FINAL
(VERSION 4)

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS JOINT MILITARY TRAINING

UTILITIES STUDY
VOLUME IV: WASTEWATER

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
JBPHH HI 96860-3134

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LIST OF ACRONYMS AND ABBREVIATIONS

BECQ	Bureau of Environmental and Coastal Quality
BOD	biological oxygen demand
CFR	Code of Federal Regulations
CJMT	CNMI Joint Military Training
CNMI	Commonwealth of the Northern Mariana Islands
CUC	Commonwealth Utilities Corporation
DEQ	Division of Environmental Quality
DoN	Department of the Navy
EIS/OEIS	Environmental Impact Statement/Overseas Environmental Impact Statement
GMZ	Groundwater Management Zone
gpd	gallons per day
IBB	International Broadcasting Bureau
IWDS	individual wastewater disposal system
lpd	liters per day
MBR	membrane bioreactor
mg/L	milligram per liter
MLA	Military Lease Area
MOP	Manual of Practice
MSA	Munitions Storage Area
NAVFAC	Naval Facilities Engineering Command
NMIAC	Northern Mariana Islands Administrative Code
NPDES	National Pollutant Discharge Elimination System
OWTS	other wastewater treatment system
RTA	Range and Training Area
SBR	sequencing batch reactor
TSS	total suspended solids
UFC	Unified Facilities Criteria
U.S.	United States
USEPA	United States Environmental Protection Agency

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CHAPTER 1. INTRODUCTION

1.1 OVERVIEW

The purpose of this volume is to provide information regarding the overall wastewater utility requirements associated with a proposed action to establish a series of live-fire and maneuver ranges, training areas, and supporting facilities within the Commonwealth of the Northern Mariana Islands (CNMI) to address the United States (U.S.) Pacific Command Service Components' unfilled training requirements in the Western Pacific. These live-fire ranges, training courses, and maneuver areas collectively constitute a Range and Training Area (RTA). Under the proposed action, a unit level RTA is proposed for Tinian and a combined level RTA is proposed on Pagan. The proposed action includes construction, range management, expanded training and operations (to include combined-arms, live-fire, and maneuver training at the unit and combined levels), establishment of danger zones, designation of special use airspace, and acquisition and/or lease of land to support simultaneous and integrated training. The CNMI Joint Military Training (CJMT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) is being prepared to assess the proposed action. This volume focuses on existing wastewater infrastructure capacity and facility requirements, proposed projects, and methodology to meet the proposed action. Figure 1.1-1 provides an overview of the CNMI, and Figure 1.1-2 and Figure 1.1-3 provide overviews of Tinian and Pagan, respectively.

There are two different training tempos proposed for both Tinian and Pagan. The first training tempo is the proposed action presented in the CJMT EIS/OEIS, consisting of 20 weeks per year on Tinian and 16 weeks per year on Pagan. In the future, the training tempo might be increased to 45 weeks per year on Tinian and 40 weeks per year on Pagan and is addressed by the CJMT EIS/OEIS as a potential future action. This study addresses both training tempos.

1.1.1 Goals and Objectives

The goal of this volume is to assess the overall wastewater utility requirements and impacts for the proposed action on Tinian and Pagan. The objectives of this volume include the following:

- Collect and review existing reports and studies
- Investigate current conditions of the wastewater infrastructure on Tinian and Pagan, current capacities, and reliability
- Research and correspond with pertinent agencies and stakeholders regarding pertinent regulatory compliance issues
- Evaluate wastewater sources, flows, collection facilities (sewers and pump stations), treatment facility location(s), process technologies, and disposal options
- Develop conceptual wastewater collection and treatment system alternatives
- Identify potential impacts and issues from the required collection, treatment, and disposal system(s)

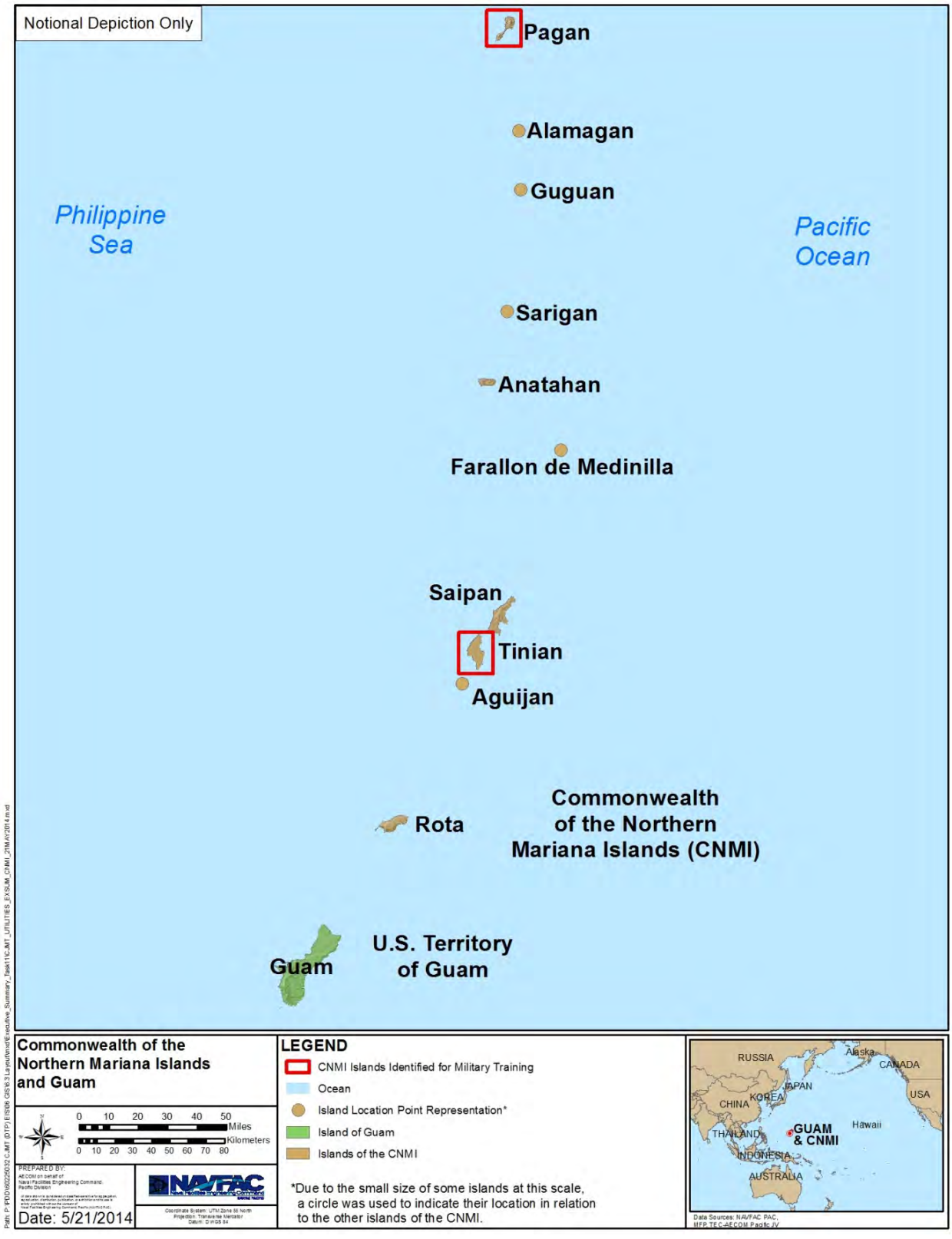

Figure 1.1-1.Commonwealth of the Northern Mariana Islands and Guam
Source: DoN 2014.

Figure 1.1-2. Island of Tinian and the Military Lease Area
Source: DoN 2014.

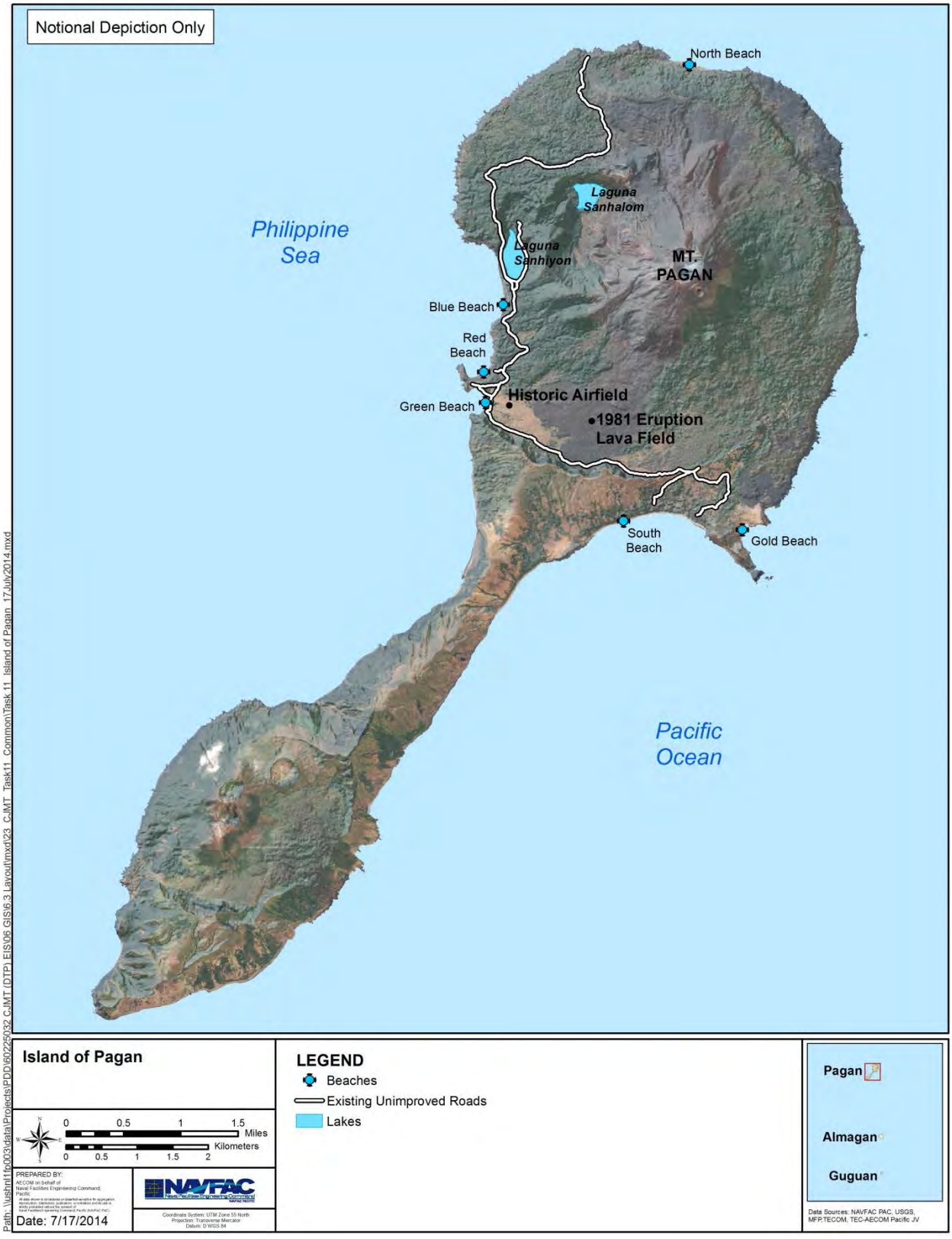

Figure 1.1-3. Island of Pagan
Source: DoN 2014.

1.2 BACKGROUND INFORMATION

The assumptions used for this volume are consistent with the *CJMT Unconstrained Training Concept for Tinian and Pagan* (DoN 2014a) and the proposed action as defined in the CJMT EIS/OEIS and master planning documents available at the time this volume was prepared.

1.2.1 Site Visit

A site visit was made to Saipan and Tinian in December 2013 to meet with local regulatory agencies and utility providers responsible for wastewater to gather information on the conditions of existing wastewater systems and discuss regulatory issues and requirements. Meeting notes, documents received, and follow-up email correspondence related to wastewater discussions from the site visit are provided in Appendix A.

1.2.2 Current Land Use

Current U.S. military training activity on Tinian is conducted on approximately 15,400 acres (6,232 hectares) in the northern two-thirds of the island. The portion of Tinian leased to the military by the CNMI is known as the Military Lease Area (MLA). Civilian activities, including fishing, hunting, plant gathering, recreation, and tourism, are permitted in the MLA when the military is not performing training exercises. Some areas are also leased back for compatible civilian use such as agriculture, including cattle grazing and small farming plots. There are some International Broadcasting Bureau (IBB) facilities located within the MLA.

Currently, Pagan does not have established military training areas and the island has no authorized residents. However, Pagan has recently been used for military helicopter/tilt-rotor aircraft landings.

1.2.3 Proposed Development

The proposed development on Tinian includes areas for unit level training by U.S., bi-lateral, and multinational forces. A base camp for housing transient trainees would support 1,500 trainees in permanent facilities and an additional surge of 1,500 trainees in expeditionary facilities such as tents. Approximately 95 permanent personnel would work year round at the base camp and throughout the ranges and support facilities. The wastewater calculations use 95 maintenance personnel as this is the latest number from the in-progress socioeconomic impact analysis while other utilities use "approximately 100" (DoN 2014d). For utility requirements, this difference is inconsequential since it represents a minor percentage difference (5% for maintenance workers, 0.3% for maximum normal training population, and 0.16% for maximum surge training population) and is within the accuracy of estimated utility requirements. A Munitions Storage Area (MSA), port improvements, and air field improvements would be constructed to support the number, frequency, and type of training envisioned (DoN 2014c). Civilian wastewater needs are considered in this volume since the proposed action could cause an impact on the existing wastewater systems.

On Pagan, the proposed development includes areas for combined level training by U.S. and multi-national forces. Training on Pagan is envisioned to be expeditionary in nature. Training exercises would involve 300 to 3,000 trainees, with an occasional surge of up to 4,000 trainees for larger exercises (DoN 2014d). No permanent personnel would be assigned to Pagan. A temporary ammunition storage area, port facilities, military training trails, and other minimal infrastructure would be constructed to support the number, frequency, and type of training envisioned (DoN 2014c). No authorized residents

currently live on Pagan and there are no existing utilities. Thus, consideration for civilian projected future wastewater impact on Pagan is not necessary.

There are two different training tempos for Tinian and Pagan. The first training tempo is the proposed action presented in the CJMT EIS/OEIS, consisting of 20 weeks per year on Tinian and 16 weeks per year on Pagan. In the future, the training tempo might be increased to 45 weeks per year on Tinian and 40 weeks per year on Pagan and is addressed by the CJMT EIS/OEIS (DoN 2014a) as a potential future action. This study addresses both training tempos.

CHAPTER 2.
EXISTING WASTEWATER SYSTEMS

2.1 TINIAN

2.1.1 United States Military Wastewater System

A U.S. military septic tank and leaching field system was constructed on Tinian in 1999 to support military training personnel and was first made available during a training exercise in March-April 1999 (Department of Defense 1999). The septic tank and leaching field system is located south of the IBB perimeter fence and west of, and adjacent to 8th Avenue as shown in Figure 2.1-1. The septic tank and leaching field system was sized and was certified for use for a population of 2,500 military training personnel with an average daily flow of 6,640 gallons per day (gpd) (25,135 liters per day [lpd]). The septic tank has a net volume of 18,700 gallons (70,787 liters). The leaching field is 70 feet (21 meters) long, 40 feet (12 meters) wide, and 6 feet (1.8 meters) deep from finish grade to the bottom of gravel (DEQ 1999).

In the past, wastewater services have been contracted out for military training exercises on Tinian. Wastewater from portable toilets is transported by a certified hauler and is transferred to the existing septic tank.

Currently the leaching field is overgrown with vegetation. From May 2012 to February 2014, the Bureau of Environmental and Coastal Quality (BECQ) Division of Environmental Quality (DEQ) allowed the use of the existing U.S. military septic tank and leaching field for military training as there was no other option available and the leaching field appeared to be draining. However, as of April 2014, BECQ DEQ is not allowing the use of the system until rehabilitation of the leaching field has been completed. Joint Region Marianas has plans to do a complete rehabilitation of the leaching field. Since the septic tank holds liquid, BECQ and Joint Region Marianas agree that the tank is structurally sound (personal communication from Mark Cruz, NAVFAC Marianas to Pete Diaz, AECOM, August 26, 2014).

2.1.2 Non-United States Military Wastewater Systems

2.1.2.1 Civilian Wastewater Systems

Tinian has no centralized municipal wastewater collection and treatment systems. Decentralized collection and treatment systems on Tinian serve some residential areas, such as the housing area in San Jose, that leads to a central septic system (Earth Tech 2005). However, most public and private buildings in the southern part of Tinian utilize individual wastewater disposal systems (IWDSs) consisting of septic tanks with leaching fields or cesspools for treatment and disposal of wastewater. Temporary toilet facilities are available through a local vendor (JGPO 2010).

A centralized municipal wastewater treatment plant to treat wastewater generated from civilians on Tinian was studied and proposed at a location south of the IBB boundary, west of 8th Avenue, and co-located a proposed solid waste landfill (JGPO 2010). However, because of the dynamics of the local economy, increases in projected construction costs, and the lack of funding, the proposed wastewater treatment plant on Tinian is not currently being pursued by the local government.

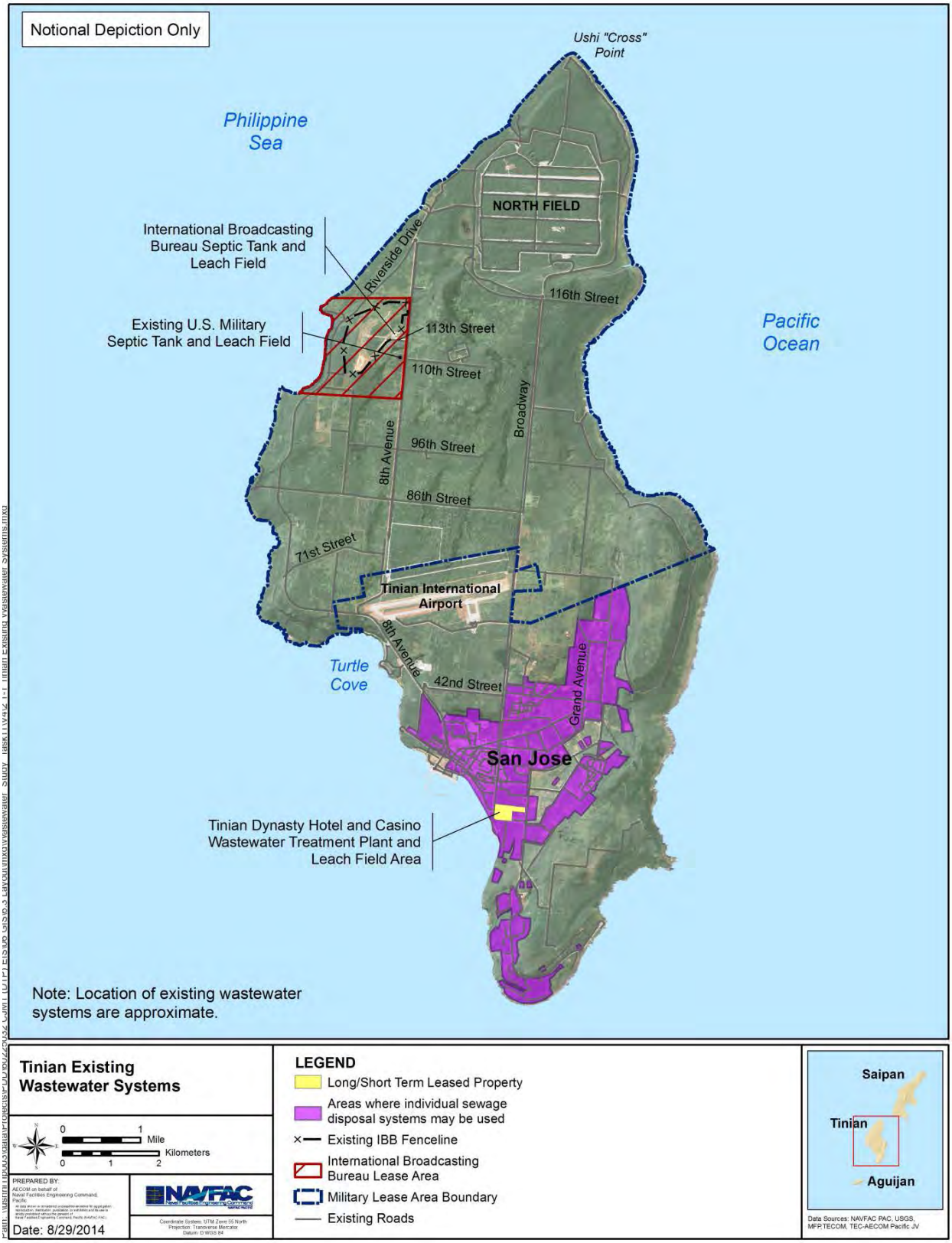

Figure 2.1-1. Tinian Existing Wastewater Systems

Source: DoN 2014.

2.1.2.2 Wastewater System for the Tinian Dynasty Hotel and Casino

The Tinian Dynasty Hotel and Casino, with 500 rooms, a casino, several restaurants, and dwelling units for staff accommodation, has its own tertiary treatment plant that is permitted to discharge a maximum average monthly flow of 0.24 million gpd (0.91 million lpd). Discharge monitoring reports from April 2014 to May 2014 show that the average daily wastewater flow to the plant ranged from 135,000 to 150,000 gpd (511,030 to 567,811 lpd). The plant consists of the following unit processes:

- Influent wet well with a manually cleaned bar screen
- Influent channel and bypass channel with a mechanically cleaned bar screen and manually cleaned bar screen, respectively
- Two equalization basins/grit removal
- Two aeration tanks
- One re-aeration tank for removal of ammonia
- Two secondary sedimentation tanks
- Two dual media filters
- Two ultra-violet modules
- Scum holding tank with alum addition
- Sludge drying beds

Final disposal of the treated effluent is through a leaching field on the hotel's property (Earth Tech 2005).

2.1.2.3 International Broadcasting Bureau Wastewater System

The IBB relay station comprises seven buildings including a transmitting and administration building, a power plant, a maintenance and storage building, two pump houses, a microwave shelter, and a guard booth (DoN 2014e). Wastewater generated at the IBB relay station facility is treated and disposed of in its own IWDS consisting of a septic tank and leaching field (JGPO 2010).

2.1.2.4 Tinian International Airport Wastewater System

Restroom facilities have been observed at the Tinian International Airport; however, no information regarding the existing capacity and status of the existing wastewater system is available. Wastewater from the existing Tinian International Airport is most likely treated and disposed of through an IWDS on the airport property.

2.2 PAGAN

In the 1970s, infrastructure improvements on Pagan included latrine buildings among other upgrades. However, in 1981, Pagan residents were relocated to Saipan because of the eruption of Mount Pagan. As of 2010, there were no authorized residents on Pagan; however, on a given day about 10 to 100 visitors could be on the island camping and/or hunting (DoN 2014d). Human waste is likely deposited or buried near the surface by campers and hunters.

There are no existing wastewater systems on Pagan currently in use.

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CHAPTER 3.
REGULATORY SETTING FOR WASTEWATER SYSTEMS

Wastewater systems on Tinian and Pagan are regulated under the CNMI Wastewater Treatment and Disposal Rules and Regulations as promulgated and enforced by the BECQ DEQ. These rules and regulations are in accordance with the 1982 Commonwealth Environmental Protection Act, as amended by the 1999 Commonwealth Environmental Amendments Act and promulgated by CNMI Executive Order Number 2013-24. These rules and regulations include requirements for the design, construction, permitting, operation, and maintenance of wastewater systems.

Disposal of treated wastewater through a leaching field or seepage pit would be subject to the requirements of the CNMI Wastewater Treatment and Disposal Rules and Regulations. Disposal of treated wastewater through an underground injection well would be subject to the requirements of the CNMI Underground Injection Well Regulations and the CNMI Well Drilling and Well Operations Regulations. For this proposed action, disposal of treated wastewater to state waters or waters of the U.S. is not anticipated; thus, it is not subject to the CNMI's Water Quality Standards, U.S. Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) permitting requirements, or Section 404 Army permitting requirements.

The Commonwealth Utilities Corporation (CUC) owns and is responsible for public water, wastewater, and power infrastructure in the CNMI. For wastewater systems, the CUC is currently subject to a Stipulated Order for the injunctive relief to address requirements under the Clean Water Act and the Safe Drinking Water Act as described later in this chapter (Section 3.4).

3.1 WASTEWATER TREATMENT AND DISPOSAL RULES AND REGULATIONS

The CNMI Wastewater Treatment and Disposal Rules and Regulations outline the requirements for both IWDS and other wastewater treatment systems (OWTS). An IWDS is a wastewater system designed and installed to treat and dispose of sewage from a single structure or group of structures using a septic tank, together with a leaching field or seepage pit. An OWTS is a wastewater system designed and installed to treat and dispose of sewage from a single structure or group of structures using means other than a septic tank together with a leaching field or seepage pit.

For projects located within a Class I Aquifer Recharge Area with an average daily flow greater than 5,000 gpd (18,927 lpd), the applicant must install and operate an OWTS meeting the siting, design, operations, and financial requirements of the CNMI regulations. A Class I Aquifer Recharge Area is defined as an area contributing surface infiltration to a geologic formation, or part of a formation that is water bearing and which currently transmits, or is believed capable of transmitting water to supply pumping wells or springs. The CNMI regulations define Class I Aquifer Recharge Areas as one of the following:

- Areas so defined and mapped by the U.S. Geological Survey as aquifer recharge zones.
- Areas defined by the Director pursuant to the CNMI Groundwater Management and Protection Act as a Class I Groundwater Management Zone (see Section 3.3).
- Areas determined in consultation with the U.S. Geological Survey and the CUC.

In general, construction and operation of an OWTS would apply to a residential project serving 100 persons or more or for any non-residential commercial or industrial project with average daily

sewage flows greater than 10,000 gpd (37,854 lpd) and would be permissible under all of the following conditions:

- There is no available public sewer.
- The project owner(s) prove the technical and financial capability to meet the OWTS operational requirements of the CNMI regulations.
- The siting and design parameters for an IWDS using a septic tank as outlined in the CNMI regulations cannot be met because of the limitations of site, soil, topography, and/or lot size.
- The siting and design parameters for an OWTS outlined in the CNMI regulations are met.

All new OWTS are subject to the design, siting, financial, and operational criteria set forth in the CNMI regulations. An IWDS or OWTS permit application must be completed and submitted to BECQ DEQ for all new waste treatment and disposal systems. A construction permit must be issued by BECQ DEQ before construction may begin on an IWDS or OWTS.

3.2 CNMI UNDERGROUND INJECTION CONTROL

The CNMI Underground Injection Control Regulations define the situations where wastewater (or other substances) may be injected into the ground. No person shall construct, install, operate, or maintain any Class I, II, III, or IV injection wells that include wells used for the disposal of hazardous waste, oil or natural gas production, or extraction of minerals. Class V wells include dry well seepage pits and leaching pits used for the introduction of waste fluids, other than those treated in septic systems. Dry wells or leaching pits used to dispose of septic system effluents are also considered Class V wells with the exception of the following:

- Individual or single-family residential waste disposal system such as domestic cesspools or septic systems
- Nonresidential cesspools, septic systems, or similar waste disposal systems that are used solely for the disposal of sanitary waste and have the capacity to serve fewer than 20 persons a day

For Class V wells, if the discharge causes a violation of the CNMI Drinking Water Regulations or may adversely affect the health of persons, additional requirements include plugging or abandoning the injection wells (NMIAC 2004).

3.3 CNMI WELL DRILLING AND WELL OPERATIONS REGULATIONS

The CNMI Well Drilling and Well Operation Regulations designate groundwater management zones and establish setback distances for public and non-public water supply wells from potential sources of contamination from land uses such as wastewater infrastructure. These regulations are promulgated by BECQ DEQ to implement the Commonwealth Groundwater Management and Protection Act of 1988.

Groundwater management zone (GMZ) classifications have been designated on the basis of groundwater quality, availability of recharge, susceptibility to degradation, and present and future land use. The three classes of GMZs are summarized as follows:

1. **Class I GMZs:** Areas capable of supplying high quality fresh water, and shall receive the highest level of environmental protection. A Class I GMZ is also defined as a Class I Aquifer Recharge Area in the CNMI Wastewater Treatment and Disposal Rules and Regulations.
2. **Class II GMZs**: Areas capable of supplying good quality groundwater, but generally of lower quality (e.g., higher chloride concentration) than a Class I GMZ.
3. **Class III GMZs:** Areas providing recharge to primarily brackish aquifers, having some intrinsic value as a resource to supply desalination plants, but primarily of lower value than groundwater found in Class I and II GMZs.

GMZs are used in other BECQ DEQ regulations to set additional restrictions on activities that may contaminate groundwater, including the Wastewater Treatment and Disposal Regulations. Currently the only island in the CNMI with established GMZs is Saipan.

Wellhead protection setback requirements from public water supplies and non-public water supplies are summarized in Table 3.3-1 and Table 3.3-2, respectively. Requirements for wellhead protection apply regardless of GMZ classification. Where GMZ requirements are adopted that are more stringent than specific wellhead protection requirements, the more stringent GMZ requirement shall apply.

Table 3.3-1. Wellhead Protection Setback Requirements from Public Water Supply

Existing Land Use	***Minimum Down/Upgradient Dimensions of Wellhead Protection Area***
Above/Below Grade Structures	10 ft/10 ft (3 m/3 m)
Road Drainage Course/Roadside	50 ft/100 ft (15 m/30 m)
Surface Water Body	150 ft/150 ft (46 m/46 m)
Public/Private Sewer Line [1]	100 ft/200 ft (30 m/61 m)
Sewage Pump Station	150 ft/300 ft (46 m/91 m)
Seepage Pit, Outhouse, Cesspool, Leaching Field, Wastewater Treatment Facility	150 ft/300 ft (46 m/91 m)
Underground Fuel Storage Tank	500 ft/500 ft (152 m/152 m)
Auto, Heavy Equipment, Engine Repair Facility	250 ft/500 ft (76 m/152 m)
Underground Injection Well	250 ft/500 ft (76 m/152 m)
IWDS Effluent Disposal (≥5,000 gpd [≥18,927 lpd])	500 ft/500 ft (152 m/152 m)
Above Ground Fuel Storage Facility (≤2,000 gal [≤7,570 liters]) [2]	250 ft/500 ft (76 m/152 m)
Above Ground Fuel Storage Facility (>2,000 gal [>7,570 liters]) [2]	1,000 ft/2,000 ft (305 m/610 m)
Above Ground Fuel Storage Facility [3]	500 ft/500 ft (152 m/152 m)
Above Ground Fuel Storage Facility [4]	200 ft/400 ft (61 m/122 m)
Landfill or Hazardous Waste Storage/Treatment Facility	1,000 ft/2,000 ft (305 m/610 m)
Unsewered Industrial Process	1,000 ft/2,000 ft (305 m/610 m)

Notes:
[1] Distance may be reduced to 50 feet (15 meters) provided monitoring and additional safety measures as prescribed by BECQ DEQ are put into place and maintained.
[2] Pertains to existing tanks constructed prior to September 2005. Depending on the terrain and site characteristics, BECQ DEQ may impose additional measures to protect the groundwater.
[3] Pertains to new tanks with secondary containment, corrosion protection, double-walled piping below grade equipped with automatic leak detection, and collision protection. Depending on the terrain and site characteristics, BECQ DEQ may impose additional measures to protect the groundwater.
[4] Pertains to new double-walled tanks with a secondary containment berm of at least 110% of the facility storage volume plus 4-inch (10-centimeter) freeboard, corrosion protection, double-walled piping below grade equipped with automatic leak detection, and collision protection. Depending on the terrain and site characteristics, BECQ DEQ may impose additional measures to protect the groundwater.
Legend: ft = feet; IWDS = individual wastewater disposal system; m = meter; gpd = gallon per day; lpd = liter per day.
Source: DEQ 2005.

Table 3.3-2. Wellhead Protection Setback Requirements from Non-Public Water Supply

Existing Land Use	***Minimum Down/Upgradient Dimensions of Wellhead Protection Area***
Road Drainage Course	25 ft/50 ft (8 m/15 m)
Surface Water Body	75 ft/75 ft (23 m/23 m)
Public/Private Sewer Line	75 ft/150 ft (23 m/46 m)
Sewage Pump Station	75 ft/150 ft (23 m/46 m)
All Other Setback Distances are as listed in Table 3.3-1	

Legend: ft = feet; m = meter.
Source: DEQ 2005.

BECQ DEQ may require the installation of one or more monitoring wells, and require the establishment of a groundwater monitoring program for water supply wells downgradient of a known or potential source of contamination, or if the zone of contribution is occupied by a known or potential source of contamination.

A comprehensive hydrogeologic investigation of the study area may be required by BECQ DEQ where proposed facilities may constitute a potential threat to the groundwater resources specifically used for drinking water supplies. Proposed facilities would include wastewater treatment and disposal facilities discharging directly or indirectly to the groundwater serving projects with an average daily wastewater generation rate of 10,000 gpd (37,854 lpd) or more. These facilities may be either an approved IWDS or a wastewater treatment facility. Any underground injection wells would also be part of the study.

3.4 STIPULATED ORDER

In 2008, a Stipulated Order was entered into court against the CUC under the Clean Water Act and the Safe Drinking Water Act. The Stipulated Order covers three major issues: (1) management and operations of the CUC; (2) a drinking water and wastewater master plan; and (3) short-term wastewater infrastructure construction. The only applicable issue to wastewater infrastructure on Tinian is the drinking water and wastewater master plan. The CUC is required to develop a comprehensive drinking water and wastewater master plan to determine current and future infrastructure needs for a 20-year period, and to provide a long-term plan for system improvements on Saipan, Rota, and Tinian. The following wastewater system assessments are required as part of the comprehensive wastewater system master plan:

- Conduct a wastewater assessment
- Conduct a condition assessment for wastewater systems
- Conduct a hydraulic capacity assessment to determine the capability of the wastewater systems to collect, convey, and treat peak dry-weather flows and peak wet-weather flows under current conditions and at projected population levels over 20 years
- Conduct an unsewered areas assessment
- Provide an infrastructure improvement plan based on wastewater assessments
- Provide a financial plan

The drinking water and wastewater master plan is under development and was not available at the time of this volume.

3.5 SOLID WASTE MANAGEMENT REGULATIONS FOR SEWAGE SLUDGE

The CNMI Solid Waste Management Regulations establish criteria and practices for new and existing solid waste management facilities including the adoption of the federal regulations (40 Code of Federal Regulations [CFR] Part 257 and Part 258). Criteria in 40 CFR Part 257 provide guidelines for the disposal of sewage sludge on the land when the sewage sludge is not used or disposed of through a practice regulated in 40 CFR Part 503. 40 CFR 503 regulates the use and disposal of solids generated during the treatment of domestic wastewater and septage.

The requirements for the disposal of sewage sludge and septic tank waste by land surface application or incorporation into soil include the following: the sludge has to have been treated by a "Process to Significantly Reduce Pathogens," public access to the area must be controlled for at least 12 months, and grazing by animals whose products are consumed by humans must be prevented for at least 1 month. If crops for direct human consumption are grown in the area where land application or incorporation into soil occurs, the sewage sludge or septic tank waste must first be treated by a "Process to Further Reduce Pathogens." However, these requirements do not apply to sewage sludge and septic waste disposed of by a trenching or burial operation. A trenching or burial operation means that sewage sludge or septic tank waste is placed in a trench or other natural or man-made depression and covered with soil or other suitable material at the end of each operating day such that the wastes do not migrate to the surface.

If solids generated from a treatment plant are disposed of in a municipal solid waste landfill or used as landfill cover material, they must comply with 40 CFR 258 rather than 40 CFR 503.

3.6 ADMINISTRATIVE ORDER RELATED TO SLUDGE DISPOSAL

In 2010, a Cease and Desist Administrative Order was issued by the DEQ to the CNMI Department of Public Works, which operates the existing Tinian Municipal Dump. The Administrative Order cited the following violations of USEPA and Solid Waste Management Regulations:

- Failure to apply daily cover
- Failure to prevent burning of waste
- Failure to prevent acceptance of prohibited wastes
- Failure to properly dispose of septic tank wastes

The existing Tinian Municipal Dump site is unlined and does not comply with Resource Conservation and Recovery Act Subtitle D regulations governing solid waste landfills. As such, the current Tinian Municipal Dump would not suffice as an option for the U.S. military to dispose of CJMT-generated municipal solid waste, septic tank wastes, or sewage sludge. The use of the Marpi solid waste facility on Saipan as a disposal site for wastes generated on Tinian would be dependent on the permit being renewed and a suitable agreement between the municipal governments of Tinian and Saipan to allow inter-island waste disposal (DoN 2014f).

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CHAPTER 4.
PROJECTED FUTURE SYSTEM REQUIREMENTS

4.1 TINIAN

Figure 4.1-1 illustrates the proposed action and areas to be developed on Tinian. Areas requiring wastewater infrastructure on Tinian include the base camp, MSA, port facilities, and airport facilities. It is anticipated that three new wastewater systems would be required for the proposed action based on the lack of an existing wastewater system, topography, and proximity to other proposed facilities. The base camp would require the largest wastewater system to collect, treat, and dispose of wastewater. The MSA and port facilities would each require a separate wastewater system from the base camp. The airport end state facilities, not part of the proposed action, could connect to the base camp wastewater system in the future. The actual location of proposed infrastructure may be affected by setbacks from other facilities (such as existing wells, wetlands, streams, coastlines, etc.) established in various CNMI regulations, as described in Chapter 3.

Existing wastewater systems serving housing on the Tinian rental market and the Tinian Dynasty Hotel and Casino would be utilized by the operations personnel and the construction workforce. To assess the impacts on existing wastewater systems on Tinian, wastewater flow from these populations were estimated. Wastewater flow estimates to design a wastewater system are generally based on domestic and industrial sources.

4.1.1 Design Criteria

The wastewater design criteria used for Tinian are based on applicable Unified Facilities Criteria (UFC) and the CNMI regulations as described in Chapter 3. Where design criteria are lacking or not applicable to the proposed action, supplemental design criteria were taken from other sources. The following is a list of sources used for the design criteria for Tinian:

- *Wastewater Collection,* UFC 3-240-01 (Department of Defense 2012a)
- *Domestic Wastewater Treatment,* UFC 3-240-02 (Department of Defense 2012b)
- *Central Vehicle Wash Facilities*, UFC 4-214-03 (Department of Defense 2004)
- *Design of Municipal Wastewater Treatment Plants*, Water Environment Federation Manual of Practice (MOP) FD-8 (WEF and ASCE 2009)
- *Design of Wastewater and Stormwater Pumping Stations*, MOP FD-4 (WEF and ASCE 1993)
- *Gravity Sanitary Sewer Design and Construction*, MOP FD-5 (WEF and ASCE 2007)
- Wastewater Engineering (Metcalf & Eddy 2003)
- Water Reuse (Metcalf & Eddy/AECOM 2007)
- *Recommended Standards for Wastewater Facilities* (Wastewater Committee of the Great Lakes 2004)
- *Public Works Utilities Criteria for Design and Construction: Electrical, Sewer, and Water* (NAVFAC Marianas 2011)
- *Onsite Wastewater Treatment Systems Manual* (USEPA 2002)
- Decentralized Systems Technology Fact Sheet: Recirculating Sand Filters (USEPA 1999a)

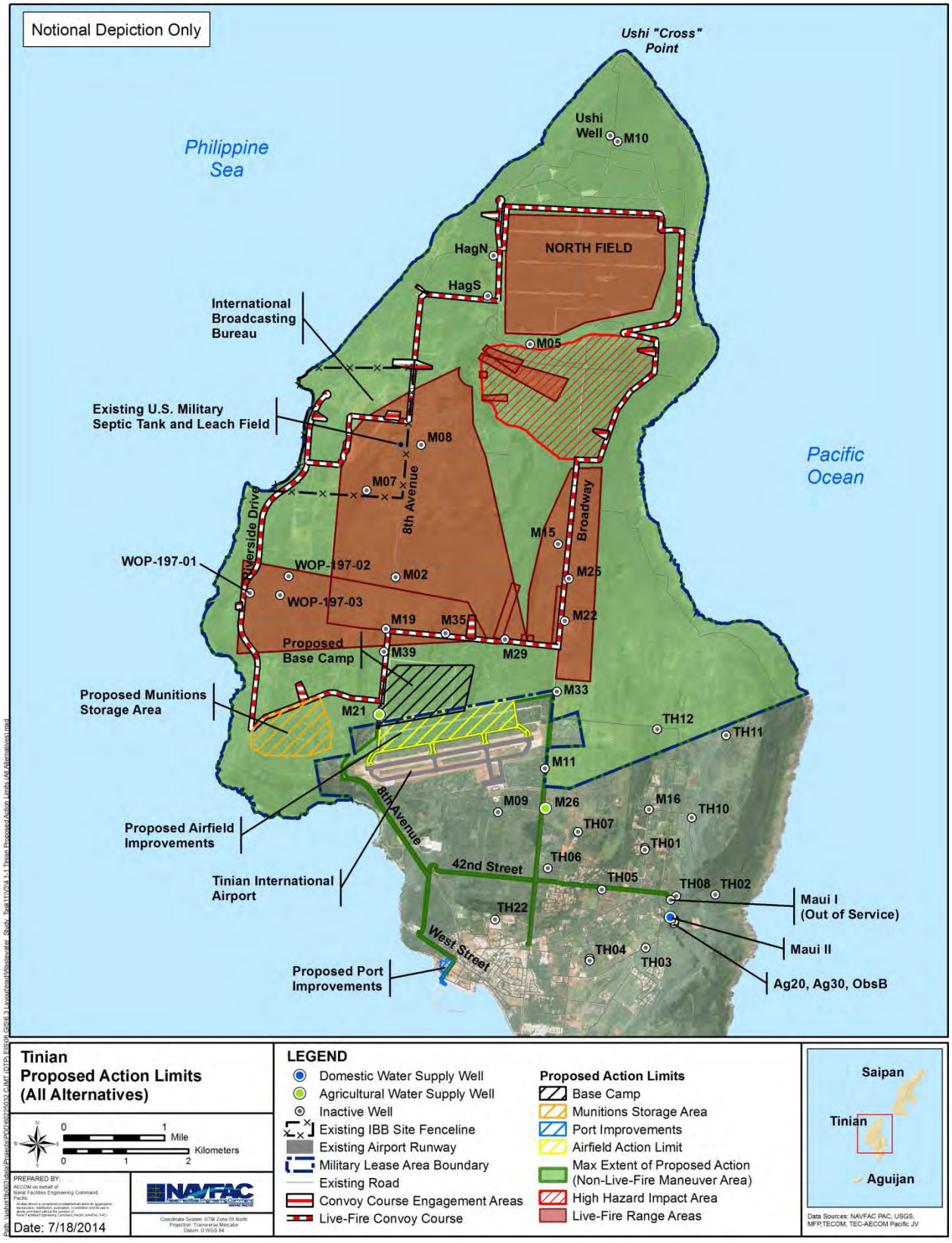

Figure 4.1-1. Tinian Proposed Action Limits (All Alternatives)
Source: DoN 2014.

4.1.1.1 Design Population

Domestic wastewater flow estimates are based on population. The design population for Tinian under the proposed action includes training personnel, operations personnel and dependents, construction workers, and construction managers and dependents, as summarized in Table 4.1-1.

Table 4.1-1. Design Population for Tinian

Category	***Population*** [1]	***Wastewater Generation Locations***
Training Personnel (Unit Level)	1,500	Base Camp; Various Training Areas
Training Personnel (Unit Level, Surge)	1,500	Base Camp; Various Training Areas
Operations Personnel (Resident)	0	Base Camp
Operations Personnel (Non-Resident)	95	Base Camp; Off-base Tinian Housing
Operations Personnel Dependents	155	Off-base Tinian Housing
Construction Workers	548	Off-base Tinian Housing; Various Construction Sites
Construction Managers	23	Off-base Tinian Housing; Various Construction Sites
Construction Manager Dependents	26	Off-base Tinian Housing

Note:
[1] To be conservative, "High" population estimates from the Socioeconomics Impact Assessment Study were used for this volume.
Source: DoN 2014a and DoN 2014d.

The design population of training personnel in permanent barracks is anticipated to be a maximum of 1,500 for a training tempo of about 20 weeks a year. A potential surge in the design population could add 1,500 training personnel in tents. If the training tempo were to increase in the future, projected at 45 weeks a year on Tinian, additional environmental studies would be prepared as required. For both training tempos, the design population would remain the same and thus the wastewater design requirements would also be the same (DoN 2014a).

Operations of the base camp and training ranges would require about 95 personnel to carry out range management and maintenance activities. About 76 operations personnel positions would be open to Tinian residents. While it would be possible over time, it is not anticipated that current Tinian residents would fill all 76 available jobs. For population estimates, it was assumed that between 8 and 38 out of the 76 operations personnel positions would be filled by current Tinian residents. For this volume, the conservative approach would be to assume that 8 operations personnel positions would be held by qualified Tinian residents and 87 operations personnel positions would be filled by qualified individuals from off island with dependents who would reside in rental housing on Tinian and not on the base camp. Other positions may be taken by Saipan residents, other residents of the CNMI, or residents from other places (DoN 2014d).

The construction workforce population during an anticipated 8- to 10-year construction period would include construction workers and construction managers with dependents. Depending on how rapidly construction is completed, the average number of construction workers, construction managers, and dependents of the construction mangers could be as high as 597. It is anticipated that the construction managers and their dependents would reside in rental housing outside of the MLA. It is anticipated that most of the construction workers would reside in dwelling units associated with the Tinian Dynasty Hotel and Casino and that no new workforce housing would need to be constructed to implement the proposed action.

4.1.1.2 Flow Estimating Unit Values

In the absence of actual annual wastewater flow data or actual annual water consumption data, wastewater design flows were estimated using average daily per capita unit values provided in UFC 3-240-02 (Department of Defense 2012b), as summarized in Table 4.1-2.

Table 4.1-2. Wastewater Flow Estimating Unit Values for Tinian

Design Population Type	*UFC Type of Installation or Building*	*Domestic Wastewater Allowance*
Off-base Housing	Military Installations	100 gpcd (379 lpcd)
Operations Personnel During Work Shift	Nonresident Personnel and Civilian Employees (per 8-hour shift)	30 gpcd (114 lpcd)
Training Personnel (Barracks)	Barracks (Permanent); Military Training Camps	50 gpcd (189 lpcd)
Training Personnel (Tents)	Barracks (Permanent); Military Training Camps	50 gpcd (189 lpcd)
Construction Workforce During Work Shift	Portable Toilets [1]	2.4 gpcd (9.1 lpcd)

Note:
[1] Assumed similar to actual flow estimates for portable toilets, see Section 4.2.1.2.
Legend: gpcd = gallons per capita per day; lpcd = liters per capita per day.
Source: Department of Defense 2012b.

4.1.1.3 Peaking Factors

Peak day flows are typically used to size equalization basins and sludge pumping systems. The peak day factor of 2.5 for small communities similar to the base camp was used (Metcalf & Eddy/AECOM 2007). Peak hourly flows are typically used to size pumping facilities, conveyance pipes, and other structures such as grit and sedimentation tanks.

Peak hour factors for U.S. military flows were determined using the Babbit's curve in the Water Environment Federation MOP FD-5 (WEF and ASCE 2007). For populations less than 1,000, a peak hour factor of 5.0 was used.

4.1.1.4 Wastewater Collection Systems

The following is a summary of the general design criteria and considerations used to develop the conceptual wastewater collection system on Tinian:

- Gravity systems are to be provided wherever possible.
- Pump stations are to be provided where the proposed site conditions will not allow for gravity systems.
- Manhole spacing for pipe sizes less than 18 inches (46 centimeters) is 400 feet (122 meters) maximum.
- Minimum cover is 3 feet (1 meter).
- Regardless of flow and depth, the minimum sizes to be used are 6-inch (15-centimeter) for building connections and 8-inch (20-centimeter) for all other sewers.
- Approximate trench width for 8-inch (20-centimeter) lines is 2 feet (0.6 meter), but may vary depending on depth, soil conditions, or construction methods.
- New wastewater mains would generally follow existing and proposed road alignments.

4.1.1.5 Wastewater Treatment Systems

Individual Wastewater Disposal Systems

The following is a summary of the general design criteria and considerations used to develop the conceptual wastewater treatment systems that would utilize a septic tank, together with a leaching field:

- This type of system is defined as an IWDS according to CNMI regulations.
- Although Tinian has not been official designated as a Class I Aquifer Recharge Area, for this volume, the design criteria for proposed IWDS on Tinian are limited to a capacity of 5,000 gpd (18,927 lpd), as if all of Tinian is considered a Class I Aquifer Recharge Area.
- Septic tank design shall follow Chapter 65-120, Part 600 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004).
    - Septic tank shall provide access for cleaning, adequate volume for settling, and for sludge and scum storage, be able to sustain all loads and pressures, and will resist corrosion.
    - For planning purposes, a multi-compartment reinforced concrete tank is to be used with an effluent filter.
- It is assumed that the percolation rates for the project would be conducive with leaching fields. Prior to construction, percolation testing is required in accordance with Chapter 65-120, Part 700 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004).
- Leaching field design shall follow Chapter 65-120, Part 800 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004).
    - For planning purposes, a percolation rate of 4–5.99 inches per hour (10.2-15.2 centimeters per hour) consistent with mixed limestone and alluvial sediments is assumed, yielding a required soil absorption factor of 1.3 gallons per square foot per day (53 liters per square meter per day).
    - The maximum size for a single leaching field would consist of seven drain lines with a total area of 60 feet (18 meters) long by 42 feet (13 meters) wide.
- Siting criteria for an IWDS shall follow the setback distances in Chapter 65-120, Part 1000 of the CNMI Wastewater Treatment and Disposal Rules and Regulations and as described in Chapter 3 of this volume.

Other Wastewater Treatment System

The following is a summary of the general design criteria and considerations used to develop the conceptual wastewater treatment systems other than a septic tank, together with a leaching field:

- This type of system is defined as an OWTS according to CNMI regulations.
- Although Tinian has not been officially designated as a Class I Aquifer Recharge Area, for this volume, the design criteria for a proposed OWTS on Tinian is for a system used for wastewater treatment capacities greater than 5,000 gpd (18,927 lpd).
- OWTS design shall follow Chapter 65-120, Part 1600 of the CNMI Wastewater Treatment and Disposal Rules and Regulations.

  - Design of an OWTS shall follow the criteria and recommendations in the *Recommended Standards for Wastewater Facilities* (Wastewater Committee of the Great Lakes 2004).
  - The OWTS shall produce, at a minimum, a secondary treated effluent.

- According to the BECQ DEQ, the use of a leaching field for an OWTS on Tinian is permitted in CNMI regulations, because Tinian does not have an official designation as a Class I GMZ or a Class I Aquifer Recharge Area.
- It is assumed that the percolation rates for the project would be conducive with leaching fields. Prior to construction, percolation testing is required in accordance with Chapter 65-120, Part 700 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004).
- The Director of DEQ may permit up to a 50% reduction in the soil absorption area for secondary treated effluent. According to BECQ DEQ staff, this reduction is directly related to the potential impact on the marine environment (personal communications from David Rosario, CNMI DEQ to Pete Diaz, AECOM, February 14, 2014). The proposed leaching field site is not anticipated to impact the marine environment; however, for design purposes, a 0% reduction in the soil absorption area was assumed.
- The leaching field design shall follow Chapter 65-120, Part 800 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004).
  - For planning purposes, a percolation rate of 4 to 5.99 inches per hour (10.2-15.2 centimeters per hour) consistent with mixed limestone and alluvial sediments is assumed, yielding a required soil absorption factor of 1.3 gallons per square foot per day (53 liters per square meter per day).
  - For planning purposes, a single leaching field would consist of seven drain lines with a total area of 60 feet (18 meters) long by 42 feet (13 meters) wide.
- Siting criteria for an OWTS shall follow the setback distances in Chapter 65-120, Part 1000 of the CNMI Wastewater Treatment and Disposal Rules and Regulations (NMIAC 2004) and as described in Chapter 3 of this volume.

4.1.2 Projected Future Wastewater Flow

To identify wastewater treatment system requirements, it is essential to determine the source, quantity, and the characteristics of wastewater flow. Wastewater normally consists of domestic and industrial wastewater. For new developments, projection of domestic wastewater flow is estimated by population data and estimates of average per capita wastewater flow rates. Industrial wastewater flows must be designed for the peak day flow as determined for the particular industrial process or activity involved. Typical industrial discharges include wastewaters from the sources such as maintenance facilities, vehicle wash areas, weapons cleaning buildings, and firefighting training facilities.

4.1.2.1 Domestic Wastewater

Domestic wastewater flow estimates were based on design populations at the proposed U.S. military facilities requiring wastewater systems. Average daily domestic wastewater flow was calculated as follows:

*Average Daily Domestic Flow = Design Population * Per Capita Rate*

Base Camp

The bulk of the domestic wastewater generated on Tinian would come from the base camp. Depending on the level of training conducted at the base camp, the design population would vary as summarized in Table 4.1-3.

Table 4.1-3. Base Camp Design Population

Training Scenario	*Operations Personnel*	*Training Personnel*		*Total*
	Non-Resident	*Barracks*	*Tents*	
No Training	95	0	0	95
Unit Level Training	95	1,500	0	1,595
Unit Level Training, Surge	95	1,500	1,500	3,095

Source: DoN 2014d.

The domestic wastewater flow estimates for the "No Training," "Unit Level Training," and "Unit Training, Surge" scenarios are presented in Table 4.1-4, Table 4.1-5, and Table 4.1-6, respectively, and are summarized in Table 4.1-7.

Table 4.1-4. Projected Future Base Camp Domestic Wastewater Flows (No Training)

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Operations Personnel			
Non-Resident	95	30 gpcd (114 lpcd)	2,850gpd (10,788 lpd)
Subtotal	95	—	2,850gpd (10,788 lpd)
Training Personnel			
Barracks	0	50 gpcd (189 lpcd)	0 gpd (0 lpd)
Tents	0	50 gpcd (189 lpcd)	0 gpd (0 lpd)
Subtotal	0	—	0 gpd (0 lpd)
Total	**95**	**—**	**2,850 gpd (10,788 lpd)**

Legend: — = None; gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Table 4.1-5. Projected Future Base Camp Domestic Wastewater Flows (Unit Level Training)

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Operations Personnel			
Non-Resident	95	30 gpcd (114 lpcd)	2,850 gpd (10,788 lpd)
Subtotal	95	—	2,850gpd (10,788 lpd)
Training Personnel			
Barracks	1,500	50 gpcd (189 lpcd)	75,000 gpd (283,906 lpd)
Tents	0	50 gpcd (189 lpcd)	0 gpd (0 lpd)
Subtotal	1,500	—	75,000 gpd (283,906 lpd)
Total	**1,595**	**—**	**77,850 gpd (294,694 lpd)**

Legend: — = None; gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Table 4.1-6. Projected Future Base Camp Domestic Wastewater Flows (Unit Level, Training, Surge)

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Operations Personnel			
Non-Resident	95	30 gpcd (114 lpcd)	2,850 gpd (10,788 lpd)
Subtotal	95	—	2,850gpd (10,788 lpd)
Training Personnel			
Barracks	1,500	50 gpcd (189 lpcd)	75,000 gpd (283,906 lpd)
Tents	1,500	50 gpcd (189 lpcd)	75,000 gpd (283,906 lpd)
Subtotal	3,000	—	150,000 gpd (369,078 lpd)
Total	**3,095**	**—**	**152,850 gpd (379,866 lpd)**

Legend: — = None; gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Table 4.1-7. Summary of Projected Future Base Camp Domestic Wastewater Flow

Training Scenario	*Total Design Population*	*Domestic Wastewater Flow*
No Training	95	2,850 gpd (10,788 lpd)
Unit Level Training	1,595	77,850 gpd (294,694 lpd)
Unit Level Training, Surge	3,095	152,850 gpd (379,866 lpd)

Legend: gpd = gallons per day; lpd = liters per day.
Source: DoN 2014.

Munitions Storage Area

The MSA would have two maintenance facilities, each equipped with restrooms and a janitor's closet that would require wastewater service (DoN 2014b). The design population assumed for the MSA facilities is a maximum of 20 non-resident personnel that would generate domestic wastewater. The estimated domestic wastewater flow estimate for the MSA is 600 gpd (2,271 lpd) as summarized in Table 4.1-8.

Table 4.1-8. Projected Future Munition Storage Domestic Wastewater Flow

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Non-Resident Personnel	20	30 gpcd (114 lpcd)	600 gpd (2,271 lpd)

Legend: gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Port Facilities

The proposed port facilities include a biosecurity facility and a design population of 6 non-resident personnel that would generate domestic wastewater. The estimated domestic wastewater flow estimate for the port facilities is 180 gpd (681 lpd) as summarized in Table 4.1-9.

Table 4.1-9. Projected Future Munition Storage Domestic Wastewater Flow

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Non-Resident Personnel	6	30 gpcd (114 lpcd)	180 gpd (681 lpd)

Legend: gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Airport Facilities

The expeditionary airport layout under Scenario 1 would not have any permanent facilities that would require wastewater infrastructure. However, in Scenario 2, future airport facilities at end state build out would include two hangar bays, an arrival/departure facility, and an air traffic control tower, which could be served by the proposed wastewater system for the base camp. Since the future airport facilities could be served by the base camp system and personnel to staff the facilities would come from the base camp, the domestic wastewater flow has been accounted for in the base camp domestic flow estimate.

Operations Personnel Housing

The domestic wastewater generated by the operations personnel and their dependents in housing on the Tinian rental market would be treated and disposed of by existing individual wastewater disposal systems associated with each rental property. The estimated domestic wastewater flow estimate for the operations personnel is 24,200 gpd (75,188 lpd) as summarized in Table 4.1-10.

Table 4.1-10. Projected Future Operations Personnel Housing Domestic Wastewater Flow

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Operations Personnel [1]	87	100 gpcd (379 lpcd)	8,700 gpd (16,443 lpd)
Operations Personnel Dependents	155	100 gpcd (379 lpcd)	15,500 gpd (24,200 lpd)
Total	242		24,200 gpd (75,188 lpd)

Note:
[1] Eight operations personnel out of 95 would be Tinian residents and would not contribute to the increase in domestic wastewater flow.
Legend: gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Construction Sites

Domestic wastewater generated by the construction workforce (Table 4.1-11) at the various construction sites for the proposed action is anticipated to be collected and disposed of by a licensed hauling contractor. It is anticipated that the initial treatment of the wastewater generated from portable toilets would be provided by the existing U.S. military septic tank and leaching field.

Table 4.1-11. Projected Future Construction Wastewater Flow

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Construction Workers	548	2.4 gpcd (9.1 lpcd)	1,315 gpd (4,979 lpd)
Construction Manager	23	2.4 gpcd (9.1 lpcd)	55.2 gpd (209 lpd)
Total	571		1,370 gpd (5,188 lpd)

Legend: gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

Construction Workforce Housing

The domestic wastewater generated by the construction workforce housed in dwelling units associated with the Tinian Dynasty Hotel and Casino would be treated and disposed of at the existing wastewater treatment plant at the hotel. The domestic wastewater generated by the construction managers and their dependents in housing on the Tinian rental market would be treated and disposed of by existing individual wastewater disposal systems associated with each rental property. Table 4.1-12 summarizes the projected future domestic wastewater flows for the construction workforce. The estimated domestic wastewater flow

estimate for the construction workers is 27,400 gpd (103,572 lpd). The estimated domestic wastewater flow estimate for the construction managers and dependents is 4,900 gpd (18,571 lpd).

Table 4.1-12. Projected Future Construction Workforce Housing Domestic Wastewater Flow

Population Category	*Design Population*	*Per Capita Rate*	*Domestic Wastewater Flow*
Construction Workers	548	50 gpcd (189 lpcd)	27,400 gpd (103,572 lpd)
Construction Manager	23	100 gpcd (379 lpcd)	2,300 gpd (8,717 lpd)
Construction Manager Dependents	26	100 gpcd (379 lpcd)	2,600 gpd (9,854 lpd)
Total	597		32,300 gpd (122,143 lpd)

Legend: gpcd = gallons per capita per day; gpd = gallons per day; lpcd = liters per capita per day; lpd = liters per day.
Source: DoN 2014.

4.1.2.2 Industrial Wastewater

Wastewater collection systems must be designed for the peak industrial flow as determined for the particular industrial process or activity involved. For this volume, industrial wastewater flow in general was estimated on the assumption that 80% of the industrial water demand (as estimated in Volume III, *Potable Water*, of this *Utilities Study*) would be discharged into the proposed wastewater system. For wash rack facilities that can be provided with make-up water to account for water losses, it was assumed that 100% of the industrial water demand from these facilities would be discharged to a proposed wastewater system. Industrial wastewater flows could vary based on the use of the facilities on the base camp; however, to determine the overall wastewater requirement for collection, treatment, and disposal, the maximum flow was used.

Base Camp

The projected maximum future industrial wastewater flow from facilities at the base camp was estimated at 43,806 gpd (165,823 lpd).

Munitions Storage Area

The projected maximum future industrial wastewater flow from the MSA facilities was estimated at 3,280 gpd (12,416 lpd).

Port Facilities

The industrial wastewater flow from the proposed port facilities on Tinian would come from the vehicle washdown area and the biosecurity facility. The projected maximum future industrial wastewater flow from the vehicle washdown area was estimated at 12,000 gpd (45,425 lpd). The projected maximum future industrial wastewater flow from the biosecurity facility was estimated at 396 gpd (1,499 lpd).

Airport Facilities

The expeditionary airport layout under the proposed action would not have any permanent facilities that would generate industrial wastewater. However, the potential future end state airport facilities would include two hangar bays, an arrival/departure facility, and an air traffic control tower, which could be served by the proposed wastewater system for the base camp. The projected industrial wastewater flow from the potential future end state airport facilities was estimated at 680 gpd (2,574 lpd).

Operations Personnel Housing

No industrial wastewater flow would be generated in the housing of operations personnel and their dependents.

Construction Workforce Housing

No industrial wastewater flow would be generated at the dwelling units associated with the Tinian Dynasty Hotel and Casino or in the housing of construction mangers and their dependents.

4.1.2.3 Total Wastewater Flows

The total average daily wastewater flow is the sum of the domestic flow and the industrial flow.

Total Wastewater Flow = Domestic Flow + Industrial Flow

Peak flow was based on the average daily flow increased by a peaking factor. The total peak flow was estimated by the following equation:

*Peak flow = Domestic flow * Peaking Factor + Industrial Flow*

With new collection systems built with modern construction techniques, the normal infiltration is accounted for in the peaking factor. It is not separately listed in the flow estimates. Estimates of peak flow would only be applicable to the base camp, as it would have more substantial flows that require wastewater infrastructure (e.g., similar to those of a small community as opposed to individual facilities).

Base Camp Wastewater System

The projected future average daily wastewater flows for the base camp on Tinian are summarized in Table 4.1-13. Table 4.1-14 presents the projected future peak day wastewater flows for the base camp. Table 4.1-15 tabulates the projected future peak hour wastewater flows for the base camp.

Table 4.1-13. Projected Future Average Wastewater Flows (Base Camp System)

Training Scenario	*Design Population*		*Average Daily Wastewater Flow*		
	Operations Personnel	*Training Personnel*	*Domestic Flow*	*Industrial Flow*	*Total Flow*
No Training	95	0	2,850 gpd (10,788 lpd)	44,202 gpd (167,322 lpd)	47,052 gpd (178,111 lpd)
Unit Level Training	95	1,500	77,850 gpd (294,694 lpd)	44,202 gpd (167,322 lpd)	122,052 gpd (462,016 lpd)
Unit Level Training, Surge	95	3,000	152,850 gpd (578,600 lpd)	44,202 gpd (167,322 lpd)	197,052 gpd (745,922 lpd)

Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

Table 4.1-14. Projected Future Peak Day Wastewater Flows (Base Camp)

Training Scenario	*Total Design Population*	*Domestic Flow*	*Peaking Factor*	*Industrial Flow*	*Total Peak Day Flow* [1]
No Training	95	2,850 gpd (10,788 lpd)	2.5	44,202 gpd (167,322 lpd)	51,327 gpd (194,293 lpd)
Unit Level Training	1,595	77,850 gpd (294,694 lpd)	2.5	44,202 gpd (167,322 lpd)	238,827 gpd (904,058 lpd)
Unit Level Training, Surge	3,095	152,850 gpd (578,600 lpd)	2.5	44,202 gpd (167,322 lpd)	426,327 gpd (1,613,823 lpd)

Note:
[1] Total Peak Flow = Domestic Flow * Peaking Factor + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

Table 4.1-15. Projected Future Peak Hour Wastewater Flows (Base Camp)

Training Scenario	*Total Design Population*	*Domestic Flow*	*Peaking Factor*	*Industrial Flow*	*Total Peak Hour Flow* [1]
No Training	95	2,850 gpd (10,788 lpd)	5.0	44,202 gpd (167,322 lpd)	58,452 gpd (221,264 lpd)
Unit Level Training	1,595	77,850 gpd (294,694 lpd)	4.6	44,202 gpd (167,322 lpd)	402,312 gpd (1,522,916 lpd)
Unit Level Training, Surge	3,095	152,850 gpd (578,600 lpd)	4.0	44,202 gpd (167,322 lpd)	655,602 gpd (2,481,723 lpd)

Note:
[1] Total Peak Flow = Domestic Flow * Peaking Factor + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

It is anticipated that wastewater generated at the biosecurity facility at the port would need to be treated and disposed of in the base camp wastewater system. Thus, the flows presented in the tables above include contributions from the biosecurity facility at the port.

Munitions Storage Area Wastewater System

Table 4.1-16 summarizes the calculation of the projected future average daily wastewater flow for the MSA. The projected future average daily wastewater flow is estimated at 3,880 gpd (14,687 lpd).

Table 4.1-16. Projected Future Average Daily Wastewater Flow (Munitions Storage Area)

Design Population	*Average Daily Wastewater Flow*		
Nonresident Personnel	*Domestic Flow*	*Industrial Flow*	*Total Flow* [1]
20	600 gpd (2,271 lpd)	3,280 gpd (12,416 lpd)	3,880 gpd (14,687 lpd)

Note:
[1] Total Average Daily Flow = Domestic Flow + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day (rounded).
Source: DoN 2014.

Port Facilities Wastewater Systems

Table 4.1-17 summarizes the calculation of the projected future average daily wastewater flow for the vehicle washdown at the port. The industrial flow associated with vehicle washdown, estimated at 12,000 gpd (45,425 lpd), would be treated by a separate system. Table 4.1-18 summarizes the calculation of the projected future average daily wastewater flow for the vehicle washdown at the port.

Table 4.1-17. Projected Future Average Daily Wastewater Flow (Port Vehicle Washdown)

Design Population	*Average Daily Wastewater Flow*		
Nonresident Personnel	*Domestic Flow*	*Industrial Flow*	*Total Flow* [1]
0	0 gpd (0 lpd)	12,000 gpd (45,425 lpd)	12,000 gpd (45,425 lpd)

Note:
[1] Total Average Daily Flow = Domestic Flow + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

To reduce permitting and maintenance requirements, it is anticipated that a holding tank would be provided for the biosecurity facility at the port that would be periodically emptied and contents transferred to the wastewater treatment and disposal system at the base camp. Thus, the projected future average daily wastewater flow for the holding tank would be 576 gpd (2,180 lpd).

Table 4.1-18. Projected Future Average Daily Wastewater Flow (Port Biosecurity Facility)

Design Population	*Average Daily Wastewater Flow*		
Nonresident Personnel	*Domestic Flow*	*Industrial Flow*	*Total Flow* [1]
6	180 gpd (681 lpd)	576 gpd (2,180 lpd)	576 gpd (2,180 lpd)

Note:
[1] Total Average Daily Flow = Domestic Flow + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

Airport Facilities

With the airport facilities anticipated to be part of the base camp wastewater system, the domestic wastewater contribution from the proposed airport facilities is accounted for in the base camp domestic flow estimate. The additional flow from the future end state airport facilities that would add to the base camp wastewater system is the industrial flow. The projected additional average daily flow from the airport facilities to the base camp wastewater system is shown in Table 4.1-19.

Table 4.1-19. Projected Future Average Daily Wastewater Flow (Airport Facilities)

Design Population	*Average Daily Wastewater Flow*		
Nonresident Personnel	*Domestic Flow*	*Industrial Flow*	*Total Additional Flow* [2]
See Note 1	See Note 1	680 gpd (2,574 lpd)	680 gpd (2,574 lpd)

Notes:
[1] Domestic flow contribution is accounted for in the base camp domestic flow estimate.
[2] Total Average Daily Flow = Domestic Flow + Industrial Flow.
Legend: gpd = gallon per day; lpd = liters per day.
Source: DoN 2014.

4.1.3 Projected Future Wastewater Loading for Base Camp Treatment System

4.1.3.1 Influent Characteristics

For this volume, the influent wastewater characteristics were based on 0.17 pound (0.08 kilogram) of biological oxygen demand–5 day (BOD_5) per capita per day and 0.20 pound (0.09 kilogram) of total suspended solids (TSS) per capita per day as recommended by the Ten States Standard (Wastewater Committee of the Great Lakes 2004). To estimate the concentration of BOD_5 and TSS loading, the average daily domestic flow was used in the calculation.

Table 4.1-20 summarizes the projected influent wastewater characteristics for the base camp on Tinian.

Table 4.1-20. Design Influent Characteristics (Base Camp)

Training Scenario	*Design Population*	*Average Daily Domestic Flow*	*BOD_5*		*TSS*	
			(lb/day)	*(mg/L)*	*(lb/day)*	*(mg/L)*
No Training	95	2,850 gpd (10,788 lpd)	16	679	19	799
Unit Level Training	1,595	77,850 gpd (294,694 lpd)	271	418	319	491
Unit Level Training, Surge	3,095	152,850 gpd (578,600 lpd)	526	413	619	486

Legend: BOD_5 = biological oxygen demand, 5-day; gpd = gallon per day; lpd = liters per day; lb/day = pounds per day; mg/L = milligram per liter; TSS = total suspended solids.
Source: DoN 2014.

Septage and leachate may contribute significant organic load and other materials that can cause operational problems and non-compliance with the BECQ DEQ permit. Septage would be screened,

discharged into an aerated holding tank, and metered into the influent upstream of the fine screens using a submersible pump with a timer to spread the discharge out over a full day.

4.1.3.2 Effluent Limitations

The CNMI regulations state that all OWTSs must be capable of producing secondary treated effluent, which is defined to have the concentration limits summarized in Table 4.1-21. In general, these effluent limits are more stringent than the industry standard.

Table 4.1-21. Effluent Limitations (Base Camp)

Effluent Characteristic	***Maximum Discharge Limits***	
	Average Monthly	***Maximum Daily***
Biochemical Oxygen Demand, 5-day	20 mg/L	40 mg/L
Total Suspended Solids	20 mg/L	40 mg/L
Total Nitrogen	1.0 mg/L	2.0 mg/L
Fecal Coliform	23 cfu/100 mL	23 cfu/100 mL
pH	Between 6.5 and 8.6	

Legend: cfu = colony forming unit; mg/L = milligram per liter; mL = milliliter.
Source: NMIAC 2004.

A critical issue with the design effluent limits is the nitrogen parameter. The definition for secondary treated effluent includes a total nitrogen concentration of 1.0 milligram per liter (mg/L). This regulatory limit is lower than what is attainable and is currently accepted as the industry best available control technology limit for total nitrogen which is about 3 mg/L. According the BECQ DEQ, each OWTS is evaluated on a case-by-case basis in terms of meeting the requirement for total nitrogen. Historically, the Tinian Dynasty Hotel and Casino, which has the only OWTS on Tinian, has been able to meet the nitrogen requirement, measuring nitrate as nitrogen. Total nitrogen is comprised of organic nitrogen, ammonia, nitrite, and nitrate. Industry best available control technology is able to reduce the nitrate component of total nitrogen to the 1 mg/L level. Nitrate has been used to measure the performance of treatment processes along with total nitrogen. For this volume, in order to meet the intent of the CNMI regulations, the best available technology will be used in order to obtain the best nitrogen removal rate.

4.2 PAGAN

Figure 4.2-1 and Figure 4.2-2 illustrate the proposed action limits for all alternatives considered on Pagan. The wastewater approach is identical between the two alternatives. The expeditionary bivouac area would be located parallel to and south of the airfield. It was assumed that biosecurity inspections on Pagan are not required; however, this remains to be validated during the consultation process.

4.2.1 Design Criteria

Because of the expeditionary nature of the proposed facilities on Pagan, the following estimates and military training manuals were used to develop the wastewater design criteria for Pagan:

- *Field Hygiene and Sanitation*, Field Manual 21-10/Marine Corps Reference Publication 4-11.1D8 (Department of Defense 2000).
- *Marianas Training Manual* (DoN 2010).

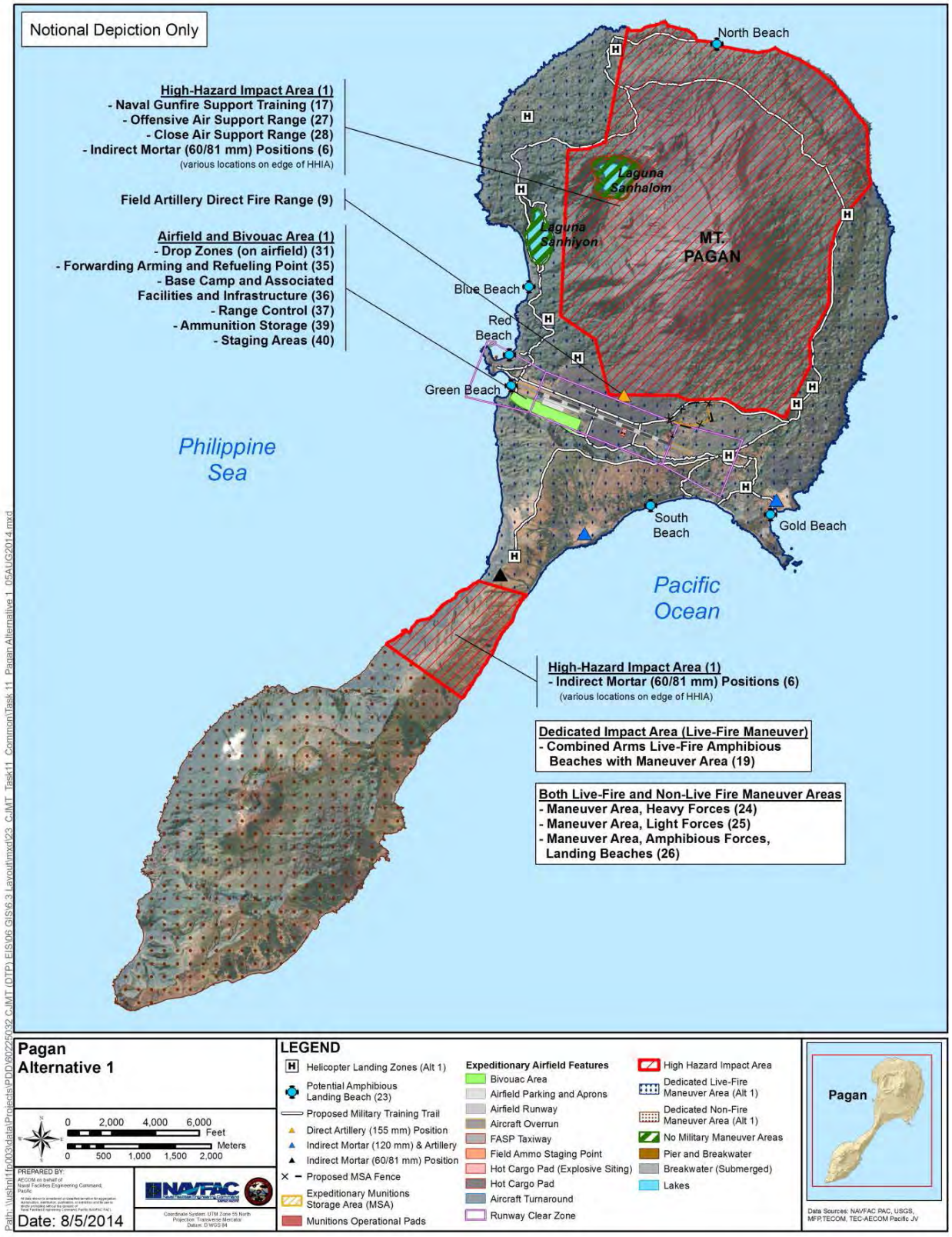

Figure 4.2-1. Pagan Alternative 1

Source: DoN 2014.

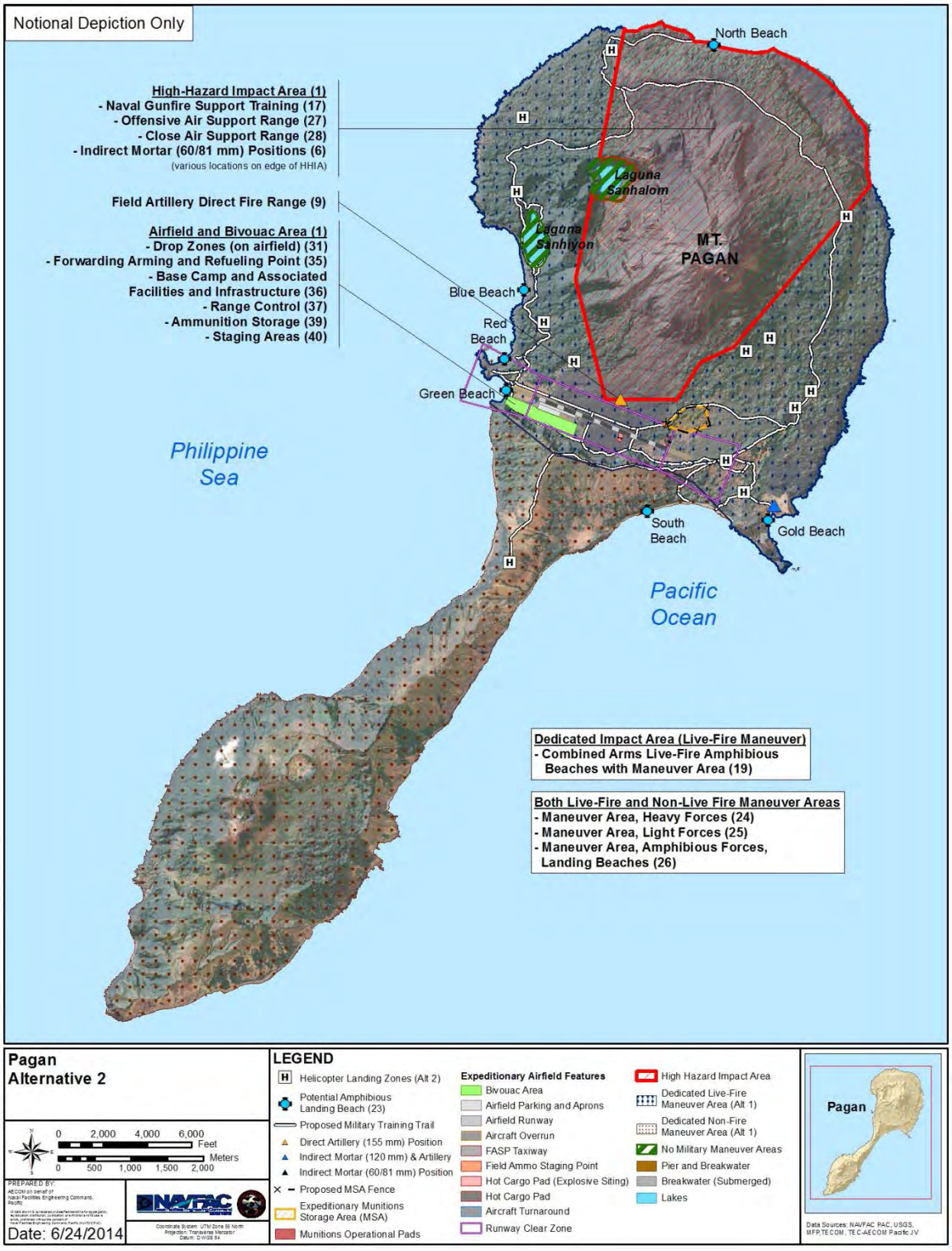

Figure 4.2-2. Pagan Alternative 2
Source: DoN 2014.

Based on wastewater volumes estimated from a previous military training exercise conducted in November 2013 to December 2013 on Tinian, the peak wastewater volume estimated for portable toilet usage was 950 gpd (3,596 lpd) by 400 military training personnel (personal communications from Mark Cruz, NAVFAC Marianas to Pete Diaz, AECOM, August 26, 2014). This is equivalent to a per capita rate of 2.4 gpd (9 lpd).

4.2.1.1 Design Population

The design population for Pagan under the proposed action includes 3,000 training personnel with a training tempo of about 16 weeks. During large force exercises, a surge of 1,000 additional training personnel is anticipated. If the training tempo were to increase in the future, projected at 40 weeks a year on Pagan, additional environmental studies would be prepared as required. For both training tempos, the design population would remain the same and thus the wastewater design requirements would also be the same. The design population on Pagan is summarized in Table 4.2-1.

Table 4.2-1. Design Population for Pagan

Category	*Population*	*Wastewater Generation Locations*
Training Personnel	3,000	Bivouac Area; Various Training Areas
Training Personnel, Surge	4,000	Bivouac Area; Various Training Areas

Source: DoN 2014a.

It is anticipated that construction on Pagan would be done by military personnel as part of the training exercises.

4.2.1.2 Flow Estimating Unit Values

Wastewater volume estimates were provided by Naval Facilities Engineering Command Marianas for a military training exercise on Tinian from November 6, 2013 to December 27, 2013. Based on a total population of 400 training personnel, the estimated daily volume of wastewater generated was 950 gallons (3,596 liters) from the portable toilets. The equivalent per capita flow value was 2.4 gallons per capita per day (9.1 liters per capita per day) for portable toilet use.

4.2.2 Projected Future Wastewater Flow

4.2.2.1 Domestic Wastewater

With a maximum population of 4,000 training personnel and a flow estimating factor of 2.4 gallons per capita per day (9.1 liters per capita per day), the estimated domestic wastewater flow to be generated on Pagan is 9,600 gpd (36,340 lpd).

4.2.2.2 Industrial Wastewater

No industrial wastewater is anticipated to be generated on Pagan.

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CHAPTER 5.
POTENTIAL WASTEWATER SYSTEM SOLUTIONS

5.1 TINIAN

5.1.1 General Requirements and Considerations

Wastewater treatment systems are required to meet effluent standards of applicable federal, state, and local government agencies or the overseas equivalent. On Tinian, the base camp, MSA, and port facilities would be served by separate wastewater systems because of their proposed locations and the lack of a centralized wastewater collection and treatment system. Equalization of flows and the organic shock load should be considered at all plants, which are critically affected by surge loadings.

5.1.2 Collection Systems Evaluation

For small community applications such as the Tinian base camp, wastewater is generally collected using a network of pipes and appurtenances. The types of collection systems that would be applicable include the following:

- Conventional gravity collection system with pump stations
- Septic tank effluent pump or gravity systems
- Grinder pump pressure system
- Vacuum collection system

The type of collection system selected depends on a number of factors, including topography, ease of construction, construction cost, energy use, minimum slope, infiltration/exfiltration, minimum diameter, access to clean main lines, trench depth, remote pump stations, and conflicts with buried utilities.

The advantages of a conventional gravity sewer system include reliability and long life expectancy (50 years), while disadvantages include deeper trenching, larger diameter pipes, and the requirement for pumping stations if downhill slopes cannot be maintained.

Collection systems that utilize septic tanks upstream to remove solids allow the use of smaller diameter gravity mains for collection. Low pressure systems offer benefits such as shallow pipe burial and small diameter piping; however, the disadvantages of such a system, particularly on a larger scale, include higher operation and maintenance costs, public education and acceptance, higher facility maintenance, and higher life cycle replacement costs.

Alternatively, a grinder pump can be utilized instead of an on-site septic tank to process wastewater in pressurized collection systems. Pressure collection systems with grinder pumps require more maintenance.

An alternative to pressurized collection systems is the use of a vacuum system and valves to control the wastewater flow. In these systems, individual building flows would have a vacuum sump and control system. A valve in the sump seals the line leading to the main to maintain a vacuum in the collection main. Vacuum pumps are housed at a central vacuum station, usually near the wastewater treatment facility. The advantages of a vacuum system include the following: they are ideal for flat topography, narrow and shallow trenches, lower energy usage and maintenance than grinder pump systems, no minimum slope required, smaller diameter pipes, and conflicts with buried utilities can be avoided.

Similar to the grinder pump systems, the disadvantages include higher operation and maintenance costs, public education and acceptance, higher facility maintenance, and higher life cycle replacement costs.

5.1.3 Treatment Technology Evaluation

5.1.3.1 Individual Wastewater Disposal System

The treatment and disposal of wastewater from a single structure or group of structures using a septic tank and leaching field are defined as an IWDS. Figure 5.1-1 illustrates a typical layout for an IWDS. The capacity limit for this type of system is typically about 10,000 gpd (37,854 lpd). However, as described in Section 3.1, the regulatory flow limit for an IWDS in a Class I Aquifer Recharge Area is less than 5,000 gpd (18,927 lpd). The primary components of a conventional IWDS include the septic tank, the subsurface infiltration system, and the soil. Subsurface wastewater infiltration systems are passive, effective, and inexpensive treatment systems due to the assimilative capacity of many soils to transform and recycle most pollutants found in wastewater.

Since the projected future wastewater flow from the base camp system is greater than 5,000 gpd (18,927 lpd), an IWDS cannot be used at the base camp, but it can be used for other facilities such as the MSA.

5.1.3.2 Other Wastewater Treatment Systems

For facilities with estimated average daily flows greater than 5,000 gpd (18,927 lpd), CNMI regulations require a minimum of secondary effluent quality. The following technologies were evaluated in this volume:

- Membrane bioreactor (MBR)
- Sequencing batch reactor (SBR)
- Sand/media filtration

Of particular concern for the potential technology evaluated is the total nitrogen limit required by the CNMI Wastewater Rules and Regulations and the generation of sludge requiring handling and disposal.

Membrane Bioreactor Technology

MBRs combine biological treatment with an integrated membrane system to provide enhanced organics and suspended solids removal. The biological process activates sludge using the suspension of diverse microorganisms to convert biodegradable, organic wastewater constituents and certain inorganic fractions into new cells and byproducts that can be removed by settling or other physical means. A conventional activated sludge process and common MBR configuration are shown in Figure 5.1-2. The membrane replaces the sedimentation and clarification function for separating the biomass in the aerated tank from the treated water. With an MBR, the overall space requirements and facilities costs can be reduced as compared to a conventional activated sludge process.

MBRs have the following advantages:

- Smaller aeration tank/reactor
- Can be designed to provide nitrogen removal to an ammonia concentration of 1 mg/L and phosphorus removal to total phosphorus concentration of 0.1 mg/L if coagulants are added
- Less sludge production
- Less chance for process upsets

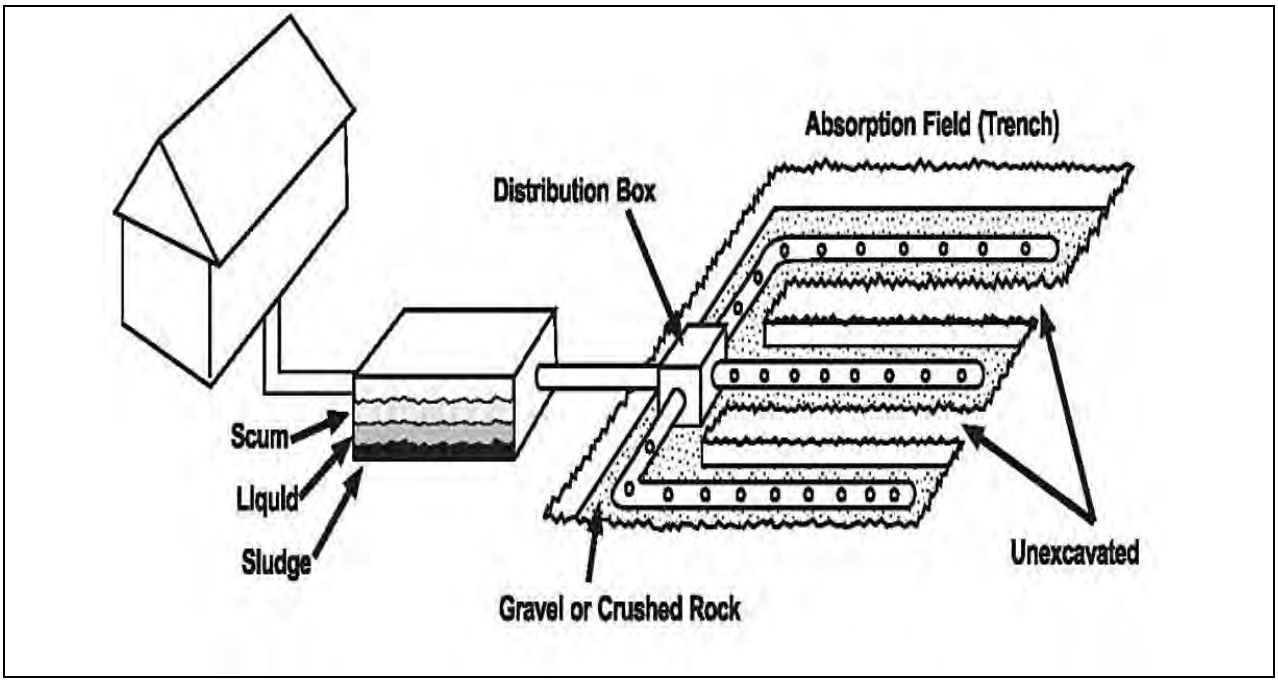

Figure 5.1-1. Individual Wastewater Disposal System (Septic Tank/Leaching Field)
Source: USEPA 2002.

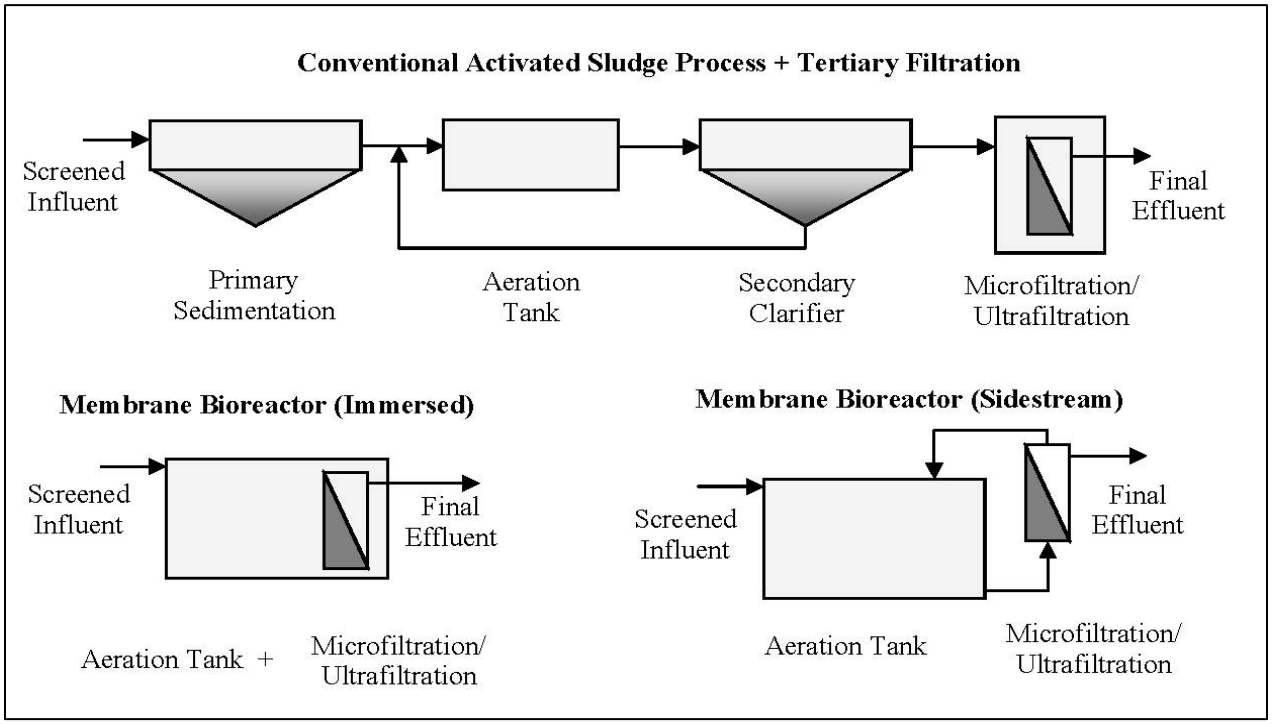

Figure 5.1-2. Conventional Activated Sludge and Membrane Bioreactor Technology
Source: Delgado et al. 2011.

MBRs have the following disadvantages:

- High capital costs for the membrane modules
- Potential for high recurring costs of periodic membrane replacement
- High energy costs due to membrane scouring
- Potential membrane fouling
- Waste sludge from the membrane process may be difficult to dewater > 20% solids content

The following are effluent limits for this technology indicated by an MBR manufacturer (Ovivo 2011) and project experience:

- BOD <5 mg/L
- TSS <5 mg/L
- Total nitrogen <5 mg/L (3 mg/L with post anoxic treatment and supplemental carbon addition such as methanol provided to the post anoxic tanks that are located upstream of the membrane tanks)
- Nitrate-nitrogen <3 mg/L (1 mg/L with post anoxic treatment and supplemental carbon addition such as methanol provided to the post anoxic tanks that are located upstream of the membrane tanks)
- Ammonia-nitrogen <1 mg/L
- Phosphorus <1 mg/L (0.1 mg/L with chemical coagulants added to the process)

Since no wastewater treatment technology can meet the CNMI regulatory limit for total nitrogen, industry best available control technology would be selected to meet the intent of the CNMI regulation. Historically, nitrate as nitrogen has been used in the CNMI in lieu of total nitrogen to meet the 1 mg/L limit. The performance of an MBR as indicated above is considered an industry best available technology. Although the total nitrogen is above 1 mg/L, the technology can reduce the nitrate as nitrogen to 1 mg/L.

Sequencing Batch Reactor

SBRs also offer a proven treatment technology similar to activated sludge systems. The SBR process involves a fill-and-draw, complete-mix reactor where both aeration and clarification occur in the same reactor. After decanting the treated effluent, the bulk of the mix liquor suspended solids remains in the reactor. Because of the batch nature of the process, flow equalization or multiple reactors are required to accommodate continuous and varying inflow of wastewater.

The advantages of an SBR process include the following:

- Elimination of a secondary clarifier
- High tolerance for short-duration peak flows and shock loadings
- Operational flexibility
- Can be modified to provide nitrogen and phosphorus removal

The disadvantages of an SBR process include the following:

- Potential for sludge bulking
- Inability to chlorinate return activated sludge for filament control
- Need for multiple reactors for reliability, adequate equalization, or to accommodate long-duration peak flows

Figure 5.1-3 illustrates an example of a proprietary SBR design that incorporates an anaerobic chamber followed by an anoxic tank to enhance the nitrification and denitrification processes. Influent enters the anaerobic chamber where influent solids are allowed to settle, much like a primary clarifier. The biological processes in the anaerobic chamber create soluble carbon as a food source for biological nutrient removal. Mix liquor is maintained in the anoxic tank to immediately react to inflow from the anaerobic chamber to suppress odors and initiate and accelerate carbon and nitrogen reactions. Denitrification reactions are accelerated in the presence of unreacted carbon from the raw sewage entering the anoxic tank. When the anoxic tank reaches a set point, a pump fills and mixes the SBR. Aeration in the SBR is cycled on and off in the interaction phase. The settling and decanting phase is the same as with a conventional SBR process.

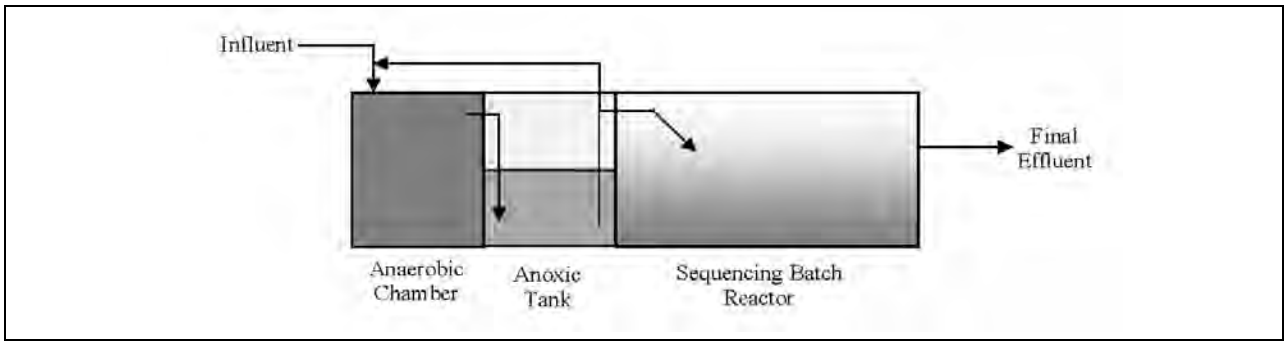

Figure 5.1-3. Sequencing Batch Reactor with Nutrient Removal
Source: Adapted from FluidyneCorp.com 2014.

The following are effluent limits for this technology indicated by an SBR manufacturer (FluidyneCorp.com 2014) and project experience:

- BOD <10 mg/L
- TSS <10 mg/L
- Total nitrogen <7 mg/L (3 mg/L with effluent denitrification filtration that includes methanol addition to treat SBR effluent)
- Nitrate-nitrogen <5 mg/L (1 mg/L with effluent denitrification filtration that includes methanol addition to treat SBR effluent)
- Ammonia-nitrogen <1 mg/L
- Phosphorus <2 mg/L

Typical prepackaged SBR systems are available for average influent flows from 5,000 gpd (18,927 lpd) to 100,000 gpd (378,541 lpd), shipped complete, pre-wired, and pre-piped.

Since no wastewater treatment technology can meet the CNMI regulatory limit for total nitrogen, industry best available control technology would be selected to meet the intent of the CNMI regulation. Historically, nitrate as nitrogen has been used by in the CNMI in lieu of total nitrogen to meet the 1 mg/L limit for nitrogen. The performance of an SBR as indicated above is considered an industry best available technology. Although the total nitrogen is above the 1 mg/L, the technology can reduce the nitrate as nitrogen to 1 mg/L.

Sand/Media Filtration

Sand or other media filters can be used to provide advanced treatment of settled wastewater or septic tank effluent. Figure 5.1-4 provides a conceptual layout of a recirculating sand filter. These systems consist of a lined excavation such as an impervious polyvinyl chloride liner on sand bedding or a watertight structure filled with uniformly sized washed sand (or other media) that is normally placed over an underdrain system. These filters are also known as packed bed filters.

Sand media filters may be used for a broad range of applications, including single-family residences, large commercial establishments, and small communities such as the base camp on Tinian. Recirculating filters are used for both large and small flows and are frequently used where nitrogen removal is necessary. Nitrogen removal of up to 70% to 80% can be achieved if an anoxic reactor is used ahead of the recirculation tank, where the nitrified return filtrate can be mixed with the carbon-rich septic tank effluent. Recirculating sand filters generally match or outperform single-pass filters in the removal of BOD, TSS, and nitrogen.

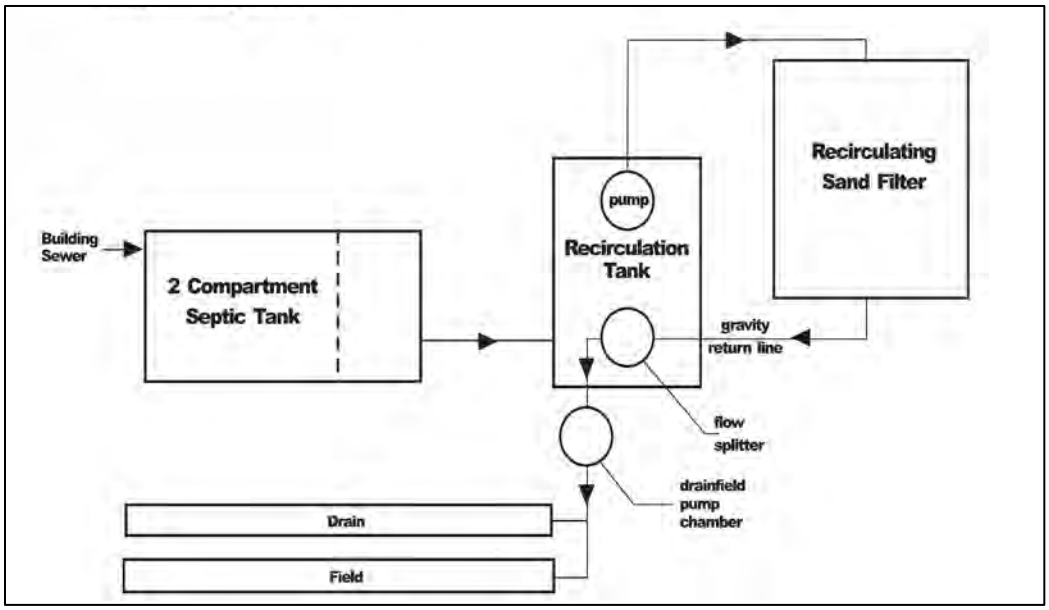

Figure 5.1-4: Recirculating Sand Filter
Source: USEPA 2002.

A recirculating sand filter can typically achieve the following effluent limits (USEPA 1999a):

- BOD <30-45 mg/L
- TSS <30-45 mg/L
- Total nitrogen <15-20 mg/L

- Ammonia-nitrogen <5-10 mg/L
- Phosphorus <3-5 mg/L

Inefficient nitrification and minimal denitrification occur with this type of process. These effluent concentrations do not comply with current CNMI regulatory criteria for secondary treated effluent, so the sand/media filtration cannot be used for the proposed action.

5.1.3.3 Industrial Wastewater Treatment System

In accordance with CNMI regulations, grease traps would be installed for all buildings where large quantities of grease related to food processing can be expected to be discharged, such as the dining facility in the base camp on Tinian.

In accordance with UFC 3-240-02, industrial wastewater sources such as fuel loading, vehicle wash platforms, vehicle grease racks, and vehicle maintenance shops must have their wastewater flow directed through oil/water separators prior to connecting to a gravity sewer and flowing downstream to a wastewater treatment system.

In accordance with UFC 4-214-03 (Department of Defense 2004), wastewater generated from vehicle wash facilities must receive primary treatment to remove settleable and floating materials. Following primary treatment, the wastewater is either released to a collection system or further treated on site and stored for reuse during future washing operations. The water used to wash vehicles should be recycled whenever possible and feasible. However, even in a total recycle system, some of the wastewater may need to be released to a discharge system before or after receiving secondary treatment. This discharge is done to ensure that water quality and water balance are maintained. Makeup water is added to the recycle system to compensate for the volume of water carried off on the wet vehicles, released, and lost to evaporation. Secondary treatment for this wastewater source can be intermittent sand filter system and lagoons. An intermittent sand filter system is comprised of an equalization basin and an intermittent sand filter. A lagoon is a basin or a series of basins where the wastewater is held for an extended period of time to achieve the desired water quality. Following secondary treatment, treated effluent can be disposed of through a retention basin.

5.1.4 Effluent Disposal Evaluation

Final effluent disposal presents unique challenges on Tinian related to Class I Aquifer Recharge Areas in the CNMI regulations. The effluent disposal options evaluated include subsurface disposal, injection well, ocean outfall, and land application.

5.1.4.1 Subsurface Disposal

The CNMI regulations (Chapter 65-120, Part 1605) state that no subsurface disposal systems for OWTS secondary treated effluent shall be permitted in a Class I Aquifer Recharge Area, except in very limited circumstances to allow public projects providing essential public services in isolated areas not served by public sewers. Because Tinian does not have a Class I GMZ, according to the BECQ DEQ, the use of leaching fields for an OWTS on Tinian is permitted in the CNMI regulations.

Wellhead protection limits described in Section 3.3 for a leaching field and wastewater treatment facility are as follows:

- Minimum down-gradient distance from a wellhead protection area is 150 feet (46 meters)
- Minimum up-gradient distance from a wellhead protection area is 300 feet (91 meters)

No existing municipal wastewater system exists nor is expected to be constructed to serve the proposed action. The proposed wastewater solution would need to ensure that total effluent loading does not exceed 2,250 gallons per acre (25,200 liters per hectare) across the entire site (CNMI regulations Chapter 65-120, Part 1605). To verify the total effluent loading limit for subsurface disposal, it is assumed that the project site area would consist of the MLA at 15,400 acres (6,232 hectares) less the IBB area at 777 acres (314 hectares), which equates to about 14,600 acres (5,908 hectares). The estimated subsurface disposal limit using a 2,250 gallons per acre (25,200 liters per hectare) factor is 32.8 million gallons per day (124 million liters per day). Based on the projected future wastewater flows developed in Chapter 4, the total effluent loading limit for subsurface disposal would not be exceeded and is available as an option.

5.1.4.2 Injection Well

The current CNMI regulations state that no underground injection disposal systems for OWTS secondary treated effluent shall be permitted in a Class I Aquifer Recharge Area. According to the BECQ DEQ, the use of a leaching field for an OWTS on Tinian is permitted in the CNMI regulations because Tinian does not have an official designation for a Class I GMZ or a Class I Aquifer Recharge Area.

According to CNMI regulations, subsurface disposal systems, such as seepage pits or leaching fields, are a subset of Class V injection wells if they serve more than 20 persons a day. They are distinguished separately in the CNMI regulations from injection wells because the design of the soil absorption area for a subsurface disposal system can be reduced for an OWTS compared to an IWDS. Underground injection wells also include drilled injection wells in addition to the subsurface disposal systems. It is not anticipated that drilled injection wells would be a suitable option.

5.1.4.3 Ocean Outfall

The current CNMI regulations state that direct discharge to state waters or waters of the U.S. are subject to the USEPA NPDES permitting requirements and Section 404 Army permitting requirements. As part of the NPDES permitting process, studies would be required to illustrate that a discharge will not cause any unreasonable degradation to the receiving water body. These studies would examine such factors as potential ecological risk, dilution through mixing, and threats to human health, to name a few. Based on the location of the base camp, it is not anticipated that an ocean outfall would be a suitable option.

5.1.4.4 Land Application

Treated wastewater may only be land applied if it meets secondary treated effluent standards, and only if the treated effluent is first discharged directly to a lined ponding basin that has the equivalent of 30 days' storage of treated effluent. Land application of treated effluent has a much higher area requirement than subsurface disposal. This disposal method may also have a higher maintenance requirement (NMIAC 2004).

5.1.5 Toilet Facilities In Remote Areas

Temporary toilet facilities include the conventional portable toilet type. However, other allowable types include chemical, combustion, and composting toilets. Where there is no existing or proposed wastewater treatment system to treat waste from temporary toilet facilities, expeditionary measures would be followed, as described later in Section 5.2.2.

5.1.5.1 Temporary Toilet Facilities

Portable toilets are readily available and have been used on Tinian to provide service to training military personnel. A disadvantage of portable toilets is the maintenance cost to haul waste from remote areas.

Combustion or incinerating toilets are self-contained units consisting of a traditional commode-type seat connected to a holding tank and a gas-fired or electric heating system to incinerate waste products deposited in the holding tank (USEPA 1999b). Incinerated products include a fine, non-hazardous ash that would require disposal in accordance with CNMI regulations. Similar to composting toilets, incinerating toilets can be used in remote and rural areas. Incinerating toilet systems are portable, simple to install, easy to use, and can be used for temporary or permanent use. The disadvantages of incinerating toilets include the requirement for energy, and some units cannot be used during the incineration process.

A composting toilet system contains and processes excrement, toilet paper, carbon additive, and sometimes food waste, typically with no water or small volumes of flush water (USEPA 1999c). The waste in composting toilets is normally mixed with sawdust, coconut coir, or peat moss to support aerobic processing, absorb liquids, and reduce odor. Unlike a septic system, a composting toilet system relies on unsaturated conditions where naturally occurring aerobic bacteria and fungi break down waste. Composting toilets may be used as an alternative to flush toilets where there is no suitable water supply or wastewater treatment facility available, or where the installation of septic systems is impractical or prohibitively expensive. Composted solids would require disposal in accordance with CNMI regulations.

5.1.6 Vehicle Wash Treatment

Wastewater generated from vehicle washdown facilities differs greatly from typical domestic wastewater. Vehicle washdown wastewater tends to have higher suspended solids and a large volume of silt, clay, sand, gravel, and debris. In addition, wastewater from vehicle washdown facilities contains higher levels of grease and oils. Wastewater from vehicle washdown facilities can be recycled or treated and discharged. Planning and design criteria for vehicle wash facilities can be found in UFC 4-214-03 (Department of Defense 2004).

All wastewater from the vehicle washdown facility must undergo primary treatment. A concrete sediment basin with an oil skimmer device is provided to separate and remove contaminants such as grease, oil, and sediment by gravity. Free oil would be removed in this basin prior to pumping, which could cause oils to emulsify. Wheeled vehicle access would be provided to this basin for removing the large volumes of sediment that accumulate in this basin. The bottom of the basin should be sloped approximately 1 percent away from the entrance ramp to assist in dewatering when the basin is emptied. Sediment basins are designed with oil recovery, inlet and outlet control structures, and drains.

Per UFC 4-214-03, intermittent sand filter systems are the preferred secondary treatment method for vehicle wash facilities requiring on-site treatment where no existing wastewater treatment is available. Secondary treatment removes suspended matter, microorganisms, impurities, and minor residual oils carried over from the primary treatment (sedimentation) process and consists mostly of colloidal materials such clays and fines.

With no existing wastewater treatment system at the port, it is anticipated that the effluent from intermittent sand filter would be discharged to a water supply basin to be recycled into the vehicle wash system. The water supply/recycle basin would be sized to hold the water demand volume plus stormwater from a 1-hour duration 10-year storm event. Any overflow from the water supply/recycle basin would discharge to a stormwater retention basin. It is anticipated that the treated vehicle washdown water would have an effluent quality complying with the installation's NPDES permit since this type of discharge is classed as a point source. The discharges must be regularly monitored and reported.

Rain that falls onto the pavement should be directed toward the treatment system since this stormwater may contain residual contaminants. Stormwater runoff from adjacent unpaved areas should be directed

away from the wash facility. The treatment system should be large enough to treat stormwater collected on the paved areas of the wash facility or captured in the basins.

A stormwater bypass should be provided at the head end of the treatment system just before the sediment basin. Stormwater diversion prior to treatment should be considered standard practice when the vehicle washdown facility is in a shutdown mode and the facility has been cleaned up. This diversion should be operated after each day's shutdown and when it is expected that the facility will not be in use for long periods of time.

5.1.7 Solids Management and Disposal Evaluation

The evaluation for solids management and disposal from wastewater systems was based on the federal regulation 40 CFR 503, *Standards for the Use or Disposal of Sewage Sludge*, the CNMI Solid Waste Management Regulations, and evaluations conducted in the Solid Waste Study (DoN 2014f). It is assumed that the solids generated from wastewater treatment process would require a percent of solids greater than 20%. Dewatering options include a screw press or a sludge drying bed and would be located at the wastewater treatment plant.

If sewage sludge and septic tank waste are applied to the land surface or incorporated into the soil, they must first be treated by a process to significantly reduce pathogens. Processes to significantly reduce pathogens include aerobic digestion, air drying, anaerobic digestion, composting, or lime stabilization. However, this requirement does not apply if the sludge and septic tank waste are disposed of in a trench or other natural or man-made depression in a permitted landfill and are covered with soil or other suitable material at the end of each operating day such that the wastes do not migrate to the surface.

According to the Solid Waste Study, the construction of a new Resource Conservation and Recovery Act compliant Subtitle D landfill is not a viable alternative for on-island disposal due to the lack of a mutually agreeable location between the CNMI and Department of Defense. Thus, all Department of Defense solid waste would have to be shipped off island to Saipan. 40 CFR 503 allows sludge from secondary treatment to be composted, and the product used as a soil amendment. However, composting would work only if there were a demand for the soil amendment product. Therefore, the solids and sludge from the wastewater treatment process would need to be containerized and shipped to a compliant landfill off island. The incineration option would require the approval of the CNMI and the issuance of air emissions permits. In the interim period before an acceptable on-island disposal method is in place, the off-island shipment of the sludge would be the sole option.

For this proposed action, it is assumed that the sludge from the secondary treatment process would be placed in containers and shipped to a compliant landfill off island. Composting of the sludge could be done as a cost savings measure if there is a demand for the soil amendment end product.

5.2 PAGAN

5.2.1 General Requirements and Considerations

Wastewater treatment systems are required to meet effluent standards of applicable federal, state, and local government agencies or the overseas equivalent. Because of the expeditionary nature of the proposed facilities on Pagan, only appropriate wastewater solutions are considered. Based on the facility requirements on Pagan, the expeditionary bivouac area and port facilities would be served by separate wastewater systems due to their proposed locations and the lack of a centralized wastewater collection and treatment system.

5.2.2 Expeditionary Procedures for Domestic Wastewater

The following guidance for handling wastewater during expeditionary military training is provided by the *Marianas Training Manual* (DoN 2010):

- Portable toilets or field facilities should be contracted for positioning at all training areas. The waste will be disposed of using existing sewage systems when available for use (e.g., sanitary latrines, specific sewage systems, and sewage treatment facilities). If such facilities have exceeded their capacity, are not functional, do not exist, or if the transport (via sewage trucks) to a suitable treatment system is not possible, human waste shall be disposed of according to field sanitation procedures.
- For smaller isolated exercise elements, field latrines and urinals must be correctly sited, constructed, and maintained, and be of sufficient scale to meet unit requirements.

Examples of field sanitation devices and procedures are provided in Field Manual 21-10/Marine Corps Reference Publication 4-11.1D (Department of Defense 2000). Figure 5.2-1 illustrates the various types of field sanitation devices.

The primary human waste disposal devices in bivouac areas are chemical toilets. Human waste collected in chemical toilets would be transported to approved disposal facilities. When chemical toilets are not available, field latrines and urinals can be constructed. The burn-out latrine is the preferred improvised waste disposal device. The burn-out latrine is also advantageous when the water table is too close to the surface of the ground or if the training is for an extended period. Burn-out latrine contents are rotated and burned daily by adding sufficient fuel to incinerate the fecal matter. A mixture of one part gasoline and four parts diesel is effective.

To prevent the accumulation of liquid waste, two types of urinals utilizing a soakage pit would be used during military training. Individual waste collection bags are the primary type used when the military trainees are on the march. If individual waste collection bags are not available on a march, cat-hole latrines would be dug. Other types of latrines include deep pit latrines and pail latrines. Deep pit latrines can be used for longer periods. If the water table is close to the surface, a pail latrine has advantages; however, it would also require more maintenance to keep the pails clean.

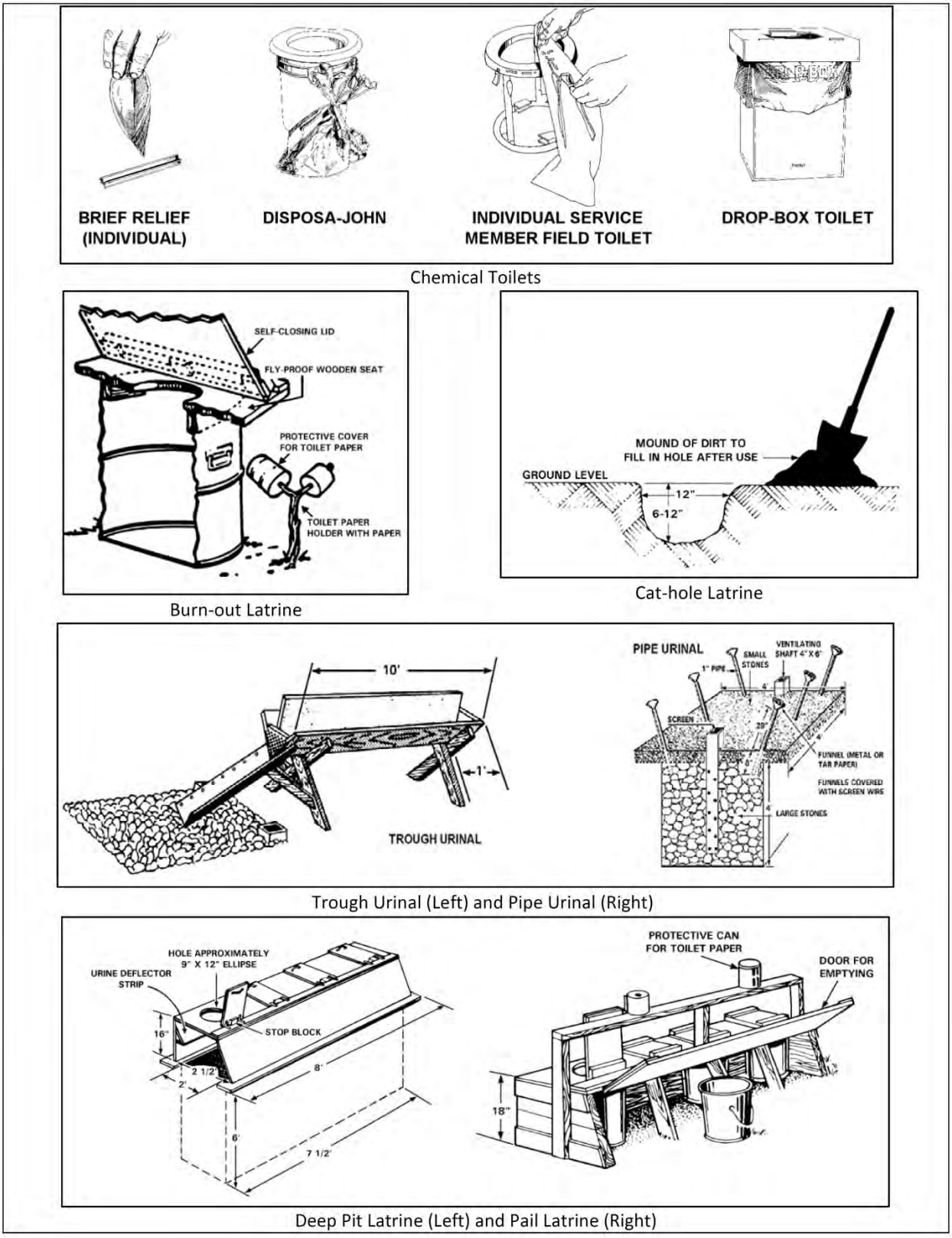

Figure 5.2-1. Types of Field Sanitation Devices
Source: Department of Defense 2000.

5.2.3 Other Wastewater Handling Procedures Considered

Other expeditionary procedures were considered for Pagan and include on-island treatment, collection and transport to Tinian for treatment, and use of treatment systems on ships.

On-island treatment of wastewater on Pagan could mimic the existing collection and handling of wastewater on Tinian for military training. The system would consist of constructing a septic tank and leaching field system in accordance with the CNMI regulations and use of portable toilets to collect wastewater. The disadvantage of this option is the maintenance required and lack of local means to dispose of the tank solids at a certified solid waste facility. With no local vendor to service the portable toilets or septic tanks, a vendor would need to be transported to Pagan or have a pump truck available on island. If no solid waste facilities are proposed for Pagan, then this option would not be viable.

Collecting and transporting all wastewater generated on Pagan to another location for treatment is another option. The main advantage of this option is that no permanent infrastructure would be required on Pagan. The main disadvantage of this option is the amount of wastewater that can be generated for a large military exercise over the course of a training cycle and the additional equipment and manpower necessary for the transport.

Treatment of wastewater generated on Pagan utilizing wastewater treatment systems onboard ships is another option considered. The main advantage of this option is that no permanent infrastructure would be required. The main disadvantage of this option would be the additional equipment and manpower required for the transport of wastewater to the onboard wastewater treatment system.

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CHAPTER 6. RECOMMENDED SOLUTIONS

6.1 TINIAN

6.1.1 Base Camp

The recommended wastewater collection system would consist of a gravity collection system with one pump station. The topography of the site generally slopes from east to west with the lowest point in the northwest corner of the base camp area. The proposed gravity collection system would be built along the proposed roadway alignments. The wastewater collection system would discharge wastewater generated from the base camp facilities to the proposed packaged wastewater treatment plant. The recommended conceptual layout of the proposed wastewater system for the base camp on Tinian is shown in Figure 6.1-1. The proposed wastewater system for the base camp on Tinian is located outside of the wellhead protection setbacks established by CNMI Well Drilling and Well Operation Regulations, from existing water supply well as shown in Figure 6.1-1. The proposed wastewater collection system would consist of a total of 16,847 feet (5,135 meters) of gravity mains, one pump station, and 2,939 feet (896 meters) of force main. The wastewater collection system would discharge wastewater generated from base facilities to a proposed packaged wastewater treatment plant in the northwest corner of the base camp area.

The packaged MBR wastewater treatment plant would consist of following components:

- Headworks with fine screening
- Septage receiving station
- Flow equalization
- MBR system
- Sludge drying system

According to BECQ DEQ, the use of a leaching field for an OWTS on Tinian is permitted in the CNMI regulations, because Tinian does not have a Class I GMZ. Final disposal of the treated effluent would be through a disposal area consisting of several leaching fields within the base camp area. The leaching fields would be downstream of the proposed treatment plant. The nearest existing well from the proposed leaching field area is M39, as shown in Figure 6.1-1. Although this well is inactive, to be conservative, the proposed well field would be sited outside of a wellhead protection area. Because the proposed leaching field would be considered an underground injection well as described in Section 3.2 and would be upstream of a well, the wellhead protection area is a 500 feet (152 meters). Sludge and other solids generated from the proposed wastewater treatment would be de-watered, containerized, and shipped to a compliant landfill off island.

6.1.2 Munitions Storage Area

The recommended wastewater system for the MSA would be a separate septic tank and leaching field in accordance with the CNMI Wastewater Rules and Regulations as shown in Figure 6.1-2. The septic tank and leaching field system would have an average daily flow of 3,880 gpd (14,687 lpd). The septic tank would have a net volume of 5,000 gallons (18,927 liters). The leaching field would consist of two sub-fields, each at 60 feet (18 meters) long, 30 feet (9 meters) wide, and 5 feet (1.8 meters) deep from finish grade to the bottom of gravel.

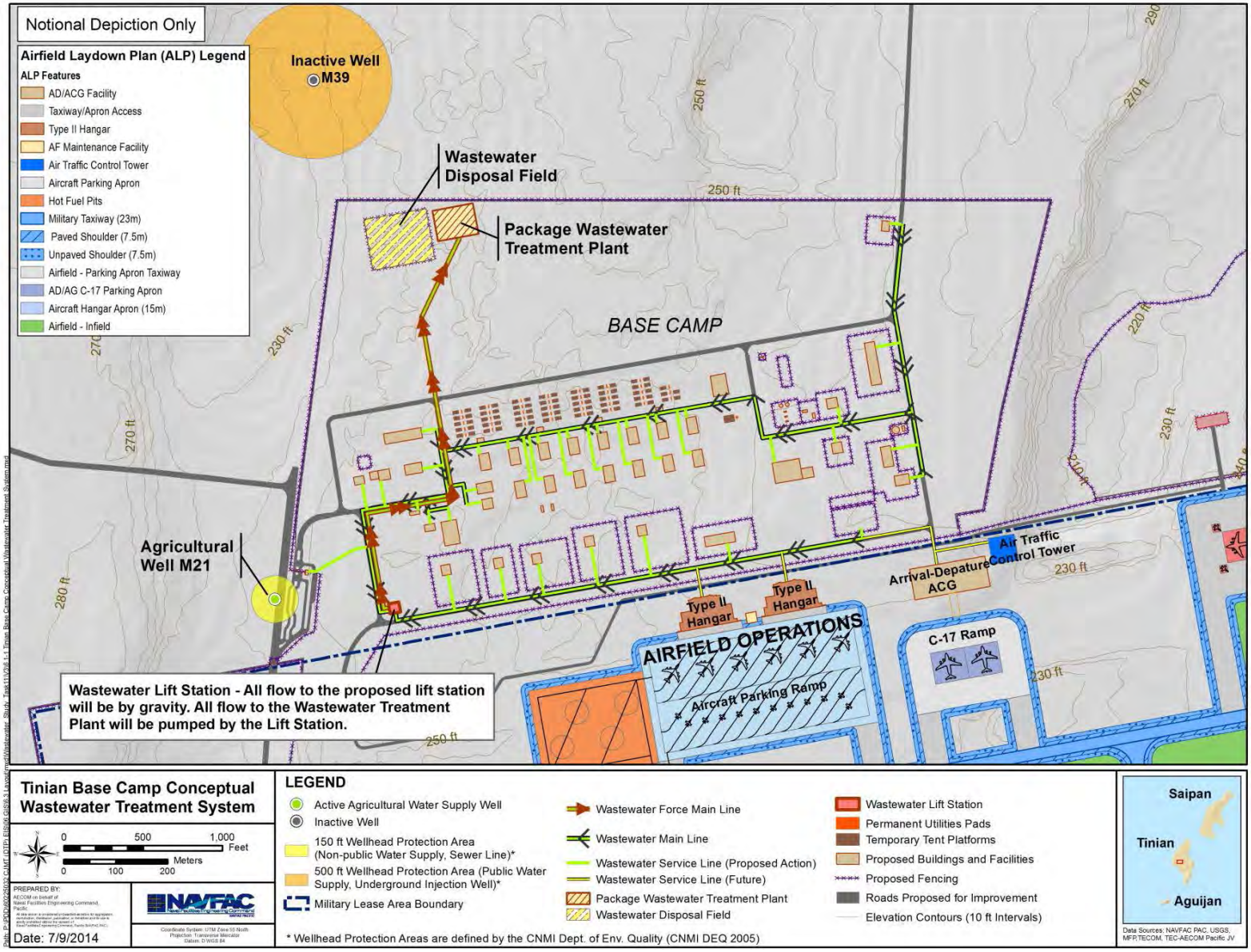

Figure 6.1-1. Tinian Base Camp Conceptual Wastewater Treatment System
Source: DoN 2014.

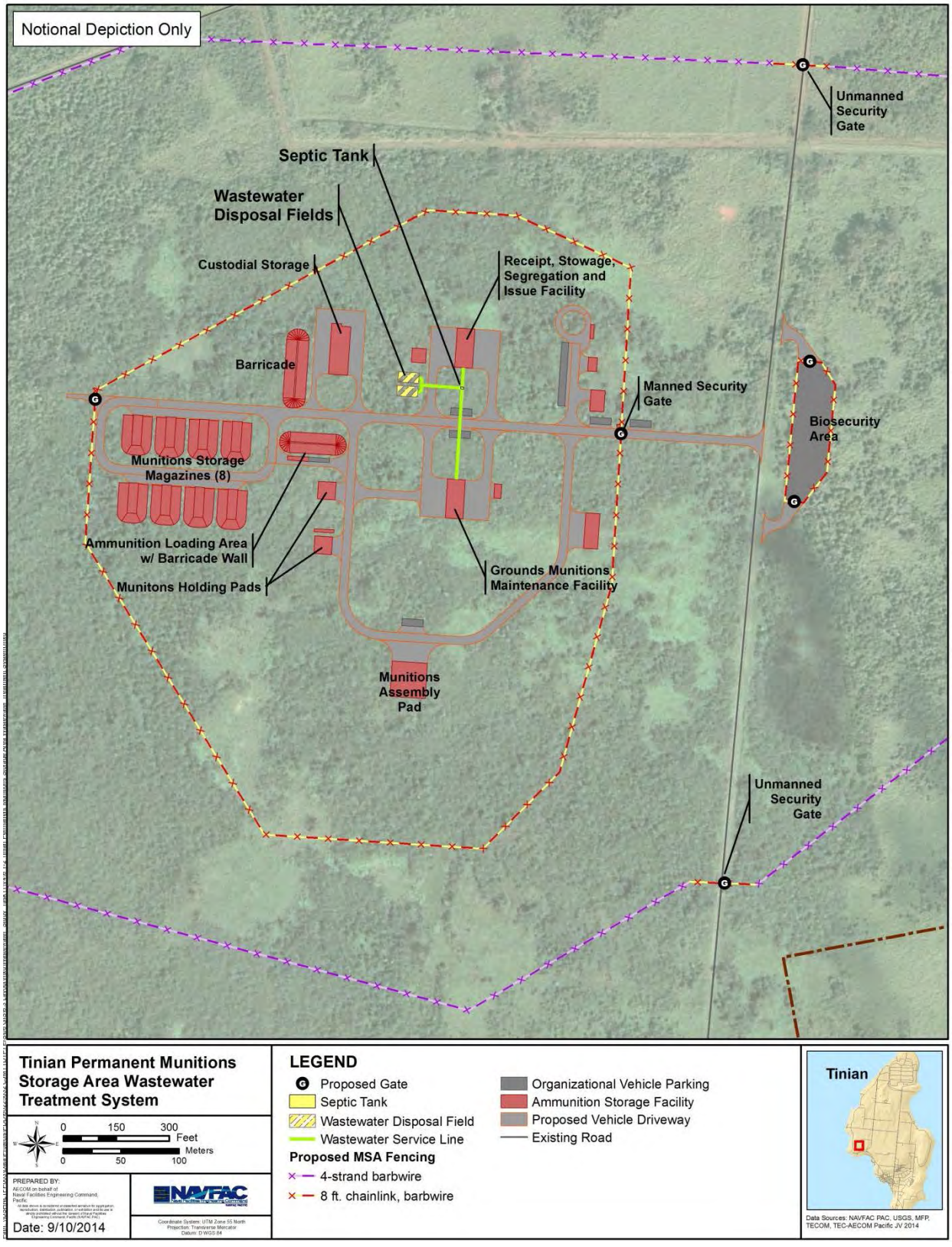

Figure 6.1-2. Tinian Permanent Munitions Storage Area Wastewater Treatment System
Source: DoN 2014.

6.1.3 Port Facilities

The proposed port facilities would include bulk fuel storage, cargo inspection and holding area, vehicle inspection area, a biosecurity building, and a vehicle washdown area. The recommended wastewater solution to treat the industrial wastewater from the vehicle washdown area on Tinian would consist of a sedimentation basin, equalization basin, and intermittent sand filtration system in accordance with UFC 4-214-03. The treated effluent would be discharged to a water supply/recycle basin and if necessary overflow into a stormwater retention basin as shown in Figure 6.1-3. The treated vehicle washdown water must be treated to produce an effluent quality complying with an NPDES permit since this type of discharge is classed as a point source. The discharges must be regularly monitored and reported.

The recommended wastewater solution for the biosecurity facility would be a holding tank that would be periodically emptied and contents transferred to the wastewater treatment and disposal system at the base camp. According to the CNMI wastewater regulations, the holding tank would need a storage capacity of 5 days of the average day wastewater flow. The design volume of the holding tank would be 3,500 gallons (13,249 liters).

6.1.4 End State Airport Facilities

Based on the proximity of the airport facilities to the base camp, it is recommended to extend wastewater service lines from the base camp wastewater collection system to the potential future end state airport facilities as shown in Figure 6.1-1. The additional future flow from the end state airport facilities on the base camp wastewater treatment plant was estimated at 680 gpd (2,574 lpd). This additional flow is primarily from industrial uses as the domestic uses have been accounted for in the base camp design population.

6.1.5 Ranges and Associated Support Facilities

The recommended wastewater solution for the ranges and associated support facilities would be the use of portable toilets. The portable toilets would be emptied periodically using a vacuum truck and conveyed to the proposed packaged wastewater treatment plant for the base camp on Tinian. Assuming a toilet to population ratio of 1:20, the estimated number of portable toilets for 3,000 military training personnel is 150. These portable toilets would be distributed among the ranges as needed.

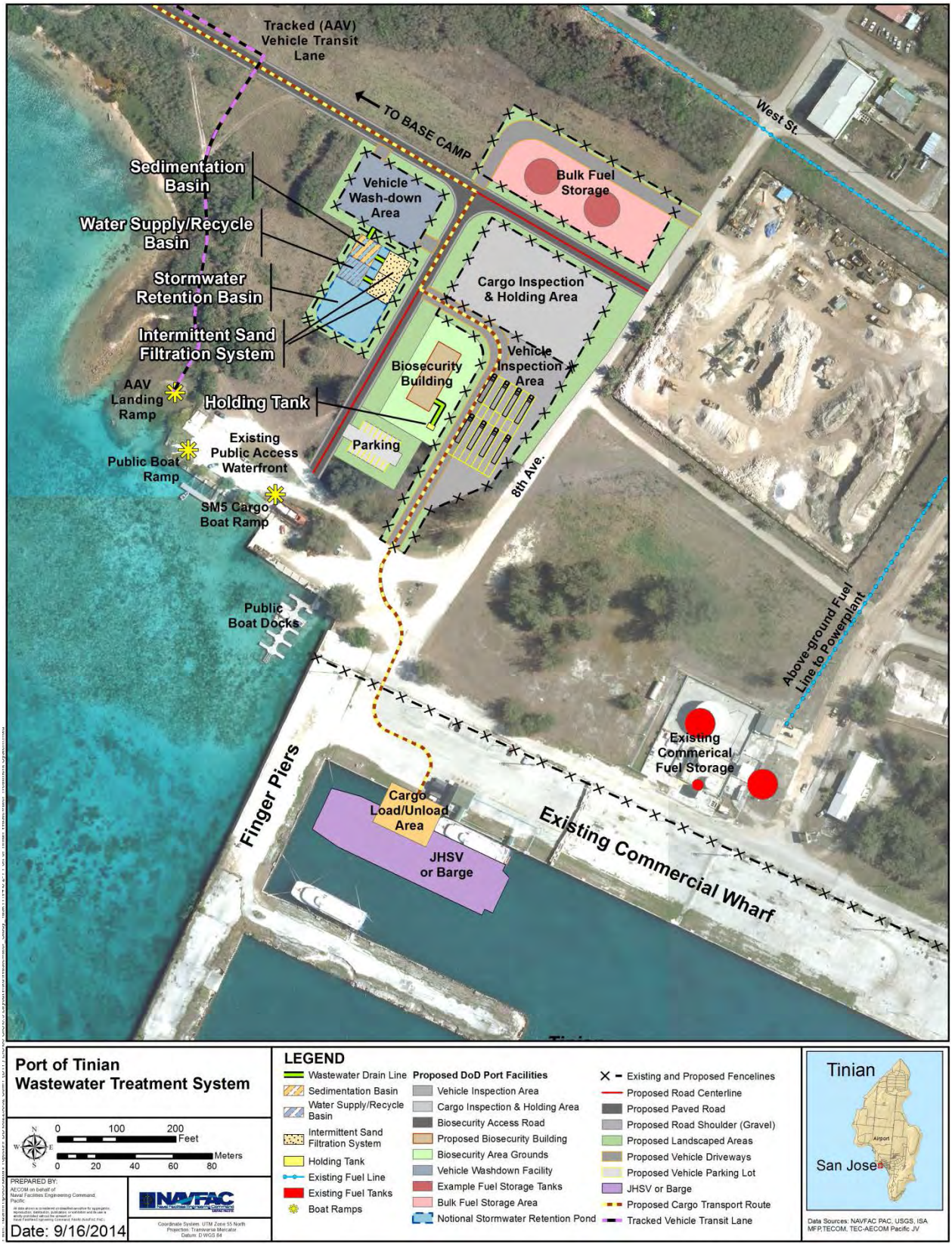

Figure 6.1-3. Port of Tinian Wastewater Treatment System
Source: DoN 2014.

6.2 PAGAN

6.2.1 Expeditionary Bivouac Area, Ranges, and Associated Support Facilities

The recommended wastewater solution for Pagan is to not construct any permanent infrastructure for the expeditionary bivouac area, ranges, and associated support facilities. It is recommended that field sanitation devices and expeditionary procedures described in the Marianas Training Manual be followed to manage the wastewater generated by the military training personnel. The primary sanitation device for human waste disposal would be a chemical toilet, which includes individual waste bags, Disposa-john, individual field toilet, and a drop-box toilet as described in Section 5.2.2. Human waste collected in chemical toilets (such as Disposa-johns, individual service member field toilets, drop box toilets; see Figure 5.2-1) would be transported to approved disposal facilities. The estimated domestic wastewater flow generated on Pagan would be 17,400 gpd (65,866 lpd) from a maximum of 4,000 military training personnel. Based on the magnitude of the estimated flow and the extended duration of the proposed training, it is recommended that temporary burn-out latrines and urinals with soakage pits be constructed. Assuming a toilet to population ratio of 1:20, the estimated number of burn-out latrines for 4,000 military training personnel is 200.

CHAPTER 7. POTENTIAL IMPACTS AND ISSUES

7.1 WASTEWATER UTILITY IMPACTS

The utility impacts assessment considers the potential effects on the capacity of existing wastewater systems.

7.1.1 Tinian

Until April of 2014, military training exercises used portable toilets and a U.S. military-owned septic tank and leaching field system for the collection, treatment, and disposal of wastewater. The existing system was designed and certified for a design population of 2,500 military training personnel with an average daily flow of 6,640 gpd (25,135 lpd).

The CJMT proposed action facilities requiring wastewater infrastructure on Tinian include a base camp, MSA, port facilities, and airport facilities. The proposed training population would include a potential surge to 3,000 training personnel. Currently it is anticipated the 95 permanent maintenance personnel would reside off-base. With the proposed permanent and temporary structures at the base camp, the estimated average daily flow per UFC requirements would range from 47,052 to 144,552 gpd (178,111 to 547,188 lpd), depending on the level of training. Actual flow should be lower because of conservation and sustainability measures incorporated in the facilities' design.

The existing U.S. military-owned septic tank and leaching field system would not be able to meet the wastewater flow requirements directly related to the proposed action. Construction of the recommended wastewater solutions in Chapter 6 would manage projected wastewater flow from the proposed action, comply with the CNMI regulations, and not have any direct impacts.

Increased wastewater flows from the construction workers generated during working hours at the various construction sites would be collected and treated through the existing U.S. military septic tank and leaching field system during the day. It is anticipated that the wastewater generated from the construction workforce during the day would not exceed the current capacity of the existing U.S. military-owned septic tank and leaching field system.

Increased wastewater flows from the construction workers generated at the dwelling units associated with the Tinian Dynasty Hotel and Casino would be treated at the hotel's wastewater treatment plant. It is anticipated that the existing OWTS at the hotel would have adequate capacity to treat and disposal of the increase in wastewater flow.

It is anticipated that the wastewater generated by new populations staying outside of the MLA such as at the Tinian Dynasty Hotel and Casino would not exceed the current capacity of the wastewater treatment plant, as the resort is limited to the 500 rooms for which the plant is designed. Similarly, it is anticipated that new populations staying in existing housing on the Tinian rental market would not exceed the capacity of the IWDSs. Maintenance and compliance with the CNMI regulations for the IWDS would be the responsibility of the homeowner of each rental property. Thus, no indirect impacts are anticipated for the proposed action on Tinian.

7.1.2 Pagan

There are no existing wastewater systems on Pagan, and no permanent wastewater infrastructure is anticipated for the expeditionary bivouac area, ranges, and associated support facilities associated with the

CJMT proposed action. Direct impacts for wastewater would be mitigated by following expeditionary procedures described in Section 5.2.2, including the use of chemical toilets or burn-out latrines and urinals.

7.2 OTHER POTENTIAL CONCERNS

7.2.1 Tinian

7.2.1.1 Construction Period

In the early phase of the construction period, construction workers, construction managers, and dependents could stay at the Tinian Dynasty Hotel and Casino prior to the availability of dwelling units associated with the hotel. Portable toilets would be utilized at the construction sites and wastewater generated taken via vacuum truck to the existing U.S. military septic tank leach field system by the IBB facilities (once it has been rehabilitated and approved). Wastewater generated at the hotel would be treated by the wastewater treatment plant for the hotel.

7.2.1.2 Operational Period

Operational concerns on Tinian include the requirement for a certified wastewater treatment plant operator and the maintenance and upkeep of the wastewater collection, treatment, and disposal systems. Wastewater operational best management practices include the following:

- Periodic inspection and cleaning of the collection system to remove grease, roots, and debris
- Regular inspection, cleaning, repair, and testing of pumps, valves, control panels, and associated equipment of the pump station and wastewater treatment plant
- Regular sampling, analysis, operational, and compliance reports in accordance with the CNMI Wastewater Rules and Regulations

7.2.2 Pagan

7.2.2.1 Construction Period

It is anticipated that field sanitation devices and expeditionary procedures would be followed to manage the wastewater generated during the construction period.

7.2.2.2 Operational Period

Operational concerns on Pagan include impacts on air quality associated with the potential burning of human waste in burn-out latrines. Incineration produces a fine, sterile ash that can be disposed of easily in the trash without infection hazard.

7.3 ASSOCIATED UTILITY IMPACTS

7.3.1 Landfill

As described in Section 3.6, the existing Tinian Municipal Dump is in non-compliance with USEPA and CNMI regulations (DEQ 2010). The proposed action would increase the amount of solids generated from wastewater processes that would require disposal in a properly permitted and compliant landfill. Tinian currently lacks such a facility. Refer to the stand-alone *Solid Waste Study* (DoN 2014f) for potential solutions for solids disposal.

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Appendix A
Tinian Site Visit Meeting Notes

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Commonwealth of the Northern Mariana Islands (CNMI) Joint Military Training (CJMT)
Environmental Impact Statement (EIS)/Overseas EIS (OEIS)
Potable Water and Wastewater Meeting Notes
December 10, 2013
0900-1030 Chamorro Standard Time (ChST)

Attendees:

Commonwealth Utilities Corporation (CUC): B. Bearden, J. Riegel
TEC-AECOM Pacific Joint Venture (JV): P. Diaz, S. Keith

Purpose

a. The purpose of the meeting was to gather information and site reconnaissance for water and wastewater utility studies to support the CNMI Joint Military Training EIS/OEIS in assessing existing conditions and potential effects of locating range and training areas on Tinian and Pagan.

Attachments

1. Meeting Attendance List
2. Draft Master Plan Project List

Attendees

Name	Representing	E-mail Address	Office Phone	Mobile Phone
Steve Keith	AECOM	stephen.keith@aecom.com	808-220-4598	808-220-4598
Pete Diaz	AECOM	pete.diaz@aecom.com	671-477-8326/7	671-788-6710
Brian Bearden	CUC/USPHS – Water/Wastewater	brian.bearden@cucgov.org	670-235-7025	
John Riegel	CUC – Water/Wastewater	john.riegel@cucgov.org	670-236-4338	

AECOM *AECOM Technical Services, Inc.*
CUC *Commonwealth Utilities Corporation*
USPHS *United States Public Health Service*

General Discussion

a. Class I aquifer recharge areas/groundwater management areas
    i. Currently none defined for Tinian or Pagan; defined only on Saipan.
    ii. Brian Bearden provided a discussion paper on the designation of groundwater management zones for Saipan; could be used for Tinian and Pagan
    iii. Based on groundwater contour; depends on thickness of the aquifer lens.
b. Water and Wastewater Master Plan (Stipulated order requirement)
    i. Currently in progress. Draft was reviewed and commented on by USEPA, but the master plan is not currently available for release. CUC estimated revisions to the draft Master Plan would be completed in 6 months, however there is no set deadline.
    ii. CUC provided the following appendices of the Master Plan
        - Appendix T – Complete Project List

- Appendix U – CNMI Safe Drinking Water Infrastructure Grant Program Guidelines
- Appendix V – Saipan Water Project Ranking - Non-EPA Criteria
- Appendix W – Summary of Water Projects (Tinian)
- Appendix X – Tinian Wastewater Projects
- Appendix Y – CNMI Construction Grant Priority System
- Appendix Z – Wastewater Project Ranking - Non-EPA Criteria

c. CUC provided a list of 15 water projects from the Draft Master plan (See Attachment 2; for more detail, refer to Appendix T):
   i. Filtration Plant for Maui Well II
   ii. SCADA Pilot Study
   iii. Valve Installation/Replacement
   iv. San Jose Village Loop Waterline
   v. Upgrade Half Million Gallon Tank (HMT)
   vi. Upgrade of Maui II Well
   vii. Security Fencing of Wetlands
   viii. Marpo Valley Water Distribution System Upgrade/Replacement
   ix. Replace all Active Meters
   x. Carolinas Waterline
   xi. Marpo Heights and Marpo Valley Water Distribution
   xii. Upgrades of Deep Wells
   xiii. Carolinas Agricultural Homestead Water System
   xiv. CPA Transmission line Replacement
   xv. Dedicated Transmission Line from Maui II to HMT
d. Inspections on CUC water systems are conducted by the CNMI DEQ. AECOM to check with DEQ for latest inspection reports/findings.

Potable Water Discussion

a. Aquifer Studies on Tinian and Pagan
   i. No recent studies.
   ii. For Tinian, a 2002 USGS study covered the geohydrology.
   iii. For Pagan, a 2006 USGS study covered the geologic mapping for Pagan; however the study does not address geohydrology.
b. CUC has no plans at this time to refurbish Maui I Well
c. Additional Water Supply
   i. CUC did agree the Maui I Well is a potential option for increased water supply; although reducing the unaccounted for water rate could be more appropriate.
   ii. Maui II Well was built to replace Maui I Well
   iii. Maui I Well was taken out of service when Maui II Well was placed into operation; no record of running both wells at the same time
   iv. Running two wells at lower pumping rates could yield higher quality water
   v. Running two wells at higher pumping rates could also have negative impact such as salt water intrusion.
   vi. CUC has no idea on pumping rate versus water quality.
   vii. Maui I Well would need to be completely rebuilt

d. A water hydraulic model was prepared by a consultant to CUC. CUC recommended contacting the consultant (Duenas, Camacho, & Associates) to provide the hydraulic model. AECOM to make the request.
e. GWUDI Study
    i. Currently in progress.
    ii. If GWUDI is determined then filtration at Maui II Well would be required.
f. Water System Issues
    i. High pressure in distribution system
    ii. No dedicated transmission system from production well to reservoirs – combined transmission/distribution
    iii. Estimated unaccounted for water (UFW) is high at 75%-80%; varies seasonally.
        - CUC provided the following data: 932 gpd water produced, 244 gpd metered use equates to 73.7% UFW.
    iv. Leaks from old galvanized pipes
    v. Appears the Quarter Million Gallon Tank (QMT) does not provide a benefit to the hydraulics of the Tinian water system
    vi. QMT overflows
g. Pressure reducing valve project
    i. CUC is currently studying locations for PRVs to mitigate high pressures experienced by customers
h. There have been no updates to the CAD/GIS data for Tinian and Pagan received on October 30, 2013.
i. Water meter data and water production data
    i. CUC directed AECOM to contact CUC Staff on Tinian for the requested data.
    ii. Point of contacts on Tinian for CUC are Evelyn Manglona and Winston Omar.
j. Water Quality Data
    i. CUC provided AECOM Water Quality Reports 2010-2012
    ii. Also available on line.

Wastewater Discussion

a. Acceptable/proven wastewater treatment system (packaged wastewater treatment)
    i. Membrane bioreactors are used successfully, such as at Managaha Island.
    ii. Lao Lao Golf & Resort uses a wetland type system.
    iii. Sequencing batch reactors (SBRs) could also be good as they can handle varying flow rates.
b. Percolation rates for leach field design criteria
    i. To be verified with DEQ
c. Effluent Disposal
    i. Would depend on location and quantity, not necessarily on effluent quality
    ii. To be verified with DEQ.
d. Sludge Management on Tinian
    i. No sludge management plan
    ii. All sludge on island is disposed of at the noncompliant landfill
    iii. Septic wastes are also disposed of at the noncompliant landfill
e. Status on municipal wastewater treatment plant
    i. No active plans on constructing a municipal plant

Action Items

AECOM to request water model from former CUC consultant DCA; CUC to be cc'd on email.

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Commonwealth of the Northern Mariana Islands (CNMI) Joint Military Training (CJMT)
Environmental Impact Statement (EIS)/Overseas EIS (OEIS)
Project Meeting Notes
December 12, 2013
1000-1100 Chamorro Standard Time (ChST)

Attendees:
CNMI Department of Environmental Quality (DEQ): D. Chambers, J. Kaipat, D. Rosario
TEC-AECOM Pacific Joint Venture (JV): P. Diaz

Purpose

The purpose of the meeting was to gather information and site reconnaissance for water and wastewater utility studies to support the CNMI Joint Military Training EIS/OEIS in assessing existing conditions and potential effects of locating range and training areas on Tinian and Pagan.

Attachments

1. Meeting Attendance List
2. Tinian GIS Map, Water System (provided by DEQ)
3. USGS Figure showing well location and water table contours (provided by DEQ)
4. Contact Info for consultant who conducted geological hydro-geological study for Tinian Landfill and CUC contact for wastewater treatment plants. (provided by DEQ)

Attendees

Name	Representing	E-mail Address	Office Phone	Mobile Phone
Pete Diaz	AECOM	pete.diaz@aecom.com	671-477-8326/7	671-788-6710
Derek Chambers	DEQ	derekchambers@deq.gov.mp	670-664-8500	
David Rosario	DEQ – Wastewater, Earthmoving,	davidrosario@deq.gov.mp	670-664-8500	
Jose Kaipat	DEQ – Safe Drinking Water Branch	josekaipat@deq.gov.mp	670-664-8500	670-989-8509

AECOM *AECOM Technical Services, Inc.*
DEQ *Division of Environmental Quality*

General Discussion

1. Aquifer recharge areas/groundwater management areas
    a. DEQ concurred none have been established for Tinian or Pagan.
    b. Discussed CUC provided guidelines used to establish these areas.

Potable Water

1. Aquifer Studies
    a. Last studies on aquifer in Tinian and Pagan were done by USGS.
2. Current Water Supply

   a. Currently Tinian only has one source of water, Maui II Well; other deep water wells have been closed and are currently inactive. CUC had drilled 8 exploratory wells, 4 were put into production.
   b. Originally the plan was to leave the deep wells as standby, but Maui Well II supplied enough water.
   c. All equipment from the deep wells have been removed and the wells have been capped.
3. Increasing Water Supply
   a. DEQ concurs Refurbishing Maui I Well is an option, however, reducing unaccounted for water would achieve the same goal.
4. Water Quality Data
   a. Began collecting data in 2000
   b. DEQ to look into water quality data when Maui I Well was in operation, if any. Switch over from Maui I Well to Maui II Well occurred around the same time water quality data collection commenced.
   c. Overall the water quality in Tinian is good (potable) but not very palatable. There has been an occasional hit on bacteria due to a water main break.
5. GWUDI
   a. CUC has contracted CH2M Hill to conduct GWUDI Study.
   b. Started last year, with the rainy season ending, study is wrapping up.
   c. GWUDI findings to be included in the Water and Wastewater Master Plan.
   d. If GWUDI is determined for the Maui II Well
      i. Filtration would be required
      ii. Rules would change
      iii. DEQ adopted federal regulation related to GWUDI.

Wastewater

1. Acceptable/proven wastewater treatment system (packaged wastewater treatment)
   a. Membrane bioreactors are used successfully, such as at Managaha Island.
   b. Lao Lao Golf & Resort uses a wetland type system.
   c. Sequencing batch reactors (SBRs) could also be good as they can handle varying flow rates.
2. Percolation rates for leach field design criteria
   a. Percolation rate may have been determined in the hydro-geologic study conducted for the proposed Tinian Landfill.
   b. Verify if document obtained by Patrick Ono contains required percolation data.
3. Effluent Disposal
   a. Would depend on location and quantity, not necessarily on effluent quality.
   b. Typically injection wells are used for disposal of brine from reverse osmosis water treatment system.
   c. For leach field systems serving more than 25 people, system is considered an injection well.
   d. If leach field is close to coastal waters, the system would require a USEPA NPDES permit (like Managaha Island WWTP system); otherwise the system would be under DEQ regulations.
   e. DEQ recommends reusing treated effluent for things like irrigation or toilet flushing
      i. On Managaha Island, effluent is reused for toilet flushing, a dye is added to identify it as recycled water.

ii. Reuse could reduce required leach field size

4. Wastewater Treatment Plant Inspections
    a. DEQ normally waits for EPA to conduct inspections on WWTPs
    b. Owners of WWTPs need to submit Discharge Monitoring Reports to DEQ
5. Existing Septic Tank
    a. Navy is planning to repair the existing leach field
    b. Point of Contact – Mark Cruz, Joint Region Marianas, 671-349-1139; POC between DEQ and exercise training.

Action Items

Jose Kaipat from DEQ to provide the following information:

a. Water quality records prior to the start-up of Maui Well #2, if any.
b. 2013 inspection reports/survey of the CUC water system
c. GIS data/shapefiles indicated in the GIS map provided in today's meeting.
d. UIC permit for Tinian Dynasty WWTP.

David Rosario from DEQ to provide the following information:

a. Write-up on Tinian Dynasty WWTP by Brian Bearden describing the system (provided via email on 12/12/13).
b. Discharge Monitoring Reports for small packaged treatment plants (Tinian Dynasty WWTP, Managaha Island WWTP, Lao Lao Bay Resort WWTP)
c. Permit for Tinian Dynasty WWTP to operate

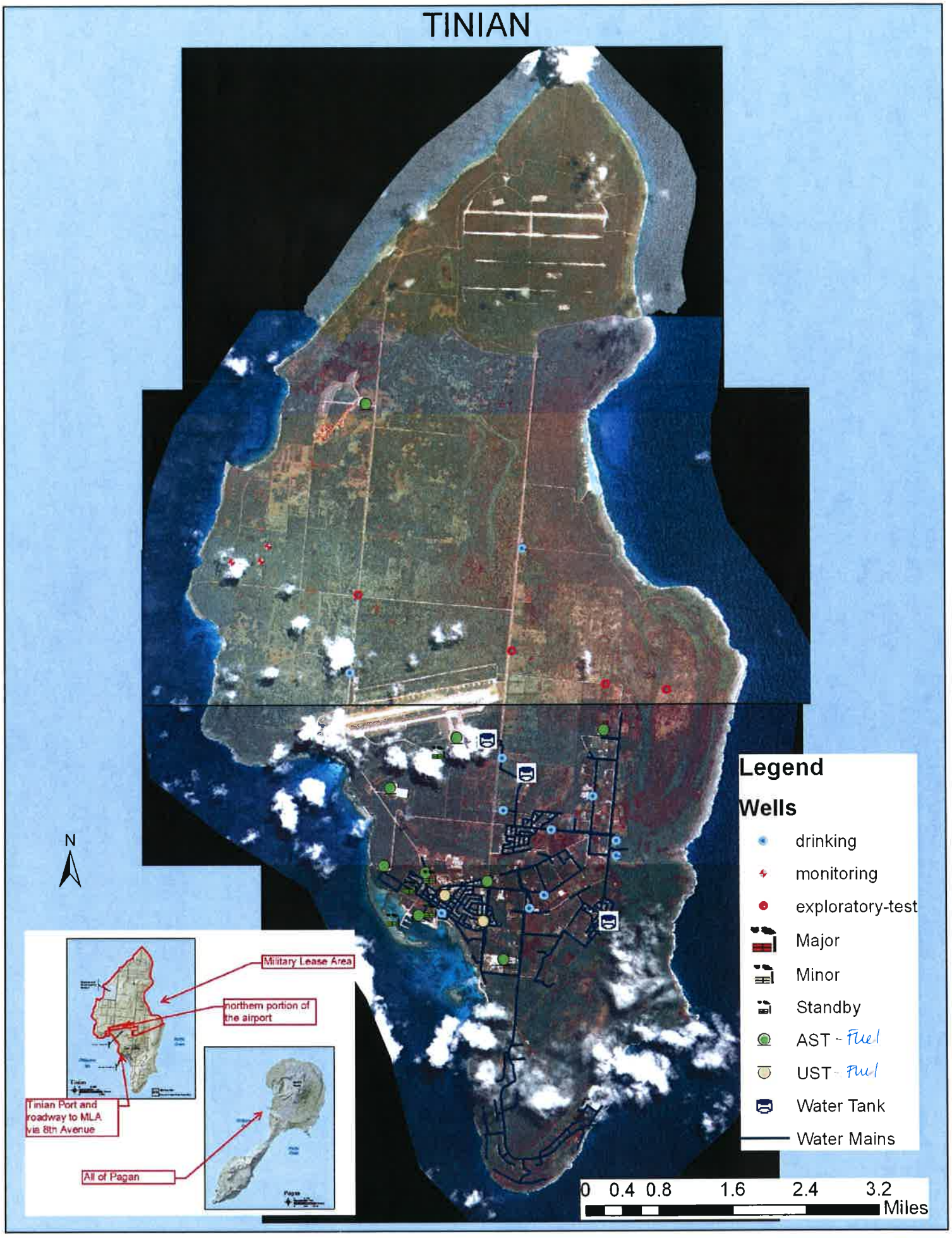
MEETING ATTENDANCE LIST

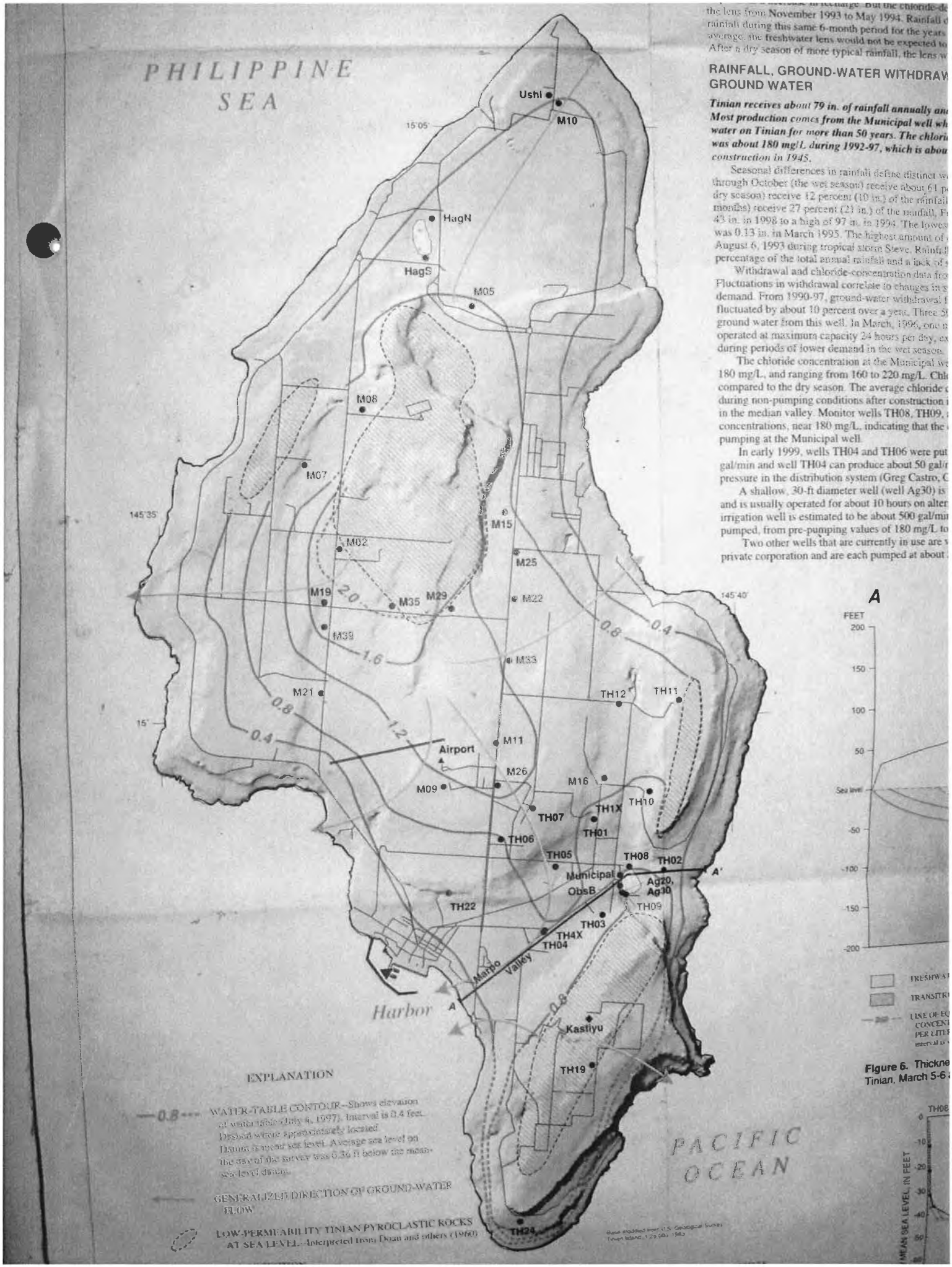
CNMI Joint Military Training EIS/OEIS - SITE VISIT DEC 2013

Date/Time: December 12, 2013
Location: CNMI DEQ Office, Saipan
Topic: Water / Wastewater

NAME	ORGANIZATION/TITLE	E-MAIL	OFFICE PHONE	CELL PHONE
Pete Diaz	AECOM	pete.diaz@aecom.com	671 477-8326	671-788-6710
Derek Chambers	DEQ	derekchambers@deq.gov.mp	670 664-8500	
David B. Rosario	DEQ	davidrosario@deq.gov.mp	6644500	—
Jose M. Kaipat	DEQ-SDWP	josekaipat@deq.gov.mp	664-8500	670-787-8509

TINIAN


Legend
Wells
drinking
monitoring
exploratory-test
Major
Minor
Standby
AST - Fuel
UST - Fuel
Water Tank
Water Mains
N
0 0.4 0.8 1.6 2.4 3.2
Miles
Military Lease Area
northern portion of the airport
Tinian Port and roadway to MLA via 8th Avenue
All of Pagan



the lens from November 1993 to May 1994. Rainfall
rainfall during this same 6-month period for the years
average, the freshwater lens would not be expected to
After a dry season of more typical rainfall, the lens w

RAINFALL, GROUND-WATER WITHDRAW
GROUND WATER

Tinian receives about 79 in. of rainfall annually an
Most production comes from the Municipal well wh
water on Tinian for more than 50 years. The chlori
was about 180 mg/L during 1992-97, which is abou
construction in 1945.

Seasonal differences in rainfall define distinct w
through October (the wet season) receive about 61 p
dry season) receive 12 percent (10 in.) of the rainfall
months) receive 27 percent (21 in.) of the rainfall, F
43 in. in 1998 to a high of 97 in. in 1994. The lowes
was 0.13 in. in March 1995. The highest amount of
August 6, 1993 during tropical storm Steve. Rainfal
percentage of the total annual rainfall and a lack of

Withdrawal and chloride-concentration data fro
Fluctuations in withdrawal correlate to changes in
demand. From 1990-97, ground-water withdrawal
fluctuated by about 10 percent over a year. Three
ground water from this well. In March, 1996, one
operated at maximum capacity 24 hours per day, e
during periods of lower demand in the wet season.

The chloride concentration at the Municipal we
180 mg/L, and ranging from 160 to 220 mg/L. Chl
compared to the dry season. The average chloride
during non-pumping conditions after construction
in the median valley. Monitor wells TH08, TH09,
concentrations, near 180 mg/L, indicating that the
pumping at the Municipal well.

In early 1999, wells TH04 and TH06 were put
gal/min and well TH04 can produce about 50 gal/
pressure in the distribution system (Greg Castro, C

A shallow, 30-ft diameter well (well Ag30) is
and is usually operated for about 10 hours on alter
irrigation well is estimated to be about 500 gal/mi
pumped, from pre-pumping values of 180 mg/L to

Two other wells that are currently in use are
private corporation and are each pumped at about

Figure 6. Thickne
Tinian, March 5-6

Municipality of Tinian and Aguiguan

Allied Pacific Environmental Consulting (APEC) was contracted by Tetra Tech. Guam to conduct geological and hydro-geologic study (July 1, 2011) at the purposed Tinian Landfill. Tetra Tech was contracted by CNMI Capital Improvement Project (CIP) (tel: 664-2371). Mr. Robert Jordan, APEC. apeccnmi@pticom.com; robairjordan@gmail.com

Wastewater Treatment Plant, Tinian:
Mr. John Riegel, Chief Engineer, Commonwealth Utilities Corporation (CUC), Tel: 235-7025 to 7030; john.riegel@cucgov.org

Managaha Wastewater Treatment Plant

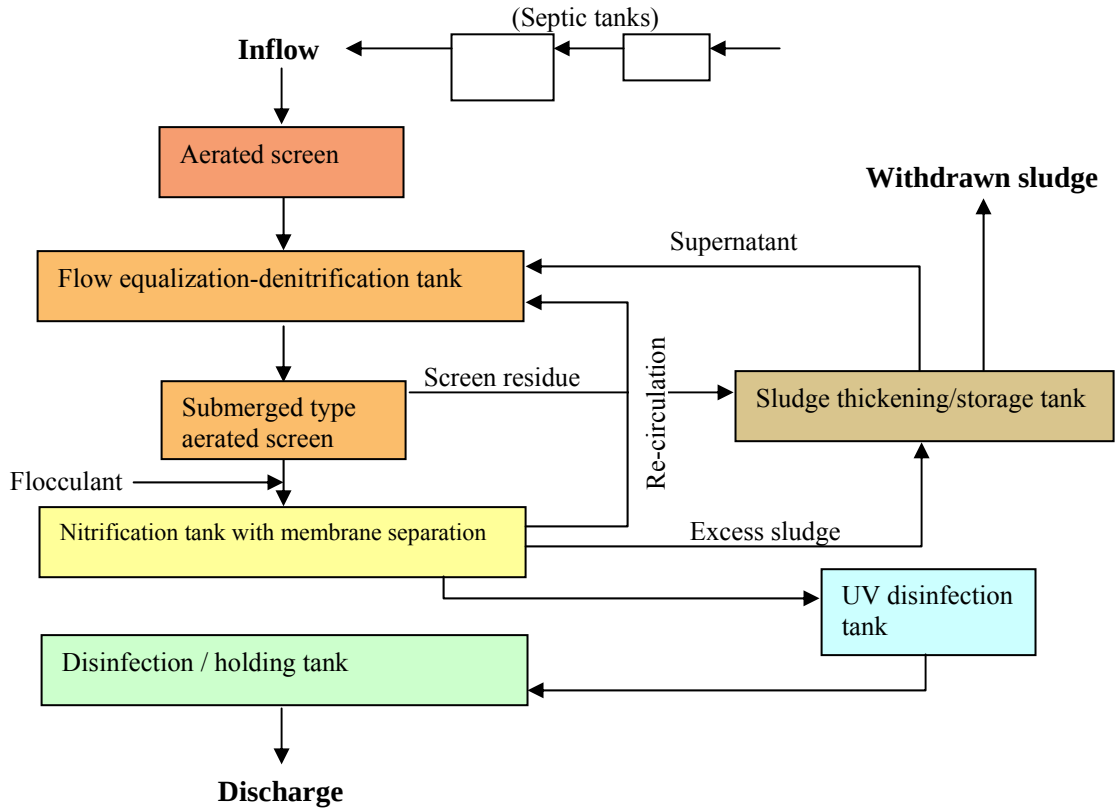
Membrane Bio Reactor (MBR) System

General plant/process description:

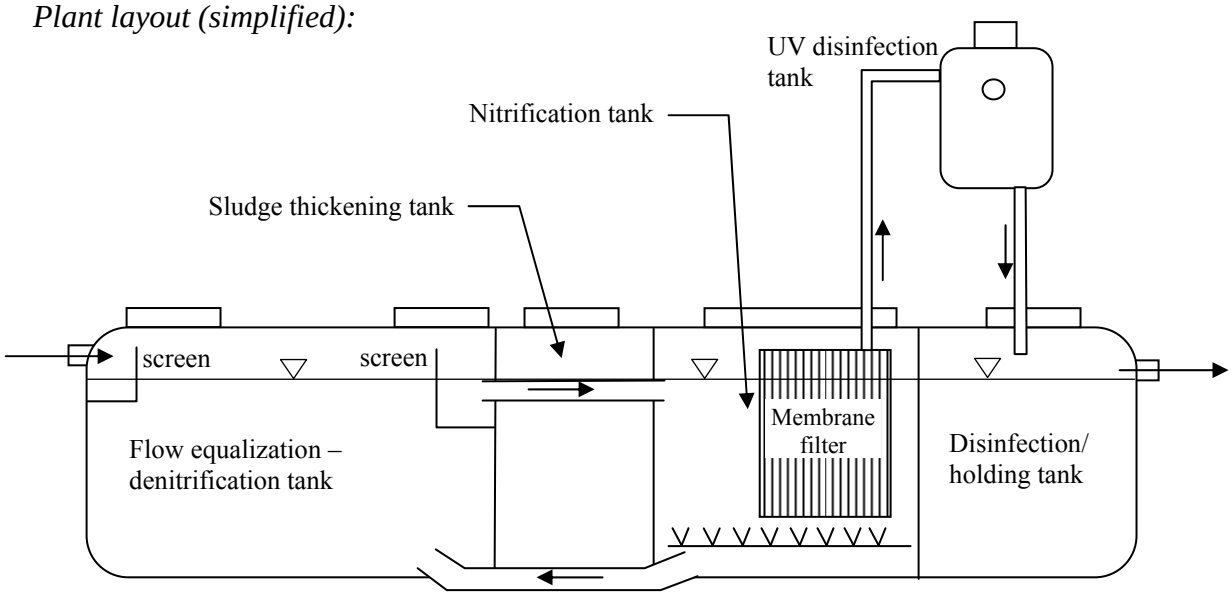
The Managaha WWTP is a package membrane bio-reactor system, or "MBR". An MBR system is basically an activated sludge system, in which a membrane filter serves to replace the clarifier as the method of solids removal. The Managaha MBR plant is further designed to provide advanced treatment through a de-nitrification process and UV disinfection, as well. Chemical phosphate removal is also included as a part of the package plant features, but is not presently being operated.

Physically, the plant is one large vessel which is divided into four chambers. Wastewater first passes through a screen and then enters the de-nitrification tank, which also serves as a flow equalization chamber. Wastewater is then passed through a second solids screen and pumped from the denitrification tank to the nitrification tank, where the membrane filter is located and the activated sludge process takes place. Wastewater is recirculated back to the denitrification tank, which is supposed to be anoxic, before being returned to the nitrification tank and membrane filter.

Process Diagram: (from manufacturer literature)



Plant layout (simplified):



The membrane filter unit is immersed in the nitrification tank. A vacuum pump maintains a mild negative pressure to draw the effluent through the membrane. The filtered effluent is then routed through the UV disinfection chamber (which is external), and then back to a holding tank at the

end of the treatment vessel prior to discharge. The fourth chamber is the sludge thickening tank, and is located between the nitrification and denitrification tanks.

From the plant, the treated effluent is discharged to another holding tank, where chlorine is added, and is then circulated to a separate plumbing system and reused for toilet flushing only. Overflow from this final holding tank is routed to the leaching field.

It should be noted that there are two septic tanks located ahead of the treatment plant. One tank is relatively small, and takes restroom waste only. The other tank is larger, and also accepts the kitchen wastewater. The larger tank also serves as the pump station, pumping effluent from the collection system to the treatment plant. The presence of these two tanks is probably not necessary, and may have been problematic in the first few months of system operation, when an especially hard time was had trying to build up an adequate biological community for the activated sludge process to begin functioning.

Loading / capacity

Total daily flow in recent months has been around 3,000 gallons per day (gpd). In busier months, flow has been as high as 5,000 gpd, and the plant design capacity is about 6,000 gpd.

Process operation

Cleaning the membrane is periodically required, and can be expected to become more frequent as the membrane ages. There are two procedures for cleaning the filter: by backwashing with a chlorine solution, or by removing the membrane unit and immersing it in a chlorine solution. The second method is preferable, but very difficult on Managaha due to the inability to access the treatment plant with lifting equipment (the membrane unit is too large and heavy for manual removal).

OK
12/11/13

DISCHARGE MONITORING REPORT

2ND DMR FOR THE MONTH OF OCTOBER (16-31) 2013

WASTEWATER TREATMENT PLANT- TINIAN DYNASTY HOTEL & CASINO

OWTS PERMIT NO.: 2010-OWTS-001

SAMPLE ID. No.: 131016-001 SAMPLED BY: Papias R. Manriquez

Contracted Laboratory: CUC Laboratory, Sadog Tasi, Saipan, CNMI.

Report date: Dec. 6, 2013

	Effluent Characteristic	Discharge Limitations Permitted	Date	Effluent Test Results	Comments
1	Flow	235,000 GPD	Oct. 16-31, 2013	107,496.06 Gal.	Average Daily Effluent
2	Nitrates (As N)	N/A	N/A	N/A	Next testing schedule: Nov. 2013
3	Settleable Solids	2.0mg/l	Oct. 16, 2013	.2 mg/L	Estimate only, settled solids can not be noticed at the bottom of cylinder.

	Parameter	Discharge Limitations Permitted	Date	Standard Methods 20th Edition	Results	Remarks
4	Biochemical Oxygen Demand (BOD)	30 mg/l	Oct. 16, 2013	SM 5210 B	< 2.7mg/L	BOD blanks within method QC limits; control standard lower than QC limits.
5	Total Suspended Solids (TSS)	30 mg/l	Oct. 16, 2013	SM 2540 D	< 3.1 mg/L	All TSS QC within method limits.
6	pH	6.5 - 8.6	Oct. 16, 2013	SM 4500-H+ B	7.8	N/A
7	Fecal Coliform	23 cfu/l	Oct. 16, 2013	SM 9222D	3 cfu/100ml	3 Fecal coliform colonies observed in 100mL filtration.

Report prepared by: Panfilo P. de Leon 12/6/13

PH Chief Mechanic/ Wastewater Treatment Plant Supervisor - TDHC

CNMI Certified Wastewater (Treatment System) Operator --- Class I, No. 0106

Tel. No.: 328-2233 ext. 2404/2438

Attn.: Mr. David Rosario

Manager - Wastewater, Earthmoving & Erosion Control Branch

C.N.M.I., D.E.Q.

Fax. No: 664-8540

Commonwealth Utilities Corporation
Water Quality Laboratory

WASTEWATER TEST REPORT

REPORT DATE: October 24, 2013

ANALYSIS REQUIRED: Wastewater - BOD, TSS, pH, Fecal Coliform

REQUESTOR: TINIAN DYNASTY HOTEL & CASINO

SAMPLE LOCATION: TDHC Wastewater Treatment Plant, Tinian **DEQ PERMIT:** 2010-OWTS-001

SAMPLE DATE: October 16, 2013 **SAMPLED BY:** Papias R. Manriquez

TINIAN DYNASTY OWTS PERMIT LIMITS

Biochemical Oxygen Demand (BOD) = 30 mg/L **Fecal Coliform** = 23 cfu/100ml

Total Suspended Solids (TSS) = 30 mg/L **pH** = 6.5 - 8.5

Date of Analysis	Location	Sample ID No.	BOD mg/L	TSS mg/L	Fecal Coliform cfu/100ml	pH	Analyzed by:
10/16/13	TDWTP	131016-001	< 2.7		3	7.8	BOD, pH,CL2-ZF/AM; mic
10/22/13	TDWTP	131016-001		3.1			TSS-ZF
MRL*/QL			2.7	2.8	1	n/a	
Permit Limits			30	30	23	6.5 - 8.5	
Method			SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+B	

* BOD control standard and blanks exceeded method QC limits; may indicate high bias and increased minimum reporting level. Starch test indicated chlorine residual in sample and neutralized with Sodium sulfite at 4 drops per 100mL sample. No sample dilution met data acceptance, BOD reported as less than MRL.
* 3 Fecal coliform colonies observed in 100mL filtration.
* All TSS QC within method limits.

BOD Sample RPD = n/a
TSS Sample RPD = 3.2%
TSS Low Control Standard recovery = 80%
TSS High Lab Control Standard recovery = 97%
TSS High LCS duplicate recovery = 99%
TSS High LCS and LCS duplicate Relative percent difference = 2.0%

Prepared & Reviewed by:
Heidi Yelin
Laboratory Manager

Approved by:
Alan Fletcher
Executive Director

OK
12/11/13

DISCHARGE MONITORING REPORT

2ND DMR FOR THE MONTH OF OCTOBER (16-31) 2013

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7	Fecal Coliform	23 cfu/l	Oct. 16, 2013	SM 9222D	3 cfu/100ml	3 Fecal coliform colonies observed in 100mL filtration.

Report prepared by: Panfilo P. de Leon 12/6/13

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10/16/13	TDWTP	131016-001	< 2.7		3	7.8	BOD, pH,CL2-ZF/AM; mic
10/22/13	TDWTP	131016-001		3.1			TSS-ZF
MRL*/QL			2.7	2.8	1	n/a	
Permit Limits			30	30	23	6.5 - 8.5	
Method			SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+B	

* BOD control standard and blanks exceeded method QC limits; may indicate high bias and increased minimum reporting level. Starch test indicated chlorine residual in sample and neutralized with Sodium sulfite at 4 drops per 100mL sample. No sample dilution met data acceptance, BOD reported as less than MRL.
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TSS Low Control Standard recovery = 80%
TSS High Lab Control Standard recovery = 97%
TSS High LCS duplicate recovery = 99%
TSS High LCS and LCS duplicate Relative percent difference = 2.0%

Prepared & Reviewed by:
Heidi Yelin
Laboratory Manager

Approved by:
Alan Fletcher
Executive Director

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different;*

NAME CMNWLTH NORTHERN MARIANA IS

ADDRESS: MANAGAHA ISLAND
Saipan, MP 96950

FACILITY: Managaha ISLAND WWTP

LOCATION: Managaha Island, Saipan
M P, 96950

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*

DISCHARGE MONITORING REPORT *(DMR)*

Form Approved
OMB No. 2040-0004

PERMIT NUMBER	DISCHARGE NUMBER
MP0020371	INF-A

DMR Mailing Code: 96950
MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	July	01	TO	2013	July	31

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD, 5-day, 20 deg.C 00310 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	11.824	11.824	lb/d		284	284	mg/L		1/31	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Solids, total suspended 00530 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	3.123	3.123	lb/d		75	75	mg/l		1/31	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Flow, in conduit or thru treatment plant 50050 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	0.005	0.005	Mgal/d						1/31	INSTAN
	PERMIT REQUIREMENT	Req. Mon. MO AVG.	Req. Mon. MO AVG.	Mgal/d						MONTHLY	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Takashi Mimura

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

T. Mimura

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA	NUMBER	MO	DD	YYYY
670	235-9373	10	29	2013

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME CMNWLTH NORTHERN MARIANA IS

ADDRESS: MANAGAHA ISLAND
Saipan, MP 96950

FACILITY: Managaha ISLAND WWTP

LOCATION: Managaha Island, Saipan
M P, 96950

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DMR Mailing Code: 96950
MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	August	01	TO	2013	August	31

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD, 5-day, 20 deg.C 00310 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	14.281	14.281	lb/d		343	343	mg/L		1/31	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Solids, total suspended 00530 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	2.290	2.290	lb/d		55	55	mg/l		1/31	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Flow, in conduit or thru treatment plant 50050 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	0.005	0.005	Mgal/d						1/31	INSTAN
	PERMIT REQUIREMENT	Req. Mon. MO AVG.	Req. Mon. MO AVG.	Mgal/d						MONTHLY	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Takashi Mimura

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MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	September	01	TO	2013	September	30

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD, 5-day, 20 deg.C 00310 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	11.075	11.075	lb/d		266	266	mg/L		1/30	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Solids, total suspended 00530 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	2.581	2.581	lb/d		62	62	mg/l		1/30	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			MONTHLY	
Flow, in conduit or thru treatment plant 50050 G 0 Raw Sewage Influent	SAMPLE MEASUREMENT	0.005	0.005	Mgal/d						1/30	INSTAN
	PERMIT REQUIREMENT	Req. Mon. MO AVG.	Req. Mon. MO AVG.	Mgal/d						MONTHLY	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		TELEPHONE		DATE		
Takashi Mimura	670	235-9373	10	29	2013
TYPED OR PRINTED	AREA	NUMBER	MO	DD	YYYY

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ADDRESS: MANAGAHA ISLAND
Saipan, MP 96950

FACILITY: Managaha ISLAND WWTP

LOCATION: Managaha Island, Saipan
M P, 96950

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*

DISCHARGE MONITORING REPORT *(DMR)*

Form Approved
OMB No. 2040-0004

MP0020371	001-A
PERMIT NUMBER	**DISCHARGE NUMBER**

DMR Mailing Code: 96950
MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	July	01	TO	2013	July	31

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPL E TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD, 5-day, 20 deg.C 00310 1 0 Effluent Gross	SAMPLE MEASUREMENT	0.117	0.117	lb/d		2.8	2.8	mg/L		1/31	inst
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			Once Per Monthly Discharge	
Solids, total suspended 00530 1 0 Effluent Gross	SAMPLE MEASUREMENT	<0.117	<0.117	lb/d		<2.8	<2.8	mg/l		1/31	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			Once Per Monthly Discharge	
Flow, in conduit or thru treatment plant 50050 1 0 Effluent Gross	SAMPLE MEASUREMENT	0.005	0.005	Mgal/d						1/31	INSTAN
	PERMIT REQUIREMENT	Req. Mon. MO AVG.	Req. Mon. MO AVG.	Mgal/d						Once Per Monthly Discharge	
Chlorine, total residual 50060 1 0 Effluent Gross	SAMPLE MEASUREMEN					B	B	ug/l		1/31	grab
	PERMIT REQUIREMENT					7.5 MO AVG	13 DAILY MAX			Once Per Monthly Discharge	
BOD, 5-day, percent removal 81010 K 0 Percent Removal	SAMPLE MEASUREMENT					99.0		%		1/31	grab
	PERMIT REQUIREMENT					85 MO AVG				Once Per Monthly Discharge	
Solids, suspended percent removal 81011 K 0 Percent Removal	SAMPLE MEASUREMENT					96.1		%		1/31	grab
	PERMIT REQUIREMENT					85 MO AVG				Once Per Monthly Discharge	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Takashi Mimura

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
AREA	NUMBER	YEAR	MO	DAY
670	235-9373	13	10	29

COMMENT AND EXPLANATION OF ANY VIOLATIONS ***(Reference all attachments here)***

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME CMNWLTH NORTHERN MARIANA IS

ADDRESS: MANAGAHA ISLAND
Saipan, MP 96950

FACILITY: Managaha ISLAND WWTP

LOCATION: Managaha Island, Saipan
M P, 96950

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*

DISCHARGE MONITORING REPORT *(DMR)*

Form Approved
OMB No. 2040-0004

MP0020371	001-A
PERMIT NUMBER	**DISCHARGE NUMBER**

DMR Mailing Code: 96950
MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD

	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	September	01	TO	2013	September	30

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD, 5-day, 20 deg.C 00310 1 0 Effluent Gross	SAMPLE MEASUREMENT	0.196	0.196	lb/d		4.7	4.7	mg/L		1/30	inst
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			Once Per Monthly Discharge	
Solids, total suspended 00530 1 0 Effluent Gross	SAMPLE MEASUREMENT	<0.087	<0.087	lb/d		<2.1	<2.1	mg/l		1/30	grab
	PERMIT REQUIREMENT	1.3 MO AVG	1.9 WKLY AVG	lb/d		30 MO AVG	45 WKL AVG			Once Per Monthly Discharge	
Flow, in conduit or thru treatment plant 50050 1 0 Effluent Gross	SAMPLE MEASUREMENT	0.005	0.005	Mgal/d						1/30	INSTAN
	PERMIT REQUIREMENT	Req. Mon. MO AVG.	Req. Mon. MO AVG.	Mgal/d						Once Per Monthly Discharge	
Chlorine, total residual 50060 1 0 Effluent Gross	SAMPLE MEASUREMEN					B	B	ug/l		1/30	grab
	PERMIT REQUIREMENT					7.5 MO AVG	13 DAILY MAX			Once Per Monthly Discharge	
BOD, 5-day, percent removal 81010 K 0 Percent Removal	SAMPLE MEASUREMENT					98.2		%		1/30	grab
	PERMIT REQUIREMENT					85 MO AVG				Once Per Monthly Discharge	
Solids, suspended percent removal 81011 K 0 Percent Removal	SAMPLE MEASUREMENT					96.6		%		1/30	grab
	PERMIT REQUIREMENT					85 MO AVG				Once Per Monthly Discharge	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Takashi Mimura

TYPED OR PRINTED

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

T. Mimura

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
670	235-9373	13	10	29
AREA	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS ***(Reference all attachments here)***

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME CMNWLTH NORTHERN MARIANA IS

ADDRESS: MANAGAHA ISLAND
Saipan, MP 96950

FACILITY: Managaha ISLAND WWTP

LOCATION: Managaha Island, Saipan
M P, 96950

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*

DISCHARGE MONITORING REPORT *(DMR)*

Form Approved
OMB No. 2040-0004

MP0020371	001-Q
PERMIT NUMBER	DISCHARGE NUMBER

DMR Mailing Code: 96950
MINOR

DISCHARGE 001/MONTHLY
External Outfall

No Discharge ☐

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	2013	July	01	TO	2013	September	30

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Enterococci 61211 1 0 Effluent Gross	SAMPLE MEASUREMENT					17.75	17.75	CFU/100 ml		1/92	grab
	PERMIT REQUIREMENT					35 MO AVG	104 DAILY MAX			Quarterly	

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE		DATE		
Takashi Mimura	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	T. Mimura	670	235-9373	13	10	29
TYPED OR PRINTED			AREA	NUMBER	YEAR	MO	DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS ***(Reference all attachments here)***

LAOLAO BAY
GOLF & RESORT

September 27, 2013

Frank Rabauliman
Director, Division of Environmental Quality
Commonwealth of Northern Mariana Island

Dear Director Rabauliman,

Respectfully submitting the following report:

DISCHARGE MONITORING REPORT

Permit # 2009-OWTS-003

COMPLIANCE PERIOD – AUGUST 2013

REPORT CONTENTS

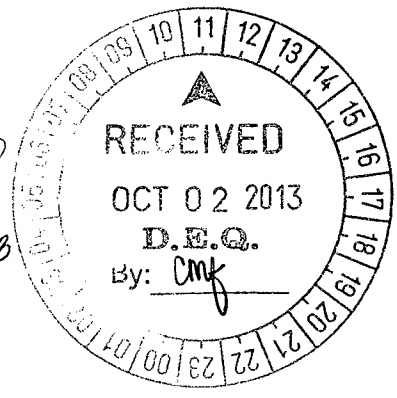
1. Discharge Monitoring Report Form
2. Daily Chlorine Residual & Wastewater Discharge Report
3. Laboratory Test Results for Sampling dates:
    a. August 07, 2013
    b. August 14, 2013
    c. August 21, 2013
    d. August 28, 2013

Sincerely,

Ruel Magtalas
Project Engineer/
Facility Maintenance Manager

PMB 1020 PPP P.O. Box 10000
Saipan, MP 96950-8900
Tel. (670) 236-8888 Fax. (670) 236-8880

10/04/13



LAND DISPOSAL OF WASTEWATER
Permit No. 2009-OWTS-003

Discharge Monitoring Report Form:

Monitoring Period: August 07, 14, 21, & 28, 2013

Page 1 of 2

Effluent Characteristic	Unit		Influent			Effluent			Number of Excedences	Sample Type	Sample Frequency
			MINIMUM	AVERAGE (Monthly)	MAXIMUM	MINIMUM	AVERAGE (Monthly)	MAXIMUM			
Flow:	GPD	SAMPLE MEASUREMENT	Gallons	Gallons	Gallons	0 Gallons	8,419 Gallons	15,000 Gallons			
		PERMIT** REQUIREMENT		24,210 Gallons						Continuous	Continuous
BOD 5	mg/L	SAMPLE MEASUREMENT				Test Result from CUC < 2 8/7/2013 < 2 8/14/2013 < 2 8/21/2013 < 2 8/28/2013	<2	-----			
		PERMIT** REQUIREMENT					20	40		Discrete	Weekly
Total Suspended Solids (TSS)	mg/L	SAMPLE MEASUREMENT				Test Result from CUC 3.2 8/7/2013 < 2.8 8/14/2013 < 2.8 8/21/2013 < 2.8 8/28/2013	<=2.9	-----			
		PERMIT** REQUIREMENT					20	40		Discrete	Weekly
Total Nitrogen	mg/L	SAMPLE MEASUREMENT					-----	-----			
		PERMIT** REQUIREMENT					1.0	2.0		Discrete	Quarterly

Fecal Coliform	cfu/ 100ml	SAMPLE MEASUREMENT				Test Result from QWI < 1 8/7/2013 < 1 8/14/2013 < 1 8/21/2013 < 1 8/28/2013	<1	-----			
		PERMIT** REQUIREMENT					23.0	23.0		Discrete	Weekly
pH		SAMPLE MEASUREMENT				Test Result from CUC 7.2 8/7/2013 7.6 8/14/2013 7.3 8/21/2013 7.5 8/28/2013	7.40	-----			
		PERMIT** REQUIREMENT				6.5		8.6		Discrete	Weekly
Chlorine Residual [1]	mg/L	SAMPLE MEASUREMENT				See Attached	Daily Chlorine	Reading			
		PERMIT** REQUIREMENT				0.1				Discrete	Daily

2009-OWTS-003

Monitoring Period: August 07, 14, 21, & 28, 2013

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information,including the possibility of fine and imprisonment for violations.

RUEL L. MAGTALAS
Facility Maintenance Manager
Print name & title

Signature

8/27/13
Date

**Laboratory analysis sheets for all monitoring results reported on this form must be attached.

[1] Copy of daily chlorine residual measurement log must be attached to this form.

LAOLAO BAY GOLF & RESORT

WASTEWATER TREATMENT PLANT

MEMBRANE BIOREACTOR/BIOLOGICAL ACTIVATED SLUDGE

DAILY CHLORINE RESIDUAL & WASTEWATER DISCHARGE(EFFLUENT)

Month: AUGUST, 2013

SAMPLE COLLECTION		INFLUENT		EFFLUENT			COMMENTS
Date	Time	Flow Meter Reading	GPD	Flow Meter Reading	GPD	Chlorine Residual (mg/L)	
7/31/2013	0815 H	0.0090515		16,560,000			
8/1/2013	0812 H	0.0065482		16,567,000	7,000	0.12	
8/2/2013	0810 H	0.0064339		16,574,000	7,000	0.12	
8/3/2013	0835 H	0.0076942		16,585,000	11,000	0.12	
8/4/2013	1000 H	0.0069856		16,595,000	10,000	0.11	
8/5/2013	0810 H	0.0055603		16,610,000	15,000	0.12	
8/6/2013	0810 H	0.0077143		16,619,000	9,000	0.12	
8/7/2013	0815 H	0.0087948		16,632,000	13,000	0.14	MLSS=9,880
8/8/2013	0822 H	0.0005829		16,638,000	6,000	0.12	
8/9/2013	0812 H	0.0002174		16,646,000	8,000	0.12	
8/10/2013	0926 H	0.0015741		16,656,000	10,000	0.14	
8/11/2013	1000 H	0.0054893		16,667,000	11,000	0.11	
8/12/2013	0820 H	0.0000637		16,675,000	8,000	0.12	
8/13/2013	0811 H	0.0005552		16,685,000	10,000	0.12	
8/14/2013	0815 H	0.0044292		16,695,000	10,000	0.13	MLSS=9,840
8/15/2013	0810 H	0.0053882		16,707,000	12,000	0.12	
8/16/2013	0808 H	0.0048275		16,721,000	14,000	0.12	
8/17/2013	1014 H	0.0049419		16,736,000	15,000	0.11	
8/18/2013	1000 H	0.0053584		16,748,000	12,000	0.11	
8/19/2013	0812 H	0.0067840		16,755,000	7,000	0.12	
8/20/2013	0807 H	0.0081203		16,763,000	8,000	0.12	
8/21/2013	0812 H	0.0045823		16,773,000	10,000	0.11	MLSS=9,540
8/22/2013	0810 H	0.0142109		16,782,000	9,000	0.12	
8/23/2013	0809 H	0.0087406		16,785,000	3,000	0.11	
8/24/2013	0944 H	0.0074358		16,785,000	0	0.12	
8/25/2013	1030 H	0.0069823		16,785,000	0	0.11	
8/26/2013	0810 H	0.0079924		16,785,000	0	0.12	
8/27/2013	0819 H	0.0077382		16,785,000	0	0.12	
8/28/2013	0820 H	0.0075062		16,785,000	0	0.12	MLSS=9,670
8/29/2013	0812 H	0.0090973		16,797,000	12,000	0.12	
8/30/2013	0815 H	0.0005132		16,808,000	11,000	0.12	
8/31/2013	0900 H	0.0006321		16,821,000	13,000	0.12	
AVERAGE			**#DIV/0!**		**8,419**	**0.119**	
NOTE: INFLUENT METER FLOW CONVERTER IS DEFECTIVE. STILL WORKING ON THE FIX.							

Commonwealth Utilities Corporation
Water Quality Laboratory

WASTEWATER TEST REPORT

REPORT DATE: August 15, 2013

ANALYSIS REQUIRED: Wastewater - BOD, TSS, pH

REQUESTOR: LAOLAO BAY GOLF & RESORT

SAMPLE LOCATION: Laolao Bay Golf & Resort Wastewater Treatment Plant, Saipan **DEQ Permit:** 2009-OWTS-003

SAMPLE DATE: August 7, 2013 **SAMPLED BY:** Domingo R. Santos

LAOLAO BAY GOLF & RESORT OWTS PERMIT LIMITS

	MO AVE	DAILY MAX	
Biochemical Oxygen Demand (BOD) =	20 mg/L	40 mg/L	**Fecal Coliform** = 23 cfu/100ml
Total Suspended Solids (TSS) =	20 mg/L	40 mg/L	**pH** = 6.5 - 8.6

Date of Analysis	Location	Sample ID No.	BOD mg/L	TSS mg/L	Fecal Coliform cfu/100ml	pH	Analyzed by:
08/07/13	LLBWTP	130807-004	< 2		not tested	7.2	BOD, pH,CL2-ZF/KC
08/13/13	LLBWTP	130807-004		3.2			TSS-BT
MRL*/QL			2.0	2.8	1	n/a	
Daily Max Permit Limits			40	40	23	6.5 - 8.6	
Method			SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+ B	

Comments: * BOD blanks and control standard within method QC limits;
Starch test indicated chlorine residual in sample and neutralized with Sodium sulfite at 1 drops per 100mL sample.
All sample dilutions met data acceptance, but less than Minimum reporting level.

* All TSS method QC within limits.

TSS Low Control Standard recovery =	104%
TSS Lab Control Standard (LCS) recovery =	92%
TSS LCS Duplicate recovery =	88%
TSS LCS and LCS Dup Relative percent difference =	4.4%
Sample TSS RPD =	11.8%

Prepared & Reviewed by:

Heidi Yelin
Laboratory Manager

Approved by:

Alan W. Fletcher
Acting Executive Director

CHAIN OF CUSTODY RECORD

No. 3031

CUC LABORATORY USE ONLY:

SAMPLE 6 DIGIT DATE CODE: 130807-004

LOGIN COMMENTS:

SAMPLE TEMP WHEN REC'D AT LAB: 1.6 (Compliance: 4 +/- 2°C)

CONDITION OF ICE: FROZEN ___ PARTIALLY FROZEN ✓ THAWED ___

SAMPLES CHECKED AGAINST COC BY: ABM

SAMPLES LOGGED IN BY: ABM

SAMPLES REC'D DAY OF COLLECTION? ✓ (check for yes)

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: LAOLAO BAY GOLF & RESORT

SYSTEM: MBR

PROJECT NAME: WASTEWATER TREATMENT PLANT (EFFLUENT)

SAMPLER PRINTED NAME: DOMINGO R. SANTOS

SAMPLER SIGNATURE: Domingo R. Santos

COMPLIANCE SAMPLES (check for yes) ✓ NON-COMPLIANCE SAMPLES (check for yes) ___

REGULATION INVOLVED: (eg. SDW, NPDES, etc...)

Type of samples (circle one): (ROUTINE) SPECIAL CONFIRMATION

CHECK ANALYSIS REQUIRED

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX *	GRAB	COMP	Coliform	Entercocci	HPC	BOD	TSS	Turbidity	Conductivity	Salinity	Temperature	Dissolved Ox	Chlorine Res	pH	Settleable Sol	Chloride	Other	SAMPLER COMMENTS
AUG. 7 2013	8:15 AM	WASTEWATER TREATMENT PLANT RAGMAN -III	130807-004	CWW	✓					✓	✓											

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(am)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	Domingo R. Santos	DOMINGO R. SANTOS	LAOLAO BAY GOLF & RESORT	08/07/2013	8:57 AM
RECEIVED BY:	[illegible]	Andrew B. Masga	CUC Water Lab Tech.	08/07/13	11:02 AM
RELINQUISHED BY:					
RECEIVED BY:					

PAGE ___ OF ___

QUALITY WATER LABORATORY
Certified Water Analysis Laboratory

QUALITY WATER INCORPORATED

CERTIFIED LABORATORY
P.O. Box 502148 CK, Saipan, MP 96950
Tel: 1(670) 233-8002 • Fax: 1(670) 233-8003

BACTERIOLOGICAL QUALITY REPORT

Q 25206
SAMPLE LOCATION ID#
PWS ID#

Balance Due _____
Amt. Paid _____
Receipt # _____
Date _____ Initial _____

Company Name LAOLAO BAY GOLF & RESORT
Sample Location WASTEWATER TREATMENT PLANT
Sampler DOMINGO R. SANTOS Collection Date AUG. 7, 2013 Time 8:15 (AM/PM)
Free / Total Chlorine 0.14 mg/l Transporter ROBERT CRISOSTOMO

Check one:
- ☑ ROUTINE
- ☐ REPEAT
- ☐ SPECIAL

Complete this box only if "repeat" is checked in box at left.
Repeat for Sample # _____
Circle one: Original Upstream Downstream Elsewhere

☐ REPLACEMENT for Sample #

Collection Remarks _____

DO NOT WRITE BELOW THIS LINE ····· FOR LABORATORY USE ONLY

Received by RRG Time Received 11:14 am
Date Recieved 8/7/13 Temperature 5 °C

- ☑ ONPG-MUG
- ☐ P/A
- ☐ MF - CFU/ 100 ml

Total Coliform		Fecal Coliform / *E. Coli*	
Absent	Present	Absent	Present
	98.3	< 1	

Date Analyzed 8/7/13
Time Analyzed 3:51 PM Read Out Date 8/8/13
Analyst MBB Read Out Time 10:00 am - RRG
Laboratory Comments: _____

RESULTS OF ANALYSIS

- ☐ Bacteriologically safe at time of sampling.
- ☑ Total coliform bacteria present at time of sampling.
- ☐ Fecal caliform or *E. coli* bacteria present at time of sampling.
- ☐ Collect repeat samples withtin 24 hours and increase the number of samples you collect next month, per your coliform monitoring plan.
- ☐ Sample rejected/invalid due to_____ (see reverse). Collect Replacement sample.
- ☐ Suspected sample tampering or data falsification.

White - Drinking Water Program Pink - Water System Blue - Laboratory

Commonwealth Utilities Corporation
Water Quality Laboratory

WASTEWATER TEST REPORT

REPORT DATE: August 22, 2013

ANALYSIS REQUIRED: Wastewater - BOD, TSS, pH

REQUESTOR: LAOLAO BAY GOLF & RESORT

SAMPLE LOCATION: Laolao Bay Golf & Resort Wastewater Treatment Plant, Saipan **DEQ Permit:** 2009-OWTS-003

SAMPLE DATE: August 14, 2013 **SAMPLED BY:** Domingo R. Santos

LAOLAO BAY GOLF & RESORT OWTS PERMIT LIMITS

	MO AVE	DAILY MAX	
Biochemical Oxygen Demand (BOD) =	20 mg/L	40 mg/L	**Fecal Coliform** = 23 cfu/100ml
Total Suspended Solids (TSS) =	20 mg/L	40 mg/L	**pH** = 6.5 - 8.6

Date of Analysis	Location	Sample ID No.	BOD mg/L	TSS mg/L	Fecal Coliform cfu/100ml	pH	Analyzed by:
08/14/13	LLBWTP	130814-003	< 2		not tested	7.6	BOD, pH,CL2-EA/KFC
08/20/13	LLBWTP	130814-003		< 2.8			TSS-BT

MRL*/QL	2.0	2.8	1	n/a
Daily Max Permit Limits	40	40	23	6.5 - 8.6
Method	SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+ B

Comments: * BOD blanks and control standard within method QC limits;
Starch test did not indicate chlorine residual in sample; sample analyzed as received.
All sample dilutions met data acceptance, but less than Minimum reporting level.

* All TSS method QC within limits.

TSS Low Control Standard recovery =	88%
TSS Lab Control Standard (LCS) recovery =	96%
TSS LCS Duplicate recovery =	93%
TSS LCS and LCS Dup Relative percent difference =	3.5%
Sample TSS RPD =	0.0%

Prepared & Reviewed by:

Heidi Yelin
Laboratory Manager

Approved by:

Alan W. Fletcher
Acting Executive Director

CHAIN OF CUSTODY RECORD

No. 3044

CUC LABORATORY USE ONLY:

SAMPLE 6 DIGIT DATE CODE: 130814-003

LOGIN COMMENTS:

SAMPLE TEMP WHEN REC'D AT LAB: 1.3 (Compliance: 4 +/- 2°C)

CONDITION OF ICE: FROZEN ___ PARTIALLY FROZEN ✓ THAWED ___

SAMPLES CHECKED AGAINST COC BY: ICPC

SAMPLES LOGGED IN BY: ICPC

SAMPLES REC'D DAY OF COLLECTION? ✓ (check for yes)

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: LAOLAO BAY GOLF & RESORT

SYSTEM: MBR

PROJECT NAME: WASTEWATER TREATMENT PLANT (EFFLUENT)

SAMPLER PRINTED NAME: DOMINGO R. SANTOS

SAMPLER SIGNATURE: Domingo R. Santos

COMPLIANCE SAMPLES (check for yes) ✓ NON-COMPLIANCE SAMPLES (check for yes)

REGULATION INVOLVED: (eg. SDW, NPDES, etc...)

Type of samples (circle one): (ROUTINE) SPECIAL CONFIRMATION

CHECK ANALYSIS REQUIRED

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX *	GRAB	COMP	Coliform	Entercocci	HPC	BOD	TSS	Turbidity	Conductivity	Salinity	Temperature	Dissolved Ox	Chlorine Res	pH	Settleable Sol	Chloride	Other	SAMPLER COMMENTS
AUG 14 2013	8:15 AM	WASTEWATER TREATMENT PLANT KAGMAN - III	130814-003	CWW	✓					✓	✓											

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(am)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	Domingo R. Santos	DOMINGO R. SANTOS	LAOLAO BAY GOLF & RESORT	08/14/2013	8:44 AM
RECEIVED BY:	Robert C.	Robert C	" " "	" " "	10:10 "
RELINQUISHED BY:	Robert C.	Robert C	" " "	" " "	10:20 "
RECEIVED BY:	Kevin P. Camacho	Kevin P. Camacho	CUC Water Lab	08/14/13	10:23 AM

QUALITY WATER LABORATORY
Certified Water Analysis Laboratory

QUALITY WATER INCORPORATED

CERTIFIED LABORATORY
P.O. Box 502148 CK, Saipan, MP 96950
Tel: 1(670) 233-8002 • Fax: 1(670) 233-8003

BACTERIOLOGICAL QUALITY REPORT

Q 25239
SAMPLE LOCATION ID#
PWS ID#

Balance Due _____
Amt. Paid _____
Receipt # _____
Date _____ Initial _____

Company Name LAOLAO BAY GOLF & RESORT
Sample Location WASTEWATER TREATMENT PLANT
Sampler DOMINGO R. SANTOS Collection Date AUG. 14, 2013 Time 8:15 AM/PM
Free / Total Chlorine 0.13 mg/l Transporter ROBERT CRISOSTOMO

Check one:
☑ ROUTINE
☐ REPEAT
☐ SPECIAL

Complete this box only if "repeat" is checked in box at left.
Repeat for Sample # _____
Circle one:
Original Upstream Downstream Elsewhere

☐ REPLACEMENT for Sample #

Collection Remarks _____

DO NOT WRITE BELOW THIS LINE — FOR LABORATORY USE ONLY

Received by MBB Time Received 11:20 PM
Date Recieved 8/14/13 Temperature 7.0 °C

☑ ONPG-MUG
☐ P/A
☐ MF - CFU/ 100 ml

Total Coliform		Fecal Coliform / *E. Coli*	
Absent	Present	Absent	Present
	1.0	< 1	

Date Analyzed 8/14/13
Time Analyzed 4:33 PM Read Out Date 8/15/13
Analyst MBB Read Out Time 10:45 am - RRG
Laboratory Comments: _____

RESULTS OF ANALYSIS

☐ Bacteriologically safe at time of sampling.
☑ Total coliform bacteria present at time of sampling.
☐ Fecal caliform or *E. coli* bacteria present at time of sampling.
☐ Collect repeat samples withtin 24 hours and increase the number of samples you collect next month, per your coliform monitoring plan.
☐ Sample rejected/invalid due to _____ (see reverse). Collect Replacement sample.
☐ Suspected sample tampering or data falsification.

White - Drinking Water Program Pink - Water System Blue - Laboratory

Commonwealth Utilities Corporation
Water Quality Laboratory

WASTEWATER TEST REPORT

REPORT DATE: August 30, 2013

ANALYSIS REQUIRED: Wastewater - BOD, TSS, pH

REQUESTOR: LAOLAO BAY GOLF & RESORT

SAMPLE LOCATION: Laolao Bay Golf & Resort Wastewater Treatment Plant, Saipan **DEQ Permit:** 2009-OWTS-003

SAMPLE DATE: August 21, 2013 **SAMPLED BY:** Domingo R. Santos

LAOLAO BAY GOLF & RESORT OWTS PERMIT LIMITS

	MO AVE	DAILY MAX	
Biochemical Oxygen Demand (BOD) =	20 mg/L	40 mg/L	**Fecal Coliform** = 23 cfu/100ml
Total Suspended Solids (TSS) =	20 mg/L	40 mg/L	**pH** = 6.5 - 8.6

Date of Analysis	Location	Sample ID No.	BOD mg/L	TSS mg/L	Fecal Coliform cfu/100ml	pH	Analyzed by:
08/21/13	LLBWTP	130821-003	< 2		not tested	7.3	BOD, pH,CL2-KC
08/27/13	LLBWTP	130821-003		< 2.8			TSS-BT
MRL*/QL			2.0	2.8	1	n/a	
Daily Max Permit Limits			40	40	23	6.5 - 8.6	
Method			SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+ B	

Comments: * BOD blanks within method QC limits; control standard lower than QC limits; results may have low bias and are qualified. Starch test indicated chlorine residual in sample and neutralized with Sodium sulfite at 2 drops per 100mL sample. No sample dilutions met data acceptance; reported as less than Minimum reporting level.

* All TSS method QC within limits.

TSS Low Control Standard recovery =	94%
TSS Lab Control Standard (LCS) recovery =	93%
TSS LCS Duplicate recovery =	101%
TSS LCS and LCS Dup Relative percent difference =	8.9%
Sample TSS RPD =	0.0%

Prepared & Reviewed by:

Heidi Yelin
Laboratory Manager

Approved by:

Alan W. Fletcher
Acting Executive Director

CHAIN OF CUSTODY RECORD

No. 3057

CUC LABORATORY USE ONLY:

SAMPLE 6 DIGIT DATE CODE: 130821-001

SAMPLES CHECKED AGAINST COC BY: KPC

LOGIN COMMENTS:

SAMPLES LOGGED IN BY: KPC

SAMPLE TEMP WHEN REC'D AT LAB: 0.5° (Compliance: 4 +/- 2°C)

SAMPLES REC'D DAY OF COLLECTION? ✓ (check for yes)

CONDITION OF ICE: FROZEN ___ PARTIALLY FROZEN ✓ THAWED ___

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: LACLAO BAY GOLF & RESORT

SYSTEM: MBR

COMPLIANCE SAMPLES (check for yes) ✓ NON-COMPLIANCE SAMPLES (check for yes)

REGULATION INVOLVED: (eg. SDW, NPDES, etc...)

Type of samples (circle one): (ROUTINE) SPECIAL CONFIRMATION

PROJECT NAME: WASTEWATER TREATMENT PLANT (EFFLUENT)

CHECK ANALYSIS REQUIRED

SAMPLER PRINTED NAME: DOMINGO R. SANTOS

SAMPLER SIGNATURE: Domingo R. Santos

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX *	GRAB	COMP	Coliform	Entercocci	HPC	BOD	TSS	Turbidity	Conductivity	Salinity	Temperature	Dissolved Ox	Chlorine Res	pH	Settleable Sol	Chloride	Other	SAMPLER COMMENTS
AUG 21 2013	8:12 AM	WASTEWATER TREATMENT PLANT KAGMAN JR	130821-001	CWW	✓					✓	✓											

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(am)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	Domingo R. Santos	DOMINGO R. SANTOS	LACLAC BAY GOLF & RESORT	08/21/2013	08:42 AM
RECEIVED BY:					9:45
RELINQUISHED BY:					10:05
RECEIVED BY:		Kevin P. Camacho	CUC Water Lab	08/21/2013	10:07

PAGE ___ OF ___

QUALITY WATER LABORATORY
Certified Water Analysis Laboratory

QUALITY WATER INCORPORATED

CERTIFIED LABORATORY
P.O. Box 502148 CK, Saipan, MP 96950
Tel: 1(670) 233-8002 • Fax: 1(670) 233-8003

BACTERIOLOGICAL QUALITY REPORT

Q 25289
SAMPLE LOCATION ID#

PWS ID#

Balance Due _____
Amt. Paid _____
Receipt # _____

Company Name LAOLAO BAY GOLF & RESORT Date _____ Initial _____

Sample Location WASTEWATER TREATMENT PLANT

Sampler DOMINGO R, SANTOS Collection Date AUG. 21, 2013 Time 08:12 AM/PM

Free / Total Chlorine 0.11 mg/l Transporter ROBERT CRISOSTOMO

Check one:
- ☑ ROUTINE
- ☐ REPEAT
- ☐ SPECIAL

Complete this box only if "repeat" is checked in box at left.
Repeat for Sample # _____
Circle one:
Original Upstream Downstream Elsewhere

☐ REPLACEMENT for Sample #

Collection Remarks _____

DO NOT WRITE BELOW THIS LINE — FOR LABORATORY USE ONLY

Received by RRG Time Received 10:47 am

Date Recieved 8/21/13 Temperature 4.5 °C

- ☑ ONPG-MUG
- ☐ P/A
- ☐ MF - CFU/ 100 ml

Total Coliform		Fecal Coliform / *E. Coli*	
Absent	Present	Absent	Present
	4.1	< 1	

Date Analyzed 8/21/13

Time Analyzed 4:54 pm Read Out Date 8/22/13

Analyst RRG Read Out Time 11:00 am - RRG

Laboratory Comments: _____

RESULTS OF ANALYSIS

- ☐ Bacteriologically safe at time of sampling.
- ☑ Total coliform bacteria present at time of sampling.
- ☐ Fecal caliform or *E. coli* bacteria present at time of sampling.
- ☐ Collect repeat samples withtin 24 hours and increase the number of samples you collect next month, per your coliform monitoring plan.
- ☐ Sample rejected/invalid due to _____ (see reverse). Collect Replacement sample.
- ☐ Suspected sample tampering or data falsification.

White - Drinking Water Program Pink - Water System Blue - Laboratory

Commonwealth Utilities Corporation
Water Quality Laboratory

WASTEWATER TEST REPORT

REPORT DATE: September 3, 2013

ANALYSIS REQUIRED: Wastewater - BOD, TSS, pH

REQUESTOR: LAOLAO BAY GOLF & RESORT

SAMPLE LOCATION: Laolao Bay Golf & Resort Wastewater Treatment Plant, Saipan **DEQ Permit:** 2009-OWTS-003

SAMPLE DATE: August 28, 2013 **SAMPLED BY:** Domingo R. Santos

LAOLAO BAY GOLF & RESORT OWTS PERMIT LIMITS

	MO AVE	DAILY MAX	
Biochemical Oxygen Demand (BOD) =	20 mg/L	40 mg/L	**Fecal Coliform** = 23 cfu/100ml
Total Suspended Solids (TSS) =	20 mg/L	40 mg/L	**pH** = 6.5 - 8.6

Date of Analysis	Location	Sample ID No.	BOD mg/L	TSS mg/L	Fecal Coliform cfu/100ml	pH	Analyzed by:
08/28/13	LLBWTP	130828-005	< 2		not tested	7.5	BOD, pH-KC; CL2-ZF
09/03/13	LLBWTP	130828-005		< 2.8			TSS-KC

MRL*/QL	2.0	2.8	1	n/a
Daily Max Permit Limits	40	40	23	6.5 - 8.6
Method	SM 5210 B	SM 2540 D	SM 9222 D	SM 4500-H^+ B

Comments: * BOD blanks and control standard within method QC limits.
Starch test indicated chlorine residual in sample and neutralized with Sodium sulfite at 1 drop per 100mL.
All sample dilutions met data acceptance, but less than than Minimum reporting level.

* All TSS method QC within limits.
Sample TSS observed at 1mg/L but less than MRL.

TSS Low Control Standard recovery =	94%
TSS Lab Control Standard (LCS) recovery =	90%
TSS LCS Duplicate recovery =	92%
TSS LCS and LCS Dup Relative percent difference =	2.2%
Sample TSS RPD =	0.0%

Prepared & Reviewed by:

Heidi Yelin
Laboratory Manager

Approved by:

Alan W. Fletcher
Acting Executive Director

CHAIN OF CUSTODY RECORD

No. 3073

CUC LABORATORY USE ONLY:
SAMPLE 6 DIGIT DATE CODE: 130828-005
LOGIN COMMENTS:
SAMPLE TEMP WHEN REC'D AT LAB: 0.8 (Compliance: 4 +/- 2°C)
CONDITION OF ICE: FROZEN ___ PARTIALLY FROZEN / THAWED ___

SAMPLES CHECKED AGAINST COC BY: ABM
SAMPLES LOGGED IN BY: ABM
SAMPLES REC'D DAY OF COLLECTION? ✓ (check for yes)

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: LAOLAO BAY GOLF & RESORT
SYSTEM: MBR
PROJECT NAME: WASTEWATER TREATMENT PLANT (EFFLUENT)
SAMPLER PRINTED NAME: DOMINGO R. SANTOS
SAMPLER SIGNATURE: Domingo R. Santos

COMPLIANCE SAMPLES (check for yes) ✓ NON-COMPLIANCE SAMPLES (check for yes)
REGULATION INVOLVED: (eg. SDW, NPDES, etc...)
Type of samples (circle one): (ROUTINE) SPECIAL CONFIRMATION

CHECK ANALYSIS REQUIRED

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX*	GRAB	COMP	Coliform	Entercocci	HPC	BOD	TSS	Turbidity	Conductivity	Salinity	Temperature	Dissolved Ox	Chlorine Res	pH	Settleable Sol	Chloride	Other	SAMPLER COMMENTS
AUG 28 12	8:15a	WASTEWATER TREATMENT PLANT	130828-005	CWW	✓					✓	✓											
1615	MM	KACAMAN JR																				

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(ɛm)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	Domingo R. Santos	DOMINGO R. SANTOS	LAOLAO BAY GOLF & RESORT	08/28/2012	8:15a.m
RECEIVED BY:		Andrew Masga	C.U.C Water Lab	08/28/12	10:45
RELINQUISHED BY:					11:05
RECEIVED BY:					

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QUALITY WATER LABORATORY
Certified Water Analysis Laboratory

QUALITY WATER INCORPORATED

CERTIFIED LABORATORY
P.O. Box 502148 CK, Saipan, MP 96950
Tel: 1(670) 233-8002 • Fax: 1(670) 233-8003

BACTERIOLOGICAL QUALITY REPORT

Q 25315
SAMPLE LOCATION ID#
PWS ID#

Balance Due _____
Amt. Paid _____
Receipt # _____
Date _____ Initial _____

Company Name LAOLAO BAY GOLF & RESORT
Sample Location WASTEWATER TREATMENT PLANT
Sampler DOMINGO R. SANTOS Collection Date AUG. 28, 2013 Time 8:20 (AM/PM)
Free / Total Chlorine 0.12 mg/l Transporter ROBERT CRISOSTOMO

Check one:
- ☑ ROUTINE
- ☐ REPEAT
- ☐ SPECIAL

Complete this box only if "repeat" is checked in box at left.
Repeat for Sample # _____
Circle one:
Original Upstream Downstream Elsewhere

☐ REPLACEMENT for Sample #

Collection Remarks _____

DO NOT WRITE BELOW THIS LINE ····· FOR LABORATORY USE ONLY

Received by MBB Time Received 11:19 PM
Date Recieved 8/28/13 Temperature 6.0 °C

- ☑ ONPG-MUG
- ☐ P/A
- ☐ MF - CFU/ 100 ml

Total Coliform		Fecal Coliform / *E. Coli*	
Absent	Present	Absent	Present
	37.9	< 1	

Date Analyzed 8/28/13
Time Analyzed 4:30 pm
Analyst RRG

Read Out Date 8/29/13
Read Out Time 10:40 am RRG

Laboratory Comments: _____

RESULTS OF ANALYSIS

- ☐ Bacteriologically safe at time of sampling.
- ☑ Total coliform bacteria present at time of sampling.
- ☐ Fecal caliform or *E. coli* bacteria present at time of sampling.
- ☐ Collect repeat samples withtin 24 hours and increase the number of samples you collect next month, per your coliform monitoring plan.
- ☐ Sample rejected/invalid due to _____ (see reverse). Collect Replacement sample.
- ☐ Suspected sample tampering or data falsification.

White - Drinking Water Program Pink - Water System Blue - Laboratory

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Division of Environmental Quality
P.O. Box 501304 Saipan, MP 96950-1304
(670) 664-8500/01 (670) 664-8540 (fax)
environment@deq.gov.mp www.deq.gov.mp

Authorization to Operate

Permit No. 2010-OWTS-001
(Tinian Dynasty Hotel & Casino)

In accordance with provisions of the CNMI Wastewater Treatment and Disposal (WTD) Regulations (NMIAC Chapter 65-120), and pursuant to the Commonwealth Environmental Protection Act, 2 CMC §§ 3101 to 3134 (Public Law 3-23), and the Commonwealth Environmental Amendments Act (Public Law 11-103), of the Commonwealth of the Northern Mariana Islands:

Tinian Dynasty Hotel & Casino
Mr. Tom Liu, General Manager
P.O. Box 1133
Tinian, MP 96952

otherwise known as the Permittee, is authorized to operate a wastewater treatment system, located at the **Tinian Dynasty Hotel & Casino, Tinian**. The wastewater treatment system is located east of the Tinian Dynasty Hotel & Casino, with discharge of effluent into a leaching field consisting of 20 individual 42 ft. by 60 ft. sub-fields located on the south side of the hotel.

Discharge of treated effluent to the leaching field is permitted in accordance with the WTD Regulations, effluent limitations, monitoring requirements, and other conditions as set forth in this authorization to operate.

This permit shall be effective: **June 18, 2010**

This permit shall expire: **June 18, 2015**

EPA: NPDES not required — No discharge into U.S. water.

Requirements of Permit 2010-OWTS-001 are as follows:

A. Effluent Limitations, Monitoring, and Reporting Requirements

A. Effluent Limitations and Monitoring Requirements Based Upon a Permitted Treatment Capacity of 235,270 gallons per day (gpd):

A.1. During the effective permit period as specified above, the Permittee is authorized to discharge effluent from the treatment system as specified in the approved as-built drawings, design calculations, and operations and maintenance plan.

A.2. Effluent discharge shall be subject to the limitations and monitoring requirements as specified in Table No. 1.

Table No. 1 – Effluent Limitations and Monitoring Requirements

Effluent Characteristic	Maximum Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Flow	235,270 gpd	-----	continuous	continuous
Biochemical Oxygen Demand (5-day) ("BOD_5")	20 mg/L	40 mg/L	weekly	discrete
Total Suspended Solids ("TSS")	20 mg/L	40 mg/L	weekly	discrete
Total Nitrogen	1.0 mg/L	2.0 mg/L	quarterly	discrete
Fecal Coliform	23 cfu/100 mL	23 cfu/100 mL	weekly	discrete
pH	Between 6.5 and 8.6		weekly	discrete

A.3. Samples shall be taken at a frequency as specified in part A.2 and shall be taken at the following locations:

Influent: - influent headworks

Effluent – between treatment plant outlet and discharge structure (control box)

A.4. Floating materials, grease, oil, scum, foam, and other matter attributable to sewage shall not be visible in the effluent.

A.5. Effluent shall be free from materials attributable to sewage that will produce visible turbidity or settle to form deposits

A.6. Effluent shall be free from substances and conditions or combinations thereof attributable to sewage which may be toxic to humans, other animals and plants, and aquatic life.

B. Treatment system influent shall be limited to domestic wastewater generated by the **Tinian Dynasty Hotel & Casino and associated staff housing** only. The Permittee shall not dispose of any hazardous waste or waste oils into the treatment system.

C. Operation and Maintenance Management Plan

C.1. The Permittee shall implement the preventative maintenance plan specified in the approved Operation and Maintenance Manual.

C.2. The Permittee shall submit an annual report, in December of each year, narrating the implementation of the preventative maintenance plan and anticipated actions to be taken for the following year.

C.3. The Permittee shall review the operation and maintenance manual and the preventative maintenance plan annually. Revisions shall be submitted to DEQ for review and approval.

D. Monitoring and Records

D.1. Representative Sampling

Samples and measurements taken as required shall be representative of the volume and nature of the monitored discharge.

-Discrete (Grab) Sample; A discrete sample of a fixed volume taken at a specific place and time.

-Continuous Sampling; For the purposes of this permit, continuous sampling shall refer to flow monitoring only.

D.2. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit.

D.3. Quality Assurance

The permittee shall have and implement an acceptable written quality assurance project plan for laboratory analyses. All QA/QC samples must be analyzed on the same dates that wastewater samples are analyzed. Duplicate chemical analyses must be conducted on a minimum of ten percent of the samples, or at least one sample per month, whichever is greater. A similar frequency shall be maintained for analyzing spiked samples. **Use of a laboratory holding a valid certification by DEQ will satisfy this condition.**

D.4. Penalties for Tampering

The Commonwealth Environmental Protection Act 3131(d) states that any person who knowingly and willfully falsifies, tampers with, or renders inaccurate any monitoring device or method or record required to be maintained under the Act, shall, upon conviction, be punished by a fine of not more than $50,000, or by imprisonment for not more than one year, or both. Each day of violation shall constitute a separate violation.

D.5. Reporting of Monitoring Results

The permittee shall submit influent and effluent monitoring results on the attached monthly Discharge Monitoring Report (DMR) form to DEQ by the 28th of the month immediately following the reported monthly sampling period (*e.g.* the March monthly DMR is due by April 28th). Unless otherwise specified, effluent flow shall be reported in terms of the arithmetic mean flow over each monthly period, and the maximum daily flow over that monthly period.

D.6. Monitoring Modification

Any changes in the monitoring, analytical, or reporting methods or requirements proposed by the permittee must be approved by the Director prior to the modification.

D.7. Retention of Records

The Permittee shall retain records of all monitoring information, including all calibration

and maintenance records, all original instrumentation charts, and copies of all reports required by this permit, for a period of at least five (5) years from the date of the sample, measurement, or report. This period may be extended or reduced by order of the Director at any time.

D.8. Records Content

Records of monitoring information shall include:

(1) Date, place, and time of sampling;
(2) Individual(s) who performed the sampling or measurements;
(3) Date(s) analyses were performed;
(4) Individual(s) who performed the analyses;
(5) Analytical techniques or methods used; and
(6) Results of analyses.

D.9. Inspection and Entry

The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and obtain copies of, at reasonable times, any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(4) Sample or monitor at reasonable times, for the purposes of assessing permit compliance, or as determined necessary by the Director, any substances or parameters at any location.

E. Reporting Requirements

E.1. Anticipated Noncompliance

The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

E.2. Compliance Reports

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule, shall be submitted no later than fourteen (14) days following each scheduled date. Discharge Monitoring Reports shall be submitted as required in Paragraph D.5. of this permit.

E.3. Twenty-Four Hour Reporting of Noncompliance

The Permittee shall report any noncompliance which may endanger health or the environment. Information shall be provided orally within twenty-four (24) hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the noncompliance. The written submission shall contain a description of the noncompliance and its causes, the period of noncompliance, the anticipated period of time the noncompliance is expected to continue, and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass;

(2) Any upset which causes the effluent to exceed the effluent limitations; or

(3) Violation of a maximum daily discharge limitation.

E.4. Other Noncompliance

The Permittee shall report all instances of noncompliance not reported under paragraph E.3., at the time monitoring reports are submitted.

E.5. Signatory Requirements

E.5.a. Applications

(1) For corporations: by a responsible corporate officer. For the purposes of

this section, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation.

(2) For a partnership or sole proprietorship: by a general partner or proprietor, respectively.

E.5.b. Reports

(1) All reports required by this permit and other information as requested by the Director shall be signed by a person described in paragraph E.5.a., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1a) The authorization is made in writing by a person described in paragraph E.5.a;

(1b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator, superintendent, or a position of equivalent responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(1c) The written authorization is submitted to the Director.

E.5.c. Changes to Authorization

If an authorization under paragraphs E.5.a. and E.5.b. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraphs E.5.a. and E.5.b. of this section must be submitted to the Director prior to submission of any reports, information, or applications required to be signed by an authorized representative.

E.5.d. Certification

Any person signing a document required by this permit shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for violations."

E.6. Duty to Provide Information

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

E.7. Availability of Reports

Except for data determined to be confidential by the Director, all reports prepared as required by the terms of this permit shall be available for public inspection at the offices of DEQ. Permit applications, permits, and effluent data shall not be considered confidential.

E.8. Penalties for Falsification of Reports

The Commonwealth Environmental Protection Act §3131(d) states that any person who knowingly and willfully makes any false statement, representation, or certification in any application, record, report, or other document filed or required to be maintained shall, upon conviction, be punished by a fine of not more than $50,000, or by imprisonment for not more than one year, or both. Each day of violation shall constitute a separate violation.

E.9. Planned Changes

The Permittee shall give notice to the Director as soon as possible of any planned physical or process alterations, or additions to the permitted facility.

F. Operation and Maintenance of Pollution Controls

F.1. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F.2. Need to Halt or Reduce not a Defense

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

F.3. Bypass of Treatment Facilities

No bypass of the treatment facility shall be permitted. Permittee shall take all necessary precautions to ensure that the system does not overflow.

F.4. Upset Conditions

An upset condition is an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include the noncompliance caused by operator error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation. In the case of an upset the Permittee may be required by the Director to dispose of the effluent through means other than the leaching field system.

F.5. Certified Operator Requirements

(1) The direct supervision of both the treatment and collection system must be

placed under the responsible charge[1] of an operator holding a valid CNMI certification equal to or greater than the classification of the treatment facility and/or collection system. For the Tinian Dynasty Hotel & Casino, the operator(s) must be certified to operate a **Class 2 treatment system,** and a **Class 1 collection system.**

(2) All operating personnel making process control/system integrity decisions about wastewater quality or quantity must be certified.

(3) A designated certified operator must be available for each operating shift.

G. Biosolids Requirements

G.1. Sludge Disposal

Digested and dewatered sludge removed from any part of the treatment facility shall only be disposed of at the Tinian municipal dump and/or landfill (once constructed), and only if the Permittee receives written permission for sludge disposal from the Tinian Department of Public Works. All sludge delivered to the dump or landfill for disposal shall be dewatered to the point that it contains "no free liquids", as determined by EPA Pub. SW-846 Method 9095, the paint filter liquids test. Alternative disposal locations or beneficial re-use of sewage sludge may be approved by the Director, in writing, provided that such disposal or re-use meets all applicable requirements of the CNMI Solid Waste Management Regulations (Chapter 65-80 NMIAC) governing federal regulations for biosolids at 40 CFR 257 and 40 CFR 503.

G.2. Screenings and Grit Disposal

Solids collected from influent screens (screenings) and the grit chamber (grit) may be disposed of at the Tinian municipal dump or landfill (once constructed), following written permission from Tinian DPW, provided the waste is adequately dewatered, securely bagged, and meets all other requirements which may be imposed by the CNMI Department of Public Works or their designated operator. Pre-treatment (disinfection) with lime may be required prior to the disposal of screenings and grit.

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[1] "Responsible charge" – The operator(s) in responsible charge is defined as the person(s) designated by the owner to be the certified operator(s) who makes decisions regarding the daily operational activities of the wastewater treatment and/or collection system that will directly impact the quality and/or quantity of wastewater.

H. General Conditions

H.1. Duty to Comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation, reissuance or modification, or denial of a permit renewal application.

H.2. Penalties for Violation of Permit Conditions

Penalties for violation of permit conditions shall be as allowed by CNMI law.

H.3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

H.4. Permit Action

This permit may be modified, revoked, reissued, or terminated for cause, as determined by the Director. The filing of a request by the Permittee for a permit modification, revocation, reissuance, or termination, or notification of planned changes or anticipated noncompliance, does not stay any permit conditions.

H.5. Transfers

This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary.

H.6. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the Permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Director.

H.7. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.

H.8. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstances, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

H.9. Re-Application

If the Permittee desires to continue an activity regulated by this permit after the expiration of the permit, the Permittee shall submit a new application at least ninety (90) days prior to the expiration date of this permit.

I. Authorization

This permit shall remain in full force and effect for the period specified, subject to the conditions as set forth herein, and as authorized by the Director of the Division of Environmental Quality.

_____ _____

DAVID B. ROSARIO Date
Acting Director

Land Disposal of Wastewater
Permit No. 2010-OWTS-001

Discharge Monitoring Report Form: Monitoring Period:_____

PAGE 1 OF 2

Effluent Characteristic	Unit		Influent			Effluent			Number of excedences	Sample Type	Sample Frequency
			MINIMUM	AVERAGE (monthly)	MAXIMUM	MINIMUM	AVERAGE (monthly)	MAXIMUM			
Flow :	GPD	SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT		235,270						continuous	continuous
BOD_5	mg/L	SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT					20	40		discrete	weekly
Total suspended solids (TSS)	mg/L	SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT					20	40		discrete	weekly
Total Nitrogen	mg/L	SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT					1.0	2.0		discrete	quarterly
Fecal Coliform	cfu/ 100mL	SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT					23	23		discrete	weekly
pH		SAMPLE MEASUREMENT									
		PERMIT** REQUIREMENT				6.5		8.6		discrete	weekly

Monitoring Period:_____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for violations.

_____	_____	_____
Print name & title	Signature	Date

* Laboratory analysis sheets for all monitoring results reported on this form must be attached

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Division of Environmental Quality
P O Box 501304 Saipan, MP 96950-1304
670-664-8500/01 670-664-8540 (fax)
environment@deq.gov.mp www.deq.gov.mp

July 25, 2013

OWNER:
CNMI Department of Public Lands
Pete A. Tenorio,
Secretary
PO Box 500380
Saipan, MP 96950

and

OPERATOR:
Tasi Tours and Transportation, Inc.
Takashi Mimura,
General Manager
P.O. Box 501023
Saipan, MP 96950

RE: Section 401 Water Quality Certification WQC-2013-001
Managaha Island Wastewater Treatment Facility

Dear Messrs. Tenorio & Mimura:

We have completed review of all application materials, public comments, and other information related to your application for Clean Water Act Section 401 Water Quality Certification for the subject activity, and have granted certification in accordance with all applicable requirements of the CNMI Water Quality Standards.

Pursuant to Part 10.3(c) of the CNMI Water Quality standards, the attached certification is granted **with conditions** as specified in the attached 401 Water Quality Certification (Number WQC-2013-001). Please make sure that you and your contractors carefully read, and fully understand these conditions. Failure to follow the conditions specified in the attached certification will constitute a violation of the CNMI Water Quality Standards.

If you have any comments or questions regarding this 401 Water Quality Certification, please contact our office at telephone numbers 664-8500/8501.

Sincerely,

FRANK M. RABAULIMAN
Director

(1 Attachments: WQC-2013-001)

cc: Director, CRMO
USEPA Region 9

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Division of Environmental Quality
P O Box 501304 Saipan, MP 96950-1304
670-664-8500/01 670-664-8540 (fax)
environment@deq.gov.mp www.deq.gov.mp

CNMI 401 WATER QUALITY CERTIFICATION

Certification No. WQC-2013-001
Managaha Island Wastewater Treatment Facility

THIS CERTIFICATION is issued in conformance with the requirements of Section 401 of the Clean Water Act (CWA), Public Law 92-500 of the United States, 33 U.S.C. §§ 1251-1387, and subject to the CNMI Water Quality Standards, as published in the Commonwealth Register, Volume 26 Number 09, pages 22914 to 22956, NMIAC Chapter 65-130, for the issuance of a National Pollution Discharge Elimination System (NPDES) by the U.S. Environmental Protection Agency (USEPA) for the operation of a membrane separation activated sludge treatment plant with ultraviolet and chlorine disinfection, and discharge of treated wastewater to a subsurface leaching field on the island of Managaha CNMI, with direct hydrological connection to the surface waters of Tanapag Lagoon, pursuant to an application filed on January 30, 2013.

There were no comments submitted during the thirty (30) day public comment period that began on June 16, 2013, stating concerns with the proposed certification of the subject treatment plant operation and discharge. DEQ determined that since there were no comments during the public comment period, a public hearing was not required.

DEQ has determined that the application and supporting documentation provide adequate assurance that the proposed discharge will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the CNMI Division of Environmental Quality (DEQ) certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of the CWA if conducted in accordance with the application, the supporting documentation, all conditions of the associated USEPA NPDES permit, and all conditions hereinafter set forth.

1. Applicant(s):

OWNER:	OPERATOR:
CNMI Department of Public Lands **Pete A. Tenorio,** **Secretary** **PO Box 500380** **Saipan, MP 96950**	**Tasi Tours and Transportation, Inc.** **Takashi Mimura,** **General Manager** **P.O. Box 501023** **Saipan, MP 96950**

2. Application Materials Evaluated:

   a. Application letter for 401 WQC, dated January 30, 2013, along with attached application documentation.

   b. Draft U.S. Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) Permit and Fact Sheets dated June 12, 2013.

3. Antidegradation Review

   Part 10. of the CNMI Water Quality Standards ("the Standards"), NMIAC § 65-130-601, requires DEQ to issue a Section 401 Water Quality Certification for any proposed activity that complies with applicable provisions of the CWA and the Standards, preserves existing uses of CNMI waters, and minimizes potential adverse impacts of the discharge through appropriate and practicable means. Part 10.3(b) of the Standards, NMIAC § 65-130-615(b), prohibits the issuance of a Certification unless the proposed activity has been determined to be consistent with the antidegradation policy through the satisfaction of all applicable provisions contained in Part 3 of the Standards, NMIAC§ 65-130-010.. In accordance with Part 10.3(c)(4), NMIAC § 65-130- 615(c)(4), the subject application for the proposed wastewater treatment facility has been determined to be consistent with the antidegradation policy as follows:

   a. Existing water quality and tier classification: The waters surrounding Managaha island are classified as Class "AA" marine waters. Occasional exceedences of water quality criteria for microbiological contaminants (enterococci) were recorded in prior years and are believed to be linked to the previous, failed wastewater treatment system. Since the installation of the new system in mid-2007, no new exceedences have been recorded, and water quality data for the waters adjacent to the proposed discharge indicate

that water quality in that area is generally excellent and exceeds the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, as defined under Part 3(c)(2) of the Standards, NMIAC § 65-130-010(a)(3)(ii).

Thus, the subject activity falls under the antidegradation requirements for "Tier 2" as described under Part 3(c)(2) of the Standards, NMIAC § 65-130-010(a)(3)(ii), which allows for limited degradation of waters in instances where "the Commonwealth determines that that lower water quality is necessary to accommodate important economic or social development," provided the requirements outlined in that section and all other relevant requirements contained within the Standards are met.

b. Extent to which proposed action is expected to lower water quality: The new treatment system provides substantially enhanced performance compared to the old system. Nonetheless, treated wastewater discharges to the groundwater of Managaha may still adversely affect water quality. Seepage along the shoreline will transport wastewater constituents such as nutrients (nitrate, phosphate), pathogens (bacteria, viruses), and other wastewater pollutants to the near-shore waters, primarily on the northern shoreline of Managaha. However, due to the enhanced treatment, which includes effluent disinfection, and the effect of strong shoreline currents, it is expected that the discharge will result neither in a significant degradation of water quality, nor violations of water quality criteria.

c. Conformance with antidegradation requirements: Although the proposed discharge may lower water quality in the immediate vicinity, DEQ has determined that the lower water quality is necessary "to accommodate important economic or social development" and is in conformance as follows with the applicable antidegradation requirements of Part 3(c)(2) ("Tier 2") of the Standards, NMIAC § 65-130-010(a)(3)(ii), which requires that the Commonwealth assure that:
Part 3(c)(2)(1), NMIAC § 65-130-010(a)(3)(ii)(A): the lower water quality be fully protective of existing and designated uses: The proposed project is not expected to contribute to violations of the water quality criteria contained in the Standards, and thus water quality will support all existing and designated uses;
Part 3(c)(2)(2), NMIAC § 65-130-010(a)(3)(ii)(B): that significant impacts on water quality and economic and social development be subject to detailed water quality and economic analyses: The proposed project is not expected to result in "significant" impacts to water quality, and is thus not

subject to this requirement;
Part 3(c)(2)(3), NMIAC § 65-130-010(a)(3)(ii)(C): the cumulative impacts of all previous and reasonably foreseeable future actions be considered: The proposed wastewater treatment plant is a replacement for the previous, failed treatment plant, and in that respect it represents a significant reduction in impact. To the best of DEQ's knowledge, there are no reasonably foreseeable additional discharges in the future plans for development on Managaha island;
Part 3(c)(2)(4); NMIAC § 65-130-010(a)(3)(ii)(D): that inter governmental coordination and public participation be included in any determination: All public participation and intergovernmental coordination requirements were followed in the preparation of this certification;
Part 3(c)(2)(5), NMIAC § 65-130-010(a)(3)(ii)(E): the highest statutory and regulatory requirements be achieved for all new and existing point sources: All requirements of this permit as well as the USEPA NPDES permit contain the most recent and most stringent statutory and regulatory requirements applicable. Moreover, the advanced treatment technology is expected to exceed these requirements and provide higher quality effluent than the minimum prescribed by law.; and:
Part 3(c)(2)(6), NMIAC § 65-130-010(a)(3)(ii)(F): that all cost effective and reasonable Best Management Practices for non-point source control be employed: Not applicable; the proposed discharge is being regulated as a point source.

5. Conditions

a. The applicant(s) shall comply with all terms, conditions, and monitoring requirements of the USEPA NPDES Permit. Failure to comply with the NPDES Permit shall constitute a violation of this Water Quality Certification. The applicant(s) shall obtain written DEQ approval for any changes to the terms and conditions included in the NPDES Permit.

b. The applicant(s) shall promptly (within one working week) provide DEQ copies of all monitoring reports (DMRs) required under the NPDES Permit.

c. The applicant(s) shall inform DEQ of all equipment failures that have the potential to adversely affect effluent quality within 24 hours of knowledge of such failure.

d. In accordance with Section 12 of the Standards, NMIAC § 65-130-801, the applicant(s) shall allow prompt access to the Director or his authorized

representative for the purpose of inspecting the premises for compliance with the terms of this certification. The inspection may be made with or without advance notice to the certification holder, with good purpose, at the discretion of the Director, but shall be made at reasonable times unless an emergency dictates otherwise.

e. This WQC covers only the operation of the wastewater treatment system described in the application materials. The applicant(s) must inform DEQ in writing of any changes to the project which may affect water quality.

f. **This WQC does not constitute an approval of the dual-plumbing wastewater re-use system which the applicant has installed on Managaha Island. DEQ notes that such dual-plumbing systems which re-use treated wastewater ARE NOT allowable under the DEQ Wastewater Treatment and Disposal Regulations. These regulations are preempted, however, as USEPA regulates this discharge under the Clean Water Act and USEPA NPDES permitting system.**

g. In accordance with Section 10.6 of the Standards, NMIAC § 65-130-625, this WQC shall be subject to amendment or modification if and to the extent that existing water quality standards are made more stringent, or new water quality standards are adopted, by DEQ.

h. This WQC does not relieve the applicant(s) from obtaining other applicable local or federal permits.

6. Period of Certification

a. This Water Quality Certification is valid only for the specified duration of the NPDES permit. Extensions may be granted upon submission of evidence of authorized extension of the original NPDES permit, however, DEQ reserves the right to require a new Water Quality Certification in the event of changes in construction practices, site conditions, or for other reasons justified, in writing, by DEQ. A new NPDES permit will require application for a new 401 Water Quality Certification. The applicant(s) is encouraged to apply for an extension or new Certification well in advance of the anticipated start of the proposed activity.

NPDES Expiration: July 31, 2018

7. Authorization

This Water Quality Certification shall remain in full force and effect for the period specified, subject to the conditions as set forth herein, and as authorized by the Director of the Division of Environmental Quality.

FRANK M. RABAULIMAN
Director, DEQ

7/26/13
Date

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Division of Environmental Quality
P O Box 501304 Saipan, MP 96950-1304
670-664-8500/01 670-664-8540 (fax)
environment@deq.gov.mp www.deq.gov.mp

EPA: NPDES not required — no discharge into U.S. waters

Authorization to Operate

Permit No. 2009-OWTS-003
(LaoLao Bay Golf & Resort)

In accordance with provisions of the CNMI Wastewater Treatment and Disposal (WTD) Regulations, and pursuant to the Commonwealth Environmental Protection Act, 2 CMC §§ 3101 to 3134 (Public Law 3-23), and the Commonwealth Environmental Amendments Act (Public Law 11-103), of the Commonwealth of the Northern Mariana Islands:

Saipan LauLau Development, Inc.
Mr. Yun Kim, President/CFO
LaoLao Bay Golf & Resort
PMB 1020 PPP, P.O. Box 10000
Saipan, MP 96950

otherwise known as the Permittee, is authorized to operate a membrane bioreactor (MBR) wastewater treatment system, located at the **LaoLao Bay Golf & Resort, Kagman, Saipan**. The wastewater treatment system is located **west of the resort facilities**, with discharge of effluent to **the golf course pond system**, and subsequent re-use as golf course irrigation.

Discharge of treated effluent to the golf course ponds and reuse as golf course irrigation is permitted in accordance with the WTD Regulations, effluent limitations, monitoring requirements, and other conditions as set forth in this authorization to operate.

This permit shall be effective: **December 4, 2009**

This permit shall expire: **December 3, 2014**

Requirements of Permit 2009-OWTS-003 are as follows:

A. Effluent Limitations, Monitoring, and Reporting Requirements

A. Effluent Limitations and Monitoring Requirements Based Upon a Permitted Treatment Capacity of 24,210 gallons per day (gpd) (*Permitted treatment capacity is based on application and fees paid. Design treatment capacity is 250 m3/day or 66,000 gpd daily average flow and 675 m3/day or178,000 gpd*) :

A.1. During the effective permit period as specified above, the Permittee is authorized to discharge effluent from the treatment system as specified in the approved as-built drawings, design calculations, and operations and maintenance plan.

A.2. Effluent discharge shall be subject to the limitations and monitoring requirements as specified in Table No. 1.

Table No. 1 – Effluent Limitations and Monitoring Requirements

Effluent Characteristic	Maximum Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Flow	24,210 gpd	-----	continuous	continuous
Biochemical Oxygen Demand (5-day) ("BOD_5")	20 mg/L	40 mg/L	weekly	discrete
Total Suspended Solids ("TSS")	20 mg/L	40 mg/L	weekly	discrete
Total Nitrogen	1.0 mg/L	2.0 mg/L	quarterly	discrete
Fecal Coliform	23 cfu/100 mL	23 cfu/100 mL	weekly	discrete
pH	Between 6.5 and 8.6		weekly	discrete
Chlorine residual	No less than 0.1 mg/L		daily	discrete

A.3. Samples shall be taken at a frequency as specified in part A.2 and shall be taken at the following locations:

Influent: - Influent screen

Effluent – Discharge tank

A.4. Floating materials, grease, oil, scum, foam, and other matter attributable to sewage shall not be visible in the effluent.

A.5. Effluent shall be free from materials attributable to sewage that will produce visible turbidity or settle to form deposits

A.6. Effluent shall be free from substances and conditions or combinations thereof attributable to sewage which may be toxic to humans, other animals and plants, and aquatic life.

B. Treatment system influent shall be limited to domestic wastewater generated by the **LaoLao Bay Golf & Resort** development facilities only. The Permittee shall not dispose of any hazardous waste or waste oils into the treatment system.

C. Operation and Maintenance Management Plan

C.1. The Permittee shall implement the preventative maintenance plan specified in the approved Operation and Maintenance Manual.

C.2. The Permittee shall submit an annual report, in December of each year, narrating the implementation of the preventative maintenance plan and anticipated actions to be taken for the following year (e.g., membrane cartridge condition vs. replacement age, etc.)

C.3. The Permittee shall review the operation and maintenance manual and the preventative maintenance plan annually. Revisions shall be submitted to DEQ for review and approval.

D. Monitoring and Records

D.1. Representative Sampling

Samples and measurements taken as required shall be representative of the volume and nature of the monitored discharge.

-Discrete (Grab) Sample; A discrete sample of a fixed volume taken at a specific place and time.

-Continuous Sampling; For the purposes of this permit, continuous sampling shall refer

to flow monitoring only.

D.2. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit.

D.3. Quality Assurance

The permittee shall have and implement an acceptable written quality assurance project plan for laboratory analyses. All QA/QC samples must be analyzed on the same dates that wastewater samples are analyzed. Duplicate chemical analyses must be conducted on a minimum of ten percent of the samples, or at least one sample per month, whichever is greater. A similar frequency shall be maintained for analyzing spiked samples. **Use of a laboratory holding a valid certification by DEQ will satisfy this condition.**

D.4. Penalties for Tampering

The Commonwealth Environmental Protection Act 3131(d) states that any person who knowingly and willfully falsifies, tampers with, or renders inaccurate any monitoring device or method or record required to be maintained under the Act, shall, upon conviction, be punished by a fine of not more than $50,000, or by imprisonment for not more than one year, or both. Each day of violation shall constitute a separate violation.

D.5. Reporting of Monitoring Results

The permittee shall submit influent and effluent monitoring results on the attached monthly Discharge Monitoring Report (DMR) form to DEQ by the 28th of the month immediately following the reported monthly sampling period (*e.g.* the March monthly DMR is due by April 28th). Unless otherwise specified, effluent flow shall be reported in terms of the arithmetic mean flow over each monthly period, and the maximum daily flow over that monthly period.

D.6. Monitoring Modification

Any changes in the monitoring, analytical, or reporting methods or requirements proposed by the permittee must be approved by the Director prior to the modification.

D.7. Retention of Records

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records, all original instrumentation charts, and copies of all reports required by this permit, for a period of at least five (5) years from the date of the sample, measurement, or report. This period may be extended or reduced by order of the Director at any time.

D.8. Records Content

Records of monitoring information shall include:

(1) Date, place, and time of sampling;
(2) Individual(s) who performed the sampling or measurements;
(3) Date(s) analyses were performed;
(4) Individual(s) who performed the analyses;
(5) Analytical techniques or methods used; and
(6) Results of analyses.

D.9. Inspection and Entry

The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and obtain copies of, at reasonable times, any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(4) Sample or monitor at reasonable times, for the purposes of assessing permit compliance, or as determined necessary by the Director, any substances or parameters at any location.

E. Reporting Requirements

E.1. Anticipated Noncompliance

The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

E.2. Compliance Reports

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule, shall be submitted no later than fourteen (14) days following each scheduled date. Discharge Monitoring Reports shall be submitted as required in Paragraph D.5. of this permit.

E.3. Twenty-Four Hour Reporting of Noncompliance

The Permittee shall report any noncompliance which may endanger health or the environment. Information shall be provided orally within twenty-four (24) hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the noncompliance. The written submission shall contain a description of the noncompliance and its causes, the period of noncompliance, the anticipated period of time the noncompliance is expected to continue, and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass;

(2) Any upset which causes the effluent to exceed the effluent limitations; or

(3) Violation of a maximum daily discharge limitation.

E.4. Other Noncompliance

The Permittee shall report all instances of noncompliance not reported under paragraph E.3., at the time monitoring reports are submitted.

E.5. Signatory Requirements

E.5.a. Applications

(1) For corporations: by a responsible corporate officer. For the purposes of this section, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation.

(2) For a partnership or sole proprietorship: by a general partner or proprietor, respectively.

E.5.b. Reports

(1) All reports required by this permit and other information as requested by the Director shall be signed by a person described in paragraph E.5.a., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1a) The authorization is made in writing by a person described in paragraph E.5.a;

(1b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator, superintendent, or a position of equivalent responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(1c) The written authorization is submitted to the Director.

E.5.c. Changes to Authorization

If an authorization under paragraphs E.5.a. and E.5.b. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraphs E.5.a. and E.5.b. of this section must be submitted to the Director prior to submission of any reports, information, or applications required to be signed by an authorized representative.

E.5.d. Certification

Any person signing a document required by this permit shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for violations."

E.6. Duty to Provide Information

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

E.7. Availability of Reports

Except for data determined to be confidential by the Director, all reports prepared as required by the terms of this permit shall be available for public inspection at the offices of DEQ. Permit applications, permits, and effluent data shall not be considered confidential.

E.8. Penalties for Falsification of Reports

The Commonwealth Environmental Protection Act §3131(d) states that any person who knowingly and willfully makes any false statement, representation, or certification in any application, record, report, or other document filed or required to be maintained shall, upon conviction, be punished by a fine of not more than $50,000, or by imprisonment for not more than one year, or both. Each day of violation shall constitute a separate violation.

E.9. Planned Changes

The Permittee shall give notice to the Director as soon as possible of any planned physical or process alterations, or additions to the permitted facility.

F. Operation and Maintenance of Pollution Controls

F.1. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F.2. Need to Halt or Reduce not a Defense

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

F.3. Bypass of Treatment Facilities

No bypass of the treatment facility shall be permitted. Permittee shall take all necessary precautions to ensure that the system does not overflow.

F.4. Upset Conditions

An upset condition is an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include the noncompliance caused by operator error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation. In the case of an upset the Permittee is required to dispose of the effluent through means other than the golf course lakes and irrigation system.

F.5. Certified Operator Requirements

(1) The direct supervision of both the treatment and collection system must be placed under the responsible charge[1] of an operator holding a valid CNMI certification equal to or greater than the classification of the treatment facility and/or collection system. For the LaoLao Bay Golf & Resort, the operator(s) must be certified to operate a **Class 3 treatment system,** and a **Class 1 collection system.**

(2) Prior to March 1, 2010, the Permittee may designate an operator(s) certified outside the CNMI. However, by no later than March 1, 2010, the Permittee must place the OWTS under the responsible charge of an operator(s) certified in the CNMI, at the levels designated in paragraph F.5.(1).

(3) All operating personnel making process control/system integrity decisions about wastewater quality or quantity must be certified.

(4) A designated certified operator must be available for each operating shift.

F.6. Inspector Safety Requirements

The Permittee must submit to the Director an OSHA-compliant confined spaces entry program **no later than December 31, 2009**. DEQ inspectors will not enter confined spaces unless properly equipped, trained, and supervised by the Permittee, and only following the approved confined space entry program. Failure to provide for safe inspector entry of confined spaces, following all applicable safety laws and regulations, will constitute a violation of this permit.

G. Effluent Re-use and Irrigation Requirements

G.1. Re-use of Treated Effluent

Treated effluent may only be used for golf course irrigation. Treated effluent shall not be used for the irrigation of food crops, parks, playgrounds, school yards, or in fountains.

[1] "Responsible charge" – The operator(s) in responsible charge is defined as the person(s) designated by the owner to be the certified operator(s) who makes decisions regarding the daily operational activities of the wastewater treatment and/or collection system that will directly impact the quality and/or quantity of wastewater.

G.2. Irrigation Plan

The approved Irrigation Plan shall be followed at all times. Any changes to the approved irrigation plan must be submitted to the Director for approval prior to implementation.

G.3. Allowable Irrigation Rates

The treated effluent shall applied at a rate not to exceed 2.0 inches per week (10,000 gallons per hectare per day), and never applied at such a rate that the effluent has the opportunity to pond or puddle before being absorbed into the upper soil horizon.

G.4. Signage

The area undergoing irrigation with treated effluent shall be marked with signs in such number and location that members of the public subject to exposure could be reasonably expected to encounter such a sign. The signs shall be written in English, Japanese, Chinese, and Korean, stating: "CAUTION: This area is irrigated with treated domestic wastewater and may contain harmful human pathogens."

G.5. Disinfection Records

The Permittee shall maintain a log of daily chlorine residual measurements and submit the log with the monthly Discharge Monitoring Reports.

H. Biosolids Requirements

H.1. Sludge Disposal

Digested or raw sludge removed from any part of the treatment facility shall only be disposed of at the Commonwealth Utilities Corporation (CUC) Sadog Tasi or Agingan Point Wastewater Treatment Plants, and only if the Permittee holds a valid sludge disposal permit or letter or permission from CUC. Any renewals, revisions, conditioning, or revocation of the CUC permit or letter of permission must be reported to the Director.

H.2. Screenings and Grit Disposal

Solids collected from influent screens (screenings) and the grit chamber (grit) may be disposed of at the Marpi Solid Waste Landfill Facility, provided the waste is adequately dewatered, securely bagged, and meets all other requirements which may be imposed by the CNMI Department of Public Works or their designated operator. Pre-treatment (disinfection) with lime may be required prior to the disposal of screenings and grit.

I. General Conditions

I.1. Duty to Comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation, reissuance or modification, or denial of a permit renewal application.

I.2. Penalties for Violation of Permit Conditions

Penalties for violation of permit conditions shall be as allowed by CNMI law.

I.3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

I.4. Permit Action

This permit may be modified, revoked, reissued, or terminated for cause, as determined by the Director. The filing of a request by the Permittee for a permit modification, revocation, reissuance, or termination, or notification of planned changes or anticipated noncompliance, does not stay any permit conditions.

I.5. Transfers

This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as

may be necessary.

I.6. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the Permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Director.

I.7. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.

I.8. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstances, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

I.9. Re-Application

If the Permittee desires to continue an activity regulated by this permit after the expiration of the permit, the Permittee shall submit a new application at least ninety (90) days prior to the expiration date of this permit.

J. Authorization

This permit shall remain in full force and effect for the period specified, subject to the conditions as set forth herein, and as authorized by the Director of the Division of Environmental Quality.

_____ _____

Frank M. Rabauliman. Date
Director

Diaz, Pete

From: David Rosario <davidrosario@deq.gov.mp>
Sent: Friday, February 14, 2014 10:41 AM
To: Diaz, Pete
Cc: Emanuel P. Borja; Keith, Stephen; josekaipat@deq.gov.mp; derekchambers@deq.gov.mp
Subject: Re: CNMI Joint Military Training - Meeting Follow up
Attachments: Tinian Wells.pdf

Hafa Adai Pete,

Sorry for the delay in getting back to your inquiries. After conferring with our Engineers, please see the embedded response in "red".

Please let us know if you need any clarification.

Regards,

David

----- Original Message -----
From: Diaz, Pete
To: davidrosario@deq.gov.mp
Cc: derekchambers@deq.gov.mp ; josekaipat@deq.gov.mp ; Keith, Stephen
Sent: Friday, February 07, 2014 12:37 PM
Subject: CNMI Joint Military Training - Meeting Follow up

Håfa Adai David,
We'd like to follow up with you regarding the design criteria provided in the CNMI Wastewater Treatment and Disposal Rules and Regulations and for some info wells in proximity to the project. As you know, the CNMI regulations puts stricter requirements for wastewater disposal systems in Class I aquifer recharge areas. Although these Class I recharge areas have only been designated in Saipan, we've inferred from the current groundwater resources available in Tinian that almost the entire island can be considered a Class I aquifer recharge area. Based on the design population for the military training, the estimated average daily flow would be about 245,000 gpd and the proposed wastewater system would be an OWTS. The estimated flow for the military training is very similar to the average monthly permitted flow for the Tinian Dynasty Casino WWTP at about 235,000 gpd.

I would greatly appreciate your guidance on the following items:

1. For the design of wastewater systems in Tinian, would the assumption of almost the entire island a Class I aquifer recharge area be valid? Was it applied to other OWTSs in Tinian? ? Yes, the entire island counts as Class I. The Tinian Dynasty is required to produce secondary treated effluent, which is the minimum required in a Class I aquifer. There are no other permitted OWTS in Tinian beside Tinian Dynasty.
2. Soil Aborption Area: The CNMI regulations state that a reduction of 50% to the soil absorption area may be permitted by the Director for secondary treated effluent. How likely would this reduction be allowed if the proposed system produced greater than secondary quality effluent? The regulations state that a reduction in soil absorption area may be given UP TO 50%. This means that, even if secondary treated effluent is produced, you may still be required to provide 100% of

the required absorption area. This reduction is directly related to the potential impact on the marine environment. It is likely that the 50% reduction may be given, but we would like you to show that the reduction in area will not negatively impact the nearby marine environment.

3. Subsurface disposal in Class I aquifer: The CNMI regulations state: "The design of such systems shall assure that total effluent loading does not exceed 2,250 gallons per acre". This loading factor equates to 0.05 gallons per SF which is very small compared to the soil absportion factors for IDWS. If this loading factor is applied, a leach field for an OWTS in a Class I aquifer would be cost prohibitive and require a lot of land. Looking at the Tinan Dynasty Casino WWTP, the disposal system consists of 20 individual 24' by 60' subfields. The apparent loading factor for the Tinian Dynasty Casino WWTP is approximately 4.67 gpd per SF. We would appreciate your guidance on an appropriate soil absportion factor for preliminary design. . The area that should be used in this calculation is the entire site area, not just the area of the leaching field beds. The Dynasty covers approximately 30 acres and the given daily flow is about 235,000 gpd. This comes to about 0.18 gpd per SF, which is still about 4 times above the limit imposed by our regulations. Unfortunately, we cannot account for the manner in which the regulations were applied / enforced years ago, but we can ensure that we adequately protect the environment today by preventing any single project from overloading a site with wastewater. We will enforce this regulation that the total effluent loading does not exceed 2,250 gpd per acre. Please note that, since the military has quite a bit of land available, it may actually be relatively easy for you to meet this requirement.
4. In order to verify setback compliance with public and nonpublic supply wells, can you confirm the current use (monitoring, agricultural water, potable water, etc) of the boxed in wells (M02, M08, M19, M21, M29, M35, and M39) in the attached document?

Only well M21 is in use (or recently in use) as an agricultural well for cattle. The status of the other wells is unknown.

A more detailed answer: The map of Tinian that you supplied is from a study done between 1990 and 1997, written in 1999 and published in 2000, called "Ground-water resources of Tinian" by USGS. The wells listed that begin with "M" were originally military wells drilled in 1944-45, then rehabilitated in 1997 for this study. Since 2004 the Safe Drinking Water Branch has attempted to locate these wells and confirm their status. The only well(s) in the red boxes on Pete's map that we have been able to locate to date is M21 (which is labeled in our well database as UPW-008. UPW stands for "un-permitted well"). M21 is known locally on Tinian as "the Mendiola well". This well is used (or has been used in the recent past) as an agricultural well – mostly for cattle. We have not been able to confirm the status (or existence) of the other wells in the red boxes [M08, M02, M19, M35, M29, or M39,]

Please note the existence of three additional wells not shown on the USGS map. These are the three monitoring wells that were installed for the proposed landfill site feasibility study. They are labeled WOP-197-01/02/03 on the attached map. These wells are outside the red box, but just adjacent to the west of one of the red boxes.

Their locations are:

UTM Zone 55 N coordinates

WOP-197-01 : NAD83UTME 348358 NAD83UTMN 1661266
WOP-197-02 : NAD83UTME 348998 NAD83UTMN 1661541
WOP-197-03 : NAD83UTME 348868 NAD83UTMN 1661282

*Also note that on the attached map a well labeled UPW-012 is shown, which corresponds to M19 on the USGS map. This well was not actually observed in the field. We took a GPS reading in the area

while searching for the well – but never actually found the M19 well, so disregard the UPW-012 well on this version of the DEQ map. I'll try to get this corrected soon*

Let me know if you have any questions. I'd appreciate your assitance.

Si Yu'os Ma'åse',

Agapito (Pete) Diaz, P.E.
Project Engineer, Pacific District
pete.diaz@aecom.com

AECOM
414 West Soledad Avenue, Suite 708, GCIC Building, Hagåtña, Guam 96910
T 1.671.477.8326 F 1.671.472.8324
www.aecom.com

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Appendix B
Flow Calculations and Estimates

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Wastewater Flow Calculations and Estimates for the Base Camp (Tinian)

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	No municipal collection system to tie into.
Treatment and Disposal	No centralized municipal system; Packaged WWTP at Tinian Dynasty Hotel and Casino, most existing buildings on septic/leaching field systems
Wastewater Sources	
Training Areas	Domestic: Portable Toilets
Base Camp	Domestic: Admin buildings, barracks, latrines (showers, toilets, laundry); Industrial: fire station, recreational center, dining facility, warehouse, maintenance shops, workspaces
Design Population (DOPAA and SIAS)	
Resident Personnel (working and living on-base)	0
Nonresident Personnel (working on-base, living off-base)	95
Training Personnel (Non-resident, Off-Post Military)	1,500
Training Personnel Surge (Non-resident, Off-Post Military)	1,500
Total	3,095
Domestic Wastewater Allowances (UFC 3-240-02, 1 Nov. 2012)	
Military Installations [Permanent], gpd	100
EM Barracks [Permanent]/Military Training Camps [Field], gpd	50
Nonresident Personnel and Civilian Employees [Permanent], gpd	30
Recreational Allowances (Metcalfe & Eddy 2003)	
Picnic Park; Assume for portable toilets; gpcd	5
Industrial Wastewater Allowances	
Assume % Water becomes WW; General	80%
Assume % Water becomes WW for Wash Racks	100%
Infiltration and Inflow Allowance	Assume accounted for in peak flow factors
Peaking Factors (Peak Hour)	
For P<1,000, PF per Curve A (Babbit)	5.0
For P=1,600, PF per Curve A (Babbit)	4.6
For P=3,100, PF per Curve A (Babbit)	4.0
Peak Day	2.5

Septic Tank Design (CNMI WW Rules and Regulations)	
Net Volume (Below effluent pipe)	For Average Daily Flows 0<Q≤500 gpd, Net Vol = 750 gallons
	For Average Daily Flows 500<Q≤1,500 gpd, Net Vol = 1.5 * Q
	For Average Daily Flows > 1,500 gpd, Net Vol = 1,125 + 0.75 * Q
Liquid Depth (Bottom of tank to effluent pipe)	5ft < D < 6ft;, Assume 6 ft (1.8m)
Assume a two compartment septic tank	First compartment volume greater than or equal to outlet compartment.
Septic Systems	
Typical large septic tank/leaching field systems flow range; gpd	10,000 to 15,000
Capacity Limit when located on Class I Recharge Area; gpd	5,000
Leaching Field Design Criteria (CNMI WW Rules and Regulations)	
Assume leaching field is acceptable (meets percolation rates and soil characteristics per WW rules and regulations)	
Soil Absorption Factor; Assume average percolation rate [4 in/hr to 5.99 in/hr]; gpd/SF (lpd/SM)	1.3
Number of Drain lines (Max=7, Min=2)	varies
Diameter of drain lines; inch	4
Length of drain line (Max=54ft, Min=18ft)	varies
Width of drain line (Max=36ft, Min=6ft), depends on number of drain lines	varies
Length of drain field (Max=60ft, Min=24ft)	varies
Width of drain field (Max=42ft, Min=12ft), depends on number of drain lines	varies
Spacing of drain line, center to center; ft	6
Distance from drain line to edge of drain field; ft	3
Depth of final cover over drain lines [Max=48in, Min=24in]; in	36
Depth of gravel under drain line [Min=12in]; in	18
Depth of gravel above drain line [Max=12in, Min=6in]; in	12
Size of gravel fill [Max=2.5in, Min=.75in]; in	2.5
Assume depth from bottom of gravel fill to water table; ft	3
Multiple drain field horizontal separation, [Min 10 ft]; ft	10
Required Soil Absorption Factor for OWTS in Class I Aquifer; gal/acre	2,250
Current MLA acreage; acres	15,353
IBB Lease Area; acres	777
Project Site; MLA Less IBB Lease Area; acres	14,576
Allowable Effluent Subsurface Disposal; gal	32,796,000

Domestic Wastewater Flows (Average day)	
Operation Personnel [Resident]; gpd	0
Operation Personnel (Non-Resident); gpd	2,850
Training Personnel; gpd	75,000
Training Personnel [Surge]; gpd	75,000
Training Scenario 1: No Training; gpd	2,850
Training Scenario 2: Typical Training; gpd	77,850
Training Scenario 3: Surge Training; gpd	152,850
Industrial Wastewater Flows	
Air Conditioning; gpd	32,202
Vehicle Wash Platform; gpd	12,000
Total Flow; gpd	44,202
Design Average Wastewater Flow	
Training Scenario 1: No Training; gpd	47,052
Training Scenario 2: Typical Training; gpd	122,052
Training Scenario 3: Surge Training; gpd	197,052
Design Peak Day Wastewater Flows	
Training Scenario 1: No Training; gpd	51,327
Training Scenario 2: Typical Training; gpd	238,827
Training Scenario 3: Surge Training; gpd	426,327
Design Peak Hour Wastewater Flows	
Training Scenario 1: No Training; gpd	58,452
Training Scenario 2: Typical Training; gpd	402,312
Training Scenario 3: Surge Training; gpd	655,602

Treatment System	
Large Septic System	Not compatible, since estimated flows greater than 15,000 gpd
Packaged Treatment Plant	Multiple modules to handle the estimated range of flows with flow equalization
Flow Equalization	
Assume storage requirement	3
Volume to Store in excess of Average Day Flow = Qp * (1d) - QA * (1d); gal.	229,275
Volume with 15% Safety Factor	263,666
Design Volume; CF	270,000
Design Volume; CF	36,094
Side Water Depth; ft	10
Free Board; ft	3
Number of Tanks	2
Area; SF	1,805
L/W Ratio	1.50
Length; ft	52
Width; ft	35
Number of Treatment Modules	
Needs to handle QA + Pump Out Rate of Equalization Tank	
Module Max day capacity per module; gpd/module	92,500
Volume storage in Equalization Tank (day)	3
Pump-out Rate = Equalization Tank Volume/ (3d); gpd (lpd)	88,000
Number of Modules = (QA + Pump-out Rate)/(Capacity per module)	3.1
Design Number of Module	4
Influent Loading	
Per Capita Contributions	
BOD (lbs/cap/day)	0.17
SS (lbs/cap/day)	0.20
Conversion Factor	8.34
Flow Scenario 1	
Population	95
Average Flow; gpd	2,850
BOD (lbs/day)	16
SS (lbs/day)	19
BOD (mg/L)	679
SS (mg/L)	799
Flow Scenario 2	
Population	1,595
Average Flow; gpd	77,850
BOD (lbs/day)	271
SS (lbs/day)	319
BOD (mg/L)	418
SS (mg/L)	491
Flow Scenario 3	
Population	3,095
Average Flow; gpd	152,850
BOD (lbs/day)	526
SS (lbs/day)	619
BOD (mg/L)	413
SS (mg/L)	486

Disposal, Leaching Field Sizing (Flow Scenario 3)	
Average Day Flow; gpd; 1.5 times Flow Scenario 3	285,052
Area Required; SF	219,271
Assumed Soil Absorption Area Reduction	0%
Design Area; SF	219,271
Assumed number of drain lines	7
Assumed width of drain field; ft	42
Assumed length of drain field; ft	60
Calculate number of drain fields	87
Number of drain fields along contour (columns)	10
Number of drain fields down-gradient (rows)	9
Total width of drain area (Assume 10 ft offset); ft	530
Total drain area length; Assume 14 ft offset at lower elevation; ft	680
Total drain area; SF	360,400
Septage Flows	
Max. Training Population, 3,000 @ 2.4 gpd	7,200
Septage Aeration Tank	
Volume with 20% Safety Factor	9,000
Volume; CF	1,203
Side Water Depth; ft	7
Free Board; ft	3
Area; SF	172
L/W Ratio	2
Length; ft	19
Width; ft	9

Wastewater Flow Calculations and Estimates for the Munitions Storage Area (Tinian)

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	No municipal collection system to tie into.
Treatment and Disposal	No centralized municipal system; Packaged WWTP at Tinian Dynasty Hotel and Casino, most existing buildings on septic/leaching field systems.
Wastewater Sources	
MSA	Domestic: Restrooms and janitor closet for 2 facilities (toilets, water closet); Industrial: None.
Design Population	
Training Personnel (Non-resident, Off-Post Military)	20
Base Camp Design Maximum	20
Domestic Wastewater Allowances (UFC 3-240-02, 1 Nov. 2012)	
Nonresident Personnel and Civilian Employees (Permanent), gpd	30
Septic Tank Design (NMIAC 2004)	
Net Volume (Below effluent pipe)	For Average Daily Flows 0<Q≤500 gpd, Net Vol = 750 gallons
	For Average Daily Flows 500<Q≤1,500 gpd, Net Vol = 1.5 * Q
	For Average Daily Flows > 1,500 gpd, Net Vol = 1,125 + 0.75 * Q
Liquid Depth (Bottom of tank to effluent pipe)	5ft < D < 6ft;, Assume 6 ft
Assume a two compartment septic tank	First compartment volume greater than or equal to outlet compartment.
Septic Systems	
In a Class I Recharge Area, Capacity Less than (gpd)	5,000

Leaching Field Design Criteria (NMIAC 2004)	
Assume leaching field is acceptable (meets percolation rates and soil characteristics per WW rules and regulations)	
Soil Absorption Factor; Assume average percolation rate (4 in/hr to 5.99 in/hr) (gpd/SF)	1.3
Number of Drain lines (Max=7, Min=2)	varies
Diameter of drain lines (inch)	4
Length of drain line (Max=54ft, Min=18ft)	varies
Width of drain line (Max=36ft, Min=6ft), depends on number of drain lines	varies
Length of drain field (Max=60ft, Min=24ft)	varies
Width of drain field (Max=42ft, Min=12ft), depends on number of drain lines	varies
Spacing of drain line, center to center (ft)	6
Distance from drain line to edge of drain field (ft)	3
Depth of final cover over drain lines (Max=48in, Min=24in)	36
Depth of gravel under drain line (Min=12in)	18
Depth of gravel above drain line (Max=12in, Min=6in)	12
Size of gravel fill(Max=2.5in, Min=.75in)	2.5
Assume depth from bottom of gravel fill to water table	3
Multiple drain field horizontal separation (Min 10 ft)	10
Domestic Wastewater Flows (Average day)	
Training Personnel (gpd)	600
Industrial Wastewater Flows	
Air Conditioning	3,280
Design Average Wastewater Flow	
Training Personnel (gpd)	3,880
Treatment System	
Septic System	Compatible, since estimated average flows ≤ 5,000 gpd

Septic Tank Design	
Design Average Day Flow (gpd)	3,880
Net Volume (gal)	4,035
Net Volume (CF)	539
Liquid Depth (ft)	5.0
Total Depth-Inside (ft)	6.0
Total Depth-Outside (ft)	7.3
Area Required (SF)	108.0
Inside Width (ft)	8.0
Outside Width (ft)	9.4
Inside Length (ft)	14.0
Outside Length (ft)	15.4
Design Total Volume (gal)	5,000
Outside Area (SF)	144.8
Concrete Volume (CY)	16.0
Disposal, Leaching Field Sizing (Flow Scenario 3)	
Design Average Day Flow (gpd)	3,880
Area Required (SF)	2,985
Design number of drain lines	5
Design width of drain field (ft)	30
Design length of drain field (ft)	60
Design Area	1800
Number of drain fields	3600
Design Number of drain fields	2
Number of drain fields along contour (columns)	1
Number of drain fields down-gradient (rows)	2
Total drain area width (Assume 10-ft offset) (ft)	50
Total drain area length (Assume 14-ft offset at lower elevation) (ft)	162
Total drain area (SF)	8,100

Wastewater Flow Calculations and Estimates for Airport Facilities (Tinian)

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	No municipal collection system to tie into.
Treatment and Disposal	No centralized municipal system; Packaged WWTP at Tinian Dynasty Hotel and Casino, most existing buildings on septic/leaching field systems.
Wastewater Sources	
MSA	Domestic: Restrooms and janitor closet for 2 facilities (toilets, water closet); Industrial: None.
Design Population	
Training Personnel (Non-resident, Off-Post Military)	Accounted for in Base Camp population
Domestic Wastewater Allowances (UFC 3-240-02, 1 Nov. 2012)	
Nonresident Personnel and Civilian Employees (Permanent), gpd	30
Domestic Wastewater Flows (Average day)	
Training Personnel (gpd) - Accounted for in Base Camp Flow Estimate	0
Industrial Wastewater Flows	
Air Conditioning (gpd)	680
Design Average Wastewater Flow	
Additional Industrial for future (gpd)	680
Treatment System	
Tie into Base Camp Wastewater System	

Wastewater Flow Calculations and Estimates for Port Facilities (Tinian)

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	No municipal collection system to tie into.
Treatment and Disposal	No centralized municipal system; Packaged WWTP at Tinian Dynasty Hotel and Casino, most existing buildings on septic/leaching field systems.
Wastewater Sources	
Port	Domestic: Restrooms; Industrial: Maintenance facilities.
Design Population	
Training Personnel (Non-resident, Off-Post Military)	6
Domestic Wastewater Allowances (UFC 3-240-02, 1 Nov. 2012)	
Nonresident Personnel and Civilian Employees (Permanent), gpd	30
Domestic Wastewater Flows (Average day)	
Training Personnel (gpd)	180
Industrial Wastewater Flows	
Air Conditioning	396
Design Average Wastewater Flow	
Port Facilities	576
Holding Tank Design	
Design Days of Storage	5
Net Volume (gal)	2,880
Net Volume (CF)	385
Liquid Depth (ft)	5.0
Total Depth-Inside (ft)	6.0
Total Depth-Outside (ft)	7.3
Area Required (SF)	77.0
Inside Width (ft)	7.0
Outside Width (ft)	8.4
Inside Length (ft)	11.0
Outside Length (ft)	12.4
Design Total Volume (gal)	3500.0
Outside Area (SF)	104.2
Concrete Volume (CY)	13.0

Sedimentation Basin Design	
Daily Volume Discharge from Wash-down area = V_{max}; gal	12,000
Volume = Volume Water + Volume Sediment	5
Assume Freeboard; ft	2
Assume Effective Depth; ft	5
Assume Sediment Depth; ft	2.0
Total Depth (ft)	9.0
Number of Basins; Assume single cell	1
Length:Width Ratio	3.0
Assume Detention Time = T_D; hr	4
Volume = Volume Water + Volume Sediment	5
Vehicle Wash Volume	
V_{max}; CF	1,604
Sediment Volume	
Number of Military Training Vehicles	124
Soiling Rate (Assume Wheeled Vehicles, average light soiling); CF/vehicle	0.5
Number of Washes per year (2 wash, per 2 week cycle at 20 weeks of training)	20
Sediment Volume; CF	1,240
Stormwater Volume	
Rainfall (1-hr duration, 10-year storm, Assume similar to Saipan); in	2.53
Vehicle Wash Area; SF	17,000
Stormwater Volume; CF	3,584
Rainfall (1-hr duration, 10-year storm, Assume similar to Saipan); in	4,448
Volume = Vmax * TD + Vsed; CF	
Basin Sizing	
Basin Area = Volume/(Effective Depth+Sediment Depth); SF	635
Width; ft	15.0
Length; ft	45.0
Total Volume; CF	6075.0
Equalization Basin Design	
Assume Freeboard; ft	3
Assume Effective Depth; ft	5
Assume Dead Storage; ft	2
Assume Sediment Depth; ft	2
Total Depth (ft)	12
Number of Basins; Assume single cell	1
Length:Width Ratio	3.0
Volume = Vmax * TD + Vsed; CF	
V_{max}; gal	
V_{max}; CF	12,000
Factor of Safety (FS)	1,604
V_{max} * FS; CF	2
Basin Sizing	
Basin Bottom Area = Volume/Effective Depth; SF	
Bottom Length and Width; ft	642
Top Length and Width;	25.3
Slant Side; ft	30
Total Volume	19

Intermittent Sand Filter System	
Assume V_{max}; for peak use; gpd	12,000
Factor of Safety (FS)	2
Design V_{max}; for peak use; gpd	24,000
Assume Loading rate; gal per acre per day	650,000
Total Filter Surface Area; acre	0.26
Assume number of filters	2
Assume number of cells per filter	4
Cell size; acres/cell	0.03
Dosing Frequency = 1 cell per 8 hour or 1 of 8 cells dosed every hour.	
Assume dosing rate; gpm per 1000 SF filter surface area	150
Dosing Rate; gpm	211.1
Assume pumping time; min	30
Volume of dose; gal	6,333
Total Filter Area; SF	5,629
Total Filter Width; ft	61
Total Filter Length; ft	92
Single Filter Area; SF	2,815
Single Filter Width; ft	43
Single Filter Length; ft	65
Assume depth of filter; ft	4.5
Water Supply/Recycle Basin	
Assume V_{max}; for peak use; gpd	12,000
Factor of Safety (FS)	2
Design V_{max}; for peak use; CF	3,208
Assume Freeboard; ft	3
Assume Effective Depth; ft	5
Assume Dead Storage; ft	2
Assume Sediment Depth; ft	0
Total Depth; ft	10
Basin Sizing	
Basin Bottom Area = Volume/Effective Depth; SF	642
Bottom Length and Width; ft	25.3
Top Length and Width; ft	30
Slant Side; ft	16
Total Volume; CF	7,766

Wastewater Flow Calculations and Estimates for Off Base Housing

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	No municipal collection system to tie into.
Treatment and Disposal	Individual Wastewater Disposal Systems; WWTP at Tinian Dynasty Hotel and Casino
Wastewater Sources	
Tinian Rental Properties	Domestic: Portable Toilets
Dwelling units	Domestic: Apartment Units (showers, toilets, water closets)
Design Population	
Construction Workers (Temporary, Non-resident)	548
Construction Managers (Temporary, Non-resident)	23
Construction Manager Dependents (Temporary, Resident)	26
Operation Workers (Tinian Resident)	8
Operation Workers (Off-island)	87
Operation Worker Dependents (Off-island)	155
Domestic Wastewater Allowances (UFC 3-240-02, 1 Nov. 2012)	
Military Installations (Permanent), gpd	100
EM Barracks (Permanent)/Military Training Camps (Field), gpd	50
Septic Tank Design (CNMI WW Rules and Regulations)	
Net Volume (Below effluent pipe)	For Average Daily Flows 0<Q≤500 gpd, Net Vol = 750 gallons
	For Average Daily Flows 500<Q≤1,500 gpd, Net Vol = 1.5 * Q
	For Average Daily Flows > 1,500 gpd, Net Vol = 1,125 + 0.75 * Q
Liquid Depth (Bottom of tank to effluent pipe)	5ft < D < 6ft;, Assume 6 ft
Assume a two compartment septic tank	First compartment volume greater than or equal to outlet compartment.
Septic Systems	
Typical large septic tank/leaching field systems flow range, gpd	10,000 to 15,000
Capacity Limit when located on Class I Recharge Area, gpd	5,000

Leaching Field Design Criteria (CNMI WW Rules and Regulations)	
Assume leaching field is acceptable (meets percolation rates and soil characteristics per CNMI WW rules and regulations)	
Soil Absorption Factor; Assume average percolation rate (4 in/hr to 5.99 in/hr) (gpd/SF)	1.3
Required Soil Absorption Factor for OWTS in Class I Aquifer(gal/acre)	2250
Number of Drain lines (Max=7, Min=2)	7
Diameter of drain lines (inch)	4
Length of drain line (Max=54ft, Min=18ft)	varies
Width of drain line (Max=36ft, Min=6ft), depends on number of drain lines	varies
Length of drain field (Max=60ft, Min=24ft)	varies
Width of drain field (Max=42ft, Min=12ft), depends on number of drain lines	varies
Spacing of drain line, center to center (ft)	6
Distance from drain line to edge of drain field (ft)	3
Depth of final cover over drain lines (Max=48in, Min=24in)	36
Depth of gravel under drain line (Min=12in)	18
Depth of gravel above drain line (Max=12in, Min=6in)	12
Size of gravel fill(Max=2.5in, Min=.75in)	2.5
Assume depth from bottom of gravel fill to water table	3
Multiple drain field horizontal separation (Min 10 ft)	10
Domestic Wastewater Flows (Average day, gpd)	
Rental Properties (Total)	29,100
Dwelling units	27,400
Industrial Wastewater Flows (gpd)	
Rental Properties (Total)	0
Dwelling units	0
Design Average Wastewater Flow	
Rental Properties (Total)	29,100
Dwelling units	27,400
Treatment System for Rental Properties	
Assume each rental property has an IWDS	

Treatment System for Dwelling units	
Dwelling units at Tinian Dynasty Hotel and Casino; Additional Flow to existing OWTS, gpd	27,400
Disposal for Dwelling units, Leaching Field Sizing; Option 3	
Design Average Day Flow (gpd)	27,400
	Utilize existing leaching field system

Wastewater Flow Calculations and Estimates for Pagan

Givens and Assumptions	***Description***
Existing Wastewater System	
Collection	None
Treatment and Disposal	None
Wastewater Sources	
Bivouac Area	A bivouac area, but minimal or no permanent buildings, located south of runway.
Biosecurity inspection/Vehicle washdown	Assumed no washdown is required.
Design Population	
Permanent Personnel	0
Minimum Training Personnel	300
Maximum Training Personnel	3,000
Surge Training Personnel Surge (Large Force Exercises)	1,000
Base Camp Design Maximum	4,000
Portable Toilet Usage	
Population	400
Daily wastewater volume (gal)	950
Wastewater unit flow; gpcd	2.4
Toilet Ratio (Base Camp Operations Workbook)	
Toilets (Range toilet/population = 1:20 - 1:10)	20
Design number of toilets	200
Industrial Wastewater Allowances	
None anticipated.	0
Domestic Wastewater Flows (Average day)	
Resident Personnel	0
Minimum Training Personnel	720
Maximum Training Personnel	7,200
Base Camp Design Maximum	9,600

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