3.16 HAZARDOUS MATERIALS AND WASTE

Section 3.16 provides a summary of the general condition and character of hazardous materials, toxic substances, hazardous waste, and sites impacted by these materials (i.e., contaminated sites) within the region of influence for the proposed action and alternatives. The region of influence for hazardous materials and waste on Tinian includes the Military Lease Area, the Tinian International Airport, and areas to the north and the vicinity of Port of Tinian where the activities related to the proposed action alternatives would occur. The region of influence for hazardous materials and waste on Pagan comprises the entire island. Live-fire maneuvers would be limited to the northern portion of the island and non-live-fire maneuvers would occur on the southern portion of the island.

3.16.1 Definitions

The phrase "hazardous substance" is used in this document to describe any item or agent (i.e., biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment and may include "hazardous materials," "toxic substances," and/or "hazardous wastes." Additionally, sites that are environmentally affected by releases of hazardous substances are referred to as "contaminated sites." These terms are briefly summarized below and more fully defined in Appendix R, *Hazardous Materials and Waste Technical Memo*.

3.16.1.1 Hazardous Materials

The term "hazardous materials" is defined under Section 1802 of the Hazardous Materials Transportation Act as "a substance or material in a quantity and form which may pose an unreasonable risk to health and safety or property when transported in commerce" (49 U.S. Code §§ 5101-5127).

When discussed in this document, hazardous materials currently present or that may be used as part of the proposed action include petroleum, oils, and lubricants; cleaning agents; adhesives; paints; pesticides; and other products necessary to perform essential functions. Fueling operations to support aircraft, watercraft, vehicle operations, and power generation on Tinian require the storage of bulk quantities of petroleum, oils, and lubricants. As such, these hazardous materials are stored in aboveground and underground storage tanks and distributed with pumps and pipelines. The storage areas for petroleum, oils, and lubricants represent potential sources of leaks, releases, or spills. Other types of hazardous materials (e.g., paints, pesticides, adhesives, cleaning agents) are distributed in smaller quantities in authorized containers such as drums, 5-gallon containers, and bottles.

3.16.1.2 Toxic Substances

The U.S. Environmental Protection Agency defines a toxic substance as "any chemical or mixture that may be harmful to the environment and to human health if inhaled, swallowed, or absorbed through the skin." The Toxic Substances Control Act of 1976 provides the U.S. Environmental Protection Agency with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures as well as the production, importation, use, and disposal of specific chemicals including asbestos, lead-based paint, polychlorinated biphenyls, and radon.

Descriptions of these substances are provided in Appendix R, *Hazardous Materials and Waste Technical Memo.*

3.16.1.3 Hazardous Waste

Hazardous wastes are defined and regulated under the under the federal Resource Conservation and Recovery Act (U.S. Environmental Protection Agency 2014). Before a material can be classified as a hazardous waste, it must first be defined as a solid waste, which can include discarded materials such as solids, liquids, and gases. Hazardous wastes may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of wastes that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned may be a hazardous waste. The U.S. Environmental Protection Agency defines several hazardous waste types: (1) listed wastes (wastes that the agency has determined are hazardous); (2) characteristic wastes (e.g., corrosive, ignitable, reactive, toxic wastes); (3) universal wastes (e.g., batteries, pesticides, mercury-containing equipment); and (4) mixed wastes (contains both radioactive and hazardous wastes) (U.S. Environmental Protection Agency 2014).

3.16.1.4 Contaminated Sites

Contaminated sites discussed as part of this EIS/OEIS are described below and include those addressed under the Defense Environmental Restoration Program and the CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality, Site Assessment and Remediation Branch. These areas were identified to have historical or current use of materials and wastes that have been recognized as hazardous. While they have not all been evaluated and confirmed to be contaminated, they are collectively referred to as contaminated sites.

3.16.1.4.1 Defense Environmental Restoration Program

The Department of Defense primarily conducts environmental restoration activities in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act. The Department of Defense began cleaning up contamination in 1975. For the purposes of this EIS/OEIS, applicable environmental restoration activities include those conducted under the Installation Restoration Program, the Military Munitions Response Program, and Formerly Used Defense Sites described in the following paragraphs.

3.16.1.4.1.1 Installation Restoration Program

The Installation Restoration Program focuses on cleaning up releases of hazardous substances that pose risks to the public and/or the environment at properties actively owned or used by the U.S. military.

3.16.1.4.1.2 Military Munitions Response Program

The Military Munitions Response Program addresses non-operational range lands with suspected or known hazards from munitions and explosives of concern that occurred prior to September 2002, but are not already included within an Installation Response Program site cleanup activity.

The Military Munitions Rule was published as a final rule in 1997 and identifies when conventional and chemical military munitions become Resource Conservation and Recovery Act hazardous waste. Military munitions include, but are not limited to: confined gases, liquids, or solid propellants; explosives;

pyrotechnics; chemical and riot agents; and smoke canisters (U.S. Environmental Protection Agency 2008b). Under the Military Munitions Rule, wholly inert items and non-munitions training materials are not defined as military munitions (U.S. Environmental Protection Agency 1997).

The Department of Defense has historically conducted live-firing, ordnance testing, and training exercises to ensure military readiness. Decades of these munitions-related activities have resulted in the presence of unexploded ordnance, discarded military munitions, and munitions constituents. Unexploded ordnance, discarded military munitions, and munitions constituents all present potential explosive hazards and are collectively referred to as munitions and explosives of concern. In 1997, the Final Military Munitions Rule (40 CFR 266, Subpart M) was published defining munitions and explosives of concern handling requirements.

Military munitions that are used for their "intended purposes" are not considered waste per the Military Munitions Rule (40 CFR 266.202). In general, military munitions become subject to Resource Conservation and Recovery Act transportation, storage, and disposal requirements (i.e., judged not to have been used for their "intended purposes") when:

- Transported off-range for storage,
- Reclaimed and/or treated for disposal,
- Buried or land filled on or off range, or
- Munitions land off range and are not immediately rendered safe or retrieved.

Munitions and explosives of concern are found on active, inactive, and closed military training ranges. Active ranges include areas being used on a periodic, ongoing basis for training purposes. Inactive ranges are: (1) not currently being used, (2) still are under military control and therefore may be used in the future as a military range, and (3) have not been put to a new use that is "incompatible" with range activities. Closed ranges are areas that have been taken out of service and put to a new use "incompatible" with range activities.

According to U.S. Environmental Protection Agency interpretation, the Military Munitions Rule "...applies only to the recovery, collection, and on range destruction of unexploded ordnance and munitions fragments during range clearance activities at active or inactive ranges. With regard to closed ranges, U.S. Environmental Protection Agency did not generally intend to include these range clearance activities to be within the scope...of the intended use...exception to Subtitle C of Resource Conservation and Recovery Act granted by the Military Munitions Rule..." munitions and explosives of concern located on closed ranges therefore "...would at some point become a solid waste potentially subject to the Resource Conservation and Recovery Act and also may include hazardous substances, pollutants or contaminants subject to the Comprehensive Environmental Response Conservation and Liability Act..." In summary, munitions and explosives of concern at closed ranges are classified as solid waste and would likely be subject to Resource Conservation and Recovery Act Subtitle C hazardous waste handling and disposal requirements as well and therefore subject to regulatory oversight (U.S. Environmental Protection Agency 2005).

3.16.1.4.1.3 Formerly Used Defense Sites

This program manages environmental cleanup on eligible properties formerly owned, leased, possessed, or used by the U.S. military. The program only applies to properties that transferred from the U.S. military before 1986 (U.S. Army Corps of Engineers 2014).

3.16.2 Regulatory Framework

Hazardous substances are controlled in the U.S. primarily by laws and regulations administered by the U.S. Environmental Protection Agency, the U.S. Occupational Safety and Health Administration, and the U.S. Department of Transportation. Each agency incorporates hazardous substance controls and safeguards according to its unique Congressional mandate. U.S. Environmental Protection Agency regulations focus on the protection of human health and the environment. U.S. Occupational Safety and Health Administration regulations primarily protect employee and workplace health and safety. U.S. Department of Transportation regulations promote the safe transportation of hazardous substances used in commerce.

The CNMI oversees and administers federal environmental regulations through the CNMI Bureau of Environmental and Coastal Quality. The CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality, Hazardous and Solid Waste Management Branch regulates hazardous waste generated within the CNMI. In 1984, the CNMI Bureau of Environmental and Coastal Quality adopted the federal hazardous waste regulations under the Resource Conservation and Recovery Act and the hazardous and solid waste amendments (CNMI Bureau of Environmental and Coastal Quality 2008). The CNMI does not have hazardous waste regulations that are more stringent than U.S. Environmental Protection Agency regulations.

The CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality, Toxic Waste Management Branch protects human health and the environment through the enforcement and ongoing inspections of hazardous waste and emergency response. The CNMI Bureau of Environmental and Coastal Quality regulates hazardous and toxic materials through Title 65: Bureau of Environmental and Coastal Quality, Division of Environmental Quality, Chapter 65-50, Hazardous Waste Management Regulations.

All Department of Defense operations on Tinian are required to comply with the CNMI, as well as applicable federal and Department of Defense laws and regulations. The following federal and CNMI laws, rules, and regulations would be followed. Refer to Appendix R, *Hazardous Materials and Waste Technical Memo*, for a detailed description and information about hazardous materials, hazardous wastes, and toxic substances. Appendix E, *Applicable Federal and Local Regulations*, provides a complete listing of applicable regulations.

3.16.2.1 Federal Regulations

- Comprehensive Environmental Response, Compensation, and Liability Act
- Resource Conservation and Recovery Act
- Military Munitions Rule
- Emergency Planning and Community Right-to-Know Act
- Toxic Substances Control Act

- Oil Pollution Act
- Pollution Prevention Act
- Occupational Safety and Health Administration laws and regulations
- Department of Transportation laws and regulations, including the Transportation Safety Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Federal Environmental Pesticide Control Act
- Federal Facilities Compliance Act
- Underground Storage Tank regulations
- Ship-Borne Hazardous Substance regulations
- Executive Order 12088, Federal Compliance with Pollution Control Standards

3.16.2.2 CNMI Regulations

- Commonwealth Environmental Protection Act
- Harmful Substance Clean Up Regulations
- Hazardous Waste Management Regulations
- Used Oil Management Rules and Regulations

3.16.3 Methodology

The following sections summarize the baseline hazardous materials and waste environment as it relates to those areas on Tinian and Pagan that would be affected by the proposed action or alternatives. As the first step, historical, topographical, and geological conditions of Tinian and Pagan were reviewed to establish a baseline of conditions present at each location. For Tinian, the 1997 Environmental Baseline Survey (GMP Associates, Inc. 1997) provided the best currently available data for Tinian; however, information was updated where more recent data was available. For Pagan, a 2013 historical ordnance assessment (DoN 2013a) provided the best currently available data. As was done for Tinian, information regarding the potential presence of hazardous materials and waste on Pagan was updated where more recent data was available.

As the second step, to determine the potential impacts, individual “areas of disturbance” under the proposed action or alternatives were examined to determine whether current or historic hazardous materials conditions may have affected or have the potential to affect these areas. Factors that are considered when making these determinations include the severity and probability of the potential for the release of hazardous materials within the area of disturbance, as well as conditions that may have affected the migration of hazardous materials. The discussion is organized as follows: (1) hazardous materials, (2) toxic substances, (3) hazardous waste, and (4) contaminated sites.

3.16.4 Tinian

The following provides a historical context of activities on Tinian that potentially could contribute to the use of hazardous materials, toxic substances, hazardous wastes, and/or creation of contaminated sites. Appendix R, *Hazardous Materials and Waste Technical Memo*, provides greater detail on land use as it pertains to the historical use of these types of substances on Tinian.

Tinian was sparsely populated prior to Spanish missionaries coming to the Northern Mariana Islands in 1668 (see Section 3.11, *Cultural Resources*). The island was largely depopulated from approximately

1700 until the early 1920s. Large-scale sugar cane cultivation began on Tinian beginning around 1922 and continued until the U.S. takeover of the island in 1944. Military use of the island by the Japanese occurred during the early 1940s, ending with the Battle of Tinian in August 1944. The U.S. military continued operations on the island during the war with a peak population of approximately 150,000 service personnel in 1944. Following World War II, small-scale U.S. military activity continued through to the present time. Meanwhile, civilian agriculture, cattle ranching, and eventually tourist activities began to take place on the island and continue today.

3.16.4.1 Hazardous Materials

3.16.4.1.1 Military Lease Area

Activities in the Military Lease Area that use hazardous materials include military training activities and use of the International Broadcasting Bureau; agricultural activities associated with cattle grazing and food production; and general public use.

3.16.4.1.1.1 Military Training Activities

As part of current military training exercises, portable, aboveground 60,000-gallon (200,000-liter) bulk diesel storage containers have been temporarily staged and used at North Field. These containers are called fuel bladders and assist in offloading fuel from aircraft (DoN 2014a). To prevent accidental releases, the fuel bladders are staged on existing pavement within temporary berms with impervious liners or secondary containment (DoN 2010). Military training activities include the use of vehicles and heavy equipment which could require refueling within the Military Lease Area.

Military training activities are conducted in compliance with standard operating procedures as described in an unpublished military training manual (M. Cruz, Joint Region Marianas, personal communication, December 2014). This includes proper storage and handling of hazardous materials inside an impervious barrier and away from catch basins, storm drains, and waterways; implementing a Spill Control Plan; and having trained spill response teams. Approved cleanup equipment is used in the event of an accidental release during military fueling activities (DoN 2010). Oily waste and bilge water from amphibious vehicles are disposed at disposal facilities on Guam and/or Saipan (DoN 2010). Plans are updated and implemented as part of continuous review for ongoing training.

3.16.4.1.1.2 International Broadcasting Bureau

The International Broadcasting Bureau is located within a compound on the west side of the Military Lease Area. The facility compound has a standby power plant consisting of three diesel-fired generators, two free-standing 30,000-gallon (100,000-liter) aboveground storage tanks, and a fuel pump house. The aboveground storage tanks are surrounded by an earthen containment berm connected to an oil/water separator for the drainage from the containment berm. In fiscal year 2012, the International Broadcasting Bureau used approximately 12,000 gallons (45,000 liters) of diesel fuel to operate the standby power plant (DoN 2013b). Fuel is delivered to the aboveground storage tanks via tanker truck. No petroleum releases related to the fuel storage activities at the International Broadcasting Bureau have been reported.

3.16.4.1.1.3 Agricultural Activities

Within the Military Lease Area, there are an estimated 32 cattle ranching operations. According to the Tinian Cattlemen Association, cattle ranching activities on Tinian are organic (i.e., do not use pesticides, herbicides, or insecticides) (L. Duponcheel, Tinian Cattlemen Association, personal communication, December 6, 2013). No permanent structures (e.g., buildings, storage facilities, aboveground or underground storage tanks) are allowed as part of the lease agreements with the ranchers. Visual observations from a windshield survey of accessible portions of the cattle ranch lands did not reveal any obvious areas of hazardous material storage or releases (i.e., soil staining, dead or stressed vegetation). However, within several of the ranch lots, observations of old appliances (e.g., washing machines) and plastic or metal drums were made. These appliances and containers are reportedly used by ranchers for water catchment and as barricades. It is unknown if these items were properly decommissioned or if they contain any potential hazardous materials.

3.16.4.1.1.4 Public Use

Access to the Military Lease Area is largely unrestricted; therefore, there is the potential for unpermitted disposal of hazardous materials and unreported releases of petroleum products from vehicles using the area in association with tourism or simply passing through. Visual observations from a windshield survey of accessible portions of the Military Lease Area did not reveal any unpermitted disposal sites or obvious areas of chemical storage or releases.

3.16.4.1.2 Tinian International Airport

The existing runways and the area north of the existing runways at Tinian International Airport that would be part of the action alternatives comprises parts of the active runway, World War II-era pavement, and otherwise undeveloped land. The Tinian International Airport uses, handles, and stores hazardous materials for daily airport operations; however, due to the limited aircraft maintenance and repair capabilities available at Tinian International Airport, the amounts of these hazardous materials are limited. Common hazardous materials at Tinian International Airport include pesticides and herbicides; industrial and household cleaning products; hydraulic fluids; paints; solvents; and petroleum, oils and lubricants (Air Force 2012). Hazardous materials are stored and managed by Tinian International Airport personnel in accordance with applicable federal and CNMI regulations.

The Tinian International Airport has two aboveground diesel storage tanks: 2,000-gallons (7,600-liter) and 1,500-gallons (5,700 liters) (CNMI Bureau of Environmental and Coastal Quality, personal communication, January 30, 2014). Fueling operations at Tinian International Airport are limited to small containers (55-gallon drums) of aviation fuel brought to the island for emergency fuel needs by commuter airlines (Commonwealth Ports Authority, personal communication, December 2013). Military training also includes fueling expeditionary vehicles at Tinian International Airport on the west end of the taxi ramp, similar to the fueling operations described for North Field.

The Micronesian Development Company holds a lease for cattle grazing south of the airport (R-12). For the past 2 years Micronesian Development Company has been applying Effective Microorgansim-1 as a pesticide/fertilizer. This product contains lactic acid, photosynthetic organisms, and yeast and is mixed with (drinking) alcohol. It is undetermined whether any other pesticides and herbicides are applied in this location.

3.16.4.1.3 Port of Tinian

The area in the vicinity of the Port of Tinian where the proposed action alternatives would occur includes the storage, use, and/or management of hazardous materials. A bulk fuel storage facility owned and operated by Mobil Oil is located at the port but not within the proposed footprint of the action alternatives. The plant provides Tinian with gasoline and diesel fuel, including fuel for the Commonwealth Utility Corporation power plant. Other aboveground storage tanks at the Mobil bulk fuel storage facility include a 63,000-gallon (240,000-liter) diesel tank and an approximately 30,000-gallon (100,000-liter) gasoline tank (CNMI Division of Environmental Quality, personal communication, January 30, 2014). A fuel tanker vessel delivers fuel to the tanks on a monthly basis (DoN 2014a). There is also a truck fueling facility for gasoline distribution at this facility.

An 1,167-foot (356-meter) long, single-walled, steel, aboveground pipeline delivers fuel from the Mobil bulk fuel plant to a 500,000-gallon (1,900,000-liter) aboveground diesel storage tank at the Commonwealth Utility Corporation power plant located to the northwest of the port at the corner of West Street and 6th Avenue (Figure 3.16-1). The pipeline is approximately 3 inches (8 centimeters) in diameter and has no secondary containment. No releases have been reported in association with the pipeline. The Commonwealth Utility Corporation has two 15,000-gallon (57,000-liter), two 7,000-gallon (26,500-liter), and one 2,000-gallon (7,600-liter) aboveground diesel fuel storage tanks (CNMI Division of Environmental Quality, personal communication, January 30, 2014). All tanks at this site are provided with secondary containment using concrete or concrete lined earthen berms. No releases have been reported at the power plant.

3.16.4.2 Toxic Substances

The 1997 Environmental Baseline Survey examined the environmental condition of the Military Lease Area including the presence and management toxic substances (GMP Associates, Inc. 1997). The results are summarized in the following subsections.

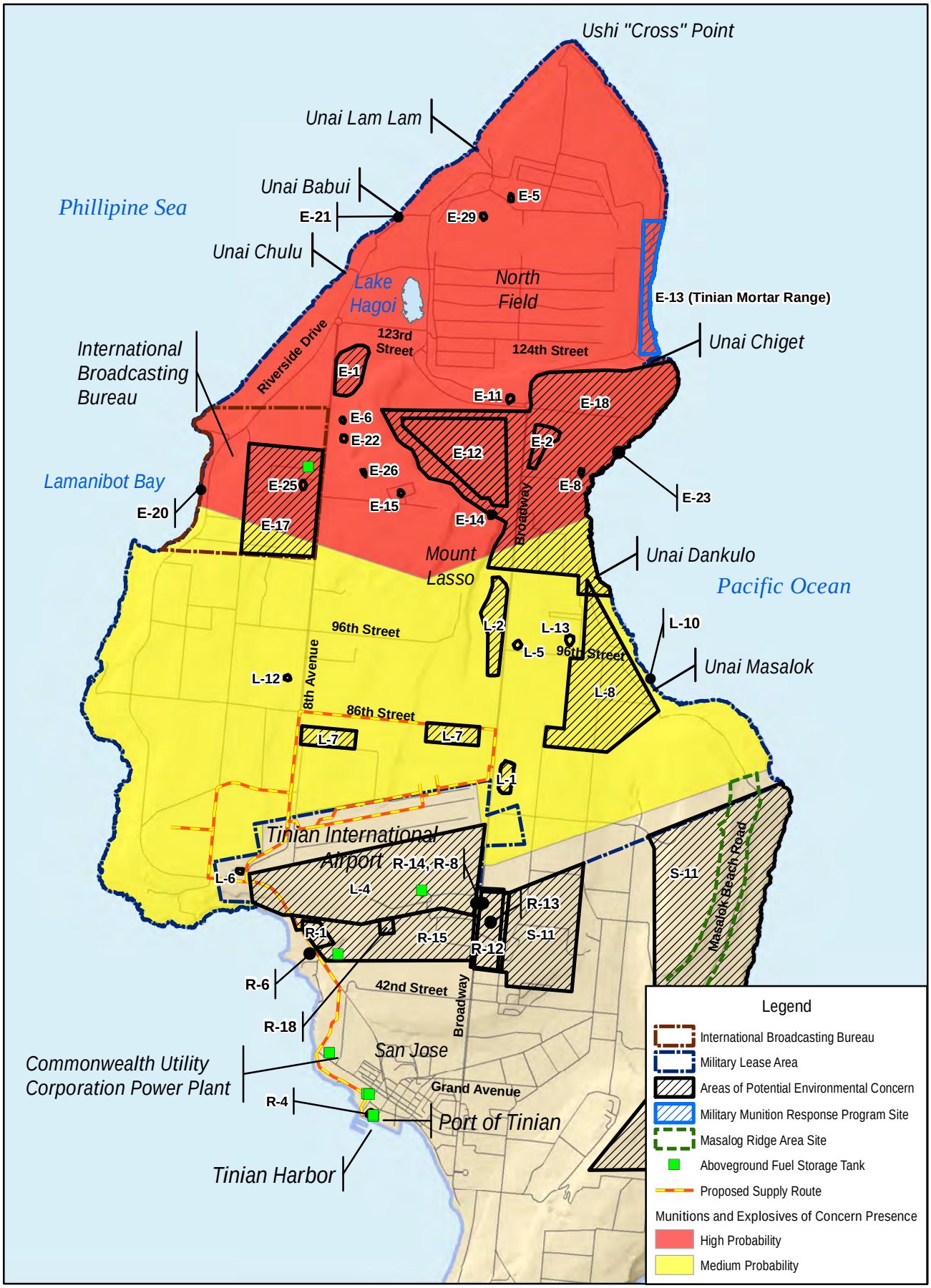
3.16.4.2.1 Island-wide Hazards

No radon testing has occurred on Tinian. However, radon testing on Guam resulted in a definite correlation between the type of surficial geology and radon concentrations. In almost all cases, elevated radon concentrations were found in buildings located above Barrigada and Mariana limestones but not in those located above alluvial clay deposits, beach deposits, and volcanic rocks (Burkhart et al. 1993). A large portion of the geology of Tinian consists of Mariana limestone, and therefore there is the potential for radon intrusion into structures constructed on Tinian.

3.16.4.2.2 Military Lease Area

3.16.4.2.2.1 Asbestos

The 1997 Environmental Baseline Survey noted the presence of asbestos-containing materials at Site L-5, the former Micronesian Development Company slaughterhouse (Figure 3.16-1) (GMP Associates, Inc. 1997). No other asbestos-containing materials were noted within the Military Lease Area.



0 0.25 0.5 1 Mile

0 0.5 1 Kilometer

Figure 3.16-1 Tinian Areas of Potential Environmental Concern And Military Munitions Response Program Sites

NORTH

Sources: GMP Associates, Inc. 1997; DoN 2010d; CNMI Department of Environmental Quality 2014

The International Broadcasting Bureau facilities were constructed in four phases from 1999 through 2003 (International Broadcasting Bureau 2009). No changes that would require the use of asbestos-containing materials are known have been made to this facility since its completion in 2003. Asbestos-containing materials are not known to be present in the International Broadcasting Bureau facilities (D. Gifford, International Broadcasting Bureau, personal communication, 2013).

3.16.4.2.2.2 Lead

No evidence of lead-based paint was found in the Military Lease Area in the 1997 Environmental Baseline Survey (GMP Associates, Inc. 1997). Additionally, lead-based paint is not known to be present in the International Broadcasting Bureau facilities (D. Gifford, International Broadcasting Bureau, personal communication, 2013). The use of lead-based paint was banned in 1978; therefore, no lead-based paint has been introduced to the site since the 1997 Environmental Baseline Survey or the construction of the International Broadcasting Bureau, and the results of the survey remain valid.

3.16.4.2.2.3 Polychlorinated Biphenyls

No evidence of historical use of polychlorinated biphenyls was found in the Military Lease Area (GMP Associates, Inc. 1997). However, existing electrical power lines were documented along Broadway and extending to the Micronesian Development Company Slaughterhouse (L-5). The presence/absence of polychlorinated biphenyls in the electrical transformers was not confirmed.

The International Broadcasting Bureau obtains its electricity from the Commonwealth Utility Corporation via off-site, overhead power distribution lines connect to a ground-mounted electrical transformer located within the facility compound. The electrical transformer and other the electrical equipment in the International Broadcasting Bureau facilities are reported to be free of polychlorinated biphenyls (D. Gifford, International Broadcasting Bureau, personal communication, 2013).

3.16.4.2.3 Tinian International Airport

The existing runways and the area north of the existing runways at Tinian International Airport that would be part of the action alternatives comprises parts of the active runway, World War II-era pavement, and otherwise undeveloped land. There are no existing structures in that portion of the airport that would potentially contain asbestos-containing materials, lead-based paint, or polychlorinated biphenyls.

3.16.4.2.4 Port of Tinian

The areas of the port that would be part of the action alternatives are comprised of concrete ramps, fenced areas, and open land. There are no structures in these areas that could potentially contain asbestos-containing materials, lead-based paint, or polychlorinated biphenyls.

3.16.4.3 Hazardous Waste

3.16.4.3.1 Military Lease Area

3.16.4.3.1.1 Military Training Activities

There are no active live-fire ranges on Tinian. However, live-fire training with small arms into bullet traps that are temporarily set up occurs at various locations within the Military Lease Area. Each temporary

range is cleared of expended hazardous materials, such as lead bullet fragments, in accordance with the Mariana Islands Range Complex Management Plan (U.S. Pacific Fleet 2007). Expended materials are removed after an exercise is completed (DoN 2010) and range byproducts expended in range firing lines, stationary defensive positions, and bullet traps are collected for removal from training areas, taken back aboard ship (as appropriate), or to Guam for proper disposal. Other range byproducts, such as brass cartridges and links, would be collected from training area roadways and recycled or managed as solid waste.

Under the Military Munitions Response Program, fired munitions are considered a solid waste when they are removed from their landing spot and then managed off-range (i.e., when transported off-range and stored, reclaimed, treated, or disposed of).

3.16.4.3.1.2 International Broadcasting Bureau

The International Broadcasting Bureau generates hazardous waste mainly in the form of used oil, fluorescent light bulbs, and batteries. These wastes are stored temporarily in the facility's hazardous waste storage area and periodically removed for proper disposal/recycling off-site (DoN 2013b).

3.16.4.3.1.3 Public Use

Access to the Military Lease Area is largely unrestricted; therefore, there is the potential for unpermitted disposal of hazardous wastes by the general public. Visual observations from a windshield survey of accessible portions of the Military Lease Area did not reveal any unpermitted waste sites or obvious areas of chemical releases.

3.16.4.3.2 Tinian International Airport

The existing runways and the area north of the existing runways at Tinian International Airport that would be part of the action alternatives comprises parts of the active runway, World War II-era pavement, and otherwise undeveloped land. There are no existing facilities or operations in this area that potentially generate hazardous waste. Access to the Tinian International Airport is restricted; therefore, disposal of hazardous wastes does not occur.

3.16.4.3.3 Port of Tinian

The areas of the port that would be part of the action alternatives are comprised of concrete ramps, fenced areas, and open land. These areas are either undeveloped or do not have activities that would generate hazardous waste.

3.16.4.4 Potential and Confirmed Contaminated Sites

Historic military activities on Tinian have resulted in adverse impacts on the area with regards to hazardous materials and wastes. An Environmental Baseline Survey conducted in 1997 identified several U.S. military sites of environmental concern on Tinian (see Figure 3.16-1). These areas were identified to have historical use of materials and wastes that have been recognized as hazardous. However, they have not all been evaluated and confirmed to be contaminated. The sites identified consisted of fuel drum sites, hazardous materials sites, and concentrated ordnance sites. While an Environmental Baseline Survey is not a comprehensive assessment of contamination, in response, the U.S. military, the U.S. Environmental Protection Agency, and the CNMI have established mitigation and cleanup activities

under a variety of programs. These programs are summarized in Section 3.16.1.4, *Contaminated Sites*, and Appendix R, *Hazardous Materials and Waste Technical Memo*. Activities conducted at Tinian through these programs are addressed in this section.

3.16.4.4.1 Island-wide Sites

Activities on Tinian during World War II resulted in the potential for contaminants to be present throughout the island. According to a 1997 Environmental Baseline Survey, numerous areas of concern were identified that were the result of wartime activities and are described in detail in the following sections (GMP Associates, Inc. 1997). Island-wide hazards were also identified, including isolated ordnance, pesticide residues (i.e., dichlorodiphenyltrichloroethane or DDT), and sodium arsenate. Isolated ordnance may be encountered across Tinian as a result of historic wartime and training activities. According to the 1997 Environmental Baseline Survey, the archeological consultant documented the location of approximately 137 pieces of isolated ordnance (GMP Associates, Inc. 1997).

The 1997 Environmental Baseline Survey also documented the historical application of DDT as having occurred regularly at various locations on the island (GMP Associates, Inc. 1997). DDT was sprayed at least twice a month, but the duration of the spraying activity was not determined. Documents indicated that pesticide applications occurred at galleys, mess halls, and restroom facilities, however, the exact locations were also not determined. Subsequent testing for DDT and its byproducts in groundwater in the Marpo Municipal Well indicated that groundwater at that location had not been contaminated with DDT or its byproducts. However, further testing of soil was recommended due to the persistence of DDT in the environment.

Finally, pit latrines were used during World War II for the disposal of human waste where/when restroom facilities were not present. The holes were backfilled when capacity was reached and new holes were dug. While in use, the holes were sprayed daily with oil and sodium arsenite for sanitation purposes. Sodium arsenite is water soluble and highly toxic. The actual locations of the pit latrines were not determined; therefore, sodium arsenite is considered an island wide hazard both in soil and groundwater. Testing conducted and the Marpo Municipal Well has indicated that this substance has not contaminated the aquifer near the well site.

3.16.4.4.2 Military Lease Area

3.16.4.4.2.1 Military Training Activities

Site E-13 (the Tinian Mortar Range; also known as the Chiget Mortar Range) identified in the 1997 Environmental Baseline Survey is being investigated under the Navy's Military Munitions Response Program (see Figure 3.16-1) (DoN 2014b; GMP Associates, Inc. 1997). Chiget Mortar Range is located next to the Blow Hole attraction on Tinian. It occupies approximately 97.5 acres (39.5 hectares) of land.

The Tinian Mortar Range was part of the World War II battlefield and was used for military live-fire training from 1945 through 1994. During training exercises, small arms caliber munitions (i.e, up to .50 caliber), 40 millimeter rifle grenades, 60 millimeter mortars, and 81 millimeter mortars were used on the range. The range was closed in 1994. The Tinian Mortar Range is currently unused by the military and is being investigated to address hazards associated with munitions and explosives of concern and munitions constituents.

A Preliminary Assessment was completed in 2006 and noted the observation of mortar fragments, cartridge casings, unexpended grenades, and various expended munitions and munitions debris. Based on the findings of the Preliminary Assessment report, a Site Inspection to address Munitions and Explosives of Concern and Munitions Constituents at the Tinian Mortar Range was recommended and conducted from May to October 2014.

The Site Inspection confirmed the presence of metal constituents at levels exceeding 2008 Guam Environmental Protection Agency Pacific Basin Environmental Screening Levels for unrestricted land use where groundwater is a current or potential source of drinking water (DoN 2014b). Chromium and iron were the most common metals to exceed project action levels. The Site Inspection determined that munitions constituents concentrations did not exceed project action levels (DoN 2014b).

Utilizing the Munitions and Explosives of Concern and Munitions Constituents findings acquired during the Site Inspection, an explosive, chemical and health hazard evaluation was documented, and a Munitions Response Site Priority of 4 was determined based on application of the Munitions Response Site Prioritization Protocol. Munitions Response Site priorities range from 1 (highest priority) to 8 (lowest priority). A further investigation to delineate the extent and magnitude of metals contamination and to assess the potential human health and environmental risks associated with past operational practices was recommended.

3.16.4.4.2.2 International Broadcasting Bureau

According to the 1997 Environmental Baseline Survey, a lessee using the southwestern portion of the International Broadcasting Bureau site for cattle grazing reported finding glass bottles in the 1950s that he buried onsite (GMP Associates, Inc. 1997). The lessee stated that the bottles had a unique but unidentifiable odor. The location of the bottles was not ascertained and the bottles are assumed to still be present on the site.

3.16.4.4.2.3 Agricultural Activities

Historic agricultural activities on Tinian have resulted in the potential for contaminated sites within the proposed action area. An Environmental Baseline Survey conducted in 1997 identified eight sites of environmental concern within or just south of the Military Lease Area (see Figure 3.16-1) that are summarized in Table 3.16-1 and described in the following paragraphs.

Table 3.16-1. Sites of Potential Environmental Concern Associated with Agricultural Activities within the Tinian Military Lease Area

Site	*Description/Materials and Location*	*Activities/Category*
E-17	Bio Pacific Agricultural Area/possible pesticide use west of 8th Avenue, surrounding International Broadcasting Bureau inside Military Lease Area	The Bio Pacific Company stored fertilizers and pesticides at a warehouse outside the Military Lease Area. The amount of fertilizers and pesticides from the warehouse that may have been applied to the agricultural land are not known; this site is considered Category 6*
E-18**	Micronesian Development Company Cattle Grazing Land/possible pesticide use south of North Field and west of Broadway	Land was used primarily for grazing cattle from 1965 through 1994. However, several chemicals including pesticides were inventoried at the Micronesian Development Company in 1990 and it is unknown whether the pesticides were used on the grazing land; therefore, this site is considered Category 6*
L-13	Micronesian Development Company slaughterhouse disposal site	Disposal of waste products from slaughterhouse. Presence of stressed vegetation documented Category 7*
R-8	Micronesian Development Company Dairy Plant	Former location of "dipping wells" for bathing cattle in a tick repellent/pesticide
R-12	Micronesian Development Company Cattle Grazing Land/possible pesticide use	Land was used primarily for grazing cattle and several chemicals including pesticides may have been used on the grazing land; therefore, this site is considered Category 7*
R-13	Micronesian Development Corporation pesticide disposal site, 590 feet east of Broadway and 1800 feet South of the ranch office	Pesticide burial took place in 1989 in an excavated trench approximately 30 feet in length and 3 feet deep. In 1994 Environmental Engineering, Inc. removed contaminated soil and treated remaining contaminated soil. This site is considered a Category 4* because all removal and remedial actions have been taken
R-14	Micronesian Development Company contaminated soil	Storage of drums containing contaminated soil excavated from site R-13 remediation activities. Category 7*
S-11**	Micronesian Development Company Agricultural Parcels/pesticides, southeastern portion of island	Most of this land is used for cattle grazing. However, it is unknown whether pesticides were used on these lands; therefore, the site is considered Category 7*

Legend: *Category 1: Areas where no storage or disposal of hazardous substances or petroleum has occurred.
Category 2: Areas where only storage of hazardous substances has occurred, but no release or disposal has occurred.
Category 3: Areas where storage or release of hazardous substances has occurred but at concentrations that do not require a removal or remedial response.
Category 4: Areas where storage or release of hazardous substances has occurred and all removal or remedial actions to protect human health and the environment have been taken.
Category 5: Area where storage or release of hazardous substance has occurred, and removal actions are underway, but all required remedial actions have not yet been taken.
Category 6: Area where storage or release of hazardous substances has occurred, but required actions have not yet been implemented.
Category 7: Area not evaluated or that requires additional evaluation.

Sources: GMP Associates, Inc. 1997; J. Victorino, Naval Facilities Engineering Command (NAVFAC) Pacific, personal communication, 2014.

The 1997 Environmental Baseline Survey identified three areas within the Military Lease Area that supported agricultural uses (GMP Associates, Inc. 1997). The first was located near the current site of the International Broadcasting Bureau and was leased by the Bio Pacific Company for approximately 10 years in the 1980s (E-17). The site was used for the experimental production of fruit trees. Numerous fertilizers, pesticides, fungicides, herbicides, and reagents were left behind when Bio Pacific Company vacated the site. The Tinian Department of Public Works removed the chemicals from the site. Because many of the chemicals are classified as hazardous materials and no application data was available, soil sampling was recommended to determine whether remedial actions are warranted. The second site was located in the eastern half of the Military Lease Area and may have been used by the Micronesian Development Company for cattle grazing under a 30-year lease between 1965 and 1994 (E-18). Several pesticides and herbicides were inventoried in association with this site but it is unknown whether any were applied. The Micronesian Development Company also held a lease just south of the Military Lease Area on the western coast of Tinian (S-11) that also may have been subject to pesticide/herbicide application. The third site is the Micronesian Development Company disposed of waste from their slaughterhouse at a site located east of Broadway at the end of 96th Street just south of the Military Lease Area. This site was also used for aircraft disposal during World War II (see L-13 depicted in Figure 3.16-1).

A dairy plant operated from 1973 through 1982 or 1983, near the current Micronesian Development Corporation ranch office along Broadway (R-8) just south of the Military Lease Area boundary. Near the dairy were "dipping wells" for bathing cattle in a tick repellent/pesticide. This site is considered a Category 7 (see description of Categories under Table 3.16-1) because it was not surveyed during the 1997 Environmental Baseline Survey and more information is needed about the dairy operation.

The Micronesian Development Corporation leased an area just south of the Military Lease Area for cattle grazing (R-12). Pesticide and fertilizer applications are suspected to have occurred in this area. Additionally, the Micronesian Development Corporation established a pesticide disposal site, 590 feet (180 meters) east of Broadway and 1,800 feet (550 meters) south of the ranch office (R-13) near the Military Lease Area boundary. Pesticide burial took place in 1989 in an excavated trench approximately 30 feet (9 meters) in length and 3 feet (1 meter) deep. In 1994 Environmental Engineering, Inc. removed contaminated soil and treated remaining contaminated soil. The CNMI Bureau of Environmental and Coastal Quality indicates that five barrels of contaminated materials from site R-13 are stored at the Micronesian Development Corporation ranch office warehouse, East of Broadway and just North of the pesticide disposal site (R-14) and are awaiting approval from U.S. Environmental Protection Agency to ship the barrels off-island (GMP Associates, Inc. 1997).

3.16.4.4.2.4 World War II Activities

Former activities by both the United States and Japanese militaries during World War II have the potential to affect site conditions in the Military Lease Area. These sites were identified in the 1997 Environmental Baseline Survey (GMP Associates, Inc. 1997). Twenty-three fuel storage facilities, ordnance sites, and disposal sites used during World War II are located on in the Military Lease Area and have the potential to have affected site conditions. These sites are summarized in Table 3.16-2 and depicted in Figure 3.16-1.

Table 3.16-2. Sites of Potential Environmental Concern Associated with World War II Activities within the Tinian Military Lease Area

Site	*Description/Materials and Location*	*Activities/Category*
E-1	12 World War II Aviation Fuel Storage Tanks/ordnance east of 8th Avenue, south of the traffic circle at the intersection of 8th Avenue and 125th Street	Some, but not all of the fuel tanks were removed as scrap metal following World War II. Small munitions may also remain at this site; this site is considered Category 5*
E-2	19 World War II Aviation Fuel Storage Tanks/ordnance east side of Broadway, south of the traffic circle at the intersection of Broadway and 116th Street	Some, but not all of the fuel tanks were removed as scrap metal following World War II. Small munitions may also remain at this site; this site is considered Category 5*
E-5	World War II Japanese Fuel Bunker/petroleum products, end of a shallow gorge in the northwestern corner of North Field	The fuel bunker was bombed or burned during the war and unburned fuel likely leaked from containers. No subsequent cleanup took place; this site is considered Category 6*
E-6	World War II Asphalt Plant/asphalt east of 8th Avenue, between 110th and 125th Streets	Due to asphalt on the ground and metal equipment at the site, this site is considered Category 6*
E-8	World War II Mine Assembly Buildings/ordnance east of Broadway	Historical maps showed a cluster of mine assembly buildings that were not found during the 1997 Environmental Baseline Survey; this site is considered Category 7*
E-11	World War II Lube Oil Storage and Dumping Unit/petroleum products west of the traffic circle at northern end of Broadway	A historical map showed a lube oil storage and dumping unit at the location indicated. No further information was available and the site was not surveyed during the 1997 Environmental Baseline Survey; this site is considered Category 7*
E-12	World War II Central Bomb Dump/ordnance south of North Field	Historical records show that this facility had storage capacity for 10,000 tons of high explosive bombs and 15,000 tons of incendiary bombs. However, it is reported that there are no areas on Tinian with concentrated munitions, so most of the munitions may have been removed from this location. Because complete removal cannot be confirmed, this site is considered Category 5*
E-14	Caves Below Mount Lasso/ordnance caves along the cliffs below the east side of Mount Lasso used as Japanese defensive positions in World War II	According to archeological records, multiple munitions were found at Japanese positions along cliffs. However, no munitions were found in the Mount Lasso cliff caves during the 1997 Environmental Baseline Survey. A more thorough survey is needed to be sure that no munitions are present; this site is considered Category 7*
E-15	World War II Army Hospital/unknown, 110th Street east of 8th Avenue	A historical map indicated the presence of an Army Hospital at this location. No further information was found, and the site was not analyzed under the 1997 Environmental Baseline Survey; the site is considered Category 7*
E-20	Coke Dump Site	This is an ocean dump site located between Earle Point and Hilo Point. The site was used for the wholesale dumping of vehicles, tools, equipment and trash at the end of World War II

Table 3.16-2. Sites of Potential Environmental Concern Associated with World War II Activities within the Tinian Military Lease Area

Site	*Description/Materials and Location*	*Activities/Category*
E-21	Trash Dump Site	This World War II trash dumping site is located along the coast between Unai Chulu and Unai Babui. The trash dump consisted of a ramp that was used to dump small garbage into the ocean. No information regarding the exact type of trash was obtained
E-22***	World War II Trash Dump Site/garbage east of 8th Avenue and International Broadcasting Bureau	A historical map identified a World War II trash dump. The site is considered Category 7* because it was not assessed during the 1997 Environmental Baseline Survey
E-23	World War II Scrap Metal Dump Site/ordnance on northeastern coast, south of Asiga Point	Scrap metal, bullets, and other evidence of ammunition were found during the 1997 Environmental Baseline Survey. This site is considered Category 6*
E-25**	World War II Scrap Metal Dump Site/ordnance west of 8th Avenue, within Site E-17 described above	This site was identified from a historical map that indicated it contained scrap metal and possibly bombs. The site was not viewed during the 1997 Environmental Baseline Survey; therefore, the site is considered Category 7*
E-26	World War II Scrap Metal Dump Site/ordnance and petroleum products east of 8th Avenue and International Broadcasting Bureau south of Site E-22	Fuel containers, bombs, and bomb casings possibly remain at this site after partial removal; therefore, the site is considered Category 5*
E-29	World War II Japanese Air Traffic Control Building/unidentified stain on floor, northern boundary of North Field	Stain on floor was not investigated during the 1997 Environmental Baseline Survey. Therefore, the site is considered Category 7*
L-1	World War II Fuel Storage Tanks/ordnance, east of Broadway and northeast of the eastern end of the Tinian International Airport Runway	Rusted fuel tanks were noted during the 1997 Environmental Baseline Survey and historical evidence suggests munitions may remain; this site is considered Category 5*
L-2	World War II Fuel Storage Tanks/ordnance, west of Broadway across 96th Street	Fuel tanks were removed after World War II, but historical evidence suggests munitions may remain; this site is considered Category 5*
L-5	Former World War II Japanese Communication Building now Micronesian Development Company Slaughterhouse/potential asbestos and petroleum, northeastern corner of Broadway and 96th Street	Due to broken, suspected friable asbestos corrugated sheeting, World War II aboveground storage tanks, and a 55-gallon container with unknown contents, the site is considered Category 7*
L-8	Masalog Bomb Dump/ordnance, eastern portion of the island, inland from Unai Masalok	This site historically had 469 compartments for bomb storage and could accommodate 18,800 tons of high explosive bombs. All of the historic munitions may not have been removed, so this site is considered Category 5*
L-12	World War II Scrap Metal Dump Site/petroleum products and ordnance, west of 8th Avenue between 96th and 86th Streets	Historical records indicated that scrap metal, bombs, fuel, and grease from World War II may not all have been removed. The site was not viewed during the 1997 Environmental Baseline Survey; therefore, the site is considered to be Category 5*

Table 3.16-2. Sites of Potential Environmental Concern Associated with World War II Activities within the Tinian Military Lease Area

Site	*Description/Materials and Location*	*Activities/Category*
L-13***	West Field "Boneyard"	World War II aircraft junkyard. The site is assigned Category 7*
R-1	World War II Fuel Tank Farm located east of 8th Avenue south of the airport. Possible presence of ordnance	Undetermined whether all fuel tanks were removed after World War II. Historical evidence suggests munitions may remain; this site is considered Category 5*

Legend: *Category 1: Areas where no storage or disposal of hazardous substances or petroleum has occurred.
Category 2: Areas where only storage of hazardous substances has occurred, but no release or disposal has occurred.
Category 3: Areas where storage or release of hazardous substances has occurred but at concentrations that do not require a removal or remedial response.
Category 4: Areas where storage or release of hazardous substances has occurred and all removal or remedial actions to protect human health and the environment have been taken.
Category 5: Area where storage or release of hazardous substance has occurred, and removal actions are underway, but all required remedial actions have not yet been taken.
Category 6: Area where storage or release of hazardous substances has occurred, but required actions have not yet been implemented.
Category 7: Area not evaluated or that requires additional evaluation.
Sources: GMP Associates, Inc. 1997; J. Victorino, NAVFAC Pacific, personal communication, 2014.

3.16.4.4.2.5 Masalog Ridge Area Site

The Masalog Ridge Area Site encompasses approximately 292 acres (118 hectares) and is part of an ordnance storage depot located in what is known as the Masalog Ridge Area. The site is located along Masalok Beach Road near Masalog Point along the eastern coast of Tinian and is partially within the Military Lease Area. The U.S. military used the site immediately following the capture of the Mariana Islands in World War II to stage ordnance for aircraft, especially B-29 Bombers for the invasion of Japan. The ordnance storage area was extensive, consisting of over a hundred open revetments with unknown quantity of ordnance stored over a large area.

The unexploded ordnance contamination occurred after World War II, during the Trust Territory of the Pacific Islands government (which was administered by the U.S. government), prior to the CNMI acquiring the property. The property was returned from the Trust Territory government when the CNMI government was created in 1976. The property is currently owned by the Department of Public Lands, which is in charge of managing public properties in the CNMI and is under the Executive Branch of the CNMI government.

Unexploded ordnance and the potential for other explosive components currently present a significant health hazard to general public at this site. The site has remained idled and undeveloped since after its use as an ordnance storage depot (CNMI Division of Environmental Quality 2014).

The CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality, Site Assessment and Remediation branch had completed and submitted U.S. Environmental Protection Agency Eligibility Determination Checklist on July 28, 2013, which was approved by U.S. Environmental Protection Agency on August 16, 2013, as a Brownfields site. A Phase 1 Environmental Site Assessment was scheduled to occur in 2014 and a Phase II Environmental Site Assessment is scheduled to occur in 2015 (CNMI Division of Environmental Quality 2014).

3.16.4.4.3 Tinian International Airport

The existing runways and the area north of the existing runways at Tinian International Airport that would be part of the action alternatives comprises parts of the active runway, World War II-era pavement, and otherwise undeveloped land. A World War II-era asphalt plant located at end of Riverside Drive was identified in the vicinity of the Tinian International Airport by the 1997 Environmental Baseline Survey (see L-6 depicted in Figure 3.16-1). Due to containers of asphalt, spilled asphalt at the plant site and on Riverside Drive, plant equipment, and scrap metal, this site is considered Category 6 (see description of Categories under Table 3.16-3) and is being addressed under the Defense Environmental Restoration Program for Formerly Used Defense Sites (GMP Associates, Inc. 1997).

3.16.4.4.3.1 Tinian Asphalt Drum Dump Site

A Defense Environmental Restoration Program for Formerly Used Defense Sites site, known as the "Tinian Asphalt Drum Dump Site" at Puntan Diaplo, has been identified at the western end of the runway at Tinian International Airport. Few details regarding the extent of possible contamination at this dump site are available; however, this site is believed to have resulted from military activities during the World War II era (Air Force 2012). This site is also identified as site L-6 in the 1997 Environmental Baseline Survey Report and shown in Figure 3.16-1. The 1997 report documented remnants of asphalt plant equipment, drums, and scrap metal at the site (GMP Associates, Inc. 1997).

3.16.4.4.3.2 Surplus Area – West Field

According to the U.S. Army Corps of Engineers, the Surplus Area-West Field site is suspected to contain containerized and non-containerized hazardous or toxic waste (U.S. Army Corps of Engineers 2012) and a soil removal action is recommended. Few details regarding the possible contamination at this site are available; however, this site is believed to be located in the vicinity of the Tinian International Airport and was deemed ineligible for remediation under the Formerly Used Defense Sites program (U.S. Army Corps of Engineers, personal communication, December 5, 2014).

3.16.4.4.4 Port of Tinian

In 1992, approximately 10,000 gallons (38,000 liters) of unleaded fuel were released at the Mobil bulk fuel storage facility (located in the vicinity of the proposed port improvements) as a result of tank bottom failure. Contamination of soils and groundwater was confirmed and remediation using a combination of in situ air sparging, free product recovery, and air stripping was implemented with quarterly groundwater monitoring.

3.16.4.4.5 Supply Route

Table 3.16-3 lists sites of environmental concerns that were identified by the 1997 Environmental Baseline Survey in the vicinity of the proposed supply route on Tinian (see Figure 3.16-1).

Table 3.16-3. Sites of Potential Environmental Concern within the Tinian Military Lease Area

Site	*Description/Materials and Location*	*Activities/Category*
R-1	World War II Fuel Tank Farm (located east of 8th Avenue south of the airport. Possible presence of ordnance)	Undetermined whether all fuel tanks were removed after World War II. Historical evidence suggests munitions may remain; this site is considered Category 5*
R-6	Tinian Solid Waste Facility	Unrestricted dumping of municipal, hospital and military waste in unlined disposal site. No monitoring daily cover, compaction or established boundaries. Category 6*
R-15	Bio Pacific Lease Area	Area was used during the 1980s for the experimental cultivation of sugar cane. Several chemicals including pesticides may have been used on the grazing land; therefore, this site is considered Category 6*
L-4	Tinian International Airport/post- World War II-era petroleum, oil, and lubricant products	The airport has a 1,500-gallon (5,700 liters) aboveground diesel storage tank inside a concrete containment berm and a 2,000-gallon (7,600-liter) aboveground diesel storage tank. Minor leaks of hydraulic fluid were probable, but at concentrations that do not require a removal or remedial response. Therefore, this site is considered Category 3*
L-6	World War II Asphalt Plant/ asphalt, end of Riverside Drive	Due to containers of asphalt, spilled asphalt at the plant site and on Riverside Drive, plant equipment, and scrap metal, this site is considered Category 6*
L-7	World War II-era Service Aprons and Engineering Areas/petroleum, oil, and lubricant products, north of Tinian International Airport	Occasional small spills of petroleum products were likely, but at concentrations that do not require a removal or remedial response. Therefore, this site is considered Category 3*

Legend: *Category 1: Areas where no storage or disposal of hazardous substances or petroleum has occurred.
Category 2: Areas where only storage of hazardous substances has occurred, but no release or disposal has occurred.
Category 3: Areas where storage or release of hazardous substances has occurred but at concentrations that do not require a removal or remedial response.
Category 4: Areas where storage or release of hazardous substances has occurred and all removal or remedial actions to protect human health and the environment have been taken.
Category 5: Area where storage or release of hazardous substance has occurred, and removal actions are underway, but all required remedial actions have not yet been taken.
Category 6: Area where storage or release of hazardous substances has occurred, but required actions have not yet been implemented.
Category 7: Area not evaluated or that requires additional evaluation.

Sources: GMP Associates, Inc. 1997; DoN 2014b; J. Victorino, NAVFAC Pacific, personal communication, 2014.

3.16.4.4.5.1 Tinian Solid Waste Facility

Solid waste on Tinian is currently transported by residents and business entities to an open disposal site west of 8th Avenue and south of the Tinian International Airport. This site is unlined and does not comply with Resource Conservation and Recovery Act Subtitle D regulations governing landfills. The CNMI Department of Public Works is required to maintain the existing Tinian Solid Waste Facility in accordance with an Administrative Order issued by the CNMI Division of Environmental Quality, which requires the application of daily cover material and prohibits burning wastes, among other operational requirements. The Administrative Order was issued in 2010 as a cease-and-desist action serving to document the findings of violations of the CNMI solid waste regulations (DoN 2014).

3.16.5 Pagan

Land uses on Pagan have varied historically from being largely uninhabited until the early 1920s, to predominant agricultural use throughout the 1920s and 1930s, and then to predominant military use during World War II. Following World War II, small-scale U.S. military activity remained until the 1950s at which point small scale agricultural use resumed. The remaining 53 residents were evacuated from Pagan due to the large-scale eruption of Mount Pagan in 1981. This eruption covered half of the runway and destroyed much of Shomushon. Many of the structures were covered by ash (over 3 feet [1 meter] thickness) and lava (over 30 feet [9 meters] thickness). Any existing hazardous materials, hazardous wastes or expended military munitions may have been covered/destroyed. Since that time the island has not been resettled or used for industrial or agricultural purposes. This type of information provides a historical context from which to evaluate the use of hazardous substances over time on the island. A detailed summary of the land uses on Pagan as it pertains to the historical use of hazardous substances can be found in Appendix R, *Hazardous Materials and Waste Technical Memo.*

3.16.5.1 Hazardous Materials

Currently, Pagan is uninhabited, and therefore no hazardous materials are used on the island. Ongoing land uses on Pagan are limited to visitor encampments and ecotourism trips. Hazardous materials associated with these uses would be limited to small volumes of fuel for vehicles and cooking. These materials would likely be consumed or brought back to their point of origin and would not be stored or disposed of on Pagan.

3.16.5.2 Toxic Substances

Historic land uses have left remnants of equipment, structures, and buildings on Pagan that have the potential to contain toxic substances such as asbestos-containing materials, lead-based paint, and polychlorinated biphenyls.

All units and surficial deposits of Mount Pagan, where known, are composed of either basalt or basaltic andesite or a combination of the two (U.S. Geological Survey 2006). Basalt has relatively little uranium and is unlikely to generate high radon levels (Brill et. al. 1994).

3.16.5.3 Hazardous Waste

Currently, Pagan is uninhabited and, therefore, no hazardous wastes are generated on the island. Ongoing land uses on Pagan are limited to visitor encampments and ecotourism trips. These uses are not likely to result in the generation of hazardous wastes.

3.16.5.4 Potentially and Confirmed Contaminated Sites

United States and Japanese military activities during World War II potentially resulted in the presence of hazardous substance contamination and/or munitions and explosives of concern on Pagan. Based on review of historical documentation, the *Final Historical Ordnance Assessment Study, Pagan, Commonwealth of the Northern Mariana Islands* (DoN 2013a) estimated a determination of areas on Pagan with moderate to high or low probability of munitions and explosives of concern and munitions potentially presenting an explosive hazard presence based on the historical locations of Japanese

defense positions. See Figure 3.16-2 for a map showing the probability of munitions and unexploded ordnance of concern on Pagan.

Historic uses on the island include residential, agricultural, and military operations that may have utilized hazardous materials. The storage and disposal of hazardous materials on Pagan was not determined, therefore, traces of these materials may still be present on the island.

Other potentially contaminated sites include the historical Japanese Imperial Army infrastructure at the former Japanese airfield and in the foothills of Mount Pagan, including an aircraft hangar, bunkers, gun placements, fuel dumps, a mining camp, and a pier on Shomshon Bay.

Table 3.16-4 lists potential historical hazardous waste sites and munitions and explosives of concern areas at on Pagan (DoN 2013a).

Table 3.16-4. Potential Historical Hazardous Waste Sites and Munitions and Explosives of Concern Areas on Pagan

Site	*Description/Materials and Location*	*Status*
Former Japanese Airfield and Surrounding Area	Potential unexploded ordnance and potential munitions constituents in soils from World War II munitions storage and aerial bombardment of primary military targets on and surrounding the airfield. World War II activities could also include potential storage and use of petroleum, oils, and lubricants, and petroleum residues that may be present in soils.	According to the *Final Historical Ordnance Assessment Study Pagan, Commonwealth of the Northern Mariana Islands* (DoN 2013a) the area around the airfield and support facilities is considered to have a moderate to high level of probability of munitions and explosives of concern presence, requiring "On-call" unexploded ordnance contractor support.
Foothills of Mount Pagan	Potential unexploded ordnance and potential munitions constituents in soils from World War II aerial bombardment of non-military targets during air raids.	According to the *Final Historical Ordnance Assessment Study Pagan, Commonwealth of the Northern Mariana Islands* (DoN 2013a) non-military positions were also bombed and are considered to have a moderate to high level of probability of munitions and explosives of concern presence, requiring "On-call" unexploded ordnance contractor support.

Source: DoN 2013a.

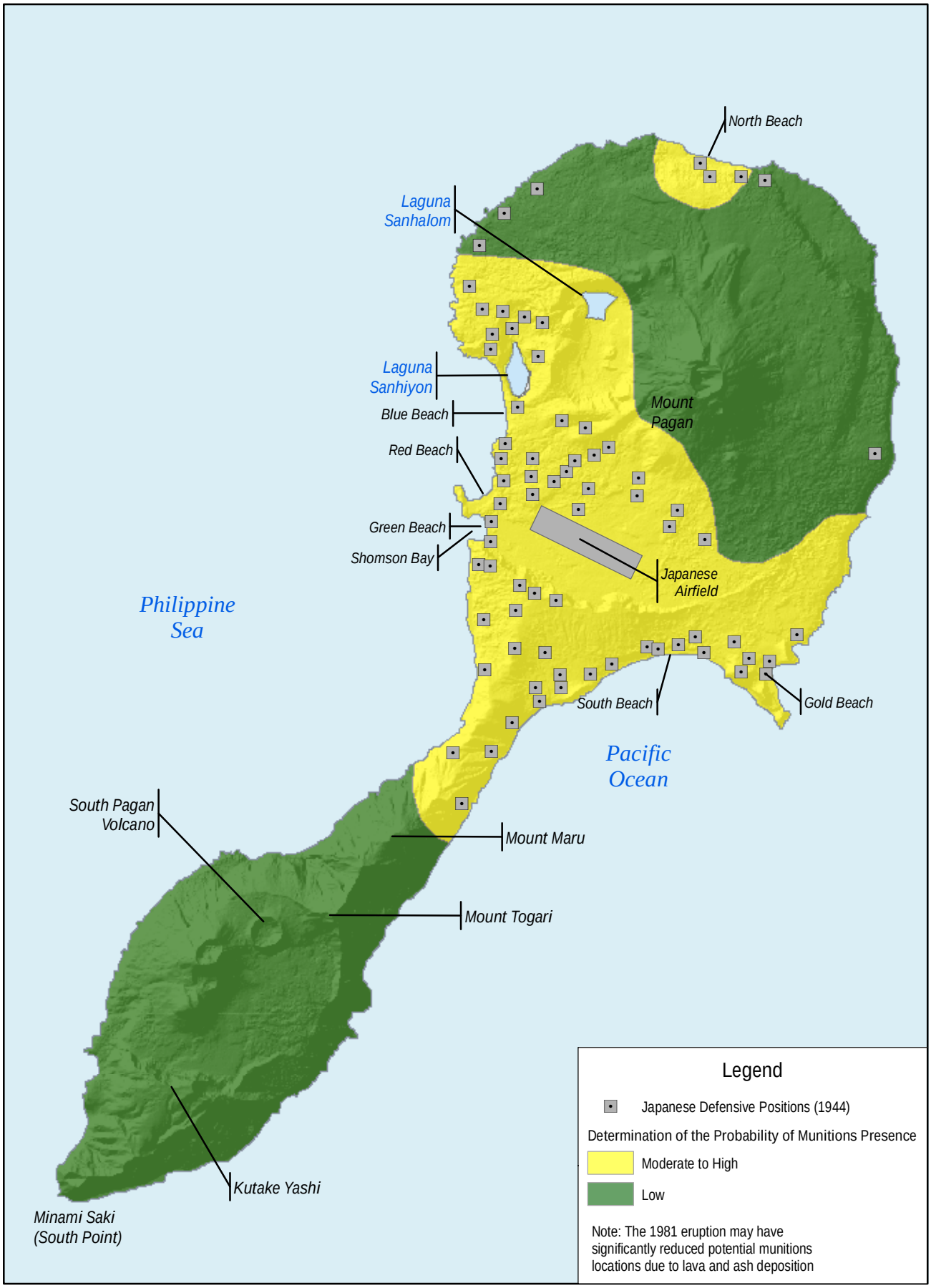


Figure 3.16-2
Probable Munitions Presence Locations

Source: DoN 2013c