and north of West Field. These three ranges are the Field Firing Range, Automated Combat Pistol/Military Police Firearms Qualification Course, and the Rifle KD Range. 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.


Jade Shoals
Dry Dock Island
Western Shoals
Middle Shoals
Apra Harbor
Sasa Bay
Big Blue Reef
Former SRF
Polaris Point
Area Enlarged
Naval Base Guam
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
N
W
E
S
Feet
0
480
960
0
130
260
Meters
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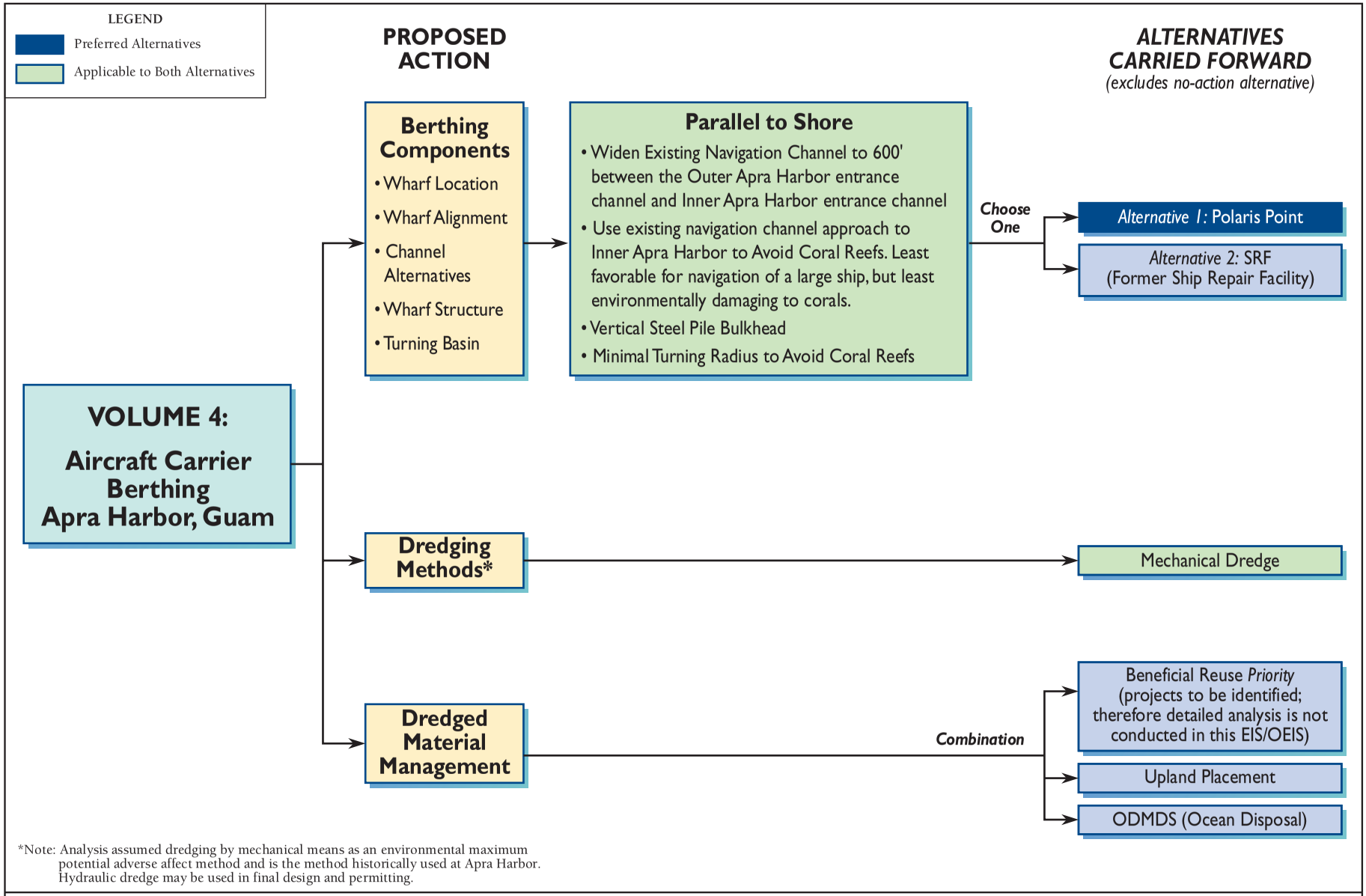

Figure ES-4a
Summary of Proposed Action and Alternatives Carried Forward for the Navy Aircraft Carrier Berthing, Guam

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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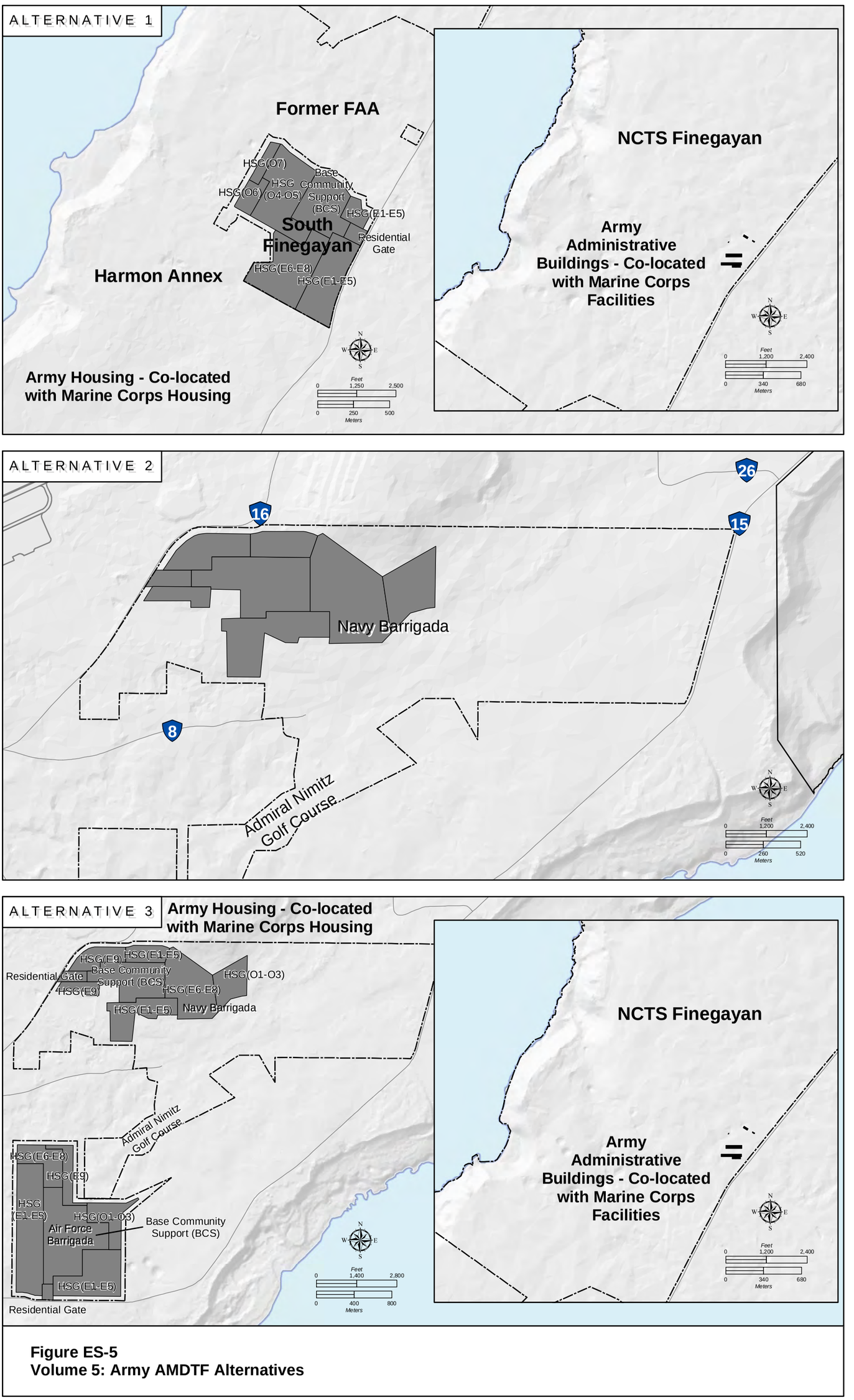

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Figure ES-5
Volume 5: Army AMDTF Alternatives

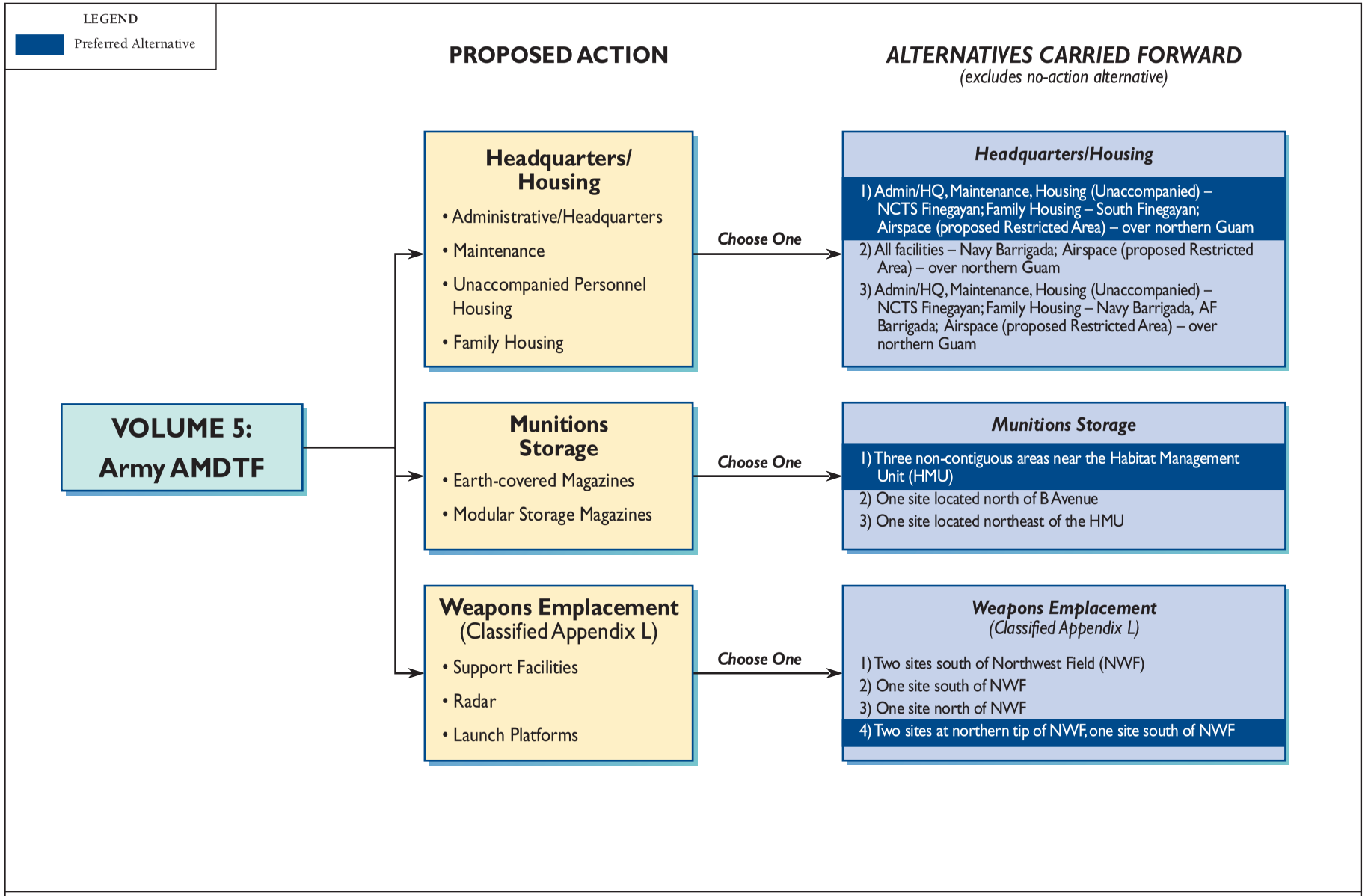

Figure ES-5a
Summary of Proposed Action and Alternatives Carried Forward for the Army Air and Missile Defense Task Force, Guam

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 approximately1, 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 [Ml]) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 Ml) 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 Ml) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 Ml) water storage tank would be construction at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 Ml) 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.

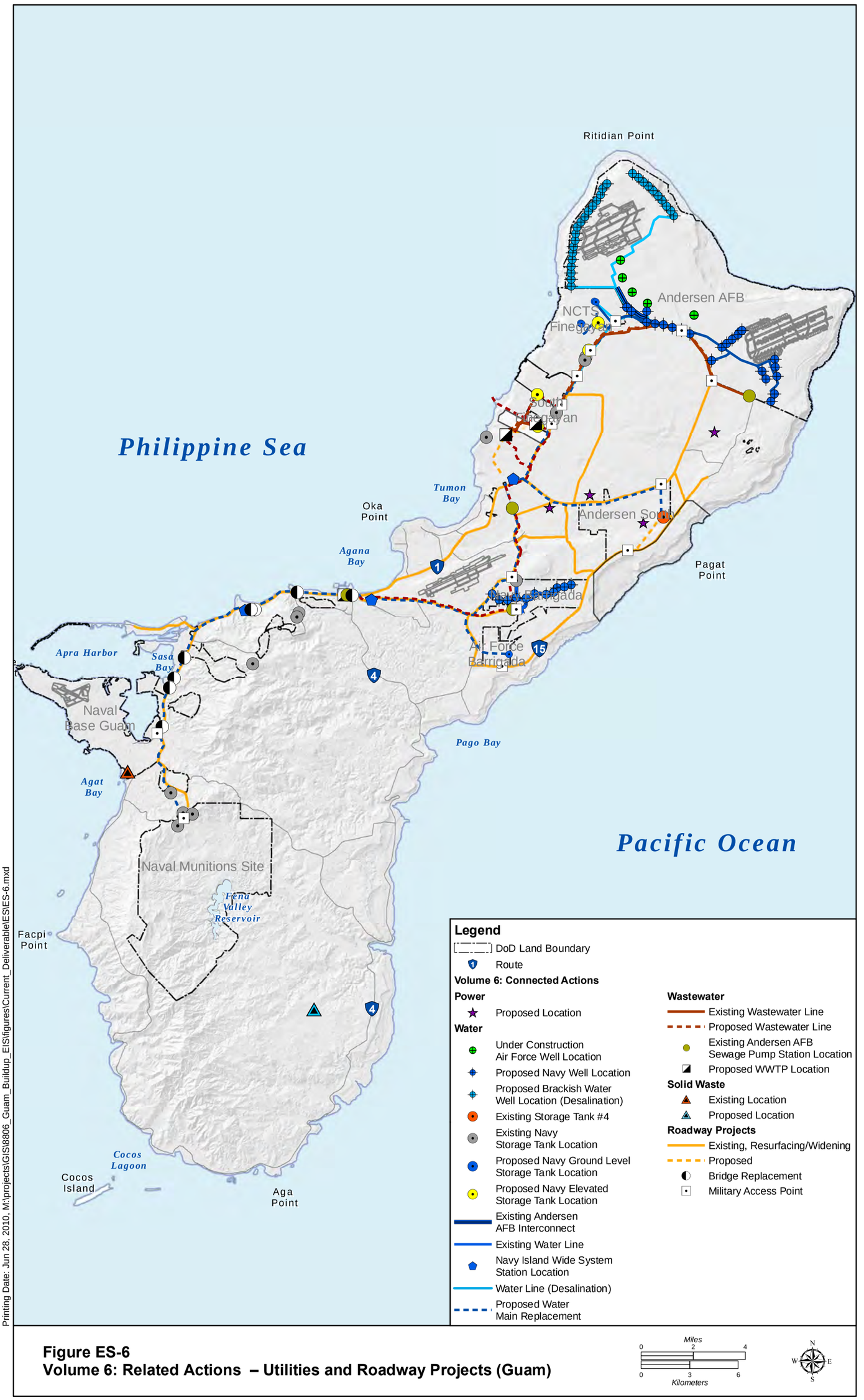

Figure ES-6
Volume 6: Related Actions – Utilities and Roadway Projects (Guam)

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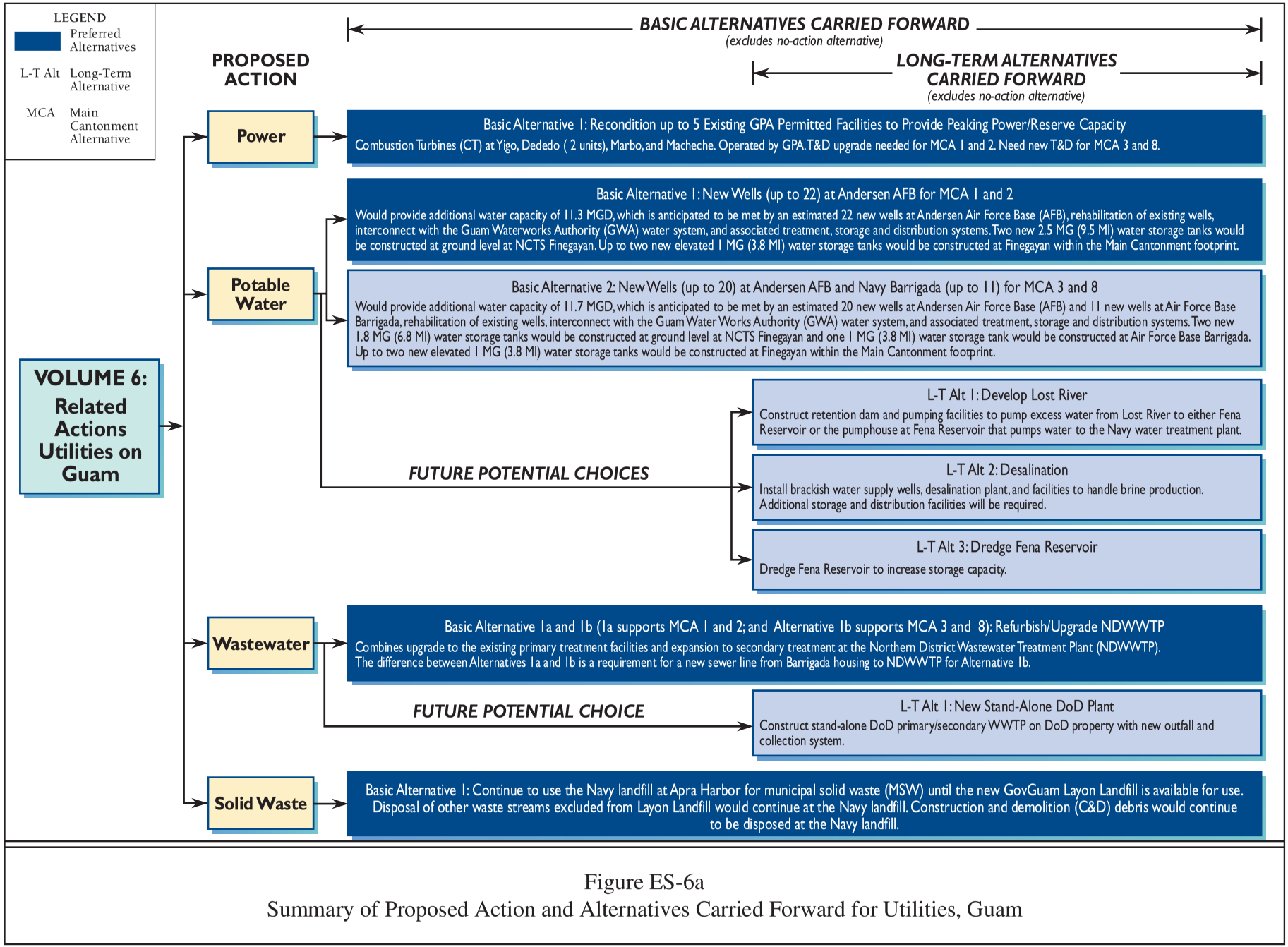

Figure ES-6a
Summary of Proposed Action and Alternatives Carried Forward for Utilities, Guam

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 hardfill.

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

Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Geological Resources	**Construction** SI-M (Guam and Tinian) • 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. **Operation** (Guam only) SI-M • 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	**Construction** SI-M (Guam only) • 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	**Construction** SI-M (Guam only) • 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. **Operation** SI (Guam only) • 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.

Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Land and Submerged Land Use	**Construction (Guam only)** SI-M (Land Use) • 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. **Operation** **Land Ownership (Guam only)** SI • Federal acquisition of land for main cantonment, firing ranges, and roadway improvements on Guam. **Land/Submerged Land Use (Guam and Tinian)** SI • 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)
Recreational Resources	**Construction (Guam only)** SI • 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. **Operation (Guam only)** SI • 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.

Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Terrestrial Biological Resources	**Construction** SI (Guam only) • 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. SI-M (Tinian only) • Loss of a portion of a previously designated habitat mitigation area would result in a significant impact, offset by adding new mitigation area. **Operation** (SI-M) (Guam and Tinian) • 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. (SI-M) (Guam only) • 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.

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Marine Biological Resources	**Construction** SI (Guam only) • 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. SI-M • Special Status Species: In-water construction actives 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 reduce 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. **Operation** SI-M (Guam only) • 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 reduce 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	**Construction (Guam and Tinian) and Operations (Guam only)** SI-M • Potential significant adverse direct impacts to approximately 31historic 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

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Visual Resources	**Construction** SI-M (Tinian and Guam) • 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. **Operations** SI-M (Guam and Tinian) • 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".

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Utilities and Off-base Roadways Capacity	**Construction and Operation - Utilities** SI-M and (SI) (Guam only) • 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. **Construction and Operation - On-base Roadways** SI-M (Guam only) • 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. **Operation - Off-base Roadways** SI (Guam only) • Off-base roadway impacts would be significant due to traffic in the north and central regions of Guam.

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Socioeconomics and General Services	**Construction** SI (Guam only) • 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. SI (Guam and Tinian) • 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). **Operation** SI (Guam only) • 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. SI (Guam and Tinian) • Significant economic impact due to termination of currently used agricultural/grazing permits on Tinian LBA lands. • Adverse sociocultural impacts on Guam and Tinian.

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Public Health and Safety	**Construction** SI (Guam only) • 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. **Operation** SI and (SI) (Guam only) • 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.

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Potentially Impacted Resource	*Significant Impacts and Proposed Mitigation of Preferred Alternatives*
Environmental Justice and the Protection of Children	**Construction** SI (Guam only) • 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. **Operation** SI and (SI) (Guam only) • 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. SI (Tinian only) • 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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Guam and CNMI Military Relocation EIS

Volume 1: Overview of Proposed Actions and Alternatives

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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.

CHAPTER 1.
PURPOSE OF AND NEED FOR ACTIONS

1.1 INTRODUCTION

This Environmental Impact Statement (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 United States (U.S.) Department of the Navy (DoN) Procedures for Implementing NEPA (32 CFR § 775).

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 EO 12114 is identified as Overseas Environmental Impact Statement (OEIS).

The Notice of Intent to prepare an EIS/OEIS published in the Federal Register identified this document as an EIS/OEIS and it was similarly identified at the public scoping meetings.

As the proposed actions were more fully developed through public scoping and subsequent refinement of requirements, as discussed in Volume 3, only routine vessel and aircraft transit activities between Guam and Tinian are proposed to occur outside the geographic scope of NEPA. The character of these activities has been studied and determined not to have the potential to significantly harm the global commons. Therefore, EO 12114 is not applicable. The document, through the Draft, remained labeled as an EIS/OEIS. After the public comment period and review of the comments, it was re-titled as an EIS and developed solely under NEPA.

Chapter 1:

An illustration of the EIS organization is presented in the Reader's Guide. A list detailing the organization of the EIS is provided below:

- *Volume 1:* Overview of the Proposed Actions and Alternatives. This Volume includes the executive summary, overarching purpose of and need for all actions, a brief description of military facilities and associated training on Guam and Commonwealth of Northern Mariana Islands (CNMI), and a summary of alternatives.
- *Volume 2:* Marine Corps Relocation – Guam. This Volume provides resource-specific information about existing conditions on Guam, a description of the purpose and need for the action, a description of reasonable alternatives including the proposed action, impact analysis, and identifies and discusses proposed mitigation measures.

- *Volume 3:* Marine Corps Relocation – Training on Tinian. This Volume provides resource-specific information about existing conditions in the CNMI, a description of the purpose and need for the action, a description of reasonable alternatives, provides an impact analysis, and identifies and discusses proposed mitigation measures.
- *Volume 4:* Aircraft Carrier Berthing. This Volume discusses the purpose and need for the action, describes the reasonable pier location alternatives, analyzes impacts, and identifies and discusses proposed mitigation measures.
- *Volume 5:* Army Air and Missile Defense Task Force (AMDTF). This Volume discusses the purpose and need for the action, describes the reasonable alternatives, analyzes impacts, and identifies and discusses proposed mitigation measures.
- *Volume 6:* Related Actions – Utilities and Roadway Projects. This Volume discusses alternatives, provides an impact analysis, and identifies and discusses proposed mitigation measures.
- *Volume 7:* Proposed Mitigation Measures, Preferred Alternatives' Impacts, and Cumulative Impacts. This Volume summarizes proposed mitigation measures, Best Management Practices (BMPs), Clean Water Act Section 404 actions, and preferred alternatives' impacts from Volumes 2 through 6. The mitigation chapter includes a discussion of adaptive program management practices that would reduce the construction phase impacts of the proposed actions. Volume 7 concludes with a cumulative impact analysis of the incremental impacts of the preferred alternatives when added to the impacts of other past, present, and reasonably foreseeable future actions. The cumulative impacts section includes a discussion of climate change.
- *Volume 8:* Additional Items Required by NEPA. The Department of Navy and regulatory agencies have kept CEQ apprised of interagency issues and progress on resolving those issues. This Volume discusses consistency with other federal, state and local land use plans, policies, and controls; required permits and approvals, irreversible and irretrievable commitments of resources; the relationship between short-term use of the environment and long-term productivity; and sustainability. Finally, this Volume provides a distribution list for the Final EIS, references, and a list of preparers.
- *Volume 9:* Appendices, including certain agency correspondence, highly cited studies, and the classified annex.
- *Volume 10:* Public Comments on the Draft EIS. This volume contains all public comments received on the Draft EIS and responses to these comments.

Volumes 2 through 5 are organized into the following chapters:

- *Chapter 1:* Purpose of and Need for Actions. This chapter states the purpose of and need for the proposed action and presents background information about the proposed action.
- *Chapter 2:* Proposed Action and Alternatives. This chapter describes the siting criteria and the screening process to evaluate and identify the reasonable alternatives, the proposed action and reasonable alternatives, and the no-action alternative.
- *Chapters 3-19:* Resource Sections. These chapters describe existing conditions and identify potential impacts to the respective resources:

  Chapter 3: Geological and Soil Resources
  Chapter 4: Water Resources
  Chapter 5: Air Quality
  Chapter 6: Noise
  Chapter 7: Airspace

Chapter 8: Land and Submerged Land Use
Chapter 9: Recreational Resources
Chapter 10: Terrestrial Biological Resources
Chapter 11: Marine Biological Resources
Chapter 12: Cultural Resources
Chapter 13: Visual Resources
Chapter 14: Marine Transportation: This chapter covers marine transportation. (Volume 6 covers roadway transportation)
Chapter 15: Utilities
Chapter 16: Socioeconomics and General Services
Chapter 17: Hazardous Materials and Waste
Chapter 18: Public Health and Safety
Chapter 19: Environmental Justice and the Protection of Children
Chapter 20: References

The proposed actions include components involving the U.S. Marine Corps (Marine Corps), the U.S. Navy (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. Finally, as discussed in Section 1.5 below, decisions will be reached on each component independent of the others. A summary overview of the proposed actions and alternatives is presented in Chapter 2 of this Volume.

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 (Japan) 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 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 project locations addressed in this EIS are Guam, a territory of the U.S, and Tinian, a part of the CNMI, a commonwealth of the U.S.; both are governed under Article IV of the U.S. Constitution. Both Guam and the nearby island of Tinian have existing military training uses that are geographically part of the Mariana Islands archipelago (Figure 1.1-1). They are located within the Mariana Islands Range Complex (MIRC), an area used by the Department of Defense (DoD) for readiness training (Figure 1.1-2).

Under an independent action, upgrades and changes to the MIRC are being analyzed in a separate EIS/OEIS. The Guam and CNMI Military Relocation EIS is based upon the assumption that the MIRC

EIS/OEIS preferred alternative represents "existing" or baseline conditions of training in the MIRC through 2015. Further discussion on the military activities within the MIRC and the relationship between the MIRC EIS/OEIS and this EIS are provided in Section 1.2.5 below.

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Figure 1.1-1
Guam Location Map

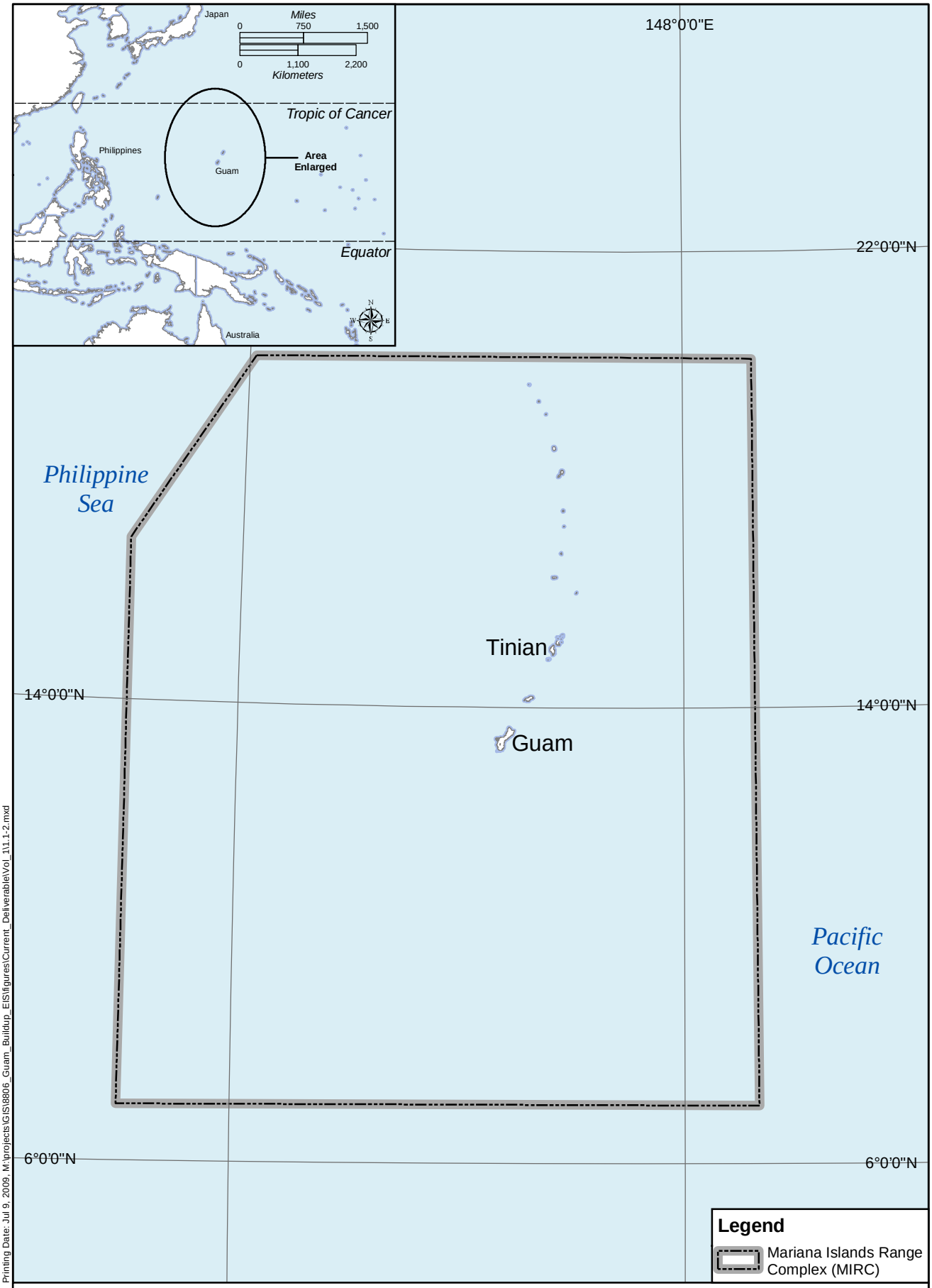

Figure 1.1-2
Mariana Islands Range Complex

1.2 EXISTING MILITARY IN THE MARIANAS

The Air Force and Navy have an established military presence in the Marianas and manage existing military facilities and lands under DoD jurisdiction on Guam. The CNMI is currently used for training for all military services that reside on Guam or transit through the Marianas. The Army also has facilities in the CNMI, on Saipan. Figure 1.2-1 and 1.2-2 show the military facilities for Guam and the CNMI, respectively.

The U.S. Coast Guard (USCG) controls a portion of Victor Wharf, and the adjacent shoreside property is used by USCG-Sector Guam.

The Navy is also the executive agent for DoD lands on Guam and the CNMI including the military leased areas in the CNMI. An overview of the existing military facilities and the MIRC is discussed below.

1.2.1 Navy

The Navy on Guam supports naval activities to maintain operational readiness—maintaining the ability of units to respond to regional threats and to protect interests of the U.S. and its allies. The Naval Base Guam at Apra Harbor is the Navy's operations center and is located on the southwest coast of Guam around Apra Harbor, including the Orote Peninsula. It serves as the forward deployment base and logistics hub, including main munitions storage and distribution center for sea, land, and air forces operating in Asia and the Western Pacific. Navy-controlled lands at Apra Harbor have land uses ranging from industrial to recreational. Other lands on Guam are used for communications facilities (Naval Communication Annex, also known as Naval Computer and Telecommunications Station [NCTS], Finegayan [communications receivers], and Barrigada [communications transmitters]); family housing/community support (Apra Heights, Nimitz Hill, and NCTS Finegayan), two petroleum, oil and lubricant storage areas (Defense Logistics Agency and Defense Fuels also known as Sasa Valley and Tenjo Vista fuels farms); munitions storage facilities (Naval Munitions Site [NMS] also known as Naval Magazine Apra Heights); the Naval Hospital; a DoD Education Activity high school (adjacent to the Naval Hospital); a Military Operations on Urban Terrain (MOUT) training range; and Navy golf course at Barrigada. In 1998 there were 3,946 active duty Navy personnel stationed on Guam. As of 2007, there were 3,879 active duty Navy personnel stationed on Guam.

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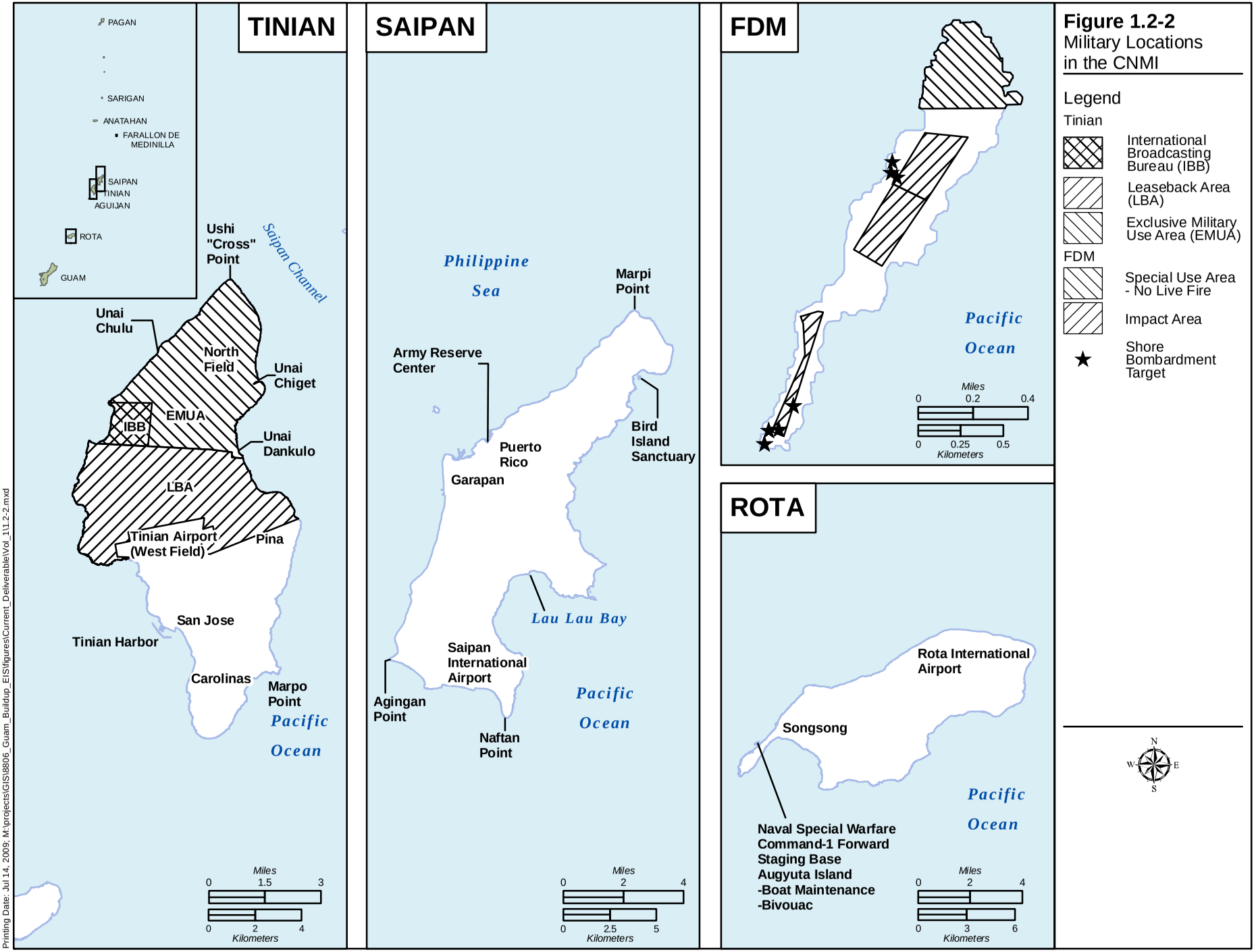
Figure 1.2-1
Military Locations on Guam



1.2.2 Air Force

Andersen Air Force Base (AFB) is the most forward U.S. sovereign AFB in the Pacific. Its role is to employ, deploy, integrate, and enable air and space forces from its location on the northern part of Guam. It serves as an important main operating base for combat and mobility contingency forces deploying or assigned in the Pacific and Indian Ocean areas. Andersen AFB is home to the 36th Wing, the Air Mobility Command 734th Air Mobility Support Squadron, Navy Helicopter Sea Combat Squadron Twenty-Five, and several tenant organizations. Andersen AFB airfield has two parallel runways approximately 11,000 feet (ft) (3,350 meters [m]) long. To the northwest of the airfield operations area is the Munitions Storage Area (MSA) which provides land for current and projected Air Force ordnance storage requirements on Guam. Explosive Safety Quantity-Distance arcs from the existing magazines impact much of the central portion of the base. To the northwest of the MSA, the Air Force manages the abandoned World War II era Northwest Field for training and expeditionary air field operations. Beyond Andersen AFB boundaries, the Air Force manages Andersen South for urban training, Barrigada (Air Force) with its weather radar facility managed in cooperation with the National Weather Service, and Mount Santa Rosa with its communications facility, water reservoir, and Federal Aviation Administration radar facility. About 3,562 acres (ac) (1,443 hectares [ha]) in Northwest Field are the primary maneuver training areas available at Andersen AFB for field exercises and helicopter operations. In 1998 there were 2,119 active duty Air Force personnel stationed on Guam. As of 2007, there were 1,596 active duty Air Force personnel stationed on Guam.

1.2.3 Army

The Army trains the Guam Army National Guard, Army Reserves, and also supports training of allied personnel. It leases 24 ac (9.72 ha) of unimproved Navy land at Barrigada for Guam Army National Guard operations and 15 ac (6.1 ha) of land in Dededo. Headquarter facilities for the Guam Army National Guard is located adjacent to Navy land at Barrigada. Navy Barrigada is 1,418 ac (574 ha), with 250 ac (101 ha) available for development. In 1998, there were 178 active duty Army personnel stationed on Guam, and as of 2007 there were 632 active duty Army personnel stationed on Guam.

1.2.4 Marianas-Installation Management Transition

The 2005 Base Closure and Realignment Act recommendations included a directive to realign DoD installation management functions on Guam to the Commander, Naval Forces, Marianas. The strategic imperative driving the realignment is twofold: the Joint Region Marianas provides installation support to the military missions; and it identifies significant savings through consolidation. Installation management functions were duplicated in the Navy's regional model for installation management. The realignment reduces duplication of overhead costs and would deliver common DoD levels of service more efficiently.

The transfer of installation management functions during the Initial Operational Capability began on January 31, 2009. As installation support functions were transferred and personnel were integrated into the Joint Region organizational structure, the Joint Region Commander assumed responsibility and authority for those functions. As the Joint Region Commander assumed authority and responsibility for functions, the supported component echelons above the installation relinquished authority to the

supporting component, but retained resourcing responsibility and oversight until Total Obligation Authority and real property transfer at Full Operational Capability on October 1, 2009.

The resulting organization created by this realignment is the Joint Region Marianas. The Navy and Air Force maintain their distinct missions and retain operational command, but regional installation support is managed by the Navy including:

- Planning, programming, budgeting, and execution
- Delivery of installation support – policies, procedures, and contracts

The Joint Region Commander is responsible for environmental permitting (Navy 2009) as of October 1, 2009. In addition, the Joint Region Commander will ensure regulatory requirements are adhered to and will manage, maintain, and renew all required permits.

1.2.5 Mariana Islands Range Complex

A range complex is a compilation of training ranges within a defined geographic region. The MIRC consists of existing DoD and Service properties used for training, international air and sea space, and certain private properties within the geographical boundaries in Micronesia. Under an independent action, upgrades and changes to the MIRC were analyzed in a separate EIS/OEIS. The Guam and CNMI Military Relocation EIS is based upon the assumption that the MIRC EIS/OEIS preferred alternative represents "existing" or baseline conditions of training in the MIRC through 2015.

The geographic expanse of the MIRC is depicted in Figure 1.1-2. It covers approximately 501,873 square nautical miles (nm^2) (1,721,376 square kilometers [km^2]) of open-ocean and coastal areas. The MIRC consists of three primary components: (1) ocean surface and subsurface areas, (2) special use airspace (SUA), and (3) land training areas. The ocean surface and subsurface areas of the range complex extend from the south of Guam to north of Pagan (part of the CNMI), and from the Pacific Ocean east of the Marianas to the middle of the Philippine Sea to the west. The range complex includes land ranges and training areas/facilities on Guam and in the CNMI. The range complex includes approximately 63,000 nm^2 (216,084 km^2) of SUA's and Air Traffic Control Assigned Airspaces including Warning Area 517 and Restricted Area 7201 over Farallon de Medinilla (FDM). CNMI training locations include areas on Guam, Tinian, Saipan, FDM, and Rota.

The complex is available for use by all branches of the Armed Services, including the Guam Army National Guard and Army Reserves (such ranges are referred to as joint use ranges). Although the Marine Corps has not had a permanent presence in the Marianas, it has trained in the MIRC on a transient basis. The following provides a general description of the Marine Corps' current utilization of the MIRC. Marine Corps training within the MIRC would increase in frequency and intensity upon relocation of the Marines from Okinawa to Guam.

Guam. Training is conducted throughout the island at various facilities.

- Assault Support: Assault support comprises those actions required to airlift personnel, supplies, or equipment into or within a battle area. The Marine Corps provides helicopter assault support for command and control, troop lift/logistics, reconnaissance, search and rescue, medical evacuation, reconnaissance team insert/extraction, and helicopter coordination and control functions. During combat conditions, assault support provides the mobility to focus and sustain combat power at decisive places and times and the capability to take advantage of fleeting battlespace opportunities. There are three levels of assault support: tactical, strategic, and operational. Polaris Point Field, Orote Point airfield, Navy and Air Force Barrigada, NCTS, NMS, Andersen South,

Northwest field, Andersen Main Cantonment, and Naval Base Guam all provide temporary sites from which assault support training can occur. From these temporary sites, the Marine Expeditionary Unit commander provides assault support to forces training within the MIRC.

- MOUT: MOUT is the use of advanced offensive close quarter battle techniques in an urban terrain. During combat, MOUT includes seizing and securing buildings or areas to neutralize enemy forces for the long-term. MOUT training is accomplished in an area built to resemble a city or town with streets, buildings, and vehicles. The training involves clearing buildings room by room, stairwell by stairwell, and keeping them clear while avoiding impacts to the civilian population. MOUT training is extensive, manpower intensive, and requires close fire maneuver coordination. Limited live and non-live-fire MOUT training is conducted at the following locations, all of which are inadequate, abandoned buildings in need of repair:
    - Orote Point Close Quarter Combat facility: a small one story building used to train forces in hand-to-hand combat with an enemy in close range. Weapons use is limited to 9-mm pistol live-fire.
    - NMS breacher house: concrete structure used to train forces in maintaining mobility in areas with man-made obstacles. Specifically, Marines are trained in forced entry, including in the use of small explosive charges. A nearby clearing is used for helicopter raid/assault training in conjunction with training in forced entry. No live-fire weapons are authorized at this training site.
- Barrigada and Andersen South: These training areas contain former family housing units that are abandoned and used for training in an urban setting with simulated munitions only.
- Direct Fire: Direct fire is the use of small arms weapons for the purpose of defense and security. Direct fire training ranges are strictly controlled and regulated by specific individual weapons qualification standards. Orote Point Known-Distance range, Andersen Combat Arms Training and Maintenance range, and NCTS small arms ranges support small arms and machine gun training up to 7.62-mm and sniper training out to a distance of 500 yards. The Known-Distance range is a long, flat cleared area and occasionally used for training other than marksmanship.
- Exercise Command, Control and Communication: provides primary communications training for command, control, and intelligence and critical interoperability and situation awareness information. Various facilities and infrastructure at Andersen AFB and Naval base are used for this type of training.
- Protect and Secure Area of Operations (Protect the Force): Force protection operations increase physical security of military personnel in the region to reduce their vulnerability to attacks. In combat environments, force protection includes offensive and defensive measures such as moving forces and building barriers, detection and assessment of threats, delay or denial of access of the adversary to their target, appropriate response threats and attack, and mitigation of effects of attack. In the region, Northwest Field, NMS, Naval Base Guam, Andersen South are the sites for these training activities.
- Amphibious Warfare: Amphibious warfare is the utilization of naval firepower, logistics, and strategy to project military power ashore. There is limited ability to train for amphibious warfare in the Marianas. Certain warfare activities are accomplished within the region using limited virtual simulated scenarios for naval gunfire and close air support. Simulated opposed landings are also a training capability in the Marianas. The amphibious vehicles and transient ships

involved in amphibious warfare training in the region are Navy assets; they support the Marine Air Ground Task Force (MAGTF) training events. Navy individual and crew training include operating the amphibious vehicles; training on weapon systems; and command, control and logistics training. Small unit training operations lead to certification of a Marine Expeditionary Unit as special operations capable. This training includes non-live-fire shore assaults, boat raids, airfield or port seizures, and reconnaissance. Larger–scale, non-live-fire exercises are carried out by MAGTF or elements of MAGTFs embarked with Expeditionary Strike Groups. Amphibious training capabilities are a training deficit in the MIRC.

Tinian. An island located approximately 100 miles (mi) (160 km) northeast of Guam, Tinian has two airfields (North Field and West Field) (see Figure 1.2-2). North Field is a large abandoned World War II era airfield that is still usable as a contingency landing field and supports short field C-130 airplanes and helicopter operations. Training on Tinian is conducted on two parcels within the Military Lease Area (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. The MLA supports small unit-level through large field exercises and expeditionary warfare training. There are no active live-fire ranges in the EMUA or LBA, except sniper small arms into bullet traps. Tinian is capable of supporting Marine Expeditionary Unit (MEU) aviation events such as ground element training and air element training, simulated evacuations of noncombatants, airfield seizure training, expeditionary airfield training, and special warfare activities.

Saipan. An island located 14 mi (23 km) north of Tinian (see Figure 1.2-2). This is the location of the Saipan Army Reserve Center. The Reserve Center location cannot support field maneuvers. On the east side of northern Saipan, the Army Reserve conducts land navigation training. This training is performed on non-DoD land. Navy-leased land (approximately 100 ac [40.47 ha]) includes a wharf area.

FDM. An island 195 mi (314 km) north of Guam, leased from the CNMI with a total land area of 182 ac (73.65 ha). FDM is an un-instrumented range used for live and inert bombing, missile strikes, and strafing. These activities require a Forward Arming and Refueling Point at Tinian for some aircraft. Restricted airspace R-7201 overlies FDM (see Figure 1.1-2 and Figure 1.2-2).

Rota. An island located approximately 35 mi (56 km) northeast of Guam (see Figure 1.2-2), Rota has a civilian airfield with a single 6,000 ft by 150 ft (1,828.8 m by 42.67 m) runway that has been used in the past to support military operations. Certain types of special warfare training including hostage rescue, non-combatant evacuation operations, and MOUT are conducted on Rota with local law enforcement, on non-DoD lands. Naval Special Warfare boats are re-fueled at the commercial pier. The airfield is lighted with a beacon and radio navigational aid but no control tower.

1.2.5.1 Training Operations Covered by the MIRC EIS/OEIS

Development of the MIRC EIS/OEIS is an independent effort due to the requirement for periodic programmatic review of ongoing and future training requirements as part of the Navy's tactical theater assessment and planning program. This program reviews ongoing DoD training contained within the MIRC. The review effort was not triggered by the proposed actions under analysis in this EIS.

The MIRC EIS/OEIS assessed the potential impacts of continuing and proposed military training activities on existing ranges within the complex. The assessment included increased training frequency and improvements to existing ranges based on all anticipated joint military service training requirements between the years 2010 and 2015. The focus of the MIRC EIS/OEIS is on the achievement of the readiness activities of all the military services. The MIRC Final EIS/OEIS proposes to:

- Maintain current types of operations
- Increase the frequency of operational training
- Expand warfare missions (subsurface only)
- Accommodate force structure changes (i.e., changes in weapons systems, new classes of homeported ships)
- Implement enhancements to enable each range to meet foreseeable needs

1.2.5.2 Training Operations Covered by the Guam and CNMI Military Relocation EIS

The Guam and CNMI Military Relocation EIS examines potential impacts from activities associated with the Marine Corps relocation of units to Guam, including training activities and infrastructure changes on and off DoD lands. As discussed above, the Marine Corps already utilizes the MIRC and would continue to do so consistent with any changes and improvements resulting from the MIRC EIS/OEIS. Since the MIRC EIS/OEIS is covering DoD-wide training on existing DoD land and training areas in the region, there is overlap between the two documents in the area of land usage. As these two documents have been developed on similar schedules, they were closely coordinated to ensure consistency. The MIRC EIS/OEIS became final in May 2010.

The Guam and CNMI Military Relocation EIS training analysis is based on the assumption that the MIRC EIS preferred alternative represents "existing conditions" of training in the MIRC through 2015, the baseline of activity before the proposed relocation. The Guam and CNMI Military Relocation EIS then covers the additional, projected training requirements from the relocation that were not anticipated during the development of the MIRC EIS/OEIS preferred alternative. Volumes 2 and 3 analyze these additional requirements and propose changes to the MIRC that would support the readiness of the relocated Marine units.

1.3 PURPOSE AND NEED

1.3.1 Overarching Purpose and Need

The overarching purpose for 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

1.4 GLOBAL PERSPECTIVE BACKGROUND

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. These forces must facilitate projection of power to ensure peace and dissuade instability. They must have a strong, local command and control structure; must be readily and rapidly deployable in the face of threats and contingencies; must be manned, equipped, trained, and sustained by a modern logistics infrastructure; and must be capable of operating with allies and other foreign forces throughout the Pacific region. Also, these forces may be called upon to defend Japan and U.S. allies (as outlined in treaties and treaty-like alliances). These international treaties, alliances, and commitments require the U.S. to maintain strategic forces, assets, and infrastructure in the region to respond to threats and contingencies.

In the Western Pacific Region, there are five of the seven worldwide, longstanding U.S. mutual defence treaties that contain alliance requirements. They are:

- U.S.– Philippines (1952)
- ANZUS (Australia, New Zealand, U.S. [1952])
- U.S.– Korea (1954)
- Southeast Asia Collective Defense (U.S., France, Australia, New Zealand, Thailand, Philippines [1955])
- U.S.–Japan (1960)

For instance, the U.S.–Japan (1960) treaty, known as the *Treaty of Mutual Cooperation and Security* (Mutual Security Treaty), contains general provisions on the further development of international cooperation and on improved future economic cooperation. Both parties assumed an obligation to maintain and develop their capacities to resist armed attack and assist each other in the event of an armed attack on either party in territories under Japanese administration. This provision is carefully crafted to be consistent with Japan's Constitution that limits its military capabilities to defensive only capabilities. U.S. treaty commitments with the other nations listed above also require a timely response to incidents and a consistent U.S. presence of force as a deterrent in the Pacific region.

1.4.1 Evolving Global Security Environment

Integrated Global Presence and Basing Strategy and Quadrennial Defense Review (QDR)

The DoD Global Posture Review published in May 2005, also known as the Integrated Global Presence and Basing Strategy (IGPBS), intended to transform U.S. forces to:

- Improve Flexibility to Contend with Uncertainty: The (then) existing U.S. force posture was established during the Cold War, when the U.S. thought threats would come from the European continent. However, current threats require forward deployment in non-European areas. The goal of the realigned forces is to have those forces positioned forward on a continual basis, with access and facilities that enable them to reach any potential crisis quickly.
- Strengthen Allied Roles and Build New Partnerships: Changes to the U.S. global posture aim to help our allies and friends modernize their own forces, strategies, and doctrines. The U.S. needs to tailor the military's overseas "footprint" to suit local conditions, reduce friction with host nations, and respect local sensitivities. A critical precept in global posture planning is that the U.S. will place forces only where those forces are wanted and welcomed by the host government.
- Create the Capacity to Act both within and across the Region: Security challenges are global in nature and relationships must address those challenges accordingly (e.g., Japan's involvement in Operation ENDURING FREEDOM (Iraq), or the North Atlantic Treaty Organization's involvement through the International Security Assistance Force in Afghanistan). To ensure peace and security in the Western Pacific Region, the U.S. must improve its ability to project power from one region to another and to manage forces on a global basis.
- Develop Rapidly Deployable Capabilities: The current state of threats indicates a global fight. Consequently, U.S. forces need to be able to move smoothly into, through, and out of host nations. This puts a premium on establishing flexible legal and support arrangements with our allies and partners. It also strengthens the demand for capabilities that provide an increasingly global reach, the worldwide disposition of key prepositioned materials and equipment, and improvements to global en route infrastructure and strategic lift.
- Focus on Effective Military Capabilities: The key to effective capabilities is to push forces forward to be closer to potential conflict areas with smaller permanently stationed forces whose composition is tailored to meet potential threats.

In practice, the IGPBS intends to reduce U.S. overseas forces from the numbers and locations of bases left over from the Cold War to new locations that are optimized to support current allies and confront new potential threats. These locations would be used in the event of a crisis to give U.S. forces access to the region. They would also allow U.S. forces to train with local allies and participate in cooperative activities, such as disaster relief or peacekeeping, which can improve military-to-military ties. U.S. forces would also rely heavily on off-shore prepositioning and sea basing to provide logistical support. Maritime prepositioning uses a fleet of cargo ships preloaded with supplies and equipment located near potential trouble spots. Prepositioning this material reduces the time required for a military unit and its equipment to deploy to a combat area.

The IGPBS and subsequent QDR (DoD 2006) concept strives to base the forces in locations that support flexibility and speed of response to anywhere in an unpredictable environment. In coordination for such a shift of forces and infrastructure, the DoD, during the development of the QDR, consulted with the Department of State, the National Security Council, and had 45 briefings to Congressional staffers and members of Congress. Further, there were visits to the government leadership in over 20 foreign countries that could be affected by the moves. For Asia, the QDR and IGPBS advocate consolidating existing South Korea bases and adjusting troop dispositions in Japan to reduce frictions with local populations. Reliance on air and naval capability would increase in the Pacific given the vast distances between allies in the region.

1.4.2 Marine Corps

Based on the QDR recommendations for global repositioning and operational realignments in the Pacific region, DoD 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).

1.4.2.1 Treaty and Alliance Requirements

The relocation of nearly half of the total Marine Corps units from Okinawa must meet treaty, international cooperative defense agreements, and other alliance requirements with Japan and U.S. allies in the Western Pacific, which include the Philippines, Australia, New Zealand, Korea, Japan, and Thailand.

The Mutual Security Treaty with Japan is the most relevant to the proposed action. Under the Mutual Security Treaty, both parties assumed an obligation to maintain and develop their capacities to resist armed attack and assist each other in the event of an armed attack on either party in territories under Japanese administration. The Agreed Minutes to the Treaty specify that the Japanese government must be consulted prior to major changes in U.S. force deployment in Japan and prior to the use of Japanese bases for combat operations, other than in defense of Japan itself.

Defense Policy Review Initiative (DPRI)

In a parallel initiative with the development of the IGPBS that began in December 2002, the U.S. was coordinating with Japan changes in positioning force posture in Japan and the options on how best 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. The DPRI was also designed to relieve stresses in the relationship with Japan while strengthening deterrence and global flexibility. Both governments prioritized reductions in the U.S. presence in Okinawa that could ameliorate longstanding frustrations among the local population and improve the local political support for the stable and enduring presence of the remaining U.S. forces. The Governments of Japan and the U.S., balancing the need to maintain the deterrent effect of forward-deployed U.S. forces with the recognized the strong desire of Okinawa residents to have the U.S. presence reduced rapidly, examined and identified

appropriate financial and other measures to enable the realization of several interconnected changes to achieve these objectives. These included relocation of Marine aviation capabilities from Marine Corps Air Station Futenma to a new facility, relocation of Marines and dependents from Okinawa to Guam, and consolidation of remaining Marine forces in Okinawa into less land area, enabling the return of valuable real estate. During the DPRI discussions, the U.S. and Japan also developed several other significant initiatives, such as the consolidation of carrier jet aircraft with Marine aircraft in Iwakuni, Japan, deployment of U.S. missile defense capabilities to Japan, and co-location of Japan's Air Defense Headquarters with the U.S. Fifth Air Force Headquarters at Yokota Air Base in Tokyo, Japan.

Alliance Transformation and Realignment Agreement (ATARA)

On October 29, 2005, the SCC released a document, *U.S.-Japan Alliance: Transformation and Realignment for the Future*, commonly referred to as the Alliance Transformation and Realignment Agreement (ATARA). In developing 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 contributing to the region's peace and security.

In the ATARA, the SCC also approved the aforementioned recommendations for realignment of U.S. Forces in Japan and the Japan Self-Defense Forces directing their respective staffs "…to finalize these specific and interrelated initiatives and develop plans, including concrete implementation schedules, no later than March 2006." 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 the cost sharing arrangements with the Japanese government.

The Mutual Security Agreement 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. As a result of the proposed action, there would be a work force on Guam of approximately 1,700 personnel supporting the Marines.

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, the westernmost sovereign territory of the United States, 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.

1.4.2.2 Response Time

Basing locations in the Pacific region were analyzed to determine those that would provide sufficient response times to potential areas of conflict. As part of its determination on how to meet the requirements to meet U.S. security interest in the Asia-Pacific region, including treaty commitments to Japan and other countries in the region, the U.S. analyzed basing locations in the Pacific region that would provide sufficient response times to potential areas of conflict. The U.S. locations in the Pacific Region considered for the military relocation were Hawaii, Alaska, California, and Guam. Non-U.S. locations considered included Korea, the Philippines, Singapore, Thailand, and Australia, because they are allies to the U.S. and are well situated for strategic force deployment for permanent basing opportunities.

One of DoD's highest priorities, highlighted in the QDR, is maintaining the readiness and sustainability of U.S. forces. In general terms, readiness is the overall ability of forces to arrive on time where needed, and be sufficiently trained, equipped, and supported to effectively carry out assigned missions. Forces must be placed and maintained so that they can be utilized in a timely fashion. The desired distance from the potential threat can vary based on unit type and need, as well as mode of transport. Traditionally, forces were deployed in a slow steady buildup over time. This planning methodology was known as the time-phased force deployment process. Now, however, crises manifest themselves quickly in a variety of locations. Forces must be placed and maintained such that they can provide a rapid and timely response. Therefore, it is critical to locate forces so that the amount of time required to reach a crisis location is kept to a minimum. Figure 1.4-1 illustrates the distances that must be spanned to deploy forces to various locations in the Pacific region.

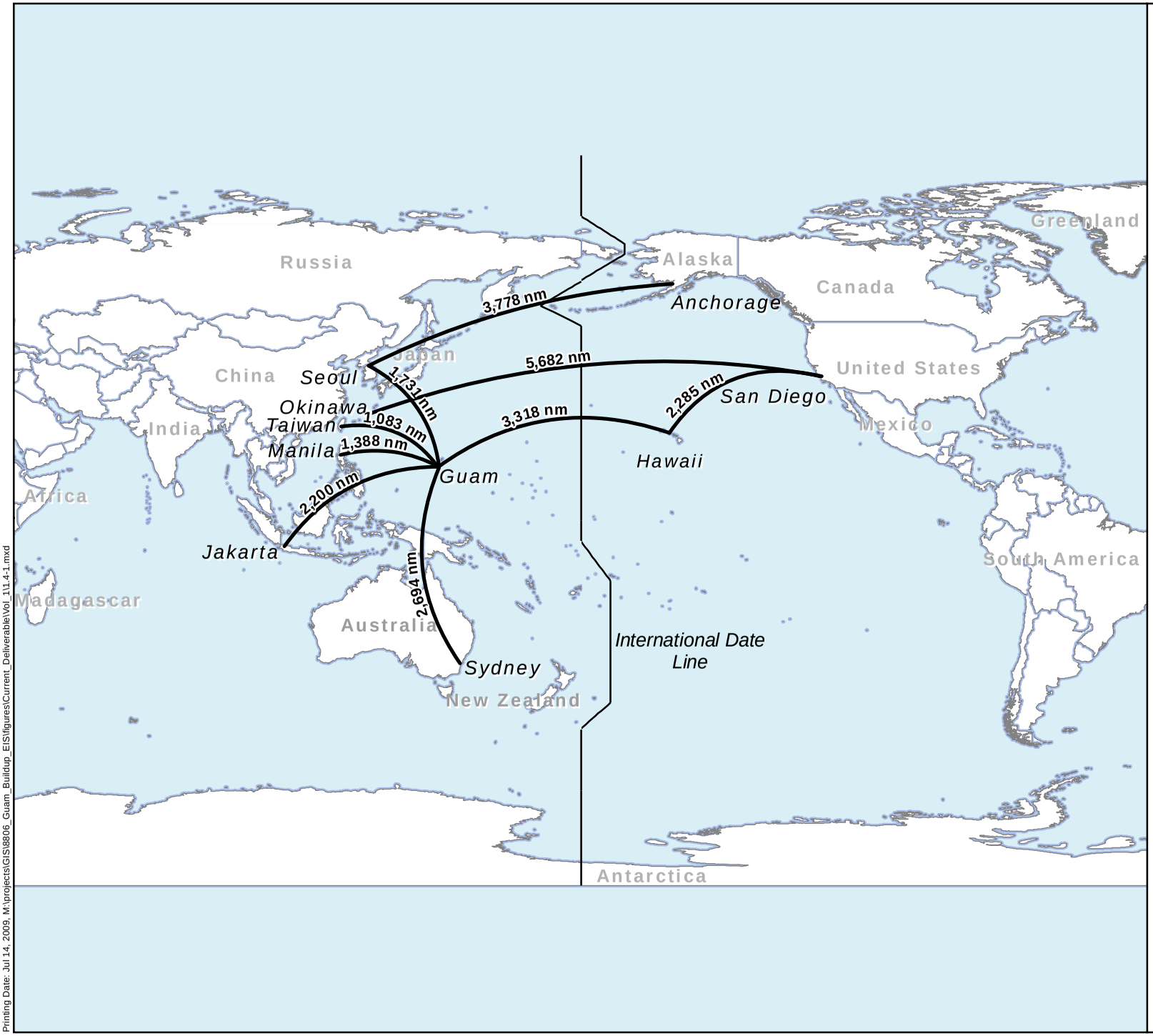


Figure 1.4-1
Travel Distances within the Pacific Region

Source: Navy 2009

Table 1.4-1 shows representative response times for deploying forces by air and sea from Hawaii, Alaska, California, and Guam to Okinawa, and Taiwan. As the table shows, forward-positioned forces on Guam provide significantly reduced response times to Pacific locations compared to forces positioned in Hawaii, Alaska, or California.

Table 1.4-1. Representative Response Times to Southeast Asia by Air and Sea

	Hawaii	*Alaska*	*California*	*Guam*
Air Deployment [1]				
Okinawa	9 hours	8.5 hours	12.6 hours	2.5 hours
Taiwan	9.7 hours	9 hours	13 hours	3.3 hours
Sea Deployment [2]				
Okinawa	8.5 days	NA[3]	15 days	3.8 days
Taiwan	9.6 days	NA[3]	16 days	5 days

Notes: [1] Air deployment times are based on C-17 speed of 450 knots (517.8 miles per hour [mph]).
[2] Sea deployment times are based on ship speed of 20 knots (23 mph).
[3] There are no seaports in Alaska currently capable of carrier strike group deployment.

Table 1.4-2 shows representative response times for deploying forces by air and sea from the Philippines, Korea, Thailand, and Australia to Okinawa and Taiwan, respectively. As the table shows, forward-positioned forces in Korea would provide the lowest representative response times to Okinawa and Taiwan when compared with the Philippines, Australia, and Thailand. However, when compared to the U.S. locations, response times from Guam are similar to the response times from Korea and the other Pacific region countries. Although forward-positioned forces in Korea have the lowest response times in the region, their mission is to maintain stability on the Korean peninsula and they historically have not been available to provide a readily deployable force to other locations in the region. Moreover, at the time of the DPRI negotiations, the U.S. was in separate negotiations to reduce presence in Korea.

Table 1.4-2. Representative Response Times to Okinawa and Taiwan within the Western Pacific Region by Air and Sea

	Philippines	*Korea*	*Thailand*	*Australia*
Air Deployment [1]				
Okinawa	1.9 hours	1.7 hours	3.6 hours	5.8 hours
Taiwan	1.6 hours	2.0 hours	2.7 hours	5.8 hours
Sea Deployment [2]				
Okinawa	1.8 days	1.6 days	3.4 days	5.5 days
Taiwan	1.1days	1.9 days	2.5 days	5.4 days

Notes: [1] Air deployment times are based on C-17 speed of 450 knots (517.8 mph).
[2] Sea deployment times are based on ship speed of 20 knots (23 mph).

1.4.2.3 Freedom of Action

Freedom of action is the ability of the U.S. to use bases and training facilities freely and without restriction at a particular locale, as well as affording the U.S. the ability to engage in rapid force posture movements and contingency response from those locations. Freedom of action is variable based upon the location of the action, with the most flexibility being available at facilities and bases located on sovereign U.S. soil. Guam, Hawaii, Alaska, and California are preferred over foreign countries because they provide the most flexibility for troops during times of maximum threat.

However, to ensure the most strategic locations were considered as basing options, U.S. representatives through the IGPBS process consulted with representatives of the Philippines, Thailand, Australia, Korea, and Singapore, which are allies to the U.S. in the Pacific region and are well situated for strategic force deployment and explored their willingness to host U.S. forces. Additionally, a permanent basing, rather

than a temporary basing, location was sought because it would provide the greatest regional stability for the placement of military assets. Further, permanent basing, consistent with the host nation laws and policies, is much more likely to be developed to support the U.S. military's specific operational requirements.

These countries, while amenable to various degrees of temporary basing or cooperative security agreements, were unwilling to allow permanent basing of U.S. forces on their soil. For instance, the Philippines and Thailand had only recently divested their countries of U.S. forces and were unwilling to allow the U.S. forces to return permanently. The Australian government was also unwilling to permit an increase of U.S. forces within its borders, with the exception of forces assigned to the Joint Combined Training Center. Singapore also declined additional military presence.

A critical precept in the QDR was to tailor the military's overseas "footprint" to increase freedom of action, reduce friction with host nations, and respect local sensitivities. The military's goal is to base forces where those forces are wanted and welcomed by the host country. Because these countries within the region have indicated their unwillingness and inability to host more U.S. forces on their lands, the U.S. military shifted its focus to basing on U.S. sovereign soil.

1.4.2.4 Summary of Global Background for Proposed Marine Relocation

Table 1.4-3 summarizes the alternatives analysis, and shows that Guam is the only location ranked favorably under the three criteria. Overall, Guam, Hawaii, Alaska, and California pose no limitation on freedom of action and have available infrastructure. However, California, Alaska, and Hawaii all create significant strains on rapid response time, interoperability, and the U.S. ability to uphold treaties and protect other interests in the Asia-Pacific region. Commitments under those treaties require that certain forces be within range to project power, to deter aggression, and dissuade coercion in the Western Pacific. In addition, Japan's clear willingness to fund the development of facilities to support the relocation of the Marines to Guam, as reaffirmed by the Japanese Diet in its recent ratification of the Guam International Agreement, reflected Japan's recognition of the continuing linkages between those forces and U.S. commitments to Japan under the Mutual Security Treaty. Also, Guam's distance from many of the likely contingency areas in the region is comparable to distances from the other potential allied countries in the Pacific region considered for permanent basing, and is close enough to threats to employ rapid response capabilities and to implement the requirements of treaties. Finally, in contrast to Guam, which is U.S. sovereign soil that meets the freedom of action operational requirement for permanent basing, no consulted allied countries in the Pacific region were willing to host a large additional contingent of U.S. forces on a permanent basis. In sum, the fundamental requirement to support the treaties and alliances that ensure peace and stability in the region, and the pressing need to reduce friction on Okinawa make Guam the only location for the realignment of forces that meets all criteria.

Table 1.4-3. Global Alternatives Analysis Summary

Alternative Site	*Criteria*		
	Alliance and Treaty Requirements	*Response Time to Southeast Asia*	*Freedom of Action*
Okinawa (current)[1]		+	–
Hawaii	–	–	+
West Coast U.S (including Alaska)	–	–	+
Marianas (Guam)	+	+	+
Philippines	–	+	–
Thailand	–	+	–
Australia	–	+	–
Singapore	–	+	–
Korea	–	+	–

Notes: + = positive response to criteria; – = negative response to criteria

[1]Scoring is specific to the Marine Corps relocation and is based upon the host nation's international agreements with the U.S. expressing the desire for this action.

1.4.2.5 Potential Locations for Marine Corps Basing and Training in the CNMI

The CNMI was also reviewed as a potential location for the Marine Corps basing in response to comments received during public scoping. The following considerations were taken into account during that review. Direct access to a deep water port for Navy ships is crucial to logistics and operational support of the Marine Corps. The relocation would also require significant utilities infrastructure, an airfield with aviation maintenance support facilities, and access to medical and quality of life facilities. Tinian possesses the most available DoD property for exclusive military use within the CNMI. Other islands in the Marianas such as Pagan, Saipan, and Rota do not have existing DoD properties of sufficient size. In contrast, Tinian has been used for training but construction of a base would reduce existing training capabilities, requiring replication of these capabilities elsewhere in the region. Tinian also only has limited infrastructure to support basing and no deep water port. Therefore, Tinian remained a focal point for training but was eliminated as a basing site. Saipan has some infrastructure but its deep water port capacity was not sufficient to meet the Navy's needs. It also has no existing DoD property to support basing. The remaining islands within the CNMI have even less infrastructure and capability to support relocation and training. Therefore, none of the locations within the CNMI were considered suitable for basing; and accordingly they were not considered reasonable alternatives.

In contrast, DoD has many facilities on Guam and owns 40,000 (ac) (16,187 ha); approximately 29% of the land mass. Relocation to Guam provides more opportunity to accommodate the relocation and associated training on existing DoD lands. The DoD maintains global mobility capabilities at Andersen AFB with Air Force Air Mobility Command capabilities to support onward deployments for Marines and other forces proposed to be relocated to Guam. The runway at Andersen AFB can accommodate tactical or strategic aircraft, including all strategic lift and strategic bomber/strike aircraft. Similarly, the Naval Base on Guam is capable of accommodating the embarkation and deployment of Marines and other forces by naval shipping. Apra Harbor is an existing Navy deep water port. Medical and quality of life (QOL) facilities are also available on Guam. Finally, Guam's close proximity to existing and potential training locations throughout the MIRC (the CNMI), especially Tinian, provides an advantage that was also a consideration when proposing Guam for basing.

Tinian provides the best opportunities for training groups of 200 Marines or larger due to greater land availability than Guam has for this type of training. It provides reliable access and maximum opportunity to realistically train with their weapons and equipment while minimizing "down time" lost when travelling to training locations. It is about 100 mi (160 km) away from Guam. 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 lease parcels. The land, however, could be developed to accommodate live-fire ranges.

1.4.3 Navy

The employment of aircraft carriers and their associated escort ships, collectively referred to as a carrier strike group (CSG), are integral to supporting U.S. interests and meeting treaty and alliance requirements, both globally and regionally. The aircraft carrier's mission is to:

- Provide a credible, sustainable, independent presence and conventional deterrence in peacetime
- Operate as the cornerstone of joint/allied maritime expeditionary forces in times of a crisis
- Operate and support aircraft attacks on enemies, protect friendly forces, and engage in sustained independent operations in war (Navy 2009a)

The Navy's proposed action is based upon treaty and alliance requirements, such as those noted below in Section 1.4.3.1 and the QDR. One of the QDR conceptual policy initiatives is that the U.S. should strive to position strike forces, which include aircraft carrier and air wing capabilities, in forward locations that support flexibility and speed of response to anywhere in an unpredictable environment. The Pentagon's strategic QDR of 2006 stated the following:

> *"The Fleet will have a greater presence in the Pacific Ocean consistent with the global shift of trade and transport. Accordingly, the Navy plans to adjust its force posture and basing to provide at least six operationally available and sustainable carriers and 60% of its submarines in the Pacific to support engagement presence and deterrence".*

This guidance reflected a need to supplement current ship deployments and the aircraft carrier base (homeport) in the Pacific. The policy initiative of the QDR was to provide a near continuous presence of multiple CSGs in the Western Pacific and/or Indian Ocean. Accordingly, the Navy began to identify how to meet: 1) treaty and alliance requirements, as well as the QDR; 2) freedom of action (use of a base without restrictions, including implementation of force protection measures to deter/avoid terrorist attacks); and 3) response times to potential areas of conflict. The most current QDR in 2010 reconfirms the Navy's capability for a "robust forward presence." Further, Guam is to be "a hub for security activities in the region." (DoD 2010)

Starting in 2005, the Navy began exercising this concept of operations by developing a series of multi-CSG exercises commonly known as "Valiant Shield" in the Mariana Islands. Traditional thinking had been, in order to assure continuous military presence in an area, a ship or forces needed to have a forward homeport or base from which to operate. The Navy, however, validated the concept of continuous rotation of strike groups to increase presence in the region as desired by the QDR. To support the continual rotational presence, a new concept was developed, a transient capable port that would provide maintenance and logistics support for aircraft carriers close to the area of responsibility (AOR). The proposed transient port capability on Guam, as discussed below, fulfills the operational requirement for continuous strike capability without the financial, political, and environmental issues associated with a forward homeport.

The Navy currently bases (homeports) six aircraft carriers in the Pacific AOR: three in San Diego, California; two in Washington State; and one in Yokosuka, Japan. A homeport provides the full suite of support services to the ship and air wing and the dependent families of personnel assigned to the CSG. These services include full depot-level maintenance, QOL support services for dependents, and other related services. When ships are deployed they visit other harbors. The length of stay, reasons for stay,

and other factors determine whether the visit is characterized as a "port" visit or "transient" visit. The length of stay and purpose of a visit are dictated by military mission requirements. Port visits are brief and may be determined by international political concerns, operational requirements, and other factors. Port visits require minimal or no shoreside support and do not necessarily require a berth. When port visits are made to locations without an available berth (anchorages), this further limits time and capability for ship maintenance and crew rest. Because a port visit is brief and independent of shoreside utility support, the aircraft carrier has the ability to get underway with minimal delay. This ability to mobilize quickly is an important force protection consideration, allowing CSG port visits to take place in foreign locations.

In contrast to port visits, the Navy proposes to develop a transient berthing capability which provides the ship and carrier air wing operational support requirements, including emergent repair and maintenance capabilities, and crew QOL. There would be no dependent QOL support nor full depot maintenance as this support is provided at the ship's homeport. To accomplish a transient capability, the berth must have "hotel services" for the ship and meet security requirements. The wharf would have to be of sufficient length and strength to safely accommodate the vessel while having adequate depth. In addition, the transient capability includes the ability to ensure quality of life and safety for the crew and ship for a duration of stay longer than is normal for a port visit. These longer stays with a ship relying on shoreside utilities increase force protection concerns; however, the advantage of a transient port capability is that a ship can be re-supplied or maintained without returning to its homeport. Development of a transient capable port close to the AOR increases aircraft carrier presence, as required by the QDR, by reducing the non-availability that occurs when a carrier must perform a long transit to its homeport. The creation of a transient capable port comes without the expense, political or environmental concerns raised by creation of a forward homeport. It also maintains adequate response times to potential conflicts.

1.4.3.1 Treaty and Alliance Requirements

Five of the seven U.S. Mutual Defense Treaties are with countries in the Western Pacific: Philippines, Australia/New Zealand (joint treaty), Korea, Japan, and Thailand. The Pacific Fleet's AOR extends from the west coast of the contiguous U.S. to the eastern shore of Africa. The AOR includes the world's five largest foreign armed forces: People's Republic of China, Russia, India, North Korea and Korea. More than half of the world's population lives within the AOR. In addition, more than 80% of the population within the Fleet's AOR lives within 500 mi (805 km) of the oceans and more than 70% of the world's natural disasters occur in this region.

When the Navy examined potential locations to support a greater carrier presence in the Pacific, it was mindful of the critical precept of the IGPBS to place visiting U.S. forces only where those U.S. forces are wanted and welcomed by the host government. Accordingly, as discussed in Section 1.4.2.3 above, because these countries within the region have indicated their hesitancy and inability to host more U.S. forces on their lands, the U.S. military shifted its focus to basing on U.S. sovereign soil.

1.4.3.2 Freedom of Action and Force Protection

In the context of creating a transient-capable port, as discussed above, a crucial factor is freedom of action. Freedom of action is the ability of the U.S. to use ports, training facilities, and bases (including the ability to re-supply and conduct mid-level maintenance) freely and without restriction at a particular locale, as well as affording the U.S. the ability to engage in force protection, rapid force posture movements, and contingency response. U.S. relations in the Pacific and Indian Ocean regions are based upon multiple bilateral treaties and international law. Within this legal framework, U.S. forces and its Pacific allies have mutual defense commitments, however, access and level of support varies for like

operations throughout the region. In short, U.S. forces responding to contingencies still have greater freedom of action when responding from U.S. territory.

The reliance on shoreside utility support for a transient-capable port reduces the aircraft carrier's ability to get underway quickly. Compared to port visits, the longer berthing times and the delay in getting underway are important considerations for force protection. The CSG concentrates a large contingent of military personnel (greater than 7,000) along with hundreds of millions of dollars of military assets when it is in a transient port, so force protection is critical. In assessing possible locations for transient capable ports, the unique requirements for emergent repairs, full shoreside utility support, and the increased force protection and security requirements that accompany the longer duration of visits make U.S. sovereign locations for the transient capable port preferable.

Force protection concerns increase with length of stay. Given the criticality of the CSG, the Navy determined that it must have maximum flexibility to protect the CSG. While force protection concerns are met in foreign ports, accomplishment of this requirement is more feasible in U.S. territory. Using these criteria, force protection can be more easily met in Guam, Hawaii, Washington, and California and are, therefore, preferred over sites in other countries because they provide the most flexibility in the combined requirements of force protection and freedom of action.

1.4.3.3 Response Times

To meet the QDR's stated policy initiatives, a comparative analysis of the potential response times from existing homeports and traditional port visit locations was conducted. The response times in Tables 1.4-1 and 1.4-2 show the challenge of siting a transient-capable port to ensure that aircraft carriers can still rapidly respond to a crisis in the Western Pacific while providing for the critical freedom of action and force protection requirements this asset requires. Ports in the region that were a home port or have previously accommodated U.S. aircraft carriers for port visits were considered as potential locations for a transient port. U.S. port locations considered were Hawaii, Guam, Washington, and California. Hawaii is located approximately 3,300 nm (6,160 km) northeast of Guam in the opposite direction of Western Pacific/Indian Ocean AOR. Hawaii is also outside of the AOR for Western Pacific operations. Transit times from the AOR to the West Coast are even longer. The transit time nearly doubles from Guam to Hawaii and again from Hawaii to California. Hawaii and California would significantly strain the capability to rapidly respond to a crisis in the Western Pacific or Indian Ocean. Accordingly, these locations were eliminated from further consideration. Non-U.S. ports in the Western Pacific that have had port visits are located in Australia, Singapore, Hong Kong, and Japan. Australia, Singapore, Hong Kong, Japan, and Guam are much closer to potential crises areas and the response times would be significantly shorter. Therefore, they were retained as potential locations for extended aircraft carrier transient capabilities.

Utilization of a location in the Western Pacific would satisfy the QDR given that maintenance and supplies would be obtained closer to the site of operations, in effect, increasing the availability and presence of carriers in the Pacific due to the reduction in transits to other locations outside of the Western Pacific AOR. The greater availability and presence enable quick responses to potential crises due to shorter travel times and distances to U.S. allies and potential hot spots within the region.

1.4.3.4 Summary of Global Background for Proposed Transient-Capable Port

Overall, Guam, Hawaii, California, and Washington pose no limitation on freedom of action, and all have some available infrastructure to support an aircraft carrier visit. Similarly, the CNMI would pose no limitation on freedom of action but in contrast to the other locations, none of the islands possess

infrastructure to support an aircraft carrier visit. Further, the deep water port in Saipan is already encumbered by maritime pre-positioned vessels strategically placed in Saipan to support U.S. military operations. Except for California and Washington, which are presently aircraft carrier homeport locations, none of the locations discussed have an aircraft carrier transient-capable pier. California, Washington, and Hawaii locations, however, would increase response times compared with locations within the Western Pacific AOR and constrain the U.S. ability to uphold treaty obligations. Those treaty obligations require that certain forces be within range to project power, to deter aggression and dissuade coercion in the Western Pacific. The aircraft carrier homeport in Japan is within the desired range; however, this pier is a dedicated homeported nuclear powered aircraft carrier pier and there is no additional capability to meet the needs of a transient nuclear powered aircraft carrier as specified by the QDR. The CNMI and Guam are close enough to many of the likely contingency areas in the region and potential threats to ensure rapid response, comply with treaty obligations, and assure the deterrent presence that U.S. forces bring to the region. Development of a transient port capability in this region, because of the proximity to the Western Pacific/Indian Ocean AOR, would enable multiple CSGs to maximize time in the Western Pacific/Indian Ocean AOR. Transient port capability meets the defense and national security policy initiatives of the QDR. Finally, the combined requirements of freedom of action and force protection can be met while meeting the required operational flexibility on Guam or the CNMI, although Guam best meets these requirements since it is sovereign U.S. territory.

Creating an aircraft carrier transient capable port in the CNMI was infeasible because it lacks other key features that are integral to the development of a transient-capable port. In contrast, these features were present on Guam, as outlined below:

- Guam maintains adequate infrastructure for shoreside utilities.
- Naval Base Guam already possesses emergent nuclear repair, radiation response, and radioactive waste management capability.
- The Navy's Munitions Storage Area on Guam is in close proximity to Apra Harbor, providing the capability to re-supply the aircraft carrier with munitions.
- Guam has an existing logistics support network through the Defense Logistics Agency that is co-located on Naval Base Guam. While in port, the aircraft carrier continues to support the on-board military personnel while continuing its daily operations and maintenance of the ship and its aircraft. Food and other supplies need to be reliably available for the ship.
- Guam provides adequate quality of life amenities. One of the primary reasons for the extended transient port visits is to provide for QOL for Sailors and Airmen deployed for extended periods of time to the Western Pacific associated with enhanced rotational presence. Studies have shown that extended deployments at sea may have detrimental effects on individual readiness unless adequate shoreside QOL amenities are available for rest and relaxation when the ship is in port. Morale and QOL of individual Sailors is important to maintain a combat ready unit and Guam provides adequate QOL amenities.
- Guam provides existing transient aircraft capabilities at Andersen AFB for visiting air wings.

In sum, the fundamental requirements to support the treaties and alliances, which ensure peace and stability in the region, and Guam's unique geography and port infrastructure, make it the only location to create a transient-capable aircraft carrier port in order to increase aircraft carrier presence in the Western Pacific.

1.4.4 Army

On December 16, 2002, National Security Presidential Directive-23 directed the DoD to establish a capability to protect the U.S. homeland, forces, and its allies from ballistic missile attacks starting in 2004. The ballistic missile defense program develops the capability to defend territories and forces of the U.S. and its allies against all classes and ranges of ballistic missile threats. To protect the territory of Guam and the U.S. forces on Guam from such threats from nations not supportive of the U.S., an AMDTF is proposed to be sited on Guam. Although there has not yet been a final determination of whether the Army will be given the ballistic missile mission on Guam, this Final EIS analyzes how that mission would be conducted. The ultimate decision on whether to establish the AMDTF will be made at some time after the Record of Decision (ROD) regarding the Marine Corps relocation. Weapons emplacement siting criteria, such as operational threats and requirements, and the analysis of siting alternatives are classified. This information is in a Classified Appendix to this public EIS.

1.5 DECISIONS TO BE MADE

The DoN will issue a ROD explaining whether and how to implement the proposed action regarding:

1. Marines Relocation:

   - Location of the administrative buildings, training areas, housing, aircraft and maintenance facilities, and air/sea embarkation areas
   - Construction and operation of facilities
   - Proposed training and operation of training ranges
   - Development of QOL facilities, such as military exchanges and commissaries, and athletic facilities
   - Acquisition of land for the proposed actions
   - Location, construction and operation of utilities and roads related to the proposed actions

2. Aircraft Carrier Transient Capable Wharf:

   - Location of the transient capable, deep-draft aircraft carrier wharf
   - Construction and operation of new and refurbished infrastructure and facilities

A summary of proposed environmental impact mitigation measures will also be included in the ROD.

The Army may co-sign the ROD with the DoN to state the decision whether and how to implement the proposed action regarding:

Army AMDTF:

- Location of the housing, administrative buildings, and facilities to support operations for the Army AMDTF
- Construction and operation of the facilities
- Training of military personnel

1.6 SITE SPECIFIC ANALYSIS VS. ANALYSIS OF LONG-TERM PROJECTS

This EIS addresses the potential direct, indirect, and cumulative short-term and long-term impacts of the proposed actions and alternatives. The EIS complies with the CEQ guidance that recommends integration of the environmental process at the earliest possible time to ensure that planning and decisions reflect environmental stewardship. In accordance with CEQ 1501.1(a), the DoN is integrating the NEPA process into early planning to ensure appropriate consideration of NEPA's policies and to eliminate delay. The majority of activities analyzed are site specific; however, some activities, such as the utilities section, contain long-term plans for actions that would be implemented at a point in the future.

It is anticipated that some utilities 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 in accordance with the Realignment Roadmap the SPEs would utilize $740 million of Government of Japan financing for utilities infrastructure improvements to support for the 3rd Marine Expeditionary Force (III MEF) forces that would be realigning from Okinawa to Guam. 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. The DoN 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 Guam utility under a utilities service contract. Fees generated through utilities service contracts could be used by the SPE or Guam utility to repay financing costs or a portion thereof. The DoD rate structure that would be established with any utilities service contract with a SPE or Guam utility would reflect current rates adjusted for inflation. Given that these SPEs have yet to be formed, these business arrangements are not currently defined. Therefore, they are presented as "conceptual" business arrangements.

Certain long-term alternatives, such as a stand-alone DoD wastewater treatment plant, are analyzed programmatically. The potential environmental effects associated with the long-term programmatic projects have been analyzed based on available information, and presented here to adequately describe the scope of the entire project. Additional NEPA documentation and resource surveys would be completed, as required, in the future when project specifics and funding become available for these long-term projects should they be pursued. The basic utilities projects are presented in site specific detail and have been identified to meet the immediate and the long-term needs estimated for the proposed actions on Guam. These alternatives are evaluated completely in Volume 6 of this Final EIS (Related Actions).

1.7 OVERVIEW OF ALTERNATIVES

Chapter 3 of this Volume provides a more detailed overview of the alternatives and contains figures that depict where projects and training ranges would be located.

1.7.1 Marine Corps

The facilities and operational and training requirements of the Marine Corps units relocating to Guam were analyzed. The requirements were grouped into components that represent core capabilities and support functions of the overall Marine Corps mission. The functions have distinct facility and operational requirements and were used to develop the range of potential alternatives. After analyzing potential alternatives, four alternatives for development of the Main Cantonment (Alternatives 1, 2, 3, and 8) were retained and carried forward for consideration. These alternatives involve various configurations of the Main Cantonment at NCTS Finegayan and development of housing and QOL functions at Finegayan, Navy Barrigada, and/or Air Force Barrigada.

Independent of the alternatives for the Main Cantonment, the proposed action also includes waterfront alternatives in Apra Harbor and airfield alternatives at Andersen AFB (including ammunition storage). There are also proposed alternatives for a training range complex and for an access road to the NMS.

Guam cannot support all live-fire ranges needed for the training of the relocated Marines. Accordingly, the Marine Corps relocation proposed action includes the development of some live-fire ranges on Tinian in CNMI. Volume 3 analyzes the environmental effects of this portion of the proposed actions and alternatives.

1.7.2 Navy

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

Volume 4 contains the full analysis of the alternatives and their environmental effects. The two alternatives carried forward are Polaris Point (Preferred) and Former SRF. They are geographically very similar (see Figure 3.4-1). The existing Outer Apra Harbor Channel would be widened to 600 ft (183 m) with minor adjustments to centerline and navigational aids. A new ship turning basin would be

established that would require dredging to -49.5 ft (-15.1 m) Mean Lower Low Water plus 2 ft (.6 m) over dredge. The turning basin would be located near the wharf and north of the Inner Apra Harbor entrance channel. The turning basins are largely, but not exactly the same. The proposed wharf designs, dredge depths, dredge methods, and dredged material management would be the same; however, there are differences in the volume of dredged material. 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.

1.7.3 Army

The siting options and analyses, including the alternatives considered and dismissed, for headquarters (HQ), operations, bachelor quarters, and family housing would be as described for the Marine Corps portion of the proposed action (see Volume 2). Requirements for these facilities are addressed in the Marine Corps Main Cantonment component as the Army and Marine Corps would be sharing these facilities. The alternatives are co-location of support facilities with the Marine Corps facilities at NCTS Finegayan; locating the Army AMDTF support facilities at Navy Barrigada; and a combination of co-location of HQ facilities with the Marine Corps facilities at NCTS Finegayan and placement of housing facilities at Navy Barrigada and Air Force Barrigada.

Eight new climate-controlled, earth-covered magazines (ECMs) and/or Modular Storage Magazines are also proposed within Munitions Storage Area 1 at Andersen AFB to store Army missiles and provide safe stowage of the system launchers during inclement weather. Explosive Safety Quantity-Distance (ESQD) arcs are an important operational component of munitions storage. These are planning areas that surround explosive hazard sites and define the minimum permissible distance between the hazard of the explosive and any inhabited building, public assembly area, and/or the boundary of Department of Defense (DoD) lands. ESQD arcs for existing munitions storage facilities in MSA 1 encompass much of the land in central Andersen AFB. Due to the hazards associated with the munitions to be stored in them, the ESQD arcs for the proposed new munitions storage facilities would extend to 1,250 feet (381 m) from each magazine. The ESQD arcs for the new magazines would encompass land outside the area of existing ESQD arcs, so the existing arcs would expand.

The weapons emplacement sites would include approximately 16 ac (6.5 ha) of developed land that would accommodate Terminal High Altitude Area Defense, Patriot Missile, and Surface-Launched Advanced Medium-Range Air-to-Air Missile operations. The missile system components are mobile, but the emplacement sites would be fixed. Weapons emplacement sites would include bermed fuel storage areas and crew billeting for shift use.

Weapons platform siting is classified and is assessed in a Classified Appendix (Appendix L) to this public EIS.

1.8 NATIONAL ENVIRONMENTAL POLICY ACT AND EXECUTIVE ORDER 12114 COMPLIANCE

The proposed federal actions are subject to NEPA. This document was prepared (1) to inform the DoN and the Army of the anticipated environmental consequences of the proposed actions and alternatives (including the no-action alternative); (2) to inform the public of potential environmental impacts associated with the proposed actions and alternatives; and (3) to help the DoN and the Army decide whether or not to approve the proposed development and construction of facilities and infrastructure, and the implementation of the training operations as proposed. The NEPA process and the timeline for this EIS are described in the following paragraphs.

1.8.1 Scope of NEPA and EO 12114

Proposed actions or impacts occurring within 12 nm (22.2 km) are subject to compliance with NEPA. Actions with the potential to significantly harm the environment beyond U.S. territorial waters (i.e., beyond 12 nm [22.2 km]) must be analyzed using the procedures set forth in EO 12114 and associated implementing regulations. An impact statement prepared under EO 12114 is identified as Overseas Environmental Impact Statement (OEIS).

1.8.2 EO 12114 Applicability Determination

At the initiation of the environmental planning process, the action proponent chose to ensure that alternatives, whether inside and outside the territorial seas, would be analyzed in the same document. This inclusive approach required compliance with both EO 12114 and NEPA regulations. The Federal Register "Notice of Intent" identified this document as an EIS/OEIS and it was similarly identified at the public scoping meetings.

The proposed actions were more fully developed through public scoping and subsequent refinement of requirements by the action proponent. Ultimately, as discussed in Volume 3, only routine vessel and aircraft transits activities between Guam and Tinian are proposed to occur outside the geographic scope of NEPA. The character of these activities has been studied and determined not to have the potential to significantly harm the global commons. Therefore, EO 12114 is not applicable. The document, through the Draft, remained labeled as an EIS/OEIS. After the public comment period and review of the comments, it was re-titled as an EIS and developed solely under NEPA.

1.8.3 Notice of Intent (NOI) and Public Scoping Period

NEPA regulations require an early and open process for determining the scope of issues that will be addressed prior to implementation of proposed actions. The Notice of Intent (NOI) to prepare an EIS/OEIS was published in the *Federal Register* on March 7, 2007 (72 Federal Register 10186) (Navy 2007a), and public scoping meetings were held on April 17 and 18, 2007 on Guam, and April 19 and 20, 2007 on Saipan and Tinian, respectively. Approximately 130 notices regarding the public scoping period were mailed on March 24, 2007 to elected officials, federal, state, and local government agencies, non-

governmental organization representatives, and other entities possibly interested in the EIS. The scoping period was scheduled end on May 1, 2007. However, the DoN extended the scoping period deadline to May 21, 2007 due to the impacts of Typhoon Kong-Rey. (Navy 2007b).

During the scoping period, the public provided comments on a variety of important topics such as access to DoD facilities, social and environmental effects, economics, Chamorro interests, safety, infrastructure, and transportation. All topics identified during the scoping period were considered in the development of the scope of the environmental impact analyses. Specific topics that were identified in the 990 comments received are addressed in the specific resource impact sections of this EIS. Table 1.8-1 shows which chapters of the Draft EIS address the public comments.

1.8.4 Draft EIS

The DoN began the public comment period for the Draft EIS with the publication of the Notice of Availability of the Draft EIS for public review and the Notice of Public Hearing in the Federal Register on November 20, 2009 (74 Federal Register 60244). The notice announced the availability of the Draft EIS and time, dates, and locations of public hearings and that public comments would be received through February 17, 2010. The notice also gave an overview of the proposed actions, and potential environmental impacts as presented in the Draft EIS. EPA published a separate Notice of the Availability of the Draft EIS on 20 November 2009 that contained an incorrect date for the conclusion of the public comment period. EPA published a correction in the Federal Register on 23 November 2009 with the correct end date for the public comment period.

The public comment period and Notice of Public Hearings were announced in three local newspapers: Pacific Daily News, Guam; Marianas Variety, Saipan; and Saipan Tribune, Saipan. These notices were published between 21 and 23 November 2009, approximately 1 month later (21 December 2009), and the weekends prior to the public hearings. This timing ensured that readers would be alerted to the hearings immediately prior to their occurrence.

Elected officials, federal, state, and local government agencies; non-governmental organization representatives; and other persons anticipated to be interested in the Draft EIS were sent mailers that described the proposed action and the public comment process, and presented the scheduled public hearing dates and locations.

The DoN hosted public hearings on the islands of Guam (four locations), Tinian, and Saipan to solicit comments on the Draft EIS. Public hearings took place on Guam on January 7, 9, 11, and 12, 2010. The public hearing on Tinian was on January 14, 2010 and on Saipan on January 15, 2010. Translators were present. In total, nearly 2,000 individuals attended the hearings with 246 verbal comments being received.

Table 1.8-1. Public Comments Received during the Scoping Process Grouped by Subject Matter and Chapter

Topics

1. Access (Ch. 8, 9)
   - DoD facilities
   - Recreation areas
   - Apra Harbor
2. Social (Ch. 16, 18)
   - Population increase and associated effects
   - Effects on educational facilities
   - Effects on public health and social services
   - Respect for local values/people
   - Socioeconomics/QOL
   - Mental health and substance abuse
   - Income levels and welfare system
   - Libraries
3. Economics (Ch. 16)
   - Labor-related issues
   - Small business opportunities
   - Effects on tourism
   - Military purchasing of goods locally
   - Competitive pricing (on base vs. off base)
   - Availability and cost of civilian housing
   - Improve economy
   - Use of local labor vs. bringing in off-island laborers/companies
4. Chamorro Interests (Ch. 12, 16)
   - Self government
   - Cultural, historical, and archaeological
   - Ancestral lands and access
   - Cultural, historic, and transition education
   - Historic properties
   - Minoritization of Chamorros/ demographic changes
5. Law Enforcement (Ch. 16, 18)
   - Crime/prostitution
   - Violence against women and children
   - Overloading local police/law enforcement resources
   - Overloading local emergency response/paramedic resources
   - Overall safety
6. Infrastructure/Transportation (Ch. 3, 4 in Volume 6)
   - Increase in traffic/roads/highways
   - Utility requirements
   - Potable water/groundwater recharge
   - Solid waste/recycling
   - Sanitary sewer system
7. Noise (Ch. 6, 7)
   - Airspace management
   - Training (artillery ranges, helicopters)
8. Land Use Planning (Ch. 8)
9. Marine Resources (Ch. 11)
   - Fish habitat, coral reefs, and marine mammals
   - Effects on local fisherman and the fishing industry
10. Ecological (Ch. 10, 11)
    - Endangered species
    - Invasive species
    - Native species
    - Natural resources
11. Air Quality (Ch. 5)
12. Surface Water (Ch. 4, 11)
    - Dredging and disposal requirements for Apra Harbor
    - Sewer outfalls
13. Cumulative Impacts (Ch. 4 in Volume 7)
14. Hazardous materials/hazardous wastes (Ch. 17)
15. Proposed actions – not enough information disclosed (Ch. 2 in Volumes 2-6)
16. International safety (NA)
17. Support for relocation (NA)
18. NEPA process (Ch. 1 in Volume 1)
19. Radiation (Ch. 18)
20. Overloading of regulating agencies (Ch. 16)
    - Construction (All Resources)

Note: Topics are addressed in various chapters of the EIS, as noted in the parentheses. Resource-specific chapter numbers in Volume 6 are different than those in Volumes 2-5.
Source: NAVFAC Pacific 2007.

The Draft EIS was made available for review at http://www.guambuildupeis.us on November 20, 2009. It was also made available at the following public libraries: UoG Robert F. Kennedy Memorial Library, Government Documents Tan Siu Lin Building, UOG Station, Mangilao, GU 96923; Nieves M. Flores Memorial Library, 254 Martyr Street, Hagåtña, GU 96910; Joeten-Kiyu Public Library, P.O. Box 501092, Saipan, MP 96950; Northern Marianas College Olympio T. Borja Memorial Library, P.O. Box 501250, Saipan, MP 96950; and the Tinian Public Library, P.O. Box 520704, Tinian, MP 96952. In addition, a reading room with copies of the Draft EIS for the public to review was established at Agana Shopping Center during normal shopping center hours from November 21, 2009 to February 17, 2010 so that members of the public could access and review the Draft EIS. Compact discs of the document were made available in the libraries for those individuals who desired a full copy of the document. The Draft EIS was provided via compact discs to regulatory agencies and other stakeholders, and individuals who requested a copy during the scoping period.

Table 1.8-2 shows which chapters of the Final EIS address the categories of the public comments received. Table 1.8-3 shows the sources of public comments. Comments presented at the public hearings as well as comments submitted by mail or electronically (email and Web site) are identified in Volume 10 of this Final EIS. Responses to each of the comments are also included in Volume 10.

Table 1.8-2. Categories of Public Comments Received on the Draft EIS

Comment Category [a]	*Number of Comments* [b]
Access (Ch. 8, 9)	170
Air quality (Ch. 5)	109
Airspace (Ch. 7)	25
Community relations – Guam (Vol. 2, Ch. 16)	233
Community relations – Tinian (Vol. 3, Ch. 16)	19
Cultural resources (Ch.12)	349
Cumulative impacts (Vol. 7, Ch. 4)	164
Environmental justice and the protection of children (Ch. 19)	71
Geological and soil resources (Ch. 3)	63
Hazardous materials and hazardous waste (Ch. 17)	176
Land acquisition (Vol. 2, Ch. 16)	394
Land and submerged land use (Ch. 8)	201
Marine biological resources (Ch. 11)	1,190
Mitigation of off-base impacts (Vol. 7, Ch. 2)	177
NEPA requirements – public involvement (Ch. 1 in Volume 1)	300
NEPA requirements – all other (Ch. 1 in Volume 1)	192
Noise (Ch. 6)	177
Other category (Various)	370
Proposed action – overall (Ch. 1 and 2 in Volume 1)	286
Proposed alternatives – AMDTF (Ch. 2 in Volume 5)	38
Proposed alternatives – CVN (Ch. 2 in Volume 4)	223
Proposed alternatives – Tinian (Ch. 2 in Volume 3)	75

Comment Category[a]	*Number of Comments*[b]
Proposed alternatives – USMC (Ch. 2 in Volume 5)	248
Protected species – general (Ch. 10, 11)	94
Public health and safety (Ch. 16, 18)	263
Public safety – crime (Ch. 16, 18)	274
Recreational resources (Ch. 9)	179
Socioeconomic – military/civilian equality (Ch. 16)	74
Socioeconomic – Chamorro interests (Ch. 16)	305
Socioeconomic and community services (Ch. 16)	1,306
Stormwater or surface water (Ch. 4)	295
Terrestrial biological resources (Ch. 10)	315
Terrestrial biology – non-native species (Ch. 10)	125
Transportation – marine (Ch. 14)	51
Transportation – on-base roads (Vol. 6, Ch. 4)	268
Transportation – off-base roads (Vol. 6, Ch. 4)	13
Uncategorized (Various)	667
Utilities – potable water (Vol. 6, Ch. 2 and resource chapters)	193
Utilities – potable water-aquifer (Vol. 6, Ch. 2 and resource chapters)	108
Utilities – power generation (Vol. 6, Ch. 2 and resource chapters)	72
Utilities – solid waste(Vol. 6, Ch. 2 and resource chapters)	146
Utilities – wastewater (Vol. 6, Ch. 2 and resource chapters)	220
Visual resources (Ch. 13)	32
Wetlands – LEDPA (Ch. 4)	73
TOTAL	**10,323**

Legend: LEDPA = Least Environmentally Damaging Practicable Alternative

[a] Topics are addressed in various chapters of this Final EIS, as noted in the parentheses. Resource-specific chapter numbers in Volumes 6 and 7 are different than those in Volumes 2 through 5.

[b] These counts current as of May 24, 2010.

Table 1.8-3. Sources of Public Comments Received during the Draft EIS

Source Group	*Number of Comments* [a]
Federal Elected Officials	24
Federal Agencies	817
Guam Territory Officials	1,163
CNMI Territory Officials	44
Other Territory Officials	0
Guam Territory Agencies	1,213
CNMI Territory Agencies	13
Other Territory Agencies	0
Guam Local Officials	6
CNMI Local Officials	0
Other Local Officials	0
Interest Groups	1,504
Individuals	5,232
Business/Commercial Entities	243
Spam	61
Late Comments	3
TOTAL	**10,323**
[a] These counts are current as of May 24, 2010.	

1.8.5 Final EIS

The Final EIS was prepared incorporating responses to comments and additional evaluations. The Final EIS identifies the preferred alternatives and was circulated in the same manner as the Draft EIS, but to an expanded list of recipients based on requests received during the Draft EIS comment period.

1.8.6 Record of Decision

After issuance of the Final EIS, a minimum of 30 days must pass before the lead agency can make a decision on its proposed actions. This provides time for the agency decision-maker to consider the purpose and need, weigh the alternatives, balance their objectives, and make a decision. The ROD can then be signed reflecting the DoD Executive Agent's final decision on the proposed actions, the rationale behind that decision, and commitments to monitoring and mitigation. The ROD will be published in the Federal Register, distributed to agencies and interested parties, and posted on the EIS website. The NEPA process and schedule is shown in Figure 1.8-1.

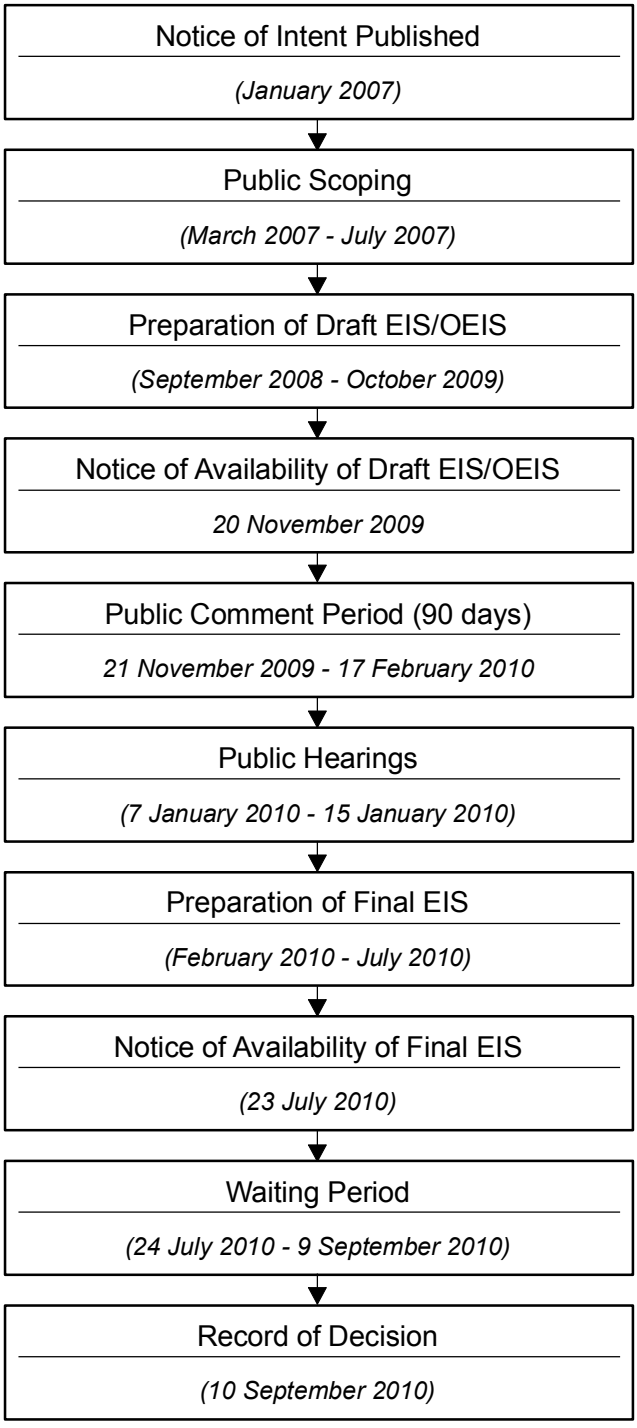


Figure 1.8-1
EIS Process and Projected Schedule

1.9 AGENCY COORDINATION

1.9.1 Lead Agency

The DoN is the lead agency (40 CFR 1501.5) for preparation of this EIS. The Office of the Secretary of Defense directed the DoN to establish a Joint Guam Program Office (JGPO) (Deputy Secretary of Defense 2006), that serves as the NEPA proponent of the proposed actions. JGPO responsibilities are as follows:

- Ensure the most efficient use of resources consistent with critical timelines
- Provide program oversight and management
- Develop strategic policy
- Synchronize and coordinate efforts
- Serve as liaison to internal and external organizations

1.9.2 Cooperating Agencies

A number of federal agencies were invited to be cooperating agencies (40 CFR 1501.6) in the preparation of this EIS. These agencies have either jurisdiction or technical expertise for any component of the proposed actions or potentially affected resource. A list of agencies invited to participate as cooperating agencies and the associated correspondence is included in Appendix B. The list of cooperating agencies is shown below:

- Federal Aviation Administration
- Federal Highways Administration
- Department of Agriculture
- U.S. Air Force
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency (USEPA) Region 9
- U.S. Office of Insular Affairs

Federal Highways Administration has prepared the transportation modeling, analysis for non-military proposed road projects and environmental impact analysis that appears and has been integrated into Volumes 2 and 6 of this Final EIS. Federal Highways Administration is using this Final EIS in compliance with the required evaluation, pursuant to NEPA, of their proposed roadway improvements on Guam. Federal Highways Administration has collaborated with the DoN through the Final EIS and will subsequently issue their own ROD to conclude their NEPA process.

1.9.3 Agency Partnering

In addition to consultations with federal cooperating agencies, the DoN has held a number of regulatory agency briefings and meetings, including those held between June and August 2007 with local, federal, regional, and territorial (Guam and CNMI) agency partners. In February 2008, the DoN initiated a partnering strategy to continue the integration among military and civilian, federal, regional, and territorial agencies throughout the EIS process.

The distribution list for the on-going partnering meetings now contains approximately 260 contacts. Due to the size and varied interests of the participants, the following working groups were established to focus on narrow ranges of issues: natural resources, cultural resources, regulatory compliance, and NEPA. The working groups formulate and address issues related to public scoping comments, baseline data for EIS resource areas, working impact analysis findings, and proposed mitigation measures. This effort has supplemented the traditional NEPA process and has resulted in identification and coordination of issues and concerns much earlier than usually occurs in the NEPA process.

The DoN has also engaged in a collaborative effort in preparing the Draft EIS with the federal cooperating agencies and territorial agency partners. An early version of the November 2009 Draft EIS was shared with the management and technical staffs of these agencies in July 2009. Review comments were received by the DoN and appropriate sections were augmented based upon the advice of these agency partners. Subsequent meetings between these agencies and the DoN occurred in September and October 2009 to ensure understanding of the agency partners concerns and to continue to focus the information provided in the Draft EIS.

Due to the importance of the need to understand the significant impacts on Guam and CNMI resulting from the proposed military relocation program, the CEQ has led a series of focused meetings on issues of concern raised by several federal cooperating and regulatory agencies. The CEQ has established agendas and requested issue papers on agencies' concerns about the proposed relocation program and sections of the Draft EIS. The series of meetings has involved discussions on issues including:

- methods for assessing impacts and possible compensation for loss of coral reef resources in Apra Harbor;
- induced growth and its effects on Guam;
- biosecurity planning and interagency efforts in providing risk assessments and planning to control and prevent spread of invasive species, including the brown tree snake;
- air quality issues including providing an analysis per the Mobile Source Air Toxics Act for the proposed relocation program;
- potable water supply and distribution, particularly for off base areas of Guam and impacts thereto associated with the proposed military relocation program; and
- coordination of additional study of location of wetlands and waters of the U.S. for inclusion in the Final EIS.

The DoN has been active in each of these meetings and provided feedback and additional information as required. Several of the discussion items including an expansion of the scientific debate to assess impacts to coral resources, definition of workforce housing proposal and estimation of induced growth are included in Chapter 4 of this Volume.

1.9.4 Agency Consultations

To ensure avoidance, minimization, and mitigation of potential conflict with the objectives and requirements of federal, state, regional, or local plans, policies, or legal requirements from the proposed actions, the DoN has had and continues to conduct extensive dialogs with the regulatory agencies. In addition, the DoN has been holding meetings with the CEQ to provide regular updates and receive inputs on the EIS. A summary of the environmental compliance requirements are presented in Volume 8.

Since the publication of the Draft EIS, the DoN has undertaken a continuing dialogue with several federal, Guam and CNMI agencies. The main areas of this continuing dialogue include:

- The DoN submitted in January 2010 a Biological Assessment (BA) pursuant to the Endangered Species Act (ESA) to the U.S. Fish and Wildlife Service (USFWS) for terrestrial species; the DoN BA provided a detailed description of the preferred alternatives of the proposed military relocation programs, impacts to threatened and endangered species and habitat, and proposed conservation or mitigation measures to compensate for adverse effects; the DoN's consultation with the USFWS has been on-going during the preparation of this Final EIS and information derived from these consultations have been incorporated herein;
- The DoN has also submitted in April 2010 a BA per the ESA to the National Marine Fisheries Service (NMFS) for marine species; the DoN BA provided a detailed description of the preferred alternatives, the impacts to threatened and endangered species and habitat, and proposed conservation or mitigation measures to compensate for adverse effects; similar to the consultation referenced above, the discussion between the DoN and NMFS have been on-going during the preparation of the Final EIS and information from these consultations have been incorporated herein;
- The DoN has been consulting with the Guam and CNMI Offices of Historic Preservation (SHPO) over the course of the EIS preparation; efforts are underway to establish a mutually agreed to Programmatic Agreement on the impacts and protection of cultural resources that would be affected by the proposed military relocation program; the information and the current status of these efforts have been incorporated into the Final EIS;

1.9.5 Guam and CNMI Local Government and Public Outreach and Involvement

The Guam Civilian Military Task Force (CMTF) was established in 2006 to develop an integrated comprehensive master plan that would accommodate the expansion of military personnel, operations, assets and missions, and to maximize opportunities resulting from this expansion for the benefit of all the people of Guam. The Guam CMTF is comprised of the following subcommittees: health and social services, public safety, education, labor, ports and customs, economic development, infrastructure, housing, social and cultural, natural resources, and environment. Although subcommittee membership is limited to Guam agencies, JGPO and other DoD representatives participate in the subcommittees' monthly meetings. This has been an effective mechanism to develop mutually beneficial and agreeable solutions to issues.

Within the CNMI, the Tinian Mayor's office has also set up a CMTF. The Tinian CMTF is comprised of The Mayor's Office of Tinian, Department of Land and Natural Resources, Department of Environmental Quality, Historic Preservation Office, Department of Public Works, and Chamber of Commerce. Approximately monthly, JGPO meets with the Tinian CMTF to address issues of concern, provide updated information on the relocation, and assist in maximizing opportunities for the people of the CNMI.

To ensure local leaders are kept apprised of planning and decision making, recurrent meetings have been held between JGPO (forward) leadership and the Office of the Guam Governor, Guam legislature, and village mayors. JGPO's subject matter experts participate and meet with representatives of Guam's Consolidated Commission on Utilities, Department of Public Works, Land Use Commission, and UoG on a variety of issues of local concern and interest to ensure local involvement in decision-making. A series of village meetings between May 2008 and January 2009 have also been conducted to allow the public an opportunity to better understand the relocation planning.

As the logistics hub of Micronesia, Guam's development has created Micronesian regional interest and concern. To address this and to ensure Micronesian leadership is apprised of planning and decision

making, JGPO (forward) has participated in the Micronesian Chief Executive Summits which bring together the Governors and Presidents of Guam, CNMI, Palau, Federated States of Micronesia, and the Marshall Islands. Environmental issues are a priority for the Micronesian Islands and JGPO environmental representation at the summits has been well received. Other Micronesian forums have afforded an opportunity for JGPO to provide outreach, such as the Micronesian Port Users meeting in Palau.

In order to ensure that the best and most innovative solutions are used for the relocation, JGPO hosted three "Industry Forums". The Guam Industry Forum brought together industry from over 15 countries with over 3,300 participants along with participants from the Governments of Guam, Japan and the U.S. Some of the issues discussed and presented were acquisition integrity, acquisition strategy, small business opportunities, bio-security, workforce housing and logistics solutions, ports, roads and utilities, Leadership in Energy and Environmental Design (LEED), and information technology.

As health and public safety issues are at the forefront of local concerns, JGPO took it upon itself to host a Public Safety Forum in June 2008. This forum brought together representatives from the local and federal governments to discuss a wide range of public health and safety issues such as military justice issues, H-2B visa process, workforce support to include worker protection, housing and security, and healthcare. Breakout sessions for future resources covered the areas of fire, courts, police, and criminal investigations. This forum was the first opportunity that local agencies had to express their concerns to their federal counterparts.

1.10 SUSTAINABILITY

1.10.1 Goals

Sustainability and smart growth work to meet the needs of the present without compromising the ability of future generations to meet their own needs. In this case, it is an approach that ensures that the military maintains its mission, readiness, national defense, training, and international defense commitments including the ability to adapt to changing geo-political realities. It also ensures the quality of life for the military while encouraging local economic growth, preserving the environment, and working to improve the quality of life for Guam and CNMI residents and visitors.

The DoN 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 Sustainability Program builds on the master planning effort already underway and includes five primary tasks: 1) identify Unified Facilities Criteria (UFC) that adversely impact sustainable efforts and propose alternative criteria; 2) Sustainable Systems Integration Model™ (SSIM™) Whole Systems Modeling; 3) integration of the U.S. Green Building Council's LEED New Construction (NC); 4) integration of sustainability into the Guam Joint Military Master Plan (GJMMP); and 5) initial direction with regard to implementation and monitoring. The foundations of the Sustainability Program are the federal mandates and targets related to energy, water, transportation, green building/LEED and greenhouse gas (GHG) emissions. Based on these foundations, the goal of the Sustainability Program is to define a program that delivers the highest level of environmental improvement while meeting federal mandates in the most cost-effective manner.

In order to reduce environmental impact and address limited resources, the DoD, including the Navy and Marine Corps, have adopted guidance and policies that promote sustainable planning, design, development, and operations. The guidance and policies work to decrease energy use, minimize reliance on traditional fossil fuels, protect and conserve water, enhance indoor air quality, and reduce the environmental impact of materials use and disposal. DoD's over-arching goal is that proposed development be sized, planned, and developed in a manner that is sustainable and works to preserve and protect limited resources.

1.10.2 Results

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:

- A target of 34% reduction in GHG emissions or 61,350 tons (55,660 metric tons) of carbon dioxide equivalent/year (equivalent of approximately 10,000 cars driven for a year)
- A reduction in power consumption by 30% or nearly 58 gigawatt hours/year (equivalent of powering 1,400 homes on Guam for a year)
- A reduction in water use by 26% or 170 million gallons (640 million liters)/day (equivalent of 286 Olympic swimming pools/year)
- A reduction of petroleum use by 30% in fleet vehicles or approximately 1.9 million gallons (7.2 million liters) of gasoline/year
- A reduction of nearly 7.6% of vehicle miles traveled (VMT), or approximately 6 million miles (9.7 million kilometers) of driving per year

These reductions are applied to the analysis presented in Volume 6 of the EIS.

1.11 DOCUMENTS INCORPORATED BY REFERENCE

Several concomitant actions are related to the proposed actions. These actions are covered in separate NEPA documents being prepared while this EIS is being developed. Table 1.11-1 clarifies the subjects of these documents. In addition, there are a number of planning and environmental studies that provide important information directly related to the preparation of this EIS that are incorporated by reference, per CEQ regulations (40 CFR 1502.21). These studies are cited, as appropriate, in later sections of this EIS and are included in the references section of each Volume of this EIS.

Table 1.11-1. Documents to Be Incorporated by Reference

Proposed Action Proponent	*Proposed Action*	*Relevance to Military Relocation EIS*
MIRC/DoD	• Periodic update of EIS/OEIS for joint training and Marianas training range activities/facilities. • Does not propose new ranges, but may propose improvements to ranges and increased use.	• MIRC EIS/OEIS establishes baseline "existing conditions" of training ranges/facilities for the Military Relocation EIS. • The Military Relocation EIS covers new training requirements and proposes new ranges and facilities not covered by the MIRC EIS/OEIS because either: 1) the need for improvements to existing ranges was not identified in time, or 2) the proposed training activity requires changes to MIRC facilities, operations, training capacities or expansion of MIRC property. • The MIRC would incorporate the added training capabilities in the next periodic update of the MIRC EIS/OEIS. • Where portions of the MIRC EIS/OEIS are incorporated, they will be specifically identified and referenced to assist the reader.
Ocean Dredged Material Disposal Site Designation (ODMDS) EIS/EPA	• EPA proposes to designate an ODMDS more than 9 nm from Apra Harbor.	• ODMDS designation provides an additional dredged material management option for all dredging projects on Guam, including the proposed military relocation projects and Port Authority of Guam projects. • Dredged material must meet strict laboratory testing standards to qualify as suitable for ocean disposal. • Beneficial reuse of dredged material would continue to be the preferred management option.

CHAPTER 2.
OVERVIEW OF PROPOSED ACTIONS

2.1 OVERVIEW

2.1.1 Introduction

As described in Chapter 1, the proposed actions consist of: (1) (a) developing and constructing facilities and infrastructure to support the relocation of approximately 8,600 Marines and their dependents from Okinawa (Japan) to Guam, (b) developing and constructing facilities and infrastructure to support training and operations on Guam and Tinian (Commonwealth of Northern Mariana Islands [CNMI]); (2) constructing a new deep-draft wharf with shoreside infrastructure improvements to create the capability in Apra Harbor, Guam to support a transient nuclear-powered aircraft carrier; and (3) developing facilities and infrastructure on Guam to support relocating approximately 600 military personnel, their dependents to establish and operate an Army Air and Missile Defense Task Force (AMDTF).

The proposed actions are a complex, multi-service project involving components of the United States (U.S.) Marine Corps, Navy, and Army. Facilities construction and improvements would be necessary to accommodate the three major elements of the proposed actions. On Guam, the proposed actions would entail increased training and operations, increased ship and personnel berthing frequency, and the establishment of aviation maintenance operations and facilities. 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 presence on Guam, and the creation of new training ranges to accommodate the training needs of a larger population of military personnel. These training facilities would be located on Guam and on Tinian in the CNMI. In summary, implementation of the proposed action or other alternatives would include the following major components:

- Temporary increase in population associated with the construction-related work force
- Permanent increase in number of military and civilian personnel and dependents on Guam with a transient presence during training on Tinian
- Increase in number and type of major equipment 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, utilities, etc.)
- 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 proposed actions and alternatives)

2.1.2 Proposed Project Locations

Figure 2.1-1 shows an overview of proposed action project locations on Department of Defense (DoD) land on Guam. The figure outlines project locations at Finegayan, Apra Harbor Naval Complex, Naval Munitions Site (NMS), Air Force Barrigada, Andersen Air Force Base (AFB), Andersen South, and Navy Barrigada. Non-DoD land potentially involved with the proposed action includes the former Federal Aviation Administration (FAA) parcel, the Harmon Area, and the Route 15 Area. Figure 2.1-2 shows an overview of the proposed action project locations on non-DoD lands.

2.1.3 Proposed Personnel Changes

Even though Guam currently hosts a significant permanent Navy and Air Force population, the proposed actions would increase the population by approximately an additional 8,600 Marine Corps and 630 Army personnel, and their combined 9,950 dependents, on Guam (Table 2.1-1). 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 Navy's proposed action does not require any additional permanent support personnel. The visiting (transient) population would increase due to the Marine Corps relocation (2,000 personnel). The Navy's 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) and would have 7,222 transient personnel. Navy personnel (both military and civilian) would be housed on their ships or, on occasion, in existing facilities. Table 2.1-1 portrays the maximum potential loading due to permanent and transient personnel. However, given the transient cycle of both the Navy and the Marine Corps, the projected average daily loading is 2,178, much less than the potential total transient loading for both services (9,222 personnel).

Table 2.1-1. Summary of Direct Military Population Changes on Guam

Service	*Permanent Military Personnel*	*Dependents*	*Transient Military Personnel*	*DoD Civilian Workforce (from off island)*	*Subtotals by Service*
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 Action Population = 30,190***

Note: * = Up to 7,222 personnel on the aircraft carrier with its 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.

Source: Navy 2006.

Uniformed military personnel would be supported by civilian personnel some of whom would likely be newly relocated to Guam and some 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.

Figure 2.1-1 Overview of Projects on Guam (DoD Lands)

***Note: Specific locations & configurations vary by alternative. Refer to respective volume(s) of EIS for detailed descriptions; volume and section numbers are included for each area**

Finegayan (NCTS and South)

Vol. 2; Vol. 5; Vol. 6

- Main Cantonment (includes quality of life facilities, family housing)
- Small Arms Firing Range (improve/expand existing)
- Army AMDTF Facilities
- Utilities: Power (Potts Junction), Potable Water, Wastewater

Naval Base Guam

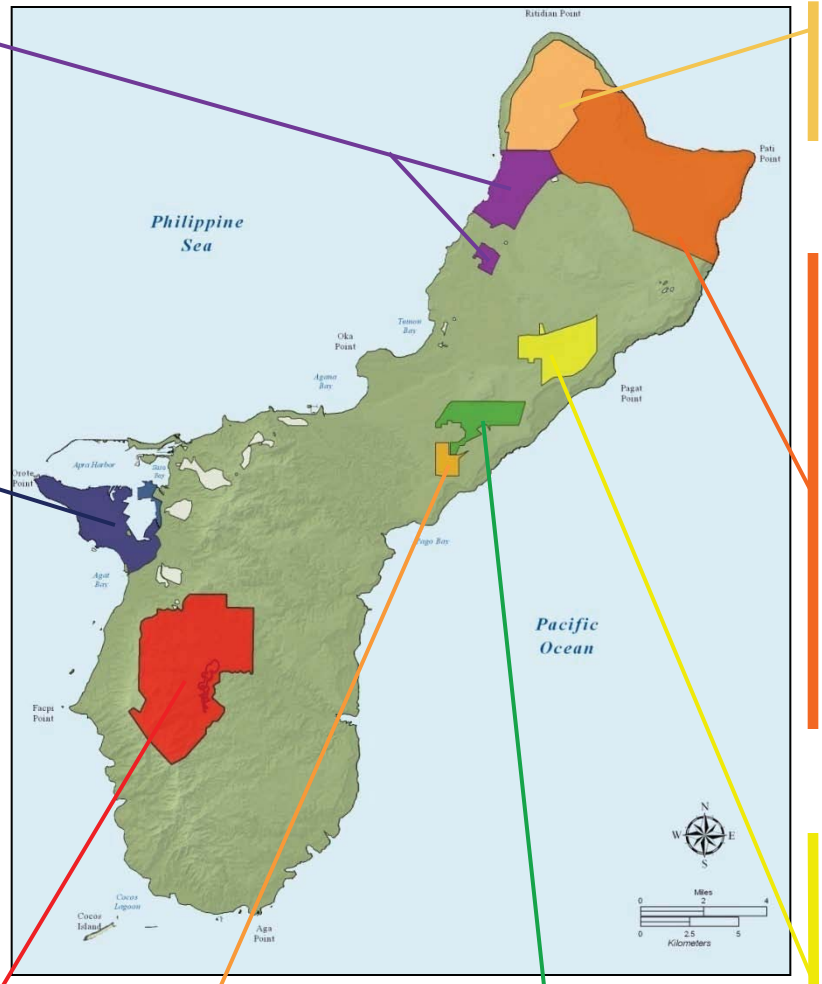
Vol. 2; Vol. 4; Vol. 6

- Wharf Improvements/Waterfront Embarkation
- LCAC/AAV Laydown
- Military Working Dog Kennel Relocation
- Apra Medical/Dental Clinic
- USCG Relocation (minus Headquarters)
- Aviation Training
- Aircraft Carrier Wharf and Fairway
- Utilities: Solid Waste

Naval Munitions Site

Vol. 2; Vol. 6

- New Munitions Storage
- Company-level Maneuver Training (new access road)
- Aviation Training
- Utilities: Solid Waste



Air Force Barrigada

Vol. 2; Vol. 5

- Main Cantonment (housing)
- Army AMDTF Facilities

Navy Barrigada

Vol. 2; Vol. 5

- Main Cantonment (housing)
- Army AMDTF Facilities

Andersen AFB NWF

Vol. 2; Vol. 5

- Aviation Landing Practice (training)
- Army AMDTF Weapons Emplacement Sites

Andersen AFB

Vol. 2; Vol. 5; Vol. 6

- Airfield Operations (North Ramp)
- Air Embarkation-Joint with Air Force (South Ramp)
- North Gate
- New Munitions Storage
- Aviation Landing Practice
- FACSFAC (Navy)
- Army AMDTF Ammunition Storage
- Utilities: Water, Wastewater, Solid Waste

Andersen South

Vol. 2; Vol. 6

- Non-firing Training (urban combat, driver/convoy)
- Firing Range Complex
- Aviation Training
- Utilities: Water

Figure 2.1-2 Overview of Projects on Guam (Non-DoD Lands)

***Note: Specific locations & configurations vary by alternative. Refer to respective volume(s) of EIS for detailed descriptions; volume and section numbers are included for each area**

Former FAA

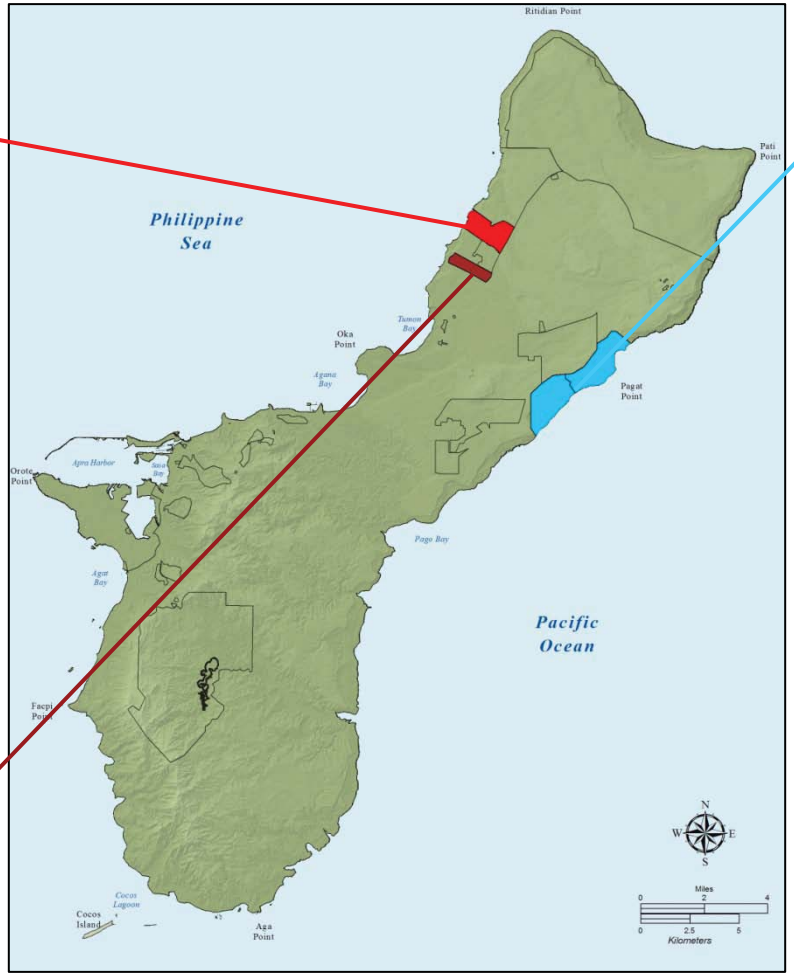
Vol. 2

- Main Cantonment (includes quality of life facilities, family housing)

Harmon Area

Vol. 2

- Family Housing (includes quality of life facilities)



Route 15 Area

Vol. 2

- Firing Range Complex

Non-DoD Other Areas

Vol. 2; Vol. 6

- Firebreak Access Roads into NMS
- Utilities: Power, Water, Wastewater, Solid Waste
- Haul Road Network (improves existing roadways)

Table 2.1-2 presents the estimated annual population increase from off-island that would result from the proposed actions. The population numbers are larger than the numbers presented in Table 2.1-1 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. The estimates were derived as follows:

- The estimated numbers of active duty military, their dependents, and civilian military workers associated with the proposed action were provided by DoD and were based on the characteristics of personnel at other military installations.
- The estimated number of off-island construction workers who would be working on DoD projects was based on planned construction spending and a conversion factor (gathered from sources familiar with Guam construction projects) that translates construction spending into an estimated number of construction workers.
- The estimated number of indirect and induced full time equivalent (FTE) workers was generated using an economic model of the employment that would result from project-related expenditures in the Guam economy for military construction and base operations.
- Estimates of the number of dependents for construction workers, indirect and induced workers, and civilian military workers were based on data from the U.S Census and sources familiar with Guam construction projects.

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 begins. 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.

Approximately 1 week per month, 200 to 400 Marine personnel would travel to Tinian to train at the proposed ranges.

2.1.4 Organization of the Remaining Chapter

The following sections provide an overview of the proposed actions. The following lists the sections, along with the appropriate Volume of the Environmental Impact Statement (EIS) that contains detailed descriptions of the proposed action and alternatives:

- Section 2.2 Marine Corps Relocation – Guam (see Volume 2 for details)
- Section 2.3 Marine Corps Relocation –Training on Tinian (see Volume 3 for details)
- Section 2.4 Aircraft Carrier Berthing (see Volume 4 for details)
- Section 2.5 Army AMDTF (see Volume 5 for details)
- Section 2.6 Related Actions – Utilities and Roadway Projects (see Volume 6 for details)
- Section 2.7 Construction

Table 2.1-2. 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 Population[1]											
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**

Note:[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.

2.2 MARINE CORPS RELOCATION – GUAM

The Marine Corps proposed action would require construction and utilization of new facilities, infrastructure, and training assets to supplement the existing military assets on and around Guam. It would also increase operational activities, increase ship berthing, and require the establishment of aviation maintenance operations and facilities. Marine Corps forces would live, train, and work on the island. 3rd Marine Expeditionary Force (III MEF) with its elements (discussed below) would be based on Guam and would be a component of the over-arching Marine Forces Pacific for operation and support of U.S. Pacific Command requirements.

The relocating forces would include the following operational elements:

- Command Element, III MEF. III MEF is the Marine Corps' forward-deployed Air-Ground-Logistics-Base Team; it has the ability to deploy rapidly and conduct operations ranging from humanitarian assistance and disaster relief to amphibious assault and High Intensity Combat. Consists primarily of headquarters (HQ) and supporting organizations. Co-location and communications connectivity is a primary facility siting requirement.
- Ground Combat Element, 3rd Marine Division Units. The Ground Combat Element has the mission of locating, closing with, and destroying the enemy with firing, maneuvering, and close combat. It provides infantry, armor, artillery, reconnaissance, anti-tank, and other combat arms. Consists of Divisional HQ and subordinate organizations. Needs to be sited near Command and other HQ and subordinate operating elements. Ground combat and combat support organizations require proximity to ranges and training areas, as well as traditional base support facilities.
- Air Combat Element, 1st Aircraft Wing and subsidiary units. The Air Combat Element operates from a variety of sea- and shore-based facilities to support Marine Air Ground Task Force (MAGTF) expeditionary operations. The focus of the Air Combat Element is to support the MAGTF during the assault landing and subsequent operations ashore. Includes the Marine Aircraft Wing HQ, expeditionary, and garrison supporting organizations. Unlike the aircraft squadrons, aviation command and general supporting elements can be located convenient to the airfield and higher commands, and do not necessarily need to be located at the airfield.
- Logistics Combat Element, 3rd Marine Logistics Group. The Logistics Combat Element provides all support functions not organic to the Ground Combat Element and Air Combat Element units. Functions include: communications, combat engineers, motor transport, medical, supply, maintenance, air delivery, and landing support. Consists of Marine Logistics Group HQ and supporting organizations that provide a variety of direct logistics support to the rest of the III MEF. The Marine Logistics Group HQ element would be sited in proximity to Command HQ and other HQs. Indirect and industrial support facilities of the Logistics Combat Element would be located in proximity to mutually supporting activities to maximize efficiency, with efficient access to roads, ports, and airfields.

- Base Support. This refers to all functions that may not be directly related to the military mission but are critical to the operation of the base and the quality of life (QOL) for military personnel and their families. Examples would include military exchanges, commissaries, and child development centers. These facilities would be sited throughout the Base.

Transient U.S. DoD and Allies operational forces would likely avail themselves of Guam's increased operational and training capabilities. A visiting Marine Expeditionary Unit, an Expeditionary Strike Group, and other joint and combined task forces including allied nation forces would likely conduct combined training exercises on Guam and the CNMI.

Typically, a visiting Expeditionary Strike Group would include three ships carrying amphibious vehicles, equipment, and personnel designed to support amphibious operations and an additional four surface combatant ships that escort the amphibious ships. The visiting ships and units involved in training exercises would berth at Apra Harbor for short periods. The numbers and types of ships and amphibious vehicles would vary with respective training missions. In addition to training, amphibious ships and their combatant escort ships may embark and disembark personnel and equipment on Guam for operational requirements. All waterfront improvements proposed to support Marine Corps requirements would be available for use by ships visiting Apra Harbor.

The following subsections describe the major activities that would be associated with the proposed Marine Corps relocation on Guam: Airfield, Main Cantonment, Waterfront, and Training.

2.2.1 Airfield

The majority of the proposed Air Combat Element (ACE) Beddown Project Area site is an inactive, previously disturbed area north of the existing Andersen AFB Airfield. This proposed area would accommodate helicopter and other vertical lift aviation assets operations, maintenance, and related training and support functions. The ACE beddown facilities would operate 24 hours per day and seven days per week. Approximately 2,000 people would occupy this space during the day shift and 400 people would be present at night. Traffic would include government owned vehicles, personal vehicles, and shuttle buses from the Main Cantonment area. Air traffic would include helicopter, vertical lift aircraft, fixed wing, and unmanned aircraft arrivals and departures. Air traffic rates are contingent on surge and operational requirements.

The Air Embarkation Project would include the Air Mobility Campus, Organic Marine Corps Cargo, and passenger operations. Air Embarkation/Disembarkation refers to the loading and unloading of passengers or cargo to aircraft. The passenger facilities are comparable to those of a small airport: luggage handling, wait area, and ticket/documentation area. Cargo is staged in the area awaiting loading to aircraft or disbursement to warehouses or individual commands. There are biosecurity searches of cargo and baggage. The site would operate 24 hours per day and 7 days per week. The total project area would be 28 acres (ac) (11.33 hectares [ha]), adjacent to the southeast boundary of the airfield (where land is available for expansion and redevelopment). The existing conditions include paved airfield parking and disturbed unused land adjacent to the airfield. This site would serve as the passenger terminal for Andersen AFB and temporary cargo storage.

Andersen AFB access improvements and the North Gate and Access Road proposed projects, would improve the traffic flow and physical security of vehicles entering and exiting the air base. The proposed 12 foot (ft) (3.66 meters [m])-wide access road is planned to intersect Route 9 approximately 10,561 ft (3,219 m) north of the existing Andersen AFB entry control point and extend into Andersen AFB

approximately 6,561.7 ft (2,000 m) until it terminates at 5th Avenue. A new entry control point facility is also proposed and would serve both commercial and private vehicles.

Roadway paving, street lighting, and drainage would be improved along the entire length of the alignment. Improvements at the new route intersection would include two dedicated turn lanes and traffic signals with demand left turn signals, via pavement detectors.

2.2.2 Main Cantonment

The Main Cantonment would be the main base of operations for the Marine Corps, and in two alternatives, would also be the main base of operations for the Army AMDTF. Facility requirements for the Main Cantonment Area include a full range of facility types, not unlike a small city: various types of housing, workplaces, recreation areas, education facilities, and health and safety-related functions. The workplace facilities are typical of a military base and include headquarters, maintenance facilities, warehouses, training areas (field and classroom), equipment/vehicle storage, and hazardous materials management and storage areas. Marine Corps command guidance and planning principles employed in designing the Main Cantonment includes:

- Accommodating individual training and as much unit training as possible on Guam
- Encouraging functionality, efficiency, and sustainability in daily operations
- Requiring command and organizational integrity
- Ensuring a high quality of life for troops and families
- Accommodating anti-terrorism/force protection (AT/FP) requirements
- Minimizing potential future encroachment
- Preserving and optimizing existing mission capabilities and joint service requirements

In each of the alternatives, the parcels were subdivided into functional areas based on many factors including: habitat, topography, and constraints. Facilities were sited throughout the proposed installation based on functional efficiency, capacity, AT/FP requirements, sustainability, and many other factors, to optimize functionality and minimize environmental impacts. All proposed facilities are presented as a component of one of the functional groups, as follows:

<u>HQ and Administrative Support Functions</u>

- Administrative offices
- Vehicle maintenance
- Electronic/communications support and maintenance
- Security
- Warehousing
- Armory
- Fuel storage
- Recycling center

<u>Base Operations</u>

- Administrative offices
- Military police functions: brig/confinement, police offices, rehabilitation facilities, military dog kennels
- Fire station and alert force facilities
- Base access: gate house, pass and identification, photographic facilities

- Warehousing
- Legal services, dental services, family services, and Morale, Welfare, and Recreation support
- Defense Reutilization and Marketing Office
- Hazardous materials management and storage/corrosion control

Bachelor's Quarters and Temporary Lodging

- Bachelor Enlisted Quarters, club, dining, indoor fitness, and swimming pool
- Bachelor Officer Quarters, officer's club
- Temporary lodging facilities

Family Housing

- Single-family and attached housing facilities of various sizes and types

Educational Facilities

- Child development/daycare facilities
- Elementary schools
- Middle schools
- High school

QOL Functions

- Main Community Center: commissary, exchange, post office, theater, bowling alley, vehicle maintenance, hobby shop, medical clinic, religious ministry facilities
- Applied instruction and auditorium facilities
- Fitness centers, swimming pool, youth centers
- Services: restaurant, location exchange, bank, gas station, gate house

2.2.3 Waterfront

Naval Base Guam is an operating military naval base that presently supports surface and subsurface combatants, and logistic support ships including amphibious ships. The Navy's general purpose wharves are on the western side of Inner Apra Harbor. Other wharves are not general purpose and have specific uses, such as submarine berthing or supply ship berthing. Port operations manages traffic and berthing assignments within the harbor. It would continue to assign berthing for ships within the existing wharf areas. Ships are assigned specific berths to accommodate the draft of vessel, operational requirements of the vessel including repairs, and on and off load requirements for the particular ship. The berths and adjacent support structures and lay-down areas would be upgraded to accommodate increased usage, and upgraded to meet new and emerging requirements in support of the Marines' relocation. Dredging would be required to accommodate some of the escort ships. Volume 2 provides detailed information regarding the location and impacts from dredging in Inner Apra Harbor.

Relocation of the Marine Corps to Guam would result in frequent embarkation operations supporting amphibious transportation of Guam-based Marines and other transiting amphibious forces for potential contingency, humanitarian, and exercise operations in the Pacific theater. The Navy's amphibious task forces and the Marine Expeditionary Units are transient forces that traditionally utilize Guam for port visits and training; such task force visits would occur more frequently after relocation. The composition of the amphibious task force would vary with each specific mission. Typically, three ships would carry equipment to support amphibious operations, and an additional four combatant ships would serve as escorts.

The amphibious task forces have historically utilized general purpose Navy wharves in Inner Apra Harbor. The proposed increase in amphibious task force visits, the increased utilities requirements, and the change in the class (type) of visiting ships would require a new embarkation area (for loading and unloading of ships) and a new amphibious vehicle laydown area. The four waterfront facility projects proposed to support this action are described below.

2.2.3.1 Embarkation and Support Ship Berthing

The amphibious task force would require an area to load and unload personnel, vehicles, and other cargo. Equipment cleaning and inspections associated with bio-hazard and customs requirements would also occur in this area. These operations are collectively referred to as waterfront embarkation. The ships carrying amphibious vehicles require wharf space and nearby support facilities to manage such operations. Wharves supporting other escort ships and support vessels would not need to be located adjacent to embarkation operations. A summary of amphibious task force facility requirements is as follows:

- Embarkation operations:
    - The amphibious ships would be berthed at Victor Wharf (the wharf traditionally assigned for amphibious shipping in Apra Harbor). A new port operations building would be constructed at the wharf, and a cargo staging and vehicle wash down area would be provided in proximity to but not adjacent to the wharf.
    - The Victor Wharf requires structural/surface repairs and utility upgrades. Proposed utility upgrades and installation include the following systems: telecommunications infrastructure, bilge oily water treatment, potable water, electrical, steam, low pressure compressed air, and sewage collection. New hardware and fenders would be provided.
- Other support vessels including non-amphibious shipping troop transport berthing:
    - Uniform Wharf would be used for troop transport ships such as ferries including High Speed Vessels.
    - All Apra Harbor wharves sustained previous earthquake damage, but Uniform Wharf is in the worst condition and is currently unusable. Extensive structural upgrades to meet seismic standards and utility upgrades are proposed. Proposed utility upgrades or installation include: electrical, water, wastewater, and telecommunications infrastructure.
- Escort (supply ships and combatants) ship berthing:
    - Sierra Wharf would be improved for the escort ships.
    - Dredging would be required from -35 ft to -38 ft (-10.6 to -11.5 m) Mean Lower Low Water for the areas fronting Sierra and Tango Wharves (see dredging discussion below).
    - Structural wharf improvements would be needed to accommodate the new dredged depth and comply with Guam seismic standards. Concrete wharf surfaces would be repaired and new hardware and fenders provided. No changes to wharf design are proposed.
    - Utility upgrades are proposed at Sierra Wharf to include the following systems: bilge oily water treatment, potable water, electrical, steam, low pressure compressed air, and sewage collection.

- Dredging at Sierra and Tango Wharves:
    - The EIS assumes mechanical dredging, which has been the standard practice for Apra Harbor. Other options include hydraulic dredging, but mechanical is perceived to be the environmentally most conservative due to releases of dredged material into the water column and temporary impacts on water quality.
    - Three dredged material management options would likely be available on Guam in 2010. The existing options are beneficial reuse and upland dewatering site. The U.S. Environmental Protection Agency is pursuing the designation of an ocean dredged material disposal site (ODMDS) approximately 11 to 14 nautical miles (nm) (20.4 to 26 kilometers [km]) from the west coast of Apra Harbor. The designation is anticipated in 2010 and the ODMDS EIS is being prepared concurrent with this EIS. An ODMDS would provide Guam a third option for dredged material management.
    - Beneficial reuse is the preferred disposal option for suitable (e.g. chemically, geotechnically) dredged material when practical; several local potential beneficial reuse projects have been identified and represent one possible scenario for use of portions of the dredged material excavated for the proposed action.
    - Based on the sediment chemistry analysis of 58 sediment core samples that were composited into six samples by geographic area, the dredged material at Sierra/Tango Wharves is likely to be suitable for either ocean disposal or upland placement and beneficial reuse in upland placement sites (Naval Facilities Engineering Command [NAVFAC] Pacific 2006). The sampling plan and the compositing of samples were based on standard guidelines used to support U.S. Army Corps of Engineers (USACE) permit applications. The chemical data results are comparable to the results on previous maintenance and construction projects' dredged material. To date, none of the Apra Harbor dredged material from the dredge area or nearby projects has required special handling, remediation, or placement in lined confined disposal facilities. These measures are not anticipated for the Sierra/Tango dredged material (or the Navy's proposed aircraft carrier berthing project described in Section 2.4).
    - The EIS impact analysis considers several scenarios: 100% beneficial reuse in association with a proposed Port Authority of Guam expansion program; up to 20% beneficial reuse of dredged material within the proposed military construction projects with remainder disposal at the ODMDS; 100% upland dewatering and placement; and 100% ODMDS placement. There would, most likely, be a combination of disposal methods described in the dredged material disposal plan, which would be prepared for inclusion in the USACE permit applications. The permit application process is administered by the USACE and the applications, including the dredged material disposal plan, are subject to review by other regulatory agencies.
    - Additional laboratory analysis would be required for submittal to USACE to support the dredged material management plan for potential ocean disposal that would include a full suite of bio-effects tests to determine suitability for placement in the approved ocean site. The permit application review process and permit conditions ensure that dredged material is managed in accordance with applicable environmental regulations.

2.2.3.2 Amphibious Vehicle Laydown Area

The amphibious vehicle laydown area is required to store, wash down, maintain, and deploy amphibious vehicles, such as landing craft and amphibious assault vehicles. Landing Craft Air Cushions (LCACs), would also utilize this area. There are proposed to be as many as four LCACs, 14 amphibious assault vehicles, and eight small reconnaissance boats permanently based in this area. Amphibious vehicles and the LCACs travel on land and water. The laydown area should be close to the water and have ramps to access the harbor for training and operations. Amphibious vehicles produce noise comparable to a diesel powered boats on the water. On land, amphibious vehicles tracks on hard surfaces generate noise in addition to engine noise. LCACs; however, are powered by gas turbines using two large shrouded propellers at the stern for forward propulsion. These gas turbines are similar to aircraft jet engines. Therefore, the laydown area must also be remote from other operations because of the noise and spray associated with the LCACs. The area is proposed for this project is along Polaris Point's southern coast and east of Alpha Wharf in inner Apra Harbor. This area is within a man-made fill area, requires no demolition, and is undeveloped (vacant) with no land use constraints. It has direct water access to Apra Harbor.

Specific components of the laydown area are identified below.

- Two new concrete ramps, which are similar to recreational boat ramps seen at private marinas. There would be paving for amphibious vehicle parking, personal vehicle parking, staging equipment, and amphibious vehicle washing.
- There would be four support buildings for administration, small boat storage, and maintenance.
- A new access road would be provided from Marine Corps Drive.

2.2.3.3 Facility Relocation Projects

Two facility relocation projects are necessary to accommodate the Marine Corps waterfront requirements.

1. U.S. Coast Guard (USCG):

    - Ship berthing and crew support buildings would be relocated from Victor Wharf to Oscar/Papa Wharves because ships carrying amphibious vessels would require the full length of Victor Wharf.
    - USCG HQ and other facilities would remain at Victor Wharf within the USCG lease area.
    - The Oscar/Papa Wharves would be refurbished and developed. The existing buildings would be demolished. The wharf face and surface deterioration would be repaired. There would be new wharf hardware and fenders. Proposed utility upgrades or installations include the following systems: bilge oily water treatment, potable water, electrical, fire protection water supply, communication infrastructure, and sewage collection.
    - The area is currently leased to the Guam Economic Development Authority by the Navy and subleased from Guam to the Guam Shipyard. A reduced footprint is proposed for the shipyard.

2. Military Working Dog Kennel:

    - The existing Military Working Dog Kennel with eight dog runs and administrative spaces within the Security Compound at Victor Wharf would be relocated to a relatively quiet inland site at the southern side of Naval Base Guam because noise of embarkation would be incompatible with the existing uses as a military working dog kennel and training location.

2.2.3.4 Medical/Dental Clinic

The Naval Hospital serves all military and dependent personnel. There are clinics at Andersen AFB and Apra Harbor. The proposed Marine Corps population increase requires more medical specialties and an increase in hospital capacity on Guam. The plans for construction of a new hospital were underway prior to the proposed Marine Corps relocation and are not included in this EIS. Many outpatient services currently provided at the Naval Hospital would need to be diverted to clinics to free up space for critical care and overnight stays. One new medical/dental clinic is proposed as part of the new the Marine Corps facilities and would be located within the Main Cantonment. In addition, the existing clinic at Apra Harbor would assume more outpatient responsibility from the Naval Hospital. The current medical/dental clinic at Apra Harbor is inadequate from a size, operational, and structural perspective for the proposed new level of service. A new clinic is proposed to accommodate, in part, the increase in on-island military population.

The proposed site is centrally located on the installation on Marine Drive, near existing family and bachelor housing areas. The clinic would include administrative spaces, medical, mental health and dental clinic spaces, urgent care clinic, preventive medicine, ancillary services, and parking for personal and emergency vehicles (approximately 290 spaces). The space allocation and designs are provided by the Bureau of Medicine and Surgery. Apra Branch Health Clinic (medical and dental) would be a single-story concrete facility of 43,091 square feet (ft^2) (4,003 square meters [m^2]). The total project area within the perimeter of the facility would be 334,000 ft^2 (31,030 m^2).

Site improvements include landscaping, sidewalks (with nonslip surface), curbs, and gutters. Subgrade construction would include utility lines and possible stormwater management systems (not yet designed). The facilities would be fully equipped with sprinkler and air conditioning systems. All facilities would be designed to Zone 4 seismic requirements, to withstand 170 mile per hour winds, and to include appropriate AT/FP distance setbacks.

2.2.4 Training

A variety of training requirements would have to be fulfilled on a regular basis by Marines as part of the proposed action, including maneuver and non-live-fire training, live-fire weapons and explosives training, and aviation operations and support. Ammunition storage areas are also part of the proposed action. The following training support and compatible high-use facilities would be required and integrated with the Main Cantonment:

- Audio-visual support, simulators, staff trainers, auditorium
- Physical fitness, swimming, obstacle course, rappelling
- Indoor small arms firing range and gas mask training chamber (effects contained within structure)
- Combat skills training
- Engineer equipment training

Andersen South would have facilities for Military Operations in Urban Terrain (MOUT) (urban warfare) and maneuver training areas. The NMS would also have maneuver training areas.

2.2.4.1 Live Fire Ranges

The proposed alternatives for the location of the Training Range Complex are on the east coast of Guam, east of Andersen South. Range Alternative A includes realignment of Route 15. Range Alternative B is south of Range Alternative A and would not include realignment of Route 15. Both alternatives would also include a proposal for special use airspace (SUA) from 0 to 3,000 ft (914 m) above ground level

(AGL) for the Surface Danger Zones (SDZs) of the machine gun range over parts of Andersen South and off the east coast of Guam. Weapons live-fire training activities would be the same at either location and would include:

- Small arms range complex: Multiple ranges would be in the complex. The proposed Known Distance (KD) range would provide for 50 firing points, but the range area would be sized for future expansion up to 80 firing points. The KD range would be 160-yards (yd) (146-m) wide and 500 yd (457 m) from the farthest firing line to the target line. The proposed pistol range would provide for 25 firing points and would be expandable to 30 firing points with a 150-ft (46-m) nonstandard small arms range for multi-purpose use. The proposed Modified Record of Fire Range would contain 16 lanes, expandable to 24 lanes in future for training with 5.56 millimeter (mm) weapons. The proposed Nonstandard Small Arms Range would be 100 m (328 ft) in length with 25 firing points, expandable in future to 50 firing points for training with 9-mm and 5.56-mm weapons.
- Machine Gun Multi-Purpose Range: The range would have eight stationary firing lanes, expandable to 12, and two moving target lanes. Lanes would be approximately 3,820 ft (1 km) long. The firing line is 492 ft (150 m) wide and the target line at its farthest extent is 984 ft (300 m) wide. The firing line is raised to include a vehicle firing platform extending 130 ft (40 m) deep. Projectiles authorized for this range include 7.62-mm, .50 caliber, and MK19 40-mm Training Projectile (TP). There would be a restricted area to 3,000 ft (914 m) AGL if this range is located near Route 15.

The following explosives live-fire training activities are also part of the proposed actions:

- Hand Grenade Range: An approximately 1 to 2 ac (0.4 to 0.8 ha) area would be cleared and developed as a hand grenade training range complex for the M67 (6.5 ounce Comp B) fragmentation hand grenade and the M69 inert practice grenade. Two alternative locations are proposed, both on Andersen South.
- Demolition Range: A pit of dirt or sand, approximately 100 ft (30 m) in diameter, would be excavated where explosives would be rigged, primed, and detonated. Training personnel would be sheltered in a bunker or defilade position approximately 985 ft (300 m) from the point of detonation. Up to 20 pounds of explosives could be used. These activities would occur at the Northwest Field.
- Breacher and Shooting House: The breacher and shooting house operations would be integrated into the MOUT at Andersen South. The shooting house would be a standard two-story enclosed structure with 100-ft (30 m) clearance on all sides. A small explosive charge (less than ¼ lb TNT) would be used as a part of training; typically five charges during the daytime and one at time (before 10 P.M.).

2.2.4.2 Naval Munitions Site Access Road Alternatives

The access road alternatives are located outside NMS property and would require acquisition of a right-of-way extending approximately 300 ft (91 m) from the road centerline. The access road alternatives are as follows:

- NMS Access Road Alternative A: This existing hiking trial is 0.4 mi (0.6 km) long, would cover 0.8 ac (0.3 ha) at a 16-ft (5-m) width, and includes no stream crossings. Under Alternative A, the trail would be improved. Vegetation would be cleared for the road shoulder for a total estimated

width of disturbance of 50 ft (15 m). Locked, unmanned gates would be placed at the beginning of the access road and at the entrance to the NMS.

- NMS Access Road Alternative B: Under this alternative, the road would not be improved and would be used by foot traffic.

2.2.4.3 Ammunition Storage

Only existing munitions storage areas were considered to be candidate sites for the proposed ammunition storage facilities under the proposed action. This narrowed the candidate sites to the NMS and the Andersen AFB Munitions Storage Areas (MSAs). Within these two areas, the primary factors in selecting alternative munitions storage configurations were as follows:

- Operational: the earth-covered magazines (ECMs) should be sited as close together as safety setback distances allow, to minimize logistical and maintenance requirements and total area encumbered by Explosive Safety Quantity-Distance (ESQD) arcs.
- Biological: the amount of habitat disturbed should be minimized (e.g., siting ECMs on previously cleared or paved areas or areas of lesser habitat value, and avoiding removal of mature trees) and the ECMs should be sited to avoid sensitive essential habitat for threatened and endangered species.
- Safety: ECMs must be sited in accordance with all regulatory guidance to ensure the safe working environment for munitions and other base personnel (i.e., the direction that the igloos are oriented in relation to each other, safety setback distances between ECMs, and explosive safety arcs within and outside of munitions storage area).

2.2.4.4 Aviation Training

Aviation operations and support would occur at multiple locations on Guam as described below.

<u>Andersen AFB North Ramp and Northwest Field</u>

- Marine Air Control Group (MACG) Training: The MACG is part of the ACE of the MAGTF. MACG training involves coordination of air command and control and air defense within the MAW. Tactical Air Operations Center training is also part of this training. Tactical Air Operations Center training involves establishment of operating air traffic control radar and radar frequency emitters and facilities consisting of shelters, a portable tower, and electrical power sources in about 48 hours, and dismantling them in approximately the same time.
- Improved Airfield Training: Certain aviation training requires improved airfields. Field Carrier Landing Practices (FCLP) training requires a lighted pad sized for a large amphibious deck ship for day/night use and with night vision goggles. Familiarization and instrument flight (FAM) requires an improved airfield with Aircraft Rescue and Fire Fighting for autorotation and simulated engine-out approaches. FCLP and FAM training would occur at an improved airfield. FCLP training involves landing on a simulated aircraft carrier. FCLP operations are almost circular patterns often conducted with several aircraft at low altitude. Approximately three training operations are conducted with each FAM sortie and five training operations with each FCLP sortie. Both are conducted during day and night.
- Landing Zones (LZ): Both improved and unimproved LZs are required to support training in Confined Area Landing (CAL), External Loads (EXT), and Helicopter Insertion Extraction (HIE). CAL training requires different closely located LZs. EXT training requires access to pre-positioned external loads for practice, and access is needed for ground helicopter support team personnel. External loads cannot be carried across public roads or populated areas. EXT training

operations would involve one pass for LZ orientation, followed by an approach of the LZ, hovering at approximately 30 ft (9 m) AGL for approximately one minute while the helicopter support team attaches a load (e.g., concrete block, items in a cargo net, or a vehicle), departure from the LZ vicinity with the load in tow, flying with the load in an arc, then returning to the LZ with the load, and hovering for approximately 30 seconds while the helicopter support team retrieves the load/equipment, and then departing the LZ vicinity. HIE activities include fast rope, rappelling, and parachute operations. HIE training operations would involve one pass for LZ orientation, followed by an approach to the LZ, hovering at approximately 30 ft (9 m) AGL for approximately 1 minute for the HIE event, and then departing the LZ. During each sortie, approximately three HIE operations would be conducted at one or more closely located LZs.

Andersen South and the NMS

- Landing Zone: Training similar to the LZ training occurring at Andersen AFB North Ramp and Northwest Field.

2.2.4.5 Development of Future Training Ranges

All Marine units, to include those relocating from Okinawa to Guam, are required to complete core competency 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, which is beyond individual live-fire qualification and requalification training, would be conducted on training ranges being constructed on Guam and Tinian and would involve integration of ground, aviation, and logistics elements under a common command element in preparation for large scale combat operations. 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 United States 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 CNMI to meet these future requirements, were evaluated during the 2010 QDR process.

To the extent that the QDR process results 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.

2.3 MARINE CORPS RELOCATION – TRAINING ON TINIAN

Under the proposed action, the Marine Corps would develop live-fire training ranges on Tinian (CNMI) to support the training and operations of Marine Corps units relocating to Guam. DoD currently leases, for military purposes, approximately two-thirds of the northern portion of Tinian. Elements of the proposed training consist of the following:

1. *Firing Ranges:* a Rifle KD Range, Automated Combat Pistol/Military Police Firearms Qualification Course, Platoon Battle Course, and Field Firing Range are proposed on Tinian
2. *Airspace Management*: Airspace use overlying the proposed firing range would continue as currently managed by the FAA. Establishment of SUA is not required or proposed for the firing ranges.

Individual, crew, and small unit weapons training would be required for Marine forces relocating from Okinawa to Guam pursuant to the Roadmap Agreement with Japan. Individual and crew weapons qualification and familiarization training ranges, maneuver areas, and aviation training including LZs are proposed for Guam as discussed previously in Section 2.2.4 of this Volume. The concept for Tinian is to provide the next stage in the training progression, and includes development of ranges for tactical employment of the basic weapons skills developed on Guam.

2.3.1 Proposed Firing Ranges

The proposed action consists of introducing live-fire weapons ranges into the Tinian Military Leaseback Area. This would require the modification of the existing lease-back agreements with the CNMI. The specific set of ranges proposed to meet the purpose and need include:

- Rifle KD Range (5.56-mm, 1,000 yd [914 m]). A Rifle KD Range, designed for training rifle marksmanship and target engagement techniques, would be developed. This range would supplement the KD range on Guam (see Section 2.2.4) by providing the additional distance required of up to 1,000 yd (914 m). Fifty firing points would be constructed, with a range width of 100 yd (91 m), and a length of 1,000 yd (914 m). The total distance of ground disturbing activities is approximately 1,050 yd (960 m) by 100 yd (91 m), or 22 ac (9 ha). The surface danger zone (SDZ) for this range is 2.17 miles (mi) (3,500 m) horizontally, with a vertical hazard distance of 388 yd (355 m).
- Automated Combat Pistol/Military Police Firearms Qualification Course. This range would be designed to meet training and qualification requirements with combat pistols and revolvers and used to train and test personnel on the skills necessary to identify, engage, and hit stationary infantry targets. This range would supplement the Pistol KD Qualification Course located on Guam. The range would be suitable for 9-mm and .45 caliber weapons. Up to 25 firing points would be constructed, with a maximum range distance of 50 yd (46 m). Total ground disturbance would take place over an area of approximately 55 yd (50 m) by 50 yd (46 m) wide, or 0.6 ac (0.24 ha). The SDZ for this range would extend 1.12 mi (1.8 km) horizontally, with a vertical hazard of 109 yd (100 m).

- Platoon Battle Course. The Platoon Battle Course would provide the capacity for small units of up to approximately 40 personnel to train in tactical scenarios, engaging targets at varying distances and angles while moving. There is no such range on Guam because the required range footprint and SDZ exceeds available land areas. Weapons that would be used on this range are those found at the platoon level. These are 5.56-mm carbines and rifles and Squad Automatic Weapons. The range footprint would be approximately 1,312 yd (1,200 m) long and 656 yd (600 m) wide, encompassing approximately 178 ac (72 ha). Within that footprint, target pits, access ways, and back stops would be constructed. For operation of the targets and safety management of the range, a range control tower would be located at the initial firing line. The SDZ would extend 2.17 mi (3.5 km) horizontally, with a vertical hazard distance of 388 yards (355 m).
- Automated Field Firing Range. This range would be designed for training target engagement techniques with the rifle, including identifying, engaging, and hitting stationary infantry targets. This would be a scored range for use with the 5.56-mm rifle but would also be suitable for the M4 Carbine and Squad Weapons System. The proposed range would be approximately 219 yd (200 m) wide by 547 yd (500 m) long, or approximately 25 ac (10 ha). The length of the SDZ is approximately 2.17 mi (3.5 km) long from the firing line and 388 yd (355 m) vertically.

2.3.2 Supporting Activities

Supporting activities include: range maintenance (grading for line of sight, creation of earthen berms, sifting of impact berms to remove used rounds for recycling), bivouac activities (i.e., setting up camp), emergency services support, and range access via roadways. No permanent facilities for supporting activities are proposed for the Tinian ranges. All training would be considered "expeditionary", in that the Marines would bring all necessary equipment to the ranges, would bivouac onsite, and would remove all equipment following completion of the training activities. No utilities systems would be required. Water and power would be provided by alternate means such as mobile water tanks and generators. Supporting activities would be accomplished without construction of permanent facilities.

2.3.3 Range Training Area (RTA) Management

The RTA on Tinian would be managed in accordance with Marine Corps Order 3550.10 (*Policies and Procedures for Range Training Area Management*) and U.S. Pacific Fleet directives contained in the Mariana Islands Range Complex and the U.S. Defense Representative (Commander Navy Region Marianas) training instructions that address safe, efficient, effective, and environmentally sustainable use of the range area. These policies include security and safety procedures and environmental management.

2.3.4 Range Operations

It is estimated that civilian use of, and access to and through, the RTA would be affected approximately 12 to 16 weeks per year. The limit of the restrictions would depend on the training uses scheduled. The transport of 200-400 Marines to Tinian from Guam for the proposed one week per month company-level training exercises would be via air or surface ferry transport. Ranges would primarily be used during daylight hours; however, some training is required during night-time hours, typically between the hours of 7:00 p.m. and 6:00 a.m.

The estimated sorties associated with the notional airlift requirements are provided in Table 2.3-1. The rotary-wing sorties would be between Andersen AFB North Field on Guam to either the bivouac area,

North Field or Tinian Airport (West Field) on Tinian. The fixed-winged sorties (C-17s) would be between Andersen AFB and the Tinian Airport (West Field). Tinian Airport (West Field) has the runway requirements for these aircraft. The fixed-winged sorties (C-130s) could use both North Field as an expeditionary field and the Tinian Airport (West Field). If equipment is moved by barge, a single barge would be able to carry the equipment necessary to support the estimated 200 to 400 Marines training evolution. Based on past practices and other range operations, elements of RTA management such as range security, range maintenance, vehicle maintenance, emergency services (fire fighting and medical), personnel support for range users (including transportation services and food services), and environmental services may be accomplished on a contract basis.

Table 2.3-1. Estimated Sorties Associated with the Notional Airlift Requirements

Aircraft Type	*Capacity (Marines Transported) per Sortie*	*Sorties for Airlift of 200 Marines*	*Sorties for Airlift of 400 Marines*
CH-53D	37	6	11
CH-53E	55	4	8
MV-22	20	10	20
C-130	76	3	6
C-17	102	2	4

2.3.5 Airspace

FAA Order JO 7400.2G, Procedures for Handling Airspace Matters (FAA 2008), and Marine Corps Order P3550.10, Polices and Procedures for Range and Training Area Management (Marine Corps 2005), do not require the establishment of restricted areas over small arms ranges. Airspace would continue to be managed by the FAA using established policies. Establishment of restricted area airspace for training on Tinian is not part of the proposed action evaluated in this EIS.

2.4 AIRCRAFT CARRIER BERTHING

2.4.1 Operation

The Pentagon's strategic QDR of 2006 supports an increased Navy presence in the Pacific. The most current QDR in 2010 reconfirms the Navy's capability for a "robust forward presence." To meet this objective, on average six aircraft carriers, including air wings and escort ships, would be homeported in the Pacific. The mission of the aircraft carrier includes:

- Providing a credible, sustainable, independent forward presence and conventional deterrence in peacetime
- Operating as the cornerstone of joint/allied maritime expeditionary forces in times of crisis
- Operating and supporting aircraft attacks on enemies, protecting friendly forces and engaging in sustained independent operations in war

Five of the six aircraft carriers are homeported on the west coast of the contiguous U.S. Rather than traveling long distances to U.S. homeport bases to refresh forces and conduct emergent repairs, the Navy proposes increased numbers and durations of aircraft carrier visits to Guam, the closest U.S. sovereign soil to the CSG operational areas in the Western Pacific. These visits would facilitate a greater transient presence in the Western Pacific. The increased presence on Guam may include up to 63 days total per year as operational requirements dictate. A new deep-draft wharf at Apra Harbor is proposed to support the transient aircraft carrier capability

Currently, Apra Harbor supports an average of two CSG port calls for an average of up to 7 days in duration per year, though actual port visits and durations are subject to change based upon Fleet operational requirements. Previous nuclear powered aircraft carrier berthing has been at Kilo Wharf. The longer transient visits, however, would interfere with existing ammunition operations at Kilo Wharf. It is the only DoD ammunition wharf in the Western Pacific and serves 12 to 14 ammunition ships in the area of operations.

2.4.2 Wharf Locations

An assessment of existing Navy wharves revealed the need for new construction. The Navy proposes to construct a deep-draft wharf and supporting infrastructure in Outer Apra Harbor to berth transient aircraft carriers and provide shoreside utilities. While berthed, the ships would be resupplied using the current logistics infrastructure. The ships do not require housing for crew or additional training facilities, but do require utilities and limited temporary shoreside facilities for Sailor liberty support services.

No new facilities are proposed to support the aircraft carrier escort ships. They would be accommodated at Inner Apra Harbor wharves on a space available basis. The Inner Apra Harbor wharf improvements proposed under the Marine Corps action would also benefit the CSG escort ships.

2.4.3 Wharf Design

Several structural design and alignment options were developed for Polaris Point and Former Ship Repair Facility alternatives. General site compatibility, constructability, costs, and seismic performance were evaluated in a feasibility study that represents a 20-30% level of design (NAVFAC Pacific 2008). The evaluation of seismicity, storm surge, wave analysis, bathymetry, and construction costs favored a vertical steel pile wharf over a concrete caisson and sheet pile bulkhead design. The vertical steel pile wharf design is assessed in the EIS impact analysis. If during the development of the 100% level of design, a different design is proposed, additional consultation with a regulatory agency including the USACE would be initiated. All designs are described further in Volume 4.

2.4.4 Dredging

The dredging methods and dredged material management options are as described for the proposed dredging at Sierra Wharf under the Marine Corps action (Section 2.2.3.1). The EIS assumes mechanical dredging, which has been the standard practice for construction and maintenance dredging in Apra Harbor. Other options include hydraulic dredging, but mechanical is perceived to be the environmentally most conservative due to releases of dredged material into the water column and temporary impacts to water quality.

Based on the sediment chemistry analysis of 14 sediment core samples that were composited into three samples by geographic area (i.e., turning basin, Polaris Point and Former SRF), the dredged material from wharf alternatives and turning basin areas is likely to be suitable for ocean disposal or upland placement in dewatering sites (NAVFAC Pacific 2006). Beneficial reuse is the preferred dredged material management alternative and several potential local reuse opportunities have been identified and are discussed in this EIS. Beneficial reuse remains an important option and is a priority. The material could be retained for Navy use (e.g., landfill cover, fill of berms in new military ranges, wharf stabilization, etc.), removed by the Government of Guam (GovGuam) (including the Port Authority of Guam), or sold to another party. Options for beneficial reuse of dredged material would be examined on a case-by-case basis.

2.5 ARMY AMDTF

2.5.1 Background

On December 16, 2002, National Security Presidential Directive-23 directed the DoD to establish a capability to protect the U.S. homeland, forces, and its allies from ballistic missile attacks starting in 2004.

The ballistic missile defense program develops the capability to defend territories and forces of the U.S. and its allies against all classes and ranges of ballistic missile threats. The proposed action is comprised of developing facilities and infrastructure on Guam to support relocating approximately 630 military personnel and their 950 dependents to establish and operate an AMDTF. The proposed Army AMDTF would be placed on Guam to defend U.S. interests on Guam from any threat of ballistic missiles. Its defensive umbrella would ensure that local military assets are protected and remain available to meet their military missions.

The proposed Army AMDTF on Guam contains the following three missile components:

- The Terminal High-Altitude Area Defense (THAAD) system is a long-range, land-based theater defense weapon which acts as the upper tier of defense against ballistic missiles. This system is designed to intercept missiles during late mid-course or final stage flight. The THAAD flies at high altitudes and provides broad area coverage against threats to critical assets such as population centers, industrial resources, and military forces.
- Patriot Missiles target short-range ballistic missiles which threaten the THAAD or other civilian or military assets on Guam. This weapon system is a point defense option with limited range designed to strike ballistic missiles, aircraft, unmanned aerial vehicles, and cruise missiles just before impact. This system utilizes hit-to-kill technology.
- A Surface-Launched Advanced Medium-Range Air-to-Air Missile (SLAMRAAM) engages targets to beyond line-of-sight and defends against the air threat from unmanned aerial vehicles and cruise missiles.

The Army AMDTF is a ground force and would not be accompanied by aircraft or ships. Components would include command and control, missile field teams, maintenance, and logistics/supplies support. The proposed mode of operation relies on inter-service agreements for all other support facilities.

2.5.1.1 Administration/HQ and Maintenance

During a typical notional work week, operations at the administration/HQ and maintenance facilities would occur 12 hours per day and 5 days per week. Each day, approximately 630 personnel would first report to the administration/HQ facilities for daily briefings and other activities before reporting to their assigned duty locations, including the emplacement sites.

Maintenance activities, including vehicle services (oil changes and lubrications, brake jobs) and any engine maintenance repairs that are needed would be conducted. Other repair activities would include air conditioning repair, generator repair, communication equipment repair and testing, and radar system

repairs (may require radiating to validate repair). Painting would only be done for minor repairs. Other activities would include storage of petroleum, oils and lubricant products, battery storage, fuel dispensing, and welding.

2.5.1.2 Weapons Emplacement Sites

Planned preventive maintenance would require a minimum continuous period of 45 minutes daily Monday-Friday. Personnel would be on-site after initially reporting to administration/HQ and the system would be active based on need. Each THAAD and Patriot Missile facility would be maintained by approximately 25 personnel at any given time.

2.5.1.3 Training

Two major categories of training would be required: individual/crew and collective. Individual/crew training would include basic rifle marksmanship and crew-served weapons training. Training ranges on Guam and in the CNMI are considered joint use (i.e., available to all U.S. forces). Consequently, the Army would utilize ranges within the Mariana Islands Range Complex for this type of training. Collective training would be required for the AMDTF. Regular crew training on all aspects leading up to and through a launch would be required for THADD, Patriot, and SLAMRAAM weapons systems. These training exercises would be conducted at the Army facilities and no training-specific facilities would be required. No live-fire missile launch training exercises would occur on Guam or in the CNMI.

2.5.2 Proposed Action

The Army AMDTF proposed action for the development of facilities and infrastructure consists of five main elements:

1. Administration/HQ and maintenance facilities
2. Munitions storage
3. Unaccompanied and family housing and associated QOL facilities
4. SUA (a restricted area) due to potential radar operation hazards to military and civilian aircraft
5. Weapons emplacement sites

The administration/HQ and maintenance facilities would comprise approximately 28 ac (11 ha) of developed land that includes a battalion HQ, company facilities, and tactical vehicle maintenance facilities. The siting options and analyses, including the alternatives considered and dismissed for HQ, operations, bachelor quarters, and family housing would be as described for the Marine Corps portion of the proposed action (see Section 2.2). Requirements for the facilities are addressed in the Marine Corps Main Cantonment component as the Army and Marine Corps would be sharing these facilities. The AMDTF support facility alternatives are: co-location of support facilities with the Marine Corps facilities at Naval Computer and Telecommunications Station (NCTS) Finegayan; locating the Army AMDTF support facilities at Navy Barrigada; and a combination of co-location of HQ facilities with the Marine Corps facilities at NCTS Finegayan and placement of housing facilities at Navy Barrigada and Air Force Barrigada.

Eight new climate-controlled, ECMs, and/or Modular Storage Magazines are proposed on Andersen AFB approximately 1 mi (1.6 km) north of the junction of Route 9 and Route 3A. The ESQD arcs are an important operational component of munitions storage. These are planning areas that surround explosive hazard sites and define the minimum permissible distance between the hazard of the explosive and any inhabited building, public assembly area, and/or the boundary of Department of Defense (DoD) lands. The ESQD arcs for existing munitions storage facilities in MSA 1 encompass much of the land in central

Andersen AFB. Due to the hazards associated with the munitions to be stored in them, the ESQD arcs for the proposed new munitions storage facilities would extend to 1,250 feet (381 m) from each magazine. The ESQD arcs for the new magazines would encompass land outside the area of existing ESQD arcs, so the existing arcs would expand.

During THAAD radar operation, there is a potential hazard to military and civilian aircraft. Therefore, a proposed SUA would be located along and off the northwest coast of Guam. The SUA would consist of a proposed Restricted Area (R-7205) to accommodate hazards associated with THAAD radar 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.

The weapons emplacement sites would be constructed to accommodate THAAD and Patriot launcher operations. Associated facilities would include hardstands, readiness buildings, missile and launcher facilities, and inclement weather storage. The Avenger/SLAMRAAM operations are mobile units. Weapon platform siting is classified and is assessed in Classified Appendix L to this Final EIS. This classified information will be reviewed by regulatory agency personnel with the appropriate security clearance.

2.6 RELATED ACTIONS – UTILITIES AND ROADWAY PROJECTS (GUAM)

The proposed military growth on Guam associated with the relocation of the Marines, the Navy aircraft carrier berthing, and Army AMDTF would increase demands on power, potable water, and wastewater utilities. The proposed actions would also affect the remaining life of the solid waste facilities currently on Guam. For purposes of this EIS, utilities actions are considered "related actions", to be implemented as a part of the proposed actions. To meet the estimated future demand resulting from the proposed actions, basic and long-term alternatives for certain utilities were developed and are presented in Volume 6. The four utilities evaluated are listed below:

- Power
- Potable Water
- Wastewater
- Solid Waste

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 Training on Tinian, 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. 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 utility 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 at a programmatic level. 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 readily available for pursuit upon signature of the Record of Decision.

DoN representatives have been meeting regularly with Guam Power Authority (GPA) and Guam Waterworks Authority (GWA). These meetings have been to coordinate needed utility upgrades, identify the best technical solutions, discuss business solutions to implement the technical solutions, and lead toward viable utility solutions both on base and off base. Volume 1, Section 4.3 describes the progress made regarding each utility.

It is anticipated that some utilities 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 in accordance with the Realignment Roadmap the SPEs would utilize $740 million of Government of

Japan financing for utilities infrastructure improvements to support for the 3rd Marine Expeditionary Force (III MEF) forces that would be realigning from Okinawa to Guam. 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. The Department of the Navy 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 Guam utility under a utilities service contract. Fees generated through utilities service contracts could be used by the SPE or Guam utility to repay financing costs or a portion thereof. The DoD rate structure that would be established with any utilities service contract with a SPE or Guam utility 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.

Long-term utility alternatives, if necessary, may require further NEPA-tiered and/or supplemental documentation as they are not evaluated herein at the project specific level, but only programmatically. If the NEPA documents are tiered from this Final EIS, the proposal and documentation would be procedurally related to the large-scale proposals to implement any of the long-term alternatives presented.

Volume 6 also evaluates the related action pertaining to roadway improvements on Guam. The Guam Road Network (GRN) is comprised of the non-military roadway system on the island of Guam. Construction of the GRN is required to provide mission-critical transportation infrastructure as part of the planned construction, training, and operations associated with the Marines, Navy, and Army proposed actions. Improvements to the roadway network are needed to allow efficient and safe access to military lands for construction of facilities and to accommodate both military-related and projected organic (ongoing) traffic growth on Guam. Without improved roads and bridges, the movement of people, materials, equipment, and waste associated with construction and operations would result in congestion. Additionally, the resultant wear and tear on existing roads could severely limit the construction schedule if these roadway and bridge projects are not implemented. Proposed improvements to the GRN would result in roadway strengthening, bridge replacement, increasing roadway capacity, roadway realignment (Route 15), providing new access, and enhancing roadway safety in response to construction for military relocation and growth.

2.7 CONSTRUCTION

This subsection discusses the construction aspects of the proposed actions and alternatives. Based on the estimates of the project planners, the proposed actions would result in approximately $12 billion, in 2008 dollars, worth of construction occurring on Guam between 2010 and 2016. Although the desired completion date for Marine relocation is 2014, the construction would likely continue to 2016.

The physical environment is primarily affected during the construction phase due to the actual physical aspects of construction. Construction would typically include (1) demolition, site clearing and grubbing, and grading; (2) horizontal layouts including placing infrastructures and roadways; and (3) vertical building including building of facilities, structures, housing, and related uses such as parks, training areas, and landscaping. Construction activities are typically short-term and in most cases would be completed in a 1- to 2-year period. However, because construction would likely occur in different geographical areas concurrently, the impacts, especially when considering commonly used facilities, such as roads, utilities, landfill locations, ports, and workers' housing, would have individual as well as a cumulative impact. See Volume 7, Proposed Mitigation Measures, Preferred Alternatives' Impacts, and Cumulative Impacts, for more information.

2.7.1 Overview

2.7.1.1 Military Construction Funding

Military construction funding would be used for a significant portion of the construction for the proposed actions. The Congressional Armed Services Committees specify military construction funding by state/territory, installation, and project in the actual statutory language. Once the funds are appropriated, they can be spent over a five year period. This form of funding provides much greater flexibility than operations and maintenance funding that must be obligated (spent) for the year appropriated. Volume 7, Chapter 2 presents two proposed mitigation measures that would impact the on-island population during construction to reduce the impacts. One proposed mitigation measure is to extend the arrival time of military personnel and their dependents to trail construction without altering the construction schedule. This is referred to as a reduction in force flow. A second proposed mitigation measure is adaptive program management. The DoD would adaptively manage the construction by slowing the tempo of construction and the adjusting sequencing of construction activities to directly influence workforce population levels associated with the proposed action before unacceptable conditions exceed infrastructure capabilities. The latter mitigation would also likely result in reduced force flow.

2.7.1.2 Value and Schedule

The proposed actions would be constructed over a six year period: 2010 - 2016.

Construction values have been calculated for each year, for each DoD component, and for the related actions direct and indirect impacts. The schedule and values are summarized in Table 2.7-1.

Table 2.7-1. Unconstrained Construction Values

Year	*Marine Corps*	*Navy*	*Army*	*Related Actions*	*Totals*
2010	$424,780,371	$0	$0	$99,666,667	$524,447,038
2011	$1,022,986,846	$61,320,000	$0	$217,666,667	$1,301,973,512
2012	$1,647,695,494	$81,760,000	$0	$483,560,000	$2,213,015,494
2013	$2,108,773,907	$81,760,000	$0	$532,293,333	$2,722,827,241
2014	$2,034,326,311	$61,320,000	$241,581,604	$468,293,333	$2,805,521,248
2015	$1,409,617,662	$0	$241,581,604	$202,400,000	$1,853,599,266
2016	$523,758,878	$0	$0	$54,000,000	$577,758,878
Total	$9,171,939,469	$286,160,000	$483,163,208	$2,057,880,000	$11,999,142,677

Note: The above are in 2008 dollars.
Source: NAVFAC Pacific 2009b.

2.7.1.3 Locations

The primary locations of Marine Corps, Navy, and Army, utilities and road widening construction are identified in Table 2.7-2 through Table 2.7-6.

Table 2.7-2. Primary Locations of Marine Corps Construction

Facility	*Location*	*Alternative*
Main Cantonment	Finegayan (NCTS & South)	Alternatives 1, 2, 3, & 8
	NCTS (Potts Junction)	
	Former FAA	Alternatives 1, 2, & 8
	Harmon Annex	Alternative 1
	Air Force Barrigada	Alternatives 3 & 8
	Navy Barrigada	Alternative 3
Marine Corps Air Combat Element	Andersen AFB North Ramp	Alternatives 1, 2, 3, & 8
Training Facility	Andersen South	Alternatives 1, 2, 3, & 8
Munitions Storage	Fena NMS	Alternatives 1, 2, 3, & 8
Munitions Storage Area 1 Storage	Andersen AFB	Alternatives 1, 2, 3, & 8
Air Embarkation	Andersen AFB	Alternatives 1, 2, 3, & 8
Victor Wharf Embarkation	Naval Base Guam	Alternatives 1, 2, 3, & 8

Table 2.7-3. Primary Locations of Navy Construction

Facility	*Location*	*Alternative*
Aircraft Carrier Wharf Apra Harbor	Naval Base Guam	Alternatives 1 & 2

Table 2.7-4. Primary Locations of Army Construction

Facility	*Location*	*Alternative*
Army Missile Defense	Finegayan	Alternatives 1 and 3
	Navy Barrigada	Alternative 2
Munitions Storage	Andersen AFB	Alternatives 1, 2, & 3

Table 2.7-5. Primary Locations of Utilities Construction

Facility	*Location*	*Alternative*
Recondition Power Stations plus transmission and distribution upgrades	Northern & Central Guam	Basic Alternative 1
Additional water capacity of 11.3 million gallons per day (MGd), which is anticipated to be met by an estimated 22 new water supply wells, refurbish some existing wells, water line improvements, ground level and elevated water tanks	Northern, Central & Southern Guam	Basic Alternative 1
Additional water capacity of 11.7 MGd, which is anticipated to be met by an estimated 31 New Water Supply Wells, Refurbish Some Existing Wells, water line improvements, ground level and elevated water tanks	Northern, Central & Southern Guam	Basic Alternative 2
Development of Lost River	Southern Guam	Long-Term Alternative 1
Desalination	Northern and Central Guam	Long-Term Alternative 2
Dredging of Fena Reservoir	Southern Guam	Long-Term Alternative 3
Refurbish Northern District Wastewater Treatment Plant (NDWWTP) Primary Treatment and expand/Upgrade to Secondary Treatment	Northern and Central Guam	Basic Alternative 1a
Refurbish Primary and expand/Upgrade to Secondary Treatment at NDWWTP and include a New Sewer from Barrigada to NDWWTP	Northern and Central Guam	Basic Alternative 1b
New Stand-Alone DoD Only Primary/Secondary Treatment Plant on DoD Property With New Outfall and Collection System.	Northern & Central Guam	Long-Term Alternative 1
Utilize Existing Navy Landfill Until New Layon Landfill is Open. Continue to use existing Navy Landfill for waste streams not accepted by Layon Landfill.	Southern Guam	Basic Alternative 1

Table 2.7-6. Primary Locations of Roadway Widening and Bridge Replacement Construction

Facility	*Location*	*Alternative*
Route 3	Route 1 to Route 9 – North	Alternatives 1, 2, 3, & 8
Route 9	Route 3 to Andersen AFB – North	Alternatives 1, 2, 3, & 8
Route 8	Route 33 (east) to Route 1 – Central	Alternatives 1, 2, 3, & 8
Route 16	Route 10A to Sabana Barrigada – Central	Alternative 2
Route 8A	Route 16 to Air Force Barrigada – Central	Alternative 2
Route 25	Route 16 to Route 26	Alternatives 1, 2, 3 & 8
Route 26	Route 1 to Route 15	Alternatives 1, 2, 3 & 8
Route 28	Route 1 to Route 3	Alternatives 1, 2, 3 & 8
Agana Bridge (GRN #3)	Route 1	Alternatives 1, 2, 3 & 8
Agueda Bridge (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Asan Bridge #1 (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Asan Bridge #2 (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Atantano Bridge (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Fonte Bridge (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Laguas Bridge (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8
Sasa Bridge (GRN #35)	Route 1	Alternatives 1, 2, 3 & 8

Proposed dredging is described in Volumes 2 and 4 would be performed at two Apra Harbor locations:

- Sierra Wharf, Inner Apra Harbor - 327,000 cy (250,000 m3) of dredged material, including 2 ft of overdredge
- Aircraft Carrier Wharf, Outer Apra Harbor - 479,000 to 608,000 cubic yards (366,221 to 464,849 m^3)

Beneficial reuse of dredged material for use in local construction or other rehabilitation projects would be investigated. A second option is upland placement. Five potential associated dredged material upland placement sites are located in the vicinity of Inner Apra Harbor. One or more of the following would be identified for use during the Army Corps of Engineers ACOE) permit process:

- Polaris Point
- Public Works Center
- Field 3
- Field 4
- Field 5

EPA is in the process of designating an ocean dredged material disposal site that would be a third option for the management of dredged material from Apra Harbor, if the material meets rigorous laboratory testing criteria.

2.7.1.4 Construction Requirements

The goal for all proposed construction (and design) is Leadership in Energy and Environmental Design (LEED) Silver rating. The major construction categories would include demolition, clearing and grubbing, grading, structural concrete foundations, building envelope (structural, walls, roofs and insulation), finishes, and subsystems (electrical, plumbing and electrical).

Demolition would generate a significant volume of material, as described in Volume 6, Section 2.4. Asbestos, lead-based paint, and other materials would be assessed and appropriately handled and disposed of primarily on-island.

DoN guidance and qualification for LEED Silver points requires a minimum of 50% of non-hazardous waste and demolition debris be recycled. Discrete items such as doors, windows, cabinets, plumbing, and lighting fixtures can be re-used if removed for reuse. Metal components of rough-in systems, such as conduit and wire, pipe, and duct work can be recycled. Concrete can be crushed for re-use in new portland cement and asphaltic concrete, and as aggregate base below footings, slabs, parking areas, and roads. The presence of paint on most of the existing concrete would affect how the concrete is prepared for use in re-use methods. The alkali content and presence of rebar in existing concrete would be addressed as a part of re-use plans. Emissions from a concrete crushing reuse facility would be controlled according to applicable statutes and regulations.

The clearing and grubbing would generate a mix of soil and organic material. Soil encountered is not expected to be contaminated; however, if it is within an area of known contamination or suspected contamination, the soils would be tested and, if contaminated, would likely be disposed of off-island.

In known uncontaminated areas, the possibility of allowing interested islanders to harvest plants that would be cleared is being considered; also, the contractor may be asked to set plants and trees aside for replanting and/or landscaping after the project is completed. The latter would allow existing indigenous and/or native plants already adapted to the area to be reused and reduce the need to purchase and use exotic plants. Other woody brush, such as tangantangan (*Leucaeha leucocephala*), can be removed and used for mulch. Based on Guam landfill requirements, green waste would be recycled and not placed in public landfills.

The proposed new Guam landfill is located in Layon, near the village of Inarajan. This new landfill is not intended for construction debris disposal but it can use construction debris in its operation (recycled into beneficial use). Construction debris that is not recycled would be directed to Guam Environmental Protection Agency-approved landfills. Grading generally would not create excess material. All clean soil and rock would likely be used on the originating site. Additionally, where possible, soil and rock would be stockpiled and used for other DoD construction projects. Reuse of the concrete, plant materials, clean soil, topsoil, and rock would constitute cost savings as well as promote recycling. Compaction of aggregate and soil would require water and where possible surface runoff water would be captured and used. Fill and/or engineered fill (aggregate or specific ratios of varying sizes) would likely be required but stockpiled material would be selected before new aggregate materials are purchased. Grading typically requires dust control and periodic or continuous watering may be needed. However, because rainfall occurs frequently (85 inches [215 centimeters] to 115 inches [235 centimeters] annually) on Guam and the humidity is high, continuous or frequent watering may not be needed. In order to save potable water resources, designers and contractors would consider captured runoff or brackish water use for water control. Stormwater Pollution Prevention Plans employing Best Management Practices would be prepared and implemented during the grading work.

All material used at the sites, with the exception of aggregate, clean soil, and topsoil would be imported from off-island. Because most of the construction materials used must be imported from off-island, the DoD would reuse demolition waste and recover and use plant materials, clean soil, topsoil, and rocks when effective. This would limit construction materials from off-island thus reducing the need to dispose of the recovered material in a landfill and the resources and facilities needed to ship materials to Guam.

Foundations, walls and roofs would be primarily concrete; some may be cast-in-place and some may be precast. Concrete batch plants would likely be set up on larger construction sites for cast-in-place construction and possibly precast facilities. On-site batch plants would require delivery of cement via specialty hopper trucks; aggregate via 18-20 cubic yard (14-15 cubic meter) dump trucks; and other minor ingredients of concrete (admixtures) primarily delivered in small bulk containers, sacks, and as liquid in drums.

Precast operation may also be set up at other sites that would require truck transportation of precast panels to the site. Some wall construction may use concrete masonry units, which would be fabricated in an off-site specialty yard. For smaller sites, and at some larger sites, concrete would be delivered in mixer trucks from commercial off-site concrete batch plants. All other 'post-structural' building and construction work would involve on-site workers installing delivered material.

Table 2.7-7. Estimated Total and Off-island Construction Workers Needed for DoD Projects

Year	*Marine Corps*	*Navy*	*Army*	*Related Actions*	*Totals*
2010	3,186	0	0	748	3,934
	2,624	0	0	615	3,239 (82%)
2011	7,627	460	0	1,633	9,720
	6,447	386	0	1,369	8,202 (84%)
2012	12,358	613	0	3,627	16,598
	10,589	525	0	3,100	14,214 (86%)
2013	15,816	613	0	3,992	20,421
	13,817	535	0	3,482	17,834 (87%)
2014	15,257	460	1,812	3,512	21,041
	13,329	401	1,580	3,063	18,373 (87%)
2015	10,572	0	1,812	1,518	13,902
	9,236	0	1,580	1,324	12,140 (87%)
2016	3,928	0	0	405	4,333
	3,432	0	0	353	3,785 (87%)

Notes: White rows represent the estimated total number of construction workers needed for DoD projects. Shaded rows represent the estimated off-island construction workers needed for DoD projects. Parentheses represent the percentage of off-island construction workers compared to the total number of construction workers.

2.7.1.5 Labor Force Requirement for DoD Projects

There would be a demand for construction-related labor for DoD projects between the years of 2010 and 2016. The estimated demand of total labor, off-island-sourced labor by year, and DoD component and related actions is shown in Table 2.7-7. The table presents unconstrained values.

There is an inadequate supply of labor available on Guam for all categories of work: management, supervision, skilled labor, and general labor. Management support during the past years of high construction activity (1990-1996) primarily came from the U.S., Japan, Korea, and Australia. It is reasonable that this historical pattern would be repeated for these proposed actions.

Historically, skilled, semi-skilled, and general labor primarily came from the Philippines and China but some skilled labor came from the other areas of the U.S. This historical pattern may be repeated, with at least two differing conditions:

- Early phases of the construction are expected to occur during reduced level of American and worldwide economic activity. This may cause jobs on Guam to be more attractive to Americans living in the continental U.S. than they were in the early 1990s.
- Use of Chinese labor in the 1990s included a high level of misrepresentation of workmen's skills. The nature of construction in China is such that skill levels in many cases are lower, and the knowledge required to execute the work do not match American style construction practices. There may be an effort by public and private entities to minimize, or even prevent such workers from being brought to Guam for the proposed actions.

Workers may be available from the CNMI and the Federated States of Micronesia. The skill level and knowledge of American construction practices are also limited in these groups. They have been used in the past with some success for labor type work but would be a numerically insignificant source of labor for the proposed actions, especially for skilled labor.

If adequate workers are not willing to travel from other parts of the U.S. to Guam to work, then foreign workers would be required to make up the shortfall. Legally, this is accomplished by issuing H-2B visas to workers from other countries, such as the Philippines. These visas are issued for specific projects and expire on completion of the work.

Although there is no conclusive method to determine where most of the off-island construction workers (under H-2B visas) would originate from, it is likely that a majority of these workers would be from the Philippines. This is because (1) Filipinos speak English, and their skill sets and construction knowledge and practice in the Philippines most closely match that of the U.S., when compared with any other nearby nations; (2) the proximity of the Philippines to Guam and the familiarity of cultural aspects on Guam; and (3) worldwide, Filipino workers represent the highest number of expatriate workers in other countries (approximately 2 million in 2008) with an estimated remittance sent back to the Philippines of $3.2 billion (Government of the Philippines 2008).

The widespread employment of H-2B workers may lead to only a small number of workers from the U.S. mainland being employed on construction projects related to the proposed actions. U.S. mainland labor may be hesitant to work on Guam since Guam tends to have lower construction wages than other U.S. regions; the lower wages can, partially, be attributed to the availability of H-2B labor. However, the current economic downturn has resulted in substantial unemployment among construction workers on the U.S. mainland and these workers may look to Guam for employment opportunities. Also, Guam labor law guarantees that U.S. citizens get first priority in job placement.

2.7.1.6 Work Force Housing

Applications for work force housing permits, conditions on workforce housing operators and the indirect impacts of workforce housing are discussed in this Volume, Chapter 4, Section 4.15.

2.7.1.7 Aggregate Requirements

Aggregate material is used in construction. It is used in concrete and pavement mixes. It can also be used a backfill. Aggregate material is divided into either coral or basalt based on its origin. It can be further divided based on its intended use.

Transportation

There are four sites on Guam from which coral aggregate material can be gathered. Basalt aggregate would be imported to Guam via ocean transportation through the Port of Guam and then transported in trucks to specific Guam locations.

Stockpile

Some aggregate material may require stockpiling off-site, depending on the availability of an area at the construction sites. Several areas may be available for off-site stockpiling such as Harmon Industrial Park, and currently undeveloped areas in Yigo and Dededo. Some on-site stockpiling may be possible at Finegayan, North Ramp, and the wharf. On-site stockpiling is less costly for the government if an area is available.

2.7.1.8 Equipment Requirements

Import of grading equipment, trucks, cranes, and small equipment would occur. There is equipment on-island but currently not enough for the proposed actions especially if multiple construction projects occur during the same time period.

2.7.1.9 Fuel Requirements

All powered equipment would be powered by diesel, gasoline, and possibly propane fuel.

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CHAPTER 3. OVERVIEW OF ALTERNATIVES

3.1 INTRODUCTION

Chapter 3:

3.1 Introduction

3.2 Marine Corps Relocation – Guam (Volume 2)

3.3 Marine Corps Relocation – Training on Tinian (Volume 3)

3.4 Aircraft Carrier Berthing (Volume 4)

3.5 Army Air and Missile Defense Task Force (Volume 5)

3.6 Utilities & Roadway Projects -Guam (Volume 6)

As described in Chapter 1, the proposed actions consists of: (1) development and construction of facilities and infrastructure to support approximately 8,600 Marines and their dependents relocated from Okinawa to Guam, and development and construction of facilities and infrastructure to support training and operations on Guam and Tinian for the relocated Marines; (2) construction of a new deep-draft wharf with shoreside infrastructure improvements creating the capability in Apra Harbor, Guam to support a transient nuclear powered aircraft carrier; and (3) development and construction of facilities and infrastructure on Guam to support relocating approximately 600 military personnel and their dependents to establish and operate an Army Air and Missile Defense Task Force (AMDTF). Each major project component (i.e., the U.S. Marine Corps on Guam, the Marine Corps on Tinian [Commonwealth of the Northern Mariana Islands {CNMI}], the Navy, and the Army) has its own sets of alternatives. In addition, related actions include utilities and roadway projects necessary to implement the proposed actions. Below is a summary of alternatives for each of the major project components.

3.2 MARINE CORPS RELOCATION – GUAM (VOLUME 2)

Alternatives 1, 2, 3, and 8 were retained for analysis and are being evaluated for the development and construction of facilities and infrastructure to support Marine Corps relocation on Guam for the Main Cantonment and training are shown in Figure 3.2-1. (Alternatives 4 through 7 were eliminated from further consideration through the process discussed in Volume 2.) Land parcels for the Main Cantonment are depicted in Figure 3.2-1a. Figure 3.2-2 depicts proposed actions and alternatives carried forward for the Marine Corps relocation on Guam. In addition to the Main Cantonment alternatives, there are alternatives for firing ranges for live and inert ordnance, range access roads, and non-firing maneuver ranges. Figure 3.2-1 also displays the locations for waterfront projects in Apra Harbor, ammunition storage locations at the Naval Munitions Site (NMS) and Munitions Storage Area, Andersen Air Force Base (AFB), and aviation facilities and embarkation facilities at Andersen AFB. These projects are associated with the relocation and remain the same for all alternatives. Main Cantonment alternatives are discussed below and the land parcels are compared in Table 3.2-1.

3.2.1 Alternative 1

Alternative 1 includes: Naval Computer Telecommunications Station (NCTS) Finegayan (1,090 acres [ac] [441 hectares {ha}]), South Finegayan (290 ac [117 ha]), acquisition of the Federal Aviation Administration (FAA) parcel (680 ac [275 ha]), and acquisition Harmon Annex (328 ac [133 ha]), 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 that is managed pursuant to a Memorandum of Agreement with the United States Fish and Wildlife Service (USFWS) (Navy and USFWS 1994). "Overlay Refuge" refers to specific areas on Guam that were established through a cooperative program centered on the protection of endangered and threatened species and other native flora and fauna, maintenance of native ecosystems, and the conservation of native biological diversity in cooperation with Guam Department of Agriculture Division of Aquatic and Wildlife Resources that is consistent with the national defense mission of the DoN and Air Force.

The site of this alternative would be bounded to the north by Andersen AFB Northwest Field (NWF) and Route 3; and on the west by a cliff line (within Department of Defense [DoD] property) and the Philippine Sea. It would be bounded to the east by limited residential development and to the south by the Harmon Village residential area (non-DoD property). Although DoD property extends 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.

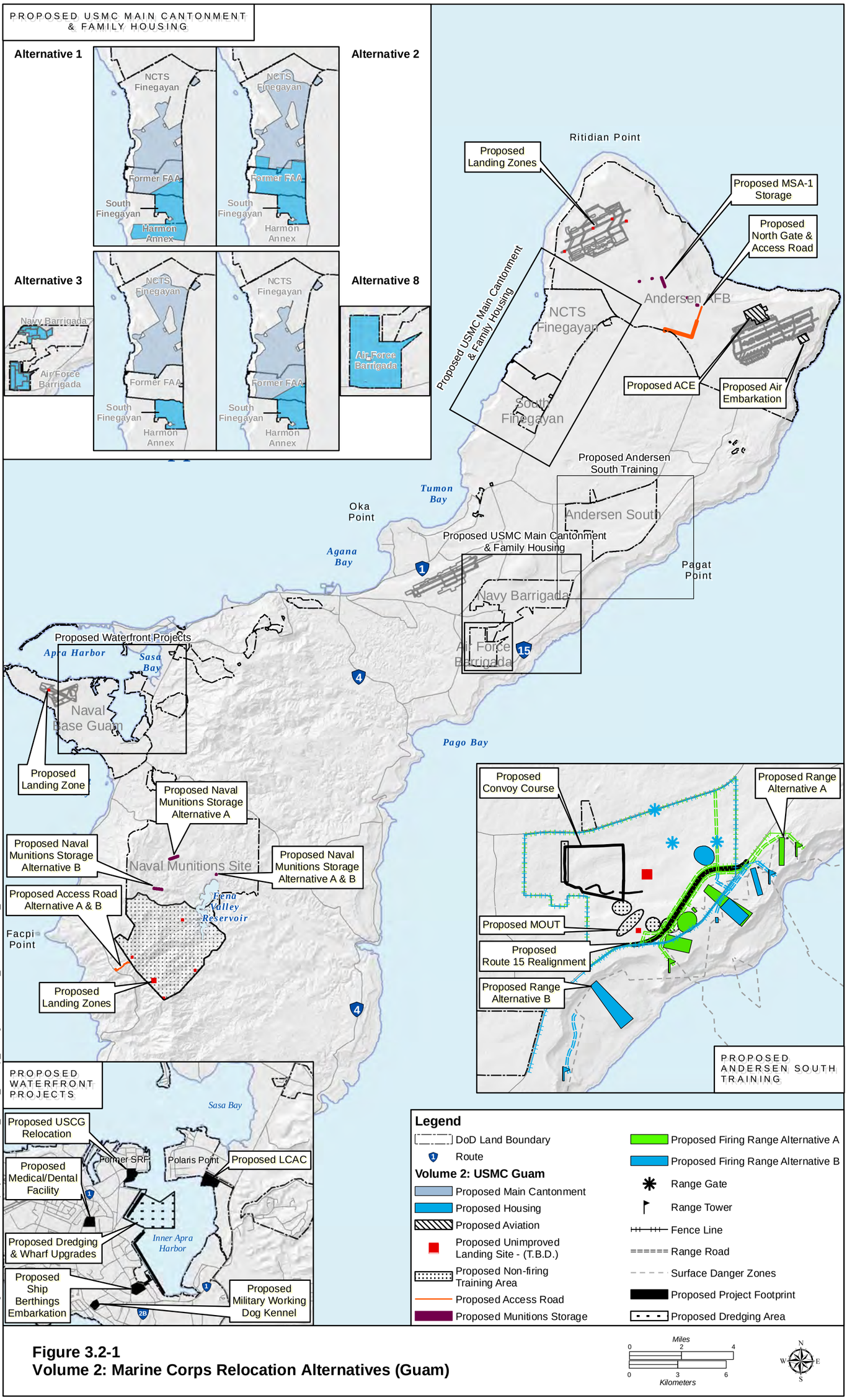

Figure 3.2-1
Volume 2: Marine Corps Relocation Alternatives (Guam)

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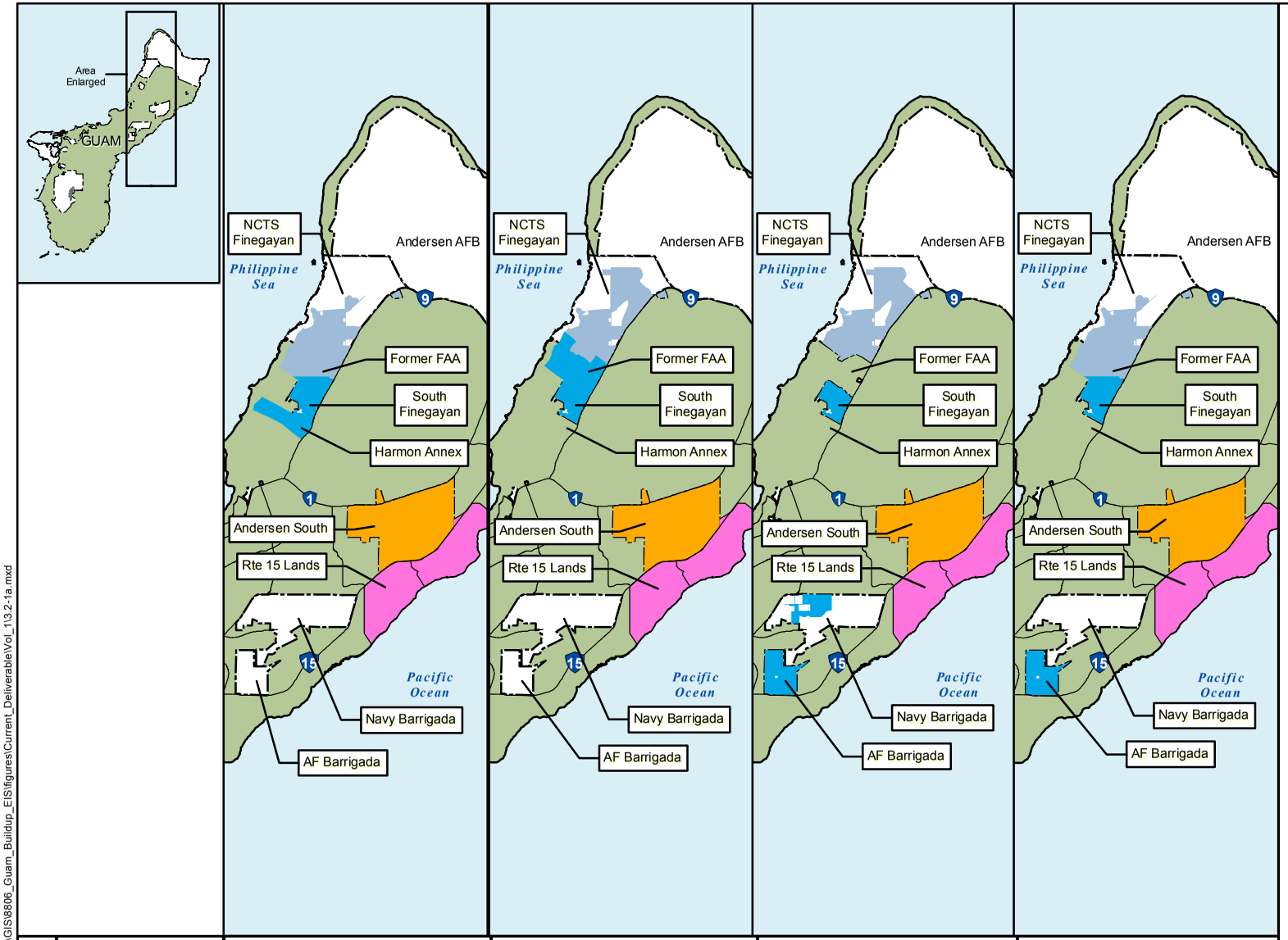

Figure 3.2-1a
Comparison of Main Cantonment Area Alternatives

Legend

- DoD-No Planned Landuse
- Non-DoD Lands
- Main Cantonment
- Family Housing/ Community Support
- Firing Range Alternative (A, B)
- Non-Fire Training

N W E S

Miles
0 2 4

0 2.5 5
Kilometers

Characteristics	Alternative	1	2	3	8
	Percent of Overlay Refuge lost at NCTS Finegayan	29	53	53	29
	Fomer FAA (acres)	680	680	0	680
	Former Harmon Annex (acres)	326	0	0	0

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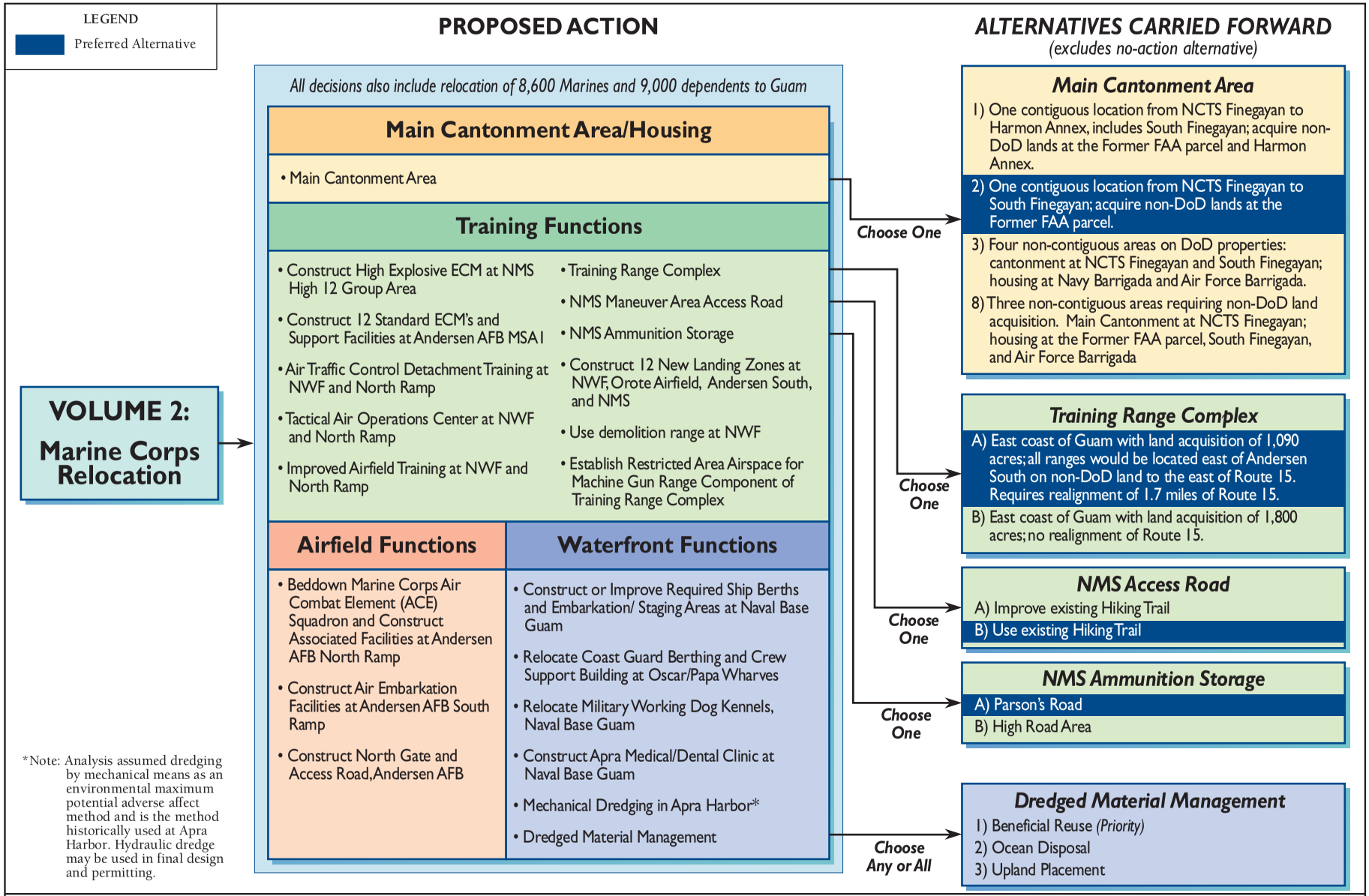

Figure 3.2-2
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation, Guam

Table 3.2-1. Summary of Parcels for Each Main Cantonment Alternative (Alternative 2–Preferred)

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: [1]Based on calculations for vegetation cover in Chapter 10.
[2] Proposed developed area only.
[3] Assumes entire parcel is developed.
[4] Excludes Next Generation Weather Radar (NEXRAD).
[5] Total acquisition area, including planned open space.
[6] Total acquisition area.

3.2.2 Alternative 2 (Preferred Alternative)

Alternative 2 includes: NCTS Finegayan (1,610 ac [652 ha]), South Finegayan (290 ac [117 ha]), and acquisition of the FAA parcel (680 ac [275 ha]), 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 would be also 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. It would be bounded to the east by a limited residential development and to the south by the Harmon Village residential area (non-DoD property).

3.2.3 Alternative 3

Alternative 3 includes: NCTS Finegayan (1,610 ac [652 ha]), South Finegayan (290 ac [117 ha]), with portions of the military housing and quality of life (QOL) services at Air Force and Navy Barrigadas (430 and 377 ac, respectively [174 ha and 153 ha]), 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 not be contiguous to the Main Cantonment area.

This configuration of the Main Cantonment area would be 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. The Navy and Air Force Barrigadas are located approximately 9 miles (mi) (14 kilometers [km]) from the proposed Main Cantonment area on the eastern side of Guam. Navy and Air Force Barrigadas 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 communications high frequency transmitting activities. Headquarters facilities for the Guam Army National Guard are located adjacent to Navy land at the Barrigada. The Navy Barrigada is 1,418 ac (574 ha) and of that, 250 ac (101 ha) are available for development. The Air Force Barrigada is a 433 ac (175 ha) parcel used by the Air Force to accommodate the Next Generation Weather Radar weather satellite receiver. It has been estimated that 400 ac (162 ha) of this parcel would be available for development. The Navy Barrigada and the Air Force Barrigada are

currently connected by the Navy Golf Course. The golf course would be removed if it was determined that the two parcels should be connected.

3.2.4 Alternative 8

Alternative 8 includes: NCTS Finegayan (1,090 ac [441 ha]), acquisition of the FAA parcel (680 ac [275 ha]), South Finegayan (290 ac [117 ha]), and portions of military housing and QOL services at Air Force Barrigada (430 ac [174 ha]), 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, the Main Cantonment area would be configured such that a portion of the housing would not contiguous to the Main Cantonment area.

3.2.5 Additional Projects Required for Marine Corps Relocation – Guam

3.2.5.1 Training Range Complex

Range Alternative A (Preferred Alternative)

Alternative A for the Training Range Complex includes all ranges located east of Andersen South on non-DoD land to the east of Route 15 as shown on Figure 3.2-1. The total land area, not including submerged lands, is estimated at 1,090 ac (441 ha). This alternative would require the realignment/reconstruction of a portion of Route 15. An approximately 1.7 mi (2.8 km)-long segment of Route 15 would be relocated to the north into Andersen South.

Range Alternative B

Range Alternative B would not require realignment of Route 15, and the land for this alternative is estimated at 1,800 ac (728 ha) as shown on Figure 3.2-1. Land acquisition would be required for control of lands associated with the Surface Danger Zones (SDZs) east of Route 15. Special Use Airspace (SUA) (restricted area) would also be required above the SDZs in the vicinity of Route 15.

3.2.5.2 Naval Munitions Site Access Road Alternatives (NMS Access Road Alternative B Preferred)

The access road alternatives are located outside NMS property and would require acquisition of a right-of-way extending approximately 300 ft (91 m) from the road centerline. The access road alternatives are as follows:

- NMS Access Road Alternative A: This existing hiking trial is 0.4 mi (0.6 km) long, would cover 0.8 ac (0.3 ha) at a 16-ft (5-m) width, and includes no stream crossings. Under Alternative A, the trail would be improved. Vegetation would be cleared for the road shoulder for a total estimated width of disturbance of 50 ft (15 m). Locked, unmanned gates would be placed at the beginning of the access road and at the entrance to the NMS.
- NMS Access Road Alternative B (preferred): Under this alternative, the road would not be improved and would be used by foot traffic.

These access road alternatives are depicted on Figure 3.2-1.

Ammunition Storage Alternatives

The candidate sites for ammunition storage in support of the proposed action are the NMS and Andersen AFB Munitions Storage Area (MSA).

NMS (Preferred Alternative)

One high explosive earth-covered magazine (ECM) (providing up to 500,000 pounds [lb] net explosive weight [NEW] storage) would be sited in the High 12 Group area of NMS that contains other high

explosive magazines. Ten other ECMs would be co-located at the NMS based on operational efficiency. Two locations were considered as potential sites for these ECMs: the Parson's Road Area and the High Road Area.

- Parson's Road Area (Ammunition Storage Alternative 1-Preferred): this area has two configurations for layout of 10 ECMs that would allow for a combined capacity of 360,000 lb NEW.
- High Road Area (Ammunition Storage Alternative 2): this area has one site that could accommodate 10 ECMs in a configuration that would allow for a combined capacity of 500,000 lb NEW.

Construction of one ECM at the High 12 Group area and 10 additional ECMs at either the Parson's Road (Alternative 1) or High Road (Alternative 2) area would occur within existing munitions area boundaries and would not alter the existing ESQD arcs at NMS. Land use constraints at each site include natural resources and proximity to other magazines. Although there may be opportunities for using older magazines with appropriate upgrades or replacing existing magazines with the proposed ECMs, the EIS evaluates the development of ammunition storage facilities in currently undeveloped areas. This does not preclude replacement or upgrade alternatives within implementation, but rather conservatively estimates potential impacts for the purposes of this EIS.

Andersen AFB MSA

Within MSA 1 (Andersen AFB), one alternative was identified for the placement of ECMs, work areas, administrative/inert warehouse building, and storage for ammunition, chaff, and flares. The proposed ECMs would be sited within the existing grid of ECMs at MSA while the storage for ammunition, chaff, and flares would be satisfied with an addition to an existing building. All proposed munitions facilities would be sited within existing munitions area boundaries and would not alter the existing ESQD arcs. An administration and inert warehouse facility would be constructed in the southeast corner of the MSA adjacent to the Air Force 36th Munitions Squadron administrative facility. Land use constraints at each site include natural resources and proximity to other ammunition storage facilities and infrastructure. As with the NMS alternative, although there may be opportunities for using older magazines with appropriate upgrades or replacing existing magazines with the proposed ECMs, the EIS evaluates development of the ECMs in currently undeveloped areas. This does not preclude replacement or upgrade alternatives within implementation, but rather conservatively estimates potential impacts for the purposes of this EIS.

3.2.5.3 Airfield Projects

Airfield projects associated with the Marines relocation would be located at Andersen AFB North Ramp and include: beddown and construction of associated facilities for the Marine Corps Air Combat Element; construction of air embarkation facilities, construction of entry control point and associated facilities to control access to the Marine Corps facilities at the airfield (refer to Figure 3.2-1).

3.2.5.4 Waterfront Projects

Waterfront projects associated with the Marines relocation would be consolidated with existing Marine Corps and U.S. Navy activities at Apra Harbor. Certain infrastructure improvements and facility relocations, however, would be required to accommodate the additional functions. Some wharfs would be refurbished and infrastructure improved. An embarkation and staging area would also be created. The U.S. Coast Guard ship berthing and crew support building would be relocated to a different wharf. The Apra Medical/Dental Clinic would be relocated on Naval Base Guam. The Military Working Dog Kennel would also be relocated. These proposed projects are depicted on Figure 3.2-1.

3.3 MARINE CORPS RELOCATION – TRAINING ON TINIAN (VOLUME 3)

Alternatives evaluated for training on the island of Tinian related to the Marine Corps relocation are shown in Figure 3.3-1. Figure 3.3-2 shows the proposed action and alternatives carried forward for the Marine Corps relocation training actions on the island of Tinian.

3.3.1 Alternative 1 (Preferred Alternative)

This alternative includes development of four live-fire training ranges within the leaseback area on the island of Tinian. Three ranges would be oriented north, with the fourth, the Platoon Battle Course, oriented 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.

3.3.2 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 within the SDZ extending over the ocean.

3.3.3 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 Known Distance Range. All three ranges are sited along the southern Military Lease Area 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.

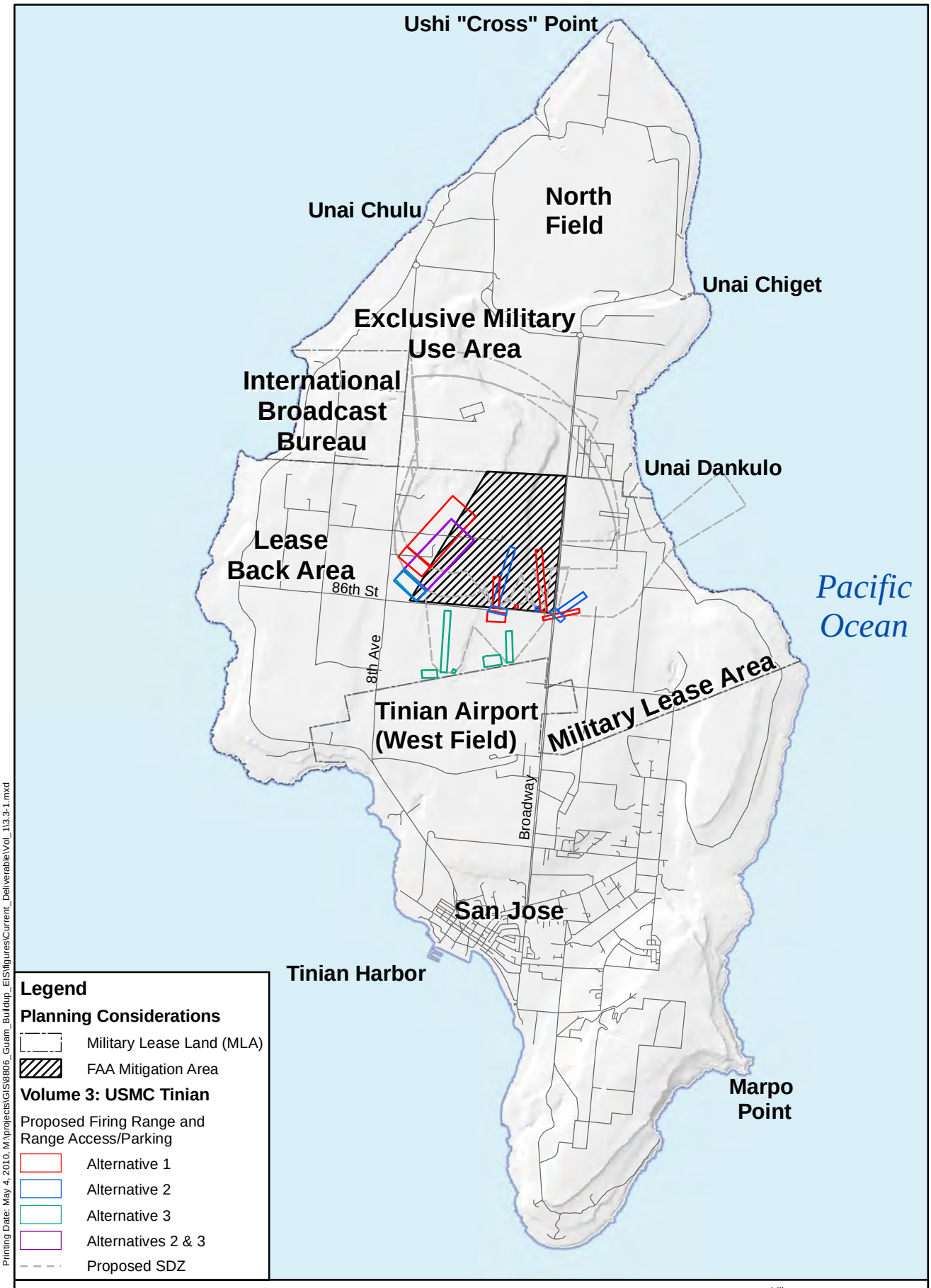

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Figure 3.3-1
Volume 3: Marine Corps Relocation Alternatives (Tinian)

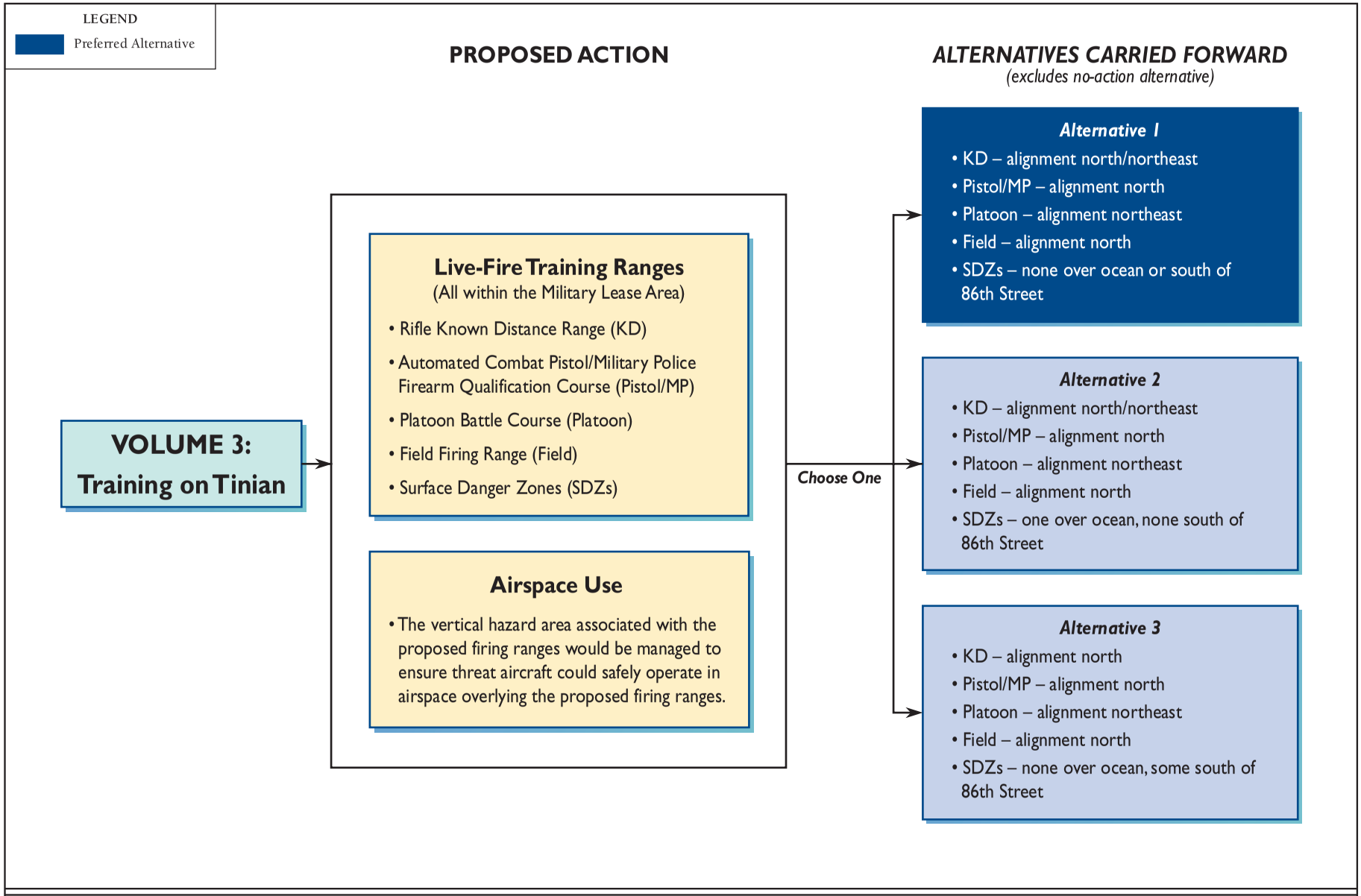


Figure 3.3-2
Summary of Proposed Action and Alternatives Carried Forward for the Marine Corps Relocation – Training, Tinian

3.4 AIRCRAFT CARRIER BERTHING (VOLUME 4)

Alternatives being evaluated for the aircraft carrier berthing are shown in Figure 3.4-1. The flow chart shown in Figure 3.4-2 depicts the proposed action and alternatives carried forward for the Navy aircraft carrier berthing on Guam.

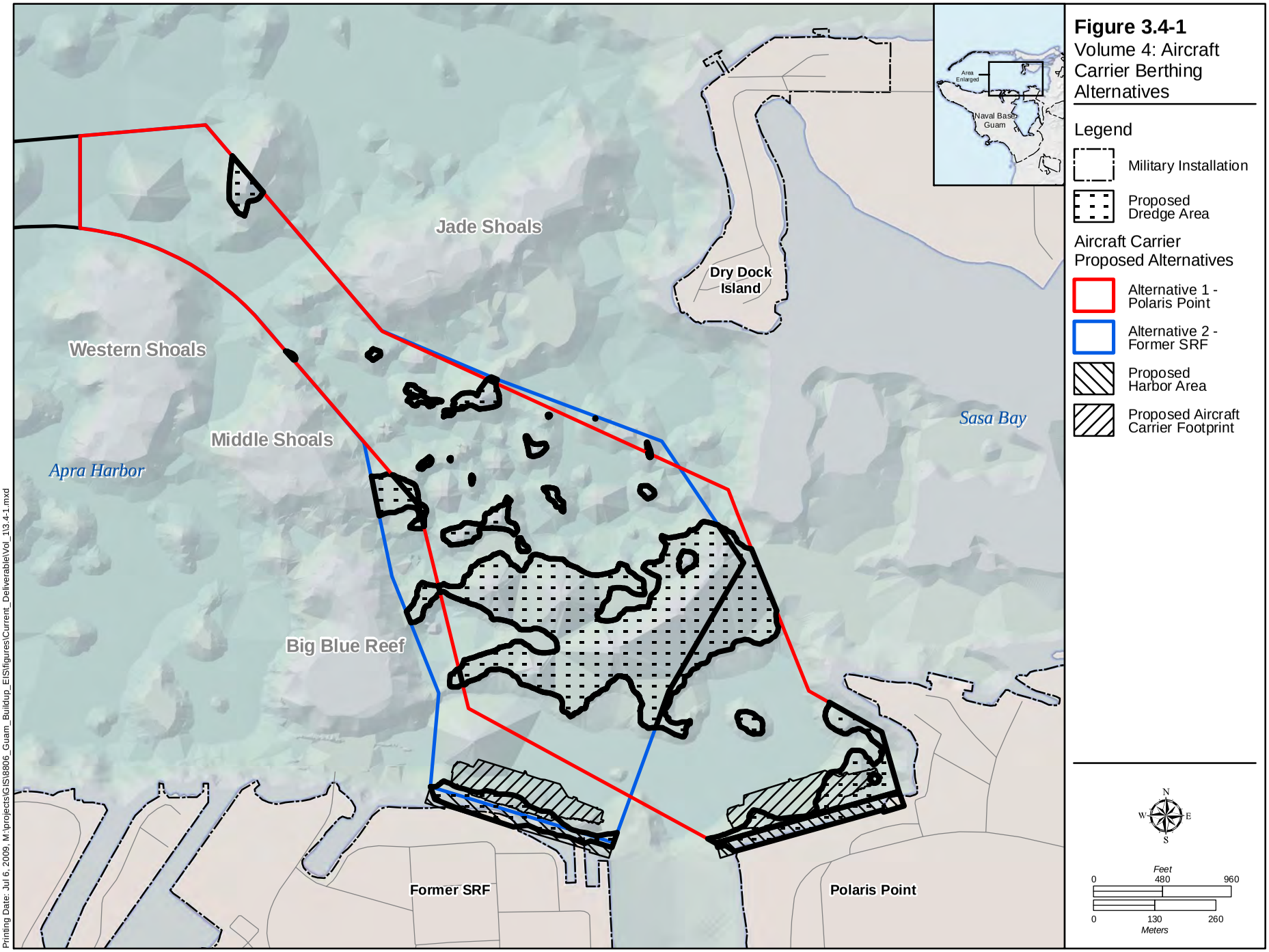
The wharf alternatives are located on either side of the entrance to the Inner Apra Harbor channel. The wharf concepts would be pile supported marginal wharfs that would be constructed parallel to shore. Each shares the same navigational approach through Outer Apra Harbor. The aircraft carrier would 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.

3.4.1 Alternative 1 (Preferred Alternative)

This alternative would construct a new deep-draft wharf at Polaris Point with shoreside infrastructure improvements. The existing Outer Apra Harbor Channel would be widened to 600 feet (ft) (183 meters [m]) with minor adjustments to channel 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 that would require dredging to -49.5 ft (-15.1 m) Mean Lower Low Water plus 2 ft (.6 m) overdraft. The turning basin would be located near the wharf and north of the Inner Apra Harbor entrance channel. The eastern edge of the new wharf would not have the required full 600 ft (183 m) of distance from the wharf face and care would be necessary to nudge the carrier into position. However, Commander, U.S. Pacific Fleet requirements show that ships can safely navigate the reduced clearance at this site.

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.


Jade Shoals
Dry Dock Island
Western Shoals
Middle Shoals
Apra Harbor
Sasa Bay
Big Blue Reef
Former SRF
Polaris Point
Area Enlarged
Naval Base Guam
Figure 3.4-1
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
N
W
E
S
Feet
0
480
960
0
130
260
Meters
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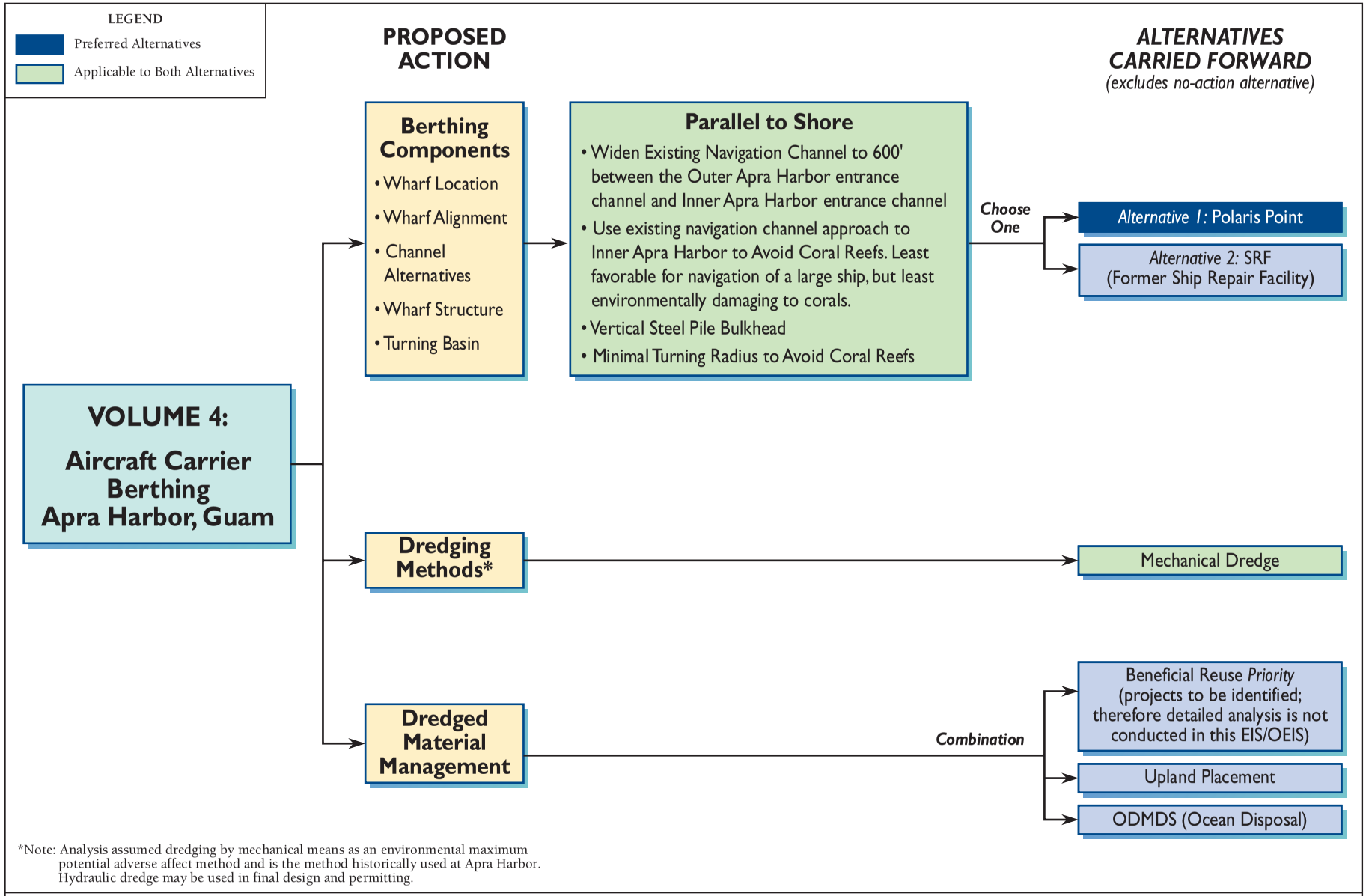

Figure 3.4-2
Summary of Proposed Action and Alternatives Carried Forward for the Navy Aircraft Carrier Berthing, Guam

Least Environmentally Damaging Practicable Alternative. In addition to being the preferred alternative, Alternative 1 is considered the *least environmentally damaging practicable alternative* (LEDPA). Specifically, § 404(b)(1) of the Clean Water Act stipulates that no discharge of dredged or fill material into waters of the United States, which include wetlands, shall be permitted if there is a practicable alternative which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences. Furthermore, an alternative is considered practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of overall project purposes. Section 404 permitting is applicable to the proposed new berthing of the aircraft carrier on Guam for the proposed work within Apra Harbor. Permitting decisions are based on guidelines ("404(b)(1) Guidelines") developed jointly with the USEPA that are now part of 40 CFR 230.

A Section 404 Permit would be applied for and obtained prior to construction. An analysis was conducted during this EIS process to illustrate the screening and selection process used in the development of this EIS has identified the LEDPA consistent with the § 404(b)(1) guidelines (see Volume 4, Section 2.4.1). Following the Record of Decision, the Navy would provide design level detail with its permit application in accordance with the USACE permit process. The USACE would make the final LEDPA determination during its Section 404 permit decision.

3.4.2 Alternative 2

This alternative would have the aircraft carrier berthing at the former Ship Repair Facility. 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.

3.5 ARMY AIR AND MISSILE DEFENSE TASK FORCE (VOLUME 5)

The Navy and Army have conferred and identified three action alternatives to be considered for the proposed Army AMDTF facilities and operations on Guam in addition to the no-action alternative. The two lesser components (the munitions storage magazines and the weapons emplacement sites) each have their own set of alternatives. All three alternatives, discussed below, have been evaluated with regard to stated purpose and need for the proposed AMDTF action and are shown in Figure 3.5-1. Figure 3.5-2 shows the proposed action and alternatives carried forward for the AMDTF facilities on Guam.

The preferred alternative for the proposed headquarters/housing facilities is Alternative 1, the preferred alternative for munitions storage is Alternative 1, and the preferred alternative for the weapons emplacement sites is Alternative 4. Weapon platform siting is classified and is assessed in a Classified Appendix (Appendix L) to this public EIS. This classified information will be reviewed by regulatory agency personnel with the appropriate security clearance.

3.5.1 Headquarters/Housing Alternative 1 (Preferred Alternative)

- The administration/headquarters (HQ), maintenance operations, and housing facilities for unaccompanied personnel would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed Marine Corps land uses.
- 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.

3.5.2 Headquarters/Housing Alternative 2

- The administration/HQ and maintenance operations would not be co-located with the Marine Corps Main Cantonment facilities. The administration/HQ and maintenance element would be located within Navy Barrigada adjacent to the NCTS antenna farms.
- Accompanied and unaccompanied personnel housing facilities would be located within Navy Barrigada, with recreational and QOL facilities included in the housing areas.

3.5.3 Headquarters/Housing Alternative 3

- The administration/HQ, maintenance, and unaccompanied personnel housing would be co-located in the eastern portion of NCTS Finegayan and would be compatible with adjacent proposed U.S. Marine Corps land uses.
- Accompanied personnel 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.

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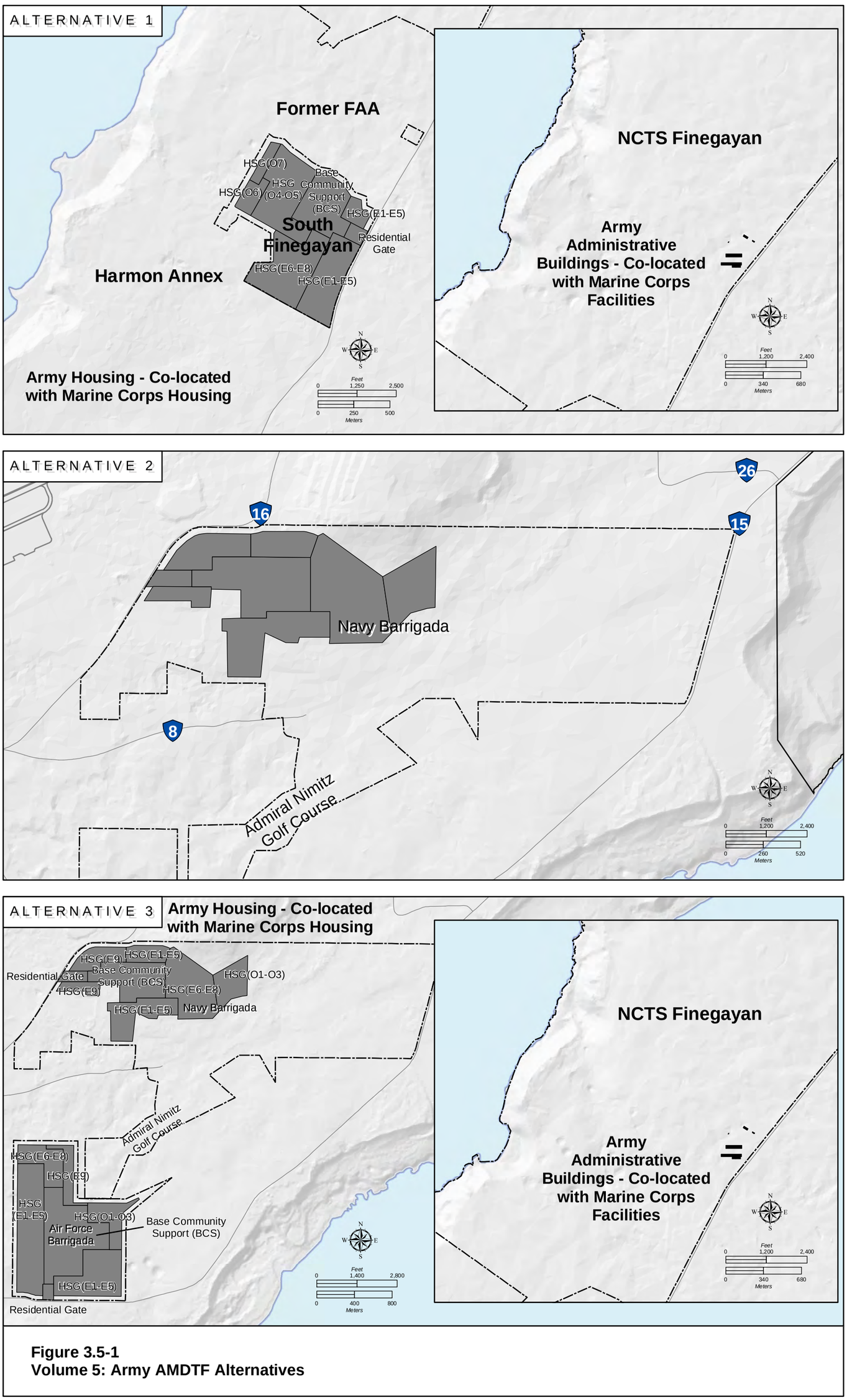

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Figure 3.5-1
Volume 5: Army AMDTF Alternatives

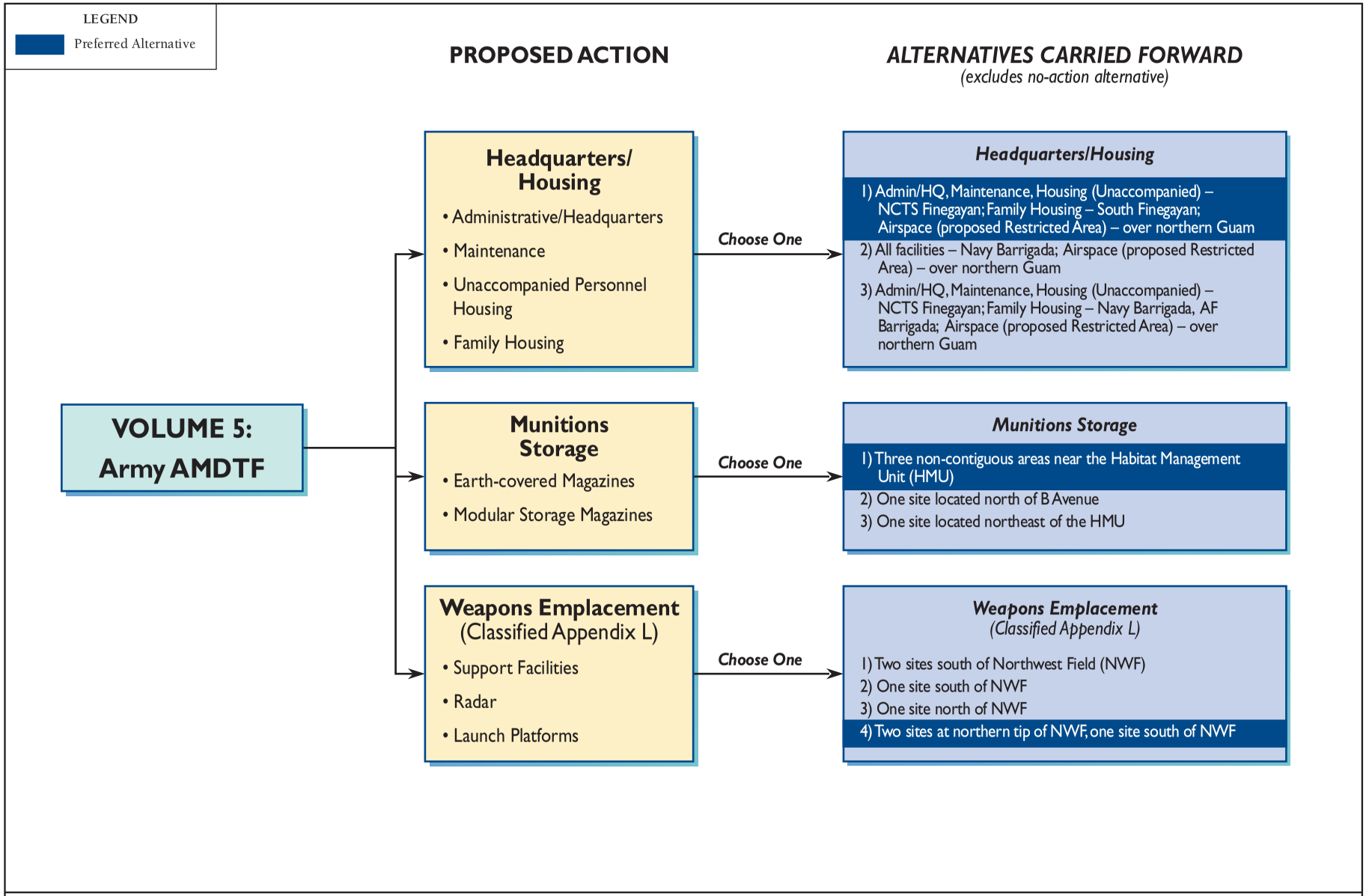

Figure 3.5-2
Summary of Proposed Action and Alternatives Carried Forward for the Army Air and Missile Defense Task Force, Guam

3.5.4 Munitions Storage Alternatives

3.5.4.1 Munitions Storage Alternative 1 (Preferred Alternative)

Munitions storage would be in three non-contiguous areas near the Habitat Management Unit (HMU) at 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 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.

3.5.4.2 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 to be 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.

3.5.4.3 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 to be 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.

3.5.5 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) that is only available to regulatory agency reviewers with the appropriate security clearance.

3.5.6 Airspace

During Terminal High Altitude Area Defense radar operation, there is a potential hazard to military and civilian aircraft. Therefore, a proposed SUA would be located along and off the northwest coast of Guam. The SUA would consist of a proposed Restricted Area to accommodate hazards associated with Terminal High-Altitude Area Defense radar operations. The proposed Restricted Area (to be called R-7205) would be from the surface up to 22,000 ft (6,700 m) above mean sea level (Flight Level [FL] 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 through 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 (NOTAM) prior to scheduled use of the airspace. There would be no restrictions to off-base ground activities (e.g. use of public roadways) during these preventive maintenance operations.

3.6 UTILITIES AND ROADWAY PROJECTS (VOLUME 6)

Alternatives being evaluated for the utilities projects and roadway projects on Guam are described below. Figure 3.6-1 shows the proposed action and alternatives carried forward for utilities on Guam.

3.6.1 Power

3.6.1.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 would recondition up to 5 existing combustion turbines for reliability/reserve power and upgrade transmission and distribution (T&D) systems. This would not require construction of new baseload power generation facilities or enlargement of the existing footprint of the combustion turbines. This work would be undertaken by the GPA on its existing permitted facilities or by a Special Purpose Entities (SPEs). Reconditioning would be made to existing GPA permitted facilities at the Marbo, Yigo, Dededo (2 units), and Macheche combustion turbines to provide required peaking power/reserve capacity. 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 and Main Cantonment Alternatives 3 and 8 would require additional upgrades to the T&D system.

Other alternatives considered in the Draft EIS are no longer considered necessary due to revised information from GPA and DoD. With the reevaluation of increased power demands associated with the proposed DoD relocation (including induced civilian growth, normally expected civilian growth, and the construction workforce), revised power demand from transient ships, and the revised approach to provide power to the transient CVN, plus the revised current demand on the GPA system (from GPA data), the current GPA generating resources have been shown to be adequate to meet the increased demand as well as required reserve capacity to ensure reliable service. Thus, Basic Alternative 1 is now the only power alternative evaluated.

3.6.2 Potable Water

3.6.2.1 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 [Ml]) water storage tanks would be constructed at ground level at NCTS Finegayan. Up to two new elevated 1 MG (3.8 Ml) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

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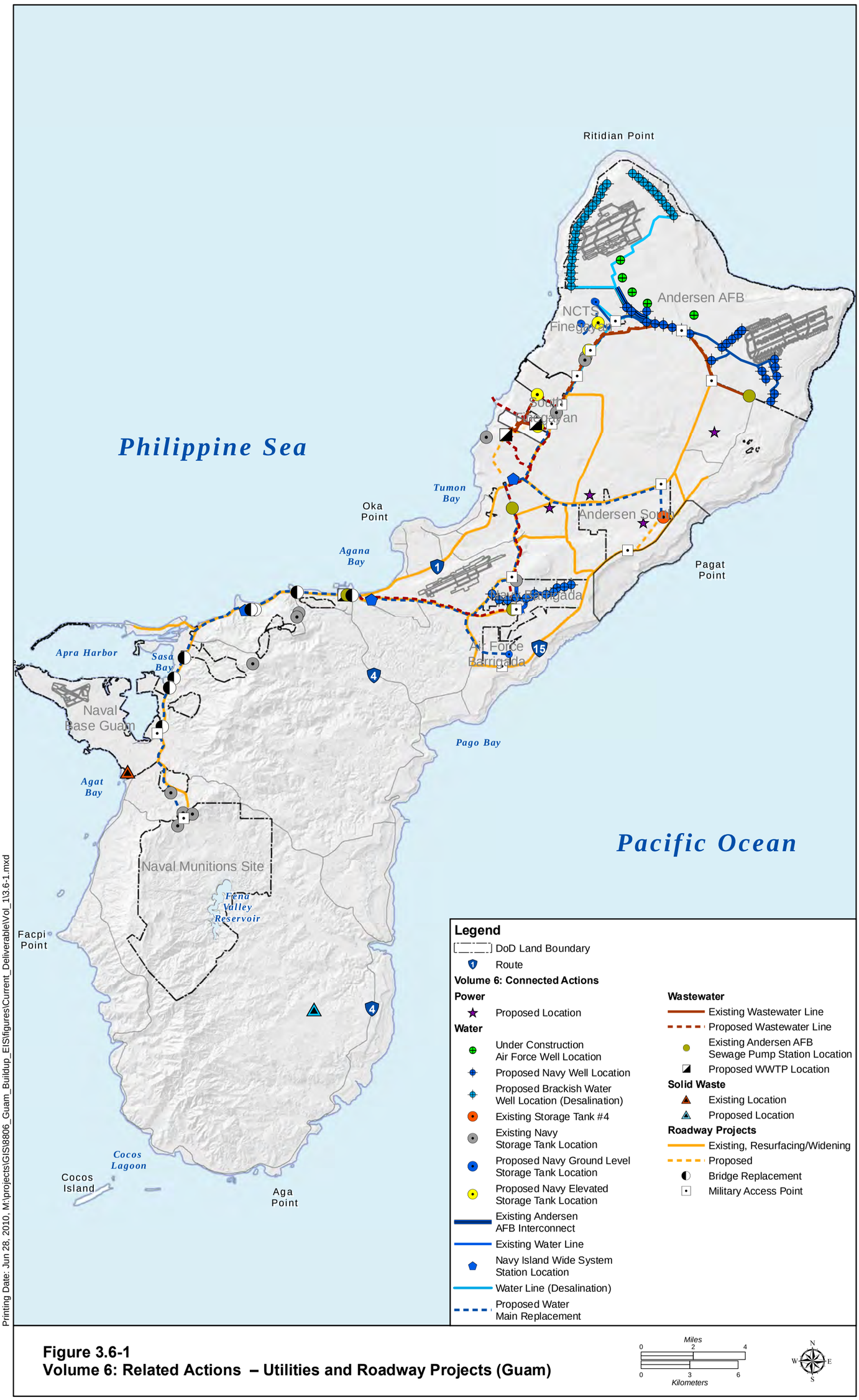

Figure 3.6-1
Volume 6: Related Actions – Utilities and Roadway Projects (Guam)

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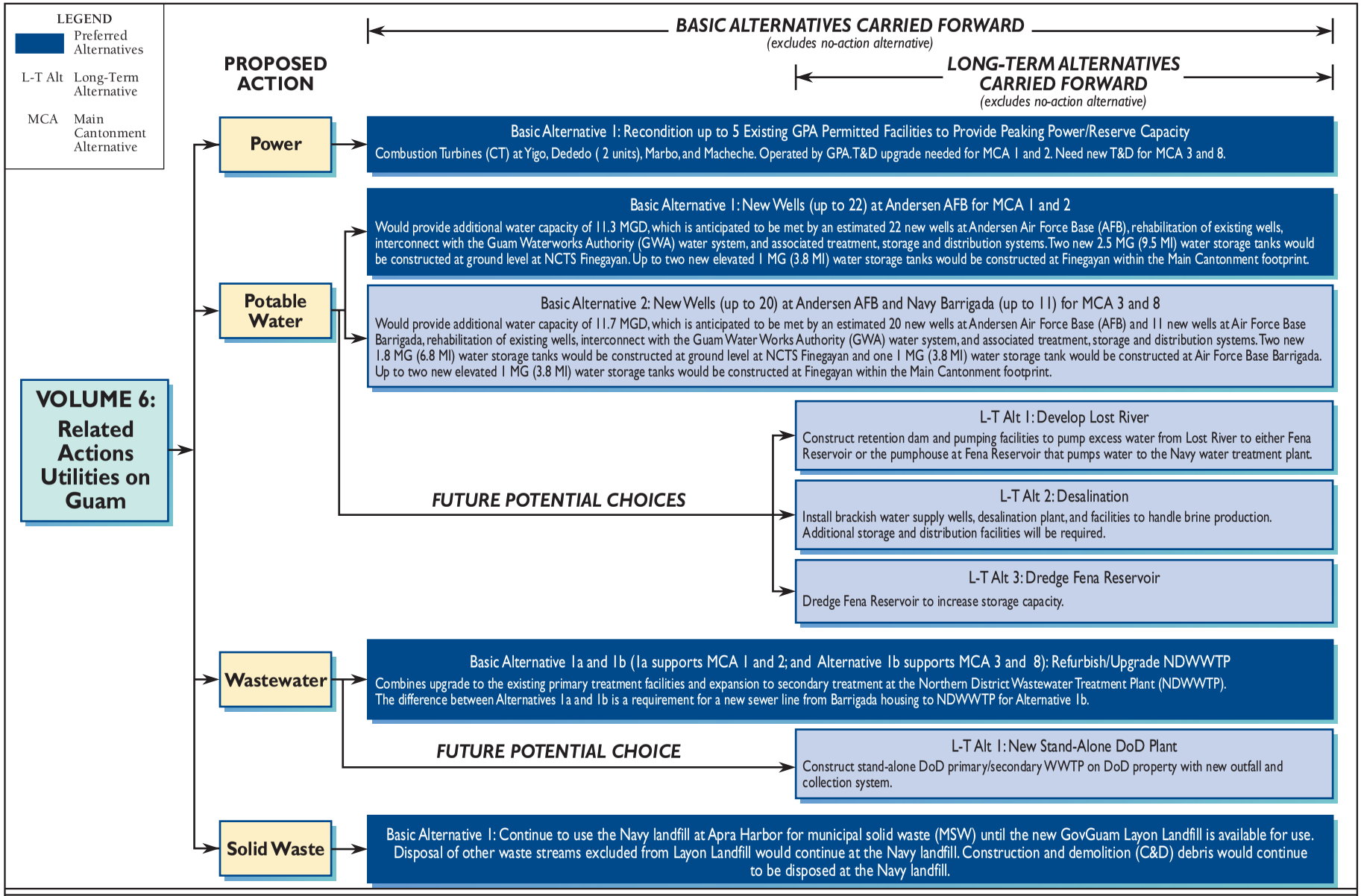

Figure 3.6-2
Summary of Proposed Action and Alternatives Carried Forward for Utilities, Guam

3.6.2.2 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 Base 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 Ml) water storage tanks would be constructed at ground level at NCTS Finegayan and one 1 MG (3.8 Ml) water storage tank would be construction at Air Force Base Barrigada. Up to two new elevated 1 MG (3.8 Ml) water storage tanks would be constructed at Finegayan within the Main Cantonment footprint.

3.6.2.3 Long-Term Alternative 1

Long-term Alternative 1 would augment water supply by development of surface water resources in the south part of Guam, specifically the Lost River. A retention area would be dredged and water contained with sheetpile or other methods of damming to create an area to extract water via pumping. Excess water would be pumped either into Fena Reservoir for later use or directly to the pump house that pumps water from Fena Reservoir to the Navy water treatment plant.

3.6.2.4 Long-Term Alternative 2

Long-term Alternative 2 would augment the water supply by desalination of brackish water which requires the removal of salt water by reverse osmosis. This option would be implemented to meet projected DoD water demands in the event that the supply from freshwater wells is insufficient to meet DoD demand. Desalination plants produce liquid wastes (brine) that may contain the following constituents: high salt concentrations, chemicals used during defouling of plant equipment, and pretreatment residues. These byproducts can be discharged directly into the ocean as long as they are diluted with other discharges, such as cooling water from power plants, they can be discharged directly in to the sewer system, or it can be dried and disposed of in a landfill.

3.6.2.5 Long-Term Alternative 3

Long-term Alternative 3 is to dredge Fena Reservoir to restore the original design storage capacity. This would provide additional storage for use during the annual dry periods.

3.6.3 Wastewater

3.6.3.1 Basic Alternative 1a (Preferred Alternative) and 1b

Basic Alternative 1 (Basic Alternative 1a supports Main Cantonment Alternatives 1 & 2; & Basic Alternative 1b supports Main Cantonment Alternatives 3 & 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.

3.6.3.2 Long-Term Alternative 1

Long-term Alternative 1 would build a new separate DoD secondary treatment plant at the NDWWTP site to treat the DoD loads only. This would support Marine Corps Relocation – Guam Alternatives 1 and 2 in their entirety, and the Finegayan development for Guam Alternatives 3 and 8.

In addition to the above, a new separate DoD secondary treatment plant at the Hagatna wastewater treatment plant (WWTP) site to treat the DoD loads only from Barrigada would be required to support Marine Corps Relocation – Guam Alternatives 3 and 8, if one of those would be chosen.

3.6.4 Solid Waste

3.6.4.1 Basic Alternative 1 (Preferred Alternative)

Basic Alternative 1 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 hardfill.

3.6.5 Roadway Projects

Individual projects have been identified from recent transportation and traffic studies on the island of Guam. These consist of 43 Guam Road Network (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)

The 58 projects cover four geographic regions on Guam: North, Central, Apra Harbor, and South. Details as to the project specific characteristics of all the projects are contained in Volume 6. 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): 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.

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CHAPTER 4.
CHANGES BETWEEN THE DRAFT AND FINAL EIS

4.1 INTRODUCTION

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 itemized changes are incorporated into the Final EIS.

4.2 ONE GUAM

There have been numerous comments 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 program. 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 interest to have DoD fund improvements to these systems and services. DoD's ability to fund actions is limited by federal law. However, to minimize adverse impacts associated with the proposed military relocation program and since the issuance of the Draft EIS, DoD has begun leading a federal inter-agency effort to identify other federal programs and funding sources that could benefit the people of Guam. This DoD approach to support identification of funding for repairs of existing sub-standard conditions on Guam would reduce adverse impacts associated with the proposed program.

The Navy acknowledges that there is the potential for effects on social services, such as educational and medical facilities, due to the added demand on services from DoD military and civilian populations as well as demand from others coming to Guam as a result of potential induced growth that may result from the DoD proposed actions. Additionally, those potential impacts, resulting in increased demands on the Guam social service, would also be affected by a possible shift in trained personnel from public and private facilities on Guam to the DoD facilities on Guam. Based upon a proposed 2014 completion date for the Marine Corps realignment effort, efforts have been made to quantify those impacts in the Final EIS. These estimates were prepared using the best available information, but were influenced by several variables, such as possible shifts of trained personnel from public and private facilities on Guam to DoD facilities, that cannot be ascertained at this time. Thus, the quantification of impacts presented in the Final

EIS is less than certain. Because DoD may consider a modified timing and sequencing for the relocation of troops through force flow reduction, the quantification of socioeconomic impacts noted in the Final EIS may not occur. Because of difficulties in quantifying such impacts in normal circumstances, much less under a under force flow reduction mitigation scenario, those social service needs on Guam are best addressed by the independent, ongoing, work of the Office of Economic Adjustment in support of the Economic Adjustment Committee's (EAC) development of a Guam infrastructure plan for those social services.

4.3 PROGRESS ON DOD – GUAM UTILITY SYSTEMS COOPERATION.

During production of the EIS and on a continuing basis, Navy representatives have also been meeting regularly with Guam Power Authority (GPA) and Guam Waterworks Authority (GWA). These meetings have been to coordinate needed utility upgrades, identify the best technical solutions, discuss business solutions to implement the technical solutions, and lead toward viable utility solutions for both on base and off base utility needs. Draft Memoranda of Understanding (MOU) have been developed to solidify cooperative arrangements for the future utility needs of DoD and to address GWA utility shortfalls related to the proposed DoD relocation, and are included as appendices to this Final EIS. These meetings have resulted in significant progress and are highlighted by utility sector as follows:

4.3.1 Power

- Concurrence has been obtained from GPA on the proposed reconditioning of 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 power 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 Special Purpose Entities (SPEs), which would likely be private business entities formed to finance, operate, manage, upgrade, or develop utility plants. It is anticipated that a 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 upgrades. The precise manner in which the SPEs would operate is not known.
- 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 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 facilities may be operated by the SPE or by GPA. Fees generated through utilities service contracts could be used by the SPE or GPA to repay financing costs or a portion thereof. The DoD rate structure that would be established with any utilities service contract with a SPE or GPA would reflect current rates adjusted for inflation.

4.3.2 Water

- GWA and DoD have agreed to develop a joint management team to 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 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.
- Transfer of additional and currently available excess water from the Navy-operated systems to GWA has been discussed. This would alleviate water shortages in the GWA system in the early years of the proposed military relocation due to civilian population growth, including the construction workforce accompanying the military relocation. These discussions led to a MOU for the cooperative use of water resources in Guam.
- Expediting installation of the proposed new Navy operated water extraction wells is necessary to meeting current and future deficiencies in the GWA water supply system and will support the workforce that will construct the facilities supporting the proposed DoD relocation.

4.3.3 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 potable water 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 Northern District Wastewater Treatment Plant (NDWWTP) may be operated by the SPE or GWA. Fees generated through utilities service contracts could be used by the SPE or GWA to repay financing costs or a portion thereof. The DoD rate structure that would be established under any utilities service contract with a SPE or GWA 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 what specific upgrades 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 wastewater treatment plant (WWTP), are on-going.

The DoD will continue to coordinate with GWA and USEPA Region 9 to ensure that GWA implements planned Capital Improvement Program projects designed to repair, refurbish, improve existing water and wastewater infrastructure to meet the needs associated with the proposed DoD relocation and associated 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 - $600 million of financing for water and wastewater improvement projects. This funding is part of the $740 million mentioned above.

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 of 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 DoD relocation effort. Although no validated estimates are yet available, a preliminary estimate has these various projects totaling approximately $1.3 billion the five year period. These estimates continue to be refined.

The EAC is evaluating overall Guam civilian hard and soft 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.

4.4 ROADWAYS

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.

4.5 ADDITIONAL SURVEYS 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.

The additional study has been used to document existing near-shore marine resources conditions at watershed sites and potential artificial reef sites on Guam. In addition, the work has been used in support of evaluation of mitigation options to compensate for loss of coral associated with the proposed development of new channel and wharf for visiting aircraft carriers in Apra Harbor.

Information from these additional surveys has been incorporated into this Final EIS; primarily in Volume 4. The field reports are also included in Volume 9 (Appendix) of the Final EIS.

Discussions with USEPA, National Oceanic and Atmospheric Administration (NOAA) and Department of Interior (DOI) identified additional data these agencies want to have available for analyzing specific alternative sites for the aircraft carrier transient berth. The Navy will voluntarily collect additional data on marine resources in Apra Harbor. The type and scope of the additional data to be collected has been developed cooperatively with USEPA, NOAA and DOI. The additional data collected, and associated analysis, will be used, along with any other data deemed appropriate by the USACE, in follow on site-specific analysis to inform the subsequent decisions regarding selection of a specific site for the transient

aircraft carrier berth as well as supporting any and all future Clean Water Act and Rivers and Harbors Act permit and associated mitigation decisions for future site selection decisions.

4.6 DEBATE ON METHODOLOGIES TO ASSESS IMPACTS TO CORAL

Adverse impacts to and loss of coral reef resources may be 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 may be impacted by future construction activities for aircraft carrier transient berthing facilities is an important initial step for the NEPA, and the CWA, and the RHA permitting processes. There are various methods that are used to assess coral reef ecosystem structure and function, all of which have specific advantages and limitations. 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. An additional assessment method, proposed by Federal Resource Agencies, involves the collection of additional size, density, and morphology information in designated quadrats via in-water surveys to evaluate community composition, biodiversity, and size-frequency distributions of each different population of coral species.

4.6.1 Photographic Percent Coral Cover (Method Used by DoD at Apra Harbor)

This method involves the use of two-dimensional photographic data to measure coral community structure in terms of percent area cover. Field methods involve the recording of digital photographs along transects using a camera mounted on a rigid frame to ensure nearly-identical dimensions of all photos. These photos are then analyzed in the laboratory using appropriate software to provide an estimate of community structure (coral as well as other types of bottom cover) within a two-dimensional format. This is a very common method for assessing coral reef ecosystem structure and function because it allows researchers to quantify the area coverage of community types at a given point in time. The ability to identify changes in community structure provides scientists and managers with a sound decision-making tool in terms of general reef monitoring and management.

In terms of repeatability, the photographic cover method produces a permanent record of the data source which can be analyzed by multiple investigators in an identical manner to arrive at reliable and repeatable estimates of coral community cover. Replication reduces the potential for bias. Furthermore, remote sensing has become a proven tool for quantifying reef community structure and distribution at large scales.

4.6.2 In Situ Quadrat Method (As Proposed by Federal Resource Agencies)

This method involves divers collecting size, density, and morphology data within defined quadrats. Colonies are identified by a variety of factors including color, morphology, tissue and skeletal boundary separation and the density and size data of corals within known quadrats are counted and measured.

These measurements are then used to evaluate community composition, biodiversity, and produce size-frequency distributions of each population of coral species within the quadrant. In-situ quadrat methods count and size organisms, estimate two-dimensional and three-dimensional percent coral cover, and estimate biodiversity.

In summary, DoD believes that the photographic percent coral cover method, with added rugosity data, is sufficient for the programmatic decision to locate the aircraft carrier transient berth on Guam and to support selection of a specific transient berth. In response to concerns raised by the resource agencies, Navy has voluntarily agreed to conduct additional studies that will be used to further inform the subsequent selection of a specific site for the aircraft carrier transient berth and any required CWA and RHA permits for the selected site.

4.7 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 in the Ugum, Umatic, Tonguan and Geus watersheds 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. The Bolanos Conservation Area is a 2,850 acre parcel managed by GovGuam, Division of Aquatic and Wildlife Resources for hunting and outdoor recreation (e.g. hiking). The Bolanos Conservation Area comprises some of the upland portions of the study area's watersheds.

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

4.8 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.

Pre- and post development site hydrology was analyzed and compared using a two dimensional dynamic hydrologic/hydraulic model to obtain and compare the baseline existing stormwater runoff to the post-construction stormwater runoff. Post development hydrology was based on the Guam Joint Military Master Plan (GJMMP) and the notional grading plan.

BMPs, acting as on-site detention and storage systems, were placed in context of the GJMMP in almost all cases with little or no effect on the GJMMP. A number of drainage impacts associated with the GJMMP were identified and will allow LID planning to be tailored more precisely to reduce drainage

impacts. Existing drainage primarily flows overland and infiltrates into the natural ground. In as much as practicable, the proposed drainage scheme and infiltration schemes emulates the existing condition.

The Comprehensive Drainage and Low Impact Development Implementation Study prepared for the potential Main Cantonment site at Finegayan provides design recommendations for capturing, treating, and routing the 95% exceedance stormwater flows (NAVFAC Pacific 2010b). For storms greater than the 95% exceedance storm and up to the 50-year, 24-hour storm event, stormwater would travel through Integrated Management Practices/Best Management Practices (IMP/BMP) treatment trains before being directed to underground and open-air detention basins that would allow infiltration to groundwater. For each subbasin, water quality treatment strategies (treatment trains) were selected based on the effectiveness of IMPs/BMPs to treat identified pollutants of concern from proposed land uses within that subbasin. The selected water quality treatment strategies resulted in estimated total suspended solids (TSS) reductions of 83.7% to 90.3%, total phosphorous reductions of 9.4% to 49.9%, and total nitrogen reductions of 11.2% to 62.6% for the representative subbasins (NAVFAC Pacific 2010b). These results illustrate that use of IMPs/BMPs can achieve significant reductions to non-point source pollutant loads. Additional information on this study is included in Volume 9 (Appendix) of the FEIS.

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 these measures for federally funded projects related to the proposed actions included in this Final EIS. The Plan includes source control and a suite of treatment Best Management Practices for the various Guam Road Network project and addresses pollutants of concern, right of way constraints, maintainability, existing drainage infrastructure, proximity to wetlands, as well as existing treatment devices.

4.9 SUSTAINABILITY STUDIES FOR MAIN CANTONMENT

The DoN prepared a Sustainability Summary Report as part of the master planning process (NAVFAC Pacific 2010a). This report is included in Appendix N of Volume 9 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.

4.10 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. The survey areas included specific locations on North Finegayan, South Finegayan, the FAA parcel, Orote Point, Inner Apra Harbor, Polaris Point, the Naval Munitions Site, Navy Barrigada, Andersen Air Force Base (AFB), Andersen South, Air Force Barrigada, the Route 15 parcel east of Andersen South, the Route

15 Valley, Access Road Option A for the southern Naval Munitions Site, Pott's Junction, and the Camp Covington Wetlands.

Additional work completed since the November 2009 DEIS includes avian, butterfly, reptiles and amphibians (herpetofauna), tree snail, and vegetation surveys along the proposed utility corridors on AAFB (three transects) and Navy Barrigada (one transect) and on Andersen South where Route 15 may be re-aligned (one transect), in-river and avian surveys at five bridges along Route 1 (Marine Corps Drive); fruit bat and Mariana swiftlet surveys in the area of the Route 15 lands, terrestrial surveys performed by NAVFAC at Polaris Point and AAFB Finegayan, and additional data on North Finegayan including avian, reptiles and amphibians (herpetofauna), tree snail, and vegetation for the additional 119 acre area (one transect) at Naval Computer and Telecommunications Station (NCTS) Finegayan.

The DoN also commissioned the USFWS and USGS to undertake natural resources surveys on Guam and several CNMI locations as part of this EIS. These studies are presented as four reports: 1) a report prepared by USGS that documents results from a biological assessment for the Pacific sheath-tailed bat that was undertaken in 2008 on Tinian and Aguiguan; 2) terrestrial resource surveys of Tinian and Aguiguan in 2008 done by USFWS; 3) small mammal surveys undertaken by USGS from 2005 to 2007 on Guam, Tinian, Rota and Saipan; and 4) avian surveys conducted by USFWS in 2008 on Tinian and Aguiguan. All of these reports and surveys were conducted to assess baseline abundance and densities and assess trends in population.

Information from these surveys has been used as natural resource baselines throughout the Final EIS. The full surveys are included in Appendix K of Volume 9 of this Final EIS.

4.11 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.

Remote Sensing is the science and art of acquiring information (spectral, spatial, temporal) about material objects, area, or phenomenon, without coming into physical contact with the objects, or area, or phenomenon under investigation. The surveys used existing National GeoSpatial-Intelligence Agency imagery of Guam. The imagery depicts wetland characteristics such as heat by plant type and moisture of hydrology. The characteristics are "ground-truthed" by wetland biologists in the field using Geographic Positioning System devices to match the characteristics 'sensed" by the remote sensing imagery. The results are depicted on new project maps that portray the boundaries of any wetlands located in the vicinity of the proposed project alternatives. This process improves the level of detail for wetlands identification and aids in the discussion of the Least Environmentally Damaging Practicable Alternative provided in this EIS for the proposed military relocation program. However, it is also 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.

4.12 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 (SIAS), 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 Department of the Navy 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.

Responses to comments concerning land acquisition are noted in Volume 10 and can be summarized in this manner: The DoN is required to comply with federal land acquisition law and regulations, which includes the requirement to offer just compensation to the owner, to provide relocation assistance services and benefits to eligible displaced persons, to treat all owners in a fair and consistent manner, and to attempt first, in all instances, acquisition through negotiated purchase. Information regarding the main regulation on Federal land acquisition, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, is available in Volume 2, Chapter 16.

4.13 CEQ DRAFT MONITORING GUIDANCE AND GUIDELINES ON GLOBAL CLIMATE CHANGE

Council on Environmental Quality (CEQ) drafted a *Guidance for NEPA Mitigation and Monitoring* (February 18, 2010) that outlines three goals to improve agency mitigation and monitoring. These goals and Final EIS consistency with these goals are summarized as follows:

1. *Proposed mitigation should be considered throughout the NEPA process. Decisions to employ mitigation measures should be clearly stated and those mitigation measures adopted by the agency should be identified as binding commitments to the extent consistent with agency authority and reflected in the NEPA documentation and any agency decision documents.*

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; however, the Final EIS and NEPA environmental review process does not commit the DoD to the proposed mitigation measures. 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.

2. *A monitoring program should be created or strengthened to ensure mitigation measures are implemented and effective.*

   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 (CNO 2007, CMC 2008).

3. *Public participation and accountability should be supported through proactive disclosure of and access to agency mitigation monitoring reports and documents.*

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. Many of the mitigation measures proposed in this Final EIS were recommended or coordinated with agencies or recommended to the DoD in comments. 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.

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 6. 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.

4.14 INTRODUCTION TO INDIRECT AND INDUCED IMPACTS ON DEVELOPMENT

Sections 4.15 and 4.16, below, discuss the impacts of indirect and induced development that would be expected as a result of the proposed action. While these sections are focused on growth and development, for purposes of clarity in these sections, it is important to explain how the classifications of indirect and induced were determined. In contrast to Volume 1, Table 2.1-2 (above) and the Socioeconomic and General Services section of Volume 7 which are based on economic factors, the most important factor to consider in classification of indirect and induced development is the expected location of population.

The three major locations 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 is discussed thoroughly in the EIS 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 action and the dependents of these groups.

Section 4.15 focuses on indirect development – the development of workforce housing. It identifies potential sites and potential environmental impacts of the development of these sites.

Section 4.16 focuses on induced development by, first estimating the need for additional housing in the off-base communities on Guam and, secondly, by estimating how many businesses and jobs would be created. (It should be noted, that development of commercial properties would be caused by direct, indirect and induced populations but since it would occur off-base, it is classified as induced development.)

4.15 WORKFORCE HOUSING: AN INDIRECT IMPACT OF THE PROPOSED ACTION

As described in this Volume, Section 2.7.1, the magnitude and schedule of the construction of facilities to support the proposed action would require more labor than Guam residents can provide. Workforce housing was described in the Draft EIS in Volume 2, Chapter 16 Socioeconomics. A table and figure of potential workforce housing sites were provided. In addition, workforce housing was described in DEIS Volume 6, Related Actions as a related action. Related actions, as defined in 40 CFR 1508.25, are actions that are closely related to the proposed action. Such actions automatically trigger other actions that have environmental impacts, cannot or would not proceed unless other actions have been taken previously or simultaneously, or are interdependent parts of a larger action and/or depend on the larger action for their justification. If not for the proposed actions, then the related action would not occur.

The Final EIS discusses workforce housing as indirect impacts rather than related actions. Chapter 16 of Volume 2, Socioeconomics, addresses the indirect impact of workforce housing and other induced populations on socioeconomics. The analysis is also presented in the Socioeconomic Impact Analysis Study, which is attached as Volume 9, Appendix F to this Final EIS. Volume 6 also assesses the effects of workforce population and other induced population on utilities as indirect impacts. In addition, 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 military relocation program on Guam. The indirect impacts of the workforce housing proposals on other resources are consolidated in this section rather than dispersed throughout Volume 2. The Chapter 4 of Volume 7, Cumulative Impact Assessment, also includes the workforce housing proposals.

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. More detail on

induced growth is presented in below in Section 4.16. Various proposals are being developed by potential contractors in anticipation of being awarded a Navy contract.

As addressed below in Section 4.15.4, several of the applications for development of workforce housing have received approval from GovGuam land development regulatory authorities and several were still under review. 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.

There are two mitigation measures that could be applied to the construction phase that would reduce the on island population and potentially reduce the number of workforce housing sites required. Both are discussed in Section 4.17 below.

Currently, there are no plans to allow contractors to locate workforce housing on DoD controlled land. Therefore, it is anticipated that should workforce housing needs require the construction of new housing, such workforce housing would be located on either private or GovGuam lands.

4.15.1 Conditions to be Met by Operators of Work Force Housing

The DoN and GovGuam acknowledge the potential impacts of the influx of transient workforce. They share the goal of mitigating potential impacts of the transient workforce to the extent practical. The basic goals for workforce housing projects to meet the GovGuam and DoN minimum standards are as follows (NAVFAC Pacific 2009b):

- provide safe, sanitary and adequate living conditions for all workers;
- provide adequate health care for all workers;
- provide safe, sanitary and healthy food supply/dining conditions for all workers;
- implement a transportation management plan that minimizes impacts on public roadways; and
- maintain protection of all personnel and property.

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. Specific provisions of DoN construction contracts also would include the basic requirements listed above. However, 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.

4.15.2 GovGuam

4.15.2.1 Guam Land Use Commission

Guam Land Use Commission Resolution No. 2009-01 (March 26, 2009) and accompanying guidelines establish that housing facilities for temporary workers (workforce housing) are a conditional land use, which is permitted within Light Industrial land use zones. The conditional use permit must be approved by the GLUC. The following are standard conditions attached to the permit, but others can be imposed by GLUC.

- Initial term is 2 years, with possible annual reviews thereafter.
- Project must have an adequate sanitary sewer system and adequate fire flow.
- Project shall comply with all health and safety regulations of GovGuam and U.S. Occupational Safety and Health Administration standards.
- Project shall have perimeter fence 6 ft (1.8 m) in height and be subject to a landscape plan.

- Project must include a development plan with specific design parameters for sleeping, toilet and shower facilities, laundry services, food services, security, medical care, transportation services and recreation areas.

4.15.2.2 Guam Department of Labor

The GovGuam Department of Labor Alien Labor and Processing & Certification Division requires a Temporary Labor Certification to petition for the use of H-2B workers with the Department of Homeland Security. Per 8 CFR 214.2 the Governor of Guam has authority to issue Temporary Labor Certifications for job opportunities on Guam.

The employers are required to demonstrate that qualified, able U.S. workers were not available. Guam Administrative Rules 17, Chapter 7, Temporary Alien Workers must be met.

A non-refundable fee of Two Hundred Dollars ($200) is to be paid to the Department of Labor upon the registration of any Temporary Alien Worker to be employed by an employer on Guam. If such registration is for a period of less than one year, the amount of this fee is to be prorated to the amount necessary to cover that portion of a year for which the registration is made.

There is currently a non-refundable yearly foreign labor fee of $1,000 per worker that Contractors must pay. The funds collected make up the Manpower Development Fund, which is used to train Guam's local workforce in highly skilled jobs.

4.15.3 Department of the Navy Contract Provisions for Foreign Workforces

DoD would rely on construction contractors, who have significant expertise in the areas of workforce housing and logistics, to support temporary foreign worker housing requirements. While GovGuam and federal agencies would retain their authority to conduct inspections and enforce laws, DoD contract provisions would require quality control, oversight and the hiring of contractors with proven track records. Well thought-out plans related to workforce housing, including quality of life requirements, would be given award preference. Contract provisions would also include requirements to provide workforce medical, dining, transportation and safety/security. There would be health screenings of all workers to reduce health risk to the Guam population. Contractors would be required to provide health care either by supplementing local Guam staff and resources or building their own clinic.

Each of the applicable requests for proposals (RFP) has an evaluation factor for Workforce Housing and Logistics. The RFP requires the potential Contractor (Offeror) to meet the following conditions.

4.15.3.1 General Conditions

Submit a comprehensive narrative plan to address the housing requirements under the responsibility of the Offeror and all prospective subcontractors, and include the following as a minimum.

- Explain the means and methods of providing temporary resident workers housing and discussion on how these facilities would minimize impacts to the local community.
- Provide maps/plans of the location of temporary resident worker housing facilities and the number of living quarters at each location.
- Provide a discussion showing that the housing facilities meet the GovGuam regulations/policies and any contemplated contractual arrangements/agreements with housing providers, permits or other documentation that support the Offeror's housing plan demonstrate a complete understanding and ability to successfully manage the proposed housing requirements.

- Provide workforce housing facilities for temporary resident workers with appropriate contractual board and lodging agreements with its workers and/or workers' representatives. Provide secure, adequate, clean, and healthy housing in accordance with 29 CFR 1910.142 and all statutes and regulations of the U.S Federal Government and/or GovGuam in effect on the date of award of the contract or thereafter promulgated by the aforementioned governmental authorities.
- Obtain all permits, licenses or other authority required by the statutes and regulations of the U.S Federal Government and/or GovGuam to construct or otherwise furnish facilities necessary for the safe and adequate housing of the Contractor's temporary resident workers employed in the performance of the work required by the contract.

4.15.3.2 Medical Care

Submit a comprehensive narrative plan to address the medical services requirements under the responsibility of the Offeror and all prospective subcontractors, and include the following as a minimum.

- Explain the means and methods of performing pre-deployment physical condition and general health screening for all workers equal to GovGuam pre-employment standards and requirements (i.e. tuberculosis test, chest x-ray, blood pressure, dental exam, etc.).
- Explain the means and methods of providing medical services and/or facilities to minimize impacts to the local medical community.
- Explain the means and methods of providing routine and emergency medical services at the work sites and temporary resident workforce housing.
- Assure that staffing, personnel assignment and other human resources practices result in development and maintenance of a healthy Contractor and Subcontractor workforce employed in the performance of the contract in accordance with all statutes and regulations of the U.S Federal Government and/or the GovGuam in effect on the date of award of the contract or thereafter promulgated by the aforementioned governmental authorities. Perform health care activities in accordance with 10 Guam Code Annotated, Chapters 84 - 96 – Guam Health Act; 25 Guam Administrative Rules (G.A.R.) Chapter 6 – Guam Board of Nurse Examiners; 25 G.A.R. Chapter 11 – Guam Board of Medical Examiners; 26 G.A.R. §§ 4401, et seq., Health Certificate Regulations, and 26 G.A.R. §§ 6200, et seq., Ambulance and Emergency Medical Technician.
- Perform worker pre-deployment physical condition and general health screening for all deployed workers equal to GovGuam pre-employment standards and requirements prior to their departure to Guam. At a minimum, said screening shall include a tuberculosis test, chest x-ray and medical evaluation, blood pressure, dental exam, and other medical tests as necessary to ensure that each worker's health status prior to deployment to Guam for work on the Government contract is adequate for performance of the activities to which the worker will be assigned giving consideration to the climatic and other physical elements to be experienced on Guam. This requirement shall not apply to managerial, specialized technical and administrative Contractor and Subcontractor workers and consultants visiting Guam for business purposes for periods of 14 calendar days or less.
- Ensure that each Contractor worker deployed to work on Guam for a period in excess of 14 calendar days shall be covered by either commercially purchased health and medical care insurance or Contractor self-furnished health and medical facilities for the entire duration of the worker's or consultant's deployed assignment. The Contractor shall effect appropriate contractual agreements with its workers and/or workers' representatives that require such workers to accept the Contractor's insurance plan coverage and/or use of the Contractor furnished medical facilities.

To the extent possible and cost effective, consider purchasing insurance and health care from established and reputable agencies rather than providing health care. The minimum insurance plan coverage and/or medical facilities furnished by the Contractor shall be as follows:

- Emergency Medical Care - initial outpatient treatment, including related diagnostic service, of the sudden and unexpected onset of a medical condition which has severe symptoms. If immediate medical attention is not obtained, the symptoms could result in serious and permanent medical consequences. Examples of such symptoms are severe chest pains, convulsions or persistent, severe abdominal pains.
- Primary Health Care - services typically included represent the full spectrum of organizations which provide care services to the population of focus. The services should include care for chronic diseases, preventive and screening services, and acute care delivery in the outpatient setting; as well as health promotion services delivered through an inter-professional team.
- Prescription Drugs - drugs or medicines that require a doctor's signature to dispense and are approved by the U.S. Food and Drug Administration for use in treating the sickness or injury for which they are prescribed.

- Comply with U.S. Government Occupational Safety & Health Administration standards and requirements (29 CFR 1910, et seq. - Occupational Safety & Health Standards). Provide medical care at the worksites during all work operations in accordance with U.S. Army Corps of Engineers Safety and Health Requirements Manual EM 385-1-1, dated 15 September 2008, and effective 12 January 2009 (EM 385-1-1), Section 3 Medical and First-Aid Requirements. At least two employees on each shift shall be qualified to administer first-aid and CPR when a medical facility or physician is not accessible within 5 minutes of an injury to a group of two or more employees. Worksites for which fewer than 100 persons are employed (greatest number of employees on a shift), and where neither a first-aid station nor an infirmary is available, shall be provided with a first-aid kit complying with ANSI Z308.1. There shall be one first-aid kit for every 25 (or fewer) employees. Worksites for which more than 99 and fewer than 300 persons are employed (greatest number of employees on a shift), shall establish and equip, as directed by a Licensed Physician (LP), a first-aid station. Worksites for which 300 or more persons are employed (greatest number of employees on a shift), shall establish and equip, as directed by a LP, an infirmary. The type of facilities, equipment, and qualified personnel provided at the first-aid station and infirmary shall comply with EM 385-1-1.
- Certify that each (1) deployed worker had a pre-deployment physical condition and general health screening and (2) each worker has a contractual agreement to accept the Contractor's insurance plan coverage and/or use of the Contractor furnished medical facilities.

4.15.3.3 Orientation Programs

- Ensure all personnel receive and acknowledge receipt of a safety, security and anti-terrorism briefing the content of which shall be consistent with inherent safety, security and anti-terrorism requirements of the project(s) to which the person will be assigned. The content of the personnel briefing for each project shall be approved by the Contracting Officer. Updated and refresher safety, security and anti-terrorism briefings will be conducted as directed by the Contracting Officer.
- Provide cultural resource awareness training.
- Provide environmental protection awareness training (proposed as mitigation for this EIS).

- Provide invasive species awareness training (proposed in Biological Assessment).

4.15.3.4 Lodging and Food

- Comply with Guam regulations. For example, if an employer certifies more than five such workers on Guam, it must make lodging and board available that complies with the details set out in the regulations. Guam regulations provide for deductions from the H-2B employee's pay (currently up to $80 per week without itemization) to allow the employer to recover costs for lodging, board and personal hygiene needs of the employee. There is a minimum space allowance for sleeping areas.

4.15.3.5 Transportation

- Comply with Guam regulations that require employer to provide transportation to/from the worksite.
- Submit a comprehensive narrative plan to address the workforce transportation requirements under the responsibility of the Offeror and all prospective Subcontractors, and include as a minimum:
    - Provide maps/plans for travel routes to and from the worksites and discussion on how these travel routes will minimize impacts to the local community.
    - Provide travel schedules (times of day) to and from the worksites and discussion on how these schedules will minimize impacts to the local community.
    - Provide means and methods to reduce vehicle travel to and from the worksites to minimize impacts to the local community.
    - Provide safe, secure and adequate transportation services for temporary resident workers to and from temporary resident workforce housing facilities and worksites to accommodate work schedules including multiple work shifts or non-standard work shifts. Work performed must comply in all respects with all statutes and regulations of the U.S Federal Government and/or the GovGuam in effect on the date of award of the contract or thereafter promulgated by the aforementioned governmental authorities.
    - Ensure basic transportation services are provided between temporary resident workforce housing facilities and available emergency shelter facilities during emergency events (man-made or natural disasters).
    - Ensure necessary vehicle and equipment inspection(s) and registration as well as operator licenses and permits are obtained and maintained current throughout the performance of the contract in accordance with all statutes, rules and regulations of the U.S. Federal Government and/or the GovGuam.

4.15.4 Workforce Housing Proposals

This section of the Final EIS provides an additional assessment of Workforce Housing by resource area. Table 4.15-1 lists the current permit applications and status for workforce housing areas as of May 2010. Figure 4.15-1 shows the nine areas in relation to the military facilities on Guam. Aerial photos for each site are provided in Figures 4.15-2 through 4.15-9. Younex Enterprises, LLC began construction at Site #1 in May 2010.

Table 4.15-1. Current and Future Locations of Temporary Workforce Housing

	Guam Land Use Commission Case #	*Applicant*	*Legal Lot Description*	*Municipal District*	*Location*	*Current Zone*	*Status*	*Capacity (people)*
1*	2009-56	Younex Enterprises, LLC	L10184 & L5039	Dededo / Tamuning	North	"M-1" (Light Industrial)	Approved by GLUC 10/29/2009	18,000
2	2010-22B	Pacific Int. Guam Inc.	L7024-R5	Yigo	North	"A" Rural	Currently being processed	1,176
3	2009-093B	DDT Konstract	L5224-6-2	Barrigada	Central	"A" Rural	Approved by GLUC 4/8/2010	390
4	2009-78	Black Construction Corp.	L5161-1-1 & -1-R15	Tamuning	Central	"M" (Light Industrial)	Approved by GLUC 2/25/2010	1,200
5	2009-94	S.K. Construction Inc.	L5106-5-NEW	Tamuning	Central	"M" (Light Industrial)	Currently being processed	350
6	2010-18	Chugach World Services Inc.	L5148-REM-EAST-1	Tamuning	Central	"M" (Light Industrial)	Currently being processed	696
7	2010-19	Core Tech International	L2103-1A-1	Tamuning	Central	"M" (Light Industrial)	Currently being processed	856
8	2008-53	Bob Salas	L3462 &3474	Mangilao	Central	"A" Rural	Currently being processed	64
9	2008-72	Bascon Corp.	L3278-2	Ordot	Central	"R-1" (Single-Family Dwelling)	Currently being processed	30
								22,762

**Note:* As of May 13, 2010 Younex reported to the GLUC that they have lowered their planned number of units to a maximum of 14,000.

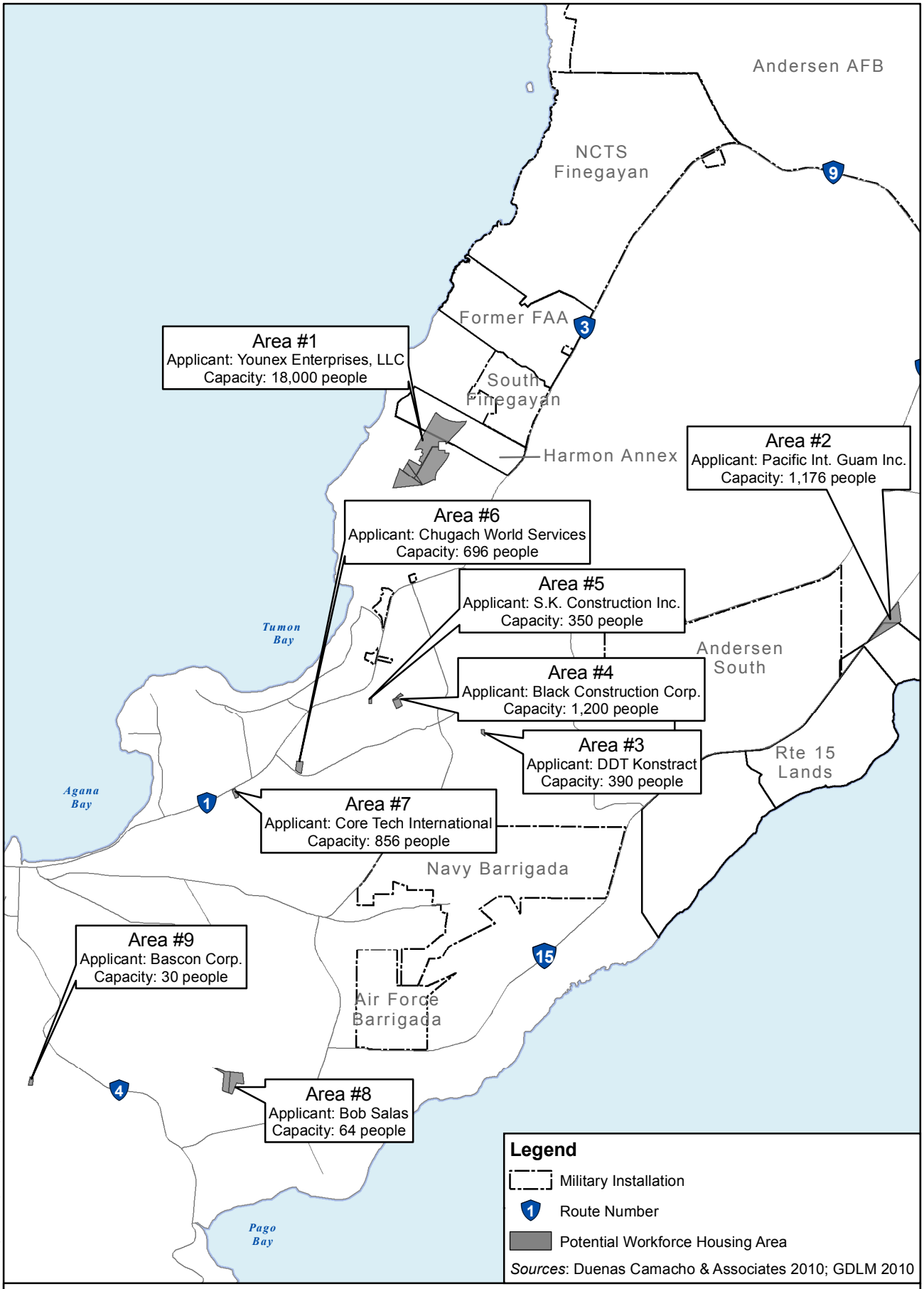

Figure 4.15-1
Potential Temporary Workforce Housing Locations

Figure 4.15-2
Temporary Workforce Housing Site 1 Aerial Photo

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Figure 4.15-3
Temporary Workforce Housing Site 2 Aerial Photo

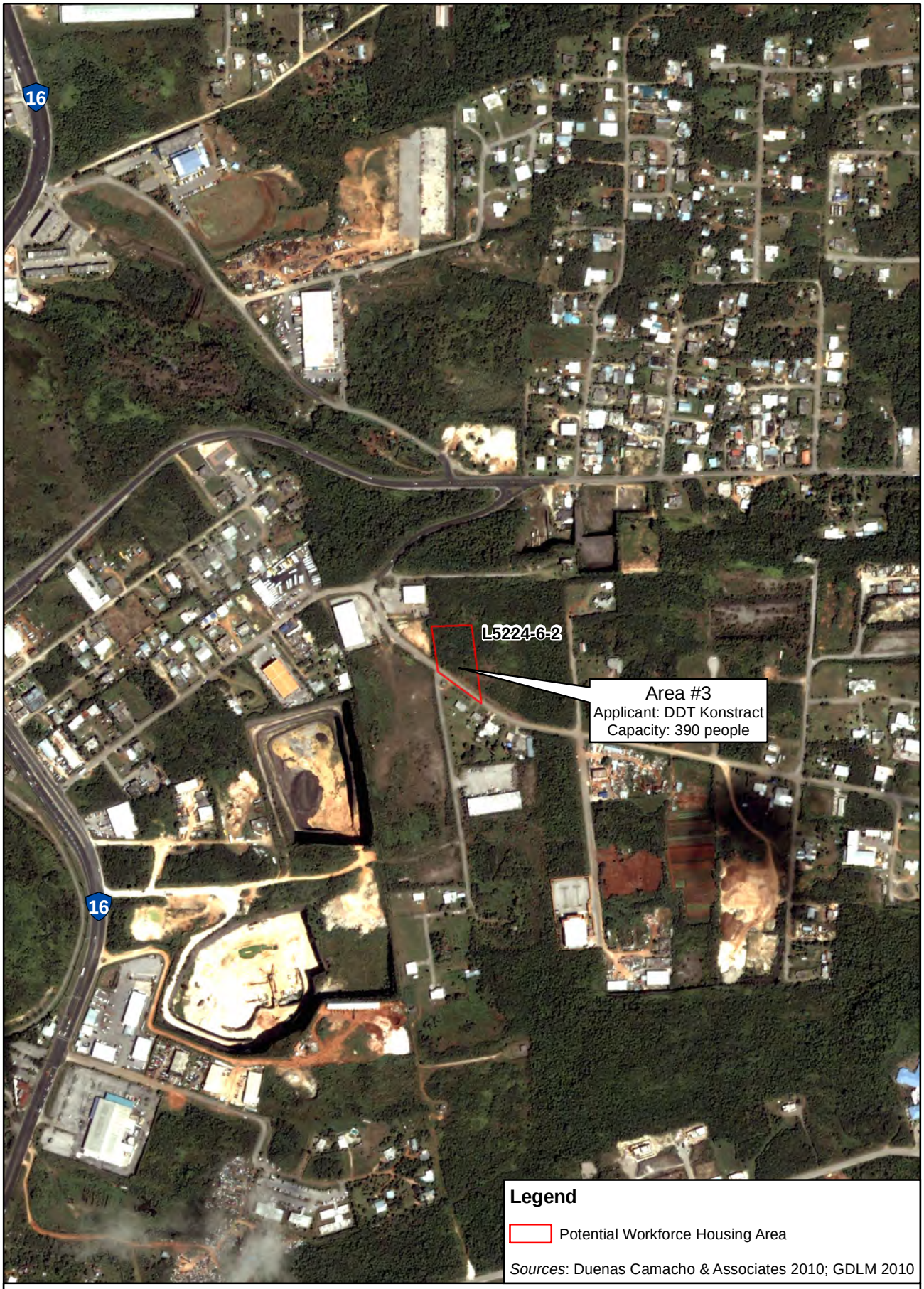

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Figure 4.15-4
Temporary Workforce Housing Site 3 Aerial Photo

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Figure 4.15-5
Temporary Workforce Housing Site 4 & 5 Aerial Photo

Figure 4.15-6
Temporary Workforce Housing Site 6 Aerial Photo

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Figure 4.15-7
Temporary Workforce Housing Site 7 Aerial Photo

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Figure 4.15-8
Temporary Workforce Housing Site 8 Aerial Photo

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Figure 4.15-9
Temporary Workforce Housing Site 9 Aerial Photo

4.15.5 Indirect Impacts of Workforce Housing Projects and Population

The Final EIS considers workforce housing an indirect impact of the proposed military relocation, specifically the Marine Corps proposed actions. This section qualitatively assesses the impact of this indirect impact. The resource areas are the same as those assessed in Volumes 2 through 6. Workforce Housing is likely to have less than significant impacts on the following resource areas: Airspace and Marine Transportation. The development and operations of these proposed Workforce Housing projects would be subject to the environmental regulatory oversight of GovGuam as well as the conditions of the contract provisions as referenced above. Beyond the contract provisions referenced, DoD does not have the authority or responsibility for environmental regulatory oversight of workforce housing projects as they would be located on non-DoD property.

4.15.5.1 Geological and Soil Resources

The proposed workforce housing sites are located in areas of northern and central Guam that have for the most part been previously developed. Due to the relatively moderate footprint of most of the workforce housing site proposals, minimal disturbances to soil, topography, and geologic resources are expected. Construction activities would implement BMPs in accordance with GovGuam regulations to ensure that impacts are minimized. A description of the standard BMPs and resource protection measures required by GovGuam regulatory mandates can be found in Volume 7 of this Final EIS. Enforcement of these BMPs and resource protection measures must be part of the GovGuam land use regulatory process. Implementation of measures such as re-vegetation as soon as possible after any ground disturbance or grading, and minimizing construction and grading during times of inclement weather would prevent erosion, thus there would be minimal impacts from soil erosion. Soil types disturbed can be found in Table 4.15-2. A more detailed description of each soil type can be found in Volume 2. Soil erosion is primarily a concern for discharge into surface or near-shore waters that are not located near the proposed workforce housing sites. There are no known sinkholes in the vicinity of the proposed workforce housing sites, however, if found, sinkholes should be avoided and a buffer zone of vegetation should be left around it as a mitigation measure to prevent further erosion or expansion. Hazards associated with earthquakes, fault rupture, and liquefaction should be minimized by adherence to UFC 3-310-04 Seismic Design for Buildings (USACE 2007). Both construction and operation of proposed workforce housing would result in less than significant impacts to soil and geologic resources.

Table 4.15-2. Soil Types at Workforce Housing Sites

Workforce Housing Area	*Soil Type*
Area #1	Guam Cobbly Clay Loam
Area #2	Guam Cobbly Clay Loam and Ritidian-Rock Outcrop Complex
Area #3	Guam Cobbly Clay Loam
Area #4	Agfayan Clay
Area #5	Agfayan Clay
Area #6	Agfayan Clay
Area #7	Agfayan Clay
Area #8	Pulantat Clay
Area #9	Pulantat Clay

4.15.5.2 Water Resources

Construction associated with the proposed workforce housing would result in the potential for a temporary increase in stormwater runoff, erosion, and sedimentation. For construction sites that disturb one or more acres, a Construction General Permit would be obtained and followed and a Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented in accordance with GovGuam

regulations. The SWPPP would identify construction-specific BMPs that would be implemented as part of construction activities to reduce the potential for erosion, runoff, sedimentation, and subsequent water quality impacts. For sites that disturb less than one acre, impacts to water resources would be minimal; water quality protection measures (i.e., BMPs) should also be implemented for these sites as practicable). A description of the standard BMPs and resource protection measures required by GovGuam regulatory mandates can be found in Volume 7 of this EIS. In addition, Guam Soil Erosion and Sediment Control Regulations would need to be followed to further reduce potential impacts.

New workforce housing would increase the amount of impervious area, resulting in an associated but relatively minor increase in stormwater discharge intensities and volume. This small increase would be accommodated by existing or new stormwater infrastructure and could result in minor increases in pollutant loading to water resources. Runoff volumes and quality would continue to be similar to existing conditions. There are limited areas of wetlands in central and northern Guam where the workforce housing sites are proposed. Therefore, impacts to wetlands would not be expected to occur. Moreover, several of the sites have been previously developed with little vegetation or other natural features remaining on site. Overall, impacts to water resources would be less than significant.

4.15.5.3 Air Quality

Construction activities associated with earth disturbances occurring at the proposed workforce housing sites would result in indirect short-term air quality impacts. Given the relatively small footprint of these sites, the temporary impact would be less than significant. During the construction period, these housing sites would use power supplies provided under the preferred power alternative described in Volume 6 of this Final EIS. As discussed in Volume 6, power-related air quality impacts including those from the operations of these sites would be less than significant. Operational emissions from commute vehicles accessing workforce housing sites are considered in Volumes 2 through 6 of this Final EIS. These emissions are considered when the potential construction activity air quality impacts are assessed. According to the emissions assessment, the potential air quality impacts from overall construction activities, including those resulting from workforce commute vehicle operations, would be less than significant.

4.15.5.4 Noise

Noise impacts due to workforce housing would be due to construction activities and the traffic associated with the workers transported by shuttle buses from the housing area to the workplace. Noise associated with construction would be from the use of graders and excavators clearing and grading the property. Site areas 1, 2, 3, part of 4, 8, and 9 appear to be undeveloped and would require more grading activities. However, only Site 1 would be large enough to accommodate multiple pieces of construction equipment sufficient to create unacceptable noise levels approaching 75 dbA. Only two residences would be affected by elevated noise levels and each could be mitigated by project sequencing and using a minimum number of equipment at a time nearest the residences. All of the other sites would either be on previously developed parcels and would not require much grading or would be too small to fit a great number of excavators and/or graders on the site. Traffic noise impacts would be minor because the DoD requires contractors to provide “means and methods to reduce vehicle travel to and from worksites…” which could be met using bus transportation. Please also refer to this Volume, Section 4.15.5.12 for a discussion on roadways. Noise impacts associated with workforce housing would be considered less than significant.

4.15.5.5 Land and Submerged Land Use

None of the proposed workforce housing sites results in acquisition of land or submerged land by the federal government. Therefore, based on the land use criteria applied in the EIS for Volumes 2 through 6, there would be no impact to land or submerged land ownership as a direct consequence of the proposed action.

Once approved by GLUC, it is assumed the sites' land use zoning is consistent with GLUC Resolution No. 2009-01 (March 26, 2009). As construction workforce housing is for the proposed military relocation program, the proposed land uses are temporary. In addition, it is assumed the zoning is consistent with GovGuam future land use planning or is an acceptable variance for temporary use. Based on a review of the aerial photographs it appears sites 1, 2, 3, and 8 are greater than 75% vegetated open space. Sites 6 and 7 appear developed. Site 9 is approximately 50% developed and one lot (L5161-1-1) of Site 4 appears developed. The loss of open space could be considered a significant adverse land use impact when the surrounding land uses are largely vacant. Sites 1, 2, 3, and 8 would result in significant impacts due to loss of open space. The remainder of the sites that result in loss of open space would have a less than significant impact. Loss of open space in an area that is largely developed is less than significant. Proposed development of the sites does not appear to restrict access to adjacent properties; therefore, no land use access impacts are identified.

4.15.5.6 Recreational Resources

The presence of the workforce associated with the proposed relocation would produce similar effects on the recreational resources that Marines and their dependents would have on non-DoD properties throughout Guam (refer to Volume 2, Chapter 9). In particular, recreational resources in northern and central Guam would experience negative effects (e.g., crowding, deterioration of resources, competition for use/space, and etc.) associated with simply having more users on their resources. This includes effects to National Park Service units associated with the War in the Pacific National Historic Park. Increased visitation associated with direct, indirect, and induced population increases would affect park resources, values, facilities, and other users. Similar to the Marines and their dependents, heavier user presence is expected on weekends and holidays since workers would be working otherwise. The gradual arrival of the Marines and their dependents would enlarge the potential recreational user population, and this would exacerbate the negative effects experienced at these recreational resources.

4.15.5.7 Terrestrial Biological Resources

Area 1. The dominant vegetation consists of shrub/grasslands, scrub forest, and tangantangan. Although recovery habitat for Mariana crow, Mariana fruit bat, and Guam Micronesian kingfisher has not been identified within the area, approximately 65% of the site has been identified as potential Guam rail recovery habitat. The proposed development of Area 1 would result in significant impacts to Guam rail recovery habitat due to the size of the site and the additive loss of Guam rail recovery habitat under the proposed action. There would be no significant impacts to other terrestrial biological resources.

Area 2. The dominant vegetation consists of tangantangan, scrub forest, and limestone forest. Approximately 30% of the site has been identified as potential recovery habitat for Mariana crow, Mariana fruit bat, and Guam Micronesian kingfisher and approximately 50% is identified as potential recovery habitat for Guam rail. Due to the size of the site, the loss of the small area of potential rail recovery habitat with the potential land development would not result in significant impacts to terrestrial biological resources. There would be no significant impacts to other terrestrial biological resources.

Area 3. This area is currently completely surrounded by urban development and consists of disturbed non-native tangantangan forest. There would be no impacts to terrestrial biological resources with the development of Area 3 for workforce housing.

Area 4. This area is currently completely surrounded by urban development and consists of disturbed non-native tangantangan forest. There would be no impacts to terrestrial biological resources with the development of Area 4 for workforce housing.

Areas 5, 6, and 7. These areas are currently completely developed and there would be no impacts to terrestrial biological resources with the development of Areas 5, 6, and 7 for workforce housing.

Areas 8 and 9. Areas 8 and 9 are adjacent to currently developed areas and approximately 25% and 60%, respectively, of the sites is already developed. Vegetation consists of only scrub forest. Although recovery habitat for Mariana crow, Mariana fruit bat, and Guam Micronesian kingfisher has not been identified within the area, approximately 75% of Area 8 and 40% of Area 9 have been identified as potential Guam rail recovery habitat. Due to the size of the sites and their proximity to developed areas, the loss of potential rail recovery habitat with the potential development of Areas 8 and 9 would not result in significant impacts to terrestrial biological resources.

4.15.5.8 Marine Biological Resources

Construction associated with the proposed workforce housing would result in the potential for a temporary increase in stormwater runoff, erosion, and sedimentation as described in the water resource section above and Volume 2, Chapters 4 and 11. Water quality protection measures (i.e., BMPs) would be implemented for these sites as required by GovGuam agencies for construction SWPPPs. A description of the standard BMPs and resource protection measures required by GovGuam regulatory mandates can be found in Volume 7 of this EIS.

The increase of impervious areas on some of the proposed workforce housing sites would result in an increase in stormwater discharge intensities and volume that may transfer to sedimentation impacts to the nearshore environment. However, given the existing limestone substrate, percolation of stormwater run-off would be high and, therefore, impacts from construction activities to the nearshore environment and marine biological resources would be less than significant and have no adverse effect on essential fish habitat (EFH).

The presence of the workforce population associated with the proposed military relocation would produce similar effects on the marine biological resources that Marines and their dependents would have on non-DoD properties throughout Guam (refer to Volume 2, Chapter 11 and Volume 7). In particular, indirect negative effects from increased recreational activities (high speed water craft/boating, fishing, tidal harvesting, diving, etc.) in the nearshore environment may be seen islandwide. Significant impacts to special-status species, such as sea turtles, and the coral reef ecosystems may occur from increased use of this resource by construction workers; the magnitude of impacts is directly related to the increase in recreational use. Damage to reefs may be long-term if caused by anchors, reef-walkers, or reckless dive or snorkel activities, resulting in an adverse effect on EFH.

4.15.5.9 Cultural Resources

Significant adverse impacts to historic properties could result from construction at the workforce housing sites proposed by private sector applicants. Ground excavation and soil removal associated with this construction could disturb historic properties. The addition of workforce personnel in the area could increase accidental damage or unauthorized collecting. This is especially of concern at workforce housing

site Area #1, which is located near the coast. This coastal area contains a number of historic properties. Construction of additional workforce housing could also require the removal of natural resources of cultural concern. These impacts and proposed mitigation measures under NEPA are also addressed in Volume 7 under cumulative impacts. Proposed mitigation measures for these impacts include avoidance of sites found during initial surveys or data recovery if avoidance is not possible. To mitigate for cumulative impacts, DoD would assist the Guam and CNMI SHPO with the five-year updates of their respective Historic Preservation Plans (HPP) (see a discussion of cumulative impacts in Volume 7, Chapter 4. The curation of archaeological collections for non-DoD properties would be at the Guam Museum.

The National Park Service has expressed concern that the induced growth resulting from the influx of construction workers would overwhelm National Park Service and National Historic Landmark resources. However, plans would be made to minimize impacts to the local community from increases in population.

The National Park Service has consulted with the Advisory Council on Historic Preservation and the Guam State Historic Preservation Office regarding the large-scale increase in permit requests for implementation of projects in the next decade. The overall workload at the Guam State Historic Preservation Office has been significantly streamlined through consultations related to the existing Programmatic Agreement. The DoD is pursuing a cultural resource agreement for DoD projects that would further streamline the review process. This action would help offset the increase in permit reviews by private developers.

4.15.5.10 Visual Resources

Construction of the workforce housing would alter the visual character of the proposed locations, but the degree of alteration is expected to be minimal. This is because some of the workforce housing is proposed in urban infill areas (Areas 4, 5, and 7—Black Construction Corporation, S. K. Construction, Inc., and Core Tech International, respectively). Completion of these projects would achieve compatibility with the existing surrounding development; therefore, these projects would have the effect of enhancing the visual character of the proposed locations. In some instances, construction of the workforce housing would facilitate the urbanization of the existing areas. These locations include Areas 3, 6, 8, 9—DDT Konstract, Chugach World Services, Bob Salas, Bascon Corporation, respectively. For Area 2—Pacific International Guam Inc.—the construction of workforce housing would substantially alter the visual character in this predominantly open space location. The workforce housing proposed in Area 1 abutting the Harmon Annex would substantially alter the visual character of the location as well; the construction of the facility would trigger the beginning of the urbanization of the proposed Main Cantonment location (however, as stated above, it is assumed that any workforce housing development must satisfy GovGuam zoning and land use conditions and be approved by GovGuam in order to proceed).

4.15.5.11 Socioeconomics and General Services

Volume 2, Chapter 16 provides the impact assessment of workforce housing. In summary, the location of the specific sites has minimal impact. Construction of the sites would provide beneficial impacts through construction jobs. The primary socioeconomic impacts are related to the increase in on-island population. Significant adverse impacts are identified due to strains placed upon government services and the social fabric resulting from differences in norms and customs between longtime Guam residents and foreign workers or Freely Associated States (FAS) in-migrants arriving on Guam for jobs. Additional impacts from population growth are discussed in Volume 2, Chapter 16.

4.15.5.12 Utilities and Roadways

Utilities

The basic four utilities of power, water, wastewater and solid waste would experience differing impacts from the establishment of a workforce housing facility, but they would not be location dependent, except for wastewater, which may flow to different wastewater treatment plants. Thus the analysis presented is applicable to all nine sites. Below is a brief discussion of the expected impacts of the workforce housing facilities for each of these utilities. For a more in depth evaluation of utility impacts from the proposed DoD relocation, including all projected population increases, see Volume 6 of this Final EIS.

Power

Power is provided by GPA via an island-wide power system. The analysis of the GPA system predicts that by adoption and implementation of the preferred power alternative, adequate power supplies would be available in sufficient time to support all of the various current proposals for workforce facilities. Localized upgrades to transmission and distribution systems would need to be provided by GPA and the developer for all of these locations in order to deliver the required power to the facilities. The financial and technical capabilities of GPA are deemed adequate to successfully provide the required infrastructure to deliver power to any or all of the currently proposed workforce housing facilities. Therefore, impacts of workforce housing on the power utility are assessed as less than significant.

Potable Water

Potable water is provided by GWA via an island-wide water system. Currently the water systems of GWA are considered barely adequate to meet current demands (see Volume 6 for detailed utilities analysis). Some of GWA's groundwater extraction wells have experienced increasing salinity and pumping from these wells has been ceased to allow the aquifer to locally relax and restore the fresh water/salt water separation. DoD has their own water system, which currently has excess water production capacity. As discussed in Section 4.3.2., above, DoD has been meeting with GWA and has established a draft memorandum of agreement for cooperation in use of water resources, including the transfer of excess DoD system water to GWA via current and proposed interconnections between the two systems.

However, the GWA distribution system is substandard and may not be able to adequately deliver this additional water. Depending on the location of the selected workforce facilities, the localized GWA distribution system may require new facilities, upgrades, and/or repair. 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. However, the proposed DoD interconnects to the GWA water distribution system would minimize impacts by more efficiently delivering water through the DoD water transmission system to areas where water is needed vice using the inadequate GWA distribution system.

The financial and technical capabilities of GWA are deemed marginal and may not allow GWA to successfully repair and upgrade the infrastructure to provide adequate water service to some of the proposed workforce housing facilities. For these reasons, the impacts of workforce housing and civilian induced population growth on the water utility are assessed as significant. Mitigations could include 1) the Government of Japan providing funding to repair and upgrade selected water and wastewater infrastructure, 2) U.S. Government funding of needed utility infrastructure repairs and upgrades through the efforts of the EAC, and/or CEQ facilitated discussions with various federal agencies, 3) an adaptive program management approach to alter construction tempo to reduce peak construction workforce

requirements, and 4) force flow modifications. Adaptive program management and force flow modifications are described in more detail in below.

Wastewater

Wastewater collection and treatment systems are provided by GWA through various treatment plants located throughout Guam. Areas 1 and 2 of the currently proposed workforce housing facilities would use the NDWWTP. The other proposed locations would use the Hagatña WWTP.

Effluent from the NDWWTP is currently not meeting all NPDES permit requirements. Average daily influent is also very close to permitted limits, with peak daily influent exceeding permitted limits. Thus, the addition of workforce housing would exacerbate this exceedance and potentially cause exceeding the actual average daily influent. However, the original physical design capacity of the NDWWTP is 12 million gallons per day (MGd) average daily influent and 27 MGd peak daily influent. Current physical capacity has been estimated at approximately 7.96 MGd. Thus with permit modifications, the NDWWTP should be able to handle the increased demand from workforce housing even prior to implementation of the preferred wastewater alternative. Sewer collection systems serving the NDWWTP are aged and reportedly in poor shape. Thus, sewer upgrades and system expansions would be needed to serve the proposed workforce housing facilities.

The Hagatña WWTP has recently been refurbished, but is still operating without meeting the requirements of its NPDES permit. The capacity of the Hagatña WWTP is adequate to handle the additional demand from the currently proposed workforce housing facilities; however, permit modifications are needed to allow for higher peak flows as the plant is currently exceeding those permitted levels. The effluent pump also requires repair as it is not operational. This can cause effluent backup during certain tidal conditions. The sewer collection system serving this area are aged and reportedly in poor shape. Thus sewer upgrades and system expansions would be needed to serve the proposed workforce housing facilities.

The financial and technical capabilities of GWA are deemed marginal and may not allow GWA to successfully prepare the infrastructure to provide adequate wastewater service to some of the proposed workforce housing facilities. For these reasons, the impacts of workforce housing and civilian induced population growth on the wastewater utility are assessed as significant. Mitigations could include 1) the Government of Japan providing funding to repair and upgrade selected water and wastewater infrastructure, 2) U.S. Government funding of needed utility infrastructure repairs and upgrades through the efforts of the EAC, and/or CEQ facilitated discussions with various federal agencies, 3) an adaptive program management approach to alter construction tempo to reduce peak construction workforce requirements, and 4) force flow modifications. Adaptive program management and force flow modifications are described in more detail in Volume 7.

Solid Waste

Implementation of the preferred solid waste alternative would be able to adequately serve all the various proposals for workforce housing. Currently, most civilian solid waste on Guam continues to be disposed at the Ordot Landfill. The new GovGuam Landfill at Layon is currently in construction and scheduled for opening July 2011. The proposed workforce housing facilities would not be expected to generate a significant increase in solid waste between now and when the new landfill would open. Thus, the impact to the solid waste utility from the currently proposed workforce housing facilities would be less than significant.

Roadways

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. The DoD requires Contractors to provide "means and methods to reduce vehicle travel to and from worksites…" that could be met using bus transportation. The majority of the workforce would be housed in the North Region (Areas 1 and 2), allowing for a relatively short commute to Finegayan where most of the proposed construction activity would occur. Table 4.15-3 identifies the expected travel routes between the various workforce housing sites and NCTS Finegayan.

DoD contract requirements allowing for multiple work schedule/or non-standard work shifts would further reduce impacts to traffic and roadways by shifting work force travel to off peak hours. BMPs and mitigation measures identified in Volume 6, Chapter 4 (Roadways) during construction would also reduce impacts from the workforce housing areas. Incorporation of BMPs and mitigation measures, including use of bus transportation, into the provision for workforce housing would reduce impacts to traffic and roadways.

4.15.5.13 Hazardous Materials and Waste

Construction activities associated with the workforce housing areas would require the use of various hazardous materials and waste. However, construction contractors would be required to implement BMPs and standard operating procedures (SOPs) to ensure that impacts from these substances are minimized. Anticipated hazardous materials and waste may include fuels, lubricants, solvents, paints, adhesives, pesticides, herbicides, and other hazardous substances.

When using hazardous substances, various federal and local environmental laws and regulations (e.g., RCRA) must be followed by the developer and operators of the proposed workforce housing sites that are designed to be protective of human health, welfare, and the environment. In order to implement these laws and regulations, various procedures, protocol, and directives should be developed that are designed to proactively eliminate or minimize pollutants to the environment. These actions involve the use of comprehensive administrative, engineering, and operations mandates, BMPs, and SOPs to prevent or minimize the inadvertent leakage, spill, or release of hazardous substances. Enforcement of these protection measures should be part of the federal and GovGuam's regulatory oversight.

Table 4.15-3. Travel Paths to NCTS Finegayan from Proposed Workforce Housing Sites

Area	*Applicant*	*Capacity*	*Village*	*Path from Area to NCTS Finegayan*	*Notes*
1	Younex Enterprises, LLC	18,000	Dededo	Option 1: Finegayan Connection	
				Option 2: Local Road to Route 3 Route 3 to NCTS Finegayan	Alternative route, no Finegayan connection.
2	Pacific International Guam, Inc.	1,176	Yigo	Route 15 to Chelan Laguna Chelan Laguna to Route 1 Route 1 to Route 9 Route 9 to Route 3 Route 3 to NCTS Finegayan	
3	DDT Konstract	390	Barrigada	Bello Street to Alageta Road Alageta Road to Route 25 Route 25 to Route 16 Route 16 to Route 27 Route 27 to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	
4	Black Construction Corp.	1,200	Tamuning	Harmon Metal Lane to A. Sanchez Street A. Sanchez Street to Route 16/Route 27 Route 27 to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	
5	S.K. Construction Inc.	350	Tamuning	Local Road to Ilipog Drive Ilipog Drive to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	

Area	*Applicant*	*Capacity*	*Village*	*Path from Area to NCTS Finegayan*	*Notes*
6	Chugach World Services	696	Tamuning	Route 10A to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	Adjacent to Home Depot on Route 10A.
7	Core Tech International	856	Tamuning	Route 1 to Route 3 Route 3 to NCTS Finegayan	
8	Bob Salas	64	Mangilao	Route 15 (Diary Road) to Route 10 Route 10 to Route 16 Route 16 to Route 27 Route 27 to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	Near correctional facility.
9	Bascon Corp.	30	Ordot	Route 19 (Dero Road) to Route 4 Route 4 to Route 1 Route 1 to Route 3 Route 3 to NCTS Finegayan	

4.15.5.14 Public Health and Safety

No impact to workforce housing areas is anticipated from operational safety concerns (i.e., aircraft mishaps, BASH, explosive safety, electromagnetic safety, and construction safety). Potential increases in air emissions from workforce housing areas would be less than significant and the potential increase in disease occurrences and mental illness cases would be low; however, it is anticipated that Guam clinics and hospital would not be able to increase staffing to meet current health care service ratios and would not be capable of handling potential increases in illnesses (e.g., air quality-related illnesses, water-related illnesses, notifiable diseases, and mental illness). With large numbers of workers living in close proximity to each other, the potential for an increase in communicable diseases such as TB could result. As discussed above, construction contractors that have significant expertise in the areas of workforce housing and logistics to support temporary foreign workers would be engaged. Contract provisions would include requirements to provide workforce medical, dining, transportation, and safety/security. There would also be health screening of all workers. Contractors would be required to provide health care either by supplementing local Guam staff and resources or building their own clinic; therefore, less than significant impacts to health care services from workforce housing would be anticipated.

Based on the potential locations for workforce housing, it is anticipated that protective services (i.e., Guam police and fire departments) would be able to respond to workforce housing areas in a timely manner. In addition, contractors would provide safety and security for their employees; therefore, no impact to police and fire service is anticipated. Compliance with statutes and regulations on hazardous materials and wastes would be adhered to; therefore, no impacts to public health and safety are anticipated from management of hazardous substances within workforce housing areas (primarily household cleaning supplies). Grading for workforce housing building foundations, access roads, underground utilities, infrastructure or other ground disturbing activities could encounter unexploded ordnances (UXO). The identification and removal of UXO prior to initiating workforce housing construction activities and occupation of the workforce housing areas should occur to ensure that potential impacts would be minimized and less than significant. Although additional workers could result in more vehicles on the roads, construction contractors would be required to provide transportation for their workers and the actual potential for increased traffic incidents is small; therefore, a less than significant impact on the health and safety of the citizens of Guam from workforce housing traffic incidents is anticipated.

4.15.5.15 Environmental Justice and the Protection of Children

The proposed workforce housing would be located on an island with high percentages of minority and low-income population and children as compared with the U.S. population. Potentially significant impacts related to workforce housing that may result in disproportionately high and adverse impacts to minority and low-income populations include cultural resources, socioeconomics, potable water, and wastewater impacts. Potentially significant health and safety risks associated with socioeconomics, potable water, and wastewater impacts may also disproportionately affect children. The potential impacts and mitigation measures to reduce those impacts are described in the corresponding sections above. With implementation of mitigation measures, the severity of the impacts would be reduced.

4.16 INDUCED GROWTH ASSOCIATED WITH PROPOSED MILITARY RELOCATION PROGRAM

In response to regulatory agency requests and public comments on the Draft EIS, further analysis of induced growth associated with the proposed military relocation program is presented in this section. Volume 2, Chapter 16 of the Draft EIS, Socioeconomics and General Services, included some information on population and housing related to induced growth; this section expands on that information and assumes the full magnitude of population growth between 2010 and 2016 as addressed in this Final EIS. Additionally, Volume 6 includes analysis of induced population growth impacts on utilities on Guam.

Induced impacts would result from the economic growth associated with the additional people, potential development and activities that are created by the increased short and long-term spending associated with the proposed military relocation program. This is similar to the induced growth that may be created as a consequence of improvements, particularly expansions, in transportation or other infrastructure that makes land more accessible and so increases the likelihood that this land would be developed or redeveloped. This land development and activities associated with induced growth could then contribute to undesired environmental impacts if local regulations to protect natural and cultural resources are not followed.

To address what would be considered induced growth on Guam as a result of the proposed military relocation program, information from the project specific economic impact model was used to estimate and depict the number of people that would be attracted to Guam over and above the military, their dependents, and the H-2B construction workers who are projected to stay in workforce housing. The remaining populations are those that would be seeking housing in non-workforce housing sites throughout Guam. The methodology used estimates the number of new workers and dependents, and translates this population into required housing and new commercial development generated by spending. Details of the direct, indirect and induced economic impacts, including population projections, are in Volume 2, Chapter 16 and the SIAS, Volume 9 Appendix F of this Final EIS.

4.16.1 Induced Housing Units

4.16.1.1 Peak Demand

Uniformed military personnel and military dependents would live on-base; and H-2B workers would live in construction workforce housing. Additional housing units would be required for the remaining 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 population includes civilian military workers and their dependents, non-H-2B construction workers (working on DoD projects) from off-island and their dependents and workers (and their dependents) who migrate to Guam for non-DoD jobs created by spending related to the proposed action. This translates into a demand of about 11,900 housing units based upon an occupancy rate of 3.9 persons per unit.

Using data from of the Guam Comprehensive Housing Study (PCR Environmental 2009), the estimated number of currently available, livable, housing units on Guam is estimated to be about 2,900. This results in the need for about 9,000 additional housing units at the peak demand.

4.16.1.2 Induced Housing Demands – Steady State

After the population peak is reached due to the construction activities related to the proposed actions, the population declines every year until a steady-state population of approximately 12,500 would be in

induced housing. Using the same methodologies as above, the incremental housing units required at steady-state would be only 272 in contrast to the peak demand of 9,000 units.

4.16.1.3 Housing Glut or Deficit

If enough housing is constructed to meet peak demand then it is likely that there would be an oversupply (glut) of housing during the steady-state timeframe, if demand is not met during the peak then a housing deficit is implied. Likely outcomes of this situation are discussed in Sections 4.3.3.2 and 4.3.3.3 of the SIAS and are summarized below:

It is unlikely that construction of new housing would fully respond to the demand to eliminate a housing deficit. The most likely outcome is a partial response of housing construction to demand. Housing construction companies would have general knowledge of the housing demands projected as long-run consequences of the proposed action's operational component, and general knowledge of the status of their competition. Building to long-run (rather than the larger, temporary, construction-period) demands would likely make financial sense to most housing providers. This implies only a partial response to construction-period housing demand. If sufficient housing is not supplied, this could prove problematic.

4.16.1.4 Reduction of Induced Housing Demand

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. Induced housing demand peak is sensitive to the pace of growth. Section 4.17.2, below, discusses how the pace of growth could be managed using adaptive program management and force flow reduction. These two notional examples do not represent a current DoD proposal and should not be viewed as the only possible manner reduce the pace of growth and its effects on the peak demand for induced housing. The potential effects of the notional examples on reducing the housing demand are shown in Figure 4-16.1.

In addition to the current DoD proposals to reduce the pace of the proposed action, other factors may reduce the requirements discussed above. For instance, some non- H-2B construction workers who would move to Guam for short time during the construction phase of the proposed military relocation program may choose to reside in workforce housing. Once available, these work force housing units may be appealing and convenient to live and commute to construction sites on planned shuttle buses. The estimates (above), of induced housing units required, assume all non-H-2B construction workers (DoD projects) would require housing units from the Guam housing market; however, based on information depicted in Table 4.15-1, there is planned development for workforce housing totaling a population of approximately 22,800 workers while there are only an estimated 13,300 H-2B workers expected at peak. This additional workforce housing units would be available to a portion of the non-H-2B in-migrant construction workers (DoD projects).

If the workforce housing absorbs a portion of these workers rather than the Guam housing market, then the number of housing units, at peak, would be lower than estimated above. If it assumed that all the proposed workforce housing is completed and has 80% occupancy by both non- and H-2B workers then, at peak, the number housing units required would decline by 1,264.

The additive effects of these various scenarios can significantly reduce the peak demand for housing. The effects of the scenarios are illustrated in the figure below.

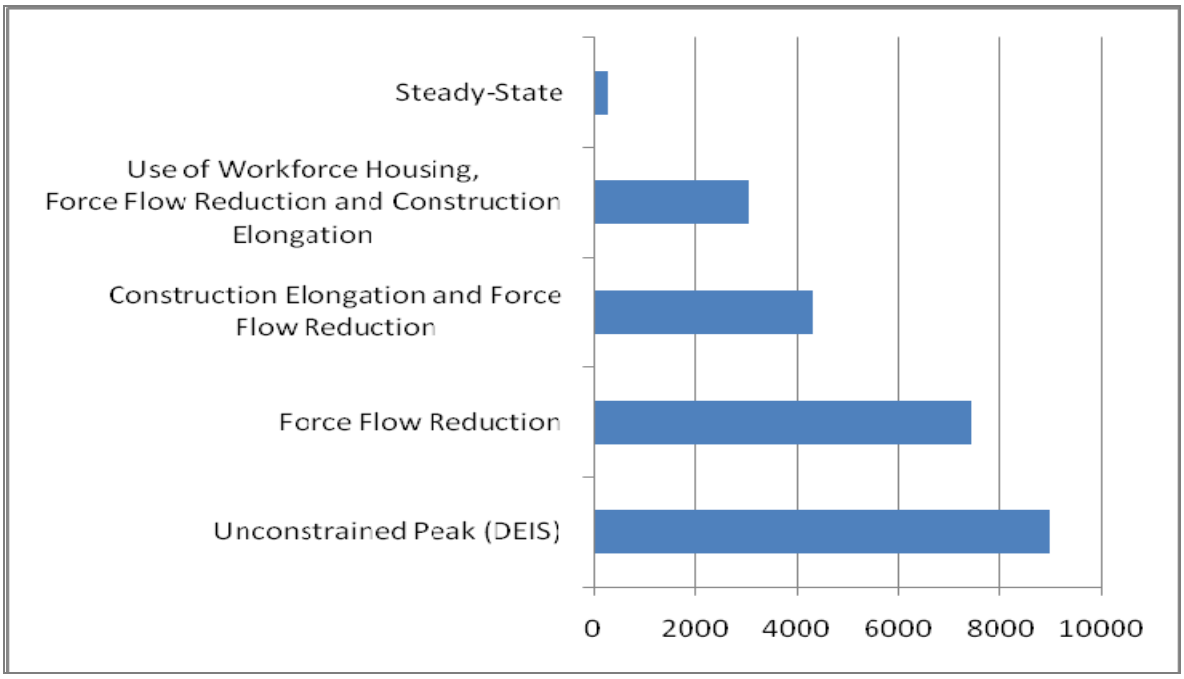

Figure 4.16-1 Induced Housing Unit Demand

4.16.2 Induced Business Establishments and Jobs

4.16.2.1 Induced Business Establishments and Jobs – Peak

The proposed actions are 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. To meet that demand, new business establishments would be developed. Based on data from Table 4.3-4 in the SIAS, presented in the Appendix (Volume 9 of Final EIS), approximately 1,295 business establishments with 18,727 full time equivalent (FTE) jobs would be induced by the proposed actions. Induced business establishments do not include growth in the number of on-base business establishments – only establishments that would be off-base are considered.

4.16.2.2 Induced Business Establishments and Jobs – Steady State

After the peak in induced economic activity is reached, the number of business establishments and jobs would decline until a steady-state is reached. The steady-state would induce 220 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 project. (Please see Figure 4.3.1 of the SIAS for an example of economic activity, at steady-state, exceeding economic activity without the proposed actions.)

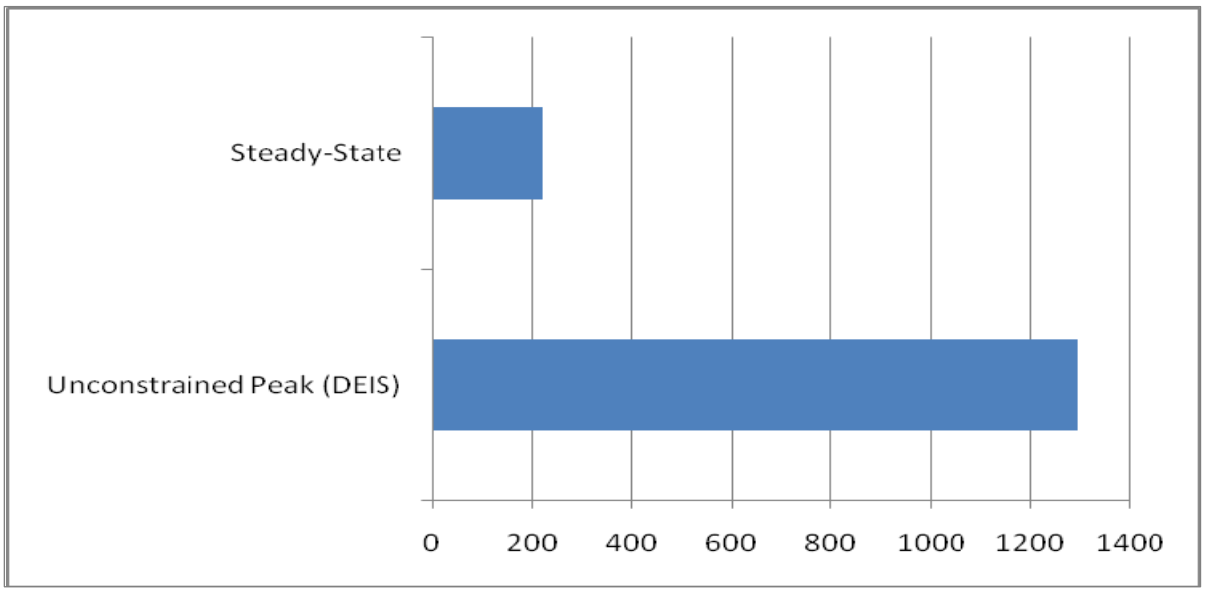

Figure 4.16-2 Induced Business Establishments

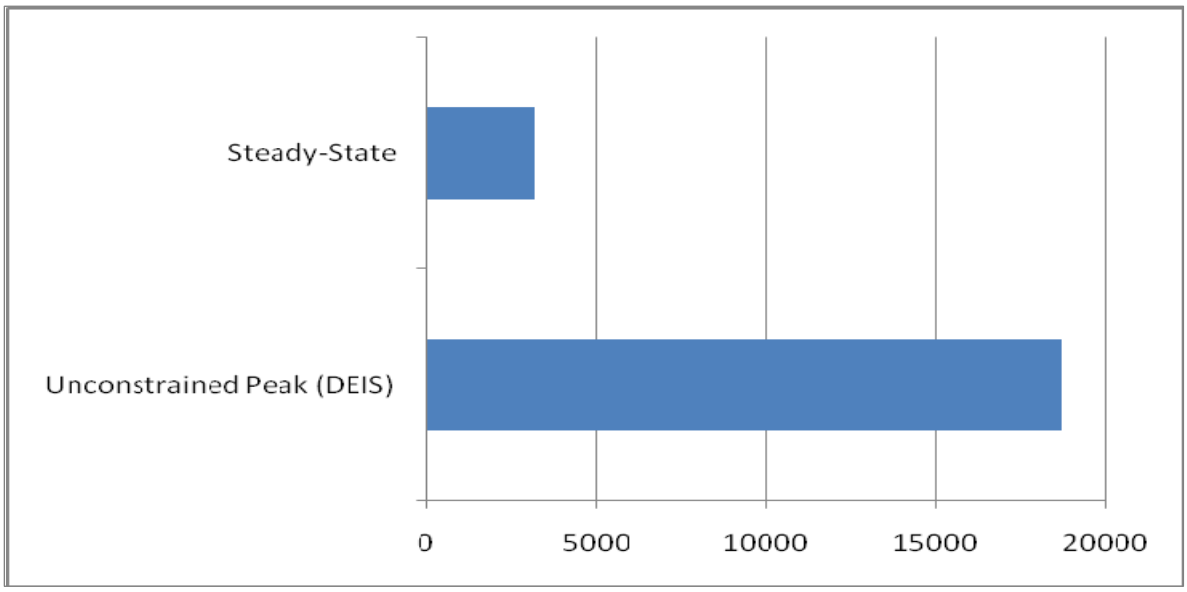

Figure 4.16-3 Induced Employment – FTE Jobs

4.16.3 Environmental Impacts of Induced Growth

There would be environmental impacts of the anticipated induced development, population growth and activities associated with the proposed military relocation program. The impacts would be to both Guam's natural and built resources from the new buildings required for housing and/or business establishments. Based upon having the most available zoned and undeveloped land, it would be anticipated that much of the induced development would be located in the central and northern sections of Guam. However, an induced population could certainly live anywhere on Guam and therefore, the effects would be islandwide. Any new construction would be controlled and managed by GovGuam regulatory authorities. The reduction of any adverse environmental effects from construction would be dependent upon adherence to these regulatory controls by private developers. The induced population would add to local traffic and utility demands and also be dependent upon local schools and other public services. The reason

that the additional people would be induced to live on Guam would be new employment opportunities. With these new jobs, the induced population would contribute to the local tax base that would offset most the fiscal impacts of their arrival.

Impacts on utilities from induced population growth are provided in Volume 6.

4.17 CONSTRUCTION-PHASE MITIGATION MEASURES TO REDUCE IMPACTS OF PROPOSED MILITARY RELOCATION PROGRAM

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.

4.17.1 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.

Project-related construction work is expected to begin in 2010, reach its peak in 2014, and end in 2016. It is assumed in this table that arrival of the military population on Guam would be complete by 2014. 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. At this peak, the total increase in Guam population from off-island would be an estimated 79,178 people, representing a temporary increase of the total island population by approximately 44%. After the 2014 peak, project-related construction expenditures and the associated construction workforce would decline rapidly as contracts awarded in 2014 are completed in 2015 and 2016. At the completion of construction, and implementation of full military operational capabilities, the population increase from off-island is projected to level off to an estimated 33,608 persons, approximately 19% above the current island population.

There are numerous scenarios that could be developed for adjusting force flow. One notional scenario is provided in Table 2.3-2 of Volume 7. This scenario does not represent a current DoD proposal regarding force flow reduction nor should it be viewed as the only possible manner in which Marine Corps force flow to Guam could be managed. Other scenarios, with differing assumptions regarding arrival rates and the ultimate completion of the arrival of the Marine Corps military population would certainly lead to different results. 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. The notional scenario is presented simply to show the possible mitigative impacts to population growth, and thus likely mitigative impacts to population sensitive resources, that could occur should the force flow projection noted in this example be implemented.

Force flow reductions, in this 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.

4.17.2 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.

Information is provided in Volume 7 that introduces the concept of adaptive program management, describes the formation and responsibilities of the proposed Council, and specifies how the Council would apply adaptive program management to the proposed action. The military construction program proposed on Guam lends itself to an adaptive program management approach because of the potential to avoid and reduce impacts, particularly to utility systems, with effective monitoring of conditions and implementation of response measures.

Existing utilities infrastructure systems on Guam, especially those that affect ground and surface water resources for drinking water and ocean waters for discharge of wastewater, have known limitations and would be most sensitive to the short-term peak increases in population during construction. There is a direct relationship between the amount of construction, the number of people who would be on Guam to support the proposed construction, and demand on utilities, all of which would peak in 2014 under the proposed action.

With implementation of adaptive program management, DoD would slow construction tempo and adjust sequencing of construction activities to directly influence work force population levels associated with the proposed action before unacceptable conditions that exceed infrastructure capabilities 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 monitoring data of impacted resources in order to reduce construction-related population increases and avoid or lessen impacts to 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, 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.

There are numerous scenarios that could be developed for implementation of adaptive program management to construction tempo and sequencing. Table 2.4-1 in Volume 7 and the figure below

provides one notional scenario of how adaptive program management could be applied in the context of construction tempo. This notional scenario also identifies a reduction in force flow because arrival of military personnel and their families would occur as adequate facilities are available. Managing the force flow so that the military population would arrive only after the construction necessary to support them is completed would delay arrival of a majority of the military population beyond 2014. The adaptive program management notional scenario is presented below only to show the possible mitigative impacts to population growth, and thus likely mitigative impacts to infrastructure and resources, that could occur should adaptive program management be implemented. Other models, with differing assumptions regarding factors that affect construction tempo, would lead to different results.

Any actual implementation of adaptive program management relative to construction tempo will be decided in the future and would be dependent upon a number of factors including, but not limited to funding for necessary construction; the implementation of improvements to the Port of Guam; utility systems upgrades for water, wastewater, and power; labor availability on Guam and in the region; material and supply prices; occurrences of natural disasters; Congressional direction, and most importantly, the monitoring of affected resources.

Figure 4.17-1 compares the proposed action, with its target completion date of 2010; force flow reduction; and the adaptive program management mitigation measure for construction tempo (including corresponding force flow reduction). In the scenario, the estimated population of off-island construction workers and their dependents that arrive on Guam is modified and spread out over a period beyond 2014. 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 presented below, the full complement of DoD population would not be relocated to Guam until after 2014. However, as noted above, this is not a current DoD proposal and should not be taken as a change in the proposed action.

For both force flow and adaptive program management scenarios the construction budget (and corresponding workforce population) is reduced on Figure 4.17-1 to reflect the recent (May 2010) funding program. This slower than anticipated construction schedule impacts subsequent years' projected construction population. It was included in both scenarios as a reflection of most the recent budget data. Effective adaptive program management would require the participation of multiple agencies, including GovGuam and federal agencies acting through the Council, to advise DoD on measures such as adjusting the construction pace and sequencing. Volume 7 provides more detail as to how adaptive program management would be effective.

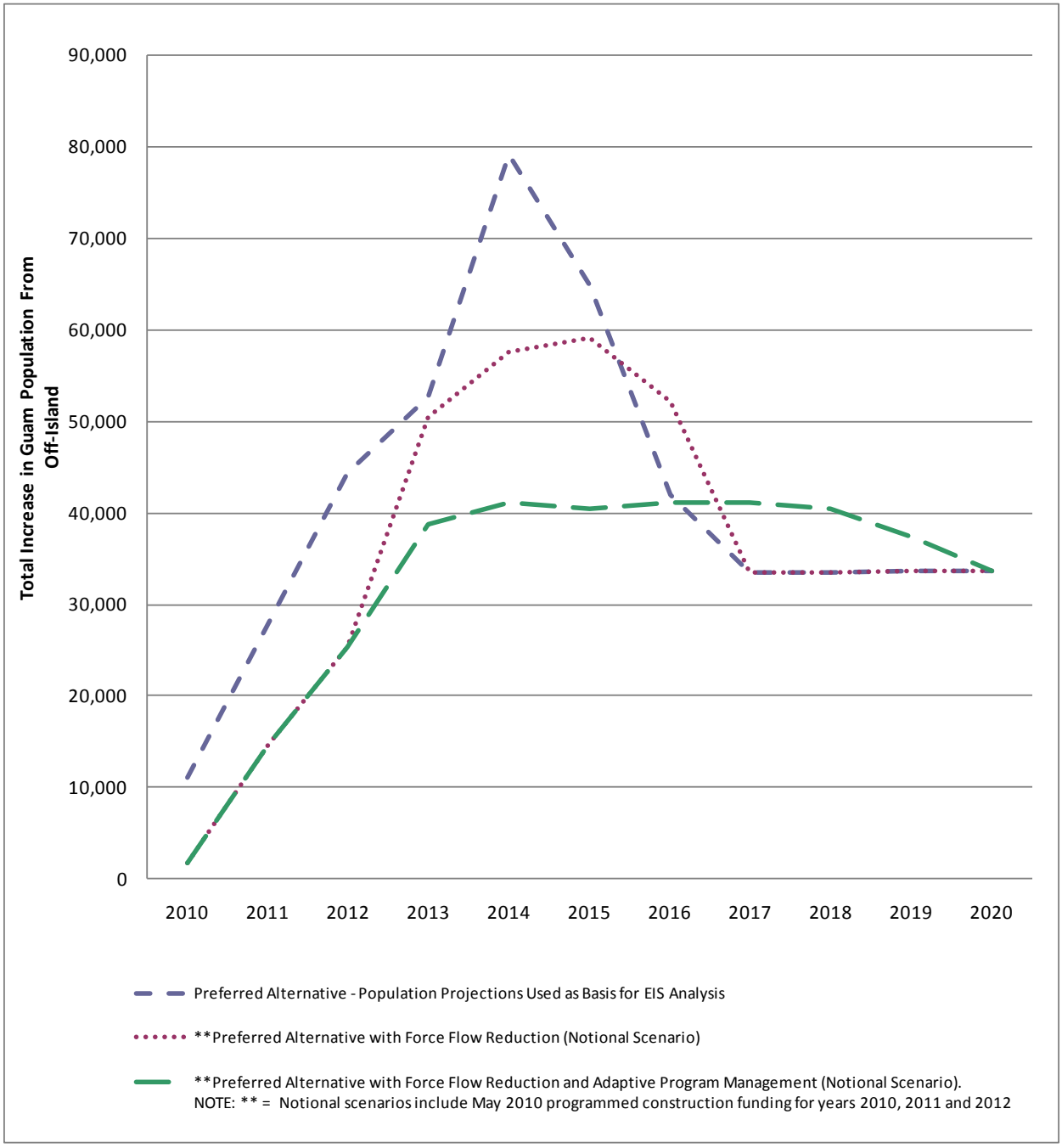

Figure 4.17-1. Population Comparison – Preferred Alternatives vs. Force Flow Reduction vs. Adaptive Program Management

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