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

July 2010

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Guam and CNMI Military Relocation EIS
Reader's Guide

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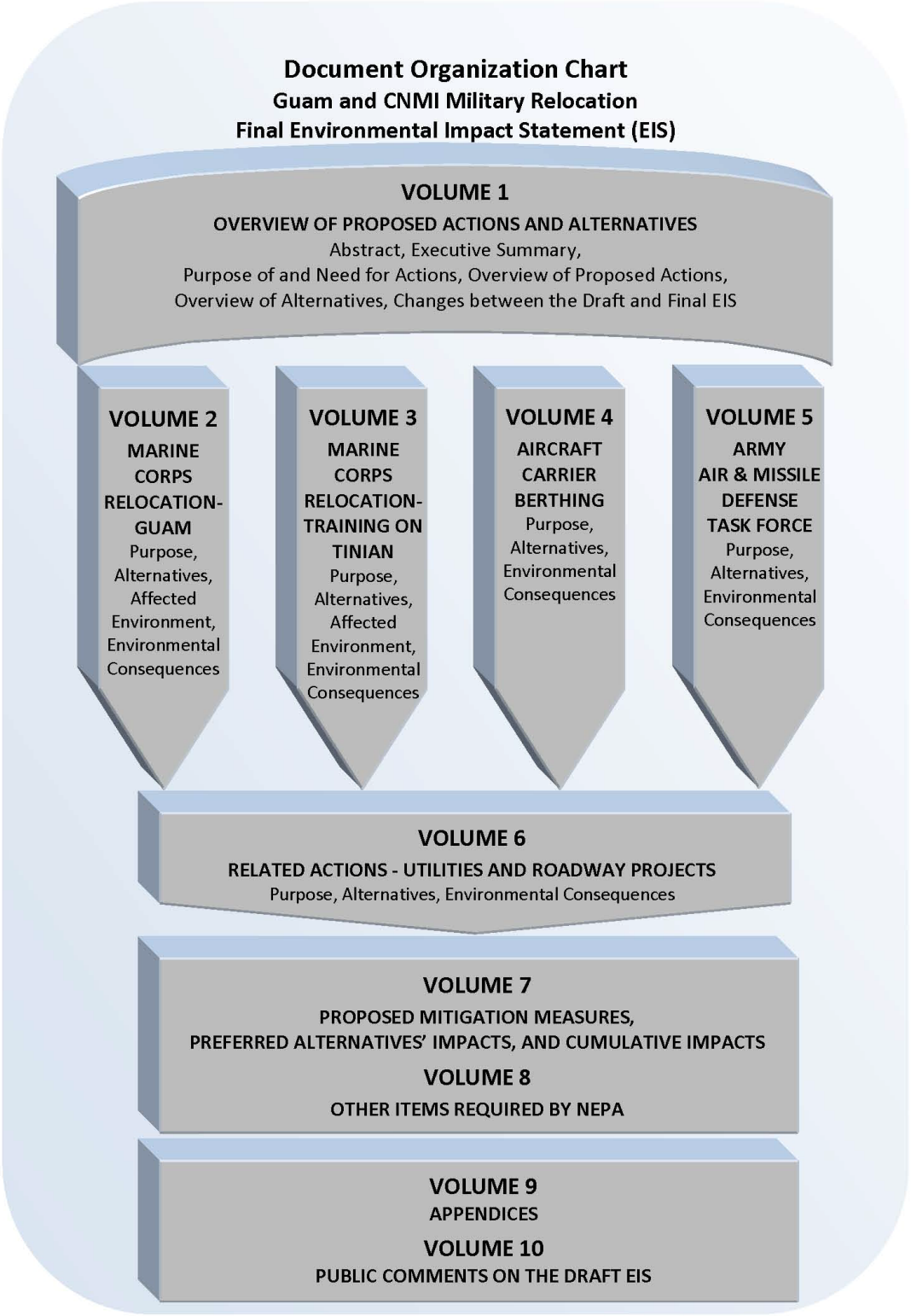

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CHAPTER 3.
AREAS OF INTEREST

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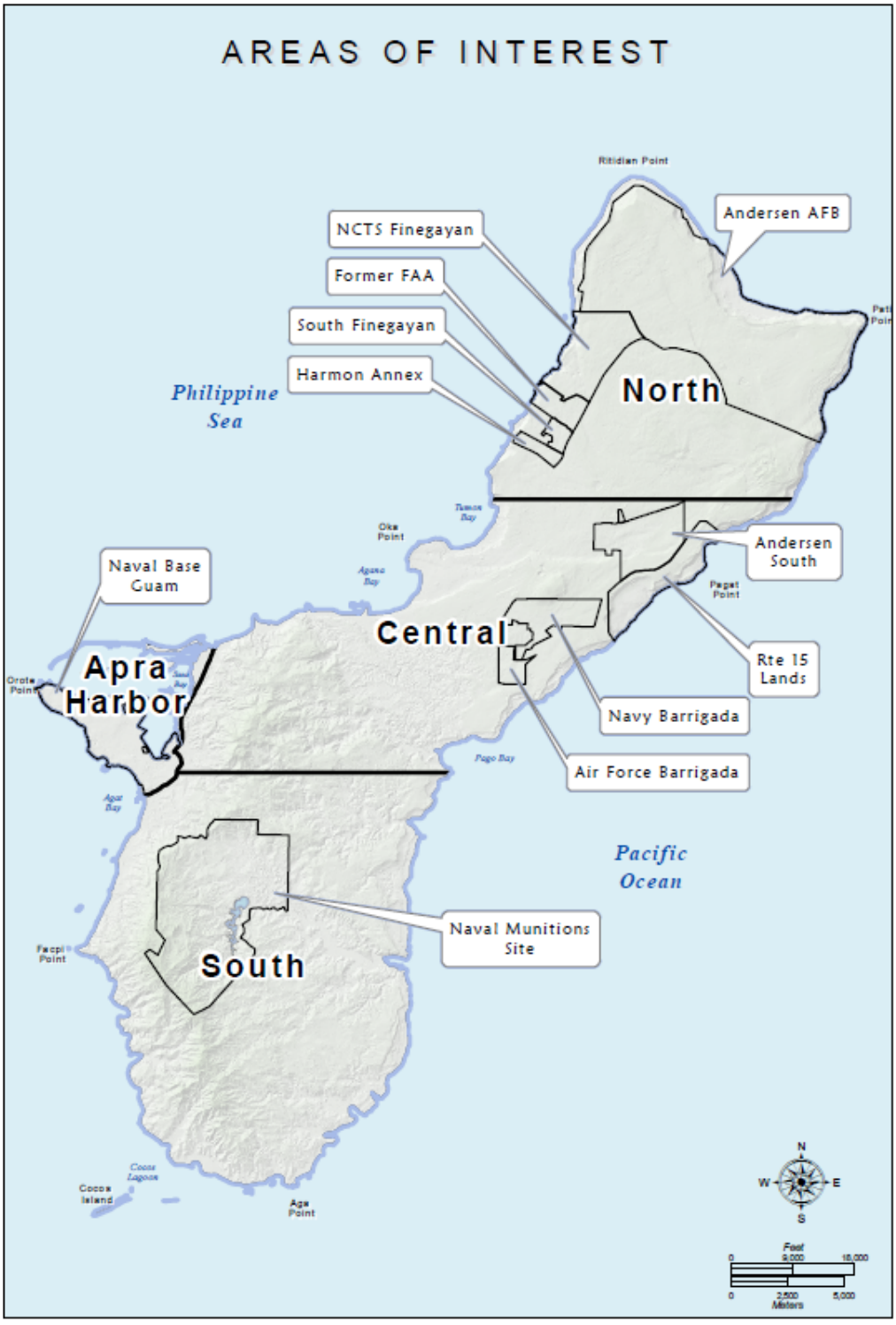

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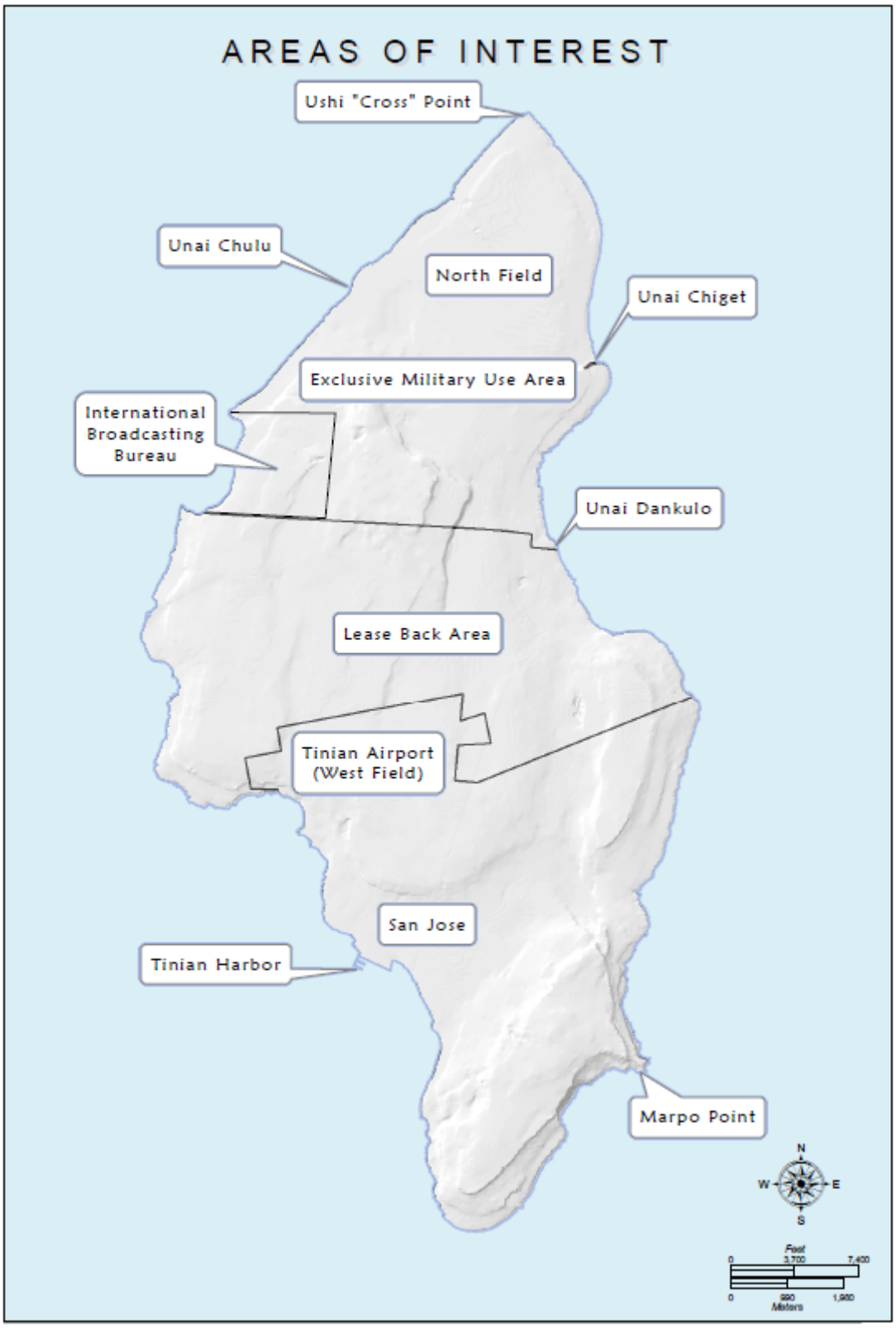
AREAS OF INTEREST
Ushi "Cross" Point
Unai Chulu
North Field
Unai Chiget
Exclusive Military Use Area
International Broadcasting Bureau
Unai Dankulo
Lease Back Area
Tinian Airport (West Field)
San Jose
Tinian Harbor
Marpo Point
N
W
E
S
Feet
0
3,700
7,400
0
990
1,980
Meters

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 8: Additional Items Required by NEPA

July 2010

Point of Contact:

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Guam and CNMI Military Relocation EIS
Volume 8: Additional Items Required by NEPA

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CHAPTER 1. INTRODUCTION

This Volume is divided into nine chapters. Chapter 1 provides a brief introduction and lists the contents of subsequent chapters. Chapter 2 is titled Consistency with Other Federal, State, and Local Land Use Plans, Policies, and Controls and provides a summary table that identifies relevant plans, policies, and controls that apply to the proposed actions. Chapter 3 identifies required permits and approvals. Chapter 4 discusses the irreversible and irretrievable commitment of resources. Chapter 5 provides a discussion on the relationship between short-term use of the environment and long-term productivity; it is subdivided into resource categories. Chapter 6 addresses the goals of sustainability and smart growth. Chapter 7 provides the distribution list of agencies receiving this document, and Chapter 8 provides information on the individuals and organizations that prepared this document. Chapter 9 presents a list of references used in this Volume.

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CHAPTER 2. CONSISTENCY WITH OTHER FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

A summary of the laws, implementing regulations, and Executive Orders (EOs) applicable to the proposed actions is provided below. The Description of Proposed Actions and Alternatives for each volume and the Guam Joint Military Master Plan have been developed to ensure consistency with land use guidelines for the project areas and with the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 2.1-1 provides a summary of the status of compliance with relevant federal, state, and local plans, policies, and controls, and the agency responsible for enforcing the laws.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §§ 4321, *et seq.*), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508), and Navy Procedures for Implementing NEPA (32 CFR § 775)	Deputy Assistant Secretary of the Navy	This Environmental Impact Statement (EIS) has been prepared in accordance with the President's Council on Environmental Quality (CEQ) Regulations implementing NEPA and Navy NEPA procedures. Preparation of this EIS and provisions for its public review are being conducted in compliance with NEPA.
EO 12114, *Environmental Effects Abroad of Major Federal Actions*	Action Proponents, (Marine Corps, Navy, Army)	This EIS has been prepared in accordance with Navy procedures for implementing EO 12114 by addressing components of the proposed action beyond 12 nautical miles (22.2 kilometers) from shore.
Coastal Zone Management Act (16 CFR 1451 et seq.), and 15 CFR 923.33(b) that requires assessment of spillover effects from federal property to State's coastal zone.	Guam Bureau of Statistics and Plans Commonwealth of the Northern Mariana Islands (CNMI) Coastal Resources Management Office	Consistency determination assessments are being reviewed by Bureau of Statistics and Plans and CNMI Coastal Resources Management Office.
Coastal Zone Management Regulations, (15 CFR 923), Subpart D – Boundaries, §33 Excluded Lands	National Oceanic and Atmospheric Administration (NOAA)	The boundary of a state's coastal zone must exclude lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the federal government, its officers or agents.
Federal Water Pollution Control Act or Clean Water Act (§§ 401 and 404; 33 USC 1251 et seq.)	U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE)	The proposed actions analyzed in this EIS would be implemented in accordance with these Acts.
Rivers and Harbors Act (§ 10 33 USC 401 et seq.)	USACE	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Marine Protection, Research and Sanctuary Act of 1972 (USC 1401-1445)	USEPA, USACE	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
Clean Air Act (42 USC 7401 et seq.)	USEPA	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Air Pollution Control Act (Public Law [PL] 10-74): Chapter 49, Title 10 of the Guam Code Annotated (GCA)	Guam Environmental Protection Agency (GEPA) Air Pollution Control Program	The proposed actions analyzed in this EIS would be implemented in accordance with these regulations.
EO 11990, *Protection of Wetlands*	Action Proponents, USACE	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.
Endangered Species Act (16 USC 1531 et seq.)	U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS)	Formal consultations with the responsible agencies are ongoing and proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801-1802)	NMFS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Coral Reef Conservation Act of 2000 (16 USC 6401 et seq.) and Coral Reef Ecosystem Conservation Amendments Act of 2007	NOAA	The proposed actions analyzed in this EIS would be implemented in accordance with these Acts.
EO 13089, *Coral Reef Protection*	NOAA, USACE	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.
Fish and Wildlife Coordination Act (16 USC 661-667e, as amended)	USFWS, NMFS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Marine Mammal Protection Act (16 USC 1431 et seq. and 50 CFR Part 216)	NMFS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*	USFWS	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.
Migratory Bird Treaty Act (16 USC 703-712)	USFWS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 USC 4701 et seq.)	USFWS, U.S. Coast Guard (USCG), NMFS, USEPA	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
EO 13112, *Non-Native Species*	USFWS, NMFS, U.S. Department of Agriculture (USDA). Enforcement assistance from Guam Department of Agriculture	Coordination with USFWS and other agencies is ongoing and proposed actions would be in accordance with this EO. Compliance would be achieved in part by development and implementation of a comprehensive biosecurity plan.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
Brown Tree Snake Control and Eradication Act of 2004 (PL 108-384, 118 Statutes 2221-2226)	USFWS, NMFS, USDA, USGS, Office of Insular Affairs. Enforcement by Guam Department of Agriculture	Coordination with USFWS and other agencies is ongoing and proposed actions would be in accordance with this Act. Compliance would be achieved in part by development and implementation of a comprehensive biosecurity plan.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low- Income Populations*	Action Proponents	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*	Action Proponents	Children would be unaffected by the proposed actions so it is in full compliance with this Order.
1993 Memorandum of Understanding (MOU) among the Government of Guam, Air Force, Navy and the USFWS for the Establishment and Management of the Guam National Wildlife Refuge and 1994 Cooperative Agreement between the Navy, Air Force and the USFWS for the Establishment and Management of the Guam National Wildlife Refuge	USFWS, Air Force, Navy	The proposed actions analyzed in this EIS would be implemented in accordance with this MOU.
National Historic Preservation Act (§ 106; 16 USC 470 et seq.) (refer to Volume 9, Appendix G, Chapter 4 for more specific information on this Act)	Guam State Historic Preservation Office, CNMI Historic Preservation Office, National Park Service (NPS)	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Consolidated Natural Resources Act of 2008 (Public Law 110-229) (refer to Volume 9, Appendix G, Chapter 4 for more specific information on this Act)	NPS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
The National Park Service Organic Act (16 USC 1 2 3, and 4) (refer to Volume 9, Appendix G, Chapter 4 for more specific information on this Act)	NPS	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
National Park Service Management Policies (MP) 2006 (refer to Volume 9, Appendix G, Chapter 4 for more specific information on these policies)	National Park Service (NPS)	The proposed actions analyzed in this EIS would be implemented in accordance with the following management policies. • Visitor Use (MP 8.2): provide enjoyment opportunities suited to resources in parks • Natural Resources (MP 1.6, 4.1.4): preserve natural resources, perpetuate best possible air quality in park, preserve natural soundscapes, and resolve potential conflicts with NPS through cooperative conservation efforts • Cultural/Historic Resources (MP 1.12, 5.3.5.1.4): maintain relationships with native peoples, help with administration of Native American Graves Protection and Repatriation Act and National Historic Preservation Act, and protect archaeological resources
General Authorities Act of 1970 (16 USC 1, 2-4), as amended by the Redwood Act of 1978 (16 USC 1a-1 through 1a-8, amended under Public Law 95-250, 92 Stat. 163, 16 USC 1a-1) (refer to Volume 9, Appendix G, Chapter 4 for more specific information on these Acts)	NPS	The proposed actions analyzed in this EIS would be implemented in accordance with these Acts.
Archaeological Resources Protection Act (Public Law 96-95; 16 USC 470aa-mm)	Applies only to federally owned lands	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Native American Graves Protection and Repatriation Act (Public Law 101-601, 104 Stat. 3048)	Does not apply to Guam or CNMI	The proposed actions analyzed in this EIS are not subject to the conditions of this Act.
EO 11593, *Protection and Enhancement of the Cultural Environment*	Action Proponents	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.
National Marine Sanctuaries Act (16 USC 1431 et seq.)	NOAA	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
EO 13158, *Marine Protected Areas*	NMFS	The proposed actions analyzed in this EIS would be implemented in accordance with this Order.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
Military Munitions Response Program	Department of Defense (DoD)	DoD is currently establishing policy and guidance for munitions response actions under the Military Munitions Response Program. Key program drivers developed to date conclude that munitions response actions would be conducted under the process outlined in the National Contingency Plan (40 CFR 300) as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9605), as amended by Superfund Amendments and Reauthorization Act (PL 99-499).
33 CFR 334, Danger Zone and Restricted Area Regulations	USACE	The proposed actions analyzed in this EIS would be implemented in compliance with these regulations.
Domestic Animal Control, Marine Corps Order 11000.22	Marine Corps	The proposed actions analyzed in this EIS would be implemented in accordance with these requirements.
Presidential Proclamation, Contiguous Zone of the United States, September 2, 1999	Government of Guam, CNMI	The proposed actions analyzed in this EIS would be implemented in accordance with this Proclamation.
Guam Public Law 20-147, as amended by Public Law 26-76	Guam Bureau of Statistics and Plans	The proposed actions analyzed in this EIS would be implemented consistent with this law.
Executive Order 78-37 (Government of Guam), Guam Land-Use Policies	Guam Bureau of Statistics and Plans	The proposed actions analyzed in this EIS would be implemented consistent with this law and the policies from the Guam Comprehensive Development Plan.
Chapter 26 of Title 17 of the GCA: GEPA Guam Soil Erosion and Sediment Control Regulations	GEPA	Implementation of BMPs specified in the CWA NPDES permits would address measures to prevent erosion and water quality impacts.
Guam Public Law 12-126. (Guam Historic Preservation Act)	Guam Historic Resources Division	The proposed actions analyzed in this EIS would be implemented consistent with this regulation.
Section 60410 (Minerals:Mining) of Chapter 60 (Land Management) Title 21 (Real Property Management of the GCA: regulations requiring submittal of all proposals for mining/commercial earth materials removal on government lands to Guam Natural Resources Board	Guam Natural Resources Board	The proposed actions analyzed in this EIS would be implemented consistent with this regulation.
§ 5103(b)(6) and (7) of the Guam Water Quality Standards, relative to Specific Numerical Water Quality Criteria on Suspended Matters and Turbidity	GEPA	Implementation of BMPs specified in the CWA NPDES permits would address measures to prevent erosion and water quality impacts.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
CNMI *Wastewater Treatment and Disposal Rules and Regulations*	CNMI Department of Environmental Quality (DEQ)	The proposed actions analyzed in this EIS would be implemented consistent with these rules and regulations.
Commonwealth Environmental Protection Act, § 3101	CNMI DEQ	The proposed actions analyzed in this EIS would be implemented consistent with this Act.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq.)	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with CERCLA.
Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.)	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with RCRA.
Farmland Protection Policy Act (7 USC 4201et seq.)	USDA, Action Proponents	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Toxic Substances Control Act (TSCA) (15 USC 2601 et seq.	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with TSCA.
Oil Pollution Act (OPA) (33 USC 2701 et seq.)	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with OPA.
Pollution Prevention Act of 1990 (PPA) (42 USC 13101-13109)	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with PPA.
Final Military Munitions Rule (40 CFR 266, Subpart M)	USEPA	The proposed actions analyzed in this EIS would be implemented in accordance with this Rule.
Noise Control Act of 1972 (PL 92-574) and Amendments of 1978 (PL 95-609)	USEPA	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Title 10 GCA, Hazardous Waste Management Program	GEPA	The proposed actions analyzed in this EIS would be implemented in accordance with this program.
CNMI Title 65 §65-50, Hazardous Waste Management Regulations	CNMI DEQ	The proposed actions analyzed in this EIS would be implemented consistent with these regulations.
Sikes Act of 1960	Action Proponents	Proposed actions would be in accordance with the integrated Natural Resource Management Plans that implement this Act.
Lacey Act Amendments of 1981	USDA Animal Plant Inspection Health Service (APHIS) Plant Protection and Quarantine (PPQ)	The proposed actions analyzed in this EIS would be implemented in accordance with this Act.
Federal Aviation Administration Orders 7400.2G and 1050.1E. MOU	Federal Aviation Administration, DoD	The proposed actions analyzed in this EIS/ would be implemented in accordance with this MOU.

Table 2.1-1. Status of Compliance with Relevant Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
Safe Drinking Water Act	USEPA	The proposed actions analyzed in this EIS would be implemented in compliance with this Act.
Executive Order 2005-35 CNMI and Guam Stormwater Management Manual	CNMI DEQ and Guam EPA	The planning, design and construction of all project actions would be consistent with these regulations.

2.1 DOD LAND USE PLANNING

The Navy does not have zoning laws or codes, but there are ideal functional relationships among land uses that guide development. In general, the working zone that includes industrial, operational, and mission support functions is distinct from the living areas, such as housing and community support. A May 2008 land use plan for Navy Main Base, generated by Naval Facilities Engineering Command Marianas Asset Management Business Line, currently guides land use planning. The Regional Commander, in consultation with base planners, would direct future development to be consistent with the objectives of the land use plan.

Regional Shore Infrastructure Planning (RSIP) Plans have historically been the Navy master planning effort. The purpose of a RSIP Plan is to consolidate facility infrastructure, streamline business line operations, and reduce surplus or demolish redundant structures on a regional basis. Individual RSIP functional plans were prepared for different activities including administration, public works, public safety, ordnance, bachelor quarters, training, and waterfront. Each plan identified and analyzed facility consolidation opportunities and presented several possible scenarios for consolidation based on cost, facility requirements, and operational needs.

The Air Force has a system of strategic plans and master plans that serve the purpose of the Navy RSIP plans. Federal actions on federal lands/submerged lands are subject to Regional/Base Command approval, but are not required to conform with state/territory land use plans or zoning codes, laws, or policies. The proposed action alternatives of this EIS have been developed in consultation with Base Command planners and approved by the Regional Commander.

Governing procedures for the use of training areas, ranges, and airspace operated and controlled by the Commander U.S. Naval Forces, Marianas, including instructions and procedures for the use of Guam and Tinian, are included in Commander Navy Region Marianas Instruction 3500.4, Marianas Training Handbook (DoD 2000). This guidance identifies specific land use constraints to enable protection of environmental resources during military training. In addition, specific regulations and information for use of units are provided to troops to protect the environment as part of the Range and Training Area Management procedures under Marine Corps Order P3550.10 (Navy 2005). All of the proposed actions would be in compliance with these regulations.

Construction on military bases is standardized and dictated by Unified Facilities Criteria (UFC) documents that provide planning, design, construction, sustainment, restoration, and modernization criteria. They are applicable to military departments, defense agencies, and DoD field activities. They were relied upon in the development of project designs and would be incorporated into construction documents and permits, and operations and maintenance activities. The documents address issues such as design standards for wharves, the space allowance for an enlisted family, the amount of parking spaces

permitted and the spatial configuration of those spaces, sustainable development, Low Impact Development, stormwater management, and the size of a swimming pool based on installation population. There is little flexibility in minimal design standards, but there is flexibility in site planning. Congressional appropriations require the incorporation of all relevant UFCs in design.

2.2 GUAM LAND USE PLANNING

2.2.1 Land Use Management

The Department of Land Management (DLM) is responsible for managing Guam's public lands. Its mandates include land use planning, maintaining legal documents on property, including deeds and survey maps, and guiding development through the zoning and building approval process. Federal lands are not subject to DLM management or control, but consistency with surrounding non-federal land uses is an important consideration for land use planning on federal and non-federal lands.

The DLM includes the Chamorro Land Trust Commission (CLTC) and Guam Ancestral Lands Commission (GALC). Other entities including the Department of Agriculture and Department of Parks and Recreation have land management functions specific to a land classification. The DLM provides administrative support to two important commissions that oversee zoning and seashore clearance permits, the Guam Land Use Commission (GLUC) and the Guam Seashore Protection Commission (GSPC). Federal lands are not subject to DLM management or control, but consistency with surrounding non-federal land uses is an important consideration for land use planning on federal and non-federal lands.

2.2.2 Guam Land Use Plan

Land use plans include goals, objectives and maps to guide future development and describe existing land uses at a point in time. Recognizing that community objectives and land use planning requirements change over time, plans are prepared to address development for a specific duration, such as five or ten years. The plans lay the foundation for zoning regulations. Federal lands are excluded from Guam land use planning unless there is anticipated release of federal lands. The Territory of Guam Master Plan that was prepared for the Territorial Planning Commission in 1966 is the adopted land use plan for Guam. Other plans have been developed such as the Guam Comprehensive Development Plan (1977) and *I Tano-ta* (Territorial Planning Council 1994). The 1977 Plan was valid for a planning period up to 2000 and the *I Tano-ta* was not adopted (Bureau of Statistics and Plans 2008). These plans provide valuable information on existing and planned land uses at points in time.

Although the 1966 land use plan is the official land use plan, it has limited utility when describing existing land use and describing trends for future development. The Guam Mapbook (Bureau of Statistics and Plans 2008) is based on aerial photography and general land uses can be discerned from the images such as:

- Residential neighborhoods
- Vacant lands – vegetated or disturbed
- Airports
- Roads

The Bureau of Statistics and Plans is preparing the *North and Central Guam Land Use Plan* (Bureau of Statistics and Plans 2009). A draft was provided by the Bureau of Statistics and Plans for reference in this EIS.

Although the plan has not been finalized, the assumption in it represents the direction of the Government of Guam and the community with respect to guiding future land use development in the central and northern areas of Guam. The Guam Joint Military Master Plan is being developed to be consistent with existing land use plans and zoning regulations of Guam.

2.3 TINIAN LAND USE PLANNING

There was no land use plan for Tinian available for use in this EIS; however, one was being prepared by the Department of Public Lands during the timeframe of the EIS. The Draft Plan is expected in 2010.

2.4 NATIONAL PARK SERVICE MANAGEMENT POLICIES

The National Park Service (NPS) sites addressed in this EIS are the War in the Pacific National Historic Park on Guam (comprised of seven units) and the North Field National Historic Landmark on Tinian. NPS is a cooperating agency for this EIS (refer to Section 1.9.2 in Volume 1). In addition, NPS has participated in the agency partnering process (refer to Section 1.9.3 in Volume 1) and is a signatory to the Programmatic Agreement being prepared as part of the Section 106 (National Historic Preservation Act) consultation process (refer to Section 12.2.1.2 of Volume 2).

The Department of the Interior submitted comments on the Draft EIS on February 17, 2010, including comments from NPS. Responses to all public comments (including NPS comments) are included in Volume 10 of this EIS. Since many of the NPS comments on the Draft EIS relate to the Programmatic Agreement, the specific NPS comment package is also included in the cultural resources technical appendix (Volume 9, Appendix G, Chapter 4). Assessment of direct and indirect effects on NPS sites are addressed in the cultural resources and recreational resources chapters of the Volumes of this EIS. In addition, NPS comments on the Draft EIS included concerns about adverse indirect effects due to an increase in population from the proposed actions; this indirect impact is discussion in Volume 1, Chapter 4.

NPS management policies for all parks are presented in *Management Policies 2006* (NPS 2006). This document focuses on management of the national park system in accordance with the NPS mission: "preserving unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The National Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world." NPS authorities are mandated in the Organic Act of 1916, the General Authorities Act (as amended by Redwood Act), National Historic Preservation Act, and the Consolidated Natural Resources Act of 2008. NPS management policies and authorities relevant to the proposed actions are listed in Table 2.1-1. Details on NPS authorities and management policies are presented in Volume 9, Appendix G, Chapter 4 (pages 74-78 of the NPS comments package).

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CHAPTER 3. REQUIRED PERMITS AND APPROVALS

3.1 REQUIRED PERMITS AND APPROVALS

A list of federal and state permits that may be required for implementation of any of the alternatives is provided in Table 3.1-1. The Navy is working with Guam Environmental Protection Agency (GEPA) to develop an electronic permitting system that all contractors and the Navy will use to obtain local permits.

Table 3.1-1. Required Permits and Approvals

Regulatory Requirement	*Permitting Agency*	*Permit Specifications*	*Responsibility*	*Phase*
Local				
5 Guam Code Annotated (GCA) § 63302	Guam Department of Agriculture	License required for cutting, removal or mutilation of live trees on public lands. Not applicable on federal lands.	Contractor	Land construction
Right-of-Way Permit	Guam Department of Public Works	Permit for construction in public right-of-way.	Contractor	Land construction
10 GCA, § 74103	Guam Environ-mental Protection Agency (GEPA)	Storage of gasoline or kerosene in quantities exceeding 50 gallons (190 liters) but not exceeding 500 gallons (1,890 liters) must be in underground storage tanks. Not applicable on federal lands.	Contractor	Land construction and operation
10 GCA, §§ 76113(a) and (b)	GEPA	Permit required to own, install, or operate an underground storage tank (UST). On federal lands, federal UST regulations apply and GEPA is notified.	Navy	Land operation
10 GCA Chapter 53, Safe Drinking Water Act	GEPA	Protect public water supplies from contamination, and provide safe drinking water for public consumption. GEPA reviews plans for distribution systems.	Navy - Federal projects comply with Safe Drinking Water Act. Contractor must coordinate with GEPA for plan approval.	Land operation
22 Guam Administrative Rules (GAR) 10103, 10106, 10107	GEPA	Development or construction activities that involve clearing, grading, filling, excavating, and other earth-moving operations must follow an approved erosion control plan. As currently written, no permit is required on federal lands, but GEPA has issued draft regulations and a permit may be required.	Federal projects are governed by National Pollutant Discharge Elimination System (NPDES) regulations and permit requirements.	Land and coastal construction

Table 3.1-1. Required Permits and Approvals

Regulatory Requirement	*Permitting Agency*	*Permit Specifications*	*Responsibility*	*Phase*
22 GAR 1127(e)	GEPA	Particulate matter emissions from fuel combustion must be controlled.	Navy	Land operation
22 GAR 1128 (a), (b) and (d)	GEPA	Fugitive dust emissions must be controlled.	Contractor	Land construction and operation
22 GAR 5104(h)	GEPA	Any petroleum storage facility containing petroleum products or hazardous substances not directly adjacent to navigable waters and below the Spill Prevention, Control and Countermeasure (SPCC) capacity requirements of 600 gallons (2,270 liters) must be provided with secondary containment to protect Guam's groundwater resources from potential threat from oil or hazardous substances discharges.	Navy - Federal projects comply with Clean Water Act, SPCC program	Operation
22 GAR 7105(a), 7106(a), (b) and (j), and 7124(c)	GEPA	Permit required to drill and operate water well. A Well Drilling Permit is required for exploratory and development work, and a Well Operating Permit is required for actual production and use of water resources. The Well Operating Permit is necessary to establish operating conditions such as allowable pumping rates, infrastructure requirements.	Navy	Land construction and operation
22 GAR 7127(b) through (d), and 7128(a), (b), and (i)	GEPA	Abandoned wells must meet destruction requirements. A well is considered abandoned if its use or maintenance is not in compliance with a valid operating permit or if it has not been used for a period of 12 consecutive months.	Navy and Contractor (Private Entity for Utilities)	Land construction

Table 3.1-1. Required Permits and Approvals

Regulatory Requirement	*Permitting Agency*	*Permit Specifications*	*Responsibility*	*Phase*
22 GAR 9105(a), 9108(a) and (b), and 9113(a) and (b)	GEPA	Federal facilities must have a valid underground injection control permit to operate a Class V underground injection well. These regulations apply to Class V injection wells only, including nonhazardous liquid waste disposal wells, community septic system wells, sand backfill wells, recharge wells, drainage wells, cooling water return flow wells, air conditioning return flow wells, salt water barrier wells, and subsidence control wells (not associated with oil and gas production).	Permit to construct would be obtained by contractor. Permit to operate would be obtained by Navy.	Land construction and operation
10 GCA Chapter 51	GEPA	Obtain pertinent solid waste permits for collection, storage, transfer, and/or processing, including processing of construction and demolition debris/wastes onsite.	Navy and Contractor	Land construction
Common-wealth of the Northern Mariana Islands (CNMI) Earthmoving and Erosion Control Regulations	CNMI Department of Environ-mental Quality (DEQ)	Obtain Earthmoving and Erosion Control Permit for excavations of any kind for any reason (ponds, drainage ditches, infrastructure development, and building foundations).	Contractor	Land construction
Title 65: Division of Environmental Quality, Chapters 60-65 Pesticide Regulations	CNMI DEQ	Establishes system of control over the importation, distribution, sale, and use of pesticides.	Navy has reporting requirement under Federal Insecticide, Fungicide and Rodenticide Act.	Land operation
Federal				
Clean Air Act (CAA) Prevention of Significant Deterioration /New Source Review permit	GEPA/ USEPA	Required for new major Prevention of Significant Deterioration source and major existing source modification with respect to attainment pollutants.	Navy and Guam Power Authority (GPA)	Land operation

Table 3.1-1. Required Permits and Approvals

Regulatory Requirement	*Permitting Agency*	*Permit Specifications*	*Responsibility*	*Phase*
CAA Nonattainment New Source Review permit	GEPA/ USEPA	Required for new major stationary source and major existing source modification with respect to nonattainment pollutants in a nonattainment area. The lowest-achievable emission rate technology and emission offsets would be required.	Navy and GPA	Design
CAA Title V permit	GEPA/ USEPA	Regulates air emissions from major stationary source and major source modification. Relevant emissions control technology would be required.	Navy and GPA	Design
Clean Water Act (CWA) NPDES Program – Construction Activities	USEPA	Seek coverage under USEPA Construction General Permit (CGP) for stormwater discharge from large and small construction activities. Requirements include filing a Notice of Intent, a Notice of Termination and a construction Stormwater Pollution Prevention Plan (SWPPP).	For Construction - Contractor and Navy	Land/coastal operation
Clean Water Act (CWA) NPDES Program – Industrial Activities	USEPA	Stormwater associated with industrial facilities must be covered under the NPDES General Industrial Permit	For new and/or modified industrial facilities, the SWPPP for the existing Navy Region Marianas Industrial Stormwater Permit would be updated.	Land/coastal operation
Rivers and Harbors Act § 10	U.S. Army Corps of Engineers (USACE)	Regulates the obstruction or alteration of navigable waters.	Navy	In-water construction
CWA § 404	USACE	Regulates discharge of dredged or fill material into waters and wetlands.	Navy	In-water/wetland construction
CWA § 401 Water Quality Certification	GEPA	401 water quality certification (WQC) issuance identifies construction or operation of a proposed project or facility would be conducted in a manner consistent with the Guam Water Quality Standards. All CWA Section 404 permits for work in marine waters, rivers, streams and wetlands require 401 WQC.	Navy	In-water construction

Table 3.1-1. Required Permits and Approvals

Regulatory Requirement	*Permitting Agency*	*Permit Specifications*	*Responsibility*	*Phase*
Coastal Zone Management Act Federal Consistency Provisions and EO 78-37	Coastal Resource Management Program and Guam Bureau of Statistics and Plans	Determination of effects and consistency of federal actions with Guam Coastal Management Plan	Navy	NEPA EIS review
Federal Aviation Administration (FAA) Order 7400.2G FAA Order 1050.1E	FAA	Special Use Airspace (SUA) required for the Marine Corps and Army AMDTF actions on Guam: either designated SUA, Restricted Area airspace or Controlled Firing Area. Required to overlay 1) the Safety Danger Zones located at the proposed firing ranges on Guam and 2) weapons emplacement sites.	Navy and Army	Design
Marine Protection, Research and Sanctuaries Act § 103	USEPA in association with USACE	Regulates the transportation of dredged material for ocean disposal. Permit requires full suite of physical, chemical and biological testing of sediment to determine suitability for ocean disposal at designated sites.	Navy	In-water construction
Title 22, Division 4, Chapter 23, Solid Waste Disposal/ 40 CFR Part 258 Subtitle D	GEPA (Granted primacy by USEPA to administer requirements D)	Existing facilities require permit modifications for horizontal or vertical expansions.	Navy	Operation

3.1.1 Summary of Applicable Regulations to Protect Environmental Resources on Guam and Tinian

This section provides a summary of the regulations that apply to protection of environmental resources. DoD-proposed actions would be implemented in accordance with all the applicable regulatory mandates. While some regulations require permits, as summarized in the above table, many serve only as guidance.

Federal Regulations

Federal regulations applicable to the proposed action are described below. The timing of permits applied for in compliance with federal regulations can vary. For example, the U.S. Army Corps of Engineers (USACE) requires evidence from the lead action agency that formal consultations with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and the State Historic Preservation Office/National Park Service have been satisfactorily completed in order to issue a Department of the

Army permit. USACE also requires a water quality certification (Section 401 of the DWA) and a determination of consistency (if applicable) in accordance with the Coastal Zone Management Act.

Clean Air Act (CAA)

The CAA defines the USEPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. Under the CAA, the USEPA sets limits on certain air pollutants, including setting limits on how much can be in the air anywhere in the United States. The CAA also gives USEPA the authority to limit emissions of air pollutants coming from sources like chemical plants, utilities, and steel mills.

Clean Water Act (CWA)

The purpose of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Under Section 404 of the CWA USACE authorizes discharges of dredged or fill material in waters of the U.S. through a permit program.

Coastal Zone Management Act

The Coastal Zone Management Act establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop management programs based on enforceable policies and mechanisms to balance resource protection and coastal development needs.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Under CERCLA, as amended by the Superfund Amendments and Reauthorization Act, a hazardous substance is defined as one that poses a potential hazard to human health or the environment by virtue of its quantity, concentration, or physical/chemical characteristics. CERCLA has established a national process to identify, characterize, and clean-up hazardous waste sites.

Department of Transportation Regulations

Department of Transportation Hazardous Materials Regulations (*49 Code of Federal Regulations [CFR] 171*) require the implementation of various protective and preventative measures designed to promote the safe transportation of hazardous materials in commerce.

Emergency Planning and Community Right-to-Know Act (EPCRA)

The EPCRA requires businesses and governments to report their use of hazardous and toxic chemicals. EPCRA also requires that workers be trained as to safe chemical handling protocols and specific chemical hazards and controls for substances used in the workplace. In addition, EPCRA requires that state and local communities be prepared to respond to potential chemical accidents through the development of emergency response plans and other measures.

Endangered Species Act 16 United States Code [USC] §1531 et seq.; 50 CFR Parts 17, Subpart I, and 50 CFR Part 402

The Endangered Species Act of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants, and the habitats in which they are found.

Federal Environmental Pesticide Control Act

The Federal Environmental Pesticide Control Act enacted as Public Law 92-516, amended the Federal Insecticide, Fungicide, and Rodenticide Act, and provides controls for the sale, use, distribution, and application of pesticides through an administrative registration process.

Federal Facilities Compliance Act

The Federal Facilities Compliance Act, enacted as Public Law 102-386 provides that all federal agencies are subject to all substantive and procedural requirements of federal, state, and local solid and hazardous waste laws in the same manner as any private party.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act provides pesticide regulations designed to protect applicators, consumers, and the environment.

Fish and Wildlife Coordination Act (16 USC § 662)

The Fish and Wildlife Coordination Act requires consideration of the effects of a proposed action on wetlands and areas affecting streams (including floodplains), as well as other protected habitats.

Groundwater Rule (40 CFR Parts 9, 141 and 142)

The Groundwater Rule provides for increased protection against microbial contamination. This is a risk-based rule that requires groundwater used by public drinking water systems be disinfected if indicator bacteria are detected in it.

Marine Protection, Research, and Sanctuaries Act (MPRSA)

The MPRSA prevents, or restricts, dumping of materials that would degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. The Act provides for a permitting process to control the ocean dumping of dredged material. The Act also establishes the marine sanctuaries program, which designates certain areas of the ocean waters as sanctuaries in order to preserve or restore these areas for their conservation, recreational, ecological, or aesthetic values.

National Wildlife Refuge System Administration Act of 1966 (16 USC §§ 668dd-668ee)

This Act provides for the administration and management of the national wildlife refuge system, including wildlife refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas.

Oil Pollution Act (OPA)

The OPA requires oil storage facilities and vessels to develop plans describing how spills or releases would be addressed. Specifically, OPA requires that facilities prepare and implement spill prevention, control, and countermeasures plans and facility response plans. These plans specify how these facilities would assess and respond to spills/releases.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration requirements are designed to protect workers and prevent workplace accidents, injuries, or illnesses.

Pollution Prevention Act

The Pollution Prevention Act focuses on pollution source(s) reduction and promotes the implementation of new and innovative practices to conserve and protect natural resources.

Resource Conservation and Recovery Act (RCRA)

RCRA requires that all hazardous waste be systematically tracked from cradle-to-grave. Furthermore, the RCRA Corrective Action Program compels responsible parties of active facilities to investigate and clean up hazardous waste releases.

Military Munitions Rule under RCRA

The Military Munitions Rule identifies when conventional and chemical military munitions become RCRA hazardous waste.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act requires approval from the USACE prior to obstructing or altering navigable waters.

Safe Drinking Water Act

The Safe Drinking Water Act regulates the nation's drinking water supplies by establishing standards for drinking water to protect against both naturally occurring and man-made contaminants. This act also seeks to prevent contamination of drinking water resources by establishing requirements under programs such as the underground injection control program.

Ship-Borne Hazardous Substances Regulations

The Ship-Borne Hazardous Substances Regulations are applicable to Navy activities "at sea", defined as beyond three nautical miles from shore, and govern the types of sewage, graywater, and oily waste discharge restrictions as a function of distance offshore or special area.

Statement of Procedures on Floodplain Management and Wetlands Protection; 40 CFR Part 6, Appendix A.

These procedures set forth USEPA policy and guidance for managing floodplains and protecting wetlands, as described in Executive Orders 11988 and 11990, respectively.

Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (USTs)

This regulation (*40 CFR Chapter 1, Part 280*) protects groundwater by establishing regulations and procedures for USTs that contain regulated substances such as petroleum products.

Toxic Substance Control Act

The Toxic Substances Control Act addresses concerns regarding chemical substances and mixtures whose manufacturing and use may pose an unreasonable risk of injury, adverse health, or adverse environmental consequences.

Underground Storage Tanks (USTs)

The UST regulations set forth various requirements to prevent unintended releases with double-walled tanks and associated piping, leak detection methods, inventory control procedures, and various other administrative and engineering design controls.

Guam Regulations

Guam Coastal Nonpoint Pollution Control Program (CNPCP) (pending)

In 2009, the EPA and the National Oceanic and Atmospheric Administration will likely approve the Guam CNPCP which lays out management measures for the control of non-point sources from such areas as new urban development, stormwater, wetlands, roads, and bridges.

Guam Environmental Protection Act (GEPA)

Public Law 11-191 created the GEPA in 1973, with responsibilities for comprehensive protection of Guam's land, water, and air.

Guam Hazardous Waste Management Program (HWMP)

The Guam HWMP requires the permitting of hazardous waste collection, treatment, storage, and disposal facilities. The Guam HWMP also mandates inspection, compliance monitoring, enforcement, and corrective action of all hazardous waste-related activities in Guam.

Guam Primary Drinking Water Regulations

Guam Safe Drinking Water Act, Title 10 GCA, Chapter 53, Section 53104 authorizes the GEPA to prescribe rules and regulations as may be necessary to implement the Safe Drinking Water Act.

Guam Seashore Protection Act and Permit System

The Guam Seashore Protection Act (*21 GCA, Chapter 63*) establishes the Guam Seashore Reserve and the Guam Seashore Protection Commission, that must review and act on any applications for development, including any dredging, within the reserve. The reserve includes all subtidal areas down to ten fathoms (60 feet; 18 meters) and extends inland to within 100 (328 feet) meters (amended to 10 meters; 3 feet) of the mean high high water mark.

Guam Soil Erosion and Sedimentation Control Regulations/Permits

Erosion Control Permits are issued by GEPA while the Department of Public Works issues Clearing and Grading Permits. For most clearing and/or grading permits there must be an accompanying Erosion Control Plan to protect water quality of the affected water resources, fresh or marine.

Guam Water Quality Standards

The Guam Water Quality Standards aim to conserve, protect, maintain, and improve the quality of Guam's waters.

National Pollutant Discharge Elimination System (NPDES)

NPDES is a federal permit for all stormwater and other point source pollution discharges. GEPA assists in the administration of these permits and reviews and certifies (401 Water Quality Certification) the permit for compliance with all local regulations and policies and in accordance with the Guam Water Quality Standards.

Pollution Discharge and Operating Permit

For discharges similar to those covered by the NPDES permit, GEPA may require a Government of Guam Pollution Discharge Permit. This permit may be issued for any number of liquid, gaseous, solid, or thermal discharges to Territorial waters that fall below the minimum criteria defined in the federal CWA.

Test Boring and Dewatering Permit

Individuals conducting soil test boring and measurements activities may be required to obtain a GEPA Test Boring Permit. Test boring activities include drilling and excavations deeper than 6 feet (2 meters) deep for a number of soil and structural engineering analysis work. In addition, if the water table is encountered during excavation work for building foundations and similar construction activities, a Dewatering Permit may be required to control and treat water pumped from the excavation prior to final discharge. Dewatering permits may apply to dredging operations as well.

CWA Section 401 Water Quality Certification

CWA Section 401 Water Quality Certification issuance identifies that construction or operation of a proposed project or facility would be conducted in a manner consistent with Guam Water Quality Standards. As part of a WQC certification, an Environmental Protection Plan (EPP) is required. EPPs describe the methods, practices and equipment to be used on site; expected or anticipated environmental problems during and after construction; and the methods, practices and equipment that may be used to avoid, mitigate or control potential adverse effects on the environment. EPPs are specifically identified in 22 Guam Annotated Regulations, Division II, Chapter 10, Section 10103.C.5(d).

Commonwealth of the Northern Mariana Islands Regulations

Wastewater Treatment and Disposal Rules and Regulations

As groundwater aquifers on Tinian and Rota are vulnerable to contamination by substances introduced onto the soil surface, these regulations protect Class 1 Aquifer Recharge Areas.

Earthmoving and Erosion Control Regulations

These regulations establish a permit process for construction activities and identify investigations and studies that are required prior to construction and design, and standards for grading, filling, and clearing.

Water Quality Standards

The Commonwealth of the Northern Mariana Islands Department of Environmental Quality has established standards for water quality for all Commonwealth waters and groundwater in order to protect their use and value for commerce, propagation of fish and wildlife, recreational purposes, and public water supply use.

CHAPTER 4. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

National Environmental Policy Act Section 101 2(c)(iv) requires a detailed statement on any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects that the use of those resources have on future generations. Irreversible commitments of resources are those that cannot be reversed except over an extremely long period of time. These irreversible effects primarily result from destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

The proposed action would constitute an irreversible or irretrievable commitment of non-renewable or depletable resources, for the materials, time, money, and energy expended during activities implementing the proposed action. Under all alternatives, except for the no-action alternative, there would be irreversible and irretrievable commitments of resources. Particular irreversible and/or irretrievable impacts that would result are noted below.

Consumption of fossil fuels and energy would occur during construction and operation activities. Fossil fuels (gasoline and diesel oil) would be used to power construction equipment and vehicles. Electrical power would be used for lighting and operations. The energy consumed for project construction and operation represents a permanent and non-renewable commitment of these resources.

Materials for construction of new facilities and associated private-sector economic and population growth would be irretrievably committed for the life of the project. Use of these materials represents a further depletion of natural resources. Construction and maintenance activities are considered a long-term non-renewable investment of these resources.

Land that would be physically altered by construction would be committed to the new use for the foreseeable future and would represent a permanent commitment of the land for the life of the project to a developed use and would decrease the amount of open land available for other uses. Access to the acquired lands would be limited to authorized personnel.

The capital and labor required for construction would be an irreversible and irretrievable commitment of the following resources:

- Soil would be displaced by construction and training activities.
- Areas of coral reef habitat would be permanently loss as a result of dredging in Apra Harbor.
- Terrestrial habitat for special status species would be permanently lost on Guam.
- Increases in vessel traffic in Apra Harbor would permanently impact marine biological resources.
- Certain archaeological sites, traditional cultural properties and historical buildings would be permanently removed or disturbed.

In addition to the resources expended during the construction and operation of the support facilities described above, there would be consumptive use of certain non-renewable energy resources required to operate dredge support systems, barges, tugs, trucks, pumps, and equipment. There would also be

commitment of time and money to accomplish the disposal of dredged material. Time and money would be expended in the planning, testing, permitting, and implementation of dredged material disposal. Dredged material disposed of offshore would be irreversibly and irretrievably committed to the disposal process. Disposal of sediment not suitable for ocean disposal at upland sites would not necessarily be irretrievably and irreversibly committed to such use, as the material could be reused for various purposes.

CHAPTER 5. RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

National Environmental Policy Act Section 101 2(c)(iv) requires a detailed statement on the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

Short-term uses of the environment associated with the alternatives include changes to the physical environment and energy and utility use during the construction of facilities associated with all alternatives except for the no-action alternative. Construction would involve short-term increases in fugitive emissions and construction-generated noise and would increase the use of fossil fuels to power equipment. In addition, expenditures of public funds and the use of labor would be required.

Long-term changes would include the alterations to land use on both Guam and Tinian that would exist for the life of the new facilities and the alteration to the dredged depth of the turning basin and entrance channel and federal navigation channel in Apra Harbor.

There are numerous plans, procedures, protocols, regulations, and laws that have been established to protect human health and the environment. Compliance with these regulatory mandates by the Department of Defense (DoD) and its contractors would reduce both short-term and long-term impacts.

5.1 GEOLOGICAL AND SOIL RESOURCES

5.1.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Short-term use of geological and soil resources would include temporary increases in localized erosion during the construction process.

5.1.2 Long-Term

Agriculturally productive soils would not be lost and the long-term productivity of these soils would be preserved. Topographic or landscape features would not be substantially changed by proposed construction activities. Areas containing karst geologic features such as Guam's unique karst caves and sinkholes would be avoided and preserved.

5.2 WATER RESOURCES

5.2.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Construction and operational activities associated with the proposed actions would result in the potential for a temporary increase in localized runoff and total suspended solids in stormwater. To minimize these potential impacts, construction-specific Best Management Practices (BMPs) would be implemented and mandates of pollution prevention regulations would be followed to reduce the associated potential for erosion, runoff, sedimentation, and associated water quality and wetland impacts. Temporary increases in turbidity and sedimentation would occur in wetlands during construction activity. These potential impacts would be minimized through the use of BMPs. Project designs would avoid direct impacts to wetlands.

The act of offshore disposal of dredged material at a U.S. Environmental Protection Agency (USEPA)-approved Ocean Dredged Material Disposal Site would be a short-term use of the environment that would affect the water quality of the area at the time of disposal. The release of dredged material into the water column during disposal events has been demonstrated to cause short-term changes in dissolved oxygen, pH and turbidity with ambient conditions returning shortly after disposal operations cease.

5.2.2 Long-Term

With the implementation of BMPs, low-impact development actions and low impact development-comparable technologies, sustainable measures, and compliance with federal and Government of Guam guidelines, surface water quality on Guam and Tinian would be protected from impacts resulting from the proposed actions.

While long-term groundwater production rates would increase, implementation of sustainability practices would reduce the amount of groundwater needed, which would help minimize impacts to groundwater availability. The resulting total annual groundwater production would be less than the sustainable yield. Monitoring of groundwater chemistry and soils would ensure no harm to existing or beneficial use.

Wetland areas would potentially be subject to localized, temporary impacts from training activity (i.e., foot traffic). However, existing training protocols encourage the avoidance of wetland areas. Vehicle traffic would avoid wetland areas during training activities. While short-term minor impacts to wetlands would occur from personnel operations, impacts would be less than significant due to the transient and low-impact nature of the activity. In addition, transient training operations would not alter the water flow to wetland areas and BMPs and compliance with federal and Government of Guam guidelines would reduce potential long-term impacts to wetlands.

The dredging associated with the proposed actions would result in long-term productivity improvements in efficient utilization of existing and proposed assets at Apra Harbor, Guam in support of the mission of the U.S. Navy Pacific Fleet. Long-term changes affecting water resources would include the alteration to the dredged depth of Apra Harbor wharf berths and navigation channel and the creation of a turning basin.

5.3 AIR QUALITY

5.3.1 Short-Term

Short-term changes in air quality would result from construction activities that are predicted to run from 2011 through 2014. Construction of new facilities would result in short-term increases in air emissions, but these increases would not exceed the 250 tons per year (TPY) major source threshold established in the USEPA Prevention of Significant Deterioration (PSD) regulations. PSD regulations are chosen as an emission impact significance threshold for the purposes of this EIS. Air permits for all potential existing major source or major stationary source modifications would be obtained as required by law. The PSD regulations were established to ensure that air quality in attainment areas does not significantly deteriorate as a result of construction and operation of major stationary sources and to allow future industrial growth to occur. The potential air emissions for all action alternatives were considered to have a less than significant impact if emissions for regulated pollutants were below the 250 TPY threshold established under the PSD regulations. The emissions threshold was applied for all relevant emissions from the individual components of the proposed action and the cumulative effects of the entire action.

The short-term impacts from all individual components of the actions discussed in Volumes 2 to 6 were categorized as having a less than significant impact. However, if the emissions level from aggregated actions exceeds 250 TPY level, a further impact concentration dispersion modeling was conducted to

further demonstrate that there is no significant air quality impact would occur during the interim construction period with the comparison of either National Ambient Air Quality Standards or other applicable impact significance levels.

Based on the results of the analyses, air emissions associated with construction are not expected to violate air quality regulations designed to protect human health and the environment and, therefore, would not degrade the short-term quality of air resources.

5.3.2 Long-Term

Long-term operational emissions (2015 and after) from components of the proposed actions were evaluated to determine the significance of overall potential air emissions impacts using the impact thresholds described for short-term impacts. Operational emissions from both mobile and stationary sources were considered. The use of low sulfur diesel fuel relies on the islandwide implementation process as compared to the action Navy has to commit independently. The issue has been described in detail in Volume 6. The nonattainment status for Guam is also described in multiple Volumes of this EIS in detail given its complex designation status. Greater power production would increase overall emissions above existing conditions at existing utility sources. However, such an increase is common for any development project and does not produce long-term changes in air quality if the emissions from the power increase do not exceed the permit conditions for those sources providing extra power demand.

Mobile sources include aircraft, training vehicles, vessels, aircraft carriers, and off base and on base roadway vehicles. The predicted emissions or applicable pollutant concentrations indicate that the operation of these sources would have a less than significant impact.

Administration, maintenance, housing, and quality of life operations would receive power from stationary utility sources. However, the affected stationary utility sources would be operated below their permitted capacity under the proposed action. Therefore operating these affected sources would be in compliance with the applicable NAAQS resulting in a less than significant impact.

Based on the analyses performed for both stationary and mobile sources, from various project components described in Volumes 2 through 6, the combined impacts of air emissions due to the proposed actions are not expected to violate air quality regulations designed to protect human health and the environment and, therefore, would not degrade the long-term productivity of the air environment.

5.4 NOISE

5.4.1 Short-Term

Noise associated with construction activities would result in short-term increases in the ambient noise environment.

5.4.2 Long-Term

Sources of noise associated with long-term operations would increase as result of increased vehicle use, aircraft operations, training range activities, vessel traffic and base operations. However, with the exception of training range noise, the long-term productivity of operations would not be affected by this increase in noise. Mitigation measures are proposed to alleviate traffic noise impacts. However, in certain areas due to existing physical conditions, sound walls are not proposed to mitigate traffic noise as they do not meet the feasible and reasonable criteria under Guam's Traffic Noise Abatement Policy. Areas with significant traffic noise that cannot be mitigated would have an affect on long-term productivity. Mitigation measures proposed for the firing ranges would reduce the impacts to long-term productivity

due to small arms range noise. The proposed hand grenade range cannot be mitigated and would have an effect on long-term productivity.

5.5 AIRSPACE

5.5.1 Short-Term

Airspace requirements for the proposed actions would have no impacts on the short-term use of existing airspace.

5.5.2 Long-Term

The required consultation and review process with the Federal Aviation Administration (FAA) on all matters affecting airspace use would eliminate the possibility of direct adverse impacts on airspace use in the regions of influence. Activities would be wholly contained within the proposed Special Use Airspace (SUA). The required scheduling process for the SUA by the military would eliminate the potential for adverse cumulative impacts. Increased flights by military pilots operating outside the SUA would still follow FAA regulations, minimizing the potential for adverse cumulative airspace use impacts. Individually, the proposed action would have no impact on airspace. Reduction of the amount of navigable airspace due to the establishment of new SUA for a ground firing range would be minimal and would not impact existing airspace use at either Andersen Air Force Base (AFB) or Antonio Borja Won Pat International Airport. There would be no requirement for changes to the existing arrivals and departures or flight paths within the Guam flying environment.

5.6 LAND AND SUBMERGED LAND USE

5.6.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Upland dewatering sites are considered temporary, but they may exist for an indeterminate amount of time and are considered a long-term impact on land use.

5.6.2 Long-Term

The primary long-term land use impact is the federal acquisition of a large amount of non-federal land involving multiple land owners on Guam to support the Marine Corps Relocation. No submerged land would be acquired. Access to the acquired land would be limited to authorized military personnel, except for the proposed training range area east of Route 15. It is the intent of DoD to allow public access to the cultural and historic sites at Pagat and Marbo, during non-training periods. Restricting access to the training ranges is required to maintain public safety. Final plans concerning access to sites potentially impacted by the proposed action have not been developed. The Army and Navy proposed actions do not require land acquisition.

The proposed land uses on federal land are generally compatible with land use plans for adjacent property. The notable exception is live-fire training ranges being sited adjacent to land use plan-designated residential development. Noise contours at levels (Zone II) considered to be incompatible with residential use that would be generated by the training ranges would encroach on the community. The areas within the Zone II noise contour are generally vacant but future development would likely be impacted by the encroachment. Loss of open space would be most notable at NCTS Finegayan. The Route 15 training range would largely remain undeveloped, naturally vegetated open space because

development is not permitted within the surface danger zones for the training ranges. The proposed action, including roadway improvements would require relocation of some businesses.

Although there would be no submerged land acquired, access to submerged lands within the training range surface danger zones would be restricted throughout most of the year.

The upland dewatering sites would represent a long-term land use. Beneficial reuse of the existing stockpiled materials and future dredge spoils would minimize the land requirement.

On Tinian, the long-term land use impacts are associated with the new firing ranges that would 1) restrict access to the training ranges during training activities; and 2) result in some agricultural leases in the lease back area not being renewed. Leases west of 8th Avenue and east of the Rifle Known Distance Range would be retained since they are outside of the surface danger zone. There would be an increased frequency of restricted public access to the training ranges. Recreational access to the land inside the surface danger zone would be allowed during non-training periods. No land or submerged land acquisition is proposed.

5.7 RECREATIONAL RESOURCES

5.7.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Construction activities would result in short-term impacts involving traffic diversion and increased congestion on the roads accessing recreational areas. During the construction period, the population increase due to the anticipated temporary (H2B) workers and the indirect population would result in increase use of existing recreational areas, potentially stressing the public recreational areas.

5.7.2 Long-Term

Although a population decrease from the construction peak would occur, the number of recreational resources users on Guam—on installations and off base—would likely increase over the course of the proposed actions. Increases in recreational resources use would likely occur at beaches and parks, scenic points, historic and cultural sites, dive spots, trails, day use resorts, golf courses, sailing venues, on installations and the rest of the island alike. Foreseeable impacts include inadequate or overcrowded facilities, such as parking, picnic shelters, restrooms, showers, boat mooring facilities, etc. Moreover, an eroded sense of enjoyment due to increased competition for opportunities among users would result at most recreational facilities (e.g., golf courses on installations, popular dive spots etc.). An increase in the number of users would accelerate deterioration of existing facilities. Furthermore, over the long-term, recreational resources will see a reduction in productivity due to increased use from population growth from both military relocation and from organic growth, unless these resources are properly maintained. Recreational resources that would be reduced in size (e.g. Dededo Buffer Strip Park reduced by roadway widening) would have a permanent long-term reduction in productivity.

A long-term trade-off of the short-term impacts would be improvement of roadways for use by recreational resources users. Additionally, within the Main Cantonment, recreational areas would be provided, thus lessening the impacts to off-site public recreational areas. Mitigation measures to develop and/or improved recreational areas for the public can reduce these impacts.

The implementation of either training alternative would result in the loss of use of Guam International Raceway, and the loss is expected to be significant because the use is unique to the island. The duration of the impact is contingent on the completion and the availability of another raceway site. The absence of the

Raceway may result in recreational users recreating the current Raceway uses on the streets (e.g., drag races).

5.8 TERRESTRIAL BIOLOGICAL RESOURCES

5.8.1 Short-Term

There would be minimal impacts from short-term uses of biological resources such as habitat areas since few wildlife and special-status species are currently present in proposed construction areas and surveys would be conducted prior to construction for any special-status species that might be present. Construction staging areas for specific projects are assumed to be within the project footprint (footprint areas would include long-term removal of habitat areas). Short-term impacts would not preclude long-term maintenance or enhancement of biological resources.

5.8.2 Long-Term

Long-term impacts would remove small amounts of primary limestone forest and ravine forest and would remove large areas of potential habitat for special-status species, including several federal, Guam, and Commonwealth of Northern Mariana Islands-listed species. However, most project areas are unoccupied by special-status species at present. Long-term impacts would also include noise, lighting and disturbance impacts on special-status species and other factors during operations. Other long-term impacts could reduce habitat quality, such as the potential for fire and spread of non-native species. These would be balanced by the implementation of plans and procedures for wildland and fire control, biosecurity and ungulate management and by enlarging or creating new ecological reserves. Implementation of the plans would improve the overall quality of habitat over current conditions.

5.9 MARINE BIOLOGICAL RESOURCES

5.9.1 Short-Term

Short-term uses of the environment include in-water or nearshore land-based construction activities (dredging, new aircraft carrier wharf construction, wharf refurbishing and associated utilities) and in-water vessel movement that would affect marine biological resources through decreased water quality (increased turbidity, sediment deposition, increased potential for pollutants and debris in the water, and general affects on water chemistry), increased vessel strikes, and noise and in-water reverberations. These short-term uses of the environment would affect Endangered Species Act-listed species and sensitive management unit species present in the essential fish habitat of Apra Harbor and Guam.

5.9.2 Long-Term

Long-term changes to the environment include changes in dredged depths in Apra Harbor, including: the federal navigation channel; aircraft carrier turning basin and new wharf; Inner Apra Harbor Entrance Channel; and Inner Apra Harbor Wharves (Sierra and Tango). New depths would remain as such. Additionally, long-term uses of the environment include in-water or nearshore land-based operational activities (increased frequency of Marine Expeditionary Unit ships and fueling vessel transport movement and aircraft carrier visits in Apra Harbor), including recreation and recreational activities (specifically Haputo Ecological Reserve Area) that would affect marine biological resources through decreased water quality (increased ammonia nitrogen levels in wastewater discharges, increased turbidity, sediment deposition, increased potential for pollutants and debris in the water, and affects on water chemistry), increased vessel strikes, and noise and in-water reverberations. Lastly, there would be long-term uses of the coastal waters along the east coasts of Guam and Tinian where the surface danger zones for the

training ranges training extend off-shore. These long-term uses of the environment would affect Endangered Species Act-listed species and sensitive management unit species present in the essential fish habitat of Apra Harbor and Guam, and possibly Tinian. Therefore, the long-term productivity of marine biological resources may be compromised.

5.10 CULTURAL RESOURCES

5.10.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. Short-term effects to the environment associated with the alternatives include temporary restriction from areas containing historic properties and the possibility of inadvertent or accidental damage from the temporary increased use of an area.

5.10.2 Long-Term

Long-term changes would include the direct loss and disturbance of 40 historic properties on both Guam and Tinian from construction and demolition, and the long-term restriction from potential traditional cultural properties as a result of training and safety requirements relating to firing ranges. With the implementation of proposed mitigation measures including data recovery and procedures for public access to certain areas, there would be a long-term benefit from the increase in knowledge of the past and the distribution of this knowledge to the public. However, the long-term productivity of cultural resources may be compromised.

5.11 VISUAL RESOURCES

5.11.1 Short-Term

Construction staging areas for specific projects are assumed to be within the project footprint. During the construction period, views in various parts of Guam and Tinian would likely include clearing and construction activities and construction traffic (including materials being transported to a construction site from the Port of Guam or Tinian Harbor).

5.11.2 Long-Term

There are no projects adjacent to identified public viewsheds that would directly add to or cumulatively affect visual resources. However, there are numerous projects throughout north and central Guam that would potentially be adding new buildings, structures, and roadways to the landscapes in these areas. Essentially, over time, the visual environment in these areas would become suburban-urban in character and generally more cluttered overall. Additionally, worker housing projects that are proposed off-base would also provide a more urbanized setting, especially in areas that propose to house large worker housing are proposed. Development of the ranges on Tinian would result in large cleared areas and a change to the central area of Tinian. This would primarily affect views from Mount Lasso, the tallest point on the island, as well as views along Broadway and 8th Avenue. Therefore, the projects on Guam and on Tinian, when combined with the various elements of the proposed actions would likely have a negative impact on the visual resources in these areas.

5.12 TRANSPORTATION

5.12.1 Short-Term

5.12.1.1 Onshore

There would be substantial short-term effects on the environment during the construction of the many roadway improvement projects envisioned in the proposed actions. The proposed roadway and bridge improvements on Guam would occur throughout the island both on existing military property and off these properties. The temporary effects during the construction phase would include the disruptions of normal traffic patterns through re-routing and congestion.

5.12.1.2 Offshore

Short-term uses of the environment that would affect marine transportation include restrictions to the movement of ships during the construction of the aircraft carrier pier adjacent to the Inner Apra Harbor entrance channel and the dredging in Outer Apra Harbor of the federal navigation channel, turning basin, and pier area.

5.12.2 Long-Term

5.12.2.1 Onshore

Following the construction phase, if all proposed roadway projects are funded under the Defense Access Road or other federal program(s) there would be long-term benefits to Guam from the proposed upgrading of numerous public roads and bridges throughout the island. Under current funding commitments, traffic conditions will remain similar to existing conditions.

5.12.2.2 Offshore

Long-term changes that would affect marine transportation include the new aircraft carrier pier that would be constructed adjacent to the entrance channel to Inner Apra Harbor. While the aircraft carrier is at the pier, security barriers around the ship may impact the movement of other ships into and out of Inner Apra Harbor. The newly dredged areas in Outer Apra Harbor of the federal navigation channel, turning basin, and aircraft carrier pier area would provide a beneficial impact to the long-term productivity of marine transportation.

5.13 UTILITIES

5.13.1 Short-Term

There would be minimal construction activities associated with the proposed action on Tinian, and there would be less than significant short-term impacts to local utilities. The following description focuses on the effects on Guam.

5.13.1.1 Power

The proposed facilities for military relocation would require reconditioning up to five existing Guam Power Authority (GPA) Combustion Turbines, and upgrades to the existing transmission and distribution system on Guam. Establishing the power demand system for Navy requirements is not anticipated to affect the short-term productivity of the environment since there would be excess power supply of 12.62 megawatts in the peak demand year of 2015 (Volume 6 Chapter 2 Table 2.1-2). Volume 6, Chapters 2 and 3 detail the demand and supply of power.

The transmission and distribution system would require replacement of existing lines that would become overloaded, installation of a redundant supply line to Andersen AFB, installation of capacitor banks to support anticipated low voltage due to increased loads and upgrades at existing substations to increase capacity.

The transmission and distribution improvements would be along existing electrical easements and would entail replacing one existing overhead electrical line with a new underground electrical line. The construction would require excavation for installation of this line (approximately 4 feet (1 meter) deep) and would have impacts along the route.

Larger substation transformers would be installed near Andersen AFB and the Navy base to support increased loads in those areas. The transformers would be located at existing GPA substation sites and are not expected to have a significant impact on the area. They would be physically larger, but would be installed near the current location to minimize impacts.

Provided all planned reconditioning of generating facilities and transmission and distribution improvements occur in a timely fashion, there would be no power shortfall during the short-term relocation period.

5.13.1.2 Potable Water

The proposed facilities for military relocation would require upgrades to the existing water production, treatment, storage, and distribution systems on Guam in order to meet additional potable water demands. The proposed DoD water supply expansion includes development of up to an anticipated 22 potable water wells at Andersen AFB and rehabilitation of the Navy Regional Medical Center wells. In order to meet the projected increase in demand on the Guam Waterworks Authority (GWA) water system, GWA would also need to expand their potable water supply through development of additional potable water wells. Lacking that expansion, DoD would have adequate excess water production capability to provide water to GWA if requested. Existing DoD and GWA groundwater well production is currently approximately an average of 45 million gallons per day (mgd) (172 million liters per day [mld]). The estimated average potable water demand for the DoD expansion is 5.43 mgd (20.8 mld). The production demand growth estimate for GWA is 7.89 mgd (30.1 mld). Total estimated groundwater demand from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 52 mgd (196 mld). Total estimated groundwater demand from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 62.5 mgd (236 mld). This is below the estimated sustainable yield of the aquifer of 81 mgd (308 mld) and thus would not impact the short-term productivity of the environment. However, in the short-term, the GWA water system would be unable to meet the estimated demand due to insufficient production wells and a higher-than-normal percentage of system water loss. There are several proposed mitigations to this condition, among which are the transfer of excess water production from the DoD system to the GWA system, acceleration of the GWA program to find and correct system leaks, and water conservation initiatives by GWA.

With DoD providing excess water production capacity to GWA at numerous strategic points in the GWA transmission system, water supply would be mitigated. However, the GWA distribution system (smaller pipes from transmission system to end users) would still be potentially inadequate and an impact on civilian growth. The construction work camp would be anticipated to be supplied with DoD water transferred to GWA in close proximity to major work camp areas and the work camps provided with new distribution systems, so the work camps should be well taken care of. Other civilian growth may have inadequate distribution capabilities without localized upgrades/repairs performed by GWA.

5.13.1.3 Wastewater

Refurbishment of the Northern District Wastewater Treatment Plant (NDWWTP) to its original primary treatment design capacity and installation of secondary treatment would meet projected interim and year 2020 wastewater flows. Early and peak year flows would need some modification to operations to allow for a somewhat higher overflow rate. That could be addressed with chemical enhanced treatment to accelerate solids settling. No short-term use of the environment is required to accomplish the required refurbishment or installation of secondary treatment processes other than uses resulting from the procurement of construction materials and/or operation of construction tools and/or equipment.

Use of the Navy wastewater treatment plant (WWTP) at Apra Harbor would be increased primarily due to the transient ship activities. This WWTP has adequate capacity. Some treatment of metals currently does not meet required standards. This would be handled by several actions and would be expected to be resolved. Thus, no short-term use of the environment is required to accomplish the utilization of the Navy WWTP at Apra Harbor to accommodate the proposed relocation.

Impacts from induced civilian growth would be felt in other areas of Guam, such as the Hagatna WWTP and its collection system, the NDWWTP collection system. DoD is seeking sources of funds to assist GWA with secondary treatment upgrades to the Hagatna WWTP and collection systems associated with the Hagatna WWTP and the NDWWTP. Provided timely resolution of collection system needs occur, no short-term use of the environment is required to accomplish the utilization of the Hagatna WWTP and collection systems for the Hagatna WWTP and the NDWWTP.

Small southern WWTPs would be impacted to a small extent from induced civilian growth, but that impact is not deemed significant per the analysis in Volume 6 Chapter 3.

5.13.1.4 Solid Waste

The solid waste management alternative would not involve any change to existing facilities. The existing Navy sanitary landfill at Apra Harbor would continue to be utilized for municipal solid waste until the new public landfill at Layon is completed and open for use, which is anticipated to be by July 2011. At that time, all DoD municipal solid waste would be disposed at the new Layon Landfill per the agreement with GovGuam. Other waste streams that are not accepted by Layon would continue to be disposed at the Apra Harbor Landfill. Implementing this solid waste alternative is not anticipated to affect the short-term productivity of the environment.

5.13.2 Long-Term

All training on Tinian 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 construction of utility infrastructure or tie-ins to public utilities is proposed to support the firing ranges on Tinian. There would be less than significant long-term impacts to local utilities on Tinian. The following description focuses on the effects on Guam.

5.13.2.1 Power

Long-term impacts would arise due to electrical utility upgrades that include the installation of an underground electrical line. Moving the line from overhead to underground would reduce the impact of tropical storms on the electrical system (improve reliability) served by that line. The existing substations for Andersen AFB and Orote would be larger but would be located at existing substations and would have a minimal impact. The transmission and distribution easements for electrical lines that currently exist

would be used for the anticipated line upgrades. Therefore, the long-term productivity and reliability of power infrastructure may be improved.

5.13.2.2 Potable Water

Including the proposed DoD expansion, the total planned well production from the Northern Guam Lens Aquifer (DoD and GWA) is approximately 47 mgd (178 mld) after all relocation activities have been completed. The total sustainable yield estimate for the Northern Guam Lens Aquifer is 81 mgd (307 mld). Therefore, the increased demand on the potable water supply resulting from the proposed military relocation to Guam is consistent with the sustainable yield estimates.

In accordance with DoD Unified Facilities Criteria, DoD water demands used to develop the proposed DoD water system were calculated assuming the maximum daily system capacity. However, the above numbers were based on an approximation of the average daily demand for DoD utilizing conservation and sustainability approaches. GWA estimates for the Guam civilian demand are based on average per capita daily demand plus an estimate of industrial uses. With the estimated average daily demand from NGLA sources of 47 mgd (178 mld) and the estimated sustainable yield of the northern Guam lens aquifer of 81 mgd (308 mld), the development of the proposed DoD water supply to support the military relocation is not expected to adversely impact the long-term productivity of the Northern Guam Lens Aquifer. Therefore, the long-term productivity of potable water infrastructure may not be compromised, and the overall reliability of the potable water system would be improved.

5.13.2.3 Wastewater

Refurbishment of the NDWWTP to its original design capacity, expansion of capacity to between 12 and 18 mgd (45.4 and 68.3 mld) and installation of new secondary treatment plant processes would ensure that increased wastewater flows to the NDWWTP receive adequate treatment prior to discharge of the effluent via the ocean outfall. This improvement in treatment efficiency would be offset during the period of time after primary treatment plant refurbishment has been completed and higher flow rates to the plant begin, but before secondary treatment plant upgrades are completed. The net effect during this interim period of time would likely have a negative impact on a small area of the ocean. However, after secondary treatment plant upgrades are completed, there would be an overall positive on the long-term productivity of the environment due to a reduction in pollutants in the secondary treatment plant discharge as compared to the pollutant loading from the NDWWTP that occurs today.

5.13.2.4 Solid Waste

The long-term solid waste management alternative would include use of the planned new GovGuam landfill (i.e., Layon Landfill), which is currently being constructed.

5.14 SOCIOECONOMICS AND GENERAL SERVICES

5.14.1 Short-Term

Short-term construction is expected to overlap with the arrival of Marine Corps personnel. This overlap, including the effects of spin-off economic growth in the private sector, would generate a Guam "boomtown" situation in that economic opportunities would be characterized by rapid population growth, labor shortages, cost of living increases, temporary demands on general services, and strains on the quality of life for many residents. The end of this "boomtown" period would technically be an economic recession, though its effects would be lessened by the use of many temporary alien laborers who would return to their home countries. Part of the short-term impacts include land acquisition actions that would

affect various private landowners and GovGuam lands due to socio-cultural affiliation to their family property and the need to relocate to other areas in Guam. On Tinian, short-term impacts would be minimal.

5.14.2 Long-Term

Long-term operations are expected to positively impact the Guam economy; although there may be some adjustments related to the tourism industry and military-civilian relations. Because of the increased permanent population, local government would have to increase its level of service in most agencies on a more permanent basis than may be required by the construction stage population boom. Therefore, the long-term socioeconomic productivity may be improved on Guam. On Tinian, long-term impacts on jobs would be minimal. Additional economic impacts could be beneficial if liberty is granted to troops while they are on Tinian. This impact however, may be countered by the loss in economic revenue due to the non-renewal of leases to cattle ranchers in the Lease Back Area.

5.15 HAZARDOUS MATERIALS AND WASTE

5.15.1 Short-Term

There are waste sites undergoing characterization and/or restoration under various environmental programs. Consideration and careful attention during project design phases must be given prior to construction to avoid overlap with these sites. If relocation of proposed construction projects that may overlap these waste sites is not possible, then various BMPs, Standard Operating Procedures (SOPs), and construction operational protocol (Volume 7) must be followed to protect human health and the environment. Construction activities would not interfere with waste site characterization and/or restoration. In addition, special design techniques and methodology will be required to ensure the long-term structural integrity of proposed construction projects. Also, proposed expansion construction areas may contain munitions and explosives of concern (MEC). Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15B establishes the Explosive Safety Submittal Process (ESS) to provide effective review, oversight, and verification of the explosives safety aspects of munitions responses (Navy 2009). Finally, demolition of existing structures could result in the requirement to dispose of asbestos containing materials and/or lead-based paint. However, there are numerous BMPs and SOPs (Volume 7) that would minimize any potential short-term impacts to human health or the environment. Construction staging areas for specific projects are assumed to be within the project footprint.

Given the various BMPs and SOPs (Volume 7) that would be required for the various construction and/or demolition projects, the proposed actions would not be expected to result in any impacts that would pose short-term risks to the general public or the environment.

5.15.2 Long-Term

The proposed actions would result in the increased transportation, handling, use, and disposal of hazardous materials (e.g., petroleum, oils and lubricants/fuels) and hazardous wastes (pesticides, herbicides, solvents, lubricants, heavy metals, etc.). However, through the use of various BMPs and SOPs (Volume 7) long-term impacts would be minimal As a result, the long-term environmental productivity may be improved. The proposed actions would not affect long-term management of hazardous waste sites.

5.16 PUBLIC HEALTH AND SAFETY

5.16.1 Short-Term

The proposed actions would be expected to result in short-term impacts to health care services, protective services, and potable water service.

The island is currently designated a Medically Underserved Area and falls below the national average in terms of health care provider to general population ratio. Based on the potential for an increase in notifiable disease and mental illness cases, a short term impact to health care services is anticipated until funding or other assistance to correct health care service deficiencies is identified.

Without increases in police and fire services (i.e., more personnel and equipment) to compensate for population increases, it would be expected that response times would increase. Because adequate increases in police and fire personnel needed to maintain existing service conditions are not likely, short-term impacts to police and fire services are anticipated until funding or other assistance to correct service deficiencies is identified.

The Guam Waterworks Authority (GWA) water system infrastructure does not meet the basic flow and pressure requirements for some customers. These conditions can result in microbiological and other contaminants entering the distribution system potentially resulting in illness. GWA water distribution system problems also exist, which may result in customers receiving inadequate supply/service. Since it is doubtful that the GWA could fund and implement required upgrades in time for the proposed military relocation to Guam, it is anticipated that short-term public health and safety impacts from increased demand on potable water and potential water-related illnesses would occur.

5.16.2 Long-Term

The proposed actions would not be expected to result in any impacts that would pose long-term risks to health, safety, or the general welfare of the public.

5.17 ENVIRONMENTAL JUSTICE AND THE PROTECTION OF CHILDREN

Environmental justice examines the potential for adverse impacts to disproportionately affect socially disadvantaged groups, including racial minorities, low-income populations, and children. Whether an action is short-term or long-term would not affect the disproportionate nature of an impact. Therefore, the relationship between short-term use of the environment and long-term productivity does not apply to environmental justice.

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CHAPTER 6. SUSTAINABILITY AND SMART GROWTH

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 as well as the quality of life of its service members. The concepts of sustainability and smart growth include the ability to adjust to changing geo-political realities while encouraging local economic growth, preserving the environment, and working to improve the quality of life for Guam residents and visitors.

This chapter summarizes the Sustainability Program of the Guam Joint Military Master Plan (GJMMP). The chapter is organized into three sections: overview (goals, laws, regulations and guidance, and the Navy's energy policy), strategies for implementation of sustainability, and the anticipated results of sustainability measures (e.g., reductions in water use, energy use, greenhouse gas emissions, and vehicle miles traveled, as well as use of renewable energy).

The Navy prepared a Sustainability Summary Report as part of the master planning process (NAVFAC Pacific 2010). This report is included in Appendix N. In summary, the Sustainability Program would meet federal mandates and achieve 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, a 7.6% reduction of vehicle miles traveled, and a target of 34% reduction in greenhouse gas emissions. These reductions are applied to the analysis presented in Volume 6 of the EIS.

6.1 OVERVIEW

6.1.1 Goals

In order to reduce environmental impacts and address limited resources, the Department of Defense (DoD), including the Navy and Marine Corps, has adopted guidance and policies that promote sustainable planning, design, development, and operations. The guidelines 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.

By choosing sustainability and smart growth, the DoD can create development that is attractive, safe, and healthy for soldiers and their dependents; foster development and operations that meet mission requirements while encouraging social, civic, and physical activity; and work to protect the environment while stimulating economic growth throughout Guam. Sustainability and smart growth policies not only diminish impacts to the limited resources found on Guam, but also help to reduce up front and operating/maintenance costs for the military over the life of its facilities.

6.1.2 Laws, Requirements, and Guidance

The DoD's sustainability and smart growth approach is based on federal, Navy, and Marine Corps policies and guidance. Such guidance requires that the proposed actions on Guam and the Commonwealth of the Northern Mariana Islands (CNMI) be carried out in such a manner as to achieve energy efficiency, pollution reduction, transportation improvements, reduction in water demand, and an appropriately sized footprint (i.e., no larger than needed for the facility function efficiently and effectively). The policies and

guidance also require that new development be designed to meet U.S. Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver certification. The greenhouse gas (GHG) emission target is an important DoD target used to guide the development of an integrated Sustainability Program for Guam. In accordance with Executive Order (EO) 13514, in January 2010, the DoD established an agency-wide goal for GHG reduction of 34%.

The Sustainability Program's core principles reflect the DoD's understanding of and commitment to the global benefits of building a highly energy efficient and environmentally sustainable base. The following federal mandates and regulations, DoD and the Navy targets are the foundation of this Sustainability Program:

- The Energy Independence and Security Act of 2007
- The Energy Policy Act of 2005
- EO 13514, "Federal Leadership in Environmental, Energy, and Economic Performance"
- EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management
- The Federal Leadership in High Performance and Sustainable Building Memorandum of Understanding (MOU) 2006
- Greenhouse Gas Targets Announcement for DoD, January 29, 2010
- Energy Awareness Message from Secretary of the Navy Ray Mabus, October 30, 2009
- Energy Independence and Security Act of 2007
- National Defense Authorization Act 2007

Navy, Marine Corps, and Joint Region Marianas policies and guidance consist of:

- Engineering & Construction Bulletin 2008-01 Energy Policy Act of 2005 Implementation and USGBC LEED certification
- Unified Facilities Criteria (UFC) 1-900-01 Selection of Methods for the Reduction, Reuse, and Recycling of Demolition Waste
- UFC 3-210-10 Low Impact Development (LID)
- UFC 4-030-01 Sustainable Development
- Naval Base Guam Instruction 4100.1 Energy Management Program
- Naval Base Guam Instruction 11330.1 Water Conservation Program
- Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, Chapter 14, Solid Waste Management and Resource Recovery Ashore.

Table 6.1-1 also provides a more detailed summary of relevant federal policies and guidance.

Table 6.1-1. Summary of Federal Policies and Guidance

Component	*Energy Policy Act of 2005*	*EO 13423*	*EO 13514*	*Federal Sustainable Performance MOU*	*Department of Energy 10 CFR*
Water Efficiency	• Apply water conservation technologies	16% water use reduction by 2015 on existing Navy basis, making conserved water available for future uses as "excess" water supply	Improve water use efficiency and management: • 26% reduction in personal water consumption • 20% reduction in industrial/ agricultural water consumption	• 20% less potable water than U.S. Environmental Protection Agency (USEPA)-1992 • Water efficient landscape and irrigation strategies	NA
Renewable Energy	• 7.5% renewable by 2013	• 50% renewable energy is from new renewable sources • Install renewable energy sources on agency	• 30% reduction of petroleum in fleet vehicles (non-combat vehicles)	NA	NA
Energy Efficiency	• Energy Star/Federal Energy Management Program-recommended products required • 30% less energy consumption than American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.1-2004 baseline • Sustainability applied to site, design, and under construction	• 30% by the end of 2015 compared to ASHRAE 90.1-2004 baseline • Earn Energy Star 7 targets	• Reducing energy intensity in buildings • Increasing use of renewable energy • Reducing use of fossil fuels	NA	• Meet Energy Star 7 targets • Reduce energy by 30% compared to ASHRAE 90.1-2004 baseline building

Table 6.1-1. Summary of Federal Policies and Guidance

Component	*Energy Policy Act of 2005*	*EO 13423*	*EO 13514*	*Federal Sustainable Performance MOU*	*Department of Energy 10 CFR*
Hydrochloro-fluorocarbons	NA	NA	See Air Quality.	NA	NA
Air Quality	NA	NA	• A 34% reduction of greenhouse gas emissions • GHG reduction of 34%	• ASHRAE standards 55-2004 and 62-2004 • Moisture control preventing buildings damage and mold • Use low-emitting materials • Protect indoor air quality during construction	NA
Solid Waste	NA	• Program project site design to recycle or salvage at least 50% of construction and demolition and land clearing waste, where local opportunities exist	• Established goal of diverting at least 50% percent of construction and demolition materials and debris by the end of fiscal year 2015	• Program project site design to recycle or salvage at least 50% of construction and demolition and land clearing waste, where local opportunities exist	NA

6.1.3 Navy Energy Policy

The Navy has already developed a five-year energy plan that can be used by Naval Facilities Engineering Command Marianas to attain compliance with the Navy's energy and sustainability goals. These goals are designed to ensure that new facilities (such as those associated with the proposed actions) comply with legal mandates including:

- *Energy Intensity*. Reduce energy usage by 3% annually or 30% by 2015 relative to 2003.
- *Renewable Energy*. Increase renewable electricity use to 7.5% of total energy by 2013.
- *Water*. Reduce water consumption 2% per year (16% by 2015) relative to 2007.
- *New Facility Design*. Design and construct all new facilities 30% more efficient than ASHRAE standard 90.1-2004.
- *New Facility Construction*. Construct new facilities to meet LEED Silver certification, as applicable.
- *Metering*. Install advanced electrical metering on all new construction.
- *Energy Efficient Products*. Purchase energy efficient (U.S. Environmental Protection Agency [USEPA] Energy Star, and Federal Energy Management Program) products.
- *Leases and Services Contracts*. Include energy and water program requirements in leases and services contracts.

6.2 IMPLEMENTATION STRATEGIES AND OBJECTIVES

6.2.1 Master Planning and Design

A significant consideration and component of the GJMMP is the integration of sustainability and smart growth guidance, policies, practices, designs, systems, and operations and maintenance. Project Planners have used the Sustainable Systems Integration Model™ (SSIM™), a proprietary, whole systems planning, environmental, and economic evaluation tool, to assess and quantify the results of various potential sustainability and smart growth strategies. SSIM™ outputs are helping to guide master planning and design and would work to support LEED and LID efforts with quantifiable information.

The Sustainability Program builds on the master planning effort already underway and includes five primary tasks: 1) identify UFC that adversely impact sustainable efforts and propose alternative criteria; 2) implement SSIM™; 3) integrate the USGBC's LEED – New Construction (NC); 4) integrate sustainability into the Guam Joint Military Master Plan (GJMMP); and 5) provide 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 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 to meet the federal mandates in the most cost-effective manner. All applicable credits in the five major categories (sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality) that are not covered by federal mandates were carefully weighted and analyzed in the SSIM™ Pilot Study. This was done for each building type accordingly to ensure overall adherence to required LEED sustainability principles. The results and recommendations (which will be provided to all designers and appropriate Navy business lines) were described in the Sustainability Program E of the SSIM™ Pilot Study selected for the proposed action. This is based on several federal mandates including Executive Order 13423, which directs federal agencies to use USEPA's Comprehensive Procurement Guidelines.

In order to populate and assess outputs of the SSIM™, master planning smart growth and sustainability workshops were conducted on Guam and Hawaii in 2009 and 2010. Stakeholders participating to date have included federal representatives from the Government of Guam, Guam Environmental Protection Agency (GEPA), USEPA, Navy, Marine Corps, and U.S. Fish and Wildlife Service. Government of Guam agencies represented included GEPA, Department of Land Management, and Bureau of Statistics and Planning. In addition, several consultants and the Guam Contractors Association provided additional expertise and local knowledge. Representatives from USEPA helped organize and facilitate the first two planning sessions and stakeholder meetings in Guam.

Participants identified specific elements to be included in the concept sustainability effort for the proposed actions with a primary focus on the proposed Main Cantonment area. Sustainability strategies for each primary system – water, energy (building, district, renewable and public realm), green building/LEED, transportation, and ecosystem services – were adjusted to achieve the maximum environmental benefit in the most cost-effective manner.

6.2.2 Application of LEED Tools

The USGBC's LEED program is a tool to measure performance on various sustainability outcomes and to assist with meeting legal mandates outlined above. The Marine Corps is required to pursue a LEED Silver rating for all applicable new facilities on Guam. Silver certification is gained by achieving a certain number of credits under the LEED rating system. Although the minimum goal is to achieve Silver certification for all qualified buildings, designers will be encouraged to elevate it to Gold and/or even to Platinum certification if reasonably and financially feasible. For the Main Cantonment, the Marine Corps and master planners are reviewing increased density of structures, mixed use building designs and service areas, facilities to increase walking, bicycle use, mass transit, and a reduction of accommodations for vehicles. Such actions work toward developing LEED – NC Campuses. Whereas LEED – NC is submitted to the USGBC on a single building by building basis, a LEED – NC Campus allows for the grouping of several facilities into a "campus" for submittal. LEED Silver credits are awarded if more than 50% of non-hazardous construction and demolition debris is recycled or salvaged, and additional credit is given if 75% recycling rates are achieved. The master planners are working with the various DoD entities to apply LEED standards to their respective facilities and operations.

LEED – NC would be applied to individual buildings of the Guam development. LEED credits would be sought for energy efficiency, water use reduction, smart design of the facility and its location, improved indoor air quality, commissioning of the mechanical systems and efficiencies in operation and maintenance.

6.3 RESULTS

6.3.1 Summary

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.

6.3.2 Sustainable Systems

6.3.2.1 Water

The goal of the SSIM™ water model for the GJMMP is to optimize the water demand estimate and conservation strategies to produce the highest performance in the most cost-effective manner. By modeling various water conservation strategies, overall potable and non-potable water usage can be determined in order to meet the federal mandates. LID has been incorporated into the water modeling process. Refer to Appendix N for more information related to the Comprehensive Drainage and LID Implementation Study.

By building a "bottom up" whole systems water balance model, water conservation measures have been incorporated into the GJMMP Sustainability Program. This includes measures such as use of low flow fixtures, interior reuse of harvested rainwater and air conditioning condensate, LID, and no irrigation. Combined in an integrated manner on the site, the water program achieves a 26% reduction from the standard to meet the federal mandate.

Example water use reduction measures include:

- *Water Conservation*. Identify and specify appropriate conservation fixtures and devices.
- *Irrigation*. Eliminate use of irrigation systems and water use for landscaping. Meet water use reduction requirements as codified in the Energy Policy Act of 2005 or the Energy Independence and Security Act of 2007.
- *Grey Water Use*. Evaluate options for use of grey water toilet flushing. Incorporate rainwater harvesting, storage and distribution.
- *Stormwater Quality, Quantity, Infiltration and Groundwater Recharge*. Design the base storm drainage system in compliance with LID UFC criteria and other modern storm water management features. Prepare a LID manual for the program to reduce water use by 26%.

6.3.2.2 Energy

Energy analysis and dynamic thermal modeling of representative building types has been conducted to assess the energy performance of the buildings to be constructed as part of the GJMMP Sustainability Program. A total of 2 typical residential building types and 12 typical non-residential building types were analyzed as part of the study. For each building type, an assessment was made of the different combinations of passive and active energy conservation measures that could be applied to the buildings in order to determine which could best help conserve energy. The Sustainability Program and SSIMe (or SSIM™ Energy) building energy studies provide compliance guidance.

The federal targets related to energy, including a 30% reduction of energy use and the requirement that 7.5% of energy used be from renewable sources, are achievable in a cost-effective manner for the GJMMP. Each of the 14 modeled building types has been optimized to meet and or exceed the energy goals put forth in the mandates as defined by the EO. The combination of street, parking lot, and pedestrian trail lighting measures identify significant opportunities for energy savings. This, along with other energy-saving techniques provides for an overall energy reduction of approximately 40% basewide.

Example energy use reduction measures include:

- *Minimizing Energy Demand*. As codified under recent laws, reduce demand for energy by 30% by 2015, eliminate use of fossil fuels by 2050, and generate 5% of hot water needs from solar sources.
- Identify and evaluate systems and elements that would minimize energy demand, meter all new buildings to monitor energy use, and use Energy Star fixtures.
- *Onsite Energy Generation*. Evaluate options such as photovoltaic, solar water systems, renewable sources and district heating and cooling.
- Reduce the heat island effect through the use of shading and light colors.

6.3.3 Green Building / LEED (ND)

The USGBC's LEED program has a number of components applicable to the proposed actions, including: LEED Building Design and Construction Version 3.0 (2009), which is designed for new non-residential construction; LEED Silver, which is currently a federal mandate; and LEED Home, which is a program designed for new residential construction. LEED Neighborhood Development (ND), which is a program that is not required but voluntary and designed for neighborhoods or communities, was also considered.

The Guam smart growth planning sessions that were held on Guam in 2009 identified the opportunity to consider LEED ND for the family housing and bachelor enlisted quarters areas of the Main Cantonment. After review and analysis, neither area meets the pre-requisites of LEED ND. Therefore neither qualifies for the voluntary program. However, there are still a number of good planning and design principles that can be considered for the GJMMP. These strategies include: enhanced trail system, base-wide shuttle system, enhanced green/open space, strategic connectivity, and onsite tree preservation.

All scenarios proposed as part of the LEED analysis are designed to meet the overarching federal requirements (of a 30% improvement over ASHRAE) while achieving the LEED Silver certification.

6.3.4 Transportation

Federal Leadership in Environmental, Energy, and Economic Performance (EO 13514) requires a 30% reduction of petroleum in fleet vehicles (non-combat vehicles) and a reduction of greenhouse gas emissions. Following EO 13514, guidance was provided by the DoD to target a 34% reduction of GHG emissions. Because vehicle associated travel, or VMT, is a significant contributor of GHG emissions, the GJMMP Sustainability Program addresses reduction of VMT and incorporates a sustainable mobility program.

Based on the goals and strategies identified in EO 13514, the following transportation goals were developed for the GJMMP Sustainability Program:

- Meet or exceed the mandates described in EO 13514.
- Reduce VMT.
- Develop a transportation system that complements the land use plan.
- Develop intuitive, user-friendly programs that fit well with the travel patterns, needs, and the environment on Guam.

The GJMMP sustainability transportation program provides feasible and implementable solutions to reduce VMT, number of vehicle trips and gallons of gasoline associated with fleet vehicles. Overall the program results meet the federal mandates, saving approximately 1.9 million gallons of gasoline a year and reducing VMT by approximately 7.6%. Example transportation efficiency measures include:

- *Bicycle and Pedestrian Oriented Site Planning*. Design the site to facilitate and encourage non-motorized vehicle traffic.
- *Reduction of Petroleum in Fleet Vehicles (Non-Combat)*. Use of 30% electric and 30% hybrid non-combat vehicles (or 60% hybrid/electric vehicles).
- *Internal Shuttle.* Include a clean fuel shuttle system for the site, addressing location and time based transportation requirements.
- *Integrate On-Site Transportation with Off-Site Transportation*. Design on site transportation to conveniently connect with offsite high-capacity (non-individual motor vehicle) systems such as an off-site shuttle. Create denser neighborhoods within walking distance to service and work facilities.
- *Car Share Program*. Establish a private car share program to reduce car ownership.

6.3.5 Waste Management

Example waste management measures include:

- Establish an Integrated Waste Management Program to include all sites.
- Recycle 50% of construction waste and reuse building materials.
- Expand the existing Navy and Air Force Recycling Programs to include the new sites, to be coordinated with Government of Guam.
- Purchase materials with various percentages of recycled content.

6.3.6 Ecosystem Services

Ecosystem services are the benefits people obtain from the natural environment (or ecosystems) around them. This includes benefits from natural assets (soil, air, water, flora and fauna) and the economic and social values inherent in these services, as well as the opportunities that can arise from considering these services more fully in master planning contexts.

6.3.6.1 Habitat-Friendly Design Strategies

Following are a number of recommended strategies related to habitat-friendly design for incorporation into the GJMMP:

- Enhance greenways for watershed protection, wildfire control, and restoration of habitat.
- Integrate community fruit gardens with reforesting areas or "plots" to improve habitat.
- Provide links with ecological corridors between open space areas. In addition, provide recreation opportunities, pedestrian and bicycle corridors and improved connectivity of the open space network. Green links help to reduce urban heat island effects (temperature rise from paved areas), improve microclimate, and provide opportunities for carbon sequestration (the storage of carbon dioxide in a solid material through biological or physical processes).
- Integrate stormwater drainage networks to create a natural system for the conveyance, storage and infiltration of stormwater, reducing the need for hard infrastructure (impervious paving).
- Provide a comprehensive sustainable trails system throughout the base.
- Use native or adapted plants in landscaping designs.
- In coordination with the development of a base biosecurity plan, ensure an existing high-quality habitat.
- Where feasible, transplant existing vegetation that may be disturbed due to construction activities.
- Provide habitat-friendly guidelines to homeowners to create backyard habitat for birds.

- Coordinate with University of Guam Agriculture Cooperative Extension Service to provide educational opportunities to homeowners on habitat-friendly planting guidelines and biosecurity.

Because of the impact on existing habitat, the Sustainability Program recommends the GJMMP incorporate habitat-friendly design strategies as noted above to minimize impacts on existing resources.

6.3.6.2 Carbon Sequestration

Carbon sequestration (the storage of carbon dioxide in a solid material through biological or physical processes) is an increasingly important consideration in GHG inventories. A project wide landscape strategy with maximized carbon sequestration effect is often one of the most cost-effective ways in helping to offset greenhouse gas emissions. EO 13514 specified the need to pursue "…opportunities with vendors and contractors to address and incorporate incentives to reduce greenhouse gas emissions..." Therefore, it is important to incorporate a carbon sequestration strategy into development of the Installation Appearance Plan and other planning documentation. Approximately 816 tons (740 metric tons) of carbon dioxide equivalent per year would be sequestered within the Main Cantonment. Example strategies include the following:

- Ensure that on-base landscape planting (existing and proposed) assists with reducing the total carbon footprint of the GJMMP through carbon sequestration calculations.
- Understand the impact of super typhoons on the survival of trees by incorporating a viable clustered tree concept. Such urban forest cover in the developed environment provides additional environmental benefits by reducing ozone and other air quality problems, reducing the "urban heat island effect", reducing building energy use through shading, and providing habitat for wildlife.
- The following planting types are noted below with relative strategy:
    - *Park Landscape*. Utilize native/adapted trees planted in clusters (for typhoon protection); provide shade and amenity to the surrounding communities.
    - *Streetscape*. Trees planted along streets, in the median, and parkway areas should include species that have higher carbon sequestration values while meeting the base appearance objectives.
    - *Residential Landscape*. The front yards and back yards of the family housing area present opportunities to reduce building energy use through shading as well as capture the carbon sequestration benefit.
    - *Open Space*. The open space areas on base should focus on improving disturbed site conditions, selecting more native species with high carbon sequestration rates, minimizing the amount of maintenance related emissions, and designing the reforestation plan to maximize long-term survival of trees.
    - *Preserved Area*. Most of the 800 acres (320 hectares) of preserved limestone forest should remain intact and proper long-term forestry management practices should continue as the primary measure to help to increase the potential for carbon sequestration.

6.3.6.3 Community Agriculture/Local Food Production

The Sustainability Program for the GJMMP has identified a practical and expandable local food production program for the proposed base to:

- Foster a "good neighbor" policy with local farmers.
- Provide opportunities for the on-base military community to interact with the University of Guam and the local community.

- Grow local fruit on site in neighborhood fruit gardens (on a small scale) for use, education, carbon sequestration (reduction of overall GHG emissions), and to enhance habitat areas.
- Earn additional LEED NC points through innovation credits.

6.3.7 Integration of Sustainability into Master Planning and Facilities Design

As part of the GJMMP planning process, the Sustainability Program has focused on effective and implementable systems that can be strategic and tactical in order to meet all applicable federal mandates in the most cost-effective manner. Integration into master planning allows the Sustainability Program measures eventually to be incorporated into facilities design.

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7.1 PARTIES RECEIVING NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)

Following is a list of parties who were directly notified about a Notice of Availability (NOA) of the Final EIS. The NOA indicates when the Final EIS was issued, where copies may be obtained or reviewed, the duration of the comment period, where comments may be sent, and the location, date and time of the Public Hearing regarding the Final EIS. Private citizens may receive a NOA, but their names are not included in the list. Also included is a list of libraries receiving an electronic copy on compact disk (CD) or hard copy of the Final EIS.

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