

CHAPTER 8

ADDITIONAL CONSIDERATIONS REQUIRED BY NEPA

8.1 INTRODUCTION

This chapter addresses additional considerations required by NEPA, which includes consistency with other federal, state, and local land use plans, policies, and controls; required permits and approvals; irreversible and irretrievable commitment of resources; the relationship between short-term use of the environment and long-term productivity; and sustainability and smart growth.

8.2 CONSISTENCY WITH OTHER FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

The proposed action alternatives as outlined in this SEIS 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. The DON does not have zoning laws or codes, but there are ideal functional relationships among land uses that guide installation development. Naval Base Guam and AAFB have land use plans that currently guide land use planning for those installations. The Regional Commander, in consultation with base planners, would direct future development to be consistent with the objectives of the land use plan. Other relevant planning documents that would affect future development include Regional Shore Infrastructure Plans and UFC documents that provide planning, design, construction, sustainment, restoration, and modernization criteria. The proposed action alternatives discussed in this SEIS would follow these guidelines. In addition, these alternatives have been developed in consultation with base planners and approved by the Regional Commander; therefore, all of the proposed action components would also be in compliance with COMNAV Marianas Instruction 3500.4, *Marianas Training Handbook* (DoD 2000) and MCO P3550.10 (DON 2005).

AAFB identified a number of land use compatibility issues associated with the proposed NWF LFTRC; these are summarized in Table 8.2-1. The Army National Guard also identified potential impacts associated with Alternative D (cantonment and family housing at Barrigada) to include: delays in their ongoing processes to acquire additional acreage north or east of the existing Army National Guard compound; a potential reduction in access to training areas that the Army National Guard currently uses in the Barrigada area; and a potential for increased traffic impacts associated with the Army National Guard's plans for future development near their main entrance. 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 1978 Guam Comprehensive Development Plan (Bureau of Plan 1978) and 1994 *I Tano'-ta: The Land Use Plan for Guam* (Territorial Planning Council 1994). The 1978 Plan was valid for a planning period up to 2000. The *I Tano'-ta* was adopted in the Guam Land use and Zoning Law in 1999, but subsequently suspended and the 1966 zoning and zoning law is the prevailing regulation (Bureau of Statistics and Plans 2008). These plans provide valuable information on existing and planned land uses at points in time. The Bureau of Statistics and Plans recently prepared the *North and Central Guam Land Use Plan*. Although the plan was adopted, the associated changes to zoning codes are pending. The assumption is that the land use plan represents the general direction of GovGuam and the community with respect to guiding future land use development in the central and northern areas of Guam. There are no such plans for the southern portion of Guam. It is also likely that rezoning of property in the surrounding community would occur in response to DoD development. The

North and Central Plan guides development decisions generally but refinement or more precise expression of land use occurs through Guam Land Use Commission actions that may or may not follow the general plan. The DoD has no direct control or authority over this process except to attempt to mitigate effects of incompatible land uses near installations. Additionally, the DoD assists communities to plan for “outside the fence” land use and economic impact through the OEA.

Table 8.2-1. NWF LFTRC Land Use Compatibility Concerns

<i>Concern</i>	<i>Impacts to Air Force Mission</i>	<i>Proposed Resolution</i>	<i>Status</i>
HG Range	Concern with potential noise impacts to other training at PRTC	HG Range relocated to Andersen South.	Resolved
Joint Threat Emitter	Joint Threat Emitter is critical for ATCAA 3. SDZ conflict in earlier LFTRC versions would affect Joint Threat Emitter availability	LFTRC layout modified to remove Joint Threat Emitter from SDZ footprint.	Resolved. Resolution of noise impacts to Joint Threat Emitter equipment is pending.
EOD Operations	RED HORSE EOD conducts controlled training detonations	Deconflict through range scheduling/range control. Utilize Tarague EOD area.	Pending development of Memorandum of Agreement
Contingency Response Group Operations	LFTRC would limit availability of Fortress Drop Zone and assault strip operations for required Air Force training.	Due to relatively low frequency, scheduling is primary means of deconfliction with LFTRC; alternate SDZs and aviation safety zones exist, if required.	Pending development of Memorandum of Agreement
VFR Recovery Point	Restricted area required for LFTRC conflicts with “North Point” VFR recovery point	TBD	Pending Memorandum of Agreement development
TERPS Issues	LFTRC impacts holding altitudes with associated published Installation Insurance Plans and circling approaches to the north	TBD	Pending Memorandum of Agreement development

8.3 REQUIRED PERMITS AND APPROVALS

A list of federal and local permits that may be required for implementation of any of the alternatives is provided in Table 3.1-1 of the 2010 Final EIS (Volume 8, Chapter 3: Required Permits and Approvals, pages 3-1 through 3-5). Permits and approvals for the proposed action are expected to be the same as for the 2010 Final EIS for the NEPA EIS review as well as project design, construction, and operation phases. While some regulations require permits, many serve only as guidance. DoD-proposed actions would be implemented in accordance with all applicable regulatory mandates.

Federal regulations that are or may be applicable to the proposed action include, but are not limited to:

- Archeological and Historic Resources Preservation Act
- ARPA
- CAA
- CWA
- Coastal Zone Management Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Department of Transportation Regulations
- National Wildlife Refuge System Administration Act
- Migratory Bird Treaty Act
- NHPA
- Noise Control Act
- Oil Pollution Act
- OSHA
- Pollution Prevention Act
- Resource Conservation and Recovery Act

- Emergency Planning and Community Right-to-Know Act
- ESA
- Federal Environmental Pesticide Control Act
- Federal Facilities Compliance Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Fish and Wildlife Coordination Act
- Groundwater Rule
- Marine Protection, Research, and Sanctuaries Act
- Fish and Wildlife Coordination Act
- Groundwater Rule
- Marine Protection, Research, and Sanctuaries Act
- Military Munitions Rule under Resource Conservation and Recovery Act
- Rivers and Harbors Act
- Safe Drinking Water Act
- Ship-Borne Hazardous Substances Regulations
- Statement of Procedures on Floodplain Management and Wetlands Protection
- Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- Toxic Substances Control Act
- Underground Storage Tanks

Guam regulations that are or may be applicable to the proposed action include, but are not limited to:

- Guam Coastal Nonpoint Pollution Control Program
- Guam Air Pollution Control Standards and Regulations
- Guam Environmental Protection Act
- Guam Hazardous Waste Management Program
- Guam Primary Drinking Water Regulations
- Guam Seashore Protection Act and Permit System
- Guam Soil Erosion and Sedimentation Control Regulations/Permits
- Guam Water Quality Standards
- Test Boring and Dewatering Permit
- Guam CWA Section 401 Water Quality Certification
- Guam Water Resources Development and Operating Regulations

8.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA § 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 timeframe. 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 required for implementing the proposed action. Irreversible and irretrievable commitments of resources would occur under all alternatives. Particular irreversible and/or irretrievable impacts that would result are noted below. These impacts are similar to those described in the 2010 Final EIS (Volume 8, Chapter 4, Irreversible and Irretrievable Commitment of Resources, pages 4-1 through 4-2).

Irreversible and irretrievable commitment of resources related to the construction and operation of the proposed cantonment/family housing includes consumption of fossil fuels and energy for construction equipment, materials for construction of new facilities and associated private-sector economic and population growth, and physically altering land with construction and committing land associated with the project to a new use for the foreseeable future. Construction and operation of the proposed LFTRC would result in an irreversible and irretrievable commitment of fossil fuels and materials as well as a commitment of land and airspace for training activities associated with LFTRC operations.

Materials and energy consumed for the project represents a permanent and non-renewable commitment of these 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, decreasing the amount of open land available for other uses. Access to the developed lands would be limited to authorized personnel.

Compared to the 2010 Final EIS, the proposed action addressed in this SEIS comprises a smaller Marine Corps cantonment/family housing area, a similarly-sized LFTRC that has a smaller SDZ footprint (based on the SDZ reduction achieved by applying the probabilistic methodology to the MPMG range), and reduced-scale infrastructure requirements to support a reduced number of relocating Marines and dependents than originally planned. Therefore, there would be a reduction in the irreversible and irretrievable commitment of resources based on the proposed action described in this SEIS compared to the 2010 Final EIS, primarily with respect to the cantonment/family housing area and reduced-scale infrastructure requirements.

Under the No-Action Alternative, the DON would implement projects identified in the September 2010 ROD (see Section 2.1 of this SEIS). The decision to construct and operate the LFTRC would remain deferred, and the DON would establish a cantonment/family housing area for approximately 8,600 Marines and 9,000 dependents on federally controlled lands at Finegayan and South Finegayan and by acquiring land known as the former FAA parcel. Therefore, under the No-Action Alternative there would also be irreversible and irretrievable commitments of resources. Irreversible and irretrievable commitments of resources as described in the 2010 Final EIS (Volume 8, Chapter 4: Irreversible and Irretrievable Commitment of Resources, pages 4-1 through 4-2) would be the same, although there would be slightly less commitment of land resources and consumption of fossil fuels and energy for construction and operation of the LFTRC.

8.5 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Section 102(2)(C)(iv) of NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment (i.e., ability to obtain or generate desired goods, services, or benefits in the future). Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that designating a parcel of land or other resource for a certain use eliminates the possibility of other uses being performed at the site.

Short-term uses of the environment associated with the proposed action include changes to the physical environment and energy and utility use during the construction of facilities associated with all alternatives. Construction would involve short-term increases in fugitive emissions and construction-

generated noise and would increase the use of fossil fuels to provide power to equipment. In addition, expenditures of public funds and the use of labor would be required.

Long-term changes would include alterations to land use on Guam that would exist for the life of the new facilities. For the purposes of this section, the “lifespan” of the proposed action is undefined but would end whenever the use of the proposed cantonment, LFTRC, and/or family housing areas are no longer needed by the DoD.

There are numerous BMPs, plans, procedures, protocols, regulations, and laws that have been established to protect human health and the environment. Compliance with regulatory mandates, permit conditions and protective measures by the DoD and its contractors would reduce both short-term and long-term impacts. In addition, by minimizing these impacts, the relationship between short-term use of the environment and long-term productivity would not be adversely affected because the range of options for future beneficial uses would not be diminished, allowing for more flexibility in long-term use options.

8.5.1 Geological and Soil Resources

Construction of the proposed action would require cut and fill, grading and contouring with long-term changes to topography. These alterations would persist beyond the life of the project. Future land uses could restore the topography - if warranted.

There would be a larger area of the island where soil is disturbed from its natural condition and identified as Urban Land Complex due to the proposed action. Slope stability would not be altered. Engineering controls implemented during project design and construction, as well as stormwater control measures implemented during operations, would control drainage and runoff and minimize the risk of soil erosion. The potential for erosion due to live-fire range activities would be minimized through range maintenance and management activities.

For any sinkholes discovered before or during construction, BMPs would include compliance with the requirements of 22 GAR Chapter 10 § 10106F; therefore, the proposed action would not result in significant impacts to sinkholes. The proposed action would not increase the risk associated with earthquakes, fault rupture, slope instability, tsunamis and liquefaction.

Use of geology and soils for implementation of the proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.2 Water Resources

There would be an increase in the amount of impervious surface resulting from implementation of the proposed action. With the application of BMPs, LID, sustainable measures, and compliance with federal and GovGuam guidelines, water quality on Guam would be protected from impacts resulting from the proposed action. Long-term beneficial impacts to nearshore water quality would occur through mitigation by assisting the GWA in identifying funding from federal agencies to upgrade the Northern District WWTP.

The potential for leachate from MECs affecting surface water or groundwater would be minimized through range maintenance BMPs and management activities.

The proposed action would not increase the risk of flood hazards and would result in either no impacts to wetlands or less than significant impacts to wetlands through mitigation, depending upon the alternatives selected.

The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.3 Air Quality

Construction and operational air quality impacts associated with the proposed action would not exceed significance thresholds.

Administration, maintenance, housing, and quality of life operations would receive power from existing stationary utility sources and include installations of various emergency generators on Navy and other critical DoD/Marine Corps facilities. However, the affected existing stationary utility sources would be operated below their currently permitted capacity under the proposed action. Therefore, operating these affected existing power sources would be in compliance with the applicable NAAQS, resulting in a less than significant impact. For anticipated installations of emergency generators at critical DoD facilities, if required under the CAA and/or GEPA permit regulations, applicable existing facility air permits would be modified or new air permits would be obtained at new facilities during the design phase of the project. This would ensure that these new emergency generators would be operated in compliance with applicable air regulations, resulting in a less than significant impact.

Stationary source air emissions due to the proposed action 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 ambient air environment. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.4 Noise

Construction and operational noise impacts associated with the proposed action would not exceed impact assessment criteria thresholds. There are no sensitive receptors that would be within the Zone II contour for the LFTRC. The steady-state noise generating activities at Finegayan would be primarily due to traffic and the impact would be less than significant.

Noise generated by the proposed action would cease at the end of the life of the project with no long-term impacts on ambient noise levels. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.5 Airspace

The proposed action, specifically the LFTRC, would have the potential for significant impacts to aviation. The potential impacts associated with the proposed action would be further studied through the DON, Air Force, and FAA consultation process and measures would be identified through this consultation process to minimize the potential effects. In addition, impacts to airspace generated by the operation of the proposed action would not permanently alter the airspace. FAA could revisit relevant airspace parameters and designations and restore the airspace to existing conditions at the end of the life of the proposed action. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.6 Land and Submerged Land Use

There are federal and GovGuam submerged lands that would be impacted by the LFTRC SDZs. The LFTRCs would result in new public access restrictions for health and safety reasons. At the end of the

lifespan of the proposed action, the public access restrictions could be removed for a beneficial impact on long-term use of the submerged lands.

The proposed action would change the current land uses of existing federal lands, and prior to implementation of the proposed action, any on-base land use compatibility issues will have been resolved. NWR land, currently managed by USFWS for conservation and education, would be within the LFTRC SDZs. USFWS administrative and visitor facilities would be relocated to the remaining area of the NWR. Public access would be restricted to portions of the NWR that overlap with the SDZs. The USFWS mission would be able to adapt to coexist with the change in land use and access restrictions. At the end of the lifespan of the proposed action, the access restrictions could be removed.

The short-term use of the land would have adverse impacts, but most of the impacts could be reversed to current conditions at the end of the lifespan of the proposed action. Current land use and access could be restored with no long-term loss of productivity and no impact on the range of options for future beneficial uses.

Land use changes outside the military installation would likely result from the economic growth associated with the additional population, potential development and activities that are created by the increased short-term spending associated with the proposed action, and over the longer term due to a more productive use of land than is taking place at present. This is similar to the induced growth that may be created as a consequence of improvements, particularly expansions, in transportation or other infrastructure that makes land more accessible and so increases the likelihood that this land would be developed or redeveloped. This land development and activities associated with induced growth could then contribute to both beneficial and adverse impacts on land use. Non-DoD land use development is subject to GovGuam agency approvals. The approval process considers the development proposal's consistency with established land use planning objectives and would minimize the adverse impacts of new development on land use.

8.5.7 Recreational Resources

The proposed action would result in adverse impacts to marine and terrestrial recreational uses at South Finegayan, and within the land and submerged land affected by the LFTRC. At the end of the life of the proposed action, these uses could be resumed. There is a potential that the restricted or managed recreational use during the life of the proposed action could beneficially impact recreational resource health. There would be a beneficial impact under the restricted access imposed by the LFTRC SDZs extending over ocean bottom fisheries areas. Short- and long-term beneficial impacts to recreation would occur from a healthier fishery by increasing fish landings when the range is not in use and when the range no longer exists.

The increase in island population (direct, indirect, and induced) could result in the overuse of existing recreational resources in other island locations. Foreseeable impacts include inadequate or overcrowded facilities, such as parking, picnic shelters, restrooms, showers, boat mooring facilities, etc. Moreover, a decreased sense of enjoyment due to increased competition for opportunities among users would result at most recreational facilities (e.g., more people on trails, crowding at popular dive spots). An increase in the number of users would accelerate the deterioration of existing facilities. Furthermore, over the long-term, recreational resources would 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.

There would be long-term impacts on recreational resource productivity. Depending on the extent of the impact to recreational resource health, it is possible for the resources to recover at some point in the future

after the lifespan of the proposed action has ended, and the range of options for future beneficial uses would be less than significantly affected.

8.5.8 Terrestrial Biological Resources

With implementation of the proposed action, large areas of primary and secondary native limestone forest would be removed, primarily associated with Overlay Refuge lands. Development of this limestone forest habitat within Overlay Refuge lands would represent a significant loss of recovery habitat for ESA-listed species including Mariana fruit bat, Mariana crow, Guam rail, Guam Micronesian kingfisher, and *Serianthes* tree.

Operational impacts would include noise, lighting, and other disturbance impacts on special-status species. Other long-term impacts could reduce habitat quality, such as the increased potential for fire and spread of non-native species. These would be balanced by the application of plans and procedures for wildland fire control and biosecurity, native forest enhancement, and by enlarging or creating new ERAs. Implementation of these plans would improve the overall quality of targeted habitat over current conditions by implementing ungulate management, control of invasive species, rodent and cat control, and restoration of native forests.

Potential effects on the Ritidian Unit of the Guam NWR and restricted access to lands within the SDZs could result in reduced access for monitoring, inventory surveys, habitat enhancement and restoration, and outreach activities.

The impacts of construction and operational activities of the proposed action would result in a loss of long-term productivity of terrestrial biological resources by limiting the range of future beneficial uses for these resources.

8.5.9 Marine Biological Resources

No in-water construction work is proposed for implementation of the proposed action. With the application of BMPs and LID plans, direct impacts on marine biological resources are expected to be less than significant. Reduced public access to submerged lands associated with the LFTRC SDZs would have a beneficial impact on marine biological resources.

The infrequency of bullets reaching the ocean and the reduced speed of the ricochet would result in less than significant direct impacts to marine animals within the SDZ. There would be long-term localized accumulation of small arms (no explosives) expended materials in the benthic habitat from the firing range operations. The rapid sinking rate of such munitions is expected to preclude ingestion by marine organisms. The operational impact of the LFTRC on marine resources would be less than significant, and no loss of long-term productivity for marine biological resources is expected. The proposed action would not reduce the range of options for future beneficial uses.

A beneficial impact on bottom fisheries would potentially occur due to restricted access under the Alternative 5 SDZ at NWF, thereby leading to a healthier fishery with increased fish yields when the range is not in use.

8.5.10 Cultural Resources

The proposed action would result in the direct loss and disturbance of NRHP-eligible sites. The potential for direct effects within the SDZ would be limited to the risk of strikes from stray rounds during range operations. The risk of such effects occurring is extremely low. The range would be designed to contain live fire inside the range itself to minimize the probability of rounds landing in the SDZ. Additionally, if a

stray round were to escape the range, the chance of it hitting a historic property is remote, given the size of the SDZ, natural topography, and dispersal of historic properties. For these reasons, the potential for direct adverse effects as a result of range operations is *de minimis*. There is potential for inadvertent or accidental damage to at least one NRHP-eligible site due to an increase in population in the area. The removal of limestone forest where culturally important natural resources may be located would also be required. With implementation of the processes and procedures in the 2011 PA, including data recovery, cultural awareness orientation briefs, and additional identification efforts, 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, at the end of the lifespan of the proposed action, the long-term productivity of cultural resources could be diminished, and the range of options for future beneficial uses may be affected.

8.5.11 Visual Resources

The proposed action would not substantially alter the views or scenic quality of significant and/or publicly recognized vistas, viewsheds, overlooks, or features; change the light, glare, or shadows within a given area; or affect sensitive receptors. At the end of the lifespan of the proposed action, facilities could be demolished and the built landscape altered. There would be no long-term loss of visual resource productivity, and the proposed action would not reduce the range of options for future beneficial uses.

8.5.12 Ground Transportation

There would be short-term adverse impacts on traffic associated with the proposed action and off-base roadway improvements are proposed that would benefit the civilian community. This benefit would extend beyond the life of the proposed action, for a positive long-term impact on ground transportation. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.13 Marine Transportation

The proposed action may affect marine transportation by impacting the military, commercial, and recreational navigational usage of Apra Harbor through the increased number of vessels. The impact was determined to be less than significant.

The LFTRC SDZ impacts a designated shipping lane used by all vessels traveling from Hawaii to Guam; however, this is considered a less than significant impact. The LFTRC SDZ would affect recreational and commercial tour navigation between Hagåtña Marina and areas north and east of Guam. The impact to navigation is considered less than significant because vessels can transit around the SDZ and through the SDZ when the range is not in operation.

At the end of the lifespan of the proposed action, the impacts of the proposed action would cease and there would be no long-term impacts on marine transportation capabilities. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.14 Utilities

Electrical power, potable water, and wastewater utility upgrades are required to support the proposed action. Some of the improvements to the GovGuam systems would benefit the community. This benefit would extend beyond the life of the proposed action, for a long-term positive impact on utility infrastructure. In addition, adding a substantial and reliable customer for wastewater, electrical power, and solid waste disposal services would provide GovGuam with needed long-term revenue to fund additional future upgrades to their utility infrastructure. The proposed action would not reduce the range

of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.15 Socioeconomics and General Services

Beneficial impacts, adverse impacts, and significant impacts of a mixed nature are identified for the proposed action; however, the generalized conclusion for Population Change, Economic Activity, Public Services, and Sociocultural Issues categories is that there would not be major adverse changes to Guam's existing socioeconomic infrastructure. The population change associated with the proposed action would not likely put excessive strain on most of Guam's public services agencies, and the estimated increases in GovGuam tax revenues would likely compensate for any increased demand that would occur. The economic impacts would be beneficial, leading to increased employment and standards of living, and impacts to Guam's housing stock and availability would not bring about reactionary development, which could have otherwise lead to dislocations in the housing market. Impacts to GovGuam public services are identified; impacts to some public service agencies are considered significant. These impacts are related to additional staffing required to meet demands from additional population that would be associated with the proposed action.

Once implementation of the proposed action is completed, the population would be reduced, with no long-term loss to the socioeconomic infrastructure. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.16 Hazardous Materials and Waste

The proposed action would result in the increased transportation, handling, use, and disposal of hazardous materials (e.g., POLs/fuels) and hazardous wastes (pesticides, herbicides, solvents, lubricants, heavy metals). However, through the use of various BMPs and SOPs, operational impacts would be minimal. At the end of the lifespan of the proposed action, there would be a net increase in the use, generation and disposal of hazardous materials and waste over current baseline conditions; however, continued adherence to BMPs and SOPs with regards to their management and continued efforts to minimize the use and generation of hazardous materials and waste during operations would reduce potential adverse impacts to less than significant. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.17 Public Health and Safety

The proposed action would result in an increased on-island population; however, no significant long-term risks to health, safety, or the general welfare of the public were identified.

At the end of the lifespan of the proposed action, there would be no residual impact to public health and safety. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.5.18 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. There likely would be disproportionate significant public health services effects on low-income populations. Guam's public health services would not be able to handle potential increases in illnesses of the medically underserved and low income at the current levels of staffing. Access to public health and social services would be additionally strained by an increase in uninsured and underinsured workers coming to Guam.

At the end of the lifespan of the proposed action, there would be no residual long-term impact to public health and safety. The proposed action would not reduce the range of options for future beneficial uses and less than significant impacts to long-term productivity are expected.

8.6 SUSTAINABILITY AND SMART GROWTH

DoD policy is to address sustainability concepts in acquisition and procurement processes and in planning and managing its installations. For every DoD program, the Department actively seeks opportunities to continually improve its activities, and continues to develop and improve methodologies to ensure systematic analysis, informed decision-making, and appropriate budgets to address sustainability in accordance with the 2012 DoD Strategic Sustainability Performance Plan. Marine Corps policy on sustainability, presented in the 2011 U.S. Marine Corps Sustainability Plan, aligns with the priorities, direction, and scope of the DoD Strategic Sustainability Performance Plan.

DoD has implemented sustainability measures on Guam, such as solar photovoltaic arrays and solar water heating. Ongoing energy efficiency efforts include smart metering and controls (building and utility control systems, peak load monitoring, etc.), solar street lights and parking/playground lighting, low flow fixtures, and new and retrofitted buildings to LEED Silver (or equivalent) design standards.

The 2010 Final EIS (Volume 8, Chapter 6, Sustainability and Smart Growth) provides a summary of sustainability goals, including an overview (laws, regulations and guidance, and the DON's energy policy), implementation strategies, and anticipated results (e.g., reductions in water use, energy use, greenhouse gas emissions, vehicle miles traveled, and plans to implement renewable energy). Those sustainability goals and potential strategies were identified based on studies conducted for the 2010 Final EIS. The studies were shaped by smart growth and sustainability workshops for DoD stakeholders to identify specific elements to be included in the concept plan for the proposed action, with a primary focus on the preferred cantonment/family housing area in the 2010 Final EIS.

The DON conducted a new sustainability analysis for the 2012 Roadmap Adjustments SEIS. The new analysis addressed the smaller force, reduction in size of the cantonment and family housing areas, and locations of the cantonment and family housing alternatives. The study identified strategies for each primary system - water, energy (building, district, renewable and public realm), green building/ LEED and transportation. Plans for each primary system were adjusted to achieve environmental benefit in a cost-effective manner. Identified strategies will be incorporated, as appropriate, into the design and implementation phases to support meeting federal sustainability mandates.

For the proposed action, DoD has identified potential sustainability strategies and measures to meet federal mandates and to achieve the following target goals set for 2020: 30% energy use reduction, 26% water use reduction, 30% reduction of petroleum use in fleet vehicles, 18.3% of total energy from renewable sources, 34% reduction in greenhouse gas emissions, and diversion of 50% of non-hazardous solid waste and 60% of construction and demolition debris from the waste stream. DoD's goal is to meet federal sustainability mandates for the new Marine Corps installation on Guam. The Marine Corps has developed goals in their 2011 Sustainability Plan to meet these mandates: Goal 1 - Improve energy and water resources management and reduce greenhouse gases; Goal 2 - Minimize waste and prevent pollution; and Goal 3 - Improve integration of sustainability practices across all missions areas.

High Performance and Sustainable Building Requirements (UFC 1-200-02) the U.S. Green Building Council LEED Reference Guide for Green Building Design and Construction, and LEED New Construction Rating System are included in the DON's design and construction contracts to meet federal

sustainability mandates. The Guiding Principles for Sustainable New Construction and Major Renovation provides guidance on employing integrated design principles, optimizing energy performance, protecting and conserving water, enhancing indoor environmental quality, and reducing environmental impact of materials. For new construction, reduction of energy and water usage is compared to the baseline building performance per established performance standards and requirements. Sustainability strategies for building energy reduction, renewable energy opportunities, water conservation measures, greenhouse gas reduction, and waste reduction are summarized below. Based on these strategies, the new Marine Corps installation on Guam will strive to meet sustainability mandates and DoD goals, including the net-zero energy installation goal (an installation that produces as much energy on site as it uses, over the course of a year).

8.6.1 Energy Reduction

The sustainability strategy for energy reduction is to implement energy conservation measures on appropriate buildings under the proposed action. These include: building control systems for lighting, light emitting diode exterior lighting, highly efficient windows, thermal insulation, more efficient fans and pumps, other technologies to reduce the cooling load of buildings, and the use of energy star appliances. In addition, industrial control systems, advanced meters, utility and building control systems, industrial control systems infrastructure (hardware, software, communication pathways), smart meters, direct digital control, and other Smart Grid components would be implemented to provide power, to allow monitoring and control systems for more efficient energy usage and to enable energy management.

8.6.2 Renewable Energy

On-site renewable energy would be provided when lifecycle cost is cost-effective and technically feasible in accordance with DoD guidance. For the proposed Marine Corps installation on Guam, combined building-mounted renewables and/or ground-mounted solar photovoltaic arrays are being considered and will be installed based on results of the feasibility study that the DON is currently conducting to determine if rooftop, adhered photovoltaic systems are economically viable and capable of withstanding typhoon conditions in Guam's corrosive environment. The proposed Marine Corps installation would partner with JRM to achieve renewable energy mandates through either an installation or regional approach using large-scale solar photovoltaic, wind, and/or other renewable resources. A portion of the power demand would be satisfied by power generated from renewable energy sources, to include photovoltaic solar panels on rooftops and approximately 20 acres (8 ha) within the cantonment and/or family housing footprints proposed for ground-mounted photovoltaic panels. JRM has initiated a regional approach to achieve renewable/alternative energy goals and would cooperate with GPA to further develop the island-wide energy demand side management and energy efficiency via renewable energy project(s) on DON-controlled land (DON 2014).

8.6.3 Water Conservation Measures

DoD would implement water conservation measures to meet indoor water use reduction mandates. Water conservation measures include low-flow water fixtures and dual flush toilets. Other potential strategies may include rain water harvesting, condensate collection from heating, ventilation, and air conditioning units and grey water collection in cisterns for additional water supply. Outdoor water conservation measures are also being considered such as reduction or elimination of irrigation systems, and use of native plants for landscaping.

8.6.4 Transportation

Potential strategies to reduce vehicle miles traveled and greenhouse gas emissions include the following:

- Use of more fuel-efficient or alternative-fuel vehicles with a fuel efficiency of at least 28.7 mpg (12.2 km/liter) or higher.
- Reduction in the number of employee commuting vehicle trips through carpooling incentives, and live-where-you work community design.
- Consider establishing a shuttle bus system to reduce traffic and improve circulation if deemed necessary.
- Design a transportation network with special consideration for pedestrians and bicyclists.
- Use of mass transit by UDP (rotational) personnel instead of privately-owned vehicles.
- Selection of the cantonment/family housing and LFTRC alternatives combination that would result in reduced travel distances.

8.6.5 Waste

The waste reduction mandates would be met through implementation of the following strategies:

- Maintenance and expansion of installation or regional recycling programs throughout the proposed Marine Corps cantonment/family housing.
- Construction of new recycling and transfer facilities at the proposed cantonment/family housing.
- Adequate laydown and processing areas in contract specifications to allow diversion of green waste (including composting), concrete, and asphalt rubble from landfill disposal.
- Requirement in the contract specifications to meet federal mandates for waste diversion during construction, including submittal of a waste management plan and reporting of waste diversion.

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